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POLICY REVIEW

Response to the Proposed Policy for Low Elevation Ungulate Winter Ranges for the Chase, Wolverine, Scott, and Finlay Northern Caribou Herds

Review Draft

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ABSTRACT

This report is forwarded in response to a request from the Ministry of Water, Land, and Air Protection for review of a draft proposal for policy regarding management of ungulate winter ranges for caribou in north-central British Columbia. Specific comments are made with regard to policy objectives and more general comments are made regarding the time-lines for submitting the proposal for formal approval.

We recommend that ratification of these comments occur at a reconvening of the UWR Working Group.

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BACKGROUND

Under the auspices of the Forest Practices Code of BC Act (Operational and site planning regulation, Section 69), the Government of British Columbia (BC), is authorized to designate areas of land necessary for the winter survival of ungulates and to set objectives for the management of those areas as Ungulate Winter Ranges (UWR). In north-central BC, direction has been undertaken in this regard for northern caribou where the identification of UWR's was based on habitat supply modeling (McNay et al. 2003) conducted for areas inhabited by 4 herds of northern caribou, locally known as the Scott, Wolverine, Chase, and Finlay herds (Schmidt and McNay 2002). The model results formed predictions about the quality of Pine-Lichen Winter Range (PLWR), located with 1-ha resolution, covering a total area of more than 3 million hectares (Figures 1 and 2). The predicted PLWR values have been tested generally by comparison to observations of habitat preferences exhibited by individual radio-collared caribou in the Wolverine and Chase herds (Chesson 1983, Doucette and McNay 2003, McNay and Doucette 2003). Although conclusions from this test indicated the PLWR model performance to be acceptable (75% and 71% accuracy[1] in the two herd areas respectively), the spatial location and extent of the UWR resultant remained to be confirmed. Confirmation of the spatial location and extend of UWR's was undertaken in a subsequent aerial reconnaissance reported by McNay and Sulyma (2003). This reconnaissance resulted in a subjective confirmation of model results (e.g., > 83% of the total observations were correctly classified) as they apply to the low-elevation winter ranges being proposed (Sulyma and Arthur 2003).

Following is a review and critique of the policy proposed for managing UWR's (i.e., Sulyma and Arthur 2003 and included here as Appendix A) under the OSPR section 69. Henceforth, the proposed UWR's for caribou of the Chase, Wolverine, Scott, and Finlay herds will be referred to simply as the proposal. Also, this report is used to forward comments from a number of people beyond the author (see Acknowledgements) and so I generalize the comments as coming from the collective group of reviewers.

COMMENTS ON SUBMISSION OF THE FINAL PROPOSAL

Comments are forwarded under the assumption that Government will follow consultation standards set out by Government; specifically the requirement for a detailed account of actions taken to address comments as a result of consultation. To this end, we propose this task be undertaken by reconvening the UWR Working Group at an appropriate time given the specific comments received and prior to producing the final proposal. To help facilitate this, we suggest at least 2-weeks notification of the intent to finalize and submit the proposal.

[1] Accuracy in this cases comes from a statistical confusion matrix used in machine language studies (Provost and Kohavi 1998) where accuracy = ((number of predicted avoided range classes actually observed as avoided + number of predicted preferred range classes actually observed as preferred) / total selections) * 100%.

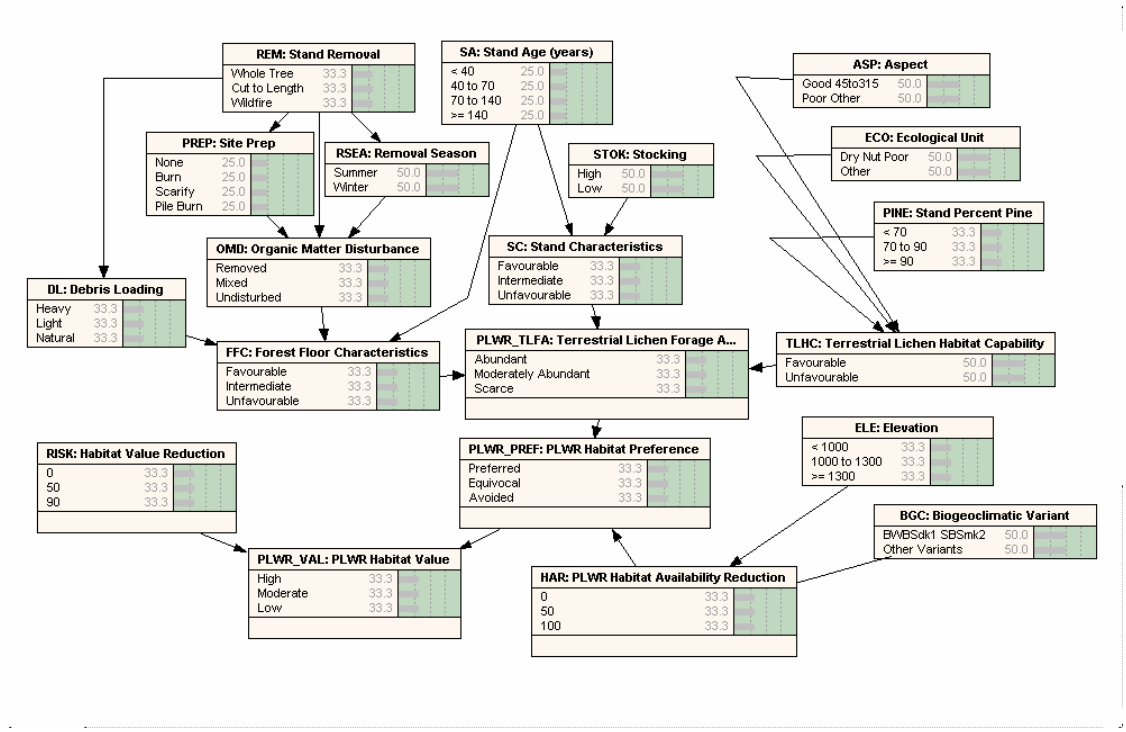

Figure 1 Ecological factors and relationships characterizing preference for pine–lichen winter ranges by northern caribou in north-central British Columbia.

