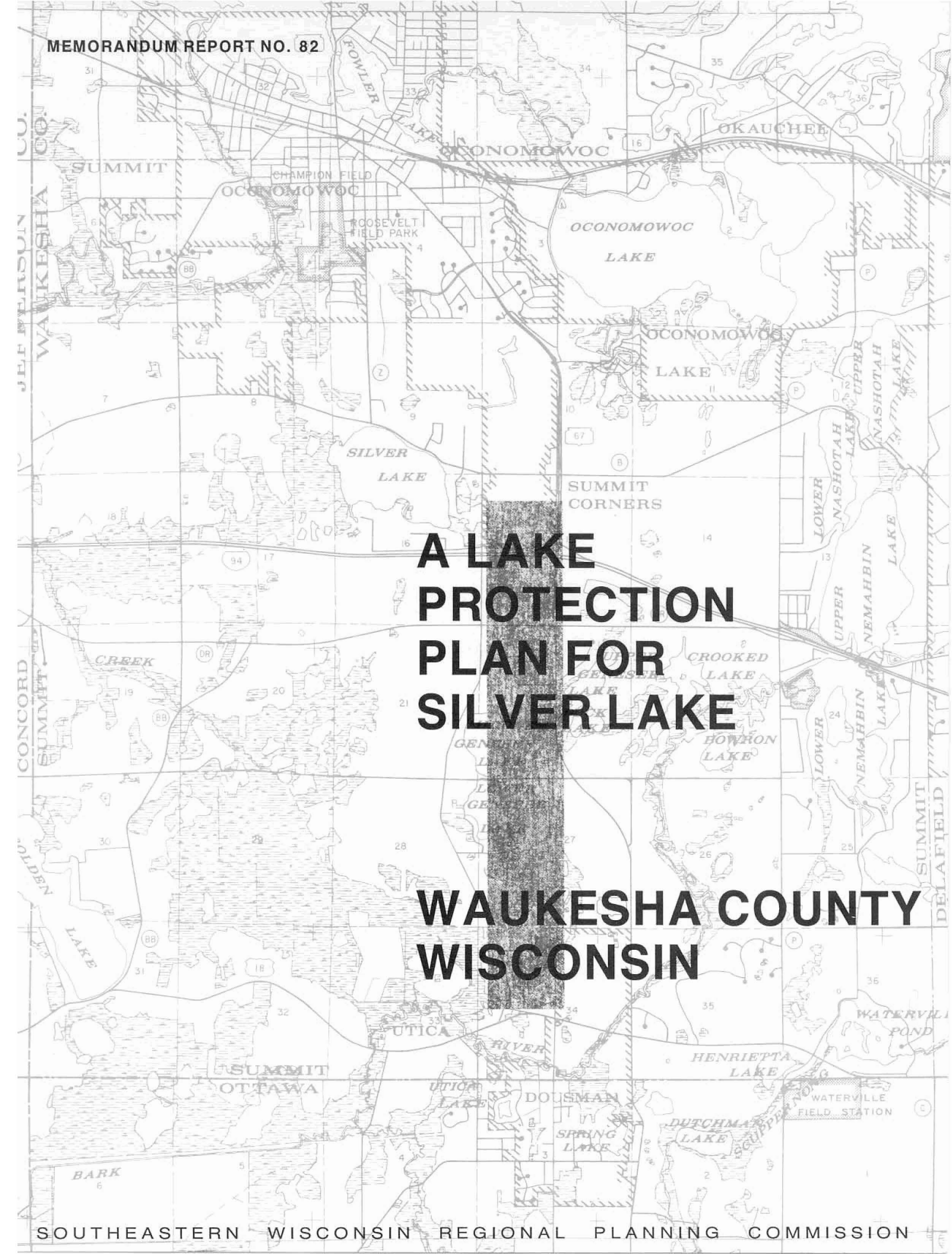
MEMORANDUM REPORT NO. 82



A LAKE PROTECTION PLAN FOR SILVER LAKE

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Special acknowledgement is due Dr. Jeffrey A. Thornton, SEWRPC Principal Planner, Mr. Donald M. Reed, SEWRPC Chief Biologist, Ms. Rachel E. Lang, SEWRPC Senior Specialist-Biologist, Ms. Tiffany G. Lyden, SEWRPC Research Analyst, and Mr. Brian T. Kempka, Mr. Kenneth J. Lovelett, and Mr. Edward J. Schmidt, SEWRPC Research Aids, for their contributions to the conduct of this study and the preparation of this report.

MEMORANDUM REPORT
NUMBER 82

A LAKE PROTECTION PLAN FOR SILVER LAKE
WAUKESHA COUNTY, WISCONSIN

Prepared by the

Southeastern Wisconsin Regional Planning Commission
for
the Town of Summit and
the Silver Lake Environmental Association, Inc.

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July 1993

Inside Region	$ 5.00
Outside Region	$10.00

A LAKE PROTECTION PLAN FOR SILVER LAKE,
WAUKESHA COUNTY, WISCONSIN

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A LAKE PROTECTION PLAN FOR SILVER LAKE, WAUKESHA COUNTY, WISCONSIN

INTRODUCTION

Silver Lake, located in the Town of Summit, Waukesha County, Wisconsin, is a valuable ecological resource offering a variety of recreational and visual opportunities to the community and its visitors. The lake is an integral part of this lake-oriented community. Unfortunately, the recreational and visual value of the lake is perceived to be adversely affected by rapid urban growth in the Silver Lake watershed and by increased lake usage. There is a potential for water quality degradation to occur in this waterbody as a result of increasing demand for high quality recreational and residential experiences in the area.

Seeking to improve the usability of Silver Lake, and to prevent deterioration of the natural assets and recreational potential of Silver Lake, the residents of the watershed formed the Silver Lake Environmental Association, Inc. in the summer of 1988. Shortly thereafter, the Association began a program of community involvement, education and lake management aimed at maintaining and improving the aspect of this valuable lake. There have been only limited lake management planning activities conducted for the Silver Lake watershed. At present, the management strategy of the Association has been based largely upon the regional water quality management plan[1] and the nonpoint source control plan for the Oconomowoc River watershed.[2]

This lake protection plan represents part of the on-going commitment of the Silver Lake Environmental Association, Inc. and the Town of Summit to sound environmental planning with respect to the Lake. This plan was prepared during 1992-93 by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) at the request of the Town of Summit and the Silver Lake Environmental Association, Inc. The aquatic plant and wetland area survey was conducted by Commission staff during September 1992. Illustrations of some of the major aquatic plant species found are attached hereto as Appendix A. Additional data were supplied from the files of the Wisconsin Department of Natural Resources (DNR) and SEWRPC.

It is important to note that this report does not represent a comprehensive water quality management plan for Silver Lake.[3] Rather, this lake protection plan follows the format adopted by the DNR for aquatic plant management plans pursuant to Chapters NR 103 and NR 107, Wisconsin Administrative Code, supplemented by the inclusion of lake use and land management information and recommendations.

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[1]SEWRPC Planning Report No. 30, A Regional Water Quality Management Plan for Southeastern Wisconsin--2000, 1979.

[2] Wisconsin Department of Natural Resources Publication No. WR-194-86, A Nonpoint Source Control Plan for the Oconomowoc River Priority Watershed Project, March 1986.

[3] An example of a comprehensive lake management plan is SEWRPC Community Assistance Planning Report No. 198, A Management Plan for Wind Lake, Racine County, Wisconsin, December 1991.

However, this plan will form an integral part of any future comprehensive lake management plan devised for Silver Lake. A comprehensive lake management plan for Silver Lake will also require that additional water quality and biological data collection and analysis, as well as a more detailed assessment of the lake watershed characteristics, than is required for the preparation of this lake protection plan alone. Only after such a complete inventory and analysis can a comprehensive lake management plan be prepared which specifies the land use, pollution control and in-lake management techniques needed to protect or enhance lake water quality. In contrast, the scope of this report is limited to a consideration of those management measures which can be effective in the protection of lake water quality and/or will directly affect the use of Silver Lake, and which can be readily undertaken by the Town of Summit in concert with the lake association and riparian residents.

This plan is comprised of six main sections: 1) a statement of planning goals and objectives; 2) a description of the lake and its watershed; 3) a statement of the current use problems and the need for a lake protection plan for Silver Lake; 4) a statement of the actions previously taken to manage Silver Lake; 5) an evaluation of alternative means of future lake management and a selected plan; and 6) a description of the recommended plan and the recommended means of implementing and evaluating the plan.

STATEMENT OF LAKE PROTECTION GOALS AND OBJECTIVES

The lake protection goals and objectives for Silver Lake were developed in consultation with the Town of Summit and Silver Lake Environmental Association, Inc. The goals and objectives are:

- to 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 the vegetation, fishery and wildlife populations in and around Silver Lake;

- to promote a quality, water-based experience for residents and visitors to Silver Lake consistent with the policies and objectives of the Wisconsin Department of Natural Resources;

- to manage the lakes in an environmentally sound manner, pursuant to the standards and requirements set forth in Administrative Codes NR 103, Water Quality Standards for Wetlands, and NR 107, Aquatic Plant Management, to preserve and enhance its water quality and biotic communities, their habitats, and essential structure and function in the waterbody and adjacent areas; and,

- to effectively control the quantity and density of aquatic plant growth in portions of the Silver Lake basin to better facilitate the conduct of water-related recreation, improve the aesthetic value of the resource to the communities, and enhance the resource value of the waterbody.

EXISTING CONDITIONS IN SILVER LAKE AND ITS WATERSHED

Physical Characteristics

Watershed Characteristics: Silver Lake is located immediately west of the unincorporated hamlet of Summit Corners in the Town of Summit, Waukesha County,

as shown on Map 1. The Lake is a seepage lake, located on the eastern edge of an extensive system of wetlands draining westerly to Battle Creek and then to the Oconomowoc River. The direct tributary drainage area of Silver Lake, situated wholly within Waukesha County, is approximately 1,276 acres as set forth in Table 1. The surrounding land uses in this area are primarily urban or urbanizing in the areas north, east and south of the lake, with the balance being natural areas--wetlands, woodlands and other open lands. Lake-oriented urban residential lands, the City of Oconomowoc Corporate Center--a commerce and industrial park-- and adjacent industrial lands, and transportation and utility corridors, including the I-94 and STH 67 corridors, are the principle urban features of the Silver Lake watershed (Table 1).

Waterbody Characteristics: Silver Lake is a 222-acre waterbody, the hydrographical characteristics of which are set forth in Table 2. The Lake is a seepage lake, roughly oval in aspect, having two well-defined "deep holes" in excess of 35 feet. The two basins are situated east of center and are separated by a narrow ridge at a depth of about 30 feet. This waterbody has a maximum depth of about 44 feet, a mean depth of 31.5 feet, and a volume of 6,993 acre-feet. The bathymetric map of the lake is shown as Map 2.

Aquatic Plant Distribution and Management Areas

A survey of plant species in the lake basin was conducted by staff of the Southeastern Wisconsin Regional Planning Commission during September 1992. The results of this survey are presented in Table 3, and graphically depicted in Map 3.[4] The flora of the main lake basin was relatively impoverished compared with that of the wetlands and shorelands at the eastern, southern and western edges of the lake; the flora of the Lake basin was dominated by the muskgrass, Chara vulgaris, which poses little problem for most recreational uses of the waterbody. The eastern "inflow" region of the lake and western "outflow" wetlands are areas where there is an especially diverse flora. Eurasian water milfoil, Myriophyllum spicatum, was present in the Lake but not widespread, while, in contrast, the purple loosestrife, Lythrum salicaria, was widely distributed throughout the riparian areas. The distributions of both of these plants should be monitored as part of the proposed aquatic plant monitoring program under the DNR Self-help Monitoring Program. These plants are both subject to rapid proliferation in the waters and wetlands of Southeastern Wisconsin and have been known to replace native vegetation in near monotypic stands which reduce the quality of fish and wildlife habitat. Purple Loosestrife is a declared weed in the State of Wisconsin and is subject to an on-going eradication program.

Fisheries, Wildlife and Waterfowl

Silver Lake is well-known for its bass and panfish fishing. The DNR Publication No. FM-800-91, Wisconsin Lakes, 1991, also indicates that northern pike are present. Numerous areas along the less steeply-sloping southern and western shores of the lake present suitable habitats for the spawning of bass and northern pike. Spawning takes place in spring, between the time of the spring thaw and mid-June. Silver Lake also has extensive beds of freshwater clams,

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[4] The distributions of plants in the various communities identified in and around Silver Lake were previously reported in a SEWRPC letter report dated July 20, 1993, and is attached to this report as Appendic C.

Map 1
LOCATION MAP FOR SILVER LAKE

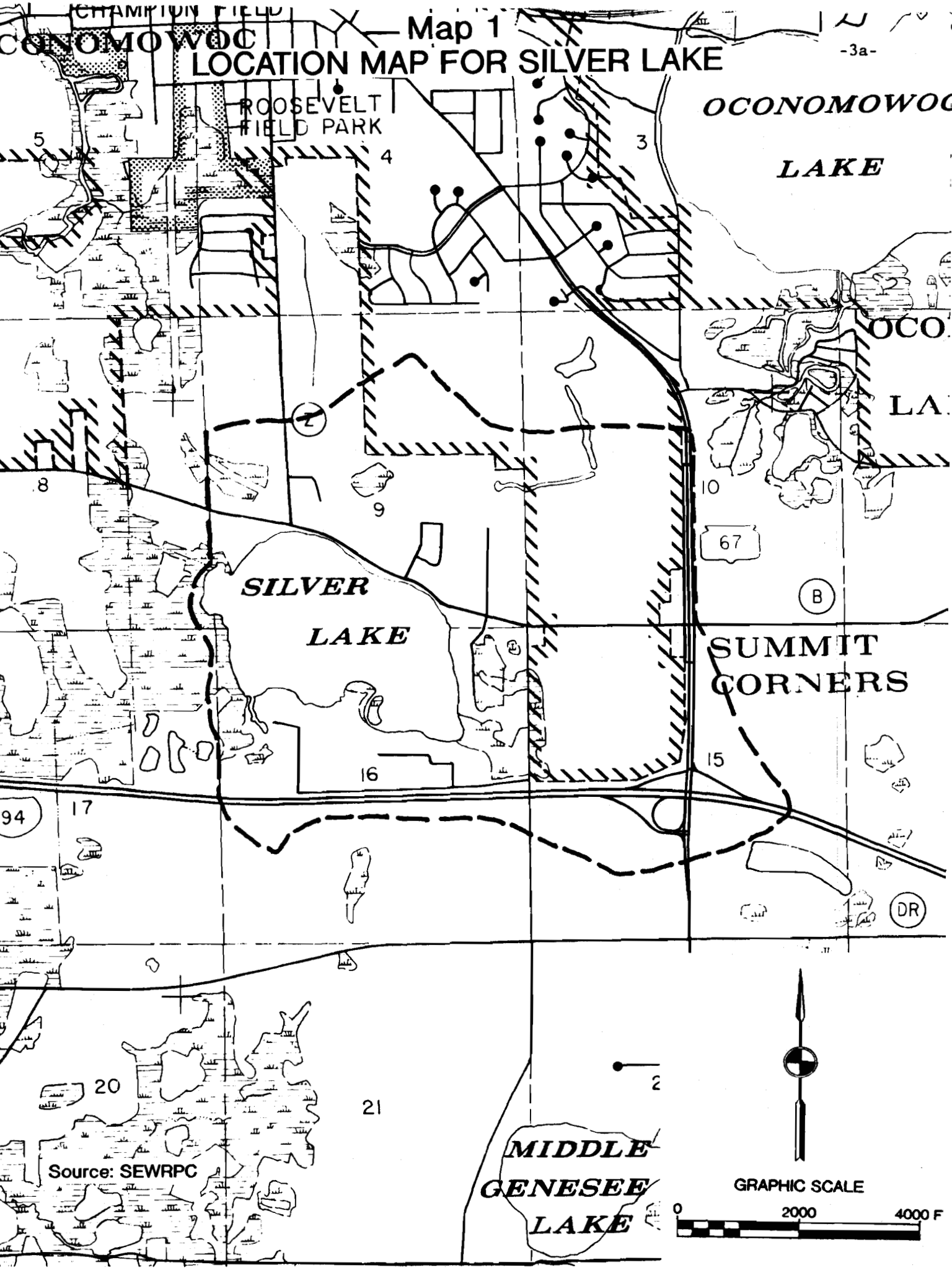

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Table 1

LAND USE IN THE SILVER LAKE DIRECT DRAINAGE AREA

Land Use Category	Direct Drainage Area				
	1990		2010		Percentage Change
	Acres	Percent	Acres	Percent	
URBAN					
Residential	133	10.4	151	11.8	+ 1.4
Commercial	5	0.3	5	0.3	0
Industrial	2	0.2	69	5.4	+ 5.2
Transportation/ Utilities	88	6.9	89	7.0	+ 0.1
General Parking	1	0.1	1	0.1	0
Government/ Institutional	2	0.2	2	0.2	0
Recreational	211	16.5	214	16.7	+ 0.2
Unused Urban	4	0.3	1	0.1	- 0.2
Subtotal	446	34.9	532	41.6	
RURAL					
Agriculture	421	33.0	355	27.8	- 5.2
Woodland	79	6.2	57	4.5	- 1.7
Wetland	75	5.9	79	6.2	+ 0.3
Water	230	18.0	228	17.9	- 0.1
Extractive	0	0	0	0	0
Landfills	0	0	0	0	0
Other Open Lands	25	2.0	25	2.0	0
Subtotal	830	65.1	744	58.4	
Total	1,276	100.0	1,276	100.0	

Source: SEWRPC

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Table 2

HYDROGRAPHIC CHARACTERISTICS OF SILVER LAKE

Parameter	Units
Surface Area	222 acres
Volume	6,992 acre-feet
Maximum Depth	44 feet
Mean Depth	31.5 feet
Direct Watershed Area	1,276 acres

Map 2

BATHYMETRIC MAP OF SILVER LAKE

OCONOMOWOC LAKE

SUMMIT CORNERS

SILVER LAKE

880

890

900

8

9

10

11

15

16

17

P

B

5' 10' 15' 20' 25' 30' 35' 40'

