2000 DALL SHEEP SURVEY

AT

SHEEP MOUNTAIN

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Introduction

The annual sheep survey took place at Sheep Mountain on June 17 with Doug Makkonen as the acting pilot. Terry Skjonsberg, Doug Clarke of the Canadian Parks Service, and Manfred Hoefs of the Fish and Wildlife Branch, YTG were the recorder/observers. The survey took 1.25 hours (1105-1220 hours) while the temperature was approximately 10°Celsius with a westerly wind gusting from between 20 and 30 kilometers per hour. There was still an abundance of snow on the higher elevations, which could have kept the sheep at lower elevations, but it is not known what effect if any this would have on the population.

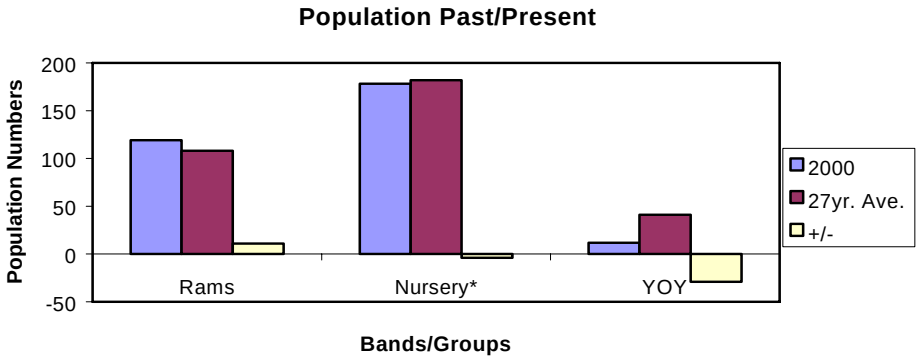
This population of Dall's Sheep (*Ovis dalli dalli*) at Sheep Mountain has been the subject of study for over thirty years, and the area is a no harvest zone.

Methods

This total count survey was carried out with classifications for adults (with subclasses for males, females, and unknowns), and juveniles (with subclasses for young of the year and yearlings). The survey area and methodology were as described by Skjonsberg (1994). As in the past the nursery band includes sheep of both sexes, as they are almost indistinguishable at early ages (especially from the air). All sheep were well within the study area except for the observations in the Congdon Creek area (observations numbered 24, 25, and 26). When these sheep were first spotted, they were on the south side of Congdon Creek (in the study area), but they then moved to the north side (most likely because of the helicopter). Because the Congdon Creek area doesn't have any physical barriers, it has been an area of contention concerning the boundary for the study area.

Results & Discussion

For this year, there is a higher number of rams, less nursery sheep and young of the year. The following chart shows the populations' changing numbers in reference to the average of the years including 1974 to 2000.



These changes in the population could be due to a number of factors like bad weather, poor plant production, immigration, emigration, and increased predation, or natural fluctuations. More results are shown in Table 1.

Weather is very important for a couple of reasons: plant production or net primary production (NPP), and the sheep can be seriously effected during lambing time with a late spring. Conversely, a late spring might boost plant growth by allowing more moisture to penetrate the soil.

Immigration and emigration might not be too important as they most likely balance out in the end. The number of sheep leaving the study area probably equals the number of sheep entering the same area.

In my opinion it is probably the fluctuations of predator pressure, which may be the biggest culprit in this case. The significantly low lamb crop may be correlated with

Table 1

Summary of Sheep mtn. Dall sheep surveys from 1974-2000

Year	Rams	Nursery sheep *	YOY	Total	YOY/total ratio	YOY/nursery ratio
1974	123	187	27	337		14.8%
1975	97	190	11	298		5.8%
1976	146	114	13	273		11.4%
1977	165	113	28	306	9.2%	24.8%
1978	142	104	38	284	13.4%	36.5%
1979	100	185	77	362	21.3%	41.6%
1980	154	143	41	338	12.1%	25.2%
1981	100	226	49	375	13.1%	21.7%
1982	112	221	11	344	3.2%	4.9%
1983	89	172	22	283	7.8%	12.8%
1984	92	185	69	346	19.9%	37.3%
1985	140	205	46	391	11.7%	22.4%
1986	100	228	36	328	10.9%	15.8%
1987	71	201	47	319	14.7%	23.4%
1988	158	142	88	388	22.7%	61.9%
1989	104	189	51	344	14.8%	26.9%
1990	76	187	67	330	20.3%	35.3%
1991	69	210	44	323	13.6%	21.0%
1992	63	184	20	267	7.5%	10.9%
1993	123	201	62	386	16.6%	30.8%
1994	79	182	33	294	11.2%	18.2%
1995	113	170	41	324	12.7%	24.1%
1996	97	193	42	332	12.6%	21.8%
1997	103	172	66	347	19.0%	38.4%
1998	91	232	55	378		23.7%
1999	87	208	21	316		10.1%
2000	119	178	12	309		6.7%
27yr. long term average						
	108	182	41	332		22.5%
2000's numbers of sheep above or below 27yr. average						
	+11	- 4	-29	-23		-15.8%

