

Alberta  Government

DRAFT Provincial Woodland Caribou Range Plan



TABLE OF CONTENTS

Table of Contents.....	1
Table of Figures	4
List of Tables.....	6
Executive Summary	7
Definitions	9
Federal Recovery Strategies – Glossary	9
Alberta’s Range Plan – Glossary	10
1 CARIBOU RECOVERY PLANNING IN ALBERTA.....	12
1.1 Federal Guidance in Caribou Range Planning	14
1.2 Provincial Guidance in Caribou Range Planning	15
1.3 Caribou Range-Specific Details	16
1.4 Alberta’s Approach to Caribou Range Planning	16
2 RANGE PLAN DEVELOPMENT PROCESS.....	18
2.1 Vision for the Provincial Woodland Caribou Range Plan	20
2.2 Objectives of the Provincial Woodland Caribou Range Plan	20
2.3 Social and Economic Assessment	20
2.3.1 Regional Overview.....	21
3.0 Managing to 65% undisturbed habitat.....	24
3.1 Calculating 65% Undisturbed Habitat.....	24
3.2 Integrated Land Management (ILM)	30
3.2.1 Restoration.....	30
3.2.2 Management of Seismic Lines	31
3.2.3 Seismic Restoration	33
3.2.4 Geophysical Exploration.....	35
3.2.5 Management of Pipelines	36
3.3 Management of Access.....	38
3.3.1 Regional Access Management Plans	41



3.3.2	Regional Access Management Plan Pilot Project	42
3.3.3	Appended Development	44
3.3.4	Access Management Requirements	46
3.4	Management of Energy Activity	48
3.4.1	Sales of New Energy Leases	48
3.4.2	Energy Development Requirements	48
3.5	Management of Forestry Activity	49
3.5.1	Forestry Requirements	52
3.6	Management of Coal, Metallic and Industrial Minerals Activity	52
3.7	Management of Sand and Gravel Activity	53
3.8	Management of Peat Activity	53
3.9	Management of Transmission Lines	53
3.10	Management of Natural Disturbance	54
3.11	Caribou Conservation Areas	55
3.11.1	Management Intent and Land Uses in Caribou Conservation Areas	57
3.11.2	International and National Biodiversity Targets	57
3.11.3	Areas Under Consideration for Conservation Area Designation in Support of Caribou Range Planning	58
4	LEGISLATIVE HABITAT PROTECTION	61
4.1	Caribou Conservation Areas	62
4.2	Integrated Land Management (ILM)	63
4.3	<i>Forests Act</i>	63
4.4	<i>Mines and Minerals Act</i>	63
4.5	<i>Public Lands Act</i>	64
4.6	<i>Provincial Parks Act</i>	64
4.7	<i>Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act</i> 65	
4.8	<i>Environmental Protection and Enhancement Act</i>	65
4.9	Other Policies, Plans and Directives	66
4.9.1	Seismic Directive	66



4.9.2 Mineral Sales and Permits	66
4.9.3 Master Schedule of Conditions and Standards (formerly Integrated Standards and Guidelines).....	66
4.9.4 Peat Allocation	66
4.9.5 Renewable Energy and Energy Transmission.....	66
4.9.6 Caribou Protection Plans.....	67
4.9.7 Alberta's Woodland Caribou Policy and Woodland Caribou Recovery Plan	67
4.10 Steps Being Taken by Jurisdiction	67
4.11 Range Plans as Evidence of Critical Habitat Protection	67
5.0 POPULATION MANAGEMENT	67
5.1 Caribou Rearing Facility.....	68
5.2 Predator Management	70
5.3 Alternate Prey Management.....	70
6.0 MONITORING	71
6.1 Population Monitoring	71
6.2 Habitat Condition Monitoring.....	72
6.2.1 Identification of Biophysical Attributes	73
6.3 Protection Measures Monitoring.....	73
7.0 TIMELINES: REPORTING AND RANGE PLAN UPDATES.....	74
7.1 Reporting on Range Plan Implementation and Monitoring	74
7.2 Caribou and Climate Change.....	74
7.3 Caribou and Natural Disturbances	74
APPENDICES.....	76



TABLE OF FIGURES

Figure 1 Alberta's boreal and southern mountain woodland caribou ranges	13
Figure 2 Illustration of predator-prey dynamics contributing to woodland caribou population declines	17
Figure 3 Illustrates how the 500m buffer is applied to linear features such as seismic lines	25
Figure 4 Illustrates how the 500m buffer is applied to forest harvest areas	25
Figure 5 Illustrates how the 500m buffer applies to an area feature like a well pad	26
Figure 6 Illustrates that areas impacted by wildfire less than 40 years old are considered disturbed and no additional 500m buffer is applied	26
Figure 7 Illustrates the cumulative disturbance when the 500m buffer is applied to all anthropogenic disturbances. This example represents 2% undisturbed habitat	27
Figure 8 Current level of undisturbed habitat within boreal caribou ranges	28
Figure 9 Current level of undisturbed habitat in the portions of southern mountain caribou ranges within Alberta	29
Figure 10 Example of limitations to reducing habitat disturbance through seismic restoration, due to occurrence of other disturbance features	34
Figure 11 Cumulative benefit of habitat restoration of below ground pipelines together with seismic line restoration	38
Figure 12 Example of benefits derived from management of access routes, combined with seismic and pipeline restoration	40
Figure 13 Example of footprint reduction options through the use of a regional access management plan	43
Figure 14 Comparison of current and optimized road networks within a sample area in the Little Smoky caribou range. The optimized road network increased undisturbed habitat while maintaining oil and gas resource availability.	45
Figure 15 Implications of appending oil and gas development features alternative distances from optimized access routes. Longer feeder roads result in significant increases to disturbance levels. A change in length from 100m to 1000m can more than double the disturbance levels in a section of land.	46
Figure 16 Comparison of current and aggregated forest harvest patterns after 40 years of harvesting	51
Figure 17 Conservation or protected areas under consideration within the caribou range planning process	59



Figure 18 Caribou rearing facility concept

70

Figure 19 Adaptive feedback cycle for range plan updates

75

DRAFT



LIST OF TABLES

Table 1 Actions associated with release of the Provincial Woodland Caribou Range Plan and caribou range-specific details	19
Table 2 Demographics of groups overlapping with Alberta's Caribou Ranges	22
Table 3 Legacy seismic line disturbance by range	33
Table 4 Pipeline disturbance by range	36
Table 5 List of Existing Conservation Areas within Woodland Caribou Ranges	56
Table 6 Areas under consideration for Conservation Area Designation in support of caribou range planning	60
Table 7 Caribou population targets per phase of recovery status	68
Table 8 Population monitoring indicators for caribou ranges	71
Table 9 Indicators associated with habitat condition and restoration activity that will be monitored and reported by Alberta for each caribou range	72



EXECUTIVE SUMMARY

Alberta's Draft Provincial Woodland Caribou Range Plan (hereafter referred to as "the Range Plan") presents a combination of habitat and population management actions, intended to address the goals and objectives of Alberta's Woodland Caribou Recovery Plan and policy, and the Federal Recovery Strategies for both the boreal and southern mountain woodland caribou populations.

Caribou recovery in each caribou range depends on addressing habitat-related factors that result in both the loss of caribou habitats and increased predation rates on caribou populations. This will require both short-term and long-term strategies and actions towards a future where caribou populations can be self-sustaining. Current habitat conditions in Alberta's caribou ranges will not support self-sustaining caribou populations. Full recovery of sufficient and suitable habitat to support self-sustaining caribou populations is anticipated to take decades to achieve.

Alberta's caribou ranges overlap important forest and energy resources that support local communities and the provincial economy. The Range Plan supports a working landscape approach where caribou and industrial activity co-exist, with careful planning and strict regulation, investment in aggressive restoration and innovative approaches, and careful monitoring of outcomes.

Caribou are an important part of the lives and traditions for people living in Alberta, in particular Indigenous peoples. Alberta is undertaking a collaborative approach to range planning, including ongoing engagement with First Nation and Métis groups. In addition, several First Nation communities are working with the province to provide Traditional Land Use (TLU) studies pertaining to caribou and human footprint. The intent is to broaden this work out to support involvement from additional communities across more caribou ranges.

The province is also working with numerous stakeholders who are active land users or have an interest in supporting caribou recovery. Our solutions address forestry and energy sectors continued access in caribou ranges and to achieve caribou habitat recovery. Social and economic outcomes are an important part of the range planning process. As detailed range planning continues, assessments will be a key aspect to ensure impacts are minimized.

Alberta's approach is a focused strategy towards achieving self-sustaining caribou populations. Many tools will be used including: habitat restoration on seismic lines, reclamation and restoration of inactive oil and gas infrastructure, aggregated and staged forest harvest areas, integrated land management (including shared access), stricter requirements for future resource development, and conservation areas where they support conservation of critical habitat but do not unduly impact industry.



This Provincial Range Plan identifies commitments to:

- Recover caribou habitat through restoration of legacy seismic lines and inactive oil and gas infrastructure.
- Engage and involve Indigenous peoples, stakeholders and municipalities in opportunities to support advancing the Range Plan and caribou recovery.
- Work with oil and gas companies to reschedule development, to contribute to the achievement of caribou goals and objectives.
- Develop stringent requirements for new oil and gas approvals, and seismic exploration programs.
- Introduce mandatory integrated land management (ILM) to require multi-use corridors and shared access for all industrial activities, to reduce current and future footprint. The first phase of ILM will be the development of Regional Access Management Plans for all land users within and directly adjacent to the caribou ranges. These access plans will be designed to benefit caribou habitat and populations, through minimizing access and supporting phased restoration of legacy access and industrial features that do not align with the access plan.
- Consolidate (aggregate) forest harvesting operations in pre-defined areas per decade to reduce the level of disturbance over any given time period and thereby sustain adequate habitat for caribou, mimic natural disturbance regimes more closely, reduce fragmentation, and create larger future patches of intact habitat.
- Identify conservation areas in some ranges where impacts to existing industrial tenure are avoided and lands contribute to caribou recovery.
- Ensure assessments, monitoring and research occurs, as needed, to track Range Plan accomplishments.
- Complete a summary and assessment every five years of progress made within each range, including summaries of monitoring and any research programs. These five-year reviews will contribute to ongoing adaptive management of Range Plan delivery. A comprehensive review and update of the Range Plan will be completed every five years, to further enable adaptive management and ensure achievement of goals and objectives.



DEFINITIONS

Alberta uses the following definitions in this Range Plan. They inform the management actions that follow, as well as monitoring and reporting activities.

Federal Recovery Strategies – Glossary

This Range Plan adopts the following definitions from the Federal Recovery Strategies.

Biophysical attributes

Habitat characteristics required by boreal caribou (and southern mountain caribou) to carry out life processes necessary for survival and recovery.

Disturbed habitat

Habitat showing: i) human-caused disturbance visible on Landsat at a scale of 1:50,000, including habitat within a 500-metre buffer of the human-caused disturbance; and/or ii) fire disturbance in the last 40 years, as identified in data from each provincial jurisdiction (without buffer).

Local population

A group of caribou occupying a defined area distinguished spatially from areas occupied by other groups of caribou. Local population dynamics are driven primarily by local factors affecting birth and death rates, rather than immigration or emigration among groups.

Range

The geographic area occupied by a group of individuals that are subject to similar factors affecting their demography and used to satisfy their life history processes (e.g. calving, rutting, wintering) over a defined time frame.

Self-sustaining local population

A local population of caribou that 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.



Undisturbed habitat

Habitat not showing any: i) human-caused disturbance visible on Landsat at a scale of 1:50,000, including habitat within a 500-metre 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).

Alberta's Range Plan – Glossary

These definitions further support the draft Provincial Woodland Caribou Range Plan.

Appended development

Development that occurs immediately adjacent (within 200m) to the centerline of a road that is recognized in a regional access management plan.

Footprint

The area of human disturbance features, exclusive of an influence buffer, until they achieve a status of restored habitat. Overlapping features are only counted once.

Forest Management Agreement (FMA)

A renewable 20 year agreement between the government and a company that grants the company the rights and obligations to manage, grow, and harvest timber on a specific area in a manner designed to provide a yield consistent with sustainable forest management principles and practices.

Forest Management Unit (FMU)

An administrative land unit established under the authority of the Forests Act for which a coniferous and deciduous annual allowable cut be calculated and managed. (Note: not all FMUs have AACs).



Historical footprint

Footprint as of 2014¹, deemed unnecessary to support continued human activity, is not initially restored and does not have a legally responsible party to deal with the restoration work (for example, historical seismic lines that have not been returned, either naturally or through management actions, to a successional pathway towards effective caribou habitat).

Restored habitat

Habitat that was disturbed in the past, but has since returned to a state that is no longer considered by Alberta to be disturbed.

Working landscape

An area of land managed for multiple environmental, social and economic objectives. These objectives include environmental conservation, as well as human use for social and economic values. In the context of caribou, this is Green Area public land managed by the provincial government on behalf of Albertans. These are forested lands managed for multiple uses (Figure 1) including forestry, energy and other resource development, habitat conservation, and protection of watersheds and biodiversity.

¹ Alberta Biodiversity Monitoring Institute's wall-to-wall human footprint inventory 2014 layer is a detailed representation of anthropogenic footprint. This inventory provides the starting point for documenting footprint and disturbed habitat levels.



1 CARIBOU RECOVERY PLANNING IN ALBERTA

In Alberta, woodland caribou (*Rangifer tarandus caribou*) are classified into two ecotypes: mountain² and boreal³. Woodland caribou in Alberta are designated as Threatened under Alberta's *Wildlife Act*. Both the boreal and southern mountain (central mountain group) woodland caribou populations are similarly designated as Threatened under Canada's *Species at Risk Act* (SARA).

Caribou ranges cover approximately 23 per cent of Alberta (including lands managed by the Government of Canada). Currently, there are twelve boreal and three southern mountain woodland caribou local populations remaining on provincial lands in Alberta (Figure 1). One additional southern mountain caribou local population remains in Jasper National Park and is under the jurisdiction of the federal government; the population receded from the former range on adjacent provincial lands. The southern mountain caribou local population located in Banff National Park was extirpated from the park and adjacent provincial lands in 2009.

Alberta is committed to achieving caribou conservation and recovery in landscapes where human activities are well managed and coordinated, supporting various land use activities and balanced outcomes. Recognizing that caribou represent one set of values, the integration of the Range Plan into other Government of Alberta plans and frameworks (for example, regional plans and biodiversity management frameworks) will ensure the province addresses desired environmental, economic and social outcomes.

² Equivalent to the nationally designated southern mountain woodland caribou (subdivided into southern and central mountain groups)

³ Equivalent to the nationally defined boreal woodland caribou



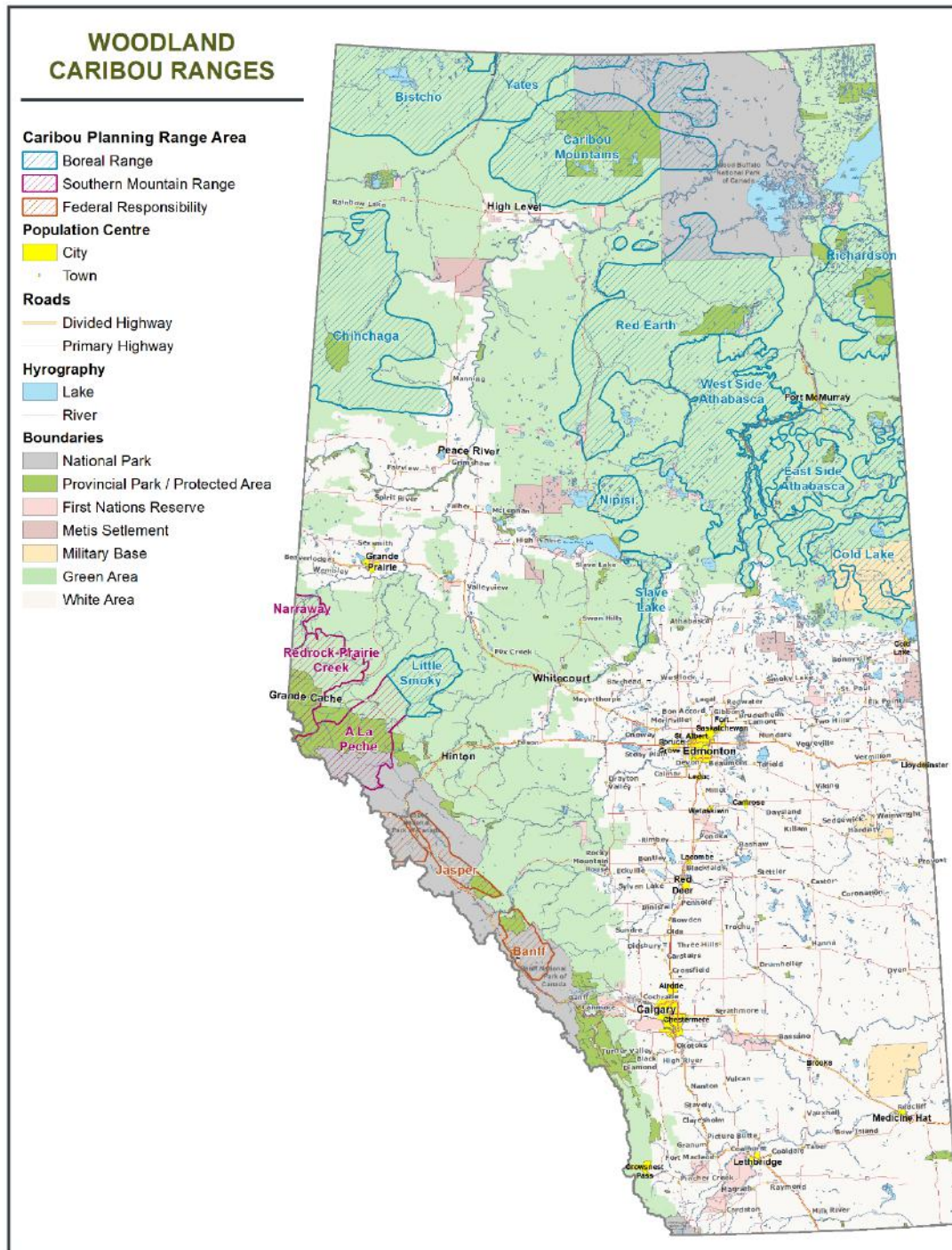


Figure 1 Alberta's boreal and southern mountain woodland caribou ranges



1.1 Federal Guidance in Caribou Range Planning

Alberta is preparing a caribou range plan to meet the requirements outlined in the Federal Recovery Strategies and guidance documents. This section outlines the federal guidance as it pertains to woodland caribou recovery planning in Alberta.

In October 2012, the Government of Canada released the *Recovery Strategy for the Woodland Caribou (Rangifer tarandus caribou), Boreal population, in Canada* (the Boreal Recovery Strategy). The strategy sets out requirements for range and action plans to support the goal of self-sustaining status for all remaining local populations of boreal woodland caribou in Canada. The strategy outlines requirements for critical habitat protection and management with the intent that woodland caribou recovery is to be achieved through a combination of habitat and population management.

In June 2014, the Government of Canada adopted the *Recovery Strategy for the Woodland Caribou Southern Mountain population (Rangifer tarandus caribou) in Canada* (the Southern Mountain Recovery Strategy), which applies to all of the mountain ecotype woodland caribou in Alberta. The Southern Mountain Recovery Strategy is comparable to the Boreal Recovery Strategy in most details. Both the *Recovery Strategy for the Woodland Caribou, Boreal Population (Rangifer tarandus caribou) in Canada*, and the *Recovery Strategy for the Woodland Caribou, Southern Mountain Population (Rangifer tarandus caribou) in Canada* are hereafter referred to as the Federal Recovery Strategies.

In September 2016, the Government of Canada released *Range Plan Guidance for Woodland Caribou, Boreal Population* which provides guidance and recommendations to aid provinces in the development of range plans for caribou population recovery. Additionally, the Government of Canada released an initial draft of *Action Plan for the Woodland Caribou (Rangifer tarandus caribou), Boreal Population, in Canada*, in July 2017. This document builds on the federal Recovery Strategy for Boreal Caribou (2012) and describes the federal government's contribution to the recovery efforts through 1) science to support recovery 2) recovery and protection; and 3) reporting on caribou recovery progress.

In October 2017, the Government of Canada released *Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (Rangifer tarandus caribou), Boreal population in Canada for the Period 2012 to 2017*. The purpose of this document is to provide a summary of the progress made toward implementing the federal Recovery Strategy since 2012.

Overall, the federal recovery goal for woodland caribou is to achieve self-sustaining local populations in all woodland caribou ranges throughout their current distribution in Canada. The recovery goal reflects the best available information, including scientific knowledge, Indigenous traditional knowledge and comments received through engagement with Indigenous groups. The goal is informed by the scientific principles of conservation and reflects the intent to recover all local populations.



1.2 Provincial Guidance in Caribou Range Planning

Alberta's goal is to stabilize, recover, and ultimately achieve naturally self-sustaining caribou populations. To date, the *Alberta Woodland Caribou Recovery Plan* (2005) and *A Woodland Caribou Policy for Alberta* (2011) have been the primary provincial guiding documents in directing woodland caribou recovery efforts. Through these policies, the Government of Alberta has committed to achieving naturally sustaining woodland caribou populations, and identifies habitat conservation and restoration as critically important actions in support of range planning.

In 2016, a provincial mediator met with select individuals from industry, municipalities, Indigenous peoples, environmental non-government organizations and academics with the purpose of information gathering and discussion in support of range planning within Alberta. These meetings produced a series of recommendations within the report *Setting Alberta on the Path to Caribou Recovery* (released in May 2016). These recommendations have contributed to current planning efforts and land use decisions to be made for Alberta's caribou ranges.

The Provincial Woodland Caribou Range Plan (the Range Plan) describes Alberta's actions towards meeting caribou conservation and recovery goals and objectives. The Range Plan outlines how activities will be managed within the caribou ranges to ensure sufficient habitat is available for caribou populations over space and time. The Range Plan identifies definitions, management strategies and actions, and monitoring and reporting that will support progress towards the requirements of: 1) *Range Plan Guidance for Woodland Caribou, Boreal Population*, and 2) the Federal Recovery Strategies.

In June 2016, Alberta released *Alberta's Caribou Action Plan*, which provided an update on caribou recovery initiatives to provide provincial guidance to the caribou range planning process (prior to the federal government finalizing *Range Plan Guidance for Woodland Caribou, (Boreal Population)*). Based on these guiding documents, Alberta released the draft Little Smoky and A La Pêche Caribou Range Plan for public comment and review.

Alberta's Provincial Woodland Caribou Range Plan was drafted based on the current federal and provincial guidance and directives at the time of writing. As well, comments collected during the public engagement period for the Draft Little Smoky and A La Pêche Caribou Range Plan, and the early engagement process for provincial range planning, were incorporated where appropriate (see Alberta's Approach to Caribou Range Planning for further detail).

The Provincial Woodland Caribou Range Plan specifically speaks to:

- Alberta's range plan development process;
- Management of caribou critical habitat in Alberta, including options for managing towards 65% undisturbed habitat and managing biophysical habitat;
- Management of caribou populations, predators and alternate prey; and
- Monitoring, reporting and future range plan updates.



1.3 Caribou Range-Specific Details

Caribou range-specific details at the landscape level will be completed as part of ongoing range planning activities and will form part of an updated caribou range plan. The details will describe the specific management approaches Alberta will take towards meeting the caribou conservation and recovery goals and objectives on a range-by-range basis. They will identify approaches for habitat and population management that sustain a working landscape where caribou and carefully managed land-use activities can co-exist. Caribou habitat management is targeted at creating and maintaining conditions which facilitate adequate caribou demographic rates, and thereby enable self-sustaining populations. These habitat conditions are affected by levels of habitat disturbance and availability of biophysical habitat, both in spatial patterns and at landscape scales that are effective for caribou.

Caribou range-specific details speak to:

- Local population self-sustainability status;
- Current habitat condition and important areas for caribou (including mapping products);
- Managing towards 65% undisturbed habitat (including mapping products);
- Management of caribou biophysical habitat; and
- Strategies that address range-specific opportunities to contribute to caribou recovery.

1.4 Alberta's Approach to Caribou Range Planning

Most of the remaining woodland caribou populations in Alberta have demonstrated consistent patterns of population decline over the period of available monitoring data - in some cases, more than 20 years of monitoring. In addition, caribou occurrence in the province has significantly declined during the 20th century, particularly along the eastern slopes. Research has shown that these declines can be attributed to complex interactions among human landscape and habitat disturbances, and predator-prey relationships. Human-caused habitat alteration can result in reduced caribou landscape occupancy (i.e. range contraction). Habitat alteration can also result in increased predator travel efficiency, increased occurrence and abundance of primary prey, and increased predator abundance - all of which result in increased predation of caribou. Reducing unnaturally high levels of disturbance on the land conserves and recovers caribou habitat and reduces caribou mortality due to predation.





Figure 2 Illustration of predator-prey dynamics contributing to woodland caribou population declines

The Federal Recovery Strategies identify critical habitat as dependent upon both biophysical habitat attributes and undisturbed habitat. The Federal Recovery Strategies guide the effective protection of critical habitat and specify the need to achieve and maintain a minimum of 65% undisturbed area within each range and provide the biophysical habitat attributes necessary for caribou recovery to self-sustaining levels. In alignment with the Federal Recovery Strategies, this Range Plan establishes a habitat trajectory towards the 65% threshold for Alberta's caribou ranges.

In alignment with the Federal Recovery Strategies, the Provincial Woodland Caribou Range Plan focuses on identifying a suite of management strategies that will put the caribou ranges on a path towards achieving the desired minimum 65% undisturbed habitat threshold. Approaches also identify means to conserve and manage biophysical habitat. Establishing sufficient future habitat to achieve self-sustaining caribou populations will take many decades in some cases. Caribou habitat will be managed through the modification and timing of forest harvesting practices, how oil and gas resource extraction is managed on the landscape, and coordination of future industrial development to reduce overall disturbance footprint on the landscape. Additional measures include the restoration and regeneration of legacy seismic lines, reducing the surface footprint of pipelines, and reclamation and restoration of other industrial landscape features - these actions will be used to speed up the recovery of disturbed landscapes. Alberta's goal is to ultimately achieve a level of habitat that will enable self-sustaining caribou populations, without the need for direct actions to reduce predation.

Caribou have been an important part of the traditional way of life of First Nations and Métis peoples in Alberta and they are general concerns with the decline of caribou populations and loss of habitat. In addition to reporting that caribou were a historical subsistence food source, Indigenous peoples also report that caribou have been an important source of raw materials. Indigenous peoples will continue to be involved in the planning process to ensure that Indigenous values, input and traditional land uses inform the both range plan development and implementation.

As planning proceeds creating both spatial and temporal direction for industry in the range-specific details, both cost benefit analysis and social assessments will be completed to ensure social and economic values are included in the planning process. Local communities and industries will have the opportunity to inform this work.



Individual caribou range-specific details will form constituent parts of the Provincial Woodland Caribou Range Plan. Alberta recognizes that woodland caribou conservation and recovery will require time and commitment to both habitat and population management actions. We are committed to ongoing assessments and research to support these actions.

2 RANGE PLAN DEVELOPMENT PROCESS

Alberta's approach to caribou range planning is centred on: developing landscape management strategies that provide habitat for caribou over space and time; achieving and maintaining a minimum of 65% undisturbed area within each caribou range; and providing the biophysical habitat attributes necessary for caribou recovery while supporting local communities and the economy. In support of this approach Indigenous, stakeholder, and municipal involvement/engagement was used to help identify and formulate the landscape management strategies that were used to build the Provincial Woodland Caribou Range Plan and caribou range-specific details.

Alberta acknowledges and respects the need for an open and transparent planning process. In order to consider potential economic, environmental and social factors associated with the development of the Range Plan, an engagement plan was developed using a multi-phased approach across the province. This engagement process was used to reach out to stakeholders, municipalities, and industry sectors for ideas, innovation and input contributing to management strategies. Potential management strategies were tested using spatial modeling and an iterative engagement process. Technical input and review were also used to test landscape management strategies and concepts.

The Government of Alberta acknowledges and respects Indigenous peoples' unique perspectives and relationship with the environment. Alberta's primary goal for Indigenous engagement was to develop an approach that allowed Alberta to collect information on caribou while providing a forum that allowed Indigenous peoples to provide meaningful input into the planning process. While a separate process, Indigenous engagement ran in parallel with stakeholder, municipal, industry and public engagement activities. Ideas, innovation and input collected during the engagement process were used to develop and inform the Provincial Woodland Caribou Range Plan, and continue to inform the development of individual range-specific details for local populations. Engagement will be held on both the Provincial Woodland Caribou Range Plan and range-specific details, as documents are released (

Table 1).



Table 1 Actions associated with release of the Provincial Woodland Caribou Range Plan and caribou range-specific details

Timeline	Action
Step 1	Engagement with Indigenous peoples, stakeholders and the public to support pre-planning and issues identification
Step 2	Public release of Alberta's Draft Provincial Woodland Caribou Range Plan
Step 3	Engagement with Indigenous peoples, stakeholders and the public on Alberta's Draft Provincial Woodland Caribou Range Plan
Step 4	Release of Draft Provincial Woodland Caribou Range Plan with range-specific details
Step 5	Engagement with Indigenous peoples, stakeholders and the public on draft Provincial Woodland Caribou Range Plan with range-specific details
Step 6	Release of final Provincial Woodland Caribou Range Plan with range-specific details

In areas where transboundary local populations of caribou occur (i.e. caribou that Alberta shares with national parks or adjacent provinces or territories), communication and information sharing was, or will be, undertaken with neighbouring jurisdictions to ensure that: 1) the current information and learnings are shared, and 2) caribou recovery actions are harmonized.

Alberta will employ an adaptive management approach to the implementation of the Range Plan. This approach is intended to meet provincial and federal goals and objectives, while remaining responsive to dynamic caribou population and landscape conditions, and to assessments of the effectiveness of management actions. While the underlying relationship between the well-being of caribou populations and habitat disturbance/change is common to all caribou ranges in Alberta, each range is unique to some extent. Some ranges will require more extensive and intensive actions to maintain caribou in the near-term as habitat recovers and resource management strategies are



implemented over the coming decades. Range plan implementation will be monitored and management strategies will be adjusted or new approaches will be explored where required.

2.1 Vision for the Provincial Woodland Caribou Range Plan

Alberta will have naturally sustaining woodland caribou populations across all caribou ranges.

2.2 Objectives of the Provincial Woodland Caribou Range Plan

1. The Provincial Woodland Caribou Range Plan works toward achieving the population and habitat goals and objectives outlined in the Federal Recovery Strategies and Alberta's Woodland Caribou Recovery Plan and policy, including:
 - a. Self-sustaining local populations in all remaining caribou ranges;
 - b. Conservation, recovery and management of critical habitat through working towards the 65% undisturbed habitat threshold and management of biophysical habitat, in both spatial and temporal patterns that provide habitat for caribou;
 - c. Application of habitat restoration and wildlife population management actions; and
 - d. Achievement or maintenance of caribou minimum local population size targets identified in the federal boreal strategy (i.e. minimum of 100 animals for each boreal caribou local population).
2. Alberta's Provincial Woodland Caribou Range Plan will minimize potential impacts to local and provincial economies.
3. Indigenous peoples, stakeholders, municipalities and members of the public support the Provincial Woodland Caribou Range Plan, and the process used to develop it.

2.3 Social and Economic Assessment

A socio-economic assessment describes the current state of potentially affected individuals and communities, using both quantitative and qualitative measures. The assessment of caribou conservation and management will follow the methodology outlined by Environment and Climate Change Canada for a cost-benefit analysis approach that focuses on calculating the net benefit to society. This type of analysis is considered to be the most robust decision-making tool available to policy makers and will include three broad categories, namely:

- Economic cost-benefit analysis;
- Social impacts; and
- Indigenous land use and culture.

The distribution and experience of social and economic effects is not equal across people of different ages and genders, and members of vulnerable population groups (e.g. seniors and



children). As such, the assessment will also employ a gender and intersectionality approach (GBA+) that acknowledges and delineates the impacts on various demographic groups that are reflective of gender, age, race, marital status, Indigenous identity, etc. Therefore, the GBA+ approach will augment the assessment and will include:

- working towards equitable participation in community consultations by both men and women, seeking out perceptions of people of different ages, marital status, and race both within mainstream and Indigenous peoples;
- disaggregating data based on sex and other demographic indicators when available for both economic and social indicators;
- ensuring a mix of both qualitative and quantitative indicators as a means to ensure both discrete measurable indicators are balanced with indicators that focus on experiences and perceptions; and
- including specific gender equality indicators to assess the potential impact to gender equality of the range plans.

2.3.1 Regional Overview

The fifteen caribou ranges overlap with numerous First Nation and Métis groups, municipalities, and considerable portions of resource development in Alberta. Accordingly, a number of communities and groups have the potential to be affected by changes to the types of activities permitted on these lands. A preliminary analysis of the socio-economic linkages between each range and potentially affected communities revealed that, in total, an estimated 67 municipalities and 70 First Nations and Métis groups may be affected or have an interest in range planning.

- 17% of people identify as being Indigenous, well above the provincial level of 6%; and
- The overall labour force participation rate is 75% (67% for women and 83% for men), slightly above the provincial rate of 73% (67% for women and 79% for men).

A summary of the demographic characteristics for the affected communities can be seen in Table 2.



Table 2 Demographics of groups overlapping with Alberta's Caribou Ranges

Communities	Population			Identify as Indigenous			In the Labour Force		
	Women	Men	Total	Women	Men	Total	Women	Men	Total
Municipalities	170,850	183,430	354,280	22,230	20,580	42,810	85,980	114,980	200,960
First Nations	11,350	11,580	22,930	10,850	11,460	22,310	2,780	3,870	6,650
Métis Settlements	3,265	3,604	6,869	2,455	2,709	5,164	1,203	1,736	2,939
Total Communities	185,465	198,614	384,079	35,535	34,749	70,284	89,963	120,586	210,549
[% of AB]	[9.1%]	[9.7%]	[9.4%]	[28.3%]	[28.8%]	[28.5%]	[8.3%]	[9.4%]	[8.9%]
Alberta Total	2,027,765	2,039,410	4,067,175	125,410	120,830	246,239	1,084,280	1,276,233	2,360,513

Source: Statistics Canada 2011, 2016 census, Environics 2014, Nichols Applied Management.

In addition to the nearly 400,000 residents in potentially affected communities, the region also hosts approximately 30,000 mobile workers who are employed outside of their home communities (possibly from outside of the area) and live temporarily in work camps or hotels/motels. These mobile workers are a key pathway through which communities far-removed from the physical act of resource recovery may experience the impacts of caribou conservation.

These communities support a considerable portion of Alberta's economic activity, most notably as host to extensive forestry, and oil and gas resources. In 2015 (latest available), the gross domestic product of the potentially impacted communities totaled \$65 billion, or 19% of the provincial total.

The importance of the extractive sectors of the economy can be seen when examining the composition of the labour force aggregated across all potentially affected communities. The most prominent industries as expressed in terms of workforce size are:

- mining and oil and gas extraction (17.2% of the local labour force);
- retail trade (10.3%);
- construction (9.8%);



- health care and social assistance (7.4%); and
- public administration (6.6%).

In addition to the nearly one in five jobs coming directly in the form of oil and gas extraction, many of the jobs identified in the construction sector are also tied directly to non-residential construction activity – namely oil and gas development. Agriculture and forestry, though not as employment intensive as many other employment sectors, accounts for approximately 4.3% of the local labour force.

The degree to which selected communities rely on the extractive sectors and related construction activity varies significantly across the ranges. Some communities have local economies that are much less diversified than the region overall and are therefore particularly sensitive to changes in specific industries. For example, communities that are more heavily dependent on the mining and oil and gas extraction industries include:

- the Town of Swan Hills (33% of the local labour force);
- the Town of Rainbow Lake (32%);
- the Specialized Municipality of Wood Buffalo (29%);
- the Town of Fox Creek (28%); and
- the Town of Grande Cache (27%);
- the Town of Bonnyville (20%);
- the M.D. of Opportunity (20%);
- the M.D. of Bonnyville (17.5%); and
- the City of Cold Lake (17%).

Similarly, there are communities that are more heavily reliant on the forestry industry. These communities include:

- Village of Boyle (59% of the local labour force);
- Woodlands County (56%);
- Athabasca County (22%);
- Northern Sunrise County (21%);
- M.D. of Lesser Slave River No. 124 (18%);
- M.D. Greenview No. 16 (15%);
- Town of Hinton (15%);



- Mackenzie County (14%);
- Grande Prairie County (13%);
- Town of Whitecourt (12%);
- Town of Manning (11%); and
- Town of High Level (10%).

Additionally, major forestry centres in northern Alberta include the Towns of Edson, Slave Lake, Grande Cache and Peace River, as well as the City of Grande Prairie. Forestry-related employment includes: logging; forestry machinery, equipment and supply merchant wholesalers; timber tract operations; sawmills and wood preservation; pulp, paper and paperboard mills; other wood and paper product manufacturing; and support activities for forestry.

3.0 MANAGING TO 65% UNDISTURBED HABITAT

3.1 Calculating 65% Undisturbed Habitat

In alignment with federal guidance, the Provincial Woodland Caribou Range Plan groups habitat disturbance into two categories: 1) anthropogenic disturbance; and 2) natural disturbance. Anthropogenic disturbances are human-caused features visible on Landsat at a scale of 1:50,000, including lands within a 500-metre buffer of each disturbance feature. The Federal Recovery Strategies have adopted the application of a 500-metre buffer on disturbance features in consideration of known negative adjacency effects of these features for caribou. Anthropogenic disturbance includes both linear and area type features. Linear features include roads, pipelines, and seismic lines (Figure 3). Area features include forest harvest areas (Figure 5), well pads and facilities. Natural disturbance is defined as wildfire disturbance in the last 40 years (does not include a buffer) (Figure 6), as identified in data from each provincial jurisdiction.

Anthropogenic disturbance is further classified into four categories:

- Permanent Disturbance: Highways, multi-lane gravel roads, electrical transmission lines, railways and municipal infrastructure.
- Temporary Disturbance: Resources roads, well pads, mines, industrial facilities and pipelines.
- Forest Harvesting: Forest harvest areas, not including roads used to access the areas.
- Legacy Seismic Lines: Seismic lines that are 4 metres or greater in width.

When all of the above disturbances are placed on the landscape, and associated 500-metre disturbance buffers applied, the total undisturbed area remaining can be calculated (Figure 7).



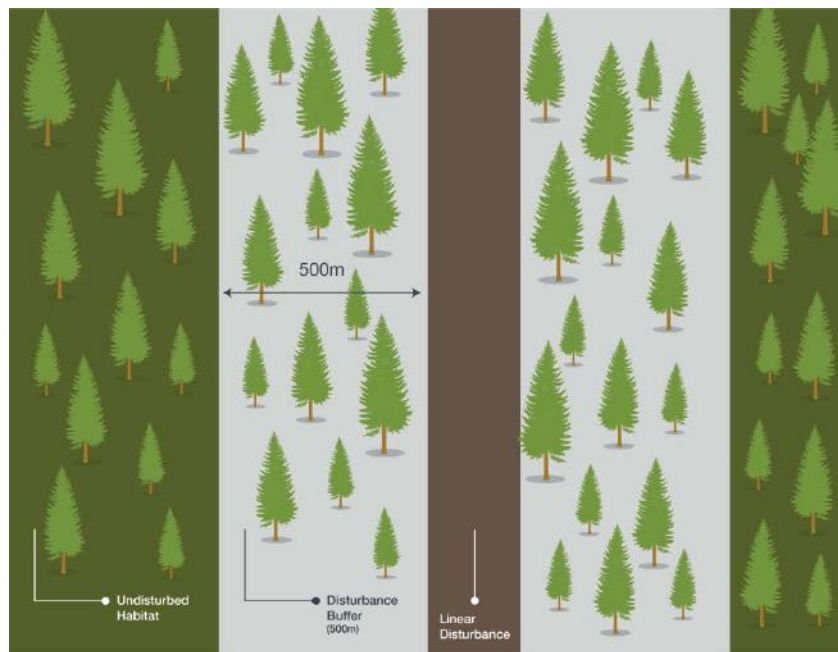


Figure 3 Illustrates how the 500m buffer is applied to linear features such as seismic lines



Figure 4 Illustrates how the 500m buffer is applied to forest harvest areas





Figure 5 Illustrates how the 500m buffer applies to an area feature like a well pad

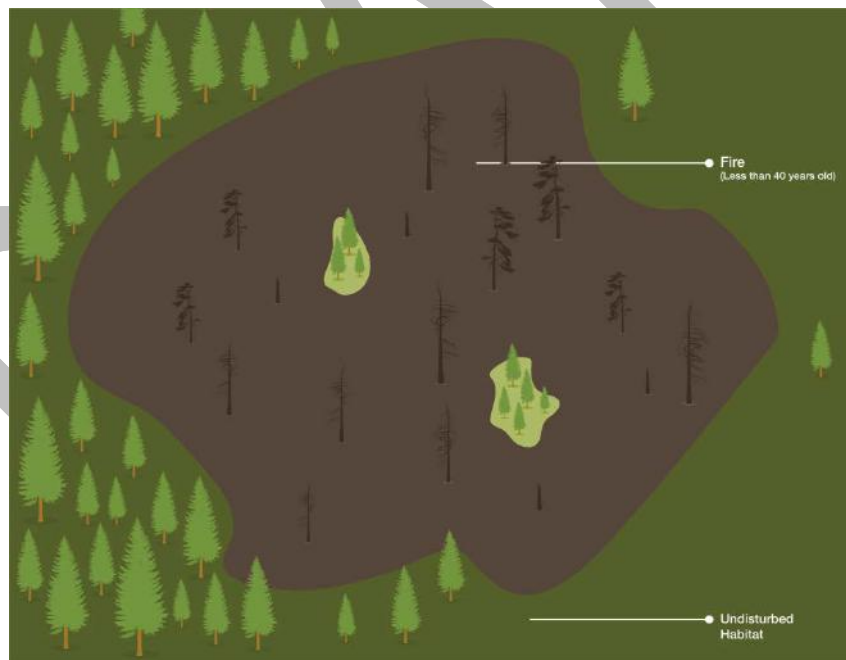


Figure 6 Illustrates that areas impacted by wildfire less than 40 years old are considered disturbed and no additional 500m buffer is applied



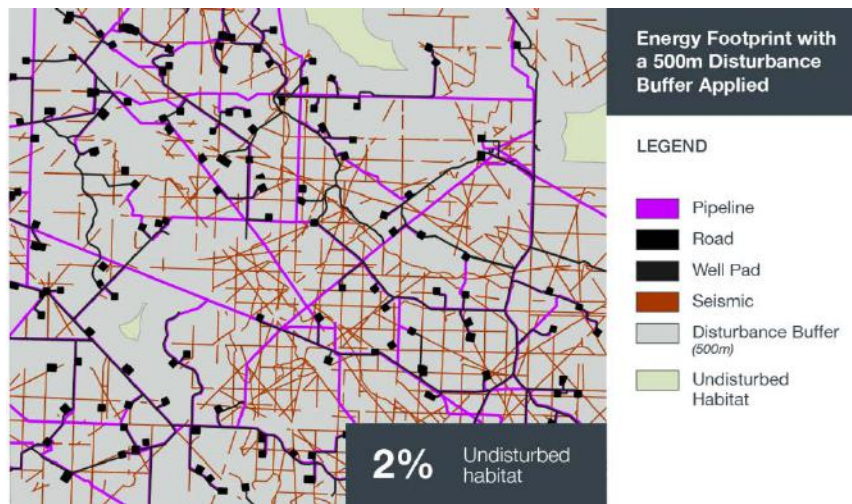


Figure 7 Illustrates the cumulative disturbance when the 500m buffer is applied to all anthropogenic disturbances. This example represents 2% undisturbed habitat

The federal boreal caribou recovery strategy outlines that caribou ranges must achieve and maintain a minimum of 65% undisturbed habitat in order for populations to have a 60% likelihood of maintaining self-sustaining levels. The federal southern mountain recovery strategy identifies a requirement to achieve and maintain a minimum 65% undisturbed habitat within local population winter range areas only. Within Alberta's jurisdiction, all caribou ranges are currently below 65% undisturbed habitat requirements (Figure 9, Figure 10). The federal proposed Action Plan for the Woodland Caribou, Boreal Population, in Canada (July 2017) recognizes the need for continued research to better understand the influence of different types of disturbance on caribou, and the importance of incorporating the results into recovery planning and actions using an adaptive management approach.



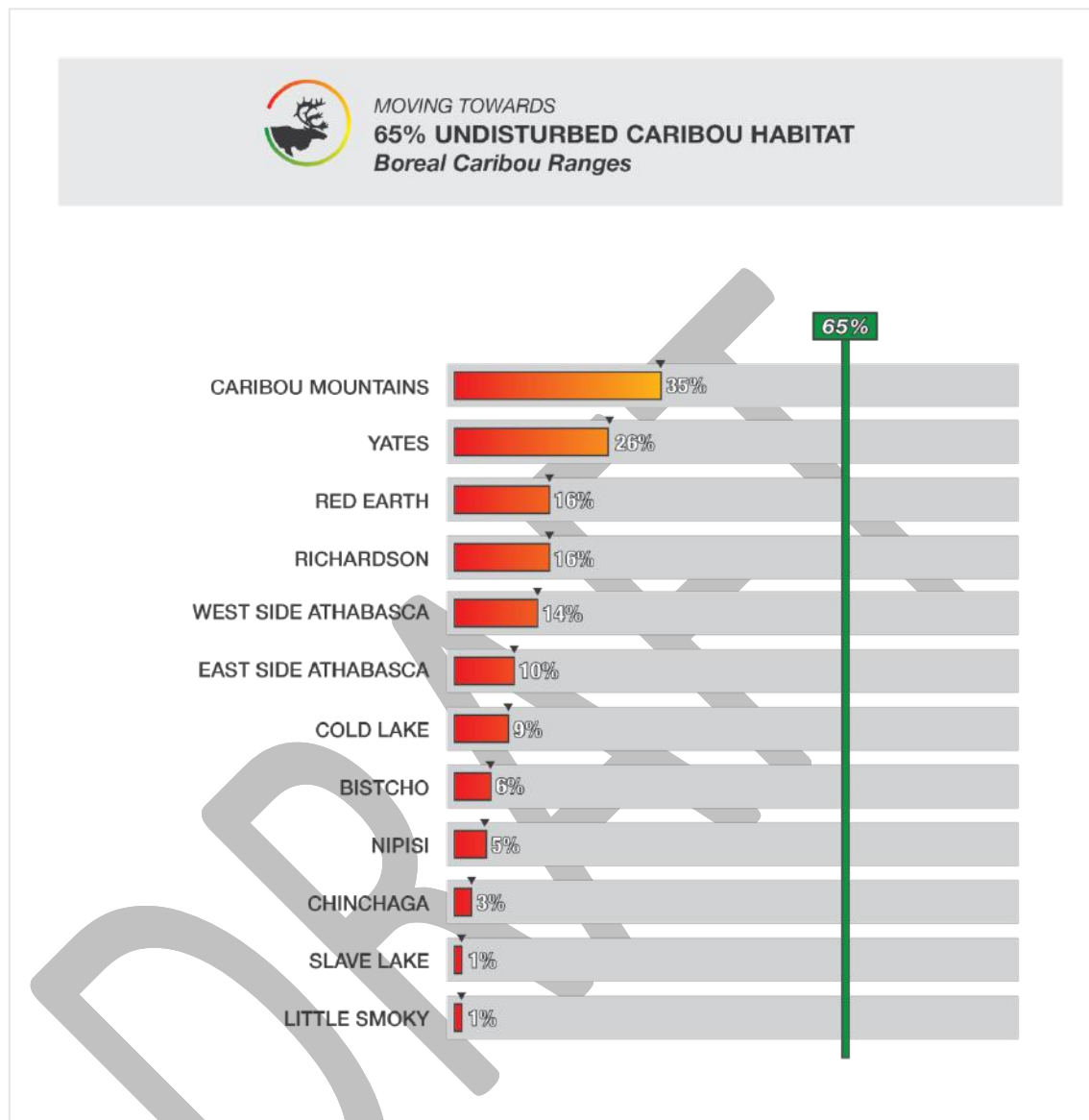


Figure 8 Current level of undisturbed habitat within boreal caribou ranges



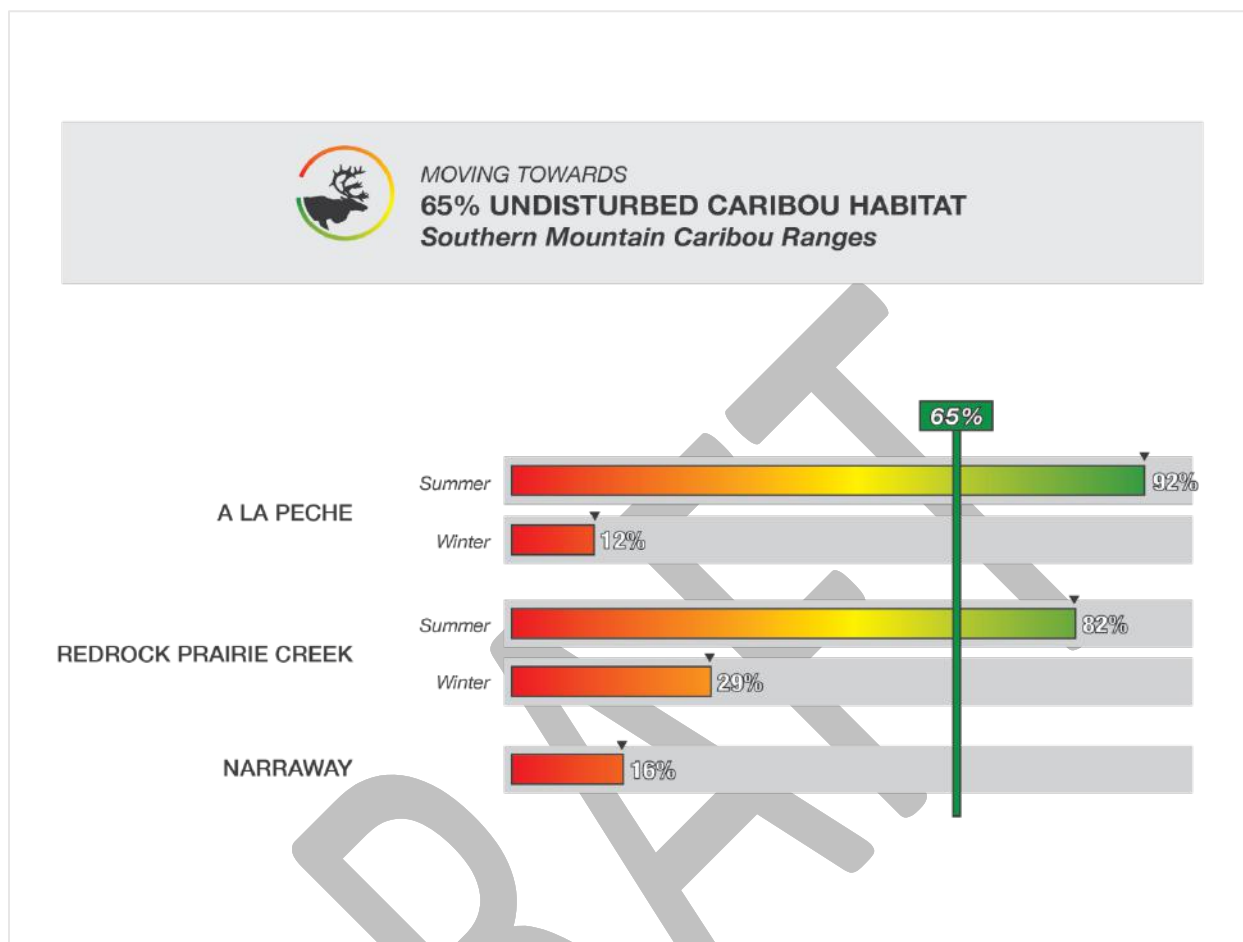


Figure 9 Current level of undisturbed habitat in the portions of southern mountain caribou ranges within Alberta

In working towards achieving the target of 65% undisturbed habitat over the next 50 to 100 years or more, the amount of disturbance currently present in caribou ranges will need to be reduced and future disturbances will need to be both managed and minimized. To help accomplish these objectives, the following sections outline specific management approaches that will restore legacy disturbance features and minimize future disturbance. These approaches will be deployed to various degrees across caribou ranges in the province to achieve range-specific outcomes, in relation to provincial and federal goals and objectives. Forthcoming caribou range-specific details will further outline management approaches employed within each range.

Alberta's management approaches are framed as a cumulative effort, using Integrated Land Management (ILM) techniques to achieve the habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to initiate the restoration of existing footprint and minimize/manage the creation of new footprint, while addressing social and economic values.



3.2 Integrated Land Management (ILM)

Integrated Land Management (ILM) is a strategic, planned approach to restore, manage and reduce human footprint on the landscape. This approach aims to balance values, benefits, risks and trade-offs when planning and managing resource extraction, land use activities, and environmental conservation and management. Integrated Land Management will be required and adhered to in applications for development, and throughout project activity cycles.