GRAPHIC SCALE

0 1000 2000 FEET

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SILVER LAKE STUDY AREA WAUKESHA COUNTY, WISCONSIN

U.S. PUBLIC LAND SURVEY SECTIONS
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Silvrlk.tb3/jat

Table 3

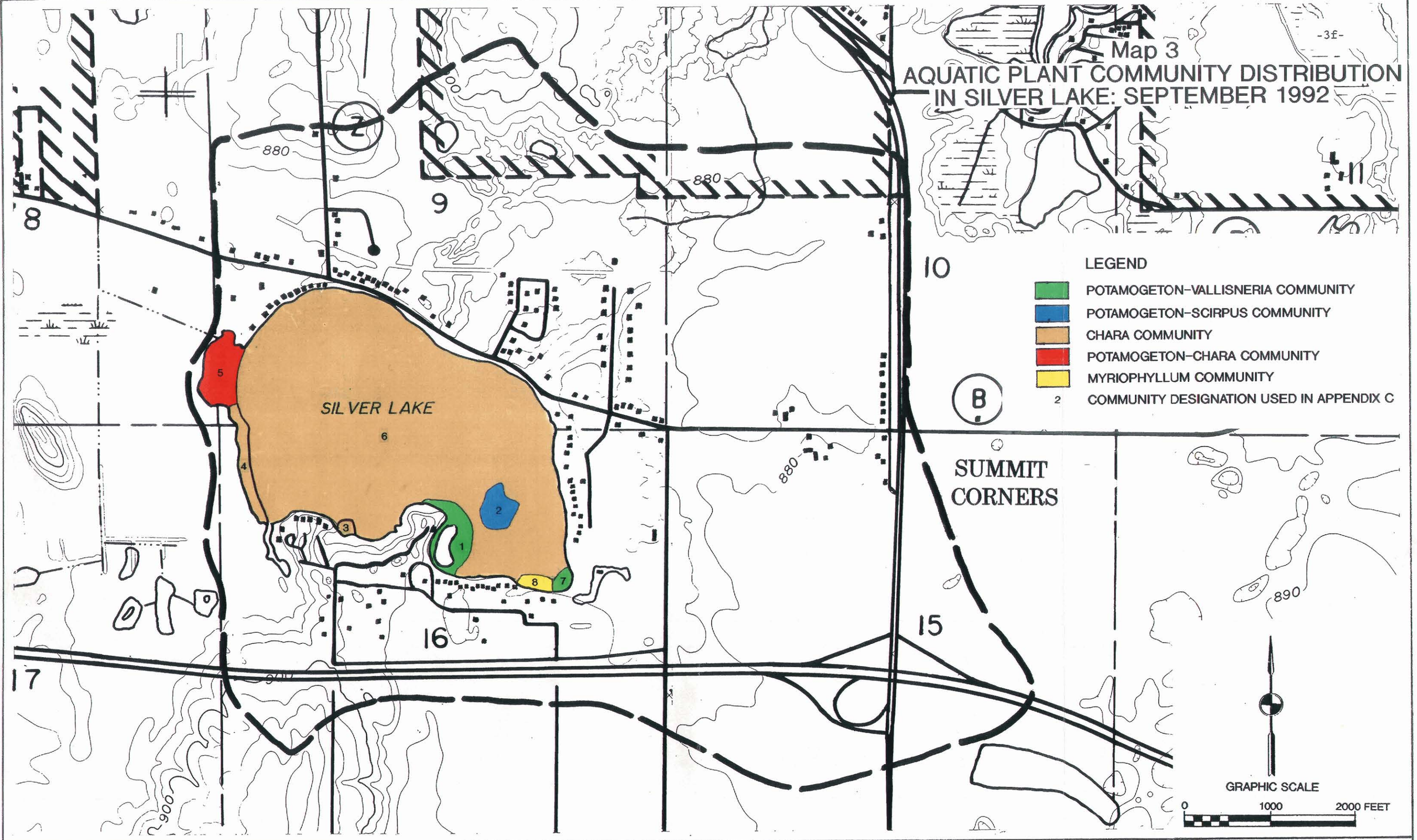
AQUATIC PLANT SPECIES PRESENT IN SILVER LAKE

Aquatic Plant	Number of Sites Where Found[a]
Emergent Vegetation	
Carex comosa (bristly sedge)	1
C. lacustris (lake sedge)	1
Cyperus esculentus (chufa)	1
Iris versicolor (blue flag iris)	1
Lythrum salicaria (purple loosestrife)	3
Ranunculus sp. (buttercup)	1
Rumex orbiculatus (great water dock)	1
Sagittaria latifolia (common arrowhead)	1
Scirpus americanus (chairmaker's rush)	3
S. acutus (hard-stemmed bulrush)	4
Typha angustifolia (narrow-leaved cat-tail)	1
T. latifolia (broad-leaved cat-tail)	3
Submergent Vegetation	
Chara vulgaris (muskgrass)	6
Myriophyllum exalbescens (water milfoil)	2
M. spicatum (Eurasian water milfoil)	1
Najas flexilis (slender naiad)	1
N. marina (bushy pondweed)	3
Polygonum sp. (smartweed)	1
P. amphibium (water knotweed)	1
P. pensylvanicum (pinkweed)	1
P. sagittatum (arrow-leaved tear-thumb)	1
Potamogeton sp. (pondweed)	1
P. crispus (curly leaf pondweed)	3
P. gramineus (grass-leaved pondweed)	2
P. natans (floating leaf pondweed)	4
P. zosteriformis (flatstem pondweed)	2
Vallisneria americana (wild celery)	2
Floating-leaved Vegetation	
Nuphar variegatum (yellow water lily)	2
Nymphaea tuberosa (white water lily)	3

[a]Seven plant communities were identified within Silver Lake; the number of occurrences refers to the number of communities in which a particular species occurred.

Source: SEWRPC

Map 3
AQUATIC PLANT COMMUNITY DISTRIBUTION IN SILVER LAKE: SEPTEMBER 1992



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especially along the shallow western edge of the lake. These beds appear to have been subject to degradation possibly as the result of nearshore boat traffic resuspending calcium carbonate--or marl--which accumulates along this shore and re-depositing this flocculent on the clam beds. This deposition of fine material on the clam beds can suffocate the animals.

Given the urban nature of much of the lake's shorelands, only urban tolerant animal species, such as raccoons and cottontail rabbits, and limited numbers of waterfowl generally inhabit these areas. A somewhat more diverse animal community and greater number of waterfowl make use of the wetland areas adjacent to the southern and western shores of the Lake. There is significant Class I or high quality and Class II or good quality wildlife habitat in this area of the watershed.

Recreation

Silver Lake is a multi-purpose waterbody serving all forms of recreation, including boating, water-skiing, swimming, and fishing during the summer months and ice-fishing during the winter. The lake is used year-round as a visual amenity--walking, bird-watching and picnicking being popular passive recreational uses of the waterbody.

There are several private recreational facilities on Silver Lake, as well as a public beach. A public boat launch is proposed for the lake. A non-profit organization maintains a summer camp on the southern shore of the Lake, while other amenities are provided by the private sector along the northern shore. The public beach is located on the northern shore of the Lake on the south side of CTH B. Several local retail outlets exist in close proximity to the Lake. A number of these local retailers specialize in sporting goods, including angling and boating supplies, and cater to the needs of lake users.

Local Ordinances

Silver Lake is subject to a boating ordinance promulgated by the Town of Summit (Appendix B). This ordinance provides generally applicable rules regulating motorboat use and operation on the waters of Silver Lake. These rules limit the times during which boats may operate on Silver Lake and allows for the enactment and enforcement of boating restrictions and limitations. The ordinance conforms to State of Wisconsin boating and water safety laws pursuant to Chapters 23, 30 and 159, Wis. Stats.

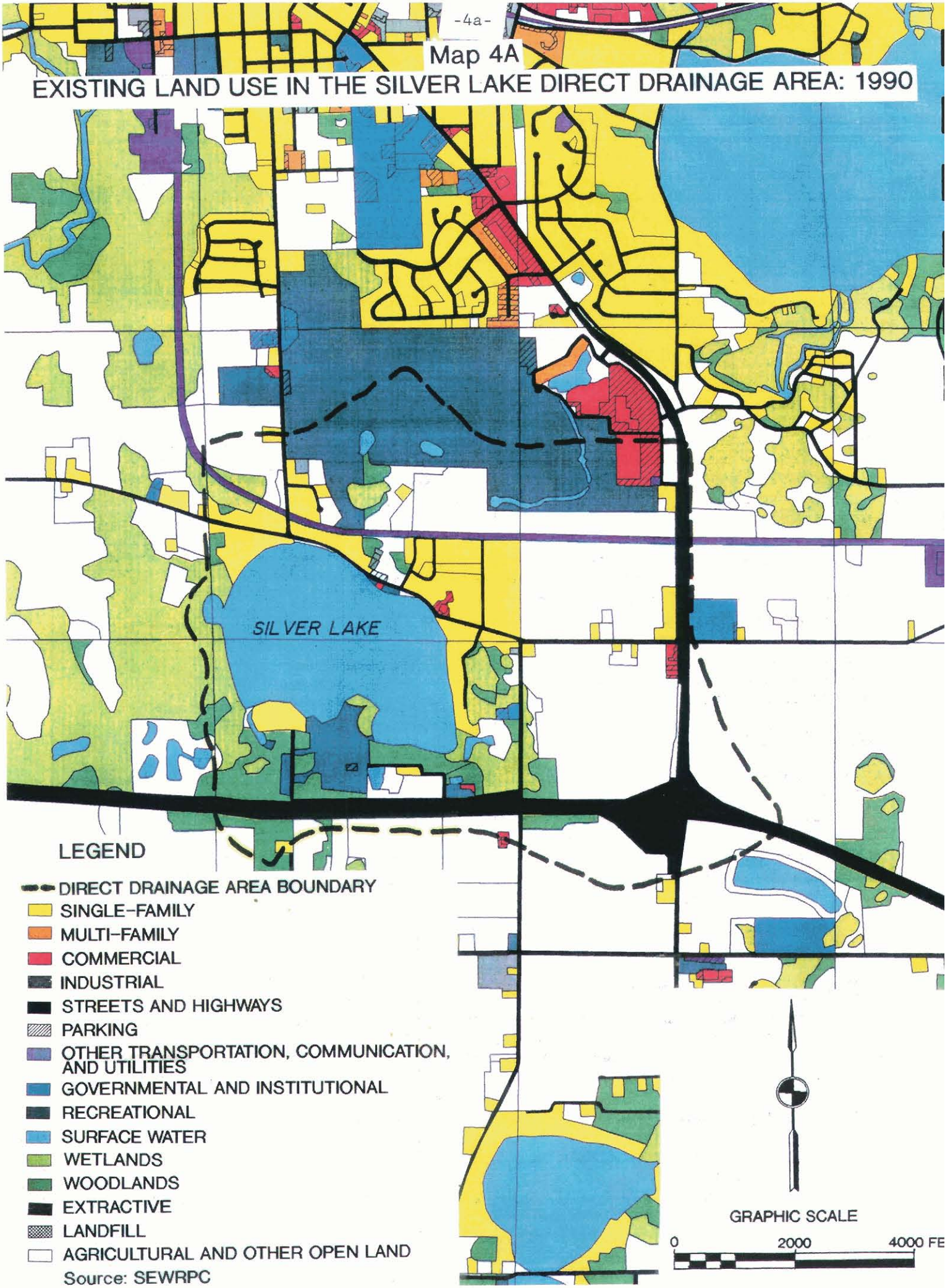
Land Use and Shoreline Development

Public and Private Access: The shoreland of Silver Lake is used for residential development, except for the western shore which is undeveloped wetland and for the private summer camp grounds on the south shore, as shown on Map 4A. A public beach is located on the northern shore of the Lake, together with a privately-owned boat launch and access site. Private access is also provided at an additional site, owned by the non-profit organization, on the southern shore of the Lake. A publicly-owned boat launch and access site has been proposed by the Wisconsin Department of Natural Resources for location on the northeastern shore.

Land Use: As at 1990, and as shown on Map 4A and presented in Table 1, urban land uses occupied about 450 acres, or about 35 percent of the 1,276-acre watershed area of Silver Lake. Approximately 150 acres, or 12 percent, is

Map 4A

EXISTING LAND USE IN THE SILVER LAKE DIRECT DRAINAGE AREA: 1990



occupied by lands designated as environmental corridor including woodlands and wetlands. Surface waters covered a further 18 percent of the watershed area. The riparian residential areas and access sites may be considered to be largely developed with some potential for infilling on a limited number of platted lots. Nevertheless, the CTH B/STH 67/I-94 highway corridor has been identified as a residential and industrial growth axis for the community in the SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin--2010, February 1992. Further residential and industrial expansion in the vicinity of the lake's watershed on the site of the Oconomowoc Corporate Center and the Pabst Farms is now being planned, although the degree of development is yet to be determined. Table 1 sets forth the proposed changes in land use likely to occur in the Silver Lake watershed as presently envisaged in the draft recommended land use plan for the I-94 west corridor being developed as a subregional land use plan designed to refine the regional plan recommendations. This plan is being prepared by SEWRPC in cooperation with the local units of government involved and the Wisconsin Department of Transportation. As can be seen, urban land uses are expected to increase from 450 acres in 1990 to about 530 acres in the year 2010. The major portion of this development is expected to take place with a corresponding loss of rural lands presently under agricultural and woodland uses. The proposed Pabst Farms development will affect only a small portion of the southeastern part of the Silver Lake watershed, east of CTH 67; the majority of the development affecting the watershed will occur in the Oconomowoc Corporate Center and adjacent lands as shown on Map 4B.

Water Quality

Silver Lake has good water quality, being classified as mesotrophic based on Secchi disc transparency measurements made by the Silver Lake Environmental Association, Inc. under the Wisconsin Department of Natural Resources Self-help Monitoring Program. A U.S. Geological Survey water quality investigation is presently underway with the financial assistance of a Chapter NR 119 Lake Management Planning Grant. On-going water quality monitoring is recommended.

Silver Lake and its watershed are part of the recharge area of the deep sandstone aquifer.[5] In addition, shallow aquifer groundwater resources in the watershed are closely inter-related with the surface waters, and sustain lake levels and provide the base flow in the wetlands. Groundwaters are also important sources of water supply, both to the Silver Lake community and throughout the Southeastern Wisconsin Region. The deep sandstone aquifer provides domestic water supplies to several cities and industrial users in Waukesha County and southeastern Wisconsin. Thus, pollution of this aquifer is of great concern and some measure of protection should be given to its recharge zone.

LAKE USE PROBLEMS AND CONCERNS

Although Silver Lake is in good condition and is capable of supporting a wide variety of water uses, there are a number of existing and potential future problems that warrant concern. These problems or issues of concern include the protection of ecologically valuable areas, construction site erosion control,

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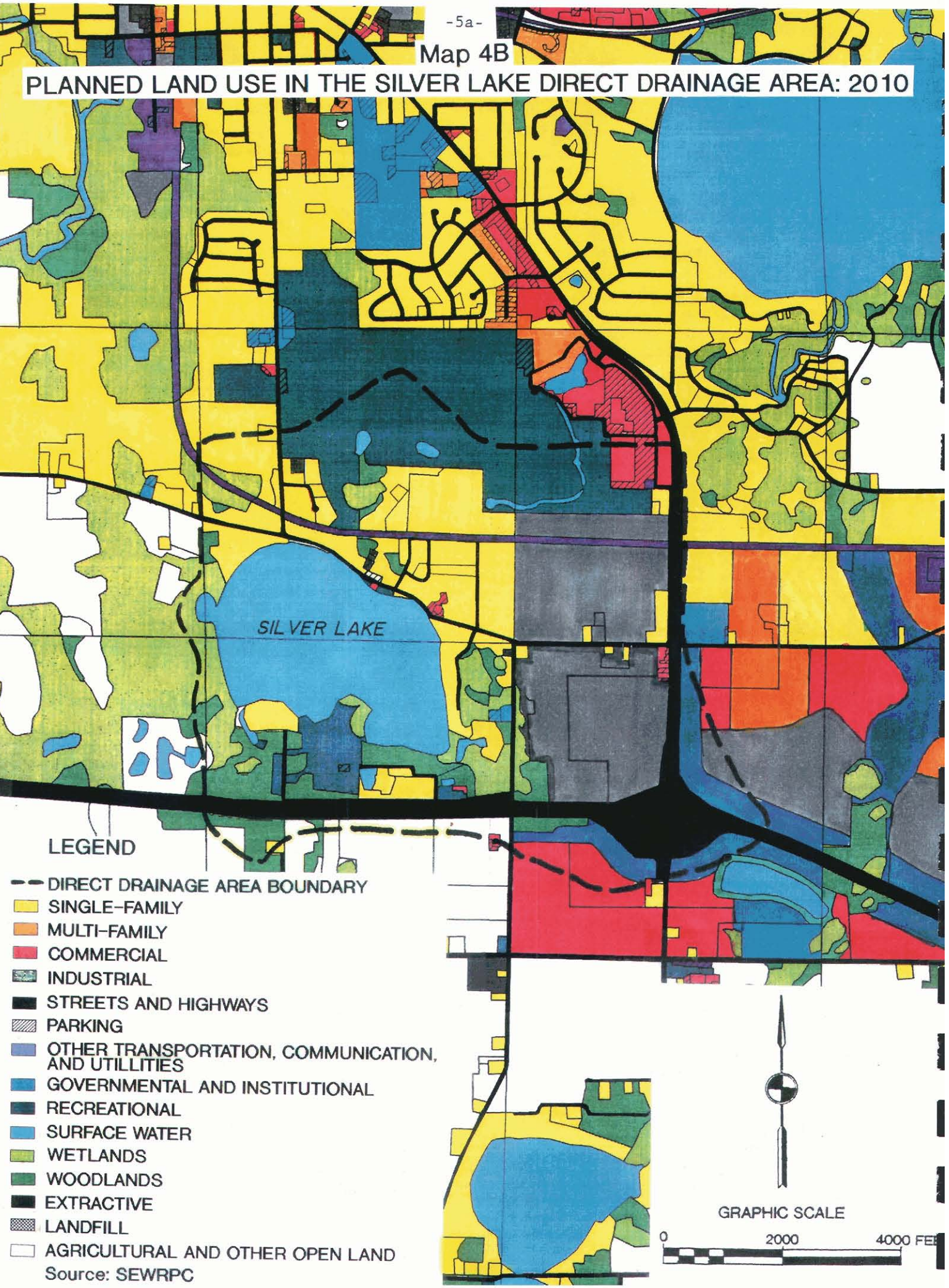
[5] SEWRPC Technical Report No. 16, Digital Computer Model of the Sandstone Aquifer in Southeastern Wisconsin, April 1976; J.B. Gonthier, U.S. Geological Survey and University of Wisconsin Extension Information Circular No. 29, GroundWater Resources of Waukesha County, Wisconsin, October 1975.

