

# Woman 11-0201-02

MN Lake ID: 11-0201-02  
 County: Cass  
 Ecoregion: Northern Lakes and Forests  
 Major Drainage Basin: Upper Mississippi River  
 Latitude/Longitude: 46.94864369 / -94.28222869  
 Water Body Type: Public Waters  
 Monitored Sites (Primary): 207  
 Monitored Sites (Secondary): N/A

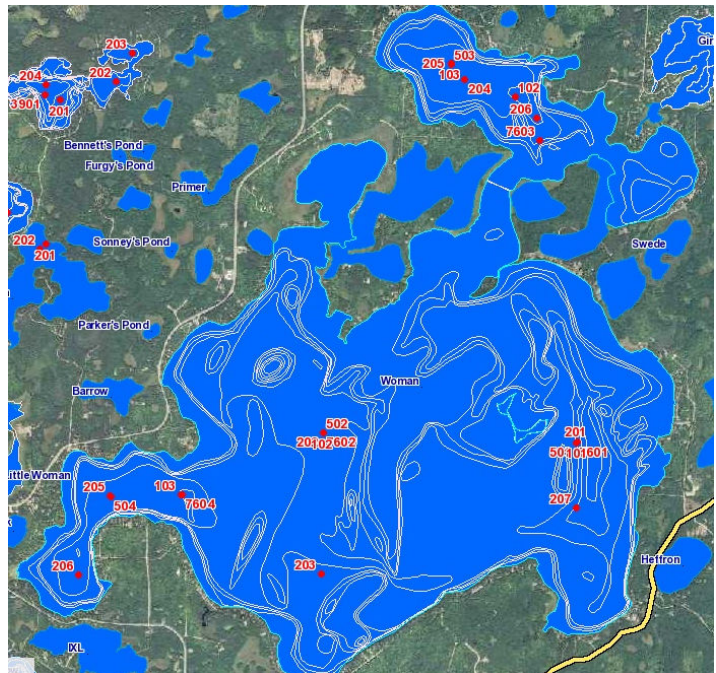
## Physical Characteristics

Surface area (acres): 4701  
 Littoral area (acres): 1927  
 % Littoral area: 40%  
 Max depth (ft): 60 (m): 18.3  
 Mean depth (ft): 18 (m): 5.5  
 Watershed size (acres): N/A

## Water Quality Characteristics - Historical Means

Years monitored: 2008-2009

Parameters	Primary Site 207
<b>Total Phosphorus Mean:</b>	12.3
<b>Total Phosphorus Min:</b>	7
<b>Total Phosphorus Max:</b>	22
<b>Number of Observations:</b>	10
<b>Chlorophyll-a Mean:</b>	2.2
<b>Chlorophyll-a Min:</b>	1
<b>Chlorophyll-a Max:</b>	4
<b>Number of Observations:</b>	10
<b>Secchi Depth Mean:</b>	14.9
<b>Secchi Depth Min:</b>	10
<b>Secchi Depth Max:</b>	21
<b>Number of Observations:</b>	10
<b>Trophic State Index Mean:</b>	38.3
<b>Trophic State:</b>	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 25<sup>th</sup> - 75<sup>th</sup> percentile range for data within each ecoregion.

Cass County is in the Northern Lakes and Forests Ecoregion.

**Woman 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:	Within the expected range, which indicates expected water quality for the area
Secchi Depth:	Within the expected range, which indicates expected water quality for the area



