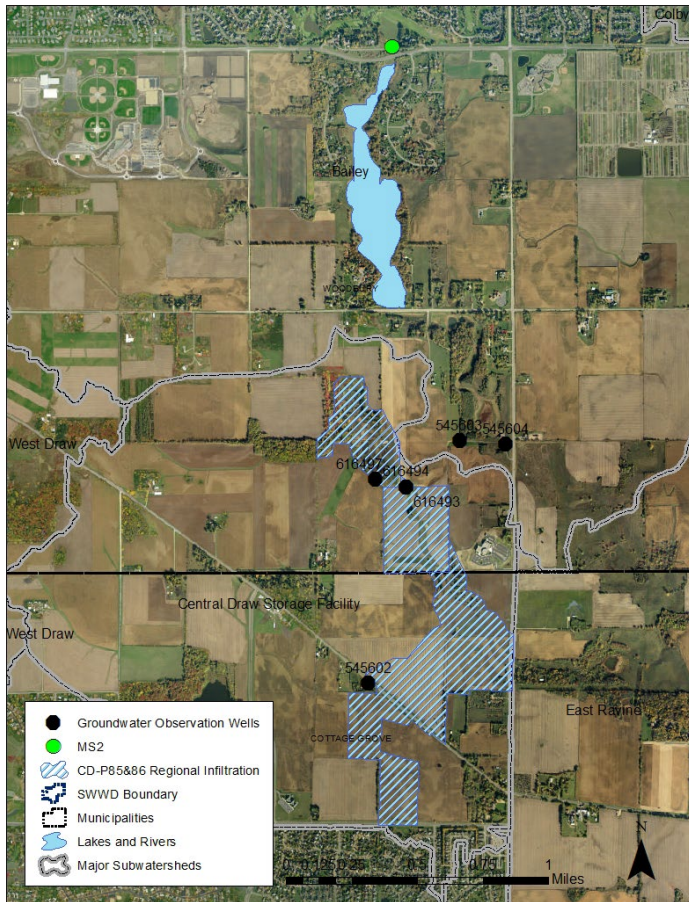




SOUTH WASHINGTON WATERSHED DISTRICT

Bailey Lake and CDSF

DNR ID #82-0456	Municipality: Woodbury
Surface Area: 61 Acres	Watershed Area: 18,431 Acres
Mean Depth:	Maximum Depth:
SWWD Maximum Allowable Phosphorus Load: maintain existing	
SWWD Trophic State Index (TSI) Goal: NA	



Map 1: Bailey Lake Area

Bailey Lake (Map 1) is at the bottom of SWWD’s Northern Watershed (NWS) and ultimately receives runoff draining through all of the other NWS lakes. Bailey Lake was historically characterized by extended dry periods and much of the basin itself was cultivated. However, Bailey Lake now permanently covers its full extent as a result of increased development throughout the NWS which is contributing more stormwater to Bailey than in the past. The lake elevation (Figure 1) is controlled by a weir outlet structure that controls flow to the City of Woodbury’s Bailey Lake lift station. The lift station pumps water in SWWD’s Central Draw Storage Facility (CDSF).

SWWD’s goal is to maintain the existing water quality of the lake. Reflecting that goal, SWWD’s TP loading standard for the Bailey Lake watershed requires developers to maintain existing TP loading rates.

Bailey Lake is monitored twice per month during the growing season through Met Council’s Citizen Assisted Monitoring Program. Monitoring results since 2017 are shown in Figures 2-4. The data record is limited, but Bailey does not meet state eutrophication standards.

Because of potential for surface water/groundwater interaction at Bailey Lake, groundwater levels and quality are monitored at wells next to Bailey Lake and within SWWD’s CDSF. Groundwater levels are monitored continuously by MnDNR at a set of four nested observation wells at CDSF. Results are shown in Figures 5-8. Based on the data, the quaternary, Jordan, and

Prairie du Chien aquifers appear to be connected. All three, along with the deeper Tunnel City aquifer were elevated for a number of years but have dropped through the repeated droughts in 2021 and 2022.

MnPCA monitors groundwater quality in the area as part of their ambient groundwater monitoring program. Samples are analyzed for several potential contaminants. Of primary significance due to high surface water/groundwater interaction are nutrients and chloride which are both sourced through Stormwater inflows to Bailey Lake. Figures 9-11 show concentrations of TP, Bromide, and Chloride in Bailey Lake and several area wells. Of greatest concern is high chlorides present at times in both the Lake and some wells. Based on presence of bromide, along with Cl:Br ratios greater than 1000, it is likely that observed chloride is sourced from road deicing material. That relationship is most clear from Bromide concentrations at well 545604 near the lift station from 2020-2023. Groundwater TP concentrations are highest at the two private wells adjacent to the lake.

