NOTICE OF UNIVERSITY ORAL

GEODESY AND GEOMATICS ENGINEERING

Master of Science in Engineering

Nicole Delpeche

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Head Hall – E16 Ocean Mapping Lab

Board of Examiners:	**Supervisor:**	**Dr. John Hughes Clarke, GGE**
	Examining Board:	**Susan Haigh, GGE**
		Dr. Katy Haralampides, Civil Eng.
	Chair:	**Dr. Sue Nichols, GGE**

Observations of Advection and Turbulent Interfacial Mixing in the Saint John River Estuary, N.B Canada

ABSTRACT

Theoretical studies, laboratory experiments, numerical simulations and field observations suggest that turbulent interfacial mixing in stratified environments initially takes the form of internal waves. Regardless of this suggestion, the generation and evolution of internal waves in the field is still not well observed. The main factor limiting observations of internal waves in the field is the spatial and temporal resolution of the observations acquired.

Under highly stratified conditions oceanographic surveys are performed in Long Reach (part of the Saint John River Estuary) for the duration of a tidal cycle. Survey sensors such as an Acoustic Doppler Current Profiler (which measures current magnitude and direction), Conductivity Temperature Depth sensor (from which density is derived) and an echosounder (which indirectly measures density interfaces, turbulence, zooplankton and suspended sediments) are all implemented to map the main oceanographic processes occurring.

The results show that turbulent interfacial mixing occurs at a period of maximum velocity shear, within the vicinity of the lateral and vertical constrictions of Long Reach. The survey sensors and survey design used, allow the generation and evolution processes of internal waves to be mapped. Different types of internal waves are observed before, during and after the turbulent interfacial mixing process, however at the exact moment of turbulent interfacial mixing the pycnocline dips downward into the bottom salty layer. This latter observation, suggests that there may possibly be another mechanism, other than internal waves that contribute to turbulent interfacial mixing in Long Reach.

Faculty Members and Graduate Students are invited to attend this presentation.