Without strategic planning and management, land use activities will often result in damage to the environment and/or conflict among users. Each individual caribou range plan will explore approaches for:

- Restoration
- Seismic lines
- Pipelines
- Access

3.2.1 Restoration

Alberta Environment and Parks (AEP) will lead a provincial restoration program, with participation from cross-ministry partners in integrated resource management and in partnership with industry, Indigenous peoples, and a third party restoration agent. The parties listed above will form a Caribou Habitat Restoration Committee. This committee will give guidance to three regional sub-committees or working groups (see below). Guidance will include provincial level oversight and direction on priorities for restoration, and guidance documents for operational implementation (e.g. Provincial Restoration and Establishment Framework for Legacy Seismic Lines in Alberta (May 2016)). Operational restoration plans will be developed by the three regional working groups led by government, and, as a minimum, representatives from regional forest and energy industry operators, Indigenous peoples, and municipalities. Regional restoration plans will be approved by the appropriate AEP personnel. Working groups will be chaired by AEP - Operations and Planning, who will assess the value of restoration plans in terms of positive caribou outcomes. The three regional working groups will be for northwest caribou ranges (Bistcho, Yates, Caribou Mountains, Chinchaga, possibly Red Earth), northeast (Richardson, West Side, East Side, Cold Lake, Nipisi, Slave Lake), and central (Narraway, Redrock-Prairie Creek, Little Smoky, A La Pêche).

A third party will operationally implement restoration activities. Strong preference for local contracting of work and Indigenous participation would be criterion in review of proposals. Restoration activities that have been voluntarily completed by industry will be recognized as contributions to the program - appropriate credit will be applied. Restoration work will need to comply with provincially established standards and targets. The Caribou Habitat Restoration Committee will make recommendations to Alberta on the role of an offsets program.

Generally, areas will be identified that will provide the most value in terms of improving caribou habitat. Assessment and inventory of sites will be a priority in order to determine which sites are



revegetating naturally, and which sites would be good candidates for treatment. The following principles will apply:

- Conservation status of individual caribou populations (e.g. populations at high risk).
- Areas important for caribou population connectivity and expansion of habitat.
 - Protected areas and other areas of low seismic footprint could be 'quick win' areas where a small amount of restoration could significantly reduce levels of disturbed habitat.
- Areas with large areas of legacy linear disturbance that are not regenerating naturally.
- Areas where high levels of resource extraction are anticipated and connecting habitat through restoration will be essential to benefit availability of habitat.
- The Little Smoky and A La Pêche ranges have been previously identified as a high priority for treatment.
- Areas with high levels of caribou occupancy.
- Sites that will not reforest naturally, but would provide habitat and connectivity within the range.
- Sites that will have the greatest chance of restoration success with lowest possible site disturbance/intervention and cost.
- Sites that are not scheduled for timber harvesting over the next 20 years or needed for re-use by energy industry within five years.
- Sites not required for human access or that do not align with access restriction objectives.
- Sites that are practical to treat.

While some disturbance features provide access routes for Indigenous peoples, hunters, fishers, trappers and other commercial users of wildlife, as well as recreationists, the vast majority of these areas do not functionally contribute to access. Alberta will seek feedback from users to identify areas of use and to integrate restoration with land use practices or rights associated with land use in the area.

The first step in any range will be understanding what lines need to be restored and the development of a plan. Within the first five years, sampling and inventory of current state of the lines will be completed, as part of range level restoration plans.

The following sections highlight restoration and associated considerations for individual disturbance types.

3.2.2 Management of Seismic Lines

Seismic lines are used during assessments of sub-surface oil, gas, and mineral resources. Practices in recent decades have generally reduced the width of new linear features and ground disturbance associated with seismic exploration. Legacy seismic lines however, were constructed using large bulldozers that greatly reduced the ability of vegetation to re-establish. Many of these lines have been periodically reused for subsequent exploration programs and as access by other industries and the public. A significant portion of the legacy seismic lines (up to 60% or more depending on the area) have yet to show significant levels of forest establishment, decades after their creation. These lines will typically require some level of intervention to re-establish forest tree cover and remove the disturbance from the landscape. Restoration standards and outcomes for seismic line restoration



within caribou ranges are described in the Provincial Restoration and Establishment Framework for Legacy Seismic Lines in Alberta (May 2016).

There are approximately 250,000 kilometres of legacy seismic lines in caribou ranges across Alberta. It is estimated that 150,000 kilometres of those legacy seismic lines, in their current state, are not fully capable of natural woody vegetation re-establishment, and therefore need some treatment(s) to encourage restoration. Treatments range from site preparation and planting to simply blocking motorized access. The site types where this would be applicable would need to be assessed and described in restoration plans. An estimated 100,000 kilometres of legacy seismic lines do not need intervention due to a combination of factors, such as:

- 1) Areas have sufficiently regenerated or are on their way towards natural regeneration⁴;
- 2) Historical and near-term approved future timber harvest areas overlap legacy seismic lines, which will be reforested as a best management practice;
- 3) Areas are not practical to restore due to environmental conditions - potential for further ecosystem degradation, poor accessibility, muskeg or bog areas that don't support significant tree cover naturally; and
- 4) Historical wildfire areas, where natural regeneration has been initiated through natural processes.

Since seismic lines are so prevalent, ensuring lines are on a successful path to re-establishing tree cover increases the intact habitat more than any other management tool. One of the key recommendations in the 2016 report *Setting Alberta on the Path to Caribou Recovery*, is the restoration of legacy seismic lines within the Little Smoky and A La Pêche ranges. Since then, Alberta has initiated a restoration project, by committing to approximately 10,000 kilometres of seismic line restoration in these ranges. Government will initially pay for the cost of restoration in these ranges and then recover costs from the energy industry. The energy sector volunteered this as a matter of social responsibility and cooperation and is partnering with Alberta throughout the program's implementation. The forestry sector will be required to restore legacy seismic lines within 500 metres of new harvesting areas. Results from the Little Smoky and A La Pêche Restoration Pilot Program will be closely monitored and assessed, so that results and learnings can be adapted and scaled-up to restoration efforts across other ranges in Alberta.

⁴ The estimated amount of legacy seismic lines experiencing natural regeneration will continue to be refined in future assessments.



3.2.3 Seismic Restoration

Seismic lines represent a significant contribution to disturbance (**Table 3**); however, the overlapping nature of anthropogenic disturbances often requires that other features be addressed in order to improve caribou habitat (e.g. **Figure 10**).

Table 3 Legacy seismic line disturbance by range

Range	Range Size (ha)	Length of Seismic Lines (km)	Per cent of Range Disturbed by Seismic Lines	Per cent Disturbed Only by Isolated Seismic Line Segments ⁵
<i>A La Pêche</i>	661,500	2,046	25	7
<i>Bistcho</i>	1,435,810	61,442	91	69
<i>Caribou Mountains</i>	2,065,873	8,601	36	29
<i>Chinchaga</i>	1,764,364	58,812	96	54
<i>Cold Lake</i>	672,586	7,883	80	34
<i>East Side Athabasca</i>	1,311,902	19,256	84	34
<i>Little Smoky</i>	308,380	9,476	98	28
<i>Narraway</i>	104,066	863	66	14
<i>Nipisi</i>	210,436	3,713	91	40

⁵Isolated seismic segments are defined as portions of line that are more than 500m away from other disturbances, so that portion of seismic line is the sole disturbance within an otherwise undisturbed area.



Range	Range Size (ha)	Length of Seismic Lines (km)	Per cent of Range Disturbed by Seismic Lines	Per cent Disturbed Only by Isolated Seismic Line Segments ⁵
<i>Red Earth</i>	2,470,203	43,643	68	45
<i>Redrock-Prairie Creek</i>	482,892	1,626	41	12
<i>Richardson</i>	707,390	2,201	34	12
<i>Slave Lake</i>	151,623	3,304	95	34
<i>West Side Athabasca</i>	1,570,712	22,068	79	42
<i>Yates</i>	522,344	5,806	61	52
TOTAL	14,440,081	250,739		
AVERAGE	962,672	16,716	65	34

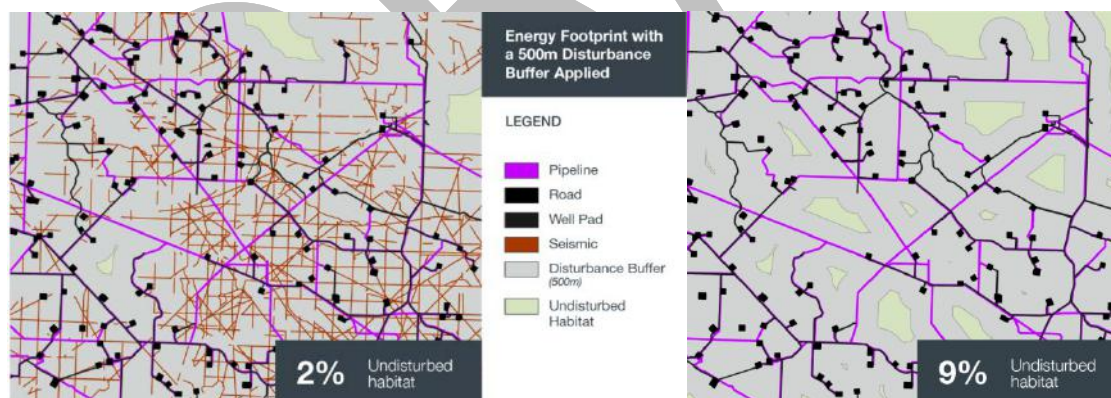


Figure 10 Example of limitations to reducing habitat disturbance through seismic restoration, due to occurrence of other disturbance features

Portions of some northern caribou ranges have areas of permafrost, and all caribou ranges have some areas which are remote or otherwise difficult to access due to the composition of the land (i.e. wetlands, bogs, muskegs, or steep terrain). In some cases, undue environmental damage may



result from attempting to access these lands for restoration. As a result, seismic lines in some difficult to access or sensitive areas will be allowed to naturally regenerate.

Alberta will undertake long-term monitoring projects to assess if legacy seismic lines are regenerating in these areas and determine if intervention is required. These requirements will be updated through range plan review updates provided every five years.

3.2.4 Geophysical Exploration

Improvements in geophysical exploration methods over the past decades have been important for minimizing disturbance. Historical methods of obtaining seismic data included creating lines widths of four metres or greater, vegetation removal, and top soil removal or compaction. Current practices generally employ low impact techniques, with narrower line width and reduced effects on vegetation and top soil.

Under this plan, geophysical exploration will adhere to the lowest footprint possible in order to avoid the need for subsequent restoration activities. Standards include:

- a. Applications for new seismic exploration must demonstrate to the Alberta Energy Regulator that reprocessing existing seismic data cannot be used in place of field operations.
- b. Where existing disturbances occur (i.e. clearings and 4m or less in width cleared lines with vegetation heights less than 1m in height and within 400m of proposed seismic program line), the creation of new lines wider than 2.75m is prohibited, and the existing lines must be reused where applicable.
- c. Lines that have had active restoration treatments must not be used.
- d. Where existing disturbances are not available, new clearings must adhere to the following standards:
 - i. Receiver lines must be meandering, under-canopy hand-cut that may not exceed 0.75m and using tree avoidance techniques (that is, no trees with a diameter at breast height greater than 10 cm to be removed). Receiver lines must not be spaced closer than 200m apart unless the receiver lines have zero new cut (i.e. lines will not require any clearing), in which case no spacing restrictions apply.
 - ii. Source lines must be meandering and may not exceed 2.75m in width and employ tree avoidance techniques to limit line of sight to less than 50m. Source lines must be at least 300m from each other. The source lines have zero new cut (i.e. lines will not require any clearing), in which case no spacing restrictions apply.
 - iii. Doglegs must be employed at all intersections with other linear features to limit line of sight.
- e. Equipment employed in seismic exploration will operate to ensure no rutting or surface duff disturbance.
- f. Shrub and tree regeneration on existing lines must be protected through avoidance techniques.



- g. Helipads must use natural open areas or existing clearings where available. If helipads are prepared, they must not exceed 35m in diameter.
- h. Heli-portable programs must have shot hole drop zones no greater than 4m in diameter.
- i. Initiate activity as early as possible in the winter to limit late winter activities. Seismic programs must be complete by February 15th of each year.

3.2.5 Management of Pipelines

Pipeline infrastructure is a key component of the petroleum industry and often represents a significant portion of the disturbance footprint (Table 4) in any area where petroleum, natural gas, or oil sands resources are being developed.

Table 4 Pipeline disturbance by range

Range	Range Size (ha)	Length of Pipelines (km)	Per cent of Range Disturbed by Pipelines	Per cent of Range Disturbed Only by Isolated Pipeline Segments ⁶
A La Peche	661,500	456	5	2
Bistcho	1,435,810	2,146	11	7
Caribou Mountains	2,065,873	0	0	0
Chinchaga	1,764,364	4,456	20	9
Cold Lake	672,586	2,963	33	14
East Side Athabasca	1,311,902	4,377	25	12
Little Smoky	308,380	1,812	44	16
Narraway	104,066	547	42	11

⁶ Isolated pipeline segments are defined as portions of pipelines that are more than 500m away from other disturbances, so that portion of pipeline is the sole disturbance within an otherwise undisturbed area.

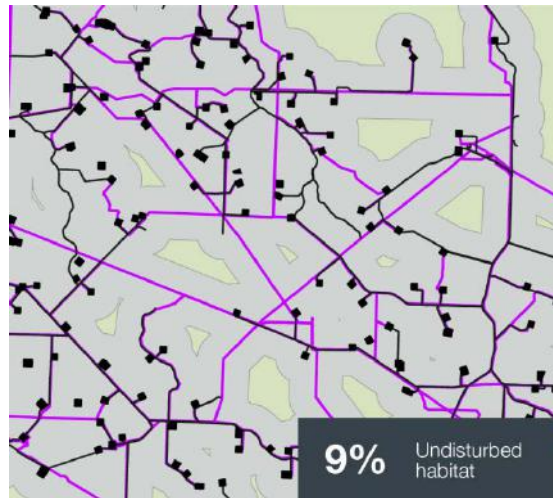


Range	Range Size (ha)	Length of Pipelines (km)	Per cent of Range Disturbed by Pipelines	Per cent of Range Disturbed Only by Isolated Pipeline Segments ⁶
<i>Nipisi</i>	210,436	630	19	9
<i>Red Earth</i>	2,470,203	2,595	8	3
<i>Redrock-Prairie Creek</i>	482,892	809	14	4
<i>Richardson</i>	707,390	38	1	1
<i>Slave Lake</i>	151,623	988	40	9
<i>West Side Athabasca</i>	1,570,712	3,533	18	9
<i>Yates</i>	522,344	39	1	1
TOTAL	14,440,081	25,389		
AVERAGE	962,672	1,693	19	7

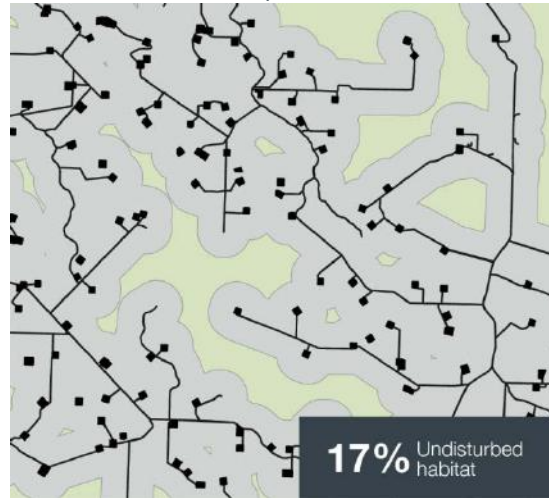
Below ground pipelines could be managed to reduce the ongoing surface footprint and associated impacts on caribou that are typically associated with pipeline infrastructure. By retaining vegetation and revegetating pipeline corridors throughout caribou ranges, pipelines can remain active and economically viable while contributing to undisturbed caribou habitat over time. Re-establishing native vegetation above active pipelines is a change to typical business practices and may present challenges for pipeline operators in some cases. Minimal access routes on pipeline right-of-ways will be required in some cases for maintenance and inspections. Mitigation strategies, such as breaking line of sight or access controls, must be employed to reduce any residual effects. Above ground, pipelines will require management approaches that address potential impacts on caribou.



Seismic Line Restoration



Seismic and Pipeline Restoration



Pipeline
 Road
 Well Pad
 Seismic
 Disturbance Buffer (200m)
 Undisturbed Habitat

Figure 11 Cumulative benefit of habitat restoration of below ground pipelines together with seismic line restoration

Under this plan, pipeline construction and operations will reduce implications for habitat disturbance. Standards include:

1. Pipelines will use existing linear corridors and revegetate on top of active underground pipelines to maintain a minimum level of forest cover that would be acceptable for caribou following construction, ensuring that any residual linear corridor is less than 4m wide.
 - a. If human or predator access is still possible (insufficient vegetation height and density), access must also be effectively managed on the pipeline corridors, using methods such as berms, woody debris, gates, or another suitable strategy as determined by Alberta and the proponent.

3.3 Management of Access

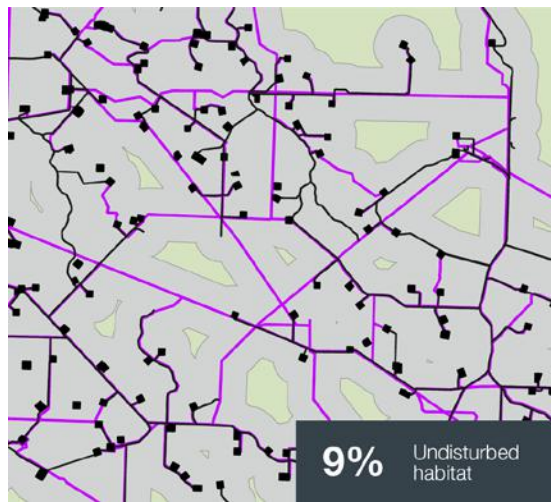
Historically, each industrial interest independently designed and constructed access routes specifically to meet their business needs, often resulting in excessive road networks, and in some cases, redundant roads. In addition to business driven decisions, the regulatory process has historically been focused on this independent planning process - this will require updating to adhere to the Integrated Land Management requirements and contribute to achievement of caribou objectives.



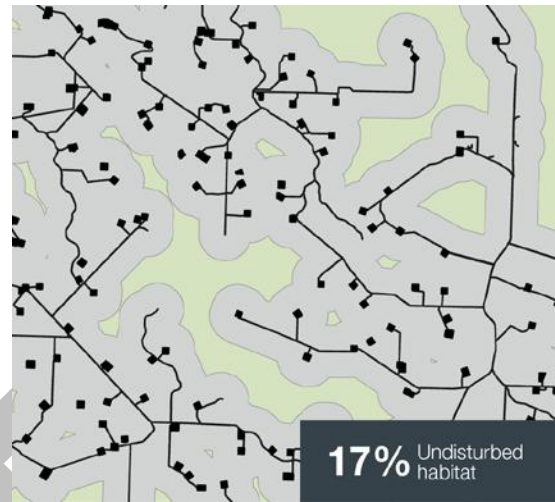
In the context of caribou range planning, access planning will be at a regional scale, encompassing entire caribou ranges where appropriate, and in some cases beyond range boundaries to incorporate other values such as grizzly bears or watersheds.

Removing redundant roads and moving towards optimized road networks, that are intended for multiple users and considerate of caribou objectives, will reduce the overall disturbance levels within a given area. Access management is best employed in combination with additional management approaches (i.e., seismic and pipeline restoration). A single land management tool will not be able to effectively restore heavily disturbed areas. Using a variety of approaches over time can shift a heavily disturbed area towards a landscape that can sustain caribou (Figure 12). Fully achieving benefits from access optimization will require attention to factors including, the amount, location and type of roads that are constructed and maintained.

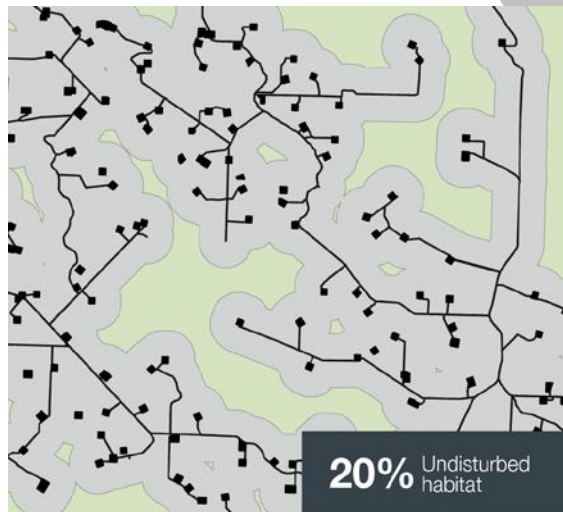




Seismic Line Restoration



Seismic and Pipeline Restoration



Seismic, Pipeline and Redundant Road Restoration



Appended Development



Figure 12 Example of benefits derived from management of access routes, combined with seismic and pipeline restoration



3.3.1 Regional Access Management Plans

The need for coordinated access planning has become evident since the cumulative effects of high levels of access development have resulted in the unintentional consequence of poor landscape outcomes. Individual resource companies can experience advantages through a collaborative approach to access planning and management including:

- reduced construction costs;
- reduced maintenance costs;
- placement of routes in optimal locations;
- greater assurance of access to the resources; and
- expedited approval process when new applications are compliant with the plan.

Regional access management plans (RAMP) are not static plans that are developed and used only for periodic guidance when required. A plan can quickly become out-of-date, and needs to be updated continually to achieve the desired outcomes. To be the most effective, access management plans must be reviewed and adapted as variances occur during the implementation of the plans. Any variances must demonstrate that there is no increase in road required to access the same amount of resource.

Following the release of Alberta's Provincial Woodland Caribou Range Plan, the energy and forest industries, with guidance from Government of Alberta, will prepare Regional Access Management Plans, which are range-specific and considerate of the need to achieve caribou objectives. Plan development would consider and review all access features required for development of the resources within the range. Access plans will be received, reviewed and approved by AEP (Operations and Planning). Indigenous peoples, local municipalities, other land users, industrial operators, and municipalities will cooperate to create shared road systems to the greatest extent possible. Individual sector road applications will not be approved without strong rationale. Temporary roads that are used for less than two years are preferred for all operations, but strong rationale will be required for approval of single sector roads that are not temporary. The objective will be to work towards the management of industrial footprint, while maintaining access for local communities and mitigating the impact on other resource values. Alberta will approve the Regional Access Management Plan access corridors, which may also contain supplementary infrastructure (i.e. pipelines and power lines) through an ILM-based approach. Pipelines and power lines that do not share common corridors with approved access within the regional access plan will be required to restore surface footprint to be on a trajectory to caribou habitat.

Long-term road access in the caribou range will be the lowest area of footprint possible, in consideration of access needed for energy and forestry resource development, as well as public or municipal access needs (where applicable).



3.3.2 Regional Access Management Plan Pilot Project

In April 2017, a Regional Access Management Plan pilot was initiated in the Little Smoky and A La Peche caribou ranges. The pilot project is a joint government and industry initiative through the Foothills Landscape Management Forum. The intent of the RAMP is to develop a transparent, repeatable, data-driven approach to reduce the overall impact on caribou from industrial access. A phased approach has been developed for this project, beginning with a proof-of-concept analysis of four townships in proximity to the Little Smoky/A La Peche caribou range selected by government and industry representatives.

Recent technological advances in petroleum and natural gas extraction provide new opportunities to reduce the number of roads required to access oil and gas resources. By expanding on the findings of the pilot project, and applying these new capabilities to future access planning, we may be able to achieve significantly lower access footprint while minimizing constraints on resource extraction opportunities (Figure 13).



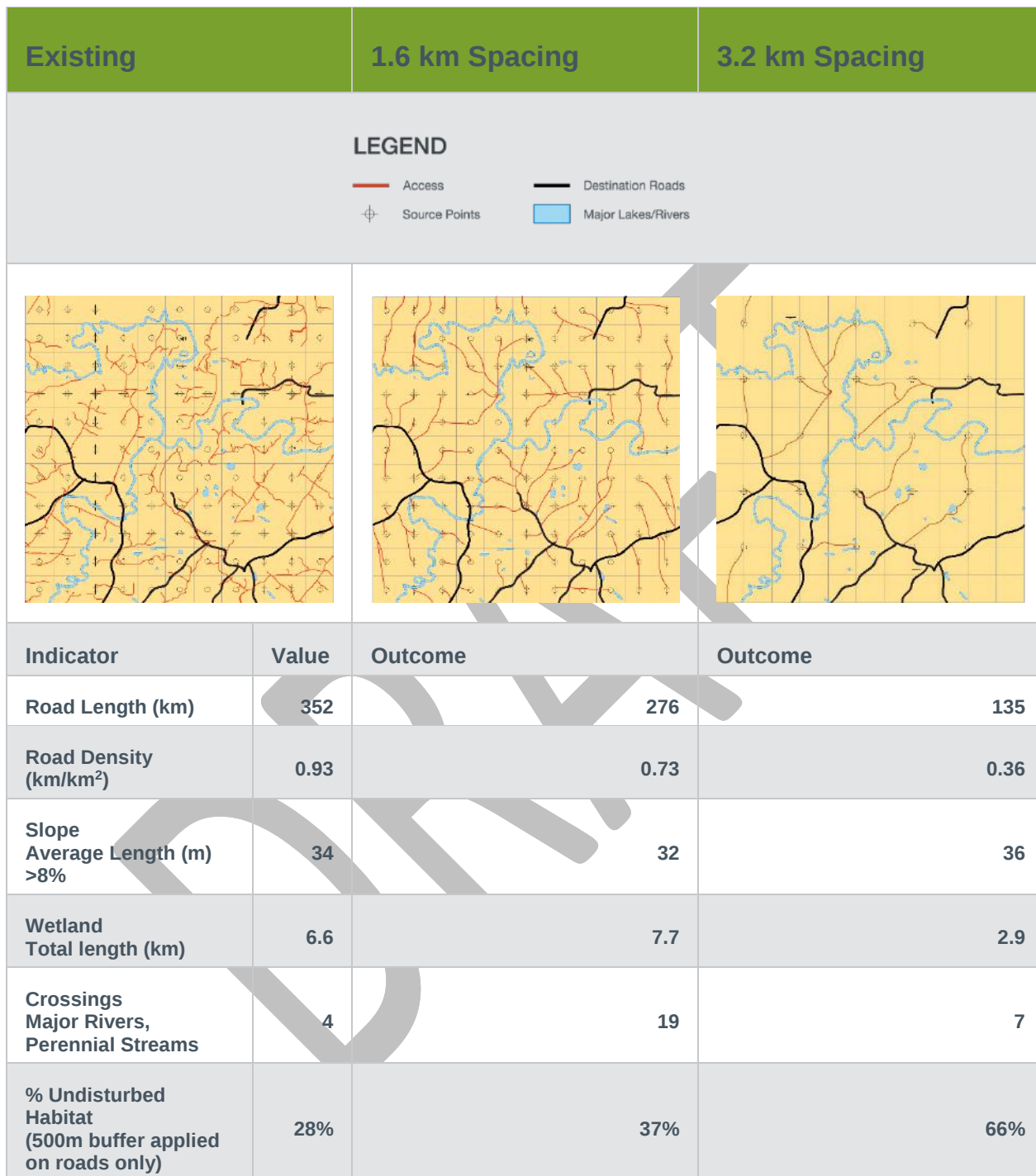


Figure 13 Example of footprint reduction options through the use of a regional access management plan



Technology advances in energy extraction, including improvements to directional drilling and multi-well pads, have created increased opportunities for regional access planning to reduce or mitigate negative impacts on caribou. Incorporating drill distances into road evaluations allows for further refinement and optimization.

3.3.3 Appended Development

Appended development (e.g. placing oil and gas production features in close proximity to optimized road networks) is a key element required to realize the full benefit of regional access management planning. A regional access management plan is designed to access resources based on the identified road network, along with temporary roads that are in place less than two years and restored immediately after. The majority of all development can be completed within 200m of an optimized road network based on current technology (Figure 14). Deviating from appended development requirements will greatly increase disturbance levels (Figure 15).

Development within regional access planning areas will be required to move towards an optimized network over time. Existing infrastructure will be incorporated into the optimized access plan where appropriate and new builds will not be permitted along existing infrastructure that does not form part of the optimized long-term access plan.



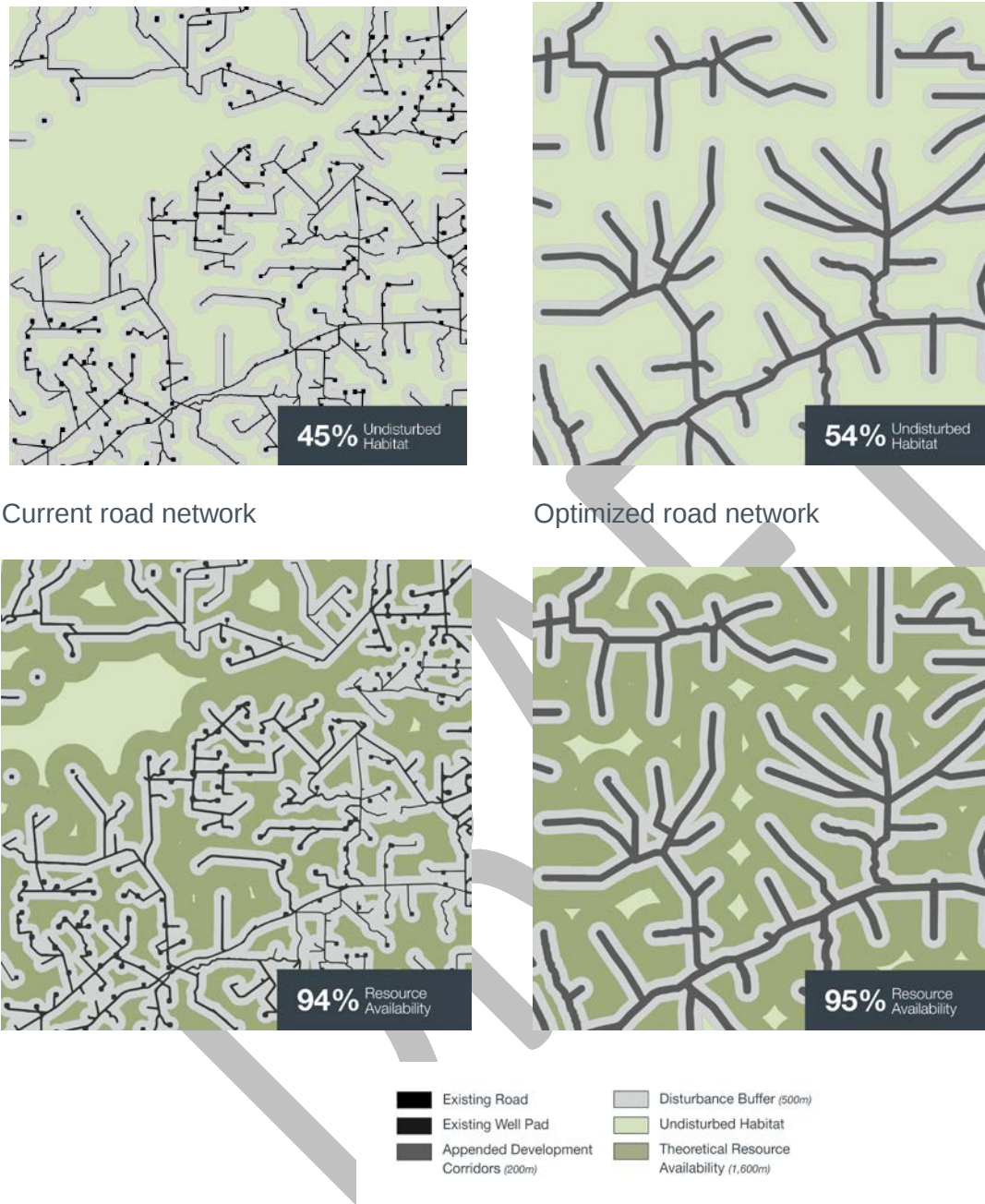


Figure 14 Comparison of current and optimized road networks within a sample area in the Little Smoky caribou range. The optimized road network increased undisturbed habitat while maintaining oil and gas resource availability.



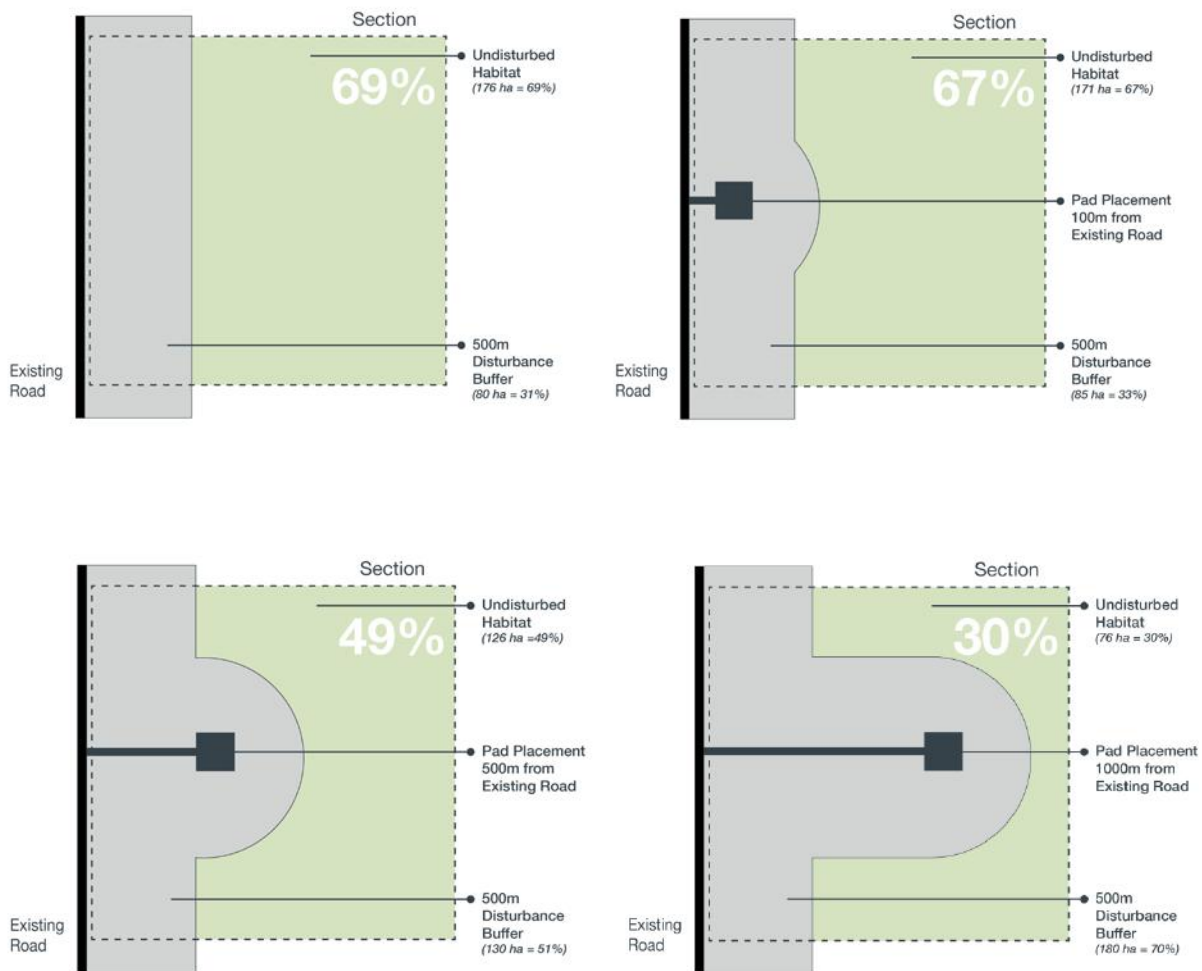


Figure 15 Implications of appending oil and gas development features alternative distances from optimized access routes. Longer feeder roads result in significant increases to disturbance levels. A change in length from 100m to 1000m can more than double the disturbance levels in a section of land.

3.3.4 Access Management Requirements

- 1) Long-term road access in the caribou range will be the lowest area of footprint possible, in consideration of access needed for energy and forestry resource development, as well as public or municipal access needed (where applicable). Industrial roads will be shared.
 - a) Forest and energy industry will develop long-term road access plans for each caribou range, or portion thereof, and submit to AEP for approval. As needed, AEP or a third party will facilitate development of the plan.



- b) All road approvals by regulators (Alberta Energy Regulator, Forestry Division of Agriculture and Forestry, and AEP Operations) will be consistent with the approved long-term road access plan for the caribou range.
 - c) The long-term road access plan will be updated as necessary, but at a minimum every five years, and confirmed with a renewed AEP approval. Amendments to the long-term road access plan will be considered when operational constraints are identified during more detailed road planning. All amendments must demonstrate that the changes will not negatively impact other identified access that is part of the plan, and consistent with caribou-related considerations.
- 2) The disposition holder shall develop access using Class V routes. Exceptions are as listed below:
- a) Alternative access standards are specified in an approved higher-level access plan.
- 3) Where specified, a Public Land Use Zone may be established in order to enforce access restrictions in caribou ranges. This will support restoration efforts for legacy disturbance features.
- 4) Industrial developments will be progressively reclaimed and restored as soon as possible in accordance with forested land reclamation standards for public land and related provisions of the caribou range plan.
- 5) Legacy linear footprint will be restored in accordance with government direction.
- a) A Caribou Habitat Restoration Committee (and regional sub-committees) will be established and determine priority areas to restore in consideration of continued access needed for Indigenous peoples, trapping, industrial and public use.
- 6) Multi-use corridors will be used for major infrastructure. Multi-use corridors combine utility and transportation infrastructure to reduce environmental impacts and costs. They can include pipelines, access roads, highways, rails, electrical transmission lines, utilities and fibre optics, which are co-located in a common corridor.
- 7) Pipelines and power lines that do not follow corridors or roads approved within an access management plan are required to restore the surface footprint back to the natural state, including representative tree cover and density.
- 8) All new oil and gas activity in caribou ranges will be appended to the long-term road access network.
- a) Development activity will occur within 200 metres of roads identified in the approved long-term access plan. A well pad may extend beyond 200 metres; however, the access point into the pad/site must be within 200 metres.
 - b) Access plan amendments will be considered when new access is proposed that does not completely align with the approved access management plan. When seeking amendments, companies must demonstrate consideration of how the changes will impact the overall regional access management plan. The proposed changes must demonstrate that resources will not be stranded, disturbance levels are not increased, and implications for caribou are mitigated. All desired infrastructure, including but not limited to existing roads, pipelines, facilities, and well pads, needs to be considered in the application. Assessments of human safety and overall environmental outcomes will be included in applications. Resulting



amendments to the access management plan will require approval by AEP.

3.4 Management of Energy Activity

The energy extraction industry continues to evolve over recent decades resulting in more efficient access to below ground resources per hectare of surface disturbance. Drilling technology has also advanced, and allows for up to 16 horizontal wells to be drilled from a single well pad versus the historical one vertical well per well pad, resulting in less overall disturbance per well. These achievements help in achieving caribou recovery objectives.

Alberta's approach to energy and mineral development in caribou ranges will target both the mineral rights acquisition process, and development, as described in sections 3.4.1 and 3.4.2. This will include alignment of surface disturbance objectives and sub-surface developments.

3.4.1 Sales of New Energy Leases

Currently, leasing of new tenure has been restricted since 2015 within caribou ranges and the inventory continues to grow. Many ranges have limited energy resource interests and are not currently leased for energy development. To support the management of future disturbance, the existing new tenure restriction will remain in place until an analysis of each range-specific plan will provide more details on potential paths to the resumption of sales. Evaluation of the following criteria will be important considerations in government's determination of the appropriateness of land sales on a range-specific basis:

- Current level of disturbance;
- Expected lifespan of existing disturbances;
- Expected lifespan of proposed disturbances;
- The projected level and type of disturbances to develop resources; and
- Caribou habitat and population health information.

It is anticipated that range plans will identify staged development zones, and associated range-specific rulesets for the development of mineral rights. Land sales will occur in accordance with the normal land sales process.

3.4.2 Energy Development Requirements

Energy development applications in caribou ranges are administered by the Alberta Energy Regulator in accordance with provincial policy, including the following:

- a. Oil and gas development will minimize landscape fragmentation within caribou ranges over space and time in alignment with range-specific rulesets.
- b. Companies with multiple lease holdings inside caribou ranges will be required to prioritize development where multi-sector development is planned (described below). Once developed and active operations cease, reclamation activities must be initiated prior to development of remaining leases.



- c. Operators will utilize multi-well pads and directional drilling within caribou ranges. Where this is not feasible, applications will be required to show rationale. The total pad size must be identified up front within the application process.
- d. Where feasible and applicable, oil and gas wells should be remotely operated and well sites should have sufficient resources (e.g. methanol, tanks) on site to minimize the number of site visits
- e. Applications from operators with limited opportunity to develop in areas where development is planned will be considered on a case-by-case basis
- f. Once operational, the disturbed area will be restored to the minimum size required for safe operations and servicing.

The ministries of Energy, and Agriculture and Forestry support a zone approach to harmonize multi-sector development. While still in a conceptual phase, the following attempts to achieve a staged approach to development within caribou ranges in support of caribou habitat restoration:

1. Zones would be established based on Alberta Environment and Parks' identification of core critical habitat priority zones and would be referenced in the Geographic Land Information Management and Planning System.
2. Alberta Energy mirrors notation in the Alberta Mineral Information system to ensure sub-surface and surface requirements are aligned, and that the Alberta Energy Regulator has access to the most current information to make regulatory decisions.
3. Land use provisions under the Public Lands Administration Regulation in the Little Smoky and A La Peche ranges (considering alignment with harvesting sequence areas) would be anticipated to support zone-locked operators.
 - a. Operators holding zone-locked primary term Crown mineral agreements could have their agreements extended through application under Section 8(1)(h) of the *Mines and Minerals Act*.

3.5 Management of Forestry Activity

Forest management activities in caribou ranges have evolved over many decades with an array of strategies, from multiple pass harvesting systems (to minimize opening size and spread disturbance across the landscape over many decades) to current practices that emphasize the use of natural disturbance patterns.

Increasingly, there is consideration of when, where and how much harvesting can occur over time. Current forest management practices take into account non-timber values, such as wildlife habitat, watershed integrity, soil productivity, and incorporate the understanding that the natural ecosystem is disturbance driven and requires periodic disturbance to maintain ecosystem health. The successful suppression of wildfire has resulted in older forested ecosystems through the elimination of low intensity fires. To maintain or improve ecosystem health, disturbance needs to occur through reduced wildfire suppression efforts, prescribed burning, or forest harvesting. Forest harvesting, while not the same physical process as burning, does enable the critical reset of forest age. The resulting harvest patterns however, do not necessarily adequately address undisturbed and biophysical habitat for caribou.



Forest harvesting strategies within caribou ranges will be adjusted to put greater focus on caribou habitat management and restoration. Future forest harvesting will focus on localizing forestry activities to minimize the overall extent of forestry-related disturbance, and help to create larger patches of intact habitat as the forest regrows. This pattern of aggregated harvesting (Figure 16) strives to emulate natural disturbances. Aggregating harvest areas further reduces the amount of access required during any given timeframe and therefore reduces increases in disturbed habitat – with potential benefits of reducing construction and maintenance costs. The grouping of harvest activities will also enable regrowth of contiguous forest patches in areas that are currently fragmented by legacy seismic lines.

Forest activities within caribou ranges can further support removal of a fragmented landscape through the reforestation of legacy linear footprint within new harvest blocks and within 500 metres adjacent to harvest blocks. Reforestation within the disturbance buffers (Figure 16) will result in larger, undisturbed areas through forest regrowth as the buffers will become undisturbed habitat at the same time as the harvest blocks. Reforestation planning will be advanced through the forest management planning process.

The location, extent, timing and rate of forest harvesting are always key components of forest management planning. Identifying the appropriate extent, timing and rate of forest harvesting will be necessary for maintaining and managing adequate undisturbed habitat and biophysical habitat over time in each range, in a manner that provides required benefits for caribou. In addition, harvest location is a key consideration in relation to both patterns of caribou population occupancy and available biophysical habitat within a caribou range during a given period. In general, it will be important to provide caribou habitat in spatial patterns and at landscape-level scales that are effective for caribou. Specific harvest approaches will vary between ranges, but in all cases harvesting location, extent, timing and rate will support achievement of caribou habitat goals and objectives over time.

On a local level, strategies could be trialed to potentially reduce the time required for a harvested area to become valuable to caribou. Trials could include activities such as terrestrial lichen seeding or transplants, and partial cutting of overstory trees to maintain a minimum level of Crown closure. Monitoring of trials would be required to understand potential benefits from these activities.



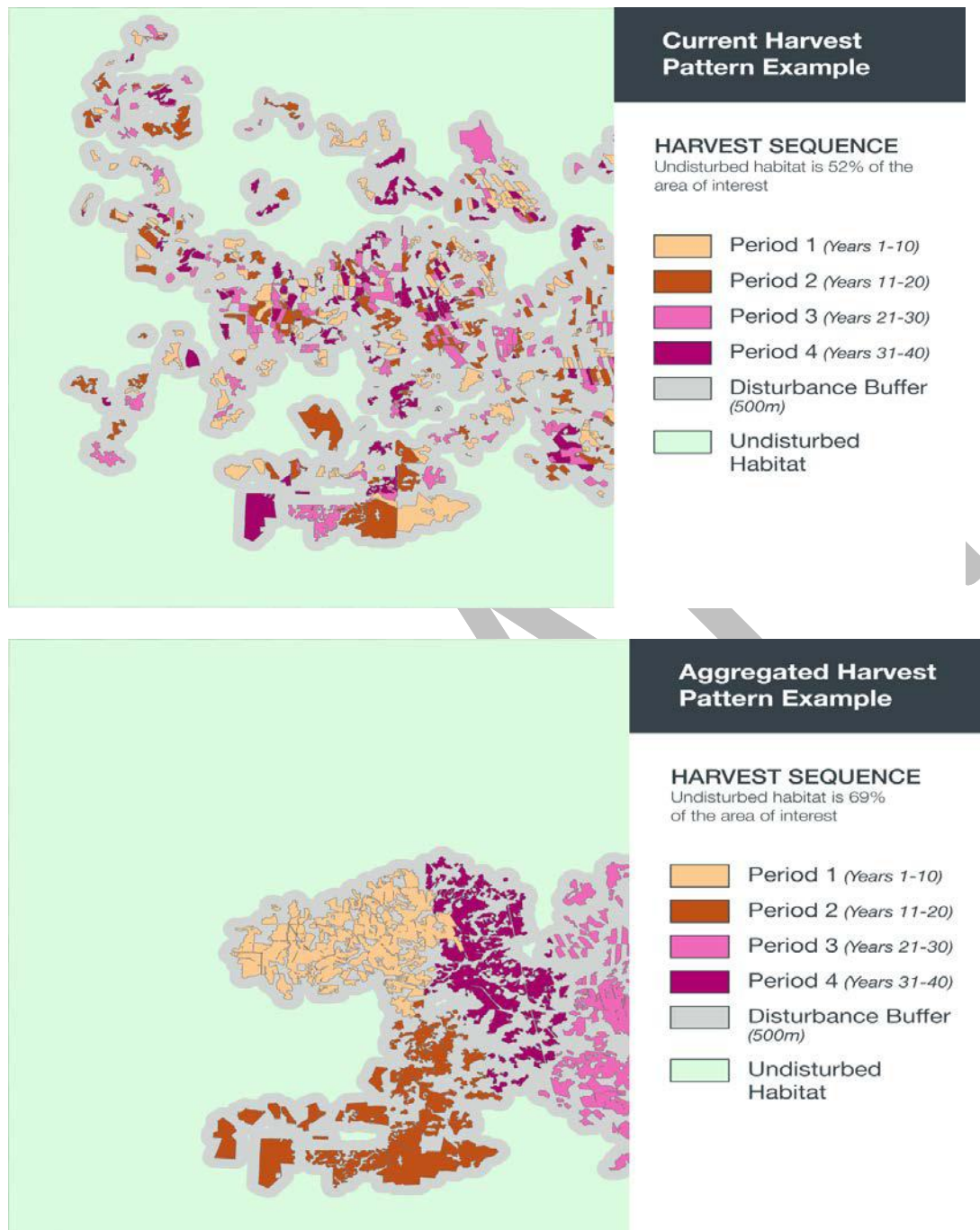


Figure 16 Comparison of current and aggregated forest harvest patterns after 40 years of harvesting



3.5.1 Forestry Requirements

1. Spatial harvest sequences in Forest Management Plans must specify the location, extent, period of entry, and rate of harvesting within caribou ranges in a manner (including spatial patterns and landscape scales) that is considerate of caribou goals and objectives. Also, the spatial harvest sequence will be aligned with the sequence of undisturbed caribou habitat development found in the Range Plan with range-specific details.
 - a. Harvest location will avoid areas of high caribou occupancy during the first 10-year period.
 - b. The extent and rate of harvesting over time will be assessed to ensure there are no significant negative implications for caribou biophysical habitat.
 - c. Existing Forest Management Plans will be updated to align with the required sequence of undisturbed habitat development.
 - d. The areas available for harvesting will be limited to predetermined harvest areas for any given decade. If an area is not harvested within the decade identified it will continue to be available the following decade, and the following will apply:
 - i. Harvesting within a predetermined harvest area must be completed prior to initiating harvest in the next available area.
 - e. Once harvesting has been initiated in the next available area, there will be no further harvesting in the preceding area until the following rotation.
 - f. Alberta Agriculture and Forestry will review application of the Pine Strategy in each caribou range and provide relevant guidance to the Forest Management Plan amendment process as outlined in this range plan.
2. Forest Harvest Plans and Annual Operating Plans will incorporate additional requirements as deemed necessary by Forest Management Branch.

3.6 Management of Coal, Metallic and Industrial Minerals Activity

Coal, metallic and industrial minerals agreements are present in portions of some caribou ranges. Existing coal, metallic and industrial minerals agreements will be honoured and adhere to approval processes and requirements in place at the time of surface approvals. Future coal and metallic and industrial minerals agreements within a caribou range will be sold with a no surface access restriction, unless appended to existing surface developments or the optimized road network for that range.

1. Existing coal, metallic and industrial minerals tenure must limit surface extraction activities beyond 200 metres from existing surface developments or an optimized approved road network, as determined by the Long-term Road Access Plan, unless following this condition will result in a proven inability to access the resource within the boundaries of a pre-existing tenure.
2. New coal, metallic and industrial minerals tenure will have a no surface access restriction beyond 200 metres of an optimized approved road network, as determined by the Long-term Road Access Plan.
3. Applications for coal, metallic and industrial mineral activities will be considered on a case by case basis in relation to impact on caribou habitat intactness (65% undisturbed) and biophysical habitat.



3.7 Management of Sand and Gravel Activity

Exclusive of the roads they require, sand and gravel operations have a relatively small disturbance footprint compared to other industrial users and are generally located in association with the industrial developments they service. Future sand and gravel development will be required to aggregate disturbance, so that the development is consistent with the ILM planning process. Future development within caribou ranges will focus on extraction for within-range use only. Existing sand and gravel agreements will be honoured, and sand and gravel extraction will follow approval processes and requirements in place at the time of surface approvals.

1. New sand and gravel dispositions will have a no surface access restriction beyond 500 metres of an optimized approved road network, as determined by the Long-term Road Access Plan.
2. Sand and gravel extracted from within a caribou range (developed since the caribou range plan release) cannot be used for purposes outside of the caribou range.
3. Authorizations will be issued for a specific, limited period of time, for each surface material lease. The length of time will be determined by the size of the surface material lease, but will range from four to six years.
 - a. Each extraction phase will be completed within the given time frame set out in the development agreement, and will have a development and reclamation sequence consisting of the following events:
 - i. Progressive extraction of each phase.
 - ii. Progressive reclamation of each phase as the successive phase is being mined; and
 - iii. Final reclamation consisting of 100% of the entire phase being reclaimed, with vegetation equal to what would have been on the site naturally before disturbance.

3.8 Management of Peat Activity

Alberta has completed a directive entitled the Allocation and Sustainable Management of Peat Resources on Public Land. This directive identifies no further allocation of peat resources within caribou ranges. Existing peat Surface Material Lease (SML) agreements will be honoured, and peat extraction will follow the approval conditions in place at the time of SML approvals.

1. The Government of Alberta will reserve from disposition all future peat areas within caribou ranges.

3.9 Management of Transmission Lines

In a similar approach taken with below ground pipelines, management actions taken on electrical transmission lines have the potential to minimize surface footprint and associated impacts on caribou. By retaining vegetation and revegetating underneath transmission lines, transmission lines can remain active and economically viable while reducing implications for caribou.

Retaining vegetation underneath transmission lines during construction would be the most preferred approach, however vegetation that is removed can also be re-established. Re-establishing native vegetation below transmission lines is a change to typical business practices and may present



unique challenges for transmission line operators. Vegetation heights will have to be monitored and controlled if necessary in order to prevent arc flash, leading to potential wildfires.

