

DALL SHEEP DISTRIBUTION, ABUNDANCE AND
"CRITICAL" AREAS ALONG THE PROPOSED
DEMPSTER LATERAL PIPELINE ROUTE

Prepared for:

FOOTHILLS PIPE LINES (YUKON) LTD.

CALGARY, ALBERTA

June 1979

This document is one which has been prepared by the Yukon Game Branch in response to plans for the Dempster Lateral Gas Pipeline. Studies involved were funded in part by Foothills Pipe Lines (Yukon) Ltd. Copies of the original report have been printed in the present form to allow for a wider distribution.

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DALL SHEEP DISTRIBUTION, ABUNDANCE AND "CRITICAL"
AREAS ALONG THE PROPOSED
DEMPSTER LATERAL PIPELINE ROUTE

MANFRED HOEFS

JUNE 30, 1979

YUKON GAME BRANCH

INTRODUCTION

The Yukon Game Branch carried out big game inventory work in Game Management Zone 2 (D. Low's and P. Jensen's outfitting areas) in the Ogilvie Mountains during July, 1978. A cooperative sheep study, between the Yukon Game Branch and the Federal Department of Northern Affairs - Roads and Airstrips Division - was concurrently carried out in the Richardson Mountains (G.M.Z. 1). Because of potential adverse effects of a proposed pipeline route through the area, Foothills Pipe Lines (Yukon) Ltd. agreed to cooperate with these studies by providing financial assistance. Foothills total contribution was \$15,000.00, of which about \$10,000.00 was used to help funding the summer 1978 investigations, while the remaining \$5,000.00 was used to assist with additional surveys carried out in winter and spring to determine winter ranges and lambing areas. The terms of reference for this contract work for Foothills specified that sheep distribution, abundance and critical areas like winter ranges, lambing areas and mineral licks were to be identified within a corridor averaging 10 miles in width on either side of the proposed Dempster Lateral Gas Pipeline route. A progress report was submitted on December 31, 1978. This is the final report (June 30, 1979) on this investigation.

METHODS

Work consisted of aerial surveys carried out with a Jet Ranger helicopter throughout the month of July, 1978, with additional surveys being flown on the following dates: Aug. 19/78 (Richardson Mountains), Feb. 4/79 (Richardson Mountains), April 8/79 (Ogilvie Mountains), May 24 - 25/79 (Ogilvie Mountains), June 8/79 (Ogilvie Mountains) and June 9/79 (Richardson Mountains).

Additional information was obtained by driving the Dempster Highway and recording sheep observations and by interviewing hunters, outfitters, highway workers and other people familiar with the area.

Detailed flight reports are attached as appendices to this report.

RESULTS AND DISCUSSION

Our summer surveys and interviews with many biologists and other reliable observers in the area reveal that there are four areas within the corridor where sheep come into very close contact with the proposed pipeline route. The division of these potential problem areas into four is arbitrary at this time, even though an attempt has been made to consider assumed population ranges, varying population densities and distinct physiographic features.

These four tentative problem areas are located along the proposed pipeline route at the following pipeline kilometre posts:

Sheep range #1 : Pipeline kilometre 372 to 394 (Richardson Mountains)

Sheep range #2 : Pipeline kilometre 567 to 586 (Northern Ogilvie Mountains)

Sheep range #3 : Pipeline kilometre 586 to 610 (Central Ogilvie Mountains)

Sheep range #4 : Pipeline kilometre 667 to 699 (South Ogilvie Mountains)

For each of these areas, a brief discussion is presented which gives the result of our surveys and interviews, lists critical areas as far as they are known to date, and makes tentative recommendations. The accompanying maps show these critical areas, assumed population ranges and their relation to the Dempster Highway and the proposed Dempster Lateral Gas Pipeline route.

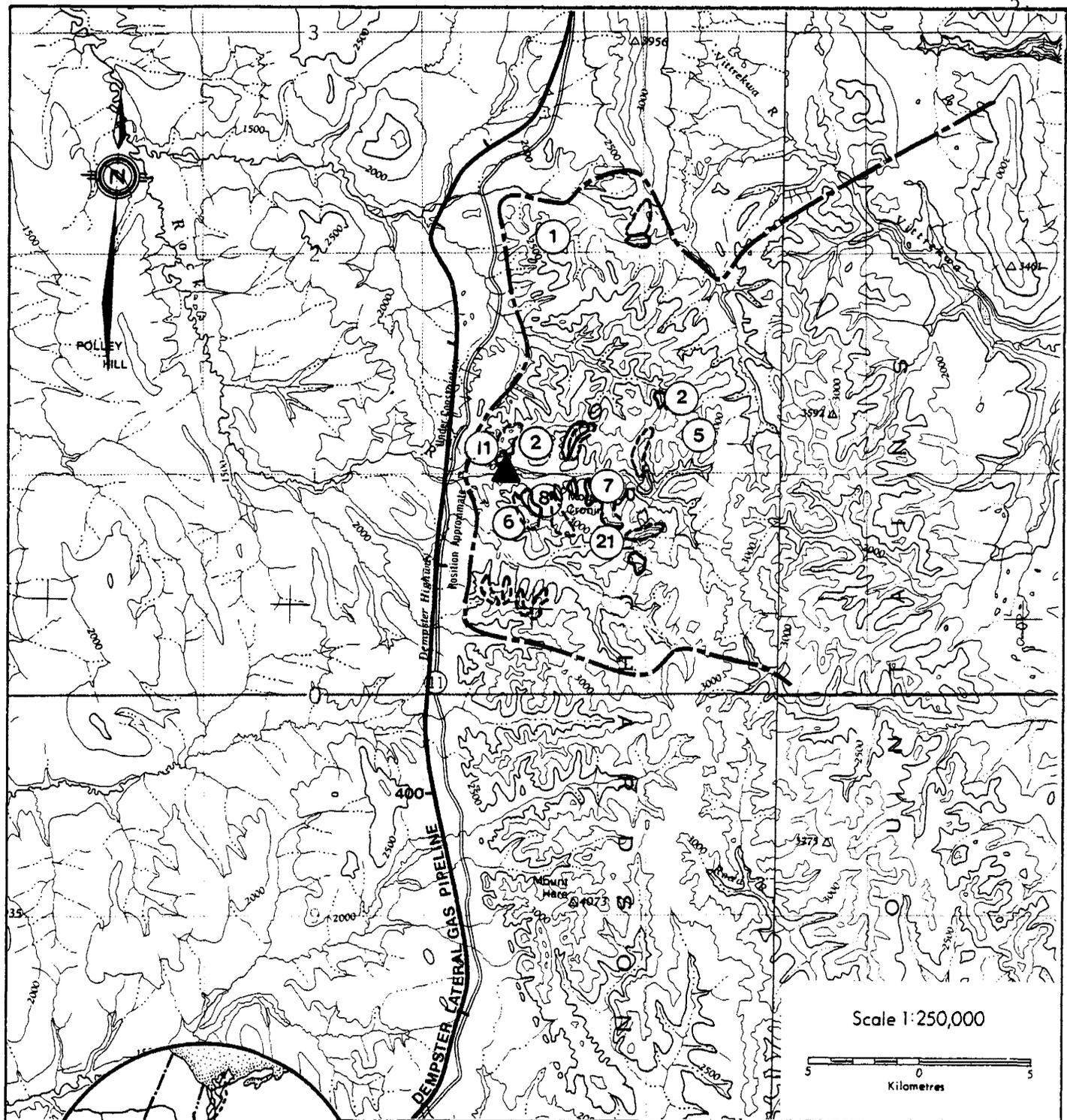
SHEEP RANGE #1Location:

Central Richardson Mountains section is located between pipeline kilometre post 372 in the north and 394 in the south (Map 1). This is a larger area than indicated in our December progress report, but we have since then learned that some rams winter north of the Cornwall River, and a fairly large number of sheep winter south of the south fork of the Rock River; both of these watercourses had previously been assumed to be good boundaries of the range of this population. While there are some suitable mountains and cliffs along the Rock River on the west side of the Dempster transportation corridor, it appears to be certain that sheep do not cross the road and remain on their range to the east of it.

Critical areas:

Detailed work on this population was limited to the summer of 1978, only one survey could be conducted during winter. A number of critical areas are in proximity to the Dempster highway. An important mineral lick is located along the Rock River only about two miles east of the highway. It is located at a large rock face, which also serves as escape terrain in summer and winter and as lambing area for a few ewes. Because of the easy access to this site by way of the Rock River, either by hiking on its gravel base (this river is completely dry in late summer and fall), or by using a snowmobile in winter, great potential exists here for disturbing sheep or poaching them, since they descend here to very low elevation and many of them cross the river bed itself.

