



**Forest
Practices
Board**

Timber Removal in Mountain Caribou Habitat

Special Investigation

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Executive Summary

Mountain caribou are at risk¹ in the southern two-thirds of British Columbia. The BC government has identified habitat loss, habitat alteration, recreation activities and predation as key factors in the caribou population declines observed over the past few decades. It has made habitat monitoring and recovery and adaptive management high priorities.

As part of its 2007 Mountain Caribou Recovery Implementation Plan (MCRIP) to return mountain caribou populations to pre-1995 levels, the BC government issued nine ungulate winter range orders, covering more than two million hectares of Crown land, under the *Government Actions Regulation of the Forest and Range Practices Act*. These orders contain special restrictions for industrial and commercial recreational activities to protect mountain caribou habitat.

In 2014, the Forest Practices Board conducted an investigation to determine whether timber removal by the forestry, hydroelectric, and adventure tourism sectors within one of the order areas—*Ungulate Winter Range Order U-3-004*, in the Blue River area (the Order)—complied with the Order’s planning and practice requirements. This report provides the results of the investigation, and comments on the status of habitat monitoring and adaptive management in Ungulate Winter Range U-3-004.

Investigators found that all licensees complied with legal requirements, and that the area of caribou habitat retained is within the Order requirements. However, they found one of the habitat retention measures only requires licensees to *consider* the use of stand level caribou habitat retention strategies and not to actually *implement* them, which makes it hard to enforce.

Investigators also observed some fragmentation of caribou habitat during the field review, and found it is not clear if the Order will be effective in achieving recovery of the caribou population. This is troubling because the population of the two caribou herds that frequent this area has been steadily declining over the past three decades, and the population is now fewer than 150 mature animals, less than 40 percent of the 1995 inventory levels.

When the Order was established, government was not certain how caribou habitat should be structured to optimize recovery. It used the best available science to support the Order, recognizing that an adaptive management framework would be required to improve it as better science developed.

Government is currently developing effectiveness monitoring, and this is in various stages of implementation. Until this work is completed, the Board cannot comment on whether the distribution of caribou habitat is meaningful for long-term caribou recovery within Ungulate Winter Range U-3-004.

¹ Most of the world’s 2500 Mountain Caribou live in British Columbia, where they are on the provincial red list ([Recovery Strategy for the Woodland Caribou, Southern Mountain population \(Rangifer tarandus caribou\) in Canada](#) – Table 1). This means they are facing imminent extirpation or extinction and are likely to become endangered if limiting factors are not reversed. Red-listed species and sub-species may be legally designated as, or may be considered candidates for legal designation as extirpated, endangered or threatened under the *Wildlife Act*.

The BC government has recognized the need and urgency to gain a better understanding of how the distribution and structure of habitat retention may potentially impact caribou herds and recovery efforts. It is working on initiatives designed to gauge and assess the effectiveness of the habitat protection measures provided in the Order, and established the Caribou Progress Monitoring Board to monitor habitat retention and adaptive management.

The Board is pleased the investigation showed that all licensees have complied with *Ungulate Winter Range Order U-3-004*, and in some cases have exceeded requirements. The Board encourages the government to continue to develop and implement effectiveness monitoring initiatives as a high priority so it can gain a better understanding of how the Order may be protecting caribou habitat from forest cover alteration and, if necessary, to adapt management measures to improve mountain caribou recovery efforts.

Introduction

Background

Mountain caribou are at risk in the southern two-thirds of British Columbia. The BC government has identified habitat loss, habitat alteration, recreation activities and predation as key factors in the caribou population declines observed over the past few decades.

As part of its 2007 Mountain Caribou Recovery Implementation Plan (MCRIP)² to return mountain caribou populations to pre-1995 levels, the government issued nine ungulate winter range orders, covering more than two million hectares of Crown land, under the *Government Actions Regulation* (GAR) of the *Forest and Range Practices Act* (FRPA). These orders contain special restrictions for industrial and commercial recreational activities within mountain caribou habitat. In 2008, the MCRIP coordination role was transferred to the Ministry of Environment, whose staff currently support the Ministry of Forests, Lands and Natural Resource Operations with delivering implementation activities to support the MCRIP.

The orders allow tenured industrial and commercial recreation users to remove timber under specific conditions. Activities may include timber harvesting and road clearing, oil and gas and mineral exploration, hydroelectric projects, heli-pad construction for landing and pick-up zones, and glading of ski runs. If timber removal cannot comply with the orders, users must seek an exemption under section 92(1) of the *Forest Planning and Practices Regulation* (FPPR) to avoid non-compliance.

The Board investigators assessed timber removal within the area covered by one of the nine orders—*Ungulate Winter Range Order U-3-004* (the Order)—to determine the extent of timber removal and the level of compliance.