Minimal access routes through the transmission line right-of-ways will be required in some cases to conduct maintenance and inspections. Mitigation strategies, such as breaking line of sight or access controls, must be employed throughout these access corridors in order to reduce any residual effects from predation and access.

1. Transmission lines will minimize the amount of linear disturbance required, and vegetation retention or re-establishment will occur following construction, in the areas between towers with tree species that can reach and maintain a minimum height of 2 metres.
 - a. Retained vegetation must not exceed the height necessary to ensure adequate distance is available between the vegetation and the conductor, as required to prevent arc flash.
 - b. If human or predator access is still possible through the vegetation, access must also be effectively managed on the pipeline corridors, using methods such as berms, woody debris, gates, or another suitable strategy as determined by Alberta and the proponent.

3.10 Management of Natural Disturbance

Mountain Pine Beetle

Pine stands in certain caribou ranges have been assessed as being from low to high susceptibility to damage from mountain pine beetle; the risk of pine mortality can be significant. Mountain pine beetle infestations, and resulting impacts to pine forests, damage hydrological function, ecosystem function, sensitive sites and wildlife habitat as well as sustainable forest harvest levels. Alberta will prioritize use of Level 1 (single-tree removal of high risk mountain pine beetle sites) control treatments in caribou ranges, approving Level 2 (block or patch harvesting of infestations) treatments as necessary.

Wildfire

Wildfire plays a crucial role in wildfire-dependant ecosystems such as boreal forest. Wildfire is the most dominant natural disturbance mechanism in most caribou ranges and will continue to disturb range habitat into the future. While wildfire does renew boreal forests, it also has negative implications for caribou populations through removal of biophysical habitat attributes. These habitat attributes take decades to recover following a wildfire. Although the location of wildfires is not entirely predictable, incorporating caribou range values and outcomes into the wildfire risk planning process will aid wildfire managers in their ability to better protect caribou habitat values and support caribou range outcomes.

The ability for Alberta wildfire management to effectively support caribou range planning is dependent on initiating long-term integrated disturbance planning, which is informed by risk management. This will allow wildfire managers to make informed decisions when implementing risk reduction strategies and managing emergency wildfires. Critical values should be prioritized within



ranges, and provincially, as an input into wildfire management planning. Disturbance on the passive land base is mainly from natural influences, therefore planning for managed disturbances must be included in long-term range planning to ensure that caribou ranges have increased resiliency to unplanned wildfire disturbances. Regional indicators such as the catastrophic wildfire indicator will also help inform risk management strategies.

As per the guidance outlined in the Federal Boreal Woodland Caribou Recovery Strategy, should a wildfire event occur causing a disturbance of 5% or more of any caribou range, the most recent range-specific range plan for the affected caribou population would be re-evaluated to adjust other contributions to habitat disturbance.

1. Alberta will focus its efforts in the caribou ranges to reduce the risk of habitat loss to natural disturbances.
2. Alberta will continue with its high state of readiness for wildfire response and suppression for all caribou ranges.
3. Range values and priorities such as any rearing facility locations and critical habitat will be identified and shared with wildfire managers to inform landscape wildfire risk management.
4. Long-term landscape disturbance planning shall include natural disturbance and other strategies aimed at reducing wildfire risk to caribou landscape and population objectives.

3.11 Caribou Conservation Areas

Conservation areas are defined geographical spaces dedicated and managed to achieve the long-term conservation of biological diversity and ecosystem processes. When used strategically, and with the ability to employ effective land and wildlife management actions, conservation areas can help to maintain or enhance wildlife populations. Examples of designations that are used for conservation areas include Wilderness Areas, Ecological Reserves, Wildland Provincial Parks, Natural Areas, Heritage Rangelands, and Public Land Use Zones. Each of these land use designations have different management intents and different uses and restrictions associated with them. These management intents guide the rules on permissions and prohibitions on activities, including recreation, development and industry.

There are currently a number of conservation areas in place within caribou ranges that were established prior to range planning activities (Table 5).



Table 5 List of Existing Conservation Areas within Woodland Caribou Ranges

Caribou Range	Conservation Areas	Hectares Protected	Per cent of Range Protected
A La Pêche	Big Berland Provincial Recreation Area Jasper National Park Pierre Grey's Lakes Provincial Park Willmore Wilderness Park	495,831	75%
Bistcho	n/a	-	-
Caribou Mountains	Caribou Mountains Provincial Park Wood Buffalo National Park	1,186,502	57%
Chinchaga	Chinchaga Wildland Provincial Park Running Lake Provincial Recreation Area Sulphur Lake Provincial Recreation Area	80,564	5%
Cold Lake	n/a	-	-
East Side Athabasca	Crow Lake Ecological Reserve Crow Lake Provincial Park Gregoire Lake Provincial Park La Biche River Wildland Provincial Park Grand Rapids Wildland Provincial Park Gipsy Lake Wildland Provincial Park Stony Mountain Wildland Provincial Park	22,461	2%
Little Smoky	n/a	-	-
Narraway	Shutter Flats Provincial Recreation Area	15	0%
Nipisi	n/a	-	-
Red Earth	Birch Mountains Wildland Provincial Park Harper Creek Natural Area Wood Buffalo National Park	337,446	14%
Redrock-Prairie Creek	Kakwa Wildland Provincial Park Two Lakes Provincial Park Willmore Wilderness Park	168,787	35%
Richardson	Athabasca Dunes Ecological Reserve; Marguerite River Wildland Provincial Park Maybelle River Wildland Provincial Park Richardson River Dunes Wildland Provincial Park	98,756	14%



Caribou Range	Conservation Areas	Hectares Protected	Per cent of Range Protected
Slave Lake	Fawcett Lake Provincial Recreation Area Hondo Natural Area Hubert Lake Wildland Provincial Park Lesser Slave Lake Provincial Park Otauwau Natural Area Saulteaux Natural Area	793	1%
West Side Athabasca	Grand Rapids Wildland Provincial Park	363	0%
Yates	Wood Buffalo National Park	73,438	14%

3.11.1 Management Intent and Land Uses in Caribou Conservation Areas

Conservation areas used in support of caribou range planning will be managed to minimize or prevent new land disturbance. This means the land disturbance associated with oil and gas, mining, and forestry operations are not considered compatible with the management intent of conservation areas.

Existing petroleum and natural gas tenure will be honoured, consistent with current policy and approval processes and requirements in place at the time of surface approvals. Specifically, existing subsurface agreements will be honoured and surface access permitted in accordance with Information Letter 2003-25, Honouring Existing Mineral Commitments in Legislated Protected Areas. The Government of Alberta will work cooperatively with companies that have existing commitments to ensure surface access impacts are avoided or minimized while still honouring commitments. Minimizing surface impacts involves utilizing integrated land management practices, employing winter access to reduce impacts on caribou, minimizing soil disturbance and enabling timely reclamation and restoration of areas no longer required for development activity.

Motorized recreation will be managed to designated off-highway vehicle trails and areas. Off-highway vehicle use is permitted only on existing off-highway vehicle trails and areas where a management plan, trails plan, regulation, sign, notice, or trail marker designates such use. No new trails, routes or access may be developed without an access plan, trail plan or regulation.

3.11.2 International and National Biodiversity Targets

In 2010, the Convention on Biological Diversity (CBD) adopted the Strategic Plan for Biodiversity, including the Aichi Targets. Aichi Target 11 states that by 2020, 17% of terrestrial areas and 10% of marine areas, especially those of importance for biodiversity and ecosystem services, will be conserved. This plan and its targets was adopted by Canada and in response, developed the 2020 Biodiversity Goals and Targets for Canada. Within the goals and targets for Canada, is Canada Target 1, which mirrors the Aichi Target 1 and states: "By 2020, at least 17% of terrestrial areas and



inland waters, and 10% of coastal and marine areas, are to be conserved through networks of protected areas and other effective area based conservation measures.”

Alberta Environment and Parks has committed to making progress on achieving all aspects of Canada Target 1 and Aichi Target 11. Conservation areas designated as part of range planning or other regional planning initiatives, may also contribute to this progress.

3.11.3 Areas Under Consideration for Conservation Area Designation in Support of Caribou Range Planning

Conservation areas under consideration (Figure 17) have been identified primarily through three processes (Table 6):

1. The Lower Athabasca Regional Plan (LARP) includes the identification of conservation areas for that region.
2. Candidate conservation areas were also identified through Setting Alberta on the Path to Caribou Recovery (the Mediator’s Report).
3. Additional candidate conservation areas have been identified through the caribou range planning process.

Independent work completed by other organizations has been used to provide some additional insight when looking at potential conservation areas. The Canadian Parks and Wilderness Society (CPAWS) of Northern Alberta modelled and analyzed areas for priority for caribou protection.



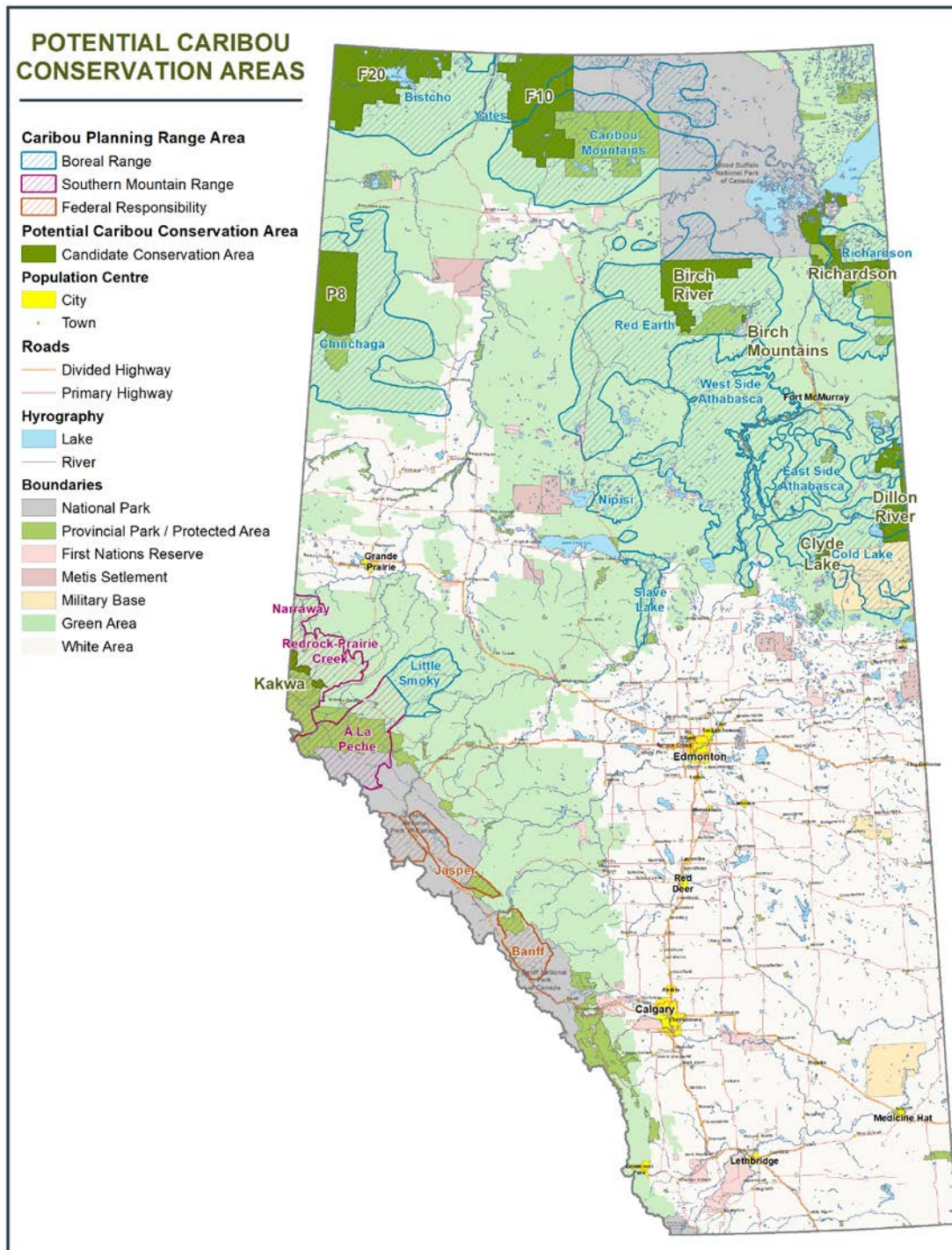


Figure 17 Conservation or protected areas under consideration within the caribou range planning process



Table 6 Areas under consideration for Conservation Area Designation in support of caribou range planning

	Area under consideration	Caribou range overlap	Total area (ha)	Per cent of Province
LARP conservation areas	Richardson Wildland Provincial Park	Richardson	265,825	0.40%
	Birch Mountain Wildland Provincial Park expansion	Red Earth	2,704	0.004%
	Dillon River Wildland Provincial Park	Cold Lake East Side Athabasca	191,545	0.29%
	Birch River Conservation Area	Red Earth	331,832	0.50%
	Clyde Lake Area	Cold Lake	11,665	0.02%
Candidate Conservation areas	Kakwa Wildland Provincial Park expansion	Redrock-Prairie Creek	31,676	0.05%
	FMU F10	Yates Caribou Mountains	661,395	1.00%
	Portion of FMU F20	Bistcho	646,053	0.98%
	FMU P8	Chinchaga	347,617	0.52%
TOTAL			2,490,312	3.8%



Lower Athabasca Regional Planning

Through the LARP process, some potential locations for conservation areas were identified in the adjacent Lower Peace Region. This included approximately 67% of Forest Management Unit (FMU) F20 and 100% of FMU F10 as potential locations for conservation areas. Where appropriate and available, candidate conservation areas for caribou will also look to contribute to other area conservation goals and recommendations, as independently identified either by external planning groups or through the province's regional planning processes. LARP includes the establishment of six new conservation areas in the region. Key criteria for designating conservation areas under LARP included:

- Areas with little to no industrial activity;
- Areas that support Indigenous peoples' traditional use;
- Areas that are representative of the biological diversity of the area; and
- Areas of sufficient size (i.e. roughly 4000-5000 square kilometres).

These values are compatible with caribou range planning objectives, therefore, Richardson Wildland Provincial Park, Dillon River Wildland Provincial Park, Birch River Conservation Area and the Birch Mountain Wildland Provincial Park expansion (Table 6 and Figure 17) will also contribute to caribou habitat management.

A change in the designation of Clyde Lake Provincial Recreation Area to a conservation area is being considered to be more consistent with the desired management intent for that area.

Candidate Conservation Areas

Additional opportunities for conservation were identified during range planning activities. Alberta discussed the potential designation of conservation areas within F10, F20, P8, and a Kakwa Wildland Provincial Park expansion with stakeholders, industry, municipalities and Indigenous peoples. During this process, the area identified in the Mediator's Report in FMU F20 was revised to reflect and incorporate additional social and economic values. Boundaries associated with FMUs F10 and P8 potential conservation areas are currently unchanged; however, conversations on boundaries and management intent will continue with stakeholders, industry, municipalities and Indigenous peoples as part of public engagement on the draft Range Plan.

4 LEGISLATIVE HABITAT PROTECTION

Implementation of the Range Plan will be supported by the *Alberta Land Stewardship Act* and specific regional plan regulations. The Land-use Framework (LUF), introduced in 2008, sets out an approach to managing the province's land and natural resources to achieve Alberta's long-term economic, environmental and social goals through regional land-use plans. A caribou range plan is a form of land-use plan covering 23 per cent of the province, and incorporates social and economic considerations. Thus, it will be a sub-regional plan under regional plans. The *Alberta Land Stewardship Act* is also intended to provide for the coordination of decisions by government decision-makers. Regional plans are legislative instruments and, for the purposes of any other



enactment, are considered to be regulations. Approved regional plans have a binding effect: regional plans bind the Crown, local government bodies, decision-makers, and land users.

The Lower Athabasca Regional Plan includes a commitment to a landscape management plan for public lands. As the caribou range plan covers a significant portion of the landscape management planning area and focuses on land disturbance and habitat needs, this planning is being aligned such that the caribou range plan will form the main component of the LARP landscape management plan. This alignment will also apply in other regions with caribou ranges.

To provide the necessary policy and legislative authority, the Range Plan, when completed, will be approved by Alberta as a sub-regional plan under the *Alberta Land Stewardship Act* and connections will be made with regional plans to support their implementation, and to provide authority. In the Lower Athabasca Region, amendments will be made to the existing regional plan to incorporate elements of the caribou Range Plan to ensure authority for the Range Plan. In other regions where a regional plan has not yet been developed, interim regional planning documents will be developed to incorporate the Range Plan while also meeting basic requirements for a regional plan under the *Alberta Land Stewardship Act*. Key provisions will include: direction to implement the management options as described in Section 3 and specified further for each caribou range; and supporting regulatory details for caribou conservation areas as specified for each caribou range. Other provincial legislation, including for example the *Responsible Energy Development Act*, the *Public Lands Act* and the *Forests Act*, will also be used to further ensure an integrated approach across government planning and decision-making. These connections and guidance will be specified in the amended Lower Athabasca Regional Plan and the interim regional planning documents (to be released with range specific details in the spring of 2018). Specific components in the caribou range plan that will be regulated, ensuring caribou habitat protection, are described in Section 3 and in further detail below.

4.1 Caribou Conservation Areas

As noted in Section 3, conservation areas can be used as a tool to enhance and maintain wildlife populations when strategically used. Conservation areas are clearly defined geographical spaces dedicated and managed to achieve the long-term conservation of biological diversity and ecosystem processes. Conservation areas to support management of caribou habitat that are identified through the range planning process will be established in the existing regional plan and interim regional planning documents. Regulatory details will support the implementation of the specific rules and permitted uses for the conservation areas. Provisions in legislation will be used to designate the conservation areas when the appropriate designation has been determined. For example, under the Lower Athabasca Regional Plan the Richardson and Dillon River conservation areas will be designated as wildland provincial parks under the *Provincial Parks Act*. Legislative designations for other conservation areas will be determined prior to finalizing the Range Plan, but options include designation: under the regional plan Alberta Land Stewardship Regulations; under the *Public Lands Act* as a Special Management Area Public Land Use Zone; or under the *Provincial Parks Act*.



4.2 Integrated Land Management (ILM)

Requirements to follow Integrated Land Management practices as described in Section 3.2 will be established in an amended Lower Athabasca Regional Plan and interim regional planning documents for other regions. Government departments and agencies will act in accordance with these when making decisions. The intention is for the requirements to be reflected in regulatory approvals and in direction given by regulators to operators with respect to operating plans, as appropriate. There will be alignment with existing regulatory guidance, such as the Master Schedule of Standards and Conditions, which identifies conditions that apply to disposition applications approved under the *Public Lands Act* as part of multiple government approval systems.

4.3 Forests Act

Alberta has developed legislation and policy for the protection, conservation and sustainable management of forests. The *Forests Act* provides for the allocation of Crown timber within designated Forest Management Units through Forest Management Agreements (FMAs), timber quota certificates and licences or timber permits. FMAs ensure that the harvest and reforestation of timber on Crown land is done in a manner designed to provide a yield consistent with sustainable forest management principles and practices. Section 10 of the *Forests Act* prohibits cutting, damaging, or destroying forest growth except as authorized under the Act or regulations. Section 25 outlines the ability to suspend, cancel, and reduce the terms of FMAs, timber quotas, licences or permits if contraventions of the Act take place. The Timber Management Regulation manages timber harvesting, reforestation and clearing of forested land for other industrial use on Alberta public lands. Contraventions of the Act and Regulations are enforced by the Crown through forest officers with penalties, fines, and imprisonment terms, as outlined in the Act and Regulations.

Government foresters and biologists work alongside forest industry representatives to develop long-term plans that ensure forest values are maintained for future generations. The details of where, when and how trees on Crown land in Alberta are harvested and managed for sustainability, are contained in FMAs approved by the Government of Alberta. FMA holders in woodland caribou ranges are required to prepare Spatial Harvest Sequences within their forest management plans (FMPs) to meet caribou habitat requirements. Following the release of a final caribou range plan there may be a need to amend existing forest management plans. The Timber Harvest Planning and Operating Ground Rules provide operationalized direction to forest companies and government for incorporating wildlife habitat requirements for caribou during timber harvest planning, implementing and monitoring timber harvesting operations on timber disposition areas in Alberta.

4.4 Mines and Minerals Act

The *Mines and Minerals Act* governs the management and disposition of rights for Crown-owned mines and minerals. Part 8 of the *Mines and Minerals Act* regulates the exploration for subsurface minerals, including petroleum, natural gas, and other minerals on both public and private lands. Under the *Responsible Energy Development Act*, the Alberta Energy Regulator (AER) is given the authority to regulate geophysical exploration activities in Alberta under part 8 of the *Mines and*



Minerals Act, the Exploration Regulation and Directives (e.g. applications, construction, reclamation, compliance, enforcement, etc.).

4.5 Public Lands Act

Public lands dispositions are regulated by two key pieces of legislation and administered by AEP and the AER. A disposition must be obtained under the *Public Lands Act* for any access to or activity on public lands and in compliance with the Public Lands Administration Regulation (PLAR). The PLAR will allow government to better manage our increasingly busy landscape to ensure the activities happening on public land are sustainable. In addition, PLAR tables (Public Lands Administration Regulation Table A1 and Public Lands Administration Regulation Table A2) define the types of dispositions available to authorize land use ranging from cultivation permits, mineral surface leases, licenses of occupation, as well as dispositions for surface minerals, pipelines and other activities likely to destroy critical habitat for woodland caribou. Violations of the Act or its regulations are enforced and a person guilty of an offence under this Act or the regulations is liable for fines and penalties.

4.6 Provincial Parks Act

Provincial parks are established and maintained for the preservation of Alberta's natural heritage, important natural areas and landscapes and the conservation and management of native plants and wildlife. The *Provincial Park Act* outlines the establishment and management of provincial parks and provincial recreations areas. Lands within a provincial park or recreation area are protected from damage and destruction and it is prohibited to collect, remove or damage plant life, animal life or natural resources without authorization. Authorizations (including permits and dispositions) are required for most activities likely to result in destruction of critical habitat within provincial parks including: infrastructure construction; maintenance and improvement; surface disturbance; and the damage or removal of plant life.

The *Provincial Parks Act* has a number of regulations that provide guidance around specific activities and restrictions in provincial parks, wildland provincial parks and provincial recreation areas. The Provincial Parks (Disposition) Regulation prohibits the construction of access roads, mineral exploration, mines, pipelines, sand and gravel and utilities in wildland provincial parks and the Provincial Parks (General) Regulation prohibits the deposit of waste and removal of wood or water. Open pit mining (including sand and gravel extraction), commercial forestry or timber harvesting are not permitted within provincial parks. Limited amounts of timber removal may take place for landscape management, public safety and the development or upgrading of recreational facilities. Alberta Parks works to ensure that existing and new dispositions have minimal disturbance to wildlife habitat and incorporate environmental considerations (including species at risk) during the internal disposition application review process. Offences under the Act are enforced and liable for fines and/or imprisonment. Mineral commitments that existed before a protected area was established will be honoured within provincial parks, wildland provincial parks, provincial recreation areas, and natural areas (Alberta Energy Information Letter 2003-25). The needs for wildlife habitat



and timing considerations that benefit caribou can be appropriately applied as specific conditions for the issuance of a disposition.

4.7 Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act

The *Wilderness Areas, Ecological Reserves, Natural Areas and Heritage Rangelands Act* (WAERNAHRA) establishes protected areas that are to be managed for the purpose of preserving their natural state and safeguarding them from impairment and industrial development. Two types of protected areas designated under WAERNAHRA are present within boreal woodland caribou ranges: natural areas and ecological reserves, each with varying degrees of protection. Natural areas protect sensitive lands and natural features from disturbance which are to be maintained in a natural state for use by the public for conservation, low intensity recreation and natural appreciation with no, or limited facilities. Ecological reserves preserve and protect representative ecosystems, rare plants, animals or landscapes for scientific research and education. Access to ecological reserves is by foot only and public roads and facilities do not normally exist and are not to be developed.

The destruction, removal or damage to any land, water, plant life or animal life is prohibited in natural areas and ecological reserves unless permitted by the Minister. Dispositions issued under other legislation are not allowed in ecological reserves and any existing dispositions are typically removed upon the designation of the area. Some existing dispositions or prohibited activities may be permitted within ecological reserves under Ministerial discretion or as a requirement to protect natural resources or public safety. Offenses under the Act are enforced and liable for fines or imprisonment. Mineral commitments that existed before a natural area was established will be honoured (Alberta Energy Information Letter 2003-25). No development is allowed within ecological reserves and wilderness areas.

4.8 Environmental Protection and Enhancement Act

The purpose of the *Environmental Protection and Enhancement Act* (EPEA) is to support and promote the protection, enhancement and wise use of the environment (air, land and water) to ensure sustainable use and preservation of the environment for future generations of Albertans while recognizing the need to promote Alberta's economy. The Act determines the requirements for environmental impact assessments and regulates the operation of industrial projects to protect the environment. A number of activities outlined in the Activities Designation Regulation and Environmental Assessment (Mandatory and Exempted Activities) Regulation are considered activities likely to destroy critical habitat and are prohibited under EPEA without approval. Regulations establish the need or exemption for environmental assessments.



4.9 Other Policies, Plans and Directives

4.9.1 Seismic Directive

The directive for seismic operations in the Little Smoky and A La Peche Caribou Ranges sets out minimum standards for seismic operations within the Little Smoky and A La Peche caribou ranges and ensures the integrity of caribou habitat during range planning until a caribou range plan is finalized.

4.9.2 Mineral Sales and Permits

The Restriction on Mineral Tenure Sales (2016) within all caribou ranges is currently in place, which applies to petroleum and natural gas, oil sands, coal, metallic and industrial mineral rights. The resumption of mineral sales in caribou ranges is anticipated when the Range Plan is completed and in alignment with the range-specific details.

4.9.3 Master Schedule of Conditions and Standards (formerly Integrated Standards and Guidelines)

The Master Schedule of Standards and Conditions consolidates standards and guidelines for public lands dispositions administered by both AEP and AER and ensures accountability for sustainable long-term environmental outcomes, approval standards, operating conditions and best management practices. Standards, operating conditions and best management practices exist for dispositions associated with activities likely to destroy critical habitat.

4.9.4 Peat Allocation

Alberta's Allocation and Sustainable Management of Peat Resources on Public Land (2017) identifies high sensitivity lands as those sensitive or critical habitats where cumulative land use poses significant challenges to the viability of sustaining fish or wildlife populations. Peat operations are considered incompatible with management goals for lands that are subject to defined management frameworks or plans (e.g. caribou ranges) that are being specifically managed to support recovery of species at risk.

4.9.5 Renewable Energy and Energy Transmission

Wildlife directives for Alberta's renewable energy projects outline standards and best management practices for minimizing impacts to wildlife and wildlife habitat during siting, construction and operation of wind and solar energy facilities. Applications for the construction, connection, operation and development of power plants, substations, transmission lines and hydro developments must ensure that environmental concerns (including wildlife habitat) are addressed in the application and follow the Environmental Protection Guidelines for Transmission Lines, which consider siting relative to sensitive and at risk species. Project environmental evaluations must be signed off by AEP and transmission lines on public land also require an Environmental Field Report (EFR) and disposition approval.



4.9.6 Caribou Protection Plans

Caribou Protection Plans (CPPs) have been used for exploration and construction activities within caribou zones, to identify and commit to disposition approval conditions that help mitigate the implications of individual development approvals for caribou. Currently, CPPs are still required for some activities which are not covered by the Master Schedule of Standards and Conditions.

4.9.7 Alberta's Woodland Caribou Policy and Woodland Caribou Recovery Plan

A Woodland Caribou Policy for Alberta and Alberta's Woodland Caribou Recovery Plan guide Alberta's development and implementation of the Range Plan. These documents outline the province's commitment to conservation and recovery of the woodland caribou populations within Alberta, through maintaining and restoring caribou habitat, and management of wildlife.

4.10 Steps Being Taken by Jurisdiction

Alberta will take a multi-step approach to ensuring the protection of critical habitat for woodland caribou populations including: additions to Alberta's protected and conservation areas; establishing requirements for Integrated Land Management and improved industrial practices; government partnerships with energy and forestry industries to restore caribou habitat; and establishing legislative and policy tools to enable and strengthen caribou conservation.

The establishment of new conservation areas in Alberta will provide a suite of conservation tools to ensure the protection and stewardship of important caribou habitat now and into the future. The establishment of protected and conservation areas also meets the objectives of regional planning and supports the provincial commitment to protect 17% of Alberta's land base by 2020. Currently, the majority of provincial caribou ranges have exceeded the federal government's thresholds for habitat disturbance - active restoration of caribou habitat will provide a step to meeting federal critical habitat objectives. Alberta is currently exploring a variety of options to provide legal mechanisms which enable caribou range plans, including amendments to existing provincial legislation and establishment of Section 11 conservation agreements with the federal government.

4.11 Range Plans as Evidence of Critical Habitat Protection

The Provincial Woodland Caribou Range Plan will contain range-specific details of management strategies to be used on a range-by-range basis. Preliminary thoughts on these approaches are identified in appendices attached to this plan.

5.0 POPULATION MANAGEMENT

Alberta's objectives for the caribou populations are framed as a phased approach towards achieving self-sustaining populations.



Table 7 Caribou population targets per phase of recovery status

Phase	Population target
<i>Stabilizing and Recovering</i>	Each range population demonstrates population stability or positive growth within the bounds of the ecological carrying capacity for caribou in each range.
<i>Sustaining</i>	Achievement and maintenance of a self-sustaining local caribou population in each of the caribou ranges.

Woodland caribou are adapted to, and occupy, relatively unproductive habitats and as a result, experience low spatial overlap with primary prey (moose, deer, and elk) and their predators (e.g. wolves) in natural landscapes. The main grounds for caribou population declines include:

- 1) Loss of habitat and range areas due to human activities, resulting in caribou range recession and ultimately the loss of individual caribou populations;
- 2) Increased abundance of prey, and thereby predators, in response to increasing young forests following human modification of the landscape;
- 3) Increased predator travelling and hunting efficiency through their use of human-created disturbance features; and
- 4) Increased predation rates on caribou due to increased occurrence and abundance of predators.

The successful recovery of self-sustaining caribou populations will be contingent on the recovery of habitat, including reducing the distribution and abundance of alternate prey and their associated predators. In many cases, recovery of habitat to support self-sustaining caribou populations will take several decades. While habitat recovers, young forests in many caribou ranges will continue to support high densities of alternate prey and caribou predators. As a result, caribou populations will need additional management actions to avoid extirpation (local population extinction) in the near-term, while caribou habitat recovers.

Most caribou populations in Alberta are declining due to high levels of predation on both adult females and calves. To date, Alberta has managed wolf numbers on several caribou ranges to reduce caribou mortality rates and thereby avoid caribou population loss.

5.1 Caribou Rearing Facility

An additional potential management action could be the construction and operation of one or more boreal woodland caribou rearing facilities, which would function as fenced, predator-free enclosures where adult and calf caribou could reside with low levels of mortality. The intention would be to



periodically release some caribou produced in a rearing facility to the surrounding caribou range, to augment the caribou population outside of the facility (Figure 19).

Predator management in the Little Smoky caribou range has halted the decline and stabilized this caribou population, but has not permitted the population to increase. Additional measures may be necessary to increase this population. Based on a recent DNA study, there are currently approximately 70 females and 40 males in this population. Following recommendations from the Mediator's report, a feasibility study has been prepared to help inform decisions regarding a potential rearing facility in the Little Smoky range.

A rearing facility for caribou has never been attempted. In theory, calves of captive caribou will have a higher survival rate because they will be sheltered from predation during their most vulnerable first 1-1.5 years. Caribou in a rearing facility are effectively removed from the population from a Federal Recovery Strategy standpoint. Following the initial decrease in the wild population as animals are transferred to the rearing facility, the hope is that these captive animals will contribute disproportionately to the population to offset their removal from the wild. The scale of a rearing facility, therefore, needs to balance the needs of the wild caribou outside the facility, with the need for captive caribou inside the facility.

To find this balance, Environment and Parks has considered establishing a 30-km² facility (with room to expand to 100 km²) in the Little Smoky range, and breeding up to 20 female caribou, until the efficacy of this approach to caribou population augmentation has been supported with evidence.

There are risks of mortality associated with any handling of caribou; therefore, experts strongly suggested a five-year pilot study, after which the program would evaluate whether the rearing facility is successfully contributing to the wild population, compared to recruitment rates of the wild caribou population. Then a decision should be made whether to expand, terminate, or continue the project, or to extend the period of the pilot to better inform this decision.

Upon evaluation of a possible Little Smoky pilot, it is possible that another facility could be considered for a boreal caribou range elsewhere in Alberta (see Cold Lake and East Side Athabasca River range-specific details for more information). Note that continued predator control (both inside and outside of the fenced enclosure) will be necessary while the rearing facility is in operation. Released caribou would not likely survive if wolf density were to return to unnaturally high levels.





Figure 18 Caribou rearing facility concept

5.2 Predator Management

For many caribou populations in Alberta, current rates of population decline from unnaturally high predation rates will result in caribou extirpation prior to recovery of adequate habitat. For this reason, wolf population reductions have been employed to reduce caribou mortality in some cases. Wolf reduction is enabled through Alberta's Woodland Caribou Recovery Plan (2004/2005), Woodland Caribou Policy for Alberta (2011), and the Management Plan for Wolves in Alberta (1991).

Wolf populations are abundant and widely distributed across provincial forested lands. Alberta's goal for wolf management will be to annually reduce and maintain wolf populations to levels that enable caribou population persistence, by achieving population stability or growth.

A wolf reduction program has been ongoing in west-central Alberta since 2005/2006, avoiding extirpation, and benefiting, both the Little Smoky and A La Pêche caribou populations. Beginning in winter season 2016/17, a wolf population reduction program was also initiated in the East Side Athabasca River and Cold Lake caribou ranges in northeast Alberta, to avoid the extirpation of these two caribou populations. There may be a need to expand the predator control program into other populations while habitat recovers, if populations continue to decline.

5.3 Alternate Prey Management

Wolf population reductions in Alberta result in increased numbers of ungulates (including moose, deer and elk). Alberta will manage these increased ungulate populations through a combination of harvest by Indigenous peoples, and general and special hunting licence opportunities.



6.0 MONITORING

As a key element of an adaptive management approach, the Government of Alberta will issue annual progress reports and five-year stewardship reports for each caribou range. Alberta Environment and Parks will be accountable for range plan reporting, in collaboration with Alberta Agriculture and Forestry, Alberta Energy, the Alberta Energy Regulator, and other relevant departments and agencies. Alberta Environment and Parks will prepare annual reports.

Alberta's monitoring program for the Range Plan will focus on three key areas: 1) Population monitoring; 2) Habitat condition monitoring; and 3) Protection measures monitoring.

6.1 Population Monitoring

Alberta will continue to monitor caribou and alternate prey populations (Table 8), and report on findings as outlined in Section 7.0 *Timelines – Reporting and Range Plan Updates*.

Table 8 Population monitoring indicators for caribou ranges

Indicator	Description
Caribou population size	Periodic estimates to assess compliance with caribou minimum population requirements
Caribou population demographic rates and growth (lambda)	Annual estimates to assess conservation status and predation rates for each caribou population, and to inform adaptive management of caribou plans
Moose (alternate prey) population size	Periodic estimates



6.2 Habitat Condition Monitoring

Habitat will be monitored based on the Range Plan habitat definitions, and reported in annual and five-year stewardship reports. The following indicators will be monitored by Alberta.

Table 9 Indicators associated with habitat condition and restoration activity that will be monitored and reported by Alberta for each caribou range

Value	Indicator	Description
Landscape condition	Footprint	The area of anthropogenic disturbance features, classified by originating activity
	Natural disturbance	The area of disturbed and undisturbed habitat affected by natural disturbance
	Linear feature	The amount and density of linear features ⁷
Caribou habitat	Disturbed/undisturbed habitat	Amount and trend of undisturbed habitat
	Biophysical habitat	Amount, type and trend of biophysical habitat attributes
	Spatial habitat parameters	Spatial pattern and landscape scale occurrence of caribou habitat
Trajectory to 65% undisturbed habitat	Regeneration activity	The area where footprint and historical footprint is being regenerated, by activity type
	Restored habitat	The area of restoration activity meets Government of Alberta requirements

⁷ Features established to connect two points. That is, seismic lines, roads, trails, transmission corridors, railways, pipelines, easements, etc. Low impact seismic is not included in linear feature density calculations.



6.2.1 Identification of Biophysical Attributes

Alongside maintaining 65% undisturbed habitat within individual caribou ranges, biophysical habitat attributes are the second component of critical habitat. They are defined in the Federal Recovery Strategies as the habitat characteristics required by boreal caribou to carry out life processes necessary for survival and recovery. Due to the dynamic nature of the boreal forest, biophysical attributes vary across both space and time. Attributes for biophysical habitat were identified in Appendix H of the Boreal Recovery Strategy at the spatial scale of the ecoregion or ecozone.

Three data sources were used by Alberta to update and further understand biophysical habitat attributes across provincial caribou ranges. Where available, Alberta Vegetation Inventory (AVI), which relies on detailed ortho-image classification of forest stands, was used as a basis to update biophysical attributes. Remaining areas were classified using a combination of Landsat satellite imagery classified by the Earth Observation for Sustainable Development of Forests (EOSD 2009) project, and Ducks Unlimited (DU) Canada's Enhanced Wetland Classification. Although at a lower resolution, the combined satellite data (DU and EOSD) were classified (as best possible) into equivalent AVI classes. Using caribou radio-telemetry location data and randomly generated points, vegetation classes were classified with respect to their contribution to biophysical habitat attributes, based on levels of caribou use and selection ratios (at the third-order scale). The age requirements for each vegetation type to qualify as biophysical habitat were similarly updated for Alberta.

6.3 Protection Measures Monitoring

Alberta Monitoring Requirements

1. Alberta will monitor habitat and population indicators as identified within [Section 6](#) of this range plan.
2. Alberta will engage Indigenous peoples and others regarding opportunities to contribute to monitoring actions.

Industry Monitoring Requirements

3. Industrial land users operating in the caribou ranges shall annually report to Alberta Environment and Parks an accurate as-built representation of additions or modifications to footprint; the department will define standards for submitted data.



7.0 TIMELINES: REPORTING AND RANGE PLAN UPDATES

Alberta is committed to achieving positive environmental, economic and social outcomes for the benefit of current and future generations of Albertans. The principle of adaptive management incorporated in the Range Plan ensures that we will modify management approaches in response to new information on their efficacy toward achieving management goals and objectives. If the management actions outlined in the Range Plan do not meet intended targets or if caribou populations continue to be challenged, Alberta will update the Range Plan, including engagement with stakeholders and Indigenous peoples.

Both population and habitat indicators will be monitored and reported on in collaboration with Alberta Agriculture and Forestry, Alberta Energy, the Alberta Energy Regulator, and other relevant departments and agencies. Alberta will also engage Indigenous peoples and others regarding opportunities for them to contribute to monitoring.

7.1 Reporting on Range Plan Implementation and Monitoring

1. Alberta, led by Alberta Environment and Parks, will prepare five-year stewardship reports for Alberta's caribou ranges.

7.2 Caribou and Climate Change

Alberta's climate has been changing. Alberta has experienced the largest increase in mean annual temperature, approximately 1.4 degrees Celsius, of all Canadian provinces over the last 100 years. More moderate winter temperatures have allowed mountain pine beetle to survive farther north and at higher elevations, and white-tailed deer ranges are encroaching further north, possibly increasing predation pressure on caribou.

Alberta will carefully evaluate continued changes in climate, identifying and addressing challenges to caribou populations, and investigating adaptation approaches to the Range Plan as necessary.

7.3 Caribou and Natural Disturbances

The occurrence of natural or unexpected disturbances, such as wildfires, within the caribou ranges could threaten the achievement of expected outcomes. As per the guidance outlined in the Federal Boreal Woodland Caribou Recovery Strategy, should a wildfire event occur causing a disturbance of 5% or more of a range, more than one year before a regular plan update evaluation, the Government of Alberta will provide a management response in collaboration with key stakeholders and Indigenous peoples, amending the Range Plan as necessary.

Reporting on Natural Disturbance Occurrence

1. If natural disturbance affects more than 5% of the area of a caribou range, more than one year before a regular plan update, Alberta will provide a management response.



Range Plan Updates (Figure 19).

2. Alberta will review and update the Range Plan at least every five years from its approval. Results of review and updates will be provided to Environment and Climate Change Canada for inclusion in their reporting related to the Federal Recovery Strategies.

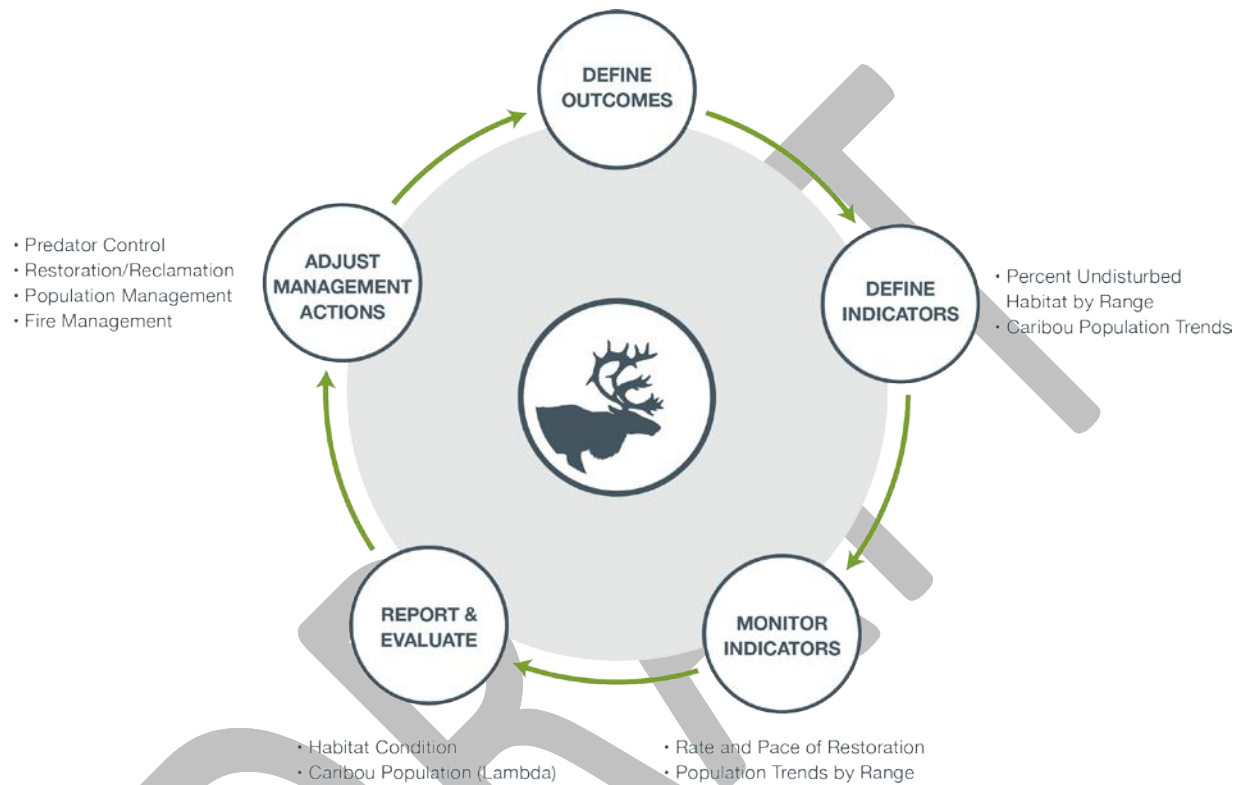


Figure 19 Adaptive feedback cycle for range plan updates





Draft Provincial Woodland Caribou Range Plan

APPENDICES



TABLE OF CONTENTS

Table of Contents.....	1
A.1 The A La Peche Caribou Range – Current State	4
1.1 A La Peche Caribou Range Overview	4
1.2 Local Population Self-Sustainability Status	5
1.3 Current Habitat Condition and Important Areas for Caribou	6
1.4 Managing to 65% Undisturbed Habitat.....	11
A.2 The Bistcho caribou range - Current State.....	13
2.1 Bistcho Caribou Range Overview	13
2.2 Local Population Self-Sustainability Status	13
2.3 Current Habitat Condition and Important Areas for Caribou	15
2.4 Managing to 65% Undisturbed Habitat.....	20
A.3 The Caribou Mountains Range - Current State.....	22
3.1 Caribou Mountains Range Overview.....	22
3.2 Local Population Self-Sustainability Status	22
3.3 Current Habitat Condition and Important Areas for Caribou	23
3.4 Managing to 65% Undisturbed Habitat.....	28
A.4 The Chinchaga Caribou Range - Current State	30
4.1 Chinchaga Caribou Range Overview	30
4.2 Local Population Self-Sustainability Status	30
4.3 Current Habitat Condition and Important Areas for Caribou	31
4.4 Managing to 65% Undisturbed Habitat.....	37
A.5 The Cold Lake Caribou Range - Current State	39
5.1 Cold Lake Caribou Range Overview	39
5.2 Local Population Self-Sustainability Status	39
5.3 Current Habitat Condition and Important Areas for Caribou	40
5.4 Managing to 65% Undisturbed Habitat.....	45
5.5 Population Management	47
A.6 The East Side of the Athabasca River Caribou Range - Current State	48



6.1	East Side of the Athabasca River (ESAR) Caribou Range Overview	48
6.2	Local Population Self-Sustainability Status	48
6.3	Current Habitat Condition and Important Areas for Caribou	50
6.4	Managing to 65% Undisturbed Habitat.....	55
6.5	Population Management	57
A.7	The Little Smoky Caribou Range - Current State.....	58
7.1	Little Smoky Caribou Range Overview.....	58
7.2	Local Population Self-Sustainability Status	58
7.3	Current Habitat Condition and Important Areas for Caribou	59
7.4	Managing to 65% Undisturbed Habitat.....	64
7.5	Population Management	65
A.8	The Narraway Caribou Range - Current State.....	66
8.1	Narraway Caribou Range Overview.....	66
8.2	Local Population Self-Sustainability Status	67
8.3	Current Habitat Condition and Important Areas for Caribou	68
8.4	Managing to 65% Undisturbed Habitat.....	73
A.9	The Nipisi Caribou Range - Current State	75
9.1	Nipisi Caribou Range Overview	75
9.2	Local Population Self-Sustainability Status	75
9.3	Current Habitat Condition and Important Areas for Caribou	76
9.4	Managing to 65% Undisturbed Habitat.....	82
A.10	The Red Earth Caribou Range - Current State.....	84
10.1	Red Earth Caribou Range Overview	84
10.2	Local Population Self-Sustainability Status	84
10.3	Current Habitat Condition and Important Areas for Caribou	85
10.4	Managing to 65% Undisturbed Habitat.....	91
A.11	The Redrock-Prairie Creek Caribou Range - Current State.....	94
11.1	Redrock-Prairie Creek Caribou Range Overview	94
11.2	Local Population Self-Sustainability Status	95
11.3	Current Habitat Condition and Important Areas for Caribou	96
11.4	Managing to 65% Undisturbed Habitat.....	101



A.12	The Richardson Caribou Range - Current State.....	103
12.1	Richardson Caribou Range Overview	103
12.2	Local Population and Sustainability Status.....	103
12.3	Current Habitat Condition and Important Areas for Caribou	104
12.4	Managing to 65% Undisturbed Habitat.....	109
A.13	The Slave Lake Caribou Range - Current State	112
13.1	Slave Lake Caribou Range Overview.....	112
13.2	Local Population Self-Sustainability Status	112
13.3	Current Habitat Condition and Important Areas for Caribou	113
13.4	Managing to 65% Undisturbed Habitat.....	118
A.14	The West Side Athabasca RIVER Caribou Range - Current State	120
14.1	West Side Athabasca River Caribou Range Overview	120
14.2	Local Population Self-Sustainability Status	120
14.3	Current Habitat Condition and Important Areas for Caribou	121
14.4	Managing to 65% Undisturbed Habitat.....	126
A.15	The Yates Caribou Range - Current State	128
15.1	Yates Caribou Range Overview	128
15.2	Local Population Self-Sustaining Status.....	128
15.3	Current Habitat Condition and Important Areas for Boreal Caribou	129
15.4	Managing to 65% Undisturbed Habitat.....	134



A.1 THE A LA PECHE CARIBOU RANGE – CURRENT STATE

1.1 A La Peche Caribou Range Overview

The A La Peche caribou range is occupied by a southern mountain woodland caribou population located in west central Alberta. The distribution of woodland caribou in west central Alberta has greatly declined over the last 50 to 80 years. The A La Peche population is one of three remaining southern mountain caribou Local Population Units (LPU) under provincial jurisdiction (together with the Redrock-Prairie Creek and Narraway populations), from a distribution of woodland caribou which formerly extended throughout much of Alberta's eastern slopes. The A La Peche caribou population is now the most southerly mountain caribou population remaining in Alberta on provincially controlled lands.

The federal Recovery Strategy for the Woodland Caribou, Southern Mountain Population (2014) guides recovery efforts with these objectives:

- Stop the decline in both size and distribution of all Local Population Units (LPU);
- Maintain the current distribution within each LPU;
- Increase the size of all LPUs to self-sustaining levels and where appropriate and attainable, to levels which can sustain a harvest with dedicated or priority access to Aboriginal peoples; and
- Within the low elevation winter range, achievement of at least 65% undisturbed habitat is specified to help achieve caribou population sustainability.

The A La Peche range (considering both summer and winter range components) is made up of 661,500 hectares (ha) of Alberta's Green Area of public managed lands. This range borders on the Little Smoky boreal caribou range and the Redrock-Prairie Creek southern mountain caribou range; it is comprised of the Foothills, Subalpine and Alpine Natural Regions, and Lower Foothills and Upper Foothills Sub-regions. A La Peche caribou migrate between mountainous summer range areas in Jasper National Park, British Columbia and Alberta, and their winter range in Alberta's forested foothills. Protected areas coincide with the A La Peche summer range areas in Jasper National Park and Wilmore Wilderness Park. Summer range in British Columbia and the winter range in Alberta are subject to multiple land uses. The habitat and biological needs of the southern mountain populations are similar to the boreal populations; however, southern mountain caribou require different seasonal ranges that are connected by the lands that enable migration.

The winter range portion of the overall A La Peche range is approximately 166,468 ha, of which 12% is considered undisturbed. The majority of the disturbance is from industrial development along with permanent infrastructure including a highway and railway. The entire winter range is allocated for forest harvesting and 95% has been made available for petroleum and natural gas development. Petroleum and natural gas are focused on the development of the Montney, Duvernay and Cretaceous formations.



The A La Peche Caribou Range is located in the Municipal District of Greenview No.16 and Yellowhead County but contributes to the economic and social sustainability of a wider network of west central Alberta towns and communities. With these economies highly dependent on natural resources, range planning has the potential to both negatively and positively impact the region.

1.2 Local Population Self-Sustainability Status

The A La Peche caribou population was in decline from 1999-2014 (Figure 1). After expansion of the annual wolf population management program within the A La Peche range in winter 2013/14, annual population growth rate estimates indicate an increasing population (Figure 1). The population is now considered stable by the Government of Alberta, although it remains classified as not self-sustaining by Canada, based primarily on habitat condition. The current wolf population management program is integral to maintaining population stability and growth of this population, and avoiding its extirpation.

Recent minimum counts of A La Peche caribou (during surveys conducted for other purposes) have documented at least 85 animals; the actual number of animals currently in this population is unknown, but is certainly in excess of 100. Three-year mean annual population growth is 1.10 (95% confidence interval (CI): 0.96-1.21) and the 10-year mean annual population growth is 0.97 (95CI: 0.80-1.09). Data to inform population growth estimates were collected by collaring female caribou from 1980-2017, (n= 169 animals: 141 VHF collars, 28 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 1999 to 2017 are shown, because this is when sample size to calculate annual population growth rate (λ) was sufficient.



