A photograph of five mountain caribou running across a snowy field in front of a dense evergreen forest. The caribou are in motion, running from left to right. The background is a thick forest of dark evergreen trees under a clear blue sky. The text is overlaid on the image in a yellow, serif font.

# Cariboo-Chilcotin Land Use Plan Mountain Caribou Strategy

October 2000

# Caribou Strategy Committee

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John Youds, R.P.Bio., Ministry of Environment

Jim Young, R.P.Bio., Ministry of Environment

# OUTLINE OF PRESENTATION

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- Key background Information
- Population Status Update
- Habitat Strategy
- Timber Harvesting Strategy



# OUTLINE OF PRESENTATION

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- Access Management
- Predator Management
- Conservation Risk Assessment
- Consultation
- Key Recommendations



# INTRODUCTION

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- Maintaining habitat values for mountain caribou has been identified as an overriding objective within the CCLUP
- CCLUP has provided 'No Harvest' and 'Modified Harvest' target to allow for maintenance of mountain caribou habitat



# INTRODUCTION

---

## Committee Tasks

- To undertake research, inventory and mapping projects required for developing an *integrated* caribou habitat management strategy.
- To identify the 35% 'modified harvest' and 65% 'no harvest' areas.
- To identify operational management strategies, including stand level and landscape level recommendations
- To develop and define 'modified harvesting' for caribou habitat
- To define portions of the caribou range which are sensitive to snowmobile use



# BACKGROUND

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- Mountain caribou are a unique ecotype of woodland caribou
- Arboreal lichen feeders during winter
- Dependent on mature and old-growth timber for survival
- Require large connected areas of suitable habitat
- Extremely vulnerable to predation
- Exist at relatively low densities



# BACKGROUND

---

Based on current knowledge, caribou habitat and populations can only be maintained if all of these issues are addressed together

- Maintaining suitable caribou habitat
- Limiting and regulating roaded access and motorized recreation in caribou habitat
- Managing predation levels on caribou



# BACKGROUND

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- Population status
- Habitat use
- Mortality



# BACKGROUND

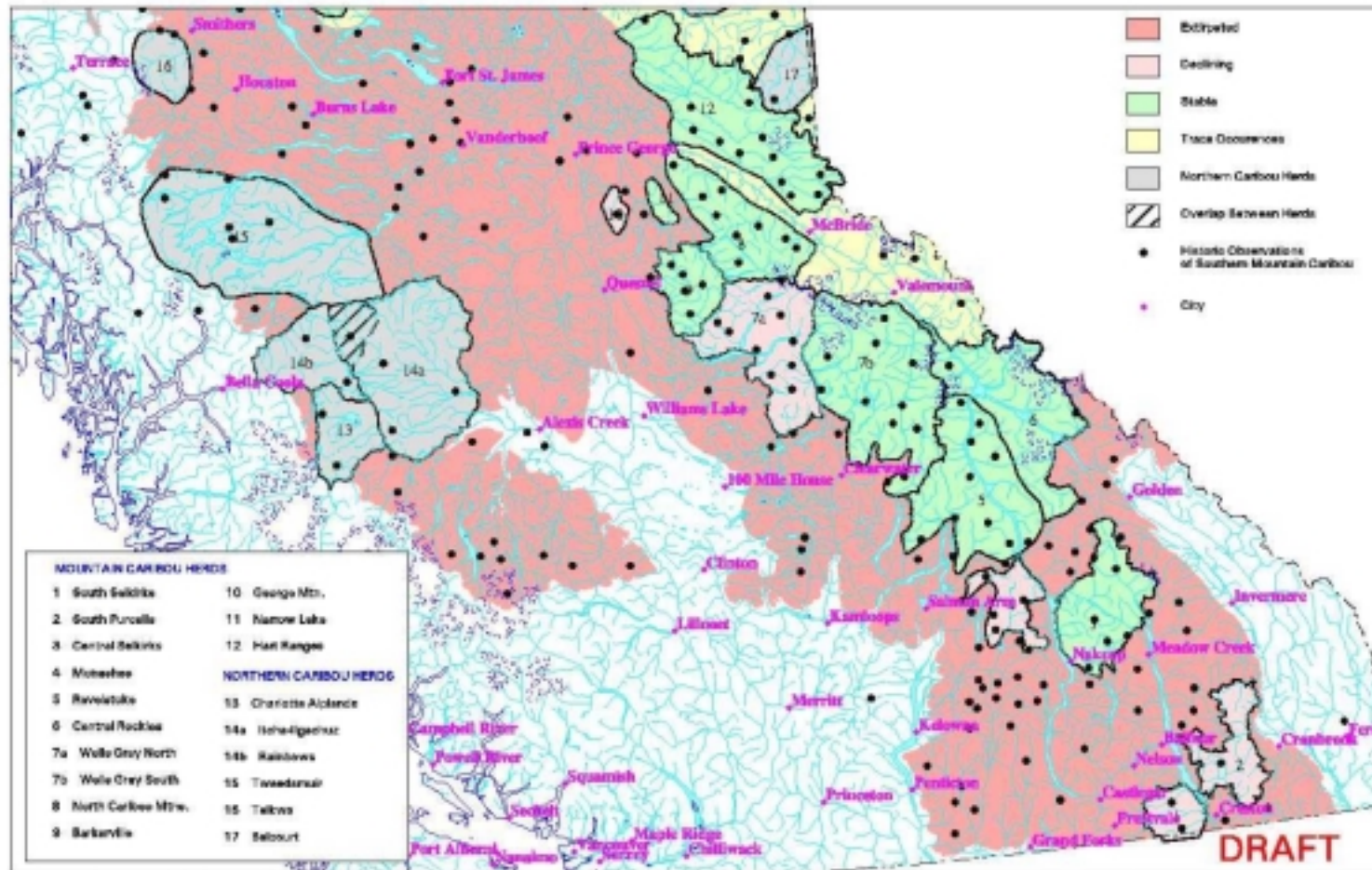
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## Mountain Caribou Distribution and Abundance

- There are less than 2,500 mountain caribou in the world and about ninety-eight percent of these animals live in B.C.
- The provincial population is divided into 13 sub-populations or herds:
  - Herds range in size from about 20 to 450 animals
  - Seven herds have populations of less than 60 animals
  - Nine herds are presently considered stable
  - Four herds are considered to be presently declining



### Historic and current distribution of mountain caribou in southern BC



Produced by the Information Technology Section  
 Ministry of Environment, Land and Parks  
 Williams Lake, British Columbia

Projection: unmodified Albers, NAD83, Spheroid GRS1980  
 lat. standard parallel: 50.000000  
 lon. standard parallel: 120.000000  
 Central Meridian: 120.000000  
 Latitude of projection origin: 44.000000

Project # 980028 - October 16, 2000



**DRAFT**

### CCLUP Mountain Caribou Strategy

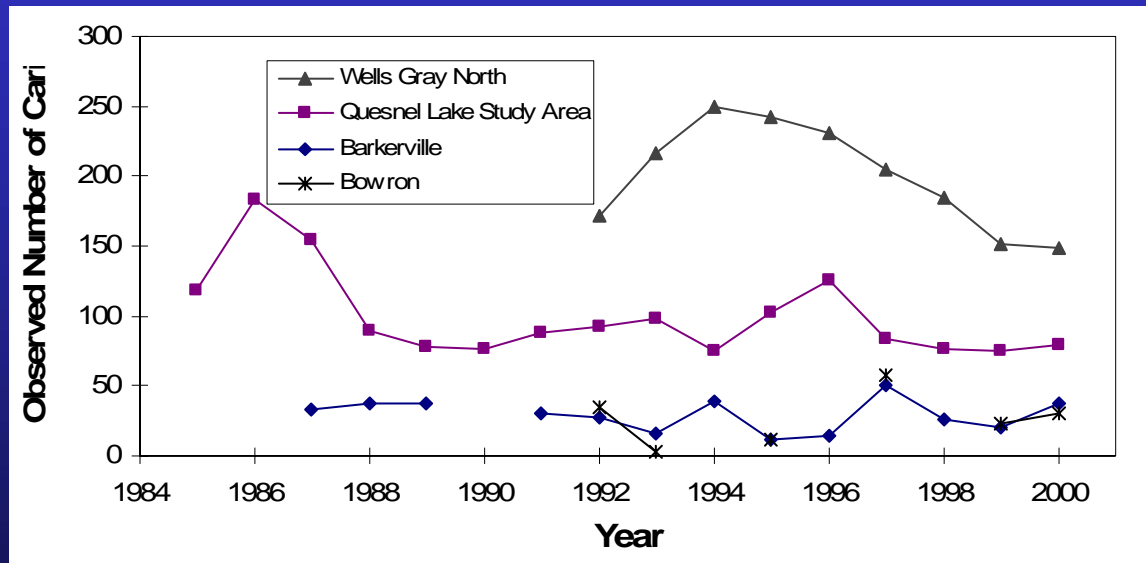


CCLUP Mountain Caribou Strategy



# BACKGROUND

## Mountain Caribou Distribution and Abundance



Mountain Caribou survey results within the Cariboo Region, 1984 – 2000 (incomplete surveys of the Quesnel Lake Study Area in 1985 and 1989; incomplete survey of the Wells Gray North sub-population in 1992).