Ungulate Winter Range U-3-004 encompasses 283 468 hectares (Figure 1) near the community of Blue River, and straddles the North Thompson River. It is located in the Wells Gray South local population unit and is frequented by the Wells Gray South and Groundhog caribou herds, both of which had more than a 60 percent decline in mature animals since 1995, and are now estimated at less than 150 animals.³ Habitat loss, degradation and fragmentation from both human-caused and natural sources, and increased predation as a result of habitat alteration, have contributed to the declining numbers. These herds were proposed to be designated as endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), in May 2014. An official change in status requires a decision by the federal Minister of Environment.

This is the Forest Practices Board's report on the results of the investigation.

² More information on the mountain caribou recovery plan can be found at: www.env.gov.bc.ca/wld/speciesconservation/mc/index.html

³ [COSEWIC Assessment and Status Report on the Caribou Rangifer Tarandus](#) (2014)

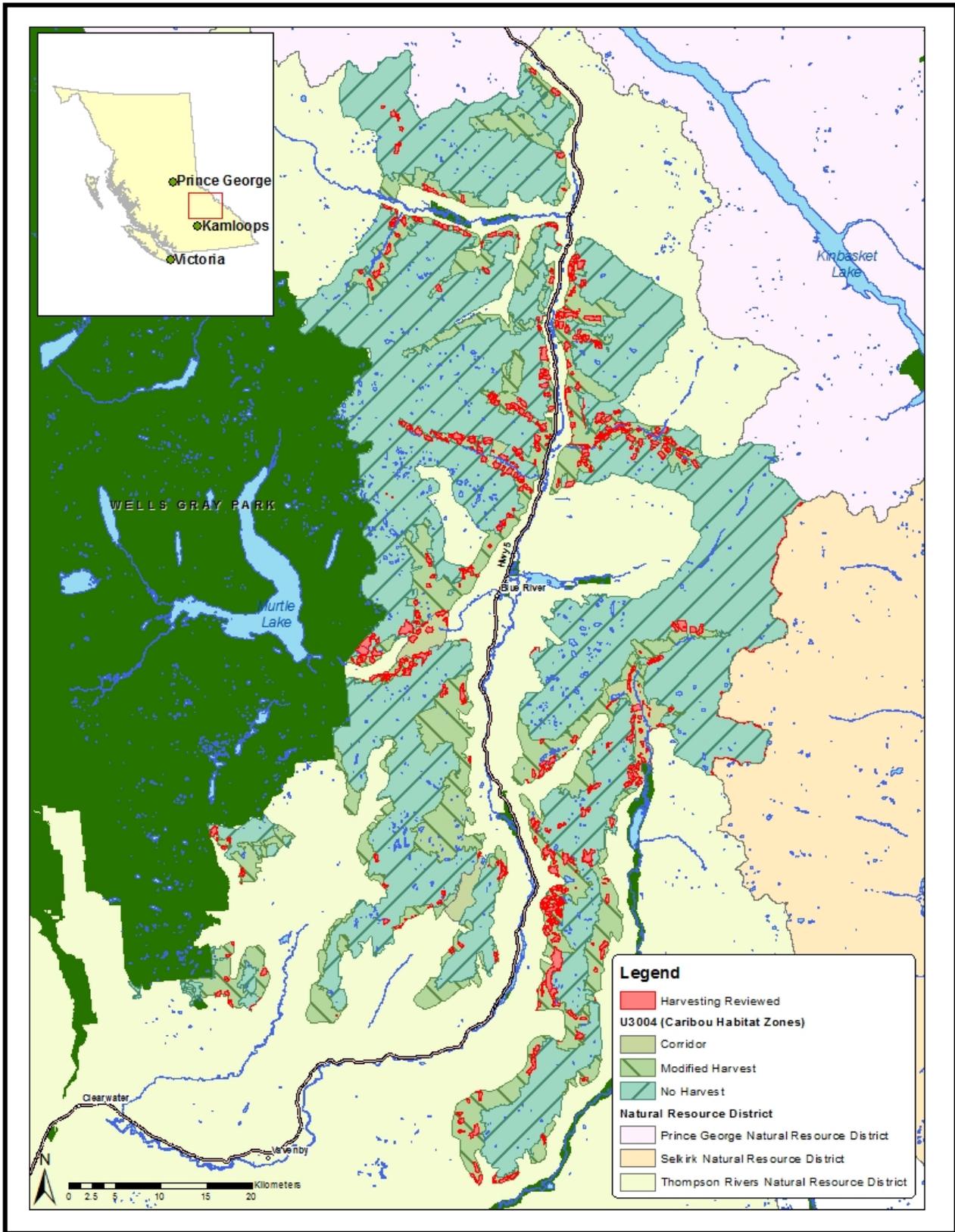


Figure 1. Location of *Ungulate Winter Range U-3-004*, illustrating the caribou habitat zones and the timber harvesting reviewed.

