Memorandum

To: Bassett Creek Watershed Management Commission (BCWMC)
From: Barr Engineering Co. (Greg Wilson, P.E., Karen Chandler, P.E.)
Subject: Item 6B–Schaper Pond Effectiveness Monitoring—2025 Results and Recommendations (CIP Project SL-3)
BCWMC February 19, 2026 Meeting Agenda
Date: February 12, 2026

5X. Schaper Pond Effectiveness Monitoring—2025 Results and Recommendations (CIP Project SL-3)

Recommendations:

1. Consider directing the Commission Engineer to work with Carp Solutions to complete another round of biomass surveys on Schaper Pond and Sweeney Lake in 2026 to confirm that the carp density remains below the management threshold. The estimated cost of the biomass survey and reporting is $12,000, which the Commission previously approved for funding at their January 2025 meeting.
2. Authorize the Commission Engineer to work with Carp Solutions to evaluate future carp management options. The estimated additional cost of developing cost-benefit analyses for the future carp management options and adding it to the carp biomass survey memo is $10,000.

1 Introduction

Schaper Pond is classified by the Minnesota Department of Natural Resources as a public water wetland; it is located south of Sweeney Lake and north of Highway 55 in the City of Golden Valley. Approximately 85-90% of the water flowing into Schaper Pond enters from the south (under Highway 55) from the Sweeney Branch of Bassett Creek. The other 10-15% of pond inflows are from a storm water inlet (called the Railroad Inlet) in the northwest lobe of the pond. The pond outlets directly to Sweeney Lake from its northeast lobe (see Figure 1).

After completion of the 2011 Sweeney Lake Total Maximum Daily Load Study (TMDL) showed significant pollution flowing from Schaper Pond into Sweeney Lake, the Commission completed the Schaper Pond Diversion CIP Project in 2015. The project included installation of a floating water baffle designed to direct flow to the northwest lobe of the pond, thus reducing the amount of sediment and nutrients reaching Sweeney Lake. Monitoring in 2017 showed continued high pollutant loads reaching Sweeney Lake resulting in additional monitoring, analysis, carp surveys, and carp removals.

At their January 2025 meeting, the Commission approved a budget of up to $42,000 from the remaining Schaper Pond Diversion Project CIP funds for the 2025 Schaper Pond effectiveness monitoring. The recommended monitoring was consistent with the monitoring completed by the Commission Engineer in 2011 and 2017 to allow for detailed computations and a comparison of pollutant load reductions between the years. Additional project background information and past monitoring results are provided in Attachment A.

