

A Guide to Commercial Backcountry Skiing Standard Operating Practices for Ski Run Development, Helicopter Landing and Pickup Site Development, and Snow Trail Development in Mountain Caribou Habitat



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Introduction

The Ministry of Environment (MoE) has the responsibility for the protection and stewardship of British Columbia's wildlife, diversity of ecosystems and rich natural resources. The Ministry works to maintain these valuable natural assets, which are at the heart of many recreational and economic activities enjoyed by British Columbians in all regions of the province. As such, the Ministry has established Government Actions Regulation orders for ungulate winter ranges (UWRs) and wildlife habitat areas (WHAs) and associated general wildlife measures (GWMs) under the *Forest and Practices Range Act (FRPA)* to support the recovery of mountain caribou in British Columbia.

In areas where approved UWR and WHA orders designated for mountain caribou apply, heli-skiing and cat-skiing forest-related cutting activities for ski run development, helicopter landing and pickup site development, and snow trail development will need to meet the practice requirements of the GWMs stipulated in the orders. Such activities exceeding the practice requirements of the GWMs will require review and possible exemption by the Regional Manager of the MoE. An exemption may be considered when the intent of the GWMs will be achieved or compliance with the provisions is not practicable, given the circumstances or conditions applicable to a particular area.

Where an occupational license to cut (OLTC) has been issued to heli-skiing and cat-skiing tenure holders prior to February 2009, which is the effective date for the GWMs, activities carried out under the OLTC will not be required to meet the practice requirement of the GWMs and no exemption from the GWMs is required. However, the MoE would hope that through working with tenure holders, the Ministry can educate operators and have voluntary compliance with the standard operating practices and operational guidance that are identified in this document.

The intent of this document is to provide guidance to commercial heli-skiing and cat-skiing tenure holders and government staff for implementing the GWMs, and carrying out activities consistent with mountain caribou recovery objectives. Specifically, this document outlines the scope and scale of forest-related cutting activities associated with this sector that if followed may proceed without requiring an exemption, in order to meet the objectives of mountain caribou recovery while supporting viable commercial tenure holders. In addition, it is anticipated that this document will be included or referenced in the required management plans for commercial heli-skiing and cat-skiing tenure holders, to ensure management of these activities are in compliance with provisions under the *Land Act* for Crown land use, and government objectives for mountain caribou recovery in British Columbia.

This document describes standard operating practices and operational guidance intended to minimize mountain caribou habitat impacts and the potential for their disturbance and displacement from forest-related cutting activities associated with commercial heli-skiing and cat-skiing tenure holders.

The objectives of this document are:

- to identify specific cutting activities associated with the commercial heli-skiing and cat-skiing tenure holders and the potential effects of these activities on mountain caribou;
- to describe standard operating practices and operational guidance for cutting activities associated with the commercial heli-skiing and cat-skiing tenure holders to minimize the potential for disturbance and displacement of mountain caribou from their habitats; and,

- to promote shared stewardship between government and the heli-skiing and cat-skiing sector for sustainable practices consistent with the commitments for mountain caribou recovery planning in British Columbia.

This document was developed through a collaborative process involving the Ministry of Environment, Ministry of Agriculture and Lands, Integrated Land Management Bureau, Ministry of Tourism, Culture and the Arts, Ministry of Forests and Range, and representatives from the heli-skiing and cat-skiing sector.

Background

The Committee on the Status of Wildlife in Canada has listed woodland caribou found in the Southern Mountains National Ecologic Area, which includes mountain caribou populations found in British Columbia, on Schedule 1 of the *Species at Risk Act* (SARA) as *threatened*. The provincial government has listed mountain caribou as *endangered* or *threatened* (i.e., the BC Conservation Data Centre's Red-list of species-at-risk). The estimated mountain caribou population is approximately 1900 animals, with population declines of >50% for many herds occurring in the past decade (MCTAC 2002, MCST 2005).

The provincial mountain caribou science team considered the primary threats to mountain caribou in British Columbia to be habitat alteration (primarily from forest harvesting and wildfire) and increased mortality from predators, mainly as a result of habitat changes favouring other ungulates and their predators (MCST 2005). Secondary threats include disturbance from winter backcountry recreation, which may disturb and displace caribou from otherwise preferred habitat. Climate change and disease are other factors that are currently poorly understood, but may also influence the viability of mountain caribou herds. Several of the herds are now critically imperilled and could become extirpated within the next 10 years unless significant recovery and conservation efforts are undertaken.

