

MUKWONAGO
WILLOW
SPRINGS
LAKE

SPRING LAKE

AQUATIC PLANT MANAGEMENT PLAN FOR PHANTOM LAKES

JERICHO

MUKWONAGO PARK

LOWER
PHANTOM
LAKE

WAUKESHA COUNTY WISCONSIN

RAINBOW
SPRINGS
LAKE

WOOD
LAKE

UPPER
PHANTOM
LAKE

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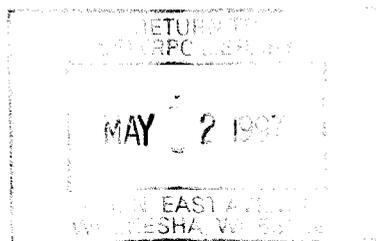
MEMORANDUM REPORT
NUMBER 81

AQUATIC PLANT MANAGEMENT PLAN FOR PHANTOM LAKES
WAUKESHA COUNTY, WISCONSIN

Prepared by the
Southeastern Wisconsin Regional Planning Commission
and
Phantom Lakes
Management District

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AN AQUATIC PLANT MANAGEMENT PLAN FOR THE PHANTOM LAKES,
WAUKESHA COUNTY, WISCONSIN

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AN AQUATIC PLANT MANAGEMENT PLAN FOR THE PHANTOM LAKES,
WAUKESHA COUNTY, WISCONSIN

INTRODUCTION

The Phantom Lakes, consisting of an upper and lower basin on the Mukwonago River in the Town and Village of Mukwonago, Waukesha County, Wisconsin, are valuable ecological resources offering one of the most varied communities of aquatic plants existing in the Southeastern Wisconsin Region as well as a variety of recreational and visual opportunities to the surrounding communities and their visitors. The lakes, and especially the Lower Phantom Lake, provide an attractive vista at the entrance to these communities along CTH ES. Unfortunately, the recreational and visual uses of these lakes, and especially the Lower Lake, have been hindered by excessive aquatic plant growth. Thus, despite an increasing demand for high quality recreational and residential experiences in this area, the prospect facing users is sometimes less than attractive.

Seeking to improve the usability of the Phantom Lakes, and to prevent deterioration of the natural assets and recreational potential of these Lakes, the Phantom Lakes Management District was formed in July 1977 by the Waukesha County Board. Shortly thereafter, the District began a program of aquatic plant management aimed at maintaining and improving these valuable Lakes. Additionally, there have been a number of planning studies involving the Phantom Lakes conducted by the Wisconsin Department of Natural Resources (DNR) and the Southeastern Wisconsin Regional Planning Commission (SEWRPC). Two of these studies, the 1969 Lake Use Reports¹ and 1982 Feasibility Study², included aquatic plant management elements which have formed the basis of the aquatic plant management strategy of the District to date.

This plan sets forth a revised aquatic plant management plan for the Phantom Lakes, and represents an important element of the on-going commitment of the Phantom Lakes Management District to sound environmental planning with respect to the Lakes. This plan was prepared during the summer of 1993 by the Regional Planning Commission at the request of the Phantom Lakes Management District. The aquatic plant survey was conducted by Commission staff with the assistance of the Lake Management District during June and July 1993 using the modified Jessen and

¹SEWRPC-DNR Lake Use Report No. FX-14, Lower Phantom Lake, Waukesha County, Wisconsin, 1969; SEWRPC-DNR Lake Use Report No. FX-33, Upper Phantom Lake, Waukesha County, Wisconsin, 1969. These reports were prepared under the Regional Planning Commission's Fox River Watershed Study.

²Wisconsin Department of Natural Resources, Phantom Lakes, Waukesha County: Feasibility Study Results; Management Alternatives, October 1982.

Lound³ transect method employed by the DNR. Representative pressed specimens of the major plant species found have been lodged with the DNR Southeast District, illustrations of which are annexed in Appendix B. Additional data were supplied from the files of the Wisconsin Department of Natural Resources and the Regional Planning Commission.

It is important to note that this report does not represent a comprehensive water quality management plan for the Phantom Lakes.⁴ Rather, the plan follows the format adopted by the DNR for Aquatic Plant Management Plans pursuant to Chapters NR 103 and NR 107, Wisconsin Administrative Code. However, this plan is designed to form an integral part of any future comprehensive lake management plan devised for the Phantom Lakes. A comprehensive lake management plan for the Phantom Lakes will also require a good deal more water quality and biological data collection and analysis, as well as a more detailed assessment of the lake watershed characteristics, than is required for an aquatic plant management 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 control of aquatic plant growth; those measures which can be readily undertaken by the Lake Management District in concert with the local authorities and riparian residents; and those measures which will directly affect the use of the Phantom Lakes.

This report is comprised of seven main sections: 1) a statement of planning goals and objectives; 2) a brief description of the lakes and their watersheds; 3) a statement of the current use restrictions and the need for aquatic plant management in the Phantom Lakes; 4) an evaluation of alternative means of aquatic plant management and a selected plan; 5) a description of the recommended plan; 6) a description of the equipment needs for the selected plan; and 7) the recommended means of monitoring and evaluating the efficacy of the plan and equipment.

STATEMENT OF AQUATIC PLANT MANAGEMENT GOALS AND OBJECTIVES

The aquatic plant management goals and objectives of the Phantom Lakes Management District were developed in consultation with the Village and Town of Mukwonago. The goals and objectives are:

- to effectively control the quantity and density of aquatic plant growth in portions of the Phantom Lakes basins 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;
- to manage the lakes in an environmentally sound manner, pursuant to the standards and requirements set forth in Administrative Codes NR 103,

³Jessen, R. and R. Lound, Minnesota Department of Conservation Game Investigational Report No. 6, An Evaluation of a Survey Technique for Submerged Aquatic Plants, 1962.

⁴An 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.

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;

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

THE PHANTOM LAKES AND THEIR WATERSHEDS

Physical Characteristics

Watershed Characteristics: The Phantom Lakes are located immediately west of the Village of Mukwonago in Waukesha County (Map 1). The Lower Phantom Lake is situated on the Mukwonago River, which forms the principle inflow and outflow of the system, while the Upper Phantom Lake is located to the south on an unnamed, spring-fed tributary. The total drainage area of the Phantom Lakes is approximately 87 square miles. Portions of the watershed extend into Jefferson and Walworth Counties. Lulu, Eagle Springs, Peters, Swift, and Beulah Lakes are included within the watershed boundaries. Within this watershed, Lulu Lake and the stretch of Mukwonago River between Eagle Springs Lake and the Phantom Lakes have recently been designated as Outstanding Resource Waters by the Wisconsin Department of Natural Resources. The area considered as the direct drainage area--the area which drains to the Phantom Lakes but excluding the area that drains through any of the other major lakes--is about 33 square miles, and is situated wholly within Waukesha County. The surrounding land uses in these areas are primarily agricultural, with the balance being natural areas--wetlands, woodlands and other open lands--and urban residential lands and transportation/utility corridors, as shown in Table 1.

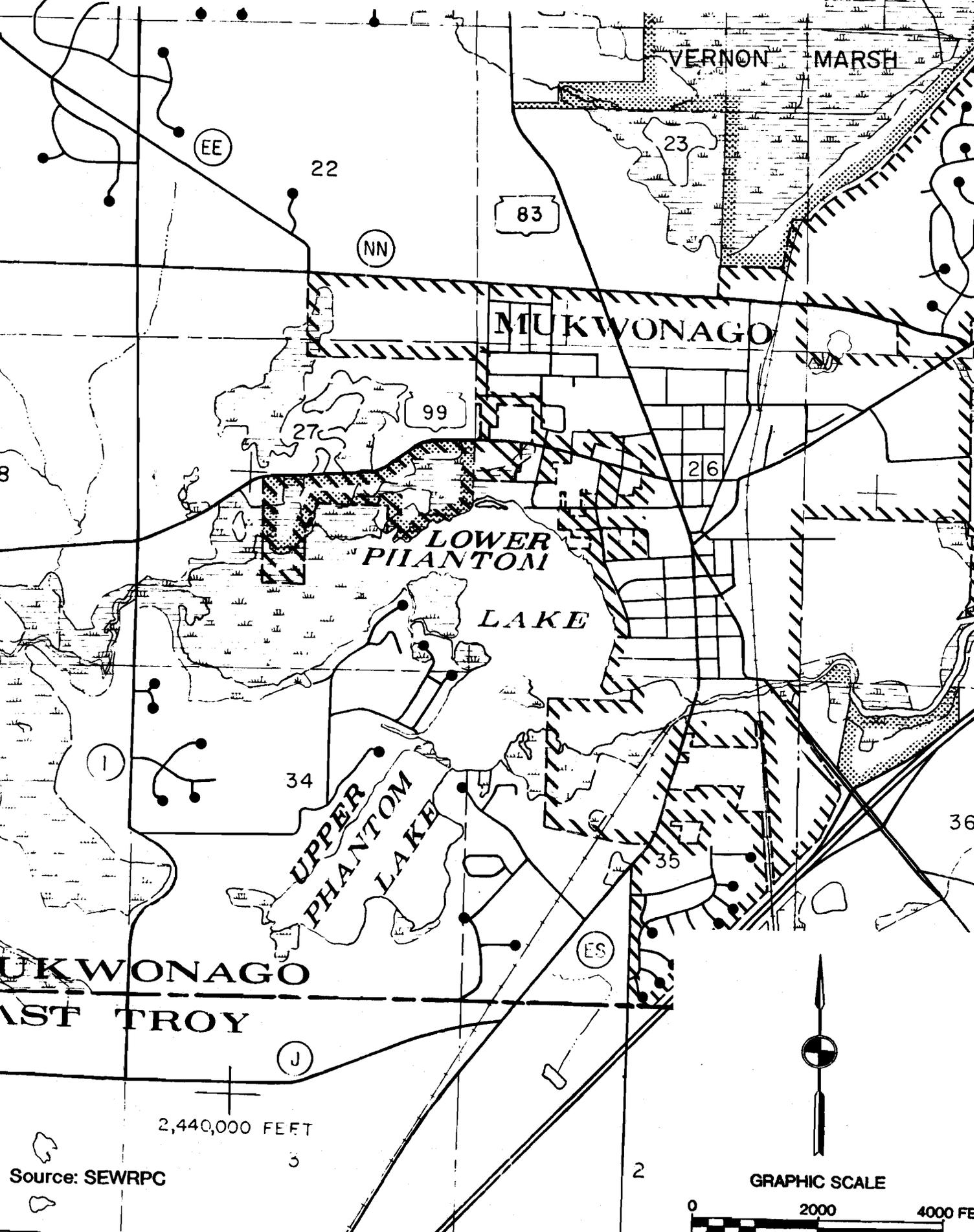
Waterbody Characteristics: The Phantom Lakes comprise a 610-acre waterbody made up of two interconnected basins known as Upper and Lower Phantom Lakes. The two basins exhibit very different hydrographical characteristics, as set forth in Table 2. The Lower Lake is a shallow, elongate basin. It is an impounded drainage lake, but lacks the clearly defined river channel so common in many drainage lakes in the Region. It has a mean depth of 3.5 feet, a maximum depth of 12 feet, a surface area of 500 acres--of which 218 acres are wetland--and a volume of 1,800 acre-feet. The Upper Lake, in contrast, is a drained lake, roughly circular in aspect, having a well-defined "deep hole". This waterbody has a maximum depth of 32 feet, a mean depth of 10 feet, a surface area of 110 acres and a volume of 1,100 acre-feet. Bathymetric maps of the two lakes are shown as Map 2. Water levels in the lakes are maintained by a dam at the outflow of the Lower Phantom Lake just east of CTH ES.

Land Use and Shoreline Development

Public and Private Access: The shoreland of the Phantom Lakes is used primarily for residential development as shown on Map 3. One public park is located on the shores of the Lower Lake, together with the public access site which includes a

Map 1 | LOCATION MAP FOR THE PHANTOM LAKES

-3a-



2,440,000 FEET

Source: SEWRPC

GRAPHIC SCALE

0 2000 4000 FE

Phantom.tbl/jat

Table 1

LAND USE IN THE PHANTOM LAKES WATERSHED

Land Use	Direct Drainage Area		Total Drainage Area ^a	
	(acres)	(percent)	(acres)	(percent)
URBAN				
Residential	2,686	12.9	4,925	10.2
Commercial	68	0.4	96	0.2
Industrial	37	0.2	45	0.1
Transportation/Utilities	827	4.0	1,712	3.5
General Parking	1	<0.1	2	<0.1
Government/Institutional	128	0.6	225	0.5
Recreational	443	2.0	938	1.9
Unused Urban	108	0.5	124	0.3
Subtotal	4,298	20.7	8,067	16.7
RURAL				
Agriculture	10,012	48.2	23,136	47.7
Woodland	2,710	13.1	8,151	16.8
Wetland	2,229	10.7	4,419	9.1
Water	521	2.5	1,971	4.1
Extractive	4	<0.1	12	<0.1
Landfills	0	--	11	<0.1
Other Open Lands	1,001	4.8	2,694	5.6
Subtotal	16,477	79.3	40,394	83.3
TOTAL	20,775	100.0	48,461	100.0

^a Excludes the portion of the watershed in Jefferson County of about 7,000 acres.

Source: SEWRPC

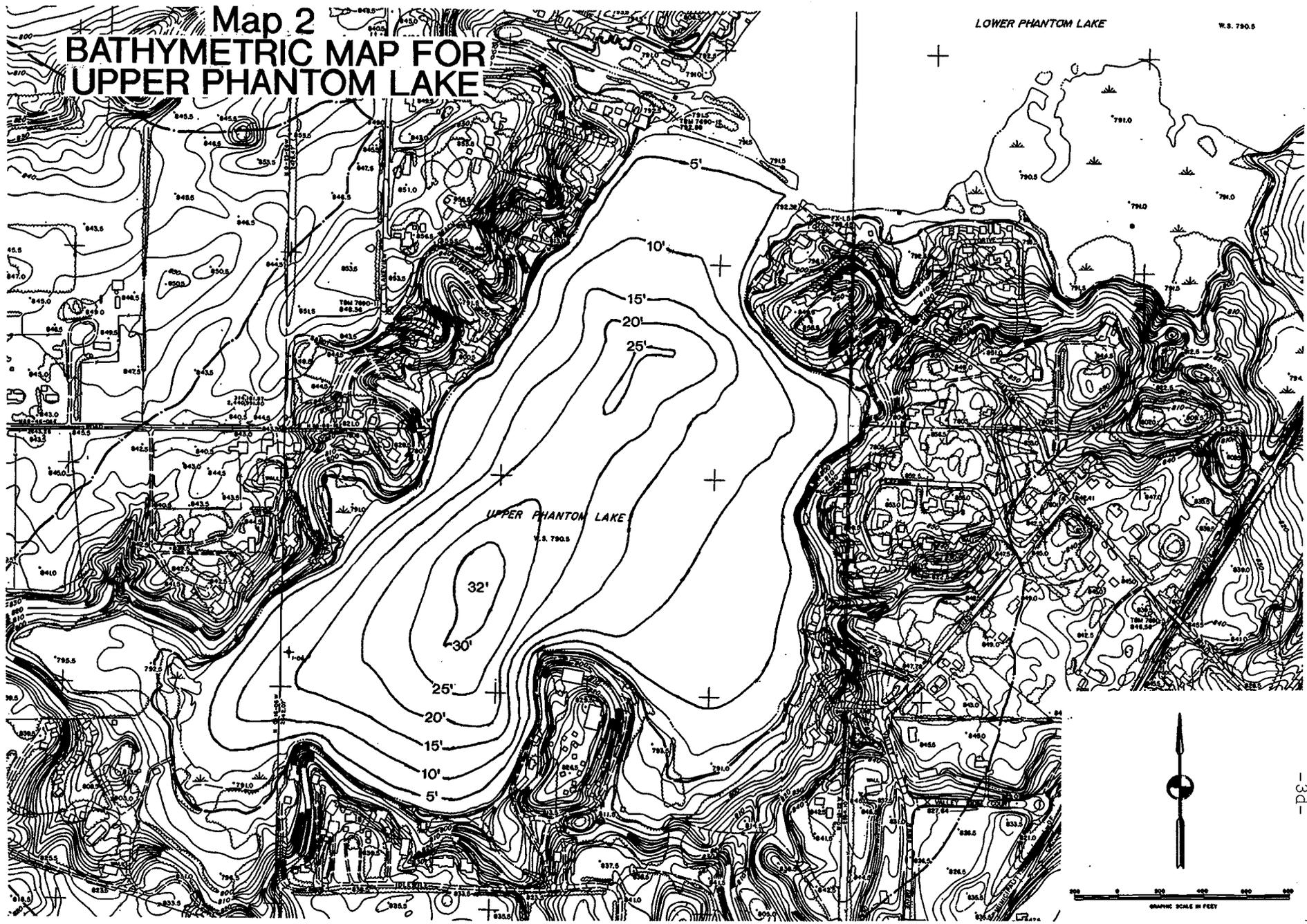
Phantom.tb2/jat/ib

Table 2

HYDROGRAPHIC CHARACTERISTICS OF THE PHANTOM LAKES

Parameter	Units	Upper Phantom	Lower Phantom
Surface Area	acres	110	500
Excluding wetlands	acres	110	281
Volume	acre-feet	1,100	1,800
Maximum Depth	feet	32	12
Mean Depth	feet	10	3.6
Watershed Area	acres		
Direct		271	20,775
Total		271	55,485
Hydraulic Retention	days	361	13

