AQUATIC RESOURCES

LAKE MASON

ADAMS AND MARQUETTE COUNTIES

INVENTORY AND LAKE MANAGEMENT PLAN

BY

LAKE MASON IMPROVEMENT ASSOCIATION

AND

AQUATIC RESOURCES

AS PART OF

LAKE MANAGEMENT PLANNING GRANT PROGRAM

STATE OF WISCONSIN

DEPARTMENT OF NATURAL RESOURCES

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GOALS AND OBJECTIVES

The objective of this study was to assess the water and land resources of Lake Mason, identify the water quality problems that are a result of these land and water uses, and develop a conservation and management plan to address these problems. The goal of this report is to increase the knowledge and understanding of the problems of Lake Mason, its watershed and associated water resources and work towards a land use ethic. The foundations of this goal have been built through this grant program by gaining private landowner cooperation in identifying these problems and expressing a desire to develop and accept a plan to solve them.

INTRODUCTION

The work of this grant is the first step in understanding the problems of Lake Mason and solving them. The assessment of these problems involved those people who live on the land and lake surrounding Lake Mason; the people whose cooperation will ultimately make this management plan work. As many of these people as possible were interviewed in the Shoreline Property Owner's Survey and in the Watershed-Stream Bank-Land Use Survey. Nearly everyone of these people expressed a desire to solve the problems but needed a better understanding of them and how the process of a lake management plan will help. Some of these individuals have lived on the land and used the water resources for decades and were important in assessing human intervention of the natural history of Lake Mason.

Also, the assessment of Lake Mason and the watershed importantly involved these individuals who have information regarding past histories and management of the lake and watershed. Information gathered from the County Land Conservationist, County Zoning officials, town officials, A.S.C.S., and fish managers, wildlife managers, and water quality DNR personnel added to the assessment details of the past that are important in developing a workable management plan of the future. It is these same individuals who will be involved in funding, administrating and most important guiding those on the land and waters of Lake Mason through the recommendations of this lake management plan.

ABSTRACT

Phase I of the Lake Mason Planning Grant concentrated on the three following areas:

1. Inventory of land and water resources to include fishery history, land and water development, and water quality changes;

2. Identification of lake and watershed problems and establishment of management plans to solve these problems; and,

3. Lake community education and information through landowner contacts, surveys, and meetings.

I. LAKE MASON INVENTORY AND EXISTING CONDITIONS

A. LAND RESOURCE INVENTORY

Interviews and contacts with County Conservationist, A.S.C.S. offices, and Zoning Officials were made to understand the existing land uses and conservation practices of the Lake Mason watershed and to determine what existing laws affected the lake and its surrounding areas. Below is a review of Adam and Marquette County programs, studies, and zoning laws.

Adams County

Soils survey of Adams County was issued in July 1984 that described the soils of the Lake Mason drainage basin. There are three soil descriptions that define the areas around Lake Mason and the watershed.

- **Kewaunee Silt Loam** is the dominant soil of the land North and Northwest in the Town of New Haven which is the main drainage basin to Lake Mason

- **Manawa Silt Loam** is the main soil on the North shore and South shore immediately East of the Amey Pond inlet.

- **Poygan Silty Clay Loam** covers the West shore areas of Lake Mason.

Water and air move through these soils at a slow to medium rate. Runoff is slow. The surface layer is friable and easily tilled, but wetness delays tillage in spring. It has a tendency to puddle after heavy rains if tilled when too wet. The compact silty clay substratum also resists root development.

Most areas of these soil types are farmed. The soil is good for cultivated crops, hay pasture, and trees. Excessive water has been removed by tile and open ditches. Minimum tillage, returning crop residue, or the addition of manure helps improve fertility and reduce crusting. Over-grazing or grazing this soil when too wet had been a major concern in the past.

These soils are poorly suited for building site development and on-site waste disposal because

of wetness and flooding. Dwelling sites can be improved by tile or open ditch drainage and by protection from flooding. The wetness problem from septic tank absorption fields can also be overcome by tile or open ditch drainage and protection from flooding.

An Erosion Control Plan was prepared by the Adams County Land Conservation Committee in 1987. This report states the Town of New Haven has 8,904.9 acres of cropland in which 6,014.2 acres have high T-values mainly due to water erosion. T-value is the tolerable soil loss; this value represents the maximum level of soil erosion that permit a high level of crop productivity to be sustained economically and indefinitely. Town of New Haven needed in 1987 4,880 acres of permanent vegetative cover, and 39,625 acres of contour strips, terraces, and waterway to reduce this T-value to acceptable levels. A small area of windbreaks and mulch or no-till acreage is also needed.

Cost sharing for all agricultural conservation practices are available from both Adams and Marquette County A.S.C.S. offices. Many of these practices were installed in the late 1970s and early 1980 in the Town of New Haven.

Adams County also adapted a Shoreline Protection Ordinance in June of 1990. This shoreline ordinance is modeled after state law mandated guidelines to protect fish and wildlife, control structures and land uses, and preserve shore cover and natural beauty.

In 1973, a Sewer and Water Planning report for Adams County was completed. It stated "Future growth of the Mason Lake area will continue primarily on the south shoreline of Mason Lake westward to CTH 'G.'" The area around Amey Pond and between Big Springs and Mason Lake is now zoned "conservancy" due to high ground water conditions. This study stated "the Mason Lake area has soil conditions ranging from moderate to severe for on-site sewage disposal, which tends to cause problems with individual sewerage systems." To eliminate this problem, a municipal sewerage system in a cooperative effort with the Village of Briggsville in Marquette County was proposed.

Marquette County

The soils along the eastern shores of Lake Mason are described in the Soil Survey of Marquette County issued in August 1975. Three main soil types from silt to sandy loam are found on the shoreline areas. Except for this land area and a small area immediately north of Briggsville, all other lands of Marquette County drains away from Lake Mason.

- **Mundelein Silt Loam** is the main soil type of the Northeast and East shores of Lake Mason North of the cemetery on the north side of Briggsville. This soil is in low areas. This soil series consists of deep, somewhat poorly drained, nearly level and gently sloping, loamy soils in low areas. Ground water is one to three feet from the surface in wet seasons. These soils formed under scattered mixed hardwoods and native grasses in lacustrine silt and fine sand. These soils have high available water capacity, moderately slow permeability, and medium natural fertility.

- **Seward Fine Sandy Loam** soil extends from the cemetery through the Village of Briggsville and approximately along the shoreline 1,000 feet South and West of the dam. The Seward soil series consists of deep, moderately well drained, nearly level and gently sloping soils. Ground water is less than five feet from the surface during wet periods. These soils formed under mixed hardwoods in sandy materials over lacustrine silt and clay. These soils have medium available water capacity, slow permeability, and low natural fertility.

- **Tendrow Fine Sandy Loam** extends on the South shore line to County line. Its series consists of deep, somewhat poorly drained sandy soils on level to gently sloping outwash plains. Groundwater is one to three feet below the surface in wet periods. These soils formed under mixed hardwoods in sandy outwash deposits. Tendrow soils have low available water capacity, rapid permeability, and low natural fertility.

In 1987 Marquette County prepared a Soil Erosion Control Plan. The area north and east of Lake

Mason contains a small area of agricultural land that drains towards the lake with silt to silt loam soils. This area has sandy soils underlain by silty clay and loamy soils. Six large fields drain towards Lake Mason but they have little slope and are fairly stable as far as water erosion is concerned.

Marquette County has two zoning ordinances that are applicable to Lake Mason. Shoreline Zoning Ordinance #8 defines shoreline protection, erosion control, vegetative cutting, and building setbacks to protect the resources of Lake Mason. Zoning Ordinance #16 describes well and land uses in the areas they call "wetland districts."

B. WATERSHED-STREAMBANK-LAND USE SURVEY

Introduction

There are three river watersheds entering Lake Mason: (1) Morris Cove [North Inlet stream], (2) Burn's Cove [Big Spring] and (3) Amey Pond [South Inlet]. Ninety-five percent of the Morris Cove and Burn's Cove watersheds are located in the Town of New Haven, Adams County. The area northwest of the Village of Briggsville and Briggsville proper west of STH 23 in the Town of E Douglas, Marquette County also flow into Lake Mason. The Amey Pond area to the south is now zoned "conservancy" and its inlet stream, which has been ditched, enters from extensive wetland areas to the south and west in the Town of Lewiston, Columbia County. The soils of New Haven "are composed of glacial till, are heavier and hold together better due to their silt and loam textures. New Haven is much more subject to water erosion than wind because of the specific soil types of the area and its steep topography."[1,2] Because of the highly erodible soil type and large agricultural areas in the Town of New Haven, the Burn's Cover and Morris Cover watersheds were intensively surveyed as part of this study.

Procedure

Both the Morris Cove and Burn's Cover Watersheds were surveyed for land use on June 19, 20 and 26, 1991, by actually walking the stream thread from their Lake Mason outlets to their origins. Soil Conservation Service Stream Bank Assessment procedures were

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[1] Adams County Soil Erosion Plan, 1987

[2] Soil Survey of Adams County, Wisconsin, 1984.

followed to avoid duplication of work in anticipation of the area being accepted into the Neenah Creek Priority Watershed Program. First property lines and land ownership were determined so the landowner could be contacted for permission and boundaries determined. This information was then transferred to the U.S.G.S. Topographic Map. The procedure was that for every 300 feet of stream thread, a record and description of the left and right banks (eroded or stable) of land slope adjacent (0-12% or >12%), and of adjacent land use was made. An additional column was used in the survey form for additional comments (e.g. erosion bank dimensions). A separate survey page was kept for every landowner so a specific management plan could be developed in problem areas.

Results and Discussion

- Morris Cove Watershed

  The Morris Cove Watershed extends north of its entrance to Lake Mason and then turns northwest. Three spring ponds enter the waterway from several locations. The total stream bank length surveyed was 83,400 feet; of this length, the upper 63,600 feet of the waterway has been ditched, tiled, and straightened (except for 1,000 feet of headwater area) and the lower 18,800 feet of stream bank meanders. Therefore 76.3% of the stream has been ditched and 23.7% meanders and has the riffle-pool characteristics of a stream.

  The results of the survey are presented in TABLE 3. The entire ditched portion of the waterway has a grass buffer strip adjacent to banks. In many places, tile lines enter the ditches from adjacent fields. Water level on June 19 and 20, 1991, in the ditched portions of the stream, was seldom more than a foot deep except where culverts or roads crossed. Water periodically stands in the ditches after heavy rain falls or during spring thaw saturating its clay banks; in places once they become saturated, the sides collapse into the ditch or carry the clay to Lake Mason. Also in places water had cut deeper but wide channels in the ditch.