In October of 2007, the provincial Species at Risk Coordination Office (SARCO) introduced the Mountain Caribou Recovery Implementation Plan, with the goal to “*Halt the decline of mountain caribou within seven years for each Planning Unit and recover mountain caribou to 1995 population levels (2500 animals) across the mountain caribou range within 20 years in those Planning Units with greater than 10 animals.*” Key components of the province's commitment to mountain caribou recovery implementation include:

- Protecting 2.2 million hectares, including 95% of high suitability mountain caribou, from logging and road building;
- Managing recreation to reduce human disturbance in mountain caribou habitat;
- Managing predator and alternative prey populations to reduce predator densities in areas where predation is preventing mountain caribou recovery;
- Increasing caribou subpopulations by transplanting animals from large to small herds; and,
- Ensuring that all components of management proceed through a monitoring-based adaptive management framework.

The key principle guiding the operational practices and guidance outlined in this document is to ensure that operational activities involving ski run development, helicopter landing and pickup site development, and snow trail development are carried out in manner that minimizes:

- the loss of mountain caribou habitat;
- the secondary effects of mountain caribou habitat changes, such as encouraging greater public access or predator access through trail building;

- the disturbance or displacement of mountain caribou from their winter habitats; and,
- the undue constraints put on commercial heli-skiing and cat-skiing tenure holders and operators in such a manner as to render operators unviable.

This guidance is provided under:

- (i) Mountain Caribou Implementation Plan: Tenured Commercial Winter Recreation Component Terms of Reference (www.env.gov.bc.ca/sarco/mc/reference.html);
- (ii) British Columbia Helicopter and Snowcat Skiing Operators Association. 2003. Stewardship of mountain ecosystems: Best practices for sustainability;
- (iii) Memorandum of Understanding Regarding Management of Helicopter and Snow-cat Skiing in Mountain Caribou Habitats (www.env.gov.bc.ca/sarco/mc/reference.html);
- (iv) Mechanized Skiing Development Plan Guidance Document for the Columbia Forest District. May 2009. Prepared by the Columbia Forest District in conjunction with the Mechanized Ski Operators, Forest Licensees, and BCTS located within the Columbia Forest District.

How to Obtain Information on Mountain Caribou in Your Area

Informed decision-making requires issue-related information compilation and synthesis. Information on the location of mountain caribou and important habitats (e.g., seasonal distribution, winter ranges, migration routes and calving areas) must be collated through standard protocols such as those described in the British Columbia Helicopter and Snowcat Skiing Operators Association (BCHSSOA) stewardship guidelines and the 2005 Memorandum of Understanding. Furthermore, it is suggested that local Ministry of Environment regional biologist(s) be contacted to validate the temporal and spatial applicability of the information gathered before conducting any activities.

A brief overview summary of some important aspects of mountain caribou ecology related to early and late winter habitat requirements are provided in Appendix 2 & 3. Some additional information sources may also be found at:

- Local knowledge by contacting Ministry of Environment biologists, caribou herd experts, researchers, managers, and/or conservation and habitat stewardship groups in your area.
- Mountain Caribou Recovery - British Columbia Ministry of Environment (www.env.gov.bc.ca/sarco/mc/index.html);
- Conservation Data Centre of the British Columbia Ministry of Environment and BC Species and System Explorer (www.env.gov.bc.ca/cdc/);
- Approved Ungulate Winter Range (UWR) - British Columbia Ministry of Environment (www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html);
- Approved Wildlife Habitat Areas (WHA) - British Columbia Ministry of Environment (www.env.gov.bc.ca/wld/frpa/iwms/wha.html);

- Columbia Mountains Institute of Applied Biology (www.cmiae.org).

How to Use This Document?

Standard Operating Practices and Operating Guidance

Ski run development, helicopter landing and pickup site development, and snow trail development are key forest-related activities of the heli-skiing and cat-skiing business. Standard Operating Practices (SOPs) for these activities are approaches based on operational experiences and an understanding of current mountain caribou ecology that are required to meet the intent of the GWMs and the desired objective for mountain caribou recovery. Operational guidance is additional information to support operators when conducting activities. Operators are encouraged to use this entire document when conducting activities to ensure they meet the practice requirements of the GWMs which are subject to *FRPA* regulations.

Ski Run Development

Ski run development is defined primarily as cutting of non-merchantable timber (timber is not extracted from the area), glading and spacing of select trees, cutting and brushing of willow and alder within treatment areas, to manage and create safe skiable terrain.

These activities have the potential to maintain over time forest openings within previously contiguous forested habitat patches, which may alter forest stand structural conditions and habitat elements important to wintering caribou (e.g., forest crown closure providing snow interception, low-hanging tree branches supporting lichen, broken/fallen tree branches providing arboreal lichen food for caribou as branch litterfall). These openings may also benefit other ungulates during the snow-free season, which in turn can benefit predators, and increase predation risk to caribou.