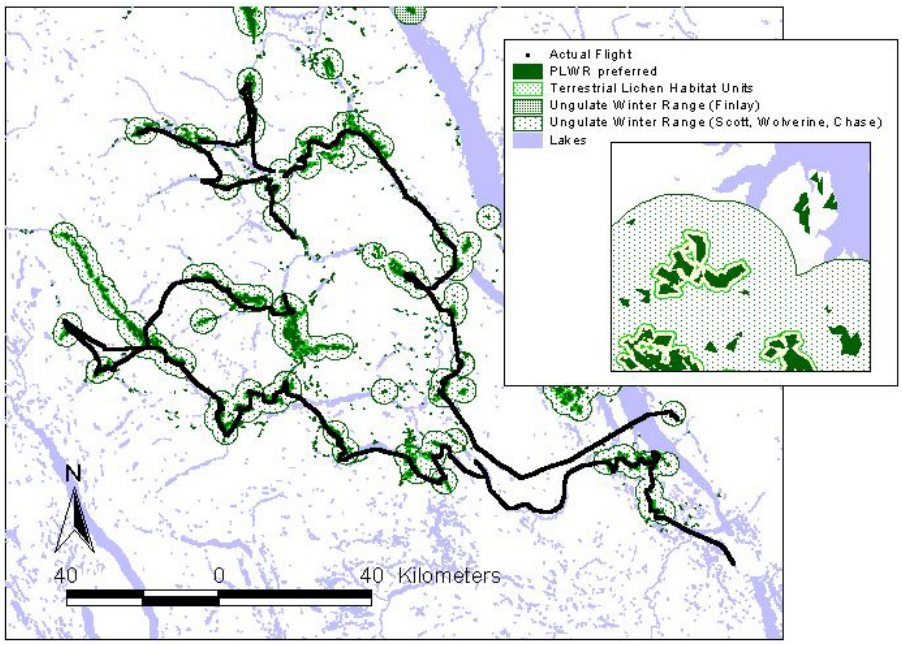

Figure 2. Management units (ungulate winter ranges, terrestrial lichen habitat, and preferred Pine-lichen Winter Range (PLWR preferred)) for northern caribou in the Scott, Wolverine, Chase, and Finlay herds of north-central British Columbia and a flight line depicting an aerial reconnaissance of the management units conducted 2003.10.09.

Although we have no specific agenda or time-line regarding submission of the full proposal, we recognize that an ongoing project intended for completion at March 31, 2004 will contribute greatly to evaluating the effectiveness of the proposed policy. This project, "Operability analysis to meet proposed ungulate winter range objectives in the Mackenzie TSA", is intended to assess the following question: Given the forest attribute data, merchantability, operability standards, and UWR management constraints, to what extent can UWR management objectives be met using Slocan's current management regime? With the current investment in this initiative, we forward the notion that the proposal would be more complete, and our investment more efficient, by including results of the operability study.

We would prefer our comments be circulated to the full consultation community, and that those participants be included in the general forum to discuss actions taken to ratify comments. This is because of the direct interaction among closely aligned themes in the proposal such as Forest Health, Timber Supply, Range (Livestock), Fire Management.

Table 3 of Section 7.0 has not been completed and so we would require a resubmission of the draft proposal that included this information before we can provide a complete review.

COMMENTS ON SPECIFIC MANAGEMENT OBJECTIVES

Reference to specific management objectives in comments below follows bulleted labels as per the documentation sent for review (Sulyma and Arthur 2003) and can be cross referenced by using Appendix A.

1. 1.1, 1.2, 3.1.3, and 4.1.2 – The use of a percentage of the area to represent a management target is unnecessary, potentially confusing, and can in some circumstances provide the wrong results. The intent is to have half of the best habitat, or as close to half as possible, functioning while the remaining half of the habitat is regenerating. To facilitate this, the concept of Terrestrial Lichen Habitat Units and Ungulate Winter Range Areas were invoked so that measurable management targets would be straight-forward (e.g., 2 or 3 of 5 TLHU's, 3 of 6 TLHU's, 7 of 14 TLHU's, etc.). We recommend rewording as follows:…by having half of the Terrestrial Lichen Habitat Units (TLHU), or as close to half as is feasible without fragmenting any one TLHU, …. Because TLHU's and UWRA's are defined areas, the rewording is a measurable directive. In the hypothetical situation where there are 3 TLHU's within a UWRA, it would be impossible to meet the range "between 45 and 55%" since the only solution would be to fragment one of the 3 TLHU's. This is not a desired result for caribou habitat since a simultaneous objective is to manage for large, unfragmented units of habitat (see objective 1.2). Having made this comment, we want to note that the comment was not at first a collective opinion since the intent of the objectives was not clear. For example, some interpreted the intent to really mean that half of the total TLHU area should be available in functioning condition. However, this would almost always mean that at least one TLHU in each UWRA would be compromised as a unit (i.e., fragmented or at least some portion of it developed on a different time schedule). We feel there is still enough uncertainty around the intent that these objectives need further review by the Ungulate Winter Range Working Group.

2. 1.1.2 and 1.2.2 – Use of the phrase “must take all” would seem to neglect other apparently competing policy under the Forest Practices Code, in particular objectives set for biodiversity or objectives set for riparian management. Also, if an TLHU included non-contributing land base, it’s not clear that an operator in the forest industry has an obligation to develop such land. We think the relevant sentence could end as: …within 20 years. It’s clear from the remaining wording that remnant parts of the TLHU are to managed on the same rotation as the portions that were developed. An alternative to dropping the part of the sentence suggested above would be to replace the word “take” with “address”. Note that the word “existing” is misspelled.
3. 1.1.3, 1.3, and the best management recommendations in Appendix 4 conflict with 2.5 and 2.6. In the former set there’s a clear direction to maintain terrestrial lichen forage by conducting timber harvest operations in the winter where in the latter set this is precluded. This apparent conflict may be irrelevant pending actions taken to ratify our comment number 6. Further to the objectives in 1.1.3 and 1.3, are we confident that logging debris and/or summer logging are deterrents to establishment of, and/or retention of, terrestrial lichens in the local ecosystems? We recognize much of this management recommendation was developed on guidance from research at other places in British Columbia which have more productive albeit cooler and moister ecosystems. Our best ecosystems for terrestrial lichens by your own definition (see Sulyma and Arthur 2003, Appendix 4) are nutrient poor, well drained sites with coarse-textured soils. These sites tend to maintain a primarily pine-dominated, open canopied forest with very low debris resulting from logging. If we were to consult data, (e.g., “Adaptive Management of the Forestry Practices in Pine-Lichen Woodlands in North-Central British Columbia”, Sulyma 2003), we may find these management directions ineffective and hence, unnecessarily restrictive.
4. 2.2 and 2.3 – Should the references “build new roads” and “keep new roads” refer to new access roads rather than all roads? It seems that way from previous sentences but we would like to see that confirmed.
5. 2.4 – This objective is redundant with other Forest Practices Code policy in the sense that, with due consideration to safety and environmental standards, direction is to always build roads to the lowest class practicable. We recognize also that there are haul-speed considerations that can interact with such an objective. If the intent is to limit the use of these roads by humans (and by predators in 3.2.2) 70-years post-development, then it would seem the wording of 3.2 is more to the point, subject to our specific comment number 10.
6. 2.5 and 2.6 – We consider these objectives to be unnecessary and should be deleted. The intent is to have half of the UWRA functioning as habitat and development should be allowed to proceed accordingly in the non-functioning, remaining portion of the UWRA; this is fundamental to the UWR policy. We recognize that use of main access routes may require continued activity (i.e., hauling) within the functioning half of UWRA’s in some specific situation. We recommend that these special cases are addressed 1-by-1 spatially. Some examples would be all those units that occupy the Osilinka and all the roads to camps and villages.
7. 3.1.2 – It is unnecessary to specify the meaning of “large” when the legal definition has been known to, and likely will continue to, change from time to time. We consider the definition should just refer to whatever the current standard is although

this would also lead to the need to measure against the standard of the period that the management took place.