TABLE 3

WATERSHED - DESCRIPTION
17 LANDOWNERS ON WATERWAYS

Waterway Banks	Stable Eroded	94.5% 5%			78,800 Ft Stream Bank 4,600
Adjacent Land Slope	0-12% > 12%	92.8% 7.2%			77,400 6,000

LAND USE ADJACENT TO BANK		FEET BANK
Crops (corn & soybean)	41.9%	34,900
Pasture	28.9%	24,100
Meadow & Wetland	13.8%	11,500
Upland Hardwoods or Wildlife Cover	8.0%	6,700
Hay & Alfalfa	6.8%	5,700
Barnyard	0.6%	500
TOTAL	100.0%	83,400

The meandered portion of stream is between the ditched portion and Lake Mason. This meandered portion has severe bank erosion as the land in this area quickly slopes towards the lake (>12% Land Slope). The land adjacent was heavily pastured and there was no fencing to stop the cattle from trampling the banks. Further erosion was caused by the velocity of storm waters entering from the ditched waterways above.

Grain crops dominated the adjacent land use making up 42% of the total. Only 0.6% of the adjacent land use was identified as having enough livestock pressures to be classified as a barnyard.

- Burn's Cove Watershed

The Burn's Cove Watershed or Big Spring's Watershed extends northwest from its entrance to Lake Mason to Big springs Millpond and then turns to the west. Six spring ponds provide water to the waterway in the watershed. The total length of stream bank surveyed was 57,000 feet. Fifty percent of this waterway has been straightened and fifty percent meanders or is shoreline of the millpond or spring ponds. The area from Big Springs Dam to Lake Mason meanders and slopes quickly to Lake Mason. Areas of greater than 12% land slope are the areas below the Big Spring Dam, areas adjacent to the Big Spring Millponds, and areas around other spring

ponds that are at the headwaters of the watershed. Only 6% of this watershed has eroded banks but 28.4% or 16,200 feet of stream bank has land adjacent with >12% slope. Most of this steep grade adjacent is hardwoods but some are heavily pastured. Land uses are further described in TABLE 4. Agriculture uses and forest-wet meadow equally share land use in this watershed.

Big Spring Millpond and Dam have prevented much silt and nutrients from entering Lake Mason. These hydraulic characteristics of the past are now limited by the increased depth of silt of the millpond and decreased retention time of water passing through it.

TABLE 4

WATERSHED - DESCRIPTION

9 LARGE PARCEL LANDOWNERS
PLUS BIG SPRING 6 SMALL PARCEL LANDOWNERS

Waterway	Stable	94.0%		53,700 feet
Banks	Eroded	6.0%		3,300 feet
Adjacent	0-12%	71.6%		40,800 feet
Land Slope	>12%	28.4%		16,200 feet

LAND USE ADJACENT TO BANK		FEET BANK
Upland Hardwoods & Wildlife Cover	28.1%	16,000
Crops (corn & soybean)	26.6%	15,150
Wet Meadow & Wetland	20.4%	11,650
Pasture	14.5%	8,250
Hay & Alfalfa	5.3%	3,000
Residential	3.0%	1,750
Barnyard	2.1%	1,200
	100.0%	57,000

C. WATER RESOURCE INVENTORIES OF LAKE MASON AND WATERSHED

Introduction

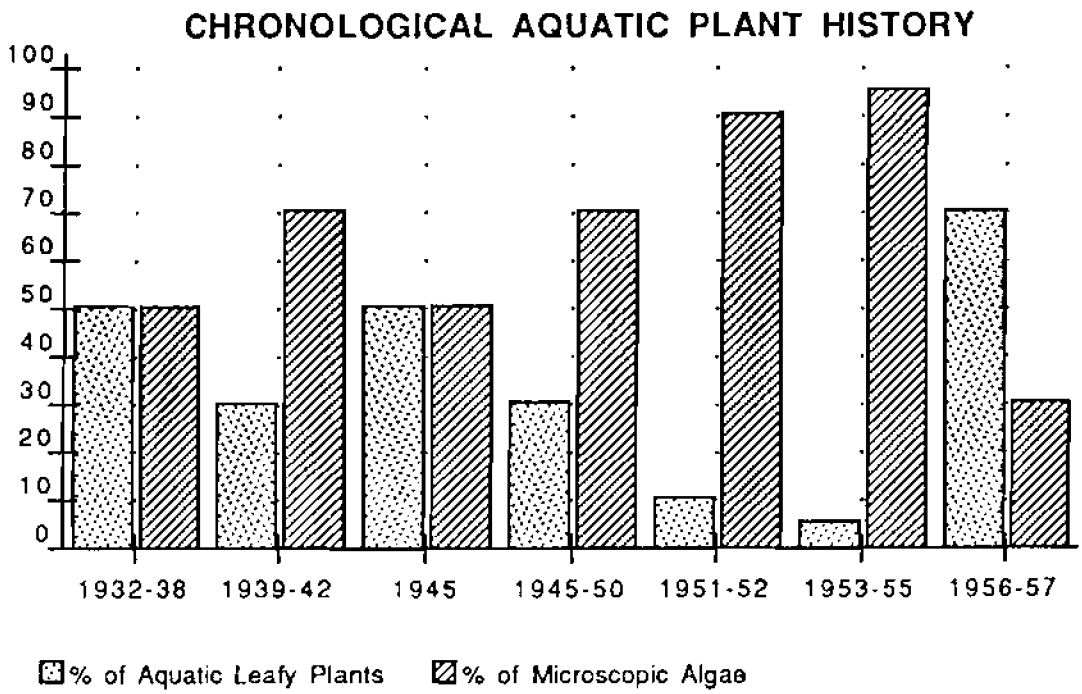
The water inventory of Lake Mason can for practical purposes be divided into three segments based on the history and data collection regarding each. They are: Fishery [1945 - Present], Aquatic Plant [1932 -

Present] and Water Chemistry [1932 - Present]. Early data for each segment of the water inventory is sparse as well as for time periods in between. It is important, however, to understand the change and inter-relationship of each segment over time. These changes not only effected each other segment but were effected by man's interactions by watershed agricultural practices, water level flow manipulation, sport fishing and commercial fishing, chemical poisoning, and residential development around the lake. Natural occurrence as flooding, drought, erosion also played a part in the changes of Lake Mason. The understanding of just how each of these manmade and natural effects have and will effect Lake Mason Water Inventory is at least difficult.

Highlights of each history are reviewed in this section of this study. Compiling of the chronological data of each segment of the water chemistry has been important in understanding the changes and identifying problems.

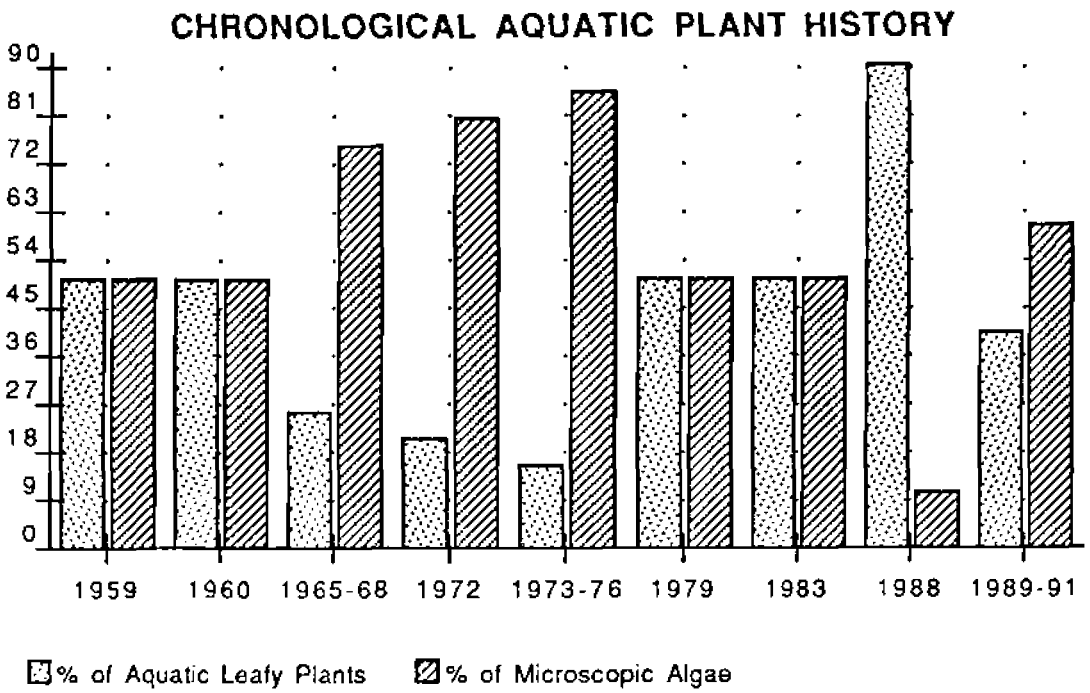
Aquatic Plants

The present abundant aquatic plants at Lake Mason is a result of a long history of change in the lake and the watershed, but aquatic plants as we see them were always present in the lake and even in the waterway before it was impounded. These aquatic plants did not always exist as leafy or stemmed plants; at times these leafy-stemmed aquatic plants (macrophytes) completely disappeared and were replaced by microscopic aquatic plants (algae) that at times created "pea soup" water in Lake Mason. It was during these times that the leafy-stemmed aquatic plants disappeared. The recorded aquatic plant history of Lake Mason begins with sketchy details regarding the fishery in 1932. History of the aquatic plant changes in Lake Mason has repeated itself several times since then. This aquatic plant history is chronologically presented in Figure VIa based on estimated plant production and associated problems from fishery files.



YEAR(S)	COMMENTS
1932-38	Rough Fish removed. June 27 - "weeds coming up thick. "Water quite green." Few Carp present.
1939-42	Commercial fishing of Rough Fish. Fishery declines. 1942 - No commercial removal.
1945	August 2 & 3 - First aquatic plant survey. "Floating and emergent vegetation in shoreline areas and at all points in Burn's & Morris Cove." "Secchi Disk - 1 foot." Vegetation seems to impart a green color to water.
1945-50	Commercial fish removal. "Algae bloom intense."
1951-52	"Few weed beds left." Carp abundant. Vegetation survey - July/August.. "Secchi Disk <1 foot maximum depth" of algae plant growth. Severe erosion North shore - 2 feet.
1953-55	Carp market down. "Pea soup green and fish kill - June 14-20." "Bottom almost completely void of aquatic plants."
1955	Drawdown and Carp poisoning. Lake Mason Improvement Association formed.
1956-57	Vegetation back. Secchi Disk in 1956 - June: 8.2 feet; July: 17 inches; August: 10 inches.

