Canada-British Columbia

Southern Mountain Caribou (Central Group)

Protection Study

Note: This document has been prepared for the purpose of supporting a review of legislation used to manage Southern Mountain Caribou and their habitat in BC. The analysis and conclusions should be not used to inform conclusions or analysis for any specific project or activity.

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Contents

1. Introduction

The purpose of this jointly-conducted Protection Study ("the Study") is to inform provincial and federal decision making with respect to the ongoing protection and recovery of southern mountain caribou in British Columbia (BC). It is a point-in-time review of information which was publically available as of October 2016.

"Southern mountain caribou" refers to the caribou population that was listed as threatened in 2003 on Schedule 1 of the *Species at Risk Act* (SARA) as "Woodland Caribou, Southern Mountain population (*Rangifer tarandus caribou*)". Southern mountain caribou occur within the Southern Mountain National Ecological Area (SMNEA). The SMNEA is part of a national ecological classification system used by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC)[1].

1.1 Background to the Protection Study

BC and Canada are signatories to the national *Accord for the Protection of Species at Risk* and the *Canada-British Columbia Agreement on Species at Risk.* The governments of both jurisdictions believe that activities and programs related to species at risk such as caribou should be undertaken in a coordinated and cooperative manner. Both governments have developed plans to address the recovery of caribou.

On Oct 4, 2016, the federal Minister of Environment and Climate Change (ECC), Catherine McKenna, and BC's Minister of Environment, Mary Polak, announced their intention to conduct a joint study to review the legislative tools in place to protect the southern mountain caribou and their habitat with the ultimate goal of determining what additional steps may need to be taken by federal or provincial governments to protect and recover southern mountain caribou.

In addition to the legislative review, this Study provides an overview of BC's approach to caribou recovery, including actions aimed at stabilizing population declines in the short term, addressing legacy impacts of habitat change, reducing future risk to caribou, and balancing the competing needs of caribou conservation with the varied interests of existing tenure holders, First Nations, and local communities.

Environment and Climate Change Canada (ECCC) will use the information from the Study to help inform decisions under the *SARA,* in particular in relation to whether the individuals[2] and their critical habitat are protected (i.e. sections 34, 61, 63). SARA looks first to provinces to protect species at risk under their jurisdiction where they are found on provincial or private land.

[1] See http://www.cosewic.gc.ca/DD31EAEE-EFBA-448B-86AB-4BA8A68D7EA4/Fig1-TerrestrialEcologicalAreas_Eng.jpg

[2] The concept of residence has been found not to apply to southern mountain caribou.

If the Minister of ECC forms the opinion, after consultation with the provincial Minister, that critical habitat is not effectively protected under provincial law and there is no protection under SARA (e.g. through an agreement) or under other federal law, the Minister must make a recommendation to the Governor in Council (federal Cabinet) for an order which would prohibit destruction of critical habitat on the unprotected portions. If an order were in place, prohibited activities may be exempted or permitted under the Act.

The Minister of ECC cannot consider socio-economic factors such as impacts on tenure holders and community interests, nor the benefits of any non-habitat related actions, in forming her opinion on critical habitat protection. The federal Cabinet, on the other hand, may take into account such considerations. If a protection order was to be recommended, the Governor in Council may choose to make the order apply to all unprotected critical habitat, apply only to some areas of unprotected critical habitat, or may choose not to issue an order. The process for considering critical habitat protection on non-federal lands is described more fully in the draft Policy on Critical Habitat Protection on Non-federal Lands[3]

The information in this Study will also contribute to decision-making related to protection of individuals. SARA sets out a similar process as that described above for critical habitat. If the Minister of ECC is of the opinion that the laws of the province effectively protect the species, no further action is required. If she is of the opinion that provincial laws do not effectively protect the species, SARA requires that the Minister recommend to the Governor in Council that a protection order be made to bring prohibitions against killing or harming the individuals into force (see s.32 of SARA for full list).

This Study represents a transparent means of presenting information, but this particular format is not a necessary precursor to decision-making under SARA.

BC will consider information presented in this Study, as well as feedback received during the public comment period, to evaluate the effectiveness of their legislation and management actions taken to date and to assess the benefits, costs, and biological/technical feasibility of additional actions that could be taken to improve progress toward meeting Canada and BC's caribou recovery objectives.

Both governments may consider this Study to provide context for land use, regulatory, and other decisions that could affect conservation and recovery of southern mountain caribou.

[3] More details on how SARA applies on non-federal lands is outlined in the draft Policy on Critical Habitat Protection on Non-federal Lands available at: http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=2987.The draft policy is available for public comment until March 31, 2017. Changes may be made before the policy is finalized.

For information on the study and the process, please email

Caribou.study@gov.bc.ca or

ec.ep.rpy-sar.pyr.ec@canada.ca

1.2 Federal and Provincial Approaches to Caribou Recovery

1.2.1 Federal Approach to Caribou Recovery

The federal approach to southern mountain caribou recovery is reflected in the federal *Recovery Strategy for the Woodland Caribou, Southern Mountain population (Rangifer tarandus caribou) in Canada* (Environment Canada 2014, henceforth, "federal recovery strategy"). The federal recovery strategy identifies caribou critical habitat and the activities likely to result in its destruction, and was posted as "final" on the Species at Risk Public Registry on June 3, 2014. The federal recovery strategy also includes a summary of actions by provincial and federal governments and Indigenous peoples completed or being taken at that time.

The federal recovery strategy distinguishes between three groups of caribou within the SMC population identified as having distinct ecological and evolutionary characteristics; namely the Northern Group, Central Group, and Southern Group. This follows the most recent COSEWIC status report, which considers these groups as different "designable units" (COSEWIC 2014).

1.2.2 BC's Approach to Caribou Recovery

Provinces and territories are the lead jurisdictions for the management and recovery of caribou on non-federal lands in Canada. BC's current approach is presented in the *Implementation Plan for the Ongoing Management of South Peace Northern Caribou (Rangifer tarandus caribou pop. 15) in British Columbia* (BC Ministry of Environment 2013) and accompanying Science Update (BC Ministry of Environment, 2014) and the *Mountain Caribou Recovery Implementation Plan* (MCRIP) which was approved in 2007.

BC's South Peace Northern Caribou (SPNC) plan addresses populations in the areas around Tumbler Ridge. This plan is inclusive of the caribou subpopulations referred to in the federal recovery strategy as the "Central Group", that occur in BC[4]. The MCRIP was approved in 2007 and provides management guidance for subpopulations referred to in the federal recovery strategy as the "Southern Group." Implementation plans outline the provincial government's response to managing species at risk. Such government decisions are informed by science but are also made with consideration of socio-economic factors. BC's caribou implementation plans include actions related to habitat

[4] The plan also includes the Graham herd, which is included in the "Northern Group" in the federal recovery strategy.

protection and restoration, predator-prey management, and direct population actions such as transplantation of wild caribou and maternity penning.

1.2.3 Differences in Terminology, and Approach Used For This Study

BC caribou plans do not use the term “critical habitat” because this term has a specific meaning in the context of SARA; however, BC has modelled habitat suitability and has mapped the boundaries of seasonal caribou ranges based on extensive field studies and on the expert opinion of experienced caribou biologists.

For the Central and Northern Groups, the federal recovery strategy recognizes high elevation winter range, low elevation winter range, Type 1 and Type 2 “matrix” habitat. The provincial SPNC plan focuses on high and low elevation winter range. Subsequent work has mapped high elevation summer ranges, and the concept and importance of managing matrix range is widely recognized.

Although the two governments have differing views on some aspects of what habitat is required for recovery, and on approaches to caribou recovery, information from the federal recovery strategy has been used for the purpose of this Study. Work to reach agreement on these differing views is occurring through a separate ongoing process to consider possible amendments to the federal recovery strategy and provincial plans.

1.3 Protection Study Components

The Study is comprised of four additional sections. They include:

a) Biological review – this section describes the most current information and understanding of SMC population status trends in SMC Local Population Units (LPUs)

b) Description of legislative instruments – this section describes provincial laws that are or may be used to prevent destruction of critical habitat[5] and prevent the killing, harming, harassing, capture or taking of individuals.

c) Analysis of legislative instruments - this section includes a spatial analysis of where the legislative instruments with potential to prevent destruction of critical habitat apply on the ground and analysis of discretion in decision-making related to authorizing activities with potential to impact caribou critical habitat.

d) Risk analysis – This section examines how geology, geography, spatial constraints and industry development patterns affect the potential for destruction of caribou habitat.

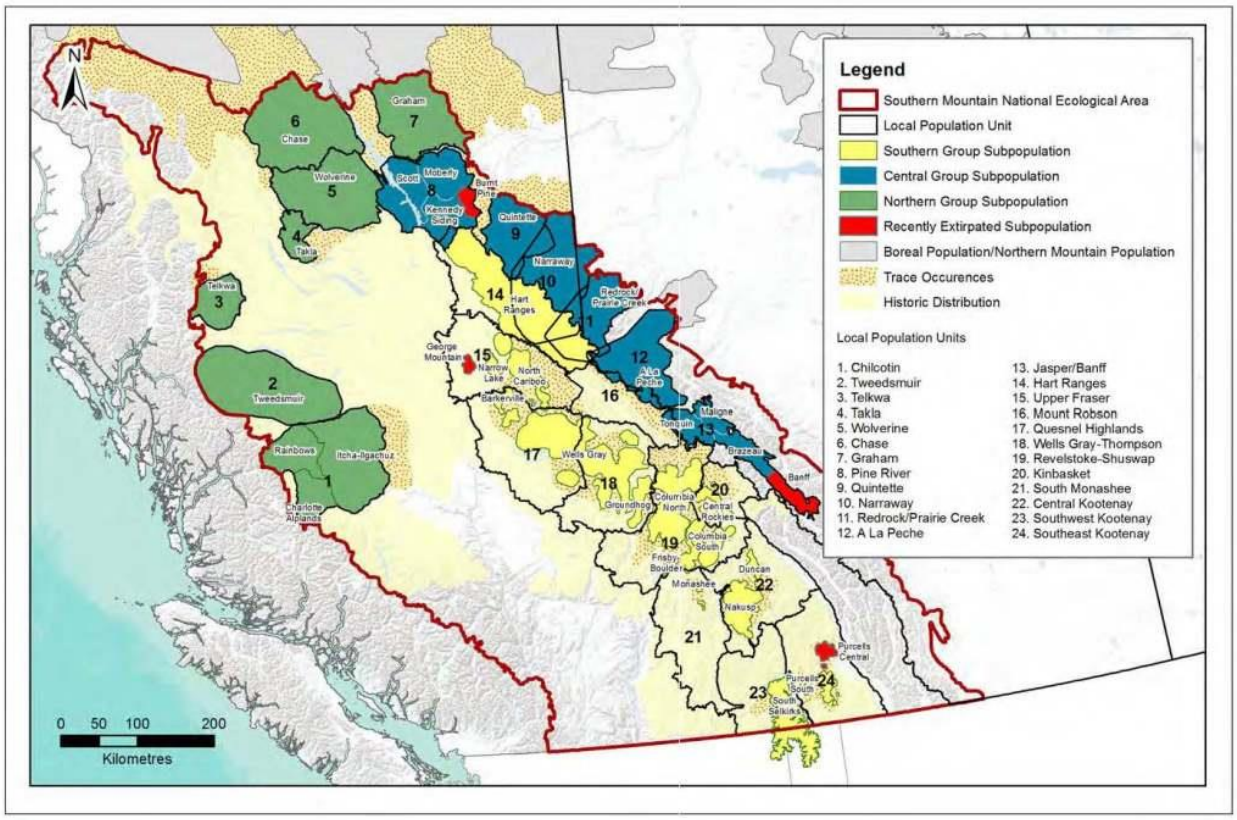
[5] The concept of “residences” under SARA has been determined not to apply to SMC.

1.4 Scope of the Protection Study

The geographic boundary of the Study is non-federal lands within the boundaries of the Central Group LPUs (shown in blue on Map 1) that occur in BC. Provincially-administered lands constitute more than 99% of the area within the Central Group LPU boundaries in BC. The legislative review considers BC provincial legislation only. Southern mountain caribou occur in National Parks, but there are no National Parks within the boundaries of the Central Group in BC[6].

The remainder of the LPUs in the Southern and Northern Groups are not the focus of this Study, but some information is provided for context. The Southern Group includes the mountain caribou populations included in BC's 2007 MCRIP shown in yellow on Map 1. The Northern Group LPUs include northern ecotype caribou that range in the Chilcotin and south Skeena areas shown as green on Map 1.

Map 1. Groups and Local Population Units of Woodland Caribou, Southern Mountain population (from Environment Canada 2014)[7].



[6] Information about caribou in National Parks is available at: http://www.pc.gc.ca/eng/pn-np/mtn/caribou/index.aspx#update

[7] BC does not use the term "local population units". The boundaries of the *subpopulations* shown in Map 1 are those recognized by BC.

2. Biological Review & Study Context

2.1 Population Numbers and Trends

Within the SMNEA, the federal recovery strategy establishes 24 caribou LPUs, 21 of which are primarily or wholly in BC and 3 that are primarily or wholly in Alberta. LPUs are used in the federal recovery strategy to describe groups of subpopulations that, historically, are assumed to have been part of the same population. Some LPUs contain a single subpopulation (sometimes referred to as a herd).

LPUs have been established and mapped in the federal recovery strategy using two different methods. For the Southern Group (known as “mountain caribou” in BC), LPU boundaries were based on BC’s MCRIP, which refers to large, contiguous "Mountain Caribou Planning Units” which groups individual subpopulations within administrative planning boundaries. This results in a LPU often covering large areas that are not currently occupied by caribou as well as matrix habitat[8].

For the Northern and Central Groups, LPUs were established using information and expertise about geographic areas currently or recently (i.e. last ~30 years) occupied by southern mountain caribou subpopulations. This was considered the best information available to ECCC at the time the recovery strategy was prepared. This results in the LPU boundaries in the Central and Northern Groups largely equating to the boundary of the subpopulation(s) within them.

The Southern Group ranges throughout the southern interior wet belt of the Province. Caribou in this region are adapted to deep snow environments, feeding almost exclusively on arboreal lichens in the winter, moving seasonally to lower elevations to access green forage in the early spring and to avoid unconsolidated snow in early winter (Apps et al. 2001).

The Central and Northern Groups use shallow-snow winter ranges in low-elevation pine-lichen forest stands or on high-elevation windswept ridges, where they crater for terrestrial lichens. The Central and Northern Groups are distinguished from each other less by behavioural differences than by genetics and the physical barrier provided by the Peace River (COSEWIC 2014).

The three Central Group LPUs that fall mostly or entirely within BC, and which are the focus of phase one of this Study, are the Pine River, Quintette and Narraway. Of the six subpopulations that are included in these three LPUs, one is extirpated (Burnt Pine) and at least three others have experienced long-term declines (Table One).

[8] The federal recovery strategy recognizes two types of matrix range, which can include seasonal migration areas, areas used less frequently than seasonal (e.g. summer, winter) range, and areas outside of seasonal ranges where predator/prey dynamics influence the predator/prey dynamics inside seasonal ranges.

Table One. Population size[i] and trend information for southern mountain caribou subpopulations in Canada (BC and Alberta (AB)).

#[ii]	Prov	Local Population Unit (LPU)	Subpopulation	Population Estimate[iii]		Population Trend[iv]	
				Estimate	Year	Current	Long-term
Northern Group							
1	BC	Chilcotin	Rainbows	50[v]	2008	Decreasing	Decreasing
	BC		Charlotte Alplands	21[vi]	2001	Decreasing	Decreasing
	BC		Itcha-Ilgachuz	1,350[vii]	2016	Decreasing[viii]	Stable[ix]
2	BC	Tweedsmuir	Tweedsmuir	165[x]	2016	Decreasing [xi]	Decreasing
3	BC	Telkwa	Telkwa	16[xii]	2016	Decreasing	Decreasing
4	BC	Takla	Takla	70	2015	Decreasing[xiii]	Unknown[xiv]
5	BC	Wolverine	Wolverine	362[xv]	2016	Increasing	Stable
6	BC	Chase	Chase	475[xvi]	2009	Unknown	Unknown
7	BC	Graham	Graham	298[xvii]	2016	Stable to Decreasing[xviii]	Unknown[xix]
	BC	**Northern Group Total**		**2,807**		**Unknown**	**Unknown**
Central Group							
8	BC	Pine River	Scott	54[xx]	2016	Increasing[xxi]	Unknown
	BC		Moberly				
	BC		Kennedy Siding	50[xxii]	2016	Stable	Decreasing
	BC		Burnt Pine	0[xxiii]	2013	Extirpated	
9	BC	Quintette	Quintette	62[xxiv]	2016	Decreasing	Decreasing
10	BC/AB	Narraway	Narraway	53[xxv]	2016	Decreasing	Decreasing
11	AB	Redrock-Prairie Creek	Redrock-Prairie Creek	127	2012	Decreasing	Decreasing

#[ii]	Prov	Local Population Unit (LPU)	Subpopulation	Population Estimate[iii]		Population Trend[iv]	
				Estimate	Year	Current	Long-term
12	AB	A La Peche	A La Peche	88	2012	Decreasing	Decreasing
13	AB	Jasper-Banff	Tonquin	34	2014	Decreasing	Decreasing
	AB		Maligne	<5[xxvi]	2014	Decreasing	Decreasing
	AB		Brazeau	15[xxvii]	2014	Decreasing	Decreasing
	AB		Banff	0	2009	Extirpated	
	BC/ AB	**Central Group Total**		**488**		**Decreasing**	**Decreasing**
Southern Group							
14	BC	Hart Ranges	Hart Ranges	375[xxviii]	2016	Decreasing[xxix]	Decreasing
15	BC	Upper Fraser	North Cariboo Mountains	146[xxx]	2016	Decreasing	Decreasing
	BC		George Mountain[xxxi]	0	2004	Extirpated	
	BC		Narrow Lake	36[xxxii]	2016	Stable[xxxiii]	Decreasing
16	BC	Mount Robson	Mount Robson[xxxiv]	0		N/A	N/A
17	BC	Quesnel Highlands	Barkerville	72[xxxv]	2016	Decreasing[xxxvi]	Increasing
			Wells Gray (North)	200[xxxvii]	2015	Decreasing	Decreasing
18	BC	Wells Gray-Thompson	Wells Gray (South)	121[xxxviii]	2015	Decreasing	Decreasing
			Groundhog	19	2016	Increasing[xxxix]	Decreasing
19	BC	Revelstoke-Shuswap	Columbia North	152[xl]	2013	Decreasing	Decreasing
	BC		Frisby-Boulder	11	2013[xli]	Decreasing	Decreasing
	BC		Columbia South	4	2016[xlii]	Decreasing	Decreasing

#[ii]	Prov	Local Population Unit (LPU)	Subpopulation	Population Estimate[iii]		Population Trend[iv]	
				Estimate	Year	Current	Long-term
20	BC	Kinbasket	Central Rockies	3[xliii]	2008	Decreasing [xliv]	Decreasing
21	BC	South Monashee	Monashee	1	2016	Extirpated [xlv]	
22	BC	Central Kootenay	Central Selkirks[xlvi]	35	2016[xlvii]	Decreasing	Decreasing
23	BC	Southwest Kootenay	South Selkirks	12[xlviii]	2016	Decreasing	Decreasing
24	BC	Southeast Kootenay	Purcells Central	0	2005	Extirpated	
	BC		Purcells South	16[xlix]	2016	Stable	Decreasing
	BC	**Southern Group Total**		**1,205**		**Decreasing**	**Decreasing**
SMNEA Total				**4,500**			

As of 2016, the total population estimate for the extant subpopulations of Central Group Woodland Caribou within BC is 219 individuals (Seip and Jones 2016). In addition to the extirpation of the Burnt Pine subpopulation before 2015, remaining subpopulations have declined by at least 50% over the past 10 years, with the exception of the Moberly. The Moberly subpopulation has increased since 2014, likely due to a combination of maternity penning and wolf control; however, the current population size of the Moberly subpopulation is less than 25% of its estimated population in 1997 (Seip and Jones 2016).

Surveys indicate that rates of both adult female survival and of juvenile recruitment are too low in most years to maintain stable populations. As elsewhere, the most common cause of adult female caribou mortality is wolf predation (Seip and Jones 2016). The ultimate drivers of higher wolf predation on caribou have been identified or hypothesized as:

- Habitat loss and disturbance at high elevations, causing caribou to move lower where they are more likely to encounter wolves and other predators (BC Ministry of Environment 2013);
- Increases in the density of linear features, which are used by wolves for hunting and can increase their ability to exploit caribou (Dickie et al. 2016);
- Increases in early seral vegetation that result in population increases among

moose, deer and elk and a consequent increase in wolves (Latham et al. 2011, Serrouya 2013);
- Warming winter temperatures, which improve over-winter survival of deer and therefore more prey for wolves and a consequent increase in wolf populations (Dawe and Boutin 2016); and,
- Generally low hunting and trapping pressure on wolves, leading to higher populations than those observed through most of the 20th century when fur prices were higher and wolf control was widespread and aggressive (BC Ministry of Forests, Lands and Natural Resource Operations 2014).

These broad landscape and climate changes might also be affecting caribou health and nutrition (e.g., Parker et al. 2009), as well as population responses of other predators like black bears (e.g., DeMars 2015). The relative importance of these factors in driving rates of wolf predation on caribou is an area of active research and not all factors can be addressed through habitat protection.

2.2 Population and Distribution Objectives

2.2.1 Federal Caribou Objectives

The federal recovery strategy states that:

"To guide recovery efforts, the population and distribution objectives are, to the extent possible, to:

- *stop the decline in both size and distribution of all LPUs;*
- *maintain the current distribution within each LPU; and*
- *increase the size of all LPUs to self-sustaining levels and, where appropriate and attainable, to levels that can sustain a harvest with dedicated or priority access to Indigenous peoples.*

LPUs are considered to be self-sustaining when:

- *the LPU on average demonstrates stable or positive population growth over the short-term (≤20 years) and is large enough to withstand random events and persist over the long-term (≥50 years) without the need for ongoing active management intervention; and*
- *there is an increase to at least 100 caribou within LPUs that currently consist of fewer than 100 caribou and there is no reduction in the number of caribou within LPUs that currently consist of over 100 caribou."*

2.2.2 BC's Caribou Objectives

The population, timing and distribution goal for South Peace Northern Caribou[9] set out in the provincial *Implementation Plan for the Ongoing Management of South Peace Northern Caribou in British Columbia* (B.C. Ministry of Environment, 2013) is:

"Increase the population of South Peace Northern Caribou to ≥ 1200 animals within 20 years across their range."

The implementation objectives from the B.C. plan are:

"1. Protect 90% of identified high elevation winter habitat across the range of South Peace Northern Caribou:

- *protect ≥ 90% of identified high elevation winter habitat in the Graham, Moberly, Burnt Pine, Scott, Kennedy Siding, and Narraway herd ranges; and*
- *protect ≥ 80% of identified high elevation winter habitat in the Quintette herd range.*

2. Conduct South Peace Northern Caribou population management to address non-habitat related threats (e.g., predation) to certain South Peace Northern Caribou herds.

3. In all ranges, manage the industrial footprint in identified high and low elevation habitats by requiring standardized industry management practices across all industry sectors to reduce or prohibit surface disturbance and habitat alteration, and support long-term sustainable caribou habitat conditions.

4. In all ranges, monitor the compliance and effectiveness of management actions and modify actions accordingly to ensure the population and distribution goal is being achieved."

2.3 Recovery Actions

BC has made significant contributions and investments toward the protection and recovery of southern mountain caribou. These contributions include investment in direct recovery action and have also required extensive engagement with stakeholders and First Nations and consideration of the full range of implications to find a balance between environmental, social, and economic considerations.

The exact amount of indirect costs to the Crown for any new protection measures in the form of lost rent from resource development is currently unknown, but will need to be carefully developed to avoid unnecessarily impacting resource development activities. As an example, the magnitude of potential impacts to mining, petroleum and natural

[9] BC's South Peace Northern Caribou herd ranges equate to the Central Group populations defined in the 2014 federal recovery strategy as the Pine River, Quintette, and Narraway LPUs.

gas, and forestry sectors within the SMC range represent approximately $30-40 billion in capital investment alone with associated spin-offs and job creation.

Actions taken by BC as the lead jurisdiction have been informed by research and inventory conducted in the region. Direct investment in southern mountain caribou subpopulations by the provincial government, industry, compensation programs, Indigenous peoples, the federal government, and stakeholders in the past 10 years alone has been more than $12.5 million.

An integral component of BC's recovery actions has been the identification and management of suitable caribou habitat, as described in later sections of this Study. Provincial and federal recovery plans recognize that habitat protection alone does not fully address the current causes of declining caribou populations. Declines are a result of a complex interaction of legacy habitat impacts, current land use practices, likely climate effects and interacting predator-prey dynamics.

In BC's view, the full suite of ultimate and proximate pathways to decline need to be addressed within the constraints of what is acceptable to Indigenous peoples, local stakeholders and the broader public.

Whether the recovery of small and declining caribou subpopulations is possible within these constraints is a topic of active debate among wildlife managers and biologists. To date, no jurisdiction in Canada has implemented a program that has demonstrated sustained success at recovering caribou at a landscape scale.

Despite these uncertainties, BC's management actions for southern mountain caribou have included the following:

2.3.1 Predation control

Predation by wolves, cougars, and bears is the most important proximate factor influencing the sustainability of many caribou herds. Direct removal of some predators has occurred through liberalized trapping and hunting seasons, aerial shooting of wolves, and expanded harvest limits for cougars near many caribou herds, especially in central BC. All Wildlife Management Units (WMU) overlapping or adjacent to caribou herds have extended seasons and larger bag limits for wolves. In the Kootenay Region (Southern Group), a trapper training and carcass recovery program was in place from 2008 to 2012 to increase trappers' wolf trapping skills and their interest in pursuing wolves. This initiative did stimulate interest from trappers, but was discontinued because it only succeeded in removal of partial packs, and the isotope analysis performed on the carcasses to determine the extent to which caribou comprised part of the wolves' diet was largely inconclusive.

2.3.2 Aerial wolf removal

Aerial wolf removal during winter conditions has been conducted in two areas (South Peace, South Selkirks) annually since January 2014. The goal is to remove 80% or more of the wolves in the treatment area. In the South Selkirk area (Southern Group), there were an estimated total of 16 wolves in four distinct packs; 9 of these wolves (two packs) were removed. In the South Peace (Central Group) there were an estimated total of 166 wolves in 17 distinct packs; 140 of these wolves (14 packs) were removed. Part of the removal program includes a fall and early winter live trapping program to enable radio collaring wolves. If there are collared wolves in each pack, the overlap with caribou habitat can be confirmed and the packs more efficiently located for removal. The removal program was designed for a five year duration and as such it is premature to assess benefits to local caribou subpopulations. However, there are indications that wolf removal in the South Peace has contributed to success in the maternity penning project and an increase in the Moberly caribou subpopulation. Results remain somewhat inconclusive. Approximately $1.5 million has been spent on aerial wolf removal, plus government staff time.

2.3.3 Indirect measures by sterilizing alpha pairs

A wolf sterilization pilot project was undertaken in the Quesnel Highlands LPU of the Southern Group from 2001 to 2012. Sterilization of adult male and female wolves effectively stopped reproduction, strongly limiting the rate of increase of wolf populations. By 2008, 39-77% of wolf packs were fertility-treated, and wolf densities were reduced by 39-48% from 2009-2012. Wolf radio-telemetry studies showed sterilized adult wolves maintained their territories, displayed normal survival rates, and sustained sexual pair bonds. However, there was no change in Quesnel Highland caribou recruitment. Moose harvest was increased after 2001 in an attempt to reduce prey biomass for wolves, but whether the moose population responded was not adequately assessed. An independent assessment recommended continuing a slightly modified sterilization program, but challenges with staffing logistics and worker safety have been insurmountable obstacles. Approximately $760,000 was spent on sterilization, plus government staff time.

2.3.4 Primary prey reduction

A primary prey (moose) and predator (wolf) reduction program has operated in the Kootenay Region (Revelstoke area – provincial wildlife management units 4-39 and 4-38) since 2003. Moose numbers were reduced using sport hunting from 1650 in 2003 (1.58/km^2) to 286 (0.27/km^2) in 2014. The decline led to a reduction in wolves from over 30 wolves /10,000 km^2 to about 12 wolves /10,000 km^2 by 2014. From 2003 to 2014, the Columbia North caribou subpopulation stabilized and may have increased. Other similarly sized caribou populations adjacent to but outside the moose reduction area

declined during this time (e.g. Wells Gray and Central Selkirks). Approximately $600,000 was spent on the moose reduction pilot project, plus government staff time.

2.3.5 Maternity penning

Predation is viewed as the main proximate factor limiting population growth of southern mountain caribou. Most predation occurs in spring within six weeks of birth and penning cows and calves during this time can protect calves from grizzly and black bears, wolverines, cougars and wolves. The ecological implications of removing such a variety of species are not tenable. Rather than removing large numbers of predators to generate small incremental gains in caribou survival, alternative means are being considered in order to reduce calf mortality.

Maternity penning projects are underway in the Moberly (Central Group) and Columbia North (Southern Group) subpopulations. Initial results indicate that maternity penning is effective when combined with predator control in areas proximate to the pen. These trials were designed for a five year duration. Approximately $3.6 million has been spent on the projects, including approximately $220,000 in capital costs, plus an unquantified amount of government staff time.

Provincial staff working in the MCRIP area are working with biologists from Idaho Fish and Game, Washington Department of Wildlife, Kalispell Tribe, US Forest Service, US Fish and Wildlife Service (USFWS), and the Fish and Wildlife Compensation Program – Columbia Basin on trans-boundary caribou conservation in the South Selkirks subpopulation (Southern Group). With an emphasis on addressing the causes of adult mortality and low recruitment, this group recently committed to implementing a maternity penning project in the Southwest Kootenay LPU. This work is being undertaken in coordination with the USFWS as part of an effort to refresh the USFWS caribou recovery process and the recently signed agreement on cooperation under the Canada/Mexico/U.S. Trilateral Committee for Wildlife and Ecosystem Conservation and Management.

Penning projects to date have yielded promising results and practitioners are continuing to refine methods to increase success. The technique could be applied in other Central Group subpopulations, if required.

2.3.6 Herd augmentation (transplant, captive breeding)

The MCRIP committed to “Boost caribou numbers in threatened herds with animals transplanted from elsewhere to ensure herds achieve critical mass for self-sufficiency.” The Purcells-South subpopulation was identified as the highest ranked priority to receive augmentation (Mountain Caribou Science Team 2008). In 2010, an augmentation plan was developed for the Purcells-South herd. In March 2012, Ministry of Forests, Lands, and Natural Resource Operations (MFLNRO) completed phase 1 of a 2 phase transplant by moving 20 northern ecotype caribou to the Purcells-South herd.

The capture and relocation of caribou was an initial success, but the project suffered from higher than expected caribou mortalities on the transplanted animals. In fall 2012, MFLNRO postponed phase 2 of the transplant for one year due to the lack of success with phase 1. Staff completed a review of the program and recommended significant operational changes to increase transplant success. Lessons learned from this transplant are expected to inform transplants for other caribou herds that are critically threatened. However, there has been no further planning for augmenting the Purcells-South herd. Approximately $900,000 has been spent on the transplant project and an unquantified amount of government staff time.

2.3.7 Captive Breeding

Captive breeding of caribou has been considered for mountain caribou (i.e. Southern Group) since 2008. The province is considering translocation-based management to help recover woodland caribou populations in several parts of their range, and at least six herds have been considered for translocation. After several assessments, it has been confirmed that there are few suitable source populations for wild transplants. Captive breeding is one option for supplying caribou for translocation without depleting wild source populations. Over the past six years the province, the Calgary Zoo, University of Calgary, the oil and gas industry, and Parks Canada have all expressed interest in collaboratively developing a captive rearing facility.

In January 2016, the Calgary Zoo hosted a captive breeding workshop to investigate and develop augmentation options for boreal caribou, including captive breeding. Large, in-situ enclosures were determined to be the method most likely to be successful. Alberta has announced support for such a project in west central Alberta. BC has not committed to large exclosures, but continues to examine caribou herds for their suitability as founder herds for a facility oriented/based approach to captive breeding. On the basis of an objective assessment of caribou founder herds in the Northern Mountain designatable unit, radio-collars were installed on caribou in the Muskwa herd. Radio telemetry data and recruitment surveys will help refine the initial indication that this herd could contribute caribou to a captive breeding program. This assessment is ongoing. Approximately $50,000 has been spent on researching captive breeding plus an unquantified amount of government staff time.

