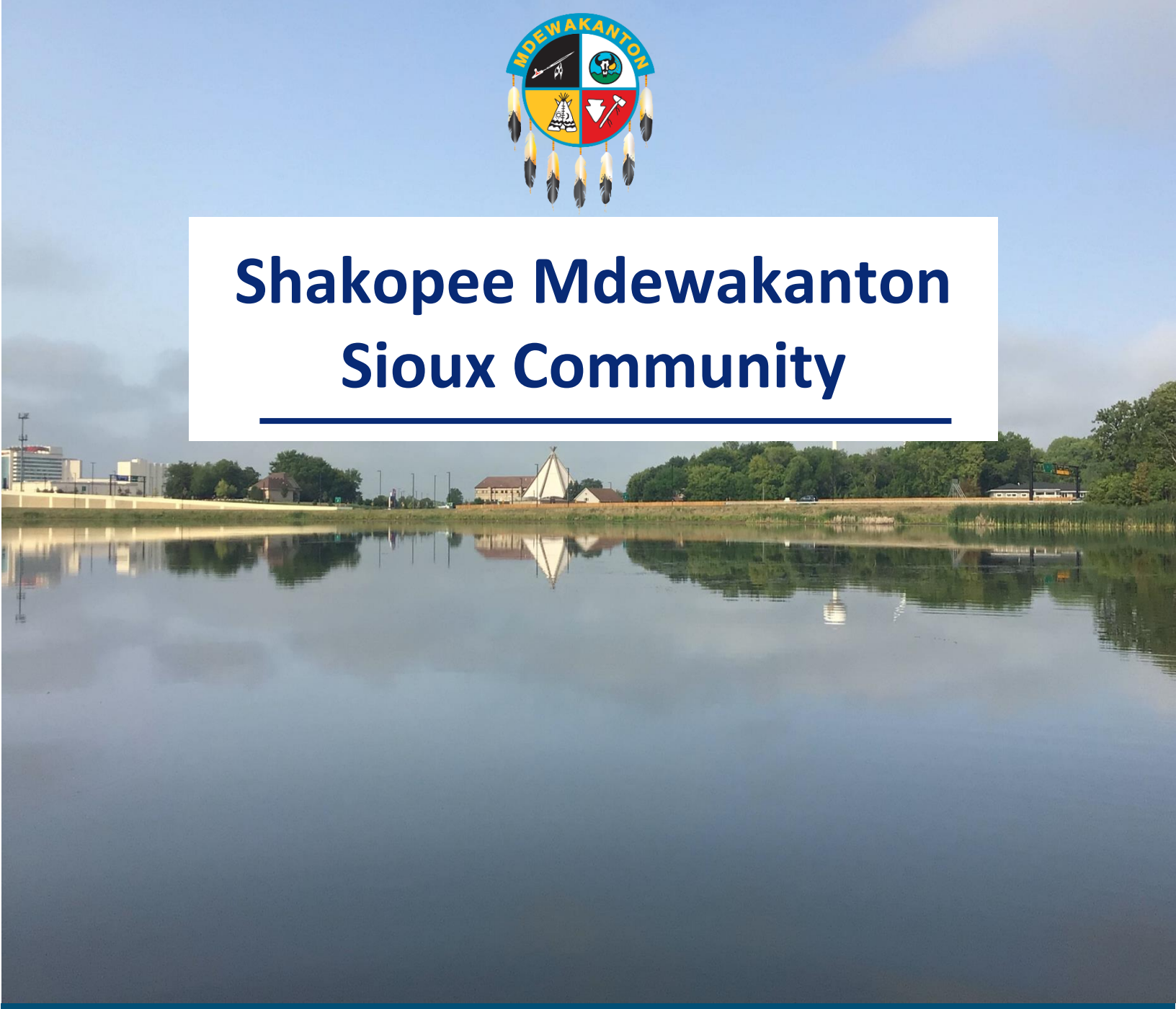


Shakopee Mdewakanton Sioux Community

Water Quality Report 2023

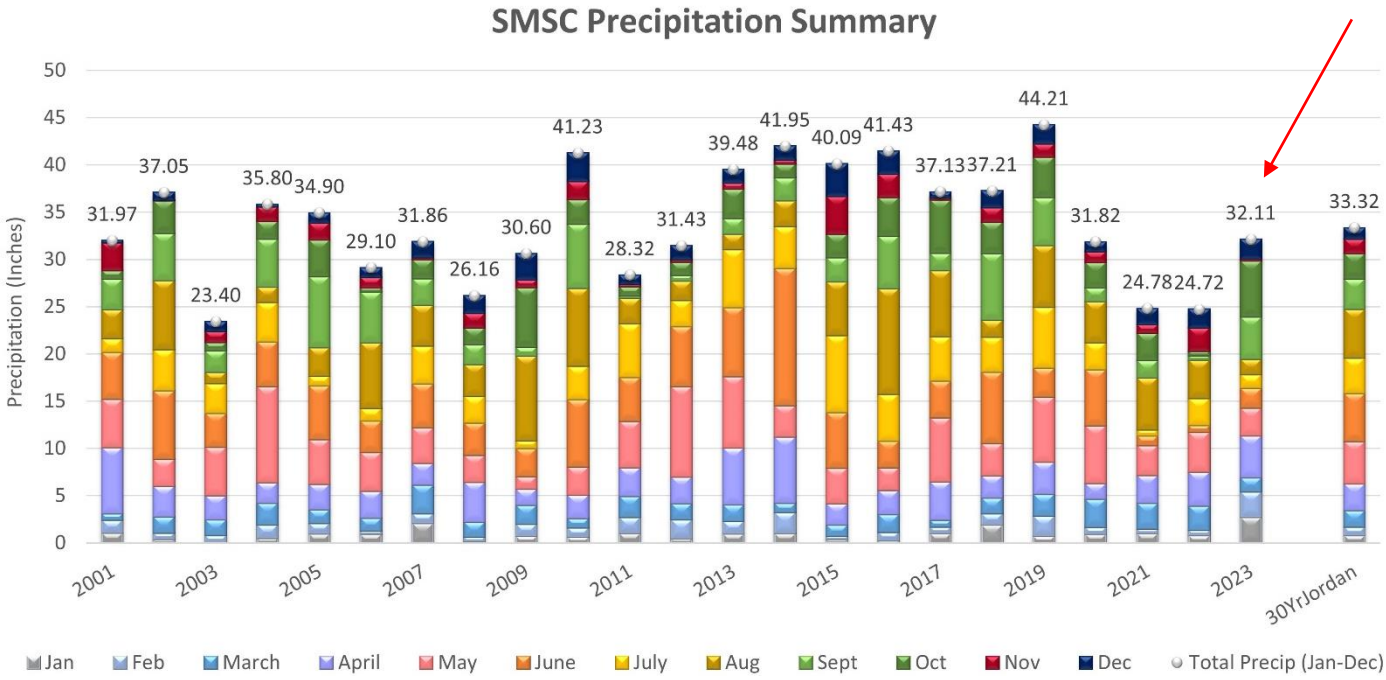
Land and Natural Resources Department

Overview

The Shakopee Mdewakanton Sioux Community (SMSC) lands are perched above the Minnesota River and at the top of the local watersheds, including the Prior Lake Outlet Minor Watershed, Lower Sand Creek Minor Watershed and City of Shakopee Minor Watershed. Protecting and improving SMSC waters can directly enhance the quality of water flowing downstream through neighboring communities and the water flowing into the Minnesota River.

