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

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BSc (University of British Columbia, 2016)

“Evaluating the role of movement behaviour and habitat familiarity on translocated grizzly bear success using an agent-based modelling approach”

Department of Geography

Monday, August 24, 2020
9:00 A.M.
Remote Defence

Supervisory Committee:
Dr. Christopher Bone, Department of Geography, University of Victoria (Supervisor)
Dr. Gordon Stenhouse, Department of Geography, UVic (Member)

External Examiner:
Dr. Mathieu Bourbonnais, Earth, Environment and Geographic Sciences, University of British Columbia

Chair of Oral Examination:
Dr. Kieka Mynhardt, Department of Mathematics and Statistics, UVic

Dr. Stephen Evans, Acting Dean, Faculty of Graduate Studies
Abstract

In North America, the grizzly bear (Ursus arcos) is one of many species increasingly threatened by the consequences of human-wildlife conflict, with human-bear encounters on the rise due to increased human activity near or in bear habitat. As a result, a growing number of bears are subjected to management measures such as translocations in which animals are moved to areas with lower risk of human conflict. While the aim of wildlife translocation is to benefit both the individual and the population or ecosystem to which it is moved, most translocated individuals either return to their original habitat or die before establishing themselves in the released area. Previous research has attempted to understand factors associated with translocation success, but new methods are needed to address the continuous and complex nature of issues related to how animals adapt to new environments.

The objective of my MSc thesis is to develop and employ a novel computer simulation model to analyze how grizzly bears respond to the process of translocation. This modelling effort attempts to capture how bears make decisions based on multiple factors, and represent how grizzly bears interact with their environment and make movement decisions based on learned behaviours. A movement model was developed for female grizzly bears using GPS-location data for bears within a region in west-central Alberta, Canada. The model, which incorporates multi scale decision-making and machine learning, generated movement patterns similar to those observed in radio-collared females in the study area. Translocation events were simulated in which bears with varying “exploration” propensities were translocated to habitats with familiar or novel landscape characteristics. In general, bears translocated to habitats with similar landscape features to their original habitat were more likely to use high-quality habitat than bears moved to areas with very different landscape features. However, while increased exploration led to greater use of high-quality habitat in the long run, exploratory behaviour was found to be mostly detrimental during the first years following a translocation, the period considered critical for translocation success. Model results were found to be scale-dependent, highlighting the need for a multi-scale approach to animal movement studies. The findings presented here emphasize the need to account for behavioural traits of wildlife and habitat characteristics of the capture and release sites when selecting a suitable translocation locations. This work also highlights the potential for ABM as a tool to study animal movement and evaluate conservation policies.