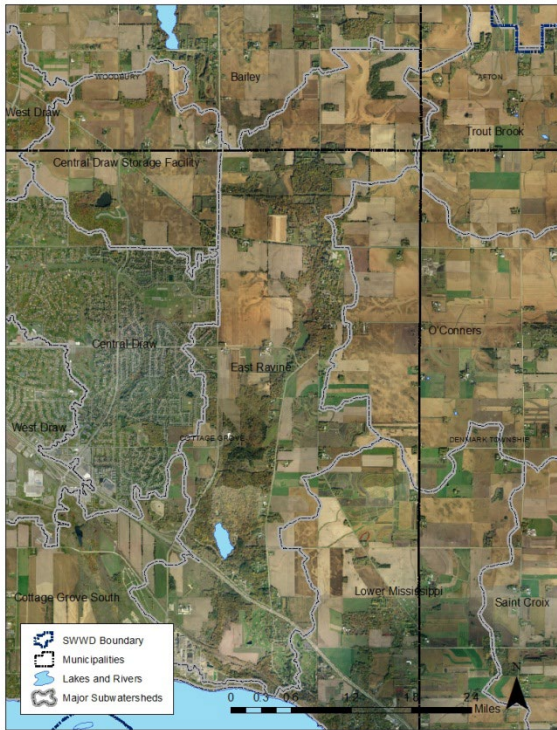




# SOUTH WASHINGTON WATERSHED DISTRICT

## Ravine Lake

DNR ID #82-0087      Municipality: Cottage Grove  
 Surface Area: 25 Acres      Watershed Area: 802 Acres  
 Mean Depth: 7 feet      Maximum Depth: 16 feet  
 SWWD Maximum Allowable Phosphorus Load: 0.075 lbs/ac/yr  
 SWWD Trophic State Index (TSI) Goal: 63-66



Map 1: East Ravine Watershed and Ravine Lake

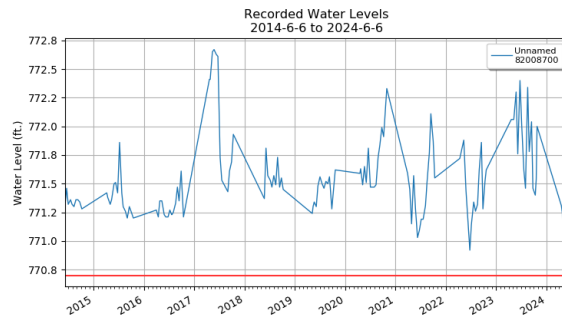
SWWD’s monitoring programs are based on a Regional Assessment approach. By following a regional approach, monitoring is focused on key resources and watershed outlets throughout the District. Ravine Lake is the only current Regional Assessment location in the East Ravine watershed. This report summarizes monitoring results for Ravine Lake.

Ravine Lake (Map 1) is located in the East Ravine subwatershed and is situated in the Cottage Grove Regional Park. A lake management plan was completed for this lake in 2013 and revised in 2019. The watershed is predominantly wooded / park or agricultural land. As noted in the management plan, the lake has an existing contributing watershed of about 1704 acres but planned local development will increase this watershed to about 2,422 acres. The lake also has a strong groundwater influx in addition to the watershed inflow. Based on the management

plan, SWWD has set a development/redevelopment total phosphorus loading standard of 0.075 lbs/ac/yr. This standard will ensure that the lake meets or exceeds State water quality standards under planned developed conditions.

Due to increasing groundwater inflows and inadequate lake outlet under the Park entrance

Figure 1: Lake Levels at Ravine Lake



road, lake levels (Figure 1) have generally risen. As shown in Figure 1, the lake's level has not been measured below the established ordinary high water level of 770.7 in the past 10 years. SWWD and Washington County worked to replace the lake outlet and remove the park entrance road from the lake in 2017. The new outlet will maintain the lake levels at elevated levels to support fisheries management, as requested by MnDNR, without inundating park infrastructure.

