University of Victoria | Graduate Studies

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

of

GILLIAN FRASER

BSc (Trent University, 2015)

**"The effects of landscape change on behaviour and risk perceptions
of predator and prey communities on a heterogeneous landscape in
Alberta and British Columbia, Canada"**

School of Environmental Studies

Friday, December 7, 2018
9:00 A.M.
University House 4
Room 100

Supervisory Committee:
Dr. Jason Fisher, School of Environmental Studies, University of Victoria (Co-Supervisor)
Dr. John Volpe, School of Environmental Studies, UVic (Co-Supervisor)

External Examiner:
Dr. John Taylor, Department of Biology, UVic

Chair of Oral Examination:
Dr. Reeta Tremblay, Department of Political Science, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Habitat selection is assumed to be informed by prior knowledge of the costs and benefits associated with habitat patches on heterogeneous landscapes. Ultimately, species should select habitat that maximizes resources acquired, and minimizes risks to mortality. However, landscape change alters the distribution of resources and, therefore, the energetic trade-offs that drive habitat selection. I investigated how landscape change, through anthropogenic disturbance features, affects behavioural decisions within the predator and prey community, and how those choices affect fitness in the boreal forests and foothills of west-central Alberta and east-central British Columbia. In my first data chapter, I investigated how interspecific interactions within the predator community changed across a gradient of anthropogenic disturbances, focusing on the habitat selection of wolverine (*Gulo gulo*). I used a novel temporally-explicit approach with camera trap data that modelled weekly co-occurrence of species. I found that anthropogenic features facilitated increased competition between wolverine and coyote, which I suggest is the mechanism that drives broad-scale declines of wolverine on disturbed landscapes. In my second chapter, I tested how woodland caribou evaluated risks and rewards associated with predation risk, disturbance features, and forage habitat during the calving period in two herds on landscapes with differing degrees of disturbance. I compared drivers of resource selection between mothers whose calves survived and mothers whose calves died in either herd. I found that resource selection for mothers on the lesser disturbed landscape was driven by a trade off between predation risk and forage habitat, wherein mothers whose calves eventually died prioritized selection of forage habitat over predation risk. However, all mothers on the more disturbed landscape prioritized their resource selection around disturbance features. Mothers whose calves died appeared to select sites closer to well sites, but more strongly avoided cut blocks and recent wildfire burns. I suggest that disturbance features introduce novel costs and rewards that are not traditionally evaluated on undisturbed landscapes, wherein caribou are required to effectively evaluate risks attributed to unique features with consequences for calf survival. More broadly, my research links the mechanisms that drive changes in habitat selection on changing landscapes with implications for species distributions and population dynamics.