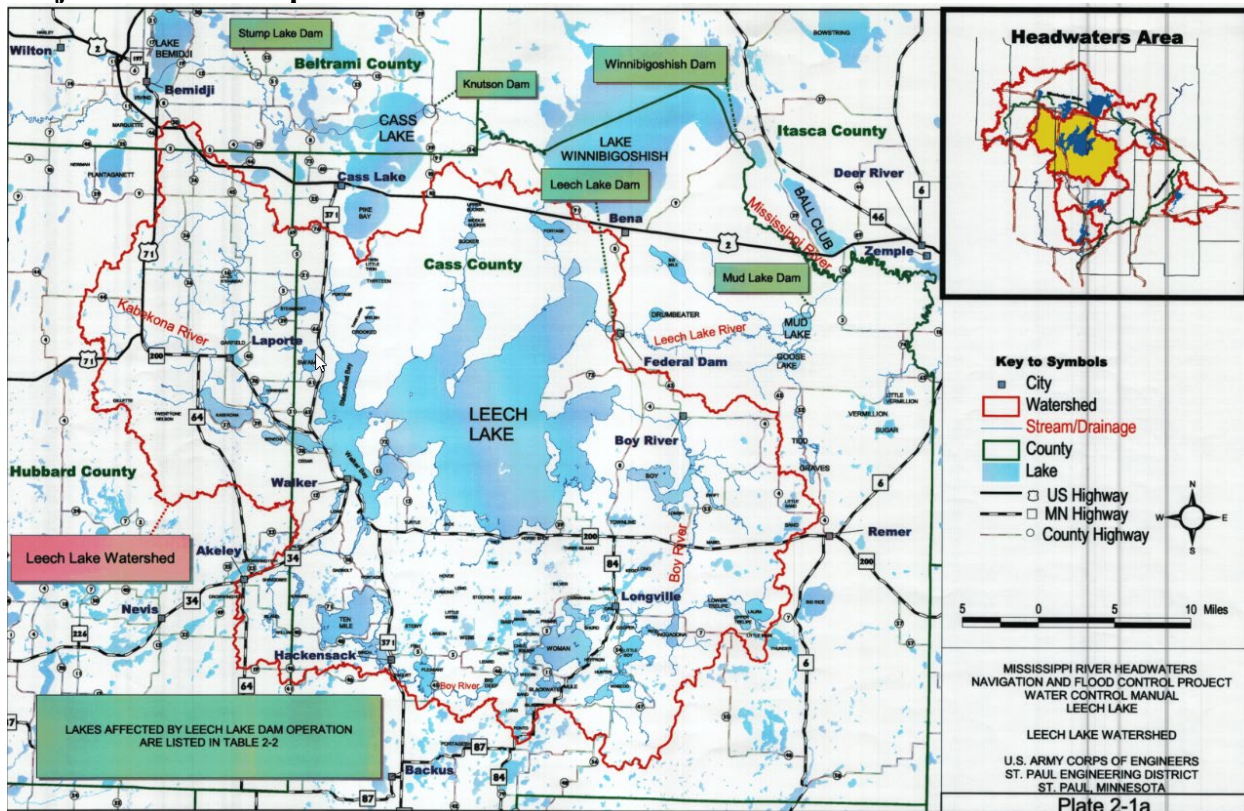


## Reservoir Summary: Leech Lake and Leech Lake Dam

**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>Leech Lake</b>	<b>Elevation in Feet</b>	<b>Area in Acres</b>	<b>Cumulative Storage in Acre-Feet</b>
Top of Control Structure	1299.54	174,500 (1)	1,233,300
Maximum Operating Limit	1297.90	161,000	1,037,000
Normal Summer Pool Level	1294.70	117,000	580,000
Minimum Operating Limit	1292.70	107,000	354,000
Gate Sill	1288.49	---	---
Stop Log Sill	1287.74	---	---
1. Extrapolated			

