

# VILLARD LAKE

MN Lake ID: 61-0067-00



POPE SOIL & WATER

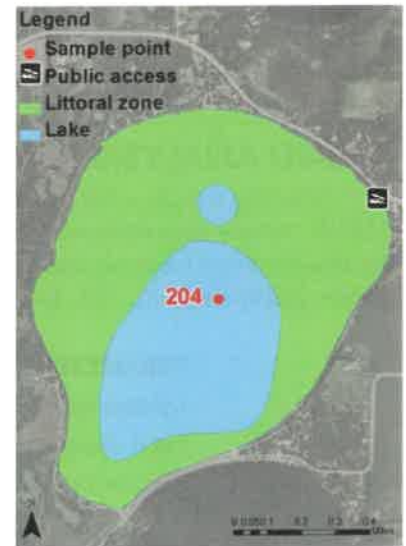


## SUMMARY

Villard Lake is a shallow eutrophic lake. Algae concentration results (chlorophyll-a) show that the lake experiences algae blooms every summer. Trend analysis shows evidence of a declining trend in transparency, which indicates declining water quality. Villard Lake has adequate historical water quality monitoring data, which makes a lake evaluation like this possible. Monitoring should continue to enable future water quality analyses such as nutrient loading and runoff modeling.

## LAKE VITALS

<b>ECOREGION:</b>	North Central Hardwood Forest
<b>MAJOR WATERSHED:</b>	Chippewa River
<b>SURFACE AREA (ACRES):</b>	544.39
<b>LITTORAL AREA (ACRES):</b>	541.47
<b>% LITTORAL DEPTH:</b>	99.5%
<b>MAX DEPTH (FT):</b>	16
<b>AQUATIC INVASIVE SPECIES:</b>	Zebra Mussels



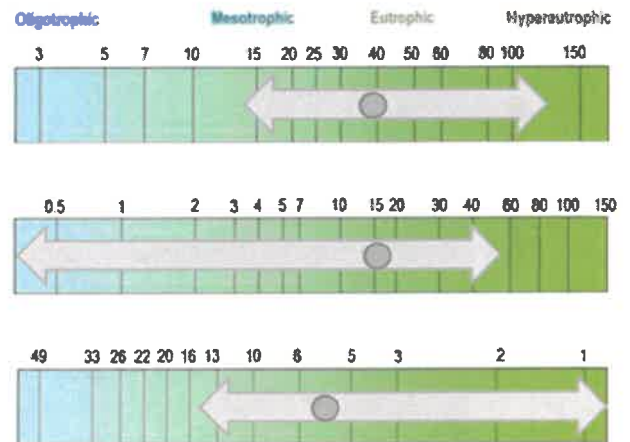
## WATER QUALITY CHARACTERISTICS

YEARS MONITORED: 1996 - 2021

PARAMETERS	204
TOTAL PHOSPHORUS MIN (UG/L):	14
TOTAL PHOSPHORUS MAX (UG/L):	124
NUMBER OF OBSERVATIONS:	145
<b>TOTAL PHOSPHORUS MEAN (UG/L):</b>	<b>39.6</b>
CHLOROPHYLL-A MIN (UG/L):	0
CHLOROPHYLL-A MAX (UG/L):	54
NUMBER OF OBSERVATIONS:	133
<b>CHLOROPHYLL-A MEAN (UG/L):</b>	<b>15.9</b>
SECCHI DEPTH MIN (FT):	0
SECCHI DEPTH MAX (FT):	15.5
NUMBER OF OBSERVATIONS:	144
<b>SECCHI DEPTH MEAN (FT):</b>	<b>5.6</b>

## TROPHIC STATE INDEX

Eutrophic (55)



## ECOREGION COMPARISONS

ECOREGION: North Central Hardwood Forest

<b>TOTAL PHOSPHORUS:</b>	Within Expected Range
<b>CHLOROPHYLL-A:</b>	Within Expected Range
<b>SECCHI DEPTH:</b>	Within Expected Range

PRIMARY SITE ONLY. COMPARISONS ARE BASED ON INTERQUARTILE RANGE, 25TH - 75TH PERCENTILE, FOR ECOREGION REFERENCE LAKES.