SWWD will continue to monitor Bailey Lake and surrounding groundwater wells along with its partners to evaluate possible trends and impacts from surface water/groundwater interactions. All data is available through SWWD.

A vegetation survey of Bailey Lake was completed in 2021. 65-85% of the lake is generally vegetated to nuisance levels. Curly leaf pondweed, an invasive species, dominates early in the year. After curly leaf pondweed dies off mid-year, coontail takes over. SWWD will continue to periodically survey vegetation to see if and how it changes over time.

Figure 1: Bailey Lake Surface Elevation

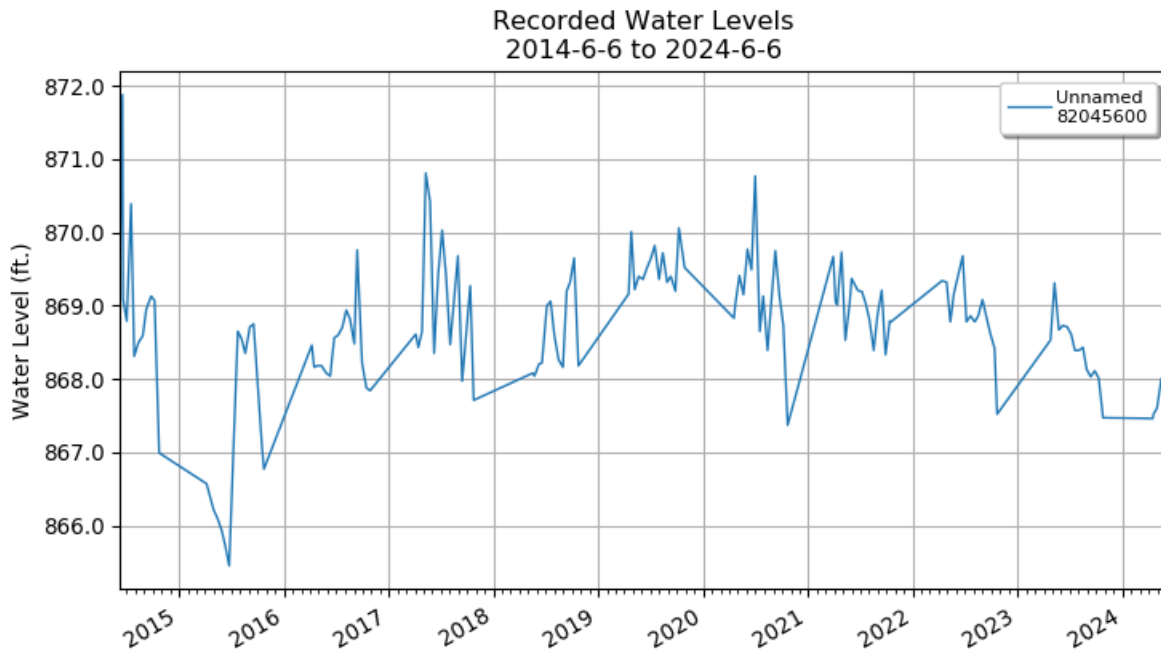


Figure 2: Bailey Lake TP

