



2016

ANNUAL REPORT

RICC | Regional Industry
Caribou Collaboration



The Regional Industry Caribou Collaboration (RICC) is a group of energy and forestry companies working collaboratively across tenure and lease boundaries to coordinate habitat restoration, conduct research on caribou ecology and landscape relationships, and lead investigative trials on landscape restoration methods, effectiveness and wildlife responses to habitat treatments.

Boreal woodland caribou are wide-ranging animals whose annual home ranges cross company leases and land-use types. Their populations are currently listed as threatened under Canada's Species at Risk Act (SARA). Many complex and interconnected factors are contributing to the decline of boreal caribou including landscape changes, both natural and human-caused, which are indirectly contributing to increased predation on caribou.

To achieve self-sustaining populations, the federal Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada estimates that at least 65% of a caribou's range should be undisturbed, with disturbance defined as human footprint plus a 500 m buffer, along with areas that have been burned in the last 40 years. As of 2012, boreal caribou ranges across northeastern Alberta were between 15% and 43% undisturbed.

The 2011 Government of Alberta's *A Woodland Caribou Policy for Alberta* identifies that "Caribou conservation is a shared government, public and private sector responsibility, led by government." Lease-specific mitigations undertaken by industry are important to minimize local impacts, whereas more population-level or range-level mitigations require collaboration. RICC enables range-level caribou recovery efforts in advance of the Government of Alberta range plan for the northeast Alberta caribou ranges.



MISSION

Enable the restoration of caribou habitat and recovery of their populations through collaborative, range-based efforts

GOAL

- ▶▶▶ Participate in collaborative research and active, science-based adaptive management activities within the defined RICC study area

OBJECTIVES

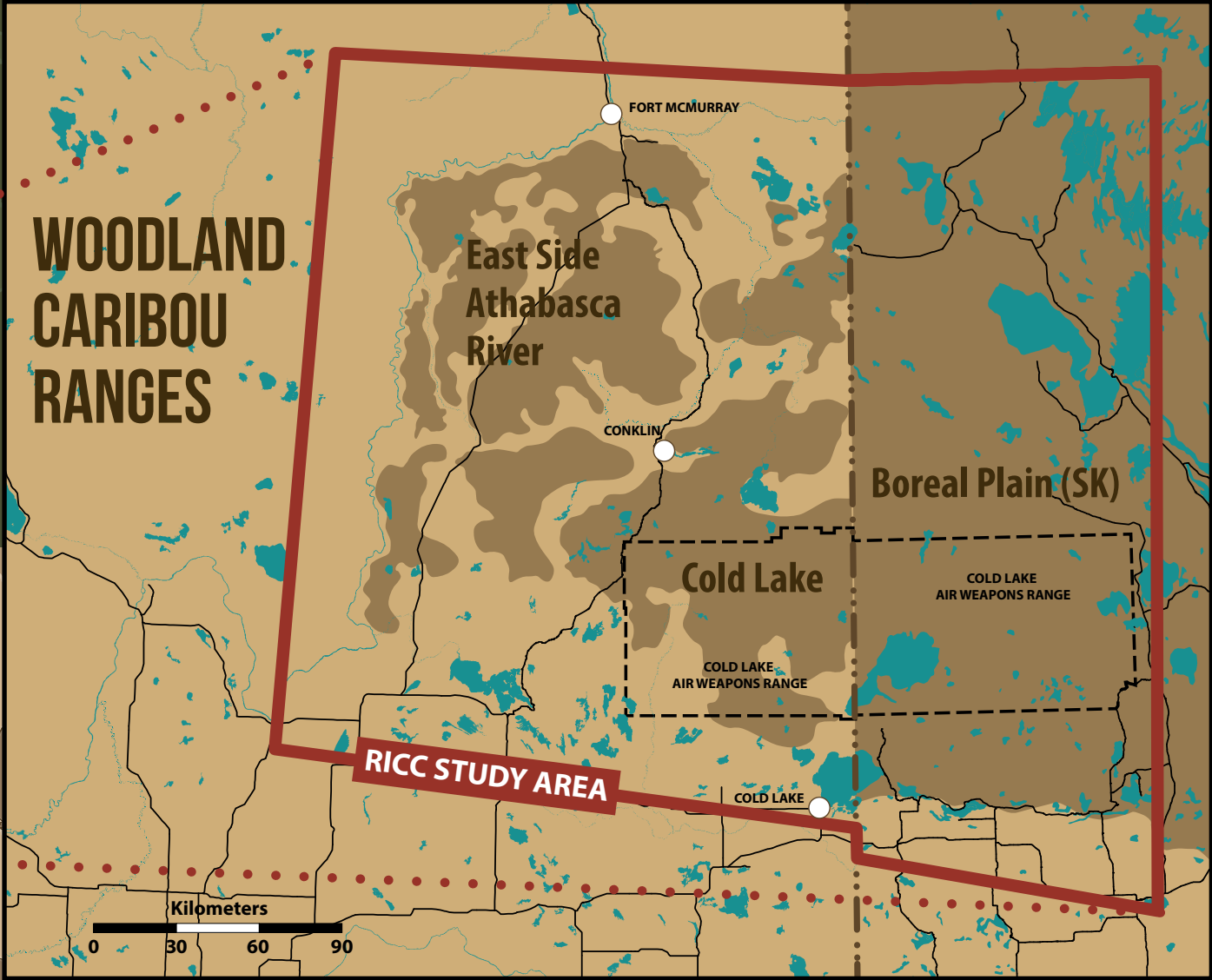
- ▶▶▶ Coordinate industry restoration of disturbance in priority areas
- ▶▶▶ Support and/or lead scientific research on caribou ecology and on caribou-predator-landscape relationships to identify priority issues and/or priority areas
- ▶▶▶ Support and/or lead investigative trials on restoration methods, effectiveness, and wildlife responses, and make recommendations for broader implementation



