

South Peace Northern Caribou

Standardized Industry Management Practices



Prepared by

BC Ministry of Forests, Lands and Natural Resource Operations

Draft Version 5.0

October 2016

Recommended Citation

B.C. Ministry of Forests, Lands and Natural Resource Operations and B.C. Ministry of Environment. 2015. South Peace Northern Caribou Standardized Industry Management Practices. Prince George, BC. 50 pp.

Cover Photograph

Graham caribou on high elevation winter range on Aylard Ridge, 2004. D. Culling photo.

Additional Copies

Additional copies can be downloaded from [xx](#)

Publication Information

ISBN: [xx](#)

Catalogue Number: [xx](#)

ACKNOWLEDGEMENTS

Photo credits:

- D. Culling: Figures 4, 5, 8, 9, cover photo
- E. Jones: Figure 2 (*Cladonia* sp., *Stereocaulon* sp., *Bryoria* sp.), Figure 6
- D. Seip: Figure 7
- D. Cichowski: Figure 2 (*Cladonia* sp.)

Illustrations by Annerose Georgeson.

EXECUTIVE SUMMARY

South Peace Northern Caribou (SPNC) include seven herds of Northern Caribou found in the southern portion of the Peace Region: the seven herds are referred to as the Graham, Moberly, Scott, Burnt Pine, Kennedy Siding, Quintette and Narraway. These herds are declining and are currently listed as *Threatened* in Schedule 1 of the federal *Species at Risk Act*. The herds are monitored regularly through a combination of late winter recruitment surveys and standardized aerial inventories. These measures indicate that all SPNC herds have declined from historic levels, with most herds continuing to decline in the short term. Three of seven SPNC herds number less than 50 individuals, making them extremely vulnerable to extirpation. The Burnt Pine herd is currently considered extirpated.

In response to the threats to these herds, and in recognition of the Treaty 8 First Nations' right to harvest caribou, the Government of British Columbia has identified management actions to increase the SPNC population. In March 2013, the ***Implementation Plan for the Ongoing Management of the South Peace Northern Caribou (Rangifer tarandus caribou pop. 15) in BC*** (PNCP) was released. The overarching goal of the PNCP is to increase the SPNC population to ≥ 1200 animals within 21 years across their range. The plan sets out four key management objectives to achieve that goal, including: protecting high elevation winter habitat, managing the industrial footprint with standardized industry management practices, monitoring compliance and effectiveness of management actions (and modifying actions as required), and conducting population management activities.

The following **Standardized Industry Management Practices** (SIMPs) will apply to the seven SPNC herds, and will achieve a key objective of the PNCP by providing information and guidance to industry and other users on how to mitigate adverse effects and provide for the appropriate management of caribou and their habitat when undertaking resource development activities. Three main principles guided the development of the SIMPs: integration, adaptive management, and stewardship.

The SIMPs are applicable **throughout all the ranges** for the seven SPNC herds (see Figure 1), and provide standardized guidance that applies to all sectors, including non-renewable and renewable energy infrastructure and transmission, coal and mineral exploration and development, aggregates, forest harvesting, and tourism and recreation. As backcountry recreational activities, particularly snowmobiling, have the potential to compound impacts of industrial activities, some SIMPs also apply to non-commercial recreational users. SIMPs will be reviewed and updated at five-year intervals to reflect current thinking, incorporate new techniques and management practices, and to address deficiencies identified through compliance and effectiveness monitoring activities.

SIMPs, for SPNC ranges, provided in this document include both landscape level and site level practices and are based on the principles of: avoiding increasing mortality risk for

Standardized Industry Management Practices

caribou; maintaining connectivity within and between ranges; avoiding destroying caribou forage and caribou forage habitat; avoiding increasing forage for other prey species such as moose and deer; and prioritizing landscape level practices over site level practices.

TABLE OF CONTENTS

1 SCOPE OF THE STANDARDIZED INDUSTRIAL MANAGEMENT PRACTICES 1
 1.1 Associated Documents..... 3
2 SOUTH PEACE NORTHERN CARIBOU 4
 2.1 Population..... 4
 2.2 Species Description and Biology 6
 2.3 Threats 7
3 SUMMARY OF SEASONAL RANGE USE..... 11
 3.1 Graham 14
 3.2 Moberly..... 15
 3.3 Scott East 15
 3.4 Burnt Pine 15
 3.5 Kennedy Siding..... 15
 3.6 Quintette..... 15
 3.7 Narraway..... 16
4 HABITAT MAPS..... 17
 4.1 High Elevation Winter Range (HEWR)..... 17
 4.2 Low Elevation Winter Range (LEWR) 18
 4.3 High Elevation Summer Range (HESR)..... 19
 4.4 Matrix Range..... 20
5 STANDARDIZED INDUSTRY MANAGEMENT PRACTICES 21
6 REFERENCES..... 38
7 GLOSSARY AND ABBREVIATIONS 39
8 APPENDIX ONE: Ungulate Winter Ranges and Wildlife Habitat Areas 41
9 APPENDIX TWO: Lower Risk Areas for Industrial Activities 43

LIST OF TABLES

Table 1. Comparison of minimum counts/population estimates and long-term trend for South Peace Northern Caribou herds, 1989 to 2015 (from Seip 2015)..... 6
Table 2. Standardized industry management practices for South Peace Northern Caribou ranges. 22

LIST OF FIGURES

Figure 1. Location of South Peace Northern Caribou (SPNC) herd ranges in British Columbia..... 3
Figure 2. Examples of *Cladina* sp. (top left), *Cladonia* sp. (top right), *Stereocaulon* sp. (bottom left) and *Bryoria* sp. (bottom right). 8

Standardized Industry Management Practices

Figure 3. Schematic representation of area of effective habitat loss (dashed line) associated with development footprint. 9

Figure 4. Landscape changes resulting from industrial development on Quintette herd High Elevation Winter Range..... 10

Figure 5. Snowmobile activity in alpine/subalpine habitat in the Quintette herd High Elevation Winter Range (HEWR), March 2013. 11

Figure 6. Alpine ridge on Mount Spieker, Quintette herd High Elevation Winter Range (HEWR)..... 12

Figure 7. Low Elevation Winter Range (LEWR), Narraway herd..... 12

Figure 8. Rugged alpine/subalpine habitat in the upper Cypress River watershed, Graham herd High Elevation Summer Range (HESR). 13

Figure 9. Two caribou cows and calves in rugged alpine calving habitat in Graham herd High Elevation Summer Range (HESR)..... 13

Figure 10. Schematic representation of location of Matrix Range within a caribou range. .. 14

Figure 11 High elevation winter range in South Peace Northern Caribou ranges. 17

Figure 12. Low elevation winter range in South Peace Northern Caribou ranges. 18

Figure 13. High elevation summer range in South Peace Northern Caribou ranges. 19

Figure 14. Matrix range in South Peace Northern Caribou ranges. 20

Figure 15. Examples of line blocking. 37

Figure 16. Examples of functional habitat loss when habitat alteration is within (left) and beyond (right) the area of influence of the existing development footprint. 37

1 SCOPE OF THE STANDARDIZED INDUSTRIAL MANAGEMENT PRACTICES

In the South Peace region of British Columbia (BC), Northern Caribou (*Rangifer tarandus*) (*hereafter*, South Peace Northern Caribou [SPNC]) are declining, and are currently listed as *Threatened* in Schedule 1 of the federal *Species at Risk Act*. In 2014, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) re-assessed the Graham herd as *Special Concern* as part of the Northern Mountain Designatable Unit (DU) and all the other herds in the South Peace area as *Endangered* as part of the Central Mountain DU. However, those designations have not yet been approved by the federal Minister of Environment. In BC, the Conservation Data Centre classifies SPNC as part of the Northern Mountain Caribou population (*Rangifer tarandus caribou* pop. 15), which is ranked S3 (special concern, vulnerable to extirpation or extinction) and is on the provincial Blue List. Northern Caribou are also listed as Species at Risk under the *Forest and Range Practices Act* and the *Oil and Gas Activities Act*, and are an Identified Wildlife Species in the Identified Wildlife Management Strategy. The BC Conservation Framework ranks this population as a priority 2 under goal 2 regarding the prevention of species and ecosystems from becoming at risk. In response to the threats to SPNC, and in recognition of the Treaty 8 First Nations right to harvest caribou, the Government of BC identified management actions to increase the population of the herds.

In March 2013, the Provincial Government of BC released the *Implementation Plan for the Ongoing Management of the South Peace Northern Caribou (Rangifer tarandus caribou pop. 15) in BC* (PNCP), containing the Province's direction for the management of these caribou herds (BC MOE 2013). The overarching goal of the PNCP is to increase the population of SPNC to ≥ 1200 animals within 21 years across their range (BC MOE 2013). The plan sets out four key management objectives to achieve that goal:

1. Protect 90% of identified high elevation winter habitat across the range of SPNC:
 - Protect $\geq 90\%$ of identified high elevation winter habitat in the Graham, Moberly, Burnt Pine, Scott, Kennedy Siding, and Narraway herd ranges, and
 - Protect $\geq 80\%$ of identified high elevation winter habitat in the Quintette herd range.
2. In all ranges, manage the industrial footprint in identified high and low elevation habitats by requiring standardized industry management practices across all industry sectors to reduce or prohibit surface disturbance and habitat alteration, and support long-term sustainable caribou habitat conditions.
3. In all ranges, monitor the compliance and effectiveness of management actions and modify actions accordingly to ensure the population and distribution goal is being achieved.
4. Conduct South Peace Northern Caribou population management to address non-habitat related threats (e.g. predation) to certain South Peace Northern Caribou herds.

Standardized Industry Management Practices

The BC Ministry of Forests, Lands and Natural Resource Operations (BC MFLNRO) is responsible for leading the implementation of the PNCP, and in collaboration with other agencies and governments, has undertaken a number of initiatives to achieve the objectives of the plan. To provide for the protection of High Elevation Winter Range (HEWR), a Caribou Mitigation and Monitoring Plan (CMMP) is required for all proposed tenures/activities where physical disturbance is proposed¹. (More information can be found on CMMPs at <http://www.env.gov.bc.ca/wld/speciesconservation/nc/documents/South%20Peace%20Northern%20Caribou%20Mitigation%20and%20Monitoring%20Plan%20Guidance.pdf>.) The Province has designated over 2.1 million hectares of land under various pieces of legislation for managing caribou range. BC MFLNRO has supported a number of population management initiatives, including conducting predator (wolf) management and providing support to a maternal penning project. Further initiatives relating to the protection of other important habitat types and effectiveness monitoring are currently in the planning stages.

The following **Standardized Industry Management Practices (SIMPs)** will achieve another objective of the PNCP. The goal of the SIMPs is to provide information and guidance to industry and other users on how to mitigate adverse effects and provide for the appropriate management of SPNC and their habitat when undertaking resource development activities.

