

**REPORT TO REGIONAL PARKS COMMITTEE  
MEETING OF WEDNESDAY, SEPTEMBER 30, 2020**

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**SUBJECT**     Elk/Beaver Lake Remediation Project

**ISSUE SUMMARY**

The Elk/Beaver Lake Watershed Management Plan (Plan) is ready for approval and a progress update is provided for in-lake remediation work.

**BACKGROUND**

Since the 1980s, Elk/Beaver Lake has experienced significant eutrophication (elevated nutrient levels) due to external (~30%) and internal (~70%) nutrient loading, with water quality deterioration, blue-green algae blooms, growth of invasive aquatic plants and severe oxygen depletion in the deeper parts of the lake. These conditions have negatively influenced the environmental, social and economic values of the area.

The lake system is complex and spans multiple jurisdictions and, from 2016-2019, the Capital Regional District (CRD) led a water quality monitoring program, conducted research and studies, and facilitated an inter-governmental working group to develop a long-term approach and plan for lake remediation to improve water quality.

External nutrients enter the lake by natural ecological processes but are elevated by various human uses within the watershed (urban, rural and agricultural). To address the ongoing external nutrient load from the land surrounding the lake, staff initiated the development of a Watershed Management Plan in 2019. A public information session, three public workshops, and direct consultation with First Nations, interest groups, field experts and government agencies were conducted. The public was invited to comment on the draft Plan in February 2020, as well through an online survey to support the finalization of the Plan. Public suggestions were reviewed for consideration and the final Plan (Appendix A) was drafted by staff. The Plan facilitates and supports partnership, collaboration and leveraging of resources with government agencies, stewardship groups and landowners to ensure the long-term sustainability of the lake's ecosystem and its many environmental, social, recreational, cultural and economic values and outlines an action plan, implementation plan and long-term monitoring program.

The report only addresses control of the external loadings and the development of best practices to reduce ongoing loadings to the lake. The internal loadings are being addressed through grant requests for an engineered in-lake solution. The CRD received a third-party technical review of in-lake remediation options to address internal nutrient loading (nutrient release from bottom sediments), conducted in 2019. Hypolimnetic oxygenation systems were recommended for both lake basins. On September 11, 2019, the CRD Board directed staff to pursue external funding opportunities and partnerships to offset at least 50% of the costs associated with acquiring and installing the remediation systems in Elk and Beaver lakes, and that staff incorporate capital and operating expenditures into the Regional Parks five-year financial plan.

Staff are currently pursuing funding and partnership opportunities to offset costs associated with the design, installation and long-term operation of the hypolimnetic oxygenation systems. Provided sufficient funds have been secured, a detailed design of the oxygenation systems will be completed in 2021 and installation of the systems are planned for 2022. Staff are currently coordinating two studies that will inform the design (sizing and siting) of the proposed oxygenation systems.

## **ALTERNATIVES**

### *Alternative 1*

The Regional Parks Committee recommends to the Capital Regional District Board:

1. That this report be received for information; and
2. That staff be directed to implement actions within the Elk/Beaver Lake Watershed Management Plan, as opportunities allow.

### *Alternative 2*

That this report be referred back to staff for additional information.

## **IMPLICATIONS**

### *Environmental & Climate Implications*

The lake and surrounding watershed play an important role in water filtration and storage, carbon sequestration and climate mitigation. The lake system is the headwaters of the Colquitz River and suffers from deteriorating water quality, leading to more frequent and extended blue-green algal blooms. Other issues, such as invasive species (notably Eurasian milfoil, American bullfrogs and many species of introduced fish species) and reduced oxygen levels also reflect deteriorating water quality and are putting more stresses on the ecosystem. Further deterioration of water quality in Elk and Beaver lakes would result in significant decline in biodiversity, habitat, and environmental values, both within the regional park and downstream in the Colquitz Watershed.

The Plan would address ongoing external nutrient sources; promote better land management practices within the watershed; improve watershed structure and function; and improve lake health and function, thereby reducing total phosphorus entering the lake. Furthermore, the anticipated outcomes of implementing the Plan include restored habitat for native aquatic species, reduced growth of Eurasian milfoil, reduced frequency of blue-green algae blooms and improved community awareness and understanding of watershed stewardship.

### *Intergovernmental Implications*

The implementation of the Plan requires collaboration and coordination among many levels of government and community partners. In particular, agencies that have jurisdiction for land use within the Elk/Beaver Lake watershed have direct responsibility for coordinating, facilitating and/or implementing the recommended actions, including District of Saanich, Central Saanich and CRD Regional Parks. The Plan identifies remediation actions and responsibilities. Outreach and education will be key to engage the public, landowners and local governments on collective

responsibilities and actions and can be facilitated by existing resources. Actions within the regional park will be led by CRD Regional Parks staff, with support from community stewardship groups and volunteers.

### *Social Implications*

Access and enjoyment of public park spaces is an important component of a healthy community. The lake and surrounding regional park functions as an important recreational hub in the capital regional district by providing various opportunities in and around the lake. Activities include swimming, fishing, rowing, hiking, dog-walking, equestrian use, nature watching and many special events. The Elk/Beaver Lake Regional Park has the greatest visitation of any regional park in the CRD with over 1.5 million visits annually and an estimated 15,000 angler days each year, making it the most fished lake on Vancouver Island. In a typical year, the park hosts many community events, day camps and nature programs that educate and benefit citizens year-round.

### *Financial Implications*

Elk/Beaver Lake provides significant economic value to the region and its residents. The business case for an in-lake remediation solution for Elk/Beaver Lake provided in September 2019 approximated the sum of annual assets that would be lost if the lake continued to degrade without intervention. The total potential economic value (i.e., not including the monetary value of the environmental, cultural and social values) associated with the recreational use of the park was conservatively estimated at over \$10 million per year.

The internal nutrient load that has accumulated in the lake is a direct function of the amount of nutrients entering the lake from external sources. While addressing the 70% internal nutrient load is essential to lake-remediation, actions to reduce the ongoing external nutrient load is critical to supporting long-term remediation efforts. Efforts to reduce and mitigate the ongoing external nutrient load will reduce nutrient load accumulation on the lake and relieve the long-term operational costs associated with an in-lake oxygenation system.

Funding to support actions within the Plan is limited and will require innovative cost-sharing approaches, creative partnerships and successful grant applications to solicit necessary funds to support implementation.

## **CONCLUSION**

The Elk/Beaver Lake system is a significant natural asset providing environmental, social and economic benefits for the CRD, but water quality continues to decline, increasing the frequency and duration of blue-green algae blooms, risk to human health, and compromising the many values of the lake and surrounding watershed. A Watershed Management Plan has been developed which outlines a series of actions and long-term monitoring efforts to address external nutrient sources, and an in-lake remediation plan is underway to procure and cost-share a hypolimnetic oxygenation system for each lake to help address internal nutrient loading. These initiatives are to be undertaken in collaboration with other agencies, landowners and organizations to ensure the long-term viability of the two lakes as the foundation for the regional park and the many benefits it provides.

**RECOMMENDATION**

The Regional Parks Committee recommends to the Capital Regional District Board:

1. That this report be received for information; and
2. That staff be directed to implement actions within the Elk/Beaver Lake Watershed Management Plan, as opportunities allow.

Submitted by:	Jeff Leahy, RPF, Senior Manager, Regional Parks
Concurrence:	Larisa Hutcheson, P. Eng., General Manager, Parks & Environmental Services
Concurrence:	Robert Lapham, MCIP, RPP, Chief Administrative Officer

**ATTACHMENT**

Appendix A: Elk/Beaver Lake Watershed Management Plan