Standard Operating Practice – *Ski Run Development*

- Ski run development shall not occur within the calving period of May 15th to June 15th.
- Maximize use of existing forestry openings or natural openings to minimize cutting in treatment areas.
- Individual tree spacing within treatment areas must be 5-8m, with retention of forest ‘clumps’ (10-20 trees or 1-2 tree lengths in size) spaced at <100m intervals throughout the treatment area (see WTPs under operational guidance).
- Retain from cutting >90% of conifer stems >20cm DBH in treatment areas. The full range of tree species, ages and sizes must be represented following treatment, similar to pre-treatment forest stand species composition and size-class distribution.
- Individual ski run development/treatment areas shall be separated from adjacent treatment areas by an area at least 3-4 times the treatment area.
- Avoid forest stands with trees bearing lichen on slopes <40% when selecting treatment areas, unless there is no other practicable option¹.
- Any harvesting shall avoid mature stands (>80 yrs old) and avoid removal of trees bearing lichen, unless there is no other practicable option¹.
- Areas of forest stands requiring removal of large veteran legacies or a significant number of stand

dead snags to make the work site safe shall be avoided, unless there is no other practicable option.

¹ Forest stands and individual trees bearing arboreal hair lichens (*Bryoria* and *Alectoria*) with estimated lichen loads of Class 3 (*moderate*) to Class 5 (*high*). Consult *Estimating the Abundance of Arboreal Forage Lichens Field Guide* (Armleder et al. 1992), for specifics.

Operational Guidance – Ski Run Development

- Build a knowledge base for the treatment area, including a landscape/drainage level context of caribou distribution, caribou habitat value and the spatial relation of these values to the area in which operations are planned. This must include gathering inventory information regarding no harvest/no road building areas (i.e., UWRs and WHAs recovery areas), important seasonal habitats such as calving areas, habitat linkage areas between seasonal ranges (i.e., early and late winter habitats, high value areas) and fragmented habitats and high road access areas (i.e., low suitability habitats).
- Consult with local government, researchers, and herd experts – particularly important where inventory is limited or lacking.
- Selection of treatment areas for ski runs should not occur in areas known to be used frequently by mountain caribou (i.e., results from up-front baseline information gathering).
- Efforts should be made to use narrow treatment areas for ski run development to minimize cutting.
- Falling of trees in Spruce/Subalpine Fir and Grand Fir forest stands should target Spruce (Subalpine Fir and Grand Fir leading forest stands are selected by caribou disproportionately more often than Spruce leading stands).
- When falling Spruce trees, operators should de-limb, score the bark the length of the stem, and cut the stem in 2 m lengths to ensure felled stems do not support or are susceptible to spruce beetle infestation.
- Wildlife Tree Patches (WTPs) should be designated for ecologically valuable wildlife trees (e.g., trees bearing arboreal hair lichens (*Bryoria* and *Alectoria*) with estimated lichen loads of Class 4 (*moderately high*) or Class 5 (*high*; Armleder et al 1992) and/or moderate to high snag densities, particularly if tree cavities and/or feeding activity is evident. WTPs should be marked for field identification to support monitoring and effectiveness evaluation. The number and size WTPs should be consistent with provincial WTP requirements, see www.for.gov.bc.ca/hfp/publications/00034/wltpolicyfinalmay15-00.pdf
- When developing ski runs in a riparian ecosystem (near streams, lakes or wetlands), operators should consider the use of natural openings to minimize cutting needs. Consult Riparian Management Area Guidebook (1995) for specifics (depending on riparian classification, a Riparian Management Area may consist of Riparian Reserve Zone and Riparian Management Zone).

Note: Although not an operational practice, field workers are encouraged to complete provincial Wildlife/Danger Tree Assessor's Course, which provides the official 'standard of care' (consistent with WorkSafe BC) for dealing with potentially dangerous but ecologically valuable trees. Successful participants will receive a certificate, which permits them to undertake wildlife danger tree assessments during all forestry-related activities.

Helicopter Landings and Pickup Site Development

The development of helicopter landings and pickup sites are selected and designated to land helicopters and allow skiers to embark or disembark the aircraft. The cutting and removal of trees in these areas is

required to create safe and effective landing and pickup sites within forested areas. In addition, landing and pickup sites require maintenance to remove emerging vegetation and tree growth, and the clearing of natural disturbance events. Thus, helicopter landings and pickup sites are permanent openings (BCHSSOA 2003).

Helicopter landings and pickup sites are often located on gentle, flat terrain or slope breaks at both high and low elevations, and in forested and alpine areas at or above the treeline. These openings can be located in important caribou habitat in both early winter (forested low elevation sites) and late winter (upper elevation sites) seasons. As such, they create permanent early seral conditions, often to the benefit of deer, elk, moose, and associated predators increasing the predation risk to caribou. Openings are generally very small, however.

