MOUNTAIN GOAT SURVEY OF SOUTHWEST YUKON AND NORTHWEST BRITISH COLUMBIA 2007

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Yukon Fish and Wildlife Branch
TR-11-14

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Summary

Mountain goat range along the border region between Atlin B.C. and Haines Junction Yukon was surveyed during February and March 2007. The project was a collaboration between Environment Yukon and the British Columbia Ministry of Environment.

The survey area comprised approximately 10 000km^2 of known goat range. A total minimum count survey method was used.

Surveyors counted 331 goats (278 adults and 53 kids) which were evenly distributed between eastern and western parts of the survey area.

Surveys were carried out by Yukon government staff and members of the Champagne and Aishihik First Nations and Carcross/Tagish First Nations.

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Introduction

Yukon and British Columbia share mountain goat populations along their common border between Haines Junction, Yukon and Atlin, B.C. Over the years, surveys have been flown in parts of this range but this was the first attempt to cover the entire range in one season.

This survey was designed to provide a comprehensive assessment of the distribution and abundance of mountain goats to inform future management of these shared populations. Prior surveys of the area include a 1990 inventory of mountain goats and Dall's sheep in Management Unit (MU) 6-27 (Schultze 1990) and surveys of Game Management Subzones (GMS) 7-10, -11,-12, and -28 conducted by the Yukon government (1978, 1984, 1992, 1998, 2000, and 2001). The southern portion of the area (MU 6-28) had not been previously surveyed.

Mountain goats are difficult to survey. They are sparsely distributed throughout most of their range and their population dynamics appear to vary widely among populations. Mountain goat herds are extremely vulnerable to over harvest and are prone to rapid, often critical, population declines (Hamel *et al.* 2006). The late age of first reproduction in females and inherently low recruitment rates (Cote and Festa-Bianchet 2001) contribute to their harvest sensitivity. In addition to biological limitations, environmental constraints such as habitat quality and quantity may also limit productivity of goat herds. In this survey area, mountain goats occur at the northern-interior extent of the species' range (Figure 1).

Given that these goats are actively harvested but managed independently by each jurisdiction, they are lightly distributed, and habitat could be limited, it is important that management agencies actively collaborate to ensure population stability and avoid local extirpation of herds.

This survey was jointly funded by Environment Yukon and the B.C. Ministry of Environment and lead by Environment Yukon staff.

