



BC BOREAL CARIBOU RESEARCH AND EFFECTIVENESS MONITORING BOARD

ANNUAL REPORT 2013

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Highlights

- The BC Boreal Caribou Research and Effectiveness Monitoring Board expended \$580,000 in its first year on projects to support management of boreal caribou in northeast BC.
- Projects totalling \$1.7M are planned for 2013-14.
- Funding is provided by the oil and gas industry through permit and production levies and contributions.
- Boreal caribou projects in the past year focused on calf survival and juvenile recruitment.
- Monitoring activities included deployment of 155 radio-collars on boreal caribou.
- Projects included significant participation by local First Nations.
- Industry operating practices have been implemented and are being monitored.
- Planned activities include the development and implementation of innovative site-level trials to test management actions that can have an immediate and measurable benefit to boreal caribou.

Background

The Government of British Columbia has developed an approach to balancing habitat protection and management actions for boreal caribou with future petroleum and natural gas (PNG) development activities. This approach is described in the “Implementation Plan for the Ongoing Management of Boreal Caribou (*Rangifer tarandus caribou* pop. 14) in British Columbia” (hereafter BCIP)¹. The BCIP outlines measures to achieve recovery objectives for boreal caribou in northeast BC, which include:

- Establishing Resource Review Areas (RRAs) where PNG tenure sales are deferred for a minimum of five years;
- Identifying and designating under the *Oil and Gas Activities Act* boreal caribou habitat areas where PNG activities are mitigated;
- Establishing operating practices to be applied to PNG activities in designated boreal caribou habitat areas;
- Restoring boreal caribou habitat;
- Managing caribou predators and their primary prey; and,
- Conducting research on boreal caribou and their habitat.

The BC Boreal Caribou Research and Effectiveness Monitoring Board (REMB) was established to implement the BCIP. The REMB was enabled through A Memorandum of Understanding (MOU) signed in August 2011

by the BC Ministry of Forests, Lands and Natural Resource Operations (FLNRO), BC Ministry of Energy, Mines and Natural Gas (MNG), BC Ministry of Environment (MoE), the Canadian Association of Petroleum Producers (CAPP), and the Explorers and Producers Association of Canada (EPAC).

CAPP and EPAC agreed to support implementation of the BCIP through a levy on PNG permitting and production, which will provide up to \$2 million annually for up to 5 years. The BC Oil and Gas Commission administers the REMB through the Science and Community Environmental Knowledge Fund.

This report partially fulfils the reporting requirements of the REMB’s steering committee and describes the priorities and timelines to implement the BCIP, as well as work completed during the REMB’s first year.



¹ Available from: <http://www.env.gov.bc.ca/wld/speciesconservation/bc/>

² Reports are available from <http://www.scek.ca/projects>

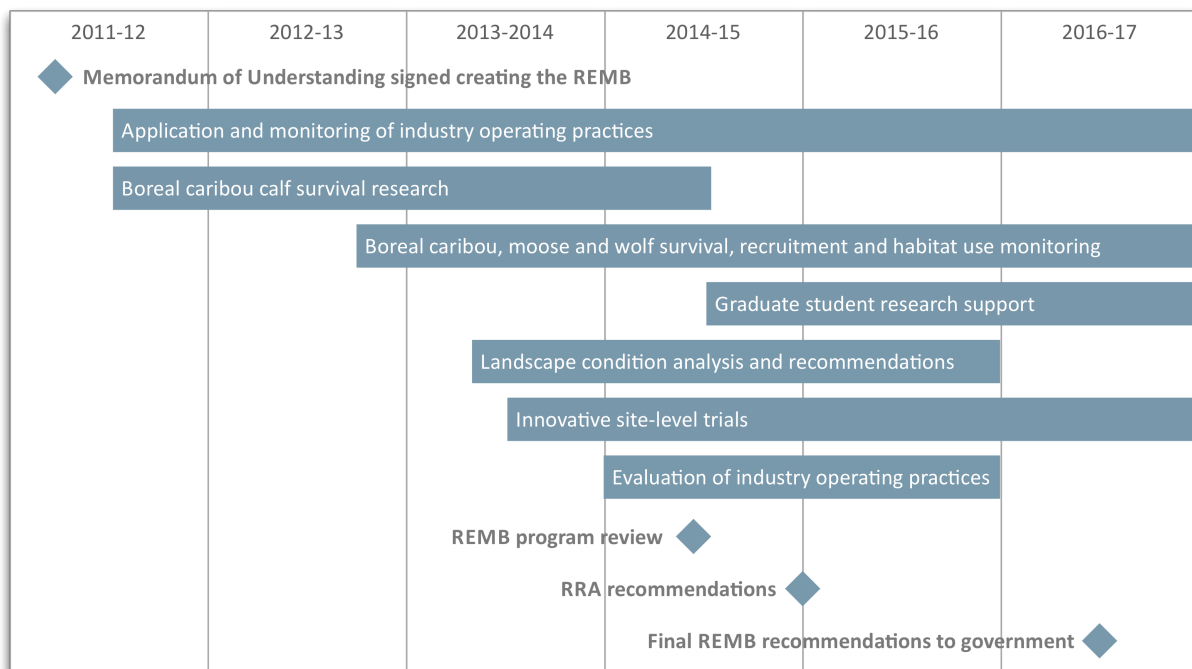
³ Bergerud, A.T. 1996. Evolving perspectives on caribou population dynamics, have we got it right yet?