Standard Operating Practice – Helicopter Landings and Pickup Site Development

- Helicopter landing and pickup site development shall not occur within the calving period of May 15th to June 15th.
- Existing forestry openings or natural openings must be used to minimize cutting when selecting helicopter landings and pickup sites.
- Where harvesting is required to develop helicopter landings and pickup sites, the amount of cutting will not result in the total opening size to exceed 1 ha.
- Any harvesting shall avoid mature stands (>80 yrs old) and avoid removal of trees bearing lichen, unless there is no other practicable option¹.

¹ Forest stands and individual trees bearing arboreal hair lichens (*Bryoria* and *Alectoria*) with estimated lichen loads of Class 3 (*moderately*) to Class 5 (*high*). Consult *Estimating the Abundance of Arboreal Forage Lichens Field Guide* (Armleder et al. 1992), for specifics.

Operational Guidance – Helicopter Landings and Pickup Site Development

- Build the knowledge base for the treatment area, including a landscape/drainage level context of caribou distribution, caribou habitat value and the spatial relation of these values to the area in which operations are planned. This must include gathering inventory information regarding no harvest/no road building areas (i.e., UWRs and WHAs recovery areas), important seasonal habitats such as calving areas, habitat linkage areas between seasonal ranges (i.e., early and late winter habitats, high value areas) and fragmented habitats and high road access areas (i.e., low suitability habitats).
- Consult with local government, researchers, and herd experts - particularly important where inventory is limited or lacking.
- Selection of helicopter landing and pickup sites should not occur in areas known to be used frequently by mountain caribou (i.e., results from up-front baseline information gathering).
- Operators should use a single helicopter landing and pickup site to service several runs in the same drainage to minimize cutting.
- Development of fuel storage and re-fuelling sites should not occur in areas known to be used frequently mountain caribou (i.e., results from up-front baseline information gathering).
- When developing helicopter landings and pickup sites in riparian ecosystems (near streams, lakes or wetlands), operators should consider the use of natural openings to minimize cutting needs. Consult Riparian Management Area Guidebook (1995) for specifics (depending on riparian

classification, a Riparian Management Area may consist of Riparian Reserve Zone and Riparian Management Zone).

Note: Although not an operational practice, field workers are encouraged to complete provincial Wildlife/Danger Tree Assessor's Course, which provides the official 'standard of care' (consistent with WorkSafe BC) for dealing with potentially dangerous but ecologically valuable trees. Successful participants will receive a certificate, which permits them to undertake wildlife danger tree assessments during all forestry-related activities.

Snow Trail Development

Snow trails are seasonal access routes that have tree cutting and removal, and rarely have side-cuts into mineral soils to allow access to skiable terrain. They are usually a combination of existing active or deactivated logging roads, snow only paths, and small sections of side cuts.

Winter use of snow trails may have direct effects on predation risk to woodland mountain caribou (James and Stuart-Smith 2000), especially if the packed trail extends from valley bottom to upper elevations. Snow trails may also provide increased access by public recreationists (e.g., snowmobilers, alpine backcountry skiers) to previously inaccessible terrain, increasing the risk of disturbing and displacing caribou from preferred habitats.

Standard Operating Practice – Snow Trail Development

- Snow trail development shall not occur within the calving period of May 15th to June 15th.
- Snow trail development must not occur in areas closed to snowmobile use under the *Wildlife Act* using Motor Vehicle Prohibition Regulations Schedule 7 - Section 7.1.
- Existing forestry openings or natural openings must be used to minimize cutting when developing snow trails.
- The volume of timber to be removed must not exceed 50m³ of per 3 km of individual trail when developing a snow trail. An individual snow trail is defined as a contiguous snow trail route used by a snow-cat machine for the purpose of transporting skiers to skiable terrain.
- Any harvesting shall avoid mature stands (>80 yrs old) and avoid removal of trees bearing lichen, unless there is no other practicable option¹.
- Actions shall be taken on snow trails to restrict summer access. This will be site-specific and could include, but not limited to the use of large, impassable boulders, root balls, and felled trees.

¹ Forest stands and individual trees bearing arboreal hair lichens (*Bryoria* and *Alectoria*) with estimated lichen loads of Class 3 (*moderate*) to Class 5 (*high*). Consult *Estimating the Abundance of Arboreal Forage Lichens Field Guide* (Armleder et al. 1992), for specifics.

