

GILCHRIST LAKE

MN Lake ID: 61-0072-00

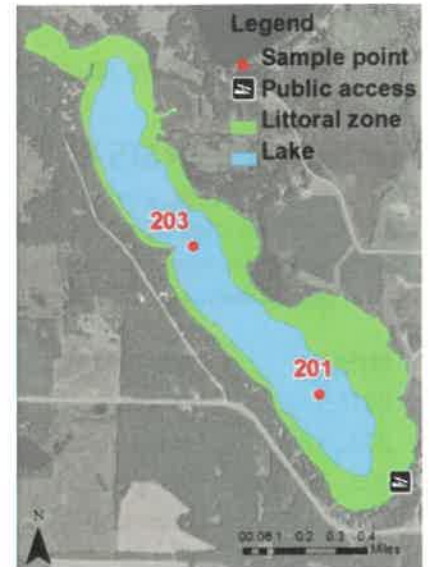


POPE SOIL & WATER



SUMMARY

Gilchrist Lake is a relatively shallow eutrophic lake. Algae concentration results (chlorophyll-a) show that the lake experiences algae blooms every summer. There is a significant improving total phosphorus trend over the past 12 years. Gilchrist Lake has adequate historical water quality monitoring data; however, monitoring has moved from site to site on the lake over time. This makes it difficult to establish trends. Limited chemical data was collected at historical site 201, so site 203 was used for trend analysis. Monitoring should continue to inform future water quality protection efforts.



LAKE VITALS

| | |
|----------------------------------|---------------------------------|
| ECOREGION: | North Central Hardwood Forest |
| MAJOR WATERSHED: | Chippewa River |
| SURFACE AREA (ACRES): | 335.96 |
| LITTORAL AREA (ACRES): | 209.33 |
| % LITTORAL DEPTH: | 62.3% |
| MAX DEPTH (FT): | 24 |
| AQUATIC INVASIVE SPECIES: | Eurasian Milfoil, Zebra Mussels |

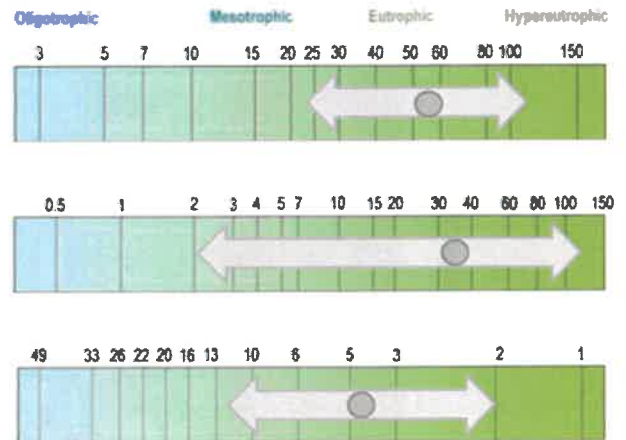
WATER QUALITY CHARACTERISTICS

YEARS MONITORED: 2009 - 2021

| PARAMETERS | 202 | 203 |
|--------------------------------------|-------------|-------------|
| TOTAL PHOSPHORUS MIN (UG/L): | 15 | 23 |
| TOTAL PHOSPHORUS MAX (UG/L): | 156 | 108 |
| NUMBER OF OBSERVATIONS: | 77 | 63 |
| TOTAL PHOSPHORUS MEAN (UG/L): | 62.8 | 55.3 |
| CHLOROPHYLL-A MIN (UG/L): | 1 | 2 |
| CHLOROPHYLL-A MAX (UG/L): | 169 | 114 |
| NUMBER OF OBSERVATIONS: | 71 | 57 |
| CHLOROPHYLL-A MEAN (UG/L): | 38.7 | 34.4 |
| SECCHI DEPTH MIN (FT): | 1 | 2 |
| SECCHI DEPTH MAX (FT): | 19 | 12 |
| NUMBER OF OBSERVATIONS: | 76 | 63 |
| SECCHI DEPTH MEAN (FT): | 5.2 | 4.7 |

