MONITORING A [redacted] MOUNTAIN GOAT HERD

IN THE [redacted] BIG SHEEP CREEK DRAINAGE

MONITORING A ROCKY MOUNTAIN GOAT HERD IN THE BIG SHEEP CREEK DRAINAGE

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ACKNOWLEDGMENTS

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SUMMARY

Monitoring a herd of Rocky Mountain goats in the Big Sheep Creek Valley was carried out from October, 1974 to February, 1976.

Distribution of the goat herd was found to be confined to specific areas. The majority of the goats were observed at elevations of between 3500 feet and 4000 feet during fall and winter months. Fall use areas were areas with an east or west aspect and having a mixture of heavily timbered draws and rock outcrops. Winter use areas were areas with a south or south-east aspect and had a high proportion of exposed slope with scattered stands of timber.

The goats were found to utilize the same area for bedding and feeding.

Based on the results of this study, the goat population was estimated at thirty-one animals. No mortality or recruitment rates were established.

The goat herd was composed of an even number of adult males to adult females. Grouping was confined to females and kids, while adult males were generally alone or in pairs.

A more intensive study of the Rocky Mountain goat herd in the Big Sheep Creek drainage should be undertaken to determine: mortality and recruitment rates; to monitor the goats on a seasonal and yearly basis; to establish the condition of available goat habitat.

Areas utilized by goats should be protected from human activities.

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INTRODUCTION

Prior to this study, little was known about the numbers and distribution of the Rocky Mountain Goats (Fig. 1.) in the Big Sheep Creek drainage. Historical records indicate the presence of goats, but there was no accurate information that could be used for management purposes. There are three sub-species of mountain goat in British Columbia and those located in the Big Sheep Creek drainage are classified as (Oreamnos americanus americanus).

> " In British Columbia the Mountain goat is divided on the basis of distribution and appearance into three sub-species: Those north of the Peace and Skeena Rivers are classified as (Oreamnos americanus columbianus); those south of the Crowsnest Pass fall into the (O.a. missoulae)race; and those throughout the remainder of B.C. are classified as (O.a. americanus). The difference in sub-species is based mainly on skull sizes and cranial characteristics."[1]

There had been an open hunting season for goats in the Big Sheep Creek drainage, but this was closed in 1963 and has remained closed. This decision was made by the British Columbia Fish and Wildlife Branch as the result of pressure from local people, primarily conservationists.

These local people felt that because of the easy access into the Big Sheep Creek area and its close proximity to population centers, the goats were in danger of being eliminated.

1. "Mountain Goats in British Columbia" (Fish and Wildlife Branch Pamphlet), K.M. MacDonald, 1972

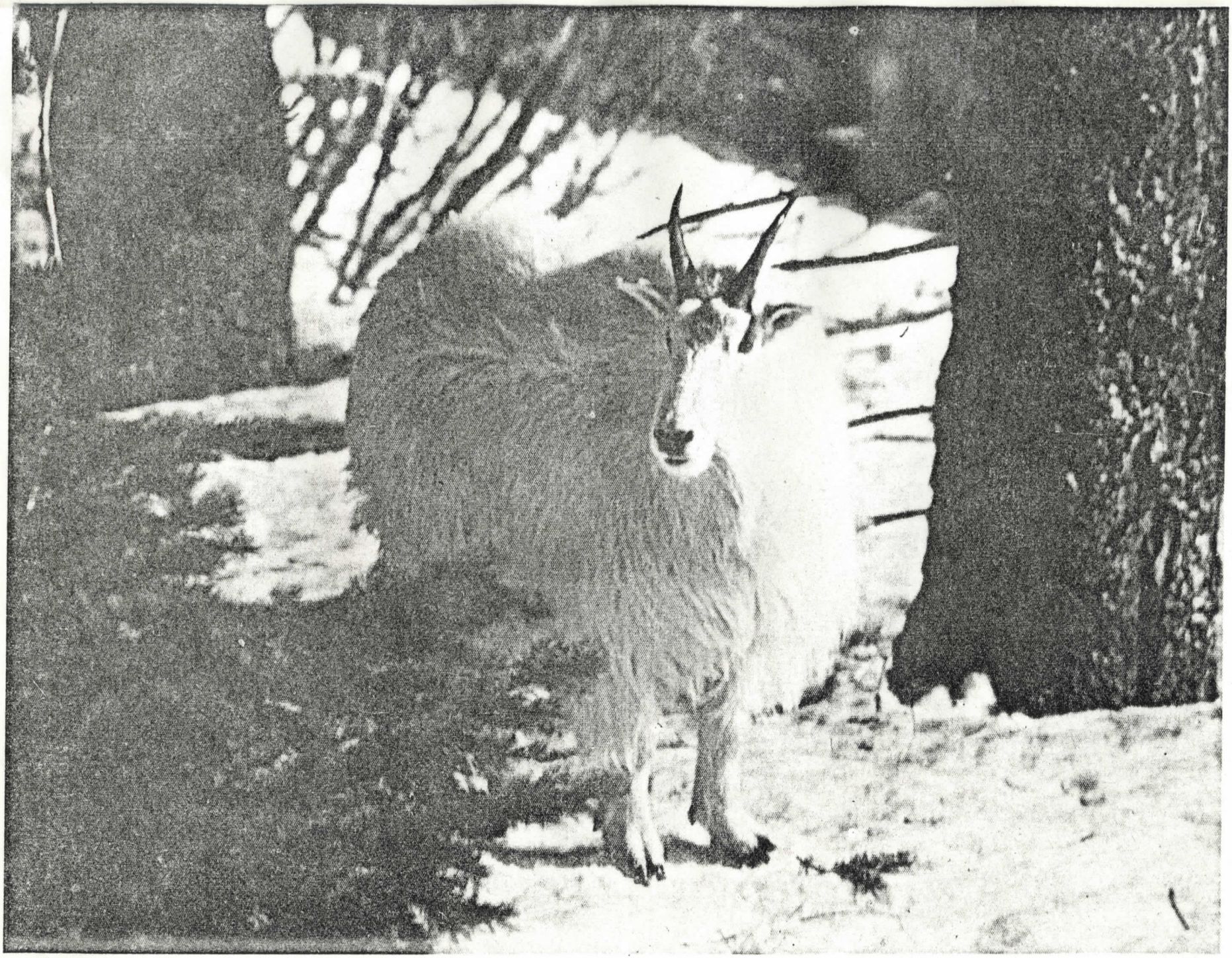


Figure 1

Rocky Mountain Goat

Because of easy accessibility and a lack of information for management purposes of the goats within the Big Sheep drainage this study was undertaken.

> " Generally, mountain goat populations have suffered from a lack of management in most regions of North America. However with the increased interest in mountain goats as a game species and the easier access to their range, there is a definite need for more intensive management."[2]

The objectives of the study were:

1. To take a count of the goats and their distribution in the study area.
2. To make general observations and record the grouping behavior of the goats in the study area.
3. To make an extensive analysis of physical and vegetation characteristics of areas utilized by the goats in the study area.
4. To prepare a suitable report of the monitoring that will aid the Fish and Wildlife in future management plans in regard to the harvest and the protection of the goats in the Big Sheep Creek study area.

To meet the objectives of the study, areas utilized by the goats were located through direct observation. From these observations, the required information for meeting the objectives of the study was collected. Direct observations took place in the fall of 1974, the fall of 1975, and the winter of 1975 - 76.

2. "Mountain Goats in British Columbia" (Fish and Wildlife Branch Pamphlet), K.M. MacDonald, 1972

STUDY AREA - BIG SHEEP CREEK DRAINAGE

LOCATION

The area that was selected to monitor mountain goats was the Big Sheep Creek drainage, (Figs. 2,3.) located in the Monashee Mountain Range, approximately 6 miles west of Rossland, B.C. The regional location of the study area is shown in (Fig. 4.).

The study area is 18 miles in length, with an average width of 6 miles, covering an area of approximately 100 square miles.

For the study area boundaries, we used: 1) the International Border for the southern boundary, 2) the heights of land on either side of Big Sheep Creek for the east and west boundaries, and 3) Highway 3 for the northern boundary. (Fig. 5.)

LAND OWNERSHIP

Land within the study area is administered by the B.C. Fish and Wildlife Branch, B.C. Forest Service, B.C. Parks Branch, Lands Branch, and private individuals. Primary utilization of the land has been and continues to be timber production, ranching, outdoor recreation, and mining.