Operational Guidance – Snow Trail Development

- Build the knowledge base for the area-of-interest, including a landscape/drainage level context of caribou distribution, caribou habitat value and the spatial relation of these values to the area in which operations are planned. This must include gathering inventory information regarding no harvest/no road building areas (i.e., UWRs and WHAs recovery areas), important seasonal habitats such as calving areas, habitat linkage areas between seasonal ranges (i.e., early and late winter habitats, high value areas) and fragmented habitats and high road access areas (i.e., low suitability habitats).
- Consult with local government, researchers, and herd experts - particularly important where

inventory is limited or lacking.

- Selection of snow trail development should not occur in areas known to be used frequently by mountain caribou (i.e., results from up-front baseline information gathering).
- Snow trail location should be planned prior to development, with control points (negative and positive) to avoid known important caribou winter habitats, seasonal migration routes, steep slopes) and focus use on existing routes and nil/low value caribou habitats.
- Operators should maximize the use of natural topographic features when selecting snow trail location; however, operators should minimize the use of ridgelines and benches as these often serve as travel corridors for caribou.
- When developing snow trails in and near riparian ecosystems (streams, lakes or wetlands), operators should consider the use of natural openings to minimize cutting needs. Consult Riparian Management Area Guidebook (1995) for specifics (depending on riparian classification, a Riparian Management Area may consist of Riparian Reserve Zone and Riparian Management Zone).

Note: *Although not an operational practice, field workers are encouraged to complete provincial Wildlife/Danger Tree Assessor's Course, which provides the official 'standard of care' (consistent with WorkSafe BC) for dealing with potentially dangerous but ecologically valuable trees. Successful participants will receive a certificate, which permits them to undertake wildlife danger tree assessments during all forestry-related activities.*

Exemption Process

Should an operator feel that the SOPs and established GWMs for mountain caribou are not considered practicable, or where the intent of the SOPs and established GWMs can be achieved through an alternative approach, operators may seek an exemption. When an exemption is desired, an exemption application must be submitted to the respective Regional Manager of the MoE with rationale describing the nature of the problem and options to integrate UWR and WHA conservation with proposed activities. Exemption application forms are available from the MoE website:

www.env.gov.bc.ca/wld/frpa/index.html. The submission of an exemption application will assist in the timely consideration of the matter, and will inform the conditions, if any, of the exemption that may be granted prior to commencement of activities. Upon receipt of a complete exemption application, a determination is expected within 14 working days of arrival. Where issues are complicated and require dialogue with the proponent, timelines will be extended and the extension requirement should be communicated to the proponent as early in the process as possible. Incomplete packages will be returned to the proponent for re-submission.

The *FRPA* does not regulate the actions of professionals; however, the *Foresters Act* does specify that the practice of professional forestry must be undertaken by a forest professional. This means, that any person with a forest tenure (meaning an agreement in the form of a licence, a permit or an agreement referred to in section 12 of the *Forest Act*, including forest licence, timber licence, tree farm licence, community forest agreement, woodlot licence, licence to cut, free use permit, or road permit) carrying out practice requirements must utilize the services of a forest professional when under taking the practice of professional forestry.

Depending on the scale of the proposed activity and potential impacts to caribou, operators may need to seek input and guidance from MoE regional biologists, herd experts and a qualified professional (e.g. RPBio), especially where mitigation options are being proposed, to support an exemption request. The commercial heli-skiing and cat-skiing sector does not operate under a professional reliance model in the manner of the forest sector. The use of a qualified professional should not be required for items that are

considered Ministry business, for example, information pertaining to the most recent science and recovery objectives. The Regional Manager should rely heavily on the content of the exemption request to understand how the proposed works are not detrimental to mountain caribou. As such, in unique circumstances or with greater variation from the SOP, the Regional Manager will require a more rigorous, science based/professionally sound (one or other), supporting rationale. Achieving the 14 day response time will be dependent on receiving a clear, well presented rationale in the exemption application. Operators are encouraged to consult with MoE regional biologists, herd experts and a qualified professional as needed.

Monitoring and Reporting

The Memorandum of Understanding (Nov 2005) outlines that members of HeliCat Canada (HCC) and government will “work together to develop, pursue funding for, and implement specific research projects and adaptive management trials which will address questions related to the potential effects of sector activities on mountain caribou and their habitats”.

This document lays out that approach that all commercial heli-skiing and cat-skiing tenure holders are expected to take for ski run development, helicopter landing and pickup site development, and snow trail development. In that context, HCC members will continue to work with government staff and science team members to develop and implement an effectiveness monitoring strategy within an adaptive management framework to ensure that the operational practices minimize the disturbance and displacement of mountain caribou from their winter habitats and support their recovery.

Safety

The operational practices described in this document can only be carried out in full compliance with the *Forest Practices Code of British Columbia Act* and *Workers Compensation Act*, Occupational Health and Safety Regulations in British Columbia.