The main principles guiding the development of these SIMPs are:

1. Integration – The SIMPs provide standardized guidance that applies to all sectors, including energy infrastructure and transmission (oil and gas and renewable energy industries), coal and mineral exploration and development, aggregates, forest harvesting, and tourism and recreation, recognizing that it is the combination of many human activities that contribute to impacts on habitat and SPNC ecology.
2. Adaptive Management – The SIMPs have been developed using the best available information, but as new information becomes available, will be updated to reflect current thinking and the most appropriate management practices. Also, the effectiveness of the SIMPs will be monitored and if gaps or inadequacies become apparent, they will be updated and corrected if possible.
3. Stewardship – The SIMPs are intended to promote stewardship by providing the information to increase awareness of caribou ecology and conservation practices, and to increase understanding of each person's role and responsibility in protecting SPNC. Unless the SIMPs are included as a permit condition(s), compliance with them is **voluntary**.

¹ The NRS Board Direction defined the circumstances under which a CMMP is required. It states that all activities within HEWR require a CMMP, except for proposed activities within high elevation winter range that: (a) have a total surface disturbance that is <0.25 ha, with disturbance of trees and terrestrial lichen communities minimized; (b) do not involve the creation of, or improvement to existing, road access; (c) do not involve the use of motorized vehicles (does not include helicopters) off of existing road access and, (d) only occur within least-risk timing windows (including construction, maintenance and removal).

Standardized Industry Management Practices

These SIMPs apply to the seven herds of Northern Caribou found in the southern portion of the Peace Region, including the Graham, Moberly, Scott, Burnt Pine, Kennedy Siding, Quintette and Narraway, all of their ranges (Figure 1), and any industrial activities in those areas. As backcountry recreational activities, particularly snowmobiling, have the potential to compound impacts of industrial activities, some SIMPs also apply to non-commercial recreational users.

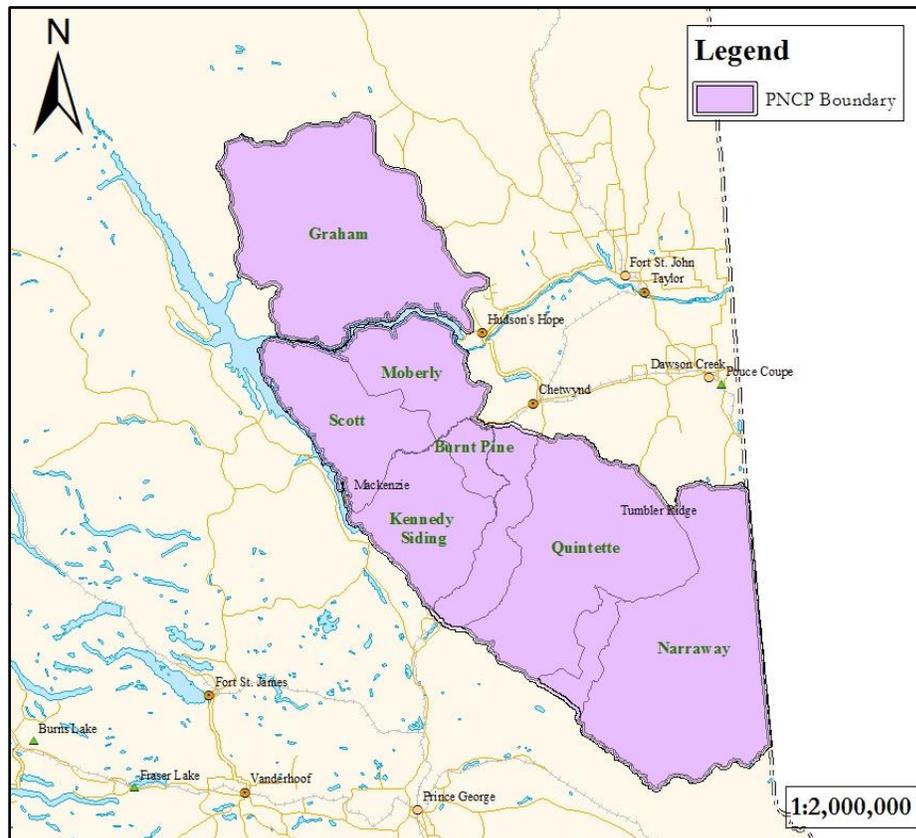


Figure 1. Location of South Peace Northern Caribou (SPNC) herd ranges in British Columbia.

1.1 Associated Documents

- The Science Update for the South Peace Northern Caribou (*Rangifer tarandus* caribou pop. 15) in British Columbia (BC MOE 2014) provides current science information on SPNC herds. Available at <http://www.env.gov.bc.ca/wld/speciesconservation/nc/index.html>
- The Government of Canada's Recovery Strategy for the Woodland Caribou, Southern Mountain population in Canada (Environment Canada 2014) applies to all

Standardized Industry Management Practices

caribou in the Southern Mountain National Ecological Area, which includes all SPNC herds. Available at

http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1309

- The West Moberly First Nation's Action Plan for the Klinse-Za Herd (McNay et al. 2013) considers the area that includes the Moberly herd's range, and areas of the Kennedy Siding, Scott, and Burnt Pine herd ranges, as defined under the PNCP. These documents contain background information and considerations from West Moberly First Nation's perspective when planning and undertaking activities in the relevant areas.² For further information on this plan, contact West Moberly First Nations.
- For more information on the effects of aircraft activities on wildlife and mitigation of those effects, see:
http://www.env.gov.bc.ca/esd/distdata/Peace_Region_Wildlife_Values/Industrial_Sectors/Best_Management_Practices/AircraftBMPJul%2015'08.pdf
- The BC Oil & Gas Commission are working on the Area Based Analysis tools that will support the assessment of cumulative effects on the landscape, including wildlife. For more information see: <https://www.bcogc.ca/public-zone/area-based-analysis-aba>
- For more information on caribou habitat restoration see: <http://www.bcogris.ca/boreal-caribou/projects/complete>
- For more information on Best Management Practices see: <http://www.env.gov.bc.ca/wld/BMP/bmpintro.html>

2 SOUTH PEACE NORTHERN CARIBOU

2.1 Population

SPNC herds are monitored through a combination of late winter recruitment surveys and standardized aerial inventories (BC MSRM 2002), with radio-collared animals used to estimate sightability and track calf recruitment (i.e., survival to ten months). Population trends are determined based on annual calf recruitment surveys and annual mortality rates for radio-collared adult females, and on observed changes in caribou abundance over time. These measures indicate that all SPNC herds have declined from historic levels (Table 1). While recent surveys indicate that most herds are continuing to decline in the short term, the Kennedy Siding and combined Moberly/Scott East herds appear to have stabilized at low

²For further information, go to: <http://www.env.gov.bc.ca/wld/speciesconservation/nc/>
http://www.registrelep.gc.ca/species/speciesDetails_e.cfm?sid=638
<http://www.westmo.org/>

Standardized Industry Management Practices

levels (Seip 2015). Three of seven herds number less than 50 individuals, making them extremely vulnerable to extirpation. The Burnt Pine herd is currently considered extirpated.

Standardized Industry Management Practices

Table 1. Comparison of minimum counts/population estimates and long-term trend for South Peace Northern Caribou herds, 1989 to 2015 (from Seip 2015).

Herd	Earliest Reliable Census		Most Recent Reliable Census		Population Trend
	Year	Estimate (Minimum Count)	Year	Estimate (Minimum Count)	
Graham	1989	1743 (581)	2015	347 (215)	Major decline over past decades; decline ongoing
Moberly/ Scott East	1995	(>200)	2015	42	Major decline over past decades; recently stable at low level
Burnt Pine	2006	(16)	2014	1	Extirpated
Kennedy Siding	2007	(120)	2015	50	Major decline over past decade; recently stable at low level
Quintette	2008	173-218	2014	98-113	Major decline over past decade; decline ongoing
Bearhole/ Redwillow ³	2008	(49)	2015	(17)	Population trend unknown; but high adult mortality, low calf recruitment and min. counts suggests population decline.
Narraway	2008	(102)	2015	(40)	Ongoing decline

2.2 Species Description and Biology

Northern Caribou feed primarily on terrestrial and arboreal lichens during the winter. Preferred terrestrial lichens include *Cladina* sp., *Cladonia* sp., *Stereocaulon* sp., and *Cetraria* sp. and the most common arboreal lichens on SPNC ranges is *Bryoria* sp. (Figure 2). To access terrestrial lichens, the caribou use high-elevation windswept ridges or low-elevation pine-lichen forests where snow depths are shallow enough to dig for terrestrial forage (called *cratering*). Arboreal lichens are most abundant in old-growth subalpine forests, but are also found in low-elevation forests. From spring through fall, Northern Caribou feed on a wide variety of shrubs, forbs, grasses and lichens. Although Northern Caribou forage is generally not considered limiting, caribou are known to shift their areas of use within their winter range over time (known as range rotation), presumably to avoid depleting slow-growing lichens. However, habitat alteration due to industrial activities or natural

³ The Narraway herd is composed of three sub-groups, the Bearhole, Redwillow and South Narraway.

Standardized Industry Management Practices

disturbances could result in fewer options for range rotation for caribou. Fine scale habitat features, such as mineral licks or sites that provide relief from biting insects (e.g. windswept ridges or residual snow patches on summer range), can be considered vulnerable habitat elements.

Breeding generally occurs between late September and November, with the peak of the rut in mid-October. Gestation averages seven to eight months, and calves are born in late May and early June. SPNC typically calve in mountainous areas, which is thought to be a strategy to avoid predators.

The main known cause of mortality in adult caribou is predation, primarily by wolves. Similar to other caribou populations, calf survival for the SPNC is low, and although the causes of calf mortality have not been investigated in the SPNC populations, other studies indicate that predation is the primary cause of calf mortality. Wolves, bears, wolverines, and golden eagles are known to prey on caribou calves.

Caribou have low productivity compared to other members of the deer family (i.e., moose, elk, and deer). Adult females generally have only one calf per year and most yearlings do not become pregnant. Therefore, unlike moose and deer, caribou populations do not have the ability to rebound quickly following a decline.

2.3 Threats

Based on the International Union for the Conservation of Nature - Conservation Measures Partnership threat classification system, the overall Threat Impact for the SPNC is Very High (75% declines; BC MOE 2014). The main threats to caribou is increased predation, which appears to be related to industrial activities in caribou habitat, in particular, forest harvesting, coal and mineral exploration and development, and energy exploration and production (including oil and gas development and windfarms).

Recreational activities, particularly back-country snowmobiling, can directly impact caribou by displacing them from preferred high-elevation winter habitat, and indirectly by providing access for wolves to travel quickly between low elevation and alpine/subalpine habitats on hard-packed snowmobile trails. Non-aboriginal hunting for SPNC is closed except for along the western edge of the Graham range (Ospika watershed) for mature bulls only) (although First Nations in the region have voluntarily stopped hunting caribou for many years because of the declining numbers).

Human activities can affect caribou by increasing the amount of early seral habitat preferred by other ungulates such as moose and deer resulting in increased predator numbers. Human activities can also adversely affect caribou through by displacing caribou from their preferred habitat and into areas with higher mortality risk and higher predation.



Figure 2. Examples of *Cladina* sp. (top left), *Cladonia* sp. (top right), *Stereocaulon* sp. (bottom left) and *Bryoria* sp. (bottom right).