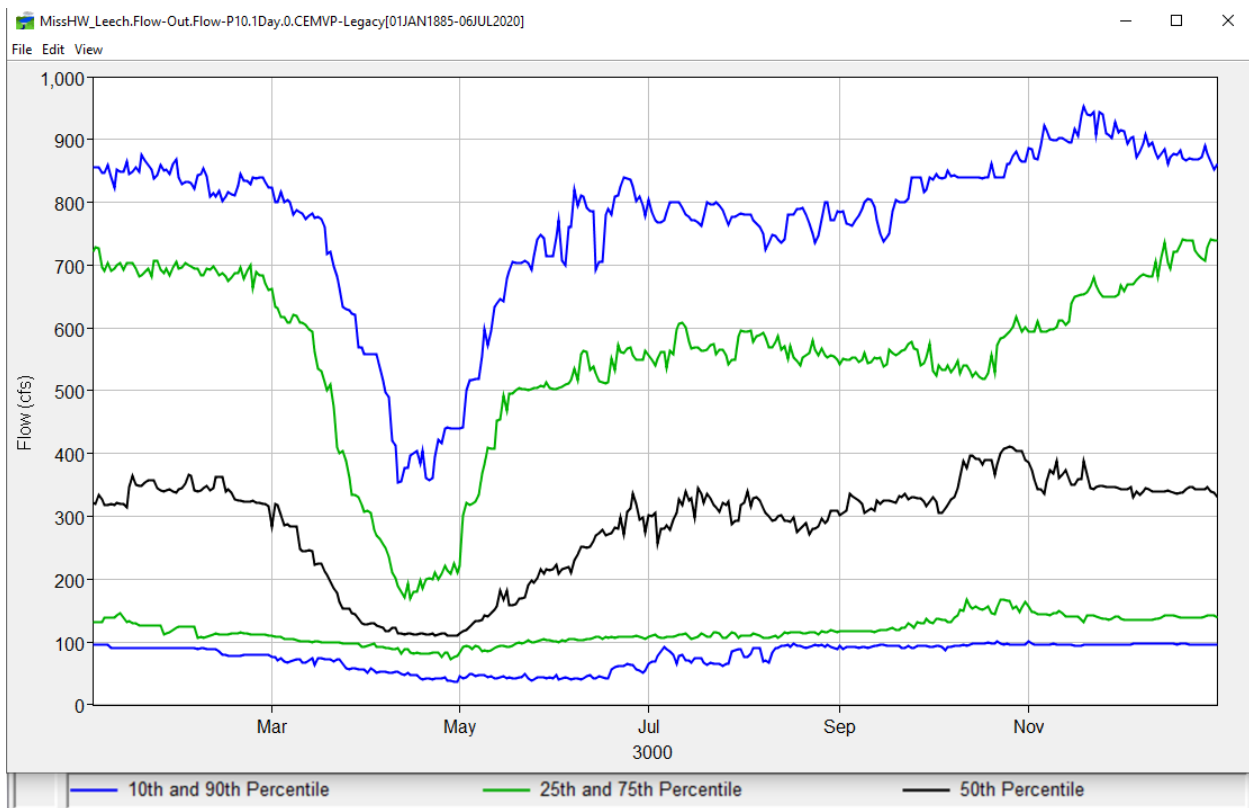
**HYDROLOGY**

Drainage Area	1,163 square miles
Storm Types	Thunderstorm, frontal rain, snow
Flood Season	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	300 cfs, 1934
Maximum 24-hr. Average Inflow	20,600 cfs, 11 Oct 1973
Maximum Discharge	2,500 cfs, 7 June 1957 (result of dam failure)
Maximum Mean Monthly Inflow	3,940 cfs, May 1950
Maximum Mean Annual Inflow	1,100 cfs, 1985
Average Annual Inflow	720 cfs
Average Discharge	360 cfs (100 years of record)