1 RICC STUDY AREA

The RICC Study Area includes the Cold Lake and East Side Athabasca River boreal woodland caribou ranges in Alberta, and part of the Boreal Plains caribou range in Saskatchewan.

The RICC study area covers approximately 85,000 km² in the Cold Lake and East Side Athabasca River (ESAR) boreal woodland caribou ranges, and parts of the boreal forest in the Saskatchewan Boreal Plain caribou range to the east as a reference environment. The study area includes an additional 20 km buffer to incorporate adjacent areas that may have an impact on woodland caribou within their ranges. The ESAR and Cold Lake caribou populations are currently in decline and the Saskatchewan Boreal Plain population's status is unknown. As of 2012, ESAR and Cold Lake ranges were 81% and 85% disturbed, respectively, and the Saskatchewan Boreal Plain range was 42% disturbed, according to the definition of disturbance in the National Recovery Strategy.



2 HABITAT RESTORATION

APPLIED AT THE REGIONAL SCALE

By the end of 2016, RICC members had implemented restoration treatments on nearly 1,000 km of legacy seismic lines in the boreal forest.

2016 RESTORATION PROJECTS

1

RESTORATION AT THE TOWNSHIP SCALE

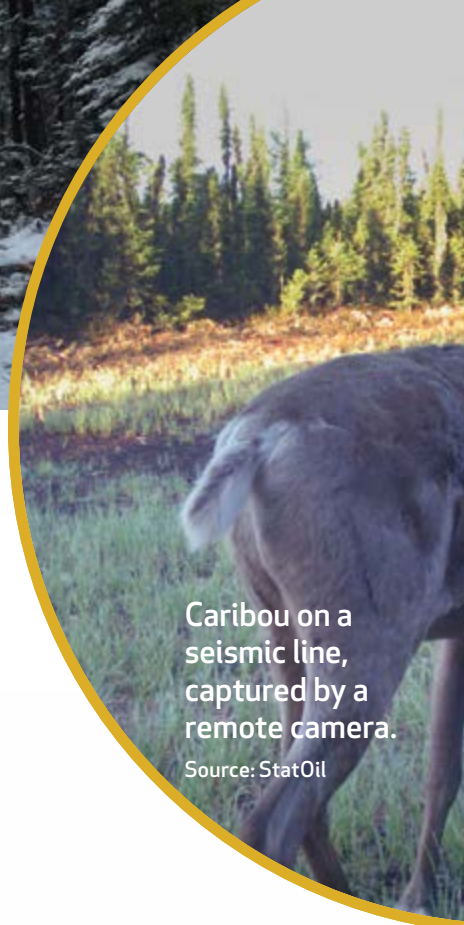
Companies involved:
CENOVUS, CANADIAN NATURAL,
IMPERIAL AND DEVON CANADA

A total of 204 km of linear features were restored within four townships. The treatment included mechanical site preparation, such as mounding and stand modification/stem bending, prior to the planting of seedlings. The program also incorporated amphibious and low ground-pressure equipment for treatment under non-frozen conditions.



