

Four Year Summary of the Quesnel Highland Snowmobile- Mountain Caribou Monitoring Project, Cariboo Region

December 2002 – April 2006



Photo by Lara Roorda

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Executive Summary

A four year monitoring plan to record baseline data of snow machine use within critical and sensitive caribou winter habitats began in December of 2002 and was concluded in April 2006 for the Quesnel Highland study area. During the course of the four years a total of 708 snow machines and 241 caribou were observed. Compliance within voluntary closure zones varied from 98.2% to 78.3%, with a four year average of 92.5%. On twenty-one occasions caribou activity and snow machine activity were recorded within 500m of each other. The majority of these potential caribou-snow machine interactions occurred in zone C, on Cameron Ridge and in the Grain Creek drainage (10 instances). Interactions were recorded on six occasions in Zone D and 5 times in Zone A. In 2006 an analysis involving probability and intensity of snow machine use within caution zones was conducted. Probability of snow machine use on a given weekend day was 80% or greater for Bald Mountain, Yanks Peak, Roundtop Mountain, Eureka Ridge and Mica Mountain. Snow machine intensities of greater than 10 snow machines per survey day were recorded for Bald Mountain, Yanks Peak, and Mica Mountain. Funding for this four year monitoring project was provided by the Habitat Conservation Trust Fund (HCTF) and the Ministry of Environment.

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Introduction

In 2000, mountain caribou became red-listed provincially and were nationally designated as 'threatened'. There are 13 mountain caribou sub-populations identified within British Columbia (Simpson 1997). The Cariboo Region includes the Barkerville, Wells Gray North and a portion of the North Cariboo Mountains sub-populations. Backcountry recreation activities, snowmobiling and heli-skiing in particular, are considered to be a major conservation concern due to the potential for displacement of caribou from their winter habitat.

To address this issue, two subsequent voluntary multi-year agreements were entered into with the local snowmobile clubs from Quesnel, 100 Mile House and Williams Lake and the Ministry of Agriculture and Lands (MAL) and the Ministry of Environment (MOE). A monitoring plan (beginning in the winter of 2002/2003) was included in this agreement to collect baseline data on snowmobile use in the *Voluntary Closure Zones* and *Caution Zones* as identified and mapped by the MAL. Voluntary closure zones were defined as areas of critical caribou habitat and were to receive no snowmobile activity. Caution zones were defined as areas of sensitive caribou habitat that remained open to snowmobile activity. The first three years (2003-2005) of this monitoring program focused on the compliance of back country recreationists within the voluntary closure zones (Price 2003, Price 2004 and Price 2005). The fourth and final year (2006) of the program was directed towards monitoring use of both mountain caribou and snow machines in and around caution zones throughout the study area (Roorda 2006). Funding for all four years of this project was provided by the Habitat Conservation Trust Fund (HCTF) and the Ministry of Environment.

Recovery strategies for Mountain caribou often incorporate a combination of recreational zoning, modified timber harvest strategies, access limitation and predator and moose management. The report produced by the Mountain Caribou Technical Advisory Committee (MWLAP 2002), information from the regional Recovery Implementation Group (RIG), and the establishment of the Provincial Species at Risk Co-ordination Office (SaRCO) in October 2004 have come together to initiate an aggressive, science-based process for developing mountain caribou recovery options. Detailed recovery options are to be delivered by SaRCO in fall 2006.

Study Area

The snowmobile monitoring project study area covers the Wells Gray North and the Barkerville sub-populations of Mountain Caribou and includes four of the five caribou census blocks (Junction, Stevenson, Horsefly and Barkerville) (Figure 1). The study area excludes Wells Gray, Cariboo Mountains and Bowron Lake Park and covers the eastern portions of the 100 Mile, Central Cariboo and Quesnel Forest Districts. The zoned survey areas are consistent with areas identified by the Ministry of Environment as critical caribou winter habitat. The monitoring project study area was divided into four zones (Figure 2): Zone A covered the area from Spanish Creek north to the East Arm of Quesnel Lake (Horsefly census block); Zone B covered the area between the East Arm and North Arm of Quesnel Lake including Blue Lead Creek (Junction census block); Zone C covered the area from the North Arm of Quesnel Lake to the Cariboo River (Stevenson census block) and finally, Zone D covered the area from Cariboo Lake north to Two Sisters Mountain (Barkerville census block).