8. 3.1.3 – We find the use of "years 0 to 70" to be confusing. What does this contribute to the objective and is it necessary?
9. 3.1.4 – What does "years from now" mean? Is this better worded as "years post-development"? Or perhaps replace "70 to 140 years from now" to "within the last 70 years of the 140 year rotation".
10. 3.2.2 – We suggest rewording as follows: …and silviculture activities, implement measures to rehabilitate all non-access roads to make it undesirable, in 70 years after development, for wolves to use them for travel."
11. 4.1.1 – It would seem that this proposal cannot be finalized without ratifying the apparent conflict with other major Forest Health policy that is currently in place. This is especially so when one considers use of the word "sanitation" but maybe less so for "salvage". We recommend that this gets through review and comment from an authority concerned with Forest Health policy. Furthermore, we suggest deleting the word epidemics – it's our opinion that epidemics are not managed.
12. 4.1.2 – In our opinion, this is redundant with the objective 4.1 and should be deleted.
13. 5.1 – This objective could be developed to provide more proactive direction by considering the primary fire-fighting response activities (and mop-up activities) and the potential effects on conservation of winter range for caribou. We should rank the effects and provide direction on which activities should take precedent in given broad scenarios.
14. 6.2.1 – Although we recognize the intent of this objective, has this been thoroughly reviewed within the context of direction from LRMP's?
15. Section 5.0 – The sentence beginning "McNay and Sulyma" and the remainder of that paragraph, should precede the first sentence of the paragraph.
16. Section 7.0 – We suggest rewording "silvicultural prescriptions" to "site plans". We cannot entertain the notion presented that this policy be retroactive to any approved development and therefore don't understand the relevance or the need to complete Table 2. Insofar as will be possible given historic development and approved planned development, we commit to implementing any accepted and approved policy for managing ungulate winter ranges for caribou and to bring habitat supply in line with the objectives as quickly as possible.
17. Section 7.0, Table 3 – This table has not been completed so we have no way to comment.

DISCUSSION

The proposal for policy to implement management of ungulate winter ranges for caribou in north-central British Columbia has advanced and is founded on the "best knowledge" available having followed major initiatives at habitat supply modeling and data collection using radio-collared caribou that range over much of the application area. The modeling has been tested using this empirical information and field verified. Although the objectives are nearing completion, some rewording is required as specified in our specific comments. Before we can comment fully on this proposal, the proposal needs to be completed – most notably, Section 7.0 Table 3 regarding the THLB netdown is not complete and this is a necessary component that would aid our review. Furthermore, we feel that testing the operability and implementability of these objectives is a required step before forwarding the proposal for formal acceptance as Government policy.

A major failing of the policy, and a potentially fatal flaw in it's effectiveness, is the inability to address integration across multiple responsibilities (e.g., parks, mining industry, different operators in the forests industry). How can UWRA's be managed effectively to meet targets and intent established by Objective 1 (providing sustainable supply of food), Objective 2 (minimizing activity that cause displacement), or Objective 3 (minimizing potential for predation) if resource use activities, regardless their source, are not co-ordinated toward the same goals? We feel strongly that simultaneous development of policy initiatives on all relevant fronts (wildlife, parks, mining, forestry, etc.) would enhance commitment to any one piece of policy in that effectiveness would be all the more likely.

ACKNOWLEDGEMENTS

This report is intended to reflect the input and comments from a number of participants in the review process beyond those of the authors. Participants in the review were Dan Boulianne (RPF), Shaun Kuzio (RPF), Doug Ambedian (RPF), Lars Hulsein (RPF), Ross Lennox (RPF), Philip Smith (RPF) and Scott McNay (PhD, RPF, RPBio). We thank Sandra Sulyma and Bill Arthur for the opportunity to comment on the proposal and for conducting a truly consultative process for the development of Ungulate Winter Range policy for caribou in the Mackenzie and Ft. St. James Timber Supply Areas.

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APPENDIX A. NORTHERN CARIBOU LOW ELEVATION UNGULATE WINTER RANGE PROPOSAL FOR THE CHASE, WOLVERINE, SCOTT AND FINLAY NORTHERN CARIBOU HERDS

Mackenzie and Fort St. James
Forest Districts

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- The staff of Wildlife Infometrics Inc., in particular, Karin Schmidt, Andrea Doucette, Victor Brumovsky, Kathy Zimmerman and Line Giguere. The dedication of the staff and many hours spent over the past year on different components of this project (well above the works contracted) has contributed greatly to making this UWR proposal the best it can be
- Randy Sulyma, for many hours volunteered contributing to this project
- All participants who attended or provided input to various Northern Caribou UWR Workshops. Their collaboration and expertise to ensure that polygon boundaries are in the right place and that objectives maintain low elevation winter range over the long term.

1.0 Introduction

Establishment of Ungulate Winter Ranges

The Environmental Stewardship Division, of the Ministry of Water, Land and Air Protection (WLAP) is charged with the task of developing *Ungulate Winter Range* (UWR) areas and objectives to ensure winter survival for ungulate species in the Omineca Region. Ungulate Winter Ranges that meet certain biological and policy criteria can be designated under Section 69 of the *Operational Site Planning Regulation* (OSPR) of the *Forest Practices Code Act of British Columbia* (FPC). They must then be considered in forest management activities regulated by the FPC.

In accordance with the OPR, the term "ungulate winter range" means an area that is identified as being critical for the winter survival of an ungulate species; northern caribou in this case. UWR objectives that accompany a designated UWR area consider key life requisites, including thermal cover, security cover and forage sources. Other potential risk factors such as displacement from habitats due to road access use conflicts with other user groups and predation are also addressed through the objectives.