Work Plan and Milestones

Within 5 years the REMB will be delivering recommendations to the BC government on key aspects of the BCIP, including (where necessary):

1. Amendments to areas managed for boreal caribou, including Resource Review Areas (RRA);
2. Preferred restoration treatments and their required extent and distribution;
3. Targets for predator and/or prey management;
4. Revisions to industry operating practices; and,
5. Other actions required for successful implementation of the BCIP.

TIMELINE OF REMB ACTIVITIES



To deliver on these recommendations the REMB is undertaking several phases of work. Industry operating practices were established in September 2011 and sponsored research on caribou survival was already underway.

Because baseline inventory data were limited, the REMB focused first-year activities on initiating survival, recruitment and habitat use monitoring of boreal caribou and other key species of the predator-prey system.

Characterizing the distribution, abundance and condition of boreal caribou habitat in northeast BC will be a near-term priority for the REMB. In addition, preliminary work is underway to test site-level mitigation practices that could generate immediate and measurable benefits to boreal caribou.

Monitoring, mapping and site-levels trials will be supported by graduate student research that is expected to begin by September 2014.

The REMB will deliver recommendations to government as they are developed and plans to complete activities by 2016-17.

Inventory and Research Activities

The REMB supported a number of inventory and research projects in 2012-13 focused on addressing key data gaps. Projects were conducted by contractors and academics and included significant participation by members of local First Nations communities².

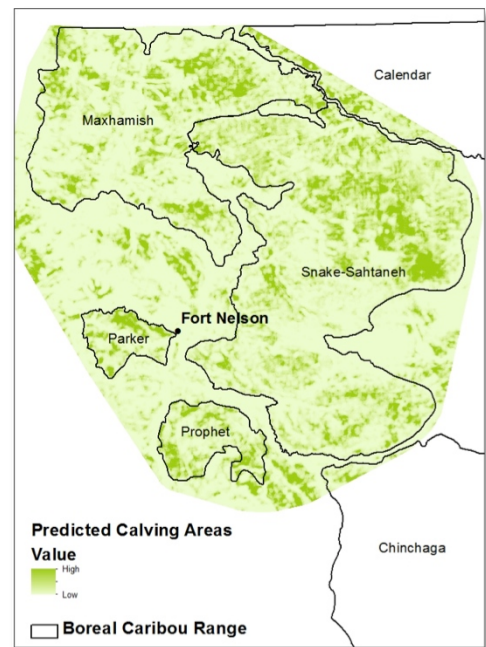
BOREAL CARIBOU CALF SURVIVAL RESEARCH

The REMB, SCEK and several other funding partners have been supporting the work of Craig DeMars, a Ph.D. candidate at the University of Alberta, since 2011. His research is focused on assessing the spatial factors affecting predation risk to boreal caribou calves and their management implications. Low calf survival is likely a driver of boreal caribou population declines and understanding the interactions among boreal caribou, landscape characteristics and the broader predator-prey system is critical to developing effective management actions.

Craig's work has involved radio-collaring and tracking adult female caribou, wolves and black bears in caribou ranges in northeast BC. Intensive springtime monitoring is used to determine boreal caribou calving locations and survival. Analyses to date have focused on identifying important calving habitat and landscape characteristics that influence whether or not calves survive their first few months of life.