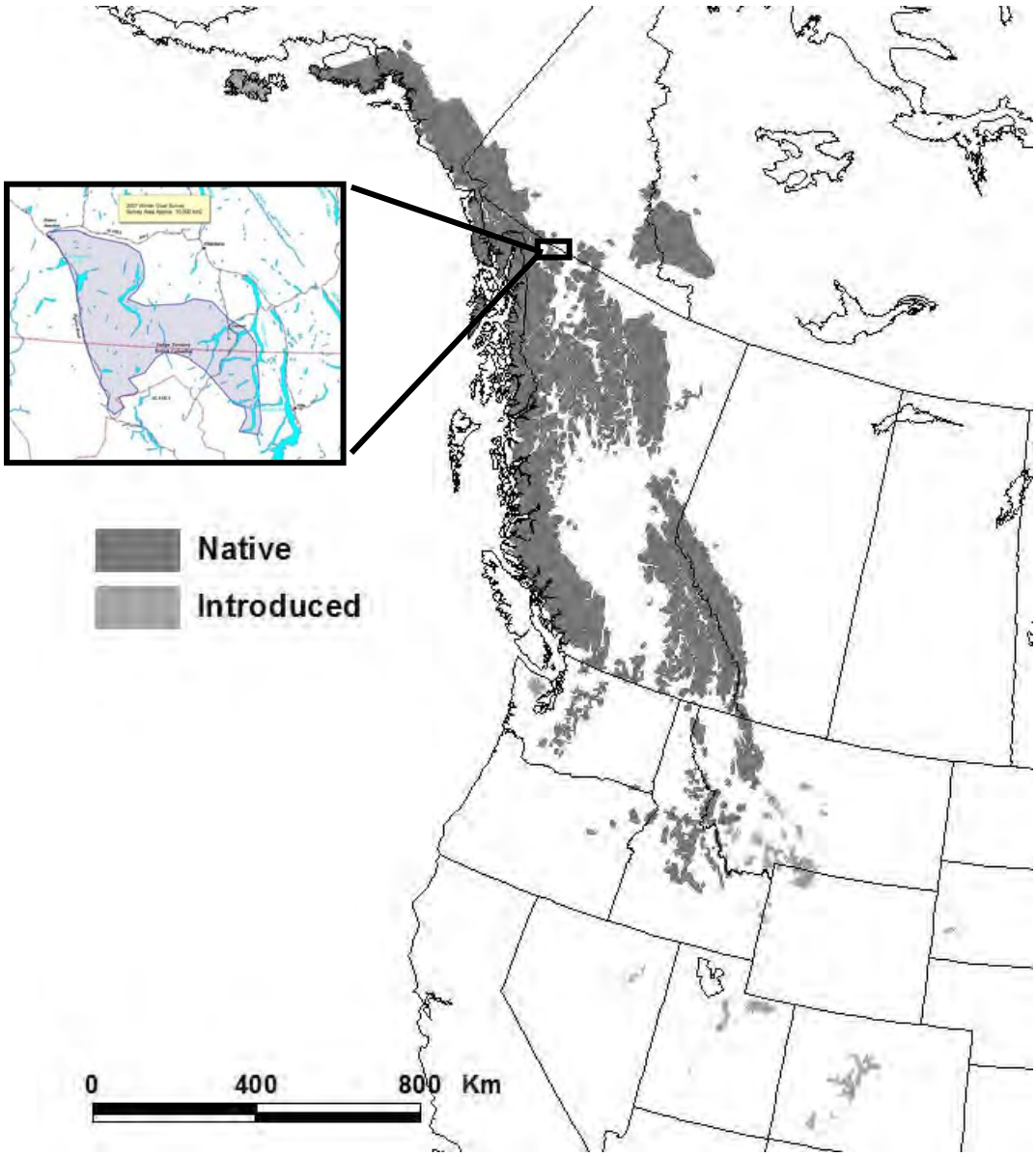

Figure 1: North American mountain goat distribution (B.C. Ministry of Environment 2010) and 2007 B.C./Yukon survey area.

Harvest Management

Although their range spans the provincial border, mountain goats are managed independently by British Columbia and Yukon. The mountain goat hunting season in British Columbia is August 1 to October 15, while the Yukon season is August 1 to October 31. All but 2 Yukon GMSs are closed to all licensed hunting while B.C. regulations range from a general open season with unrestricted harvest for resident hunters and permit-holding guides to a limited entry hunt (LEH) regulated through quota restrictions (Table 1).

Table 1. Hunting regulations for B.C. Management Units/ Yukon GMS surveyed.

Zone/MU	Licensed Authorizations (per year)	Number of Guides (BC)	Guide Quota (BC)
6-27 (Open Area)	unrestricted	2	unrestricted
6-27A (LEH)	5	1	1/year
6-27B (LEH)	7	1	1/year
6-28B (LEH)	15	1	1/year
6-28 (Open Area)	unrestricted	2	unrestricted
6-29 (Open Area	unrestricted	1	unrestricted
7-10	closed		
7-11	closed		
7-12	closed		
7-28	closed		
7-32	closed		
7-33	closed		
7-34	1		
7-35	2		
7-36	closed		
9-06	closed		

Objectives for the 2007 survey were to:

- Update population data for mountain goats inhabiting southwest Yukon and northwestern British Columbia;
- Identify important mountain goat wintering areas within this goat range;
- Facilitate communication on management of transboundary mountain goat populations between Yukon and British Columbia; and
- Increase involvement of affected First Nations in management of species of concern.

Study Area

The survey area was bounded by the Haines Road to the west, Tagish Lake to the east, and the Alaska border to the south. The northern boundary was approximately 35 km north of the B.C. / Yukon border, and represents the regional northern extent of mountain goat

range. Time and weather constraints prevented inclusion of Yukon GMS 7-29 east of Primrose Lake (Figure 2).