Scope

The objective of the investigation was to determine the extent of timber removal in mountain caribou habitat by harvesting, road-building, heli-landing construction and other minor activities, and the compliance of these activities with the Order.

The investigation included all timber removal authorized within Ungulate Winter Range U-3-004 for which the cutting authority was issued after the effective date of the Order (February 1, 2009) up to October 7, 2014, when the field sampling took place. The investigators also looked for habitat incursions with no cutting authority. Forestry, hydroelectric, adventure tourism and mineral exploration sectors were included in the investigation. However, the mineral exploration sector turned out to have no activities timber removal.

The investigators assessed the extent of habitat removal and commented on the status of habitat effectiveness monitoring in Ungulate Winter Range U-3-004.

Approach

In summer 2014, the Board informed licensees and government working within Ungulate Winter Range U-3-004 about the investigation. Board investigators used government forest tenure databases to determine the number, size and location of openings created in this area after February 1, 2009. They then asked licensees for any available planning and licence documents related to the timber harvest activity.

Investigators reviewed all available documentation and then a team, consisting of a professional forester and a professional biologist, visited the cutblocks during the fall of 2014 to assess whether licensees had complied with the requirements of the Order and cutting authorizations. The evaluation criteria section of this report lists several questions that the investigators used to assess whether the licensees complied with the regulatory requirements. In addition, investigators looked for any additional non-permitted openings that were not included in the government databases.



Figure 2. Caribou in late winter habitat.

Photo Courtesy of Leo De Groot

Legal Framework

Timber harvesting activities in a caribou ungulate winter range are governed by legislation and are overseen, in most cases, by professional foresters. FRPA and the FPPR specify certain requirements for operational planning and timber removal in an ungulate winter range.

Under the GAR, the government can establish requirements for conserving specific resource values, such as caribou habitat. In this case, these requirements are aimed at ensuring that adequate forest cover is retained in mountain caribou habitat, and that industrial activities minimize disturbance of caribou during a critical survival period. The government established *Ungulate Winter Range Order U-3-004*,⁴ in the Wells Gray Thompson planning unit, and specified general wildlife measures (GWMs) to protect and conserve mountain caribou.

Legislation

FRPA and the FPPR set out the planning requirements that must be met for harvesting timber in caribou habitat on Crown land. The requirements are designed to ensure industrial users protect caribou habitat. All of the activities assessed were for licences issued under the *Forest Act*, and are subject to the requirements of FRPA and the Order. However, the legal requirements differ for each sector and licence type as described below.

The FRPA requirements relevant to this investigation are:

- Section 5 – A forest stewardship plan (FSP) must specify results and strategies related to objectives set by government, unless exempted under FPPR section 7(3).
- Section 10 – A FSP holder must prepare a site plan prior to timber harvesting. The site plan must be consistent with the FSP and legislation, and must identify how the results and strategies apply to the site.
- Section 21 – A FSP holder must ensure that the results specified in the plan are achieved, and the strategies described in the plan are carried out.

The FPPR requirements relevant to this investigation are:

- Section 14 – A FSP holder must ensure that the plan identifies an ungulate winter range that is in effect in any of the forest development units identified in the plan.
- Section 69 – An authorized person who carries out primary forest activities on an area must comply with each GWM that applies to the area, unless exempted.

⁴ GAR Order U-3-004 was established in December 2008 and came into effect in February 2009. It spatially defines the area covered by the Order and specifies general wildlife measures to conserve and protect mountain caribou. All timber harvesting within Ungulate Winter Range U-3-004 approved after its effective date must comply with its general wildlife measures, unless exempted. For more information, the Order can be found online at: www.env.gov.bc.ca/wld/documents/uwr/u-3-004_order_09Dec09.pdf

The Order identifies three habitat zones (Figure 1) and GWMs specific to the sectors that operate within each zone. The zones are:

- **No-harvest zone (NHZ)** – critical caribou habitat with very restricted activities, including limited harvesting in specific circumstances;
- **Modified harvest zone (MHZ)** – less critical or matrix caribou habitat with retention and activity restrictions; and
- **Corridors (COR)** – provide for caribou movement between seasonal habitats with retention and migration trail functionality restrictions.

The legal requirements for each sector and zone are summarized in Table 1. The forest sector must meet the requirements of FRPA sections 5, 10 and 21, FPPR, sections 14 and 69, and GWMs 1-8. The hydroelectric sector must meet the requirements of FPPR section 69 and GWMs 1-4 and 10. The adventure tourism sector must meet the requirements of FPPR section 69 and GWMs 1-4 and 12. The GWMs for the forest sector change depending on what habitat zone they are operating in. The GWMs for each zone and sector are described in the Order (link in footnote 4).