The overall intent of *Forest Practices Code* candidate ungulate winter ranges is to:

(1) identify the areas that are necessary for the winter survival of northern caribou
(2) ensure that these areas are distributed in the most effective way for maintaining northern caribou across their natural range; and
(3) ensure that timber supply impacts do not exceed those included in Timber Supply Review 1 (TSR1 and /or TSR 2)

AT THIS POINT IN TIME, THIS CANDIDATE NORTHERN CARIBOU UWR INCLUDES ONLY LOW ELEVATION HABITAT. WE MAY IDENTIFY HIGHER ELEVATION WINTER RANGE SITES AND MANAGEMENT OBJECTIVES AT A LATER DATE AS THE TOOLS FOR HABITAT IDENTIFICATION EVOLVE AND THERE IS MORE DISCUSSION ON APPROPRIATE MANAGEMENT OBJECTIVES FOR HIGHER ELEVATION SITES. THESE HIGHER ELEVATION SITES CURRENTLY HAVE A LOWER RISK DUE TO DIRECT IMPACTS FROM FOREST OPERATION THAN THE IDENTIFIED LOWER ELEVATION TERRESTRIAL LICHEN WINTER RANGES INCLUDED IN THIS PROPOSAL.

2.0 Recommended Management Objectives

The Environmental Stewardship Division of the Minisitry of Water, Land and Air Protection, Omineca Region recommends the following candidate Northern Caribou UWR.

Within the Ungulate Winter Range Areas (UWRA) as defined in Table 1 (Appendix 1) and spatially shown on Map 1 (Appendix 2), the following practices are established as management objectives for the conservation of habitat for northern caribou.

1 Desired Habitat Condition (Food)

1.1 Within each Ungulate Winter Range Area (UWRA), maintain a sustainable supply of terrestrial lichen habitat by having 50% of the total area of the delineated Terrestrial Lichen Habitat Units (TLHU), or as close to half (between 45 to 55%) as is feasible without fragmenting any one TLHU, between the age of 70 to 140 years. Simultaneously manage the remaining area of TLHU to be at an age between 0 and 70 years.

1.1.1 This objective to be met simultaneously with Objective 3.1.

1.1.2 Once industrial activities (*e.g.* harvesting and silviculture activities, mining activities) begin within a TLHU, all activities must be completed within 20 years and must take all of the TLHU. Interstitial areas between sites of abundant terrestrial lichen habitat are to be managed on the same rotation as the entire TLHU regardless of their development status. What is not harvested in the first entry within a TLHU will not be available for harvest until the next rotation (140 year rotation). An exisiting main haul road that runs through a TLHU and is necessary to access timber beyond the TLHU is excluded from this objective.

1.1.3 Within each TLHU and where terrestrial lichen habitat exists, maintain forest floor conditions and/or a soil matrix that promotes terrestrial lichen growth over bryophytes and vascular plants.

1.2 In the event that a beetle epidemic makes it not possible to manage to a stand age, within each UWRA, maintain a sustainable supply of terrestrial lichen habitat by having 50% of the delineated TLHU, or as close to half (between 45 to 55%) of the units as is feasible without fragmenting any one TLHU, in a successional stage that provides moderate (Class 3) or high (Class 4) lichen value, as defined in 'Methods for assessing caribou forage lichen in the Fort St. James Forest District' (Lance & Eastland., 1999). Simultaneously, ensure the remaining 50% of the TLHU, or as close to half (between 45 to 55%) as is feasible without fragmenting any one TLHU, provide moderate (Class 3) or high (Class 4) lichen value (Lance & Eastland., 1999) in 70 years time.

1.2.1 THIS OBJECTIVE TO BE MET SIMULTANEOUSLY WITH OBJECTIVE 3.1.

1.2.2 Once industrial activities (*e.g.* harvesting and silviculture activities, mining activities) begin within a TLHU, all activities must be completed within 20 years and must take all of the TLHU. Interstitial areas between sites of abundant terrestrial lichen habitat are to be managed on the same rotation as the entire TLHU regardless of their development status. What is not harvested in the first entry within a TLHU will not be available for harvest until the next rotation (140 year rotation). An existing main haul road that runs through a TLHU and is necessary to access timber beyond the TLHU is excluded from this objective.

1.2.3 Within each TLHU and where pine lichen habitats exist, maintain forest floor conditions and/or a soil matrix that promotes terrestrial lichen growth over bryophytes and vascular plants.

1.3 Within each UWRA, outside of TLHU and where terrestrial lichen habitat exists, maintain forest floor conditions and/or a soil matrix that promotes terrestrial lichen growth over bryophytes and vascular plants.

2 Desired Habitat Condition (Displacement)

2.1 Within UWRA in the Fort St. James Forest District, follow strategic direction for placement of main roads given in the current *Northern Long Term Road Corridors Plan* (NLTRC). Alternative locations will be considered if shown to further minimize the displacement of caribou from UWRA and/or can further limit predator access to UWRA.

2.2 Within UWRA in the Fort St. James Forest District where there is no strategic direction, plan the location and design of new access routes to minimize the potential to displace caribou from UWRA and/or to limit the potential for predator access to UWRA. Do not build new roads through and keep new roads as far away as possible from TLHU if other viable alternatives exist.

2.3 Within UWRA in the Mackenzie Forest District, plan the location and design of new access routes to minimize the potential to displace caribou from UWRA and/or to limit the potential for predator access to UWRA. Do not build new roads through and keep new roads as far away as possible from TLHU if

other viable alternatives exist.

2.4 Within all UWRA, construct roads to the lowest class practicable, given the proposed use and necessary safety and environmental standards.

2.5 Within UWR polygons that have main road passing through to access timber beyond (polygon numbers x, x and x), develop and implement road building, harvesting and hauling schedule to minimize industrial activities when caribou are using UWRA. This objective to be met simultaneously with Objective 1.1 or 1.2 and 3.1.

2.6 Within UWRA that are at the end of a road system (UWR polygon numbers x, x and x), develop and implement road building, harvesting and hauling schedule to not have industrial activities in the UWR when caribou are using the UWRA. If on-ground or aerial surveys confirm that caribou have not occupied the area in any given year, then forest operations may proceed. This objective to be met simultaneously with Objective 1.1 or 1.2 and 3.1.

3 Desired Habitat Condition (Predation)

3.1 Within each UWRA, minimize fragmentation so caribou have the opportunity to minimize encounters with predators.

3.1.1 This objective to be met simultaneously with Objective 1.1 or 1.2.

3.1.2 Maintain large (250 to 5000 ha), contiguous patches of mature forest balanced with large (250 to 5000 ha), contiguous patches of regenerating forest.

3.1.3 While achieving patch size targets at the landscape level for years 0 to 70, preferentially plan and locate some large patches to overlap with UWRA polygons to include half of the total area of TLHU in an UWRA, or as close to half (between 45 to 55 %) as is feasible without fragmenting any one TLHU.

3.1.3.1 Preferentially chose TLHU that are close together such that activities are concentrated on one side of the UWRA or the other.