Map 4B

PLANNED LAND USE IN THE SILVER LAKE DIRECT DRAINAGE AREA: 2010



stormwater pollution control, wastewater pollution control, boating demands and improved public access to the Lake, and continued protection of the shoreline. Some of these concerns can also affect groundwater quality and the potable water supply used by the Silver Lake residential areas.

Ecologically Valuable Areas

The ecologically valuable areas of Silver Lake and its watershed are shown on Map 5. These areas, identified from the field inventory conducted during September 1992 by Commission staff, include portions of Silver Lake which support important biota or contain valuable habitat such as wetlands which lie adjacent to the Lake, Class I wildlife habitat, and the primary environmental corridors within the Lake's drainage area. Critical sites within the Lake include prime fish spawning habitat, macrophyte beds--especially those containing a diverse native flora, and the shoreline areas supporting productive aquatic habitat--especially the extensive bivalve habitat areas along the western shores of Silver Lake.

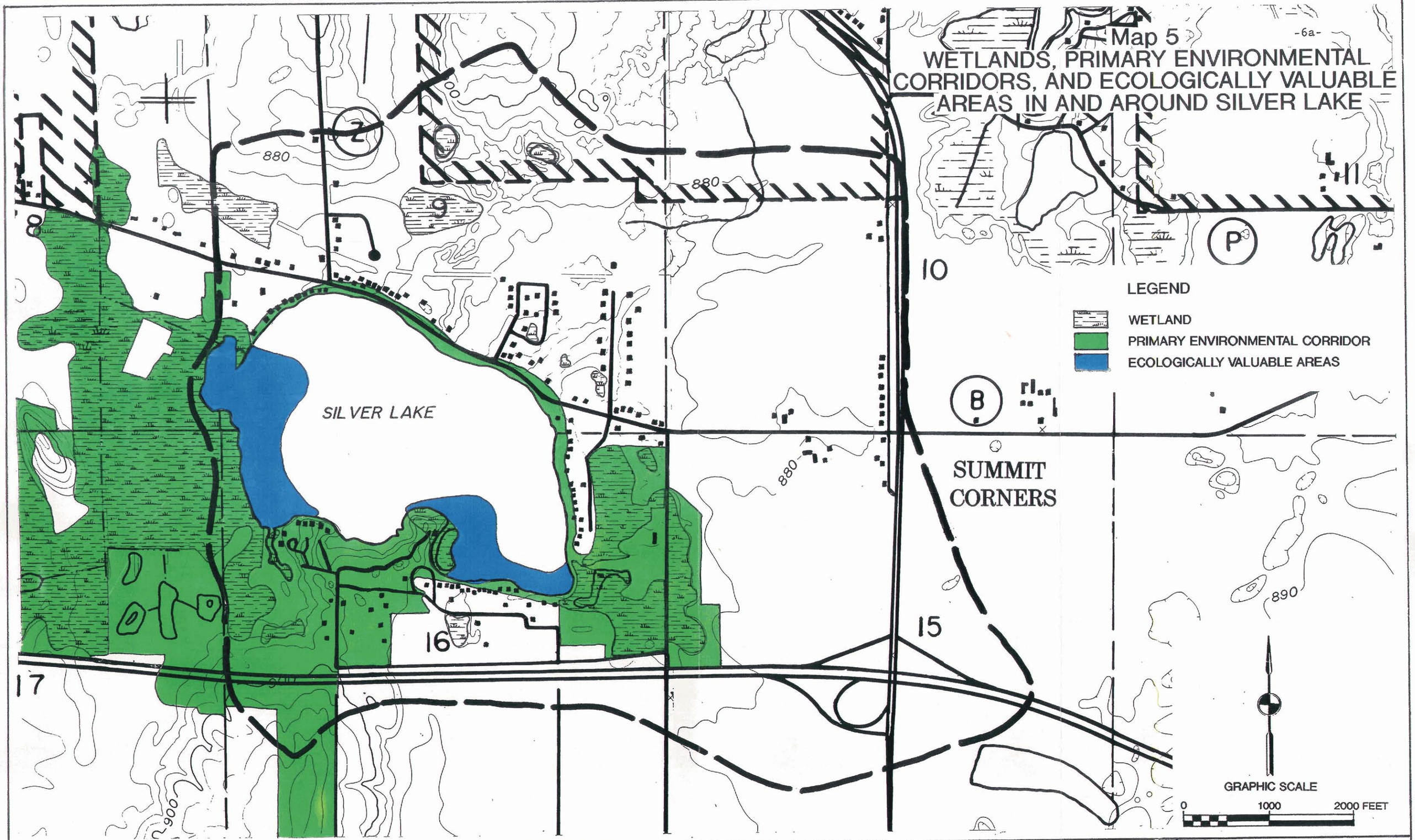
Five wetland areas adjacent to Silver Lake were identified as ecologically valuable; two of these are physically connected to the Lake and provide valuable fish spawning habitat, especially during the early spring. These areas are the small embayment located on the western shore of the Lake--identified as Plant Community Area No. 5 in the Commission's Letter Report dated July 20, 1993; reproduced as Appendix C--and the rather large wetland system at the southeastern corner of the Lake, proximate to the City of Oconomowoc Corporate Center--identified as Plant Community Areas No. 10 and 11. The other wetlands within the watershed but removed from the Lake proper include an extensive wetland area to the north of the Lake--Plant Community Areas Nos. 14, 15, and 16--and two areas to the south, one being directly south of the Lake--Plant Community Area No. 9--and the other at the southwestern corner of the Lake--Plant Community Area Nos. 4 and 8. In addition to providing habitat, these areas also provide the scenic vistas which characterize the ambience of the Silver Lake watershed and serve beneficial environmental purposes as buffers between the rapidly urbanizing lands north and east of the watershed and the Lake. For these reasons, these ecologically valuable areas should be protected from disturbance, degradation and improper use.

The environmental corridors in the Silver Lake drainage area contain the best remaining woodlands, wetlands, and wildlife habitat. The protection of these resources from additional intrusion by incompatible land uses which degrade and destroy the environmental values of these sites, and the preservation of the corridors in an essentially open and natural state, is essential to the maintenance of a high level of environmental quality.

Construction Site Erosion and Stormwater Pollution Control

Erosion from new urban construction in the direct drainage area of Silver Lake is a potential threat to the Lake's water quality. As discussed earlier, the northern and eastern portions of the Lake's watershed are expected to experience significant urban development in the foreseeable future--already there is extensive urban development activity taking place in the City of Oconomowoc Corporate Center and adjacent industrial lands. In the past, adequate erosion controls were not voluntarily employed by developers, with the result that pollutant loadings from these sites during storm events had an apparent, substantial impact on the Lake's environment. Construction site erosion and urban

Map 5
WETLANDS, PRIMARY ENVIRONMENTAL CORRIDORS, AND ECOLOGICALLY VALUABLE AREAS IN AND AROUND SILVER LAKE



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nonpoint source pollutant generation associated with stormwater runoff were noted, along with onsite sewage systems, to be the major nonpoint source contamination problems likely to affect Silver Lake as identified in the regional water quality management plan and the Oconomowoc River nonpoint source priority watershed plan.[6] The Town of Summit does not presently have an erosion control ordinance, although the City and Town of Oconomowoc and Waukesha County do. A model erosion control ordinance has been developed by the League of Wisconsin Municipalities and the Wisconsin Department of Natural Resources.[7]

More recently, nonpoint source pollution control and construction erosion control plans for developments within the Oconomowoc Corporate Center were developed and reviewed by all parties. Initial plans have been revised by the developers as a result of this review process and the final plans are considered to be generally sound. Similar plans have also been prepared for the major industrial development north of the Oconomowoc Corporate Center.

Further recent amendments to the Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1982, and the regulations issued pursuant thereto, have provided that the Wisconsin Department of Natural Resources issue permits for the discharge of runoff from construction sites of five acres in area or larger, industrial sites, and municipal areas under the Wisconsin Pollutant Discharge Elimination System (WPDES). These regulations provide for the issuance of permits based on the establishment and maintenance of a construction erosion control and stormwater management plan by the permit applicants and the regular inspection of the facilities outlined in the plan. The plan must contain (i) a site description; (ii) a description of the appropriate controls and measures that will be performed at the site to prevent the loss of pollutants from the site to the waters of the State; (iii) a description of the interim and permanent stabilization practices and structural practices to limit, store or divert stormwater flows; (iv) a description of such temporary measures as may be needed during the construction process to control pollutant loss and runoff; (v) a statement of the maintenance and management practices to ensure the continued utility of these practices and devices; (vi) a statement concerning the minimization of the loss of solid materials both on and off the site; and (vii) the identification of the contractors and sub-contractors responsible for the installation and maintenance of the stormwater management measures contained within the plan.[8] These planning and permitting requirements are applicable in the Silver Lake watershed. Such plans have been developed for the recent major developments in the watershed and specifically approved by the Wisconsin Department of Natural Resources. However, currently there is typically no specific review of such plans for most projects provided at this time.

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[6]Wisconsin Department of Natural Resources Publication No. WR-194-86, A Nonpoint Source Control Plan for the Oconomowoc River Priority Watershed Project, March 1986.

[7]See Wisconsin Department of Natural Resources Publication No. WR-222-92, Wisconsin Construction Site Best Management Practice Handbook, 1992.

[8]Wisconsin Department of Natural Resources Briefing Memo for WPDES Permit No. WI-0067821-1, Construction Site Erosion Control and Storm Water Management, November 1992; and Wisconsin Department of Natural Resources Briefing Memo for WPDES Permit No. WI-0067849-1, Draft General Permit to Discharge Storm Water Associated with Industrial Activity, November 1992.

Wastewater Pollution Control

Existing and planned urban development areas in the Silver Lake drainage area are included within the City of Oconomowoc Sanitary Sewer Service Area. At present, however, the residential areas around Silver Lake are served by private septic onsite systems. Onsite sewage disposal systems were indicated to be a significant source of phosphorus loading to Silver Lake in the regional water quality management plan. Sanitary sewer service is expected to be provided to the Silver Lake residential areas--along the northern, eastern and southern shores of the lake--by the year 2000 under the current plan.[9] Under this plan, wastewater from the Silver Lake watershed would be conveyed to the City of Oconomowoc sewerage system for treatment and disposal.

Boating Demands and Public Access

Overcrowding and excessive recreational boating use have become major problems on many lakes in southeastern Wisconsin, especially those offering high quality recreational opportunities within a one- to two-hour drive of the Chicago-Milwaukee metroplex. Given the location and good water quality of Silver Lake, recreational and boating uses of the lake can only be expected to increase substantially in the near future.

Use of the lake by boat traffic can be expected to increase with the construction of a public boating access facility on the Lake in the near future. Current requirements contained in Section NR 1.92 of the Wisconsin Administrative Code mandate a level of access such that public access sites accommodate at least one car-trailer unit for each 10 acres of open water lake surface. Applying this guideline to Silver Lake, twenty-two car-trailer units should be provided. While the actual number of car-trailer units planned for the access site is significantly less--12 units, including one handicapped accessible unit are being planned--even this level of increased lake usage could further impact the ecological structure and functioning of Silver Lake if not managed in such a way as to minimize the anticipated impacts.

Potential ecosystem impacts due to excessive boating activity can include reduced quality of the sportfish resource, due to angling pressures and potential interruption of sportfish spawning patterns due to increased turbidities arising from resuspension of the marl layer on the lake bottom, perhaps leading to the development of stunted populations of panfish and an increase in rough fish abundance through lack of predation. In addition, potential impacts include intensification of the risk of boating accidents associated with the high speed operation of power boats, increased shoreline erosion, and modification of plant community structure due to use-related damages. There is also the increased potential for contamination of the lake waters by motor fuels and lubricants, exhaust fumes, and other substances released from, or exposed on, the lake bottom due to the erosional effects of high speed boat traffic.

Shoreline Protection

Although shoreland erosion is not a major problem on Silver Lake, it is noteworthy that many structures have been built to protect the Lake's shoreline. These

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[9]SEWRPC Community Assistance Planning Report No. 172, Sanitary Sewer Service Area for the City of Oconomowoc and Environs, Waukesha County, Wisconsin, February 1989.

structures, shown on Map 6, were generally well maintained when inspected during July 1993 by Commission staff. However, shoreline erosion could be expected to increase as lake usage increases, and erosion-related problems could worsen in future. While construction of visually-intrusive shoreland protection structures may be considered, other options may be preferred by lake residents seeking to conserve the ambience of Silver Lake. These options are discussed further in a later section of this report.

Groundwater Protection

Domestic water supplies to households at Silver Lake are drawn from both the shallow and the deep groundwater aquifers. Contamination of the aquifers by contaminants leaching into the groundwater from the land surface remains an issue of concern in the area. Measures taken to minimize surface water quality degradation in the Silver Lake watershed should generally also serve to protect the groundwater resources of the watershed from contamination. Conservation of the wetlands and other habitat areas in their natural state, as outlined above, will contribute to the protection of the groundwaters in the Silver Lake watershed.

PAST AND PRESENT LAKE PROTECTION PRACTICES

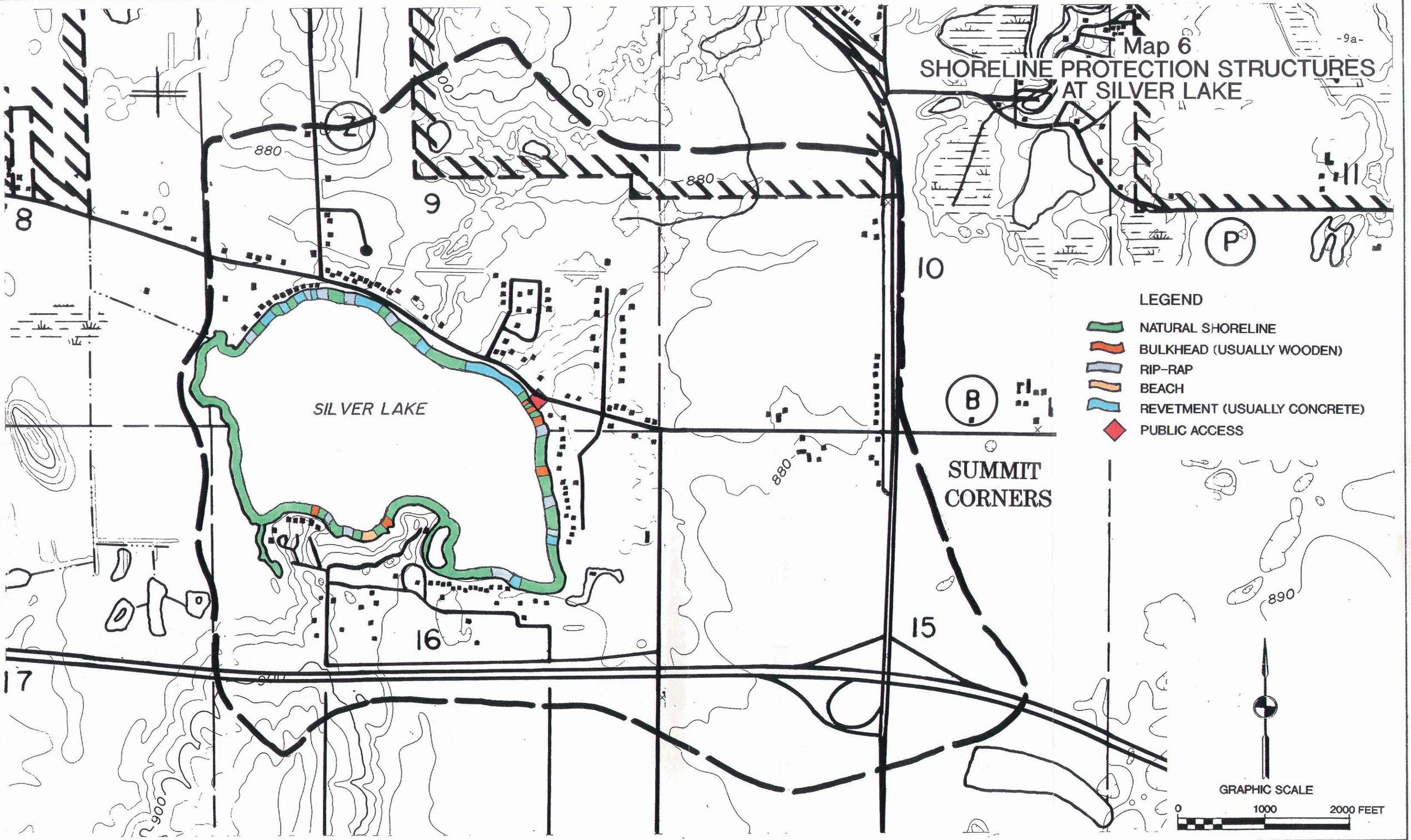
The residents of Silver Lake, in conjunction with the Town of Summit, have long recognized the importance of informed and timely action in the protection of the water quality of Silver Lake. Their initial concern resulted in the formation of the Silver Lake Environmental Association, Inc. which provides the forum for many of the lake management activities of the Lake's residents. To date, the Association undertakes regular water quality measurements under the auspices of the DNR Self-help Monitoring Program. These citizen-based measurements are presently being augmented by a U. S. Geological Survey water quality investigation being conducted through the Chapter NR 119 Lake Management Planning Grant Program. The Town of Summit has received a Phase I Lake Management Planning Grant to cost-share studies of water quality aquatic plant communities in the Silver Lake watershed area and lake protection evaluation studies documented in this report. Both studies will eventually become part of a comprehensive lake management plan for Silver Lake.

