

Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5A – Carp Assessment and Post-Alum Treatment Monitoring Results for Schaper Pond and Sweeney Lake (CIP Projects SL-3 and SL-8)
BCWMC January 19, 2023 Meeting Agenda
Date: January 12, 2023

5A. Carp Assessment and Post-Alum Treatment Monitoring Results for Schaper Pond and Sweeney Lake (CIP Projects SL-3 and SL-8)

Recommendations:

1. Approve a budget of up to \$60,000 in 2024 from the Schaper Pond Diversion Project CIP funds for follow-up carp assessments and carp removal with box nets, if preliminary results of the carp surveys show high populations of carp. Recommendation approved by BCWMC 1-19-23

Background

Several investigations in 2017 and 2018 identified problems with stormwater treatment in Schaper Pond and found carp populations exceeding the 100 kg/ha threshold associated with impacts on water quality (Bajer et al., 2009). In 2019, the Commission was awarded grant funding for the Sweeney Lake Water Quality Improvement Project, which included a goal to reduce carp biomass in Sweeney Lake and Schaper Pond (shown in Figure 1) during the spring and summer of 2020. In addition, this project intended to track carp movement to 1) assess the likelihood that carp from Sweeney Lake could re-populate Schaper Pond, and 2) assess the need to prevent movement of juvenile and adult carp from Schaper Pond to Sweeney Lake. The Commission Engineer hired Carp Solutions, LLC as its subconsultant on this investigation (and all previous investigations) to analyze carp impacts in the Sweeney Lake-Schaper Pond system.

In 2020, Carp Solutions conducted box netting and electrofishing in Sweeney Lake and Schaper Pond. Overall, 452 carp were removed from Sweeney Lake and 152 carp were removed from Schaper Pond, which dropped the carp populations to levels that equated to respective biomass densities of 68 and 75 kg/ha—below the critical threshold of 100 kg/ha. While the carp removals were successful, it was also learned that Schaper Pond was likely a nursery area for carp. In February 2021, the Commission directed staff to evaluate various options for long term control of carp in Schaper Pond and Sweeney Lake. Staff developed and evaluated a matrix of several different options including constructing electric and non-electric barriers as well as stocking panfish in Schaper Pond to predate carp eggs and carp fry. After reviewing the benefits, limitations, and costs of various options, staff recommended an adaptive



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Figure 1

SCHAPER POND
Schaper Pond with Outlet
to Sweeney Lake
Bassett Creek Watershed
Management Commission

management approach to reassess the carp population and their movements by repeating the carp assessment performed in 2019. This action would help understand how quickly the carp population might rebound in these waterbodies to pre-removal levels and which permanent solution would be most cost effective. At their September 16, 2021, meeting, the Commission approved the adaptive management approach of gathering additional carp population data in 2022, contacting the Minnesota Department of Natural Resources (MnDNR) regarding permitting, and contacting a fish hatchery to provide panfish stocking in Schaper Pond. The Commission also suggested that, if carp numbers are found to be high in May and June, then action should switch to box netting and electrofishing to protect the investment in Sweeney Lake.

The Commission also used grant funding for the Sweeney Lake Water Quality Improvement Project to complete a two-phase alum treatment of Sweeney Lake. This treatment included the combined application of 61,760 gallons of alum and 29,880 gallons of sodium aluminate in the fall of 2020 and 2022, to control sediment phosphorus release and address the internal phosphorus load that contributed to the lake water quality impairment.

Carp Assessment Results for Schaper Pond and Sweeney Lake (CIP Project SL-3)

During the summer of 2022, Barr obtained a MnDNR permit and subcontracted with a fish hatchery to stock 800 adult panfish in the northwest corner of Schaper Pond.

In addition, Carp Solutions re-surveyed the carp populations in Schaper Pond and Sweeney Lake during the summer of 2022 and we compared biomass estimates with past surveys, as shown in the following table.

