

2004 POPULATION CENSUS
FOR THE
CENTRAL SELKIRK MOUNTAIN CARIBOU

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Executive Summary

Central Selkirk mountain caribou population estimates have declined in every census year since surveys began in 1996. The 1996 census flight observed 211 animals where 12 of 14 radio-collared caribou were spotted. The 2002 census, in which 96 caribou were spotted and 6 of 9 radio-collared animals were sighted, resulted in a population estimate of 131 caribou in the study area. The 2002 result was the first year in which a population trend could be established statistically.

A total of 70 animals, including 13 calves, were spotted during helicopter census flights completed in March 2004. Following the census flights, a supplemental fixed wing survey of the peripheral of the study area was conducted, but no caribou were observed. There was only one radio-collar still active in the study area at the time of the 2004 census; consequently, no measure of sightability (ratio of marked animals seen to known number of marked animals) was calculated. A total count for all census years and population estimates in years where mark-resight data were available are presented.

Due to recent population trend, it is recommended that a population census be conducted every year for the next few years. As mountain caribou are relatively easy to census, weather and climatic conditions permitting, no additional caribou collaring is needed at this time.

Forestry, backcountry recreation and mountain caribou recovery require a coordinated effort if current population trend for the Central Selkirk mountain caribou is to be reversed.

Acknowledgements

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INTRODUCTION

In the fall of 1996, a five-year mountain caribou (*Rangifer tarandus*) inventory project was initiated for the Central Selkirks caribou study area (Figure 1). The purpose was to provide caribou population and habitat information necessary to effectively integrate the needs of caribou with strategic landscape planning and operational implementation. The study included caribou capture and radio-collaring, fixed-wing monitoring of collared caribou, population censuses, winter trailing of caribou, habitat field studies and necropsy of collared caribou mortality.

Several caribou habitat models at various spatial scales were developed based on this work. Multiple logistic regression analysis was used to examine resource selection at the stand and landscape levels (Hamilton *et al.* 1999), multiscale analysis of caribou habitat selection was used to derive a spatially explicit model of caribou habitat at the landscape scale (Hamilton *et al.* 2000) and standardized species-habitat modelling (RIC 1999) was used to develop seasonal capability/suitability habitat mapping (1:20,000 scale) for the known range of caribou in the Central Selkirks (Hamilton and Wilson 2003).

Inventory results were used to develop a caribou-focused landscape unit planning pilot project within the Fish, Trout and Halfway landscape units of TFL23 (LUP Working Group 2002). The project identifies operational landscape unit planning objectives that spatially integrated the habitat needs of caribou with old and mature forest retention requirements identified in the strategic Kootenay-Boundary Higher Level Plan Order (January 2001). The methods and results from this landscape unit pilot project were expanded to cover the entire Central Selkirk study area in 2003 (Hamilton and Wilson 2003). Inventory results were also applied to investigation of cumulative effects of forestry and mechanized backcountry recreation on the Central Selkirk mountain caribou (Wilson and Hamilton 2003).

The plans recommend a caribou population census be conducted at 2-3 year intervals to monitor population trends and overall effectiveness of plan implementation. The last caribou census in the Central Selkirks was conducted in 2002.

The primary purpose of this report is to present the 2004 census results for the Central Selkirks caribou study area. There was only one caribou with an active radio-transmitter collar in the study area at the time of the 2004 census; therefore, no measure of sightability (ratio of marked animals seen to known number of marked animals) was calculated. A total count for all census years and population estimates in years where mark-resight data were available are presented.