# BACKGROUND

## Mountain Caribou Distribution and Abundance

### Major Mortality Factors

- Predation
- Avalanches
- Accidents



# BACKGROUND

---

## Mountain Caribou Seasonal Patterns of Habitat Use

Radio Tracking provides useful information about wildlife populations

- Animal movements
- Home range estimates
- Habitat use information
- Mortality rates
- Population estimates



# BACKGROUND

---

## Mountain Caribou Seasonal Patterns of Habitat Use

Summary of radio-telemetry studies overlapping with Mountain Caribou range

Project	Described by	Monitoring Period	Animal Sample	Data Points By season				Total Points
				EW	LW	SP	SU	
Quesnel Highland	Young and Roorda (2000)	12/93 – 05/99	43	706	794	369	844	2713
Quesnel Lake	Seip (1992)	02/84 – 04/88	32	242	452	292	794	1780
Wells Gray Park	Seip (1990)	03/86 – 03/89	31	205	353	197	630	1385
Total			106	1153	1599	858	2268	5878

Seasons are as described by Simpson et al. (1997)

EW – Early Winter (November 1 – January 15)

LW – Late Winter (January 16 – April 15)

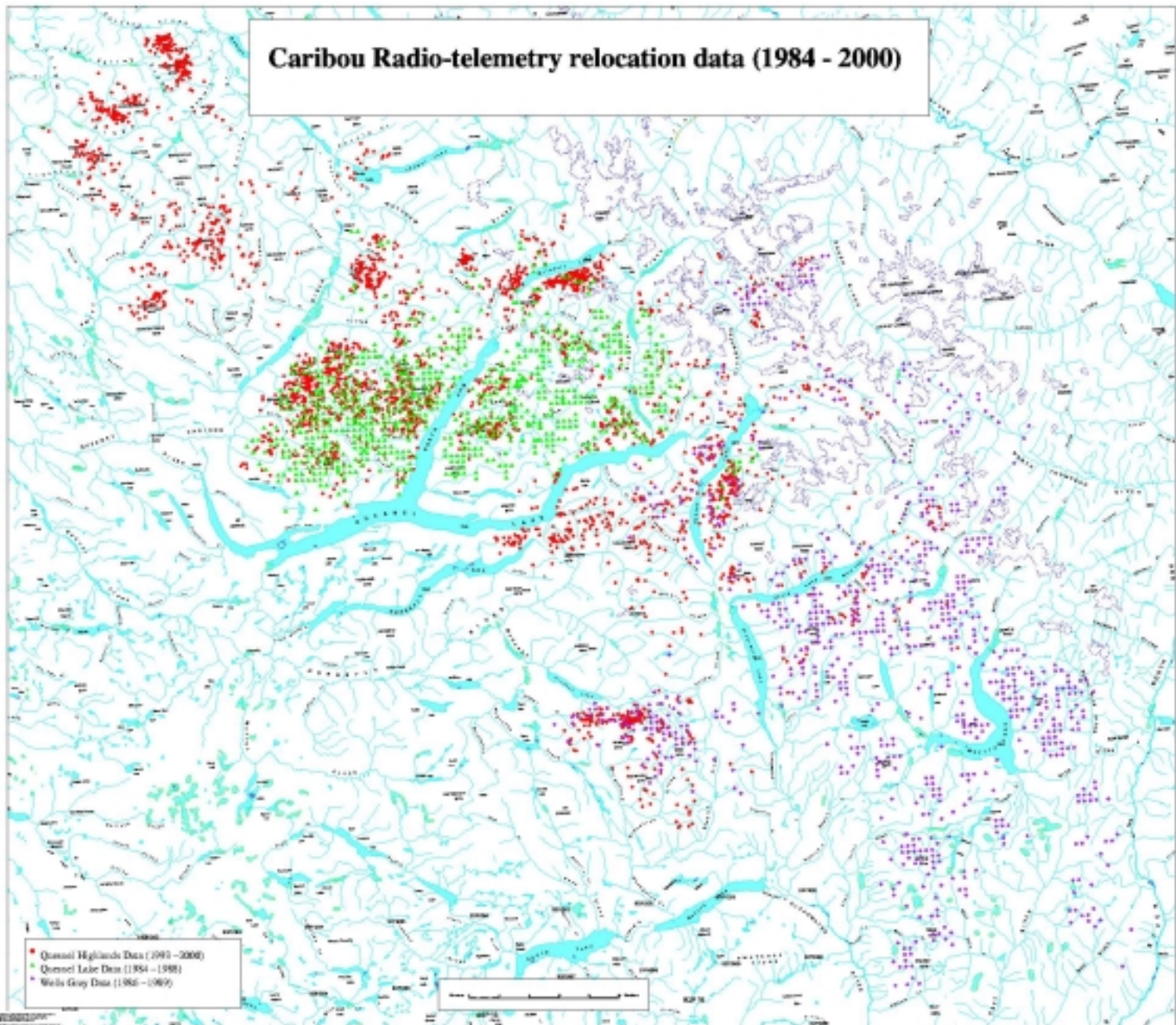
SP – Spring (April 16 – May 31)

SU – Summer (June 1 – October 31)





### Caribou Radio-telemetry relocation data (1984 - 2000)



# BACKGROUND

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## Habitat Suitability Index Modeling

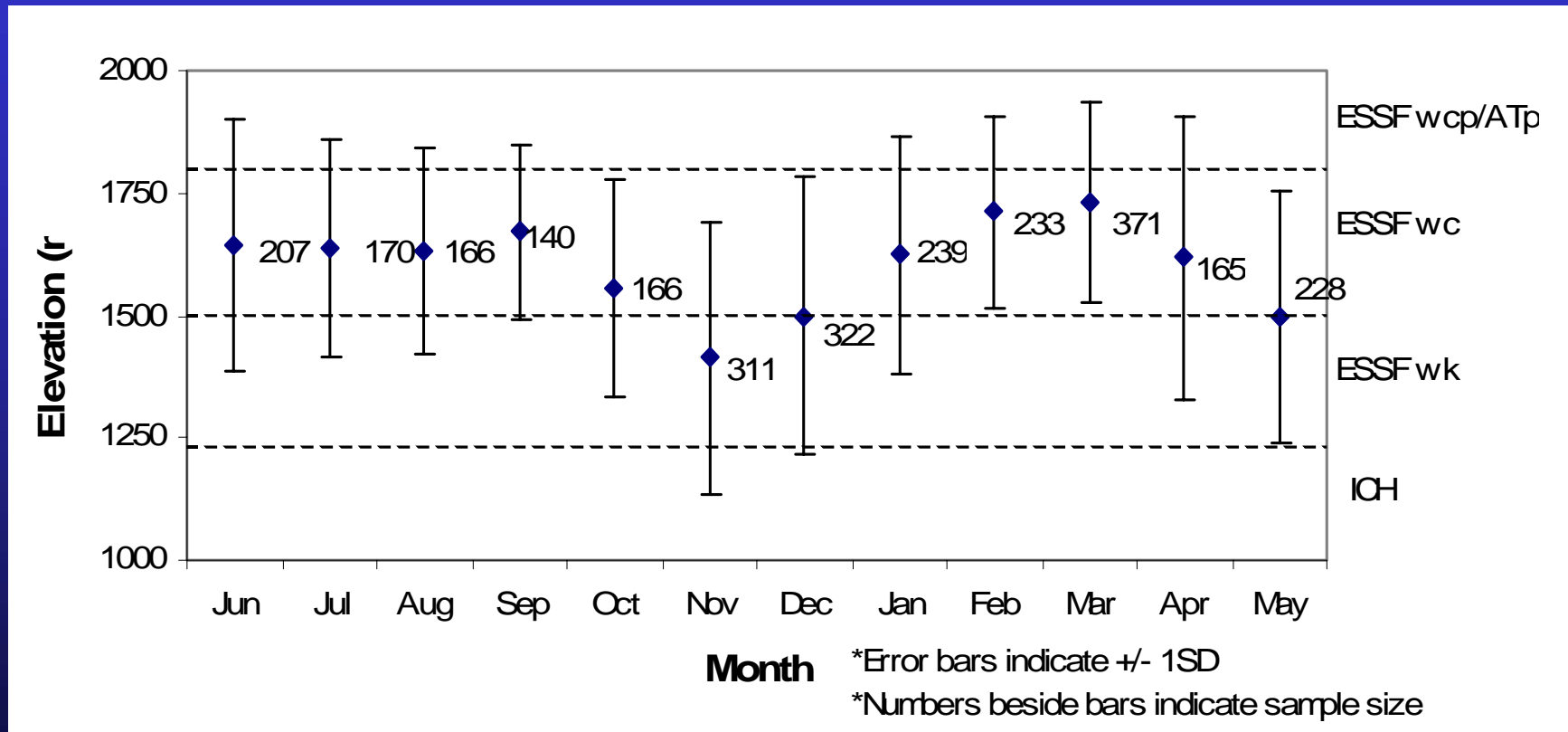
Predictive habitat suitability maps were developed to aid in the refinement of 'no harvest' and 'modified harvest' areas:

- Utilized over 6000 telemetry points from over 150 animals
- Considered 21 forest cover and terrain variables
- Evaluated selection at four spatial scales
- Results identified different habitat needs within two areas:
  - highland zone
  - mountain zone
- Developed maps for each of the four identified seasons



# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use



Monthly elevation use of radio-collared caribou (from Young and Roorda, 2000).