Table 1. Summary of Legal Requirements by Habitat Zone and Sector

Summary of Legal Requirements Examined			
Habitat Zone	SECTOR		
	Forest	Hydroelectric	Adventure Tourism
Planning	FRPA s 5,10,21 FPPR 14	As per licence to cut	As per licence to cut
NHZ	GWM 1,2,3,4 FPPR 69	GWM 1,2,3,4,10 FPPR 69	GWM 1,2,3,4, 12 FPPR 69
MHZ	GWM 5, 6, FPPR 69	Exempt	Exempt
COR	GWM 7, 8, FPPR 69	Exempt	Exempt

Evaluation Criteria

To determine if timber removal met legislative requirements, the investigators reviewed all available planning and licence documentation and conducted field inspections to answer the following questions. Site conditions were recorded on a field inspection form.

Planning (applies to the forest sector only)

1. Does the FSP specify results and strategies related to caribou objectives or is the licensee exempt from doing so?
2. Did the licensee identify Ungulate Winter Range U-3-004 in the FSP and site plan?
3. Did the licensee prepare a site plan prior to timber harvesting?
4. Is the site plan consistent with the FSP and legislation, and does it identify how the results, strategies and measures for caribou apply to the site?
5. Did the licensee ensure that the strategies described in the plan were carried out?
6. Did the licensee ensure that the results were achieved?

Practices (applies to all sectors)

7. Did the licensees' activities comply with each GWM that applies to the area? If not, was the licensee exempted?

Population

The investigators examined 7 licensees, representing the forest, hydroelectric and adventure tourism sectors, including 4 FSPs and 66 openings. Table 2 shows the breakdown by sector and habitat zone. Most of the openings were created in the modified harvest zone by the forest sector, while a few were created in the no-harvest zone by the hydroelectric and adventure tourism sectors. No openings were created in the corridors. All of the openings were field sampled.

Table 2. Population by Sector and Habitat Zone

Sector/Tenure Type	Licensees	Number of Openings	Opening Area (ha)			
			NHZ	MHZ	COR	Total
Forestry/Forest Licence or TSL	4	63	1.0	1366.0	0.0	1367.0
Hydroelectric/Licence to Cut	1	1	0.0	10.0	0.0	10.0
Adventure Tourism/Licence to Cut	2	2	0.7	0.0	0.0	0.7
Total	7	66	1.7	1376.0	0.0	1377.7

Results

Compliance

The results of this investigation are reported by sector. All sectors complied with the planning and practice requirements of FRPA and the Order.

Planning: Evaluation Criteria 1-6

Based on the planning evaluation questions, investigators found that the forest sector complied with the planning requirements of FRPA by employing the following practices.

1. Licensees specified objectives, results and strategies for caribou in their FSPs. If they were exempt under FPPR, section 7(3), they used the GWMs specified in the Order to guide their activities.
2. All FSPs examined contained maps that delineated Ungulate Winter Range U-3-004, and all of the site plans examined identified that the planned harvest activity fell within Ungulate Winter Range U-3-004.
3. Licensees prepared site plans prior to timber harvesting. All site plans examined pre-dated harvest commencement dates.
4. Licensees prepared site plans that were consistent with the results, strategies and measures specified in the FSPs and the Order. In their site plans, licensees correctly identified the caribou habitat zone where the activities were located. They prescribed site-specific retention strategies in consideration of promoting the maintenance and recovery of caribou habitat.

They used existing forest cover, where possible, to optimize retention levels and promote a more rapid recovery of caribou habitat (covered in more detail in the GWM 6 section of this report). They avoided the creation of openings in corridor zones to provide continuous and connected habitat for caribou migration. They planned cutblocks with an emphasis on retaining adequate habitat width for movement and transitional habitat use—for example, no openings were created where the site distance exceeded 500 metres. They anchored retention patches to existing old growth management areas and riparian features to assist in maintaining movement corridors and forage opportunities. Fifty-four cutblocks had riparian features and seven had adjacent old growth management areas, and all of these had retention anchored to these features.

5. Licensees ensured that the strategies described in the site plan were carried out by conducting pre-harvest briefings with loggers and in-progress harvest inspections.
6. Licensees ensured that the results were achieved by conducting post-harvest inspections and monitoring forest cover removal in the modified harvest zone to ensure habitat retention requirements in the Order had been met. The Practices section of this report (below) further discusses the status of habitat retention.

Although hydroelectric and adventure tourism sectors do not have the same planning requirements as the forest sector, investigators reviewed their licence documents and talked with the licensees to assess their familiarity with the Order. Investigators found that the licence documents did not contain reference to the Order. However, government staff stated that, when issuing the licences, they restricted the harvest activities to the limitations of the Order, and briefed the licensees on the requirements of the Order. Investigators observed three openings created by these sectors, each less than one hectare, which, due to their size, location and structure, did not have a significant impact on caribou habitat.