FIGURE VIa



YEAR(S)	COMMENTS
1959	"Vegetation planted in spring." "Film of algae over most of lake in spring."
1960	Aquatic Plant Survey
1960-64	No data
1965-68	"Water always dirty." Cottage and campground development.
1970	Carp poisoning
1972	"Algae chokes lake." Filamentous algae decay on North shore. Fish kill. Planktonic algae bloom heavy - treated June 29, 1972. -- Nutrient Survey -- "Runoff extreme."
1973-76	Fish kills. Algae Blooms. No Carp.
1977-78	No Data. Commercial treatment of plants.
1979	First Carp appears.
1980-82	No data. Lake District proposed and defeated.
1983	Fish kill. "Weeds not too bad" (no treatment)
1984-87	Little data
1988	Aquatic Plant Survey. P. Crispus covers entire bottom.
1989-91	Winter drawdown begins. Fish kills continue

FIGURE VIa

Aquatic plant and algae changes are evident as shown in FIGURE VIa. Review of aquatic plant survey of the past and near present indicate many of the same plants exist, many have disappeared, and the threat of exotic plants as Eurasian Water Milfoil is now appearing. These plants have reacted to light competition with algae, with each other, and changes in the fisheries (especially rough fish) as well as water chemistry changes.

Fishery History

The written history of Lake Mason fishery extends back to 1932 when rough fish removal for commercial harvest was mentioned in a 1935 report. Fishery history continues today with management practices attempting to keep the rough fish controlled, keeping panfish from stunting, and maintaining a fishable game fish population.

The chronological history as presented in TABLE 5 shows that the fishery has faced many problems of water quality and habitat destruction from 1932 to present.

TABLE 5

CHRONOLOGICAL FISHERY HISTORY

YEAR(S)		COMMENTS
1932-34	1	Rough Fish removed by commercial harvest
1935	2	Few carp reported. June 27, 1935 "water quite green and weeds coming up thick."
1938-41		Game fishery begins to decline, commercial fishery removal of Rough Fish: 550 lb. (1938); 6,790 lb. (1939); 7,700 (1940); 990 lb. (1941).
1942	1	No fish removal, only six walleye caught in nets. Game fish continue to decline.
1943-45	1	Rough Fish removal: 33,000 lb. (1943); 113,750 lb. (1944); 4,790 (1945).
	2	First fishery survey: Carp 4-10 lb each. White suckers - 16.75"; NP 20.5"; LMB 10-11.3" with tape worm; Bluegills, Pumpkinseed, Y Bass, White Bass, and Black Crappies in excellent condition (Black Crappie dominant). Channel Cat 9-12.8" and Br. Bullhead - 9.0"
	3	3,000 fingerling bass stocked.

TABLE 5 (Continued)

CHRONOLOGICAL FISHERY HISTORY

YEAR(S)		COMMENTS
1946	1	Rough Fish Removal: 25,000 lb.
	3	10,000 LMB fingerlings stocked
1947	1	Rough Fish Removal: 3,100 lb.
	2	25 Pickeral netted, early opener for walleye.
1948	1	Rough Fish Removal: 34,075 lb.
	3	2,500 LMB fingerlings stocked.
1949	1	Rough Fish Removal: 65,457 lb.
	2	"Skinny Game Fish"
	3	18,460 LMB fingerlings stocked.
1950	1	Rough Fish Removal: 37,090 lb.
	2	"Panfish Skinny"
1951	1	Rough Fish Removal: 199,930 lb.
	2	Yellow Bass dominant
	3	9,190 LMB fingerlings stocked.
1952	1	No commercial fishing
1953	1	Rough Fish Removal: 14,100 lb.
	2	Fishing poor
1954	1	No commercial harvest. Carp control gate on Amey Pond.
	2	Fish kill: (24) 7-9.5" Bl. Crappie; (46) 6-8" White Bass on west end of heaviest, water "pea soup"
		-- Drawdown proposed --
1955	2	Fish kill in Spring.
		Drawdown and rotenone in Fall.
	1	400,000 lb. Carp killed (average 3.4 lb. each).
		Fish Survey at kill: BG: 7.0-9"; P.S. 3.2 - 4.3"; Y. Bass 7-9"; Bl. Crappies 7-12.5"
		Total Fish Removed: 508,328
1957	1	
	2	
	3	Stocked: NP 2,354,000 fry; WE 67,873 fingerlings; BG 2,713 3-6"; Bl. Crappies 1,000 lb.; W. Crappies 200 lb.
1958	1	Repeat fish poisoning in Amey Pond
	2	Shocking Survey.
	3	Stocked: NP - 3,000 6-8"; LMB - 203M fingerlings; WE - 67,873 fingerlings.
1959	1	Rough Fish Removal: 154,050 lb.
	3	Stocked LMB - 18,100 fingerlings
1960	1	Rough Fish Removal: 96,440 lb. Carp growing slowly.
	2	Toxaphene McCall Lake
	3	Stock: LMB - 12,000 fingerlings; BG - 95,000 1"

TABLE 5 (continued)

CHRONOLOGICAL FISHERY HISTORY

YEAR(S)		COMMENTS
1961	1	Rough Fish Removal: 133,050 lb.
	2	
	3	Stocked: Northern Pike - 300 fingerlings
1962	1	Rough Fish Removal: 129,050 lb.
	2	Ice fishing closing proposal.
		Fishery Survey: Carp 13.8" (108); N.P. 16-35" (23); WE 10-16.5" (24); BG 4.7-7.7" (21); Y. Bass 4.8-5.8" (16); Catfish 5.4"-16.9" (10); Bl. Crappie 4.1-10.3" (106); Y.P. 7.0-7.6" (4); Bullheads 7.5-8.0" (84).
	3	Stocking: NP 50 Adults; LMB 32,400 fingerlings; BG 90 Adults.
1963	1	Carp reproducing; 89,900 lb. removed.
	2	Fishery Survey: Yellow Bass & Bl. Crappie dominant.
	3	Stocking: NP 500 fingerlings; LMB - 22,000 fingerlings - 500 10".
1964	1	Rough Fish Removal: 8,400 lb.
	2	Bl. Crappies dominant
	3	Stocking: LMB, 10M fingerlings
1965	1	Rough Fish Removal: 69,000 lb.
	2	Bl. Crappies dominant
		--Drawdown proposed --
	3	Stocked: NP - 2,933 8-22"
1966	1	Rough Fish Removal: 62,500 lb.
1967	1	Rough Fish Removal: 87,500 lb.
	2	Bl. Crappies dominant
		Fish eradication considered
	3	Stocked: N.P. 250 13"
1968		
	3	Stocked: NP 4,113
1969	1	Carp seining ends.
	2	Fish eradication (poisoning) considered.
1970		
	2	Fish eradication
1971		
	2	Lake clears
	3	Stocking: NP 2,289,000 fry; Muskie 68,000 fry; WE 5,665,000 fry; LMB 268,990 fry; Y.P. 6,548; Gr. Sunfish 3,464; Minnows 50,155
1972		
	2	Fish kill - June 29
	3	Stocked: NP 1,008,000 fry; WE 2,000,000 fry; LMB 50,000 fry.
1973		
	2	Fish kill - July 22
		Winter fishery

TABLE 5 (continued)

CHRONOLOGICAL FISHERY HISTORY

YEAR(S)		COMMENTS
1975	2	Fishery Survey: Mean sizes: NP 22"; WE 10-11"; LMB 14"; BG 4.3"; P.S. 6.5"' Y.P. 7.1" (dominant)
1976	1	Fish kill - July 12. Algae bloom
1979	1 2	First Carp appears Fishery Survey: Carp 18" & 10" (2); White Sucker 15 & 15.9" (2); NP 20-35.4" (7); WE 14-24.4" (4); LMB 3.5-19.9" (66); BG 1.5-8.2" (40); P.S. 2.9-7.5" (110); Bl. Crappies 4.3-10.7" (18); Br. Bullhead 7-14.9" (17); Y.P. 4.0-9.8" (132); Green Sunfish 4 & 5.2" (2).
1983	2	July 23 & 24, 1983: Fish kill of BG, LMB and Y.P.
1984	2	Amey Pond purchased. N.P. survey: 90% male & 10% female
1985	2	Fishery Survey: Mean Lengths. NP 23.4"; LMB 16.7"; BG 6.0" (dominant); P.S. 5.2"; Bl. Crappie 7.0" (2nd dominant); Y.P. 6.8"; Golden Shiners (abundant).
1988	1 2	Panfish removed: 50M Drawdown begins N.P. Mean Length 21.5"; BG 5.63"
1989	2 3	B.G. fish kill North shore; B.G. Mean Length: 6.1" Stocked: Hybrid Muskie 1,463 9-9.50"
1990	2	B.G. Mean Length: 6.77"
1991	2	N.P. Males 28" (age 6); Females 34" (age 9)

The fisheries of Lake Mason is now at a turning point -- Water Chemistry conditions of high fertility has caused nuisance levels of aquatic plants that affect the fishery. Nutrient reduction is important in the near future to prevent massive fish kills, loss of game fish, and species shift to those who tolerate heavy algae blooms.

Water Chemistry

Water chemistry data of Lake Mason first began in 1950 with alkalinity testing and has progressed to today's long-term lake monitoring that began in 1973, which includes over 30 parameters. The first intensive water chemistry of Lake Mason was part of a nutrient study made on April 24, 1972. In 1972 the summary of the nutrient report stated:

> ". . . farm runoff is adding to the nutrient levels of Lake Mason. However, it would also appear that background levels of nutrients of Lake Mason watershed are naturally high and will continue to be a problem even if all sources of farm runoff were stopped."

With this understanding and over 20 years of water chemistry data to support water chemistry changes, there is evidence that land uses have changed for the better and nutrients are *still* abundant throughout the lake--they will always be there. The collected water chemistry is valuable and will remain valuable in the future if it can be integrated with aquatic plant and animal changes and human management strategies.

D. SHORELINE PROPERTY OWNER'S SURVEY

Procedure

A Shoreline Property Owner's Survey was conducted on the weekends of July 5 & 6 and July 13 & 14. Fifty-nine people who own residents or businesses on Lake Mason were interviewed and a survey sheet (APPENDIX A) was completed for all 59 lake residents. There are 120 property owners adjacent to the lake which include seven larger parcels or agricultural use lands and 8 facilities that are considered other than single dwellings. Properties were given a number beginning with the Northwest Corner of Lake Mason at Burns Cove and continuing in a clockwise direction until the entire circumference of lake properties were numbered. The survey consisted of ten questions. Questions 1-5 concerned lake use, 6-7 were in regards to water and sanitary service and 8-10 were opinion questions regarding the lake.

