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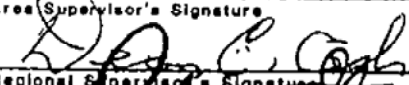
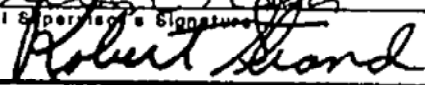
# Appendix A. LAKE MANAGEMENT PLAN

DEPARTMENT OF MINNESOTA NATURAL RESOURCES

(Use reverse side and add additional sheets as needed)

Region	Area	D.O.W. Number	County	D.O.W. Lake Name	Acreage
I	130	60 - 305	Polk	Maple	1477
<b>Long Range Goal:</b> To provide a walleye population of 5 per gillnet set at an average weight of 1.5 pounds. To provide a northern pike population of 3 per set.					
<b>Operational Plan:</b> Walleye fingerlings will be stocked at 1 pound per littoral acre on a biennial basis. No stocking of any other species is recommended at this time.					
<b>Mid Range Objective:</b> Complete an assessment netting and adjust the operational plan as required. Identify other area lakes in this lake classification where this management may work.					
<b>Potential Plan:</b> Provide technical advice and assistance to the lake association in developing a walleye spawning rock reef.					

TOTAL \$ \_\_\_\_\_

<b>Primary Species Management</b> WAE	<b>Secondary Species Management</b> NOP, BLG, BLC	<b>FOR CENTRAL OFFICE USE ONLY</b>	
<b>Area Supervisor's Signature</b> 		<b>Entry Date</b> _ / _ / _	<b>Year Resurvey</b> _ _
<b>Regional Supervisor's Signature</b> 		<b>Stock Species - Size - Number per Acre</b>	
<b>Date</b> 04 / 21 / 91		<b>Pr./Sec.</b>	
<b>Date</b> 05 / 06 / 91		<b>Schedule</b>	<b>Year Beginning</b> _ _
<b>Month Day Year</b>		<b>Population Manipulation</b>	
		<input type="checkbox"/> YES <input type="checkbox"/> NO    Year _ _	
		<b>Development</b>	
		<input type="checkbox"/> YES <input type="checkbox"/> NO    Year _ _	
		<b>Creel or Use Survey</b>	
		<input type="checkbox"/> YES <input type="checkbox"/> NO    Year _ _	
		<b>Other</b>	

**NARRATIVE:**

(Historical perspectives - various surveys; past management; social considerations; present limiting factors; survey needs; land acquisition; habitat development and protection; commercial fishery; stocking plans; other management tools; and evaluation plans)

VARIOUS SURVEYS

Maple Lake was initially surveyed in 1929 and mapped in 1973. The lake had game lake surveys in 1946, 1953 and 1956. Fisheries surveys were done in 1971, 1979, and a resurvey in 1990. Population assessments were done in 1983 and 1987.

PAST MANAGEMENT

Past management has consisted of rough fish removal and game fish stocking. Fish species stocked have included LMB, BLG, BLC, NOP and WAE and white sucker. Stocking from 1972 to the present has consisted of walleye and northern pike. Rough fish removal has been commercial netting and has resulted in removal of 514,030

pounds of bullheads, 28,605 pounds of yellow perch, 5,660 pounds of white sucker, 188 pounds of turtles and 40 pounds of carp.

#### SOCIAL CONSIDERATIONS

Maple Lake is very heavily developed with 685 property owners listed in the current Maple Lake Ass'n. Directory. This lake is the closest fish lake to the towns of Thief River Falls, Red Lake Falls, Crookston, Warren, East Grand Forks and Grand Forks, ND. Competition for surface water use during the open water months is intense. Water skiers, speed boaters, sail boaters, and fishermen all vie for their place. Fishing pressure has increased dramatically over the last seven years due to the increasing catch of walleye and black crappie.

#### PRESENT LIMITING FACTORS

Walleye spawning areas are lacking in this lake due to siltation. Winter kill has been a factor limiting game fish populations and enhancing rough fish populations. A three unit pump baffle aeration system has been purchased through the C.O.R.E. program which should eliminate winter kill as a limiting factor.

#### COMMERCIAL FISHERY

Attempts will be made to get a commercial bullheader operating on the lake. This lake is in an unassigned commercial fishing area and is quite far from most commercial operators.