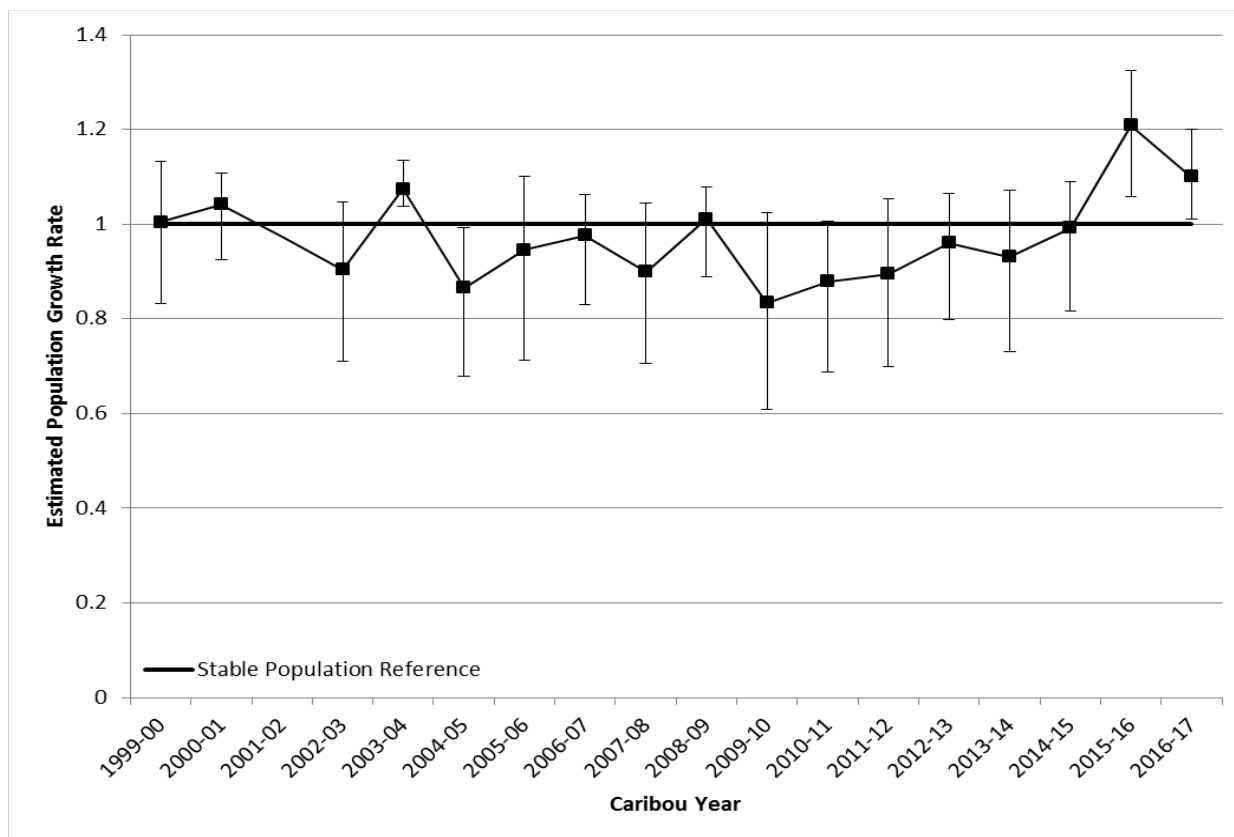


Figure 1 Estimated annual population growth rate for the A La Peche caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).

1.3 Current Habitat Condition and Important Areas for Caribou

1.3.1 Habitat Condition and Disturbance Levels

The A La Peche range contains forestry, energy, minerals, and aggregates resources, which has led to resource extraction activities over the past decades and the issuance of related industrial tenure. Petroleum, natural gas, and forestry are the primary industrial activities and tenure holders in the A La Peche range. Other industrial activities within the range include metallic and industrial minerals, and sand and gravel.

Considering both summer and winter ranges, the overall A La Peche caribou range currently has 72% undisturbed habitat (Table 1; Figure 2); 28% of the overall range is considered disturbed by either human footprint, including the 500m buffer, or wildfire. Wildfires within the past 40 years account for 2% of the disturbance within the range. The A La Peche caribou winter range (which requires 65% undisturbed habitat under the federal recovery strategy) currently has 12% undisturbed habitat. The summer range under Alberta's jurisdiction is 92% undisturbed.



Table 1 - Industrial tenure within the winter portion of the range

Industry	Tenure Type	Percent of Winter Range Tenured
Forestry	Forest Management Agreement and/or Quota	100%
Oil Sands	Permit or Lease	0%
Petroleum and Natural Gas	Permit or Lease	95%
Metallic and Industrial Minerals	Permit or Lease	9%

Table 2 - Habitat Condition Balance Sheet¹.

Time	Winter Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
Present	166,467	<1%	84%	34%	6%	36%	88%	12%

¹ Numbers in the Habitat Condition Balance Sheet are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



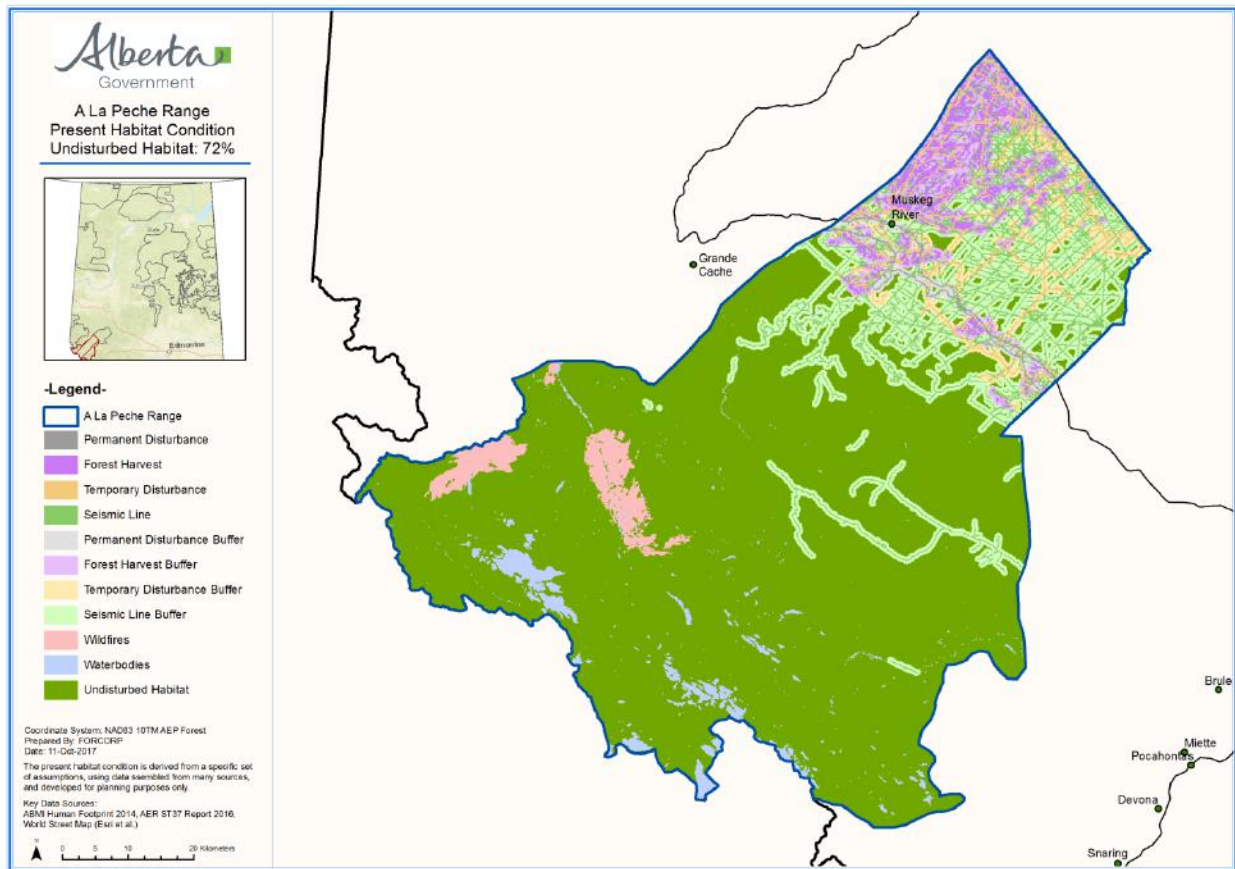


Figure 2 Current disturbed and undisturbed habitat in the A La Peche Caribou Range.

1.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 3 and Figure 4) and the occurrence of biophysical habitat (Figure 5) were identified for the A La Peche caribou range. Following direction from the federal guidance document, important areas for caribou (Figure 6) were identified, which include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use, biophysical habitat and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



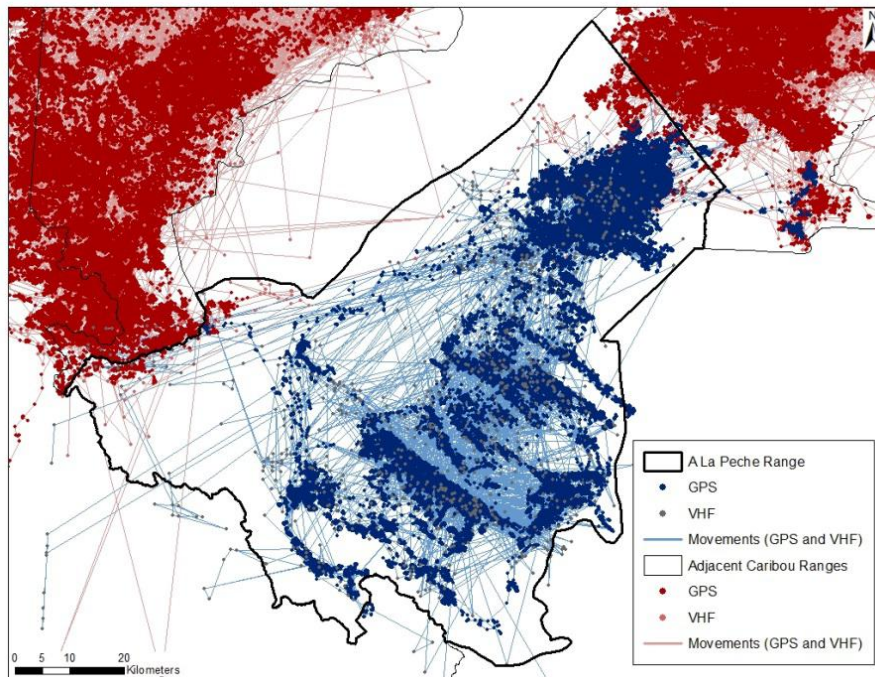


Figure 3 Locations from radio-collared caribou for the A La Peche and adjacent caribou populations. Data collected 1980-2017, from n = 169 A La Peche caribou (141 VHF collars, 28 GPS collars). Lines indicate caribou movements between individual location points.

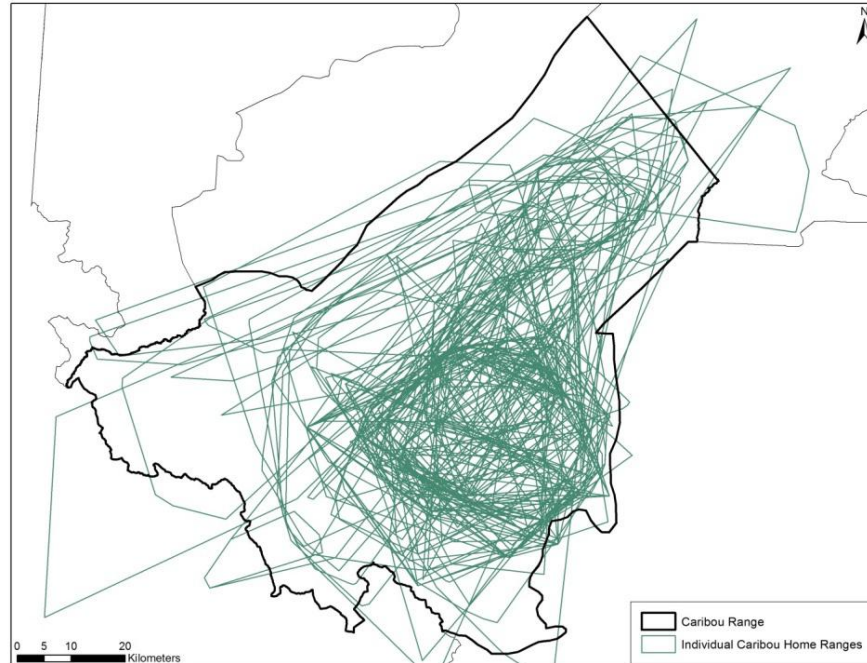


Figure 4 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1980-2017, from n = 169 A La Peche caribou (141 VHF collars, 28 GPS collars).



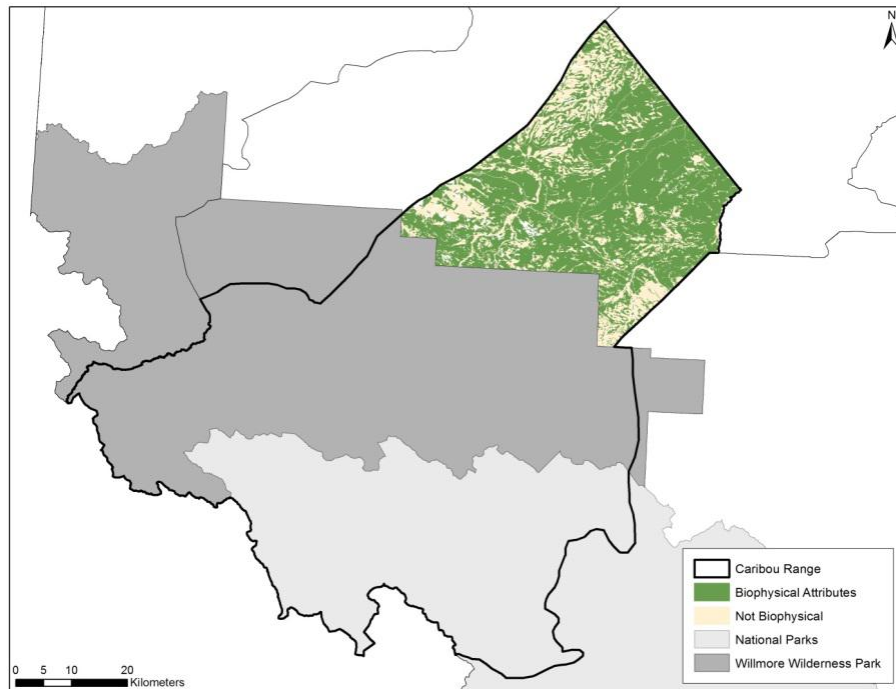


Figure 5 Current availability of caribou biophysical habitat in the A La Pêche caribou range. Where available, biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data. No data with sufficient detail was available for mountain areas.

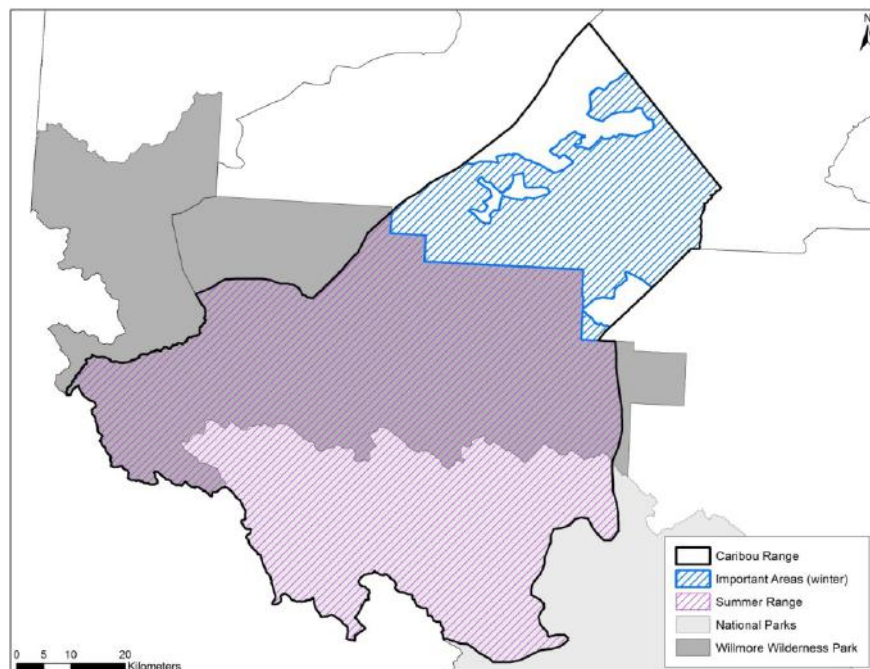


Figure 6 Important areas for caribou in the A La Pêche caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



1.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using Integrated Land Management (ILM) techniques to achieve adequate habitat that will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM, and other management approaches, that will initiate achievement of the recovery goals and objectives within the A La Peche caribou range.

1.4.1 Restoration Management

Operational restoration plans for this range will be developed by a central region sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

1. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

1.4.2 Management of Access

Within the A La Peche caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

2. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
3. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

1.4.3 Management of Energy Activity

4. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.



1.4.4 Management of Forestry Activity

5. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
6. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

1.4.5 Management of Coal, Metallic and Industrial Minerals Activity

7. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

1.4.6 Management of Sand and Gravel Activity

8. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

1.4.7 Management of Peat Activity

9. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.



A.2 THE BISTCHO CARIBOU RANGE - CURRENT STATE

2.1 Bistcho Caribou Range Overview

The Bistcho caribou range is occupied by a boreal woodland caribou population. Some caribou in this population use adjacent areas in British Columbia and the Northwest Territories. On its eastern side the Bistcho range borders on the Yates caribou range. The Bistcho range is located within the Boreal Forest Natural Region, and Northern Mixedwood, Central Mixedwood, Dry Mixedwood and Lower Boreal Highlands Sub-regions in northern Alberta. The range is a total 1,435,810 hectares in size.

The Bistcho caribou range is located in Mackenzie County. The Bistcho range also overlaps with Forest Management Units (FMU) F26 and F20. Volumes harvested in this area are used to supply a dimension lumber sawmill in High Level, an oriented strand board facility near High Level and a dimensional lumber sawmill and pellet mill near the town of La Crete. There is currently no forestry tenure or allocation in F20 outside of a small Community Timber Permit Program (CTPP) of 1,500 m³/yr. of deciduous.

The Bistcho range overlaps with the Muskwa petroleum and natural gas formation, with approximately 20% of the range overlapping with oil and gas footprint and current operations. Old seismic lines contribute to the majority of the disturbance footprint within the Bistcho range, totalling 62,668 km. Current oil and gas operations within this range are primarily localized to the southern and eastern portions of the range. While there are some oil and gas producers that are operating in the range, a significant amount of current energy infrastructure is listed as inactive, suspended or abandoned. Though this infrastructure may not currently be in use, a large amount of it has not been reclaimed or restored. Currently, there are no known coal deposits or coal exploration activity within the Bistcho range.

2.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each boreal caribou local population in Canada. At the time of the assessment, the Bistcho population was listed as very unlikely to be self-sustaining (Environment Canada, 2011). In the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada for the Period 2012-2017) the Bistcho caribou population is described as continuing to decline.

The Bistcho caribou population was in decline from 2007 to 2011 (Figure 7). There are some indications that the population may be stabilizing at reduced population levels, with some recent population growth rate estimates indicating a stable population (Figure 7). However, there is continued variation in growth rate among years. The three-year mean annual population growth for the Bistcho population is 1.04 (95% CI: 0.89 - 1.14) and the 10-year mean annual population growth is 0.92 (95% CI: 0.72 -1.07). Recent minimum counts of the Bistcho caribou during surveys conducted for other purposes have documented at least 257 animals; the actual number of animals currently in this population is unknown.



Data to inform population growth estimates were collected through monitoring collared female caribou from 2004 to 2017, (n= 157 animals: 91 VHF collars, 66 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. For the purposes of this report, only data from 2006 to 2017 are shown, because this is when sample size to calculate lambda was sufficient.



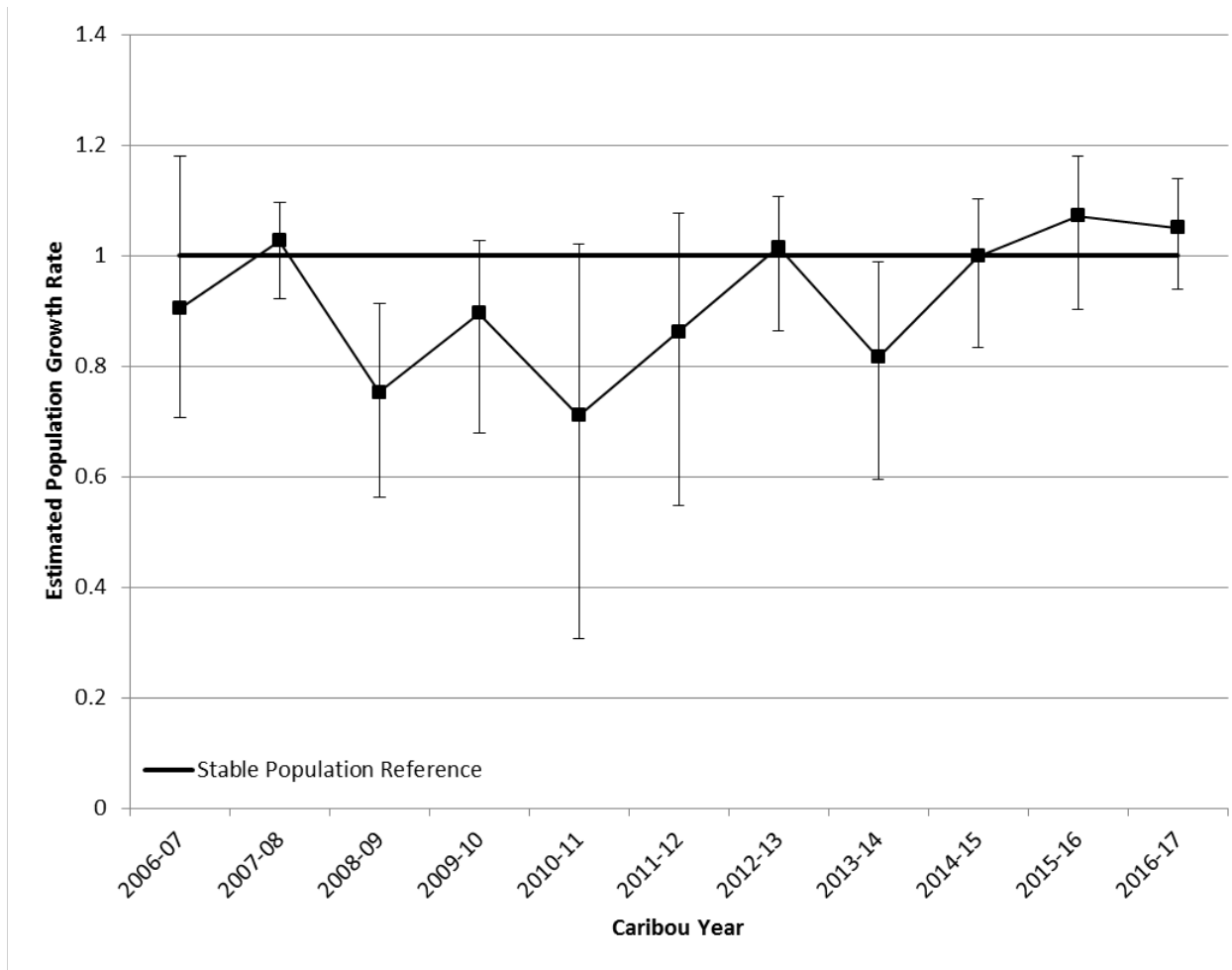


Figure 7 Estimated annual population growth rate for the Bistcho caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).

2.3 Current Habitat Condition and Important Areas for Caribou

2.3.1 Habitat condition and disturbance levels

Petroleum, natural gas, and forestry are the main industrial activities and tenure holders in the Bistcho range (Table 3). Other industrial activities within the range include metallic and industrial minerals, sand and gravel and electrical transmission lines. Legacy seismic lines continue to be part of the historical footprint within the Bistcho range.

Currently, 94% of the Bistcho range is considered disturbed by natural and anthropogenic footprint including the federal 500 m buffer (Table 4; Figure 8). Wildfires within the past 40 years account for 38% of the disturbance within this range, though some of this footprint overlaps with anthropogenic footprint within the range.



Table 3 – Industrial Tenure within the Bistcho range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement	61%
Petroleum/Natural Gas	Permit or Lease	19%
Natural Gas	Permit or Lease	<1%
Metallic and Industrial Minerals	Permit or Lease	<1%

Table 4 – Habitat Condition Balance Sheet.²

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
2011 Scientific Assessment	1,435,810	20%					61%	29%
Present	1,435,810	32%	91%	4%	1%	16%	91%	6%

² Numbers in the Habitat Condition Balance Sheet are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



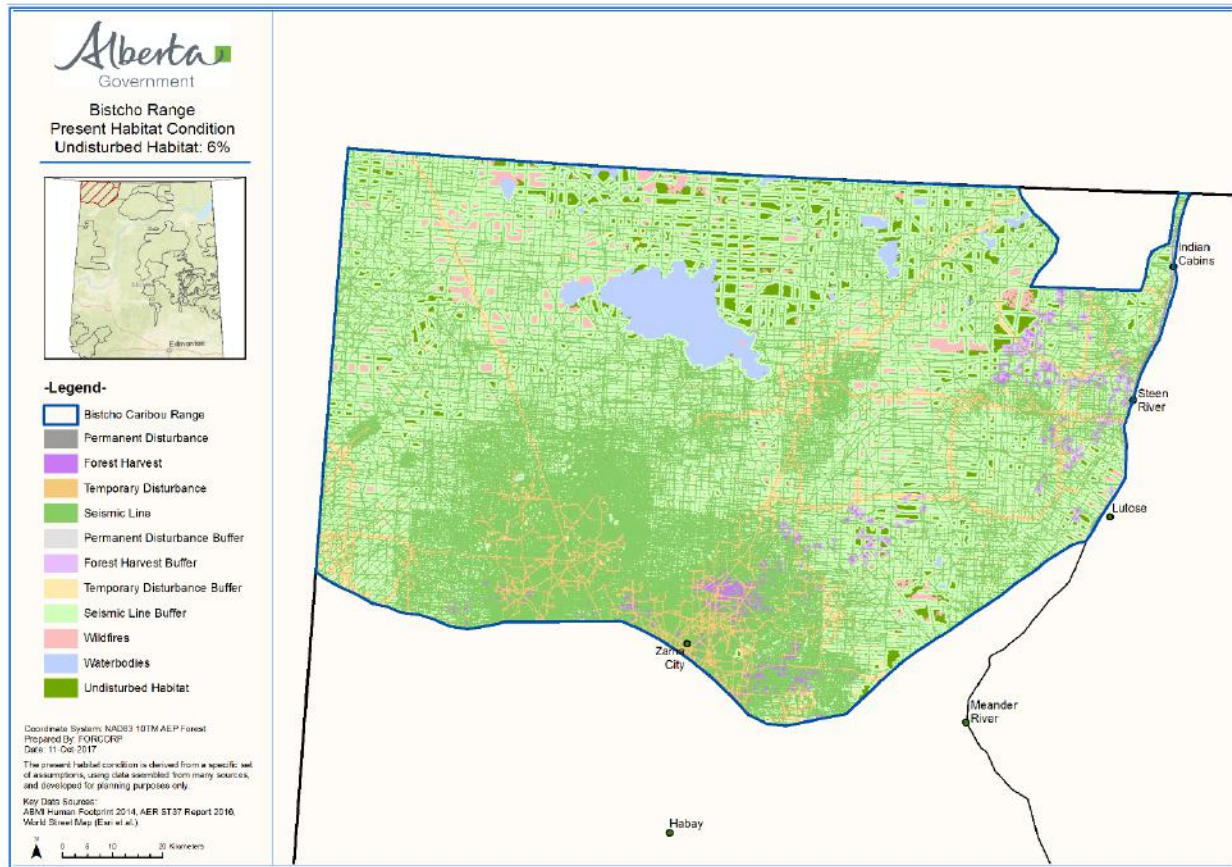


Figure 8 The current state of disturbed and undisturbed habitat within the Bistcho caribou range.

2.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 9 and Figure 10) and the occurrence of biophysical habitat (Figure 11) were identified for the Bistcho caribou range. Following direction from the federal guidance document, important areas for caribou (Figure 12) were also identified and include areas key for maintaining connectivity within and among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use, biophysical habitat and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



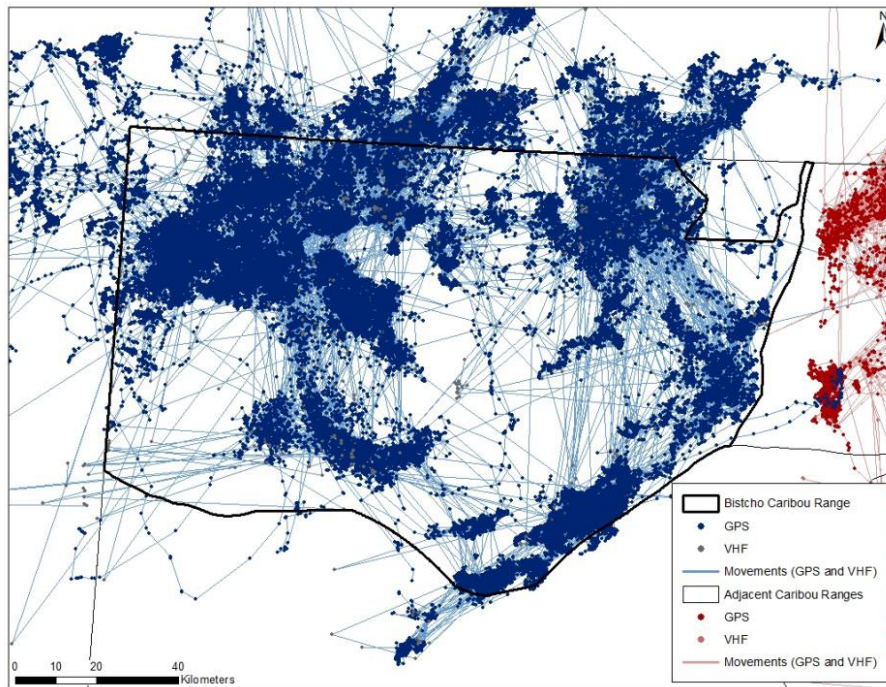


Figure 9 Locations from radio-collared Bistcho caribou and adjacent caribou populations. Data collected 2004-2017, from $n = 157$ Bistcho caribou (91 VHF collars, 66 GPS collars). Lines indicate caribou movements between individual location points.



Figure 10 Individual caribou home ranges depicted by minimum convex polygons. Data collected 2004-2017, from $n = 157$ Bistcho caribou (91 VHF collars, 66 GPS collars)



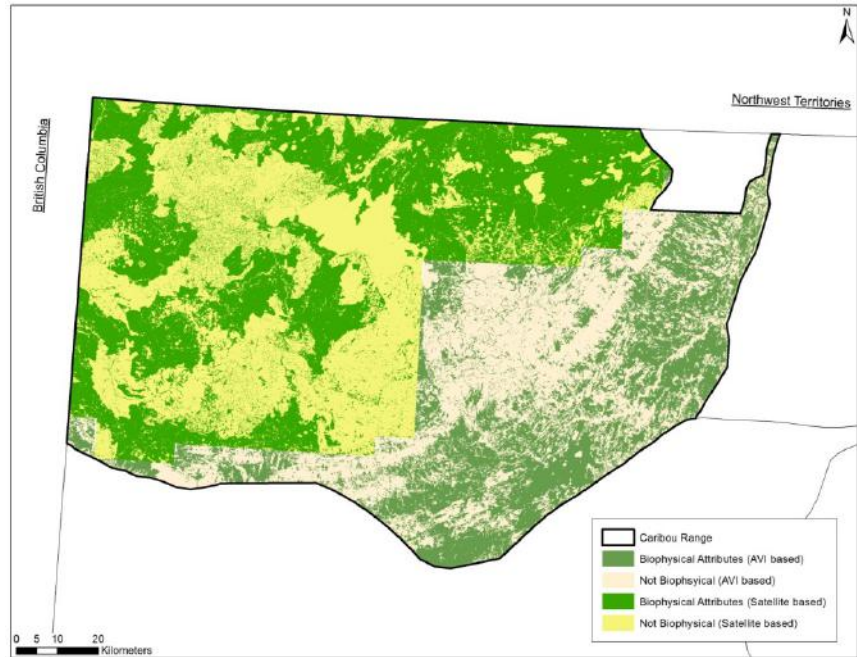


Figure 11 Current availability of caribou biophysical habitat in the Bistcho caribou range. Where available, biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

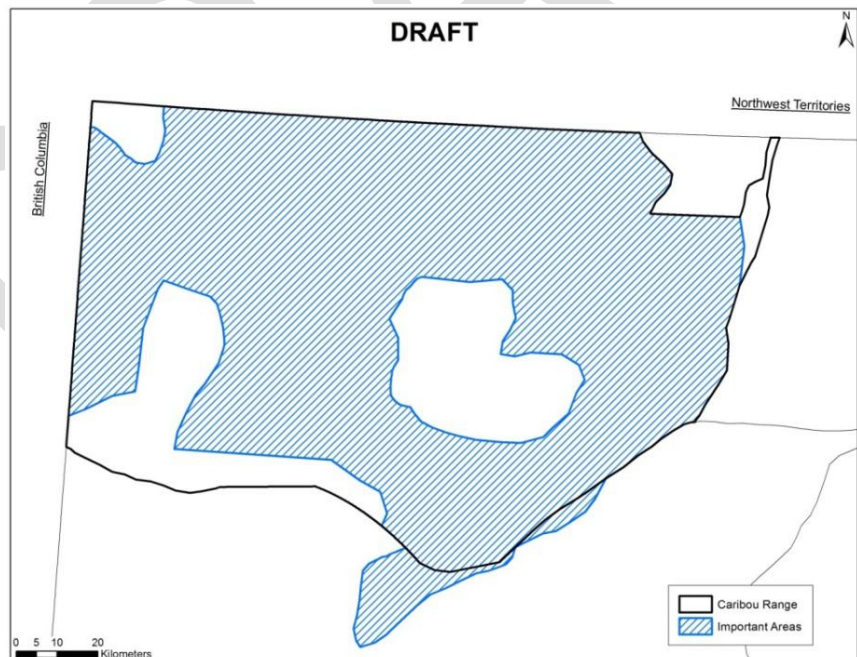


Figure 12 Important areas for caribou in the Bistcho caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



2.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management actions that will initiate achievement of the recovery goals and objectives within the Bistcho caribou range.

2.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northwestern regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

10. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration activities needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

2.4.2 Management of Access

Within the Bistcho caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

11. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
12. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan that will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

2.4.3 Management of Energy Activity

13. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.



2.4.4 Management of Forestry Activity

14. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
15. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

2.4.5 Management of Coal, Metallic and Industrial Minerals Activity

16. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

2.4.6 Management of Sand and Gravel Activity

17. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

2.4.7 Management of Peat Activity

18. Peat activities within the caribou range will follow approaches identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

2.4.8 Candidate Conservation Areas

19. Designate a new Conservation Area within a portion of FMU F20.
 - a. Designation to be finalized through public engagement processes and finalization of the Bistcho Caribou Range Plan.
 - b. No future surface disturbance will be issued within the Conservation Area.
 - c. Existing leases, activities and agreements within the Conservation Area will be honoured.
 - d. Designation will work to contribute to other regional planning initiatives for the area (i.e. the Lower Peace Regional Plan).
 - e. Designation to contribute to Alberta's goal of protecting 17% of terrestrial areas by 2020.



A.3 THE CARIBOU MOUNTAINS RANGE - CURRENT STATE

3.1 Caribou Mountains Range Overview

The Caribou Mountains caribou range is occupied by a boreal woodland caribou population. This caribou range is currently delineated as extending into Wood Buffalo National Park, although there is relatively little documented occurrence of the Caribou Mountains caribou population within the park. This caribou range is located within the Boreal Forest Natural Region, and Northern Mixedwood, Central Mixedwood, Boreal Subarctic, and Lower Boreal Highlands Sub-regions in northern Alberta. The range is a total 2,065,873 ha in size and overlaps with Caribou Mountains Wildland Provincial Park and Wood Buffalo National Park.

The Caribou Mountains range is located in Mackenzie County. The range partially overlaps with forest allocation within FMU F26, F23, and unallocated forest tenure in F10. Timber harvested in this area is used to supply a dimension lumber sawmill in High Level, an oriented strand board facility near High Level and a dimension lumber sawmill and pellet mill near the town of La Crete.

Currently, there is little of the range occupied by oil and gas leases, with only one active well located within the range at the time of this report. Historic seismic lines contribute to the majority of the disturbance footprint within the Caribou Mountains range, totalling 10,480 km of legacy disturbance footprint located throughout the range. Wildfire is also a dominant disturbance type in this caribou range.

3.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each local population in Canada. At the time of the assessment, the Caribou Mountains range was listed as very unlikely to be self-sustaining (Environment Canada, 2011). In the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada for the Period 2012-2017) the Caribou Mountains population is described as continuing to decline.

The Caribou Mountains population has been in decline since monitoring began in 1999. (Figure 13). The three-year mean annual population growth for the Caribou Mountains range is 0.94 (95% CI: 0.77-1.06) and the 10-year annual mean population growth is 0.93 (95CI: 0.76-1.05).

Data to inform population growth estimates were collected by collaring female caribou from 1995 to 2017 (n= 143 animals: 134 VHF collars, 9 GPS collars) and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 1999 to 2017 are shown, because this is when sample size to calculate annual population growth rate (λ) was sufficient. Recent minimum counts of Caribou Mountains population (during surveys conducted for other purposes) have documented up to 352 animals; the actual number of animals currently in this population is unknown.



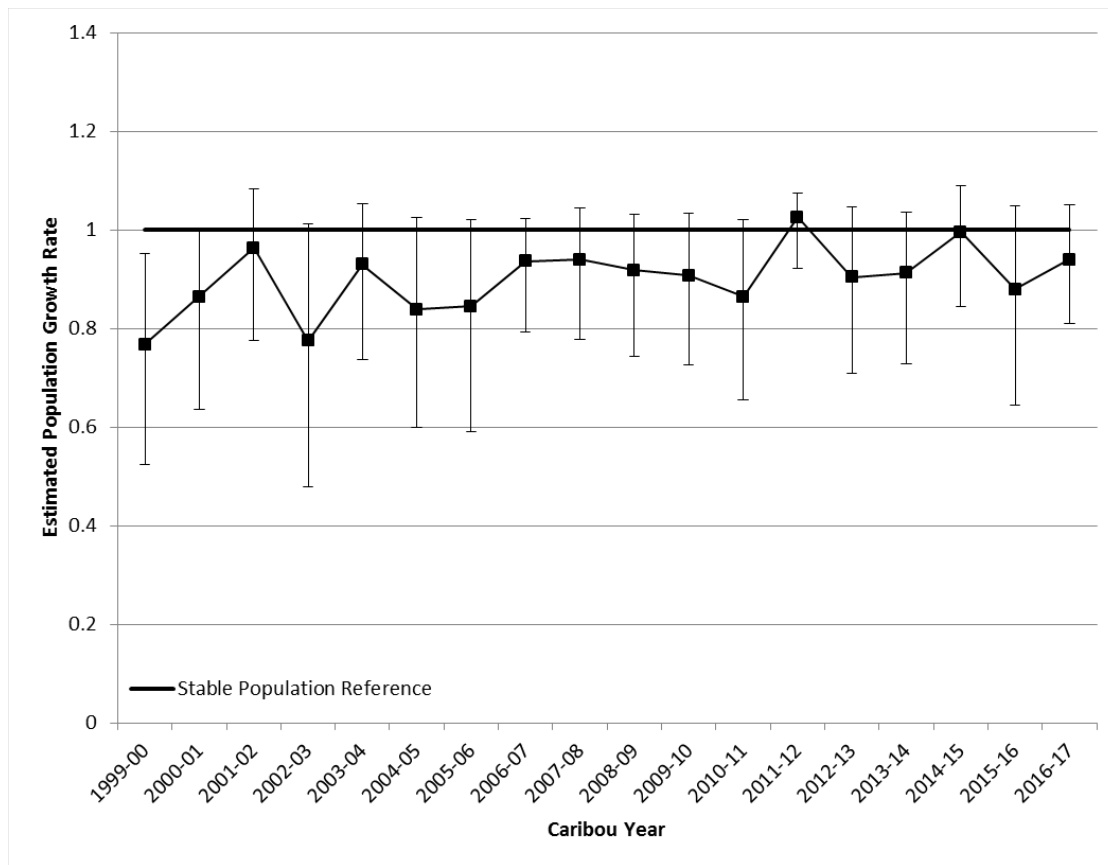


Figure 13 Estimates of annual population growth rate for the Caribou Mountains population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. a population increase), <1 indicates a negative population growth (i.e. a population decline).

3.3 Current Habitat Condition and Important Areas for Caribou

3.3.1 Habitat condition and disturbance levels

Petroleum, natural gas and forestry are the main industrial activities and tenure holders in the Caribou Mountains range (Table 5). Legacy seismic lines and wildfire are dominant habitat disturbance features within the Caribou Mountains range.

Currently, 65% of the Caribou Mountains range is considered disturbed by natural and anthropogenic footprint including the federal 500 m buffer. Wildfires within the past 40 years account for 45% of the disturbance within this range, though some of this footprint overlaps with anthropogenic footprint within the range (Table 6 and Figure 14).



Table 5 – Industrial Tenure within the Caribou Mountains range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	28%
Petroleum and Natural Gas	Permit or Lease	<1%

Table 6 – Habitat Condition Balance Sheet.³

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
2011 Scientific Assessment	2,065,873	44%					57%	43%
Present	2,065,873	45%	36%	4%	<1%	1%	37%	35%

³ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



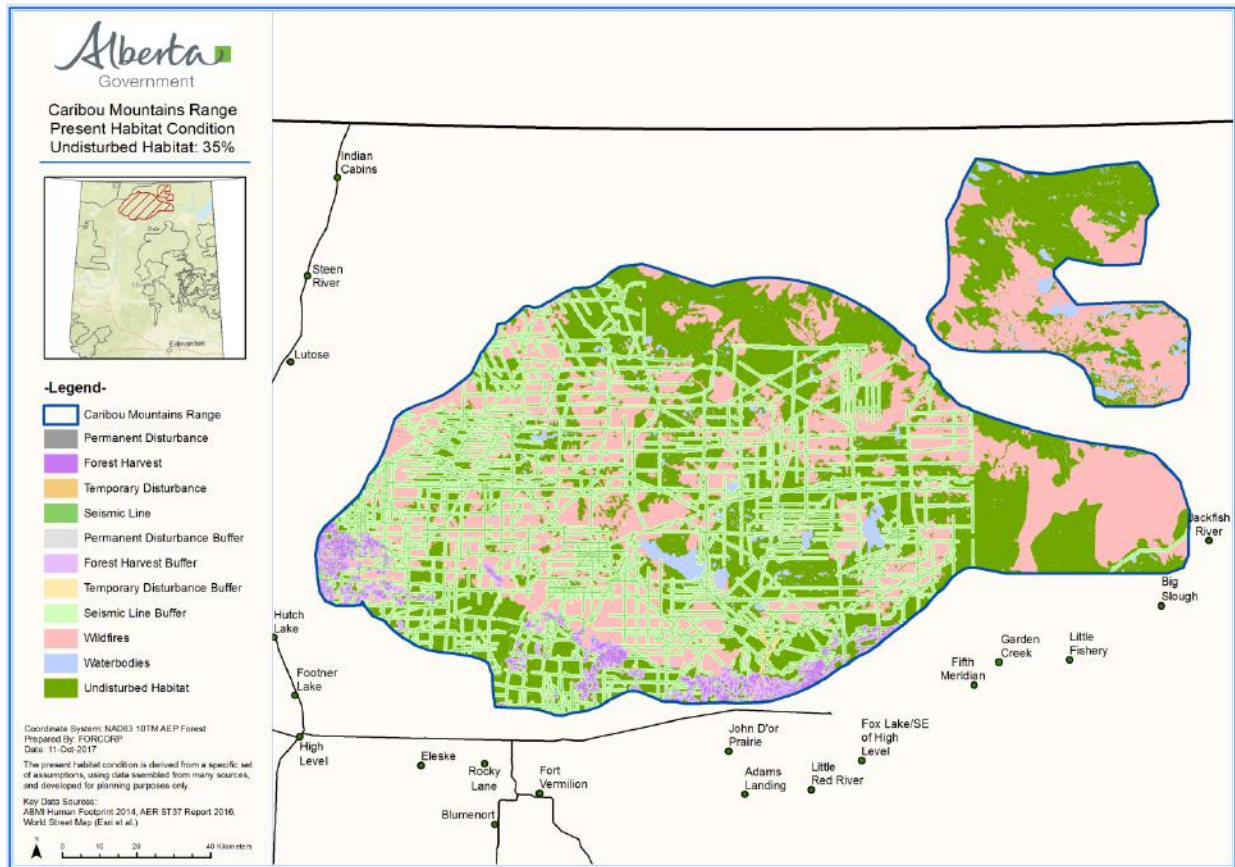


Figure 14 The current state of disturbed and undisturbed habitat within the Caribou Mountains range.

3.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 15 and Figure 16) and the occurrence of biophysical habitat (Figure 17) were identified for the Caribou Mountains range. Following direction from the federal guidance document, important areas for caribou (Figure 18) also identified and include areas key for maintaining connectivity within and among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use, biophysical habitat and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



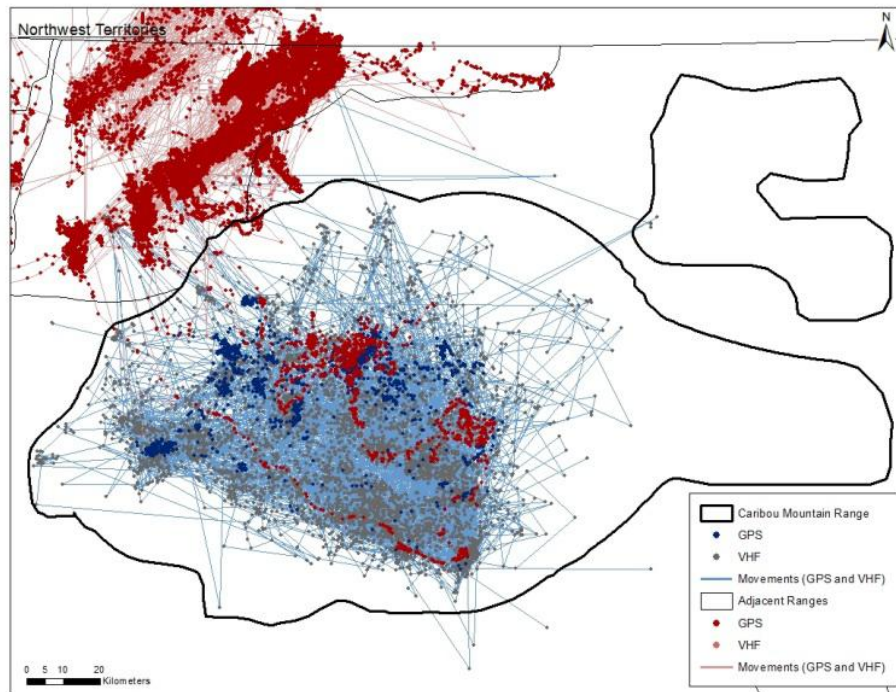


Figure 15 Locations from radio-collared caribou from the Caribou Mountains and adjacent caribou populations. Data collected 1995-2017, from n = 143 Caribou Mountains caribou (134 VHF collars, 9 GPS collars). Lines indicate caribou movements individual between movement locations.

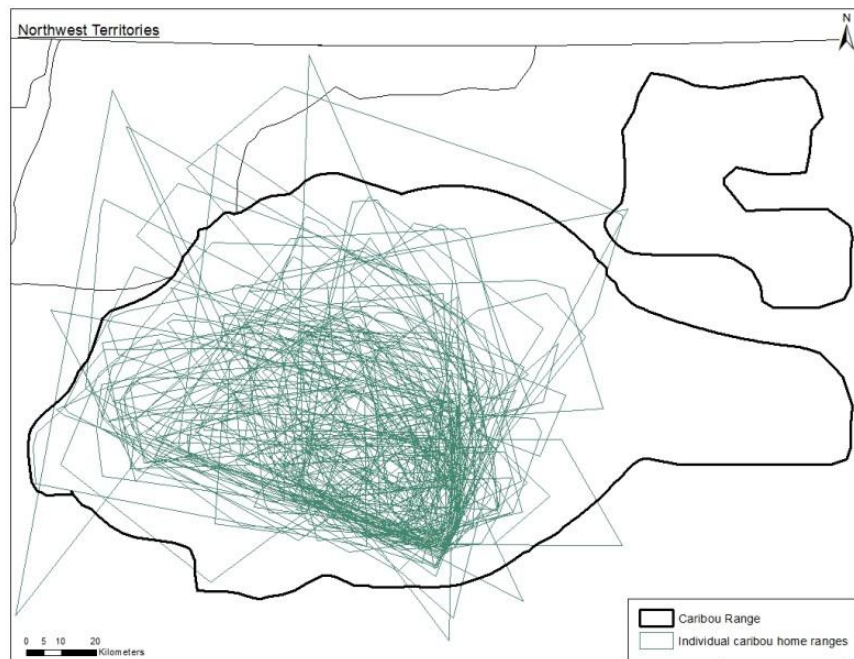


Figure 16 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1995-2017, from n = 143 Caribou Mountains caribou (134 VHF collars, 9 GPS collars).



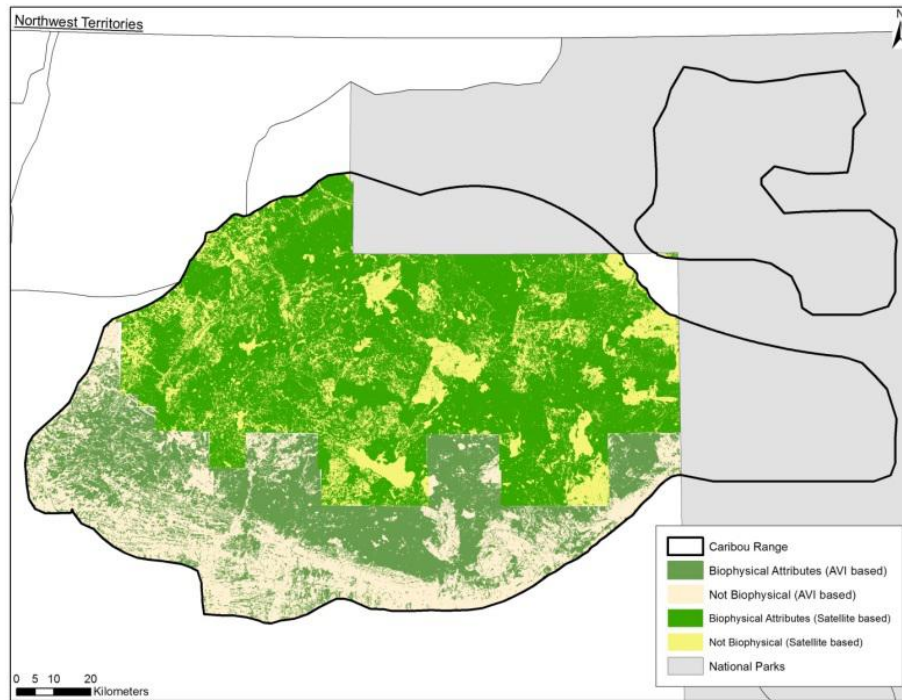


Figure 17 Current availability of caribou biophysical habitat in the Caribou Mountains caribou range. Where available, biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

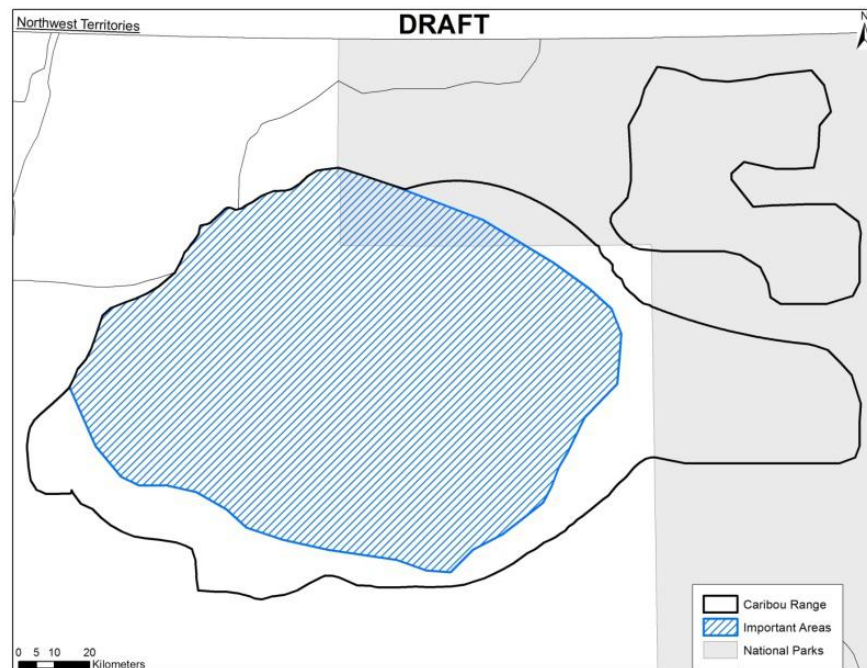


Figure 18 Important areas for caribou in the Caribou Mountains caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



3.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate habitat that will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management approaches that will initiate achievement of the recovery goals and objectives within the Caribou Mountains range.

3.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northwestern regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

20. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

3.4.2 Management of Access

Within the Caribou Mountains range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

21. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
22. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan that will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

3.4.3 Management of Energy Activity

23. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.