Results

- Question 1 through 5

  Over one-third of the lake residents interviewed have lived on the lake less than five years.

  Question #1: How long have you owned property on Lake Mason? (Figure IVa - below)

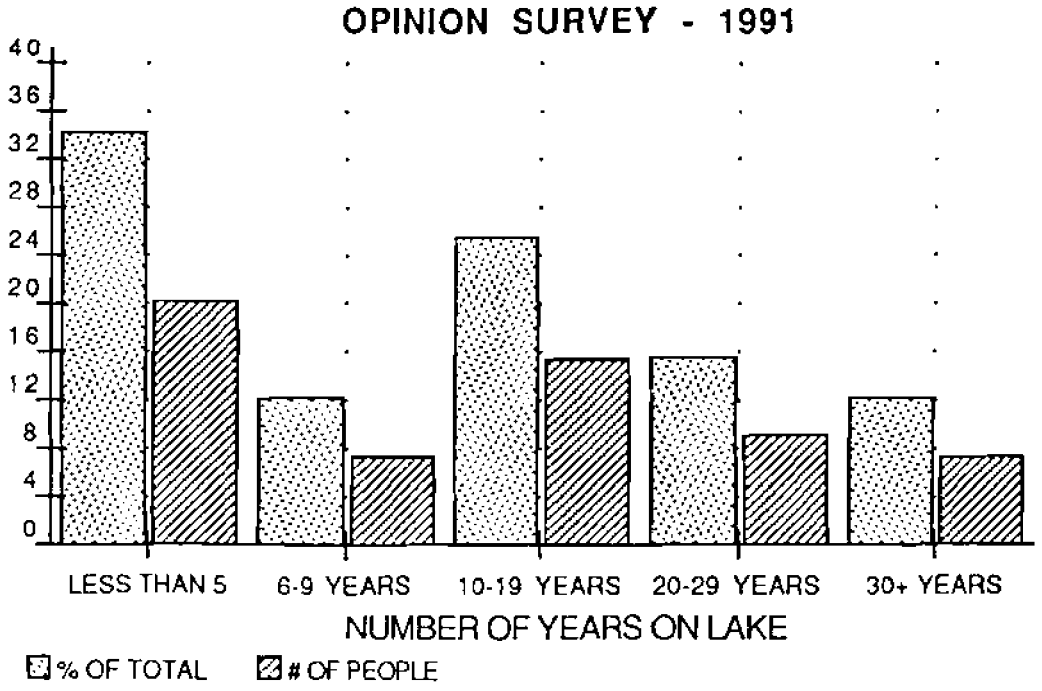


FIGURE IVa

Nearly 60% of the residences on the lake are used year round with another 13.6% winterized and could be used year round but are only used for three seasons. Only 24.1% of the residences are considered seasonal (seasonal cottage plus three seasons cottage) (FIGURE IVb).

There are eight facilities on the lake that do not fall into single dwelling categories; all but one were interviewed and included in the results of this survey. These have been categorized as follows:

3 - resorts and campgrounds
1 - resort, lounge, and motel
1 - resort, home and 4 cottages
1 - resort, 3 cottages, and motel
2 - group cottages: 1) Winterized, 10 seasonal
2) 6 seasonal

Operation of all but one facility is considered three seasons with peak activities of these seven other facilities from Labor Day to Memorial Day. Early fishing and late hunting activities increase activity outside the peak time.

Question 2: What would you consider your property?

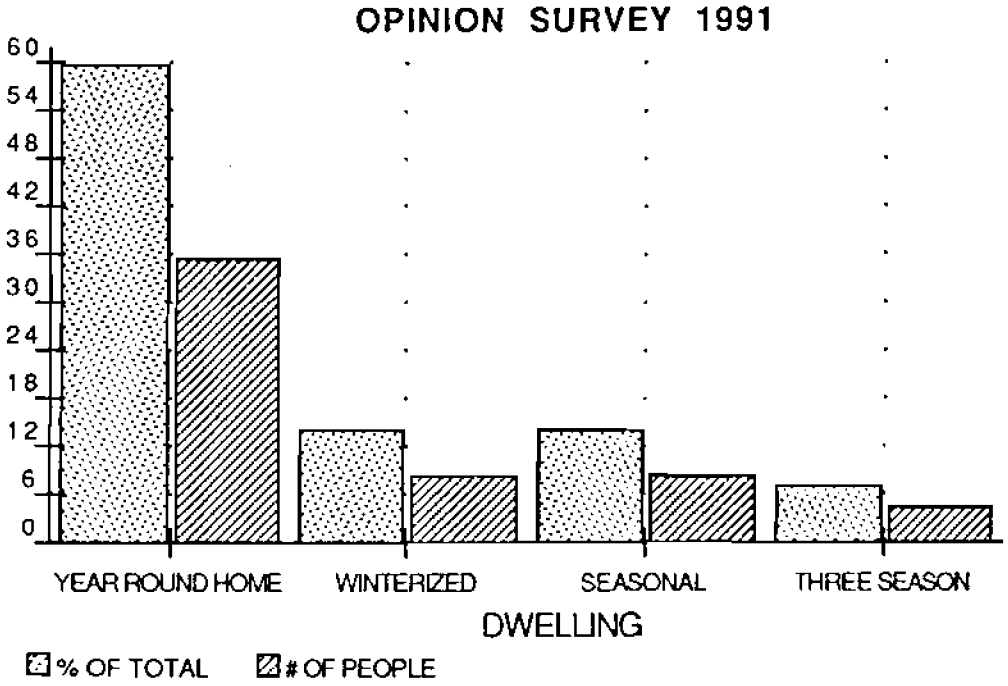


FIGURE IVb

NOTE: One resort-campground did not fill out questionnaire and three single dwellings left Question #3 blank.

Questions 3 and 4

Answers to Questions 3 and 4 (by shoreline property owners) were used in determining the use of their facilities. The questions were simply put: How often and how many people use the dwelling described in Question 2?

A method was developed to determine current use of Lake Mason by all shoreline property owners

including not only single dwelling but multiple dwelling facilities to include the resorts, campgrounds, 2 - group cottages described above. From the information from Questions 2, 3 and 4, three categories of lake use were developed. Definition of each category is as follows:

WE (PEOPLE WEEKENDS) - number of people that use the dwelling X the number of weekends used (e.g. 6 people using a cottage every weekend = 6 people X 52 weekends = 312 people weekends).

WD (PEOPLE WEEKDAYS) - number of people that use the dwelling X number of weekdays used (e.g. a couple with a home on the lake who reside year round = 2 x 26 weekdays = 522 weekdays).

V (PEOPLE VACATION WEEKS) - number of people that use the dwelling X number of weeks vacation (e.g. a family of four spends their two-week vacation [including weekends] at their cottage = 4 people X 2 weeks vacation = 8 people weeks).

A single residence or a multi-dwelling facility on Lake Mason can be in any or all of these three categories.

Each category (WE, WD, and V) totals were expanded to a grand total to express Lake Mason property owner's use of the lake as PD (PEOPLE DAYS) (TABLE 1).

Questions 3 & 4: How often do you use your dwelling? On an average, how many people use your dwelling during the period(s) checked above?

TABLE 1

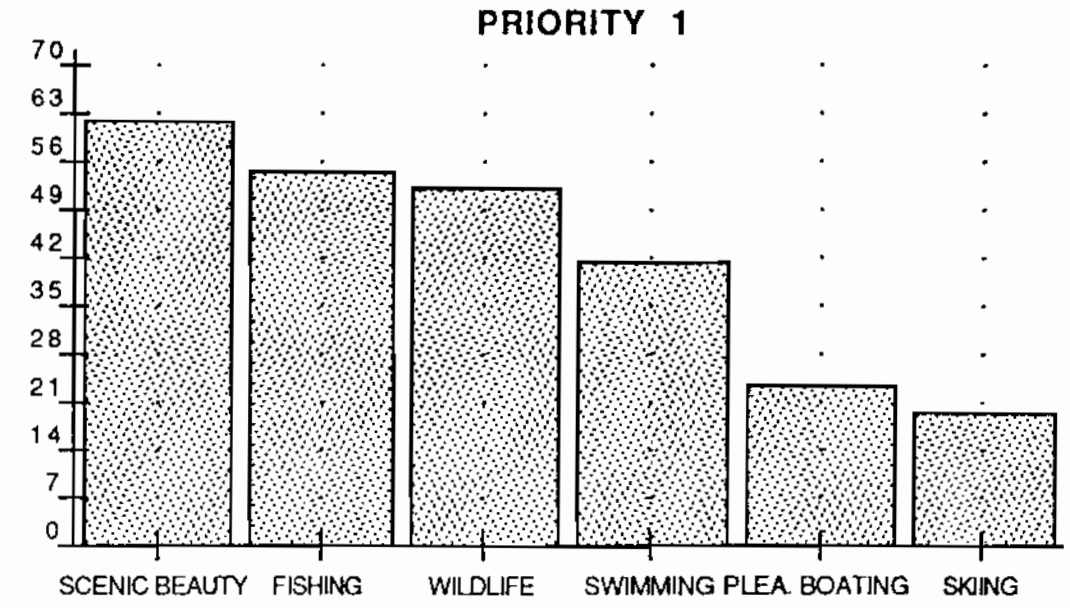
LAKE MASON PROPERTY OWNERS SURVEY - 1991

		PD (PEOPLE DAYS)	PD [% OF TOTAL]
WE (PEOPLE WEEKENDS)	3,043.3	6,086.6(2x)	12,173.2 (2x) [31%]
WD (PEOPLE WEEKDAYS)	12,914.5		25,829 (2x) [65%]
V (PEOPLE VACATION WEEKS)	133.3	933.1(7x)	1,866.2 (2x) [4%]
TOTAL PEOPLE DAYS BY LAKE PROPERTY OWNERS:			**39,868.4**

PEOPLE WEEKENDS (WE) were multiplied by two (2x) for day conversion and again multiplied by two (2x) for extrapolation as only 50% of single dwelling property owners were interviewed. Multiple unit facilities were included in the People Weekend and People Weekday totals using number units and occupancy rates/unit of time (weekends) but were not included in second multiplication (2x). PEOPLE DAYS (WD) were multiplied by 2(2x) for extrapolation as above. PEOPLE VACATION WEEKS (V) was multiplied by seven (7x) to convert weeks to days and again multiplied by two (2x) for extrapolation of total PEOPLE DAYS.