# BACKGROUND

---

## Mountain Caribou Seasonal Patterns of Habitat Use

### Summer/Fall Habitat Use:

- Between 1250 – 2000 m. elevation
- ESSF zone
- Gentle slopes
- Cool aspects
- Mature and old forests
- Balsam and Spruce stands

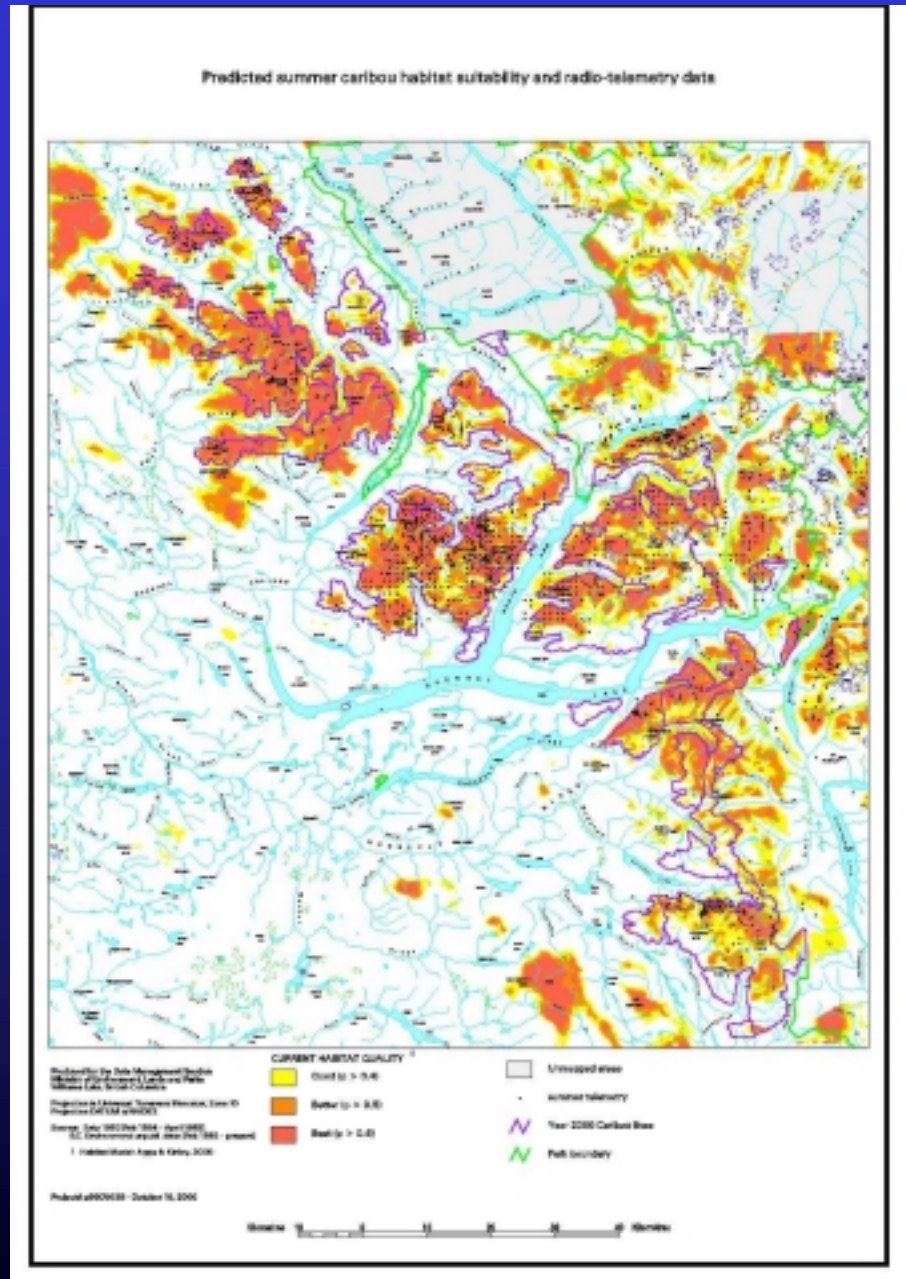


# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use

### Summer/Fall Habitat Use

- Between 1250 – 2000 m. elevation
- ESSF zone
- Gentle slopes
- Cool aspects
- Mature and old forests
- Balsam and Spruce stands



# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use

### Early Winter Habitat Use

- Varies slightly between zones
- Between 1000 – 2000 m. elevation
- ICH and ESSF zone
- Gentle slopes
- Mature and old forests
- Cedar and hemlock in ICH
- Balsam and spruce in ESSF

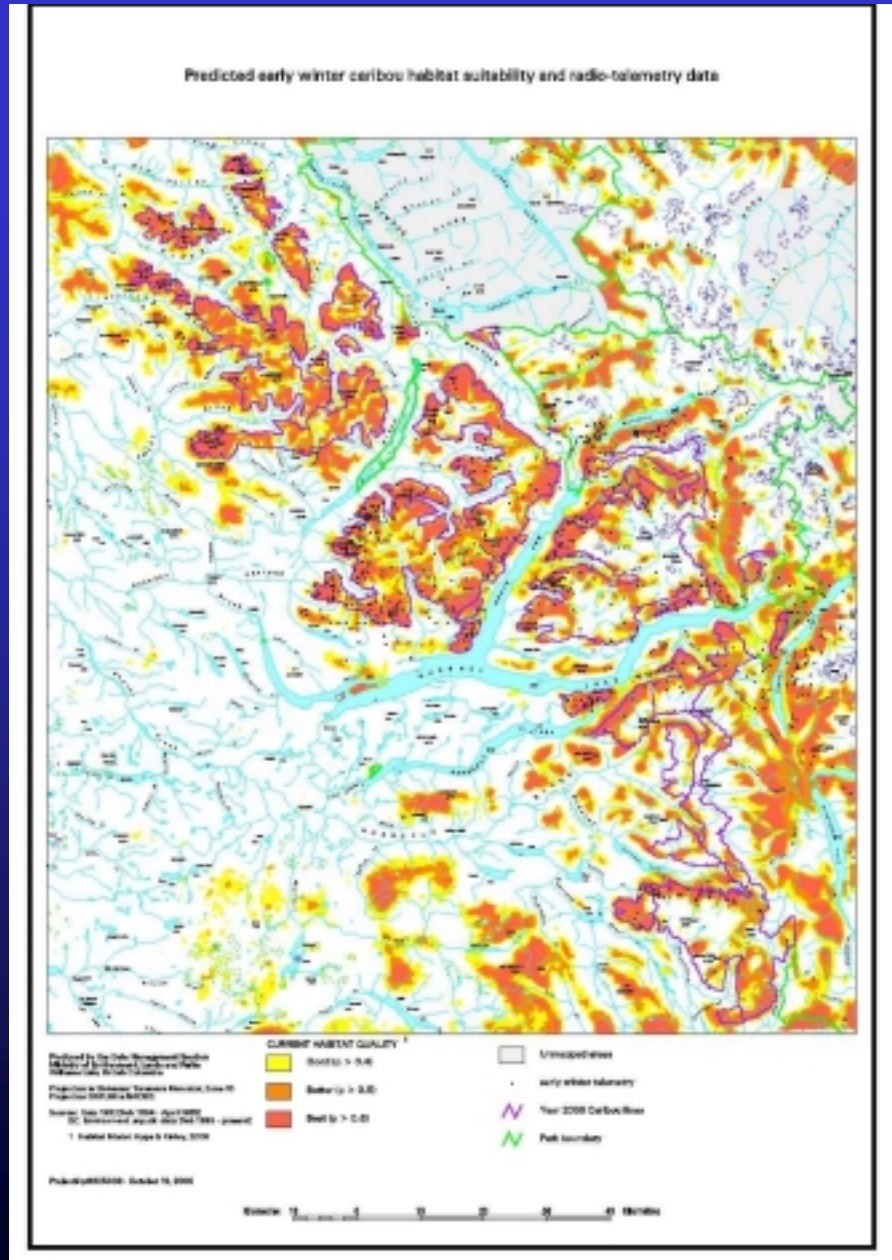


# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use

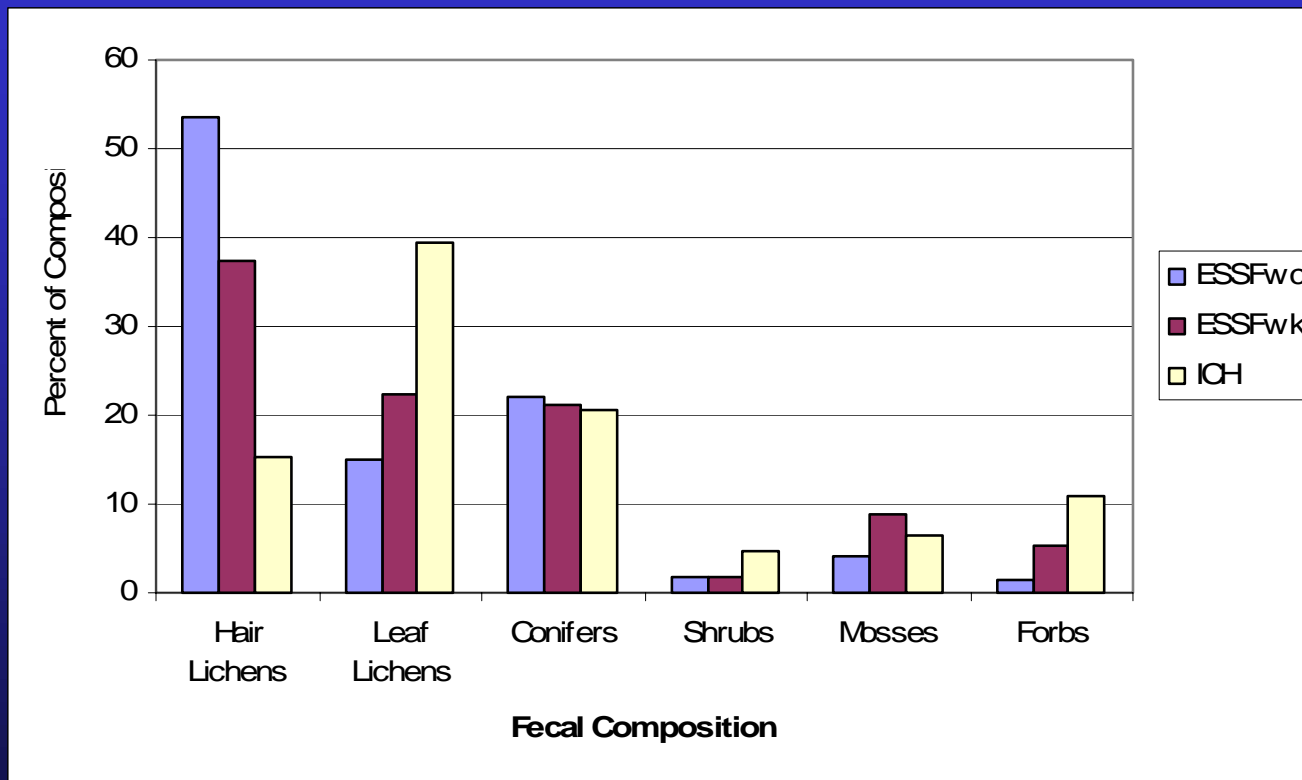
### Early Winter Habitat Use

- Varies slightly between zones
- Between 1000 – 2000 m. elevation
- ICH and ESSF zone
- Gentle slopes
- Mature and old forests
- Cedar and hemlock in ICH
- Balsam and spruce in ESSF



# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use



Early winter diet of mountain caribou in the Cariboo Region. (Samples collected from November 17, 1995 to January 25, 1996 and November 19 to December 18, 1996; sample sizes were ICHwk n=9; ESSFwk n=3 and ESSFwc & wcp n=14).







