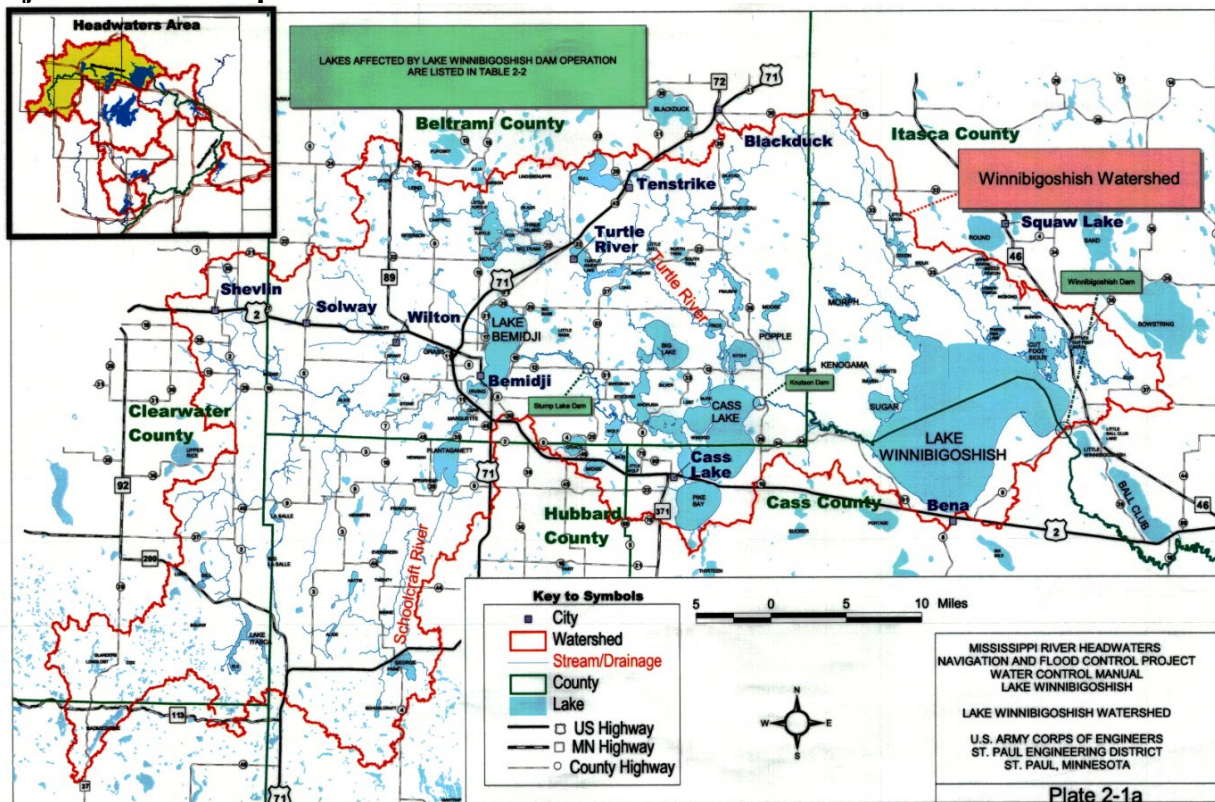


## Reservoir Summary: Lake Winnibigoshish and Lake Winnibigoshish Dam

**Project General Objectives:** The reservoir is regulated primarily for recreation, flood control, fish and wildlife and Tribal Trust. The Water Control Plan supports recreation by maintaining, when possible, stable reservoir levels within a specified elevation band during the summer. Flood control objectives are met by a fall/winter drawdown schedule and a designated flood control storage pool, which provides storage capacity for spring and summer flood events. Water levels are managed, when conditions permit, for various fish and wildlife and Tribal Trust concerns. The low-flow plan manages water resources both upstream and downstream of the dam during critical periods

### Project Location Map:



**Pertinent Data:**

Datum = NGVD 29

<b>Lake Winnibigoshish</b>	<b>Elevation in Feet</b>	<b>Area in Acres</b>	<b>Cumulative Storage in Acre-Feet</b>
Top of Control Structure	1304.36	121,000	1,240,000
Maximum Operating Limit	1303.14	115,000	1,114,000
Normal Summer Pool Level	1298.19	66,000	700,000
Minimum Operating Limit	1294.94	57,000	500,000
Gate Sill	1285.22	---	0