ALTERNATIVE LAKE PROTECTION PRACTICES

Background

Silver Lake constitutes a relatively high quality aquatic habitat in close proximity to the Milwaukee conurbation, and as such requires careful and balanced management to prevent degradation of its water quality and the quality of its residential and recreational opportunities. As noted above, the continuing development of the Oconomowoc urban area adjacent to the Lake gives rise to a number of immediate concerns over existing and potential water quality impacts. Alternatives considered to protect or enhance the environmental quality of Silver Lake relate primarily to these concerns and include: the protection of ecologically valuable areas through the promulgation of an amended boating ordinance and the associated ordinance implementation measures or the acquisition of selected lands; the promulgation of construction erosion and stormwater management measures; the provision of a public sanitary sewer system; shoreline erosion protection measures; the provision of public boating access; and the continuation and expansion of public information and participation programs.

Map 6
SHORELINE PROTECTION STRUCTURES AT SILVER LAKE



SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SILVER LAKE STUDY AREA WAUKESHA COUNTY, WISCONSIN

U.S. PUBLIC LAND SURVEY SECTIONS
8-11, 14-17 T 7 N R 17 E
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Ecologically Valuable Areas

Silver Lake and its watershed contain relatively large areas of high quality habitat and wetlands, including significant areas of diverse, native aquatic vegetation suitable for fish spawning. Three options to provide additional protection in this area were considered; 1) promulgation of a more restrictive boating ordinance limiting boating access to specific shallow water areas of the Lake; 2) the establishment of "slow-no-wake" boating areas lying in close proximity of the critical environmental areas; and 3) the purchase of critical properties.

The promulgation of more stringent controls on the use of powered water craft along the shallow southern and western shores of Silver Lake could restrict high speed boat traffic in the areas where severe ecological damage would be likely to occur. These areas would include the clam beds along the western shore, the extensive wetland plant communities of the western embayment, and the extensive aquatic plant communities on the southeastern shore at the "inlet" of the Lake. These controls have the advantage of being inexpensive to promulgate. Control of boat traffic could be effected either within a specified distance of the shoreline--i.e., the "shore zone", within 200 feet of the shoreline, as defined in the DNR boating ordinance guidelines[10] or in specific areas of the lake--"boat excluded areas" or a "motorboat prohibition"--or by limiting the speed at which high speed boat traffic travels in specific areas of the lake--"slow-no-wake" or some other "speed restriction". Boat excluded areas must be designated by approved regulatory markers. The use of boat-excluded areas are preferable to motorboat prohibition areas as the latter can lead to legal challenges based on the right of free use of navigable waters. Similarly, slow-no-wake restrictions are preferable to speed limits designated in miles-per-hour terms.[11] Placement of regulatory markers must conform to Section NR 5.09 of the Wisconsin Administrative Code, and all restrictions placed on the use of the waters of the State must be predicated upon the protection of public health, safety or welfare. Where a boating ordinance is enacted in conformity with State law, it must be clearly posted at public landings in accordance with Section 30.77(4) of the Wisconsin Statutes.

Buoyage can be expensive to obtain, install, and maintain, but has the advantage of being readily visible to recreational boaters. It also clearly demarcates the affected areas. Two options exist; the establishment of regulated areas--the use of control buoys for slow-no-wake or use of prohibition buoys for exclusionary areas--or the enhancement of public awareness. The establishment of slow-no-wake areas within Silver Lake requires promulgation of a boating ordinance, the authorization of the local municipality having jurisdiction over the waters involved, and a DNR permit. Only regulatory markers are enforceable. The buoys used to demarcate regulated areas must be cylindrical in shape, seven or more inches in diameter, and extend 36 or more inches above the waterline. The buoys will be white, with instructions provided in black lettering. Prohibition buoys will display an orange diamond with an orange cross inside, while control buoys will display an orange circle. Alternatively, Chapter 30, Wis. Stats., allows local authorities having jurisdiction over the waters involved to place danger

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[10] Wisconsin Department of Natural Resources, Guidelines: Ordinance Writing and Buoy Placement for Wisconsin Waters, s.d.

[11] Ibid.

buoys or informational buoys without an ordinance, although a DNR permit is still required. Informational buoys are similar in construction to the regulatory buoys, but will contain an orange square on the white background. Informational buoys are not enforceable. Placement of buoys may be cost-shared through grants from the Wisconsin Waterways Commission, administered by the DNR Bureau of Community Assistance.

The purchase of specific critical properties as a means of protecting them from encroachment or further degradation, or as a means of facilitating their rehabilitation and restoration, is possible through the Chapter NR 50/51 Stewardship Grant Program or the Chapter NR 191 Lake Protection Grant Program. Lands that might be considered as being ecologically valuable and having potential water quality benefit for Silver Lake have been identified in the Commission's letter report set forth in Appendix C and are highlighted on Map 7. Outright purchase, or the purchase of conservation easements, are both possible options. Lands proposed for purchase must be appraised using standard governmental land acquisition procedures as established by the DNR, and must be subject to a land management plan setting forth the process and procedures for their long term maintenance and development. Both grant programs provide State cost-share funding for the purchase up to a maximum State share of $100,000. Given that the critical lands identified in the Commission's letter report are zoned conservancy, and hence already protected under this zoning, the protection of all of these lands by purchase or conservation easement may not be essential.

Construction Site Erosion Control and Stormwater Management

As a consequence of regulatory changes arising from the recently promulgated stormwater pollution control regulations, construction site best management practices are now required for all construction sites greater than five acres in areal extent. Related stormwater management provisions also apply to industrial facilities, including manufacturing facilities, hazardous and industrial solid waste disposal facilities, recycling facilities, steam-powered electric generating facilities, mining facilities, bulk storage facilities, and transportation maintenance facilities. Typically, stormwater management practices include both structural--constructed practices such as wet or dry detention basins, grassed buffer strips along waterways, flow barriers and sedimentation ponds--and nonstructural--institutional practices like improved homeowner housekeeping. A description and costs of these practices appears in various publications including recent SEWRPC and DNR reports.[12] Development of an appropriate ordinance would be an initial step toward the control of construction erosion related nonpoint source pollution.

Onsite Sewage Disposal System Control

The existing and planned urban development areas in the Silver Lake drainage area are included in the planned City of Oconomowoc sewer service area as noted above. Provision of a public sewer system with connection to the City's sewerage system will adequately control any pollution presently arising from onsite systems.

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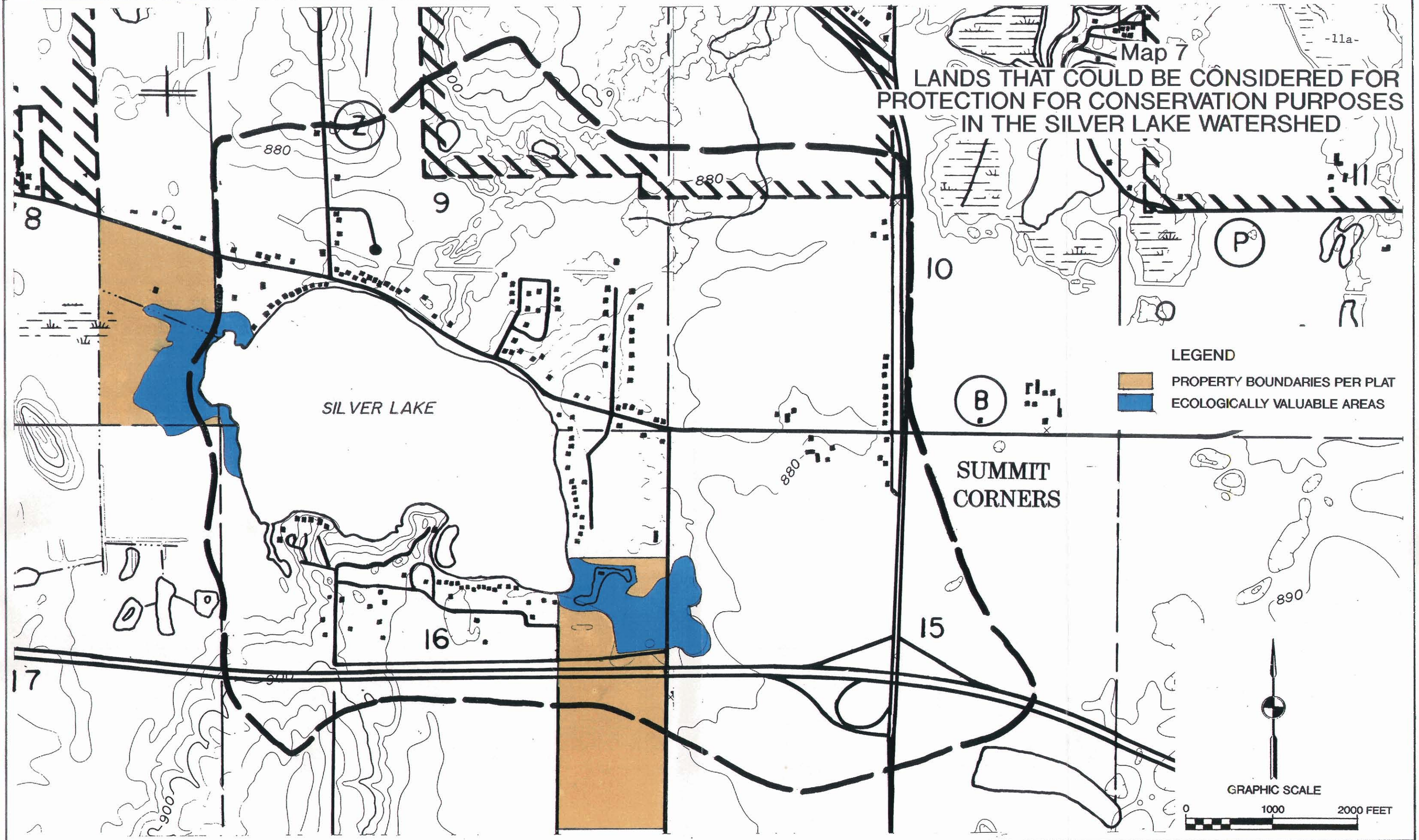
[12]SEWRPC Technical Report No. 31, Costs of Urban Nonpoint Source Water Pollution Control Measures, June 1991; and
DNR, Wisconsin Construction Site Best Management Practices Handbook, April 1989.

Map 7
LANDS THAT COULD BE CONSIDERED FOR PROTECTION FOR CONSERVATION PURPOSES IN THE SILVER LAKE WATERSHED



SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SILVER LAKE STUDY AREA WAUKESHA COUNTY, WISCONSIN

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Boating Demands and Public Access

The DNR has indicated that a public boat launch will be provided at Silver Lake. The public access site will replace the existing privately-owned access site on the northern shore of the lake. Determination of the amount of access that can be accommodated at Silver Lake is dependent on the areal extent of the open water lake surface. Based on existing guidelines set forth in Section NR 1.92, Wisconsin Administrative Code, the number of car-trailer units that could be accommodated at Silver Lake would be on the order of one per ten acres, or 22 car-trailer units. These guidelines are currently under review by the DNR. In terms of the proposed revised guidelines recommended by the Natural Resources Board to the State Legislature, which are presently under consideration, the suggested provision for car-trailer units would be in the range of 7 to 13 at Silver Lake. The twelve units presently being proposed by the DNR, including one handicapped accessible unit, are therefore consistent with both the existing and proposed public access guidelines.

Shoreline Protection

Shoreline protection can be enhanced by providing lakeshore residents with information on the methods of proper construction and maintenance of shoreland protection structures and on the problems commonly associated with such structures. Information on alternative methods of shoreline protections and their costs is commonly available from the Wisconsin Department of Natural Resources, the University of Wisconsin Extension (UWEX), and U.S. Army Corps of Engineers. DNR permits are required for new shore protection structures. That permitting process now limits the types of structures which can be installed. In addition, the promulgation of a boating ordinance should provide a further degree of protection to the shallow areas of the Lake and to the shoreline by limiting boat usage in these areas.

Groundwater Protection

Two options exist relative to the protection of groundwaters; namely, the promulgation of a groundwater protection ordinance limiting certain types of development in the vicinity of the groundwater recharge areas and/or within a selected time-of-travel zone around the various well-points established in the watershed, and the implementation of stormwater and wastewater pollution control practices already discussed. Outright purchase, or the purchase of conservation easements on critical properties, could also be considered.

Public Information

It is the policy of the Town of Summit and the Silver Lake Environmental Association, Inc. to maintain active communication on lake matters with the community. This dialogue is carried out through the medium of the public press and in public forum through various Town Committees, public meetings, and other scheduled hearings. Further, the Association holds regular public meetings and sends a newsletter to electors and riparian property owners. Informational issues identified can be dealt with at subsequent Association meetings or through articles in the Association newsletter. In addition, this plan and its subsequent iterations will be made available for public inspection at the Association's annual meetings.

RECOMMENDED LAKE PROTECTION PLAN

The recommended lake protection plan for Silver Lake provides an overall strategy for accommodating increased demands for new urban development, additional recreational activities, and more public access without damaging the Lake's most valuable and limited high quality resources. The plan contains recommendations to protect ecologically valuable areas, to abate excessive sediment loadings from construction associated with new urban development and prevent increased erosion of the shoreline, and to restrict boating to safe and environmentally-sound levels while providing adequate public access. Further, this plan supports and adopts by reference existing recreation and open space development plans, sanitary sewer service area development plans, and the adopted regional land use and water quality management plans for the Silver Lake watershed. The recommended plan is summarized in graphic form on Map 8.

It is recommended that the Town of Summit and the Silver Lake Environmental Association, Inc. take the lead in implementing the plan. The following paragraphs summarize the recommended management actions:

1. Protection of Ecologically Valuable Areas: It is recommended that measures be taken to preserve and protect ecologically valuable areas within Silver Lake and its watershed, including the extensive macrophyte and benthic fauna beds in the western and southeastern portions of the Lake basin, the extensive wetlands at the eastern and western extremities of the Lake, and the primary environmental corridor in the Lake's watershed. The ecologically valuable areas in Silver Lake are shown on Map 8 and cover a total of about 15 acres. In order to prevent disturbance of these important ecological sites, the following restrictions are recommended:

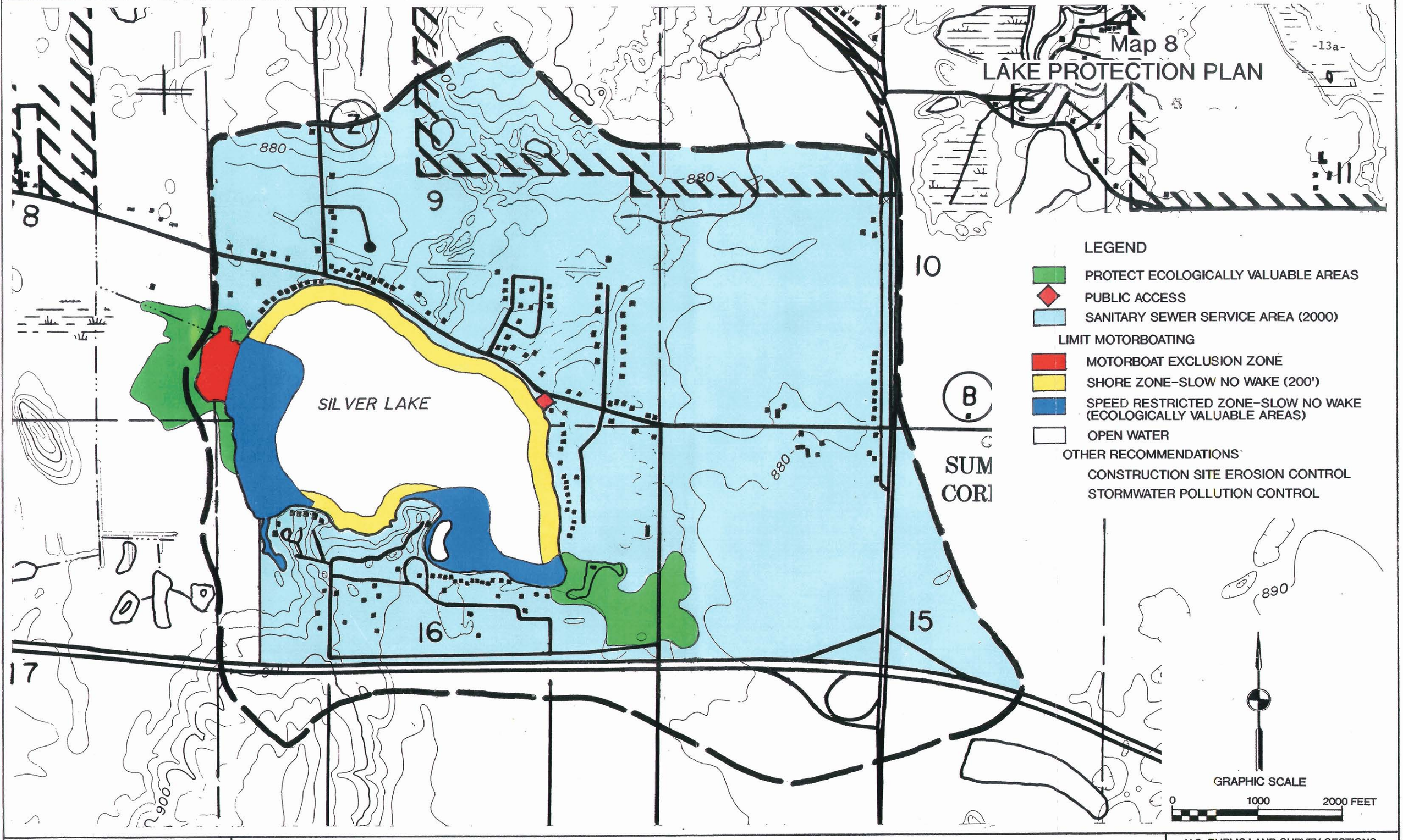
   a. That the Town of Summit, through its existing boating ordinance or an amendment thereof, limit boat speeds in the two ecologically valuable lake areas to slow-no-wake as defined in Chapter 30 of the Wisconsin Statutes, and exclude motorized boat traffic from the western bay adjacent to the Lake, as shown on Map 8.

   b. That the Town of Summit and the Silver Lake Environmental Association, Inc., through a joint education and information program, discourage human disturbances in the two ecologically valuable in-lake areas except insofar as is necessary to provide riparian residents with a minimum level of access to the main body of the Lake. This could include limiting potentially harmful water sports in these ecologically valuable areas.

   c. That the Wisconsin Department of Natural Resources prohibit dredging, placement of materials, and herbicide usage within ecologically valuable areas;

   d. That the ecologically valuable areas be marked by the Town of Summit with buoys and signs to help enforce the recommended restrictions. The selection of regulatory or informational buoys should be made by the Town in concert with the Lake Association and other interested parties.