#### STOCKING PLANS

Maple Lake will be stocked with 1 pound of walleye fingerlings per littoral acre on a biennial basis. The first plant was made in 1986. This stocking rate will be maintained until the long range goal is reached. When the long range goal is reached the operational plan will be adjusted as required.

#### OTHER MANAGEMENT TOOLS

The Lake Improvement District is interested in installing a rock reef walleye spawning area in the lake. This will be encouraged and technical advice given to the group. The group is also looking for walleye rearing areas close to Maple Lake for use in years the lake is due for stocking.

#### EVALUATION PLANS

The lake will be resurveyed or assessment netted every five years to determine the success of management plans.

Note: The Red Lake Watershed District has a plan in place to divert water from the Poplar River Watershed into Maple Lake for water level control. Maple Lake currently has better than expected water quality for a class 41 lake due to a limited present watershed and heavy groundwater fed to the lake. Additional nutrients from expanded agricultural run off may greatly reduce lake water quality and make fish management objectives much more difficult if not impossible.

# Appendix Table A-1

FGL-FINGERLING YRL-YEARLING FRY

YEAR	GF NO.	DATE	SPECIES	LBS.	NO. TO A LB.	RATE	NUMBER	YR. TOTAL
1971	4622	01-22-71	NOR. PIKE	302	1,000	FGL	3,020	118,636
	4757	07-16-71	SUNFISH	243	1,400	YRL	3,402	
	4758	07-23-71	SUNFISH	101	1,400	YRL	1,414	
	D-5747	10-28-71	WALLEYE	1,385	8,000	FGL	110,800	
1972	4866	02-01-72	NOR. PIKE	125	1,000	FGL	1,250	43,010
	E-14613	10-25-72	WALLEYE	522	8,000	FGL	41,760	
1973	E-8912	10-15-73	WALLEYE	204	16,000	FGL	32,640	32,640
1974	3,606	02-08-74	NOR. PIKE	207	500	FGL	1,035	1,191
	1,390	10-28-74	WALLEYE	13	12	FGL	156	
1975	3,441	02-24-75	NOR. PIKE	4	4	YRL	16	18,616
	4,411	10-22-75	WALLEYE	465	4,000	FGL	18,600	
1976	1,269	11-22-76	WALLEYE	628	63	FGL	39,564	39,564
1977	8271	10-18-77	WALLEYE	100	17	FGL	1,700	4,986
	23130	10-24-77	WALLEYE	62	38	FGL	2,356	
	23131	10-24-77	WALLEYE	31	30	FGL	930	
1978	15683	05-13-78	WALLEYE	35 CANS	20,000/CAN	FRY	700,000	732,480
	15577	10-12-78	WALLEYE	812	40	FGL	32,480	
1979	14966	10-04-79	WALLEYE	332	100	FGL	33,200	33,200
1980	17994	10-07-80	WALLEYE	649	16	FGL	10,384	10,384
1981	2151	10-08-81	WALLEYE	299	28	FGL	8,372	8,372
1982	2480	10-17-82	WALLEYE	295	50	FGL	14,750	14,750
1983	5967	05-10-83	WALLEYE	273	110,000	FGL	3,003,000	3,003,000
1984	7081	05-10-84	WALLEYE	227	110,000	FGL	2,500,000	2,500,000
1985	16499	05-06-85	WALLEYE	-0-		FRY	2,500,000	2,500,000
1986	23493	10-02-86	WALLEYE	93	34	FGL	3,162	21,259
	23804	10-13-86	WALLEYE	380	13	FGL	4,940	
	23804	10-13-86	WALLEYE	345	13	FGL	4,485	
	23804	10-13-86	WALLEYE	584	13	FGL	7,592	
	24215	10-02-86	WALLEYE	60	18	FGL	1,080	
1988	34286	09-21-88	WALLEYE	80	39	FGL	3,120	11,630
	34372	09-20-88	WALLEYE	250	7	FGL	1,750	
	34372	09-20-88	WALLEYE	230	1	YRL	230	
	34373	09-21-88	WALLEYE	360	7	FGL	2,520	
	34373	09-21-88	WALLEYE	35	1	YRL	35	
	34375	09-26-88	WALLEYE	474	7	FGL	3,318	
	34375	09-26-88	WALLEYE	16	1	YRL	16	
	34386	10-13-88	WALLEYE	44	9	FGL	396	
	34419	10-13-88	WALLEYE	35	7	FGL	245	