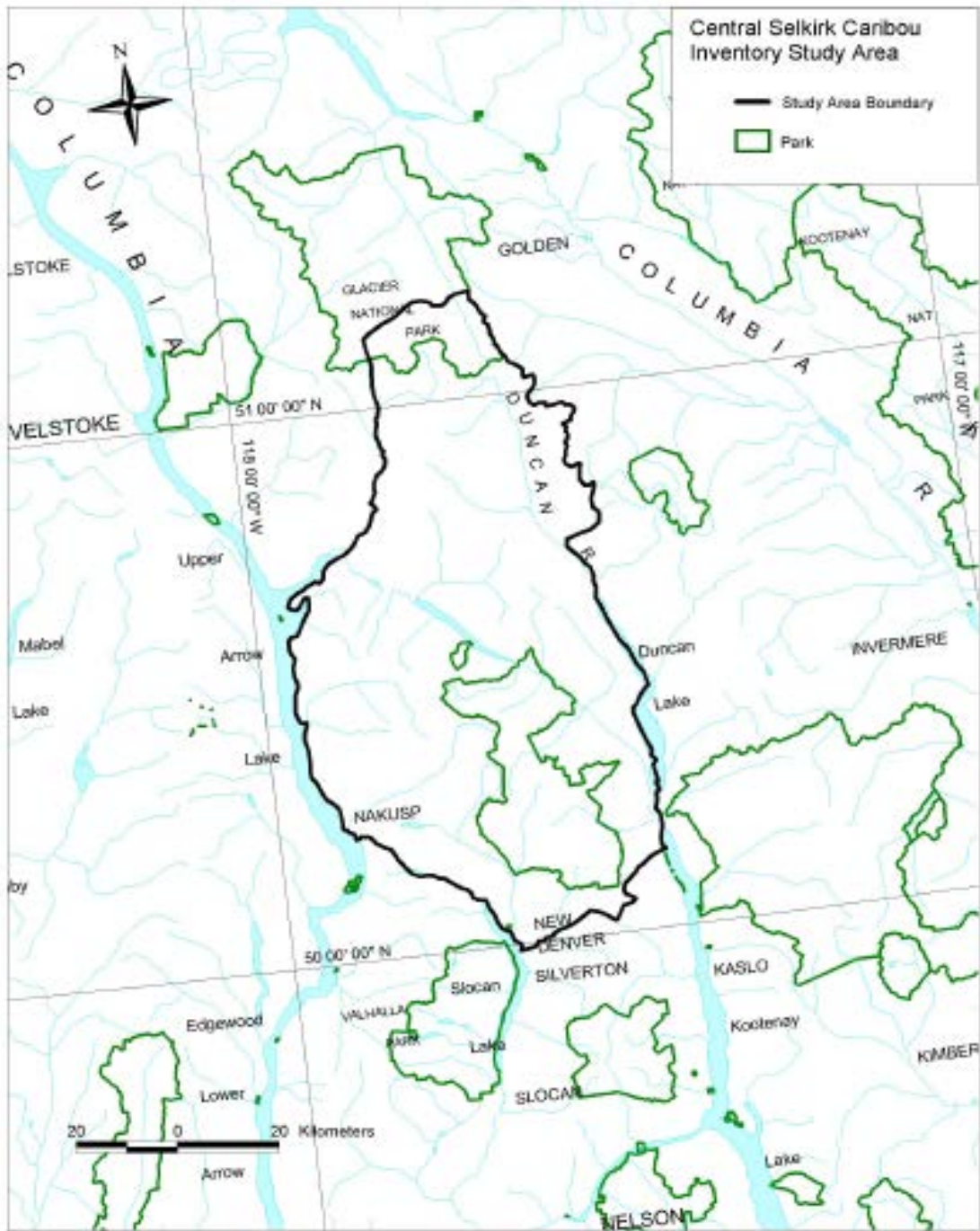


Figure 1: Central Selkirks Caribou Study Area

STUDY AREA

The Central Selkirk mountain caribou study area is located within the North Columbia Mountains Ecoregion and the Central Columbia Mountains and Northern Kootenay Mountains Ecosections (Meidinger and Pojar 1991). The area is characterized by steeply sloping mountainous terrain that is dominated by mature forest at low elevations, rising to rock and glaciers in the alpine, particularly in the northern section of the area. The study area encompasses approximately 6,090 km². It is bounded to the west by the Arrow reservoir and the Lardeau and Duncan valleys to the east and stretches from the town of New Denver in the Slocan valley in the south to Glacier National Park in the north.

Lower elevations are dominated by variants of the Interior Cedar-Hemlock (ICH) biogeoclimatic zone, included the ICHdw in the extreme southern portions of the area, the ICHmw2 along south and west-facing portions of the Arrow and Lardeau valleys, ICHwk1 in higher elevation and northern areas, and ICHvk1 in the far north (Braumandl and Curran 1992). The Engelmann spruce-Subalpine fir (ESSF) zone dominates the high elevation forest and is comprised primarily of ESSFwc1 and ESSFwc4 variants with ESSFwm and ESSFvc variants occurring in the north. The Alpine Tundra (AT) biogeoclimatic zone dominates the highest elevations.

METHODS

In late March 2004, we conducted census flights of the Central Selkirks caribou study area in accordance with the aerial-based inventory methods outlined by Resource Inventory Standards Committee (RISC; 2002). The study area was stratified into Nakusp and Duncan census blocks (Miller 1996). Flight paths were similar to those used in previous censuses (Hamilton and Wilson 2002b; Figure 2). The area was surveyed two days following fresh snowfall.

