

Press Release
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FOR IMMEDIATE RELEASE

Cultus Lake water quality degradation can be reversed

Steps taken to address nutrient delivery from septic tanks, gull deposits and agricultural run-off could lessen impacts of eutrophication

Chilliwack, B.C. – Cultus Lake is experiencing water quality degradation from an overabundance of watershed and atmospheric nutrients that could impact its fish species and lake aesthetics. However, these negative changes could be reversed with thoughtful planning, say lake researchers.

"Cultural eutrophication is a major concern for the lake, but it is reversible. If we all recognize water quality is a common link between all social and ecological lake interests, positive changes for future lake conditions can be made", renowned lake scientist Dr. Daniel Selbie told a rapt crowd of 130 people during a two-hour presentation Jan. 22 at the Cultus Lake Community School.

Audience members included elected officials, planners and other staff from the City of Chilliwack, the Fraser Valley Regional District, the Cultus Lake Park Board, and local residents.

An adjunct professor at Simon Fraser University's School of Resource and Environmental Management, and head of the Lakes Research Program for Fisheries and Oceans Canada's Science Branch, Selbie outlined results from a recently completed study he co-supervised. SFU master's student Annika Putt undertook the research work.

Cultural eutrophication manifests in a lake when algal-limiting nutrients such as nitrogen and phosphorus occur in excess. Excessive levels of nutrients in lakes trigger dense growth of plant life, most frequently algae, which can block out sunlight, lead to depletion of deep water oxygen depletion in summer and fall, and can begin a reaction of changes that impact both aquatic ecosystems and lake aesthetics.

"Cultus Lake is in the early stages of cultural eutrophication," Selbie told the audience.

Researchers traced the influx of nitrogen and phosphorus to agriculture from areas such as Columbia Valley, septic fields and air-borne deposits. They also found a significant amount of phosphorus comes from guano deposited by up to 12,000 gulls that roost on the lake overnight from fall to spring, after feeding in the Fraser Valley during the day.

Core samples of lake-bottom sediments showed lower levels of nutrients and algae, historically, which was in agreement with lake modeling results. However, the lake's chemistry has changed unequivocally since the 1950s, consistent with increases in human activity in and around Cultus Lake, Selbie said.

Today, the genetically distinct Cultus Lake sockeye salmon is on the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2003) endangered list. Also, the endemic Cultus Pygmy Sculpin is a listed federally as threatened under the Species at Risk Act (SARA), threatened species.

The annual delivery of nutrients spurs an increase of algae, which largely blooms out of sight, about ten metres below the surface of the lake in summer. Comparisons with historical data show this has intensified through time.

These algal blooms result in excess organic matter that falls to the lake bottom, where aerobic decomposition through summer and fall reduces the oxygen available to fish in deeper waters. As oxygen levels decrease at the very bottom of Cultus Lake, vast nutrient reserves stored in lake sediments can be released, which can in turn rapidly further accelerate lake eutrophication.

If the influx of nutrients is left unchecked, with further anticipated watershed development and continued atmospheric deposition, eutrophication is predicted to intensify with the expected negative ecological and lake aesthetic impacts.

An added pressure includes global climate change, which is warming the lake and entire watershed, and which will likely compound the effects of eutrophication. Already, upper level water temperatures during the summer in the lake exceed the temperatures sockeye salmon can tolerate over a prolonged period, and this is expected to intensify with climate change.

If oxygen is further depleted in the lake's deep waters due to eutrophication, fish species in Cultus may be squeezed into a smaller and smaller livable space, between the layers of too warm water above and oxygen-poor water below.

Sadly, overloading of nutrients is not an unusual phenomenon, Selbie noted.

Eutrophication is the most urgent fresh water quality problem globally, according to the United Nations Department of Economic and Social Affairs, which recognized the priceless value of clean water in its International Decade for Action 'Water for Life,' 2005-2015. As with Cultus Lake, the main culprits are excess, human-derived nitrogen and phosphorus in fresh water.

While Cultus Lake is showing the warning signs of eutrophication, positive steps can be taken, said Selbie. "The good news is the eutrophication is an environmental problem that we can do something about relatively easily. That means planning with the lake in mind," he said.

In the short term, this could mean exporting sewage from the watershed, and preventing gulls from depositing guano in the lake. Long-term mitigation will likely require changes in agricultural practices to reduce watershed loading and atmospheric deposition of fertilizers that contain nitrogen and phosphorous, he said.

The evening was hosted by the Cultus Lake Aquatic Stewardship Strategy, and the research was supported by several groups including the Fraser Basin Council, Fisheries & Oceans Canada Science Branch, Canadian Wildlife Federation, Fraser Salmon & Watersheds program and others.

The study is available on the SFU website at <https://theses.lib.sfu.ca/thesis/etd8600>.

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Quick fact: One thousand residents live in the Cultus Lake area year-round. Cultus Lake is a popular recreational destination for many people in the Lower Mainland traffic counts show two to three million visits each year.

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***About the Study**

"*Spatiotemporal nutrient loading to Cultus Lake: Context for Eutrophication and Implications for Integrated Watershed-Lake Management*" is a 2014 Master of Resource Management research study by Annika Elsie Putt, is available on the Simon Fraser University website: <https://theses.lib.sfu.ca/thesis/etd8600>. Limnologist and SFU Adjunct Professor Dr. Daniel Selbie was one of the research supervisors.

About Cultus Lake Aquatic Stewardship Strategy (CLASS):

CLASS is a network of more than 60 organizations and individuals interested in the future of Cultus Lake. They work to identify key issues, gather information and support research on the lake. Participants include the Cultus Lake Community Association, Lindell Beach Ratepayers, BC Parks, Fisheries and Oceans Canada, Cultus Lake Park Board, Soowahlie First Nation, Ts'elxwéyewqw Tribe Society, Stó:lō Tribal Council, Fraser Valley Regional District, Fraser River Salmon Table Society, Fraser Valley Watersheds Coalition, Sport Fishing Advisory Board, Fraser Salmon Fishers Society and participants from business, industry, education and other sectors. CLASS contact: Marion Robinson, marion16@telus.net or Dave Clyne, clyne@alumni.sfu.ca