**University of Victoria** | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

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BEd (University of British Columbia, 2012)
BSc (University of British Columbia, 2011)

**"A 258-Year Record of Precipitation as Snow (PAS) from Tree-rings, Southern Coast Mountains, British Columbia"**

Department of Geography

Thursday, December 15, 2016
9:00AM
David Turpin Building
Room B215

Supervisory Committee:
Dr. Daniel Smith, Department of Geography, University of Victoria (Supervisor)
Dr. Terry Prowse, Department of Geography, UVic (Member)
Dr. Bethany Coulthard, School of Geography & Development, University of Arizona (Outside Member)

External Examiner:
Dr. Eric Higgs, School of Environmental Studies, UVic

Chair of Oral Examination:
Dr. Scott Watson, Department of Political Science, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

# Abstract

In Pacific North America, a substantial amount of the streamflow available during the dry summer months originates from melting mountain snowpacks. This nivally-sourced runoff varies in quantity based on the numerous factors that affect the total volume of water contained within a snowpack at any given time. Any volumetric calculation of water availability from a seasonal snowpack inherits this degree of variability. To develop the best predictive models of future water availability derived from mountainous snowpacks, the longest possible data record is required. However, instrumental data for snow measurements, when available, are limited to a length of only five or six decades in most regions of Pacific North America. In this study, tree-rings from snow-depth sensitive tree species (mountain hemlock (*Tsuga mertensiana*) and subalpine fir (*Abies lasiocarpa*)) were used as a proxy to develop a 258-year record of precipitation as snow (PAS) for the southern Coast Mountains of British Columbia. Four snow models were evaluated based on a suite of dendroclimatological model diagnostics. From these, one PAS reconstruction was carried out. The reconstruction was unable to properly validate using the leave-one-out cross validation method yielding statistical limitations; however, this research yielded a number of inferences and recommendations for future research.