Because caribou are typically found in high-elevation subalpine areas in late winter, timberline/alpine contours were followed using a Bell 206 helicopter. Helicopter speed and altitude varied along the established flight paths. When tracks or caribou were seen, the helicopter left the flight path until animals were located and counted, and any radio-collared individuals were identified by frequency. If the animals were not located, the number of tracks was recorded.

After completion of the 2-day helicopter census, a fixed wing reconnaissance flight of the peripheral of the study area was conducted. The purpose was to survey the outer boundaries of the known distribution of caribou in the Central Selkirks to identify any additional areas that may be occupied by caribou. Frequencies of potentially active caribou radio-collars were also scanned during the fixed wing flight to determine collar status. No telemetry monitoring of radio-collared caribou in the Central Selkirk study area had been conducted since March of 2002.

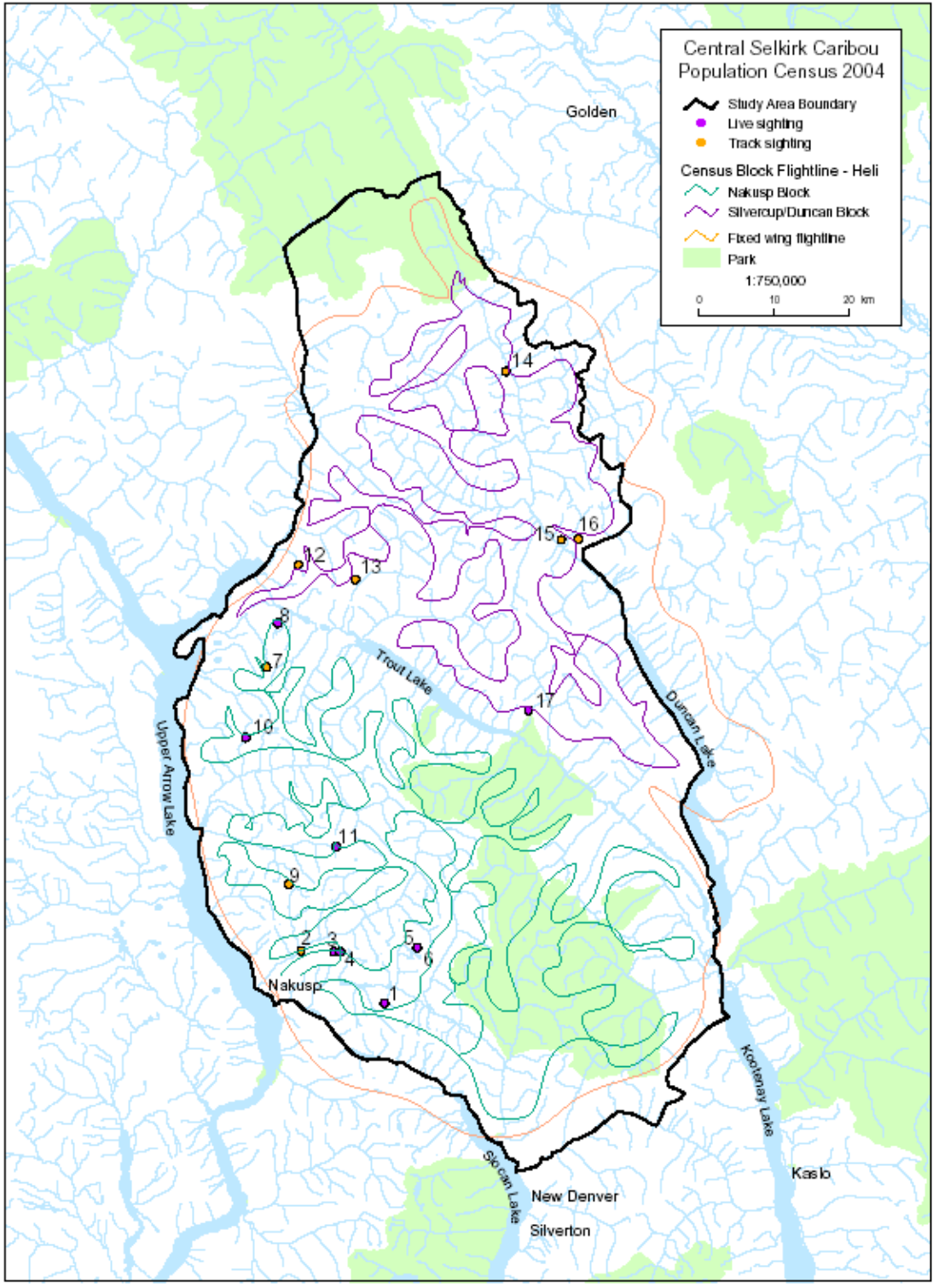


Figure 2: 2004 Census Flight Lines and Observation Locations in Central Selkirk Study Area