Wet climate and relatively high winter snow depths characterize this mountainous area, with winter snow depths exceeding 2 m in the mountains. Climatic moisture increases in an easterly direction and with elevation. Continuous, extensive high elevation caribou winter ranges occur on rounded sub-alpine mountain tops throughout the Quesnel Highland and Bowron Valley Ecosections. Within the higher and increased rugged terrain of the more easterly Cariboo Mountains, high elevation caribou winter ranges are present, but are more restricted and discontinuous in nature. The area is comprised of several biogeoclimatic zones including the Alpine Tundra (AT), Engelmann Spruce Sub alpine Fir (ESSF), Interior Cedar Hemlock (ICH) and Sub-Boreal Spruce (SBS) zones.

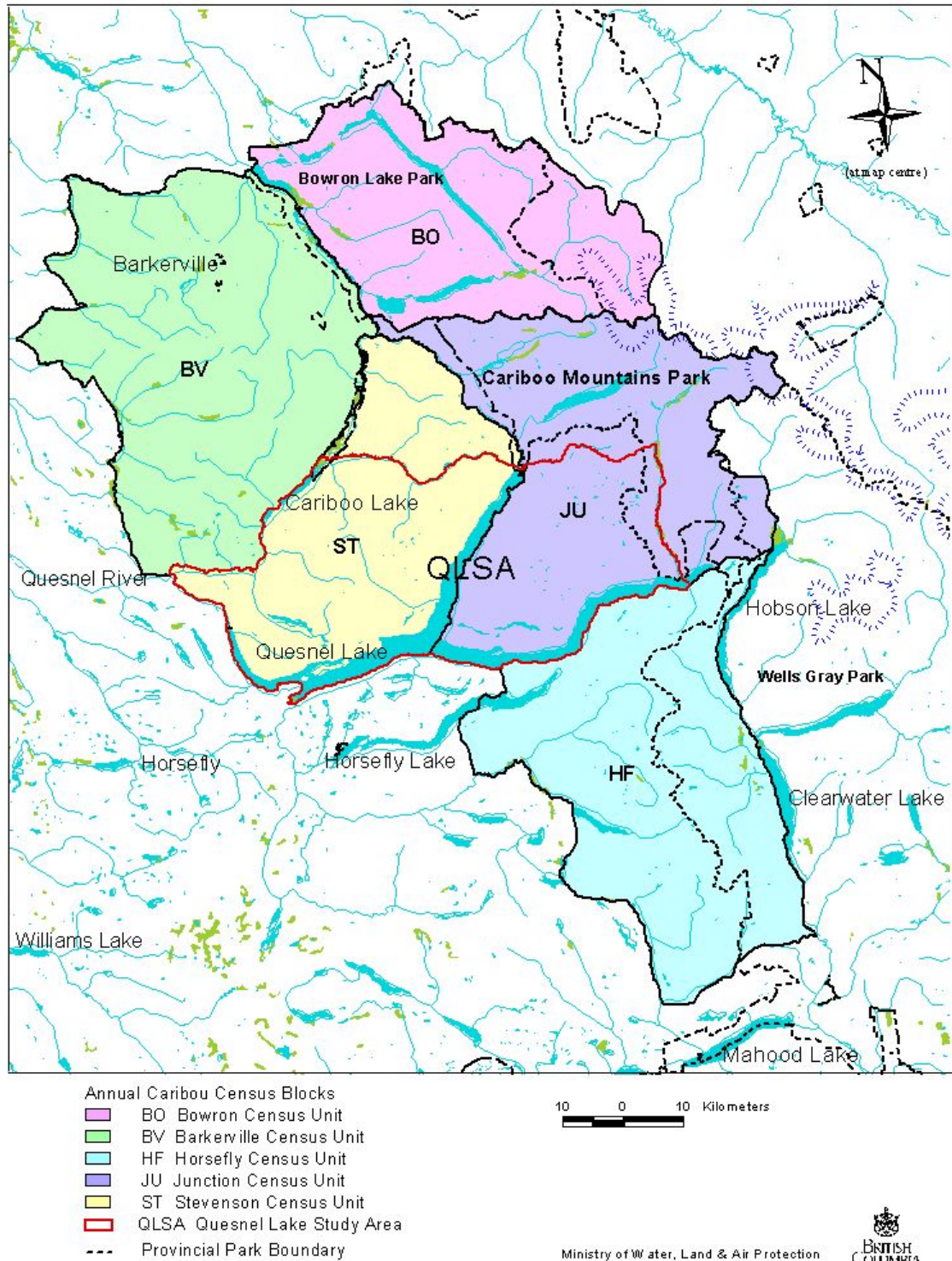


Figure 1. Quesnel Highland Mountain Caribou Census Blocks.

