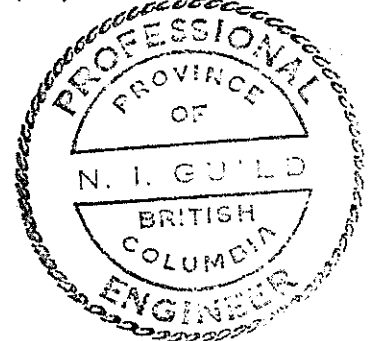




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4 October 1982

Habitat Management  
Northwest Territories Wildlife Service  
Government of the Northwest Territories  
Yellowknife, Northwest Territories  
X 1A 2L9

Attention: Mr. Paul A. Gray, Supervisor

Reference: K4718 - Prairie Creek Project: Wildlife Studies, 1982 Addendum

Dear Paul;

Attached is our draft report dealing with the first (Dall's sheep) of three topics we were to address. The other two topics (thermal cover and caribou calving) are being studied at present and our timetable for completion is 8 October.

Sightings of lambs and ewes have been plotted, photographs and air photos examined in order to get a better definition of Dall's sheep lambing distribution. I have reviewed the recent literature and spoken at length with Dr. Wayne Heimer of Alaska. Heimer made two points: Dall's sheep are very faithful to traditional sites and the large mammal least likely to retreat because of development. Second, they show little response to humans. He even had doubts that MacArthur's measurements of elevated HR in sheep in response to approaches by man coming over a ridge, and with a dog within 150 m were a valid measurement of stress (J. Wild. Mgmt. 46).

These views plus the considerable elevational buffer near the mine were my chief reasons for concluding in the attached text that impacts of development at Prairie Creek on sheep will be negligible.

Your comments would be most welcome.

Yours truly

BEAK CONSULTANTS LIMITED

Ian Robertson  
Director, Terrestrial Sciences

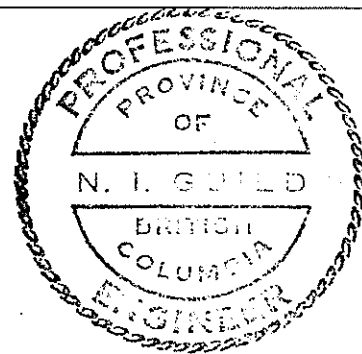
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cc: Gerry Hamilton, Cadillac Explorations  
✓ Norman I. Guild, Ker Priestman & Associates Ltd.

**RECEIVED**

OCT 7 1982

KER, PRIESTMAN  
& ASSOCIATES LTD.



FILE: K4718  
DATE: October 1982

PRAIRIE CREEK PROJECT  
WILDLIFE STUDIES  
1982 ADDENDUM

Prepared for:

CADILLAC EXPLORATIONS LTD.  
CALGARY, ALBERTA

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DRAFT

## 1.0 INTRODUCTION

This report addresses deficiencies in an earlier report in this series Prairie Creek Project: Vegetation and Wildlife Studies, 1981 (BEAK, 1981). These deficiencies were identified as part of the government review of the 1981 report and confirmed in a series of meetings between the Government of the Northwest Territories (Wildlife Service), the federal Department of Indian and Northern Affairs (Renewable Resources Branch) and representatives of Cadillac Explorations Limited, including Beak Consultants and Ker Priestman & Associates.

To overcome these deficiencies, the review concluded that three topics could be addressed immediately, utilizing data gathered to date, plus existing literature. These topics were:

- i) Dall's sheep (Ovis dalli dalli) lambing areas;
- ii) distribution of thermal cover in vegetation unit #2; and
- iii) mountain caribou (Rangifer tarandus osborni) calving areas.

The assumption in addressing these topics was that there was sufficient existing information to improve our definition of these areas compared to that offered in the 1981 report.

## 2.0 DALL'S SHEEP LAMBING AREAS

Lambing in Dall's sheep may occur as early as April 30, and as late as June 4 (Hoefs and Cowan, 1979). In the closely related Stone's sheep (Ovis dalli stonei) studied by Geist (1971) in the Cassiar Mountains of northwestern B.C. lambing "occurred in the first week in June". Lambing was not observed in our studies in the Mackenzie Mountains but early June surveys (June 9-10, 1981) indicated that in one instance lambs had already joined together into a nursery band, but that other sightings identified only single lambs and with their dams, or two such combinations in close proximity (BEAK, 1981).

