

Mann 11-0282-00

MN Lake ID: 11-0282-00
 County: Cass
 Ecoregion: Northern Lakes and Forests
 Major Drainage Basin: Upper Mississippi River
 Latitude/Longitude: 46.97277778 / -94.34333333
 Water Body Type: Public Waters
 Monitored Sites (Primary): 3901
 Monitored Sites (Secondary): N/A

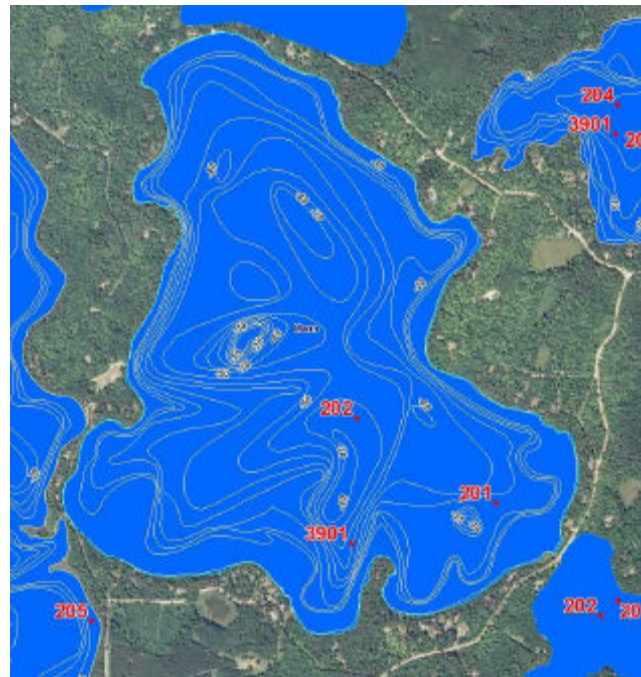
Physical Characteristics

Surface area (acres): 445
 Littoral area (acres): 44
 % Littoral area: 9%
 Max depth (ft): 93 (m): 28.3
 Mean depth (ft): N/A (m): N/A
 Watershed size (acres): N/A

Water Quality Characteristics - Historical Means

Years monitored: 2008-2009

Parameters	Primary Site 3901
Total Phosphorus Mean:	11.2
Total Phosphorus Min:	8
Total Phosphorus Max:	17
Number of Observations:	9
Chlorophyll-a Mean:	2.8
Chlorophyll-a Min:	1
Chlorophyll-a Max:	5
Number of Observations:	9
Secchi Depth Mean:	11.9
Secchi Depth Min:	10.5
Secchi Depth Max:	14
Number of Observations:	9
Trophic State Index Mean:	39.8
Trophic State:	Oligotrophic



Ecoregion Comparisons

Minnesota is divided into 7 ecoregions based on land use, vegetation, precipitation and geology. The MPCA has developed a way to determine the "average range" of water quality expected for lakes in each ecoregion.

From 1985-1988, the MPCA evaluated the lake water quality for chosen reference lakes. These reference lakes are not considered pristine, but are considered to have little human impact and therefore are representative of the typical lakes within the ecoregion. The "average range" refers to the 25th - 75th percentile range for data within each ecoregion.

Cass County is in the Northern Lakes and Forests Ecoregion.

Mann Lake compares to the ecoregion average ranges as indicated below:

Total Phosphorus:	Better than expected range, which indicates better than expected water quality for the area
Chlorophyll-a:	Better than expected range, which indicates better than expected water quality for the area
Secchi Depth:	Within expected range, which indicates expected water quality for the area



Trend Analysis Report

For detecting trends, a minimum of 8-10 years of data with 4 or more readings per season are recommended. Minimum confidence accepted by the MPCA is 90%. This means that there is a 90% chance that the data are showing a true trend and a 10% chance that the trend is a random result of the data. Only short-term trends can be determined with just a few years of data, because there can be different wet years and dry years, water levels, weather, etc., that affect the water quality naturally.

There is not enough historical data for to perform trend analysis for total phosphorus, chlorophyll *a*, or Secchi depth on Mann Lake (Site 3901).

Individual Lake Data Summary

County	MN Lake ID	Lake	Site	Date Range	Data Source
Cass	11-0282-00	Mann	3901 (Primary)	06-01-2008 - 09-30-2009	RMB Lab

Historical Mean						11.2	2.8	11.9	38	39	41	39
Date	Time	Site	Sampler	Lab Code	Data Source	TP ug/L	ChIA ug/L	Secchi Ft.	TSI Phos.	TSI ChIAL	TSI Secchi Ft.	TSI Avg.
6/9/2008	11:00 AM	3901	Bill Shipman	78428	RMB Lab	17	3	10.5	45	41	43	43
6/29/2008	6:30 PM	3901	Bill Shipman	80742	RMB Lab	16	3	11	44	41	43	43
7/28/2008	8:15 AM	3901	Bill Shipman	83612	RMB Lab	8	1	11	34	31	43	36
9/9/2008	3:15 PM	3901	Bill Shipman	87179	RMB Lab	8	3	13.5	34	41	40	38
Annual Mean						12.2	2.5	11.5	39	38	42	40
Date	Time	Site	Sampler	Lab Code	Data Source	TP ug/L	ChIA ug/L	Secchi Ft.	TSI Phos.	TSI ChIAL	TSI Secchi Ft.	TSI Avg.
5/31/2009	2:40 PM	3901	Ralph Bjorgaard	98224	RMB Lab	10	5	11	37	46	43	42
6/21/2009	12:30 PM	3901	Bill Shipman	101093	RMB Lab	9	1	12	36	31	41	36
7/12/2009	3:30 PM	3901	Bill Shipman	103470	RMB Lab	9	2	12.5	36	37	41	38
8/9/2009	4:00 PM	3901	Bill Shipman	107089	RMB Lab	13	3	12	41	41	41	41
9/13/2009	3:40 PM	3901	Ralph Bjorgaard	110805	RMB Lab	11	4	14	39	44	39	41
Annual Mean						10.4	3	12.3	37	39	41	39