Map 8
LAKE PROTECTION PLAN



LEGEND

- PROTECT ECOLOGICALLY VALUABLE AREAS
- PUBLIC ACCESS
- SANITARY SEWER SERVICE AREA (2000)

LIMIT MOTORBOATING

- MOTORBOAT EXCLUSION ZONE
- SHORE ZONE–SLOW NO WAKE (200')
- SPEED RESTRICTED ZONE–SLOW NO WAKE (ECOLOGICALLY VALUABLE AREAS)
- OPEN WATER

OTHER RECOMMENDATIONS

- CONSTRUCTION SITE EROSION CONTROL
- STORMWATER POLLUTION CONTROL

GRAPHIC SCALE

0 1000 2000 FEET

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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The major wetlands located adjacent to Silver Lake, which contain valuable aquatic plant communities and important fish and wildlife habitat are shown on Maps 7 and 8. In order to assure the long term protection and preservation of these wetlands, it is recommended that the Town of Summit and/or the Silver Lake Environmental Association, Inc. consider the eventual public acquisition of these wetlands or acquisition of conservancy easements over such wetlands. The area of these wetlands totals about 20 acres. The immediate protection of these wetlands is assured through their conservancy zoning. Nevertheless, it is conceivable that future management actions may be necessary to ensure the habitat quality of the wetlands--actions such as the control of purple loosestrife or other invasive plants which might degrade the habitat quality of the wetlands--and, in such situations, public ownership would be an advantage. Given the locations of the two wetlands and their ecological value, public acquisition would appear to meet the criteria for cost-shared acquisition under the Chapter NR 191 Lake Protection Grant program administered by the DNR. Monies granted in terms of this program provide up to 50 percent of the purchase price, or the cost of acquisition of a conservancy easement, subject to a cap of $100,000 on the State share per parcel. A land management plan is required in support of applications made under this grant program.

It is further recommended that all other primary environmental corridor lands in the Silver Lake watershed be preserved in essentially-natural open-space uses, primarily through public land use controls. Such preservation should be promoted through the placement of such resources in appropriate conservancy zoning districts, and through the enforcement of existing regulations intended to protect such natural resources, as noted above. While only the wetlands located adjacent to Silver Lake are specifically recommended for eventual public acquisition, appropriate public agencies should consider the acquisition of other primary environmental corridor lands as such lands become available. Furthermore, should urban development not proposed or envisioned under the 2010 land use plan referenced herein threaten to destroy or degrade natural resources located within the primary environmental corridors, appropriate public agencies should consider acquisition of such lands for resource and open space preservation purposes.

2. Limit Motorboating: It is recommended that the Town of Summit amend its Boating Ordinance to limit high speed boating activities to the deeper water portions of the Lake, as shown on Map 8. This may or may not require buoyage depending on the sufficiency of the notice provided to users and riparian residents, enforcement and compliance by the public. Alternatively, the Town could consider imposing slow-no-wake speed restrictions on motor-driven water craft within the shore zone, but especially within the ecologically valuable areas, and creating an exclusionary zone within the western bay, as shown on Map 8. Such regulations would have to be approved by the DNR, posted at the private and proposed public boat landings, published in an approved manner in the community, and demarcated by suitable buoyage as discussed earlier. These boating regulations will help to reduce ecological damage, safety hazards, and recreational use conflicts associated with powered watercraft activities. This ordinance should also be beneficial in reducing the incidences of shoreland and lake bottom erosion arising from the passage of boats in the shallow areas of the Lake.

3. Aquatic Plant Management: It is recommended that the extent of the Eurasian Milfoil in the lake be monitored and that the present control be limited to manual removal by private property owners as deemed necessary. It is further recommended that the Town of Summit and the Silver Lake Environmental Association, Inc. continue to monitor the extent of the infestation of Purple Loosetrife in the watershed and to work with the DNR and other support groups to further assess needed management actions to limit the impacts of this plant on the lake and its watershed areas.

4. Abate Nonpoint Sources of Pollution Including Construction Site Erosion Pollution: It is recommended that the Town of Summit adopt a construction site erosion control ordinance pursuant to the model ordinance developed by the League of Wisconsin Municipalities and referenced herein. It is recommended that this ordinance be strictly enforced to reduce sediment and contaminant loadings from the rapidly urbanizing regions of the Lake's watershed, and especially in those areas riparian to the Lake. It is further recommended that the County and the City construction site erosion control ordinance continue to be enforced in the watershed.

   It is further recommended that the Town of Summit, in conjunction with the Silver Lake Environmental Association, Inc., conduct a public education and information program providing riparian residents with information on alternative forms of lawn and garden care, household chemical usage, shoreland protection structures, and other relevant information as may be obtained from the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, DNR, and UWEX in order to reduce and minimize the adverse impacts of residential development in the Lake's watershed. It is suggested that the aforementioned organizations seek the assistance of the Oconomowoc Area Chamber of Commerce providing similar information to businesses within the Silver Lake watershed. When possible, it is suggested that informational programming be included at the annual meetings of the Silver Lake Environmental Association, Inc. and other agencies as appropriate.

5. Implementation of Public Access: It is recommended that the provision of public access, as currently being planned by the DNR, proceed with any adjustments or refinements to the plan as may be deemed appropriate based upon discussions between the DNR, the Town of Summit, the Silver Lake Environmental Association, Inc. and other interested parties. It is specifically recommended that the proposed site design for the access site include specific provisions for control of nonpoint source pollution and aesthetic improvements. Such measures could include vegetative buffer areas along the lake and low elevation portions of the site and plantings. It is also recommended that provision be made at this and other access sites on the Lake for the posting of such boating regulations as may be adopted by the Town of Summit and other notices as necessary.

6. Provision of Public Sanitary Sewer Service: It is recommended that a public sanitary sewer system be provided to serve the urban development around Silver Lake as set forth in the currently adopted regional water quality management plan and the adopted Oconomowoc sewer service area plan, both previously referenced.

SUMMARY

This report, which documents the findings and recommendations of a study requested by the Town Board of the Town of Summit and the Silver Lake Environmental Association, Inc., examines existing and anticipated lake use, land management, and aquatic plant management problems encountered by users of Silver Lake and presents a recommended plan for the resolution of these problems. Silver Lake was found to be a mesotrophic, largely deep water lake of exceptional quality located in close proximity to the Milwaukee metropolitan area and adjacent to a rapidly urbanizing part of Waukesha County in which its watershed is wholly located. Surveys indicated that the Lake and its watershed contain significant areas of ecological value, including wetlands and high quality wildlife habitat surrounding the Lake and extensive macrophyte and benthic faunal beds within the Lake. These ecologically valuable areas were predominantly located in shallow water and have been subject to past disturbances, at least in part related to high speed boat traffic and use.

The Silver Lake lake protection plan recommends immediate actions be taken to limit further human impacts on the in-lake ecologically valuable areas and reduce human impacts on the ecologically valuable areas adjacent to the Lake and in its watershed. Specifically, these actions include adoption or amendment of Town ordinances relating to boating on Silver Lake, along with the associated posting and buoyage installations necessary to protect ecologically important areas in and adjacent to the lake. The plan also recommends only limited aquatic plant management action, including selected manual removal and surveillance activities at this time. The important ecological area protection measures also include public education and actually obtaining protection easements. In addition, stormwater and construction site erosion management in the watershed and the provision of a public sanitary sewer system to serve the lake is recommended. The plan also recognizes the need for a public boat access site to serve the lake. Ordinance development should be linked with an on-going program of public information and education providing riparian residents and lake users, for example, with additional options to household chemical usage, lawn and garden care, shoreland protection, and recreational usage of the Lake. Further, consideration of public acquisition of, or acquisition of conservation easements over, lands within the primary environmental corridors to ensure the protection and preservation of these ecologically valuable areas is also recommended. In this way, the recommended plan seeks to balance the demand for high quality residential and recreational opportunities at Silver Lake with the requirements of the environment that creates this sought-after high quality experience. This plan is consistent with existing planning guidelines produced for the Town of Summit and Waukesha County.

APPENDICES

APPENDIX A

ILLUSTRATIONS OF COMMON AQUATIC PLANTS IN SILVER LAKE

FLOATING LEAF PONDWEED (Potamogeton natans)

Floating leaf pondweed has leaves which float on the surface with the rest of the plant submerged. It provides food and shelter for fish and other aquatic species.

Source: SEWRPC

WILD CELERY OR EEL GRASS (Vallisneria americana)

Eel grass is a submersed plant which provides shade, shelter, and food for fish. It supports insects and is a valuable food source for waterfowl. Sometimes forming dense growths, eel grass may be undesirable in swimming areas.

ource: SEWRPC

SILVER LAKE

AQUATIC PLANT SURVEY

September 1992

CURLY-LEAVED PONDWEED (Potamogeton crispus)

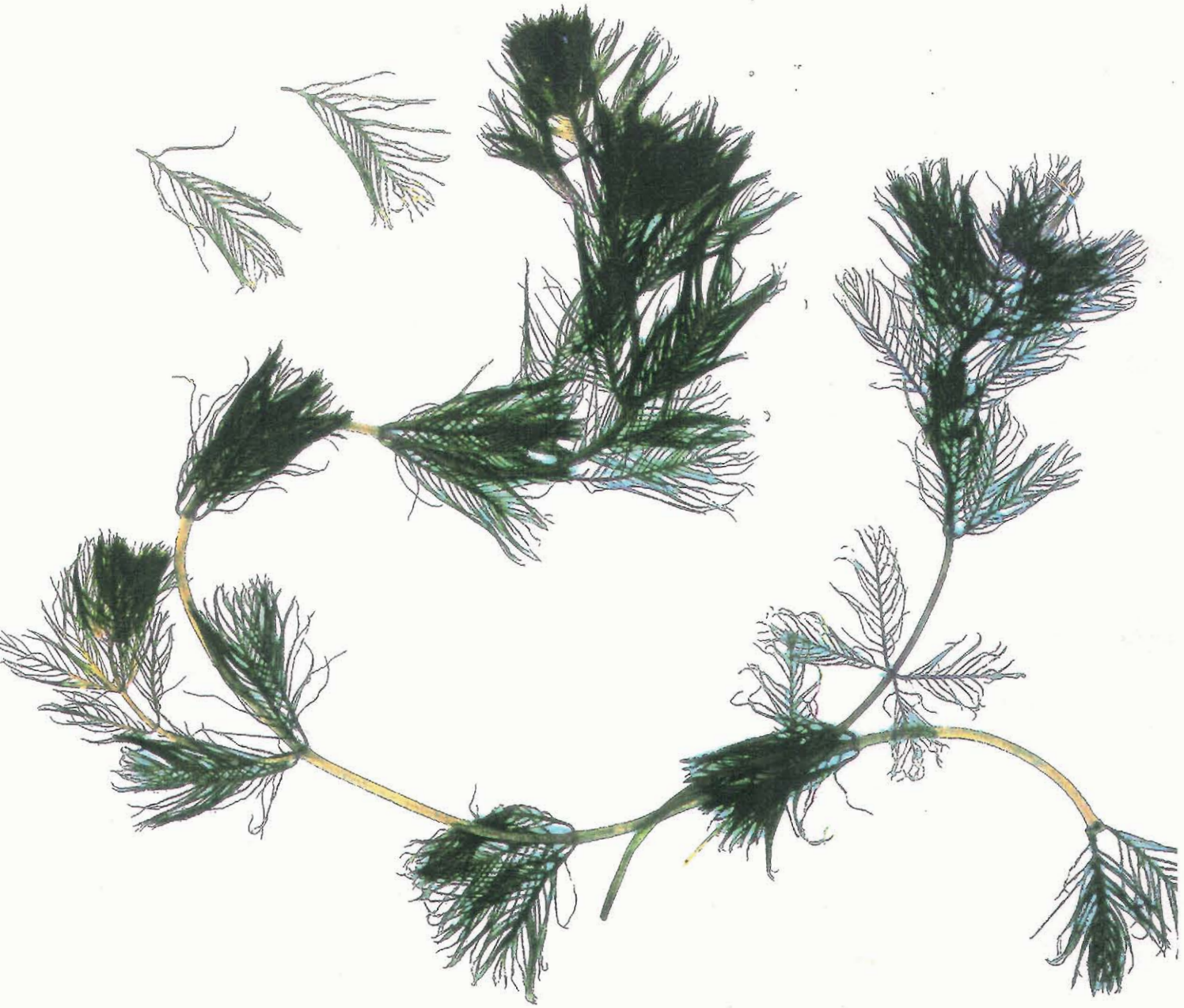
Curly-leaved pondweed provides minimal cover and insect food base for panfish and bass. This species is not native to the United States and can form excessive thick growth patches.

Source: SEWRPC

SILVER LAKE

AQUATIC PLANT SURVEY

September 1992



EURASIAN MILFOIL (Myriophyllum spicatum)

Eurasian milfoil is an introduced species. It is anaggressive colonizer that spreads by fragments. Extreme care should be taken to clean boats and trailers so that fragments are not spread to other lakes

urce: SEWRPC

SILVER LAKE

AQUATIC PLANT SURVEY

September 1992

WHITE WATER LILY (Nymphaea odoratum)

Source: SEWRPC

YELLOW WATER LILY (Nuphar variegatum)

Yellow water lily and white water lily are found in shallow portions of lakes and ponds. The leaves float on the surface of the water and algae and insects often grow under the leaves. Yellow and white water lilies provide shade and shelter for fish but may cause problems because of the extensiveness of their beds in shallow portions of lakes.

urce: SEWRPC

MUSKGRASS (Chara spp.)

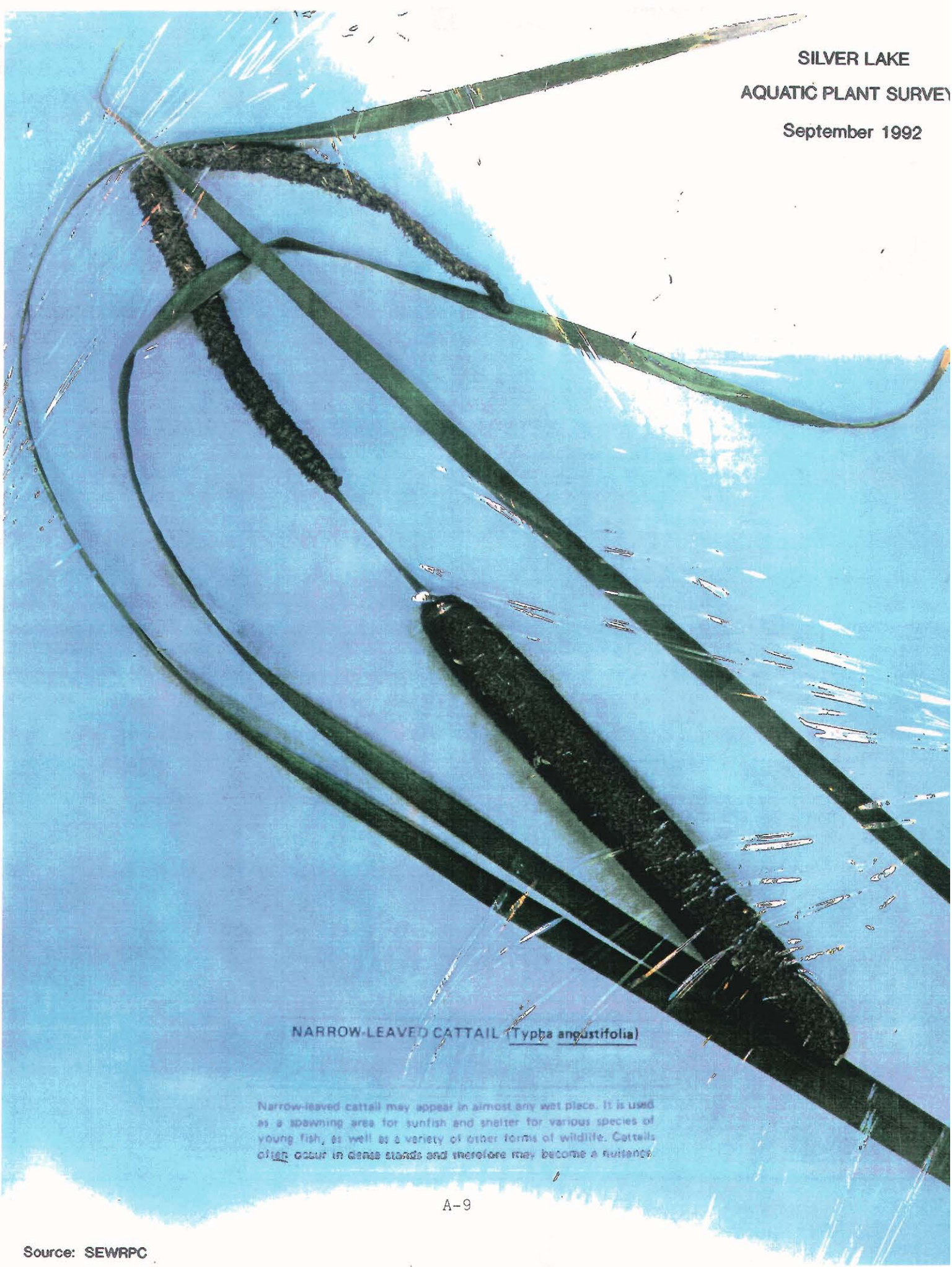
Muskgrass is a type of algae which usually occurs in hard water. It provides fair cover for fish and produces excellent food for young trout, large- and smallmouth bass, and black bass.