Stem bending on a seismic line

Source: MEG Energy



2

6,590 PLANTED AND 2,550 TRANSPLANTED SEEDLINGS

Companies involved:
MEG ENERGY

Over 15 km of linear features were restored in the Christina herd of the ESAR caribou range. Treatments included hand treatments (fertilizing, hinging, and bend and lash), and machine treatments (mounding with hinging, planting and transplanting or ripping and hinging). As part of this program, almost 10,000 seedlings were planted. Three fence units were applied at strategic locations off a winter road disposition for access and line-of-sight management.

Caribou on a seismic line, captured by a remote camera.

Source: StatOil

3

RESTORATION: EAST SIDE ATHABASCA CARIBOU RANGE

Companies involved:
STATOIL CANADA AND DEVON CANADA

In 2016, Statoil Canada and Devon Canada collaborated on a restoration effort in the western portion of the East Side Athabasca Caribou Range (Egg Pony Herd), by planting 5.9 km of seismic lines. RICC is exploring additional restoration opportunities and collaboration partnerships within the East Side Athabasca Range.

4

RESTORING PROVINCIAL PARKS THROUGH COLLABORATION

Companies involved:
TRANSCANADA AND ALBERTA-PACIFIC FORESTRY INDUSTRIES

Collaboration has taken place with Alberta Parks to restore seismic features in provincial parks and conservation areas in northeastern Alberta. A restoration plan was developed in late 2016 to continue restoration treatments in the south Dillon Wildlands in 2017 and plan future restoration activities in the Stony Mountain Wildlands in 2018.





5

BUILDING LARGER PATCHES OF RESTORED HABITAT

Companies involved:

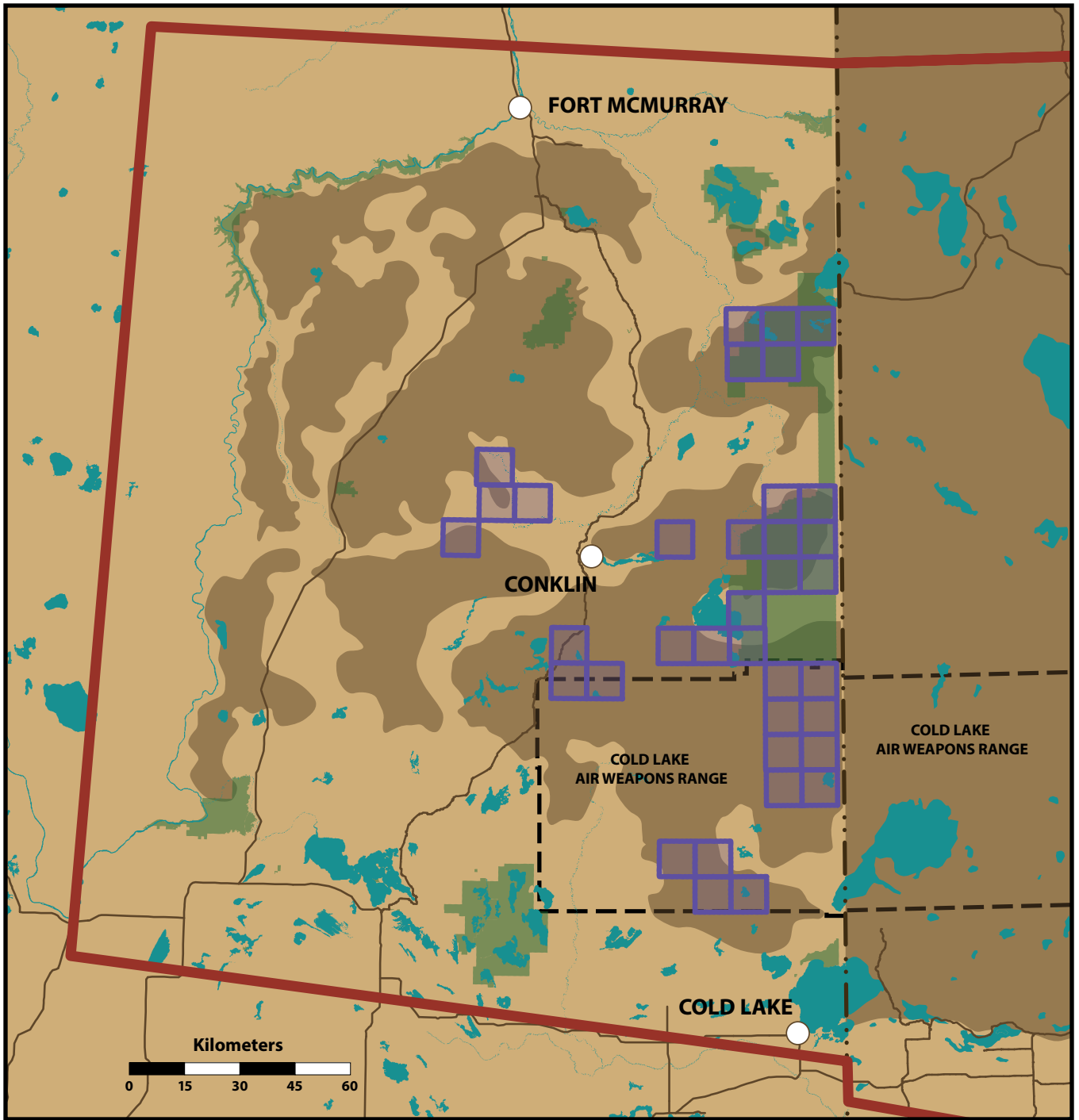
CENOVUS

The LiDEA (Linear Deactivation) Project, led by Cenovus, was initiated in 2013 as a long-term adaptive management trial that applied restoration treatments to approximately 370 km² of boreal caribou habitat. In 2016, Cenovus launched its 10-year Caribou Habitat Restoration Project to restore caribou habitat within the Cold Lake herd.



Employees monitoring conditions on a Devon lease.

Source: Devon Canada



Townships in which treatments have occurred (purple), contributing to the RICC mission in the Cold Lake and ESAR ranges. Townships identified as treatment areas have various intensities of treated lines, ranging from Statoil's targeted coarse woody debris treatments to the intensive mounding and planting in LiDea.

 Townships with treatments

Aerial view of a restored seismic line

including the use of fences for access and line-of-sight management



3 CONTRIBUTING PROJECTS

PREDATOR COLLARING AND MONITORING PROVIDE INSIGHT

In 2015, RICC began managing bear and wolf telemetry work initiated by individual member companies to track wildlife use of linear features and their response to restoration treatments. Data acquired from these collars are being used to help test a series of predictions that were collaboratively developed during the initiation of the LiDea program and University of Alberta graduate research. Predictions are geared towards better understanding the functional and numerical responses of predators to linear features and

management actions such as habitat restoration. For example, seasonal home ranges for individual wolves and bears collared in the RICC study area were determined using collar location data.

In February of 2016, nine long-term GPS telemetry collars were deployed on wolves to fill spatial gaps and replace existing collars. These collars increased the ability to validate population estimates for the RICC aerial wolf census and will help to maintain long-term location data coverage.

Wolves travel two to three times faster on linear features compared to natural forest, thereby potentially increasing their encounters with caribou and other prey.

EMPIRICAL RESEARCH TO INFORM RESTORATION STRATEGIES

RICC supported the graduate research of Melanie Dickie, a student at the University of Alberta under the supervision of Dr. Stan Boutin. Melanie's work resulted in a peer-reviewed manuscript which found that wolves select linear features and travel 2-3 times faster while on linear features. In addition, results show that net daily movement rates increased because of the increased time and speed spent on linear features.

In 2016 Melanie built on this work by evaluating the functional recovery of linear features for woodland caribou. She looked at more detailed and sophisticated analyses to examine how vegetation

on linear features affects wolf selection of, and movement on, these features. Travel speeds were strongly reduced once vegetation reached heights of 0.50 m.