PHYSICAL CHARACTERISTICS

The Big Sheep Creek drainage lies in a north-south valley. The study area is mountainous with elevations

Figure 2 - (NORTHERN SECTION OF THE STUDY AREA) Looking northwest, Goat Mountain is in the center of the photo.

Figure 3 - (SOUTHERN SECTION OF THE STUDY AREA) Looking north up Big Sheep Creek from near the International border. Old Glory is visible on the top right hand corner of the photo.

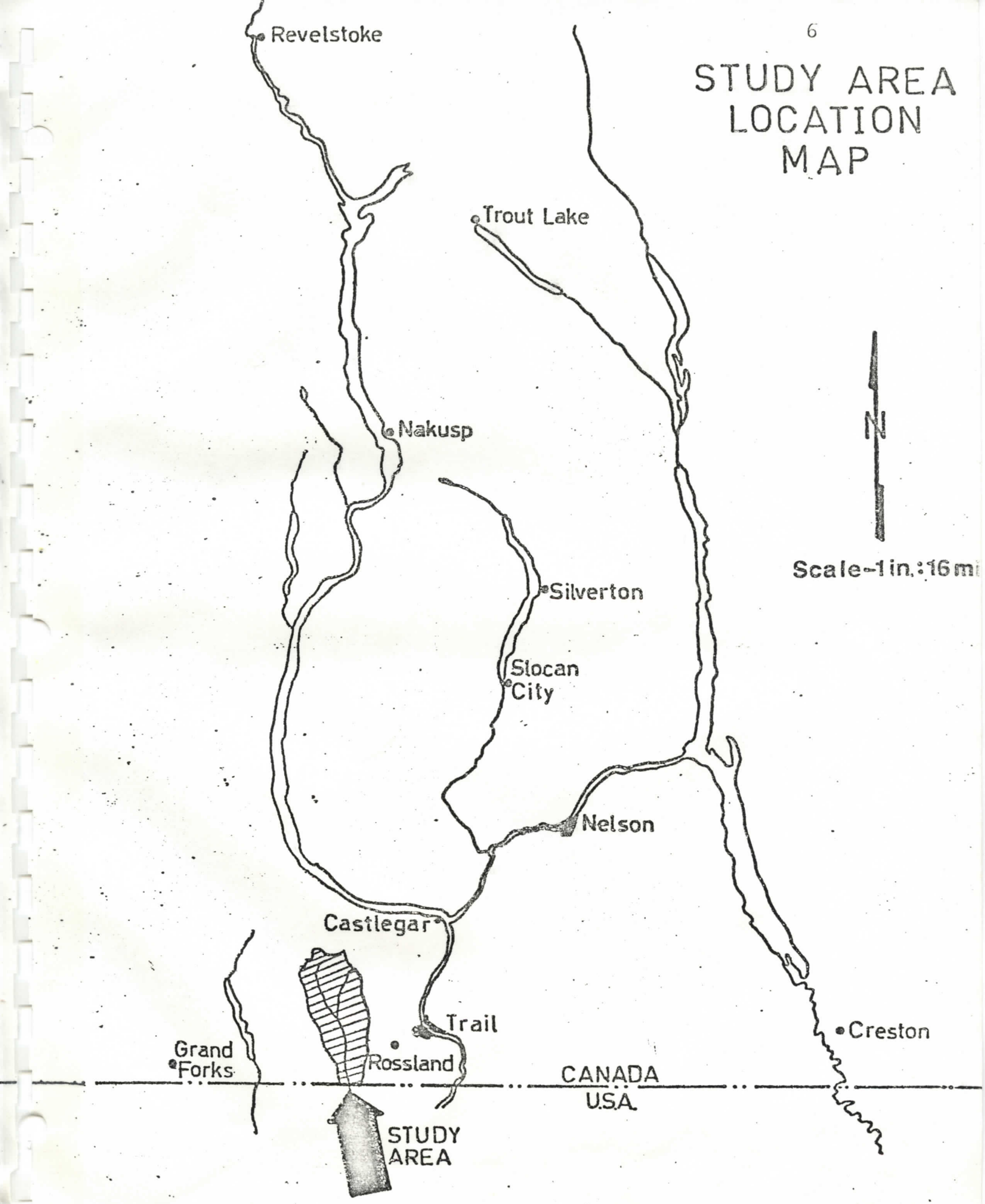


Figure 4 - The Big Sheep Creek Study Area is located in the West Kootenay Region of south-central British Columbia.

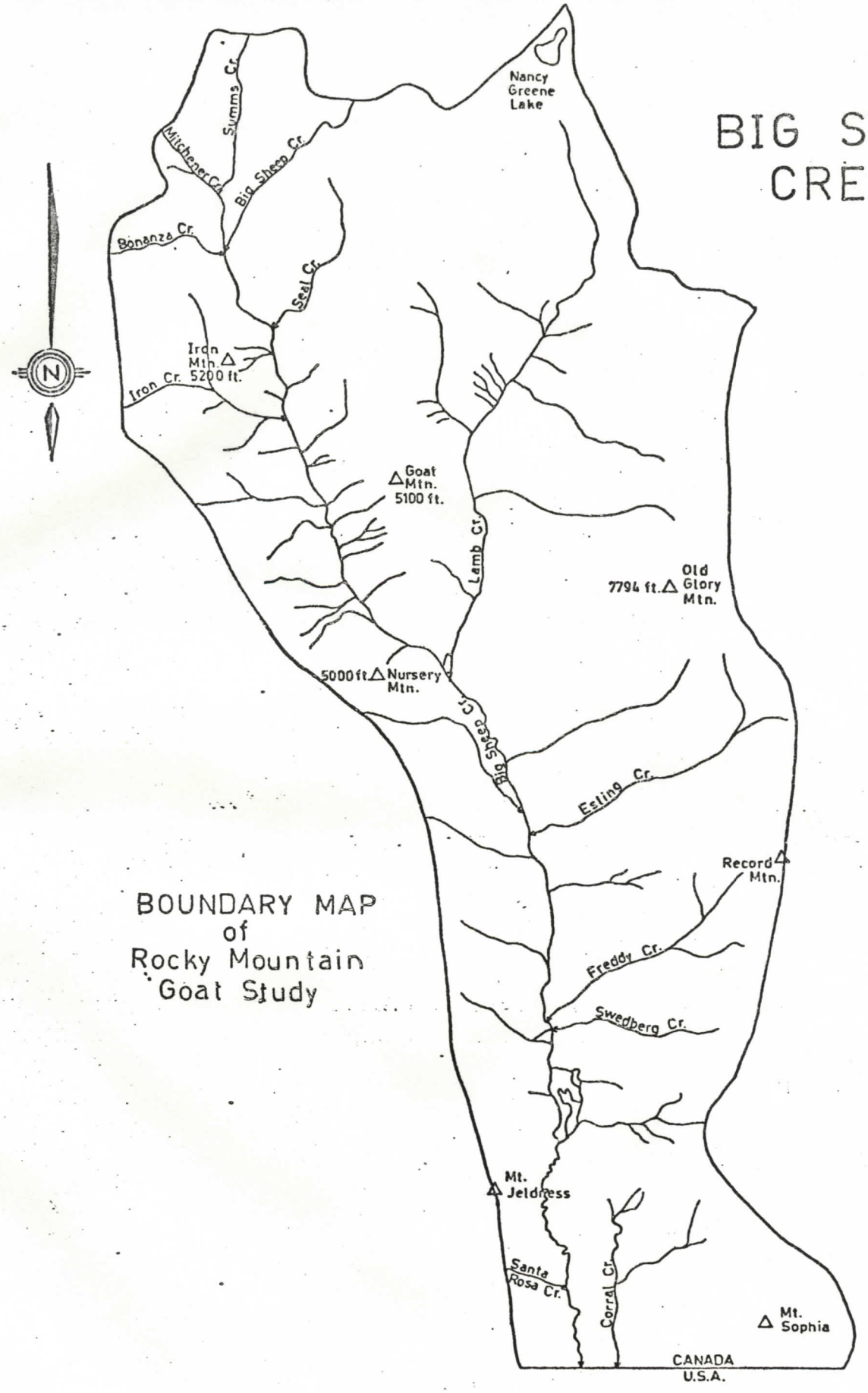


Figure 5 - The Big Sheep Creek Mountain Goat Study Boundary Map.

ranging from 2300 feet to over 7000 feet.

The 25 year average weather records were obtained from the Castlegar Airport, which lies 18 miles east of the study area. The average temperatures ranged from a high of +15° Celsius in September to a low of -2.5°Celsius in December. (Fig. 6.) The average precipitation (Fig.7.) was 4.1 cm. in September, reaching a high of over 13 cm. in December. For average snowfall and rainfall refer to (Fig. 8.).