- Question 5

Question 5 answers were used to understand lake property owner's opinions in regards to use and importance of their lake dwelling. The results are tabulated in Figure IVc. In Question 5, the property owner was asked to prioritize into five categories (category 1 would be a high priority and category 5 a low priority) six recreational uses listed to include: swimming, fishing, pleasure boating, skiing, scenic beauty and tranquility, and wildlife habitat. The question was clarified to include what you feel is important and if this use is limited at this time (e.g. limited by excess weed growth) do not decrease its importance when prioritizing.


PRIORITY 1
70
63
56
49
42
35
28
21
14
7
0
SCENIC BEAUTY
FISHING
WILDLIFE
SWIMMING
PLEA. BOATING
SKIING

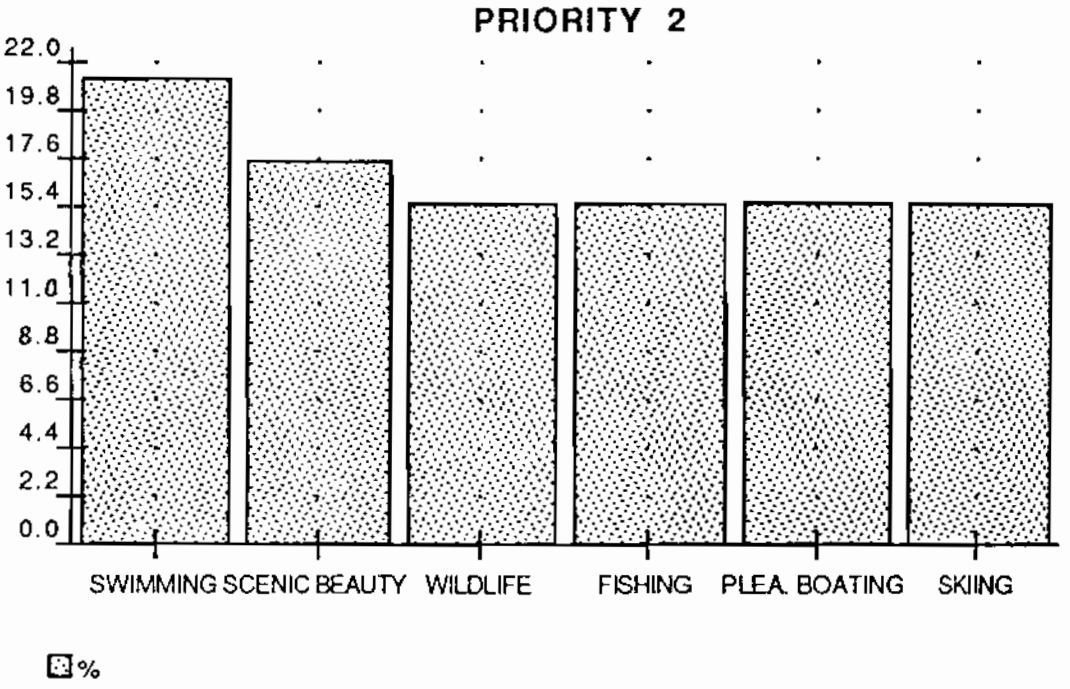

PRIORITY 2
22.0
19.8
17.6
15.4
13.2
11.0
8.8
6.6
4.4
2.2
0.0
SWIMMING
SCENIC BEAUTY
WILDLIFE
FISHING
PLEA. BOATING
SKIING
%

FIGURE IVc

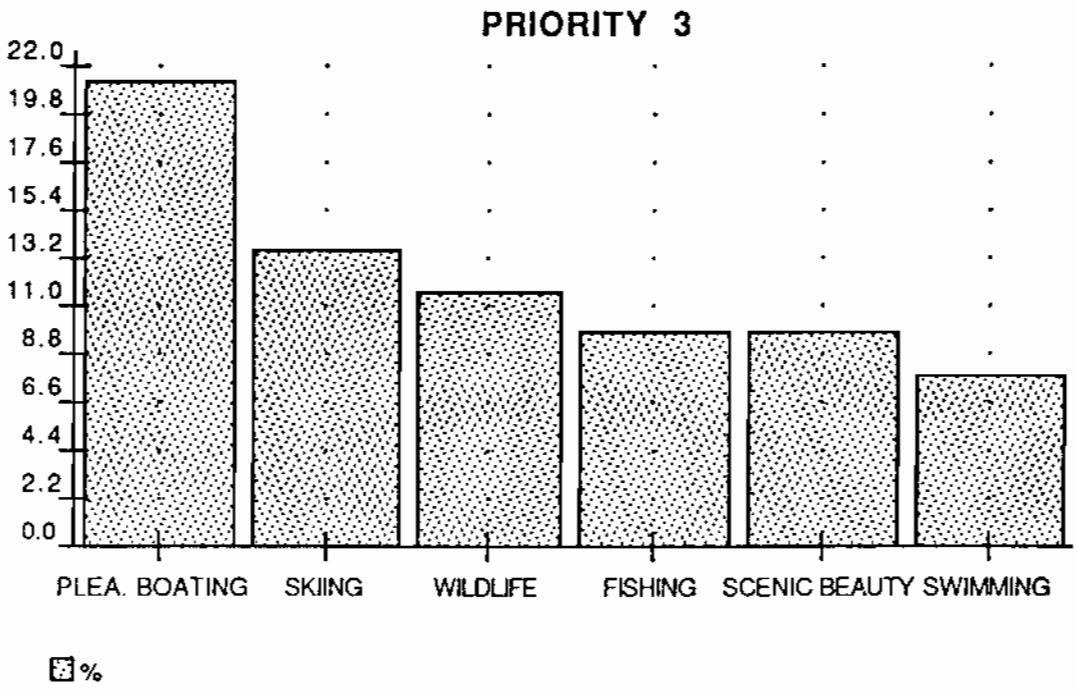


FIGURE IVc (continued)

- Questions 6 and 7

  Answers were used as a survey of water and waste disposal facilities adjacent to Lake Mason.

  Wells on the North side of lake are from 70-90 feet deep with a mean depth of wells of 82 feet. All wells of those surveyed on the North shore can or do produce artesian flow of .5 gpm to 10 gpm with the mean flow of 2 gpm out of 14 wells. Wells on the Northeast end of lake are from 50-70 feet and are pumped. Wells on the East and South side of lake are both drilled and driven sand point and range from shallow to 120 feet. A few of the deeper wells surveyed on the South-Southwest of lake have artesian flows. The 120 foot well continued to flow on winter drawdown where a 90 foot artesian well next door stopped flowing on drawdown.

  The waste disposal systems (described in the survey) on the North shores and East consists of 24 septic tanks with drainfields, four holding tanks, and four mound systems with drainfields. The South and Southwest shore dwellings have nine septic tanks with drainfields, seven holding tanks and one

mound system with drainfield. Figure IVd describes these facilities further.

NOTE: Number of single dwelling waste disposal systems described in survey: 46

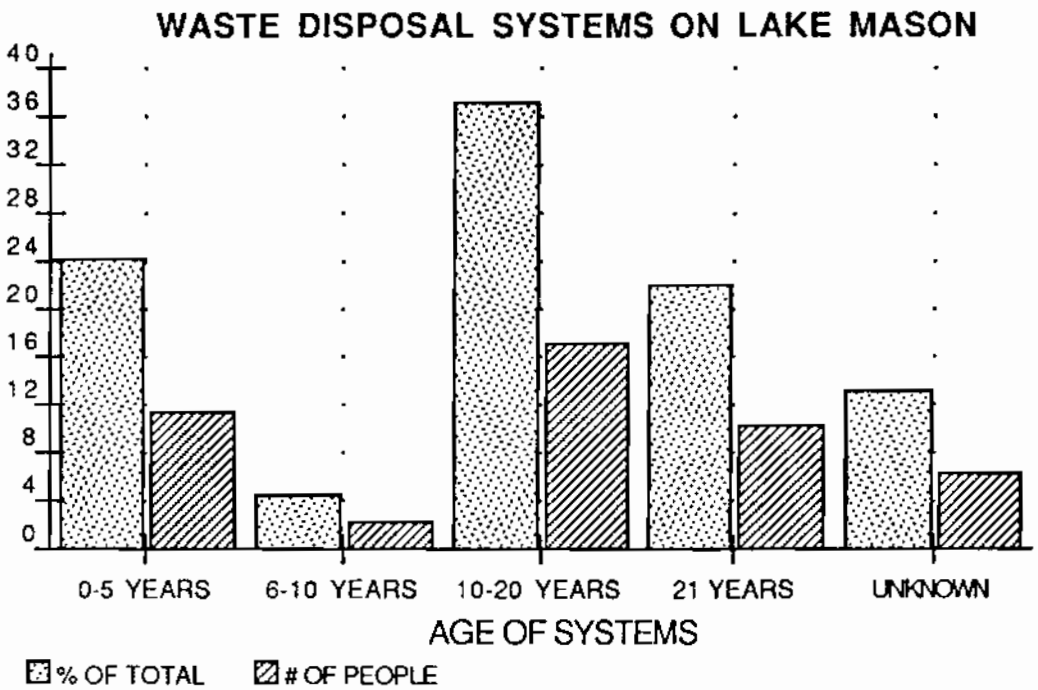


FIGURE IVd

Maintenance of Waste Disposal Systems

Twenty-seven dwellings out of 46 dwellings surveyed have their holding tanks or septic tanks pumped. The schedule of pumping varies from "as needed" to "occasional" and from every six weeks to every other year based on dwelling use. Pumping corresponded to described uses in Questions 2 through 4. Seven dwellings surveyed indicated no pumping was required and another seven units indicated they had septic problems during high water periods in spring.

- Questions 8 through 10

Questions 8 through 10 were opinion questions relating to problems of Lake Mason and the direction those surveyed wished to go to solve or lessen the effects of the problems. The results of

those questions are described in Figure IVe and Table 2.

Question 8: What do you feel are the major problems facing Lake Mason at this time? Surveyed people were asked to place in Priority Levels 1 through 5 (Priority 1 being largest problem and Priority 5 the least problem).

