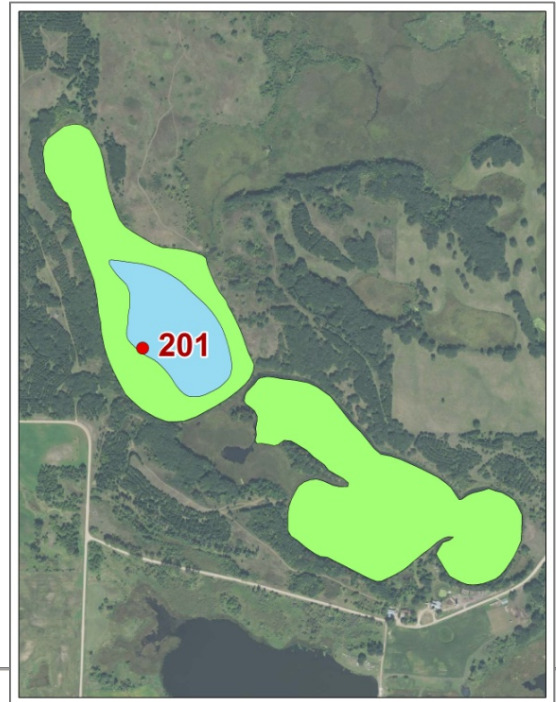


Summary

Hoff Lake is a mesotrophic lake, with a moderate amount of production. Algae concentration results (chlorophyll a) and transparency show that the lake does not experience large algae blooms. There is indication of a declining trend in water clarity since 2000. There has been no new data collected on Hoff Lake since 2013. Secchi disk monitoring should begin again to see if water quality has changed between 2013-2016.

Lake Vitals

MN Lake ID:	61-0092-00
Ecoregion:	North Central Hardwood Forest
Major Watershed:	Chippewa R.
Surface area (acres):	101.1
Littoral area (acres):	83.8
% Littoral area:	82.9%
Max depth:	35.9 (ft) 10.9 (m)
Aquatic Invasive Species:	None



Water Quality Characteristics

Years monitored: 1993 - 2013

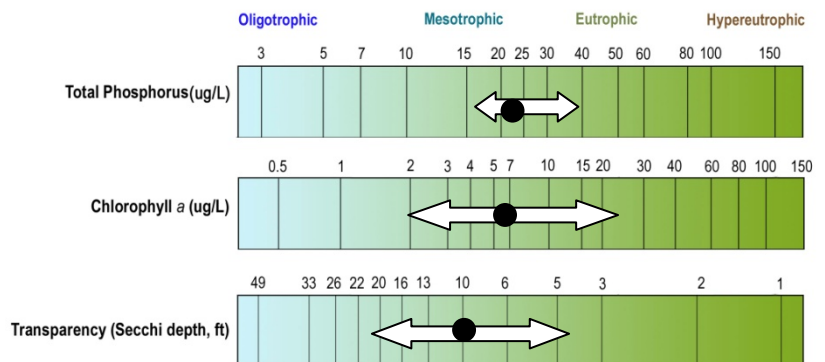
Parameters

	Historical	2016
Total Phosphorus Mean (ug/L):	22.7	
Total Phosphorus Min (ug/L):	16	
Total Phosphorus Max (ug/L):	39	
Number of Observations:	12	0
Chlorophyll-a Mean (ug/L):	6.9	
Chlorophyll-a Min (ug/L):	2	
Chlorophyll-a Max (ug/L):	21	
Number of Observations:	12	0
Secchi Depth Mean (ft):	10.2	
Secchi Depth Min (ft):	5	
Secchi Depth Max (ft):	21	
Number of Observations:	85	0

Trophic State Index

Trophic State: Mesotrophic (45)

The figure below shows the minimum and maximum values with the arrows and the mean with the black dot (site 201).



