



REPORT

TO: Mayor Lawlor and Members of Council

FROM: Kevin Okimi, Director of Parks and Open Space

DATE: October 13, 2023

REPORT NO.: RP-2023-010

SUBJECT: Fairy Lake Water Quality Study Update

RECOMMENDATION:

THAT Report No. RP-2023-010 regarding Fairy Lake Water Quality Study Update dated October 13, 2023 be received;

AND FURTHER THAT the Fairy Lake Water Quality Update Report 2021-2022 dated May 2023 (Appendix B) be received for information;

AND FURTHER THAT Staff be directed to undertake public and stakeholder consultation to obtain feedback on the management recommendations contained in the Fairy Lake Water Quality Update Report;

AND FURTHER THAT Staff report back on the results of public consultation related to the recommendations contained within the Fairy Lake Water Quality Update Report for final Council Approval;

AND FURTHER THAT implementation of the recommendations of the Fairy Lake Water Quality Update Report be referred to Budget Committee.

KEY POINTS:

The following are key points for consideration with respect to this report:

- Fairy Lake is a man-made lake built in early 1800s. It provides unique free access to water recreational resources for residents of Halton Hills.
- Due to its nature (man-made), maintenance of the lake was required in the past. This included dredging in the 1960s, and vegetation removal until the 1990s. After discontinuation of the maintenance, the aquatic vegetation in the lake

increased and the lake and surrounding areas are recognized as a provincially significant wetland complex, as well as a small open water area.

- The 2010 Fairy Lake Water Quality Study was the basis for Council approving managing the lake as a wetland, as well as other various recommendations (preserving existing aquatic vegetation, continuing egg oiling project, etc.)
- Due to water quality concerns and increased vegetation, there may be impacts to the use of the lake by the public (swimming or boating) for recreation.
- No additional monitoring or water quality testing occurred from 2010 to 2020 to measure any changes to water quality, or confirm the benefit of any of the management actions taken.
- Council approved the Fairy Lake Water Quality Update as part of the 2020 Capital Budget process, and additional funds for a partnership project with the University of Guelph and Credit Valley Conservation as part of the 2021 Capital Budget.
- The purpose of this report is to present the Fairy Lake Water Quality Study Update report, technical results and consultant recommendations to Council for information.
- Following approval of this report, it is recommended that staff, and the consulting team, conduct public consultation to obtain public and stakeholder feedback on the management recommendations contained within the report.
- Staff will report back to Council for the final approval of any recommendations along with a summary of public and stakeholder feedback.

BACKGROUND AND DISCUSSION:

The purpose of this report is for Council to receive the Fairy Lake Water Quality Study Update for information, and to direct staff to undertake public consultation on the management recommendations contained within the report.

Fairy Lake Background:

Fairy Lake is a man-made lake approximately 26 hectares in size located in Acton near the headwaters of Black Creek adjacent to Prospect Park and Rotary Park, surrounded by residential properties. Fairy Lake is part of a designated Provincially Significant Wetland (PSW) as well as the surrounding area southwest of the lake. The lake is also adjacent to rural lands, campground/trailer parks, and natural open spaces. See Appendix A for a location map of Fairy Lake. The Town has undertaken various studies of Fairy Lake over the years; most recently the Fairy Lake Water Quality Study (2010).

Prior to the creation of the lake in the early 1800s, the area was likely a wetland, and maintenance of the lake was required to remove excessive vegetation/sediment historically, though those activities ceased prior to 2000. Dredging of the lake has been documented to have occurred in the 1960s, and vegetation management occurred until the 1990s when it was discontinued as a cost savings measure. Since the end of maintenance activities in the 1990s, there has been an increase in aquatic vegetation. In recent years, there has also been higher occurrences of poor water quality at the

public beach in Prospect Park. The former beach by the Boathouse in Prospect Park was closed by the Town around the time of the 2010 Study.

Fairy Lake Water Quality Study 2010 & Outcomes:

The above concerns were a primary reason for the Water Quality Study conducted in 2010. The 2010 Fairy Lake Water Quality Study confirmed the state of the lake as a wetland complex, and not a true lake based on the state of the vegetated communities.

Since the completion of the 2010 Water Quality Study, the Town's ongoing management has focused on creating or maintaining naturalized buffers to the lake, egg oiling, and public education. The Town has worked to reduce the use of fertilizers containing phosphorous for parks adjacent to Fairy Lake. The Town has also been working with the Region of Halton on a phosphorous reduction program, which included the improvements to the storm water infrastructure that drain into Bovis Channel.

Since the completion of the original 2010 study, there has been no ongoing testing conducted to determine the effectiveness of any of the ongoing programs, or additional works to identify a nutrient balance model for the lake as recommended by the 2010 study. The 2010 Study's recommendations have been implemented to varying degrees since approved by Council.

