University of Victoria | Graduate Studies

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

of

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BA (Arizona State University, 2015)

"Benthic Ecology in Two British Columbian Fjords: Compositional and Functional Patterns"

School of Earth and Ocean Sciences

Thursday, November 16, 2017
1:00 P.M.
Bob Wright Centre
Room A319

Supervisory Committee:
Dr. Verena Tunnicliffe, School of Earth and Ocean Sciences, University of Victoria (Supervisor)
Dr. S. Kim Juniper, School of Earth and Ocean Sciences, UVic (Member)
Dr. Julia Baum, Department of Biology, UVic (Outside Member)

External Examiner:
Dr. Akash Sastri, Department of Biology, University of Victoria/Oceans Network Canada

Chair of Oral Examination:
Dr. Ian Putnam, Department of Mathematics and Statistics, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

As global change alters the chemical and physical dynamics of the ocean, it is increasingly necessary to determine ecological responses across environmental gradients. The benthic ecosystems of fjords often contain a multitude of environmental gradients conducive to multivariate field studies. In this thesis, I describe the benthic community structure of two British Columbian fjords in relation to markedly different environmental variables. In Chapter 2, I show a strong correlation between suspension-feeder abundance and flow structure on the steep fjord walls of Douglas Channel, BC. I also describe distinct assemblages with depth and with location along the fjord head-mouth axis. Using a suite of biological traits, I show that the deep portion (> 400 m depth) of the most seaward site is the most taxonomically and functionally diverse in the fjord. My results suggest fjord walls form an expansive ecosystem containing diverse and dense assemblages relevant to the flow of energy through fjord basins and as biodiversity reservoirs. In Chapter 3, I extend a long-term hypoxia time-series to document the response of soft-bottom epibenthic megafauna of Saanich Inlet, BC to a prolonged hypoxic event in 2016 that caused abundance declines, community aggregation and shifts in species composition more extreme than those seen in the 2013 hypoxia cycle. I also assess community threshold responses along the oxygen gradient; I found community transitions consistent across years and with Northeast Pacific oxygen thresholds based in ecophysiological studies. Taken together, these studies show a strong coupling between oceanographic conditions and the community structure of fjord benthos. I suggest that climate-driven alterations in North Pacific oceanographic regimes may portend major changes in fjord ecosystems.