Ecoregion Comparisons

(Primary site only. Comparisons are based on interquartile range, 25th - 75th percentile, for ecoregion reference lakes)

Ecoregion:	North Central Hardwood Forest
Total Phosphorus:	Below Expected Range, which is better than expected
Chlorophyll-a:	Within Expected Range
Secchi Depth:	Above Expected Range, which is better than expected



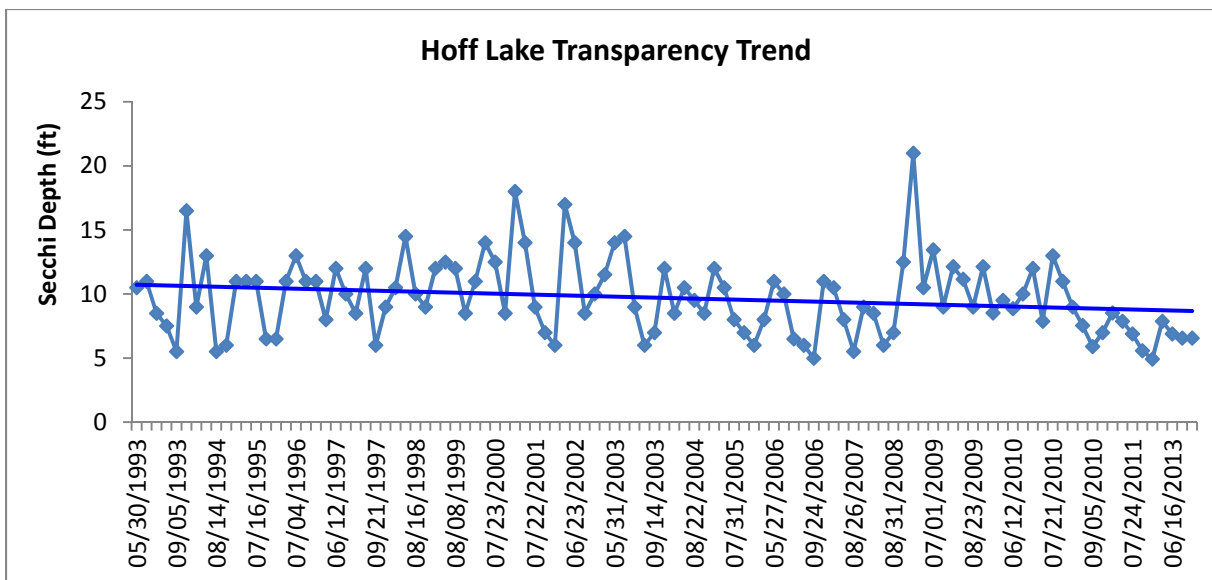
Trend Analysis Report

In assessing water quality, agencies and other lake data users want to know if the amount of algae has been changing over time. Scientists test hypotheses using statistics, and the hypothesis used in a trend analysis is that no trend exists. In other words, we begin with the assumption that there is no trend. We collect data and use statistics to determine the probability of collecting our data if this hypothesis of no trend is indeed true. The output from a statistical test is called the probability value (or p-value for short) of collecting data given the hypothesis of no trend is true. The smaller this probability value, the more likely the null hypothesis of no trend can be rejected. The MPCA has set the acceptable p-value to be less than 10%. In other words, if $p < 0.10$ we reject the hypothesis of no trend and accept that a trend likely exists. Another way to think of this is to say that there is in reality an existing trend, there is a 90% chance we would have collected the data we collected and that a 10% chance that the trend is a random result of the data. For detecting trends, a minimum of 8-10 years of data with four or more readings per season are recommended by the MPCA. Where data does not cover at least eight years or where there are only few samples within a year, trends can be misidentified because there can be different wet years and dry years, water levels, weather, and etc., that affect the water quality naturally.

Hoff Lake had enough data to perform a trend analysis for transparency (Table 1). The data was analyzed using the Mann Kendall Trend Analysis.

Table 1. Trend analysis for Hoff Lake.

Lake Site	Parameter	Date Range	Trend
201	Transparency	1993-2007, 2009-2011, 2013	No Trend
201	Transparency	2000-2007, 2009-2011, 2013	Declining (99%)
201	Total Phosphorus	2009-2010	Insufficient data
201	Chlorophyll-a	2009-2010	Insufficient data



Hoff Lake shows no evidence of a trend in water transparency as monitored from 1993-2013; however when looking at the data since 2000, there is indication of a declining transparency trend. Transparency monitoring should continue so that this trend can be tracked in future years.