CCLUP Mountain Caribou Strategy



# BACKGROUND

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## Mountain Caribou Seasonal Patterns of Habitat Use

### Late Winter Habitat Use

- Between 1500 – 2000 m. elevation
- Middle and Upper ESSF sub-zones
- Gentle slopes
- Mature and old forests
- Balsam and Spruce Stands

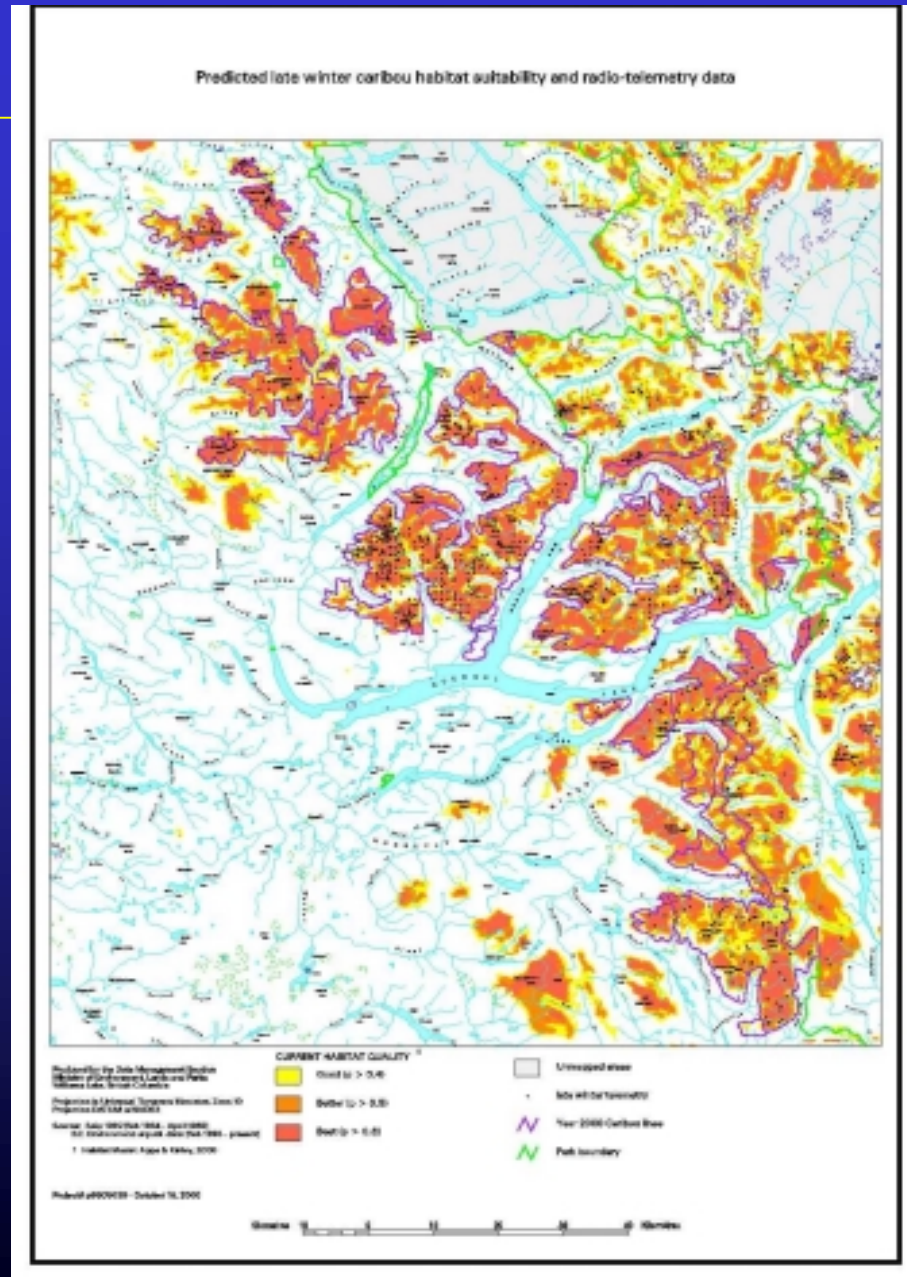


# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use

### Late Winter Habitat Use

- Between 1500 – 2000 m. elevation
- Middle and Upper ESSF sub-zones
- Gentle slopes
- Mature and old forests
- Balsam and Spruce Stands



# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use

### Spring Habitat Use

- Between 1000 – 2000 m. elevation
- ICH and ESSF zones
- Gentle to moderate slopes
- Warm aspects
- Mature and old forests
- Balsam and Spruce stands

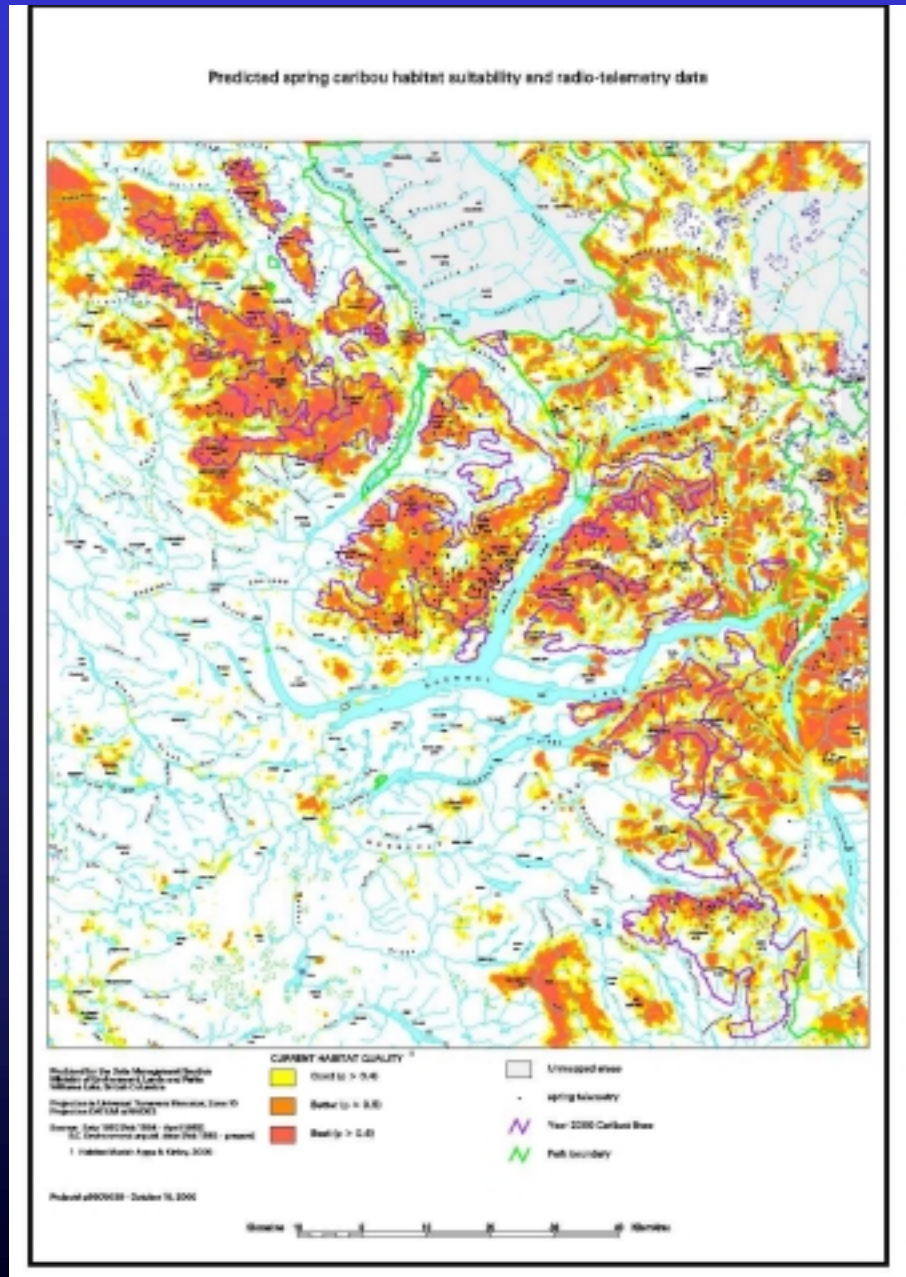


# BACKGROUND

## Mountain Caribou Seasonal Patterns of Habitat Use

### Spring Habitat Use

- Between 1000 – 2000 m. elevation
- ICH and ESSF zones
- Gentle to moderate slopes
- Warm aspects
- Mature and old forests
- Balsam and Spruce stands



# TARGETS



# CCLUP TARGETS FOR EASTERN CARIBOU

## General Direction to the Committee:

- 65/35 split of 'no harvest' and 'modified harvest' by sub-unit
- Major adjustments (trades) are possible as long as they have a neutral impact to timber values

Approved 1998 CCLUP targets by sub-unit (areas in hectares of productive forest land)

CCLUP Sub-Unit	35% 'Modified Harvest'	65% 'No Harvest'	Deferral Area
Cottonwood	3,922	7,285	11,207
Canim	2,681	4,978	7,659
Boss/Deception	7,352	13,655	21,007
Quesnel Highland	13,235	24,580	37,815
Quesnel Lake	20,999	38,998	59,997
<b>TOTAL</b>	<b>48,189</b>	<b>89,496</b>	<b>137,685</b>



# HABITAT STRATEGY

---

## Recommended Location of Mountain Caribou Target

Criteria for delineating Caribou Habitat Areas:

‘No harvest’ areas were selected based on the following criteria:

- Areas of moderate or high caribou use
- Areas of moderate to high suitability
- Relatively large areas were identified instead of small areas





# HABITAT STRATEGY

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## Recommended Location of Mountain Caribou Target