These results suggest that most of the movement efficiency afforded to wolves by linear features is mediated when vegetation exceeds 0.50 m. This finding could directly inform future restoration strategies and practices, as active restoration could be focused on areas that have not met this value.

CHECKING OUR SCIENCE: AN EXTERNAL REVIEW

The RICC Steering Committee coordinated an independent program review by external third parties. The primary objective of the external review was to critically evaluate the scientific and technical merits of the research and monitoring foundations of RICC, and to identify strengths and recommend improvements or changes to those elements or to the implementation approach.

The external review will conclude with a review document presented to RICC in spring 2017.

Reviewers:

Dale Seip, Ph.D, P.Ag., R.P.Bio.

Wildlife Ecologist
Northern Interior Forest Region,
Government of British Columbia

Justina Ray, Ph.D.

President and Senior Scientist
Wildlife Conservation Society Canada

Ellen Macdonald, Ph.D

Department Chair
Professor, Renewable Resources,
University of Alberta

LIDEA RESULTS COMING IN

2016 marks the conclusion of the first wildlife monitoring pulse for the LiDea project. Wildlife monitoring in LiDea focused on large predators and alternate ungulate prey of relevance to the caribou system in Northeast Alberta. Monitoring and analyses are organized into site, individual and population levels. In general, results suggest a behavioural response from large mammals can be achieved with restoration treatment—specifically how the use of legacy linear features can be significantly reduced with restoration treatments. Further results will be shared once the final report and manuscripts are prepared.



STANDARDIZING REMOTE CAMERA STUDY DESIGN AND PROTOCOLS

Existing guidelines for recovering caribou populations are primarily based on criteria linked to vegetation. However, the ecological processes influencing caribou predation may recover at rates that differ from the recovery of vegetation structure, suggesting multiple metrics may be required to effectively monitor and assess how effective habitat restoration initiatives are.

RICC conducted a workshop in 2016 to discuss the feasibility of a large-scale, long-term remote camera monitoring program. Workshop participants

discussed whether RICC objectives can be met using a large-scale camera monitoring program as well as the merit and feasibility of standardizing protocols for camera monitoring within and outside of existing RICC projects and partnerships.

A document is currently being drafted jointly by the University of Alberta's Craig DeMars and the Alberta Biodiversity Monitoring Institute's Rob Serrouya to provide clear recommendations on study design for remote camera monitoring of the effects of habitat restoration on wildlife.

ESTIMATING THE DENSITY OF CARIBOU, THEIR PREDATORS AND ALTERNATE PREY SPECIES

InnoTech Alberta (formerly Alberta Innovates Technology Futures) has started a project within the RICC study area to develop and evaluate Spatial Count models using remote camera detections to generate density estimates for caribou, moose, black bears and wolves. InnoTech will use data from their Boreal Deer Project, in conjunction with RICC data, to develop and evaluate Spatial Mark-Recapture (SMR) models for estimating animal densities (e.g. wolf, bear, caribou, moose). The collaboration and inclusion of multiple datasets will improve the accuracy and precision of density estimates. In addition, the research will compare the camera-based density estimates with independent estimates of density in the region generated by complementary projects (e.g., fecal DNA capture-

recapture methods being undertaken as part of the LiDEA project).

This program will develop recommendations for the use of remote camera and spatial capture-recapture methods in future survey and monitoring efforts to support caribou management in Alberta's Oil Sands region. These results will be important as habitat restoration activities progress, since they will provide reliable density estimates that can be compared spatially (where treatments have and haven't occurred) and over time. This project is expected to produce a report in 2017 describing modelling methods, density estimates and recommendations for further work on white-tailed deer, wolf, black bear, coyote, caribou, and moose populations in the study area.