Disclaimer

The operational practices described in this document are intended to be consistent with the current statutes, policies, regulations or legislation pertaining to mountain caribou recovery. They are not intended to replace existing commercial recreation ‘best practices’ for sustainability important for protecting terrestrial, aquatic and environment values.

Glossary

The definitions below are provided “for the purposes of this document”.

Clearing of Natural Disturbance Event

Clearing of natural disturbance events require the cutting of merchantable timber that has fallen due to a natural disturbance event (e.g., wind) and is inadvertently preventing safe travel on, or around, an existing helicopter landing and/or pickup site or ski run. Cutting of timber shall occur where the affected timber is $> 10 \text{ m}^3 / \text{ha}$ if located $< 1 \text{ km}$ from the roadside, or $> 100 \text{ m}^3 / \text{ha}$ if located $> 1 \text{ km}$ from the roadside.

Forestry opening

An area denude of trees due to forestry practices that are carried out on forest land to facilitate the use of forest resources, including, but not limited to, timber harvesting, road construction, silviculture, grazing, recreation, pest control and wildfire suppression.

Habitat Rating:

Values (H, M, L) assigned to a habitat for its potential to support a particular species (e.g.. mountain caribou) for a particular season (early winter, late winter) and life requisite (food, cover). Ratings reflect the expected use of the habitat by the species of concern.

Habitat Suitability:

The ability of the habitat in its current condition to provide the life requisites of a species. It is an estimate of how well current habitat conditions provide food, security cover, thermal cover for the species.

Helicopter Landing / Pickup Site Development:

Helicopter landings are locations where individuals disembark the helicopter, most often at the top of a ski run. Helicopter pickups are locations where individuals embark the helicopter, most often at the bottom of a ski run. Landing / pickup development locations will utilize natural openings whenever possible. Landing / pickup development may also include the expansion of existing helicopter pads which may range in size from .25 to 1 hectares. These locations will most likely require regular maintenance to ensure safety of guests, staff and helicopters.

Maintenance:

Maintenance consists of brushing, removal of natural regeneration, and removal of danger trees. Maintenance only authorizes the cutting of standing merchantable timber if the timber presents a safety threat around a helicopter landing / pickup (not all helicopter landing / pickups will be spatially identified). Maintenance also includes cutting of fallen merchantable timber if it is unfeasible to utilize the timber (i.e. volume of merchantable timber is $< 10 \text{ m}^3/\text{ha}$, or $< 100 \text{ m}^3 / \text{ha}$ and is located $> 1 \text{ km}$ from the roadside). Maintenance does not include the cutting of any reserve trees from the previous spacing project that contributed to the post spacing free growing survey.

Natural opening

An area denude of trees due natural events such as fire, severe drought, insect or disease attack, wind, flooding, landslide, vegetative succession to meadows and grass lands, or any other similar events.

Practicable:

Requires that all relevant circumstances be considered, balancing economic, productive, spiritual, ecological and recreational values of forests to meet the economic, social and cultural needs of peoples and communities, including First Nations (Appendix 1, Preamble to the Forest Practices Code).

Ski Run Development:

Is accomplished by primarily cutting non-merchantable timber (<15cm diameter at stump height for PL, < 20cm diameter at stump height for all other species), and removing hazardous stems through primarily hand falling techniques. This includes glading in mature forests, cutting in old burns, spacing in avalanche chutes and alder cutting. This is not considered logging, as no cut trees are extracted from the area. All felled trees will be limbed, bucked, and laid as flat on the ground as is practical. Stems will be cut as low and flat as possible to ensure safe future skier passage.

Snow Trail Development:

Winter snow trails are trails for cat-ski travel. They are developed using snow and may have trees cut or removed for access. Snow trails rarely have side-cuts into mineral soils.

Spacing:

Refers to working in reforested cut blocks which have been accepted by the Ministry of Forests and Range and meeting the Free Growing obligations specified in the approved stocking standards for a forest agreement holder applicable to the site. These forests have not yet achieved the merchantability standards specified in the provincial waste and residue manual. The cutting treatment is similar to silviculture spacing, however, with the alternate goals of achieving safe and enjoyable ski terrain while additionally maintaining healthy and productive forest stands. Spacing techniques and individual tree selection criteria must address site specific characteristics including: preferred species, tree health and vigour and skiable terrain.