Standardized Industry Management Practices

Human activities can also compromise caribou habitat by damaging lichens resulting in reduced food availability. Linear features (roads, seismic lines, transmission lines, pipelines) that are associated with industrial activities can also result in habitat alteration (i.e., conversion to early seral habitats), direct mortality due to collisions with vehicles/trains or increased illegal hunting, increased predator efficiency, and increased access resulting in increased potential for displacement from other human activities such as recreation. In general, caribou avoid anthropogenic habitat alteration and associated linear features, resulting in effective habitat loss beyond the actual development footprint (Figure 3).

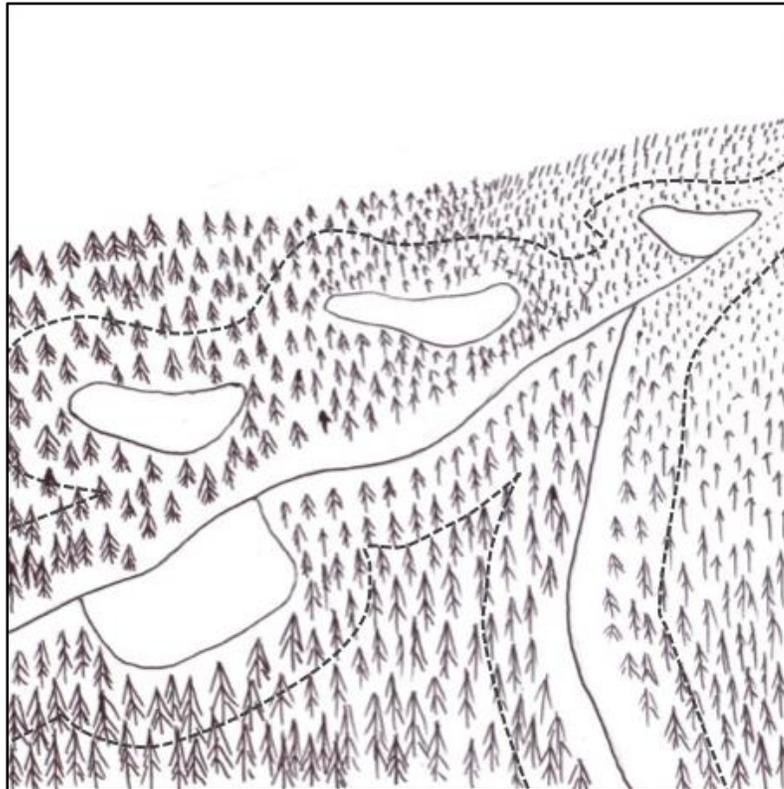


Figure 3. Schematic representation of area of effective habitat loss (dashed line) associated with development footprint.

Threats to caribou are complex and interrelated. Caribou and wolves co-existed in the South Peace area for thousands of years, but in the last few decades, SPNC have exhibited a dramatic decline in numbers due to unsustainable levels of wolf predation in combination with other mortality factors. This period of decline corresponds to significant changes to the landscape due to industrial activities. The proposed mechanism of decline is that industrial activities have modified the landscape in a way that has increased the number and distribution of early seral ungulates, which in turn have resulted in an increase in the density

Standardized Industry Management Practices

and distribution of wolves. Since wolves are sustained by other ungulates, there is no negative feedback on wolf numbers as caribou populations decline.

Other threats include natural disturbances such as wildfire and forest insects. Although wildfire has played a relatively minor role in habitat alteration on SPNC ranges during the past 50 years, in 2014, three large wildfires burned 8,000 ha on the Graham range, 26,000 ha on the Moberly range, and 33,500 ha on the Narraway range. Historically, caribou were able to respond to natural disturbances by using undisturbed portions of their ranges; however, with additional habitat alteration resulting from human activities, the availability of undisturbed alternate ranges is becoming increasingly limited. Climate change may result in additional stress on SPNC herds associated with increasing frequency and severity of wildfires and forest insect outbreaks, and increasing incidence of caribou parasites and diseases.

Figures 4 and 5 show impacts of industrial and recreational activity on SPNC ranges, respectively.



Figure 4. Landscape changes resulting from industrial development on Quintette herd High Elevation Winter Range.



Figure 5. Snowmobile activity in alpine/subalpine habitat in the Quintette herd High Elevation Winter Range (HEWR), March 2013.

3 SUMMARY OF SEASONAL RANGE USE

The seasonal habitat use patterns of Northern Caribou generally reflect their ability to obtain forage and cover, and to maintain spatial separation between themselves and predators (primarily wolves) and other prey (moose, deer), which often live in the valley bottoms and low elevations. In winter, SPNC typically select windswept alpine ridges (Figure 6) and/or low-elevation forests along the eastern slopes of the Rocky Mountains (Figure 7), where relatively shallow snow depths permit cratering for terrestrial lichens. In spring, the majority of SPNC migrate west to spend the snow free months in the interior of the Rocky Mountains (Figure 8), where they calve in rugged alpine/subalpine habitats. Female caribou use secluded areas in the alpine and subalpine to avoid or "space away" from predators and alternate prey species, frequently selecting for security for their calves over forage availability (Figure 9). In summer, the caribou remain in the mountainous habitat. Snowfall triggers the migration back to the lower elevation ridges along the eastern edge of their respective ranges. While this west-east seasonal migration is the general rule, a portion of caribou in the Narraway herd remain in low-elevation forest habitat throughout the summer.



Figure 6. Alpine ridge on Mount Spieker, Quintette herd High Elevation Winter Range (HEWR).

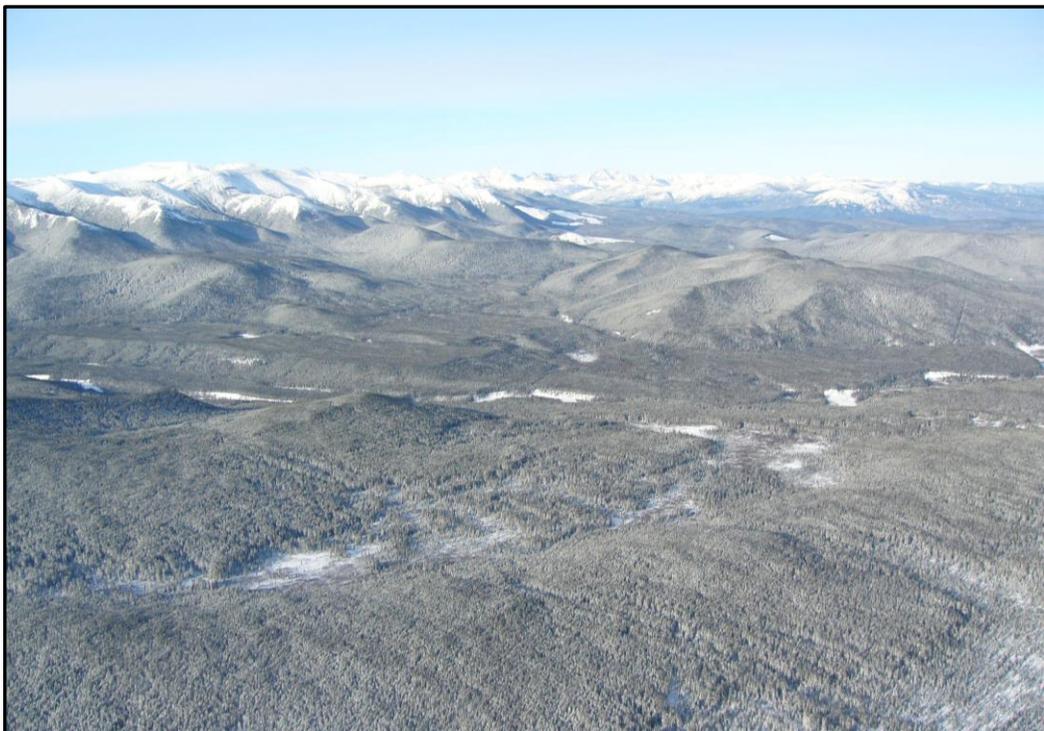


Figure 7. Low Elevation Winter Range (LEWR), Narraway herd.



Figure 8. Rugged alpine/subalpine habitat in the upper Cypress River watershed, Graham herd High Elevation Summer Range (HESR).



Figure 9. Two caribou cows and calves in rugged alpine calving habitat in Graham herd High Elevation Summer Range (HESR).

Standardized Industry Management Practices

Seasonal ranges for the SPNC have been mapped using the best available data for each herd, including: habitat modelling (resource selection functions [RSF]), telemetry data and elevation criteria. While most SPNC herds have been monitored using radio-telemetry for roughly the past decade, telemetry data has been collected periodically for the Graham and Quintette herds as far back as the 1980s.

For the purposes of these SIMPs, *Matrix Range* is the habitat areas that contribute to the predator-prey system on a caribou range, but are not main caribou habitat areas.

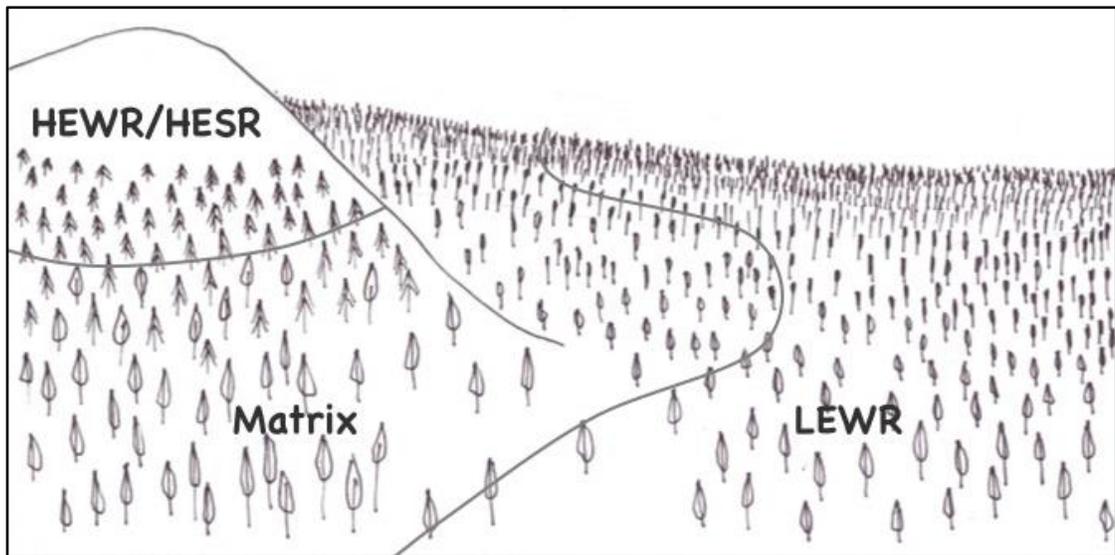


Figure 10. Schematic representation of location of Matrix Range within a caribou range.