Ravine Lake generally meets SWWD water quality goals. And, while currently listed as impaired by the State, Ravine Lake is close to meeting State eutrophication standards. TP (Figure 2), Chlorophyll a (Figure 3), and Secchi Transparency (Figure 4) have all shown steady or improving conditions with periodic spikes in nuisance conditions (2002, 2012). Improvements in the three eutrophication measures are also reflected in improved Lake Grades (Table 1). Despite generally good monitoring results, blue green algae has been creating nuisance conditions at increased frequency the past few years.

Of concern, however, are dramatically increasing chloride concentrations at Ravine Lake (Figure 5). While chloride concentrations meet applicable standards, the rate of increase is concerning. SWWD is working with the City of Cottage Grove and Washington County to review winter de-icing practices which is generally the major source of chloride in metro watersheds. All SWWD data is available at <http://wq.swwdmn.org/>.

The Ravine Lake fishery is actively managed by the MN DNR and has been stocked with various fish species since 2002, coinciding with improved water quality. A fish survey was conducted in 2016 and showed good numbers of walleye, bluegill, crappie, and largemouth bass. The survey is available at (<http://www.dnr.state.mn.us/lakefind/showreport.html?downum=82008700>). It is likely that observed water quality improvements are due, at least in part, to having a healthier, more balanced fish community.

A vegetation survey of Ravine Lake was completed in 2021. Over 90% of the lake is vegetated, often at levels that impact recreation. Curly-leaf pondweed, an invasive, non-native species which was first surveyed in 2015 is now very abundant and can exacerbate nuisance conditions with dense early season vegetative cover and late summer die-offs releasing nutrients into the lake. Coontail, a native species, likewise develops nuisance conditions. SWWD began efforts to control curly leaf pondweed in 2022 and will continue those efforts for the immediate future.

Based on the current water quality of the Lake, it is likely that total phosphorus loading in the watershed is in line with SWWD standards. However, internal loading may be a problem and may need to be addressed to fully meet goals. SWWD will continue monitoring efforts at Ravine Lake to better identify any water quality changes as development occurs over the next decade.