2023 HIGHLIGHTS:

- **Water quality improvements and 24 years of water sampling**
  Arctic Lake invasive common carp continue to travel downstream towards Prior Lake to spawn. Because of an outlet barrier and a beaver dam, there have been over 200 carp removed in this channel in 2022 and 2023. Collaboratively working with Prior Lake-Spring Lake Watershed District has continued to reduce the invasive common carp population in the Arctic Lake system. Another positive improvement in SMSC lakes, is that Mystic Lake total phosphorus reached the lowest concentration in all years of sampling, showing great aquatic health.
- **Sensitive resource to protect at SMSC**
  A survey at Howard Lake discovered a unique freshwater sponge, indicating pristine water quality and a healthy aquatic habitat. Unfortunately, salt concentrations continue to increase in the lake, which is toxic to aquatic life and sensitive aquatic plants. Without a change in the system, the quality of this resource may begin to decline.
- **Additional water resources added to SMSC water inventory**
  SMSC acquired new properties that included new water resources, including Lake O'Dowd and Gifford Lake. These properties do not have Treatment as a State status but may be included in this report in the future.
- **New monitoring conducted for zebra mussels across all SMSC lakes**
  Zebra mussels are an invasive mollusk that can negatively impact aquatic ecosystems by filtering organisms that are needed by native species. SMSC installed monitoring devices at all SMSC lakes (7) that can identify possible invasion of the species. No zebra mussels were found in 2022-2023.
- **Weather conditions in 2021-2023 were unique because the area experienced a severe drought**
  Many SMSC streams and the ponds behind Hoċokata Ṫi (SMSC Cultural Center) dried up from lack of rainfall. The graph below shows precipitation data from the SMSC weather station since 2001.



Background

The SMSC Land and Natural Resources Department has been collecting water quality and weather data since 1999. The overall goal is to ensure that all tribal waters are clean and provide a safe and healthy resource for Community Members, future generations and surrounding communities.

Water Body Type	Number of Waterbodies	Based on SMSC boundaries	Water Uses/goals
Wetlands and ponds within SMSC boundaries	165	582.8 acres	A, R, C
Total surface area of lakes important to SMSC	7	817 acres	A, R, C
Intermittent stream miles within SMSC boundaries	16	3.43 miles	A, R, C
Ditch miles within SMSC boundaries	12	4.42 miles	A, R, C
River frontage miles adjoining SMSC boundaries (Mnisota Wakpa)	1	0.30 miles	A, R, C
Springs within SMSC boundaries or cultural areas	3		A, C

Table 1. SMSC water resources identified within or adjacent to SMSC boundaries as of the 2022 sampling season.

Lakes, streams and wetlands are monitored based on their water uses/goals including aquatic life (A), recreation (R) and/or cultural importance (C).

A: Aquatic Life- Waters should be able to support a healthy community of fish, amphibians, reptiles, vertebrates, invertebrates, plants, waterfowl and mammals. This also includes providing sufficient aquatic habitat.

R: Recreation- Waters shall be suitable for fishing, hunting, kayaking and canoeing for Community Members. In addition, should provide aesthetic enjoyment for surrounding walking paths, neighborhoods and businesses.

C: Cultural importance- Protect water quality and quantity for future generations, including groundwater conservation and environmental restoration.

Summary	Sampling Objective	Uses/ Goals	Sampling Design	Frequency	Sampling Period	Sampling Sessions
Lakes	1, 2, 3	A, R, C	Trend: water quality, level	Bi-weekly	May to Nov	15
			Biological: aquatic vegetation	Annual	May to Nov	1
Lake inlet/outlet	1, 2	A, R	Trend: water quality, flow	Bi-weekly	May to Nov	15
Wetlands, streams and ponds	1, 2, 3	A, R, C	Trend: water quality, level, flow	Weekly	April to Nov	25
			Biological: macroinvertebrates	Funding dependent	May to Nov	Funding dependent
Weather	2	A, R	Trend: Weather	Daily	Jan to Dec	Continuous

Table 2. Summary of SMSC monitoring activities. Obj 1. Monitor trends and compare to MN state standards, Obj 2. Monitor water quantity, Obj 3. Gather new data and determine causes/sources of water quality issues.

The parameters monitored depends on the sampling objectives and water uses/goals at each sampling site.