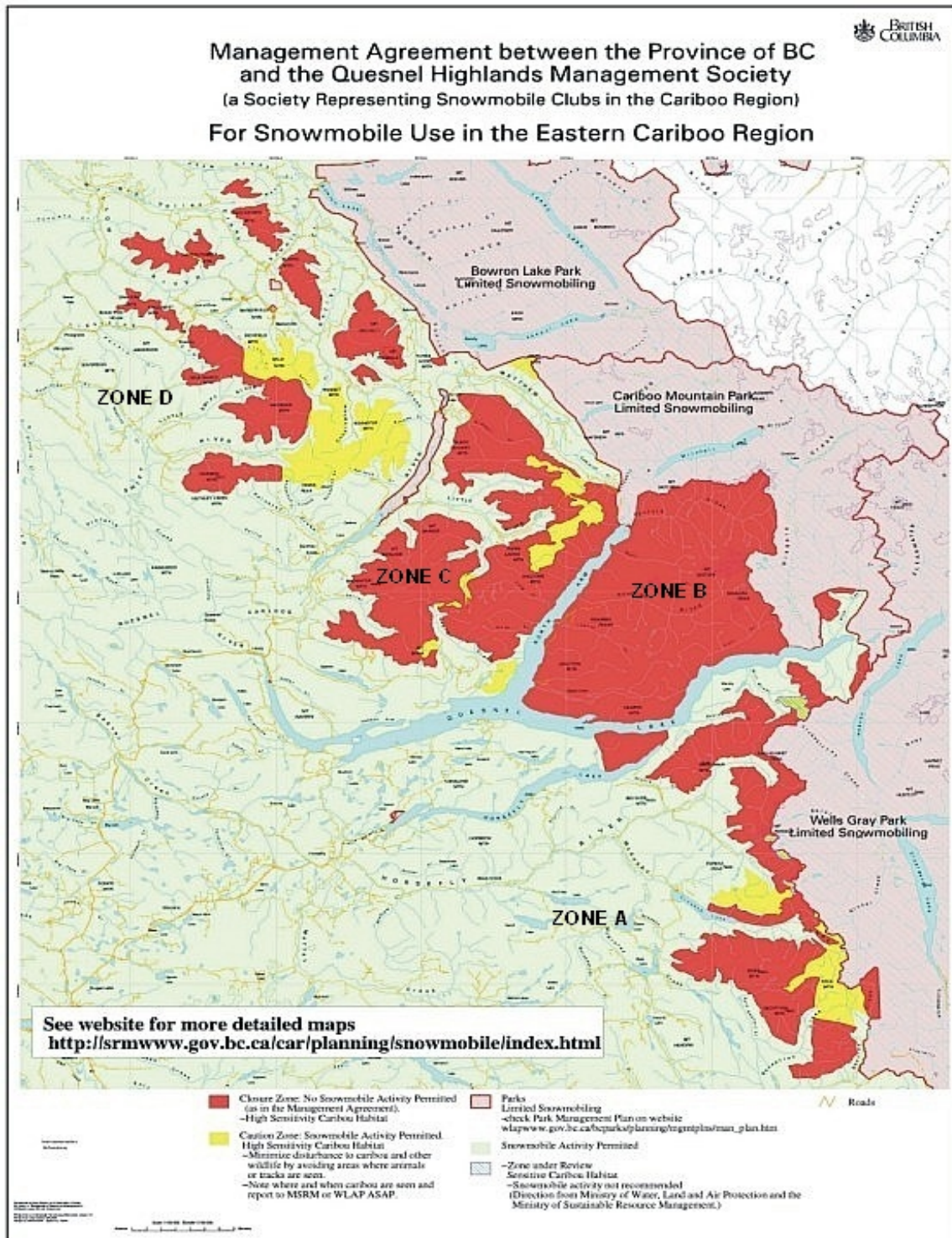


Figure 2. Map of the project study area indicating voluntary closure and caution zones.

Methods

After the first initial flights, it was determined that flights should be conducted on weekends whenever possible to take advantage of peak snowmobile use periods. Weather permitting, during the first three years of the project, closure areas within two zones were flown per day. During the fourth year of the project caution areas in all three zones, A, C and D were flown in one day. All flights originated from the Williams Lake Airport in a Cessna 182 or Cessna 205 fixed wing aircraft. Locations were taken with a Garmin 95 Global Positioning System (GPS) unit and were recorded on Snowmobile Monitoring Data Collection Forms (attached) in UTM's. Whenever possible, photographs were taken of habitat conflicts and snowmobile use within closure zones.