CENSUSING WOLVES TO BETTER UNDERSTAND THE RELATIONSHIP BETWEEN PREDATORS, HABITAT, HUMAN DISTURBANCE AND CARIBOU POPULATION GROWTH RATES

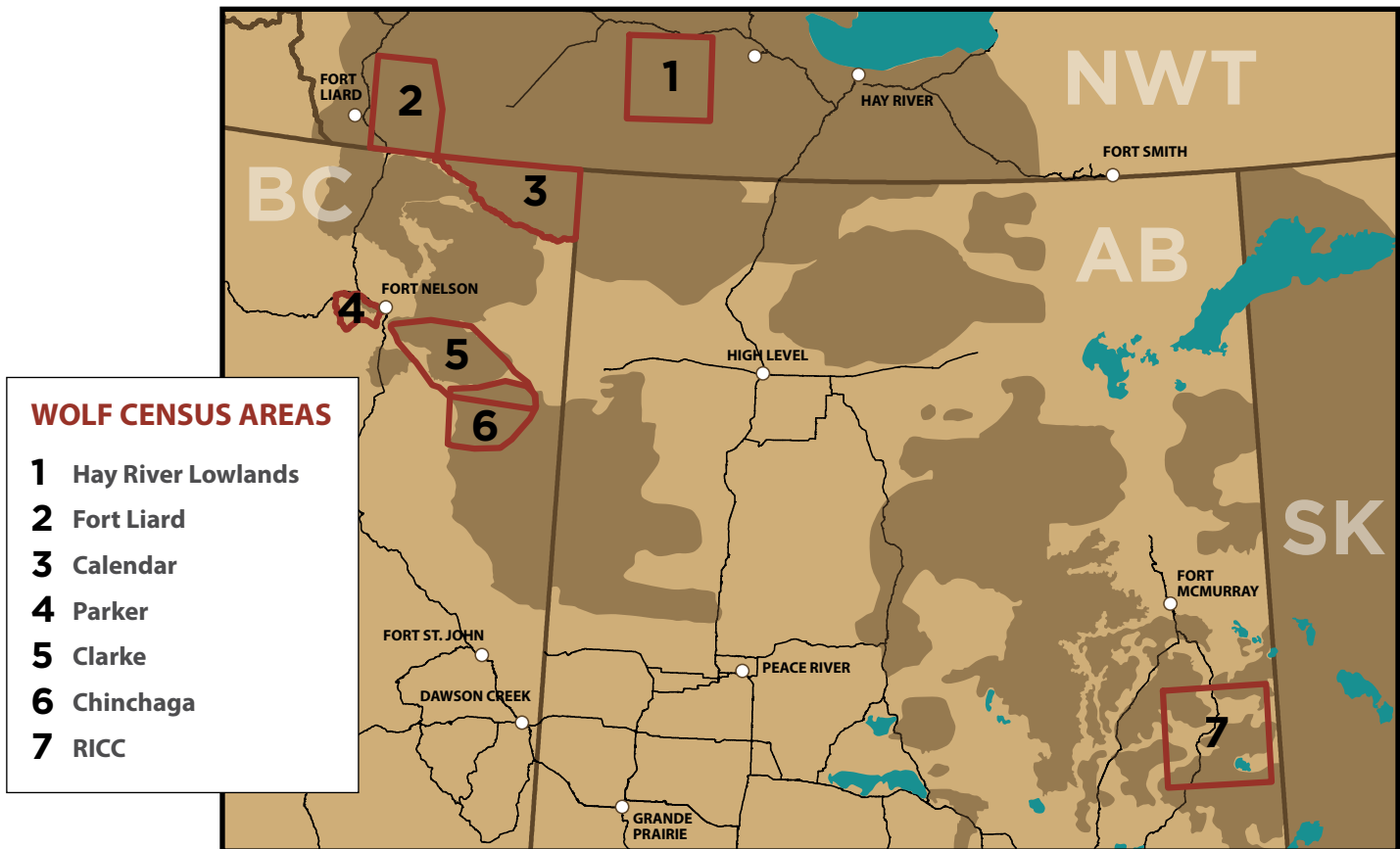
RICC became a study location of a collaborative program between BC OGRIS (British Columbia Oil and Gas Research and Innovation Society) the Government of Northwest Territories, and the Alberta Biodiversity Monitoring Institute's Caribou Monitoring Unit to address the relative influence of human footprint, climate and natural habitat composition on the abundance of moose, wolves and caribou.