Map 2 BATHYMETRIC MAP FOR UPPER PHANTOM LAKE

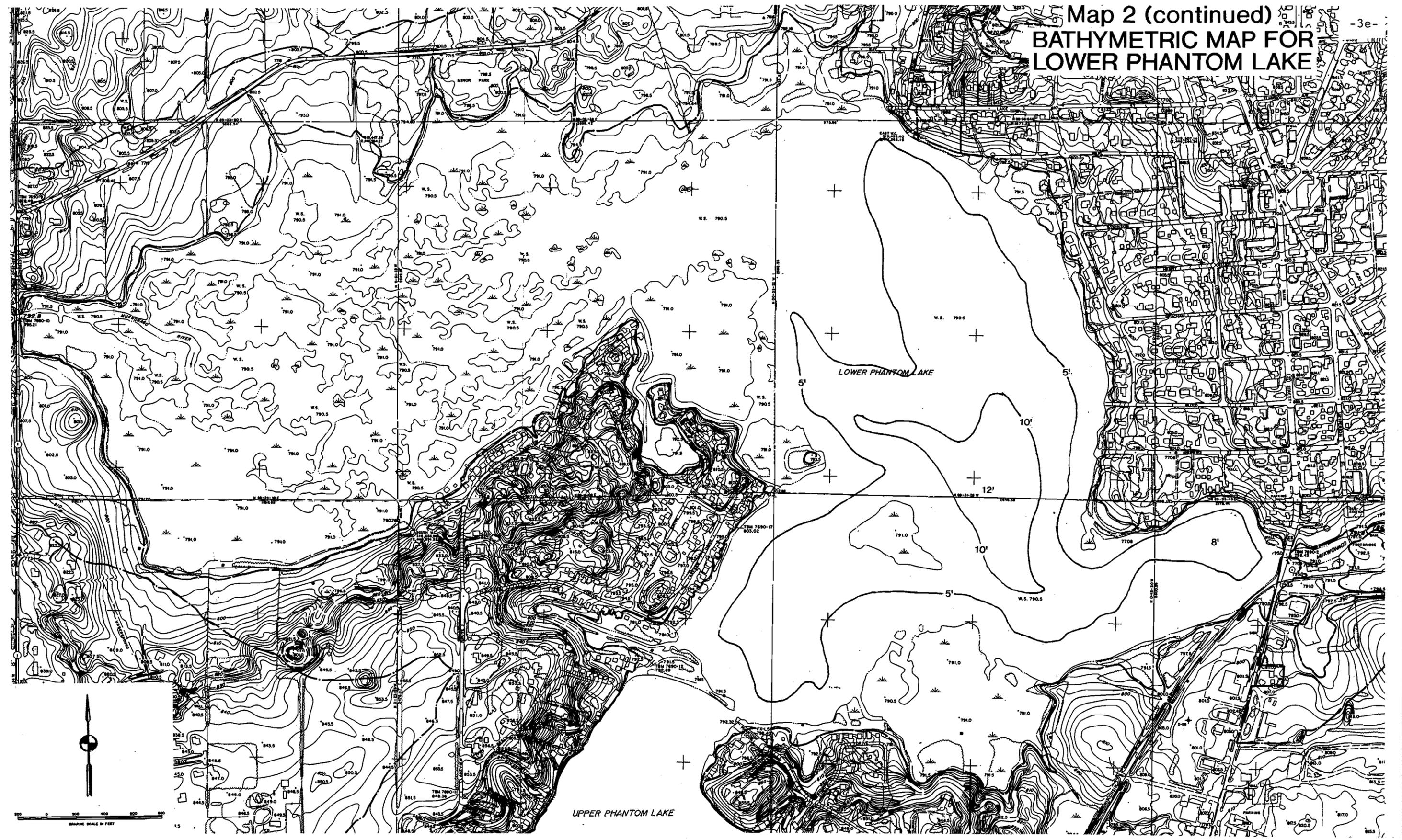


AQUATIC PLANT MANAGEMENT PLAN FOR PHANTOM LAKES, WAUKESHA COUNTY, WISCONSIN - UPPER PHANTOM LAKE

U.S. PUBLIC LAND SURVEY SECTIONS
34, 35 T 5 N R 18 E
MUKWONAGO TOWNSHIP

Map 2 (continued)
**BATHYMETRIC MAP FOR
LOWER PHANTOM LAKE**

-3e-



 **SOUTHEASTERN
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**AQUATIC PLANT MANAGEMENT PLAN FOR PHANTOM LAKES,
WAUKESHA COUNTY, WISCONSIN - LOWER PHANTOM LAKE**

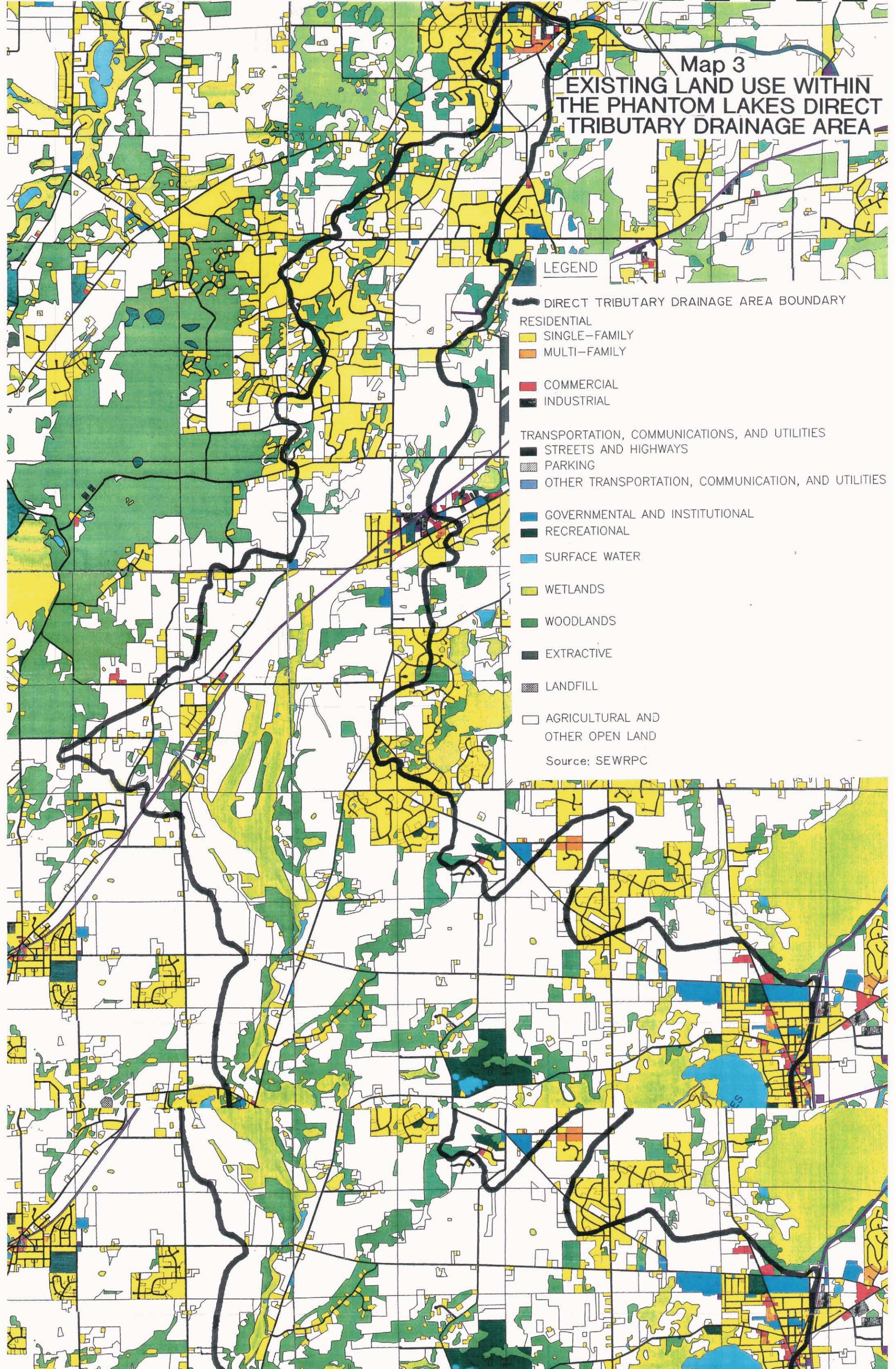
**U.S. PUBLIC LAND SURVEY SECTIONS
26, 27, 34, 35 T 5 N R 18 E
MUKWONAGO TOWNSHIP**

**Map 3
EXISTING LAND USE WITHIN
THE PHANTOM LAKES DIRECT
TRIBUTARY DRAINAGE AREA**

LEGEND

-  DIRECT TRIBUTARY DRAINAGE AREA BOUNDARY
- RESIDENTIAL**
-  SINGLE-FAMILY
-  MULTI-FAMILY
-  COMMERCIAL
-  INDUSTRIAL
- TRANSPORTATION, COMMUNICATIONS, AND UTILITIES**
-  STREETS AND HIGHWAYS
-  PARKING
-  OTHER TRANSPORTATION, COMMUNICATION, AND UTILITIES
-  GOVERNMENTAL AND INSTITUTIONAL
-  RECREATIONAL
-  SURFACE WATER
-  WETLANDS
-  WOODLANDS
-  EXTRACTIVE
-  LANDFILL
-  AGRICULTURAL AND OTHER OPEN LAND

Source: SEWRPC



boat launch and handicapped accessible fishing pier. At least three public roads terminate at the lake shore, providing additional carry-in access opportunities. Private access is provided at five additional sites, which include two camps owned by non-profit organizations on the Upper Lake. The Phantom Lakes have traditionally been considered as having adequate public access.⁵

Land Use: In 1990, as shown on Map 3 and presented in Table 1, urban land uses occupied about 12 percent of the 20,775-acre direct drainage area of the Phantom Lakes. Approximately the same percentage is occupied by lands designated as environmental corridor. Surface waters covered a further 2.5 percent of the direct drainage area. The riparian residential areas and access sites--including an 80-household, backlot development with lake access rights--may be considered to be largely developed with some potential for infilling on a limited number of platted lots. The GTH ES highway corridor has been identified as a residential growth axis for the community in the SEWRPC Planning Report No. 40, A Regional Land Use Plan for Southeastern Wisconsin--2010, February 1992, and further residential expansion in the watershed of the Lakes within the Village of Mukwonago urban area is anticipated, with a corresponding loss of rural lands primarily agricultural lands.

Aquatic Plants, Distribution and Management Areas

Several surveys of aquatic plant communities in the Phantom Lakes have been conducted. In 1967 and again in 1980, the DNR conducted aquatic plant surveys in both lake basins and compiled the results into species and abundance rating lists, as shown in Table 3. These surveys identified some 26 species of plants, approximately half of which were common to abundant, with a greater variety of species being found in the Lower Phantom Lake than in the Upper. Species that interfere with the recreational or aesthetic use of the lakes, such as Potamogeton pectinatus, Myriophyllum sp., and Elodea canadensis, were all identified as common to abundant in these surveys, and were especially dense in the Lower Phantom Lake. These previous studies described the distribution of these plants in terms of three zones relative to the habitat characteristics--submergent, floating leaved or emergent--of the plant species involved. Again, the latter species were most abundant in the Lower Lake, which was the most severely impacted, in terms of recreational use, of the two lakes. In contrast, the Upper Lake was dominated by a low-growing Chara sp. which rarely interfered with recreational usage.

An abbreviated study, conducted by the DNR in July 1992 off the Whispering Bay development on the western shore of the Lower Lake, resulted in the compilation a list of some 19 aquatic plant species, mostly of the submergent and floating leaved varieties.

The most recent survey of plant species in the two lake basins was conducted by staff of the Southeastern Wisconsin Regional Planning Commission during June/July 1993. The results of this survey are also presented in Table 3, and graphically depicted in Map 4. Few changes in the species composition and distribution of plants in the Phantom Lakes were observed. The flora of the Upper Lake remained impoverished compared with that of the Lower Lake; the flora of the Lower Lake remained dominated by predominantly native Myriophyllum

⁵Edward R. Schumacher, Inland Fisheries Supervisor, DNR Bureau of Fish Management, Personal Communication, August 3, 1993.

Table 3

AQUATIC PLANT SPECIES PRESENT IN THE PHANTOM LAKES

Aquatic Plant	Relative Abundance ^a			
	1967	1980	1992 ^b	1993
LOWER PHANTOM LAKE				
<i>Ceratophyllum demersum</i> (coontail)	c	c	p	c
<i>Chara vulgaris</i> (muskgrass)	c	a	p	a
<i>Elodea canadensis</i> (waterweed)	c	c	p	c
<i>Myriophyllum</i> sp. (water milfoil)	-	-	p	-
<i>M. exalbescens</i> (water milfoil)	a	a	-	-
<i>M. heterophyllum</i> (water milfoil)	-	-	-	a
<i>M. spicatum</i> (eurasian water milfoil)	-	-	p	s
<i>Najas</i> sp. (bushy pondweed)	c	c	-	-
<i>N. guadalupensis</i> (southern naiad)	-	-	p	s
<i>Polygonum</i> sp. (smartweed)	s	-	-	s
<i>Potamogeton amplifolius</i> (large leaf pondweed)	c	a	p	c
<i>P. crispus</i> (curly leaf pondweed)	s	s	p	s
<i>P. filiformis</i> (narrow-lead pondweed)	-	-	p	-
<i>P. illinoensis</i> (Illinois pondweed)	-	-	p	-
<i>P. natans</i> (floating leaf pondweed)	c	a	p	c
<i>P. pectinatus</i> (Sago pondweed)	s	a	p	c
<i>P. praelongus</i> (white stem pondweed)	s	-	p	c
<i>P. richardsonii</i> (clasping leaf pondweed)	-	c	p	-
<i>P. zosteriformis</i> (flatstem pondweed)	c	a	p	c
<i>Ranunculus trichophyllus</i> (water crowfoot)	s	-	-	-
<i>Utricularia</i> sp. (bladderwort)	s	a	p	c
<i>Valisneria americana</i> (wild celery)	c	c	p	c
<i>Lemma</i> sp. (duckweed)	s	-	-	s
<i>Nuphar variegatum</i> (bulhead pond lily)	a	c	p	c
<i>Nymphaea</i> sp. (white water lily)	c	c	p	c
<i>Decodon</i> sp. (swamp loosestrife)	a	a	-	a
<i>Rumex</i> sp. (dock)	s	-	-	-
Cyperaceae (sedges)	c	a	-	-
<i>Scirpus</i> sp. (bulrush)	s	a	-	c
<i>Sparganium</i> sp. (burreed)	c	-	-	-
<i>Typha</i> sp. (cattail)	c	a	-	a
<i>Zizania aquatica</i> (wild rice)	s	s	-	-

-continued-

Table 3 (cont'd)

Aquatic Plant	Relative Abundance		
	1967	1980	1993
UPPER PHANTOM LAKE			
<i>Ceratophyllum demersum</i> (coontail)	c	s	-
<i>Chara vulgaris</i> (muskgrass)	a	a	a
<i>Elodea canadensis</i> (waterweed)	s	c	-
<i>Myriophyllum exalbescens</i> (water milfoil)	s	a	-
<i>M. heterophyllum</i> (water milfoil)	-	-	c
<i>M. spicatum</i> (eurasian water milfoil)	-	-	s
<i>Najas</i> sp. (bushy pondweed)	c	c	s
<i>Nitella</i> sp. (nitella)	c	-	-
<i>Potamogeton</i> sp. (unidentified)	s	-	-
<i>P. amplifolius</i> (large leaf pondweed)	s	a	-
<i>P. crispus</i> (curly leaf pondweed)	s	s	-
<i>P. gramineus</i> (variable pondweed)	s	-	-
<i>P. natans</i> (floating leaf pondweed)	s	-	-
<i>P. oakesianus</i>	s	-	-
<i>P. pectinatus</i> (Sago pondweed)	c	a	-
<i>P. praelongus</i> (white-stemmed pondweed)	-	-	s
<i>P. richardsonii</i> (clasping leaf pondweed)	s	-	-
<i>P. zosteriformis</i> (flatstem pondweed)	s	-	s
<i>Utricularia</i> sp. (bladderwort)	s	-	s
<i>Valisneria americana</i> (wild celery)	c	c	s
<i>Nuphar variegatum</i> (bulhead pond lily)	s	-	s
<i>Nymphaea</i> sp. (white water lily)	s	-	s
<i>Decodon</i> sp. (swamp loosestrife)	s	-	s
Cyperaceae (sedges)	s	-	-
<i>Scirpus</i> sp. (bulrush)	s	s	-
<i>Typha</i> sp. (cattail)	s	s	s

*Species mean density rating for all sample points including sample points where a particular species did not occur in the Phantom Lakes:

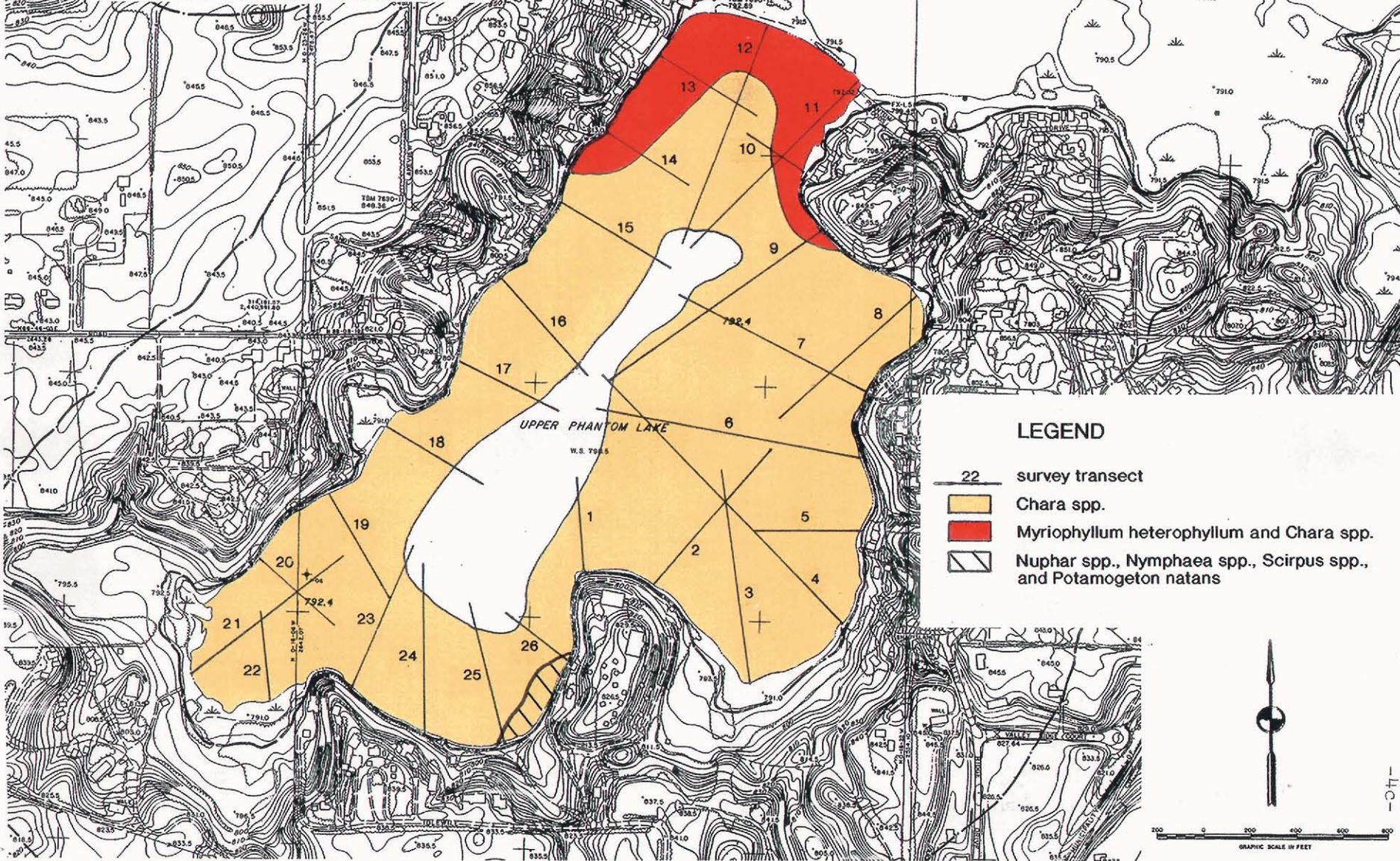
A = abundant (density rating = 4 to 5), C = common (density rating = 2 to 3), S = scarce (density rating = 1), and - = absent (density rating = 0).