Treatment Area:

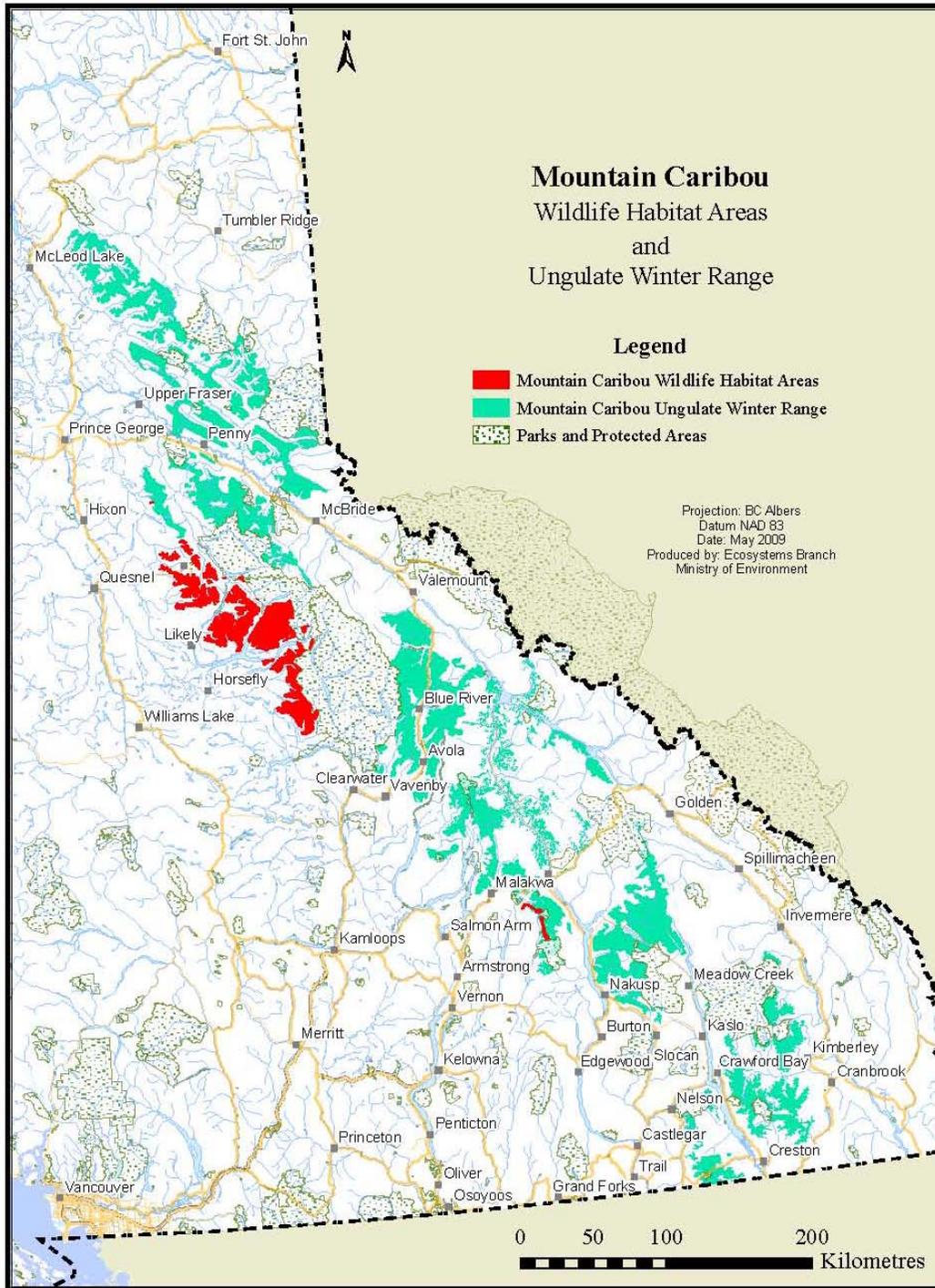
The specific geographic area identified in tenure management plans for adventure tourism tenure holders as an individual run and referred to as the “identified ski terrain” or “ski-pod”. Treatment areas can be defined spatially as having a running length and width.

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¹ There are more scientific references and current research papers and publications on mountain caribou than the few selected references listed.

Appendix 1: Established ungulate winter ranges and wildlife habitat areas to support mountain caribou recovery in British Columbia.



Appendix 2: Some important aspects of caribou habitat

Mountain caribou are an ecotype of the woodland caribou (*Rangifer tarandus caribou*), and inhabit mature/old forests in the Interior Cedar-Hemlock (ICH), Sub-Boreal Spruce (SBS), Engelmann Spruce-Subalpine fir (ESSF) and alpine tundra (AT) biogeoclimatic zones of the Columbia Mountains and south-central Rocky Mountains of southeastern British Columbia.