RESULTS and DISCUSSION

There has been no aerial monitoring of radio-collared caribou in the Central Selkirk study area since March 2002. Status of VHF radio-transmitters collars on caribou was unknown at the start of the 2004 census. No radio-collared caribou were sighted, so sightability correction factors were not calculated for 2004 census results (previous population estimate results are discussed below).

A total of 70 caribou were counted during the 2004 census (Table 1; Figure 3). Of the 9 sighting locations, 3 sightings were of groups with ≤ 5 caribou, 4 sightings were of groups of 6-10 caribou, and 2 sightings were of groups >11 caribou. Thirteen calves were observed. In addition, 16 sets of tracks were seen but attempts to locate the animals were unsuccessful due to the thick forest canopy that concealed the animals from view.

The fixed wing reconnaissance flight of the peripheral of the study area did not result in any additional observations of caribou; however, a broad scan of radio-collar frequencies revealed one active collar from the Central Selkirk study and one active collar (frequency 148.650) from a caribou that was translocated into the South Selkirks sub-population several years ago. This brought the total live count of caribou in the Central Selkirks to 72. Eight other potentially active radio transmitters from collared caribou in the Central Selkirk caribou study area were confirmed as inactive (*i.e.*, no signal or collar transmitter on mortality alert).

Late winter caribou sightings and group sizes have been decreasing over census years. The 1997 census recorded 222 sightings of caribou. Eight sightings were of groups with >11 caribou, with one group of 23 caribou sighted in the Cape Horn area. Only one group >11 animals was sighted in the Deep Creek area during the 2002 census (much of this area was burned in 2003). Only two areas, the headwaters of Haskins/America Creeks (south end of Silvercup Ridge) and Hamlings Lakes, have supported >10 animals in more than two census years (1997, 2002 and 2004).

Table 1: Central Selkirk caribou census results (March 2004)

Sighting	Drainage	Lat + Long	Adult	Juv.	Total	Tracks only
1	Fitzstubbs	5012.359 11735.082	6	1	7	
2	Jordan Mtn	5016.192 11743.544				1
3	Jordan Mtn	5016.360 11740.373	3		3	
4	Kimbol Lk	5016.719 11739.534	4		4	
5	Hamling Lks	5016.280 11730.411	12	3	15	
6	Hamling Lks	5016.280 11730.411	5	1	6	
7	Beaton	5037.095 11743.977				3
8	Armstrong Lk	5040.145 11742.114	5	2	7	
9	Gardner	5021.398 11744.993				4
10	Nacillawaet	5032.824 11747.039	2	2	4	
11	St Leon	5024.807 11738.294	5	1	6	
12	Johnstone	5044.330 11738.598				1
13	Mt Goat	5043.985 11732.974				1
14	Nemo	5056.178 11712.887				2
15	Duncan	5044.764 11708.080				1
16	Duncan	5044.425 11706.608				3
17	America	5032.069 11714.608	15	3	18	
TOTAL			57	13	70	16



Figure 3: Total Count of Caribou from Population Censuses Completed in the Central Selkirk Study Area

Total live count of the number of animals observed during censuses has declined in each census year since surveys were first completed in 1996. Total counts have dropped from 211 in 1996 to 70 in 2004, a 67% decline. No animals were observed in the Duncan block during the 2004 census, although 6 sets of tracks were seen and few caribou are normally found there. The greatest number of animals observed during any census year occurred in 1997, when 222 animals were counted and 22 of 23 radio-collared caribou were spotted with the Central Selkirk study area.

Previous population estimates were determined using the ratio of marked animals seen to the known number of marked animals as a measure of sightability. Hamilton and Wilson (2002b) reported a population decline of 53% between 1996 and 2002, although 2002 was the first year in which this trend could be established statistically (Table 2; Figure 4).