Source: SEWRPC

FLAT-STEMMED PONDWEED (Potamogeton zosteriformis)

Flat-stemmed pondweed provides moderate cover for panfish, largemouth bass, and northern pike. It also supports a strong insect population which provides food for fish and ducklings.

Source: SEWRPC



NARROW-LEAVED CATTAIL (Typha angustifolia)

Narrow-leaved cattail may appear in almost any wet place. It is used as a spawning area for sunfish and shelter for various species of young fish, as well as a variety of other forms of wildlife. Cattails often occur in dense stands and therefore may become a nuisance.

Source: SEWRPC

SILVER LAKE

AQUATIC PLANT SURVEY

September 1992

BROAD-LEAVED CATTAIL (Typha latifolia)

urce: SEWRPC

APPENDIX B

BOATING ORDINANCE APPLICABLE TO SILVER LAKE

Third Draft

STATE OF WISCONSIN TOWN OF SUMMIT CITY OF OCONOMOWOC WAUKESHA COUNTY

ORDINANCE NO. 186

AN ORDINANCE REGULATING THE USE AND OPERATION OF MOTOR BOATS ON THE WATERS OF SILVER LAKE IN THE TOWN OF SUMMIT AND THE CITY OF OCONOMOWOC

WHEREAS, the Town Board of the Town of Summit and the Common Council of the City of Oconomowoc, Waukesha County, Wisconsin deem it necessary to regulate the use and operation of motor operated boats for the protection of life, person and property on Silver Lake, and

WHEREAS, the Town Board of the Town of Summit and the Common Council of the City of Oconomowoc, Waukesha County, Wisconsin intend by this ordinance to provide safe and healthful conditions for the enjoyment of aquatic recreation consistent with public rights and interests and the capability of the water resource,

NOW, THEREFORE, the Town Board of the Town of Summit and the Common Council of the City of Oconomowoc, Waukesha County, Wisconsin DO ORDAIN AS FOLLOWS:

SECTION 1: An ordinance to regulate the use and operation of motor boats, and to regulate water sports upon and under the water of Silver Lake is hereby created to read as follows:

1. APPLICATION: The provisions of this ordinance shall apply to the waters of Silver Lake, within the jurisdiction of the Town of Summit and the City of Oconomowoc. The provisions of this ordinance shall be enforced by the officers of the Water Safety Patrol Unit and police of the jurisdiction of the Town of Summit.

2. STATE BOATING AND WATER SAFETY LAWS ADOPTED:

   A. Except as otherwise specifically provided in this ordinance, the current and future statutory provisions describing and defining regulations with respect to water traffic, boats, boating, and relating water activities in §§30.50 up to and including 30.71, of the

Wisconsin Statutes, exclusive of any provisions therein relating to the penalties to be imposed or the punishment for violation of said statutes, are hereby adopted and by reference made a part of this ordinance as if fully set forth herein. Any act required to be performed or prohibited by any current or future statute incorporated herein by reference is required or prohibited by this ordinance. Any further additions, amendments, revisions or modifications of the statute incorporated herein are intended to be made part of this ordinance in order to secure uniform state-wide regulation of the waterways of the State.

B. All rules and orders created by the Wisconsin Department of Natural Resources, modifying or supplementing the foregoing provisions of State Law or which may be adopted or made in the future, are hereby incorporated in and made a part of this ordinance by deferring to the same as if they are or were to be set out herein verbatim.

3. OPERATION OF MOTOR BOATS: No motor boat shall be operated on Silver Lake from sunset until sunrise at a speed in excess of slow no wake.

4. SWIMMING REGULATIONS: No person, unless said person is engaging in activities and subject to the provisions of §30.70, Wisconsin Statutes, entitled Skin Diving, shall:

A. Swim from any unmanned boat, unless such boat is anchored, or

B. Swim more than 150 feet from the shoreline unless is a designated swimming zone or unless accompanied by a competent person in a boat, or

C. Swim more than 150 feet from the shoreline between sunset and sunrise.

5. PENALTY:

A. STATE BOATING AND WATER SAFETY LAWS AND ALL OTHER VIOLATIONS AS SET FORTH IN §2 OF THIS ORDINANCE.

Any forfeiture for violation of the State statute, rule or order adopted by reference in §2 of this ordinance shall conform to the forfeiture permitted to be imposed for violation of such statutes as set forth in the Uniform Wisconsin Deposit and Bail Schedule for Conservation, Boating, Snowmobile, and ATV Violations, including any variations or increases for subsequent offenses, which schedule is adopted by reference.

B. LOCAL BOATING LAWS AS SET FORTH IN §§3 AND 4 OF THIS ORDINANCE.

Any person 16 years or older violating the provisions of this ordinance shall be subject to a forfeiture of not more than $500 plus court costs and penalty assessment. Failure to pay any forfeiture hereunder shall subject the violator to imprisonment in the County Jail or loss of license.

Any person 14 or 15 years of age shall be subject to a forfeiture of not less than $10 nor more than $25 plus court costs and penalty assessment per each offense or referred to the proper authorities as provided in Chapter 48, Wisconsin Statutes. Failure to pay any forfeiture hereunder shall subject the violator to the provisions of §48.17(2), Wisconsin Statutes.

Any person under the age of 14 shall be referred to the proper authorities as provided in Chapter 48, Wisconsin Statutes.

6. ENFORCEMENT.

A. ENFORCEMENT PROCEDURE. The statutory provisions of §§66.115, 66.119, 66.12, 30.29, 30.50 to 30.71, and Chapter 799, Wisconsin Statutes, are adopted and by reference made a part of this ordinance as if fully set herein. Any act required to be performed or prohibited by any statute incorporated herein by reference is required or prohibited by this ordinance. Any future additions, amendments, revisions or modifications of the statutes incorporated herein are intended to be made part of this ordinance in order to secure uniform state-wide regulation and enforcement of boating ordinance violations. Further, the Town of Summit and the City of Oconomowoc specifically elect to use the citation method of enforcement.

B. DEPOSITS.

1. Schedule of Deposits. The schedule of cash deposits shall be as follows:

§2: Applicable sections of Uniform Wisconsin Deposit and Bail Schedule for Conservation, Boating, Snowmobile and ATV Violations plus current assessment fees and current court costs if applicable.

SS3 and 4: $50 plus court costs and assessments plus current assessment fees and current court costs if applicable.

2. Deposit for Repeat Offenses. Any person found guilty of violating this ordinance or any part thereof who was previously convicted of the same section within the last year shall forfeit twice the deposit delineated above plus court costs and penalty assessment.

3. Non-Scheduled Deposit. If a deposit schedule has not been established for a specific violation, the arresting officer shall require the alleged offender to deposit not less than the maximum forfeiture permitted hereunder.

4. Depository. Deposits should be made in cash, money order, or certified check to the Clerk of Municipal Court, who shall issue a receipt therefore as required by Wisconsin Statute. If the deposit is mailed, the signed statement required by Wisconsin Statute shall be mailed with the deposit.

C. NONEXCLUSIVITY.

1. Other Ordinances. Adoption of this ordinance does not preclude the Town Board or Common Council from adopting any other ordinance or providing for the enforcement of any other law or ordinance relating to the same or other matter.

2. Other Remedies. The issuance of a citation hereunder shall not preclude the Town Board or Common Council or any authorized office from proceedings under any other ordinance of law or by any other enforcement method to enforce any ordinance, regulation or order.

SECTION 2: SEVERABILITY.

The several sections of this ordinance are declared to be severable. If any section or portion thereof shall be declared by a court of competent jurisdiction to be invalid, unlawful or unenforceable, such decision shall apply only to the specific section or portion thereof directly specified in the decision, and shall not affect the validity of any other provisions, sections or portions thereof of the ordinance. The remainder of

the ordinance shall remain in full force and effect. Any other ordinances whose terms are in conflict with the provisions of this ordinance are hereby repealed as to those terms that conflict.

SECTION 3. EFFECTIVE DATE.

This ordinance shall take effect immediately upon passage and posting or publication as provided by law.

This ordinance passed this 3RD day of Nov, 1992.

BY ORDER OF THE TOWN BOARD OF THE TOWN OF SUMMIT, WAUKESHA COUNTY, WISCONSIN

EDWIN H. ROHLOFF, TOWN CHAIRMAN

ATTEST:

APPENDIX C

SEWRPC LETTER REPORT:
PRELIMINARY VEGETATION SURVEY--SILVER LAKE, July 1993

COPY

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

916 N. EAST AVENUE • P.O. BOX 1607 • WAUKESHA, WISCONSIN 53187-1607 • TELEPHONE (414) 547-6721
TELECOPIER (414) 547-1103

Serving the Counties of: KENOSHA
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July 20, 1993

Mr. Edwin H. Rohloff, Chairman
Town of Summit
2911 N. Dousman Road
Oconomowoc, Wisconsin 53066

Dear Mr. Rohloff:

In accordance with the August 5, 1992, letter agreement between the Commission and the Town of Summit, the Commission staff has now completed an inventory of the Silver Lake watershed wetlands and environmentally sensitive areas, and is hereby providing to the Town a report describing the inventory findings. The results of the two other work items covered under the aforementioned letter agreement--the provision of management recommendations based upon an analysis of the inventory data described herein, and land use recommendations based upon the regional and subregional land use planning conducted by the Commission--will be provided to you under separate cover within the next two weeks.

The Commission staff, field inspected, and evaluated wetlands and environmentally sensitive areas within the Silver Lake watershed on September 17, 1992. The findings of the field inspection are attached hereto as Exhibit A and may be summarized as follows:

1. A total of eighteen plant community areas were identified. The areal extent of each plant community area is shown on the 1 inch equal 400 feet scale 1990 aerial photograph attached hereto as Exhibit B. All of the eighteen plant community areas are located within the Silver Lake watershed.

2. Plant community area No. 1 is an approximately 8.5-acre wetland consisting of open water, and deep and shallow marsh. Disturbances include past dredging and wetland filling along the shoreline. The shallow marsh portion of the plant community area is conducive to Northern pike spawning.

3. Plant community area No. 2 is an approximately 1.8-acre wetland consisting of open water, and deep marsh. No disturbances to the plant community area were apparent. The lake bottom consists of marl and gravel and is conducive to Centrarchid spawning.

4. Plant community area No. 3 is an approximately 1.0-acre wetland consisting of open water, deep and shallow marsh, and Southern wet to wet-mesic lowland hardwoods along the lakeshore edge. Disturbances include some siltation and sedimentation due to construction site runoff from adjacent residential lands. The aquatic bed area of the open water portion provides some areas for Centrarchid spawning.

5. Plant community area No. 4 is an approximately 23-acre wetland consisting of shallow marsh, fresh (wet) meadow, and Southern wet to wet-mesic lowland hardwoods. Disturbances include boat traffic in shallow areas leading to silt suspension, redeposition, and accumulation. A large clam/mussel bed die off area was observed during the field inspection. The die-off is likely due to siltation and sedimentation of the beds.

6. Plant community area No. 5 is an approximately 18-acre wetland consisting of open water, deep and shallow marsh, shrub-carr, and Southern wet to wet-mesic lowland hardwoods. Disturbances include motorized boat activity which displaces the lake substrate, channelization of flow, and past draining.

7. Plant community area No. 6 is an approximately 205-acre open water area consisting of aquatic lakebed dominated by submerged and floating hydrophytes. Disturbances include silt suspension, redeposition, and accumulation due to motorized boat activity.

8. Plant community area No. 7 is an approximately 1.5-acre wetland consisting of aquatic lakebed, deep marsh, and Southern wet to wet-mesic lowland hardwoods. Disturbances include dumping and littering in and along the lakeshore. The aquatic lakebed area is conducive to Centrarchid spawning.

9. Plant community area No. 8 is an approximately 1.3-acre aquatic lakebed consisting of open water dominated by submerged hydrophytes. Disturbances include motorized boat activity and run-off from adjacent residential yards. This aquatic community is somewhat conducive to Centrarchid spawning and provides some Bass and Northern pike habitat.

10. Plant community area No. 9 is an approximately 2.8-acre wetland consisting of shallow marsh with fresh (wet) meadow and Southern wet-mesic lowland hardwoods along the edge. No significant disturbances to the plant community were apparent.

11. Plant community area No. 10 is an approximately 2.0-acre wetland consisting of fresh (wet) meadow, and scattered, Southern wet-mesic lowland hardwoods. Disturbances include past grazing and agricultural land management activities in and along the wetland edge.

12. Plant community area No. 11 is an approximately 16.5-acre wetland consisting of shallow marsh, Southern sedge meadow, and fresh (wet) meadow with scattered, lowland shrubs. Disturbances include past grazing and agricultural land management activities along the wetland edge.

13. Plant community area No. 12 is an approximately 7.5-acre wetland consisting of Southern sedge meadow, and fresh (wet) meadow, with scattered, Southern wet to wet-mesic lowland hardwoods and shrubs. Disturbances include past agricultural land encroachment in dry years, agricultural runoff from adjacent croplands, and some past wetland filling.

14. Plant community area No. 13 is an approximately 16.8-acre wetland consisting of fresh (wet) meadow and Southern wet-mesic lowland hardwoods. Disturbances include filling for gardens and residential lawn encroachment.

15. Plant community area No. 14 is an approximately 9.8-acre wetland consisting of fresh (wet) meadow, and Southern wet-mesic lowland hardwoods. Disturbances include past filling for the railroad right-of-way, past agricultural land encroachment along the wetland edge, and water level changes due to past draining attempts.

16. Plant community area No. 15 is an approximately 7.2-acre wetland consisting of Southern sedge meadow, fresh (wet) meadow, and lowland hardwoods. Disturbances include past cutting and filling due to golf course construction.

17. Plant community area No. 16 is an approximately 2.2-acre wetland consisting of open water with some shallow marsh. Disturbances include mowing long the wetland edge and run-off from the adjacent golf course.

18. Plant community area No. 17 is an approximately 1.5-acre wetland consisting of open water, some shallow marsh, and scattered lowland hardwoods. Disturbances include mowing along the wetland edge, and run-off from the adjacent golf course lands.

19. Plant community area No. 18 is an approximately 1.3-acre wetland consisting of fresh (wet) meadow with some Southern wet to wet-mesic lowland hardwoods. Disturbances include past cutting of vegetation and wetland draining.

20. No federal- or state-designated rare, threatened or endangered species were observed during the field inspection.

21. The entire area of plant community area Nos. 1 through 9, 11, 12, 13, and 18 are located within a Commission-delineated primary environmental corridor. The areal extent of the primary environmental corridor is shown on Exhibit B.

22. The areal extent of the wildlife habitat areas within and adjacent to the Silver Lake watershed are shown on the 1 inch equals 400 feet scale 1985 aerial photograph attached hereto as Exhibit C.

23. The one inch equals 400 feet 1990 aerial photograph attached hereto as Exhibit D shows the aerial extent of ecologically valuable wetland and aquatic habitat which also offer water quality benefits within the Silver Lake drainage area.

We trust that the foregoing information fulfills that portion of the aforementioned letter agreement relating to the necessary inventories. Should you have any questions concerning this matter, please do not hesitate to call.

Sincerely,

Kurt W. Bauer
Executive Director

KWB/REL/wbw

Enclosures

cc: David L. Barquist, Silver Lake Environmental Assoc., Inc.

A:SilverLk.Ltr

SVY.742
410-300

EXHIBIT A

PRELIMINARY VEGETATION SURVEY
SILVER LAKE

Date: September 17, 1992

Observer: Donald M. Reed, Chief Biologist
Rachel E. Lang, Senior Specialist-Biologist
Southeastern Wisconsin Regional Planning Commission

Location: Town of Summit in parts of U.S. Public Land Survey Sections 9, 15, and 16, Township 7 North, Range 17 East, Waukesha County, Wisconsin.

Species List: Plant Community Area No. 1

CHARACEAE
Chara vulgaris--Muskgrass

CUPRESSACEAE
Thuja occidentalis--White cedar

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail

NAJADACEAE
Potamogeton natans--Common pondweed
Potamogeton pectinatus--Sago pondweed
Najas marina--Spiny naiad

ALISMATACEAE
Sagittaria latifolia--Common arrowhead

HYDROCHARITACEAE
Vallisneria americana--Tape grass

GRAMINEAE
Phalaris arundinacea[1]--Reed canary grass
Echinochloa crusgalli[1]--Barnyard grass

CYPERACEAE
Scirpus americanus--Chairmaker's rush
Scirpus acutus--Hard-stemmed bulrush
Carex stricta--Tussock sedge

SALICACEAE
Populus deltoides--Cottonwood
Salix nigra--Black willow
Salix sp. --Willow

BETULACEAE
Betula papyrifera[2]--Paper birch

URTICACEAE
Urtica dioica--Stinging nettle

POLYGONACEAE
Polygonum pensylvanicum--Pinkweed

NYMPHAEACEAE
Nymphaea tuberosa--White water lily

BALSAMINACEAE
Impatiens biflora--Jewelweed

LYTHRACEAE
Lythrum salicaria[1]--Purple loosestrife

HALORAGACEAE
Myriophyllum exalbescens[3]--Spiked water milfoil

CORNACEAE
Cornus amomum--Silky dogwood
Cornus stolonifera--Red osier dogwood

OLEACEAE
Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE
Asclepias incarnata--Marsh milkweed

VERBENACEAE
Verbena hastata--Blue vervain

LABIATAE
Stachys palustris--Hedge-nettle

COMPOSITAE
Bidens sp. --Beggar's-ticks
Aster lucidulus--Swamp aster
Eupatorium maculatum--Joe-pye weed

Total number of plant species: 32
Number of alien, or non-native, plant species: 4 (13 percent)

This approximately 8.5- acre wetland plant community area consists of open water, and deep and shallow marsh. Disturbances to the plant community area include past dredging and wetland filling along the shoreline. The aquatic bed of the open water areas adjacent to this plant community area provide good Centrarchid and Bass spawning habitat. Further, the shallow marsh portion of the plant community area is condusive to Northern pike spawning. No federal- or state designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Alien, or non-native, plant species.
[2]Planted tree species.
[3]The taxonomy between the native Water-milfoil (Myriophyllum exalbescens Fern.) and the Eurasian water-milfoil (Myriophyllum spicatum L.) is unclear at this time. Fassett (1957), Swink and Wilhelm (1979), and Gleason and Cronquist (1963) describe them as a single species, M. spicatum. Voss (1985) includes the most credible documented discussion of the two as potentially separate species, but he also acknowledges the lack of agreement. Gleason and Cronquist's (1991) recent revision also separates the two, but M. exalbescens is included as Myriophyllum sibiricum. Based upon Voss (1985) and Bleason and Cronquist (1991), the plants collected at Silver Lake were keyed to the Eurasian species, M. spicatum.

