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## RESEARCH COLLOQUIUM SERIES

**Dr. Christina Semeniuk**  
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**Friday**  
**Nov 22, 2013**

**3:30 - 4:30**

**LECTURE THEATRE**

**8-166**

### CRITICAL HABITAT PLANNING: MORE THAN JUST LINES ON A MAP

Woodland caribou (*Rangifer tarandus caribou*) in Alberta, Canada, are designated as threatened due to their reduced distribution, a decrease in the number and size of populations, and threats of continued declines associated with oil and gas extraction and forestry industries. Assessing and managing cumulative effects of human activities on caribou and providing adequate habitat to allow for its persistence is of critical importance. In this study, a scenario modeling approach that combines movement ecology with behavioural ecology within an agent-based framework is presented to achieve three objectives: (i) recreate the movement behaviours of caribou to understand how they select and use their winter habitat, (ii) determine the relative impact of different industrial features on caribou habitat selection strategies, and (iii) assess how caribou adapt to their changing environment. The study was conducted in the Little Smoky region, covering an area of 3100 km<sup>2</sup> located in the foothills of west-central Alberta, which has one of the highest levels of industrial development of any caribou herd in Canada. Based on caribou bioenergetics, the agent-based model (ABM) simulates caribou as individual agents that make trade-off decisions to maximize their survival and reproductive success while avoiding predators and habitat disturbance. Using a validated optimal foraging strategy, caribou habitat-selection responses under five scenarios of future land development plans were simulated. We found that herd spatial extent progressively contracted with increasing industry intensity; and caribou lost most reproductive energy when forestry only was developed. Despite increased use of area set aside as critical habitat, females still failed reproduction if oil and gas continued to develop within.

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