3.1 Graham

The Graham Range is centered on the Graham River watershed, and is bounded by the Boreal Plains ecoprovince to the east, the Ospika River watershed to the west, the north shore of the Peace Reach of Williston Reservoir to the south, and the upper Halfway River to the north. In winter, Graham caribou use windswept alpine slopes and adjacent subalpine forests. While these caribou also use lower elevation forests on a seasonal basis, the full extent of LEWR is not currently known. The herd is comprised of both migratory and resident individuals, with some animals moving deeper into the Rocky Mountains during the snow-free months and others remaining on the core winter range throughout the year.

3.2 Moberly

The Moberly herd generally resides on the eastern slopes of the Rocky Mountains, between the Peace Arm of the Williston Reservoir and the Pine River valley. In winter, they use windswept alpine slopes and adjacent subalpine. In summer, most Moberly caribou migrate west towards the central core of the Rockies, occupying alpine and subalpine habitats.

3.3 Scott East

The Scott East herd is the least studied of the SPNC. These caribou predominantly live on the east side of the Parsnip Arm of the Williston Reservoir, immediately adjacent to the Moberly range. Recently, some caribou from the Moberly range have been found to use portions of the Scott East winter range in some years (Seip and Jones 2014). During the winter, Scott East caribou live at high elevations, foraging for terrestrial lichens in alpine areas and for arboreal lichens in adjacent subalpine forests.

3.4 Burnt Pine

The range of the Burnt Pine caribou herd is located on the eastern side of the Rocky Mountains between the Pine River to the north, and the Burnt River to the south. Their habitat in the winter is comprised of windswept alpine and subalpine forests.

The Burnt Pine herd included approximately 20 animals in the early 2000s, but gradually declined and is considered to be extirpated. There is some overlap between the summer ranges of the Burnt Pine and Kennedy Siding herds, which provides for the potential recolonization of the Burnt Pine range by Kennedy Siding caribou in the future.

3.5 Kennedy Siding

Kennedy Siding caribou use both high and low elevation areas in the winter. In early winter, the herd craters for terrestrial lichens in low elevation pine forests in the Kennedy Siding area, between the Misinchinka River and the rail line. As snow depth increases as winter progresses, they move northeast to alpine/subalpine areas between the Parsnip and Burnt Pine rivers. While the low elevation habitat areas used by the Kennedy Siding caribou in the winter have been significantly altered (approximately 10% was logged in the 1990s, with another approximately 7% salvage logged in 2004, and the remainder has been significantly affected by mountain pine beetle), caribou continue to use the area.

3.6 Quintette

The Quintette caribou herd lives on the eastern ridges of the Rocky Mountains, bounded by the continental divide on the west, the Sukunka River on the north, and Kinuseo Creek on

Standardized Industry Management Practices

the south. The herd consists of two subgroups, with one subgroup wintering in alpine/subalpine complexes in the “Quintette Mountain block” and the other wintering in the “Mt. Spieker block”. In recent years, caribou using the Quintette Mountain block have shifted from using the traditional high elevation core winter range, which has been heavily impacted by mining activity, to low elevation forests. Over the summer, most of the herd migrates west, deeper into the Rocky Mountains, with some animals remaining along the front ridges.

3.7 Narraway

The Narraway herd consists of the South Narraway subgroup and the Bearhole-Redwillow subgroup, based on three core areas of use (South Narraway, Bearhole Lake, Redwillow River). The herd primarily winters in low-elevation forests straddling the BC/Alberta border to the east of the Rocky Mountain foothills, but makes some use of adjacent areas of high elevation winter range. The herd also utilizes black spruce and tamarack forests and low elevation wetlands. In late spring, the herd migrates to high elevation calving and summer range deep into the Rocky Mountains, as far west as Herrick Creek in the Fraser River drainage.

4 HABITAT MAPS

4.1 High Elevation Winter Range (HEWR)

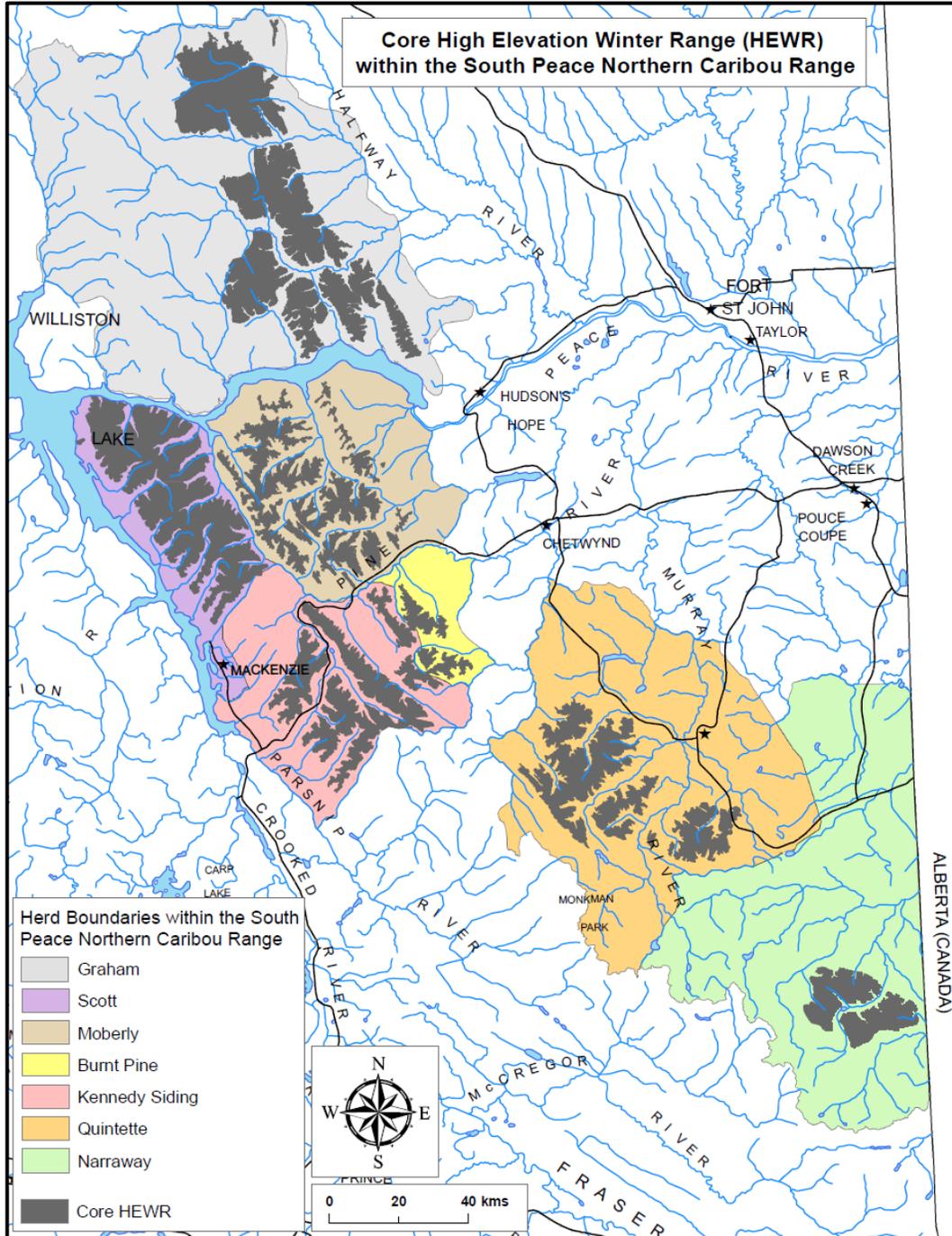


Figure 11 High elevation winter range in South Peace Northern Caribou ranges.

4.2 Low Elevation Winter Range (LEWR)

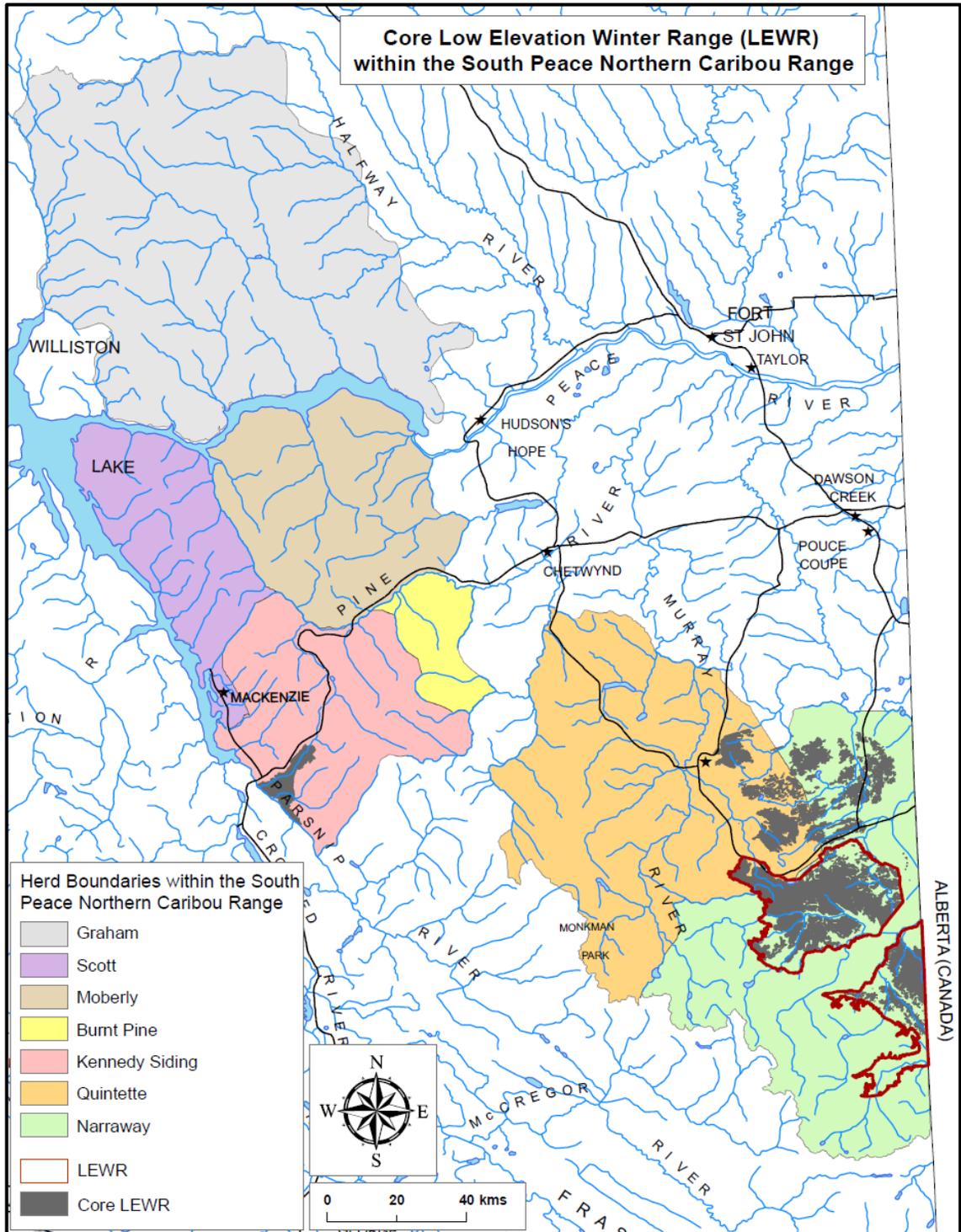


Figure 12. Low elevation winter range in South Peace Northern Caribou ranges.
 Note: The LEWR boundary incorporates the core areas and adjacent areas that are significant caribou habitat.