the local Snowshoe Hare (*Lepus americanus*) population and its' influence on the local predator population.

At this time, the Snowshoe Hare is going through a crash phase of their population cycle, which, in my opinion, would leave a lot of predators looking for an alternative food source. The Kluane National Park Reserve Resource Description and Analysis lists the main predators of these sheep as coyotes, golden eagles, and wolves. But, hunted less frequently by wolverine, lynx, and grizzly bears (Hoefs & Cowan 1979). The following is a summary of the feeding habits of these predators.

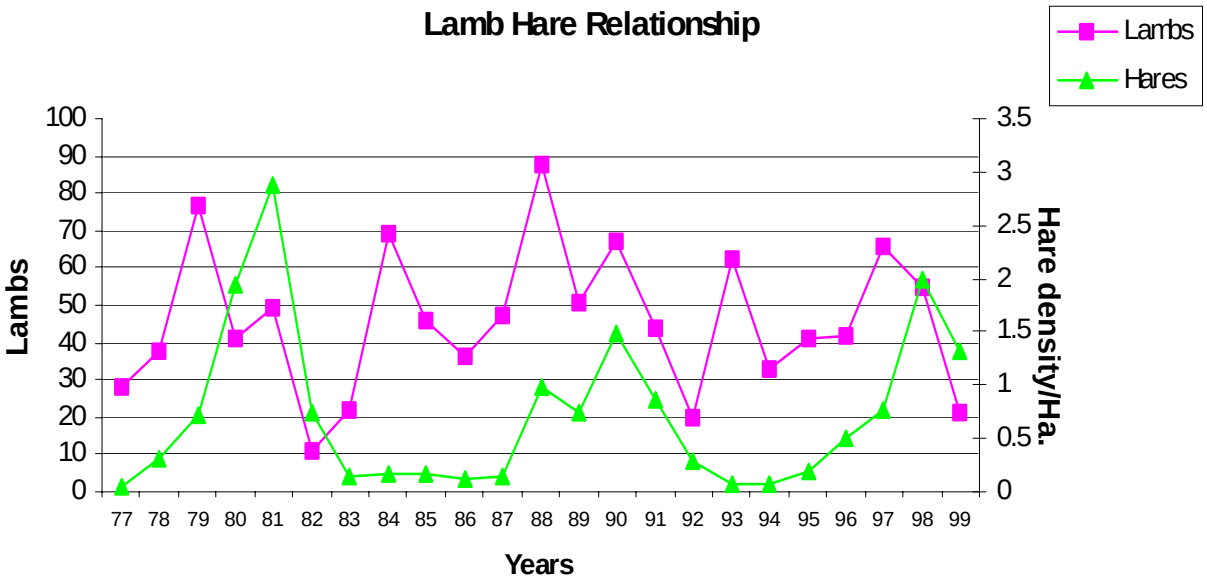
- Coyote (*Canis latrans*) –The coyote is a recent arrival to the Yukon, which brings the question of what effects will emerge because of its' dispersal to this area. The sheep are native to the area, and due to ecological change, have gained a 'new' predator. Though the coyote favors Snowshoe Hare (need a reference for this) and lives in a cyclical population because of it, they will, being opportunistic scavengers, attempt to eat other prey.
- Golden eagle (*Aquila chrysaetos*) –One of the largest raptors in the Kluane area and prey consists of hares, marmots, squirrels, various rodents and birds (Armstrong, 1983).
- Wolf (*Canis lupus linnaeus*) – Their principle food is moose and other large mammals, such as caribou and sheep, but they are also opportunistic hunters of small mammals (Cottrell 1975).
- Wolverine (*Gulo gulo*) –Wolverine prey on small and large mammals such as moose calves, caribou, sheep, and mountain goats (Youngman 1975).