### Criteria for delineating Caribou Habitat Areas:

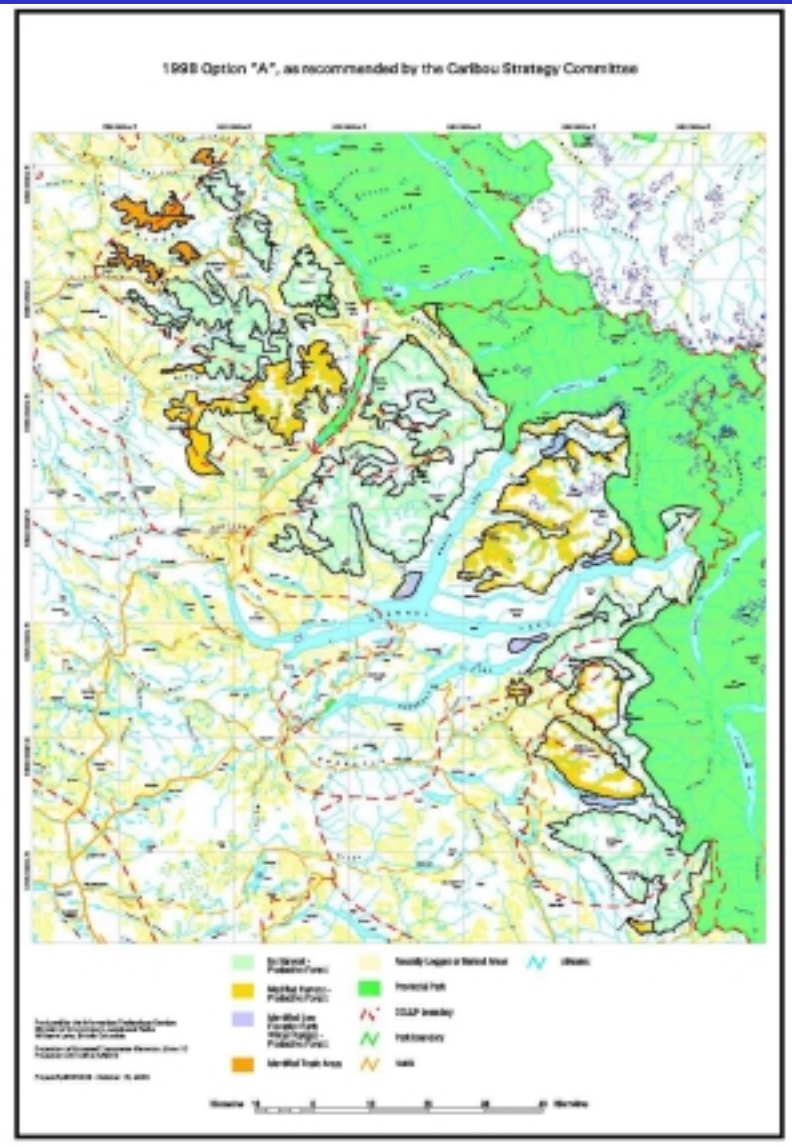
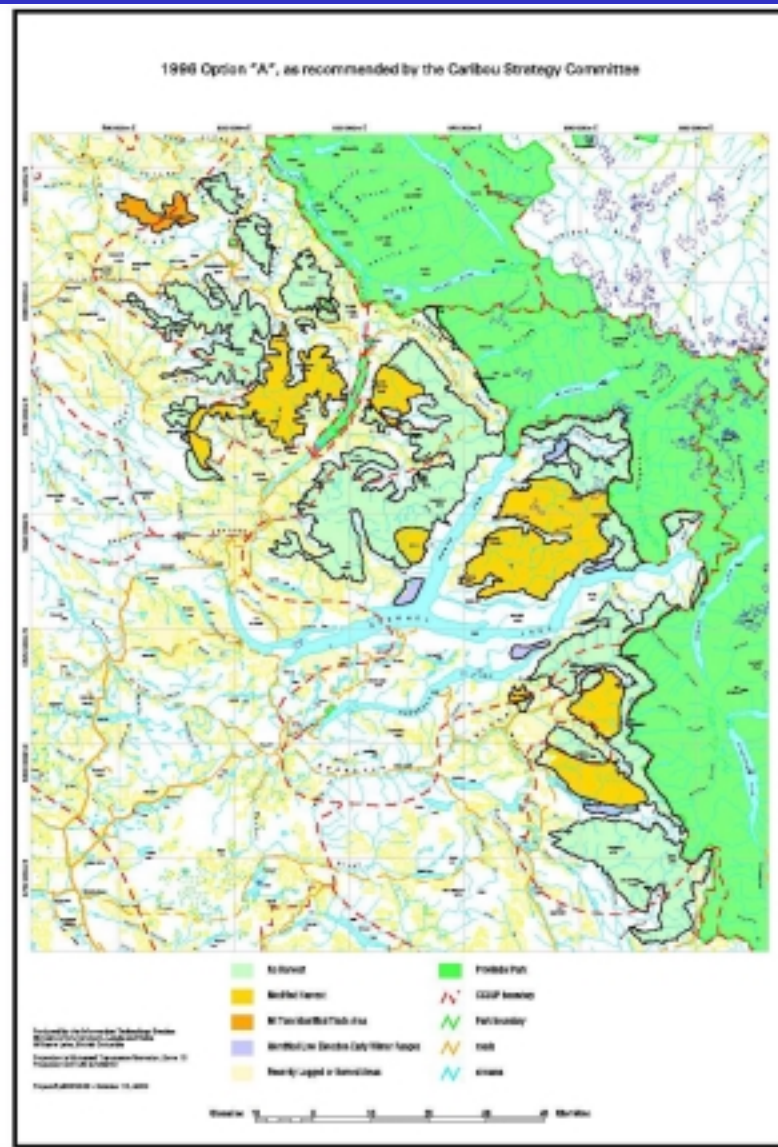
At the landscape level, the identification of 'modified harvest' as compared to 'no harvest' areas for eastern caribou utilized criteria as follows:

- Areas of lower current use
- Areas of lower present suitability
- Areas of lower recreational accessibility
- Relatively large areas
- Peripheral areas
- Quesnel District trade agreements considered



# HABITAT STRATEGY

## Recommended Location of Mountain Caribou Target



# CCLUP TARGETS FOR EASTERN CARIBOU

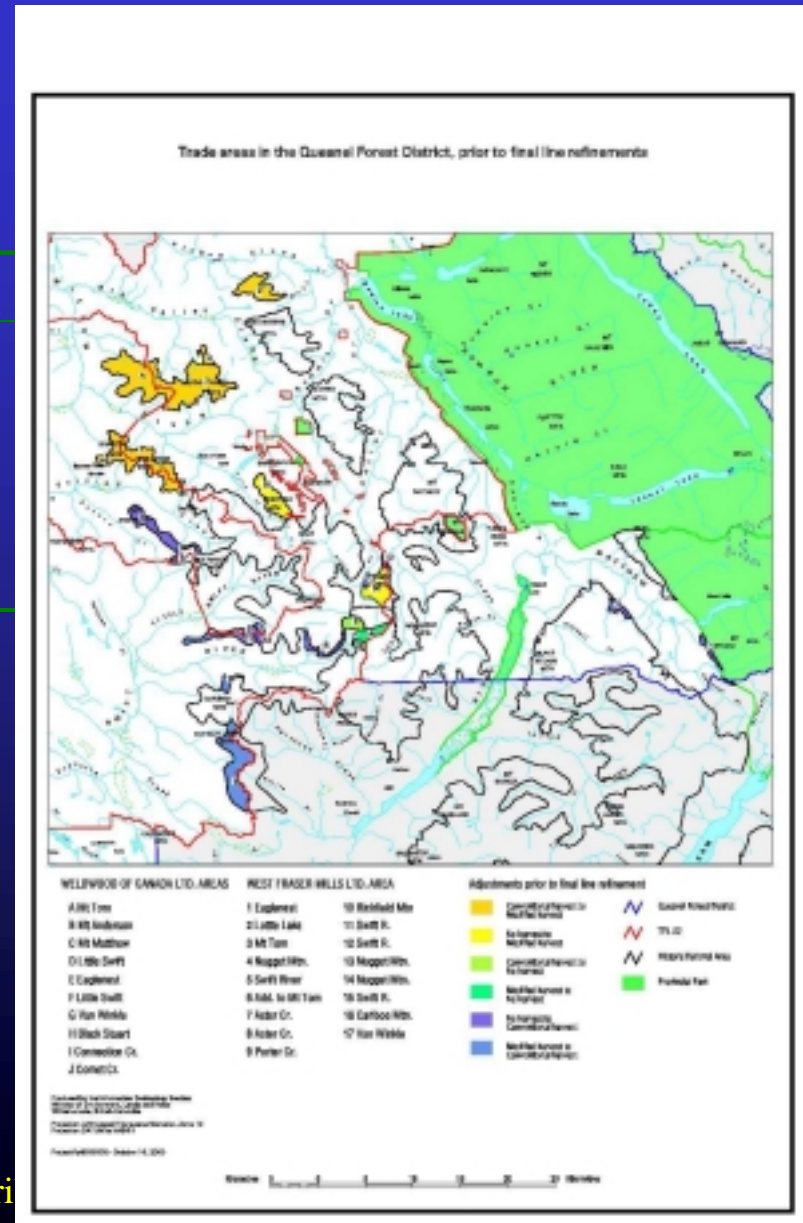
## Quesnel District Trade Agreements

Approved 1998 CCLUP targets by sub-unit (areas in hectares of productive forest land)

CCLUP Sub-Unit	35% 'Modified Harvest'	65% 'No Harvest'	Deferral Area
Cottonwood	3,922	7,285	11,207
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<b>TOTAL</b>	<b>48,189</b>	<b>89,496</b>	<b>137,685</b>