4.3 High Elevation Summer Range (HESR)

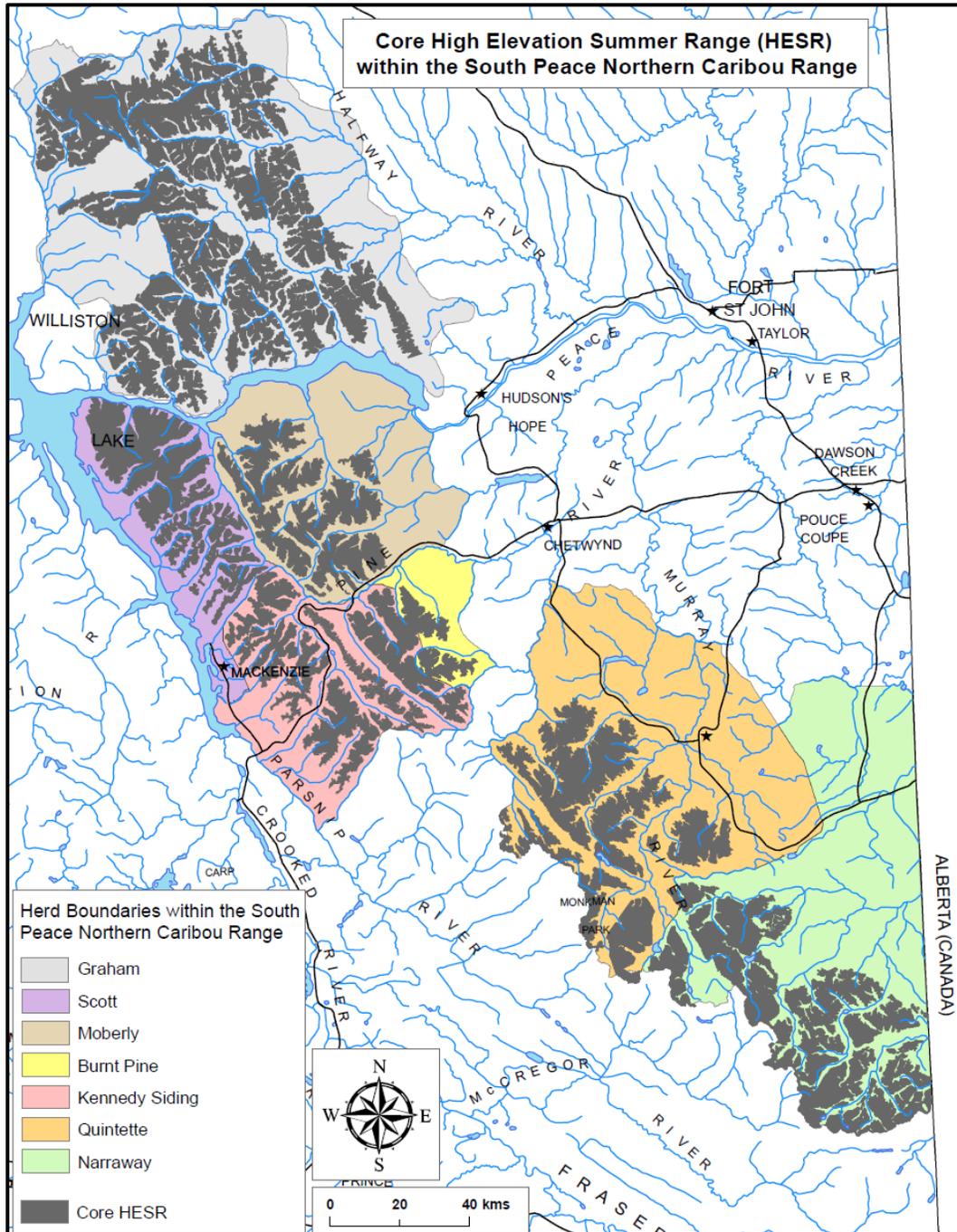


Figure 13. High elevation summer range in South Peace Northern Caribou ranges.

4.4 Matrix Range

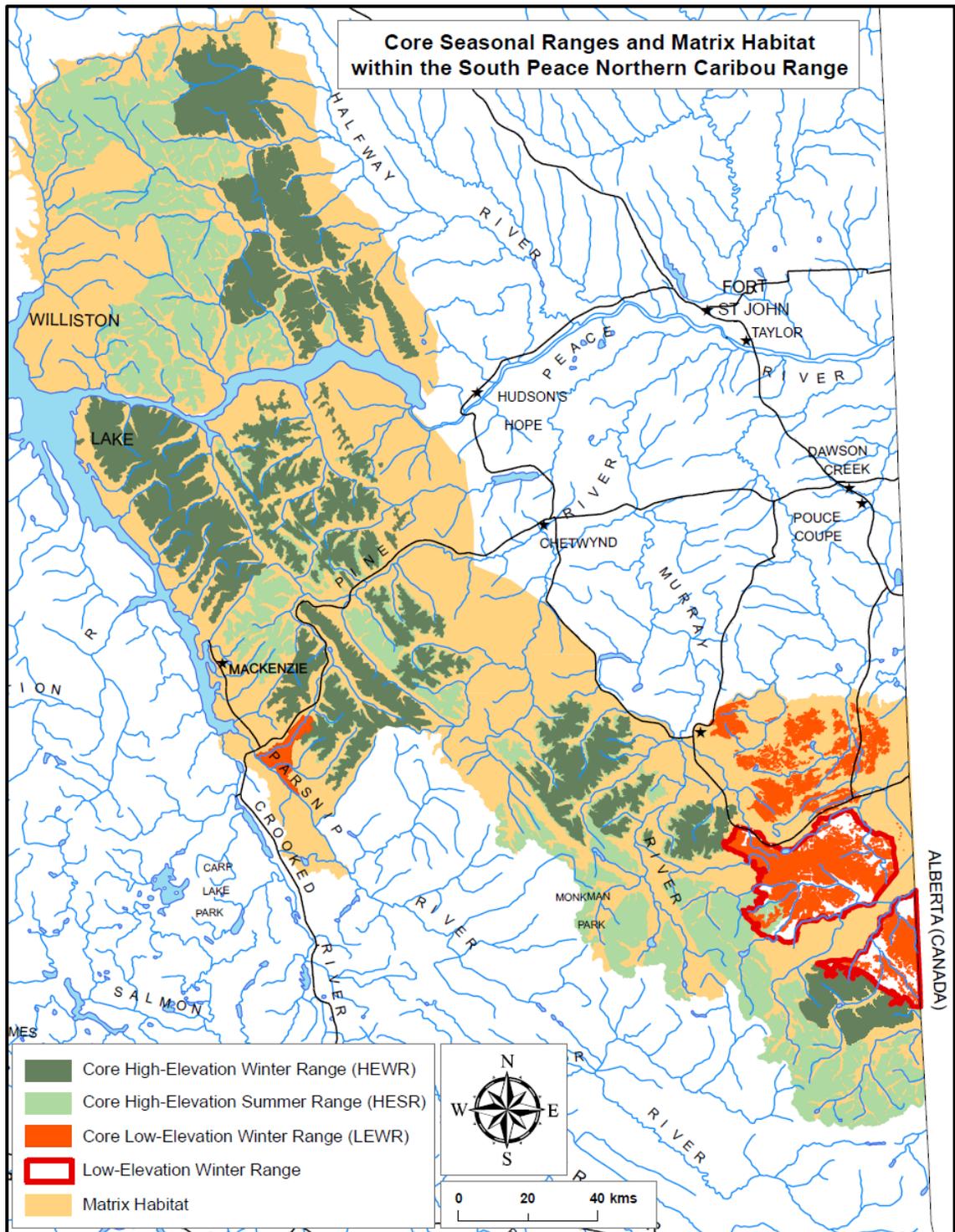


Figure 14. Matrix range in South Peace Northern Caribou ranges.

5 STANDARDIZED INDUSTRY MANAGEMENT PRACTICES

SIMPs for SPNC ranges include both landscape level and site level practices (Table 2) to mitigate adverse effects on caribou resulting from industrial activities, and are based on the following principles.

1. Avoid increasing mortality risk for caribou (landscape).
2. Maintain connectivity between ranges (landscape).
3. Avoid destroying caribou forage and caribou forage habitat (site).
4. Avoid increasing forage for other prey species such as moose and deer (site).
5. Prioritize landscape level practices over site level practices.

In situations where landscape level practices and site level practices conflict, landscape level practices are the priority.

SIMPs apply to areas within caribou ranges, including but not limited to Matrix Range, LEWR, and “lower risk areas for industrial activities” in HEWR and HESR as shown in Section 4 – Habitat Maps. SIMPs are intended to guide industrial activities and commercial recreation activities, particularly SIMPs that address timing and duration of activities, and any habitat alteration resulting from activities. SIMPs are not compulsory unless imposed through a regulatory tool, e.g. permit condition, but are recommended to ensure the effects of activities on caribou are minimized as much as possible. It is envisioned that the SIMPs will be utilized as an important project planning consideration and incorporated into the project design to ensure that any effects on caribou and their habitat are minimized. **In all instances, any existing relevant legislation and/or regulations take priority over the recommendations in the SIMPs.**

The SIMPs will be reviewed and updated periodically (five-year intervals, or sooner if necessary) to reflect current thinking, to incorporate new techniques and management practices, and to address deficiencies identified through compliance and effectiveness monitoring activities.

Standardized Industry Management Practices

Table 2. Standardized industry management practices for South Peace Northern Caribou ranges.