TOTAL STOCKED AS OF OCT. 13, 1988

## Appendix Table A-2

### History of Maple Lake Rearing Pond

<u>Year</u>	<u>Pounds</u>	<u>Number</u>	<u>Rate</u>
1986	0	0	0
1982	295	14750	50
1981	299	8372	28
1980	658	10384	16
1979	332	33200	100
1978	812	32480	40
1977	100	1700	17
1976	853	53739	63
1975	468	18600	40
1974	13	156	12
1973	204	32640	160
1972	522	41760	80
1971	1385	110800	80
1970	1509	128269	85
1969	1918	95454	52
	<u>9,368</u>	<u>582,304</u>	<u>62/#</u>





## Appendix Table B-1. Maple Lake Rainfall, Lake Levels, Surface Temperature and Secchi Disk Data-1991 Weekly Data

Sampling week beginning on Saturday	Secchi disk reading	Water Temperature	pH reading	Lake level	Total weekly rainfall
MAY 11	8	64	8.0	71.3	1.08
18	6	65	8.2	71.5	1.6
25	5	66	8.2	71.5	0
JUNE 1	3.5	72	8.2	71.5	0
8	3.0	74	8.2	71.6	2.75
15	3.0	74	8.4	71.65	1.46
22	3.0	74	8.3	71.8	2.30
29	3.0	72	8.3	71.9	2.16
JULY 6	3.0	76	8.4	71.85	.73
13	3.0	75	8.4	71.9	0
20	3.0	74	8.4	71.8	.42
27	3.0	72	8.4	71.7	.75
AUG 3	3	72	8.4	71.7	1.40
17	3	74	8.4	71.7	.15
24	3	72	8.4	71.5	.98
31	3	70	8.4	71.4	0
SEPT 7	5	74	8.4	71.2	1.65
14	2.5	70	8.5	71.35	3.07
21	2.5	70	8.5	71.5	1.65
28	3.0	68	8.5	71.5	.30

av. 3.3

21.4

Please record each week's water monitoring measurements on this sheet. Return to the Freshwater Foundation at the end of the monitoring season along with one lake map marked with sampling site.



Appendix Table B-2. 1991 Lake Sampling Data:  
Maple Lake, Union Lake and Lake Sarah

East Polk Citizen Lake Monitoring Program Lab Results - 1991														
Parameters & Schedule	Maple Lake		Maple Lake		Maple Lake		Union Lake		Union Lake		Union Lake		Lake Sarah	
	101	102	103	104	101	102	103	104	Deep	101	104	101	104	
Tot. Phosphorus	0.045	0.062	0.039		<0.010	0.034	0.054					<0.010		
Tot. Ortho Phos.	0.002	0.004	0.001		0.006	0.004	0.002					0.002		
Chlorophyll a	18.30	25.00	25.60		4.81	4.49	5.13					3.84		
Tot. Kjeldahl N	1.42	1.60	1.54		1.19	1.07	0.95					1.00		
N-NO2+NO3	<0.01				0.03							<0.01		
N-NH3	0.02				0.04							0.05		
Susp. Solids	9.4				2.2							2.2		
Tot. Solids	310				220							240		
Phaeophytin-A	1.60	5.77	3.84		<0.32	0.32	0.64					3.20		
Field pH	8.93	8.95	9.00		8.94	8.89	8.83					8.85		
Fld Conductivity	440	440	430		310.00	320.00	325.00					360		
Secchi (ft.)	3.50	3.00	3.00		12.50							11.50		
Surface temp(C)	21.9				21.8							21.4		
Surface D.O.	8.1				9.25							8.15		
<b>7/2/91-ERA</b>	<b>M.L.#1</b>	<b>M.L.#2</b>	<b>M.L.#3</b>	<b>M.L.#4</b>	<b>U.L.#1</b>	<b>U.L.#2</b>	<b>U.L.#3</b>	<b>U.L.#4</b>	<b>U.L. Dp</b>	<b>L.S.#1</b>	<b>L.S.#4</b>			
Tot. Phosphorus	0.054	0.069	0.069	0.044	0.025	0.041	0.031	0.023	0.028	0.030	0.034			
Tot. Ortho Phos.				0.004	<0.002			<0.002				<0.002		
Chlorophyll a	10	16	14		5	5	5			11		11		
Tot. Kjeldahl N	1.30	1.55	1.36	1.18	0.79	0.96	0.87	0.88	0.74	1.01		1.01	0.91	
Nitrate+Nitrite				<0.01	<0.01			<0.01		<0.01		<0.01	<0.01	
Tot. Susp. Solids				12	4			4				10		
Tot. Vol. Solids				6	1			<1				4		
Color				6	2			7	1			7		
Chloride-deep									6					
Temp-surf. (C)	21.0	20.8	20.8		20.8	20.9	21.0					22.0		
D.O.-surface	7.40	7.70	7.70		8.45	8.10	7.50					7.90		
Secchi disc(ft.)		2.5	2.5		8.0	8.5	7.5					5.0		