3.1.3.2 Harvest these THLU within the first 70 years of the 140 year rotation.

3.1.4 Harvest the remaining ½ of the total area of TLHU in the UWRA 70 to 140 years from now.

3.2 Within all UWRA, limit the increase of predator efficiency.

3.2.1 Minimize road or other access development subject to operational and safety constraints.

3.2.2 Upon completion of harvesting and silviculture activities, permanently rehabilitate all roads than are not necessary to access timber beyond the UWRA. Prescribe measures for rehabilitation of the roads that will make it undesirable, in 70 years time, for wolves to use them for travel corridors.

4 Forest Health

4.1 Within each UWRA, maintain desired habitat conditions (Objectives 1.1 or 1.2, 3.1, 3.2 and 3.3) by managing forest health epidemics (e.g., bark beetle populations) in a manner consistent with the UWR objectives.

4.1.1 Sanitation and salvage activities cannot contravene maintenance of a sustainable supply (Objective 1.1 or 1.2) or distribution (Objective 3.1) of terrestrial lichen habitat.

4.1.2 Harvest in terrestrial lichen habitats for any purpose is permitted up to a maximum of 55% per 140 year rotation of the total area of the delineated Terrestrial Lichen Habitat Units (TLHU) within a UWRA, or as close to half as is feasible (between 45 to 55%) without fragmenting any one TLHU.

5 Fire Management

5.1 In appropriate fire management plans, reflect northern caribou objectives for all UWRA.

5.2 Within UWRA where forest development is currently not viable or operational, consider the use of prescribed fire to achieve a sustainable supply of terrestrial lichen habitats. This objective to be met simultaneously with Objective 1.1 or 1.2 and 3.1.

6 Range (Livestock)

6.1 Where existing range tenures overlap with UWRA, manage for pine lichen habitat (both within and outside of delineated TLHU) to reduce conflicts between caribou and livestock.

6.1.1 Address range use and timing (duration of use) so that livestock and associated range activities do not result in:

6.1.1.1 DISPLACEMENT OF CARIBOU FROM THE UWR

6.1.1.2 damage or degradation (i.e. trampling, fragmentation, etc.) of pine lichen habitat

6.1.1.3 conversion of pine lichen habitat to forbe or moss cover

6.1.2 New range development features such as, but not limited to, waterholes, fences, salt blocks/sites, corrals, access roads, and trails, that would result in concentration of livestock in the UWRA, will not be developed within the UWRA.

6.2 Where new range tenures overlap with UWRA, reduce conflicts between caribou and livestock.

6.2.1 No livestock grazing or browsing within the UWRA

6.2.2 Range development features such as but not limited to, waterholes, fences, salting blocks/sites, corrals, access roads, and trails, will not be developed within the UWRA.

6.3 Within all UWRA, do not introduce animals that pose a proven health risk to caribou.

3.0 Northern Caribou – Ecology and Habitat Requirements

Caribou in British Columbia belong to the 'woodland' caribou subspecies (*Rangifer tarandus caribou*). They are further divided into two different ecotypes, mountain ecotype and northern ecotype (Stevenson and Hatler, 1985).

> Mountain caribou are found in southeastern BC, from Prince George south to the border of the United States. They spend much of the year at high elevations in subalpine forest and alpine habitats. In winter, they feed primarily on arboreal lichens in old growth Engellmann Spruce, Subalpine Fir (ESSF) forests.
>
> Northern Caribou are found in the northern and west-central areas of the province. They generally inhabit mountainous areas in summer, and use low elevation pine forests or windswept alpine areas during winter (Wood, 1996). The low snow depths in those habitats allow them to crater for terrestrial lichens (Seip and Cichowski, 1996).

All caribou are sensitive to a number of factors; habitat fragmentation, reductions in winter food supply, alterations in predator-prey relationships, and displacement and mortality due to increased access and associated human disturbance (Seip and Cichowski 1996). Natural and human-caused impacts may be additive.

> Habitat fragmentation and reduction in winter food supply: Northern caribou inhabit ecosystems that experience frequent large-scale stand disturbing events. Historically, when disturbance events such as fire and forest insects occurred, caribou were able to shift their use from disturbed areas to other portions of their winter range, or to alternate winter ranges. Currently, forest insects and forest insect management contribute additional challenges to successful caribou habitat management. Forest practises resulting in habitat loss and fragmentation are considered to be the greatest habitat management concern (Northern Caribou Technical Advisory Committee, 2003).
>
> Alterations in predator-prey relationships: Caribou require "space". They need sufficient tracts of land that allow caribou to distance themselves from predators such as wolves and bears. How this space is distributed on the landscape in the form of summer and winter habitat is an important limiting factor for long-term persistence of northern caribou (Seip and Cichowski 1996). Industrial activities, without the integration of caribou habitat management, have the potential to alter predator-prey relationships, resulting in increased predation risks on caribou. This may occur through increased shrub/forb production leading to increased numbers of other ungulates (eg. moose, deer), restricting caribou into mature forest habitat patches, or providing easier access for predators to travel into caribou habitats and prey on caribou (James and Stuart-Smith 2000). Effective avoidance of predators or poachers probably cannot occur in an environment that consists of a network of roads and a patchwork of forest age classes (Seip and Cichowski 1996). Predation,

primarily by wolves, can have a severe impact on caribou recruitment. Caribou possess the lowest productivity of the deer family and therefore are slow to recover from population declines (Nietfeld *et al.* 1985). Seip and Cichowski (1996) conclude that the density of caribou populations in BC appears to be related to their ability to become spatially separated from their predators. Further, the abundance of wolves is a function of the availability of its other prey, particularly moose. Therefore, by avoiding habitats that support alternate prey, caribou reduce their exposure to predators. Wood (1996) suspected that mortalities of radio-collared caribou in the Omineca Mountains were primarily from wolves.

Displacement: Other major threats include displacement from critical habitats by human disturbance via uncontrolled mechanized access (snowmobile or ATV) in winter and summer habitat.

Habitat requirements for caribou include the following:

In ***early-winter***, caribou diet is primarily terrestrial lichen, arboreal lichen and conifers (Wood, 1996). In ***late-winter***, they generally move to wind-swept, high-elevation slopes. Wood (1994) reports that all caribou found during a winter ungulate survey of the Muskwa Range were on windswept south or west facing slopes. Diet during late-winter is composed of terrestrial and arboreal lichens, mosses, grasses, shrubs and forbs (Wood, 1996).

In ***spring*** (April/May), caribou move from high elevation winter ranges to lower elevation habitat, primarily lodgepole pine and lodgepole pine-white spruce dominated stands (Wood, 1996). In early spring, caribou are seeking new green vegetation in bogs, riparian areas, and open meadows (Hatler 1986). Use of habitats such as south-facing deciduous hillsides, aspen stands and meadows that become snow-free earlier than heavily timbered areas is common (Wood, 1994).

