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

of

JEREMY KROGH

BSc (University of Victoria, 2014)

“Dissolved Oxygen and Carbon Dynamics in a High-Energy Coastal Environment near Victoria BC’s Untreated Municipal Sewage Outfalls”

School of Earth and Ocean Sciences

Wednesday, April 12, 2017
10:00 A.M.
Bob Wright Centre
Room A319

Supervisory Committee:
Dr. Roberta Hamme, School of Earth and Ocean Sciences, University of Victoria (Co-Supervisor)
Dr. Debby Ianson, School of Earth and Ocean Sciences, UVic (Co-Supervisor)
Dr. Kenneth Denman, School of Earth and Ocean Sciences, UVic (Member)
Mr. Christopher Lowe, Marine Program, Capital Regional District

External Examiner:
Dr. Sophie Johannessen, Science Staff, Institute of Ocean Sciences

Chair of Oral Examination:
Dr. Justin Albert, Department of Physics and Astronomy, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

Wastewater disposal often has deleterious impacts on the receiving environment. Low levels of dissolved oxygen are of particular concern. Here I investigate the impacts on dissolved oxygen and carbon chemistry of screened municipal wastewater in the marine waters off Victoria BC Canada. I analyzed data from a series of undersea moorings, ship-based monitoring, and underwater remote operated vehicle video, and used these observations to construct a two-layer box model of the nearfield receiving environment. Despite the lack of more advanced treatment, I find that dissolved oxygen levels near the outfalls are well above the commonly used 63 μmol kg⁻¹ hypoxic threshold and that the outfalls’ impact on water column oxygen is likely less than a few μmol kg⁻¹. Likewise, dissolved inorganic carbon is not elevated and pH not depressed. Strong tidal currents, cold water temperatures, and the light limited nature of the marine environment surrounding Victoria give these waters a high assimilative capacity for organic waste.