- **Lakes (4):** Ammonia (NH3), Calcium (Ca), Chlorophyll-a (Chl-a), Chloride (Cl), Clarity (Secchi), Dissolved Oxygen (DO), Magnesium (Mg), Nitrate+Nitrite (NO3+NO2), Total Kjeldahl Nitrogen (TKN), Orthophosphorus, Oxidation Reduction Potential (ORP), pH, Total Phosphorus (TP), Sodium (Na), Specific Conductivity (SpCond), Sulfate (SO4), Temperature, Total Dissolved Solids (TDS), Total Suspended Solids (TSS) and Water Level.
- **Wetlands (1), Streams (2) and Inlet/Outlet (1)**: Dissolved Oxygen (DO), Oxidation Reduction Potential (ORP), pH, Specific Conductivity (SpCond), Stream Flow, Temperature, Total Dissolved Solids (TDS) and Water Level.

Data from this report is submitted annually to the EPA Water Quality Exchange (WQX) database. Methods and procedures follow the EPA approved SMSC Monitoring Strategy and SMSC Quality Assurance Project Plan, updated in 2020. Laboratory analysis was conducted by Pace Analytical Laboratory. Waters are compared to Minnesota Class 2B surface water standards.

Summary

- **Arctic Lake**
  Total phosphorus is closely monitored at Arctic Lake due to historical agriculture nearby and this parameter not meeting state standards in all 24 years of sampling. In addition to phosphorus, there are often late season algae blooms at Arctic. A goal to improve water quality is to continue controlling invasive common carp and encourage native aquatic vegetation to grow. Common carp are being removed every year in the Arctic Outlet channel by the Prior Lake-Spring Lake Watershed District. Following carp control, native aquatic vegetation will be transplanted because their roots naturally remove phosphorus and increase dissolved oxygen in the water. For future work, SMSC Land Department are exploring other options to control internal phosphorus loading.
- **Mystic Lake**
  Mystic Lake is located next to a roadway, so winter road salt and chloride contamination can be a problem. The 2023 concentrations were the highest in all 24 years of monitoring. This is likely due to a heavy winter snow (more deicing) followed by another year of drought conditions (water level dropping 2 feet over the year). Even with these circumstances, the lake had low phosphorus concentrations and good aquatic life.
- **Pike Lake**
  Pike lake is impaired for nutrients since 2002 and monitored by the Prior Lake-Spring Lake Watershed District. SMSC owns land on the northern shore and conducts restoration work to improve the land and water resources. In winter 2021, there was a natural fish kill due to low oxygen conditions. In response, SMSC started a winter lake aeration system and stocked the lake with bluegill, bass and crappies in the following years. The water quality doesn't meet state standards, so there will be continued efforts to explore solutions to improve this lake. A canoeing education event happened here.

- **Howard Lake**
  A survey at Howard Lake discovered a unique freshwater sponge, indicating pristine water quality and a healthy aquatic habitat. Also, a diversity of plants, animals, waterfowl and birds utilize this lake. Unfortunately, salt concentrations continue to increase in the lake, which is toxic to aquatic life and sensitive aquatic plants. Without a change in the system, the quality of this resource may begin to decline.
- **Streams and Wetlands**
  From 2021-2023, the area experienced summer drought conditions. Each year the effects of this were apparent in SMSC streams and wetlands. Stream Site 5 was dry for 9 weeks and downstream Lucky 7 was dry for 18 weeks. This limits the amount of water habitat in our area and there is less groundwater recharge in the area.
- **Golf Pond**
  A continuous sensor measuring specific conductivity is deployed in the water reuse pond that irrigates the golf course. Specific conductivity can give us an estimate of chloride and shows us that the concentrations were elevated in 2023 compared to 2022. Otherwise, the pond has very consistent water quality.
- **Additional monitoring and education events**
  - No zebra mussels were found in any of the 7 SMSC lakes in 2022-2023.
  - Macroinvertebrates were sampled in 4 wetlands and 1 stream. Howard Lake shoreline edge showed excellent wetland health with an IBI of 25 (excellent condition). A stream was monitored but it was too late in the year and the drought conditions impacted the results making that data unreportable.
  - In 2023, the SMSC Land Department hosted the annual Earth Week, which included education events on the water cycle and stormwater projects. Also, there were 6 education events specific for youth that included riparian zone tag, water cycle bead game, fossil formation, canoeing, fish stocking and topography sandbox.