8/7/91(ERA)	M.L.#1	M.L.#2	M.L.#3	M.L.#4	U.L.#1	U.L.#2	U.L.#3	U.L.#4	U.L.Dp	L.S.#1	L.S.#4
Tot. Phosphorus	0.033	0.034	0.045	0.055	0.011	0.017	0.025			0.025	
Tot. Ortho Phos.	0.003			0.029	0.002					0.002	
Chlorophyll a	22	22	24	21	3	6	13			11	
Tot. Kjeldahl N	1.34	1.37	1.36	1.37	0.46	1.15	1.12			1.03	
Nitrate+Nitrite	<0.01			<0.01	<0.01					<0.01	
Tot. Susp. Solids	15			16	<4					6	
Tot. Vol. Solids	11			11	<4					4	
Color	13			13	7					12	
Chloride	12			11	5					12	
Temp-surf. (C)	21.0	21.5	21.5		21.8	20.9	21.0			22.0	
D.O. - surface	13/8.35	8.80	8.60		8.8	8.10	7.50			8.20	
secchi disc(ft.)	2.5	2.3	2.6		13.5	8.5	7.5			5.5	
Conductivity	490.00	500.00	490.00	500.00	350.00	330.00	340.00			400.00	
Tot. Alkalinity											
9/12/91ERA	M.L.#1	M.L.#2	M.L.#3	M.L.#4	U.L.#1	U.L.#2	U.L.#3	U.L.#4	U.L.DP	L.S.#1	L.S.#4
Tot. Phosphorus	0.042	0.038	0.038		0.018	0.024	0.032	0.019		0.02	
Tot. Ortho Phos.	*				*			*		*	
Chlorophyll a	17	14	13		3	10	6	2		5	
Tot. Kjeldahl N	1.23	2.20	1.27		0.70	0.79	0.77	0.73		1.51	
Nitrate+Nitrite	<0.01				<0.01			<0.01		<0.01	
Tot. Susp. Solids	16				<4			<4		7	
Tot. Vol. Solids	11				<4			<4		2	
Color	*				*			*		*	
Chloride											
Temp-surf. (C)	19.0	19.2	19.2		20.05	20.2	20.2			19.5	
D.O. - surface	13/8.2	8.60	9.00		8.3	8.80	8.80			9.25	
secchi disc(ft.)	2.5	2.5	2.5		13.5	7.0	6.0			6.0	
Conductivity											
Tot. Alkalinity											

10/9/91-ERA	M.I. #1	M.I. #2	M.I. #3	M.I. #4	U.I. #1	U.I. #2	U.I. #3	U.I. #4	U.I. Dp	I.S. #1	I.S. #4
Tot. Phosphorus	0.039	0.057	0.04		0.022	0.024	0.021	0.022		0.034	
Tot. Ortho Phos	0.003				0.003			0.005		<0.002	
Chlorophyll a	9	6	10		13	11	8	13		8	
Tot. Kjeldahl N	1.35	1.02	1.57		0.80	0.94	0.84	1.00		0.70	
Nitrate+Nitrite	0.01				<0.01			<0.01		<0.01	
Tot. Susp. Solids	8				<4			<4		<4	
Tot. Vol. Solids	6				<4			<4		<4	
Color	13				3			2		10	
Chloride											
Temp - surf. (C)	8.00	9.00	9.00		11.40	10.00	10.00			9.20	
D.O. - surface	11.00	10.20	10.80		10.30	10.90	10.60			9.30	
Secchi disc(ft.)	4.0	3.5	3.5		10.0	7.5	8.0			7.5	
Conductivity											
Tot. Alkalinity											
<p>Note: The chlorophyll a values reported for the August 7 sampling date are from a split sample sent to the Minnesota Department of Health lab. Results from ERA Labs for this variable were considered unreliable due to problems encountered in handling of the samples.</p>											
* Results not available											