Carp Population Survey	Date	Estimated Carp Biomass (kg/ha)	
		Schaper Pond	Sweeney Lake
Baseline Assessment	October, 2018	420	1,030
Following Box Net Removal	Summer, 2020	75	68
Re-assessment	Summer, 2022	44	83

The results of the 2022 carp population survey confirmed that the 2020 box net removal resulted in lasting control of the adult carp, with estimated biomass densities well below the 100 kg/ha water quality impact threshold in both Schaper Pond and Sweeney Lake. The 2022 re-assessment also noted the presence of small/juvenile carp, which indicated that carp reproduction is occurring in the system. Carp

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migration data collected between 2018 and 2020 showed that about a quarter of the adult carp in Sweeney Lake migrated to Schaper Pond to spawn.

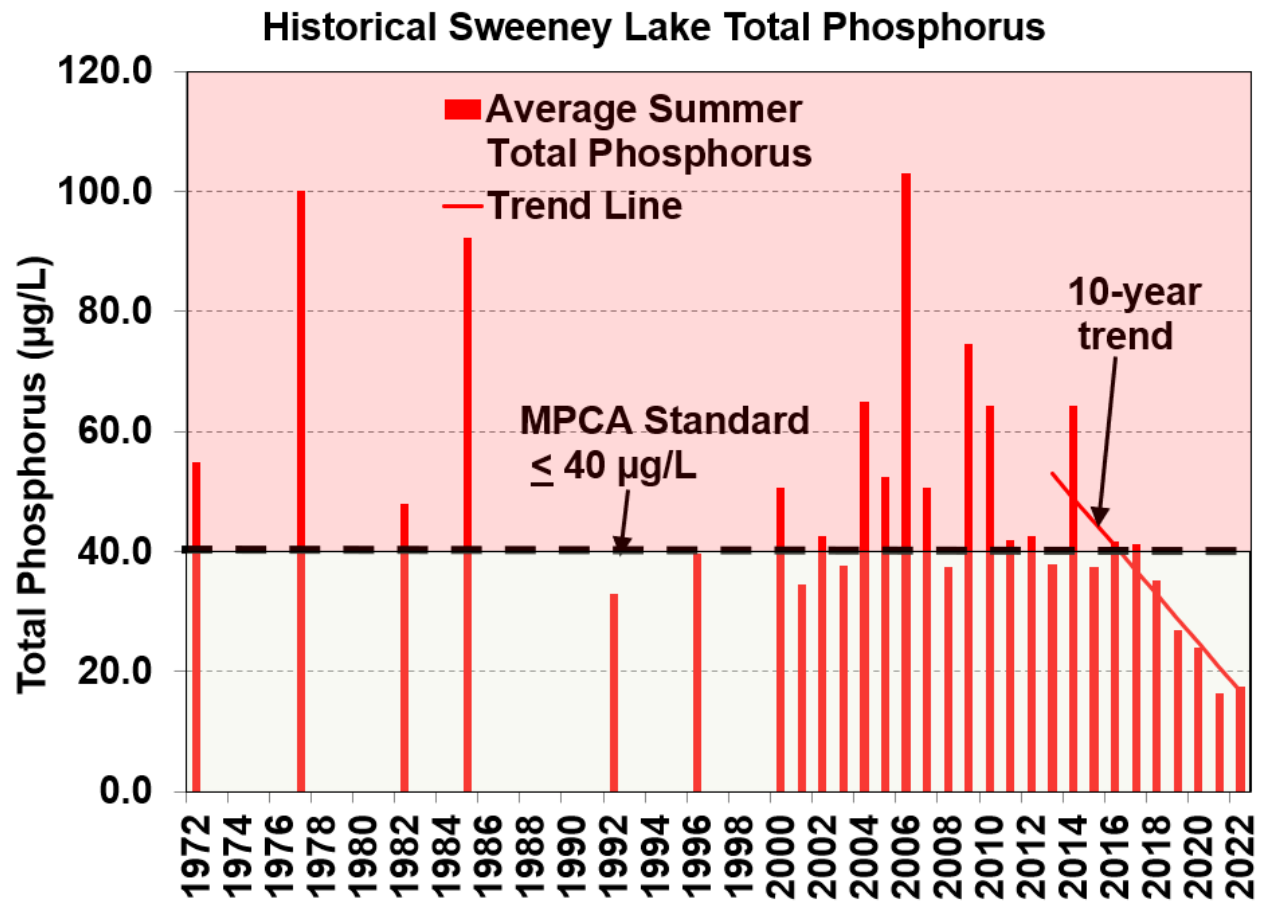
Because there is still a risk that carp reproduction may lead to higher biomass densities in the future, we recommend that the Commission resurvey carp populations again in both Schaper Pond and Sweeney Lake in 2024 and perform carp removal with box nets, if preliminary results of the carp surveys showing high populations of carp. If future (2024 or 2026) carp survey population assessments indicate more significant carp recruitment from Sweeney Lake to Schaper Pond, it may warrant implementation of a low-voltage electric barrier between the two water bodies.