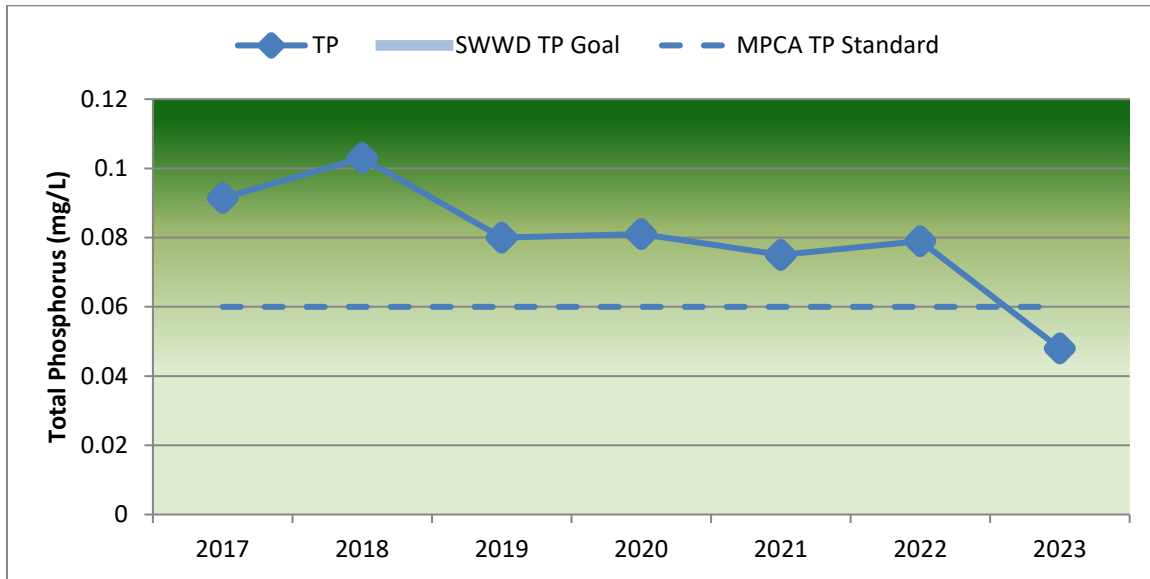


Figure 3: Bailey Lake Chlorophyll a

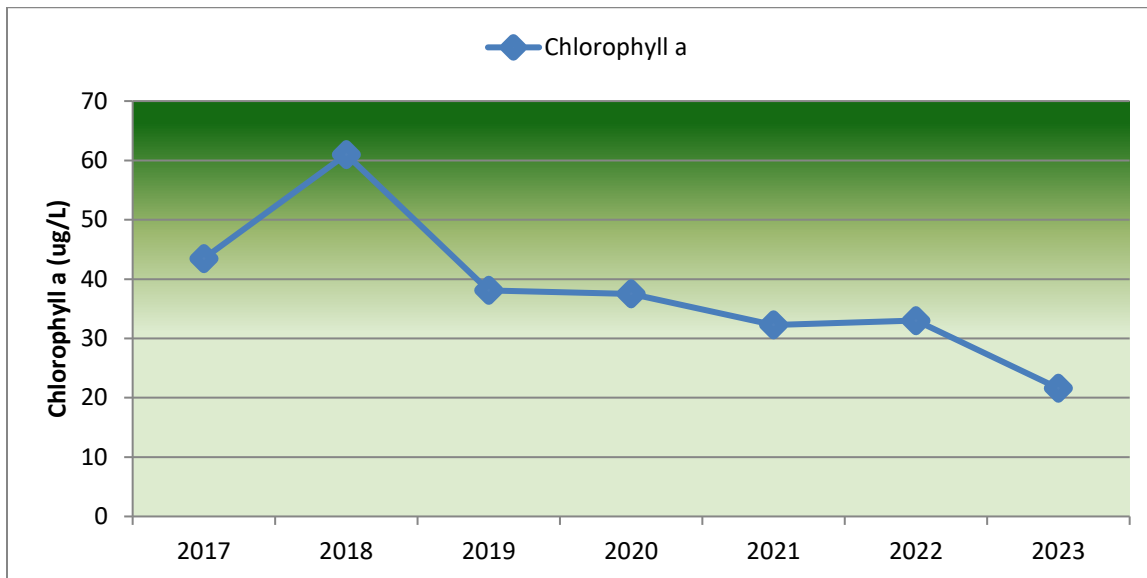


Figure 4: Bailey Lake Secchi Transparency

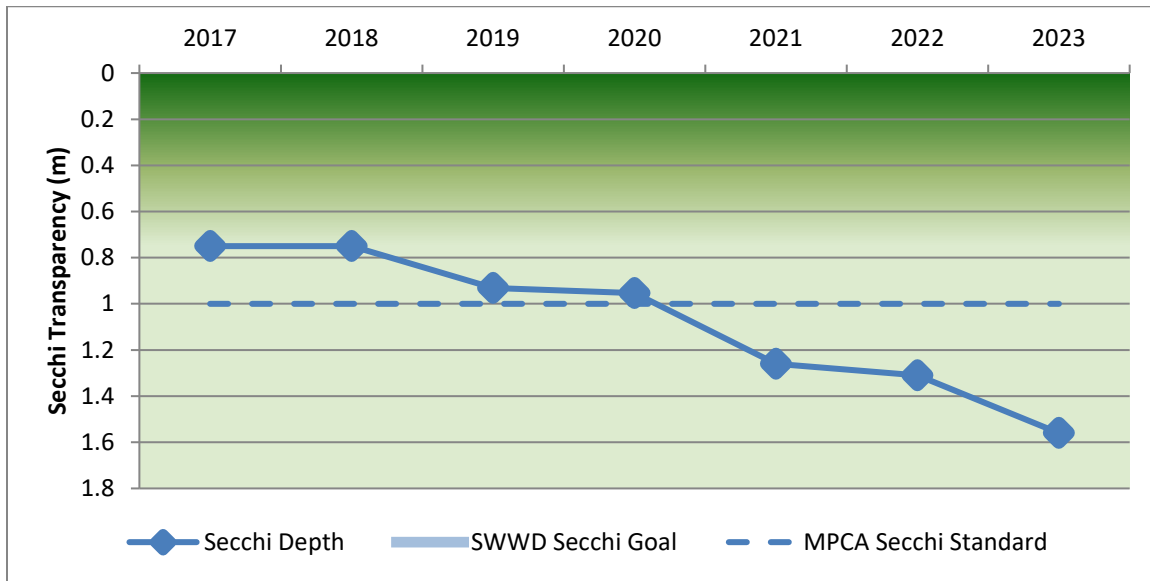


Figure 5: Quaternary Aquifer Elevation

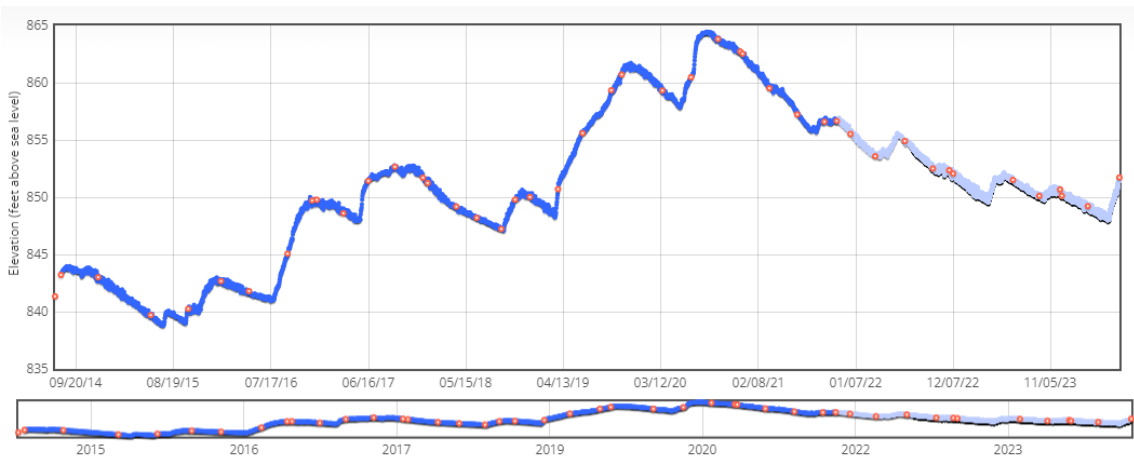


Figure 6: Prairie Du Chien Aquifer Elevation

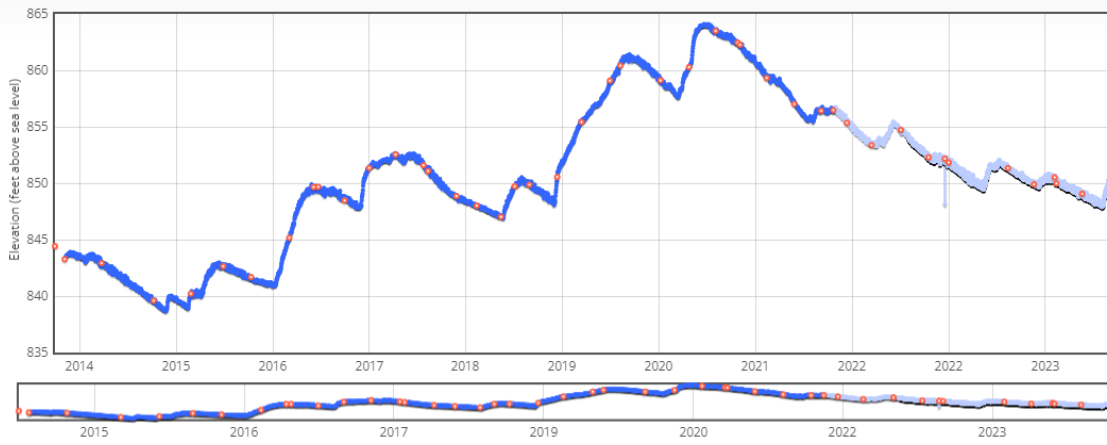