Summer range is primarily upper elevation Engelman spruce/subalpine fir forests and sub-alpine/alpine areas. Females often ascend to summer ranges for calving before males. In Jasper, summer northern caribou diet is composed of forbs, shrubs and graminoids and continues to include terrestrial lichens. Rutting occurs in the fall and rutting areas are usually in or close to summer habitats (Wood, 1994; Sentar, 1994).

Lichen availability is critical to evaluating northern caribou habitat however, predicting lichen productivity is difficult. Highest densities are associated with mature forests as lichen is very slow growing. The most suitable growing sites tend to be drier, with low nutrient availability and where productivity of other plants is low (Coxson *et al.*, 1998; Sentar, 1994; Seip, 1996). Coxson *et al.* (1998) also reports higher terrestrial lichen cover on crest and upper slopes of the landscape. Other factors which influence the distribution and

abundance of terrestrial lichen are the severity of initial perturbation (e.g. fire), and site conditions.

4.0 Background on Northern Caribou in the Fort St. James and Mackenzie Forest Districts.

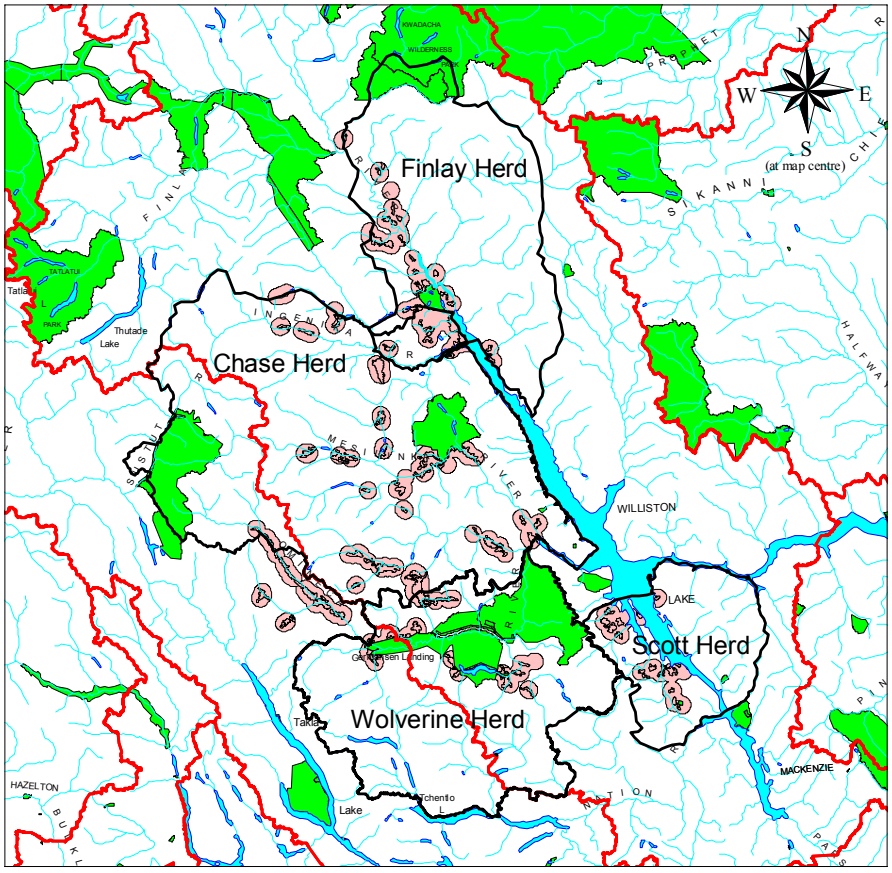
The northern caribou herds that range within the Omineca Region include the Akie/Finlay, the Chase; the Scott; the Wolverine and the Takla herds[2] (Figure 1). They are all being influenced to varying degrees by industrial development. Current population estimates are 200 in the Finlay (pers. comm.; Debbie Cichowski; 020820) and 550 in both the Chase and Wolverine herds (Zimmerman et al. 2002). These population levels, in contrast to many caribou populations to the south, are likely sustainable at these levels provided that issues of access, predation and habitat (food) management are addressed for each herd through a comprehensive, herd-based management plan. This candidate northern caribou UWR proposal is just one component of such a plan. The work being completed by the Recovery Implementation Group (RIG) will address all components of herd-based management.

The BC Conservation Data Centre (CDC) ranks northern caribou in British Columbia as blue listed. A CDC blue listing includes any indigenous species or subspecies considered to be of special concern, having characteristics that make them particularly sensitive or vulnerable to human activities or natural events. Further information on the BC Conservation Data Centre can be found at http://srmwww.gov.bc.ca/cdc/.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has listed caribou in the Southern Mountains National Ecological Area as threatened.

[2] The Takla herd are taxomonically northern caribou. Currently, they are exhibiting mountain caribou feeding characteristics. In winter, they feed on terrestrial lichens in alpine habitat and arboreal lichens below treeline (Poole *et al*. 2000). As such, a separate UWR proposal has been developed for this herd, consistent with those for mountain caribou.

Figure 1 - Northern Caribou Herds



1:2,000,000

20 0 20 Kilometers

Northern Caribou UWR Herd Boundaries

Northern Caribou UWR Herd Boundaries

Ministry of Forest Districts

Ministry of Forest Districts

Parks

Protected Area - Provincial

Ministry of Water, Land and Air Protection
Omineca Region
December 9, 2003

BRITISH COLUMBIA

This includes all the mountain caribou ecotype and some of the northern caribou ecotype (the Takla, Wolverine, Chase and Finlay herds in the Ministry of Water, Land and Air Protection (MWLAP) Omineca Region. Under the federal *Species at Risk Act* (SARA), the province is responsible for providing effective management for northern caribou. If provincial efforts are found to be lacking, the legislation requires the federal government to implement an effective conservation and recovery plan. COSEWIC has not completed a Status Report for these animals. Information on COSEWIC can be found at http://www.speciesatrisk.gc.ca/.

Through SARA, a Recovery Implementation Group (RIG) has been established to assess management needs of northern caribou in our area and develop a provincial recovery plan. Scott McNay, biologist for Slocan Forest Products-Mackenzie Division, is the chair of this group. For further information on the RIG, please contact Scott McNay at mcnays@mackenzie.slocan.com.

5.0 Approach and Methods

A great deal of preliminary work has been undertaken in the preparation of this report.

MWLAP chose to apply the newly developed model Caribou Habitat Assessment and Supply Estimator (CHASE) (McNay *et al.*, 2003). It provides the best scientific based approach to date for the identification of low elevation UWR units for northern caribou.