The natural history of lambing in wild North American sheep is composed of the following sequence. Some 2-3 weeks prior to parturition, ewes leave the herd and seek rugged cliff habitat for lambing (Geist, 1971). Here the ewes give birth. This seclusion provides both for protection and mutual imprinting, undisturbed by other animals. The seclusion period lasts 5-7 days, after which the ewe and lamb move to the more open slopes characteristic of the summer range. This is where ewes, yearlings and lambs meet and where nursery bands form. The location of nursery bands and lambing areas are in close proximity.

Based on this information we concluded that most lambing was complete by June 9-10, 1981. The sighting of one nursery band at that time indicates that in 1981 lambing probably peaked prior to June 1. But the sighting of single ewe-lamb units the previous year in early July indicates that in 1980 in the Mackenzie Mountains some lambing may have occurred at least into the first week of June, and perhaps later.

Our observations in July, 1980 and June, 1981 did not include formal lambing habitat evaluations. However, photographs of the Mackenzie Mountains near Prairie Creek show certain of the lambing/nursery areas (Plates 1-6). In the photograph of 'Sheep' Mountain (Plate 3) a portion of a nursery band can be seen, plus the cliffs which would act as a predator barrier - a constituent of lambing habitat/escape terrain.

The distribution of these mapped sightings indicates lambing/nursery areas are widely distributed through the Prairie Creek portion of the Mackenzie Mountains. But, there is a clear concentration of sites between the mine/mill complex and Folded Mountain, below which the road makes a turn to the east.

The distribution of lambing areas may vary from year to year. The fact that Site 1 is the only site where a lamb and ewe were observed in both 1980 and 1981 provides some support for this idea. However, the timing of the surveys were one month apart and significant movement is likely to take place between early June and early July.

Assuming that the locations of lambs and ewes observed by us are close to lambing areas, the topic of disturbance deserves some re-examination. First, the proximity of sheep sightings and development activities on a map is misleading. Mine development and related transportation activities take place exclusively in the valley floor at an elevation below 950 m, except where the road heads east of Folded Mountain and rises to approximately 1500 m. Elevations at which ewes and lambs were sighted were considerably higher than the valley floor (Table 1) and generally out of sight of it. Sites 1 and 5 are the only exceptions: the former is a possible lambing area, the latter was a concentration area for sheep attracted to a suspected deposit of de-icing salt. In some respects this proximity to human activity is similar to that of the Dall's sheep of Kluane National Park (Hoefs and Cowan, 1979). Their prime summer range is located from 2,000 to 6,000 m from the Alaska Highway, and this includes some of the lambing sites.

TABLE 1: Approximate Elevations of Lamb and Ewe Sightings in 1980 and 1981. Site locations are found in Figure 1.

Site 1	950 m	Site 7	1500 m
Site 2	1500 m	Site 8	1160 m
Site 3	1610 m	Site 9	1300 m
Site 4	1600 m	Site 10	1400 m
Site 5	975 m*	Site 11	1050 m
Site 6	1500 m	Site 12	1400 m