Activity	Standardized Industry Management Practice	Management Intent/Rationale
<p>1.Linear Corridors (Examples include, but are not limited to: access roads, seismic lines, pipeline right-of-ways, utility corridors)</p>	<p>a) Use existing linear corridors/road networks as much as possible and minimize the number of new linear corridors created by coordinating planning and implementation of road development among industrial users, using shared/common corridors, and incorporating existing footprint into project plans.</p>	<p>Having industry better identify and plan long-term access and infrastructure needs will assist in maintaining high quality, effective habitat for caribou. Coordination among industries is encouraged to minimize footprint and maximize spatial and temporal overlap of developments.</p> <p>Careful consideration should be given to alternate routes before re-opening existing lines that are starting to regenerate given their ability to function as visual screens/line-of- sight breaks. Preference would be for industry to re-open those lines that are not meeting the definition of “adequate visual screen” defined in section 1f below.</p>
	<p>b) Design and construct roads and other linear features to the lowest class practicable while maintaining safety and environmental standards.</p>	<p>Minimizing initial habitat alteration reduces the potential for increased predator efficiency and recreational use, and speeds up restoration time.</p> <p>Proponents should consider the temporal aspect of developments. If only temporary in nature (e.g. exploratory work, seasonally restricted) then design linear corridors to meet the minimum operational need while safely delivering the project.</p>
	<p>c) Minimize corridor widths by:</p> <ul style="list-style-type: none"> • paralleling and overlapping new linear corridors with existing right-of-ways (e.g. access, utility 	<p>The management intent of paralleling linear corridors is to reduce habitat loss and fragmentation on the landscape by having developments such as pipelines and utility power lines,</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<p>corridors, and pipelines) to the greatest extent possible,</p> <ul style="list-style-type: none"> • taking minor incremental increases along existing linear corridors, • incorporating pullouts for access, • utilizing variable widths along access and/or pipeline right-of-ways, • sharing workspaces. 	<p>etc. be located immediately adjacent to existing right-of-ways.</p>
	<p>d) If possible, avoid placing new linear corridors through or near high value caribou habitat (e.g., pine-lichen forest stands, other habitats that support terrestrial lichens, alpine/subalpine caribou habitat). (See definitions of HEWR, HESR, and LEWR in glossary for further information on “high value caribou habitat”.)</p>	<p>Focus construction of new linear corridors in habitats that have limited value to caribou.</p> <p>Pine-lichen forest stands generally possess the following attributes:</p> <ul style="list-style-type: none"> • 25 -55% crown closure, • 50-110 years of age, • pine 7-17 m in height, • a site index ≤ 13, (see the glossary for a definition of “site index”) • a duff layer < 5 cm.
	<p>e) Provide adequate visual screening along roads and other linear corridors that need to be kept free from obstructions. Practices that will help achieve this include, but are not limited to:</p> <ul style="list-style-type: none"> • environmental bio-engineering at strategic locations along the linear corridor using appropriate vegetation species, 	<p>Adequate visual screening along linear corridors is preferred to aid in reducing the line of sight of predators as well as to mitigate harassment or sensory disturbance of caribou by humans. In general, an adequate visual screen is comprised of vegetative cover capable of hiding 90% of a standing adult caribou from view at a distance of 200 feet (60 meters). Topographical features may minimize the amount of vegetative visual screening</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<ul style="list-style-type: none"> • constructing dog-legs at access intersections, • leaving shrub bands (but avoiding moose or deer forage species) along the linear corridor, • avoiding construction of long straight linear corridors through forested areas. 	<p>required along access routes.</p>
	<p>f) Provide adequate visual screening on linear corridors that can accommodate obstructions and on decommissioned roads, and implement line-of-sight management strategies every 200 meters on linear features. Practices that will help achieve this include, but are not limited to (Figure 15):</p> <ul style="list-style-type: none"> • line blocking using woody debris/rollback/tree bending, planting/transplanting seedlings (including mounding on wet sites), • constructing earthen berms, • environmental bio-engineering at strategic locations along the linear corridor using appropriate vegetation species, • constructing dog-legs at access intersections, • leaving shrub bands (but avoiding moose or deer forage species) along the linear corridor, • minimizing root mat and duff disturbance to expedite site re-vegetation, • avoiding the removal of large diameter trees, • avoiding construction of long straight linear corridors through forested areas. 	<p>Adequate visual screening along linear corridors is preferred to aid in reducing the line of sight of predators as well as to mitigate harassment or sensory disturbance of caribou by humans. In general, an adequate visual screen is comprised of vegetative cover capable of hiding 90% of a standing adult caribou from view at a distance of 200 feet (60 meters). Topographical features may minimize the amount of vegetative visual screening required along access routes.</p> <p>It is recommended that industry periodically review access and infrastructure requirements and initiate restoration activities on those sites no longer necessary.</p> <p>Industry is encouraged to implement newer restoration techniques as they become available.</p> <p>Worker safety is also an important project planning component when managing linear corridors.</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<p>g) Unless there is no other practicable option, linear corridors and associated infrastructure should not cross natural meadows and wetlands (including black spruce bogs) and should not be constructed within the riparian management area of wetlands.</p>	<p>Caribou wintering in low elevation forests make use of natural clearings and meadows as secondary feeding sites. Natural meadows provide a large grass and sedge component, which likely supplements a lichen-based diet.</p> <p>It is recommended that a qualified professional be engaged to help classify wetlands and inform on appropriate buffers, which will be influenced by many wetland functions, including wildlife habitat. The document <i>Wetland Ways: Interim Guidelines for Wetland Protection and Conservation in British Columbia</i> provides best management practices to minimize site-specific impacts of development on wetland habitats.</p>
	<p>h) Minimize impacts to terrestrial lichen resources. This may be achieved by:</p> <ul style="list-style-type: none"> • avoiding disturbance of duff layer and vegetative root mat, • conducting activities during winter with an adequate snowpack, but when caribou are not using the area 	<p>Key lichen species used by Northern Caribou are (see Figure 2):</p> <p>Terrestrial Lichens: <i>Cladina</i> spp., <i>Cladonia</i> spp., <i>Stereocaulon</i> spp., <i>Cetraria</i> spp.</p> <p>Arboreal Lichens: <i>Bryoria</i> spp. (most common), <i>Usnea</i> spp.</p> <p>Linear developments associated with industrial activities should be low impact in terms of construction.</p>
	<p>i) Minimize ground disturbance. This can be achieved by:</p> <ul style="list-style-type: none"> • avoiding disturbance of duff layer and vegetative root mat, 	<p>Linear developments associated with industrial activities should be low impact in terms of construction.</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<ul style="list-style-type: none"> • using padding, matting, geotextiles, and short segments of corduroy on wetter sites • conducting activities during winter with an adequate snowpack, but when caribou are not using the area 	
	<p>j) Minimize snow removal to reduce predator travel along linear corridors. For any linear corridors where snow ploughing is required, breaks should be created at 200 meter intervals in snow berms to permit caribou movements. Construct snow berms to reduce height and ensure that breaks on either side of the corridor are opposite one another (not offset).</p>	<p>Ploughing of corridors not required for operations and maintenance during winter adds to the density of usable linear features and may result in additional travel corridors for predators and increased vehicular traffic. Industry is advised to limit snow ploughing to those corridors only required for current operations, maintenance and/or emergency access.</p>
	<p>k) On winter ranges, coordinate industrial use of specific linear corridors or portions of, to minimize the period during which snow ploughing needs to be conducted.</p>	<p>Reducing the duration of activities during the winter reduces the duration that roads are ploughed. Ploughing can result in greater predator efficiency and increased vehicular traffic.</p>
	<p>l) Reduce vehicle speed limits when caribou are using the area.</p>	<p>Reducing speed limits reduces the potential for collisions with caribou.</p>
	<p>m) Where possible, construction activities should not result in barriers to caribou movement. Where the</p>	

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<p>top height of potential barriers (e.g. strung pipe, soil stockpiles, windrows) exceed 1.5 meters in height for more than 72 hours in duration, it is required that physical breaks in pipe/material be employed every 200 meters.</p>	
<p>2. Infrastructure (Examples include, but are not limited to: well sites, facilities, ancillary structures, coal exploration sites, MET towers)</p>	<p>a) Minimize the number of new clearings for infrastructure created by using shared/common sites and incorporating existing footprint into project plans.</p>	<p>Land clearing for infrastructure may negatively impact caribou through direct means (e.g. habitat loss, fragmentation) and indirect means (sensory disturbance from noise, lights etc.). Industry is encouraged to explore options to minimize total surface area required for individual infrastructure components and promptly restore workspace clearings after completion of construction.</p> <p>Industry is also encouraged to remove any infrastructure no longer required (e.g. buildings, camps) and initiate restoration.</p>
	<p>b) When possible, avoid locating infrastructure in areas of high value habitat; avoid large patches of mature pine stands. (See definitions in glossary for HEWR, HESR, and LEWR.)</p>	
	<p>c) Remotely operate relevant infrastructure to the greatest extent possible. Use alternative access means such as lower grade access or helicopter support for maintenance activities of infrastructure.</p>	

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
3. Habitat Alteration and Landscape Level Habitat Configuration	a) Locate activities that require habitat alteration as close as possible to existing anthropogenic features.	Land clearing for infrastructure may negatively impact caribou through direct means (e.g. habitat loss, fragmentation) and indirect means (sensory disturbance from noise, lights etc.) resulting in functional habitat loss beyond the development footprint. The Recovery Strategy uses a 500 m buffer to account for functional habitat loss around the development footprint. Focussing habitat alteration/infrastructure within the buffer results in less overall functional habitat loss than if development occurs outside of the buffer (Figure 16).
	b) Whenever possible, conduct industrial activities only in areas defined as “Lower Risk Areas for Industrial Activities,” in Appendix Two.	Appendix Two contains a map showing the areas within HEWR where industrial activities will likely pose a lesser risk to caribou. While still within HEWR and as such important caribou habitat, some areas that were considered to be less critical to caribou were identified by technical experts. Developments are not required to be within these areas, nor are development within these areas guaranteed to have no effect on caribou; it is included as a potential project planning consideration.
	c) Focus activities that result in habitat alteration in the periphery of caribou ranges where they are not adjacent to other caribou ranges.	Habitat alteration in the periphery of caribou ranges results in less risk to caribou than habitat alteration closer to the central area of caribou ranges.
	d) Avoid debris/slash piles on terrestrial lichen sites.	Terrestrial lichens are unable to survive under excessive accumulations of debris or slash.

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<p>e) Do not use sites that support terrestrial lichens as sources of gravel for building roads or for any other purpose, if at all possible.</p>	
<p>4. Timing</p>	<p>a) Implement an “early in, early out” policy for industrial activities. Industrial activities should be planned to occur within the least risk timing window identified below except for in 4b below.</p> <p><u>Least risk timing window:</u> July 16 – September 14</p> <p>Cautionary timing window: September 15 – January 14</p> <p>Critical timing window: January 15 – July 15</p>	<p>Depending on the time of year, industrial activity can pose various risks to caribou. The effect of physical and/or non-physical disturbances to caribou can induce various negative responses including: fleeing, habitat shifts, increased movement, displacement to areas of increased predations risk (especially significant during calving and post calving when calves are more susceptible to predation), decreased foraging and resting rates and decreased reproductive success. Other more subtle responses, such as increased heart and metabolic rates, rumination disruptions, and increased levels of stress hormones, may also have energetic consequences which can be problematic to wildlife, particularly during those life requisite periods when individuals are already physiologically stressed (e.g. late winter).</p> <p>In the event industrial activities cannot adhere to these timing windows, industrial operators are required to retain the services of qualified professionals with experience in caribou ecology/biology to prepare caribou mitigation plans to help guide activities and minimize the risk of adverse impacts to the species and the habitat they occupy.</p> <p>More information about timing windows can be obtained from the “Peace Region Selected Terrestrial and Aquatic Wildlife Least Risk Windows (April 2011)” and its supporting ‘biological rationale’.</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
		(See http://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/regional-wildlife/northeast)
	b) In areas where HESR occurs but does not overlap with HEWR, avoid conducting activities during summer months.	In areas where caribou are present only during summer, impacts to caribou will be minimized if activities are conducted when caribou are not present.
	c) coordinate timing of industrial activities to be conducted concurrently as much as possible.	Reducing the overall duration of activities reduces overall exposure of caribou to sensory disturbance and other risks.
5. Other Sources of Caribou Mortality	a) Ensure that open excavations (e.g. trenches, pits, sumps, exploration drill holes) do not entrap caribou. This can in part be achieved by: <ul style="list-style-type: none"> • fencing open excavations, • backfilling/contouring open excavations to a stable angle of repose. 	
	b) Ensure that potential sources of industrial contamination (e.g. sumps, settling ponds) are adequately contained (fenced) to prevent caribou from accessing and ingesting hazardous material.	
6. Indirect Project Effects	a) Minimize noise by ensuring that all exhaust systems have properly installed mufflers and machinery is	Reducing exposure of caribou to sensory disturbances minimizes stress.