## Watershed Characteristics

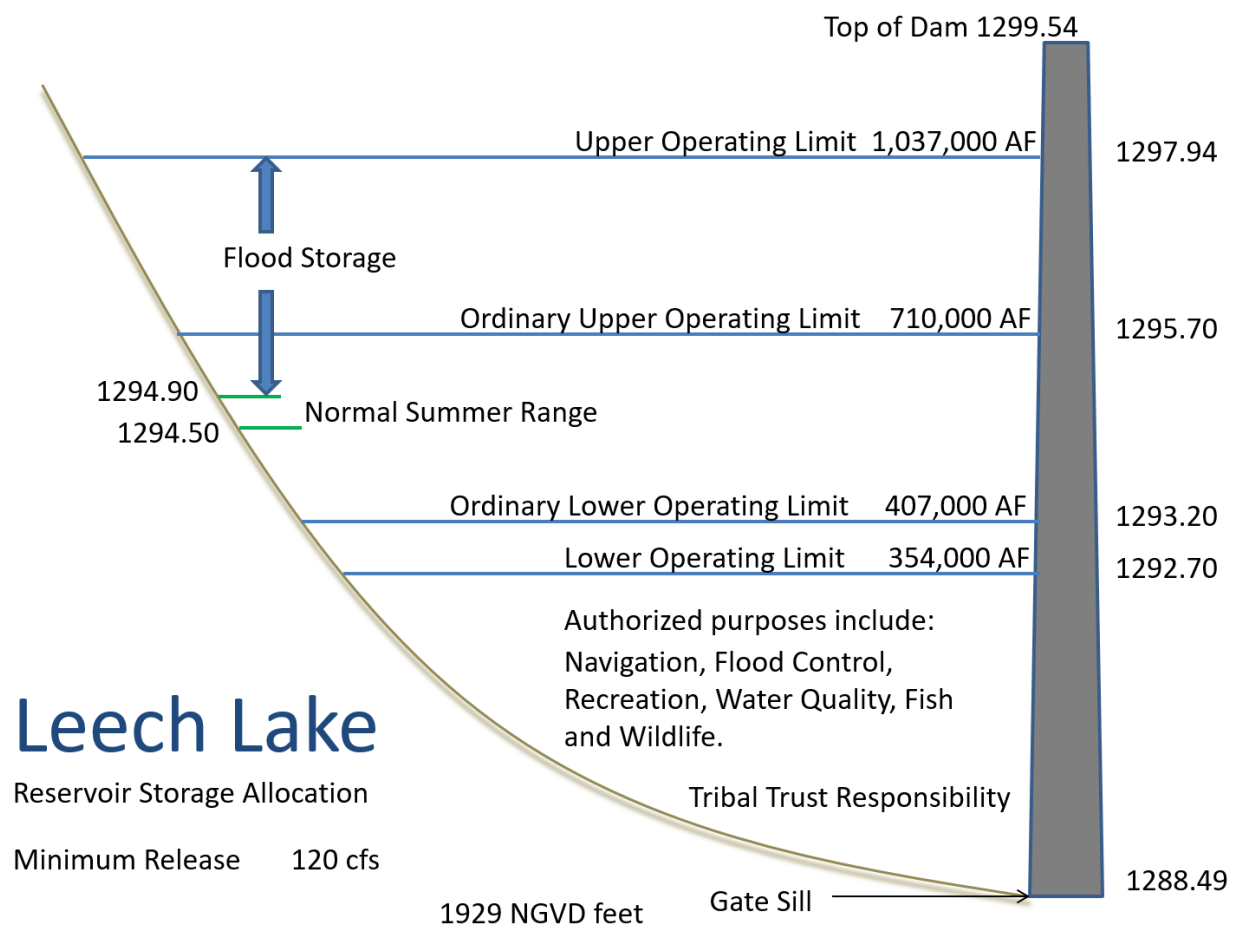
Leech Lake Dam was built on the outlet of Leech, a very large lake draining into the Mississippi River headwaters. The runoff from Leech Lake watershed is slow and significantly attenuated as a result of the relatively flat topography and the presence of many lakes and wetlands. Leech Lake Dam controls the runoff from a 1,163 square mile area, of which 65 percent is dry land, 10 percent is water, and 25 percent is wetlands. In general, the land not covered by wetlands is forested. The average overland slope is 6.9 feet per mile.

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 Leech Lake.



**Figure 1.** Duration hydrograph for Leech Lake discharges.

## Pool Allocation



## Overall Plan for Water Control

Leech Lake reservoir is regulated between a minimum elevation of 1292.70 feet and a maximum elevation of 1297.94 feet. If possible, the reservoir level should be within its summer range/band of 1294.50 feet to 1294.90 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 reservoir is usually drawn down to approximately elevation is 1293.80 feet, however the reservoir can be drawn down to 1292.70 feet if warranted by potential spring runoff conditions. Significant shoreline erosion begins to occur at approximately elevation 1295.70 feet but storage to elevation 1297.94 feet can be used if needed to prevent flooding downstream. Regardless of the season, the flood control operation is coordinated with Winnibigoshish and Pokegama reservoirs for flood control at Aitkin, MN and, if necessary, other downstream areas.

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-5 LEECH LAKE OPERATING RULES		
	CURRENT	FINAL
Summer Band (elev. - feet)	1294.50-1294.90	1294.50-1294.90
Summer Target (elev. - feet)	1294.70	1294.70
Band Width (feet)	0.4	0.4
Normal Drawdown (elev. - feet)	1293.80	1293.80
Maximum Drawdown (elev. - feet)	1292.70	1292.70
Rate of Release (change/day)	100 cfs or 0.25 ft. of TW change	20-30%
Spring Pulse	NA	790 cfs
Minimum Flow Requirements	>=(1292.70): 100 cfs	>=(1292.70): 120 cfs
	<(1292.70): 50 cfs	<(1292.70): 60 cfs

Figure S-3. Final Plan Operating Hydrograph, Leech Lake