Most lambing areas of this population are located within eight miles of the Dempster highway, three are located within four miles. The accompanying map show eleven cliff areas in the western half of this



MAP 1 SHEEP RANGE No.1

-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
-  LOCATION OF LAMBING AREA
-  LOCATION OF MINERAL LICK
-  LOCATION OF SHEEP CROSSING THE DEMPSTER HIGHWAY
-  KNOWN BOUNDARY OF SHEEP RANGE
-  PIPELINE ROUTE & KILOMETRE POSTS

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Cliff face at Rock River, two miles east of Dempster Highway, which serves as escape terrain in winter and summer, and is the site of a mineral lick and lambing area.

population's range, most of these are used for lambing. This sheep range is somewhat unique and atypical as far as physiography, types of winter ranges and lambing areas are concerned. The region consists of rolling hills, at the very most 2,000 feet above the elevation of the valleys, and cliffs are limited to small erosion sites along rivers and creeks. They are not very common and occupy a very small percentage (less than 5%) of the surface area. They appear to be one of the limiting factors of this population. We do not have one large rugged mountain face that serves as winter range, escape terrain and lambing area as we have in many sheep ranges in the southern Yukon. We have a number (at least 12 in the western half of this population's range) of small cliff areas, which serve as escape terrain and lambing areas for one to three ewes.

Winter ranges are also atypical since many of them double as summer ranges. The typical winter ranges of grassy, south-facing slopes at low elevation are not found here. Sheep are on top of the mountains in mid-winter and utilize areas where the snow has been removed by wind. These winter ranges are also numerous and small, most of them are within four miles of the Dempster highway. Road construction people have repeatedly seen sheep from the highway in winter, and this fact has undoubtedly assisted in four sheep being shot by McPherson Indians in the winter of 1977/78 and an equal number (as yet unconfirmed) in 1978/79.

The known winter ranges and lambing cliffs, the mineral lick and the sheep distribution during lambing time in 1979 are shown on the attached map. A recently completed report (Russell and Hoefs, 1979) deals in detail with sheep distribution and critical areas of this population in relation to the Dempster Highway. Individual survey reports are attached as an appendix to this paper.

Population size:

A number of surveys have been conducted to assess the population status in 1977, 1978, and the spring of 1979. Using interpolations from various classified counts in 1978 it is known that a minimum number of 103 sheep existed immediately after the lambs were born by mid-June. However, 1978 was an exceptionally good year with 26 lambs being born; in 1979 we have, so far, evidence of only 14. The entire population is known to winter on the western half of their year-round range within eight miles of the Dempster Highway, presumably because of more severe snow conditions on the eastern half.

Population surveys have revealed an imbalanced sex ratio favouring female bands. This lack of rams may indicate that our knowledge of the total range of this population is incomplete, or that illegal hunting for rams takes place. It is known that these sheep are occasionally hunted by Indians from Fort McPherson concurrently with caribou hunts, but so far it was assumed that their hunting was "meat hunting" - indiscriminate of sex and age and, therefore, not likely to upset the natural sex ratio in the population. Population statistics for this population as well as concerns with regard to potential adverse effects on this herd by the Dempster Highway are found in Hoefs (1978) and Russell and Hoefs (1979).

Recommendations:

Because of the proximity to the most recently proposed pipeline route, paralleling the Dempster Highway in this section, of a number of critical areas it is recommended to move the pipeline westward to the location for which the route was first proposed (see attached map for details). Construction activity would then be more than ten miles removed from the sheep and no adverse effects should come into being.

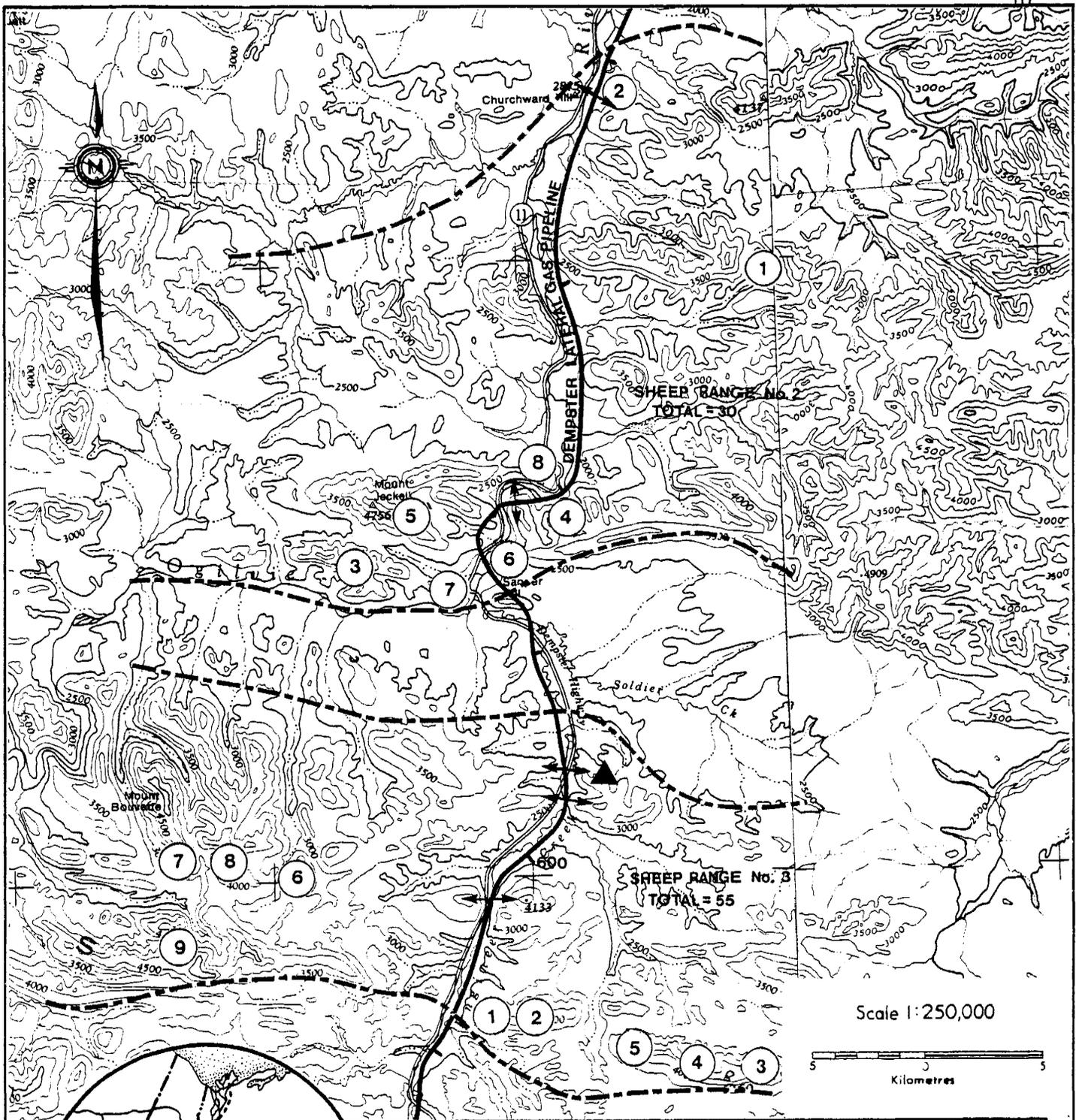
SHEEP RANGE #2Location:

Northern Ogilvie Mountains section is located between pipeline kilometre posts 567 in the north and 586 (Ogilvie Bridge) in the south, on both sides of the pipeline route and Dempster Highway (Map 2). This is a low density sheep range, and times and locations of observations are irregular and unpredictable. However, sheep have been observed on both sides of the transportation route and are known to cross it.

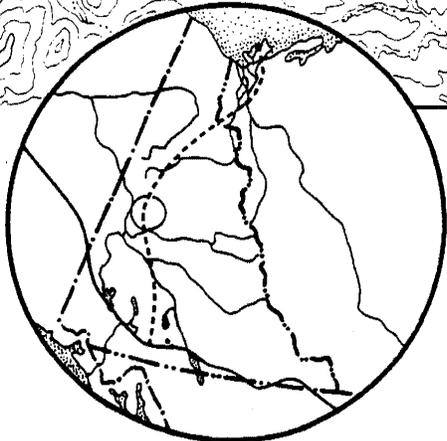
Critical areas:

The term "critical area" is not appropriate here since mineral licks, lambing areas, regularly used migration routes or winter ranges are not known to exist. The following is a summary of sheep observations made in this area, the numbers correspond to locations on the map attached to this report.

- (1) 1 ewe, 1 lamb (survey July 13, 1978 - Larsen, Hoefs)
- (2) 1 ram swam Ogilvie River near Churchward Hill in October 1978 (D. Drummond, Conservation Officer, Dawson)
- (3) 2 rams (survey July 14, 1978 - Hoefs, Larsen)
- (4) 2 rams crossed river and road during caribou migration and were shot by hunters from the road (late October, 1975) - Hoefs, Sinclair
- (5) 7 ewes, 1 yearling, 2 lambs observed during falcon survey on July 22, 1977 by Wayne Nelson and M. Hoefs
- (6) 2 sheep (unclassified) crossed river and road near road mile 124.5 on August 6, 1978 (Wayne Nelson)
- (7) Sid Carr, former lodgeowner of "Ogilvie Lodge", pipeline mile 573, saw one ram on mountain northeast of bridge repeatedly during the winter of 1974/75



MAP 2 SHEEP RANGES No.2 & No.3



-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
-  LOCATION OF LAMBING AREA
-  LOCATION OF MINERAL LICK
-  LOCATION OF SHEEP CROSSING THE DEMPSTER HIGHWAY
-  KNOWN BOUNDARY OF SHEEP RANGE
-  PIPELINE ROUTE & KILOMETRE POSTS

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PIPELINE ROUTE & KILOMETRE POSTS

- (8) 1 ram observed on west side of pipeline route (mile 568) on October 20, 1978, by Rick Farnell (Wildlife Technician of Yukon Game Branch)
- (9) 1 female on mountain east of pipeline route. Observed by Barney Smith, Biologist with Yukon Game Branch, May 25, 1979

Winter surveys made repeatedly by caribou investigators did not reveal any sheep winter ranges close to the Dempster route in this area, nor did we see any sheep in our survey on April 4, 1979. Only one sheep was located during lambing surveys conducted on May 22, May 25 and June 8, 1979.