^bAquatic plant survey conducted by DNR in Whispering Bay, Lower Phantom Lake, July 1992. Source: DNR-SED memorandum referenced 3200 and dated September 15, 1992. p = present (no density rating given).

Source: SEWRPC

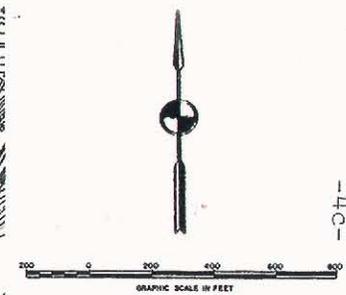
Map 4

AQUATIC PLANT COMMUNITY DISTRIBUTION IN UPPER PHANTOM LAKE

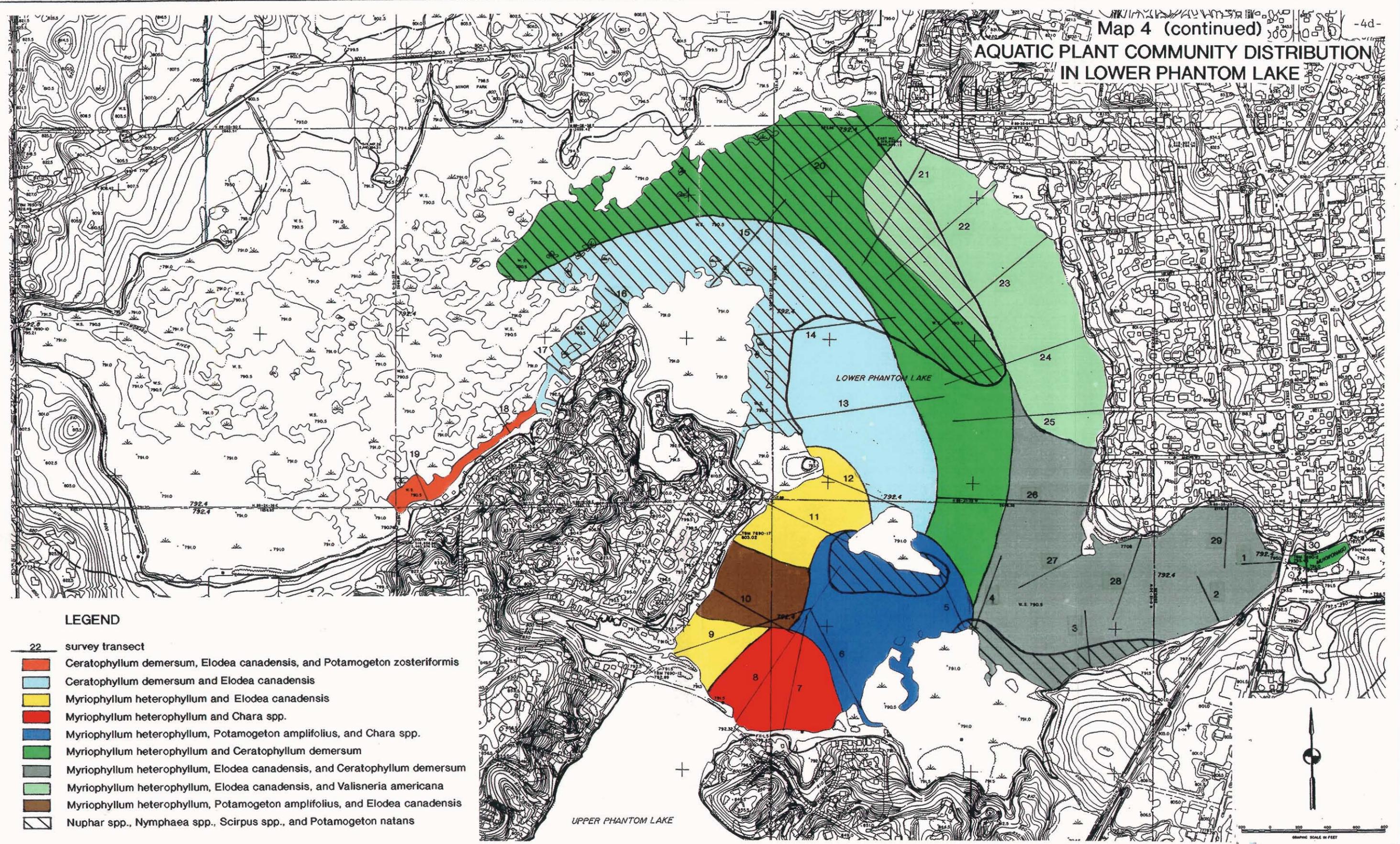


LEGEND

-  survey transect
-  Chara spp.
-  Myriophyllum heterophyllum and Chara spp.
-  Nuphar spp., Nymphaea spp., Scirpus spp., and Potamogeton natans



**AQUATIC PLANT COMMUNITY DISTRIBUTION
IN LOWER PHANTOM LAKE**



LEGEND

- 22 survey transect
- Ceratophyllum demersum, Elodea canadensis, and Potamogeton zosteriformis
- Ceratophyllum demersum and Elodea canadensis
- Myriophyllum heterophyllum and Elodea canadensis
- Myriophyllum heterophyllum and Chara spp.
- Myriophyllum heterophyllum, Potamogeton amplifolius, and Chara spp.
- Myriophyllum heterophyllum and Ceratophyllum demersum
- Myriophyllum heterophyllum, Elodea canadensis, and Ceratophyllum demersum
- Myriophyllum heterophyllum, Elodea canadensis, and Valisneria americana
- Myriophyllum heterophyllum, Potamogeton amplifolius, and Elodea canadensis
- Nuphar spp., Nymphaea spp., Scirpus spp., and Potamogeton natans

species, and Ceratophyllum demersum and Elodea canadensis, which ranged in abundance from common to abundant in various areas of the lake (Table 4). The overall abundance of plants in the Phantom Lakes system remained high with few notable changes in the composition of the flora. Eurasian water milfoil, while present, was not widespread; however, the distribution of this plant should be monitored as part of the Self-help Monitoring Program described below.

The theoretical maximum depth of colonization of aquatic macrophytes in the Phantom Lakes is about 17 feet.⁶

Fisheries, Wildlife and Waterfowl

The Phantom Lakes are well-known for their bass and panfish fisheries. The DNR Publication No. PUBL-FM-800 91, *Wisconsin Lakes*, 1991, also indicates that northern pike are common. No stocking has been carried out on the Phantom Lakes since 1972, when the last introductions of record were made. Good bass breeding habitat exists almost exclusively in the Upper Lake.

Given the urban nature of the shorelands, only small animals and limited numbers of waterfowl generally inhabit these areas, although somewhat greater numbers make use of the parkland areas both on the (Lower) Lake and upstream. There are numerous pairs of swans on the Lower Lake and geese are especially abundant. Active breeding colonies of both bird species inhabit the lake and surrounding wetlands during spring and early summer.

Recreation

Recreational Uses: The Phantom Lakes are multi-purpose waterbodies serving all forms of recreation, including boating (especially sailing and canoeing in the Upper Lake), swimming, and fishing during the summer months and snowmobiling and ice-fishing during the winter. The lakes are used year-round as a visual amenity; walking, bird-watching and picnicking being popular passive recreational uses of the waterbodies. Given the shallow nature of the Lower Lake, little use is made of that lake for waterskiing compared to other area lakes, but waterskiing is possible and popular on the Upper Phantom Lake.

Recreational Facilities: There are several private recreational facilities on the Phantom Lakes, as well as a public park and boat launch site as shown on Map 3. Two non-profit organizations maintain summer camps on the Upper Phantom Lake, while other amenities are provided by the private sector adjacent to the channel linking the Upper and Lower Phantom Lakes. Several local retail outlets exist in close proximity to the Lakes, including the Village of Mukwonago central business district and shopping area. A public beach facility is located just above the outlet of the Lower Phantom Lake on the east side of CTH ES. A number of local retailers specialize in sporting goods, including angling and boating supplies, and cater to the needs of lake users.

Local Ordinances

Both Phantom Lakes are subject to boating ordinances promulgated by the Village and Town of Mukwonago (Appendix A). These ordinances provide generally applica-

⁶Moore, L. and K. Thornton, U. S. Environmental Protection Agency Report No. EPA-440/5-88-002, The Lake and Reservoir Restoration Guidance Manual, 1988.

Phantom.tb4/jat

Table 4

FREQUENCY OF OCCURENCE AND DENSITY RATINGS
OF MAJOR PLANT SPECIES IN THE PHANTOM LAKES: JULY 1993

Plant Species	Sites Found	Frequency of Occurrence	Density* at Sites Found	Density In Whole Lake
LOWER PHANTOM LAKE (83 Sampling Points)				
<i>M. heterophyllum</i>	69	83%	3.0	2.5
<i>M. spicatum</i>	27	33	1.2	0.4
<i>C. demersum</i>	36	43	2.1	0.9
<i>E. canadensis</i>	36	43	2.4	1.0
<i>Chara spp.</i>	19	23	2.3	0.5
<i>V. americana</i>	23	28	1.0	0.5
UPPER PHANTOM LAKE (107 Sampling Points ^b)				
<i>M. heterophyllum</i>	17	16%	2.2	0.4
<i>M. spicatum</i>	9	8	1.1	0.1
<i>C. demersum</i>	- - - - -	not found	- - - - -	- - - - -
<i>E. canadensis</i>	- - - - -	not found	- - - - -	- - - - -
<i>Chara spp.</i>	71	66	3.6	2.4
<i>V. americana</i>	16	15	1.25	0.2

* Density is expressed on the 5 point WDNR rating scale, where a score of 5 = abundant, 1 = scarce.

^b Includes 22 sites where no plants were recovered.

ble rules for all waters within the jurisdictions of the two local authorities, and for specific rules affecting the use of the Upper and Lower Phantom Lakes. On the Upper Lake, these rules limit the times during which waterskiing may take place and during which boats may operate at high speeds. Similar rules apply to the Lower Phantom Lake; in addition, aqua-planing and para-sailing are specifically prohibited on the Lower Lake. On the Upper Phantom Lake, these activities are covered under the general prohibitions applicable to that waterbody. These ordinances conform to State of Wisconsin boating and water safety laws pursuant to Chapters 23, 30 and 159, Wis. Stats.

USE RESTRICTIONS IMPOSED BY AQUATIC PLANTS

Heavy plant growth, of up to 85 percent of the water surface area, impedes boating traffic in the Phantom Lakes system. In particular, the excessive plant growth in the Lower Phantom Lake basin makes this waterbody impassable without a plant control strategy. Even with such a strategy, boating access to the Lower Lake is restricted to a narrow band along the edges of the waterbody. Such dense growths also severely restrict shoreline angling and swimming, and even impair aesthetic use of that waterbody as the resultant plant growth is visually unappealing and, at times, odoriferous. The result is numerous public complaints throughout the summer season.

The abundance of aquatic plants in the Lower Lake basin along County Highway ES-- the principal southern entrance to the Village of Mukwonago--not only adversely affects riparian property values and the aesthetic enjoyment of the residents, but reflects poorly on the image of the Town and Village of Mukwonago, since both communities share this common "Gateway". Further, SEWRPC Planning Report No. 40, A Regional Land Use Plan For Southeastern Wisconsin--2010, identifies this corridor for medium density residential development, a land use that may be adversely affected by the perceived excessive growth of aquatic plants based on the access and aesthetic considerations involved. The Phantom Lakes Management District regularly receives complaints from the residents of a recent condominium development situated on the lake shore regarding the present level of aquatic plant growth. While these recent developments are situated to landward of a particularly rich aquatic flora, which the Phantom Lakes Management District wishes to encourage and preserve, the District recognizes the need to provide for riparian access and, hence, the need for an aquatic plant management plan that balances riparian rights with the ecological integrity of the lake system.

PAST AND PRESENT AQUATIC PLANT MANAGEMENT PRACTICES

A DNR approved "Nuisance Weed Control Program" has been undertaken at Phantom Lakes since 1941. This program initially involved the chemical treatment of aquatic plants using aquatic herbicides, including sodium arsenite, copper compounds and organic chemicals. However, following a program of public information and education undertaken by the Phantom Lakes Management District, herbicide use has been discontinued and no further applications of aquatic herbicides have taken place since 1987. Other aquatic plant management techniques, including bottom covering, shoreland rip-rap, and, in the Lower Lake, limited drawdowns, have also been employed in an effort to reduce the extent of plant growth in the lakes. Given the extent and abundance of plant growth in this lake, these alternative methods have been perceived as less than successful by the community.

Since the mid-1980s harvesting has been the preferred method of controlling aquatic plant growth in the lakes. The Phantom Lakes Management District has operated an aquatic plant harvester on the lakes for many years. The present machine is nearing the end of its productive life, being over ten years old and subject to frequent and costly maintenance. This equipment needs to be replaced. Breakdowns notwithstanding, the equipment operates--primarily on the Lower Phantom Lake--40 hours per week, weather permitting, during spring and summer (May 15 to September 15). During the last two years, approximately 200 truckloads of aquatic plant biomass have been removed during the months of June, July and August, primarily from the Lower Lake. In addition, residents remove nuisance aquatic plants from their own shoreland areas using rakes and other manual harvesting techniques.

The change from chemical controls, as summarized in Table 5, to mechanical control of the nuisance plant materials has been viewed by most residents and riparian owners as a favorable change in plant management policy, resulting in an equally "good" effect with less potential for long term environmental damage. Harvesting has generally improved the aesthetic appearance of the resource and is consistent with the recommendations set for these lakes in the Regional water quality management plan.⁷ Finally, harvesting has permitted recreational uses to continue at this popular and well-used water resource.

ALTERNATIVE METHODS FOR AQUATIC PLANT CONTROL

Background

Physical, chemical, manual and mechanical methods of controlling aquatic plants are potentially viable for use of the Phantom Lakes.⁸ In addition, public education and information programs are an important auxiliary component of any aquatic plant management strategy. Consideration has been given to each of these alternatives. A number of these aquatic plant management techniques have been employed on the Phantom Lakes with varying degrees of success in the past.

Physical Controls

Two physical control methods were considered for use on the Phantom Lakes; namely, draw-down and the use of shoreline stabilization. Draw-down, or the temporary reduction of water levels within the impounded portion of the lakes, is intended to expose the aquatic plants to extreme temperatures--drying (desiccating) the plants during the summer and freezing them during the winter--while consolidating the organic sediments that form the substrate of the rooted plant species in order to reduce the re-growth of plants during the subsequent growing season or seasons. Draw-downs are usually carried out over a four- to six-month period which includes either a winter or summer season to achieve the greatest effect. The procedure is rarely completely effective, destroying some plant species while encouraging others including some of the less desirable invasive species. It must also be repeated on a two year rotational schedule

⁷ SEWRPC Planning Report No. 30, A Regional Water Quality Management Plan for Southeastern Wisconsin--2000, Volume Two: Alternative Plans, February 1979.

⁸The various methods referred to in the text are described in more detail in U.S. Environmental Protection Agency Report No. EPA 440/4-90-006, The Lake and Reservoir Restoration Guidance Manual, Second Edition, August 1990.

Phantom.tb5/jat

Table 5

AQUATIC HERBICIDE USE ON THE PHANTOM LAKES

Year	Acres	Sodium Arsenite (pounds)	Diquat (pounds)	Diquat (gallons)	Aquathol (gallons)	Endothol (pounds)	K-Endothall (gallons)	2,4-D (pounds)	2,4,5-T (pounds)	Copper Sulfate (pounds)
1959	--	1,080	--	--	--	--	--	--	--	--
1960	--	1,260	--	--	--	--	--	--	--	100
1961	--	1,176	--	--	--	--	--	--	--	100
1962	--	360	--	--	--	--	--	--	--	--
..										
1967	--	--	--	--	--	--	--	60	--	--
1968	--	--	--	--	--	--	--	1,860	--	--
1969	--	--	128	--	--	30	--	360	40	45
1970	45	--	--	9	1,200	--	26.5	--	--	103.3
1971	25.5	--	--	--	--	--	--	--	--	115
..										
1973	103.4	--	--	--	160	--	--	--	--	450 gal
1974	53.7	--	--	--	--	--	--	--	--	285
1975	29	--	--	--	--	--	90	--	--	150
..										
1977	--	--	--	--	--	--	--	--	--	--
TOTALS	256.6	3,876	128	9	1,360	30	116.5	2,280	40	898.3 450gal

Source: Wisconsin Department of Natural Resources

for maximum effectiveness. On the Phantom Lakes, the potential exists for the conduct of a three-foot draw-down. However, draw-down is not considered practical due to the heavy recreational demands placed on the lake throughout the year. Although the District has employed this technique on occasion to conduct dam and shoreline maintenance, the regular use of this technique necessary to control plant growth is not considered to be generally practicable at this time.