\* Adit #3

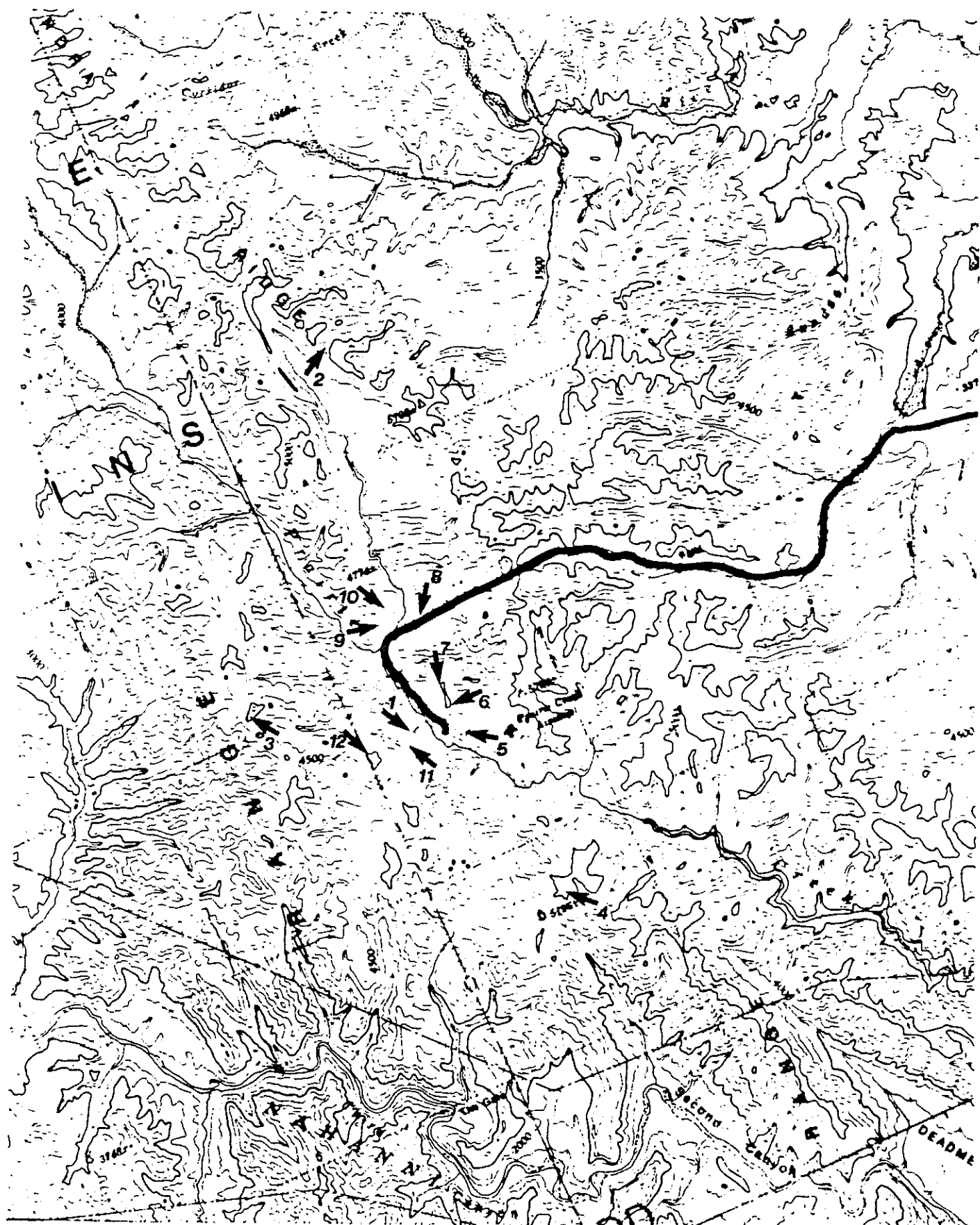


FIGURE 1: Location of Lambs and Ewes Based on Aerial Surveys in July 1980 (Sites 1-4) and 9-10 June 1981 (Sites 1, 5-12).

In Alaska, Wayne Heimer has examined Dall's sheep responses to human activities (Heimer, 1978). He compared a population in Dry Creek, an important focus of sheep investigation, exposed to pressures from mineral development and hunting with a control ("undisturbed") population in Mt. McKinley National Park. Comparing the two populations in terms of number of lambs/100 ewes, yearlings/100 ewes, percent of lambs surviving first winter and estimated population, Heimer did not detect a measurable difference.