Current Situation:

Today, the dam remains in place and maintains the water levels creating the 'lake' which is used for boating, swimming, fishing, and providing scenic views from various vantage points. There continues to be significant amounts of aquatic vegetation which may impact the level of some recreational activities which are much lower than when more active maintenance of the lake was occurring, and water quality concerns continue to affect the Prospect Park Beach.

The ongoing management of Fairy Lake is handled by various Town departments, including Recreation & Parks; Transportation & Public Works/Park Operations as well as broad interest from the Town's Business, Environment and Culture Department (Climate Change & Asset Management divisions). Fairy Lake is one of the Town's key natural assets.

There is also significant interaction with Halton Region and Credit Valley Conservation Authority who both have interests in water quality issues surrounding the lake due to the Acton Wastewater Treatment Plant downstream on Black Creek, the Prospect Park Water Treatment Plant located in Prospect Park, and the key location in the Black Creek Watershed. Both agencies have been involved with ongoing activities related to Fairy Lake due to ongoing programs or associated impacts to plant operations.

In 2021, the Town in conjunction with the Region of Halton completed upgrades to the dam to ensure proper functioning related to Regional infrastructure in the vicinity. There have also been a number of improvements over the years to enhance public access to the lake (Prospect Park Dock improvements, Fairy Lake Dam viewing platform, Birchway Place trail & overlook).

In 2023, due to historic failed water quality at the public beach and lack of a more rigorous maintenance program by the Town, the Region of Halton Public Health Department reduced the frequency of water quality tests at the Prospect Park Beach to monthly and required a permanent posting of “unsafe” to be installed on signage at the beach.

Over the past four years, blue green algae has been identified in the lake, and there has been increasing public concern about the conditions in the lake both from an ecological standpoint and a recreational standpoint.

Fairy Lake Water Quality Study Update (2021):

In order to review the effectiveness of current practices, and update the baseline water quality levels, Council approved the [project charter](#) for an update to the Fairy Lake Water Quality Study as part of Council Report [RP-2021-0003](#). LGL limited was retained to complete the update. The update focused on evaluating the results of the actions taken to date, as well as reestablishing a testing baseline and building on the other actions completed by partner agencies since the completion of the 2010 study. The updated study also looks to confirm the management approach to Fairy Lake, including a review of impacts of and to recreational uses, as well as any recommended changes.

The field work and technical review of the water quality occurred from June 2021 and continued until Summer of 2022. Following the completion of field work and analysis, the consultant and staff technical team have worked to prepare the final report to summarize the technical results, and make management recommendations that could then be shared for public consultation and stakeholder input. The final report was completed in June 2023 and is attached as Appendix B. The 2023 Update also includes a Nutrient Model which is appended to the final report which was one of the recommendations of the 2010 study, and a recommended monitoring plan.

Recommendations for management have been identified by the consultant with the goal to improve water quality by reducing the impact/source of stressors to the lake to support the recreational uses of the lake while maintaining its ecological function. The following table provides a summary of the key management recommendations for Fairy Lake. A presentation describing the results of the study is included as Appendix C and a narrated version would be used as part of the public consultation materials if Council approves the recommendations of this report.

Recommendation	Goal/Targeted Stressor	Example
Review existing agricultural management best practices as part of the watershed rural incentives program and introduce new or enhanced BMPs	Reduce nutrient loading to nearby waterbodies as a result of soil disturbance and erosion	No-till or conservation tillage practices, cover crops, vegetative buffers to creeks, nutrient management plans

Recommendation	Goal/Targeted Stressor	Example
Storm sewer retrofits	Reduce contaminants in stormwater flows before they reach the lake	Oil grit separators, filters, adaptive management solutions being investigated for the Region's phosphorus offsetting plan
Low impact development design and retrofits	Reduce contaminants in stormwater flows before they reach the lake	Incorporate LID features in new development – inclusion of green roof, permeable pavement, bioretention/rain gardens, rainwater harvesting, soakaway pits, and infiltration chambers Retrofit existing neighbourhoods, hosting LID features in road right of ways, within residential, industrial or commercial, or public land (Town owned parks and facilities, schools, etc.)
Natural Channel Design	Attenuate stormwater flow rate and quality, moderate water temperature, reduce nitrogen loading	Restore concrete channel upstream of Fairy Lake Restore the hyporheic zone of rivers
Wetland Design	Attenuate stormwater flow rate and quality, reduce contaminant loading	Tyler Avenue stormwater outfall and mouth of Black Creek/Bovis Creek at Fairy Lake
Vegetation Management	Attenuate stormwater flow rate and quality Reduce erosion, increase infiltration, reduce nutrient loading, improve habitat Limit access to the lake shoreline (reducing goose activity and human disturbance)	Use of planted riparian buffers with native seed mixes along the lake shoreline and adjacent to Black Creek/Bovis Creek upstream of the lake