The entire survey area was approximately 10 000 km$^{2.}$ For logistic reasons it was divided into eastern and western survey areas, based on topographic features (Figure 2).

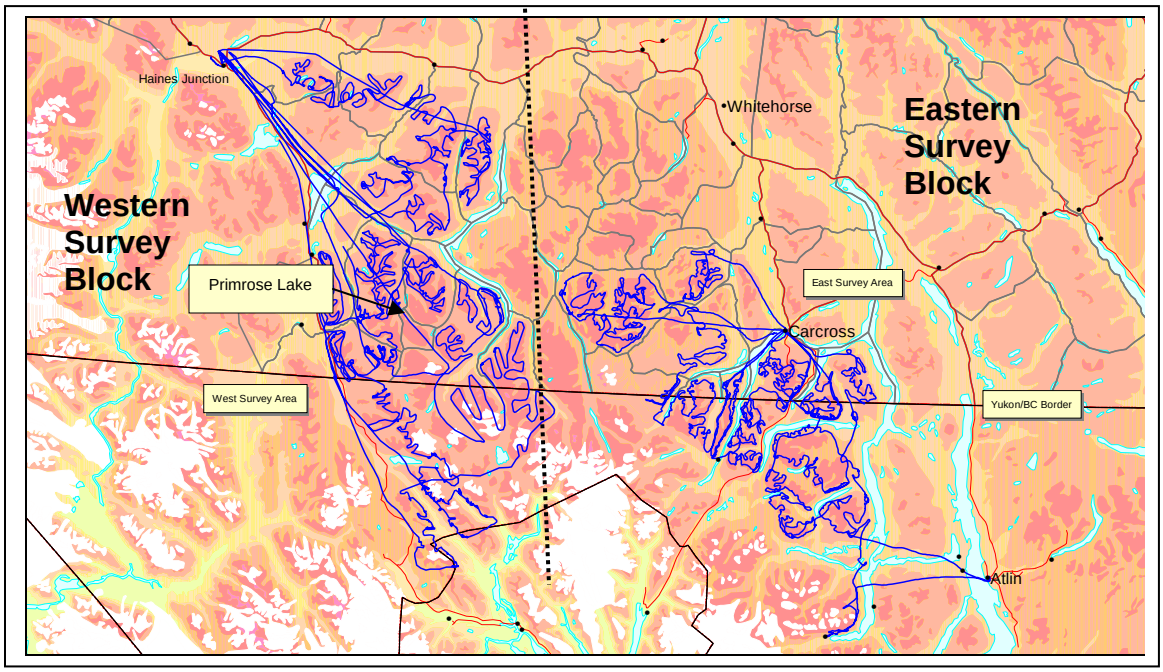

Figure 2: Generalized survey area, designation of eastern and western boundaries and survey flight lines.

Survey Methods

Survey units encompassed known goat range and areas which appeared to be high quality winter habitat. Survey crews consisted of the pilot, Environment Yukon navigator and two experienced observers (staff from Environment Yukon and local First Nations).

Mountain blocks were surveyed systematically from the base of the mountain working upward in elevation. Much of the survey area was not ideal range (glaciated or high elevation with no vegetation) so search intensity of each block varied according to the perceived habitat quality and the presence or absence of animal sign. Track detection was the primary search method used to initially detect animals. Once tracks were identified, the area was searched until the animal(s) were located. Many animals could not be reliably identified to age or sex classes and were therefore categorized as either a kid or adult (“non-kid”).

Flight tracks and goat locations were recorded with a GPS (Garmin 76) with map datum set to WGS 84. Aircraft for all survey flights were Bell Jet Ranger 206B helicopters.

Results

Survey

The survey of the west block was completed between February 12 and March 8, 2007 and the east block was completed March 12 to18, 2007. In total, 42.3 hours of survey time were flown.