2.3.8 Wildlife collaring and monitoring

Monitoring and research programs have been implemented to assess how key wildlife populations (e.g. caribou, moose, wolf) respond to natural (e.g. fire and insect outbreak) and human (e.g. logging, winter recreation) factors. This can lead to an increased understanding of the animal and herd dynamics and help refine management tools. Approximately $1.5 million has been invested in wildlife monitoring program plus government staff time.

2.3.9 Caribou Surveys

Population monitoring is on-going. Many caribou herds are surveyed on a regular basis. Ideally each herd is surveyed every third year. Where significant investment in management is occurring, surveys occur more frequently. This information enables tracking of population trends and assessment of response to management actions. Approximately $2.5million has been invested in caribou survey work plus staff time.

2.3.10 Management of Human Disturbance (Recreation Activities)

Caribou are susceptible to disturbance and displacement by winter recreation. Recreational snowmobile access has been closed in many areas of mountain caribou range and for some northern herds[10]. Annual winter enforcement flights are undertaken to promote compliance and ticket those violating the closures. Heli-ski tenure holders are subject to conditions in a Memorandum of Understanding to reduce the effects from helicopters. Tenure holders (i.e. those who have authorization to use Crown land for commercial recreation) are required to annually submit information on wildlife sightings and their operational responses to encounters. There is a moratorium on granting additional commercial recreation tenures in mountain caribou areas. Approximately $634,000 has been spent on monitoring snowmobile closed areas plus an unquantified amount of staff time.

2.3.11 Industry Management Practices

Standardized Industry Management Practices for forestry, oil and gas, mineral exploration and other land base activities have been developed[11] and are in the process of being formally endorsed. Guidelines provide sound technical, but not legally binding, advice to resource professionals for mitigating possible impacts to caribou. Investment has been primarily in the form of staff time.

[10] http://www.env.gov.bc.ca/fw/wildlife/snowmobile-closures/
[11] http://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/wildlife-wildlife-habitat/caribou/simps_-_october_2016_2.docx

2.3.12 Summary of financial investment in direct management of southern mountain caribou

Table Two. Direct financial investment from 2006 to 2016

Management tool	Budget expended ($)
Transplant	900,000
Research	302,000
Maternal Penning	3,600,000
Wolf collaring, surveys, and inventory	370,000
Wolf removal	1,500,000
Alternate prey reduction	600,000
Wolf sterilization	760,000
Caribou surveys	2,500,000
Caribou collaring and monitoring	1,130,000
Snowmobile monitoring	634,000
Recreational management	61,000
Habitat Management	168,000
Total	12,525,000

2.4 Critical Habitat Identification

Critical habitat is defined in SARA subsection 2(1) as “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species.” Critical habitat for this species is identified at the landscape scale in the federal recovery strategy. Recovery is defined by population and distribution objectives; therefore, critical habitat is the habitat necessary to achieve the population and distribution objectives for southern mountain caribou.

The federal recovery strategy identified six categories of range as critical habitat (Table Three). All areas of each LPU where the biophysical attributes of critical habitat outlined in the recovery strategy exist are identified as critical habitat. For some categories of critical habitat, the federal recovery strategy establishes thresholds for the minimum amount of undisturbed habitat considered necessary to achieve recovery of caribou within the LPUs.

Thresholds were estimated from best available information at the time of the drafting of the recovery strategy. They also draw on experience from the development of the recovery strategy for boreal populations of woodland caribou. Thresholds are defined in part because of the link between landscape disturbance and increasing deer, moose and elk populations, and therefore predator density, in caribou range. However, disturbance is not the only mechanism by which prey and predator numbers can be artificially elevated (e.g., see Bradley and Neufeld 2012 for an explanation of the decline of woodland caribou in Jasper National Park, where disturbance thresholds have not been exceeded). Additionally, disturbance interacts with many other habitat and non-habitat factors to characterize favorable or unfavorable conditions for caribou. Therefore, defining with confidence the level of habitat disturbance that is consistent with survival and recovery of caribou is challenging.

For the purpose of calculating the amount of disturbance in ranges subject to a threshold of a minimum of 65% undisturbed habitat, disturbance is defined as the area affected by human-caused disturbance visible on Landsat imagery at a scale of 1:50,000 scale including a 500m buffer, and/or fire disturbance in the last 40 years[12]. Table Three shows the different categories of critical habitat identified in the recovery strategy and the associated minimum undisturbed habitat thresholds. The locations of these six different critical habitat categories were not fully mapped at a fine scale in the federal recovery strategy[13]. As a result, currently available information was used to temporarily define high elevation habitat for the purpose of this Study (for example, see section 2.6).

Critical habitat for southern mountain caribou is comprised of three components: location, amount, and type.

2.4.1 Critical Habitat Locations

Critical habitat as defined in the federal recovery strategy is found within the following locations (italicized text is excerpted directly from the recovery strategy):

- *"the high elevation winter and/or summer (spring, calving, summer, fall/rut) range delimited by the LPU boundaries for all Groups;*
- *the low elevation summer (spring, calving, summer, fall/rut) range delimited by the LPU boundaries for the Northern Group;*

[12] This is the same threshold and definition used for boreal populations of woodland caribou, which is based on a modelled relationship between habitat disturbance and likelihood that a boreal caribou population would be self-sustaining. There is no such analysis for southern mountain caribou. The minimum 65% undisturbed threshold was chosen because boreal caribou ranges and low elevation winter ranges and Type 1 matrix range for the Northern and Central Groups of southern mountain caribou all consist of fire-adapted ecosystems.

[13] As of January 2017, amendments to the recovery strategy are currently underway. A proposed amendment including more comprehensive mapping of critical habitat categories is expected in 2017.

- *the low elevation spring and/or early winter range delimited by the LPU boundaries for the Southern Group;*
- *the LPU boundaries of the Northern and Central Groups, which provides for an overall ecological condition for low elevation winter range and Type 1 matrix range that will allow for an ongoing recruitment and retirement cycle of habitat, which maintains a perpetual state of a minimum of 65% of the area as undisturbed*[14]*; and,*
- *Type 2 matrix range for all Groups, and Type 1 matrix range for the Southern Group that provides for an overall ecological condition that will allow for low predation risk, defined as wolf population densities less than 3 wolves/1000 km*^{2}*.*

Existing, essentially permanent features such as maintained trails, roads and existing infrastructure (e.g., buildings), and agricultural fields are not generally considered components of critical habitat, even where they occur within a critical habitat polygon."

2.4.2. Critical Habitat Amounts

The amount of critical habitat is described as follows:

- *"In low elevation winter ranges and Type 1 matrix range in the Northern and Central Groups with less than 65% undisturbed habitat, critical habitat includes that which is currently suitable as well as adjacent habitats that over time would contribute to the attainment of 65% undisturbed habitat.*
- *In low elevation winter ranges and Type 1 matrix range in the Northern and Central Groups with 65% or more undisturbed habitat, critical habitat includes at least 65% undisturbed suitable habitat in low elevation winter and Type 1 matrix range, recognizing that habitat will change over time given the dynamic nature of the forest in these ranges.*
- *In high elevation winter and/or summer ranges for all Groups, low elevation summer ranges for the Northern Group, and low elevation spring and/or early winter range for the Southern Group, critical habitat includes that which is currently suitable as well as adjacent habitat that over time would become suitable through restoration."*

[14] *Undisturbed habitat* is defined in the 2014 recovery strategy as: habitat not showing any: i) human-caused disturbance visible on Landsat at a scale of 1:50,000, including habitat within a 500 m buffer of the human-caused disturbance; and/or ii) fire disturbance in the last 40 years, as identified in data from each provincial and territorial jurisdiction (without buffer). Note that as a result of this definition, permanently disturbed areas which are not generally considered *components* of critical habitat *are* included in the overall calculation of disturbance.

2.4.3. Critical Habitat Type

"Type" describes the biophysical attributes of critical habitat (may be interpreted as "parts" of critical habitat). Biophysical attributes are those habitat characteristics required by southern mountain caribou to carry out life processes; for example, access to food sources, low predation risk, low sensory disturbance. General descriptions of biophysical attributes for all three groups (i.e. North, Central, and Southern), and for the different categories of critical habitat, are provided in Appendix C of the 2014 federal recovery strategy.

Table Three – Summary of Critical Habitat Categories and Disturbance Thresholds from the federal recovery strategy

<table>
<tr><th>Category of Critical Habitat Range</th><th>Northern Group</th><th>Central Group</th><th>Southern Group</th></tr>
<tr><td>High Elevation Winter Range</td><td colspan="3" rowspan="2">Minimal disturbance</td></tr>
<tr><td>High Elevation Summer Range</td></tr>
<tr><td>Low Elevation Winter Range</td><td colspan="2">Minimum 65% undisturbed</td><td>n/a[15]</td></tr>
<tr><td>Low Elevation Summer Range</td><td>Minimal disturbance</td><td>n/a</td><td>n/a</td></tr>
<tr><td>Low Elevation Early Winter and/or Spring Range</td><td colspan="2">n/a</td><td>Minimal disturbance</td></tr>
<tr><td>Type 1 Matrix</td><td colspan="2">Minimum 65% undisturbed</td><td>Wolf densities of <3/1000km^2</td></tr>
<tr><td>Type 2 Matrix[16]</td><td colspan="3">Wolf densities of < 3/1000km^2</td></tr>
</table>

2.5 Important Caribou Habitat Identified by BC

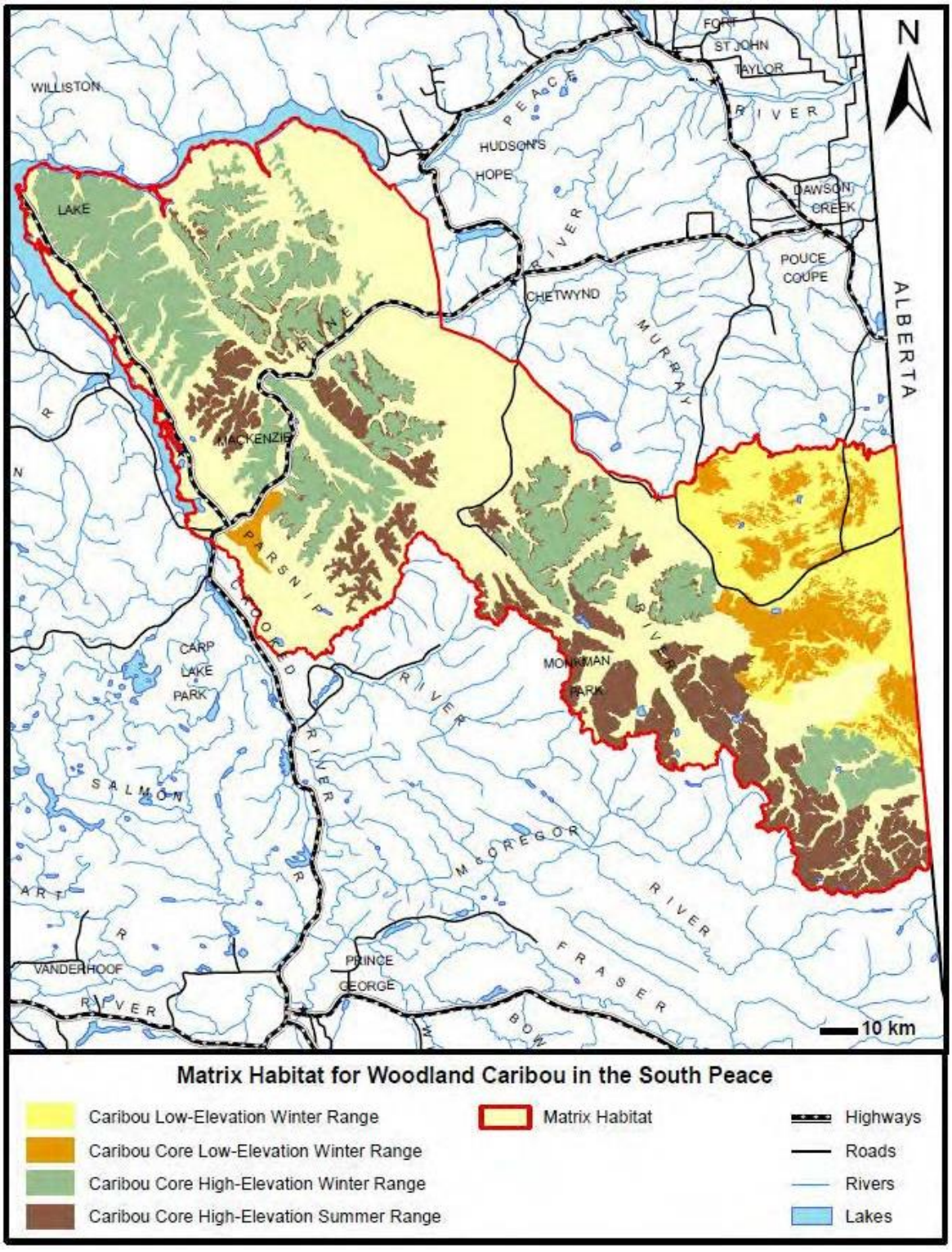
As noted previously, BC's implementation plans do not use the term "critical habitat". Seasonal suitability maps for the Central Group have been developed[17] (Map 2). The maps were based on resource selection function models of data collected on radio-collared caribou throughout the three LPUs in BC, as well as on maps of habitat attributes. The suitability maps identify different classes of caribou habitat selection in both high- and low-elevation portions of LPUs. Core high elevation winter ranges

[15] n/a indicates this category of habitat does not exist in the these groupings of LPUs
[16] Type 2 matrix range exists in areas outside the mapped LPUs for the Northern and Central Groups.
[17] http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/wildlife-conservation/caribou/central-mountain-caribou

incorporated between 87-95% of high elevation winter telemetry locations, core high elevation summer ranges incorporated 83-92% of summer locations, and core low elevation winter ranges incorporated 81-98% of low elevation winter locations. The habitat areas that contribute to the predator-prey system on a caribou range, but are not core caribou habitat areas, constitute matrix habitat (Seip and Jones 2015).

Suitability mapping was used by BC to inform the boundaries of legal designations (see legislative review below). The South Peace Northern Caribou implementation plan prioritized the protection of 80-90% of high elevation habitats, and required the development of Caribou Mitigation and Monitoring Plans in high elevation habitats where development is planned. Low elevation winter range for caribou is managed through objectives in designated areas that aim to maintain caribou habitat attributes and minimize habitat fragmentation.

Map 2. BC's Caribou Habitat Mapping for the Central Group



2.6 Disturbance in Low Elevation Winter and Type 1 matrix ranges

As discussed earlier, the federal recovery strategy requires that LPUs be maintained or restored to a condition that includes at least 65% “undisturbed” (or conversely no more than 35% “disturbed”) habitat in low elevation winter range and Type 1 matrix habitat.

In 2012, ECCC mapped disturbances in subpopulation ranges as they were defined at the time, following methodology similar[18] to that completed for a Scientific Assessment to Inform the Identification of Critical Habitat for Boreal Caribou (Environment Canada 2011), which defines disturbance as anthropogenic disturbances visible on Landsat 5 imagery at 1:50:000 viewing scale[19] with a 500 m buffer added, as well as fire disturbance in the last 40 years with no buffer.

For the purposes of this Study, the 2012 disturbance mapping was used to calculate the amount of disturbance in all areas within the boundaries of the LPUs as they were defined in the federal recovery strategy except those identified as high elevation seasonal range (for which the management objective is “minimal disturbance”).

Although Type 1 matrix range can contain high elevation areas, low elevation winter range and Type 1 matrix habitat are hereafter referred to as “non-high elevation”, to distinguish these critical habitat types which are subject to the minimum 65% undisturbed habitat threshold from the high elevation seasonal ranges where the management objective is “minimal disturbance”. The high elevation seasonal range areas were defined according to readily accessible data available at the time of the Study (Annex 2). The inverse of these areas represents the total non-high elevation range. The amount of disturbance in non-high elevation areas exceeds the maximum 35% habitat disturbance threshold in all three BC Central Group LPUs (Table Four, Maps 3, 4, and 5).

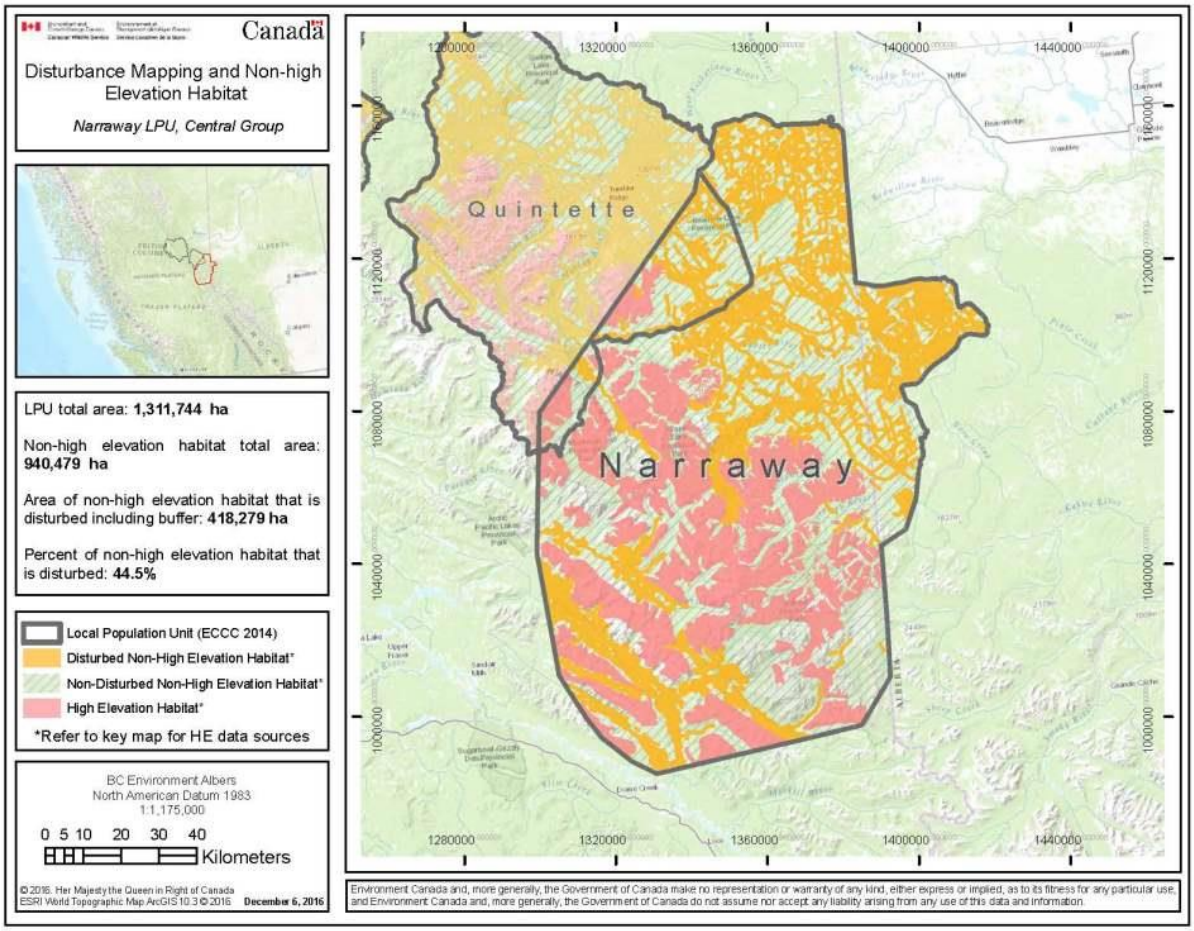
[18] In 2012, the methodology followed for SMC included the addition of ancillary data for seismic lines even if they were not visible at the 30m resolution. This was not consistent with the approach taken for boreal caribou.

[19] The detailed methodology used by Environment Canada 2011 indicates that a 30 m resolution was used.

Table Four. Disturbance in non-high elevation areas within Central Group LPUs

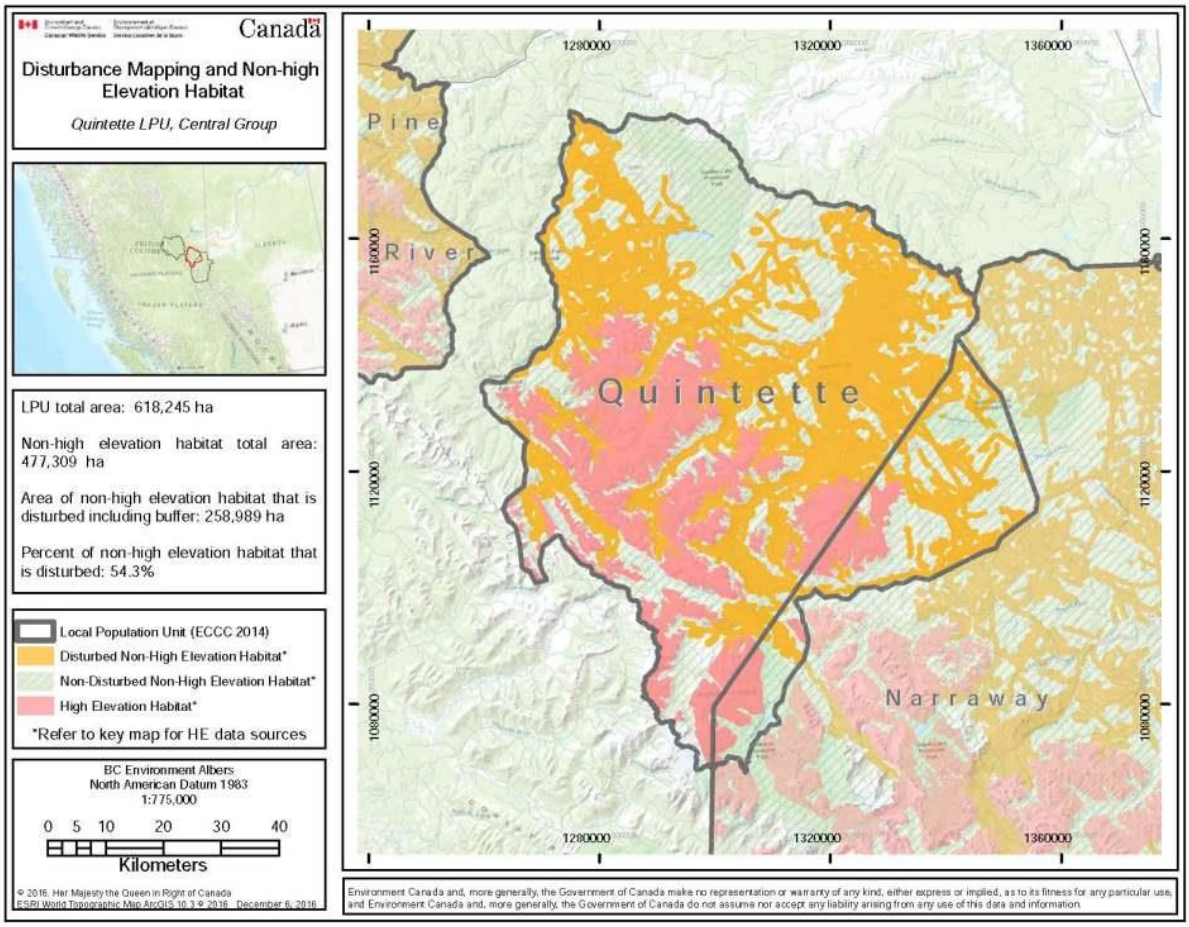
LPU	LPU Total Area (ha)	Non-high elevation habitat (ha)	Disturbed area (ha) (seismic lines excluded[20])	% disturbed (seismic lines excluded)	% disturbed (seismic lines included)
Narraway	1,311,744	940,479	418,280	44.5	50.4
Quintette	618,245	477,309	258,990	54.3	57.6
PineRiver	1,155,611	787,145	489,130	62.1	62.6

Map 3. Disturbance in non-high elevation areas – Narraway LPU

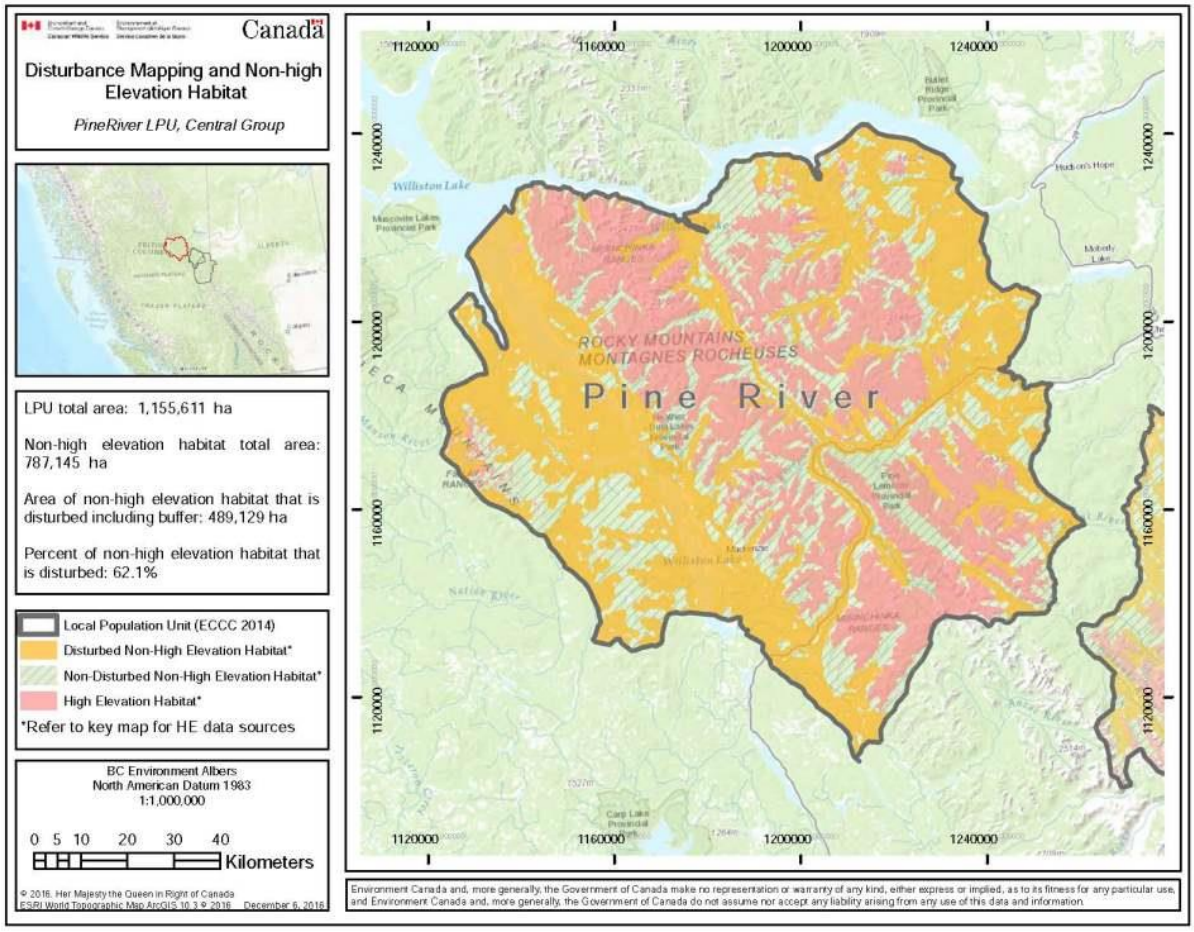


[20] For the purposes of this study, seismic lines were removed from the disturbance layer, for comparison.

Map 4. Disturbance in non-high elevation areas – Quintette LPU



Map 5. Disturbance in non-high elevation areas – Pine River LPU



A recent analysis of the Quintette LPU found that 62% of the low elevation/matrix habitat was disturbed (Glencore 2016). This analysis followed the Environment Canada (2011) methodology for boreal caribou as applied to 2015 Landsat imagery. As such, it reflects more recent imagery, and therefore is likely indicative of additional recent disturbance, possibly explaining the higher disturbance value (62%) compared to the 58% reflected in Table Four, which is based on 2011 imagery.

Note that, unlike low elevation winter range and Type 1 matrix range, a minimum amount of 65% undisturbed habitat is not part of the definition of critical habitat for high elevation range.

2.7 Activities Likely to Result in Destruction of Critical Habitat

The federal recovery strategy indicates that habitat destruction would result if a portion of the critical habitat were degraded, either permanently or temporarily, by activities occurring either within or external to the critical habitat, such that the habitat function provided by the degraded portion is no longer available to the species when needed.

The activities likely to result in destruction of critical habitat are listed in the federal recovery strategy as follows:

"*Relevant to all categories of critical habitat, except Type 2 matrix range across all groups and Type 1 matrix range for the Southern Group, activities likely to result in destruction of critical habitat include, but are not limited to, the following:*

- *Any activity resulting in the direct loss of southern mountain caribou critical habitat. Examples of such activities include: conversion of habitat to agriculture, mines, and industrial and infrastructure development.*
- *Any activity resulting in the degradation of critical habitat leading to a reduced, but not total loss of both habitat quality and availability for southern mountain caribou. Examples of such activities include: forestry cut blocks, pollution, drainage of an area, and flooding.*
- *Any activity resulting in the cumulative fragmentation of habitat by human-made linear features during the time frame over which population and distribution objectives are to be achieved. Examples of such activities include: road development, seismic lines, pipelines, and hydroelectric corridors.*
- *Any activity that, if not sufficiently mitigated, results in displacement of southern mountain caribou from part or all of their seasonal ranges, and/or from the biophysical attributes of those ranges, that is sufficient to cause a reduction in their movements and/or reproductive success, or to lead to higher mortality leading to range retraction or population decline.*
- *Any activity that, if not sufficiently mitigated, increases the likelihood of increased predator density in critical habitat (e.g., alteration of habitat to conditions favourable to other ungulates).*
- *Any activity that, if not sufficiently mitigated, facilitates predator access to and within critical habitat (e.g., snowmobiling, snowshoeing, backcountry skiing).*

Activities that are likely to result in the destruction of critical habitat of Type 2 matrix range across all groups and Type 1 matrix range in the Southern Group include, but are not limited to, the following:

- *any activity that, if not sufficiently mitigated, increases the likelihood of increased predator density in critical habitat (e.g., alteration of habitat to conditions favourable to other ungulates); and/or,*
- *any activity that, if not sufficiently mitigated, reduces the effectiveness of predator management."*

ECCC has developed a draft flowchart to assist in determining whether a given activity is likely to result in destruction of critical habitat. This is shown in Figure One below.

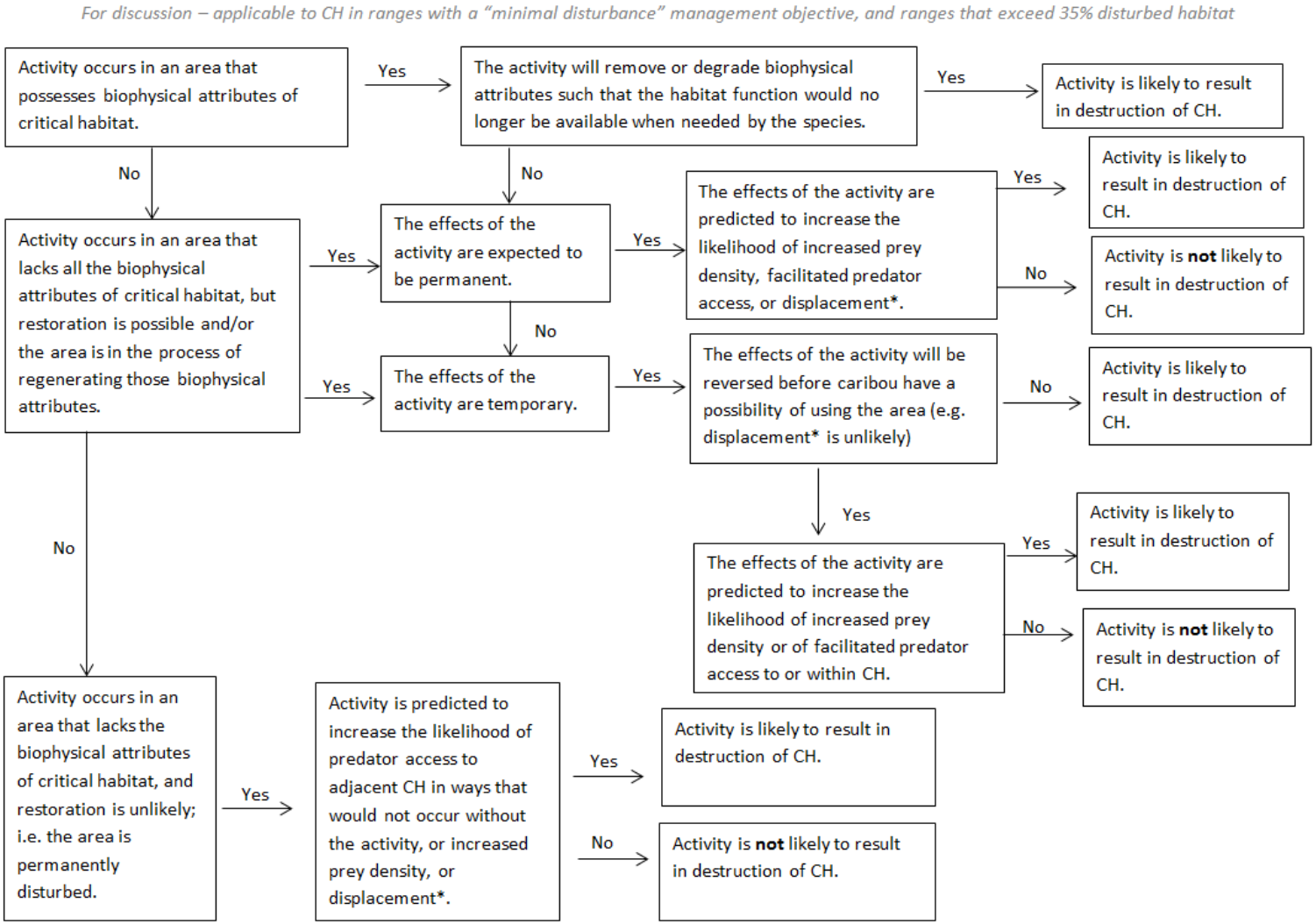
As noted in section 2.6, preliminary disturbance mapping indicates that the federal recovery strategy threshold of 35% maximum disturbance for low elevation winter range and Type 1 matrix habitat has been exceeded in all three LPUs within the Central Group. Therefore critical habitat includes that which is currently undisturbed as well as adjacent habitats that over time would contribute to the attainment of 65% undisturbed habitat. In high elevation ranges, critical habitat includes that which is currently undisturbed as well as adjacent habitat that would become undisturbed through restoration.

