



## Armstrong Lake

DNR ID #82-0116      Municipality: Lake Elmo/Oakdale  
 Surface Area: 39 Acres    Watershed Area: 566 Acres  
 Mean Depth: 3-5 feet    Maximum Depth: 5 feet  
 SWWD Maximum Allowable Phosphorus Load: 0.18 lbs/ac/yr  
 SWWD Trophic State Index (TSI) goal: 63-66

Armstrong Lake (Map 1) is approximately 39 acres in size and has a contributing watershed of 487 acres. This very shallow and flat lake is located in the headwaters of the Northern Watershed (NWS). A majority of the drainage area to the lake is from Oakdale and is comprised mostly of low density residential land use with some farm areas; few undeveloped parcels remain. The lake is primarily used for wildlife viewing and aesthetics; although, non-motorized boating is possible.

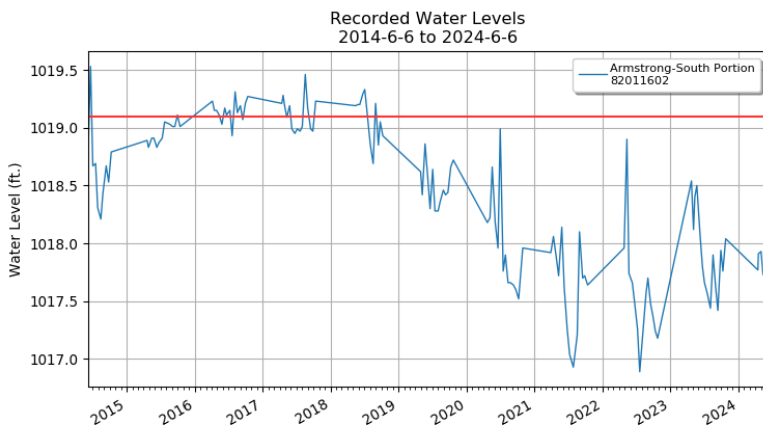


Map 1: Armstrong Lake

The lake is divided by County Road 10 with a culvert connecting to two basins. Water quality samples are taken from the southern basin which has a greater depth. Overall, Armstrong Lake shows very little fluctuation in surface elevation, generally holding within a range of 1018-1019 ft. The lake was elevated following an extremely wet 2016, the wettest year on record at the Minneapolis St. Paul International Airport at the time. That record was broken in 2019, although elevations at Armstrong Lake have since dropped (Figure 1).

The State sets several in-lake water quality standards applicable to Armstrong Lake; including a total phosphorus (TP) concentration of 0.060 mg/L. TP concentrations higher than the state standard are generally indicative of increased rates of eutrophication or excess plant and algae growth. SWWD’s interim goal for Armstrong Lake (Trophic State Index = 63-66) corresponds to an in-lake total phosphorus (TP) concentration of 0.059-0.073 mg/L and an average watershed TP loading rate of 0.18 lbs/ac/yr.

Figure 1: Lake Surface Elevation of Armstrong Lake



The State does not currently consider Armstrong Lake to be impaired. However, in-lake TP concentration (Figure 2), periodically exceeds the state standard including each of the past three years. In-lake chlorophyll a concentrations (Figure 3), a measure of algae in the lake, is consistently low. Secchi

transparency (Figure 4) is consistently poor. However, some of the low transparency is likely due to high mixing of lake sediments in the shallow lake. Additionally, ability to measure clarity is limited at times by vegetation growth. Overall, we Armstrong Lake water quality is steady and generally in line with SWWD’s in-lake water quality goals and State standards. That trend is reflected in historic lake grades as assigned by the Metropolitan Council (Table 1). Additional data for Armstrong Lake is available through SWWD’s web database at [www.swwdmn.org](http://www.swwdmn.org) and MN Department of Natural Resources at <http://www.dnr.state.mn.us/lakefind/index.html>.

Of recent concern at Armstrong Lake is increasing chloride concentrations (Figure 5). While concentrations meet applicable standards, the rapid increase is cause for concern. SWWD is working with the City of Oakdale and Washington County to improve winter de-icing operations which are the major source of chloride in metro watersheds.

A vegetation survey of Armstrong Lake was completed in 2021. The lake is densely vegetated. Nearly the entire lake edge is covered by dense cattail stands. Inside the cattails, the lake surface is covered by a mix of white and yellow water lilies. Coontail is also pervasive making boat navigation difficult. Curly leaf pondweed and purple loosestrife, both aquatic invasive species, are present in low amounts.

SWWD has completed a management plan for Armstrong Lake. That plan identifies phosphorus load reductions necessary to maintain Armstrong Lake water quality at the state standard. Subsequent watershed retrofit analyses have identified the most cost effective projects for achieving load reductions. SWWD is currently pursuing those projects.