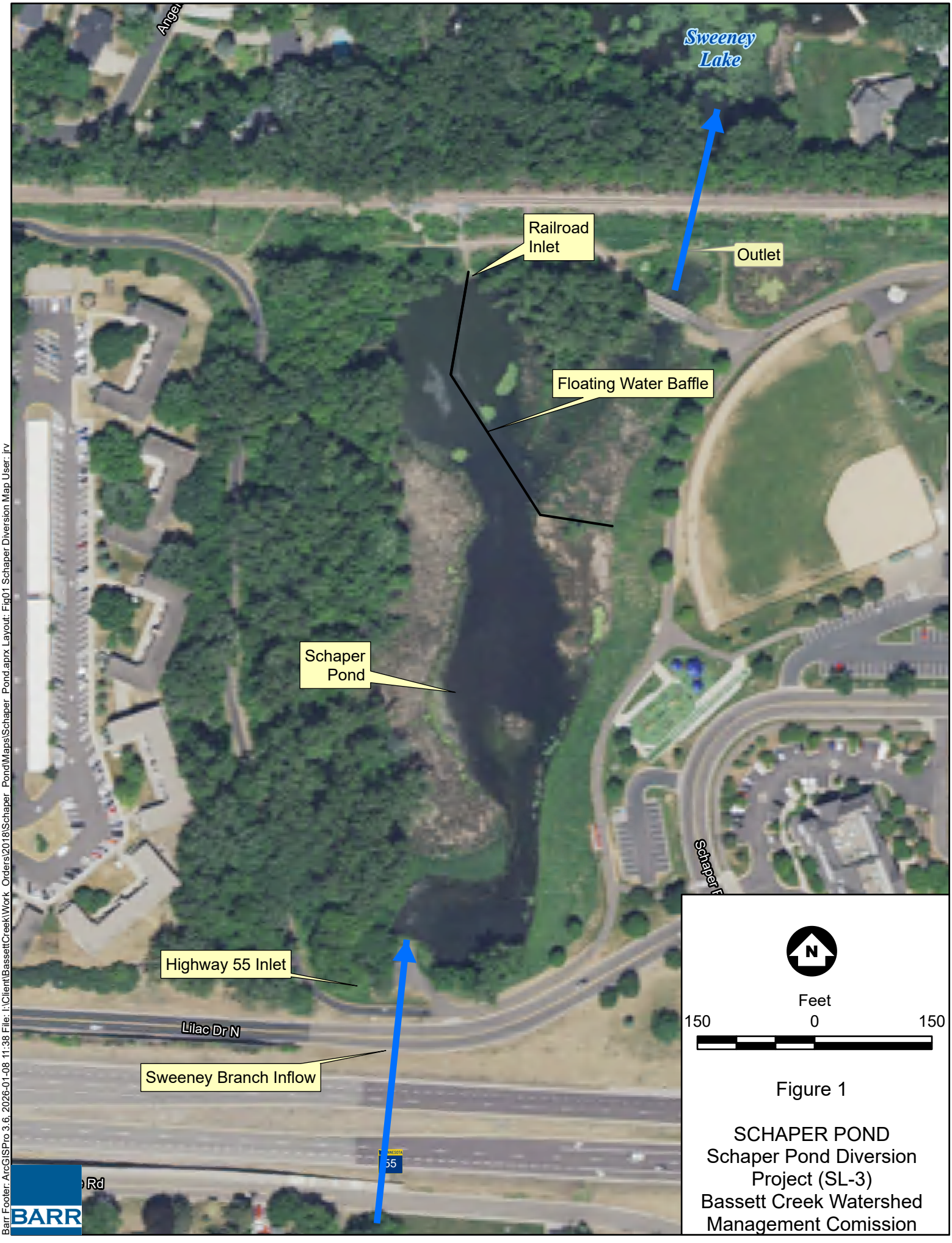

Figure 1

SCHAPER POND
Schaper Pond Diversion Project (SL-3)
Bassett Creek Watershed Management Comission

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With the carp population below the water quality threshold of 100 kg/ha since the fall of 2024, and assuming no construction or other impacts from the watershed, monitoring results from 2025 were intended to show the effectiveness of the floating water baffle diversion in Schaper Pond at reducing total phosphorus (TP) and total suspended solids (TSS) concentrations.

2 Pond Treatment Effectiveness Comparisons During Project Implementation

Water quality samples were collected from the Schaper Pond outlet and inlet sites and analyzed for TP, total dissolved phosphorus (TDP), TSS, and volatile suspended solids (VSS) and the monitoring results were used to evaluate the effectiveness of Schaper Pond diversion structure. Table 1 shows a summary and comparison of results from the 2011, 2017, and 2025 effectiveness monitoring at Schaper Pond. Because the water quality samples were collected over a range of flows for events of varying magnitudes, the sample results were flow-weighted for comparison between the monitoring periods (summing the product of average flow and parameter concentration for each sample and dividing by the total flow sampled).

Table 1 Comparison of 2011, 2017 and 2025 Water Quality Effectiveness Monitoring

Flow-Weighted Event Mean Concentrations					
	Parameter (mg/L)				Average Flow (cfs)
2025 Monitoring Location	TSS	VSS	TP	TDP	
Highway 55 Inlet	45	11	0.138	0.028	20.3
Railroad Inlet	7	2	0.126	0.098	4.04
Pond Outlet	7	3	0.081	0.029	24.4
2017 Report					
Highway 55 Inlet	22	6	0.090	0.018	20.8
Railroad Inlet	26	6	0.125	0.018	1.95
Pond Outlet	36	8	0.105	0.016	19.4
2011 Report					
Highway 55 Inlet	52	10	0.142	0.028	22.5
Railroad Inlet	14	5	0.118	0.055	2.5
Pond Outlet	26	7	0.098	0.034	25

When comparing the water quality entering and leaving the pond during the three time periods, we offer the following observations:

- In 2017 (after installation of the floating water baffle), Schaper Pond was not removing TSS or TP as well as it did in 2011 prior to installation of the baffle, such that the flow-weighted pollutant concentrations were higher at the pond outlet than the combined inflow during most of the monitored events.
- 2025 monitoring data for TP and TSS shows that Schaper Pond is removing both pollutants significantly better than prior years. The monitored flow rates from 2025 were consistent with both prior years of monitoring.