The Study has identified five broad groupings of activities with the potential to impact caribou critical habitat, based on the threat assessment in the federal recovery strategy.

These groupings include:

- Forest harvesting –related (including road building)
- Mining-related (including coal & mineral exploration & road / transmission line building)
- Oil & gas-related (including road building, pipelines, and forest harvesting as a precursor)
- Renewable energy-related (e.g. windfarms, independent power projects & associated roads / infrastructure)
- Recreation-related (e.g. winter motorized & non-motorized recreation, ski hill expansion, summer ORV use)

Figure One. Draft ECCC Critical Habitat Destruction Flowchart



* As per the recovery strategy, *displacement* of SMC from part or all of their seasonal ranges that is sufficient to cause a reduction in their movements and/or reproductive success, or to lead to higher mortality leading to range retraction or population decline.

3. Description of Legislative Instruments

3.1 Overview of relevant laws governing use of provincial Crown land in B.C.

The Government of BC utilizes various pieces of legislation to manage land-based activities. While this Study considers specific legislative instruments in the context of protecting caribou critical habitat, the purpose of most of BC's land use legislation is to manage activities such as forestry, mining, oil and gas and recreation (including the environmental effects of those activities). Under BC's "activity-based" approach, there is no single piece of legislation which has a specific purpose of protecting caribou habitat, but caribou habitat is explicitly considered in the designation and application of many of the legislative instruments discussed in the Study.

For the purposes of this study, the term *legislative instrument* is used to refer to any land use designation or regulatory authority that has the potential to protect caribou habitat, regardless of its effectiveness.

3.1.1 Approach to Description of Legislative Instruments

This section provides a description of each of the legislative instruments that could be relevant to caribou habitat protection on non-federal land (Table Five). For each legislative instrument, a brief explanation of the statutory context is provided as well as the location where the specific instrument applies within the Central Group. Multiple pieces of legislation and regulations can govern the activities which occur within a specific designated area.

For the purpose of the Study, the specific criteria included in the description of legislative instruments were those set out in ECCC's draft Policy on Critical Habitat Protection on Non-federal Land. These include prohibitions and offences, penalties or consequences, enforcement regime, limitations, exemptions, discretion, and permitting authorities.

Also included in the Study is a discussion of how BC Statutory Decision Makers have considered caribou habitat when making decisions, as well as how compliance and enforcement (C&E) is carried out in practice. These details about the implementation of the legislation are referred to as "history of application" and help to provide additional information on how the Province considers caribou habitat. History of application is also useful to highlight and describe areas where additional focus and emphasis on caribou could be inserted into provincial decisions.

History of application includes a discussion of authorizations made for specific activities since the legislative instruments have been designated. "Authorizations" include tenure, which is an agreement between an individual or company and the provincial or federal

government which provides the individual or company with an interest in the land. Types of tenure can include leases and licences which cover broad areas within which activities may or may not be subsequently authorized as well as more site-specific permits to undertake works on the ground. This discussion of history of application provides general information only about the potential for activities governed by the canvassed legislative instruments to occur within the LPUs of the Central Group. However, it is important to note that a given authorization or activity may not necessarily result in destruction of critical habitat. Significantly more detailed analysis would be required to determine whether critical habitat was or could be destroyed as a result of these authorizations. A table of all authorizations is provided in Annex 1.

This review is a “point in time” analysis and only considers legislative instruments that are in force at the time of writing.

Table Five. Provincial legislative instruments that could be relevant to habitat protection for the Central Group of southern mountain caribou in BC

Legislative Instrument	**Associated Legislation**
Ecological Reserve	*Ecological Reserve Act* *Ecological Reserve Regulations* *Protected Areas of British Columbia Act* *Offence Act* *Violation Ticket Administration and Fines Regulation*
Class A Provincial Park	*Protected Areas of British Columbia Act Park Act* *Offence Act* *Violation Ticket Administration and Fines Regulation*
Protected Area	*Environment and Land Use Act* *Park Act* *Offence Act* *Violation Ticket Administration and Fines Regulation*
Wildlife Habitat Area (WHA) Ungulate Winter Range (UWR)	*Forest Act* *Forest and Range Practices Act* (FRPA) *Administrative Orders and Remedies Regulation* *Forest Planning and Practices Regulation* *Woodlot Licence Planning and Practices Regulation* *Government Actions Regulation* *Offence Act* *Oil and Gas Activities Act* (OGAA) *Environmental Protection and Management Regulation*
FPPR Section 7 and WLPPR Section 9 notice area	*Forest and Range Practices Act (*FRPA) *Forest Planning and Practices Regulation* *Woodlot Licence Planning and Practices Regulation* *Offence Act*
Old Growth Management Area	*Land Act* *Forest Act* *Forest and Range Practices Act* (FRPA) *Forest Planning and Practices Regulation* *Oil and Gas Activities Act* (OGAA) *Environmental Protection and Management Regulation*
Resource Review Area	*Petroleum and Natural Gas Act* *Oil and Gas Activities Act (*OGAA)

Legislative Instrument	Associated Legislation
Petroleum and Natural Gas Act (PNGA) s.72 reserve area	*Petroleum and Natural Gas Act* *Oil and Gas Activities Act (*OGAA)
s. 15 OIC Reserve	*Land Act* *Offence Act*
s.16 Withdrawal	
s. 17 Conditional Withdrawal	
No Registration Reserve (mineral and/or placer)	*Mineral Tenure Act* *Mines Act*
Coal Land Reserve	*Coal Act* *Mines Act*
Motor Vehicle or Public Access Prohibition	*Wildlife Act* *Motor Vehicle Prohibition Regulation* *Public Access Prohibition Regulation*
Reviewable Projects	*Environmental Assessment Act*

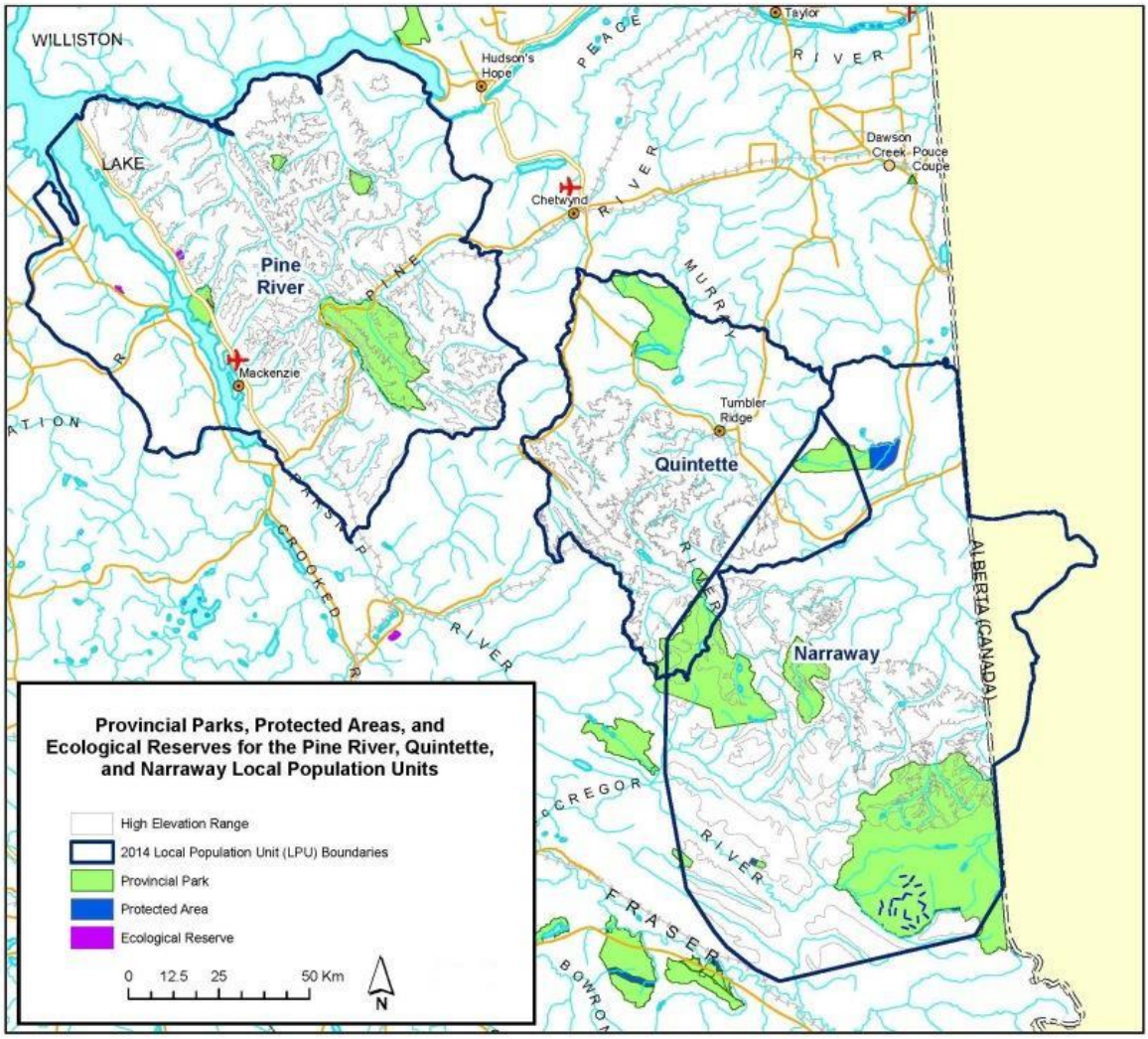
The following additional instruments are spatially relevant to the Southern and Northern Groups of SMC but not to the Central Group: community watersheds established under the *Drinking Water Protection Act / Government Action Regulation* subsection 8(1); recreation closures established under section 58 of the *Forest and Range Practices Act*; the *Muskwa - Kechika Management Area Act,* and wildlife management areas established under the *Wildlife Act*. There are no geographic areas subject to these instruments within the Central Group boundaries.

3.2 Laws of BC with potential to protect habitat within SMC Central Group range

3.2.1 Parks and Protected Areas System

British Columbia's protected areas system provides for the protection and maintenance of important natural and cultural values and outdoor recreation opportunities. The designations relevant to the Central Group area include ecological reserves, Class A provincial parks, and protected areas (Map 6).

Map 6. Ecological reserves, parks and protected areas with the Central Group



3.2.2 Ecological Reserves

Ecological reserves are created through the *Ecological Reserve Act* or the *Protected Areas of British Columbia Act*[21]. The *Ecological Reserve Act* reserves land within an ecological reserve from further disposition under any other Act, explicitly including the following Acts that regulate activities relevant to southern mountain caribou habitat: *Coal Act*, *Forest Act, Land Act, Mineral Tenure Act*, *Mining Right of Way Act, Petroleum and Natural Gas Act*.

There are three ecological reserves within the LPU boundaries of the Central Group covering a total of 1114 ha, all within the Pine River LPU (Map 6).

[21] The *Protected Areas of British Columbia Act* consolidates in its schedules most of the Class A parks, conservancies and ecological reserves for the purposes of the *Park Act* and the *Ecological Reserve Act*. It contains no provisions specific to the regulation of land use.

The *Ecological Reserve Act* and the *Park Act* both make it an offence to violate the regulations. The *Ecological Reserve Regulations* specifically indicate that "No person shall enter upon an ecological reserve for a purpose inconsistent with the *Ecological Reserve Act*, and without limiting the generality of the foregoing, no person shall prospect for minerals, cut timber, allow domesticated animals to graze, camp, light fires, trap or molest animals, build roads or trails, use motorized vehicles within an ecological reserve, or remove plants, animals or material from an ecological reserve."

The activities likely to affect caribou or their critical habitat are prohibited in these areas and permits may only be issued for ecological scientific research or educational purposes.

Enforcement actions may be taken by enforcement officers designated under various other statutes. A spectrum of enforcement options are specified in the legislation including warnings, tickets for violations and prosecution of offences. This and other Acts are supported by the *Offence Act* and its *Violation Ticket Administration and Fines Regulation*, which provides additional details about enforcement processes. Fines associated with tickets range from $115 for failing to obey a sign to $288 for unauthorized activities.

If convicted of an offence, maximum penalties of up to $200,000, with each day the offence continues constituting a separate offence.

History of application:

In general, informal enforcement actions available to natural resource officers and park wardens in parks, protected areas, and ecological reserves include compliance promotion and warning tickets. BC's environmental violations database does not list the *Ecological Reserves Act*, implying that few if any formal enforcement actions are taken in these areas. A review of park use permits indicates that no research or educational use permits have been issued to date in these three ecological areas. Other authorizations have been issued that appear to overlap with ecological reserves (Annex 1). Some of these may be the result of coarse / fine scale mapping errors. In the case of forest harvesting authorizations, there was a Blanket Salvage Permit[22] (BSP) for bark beetle management issued over the entire Blackwater Creek Ecological Reserve (292 ha). Although not common practice, this can occur in ecological reserves if salvage logging is deemed necessary to prevent the spread of the bark beetle to adjacent areas. Typically harvesting would occur in very small areas relative to the size of the BSP, and may not have occurred within the ecological reserve itself.

[22] https://www.for.gov.bc.ca/hth/timber-tenures/blanket-salvage-permit/blanket-salvage-permit.htm

3.2.3 Provincial Parks - Class A

Provincial parks are designated through the *Protected Areas of British Columbia Act* and are “dedicated to the preservation of their natural environments for the inspiration, use and enjoyment of the public.”

There are 14 Class A provincial parks within the LPU boundaries of the Central Group covering a total of 338,792 ha (11% of the total area of the three LPUs) (Map 6). There are no Class B or C[23] provincial parks within the boundaries of the Central Group.

The *Park Act* prohibits most non-recreational activities without a permit, and states that generally, permits shall not be issued "unless necessary to preserve or maintain the recreational values of the park" (*Park Act* s.8(2) and 9(2)). Enforcement actions may be taken by enforcement officers designated under various other statutes.

Options for enforcement that are specified in the legislation include offence prosecution or violation tickets. Fines associated with tickets range from $115 for failing to obey a sign to $345 for illegal use of a vehicle. If convicted of an offence, maximum penalties of up to $200,000 for contravention of the regulations are possible, and up to $1,000,000 or up to a year imprisonment is possible for contravention of the Act. Directors or park officers may also order removal or repairs to structures or works, and may order people to cease or refrain from actions or conduct detrimental to the public interest.

Within parks (and protected areas to which section 33 of the *Park Act* applies), a drilling license, permit, lease or other right may be issued under the *Petroleum and Natural Gas Act* (PNGA), or permits may be issued under the *Oil and Gas Activities Act* - however, this may only occur if the authorization does not "permit, authorize or allow entry on or occupation, use or disturbance of the surface of land within the park" (*Park Act* s.33). Avoiding surface disturbance would likely prevent destruction of southern mountain caribou critical habitat. Exploration for or production of government-owned petroleum and natural gas is prohibited except in accordance with the PNGA and the *Oil and Gas Activities Act*. In the case of unauthorized disturbance of the surface of the land for purposes related petroleum or natural gas, in addition to other enforcement actions, the minister may issue an order to cease activities, and may order restoration and compensation for remedial or preventative actions taken by the government as a result of the contravention.

Amendments passed in 2014 (*Park Act* s.9.3) broaden discretion for the issuance of permits for research activities, which can include research related to environmental assessments (EAs), feasibility studies (e.g. for roads and pipelines), and to inform decisions around park boundary adjustments.

[23] A Class B park may permit a broader range of activities and uses than a Class A park, provided that such uses are not detrimental to the recreational values of the park. Class C parks must be managed by a local board appointed by the minister.

Motorized and non-motorized recreational activities and associated infrastructure are managed to varying extents in accordance with park management plans and zoning.

History of application:

Policy related to the issuance of research permits recommends the permit be denied if the research activity will result in adverse impacts, which are impacts that will impair the function or role of a protected area.

A representative sample of park use permits issued since the various parks and protected areas were established have been reviewed, and none appear to have presented a risk of caribou critical habitat destruction. Note that recreational activities including snowmobile use are still authorized in certain areas of some parks, and park use permits are not required for these activities. The province manages these activities to reduce impacts to caribou through the use of zoning, adaptive management to incorporate current information about caribou movements, and best management practices for recreational activities. Authorizations related to various activities do overlap with provincial parks (Annex 1), likely as a result of the inclusion of broad-based tenure in the analysis.

3.2.4 Protected Areas

Protected areas are created under the authority of the *Environment and Land Use Act* (ELUA) and must be designated by Order in Council (OIC).

There are 3 protected areas within the LPU boundaries of the Central Group covering a total of 5800 ha, all in the Narraway LPU. All three protected areas are adjacent to Class A provincial parks (Map 6).

The ELUA is flexible, so various activities can be specified as being regulated, prohibited, or allowed; typically by order, or in a management or policy statement.

In the ELUA orders that designated the three protected areas in southern mountain caribou LPUs, the provincial Cabinet specified that sections of the *Park Act* applies to the designated areas as if they were a Class A park. Therefore, the discussion above regarding provincial parks applies in these cases, except for the 2014 amendments to the *Park Act* section 9.3 regarding permits for research activities, which do not apply because the ELUA orders pre-date those amendments.

The ELUA orders also specifically allowed for the construction, use, and maintenance of roads, pipelines, and/or powerlines through the protected areas, subject to assessment of impacts and mitigation requirements. For these specified projects, the ELUA orders specified that park use permits must be issued despite sections 8, 9, and 30 of the Park Act, which would otherwise prohibit the issuance of a permit for these purposes. Occupancy and use of the land associated with existing mineral titles was also specifically allowed in one case.

History of application:

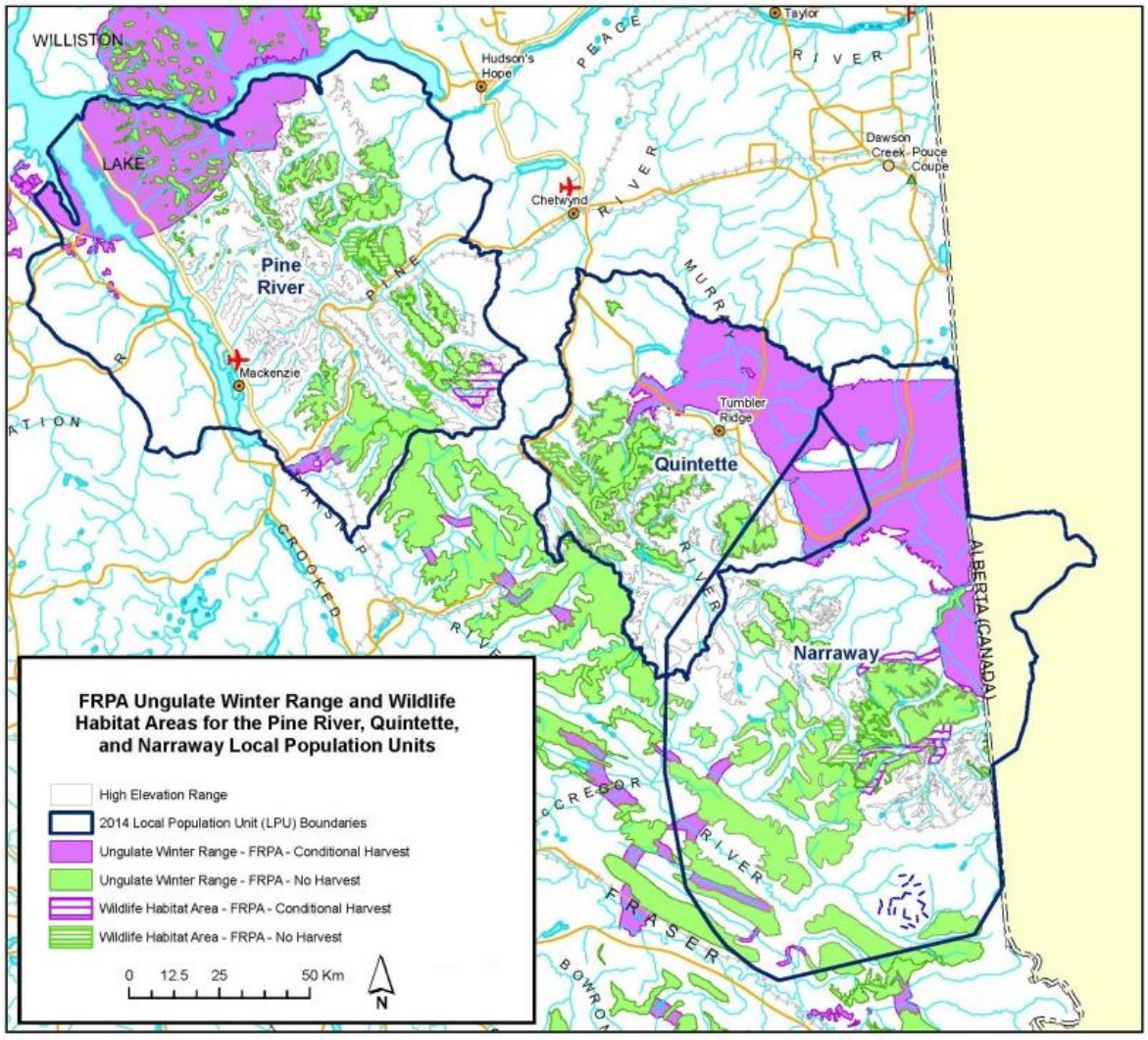
See discussion above for provincial parks, which also applies to protected areas. Authorizations related to various activities do overlap with provincial parks (Annex 1), likely as a result of the inclusion of broad-based tenure in the analysis.

3.2.5 Wildlife Habitat Areas and Ungulate Winter Ranges (under FRPA)

The FRPA enables the development of regulations to provide authorization for the minister to establish WHAs and ungulate winter ranges (UWRs). The *Government Actions Regulation* (GAR) in turn enables the establishment, by order, of individual WHAs, UWRs and general wildlife measures (GWMs).

There are 26 wildlife habitat areas for caribou within the LPU boundaries of the Central Group covering a total of 173,290 ha, or 6% of the LPUs (Map 7)

Map 7. Wildlife habitat areas and ungulate winter ranges established under FRPA for caribou within the Central Group area



These WHAs and associated GWMs were all established through one GAR order that was approved in May 2008 (Peace Forest District). The order specifies that activities authorized for the purpose of subsurface resource exploration, development or production (e.g. mineral exploration) are exempted from the GWMs.

"No harvest" GWMs apply to most (143,927 ha) of the WHAs shown on Map 7. These WHAs were established to protect high elevation caribou calving and rutting habitat. These GWMs indicate that primary forest activities[24] will not result in: the construction of roads or trails, removal of forest cover, use of pesticides, or development of recreation sites or trails.

"Conditional harvest" GWMs apply to three of the WHAs (9-073, 9-144 and 9-145) which were established to protect connectivity/corridor habitat in the Narraway LPU. With respect to primary forest activities and access, these restrict the construction of mainline roads; require deactivation of roads following silvicultural activities; and require other roads to use existing linear corridors and provide adequate visual screening, to the extent practicable in all cases. The GWMs require coordinated planning of road development and deactivation to minimize disturbance to caribou. With respect to harvesting and silviculture, the GWMs state that primary forest activities will result in:

- a network of connected forest cover, which provides visual screening and snow interception, to facilitate caribou movement;
- pre-harvest pine-leading stands being re-established as pine-leading stands.

The GWMs also indicate that primary forest activities will not result in material adverse disturbance to the productivity of key terrestrial lichen communities, will be completed in as short a timeframe as practicable, to a maximum of 5 years from initiation, and will not result in the development of recreation sites or trails.

There are currently five GAR orders establishing UWRs for caribou covering a total of 952,468 ha, with multiple units that are relevant to the Central Group of SMC, all of which came into effect between 2003 and 2009 (U-7-001, U-7-003, U-7-007, U-7-009, U-9-002). There is also one recently approved (May 2016) GAR order establishing UWRs for mountain goat within the Central Group (U-7-030)[25].

GWMs are also specified in each GAR order. "No harvest" units (419,437 ha, Map 7) are established for high elevation winter ranges, and "conditional harvest" units (533,031 ha, Map 7) are for low elevation winter range or corridor areas. There are

[24] As defined in the *Forest Planning and Practices Regulation* section 1(1): "primary forest activity" means one or more of the following: (a) timber harvesting; (b) silviculture treatments; (c) road construction, maintenance and deactivation

[25] Note: a portion of the specified area in U-7-028 overlaps with Pine River LPU, but the GWMs pertain to domestic animals and are not applicable to caribou. There is also overlap with a few small units of 9-001 – conditional harvest, for elk, deer, and moose.

often broad or constrained exemptions for mineral exploration activities, and for timber harvesting and road construction approved prior to the date of the order.

GWMs in “conditional harvest” units usually constrain the construction or location of mainline roads, require the use of existing linear corridors and provision of visual screening wherever possible for secondary roads, and indicate the need for access management. GWMs for forestry activities within “conditional harvest” units are more varied, but examples include:

- maintenance of key lichen communities, mimicking of the natural disturbance regime (harvest large patches with equivalent size connected leave areas), a maximum allowable disturbance of 33% of the forested area being less than 3 meters, retention of at least 60% of the pine-leading stands > 60 years of age and a minimum 100 year rotation (u-9-002);
- maintaining a minimum of 20% of the forest within each unit as greater than 100 years of age in a contiguous, wind firm corridor, no more than 20% of the productive forest area of each unit being less than 3 metre green-up condition at any time, conducting forest health sanitation activities in a manner that does not result in a material adverse impact on caribou habitat (u-7-003, u-7-009)
- reduce moose browse through appropriate silviculture practices, log approximately half the area at a time on a 100 year rotation, harvest in large patches, schedule harvesting to avoid disturbing caribou and terrestrial lichen (u-7-001)
- create large openings with equivalent size forested leave areas, maintain at least 40% of pre-harvest terrestrial lichen cover, re-establish a forested stand that is consistent with pre-harvest species composition. (u-7-007)

FRPA indicates that it is prohibited to cut, damage, destroy or remove Crown timber, and to use, construct, maintain or deactivate a road without authorization. It is prohibited to harvest timber or build roads without an approved forest stewardship plan (FSP) in an area subject to a licence or agreement.

When authorizations are in place, the *Forest Planning and Practices Regulation* (FPPR) section 69 states that authorized persons “must comply” with each applicable GWM when conducting forest practices within WHAs or UWRs. An equivalent provision exists for woodlot licence holders; section 55 of the *Woodlot Licence Planning and Practices Regulation* (WLPPR). Penalties depend on the specific prohibition that is contravened and enforcement can include prosecution in court (various fines up to $1,000,000 and/or up to 3 years imprisonment), compliance or remediation orders, administrative penalties (various amounts including calculations based on volume of timber subject to the contravention), or issuance of a violation ticket ($173 for most provisions relevant here). Orders that require the licensee to remediate the effects of a contravention are a

particularly powerful enforcement tool. FRPA section 112 provides the authority to impose conditions on orders.

The requirement to comply with GWMs (FPPR s.69 / WLPPR s.55) only applies to "authorized persons" or "woodlot licence holders" carrying out "primary forest activities". Some individual orders that establish GWMs also include exemptions from the application of the GWMs for specific activities such as mineral exploration.

The Minister's delegate has discretion to issue an exemption to the GWMs if compliance with the provision is not practicable (FPPR s.92 / WLPPR s.79). This discretion is not further constrained within the legislation, but FRPA section 112(1) provides authority to impose conditions with respect to exemptions.

History of application – offences, penalties and enforcement

The MFLNRO issues annual reports on C&E activities (http://www.for.gov.bc.ca/hen/reports.htm). However, these are not specific to WHAs/UWRs. MFLNRO C&E staff have indicated that C&E activities within caribou WHAs/UWRs are no different than in areas outside WHAs/UWRs; e.g. there is no additional compliance monitoring.

A July 2013 Forest Practices Board (FPB) Special Investigation Report (FPB/SIR/37), which was not specific to WHAs/UWRs, found that there was a 2/3 drop in the number of inspections of forest and range practices carried out in 2011-12 compared to 2010, following a reorganization of government departments, with the newly created Ministry of Forests, Lands and Natural Resource Operations having a broader mandate and fewer officers than its predecessor the Ministry of Forests and Range. The Board was concerned that fewer inspections may result in licensees' activities not being inspected enough; particularly harvesting and road activities that pose a high risk of harm to resource values.

An October 2014 FPB Special Investigation Report (FPB/SIR/41) looked at timeliness, penalty size and transparency of administrative penalty determinations (not specific to WHAs/UWRs or to authorized operators). The report indicates that "The Ministry of Forests, Lands and Natural Resource Operations states that, historically, about 20 per cent of detected non-compliances have been dealt with by enforcement action, which includes violation tickets, prosecutions and administrative penalties. The remaining 80 percent of non-compliances have been dealt with through warning tickets or compliance notices."

The FPB examined 146 contravention determinations under FRPA and the *Wildlife Act* made by MFLNRO during a five-year period between 2009 and 2014 (average of 29 per year; it was noted that in the previous five year period, there were about 96 determinations annually, and the reduction in the number of determinations

corresponded with a reduction in the number of inspections.). Thirty of the determinations involved alleged contraventions related to unauthorized harvesting.

The FPB found that there were opportunities for improvement in timeliness of decision-making with respect to a determination. The Board also found that in general, penalties seem low; 79% of penalties were below $5000, and 91% of penalties were less than 10% of the maximum authorized penalty prescribed by regulation. The FPB found that economic benefit is not always removed through the application of a penalty, and that the size of the enterprise (e.g. major licensee or individual) is not a factor in determining the size of penalty.

One recent (April 2016) example of an administrative determination concerned unauthorized forest harvesting of 17.2 ha, some of which was within a caribou WHA and UWR. The alleged contravention was associated with work in an adjacent area authorized through an Occupant Licence to Cut (OLTC), which was issued to a mining company to facilitate coal exploration (access roads and drilling sites) on its coal tenure. The unauthorized work occurred in 2012 and was self-reported by the company to the Ministry of Energy and Mines (MEM) in January 2013. The MFLNRO District Manager found that there was a contravention of FRPA section 52(1), which prohibits unauthorized cutting of Crown timber. FPPR section 69 was not applicable in this case. The three year limitation period (FRPA section 75(1)) had expired by the time the determination was made, so no penalties were levied. The company was required to pay stumpage on the timber.

West Coast Environmental Law (WCEL) (2014) had similar concerns as the FPB in 2014 regarding MFLNRO's C&E actions, finding that the number of inspections significantly decreased between 1998 and 2012 and the ratio of inspections to enforcement action taken increased; although this was attributed to more targeted inspections as well as a decline in the size of the forest industry overall. WCEL also noted a decline in the use of "administrative monetary penalties" and an increase in "enforcement tickets", with tickets typically having a much lower financial cost to the company.