We also asked Carp Solutions to consider whether the stocking of adult panfish (bluegills) was beneficial and/or successful at controlling carp reproduction in Schaper Pond. Following the panfish stocking, Carp Solutions did not observe bluegills during electrofishing and only captured two adult size bluegills out of the nine bluegills that were caught during a trap net survey. Because they did not catch very many bluegills in Schaper Pond, it indicates that the bluegills could have easily migrated out of the pond to Sweeney Lake where the habitat would be better for natural colonization. As a result, we do not believe panfish are effective at controlling carp populations in Schaper Pond and do not recommend that future stocking continue in the Pond.

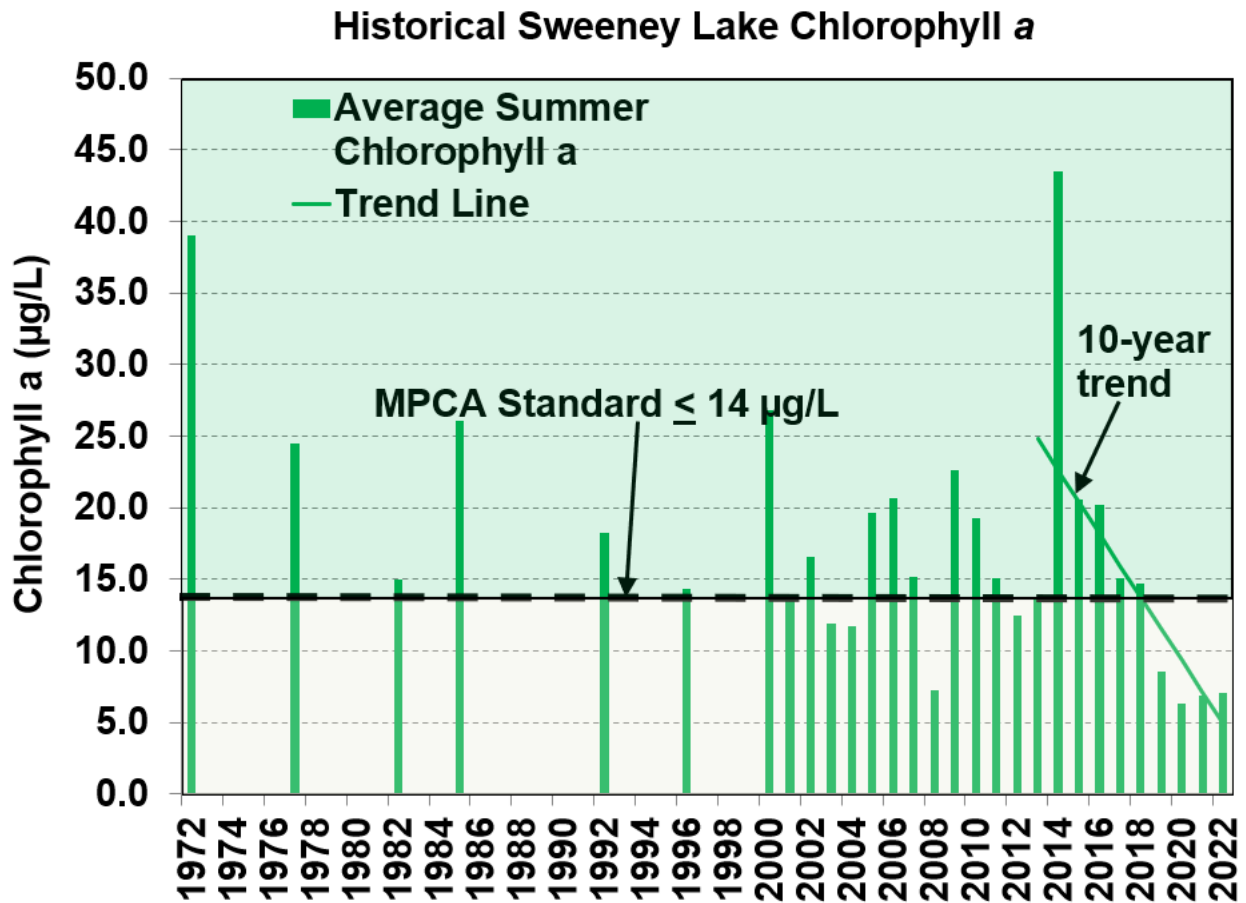
Post-Alum Treatment Monitoring Results for Sweeney Lake (CIP Project SL-8)