Figure 2: In-lake Total Phosphorus Concentrations at Ravine Lake

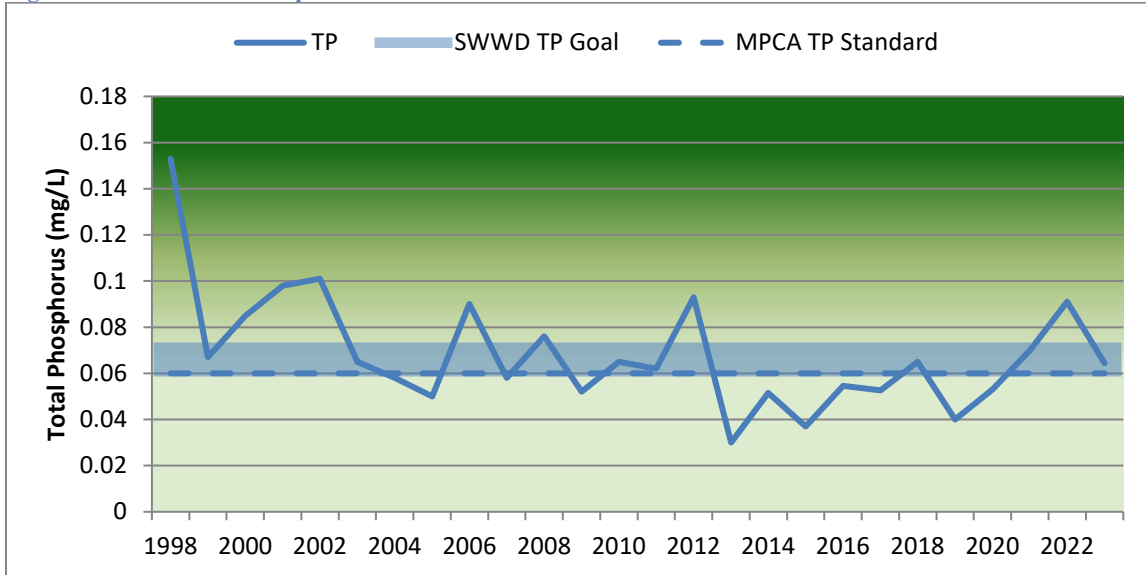


Figure 3: In-lake Chlorophyll a Concentrations at Ravine Lake

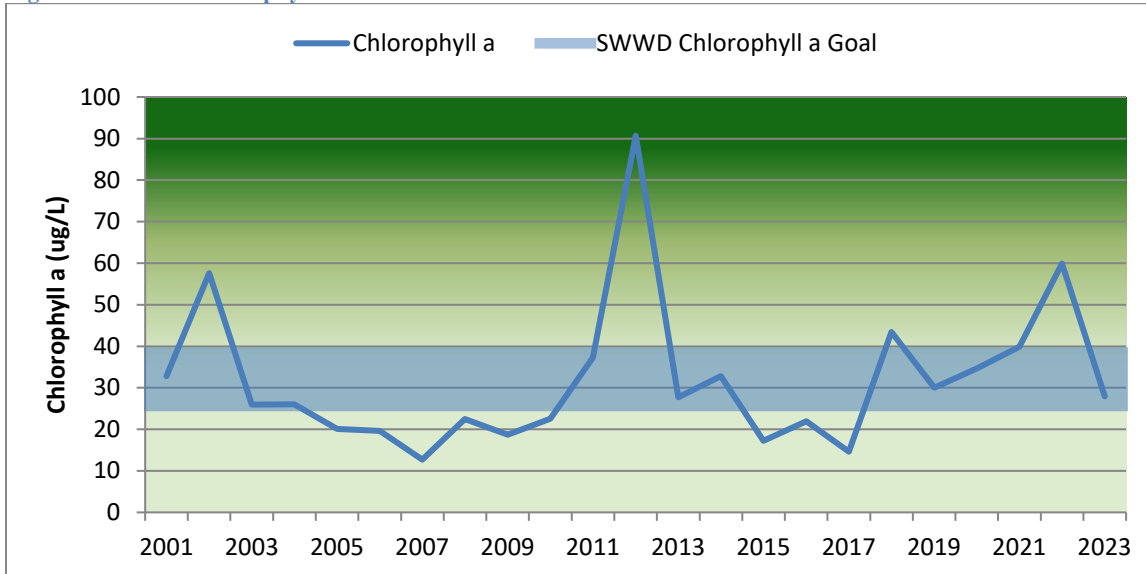


Figure 4: Secchi Transparency Depths at Ravine Lake

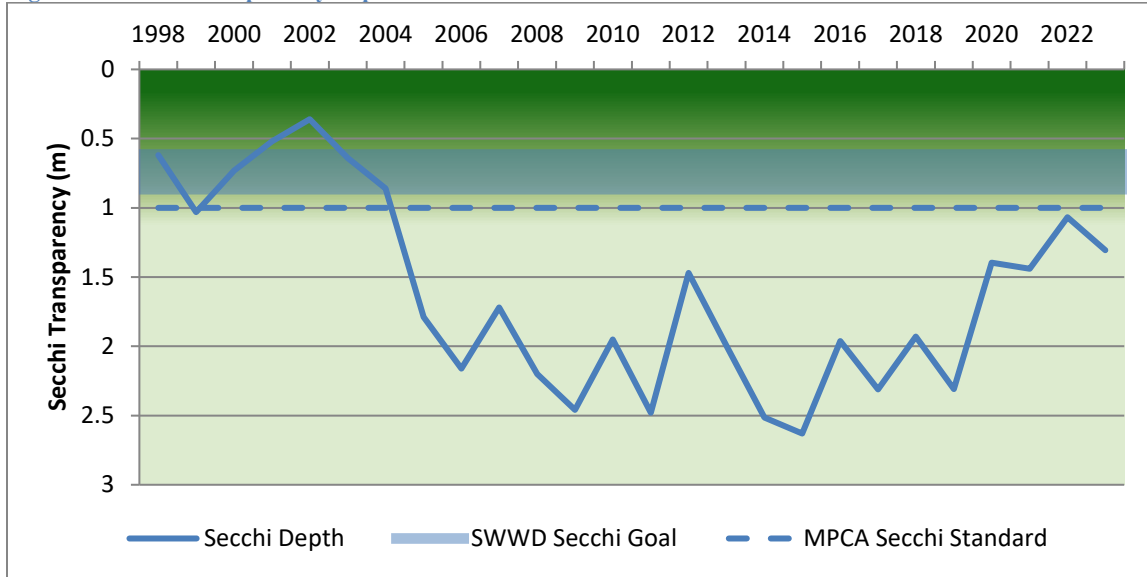


Figure 5: Chloride Concentrations at Ravine Lake

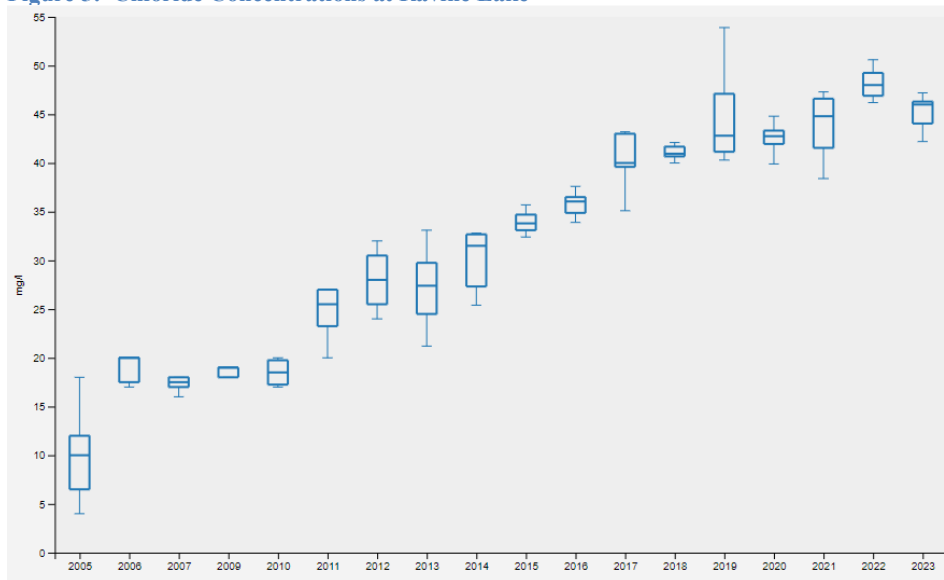


Table 1: Annual Lake Grades for Ravine Lake

|                     | Trophic Status | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---------------------|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Total Phosphorus    | 64; eutrophic  | D  | D  | D  | D  | C  | C  | D  | C  | D  | C  | C  | C  | D  | B  | C  | B  | C  | C  | C  | B  | C  | D  | D  | C  |
| Chlorophyll         | 63; eutrophic  | C  | C  | D  | C  | C  | C  | C  | B  | C  | B  | C  | C  | F  | C  | C  | B  | C  | B  | C  | C  | C  | C  | D  | C  |
| Secchi Transparency | 56; eutrophic  | F  | F  | F  | F  | D  | C  | C  | C  | C  | B  | C  | B  | C  | B  | B  | B  | C  | B  | C  | B  | C  | C  | D  | C  |
| Overall             | eutrophic      | D  | D  | D  | D  | C  | C  | C  | C  | C  | B  | C  | C  | D  | B  | C  | B  | C  | B  | C  | B  | C  | C  | D  | C  |

Note: 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.