

Inguadona (S.Bay) 11-0120-02

MN Lake ID: 11-0120-02
 County: Cass
 Ecoregion: Northern Lakes and Forests
 Major Drainage Basin: Upper Mississippi River
 Latitude/Longitude: 46.96666667 / -94.13052778
 Water Body Type: Public Waters
 Monitored Sites (Primary): 201
 Monitored Sites (Secondary): N/A

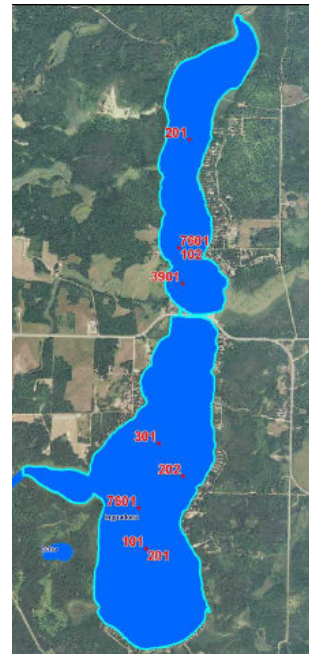
Physical Characteristics

Surface area (acres): 907
 Littoral area (acres): N/A
 % Littoral area: N/A
 Max depth (ft): 90 (m): 27.4
 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 201
Total Phosphorus Mean:	16
Total Phosphorus Min:	13
Total Phosphorus Max:	21
Number of Observations:	10
Chlorophyll-a Mean:	5.2
Chlorophyll-a Min:	1
Chlorophyll-a Max:	9
Number of Observations:	10
Secchi Depth Mean:	11.3
Secchi Depth Min:	9.5
Secchi Depth Max:	13.5
Number of Observations:	10
Trophic State Index Mean (Primary Site):	43.9
Trophic State:	Mesotrophic



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.

Inguadona Lake (Site 201) compares to the ecoregion average ranges as indicated below:

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



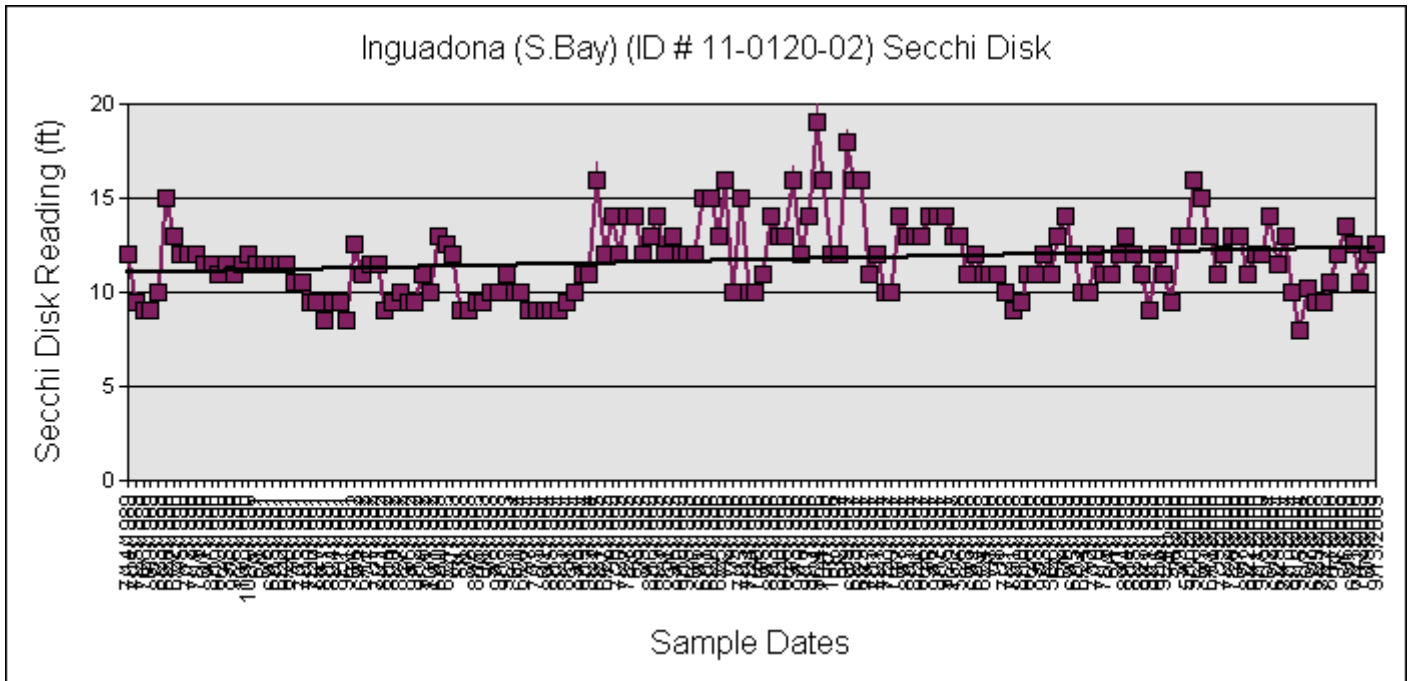
Trend Analysis Report

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 to perform trend analysis for total phosphorus or chlorophyll *a* on Inguadona Lake. 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.

County	MN Lake ID	Lake	Site	Data Evaluated	Date Range	Data Source
Cass	11-0120-02	Inguadona (S.Bay)	201 (Primary)	Secchi Disk	07-01-1989 - 09-30-2009	All Historical

**The probability that a true significant trend exists is 99%
Secchi Disk is increasing, which indicates improving water quality.**



Individual Lake Data Summary

County	MN Lake ID	Lake	Site	Date Range	Data Source
Cass	11-0120-02	Inguadona (S.Bay)	201 (Primary)	06-01-2008 - 09-30-2009	RMB Lab

Historical Mean						16	5.2	11.3	43	45	42	43
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.
6/7/2008	11:30 AM	201	Joe Hessburg	78397	RMB Lab	21	4	10.25	48	44	44	45
6/29/2008	11:30 AM	201	LeRoy Bertsch	80738	RMB Lab	18	7	9.5	46	50	45	47
7/27/2008	2:30 PM	201	Joe Hessburg	83594	RMB Lab	14	5	9.5	42	46	45	44
8/17/2008	7:30 PM	201	Joe Hessburg	85409	RMB Lab	14	5	10.5	42	46	43	44
9/7/2008	2:30 PM	201	LeRoy Bertsch	86968	RMB Lab	18	7	12	46	50	41	46
Annual Mean						17	5.6	10.4	44	47	43	45
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.
6/6/2009	2:30 PM	201	LeRoy Bertsch	99137	RMB Lab	14	4	13.5	42	44	40	42
6/21/2009	11:00 AM	201	LeRoy Bertsch	101083	RMB Lab	13	1	12.5	41	31	41	38
7/12/2009	11:50 AM	201	Willow A. Penn	103441	RMB Lab	15	3	10.5	43	41	43	42
8/9/2009	10:40 AM	201	LeRoy Bertsch	107101	RMB Lab	19	7	12	47	50	41	46
9/13/2009	9:30 AM	201	LeRoy Bertsch	110775	RMB Lab	14	9	12.5	42	52	41	45
Annual Mean						15	4.8	12.2	43	43	41	42