Population Size:

The total population size of this area (survey units A, D in Larsen, 1978) is estimated at not more than 25 to 30 sheep (Larsen, 1978). It must be pointed out though, that the use of the Ogilvie River as a boundary was arbitrary and may be unrealistic. A sheep population, with a greater density, is found immediately south of the river (Range #3), and exchange between these two populations is likely.

Recommendations:

Since sheep observation in this area were made almost exclusively in summer and fall, it appears reasonable to suggest that construction activity carried out between October and May (following) will have no adverse effects on the local sheep population.

SHEEP RANGE #3Location:

Central Ogilvie Mountains section is located between pipeline kilometre post 586 (Ogilvie Bridge) in the north and kilometre post 610 in the south (Map 2). Sheep have been observed on both sides of the transportation corridor and crossings in spring and summer appear to be regular events.

Critical Areas:

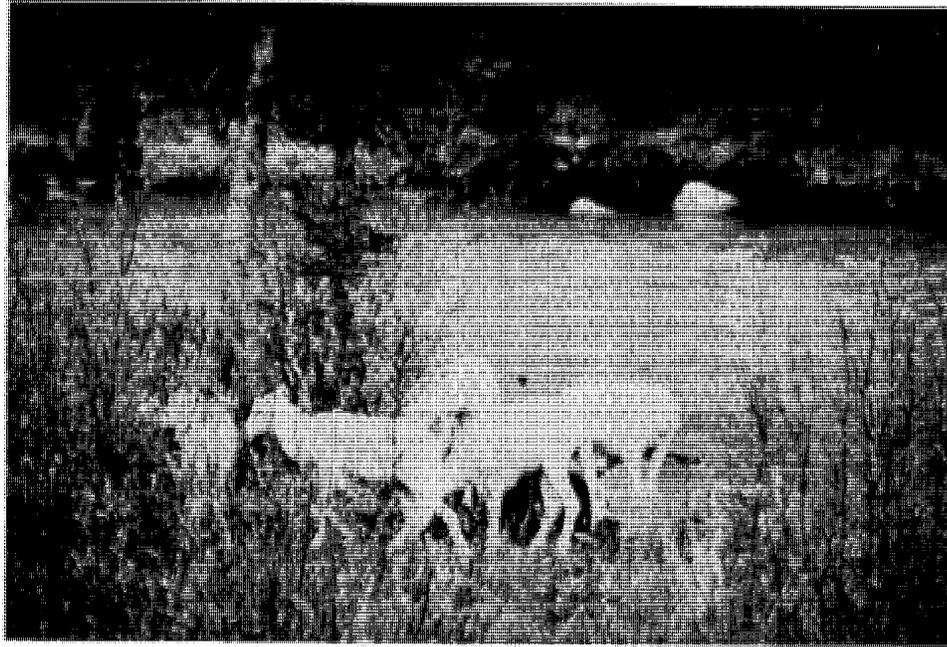
Sheep have been observed along the road at the following locations: Road mile posts 115 to 117, 112 to 114 and 108 to 109. The most heavily used locations appear to be mile posts 115.8 to 116.8 and 111.0 to 112.5. Sheep appear to come down to the road in these locations to use mineral licks along Engineer Creek. We have reports on observations of more than one lick site, but only one (near mile post 117) was documented. The enclosed photograph shows sheep using the lick along Engineer Creek near mile post 117.

The following are eye-witness reports of sheep crossing the transportation corridor in this area, or of sheep using the mineral lick along Engineer Creek.

Mile 115 - 116, John McDonald saw and photographed three sheep coming down the Dempster Highway in June, 1977.

Mile 117, Tony Nette saw and photographed five sheep using mineral lick in June, 1978.

Dan Drummond, Conservation Officer in Dawson, filed the following four reports:



Mineral lick use along Engineer Creek near
Mile 117

Mile 116 (east side) - 8 sheep (2 rams, 4 ewes, 2 lambs)
September 18, 1976.

Mile 117 (on the road) - 2 rams on November 7, 1976.

Mile 116 (east side) - 3 ewes on June 7, 1978.

Mile 117 (east side) - 7 rams in late July, 1978.

Sharon Russel and Janet McDonald made the following observations:

Mile 113.5 (on the road) - 1 ram, 1 ewe, 2 yearlings on May 28, 1978.

Mile 116 (east side) - 3 rams, 1 ewe, 1 yearling and four unclassified sheep on May 28, 1978.

The writer made the following observations in summer 1978:

Mile 116 (east side) - 5 ewes and lambs on June 16, 1978

Mile 117 (east side) - 15 sheep (3 rams, 6 ewes, 2 yearlings, 2 lambs, 2 unclassified on June 18, 1978.

Observations so far indicate that the lick area is primarily used in May and June. However, the occasional observation of sheep near the road in the fall may indicate that they want to use the lick or cross the road even at that time of the year, but that possibly hunting has prevented this and has essentially stopped lick use in the fall.

Surveys conducted in winter and during the lambing period did not document any winter ranges or lambing grounds close to the Dempster route in this location. It, therefore, appears that the mineral lick draws the sheep to this location and that other critical areas are more than five to ten miles away from the transportation corridor.

Population Size:

Detailed surveys were carried out by the Yukon Game Branch in this area on July 16, 1978. The following sheep observations were made within the 20 mile pipeline corridor, the numbers correspond to locations on Map 2.

- (1) 9 ewes, 1 yr1 and 2 lambs
- (2) 2 rams
- (3) 1 ewe, 1 yr1
- (4) 6 ewes, 3 lambs
- (5) 3 ewes, 2 lambs
- (6) 1 ram
- (7) 2 rams
- (8) 4 ewes, 1 lamb
- (9) 2 rams

Larsen (1978) estimates the total number of sheep in this population (survey unit C) at about 55.

Recommendations:

No use of the area by sheep has so far been documented for the winter season. It, therefore, appears that construction activity carried out in this area between mid-November and mid-May following will not disturb the local sheep population.

On the other hand, we are dealing in this area with a very narrow valley, and the locating of the pipeline right-of-way, access road and possible borrow pit sites has to be done very precisely so as to not destroy the lick sites along Engineer Creek and migration trails leading to them. Our information to date is insufficient to aid in this exercise. To acquire the necessary data would necessitate a full-time observer in the area for a whole season to watch the sheep and record these critical sites on large-scale maps.

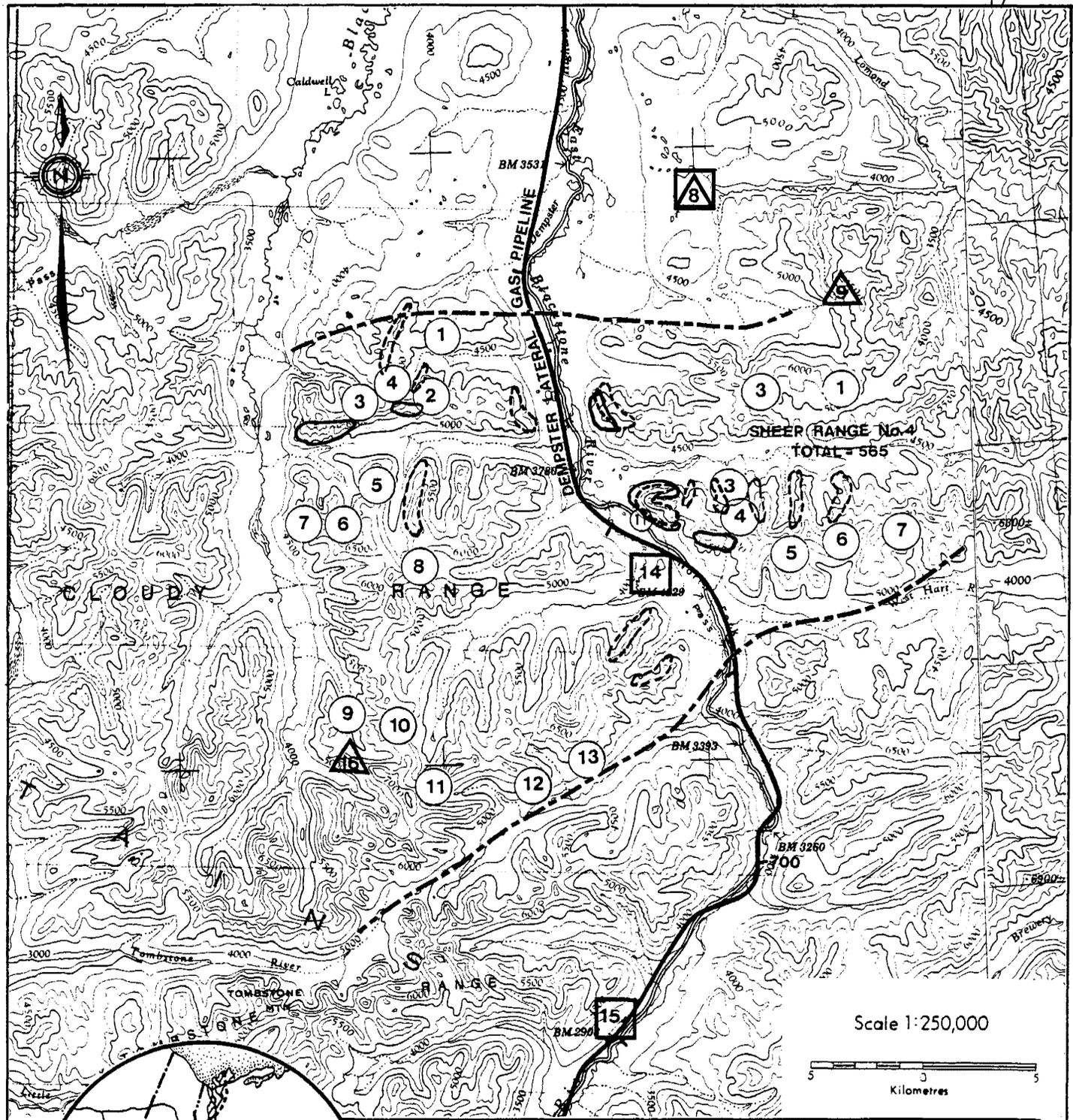
SHEEP RANGE #4Location:

Southern Ogilvie Mountains section is located between pipeline kilometre 667 in the north and 699 in the south, on both sides of the transportation corridor (Map 3). In this location the transportation corridor bisects the densest sheep population and the best sheep habitat over its entire length. Sheep ranges are found on both sides of the corridor and sheep migrations across it are most likely annual events.

Critical Areas:

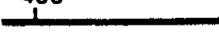
Lambing areas are located along the proposed pipeline route and directly facing it, between pipeline kilometre posts 675 and 686 along the east side of the corridor, and between 673 and 676 on its west side. Additional ones are farther removed from the corridor, as shown on Map 3.

Winter ranges, directly along the corridor, and most often associated with lambing areas, have been documented on the east side between kilometre posts 673 and 683 and on the west side between kilometre posts 673 and 676. Additional winter ranges within eight miles of the corridor extend eastward along the valley that meets the pipeline route at kilometre post 678 from the east and west, as well as south of North Fork Pass at the west side of the route between kilometre 691 and 698. Detailed locations are given on the accompanying map. In contrast to winter ranges of sheep in the southern Yukon, most of these winter ranges are north and west-facing slopes. It is assumed that this phenomenon is related to the distribution of snow in this region. Most weather systems in winter move in from the south along North Fork Pass and will, therefore, deposit most of their snow on the south-facing slopes.



MAP 3 SHEEP RANGE No. 4



-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
-  LOCATION OF LAMBING AREA
-  LOCATION OF MINERAL LICK
-  LOCATION OF SHEEP CROSSING THE DEMPSTER HIGHWAY
-  KNOWN BOUNDARY OF SHEEP RANGE
-  PIPELINE ROUTE & KILOMETRE POSTS

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We have not been able to ascertain the presence of any mineral licks in proximity to the proposed pipeline route, but our short stays in the area, of usually not more than two to three days duration, were insufficient for that kind of investigation. A major lick, as those located along Engineer Creek, has not been reported to us by hunters or other highway travellers.

It is assumed that sheep on the west and east side of the corridor are part of the same population. No detailed studies have been carried out to determine magnitude and frequency of migrations, but we have the following eye-witness reports of sheep crossing the corridor in this area. Rick Rarnell saw 3 sheep (2 ewes, 1 lamb) cross the road near North Fork Pass, kilometre mile 685, on August 19, 1978. Dan Drummond reported the following two observations: Highway mile 52 - 2 rams crossing the road west to east on November 10, 1976 and 11 sheep (ewes and lambs) crossing the road mile 53 from west to east on October 2, 1976. Additional, yet unconfirmed, observations of sheep crossings have been reported by tourists travelling the highway.

Population size:

Detailed surveys carried out by the Yukon Game Branch in this area took place on July 26, 1978. The following observations were made within the 20 mile pipeline corridor, the numbers correspond to locations marked on the map attached.

a) east side of transportation corridor: Total count 135 sheep

- (1) 1 ewe
- (2) 2 rams, 3 ewes, 1 yr1
- (3) 2 rams
- (4) 7 ewes, 2 yr1 1 ram

- (5) 25 ewes, 9 lambs
- (6) 4 rams, 52 ewes, 5 yr1s, 12 lambs
- (7) 6 ewes, 3 lambs
- (8) 1 grizzly, 1 ewe moose
- (9) 1 wolf

b) west side of transportation corridor: Total count 240 sheep

- (1) 2 ewes, 1 yr1
- (2) 6 ewes, 2 yr1
- (3) 1 ram
- (4) 5 ewes, 2 yr1, 1 lamb
- (5) 19 ewes, 3 yr1, 4 lambs, 4 rams
- (6) 1 ewe, 1 yr1
- (7) 48 ewes, 6 yr1, 7 lambs, 2 rams
- (8) 18 ewes, 7 yr1, 4 lambs
- (9) 55 ewes, 15 yr1, 11 lambs, 3 rams
- (10) 5 rams
- (11) 5 rams
- (12) 1 ram
- (13) 1 ram
- (14) 1 moose (ram)
- (15) 1 moose (ram)
- (16) 1 grizzly

The total population size in this area (survey units L and M) is estimated at 560 to 580 (Larsen, 1978).

Recommendations:

Our knowledge is at this time insufficient to make specific recommendations as to the scheduling of construction periods. In general, the winter period starting at October and extending to and

including the lambing period in mid-June are most critical, as far as potential adverse impacts on sheep is concerned. On the other hand, it appears to be the summer months and the fall when migration across the valley is most likely to take place, because of snow barrier effects at other times. It is, therefore, recommended that an observer is stationed in the area for a season to monitor sheep behaviour and to work out "safe" construction windows.

The accompanying map shows known winter ranges and lambing areas, as well as distribution of sheep during our most detailed surveys to date (July 26, 1978).

GENERAL CONCLUSION AND RECOMMENDATIONS

If one considers that the total length of the proposed Dempster lateral pipeline route is more than 1200 kilometres, while the extent of the areas where it comes into contact with sheep populations total only 150 kilometres, it might appear that concerns for sheep are not an important matter. The Porcupine caribou herd uses over 480 kilometres of ranges paralleling the Dempster route, moose and grizzly have an even wider distribution and so have many of the smaller mammals and bird species. Because of this a lot of attention has been paid to the Porcupine caribou herd and to other "high profile" species like falcons. However, what sets sheep apart and makes them unique compared to those other species is the fact that their range is very small and restricted. They are there all the time. We have six months per year to work in the area without interfering with caribou, we have nine months that will not interfere with falcon nesting. As far as moose, wolf and bear are concerned, these species will readily reoccupy areas from which they have been displaced, should previously natural conditions come into being again. All these seasonal activities and behavioural traits allow us to schedule construction in a manner that would reduce or eliminate disturbance and other adverse effects. With sheep we do not have these advantages. They use their ranges and critical areas in a traditional manner, that has been passed on from older to younger members of a band for many generations.

Most ranges in the Yukon, that have not been subject to severe disturbance or excessive hunting, are filled at capacity level. This carrying capacity is determined by such limiting factors as size and quality of winter range, and presence of cliffs for escape terrain and lambing areas. It is, therefore, unrealistic to assume that sheep that are displaced from their home range will find a suitable habitat somewhere else. Investigators agree that of a big game species found

in the Yukon, sheep are the ones most susceptible to disturbance. Our observations of other sheep populations in the Yukon document that exploration activities on a sheep range and more importantly, its being made accessible by roads and trails will almost always result in population declines and that abandonments of ranges because of disturbance are permanent. We have up to a dozen areas in the Yukon from which sheep have disappeared, some as far back as meat hunting days during the gold rush, others very recent, but we do not have one example of sheep ever recolonizing abandoned ranges. If it does occur at all, it is too slow a process to be relevant for management considerations.

Because of this peculiarity of sheep, it is important to consider potential impacts on them more carefully than for other species.

Our investigation has filled some of the information gaps. We know in what areas the proposed pipeline route comes into contact with sheep. We can eliminate concerns in the Richardson Mountains problem area by moving the proposed route back to its original location. We have catalogued many of the critical areas, even though it is unrealistic to assume that the few surveys carried out were sufficient to locate them all. The greatest question mark remaining is the magnitude of animals involved and the frequency of movements across the route. Its determination requires continuous surveillance and can not be assessed from a few surveys and interviews. However, its knowledge is essential, if proper recommendations regarding construction schedules are to be made.