To avoid biasing results, complete closure and caution zones were surveyed rather than simply flying directly to known areas of snowmobile use. This also provided the opportunity to obtain locations of any caribou residing in or adjacent to the snowmobile zones. At times, when radio-collared caribou were heard near the flight path, an effort was made to ascertain relocations of these animals. As caribou, caribou tracks or beds, snowmobiles or snowmobile tracks were sighted the GPS co-ordinates were recorded along with the geographic location, the number of snowmobiles, amount of usage and any relationship to caribou. These data points were then plotted on a map of the project area. At the end of each monitoring year, reports were prepared summarizing the information obtained (Price 2003, Price 2004, Price 2005 and Roorda 2006)

Project Costs

Between December 2002 and April 2006 a grand total of \$47,413.83 was spent to complete four years of snowmobile and caribou monitoring within the Quesnel Highland study area (Table 1). A total of 164.1 flight hours were logged during 61 separate flights. Total costs for the 2006 winter included \$2002.25 in contractor labour and expenses. The first three years of flight monitoring and report writing were completed by government staff.

Table 1. Cost summary for four years of snowmobile/caribou monitoring within the study area (2002-2006).

Year	No. of Flights	Flight Hours	Total cost
2003	21	53.1	\$14,399.78
2004	25	56.9	\$16,309.76
2005	6	19.0	\$5,703.32
2006	9	35.1	\$11,000.97
Total	61	164.1	\$47,413.83

Results

During monitoring flights for all four years a grand total of 708 snowmobiles were observed within, and adjacent to monitored closure and caution zones (Table 2). It is important to note that on many occasions fresh snow machine tracks were observed, but the machines could not be located during the time allotted. Two hundred and forty-one caribou were observed with an additional 362 animals estimated from track and bed counts. No snow machine use was observed during the course of the study in Zone B, the area between the North and East Arms of Quesnel Lake. Detailed maps of zones A, B, C and D and associated snowmobile and caribou activity can be found in Appendix 1.

Table 2. Summary of observed snowmobile and caribou activity during the four years of the project (for all active zones) within the Quesnel Highland survey area (December 2002 – April 2006).

Monitoring Year	Zone A	Zone C	Zone D	# Snowmobiles observed	Caribou observed	Additional caribou estimated from tracks/beds
Year 1	80	31	10	121	29	121
Year 2	63	31	7	101	90	34
Year 3	35	82	2	119	22	93
Year 4 ¹	130	22	215	367	100	114
Totals	308	166	234	708	241	362

Closure Zone Monitoring

In the first three monitoring years, compliance with voluntary closure zones was defined as a percentage:

Percent compliance = $100 - [(\# \text{ snow machines observed in closure zones} / \text{total } \# \text{ snow machines observed in both closure and caution zones}) * 100]$

Compliance within voluntary closure zones over the four years of the project varied from as high as 98.2% of the snowmobiles observed in 2005 to 78.3% of the snowmobiles observed in 2004 (Table 3). In 2006, 6% of the snowmobiles observed were in closure zones, but this figure is likely under represented since closure zones were only monitored incidentally. The four year average was 92.5% compliance.

¹ The 2006 increase in snow machines observed is due to the monitoring of caution zones specifically as opposed to the focus on closure zones for the first three years.

Table 3. Four year summary of snowmobile compliance within closure zones ((December 2002 – April 2006) within the study area.

Year	No. of snowmobiles in closure zones	No. of snowmobiles in caution zones	% Snowmobiles in closure zones
2003	9	112	92.6%
2004	18	65	78.3%
2005	2	107	98.2%
2006 ²	22	343	94.0%
Four year average	51	627	92.5%

Habitat Conflicts

On twenty-one occasions caribou activity and snow machine activity were recorded within 500m of each other (Table 4). Caribou or caribou track was defined as either overlapping snow machine track (0m) or within 500m (<500m) of snow machines and/or their tracks. In the majority of cases, it was snow machine tracks observed in the vicinity of caribou activity, but on three occasions snow machines and operators were observed within 500m of caribou track. Zone B received no snow machine use due to its' remote location and lack of road access. The majority of caribou, snow machine interactions occurred in zone C, on Cameron Ridge and in the Grain Creek drainage (10 instances). Interactions were recorded on six occasions in Zone D and 5 times in Zone A.

Table 4. Four year summary of snowmobile and caribou habitat conflicts by zone within the study area (December 2002 – April 2006).