History of application – discretion, exemptions, authorizations

Guidance relating to the discretion [as per FPPR s.92(1)] to grant exemptions from the requirement to comply with the GWMs [as per FPPR s.69] if compliance with the provision “is not practicable” can be found here:
http://www.env.gov.bc.ca/wld/documents/frpa/GWM_Exemption_RequestForm.doc

FRPA General Bulletin No. 3 (June 2005) produced by the province discusses the use of the term "practicable" throughout FRPA and its regulations.

It provides the following example with respect to FPPR section 12(7): In situations where this exemption power might be used, the delegated decision maker would have

to determine that it is not feasible to come up with a result or strategy that is consistent with an objective in a particular area. Rather than specifying an inconsistent result or strategy, the person is exempted from the requirement of specifying a result or strategy. The exemption need not relate to the entire plan but to a "particular area", given the circumstances or conditions applicable to that area. For that particular area, the person is exempted from specifying a result or strategy only in relation to the objective in question.

Authorizations for forest harvesting have been issued in WHAs and UWRs since they were established under FRPA for management of caribou (Annex 1). The authorizations overlap with 351 ha of ‘no harvest’ WHAs and 1206 ha of ‘conditional harvest’ WHAs, and with 16,537 ha of ‘no harvest’ UWRs and 1,988 ha of ‘conditional harvest’ UWRs. The specifics of the various authorizations have not yet been reviewed. They may apply to persons who are not subject to the GWMs, or they may reflect the exercise of discretion to grant exemptions from the GWMs. Authorizations have also been issued within these WHAs for other activities, which is reflective of the fact that FRPA does not regulate non-forestry activities.

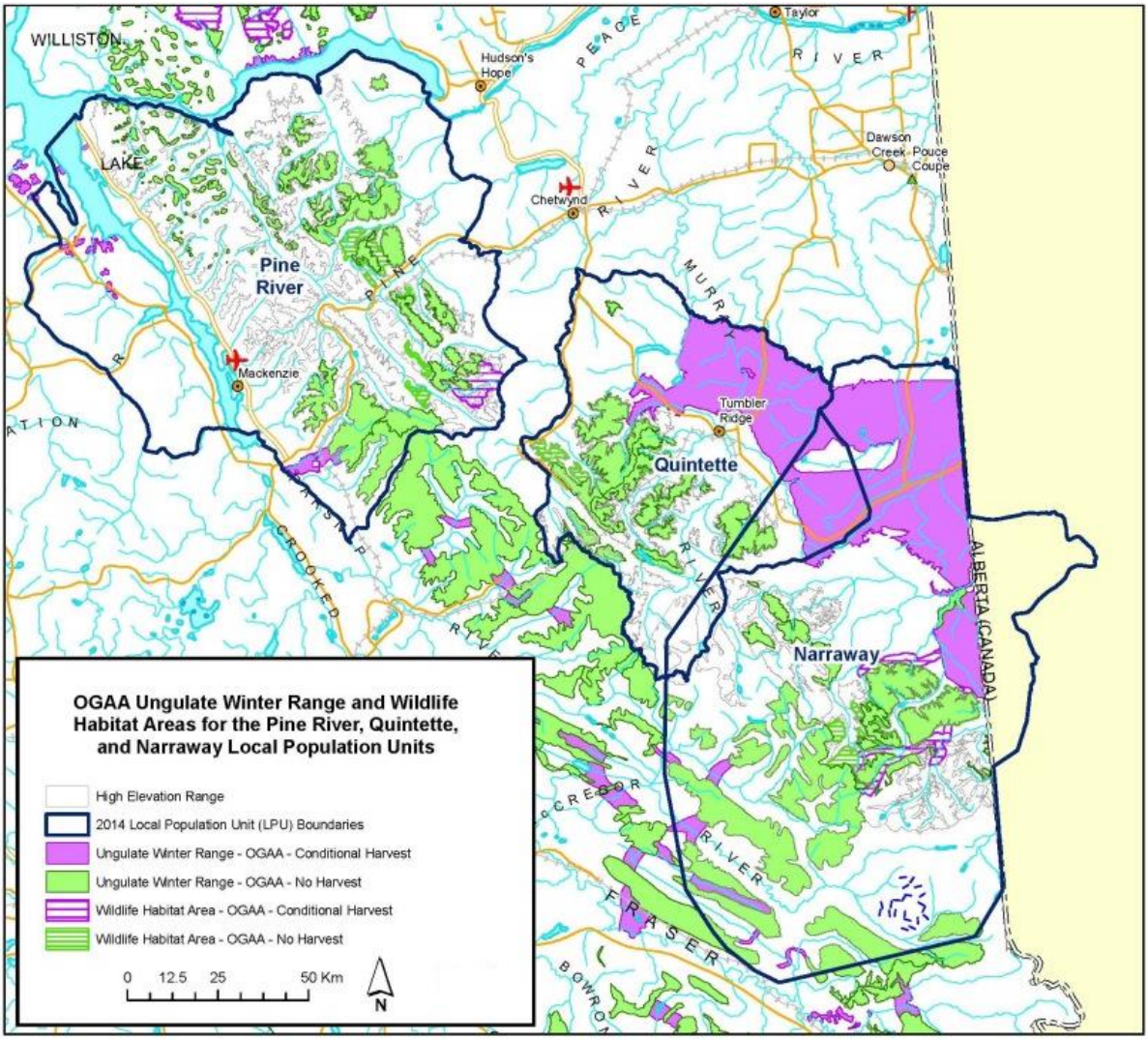
3.2.6 Wildlife Habitat Areas and Ungulate Winter Ranges (under OGAA)

The provisions of the PNGA, the *Oil and Gas Activities Act* (OGAA) and OGAA’s *Environmental Protection and Management Regulation* (EPMR) apply to all oil and gas activities wherever they occur in the province, and include the harvesting of timber under a master licence to cut.

The EPMR provides the legislative authority for the Minister responsible for administering the *Wildlife Act* to establish WHAs and UWRs for the purposes of the EPMR. Orders to continue WHA and UWR designations previously made under the FRPA were approved on August 18, 2011.

All WHAs and UWRs with “no harvest” GWMs established under FRPA that are relevant to the Central Group LPUs (see previous section) are also subject to OGAA and the EPMR. This amounts to 143,982 ha for WHAs and 419,437 ha for UWRs. A further 29,264 ha in WHAs and 354,631 ha in UWRs are established as the purposes of the EMPR that were previously designated under FPRA with “conditional harvest” general wildlife measures (Map 8).

Map 8. OGAA UWRs and WHAs for caribou in the Central Group



The OGAA requires the Oil and Gas Commission (OGC or "the Commission") to consider "government's environmental objectives" when deciding whether or not to issue a permit to undertake oil and gas activities. The objectives are set out in the EPMR of the OGAA. The OGAA also requires persons carrying out oil and gas activities within operating areas to comply with environmental protection and management requirements established under the EPMR as well as with other regulations under OGAA and its specified enactments.

Unauthorized activities are prohibited. Under the PNGA, it is an offence to explore for or produce government-owned petroleum and natural gas except in accordance with the PNGA and OGAA. OGAA makes it an offence to carry out an oil and gas activity except in compliance with the Act, the regulations and any permit or order. Under the FRPA , it is an offence to cut, damage, destroy or remove Crown timber, and to use, construct, maintain or deactivate a road without authorization. Under the *Land Act* it is an offence

to occupy or use Crown Land without lawful authority. It is also an offence to use Crown Land for a purpose not provided for in a disposition under that Act.

Penalties depend on the specific prohibition that is contravened and the form of enforcement, which can include offence prosecution in court, administrative penalties, or orders. For example, penalties for unauthorized oil and gas activities (e.g. contraventions of OGAA section 21) could result in fines up to $1,500,000 and/or imprisonment if convicted of an offence, or administrative penalties up to $500,000. The OGC has enforcement powers related to all oil and gas activities regardless of whether the provision is under OGAA, FRPA, or the *Land Act*.

The EPMR section 6(a) states that operating areas are not to be located within a WHA or UWR unless an operating area will not have a material adverse effect on the ability of the wildlife habitat within the WHA/UWR to provide for the survival, within the WHA/UWR, of the wildlife species for which the WHA/UWR was established.

History of Application

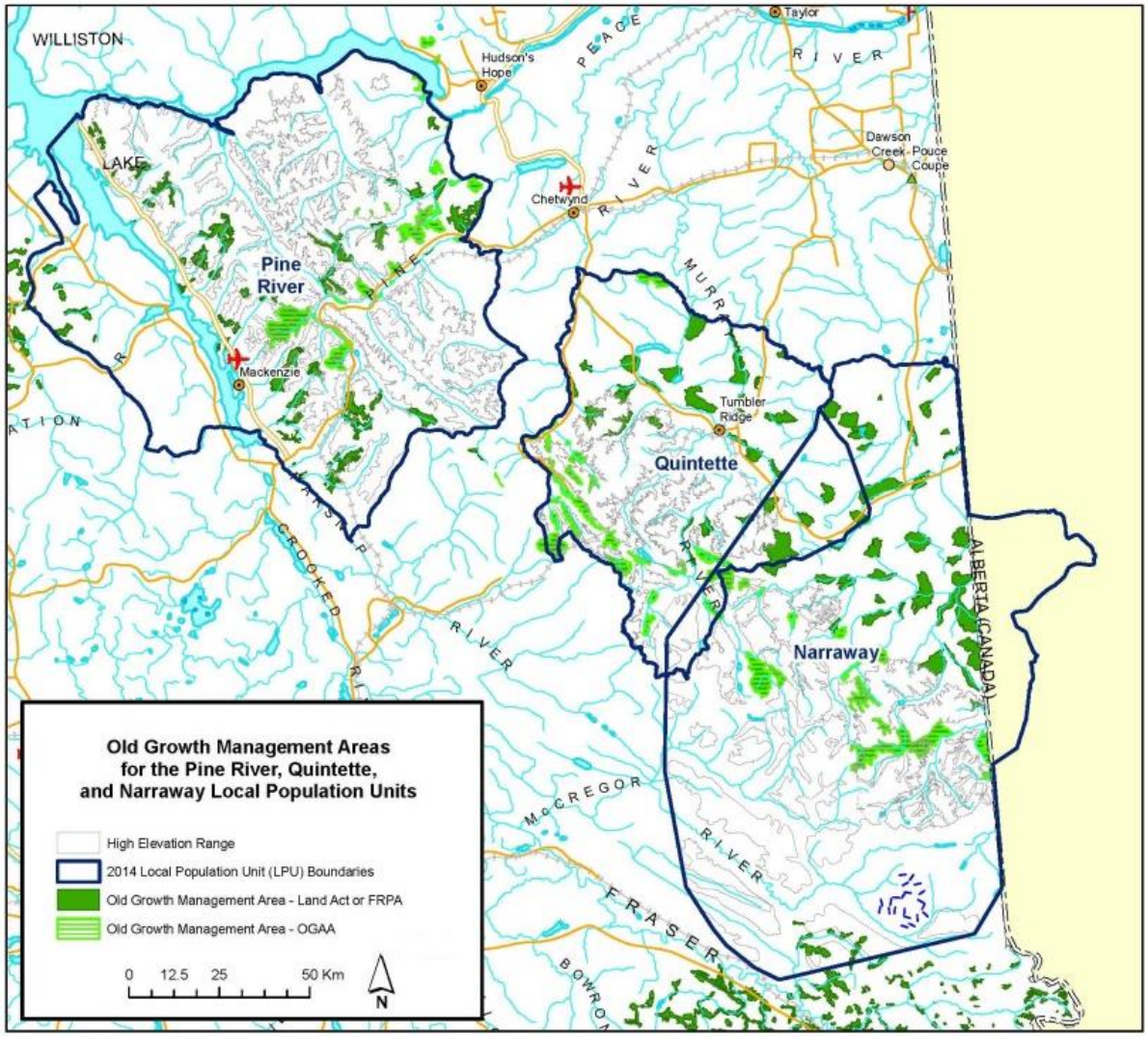
The OGC's Environmental Protection and Management Guideline (EPMG) (June 2016, version 2.3) provides additional guidance on the interpretation of "material adverse effect" and indicates that WHAs and UWRs should be avoided. If an oil and gas activity is proposed within one of these areas, the applicant must demonstrate adherence to the mitigation hierarchy (avoid, minimize, mitigate, restore), provide a compelling rationale for why activities would be proposed in these areas, and provide a mitigation plan outlining how the activity will not have a material adverse effect on the wildlife. The OGC has indicated that the GWMs established under FRPA would also inform the decision making.

Authorizations for forest harvesting have been issued in WHAs and UWRs since they were established under OGAA within the Central Group LPU boundaries (Annex 1). The authorizations overlap with 2,252 ha of 'no harvest' WHAs and 5,612 ha of 'conditional harvest' WHAs, and with 164,553 ha of 'no harvest' UWRs and 11,840 ha of 'conditional harvest' UWRs. The specifics of the various authorizations have not been reviewed for how the activity was determined not to have a material adverse effect on the wildlife. Authorizations have also been issued within these WHAs and UWRs for other activities, which is reflective of the fact that OGAA does not regulate non-oil and gas activities.

3.2.7 Old-growth Management Areas (OGMAs)(under FRPA or the Land Act)

Spatially-explicit OGMAs established under FRPA or the *Land Act* cover a total of 190,924 ha within the LPU boundaries of the Central Group (6.4%) (Map 9).

Map 9. Spatially-explicit OGMAs relevant to the Central Group in BC



Government objectives, including those pertaining to OGMAs, may be established by order under the *Land Act* (section 93.4) or carried forward from the former *Forest Practices Code of British Columbia Act* (as per *Forest Planning and Practices Regulation* section 1(1)).

A provincial non-spatial old growth order was passed in 2004, and there are two spatially explicit legal orders established pursuant to of the *Land Act* and one *Forest Practices Code* order that are relevant to the Central Group.

Under FRPA, it is prohibited to cut, damage, destroy or remove Crown timber, and to use, construct, maintain or deactivate a road without authorization. It is prohibited to harvest timber or build roads without an approved FSP or woodlot licence plan (WLP), as applicable, in an area subject to a licence or agreement. FSPs and WLPs must specify intended results and strategies in relation to objectives set by government; FSP or WLP holders must ensure specified results are achieved and strategies carried out. As discussed above, the objectives set by government that must be reflected in FSPs for OGMAs are legally established by order. Non-legal OGMAs that are identified during landscape unit planning or an operational planning process are also legally enforceable if a licensee has voluntarily incorporated the objectives into their FSP.

The two orders that establish spatially explicit OGMAs under the *Land Act* include the simple objective to "retain all timber within OGMAs", with exceptions for incursions of 5-10% disturbance (maximum of 40 ha). The one *Forest Practices Code* order indicates that cutting trees within OGMAs is limited to circumstances where it is absolutely necessary for insect or disease infestation control.

It is an offence to contravene any of these prohibitions or requirements. See the discussion above for WHAs and UWRs under FRPA for more information about penalties and enforcement mechanisms.

Forestry activities undertaken by *Forest Act* agreement holders who are not required to prepare a FSP or WLP are not legally subject to the objectives set by government. In addition, woodlot licence holders are specifically exempted from government's objectives for old growth retention (i.e. OGMAs).

The minister must exempt a person responsible for preparing an FSP from the requirement to specify results or strategies for achieving government objectives, if the minister determines that it is not practicable for the person to do so.

History of Application

A FPB investigation into the implementation of OGMAs (SIR36, June 2012) "included a review of the content of approximately 20 FSPs, roughly distributed across all forest regions, to assess if the orders that apply to the area covered by the FSPs were appropriately addressed. Overall, the content of FSPs either met or exceeded the requirements of the applicable order. "The investigation found that FSPs generally include restrictions on harvesting and road construction similar to the thresholds found in orders establishing legal OGMAs." […] "Despite provisions in FSPs to harvest or build roads in non-legal OGMAs, licensees said they tend to avoid OGMAs wherever possible and most incursions were minor (probably in the 0.5 to 1 hectare range)."

Sixty-one authorizations for forest harvesting have been issued that overlap with 1,423 ha of spatially explicit OGMAs within the Central Group LPU boundaries since they were established under FRPA or the *Land Act* (Annex 1). The specifics of the various

authorizations have not yet been reviewed as to whether they represent activities undertaken by agreement holders who are not required to prepare a FSP or WLP or exemptions granted if the achievement of results and strategies is determined not to be practicable. Authorizations have also been issued within these OGMAs for other activities.

3.2.8 Old-growth Management Areas (OGMAs) (under OGAA)

Spatially-explicit OGMAs established under OGAA cover a total of 64,945 ha within the LPU boundaries of the Central Group (2.2%) (Map 9).

The EPMR (section 32) provides for the establishment of old-growth management areas relevant to oil and gas activities.

The EPMR section 7 indicates that operating areas for oil and gas are not to be located within an old-growth management area "unless it will not have a material adverse effect on the old seral stage forest representation within that area". As a matter of policy, the OGC considers all OGMAs, not only those formally designated under OGAA. See the discussion above regarding WHAs and UWRs under OGAA for more information; all the same information applies to OGMAs.

History of Application

No authorizations for oil and gas activities have been issued that overlap with spatially explicit OGMAs since they were established under OGAA within the Central Group LPU boundaries (Annex 1). Authorizations have been issued within these OGMAs for other activities. Authorizations for oil and gas activities have been issued that overlap with 15,602 ha of spatially explicit OGMAs since they were established under FRPA or the *Land Act* within the Central Group LPU boundaries.

3.2.9 Forest and Range Practices Act FPPR Section 7 and WLPPR Section 9 notices

The FRPA requires a FSP or WLP, as applicable, in an area subject to specified types of licenses or agreements. FSPs and WLPs must specify intended results and strategies in relation to objectives set by government. The objectives for wildlife are identified through the FPPR section 7 and WLPPR section 9. A person preparing a FSP or WLP is required to address the objective if the person is notified of the applicable species and indicators of the amount, distribution and attributes of the wildlife habitat applicable to the objective. Notices were provided in December 2004[26]. The notices generally identify an overall amount of area and distribution of area to be conserved, but are otherwise aspatial. Many notices have been superseded by newer wildlife habitat areas or ungulate winter ranges, at which point the aspatial objective becomes

[26] http://www.env.gov.bc.ca/wld/frpa/notices/sar.html , http://www.env.gov.bc.ca/wld/frpa/notices/uwr.html

spatialized, and the amount of the aspatial objective is reduced by the equivalent amount of the new spatially explicit WHA or UWR.

There are notices still in effect that could be relevant to the Central Group (Table Six); however, given that the forest district boundaries extend beyond the LPU boundaries and the a spatial nature of the notices, it is difficult to determine the actual extent of overlap.

Table Six. Summary of FPPR Section 7 and WLPPR Section 9 notices still in effect for northern caribou in forest districts that overlap with Central Group LPU boundaries.

Forest District (FD) / Timber Supply Area (TSA)	Amount included in current Notice (Dec 2004)		Exemption from objective	Amount remaining in the notice following approval of WHAs/UWRs		WHA / UWR orders and notices providing exemption
	Total Area (ha)	Mature THLB Impact (ha)		Total Area (ha)	Mature THLB Impact (ha)	
Mackenzie FD	Not specified	10,100		Not specified	10,100	
Mackenzie TSA	Not specified	1995	Partial	Not specified	272	u-7-007 u-7-009
Prince George FD	Not specified	1000		Not specified	1000	

As discussed in the section on OGMAs, FSP or WLP holders must ensure specified results are achieved and strategies carried out. See the discussion in the section on WHAs and UWRs under FRPA for more information about penalties and enforcement mechanisms.

The requirement to prepare FSP and to ensure the results are met and strategies carried out only applies to certain *Forest Act* agreement holders. FRPA s.3 specifies the types of licences and agreements for which a FSP must be prepared. By omission, other types of agreements under s.12 of the Forest Act do not require the preparation of a FSP.

The minister must exempt a person responsible for preparing an FSP from the requirement to specify results or strategies for achieving government objectives, if the minister determines that it is not practicable for the person to do so.

For woodlot licence holders, the objectives are not required to be reflected in the woodlot licence plan. The WLPPR states that the woodlot licence holder must act in a manner consistent with the objective specified in a WLPPR section 9 notice; however, failure to do so is not specified as an offence in WLPPR section 90.

For licensees responsible for preparing a FSP, the aspatial nature of the notices presents a challenge in tracking of whether the objectives are achieved amongst multiple licensees.

History of Application

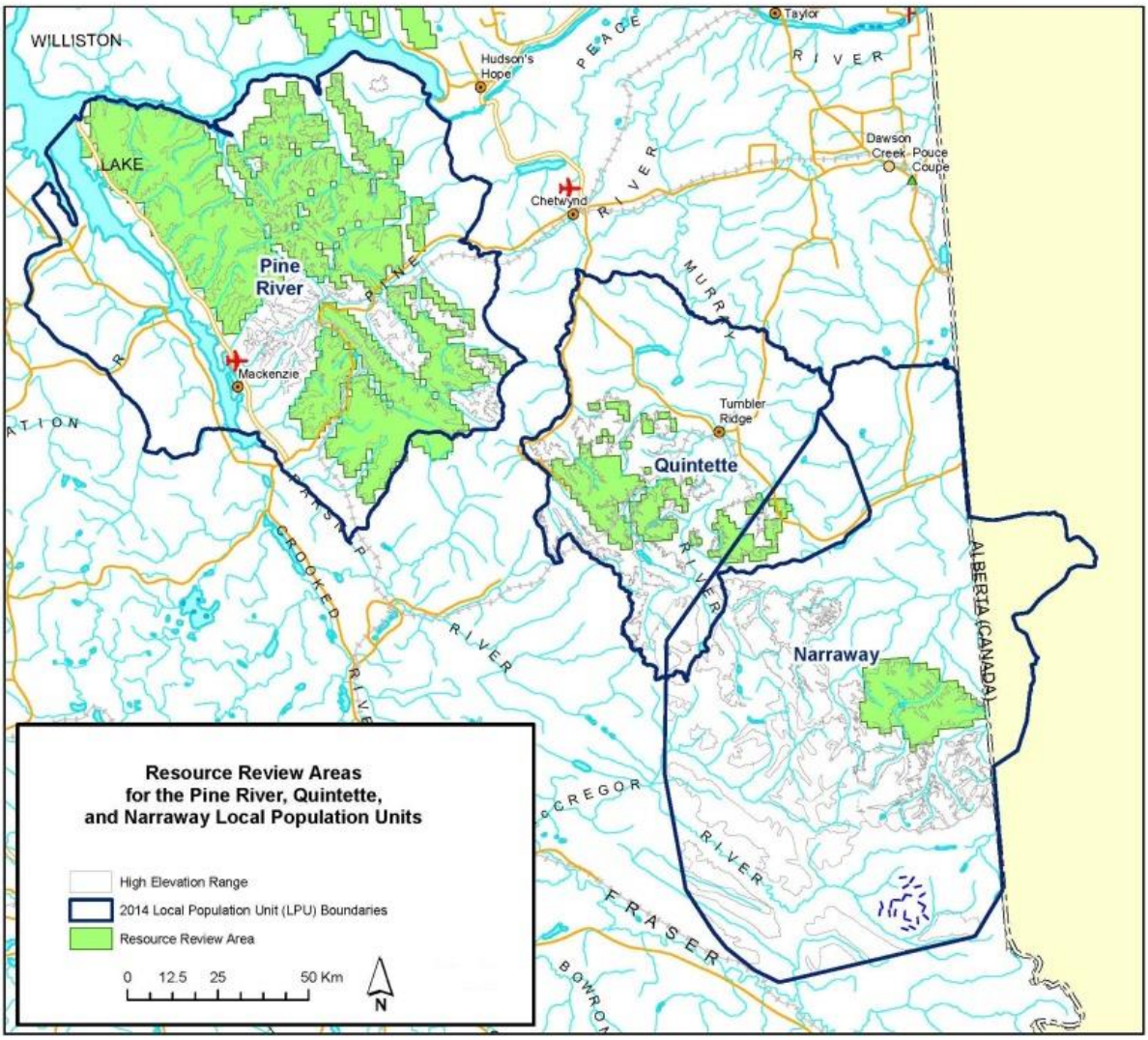
Two example FSPs were reviewed. One indicated that forest operations would be consistent with the FPPR section 7 notice, but did not indicate how that would be achieved or managed. The second indicated that the FSP agreement holders will participate with other forest tenure agreement holders to ensure no harvesting or road construction will occur on the amount of area specified in the section 7 notice. The specific results / strategies are: where the habitat attributes for caribou occur within herd boundaries, the agreement holder will conduct a caribou wildlife habitat assessment prior to harvesting of roads or cutblocks; the assessment will evaluate and develop recommendations for management of calving sites, rutting areas, connectivity, and mineral licks; forest operations will be consistent with the mountain caribou wildlife habitat assessment recommendations.

3.2.10 Resource Review Areas

The PNGA regulates the issuance of subsurface petroleum and natural gas tenure. Tenure does not include authorization to conduct activities. In order to conduct any oil and gas activity or related activity, a proponent must apply to the OGC in accordance with the OGAA. The only oil and gas activity for which tenure is required is drilling or operating a well (other than a water source well). In all other cases there is no direct link between subsurface tenure and oil and gas activities.

Resource Review Areas (RRAs) refer to a policy tool. The Ministry of Natural Gas Development provides notice to industry that new petroleum and natural gas tenure requests will not be accepted in the designated areas. RRAs are used regularly to indicate to industry areas in which the Ministry will not accept posting requests or issue tenure. Where RRAs are in place (Map 10), tenure will not be granted in any case.

Map 10. Resource Review Areas within the Central Group LPU boundaries



History of Application

Since the RRAs were established, authorizations for oil and gas activities have been issued that overlap with 1,639 ha of RRAs within the Central Group LPU boundaries (Annex 1).

3.2.11 Petroleum and Natural Gas Act s.72 Withdrawal Orders

Section 72 (1) of the PNGA enables the minister, by order, to withdraw Crown reserves petroleum, natural gas, and oil-related resources from disposition. There is one Ministerial withdrawal order in effect with a very small amount of overlap with one of the Central Group LPUs[27].

[27] http://www2.gov.bc.ca/gov/content/industry/natural-gas-oil/petroleum-natural-gas-tenure/information-letters

Under the PNGA, it is an offence to explore for or produce government-owned petroleum and natural gas except in accordance with the PNGA and associated regulations. It is also an offence under the *Oil and Gas Activities Act* (OGAA) to carry out unauthorized oil and gas activities. Under the PNGA and OGAA, unauthorized activities are clearly prohibited; the prohibitions are enforceable, and contraventions could be subject to significant penalties.

The only oil and gas activity for which tenure is required is drilling or operating a well, other than a water source well. In all other cases there is no direct link between subsurface tenure and oil and gas activities. Therefore, other oil and gas activities may still be authorized, so long as they are in accordance with OGAA and its regulations.

Where Crown reserves have been withdrawn from disposition under PNGA section 72(1), tenure will not be disposed until the withdrawal order is cancelled by the minister. Under section 72(2) of the PNGA, withdrawn Crown reserves may be managed, developed or disposed of in accordance to the terms and for the price approved by the Lieutenant Governor in Council, or in accordance with regulations under PNGA section 72(3).

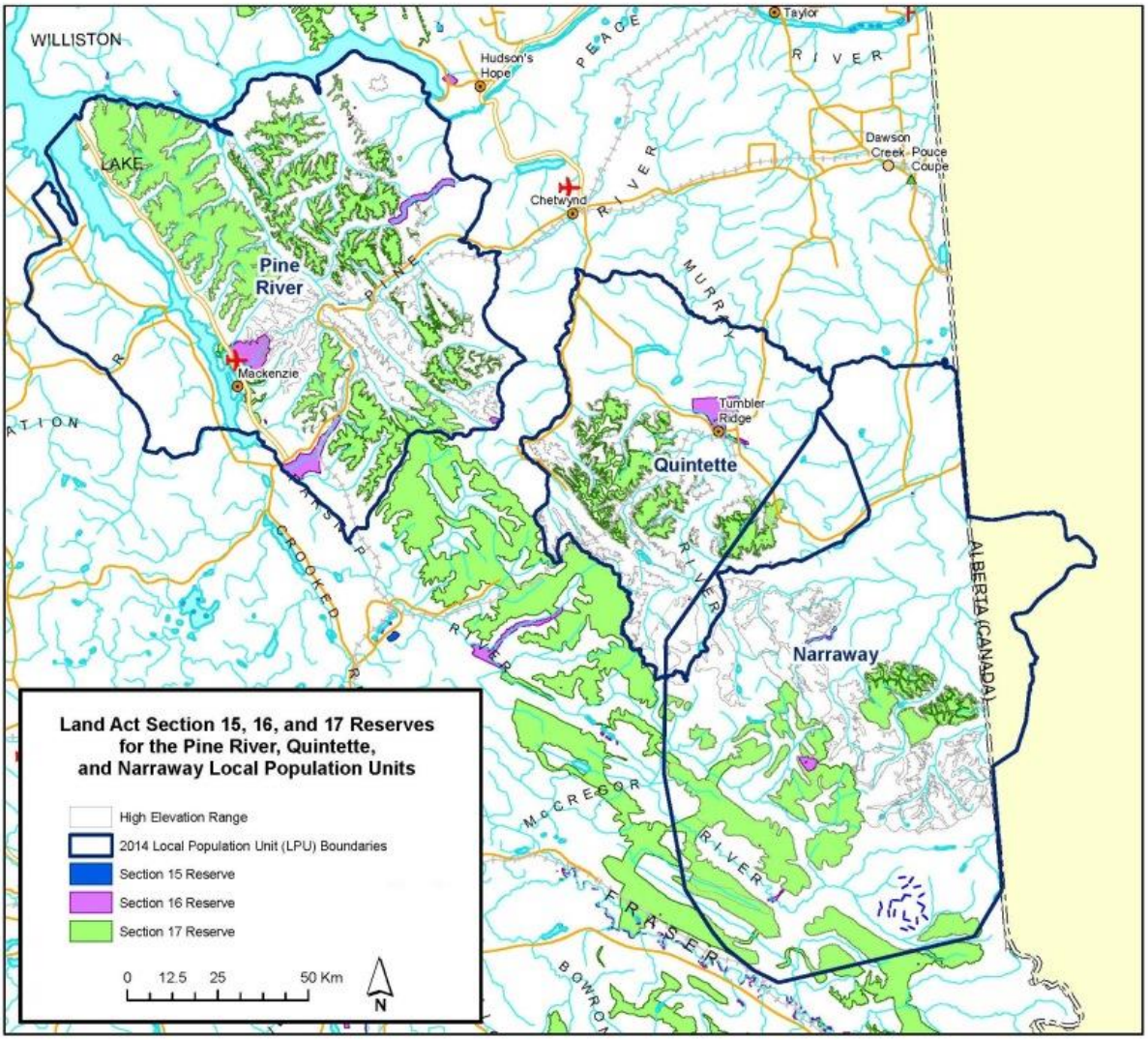
History of Application

No information available.

3.2.12 Land Act Reserves and Withdrawals

Reserves are legal designations under sections 15, 16 or 17 of the *Land Act* that may be placed on Crown land as a means of preventing or restricting the disposition of the land due to an acknowledged value or concern in the public interest. There are 27 *Land Act* section 17 conditional withdrawal areas within the LPU boundaries of the Central Group (489,435 ha), with significant amounts designated for the purpose of recognizing caribou habitat (Map 11). There are 35 areas (29,314 ha) designated as *Land Act* section 16 withdrawals (map reserves) within the LPU boundaries of the Central Group, most very small; sub-purposes of areas over 5000 ha include watershed reserve and fish & wildlife management, and may be incidentally relevant to caribou habitat (Map 11). The only *Land Act* section 15 OIC Reserves within the LPU boundaries of the Central Group occur within the Pine River LPU. These were established as recreation or flooding reserves and have no direct or incidental relevance for caribou habitat (Map 11).

Map 11. *Land Act* section 15, 16 and 17 reserves within the Central Group LPU boundaries



The *Land Act* makes it an offence to use Crown land without lawful authority. In areas designated under sections 15, 16, or 17, that authority will not be granted except for the specified purpose (or compatible use in the case of section 17). For the purposes of this study, only section 15, 16, and 17 reserves and withdrawals with a specified general purpose of “Environment, Conservation, and Recreation” were considered.

Applications for tenure under the *Land Act* may only be accepted on Crown land covered by a section 17 conditional withdrawal if the use or uses are allowed in the withdrawal notice or are compatible with the intent of the withdrawal notice. These are also referred to as designated use areas.

Section 16 withdrawals (also known as map reserves) are a temporary withdrawal of Crown land from disposition for all purposes under the *Land Act* except those specified. Applications for tenure are not accepted for these areas for the duration of the term.