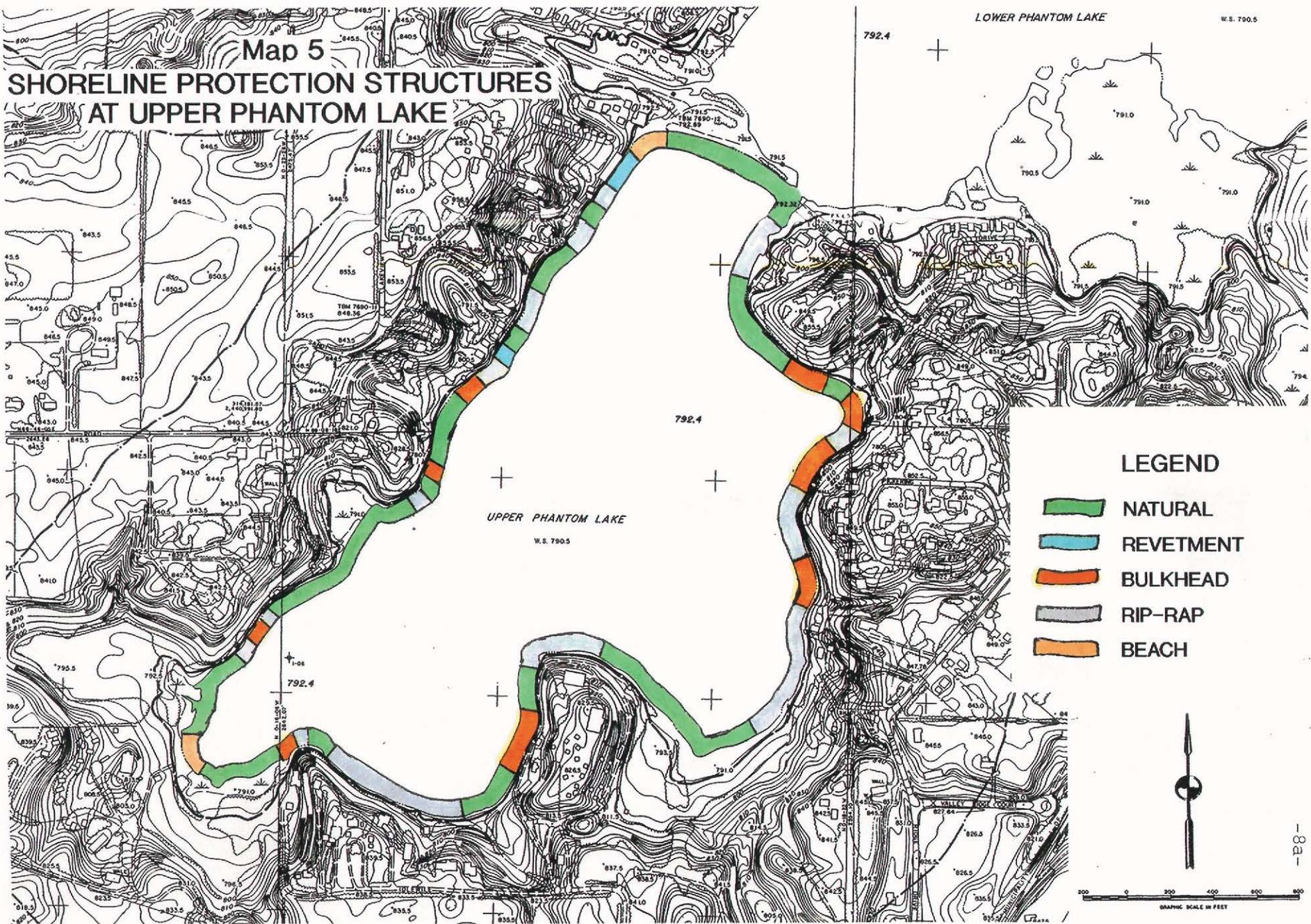
Another physical method--the use of shoreland stabilization techniques to modify portions of the shoreline and control the growth of the shoreland plants, especially in the Upper Lake--has proven more sustainable and has been employed in those areas where access is desired. These areas are generally adjacent to residential areas of shoreline as shown on Map 5. The objective of these shoreland stabilization techniques, which include riprap and wooden, typically railway tie, bulkheads, is to protect or modify the shorelands of the lake in such a way that the establishment of rooted aquatic plants is discouraged. Riprap, for example, is essentially a bottom-covering technique which replaces the organic nearshore sediments with rock; bulkheads replace gently sloping shoreline sediments with a vertical barrier creating higher levels of turbulence in this nearshore zone. In the Phantom Lakes, few of the remaining areas of lake shoreline are amenable to use of this type of control. Use of riprap should be especially avoided in the area of the Mukwonago River inflow as the present lack of a defined river channel enhances the beneficial filtering effect provided by the headwater wetlands of Lower Phantom Lake. The use of other forms of bottom-covering barriers such as aqua-screens might be beneficial in some shallow shoreland areas--around docks and piers, for example.

Chemical Controls

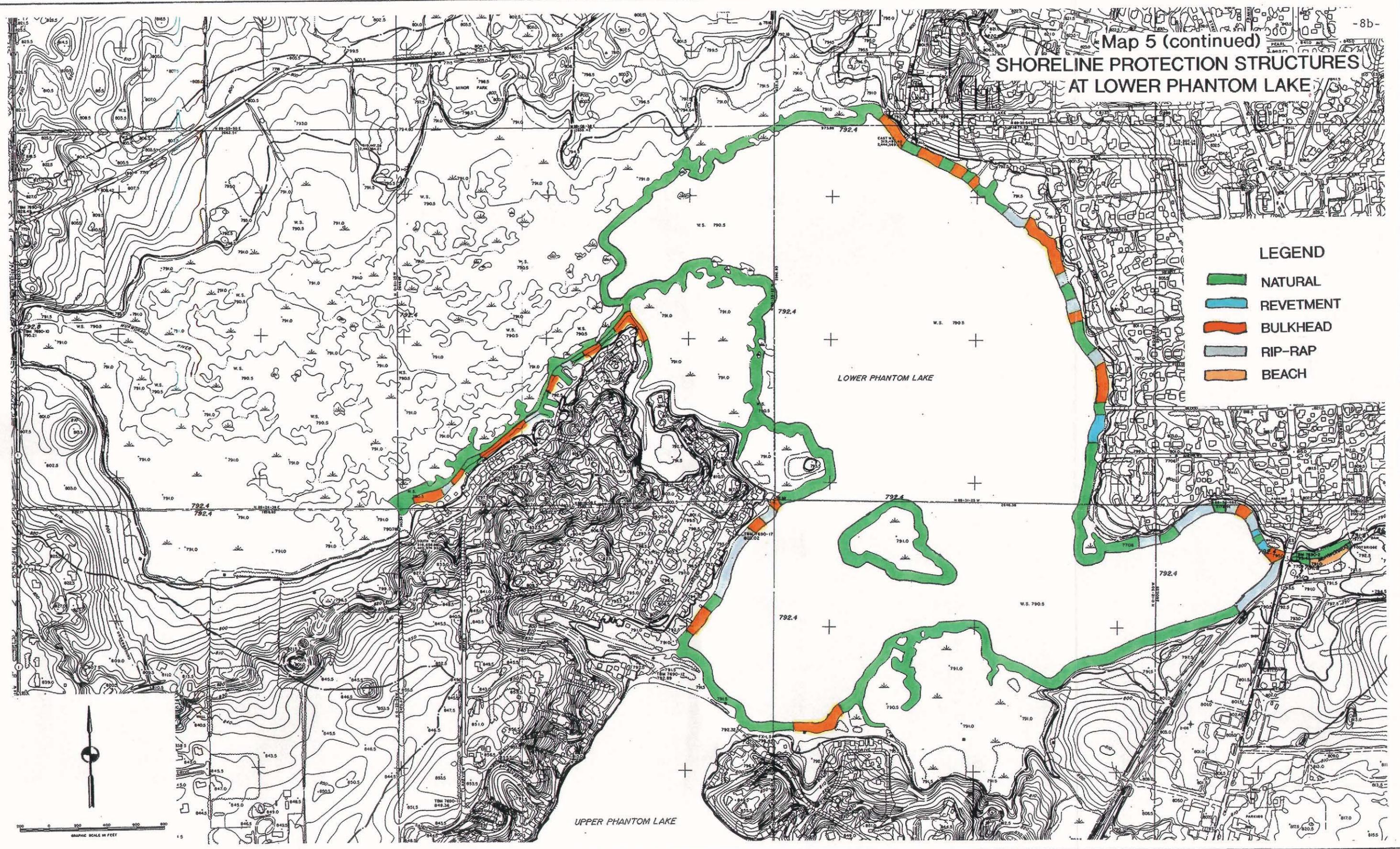
Chemical controls are viewed by the some within community as having potential long-term environmental impacts as well as possible consequences for groundwater contamination which could ultimately affect drinking water supplies in the area. While all of the herbicides likely to be used in these lakes are registered with, and approved by, the U.S. Environmental Protection Agency, the largely unknown, but potential, human health impacts of these chemicals are cause for concern among riparian residents who have voluntarily refrained from their wide-spread use in the system.

In addition, in the Lower Lake, where the greatest plant biomass is situated, the presence of extensive wetlands, waterfowl and fish breeding areas, and diverse communities of native aquatic vegetation as shown on Map 6, make wide-spread application of aquatic herbicides undesirable. The large area and lack of fine-scale control over both the area of application--given the tendency of the liquid herbicides commonly used to treat aquatic plant growth in the Region to diffuse in the water column in the direction of the prevailing winds--and the types of plants affected--given the broad spectrum of many of the herbicides in common usage in the Region, which limit the degree of selectivity possible--further mediate against the wide-spread use of these controls.

Map 5
SHORELINE PROTECTION STRUCTURES
AT UPPER PHANTOM LAKE



SHORELINE PROTECTION STRUCTURES AT LOWER PHANTOM LAKE

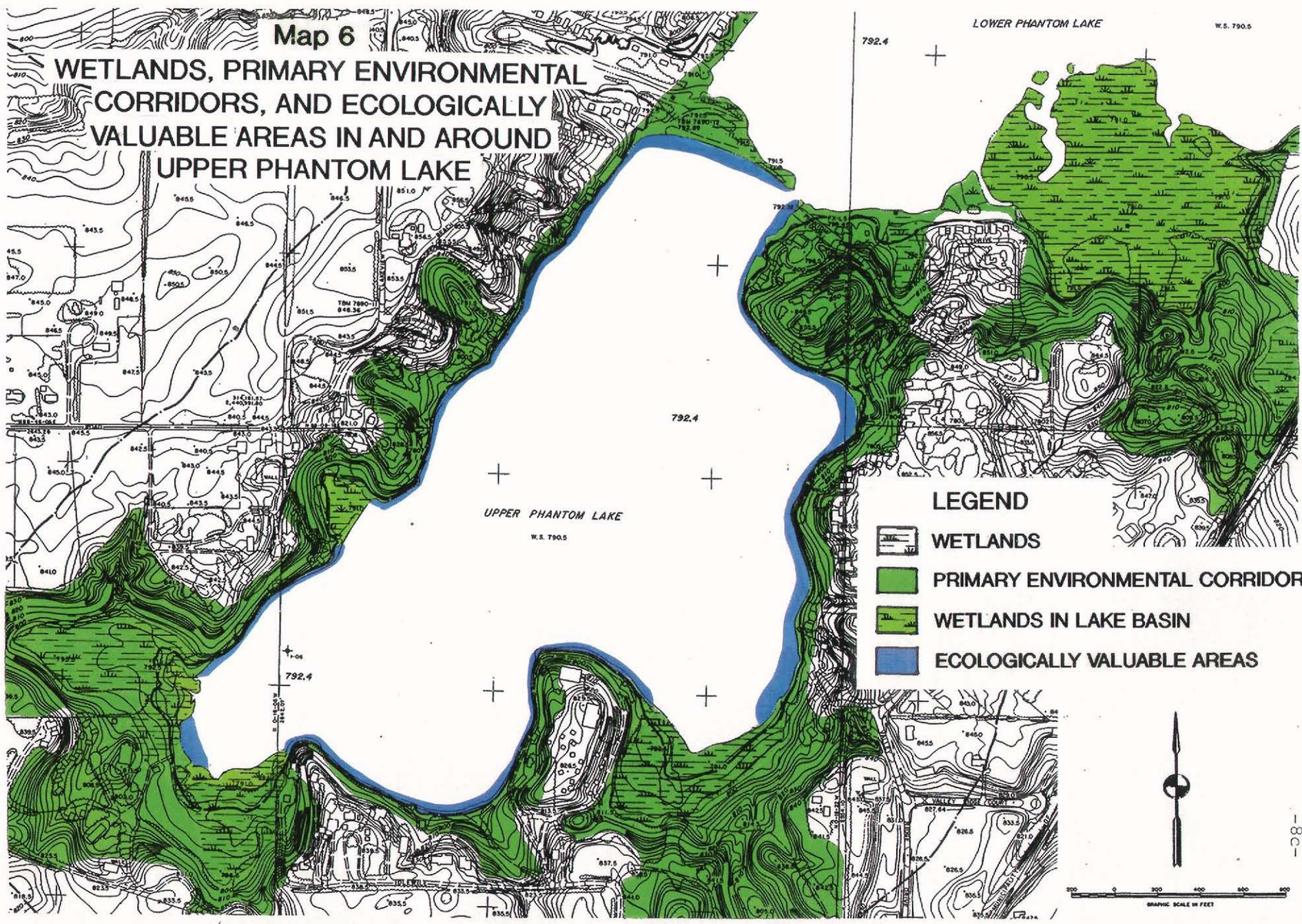


Map 6

WETLANDS, PRIMARY ENVIRONMENTAL CORRIDORS, AND ECOLOGICALLY VALUABLE AREAS IN AND AROUND UPPER PHANTOM LAKE

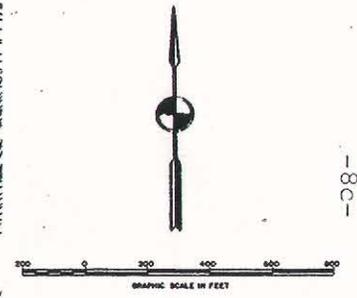
LOWER PHANTOM LAKE

W.S. 790.5

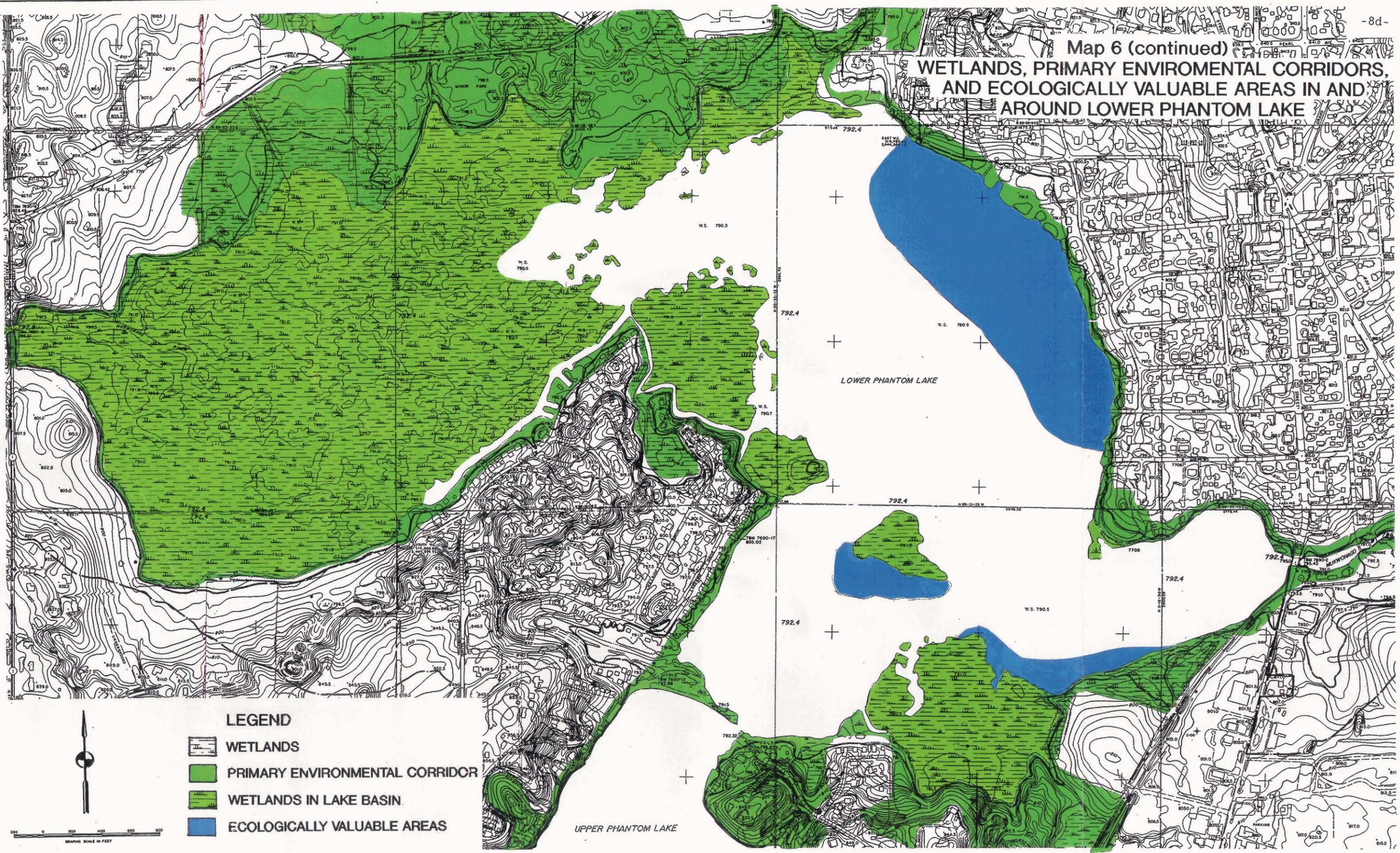


LEGEND

-  WETLANDS
-  PRIMARY ENVIRONMENTAL CORRIDOR
-  WETLANDS IN LAKE BASIN
-  ECOLOGICALLY VALUABLE AREAS



Map 6 (continued) WETLANDS, PRIMARY ENVIRONMENTAL CORRIDORS, AND ECOLOGICALLY VALUABLE AREAS IN AND AROUND LOWER PHANTOM LAKE



- LEGEND**
-  WETLANDS
 -  PRIMARY ENVIRONMENTAL CORRIDOR
 -  WETLANDS IN LAKE BASIN
 -  ECOLOGICALLY VALUABLE AREAS

Aquatic herbicides are relatively expensive. Treatment costs are estimated at between \$300 and \$400 per acre treated.⁹ In a waterbody the size of the Phantom Lakes, this would result in an annual treatment cost on the order of \$20,000 for the approximately 50 acre area proposed for harvesting on Map 7 to about \$45,000 per year for the largest treatment carried out in Table 5.

Finally, while aquatic herbicides produce a rapid response amongst the target plant species and are relatively easy to use, they do leave the plant remains to decompose in the lake basin, which, in the case of the Lower Phantom Lake, will, over time, aggravate the existing problem of lack of lake depth. Further, enhanced decomposition could potentially deplete in-lake oxygen levels to below critical levels for the maintenance of the fish population of the lake, while the presence of the herbicide and its residues, however inert, combined with the depleted aquatic flora, could bode ill for the avifauna currently inhabiting the

lakes and their environs. And these treatments will have to be repeated at least annually to be effective in controlling the growth of the plants present in the Phantom Lakes system.

Thus, given the relatively high cost of this option and the need for repeated annual or semi-annual treatments with their potentially negative consequences, this option is not feasible on the scale required to control the biomass present in the Phantom Lakes system.

Manual Controls

Manual methods will be needed to control near shore aquatic plants, and collect floating material from the mechanical harvesting operations. Manual methods are most effective in these types of applications. However, manual techniques are difficult to employ on a large-scale, being the least efficient aquatic plant control methods. The methods are too labor-intensive and time-consuming to be employed on the scale needed to manage aquatic plant growth problems in the Phantom Lakes. They are, however, the recommended methods of control for small-scale application in and around piers, docks and other access points that cannot be reached by mechanical means as described below.

