

Project Profile

Project Name:	Censusing Wolves to Determine Associations Between Industrial Activity and Caribou Population Growth Rates
Project Number:	BCIP-2016-12
Proponent:	Alberta Biodiversity Monitoring Institute
Funding Envelope:	Boreal Caribou
Timeframe:	October 15, 2015 to December 31, 2016

Project objectives

The objectives of the project are to:

1. Validate the method by estimating the number of collared wolves that are missed during the census; this will be primarily addressed in the Cold Lake/Christina study areas of Alberta and will not require SCEK funds – however validation will also occur in NE BC, with recently deployed wolf collars (though sample size is limited in NE BC);
2. Expand the range of ecological conditions to further test human-induced apparent competition, compared to natural habitat drivers that affect caribou-moose-wolf interactions. This objective will require sampling in the NWT where human footprint is minimal, and will be funded through a combination of NWT funds and SCEK funds;
3. Continue to test associations between wolf and moose abundance; and
4. Continue to increase collaboration among jurisdictions. The final report will include reporting on all 4 of these objectives.

Project description

We will be conducting wolf censuses in 3 broad areas.

1. Northeast British Columbia: 2 caribou ranges (or portions thereof) at about 5000 km² each will be surveyed. The exact ranges have yet to be determined, but will be decided in conjunction with the SCEK moose/wolf subcommittee that was formed on June 25, 2015. The committee includes representatives from UNBC, ABMI, REMB and relevant contract researchers.
2. NWT: one study area will be sampled in NWT. The range will consist of the Southern Decho area, adjacent to the Calendar range in NE BC, where REMB currently has collared wolves and caribou that cross over into the NWT. A second study area may also be sampled, but will be funded by sources external to REMB.
3. NE Alberta: Two ranges will be sampled in this area, based on discussions within the RICC group (Regional Industry Caribou Collaboration). These ranges will be surveyed with funds from Alberta.

The primary reason for a coordinated, multi-jurisdictional sampling program is to clarify the relative importance of human footprint vs. natural habitat at affecting the abundance of moose and wolves. In turn, the relative importance of these factors can be contrasted to determine how caribou dynamics are affected. To achieve this goal, sampling across a broad range of human footprint is required. When examining the figure below (linear feature layer obtained by Environment Canada's caribou recovery program), it is clear that as we transition from BC and Alberta to the NWT, linear features decline dramatically. To maximize learning about the relative effects outlined above, sampling in NWT will be very beneficial. With collaboration between REMB and the NWT, we are hoping to sample wolves in the 'Decho South' caribou area, adjacent to the Calendar range in NE BC. Collared wolves and caribou currently travel between the Decho and Calendar ranges, so the sampling proposed here would not be out of the scope of the REMB.

Project background

The first year pilot to count wolves in boreal caribou ranges revealed four important findings: 1) the method showed promise, with high detection of wolves and wolf sign, and logistical feasibility; 2) much higher wolf numbers than anticipated; 3) possibly more moose observed than anticipated, and 4) general associations between wolf abundance and moose abundance were supported among caribou ranges.

However, planned attempts at validation did not materialize because fewer wolf collars were deployed than were anticipated, and they were deployed after the wolf census. This year, our project will fill key gaps including a better attempt at validation and expanding the range of sampling to include areas with little to no human footprint. Expanding the range of sampling is based on the premise of increased collaboration among 2 adjacent jurisdictions, Alberta and NWT. The NWT areas will serve the purpose of sampling wolves with low seismic line density and other human footprint, and sampling in Alberta will help with validation because currently over 20 wolves are collared in a relatively small area.

Project approach

Our field sampling will incorporate a 2-phase sampling design, with occupancy estimates based on using systematic transects with a fixed wing aircraft, and abundance estimates based on near-immediate follow-up, again with fixed-wing aircraft and helicopter(s). Transect spacing will be set at 3 km based on a power analysis of actual movement rates of GPS collared wolves in the study area in winter. Our analysis was based on varying cumulative wolf movement over 1 to 4 days, and varying simulated transect spacing from 2 to 5 km. The response metric was the proportion of independent detections of crossing events across the simulated transects. Three-km spacing provided a reasonable trade-off between detecting wolf tracks and operational feasibility. However, transect spacing may be varied depending upon actual detection rates in the field. This power analysis will be adjusted and validated as the sampling progresses.

If snow conditions or sightability make it difficult to follow detected wolf tracks from the fixed-wing aircraft, a helicopter will be used to subsequently estimate abundance. The helicopter will conduct near-

ground hovers, or put down to allow observers to make close inspections of tracks, for example, to count tracks on lake ice or seismic lines. Censuses will occur 3 to 6 days after a large snowfall event, allowing fresh tracks to be detected and counted. Each range will be censused once during a single winter, and will be complete within 3 to 4 days to minimize confusion that may arise from wolf movement among survey areas.

Advantages of a 2-phase approach include risk minimization, because if attempts to estimate abundance fail due to poor counting conditions, at a minimum, occupancy will be estimated and compared among caribou ranges. We will also make use of radio-collared packs to obtain a rough estimate of detectability, though crews will not use collared pack information to locate packs. This way, after each wolf track is located, crews will scan through known frequencies to determine the proportion of wolf packs that were detected using the 2-phase method. This estimate of detectability will provide a degree of confidence for our method.

Of equal importance is to validate our method of counting wolves. By validation we mean using a mark-resight component to determine the proportion of collared wolves that are detected by our method. This validation is unlikely to occur in any one jurisdiction due to the limited sample size of collared wolves, yet the area with the most collared wolves (>20) is currently in the Cold Lake/Christina ranges south of Ft. McMurray, Alberta. At a cost of >\$500,000 to collar and monitor these wolves, REMB will be getting this validation component at little to no cost because of the proposed coordinated aspect of our research. A final report will include sampling from all 3 jurisdictions, addressing validation and the relative effect of human footprint on the dynamics of wolves, caribou, and moose.

Project deliverables

The deliverables from this project include the following:

1. Final Report, which will include an estimate of wolf abundance for each caribou range, clear recommendations to adjust methods including survey intensity and frequency, a discussion on wolf population closure (based in part on information from GPS fitted wolves).