Project Profile

Project Name:	Predicting the Population-Level Response of Boreal Caribou to Seismic Line Restoration
Project Number:	BCIP-2016-11
Proponent:	Alberta Biodiversity Monitoring Institute (Serrouya)
Funding Envelope:	Boreal Caribou
Timeframe:	September 1, 2016 to April 30, 2017

Project objectives

The objective of the project are:

1. Predict caribou abundance following restoration of linear features.
2. Estimate the cost of restoring linear features for each scenario—a cost per additional caribou gained by restoring linear features.

Project description

This project will use data acquired from the boreal forest in both BC and Alberta, along with quantitative population models, to predict the population-level response of caribou to seismic line restoration.

Mechanistic models will be used to predict the response of caribou populations to restoring seismic lines. Each "mechanism" included in the model will be based on actual data; for instance describing the functional response (mechanism) of predators (wolves) to their prey (caribou and moose) using data on wolf movement rates on and off seismic lines, % overlap between wolves and caribou, and the handling time of wolves on caribou and moose. These data will be incorporated into ordinary differential equations (ODEs) that have been successfully used to describe and predict real-world wolf-moose-caribou interactions in British Columbia (Serrouya et al. 2015).

The model used in this project will be based on equations representing 2 prey and 1 predator – i.e. they capture the process of apparent competition, and are based on logistic growth along with type II functional response of the predator. This is a theoretical exercise, but provides a valuable tool for assessing the economic and biological efficiency of undertaking this ambitious management action, based on its ability to predict management outcomes.

The primary study area will be boreal caribou ranges from northeastern British Columbia.

Project approach

The project will be carried out using the following approach:
1. Define model containing the Ordinary Differential Equations (ODEs) for use in study.
2. Conduct simulations using the model that vary the abundance of seismic lines and travel speed.
3. Conduct sensitivity analysis for all parameters.
4. Document findings in project report.

Project deliverables

The deliverables from this project include the following:
1. Final Report.
2. Presentation.