Table 2: Total and adult-only population estimates for the Central Selkirks Caribou Study Area

Study area	All age classes			Adults only			
	Year	Minimum	Estimate	90% CI	Minimum	Estimate	90% CI
	1996	211	268	230-354	189	246	208-332
	1997	223	231	223-266	206	214	206-239
	1999	181	213	190-266	167	199	176-252
	2002	96	131	105-207	80	115	89-191
	2004	72	-	-	59	-	-
Nakusp only							
	1996	186	211	191-264	167	192	172-245
	1997	203	211	203-236	186	194	186-219
	1999	155	182	162-226	143	170	150-214
	2002	76	103	83-162	64	91	71-150
	2004	72	-	-	59	-	-
Duncan only							
	1996	25	-	-	22	-	-
	1997	24	-	-	20	-	-
	1999	26	-	-	24	-	-
	2002	20	-	-	16	-	-
	2004	0	-	-	0	-	-

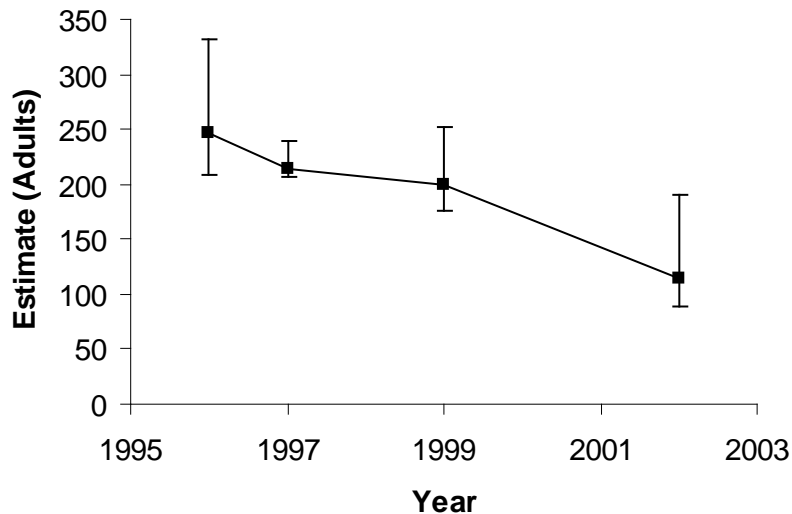


Figure 4: Adult-only population estimates for the Central Selkirk caribou herd based on the maximum likelihood joint hyper geometric estimator for closed populations and 90% confidence intervals.

Hamilton and Wilson (2002b) reported a downward trend in the Central Selkirks caribou population from an estimated 246 adults in 1996 to 115 in 2002, a 53% decline. We speculated the reasons for the decline to be largely unknown, but likely cumulative. Probable impacts include forest harvesting that reduces standing crop of arboreal lichens available during critical periods, increasing commercial and non-commercial backcountry recreation use and possible disturbance and/or displacement of caribou from preferred habitat, and recent mild winters that might have restricted access to arboreal lichens at high elevations (*i.e.*, caribou couldn't reach lichens because of shallow snow), forcing them to remain at lower elevations where predators are more common. Additional factors noted in the Recovery Action Plan for the North Kootenay Mountain Caribou (Hamilton *et al* 2003) included forest fragmentation that favours other ungulate species and their predators and increases in human access into seasonal habitats occupied by caribou. These reasons remain relevant.

A conscious effort was made during the census flights to minimize stress and/or harassment to the animals. Consequently, when initial effort to locate caribou in heavily forested stands was unsuccessful, we did not continue extended flying in the vicinity of the tracks to further attempt to 'flush' the animals into the open. In such instances the observation was recorded as 'tracks' only. Results should be interpreted accordingly.

RECOMMENDATIONS

The total live count results from 2004 are consistent with earlier trends reported for the Central Selkirk caribou population. Further work, particularly around cumulative impacts, is required to determine the causes of the population decline.

Hamilton and Wilson (2002b) noted there are stresses to caribou associated with capture and radio-collaring that can result in direct mortality. There is also anecdotal evidence that captures can sensitize animals to future disturbances by aircraft and can create additional stresses that might last for years. It is thus difficult to justify additional radio-collaring. Rather, it is recommended that effort should shift to flying censuses once or twice per year and relying on relative numbers to identify population trends.

Efforts should continue to reverse the decline of the Central Selkirk mountain caribou. Coordination of caribou management efforts being made by the forest industry, backcountry recreation users and government will be needed. Attention should focus on caribou recovery planning and use of existing data on caribou habitat use and distribution in relation to cumulative impacts on the landscape.

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