Target based on trades within the Quesnel District

CCLUP Sub-Unit	'Modified Harvest' Target	'No Harvest' Target	Total Area with Caribou Target
Cottonwood	5,658	6,882	12,540
Canim	2,681	4,978	7,659
Boss/Deception	7,352	13,655	21,007
Quesnel Highland	16,819	22,724	39,543
Quesnel Lake	20,999	38,597	59,596
<b>TOTAL</b>	<b>53,509</b>	<b>86,836</b>	<b>140,345</b>



CCLUP Mountain Caribou

# HABITAT STRATEGY

---

## Recommended Location of Mountain Caribou Target

Criteria for refining caribou area boundaries:

- The seasonal habitat suitability index model maps
- Input from the forest industry and the conservation sector
- Generally, the lower limit of high elevation habitat is approximately 1500 meters elevation
- Steeper terrain is of lower quality to mountain caribou
- Cool aspects at mid elevations, with gentle terrain, are of high value to mountain caribou
- Consider existing or approved logging

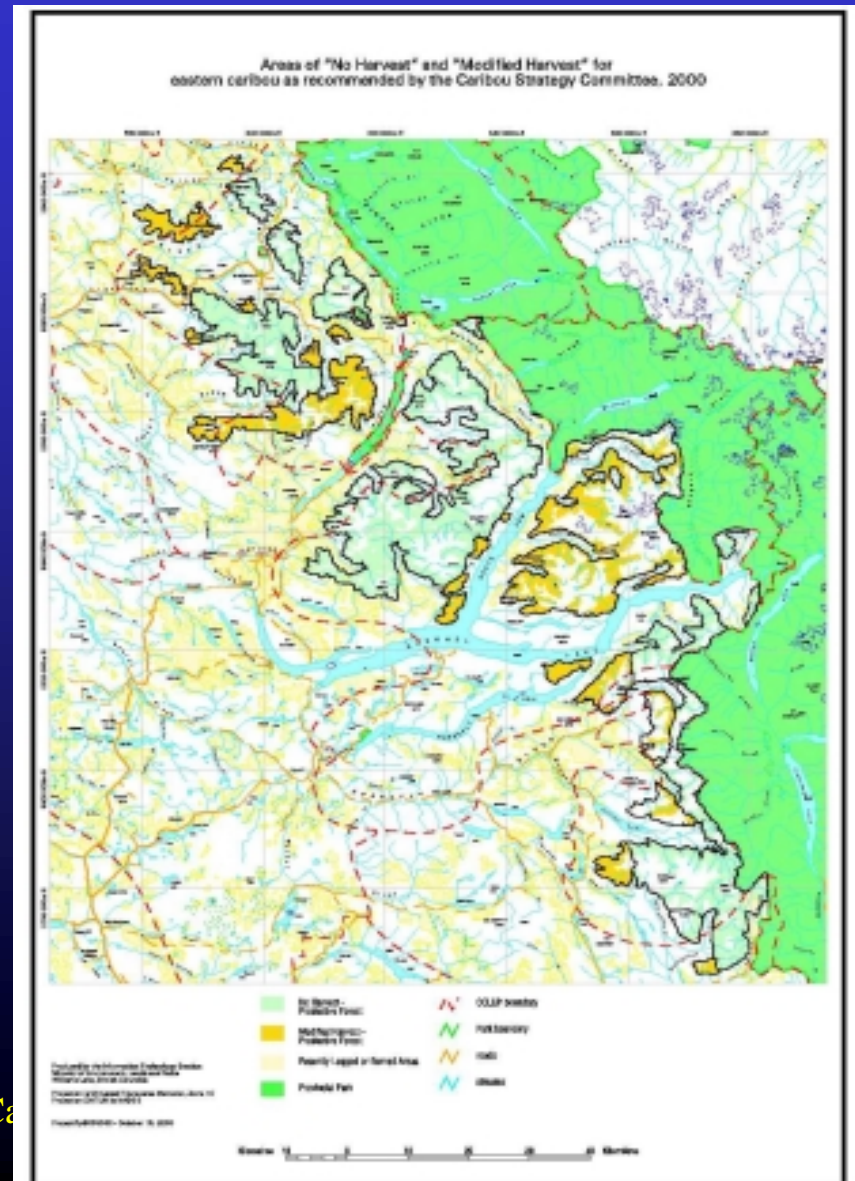


# HABITAT STRATEGY

## Recommended Location of Mountain Caribou Target

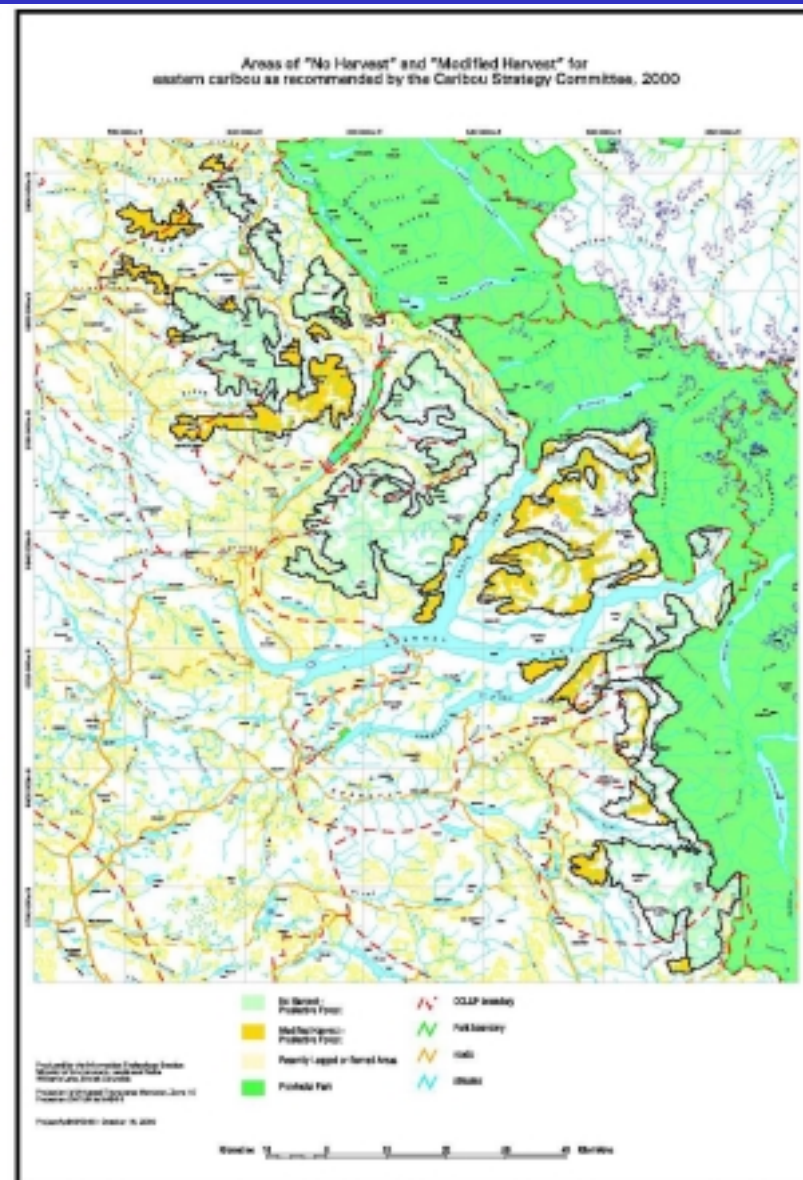
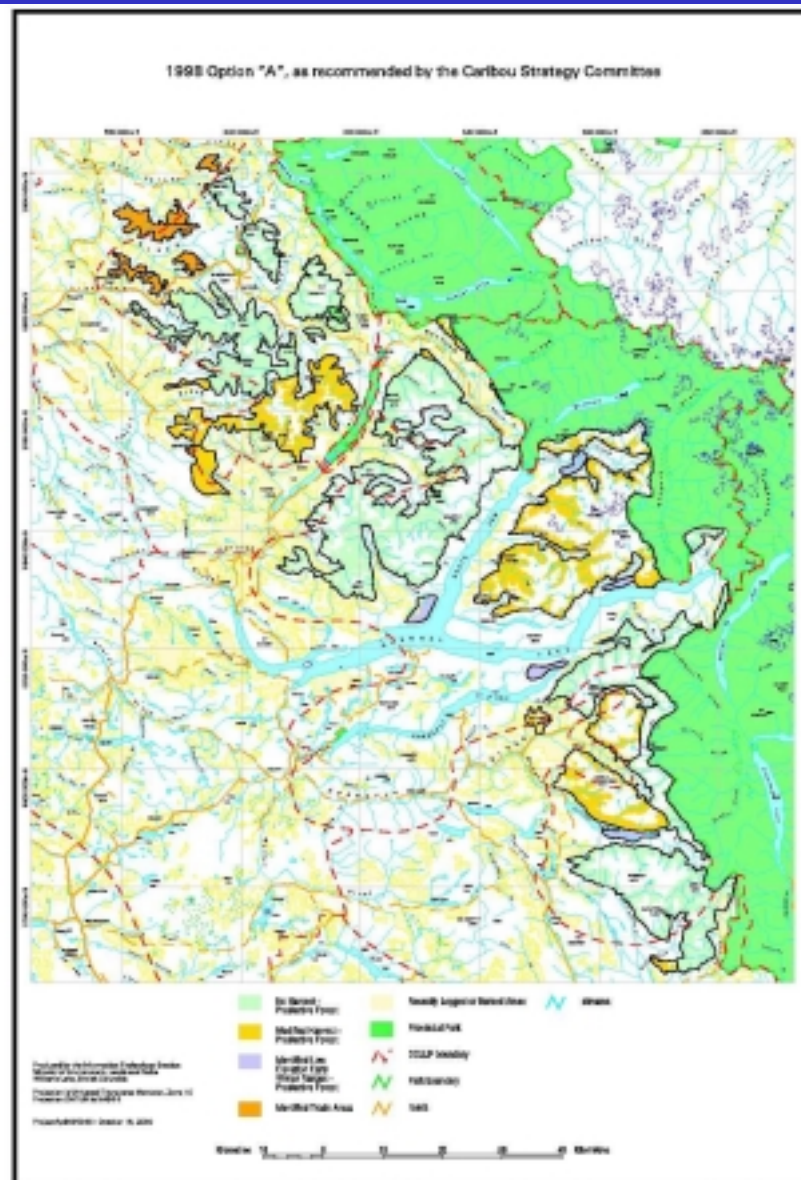
Major changes are:

- Inclusion of a few, key low-elevation early winter ranges around Quesnel Lake
- New 'conventional harvesting' in several large areas
- Addition of 'modified harvest' to the 100 Mile House TSA west of Boss Mountain
- New 'modified harvest' in the upper Horsefly drainage
- In the Quesnel TSA, new 'modified harvest' areas due to trades
- In the Quesnel TSA, new 'conventional harvesting' areas due to trades



# HABITAT STRATEGY

## Recommended Location of Mountain Caribou Target



# HABITAT STRATEGY

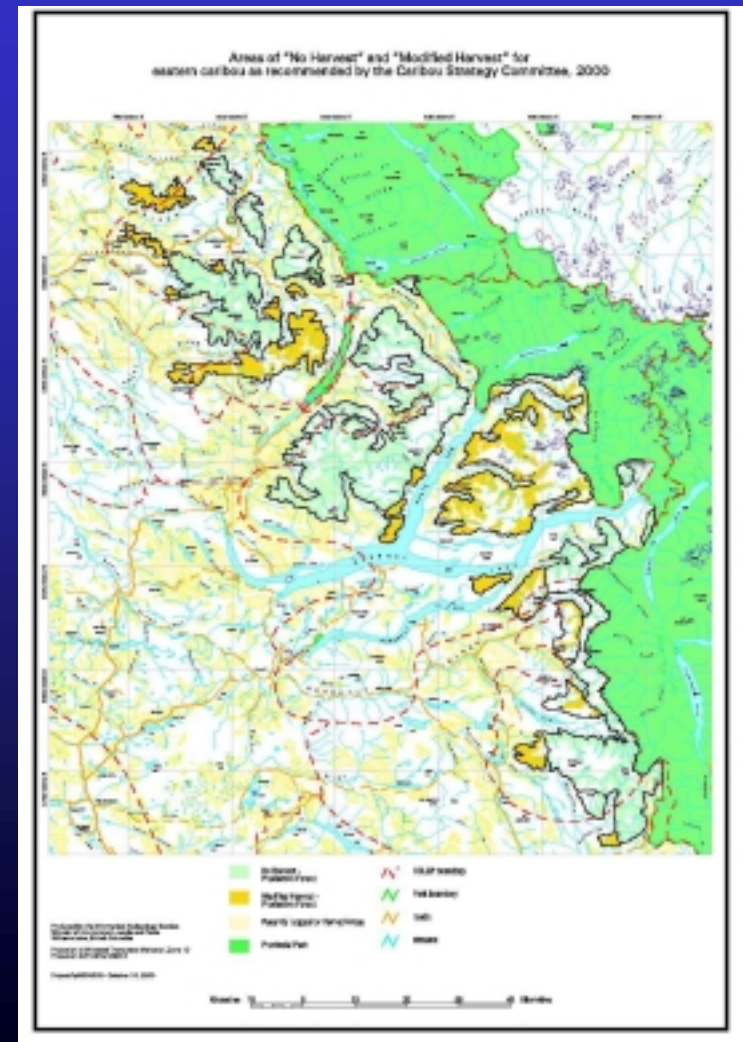
## Recommended Location of Mountain Caribou Target

Target based on trades within the Quesnel District.

CCLUP Sub-Unit	'Modified Harvest' Target	'No Harvest' Target	Total Area with Caribou Target
Cottonwood	5,658	6,882	12,540
Canim	2,681	4,978	7,659
Boss/Deception	7,352	13,655	21,007
Quesnel Highland	16,819	22,724	39,543
Quesnel Lake	20,999	38,597	59,596
<b>TOTAL</b>	<b>53,509</b>	<b>86,836</b>	<b>140,345</b>

Recommended distribution of mountain caribou target

CCLUP Sub-Unit	Recommended 'Modified Harvest' Target	Recommended 'No Harvest' Target	Recommended Total Caribou Target
Cottonwood	4,857	6,948	11,805
Canim	965	4,938	5,903
Boss/Deception	4,688	11,751	16,439
Quesnel Highland	15,604	23,230	38,834
Quesnel Lake	27,395	39,969	67,364
<b>TOTAL</b>	<b>53,509</b>	<b>86,836</b>	<b>140,345</b>



CCLUP Mountain Caribou Strategy

# TIMBER HARVESTING STRATEGY

CCLUP Mountain Caribou Strategy





# TIMBER HARVESTING STRATEGY

---

## Habitat and Silvicultural Systems Research

- Pilot Trial (1990/1991)
- Replicated Research Trial (1992/1993)
- Adaptive Management Trial (starting 2000-2001)



CCLUP Mountain Caribou Strategy



# TIMBER HARVESTING STRATEGY

---

## Habitat and Silvicultural Systems Research

- Pilot Trial (1990/1991)
- Replicated Research Trial (1992/1993)
- Adaptive Management Trial (starting 2000-2001)



CCLUP Mountain Caribou Strategy



# TIMBER HARVESTING STRATEGY

---

## Habitat and Silvicultural Systems Research

- Pilot Trial (1990/1991)
- Replicated Research Trial (1992/1993)
- Adaptive Management Trial (starting 2000-2001)





# **TIMBER HARVESTING STRATEGY**

---

## **Habitat and Silvicultural Systems Research**

### **Major Results and Conclusions from Group**

#### **Selection Trials**

- Planted spruce and subalpine fir seedling performance in openings from 0.1 to 1.0 ha is adequate and should meet current free-growing standards
- Long-term yield modelled in the CCLUP Integration Report can be achieved
- Lichen growth rates and lichen biomass are somewhat reduced
- Windthrow is not a problem





Spruce



Sub-alpine Fir



Arboreal Lichen





# TIMBER HARVESTING STRATEGY

---

## Habitat and Silvicultural Systems Research

### Major Conclusions from Other Research

- Corroboration of results in the Cariboo Region for recommended opening sizes and cutting cycles for group selection
- Group selection with openings of 0.24 ha in the ICHwk has produced good seedling survival and growth
- No windthrow problems with the recommended group selection system in ESSF or ICH





CCLUP Mountain Caribou Strategy



# TIMBER HARVESTING STRATEGY

## Habitat and Silvicultural Systems Research

### Conclusion:

- Based on all sources of information we are optimistic that group selection will be able to maintain caribou habitat and should have no problem producing the modelled timber yield expectations



# TIMBER HARVESTING STRATEGY

## General Forest Development Recommendations

- Timber access must be an even flow by TSA (excluding 100 Mile TSA)
  - Limit harvesting to a maximum of 1/3<sup>rd</sup> of the following areas in any 20-year period: TFL#52, Quesnel TSA, Williams Lake TSA north of Quesnel Lake, Williams Lake TSA south of Quesnel Lake
- Forest development must be spatially and temporally concentrated
- Cutblocks should be large using the recommended selection systems



# TIMBER HARVESTING STRATEGY

## Operational Location of Harvest Boundary

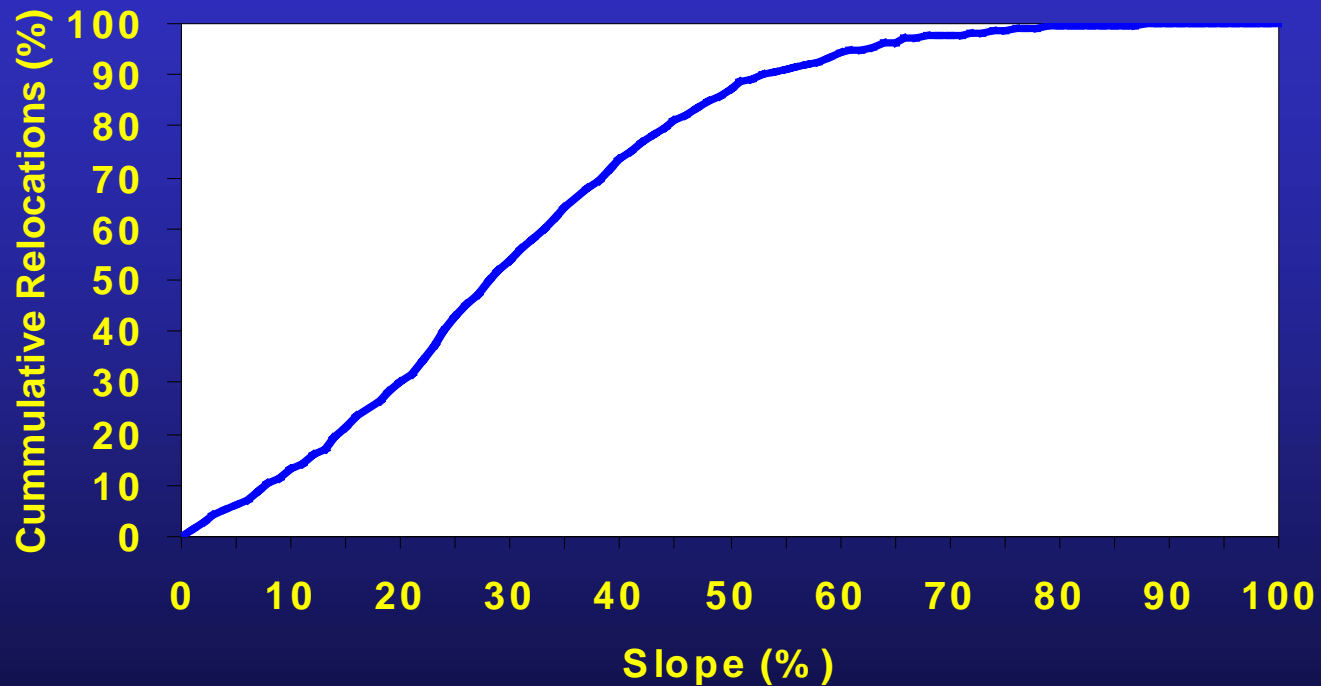
To provide *flexibility* at the operational level boundaries of 'No Harvest' and 'Modified Harvest' can be adjusted with these conditions:

- Adjustments to a maximum of 200 metres
- Adjustments must be neutral or beneficial to caribou
- Adjustments in the opposite direction must be proposed to make up the same area
- Adjustments require approval of the DM and DEO



# TIMBER HARVESTING STRATEGY

## Cumulative Frequency Distribution of Slope Use by Radio-telemetry Equipped Mountain Caribou



# TIMBER HARVESTING STRATEGY

---

**Recommended Silvicultural Systems in ‘Modified Harvest’ in ESSF and ICH (Group selection is the preferred system on all slopes)**

SLOPE (%)	SILVICULTURAL SYSTEM
Gentle or Moderate (0-40)	Group or Single-tree Selection
Moderately Steep (41-50)	Group or Strip selection
Steep (>50)	Strip or Group Selection



# TIMBER HARVESTING STRATEGY

---

## Group Selection Recommendations for ESSF and ICH

- 33% removal on an area basis
- 80 year cutting cycle (240 year rotation)
- Openings from 0.2 to 1.0 ha in size
- Shape of openings can vary but should be at least ~2 tree-lengths wide
- Openings should be at least 2 tree-lengths apart
- Safe, standing dead trees outside of openings should be left





CCLUP Mountain Caribou Strategy



# TIMBER HARVESTING STRATEGY

---

## **Strip Selection Recommendations for Steep Slopes in the ESSF and ICH**

- 33% removal on an area basis
- 80 year cutting cycle (240 year rotation)
- Harvested strips should not be more than 2-3 tree lengths wide
- Residual stand must be windfirm
- Safe, standing dead trees outside of strips should be left



# TIMBER HARVESTING STRATEGY

---

## **Post-Harvesting Recommendations:**

### **Planting**

- Lodgepole pine should not be planted in mountain caribou habitat
- Seedlings should be planted to achieve a clumped distribution



# TIMBER HARVESTING STRATEGY

---

## Appraisal Allowances for 'Modified Harvesting'

- A timely resolution of the appraisal issue is essential to the successful implementation of the caribou strategy





CCLUP Mountain Caribou Strategy



# ACCESS MANAGEMENT

---

*“The long term persistence of mountain caribou is dependent upon a perpetual supply of suitable habitat where there is little or no vehicle access and human disturbance.”*



# ACCESS MANAGEMENT

---

- Minimises overall access development by locating ‘modified harvest’ in large, aggregated areas
- Recommends an *aggregated cut* over short time periods, followed by road de-building
- Recommends an *overall access management plan* for the caribou winter range, addressing road closures and deactivation
- Recommends that *permanent* road access should be minimised throughout caribou range
- Recommends that *motorized recreational access* should be carefully regulated or excluded from sensitive caribou winter range areas

# ACCESS MANAGEMENT

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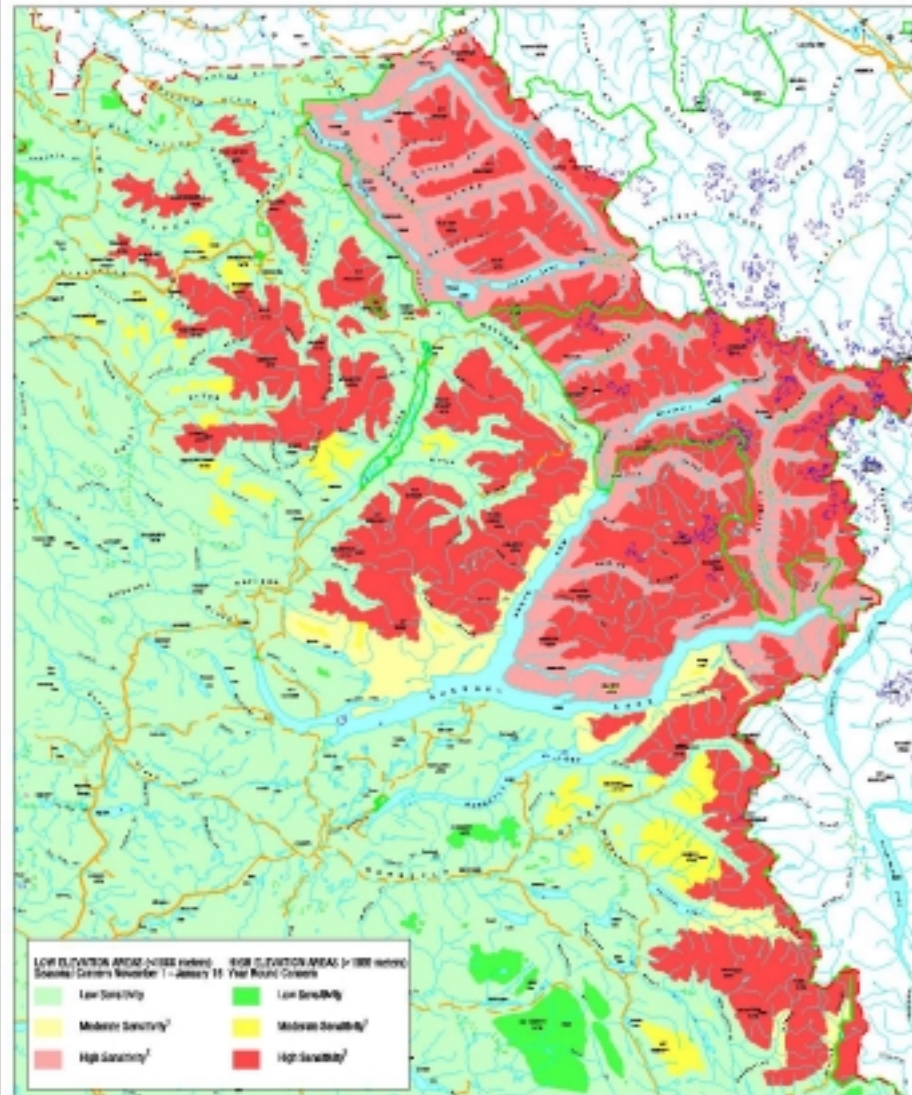
*“Snowmobile activity on caribou winter ranges is considered a major conservation concern because of its potential displacement impact on caribou distribution”*

- Identifies *sensitive areas* where snowmobiling restrictions are necessary in order to maintain caribou use
- A *snowmobile planning process* is currently underway, led by an IAMC technical planning team
- It is critical that a *snowmobile zoning strategy* be developed for the caribou range





Sensitive caribou areas where recreational uses of snowmobiles, ATVs and helicopters should be carefully regulated and/or excluded



<sup>1</sup> Moderate sensitivity areas may require some restricted recreation restrictions.

<sup>2</sup> High sensitivity areas will require a combination of control regulation and areas closed to restricted recreation in order to maintain wildlife - refer to management guidelines within Appendix B for details.

Geological Information Technology Centre  
 Ministry of Environment, Land and Parks  
 Wildlife Act, British Columbia  
 Prepared by: [Name] / [Organization Name] / [Date]  
 Project Number: [Number]

OGIIP boundary   
 Park boundary   
 road   
 stream

Scale: 0 10 20 30 40 Kilometers

# PREDATOR MANAGEMENT

---

*“It is essential that mountain caribou have adequate space to avoid excessive levels of predation. Movement away from areas of high prey numbers... appears to be critical to their long-term survival.”*

- Recommends development of a modified regional moose management strategy within and adjacent to caribou range
- Recommends development of a wolf management program within caribou range



# CONSERVATION RISK ASSESSMENT

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*“The mountain caribou population is now red-listed in the province, which is an acknowledgement that there is a risk of extirpation or extinction if current trends continue.”*

- Identifies risks to maintenance of the caribou population
- Provides preliminary assessments of these risks given entire application of the recommended strategy
- Recommends that further more detailed risk assessment be completed



# CONSULTATION

---

## Input to the 1996 Interim Report

- Provided the first approximation of 'modified' and 'no harvest' distribution
- Committee met 5 times with STTAA

## Input to the 1998 Interim Report

- Provided a second approximation of 'modified' and 'no harvest' distribution
- Major Licensees and Conservation Council participated in review process
- Several meetings were held with stakeholder representatives



# CONSULTATION

---

## Input to the 2000 Report

- Provided a refinement of 'modified' and 'no harvest' boundaries at a detailed scale
- Extended consultation period
- Input incorporated on line work where possible
- Refer to Appendix 2, p. 55



# KEY RECOMMENDATIONS

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## **Refined habitat strategy**

- Early winter range
- Quesnel trades
- More 'modified harvest' in 100 Mile TSA
- Improved caribou habitat protection

## **Refined timber harvest strategy**

- Flexibility with silvicultural systems on various slopes
- Flexibility for making operational boundary adjustments



# KEY RECOMMENDATIONS

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## **Access management strategy**

- Identification of sensitive areas where careful regulation or exclusion of motorized recreation is required
- Overall access management plan
- Timber harvest activities aggregated, followed by road de-building



# KEY RECOMMENDATIONS

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## **Predator management strategy**

- Direct management intervention may be required
- Development of a modified moose management strategy
- Development of a wolf management program





# Caribou



Access

Habitat

Predators



# CREDITS

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## Funding Support Provided By:

Forest Renewal BC

Habitat Conservation Trust Fund

Corporate Resource Inventory Initiative

Ainsworth Lumber Company Ltd.

Weldwood of Canada Ltd.

Riverside Forest Products Ltd.

West Fraser Mills Ltd.

Ministry of Environment, Lands and Parks

Ministry of Forests

# CREDITS

---

Jennifer Ballentine - GIS support

Teresa Newsome, Ordell Steen, Micheala Waterhouse - Silvicultural systems research

Lara Roorda, Nichola Freeman, Wade Beaulieu, Katharine VanSpall - Caribou research

Peter Andrews, Lyle Badger, Steve Dodge, Larry Gardner, Cris Guppy, Al Moi - Quesnel committee

Karen Campbell - Forest industry stakeholder representative

Gordon Rattray - CLMA contact

Dave Neads - Conservation council stakeholder representative