3.4.4 Management of Forestry Activity

24. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
25. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

3.4.5 Management of Coal, Metallic and Industrial Minerals Activity

26. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

3.4.6 Management of Sand and Gravel Activity

27. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

3.4.7 Management of Peat Activity

28. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

3.4.8 Candidate Conservation Areas

29. Designate a new Conservation Area within FMU F10.
 - a. Designation to be finalized through public engagement processes and finalization of the Caribou Mountains range plan.
 - b. No future surface disturbance will be issued within the Conservation Area.
 - c. Existing leases, activities and agreements within the Conservation Area will be honoured.
 - d. Designation will work to contribute to other regional planning initiatives for the area (i.e. the Lower Peace Regional Plan).
 - e. Designation to contribute to Alberta's goal of protecting 17% of terrestrial areas by 2020.



A.4 THE CHINCHAGA CARIBOU RANGE - CURRENT STATE

4.1 Chinchaga Caribou Range Overview

The Chinchaga caribou range is occupied by a boreal woodland caribou population. Some animals from this population use adjacent areas in British Columbia. The Chinchaga range is located within the Boreal Forest Natural Region, and Central Mixedwood, Dry Mixedwood Lower Boreal Highlands, and Upper Boreal Highlands Sub-regions in northern Alberta. The range is a total 1,764,364 hectares in size.

The Chinchaga range is located in Mackenzie County, County of Northern Lights, Clear Hills County and Northern Sunrise County. This range also overlaps forest tenure allocation within FMUs F26, P20 and P19 and unallocated forest resources in F14, P14 and P8. Volumes harvested in these areas are used to supply a dimension lumber sawmill in High Level, an oriented strand board facility near High Level, a dimension lumber sawmill and pellet mill near the town of La Crete, a dimension lumber sawmill near Manning, and a pulp mill near Peace River. While there is currently no forestry tenure allocated in F14, P14 or P8 there are Community Timber Permit Programs (CTPPs) issued for these areas.

The Chinchaga range overlaps areas with oil and natural gas leases, in addition to oil sands tenure. Specifically, the Chinchaga range overlaps with the Montney, Muskwa, North Nordegg and Wilrich formations (among others), with current oil and gas operations spread across the range. In addition to oil and gas, coal and metallic leases/agreements are also located in the range. Historic seismic lines contribute to the majority of the disturbance footprint within the Chinchaga range, totalling 62,582 km of legacy disturbance footprint throughout the range. Wildfire contributes to the remaining disturbance levels within this range (though some of this natural footprint overlaps with current anthropogenic footprint found on the landscape).

4.2 Local Population Self-Sustainability Status

The Chinchaga caribou population has been in decline since monitoring began in 2002. Most annual population growth rate estimates indicate a declining population (Figure 19). In the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada for the Period 2012-2017) the Chinchaga caribou population is described as continuing to decline.

Recent minimum counts of the Chinchaga caribou during surveys conducted for other purposes have documented at least 74 animals; the actual number of animals currently in this population is unknown. The three-year mean annual population growth is 0.97 (95% CI: 0.81-1.09) and the 10-year mean annual population growth is 0.92 (95CI: 0.84-1.10). Data to inform population growth estimates were collected by collaring female caribou from 1982-2017, (n= 198 animals: 130 VHF collars, 68 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March.



Only data from 2002-2017 are shown, because this is when sample size to calculate lambda was sufficient.

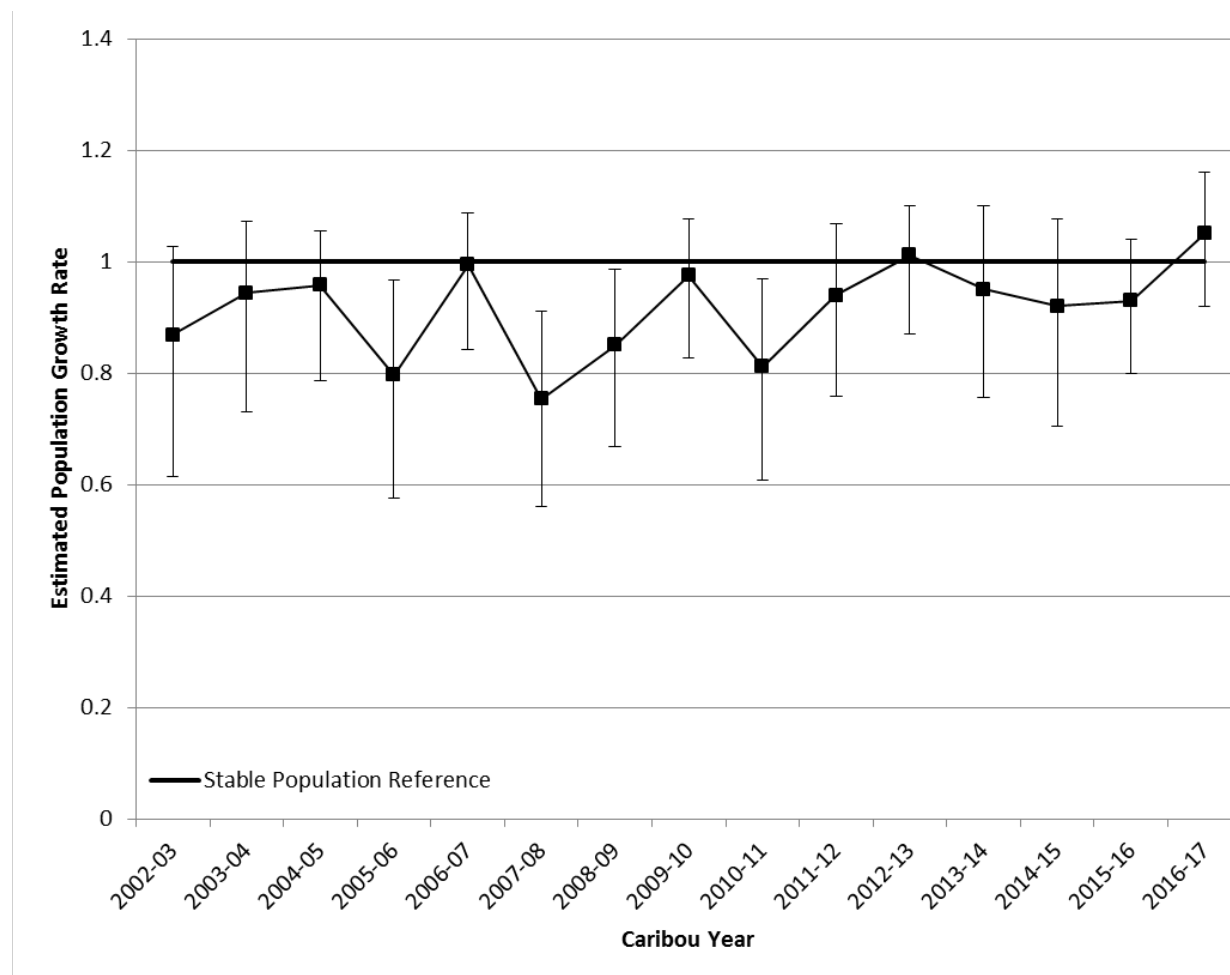


Figure 19 Annual estimates of population growth rate for the Chinchaga caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).

4.3 Current Habitat Condition and Important Areas for Caribou

4.3.1 Habitat condition and disturbance levels

Petroleum, natural gas and forestry are the main industrial activities and tenure holders in the Chinchaga range (Table 7). Other industrial activities within the range include coal, metallic and industrial minerals, sand and gravel and electrical transmission lines. Legacy seismic lines continue to remain as part of a historical footprint within the Chinchaga range, covering 96% of the range.



Currently, 97% of the Chinchaga range is considered disturbed by natural and anthropogenic footprint including the federal 500 m buffer (Table 8; Figure 20). Wildfires within the past 40 years account for 12% of the disturbance within this range, though some of this footprint overlaps with anthropogenic footprint within the range.



Table 7 – Industrial Tenure within the Chinchaga range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	71%
Oil Sands	Permit or Lease	1%
Natural Gas	Permit or Lease	3%
Coal	Permit or Lease	1%
Petroleum and Natural Gas	Permit or Lease	23%
Metallic and Industrial Minerals	Permit or Lease	6%

Table 8 – Habitat Condition Balance Sheet.⁴

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
2011 Scientific Assessment	1,764,364	8%					74%	24%
Present	1,764,364	12%	96%	13%	3%	29%	97%	3%

⁴ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



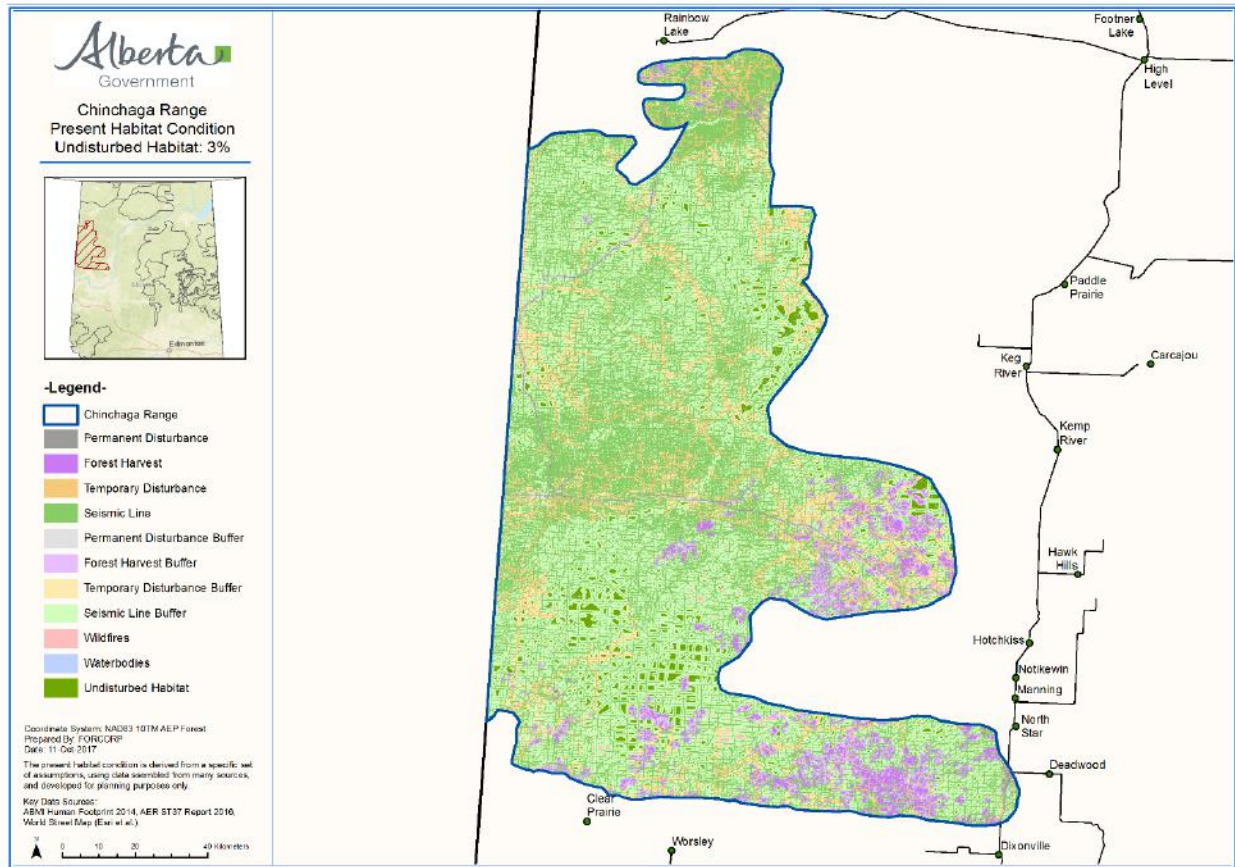


Figure 20 The current state of disturbed and undisturbed habitat within the Chinchaga caribou range.

4.3.2 Patterns of Habitat Use

Patterns of habitat use (Figure 21 and Figure 22) and biophysical habitat (Figure 23) were identified for the Chinchaga caribou range. Following direction from the federal guidance document, important areas for caribou (Figure 24) were also identified and include areas key for maintaining connectivity within and among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use, biophysical habitat and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



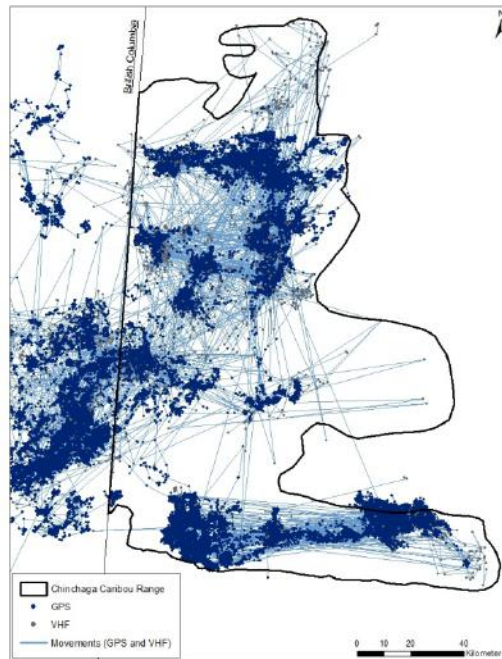


Figure 21 Locations from radio-collared caribou from the Chinchaga population. Data collected 1982-2017, from $n = 198$ animals (130 VHF collars, 68 GPS collars). Lines indicate caribou movements between locations.



Figure 22 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1982-2017, from $n = 198$ Chinchaga caribou (130 VHF collars, 68 GPS collars).



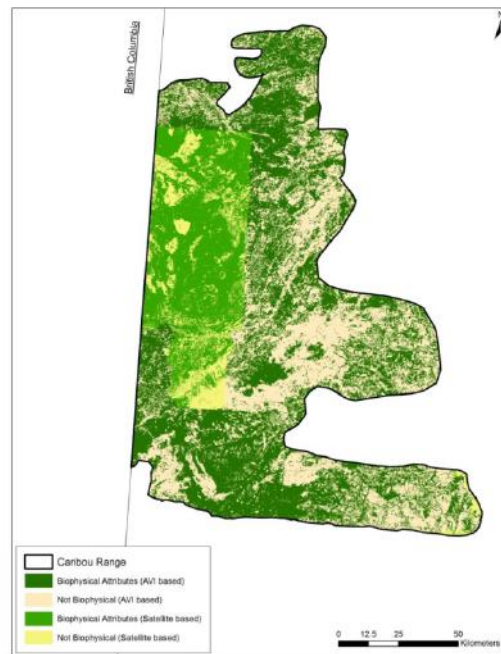


Figure 23 Current availability of caribou biophysical habitat in the Chinchaga caribou range. Where available, biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

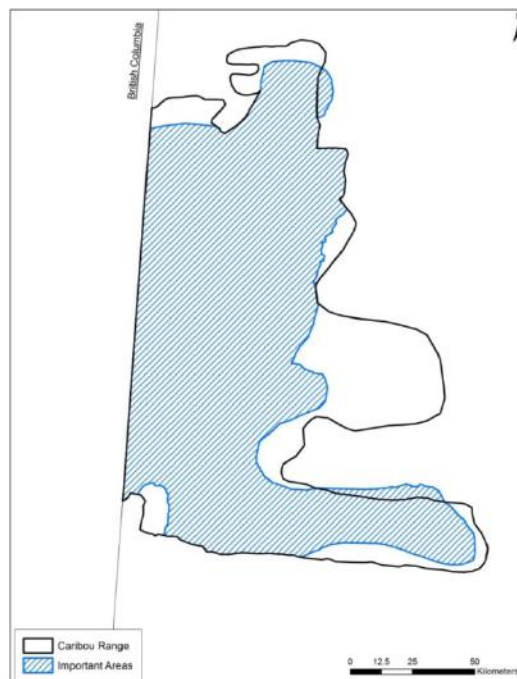


Figure 24 Important areas for caribou in the Chinchaga caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



4.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate habitat that will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management approaches that will initiate achievement of the recovery goals and objectives within the Chinchaga caribou range.

4.4.1 Restoration Management

Operational restoration plans for this range will be developed by the Northwestern regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

30. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration activities needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

4.4.2 Management of Access

Within the Chinchaga caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

31. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
32. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan that will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

4.4.3 Management of Energy Activity

33. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.



4.4.4 Management of Forestry Activity

34. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
35. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

4.4.5 Management of Coal, Metallic and Industrial Minerals Activity

36. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

4.4.6 Management of Sand and Gravel Activity

37. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

4.4.7 Management of Peat Activity

38. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

4.4.8 Candidate Conservation Areas

39. Designate a new Conservation Area within FMU P8.
 - a. Designation to be finalized through public engagement processes and finalization of the Chinchaga Caribou range plan.
 - b. No future surface disturbance will be issued within the Conservation Area.
 - c. Existing leases, activities and agreements within the Conservation Area will be honoured.
 - d. Designation will work to contribute to other regional planning initiatives for the area (i.e. the Lower Peace Regional Plan).
 - e. Designation to contribute to Alberta's goal of protecting 17% of terrestrial areas by 2020.



A.5 THE COLD LAKE CARIBOU RANGE - CURRENT STATE

5.1 Cold Lake Caribou Range Overview

The Cold Lake caribou range is occupied by a boreal woodland caribou population. Some caribou in this population use adjacent areas in Saskatchewan. The Cold Lake range is bordered on its northern side by the East Side of the Athabasca River caribou range. The Cold Lake Range is 672,422 ha in size, and is a part of the Boreal Plains Ecozone. It is located in northeast Alberta, north of the Town of Cold Lake, and partially within the municipal boundary of the Municipal District of Bonnyville. This range extends into the province of Saskatchewan, and has the Cold Lake Air Weapons Range (CLAWR) located within its boundary.

The main sources of anthropogenic footprint within this range can be attributed to the extraction of natural resources (e.g. oil, gas, timber, sand and gravel). The exploration, extraction and development of these resources provides economic stability to many Albertan communities. For example, timber volumes harvested from this range help to supply a pulp mill near Athabasca, two saw mills near Iron River, and salvage wood collected by Cold Lake First Nation. Oil and gas companies operating in this range employ staff from across Alberta and Canada, in a wide variety of vocations.

5.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each local population in Canada. At the time of the assessment, the Cold Lake range was listed as very unlikely to be self-sustaining (Environment Canada, 2011). According to the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for Woodland Caribou, (*Rangifer tarandus caribou*), Boreal Population in Canada for the period 2012-2017) the Cold Lake caribou population continues to decline.

The Cold Lake caribou population has been in decline since monitoring began in 1999. All annual population growth rate estimates since 2000 have indicated a decreasing population (Figure 25); the decline in some years has been steep. A wolf population reduction program began in this range in 2016/17. Recent minimum counts of Cold Lake caribou (during surveys conducted for other purposes) have documented at least 117 animals in Alberta and 73 animals in Saskatchewan. Fecal DNA-based techniques are being employed in an attempt to develop an accurate estimate of the caribou population size. Three-year mean annual population growth is 0.92 (95% CI: 0.76-1.04) and the 10-year mean annual population growth is 0.83 (95CI: 0.63-0.98). Data to inform population growth estimates were collected by collaring female caribou from 1992-2017, (n= 305 animals: 244 VHF collars, 61 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 1999-2017 are shown, because this is when sample size to calculate annual population growth rate (λ) was sufficient.



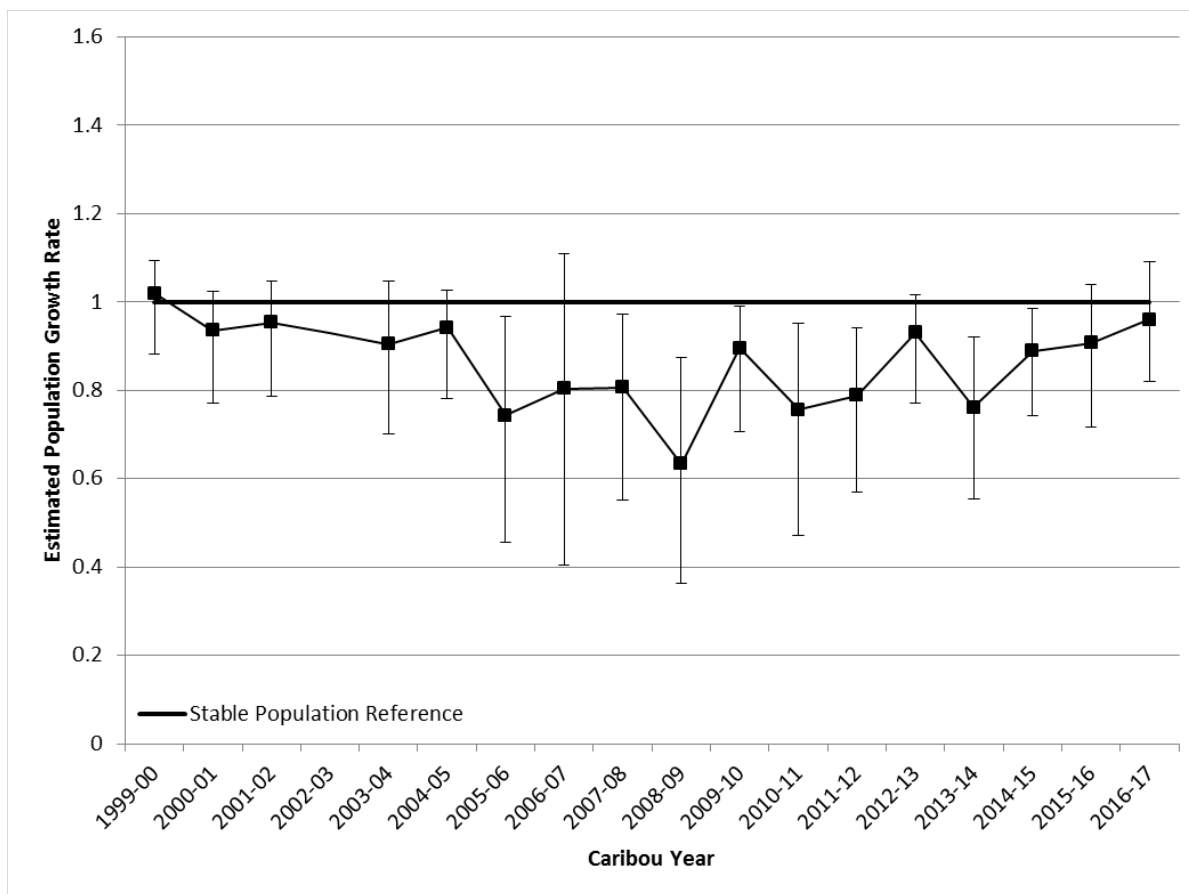


Figure 25 Estimated annual population growth rate for the Cold Lake caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population growth), <1 indicates negative population growth (i.e. population decline).

5.3 Current Habitat Condition and Important Areas for Caribou

5.3.1 Habitat condition and disturbance levels

Petroleum, natural gas, oil sands, forestry and metallic/minerals are the main industrial activities and tenure holders in the Cold Lake range (Table 9). Legacy footprint including seismic lines, abandoned wells and pipelines also make up a large portion of the current footprint. Active restoration of seismic lines has been occurring within the Cold Lake caribou range, including work completed by industry within the Dillon Wildland Park and near Christina Lake and Foster Creek.

The Cold Lake caribou range currently has 15% undisturbed habitat (not including wildfire), and at 9% undisturbed habitat including wildfire (Table 10; Figure 26). Wildfire is a major contributor to the overall per cent disturbed habitat in northeast Alberta including the Cold Lake range.



Table 9 – Industrial Tenure within the Range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	35%
Oil Sands	Permit or Lease	63%
Petroleum and Natural Gas	Permit or Lease	56%
Metallic and Industrial Minerals	Permit or Lease	0%

Table 10 – Habitat Condition Balance Sheet.⁵

Time	Range Size (ha)	Total Wildfire Disturbance (%)	Anthropogenic Disturbance				Total Anthropogenic Disturbance (%)	Total Undisturbed Habitat (%)
			Seismic Line Disturbance (%)	Forest Harvest Disturbance (%)	Permanent Disturbance (%)	Temporary Disturbance (%)		
2011 Scientific Assessment	672,422	32					72	15
Present	672,422	30	80	4	5	48	87	9

⁵ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



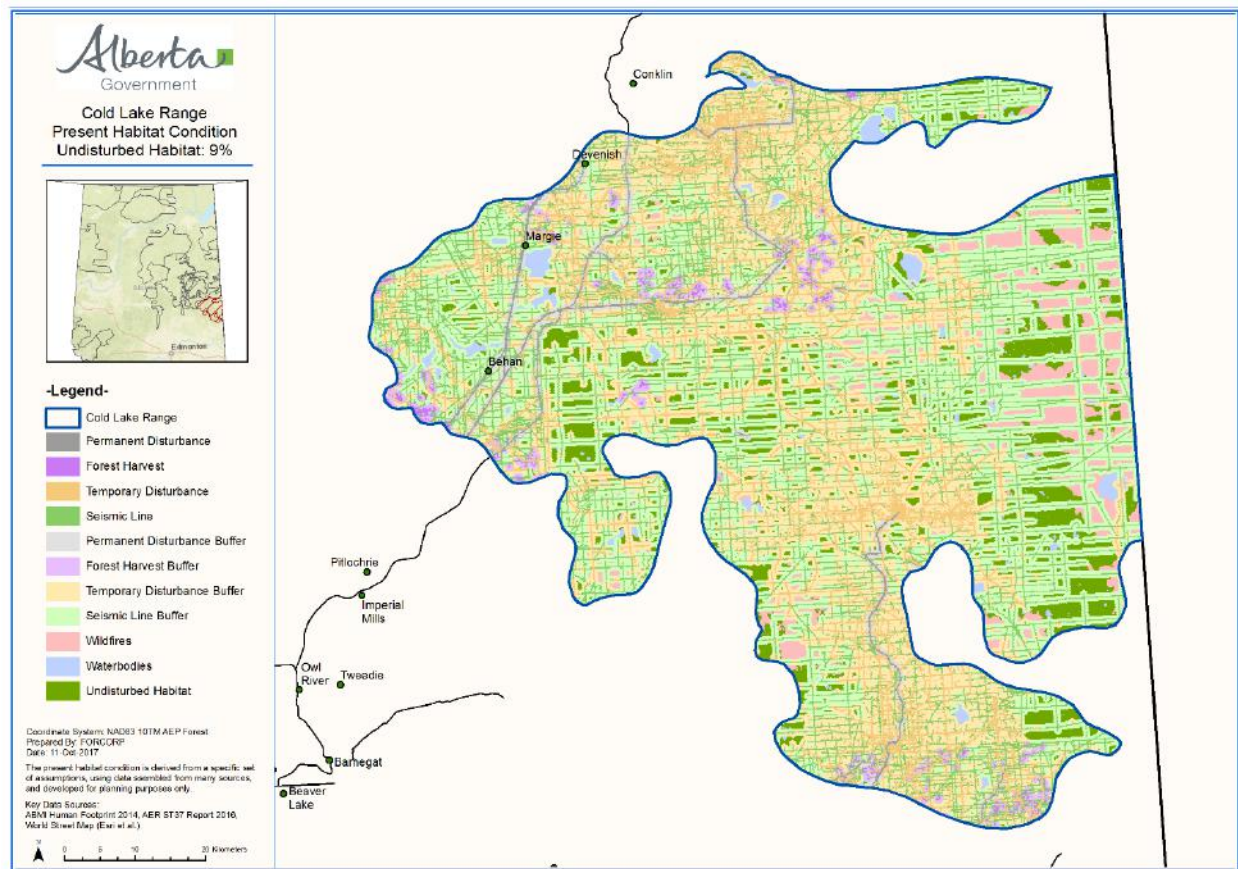


Figure 26 The current state of disturbed and undisturbed habitat within the Cold Lake caribou range

5.3.2 Patterns of habitat use

Patterns of habitat use (Figure 27 and Figure 28) and the occurrence of biophysical attributes (Figure 29) were identified for the Cold Lake range. Following direction from the federal guidance document, important areas (Figure 30) for caribou were also identified and include areas key for maintaining connectivity within and among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



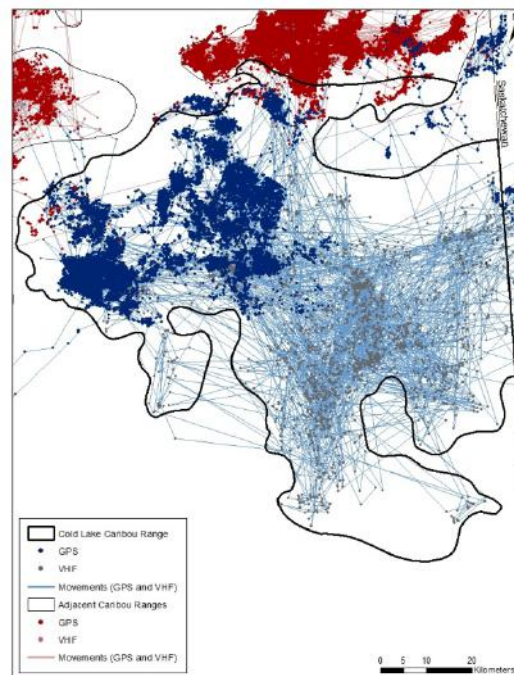


Figure 27 Locations from radio-collared caribou from Cold Lake and adjacent caribou populations. Data collected 1998-2017, from n = 117 Cold Lake caribou (105 VHF collars, 12 GPS collars). Lines indicate caribou movements between individual location points.

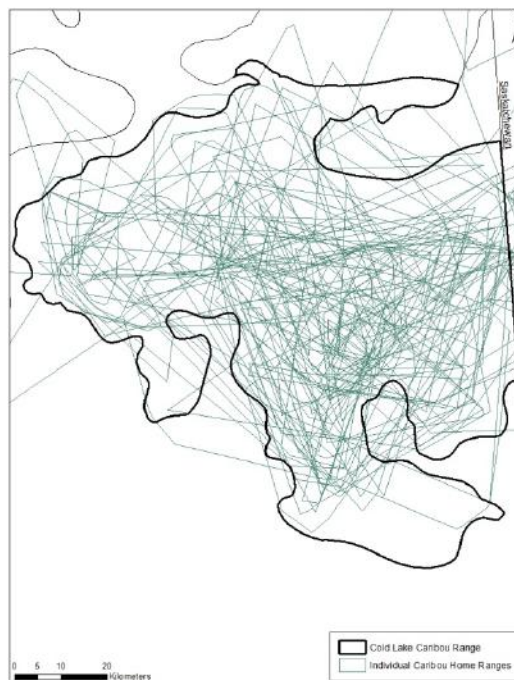


Figure 28 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1998-2017, from n = 117 Cold Lake caribou (105 VHF collars, 12 GPS collars).



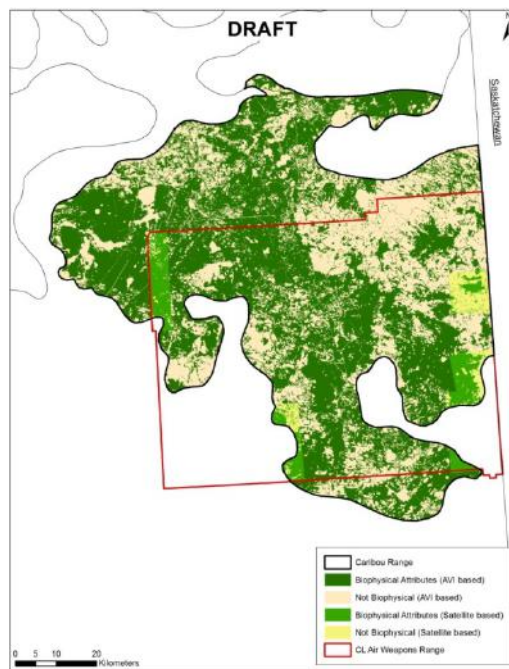


Figure 29 Current availability of caribou biophysical habitat for caribou in the Cold Lake caribou range. Where available, biophysical habitat was classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

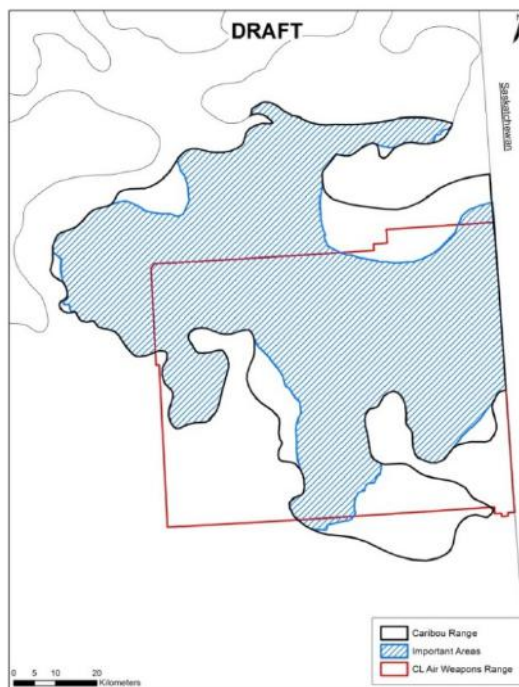


Figure 30 Important areas for caribou in the Cold Lake caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



5.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and management approaches that will initiate achievement of the recovery goals and objectives within the Cold Lake caribou range.

5.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northeast regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

40. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable approaches identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

5.4.2 Management of Access

Within the Cold Lake caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values. Access Management within this range will consider:

41. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
42. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan that will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.
43. Within the Cold Lake caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values. There are certain considerations specific to the Cold Lake caribou range that must be addressed during the planning phase:
 - a. Access management must align with the Memorandum Agreement (1986) between the provincial and federal government (re: Cold Lake Air Weapons Range).



- b. Access management must take into account habitat connectivity between adjacent jurisdictions (Province of Saskatchewan).
- c. Access management must align with the objectives of the Lower Athabasca Landscape Management Plan (to reduce footprint and maintain biodiversity).
- d. Access management must ensure connectivity within and between caribou ranges (reduce fragmentation and preserve intactness within the range).

5.4.3 Management of Energy Activity

- 44. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

5.4.4 Management of Forestry Activity

- 45. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
- 46. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

5.4.5 Management of Coal, Metallic and Industrial Minerals Activity

- 47. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific strategies needs to occur before the individual caribou range plan is released.

5.4.6 Management of Sand and Gravel Activity

- 48. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

5.4.7 Management of Peat Activity

- 49. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

5.4.8 Conservation Areas

- 50. The Lower Athabasca Regional Plan (LARP) was approved in 2012. Within this plan, new conservation areas were identified in the Lower Athabasca Region. The Dillon River Wildland Park was established through the LARP planning process, and covers a portion of the Cold Lake caribou range. This conservation area is 191,544 ha in size, and is considered a wildland park. This designation prohibits all industrial activity, but allows for continued recreation, hunting, fishing, trapping and multi-use corridors (Alberta Government 2012).



5.5 Population Management

Alberta's objectives for the Cold Lake caribou populations are framed as a phased approach towards achieving self-sustaining populations. Several management approaches are being considered for this range, including predator population management and possibly a rearing program.

An industry led initiative to explore the use of predator exclusion fence(s) in the northeast (East Side Athabasca River and Cold Lake ranges) was undertaken by the Canadian Oil Sands Innovation Alliance (COSIA). The pilot study is known as the Caribou Predator Fencing Pilot, and explored the design, location and feasibility of a caribou fence in the northeast. First Nation and Métis community members were involved in the pilot, informing the process based on unique knowledge of caribou and the landscape.



A.6 THE EAST SIDE OF THE ATHABASCA RIVER CARIBOU RANGE - CURRENT STATE

6.1 East Side of the Athabasca River (ESAR) Caribou Range Overview

The ESAR caribou range is occupied by a boreal caribou population. This population occurs in seven disjuncted sub-range areas, which are lumped together to comprise the overall ESAR range. The range borders on the Cold Lake range to the southeast and the West Side of the Athabasca River range to the west. The ESAR range is located in northern Alberta, north of the community of Lac La Biche. It is 1,315,980 ha in size, and falls within Boreal Plain Ecozone.

The ESAR range boundary overlaps portions of the counties of Athabasca and Lac La Biche as well as the Regional Municipality of Wood Buffalo. The main sources of anthropogenic footprint within this range can be attributed to the extraction of natural resources (e.g. oil, gas, timber, sand and gravel). The exploration, extraction and development of these resources provide social and economic benefits to many Alberta communities. For example, timber volumes harvested from this range help to supply a pulp mill near Athabasca and a sawmill in Fort McMurray. Oil and gas companies operating in this range employ staff from across Alberta and Canada, in a wide variety of vocations. The Stony Mountain Wildland Park, along with other provincial parks, is frequented by recreationists and outdoor enthusiasts.

The ESAR caribou range is overlapped by the Lower Athabasca Regional Plan boundary (including the Landscape Management Plan boundary (LMP) and the South Athabasca Oil Sands (SAOS) plan boundary). Work has been undertaken through the LMP to identify areas of high biodiversity and through the SAOS to model and manage cumulative effects of in situ operations in this area. These planning initiatives will help inform the range plan for the ESAR.

6.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada [ECCC]) released a scientific assessment for each local population in Canada. At the time of the assessment, the ESAR range was listed as very unlikely to be self-sustaining (Environment Canada, 2011). In the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for Woodland Caribou, (*Rangifer tarandus caribou*), Boreal Population in Canada for the period 2012-2017) the ESAR caribou population is described as continuing to decline.

The East Side Athabasca River caribou population has been in decline since monitoring began in 1999. All but one annual population growth rate estimate indicates a decreasing population (Figure 31). The population is considered declining by the Government of Alberta, and is classified as not self-sustaining by Canada based on habitat condition. A wolf population reduction program began in this range in 2016/17. Recent minimum counts of ESAR caribou (during surveys conducted for other purposes) have documented at least 227 animals. Fecal DNA-based techniques are being employed in an attempt to develop an accurate estimate of the caribou population size. Three-year mean annual population growth is 0.93 (95% CI: 0.84-



1.01) and the 10-year mean annual population growth is 0.90 (95CI: 0.77-1.00). Data to inform population growth estimates were collected by collaring female caribou from 1992-2017, (n= 305 animals: 244 VHF collars, 61 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 1999-2017 are shown, because this is when sample size to calculate annual population growth (λ) was sufficient.

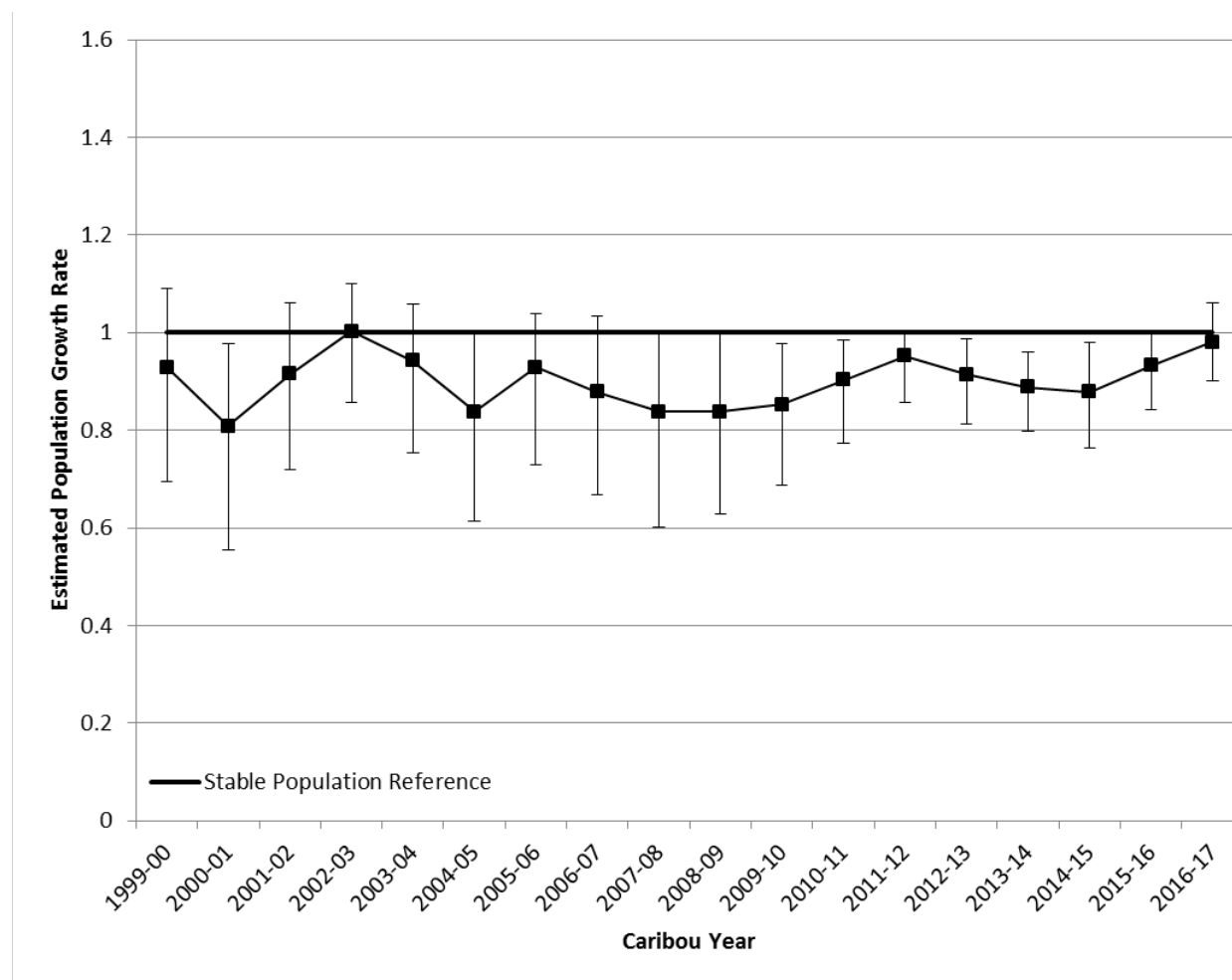


Figure 31 Estimated annual population growth rate for the East Side Athabasca River caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).



6.3 Current Habitat Condition and Important Areas for Caribou

6.3.1 Habitat condition and disturbance levels

The ESAR Range is located north and northwest of the community of Lac La Biche, Alberta. It extends north towards Fort McMurray and west towards the Athabasca River. The ESAR is broken down into seven sub-ranges: Agnes, Algar, Bohn, Christina, Egg-Pony, Wandering and Wiau. These sub-units were determined based on adult female caribou collar data.

Forestry, oil sands and petroleum natural gas (PNG) are the main industrial activities in the ESAR range (Table 11). Like many of the caribou ranges in the northeast, the ESAR range has experienced recent wildfires, accounting for 34% of overall disturbance (

Table 12). Aside from wildfire, the ESAR range is highly fragmented with anthropogenic footprint as well; having nearly 20,000 km of seismic lines and numerous wells, pipelines and roads (Figure 32).



Table 11 – Industrial Tenure within the East Side of the Athabasca River range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	87%
Oil Sands	Permit or Lease	73%
Petroleum and Natural Gas	Permit or Lease	49%
Metallic and Industrial Minerals	Permit or Lease	0%

Table 12 – Habitat Condition Balance Sheet.⁶

Time	Range Size (ha)	Total Wildfire Disturbance (%)	Anthropogenic Disturbance				Total Anthropogenic Disturbance (%)	Total Undisturbed Habitat (%)
			Seismic Line Disturbance (%)	Forest Harvest Disturbance (%)	Permanent Disturbance (%)	Temporary Disturbance (%)		
2011 Scientific Assessment	1,315,980	26					77	19
Present	1,315,980	32	84	13	3	41	88	10

⁶ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



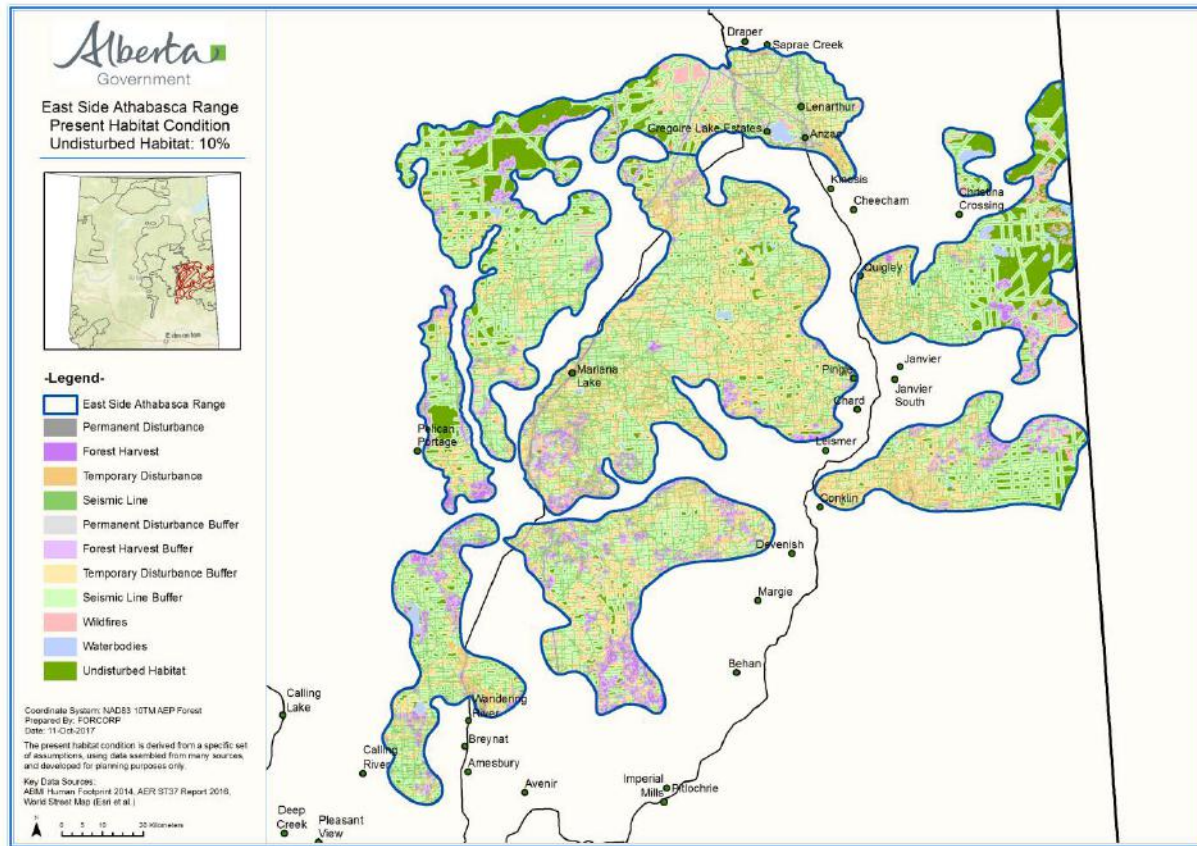


Figure 32 The current state of disturbed and undisturbed habitat within the ESAR caribou range

6.3.2 Patterns of habitat use

Patterns of caribou habitat use (Figure 33 and Figure 34) and the occurrence of biophysical attributes (Figure 35) were identified for the ESAR range. Following direction from the federal guidance document, important areas (Figure 36) for caribou also include areas key for maintaining connectivity within ranges and among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



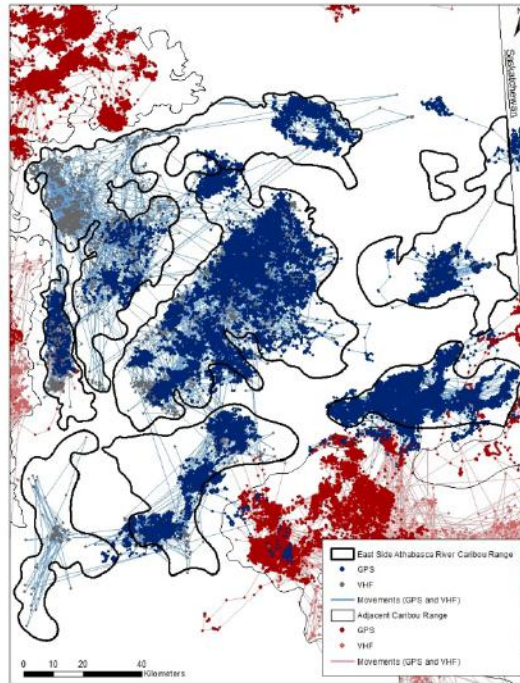


Figure 33 Locations from radio-collared caribou from the ESAR and adjacent caribou populations. Data collected 1992-2017, from n = 305 ESAR caribou (244 VHF collars, 61 GPS collars). Lines indicate caribou movements between individual location points.

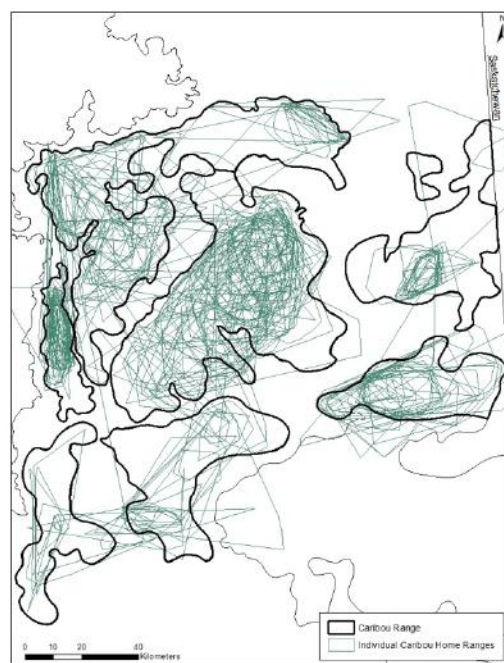


Figure 34 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1992-2017, from n = 305 ESAR caribou (244 VHF collars, 61 GPS collars).



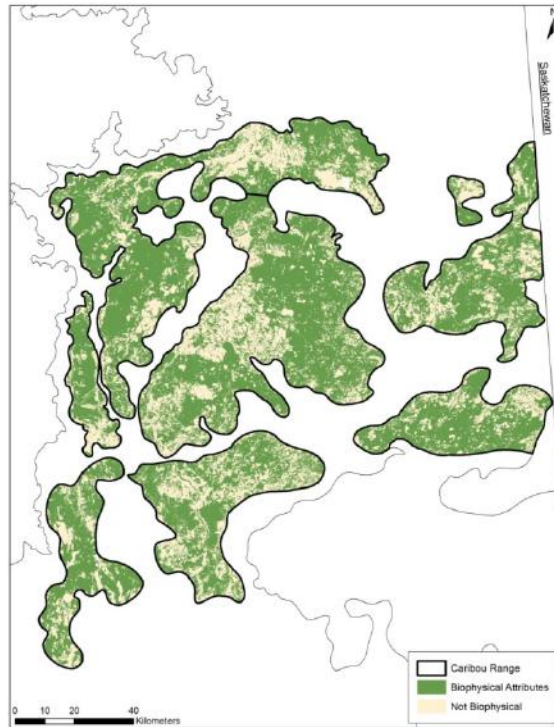


Figure 35 Current availability of caribou biophysical habitat in the ESAR caribou range. Biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data.



Figure 36 Important areas for caribou in the ESAR caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



6.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat that will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and management approaches that will initiate achievement of the recovery goals and objectives within the ESAR caribou range.

6.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northeast regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

51. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

6.4.2 Management of Access

Within the ESAR caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

52. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
53. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.
54. Within the ESAR caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values. There are certain considerations specific to the ESAR caribou range that must be addressed during the planning phase:
 - a. Access management must align with the objectives of the Lower Athabasca Landscape Management Plan (to reduce footprint and maintain biodiversity).



- b. Access management must ensure connectivity within and between caribou ranges (reduce fragmentation and preserve intactness within the range).

6.4.3 Management of Energy Activity

55. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

6.4.4 Management of Forestry Activity

56. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
57. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

6.4.5 Management of Coal, Metallic and Industrial Minerals Activity

58. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

6.4.6 Management of Sand and Gravel Activity

59. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

6.4.7 Management of Peat Activity

60. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

6.4.8 Conservation Areas

61. The Lower Athabasca Regional Plan (LARP) was approved in 2012. Within this plan, new conservation areas were identified in the Lower Athabasca Region (Alberta Government 2012). The ESAR range overlaps with several conservation areas, protecting 2% of the range:

- Grand Rapids Wildland Provincial Park
- Stony Mountain Wildland Provincial Park
- Gregoire Lake Provincial Park
- Gipsy Lake Wildland Provincial Park
- Crow Lake Ecological Reserve



6.5 Population Management

Alberta's objectives for the ESAR caribou populations are framed as a phased approach towards achieving self-sustaining populations. Several management approaches are being considered for this range, including predator population program and possibly a rearing program.

An industry-led initiative to explore the use of predator exclusion fence(s) in the northeast (ESAR and Cold Lake ranges) was undertaken by the COSIA. The pilot study is known as the Caribou Predator Fencing Pilot, and explored the design, location and feasibility of a caribou fence in the northeast. First Nation and Métis community members were involved in the pilot, informing the process based on unique knowledge of caribou and the landscape.