LITERATURE CITED

- Hoefs, M. (1978): Dall sheep in the Richardson Mountains - distribution, abundance and management concerns. Unpubl. report on file with Yukon Game Branch.
- Russell, S. and M. Hoefs (1979): Mount Cronin Dall sheep study. Unpubl. report on file with Yukon Game Branch.
- Larsen, D.G. (1978): Wildlife inventories in G.M.Z. 2 (Yukon Territory) with an evaluation of Dall sheep populations and harvests. Unpubl. report on file with Yukon Game Branch.

APPENDICES

Survey reports for winter ranges and lambing areas.

SHEEP WINTER RANGE SURVEY IN OGILVIE MOUNTAINS, APRIL 8, 1979

Survey Crew: M. Hoefs - Navigator-recorder
Rick Farnell - observer
W. Kale - observer

Date & Time: April 8, 1979, 11:30 to 4:30 p.m.
4.5 hours actual helicopter time, which includes ferry
time from Dawson.

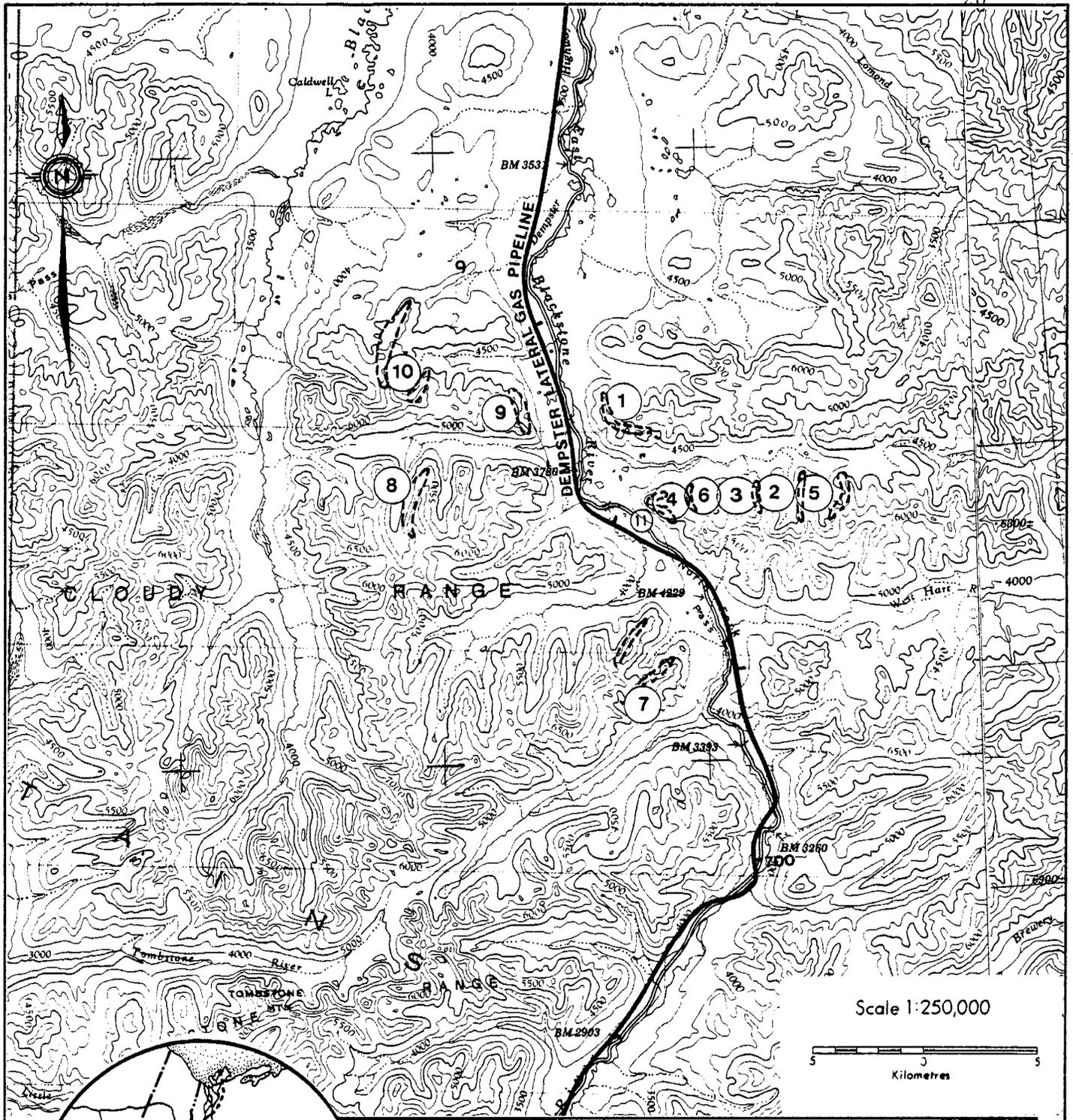
Weather: partially sunny, but mostly high overcast, Cloudy north
of the Ogilvie range; snow late in the afternoon.

Area Covered: A corridor of about five to ten miles on each side of
the Dempster Highway was surveyed. Known sheep range
were flown in detail; areas not known to support sheep,
as well as areas with continuous heavy, deep snow cover
and no animal signs were only covered superficially.

The only sheep winter range locations were in the southern Ogilvie
Mountains - in the Cloudy Range, approximately from Mile 45 to Mile 60,
Dempster Highway. Three of these wintering areas were directly beside
the road, and the sheep on them could have been observed from the
road.

The following numbers refer to locations marked on the accompanying
map. No attempt was made to get a good classified count; the limited
funding was more appropriately spent by trying to locate and map as
many wintering areas as possible.

- 1) 4+ nursery sheep (one had a black tail)
- 2) 10+ nursery sheep
- 3) 8+ nursery sheep



SHEEP WINTER RANGE APRIL 8, 1979 OGILVIE MOUNTAIN

-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
-  LOCATION OF LAMMING AREA
-  LOCATION OF SHEEP CROSSING THE DEMPSTER HIGHWAY

400  KNOWN BOUNDARY OF SHEEP RANGE
 PIPELINE ROUTE & KILOMETRE POSTS

- 4) 6+ nursery sheep
- 5) 7+ nursery sheep
- 6) 1 sheep (lamb or yearling) killed by wolverine.
Wolverine was feeding on it, but ran away when the helicopter approached.
- 7) 6 mature rams seen by Rick on February 19, 1979
2 rams were in this location today.
- 8) 1 ewe
- 9) 5 nursery sheep
- 10) 5 sheep (one young ram (fannin) and 4 ewes)

55+ sheep on winter ranges within Dempster corridor.

The winter ranges located in the Ogilvie Mountains today differ from typical Dall sheep winter ranges in the southern Yukon in three aspects.

- a) They are on windblown, snow free ridges, at high altitudes.
Sheep have been observed in the same locations also in summer.
They are, therefore, "year-round" ranges.
- b) Most likely because of the prevailing weather patterns, these winter ranges are located along the north side of mountain ridges, while in the south they are usually found on the south sides of mountain ridges.

It is assumed that snow-laden weather systems move in from the south and deposit most of their moisture on the south side of mountains, while the north sides get less moisture, and the snow depth is, therefore, less severe and more tolerable to sheep.

- c) The winter ranges are not high density concentration areas as observed in the southern Yukon. There appear to be numerous

small wintering areas which are occupied by a small number of sheep. This pattern may vary depending on snow conditions between winters, it may also vary at different times within the same winter. Only repeated surveys will document this.

The winter range of the sheep population using the mineral licks along Engineer Creek (Mile 117 - 119, etc.) could not be located and is assumed to be farther than five miles off the Dempster Highway. Winter ranges are shown on the accompanying map. At least ten different golden eagles were located today.

SHEEP SURVEY ALONG DEMPSTER HIGHWAY ON MAY 22, 1979

A survey was made of known sheep ranges along the Dempster Highway on May 22, 1979 by driving the road and scanning the mountains with a spotting scope. We could drive as far as Mile 139, where high water has washed out the road and made it impassible.

The only sheep that we observed were found on the mountains behind (east) of P. Jensen's outfitting camp. One band of nursery sheep (7 ewes and yearlings) were on the high ridge about two miles east of the road, while another group of 13 ewes and yearlings were at lower altitude directly facing the road behind Jensen's camp. It is assumed that those are lambing areas, even though no newborn lamb was located on this survey. The mineral licks along Engineer Creek (Mile 113 - 119) are not being used by sheep at this time. No sheep were seen north of the Ogilvie crossing to Churchward Hill, where the wash-out was located. The sheep in the Richardson Mountains could not be observed, because the road problem prevented us from driving there.

SHEEP SURVEY ALONG DEMPSTER HIGHWAY - MAY 24 and 25, 1979

These data are compiled from notes provided by Barney Smith.