Throughout the survey, weather conditions were dominated by a high pressure system with consistently strong northerly outflow winds. Periods of heavy cloud and periodic snow flurries hampered survey efforts, prolonged the survey timeframe, and prevented coverage of some areas. Record high snowfall during winter 2006/2007 resulted in very little exposed ground and conditions were comparable to those of a mid-winter survey. Most flights were conducted in fair weather conditions with good light for visibility and track definition.

Mountain Goat Observations

A total of 331 goats were counted: 278 adults and 53 kids. There were 163 goats (139 adults and 24 kids) seen in the western survey block and 168 goats (139 adults and 29 kids) in the eastern block.

Along jurisdictional lines, a total of 76 goats (63 adults and 13 kids) were seen in Yukon (Table 2) and 228 goats (193 adults, 35 kids) in British Columbia (Table 3). An additional 27 goats were observed in Alaska near the southwest border of MU 6-28.

Table 2. Number of mountain goats observed in Yukon GMSs, February-March 2007.

Yukon GMS	Adults	Kids	Total
7-07	3	2	5
7-10	9	2	11
7-12	4	1	5
7-32	1	0	1
7-33	2	1	3
7-34	11	1	12
7-35	10	2	12
7-36	22	4	26
9-06	1	0	1
TOTAL	63	13	76

Table 3. Number of mountain goats observed in B.C. WMUs, February-March 2007.

B.C. WMU	LEH Zone	Adults	Kids	Total
6-27	-			
6-27	A			
6-27	B			
TOTAL 6-27		45	10	55
6-28	-			
6-28	B			
TOTAL 6-28		148	25	173
TOTAL		193	35	228

Discussion and Recommendations

While the total count for this survey was 331 goats, it is acknowledged that a single aerial survey cannot provide an accurate population estimate. Goats typically inhabit steep, complex terrain and their instinct is to hide rather than flee from aircraft. Gonzalez-Voyer *et al* (2001) found that on average, 69.5% of a marked mountain goat population was located, with the proportion of goats seen in any one survey ranging from 55% to 84%.

Successful winter surveys of white-coloured wildlife rely heavily on good snow and light conditions to aid track detection. Although there was fresh snow throughout the survey area, consistently strong winds frequently resulted in tracks being drifted over. Several animals were located under cliffs with no clear evidence of tracks suggesting that animals may have been missed due to lack of sign. However, unusually deep snow may have concentrated animals and limited their distribution, possibly increasing the chances of their detection.

It is difficult to compare results of this survey with the previous records because of the inconsistent coverage and timing and variable time since the last survey (1 to 17 years). There are however, several points which can be made regarding the results.

Population counts were lower than expected for much of the survey area, which raises concerns about the long-term viability of these populations under current management regimes. Recent work by Hamel *et al.* (2006) indicates that small (n=25) and medium (n=50) size populations have an extinction risk of 18 to 82% over 40 years (harvest notwithstanding). Further, they show that non-selective yearly harvest rates greater than 1% of goats 2 years and older were not sustainable

over the short term for some populations. Clearly, these findings are important to the relatively small, isolated populations within the survey area, and should be important management considerations. Although definite population size is not known, we assume that a number of the local populations including those around Kusawa Lake and Ben-My-Cree are sufficiently small that they should be closely monitored to ensure long term population stability.

Survey results from the Kusawa Lake area support the idea that populations are vulnerable to decline even under very light harvest pressure (Figure 3). Repeated surveys in the Kusawa area in response to hunter demand for additional goat hunting opportunities, suggest goat numbers have declined even though there has been no licensed harvest since 2000. It is important to consider management of other populations and the factors that might initiate declines.