- The 2025 TP and TSS concentrations entering the pond under Hwy 55 and from the railroad inlet were consistent with the observations from 2011, but slightly higher than the 2017 concentrations for the Hwy 55 inlet and lower than the respective concentrations for the railroad inlet.
- TSS concentrations leaving the pond (and entering Sweeney Lake) were 30% higher in 2017 than in 2011, but the 2025 TSS and VSS concentrations were significantly (70-80%) lower than both prior years of monitoring.
- TP concentrations leaving the pond (and entering Sweeney Lake) in 2025 were 40% lower than the flow-weighted inflow to the pond and 20% lower than the outflow observations than both prior years of monitoring.
- TDP concentrations leaving the pond in 2025 were higher than the 2017 observations but consistent with 2011. Observations are consistent with the expectation that the pond was not designed to remove dissolved phosphorus.

2.1 Influence of Carp

As noted (and shown in Table 1), the flow-weighted concentrations of TSS, VSS, and TP were higher at the pond outlet than the combined inflows to Schaper Pond in 2017. To better understand this, sample results for each of the 12 sampling events from 2017 were evaluated to consider whether flow or residence time (the amount of time it takes water to travel through the pond) could explain why Schaper Pond was not removing suspended solids or TP as well as expected or at the same efficiency as it did in 2011. The following observations indicated that the presence of carp compromised the treatment efficiency of the pond (this was confirmed in 2018, following surveys of pond bathymetry and carp):

- There was only one monitoring event in 2017 that resulted in some removal of TSS and TP.
- All other sampling events resulted in a net export of phosphorus and TSS from the pond, with greater levels of export coinciding with lower flow.
- The net export of TSS from the pond is significantly higher than TP export for the corresponding events (i.e., the ratio is higher), which appears to rule out sediment phosphorus release as a source of phosphorus because the dissolved phosphorus levels observed at the Schaper Pond outlet were quite low.

The Commission worked with Carp Solutions to implement carp removal efforts with baited box netting both in the summer of 2020 and the fall of 2024. As a result of these carp control efforts in the Schaper Pond-Sweeney Lake system, the 2025 TSS and TP effectiveness monitoring data show that Schaper Pond is now removing both pollutants significantly better than during prior years of effectiveness monitoring and the floating water baffle is functioning as designed. The 40% TP removal estimate (cited above) corresponds to a 109-pound load reduction during the June through September period, which is greater than the 99 pounds of phosphorus removal required by the Sweeney Lake TMDL.

3 Recommendations

Based on Carp Solutions' current assessment, they identified Schaper Pond as the "carp engine" for the whole Sweeney Branch system because young carp are hatched and recruited from that location. In addition, since there are no barriers for movement of adult carp, the carp population can bounce back up in Schaper Pond within a season. It is important to maintain a low carp population in Schaper Pond every year. As a result, the Commission Engineer worked with Carp Solutions to consider future activities and recommendations for monitoring and controlling carp in both Schaper Pond and Sweeney Lake. Carp Solutions recommends a carp population (biomass) survey of Schaper Pond every year and of Sweeney

Lake every three years, along with consideration of a carp barrier between Sweeney Lake and Schaper Pond.

The Commission Engineer recommends that Carp Solutions complete another round of biomass surveys on Schaper Pond and Sweeney Lake in 2026 to confirm that the carp density remains below the management threshold. The estimated cost of the biomass survey and reporting is $12,000, which the Commission approved for funding at their January 2025 meeting.

Following completion of the biomass survey, the Commission Engineer will prepare a memo reporting results of the 2026 carp survey and providing recommendations for any additional future carp management. We envision future carp management options to include baited box netting with ongoing surveys, an electric barrier, or physical barrier with less frequent surveys. The estimated additional cost of developing cost-benefit analyses for the future carp management options and adding it to the survey report memo is $10,000.

4 Status of Overall Schaper Pond (SL-3) CIP Budget:

The table below summarizes the status of the overall Schaper Pond (SL-3) CIP budget, considering work-to-date and future work.

Status of overall Schaper Pond (SL-3) CIP Budget	
Original Schaper Pond (SL-3) CIP budget	$612,000.00
Remaining CIP budget (as of 1/30/2026)	$29,179.70
Costs for Schaper Pond Effectiveness Monitoring Project: • Remaining monitoring project expenses • Recommended 2026 carp survey work • Recommended future carp management analysis Total future costs:	 $ 2,148.19 $12,000.00 $10,000.00 $24,148.19
Total estimated remaining future CIP budget	$ 5,031.51

Attachment A

Project Background

1 Project Background

1.1 Sweeney Lake TMDL and 2011 Schaper Pond Effectiveness Monitoring

In 2011, the Commission completed the Sweeney Lake Total Phosphorous Total Maximum Daily Load Study (TMDL). The study's implementation plan identified modifying the water flow through Schaper Pond as one of the options toward achieving the goal of reducing phosphorous loads into Sweeney Lake. The BCWMC completed a feasibility report for the Schaper Pond Improvement Project in February 2012. The BCWMC added the Schaper Pond Diversion Project to their Capital Improvement Program in 2013 and officially ordered the project in September 2013.