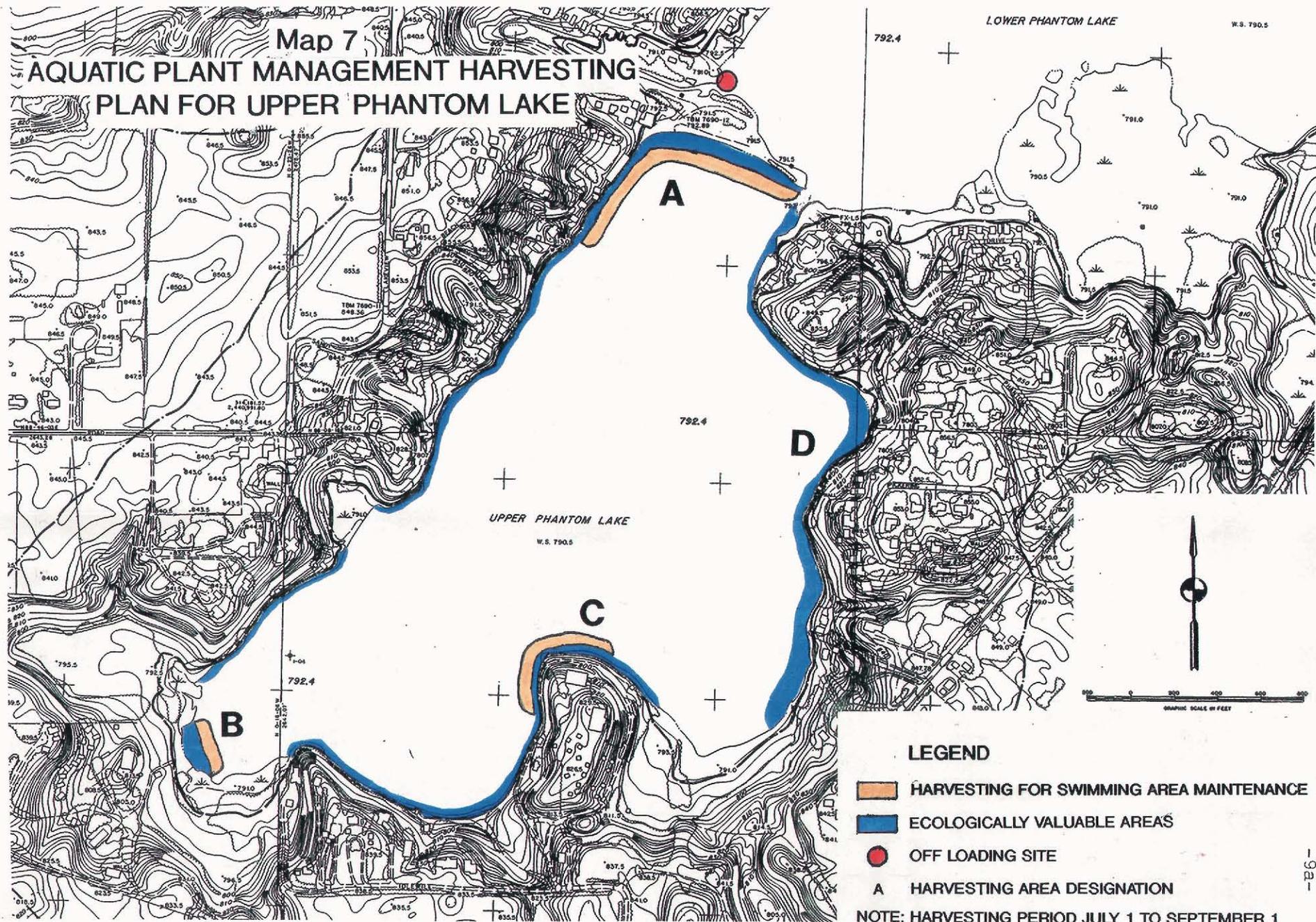
Mechanical Controls

Mechanical harvesting permits a high degree of control over both the depth and area of treatment, and provides for the removal of the plant biomass from the waterbodies, reducing the potentials for nutrient leaching back into the lakes and for the occurrence of oxygen depletion effects. Nevertheless, manual collection of cut plant fragments not captured by the harvester must remain an integral part of the harvesting procedure, as indicated above, in order to avoid the spreading and regrowth of plant fragments in downwind areas of the lake. This will require that the existing level of control and supervision exercised by the Lake District Commission be maintained in order to avoid any undesirable impacts on the environmentally and ecologically sensitive areas in these lakes. Potential impacts include the resuspension of lake bottom sediments in shallow

⁹Chemical application costs are based on estimates given by James Schmidt, Surface Water Product Manager, Marine Biochemists, Inc., in SEWRPC Community Assistance Planning Report No. 182, A Water Use Management Plan for Waubeesee Lake and the Anderson Canal, Racine County, Wisconsin, December 1990.

Map 7

AQUATIC PLANT MANAGEMENT HARVESTING PLAN FOR UPPER PHANTOM LAKE

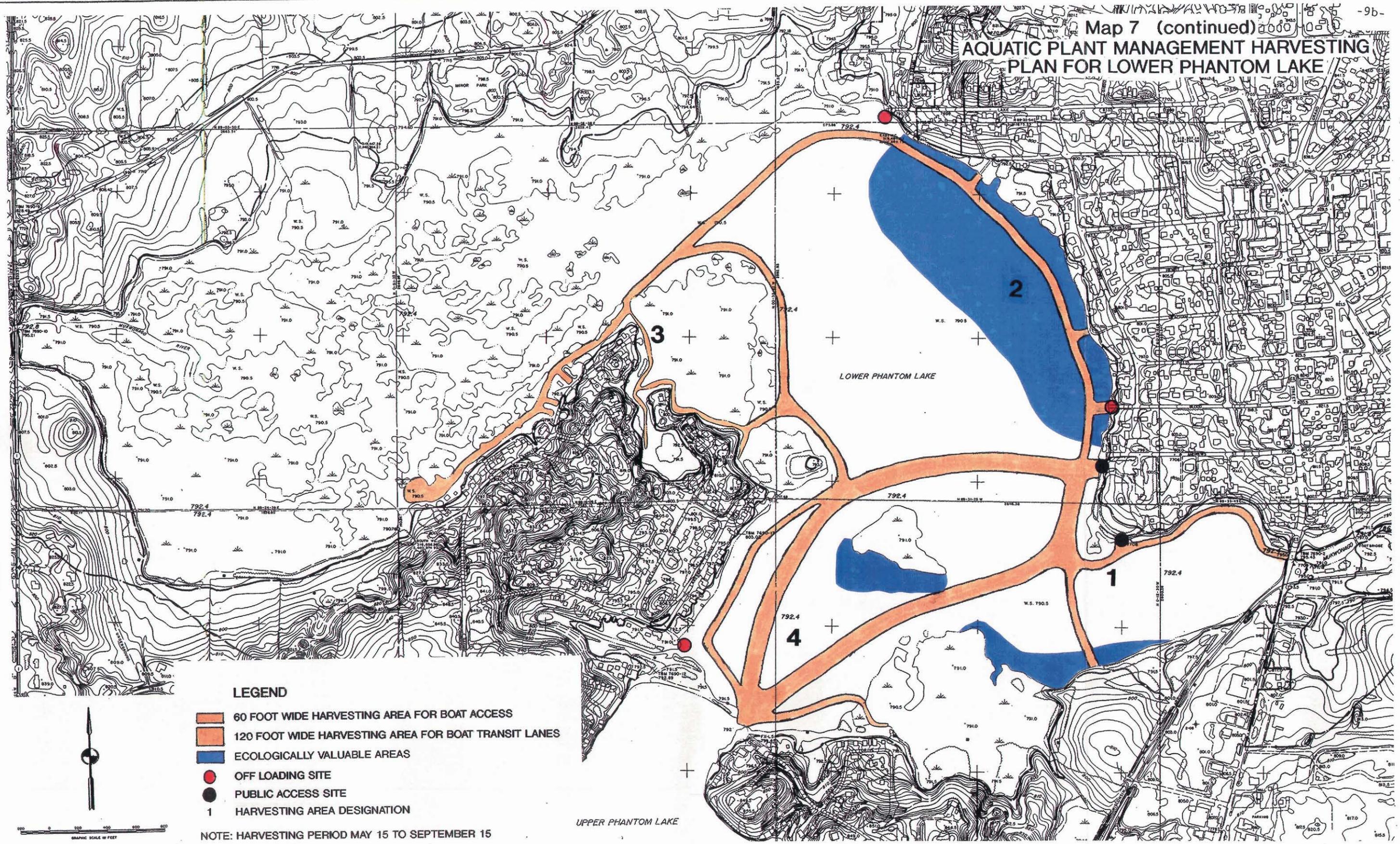


LEGEND

-  HARVESTING FOR SWIMMING AREA MAINTENANCE
-  ECOLOGICALLY VALUABLE AREAS
-  OFF LOADING SITE
- A** HARVESTING AREA DESIGNATION

NOTE: HARVESTING PERIOD JULY 1 TO SEPTEMBER 1

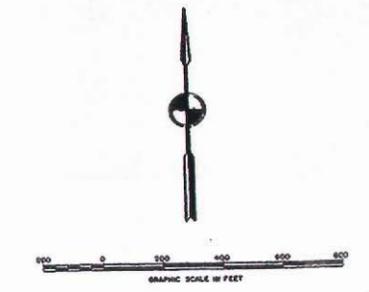
Map 7 (continued) AQUATIC PLANT MANAGEMENT HARVESTING PLAN FOR LOWER PHANTOM LAKE



LEGEND

- 60 FOOT WIDE HARVESTING AREA FOR BOAT ACCESS
- 120 FOOT WIDE HARVESTING AREA FOR BOAT TRANSIT LANES
- ECOLOGICALLY VALUABLE AREAS
- OFF LOADING SITE
- PUBLIC ACCESS SITE
- 1 HARVESTING AREA DESIGNATION

NOTE: HARVESTING PERIOD MAY 15 TO SEPTEMBER 15



areas, the capture of fish and other aquatic animals during harvesting, and the spread of plant fragments that escape the collector. Supervision is therefore especially important during periods of fish breeding activity--May 15 to June 30--and in the monitoring of areas where nascent growths of the eurasian water milfoil have been detected. The use of harvesting has the advantage of being controllable with regard to time and location. This alternative also results in the removal of plant growth from the lake, thereby reducing sedimentation and phosphorus levels in the lake. Enrollment of the District in the proposed DNR Milfoil Watch Program, which is being considered as a future component of the Self-help Monitoring Program, is strongly recommended. These, and other operational, issues are described in more detail in the recommended aquatic plant management plan set forth below.

The capital cost of the aquatic plant harvester is relatively high--between about \$70,000 and \$80,000 as set out below, amortized over 10 years--with annual operating costs of about \$20,000. However, the overall costs of this method compare very favorably with those of other techniques, such as chemical treatment for example, which produce similar results. In addition, the Phantom Lakes Management District has had many years experience with mechanical harvesting as an aquatic plant management technique. Based on this experience, as well as on the cost and environmental considerations, mechanical harvesting of the plants appears to be the most practicable means of controlling plant growth in an environmentally-sensitive and cost-effective manner on these Lakes. Thus, the use of mechanical harvester technologies has been selected as the management technique of choice on the Phantom Lakes.

Information and Education

In addition to these in-lake rehabilitation methods, an on-going campaign of community information is proposed to support the aquatic plant management program by encouraging the use of shoreland buffer strips, responsible use of household and garden chemicals, and environmentally-friendly household and garden practices to minimize the input of nutrients and contaminants from these riparian areas. Encouraging or requiring riparians to reduce the amount of nutrients they introduce to the Phantom Lakes watershed contributes to the attainment of the water quality goals in both lakes as set forth in the Regional water quality management plan. The information and education effort will also inform District electors of the benefits accrued through the preservation of an healthy and diverse aquatic flora in the lake, and keep them informed about the aquatic plant management efforts being carried out by the District. Other programming, including "field days for kids" to introduce community youth to the basic concepts of freshwater ecology, is also being considered by the District.

RECOMMENDED AQUATIC PLANT MANAGEMENT PLAN

Harvesting Plan

The recommended aquatic plant management plan is set forth in Map 7. As indicated, it is proposed that aquatic plant management activities be restricted in certain ecologically valuable areas of the lakes. These areas are shown on Maps 6 and 7, and include those portions of the Lower Lake basin which serve as breeding and feeding habitat for a variety of waterfowl, including swans and geese. The upper reaches of the Lower Lake have been classified as wetland and will be excluded from aquatic plant management operations except for the maintenance of the existing boating access channel on the southern bank. In the Upper

Lake, areas of gravel lake bottom suitable for bass breeding habitat have likewise been indicated as ecologically valuable. Aquatic plant management operations will be concentrated in the vicinities of the boating access ramps and in the principal recreational use areas. Approximately 50 acres are proposed for harvesting. Harvesting will begin in channel areas, primarily for hydraulic reasons, during mid-May and continue throughout the summer months, until mid-September. Harvesting in the lake areas supporting breeding habitat will be delayed until early July, as indicated on Map 7.

Harvesting will not take place in shallow waters--generally three feet or less in depth--to avoid disturbance of fish spawning areas and beds of native aquatic plants, except for the limited number of access channels shown on Map 7. It may also be desirable to provide a limited number of "fish lanes" to enhance the lake fishery, although such actions should be based on the recommendation of the DNR area fish manager and follow a fisheries study to determine the necessity of such actions. Special efforts will be made to avoid disturbing major spawning and habitat areas of bass in the Phantom Lakes during the May-June spawning season. However, it is foreseen that manual harvesting of aquatic plants in the vicinities of docks and jetties will be undertaken by individual riparian householders.

As noted above, the goal of the management program is to accommodate recreational uses of the impoundment insofar as possible without disruption of the ecological structure and functioning of the lake ecosystem, and to enhance the public perception of the Phantom Lakes as a "Gateway" to its neighboring communities.

Depth of Harvesting and Treatment of Fragments

The proposed harvesting system--an Aquarius Systems HM-420 Aquatic Plant Harvester--has a maximum cutting depth of 5-1/2 feet. While this exceeds the mean depth of the Lower Phantom Lake, it is not the intention of the owners or operators of the equipment to denude the impoundment of aquatic plants given the ecological value of the waterbody to breeding colonies of waterfowl. Further, the lake hydrography does not permit extensive motorized boat traffic in the Lower Lake, nor do the program goals provide for such uses in that lake. Rather, the harvesting plan recommends establishment of boating access lanes. The depth of harvesting in these boating access lanes will be sufficient to permit use of motors while maintaining the vegetative cover on the lake bottom. This will minimize the resuspension of the lake bottom sediments and reduce the negative consequences of power boat usage in the shallow water portions of the Lakes. The depth of harvesting will be generally between two and three feet below the lake surface.

Plant cuttings and fragments will be collected *in situ* by the harvester. Those fragments accumulating along the shore land areas will be collected by riparian homeowners or collected by the District on request. The District may wish to consider employing additional staff and/or equipment to facilitate such collections.

Buoyage

Given the extremely high plant biomass in the areas to be harvested, and well-defined local landmarks, the use of buoyage has been obviated on the Phantom Lakes. Further, the operators can be made familiar with the plan and local

landmarks to the degree necessary to carry out the plan without the use of buoyage. A laminated copy of the harvesting plan is provided to the harvester operators. Harvester operations on the Phantom Lakes are regularly supervised by a Lake Management District Commissioner.

Harvested Plant Material Transfer Site(s)

Off-loading of harvested plant material will take place at three access sites on the Lower Phantom Lake as shown on Map 7. One further site is proposed on the Upper Lake. Plant material is transferred from the harvester to a dump truck using a conveyor, and transported to disposal sites identified by the Phantom Lakes Management District. Plant material is collected and disposed of daily to avoid leaching of nutrients back into the lake and to minimize the visual degradation of the environment near the off-loading sites. The operators will stringently police the off-loading sites to ensure minimal disruption of boaters and of the people using the riparian areas of the lake.

Disposal of Harvested Plant Material

Harvested plant material is to be land spread on area farms and composted by local householders. The Phantom Lakes Management District encourages the use of compost as part of its public information campaign to reduce the use of inorganic fertilizers in the Phantom Lakes watershed. This system has proven effective in the past.

Precautions to Protect Wildlife and Ecologically Valuable Areas

As noted above, the operators will be provided with a laminated copy of the approved harvesting plan map showing the limits of harvesting operations (see Map 7). A copy of this map will be kept on the harvester at all times. Operations will be forbidden in the upper reaches of the Lower Lake to prevent disturbance of the wetland areas, and in those areas of three feet or less in depth in the Upper Lake to protect bass habitat and spawning areas. In addition, harvesting operations will be timed to minimize any impact on the bass breeding season--as indicated on Map 7. Fish and other aquatic life captured by the harvester will be returned to the Lakes whenever possible. Other areas of ecological value include the areas of significant biodiversity located along the southern shores of the Lower Lake, and the wild celery beds and waterfowl habitat along the eastern shores. Excepting for the boating access lanes as mentioned above, these areas will be protected from disturbance by the harvester.

Public Information

It is the policy of the Phantom Lakes Management District to maintain an active dialogue with the community. This dialogue is carried out through the medium of the public press (the Mukwonago Chief regularly publishes news and information on the Phantom Lakes, including the notices and minutes of the meetings of the Phantom Lakes Management District) and in public fora through various Town and Village Committees, public meetings and other scheduled hearings. Further, the Phantom Lakes Management District holds regular public meetings and sends a newsletter to electors and riparian property owners. The District also supports the use of signage at the public and private access sites to inform lake users on various issues, including the need to prevent the spread of eurasian water

milfoil. In addition, this aquatic plant management plan will be made available for public inspection at the District's annual meetings.

Harvesting Schedule

The harvesting season will begin no earlier than May 15 and will end no later than September 15 of each year. Harvesting will average 35 to 40 hours per week and may include limited time on weekends. The harvesting schedule is dependent on weather conditions and plant growth, and is designed to minimize recreational conflicts. Harvesting will be confined to daylight hours to minimize public disturbances resulting from the harvester and plant removal operations. Harvesting will also be scheduled to minimize potential impacts on the bass fishery in the Upper Lake by delaying the start of harvesting operations in the shallow areas of that lake until July 1 of each year.

EQUIPMENT NEEDS AND OPERATION

Equipment Needs and Total Costs

Harvester: Aquarius Systems model HM-420 with model 2L40C
"Silent Pack" Hatz diesel engine, or equivalent.

Manufacturer: Aquarius Systems Division, D&D Products, Inc.,
North Prairie, Wisconsin, or other manufacturer with comparable
equipment.

<u>Costs:</u>	1) HM-420 Aquatic Plant Harvester or equivalent	\$52,500
	1) TR-12 Trailer or equivalent	6,500
	Hatz Diesel "Silent Pack" Engine or equivalent	1,000
	Stainless mesh on cutter head	900
	Food grade hydraulic fluid	250
	1) S/C-12 Shore Conveyor or equivalent	12,500
	Power Pack for Shore Conveyor	<u>3,000</u>
	Total Cost	\$75,650

Maintenance Schedule, Storage and Related Costs

The District has operated an aquatic plant harvester for many years, and is familiar with the operational and maintenance requirements of this type of machinery. Routine maintenance will be performed by the Phantom Lakes Management District in accordance with the manufacturer's recommended maintenance schedule. Major maintenance will be done under contract by the manufacturer. Maintenance costs will be borne by the Phantom Lakes Management District.

Winter storage of the harvesting equipment will be the responsibility of the Phantom Lakes Management District. The harvester will usually be stored with the manufacturer, as it has been since 1991, where it will undergo an annual maintenance program during the winter months. The harvester will be stored outside on a covered trailer when not stored with the manufacturer.