A.7 THE LITTLE SMOKY CARIBOU RANGE - CURRENT STATE

7.1 Little Smoky Caribou Range Overview

The Little Smoky caribou range is occupied by the last boreal population of woodland caribou occurring in the eastern slopes of Alberta. The distribution of woodland caribou in west-central Alberta has greatly declined over the last 50 to 80 years. This range borders on the A La Pêche caribou range. While they share a common border; the caribou in the Little Smoky range are non-migratory while the A La Pêche population are migratory.

The range is made up of 308,380 hectares of Alberta's Green Area of public managed lands. The Little Smoky range is located within the Foothills, Subalpine and Alpine Natural Regions, and Lower Foothills and Upper Foothills Sub-regions.

The Little Smoky caribou range is located in the Municipal District of Greenview No.16 and Yellowhead County but contributes to the economic and social sustainability of a wider network of west-central Alberta towns and communities.

The main industrial land uses within the Little Smoky range are forestry and oil and gas. The range is heavily impacted by industrial activity and overlaps with Forest Management Agreements and forest quota allocations which cover 100% of the range. The range also overlaps with petroleum and natural gas resources (97%) and metallic and industrial mineral resources (1%) contained in the Nikanassin and Shallow formations.

7.2 Local Population Self-Sustainability Status

The Little Smoky caribou population was in decline from 1999-2005. After implementing an annual wolf population management program in winter 2005/06, annual population growth rate estimates indicated a stable population (Figure 37). The population is considered stable by the Government of Alberta, although it remains classified as not self-sustaining by Canada, based primarily on habitat condition. The current wolf population program is integral to maintaining population stability and growth of this population, and avoiding its extirpation. Data to inform population growth estimates were collected by collaring female caribou from 1981-2017, (n= 188 animals: 122 VHF collars, 66 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 1999-2017 are shown, because this is when sample size to calculate annual population growth rate (λ) was sufficient.

Based on a fecal DNA mark-recapture population estimate, the size of the Little Smoky population is estimated to be 110 individuals (95% CI: 108-116). The 3-year mean population growth is 0.97 (95CI: 0.81-1.09) and the 10-year mean population growth is 0.99 (95CI: 0.84-1.10).



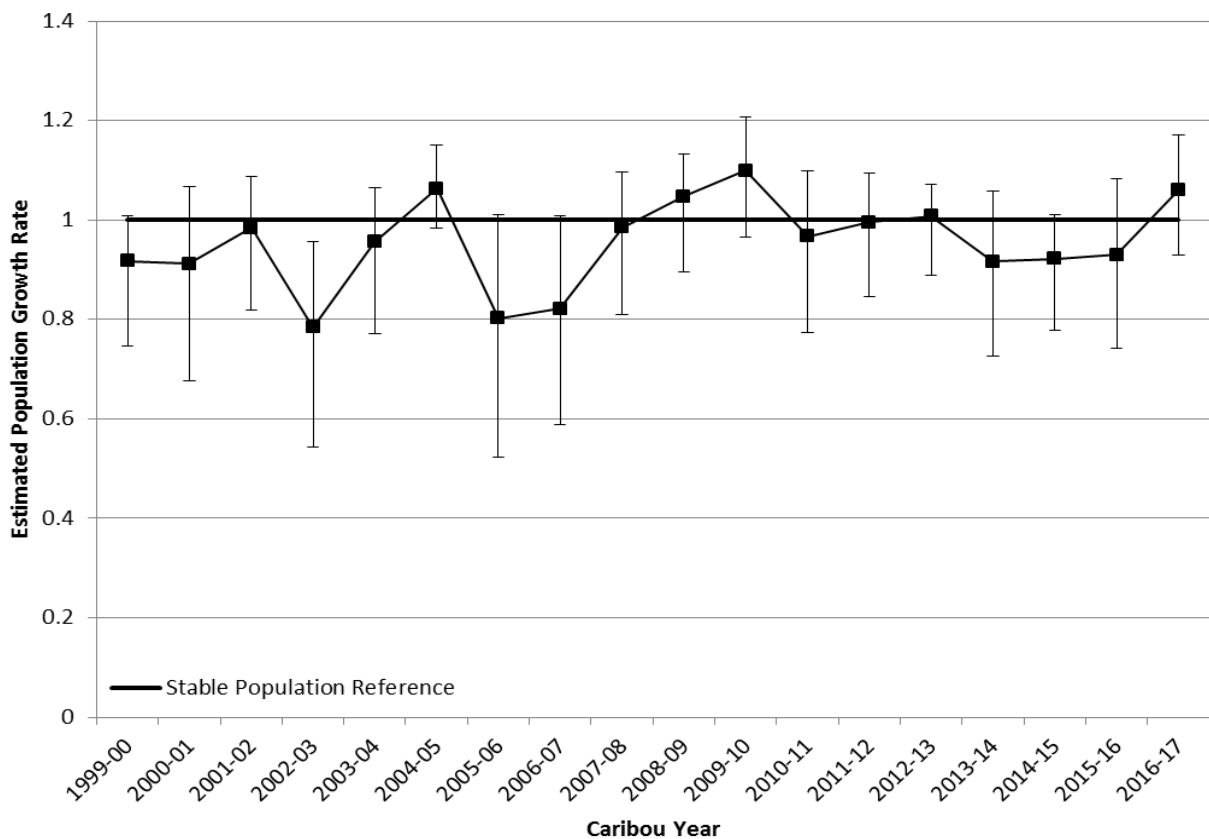


Figure 37 Estimated annual population growth rate for the Little Smoky caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e., population increase), <1 indicates negative population growth (population decline).

7.3 Current Habitat Condition and Important Areas for Caribou

7.3.1 Habitat Condition and Disturbance Levels

The Little Smoky range contains forestry, energy, minerals, and aggregates resources, which has led to resource extraction activities over the past decades and the issuance of related industrial tenure. Petroleum, natural gas, metallic and industrial minerals, and forestry are the primary industrial activities and tenure holders in the Little Smoky range (Table 13).

Currently, 99% of the Little Smoky range is considered disturbed by natural and anthropogenic footprint including the federal 500 m buffer (Table 14; Figure 38). Wildfires within the past 40 years account for less than 1% of the disturbance within this range, though some of this footprint overlaps with anthropogenic footprint within the range.



Table 13 – Industrial Tenure within the Little Smoky range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	100%
Oil Sands	Permit or Lease	0%
Petroleum and Natural Gas	Permit or Lease	97%
Metallic and Industrial Minerals	Permit or Lease	1%

Table 14 – Habitat Condition Balance Sheet.⁷

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
2011 Scientific Assessment	308,606	0.2%					95%	5%
Present	308,380	<1%%	98%	38%	1%	56%	99%	1%

⁷ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



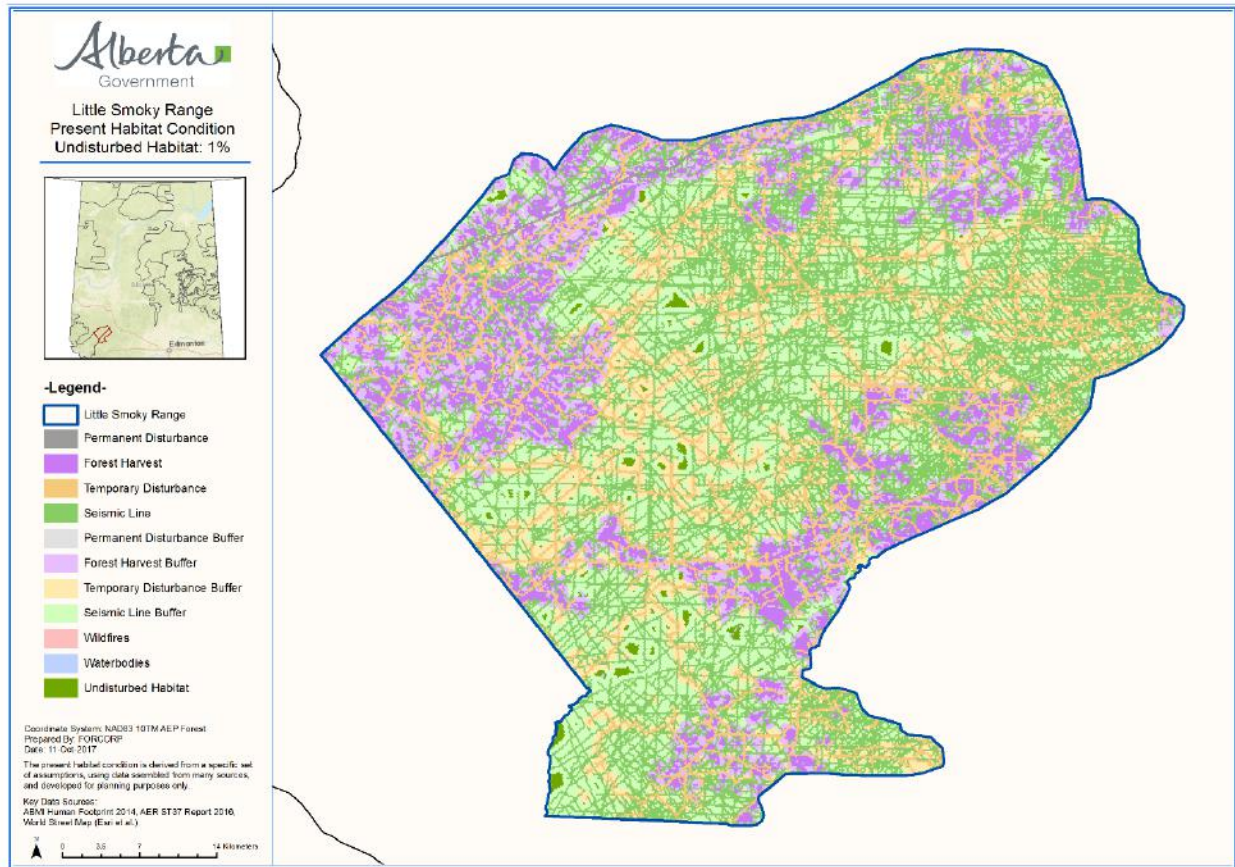


Figure 38 The current state of disturbed and undisturbed habitat within the Little Smoky caribou range

7.3.2 Patterns of habitat use

Patterns of habitat use (Figure 39 and Figure 40) and biophysical habitat (Figure 41) were identified for the Little Smoky caribou range. Following direction from the federal guidance document, important areas for caribou (Figure 42) also include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use, biophysical habitat and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



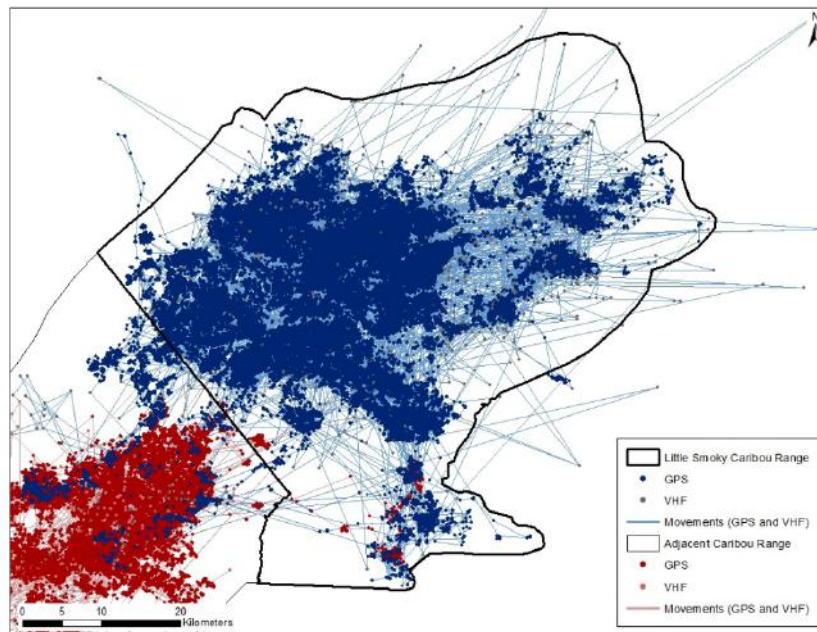


Figure 39 Locations from radio-collared Little Smoky caribou and adjacent caribou populations. Data collected 1981-2017, from $n = 188$ Little Smoky animals (122 VHF collars, 66 GPS collars). Lines indicate caribou movements between individual location points.



Figure 40 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1981-2017, from $n = 188$ Little Smoky animals (122 VHF collars, 66 GPS collars)



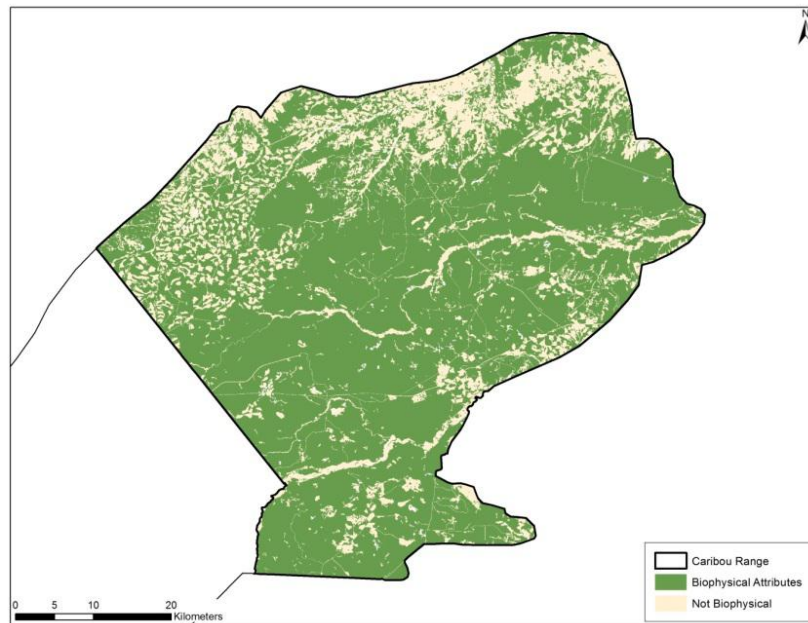


Figure 41 Current availability of caribou biophysical habitat in the Little Smoky caribou range. Biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

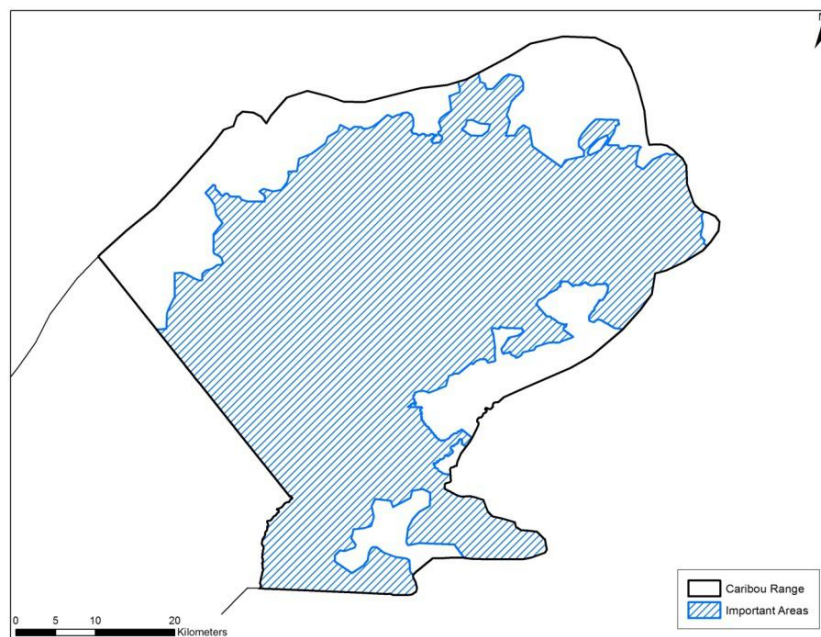


Figure 42 Important areas for caribou in the Little Smoky caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



7.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management actions that will initiate achievement of the recovery goals and objectives within the Little Smoky caribou range.

7.4.1 Restoration Management

Operational restoration plans for this range will be developed by the central region sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

62. In the caribou range, restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Caribou Range Plan.

7.4.2 Management of Access

Within the Little Smoky caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

63. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
64. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

7.4.3 Management of Energy Activity

65. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific actions needs to occur before the individual caribou range plan is released.



7.4.4 Management of Forestry Activity

- 66. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Caribou Range Plan.
- 67. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

7.4.5 Management of Coal, Metallic and Industrial Minerals Activity

- 68. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

7.4.6 Management of Sand and Gravel Activity

- 69. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

7.4.7 Management of Peat Activity

- 70. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Caribou Range Plan.

7.5 Population Management

Alberta's objectives for the Little Smoky caribou population are framed as a phased approach towards achieving self-sustaining populations. Several management approaches are being considered for this range, including ongoing predator population management and a rearing program.



A.8 THE NARRAWAY CARIBOU RANGE - CURRENT STATE

8.1 Narraway Caribou Range Overview

The Narraway caribou range is occupied by a southern mountain population of woodland caribou located in west central Alberta. The distribution of woodland caribou in west-central Alberta has greatly declined over the last 50 to 80 years. The Narraway population is one of three remaining southern mountain caribou LPUs under provincial jurisdiction (together with the Redrock-Prairie Creek and A La Peche populations), from a distribution of woodland caribou which formerly extended throughout much of Alberta's eastern slopes. Narraway caribou annually migrate between mountainous areas in British Columbia in the summer months and foothills forests in British Columbia and Alberta in the winter. The habitat and biological needs of the southern mountain populations are similar to the boreal populations; however, southern mountain caribou require different seasonal ranges that are connected by the lands that enable migration.

The range is made up of 104,066 hectares of Alberta's Green Area of public managed lands. This range borders on the Redrock-Prairie Creek caribou range.

The federal Recovery Strategy for the Woodland Caribou, Southern Mountain Population (2014) guides recovery efforts with these objectives:

- Stop the decline in both size and distribution of all Local Population Units (LPU);
- Maintain the current distribution within each LPU;
- Increase the size of all LPUs to self-sustaining levels and where appropriate and attainable, to levels which can sustain a harvest with dedicated or priority access to Aboriginal peoples; and
- Within the low elevation winter range, achievement of at least 65% undisturbed habitat is specified to help achieve caribou population sustainability.

The Narraway caribou range is located in the Municipal District of Greenview No.16 and the County of Grande Prairie, but contributes to the economic and social sustainability of a wider network of west-central Alberta towns and communities such as the town of Grande Cache. With these economies highly dependent on natural resources, range planning has the potential to both negatively and positively impact the town.

The main industrial land uses within the Narraway caribou range are forestry and oil and gas. The Narraway caribou range overlaps with one FMA which covers 100% of the range. The range also overlaps with petroleum and natural gas resources and metallic and industrial mineral resources contained in the Nikanassin and Shallow formations.



8.2 Local Population Self-Sustainability Status

The Narraway caribou range has generally been decreasing during the period of monitoring (Figure 43). Recent field operations have had difficulty in locating animals and it is possible that this population is nearing extirpation. Range recession has also been documented for this caribou population.

Expansion of the wolf population management program to include the Alberta portion of the Narraway range in 2014/15 may have slowed their decline, as population growth rates since then have been near 1 (Figure 43), but total population size is believed to be small (less than 50 animals) leaving this population as very vulnerable. The population is considered to be declining by the Government of Alberta, and not self-sustaining by Canada based primarily on habitat condition. Recent minimum counts of Narraway caribou (during surveys conducted for other purposes) have documented 28 animals; the actual number of animals currently in this population is unknown. Three-year mean population growth is 0.84 (95% CI: 0.59-1.07) and the 10-year mean population growth is 0.88 (95CI: 0.67-1.04). Data to inform population growth estimates were collected by collaring female caribou from 1995-2017, (n= 189 animals: 99 VHF collars, 90 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 2007-2017 are shown, because this is when sample size to calculate annual population growth rate (λ) was sufficient.



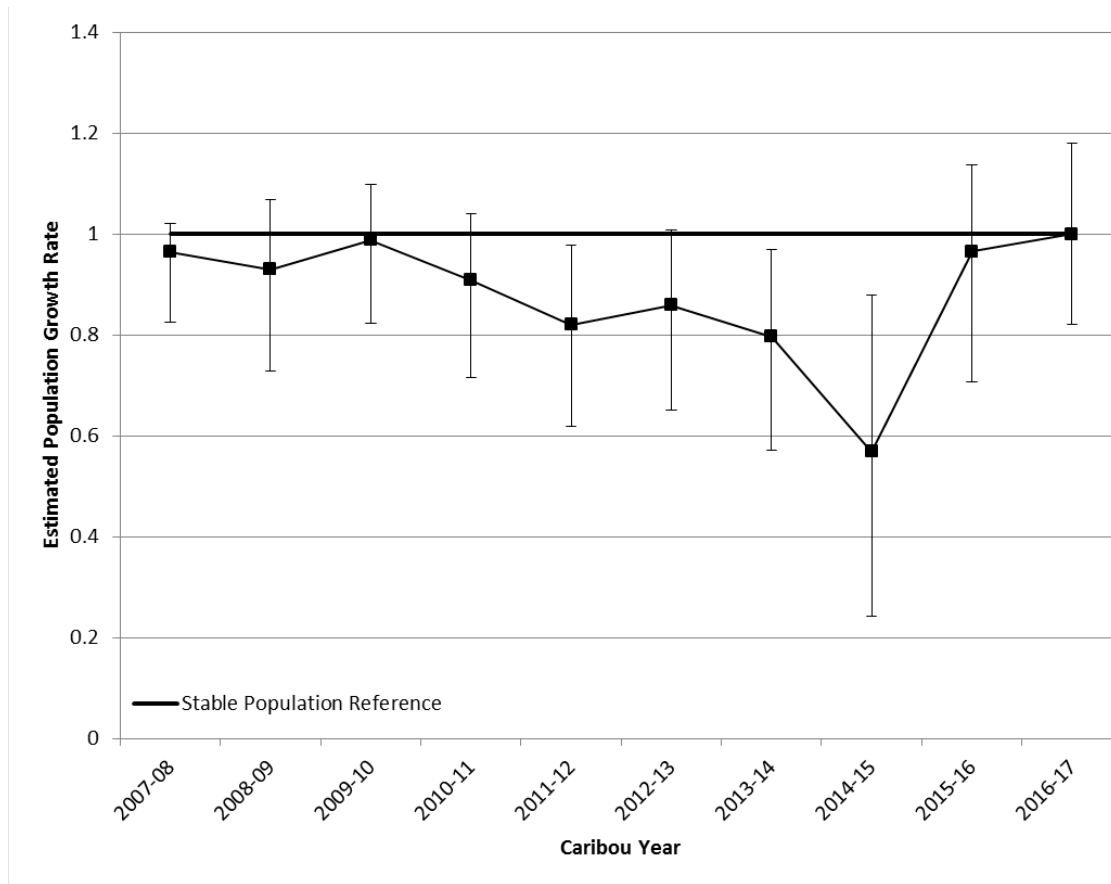


Figure 43 Estimated annual population growth rate for the Narraway caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).

8.3 Current Habitat Condition and Important Areas for Caribou

8.3.1 Habitat Condition and Disturbance Levels

The Narraway range contains forestry, energy, minerals, and aggregates resources, which has led to resource extraction activities over the past decades and the issuance of related industrial tenure (Table 15). Petroleum, natural gas, and forestry are the primary industrial activities and tenure holders in the Narraway range. Other industrial activities within the range include metallic and industrial minerals, sand and gravel, peat and electrical transmission lines.

Currently, 84% of the Narraway range is considered disturbed by natural and anthropogenic footprint including the federal 500 m buffer (Table 16; Figure 44). Wildfires within the past 40 years account for 4% of the disturbance within this range, though some of this footprint overlaps with anthropogenic footprint within the range.



Table 15 – Industrial Tenure within the Narraway range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	100%
Oil Sands	Permit or Lease	0%
Petroleum and Natural Gas	Permit or Lease	88%
Metallic and Industrial Minerals	Permit or Lease	9%

Table 16 – Habitat Condition Balance Sheet.⁸

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
Present	104, 066	4%	66%	46%	<1%	51%	84%	16%

⁸ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



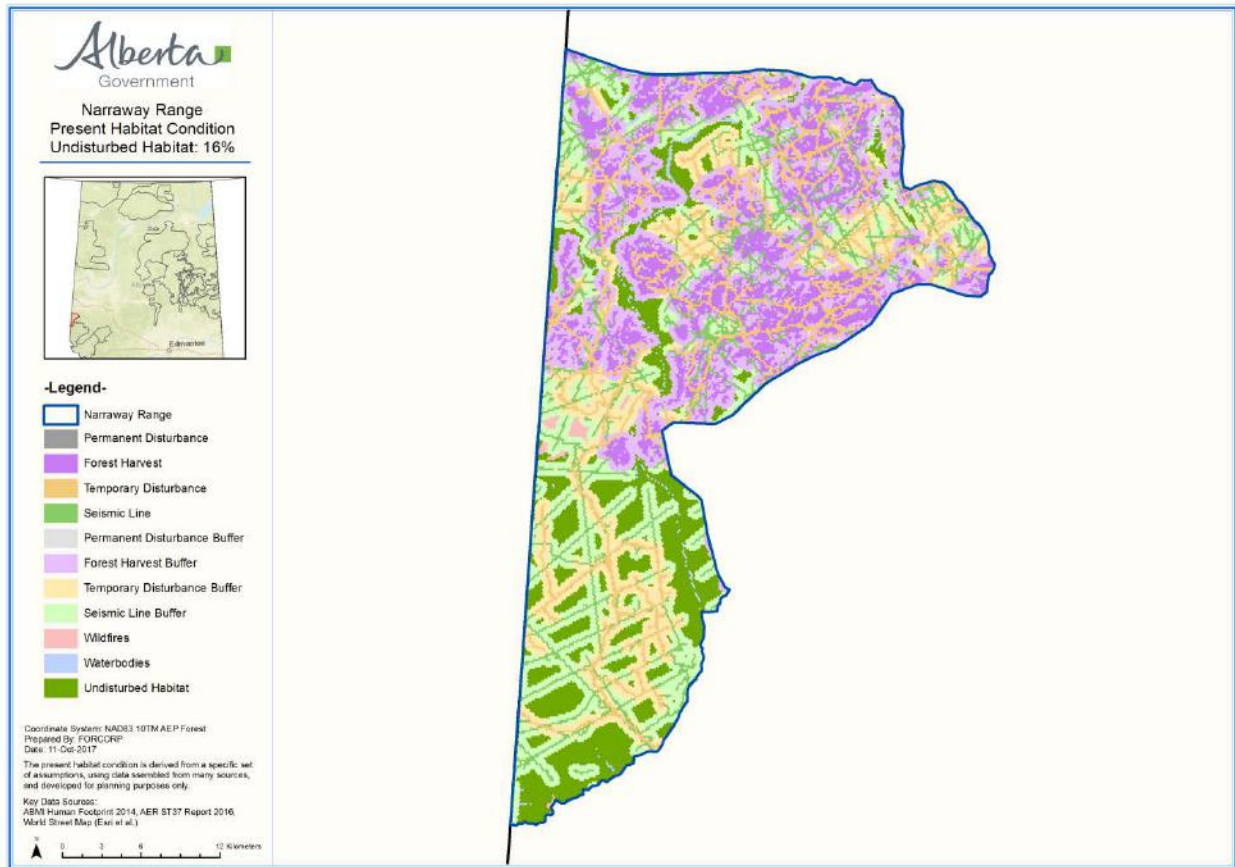


Figure 44 The current state of disturbed and undisturbed habitat within the Narraway caribou range

8.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 45 and Figure 46) and biophysical habitat (Figure 47) were identified for the Narraway caribou range. Following direction from the federal guidance document, important areas for caribou (Figure 48) were identified, which include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use, biophysical habitat and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



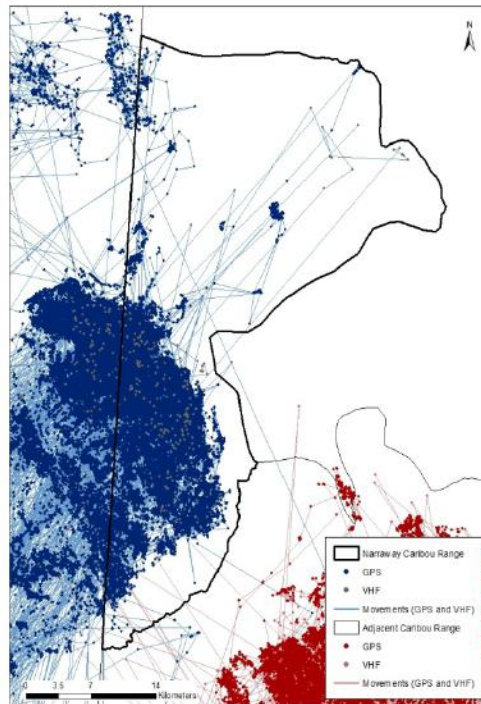


Figure 45 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1995-2017, from n = 189 Narraway caribou (99 VHF collars, 90 GPS collars)

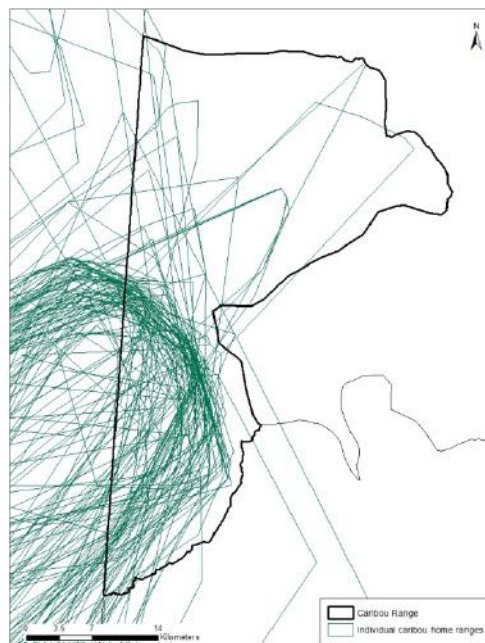


Figure 46 Locations of caribou collared from the Narraway and adjacent caribou ranges. Data collected 1995-2017, from n = 189 (99 VHF collars, 90 GPS collars). Lines indicate caribou movements between individual location points.



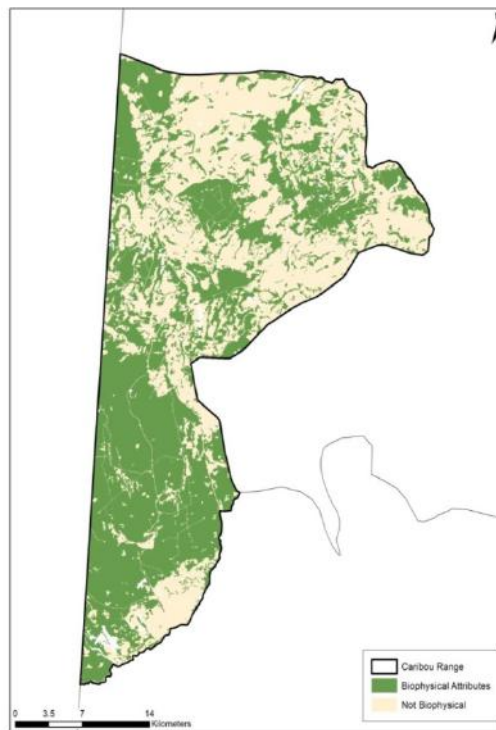


Figure 47 Current availability of caribou biophysical habitat in the Narraway caribou range. Biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data.

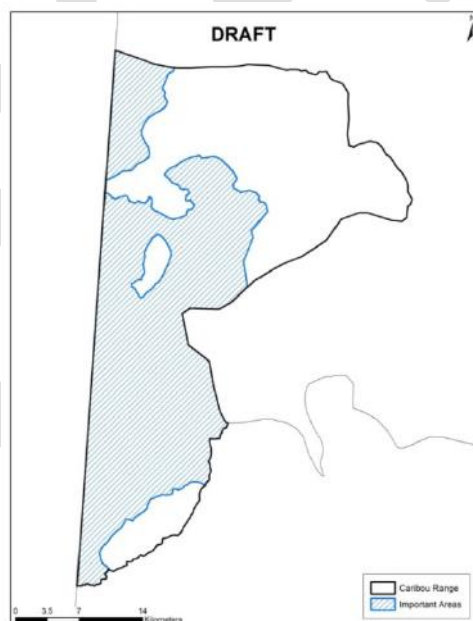


Figure 48 Important areas for caribou in the Narraway caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



8.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management approaches that will initiate achievement of the recovery goals and objectives within the Narraway caribou range.

8.4.1 Restoration Management

Operational restoration plans for this range will be developed by the central region sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

71. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

8.4.2 Management of Access

Within the Narraway caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

72. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
73. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

8.4.3 Management of Energy Activity

74. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.



8.4.4 Management of Forestry Activity

- 75. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
- 76. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate harvesting within the range over time.

8.4.5 Management of Coal, Metallic and Industrial Minerals Activity

- 77. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

8.4.6 Management of Sand and Gravel Activity

- 78. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

8.4.7 Management of Peat Activity

- 79. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.



A.9 THE NIPISI CARIBOU RANGE - CURRENT STATE

9.1 Nipisi Caribou Range Overview

The Nipisi caribou range is occupied by a boreal woodland caribou population. This range is located within the Central Mixedwood Subregion of the Boreal Natural Region, and the Lower Foothills Subregion of the Foothills Natural Region in central Alberta. The range is 210,436 hectares in size and shares no common borders with neighboring ranges. Nipisi caribou have occasionally been documented as travelling to and from the Red Earth and West Side Athabasca caribou ranges.

The Nipisi caribou range is located in the Municipal District of Lesser Slave River No.124, Municipal District of Big Lakes, Northern Sunrise County and the Municipal District of Opportunity, which overlie significant natural and economic resources. Natural resource exploration, extraction, and development in the area contribute to the economic and social stability of a wide network of central Alberta towns, communities, and demographics.

The main industrial land uses within the Nipisi caribou range are forestry and oil and gas. The Nipisi caribou range overlaps with FMUs S17, S18, and S19. Timber resources harvested in this area are primarily used to supply mills in the vicinity of the Town of Slave Lake, as well as a range of other communities in central Alberta. The Nipisi caribou range also overlaps with sub-surface mineral resources contained in the Gilwood formation and the Mannville group.

9.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each local population in Canada. At the time of the assessment, the Nipisi range was listed as unlikely to be self-sustaining (Environment Canada, 2011). In the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada for the Period 2012-2017) it was outlined that the Nipisi caribou population trend is not available.

The Nipisi caribou population has likely been declining since monitoring began in 2006. Although the population appears in some years to show positive growth (Figure 49) or population stability, many of these estimates have high uncertainty due to small sample size of radio-collared caribou, associated with small population size.

Recent minimum counts of the Nipisi caribou during surveys conducted for other purposes have documented at least 49 animals; the actual number of animals currently in this population is unknown. Three-year mean annual population growth is 0.94 (95% CI: 0.75-1.06) and the 10-year mean annual population growth is 0.97 (95CI: 0.77-1.11). Data to inform population growth estimates were collected by collaring female caribou from 2005 to 2017, (n= 37 animals: 30 VHF collars, 7 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from



2006 to 2017 are shown, but note that these estimates are all challenged by small sample size due to very small total population size.

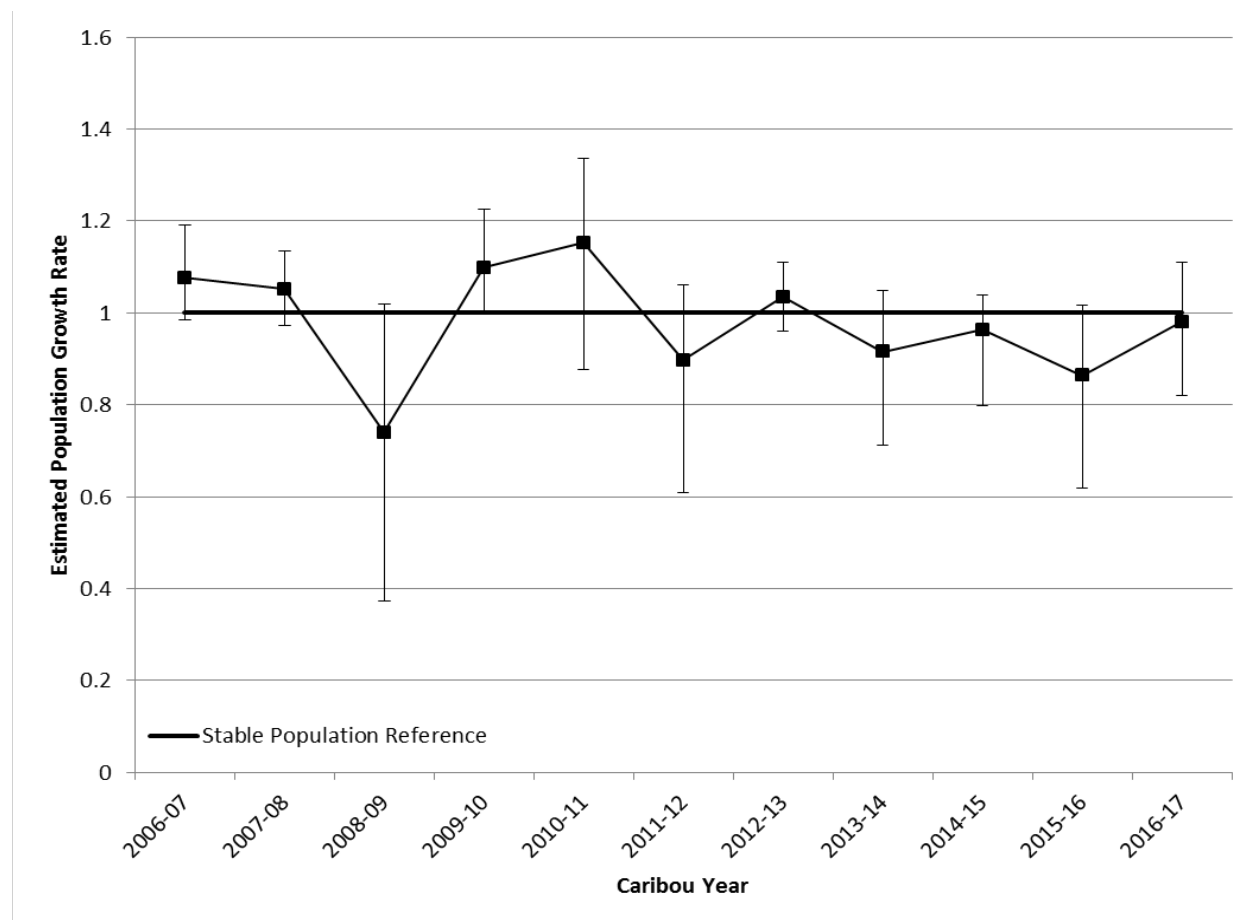


Figure 49 Estimated annual population growth rate for the Nipisi caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).

9.3 Current Habitat Condition and Important Areas for Caribou

9.3.1 Habitat Condition and Disturbance Levels

The Nipisi range contains forestry, energy, minerals, and aggregates resources, which has led to resource extraction activities over the past decades and the issuance of related industrial tenure. Petroleum, natural gas, and forestry are the primary industrial activities and tenure holders in the Nipisi range (Table 17 and Table 18). Other industrial activities within the range include metallic and industrial minerals, sand and gravel, peat, and electrical transmission lines.



The Nipisi range is currently 94% disturbed by anthropogenic footprint, 8% disturbed by wildfires within the last 40 years, and 95% disturbed by the combination of anthropogenic and wildfire footprint (Table 18; Figure 50).



Table 17 – Industrial Tenure within the Nipisi range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	100%
Oil Sands	Permit or Lease	14%
Petroleum and Natural Gas	Permit or Lease	25%
Metallic and Industrial Minerals	Permit or Lease	0%

Table 18 – Habitat Condition Balance Sheet.⁹

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
2011 Scientific Assessment	210,436	6%					66%	32%
Present	210,436	8%	91%	21%	1%	29%	94%	5%

⁹ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



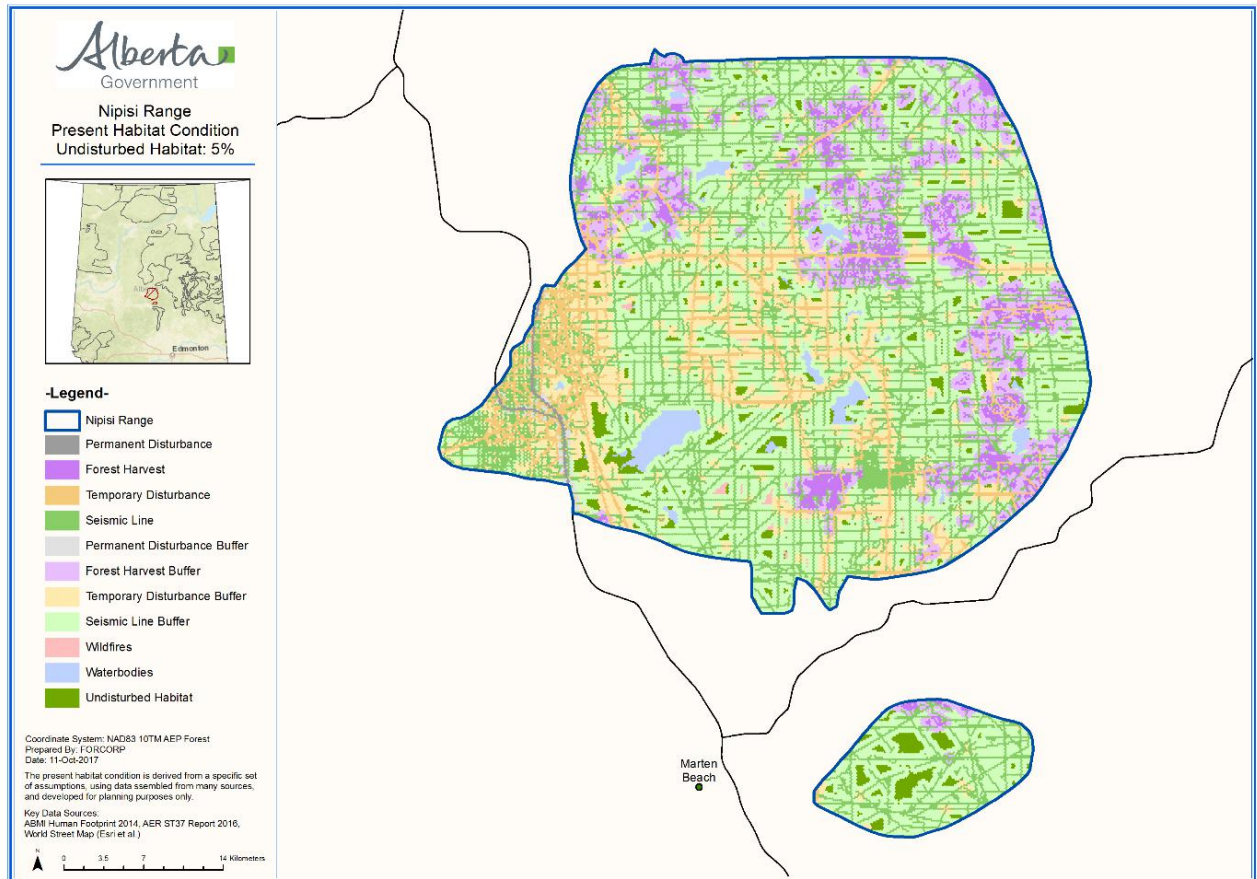


Figure 50 The current state of disturbed and undisturbed habitat within the Nipisi caribou range

9.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 51 and Figure 52) and biophysical habitat (Figure 53) were identified for the Nipisi range. Following direction from the federal guidance document, important areas for caribou (Figure 54) also identified and include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



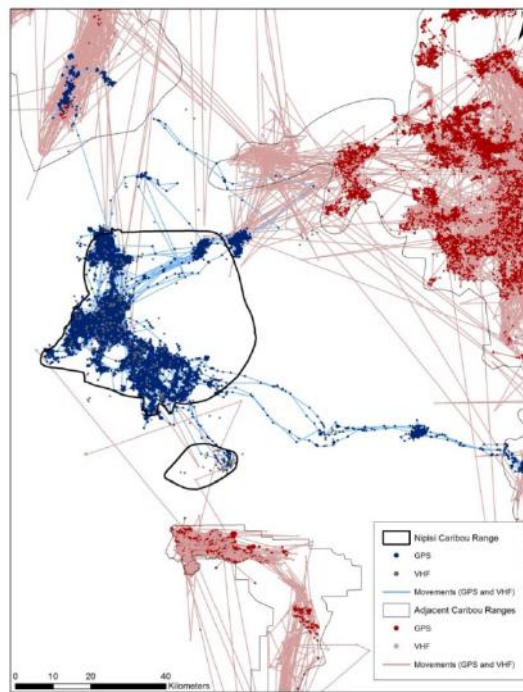


Figure 51 Locations from radio-collared caribou from the Nipisi and adjacent caribou populations. Data collected 2005-2017, from n = 37 Nipisi caribou (30 VHF collars, 7 GPS collars). Lines indicate caribou movements between individual location points.

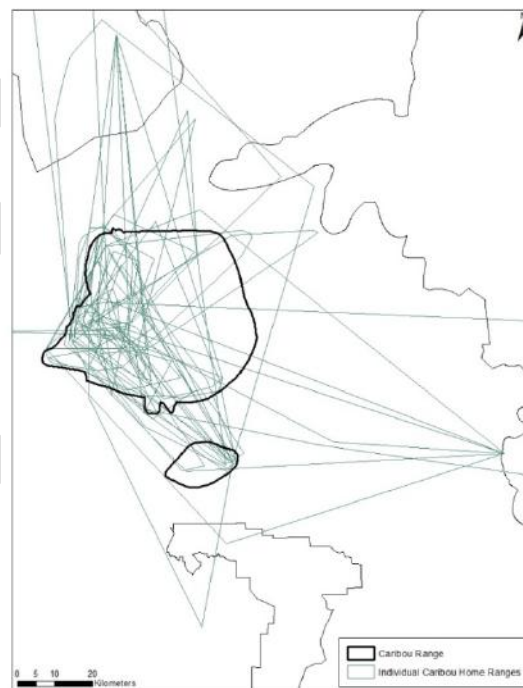


Figure 52 Individual caribou home ranges depicted by minimum convex polygons. Data collected 2005-2017, from n = 37 Nipisi caribou (30 VHF collars, 7 GPS collars).



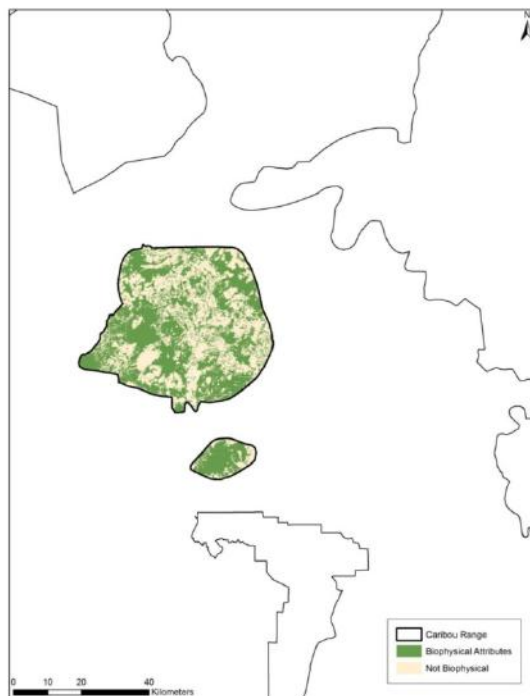


Figure 53 Current availability of caribou biophysical habitat in the Nipisi caribou range. Biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data.



Figure 54 Important areas for caribou in the Nipisi caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



9.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM techniques and other management approaches that will initiate achievement of the recovery goals and objectives within the Nipisi caribou range.

9.4.1 Restoration Management

Operational restoration plans for this range will be developed by the Northeast regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

80. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in Alberta's the Provincial Woodland Caribou Range Plan.

9.4.2 Management of Access

Within the Nipisi caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

81. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
82. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.
 - a. Access management will consider areas adjacent to the Nipisi range and areas connecting to the Slave Lake, Red Earth, and West Side Athabasca River ranges.

9.4.3 Management of Energy Activity

83. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou



Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

9.4.4 Management of Forestry Activity

- 84. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
- 85. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing, and rate of harvesting within the range over time.

9.4.5 Management of Coal, Metallic and Industrial Minerals Activity

- 86. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

9.4.6 Management of Sand and Gravel Activity

- 87. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

9.4.7 Management of Peat Activity

- 88. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.



A.10 THE RED EARTH CARIBOU RANGE - CURRENT STATE

10.1 Red Earth Caribou Range Overview

The Red Earth caribou range is occupied by a boreal woodland caribou population. The currently delineated Red Earth range extends into Wood Buffalo National Park, however Alberta has been able to document on a small area of caribou occupancy within the park. The Red Earth and West Side of the Athabasca River caribou ranges share a boundary. The Red Earth range is located in northern Alberta, northeast of the community of Red Earth Creek. It is 2,473,729 hectares (ha) in size, and falls within Boreal Plains Ecozone.

The Red Earth range boundary overlaps portions of the County of Northern Sunrise as well as the Regional Municipality of Wood Buffalo and Municipal District of Opportunity. The main sources of anthropogenic footprint within this range can be attributed to the extraction of natural resources (e.g. oil, gas, timber, sand and gravel). The exploration, extraction and development of these resources provide social and economic stability to many Alberta communities. For example, volumes harvested from this range supply pulp mills near Athabasca and Peace River and saw mills in La Crete, High Level and Fort McMurray. Oil and gas companies operating in this range employ staff from across Alberta and Canada, in a wide variety of vocations.

A portion of the Red Earth range was designated a conservation area under the Lower Athabasca Regional Plan (LARP), 2012. This area is referred to as the Birch River Conservation Area (BRCA) and is being managed to conserve biodiversity. As such, LARP limits the types of activities permitted in this area (e.g. no new oil and gas development). There is an interim forest management plan in place that details an ecosystem forest management approach, and highlights that the primary objective of this area is biodiversity.

10.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each local population in Canada. At the time of the assessment, the Red Earth range was listed as very unlikely to be self-sustaining (Environment Canada, 2011). According to the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for Woodland Caribou, (*Rangifer tarandus caribou*), Boreal Population in Canada for the period 2012-2017) the Red Earth caribou population continues to decline.

The Red Earth caribou population has been declining since monitoring began in 1999. Most population growth rate estimates indicated a decreasing population, with a steep decline in some years (Figure 55). Recent minimum counts of Red Earth caribou (during surveys conducted for other purposes) have documented at least 78 animals. Fecal DNA-based techniques are being employed in an attempt to develop an accurate estimate of the caribou population size. Three-year mean annual population growth is 0.85 (95% CI: 0.67-1.01) and the 10-year mean annual population growth is 0.88 (95CI: 0.71-1.02). Data to inform population



growth estimates were collected by collaring female caribou from 1995-2017, (n= 243 animals: 171 VHF collars, 72 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 1999-2017 are shown, because this is when sample size to calculate annual population growth (lambda) was sufficient.