In 2011, Schaper Pond was monitored as part of the Sweeney Lake TMDL Study. Samples were analyzed for TP, TDP, TSS, and VSS for six events, and two events were also analyzed for particle size distribution. The monitoring results were used to evaluate treatment enhancements for the Schaper Pond Improvement Project feasibility study. Results showed that approximately 90% of the phosphorus load into Schaper Pond was entering from the Highway 55 inlet and that the primary flow path through the pond resulted in the short-circuiting of approximately 65% of the pond's volume, which could have otherwise been used to settle phosphorus entering from this inlet. As a result, diversion structure installation to extend the flow path through the pond into the northwest lobe was identified to allow more time for phosphorus to settle and improve the overall phosphorus removal performance in Schaper Pond.

1.2 Implementation of Floating Water Baffle

The City of Golden Valley constructed the Schaper Pond Diversion Project in 2015. The project was constructed to divert water flowing into the pond from the south, via a floating water baffle, toward the northwest portion of the pond. Based on 2011 monitoring data and modeling, it was believed that the diversion would allow the water to remain in the pond for a longer period of time, allowing a greater amount of sediment, phosphorous, and other suspended solids to settle out before the water exited into Sweeney Lake. The project included the installation of an approximately 380-foot-long floating water baffle extending out from the east side of the pond and the construction of two maintenance access areas. The project was expected to reduce the amount of phosphorus reaching Sweeney Lake by an estimated 81 - 156 pounds per year.

Additional repairs and maintenance to the floating baffle, as well as vegetation management on the east side of the pond, was performed by the city in 2016. Also in 2016, the Commission approved the use of a portion of the remaining CIP funds to study the effectiveness of the project in 2017 by replicating the monitoring that occurred in 2011.

1.3 2017-2018 Effectiveness Monitoring and 2020-2024 Carp Management

The 2017 effectiveness monitoring was initiated after confirmation that the floating barrier was secured and working properly. The 2017 and 2011 sampling locations, equipment and methods were identical. Similar to 2011, two sets of samples (representing both high and low flow events) from the Highway 55 inlet and Schaper Pond outlet were analyzed for particle size distribution to aid in determining the likelihood that the solids (and phosphorus attached to solids) in the inflow could be settled in the pond. Results of the monitoring in 2017, along with follow-up monitoring and assessment in 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), as shown in the following table.

Carp Population Survey	Date	Estimated Carp Biomass (kg/ha)[1]	
		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
Re-assessment	Summer 2024	57	178
Following Box Net Removal	Fall 2024	57	31

[1] The water quality management threshold for carp biomass is 100 kg/ha.

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 during the spring and summer of 2020. As part of the project, carp movement in the system was tracked 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 as its subconsultant on this investigation (and all previous and subsequent investigations) to analyze carp impacts in the Sweeney Lake-Schaper Pond system.

A 2022 carp survey and reassessment of biomass confirmed that carp populations in Schaper Pond and Sweeney Lake were still below the 100 kg/ha threshold for water quality impacts (see above table). At their meeting in January 2023, the Commission approved the Commission Engineer's recommendations and associated funding to resurvey and reassess the carp populations in the system in 2024 and perform box netting for carp removals. The Commission also directed the Commission Engineer to provide recommendations for future Schaper Pond effectiveness monitoring, to evaluate the performance of the diversion project, and integrate that monitoring with the planned 2024 carp survey and removal. At their March 2023 meeting, the Commission directed the Commission Engineer to complete (screening level) Schaper Pond monitoring that occurred during the late summer/early fall of 2023.

Carp Solutions completed carp population surveys of Sweeney Lake on June 24th and July 10th, 2024 and of Schaper Pond on June 26th, 2024, and estimated that carp biomass in Sweeney Lake exceed the 100 kg/ha threshold for water quality impacts (see "Summer, 2024" row in the above table); this was a significant increase over the prior two assessment periods. The carp biomass estimate for Schaper Pond was approximately the same as two prior assessment periods (see table) and well below the 100 kg/ha threshold for water quality impacts.

Due to the high carp biomass in Sweeney Lake, Carp Solutions completed another round of baited box nets for carp removal in the lake in 2024 and the previously scheduled Schaper Pond effectiveness monitoring was delayed for the season. During fall 2024, Carp Solutions caught and removed 191 carp from Sweeney Lake, weighing a total of 1473 pounds (an estimated 42.5% of the carp biomass in the lake). After carp removal, the estimated carp biomass density in the lake was reduced to 31 kg/ha (see above table).