VITAL STATISTICS OF LAKE WINONA

MEASUREMENTS BASED ON 1973 MINN. DNR MAP 85-11

	Upper Lake	Lower Lake	Entire Lake
Length of Basin	.6 miles	1.4 miles	2.0 miles
Width of Basin	.3 miles	.3 miles	.3 miles
Length of Shoreline	1.7 miles	3.6 miles	5.3 miles
Maximum Depth	24 feet	38 feet	38 feet
Area	89 acres	230 acres	319 acres
Littoral Area (weed growth area, less than 10 feet deep)	3,511,258 $ft.^2$	6,841,420 $ft.^2$	10,352,678 $ft.^2$
% Littoral Area	93.5%	74.0%	86.6%
Volume	27,424,257 $ft.^3$	87,496,797 $ft.^3$	114,921,054,054 $ft.^3$
Volume Development (volume of lake compared to that of a cone with same surface area and depth)	.88	.69	.68
Shoreline Development (length of shoreline compared to that of a circle with same surface area)	1.29	1.70	2.12
Number of Aerators	2	4	6
Inlets and Normal Flow	1 at 15 C.F.S. (Gilmore Creek)		
Outlets		1 (culvert and flood gate at Mankato Ave.)	
Normal Lake Level (regulated by pumps during flood time)			646.5 ft. above sea level
Normal Fluctuations in Lake Level			646.2-646.7 f.a.s.l.
Maximum Level			649.2 (during 1965 flood)

LAKE WINONA VOLUME DETERMINATIONS

Planimeter estimate based on 1954 map	-	152,854,000 cubic feet
Gravimetric estimate based on 1954 map	-	133,947,400 cubic feet
Planimeter estimate based on 1972 map	-	113,948,000 cubic feet
Gravimetric estimate based on 1972 map	-	115,730,000 cubic feet
Graphic estimate based on 1972 map	-	113,979,000 cubic feet

LAKE WINONA DISCHARGE FLOWS

The following information on Lake Winona flows was obtained by Robert J. Bollant, Winona City Engineer, from studies by the Minnesota Highway Department and by the U.S. Army Corps of Engineers.

The normal flow into Lake Winona from the Gilmore Creek Watershed (channeled through Boller's Lake) varies between 2.0 cubic feet per second and 20.0 cubic feet per second. Both the Minnesota Department of Transportation and the Corps of Engineers estimate the maximum 50-year inflow at 420 cubic feet per second.

The normal lake elevation is 646.4. Presently, with flood pumping, an effort is made to keep the lake elevation below elevation 647.5. If the 50-year rain occurred at the same time the river was high, the Corps of Engineers estimates that the Lake Winona level could go up to a maximum of elevation 649.5.

DATES OF ICE COVER

During the 1973-1985 period of record, the earliest date of permanent ice cover on Lake Winona was November 15, 1976. The latest date of permanent ice cover was December 7, 1982. The earliest ice-free date was March 23, 1976, and the latest was April 19, 1979. In 1982, Lake Winona was 100% ice-covered from November 17 until November 27, but the cover melted and the lake stayed ice-free until December 2.

VOLUME RELATIONSHIPS OF LAKE WINONA

(based on a 1972 hydrographic map made by the WSU Biology Department)

	UPPER BASIN		LOWER BASIN		SUM OF BOTH	
Stratum	Volume of Stratum/ft^3	% of Total	Volume of Stratum/ft^3	% of Total	Volume of Stratum/ft^3	% of Total
0-5'	21,037,588	67.7	43,018,071	49	64,055,659	54.00
5-10	7,889, 204	25.4	25,488,679	29	33,377,883	28.14
10-15	1,644,328	5.3	10,101,686	11.5	11,746,014	9.90
15-20	478,882	1.5	5,780,799	6.6	6,259,681	5.28
20-25	32,096	.1	2,428,499	2.8	2,460,595	2.07
			479,323	.5	479,323	0.40
30-35			207,360	.2	207,360	0.18
35-37			30,707	.04	30,707	0.03
0-10	28,926,792	93.1	68,506,750	78.3	97,433,542	82.14
0-15	30,571,120	98.4	78,608,436	89.8	109,179,556	92.04
0-20	31,050,001	99.9	84,389,235	96.6	115,439,236	97.32
0-25	31,082,098	100	86,817,734	99.2	117,899,832	99.40
0-30			87,297,057	99.7	118,379,155	99.80
0-35			87,504,417	99.96	118,586,515	99.97
0-37			87,535,124	100	118,617,222	100