

Project Profile

Project Name:	Testing Predator Response to Large-Scale Restoration of Linear Features Within Boreal Caribou Range
Project Number:	BCIP-2016-10
Proponent:	Alberta Biodiversity Monitoring Institute
Funding Envelope:	Boreal Caribou
Timeframe:	September 1, 2015 to February 28, 2016

Project objectives

This project has both short- and long-term objectives. For the short-term, our objectives primarily relate to project scoping. Long-term objectives relate to the actual implementation of restoration techniques.

Short-term Objectives:

1. Identify appropriate restoration techniques that can effectively and efficiently be applied at a large scale.
2. Identify suitable home ranges of wolf packs within NE BC that could be selected as sample units for the implementation phase of the project.
3. Identify and engage all potential stakeholders – including First Nations – affected by a large-scale restoration project.
4. Develop clear recommendations for implementing linear feature restoration on a large scale.

Long-term Objectives:

1. Identify cost-effective linear feature restoration techniques that effectively inhibit caribou-predator spatial overlap and/or decrease predator movement rates.
2. Identify the spatial scale(s) necessary for effectively reducing caribou predation rates.

Project description

Linear feature restoration within boreal caribou range has become an increasingly important management lever aimed at stabilizing or recovering caribou populations. Successfully implementing this lever requires identifying and testing effective restoration techniques that are both logistically and economically feasible over large spatial scales. To inform this knowledge gap, this project will review existing restoration techniques, seek input from experts in ecological restoration to identify appropriate techniques suitable to large-scale implementation, then test these techniques at scales that biologically meaningful to caribou.

Project background

Population declines of boreal caribou have been linked to increasing predation rates that are ultimately facilitated by human and natural disturbance within caribou range (Environment Canada 2008). In western ranges of boreal caribou, linear features (e.g. seismic lines, pipelines and roads) are thought to play a primary role in increasing predation rates by increasing caribou-predator spatial overlap (Latham et al. 2011) and increasing predator hunting efficiency (McKenzie et al. 2012). As a consequence of this linkage, increasing effort has been allocated toward developing effective techniques for mitigating or functionally restoring linear features within and adjacent to caribou range (e.g. Regional Industry Caribou Collaboration initiatives in Alberta). Critical to such restoration efforts is understanding the spatial scale necessary for restoration to effectively decrease caribou predation rates. Because linear features increase caribou-predator encounters by primarily influencing the predator's behaviour, one suggested approach is to use the biological scale of the predator as a starting reference point (Wilson 2015). That is, the scale of restoration should be large enough to encompass a predator's home range.

For this project, we will evaluate predator response to large-scale restoration of linear features. We will specifically assess whether restoring linear features in all or a significant proportion of a wolf pack's home range can effectively reduce caribou predation rates. This project will build upon existing linear feature restoration initiatives in Alberta but will importantly test the effectiveness of restoration at a biologically defined spatial scale. Outcomes from such a test will directly inform current and proposed restoration initiatives particularly with respect to the requirements of spatial scale and cost.

Project approach

The project will be carried out using the following approach:

Project Scoping

Large-scale restoration of linear features within caribou range will require considerable planning prior to project implementation. As such, a project scoping phase is a necessary first step. This phase will entail:

1. An updated literature review of linear feature restoration techniques and a cost-benefit analysis of each proposed technique.
2. An analysis of wolf movement data to identify potential pack home ranges appropriate for inclusion in the Project Implementation phase. This analysis would use existing wolf GPS data collected from NE BC.
3. Formation of an Advisory Board. This board will entail individuals with expertise in linear feature restoration, representatives from key project stakeholders and representatives from REMB and the SCEK Steering Committee. A primary directive of the Advisory Board will be to formulate clear recommendations for implementing linear feature restoration within NE BC. Upon completion of the literature review and wolf data analysis, we anticipate 1-3 meetings of the Advisory Board to discuss implementation options.

Proposed Methods for Project Implementation

Project implementation will be directly informed by the project scoping phase. Ultimately, however, we propose a before-after-control-impact design (BACI) design to assess wolf response to linear feature restoration. With this design, we will identify and select at least two wolf packs that have similar linear

feature densities within their home ranges. For all selected packs, we will collect baseline movement and space use data prior to the implementation of restoration techniques. Such data may come from existing GPS collar data sets and/or the deployment of additional GPS collars within the selected packs. After collecting baseline data, we will then select the home range of one pack for linear feature restoration. The scoping phase will inform the type of restoration technique and we will collaborate with other existing restoration projects (i.e. Golder in NE BC and RICC in Alberta) to assist prioritizing lines for restoration. Within any prioritization process, we anticipate using an area-based approach when restoring lines within the pack's home range (Wilson 2015). Wolf packs not selected for restoration treatment will function as controls to further assess treatment efficacy.

Key to evaluating the effectiveness of restoration strategies will be selecting the appropriate response metrics. Our ultimate objective is to decrease predator kill rates, which should equate to a decrease in caribou predation rates and therefore positively influence caribou population growth rates. Evaluating kill rates, however, can be expensive and difficult to measure, particularly during the snow-free season when predator use of lines is generally highest (Latham et al. 2011). As a result, we anticipate monitoring two surrogates: i) relative use by predators of treated areas, which will directly assess changes in caribou-wolf spatial overlap; and, ii) wolf movement speed, which directly influences the functional response – or hunting efficiency – of predators (McKenzie et al. 2012). Both metrics – use and speed – can be derived from GPS radio-collars deployed on wolves within the treatment and control packs.

Project deliverables

We will produce the following deliverables in the Project Scoping phase to update project status and accomplishments:

1. Final Report

This report will contain clear recommendations for implementing large-scale linear feature restoration within boreal caribou ranges of NE BC.