Preliminary results suggest that boreal caribou cows move from winter ranges dominated by habitats providing terrestrial lichens into landscape mosaics of fens and upland conifers. Use of these habitats may represent a maladaptive strategy in areas characterized by high wolf populations because wolves tend to select similar habitats in spring. This loss of spatial separation between boreal caribou and wolves during this critical season might be resulting in high predation rates on boreal caribou calves.

Craig will be concluding his fieldwork in spring-summer 2013 and completing his thesis in 2014.



Low calf survival is likely a driver of boreal caribou population declines

² Reports are available from <http://www.scek.ca/projects>

BOREAL CARIBOU RADIO-COLLARING

Monitoring the survival, recruitment and habitat use of boreal caribou is critical to understanding current population trends, responses to landscape change, and the effectiveness of management actions aimed at mitigating industrial impacts. Before this year, monitoring had been sporadic and localized and population sizes and trends were inferred primarily from indices of habitat suitability and landscape condition.

To meet a goal of monitoring the survival and recruitment of 10-15% of the boreal caribou population in each of the 6 ranges in northeast BC, the REMB contracted Diversified Environmental Services to radio-collar 155 boreal caribou. A mix of VHF and GPS radio-collars were deployed to provide both long-term survival data and habitat use information in areas that had not been previously sampled.



This ambitious program represents one of the largest single radio-collar deployments ever completed in Canada and will provide a foundation of monitoring data for several years. Additional radio-collars will be deployed annually to maintain a consistent sampling effort.

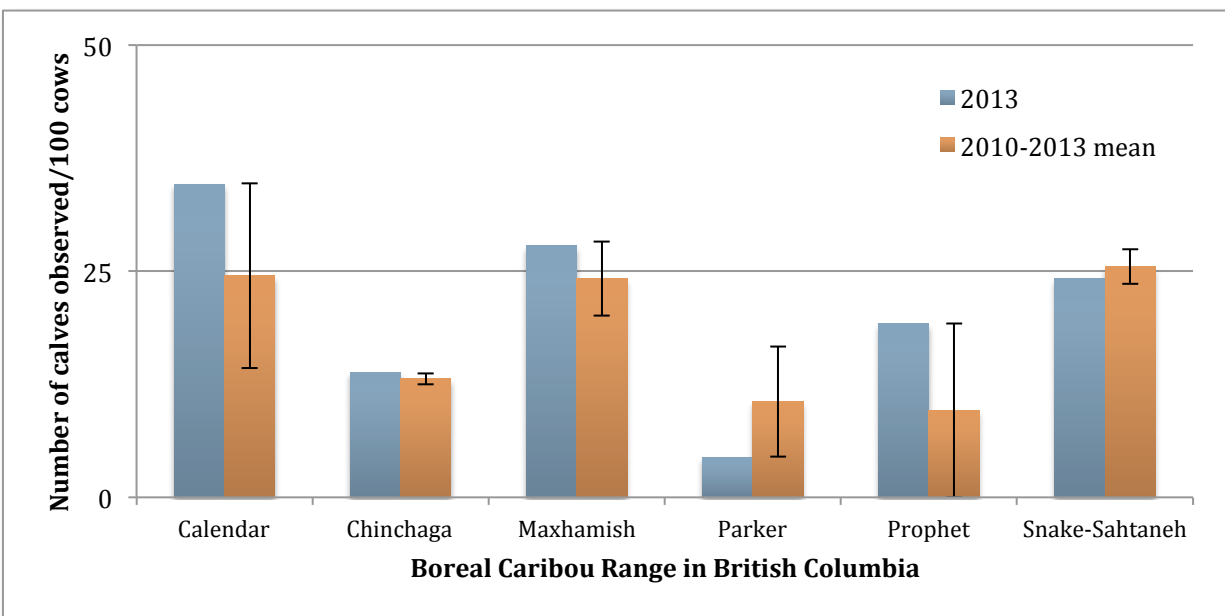
155 female boreal caribou were radio-collared in winter 2013 to monitor habitat use, survival and juvenile recruitment

BOREAL CARIBOU RECRUITMENT SURVEY

“Recruitment” measures the number of young animals entering the adult population. This is an important indicator of population trend and is assessed by determining the proportion of adult females that are accompanied by calves in March. By this time, calves are nearly a year old and will soon be independent as their mothers enter another calving season. In general, caribou populations are considered stable or increasing when >25% of adult females have calves with them from the previous spring when surveyed in late winter.³

The REMB contracted Diversified Environmental Services to conduct a recruitment survey in March 2013. With the large number of radio-collars recently deployed, the surveyors were able to locate more than 600 collared and uncollared females and more than 900 boreal caribou overall – the largest number of boreal caribou ever surveyed in northeast BC.