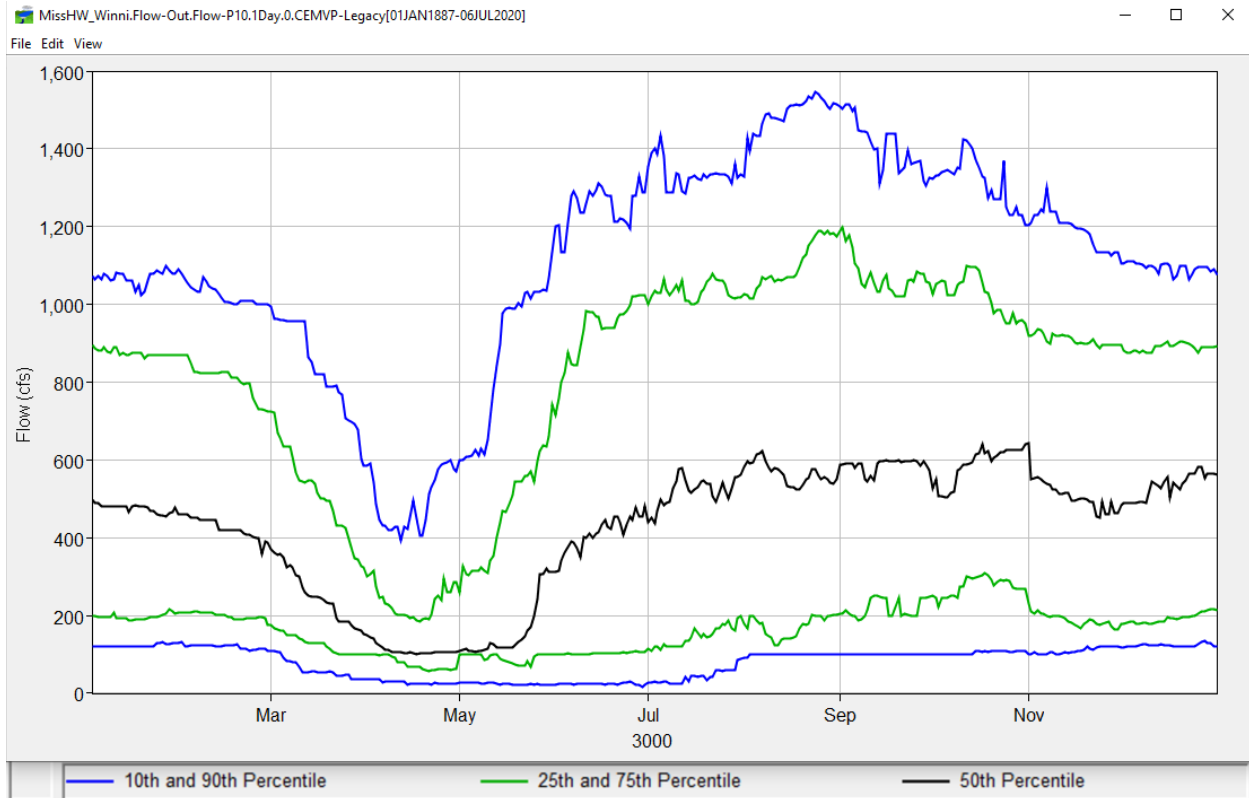
**HYDROLOGY**

Drainage Area	1,442 square miles
One Inch of Runoff Equals	76,907 acre-feet
Storm Types	Thunderstorm, frontal rain, snow
Flood Season	15 March - June
Low Flow Season	July - October
Minimum Daily Inflow	Flow is very low during dry periods.
Minimum Mean Monthly Inflow	Flow is very low during dry periods.
Minimum Mean Annual Inflow	210 cfs, 1934
Maximum 24-hr. Average Inflow	9,200 cfs, 29 July 1905
Maximum Mean Monthly Inflow	5,540 cfs, Oct 1900
Maximum Mean Annual Inflow	1,660 cfs, 1905
Average Discharge	520 cfs (100 years of record)
Average Annual Inflow	720 cfs
1950 Flood Volume	355,600 acre-feet