Caribou are adapted to persist in low numbers and use large areas of suitable habitat. Suitable habitat is defined as habitat essential to meet the seasonal life requisites of caribou (food, cover, water and the spatial arrangement of those habitat elements). Mountain caribou habitat selection can be generally described by four seasonal use patterns, or time periods: early winter (November to mid January); late winter (mid January to mid April); spring (mid April to May); and, summer/fall (June to October). Exact dates may vary annually for each local population, depending on geographic differences, topography, snow conditions and weather conditions – with differences in early winter habitat use varying the most among populations (Terry et al 1996, Simpson et al 1997, MCTAC 2002).

Arboreal lichen (*Bryoria spp* and *Alectoria sarmentosa*) found on standing trees, fallen trees (windthrow) and lichen litterfall found on branches from standing trees are the primary sources during **early winter**, with some feeding on evergreen shrubs such as falsebox if available. A forest canopy that reduces ground snow depths, affording greater animal mobility and forage availability, is important during this period. **Late winter** habitat selection is characterized by deep snowpack and consolidation, which enables caribou to travel on top of snowpack and move into upper elevation, open-canopied ESSF and AT subalpine forested parkland habitats, where they feed exclusively on arboreal hair lichens (*Bryoria spp* and *Alectoria sarmentosa*). When snow begins to melt in early **spring**, caribou migrate to lower elevation habitats to feed on lush, green emerging vegetation. Once snow melts, caribou again move into upper elevation ESSF forest, ESSF parkland and alpine habitats, taking advantage of abundant herb and shrubs food abundance of the **summer** growing season (Simpson et al 1997, Stevenson et al 2001, MCTAC 2002).

Consistent with mountain caribou recovery planning, the focus of this document is on the early winter and late winter seasons, which also coincides with commercial heli-skiing and cat-skiing activities. An overview summary of important mountain caribou early winter, late winter, and connectivity/linkage habitat characteristics of relevance to forest habitat activities needed to support commercial backcountry winter tenure operations are provided in Appendix 3.

Appendix 3: General mountain caribou early winter and late winter habitat considerations²

Habitat Season	Caribou Winter Habitat Stewardship Considerations	
<p>Early Winter (Nov. - mid Jan.)</p>	<p>Caribou experience high energy expenditures during this period due to deep, soft, unconsolidated snow which reduces animal mobility and forage availability.</p> <p><u>Landscape level</u></p> <ul style="list-style-type: none"> • ICH and low elevation ESSF Biogeoclimatic zones in southern and central areas; • SBS and low elevation ESSF Biogeoclimatic zones in northeastern areas; • Hemlock (Hw) and Balsam (Bl) leading forests > 140 years • Flat to gentle sloping terrain; • Connectivity between seasonal habitats (see below). <p><u>Stand level</u> high canopy closure and snow interception capability</p> <ul style="list-style-type: none"> • low hanging dead and live branches supporting arboreal lichen; • Important food sources include arboreal lichens (primarily <i>Bryoria</i> and <i>Alectoria spp</i>) found on standing trees, wind thrown trees, branch litter fall with lichen from trees, and evergreen forage such as Falsebox or other forbs/shrubs not cover by snow; • Significant proportion of lichen may occur on snags, particularly in upper ESSF. 	 <p>Stand level characteristics of caribou habitat</p>  <p>Low hanging branches supporting the growth of lichens</p>

² Habitat characteristics may vary by local mountain caribou population depending on geographic differences, topography, and weather conditions – particularly for the early winter period.

Habitat Season	Caribou Winter Habitat Stewardship Considerations	
<p>Late Winter (mid Jan. - mid Apr.)</p>	<p>Caribou require deep, consolidated snow pack to allow caribou to travel on top of the snow pack to elevate the animals to access arboreal hair lichens hanging from tree branches (lichen productivity below the snowline on trees is usually very low to nil).</p> <p><u>Landscape level</u></p> <ul style="list-style-type: none"> • Low canopy closure with open forest stands to moderate canopy closure old stands consisting of ‘patchy’ clumps of trees and individual trees spatially distributed over large areas; • Flat to gently sloping terrain; • High arboreal lichen productivity found on trees with fully developed crown characteristics; • Late winter caribou habitats are often same areas as calving and summer/fall habitats. <p><u>Stand level</u></p> <ul style="list-style-type: none"> • Fully developed forest canopies, with low hanging dead and live branches supporting abundant arboreal hair lichens available <4.5m tree height from bare ground level; • Significant proportion of lichen may occur on snags, particularly in upper ESSF. 	 <p>Trees distributed in ‘Patchy’ clumps in the landscape matrix</p>
<p>Linkage between seasonal habitats</p>	<p>Mature to old contiguous forested corridors, usually ridgelines and/or riparian corridors, that provide connectivity between lower elevations early winter habitat and upper elevation late winter habitat.</p>	 <p>The landscape matrix and connectivity of caribou habitat</p>