BOREAL CARIBOU CALF RECRUITMENT IN NORTHEAST BC RANGES



The observed ratio of calves per 100 cow caribou was 21 for all of northeast BC. The ratio differed among ranges and ratios are known to vary from year-to-year. But current data suggest that caribou populations in the Prophet, Parker, and Chinchaga ranges are likely declining, while populations in the Calendar, Maxhamish and Snake-Sahtaneh ranges may be stable, depending on trends in adult survival⁴.

³ Bergerud, A.T. 1996. Evolving perspectives on caribou population dynamics, have we got it right yet? Rangifer Special Issue 9: 95-116.

⁴ 4-year means in figure are illustrated with error bars of one standard error.

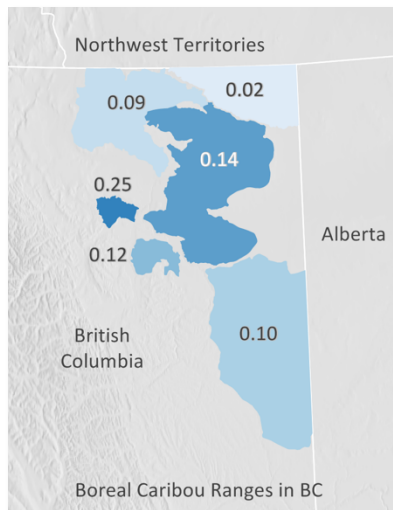
MOOSE DENSITY SURVEY IN BOREAL CARIBOU CORE AREAS

Moose populations are a major driver of predator-prey dynamics in boreal ecosystems. Population densities are higher in early seral habitats often associated with recent forest harvesting or other industrial activity⁵. Boreal caribou are hypothesized to suffer higher mortality when wolf populations respond to increasing moose densities; therefore, knowing the density of moose in and near caribou habitat is an important indicator of risk to boreal caribou.

The REMB contracted Canadian Wildlife Capture Ltd. to conduct a moose survey in core caribou habitat that had not been surveyed in at least the past 8 years.

Surveyors counted more than 300 moose while flying nearly 4,000 km of transects. In general, moose densities in core caribou areas were low but ratios of calves to cows suggested that the population was likely increasing in many areas.

Pooled with previous survey data, the REMB now has recent moose density estimates throughout the range of boreal caribou in northeast BC. Average moose densities are lowest in the northernmost ranges (Calendar and Maxhamish) and Chinchaga and highest in portions of the Snake-Sahtaneh, Parker and Prophet ranges.



Moose densities are low but likely increasing in core caribou habitat



⁵ Fisher, J. T. and L. Wilkinson. 2005. The response of mammals to forest fire and timber harvest in the North American boreal forest. *Mammal Review* 35:51-81.

Current Management Response

HABITAT PROTECTION AND MANAGEMENT

Various habitat protections are in place within boreal caribou ranges in northeast BC. These include:

1. **Resource Review Areas (RRA):** oil and gas tenuring has been suspended in these areas until 2015.
2. **Ungulate Winter Ranges (UWR) Type A:** the forest industry is prohibited from harvesting and road-building and oil and gas activities are subject to operating practices.
3. **Ungulate Winter Ranges (UWR) Type B:** forest harvesting and road-building are restricted and oil and gas activities are subject to operating practices.
4. **Wildlife Habitat Areas (WHA):** the forest industry is prohibited from harvesting and road-building and oil and gas activities are subject to operating practices.
5. **Parks and Protected Areas:** industrial activities are prohibited.

Although many of the designations are sector-specific, areas overlap and provide extensive protection of caribou habitat.

HABITAT PROTECTION FOR BOREAL CARIBOU (KM²)

CARIBOU RANGE	AREA	RRA	UWR(A)	UWR(B)	WHA	PARKS	%
Calendar	4,973	2,162	1,561	3,178	0	204	100
Chinchaga	13,898	2,123	N/A	N/A	0	157	16
Maxhamish	7,095	0	1,396	3,289	0	275	70
Parker	752	0	96	122	0	2	29
Prophet	1,193	825	149	766	0	4	91
Snake-Sahtaneh	12,000	0	3,809	646	2,763	0	38
Total	39,910	5,010	7,010	8,000	2,763	643	45

The proportion of boreal caribou ranges under special management varies from a high of 100% in the Calendar to a low of 16% in the Chinchaga. The BC government has designated Ungulate Winter Ranges and associated measures for boreal caribou habitat management in the Chinchaga range. The new designations will be gazetted in May 2013 and will substantially increase the level of protection of caribou habitat in this area.

