



**University  
of Victoria**

Graduate Studies

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

of

**KRISTEN KANES**

BSc (University of Victoria, 2013)

**“Temporal Patterns in Pacific White-Sided Dolphin Communication  
Signals at Barkley Canyon, with Implications for Multiple Stocks”**

School of Earth and Ocean Sciences

Thursday, April 26<sup>th</sup>, 2018

1:30 P.M.

Bob Wright Centre

Room A319

Supervisory Committee:

Dr. Stan Dosso, School of Earth and Ocean Sciences, University of Victoria (Co-Supervisor)

Dr. Svein Vagle, School of Earth and Ocean Sciences, Uvic (Co-Supervisor)

Dr. Lucinda Leonard, School of Earth and Ocean Sciences, UVic (Member)

Dr. Tania Lado Insua, Ocean Networks Canada, School of Earth and Ocean Sciences, UVic  
(Member)

External Examiner:

Dr. Francis Juanes, Department of Biology, UVic

Chair of Oral Examination:

Dr. Anita Prest, Department of Curriculum and Instruction, UVic

## **Abstract**

Evaluation of diel and seasonal patterns in offshore marine mammal activity through visual data collection can be impaired by poor weather and light limitations and by the requirement for costly ship time. As a result, relatively little is known about the diel patterns of wild dolphins. Pacific white-sided dolphins north of Southern California are particularly under-researched. Collecting acoustic data can be a cost-effective approach to evaluating activity patterns in offshore marine mammals. However, manual analysis of acoustic data is time-consuming, and impractical for large data sets. This study evaluates diel and seasonal patterns in Pacific white-sided dolphin communication through automated analysis of one year of continuous acoustic data collected from the Barkley Canyon node of Ocean Networks Canada's NEPTUNE observatory, offshore Vancouver Island, British Columbia, Canada. In this study, marine mammal acoustic signals are manually annotated in a sub-set of the data, and used to train a random forest classifier targeting Pacific white-sided dolphin pulsed calls. Marine mammal vocalizations are classified using the resultant classifier, manually verified, and examined for seasonal and diel patterns. Pacific white-sided dolphins are shown to be vocally active during all diel periods in the spring and summer, but primarily at dusk and night in the fall and winter. Additionally, the percentage of time they are detected drops significantly in the fall and remains low during the winter. This pattern suggests that a group of day-active dolphins, possibly a unique stock, leaves Barkley Canyon in the fall and returns in the spring. It is hypothesized that this group may be following the Pacific herring, which are present at the surface during the day at Barkley Canyon in the spring and summer, and migrate inshore for the fall and winter.