Practices: Evaluation Criteria 7

Section 69 of FPPR requires that licensees comply with the GWMs, and the investigators found that all sectors complied with the measures contained in the Order. No licensees were exempted from meeting the requirements of the Order.

The forest sector complied with GWMs 1-4 by minimizing activities in the no-harvest zone. Investigators found one cutblock with an incursion less than one hectare in size in the no-harvest zone. This met the requirements of GWM 3 because the incursion was less than five hectares, and it provided a logical harvest boundary.

The forest sector licensees collectively monitored the area of mountain caribou habitat in suitable condition, as described in the GWM 5 section of this report (see below). They considered activities that were designed to retain caribou habitat attributes and accelerate the recovery of caribou habitat suitability, as described in the GWM 6 section below. To accommodate caribou migration, they maintained suitable habitat and trail functionality by avoiding any harvesting or road building activities in the corridor zones, meeting the requirements of GWMs 7 and 8. They timed activities in all zones to avoid critical habitat use periods in the summer and early winter.

The hydroelectric and adventure tourism sectors complied with GWMs 10 and 12 by conducting clearing activities during late summer and fall months, which are outside calving periods. They also used existing clearings, if possible, when building helicopter landing pads, lodges or hydroelectric

facilities. Investigators found that all of the clearings examined incorporated natural openings. Licensees reduced impacts on caribou habitat by minimizing the removal of lichen bearing trees, restricting openings to less than 1 hectare, building access trails less than four metres wide, and avoiding additional ski run or snow trail development in no-harvest zones.

During the field review, investigators did not observe any openings within Ungulate Winter Range U-3-004 that were not regulated under the *Forest Act* or FRPA, such as oil and gas, heli-skiing or hydroelectric activities regulated under the *Land Act*, or that were potentially unauthorized. Investigators also assessed whether the desired conditions to maintain caribou habitat were achieved. They found that licensees had created only a few small openings within the no-harvest zone, and all were compliant with the GWMs. Therefore investigators focused on whether practices within the modified harvest zone met the conditions for GWMs 5 and 6.

General Wildlife Measure 5 (forest sector only)

This measure requires that licensees retain at least 1800 hectares of caribou habitat in the timber harvesting land base (THLB)⁵ and 7957 hectares in the non-timber harvesting land base (NHLB). In November 2014, the licensees conducted an analysis to determine the current and planned (5-year horizon) status of caribou habitat retention. They took a conservative approach in their analysis, and did not include some areas that were considered available for harvest in the original 2007 analysis. In doing so, they conservatively underestimated the surplus of caribou habitat. The results are summarized in Table 3.

Currently, the minimum retention targets are exceeded by 18 896 hectares in the THLB and 732 hectares in the NHLB. After 5 years, the sector projects a surplus of 17 012 hectares in the THLB and 127 hectares in the NHLB. While licensees estimate that caribou habitat retention will near its target minimum in the NHLB in 5 years, agreement holders assessed the timber available for harvest in the NHLB before the Order was established and the government adjusted the target accordingly. As such, the NHLB contains very little economically viable timber and licensees do not expect to conduct a significant amount of timber harvesting in the NHLB beyond the five-year horizon. The extent of forest cover removal is within the areas described in the Order.

Table 3. Status of Caribou Habitat within the Modified Harvest Zone of Ungulate Winter Range U-3-004

Land base Type	Min Caribou Habitat (ha)	Current Condition(ha)	Surplus / Deficit (ha)	Planned Condition (ha)*	Surplus / Deficit (ha)
THLB	1 800	20 696	+18 896	18 812	+17 012
NHLB	7 957	8 689	+732	8 084	+127
Total	9 757	29 386		26 896	

*Planned condition includes timber harvest planned over the next 5 years.

⁵ The timber harvesting land base (THLB) is the area of land within a timber supply area that is available for commercial timber production. The THLB excludes lands unavailable or inappropriate for timber production (e.g., lands designated for other uses, lands with sensitive or inaccessible terrain). Lands outside the timber harvesting land base, defined as the non-timber harvesting land base (NHLB), still contribute to and are managed for other forest values (e.g., caribou habitat or old growth). Some areas in the NHLB, previously considered as non-viable for timber harvest, may become viable due to improved harvesting technology and better market conditions. Caribou habitat suitability is based on the Species at Risk Coordination Office suitability file of 2007, 1800 ha THLB from TSR2 (2001) and 7957 ha of NHLB from TSR4 (2008).

While this analysis demonstrates that licensees are meeting the area retention requirements of the Order, it does not demonstrate whether the spatial and structural requirements for caribou habitat have been met. While licensees are not required to analyze the distribution of habitat retention, investigators did not observe any localized fragmentation. Figure 3 shows an example of good practices in one cutblock in a modified harvest zone. However, as described in the habitat monitoring section of this report, it is not clear whether, at the landscape scale, habitat exists in patches of adequate size and location to be suitable for caribou use.