INDUSTRY OPERATING PRACTICES

The development and implementation of PNG industry operating practices to mitigate impacts of industrial activity on boreal caribou has been an important response to the challenge of managing the species in northeast BC. Evaluating these operating practices requires the following:

1. Monitoring industry compliance to ensure that companies are meeting permit requirements;
2. Monitoring implementation of the operating practices to ensure that requirements are reflected in permits; and,
3. Monitoring effectiveness to ensure that operating practices are meeting objectives.

Compliance Monitoring

The BC Oil and Gas Commission (OGC) is responsible for regulating oil and gas activities in BC, and one of the Commission's responsibilities is to ensure that oil and gas operations are consistent with conditions contained in permits authorized under the *Oil and Gas Activities Act*.

Applications for activities in boreal caribou Wildlife Habitat Areas and Ungulate Winter Ranges are reviewed for consistency with industry operating practices and, where appropriate, specific operating requirements are included as conditions in permits issued for specific oil and gas activities.

The Commission conducts compliance inspections and initiates enforcement actions where appropriate and publishes compliance reports annually.

Implementation Monitoring

The Ministry of Environment may order an independent audit of the OGC's performance related to protection and effective management of the environment. This authority may extend to auditing the implementation of industry operating practices for boreal caribou in permits issued by OGC.

Effectiveness Monitoring

Assessing whether the operating practices are meeting the objectives of the BCIP requires effectiveness monitoring. Assessing the effectiveness of industry operating practices and recommending revisions is a key deliverable of the REMB. Evaluation of operating practices is scheduled to begin in 2014.



Work plan for 2013-14

Projects totalling \$1.7M are planned for 2013-14. Work will be focused on the following objectives:

1. **Implementing site-level mitigation trials.** In addition to current industry operating practices there may be actions that can provide immediate and measurable benefits to boreal caribou at the site level. Developing and supporting field trials of innovative site-level management actions is a key objective for the REMB in the upcoming year.
2. **Update models to reflect survey data collected during 2012-13.** Baseline data collected during the year will be used to update predictive management models to ensure that research, inventory and management decisions are based on the most up-to-date information.
3. **Acquire or develop caribou habitat mapping.** Understanding the current distribution, abundance and condition of boreal caribou habitat in northeast BC will help to determine the intensity and duration of management actions required to mitigate industrial impacts.
4. **Evaluate and address gaps in baseline data.** Revisions to management models might indicate important gaps in the REMB's current data gathering activities. Projects will be designed and implemented to address these gaps, where required. This is scheduled to include surveys of traditional ecological knowledge of local First Nations.
5. **Identify research hypotheses for graduate student intake in 2014.** The REMB will work with academic researchers to identify research gaps suitable for graduate student projects.
6. **Conduct a preliminary assessment of RRA effectiveness and a work plan to develop final recommendations.** The current moratorium on tenure sales in Resource Review Areas is set to expire in 2015. In anticipation of this deadline, the REMB will be conducting a preliminary assessment of current RRAs, based on existing information, with recommended actions and analyses required to complete the assessment before the policy expires.
7. **Design and implement a data management and sharing strategy.** Inventory and research activities sponsored by the REMB are generating significant data that could be leveraged by others to improve boreal caribou management. The REMB will be developing a strategy to share data with key partners and stakeholders to maximize the value of data collected during projects.



Financial Summary

The REMB is financed primarily through permitting fees and production levies on oil and gas activities in BC. The Fund also accepted a \$20,000 contribution from TransCanada PipeLines in 2012 to invest toward habitat restoration.

Because 2012-13 was the first year for the REMB, the program ran a considerable surplus. Program expenses will rise sharply in 2013-14 to fund existing and new inventory and research projects.

REVENUE, EXPENSES AND FUND BALANCE		\$
Revenues		
Interest		5,329
Contributions (TransCanada PipeLines Limited)		20,000
Fees		321,200
Levies		1,502,501
		1,849,030
Expenses		
Project Costs		604,455
Professional services		61,465
Amortization expense		3,671
Management Fees		14,520
Miscellaneous		3,544
		687,655
Excess (deficiency) of revenue over expenses		1,161,375
Balance, beginning of year		733,809
Balance, end of year		1,895,184

Partners and Funders



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