Seven wolf survey units (WSUs; 752 to 7271 km²) were sampled, one of which was located within the RICC study area. The RICC WSU was important in the overall study design because survey units were chosen to maximize variation in the influence of habitat disturbance with pre-existing estimates of caribou population growth rates and moose density.

A survey method to estimate wolf abundance was developed by simulating aerial transect spacing

and time since snowfall to estimate the probability of encountering wolf tracks using 5-minute GPS data from wolves. These methodologies were adopted and used to compare the relative importance of human footprint and natural habitat (amount of wetland habitat) on wolf density and caribou population growth rates to determine which factors had a greater influence.

Preliminary results show that increased human footprint was related to higher wolf density and decreased caribou population growth. Areas with less wetland habitat also had a lower caribou growth rate. The upcoming year will use methods developed in the pilot program to conduct additional surveys to increase sample size and provide data to further evaluate the links between landscape attributes, prey and predators.



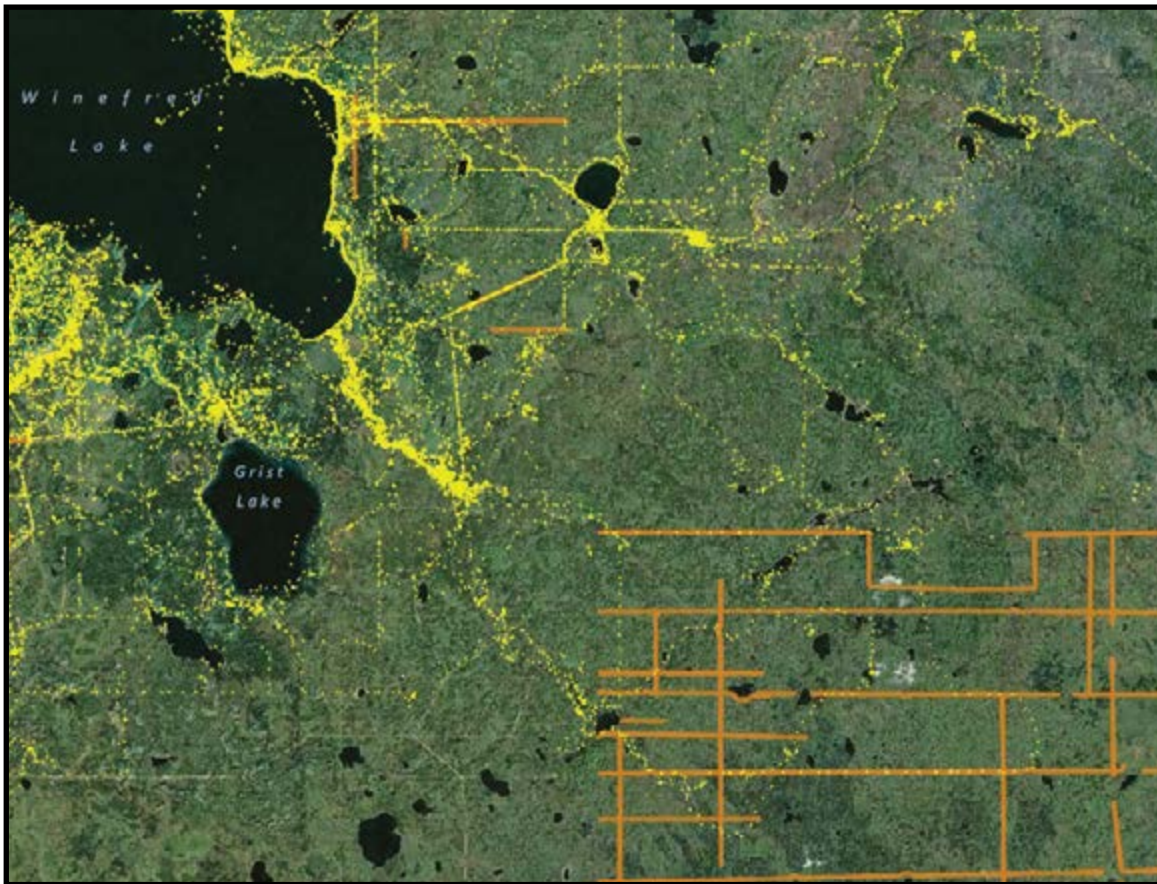
Map showing the seven WSUs that were surveyed in two winters (2014/2015 – Calendar, Chinchaga Resource Review Area (RRA), Clarke and Parker; 2015/2016 – RICC area, Fort Liard, and Hay River Lowlands).