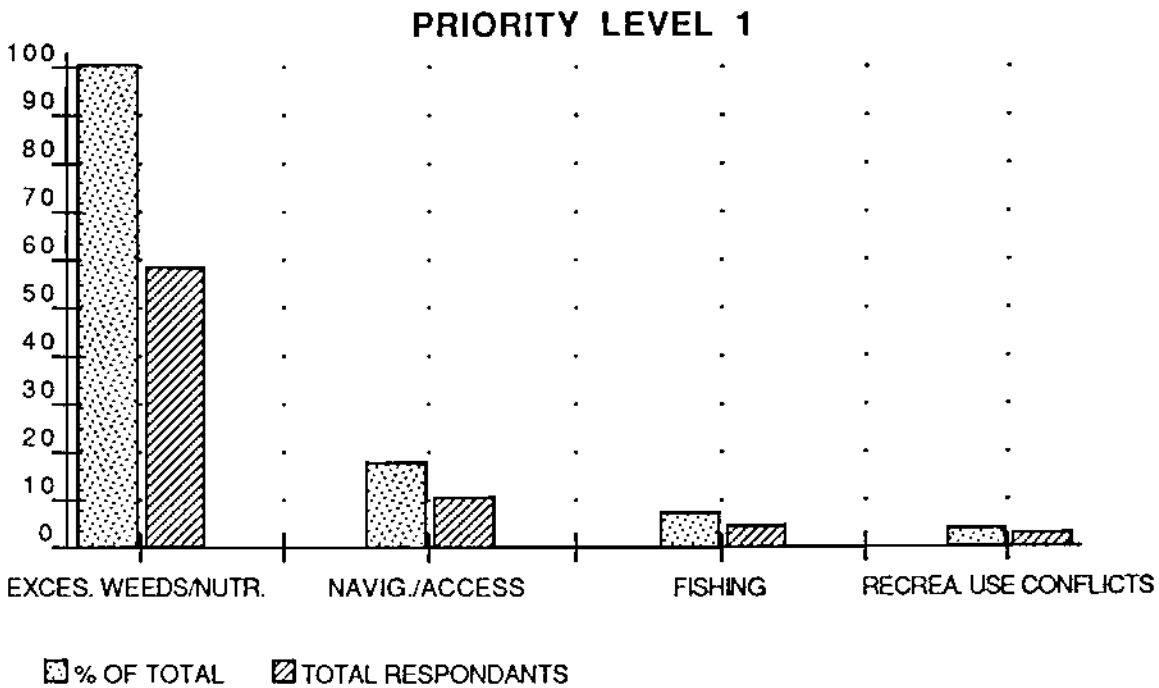
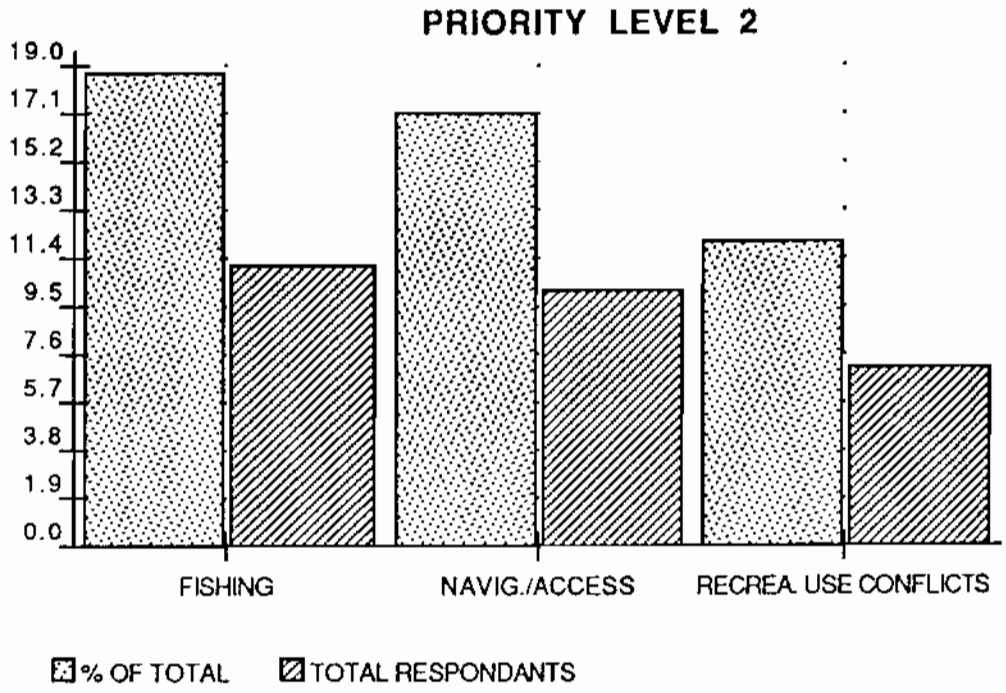


FIGURE IVe



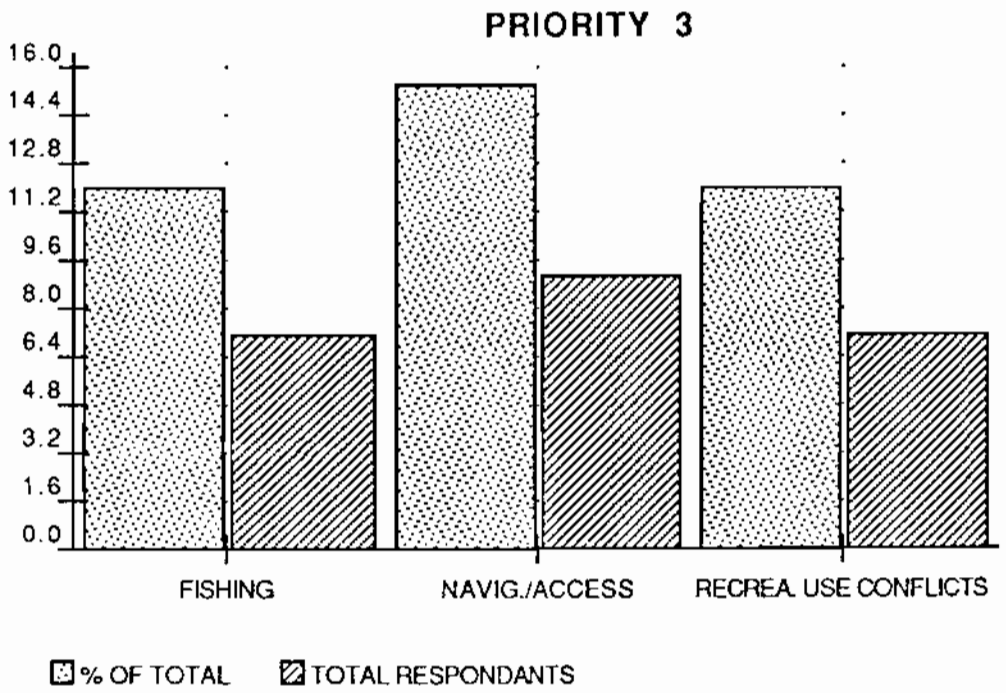
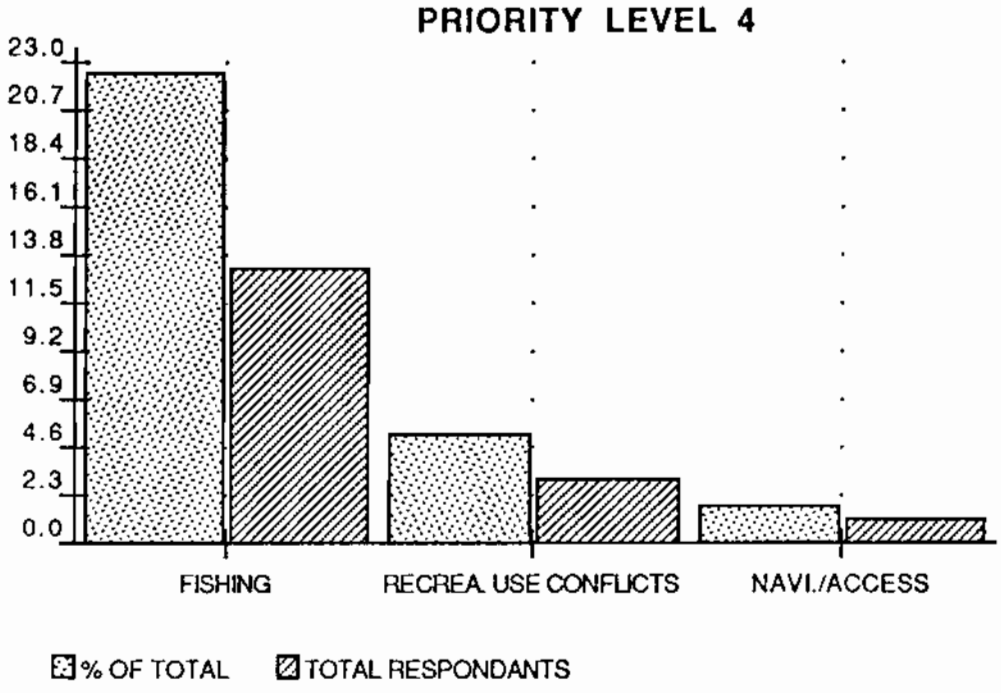


FIGURE IVe(continued)



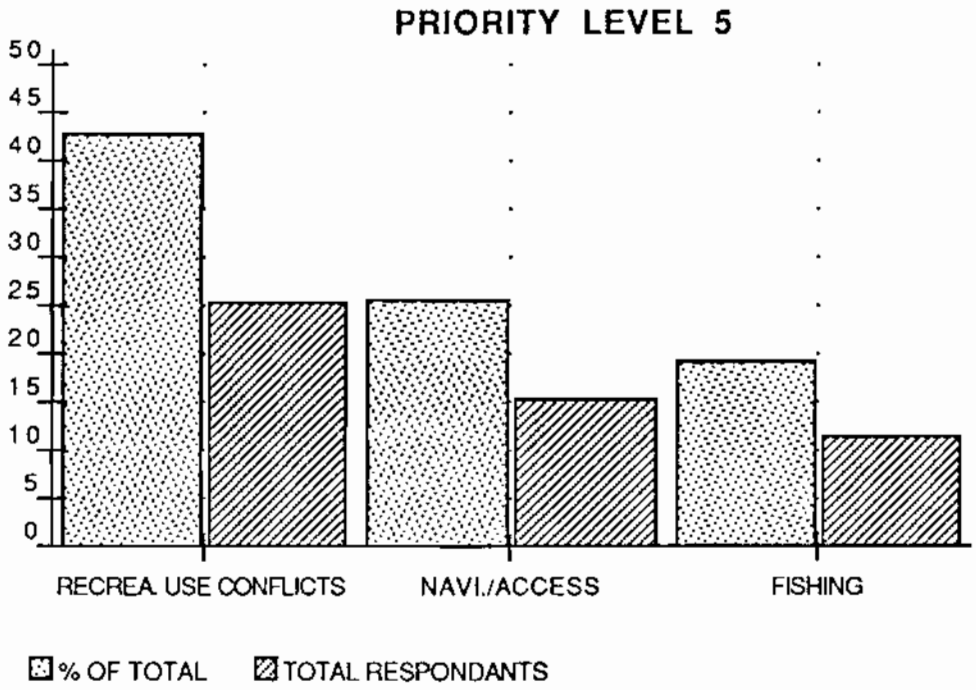


FIGURE IVe (continued)

Weeds and Excess nutrients effected every other category listed as excessive weed growth can clog props on motors or rudders when boating, cause an over-abundance of panfish, and disrupt swimming and skiing activities.