This ecological conclusion has been confirmed to some degree by direct measurements of heart rate in the closely related mountain sheep (Ovis canadensis canadensis). MacArthur and his colleagues captured seven ewes and one ram, implanting subcutaneous electrodes connected to an externally mounted FM transmitter. The heart rates (HR) of the released animals were monitored by radio telemetry while simultaneously the animals were under observation (MacArthur et al., 1982). In response to vehicular traffic, 91.2% of the measured responses indicated no elevated HR, and most of the remainder occurred when the vehicles were within 25 m of the animal. The latter situation would be most unusual at Prairie Creek. Beyond 400 m there were no HR responses to helicopter or fixed-wing aircraft. One likely lambing area (Site 1) is approximately 400 m from the existing airstrip. This finding by MacArthur suggests that this potential lambing area could co-exist with an occasionally used airstrip because the latter does not constitute a disturbance. The approach of a human, a human advancing over a ridge and approaching with a dog, elicited increasing HR responses. However, these tests involved approaches within 150 m, approaches likely to occur only rarely with mineral exploration and mine development.

The studies by Heimer in Alaska and MacArthur et al in Alberta lend considerable confidence to the view that the development of mining in Prairie Creek will have no measurable effect upon Dall's sheep, including important functions such as lambing. The observance of mitigation measures identified in earlier reports in this series (Ker Priestman and Associates, 1980; Beak Consultants Limited, 1981) should help maintain this co-existence.



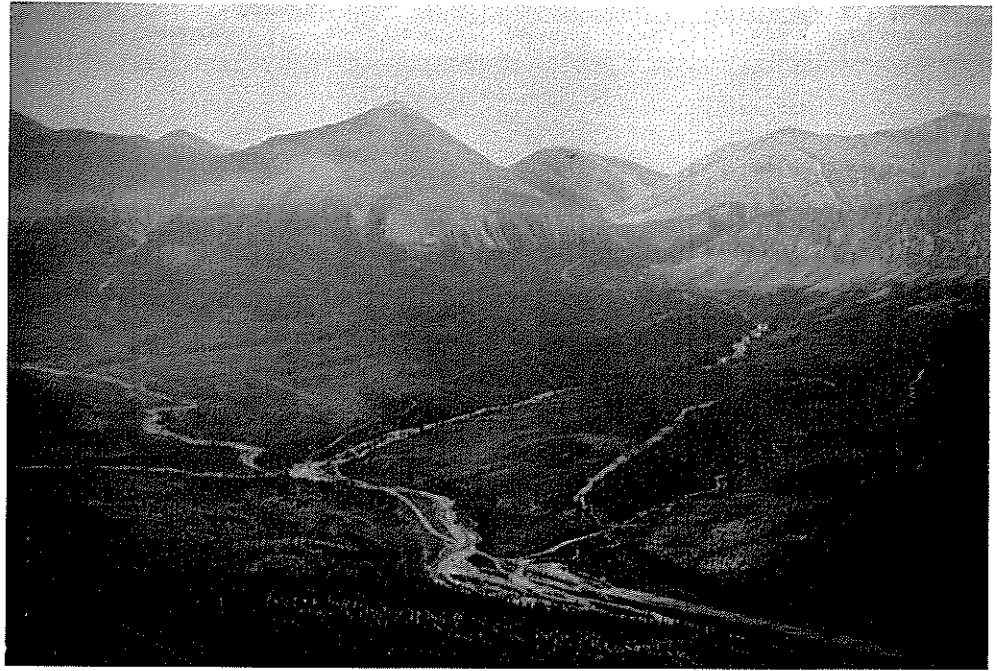


Plate 1: Looking across Caribou Flats towards Tundra Ridge. Lamb/ewe observation Site 2 is on the extreme left of the photo.



Plate 2: Tundra Ridge looking east. Near Site 2.



Plate 3: Sheep Mountain (Site 3), location of a large nursery band, July 1980.