Recommendation	Goal/Targeted Stressor	Example
Waterfowl Management	Reduce bacteria source Improve conditions at recreational facilities	Daily beach grooming Habitat modification along lake shoreline Changing maintenance practices in grassed areas Using natural applications to open grassed areas to deter geese (e.g., garlic based) Use barriers (retractable fencing) to keep geese from loafing and fouling the beach Use of hazing techniques (dogs or raptors)
Engage local property owners and businesses adjacent to, or with a surface water connection to the lake	Reduce water quality stressors from private properties adjacent to the lake	Promote stewardship initiatives through education and incentives (e.g., use of LID design and retrofits, vegetative and waterfowl management techniques)
Monitor the effectiveness of management activities at meeting targeted goals	Identifying adaptive management to align with changing conditions over time	Long-term monitoring program
Coordinate efforts of various stakeholders to align goals and share available resources	Allow for adaptive management to align with changing conditions over time and shifting priorities/goals for the Fairy Lake catchment.	Establish a cross agency and disciplinary technical group that meets regularly to review the results of emerging studies, plan future studies, and develop and prioritize management approaches to align with the collective goals of the group and make the best use of available resources.

Now that the Fairy Lake Water Quality Study Update and management recommendations are completed, staff are seeking Council direction to publish the technical report and seek community and stakeholder feedback on the management recommendations contained within the report (listed above). This Council report is not seeking final approval of any of the management recommendations.

Once public consultation is completed, staff will report back to Council with final recommendations and phasing of any management actions determined to be appropriate or prioritized to be advanced. as well as an implementation strategy for actions requiring cooperation with other agencies.

Additional Studies:

As part of a related study, the University of Guelph and Credit Valley Conservation (CVC) received a grant to undertake additional studies at Fairy Lake in partnership with the Town. The Town and Region contributed funding towards the grant. These studies include:

- Background review and lake model analysis.
- Additional water quality and quantity monitoring, including additional assessment during wet weather conditions. This includes tributary flow monitoring with new water level loggers.
- Microbial Source Tracking and eDNA Assessment – which identifies sources of bacteria (i.e. E.Coli) to determine if it is from specific contaminants (i.e. septic, animal waste, etc.), as well as wildlife diversity present in the lake.
- A Fairy Lake Catchment Model looking at Harmful Algal Blooms (HABs), which will be used to create a Decision Support System that will recommend best management practices to address cyanobacteria (blue green algae).

The University of Guelph / CVC study is ongoing in 2023, and additional information will be reported back in 2024 when those studies are completed if any additional management recommendations are made.

STRATEGIC PLAN ALIGNMENT:

This report aligns to the Town's Strategic plan recognizing the value to preserve, protect and enhance our natural environment for the health benefits and enjoyment it provides to present and future generations.

This report also identifies climate change and the environment as one of the Town's Strategic priorities.

RELATIONSHIP TO CLIMATE CHANGE:

This report impacts and/or helps address climate change and the Town's resiliency through climate adaptation. This report also impacts and/or helps address climate change and the Town's Net Zero target through climate mitigation.

PUBLIC ENGAGEMENT:

Public Engagement will be required; consultation with Communications staff to follow.

In early 2020, as part of the preliminary preparation for the project to inform the Terms of Reference and scope of work for the Fairy Lake Water Quality Study Update, a [Fairy Lake](#) page was set up on the Town's website and a public survey was also undertaken on [Let's Talk Halton Hills](#). The survey received over 250 responses, and a summary of the results of the survey can be found in Appendix D (detailed comments excluded).

The majority of the responders identified their concerns with the current state of the lake and perceived reduced value from a recreational perspective including reduced quality of beach access, swimming and boating. The majority of the responders identified a desire to strike a balance between ecology and usability for the well-being of the residents of Acton and Halton Hills while protecting the lake.

While many of the results of the Water Quality Study Update report are very technical in nature, Public Engagement will be focused on the management recommendations contained within the technical report as well as general feedback on recreational use of the lake. If the recommendations of this report are approved, staff will undertake public consultation on the draft recommendations, and report back to Council with the results. The Town's [Fairy Lake Page](#) and Let's Talk Halton Hills [project website](#) will continue to be used for providing information to the public throughout the study update.

INTERNAL CONSULTATION:

The Fairy Lake Water Quality study has included a Technical Advisory Committee made up of staff from Transportation & Public Works; Business, Environment & Culture; Recreation & Parks and Communications, as well as Credit Valley Conservation and the Region of Halton, who were also consulted for the preparation of this report.

FINANCIAL IMPLICATIONS:

This report has the potential to require funding in a future budget year and therefore needs to be referred to budget committee for tracking purposes. Final management recommendations of the Fairy Lake Water Quality Update Report, if approved by Council in the future, will be considered as part of the 2024 or future Budget Committee reviews.

Reviewed and approved by,

Paul Damaso, Commissioner of Recreation & Parks

Chris Mills, Chief Administrative Officer