# Trend Analysis Report

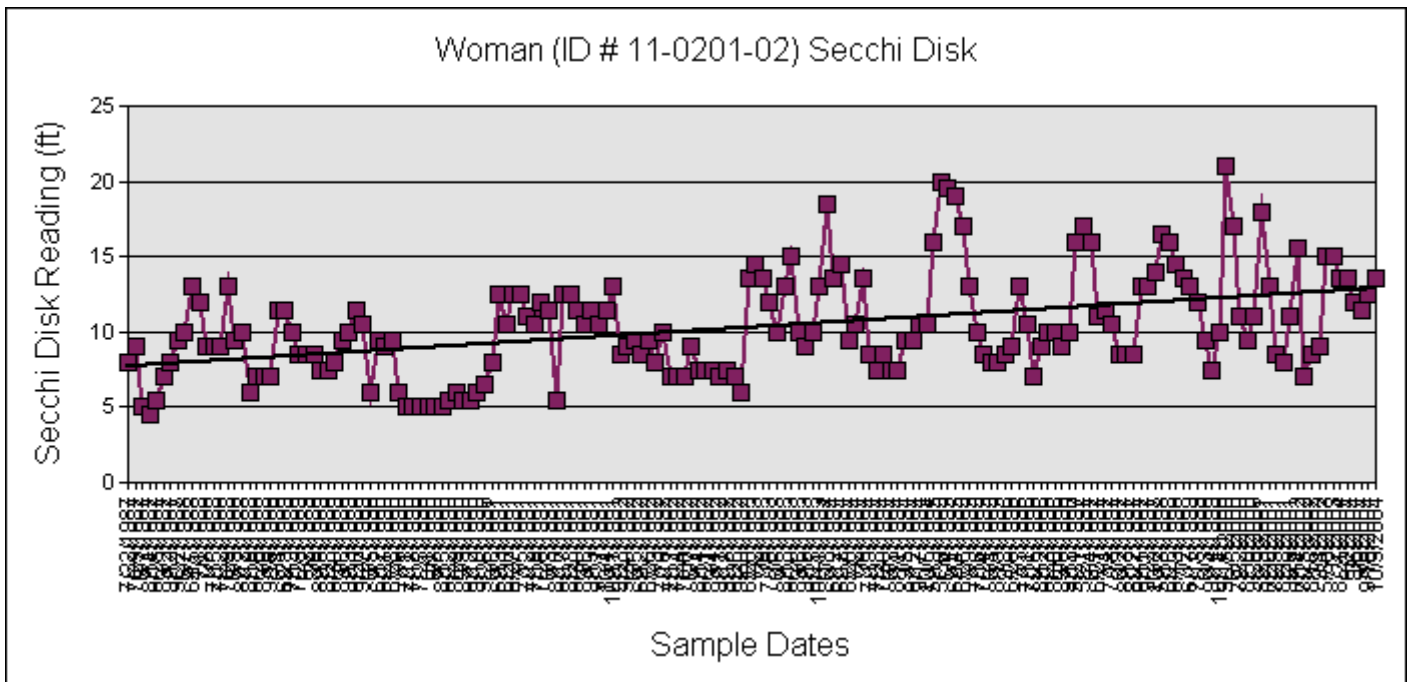
For detecting trends, a minimum of 8-10 years of data with 4 or more readings per season are recommended. Minimum confidence accepted by the MPCA is 90%. This means that there is a 90% chance that the data are showing a true trend and a 10% chance that the trend is a random result of the data. Only short-term 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 to perform trend analysis for total phosphorus or chlorophyll *a* on Woman Lake (Site 207). Site 201 has enough transparency data to perform a long-term Secchi depth trend analysis. The data was analyzed using the Mann Kendall Trend Analysis.

## Trend Analysis Report

County	MN Lake ID	Lake	Site	Data Evaluated	Date Range	Data Source
Cass	11-0201-02	<b>Woman</b>	201	Secchi Disk	07-01-1987 - 10-31-2004	All Historical

**The probability that a true significant trend exists is 99.9%  
Secchi Disk is increasing, which indicates improving water quality.**



## Individual Lake Data Summary

County	MN Lake ID	Lake	Site	Date Range	Data Source
Cass	11-0201-02	<b>Woman</b>	207 (Primary)	06-01-2008 - 09-30-2009	RMB Lab

Historical Mean						12.3	2.2	14.9	39	36	38	38
Date	Time	Site	Sampler	Lab Code	Data Source	TP ug/L	ChlA ug/L	Secchi Ft.	TSI Phos.	TSI ChlAL	TSI Secchi Ft.	TSI Avg.
<a href="#">6/8/2008</a>	2:15 PM	207	Rich Hess	78452	RMB Lab	11	1	18.5	39	31	35	35
<a href="#">6/29/2008</a>	10:30 AM	207	Rich Hess	80751	RMB Lab	8	2	15.5	34	37	38	36
<a href="#">7/27/2008</a>	1:55 PM	207	Rich Hess	83603	RMB Lab	12	1	12	40	31	41	37
<a href="#">8/17/2008</a>	2:10 PM	207	Rich Hess	85416	RMB Lab	12	4	10.5	40	44	43	42
<a href="#">9/8/2008</a>	8:15 AM	207	Rich Hess	86965	RMB Lab	22	4	10	49	44	44	46
Annual Mean						13	2.4	13.3	40	37	40	39
Date	Time	Site	Sampler	Lab Code	Data Source	TP ug/L	ChlA ug/L	Secchi Ft.	TSI Phos.	TSI ChlAL	TSI Secchi Ft.	TSI Avg.
<a href="#">5/31/2009</a>	11:00 AM	207	Rich Hess	98184	RMB Lab	10	1	21	37	31	33	34
<a href="#">6/21/2009</a>	12:15 PM	207	Rich Hess	101103	RMB Lab	7	2	14.5	32	37	39	36
<a href="#">7/12/2009</a>	11:45 AM	207	Rich Hess	103457	RMB Lab	11	1	15.5	39	31	38	36
<a href="#">8/9/2009</a>	2:50 PM	207	Rich Hess	107091	RMB Lab	16	3	16.5	44	41	37	41
<a href="#">9/13/2009</a>	11:10 AM	207	Rich Hess	110802	RMB Lab	14	3	15.5	42	41	38	40
Annual Mean						11.6	2	16.6	38	36	37	37