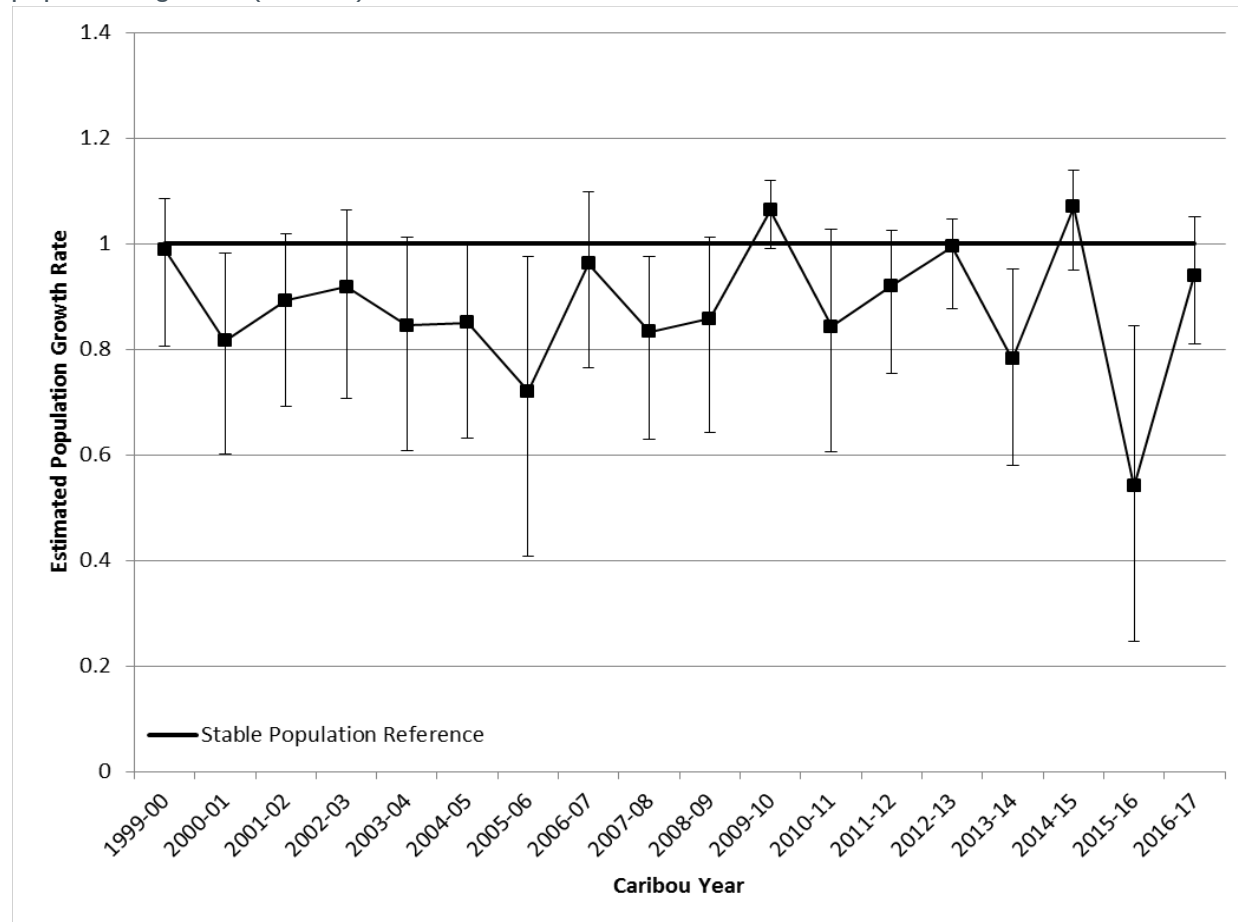


Figure 55 Estimated annual population growth rate for the Red Earth caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative populations growth (i.e. population decline).

10.3 Current Habitat Condition and Important Areas for Caribou

10.3.1 Habitat condition and disturbance levels

The Red Earth range is located north and northwest of the community of Red Earth Creek, Alberta. It extends north towards Wood Buffalo National Park and east towards the Birch Mountains. It is adjacent to the West Side Athabasca Range (WSAR).



This area falls within the Boreal Plain Ecozone. Wildfires are common, and many species are very well adapted to them. Dominant tree species include white spruce, black spruce, balsam fir, jack pine, tamarack, birch, alder, trembling aspen, balsam poplar, and willow.

Forestry, oil sands and petroleum and natural gas are the main industrial activities in the Red Earth range (Table 19). Wildfire is a major contributor to the overall per cent disturbed habitat in northeast Alberta. For example, wildfires in the Red Earth range account for 38% of total disturbance. Legacy footprint, especially seismic lines, have left this range highly fragmented (Table 20; Figure 59). There are over 43,000 km of seismic lines in this range.



Table 19 – Industrial Tenure within the Red Earth range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	35%
Oil Sands	Permit or Lease	34%
Petroleum and Natural Gas	Permit or Lease	15%
Metallic and Industrial Minerals	Permit or Lease	1%

Table 20 – Habitat Condition Balance Sheet.¹⁰

Time	Range Size (ha)	Total Wildfire Disturbance (%)	Anthropogenic Disturbance				Total Anthropogenic Disturbance (%)	Total Undisturbed Habitat (%)
			Seismic Line Disturbance (%)	Forest Harvest Disturbance (%)	Permanent Disturbance (%)	Temporary Disturbance (%)		
2011 Scientific Assessment	2,473,729	30					44	38
Present	2,473,729	38	68	7	1	14	68	16

¹⁰ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



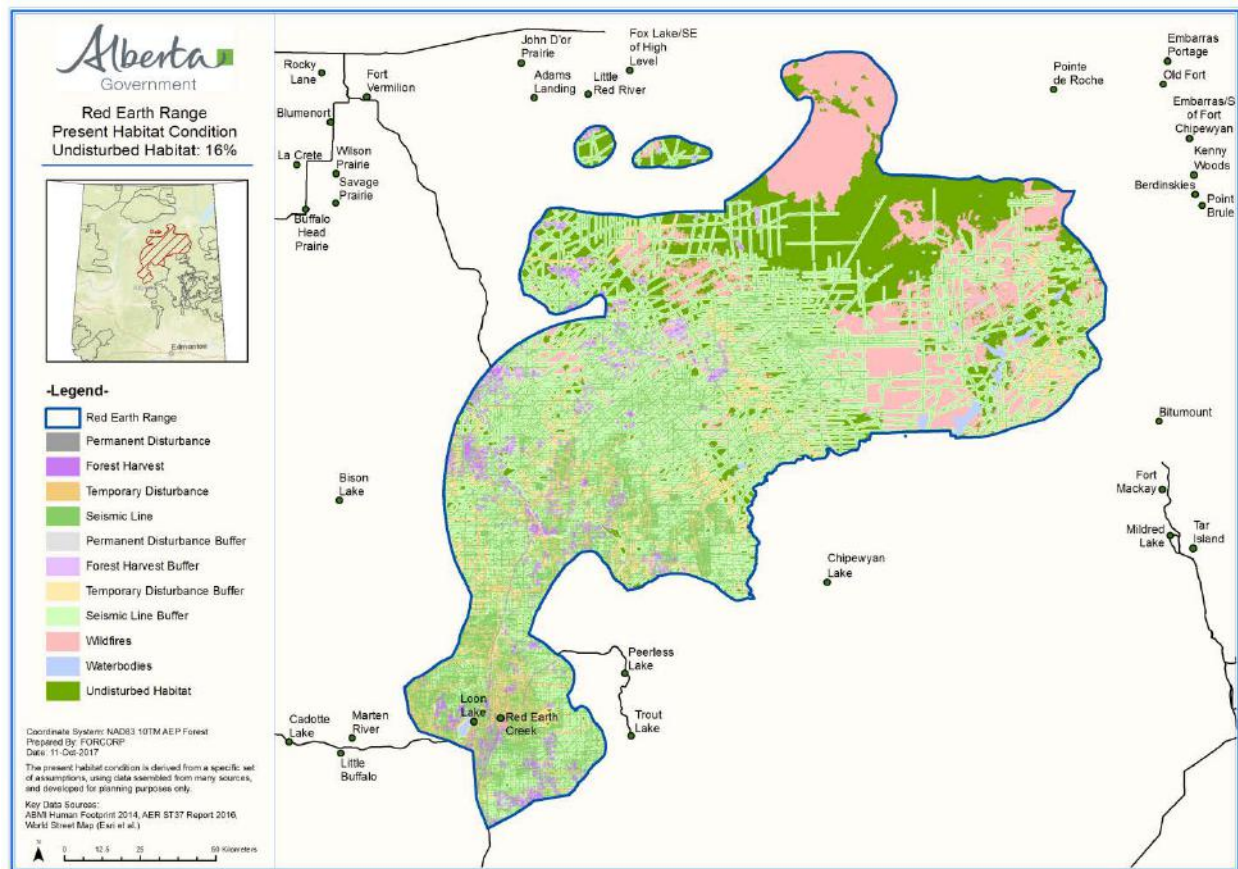


Figure 56 The current state of disturbed and undisturbed habitat within the Red Earth caribou range.

10.3.2 Patterns of habitat use

Patterns of caribou habitat use (Figure 57 and Figure 58) and the occurrence of biophysical habitat (Figure 59) were identified for the Red Earth range. Following direction from the federal guidance document, important areas for caribou (Figure 60) were identified, which include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



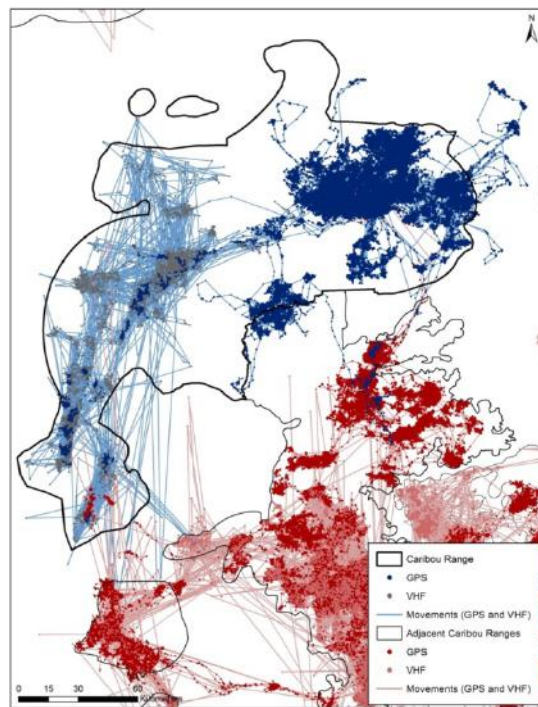


Figure 57 Locations from radio-collared caribou from the Red Earth and adjacent caribou populations. Data collected 1995-2017, from n = 243 Red Earth caribou (171 VHF collars, 72 GPS collars). Lines indicate caribou movements between individual location points.

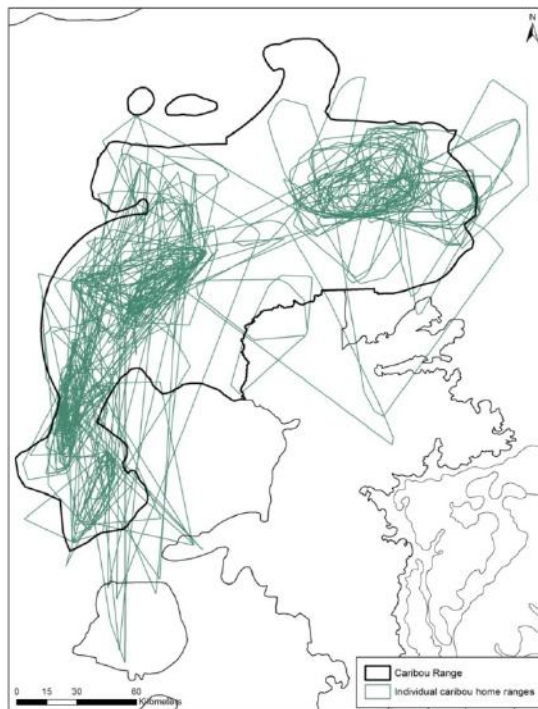


Figure 58 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1995-2017, from n = 243 Red Earth caribou (171 VHF collars, 72 GPS collars).



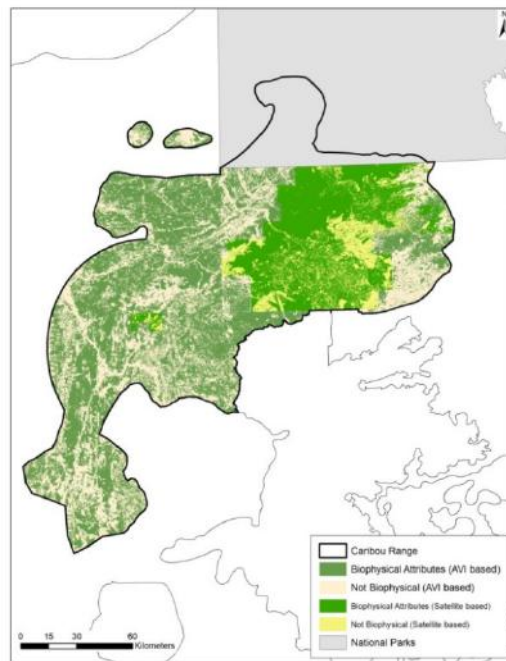


Figure 59 Current availability of caribou biophysical habitat in the Red Earth caribou range. Where available, biophysical habitat was classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

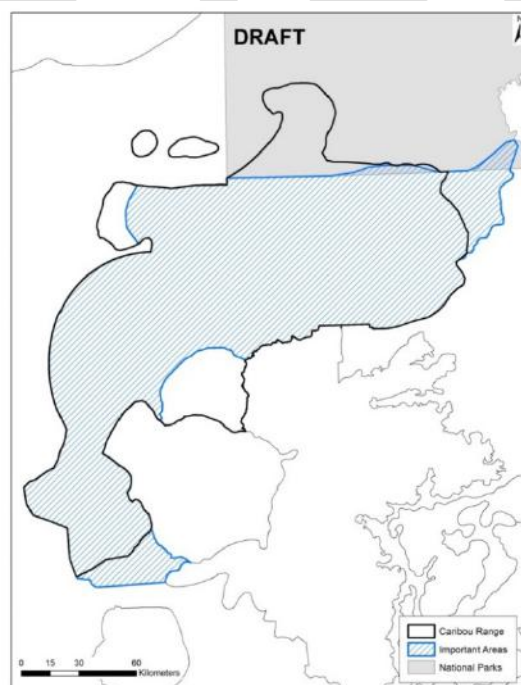


Figure 60 Important areas for caribou in the Red Earth caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



10.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management approaches that will initiate achievement of the recovery goals and objectives within the Red Earth caribou range.

10.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northeast regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

89. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

10.4.2 Management of Access

Within the Red Earth caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

90. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
91. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.
92. Within the Red Earth caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values. There are certain considerations specific to the Red Earth caribou range that must be addressed during the planning phase:



- a. Access management must align with and consider the management objectives of the Moose Lake Access Management Plan.
- b. Access management within the Red Earth caribou range must consider the interim forest management approach outlined for the Birch River Conservation Area.
- c. Access management must align with the objectives of the Lower Athabasca Landscape Management Plan (to reduce footprint and maintain biodiversity).
- d. Access management must ensure habitat connectivity within and between caribou ranges (reduce fragmentation and preserve intactness within the range).

10.4.3 Management of Energy Activity

93. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

10.4.4 Management of Forestry Activity

94. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Caribou Range Plan.
95. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

10.4.5 Management of Coal, Metallic and Industrial Minerals Activity

96. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

10.4.6 Management of Sand and Gravel Activity

97. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

10.4.7 Management of Peat Activity

98. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Caribou Range Plan.

10.4.8 Conservation Areas

99. A portion of the Red Earth caribou range is located within the Lower Athabasca Region. In 2012 the Government of Alberta finalized and approved the Lower Athabasca Regional Plan (LARP). Within this plan, new conservation areas were identified, providing enhanced protection for overall biodiversity in the region. Currently, 14% of the Red Earth caribou range is protected by the Wood Buffalo National Park and the Birch Mountains Wildland Park. This does not include the proposed Birch River Conservation Area (BRCA) and



possibly a conservation area in Forest Management Unit F23 (west of the BRCA boundary).

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A.11 THE REDROCK-PRAIRIE CREEK CARIBOU RANGE - CURRENT STATE

11.1 Redrock-Prairie Creek Caribou Range Overview

The Redrock-Prairie Creek caribou range is occupied by a southern mountain woodland caribou population located in west central Alberta. The distribution of woodland caribou in west-central Alberta has greatly declined over the last 50 to 80 years. The Redrock-Prairie Creek population is one of three remaining southern mountain caribou LPUs under provincial jurisdiction (together with the A La Peche and Narraway populations), from a distribution of woodland caribou which formerly extended throughout much of Alberta's eastern slopes. Range recession has been documented for this caribou population.

The federal Recovery Strategy for the Woodland Caribou, Southern Mountain Population (2014) guides recovery efforts with these objectives:

- Stop the decline in both size and distribution of all Local Population Units (LPU);
- Maintain the current distribution within each LPU;
- Increase the size of all LPUs to self-sustaining levels and where appropriate and attainable, to levels which can sustain a harvest with dedicated or priority access to Aboriginal peoples; and
- Within the low elevation winter range, achievement of at least 65% undisturbed habitat is specified to help achieve caribou population sustainability.

The Redrock-Prairie Creek caribou range contains 4,825 km² of Alberta's Green Area of public managed lands (482,892 hectares). This range borders on the Narraway caribou range on the west edge and the A La Peche range on the south. The woodland caribou in this range migrate between mountainous areas in British Columbia and Alberta in the summer months and foothills forests in Alberta in the winter where they occupy highly diverse topography and terrain types. The habitat and biological needs of the southern mountain populations are similar to the boreal populations; however, southern mountain caribou require different seasonal ranges that are connected by the lands that enable migration. The Redrock-Prairie Creek range is 52% disturbed through a combination of anthropogenic footprint and wildfire.

The Redrock-Prairie Creek caribou range is located in the Municipal District of Greenview No.16 but contributes to the economic and social sustainability of a wider network of west-central Alberta towns and communities such as the city of Grande Prairie. With these economies highly dependent on natural resources, range planning has the potential to both negatively and positively impact the town.

The main industrial land uses within the Redrock-Prairie Creek caribou range are forestry and oil and gas. The range overlaps with one FMA which covers 24% of the range. The range also overlaps with petroleum and natural gas resources (30%) and metallic and industrial minerals (34%).



11.2 Local Population Self-Sustainability Status

The Redrock-Prairie Creek caribou population has been in decline since monitoring began in 2003, with almost all estimated annual population growth rates indicating a decreasing population (Figure 61); some years have shown sharp declines in population growth. Expansion of the wolf control program to the Redrock-Prairie Creek range in 2014/15 may have slowed this decline. The population is considered to be declining by the Government of Alberta, and not self-sustaining by Canada based on their multiple lines of evidence including habitat condition, population size and population trend. Recent minimum counts of Redrock-Prairie Creek caribou during surveys conducted for other purposes have documented at least 96 animals; the actual number of animals currently in this population is unknown. Three-year mean population growth is 0.85 (95% CI: 0.62-1.04) and the 10-year mean population growth is 0.85 (95% CI: 0.63-1.02). Data to inform population growth estimates were collected by collaring female caribou from 1981-2017, (n= 353 animals: 223 VHF collars, 130 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 2003-2017 are shown, because this is when sample size to calculate lambda was sufficient.

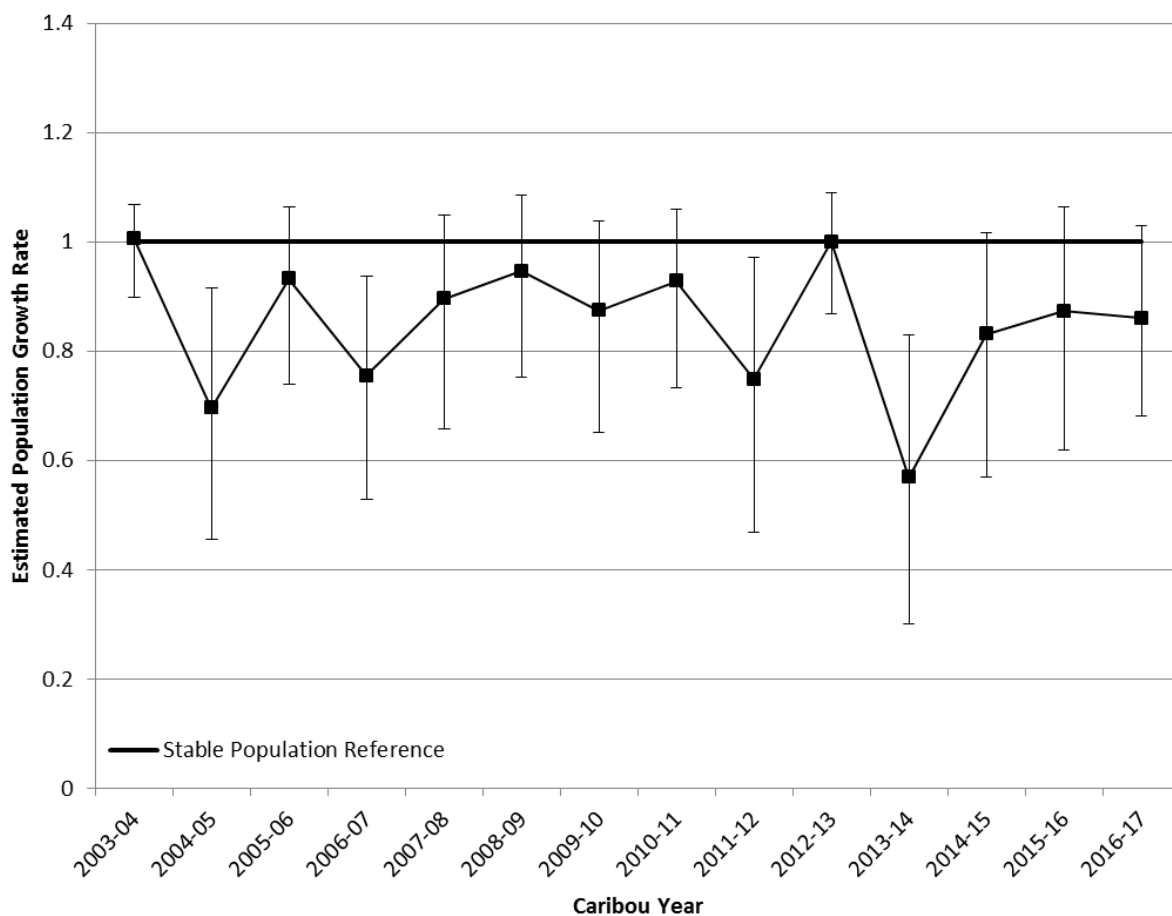


Figure 61 Estimated annual population growth rate for the Redrock-Prairie Creek caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative populations growth (i.e. population decline).

11.3 Current Habitat Condition and Important Areas for Caribou

11.3.1 Habitat condition and disturbance levels

The Redrock-Prairie Creek range contains forestry, energy, minerals, and aggregates resources, which has led to resource extraction activities over the past decades and the issuance of related industrial tenure (Table 21). Petroleum, natural gas, and forestry are the primary industrial activities and tenure holders in the Redrock-Prairie Creek range. Other industrial activities within the range include coal mining, and sand and gravel. Legacy seismic lines continue to remain as part of a historical footprint within the Redrock-Prairie Creek range.

The Redrock-Prairie Creek range is currently 49% disturbed by anthropogenic footprint, 3% disturbed by wildfires within the last 40 years, and 52% disturbed by the combination of anthropogenic and wildfire footprint (Table 22; Figure 62). Redrock-Prairie Creek's winter range is 29% undisturbed, and the summer range 82% undisturbed.



Table 21 – Industrial Tenure within the Redrock-Prairie Creek range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	24%
Oil Sands	Permit or Lease	0%
Petroleum and Natural Gas	Permit or Lease	30%
Metallic and Industrial Minerals	Permit or Lease	34%

Table 22 – Habitat Condition Balance Sheet.¹¹

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
Present	482,892	3%	41%	16%	1%	22%	49%	48%

¹¹ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



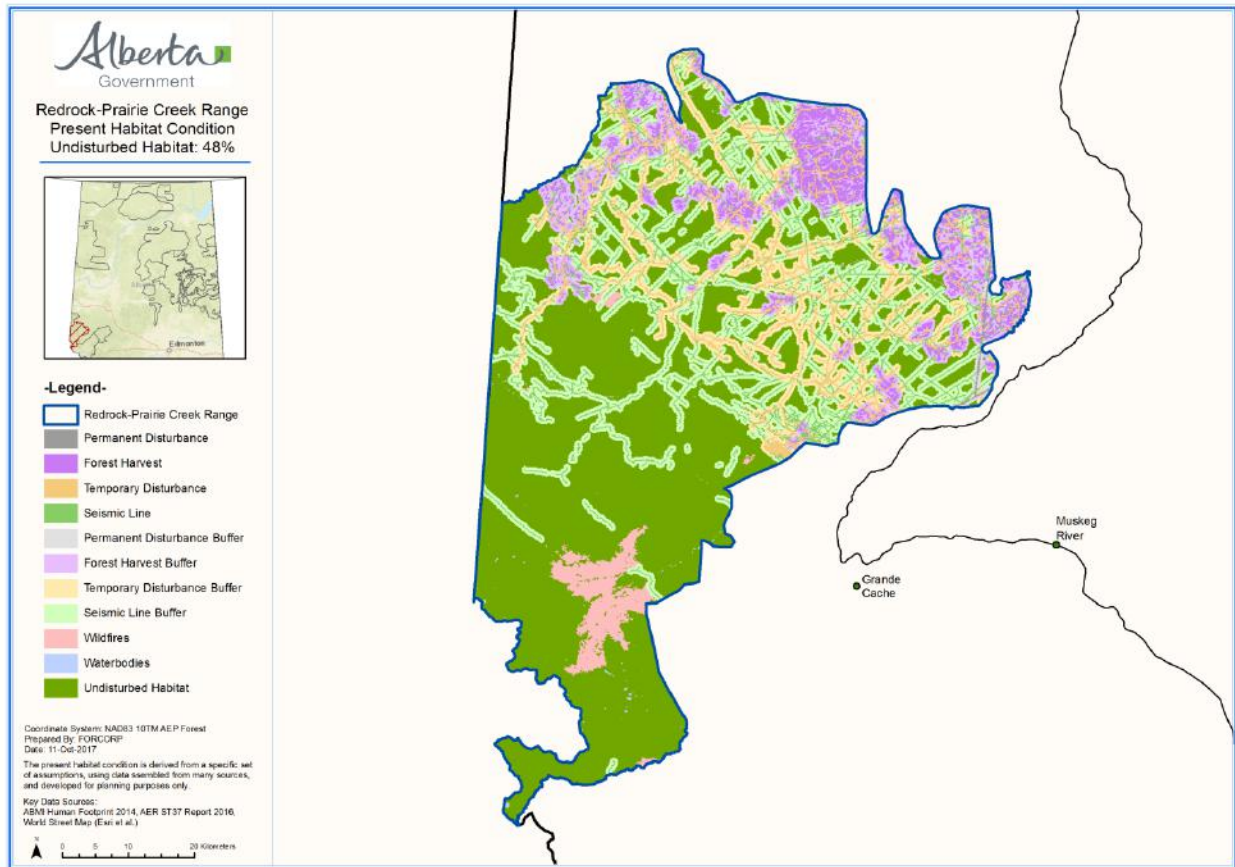


Figure 62 The current state of disturbed and undisturbed habitat within the Redrock-Prairie Creek caribou range

11.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 63 and Figure 64) and the occurrence of biophysical habitat (Figure 65) were identified for the Redrock-Prairie Creek range. Following direction from the federal guidance document, important areas for caribou (Figure 66) were identified, which include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Caribou Range Plan.



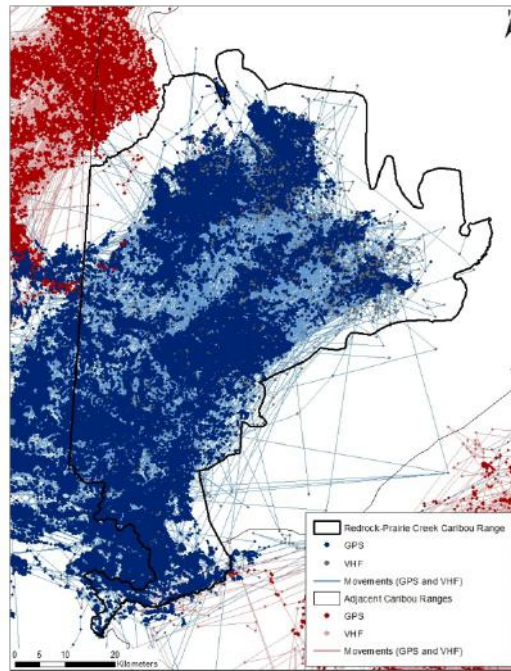


Figure 63 Caribou use. Locations from radio-collared caribou from the Redrock-Prairie Creek and adjacent caribou populations. Data collected 1981-2017 from n = 353 Redrock-Prairie Creek caribou (223 VHF collars, 130 GPS collars). Lines indicate caribou movements between individual locations points.

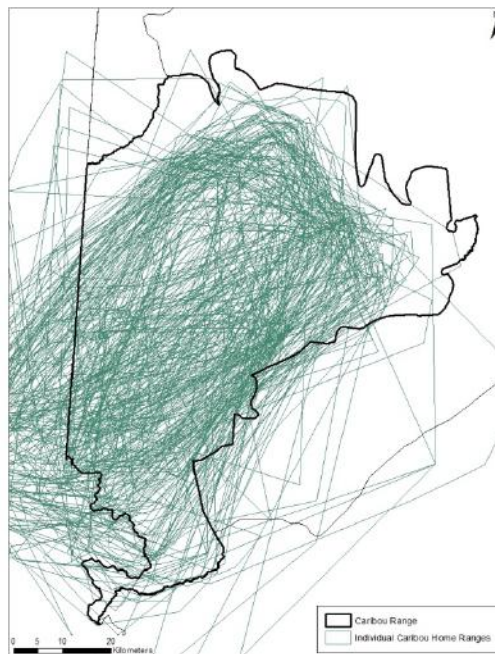


Figure 64 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1981-2017, from n = 353 Redrock-Prairie Creek caribou (223 VHF collars, 130 GPS collars).



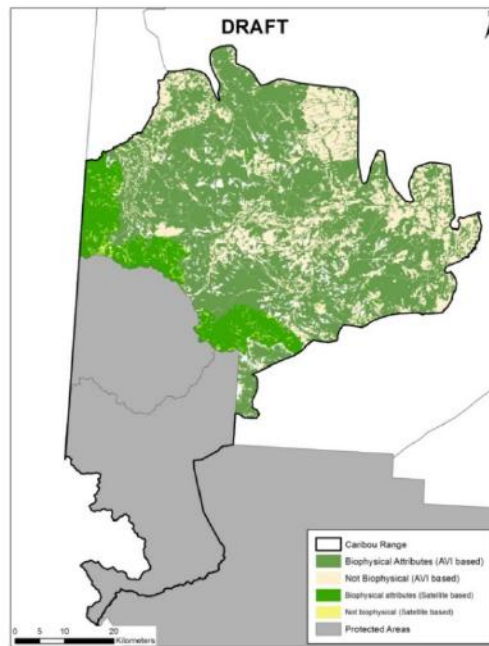


Figure 65 Current availability of caribou biophysical habitat in the Redrock-Prairie Creek caribou range. Where available, biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD). No data with sufficient detail was available for mountain areas.

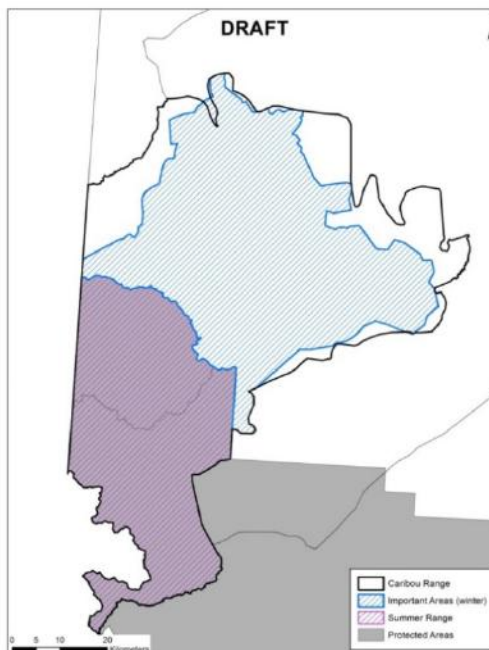


Figure 66 Important areas for caribou in the Redrock-Prairie Creek caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



11.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management approaches that will initiate achievement of the recovery goals and objectives within the Redrock-Prairie Creek caribou range.

11.4.1 Restoration Management

Operational restoration plans for this range will be developed by the central region sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

100. In the caribou range, restoration plans will follow all applicable strategies identified under the *Restoration* section in the Provincial Caribou Range Plan. Further refinement on the timing and implementation strategies needs to occur before the individual caribou range plan is released.
- a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable approaches identified under the *Management of Transmission Lines* section in the Provincial Caribou Range Plan.

11.4.2 Management of Access

Within the Redrock-Prairie Creek caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

101. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
102. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

11.4.3 Management of Energy Activity

103. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.



11.4.4 Management of Forestry Activity

104. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
105. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

11.4.5 Management of Coal, Metallic and Industrial Minerals Activity

106. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific strategies needs to occur before the individual caribou range plan is released.

11.4.6 Management of Sand and Gravel Activity

107. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

11.4.7 Management of Peat Activity

108. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

11.4.8 Conservation Areas

109. Designate lands adjacent to existing Kakwa Wildland Provincial Park and Willmore Wilderness Park.
 - a. Designation to be finalized through public engagement processes and finalization of the Redrock-Prairie Creek Caribou Range Plan.
 - b. No future surface disturbance will be issued within the Conservation Area.
 - c. Existing leases, activities and agreements within the Conservation Area will be honoured.
 - d. Designation will work to contribute to other regional planning initiatives for the area.
 - e. Designation to contribute to Alberta's goal of protecting 17% of terrestrial areas by 2020.



A.12 THE RICHARDSON CARIBOU RANGE - CURRENT STATE

12.1 Richardson Caribou Range Overview

The Richardson caribou range is occupied by a boreal woodland caribou population. Some caribou from this population use adjacent areas in Saskatchewan. The Richardson range is located in northern Alberta, northeast of the community of Fort McMurray and along the Saskatchewan border. It is 707,350 ha in size, and falls within two Ecozone types (Boreal Shield and Boreal Plains).

The Richardson caribou range boundary overlaps a portion of the Regional Municipality of Wood Buffalo. Compared to the other ranges in northeast Alberta, the Richardson caribou range has the lowest anthropogenic disturbance. The main sources of anthropogenic footprint within this range can be attributed to the extraction of natural resources (e.g. oil, gas and timber). The exploration, extraction and development of these resources provide social and economic stability to many Alberta communities. For example, volumes harvested from this range supply pulp mills near Athabasca and a saw mill in Fort McMurray. Oil and gas companies operating in this range employ staff from across Alberta and Canada, in a wide variety of vocations. The bulk of the recreation use occurs to the south and west of the Richardson River Dunes Wildland Park.

12.2 Local Population and Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each local population in Canada. At the time of the assessment, there was insufficient data to determine the self-sustainability status of this caribou population (Environment Canada, 2011). However, according to the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for Woodland Caribou, (*Rangifer tarandus caribou*), Boreal Population in Canada for the period 2012-2017) the Richardson caribou population is currently considered stable.

The Richardson caribou population appears to have been stable since monitoring began in 2009 (Figure 67). Recent minimum counts of the Richardson caribou during surveys conducted for other purposes have documented at least 125 animals; the actual number of animals currently in this population is unknown. Three-year mean annual population growth is 0.99 (95% CI: 0.82-1.11) and the 9-year mean annual population growth is 0.96 (95CI: 0.73-1.10). Data to inform population growth estimates were collected by collaring female caribou from 2008-2017, (n= 95 animals: 58 VHF collars, 37 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 2009-2017 are shown, because this is when sample size to calculate annual population growth rate (λ) was sufficient.



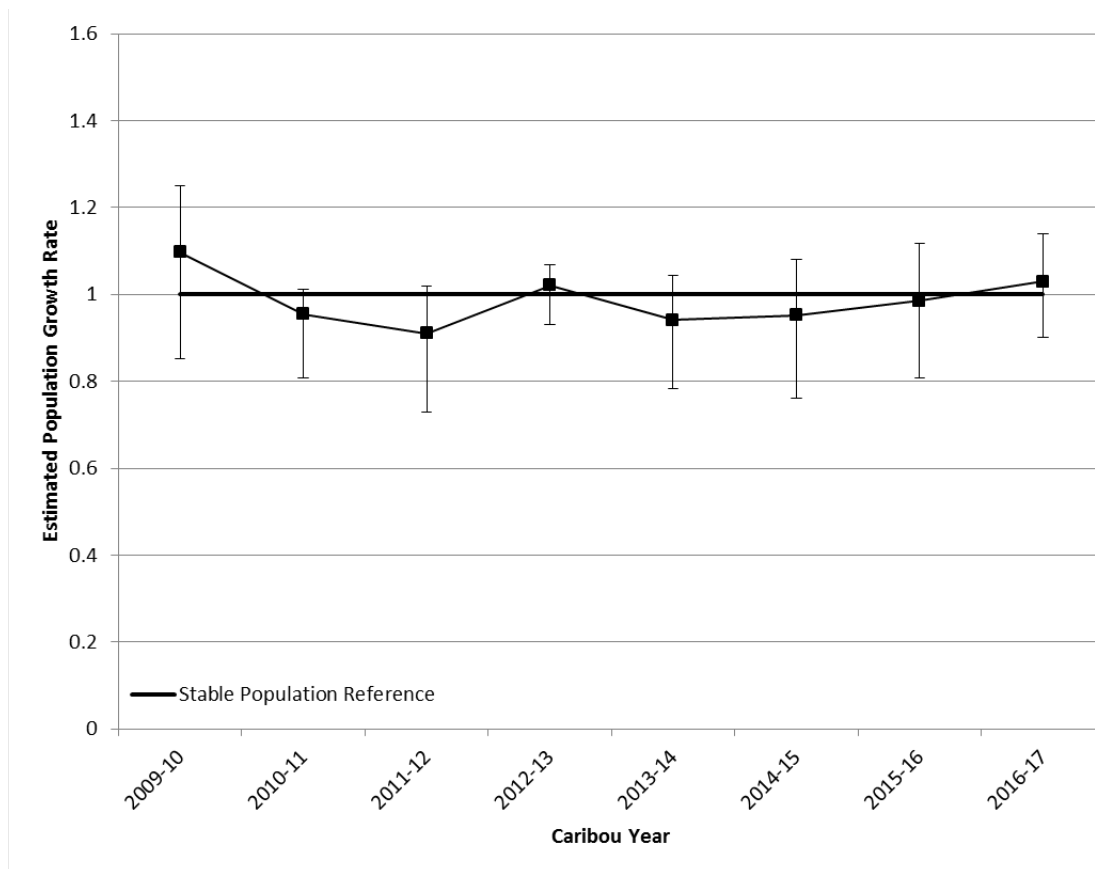


Figure 67 Estimated annual population growth rate for the Richardson caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).

12.3 Current Habitat Condition and Important Areas for Caribou

12.3.1 Habitat condition and disturbance levels

The Richardson range is located in two Ecozone types: the Boreal Shield and Boreal Plains. It is a unique landscape, known for its sand dunes and rare plant species. Forestry, oil sands and petroleum and natural gas are the main industrial activities in the Richardson range (Table 23). The anthropogenic footprint occurs primarily in the southern portion of this range (

Table 24; Figure 68), while the northern portion of the range is primarily disturbed by wildfire.

This range has recently experienced large landscape wildfires that have disturbed over 70% of the range. Modelling results for the Richardson range indicate that this range is currently at 64% undisturbed (not including wildfire), and at 16% undisturbed (including wildfire).

Wildfire is a major contributor to the overall per cent disturbed habitat in northeast Alberta, especially in the Richardson range. For example, in 2011 a wildfire known as the “Richardson Fire” burned over 700,000 hectares (1,700,000 acres).



Table 23 – Industrial Tenure within the Richardson range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	6%
Oil Sands	Permit or Lease	39%
Petroleum and Natural Gas	Permit or Lease	1%
Metallic and Industrial Minerals	Permit or Lease	40%

Table 24 – Habitat Condition Balance Sheet.¹²

Time	Range Size (ha)	Total Wildfire Disturbance (%)	Anthropogenic Disturbance				Total Anthropogenic Disturbance (%)	Total Undisturbed Habitat (%)
			Seismic Line Disturbance (%)	Forest Harvest Disturbance (%)	Permanent Disturbance (%)	Temporary Disturbance (%)		
2011 Scientific Assessment	707,350	67					22	18
Present	707,350	65	34	<1	<1	14	36	16

¹² Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



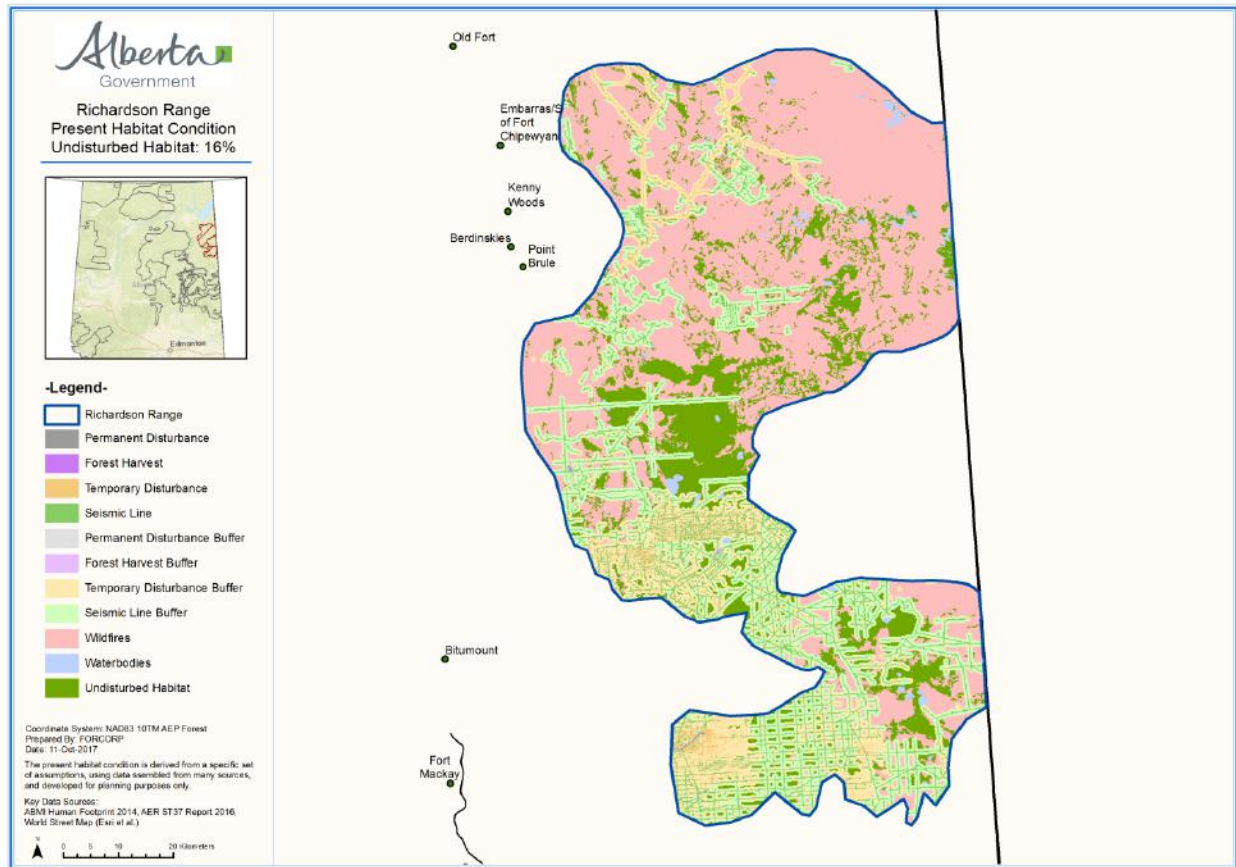


Figure 68 The current state of disturbed and undisturbed habitat within the Richardson caribou range

12.3.2 Patterns of habitat use

Patterns of caribou habitat use (Figure 69 and Figure 70) and the occurrence of biophysical habitat (Figure 71) were identified for the Richardson range. Following direction from the federal guidance document, important areas for caribou (Figure 72) were also identified and include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



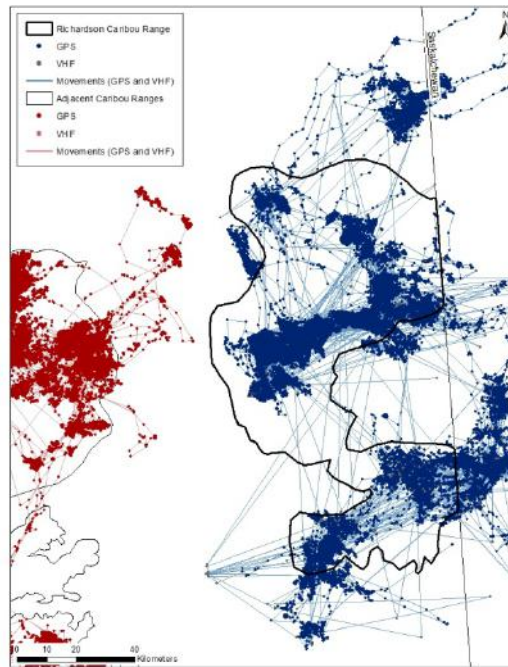


Figure 69 Locations from radio-collared caribou from the Richardson and adjacent caribou populations. Data collected 2008-2017, from n = 95 Richardson caribou (58 VHF collars, 37 GPS collars). Lines indicate caribou movements between individual location points.

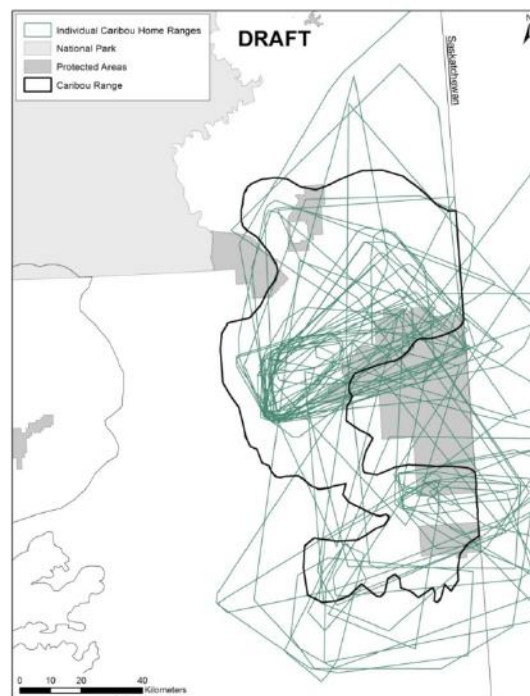


Figure 70 Individual caribou home ranges depicted by minimum convex polygons. Data collected 2008-2017, from n = 95 Richardson caribou (58 VHF collars, 37 GPS collars).



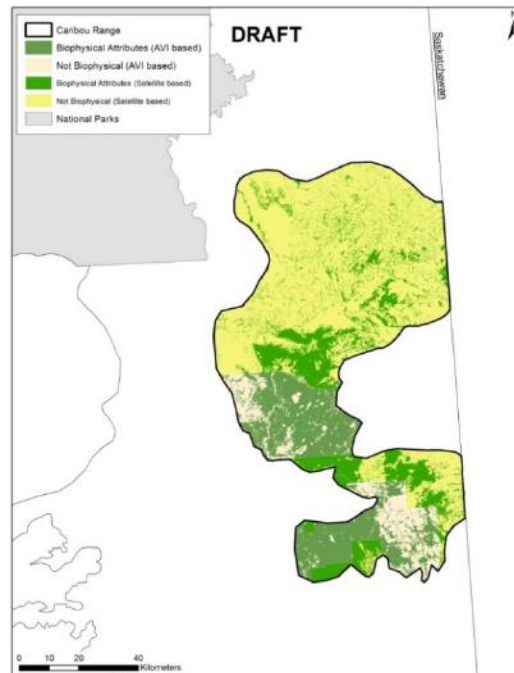


Figure 71 Current availability of caribou biophysical habitat in the Richardson caribou range. Where available, biophysical habitat was classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

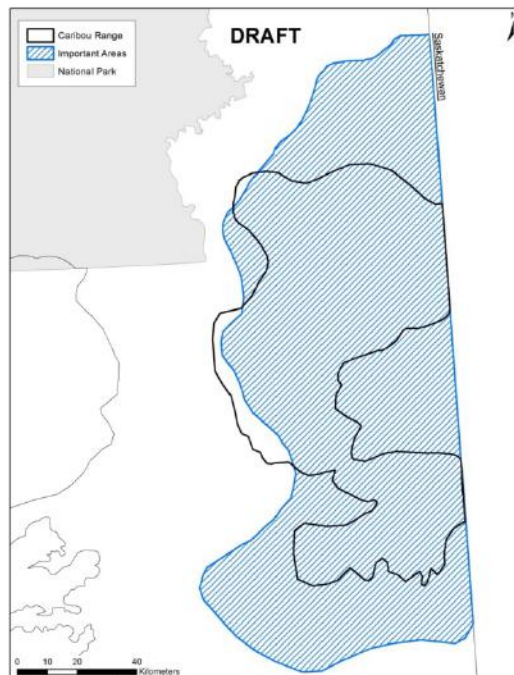


Figure 72 Important areas for caribou in the Richardson caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



12.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management approaches that will initiate achievement of the recovery goals and objectives within the Richardson caribou range.

12.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northeast regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

110. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable approaches identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

12.4.2 Management of Access

Within the Richardson caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

111. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
112. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.
113. Within the Richardson caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values. There are certain considerations specific to the Richardson caribou range that must be addressed during the planning phase:



- a. Access management must align with the objectives of the Lower Athabasca Landscape Management Plan (to reduce footprint and maintain biodiversity).
- b. Access management must ensure connectivity within and between caribou ranges (reduce fragmentation and preserve intactness within the range).
- c. Access management must take into account habitat connectivity between adjacent jurisdictions (Province of Saskatchewan).

12.4.3 Management of Energy Activity

114. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

12.4.4 Management of Forestry Activity

115. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
116. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

12.4.5 Management of Coal, Metallic and Industrial Minerals Activity

117. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

12.4.6 Management of Sand and Gravel Activity

118. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

12.4.7 Management of Peat Activity

119. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

12.4.8 Conservation Areas

120. The Lower Athabasca Regional Plan (LARP) was finalized and approved in 2012. During the development of this regional plan, several new conservation areas were identified. The Richardson caribou range overlaps with three wildland parks, providing enhance protection for 14% of the range:

- Maybelle River Wildland Park
- Richardson River Dunes Wildland Park, and
- Marguerite River Wildland Park.



Certain activities are prohibited within a wildland park; including: petroleum and natural gas, oil sands, metallic and industrial minerals and coal, surface materials and forestry (Alberta Government 2012).

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A.13 THE SLAVE LAKE CARIBOU RANGE - CURRENT STATE

13.1 Slave Lake Caribou Range Overview

The Slave Lake caribou range is occupied by a boreal woodland caribou population. The Slave Lake range is located within the Central Mixedwood Subregion of the Boreal Natural Region in central Alberta. The range is currently defined to cover an area of 151,623 hectares in size and shares no common borders with neighboring ranges. The Slave Lake population are non-migratory boreal caribou, though some animals have been observed travelling to and from the Nipisi caribou range.

The Slave Lake caribou range is located in the Municipal District of Lesser Slave River No.124 and Woodlands County, which overlie significant natural and economic resources. Natural resource exploration, extraction, and development in the area contribute to the economic and social stability of a wide network of central Alberta towns, communities, and demographics.

The main industrial land uses within the Slave Lake caribou range are forestry and oil and gas. The Slave Lake caribou range overlaps with FMUs S17, S20, S24, and W11. Timber resources harvested in this area are primarily used to supply mills in the vicinity of the Town of Slave Lake, as well as a range of other communities in central Alberta. The Slave Lake caribou range also overlaps with sub-surface mineral resources contained in the Gilwood formation and the Mannville group.

13.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each local population in Canada. At the time of the assessment, the Slave Lake population was listed as very unlikely to be self-sustaining (Environment Canada, 2011). In the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada for the Period 2012-2017) it was outlined that the Slave Lake caribou population trend is not available.

The Slave Lake caribou population has likely been declining since monitoring began in 2001. Although the population appears to have some years of positive growth (Figure 73) or population stability; however, many of these estimates have high uncertainty due to small sample size of radio-collared caribou related to small caribou population size.

Recent minimum counts of the Slave Lake caribou during surveys conducted for other purposes have documented at least 29 animals; the actual number of animals currently in this population is unknown. Three-year mean annual population growth is 0.91 (95% CI: 0.73-1.09) and the 10-year mean annual population growth is 0.93 (95CI: 0.67-1.11). Data to inform population growth estimates were collected by collaring female caribou from 1983-2017, (n= 55 animals: 47 VHF collars, 8 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from



2001-2017 are shown, but note that these estimates are all challenged by small sample size due to small total population size.