Insurance Coverage

Insurance coverage on the harvester will be incorporated into the policy held by the Phantom Lakes Management District on all capital equipment. Liability

insurance for the operation of the harvester will be borne by the Phantom Lakes Management District. The relevant certificates of insurance will be held by the District.

Operators, Training and Supervision

The harvester will be owned by the Phantom Lakes Management District. The harvester will be operated by staff under contract to the Phantom Lakes Management District who will be responsible for day-to-day operations of the equipment.

Initial training will be provided by the manufacturer on delivery of the machinery. It is anticipated that at least one of the operators will have prior experience in the operation of an aquatic plant harvester as a result of previous employment in the harvesting program.

Day-to-day supervision will be by the Commissioners of the Phantom Lakes Management District.

EVALUATION AND MONITORING

Daily Record-keeping Relating to the Harvesting Operation

Daily harvesting activities will be recorded by the operator in a harvester operations log as set forth in Figure 1. Harvesting areas will be identified using the harvesting areas designations shown on Map 7, while the shore conveyor location will be designated by the appropriate street name. Regular reports on the harvesting operations will be included on the Commission's meeting agenda, while an annual summary of the harvesting program will be submitted to the annual meeting of the Phantom Lakes Management District.

It is the intention of the Phantom Lakes Management District to undertake a regular review of the harvesting program as part of its normal operations and citizen-based monitoring program. In addition, it is the policy of the Phantom Lakes Management District to regularly up-date its aquatic plant management plan; this plan is the third in the series of plans produced by the District in a twenty-five year period--the anticipated currency of a plan is five to ten years.

Daily Record-keeping Relating to the Harvester

Daily maintenance and service records--including engine hours, fuel consumed, oil used, routine maintenance performed, and operator identification--will be recorded in the harvester operations log shown in Figure 1, which is regularly audited by the Lake District Commissioners.

SUMMARY

This report, which documents the findings and recommendations of a study requested by the Phantom Lakes Management District, examines existing and anticipated aquatic plant problems encountered by users of the Phantom Lakes and presents a recommended plan for the resolution of these problems. The Phantom Lakes were found to support abundant growths of floating-leaved, emergent and submergent aquatic plants which interfered with the use of the Lakes--especially the Lower Lake--particularly for navigation and access to the Lakes. However, surveys indicated that the Lakes contained a diverse community of predominantly

native aquatic plants which supported a variety of wetland plant and animal communities and provided breeding habitat for large numbers of fish and birds, including waterfowl such as swans and geese. Thus, the Lakes provide for a variety of high quality recreational uses that include both active and passive pursuits such as boating and waterskiing, and bird-watching and aesthetic enjoyment of the outdoors.

The Phantom Lakes Management District recognizes the need to preserve the particularly rich aquatic flora and fauna of the Lakes, while providing for riparian access and water-based recreational uses of the Lakes. For this reason, the Phantom Lakes aquatic plant management plan recommends limited mechanical harvesting, supplemented by manual control around docks and piers, as the principle means of managing plant growth in the Lakes. Harvesting in the Lakes will be restricted to about 50 surface acres, concentrated largely in boating access channels serving the riparian community of the Lower Lake and in the beach areas of the Upper Lake. Harvesting will be prohibited in ecologically valuable areas of the Lakes, such as the wetlands at the head of the Lower Lake, and restricted in other riparian areas of less than 3 feet in depth. Harvesting will also be restricted to the time period from May 15 to September 15 annually, except in the Upper Lake where the bass breeding season will further restrict harvesting to the period from July 1 to September 15 annually. Harvesting operations will be generally conducted weekdays, during daylight hours, to minimize user conflicts. Harvested plant material is transferred from the harvester to a dump truck for disposal as compost at area farms and home-steads.

The Phantom Lakes aquatic plant management plan recommends the use of an Aquarius Systems model HM-420 aquatic plant harvester and ancillary equipment, or equivalents, in the conduct of the harvesting program. The District has had a number of years of experience with aquatic plant harvesters of similar design and has an established operational and supervisory procedure. Several harvesting areas have been established on the Lakes for reporting purposes, and regular reports on the harvesting program are made to both the District Commissioners and District electors--the latter as part of the District's active information and education program. The District also maintains the necessary insurance coverage on the harvester and its operations, and ensures that the equipment is maintained in good operating condition. Manual plant control around docks and piers will be carried out by riparian residents as necessary.

APPENDICES

APPENDIX A

BOATING ORDINANCES APPLICABLE TO THE PHANTOM LAKES

STATE OF WISCONSIN: COUNTY OF WAUKESHA: VILLAGE AND TOWN OF MUKWONAGO

ORDINANCE NO. 90-2

An ordinance to repeal and recreate the
BOATING CODE
FOR LOWER PHANTOM LAKE
in the
TOWN OF MUKWONAGO
AND THE
VILLAGE OF MUKWONAGO

The Town Board of the Town of Mukwonago and the Village Board of the Village of Mukwonago, Waukesha County, State of Wisconsin, DO ORDAIN AS FOLLOWS:

SECTION 1: An ordinance to regulate the use or operation of boats, the water traffic, and the water sports upon or under all waters lying within the Town of Mukwonago and the Village of Mukwonago on Lower Phantom Lake and to restrict or prohibit the use or operation of all motorized vehicles on the surfaces of the frozen waters lying within the Town of Mukwonago and to declare and impose penalties and enforce the same for any violation of such ordinance. All prior ordinances, are hereby repealed and recreated to read as follows:

CHAPTER 2

BOATING CODE

- 2.11 INTENT
- 2.12 APPLICATION
- 2.13 STATE BOATING AND WATER SAFETY LAWS ADOPTED
- 2.14 DEFINITIONS
- 2.15 GENERAL RULES FOR ALL WATERS
- 2.16 SPECIFIC RULES FOR LOWER PHANTOM LAKE
- 2.17 PENALTY
- 2.18 ENFORCEMENT

2.11 INTENT

The intent of this ordinance is to provide safe and healthful conditions for the enjoyment of aquatic recreation consistent with public rights and interest and the capability of the water resource.

2.12 APPLICATION

The provisions of this ordinance shall apply to the waters of Lower Phantom Lake, within the jurisdiction of the Town of Mukwonago and, the Village of Mukwonago. 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 Mukwonago.

2.13 STATE BOATING AND WATER SAFETY LAWS ADOPTED

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 related water activities in CHAPTERS 30.29, 30.50 up to and including 30.71, and 30.81 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 statutes 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.

2.14 DEFINITIONS

- A. BOAT: or vessel means every description of water craft other than a seaplane on the water, used or capable of being used as a means of transportation on water including sailboats and inflatables.
- B. DESIGNATED ANCHORAGES: an area of water established and marked as an anchorage by lawful authority.

- C. MOTORBOAT: means any boat equipped with propulsion machinery whether in use or not.
- D. MOTOR VEHICLE: shall be construed to mean any kind of device or thing designed or utilized for propulsion or movement using a motor, whether internal combustion design or not, and includes all vehicles which are of any type or kind in any way self-propelled, but is not limited to any automobiles, mini-bike, go-cart, trail bike, all-terrain vehicle, motorcycle, mo-ped, jeep, motor truck, or snowmobile.
- E. OPERATE: or use when used in reference to a motorboat or vessel means to navigate or employ.
- F. OPERATE: or use when used in reference to a motor vehicle means to drive or be in actual physical control of a motor vehicle.
- G. PUBLIC ACCESS: any access to the water by means of public property.
- H. SHORE ZONE: all surface water within 100 feet of any shore.
- I. SLOW-NO-WAKE: means that speed at which a boat moves as slowly as possible while still maintaining steering control.
- J. SWIMMING ZONE: an authorized area marked by regulatory markers to designate a swimming area.
- K. WATERSKIING: the use of water skis, surf board, inner tube, or any similar device while being towed.

2.15 GENERAL RULES FOR ALL WATERS

A. RACING PROHIBITED

No person shall operate a motorboat in a race or speed contest with any other motorboat except as provided in properly regulated races, regattas, sporting events, and exhibitions authorized by the Town Board and Village Board.

B. SWIMMING REGULATIONS

- 1. SWIMMING FROM BOAT. No person shall swim from any unmanned boat unless such boat is anchored.
- 2. DISTANCE FROM SHORE OR RAFT. Unless in a designated swimming zone, no person shall swim more than 150 feet

from shore or more than 50 feet from a diving raft unless accompanied by a boat for the protection of the swimmer and as an aid to other boats in determining the location of the swimmer, and such swimmer shall not be more than 50 feet from the accompanying boat.

3. HOURS LIMITED. No person shall swim more than 150 feet from the shoreline between sunset and sunrise.
4. SWIMMING ZONES. The Town Board and the Village Board may, by resolution, designate swimming areas and cause such areas to be appropriately marked. Both governing bodies must approve said areas.

C. WATER SKIING

All skiing shall be done in a counter-clockwise pattern.

D. LITTERING PROHIBITED.

No person shall deposit, place, or throw from any boat, raft, pier platform, motorized vehicle, or similar structure or from or on the adjoining shoreline any cans, papers, bottles, debris, refuse, garbage, or solid or liquid waste into the waters or upon the frozen surface.

E. ICEBOUND WATERS

1. SPEED OF VEHICLES. 15 mph for all vehicles licensed for highway travel.
2. NEGLIGENT OPERATION. No person may operate or use a motor vehicle upon the icebound waters in a careless, negligent, or reckless manner so as to endanger his life, property, or person, or the life, property, or person of another.
3. LIABILITY OF LOCAL GOVERNMENT. All traffic on the icebound inland waters shall be at the risk of the traveler.
4. OPERATION OF SNOWMOBILES AND ALL TERRAIN VEHICLES. See Sec. 350.10(9) and Sec. 23.33(3)(h) Stats.

F. OPERATION OF MOTOR VEHICLES IN WATER PROHIBITED

Any operation of motor vehicles in navigable waters is prohibited except as provided for in Sec. 30.29(3) Stats.

2.16 SPECIFIC RULES FOR LOWER PHANTOM LAKE

A. CHANNEL WAYS

The Town Board and Village Board designate the following channel ways to be "Slow-No-Wake" areas:

1. The portion of the channel that specifically lies between the two points of land which connect Lower and Upper Phantom Lakes and which extends 100 feet into the lower lake in a north-easterly direction as marked by buoys.

B. WATER SKIING

The Town Board and the Village Board prohibit water skiing or towing during the following hours:

No water skiing any day before 10:00 a.m.

No water skiing after 7:00 p.m. on Monday, Tuesday, Wednesday, Thursday or Friday.

No water skiing after 5:00 p.m. on Saturday, Sunday or holidays.

C. AQUA-PLANES AND PARA-SAILING

Aqua-planing and para-sailing are not allowed at any time on Lower Phantom Lake.

2.17 PENALTY

A. STATE BOATING AND WATER SAFETY LAWS AND ALL OTHER VIOLATIONS AS SET FORTH IN SECTION 2.12 OF THIS ORDINANCE

Any forfeiture for violation of the State Statute adopted by reference in Section 2.12 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 SECTION 2.14 AND 2.15 OF THIS ORDINANCE.

1. GENERAL PROVISIONS. Any person 16 years or older violating the provisions of this ordinance shall be subject to a forfeiture of not more than \$500.00 plus court costs and penalty assessment. Failure to pay any

forfeiture hereunder shall subject the violator to imprisonment in the County Jail until full payment is made, but not to exceed 90 days.

Any persons 14 or 15 years of age shall be subject to a forfeiture of not less than \$10.00 nor more than \$25.00 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 Section 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.

2. DEPOSIT SCHEDULE

2.12 Applicable sections of Uniform Wisconsin Deposit and Bail Schedule for Conservation, Boating, Snowmobile and ATV Violations.

- 2.14(A) \$50.00 plus court costs and penalty assessment.
- 2.14(B)(1) \$50.00 plus court costs and penalty assessment.
- 2.14(B)(2) \$50.00 plus court costs and penalty assessment.
- 2.14(B)(3) \$50.00 plus court costs and penalty assessment.
- 2.14(C) \$50.00 plus court costs and penalty assessment.
- 2.14(D) \$50.00 plus court costs and penalty assessment.
(except metal and glass).
- 2.14(D) \$100.00 plus court costs and penalty assessment.
(metal and glass only).
- 2.14(E) \$50.00 plus court costs and penalty assessment.
- 2.14(F) \$50.00 plus court costs and penalty assessment.
- 2.15 \$50.00 plus court costs and penalty assessment.

3. 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.

4. 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.

2.18 ENFORCEMENT

A. ENFORCEMENT PROCEDURE

The statutory provisions of sections 66.115, 66.119, 66.12, 30.29, 30.50 to 30.71, and Chapter 199, 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 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 Mukwonago and Village of Mukwonago specifically elect to use the citation method of enforcement.

B. DEPOSITS

1. SCHEDULE OF DEPOSITS

The schedule of cash deposits shall be as set forth in Section 2.17 of this Ordinance. Also included in the cash deposit will be a current penalty assessment fee and the current court costs if applicable.

2. DEPOSITORY

Deposits should be made in cash, money order, or certified check to the clerk of Circuit Court of Waukesha County, 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. ISSUANCE OF CITATIONS

All sections of this Ordinance shall be enforced by a Town or Village police officer or lake patrol officer.

D. NONEXCLUSIVITY

1. OTHER ORDINANCES

Adoption of this Ordinance does not preclude the Town Board or Village Board 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 Village Board 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: The several sections of this ordinance are declared to be severable. If any section or portion thereof shall be declared by a decision of a court of competent jurisdiction to be invalid, unlawful, or non-enforceable, such decision shall apply only to the specific section or portion thereof directly specified in the decision and not affect the validity of all other provisions, sections, or portions thereof of the ordinance, which 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: This ordinance shall take effect immediately upon passage and posting or publication as provided by law.

Passed and adopted this 12th day of March, 1990.

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



John G. Maher, Town Chairman

ATTEST:

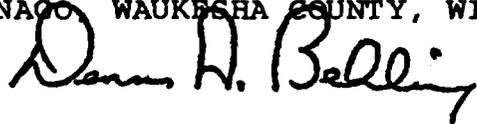


Estelle L. Jost, Town Clerk

Published or posted on the _____ day of _____, 1990.

Passed and adopted this _____ day of _____, 1990.

BY ORDER OF THE BOARD OF THE VILLAGE OF
MUKWONAGO, WAUKESHA COUNTY, WISCONSIN



Dennis A. Behling, Village President

ATTEST:



Bernard W. Kahl, Village Clerk

Village Ord. #467

STATE OF WISCONSIN:

COUNTY OF WAUKESHA:

TOWN OF MUKWONAGO

ORDINANCE NO. 88-2

**An ordinance to repeal and recreate the
BOATING CODE
in the
TOWN OF MUKWONAGO**

The Town Board of the Town of Mukwonago, Waukesha County, State of Wisconsin, DO ORDAIN AS FOLLOWS:

SECTION 1: An ordinance to regulate the use or operation of boats the water traffic, and the water sports upon or under all waters except for Lower Phantom Lake lying within the Town of Mukwonago and to restrict or prohibit the use or operation of all motorized vehicles on the surfaces of the frozen waters lying within the Town of Mukwonago and to declare and impose penalties and enforce the same for any violation of such ordinance. All prior ordinances, including but not limited to Ordinance Nos. 97 and 82-1, are hereby repealed and recreated to read as follows:

UPPER PHANTOM LAKE

WHEREAS, the Town of Mukwonago has within its corporate boundaries a beautiful spring fed lake known as Upper Phantom Lake; and

WHEREAS, Upper Phantom Lake is surrounded by year round homes whose occupants enjoy the aesthetic beauty and serenity provided by the view; and

WHEREAS, Upper Phantom Lake is heavily used by the anglers, canoists, sailboaters, sailboarders, boaters, campers, picnickers, and waterskiers to such an extent that the watershed suffers from over-use; and

WHEREAS, the Phantom Lakes Management District was given the power to protect and monitor the ecosystem, and it is their conclusion that there should be laws that govern the use of the lake.

THEREFORE, the Town of Mukwonago, in the best interest of the public health, safety, and welfare, deems it necessary that special regulations be adopted to protect life, property, and environmental quality of Upper Phantom Lake.

SPRING LAKE

WHEREAS, the Town of Mukwonago has within its corporate boundaries a beautiful spring fed lake known as Spring Lake; and

WHEREAS, Spring Lake is a shallow body of water abundant with aquatic vegetation and supporting fish life; and

WHEREAS, Spring Lake is heavily used, mainly by the angler and wildlife enthusiast, and its greatest attribute is as a fishery; and

WHEREAS, the Department of Natural Resources has stated that large portions of Spring Lake are not suited for motor powered boats; and

WHEREAS, Spring Lake's water quality is suited for swimming: the gradual slope of the basin with a gravel and sandy bottom enhances the swimming potential. Due to the shallowness of Spring Lake at the shoreline, swimmers must travel a substantial distance from the shoreline in order to be able to swim; and

WHEREAS, the marsh frontage contiguous with the open water of Spring Lake is a prime pheasant and muskrat habitat; and

WHEREAS, wildlife observation opportunities are ideal as the aesthetic features are rated highly by the Department of Natural Resources.

THEREFORE, the Town of Mukwonago, in the best interest of the public health, safety, and welfare deems it necessary that special regulations be adopted to protect life, property, and environmental quality of Spring Lake.

WILLOW SPRING LAKE

WHEREAS, the Town of Mukwonago has within its corporate boundaries a beautiful spring fed lake known as Willow Spring Lake; and

WHEREAS, Willow Spring Lake is an impoundment of approximately 43 acres situated in an environmentally sensitive area; and

WHEREAS, the majority of lands adjacent to Willow Spring Lake have Houghton muck soils which exhibit a high erosion potential and wakes created by outboard motors could accelerate the erosion problem; and

WHEREAS, the most prevalent macrophyte in Willow Spring Lake is myriophyllum sp. (Parrots Feather). This plant reproduces through fragmentation. Any broken pieces of this plant will sprout and start a new plant. Operation of motor boats through these weed beds will increase weed growth in Willow Spring Lake, decreasing the quality of the lake for sailing, swimming, and other open-water activities; and

WHEREAS, the wetlands surrounding Willow Spring Lake have been classified by the Waukesha County Naturalist, and the survey indicated that the environmental quality of the wetlands around Willow Spring Lake were of exceptional quality and included observations of plant and animal species which would be disturbed by operation of outboard motors. Observation of ospreys, great blue herons, rookeries of little green herons, and pied-billed grebes indicate the importance of maintaining Willow Spring Lake in as natural a state as possible, including minimizing wildlife disturbance by outboard motors; and

WHEREAS, Willow Spring Lake ice conditions are treacherous throughout the winter as numerous springs, Spring Creek, and the Spring Creek outlet modify ice conditions resulting in weakened ice cover and hazardous conditions for vehicular travel.

THEREFORE, the Town of Mukwonago, in the best interest of the public health, safety, and welfare, deems it necessary that special regulations be adopted to protect life, property, and environmental quality of Willow Spring Lake.