DATA PORTAL FACILITATES COLLABORATION

The RICC data portal facilitates data sharing, collaboration and habitat restoration planning among RICC members. In 2016, the portal was updated to include:

- ›››› Inventory of treated linear features
- ›››› Predator telemetry
- ›››› Industrial project boundaries
- ›››› Land-use planning boundaries under the Lower Athabasca Regional Plan (LARP)
- ›››› Provincial Protected Areas
- ›››› Planned habitat restoration areas
- ›››› GoA caribou home range data (Minimum Convex Polygons (MCPs))

Together, these resources create an easily accessible place for RICC members to locate and utilize data associated with caribou conservation and land-use planning within the ESAR and Cold Lake caribou ranges.



Screen capture of the RICC Data Portal mapping interface, displaying caribou range (open green polygons), the Cold Lake Air Weapons Range (pink polygon), wolf telemetry (small yellow points), and treated linear features (orange polylines). Visitors to the portal can select which layers they would like to view using a drop-down menu.

4 LOOKING TO THE FUTURE

RICC's increased collaboration in coordinated habitat restoration and research is making significant progress in the amount of area that has been treated, treatment monitoring methods, centralized data viewing, and the development of restoration prioritization protocols. Here's what to expect from RICC in 2017:

- »»» Restoration activities and monitoring of long-lasting life-cycle collars to economically monitor survival of wolves and bears
- »»» Increased efforts to monitor vegetation and animal use of treated lines, including the implementation of remote technologies
- »»» Increased restoration activities, with companies working together to plan and restore contiguous areas to create larger zones of undisturbed habitat.
- »»» Incorporating knowledge from COSIA's restoration prioritization project to identify priority areas for habitat restoration in the Cold Lake and ESAR caribou ranges

PRESENTATIONS

PRESENTATIONS	WORKSHOP / CONFERENCE	AUTHORS	DATE	LOCATION
Choosing the right lines: Coordinated caribou habitat restoration across industrial sectors in Alberta	North American Caribou Workshop	Margaret Donnelly, ALPAC	May 16-20, 2016	Thunder Bay, ON
Cenovus caribou habitat restoration: Innovative silviculture for the Cold Lake herd range in Alberta	North American Caribou Workshop	Michael Cody, Cenovus	May 16-20, 2016	Thunder Bay, ON
A collaborative energy sector approach to conserving caribou in the oil sands region of Alberta	North American Caribou Workshop	Amit Saxena, Devon	May 16-20, 2016	Thunder Bay, ON
From applied research to a community of practice: important perceptions and misconceptions associated with linear restoration	Canadian Institute of Forest Ecology: Seismic line restoration technical session	Michael Cody, Cenovus	December 1, 2016	Edmonton, AB
Silviculture approaches to restoring a predator-prey system: examples from Boreal Alberta	Columbia Mountain Institute of Applied Ecology, Predator Prey Conference	Michael Cody, Cenovus	April 5-7, 2016	Revelstoke, BC

POSTERS

Functional Restoration of Linear Features: The Big Bad Wolf's Perspective	North American Caribou Workshop	Dickie, M., Serrouya, R., McNay, S., and Boutin, S.	May 16-20, 2016	Thunder Bay, ON
Effect of linear feature abundance and vegetation structure on wolf selection and movement	Columbia Mountain Institute of Applied Ecology, Predator Prey Conference	Dickie, M., DeMars, C., Serrouya, M., Cranston, J., and Boutin, S.	April 5-7, 2016	Revelstoke, BC

RICC is a group of like-minded energy and forestry companies operating in the Cold Lake and East Side Athabasca River (ESAR) boreal caribou ranges of northeastern Alberta.



Regional Industry Caribou Collaboration members work with academia, the Government of Alberta and the Alberta Biodiversity Monitoring Institute (ABMI) Caribou Monitoring Unit on an ongoing basis. Learn more about our work and how to become a member at:

www.cosia.ca/initiatives/land/regional-industry-caribou-collaborative

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