Year	Zone A		Zone C		Zone D	
	0m	<500m	0m	<500m	0m	<500m
2002/2003	0	2	0	0	3	1
2003/2004	1	0	5	0	0	0
2004/2005	0	0	3	0	1	0
2005/2006	0	2	1	1	1	0
Zone Totals	1	4	9	1	5	1

Intensity of Snowmobile Use

In 2006 an analysis involving probability and intensity of use was conducted. For this analysis, *probability of activity* indicated the likelihood that an area would be visited by at least one snowmobile on any given weekend day during the peak use period of January 1st to March 31st, 2006. Average snow machines observed per day gave an indication of intensity of recreation within that area. Average number of snow machines observed per active day was also included to give a better indication of intensity on “prime” days when temperature and avalanche conditions were less likely to be issues. Grain Creek and Nugget Mountain had the lowest probability of snow machine activity (Table 5) while snow machines activity was observed on Yanks Peak and Bald Mountain on all 2005/2006 flights, indicating a 100% probability of activity. Intensity (average snow

² In 2006, caution zones were actively monitored and closure zones were only incidentally recorded.

machines per survey day) was highest for Bald Mountain, Yanks Peak and Mica Mountain respectively and was lowest for Cameron Ridge, Nugget Mountain and Grain Creek.

Table 5. Probability and intensity of snow machine use for the Quesnel Highland survey area from January to March 2006. (SM = number of snowmobiles observed)

Zone	Area	Probability of Activity	Av. SM/ Survey Day	Av. SM/ Active Day
A	Mica Mtn.	80.0%	10.6	13.25
A	Eureka Ridge	83.3%	7.5	9.0
C	Cameron Ridge	40.0%	1.4	3.5
C	Grain Creek	16.7%	1.5	9.0
D	Yanks Peak	100.0%	13.0	13.0
D	Roundtop Mtn.	83.3%	4.8	6.4
D	Nugget Mtn.	33.3%	1.4	4.5
D	Bald Mtn.	100.0%	15.6	15.6

Discussion

Knowledge of the extent, intensity and variability of winter recreation within mountain caribou range can contribute to understanding the potential impacts to caribou. Four consecutive years of caribou and snowmobile monitoring within the Quesnel Highland study area have provided excellent baseline data for recreational use. The two main areas of concern appear to be the Grain Creek area and the NW corner of Mica Mountain. In addition, signage needs to be repaired and made more visible to passing snow machines within zones A, C and D.

The 2006 March survey observed 93 caribou within the Stevenson census block (Zone C) (Freeman and Stalberg 2006). The majority of these caribou were observed in the headwaters of Grain Creek. Although virtually all of the Upper Grain Creek drainage is within the voluntary closure zone, the small Grain Creek caution zone provides access to vast amounts of critical winter caribou habitat. The lack of maintained, visible signage (Figure 3) and easy access to the alpine from caution zones makes enforcement of compliance within this sensitive area extremely difficult. Both signs in Zone C, located on access routes to Cameron Ridge and Grain Creek were in disrepair and difficult to read (as of June 2006).



Figure 3. Sign indicating closure and caution zones in the Grain Creek area (Zone C) taken in June 2006.

The consistent and combined number of caribou observed during snowmobile flights, caribou surveys and telemetry flights indicate plainly that Grain Creek is one of the most critical and important areas of caribou winter habitat for the Wells Gray North sub-population. The Grain Creek caution zone is generally utilized by snowmobiles to a lesser degree than caution areas in Zones A and D (Table 5). The 2006 monitoring report showed that the Grain Creek area received the least amount of use within the study area, with a 16.7% probability of activity. This can likely be attributed to both the greater travel time involved to reach the area and a lesser degree of historical use. The lesser degree of snowmobile use, coupled with the small size of the caution zone and most importantly, the fact that caribou rely heavily on the area for winter forage make this area the best and only area recommended for conversion to a voluntary closure zone.

The 2006 March mountain caribou survey observed 39 caribou inhabiting zone A. In the past mountain caribou have utilized high elevation habitat from the southern shore of Quesnel Lake down to the south side of Deception Mountain. However, recent telemetry and winter surveys indicate that these caribou utilize the Boss/Besig/Mica Mountain complex almost exclusively during the winter (Freeman and Stalberg 2006, Young and Freeman 2003). As winter recreationists extend the play areas in a northern direction along Mica Mountain and expand onto the eastern slopes of Mt. Besig the chances of displacing caribou from these shrinking habitats or inducing stress on these animals' increases. In April of 2003, twenty caribou were observed utilizing the bowl on the Eastern most slope of Besig Mountain, approximately 500m from snowmobile activity. In 2006, a bull group of about 6 caribou spent a large portion of the winter months on the East side of Mt. Besig and the NW edge of Mica Mountain. These animals and their

tracks can often be seen in the vicinity of a popular hill climb in this area. Keeping local clubs informed and reinforcing the location of the caution zone boundary may improve the chances that these caribou are not inadvertently pushed from this portion of winter habitat. Additional signage on the NW ridge of Mica Mountain may also help avoid the possibility of increased stress to the animals.