Figure 3. Harvest cutblock in the modified harvest zone. The licensee has prescribed a patchy/irregular distribution of openings and tree retention designed to provide thermal and predator cover, retain lichen bearing trees, promote quicker lichen bearing recovery and minimize habitat fragmentation.

General Wildlife Measure 6 (forest sector only)

This measure requires licensees to consider using activities that retain caribou habitat attributes and accelerate the recovery of caribou habitat suitability in the modified harvest zone. When the Order was established, the government was not certain whether this measure would achieve caribou objectives. While it used the best available information for habitat management available at the time, the government recognized that habitat management practices may change over time. By design, the measure provides the government with the flexibility to adapt recovery practices should better information become available, and provides licensees with the flexibility to deviate from the measure for forest health and safety reasons.

Prior to the Order, licensees were required to follow the timber harvesting guidelines contained in Appendix 10 of the Kamloops Land and Resource Management Plan⁶ (KLRMP), *Guidelines for Managing Mountain Caribou*, which includes a requirement for prescribing foresters to employ the guidelines unless a sound rationale is provided. Appendix 10 has since been removed from the KLRMP, and the Order only requires that licensees consider the guidelines in Appendix 10.

⁶ The [Kamloops Land and Resource Management Plan](#) (1996) includes legally established area specific objectives and strategies for the North Thompson caribou habitat. In 2009 the [KLRMP](#) was amended to remove the caribou sections to eliminate any potential conflicts with the provincial caribou recovery strategy and GAR Order U-3-004. It no longer contains any enforceable caribou objectives, strategies or indicators. These objectives and strategies are still considered as guidance for caribou habitat management in the Order.

Therefore, the retention of caribou habitat attributes is no longer a legal requirement, and licensees are not required to implement or rationalize habitat management activities.

While this approach provides some flexibility to the government and the licensees, it creates a situation where the implementation of habitat management measures is at the licensees' discretion. This section reports on whether the licensees had considered and implemented the habitat management measures.

The KLRMP defines forest management objectives and strategies, which are described in more detail in [Extension Note, BC Journal of Ecosystems and Management, Silviculture options for use in ranges designated for the conservation of mountain caribou in British Columbia](#), to attain suitable habitat attributes specific to early and late winter habitat use by caribou. Investigators, using these strategies as a baseline, examined the site plans to assess whether licensees had correctly identified the type of habitat (i.e., NHZ, MHZ, COR) where they were operating, and whether they had considered the applicable forest management strategies, prescribed them in site plans, and achieved the prescribed conditions.

When planning timber harvesting, licensees stated that they are guided by viable timber opportunities, although they make an effort to plan cutblocks in the modified harvest zone so there is adequate forest cover and width for movement and transitional habitat use. They also anchor tree retention to existing old growth management areas and riparian features to assist in providing movement corridors and forage opportunities for caribou. Investigators found their practices to be consistent with this statement, as described in the planning section of this report.



Figure 4. Tree retention in early winter range designed to retain lichen bearing trees, and provide thermal and predator cover for caribou.



Figure 5. Tree retention in early winter range, where limited by steep slopes and cable harvesting, few trees have been retained.

Investigators observed various levels of forest cover retention in the modified harvest zone, ranging from a few standing trees to more than 50 percent retention, as contrasted in Figures 4 and 5. Licensees retained caribou habitat attributes, where possible, and adequately explained retention levels in site plans, based on the pre-harvest stand structure suitability, forest health and harvest system requirements. They retained the fewest stems when using cable harvest systems, when there were forest health concerns, or when less suitable forest stands were harvested, such as younger pine stands infected with mountain pine beetle. Investigators found that in nine of the 63 cutblocks reviewed forest health or harvest systems (steep/cable) led licensees to retain only a few trees.

The investigators found all licensees had correctly identified the habitat type they were operating in for all cutblocks so they could retain desired habitat attributes. For each cutblock, they had assessed the potential of pre-harvest stands to provide caribou habitat attributes. For example, they assessed stand structure, lichen bearing potential, forest health, and wind firmness to help determine tree retention. They made sure they were using ecologically suitable tree species for regeneration, and assessed the stand understory to help determine which trees and shrubs to retain to provide snow interception and predator cover, and to capture lichen fall. Once the desired stand attributes were identified, the licensees drafted a site plan, which was designed to balance attribute retention with forest health and harvest systems. Post-harvest, licensees assessed slash loading and coarse woody debris to help determine how debris would be managed to provide for caribou movement.