- Question 9

  The depth and fertility of Lake Mason causes many problems for the recreational use of the lake. What priorities would you give to solve, prevent, or keep these conditions from worsening. Priority 1 (high priority) to Priority 5 (low priority) and then indicate if effort for each priority should be LIMITED or EXTENSIVE.

TABLE 2

Questionnaire Responses to Proposed Lake Management Practices

		LIMITED					EXTENSIVE				
Priority		**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
1.	Machine harvesting of aquatic plants	10(3)	6	6	3	20	3	2	1	0	2
2.	Chemical treatment of aquatic plants	10(3)	6	10	5	11	8	0	2	0	0
3.	Dredging/removal of lake bed materials	2	5	5	5	22	7	3	0	1	0
4.	Long-term watershed & shoreline protection	2	0	2	1	1	37(1)	5	5	0	1
5.	Water level & flow management	6	6	3	3	2	24(2)	5	2	1	0

(1) Thirty-seven (37) or 62.7% of shoreline property owners consider long-term watershed and shoreline protection top priority with extensive effort in future management.

(2) Twenty-four (24) or 40.7% of shoreline property owners consider water level and flow management as top priority with extensive effort in future management.

(3) Both mechanical and chemical harvesting of aquatic weeds on a limited basis were strongly supported.

- Question 10

  Question 10 reads: "Would you support a strong local organization with legal authority to assume management responsibility for the lake and with power to assess cost according to benefits received?"

Yes	45
No	6
Abstain	8

Discussion

Several trends in lake use were evident after 79 interviews. With one-third of the residences living on the lake for less than five years and nearly sixty percent of the single dwelling residences are used year round, many assumptions might be made. The large turnover of residences may have been due to problems with abundance of aquatic vegetation that affects every use of lake property listed in Question 5. It may be a result of the social trend that follows more leisure time. Thirteen of those living on the lake less than five years consider their dwellings year round homes but only half of these spend over fifty percent of their time there, eight more utilize their dwellings for three seasons and minimum of 28 weekends per year.

Twelve out of sixteen or 75% of those living on the lake for 20+ years are full-time residents. Those who have had property on the lake from 10-19 years use the lake on an average of 20 weekends per year.

The property owner's survey was important in describing lake use and the resultant formula used to determine people days on Lake Mason follows the social trend of movement from cities to rural areas. Sixty-five percent of the total people days of lake dwelling use is during the week day. Thirty-one percent of the total people days is weekend use. Only four percent is vacation time. The information includes both weekend and week day data from multiple dwellings around the lake. This survey does not include day users who do not utilize the dwellings located adjacent to the lake.

Lake property owner's perception of the value of their dwelling follows other lake survey results in that the number one reason for owning the property is the scenic beauty and tranquility that comes with being adjacent to water. The next two Priority I selections--fishing and wildlife--follow the obvious trend of the natural attributes of Lake Mason; its shallowness and fertility is ideal for wildlife habitat and an abundance of fish. This also coincides with heavy year round use of the lake.

Swimming took the highest category as a Priority 2 and ranked higher than pleasure boating and skiing as a Priority 1. This fact is important in developing management strategies for the lake and addressing the number one problem of excessive weed growth.

Management planning strategies must also address the top Priority 3 item of pleasure boating. Pleasure boating will continue to increase in the future.

Water supply around the lake varies greatly from the north to south shores. North shore properties have deeper wells with artesian flow where south shore properties generally have shallower wells and little artesian flow. The south shore properties shallow wells are more susceptible to surface water contamination. Artesian water naturally contains nitrogen gas that comes with a deep-water source.

Waste disposal facilities around the lake are of three main types in descending order; septic tank with drainfield, holding tanks, and mound systems. Two very important trends in the waste water facilities are evident. The first is nearly twenty-five percent (23.9%) of the facilities are less than five years old that correspond with one-third of the dwellings changing hands in the same five years. The second trend is that 57% of those interviewed conduct maintenance on their waste disposal systems.

There are a number of older systems but there also is a conscious effort to maintain these systems when required and on a periodic basis based on use. Several residents have problems with their sanitary facilities during spring high water times. The lake management planning strategies must address these systems to reduce nitrogen from reaching the lake at these times.

The direction of lake management of Lake Mason is clear as stated in the results of Questions 8 through 10. Over-abundance of aquatic weeds is the number one problem. First, long-term watershed and shoreline

protection and water level and flow management are top priorities in solving this problem. These are long-term, priority goals where short-term opinion favors limited mechanical and chemical harvesting. The people support a fair, legal, and strong organization to bring about a management plan to implement the plan.

II. LAKE COMMUNITY EDUCATION AND INFORMATION

Several Mason Lake Association meetings were held as informational meetings in regard to preplanning studies and lake planning. In the spring meeting on May 25, 1991, this Lake Management Planning Grant Study and Plan was introduced and a review of land and water inventories gathered over the winter was presented. During the fall meeting on August 31, 1991, the results and analysis of the Watershed Land Use Survey and Shoreline Property Owner's Survey was presented to the Association. Problem areas of Lake Mason and its watershed and general solutions to solve these problems were presented at that time in a poster display. On May 23, 1992, the preliminary plan and management recommendations were presented to the Mason Lake Association and 70 copies distributed. Final plan is to be distributed to all Association members during the fall meeting.

Mason Lake Association met with Aquatic Resources on several occasions to review studies and to discuss and make decisions in regard to the plan. The board discussed, reviewed, and approved the lake and watershed management recommendations at a June 27, 1992 board meeting. Approval was given to apply for Phase II planning grant monies for implementation of the plan.

Direct one-on-one contact with Lake shoreline owners and watershed property owners was important in communicating the lake's problems and determining feasible solutions. Direct contact with landowners in the watershed was during the land use survey in the spring of 1981 to ask permission and to explain problems and possible solutions. Second interviews were conducted and more time was spent on problem areas in the spring of 1982.

Over fifty percent of the shoreline landowners were personally interviewed as part of the shoreline property owner's survey. Lake use problems, well and sanitary problems, and lake use opinions gathered during these interviews were vital in understanding and developing a lake management plan.

Preliminary recommendations for Lake Mason watershed management plans and land use survey were discussed in a meeting with the two main resource managers on November 7, 1991. Scott Ironsides, Adams County Fish Manager, and Mark Klish, Adams County Conservationist both provided excellent cooperation and suggestions in

developing the plan. Their help and cooperation are essential to the implementation and funding of the final plans.

III. LAKE MASON MANAGEMENT PLAN

A. Introduction

Lake Mason's number one problem at the present is excessive nutrients. The two controlling nutrients are phosphorus and nitrogen. Phosphorus reactions are known to be the most important nutrient limiting the amount of algae and weed growth in over 80% of Wisconsin lakes. Nitrogen is the second most important nutrient, after phosphorus, causing weed and algae problems.

Major sources of phosphorus are human and animal waste, soil erosion, runoff from farm lands or lawns, and detergents. Nitrogen is everywhere; in precipitation, in ground water, in fertilizer, in human waste and animal waste (both domestic and wild). Nuisance blue green (filamentous) algae are often associated with lakes having low nitrogen-phosphorus ratios. These algaes are able to use free nitrogen dissolved in lake water as a nitrogen source.

Our problem is simple to understand. The hard part is to keep these nutrients from entering Lake Mason and when they do enter the lake and watershed channel them into plants and animals that will benefit our recreational needs. The management of these nutrients must be intense if results are to be visible. With the technologies and funding available at this time, these intense management plans can be addressed now.

The management plan must also address the people's need for recreational uses of the lake in the future and stress "shared" use of the resource through "zoned management" of Lake Mason.

1. Watershed Management

Nutrient reduction from the watershed has decreased significantly from the 1960s and 1970s. Grass buffer strips and other conservation plans in the agricultural community have gone a long way in reducing the nutrient load. Runoff of nutrients from frozen ground and during heavy rains will continue. Some seepage through tile lines will also occur. The extensive ditching of the waterways in the watershed is necessary to preserve the agricultural abilities of the fertile soil by draining surface water quickly but does not allow the suspended nutrients from running frozen ground and flash flooding to settle out as a meandering stream does. These ditches can be modified

to increase their cross sectional area and reduce "in ditch" erosion and still maintain the function of the tile.

A few "barnyard" situations exist that contribute nitrogen and phosphorus through animal waste contributions. A buffer strip of vegetation less than five feet wide can with the right grasses prevent even these nutrients from entering a waterway. Highly Erodible Lands conservation plans combined with wildlife habitat plans or abandoned and agricultural lands replaced by restored wetlands can contribute to nutrient reduction. The above watershed management plans are options that are available to all land owners in the watershed that have waterways. Funding is now available or can be made available so these management practices can be carried out with 80 to 100% of the cost being paid by the federal, state, and even private concerns. They cannot be carried out without your cooperation. Agency funding is also available for conservation purchase of important areas for fish and wildlife habitat.

In those portions of the Big Spring and Morris Cove streams above Lake Mason that are not ditched in-stream hydraulic management plans can be combined with fencing to settle out the nutrients (silt) in pools before entering Lake Mason. Riffle areas can be created to increase oxygen levels that will reduce or change nitrogen to chemical forms that will be released to the air or become part of "good" aquatic plants. This practice should be combined with the restoration of wild rice and wild celery in both Morris and Burn's Covers.

Ground water entering the watershed streams from spring ponds and artesian springs should be splashed and exposed to the air as much as possible to drive dissolved nitrogen and carbon dioxide from them. Both dissolved nitrogen and carbon dioxide are used by aquatic plants in growth and production.

A wildlife control plan needs to be developed to reduce geese excrement from entering system.

2. <u>In-Lake Management</u>

- Grass buffer strip (green belt) around lake
- Fall pumping and replacing of septics
- Aeration of artesian water flows
- Reduced fertilizer
- Aquatic weed harvest
- Fish harvest

Nutrient reduction from in the lake and immediate shoreline must also be reduced drastically if results are to be evident.