Reserves established under section 15 are established by OIC and are therefore known as OIC Reserves. They can be amended or cancelled only by another order, and dispositions are absolutely reserved during the term, which is specified in the establishing order (minimum five years).

The *Land Act* section 60 states that it is an offence to occupy, possess, or use Crown land without lawful authority, and to perform any excavation or filling without authorization. If convicted of an offence, a person is subject to fines up to $20,000 or imprisonment or both. Other than prosecution, contraventions of section 60 may also be subject to requirements to cease the unauthorized use and restore the land or pay for its restoration. Enforcement authorities are clear.

These designations (i.e. under section 15, 16, and 17) do not apply to activities that do not require a *Land Act* disposition for occupancy. This includes some oil & gas-related, mining-related, and non-commercial recreation activities.

Within section 15 OIC reserves, the minister has discretion to authorize temporary licenses for less than two years for a variety of activities, and to authorize construction of roads.

Within areas designated under section 15, 16, or 17, activities may be authorized so long as they are for the purpose, or compatible with the purpose in the case of section 17, for which the area was designated. In some situations this could include activities with the potential to result in destruction of critical habitat. It would be necessary to review the terms and conditions associated with each of the designated areas to assess the extent of this risk.

History of Application

The Compliance and Enforcement Branch of MFLNRO investigates and enforces some issues of non-compliance with the *Land Act*. Other issues of noncompliance with the *Land Act* are investigated and resolved by Authorization staff.

Enforcement activities for *Land Act* noncompliance are initiated by complaints, inspections, and audits. Compliance actions can range from requests or notices to comply through to prosecutions in the courts of law. Most issues of noncompliance to the *Land Act* are resolved through requests or notice to comply. These requests or notices to comply can be generated by Authorization staff.

Compliance promotion is conducted in the form of proponent education and information sharing through Notices of Final Review at time of tenure issuance and through inspections and audits.

The terms or conditions to section 15, 16 and 17 reserves normally take the form of an "Intent Statement". All non-compatible activities proposed within a reserve are considered by the statutory decision-maker or Cabinet with full engagement and consultation. If a non-compatible activity is deemed necessary, the decision would require cancellation or amendment of the reserve to allow the proposed activity.

The authorizations issued under the *Land Act* since the various *Land Act* reserves within the Central Group LPU boundaries were established are shown the table below, and in Section 4.

Table Seven. Authorizations issued under the *Land Act* within *Land Act* reserves with a purpose of "Environment, Conservation, and Recreation" since the reserves were established.

	Section 15		Section 16		Section 17	
Activity Category	# of authorizations	Total Area (ha) of Overlap	# of authorizations	Total Area (ha) of Overlap	# of authorizations	Total Area (ha) of Overlap
Recreation	0	0	2	1,645	2	131,016
Renewable energy	0	0	6	3,732	3	318
Other activities regulated by the *Land Act*	3	1	27	3,440	10	978

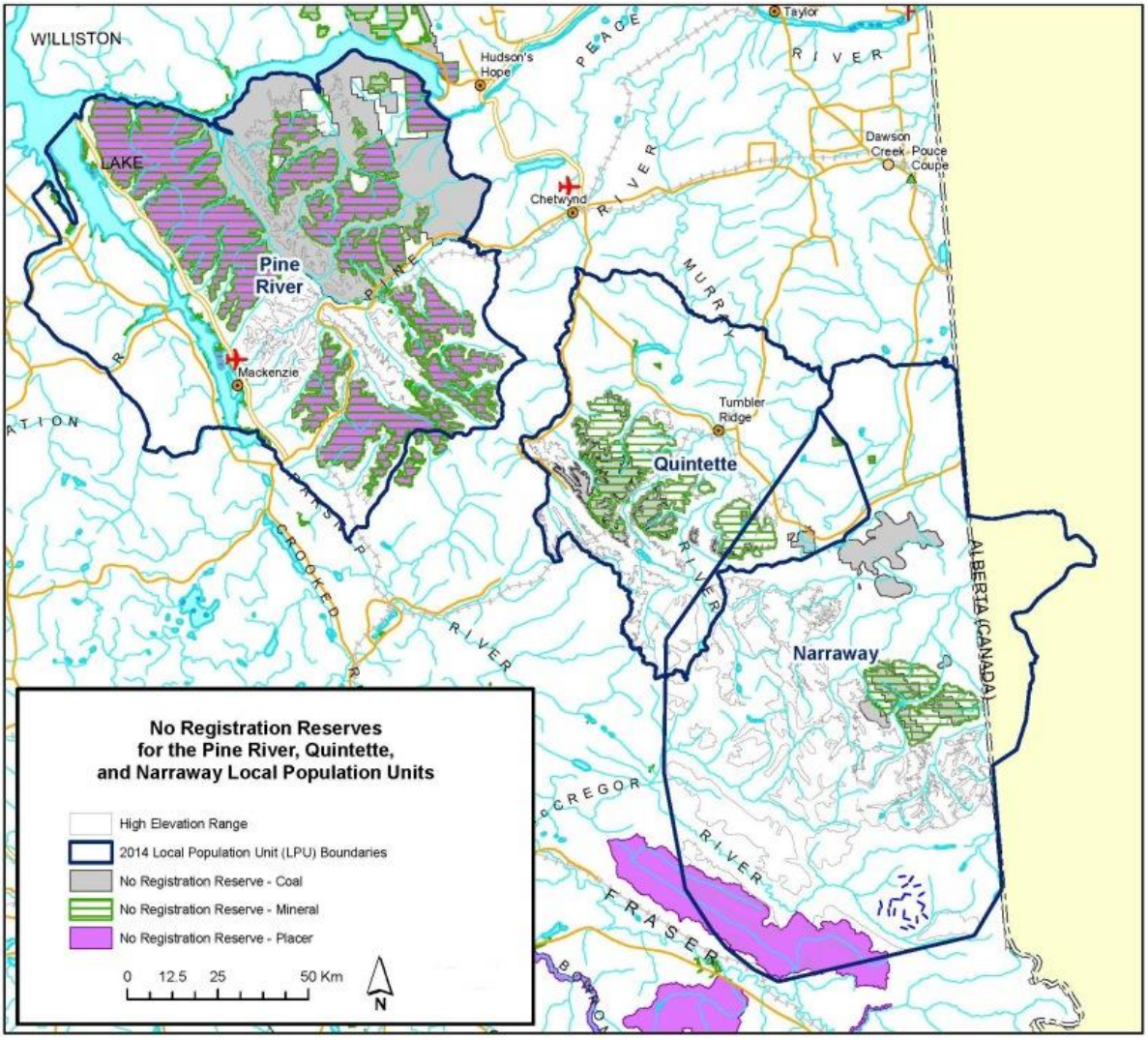
3.2.13 Mineral Tenure Act Mineral No Registration Reserves

The *Mineral Tenure Act* enables the establishment, through regulation, of no registration reserves and conditional registration reserves, for mineral or placer claims, or both.

In areas designated as no registration reserves, free miners are prohibited from registering a mineral and/ or placer claim. In areas designated as conditional registration reserves, free miners may register a mineral and/or placer claim, but subject to conditions, generally that they must not interfere with another use of the land such as a pipeline, transmission line or gravel pit. Since conditional reserves do not constrain activities in a way that considers caribou habitat, they will not be reviewed further in this Study.

No registration reserves for mineral claims overlap with 499,115 ha (17%) of the area of the Central Group LPUs; no registration reserves for placer claims are in effect over 444,960 ha (15%) of the area (Map 12).

Map 12. Mineral or mineral, coal and placer no registration reserves within the Central Group LPU boundaries



The *Mineral Tenure Act* makes it an offence to explore for, develop or produce minerals except in accordance with the Act and regulations. If convicted of an offence, fines of up to $25,000 or up to six months imprisonment or both are possible. The *Mines Act* also makes it an offence to start any work in, on, or about a mine without a permit. If convicted of an offence, fines of up to $1,000,000 or up to three years imprisonment or both are possible, as well as additional penalties if a written notice was served. There is no discretion to authorize the exploration, development, or production of minerals except in accordance with the *Mineral Tenure Act* and regulations.

In areas designated as no registration reserves, free miners are prohibited from registering a mineral and/ or placer claim. There is no discretion to issue leases,

licences, permits or other authorizations for the exploration, development, or production of minerals on a no registration reserve if there were no existing claims in place.

The *Mines Act* specifies that inspectors, including the Chief Inspector of Mines, may inspect a mining activity site that is operating without a permit. An inspection report must be completed and include orders for remedial action if contraventions of the Act are noted. Follow-up orders are enabled including the taking of remedial action and suspension of work. This may be further escalated to the Supreme Court if necessary.

Titles in a no registration reserve area that were registered prior to the establishment of a reserve are unaffected by the reserve, and recorded holders of such titles may apply for permits under the *Mines Act* to conduct mining activity. *Mines Act* permits may be issued on Crown or private land in the absence of a mineral or coal title, such as for a gravel or aggregate quarry. Gravel and construction aggregate are not regulated under the *Mineral Tenure Act*, and may be disposed of on Crown land under the *Land Act*.

Note that no registration reserves are only relevant for resource specified in the establishing regulation (i.e. mineral or placer or both).

History of Application

Since the various mineral no registration reserves were established, there have been 14 authorizations under the *Mineral Tenure Act* within the no registration reserves. These overlap with 91 ha of the Central Group LPU area (Annex 1). In placer no registration reserves, there have been 27 authorizations overlapping 117 ha.

3.2.14 Coal Act Coal Land Reserves

The *Coal Act* enables the establishment, through regulation, of coal land reserves (CLR) (also known as no registration reserves[28]). Areas in which these are in effect are shown in Map 12 above.

The *Coal Act* makes it an offence to explore for, develop or produce coal on a CLR without lawful authority. The *Mines Act* also makes it an offence to start any work in, on, or about a mine without a permit. In areas designated as CLRs, that authority will not be granted. Coal titles may not exist in a CLR because the exploration and development of coal are rights acquired with a coal title, and the CLR prohibits those activities.

If convicted of an offence under the *Mines Act,* fines of up to $1,000,000 or up to three years imprisonment or both are possible, as well as additional penalties if a written notice was served. The *Mines Act* specifies that inspectors, including the Chief Inspector of Mines, may inspect a mining activity site that is operating without a permit. An inspection report must be completed and include orders for remedial action if

[28] Technically, the term “no registration reserve” only applies to mineral and placer no registration reserves, not to coal. However, mining reserves are often discussed together, and in those situations, the term “no registration reserve” is informally used in conjunction with a coal land reserve.

contraventions of the Act are noted. Follow-up orders are enabled including the taking of remedial action and suspension of work. This may be further escalated to the Supreme Court if necessary.

Under the *Coal Act*, if “recorded holders” are not compliant with the Act or an existing licence, lease, or permit, the minister may notify the recorded holder of the failure to comply. If the non-compliance is not remedied within the time specified in the notice, the Minister may order the suspension of operations, refuse to renew any license or lease, and ultimately may cancel the license or lease. These compliance provisions of the *Coal Act* would not be relevant within a CLR, as no licence or lease will be issued within CLRs.

History of Application

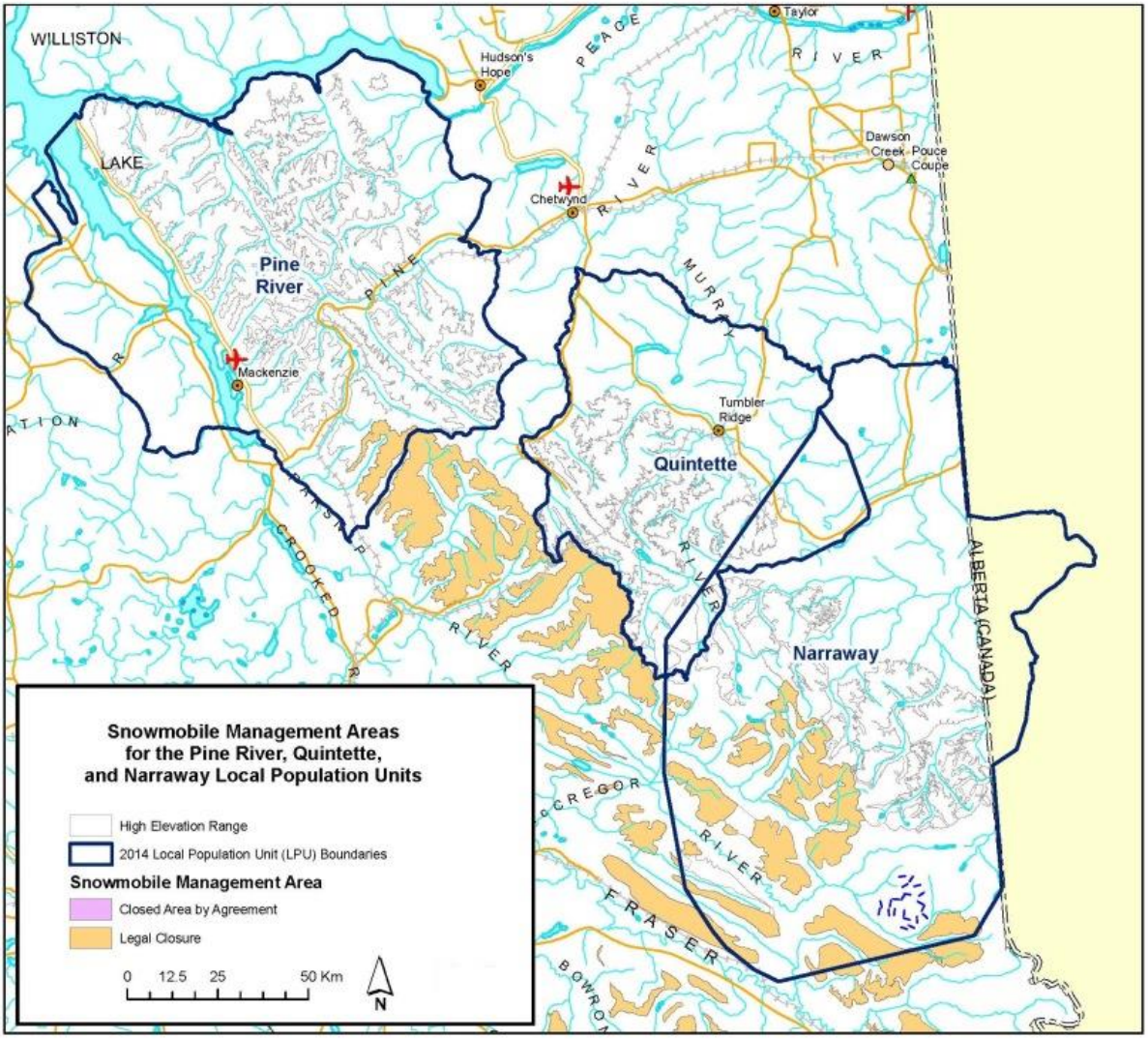
The MEM is not aware of anyone exploring for coal in a coal land reserve, and has no record of any complaint against someone exploring for coal in a coal land reserve.

There have been no authorizations for coal mining issued within a CLR since the CLRs were established (Annex 1).

3.2.15 Wildlife Act Motor Vehicle Prohibition and Public Access Prohibition

Two regulations established under the *Wildlife Act*: the *Motor Vehicle Prohibition Regulation* (MVPR) and the *Public Access Prohibition Regulation* (PAPR), make it an offence to use or operate motor vehicles, or certain types of motor vehicles, in specific areas, sometimes only for specific times of year. The areas to which the prohibitions apply are set out in the regulations themselves. Spatially-explicit information is available for snowmobile closures under the MVPR (Map 13).

Map 13. MVPR closure areas (for snowmobiles) within the Central Group LPU boundaries



At the times and locations the prohibitions are in place, it is an offence to use or operate motor vehicles or certain types of motor vehicles (i.e. snowmobile or all-terrain vehicle). The prohibitions can be enforced by various officials, and may be prosecuted as an offence, or persons can be subject to violation tickets. Penalties range from $115 to $230 violation tickets to a maximum $50,000 fine and/ or less than six months imprisonment for a first offence if convicted in court.

There are specific exemptions to the prohibitions that apply to specified areas. These include some commercial purposes and times of year. In addition to the specified exemptions, the *Permit Regulation* grants the regional manager authority to grant exemptions to the regulations, by permit. Permits may also be issued by the director, as enabled by the *Wildlife Act*.

History of Application

As discussed in section 2.3, annual winter enforcement flights are undertaken to promote compliance and ticket those violating the closures.

3.2.16 Projects subject to the B.C. Environmental Assessment Act

The *Environmental Assessment Act* (EAA) applies essentially to major projects only.

Projects become "reviewable" in one of three ways:

- Prescribed by regulation under EAA s. 5(1): (see *Reviewable Projects Regulation*);
- Designated by ministerial order under EAA s. 6(1);
- At the request of a proponent under EAA s. 7.

Under the *Reviewable Projects Regulation*, the following projects are designated as reviewable (and conceivable to be applied for in southern mountain caribou range):

- Coal, mineral, and placer mineral mines; and sand and gravel pits and construction stone and industrial mineral quarries that meet criteria laid out in Table 6 of the regulation
- Power plants (e.g. wind, hydro, biomass) or electric transmission lines that meet criteria laid out in Table 7
- Natural Gas Processing Plants, and Transmission Pipelines that meet criteria laid out in Table 8
- Water Management Projects including diversion projects, and groundwater extraction projects that meet criteria laid out in Table 9
- Tourism Resort developments that meet criteria laid out in Table 15

The issuance of an EA certificate is not sufficient in and of itself to enable a project to proceed. Permits would still be required for specific works, and the issuance of such permits would be in the context of other pieces of legislation (e.g. cutting permits, drilling permits, etc.) However, the issuance of an EA certificate is a necessary precursor to applying for those permits. If an EA certificate is issued, it sets the major design considerations and allows the project to proceed to permitting Additional constraints can be applied by permitting agencies.

For those "reviewable projects" to which the EAA applies, it is an offence to initiate project-related works without an EA certificate, unless it has been determined that a certificate is not required. Approvals also may not be issued under other enactments for project-related works on reviewable projects, unless an EA certificate has been issued or determined not to be required. If a certificate is issued, it includes legally binding conditions. Failure to comply with the conditions is an offence under the EAA.

Incidents of non-compliance may be enforced through various administrative or judicial means, and Environmental Assessment Office (EAO) C&E officers are able to investigate and carry out enforcement actions. C&E activities may include orders to cease activities or to carry out measures to remedy the effects of non-compliance. The Act provides for remedies such as voluntary compliance agreements as well as for escalating penalties for certificate holders including fines up to $100,000 and/or imprisonment for less than 6 months if convicted of a first offence. Other enforcement actions and penalties include cancellation of an EA certificate or suspension of rights under it.

As indicated above, the EAA only applies to major projects, and can therefore not be considered with respect to other activities. For example, exploration activities in support of a mining or wind energy project may not meet the threshold for a reviewable project. Approval of these activities would be subject to other legislation (e.g. *FRPA, Lands Act, Mines Act*).

Where critical habitat is identified during the EA as potentially being affected by the project, it is likely that certificate conditions and/or the design of a given project would occur in such a way as to avoid, minimize, and/or mitigate destruction of critical habitat. The issuance and specific content of the conditions is subject to Ministerial discretion; there is no legislative requirement to avoid critical habitat destruction, or to apply any specific mitigation measures. In practice, the EA approach and methodology considers caribou, its habitat and all other potential impacted “valued components”. Certificates may be issued even if there is a finding of significant adverse environmental effects, which may or may not result in destruction of critical habitat.

Proponents may request an exemption to the requirement to obtain a certificate. This exemption may be granted if the Executive Director of the EAO considers that a project will not have significant adverse effects (SAE) (EAA s. 10(1)(b)). Critical habitat for a species at risk is not an explicit consideration in the legislation for the Executive Director. However, the exemption process will consider potential impacts to species at risk and their habitat. The lack of explicit consideration in the legislation provides for flexibility to consider a multitude of valued components and mitigations.

History of Application

Certificates have been issued for projects within southern mountain caribou Central Group local population unit boundaries (Table Eight), including four since the federal recovery strategy was finalized in June 2014[29]. The BC EAO found that, of the four most recent projects, after consideration of mitigation and monitoring plans, the two pipelines are predicted to result in SAE to caribou. Projects are listed in reverse chronological

[29] The four recently approved projects are: Prince Rupert Gas Transmission, Westcoast Connector Gas Transmission, Murray River Coal, and Meikle Wind Energy.

order within categories below, with very brief summaries that do not capture the depth of analysis provided in the EA process.

Table Eight. Summary of Projects for which certificates have been issued within the Central Group LPU boundaries.

Project Name	Date certificate issued	BC EAO finding of SAE to caribou?	Summary of SAE findings
Prince Rupert Gas Transmission Pipeline (PRGT)	Nov 25, 2014	Yes	Finding of likely SAE included consideration of mitigation and monitoring plan, recognizing that mitigation measures are not yet proven for caribou. PRGT would affect the Moberly/Klinse-Za, Kennedy Siding, Scott herds (South Peace Northern Caribou (SPNC) and the Takla herd. WCGT would affect the Graham, Moberly, Kennedy Siding and Scott herds (SPNC) and Wolverine herd
Westcoast Connector Gas Transmission Pipeline (WCGT)	Nov 25, 2014	Yes	
Murray River Coal Mine	Oct 1, 2015	No	EAO concluded no residual or cumulative effects to caribou (Quintette herd). EAO's assessment report (AR) notes that during the EA there was the issue of uncertainty regarding how subsidence would impact wildlife habitat and uncertainty around the proponent's determination of no residual effects for caribou. Additionally, there was the issue of specific uncertainty regarding potential impacts on caribou: •Locally and regionally •Potential use of low elevation habitat in the Project area if high elevation habitat is lost or altered by other proposed Projects in the area •Potential impacts of an increase in wolf population on caribou due to the creation of early seral habitat. In response to the uncertainty, EAO proposed a Wildlife management plan, that must be aligned with the management direction of the Peace Northern Caribou Plan Project also requires a federal EA. On Oct 17, 2016, the federal Minister of ECC decided that the project is likely to cause significant adverse cumulative environmental effects. The decision must now be referred to the GiC.
Roman Coal Mine	Dec 14, 2012	Yes	Finding of likely SAE on the Babcock-Quintette sub-herd, and in turn, the Quintette herd, and a related conclusion that there is a negative impact on the Treaty 8 right to hunt caribou as part of the seasonal round that has not yet been appropriately accommodated.

Project Name	Date certificate issued	BC EAO finding of SAE to caribou?	Summary of SAE findings
			EAO, taking a precautionary approach, noted that the mitigation strategies as proposed by the Proponent (consistent with the draft Interim Direction) were not yet proven to be effective in BC. In addition, as the objectives of the PNCP had not yet been established by government, a mechanism to weigh the ecological and management opinions was not available. The Ministers of MOE and MEM in their reasons for decision, disagreed with the AR as the Peace Northern Caribou Plan had been approved after the AR was issued (but before Ministers made their decision). The Ministers said that due to the measures in the Peace Northern Caribou Plan and the mitigation measures in the Roman certificate, the adverse effects of the Project would be offset and there would not be a significant residual effect on caribou across the Peace Northern Caribou Plan area due to the Project.
Hermann Coal Mine (expansion of Wolverine)	Nov 24, 2008 (amended Nov 15, 2013 to include new caribou-related conditions)	No	EAO noted possibility of residual effects but considered them to be substantially reversible except for the pit walls and pit wall in the long-term, of medium magnitude, and deemed the effects to be less than significant.
Wolverine Coal Mine	Jan 13, 2005	No	EAO determined that mitigation measures would prevent or reduce potential SAE, but noted uncertainty around the impact of the EB pit on caribou migration routes of the Quintette herd; and uncertainty regarding the threshold values for cumulative habitat disturbance within the caribou range resulting in a population decline. EAO found that the Quintette herd of about 160 to 200 animals (at that time) is one of four recognized herds in the general area of the proposed mine. About 50 caribou were on Quintette Mountain; the rest were concentrated in the Wolverine and Bullmoose areas. There was insufficient information to determine nature and use of the EB pit area.
Meikle Wind Energy	June 24, 2014	No	Project application indicated modifications to avoid locating infrastructure inside a low elevation ungulate winter range designated for caribou, and to avoid areas identified by West Moberly First

Project Name	Date certificate issued	BC EAO finding of SAE to caribou?	Summary of SAE findings
			Nation for protection of the Klinse-Za herd in a draft action plan. EAO considered the Application and additional information provided during the Application Review, and concluded that there would be negligible effects to Northern caribou resulting from the proposed Project. No residual effects were predicted for northern caribou.
Tumbler Ridge Wind Energy	March 27, 2012	No	EAO determined that the probability of caribou using the proposed Project area was low, the geographic extent would be local, and the Proponent would implement a Caribou Protection Plan including adaptive management strategies, if caribou were observed frequenting the proposed Project site.
Quality Wind Project	July 9, 2010	No	EAO was satisfied that the proposed Project would not likely result in significant adverse residual effects on terrestrial wildlife. Quality Wind Project - No adverse residual effects to caribou Thunder Mountain - Low to moderate magnitude residual effects on caribou.
Thunder Mountain Wind	Dec 10, 2009	No	
Dokie Wind Energy	Aug 8, 2006	No	Application indicated lack of overlap between core caribou distribution and project footprint, and low suitability of the local assessment area for caribou winter foraging. Project characterized as minor contributor to overall industrial clearing in the regional assessment area, particularly compared to timber harvesting. Moberly herd slightly overlapped RSA. Low magnitude residual effects to movement patterns, and direct mortality. Minimal concern for effects on habitat availability due to lack of overlap between caribou distribution and Project footprint. Not significant.

3.3 Laws of BC that are in place to protect individuals

The *Wildlife Act* defines any member of the family *Cervidae*, which includes caribou, as “big game” and the definition of wildlife includes game species. Caribou are thus included in the definition of wildlife, and game, for the purposes of the Act.

The *Wildlife Act* makes it an offence to hunt, take, trap, wound, or kill wildlife; to attempt to capture wildlife; to possess wildlife; to herd or harass wildlife with a vehicle; to allow a

dog to hunt or pursue wildlife; and to import, export, transport or traffic in wildlife; except as authorized under the Act and regulations.

If convicted of an offence under most of these provisions, a person could be subject to a fine up to $100,000 and/or up to 1 year imprisonment for a first conviction. For second and subsequent convictions, fines range from $2,000-$200,000 and/or up to 2 years imprisonment. Trafficking has higher penalties.

Cabinet has broad authority to pass regulations, including the *Hunting Regulation* and *Limited Entry Hunting Regulation*, which are amended regularly. The current regulations do not include authorizations for hunting of caribou within any Central Group southern mountain caribou local population unit boundaries.

The *Permit Regulation* provides a regional manager with the authority to issue permits that would exempt the permit holder from some of the above provisions. Permits to hunt, trap or kill wildlife during the open or closed season may be issued for: scientific purposes; educational purposes; or if necessary for the proper management of the wildlife resource. The discretion to issue permits to capture and possess live wildlife are constrained by the requirement for the regional manager to be satisfied that issuing the permit is not contrary to the proper management of wildlife resources in BC.

4. Analysis of legislative instruments

This section identifies areas where legislative instruments with some potential to prevent destruction are or are not in place for one or more groups of activities. Information is provided on:

i. Areas for which there are no spatially-explicit legislative instruments in place that would constrain any of the relevant groups of activities
ii. Areas in which some, but not all, activities are constrained by the application of legislative instruments.
iii. Decision-making related to authorizing activities that is not constrained by a substantive requirement to meet threshold conservation objectives, in this case protection of caribou critical habitat.

This section examines each in as they relate to each of the activity groups described in the “Activities Likely to Result in Destruction of Critical Habitat” section. For reference, these include:

- Forest harvesting –related (including road building)
- Mining-related (including coal & mineral exploration & road / transmission line building)
- Oil & gas-related (including road building, pipelines, and forest harvesting as a precursor)

- Renewable energy-related (e.g. windfarms, independent power projects & associated roads / infrastructure)
- Recreation-related (e.g. winter motorized & non-motorized recreation, ski hill expansion, summer ORV use)

4.1 Spatially-explicit legislative instruments – any group of activities

The boundaries of the three LPUs within the Central Group in BC, as defined in the 2014 federal recovery strategy, encompass a total of 2,975,871 ha. Within these LPUs there are 15 different types of spatially-explicit legislative instruments that could be used to constrain one or more activities such that destruction of critical habitat by that activity or activities would be avoided. The total area covered by each instrument, as well as the area within and outside of high elevation caribou ranges is shown in Table Nine.

Table Nine. Area covered by Legislative Instruments within Central Group LPUs.

NARRAWAY/PINE RIVER/QUINTETTE LPUs COMBINED (Central Group) Total Area (ha):	**2,975,871**					
High Elevation (Winter or Summer) Range Area (ha):	**823,717**					
Non-High Elevation Range Area (ha):	**2,152,154**					
Legislative Instrument (LI)	**Total Area (ha) of LI in LPU boundaries**	**% of Central Group LPU boundaries (all ranges)**	**Area (ha) within Central Group high elevation winter or summer range**	**% of Central Group high elevation range**	**Area (ha) within Central Group, outside high elevation range**	**% of Central Group non-high elevation range**
Ecological Reserve	1,114	0.0%	143	0.0%	971	0.0%
Motor Vehicle Prohibition Regulation (*Wildlife Act)*	153,608	5.2%	153,589	18.6%	18	0.0%
No Registration Reserve - Coal (Coal Land Reserve)	602,627	20.3%	335,215	40.7%	267,412	12.4%
No Registration Reserve - Mineral	499,115	16.8%	378,483	45.9%	120,632	5.6%
No Registration Reserve - Placer	444,960	15.0%	296,958	36.1%	148,002	6.9%
Old Growth Management Area (FRPA)	190,924	6.4%	30,255	3.7%	160,669	7.5%
Old Growth Management Area (OGAA)	64,945	2.2%	13,651	1.7%	51,294	2.4%
Protected Area	5,800	0.2%	-	-	5,800	0.3%
Provincial Park	338,792	11.4%	91,468	11.1%	247,325	11.5%
Resource Review Area (oil and gas)	627,794	21.1%	405,727	49.3%	222,067	10.3%
Legislative Instrument (LI)	**Total Area (ha) of LI in LPU boundaries**	**% of Central Group LPU boundaries (all ranges)**	**Area (ha) within Central Group high elevation range**	**% of Central Group high elevation range**	**Area (ha) within Central Group, outside high**	**% of Central Group non-high elevation range**

					elevation range	
Section 15 OIC Reserve (*Land Act*)	25	0.0%	-	-	25	0.0%
Section 16 withdrawal (Map Reserve) (*Land Act*)	29,314	1.0%	3,161	0.4%	26,153	1.2%
Section 17 conditional withdrawal (designated use area) (*Land Act)*	489,435	16.4%	470,381	57.1%	19,054	0.9%
Ungulate Winter Range - FRPA - *Conditional Harvest GWMs*	533,031	17.9%	72,090	8.8%	460,941	21.4%
Ungulate Winter Range - FRPA - *No Harvest GWMs*	419,437	14.1%	404,220	49.1%	15,216	0.7%
Ungulate Winter Range - OGAA - *Conditional Harvest GWMs*	354,631	11.9%	270	0.0%	354,361	16.5%
Ungulate Winter Range - OGAA - *No Harvest GWMs*	419,437	14.1%	404,220	49.1%	15,216	0.7%
Wildlife Habitat Area - FRPA - *Conditional Harvest GWMs*	29,363	1.0%	9,639	1.2%	19,723	0.9%
Wildlife Habitat Area - FRPA - *No Harvest GWMs*	143,928	4.8%	143,928	17.5%	0	-
Wildlife Habitat Area - OGAA - *Conditional Harvest GWMs*	29,264	1.0%	9,639	1.2%	19,625	0.9%
Wildlife Habitat Area - OGAA - *No Harvest GWMs*	143,928	4.8%	143,928	17.5%	0	-
Provincial Crown land outside above LI	1,027,427	34.5%	81,952	9.9%	945,475	43.9%
Federally-administered Land & First Nation Reserves (no LI reviewed)	74	0.0%	-	-	74	0.0%
Private & municipal (no LI reviewed)	11,305	0.4%	33	0.0%	11,272	0.5%

Note: there are frequent overlaps, so sum will not add to the total area within the LPUs.
Additional non-spatially explicit legislative instruments also apply in some areas.