## Appendix C. Resource Agencies and People

Many local government agencies are involved in natural resource management in one form or another. A brief description of their role and how to reach them follows. These are certainly not all the agencies that can be of assistance, but these can refer you to other sources of assistance.

**East and West Polk Soil and Water Conservation Districts:** SWCDs plan, develop and carry out a program of soil, water and resource conservation use. The main purpose of Districts are to reduce soil erosion and maintain good quality of water resources. Programs administered by the SWCDs are: cost-share for erosion control and water quality; provide funds to help solve sediment and erosion problems on streambank, lakeshores and roadsides; administer the Reinvest in Minnesota Program (RIM); review DNR water permits; coordinate Polk County's Comprehensive Water Plan; carry out a tree planting program; and conduct educational activities. The EPSWCD can be contacted by calling 563-2475 or writing P.O. Box 57, McIntosh, MN 56556. The WPSWCD can be contacted by calling 281-6361 or writing 528 Strander Ave., Crookston, MN 56716.

**East and West Polk County Extension Offices:** Minnesota Extension Service is an outreach unit of the University of Minnesota providing statewide access to research-based education for people of all ages. Minnesota Extension Service education focuses on the development of individuals, families and communities as they relate to human, environmental, natural and economic resources. County Agricultural Agents provide information on crops, livestock and horticultural areas. East Polk Ag Agent is Marvin Lee, West Polk's is Russ Syverson. County Home Economics Agents provide education and support materials in the areas of families and communities, energy and environment, family resource management and foods, nutrition and health. County 4-H Agents provide support to the local 4-H programs including Youth at Risk, volunteerism and summer youth programs. The East Polk County Extension Office can be contacted by calling 563-2465 or writing McIntosh Municipal Building, McIntosh, MN 56556. The West Polk County Office can be contacted by calling 281-1751 or writing 1500 University Ave., Crookston, MN 56716.

**Polk County Planning and Zoning:** The Polk County Zoning Office regulates land use and development in the unincorporated area of the County. The location and construction of structures and septic systems is regulated to protect surface water, ground water, and the public welfare. The Zoning Administrator is also designated as the County Feedlot Officer and can provide livestock operations with evaluating their pollution potential and waste storage, handling and utilization. The Polk County Zoning Office can be contacted by calling 281-6713 or writing P.O. Box 91, Crookston, MN 56716.

**WATERSHED DISTRICTS** are special purpose local units of government whose boundaries follow those of a natural watershed (an area of land in which all water drains to one outlet). They coordinate all water management decisions in the watershed with an emphasis on flood and erosion control. They are governed by a board of managers appointed by the boards of county commissioners. Polk County primarily lies within the Red Lake WD, with the Sand Hill River WD covering the southern portion of the county.

**Red Lake Watershed District:** The Red Lake Watershed District covers a geographic area approximately 5,990 square miles which includes the Red Lake River and its tributaries such as the Thief River, Clearwater River, Lost River and Poplar River. The RLWD is involved with the Poplar River Diversion-Project which calls for improvement of judicial ditch #73, from Mitchell Lake to Maple Lake, and reconstruction of the Poplar River Diversion from the Poplar River to Badger Lake. These works could divert water to Maple Lake as needed, providing a more adequate water supply to maintain the normal level of Maple Lake. The office is located at: 102 North Main, Box 803, Thief River Falls, MN 56701 or call 681-5800.