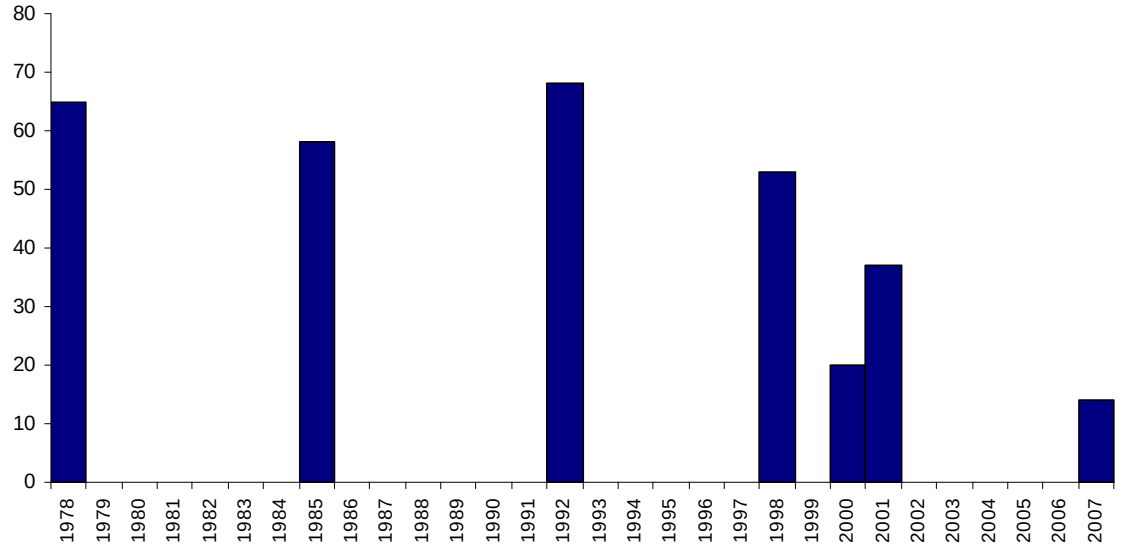

Figure 3. Total number of goats counted in the Kusawa Lake area (GMS 7-10, -11, -12, and -28).

Survey results from the Kelsall Lake area and the area north of Tutshi Lake to Bennett Lake showed reasonable goat numbers through this survey. The shared Tutshi to Bennett Lake population (Yukon GMS 7-34 and -35, B.C. MU 6-28B is relatively accessible and an example of an area that would benefit from inter-jurisdictional review. On average 1 goat is taken in the Yukon range (average 0.2 in 7-34, 0.8 in 7-35) while in the adjacent B.C. area the average annual harvest is 1.4, for a total of 2.4 goats per year (Table 4).

Table 4. Annual B.C. / Yukon mountain goat harvest by zone 1997-2006

Zone	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Average Annual Harvest 1997-2001	Average Annual Harvest 2002-2006
6-27	9	7	5	6	9	6	10	12	8	3	7.2	7.8
6-27A	2	2	1	1	3	1	1	3	2	0	1.8	1.4
6-27B	2	1	2	2	1	1	2	3	1	1	1.6	1.6
6-28B	1	1	1	0	1	0	1	5	1	0	0.8	1.4
6-28	10	12	5	2	6	2	5	5	5	3	7	4
6-29	3	5	2	4	3	4	2	4	4	1	3.4	3
7-10	0	0	1	2	1	0	0	0	0	0	0.8	0
7-11	0	0	0	0	0	0	0	0	0	0	0	0
7-12	0	0	1	2	0	0	0	0	0	0	0.6	0
7-28	0	0	0	1	0	0	0	0	0	0	0.2	0
7-34	0	1	1	1	0	1	0	0	0	0	0.6	0.2
7-35	1	2	2	0	1	0	1	1	1	1	1.2	0.8
7-36	0	0	0	0	0	0	0	0	0	1	0	0.2
9-06	0	0	0	0	0	0	0	0	0	0	0	0

While harvest on either side of the border may not appear high, an overall harvest of 2.4 goats per year from a population of 52 adult is a 4.6% harvest rate. A re-evaluation of harvest numbers by management unit should be considered in the transboundary area to ensure that regulations support a sustainable harvest.

Collaborations between Yukon, British Columbia, and First Nation governments should also be encouraged so that full information supports a full discussion of the current management approach of goats along the shared jurisdictional boundary.

The Management Plan for the Mountain Goat (*Oreamnos americanus*) in British Columbia (2010) provides recommendations for improved census techniques, harvest, and habitat management and should be reviewed for its relevance to Yukon mountain goat management, in the absence of our own plan.

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