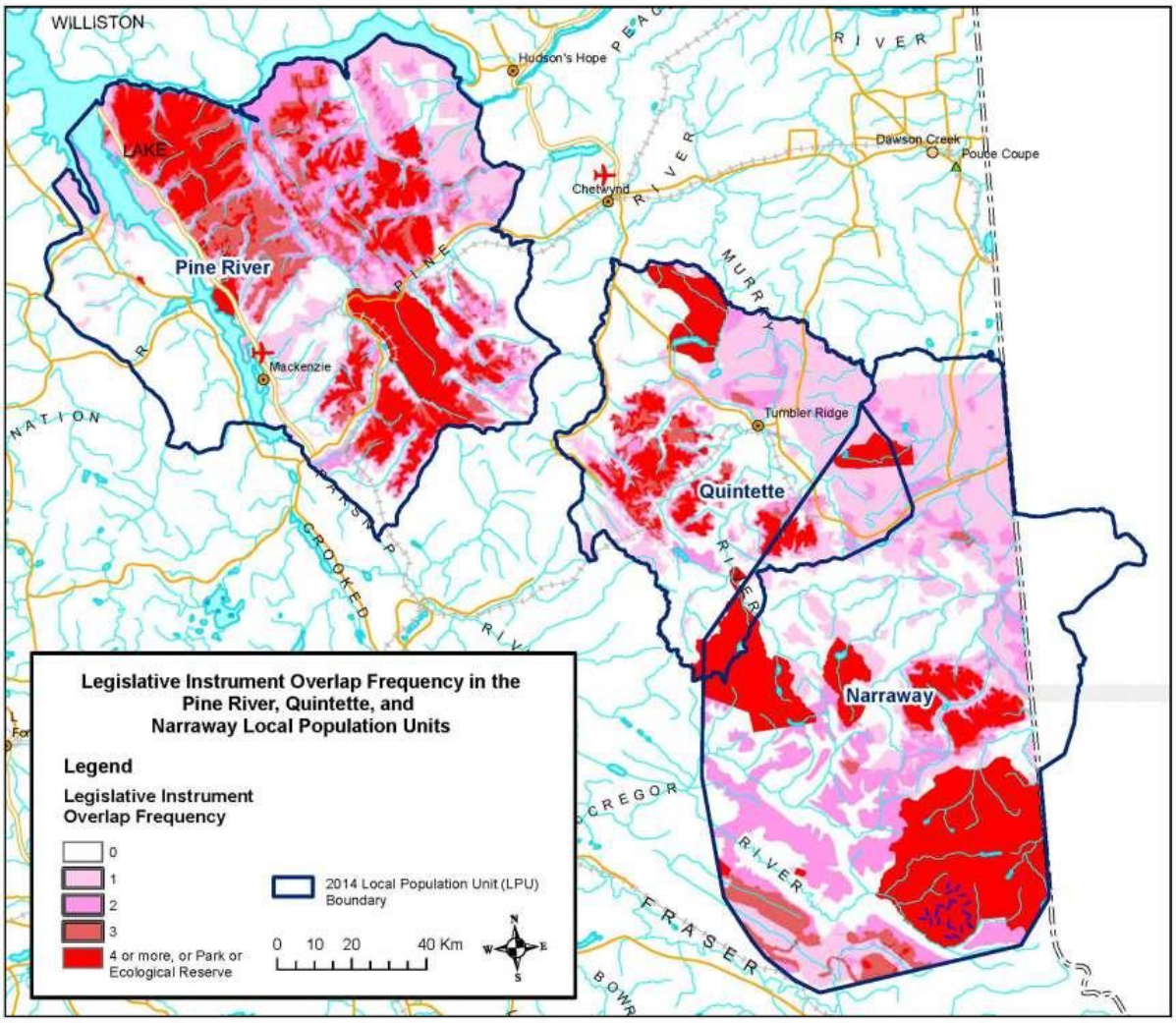
Map 14 shows all the legislative instruments described in Table Nine in a “cumulative” image. Those areas which are darker red have four or more different protection designations or are in an ecological reserve, provincial park or protected area. The analysis shows that one or more legislative instruments, regardless of efficacy, are in place for almost 87% of high elevation caribou habitat and 60.3% of the remaining area within the Central Group LPUs.

The spatial area to which none of the listed legislative instruments apply represents about 13% of the high elevation caribou habitat.

The spatial area to which none of the listed legislative instruments apply represents about 41% of the area outside high elevation caribou habitat, which would be considered critical habitat by ECCC. Some of this area would not be considered caribou habitat by BC. In these areas, operators must still comply with the general provisions of FRPA, the Coal Act, OGAA, etc., and their associated regulations. Voluntary guidelines and professional reliance may go further in mitigating the effects of the activities on caribou.

The location and configuration of the areas where no instruments apply are relevant to a determination of which areas should be addressed first to achieve the objective of a maximum of 35% disturbance. The achievement and maintenance of the minimum of 65% undisturbed habitat depends on factors such as habitat connectivity to support the functioning of biophysical attributes within these ranges.

Map 14. Overlapping Legislative Instruments Within the Central Group



4.2 Spatially-explicit legislative instruments – some groups of activities

There are situations where one or more legislative instruments are in place that could partially or fully constrain some, but not all, groups of activities which have the potential to impact caribou critical habitat. A legislative instrument may be in place which could reduce or eliminate potential impacts to caribou habitat from, for instance, forestry, but there may be no mechanism / designation in place to manage potential impacts from coal mining, recreation and wind energy. Likewise, one or more legislative instruments may constrain most activity groups at a given area of the landscape, but no instrument would constrain one activity group.

Table Ten indicates the legislative instruments that are relevant to each of the activity groups being considered by this Study, and the areas to which they do not apply.

Table Ten. Areas within the Central Group LPU boundaries that are not covered by legislative instruments associated with activity groupings.

Activity Group	Relevant Legislative Instruments[30]	Area not covered by relevant instrument(s)[31]	
		High Elevation habitat	Non-high elevation habitat
Forest Harvesting & Roads	Parks Protected Areas Ecological Reserves Old Growth Management Areas "No harvest" Wildlife Habitat Areas "No harvest" Ungulate Winter Ranges	279,925 ha / 34%	1,724,724 ha / 80%
	As above, but including "conditional harvest" WHAs & UWRs	213,735 ha / 26%	1296352 ha / 60%
Coal mining & related activities	Parks Protected Areas Ecological Reserves Coal Land Reserves	396,890 ha / 48%	1,631,418 / 76%
Mineral mining & related activities	Parks Protected Areas Ecological Reserves Mineral No Registration Reserves	353,623 ha / 43%	1778916 ha / 83%
Placer mining & related activities	Parks Protected Areas Ecological Reserves Placer No Registration Reserves	435148 ha / 53%	1751658 ha / 81%
Sand and gravel extraction	Parks Protected Areas Ecological Reserves Land Act Reserves	259,859 ha / 32%	1,852,988 ha / 86%
Oil & gas exploration & infrastructure	Parks Protected Areas Ecological Reserves Old Growth Management Areas	290,429 ha /	1,831,603 ha /

[30] See section 3 for discussion of instruments and spatial extent of non-overlapping coverage
[31] After accounting for overlap between instruments

Activity Group	Relevant Legislative Instruments[30]	Area not covered by relevant instrument(s)[31]	
		High Elevation habitat	**Non-high elevation habitat**
	"No harvest" Wildlife Habitat Areas "No harvest" Ungulate Winter Ranges --- As above, but including "conditional harvest" WHAs & UWRs	35% --- 274,447 ha / 33%	85% --- 1,399,449 ha / 65%
Renewable Energy **Recreation** **Other**	Parks Protected Areas Ecological Reserves Land Act Reserves	259,859 ha / 32%	1,852,988 ha / 86%

4.3 Discretion within Legislative Instruments

Section 3.2 above provides a review of the legislative tools used by BC to manage land-based activities. Table Eleven below presents a high level summary of how each piece of legislation addresses each of the groupings of activities that has the potential to destroy or disturb caribou habitat, and highlights areas where discretion exists to authorize those activities in the context of the legislative instrument. See section 3.2 for more information about the constraints on that discretion, where it exists.

Table Eleven. BC's legislative instruments compared against activities

	General Activity Type / Constraints on the Activity within Designated Area				
Type of Designation/ % of Central Group LPU area	**Forest Harvesting & Roads**	**Mineral exploration & mining**	**Oil & gas exploration & infrastructure**	**Renewable Energy & associated roads etc,**	**Recreation**
Ecological Reserve *(Ecological Reserve Act)* 0.04%	Prohibited	Prohibited	Prohibited	Prohibited	Motorized – Prohibited
Class A Provincial Park *(Park Act)* 11%	Prohibited	Prohibited. Research permits associated with environmental assessments etc. may be authorized.	May only be authorized if activities do not disturb the surface of land. Research permits associated with environmental assessments etc. may be authorized.	Prohibited. Research permits associated with environmental assessments etc. may be authorized.	Constrained to various levels / specific areas depending on the park
Protected Area *(Park Act, Environment and Land Use Act)* 0.2%	Same as for Provincial Parks except some specific projects were authorized when areas were designated (e.g. roads, pipelines, powerlines, use of the land associated with existing mineral title)				Same as for Provincial Parks
Wildlife Habitat Area (WHA) (5%) **or Ungulate Winter Range (UWR)** (14%)**– "no harvest" General Wildlife Measures** (*Forest and Range Practices Act* (FRPA) / *Oil and Gas Activities Act* (OGAA))	No removal of forest cover or construction of roads or trails. Exemption may be granted if not practicable.	No constraints through FRPA. May be constrained as a result of an EA process; the general provisions of the *Mineral Tenure Act, Mines Act, and Coal Act* always apply.	If designated under OGAA, operating areas are not to be located within a WHA or UWR (regardless of whether the GWMs are "no harvest" or "conditional harvest" unless it will not have a material adverse	Same as for forest harvesting and roads.	Recreation sites and trails will not be developed. Otherwise no constraints.

	General Activity Type / Constraints on the Activity within Designated Area				
Type of Designation/ % of Central Group LPU area	**Forest Harvesting & Roads**	**Mineral exploration & mining**	**Oil & gas exploration & infrastructure**	**Renewable Energy & associated roads etc,**	**Recreation**
Wildlife Habitat Area (WHA) (1%) **or Ungulate Winter Range (UWR)** (18%)**– "conditional harvest" General Wildlife Measures** (FRPA / OGAA)	Some harvesting allowed. Constraints vary according to area-specific general wildlife measures. Exemption may be granted if not practicable.		effect on the ability of the wildlife habitat within the WHA/UWR to provide for the survival, within the WHA/UWR, of the wildlife species for which the WHA/UWR was established. Even if not designated under OGAA, OGC considers material adverse effects on caribou within UWRs, WHAs as a matter of policy.		No constraints
FPPR Section 7 notice area (FRPA) (aspatial / undefined area)	Depends on the results and strategies specified by the licensee in their Forest Stewardship Plan. These areas are aspatial, so tracking achievement of overall government	No constraints through FRPA. May be constrained as a result of an EA process; the general provisions of the *Mineral Tenure Act, Mines Act, and Coal Act* always apply.	No constraints through FRPA. The general provisions of OGAA and its regulations, especially the EPMR, always apply.	No constraints through FRPA. May be constrained as a result of an EA process; the general provisions of FRPA and the *Land Act* always apply.	No constraints

	General Activity Type / Constraints on the Activity within Designated Area				
Type of Designation/ % of Central Group LPU area	**Forest Harvesting & Roads**	**Mineral exploration & mining**	**Oil & gas exploration & infrastructure**	**Renewable Energy & associated roads etc,**	**Recreation**
	objectives amongst licensees is a challenge. Only applies to *Forest Act* agreement holders who are required to prepare a Forest Stewardship Plan (e.g. major licencees). Exemption may be granted if not practicable.				
Old Growth Management Area (*Forest and Range Practices Act* (FRPA) / *Oil and Gas Activities Act* (OGAA)) 6.4%	Depends on the results and strategies specified by the licensee in their Forest Stewardship Plan. Generally, all timber must be retained, with exceptions for minor incursions. Only applies to *Forest Act* agreement holders	No constraints through FRPA. May be constrained as a result of an EA process; the general provisions of the *Mineral Tenure Act, Mines Act, and Coal Act* always apply.	If designated under OGAA, operating areas are not to be located within an OGMA "unless it will not have a material adverse effect on the old seral stage forest representation within that area".	No constraints through FRPA. May be constrained as a result of an EA process; the general provisions of FRPA and the *Land Act* always apply.	No constraints

	General Activity Type / Constraints on the Activity within Designated Area				
Type of Designation/ % of Central Group LPU area	**Forest Harvesting & Roads**	**Mineral exploration & mining**	**Oil & gas exploration & infrastructure**	**Renewable Energy & associated roads etc,**	**Recreation**
	who are required to prepare a Forest Stewardship Plan (e.g. major licencees). Exemption may be granted if not practicable.				
Resource Review Area (*Petroleum and Natural Gas Activities Act* (PNGA) / *Oil and Gas Activities Act* (OGAA) / *Environmental Protection and Management Regulation* (EPMR)) 21%	No constraints through PNGA/ OGAA. The general provisions of FRPA always apply.	No constraints through PNGA/ OGAA. May be constrained as a result of an EA process; the general provisions of the *Mineral Tenure Act, Mines Act, and Coal Act* always apply.	No new tenures will be issued for subsurface oil and gas activities. The only activity for which tenure is required is drilling or operating a well; all other oil and gas activities may still be authorized under OGAA, in accordance with the EPMR.	No constraints through FRPA. May be constrained as a result of an EA process; the general provisions of FRPA and the *Land Act* always apply.	No constraints
No Registration Reserve *(Mineral Tenure Act)* **/** **Coal Land Reserve** *(Coal Act)*	No constraints through *Coal Act / Mineral Tenure Act*. The general provisions of FRPA always apply.	No registration reserves: new mineral title will not be granted. Holders of mineral title granted prior to the establishment of the reserve may apply	No constraints through *Coal Act / Mineral Tenure Act*. The general provisions of OGAA and its regulations, especially the EPMR, always apply.	No constraints through *Coal Act / Mineral Tenure Act*. May be constrained as a result of an EA process; the general provisions of FRPA and the *Land Act*	No constraints

	General Activity Type / Constraints on the Activity within Designated Area				
Type of Designation/ % of Central Group LPU area	**Forest Harvesting & Roads**	**Mineral exploration & mining**	**Oil & gas exploration & infrastructure**	**Renewable Energy & associated roads etc,**	**Recreation**
Cumulative 28% for MTA NRR and Coal Land Reserves		for permits under the *Mines Act*. Reserve only applies to the specified resource (e.g. mineral or placer or both). Coal land reserves: exploration and development of coal is prohibited.		always apply.	
s. 15 OIC Reserve *(Land Act)* 0.001%	In general, activities inconsistent with the stated purpose (e.g. of Environment, Conservation, and Recreation), and specifically with the Intent Statement for the reserve, will not be authorized. However, the Minister has discretion to authorize temporary licences for less than two years for a variety of activities, and to authorize construction of roads. The designation does not apply to activities that do not require a *Land Act* disposition for occupancy. This includes some oil & gas-related & mining-related activities. In addition, some activities may be consistent with the Intent Statement but still result in destruction of critical habitat.				

<table>
<tr><td></td><td colspan="5">General Activity Type / Constraints on the Activity within Designated Area</td></tr>
<tr><td>Type of Designation/ % of Central Group LPU area</td><td>Forest Harvesting & Roads</td><td>Mineral exploration & mining</td><td>Oil & gas exploration & infrastructure</td><td>Renewable Energy & associated roads etc,</td><td>Recreation</td></tr>
<tr><td>s.16 Withdrawal
(Land Act)
1%</td><td colspan="4" rowspan="2">As for Land Act section 15 reserves, except there is no authority to issue temporary licences.</td><td rowspan="2">Non-commercial recreation activities are not constrained. Commercial activities are the same as for other activities.</td></tr>
<tr><td>s. 17 Conditional Withdrawal
(Land Act)
16%</td></tr>
<tr><td>Motor Vehicle Prohibition Regulation
5%
Public Access Prohibition
% unclear
(Wildlife Act)</td><td colspan="5">Constraints vary according to the specific regulation. At the times and locations the prohibitions are in place, it is an offence to use or operate motor vehicles or certain types of motor vehicles (i.e. snowmobile or all-terrain vehicle). There are specific exemptions to the prohibitions that apply to specified areas. These include some commercial purposes and times of year. Exemptions may also be granted by permit.</td></tr>
</table>

5. Preliminary Review of Risks

5.1 Preliminary review of risk factors that could impact the likelihood that critical habitat destruction will occur

In areas where there are no legislative instruments in place to constrain any activity in the context of caribou habitat, or where instruments prohibit or constrain some but not all activities, or where discretion is exercised to allow certain activities, there is potential for activities to occur that could result in destruction of critical habitat. However, the risk of habitat destruction is a function of the likelihood of an activity occurring, and the consequence to critical habitat if it does occur. Therefore, areas where legislative instruments are not in place for any or all activities correlate only partly with the risk of critical habitat destruction. In addition, decision-makers have discretion to prohibit or mitigate activities through permits and authorizations. These factors, as well as market drivers, make it difficult to forecast time-specific and place-specific risks to critical habitat.

However, within the Central Group, it is possible to spatially demonstrate where the different activity types could be permitted by examining the areas to which the various legislative instruments do not apply. The geography and geology of the Central Group LPUs broadly identify the capability of the land base to support industrial and recreational activities, and therefore indicate where there may be demand for future activities. However, if proposed, there is no obligation to grant authorization for activities that may destroy critical habitat.

In addition, in 2013, the Natural Resource Board provided direction to Statutory Decision Makers to consider caribou habitat when making decisions related to development in high elevation ranges[32].

As indicated in section 2.3, Standardized Industry Management Practices have been developed[33] and are in the process of being formally endorsed. Guidelines provide sound technical but not legally binding advice to resource professionals to mitigate possible impacts to caribou.

5.1.1 Mining

Introduction

Much of the geology of the Central Group is captured within the Western Canadian Sedimentary Basin and is comprised of sedimentary rocks and formations at high

[32] http://www.env.gov.bc.ca/wld/speciesconservation/nc/documents/Natural%20Resource%20Board%20Direction.pdf

[33] http://www2.gov.bc.ca/assets/gov/environment/plants-animals-and-ecosystems/wildlife-wildlife-habitat/caribou/simps_-_october_2016_2.docx

elevations which support bands of high quality metallurgical (steel making) coal which has been exposed in the “Quintette Coal Block” in the ridgelines around Tumbler Ridge.

The Quintette region is underlain by a thick pile of marine and terrestrial sediments that formed at and near the western margin of North America. The foothills and plains parts of the region are underlain by clastic sediments with a thick mantle of glacial materials. Relief is low to rolling with little outcrop exposed.

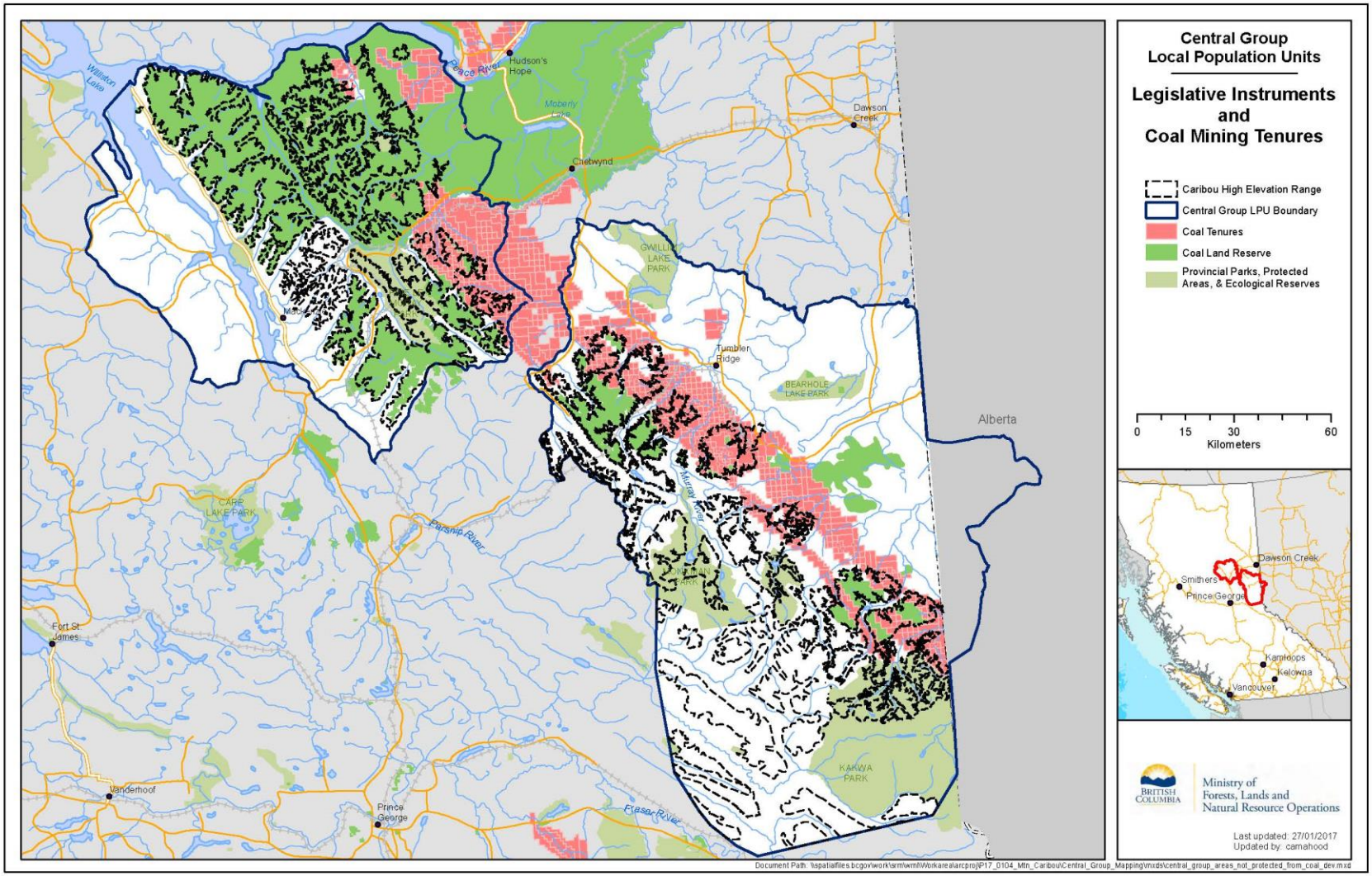
Coal Potential

The coal mines in the Quintette parcel have driven both the production and also exploration throughout the region. There are eight former producing mines in the region. Some have been closed and reclaimed but others are periodically put into care and maintenance until economic conditions improve and they can be reopened. Coal exploration and development can be expected to continue for years to come because of the value and availability of metallurgical coal.

There are extensive coal tenures and leases across the region, blanketing virtually all of the area that can or may host economically viable coal deposits (see red polygons on Map 15). These are areas within which the risk of destruction of caribou habitat from coal mining is the highest. It should be noted that tenured areas represent a large area within which more site-specific activities may be authorized; the entire area of a given tenure is not necessarily at risk of habitat destruction, and neither does the existence of a tenure necessarily lead to any development that would impact caribou habitat.

The majority of mining to date has been from surface mines, but some work now in development includes underground operations. Based on current and anticipated technologies, plus geological potential, this could extend in excess of another century. Coal economics will be the greatest control of the degree and pace of development. The MEM considers the development of coal projects outside these red polygons area unlikely over the next 20 years, but it should be noted that market forces can determine that areas which have not been historically or currently economic for industrial development could become economic and therefore subject to new authorizations should coal prices significantly increase outside of historic ranges.

Map 15. Legislative instruments and coal mining tenures in the Central Group

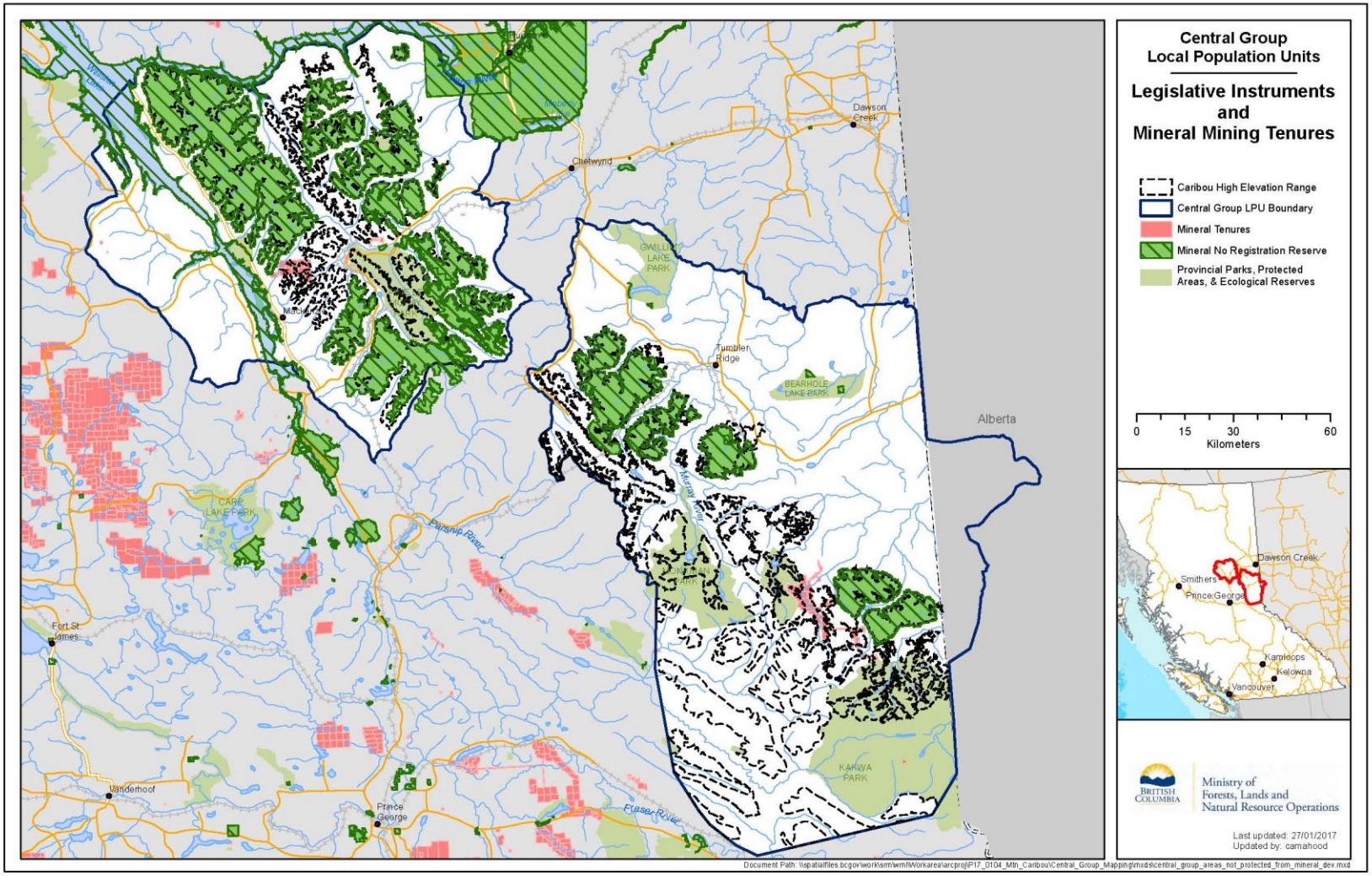


Metal and Minerals Potential

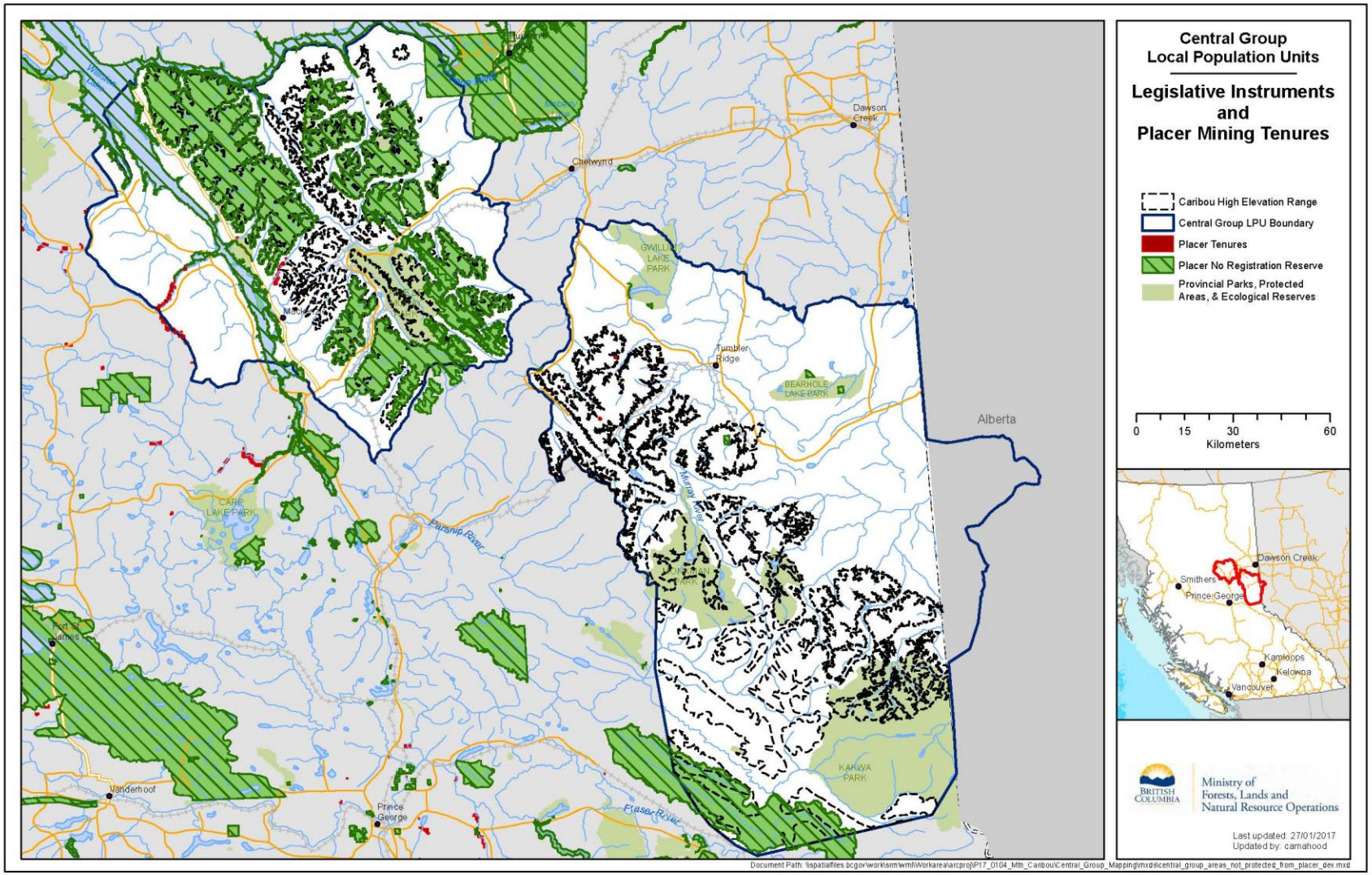
The low mineral potential of the rocks in this area is reflected in virtually nonexistent exploration activity. Geologically, the potential for mineral varieties is limited in number. Limestone, for both agricultural and cement use, would be the most likely target. To date, the phosphate potential has not been determined, but its presence could be of economic interest, even if only at a local scale.

With respect to metal mining, the geology of the Western Canadian Sedimentary Basin, which produces high value coal deposits, is not the type of geology which could support high value placer or hard rock mines, which tend to be found in igneous porphyry rock which is more commonly found in Northwest BC. As a result, metal mining activities, including placer mining, in the Central Group are considered by MEM to represent a low risk to caribou habitat over the next 20 years.

Map 16. Legislative instruments and mineral tenures in the Central Group



Map 17. Legislative instruments and placer tenures in the Central Group



5.1.2 Oil and Gas

Introduction

Industry has increasingly placed the majority of its development effort into the new "unconventional resource plays" such as shale gas and shale oil, where the geological risk of failure is eliminated because the target zones contain hydrocarbons throughout their extent and new technology successfully brings in production. In BC, this has resulted in well over 90% of development being focused on these shale gas resources. As a result of this shift in industry focus, development of conventional resources is minimal. In addition, most of those conventional resources in BC have either been heavily developed in the past or will not be developed until the easier resource plays have been fully developed, a process expected to take 50 to 100 years.

The Central Group LPUs contain some areas of conventional resource potential, much of it already developed. The remainder of these conventional resources are expected to remain undeveloped pending the further exploitation of the unconventional shale gas resources in BC. This process is expected to take many decades.