**Sand Hill River Watershed District:** Originating at Sand Hill Lake south of Fosston, the Sand Hill River Watershed District is a thin rectangle about eight miles wide and 55 miles long that encompasses 494 square miles. Union Lake and Lake Sarah are within the SHRWD boundaries. A major project that the SHRWD has been working on is development of a reservoir in the Winger area. The reservoir would provide flood control on the Red River of the North and the Sand Hill River and provide recreation and wildlife benefits to the area. The office is located at 101 Washington Ave NW, Box 84, Fertile, MN 56540 or call 945-3204.

**Maple Lake Improvement District:** The Maple Lake Improvement District was established March 23, 1987. By changing to a District, rather than the former Association, the cost of lake improvement projects, (aeration, street lights, cleanup, annual meeting, directory, newsletter, water quality, fisheries, etc.) are now shared by all of the property owners through an assessment on the real estate tax, rather than depending on voluntary payment of dues. Although the District was created by the County Board, it is essentially controlled by the property owners with seven directors for the District, four of which must be local "residents." Regular meetings are held monthly, the second Thursday, at 7:30 p.m. The MLID mailing address is Box 233B, Mentor, MN 56736.

**Union Lake Sarah Improvement Association:** The Union Lake Sarah Improvement Association was formed in 1941 to assist with improvements for Union Lake and Lake Sarah. Dues of \$15 per year are voluntary. Funds are used for projects such as printing of a lake directory, installation of warning buoys, fisheries management and water quality monitoring. The Association has a locally elected 5 member board with an annual meeting held the first Wednesday in May and a summer meeting held in August.

**Polk County Central Cities:** Polk County Central Cities (PCCC) is a cooperative project initiated in 1986 between the communities of Erskine, Fertile, McIntosh, Mentor and Winger. Project activities have included economic development, tourism promotion, arts inventory, environmental education, recreation development and natural resource improvements. Funding for staffing and programs is primarily dependant on grants with some local funding. The PCCC office is located at the Fertile Community Center; 945-3129. Call for information on current projects.

**Minnesota Dept. of Natural Resources-Division of Waters:** The area office provides administrative and technical assistance in a six-county area of northwest Minnesota including Polk County. Programs include: 1) Land use administration-shoreland and floodplain zoning; 2) Permitting-which includes work performed in State protected waters and appropriation of surface and ground water, also includes State waterbank program, which protects wetlands from drainage; 3) Enforcement-inspect and take action on zoning and protected waters violations; 4) Hydrologic surveys and studies-includes surface and ground water studies; 5) Public information-prepare news releases, attend public meetings and make presentations upon request; 6) Cooperative programs-environmental review, respond to local agency concerns; 7) Grants-provide funding for flood damage reduction, stream maintenance, ground water and surface water studies and shoreline management. Minnesota is known for its water--more than 12,000 lakes, 90,000 miles of streams, nearly 9 million acres of wetlands and the State's vast ground water resources. Protecting these resources while arbitrating between competing uses is the job of the Division of Waters. The DNR Div. of Waters Regional Office can be contacted by calling 681-7789 or writing 123 Main Avenue North, Thief River Falls, MN 56701.

**Minnesota Pollution Control Agency:** MPCA Regional office staff can assist local efforts by providing literature on lakes and lake management, speakers for meetings, technical assistance on lake problems and lake management strategies, and enforcement where pollution control laws are violated. Agency staff have information on what lakeshore residents can do to be better stewards of their lake and how they can form lake associations and coalitions to gain support for their efforts. Interest and enrollment in self help lake management programs such as the MPCA's Lake Assessment, Clean Water Partnerships and similar programs is at an all time high. For information and assistance in dealing with your particular lake problem or concern contact us by calling (218) 847-1519 or writing to Minnesota Pollution Control Agency, 714 Lake Avenue, Detroit Lakes, Mn 56540.

**Polk County Solid Waste Management:** The Polk County transfer station in Crookston offers the following services for area residents with hours of delivery from 8:00 a.m.-4:00 p.m. Monday through Friday. Items of acceptance are: Refuse from households-no charge; Recyclable material, i.e., aluminum, newsprint, glass and metal cans-no charge( The ODC will purchase aluminum at the current market price; Crankcase oil up to 50 gal. per delivery-no charge; Up to a pick-up load of demolition material, \$1.00 charge and we will coordinate larger loads for disposal at the landfill; White goods, i.e., refrigerators, freezers, air conditioners, water heaters and