Within the Barkerville census block, voluntary closure zones appear to be complied with and the occasions where high elevation areas are used simultaneously by machines and animals is usually limited to small transient bull groups passing through snowmobile caution zones. Within the Barkerville census block, 44 caribou were observed during the March 2006 mountain caribou survey (Freeman and Stalberg 2006). This zone has historically received the most recreational use within the Cariboo Region. Likely due to this duration and intensity of use, few caribou are now sighted within snowmobile zones and animals appear to be conditioned to avoid these areas of activity.

Recommendations

- Work with the local snowmobile clubs on converting the Grain Creek snowmobile caution zone to a voluntary closure zone to reflect best efforts at caribou conservation.
- Work with the snowmobile clubs to ensure visible and annually maintained signage at all access points and that recreationists are aware of closure zone locations and caution zone etiquette.
- Maintain relationships with snowmobile clubs and their members and encourage “self-policing” within areas of caribou habitat.
- Increase awareness of caribou use in the NW corner of the Mica Mountain caution zone and consider additional signage on the ridge at the extent of the caution zone boundary.
- MOE should continue periodic monitoring of closure areas to confirm compliance.

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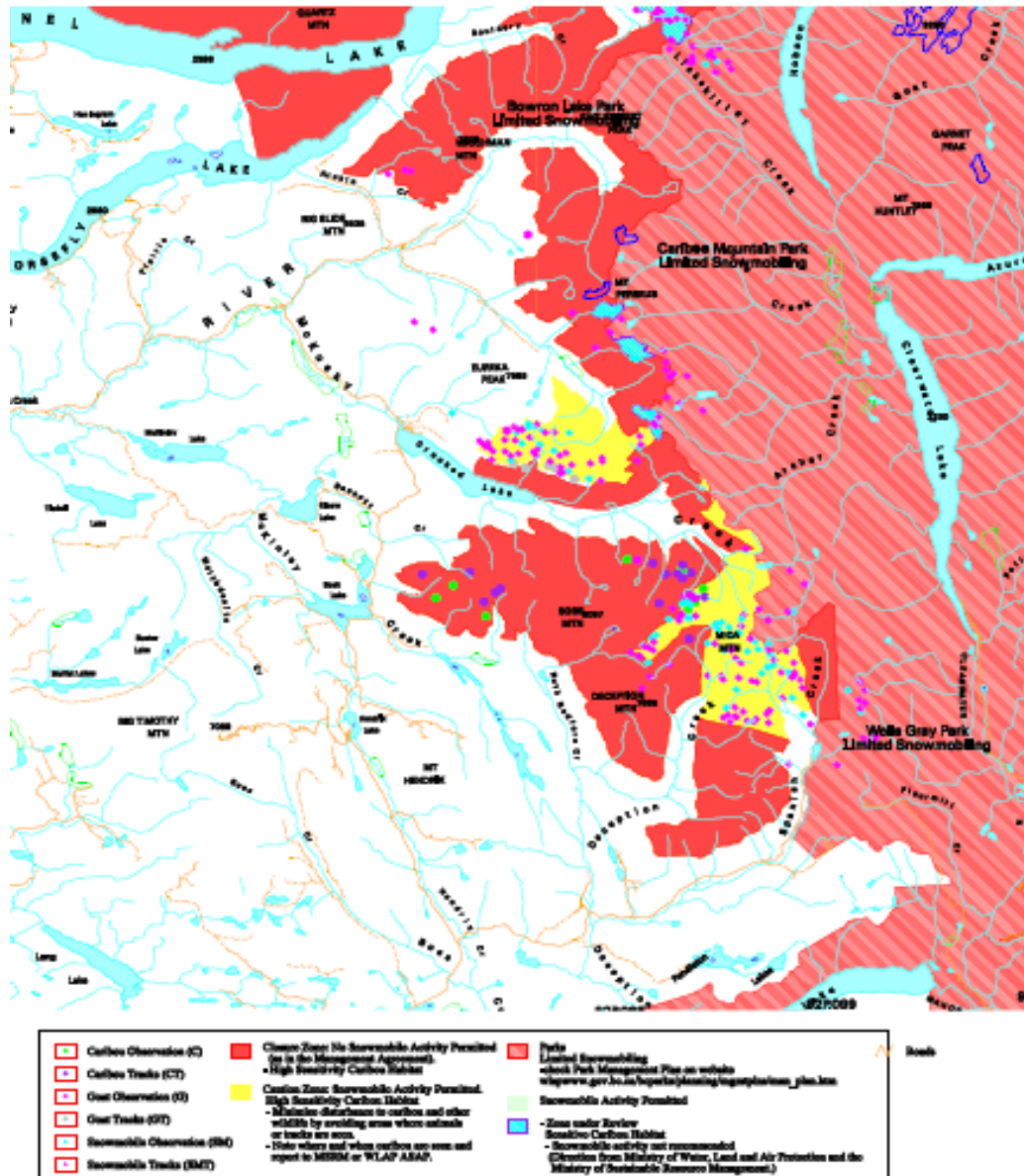
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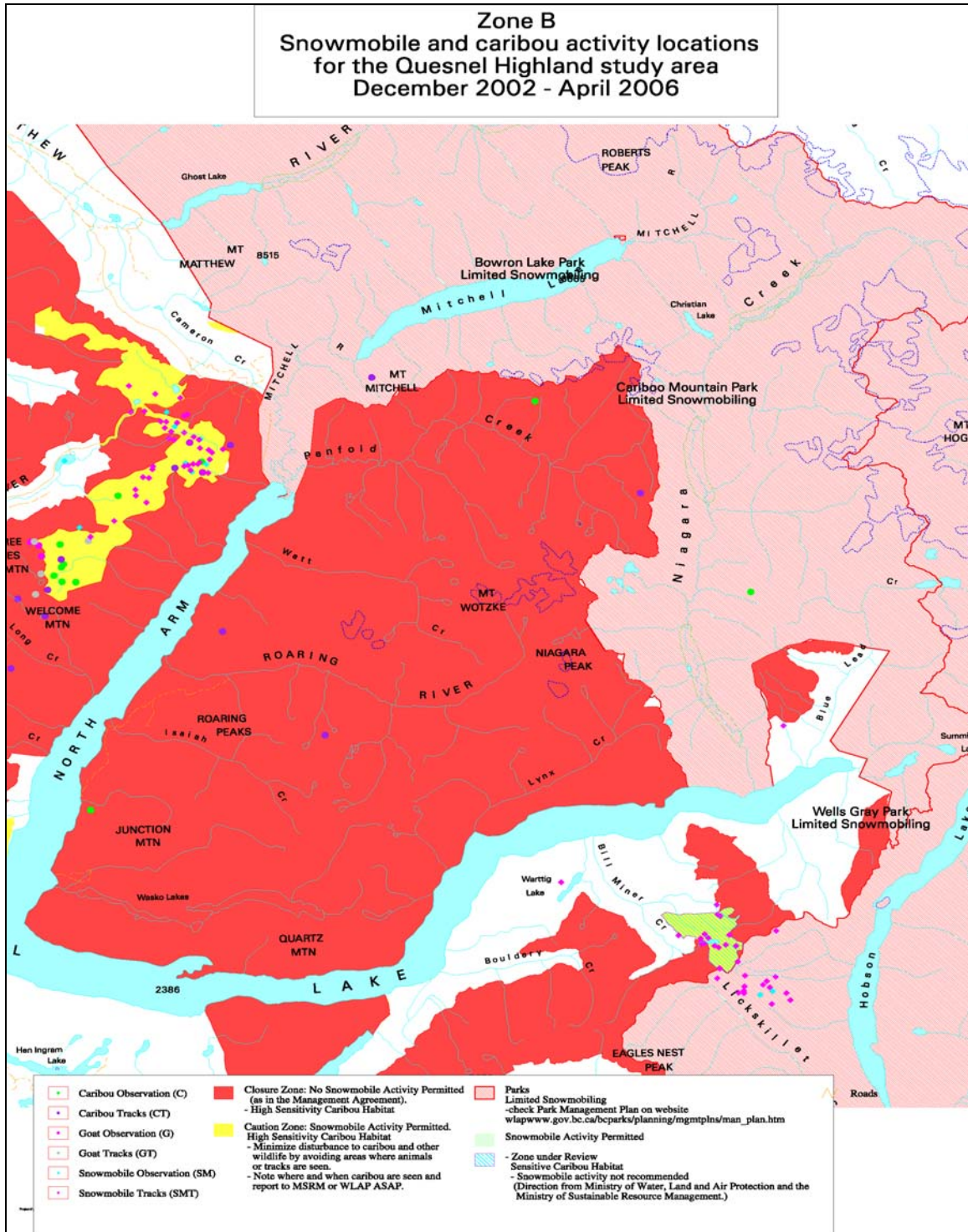
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Appendix 1