Figure 2: In-lake Total Phosphorus Concentration at Armstrong Lake

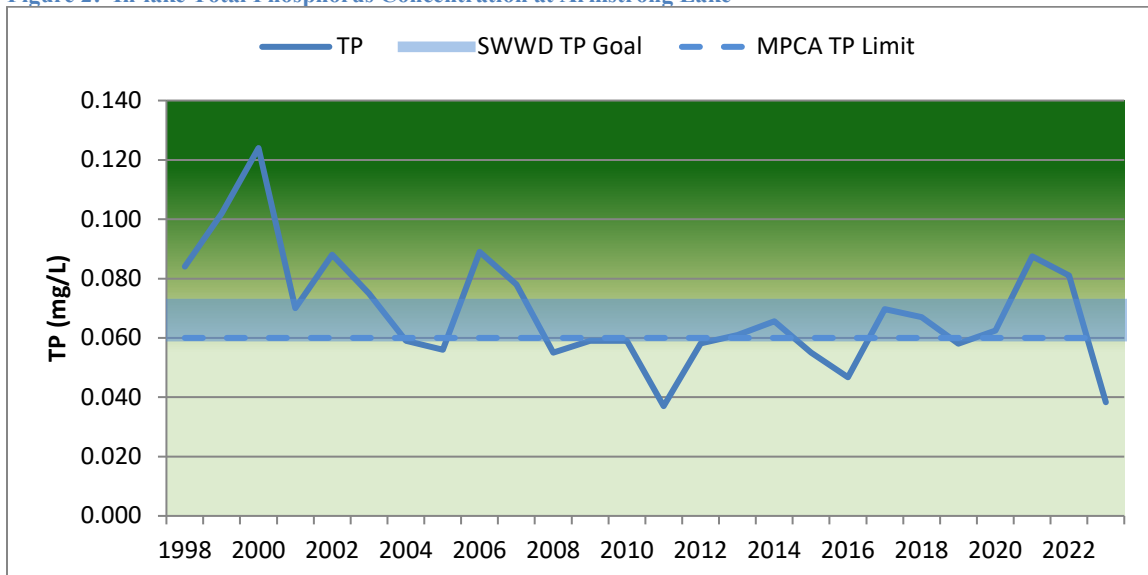


Figure 3: In-lake Chlorophyll a Concentration at Armstrong Lake

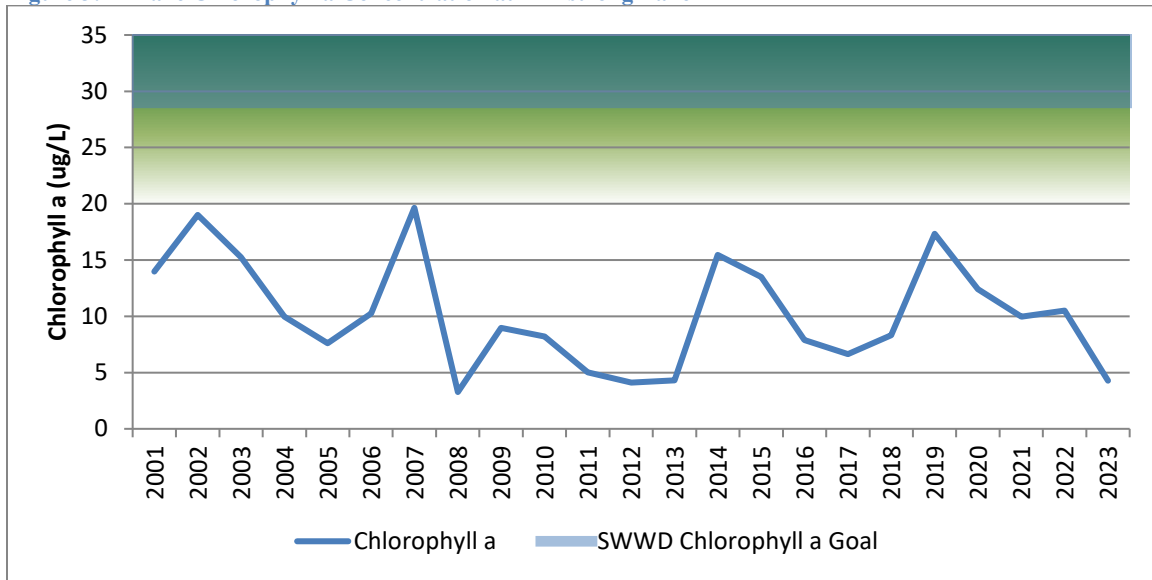
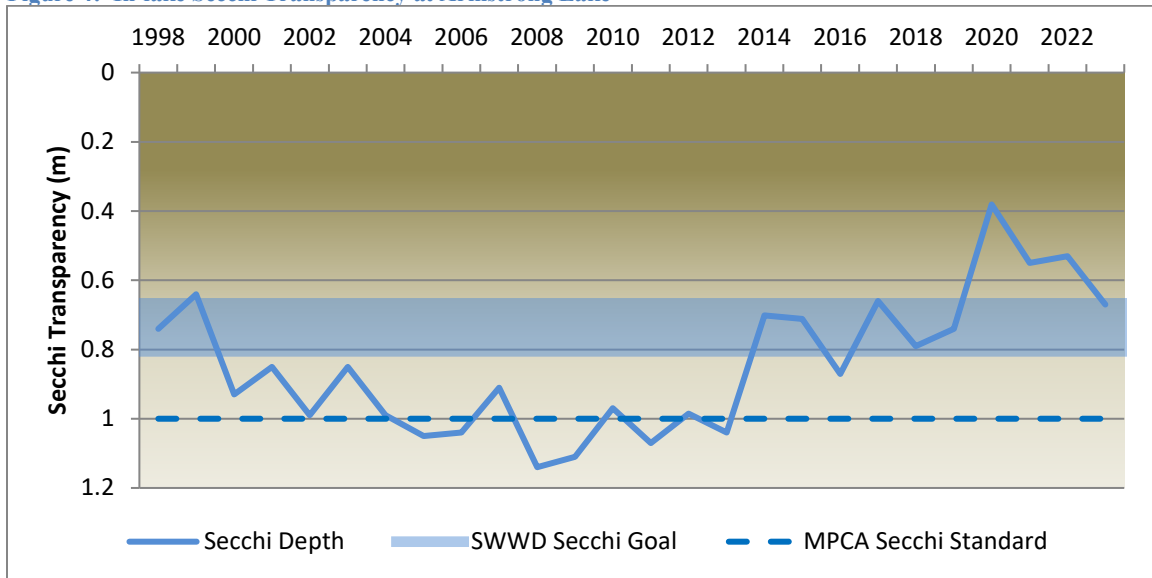
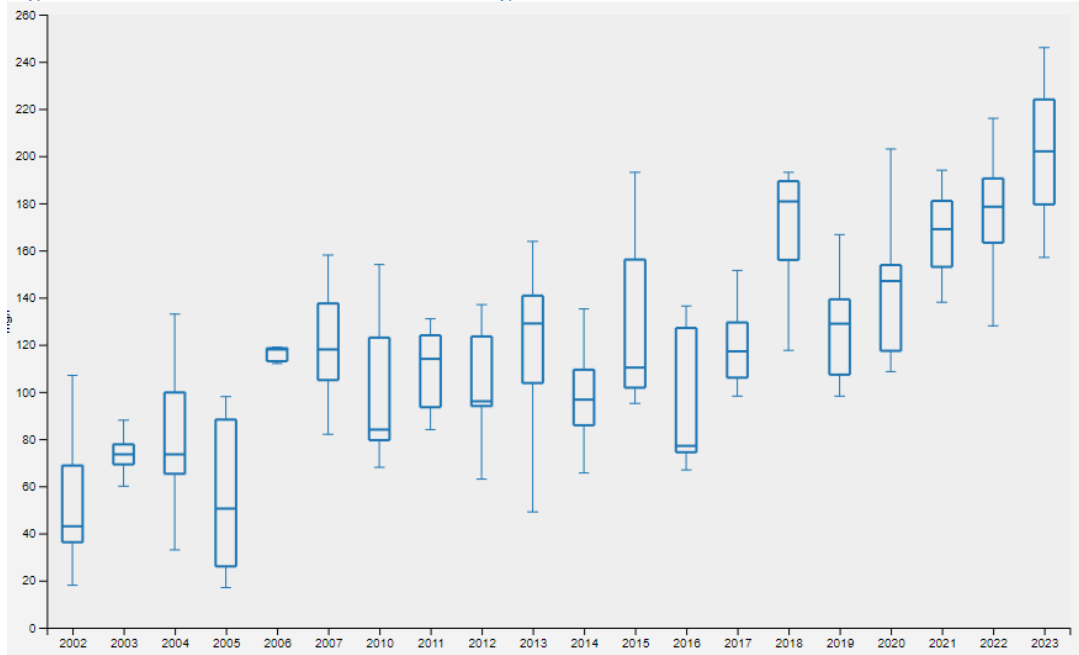


Figure 4: In-lake Secchi Transparency at Armstrong Lake



**Figure 5: Chloride Concentrations at Armstrong Lake**



**Table 1: Historic Lake Grades for Armstrong Lake**

Parameter	Trophic Status	Lake Grade																						
		0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	16	17	18	19	20	21	22
<b>Total Phosphorus</b>	57; Eutrophic	D	D	D	C	C	D	D	C	C	C	C	C	C	C	C	C	D	D	C	C	D	D	C
<b>Chlorophyll</b>	45; Mesotrophic	C	B	B	A	A	B	C	A	B	A	A	A	A	B	B	A	A	A	B	B	A	B	A
<b>Secchi Transparency</b>	66; Eutrophic	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	F	D	D	F	F	F	F
<b>Overall</b>	Eutrophic	D	C	C	C	C	C	D	C	C	C	C	C	C	C	C	C	C	C	C	C	C	D	C

Note: Preliminary. Lake grades are based on comparison with other lakes in the Minneapolis-St. Paul metropolitan area. Criteria for assigning lake grades are established by the Metropolitan Council. Final grades are assigned by Metropolitan Council.