In dry weather, the study area is highly accessible by motor vehicle. In winter, access into the central portion of the study area is confined to snowmobiles and skiers. The old Cascade Highway proceeds in an east-west direction through the southern portion of the study area. An old logging road parallels Big Sheep Creek and provides access into the southern and central portion of the study area. Access into the northern portion of the study area is provided by Highway 3 and several logging roads and trails. (Fig. 9.)

VEGETATION CHARACTERISTICS

A large portion of the valley has been burnt by fires that swept through the area in the 1920's and 1930's. As a result, a large portion of the study area is covered by immature timber. There are, however, some isolated stands of mature timber located throughout the study area. The largest portion of this timber is located in the northern

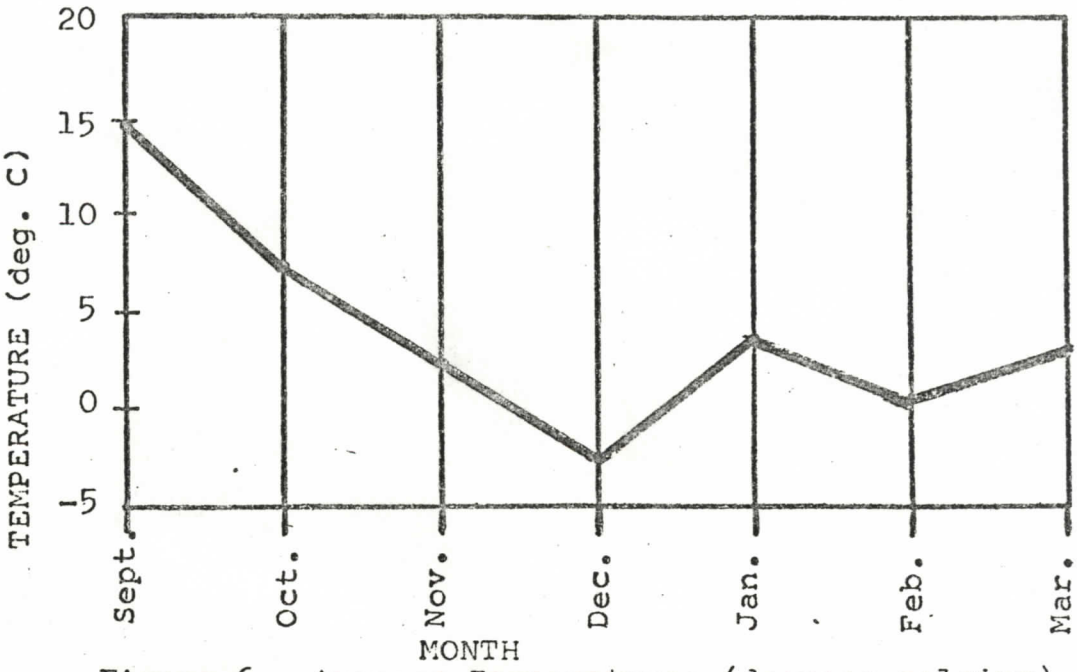


Figure 6 - Average Temperatures (degrees celsius), September to March. 25 Year Average-Castlegar Airport.

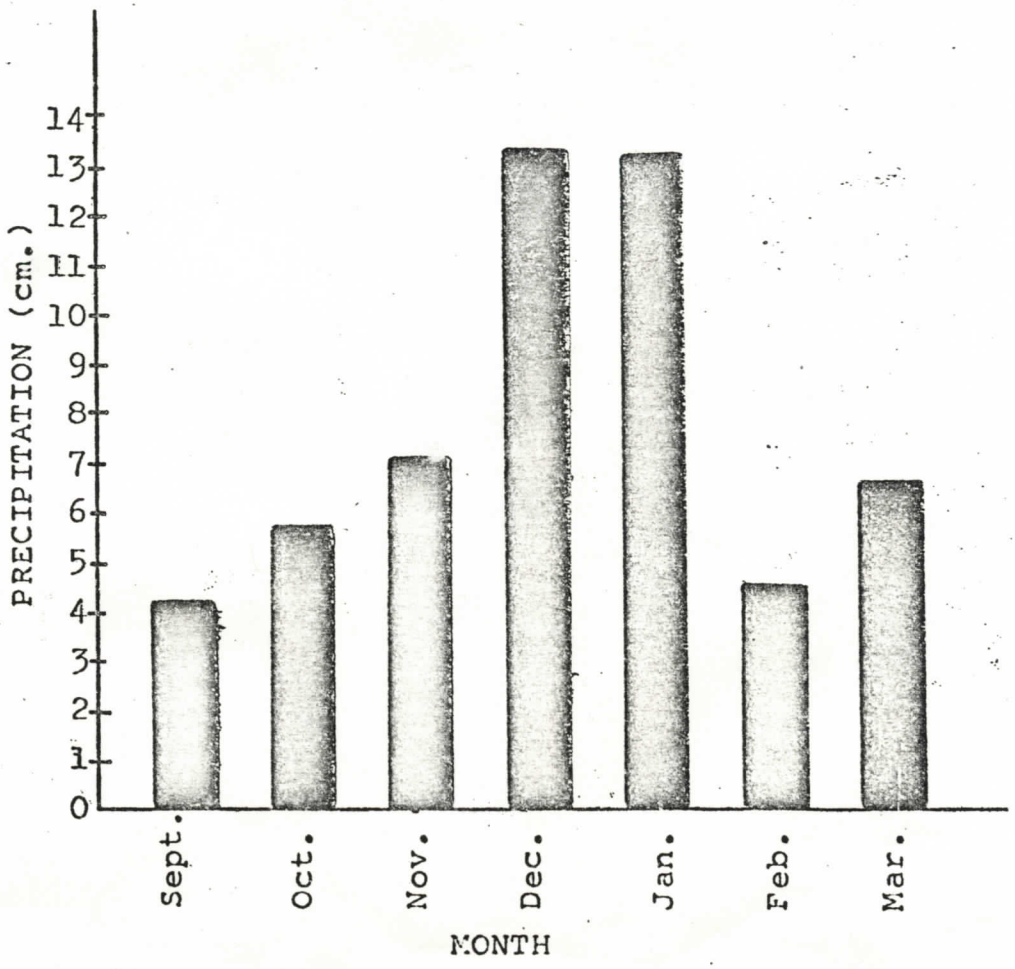


Figure 7 - Average Precipitation (centimeters), September to March. 25 Year Average-Castlegar Airport.