The investigators found that licensees prescribed forest activities (harvest timing, tree and shrub retention, coarse woody debris retention, silviculture treatments and regeneration) in site plans that incorporated management measures to retain desired habitat attributes, where possible, and implemented these plans. Licensees demonstrated that they had considered employing harvest and silviculture activities that retained mountain caribou habitat attributes, or were intended to accelerate the recovery of mountain caribou habitat suitability. While they were not legally required to do so, the licensees had implemented habitat protection measures prescribed in the site plans, and rationalized why they could not implement them where they were limited by harvest system and forest health constraints.

Habitat Monitoring

While the scope of this investigation includes habitat removal and the possible impact on the caribou herds and recovery efforts within Ungulate Winter Range U-3-004, it does not include all current management actions related to mountain caribou recovery (i.e., predator, recreation, habitat and herd management).

When the Order was established, the government was not certain how caribou habitat should be structured to optimize caribou recovery. It used the best available science for habitat management at the time to establish wildlife measures designed to achieve recovery objectives.

Investigators observed some landscape level habitat fragmentation⁷ within the NHZ and MHZ (Figure 6), which caused them to question whether the distribution of the harvesting and habitat

⁷ Habitat fragmentation is the process by which habitat loss results in the division of large, continuous habitats into smaller, more isolated remnants. Fragmentation can lead to a reduction in the total area of the habitat, a decrease of the interior edge ratio, isolation of one habitat fragment from other areas of habitat, breaking up of one patch of habitat into several smaller patches, and a decrease in the average size of each patch of habitat. Fragmentation can reduce population connectivity and the probability of population persistence.

retention is meaningful for long-term caribou recovery and accessible for the current population of caribou. Most of the fragmentation is due to timber harvesting that occurred prior to the establishment of Order, and the wildlife measures were intended to account for the recovery of these areas.

The government recognized that an adaptive management framework would need to be developed to monitor recovery actions, and to ensure the measures are providing suitable habitat structure and distribution. Meanwhile, licensees have full discretion and flexibility to decide where to harvest within the limits of the Order. While the government requires licensees to monitor the area removed within the MHZ, it does not require them to monitor the distribution and structure of habitat retention and assess how it may affect caribou recovery. The current framework creates a situation where the location of new openings may contribute to habitat fragmentation. Presently, the forest licensees can demonstrate they are within the limits of habitat area removal, however, there is not enough information available on the structure and distribution of caribou habitat to allow the Board to comment on habitat fragmentation.



Figure 6. Recent harvesting is depicted in the foreground, with retention designed to provide caribou habitat. In the background, roads, power line rights-of-way and large tracts of immature timber with low lichen bearing capability, have fragmented caribou habitat in the no-harvest and modified harvest zones. The background incursions were created prior to the Order, and are expected to recover under the protection of the Order.

Both government and forest licensees continue to monitor habitat alteration, and are developing adaptive management strategies to refine habitat retention measures. The licensees monitor compliance with the area requirements of the Order through the [Nicola Thompson Fraser Sustainable Forest Management Plan \(NTF SFMP\)](#), which includes collectively monitoring and reporting on conformance with management strategies for mountain caribou and annually reporting the areas specified in the Order. In its latest annual report ([January 2015](#)), the NTF SFMP reported that all members are in conformance with habitat retention requirements.

The government monitors habitat retention and adaptive management through the [Caribou Progress Monitoring Board](#) (CPMB), initiated in May 2008. The CPMB oversees and evaluates cross-sector implementation, monitoring and adaptation activities for all MCRIP components. It periodically reviews and evaluates the progress of implementation activities for all management controls of the MCRIP, and provides information and feedback on recovery implementation to government, constituent groups and the public. The CPMB monitors adaptive management and research initiatives designed to help improve the structure and distribution of habitat. Government is currently conducting several habitat management initiatives, including habitat protection and monitoring in ungulate winter ranges (see Appendix A). These initiatives have not been fully developed and implemented, so there is little information available to allow the Board to comment on whether the distribution of caribou habitat is meaningful for long-term caribou recovery within Ungulate Winter Range U-3-004.

Given the historical rate of decline in the caribou herds in Ungulate Winter Range U-3-004 (greater than 60 percent decline over the past 20 years—COSEWIC 2014) and the projected rate of decline of at least 40 percent within the next five years, the government has recognized the urgency in gaining a better understanding of whether the type and distribution of suitable habitat being retained will be effective for long-term caribou recovery. The Canadian government has identified habitat monitoring and adaptive management as high priority items,⁸ and continues to work with the provincial government on developing and implementing initiatives to address habitat recovery.

Conclusions

This investigation set out to determine whether licensees authorized to remove timber in mountain caribou habitat for harvesting, road-building, heli-landing construction, and other activities, complied with *Ungulate Winter Range Order U-3-004*. Investigators examined four forest stewardship plans and 66 openings, totalling 1378 hectares. Most (63) openings were created by four forest licensees, with one each created by one hydroelectric and two adventure tourism licensees. All of the openings were field reviewed.

