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

of

EVA STREDULINSKY

BSc (University of Victoria, 2010)

“Determinants of Group Splitting: An Examination of Environmental, Demographic, Genealogical and State-Dependent Factors of Matrilineal Fission in a Threatened Population of Fish-Eating Killer Whales (Orcinus orca)”

Department of Geography

Monday, September 19, 2016
11:00am
David Turpin Building
Room B215

Supervisory Committee:
Dr. Christopher Darimont, Department of Geography, University of Victoria (Supervisor)
Dr. John K. B. Ford, Department of Zoology, UBC (Outside Member)

External Examiner:
Dr. Lisa Gould, Department of Anthropology, UVic

Chair of Oral Examination:
Dr. Daniel German, Department of Computer Science, UVic

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

Group living is a social strategy adopted by many species, where individuals can exhibit long-term social affiliation with others, strengthened through cooperative behaviour and often kinship. For highly social mammals, changes in group membership may have significant consequences for the long-term viability and functioning of a population. Detecting significant social events is essential for monitoring the social dynamics of such populations and is crucial to determining the factors underlying these events. Temporally locating changes in social organization, especially with incomplete data, poses significant analytical challenges. To resolve this issue, I develop and assess a straightforward, multi-stage and generalizable method with broad utility for ecologists interested in detecting and subsequently investigating causes of changes in social organization. My approach illustrates the frequency and ecological relevance of binary group fission and fusion events in a population of fish-eating 'Resident' killer whales (Orcinus orca). Group fission is a process commonly found in social mammals, yet is poorly described in many taxa, and has never been formally described in killer whales. To address this gap, I provide the first description of matrilineal fission in killer whales, from a threatened but growing Northern Resident killer whale population in which matrilineal fission has been observed for the past three decades. I also undertake the first comprehensive assessment of how killer whale intragroup cohesion is influenced by group structure, demography and resource abundance. Fission in Northern Resident killer whales was observed to occur both along and across maternal lines, where animals dispersed in parallel with their closest maternal kin. I show that fission in this population is driven primarily by population growth and the demographic conditions of groups, particularly those dictating the nutritional requirements of the group. I posit that intragroup food competition is the most likely explanation for group fission in this population, where prey abundance also has ancillary effects. As group fission can have a direct impact on the fitness of group members and the long-term viability of a population, this analysis underscores the importance of incorporating studies of sociality into the management of threatened populations of social mammals.