Plant Community Area No. 2

CHARACEAE
Chara vulgaris--Muskgrass

NAJADACEAE
Potamogeton natans--Common pondweed
Potamogeton crispus--Curly pondweed

CYPERACEAE
Scirpus acutus--Hard-stemmed bulrush

Total number of plant species: 4
Number of alien, or non-native, plant species: 0

This approximately 1.8-acre wetland plant community area consists of open water and deep marsh. The lake bottom consists of marl and gravel and is condusive to Centrachid spawning. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

Plant Community Area No. 3

CHARACEAE
Chara vulgaris--Muskgrass

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail

CYPERACEAE
Cyperus esculentus--Chufa
Scirpus americanus--Chairmaker's rush
Scirpus acutus--Hard-stemmed bulrush
Carex comosa--Bristly sedge

IRIDACEAE
Iris versicolor--Blue flag iris

SALICACEAE
Populus deltoides[1]--Cottonwood
Salix nigra[1]--Black willow

ULMACEAE
Ulmus americana[1]--American elm

URTICACEAE
Boehmeria cylindrica--False nettle
Pilea pumila--Clearweed

POLYGONACEAE
Polygonum sp. --Smartweed

RANUNCULACEAE
Ranunculus sp. --Buttercup

ACERACEAE
Acer negundo[1]--Boxelder

BALSAMINACEAE
Impatiens biflora--Jewelweed

LYTHRACEAE
Lythrum salicaria[2]--Purple loosestrife

HALORAGACEAE
Myriophyllum spicatum[3]--Spiked water milfoil

OLEACEAE
Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE
Asclepias incarnata--Marsh milkweed

VERBENACEAE
Verbena hastata--Blue vervain

LABIATAE
Lycopus uniflorus--Northern bugleweed

LOBELIACEAE
Lobelia siphilitica--Great blue lobelia

Total number of plant species: 23
Number of alien, or non-native, plant species: 2 (9 percent)

This approximately 1.0-acre wetland plant community area consists of open water, deep and shallow marsh, and Southern wet to wet-mesic lowland hardwoods along the lakeshore. Disturbances to the plant community area include some siltation and sedimentation due to construction site runoff from adjacent residential lands. The aquatic bed area of open water provides some areas for Centrarchid spawning. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Growing along the lakeshore.
[2]Alien, or non-native, plant species.
[3]See footnote No. 3 under Plant Community Area No. 1.

Plant Community Area No. 4

CHARACEAE
Chara vulgaris--Muskgrass

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail

CYPERACEAE
Scirpus americanus--Chairmaker's rush
Scirpus acutus--Hard-stemmed bulrush

SALICACEAE
Salix nigra--Black willow
Salix spp. --Willows

ULMACEAE
Ulmus americana--American elm

ACERACEAE
Acer rubrum--Red maple
Acer negundo--Boxelder

RHAMNACEAE
Rhamnus cathartica[1]--Common buckthorn

VITACEAE
Vitis riparia--River-bank grape

OLEACEAE
Fraxinus pennsylvanica--Green ash

CUCURBITACEAE
Echinocystis lobata--Wild cucumber

Total number of plant species: 13+
Number of alien, or non-native, plant species: 1 (8 percent)

This approximately 23-acre wetland plant community area consists of shallow marsh, fresh (wet) meadow, and Southern wet to wet-mesic lowland hardwoods. Disturbances to the plant community area include boat traffic in shallow areas leading to silt suspension, redeposition, and accumulation. A large clam bed die-off area was observed during the field inspection. The die-off is likely due to siltation and sedimentation of the beds. No federal or state-designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Alien, or non-native, plant species.

Plant Community Area No. 5

CHARACEAE
- Chara vulgaris[1]--Muskgrass

PINACEAE
- Larix laricina--Tamarack

TYPHACEAE
- Typha latifolia--Broad-leaved cat-tail
- Typha angustifolia--Narrow-leaved cat-tail

NAJADACEAE
- Potamogeton natans--Common pondweed
- Potamogeton gramineus--Grass-leaved pondweed
- Potamogeton (crispus?)[2]--Curly pondweed
- Najas marina[1]--Spiny naiad

GRAMINEAE
- Agrostis alba[2]--Redtop
- Phalaris arundinacea[2]--Reed canary grass

CYPERACEAE
- Scirpus americanus--Chairmaker's rush
- Scirpus acutus--Hard-stemmed bulrush
- Carex lacustris--Lake sedge

SALICACEAE
- Salix nigra--Black willow
- Salix spp.[3]--Willows

ULMACEAE
- Ulmus americana--American elm

URTICACEAE
- Urtica procera--Stinging nettle
- Pilea pumila--Clearweed

POLYGONACEAE
- Rumex orbiculatus--Great water dock
- Polygonum amphibium--Water knotweed
- Polygonum sagittatum--Arrow-leaved tear-thumb

NYMPHAEACEAE
- Nuphar variegatum--Yellow water lily
- Nymphaea tuberosa--White water lily

SAXIFRAGACEAE
- Ribes americanum--Wild black currant

BALSAMINACEAE
- Impatiens biflora--Jewelweed

RHAMNACEAE
Rhamnus cathartica[2]--Common buckthorn
Rhamnus frangula[2,3]--Glossy buckthorn

LYTHRACEAE
Lythrum salicaria[2]--Purple loosestrife

CORNACEAE
Cornus amomum--Silky dogwood
Cornus stolonifera--Red osier dogwood

OLEACEAE
Fraxinus pennsylvanica--Green ash

LABIATAE
Lycopus americanus--Cutleaf bugleweed
Mentha arvensis--Wild mint

SOLANACEAE
Solanum dulcamara[2]--Deadly nightshade

LENTIBULARIACEAE
Utricularia intermedia--Flat-leaved bladderwort

CUCURBITACEAE
Echinocystis lobata--Wild cucumber

COMPOSITAE
Bidens frondosa--Common beggar's-ticks

Total number of plant species: 37+
Number of alien, or non-native, plant species: 6 (16 percent)

This approximately 18.0-acre wetland plant community area consists of open water, deep and shallow marsh, shrub-carr, and Southern wet to wet-mesic lowland hardwoods. Disturbances to the plant community area include motorized boat activity which displaces the lake substrate, channalization of flow, and past drianing. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Co-dominant submerged hydrophytes.
[2]Alien, or non-native, plant species.
[3]Co-dominant shrub species.

Plant Community Area No. 6

CHARACEAE
Chara vulgaris[1]--Muskgrass

NAJADACEAE
Potamogeton natans--Common pondweed
Potamogeton crispus[2]--Curly pondweed
Potamogeton gramineus--Grass-leaved pondweed
Potamogeton zosteriformis--Flat-stemmed pondweed
Potamogeton sp. --Pondweed
Najas marina--Spiny naiad

HYDROCHARITACEAE
Vallisneria americana--Tape grass

HALORAGACEAE
Myriophyllum exalbescens[3]--Spiked water milfoil

Total number of plant species: 9
Number of alien, or non-native, plant species: 2 (22 percent)

This approximately 205-acre open water community areas consisting of open water aquatic lakebed dominated by submerged and floating hydrophytes. Disturbances to the plant community area include silt suspension, redeposition, and exxumulation due to motorized boat activity. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Dominant submerged hydrophyte.
[2]Alien, or non-native, plant species.
[3]See footnote No. 3 under Plant Community Area No. 1.

Plant Community Area No. 7

CHARACEAE
Chara vulgaris--Muskgrass

NAJADACEAE
Potamogeton natans--Common pondweed
Potamogeton zosteriformis--Flat-stemmed pondweed
Najas marina--Spiny naiad
Najas flexilis--Slender naiad

HYDROCHARITACEAE
Vallisneria americana[1]--Tape grass

GRAMINEAE
Phalaris arundinacea[2]--Reed canary grass

SALICACEAE
Populus deltoides[3]--Cottonwood
Salix nigra[3]--Black willow

FAGACEAE
Quercus macrocarpa[3]--Bur oak

NYMPHAEACEAE
Nuphar variegatum--Yellow water lily
Nymphaea tuberosa--White water lily

PLANTAGINACEAE
(Littorella uniflora?)--European shoreweed

COMPOSITAE
Solidago gigantea[3]--Giant goldenrod

Total number of plant species: 14
Number of alien, or non-native, plant species: 1 (7 percent)

This approximately 1.5-acre wetland plant community area consists of deep marsh, aquatic lakebed, Southern wet to wet-mesic lowland hardwoods. Disturbances to the plant community area include dumping and littering. The aquatic bed and open water areas are conducive to Centrarchid spawning. No federal- or state-designated rare, threatened, or endangered species were observered during the field inspection.

---

[1]Dominant submerged hydrophtye.
[2]Alien, or non-native, plant species.
[3]Growing along the shoreline.

Plant Community Area No. 8

CHARACEAE
Chara vulgaris--Muskgrass

HALORAGACEAE
Myriophyllum spicatum[1,2]--Spiked water milfoil

Total number of plant species: 2
Number of alien, or non-native, plant species: 1 (50 percent)

This approximately 1.3-acre wetland plant community area of open water consisting of aquatic lake bed is dominated by submerged hydrophytes. Disturbances to the plant community area include motorized boat activity and run-off from adjacent residential yards. This aquatic community is somewhat conducive to Centrarchid spawning and provides some Bass and Northern pike habitat. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Alien, or non-native, plant species.
[2]Dominant hydrophyte. Also, see footnote No. 3 under Plant Community Area No.

Plant Community Area No. 9

POLYPODIACEAE
Onoclea sensibilis--Sensitive fern

GRAMINEAE
Phalaris arundinacea[1]--Reed canary grass

CYPERACEAE
Scirpus atrovirens--Green bulrush
Carex comosa--Bristly sedge
Carex lacustris--Lake sedge

SALICACEAE
Salix spp. --Willows

URTICACEAE
Boehmeria cylindrica--False nettle

ANACARDIACEAE
Rhus glabra[2]--Smooth sumac

BALSAMINACEAE
Impatiens biflora--Jewelweed

RHAMNACEAE
Rhamnus cathartica[1]--Common buckthorn

OLEACEAE
Fraxinus pennsylvanica--Green ash

Total number of plant species: 11+
Number of alien, or non-native, plant species: 2 (18 percent)

This approximately 2.8-acre wetland plant community area consists of shallow marsh with fresh (wet) meadow and wet-mesic lowland hardwoods along the edge. No significant disturbances to the plant community area were apparent. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Alien, or non-native, plant species.
[2]Growing along the wetland edge.

Plant Community Area No. 10

ALISMATACEAE
Sagittaria latifolia--Common arrowhead

GRAMINEAE
Phalaris arundinacea[1,2]--Reed canary grass
Setaria sp. [1]--Foxtail

CYPERACEAE
Carex sp. --Sedge

SALICACEAE
Populus deltoides--Cottonwood

URTICACEAE
Urtica dioica--Stinging nettle

AMARANTHACEAE
Amaranthus retroflexus[1,3]--Redroot pigweed

FABACEAE
Trifolium pratense[1,3]--Red clover

ANACARDIACEAE
Rhus glabra[2,3]--Smooth sumac

ACERACEAE
Acer negundo[2,3]--Boxelder

VITACEAE
Vitis riparia--River-bank grape

UMBELLIFERAE
Daucus carota[1,3]--Queen Anne's lace

SOLANACEAE
Solanum dulcamara[1]--Deadly nightshade

CAPRIFOLIACEAE
Viburnum opulus[1]--High-bush cranberry

COMPOSITAE
Aster lateriflorus--Calico aster
Aster simplex--Marsh aster
Lactuca canadensis[3]--Wild lettuce

Total number of plant species: 17
Number of alien, or non-native, plant species: 7 (41 percent)

This approximately 2.0-acre wetland plant community area consists of fresh (wet) meadow and scattered Southern wet-mesic lowland hardwoods. Disturbances to the plant community area include past grazing and agricultural land management activities in and along the wetland edge. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

---

[1]Alien, or non-native, plant species.
[2]Dominant plant species.
[3]Growing along the wetland edge.

Plant Community Area No. 11

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail

GRAMINEAE
Phalaris arundinacea[1]--Reed canary grass

CYPERACEAE
Carex stricta--Tussock sedge

IRIDACEAE
Iris versicolor--Blue flag iris

SALICACEAE
Salix nigra[2]--Black willow
Salix bebbiana--Beaked willow

POLYGONACEAE
Polygonum pensylvanicum--Pinkweed
Polygonum sp. --Smartweed

RHAMNACEAE
Rhamnus frangula[1]--Glossy buckthorn

ONAGRACEAE
Epilobium coloratum--Willow herb

CORNACEAE
Cornus stolonifera--Red osier dogwood

ASCLEPIADACEAE
Asclepias incarnata--Marsh milkweed

VERBENACEAE
Verbena hastata--Blue vervain

COMPOSITAE
Bidens spp. --Beggar's-ticks
Solidago gigantea--Giant goldenrod
Solidago graminifolia--Grassleaf goldenrod
Aster lucidulus--Swamp aster
Aster lateriflorus[2]--Calico aster
Aster simplex--Marsh aster
Eupatorium perfoliatum--Boneset
Cirsium vulgare[1,2]--Bull thistle

Total number of plant species: 21
Number of alien, or non-native, plant species: 3 (14 percent)

This approximately 16.5-acre wetland plant community area consists of shallow marsh, southern sedge meadow, and fresh (wet) meadow with scattered lowland shrubs. Disturbances to the plant community area include past grazing and agricultural land management activities along the wetland edge. No federal- or state-designated rare, threatened, of endangered species were observed during the field inspection.

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[1]Alien, or non-native, plant species.
[2]Growing along the wetland edge.

Plant Community Area No. 12

POLYPODIACEAE
Onoclea sensibilis--Sensitive fern

CUPRESSACEAE
Juniperus virginiana[1]--Red-cedar

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail

ALISMATACEAE
Sagittaria latifolia--Common arrowhead

GRAMINEAE
Poa pratensis[1]--Kentucky bluegrass
Agropyron repens[1,2]--Quack grass
Phalaris arundinacea[2,3]--Reed canary grass
Leptoloma cognatum[1]--Fall witch-grass

CYPERACEAE
Eleocharis erythropoda--Spike rush
Scirpus atrovirens--Green bulrush
Carex stricta[3]--Tussock sedge

IRIDACEAE
Iris versicolor--Blue flag iris

SALICACEAE
Populus tremuloides[1]--Quaking aspen
Populus deltoides--Cottonwood
Salix babylonica[1,2]--Weeping willow
Salix nigra--Black willow
Salix exigua--Sand-bar willow
Salix bebbiana--Beaked willow
Salix sp. --Willow

FAGACEAE
Quercus macrocarpa[1]--Bur oak

ULMACEAE
Ulmus americana[1]--American elm

POLYGONACEAE
Rumex crispus[1,2]--Curly dock
Polygonum pensylvanicum--Pinkweed

CARYOPHYLLACEAE
Saponaria officinalis[1,2]--Bouncing bet

ROSACEAE
Potentilla arguta[1]--Prairie cinquefoil
Geum canadense--White avens
Spiraea alba--Meadow sweet

ACERACEAE
Acer negundo[1]--Boxelder

RHAMNACEAE
Rhamnus cathartica[1,2]--Common buckthorn
Rhamnus frangula[1,2]--Glossy buckthorn

ONAGRACEAE
Oenothera biennis[1]--Evening-primrose

UMBELLIFERAE
Daucus carota[1,2]--Queen Anne's lace

CORNACEAE
Cornus amomum--Silky dogwood
Cornus stolonifera--Red osier dogwood

ASCLEPIADACEAE
Asclepias incarnata--Marsh milkweed

VERBENACEAE
Verbena hastata--Blue vervain

SOLANACEAE
Solanum dulcamara[2]--Deadly nightshade

SCROPHULARIACEAE
Verbascum thapsus[1,2]--Mullein
Gerardia tenuifolia--Slender gerardia

CAPRIFOLIACEAE
Viburnum lentago--Nannyberry
Lonicera X bella[1,2]--Hybrid honeysuckle

CUCURBITACEAE
Echinocystis lobata--Wild cucumber

COMPOSITAE
Bidens sp. --Beggar's-ticks
Achillea millefolium[1,2]--Yarrow
Solidago gigantea--Giant goldenrod
Aster lucidulus--Swamp aster
Aster simplex--Marsh aster
Eupatorium maculatum--Joe-pye weed
Eupatorium perfoliatum--Boneset
Arctium minus[1,2]--Common burdock
Cirsium arvense[1,2]--Canada thistle

Total number of plant species: 51
Number of alien, or non-native, plant species: 14 (27 percent)

This approximately 7.5-acre wetland plant community area consists of southern sedge meadow, and fresh (wet) meadow, with scattered wet to wet-mesic shrubs and lowland hardwoods. Disturbances to the plant community area include past agricultural land encroachment in dry years, agricultural runoff from adgacent croplands, and some past wetland filling. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

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[1]Growing along the wetland edge.
[2]Alien, or non-native plant species.
[3]Co-dominant plant species.