The Caribou Habitat Assessment and Supply Estimator (CHASE) is a strategic and operational planning framework for use in the management of caribou populations and their habitat in the Mackenzie TSA. This model links caribou and habitat information, predation risk factors, forest development planning, and forest management activities to forecast the distributions of caribou habitat and timber supply through time.

The framework used to predict the ecological value of northern caribou ranges and the follow-up adaptive management tests were developed through a series of consultative workshops involving industry, government and academia. The range types considered were those most likely to be either limiting or important to caribou populations in the area. These included: 1) calving and summer range; 2) pine-lichen winter range; 3) high-elevation winter range; and 4) movement corridors. Each range type was influenced by the risk of predation by wolves, for which wolf density was estimated based on its relationship to moose density.
Slocan Forest Products, Ltd. Mackenzie Division - Integrated Resources Management
URL site: http://www.slocan.com/irm/projects/caribou/model/index.html

Following in the footsteps of the CHASE model development process, three workshops involving industry, government and academia, and First Nations, where held during June and July 2003. Participants reviewed, critiqued and fined tuned the model output so that, given our knowledge to date of suitable low elevation winter range for northern caribou, the

UWR polygons made sense on the ground. Participants in these workshops also reviewed, critiqued, developed and provided comments the objectives that are associated with these UWR polygons.

Due to the complexity of winter life requisite requirements of northern caribou and the different scales at which these requirements are managed, the concept of a smaller Terrestrial Lichen Habitat Units (TLHU) within UWR polygons evolved.

The model was run on herd areas (as identified on Figure 1) and on the Ominicetla Landscape Unit (includes upper Omineca River and Ominicetla Creek watersheds) in the Fort St. James Forest District. The following is a general summary of the steps taken to produce the low elevation UWR polygons and associated TLH Units (Brumovsky, 2003):

1. **Pine Lichen Capability Mapping** - A pine lichen winter range (PLWR) capability map was produced following the procedures documented in the CHASE Model User's Guide (Doucette *et al.*, 2003). This output map shows where the 'preferred' pine lichen capability areas are within the landbase that was modelled.
2. **Identification of UWR polygon** - A 500m circular majority filter was applied to the preferred PLWR capability cells to create a layer which groups clusters of PLWR cells and discards isolated PLWR cells. The UWR polygons were than generated by buffering the 'filtered' preferred PLWR capability groups by a distance of 3000 m.
3. **Identification of TLH Units within UWR polygons** - An intersection of UWR polygon and **un**-filtered preferred PLWR capability cells was then performed to obtain a data set showing all preferred PLWR polygons within the newly identified UWR polygon. Preliminary TLH units were created by buffering all preferred PLWR capability cells by 200m. Preliminary TLH units <= 200 ha where discarded, leaving the final TLH Unit polygons.

MWLAP then grouped the UWR polygons (Table 1, Appendix 1) based on spatial arrangement so that a small UWR containing only one TLHU would be managed along with larger and/or other small UWR polygons. These groupings of UWR polygons are called **Ungulate Winter Range Areas (UWRA).** The intent of grouping is to allow for more operational flexibility in the application of Objective 1.1 or 1.2 and 3.1 and the potential for better spatial arrangement of activities relative to caribou habitat management.

An aerial reconnaissance of proposed UWRA and TLHU was conducted throughout the Scott, Wolverine, and Chase caribou herd areas in Oct 2003 to assess the veracity of model predictions about the spatial location and range condition of proposed management unit (McNay and Sulyma, 2003). The basic conclusion resulting from the aerial reconnaissance was that the CHASE model performed well in locating sites of abundant terrestrial lichen. McNay and Sulyma caution that the model is a planning tool and when subjected to "real world" conditions can be expected to have some error; either as a result of uncertainty in the modelled relationships or in the input data. They recommend it would be best if

modelled predictions were field-tested prior to operational implementation, or implemented within an adaptive management framework.

6.0 Strategic Land Use Recommendations

Fort St. James Land and Resource Management Plan (LRMP)

As both the Wolverine and Chase Caribou herds range with the Fort St. James Forest District, the Fort St. James LRMP table spent considerable time in discussions around caribou and their habitat. In the end, the table agreed upon a Caribou Management Strategy for designated Caribou Management Areas with the following intent:

> *To perpetuate caribou and their habitats within the Fort St. James LRMP planning area.*
> *This plan recognizes that this intent may not be realized for all herds within the planning area, and that the management direction in this plan presents risks to individual herds, particularly those which utilize the middle third of the planning area. However, this plan strives to lower these risks by adopting a sensitive approach to resource management in important caribou areas. Within Caribou Management Areas any development activities should be compatible with caribou populations and habitat objectives.*
> *This LRMP supports further research and inventory as a top priority within the Fort St. James planning area.*

Management strategies were developed for:

- specific Caribou Management Areas (Mt Blanchet, Upper Birdflat-Willow, Upper Omineca, Fire Flats, Sustut, and Upper Skeena)
- Forest Development Planning,
- General Forest Management, and
- All Resource Development

Further details on these strategies can be found in the LRMP document, located at:
http://srmwww.gov.bc.ca/rmd/lrmp/ftstjames/index.htm

Mackenzie Land and Resource Management Plan (LRMP)

Woodland caribou (Rangifer tarandus caribou) are found and range in 75 - 80% of the Mackenzie LRMP Area. In BC, only the Fort Nelson and Dease Lake areas contain comparable populations of the species. To sustain caribou populations in the Mackenzie

LRMP Area, with development of extractive resources and recreational use, management direction is required.

The development of caribou management direction was a high priority of the Mackenzie LRMP working group and a stand alone caribou management strategy was developed as general management direction for the plan area.

This direction was developed within a context of herd management and will be adaptive in nature to incorporate new information over time and to allow for the modification and improvement of practices with experience.

The Mackenzie LRMP can be found at http://srmwww.gov.bc.ca/rmd/lrmp/mackenzi/index.htm

The use of the CHASE modeling process and detailed delineation of low elevation caribou UWR is a good example of the application of this Mackenzie LRMP direction.

7.0 Forestry Resource Impacts

The Fort St. James and Mackenzie Forest Districts are situated in B.C.'s northeast interior.

The Fort St. James Forest District, along with the Prince George and Vanderhoof Forest Districts, make up the Prince George Timber Supply Area (TSA). The Mackenzie Forest District is managed under the Mackenzie TSA.

Table 2 below summarize currently approved cutblocks and roads within the proposed northern caribou UWR and Timber Harvest Landbase impacts. Existing approved blocks and roads remain approved. However, if fieldwork has not been completed or a silviculture prescription has not been finalised, we put these forth as guidelines and strongly recommend they be applied.