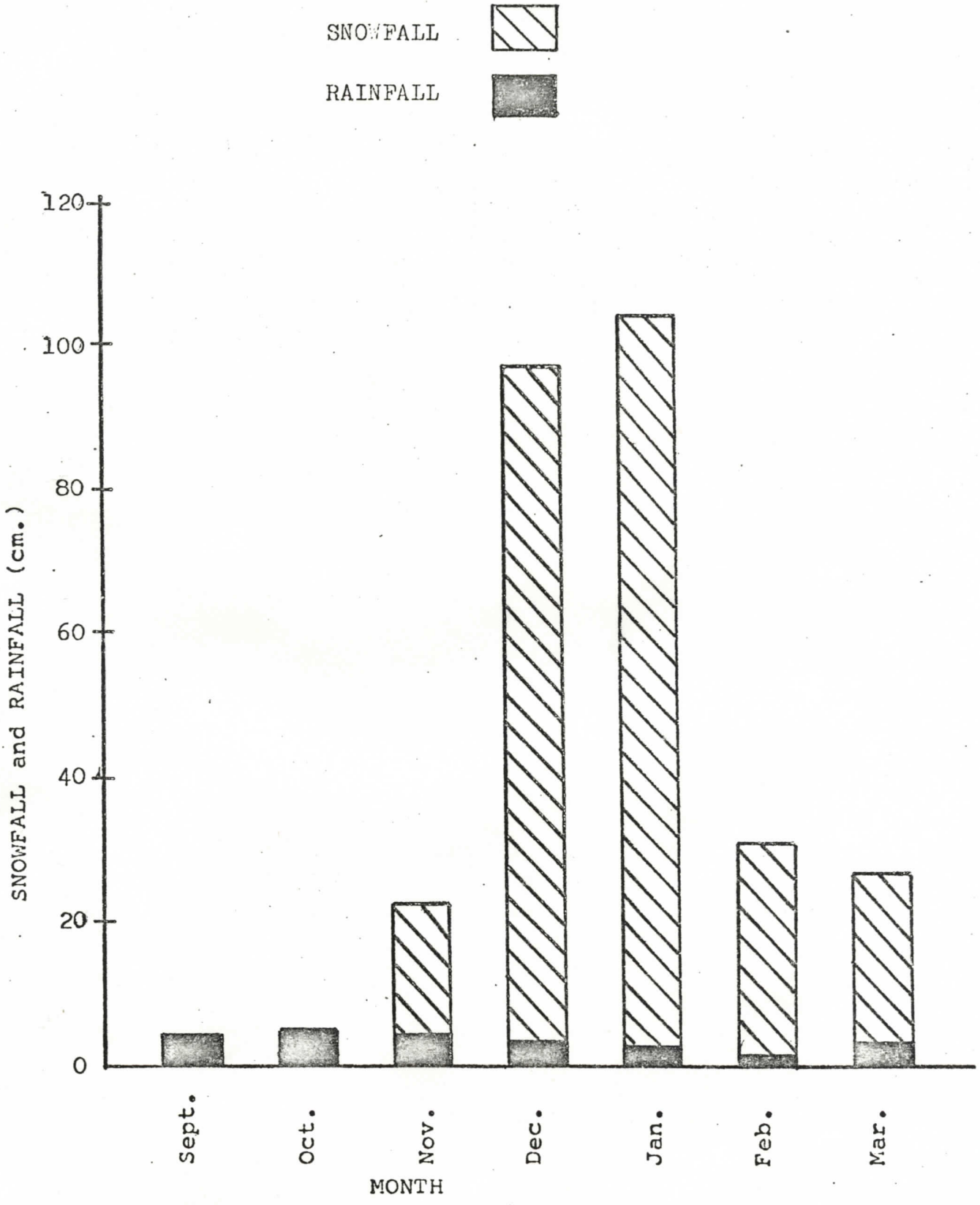


Figure 8 - Average snowfall and rainfall, September to March. 25 Year Average-Castlegar Airport.

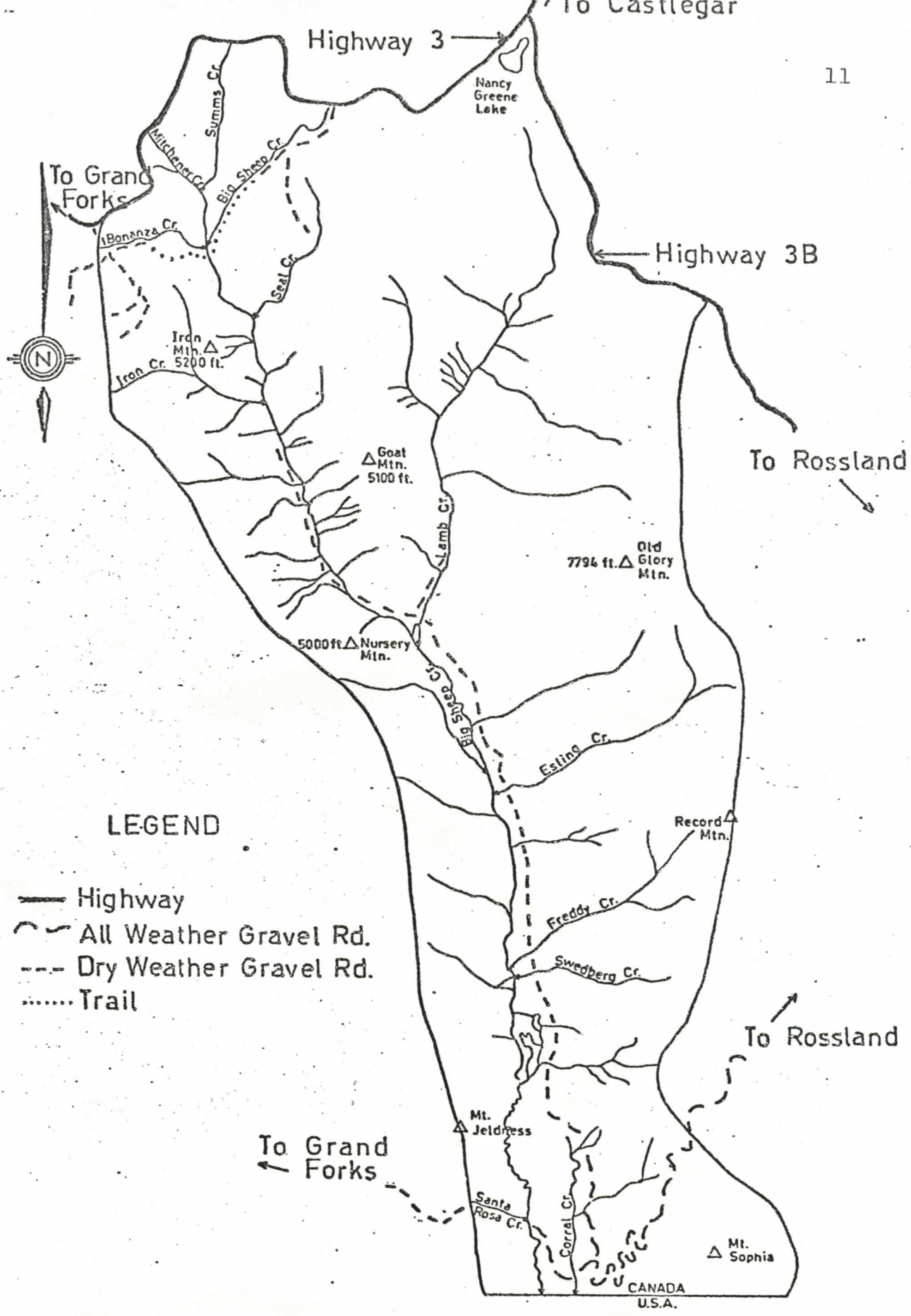
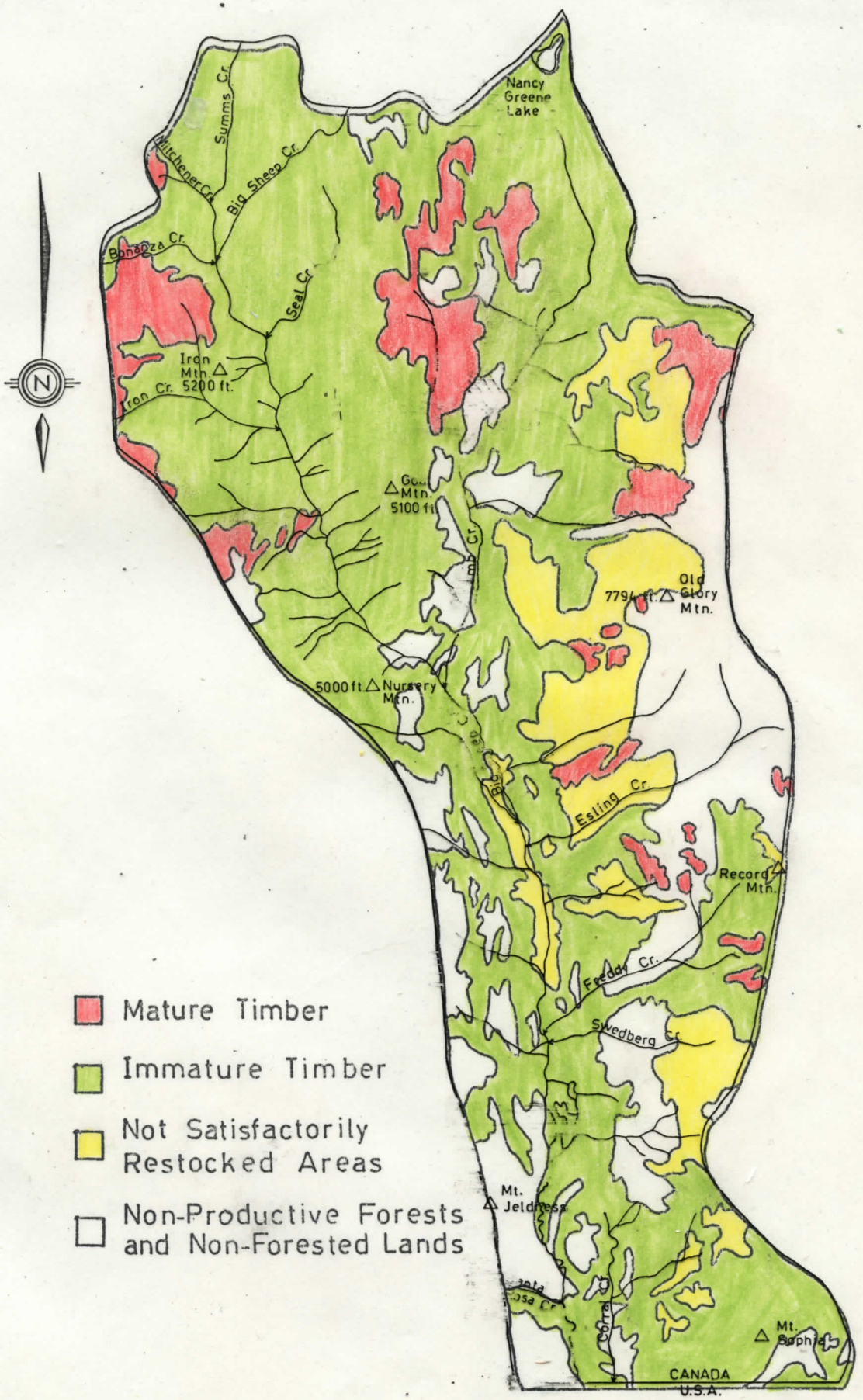