Plant Community Area No. 13

TYPHACEAE
Typha angustifolia--Narrow-leaved cat-tail

GRAMINEAE
Phalaris arundinacea[1,2]--Reed canary grass

SALICACEAE
Populus tremuloides[3]--Quaking aspen
Salix nigra--Black willow
Salix spp. --Willows

URTICACEAE
Urtica dioica--Stinging nettle
Boehmeria cylindrica--False nettle

ANACARDIACEAE
Rhus sp.[1]--Smooth sumac

ACERACEAE
Acer saccharinum--Silver maple
Acer negundo--Boxelder

BALSAMINACEAE
Impatiens biflora--Jewelweed

RHAMNACEAE
Rhamnus frangula[1]--Glossy buckthorn

VITACEAE
Vitis riparia[3]--River-bank grape

CORNACEAE
Cornus rugosa--Roundleaf dogwood

OLEACEAE
Fraxinus pennsylvanica--Green ash

COMPOSITAE
Solidago canadensis--Canada goldenrod
Eupatorium maculatum--Joe-pye weed

Total number of plant species: 17+
Number of alien, or non-native, plant species: 3 (18 percent)

This approximately 16.8-acre wetland plant community area consists of fresh (wet) meadow and Southern wet-mesic lowland hardwoods. Disturbances to the plant community area include filling for gardens and residential lawn encroachment. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

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[1]Alien, or non-native, plant species.
[2]Dominant plant species.
[3]Growing along the wetland edge.

Plant Community Area No. 14

POLYPODIACEAE
Onoclea sensibilis--Sensitive fern

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail
Typha angustifolia--Narrow-leaved cat-tail

GRAMINEAE
Phalaris arundinacea[1,2]--Reed canary grass

SALICACEAE
Populus tremuloides--Quaking aspen
Populus deltoides--Cottonwood
Salix sp. --Willow

JUGLANDACEAE
Juglans nigra[3]--Black walnut

ULMACEAE
Ulmus americana--American elm

URTICACEAE
Urtica dioica--Stinging nettle

POLYGONACEAE
Polygonum pensylvanicum--Pinkweed
Polygonum punctatum--Smartweed
Polygonum sagittatum--Arrow-leaved tear-thumb
Polygonum amphibium--Smartweed

ROSACEAE
Spiraea alba--Meadow sweet

ACERACEAE
Acer saccharinum--Silver maple

RHAMNACEAE
Rhamnus cathartica[1]--Common buckthorn

VITACEAE
Vitis riparia--River-bank grape

CORNACEAE
Cornus amomum--Silky dogwood
Cornus stolonifera--Red osier dogwood

VERBENACEAE
Verbena hastata--Blue vervain

SOLANACEAE
Solanum dulcamara[1]--Deadly nightshade

CAPRIFOLIACEAE
Sambucus canadensis--Elderberry

Total number of plant species: 23
Number of alien, or non-native, plant species: 3 (13 percent)

This approximately 9.8-acre wetland plant community area consists of fresh (wet) meadow, and Southern wet-mesic lowland hardwoods. Disturbances to the plant community area include past filling for the railroad right-of-way, past agricultural land encroachment along the wetland edge, and water level changes due to past draining attempts. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

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[1]Alien, or non-native, plant species.
[2]Dominant plant species.
[3]Growing along the wetland edge.

Plant Community Area No. 15

POLYPODIACEAE
- Onoclea sensibilis--Sensitive fern

GRAMINEAE
- Agrostis alba[1]--Redtop
- Phalaris arundinacea[1]--Reed canary grass

CYPERACEAE
- Scirpus validus--Soft-stemmed bulrush
- Scirpus fluviatilis--River bulrush
- Scirpus cyperinus--Wool grass
- Carex pensylvanica--Pennsylvania sedge
- Carex stricta--Tussock sedge

LEMNACEAE
- Lemna minor--Duckweed

IRIDACEAE
- Iris versicolor--Blue flag iris

SALICACEAE
- Populus tremuloides[2]--Quaking aspen
- Populus deltoides--Cottonwood
- Salix nigra--Black willow

JUGLANDACEAE
- Carya ovata--Shagbark hickory

FAGACEAE
- Quercus alba[2]--White oak
- Quercus rubra[2]--Northern red oak

ULMACEAE
- Ulmus americana--American elm

URTICACEAE
- Urtica dioica--Stinging nettle
- Pilea pumila--Clearweed

POLYGONACEAE
- Polygonum punctatum--Smartweed
- Polygonum persicaria[1]--Lady's thumb
- Polygonum sagittatum--Arrow-leaved tear-thumb

CRUCIFERAE
- Alliaria officinalis[1]--Garlic-mustard

SAXIFRAGACEAE
- Ribes americanum--Wild black currant

ROSACEAE
- Potentilla simplex[2]--Old field cinquefoil
- Rubus strigosus[2]--Red raspberry
- Prunus serotina[2]--Black cherry
- Prunus virginiana[2]--Choke-cherry

ANACARDIACEAE
- Rhus radicans[2]--Poison ivy

ACERACEAE
- Acer rubrum--Red maple
- Acer negundo[3]--Boxelder

RHAMNACEAE
- Rhamnus cathartica[1,3]--Common buckthorn
- Rhamnus frangula[1]--Glossy buckthorn

VITACEAE
- Parthenocissus sp. --Virginia creeper

ONAGRACEAE
- Epilobium coloratum--Willow herb

OLEACEAE
- Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE
- Asclepias incarnata--Marsh milkweed

CONVOLVULACEAE
- Cuscuta gronovii--Dodder

LABIATAE
- Lycopus uniflorus--Northern bugleweed

SOLANACEAE
- Solanum dulcamara[1]--Deadly nightshade

CAPRIFOLIACEAE
- Viburnum opulus[1]--High-bush cranberry
- Lonicera X bella[1]--Hybrid honeysuckle

CUCURBITACEAE
- Echinocystis lobata--Wild cucumber

COMPOSITAE
- Bidens coronata--Tall swamp-marigold
- Solidago gigantea--Giant goldenrod
- Solidago graminifolia--Grassleaf goldenrod
- Aster puniceus--Red-stemmed aster
- Aster lucidulus--Swamp aster
- Erechtites hieracifolia--Fireweed

Total number of plant species: 49
Number of alien, or non-native, plant species: 9 (18 percent)

This approximately 7.2-acre wetland plant community area consists of some southern sedge meadow, fresh (wet) meadow, and lowland hardwoods. Disturbances to the plant community area include past cutting, and filling due to golf course construction. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

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[1]Alien, or non-native, plant species.
[2]Growing along the wetland edge.
[3]Dominant shrub species.

Plant Community Area No. 16

POLYPODIACEAE
Onoclea sensibilis--Sensitive fern

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail

SPARGANIACEAE
Sparganium eurycarpum--Common bur-reed

NAJADACEAE
Potamogeton natans--Common pondweed

ALISMATACEAE
Sagittaria latifolia--Common arrowhead

GRAMINEAE
Agrostis alba[1]--Redtop
Phalaris arundinacea[1]--Reed canary grass

CYPERACEAE
Scirpus validus--Soft-stemmed bulrush
Scirpus acutus--Hard-stemmed bulrush
Scirpus fluviatilis--River bulrush
Scirpus cyperinus--Wool grass
Carex stricta--Tussock sedge

JUNCACEAE
Juncus sp. --Rush

IRIDACEAE
Iris versicolor--Blue flag iris

SALICACEAE
Populus tremuloides--Quaking aspen
Salix sp. --Willow

ULMACEAE
Ulmus americana--American elm

URTICACEAE
Urtica dioica--Stinging nettle
Pilea pumila--Clearweed

POLYGONACEAE
Polygonum lapathifolium--Smartweed
Polygonum punctatum--Smartweed
Polygonum persicaria[1]--Lady's thumb
Polygonum sagittatum--Arrow-leaved tear-thumb

ROSACEAE
Rubus strigosus--Red raspberry

RHAMNACEAE
Rhamnus frangula[1]--Glossy buckthorn

ONAGRACEAE
Epilobium coloratum--Willow herb

ASCLEPIADACEAE
Asclepias incarnata--Marsh milkweed

CONVOLVULACEAE
Cuscuta gronovii--Dodder

LABIATAE
Lycopus uniflorus--Northern bugleweed
Lycopus americanus--Cutleaf bugleweed

SOLANACEAE
Solanum dulcamara[1]--Deadly nightshade
Solanum carolinense--Horse-nettle

CUCURBITACEAE
Echinocystis lobata--Wild cucumber

COMPOSITAE
Bidens coronata--Tall swamp-marigold
Bidens sp. --Beggar's-ticks
Solidago gigantea--Giant goldenrod
Solidago graminifolia--Grassleaf goldenrod
Aster puniceus--Red-stemmed aster
Aster lucidulus--Swamp aster

Total number of plant species: 39
Number of alien, or non-native, plant species: 5 (13 percent)

This approximately 2.0-acre wetland plant community area consists of open water with some shallow marsh. Disturbances to the plant community area include mowing along the wetland edge, and run-off from the adjacent golf course. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

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[1]Alien, or non-native, plant species.

Plant Community Area No. 17

POLYPODIACEAE
- Onoclea sensibilis--Sensitive fern

TYPHACEAE
- Typha latifolia--Broad-leaved cat-tail

GRAMINEAE
- Agrostis alba[1]--Redtop
- Phalaris arundinacea[1]--Reed canary grass
- Zizania aquatica--Wild rice

CYPERACEAE
- Scirpus validus--Soft-stemmed bulrush
- Scirpus fluviatilis--River bulrush
- Scirpus cyperinus--Wool grass
- Carex stricta--Tussock sedge

IRIDACEAE
- Iris versicolor--Blue flag iris

SALICACEAE
- Populus tremuloides--Quaking aspen
- Salix nigra--Black willow
- Salix exigua--Sand-bar willow

ULMACEAE
- Ulmus americana--American elm

URTICACEAE
- Urtica dioica--Stinging nettle
- Pilea pumila--Clearweed

POLYGONACEAE
- Polygonum punctatum--Smartweed
- Polygonum sagittatum--Arrow-leaved tear-thumb

ROSACEAE
- Rubus strigosus--Red raspberry
- Rosa multiflora[1]--Multiflora rose
- Prunus serotina--Black cherry

ACERACEAE
- Acer rubrum--Red maple
- Acer negundo--Boxelder

BALSAMINACEAE
- Impatiens biflora--Jewelweed

RHAMNACEAE
- Rhamnus frangula[1]--Glossy buckthorn

VITACEAE
Vitis riparia--River-bank grape

ONAGRACEAE
Epilobium coloratum--Willow herb

CORNACEAE
Cornus stolonifera--Red osier dogwood

ASCLEPIADACEAE
Asclepias incarnata--Marsh milkweed

CONVOLVULACEAE
Cuscuta gronovii--Dodder

VERBENACEAE
Verbena hastata--Blue vervain

LABIATAE
Lycopus uniflorus--Northern bugleweed
Lycopus americanus--Cutleaf bugleweed

SOLANACEAE
Solanum dulcamara[1]--Deadly nightshade

CUCURBITACEAE
Echinocystis lobata--Wild cucumber

COMPOSITAE
Bidens coronata--Tall swamp-marigold
Solidago gigantea--Giant goldenrod
Aster puniceus--Red-stemmed aster
Aster lucidulus--Swamp aster
Erichtites hieracifolia--False boneset

Total number of plant species: 40
Number of alien, or non-native, plant species: 5 (13 percent)

This approximately 1.5-acre wetland plant community area consists of open water with some shallow marsh and scattered lowland hardwoods. Disturbances to the plant community area include mowing along the wetland edge, and run-off from the adjacent golf course lands. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

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[1]Alien, or non-native, plant species.

Plant Community Area No. 18

TYPHACEAE
Typha latifolia--Broad-leaved cat-tail

GRAMINEAE
Phalaris arundinacea[1]--Reed canary grass

URTICACEAE
Urtica dioica--Stinging nettle

POLYGONACEAE
Polygonum sagittatum--Arrow-leaved tear-thumb

ACERACEAE
Acer negundo[2]--Boxelder

BALSAMINACEAE
Impatiens biflora--Jewelweed

ONAGRACEAE
Epilobium coloratum--Willow herb

SOLANACEAE
Solanum dulcamara[1]--Deadly nightshade

CUCURBITACEAE
Echinocystis lobata--Wild cucumber

COMPOSITAE
Solidago gigantea--Giant goldenrod
Solidago graminifolia--Grassleaf goldenrod
Cirsium vulgare[1,2]--Bull thistle

Total number of plant species: 12
Number of alien, or non-native, plant species: 3 (25 percent)

This approximately 1.3-acre wetland plant community area consists of fresh (wet) meadow with some second growth wet-mesic lowland hardwoods. Disturbances to the plant community area include past cutting of vegetaton and wetland drianing. No federal- or state-designated rare, threatened, or endangered species were observed during the field inspection.

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[1]Alien, or non-native, plant species.
[2]Growing along the wetland edge.

Exhibit B

LEGEND

- WETLANDS
- PRIMARY ENVIRONMENTAL CORRIDOR BOUNDARY
- 6 PLANT COMMUNITIES AND DESIGNATIONS

NOTE: REDRAWN FROM 1"=400' SCALE AERIAL PHOTOGRAPHS FOR ILLUSTRATION PURPOSES ONLY.

SILVER LAKE

SUMMIT CORNERS

GRAPHIC SCALE

0 1000 2000 FEET

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SILVER LAKE STUDY AREA WAUKESHA COUNTY, WISCONSIN

U.S. PUBLIC LAND SURVEY SECTIONS
8-11, 14-17 T 7 N R 17 E
SUMMIT TOWNSHIP

Exhibit C

LEGEND

CLASS I (HIGH VALUE)

CLASS II (MEDIUM VALUE)

CLASS III (GOOD VALUE)

NOTE: REDRAWN FROM 1"=400' SCALE AERIAL PHOTOGRAPHS FOR ILLUSTRATION PURPOSES ONLY.

SILVER LAKE

SUMMIT CORNERS

880

890

900

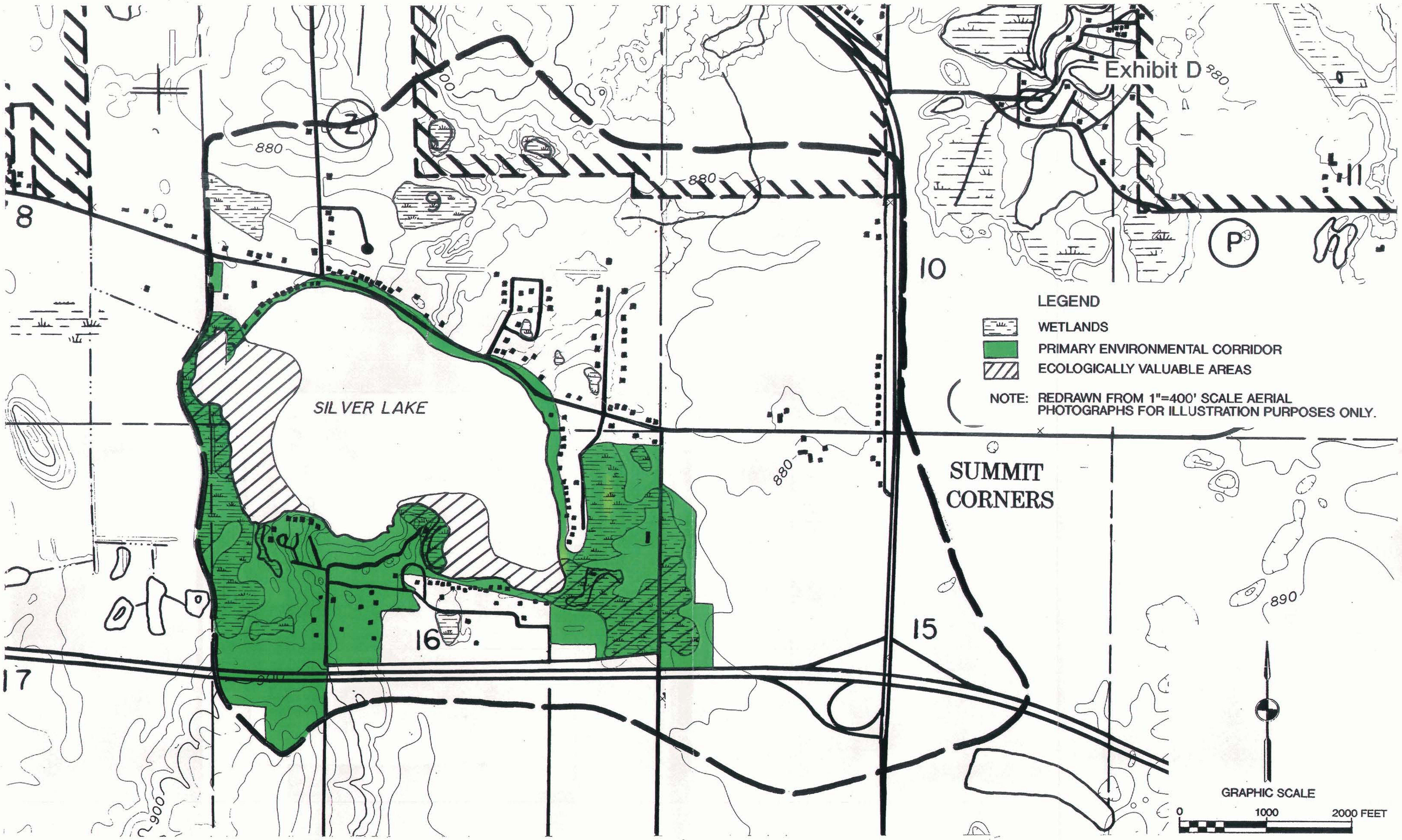
GRAPHIC SCALE

0 1000 2000 FEET

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SILVER LAKE STUDY AREA WAUKESHA COUNTY, WISCONSIN

U.S. PUBLIC LAND SURVEY SECTIONS
8-11, 14-17 T 7 N R 17 E
SUMMIT TOWNSHIP



SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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