PILOT: Ralph Pelltier

NAVIGATOR/RECORDER: Barney Smith

OBSERVER: Norm Barichello

AIRCRAFT 206A Jet Ranger

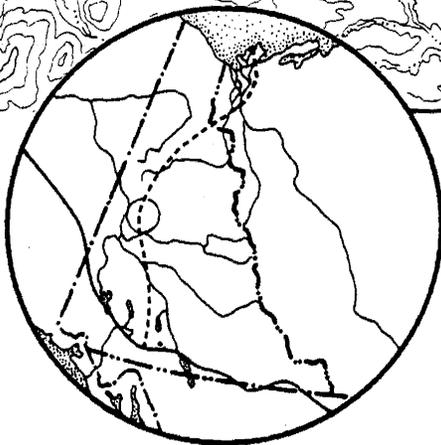
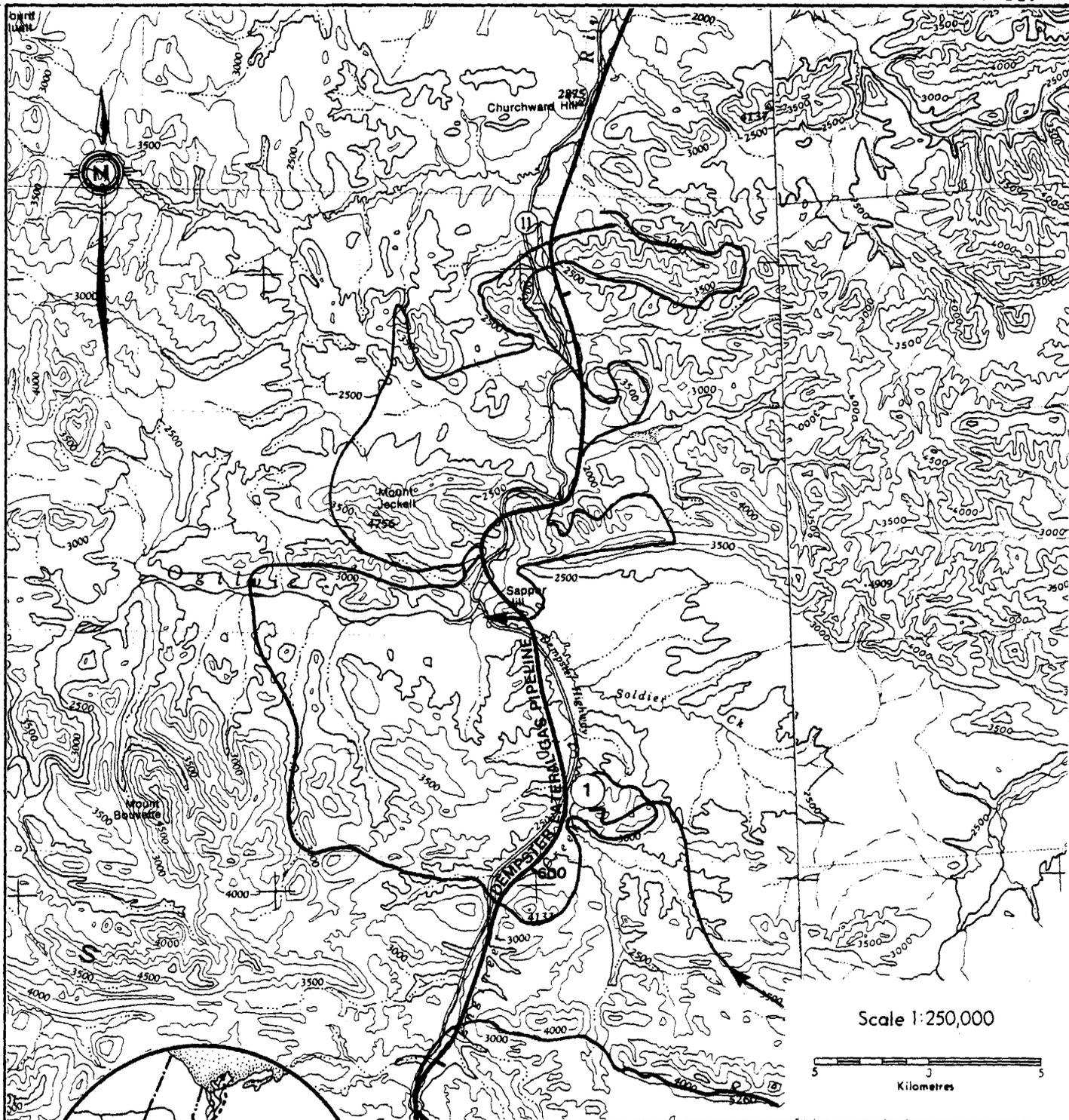
WEATHER: Mainly sunny, some showers,
 Temp. +5 to +10°

A) The Sapper Hill area

Time: 9:10 a.m. to 11:45 a.m.

The south slopes of all the ridges were snowfree and were, therefore the only slopes surveyed. A contour type of flight pattern was used with two observers facing the slopes; the contour chosen was one about 3/4 of the way up the slope but was often altered to examine escape terrain.

The coverage of this area (relative to the summer work) was about 70%-90%. As the flight line indicates, some areas were not surveyed because of the limited time available. The only sheep (or large mammal) seen was a ewe at 3000' on a south facing slope just below escape terrain. Solitary sheep at low elevations would have been easy to miss, but I doubt that any band would have escaped our attention.



SHEEP SURVEY MAY 24, 25, 1979

-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
-  LOCATION OF LAMBING AREA
-  LOCATION OF MINERAL LICK
-  LOCATION OF SHEEP CROSSING THE DEMPSTER HIGHWAY
-  KNOWN BOUNDARY OF SHEEP RANGE
-  PIPELINE ROUTE & KILOMETRE POSTS



The southernmost ridge in the survey block was surveyed from approximately 1 mile west of the Blackstone all the way to Engineer Creek.

Other evidence of sheep (tracks + trails) presence was infrequently encountered. Two old track sets (grizzly or caribou) were observed. The snow looked between 1 and 3 feet deep on north slopes.

B) Jensen's area (east)

The block east of Jensen's camp. Large numbers of sheep were seen in this area, however only one lamb and no legal rams were seen. No effort was made to further segregate adults and yearlings because of our concern about unnecessary disturbance to pregnant ewes.

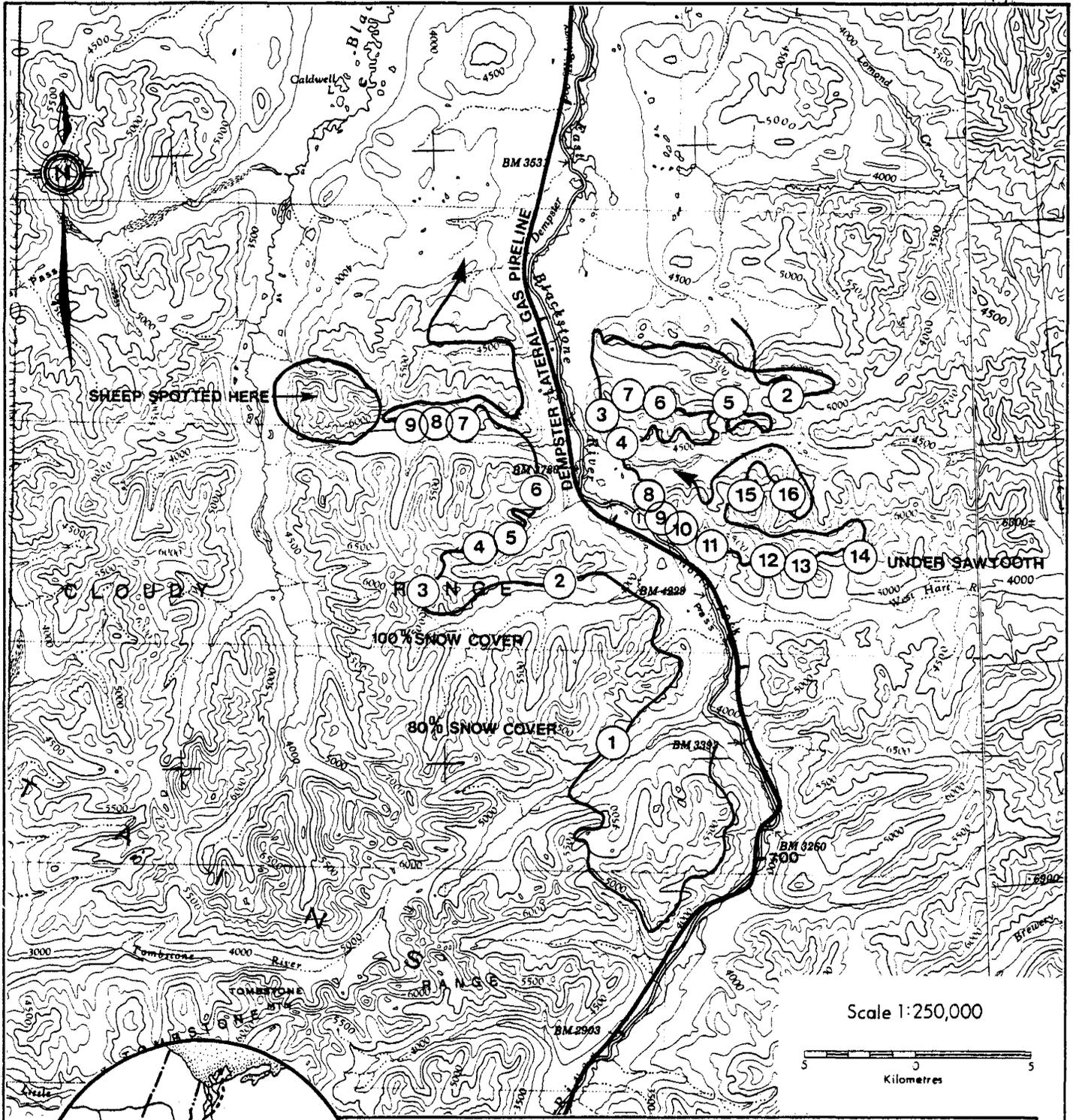
Sheep were sighted on snowfree slopes on a variety of slopes aspects and elevations. No obvious pattern was detected.