Figure 9 - Access within the Big Sheep Creek Study Area.

end of the study area, but most of this timber has been removed or is in the process of being removed. (Fig. 10.)



FOREST STOCKING

Figure 10- Forest Stocking within the Big Sheep Creek Study Area.

METHODOLOGY

Before we began any actual monitoring of the goats, we obtained topographic maps, forest-cover maps, Canada Land Inventory maps, and aerial photographs of the study area.

We also looked at alternate methods of studying mountain goats, to meet the objectives of this study.

ALTERNATE STUDY METHODS

Method A - Ground and Aerial Counts

Counts of goats from the ground would have been made and the location of all the animals observed recorded. This count would have been made over a number of days to arrive at an average number of animals per trip. Aerial counts by helicopter would then be made of the same area and a ratio established of aerial counts to ground counts. This ratio would then be applied to the rest of the study area using an aerial count. We rejected this method because:

a) It would be too expensive.

b) The helicopters would disturb the goats.

c) It was inappropiate because of the small numbers of goats in the area.

Method B - Marking and Tagging

The goats would be located and a tranquilizer gun would have been used to immobolize the goats. Once the goat was

down, a tag would have been fastened to the goat. With the tags the goats could be readily identified at a distance, making it much easier to identify individual goats. We rejected this method because:

a) It would be too expensive and time consuming.

b) A conservation officer would have to be with us to do all the tranquilizing.

c) On previous trips to the study area, we found that the goats were easily approached for photographing. (Fig. 11.) We felt that it would be easy to get close enough to tranquilize the goats, but because of their rugged terrain, (Fig. 12.) there would be the possibility of losing the goats over the cliffs before the drug took effect.

> " Mountain goats are generally considered to be non-migratory animals and inhabit the roughest possible terrain in the mountain ranges of our province, usually remaining at or above the timberline and within easy reach of rocky bluffs or crags for hasty retreat from any danger."3

Method C - Indirect Method

By the use of tracks, pellet counts, and bedding areas an estimate of population could be arrived at. We rejected this method because:

a) It would have given us the areas the goats had used or were using, but would not have been accurate or detailed enough for the purpose of this study.

3. "Mountain Goats in British Columbia" (Fish and Wildlife Branch Pamphlet), K.M. MacDonald, 1972

Figure 11 - Mountain Goat (billy) on Iron Mountain.

Figure 12 - Mountain Goat on Iron Mountain, photo shows typical escape terrain used by the goats.

STUDY METHOD USED

All of the previous techniques were given consideration and for our study we decided to monitor the goats using direct observations. During the second year of our course we were alloted one day a week in which to do field work.

DATA COLLECTION

1) To keep an accurate record of our observations, a data collection form was made up. (Appendix A.) The form was set up to keep data collection consistent. Each goat was assigned a number so that every time we saw that particular goat, more information was added to the goat's form. The form contained the following: the goat's identification number, the dates that the goat was observed, the sex of the goat, the location of the goat, and a column was provided for general observations. Photographs were also taken of the study area and areas used by the goats.

During the fall we used a four wheel drive to reach observation points and hiked into areas where we were unable to travel with the four wheel drive. During the winter, we used a snowmobile and snowshoes to travel into the study area. One aerial flight of the study area was also taken in September, 1975 to acquire a better perspective of the topography of the area.

The actual monitoring of the goats was done using binoculars and spotting scopes. We were close enough to the goats to observe them clearly, but we were far enough away so that we didn't alarm them. In most cases, the goats didn't even know that we were in the area.

2) The vegetation inventory was done using forest-cover maps and field checks. We had planned to complete a vegetation inventory using sample plots, but we were unable to do so because of time constraints. However, we noted timber types and forage used by the goats for food and shelter.

RESULTS AND DISCUSSION

DISTRIBUTION OF THE GOAT HERD

Based on forty observations of goats between October, 1974, and February, 1976, the distribution of the goats was found to be confined to specific areas. Areas on Goat Mountain, (Figs. 13,14,15.) Iron Mountain, (Fig. 16.) Nursery Mountain, (Figs. 17,18.) In-Between Mountain, (Fig. 19,20.) and Mount Jeldness (Fig.21.) were utilized by goats both fall and winter during this study. Although the goats utilized different areas in the fall than in the winter, the distance separating the two areas was relatively short and in some instances the same area was used in both the fall and the winter.

PHYSICAL AND VEGETATION CHARACTERISTICS OF FALL AND WINTER USE AREAS

Goats utilized areas according to elevation, aspect, vegetation cover, and availability of rock outcrops.

Sixty-seven percent of the forty observed locations were between 3500 feet and 4000 feet in elevation. (Fig.22.) The elevations of observed locations between fall and winter use areas remained constant and therefore were not a determining factor between use areas.

Aspect was the major difference between fall and winter use areas. In the fall the goats preferred an east aspect (74% of thirty observations.) or west aspect. (17% of thirty

Figure 13 - FALL

Figure 14 - WINTER

GOAT MOUNTAIN-SOUTH

Looking north towards Goat Mountain from the road that follows the east bank of Big Sheep Creek.

Figure 15 - Looking east towards Goat Mountain.

Figure 16 - Looking north, Big Sheep Creek is on the right hand side of the photo. Iron Mountain is in the center of the photo.

Figure 17 -- FALL

The photos were taken looking due west from where the road following the east bank of Big Sheep Creek crosses Lamb Creek.