- Lynx (*Lynx lynx canadensis*) –The lynx diet consists almost exclusively of Snowshoe Hare, but they also prey on rodents and birds (Burt & Grossenheider, 1964).
- Grizzly bear (*Ursus arctos horribilis*) –These bears are omnivorous which means that they eat both plant material and meat. Grizzly bears eat many different types of plants which I won't mention, but the meat section of their diet is relevant to this paper and includes insects, mice, ground squirrels, beaver, marmots, moose, deer, elk, caribou, mountain sheep, mountain goats, salmon, and carrion of all types (not necessarily in that order).(Hummel & Pettigrew, 1991)

I listed the predators and their food sources to illustrate how this correlation between the Snowshoe Hare and the lamb-crop could be realized. By showing the predators preferred food sources (Snowshoe Hare) with underlines, and the alternatives, I thought the possible correlation might be more apparent.

John Wilmshurst, a statistician for Parks Canada, helped me with the statistical analysis of this data, which shows a trend towards a positive relationship between the Snowshoe Hare population and the Sheep Mountain lamb productivity. This relationship is most likely due to predator pressure, but this hypothesis requires further investigation.

The following graph shows twenty-three years of hare data (Krebs, et. al. KEMP, 2000) combined with the corresponding years of lamb-crop data (Canadian Parks Service, 2000).



As shown, the only problem with the correlation theory, are the data points 6 (82) &16 (92). At these points, the lambcrops seem to rebound immediately while the hare population is still decreasing. This could be explained by evidence that shows predator numbers crashing with the hares (not shown in graph). The predator data shows that population numbers stay down for about three years following the hare crash (Hofer, 2000). These three years would provide a break for the lambcrops and the general sheep population.

If this relationship continues, I would be inclined to predict that lamb-crops would be more significant as the Snowshoe Hare population recovers. Usually the lamb-crops are revitalized within a season or two of a hare crash. This may be due to predators dying off, age class changes, and/or the weather and other factors.

Acknowledgments

I would like to mention a special ‘Thank You’ to Manfred Hoefs, who is retiring this year, and also to Charles Krebs, Liz Hofer and the rest of the Kluane Ecological

Monitoring Program team. This paper would not have been possible without the work of these people.

Recommendations:

- Predator surveys should be carried out on an annual basis.
- Net Primary Production (NPP) should be calculated each year. After sufficient data is collected with the corresponding weather information, a production curve could be produced for the area. Eventually, this data could lead to a calculation of carrying capacity for Sheep Mountain.
- Weather surveys (at or near lambing elevations) should be added to the continued monitoring of this population.
- The area should remain a Special Preservation Area to protect rare plant species and to serve as a control for other sheep populations.
- The survey should remain consistent in annual timing, and some effort to control the quality of observations in the Congdon Creek area must be made.

References

Armstrong, R.H. 1983. A New Expanded Guide to the Birds of Alaska. Alaska Northwest Publishing Company, Anchorage, Alaska.

Burt, W.H. & R.P. Grossenheider. 1964. A Field Guide to the Mammals. Houton Mifflin Company Boston.

Cottrell, T.J. 1975. An Evaluation of the National Park Planning Process with Implications for Wildlife: A Case Study of the Kluane National Park. M. A. Thesis, University of Waterloo, Waterloo. 241 p.

Hoefs, M. & I. McT. Cowan. 1979. Ecological Investigation of a population of Dall Sheep (*Ovis dalli dalli* Nelson). Syesis 12 (Suppl. 1):83 p.

Hofer, Liz. 2000. Kluane Ecological Monitoring Program. Unpublished data.

Hummel, Monte and Sherry Pettigrew. 1991. Wild Hunters: Predators in Peril. Key Porter Books Limited, Toronto, Ontario.

Krebs, C.J. 2000. Klaune Ecological Monitoring Program. Unpublished data.

Skjonsberg, T. 1994. Dall Sheep Survey Methodology for Sheep Mountain. Kluane National Park Reserve, Canadian Parks Service.

Youngman, P.M. 1975. Mammals of the Yukon Territory. National Museum of Canada. Publ. In Zoology No.10. Ottawa. 192 p.