Both phosphorus and nitrogen reduction can and must be reduced in the lake. The top priority is to create a "green belt" around the entire lake utilizing plants that have long and dense root systems to intercept nutrients from lawn, septic, and artesian well water.

Aquatic plant, fish, and geese harvest regulations should be developed to further remove nutrients in combination with providing and preserving the recreational value of each.

The hydraulic abilities of the Lake Mason Flowage are unique. The amount of ground water entering the lake itself and the watershed is tremendous. On drawdown, large springs are evident on the southwest and northwest shoreline areas. The Lake Mason Drainage Basin is relatively small; the approximate Drainage Basin/Lake Area ratio is 6 or 7:1. Retention time of the water entering and leaving the lake, combined with the shallowness of the lake, can reduce phosphorus and nitrogen activities in the lake. Dam operation and construction can aid in the hydraulic ability of Lake Mason and Big Spring Flowages.

B. Management Plan

The Lake Mason Management Plan Phase I includes identifying specific sites and conditions that presently exist that contribute to the problems of Lake Mason. These seven site and condition types and locations are identified in Plates I and II (see APPENDIX). Property borders and property owner numbers are indicated in Plates III and IV (see APPENDIX). Below is a discussion of each of the seven site and condition types. Individual location management plans will vary but the conservation principles applied to each site or condition is similar.

1. Grass Waterway Alteration Areas

Many areas of the Lake Mason watershed that were once vast areas of wetlands have been changed to agricultural areas through draining by a system of ditches and tiles. In most of the watershed these ditches are buffered by vegetative buffer strips separating the ditch from the agricultural areas adjacent. This vegetative buffer strip consist mainly

of reed canary grass that prevents and filters agricultural fertilizers and soil from entering the ditch that eventually drains water to Lake Mason. But, because of the clay soil that exist in the Lake Mason watershed to the north, during periods of heavy rain and spring runoff over frozen ground, suspended clay-laiden water enters the ditches and streams entering Lake Mason. Water from land runoff, smaller ditches above, and the tile systems collect in the ditched waterway areas indicated in Plates I and II (see APPENDIX). Standing water in these areas of the ditch saturates the raw clay sides of the ditch; which under its own weight falls to the bottom of the ditch further widening the ditch and contributing to the clay load entering Lake Mason. These areas should be modified by increasing the cross-sectional area of the ditch. This will decrease the depth of the standing water in the indicated areas of Plate I and II (see APPENDIX). This design change will also decrease the water velocity and increase the clay settling capacity of this portion of the ditch.

2. Meandered Stream Restoration

There are several portions of both the Morris Cove and Burns Cove (Big Springs) waterways that have not been ditched and are remnants of the original streams. Many have eroded banks from cattle and geese activity or from the effects of high water velocities during periods of heavy rains or snow melt. The meandered portions of these streams are important as their riffle areas add oxygen to the water and drive out nitrogen and carbon dioxide gases. Their pool areas slow the water velocities down and settle out suspended clay particles that contribute nutrients to Lake Mason. These areas should be protected or restored, especially as they are located below areas that have been ditched that do not have these important qualities.

Morris Cove inlet has a long segment of meandering stream with a relatively large elevation drop between the extensive ditched areas of the stream and the lake [Areas 1, 2, and 3, Plate IV] (see APPENDIX). This area should be fenced with a minimum of ten foot buffer strip on each side of the stream. Bank erosion areas will eventually heal themselves if other conservation practices above are implemented; if not, stream bank riprapping will be needed to stabilize the effects of water velocities. Pool-riffle areas will also eventually stabilize once the cattle and geese are kept from the bank.

Burns Cove inlet (Big Springs) has extensive areas of meandered stream and extensive groundwater recharging areas through spring ponds and spring seepage. Many of these same areas also have erosion and nutrient loading problems from domestic cattle and concentrated waterfowl use. Where cattle exist, areas adjacent to the stream should be fenced. There are two large areas of the stream that conservation and rehabilitation efforts should concentrate [Areas 1 and 2, 3 and 4, Plate III] (see APPENDIX). Both of these areas have the cold water recharge potentials that with restoration can support a water quality capable of supporting trout. The area below Big springs dam and above Lake Mason [Areas 1 and 2] is heavily wooded but needs bank stabilization at several locations. Areas 3 and 4 above Big Spring Flowage should be fenced with a minimum of ten foot buffer on both sides.

Meandered stream areas below the several spring ponds in the Burns Cove watershed as indicated in Plate I (see APPENDIX) should be protected or rehabilitated to increase the riffle-pool ratio and increase oxygen levels in the water where possible.

3. Wetland Restoration Sites

There are several sites in the subwatersheds where wetland restoration is possible. Many are areas with failed tile systems or areas that have been set aside in the Conservation Reserve Program of the Soil Conservation Service. Other areas retain water and make poor pasture or cropland. These areas are described in Plates I and II (see APPENDIX).

4. Spring Head Protection and Rehabilitation

Several sites have been identified in Plates I and II (see APPENDIX). These areas should be fenced and protected from cattle grazing and runoff from upland fields. Most are located in large elevation drop areas (highly erodible lands) and agricultural use above and adjacent can increase the nutrient loading to the stream below and eventually Lake Mason. The outfalls from these ponds contribute cold water which can retain more oxygen than warmer water. Stream habitat or control structures below these spring ponds should be placed or operated to provide this cold oxygenated water to the stream and ditch sections below. Oxygenated water can support a more diverse plant and animal population that can further reduce nutrients.

5. Big Spring Pond Restoration

Big Spring Flowage over time has completely silted in and only a few feet of water exist--even in the dam area. Large algae masses and macrophyte growth dominate the flowage. Conservation efforts in the watershed above in recent years has reduced the silt load it receives. Dredging or drawdown for sediment consolidation and dam restoration to include a bottom draw of cold water are recommended.

Dredging or drawdown to consolidate silt will increase the recreational and esthetic value of Big Spring. Increased depth and the bottom draw will allow cooler oxygenated water to be discharged to the stream below.

6. Inlet Bay Restoration

Both Burns and Morris Coves at one time supported large beds of wild rice and wild celery. The management plan for these large areas of water one to three feet deep is to restore these bays to wild rice and wild celery. Restoration of these plants would provide a nutrient storage in the bays that the two major watersheds enter. These nutrients would then provide food for fish and wildlife and be removed from the water column--less nutrients would be available to other aquatic plants of Lake Mason. Navigational and recreational activities in these areas are now limited by the shallow depth which is ideal for the growth of these plants. Seed plots should be started and maintained until they become established on their own.

7. Green Belt Cooperative Areas

Shoreline buffer strip areas and land management cooperative areas should be organized around the lake. Twelve areas around the lake have been identified in Plates I and II (see APPENDIX). They have been grouped according to location and access. Adjacent properties have similar problems in regard to well and sanitary conditions, shoreline stabilities, and lake access. Cooperative areas would allow neighbors to develop and coordinate shoreline landscaping and conservation practices together. Cooperative fall pumping, plant and seed purchase, and landscape contracting can be economically significant and increase the effect of this conservation plan.

IV. FUNDING AND PHASE II LAKE MANAGEMENT PLANNING

Individual property owner management plans whether it be in the watershed or on the lake shore will be the key to making the management plan work--only a few interested individuals who try will not bring long-term results, but will lead the way. Money is available for "demonstration plots" for the lake shore buffer strip and wetland restoration to begin helping others understand the process.

A second Lake Management Grant can be applied for to provide planning assistance for individual property owners. Further grants can also be used to create a management plan for in-lake zone management to address recreational problems caused by too many weeds and excessive lake use. A zone-management plan can document a need for aquatic plant harvesting for navigation, access, swimming, wildlife, and fish management concerns.

A water budget as part of a plan for the hydraulic management of the lake (water levels and dam operation, limited dredging) can also be part of Phase II or III of a planning grant.

Water chemistry relationships to aquatic plant growth and development should also be considered in further planning grants.

Watershed management plan funding can be coordinated through the Neenah Creek Priority Watershed Program which is a ten year project.

Private funds are available and are only limited by the energy and imagination of the Lake Mason community including the Lake Mason Improvement Association, the townships, and sportsmen that use the lake.

Another funding and management option is the formation of a lake district that can, if set up and operated properly, provide "a strong local organization with legal authority to assume management responsibility for the lake, and with power to assess cost according to benefits received."

LAKE MASON PROPERTY OWNER'S OPINION SURVEY - SUMMER 1991

Conducted by
Lake Mason Improvement Association and Aquatic Resources

NAME:_____ LOCATION:_____

MAILING ADDRESS:_____

1. How long have you owned property on Mason Lake?_____
2. Would you consider your property _____seasonal cottage ____year-round home _____vacant lot ____mobile home _____ 3 seasons _____winterized cottage _____other (explain) _____
3. How often do you use your lake dwelling? ____vacation weeks and ___ weekends per year _____weekends per year ____other (explain) _____
4. On an average, how many people use your property during the period(s) checked above: _____vacation, _____vacation & weekends/year, _____weekends/year
5. In describing your use & importance of your lake property, in what numbered priority would you place the following: ____swimming, ____fishing, ____pleasure boating, _____skiing, _____scenic beauty & tranquility, ____wildlife habitat
6. What is the water source for your lake dwelling: _____artesian well, _____pumped well, _____other (explain) _____
7. What type of waste disposal system does your property have? _____septic, _____holding tank, _____self-contained, _____other (explain) _____
   How old is your waste disposal system? _____
   Have you had any problems with it? _____
   What maintenance does it require? _____
   Where is your waste disposal system located? Describe. _____
8. What do you feel are the major problems facing the lake at this time (please number in order of priority) _____excessive weeds and nutrients, _____poor fishing, _____recreational use conflicts, _____navigational access problems
9. The depth and fertility of Lake Mason causes many problems for the recreational use of the lake. What priorities would you give to solve, prevent, or keep these conditions from worsening. (Please number in order of priority.)

_____Machine harvesting of aquatic plants	____ Limited	____Extensive
_____Chemical treatment of aquatic plants	____ Limited	____Extensive
_____Dredging/removal of lake bed materials	____ Limited	____Extensive
_____Long-term watershed & shoreline protection	____ Limited	____Extensive
_____Water level and flow management	____ Limited	____Extensive

10. Would you support a strong local organization with legal authority to assume management responsibility for the lake, and with power to assess cost according to benefits received? _____ yes _____ no

Comments: _____

_____

_____