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	operating as per specifications; avoid unnecessary idling of equipment.	
	b) If utilizing aircraft to facilitate any aspect of a project, follow the direction outlined in the document entitled "Peace Region Guidelines for Aircraft Operations/Wildlife Interactions - July 15, 2008"	
7. Fine Scale Features	a) Maintain known and potential mineral licks and associated wildlife trails to licks in a natural state and ensure caribou have access to these sites during high-use seasons (April to October).	
	b) If mineral licks are encountered during industrial activities, a minimum 250-meter operational setback should be employed.	
	c) Where industrial activities cannot be located outside of the 250 meter operational setback, connectivity to adjacent forested areas should be maintained.	
	d) For existing activities near licks, minimize site use and sensory disturbance during critical periods. Refer	

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	to Timing Section 4 for details.	
	e) Avoid disruptions to drainage and groundwater near mineral licks.	
	f) Maintain visual screening (i.e. forested cover) to provide security and escape cover around mineral licks and trails.	Any mineral licks encountered in the field should be recorded including a UTM coordinate and the information provided to the Ministry of Forests, Lands and Natural Resource Operations, Northeast Region Ecosystems Section.
8. Restoration	<p>a) Promptly restore linear corridors and any other areas no longer required for projects. Restoration efforts should not create habitat that will benefit other prey species (which in turn can increase the incidental predation of caribou). This can in part be achieved by:</p> <ul style="list-style-type: none"> • restoring native plant communities, • selecting less palatable native species for re-vegetation, • using vegetation management practices such as manual brushing to reduce willow and shrub layers until other vegetation/forest recovers, • avoiding brushing during seasonal periods when shrubs favoured by moose respond positively to brushing, • avoiding seeding with mat forming graminoid 	<p>Industry is directed to consult the “<u>Peace-Liard Re-Vegetation Manual</u>” (Northeast Invasive Plant Committee 2010) for information about re-vegetation in northeast B.C. This document provides a variety of information on re-vegetation planning, where to employ the use of native plants, sourcing native plant material, re-vegetating with shrubs, seedbed preparation, seed mixes, seeding equipment and timing and rates for planting.</p> <p>Industry is to avoid seeding of non-native or invasive grasses and legumes based mixes, which can create competition for native target species and provide alternative food sources for predators and alternate prey.</p> <p>It is recommended that industry periodically review access and infrastructure requirements and initiate restoration activities on those sites no longer necessary.</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<p>species,</p> <ul style="list-style-type: none"> • facilitating lichen re-establishment (in appropriate habitats). 	
	<p>b) Restore habitat to a condition that reflects pre-habitat alteration site conditions. This can in part be achieved by the following methods, but is not limited to these items:</p> <ul style="list-style-type: none"> • replanting, • making features impassable to predators (temporarily using practices such as coarse woody debris piles, rocks, until native vegetation makes the area unusable), • employing line of sight options in section 1f, and • re-contouring slopes, opening drainages and stabilizing sites for erosion. 	<p>Industry is encouraged to regularly review its development footprint and undertake interim and final restoration efforts as soon as possible. Interim restoration will not only help minimize industrial footprint, promote soil conservation, assist with invasive plant management, it will help the landscape reach secondary succession sooner.</p> <p>Restoration activities implemented need to consider practices not normally applied as sector standard (e.g., conifer planting of portions of a pipeline right-of-way or along exploration trail access).</p>
	<p>c) Coordinate planning and implementation of deactivation and other restoration activities between users.</p>	<p>Minimizing the duration of restoration activities in an area reduces overall exposure of caribou to sensory disturbance and other risks.</p>
<p>9. Stewardship</p>	<p>a) All authorized persons who carries out primary forest activities are to be consistent with the General Wildlife Measures (GWM's) outlined in legally established Ungulate Winter Range (UWR) and Wildlife Habitat Areas (WHA) Orders overlapping</p>	<p>More information about UWR's, including the Orders, is available at: http://www.env.gov.bc.ca/wld/frpa/uwr/index.html</p> <p>More information about WHA's including the Orders, is available</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<p>with their activities.</p> <p>The GWMs were developed to maintain the habitat values of the area and minimize or prevent human-caused disturbances. The GWMs are considered best management practices, and all industrial proponents are encouraged to implement this direction into their project planning.</p>	<p>at: http://www.env.gov.bc.ca/wld/frpa/iwms/index.html</p> <p>See Appendix One.</p>
	<p>b) Whenever possible, industrial operators will disseminate caribou awareness and education information for field employees and contractors working within caribou range.</p>	<p>Possible components of such an information package may include, but is not limited to: caribou biology/ecology, conservation status, risks to caribou associated with activities, what to do if caribou are encountered during the course of activities, habitat feature (e.g. licks) identification and management etc.</p>
	<p>c) When working within caribou range, employees and contractors should be discouraged from possessing firearms, except for authorized safety purposes.</p>	<p>Firearms can result in indirect effects (sensory disturbance) and direct effects (accidental harvest) on caribou.</p>
	<p>d) When in caribou range, company employees or contractors are discouraged from possessing any animals, other than animals required for work.</p>	<p>Domestic animals can harass and potentially displace caribou.</p>
	<p>e) No personal use of snowmobiles, ATV's or other motorized recreational vehicles by company</p>	<p>Motorized vehicles can result in sensory disturbance and harassment of wildlife.</p>

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	employees or contractors should be allowed within caribou range when resident in camp facilities.	
	f) Ensure that industrial worksites are tidy and materials such as cables, wires, fencing etc. are properly stored so as not to entangle caribou or other wildlife.	
	g) Where feasible, use mass transit means to transport workers to and from work sites to reduce traffic volumes and vehicle collision risks to caribou.	Mass transit can include any form of shared vehicle use, i.e. a crummy.
	h) Consider posting and enforcing winter speed limits on high-grade roads and on secondary roads within caribou range.	Collision related mortality is preventable and achievable through the establishment and enforcement of road restrictions and safety protocols. Speed restrictions are a component of this, as is traffic calling, maintenance planning (to facilitate caribou movement near roads) and signage indicating areas of higher caribou use.
	i) Consider management actions to reduce or limit recreational access associated with industrial activities. This can in part be achieved by: <ul style="list-style-type: none"> • not providing access to remote or previously inaccessible areas, • limiting public access beyond specific control 	Recreational opportunities that are created as a result of industrial development have the potential to adversely impact caribou and their habitat, depending on the location, time of year, intensity, frequency and type of recreational activity occurring. Limiting public access is challenging but implementing practices such as using access control structures, deactivating

Standardized Industry Management Practices

Activity	Standardized Industry Management Practice	Management Intent/Rationale
	<p>points,</p> <ul style="list-style-type: none">• not ploughing or packing access to caribou habitat in winter,• deactivating access no longer required, and• complying with motor vehicle closure areas.	<p>access, removing crossing structures or undertaking vegetation management to deter unregulated use can help meet this objective.</p>

Standardized Industry Management Practices

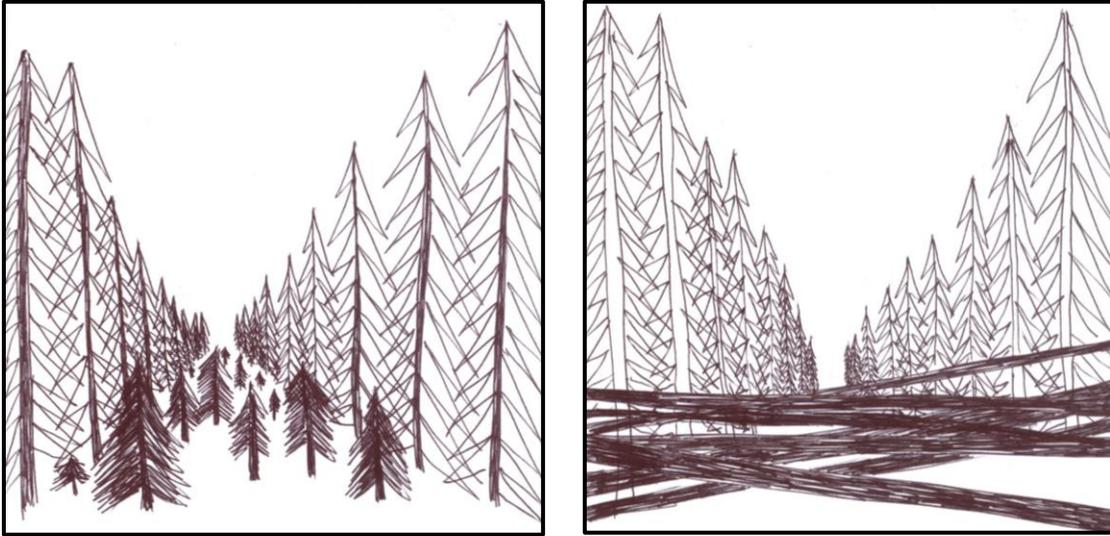


Figure 15. Examples of line blocking.

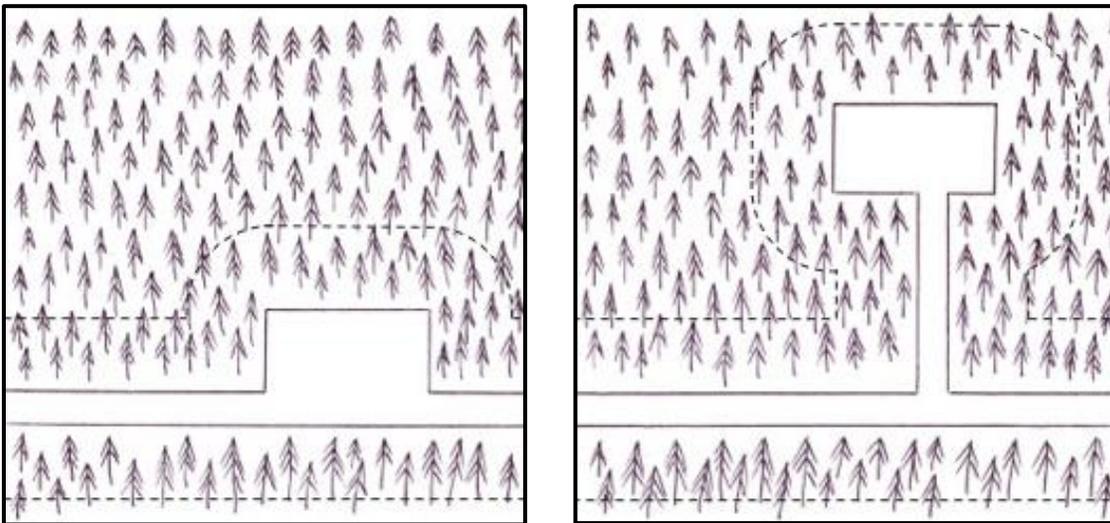


Figure 16. Examples of the effects of consolidating the development footprint on functional habitat. Given the sprawling nature of the footprint, the right hand illustration compromises more functional habitat than the left hand illustration.