Four wolverines were sighted, 66 sheep were sighted and 2 moose. it is difficult to imagine what the wolverines were feeding on (perhaps marmots or lambs). The moose cows were both feeding in the shrub subalpine above 4000'.

The survey efficiency here was good (90+%) as we did a contour survey at 4500-5500' and then did a ridge backbone flight at the end of survey period.

The following numbers correspond to locations on the map (attached).

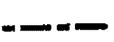
1. 1 female - Sapper Hill area
2. Moose (female)



Scale 1:250,000



SHEEP SURVEY MAY 24, 25, 1979

-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
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400

3. 6 females, 1 yr1
 4. Moose (female)
 5. 1 wolverine
 6. 1 wolverine
 7. 13 females (no lambs)
 8. 4 females (no lambs)
 9. 1 female
 10. 13 female, and yr1 (no lamb)
 11. 1 wolverine
 12. 6 females and 1 male (1/2 curl)
 13. wolverine
 14. 16 female, yr1 + 1 lamb (some young rams in group)
 15. 7 female, and yr1
 16. 1 marmot
- 70 sheep (only 1 newborn lamb)

C) Jensen's area (west)

May 25, 1979

The range to the west of Jensen's camp was surveyed fairly intensively. The southern areas were snowbound, even on the southern slopes. It seems like the afternoon sun is important for snow melt. The valleys immediately to the west of Jensen's camp had more direct south aspects (as opposed to SE aspects farther south) and were snowfree. Numerous little "peaklets" on the slope provided large amounts of escape terrain at all elevations. We surveyed slopes, on which sheep were seen, twice but still could have missed single animals.

In total 33 sheep were seen of which 7 were rams (2 f.c.). No lambs were seen. 'Fat' ewes suggest this survey preceded lambing. The ridge with the bulk of the sheep sightings was only surveyed to slightly west of your survey boundary. Mossop and

Barichello saw sheep to the west of this on a previous survey and it should be examined later.

Survey completed 10:25 a.m.

The following numbers correspond to locations on the map (attached).

1. Golden eagle
2. Golden eagle
3. Wolverine or marmot?
4. 1 female
5. 6 male (2 full curl)
1 female
6. Golden eagle
7. 9 unclassified sheep (but no lambs)
8. 6 female and yr1
9. Wolverine, 1 male, 10 ewes
33 sheep (3 golden eagle) no newborn lambs

Total flying time: May 24 3.8 hours
May 25 2.3 hours
 6.1 hours

Since only one lamb was observed in over 100 sheep, it appears that the lambing season has just started in this area.

SHEEP SURVEY IN OGILVIE MOUNTAINS ON JUNE 8, 1979

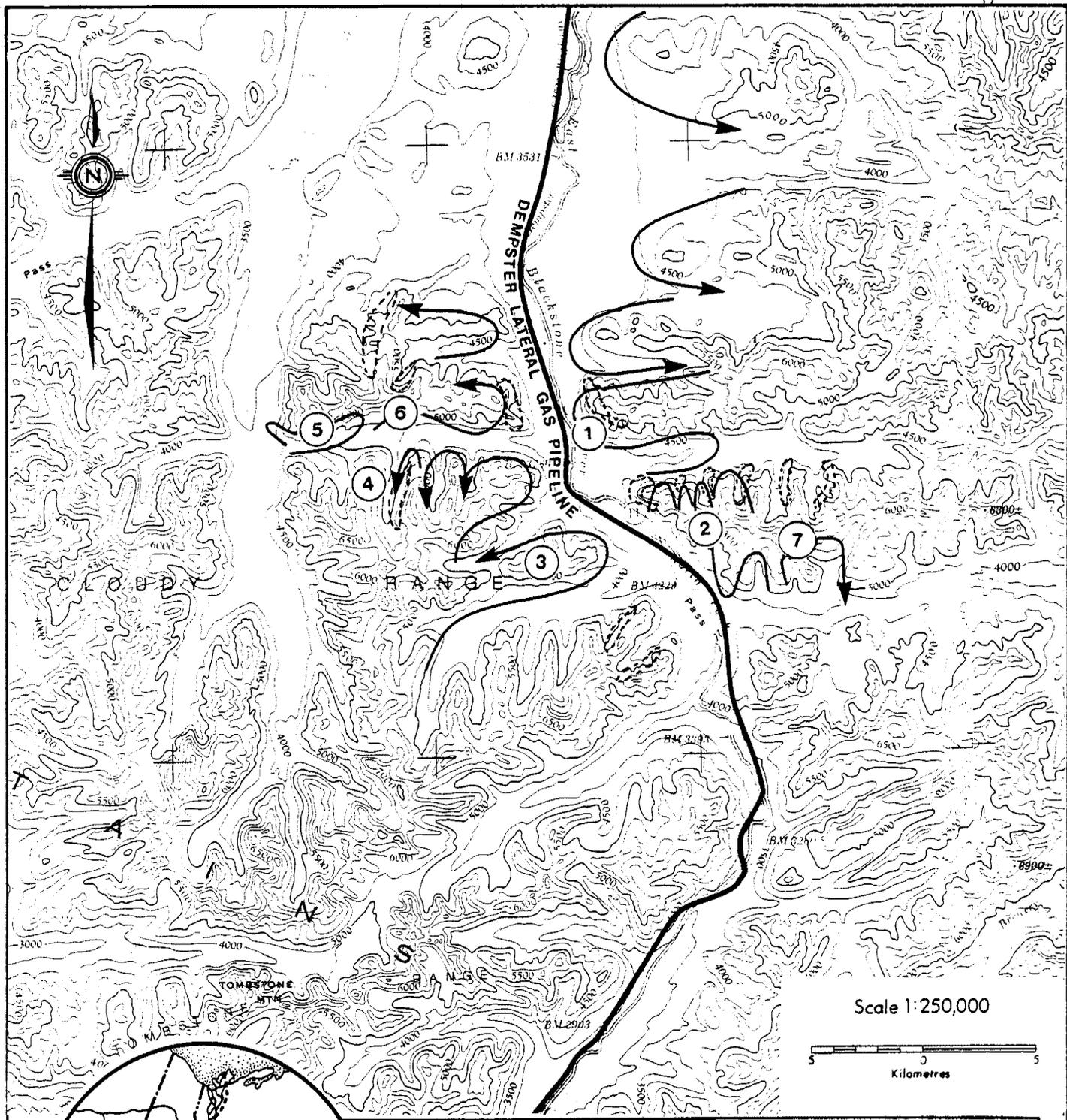
This is the last survey for the Foothills Pipe Lines Ltd. contract to establish critical sheep ranges in proximity to the proposed pipeline route. The aim of this survey, the second during the last two weeks, was to locate lambing areas. The survey extended for a distance of about five miles on either side of the Dempster corridor, except on known sheep ranges where it covered a distance of over ten miles on each side.

Few sheep were located during this survey, and only one lamb was found.

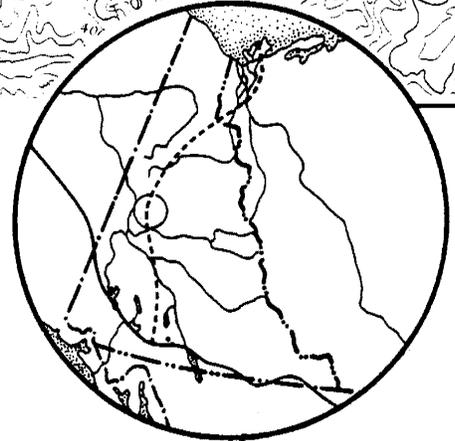
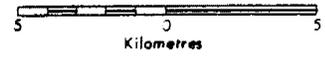
We surveyed the southern Ogilvie, Jensen's outfitting area, in great detail and located 67 sheep near the transportation corridor. The sheep range near Engineer Creek was also surveyed eastward to the Blackstone River. Only 2 rams were located here, and no use of the mineral licks along Engineer Creek on the Dempster was observed. Christine Boyd, however, told me that 2 sheep were observed in this area earlier this week. North of the Ogilvie Bridge we surveyed Mount Jeckell and the higher mountains to the north of it, where the V.H.F. tower is located. No sheep were located here.

The following numbers refer to locations on the attached map and the numbers and types of sheep seen there.