# 2021 WATER QUALITY CHARACTERISTICS

SITE 204

PARAMETERS	TOTAL PHOSPHORUS (UG/L)	CHLOROPHYLL-A (UG/L)	SECCHI DEPTH (FT)
MIN:	21	1	0
MAX:	57	20	10.5
NUMBER OF OBSERVATIONS:	5	5	5
MEAN:	36	11.2	3.1

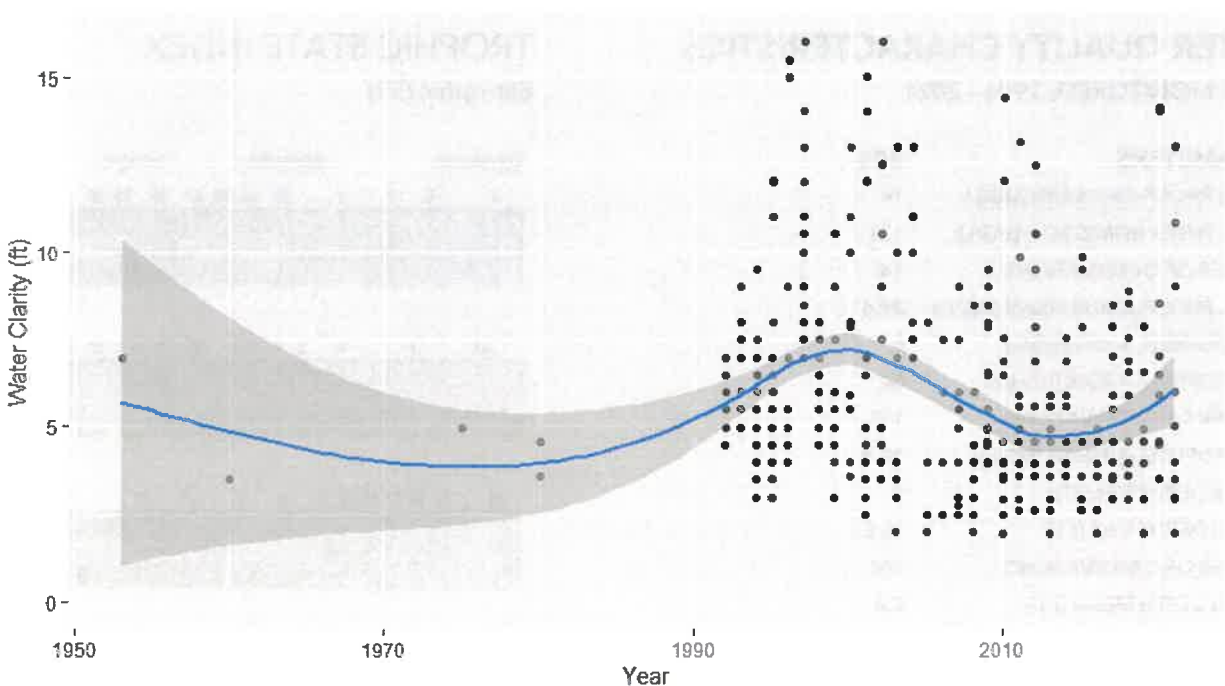
TROPHIC STATE INDEX: 54.7

## TREND ANALYSIS REPORT

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, etc., that affect the water quality naturally. The data was analyzed using the Mann Kendall Trend Analysis.

SITE	PARAMETERS	DATE RANGE	TREND
204	Transparency	1996-2021	Declining with 95% confidence
204	Total phosphorus	1996-2021	Improving with 80% confidence
204	Chlorophyll-A	1996-2021	No significant trend exists

### VILLARD LAKE TRANSPARENCY TREND



GRAPH SOURCE: MINNESOTA POLLUTION CONTROL AGENCY

Villard Lake shows evidence of a declining trend in transparency from the years 2000-2017. However, there is a potential rebounding trend over the past 4 years. Phosphorus levels in Villard Lake are decreasing, which indicates improving water quality. Monitoring should continue so that these trends can be tracked in future years and to inform future lake restoration efforts.