TABLE 2: FOREST LICENSEE/UNGULATE WINTER RANGE OVERLAP

FOREST LICENSEE	TSA	CURRENT FOREST DEVELOPMENT PLAN CONFLICTS[3]
CANADIAN FOREST PRODUCTS (FL A40873)	PRINCE GEORGE TSA (FORT ST. JAMES FOREST DISTRICT)	
BC TIMBER SALES STUART NECHAKO UNIT	PRINCE GEORGE TSA (FORT ST. JAMES FOREST DISTRICT)	
BC TIMBER SALES PRINCE GEORGE	MACKENZIE TSA	
ABITIBI CONSOLIDATED	MACKENZIE TSA	
SLOCAN FOREST PRODUCTS.	MACKENZIE TSA	

[3] To be filled in be licensee

Table 3 below summarize Timber Harvest Landbase impacts[4].

TABLE 3: TIMBER HARVEST LAND BASE (THLB) NETDOWN SUMMARY

UWRA UNIT NO.	UWRA NAME	UWRA GROSS AREA (HA)	TLHU TOTAL GROSS AREA (HA)	100% THLB NETDOWN OF TLHU (HA)	CONVERSION FACTOR FOR TLHU BASED ON APPLICATION OF UWR MANAGEMENT OBJECTIVES	IMPACT/NETDOWN FOR TLHU WITHIN PROPOSED UWRA (HA)
1	UPPER FINLAY	35129	4287			
2	FINLAY/BLUFF HILL	52696	8976			
3	TUCHA/ INGENIKA	22071	2058			
4	SWANNELL/ GOLDENEYE	15595	3733			
5	UPPER MESILINKA	14840	3624			
6	MID MESILINKA	34682	6145			
7	LOWER	24291	3612			

[4] To be filled in once information available from Ministry of Forests.

	OSILINKA					
8	CONGLOMERATE	39248	12544			
9	UPPER OMINECA	43278	8262			
10,11	MID OMINECA	15601	3344			
12	GERMANSEN	22008	4489			
13	ELUND CREEK	18902	3419			
14	15 MILE SWAMP	21686	3402			

8.0 Other Resource Impacts

This document has been referred to Ministry of Sustainable Resource Management and Ministry of Mines.

Concerns and comments regarding other resource impacts will be filled in after referral comment period completed and following any meetings that may be set up to review this proposal.

9.0 First Nations

This candidate UWR proposal falls within traditional territories of the following:

Tsay Key Dene First Nation,
Kwadacha Band,
Halfway River First Nation,
Saulteau First Nation,
Takla Lake First Nation,
Nak'azdli First Nation, and
McLeod Lake Indian Band

This document has been referred to all affected First Nations.

Concerns and comments of First Nations will be filled in after referral comment period completed and following any meetings that may be set up to review this proposal.

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Appendix 1: Table 1 Northern Caribou Ungulate Winter Range Areas (UWRA) Defined

Sent as separate Excel file
(7 pages, legal size, landscape layout)

Appendix 2: Map 1 Draft Northern Caribou UWR (U-7-007)

Sent as separate .wmf file

(1 'E' size {33" x 44"} map to plot out, portrait layout)

Appendix 3: Summary of Consultation

Contact Name	Response / Comments

Appendix 4: Guidelines for Northern Caribou

Ministry of Water Land and Air Protection
Environmental Stewardship Division - Omineca Region

Introduction

These guidelines are intended to compliment the legislated northern caribou UWR objectives and give further recommendations on how to implement them.

Definition: Terrestrial lichen habitat

is defined as a habitat that has the site characteristics to grow terrestrial lichens. Generally, these habitats areas are found in pine-dominated forests (>90% Pl) that have a site index of less than 14.5, are associated with dry-nutrient poor site series with aspect >= 45^{o} and <= 315^{o} (Sulyma 2001). In turn terrestrial lichen sites tend to have coarse-textured (sand) soils with a high coarse fragment content.

Desired Habitat Condition (Food)

Further to **Objective 1.1.3**, WLAP offers the following guidance:

- Within terrestrial lichen habitats, to maintaining forest floor conditions and/or soil matrix on terrestrial lichen habitat that promotes terrestrial lichen growth over bryophytes and vascular plants, recommend:
    - no fertilization,
    - no piling
    - no chipping, or
    - not leaving debris on the site.
    - winter harvesting with adequate snow cover to avoid disturbance to terrestrial lichen

Desired Habitat Condition (Displacement)

Further to **Objective 2.4**, WLAP offers the following guidance::

- Harvesting and development activities within these UWR's at the end of a road system could be incorporated, planned and scheduled as start up wood or summer harvest.

- In the case of BC Timber Sales in the Mackenzie Forest District, constraints could be put on individual timber sale that pertain to timing and caribou management. Would require co-ordinated planning between licensees and BCTS would be required. Some sort of certainty in terms of availability and year of harvest of a suitable BCTS blocks within licensees areas would also be a key in making this work.

Further to **Objective 2.5**, WLAP offers the following guidance::

- Whenever possible, within UWR's that are not at the end of a road system scheduling could be done such that harvesting could be planned to occur in some of the UWR's rather than having activities in all such UWR's all the time.

Additional recommendations:

In keeping with an adaptive Management intent, review and update Access Management Plans as required to incorporate UWR areas and objectives to avoid human use of high value caribou habitat. Access management points should include access closure points by signage and physical structures (i.e. concrete barriers, deep road trenches, non-ploughed roads etc.), or other proven methods.

Desired Habitat Condition (Predation)

Further to **Objective 3.1**, WLAP offers the following guidance:

The specific size and distribution of the TLHU units within UWRA will guide practitioners where to harvest in the first 70 years of the 140 year rotation. Within the Landscape Unit that a UWRA lies within, try to maintain large (250 to 5000 ha), contiguous patches of mature forest balanced with large (250 to 5000 ha), contiguous patches of regenerating forest. The intent is to concentrate early seral stage forests (the first half of the rotation) in 'one part' of the UWRA.

Additional recommendations:

The following are the current documents that give guidance on patch size and distribution:

- Biodiversity Guidebook
- Landscape Unit Planning Guidebook
- Natural Disturbance Regimes. More information on natural disturbance dynamics is now available. Craig Delong's 2002 work on natural disturbance units of the Prince George Forest Region provides guidance for sustainable forest management emphasizing Natural Range of Variability (NRV). Under this approach, the Vanderhoof Forest District is classified as part of the Moist Interior natural disturbance unit, and has refined patch size distribution, block design, species composition, and structure associated targets.

Forest Health

Further to **Objective 4.1**, WLAP offers the following guidance:

- Prior to 'reacting' to forest health issues, familiarize and understand plans of all licensees operating in an UWR
- become familiar with what was trying to be achieved (eg. Where was the 50% of TLH Units 0 to 70 and where are the remaining TLH units being managed as 70 to 140?)
- ensuring prompt rehabilitation of associated access roads.