NURSERY

MOUNTAIN

Figure 18 = WINTER

Figure 19 - FALL

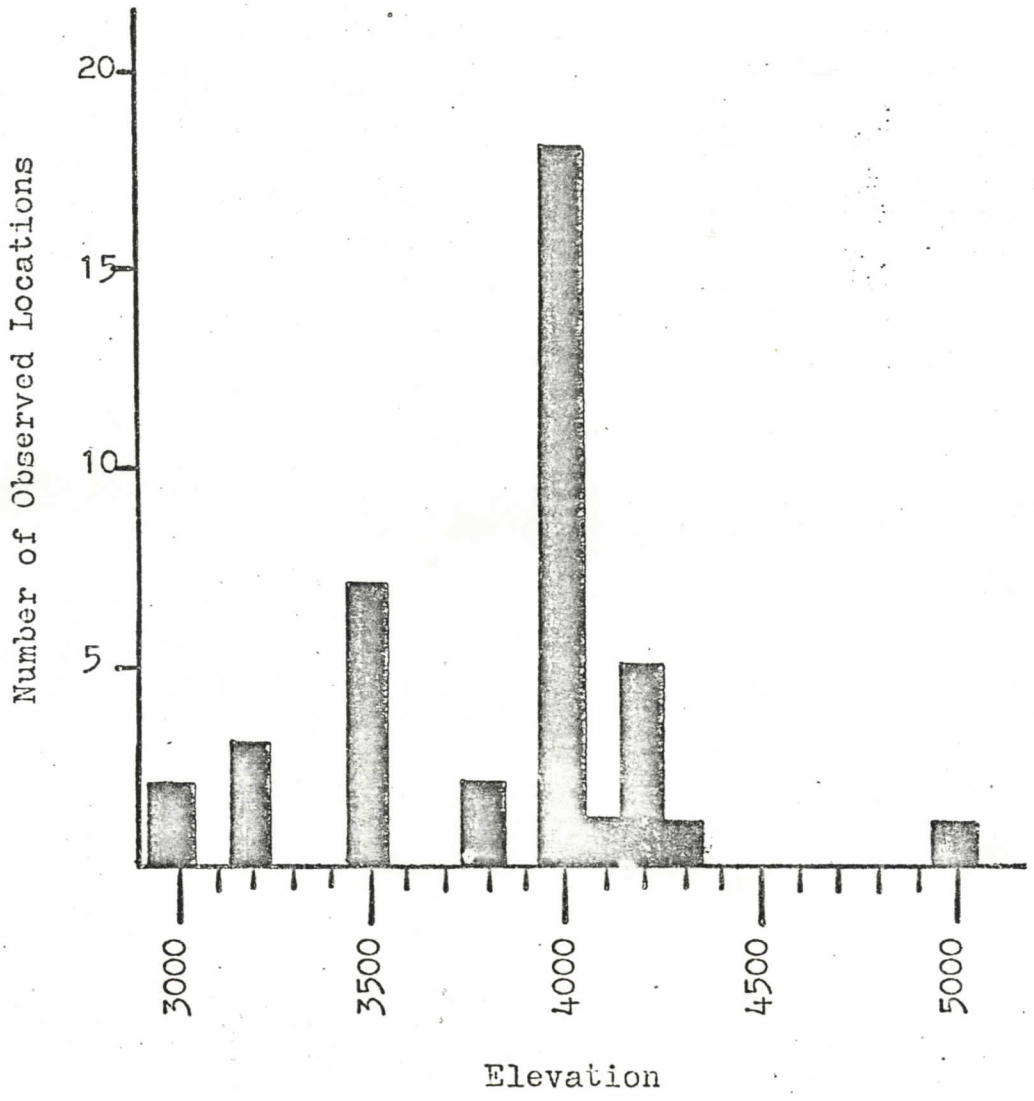
Figure 20 - WINTER

IN-BETWEEN MOUNTAIN

The photos were taken looking northwest towards In-Between Mountain from where the road that follows the east bank of Big Sheep Creek crosses Lamb Creek.

Figure 21 - Mount Jeldness (fall), looking west from the main road (Old Cascade Highway) leading into the Big Sheep Creek drainage.

FIGURE 22. - Elevation distribution of forty observed locations of goats seen, October, 1974 through February, 1976.



observations.) (Table 1.) The remainder of the fall observations were on areas with a south or south-east aspect. In the winter the goats preferred a south aspect (70% of ten observations.) or a south-east aspect. (20% of ten observations.) (Table 1.) One goat (Goat 18.) was observed on a west aspect during the winter and also utilized this as its wintering area. Goats which were noted to prefer areas with an east aspect in the fall moved to areas with a south aspect in the winter. Goats which were observed in the fall in areas with a south or south-east aspect remained there during the winter.

The amount of vegetation cover and rock outcrops differed between fall use and winter use areas. Fall use areas consisted of a mixture of rock outcrops and heavily timbered draws of Western Larch, Douglas Fir, Englemann Spruce, or Sub-alpine Fir. Winter use areas consisted of scattered timber, rock outcrops, and more open slopes than the areas used in the fall.

BEDDING AND FEEDING BEHAVIOR

No intensive work was done on bedding and feeding activities of the goat herd, but some general observations were noted. The goats utilized the same areas for both bedding and feeding activities.

In the winter months on sunny days, goats were observed bedded on top of rock outcrops which had been cleared off as a result of wind. In inclement weather, they would bed

TABLE 1. Locations of goats in relation to aspect and season.

Dates	Location	Total Observed	Number of Observations	Aspect
Oct.-Nov./74	Mt. Jeldness	1	7	East
Oct.-Nov./74	Nursery Mt.	1	1	East
Oct.-Nov./74	Nursery Mt.	2	1	East
Oct.-Nov./74	In-Between Mt.	4	1	East
Oct.-Nov./74	In-Between Mt.	1	1	South-East
Oct.-Nov./74	In-Between Mt.	1	1	South-East
Oct.-Nov./74	Goat Mt.	1	1	East
Oct.-Nov./74	Goat Mt.	2	1	West
Oct.-Nov./74	Iron Mt.	2	1	East
Oct.-Nov./74	Iron Mt.	1	1	East
Dec./74	Goat Mt.	1	1	West
Sept.-Oct./75	Nursery Mt.	1	4	East
Sept.-Oct./75	Nursery Mt.	2	1	East
Sept.-Oct./75	Goat Mt.	1	1	South
Sept.-Oct./75	Goat Mt.	1	2	West
Sept.-Oct./75	Goat Mt.	1	1	West
Sept.-Oct./75	Goat Mt.	1	1	West
Sept.-Oct./75	Goat Mt.	5	1	East
Sept.-Oct./75	Goat Mt.	2	3	East
Jan.-Feb./76	Nursery Mt.	1	2	South
Jan.-Feb./76	Nursery Mt.	3	1	South
Jan.-Feb./76	Goat Mt.	2	1	South
Jan.-Feb./76	Goat Mt.	2	2	South
Jan.-Feb./76	Goat Mt.	6	1	South
Jan.-Feb./76	In-Between Mt.	4	1	South-East
Jan.-Feb./76	In-Between Mt.	2	1	South-East

in the timber stands adjacent to the rock outcrops. In the hotter weather of the fall, goats were observed bedded in heavily shaded, timbered draws. When bedded, the goats were in a position that afforded them a good view.

In the winter, goats were observed browsing on shrubs and grasses that were exposed on the southern slopes. We observed the goats feeding on various grasses and shrubs during the fall.

GOAT NUMBERS

The population size of the goat herd within the study area between October, 1974, and February, 1976, was estimated to be thirty-one animals. This estimate was based on direct observations of thirty-one different goats during this study. Goats which were observed in the same place and classified the same on each observation were assumed to be the same individual.

COMPOSITION AND GROUPING

The goats we observed were identified according to sex and age whenever possible and classified under one of the following four types:

1) Adult male
2) Adult female
3) Yearling or kid
4) Unknown sex

The thirty-one different goats observed during the study

consisted of ten adult males, eleven adult females, one yearling, seven kids, and two adults of unknown sex. The goats were observed on seven specific areas within the study area. (Fig. 23.)

Three goats were observed on Nursery Mountain (Fig.24.) during the study. A single adult female was observed on seven occasions and a group of two (two adult females.) was observed on two occasions. A group of three (three adult females.) was observed on one occasion in February, 1976. (Table 2.)

Ten goats were observed on In-Between Mountain (Fig.25.) during this study. A group of four (two adult females, two kids.) were observed on October 6, 1974, and two single (adult males.) were observed on October 19, 1976. On February 4, 1976, a group of two (two adult males.) and a group of four (three adult males, one adult of unknown sex.) were observed. (Table 2.)

Fourteen goats were observed on Goat Mountain (Figs. 26,27.) during this study. On the northern portion of the mountain, a group of two (two adult males.) and a single (adult of unknown sex.) were observed. On the southern portion of the mountain a single,(adult male.) a group of two, (one adult female, one kid.) a group of two, (one adult, one yearling.) and a group of six (three adult females, three kids.) were observed. (Table 2.)

Three goats consisting of a single (adult male.) and a group of two (one adult female, one kid.) were observed