During 2022, the Commission Engineer continued post-alum treatment monitoring of Sweeney Lake to compare water quality with the State standards and to gauge the success of the Sweeney Lake Water Quality Improvement Project.

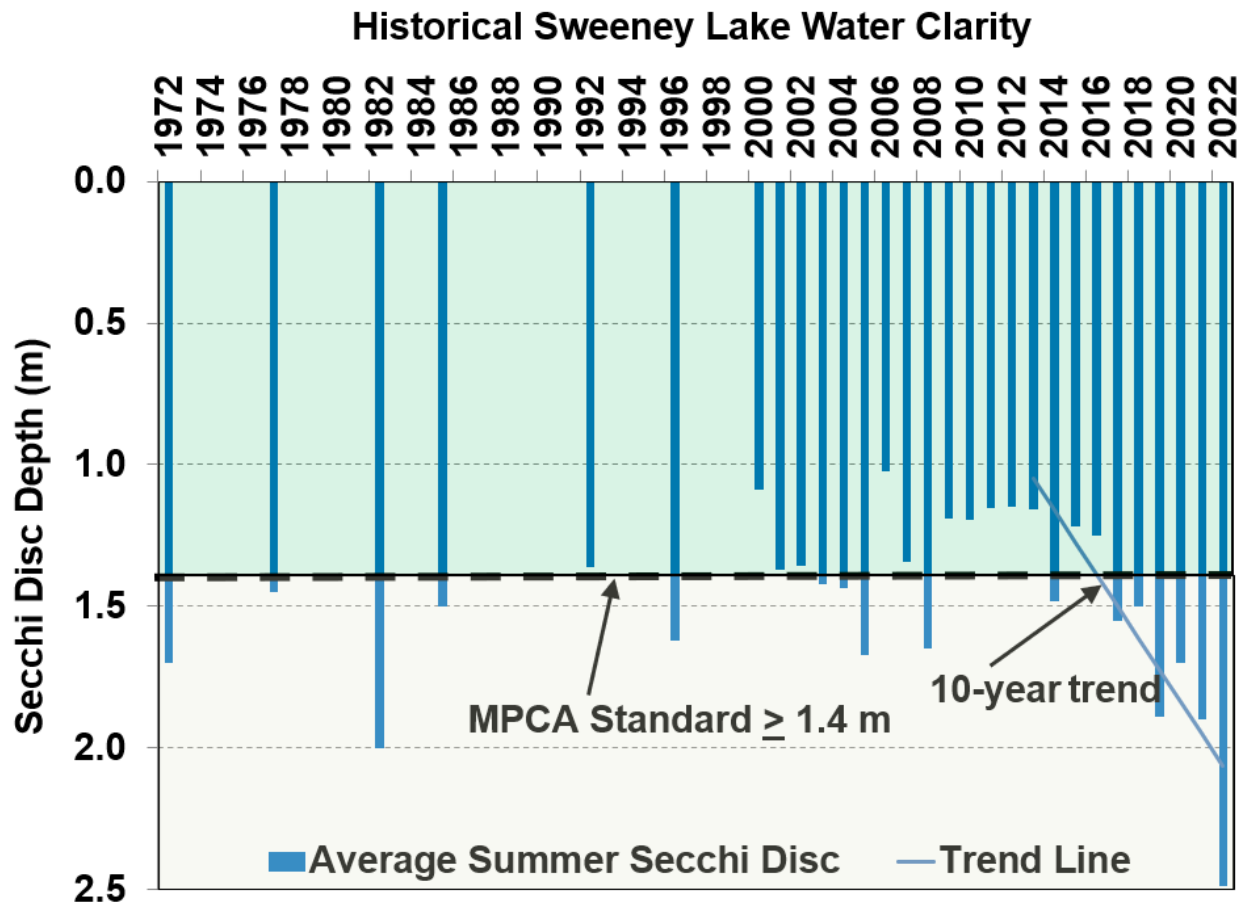
The following figure shows how the historical Sweeney Lake average summer total phosphorus concentrations compare to the 40 µg/L State standard for deep lakes. The current data and 10-year trend show that the most recent summer average phosphorus concentrations are consistently meeting the MPCA standard, with a significantly improving trend in the past 10 years. The average total phosphorus concentration in Sweeney Lake has dropped from 58 µg/L (thru 2006) to an average of 34 µg/L during the past ten years.