TROPIC STATE INDEX

Eutrophic (59.4) - Site 203



ECOREGION COMPARISONS

ECOREGION: North Central Hardwood Forest

| | |
|--------------------------|----------------------------|
| TOTAL PHOSPHORUS: | Poorer Than Expected Range |
| CHLOROPHYLL-A: | Poorer Than Expected Range |
| SECCHI DEPTH: | Within Expected Range |

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



2021 WATER QUALITY CHARACTERISTICS

SITE 202

| PARAMETERS | TOTAL PHOSPHORUS (UG/L) | CHLOROPHYLL-A (UG/L) | SECCHI DEPTH (FT) |
|-------------------------|-------------------------|----------------------|-------------------|
| MIN: | 15 | 2 | 2.5 |
| MAX: | 77 | 59 | 19 |
| NUMBER OF OBSERVATIONS: | 5 | 5 | 5 |
| MEAN: | 40 | 24 | 7.9 |

TROPHIC STATE INDEX: 53

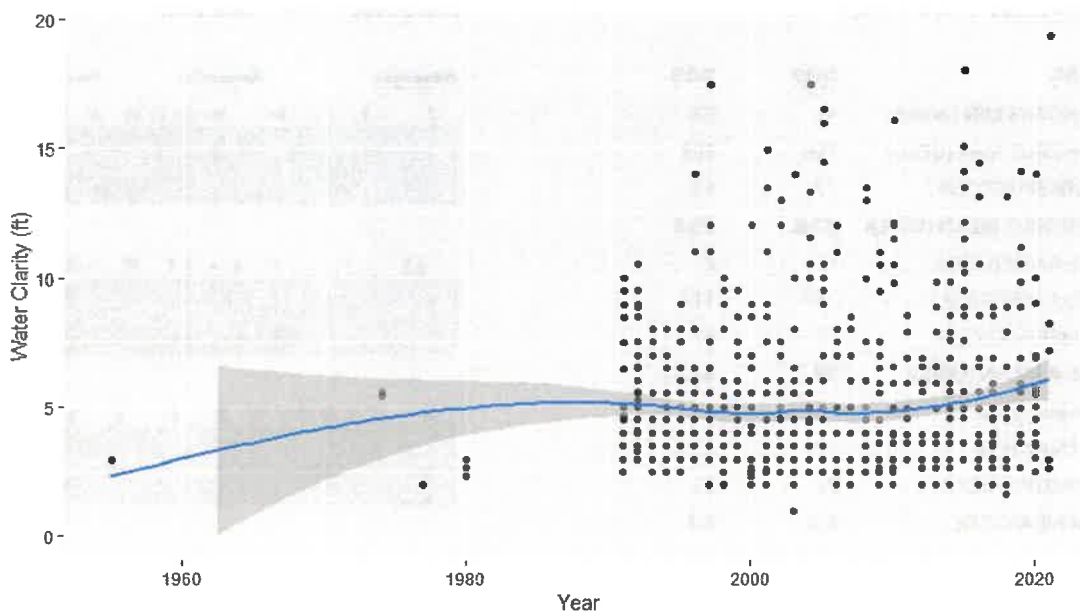
TREND ANALYSIS REPORT

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 |
|------|------------------|-----------------|-------------------------------|
| 201* | Transparency | 1980, 1991-2009 | No significant trend exists |
| 203 | Transparency | 2009-2021 | No significant trend exists |
| 203 | Total phosphorus | 2009-2021 | Improving with 90% confidence |
| 203 | Chlorophyll-A | 2009-2021 | No significant trend exists |

* Historical site 201 has not been monitored in recent years.

GILCHRIST LAKE TRANSPARENCY TREND



GRAPH SOURCE: MINNESOTA POLLUTION CONTROL AGENCY

Gilchrist Lake shows evidence of reduced phosphorus levels over the past 10 years at site 203. There is no significant trend in chlorophyll-a or transparency. Monitoring has moved from site to site on the lake over time, making it difficult to establish trends. Overall, these trend results show that the water quality in Gilchrist Lake is stable or improving, with no apparent indication of decline. Transparency monitoring should continue so that this potential improving trend can be tracked in future years. Revisiting site 203 to gather additional comparison samples would be helpful in the analysis. Site 202 tends to have better clarity in May of some years when at comparable nutrient levels to site 203.