## Watershed Characteristics

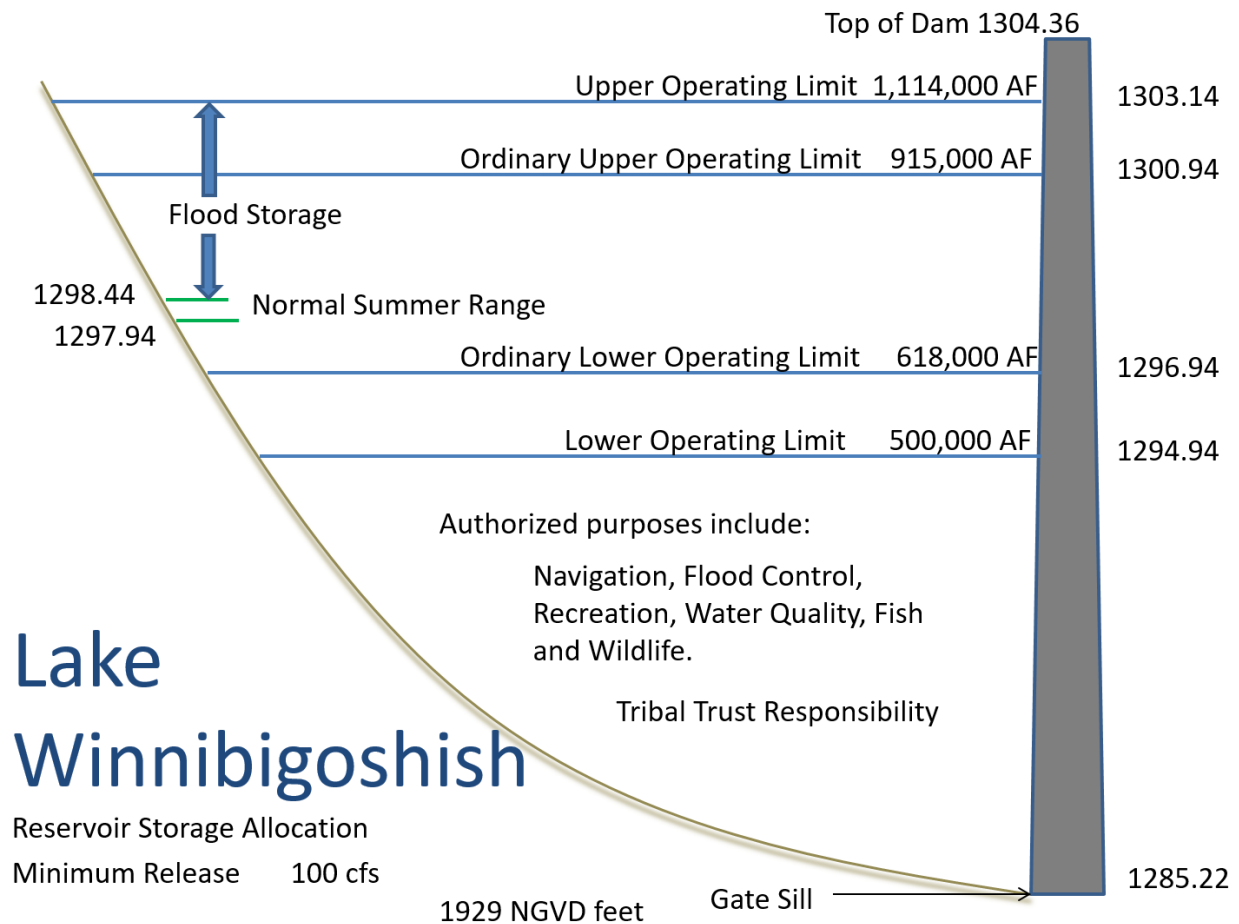
Lake Winnibigoshish Dam was built on the outlet of Cass Lake, a very large freshwater lake on the Mississippi River headwaters. Much of the drainage area is wooded with marsh land.

This geology along with a climate and pronounced spring snowmelt creates fairly consistent flows with the peak occurring from spring melt. **Figure 1** shows a duration hydrograph of the discharges from Lake Winnibigoshish Dam.



**Figure 1.** Duration hydrograph for Lake Winnibigoshish Dam discharges.

## Pool Allocation



## Overall Plan for Water Control

Lake Winnibigoshish reservoir is regulated between a minimum elevation of 1294.94 feet and a maximum elevation of 1303.14 feet. If possible, the reservoir level should be within its summer range/band of 1297.94 feet to 1298.44 feet by the first day of the fishing season (approx. mid-May). The winter drawdown of the reservoir for spring flood control begins in the fall. The ordinary (normal) spring drawdown elevation is 1296.94 feet, however the reservoir can be drawn down to 1294.94 feet if warranted by potential spring runoff conditions. The overflow spillways at Knutson Dam are inundated approximately elevation 1301.5 feet; however, storage in Winnibigoshish to elevation 1303.14 feet can be used if needed to prevent flooding downstream. Regardless of the season, the flood control operation is coordinated with Leech and Pokegama reservoirs for flood control at Aitkin, MN and, if necessary, other downstream areas. To promote walleye spawning, the reservoir has a target elevation range of 1297.44 to 1297.75 feet during 18 to 25 April (1297.75 ft. is optimal).

The Water Control Manuals (WCM) are in the process of being updated with the findings of the 2009 Reservoir Operating Plan Evaluation (ROPE) Study. The table below summarizes reservoir operation for both the WCM and ROPE parameters.

TABLE S-4 LAKE WINNIBIGOSHISH OPERATING RULES		
	CURRENT	FINAL
Summer Band (elev. - feet)	1297.94 -1298.44	1297.94 -1298.44
Summer Target (elev. - feet)	1298.19	1298.19
Band Width (feet)	0.5	0.5
Normal Drawdown (elev. - feet)	1296.94	1296.94
Maximum Drawdown (elev. - feet)	1294.94	1294.94
Rate of Release (change/day)	200 cfs or 0.5 ft. of TW change	20-30%
Spring Pulse	NA	1060 cfs
Minimum Flow Requirements	$\geq(1294.94)$ : 100 cfs	$\geq(1294.94)$ : 100 cfs
	$<(1294.94)$ : 50 cfs	$<(1294.94)$ : 50 cfs

Figure S-2. Final Plan Operating Hydrograph, Lake Winnibigoshish

