ENVIRONMENT COMMITTEE

TO: *MAYOR AND COUNCILLORS*

SUBJECT: DEER LAKE ECOSYSTEM REMEDIATION STUDY FINDINGS

RECOMMENDATION:

THAT the report titled “Deer Lake Ecosystem Remediation Study Findings” dated March 31, 2025, of the Environment Committee meeting, be received for information.

REPORT

The Environment Committee, at its meeting held on March 31, 2025, received and adopted the ***attached*** report sharing findings stemming from a recent ecosystem study completed at Deer Lake.

On behalf of the Environment Committee,

Councillor J. Keithley
Chair

Councillor M. Santiago
Vice Chair

Meeting March 31, 2025
File: 2410 20
COMMITTEE REPORT

TO: ENVIRONMENT COMMITTEE (EC)
FROM: GENERAL MANAGER CORPORATE SERVICES
GENERAL MANAGER ENGINEERING
SUBJECT: **DEER LAKE ECOSYSTEM REMEDIATION STUDY FINDINGS**
PURPOSE: To share findings stemming from a recent ecosystem study completed at Deer Lake.

RECOMMENDATION

THAT the report entitled "Deer Lake Ecosystem Remediation Study Findings" dated March 31, 2025, be received for information.

1.0 POLICY SECTION

The City of Burnaby's ongoing environmental stewardship of Deer Lake is consistent with the:

- Burnaby Environmental Sustainability Strategy (2016);
- Burnaby Watercourse Bylaw (Bylaw No.9044);
- Parks Regulation Bylaw (Bylaw No. 7331);
- Streamside Protection and Enhancement Areas as defined in section 6.23 of the Burnaby Zoning Bylaw (Bylaw No. 4742);
- BC Ministry of Environment's Water Quality Guidelines; and the
- Integrated Watershed Management Plan (IWMP) for the Deer Lake Watershed.

2.0 BACKGROUND

Deer Lake is a lake and wetland area in the central valley watershed of Burnaby in proximity to the City of Burnaby's cultural precinct and to Burnaby City Hall. The area is a vital ecosystem location for a wide variety of flora and fauna and also connects to salmon bearing streams.

Deer Lake, while still a 'jewel' of Burnaby, is often turbid and nutrient rich as a result of urban run-off, natural aging, an increase in abundance of invasive plant and animal species, and the presence of high-traffic roadways near the lake. It has long been a goal of the City of Burnaby to expand an ecosystem remediation program for Deer Lake. Efforts to-date have been informed by the existing IWMP for the Deer Lake Watershed.

Recent efforts to further improve the Deer Lake ecosystem have included working through the Civic Innovation Lab (the 'Lab') to engage Simon Fraser University (SFU) expert researchers to investigate the health of Deer Lake in more detail from an

ecotoxicology perspective focussing on water and sediment sample analysis. This work was completed by two SFU research associates working under the advisement of Dr. Leah Bendell, Professor of Marine Ecology & Ecotoxicology in the SFU Department of Biology.

The Lab was founded in 2022 by the City of Burnaby in partnership with Simon Fraser University (SFU), with a mandate to research and develop innovative solutions to civic issues and challenges, in addition to providing educational advancement through collaborative learning and research opportunities. Since its founding the Lab has expanded to support over 20 projects spanning 8 municipal and 14 SFU departments.

This study was further supported by a staff technical working group comprised of representatives from Engineering (Drainage), Planning and Development (Community Planning and Climate Action), and Parks, Recreation and Cultural Service (Parks Planning and Parks Operations).

3.0 GENERAL INFORMATION

In May 2023, two research associates were hired to work with Dr. Bendell. Field collection work occurred over the summer and early fall of 2023, with water and sediment samples (collected via Ekman Grab sampling) taken from a series of shoreline sites, inner lake sites, and sites adjacent to incoming creeks (Figures 1.0 and 2.0). More specifically, these sample were analyzed to:

- assess the current ecological state of Deer Lake through evaluation of core and surficial sediment and surface water sample quality, sediment structure, and identification of local species; and
- confirm inflow patterns and identify sources of contamination potentially affecting the waterways of Deer Lake.

Figure 1.0 – Sediment Sample Locations

Figure 2.0 – Water Sample Locations

The data collected was analyzed at Dr. Bendell's lab at SFU, with some samples also tested by ALS Environmental Services. This data analysis informed the compilation of a baseline assessment report outlining the current health of the lake from an ecosystem perspective including a cataloguing of potential stressors, with accompanying suggested remediated strategies. The resulting research report was reviewed and approved by the staff technical working group and all materials, including data tables, are in the receipt of relevant City staff.

3.1 General Findings

The research process has been concluded, and a high-level overview of key findings is provided below:

- Water temperature, pH, conductivity, and chloride readings were observed within the expected ranges across the sites;
- Dissolved oxygen levels at the majority of the sites were noted to be within the acceptable range (i.e., greater than or equal to 80%);
- In some sediment samples, levels of metals (e.g. cadmium) exceeding Canadian guidelines were observed;
- Significant spatial variations in sediment cores across the investigated sites were observed; and
- Surface water sampling revealed environmentally acceptable chemistry and nutrient levels across the sites, suggesting that local waterfowl populations have not adversely impacted acceptable nitrogen and/or phosphorus levels from fecal contamination.

Based on these findings, the researchers proposed a range of possible remediation approaches including:

- Expanded use of settling ponds and biofiltration systems upstream of Deer Lake;

- Improved interception of run-off from major roadways in proximity (e.g. Royal Oak Ave.) prior to release into the Deer Lake watershed;
- Continued use of physical barricading, where possible, to prevent rooting and spread of invasive species;
- Implement targeted aquatic vegetation management including late spring/early summer cutting for Eurasian milfoil and late summer/early fall cutting for fragrant water lily (etc.); and
- Planting of vegetation along roadsides to sequester heavy metals deposited on adjacent soils.

Pending the Environment Committee's recommendation, and approval by Council, relevant staff will complete a thorough analysis of the research findings and associated remediation strategies and investigate opportunities for implementation.

4.0 COMMUNICATION AND COMMUNITY ENGAGEMENT

A profile of the research project was included in the Fall 2023 print edition of Burnaby Connect, delivered to every mailing address in Burnaby (approximately 90,000 households). Staff will engage with the Marketing and Corporate Communications department to engage with the public on potential future actions.

5.0 FINANCIAL CONSIDERATIONS

The subject study was supported via funds approved as part of the 2023 civic budget. This amount supported the participation of the two research associates and laboratory testing of samples. This amount was augmented by in-kind advisement services provided by Simon Fraser University professor Dr. Bendell. Financial considerations associated with implementing any of the recommended elements will be examined by staff on a case-by-case basis and brought forward to Council for consideration via the regular budgeting process.

Respectfully submitted,

May Phang, General Manager Engineering

Juli Halliwell, General Manager Corporate Services

ATTACHMENTS

None.

REPORT CONTRIBUTORS

This report was prepared by Rebekah Mahaffey, Executive Director Civic Innovation Lab and Simone Rousseau, Senior Manager Infrastructure and reviewed by Andre Kolber, Manager Parks Operations; Mark Sloat, Senior Environmental Planner; and Christine Ensing, Climate Action and Energy Specialist.