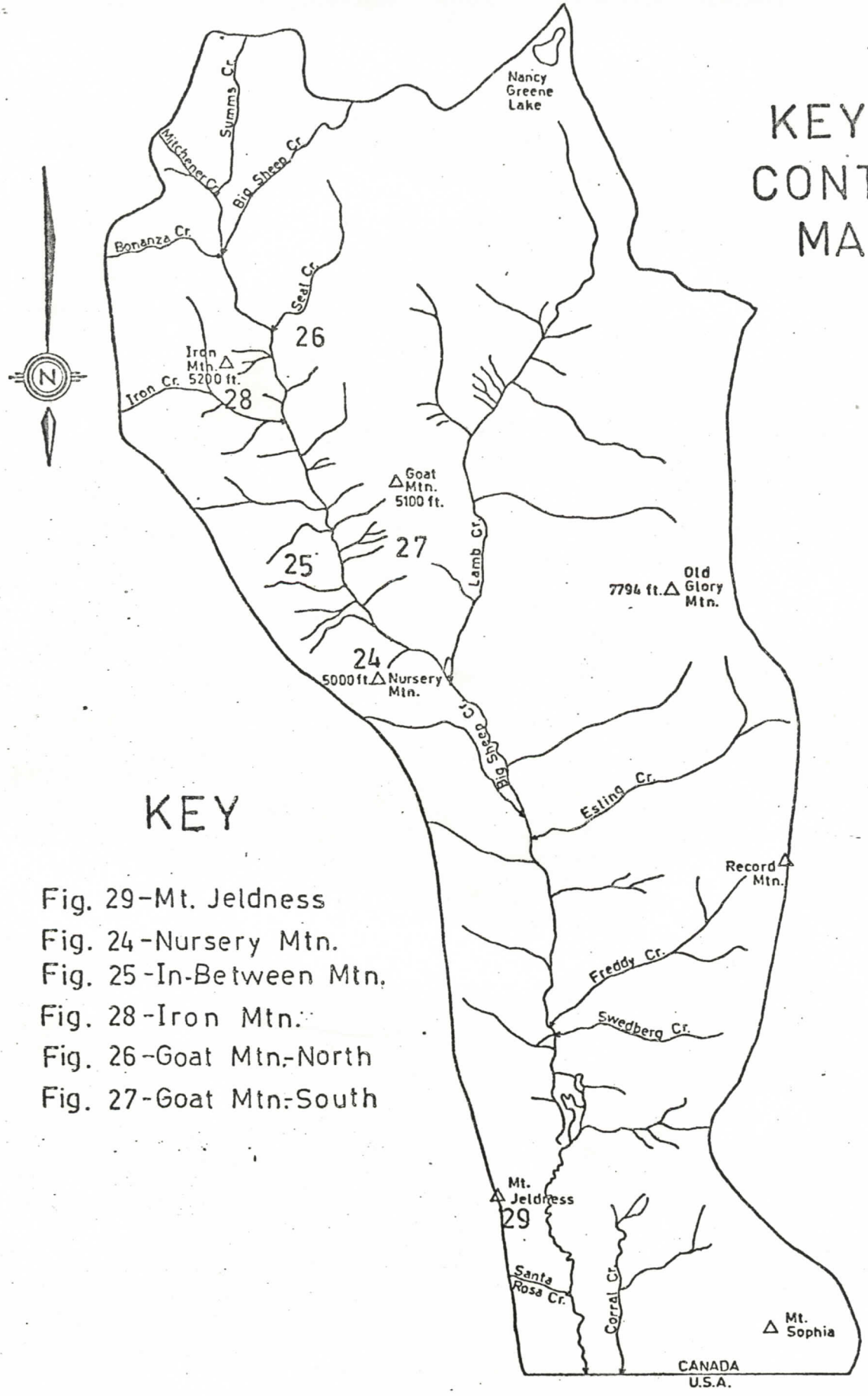


Figure 23 - Key to Observed Location Maps. The key areas used by Goats have been mapped at a scale of 1 in: $\frac{1}{5}$ mi.

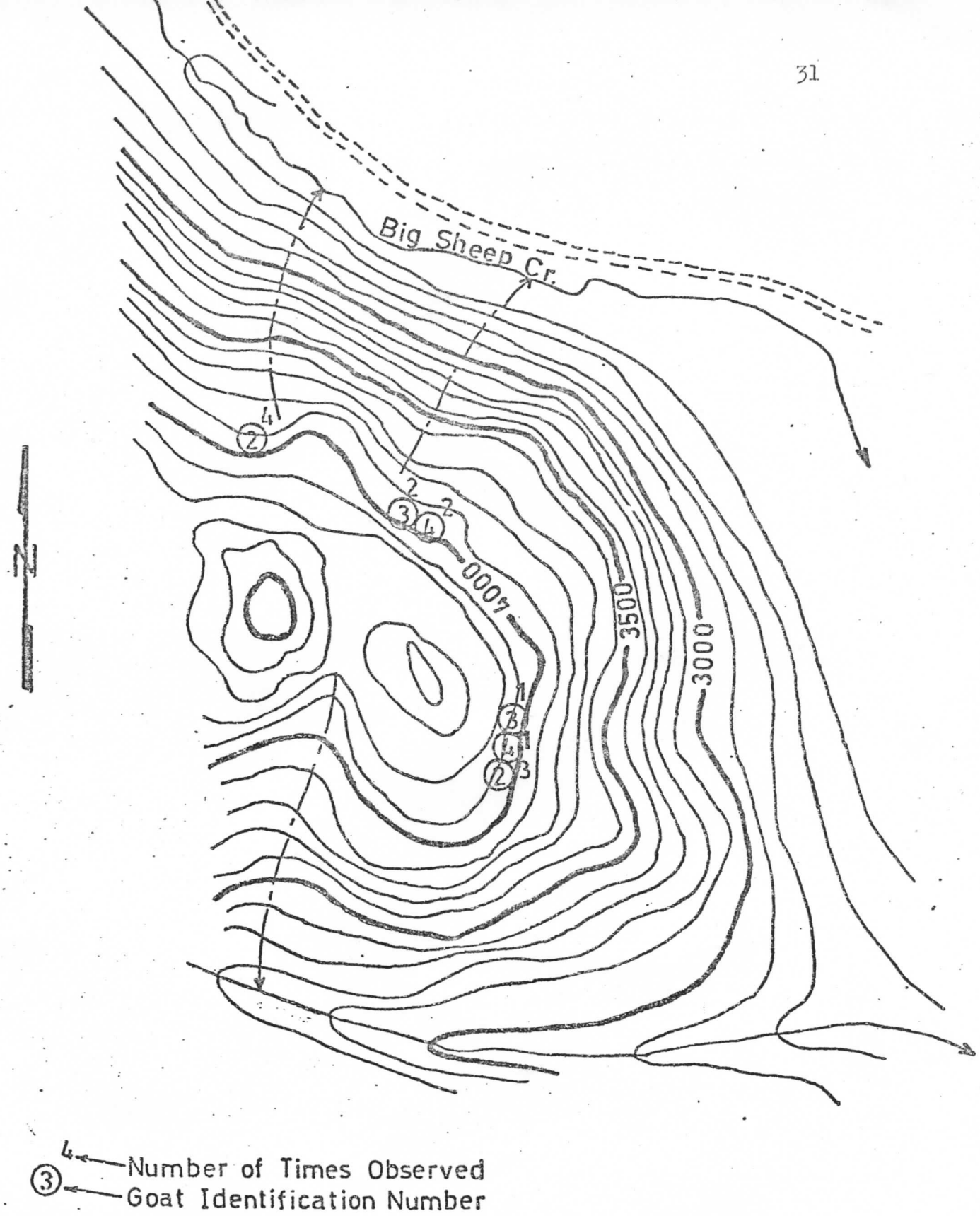


Figure 24 - Observed locations of goats on Nursery Mountain

TABLE 2. Composition of goats seen, October, 1974 through February, 1976.

Mountain Location	Date D/M/Y	Total Observed	Composition			
			Adult Males	Adult Females	Yearlings Kids	Unknown Sex
Jeldness	05/10/74	1	1	-	-	-
Jeldness	06/10/74	1	1	-	-	-
Jeldness	12/10/74	1	1	-	-	-
Jeldness	19/10/74	1	1	-	-	-
Jeldness	20/10/74	1	1	-	-	-
Jeldness	09/10/74	1	1	-	-	-
Jeldness	15/10/74	1	1	-	-	-
Nursery	19/10/74	2	-	2	-	-
Nursery	26/10/74	1	-	1	-	-
Nursery	17/09/75	1	-	1	-	-
Nursery	29/09/75	2	-	2	-	-
Nursery	04/10/75	1	-	1	-	-
Nursery	08/10/75	1	-	1	-	-
Nursery	18/10/75	1	-	1	-	-
Nursery	28/01/76	1	-	1	-	-
Nursery	04/02/76	1	-	1	-	-
Nursery	28/02/76	3	-	3	-	-
In-Between	06/10/74	4	-	2	2	-
In-Between	19/10/74	1	1	-	-	-
In-Between	19/10/74	1	-	-	-	1
In-Between	04/02/76	4	3	-	-	1
In-Between	04/02/76	2	2	-	-	-
Iron	02/11/74	1	1	-	-	-
Iron	02/11/74	2	-	1	1	-

TABLE 2 . (Continued)

