

# Memo

**To:** Zahra Parhizgari; City of Markham  
**From:** Brian Graham  
**Cc:** Angela Wallace, Danny Moro; Toronto and Region Conservation Authority  
**Date:** November 19, 2025  
**Re:** Swan Lake Fish Inventory and Removal

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## Introduction

Toronto and Region Conservation Authority (TRCA) was contracted by the City of Markham to complete a fish inventory and removal at Swan Lake. This memo outlines the completion of these deliverables as well as recommendations for future monitoring and management related to the Swan Lake fishery.

## Background

Swan Lake in Markham, Ontario, is hyper-eutrophic meaning it is extremely rich in nutrients. On June 23, 2020, City of Markham Council approved the *Swan Lake Water Quality Improvement Program*. The program includes: the continuation of an annual water quality monitoring program, continuation of goose control, a chemical treatment program, and a fish management program. In 2021, the City asked TRCA to facilitate the fish inventory and relocation portion of the program through a fee-for-service contract. In 2021, three fish species were captured across five different sampling events. The three species were: Brown Bullhead (*Ameiurus nebulosus*), Common Carp (*Cyprinus carpio*) and Fathead Minnow (*Pimephales promelas*; see August 5, 2021 memo to City of Markham for more details). To reduce disturbance to the chemical treatment, 7 Common Carp were euthanized and 210 Brown Bullhead (a native bottom-dwelling fish) were relocated to Milne Pond in 2021. From 2022 to 2025, a less intensive sampling program was conducted and 1143 fish were euthanized to remove them from the lake.

## Permitting

For 2025, TRCA completed the work under License to Collect Fish for Scientific Purposes AMOS-2024-FWCA-00197. Similar to past years, Ontario Ministry of Natural Resources and Forestry (OMNRF) requested that both Common Carp and Brown Bullhead be euthanized rather than relocated. The follow up information for the License to Collect Fish for Scientific Purposes will be submitted to OMNRF in late 2025 or early 2026 as part of TRCA's larger fish monitoring program reporting.

## Fish Sampling Methods & Results

Fish were captured using an electrofishing boat on April 25, 2025. A fyke net was also used to capture fish. The same electrofishing sampling transects from previous years were repeated in 2025. All fish captured were identified and enumerated.

Three fish species were captured in 2025 (Table 1):

- Brown Bullhead – native, bottom dwelling
- Fathead Minnow – native minnow
- Goldfish – non-native

No new species were identified in Swan Lake. Common Carp were noticeably absent from the 2025 sample.

**Table 1. Results from fish sampling conducted in Swan Lake by TRCA in spring 2025**

| Date           | Average Water Temp (°C) | Sampling Method                      | Fish Species              | # Fish |
|----------------|-------------------------|--------------------------------------|---------------------------|--------|
| April 25, 2025 | 12.32                   | Boat<br>electrofishing /<br>Fyke Net | Brown Bullhead            | 391    |
|                |                         |                                      | Fathead Minnow            | 3586   |
|                |                         |                                      | Goldfish                  | 354    |
|                |                         |                                      | Common Carp x<br>Goldfish | 1      |

All fish species are considered tolerant to environmental perturbation. A total of 371 Brown Bullhead, Goldfish and hybrids were euthanized in 2025.

**Table 2. Summary of 2021 to 2024 fish sampling data for Swan Lake**

| Date       | Sample Effort | Fish Species   | # Fish |
|------------|---------------|----------------|--------|
| April 2021 |               | Brown Bullhead | 210    |

|             |                                             |                               |         |
|-------------|---------------------------------------------|-------------------------------|---------|
|             | 3 days boat electrofishing + 2 days of nets | Common Carp                   | 7       |
|             |                                             | Fathead Minnow                | >10,000 |
| August 2022 | 1 day boat electrofishing + 1 day of nets   | Brown Bullhead                | 80      |
|             |                                             | Common Carp                   | 20      |
|             |                                             | Fathead Minnow                | 875     |
| August 2023 | 1 day boat electrofishing                   | Brown Bullhead                | 84      |
|             |                                             | Common Carp                   | 103     |
|             |                                             | Fathead Minnow                | 14      |
|             |                                             | Goldfish                      | 2       |
| April 2024  | 1 day boat electrofishing + 1 day of nets   | Brown Bullhead                | 193     |
|             |                                             | Common Carp                   | 1       |
|             |                                             | Fathead Minnow                | 1521    |
|             |                                             | Goldfish                      | 13      |
|             |                                             | Common Carp x Goldfish        | 59      |
|             |                                             | Emerald Shiner                | 1       |
| April 2025  | 1 day boat electrofishing + 1 day of nets   | Brown Bullhead                | 391     |
|             |                                             | Fathead Minnow                | 3586    |
|             |                                             | Goldfish                      | 354     |
|             |                                             | Goldfish x Common Carp hybrid | 1       |

Sampling in 2021, 2022, 2024 and 2025 had more sampling effort compared to 2023 (i.e. no nets) which likely explains why there were less Fathead Minnow caught in that year. Goldfish first appeared in the 2023 sampling and their numbers have increased in the following years. They have also begun to hybridize with the Common Carp population. The timing of the sampling (April versus August) may have also influenced the catch due to differences in water temperature and fish activity.

### Summary and Recommendations

Fish sampling was completed in Swan Lake by TRCA from 2021 to 2025. Only six fish species were caught: Common Carp, Brown Bullhead, Fathead Minnow, Emerald Shiner, Goldfish, and Goldfish x Common Carp hybrids. A total of 582 Brown Bullhead, 131 Common Carp, 369 Goldfish and 60 hybrids have been removed from Swan Lake between 2021 and 2025. Although Brown Bullhead, Common Carp, Goldfish and the hybrids have been removed from the lake, they likely have not been eliminated completely from the system. This leaves the Fathead Minnow as the main native fish species remaining. All of the captured fish species are considered tolerant of poor habitat (e.g. non-ideal water quality) conditions. A small number of

fish species in a lake does not constitute a well-balanced community. Healthy fish communities in Toronto Region lakes usually comprised of multiple fish species from a variety of trophic levels.

This is the third year of sampling that Goldfish were captured. Their population appears to be increasing. Pet Goldfish may have been released by into the pond. If signage does not already exist, we recommend installing a sign to remind people not to release pet fish into the pond.

If chemical treatment is again scheduled for next year, fish sampling before the next chemical treatment should be considered. If you would like TRCA to conduct the fish sampling/removal again, please contact us as early as possible in 2026 so that we may begin project planning.

The *Swan Lake Long-term Management Plan* (City of Markham, 2021) recommended benthic fish removal for 5 years (2021-2025). This work has now been completed. TRCA recommends that fish monitoring continues annually and that invasive species are removed. As in 2025, consideration should be given to returning some/all of the Brown Bullhead to the lake (rather than removal) since they are a native fish, and it is important to have some benthic feeders in a lake ecosystem. Almost 600 Brown Bullhead have been removed from the lake therefore reducing benthic disturbance by this fish species. Common Carp (along with other invasive fish such as Koi and Goldfish) should continue to be euthanized and removed from the system.

The *Swan Lake Long-term Management Plan* also recommended that a fish management plan be developed in Phase 2 (post 2025). This included stocking fish in cooperation with OMNR. As per communication with Town of Markham staff, 500 Largemouth Bass were stocked after TRCA sampling in May of 2025. Monitoring of these stocked fish and their spawning activity is recommended in 2026.