CHAPTER 2

BOATING CODE

- 2.01 **APPLICABILITY**
- 2.02 **STATE BOATING AND WATER SAFETY LAWS ADOPTED**
- 2.03 **DEFINITIONS**
- 2.04 **GENERAL RULES FOR ALL WATERS**
- 2.05 **AQUA-PLANES AND PARA-SAILING**
- 2.06 **SPECIFIC RULES FOR UPPER PHANTOM LAKE**
- 2.07 **SPECIFIC RULES FOR SPRING LAKE**
- 2.08 **SPECIFIC RULES FOR WILLOW SPRING LAKE**
- 2.09 **PENALTY**
- 2.10 **ENFORCEMENT**

2.01 APPLICABILITY

The provisions of this ordinance shall apply to the waters of Spring Lake, Willow Spring Lake, Upper Phantom Lake, Rainbow Spring Lakes, Mukwonago County Park Lakes, the Fox River, the Mukwonago River, Spring Creek, and Jericho Creek within the jurisdiction of the Town of Mukwonago. 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 Mukwonago.

2.02 STATE BOATING AND WATER SAFETY LAWS ADOPTED

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 related water activities in CHAPTERS 30.29, 30.50 up to and including 30.71, and 30.81 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 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 of the waterways of the state.

2.03 DEFINITIONS

- A. BOAT: or vessel means every description of watercraft other than a seaplane on the water, used or capable of being used as a means of transportation on water including sailboards and inflatables.
- B. DESIGNATED ANCHORAGES: an area of water established and marked as an anchorage by lawful authority.
- C. MOTORBOAT: means any boat equipped with propulsion machinery whether in use or not.
- D. MOTOR VEHICLE: shall be construed to mean any kind of device or thing designed or utilized for propulsion or movement using a motor, whether internal combustion design or not, and includes all vehicles which are of any type or kind in any way self-propelled, but is not limited to any automobile, mini-

bike, go-cart, trail bike, all-terrain vehicle, motorcycle, mo-ped, jeep, motor truck, or snowmobile.

- E. OPERATE: or use when used in reference to a motorboat or vessel means to navigate or employ.
- F. OPERATE: or use when used in reference to a motor vehicle means to drive or be in actual physical control of a motor vehicle.
- G. PUBLIC ACCESS: any access to the water by means of public property.
- H. SHORE ZONE: all surface water within 100 feet of any shore.
- I. SLOW-NO-WAKE: means that speed at which a boat moves as slowly as possible while still maintaining steering control.
- J. SWIMMING ZONE: an authorized area marked by regulatory markers to designate a swimming area.
- K. WATERSKIING: the use of waterskis, surfboard, innertube, or any similar device while being towed.

2.04 GENERAL RULES FOR ALL WATERS

A. RACING PROHIBITED

No person shall operate a motorboat in a race or speed contest with any other motorboat except as provided in properly regulated races, regattas, sporting events, and exhibitions authorized by the Town Board.

B. SWIMMING REGULATIONS

1. SWIMMING FROM BOAT. No person shall swim from any unmanned boat unless such boat is anchored.
2. DISTANCE FROM SHORE OR RAFT. Unless in a designated swimming zone no person shall swim more than 150 feet from shore or more than 50 feet from a diving raft unless accompanied by a boat for the protection of the swimmer and as an aid to other boats in determining the location of the swimmer, and such swimmer shall not be more than 50 feet from the accompanying boat.
3. HOURS LIMITED. No person shall swim more than 150 feet from the shoreline between sunset and sunrise.

2.05 AQUA-PLANES AND PARA-SAILING

Aqua-planing and Para-sailing are not allowed at any time.

2.06 SPECIFIC RULES FOR UPPER PHANTOM LAKE

A. CHANNEL WAYS

The Town Board does designate the following channel ways to be "Slow-No-Wake" areas:

1. The portion of the channel that specifically lies between the two points of land which connect Lower and Upper Phantom Lakes and which extends 150 feet into the upper lake in a south-westerly direction as marked by buoys.

B. WATERSKIING

The Town Board does prohibit waterskiing or towing a waterskier during the following hours:

No waterskiing any day before 10:00 A.M.

No waterskiing after 7:00 P.M. on Monday, Tuesday, Wednesday, Thursday, or Friday

No waterskiing after 4:00 P.M. on Saturday, Sunday, or holidays

2.07 SPECIFIC RULES FOR SPRING LAKE

A. SPEED RESTRICTIONS

No person shall operate a motorboat at a speed in excess of slow-no-wake except between the hours of 11:00 A.M. and 2:00 P.M.

B. WATERSKIING

The Town Board does designate that no person shall be permitted to waterski and no person shall be permitted to operate a boat while towing another person on waterskis, surfboard, or any similar device between the hours of 2:00 P.M. and 11:00 A.M.

2.08 SPECIFIC RULES FOR WILLOW SPRING LAKE

A. MOTOR VEHICLES PROHIBITED ON ICEBOUND WATERS

No person shall operate or use a motor vehicle upon the ice-bound waters of Willow Spring Lake.

B. MOTORBOATS AND/OR MOTOR VEHICLES PROPELLED BY AN INTERNAL COMBUSTION ENGINE PROHIBITED

No person shall operate a motorboat and/or a motor vehicle propelled by an internal combustion engine on the waters of Willow Spring Lake.

C. SPEED RESTRICTIONS

Pursuant to Section 30.635, Wisconsin Statutes, no person shall operate a motorboat at a speed in excess of slow-no-wake.

2.09 PENALTY

A. STATE BOATING AND WATER SAFETY LAWS AND ALL OTHER VIOLATIONS AS SET FORTH IN SECTION 2.02 OF THIS ORDINANCE

Any forfeiture for violation of the State Statutes adopted by reference in Section 2.02 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 SECTION 2.04 AND 2.05, 2.06, 2.07, AND 2.08 OF THIS ORDINANCE

1. **GENERAL PROVISIONS.** Any person over 16 years of age or older violating the provisions of this ordinance shall be subject to a forfeiture of not more than \$500.00 plus court costs and penalty assessment for the first offense. Failure to pay any forfeiture hereunder shall subject the violator to imprisonment in the County Jail until full payment is made but not to exceed 90 days.

Any persons 14 or 15 years of age shall be subject to a forfeiture of not less than \$10.00 nor more than \$25.00 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 Section 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.

2. DEPOSIT SCHEDULE

2.02 Applicable sections of Uniform Wisconsin Deposit and Bail Schedule for Conservation, Boating, Snowmobile, and ATV Violations.

2.04(A)	\$50.00 plus court costs and penalty assessment.
2.04(B)(1)	\$50.00 plus court costs and penalty assessment.
2.04(B)(2)	\$50.00 plus court costs and penalty assessment.
2.04(B)(3)	\$50.00 plus court costs and penalty assessment.
2.04(C)	\$50.00 plus court costs and penalty assessment.
2.04(D)	\$50.00 plus court costs and penalty assessment. (except metal and glass).
2.04(D)	\$100.00 plus court costs and penalty assessment (metal and glass only).
2.04(E)	\$50.00 plus court costs and penalty assessment.
2.04(F)	\$50.00 plus court costs and penalty assessment.
2.05	\$50.00 plus court costs and penalty assessment.
2.06(C)	\$50.00 plus court costs and penalty assessment.
2.07(A)	\$50.00 plus court costs and penalty assessment.
2.07(B)	\$50.00 plus court costs and penalty assessment.
2.08(A)	\$50.00 plus court costs and penalty assessment.
2.08(B)	\$50.00 plus court costs and penalty assessment.
2.08(C)	\$50.00 plus court costs and penalty assessment.

3. 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.

4. 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.

2. OTHER REMEDIES

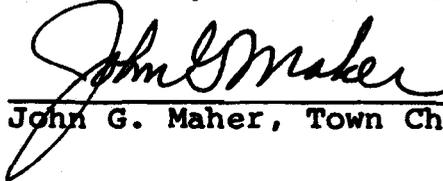
The issuance of a citation hereunder shall not preclude the Town Board or any authorized office from proceedings under any other Ordinance of Law or by any other enforcement method to enforce any Ordinance, regulation, or order.

SECTION 2: The several sections of this ordinance are declared to be severable. If any section or portion thereof shall be declared by a decision of a court of competent jurisdiction to be invalid, unlawful, or non-enforceable, such decision shall apply only to the specific section or portion thereof directly specified in the decision and not affect the validity of all other provisions, sections, or portions thereof of the ordinance, which 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: This ordinance shall take effect immediately upon passage and posting or publication as provided by law.

Passed and adopted this 11th day of July, 1988.

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



John G. Maher, Town Chairman

ATTEST:



Estelle L. Jost, Town Clerk

Published or posted on the 25th day of July, 1988.

APPENDIX B

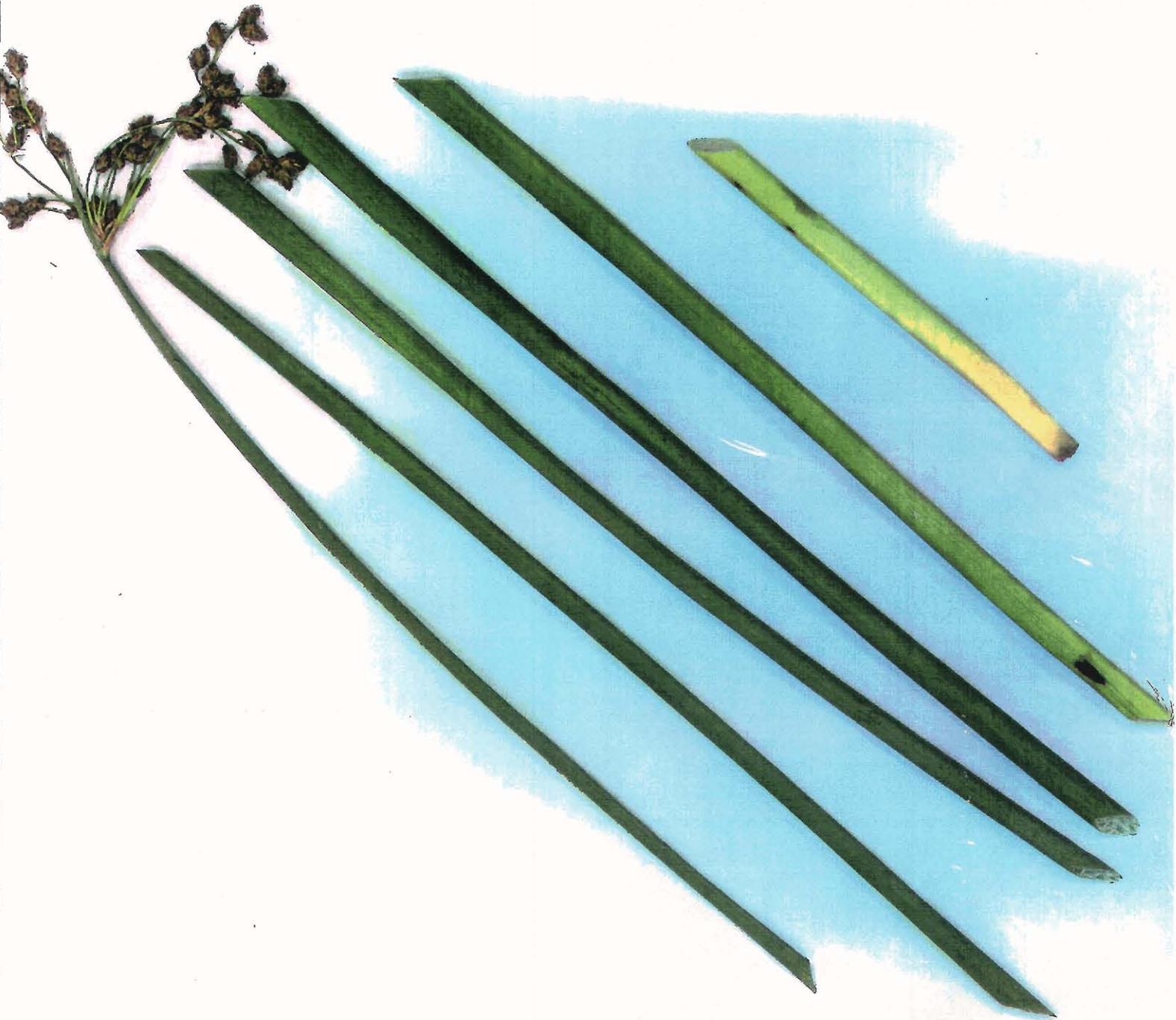
ILLUSTRATIONS OF COMMON AQUATIC PLANTS IN THE PHANTOM LAKES

PHANTOM LAKES
AQUATIC PLANT SURVEY
JUNE-JULY 1993



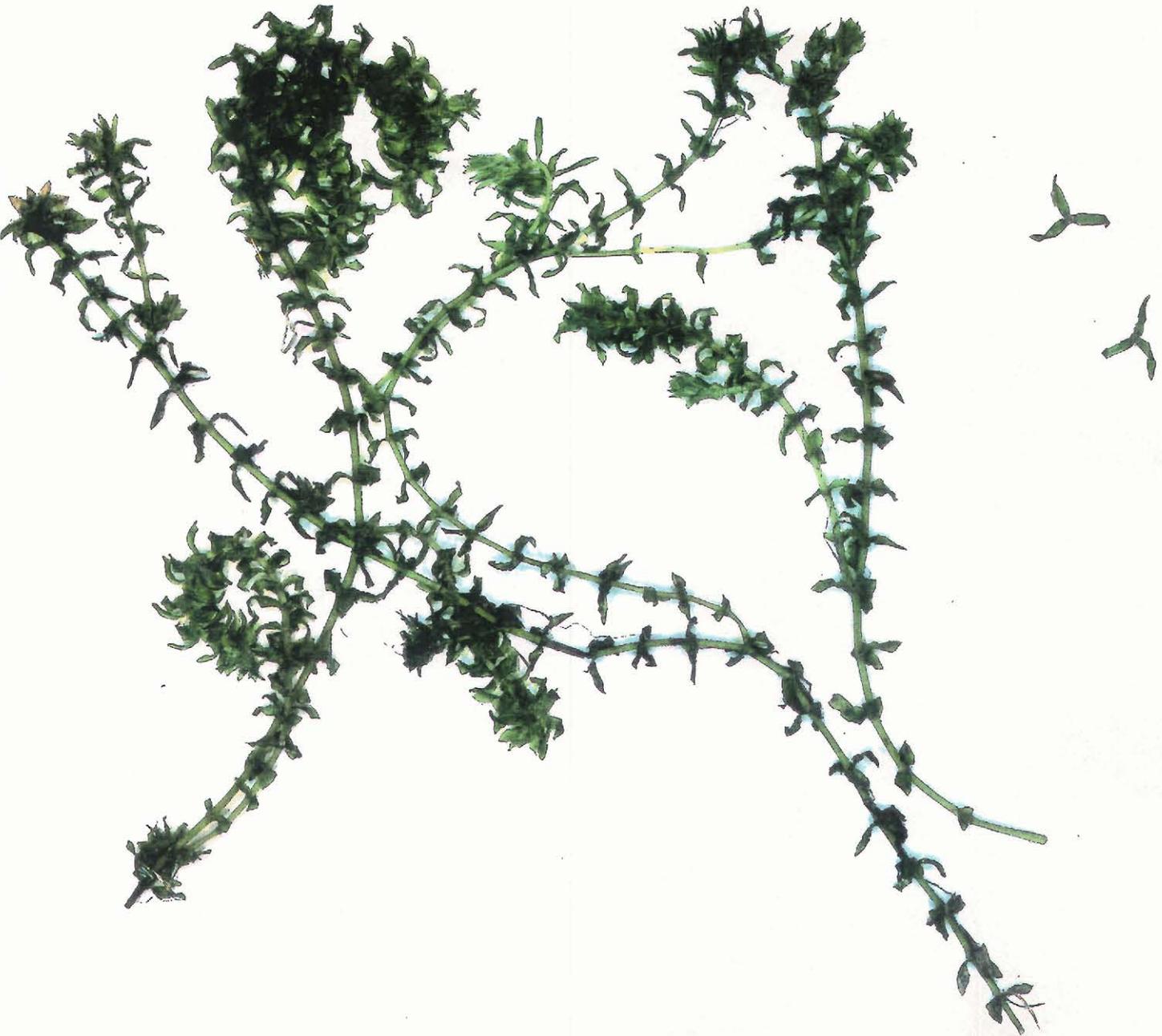
SWAMP LOOSESTRIFE (Decodon spp.)

JUNE-JULY 1993



SOFTSTEM BULRUSH (Scirpus validus)

Softstem bulrush is an emergent aquatic species. It supports insects and provides food for young fish and many species of waterfowl.



COMMON WATERWEED (Elodea canadensis)

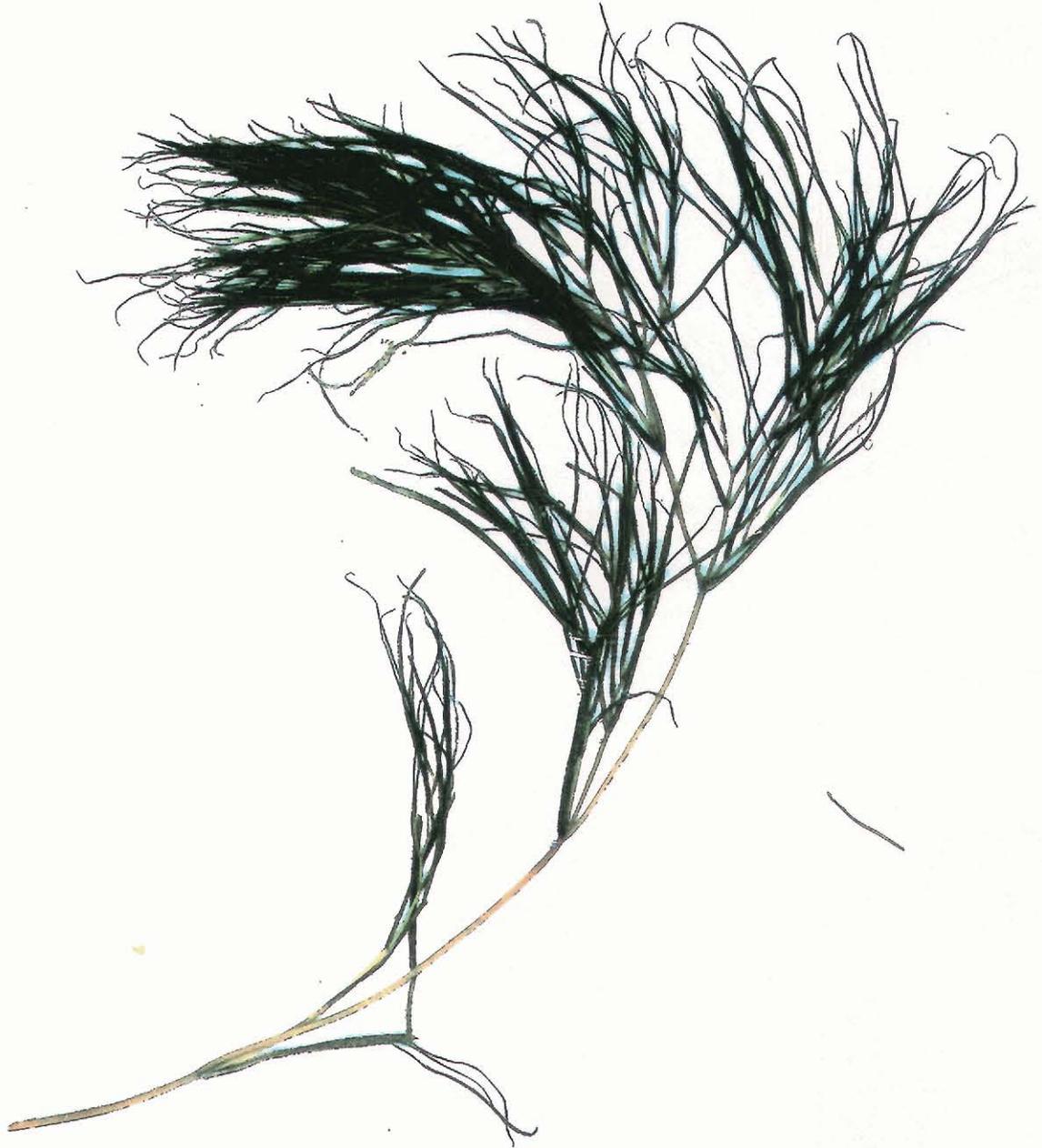
Common waterweed is a submerged plant which usually occurs in hard water. It provides cover for many small aquatic organisms which serve as food for the fish population. Waterweed is an aggressive plant and may suppress the growth of other aquatic plants.