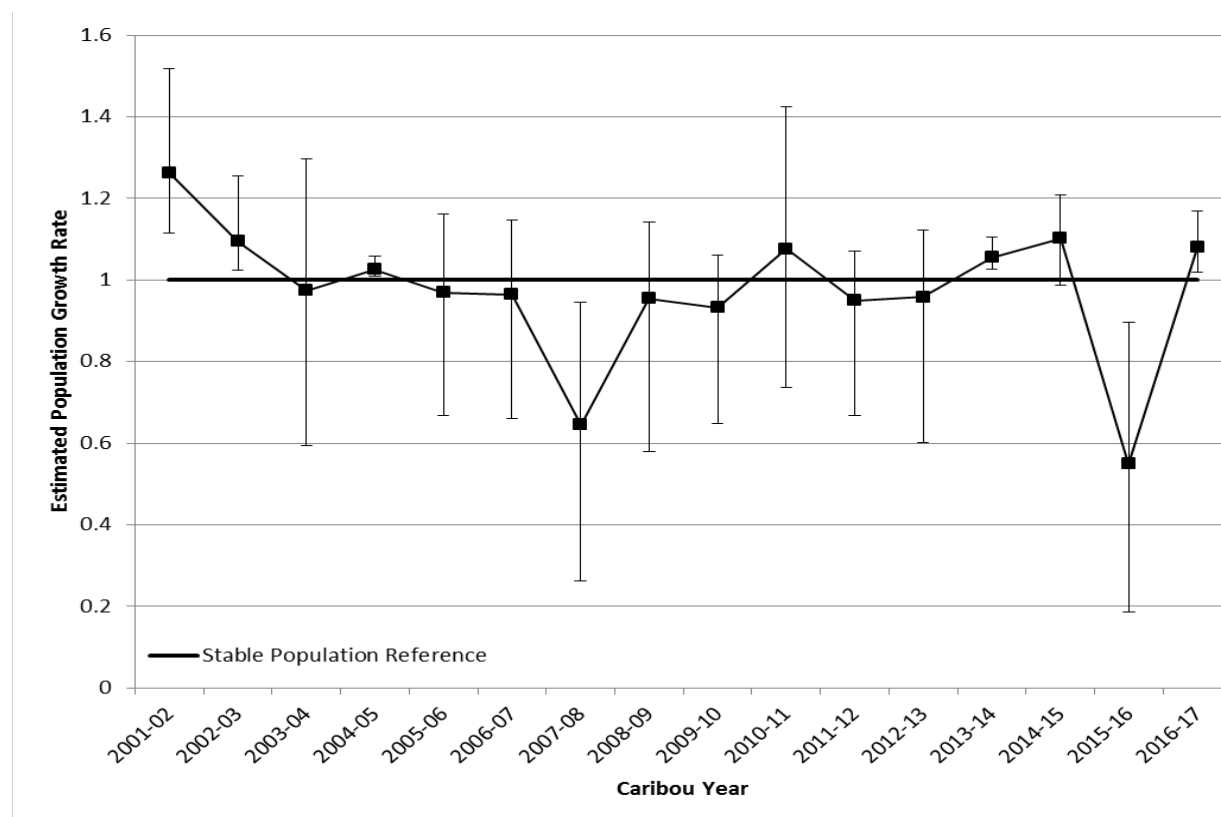


Figure 73 Estimated annual population growth rate for the Slave Lake caribou population. Growth rate of 1 indicates stable population for that year (no growth), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative population growth (i.e. population decline).

13.3 Current Habitat Condition and Important Areas for Caribou

13.3.1 Habitat Condition and Disturbance Levels

The Slave Lake range contains forestry, energy, minerals, and aggregates resources, which has led to resource extraction activities over the past decades and the issuance of related industrial tenure. Petroleum, natural gas, and forestry are the primary industrial activities and tenure holders in the Slave Lake range (Table 25 and Table 26). Other industrial activities within the range include metallic and industrial minerals, sand and gravel, peat, and electrical transmission lines.

The Slave Lake range is currently 99% disturbed by anthropogenic footprint, 37% disturbed by wildfires within the last 40 years, and 99% disturbed by the combination of anthropogenic and wildfire footprint (Table 26; Figure 74).



Table 25 – Industrial Tenure within the Slave Lake range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	96%
Petroleum and Natural Gas	Permit or Lease	47%
Metallic and Industrial Minerals	Permit or Lease	1%

Table 26 – Habitat Condition Balance Sheet.¹³

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
2011 Scientific Assessment	151,623	37%					63%	20%
Present	151,623	37%	95%	28%	8%	53%	99%	1%

¹³ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



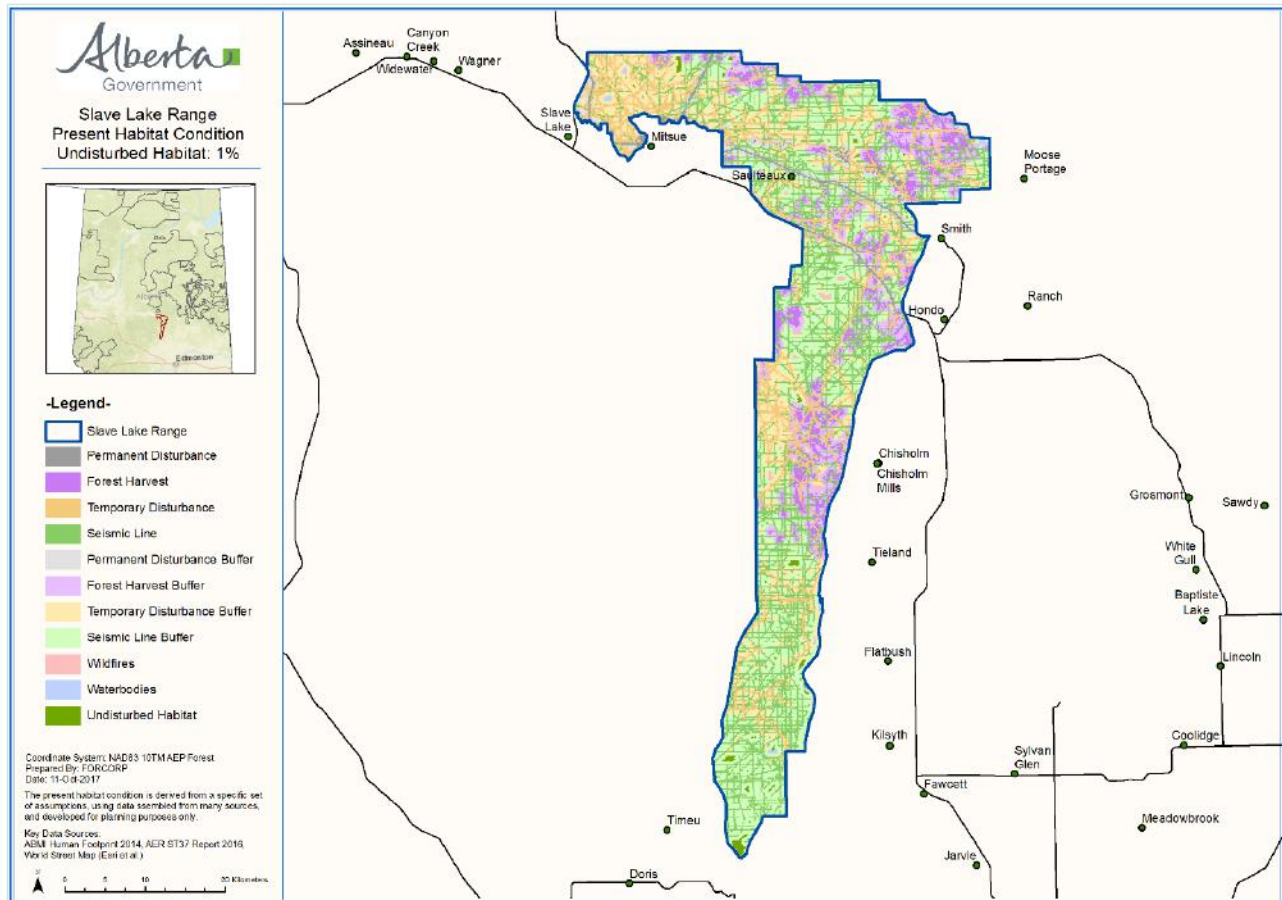


Figure 74 Current disturbed and undisturbed habitat in the Slave Lake caribou range

13.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 75 and Figure 76) and the occurrence of biophysical habitat (Figure 77) were identified for the Slave Lake range. Following direction from the federal guidance document, important areas for caribou (Figure 78) were also identified and include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



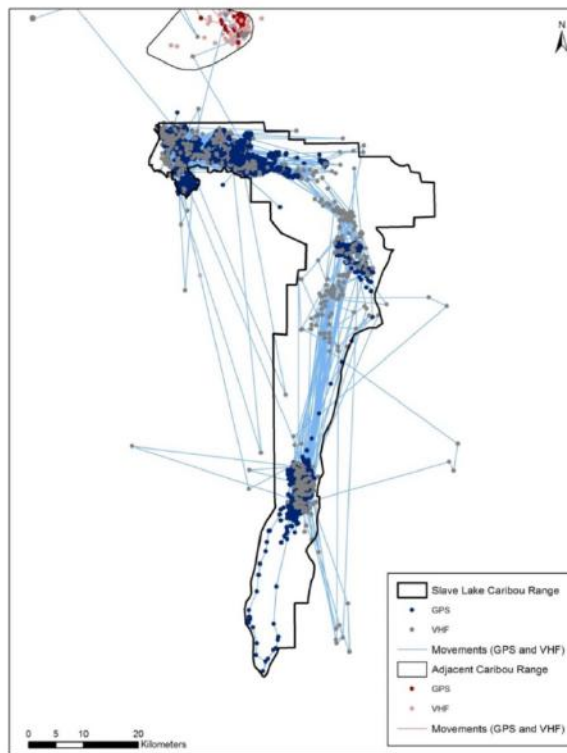


Figure 75 Locations from radio-collared caribou from the Slave Lake and adjacent caribou populations. Data collected 1983-2017, from n = 55 Slave Lake caribou (47 VHF collars, 8 GPS collars). Lines indicate caribou movements between individual location points.



Figure 76 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1983-2017, from n = 55 Slave Lake caribou (47 VHF collars, 8 GPS collars).



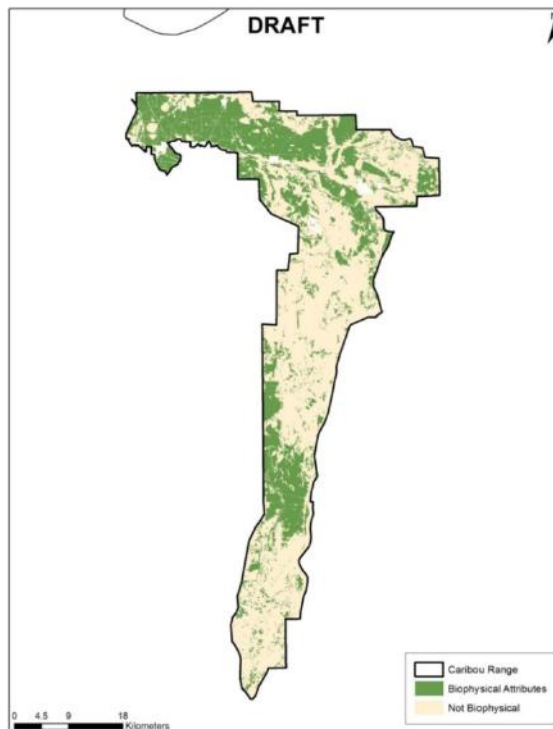


Figure 77 Current availability of caribou biophysical habitat in the Slave Lake caribou range. Biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data.

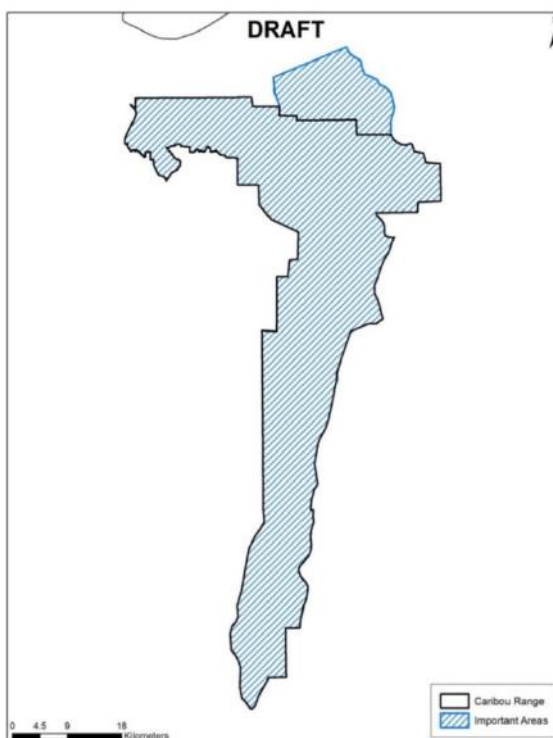


Figure 78 Important areas for caribou in the Slave Lake caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



13.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and management approaches that will initiate achievement of the recovery goals and objectives within the Slave Lake caribou range.

13.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northeast regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

121. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

13.4.2 Management of Access

Within the Slave Lake caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

122. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
123. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.
 - a. Access management will consider areas adjacent to the Slave Lake range and areas connecting to the Nipisi range.

13.4.3 Management of Energy Activity

124. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou



Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

13.4.4 Management of Forestry Activity

- 125. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
- 126. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing, and rate of harvesting within the range over time.

13.4.5 Management of Coal, Metallic and Industrial Minerals Activity

- 127. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

13.4.6 Management of Sand and Gravel Activity

- 128. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific strategies needs to occur before the individual caribou range plan is released.

13.4.7 Management of Peat Activity

- 129. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.



A.14 THE WEST SIDE ATHABASCA RIVER CARIBOU RANGE - CURRENT STATE

14.1 West Side Athabasca River Caribou Range Overview

The West Side Athabasca River (WSAR) caribou range is occupied by a boreal woodland caribou population. This range shares a boarder with the Red Earth range and is in proximity to the East Side of the Athabasca River ranges. The WSAR range is located in northern Alberta, north of the community of Calling Lake and west of the Athabasca River. It is 1,572,652 ha in size, and falls within Boreal Plain Ecozone.

The WSAR range boundary overlaps portions of the Regional Municipality of Wood Buffalo and Municipal District of Opportunity. The main sources of anthropogenic footprint within this range can be attributed to the extraction of natural resources (e.g. oil, gas and timber). The exploration, extraction and development of these resources provide social and economic stability to many Alberta communities. For example, volumes harvested from this range supply pulp mills near Athabasca and a saw mill in Fort McMurray. Oil and gas companies operating in this range employ staff from across Alberta and Canada, in a wide variety of vocations. Hunting, trapping and recreation opportunities are all actively pursued within the range as well.

14.2 Local Population Self-Sustainability Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each local population in Canada. At the time of the assessment, the WSAR range was listed as very unlikely to be self-sustaining (Environment Canada, 2011). According to the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for Woodland Caribou, (*Rangifer tarandus caribou*), Boreal Population in Canada for the period 2012-2017) the WSAR caribou population continues to decline.

The West Side Athabasca River caribou population has been in decline since monitoring began in 1999. All but one annual population growth rate estimate indicated a decreasing population (Figure 79); with some years indicating a steep decline. Recent minimum counts of the WSAR caribou during surveys conducted for other purposes have documents at least 133 animals. Fecal DNA-based techniques are being employed in an attempt to develop an accurate estimate of the caribou population size. Three-year mean annual population growth is 0.93 (95% CI: 0.77-1.04) and the 10-year mean annual population growth is 0.88 (95CI: 0.68-1.02). Data to inform population growth estimates were collected by collaring female caribou from 1991-2017, (n= 234 animals: 180 VHF collars, 54 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment surveys in late March. Only data from 1999-2017 are shown, because this is when sample size to calculate annual population growth rate (λ) was sufficient.



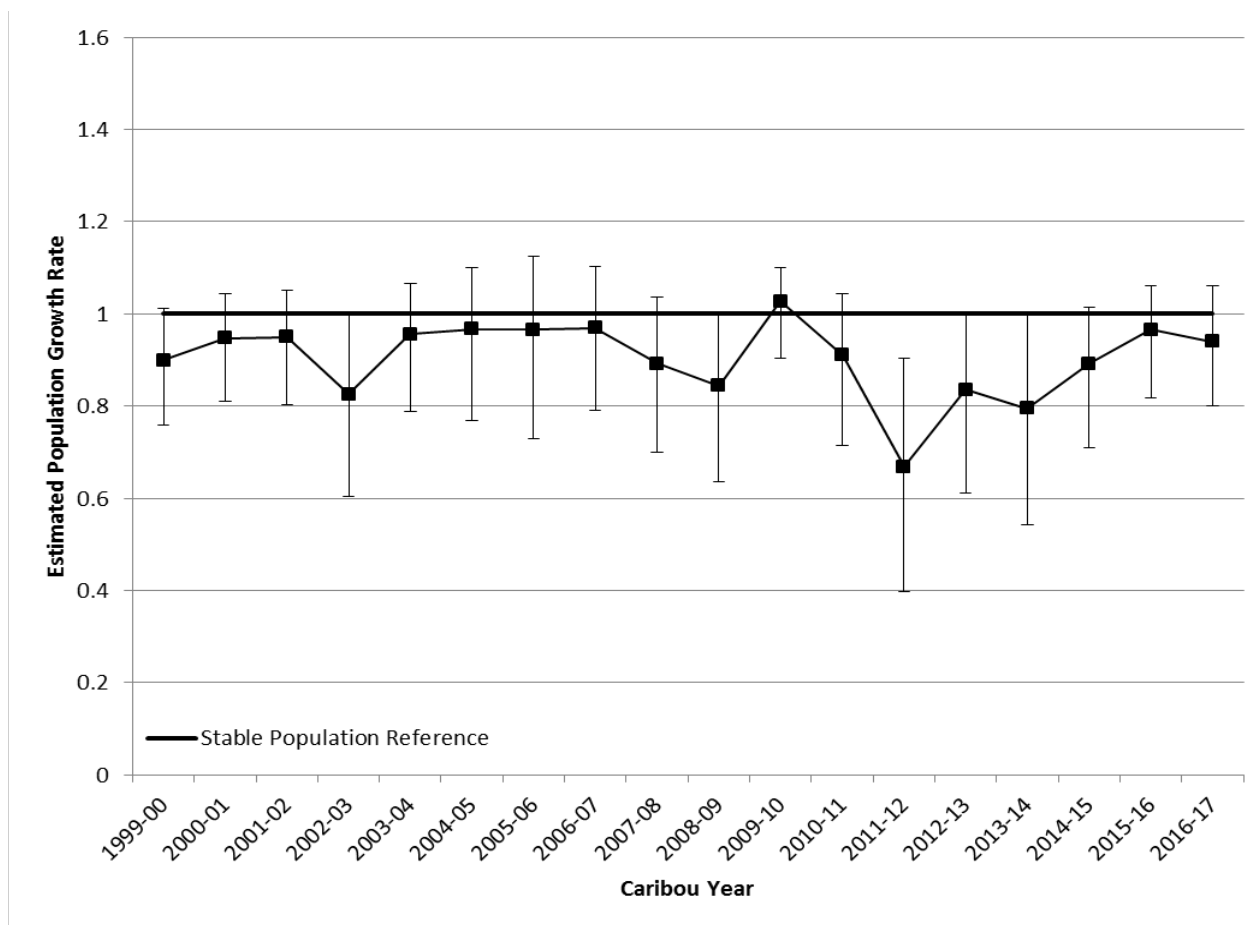


Figure 79 Estimated annual population growth rate for the West Side Athabasca River caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates negative populations growth (i.e. population decline).

14.3 Current Habitat Condition and Important Areas for Caribou

14.3.1 Habitat condition and disturbance levels

The WSAR range is located north and northwest of the community of Calling Lake, Alberta. Its eastern boundary follows the Athabasca River and it extends north towards Birch Mountains Wildland Park and west towards the North Wabasca Lake.

This area falls within the Boreal Plain Ecozone, which is described as having much of the area covered with forests. Wildfires are common in this Ecozone. Dominant tree species include white spruce, black spruce, balsam fir, jack pine, tamarack, birch, alder, trembling aspen, and balsam poplar. The deciduous species are most commonly found in the south, the coniferous species to the north.

The bulk of disturbance can be attributed to human footprint, including legacy seismic lines, pipelines, roads, wells, forest harvest and transmission lines (Table 27). Wildfire in the WSAR range wildfire only accounts for 6% of the total disturbed area. Almost the entire WSAR range is covered by FMA or quota and/or oil sands tenure (Table 28; Figure 80).



Table 27 – Industrial Tenure within the WSAR range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	98%
Oil Sands	Permit or Lease	87%
Petroleum and Natural Gas	Permit or Lease	34%
Metallic and Industrial Minerals	Permit or Lease	0%

Table 28 – Habitat Condition Balance Sheet.¹⁴

Time	Range Size (ha)	Total Wildfire Disturbance (%)	Anthropogenic Disturbance				Total Anthropogenic Disturbance (%)	Total Undisturbed Habitat (%)
			Seismic Line Disturbance (%)	Forest Harvest Disturbance (%)	Permanent Disturbance (%)	Temporary Disturbance (%)		
2011 Scientific Assessment	1,572,652	4					68	31
Present	1,572,652	6	79	5	2	34	84	14

¹⁴ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



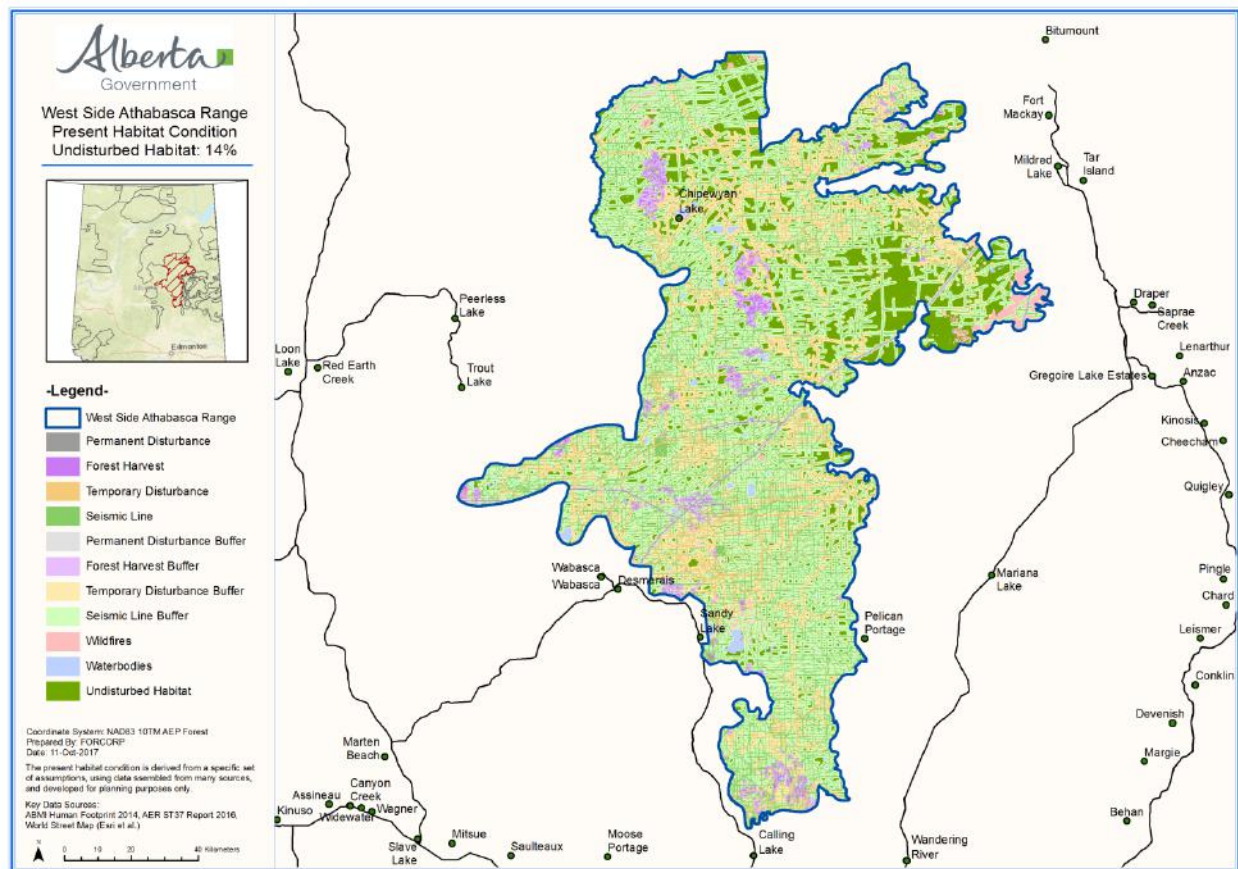


Figure 80 The current state of disturbed and undisturbed habitat within the WSAR caribou range

14.3.2 Patterns of habitat use

Patterns of caribou habitat use (Figure 81 and Figure 82) and the occurrence of biophysical habitat (Figure 83) were identified for the WSAR range. Following direction from the federal guidance document, important areas (Figure 84) for caribou also identified, and include areas key for maintaining connectivity within ranges and connectivity among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



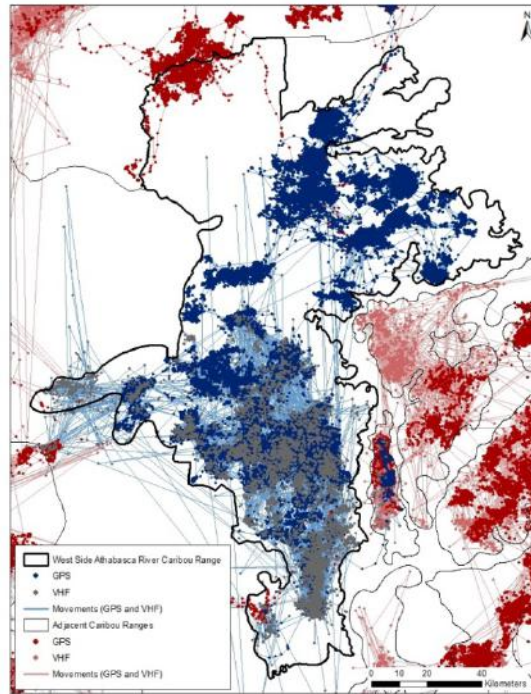


Figure 81 Locations from radio-collared caribou from the WSAR and adjacent caribou ranges. Data collected 1991-2017, from $n = 234$ WSAR caribou (180 VHF collars, 54 GPS collars). Lines indicate caribou movements between individual location points.

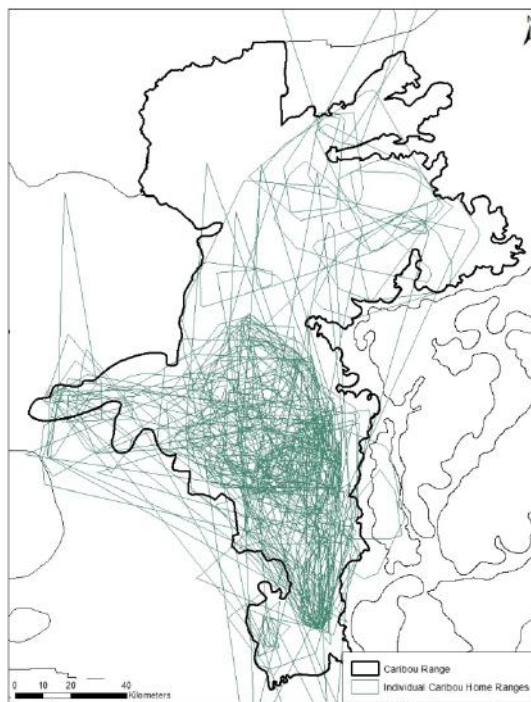


Figure 82 Individual caribou home ranges depicted by minimum convex polygons. Data collected 1991-2017, from $n = 234$ WSAR caribou (180 VHF collars, 54 GPS collars).



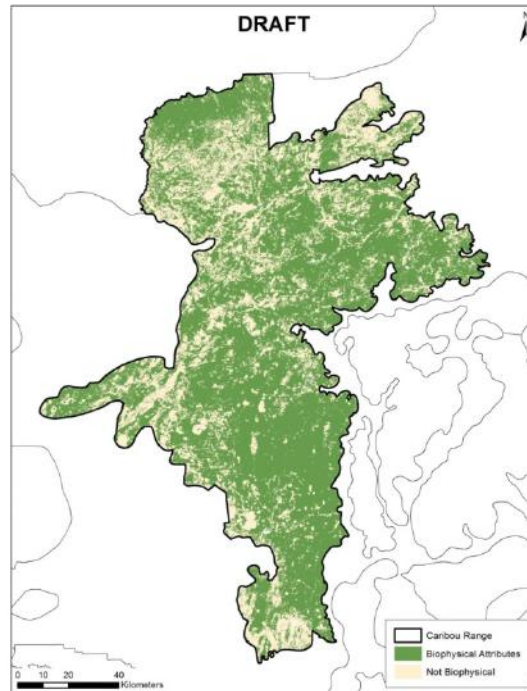


Figure 83 Current availability of caribou biophysical habitat for caribou in the WSAR caribou range. Biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data.

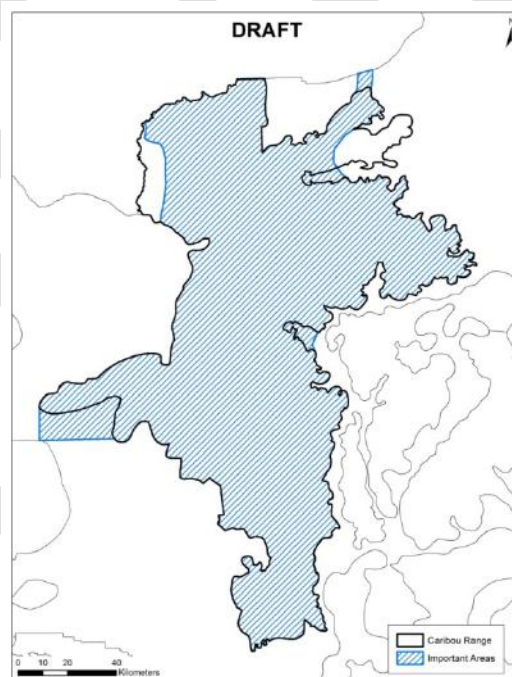


Figure 84 Important areas for caribou in the WSAR caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



14.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM techniques and other management approaches that will initiate achievement of the recovery goals and objectives within the WSAR caribou range.

14.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northeast regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

130. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation approaches needs to occur before the individual caribou range plan is released.
 - a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
 - b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
 - c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

14.4.2 Management of Access

Within the WSAR caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

131. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.
132. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.
133. Within the WSAR caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values. There are certain considerations specific to the WSAR caribou range that must be addressed during the planning phase:



- a. Access management must align with the objectives of the Lower Athabasca Landscape Management Plan (to reduce footprint and maintain biodiversity).
- b. Access management must ensure habitat connectivity within and between caribou ranges (reduce fragmentation and preserve intactness within the range).

14.4.3 Management of Energy Activity

134. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

14.4.4 Management of Forestry Activity

135. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
136. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

14.4.5 Management of Coal, Metallic and Industrial Minerals Activity

137. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

14.4.6 Management of Sand and Gravel Activity

138. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific strategies needs to occur before the individual caribou range plan is released.

14.4.7 Management of Peat Activity

139. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

14.4.8 Conservation Areas

140. The Lower Athabasca Regional Plan (LARP) was approved in 2012. Within this plan, new conservation areas were identified in the Lower Athabasca Region. A portion of the WSAR range is located within this region, however, no new conservation areas were identified within this range (less than 1% of the range is covered by existing protected areas).



A.15 THE YATES CARIBOU RANGE - CURRENT STATE

15.1 Yates Caribou Range Overview

The Yates caribou range is occupied by a boreal woodland caribou population. Some caribou from this population use adjacent areas of the Northwest Territories. As currently delineated this range extends into Wood Buffalo National Park; however, Alberta has been able to document only minimal use of the park by this caribou population. The Yates range is located within the Boreal Forest Natural Region and Northern Mixedwood Sub-region in northern Alberta. The range is a total 522,344 ha in size.

The Yates caribou range is located in Mackenzie County. Additionally, approximately 14% of the range overlaps with Wood Buffalo National Park. The Yates range overlaps with FMUs F26 and F10. Timber harvested in F26 is used to supply a dimension lumber sawmill in High Level, an oriented strand board facility near High Level and a dimension lumber sawmill and pellet mill near the town of La Crete. There is currently no forestry allocation in F10.

The Yates range overlaps the Muskwa Formation. There are some oil and gas operations located in the range, with the majority of the operations localized to the southwestern portion of the range. Currently, there are no known coal deposits or coal exploration activity within the Yates range. Historic seismic lines contribute to the majority of the disturbance footprint within the Yates range, totalling 6,190 km of legacy disturbance footprint throughout the range.

15.2 Local Population Self-Sustaining Status

In 2011, Environment Canada (now Environment and Climate Change Canada (ECCC)) released a scientific assessment for each boreal caribou local population in Canada. At the time of the assessment, the Yates range was listed as unlikely to be self-sustaining (Environment Canada, 2011). In the update provided by Environment and Climate Change Canada (Report on the Progress of Recovery Strategy Implementation for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada for the Period 2012-2017) the Yates caribou population is described as stable.

The population is currently considered to be stable by the Government of Alberta. The Yates caribou population was previously in decline from 2010 to 2014 (Figure 85); the population appears to have stabilized since then, with some years of population growth.

Recent minimum counts of the Yates caribou during surveys conducted for other purposes have documented at least 236 animals; the actual number of animals currently in this population is unknown. Three-year annual mean population growth is 0.99 (95% CI: 0.84 -1.11) and the 10-year mean annual population growth is 0.96 (95CI: 0.79 -1.08).

Data to inform population growth estimates were collected by collaring female caribou from 2007 to 2017, (n= 91 animals: 66 VHF collars, 25 GPS collars), and monitoring their survival through mortality surveys conducted four times per year, combined with annual calf recruitment



surveys in late March. Only data from 2008 to 2017 are shown, because this is when sample size to calculate lambda was sufficient.

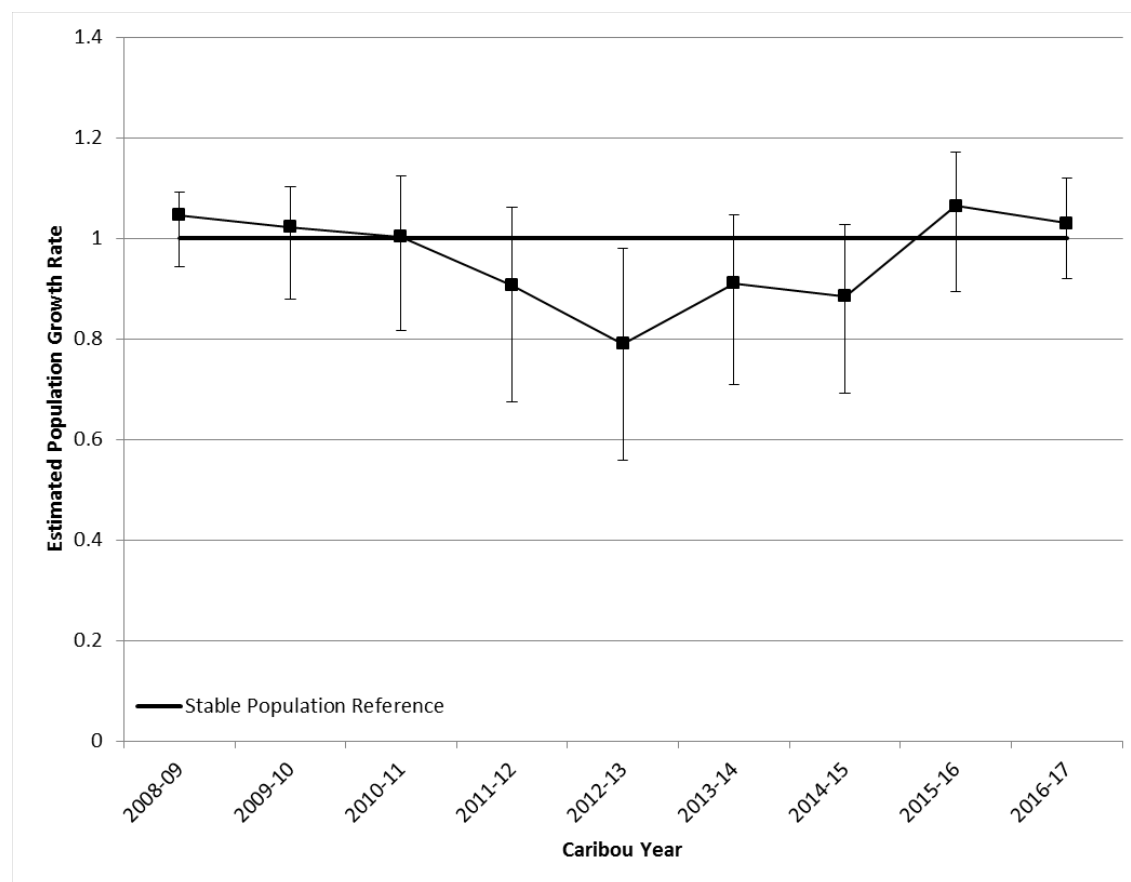


Figure 85 Estimated annual estimates of population growth rate for the Yates caribou population. Growth rate of 1 indicates stable population for that year (i.e. population size unchanged), a rate of >1 indicates positive growth (i.e. population increase), <1 indicates a negative growth rate (i.e. population decline).

15.3 Current Habitat Condition and Important Areas for Boreal Caribou

15.3.1 Habitat condition and disturbance levels

Petroleum, natural gas and forestry are the main industrial activities and tenure holders in the Yates range (Table 29). Other industrial activities within the range include metallic and industrial minerals, sand and gravel and electrical transmission lines. Legacy seismic lines continue to be a large contributor to the historical footprint within the Yates range.

Currently, 74% of the Yates range is considered disturbed by natural and anthropogenic footprint including the federal 500 m buffer (Table 30; and Figure 86). Wildfires within the past 40 years account for 36% of the disturbance within this range, though some of this footprint overlaps with anthropogenic footprint within the range.



Table 29 – Industrial Tenure within the Yates range.

Industry	Tenure Type	Percent of Range Tenured
Forestry	Forest Management Agreement and/or Quota	28%
Petroleum and Natural Gas	Permit or Lease	1%

Table 30 – Habitat Condition Balance Sheet.¹⁵

Time	Range Size (ha)	Total Wildfire Disturbance	Anthropogenic Disturbance				Total Anthropogenic Disturbance	Total Undisturbed Habitat
			Seismic Line Disturbance	Forest Harvest Disturbance	Permanent Disturbance	Temporary Disturbance		
2011 Scientific Assessment	522,344	43%					21%	39%
Present	522,344	36%	61%	3%	<1%	2%	61%	26%

¹⁵ Numbers in the *Habitat Condition Balance Sheet* are preliminary and subject to change as model inputs and outputs are updated throughout future iterations. Numbers cannot be added to reflect total disturbance, due to multiple layers of overlapping disturbance buffers.



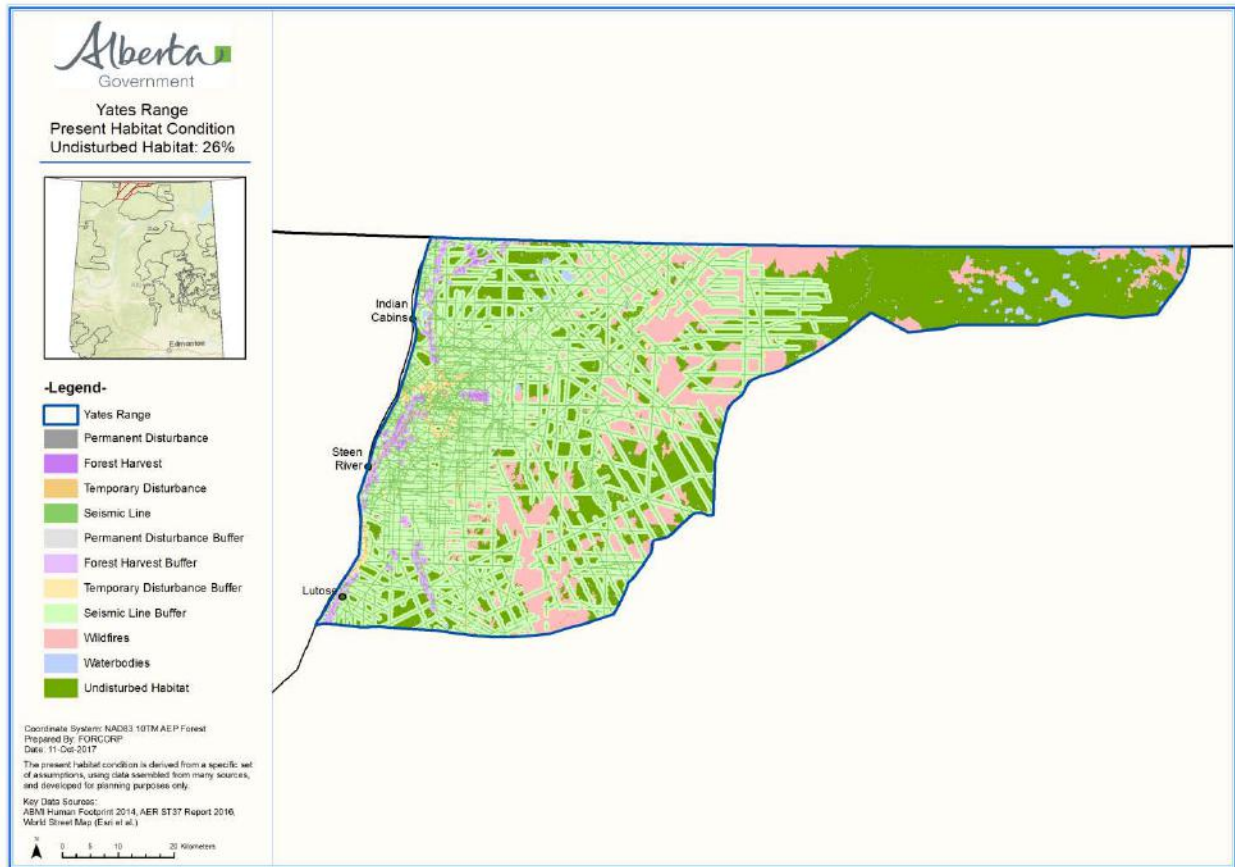


Figure 86 The current state of disturbed and undisturbed habitat within the Yates caribou range

15.3.2 Patterns of Habitat Use

Patterns of caribou habitat use (Figure 87 and Figure 88) and the occurrence of biophysical habitat (Figure 89) were identified for the Yates range. Following direction from the federal guidance document, important areas for caribou (Figure 90) were also identified and include areas key for maintaining connectivity within ranges and among ranges. For some ranges, this includes areas outside of currently delineated caribou range. Methods used for deriving patterns of habitat use, biophysical habitat and important areas for caribou are detailed within the Provincial Woodland Caribou Range Plan.



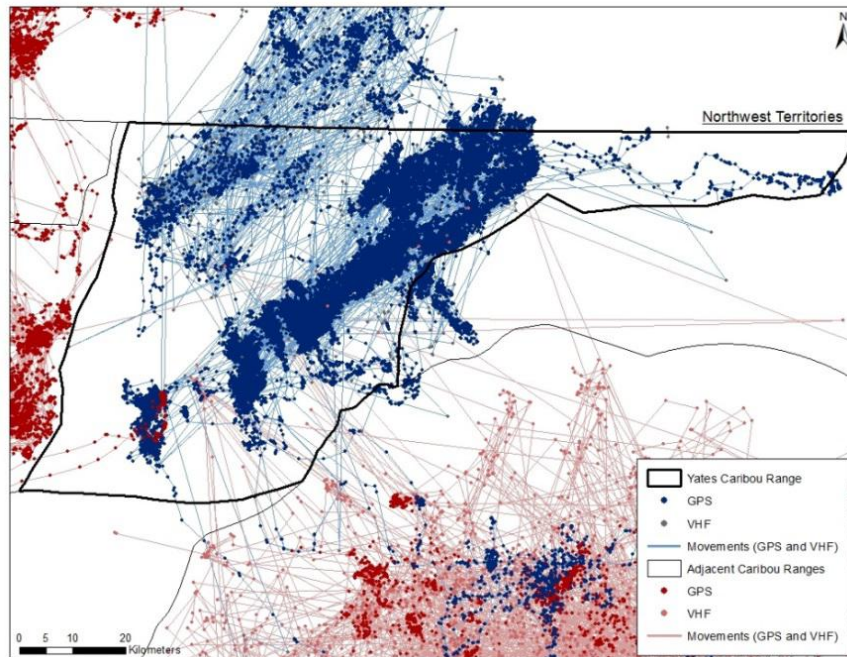


Figure 87 Locations from radio-collared caribou from the Yates caribou and adjacent caribou populations. Data collected 2007-2017, from n = 91 animals (66 VHF collars, 25 GPS collars). Lines indicate caribou movements between individual location points.

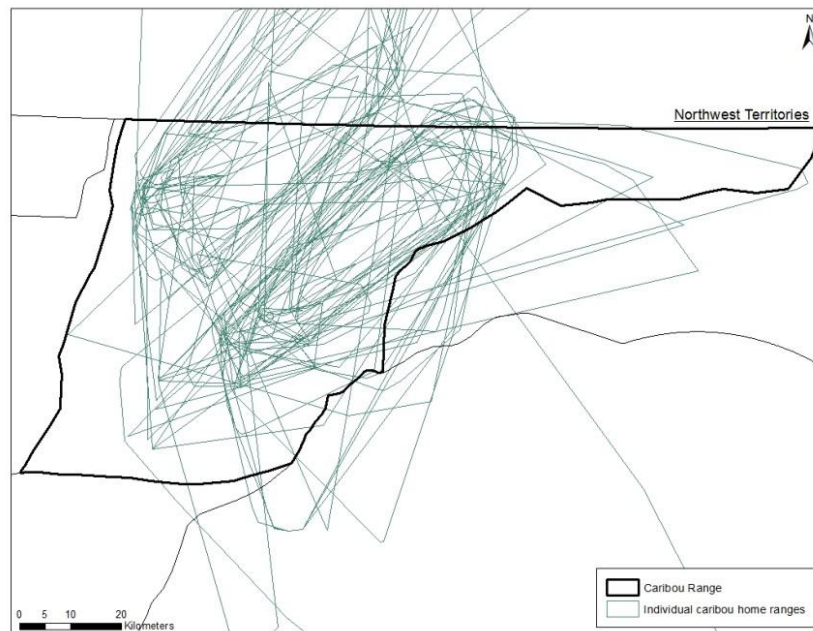


Figure 88 Individual caribou home ranges depicted by minimum convex polygons. Data collected 2007-2017, from n= 91 Yates caribou (66 VHF collars, 25 GPS collars)



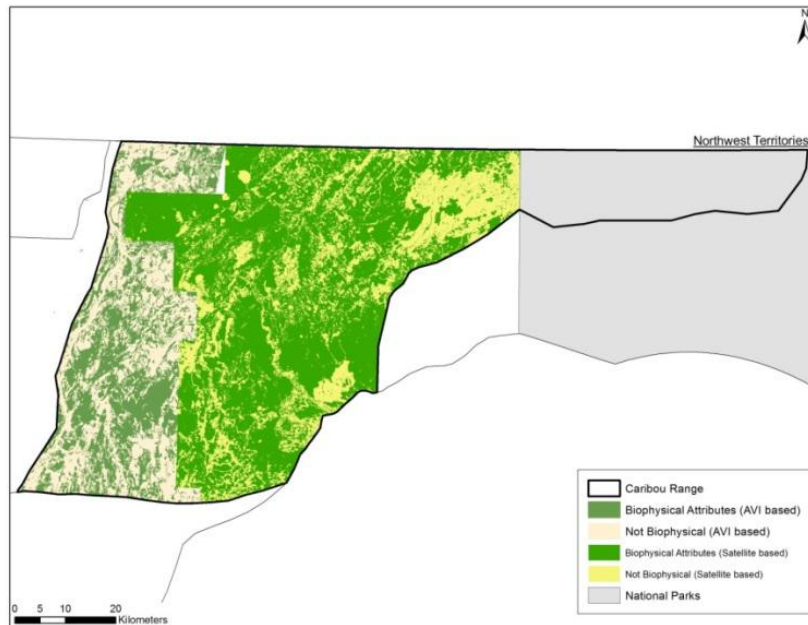


Figure 89 Current availability of biophysical habitat in the Yates caribou range. Where available, biophysical habitat classified using Alberta Vegetation Index (AVI) orthophoto data. Remaining areas classified with satellite-based datasets from Ducks Unlimited and Earth Observation for Sustainable Development (EOSD).

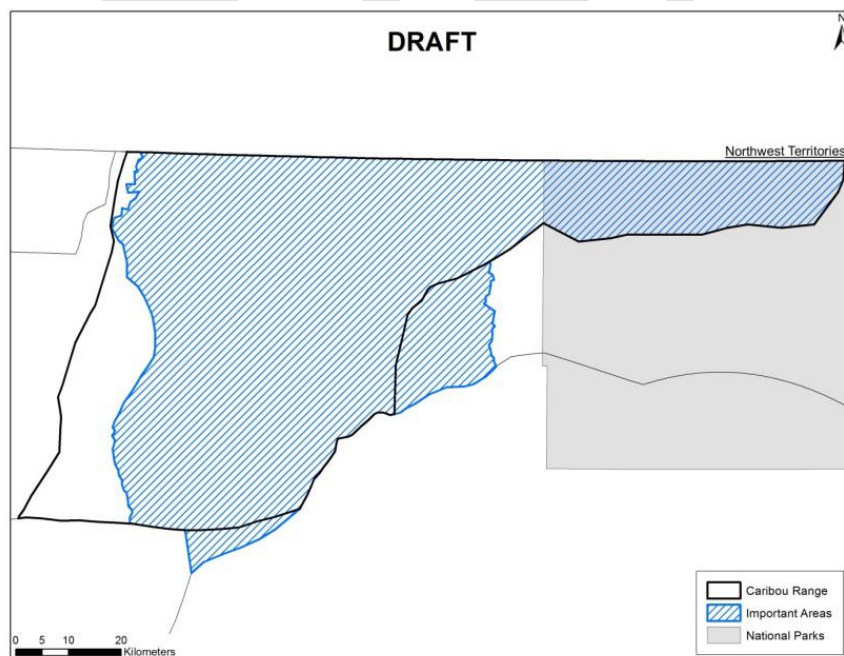


Figure 90 Important areas for caribou in the Yates caribou range. Important areas consider distribution of current biophysical habitat, current patterns of use and connectivity within and among ranges.



15.4 Managing to 65% Undisturbed Habitat

Alberta's management approaches are framed as a cumulative effort, using ILM techniques to achieve the adequate effective habitat which will support self-sustaining caribou populations. Alberta's immediate goal is to establish and enact ILM and other management approaches that will initiate achievement of the recovery goals and objectives within the Yates caribou range.

15.4.1 Restoration Management

Operational restoration plans for this range will be developed by the northwestern regional sub-committee working group led by government, with representatives from regional forest and energy industry operators, Indigenous groups, and municipalities.

141. Restoration activities within the caribou range will follow all applicable strategies identified under the *Restoration* section in the Provincial Woodland Caribou Range Plan. Further refinement on the timing and implementation of restoration approaches needs to occur before the individual caribou range plan is released.

- a. Industries operating within the range will follow all applicable strategies identified under the *Management of Seismic Lines* section in the Provincial Woodland Caribou Range Plan.
- b. Industries operating within the range will follow all applicable strategies identified under the *Management of Pipelines* section in the Provincial Woodland Caribou Range Plan.
- c. Industries operating within the range will follow all applicable strategies identified under the *Management of Transmission Lines* section in the Provincial Woodland Caribou Range Plan.

15.4.2 Management of Access

Within the Yates caribou range, access planning will be at a regional scale encompassing the entire caribou range and evaluating the potential to expand beyond range boundaries to incorporate other values.

142. Access Management activities within the caribou range will follow all applicable strategies identified under the *Management of Access* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

143. Energy and forestry industries operating within the range, with guidance from Government of Alberta, will prepare a Regional Access Management Plan which will consider the need to achieve caribou objectives. Plan development would consider and review all access features in support of ILM.

15.4.3 Management of Energy Activity

144. Energy activities within the caribou range will follow all applicable strategies identified under the *Management of Energy Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement on the appropriate and specific approaches needs to occur before the individual caribou range plan is released.



15.4.4 Management of Forestry Activity

145. Forest harvesting activities within the caribou range will follow all applicable strategies identified under the *Management of Forestry Activity* section in the Provincial Woodland Caribou Range Plan.
146. Forest harvesting activities within the caribou range will follow an aggregated harvest pattern. Further refinement is required to identify the location, timing and rate of harvesting within the range over time.

15.4.5 Management of Coal, Metallic and Industrial Minerals Activity

147. Coal and Metallic and Industrial Mineral activities within the caribou range will follow strategies identified under the *Management of Coal, Metallic and Industrial Minerals Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

15.4.6 Management of Sand and Gravel Activity

148. Sand and Gravel activities within the caribou range will follow strategies identified under the *Management of Sand and Gravel Activity* section in the Provincial Woodland Caribou Range Plan. Further refinement of the appropriate and specific approaches needs to occur before the individual caribou range plan is released.

15.4.7 Management of Peat Activity

149. Peat activities within the caribou range will follow strategies identified under the *Management of Peat Activity* section in the Provincial Woodland Caribou Range Plan.

15.4.8 Candidate Conservation Areas

150. Designate a new Conservation Area within FMU F10.
 - a. Required designation to be finalized through public engagement processes and finalization of the Yates Caribou Range Plan.
 - b. No future surface disturbance will be issued within the Conservation Area.
 - c. Existing leases, activities and agreements within the Conservation Area will be honoured.
 - d. Designation will work to contribute to other regional planning initiatives for the area (i.e. the Lower Peace Regional Plan).
 - e. Designation to contribute to Alberta's goal of protecting 17% of terrestrial areas by 2020.