Board investigators found that all licensees complied with the legal requirements of FRPA and the Order, and observed no non-permitted openings. The amount of timber removal is currently within the Order requirements, and predicted to be so within the five-year planning horizon.

Investigators found that most of the GWMs contained in the Order were consistent with the government's objective to protect caribou. The one exception is GWM 6, which allows operational

⁸ [Recovery Strategy for the Woodland Caribou, Southern Mountain population \(*Rangifer tarandus caribou*\) in Canada](#) (2014)

flexibility. While licensees must consider habitat measures, they are not required to implement habitat protection measures.

Members of the MCRIP's Progress Monitoring Board and the Nicola Thompson Fraser SFMP are coordinating ongoing monitoring to assess the amount of timber removal in caribou habitat and the effectiveness of forest management measures for maintaining caribou habitat attributes. This includes periodic caribou and forest inventories, and adapting practices to better suit caribou recovery objectives.

Currently, the potential impacts of forest cover removal from industrial and adventure tourism activities on caribou recovery within Ungulate Winter Range U-3-004, are not fully understood. The provincial government continues to develop and implement effectiveness monitoring initiatives so it can gain a better understanding of how the Order is protecting caribou habitat from forest cover modification. Relevant initiatives, in various stages of development and implementation, include assessing the distribution, structure, abundance and utility of habitat retention and adapting habitat management measures to improve the recovery of mountain caribou. The Board cannot comment on the effectiveness of the Order because the results of these initiatives are not yet available to assess

Appendix A: Government Effectiveness Monitoring Initiatives

Given the rate of population decline of the caribou herds, the government has recognized the need and urgency to gain a better understanding of how the spatial distribution and structure of habitat retention potentially impacts caribou herds and recovery efforts, and has developed several initiatives that, in part, are designed to gauge and assess the effectiveness of the habitat protection measures provided in ungulate winter range orders.

These initiatives include habitat suitability studies; population inventories; developing a monitoring and adaptive management recovery strategy that addresses the level of protection from legal measures; monitoring the distribution and abundance of habitat; and assessing continued use of habitat by caribou, given harvest treatments and the retention of habitat attributes. The development and implementation of initiatives is on-going and at various stages of completion.

Some of the key habitat management initiatives undertaken by the government include:

- **Habitat protection** in critical caribou habitat by establishing ungulate winter ranges through government order.
- **Adaptive management** and research to initiatives designed to help gauge and assess the effectiveness of habitat protection measures, including:
 - Conducting caribou population inventories on a herd-by-herd basis to gauge the success of recovery efforts; every third year for each herd or more frequently during periods of more intense management.
 - Reviewing habitat suitability, including an adaptive management project to test caribou use of designated habitat. The project shows that more than 80 percent of mountain caribou used habitat under GAR during the study period ([Monitoring Mountain Caribou Wildlife Habitat Areas and Ungulate Winter Ranges](#)—March 2012). The project concludes that the caribou are using the areas defined in the ungulate winter ranges, and will not lead to any modifications of ungulate winter range boundaries to increase caribou use.
 - Designing an approach to assess the effectiveness of habitat protection measures. MCRIP is developing an effectiveness monitoring framework and hopes to apply the principles being developed to mountain caribou in the near future.
 - Developing a [Monitoring and Adaptive Management Strategy for Mountain Caribou Recovery Implementation](#) (initiated in September 2009) that, in part, focuses on habitat management and addresses the following items: the level of protection from forest harvesting and road building provided by legal measures; the distribution and abundance of habitat in meeting population goals; and the continued use of habitat by caribou given harvest treatments and retention of caribou attributes. The strategy has now been drafted and, pending resources, is being implemented at various stages, including adaptive management projects on maternal penning and alternate prey reduction to date.

The government has identified habitat monitoring and adaptive management as high priority items,⁹ and continues to work on developing and implementing initiatives to address habitat recovery.

⁹ [Recovery Strategy for the Woodland Caribou, Southern Mountain population \(*Rangifer tarandus caribou*\) in Canada](#) (2014)

Appendix B: Abbreviations

COR	corridors
CPMB	Caribou Progress Monitoring Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
FPPR	Forest Planning and Practices Regulation
FRPA	Forest and Range Practices Act
FSP	forest stewardship plan
GAR	Government Actions Regulation
GWM	general wildlife measure
KLRMP	Kamloops Land and Resource Management Plan
MCRIP	Mountain Caribou Recovery Implementation Plan
MHZ	modified harvest zone
NHLB	non-timber harvesting land base
NHZ	no-harvest zone
NTF SFMP	Nicola Thompson Fraser Sustainable Forest Management Plan
THLB	timber harvesting land base
TSL	timber sale licence



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