University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

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BSc Honours (University of Victoria, 2012)

"13,000 years of fire activity in a temperate rainforest on the Central Coast of British Columbia, Canada"

School of Environmental Studies

Tuesday, February 20, 2018
2:00 P.M.
Clearihue Building
Room B017

Supervisory Committee:
Dr. Brian Starzomski, School of Environmental Studies, University of Victoria (Supervisor)
Dr. John Volpe, School of Environmental Studies, UVic (Member)
Dr. Dan Smith, Department of Geography, UVic (Outside Member)
Dr. Kenneth Lertzman, School of Environmental Studies, UVic (Additional Member)
Dr. Andy MacKinnon, School of Environmental Studies, UVic (Additional Member)

External Examiner:
Dr. Andrés Holz, Department of Geography, Portland State University

Chair of Oral Examination:
Dr. Colin Goldblatt, School of Earth and Ocean Sciences, UVic

Dr. Stephen V. Evans, Acting Dean, Faculty of Graduate Studies

Abstract

While wildfire is globally most common in the savanna-grassland ecotone, the flammability of coastal temperate rainforests is considered low and little is known regarding historic fire activity. Reconstructing historical fire activity typically requires dendrochronological records from fire-scarred trees and post-fire cohorts, but this type of information is rare in perhumid temperate rainforests, which are dominated by dense fuels with high year-round moisture content. I reconstructed historic fire activity using fire scars, tree rings, soil charcoal, and remote sensing techniques in a 2000 km2 island group located within the Hakai Lúxvbálís Conservancy on the coastal margin of central British Columbia. I broadly assessed 13,000 years of fire activity with charcoal deposited in soils, and reconstructed late Holocene fire events with a 700-year chronology built from living fire-scarred trees and stand establishment data. I used a weight of evidence approach to hypothesize the origins of fires and whether First Nations intentionally utilized fire for resource management. Low-severity fires occurred most frequently in forests surrounding former First Nations habitation sites, and lightning strikes do not occur often enough to explain the observed pattern of fire activity in the study area. Lowseverity fires occurred approximately every 39 years, and were 25 times more likely to occur than previously estimated. Fires influenced the composition and structure of vegetation by creating a mosaic of forest types in different stages of succession, and thus increased the abundance of culturally important food plants. Fires have not occurred in the study area since 1893, which also coincides with the reduction of First Nations activities in their traditional territories. My data are consistent with the hypothesis that humans intentionally used fire to manage resources, though further research and ethnographic data collected elsewhere in the region is required to corroborate these findings. Ecological legacies of historic fires remain visible on the present day landscape, and by reconstructing the historic range of fire cycle variability we gain a better understanding of human-driven fire activity and the abrupt changes that occurred in the 20th century.