PHANTOM LAKES
AQUATIC PLANT SURVEY
JUNE-JULY 1993



WHITESTEM PONDWEED (Potamogeton praelongus)

Whitestem pondweed provides cover for largemouth bass, panfish, and northern pike. It also supports a strong insect population which serves as food for panfish and ducklings.



SAGO PONDWEED (Potamogeton pectinatus)

Sago pondweed is found in hard or brackish water of lakes and slow-flowing streams. Sago pondweed provides food and shelter for young trout and other fish.



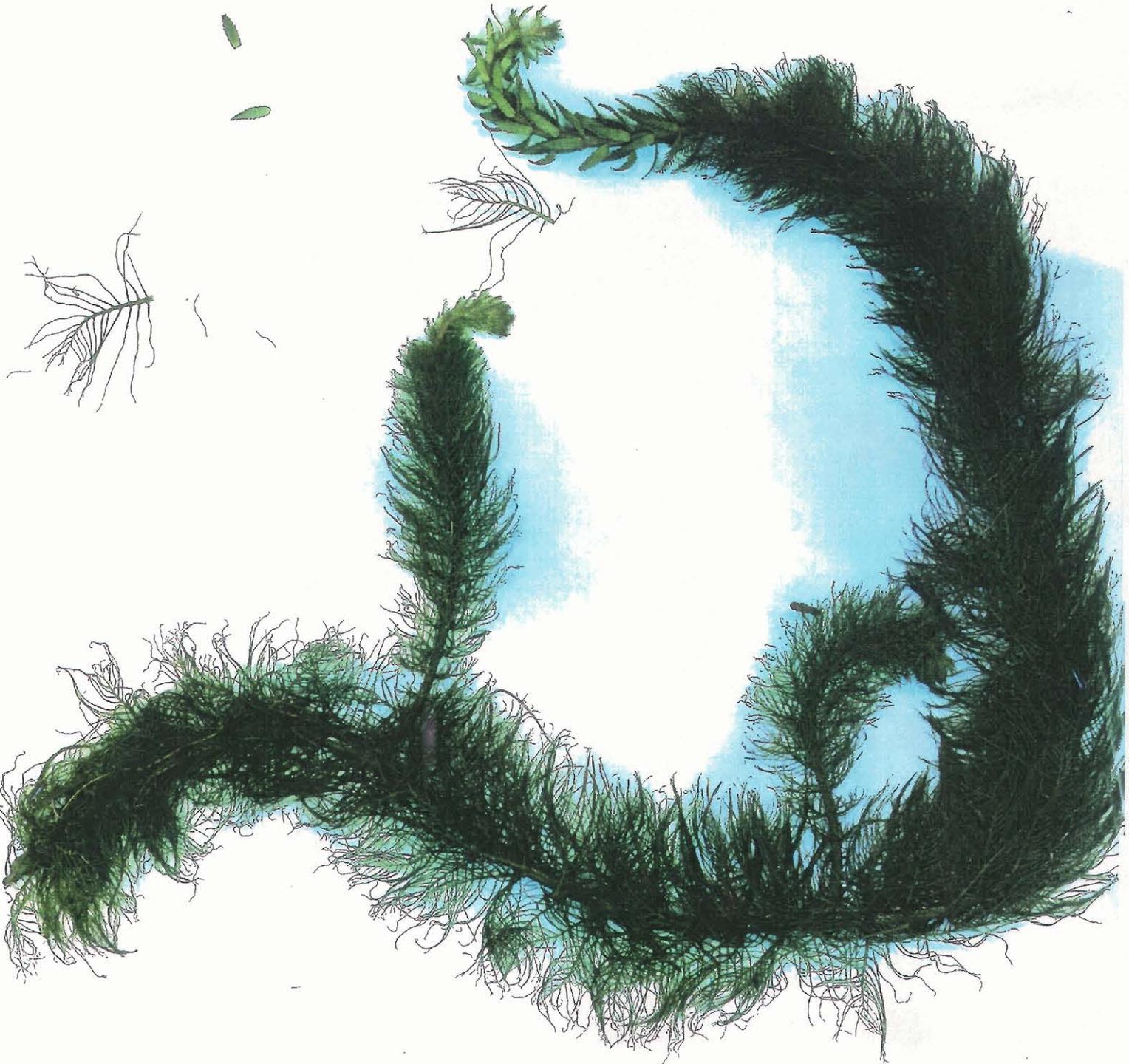
BLADDERWORT (Utricularia sp.)

Bladderwort is a carnivorous plant which occurs in shallow ponds and lakes or on wet soils. The small bladders are traps which catch tiny animal life, particularly crustaceans. Bladderwort provides some food and cover for fish. It is never abundant enough to become a nuisance.



COONTAIL (Ceratophyllum demersum)

Coontail is a submerged plant which prefers hard water. It supplies cover for shrimp and young fish and supports insects which are valuable as fish food. A heavy growth of coontail is an indication of very fertile lake conditions.



WATER MILFOIL (Myriophyllum heterophyllum)

Water milfoil is a submergent plant which may cause extensive weed problems in lakes and streams. However, when not overabundant, water milfoil provides cover for fish and is a valuable food source for many forms of aquatic life.

JUNE-JULY 1993



LARGE LEAF PONDWEED (Potamogeton amplifolius)

Large leaf pondweed is usually found in relatively hard water. Submersed, it supports insects and provides a good food supply for fish.



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.

JUNE-JULY 1993



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.



FLAT-STEMMED PONDWEED (*Potamogeton zosteriformis*)

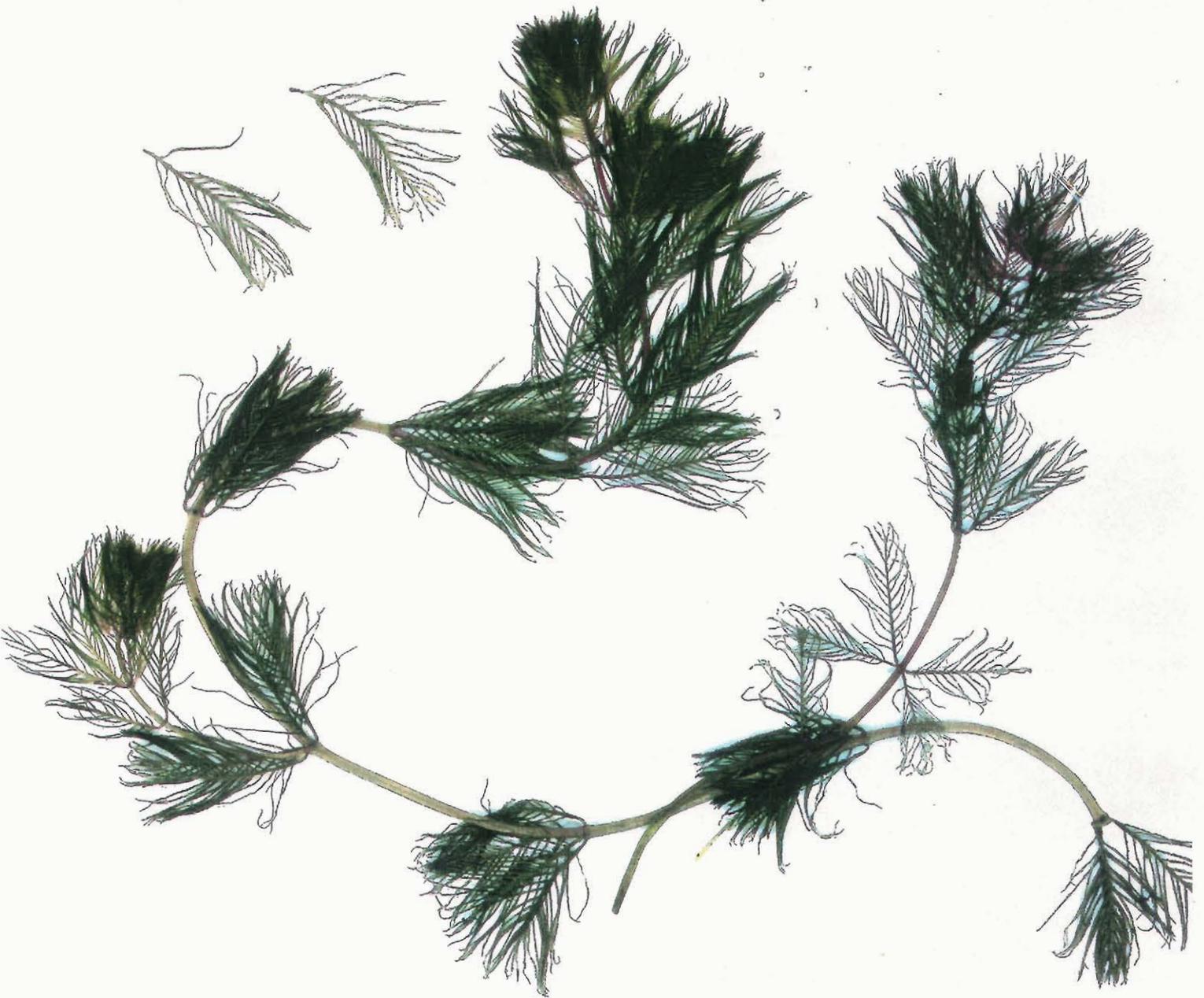
Flat-stemmed pondweed provides moderate cover for panfish, largemouth bass, and northern pike. It also supports a strong insect population which provides food for fish and ducklings.



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.

PHANTOM LAKES
AQUATIC PLANT SURVEY
JUNE-JULY 1993



EURASIAN MILFOIL (Myriophyllum spicatum)

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

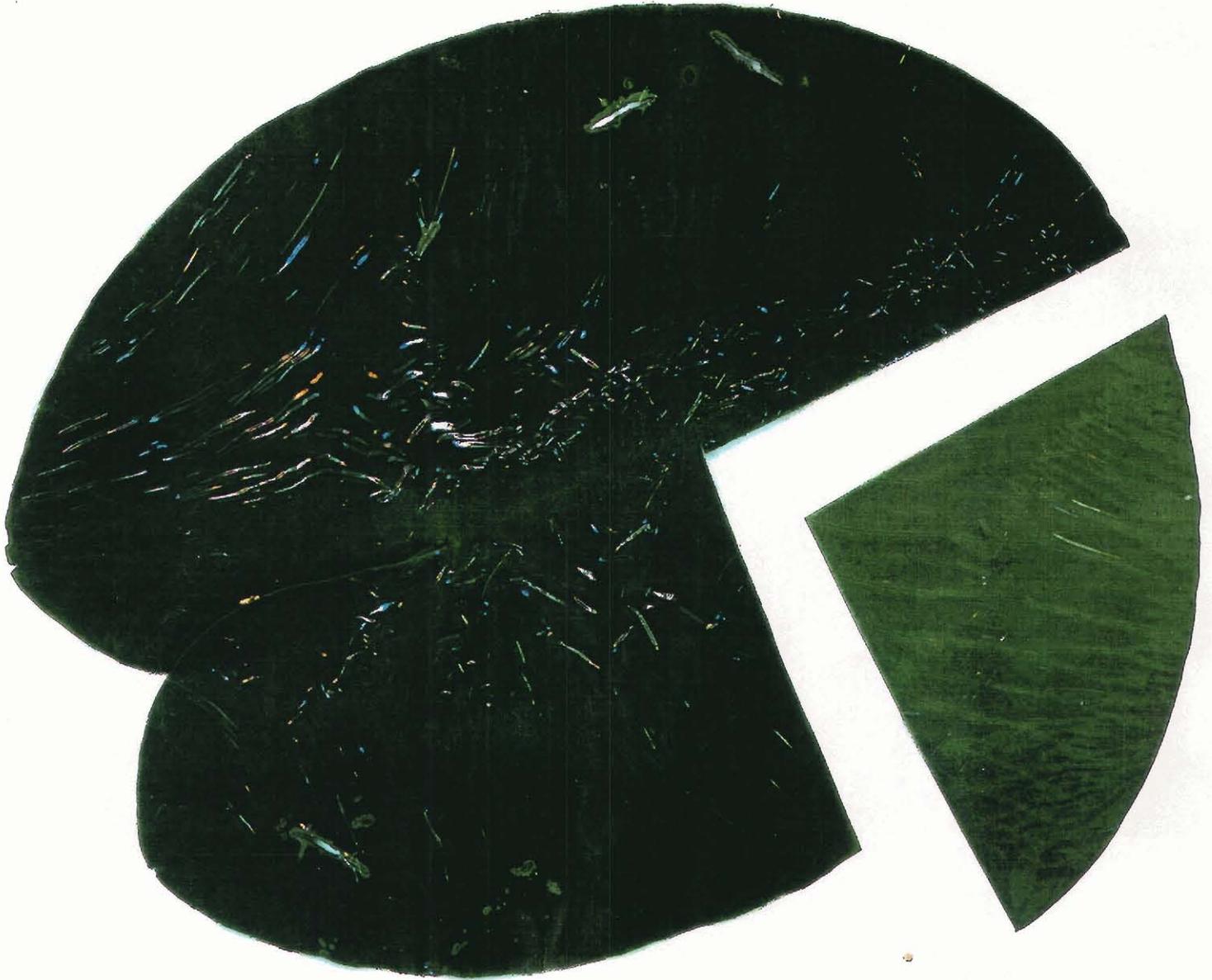
PHANTOM LAKES
AQUATIC PLANT SURVEY

JUNE-JULY 1993



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.



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.

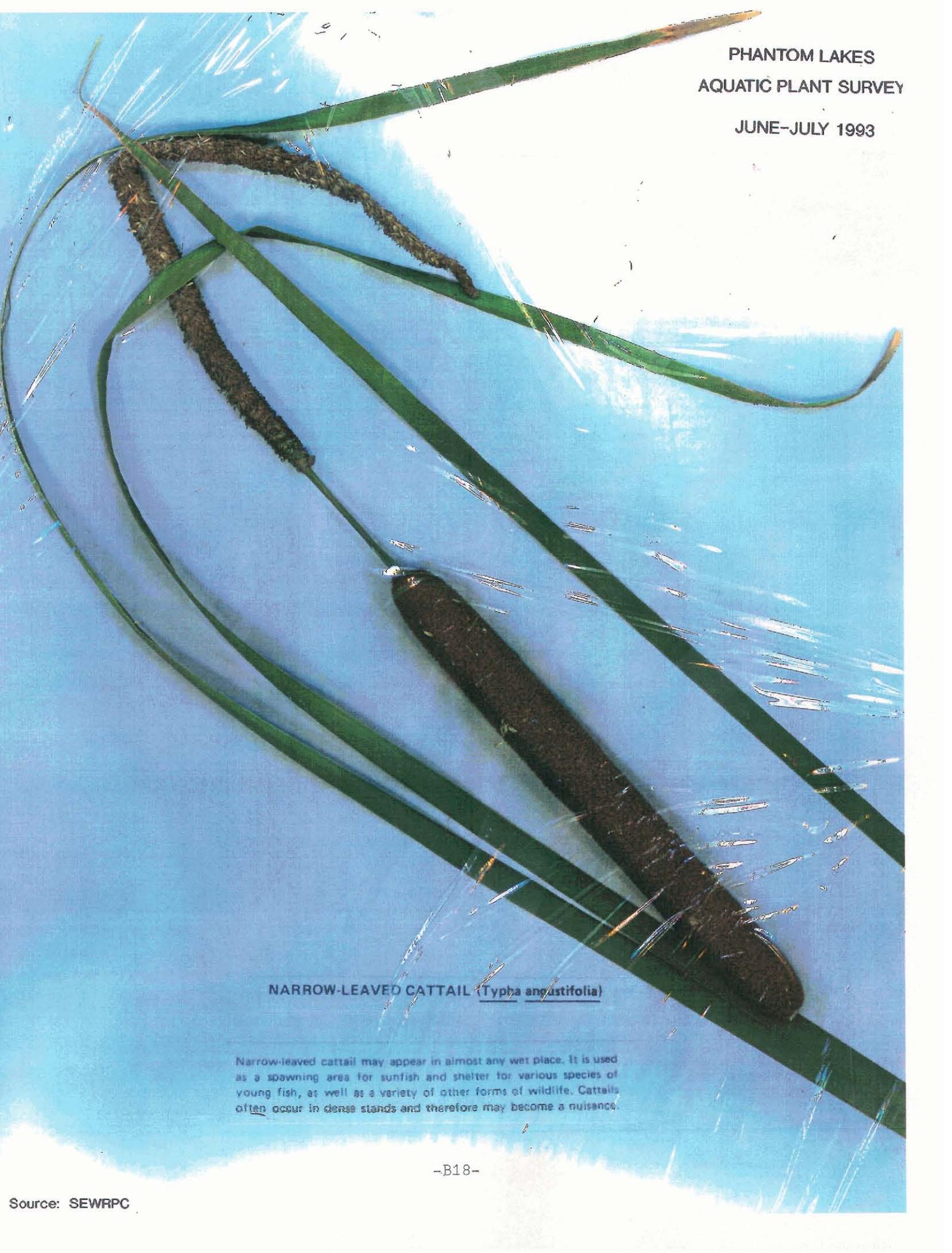
PHANTOM LAKES
AQUATIC PLANT SURVEY

JUNE-JULY 1993



WHITE WATER LILY (Nymphaea odoratum)

JUNE-JULY 1993



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.

PHANTOM LAKES
AQUATIC PLANT SURVEY
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BROAD-LEAVED CATTAIL (*Typha latifolia*)