1. 23 female and yr1s + 1 lamb
2. 6 female and yr1
3. 4 female and yr1
4. 9 female and yr1
5. 12 female and yr1
6. 12 female and yr1
7. 2 males



Scale 1:250,000



SHEEP SURVEY JUNE 8, 1979 OGILVIE MOUNTAIN

-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
-  LOCATION OF LAMING AREA
-  LOCATION OF MINERAL LICK
-  LOCATION OF SHEEP CROSSING THE DEMPSTER HIGHWAY
-  KNOWN BOUNDARY OF SHEEP RANGE
-  PIPELINE ROUTE & KILOMETRE POSTS

400

We located 66 nursery sheep (ewes, yearlings and young rams) but only 1 lamb with them. It is reasonable to assume that the lambing period is almost completed by now and few if any additional lambs, could be expected, even in a normal year. If our sample size was representative, then this year's lamb crops was a complete disaster. However, since our survey area boundary was artificial and cut across known sheep ranges, it is possible that ewes with lambs were on pasture of the ranges not surveyed. On the other hand, the extremely cold winter and very heavy snowfall may have resulted in absorption and abortion of fetuses. It also appears possible that the adult sheep suffered heavy mortalities since many more were seen last winter in the same survey area.

Based on the last two surveys, it appears that only the lambing area from North Fork Pass northward to the mountain behind Jensen's camp, are in close proximity to the proposed pipeline route in the Ogilvie Mountains. Other lambing areas appear to be farther than five miles away from the transportation corridor.

Total hours flown with helicopter: 3.8 hours
Machine: Shirley Helicopter Jet Ranger 206B
Pilot: Ralph Pelltier
Navigator/Recorder: Manfred Hoefs
Observers: Morning - Norm Barichello
 Afternoon - Barney Smith
Weather: Showers, windy, some sun

SURVEY OF THE MT. CRONIN SHEEP POPULATION JUNE 9, 1979

DATE OF SURVEY: June 9, 1979

TIME: 10:30 a.m. to 2:30 p.m.
4 hrs helicopter time, not including
ferry time from Mile 123.

WEATHER: Warm, sunny, calm

PILOT: Ralph Pelletier

HELICOPTER: Jet Range 206A (Shirley's)

NAVIGATOR/RECORDER: M. Hoefs

OBSERVERS: Barney Smith and Tony Hamilton

The emphasis of this survey was on the western half of this population's range, that portion close to the proposed Dempster Lateral pipeline route, since it was part of our contract job for Foothills Pipe Lines Ltd. The eastern half of the range was not checked in great detail, only areas where sheep were seen a year ago, were looked over. Because of this, it is likely that our survey results, as far as total population is concerned, are incomplete.

Lambing areas are essentially the same as those located by the study crew last year. Because of lack of cliffs in this region, practically every little place of escape terrain is used for lambing. There are a number of small lambing areas, not one large continuous one, as we know from Sheep Mountain in Kluane.

The following list gives the locations where sheep were observed. The numbers correspond to numbers on the map, except for numbers 10, 11 and 12 which are on the Road River map sheet.

| # | Rams | | | | Female | Yrl. | Lambs |
|-------|-------------|--------------|--------------|--------------|--------|------|-------|
| | 2 yr (90°) | 3 yr (180°) | 4-5(180-270) | 6+(270-360) | | | |
| 1. | | | | 1 male (360) | | | |
| 2. | | | | | 1 | | |
| 3. | 3 male (90) | 3 male (180) | | | 6 | 2 | |
| 4. | | 2 male (180) | | | | | |
| 5. | | | | | 4 | | 3 |
| 6. | | | | | 13 | 2 | 6 |
| 7. | | | | | 3 | 1 | 3 |
| 8. | | | | | 1 | | 1 |
| 9. | | | | | 2 | 1 | |
| 10.* | | | 1 male (270) | 9 male (360) | | | |
| 12. | | | | | 11 | 2 | 1 |
| <hr/> | | | | | | | |
| | 3 | 5 | 1 | 10 | 41 | 8 | 14 |
| | <hr/> | | | | | | |
| | 19 rams | | | | | | |

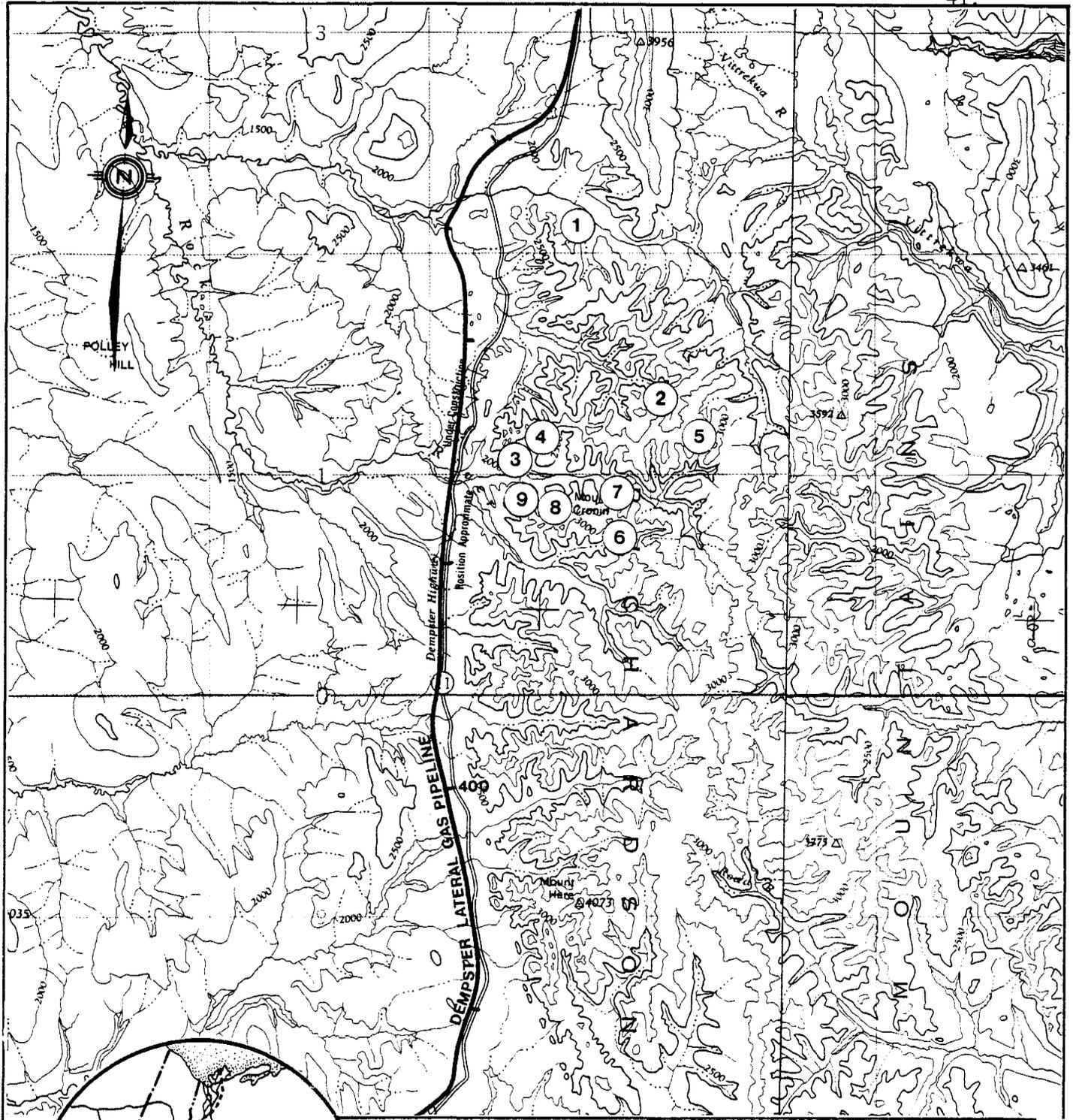
Total 82

* Observation #10 (these rams were on a mountain east of the divide where they were also located on June 17, 1978).

Observation #11 were two moose on top of a mountain (picture taken).

Observation #12 were all sheep in the Teflon Creek mineral lick area.

Observation #5, 6, 7, 8 are lambing areas within ten miles of the Dempster Highway.



SHEEP SURVEY JUNE 9, 1979 MT. CRONIN

-  LOCATION OF SHEEP OBSERVATION
-  LOCATION OF WINTER RANGE
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DEMPSTER HIGHWAY
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400



As already pointed out, it is assumed that this survey is incomplete, because of the superficial coverage of the eastern half of the population's range. There was still lots of snow in the eastern half and the sheep had just begun their migration to that side.

Only a week ago, when Bob Hayes did falcon surveys in that area, no sheep was observed on the east side.

On the other hand, if this survey was complete, then the population has suffered heavy winter mortality and has been reduced by about 20%. Most heavy would be the loss among the lambs of last year, since 26 were still alive in August, 1978 and only 8 were observed now.

Also the ewe count was considerably lower, since 57 were alive last summer and only 41 were located this time.

If we want to monitor the population dynamics of this herd it is essential to repeat this survey in August or September.