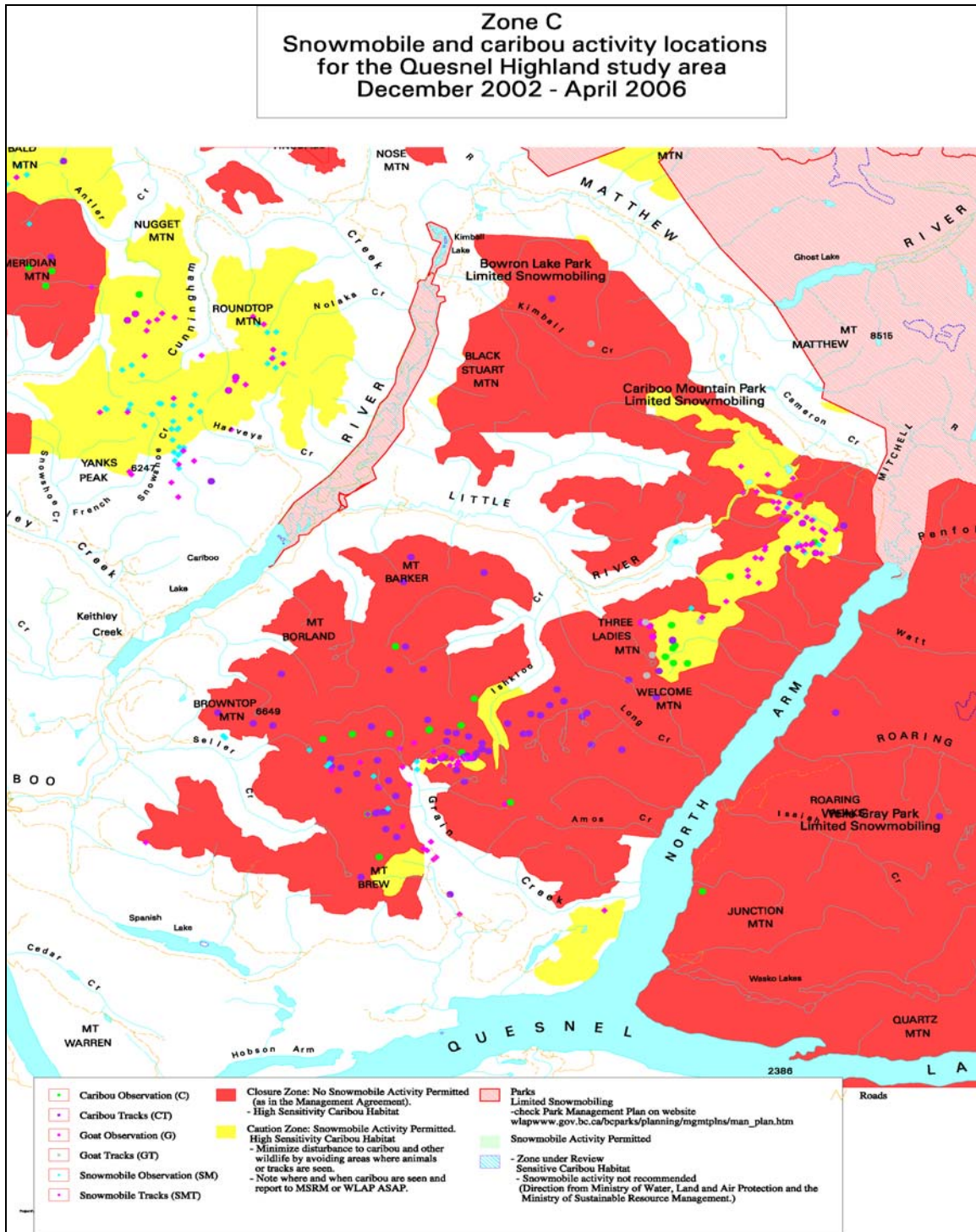
Zone A Snowmobile and caribou activity locations for the Quesnel Highland study area December 2002 - April 2006



Appendix 2



Appendix 3



Appendix 4