6 REFERENCES

- BC MOE (BC Ministry of Environment). 2013. Implementation plan for the ongoing management of the South Peace Northern Caribou (*Rangifer tarandus caribou* pop. 15) in British Columbia. Victoria, B.C.
- BC MOE (BC Ministry of Environment). 2014. Science update for the South Peace Northern Caribou (*Rangifer tarandus caribou* pop.15) in British Columbia. Victoria, BC. 43 pp.
- BC MSRM (BC Ministry of Sustainable Resource Management). 2002. Aerial-based Inventory methods for selected ungulates: bison, mountain goat, mountain sheep, moose, elk, deer and caribou. Standards for Components of British Columbia's Biodiversity No. 32. BC Ministry of Sustainable Resource Management. Victoria, B.C.
- Churchill, B., and B. Holland. 2003. Wildlife and aircraft operation: assessment of impacts, mitigation and recommendations for Best management Practices in the Peace Region. Prepared for BC Ministry of Water, land and Air Protection, Fort St. John, B.C.
- Environment Canada. 2014. Recovery strategy for the woodland caribou, Southern Mountain population (*Rangifer tarandus caribou*) in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. viii + 103p.
- McNay, R.S., D. Cichowski, and B.R. Muir. 2013. Action Plan for the Klinse-Za Herd of Woodland Caribou (*Rangifer tarandus caribou*) in Canada (Draft). *Species at Risk Act* Action Plan Series. West Moberly First Nations, Moberly Lake, B.C. 28p.
- Northeast Invasive Plant Committee. 2010. Peace-Liard Re-Vegetation Manual. Northeast Invasive Plant Committee, Fort St. John, B.C. 51p.
- Natural Resource Sector Board. 2013. Planning and approval of development activities in the South Peace Northern Caribou area.
- Seip, D. 2015. Population status of caribou herds in the PNCP management area. Presentation to the Peace Northern Caribou Committee Workshop, June 30, 2015, Saulteau First Nation, Moberly Lake, BC.

7 GLOSSARY AND ABBREVIATIONS

Early in, Early out - a commonly prescribed industrial operating practice designed to minimize sensory disturbance to caribou by planning and implementing winter development activities within caribou ranges to avoid the sensitive late winter through calving period. Work should commence as soon as frozen-ground conditions (i.e., freeze-up) allow, and be completed within caribou ranges in the earlier part of the winter.

High Elevation Winter Range (HEWR) - habitat type that includes windswept alpine ridges and adjacent subalpine forest; HEWR is highly susceptible to fragmentation, loss, and long-term alteration by industrial activities. High value areas in the HEWR include alpine, subalpine parkland and mature high-elevation subalpine forests.

High Elevation Summer Range (HESR) - habitat type that includes alpine and subalpine areas used by caribou for calving and summer range, with many areas also serving as HEWR; HESR is highly susceptible to fragmentation, loss, and long-term alteration by industrial activities. As with HEWR, high value areas in the HESR include alpine, subalpine parkland and mature high-elevation subalpine forests.

Identified Wildlife - species at risk and regionally important wildlife designated as requiring special management attention under the Forest and Range Practices Act.

Low Elevation Winter Range (LEWR) - habitat type that includes low elevation forest types (e.g. pine, pine-leading, black-spruce-leading, tamarack leading stands) used by Kennedy Siding, Narraway and Quintette herds in the winter.

Low Impact - operating practices designed to reduce habitat disturbance within caribou ranges, including measures aimed at minimizing ground disturbance, minimizing disturbance of vegetation and the duff layer, minimizing right of way widths, avoiding potential damage to caribou forage (including terrestrial lichens), avoiding the creation of long sight-lines that support increased predator hunting efficiency within caribou ranges, avoiding the creation of physical or psychological barriers to caribou movement, minimizing cumulative impacts through the use of shared right of ways, and planning linear corridors routes in the least desirable caribou habitat, in proximity to existing access routes.

Lower Risk Areas for Industrial Activities – Areas within the high elevation winter ranges (HEWR) of the South Peace Northern Caribou (SPNC) identified by technical advisors that possess relatively lower habitat value to caribou than other areas of HEWR. There is no requirement to operate within these areas, and all applications for development would be subject to the same regulatory requirements regardless of whether there are located within these areas.

Standardized Industry Management Practices

Matrix Range – the habitat areas that contribute to the predator-prey system on a caribou range, but are not the main caribou habitat areas, constitute matrix habitat. (*Note that the Federal Recovery Strategy for the Woodland Caribou define matrix habitat differently.*)

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

Range – A geographic area occupied by a group of individuals that are subjected to the same influences affecting vital rates over a defined time frame.

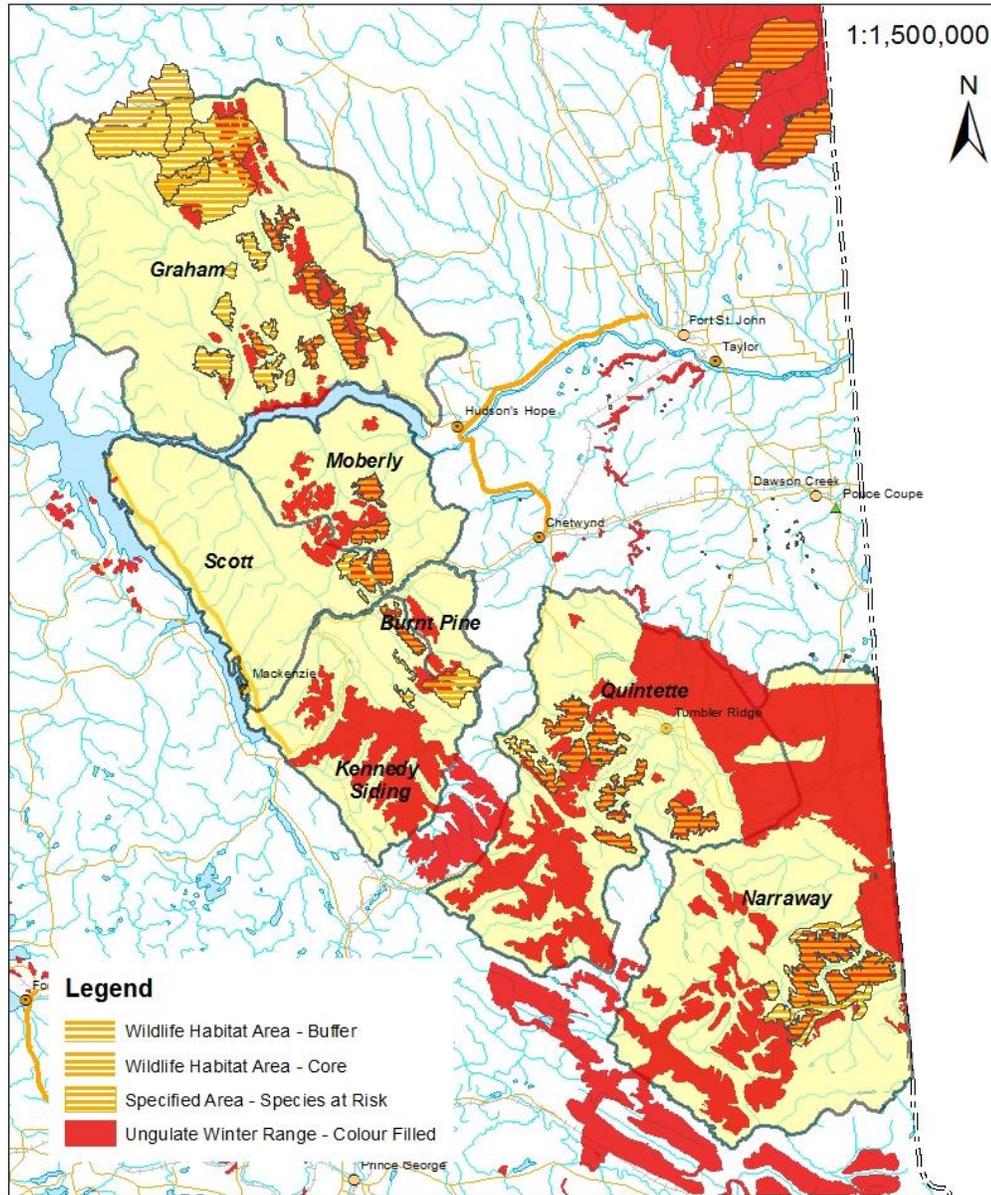
Restoration - The process of assisting the recovery of a damaged or destroyed ecosystem through human intervention and/or action.

Site Index – An expression of the forest site quality of a stand, at a specified age, based either on the site height, or on the top height (height of the largest diameter tree on a 0.01 ha plot, providing the tree is suitable), which is a more objective measure (FP Code). The measure of the relative productive capacity of a site for a particular tree species, based on height at a given reference or base age (50). (*from FSJ Pilot Draft SFMP*).

Ungulate Winter Range (UWR) - areas designated under the *Forest and Range Practices Act* and *Oil and Gas Activities Act* that contain habitat that is necessary to meet the winter habitat requirements of an ungulate species, including caribou.

Wildlife Habitat Area (WHA) - areas designated under the *Forest and Range Practices Act* and *Oil and Gas Activities Act* that are necessary to meet the habitat requirements of an Identified Wildlife element.

8 APPENDIX ONE: Ungulate Winter Ranges and Wildlife Habitat Areas



Ungulate Winter Ranges (UWR) and Wildlife Habitat Areas (WHA) are areas designated under the *Government Actions Regulation* of the *Forest and Range Practices Act* that provide for defined areas of habitat to protect or conserve a species at risk, regionally important wildlife or specified ungulate species. The delineation of the boundaries of a UWR are based on current understanding of ungulate habitat requirements in winter, as interpreted by the Ministry of Environment (MOE) regional staff from current scientific and management literature, local knowledge, and other expertise from the region. For the avoidance of doubt, the UWR and WHA orders are compulsory and are applicable in addition to any recommendations set out in the SIMPs.

Standardized Industry Management Practices

The location of UWRs and WHAs can be found on iMapBC, which contains a variety of information on both development and protective measures (i.e. parks and reserves) for caribou and other wildlife. Go to: <http://www2.gov.bc.ca/gov/content/governments/about-the-bc-government/databc/geographic-data-and-services/imapbc>

9 APPENDIX TWO: Lower Risk Areas for Industrial Activities

