

The Canadian  
Geotechnical Society



La Société Canadienne  
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## CGS Luncheon Presentation

### Water Budget Investigation for Small Endorheic Lakes in Urban Settings in Cold Climates

**Presented by:**

**Bernard B. Ayumu**

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#### **Presentation Abstract:**

Small recreational watersheds in urban settings often experience water quality degradation due to eutrophication. Their water budget would provide insight into understanding nutrients pathways; however, this information is often lacking. This paper addresses this problem by simple but innovative approaches to investigate the water budget of small urban endorheic recreational lakes located in cold climates. The field campaign involved the use of HOBO water loggers and stable water isotope analyses were used to estimate surface inflows, lake evaporation, lake-groundwater interaction, and lake residence times in the FortWhyte Alive catchment. Two adjacent catchments consisting of 4 interconnected lakes on one side and an isolated lake, Lake Cargill, on the other side were investigated. Although the observed catchments were next to each other, they showed significant changes in their water budget. While the interconnected lakes received groundwater inflow of about 8% of the overall inflow, Lake Cargill showed no groundwater contact but a lakewater loss of about 2% to the groundwater. The evaporation-inflow ratios in both catchments exceeded 50% indicating typical endorheic conditions. This resulted in large lake residence times which facilitated rapid nutrient enrichment in the lakes.

#### **About the Presenter:**

Bernard received his B.Sc. in Geodetic Engineering from the Kwame Nkrumah University of Science and Technology, Ghana. He left for Germany afterwards where he received his M.Sc. in Groundwater Management from the Freiberg University of Mining and Technology with emphasis on Physical and Chemical Hydrogeology. Apart from working on small research projects ranging from groundwater flow, transport and reactive modelling to groundwater/minewater contamination during his studies, his major research work was on water-CO<sub>2</sub>-carbonate reaction kinetics in high pressure-temperature reservoir systems.

He later joined the Groundwater and Geotechnical Research Group at the University of Manitoba as an M.Sc. Civil Engineering student where he is currently investigating lake-groundwater interaction in eutrophic systems using stable water isotopes. He is passionate about Groundwater science and Geoenvironmental engineering research and projects.

**Date:** Thursday, November 12, 2020

**Time:** Presentation at 12:00 PM

**Location:** MS Teams Meeting

**Registration Fee:** Free Event!

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**For event information:**

<http://www.cgsmanitoba.ca/lunch-seminars/upcoming/>

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- This event qualifies for 1 Professional Development Hour. The event is classified as 'Informal Activity' under EGM's CPD Program.
- Please note that if you are unable to attend, someone else can be sent in your place. We are accepting walk-ins depending on seating availability.
- If you wish to be added to the mailing list, please send an email to [cgs.manitoba@gmail.com](mailto:cgs.manitoba@gmail.com)