Figure 7: Jordan Aquifer Elevation



Figure 8: Tunnel City Aquifer Elevation



Figure 9: Lake and Groundwater Total Phosphorus Concentrations

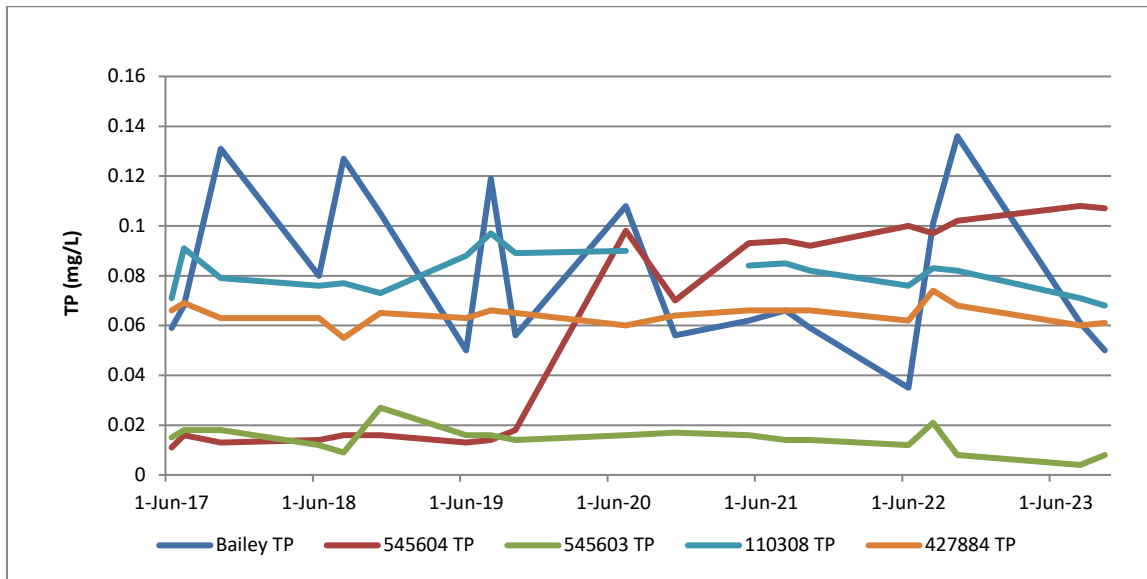


Figure 10: Groundwater Bromide Concentrations

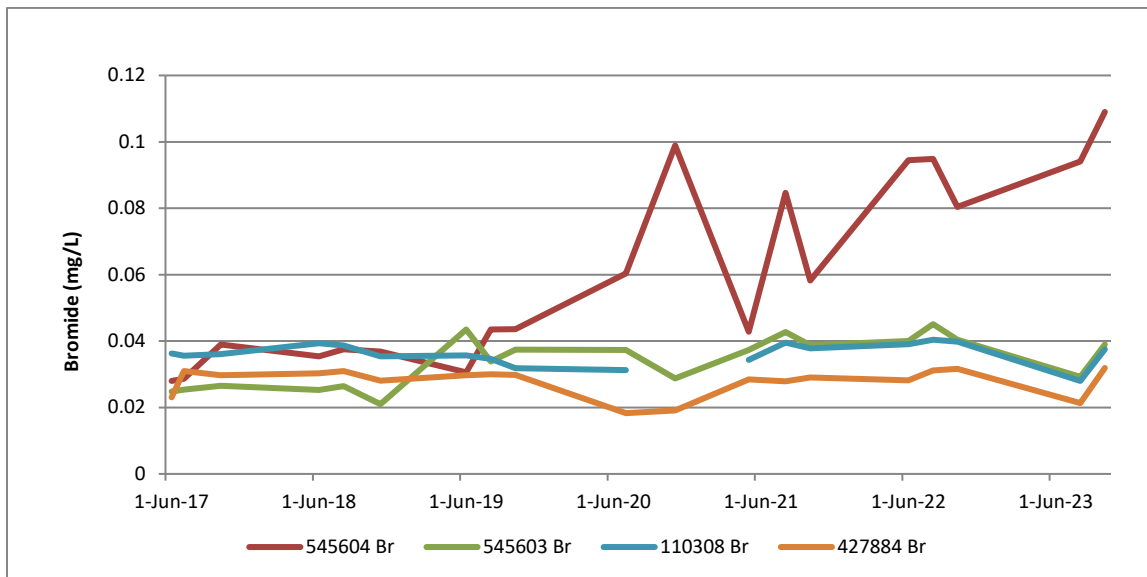


Figure 11: Lake and Groundwater Chloride Concentrations