The following figure shows how the historical Sweeney Lake average summer chlorophyll-a concentrations compared to the 14 µg/L State standard for deep lakes. The current data show that the most recent summer average chlorophyll-a concentrations are consistently meeting the MPCA standard, with a significantly improving trend in the past 10 years. The average chlorophyll-a concentration in Sweeney Lake has dropped from 20 µg/L (thru 2006) to an average of 15.7 µg/L during the past ten years.



The following figure shows how the historical Sweeney Lake average summer Secchi disc transparency (a measure of water clarity) compares to the 1.4-meter State standard for deep lakes. The current data and 10-year trend show that the most recent summer average Secchi disc transparencies are consistently meeting the MPCA standard, with a significantly improving trend in the past 10 years. The average Secchi disc transparency in Sweeney Lake has improved from 1.46 meters (thru 2006) to an average of 1.61 meters during the past ten years.



Because the most recent 10 years of total phosphorus concentrations and the Secchi disc transparency data in Sweeney Lake both meet the State standard, the lake will be delisted by MPCA during in 2024.

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Recommendation for 2024 Carp Reassessment and Box Netting (Contingent)

We recommend that the Commission budget \$60,000 (\$10,000 for carp population reassessment and \$50,000 for box netting) from the remaining Schaper Pond Diversion Project CIP funds in 2024 for follow-up carp assessment in Schaper Pond and Sweeney Lake. If preliminary results of the carp surveys show high populations of carp (i.e., above the critical threshold of 100 kg/ha) in May and June, the Commission Engineer will contract and coordinate with Carp Solutions to perform carp removal with box nets as described below:

Carp Solutions will conduct carp removal with baited box nets, which assumes installation of at least three nets in near-shore areas throughout Sweeney Lake and two nets installed in Schaper Pond. The nets will be installed in July. Following box net installation, the nets will be baited for approximately seven days. The carp will be captured, euthanized, and removed. Captured fish will be examined for fin clips to estimate percent of population removed. The carp removal process will occur twice, with a break of several weeks between each round. Baiting will cease during the break and carp removal activities will be conducted in July and September.