The Montney unconventional shale gas play overlaps small areas in the northeastern extremities of the Central Group. These small areas are expected to receive development drilling activity on multi-well drilling pads as the Montney resource play is developed. The timing of this development, however, depends on the timing of a Liquefied Natural Gas (LNG) export capability. Current economic and market analyses suggest that this development may not occur for a decade or more. In addition, it is expected these areas are in the dry gas window and further from proposed infrastructure development, therefore having less desirable economics for development.

The domestic market for natural gas in eastern Canada is being displaced by lower cost gas from the eastern United States, while exports of natural gas from western Canada to the United States are declining due to greater U.S. gas production. Therefore, although the domestic western Canada market is sustained and rising, exports off the continent via LNG are important to the timing of BC Montney gas development activity.

Pine River LPU

The entire Pine River range is west of and outside any unconventional Montney resource play. No Montney development will occur. Due to the nature of the geology and absence of hydrocarbon reservoirs, there is no oil and gas potential in the west half of the Pine River range. A small area in the southeast contains existing title, but it has been developed and no further activity is expected.

The remaining area of the eastern part of the range contains conventional gas potential but there is no current title and no interest in conventional exploration, for the reasons

noted in the general comments above. Therefore, no conventional exploration is expected in the next 50 years or more.

Quintette LPU

A small area in the extreme northeastern part of Quintette range is within the Montney resource play area. Therefore, development is expected here, but will depend on the timing of the arrival of gas markets. If the export market for LNG proceeds in the next 5 years then development is expected in this area over the next 25 years. If LNG proceeds in the next cycle in about 15 years, Montney gas development is expected to proceed over the ensuing 25 years. Otherwise, development is dependent on domestic western Canadian markets.

The southwestern 25% of the Quintette range area is untenured and has some very low gas potential. No interest in acquiring title or drilling is expected in this area in the future.

The remaining 75% of the Quintette range contains existing tenure that has been heavily developed for conventional gas. Some of the tenure remains to be developed. However, this development is expected to be delayed while Montney development occurs, and then to proceed very slowly. Little conventional development activity is expected in the next 20 to 30 years, and even then it is expected to be at a very slow pace.

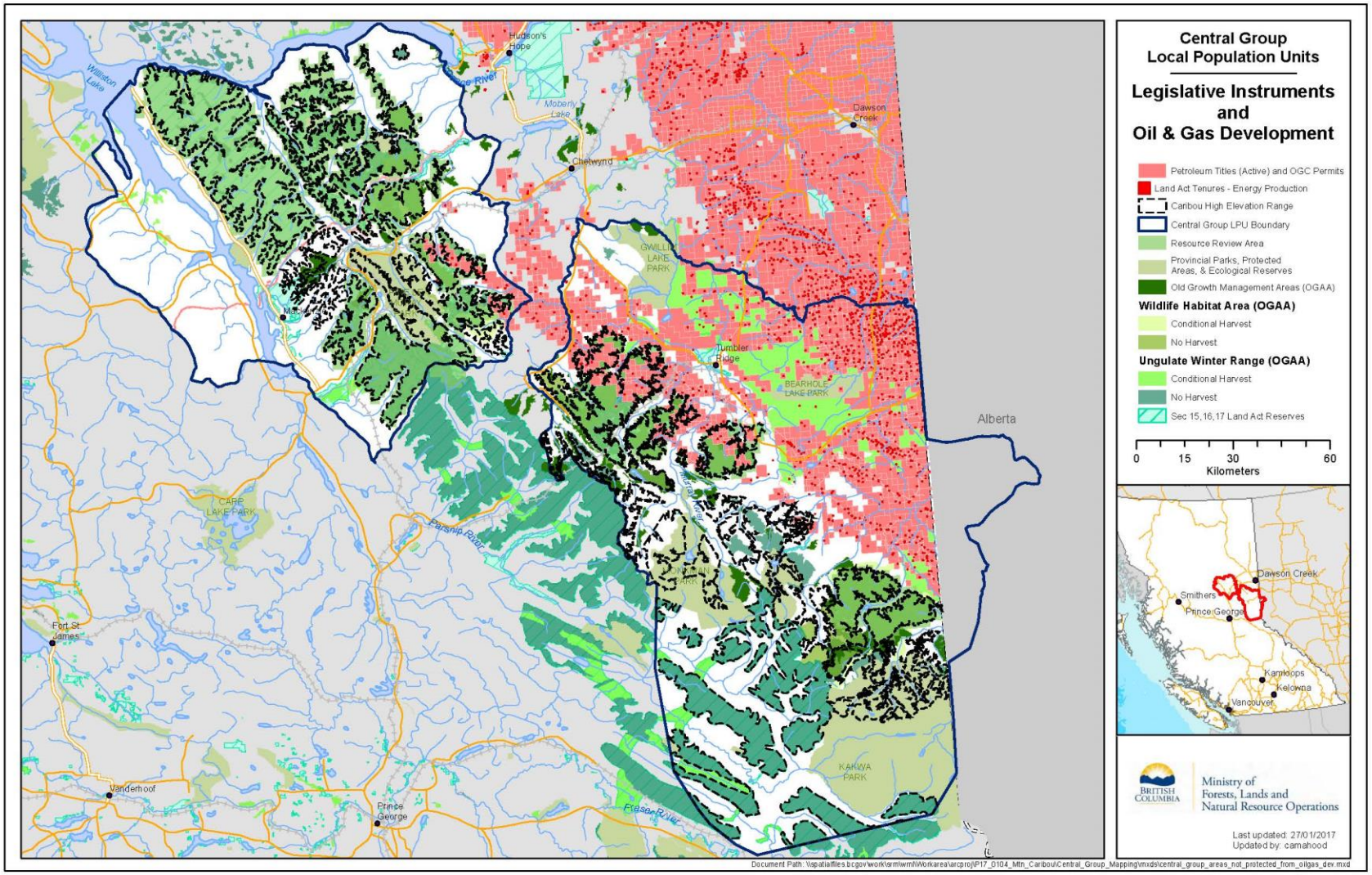
Narraway LPU

About 10 to 15% of the Narraway range in the farthest north is within the Montney resource play. Therefore, development is expected here, but depending on the timing of the arrival of gas markets. If the export market for LNG proceeds in the next 5 years then development is expected in this area over the next 25 years. If LNG proceeds in the next cycle in about 15 years, Montney gas development is expected to proceed over the ensuing 25 years if it has not occurred in the first LNG cycle. Otherwise, development is dependent on domestic western Canadian markets.

The northwest 50% of the Narraway range area contains both Deep Basin gas potential and foothills gas-filled anticlines. This area is partially tenured and the tenured areas are heavily developed. Therefore, only sparse infill development may occur, and new development will draw very little interest due to the predominant interest in resource plays elsewhere.

The southwest 50% of Narraway range is untenured and no exploration or development activity is expected. Most of the area has no hydrocarbon potential.

Map 18. Legislative instruments and oil and gas development in the Central Group

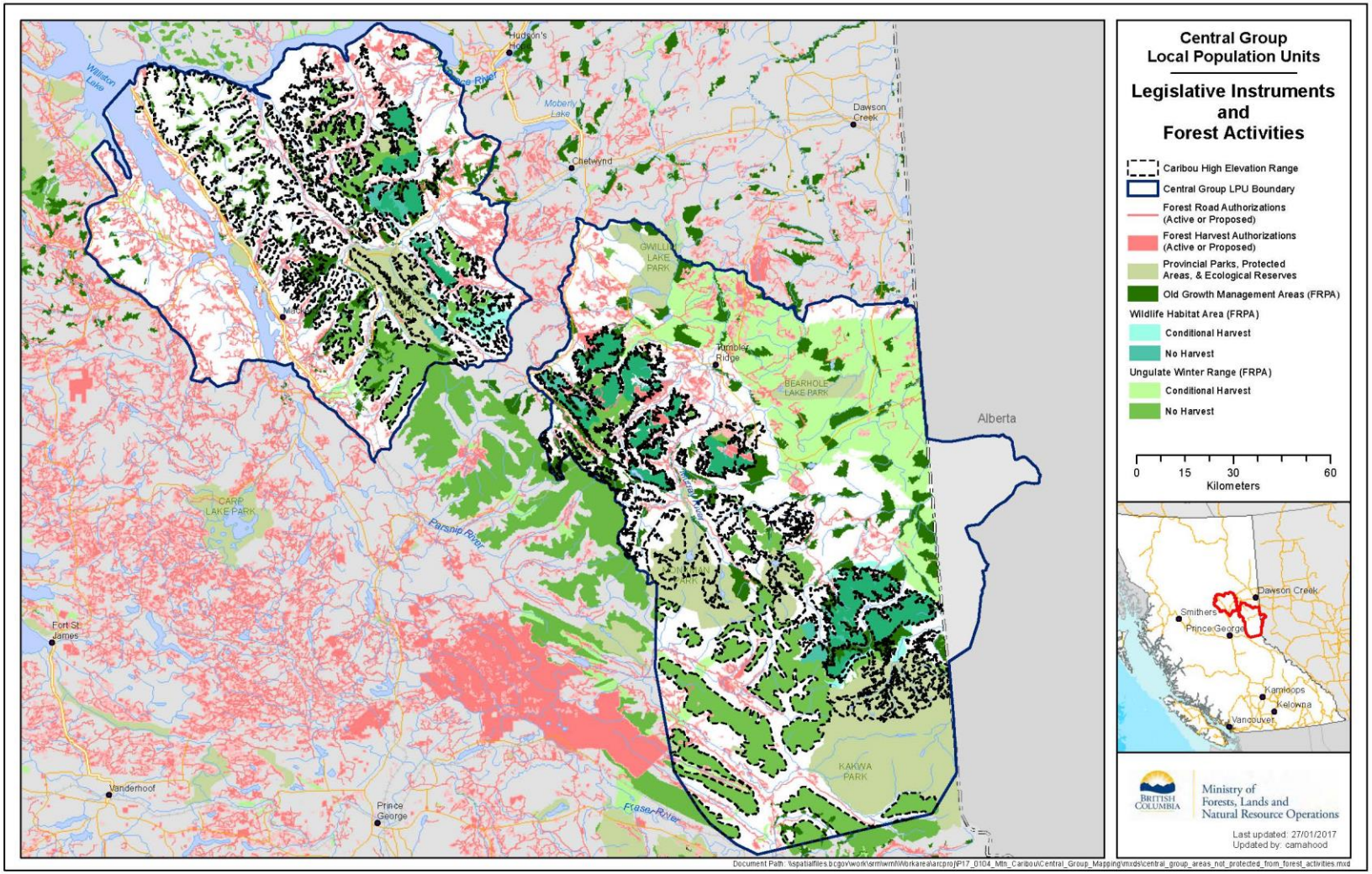


5.1.3 Forestry

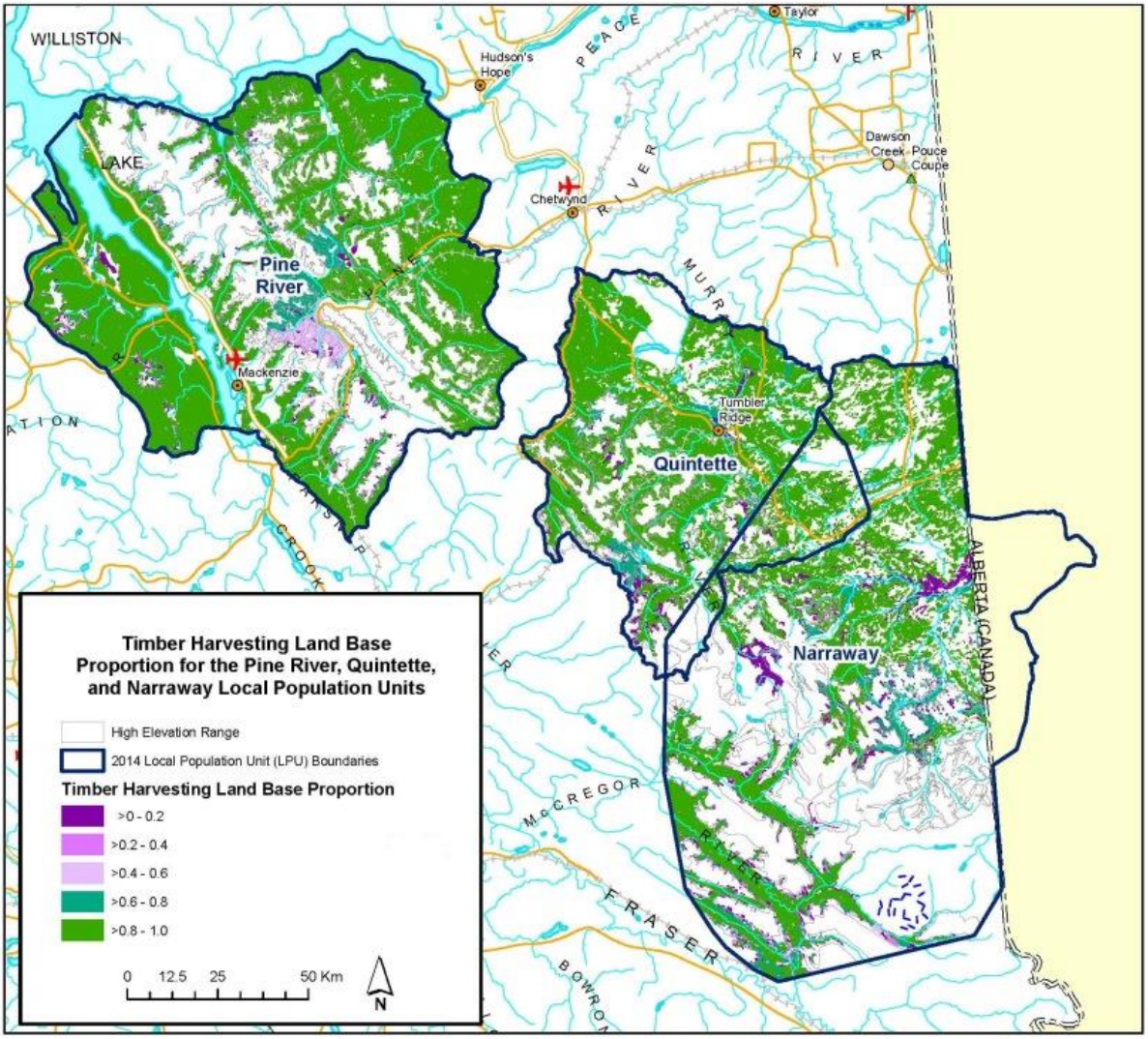
All lands that are contained with the Timber Harvesting Land Base (THLB) are considered feasible for harvest and contribute to the Allowable Annual Cut. Those areas, unless otherwise constrained, are assumed to be harvested at some point in a normal forest rotation (between 80 and 100 years). Forest companies will prioritize areas for harvest based on economic factors as well as environmental factors (managing the rate of harvesting in a watershed, for example). As a result, any particular stand has a low probability of being harvested in the short term, but a high probability of being harvested in the long term.

Lands that are outside the THLB are excluded from harvestable inventory either due to environmental reasons (unstable slopes, riparian reserves, etc.), or because they are not productive (low site index), or are not economic (steep slopes, low volume, etc.). There is no prohibition on harvest in these areas, but operational experience confirms they are rarely harvested for commercial forest purposes.

Map 19. Legislative instruments and forestry activities in the Central Group



Map 20. Timber Harvesting Land Base for the Central Group



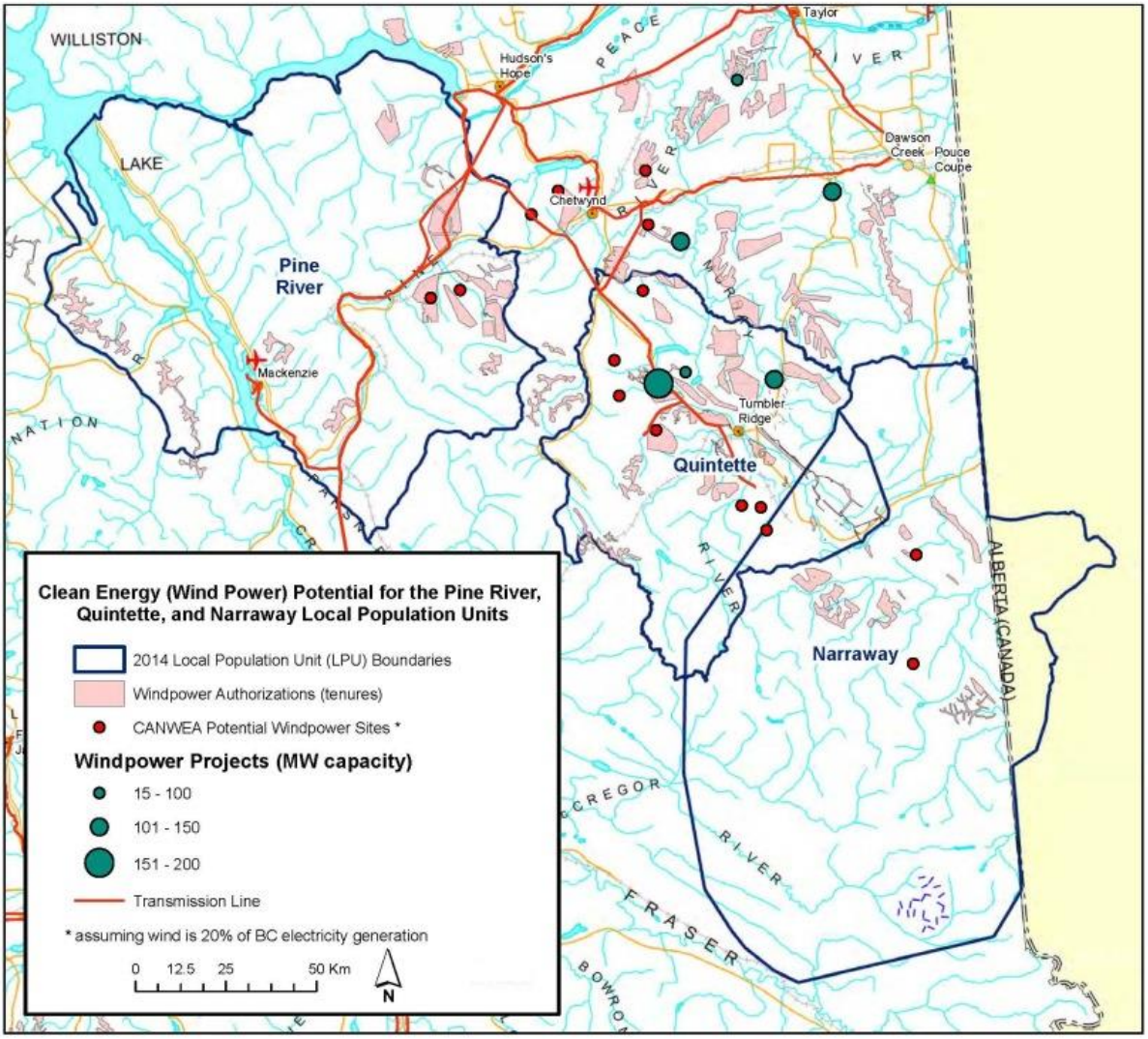
5.1.4 Wind Energy

Most of the wind project developments in the province are located in the South Peace region near Tumbler Ridge, Dawson Creek and Chetwynd. Wind projects provide approximately 10% of the electricity that BC Hydro purchases from Clean Energy Producers (approximately 2% of total Provincial electricity generation). The most favourable wind resources tend to be located on higher elevation ridge lines.

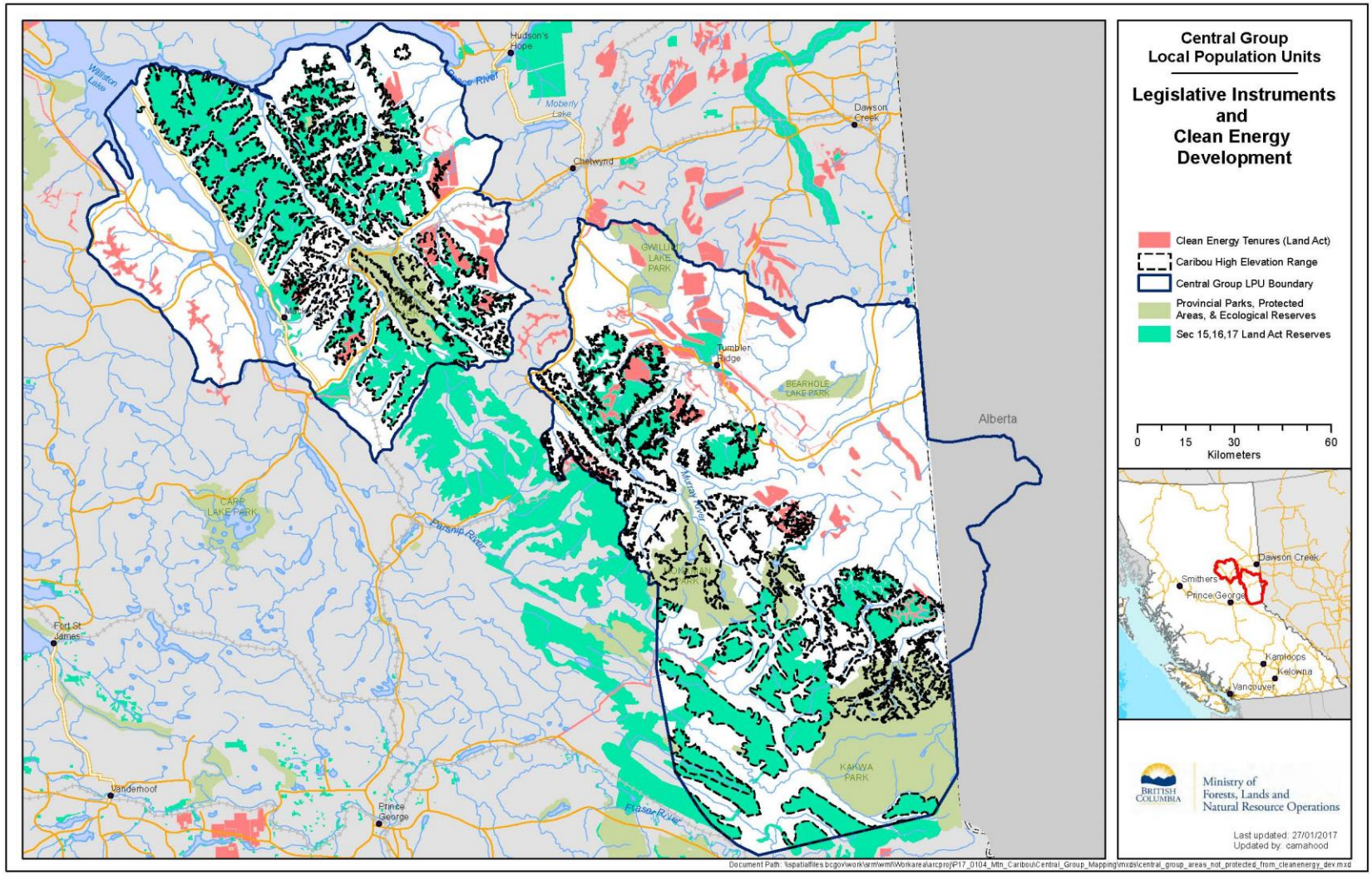
There are currently two developments within the Central Group range: the 142 megawatt (MW) Quality Wind Project and the 144 MW Dokie Wind Project. There are also three projects in development that have electricity purchase agreements with BC Hydro: the 185 MW Meikle Wind Project, the 15 MW Septimus Creek Wind Project and the 15 MW Moose Lake Wind Project. The Land Use Operation Policy for wind

power (http://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/windpower.pdf) requires that proponents submit a Development Plan on the environmental impacts and mitigation measures; requires buffer areas, sound and noise attenuation; and diligent use requirements.

Map 21. Clean energy (wind power) potential in the Central Group



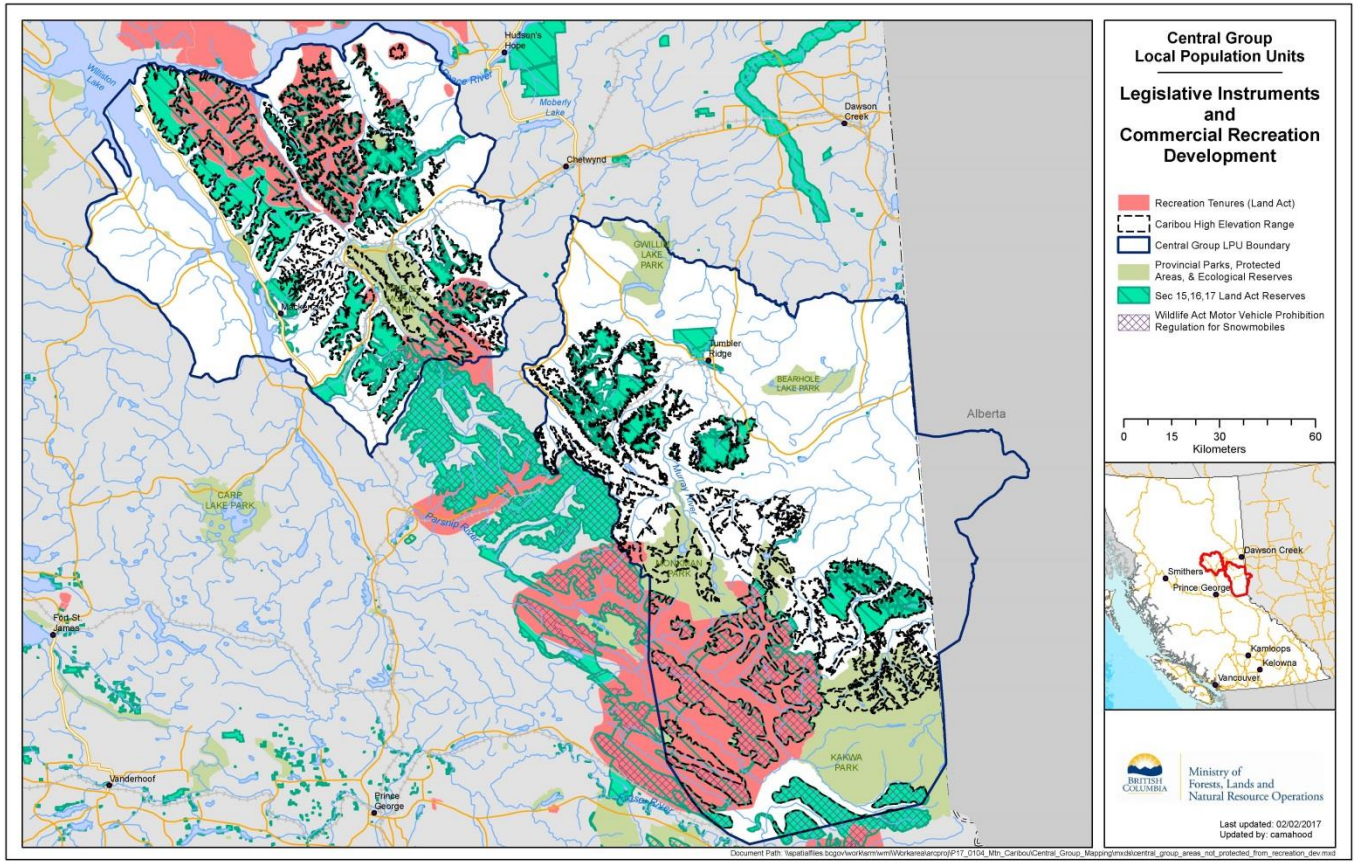
Map 22. Legislative instruments and *Land Act* tenures for clean energy in the Central Group



5.1.5 Recreation

Within the Central Group, despite the amount of tenured area, recreational activities are not considered a widespread concern. Popular snowmobiling areas are limited in number, well established and believed to be unlikely to expand, based on preferred terrain and access constraints. Higher risk would result when known high use recreation areas transition between low & high elevation habitat and/or intersect with a time & location when caribou are using the habitat.

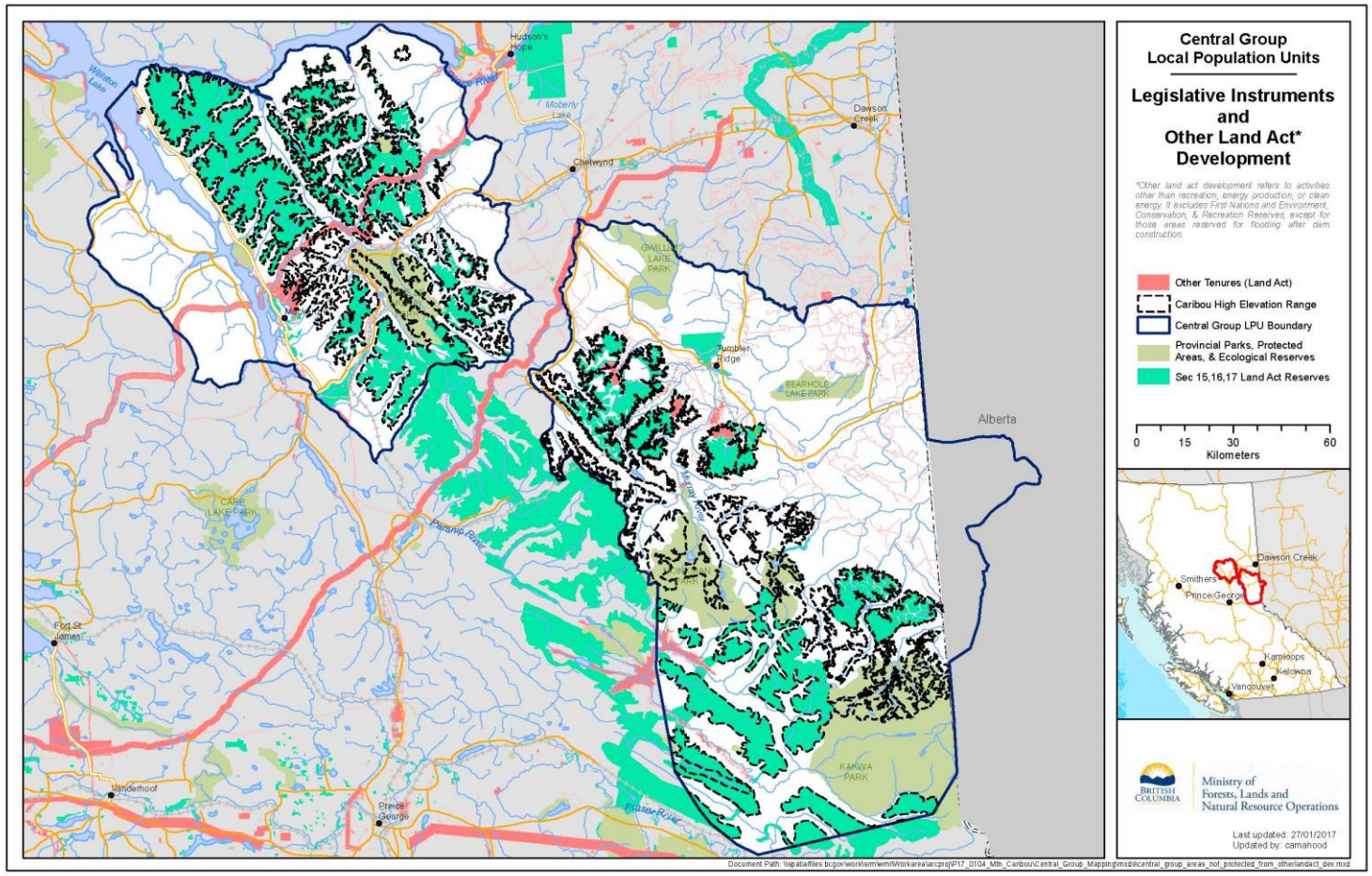
Map 23. Legislative instruments and *Land Act* tenures for recreation in the Central Group



5.1.6 Other

Particularly under the *Land Act*, tenure can be granted for multiple purposes not included in the discussion above. Within tenured areas, site-specific activities may be authorized, and therefore represent an area within which risk may be higher.