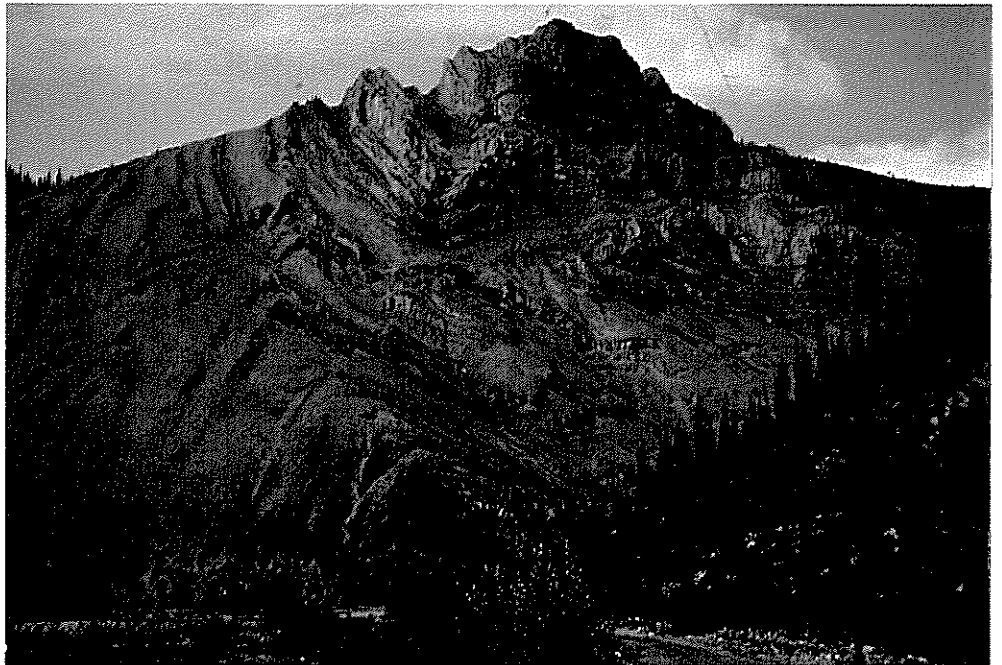


Plate 4: Folded Mountain (Sites 9 and 10).

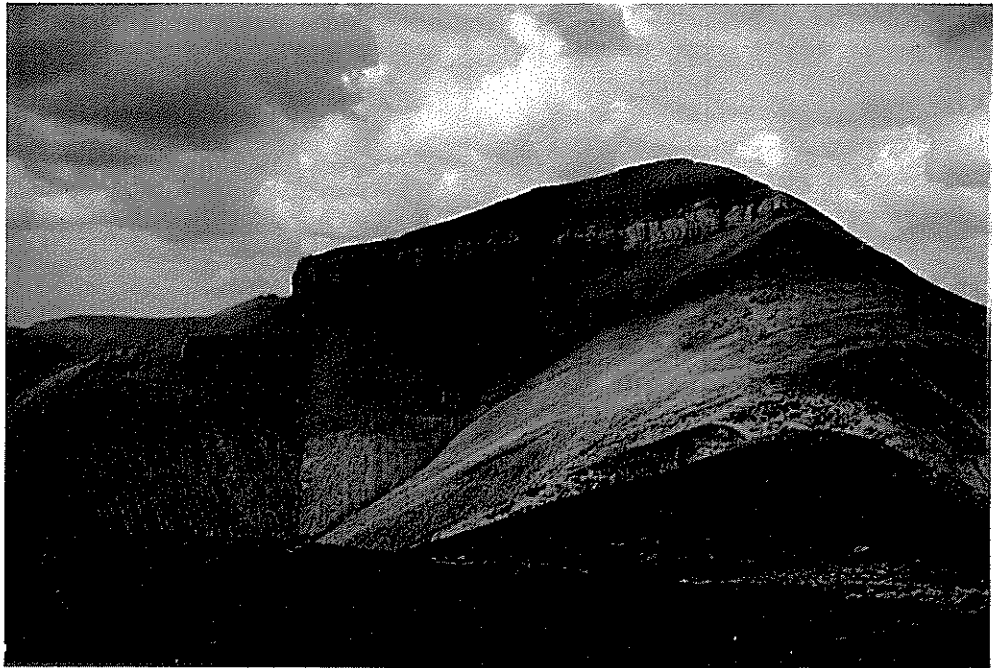


Plate 5: Cover Mountain (Site 4).



Plate 6: Alpine habitat west of Prairie Creek between Sites 3 and 4.

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