Map 24. Legislative instruments and *Land Act* tenures for other purposes in the Central Group



5.1.7 Summary of Existing Tenures within the Central Group LPU area (Table Twelve)

Activity	High elevation habitat (823,717 ha)	Non-high elevation habitat (2,152,154 ha)
Mining		
Coal	Coal tenures (leases and licences) (Quintette Coal Belt)	
	176,323 ha / 21%	515,814 ha / 24%
Metal & placer	Mineral and placer tenures - claims	
	122,069 ha / 15%	141,950 ha / 7%
Gravel	*Land Act* tenures (quarrying)	
	1 ha / 0 %	609 ha / 0 %
Oil and Gas	Petroleum Titles, *Land Act* tenures (energy production), & OGC permits	
	63,773 ha / 77% - entire Central Group LPU 0 ha / 0 % - in unconventional Montney resource play area	1,472,282 ha / 68% - entire Central Group LPU 147,175 ha / 7% - in unconventional Montney resource play area
Forestry	Area inside the THLB	
	113,200 ha / 14%	995,469 ha / 46%
	Forest harvest authorizations & forest roads	
	1491 ha / %	98,894 ha / 5%
Clean Energy	*Land Act* tenures (windpower & water power)	
	41,085 ha / 5%	138,267 ha / 6.4%
Commercial Recreation	*Land Act* tenures (recreation)	
	254,318 ha / 31%	251,594 ha /12 %
Other (*Land Act*)	*Land Act* tenures (other purposes)	
	8,417 ha /1 %	102,220 ha / 5%

6. Anticipated Next Steps

The governments of BC and Canada welcome feedback on the Study for 30 days after the posting date. The information from the Study and this feedback will inform the federal decision-making process under SARA, and discussions by both governments about additional actions that may be necessary to further the protection and recovery of southern mountain caribou.

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Annex 1. History of Application – Authorizations issued after establishment of legislative instruments

Section 3 provides information about how the various legislative instruments may or may not constrain different activities. In some cases there is discretion available to Statutory Decision Makers (SDM) in making decisions which may affect caribou habitat. Too much discretion means that there is not enough certainty to predict that the legislation will be effective in preventing destruction of caribou habitat. Conversely, not enough discretion could mean that a SDM does not have the ability to consider caribou habitat when making a decision.

The tables below provide information on the number and area of authorizations that have been issued after the date the various legislative instruments were established. This provides general information only about the potential for activities to occur within the legislative instruments established within the LPUs of the Central Group. “Authorizations” include tenure, which are broad areas within which activities may or may not be subsequently authorized (e.g. leases and licenses), as well as more site-specific permits to undertake works on the ground.

The history of authorizations made since the areas were designated reinforces the finding that one or multiple categories of activities could still be authorized within the various designated areas.

However, it is important to note that a given authorization or activity may not necessarily result in destruction of critical habitat. Significantly more detailed analysis would be required to determine whether critical habitat was or could be destroyed as a result of these authorizations.

Annex 1. Table One. Types of authorizations and tenures included in analysis.

Enabling Act	Authorization type	Tenure type
Forest and Range Practices Act	Forest harvest authorizations	License
	Forest roads	Permit
		Tenure
Mineral Tenure Act	Coal titles	Claim
		Lease
		License
		Cell title submission
		Permits (point data only)
	Mineral titles	Claim
		Lease
		License
		Cell title submission
		Permits (point data only))
	Placer titles	Claim
		Lease
		License
		Cell title submission
		Permits (point data only)
	Rock/sand/gravel quarrying	Permits (point data only)
	Other Notice of Work Permits	Permits (point data only)
Petroleum and Natural Gas Act	Petroleum	Lease
		License
		Permit
		Reservation
Oil and Gas Activities Act	Oil & gas	Permit
Land Act	Non renewable energy production	Crown grant
		License
		Permit
		Reserve/notation
		Lease
		Right-of-way
	Other *Land Act* authorizations	Crown grant
		License
		Permit
		Reserve/notation
		Lease
		Right-of-way
	Commercial recreation	Crown grant
		License

Enabling Act	Authorization type	Tenure type
		Permit
		Reserve/notation
		Lease
		Right-of-way
	Renewable energy	Crown grant
		License
		Permit
		Reserve/notation
		Lease
		Right-of-way

Annex 1. Table Two. Mining-related authorizations issued after legislative instruments (LI) were established. Bold text indicates that authorizations were issued for an activity that the instrument would have been expected to constrain, so potentially reflect the exercise of discretion. Regular text indicates that the LI would not be expected to constrain the related activity, so reflect the potential for other activities to be authorized when legislative instruments do not overlap.

NARRAWAY/ PINE RIVER/ QUINTETTE LPUs COMBINED Total Area (ha):	**2,975,871**	**Mining - Coal (includes some point data)**				**Mining - Mineral (includes some point data)**				**Mining - Placer (includes some point data)**				**Mining - Rock Quarrying/ Gravel-Sand Pit (point data only)**	**Mining - Other (point data only)**
Legislative Instrument (LI)	**Total Area (ha) of LI in LPU**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**	**Total # of Authorizations**	**Total # of Authorizations**
Ecological Reserve	1,114	-	-	-	-	**1**	**1**	**9**	**0.8%**	-	-	-	-	-	-
Provincial Park	338,792	**1**	**1**	**0**	**0.0%**	**42**	**42**	**1,374**	**0.4%**	**4**	**4**	**33**	**0.0%**	**-**	**7**
Protected Area	5,800	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wildlife Habitat Area (WHA)- FRPA - No Harvest	29,363	12	12	5,802	19.8%	4	4	536	1.8%	1	1	115	0.4%	-	-
WHA - FRPA - Conditional Harvest	143,927	22	23	5,869	4.1%	53	53	6,426	4.5%	2	2	38	0.0%	-	-
WHA- OGAA - No Harvest	29,264	12	12	5,802	19.8%	4	4	536	1.8%	1	1	115	0.4%	-	-
WHA- OGAA - Conditional Harvest	143,927	22	23	5,869	4.1%	53	53	6,426	4.5%	2	2	38	0.0%	-	-
Ungulate Winter Range (UWR) - FRPA - No Harvest	533,031	58	58	24,038	4.5%	16	16	1,583	0.3%	-	-	-	0.0%	19	5
UWR - FRPA - Conditional Harvest	419,437	31	34	9,368	2.2%	174	201	31,513	7.5%	2	2	38	0.0%	-	1
UWR- OGAA - No Harvest	354,631	58	58	24,038	6.8%	16	16	1,583	0.4%	-	-	-	-	18	5

NARRAWAY/ PINE RIVER/ QUINTETTE LPUs COMBINED Total Area (ha):	**2,975,871**	**Mining - Coal (includes some point data)**				**Mining - Mineral (includes some point data)**				**Mining - Placer (includes some point data)**				**Mining - Rock Quarrying/ Gravel-Sand Pit (point data only)**	**Mining - Other (point data only)**
UWR - OGAA - Conditional Harvest	419,437	31	34	9,368	2.2%	174	201	31,513	7.5%	2	2	38	0.0%	-	1
Old Growth Management Area - Land Act / FRPA	190,924	60	66	11,936	6.3%	134	156	10,203	5.3%	2	2	35	0.0%	2	-
Old Growth Management Area - OGAA	64,945	-	-	-	-	4	4	47	0.1%	-	-	-	-	-	-
Resource Review Area	627,794	21	21	8,760	1.4%	36	36	6,174	1.0%	9	9	257	0.0%	2	-
Section 15 Land Act Reserve	25	2	2	9	36.6%	-	-	-	-	-	-	-	-	-	-
Section 16 Land Act Reserve	29,314	9	10	1,382	4.7%	18	25	570	1.9%	2	4	62	0.2%	2	-
Section 17 Land Act Reserve	489,435	16	16	3,223	0.7%	28	31	8,000	1.6%	3	6	24	0.0%	4	5
Coal Land Reserve	602,627	-	-	-	-	16	16	2,620	0.4%	2	2	1	0.0%	11	-
No Registration Reserve - Mineral	499,115	44	45	14,755	3.0%	**14**	**14**	**91**	**0.0%**	28	30	117	0.0%	4	-
No Registration Reserve - Placer	444,960	16	16	8,264	1.9%	17	17	117	0.0%	**27**	**29**	**117**	**0.0%**	8	-

Annex 1. Table Three. Forest Harvesting and Oil & Gas-related authorizations issued after legislative instruments (LI) were established. Bold text indicates that authorizations were issued for an activity that the instrument would have been expected to constrain, so potentially reflect the exercise of discretion. Regular text indicates that the LI would not be expected to constrain the related activity, so reflect the potential for other activities to be authorized when legislative instruments do not overlap.

NARRAWAY/ PINE RIVER/ QUINTETTE LPUs COMBINED Total Area (ha):	**2,975,871**	**Forest Harvesting**				**Oil & Gas**			
Land Management Designation (LI)	**Total Area (ha) of LI in LPU**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**
Ecological Reserve	1,114	**10**	**10**	**292**	**26.2%**	**1**	**1**	**126**	**11.3%**
Class A Provincial Park	338,792	**10**	**10**	**103**	**0.0%**	**46**	**46**	**10,229**	**3.0%**
Protected Area	5,800	-	-	-	-	**6**	**6**	**314**	**5.4%**
Wildlife Habitat Area - FRPA - No Harvest	29,363	**6**	**6**	**351**	**1.2%**	27	27	2,307	7.9%
Wildlife Habitat Area - FRPA - Conditional Harvest	143,927	16	16	1,206	0.8%	29	32	5,612	3.9%
Wildlife Habitat Area - OGAA - No Harvest	29,264	6	6	351	1.2%	**21**	**21**	**2,252**	**7.7%**
Wildlife Habitat Area - OGAA - Conditional Harvest	143,927	16	16	1,206	0.8%	29	32	5,612	3.9%
Ungulate Winter Range - FRPA - No Harvest	533,031	**206**	**209**	**16,537**	**3.1%**	3,126	3,136	164,553	30.9%
Ungulate Winter Range - FRPA - Conditional Harvest	419,437	21	23	1,988	0.5%	53	61	11,840	2.8%
Ungulate Winter Range - OGAA - No Harvest	354,631	193	196	15,261	4.3%	**3,126**	**3,136**	**164,553**	**46.4%**

NARRAWAY/ PINE RIVER/ QUINTETTE LPUs COMBINED Total Area (ha):	**2,975,871**	**Forest Harvesting**				**Oil & Gas**			
Ungulate Winter Range - OGAA - Conditional Harvest	419,437	21	23	1,988	0.5%	53	61	11,840	2.8%
Old Growth Management Area - Land Act / FRPA	190,924	**61**	**67**	**1,423**	**0.7%**	579	610	15,602	8.2%
Old Growth Management Area - OGAA	64,945	1	1	3	0.0%	-	-	-	-
Resource Review Area	627,794	48	48	2,550	0.4%	**449**	**449**	**1,639**	**0.3%**
Section 15 Land Act Reserve	25	-	-	-	-	9	9	21	84.2%
Section 16 Land Act Reserve	29,314	123	147	2,740	9.3%	322	358	17,362	59.2%
Section 17 Land Act Reserve	489,435	30	35	307	0.1%	93	190	525	0.1%
Coal Land Reserve	602,627	21	21	1,476	0.2%	106	106	6,029	1.0%
No Registration Reserve - Mineral	499,115	135	137	4,136	0.8%	149	149	839	0.2%
No Registration Reserve - Placer	444,960	162	163	5,279	1.2%	134	134	823	0.2%

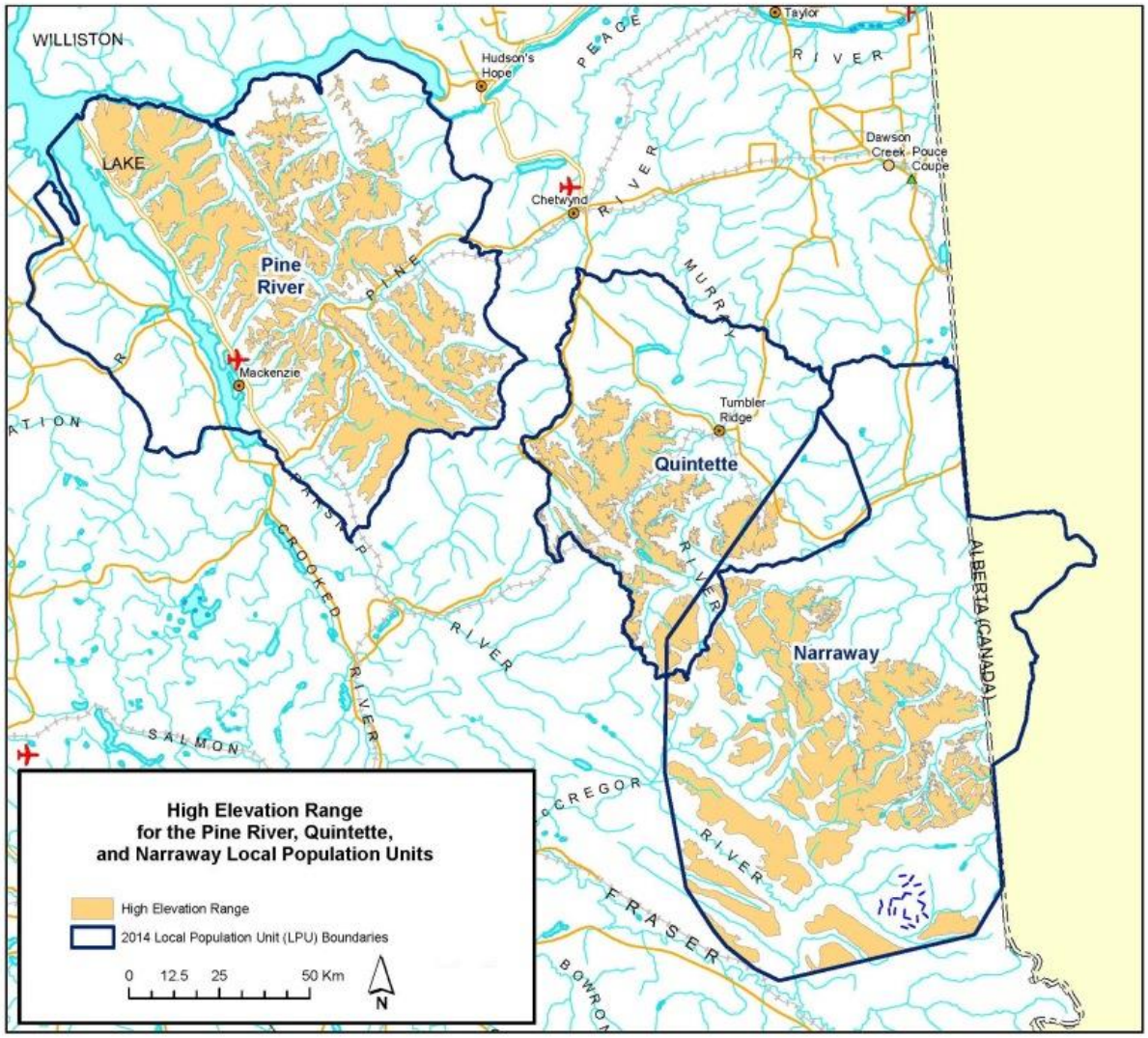
Annex 1. Table Four. Commercial recreation, renewable energy, and other *Land Act* authorizations issued after legislative instruments (LI) were established. Bold text indicates that authorizations were issued for an activity that the instrument would have been expected to constrain, so potentially reflect the exercise of discretion. Regular text indicates that the LI would not be expected to constrain the related activity, so reflect the potential for other activities to be authorized when legislative instruments do not overlap.

NARRAWAY/PINE RIVER/QUINTETTE LPUs COMBINED Total Area (ha):	**2,975,871**	**Recreation**				**Renewable Energy**				**Other**			
		Authorizations Issued After the Legislative Instrument was Established				**Authorizations Issued After the Legislative Instrument was Established**				**Authorizations Issued After the Legislative Instrument was Established**			
Legislative Instrument (LI) Type	**Total Area (ha) of LI in LPU**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**	**Total # of Authorizations**	**# of Overlaps with LI**	**Total Area (ha) of Overlap with this LI**	**% of LI this Overlap Represents**
Ecological Reserve	1,114	-	-	-	-	-	-	-	-	-	-	-	-
No Registration Reserve - Coal	602,627	5	5	581	0.1%	4	6	2,544	0.4%	26	29	14,040	2.3%
No Registration Reserve - Mineral	499,115	7	8	106,668	21.4%	23	27	17,263	3.5%	42	46	4,719	0.9%
No Registration Reserve - Placer	444,960	8	9	136,960	30.8%	11	13	6,246	1.4%	38	42	3,154	0.7%
Old Growth Management Area - FRPA	190,924	7	14	3,376	1.8%	48	65	11,962	6.3%	78	113	4,008	2.1%
Old Growth Management Area - OGAA	64,945	-	-	-	-	3	4	1,443	2.2%	2	2	25	0.0%
Protected Area	5,800	1	1	288	5.0%	-	-	-	-	-	-	-	-
Provincial Park	338,792	2	3	8	0.0%	-	-	-	-	8	8	7	0.0%
Registration Reserve Area	627,794	7	7	1,664	0.3%	24	24	18,551	3.0%	14	14	7,536	1.2%
Section 15 Reserve	25	-	-	-	-	-	-	-	-	**3**	**3**	**1**	**4.0%**
Section 16 Reserve	29,314	2	5	1,645	5.6%	**6**	**8**	**3,732**	**12.7%**	**27**	**37**	**3,440**	**11.7%**
Section 17 Reserve	489,435	2	2	131,016	26.8%	**3**	**3**	**318**	**0.1%**	**10**	**26**	**978**	**0.2%**

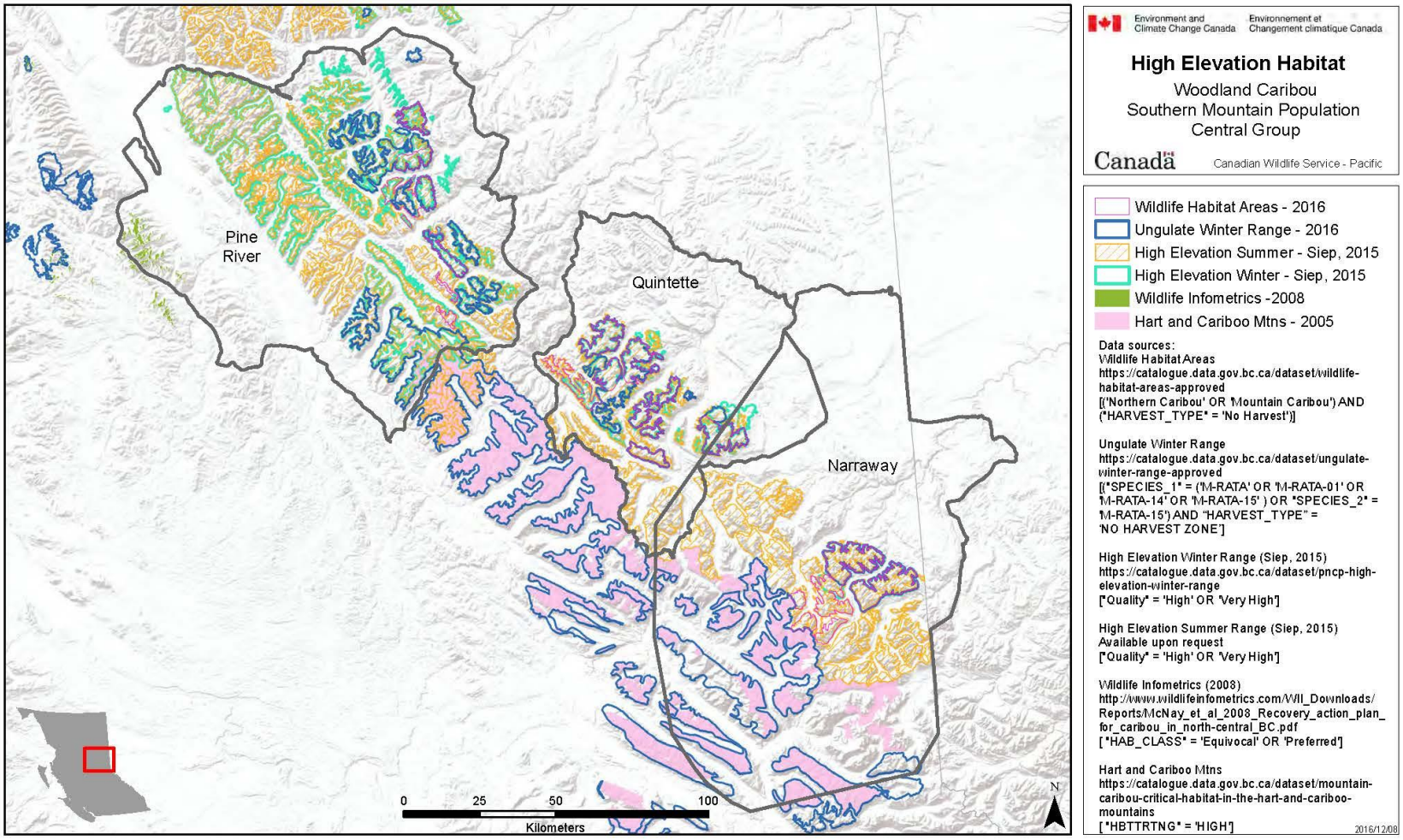
NARRAWAY/PINE RIVER/QUINTETTE LPUs COMBINED Total Area (ha):	2,975,871	Recreation				Renewable Energy				Other			
		Authorizations Issued After the Legislative Instrument was Established				Authorizations Issued After the Legislative Instrument was Established				Authorizations Issued After the Legislative Instrument was Established			
Ungulate Winter Range - FRPA - No Harvest	533,031	2	2	2	0.0%	36	42	28,849	5.4%	251	253	2,633	0.5%
Ungulate Winter Range - FRPA - Conditional Harvest	419,437	9	35	162,035	38.6%	27	32	24,754	5.9%	9	13	1,245	0.3%
Ungulate Winter Range - OGAA - No Harvest	354,631	2	2	2	0.0%	36	42	28,849	8.1%	251	253	2,633	0.7%
Ungulate Winter Range - OGAA - Conditional Harvest	419,437	9	35	162,035	38.6%	27	32	24,754	5.9%	9	13	1,245	0.3%
Wildlife Habitat Area - FRPA - No Harvest	29,363	3	3	270	0.9%	3	3	814	2.8%	9	9	20	0.1%
Wildlife Habitat Area - FRPA - Conditional Harvest	143,927	5	7	3,223	2.2%	18	18	15,421	10.7%	10	15	1,660	1.2%
Wildlife Habitat Area - OGAA - No Harvest	29,264	3	3	270	0.9%	3	3	814	2.8%	9	9	20	0.1%
Wildlife Habitat Area - OGAA - Conditional Harvest	143,927	5	7	3,223	2.2%	18	18	15,421	10.7%	10	15	1,660	1.2%

Annex 2. Key maps for high elevation data

Annex 2. Map A1. High elevation habitat used in BC's maps



Annex 2. Map A2. High elevation habitat used in ECCC disturbance mapping



End notes

[i] "Population sizes" are estimates of total animals in the population

[ii] "#" corresponds to LPU number in Figure 4

[iii] Population estimates are based on survey data unless otherwise noted and include all age classes

[iv] Current trend based on interviews with jurisdictional experts. Long-term trend derived from three-generation (27 years) trends based on survey data for Southern and Northern Groups, and on population vital rates (radio-collared adult mortality, late winter calf recruitment) for Central Group and Tweedsmuir subpopulation of the Northern Group

[v] Total estimate of 50 is based on a total of 44 caribou seen (38 adults, 6 calves) during an absolute abundance survey (Freeman 2009). This subpopulation will be re-surveyed in October 2016 (N. Dodd, pers. comm. 2016)

[vi] The 23 caribou (7 bulls, 12 cows, 4 calves) observed is a minimum count (Young et al. 2001) and given the vast terrain and the small groups the Charlotte Alplands caribou are observed in, variability in the survey observations is not unexpected (i.e., caribou were likely missed) (N. Dodd, pers. comm. 2016). There was a decline in the breeding component from 29 cows in 1993 to 12 cows in 2001 (Young et al. 2001). Given anecdotal sightings of 6 and 9 animals in 2009, the subpopulation has likely decreased and it would be reasonable to suggest that there are currently <25 animals (N. Dodd, pers. comm. 2016)

[vii] The 2014 population estimate (1350) was a mark-resight absolute abundance survey (Dodd *in draft*)

[viii] The short-term population trend is decreasing (2003-2014) with a change in population size of 51.8% and the current trend of surveys done in 2012 and 2014 is down with a change in caribou numbers of -15.6% (Dodd *in draft*)

[ix] The long-term population trend (1994-2014) is stable with change in population size of -3.6%. Although the 20 year trend suggests stability, the Itcha-Ilgachuz caribou herd did experience population growth in the late 1990 and early 2000s, during which time the population increased from approximately 1500 animals to a peak of 2800 between 1995 and 2003. Since then, numbers have steadily declined and the population appears to be similar in size to that of the early 1990s (Dodd *in draft*))

[x] Midpoint between estimate of 150-180. The lower bound based on mark-recapture assessment using collars and upper bound still requiring confirmation. Estimate based on surveys in October 2015 and March 2016, and mark-capture analysis of fall 2015 survey. Minimum population count on March 16 2016 was 120 caribou (A. Roberts, pers. comm. 2016)

[xi] Current assessment of population trend indicates continued population decline (A. Roberts, pers. comm. 2016)

[xii] J. Campbell, pers. comm. 2016

[xiii] The Takla herd declined 44%, or about 7% per year, between 2004 and 2012. It is unclear why this herd appears to be declining despite reasonably high calf recruitment (17-20% calves in the population). The decline was not equivalent among the different portions of the herd's range (Seip 2015)

[xiv] Recent historical population estimates include a minimum count of 102 in 1998 (Poole et al. 2000), 125 counted in 2004 (Wilson et al.), and 70 counted in 2012 (Klohn Crippen Berger Ltd.)

[xv] A total of 258 caribou were counted in the study area, including 6 calves/100 cows and 31 bulls/100 cows. Applying detectability and area correction factors yielded a population estimate of 362 caribou within the Wolverine caribou range (Hansen and Paterson 2016)

[xvi] A survey was conducted in 2010 with an estimate of 347, but the 2009 survey is used as the estimate (COSEWIC 2014)

[xvii] Population estimate is based on late winter aerial inventory of alpine complexes within the core winter range of the Graham herd (12 survey blocks between Butler Ridge and the Halfway River), an estimate of

sightability, and accounting for the proportion of the collared sample located outside the survey blocks at the time of inventory (Culling and Culling 2016)

[xviii] Twelve percent calf recruitment (assuming 50% females), coupled with 7-10% adult female mortality, suggests a short-term population trend of stable to slightly declining (λ 1.01-0.98) (Culling and Culling 2016)

[xix] COSEWIC (2014) indicates a stable long-term trend from 1989 to 2009, with the population estimate being 708 caribou in 2009. However, between 2009 and 2016 there was a 58% decline (i.e., 708 to 298) in the Graham herd

[xx] Combined count of caribou from both the Scott and Moberly subpopulation (Seip and Jones 2016). In 2013, the Scott and Moberly subpopulations had estimates of 20-40 and 16 caribou, respectively (Seip and Jones). COSEWIC (2014) reports a population estimate of 22 caribou for the Moberly subpopulation in 2014

[xxi] Based on the combined high adult survival rate and relatively high calf recruitment rate resulting in a population increase from 42 caribou in 2015. The improved population status corresponds to the combination of maternal penning and wolf control in 2015 (Seip and Jones 2016)

[xxii] Population count based on motion-sensor camera photographs. The population of 50 caribou was identical to the number counted in 2015, and similar to population estimates since 2011 (e.g., 41 in 2013 (Seip and Jones)) indicating that the Kennedy Siding herd has been stable over recent years. The number of caribou counted in 2015, however, was substantially lower than the 120 caribou counted in 2007 (Seip and Jones 2016)

[xxiii] The last known caribou observed in the Burnt Pine area was an uncollared cow in March 2013 that may be have been a Kennedy Siding caribou and there is no evidence that there are any remaining caribou that use the Burnt Pine range over the entire year (Seip and Jones 2013). Ongoing monitoring of the population will confirm whether or not this subpopulation has been extirpated (COSEWIC 2014)

[xxiv] Overall population estimate accounted for sightability. Minimum survey count was 39, of which 33 were in the high elevation census area (Seip and Jones 2016). Population estimate was 114-129 in 2013 (Seip and Jones) and 106 (98-113) in 2014 (COSEWIC 2014). Based on recent estimates, there's been a 58% decline from 2014 to 2016

[xxv] Population estimate for the Bearhole-Redwillow subgroup (18 minimum): the minimum count of caribou was 18 (excluding the Quintette caribou), which is comparable to numbers counted in recent years, and consistent with an ongoing decline from a minimum count of 49 caribou and a population estimate of 80 caribou in 2008 (Seip and Jones 2016) and 24 in 2013 (Seip and Jones). Population estimate for South Narraway Subgroup (35 minimum): a total of 35 caribou were counted including five calves for a calf recruitment of 14.3 %. This represents an ongoing decline in the minimum count from at least 102 caribou in 2008 (Seip and Jones 2016) and 50 in 2013 (Seip and Jones)

[xxvi] No more than 5 have been observed at once in the past few years (L. Neufeld, pers. comm. 2016)

[xxvii] Population estimate is based on a minimum count of 13 (L. Neufeld, pers. comm. 2016)

[xxviii] Population estimate applies to Hart South (246) and Parsnip (129) subpopulations (Klaczek and Heard 2016)

[xxix] Survey results suggest that the Hart South and Parsnip subpopulations have declined by 40-50% over the last decade and the Hart South has declined by 40% since 2012 and the Parsnip has remained stable since 2012 (Klaczek and Heard 2016)

[xxx] Census of Sugar Bowl and Haggen blocks only. Survey results suggest that the North Cariboo Mountain subpopulation has declined by 40-50% over the last decade and appears stable since 2012 (Klaczek and Heard 2016)

[xxxi] Range no longer managed by Province of BC for caribou.

[xxxii] 42 animals observed in 2014 (Courtier and Heard 2014)

[xxxiii] Survey results suggest that the Narrow Lake subpopulation has declined by 40-50% over the last decade and appears stable since 2012 (Klaczek and Heard 2016)

[xxxiv] The Mount Robson LPU includes only small portions of the Central Group's Tonquin and A La Peche subpopulation ranges; population size and trend estimates for those subpopulations are included in the Central Group. Mount Robson was not included in COSEWIC's assessment and status report (2014)

[xxxv] Minimum count was 51. Population estimate (72) was corrected using a sightability correction factor (0.709) specific to the Barkerville subpopulation (N. Dodd, pers. comm. 2016)

[xxxvi] 2012 estimate was 90, with minimum count of 75 (N. Dodd, pers. comm. 2016)

[xxxvii] Minimum count was 164. Survey estimate corrected with sightability correction factor (0.857) was 191. Subjective population estimate, adjusted for fresh tracks of caribou that were not visible due to vegetation, was 200 (N. Dodd, pers. comm. 2016)

[xxxviii] 2013 is the most recent complete count for Wells Gray (South) (133). A partial count was done in 2015 and with some extrapolation the population estimate was 121 (J. Surgenor, pers. comm. 2016)

[xxxix] The population estimate was 14 and 19 caribou for the for Groundhog subpopulation in 2015 and 2016, respectively (J. Surgenor, pers. comm. 2016)

[xl] Includes those caribou counted directly (148) and estimated from tracks observed (4). Not a calculated population estimate accounting for sightability (Legebokow and Serrouya 2013)

[xli] Includes those caribou counted directly (11) and not a calculated population estimate accounting for sightability (Legebokow and Serrouya 2013)

[xlii] S.Boyle, Parks Canada Agency (Mount Revelstoke Glacier National Park), pers.comm.2016

[xliii] Includes those caribou counted directly (3) and not a calculated population estimate accounting for sightability (Legebokow and Serrouya 2013)

[xliv] Serrouya et al. (2014) states that this LPU may be extirpated

[xlv] One caribou was associated with one small caribou track network observed and survey team was confident that this was the only caribou at that site. Surveyors concluded that there was only one caribou left in the known recent range of the South Monashee herd and consider the herd to be functionally extirpated (van Oort, H. and R. Laubman 2016). Three caribou were observed in 2013 (Legebokow and Serrouya 2013)

[xlvi] Since 2005, the Central Selkirk caribou subpopulation has been divided into the Nakusp and Duncan blocks. However, since 2010, caribou have been consistently sighted in between the Duncan and Nakusp blocks and were not technically part of either. Thus, the BC Ministry of Forests, Lands and Natural Resource Operations returned to the convention of using the term "Central Selkirks" without further division into blocks (DeGroot 2014), which has been adopted in this amendment. Thus, the total population estimate of 35 includes caribou from both the Nakusp and Duncan blocks.

[xlvii] The sub population declined approximately 50% between 1999 and 2002, and then remained relatively stable for a decade. The results of this year's census indicate a 40% decline from the last census in 2012 and a 77% decline since comprehensive census work began in the mid 1990's (DeGroot 2014)

[xlviii] Total population count. All were in British Columbia at time of survey. Caribou spend most of their time in Canada with occasional movements into the US (L. DeGroot, pers. comm. 2016)

[xlix] L. DeGroot, pers. comm. 2016