Mountain Location	Date D/M/Y	Total Observed	Composition			
			Adult Males	Adult Females	Yearlings Kids	Unknown Sex
Goat	02/11/74	1	-	-	-	1
Goat	02/11/74	2	2	-	-	-
Goat	31/12/74	1	-	-	-	1
Goat	17/09/75	1	1	-	-	-
Goat	20/09/75	1	1	-	-	-
Goat	24/09/75	1	1	-	-	-
Goat	24/09/75	1	-	-	-	1
Goat	04/10/75	2	-	1	1	-
Goat	08/10/75	2	-	1	1	-
Goat	12/10/75	1	1	-	-	-
Goat	12/10/75	5	-	3	2	-
Goat	18/10/75	2	-	1	1	-
Goat	25/01/76	2	-	1	1	-
Goat	04/02/76	2	-	1	1	-
Goat	04/02/76	6	-	3	3	-
Goat	28/02/76	2	-	1	1	-

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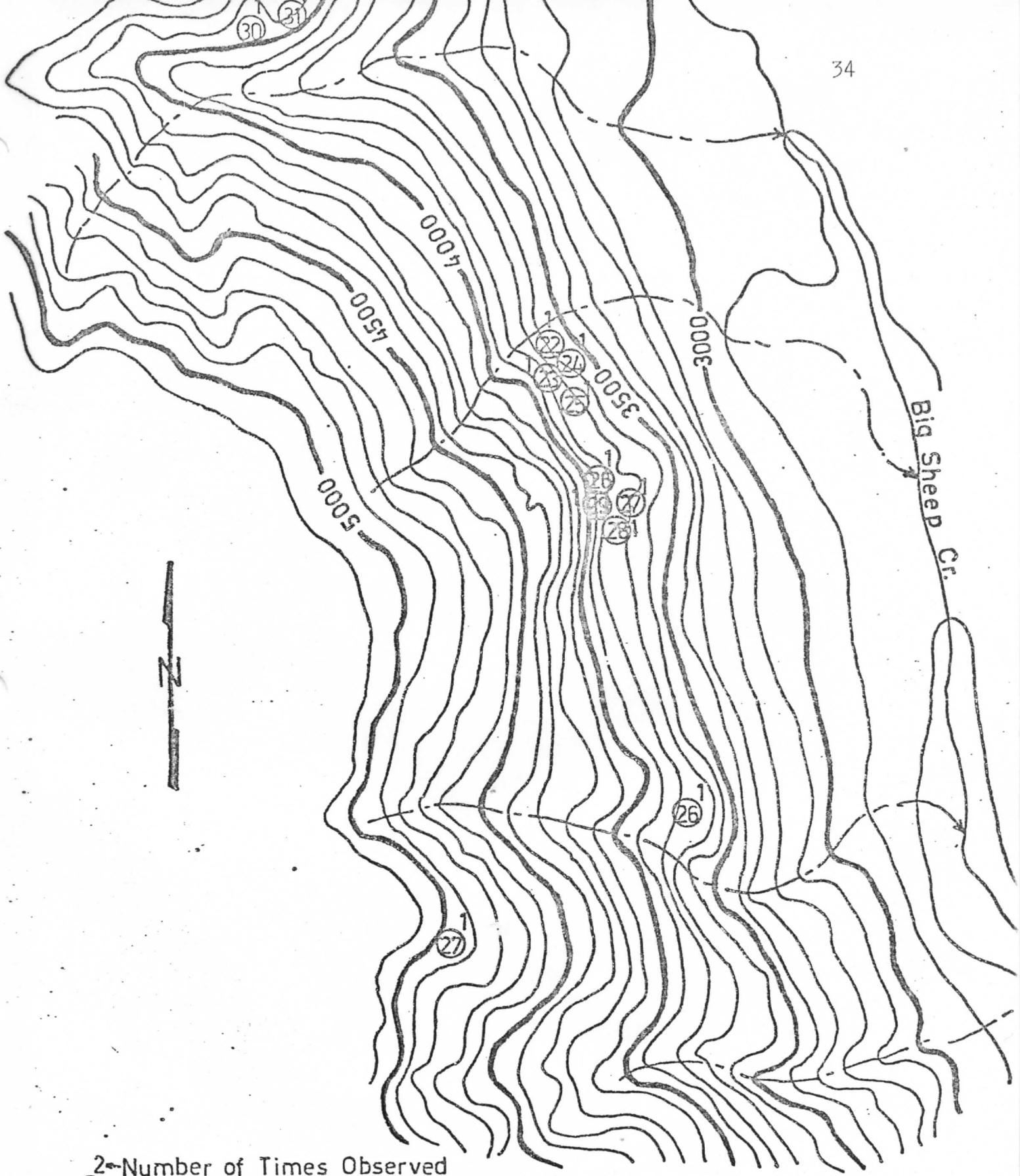
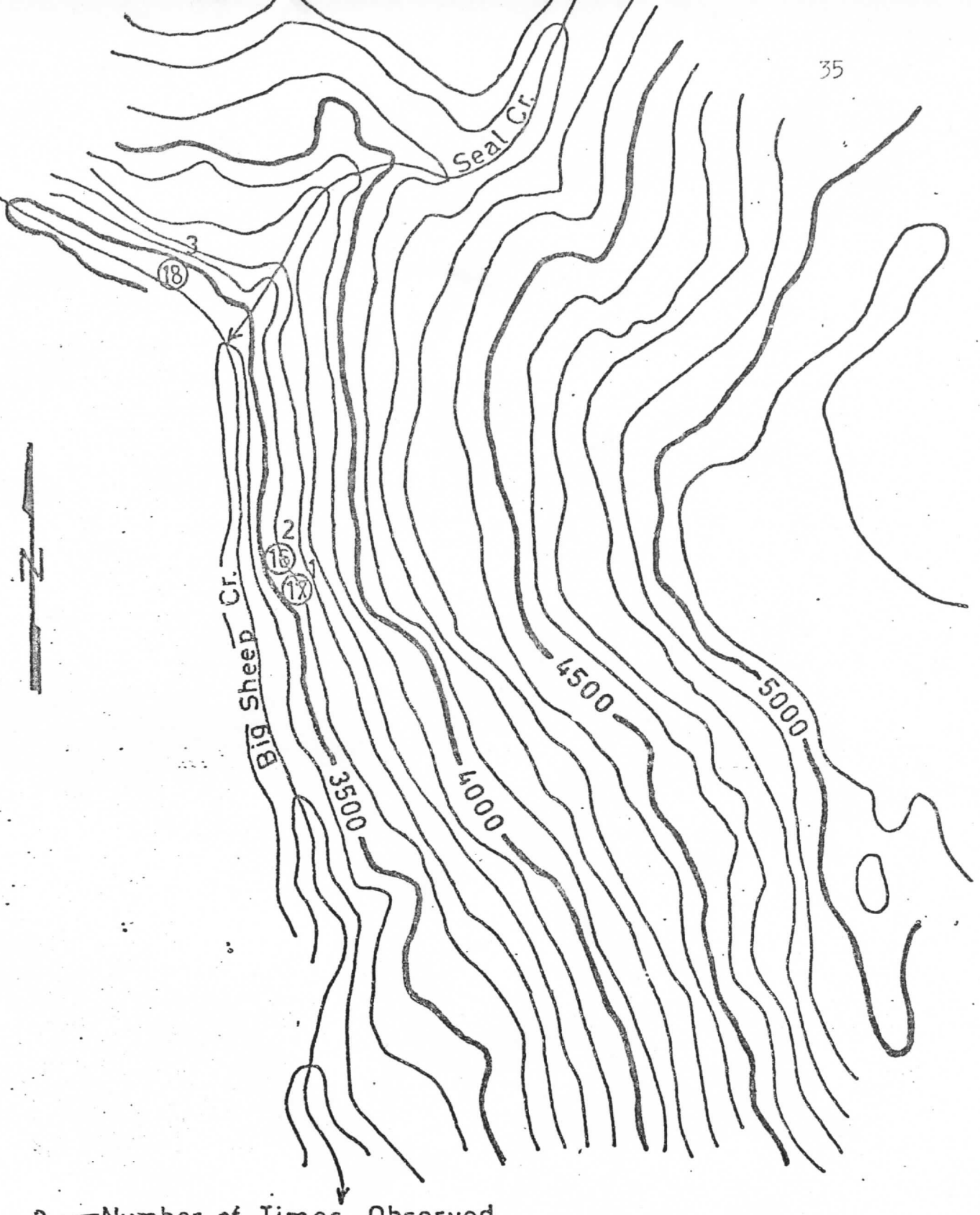


Figure 25 - Observed locations of goats on In-Between Mountain.



2 ← Number of Times Observed

(3) ← Goat Identification Number

GOAT MOUNTAIN-NORTH

Scale–1 in: 1/5 mi

Figure 26 – Observed locations of goats on Goat Mountain–North.

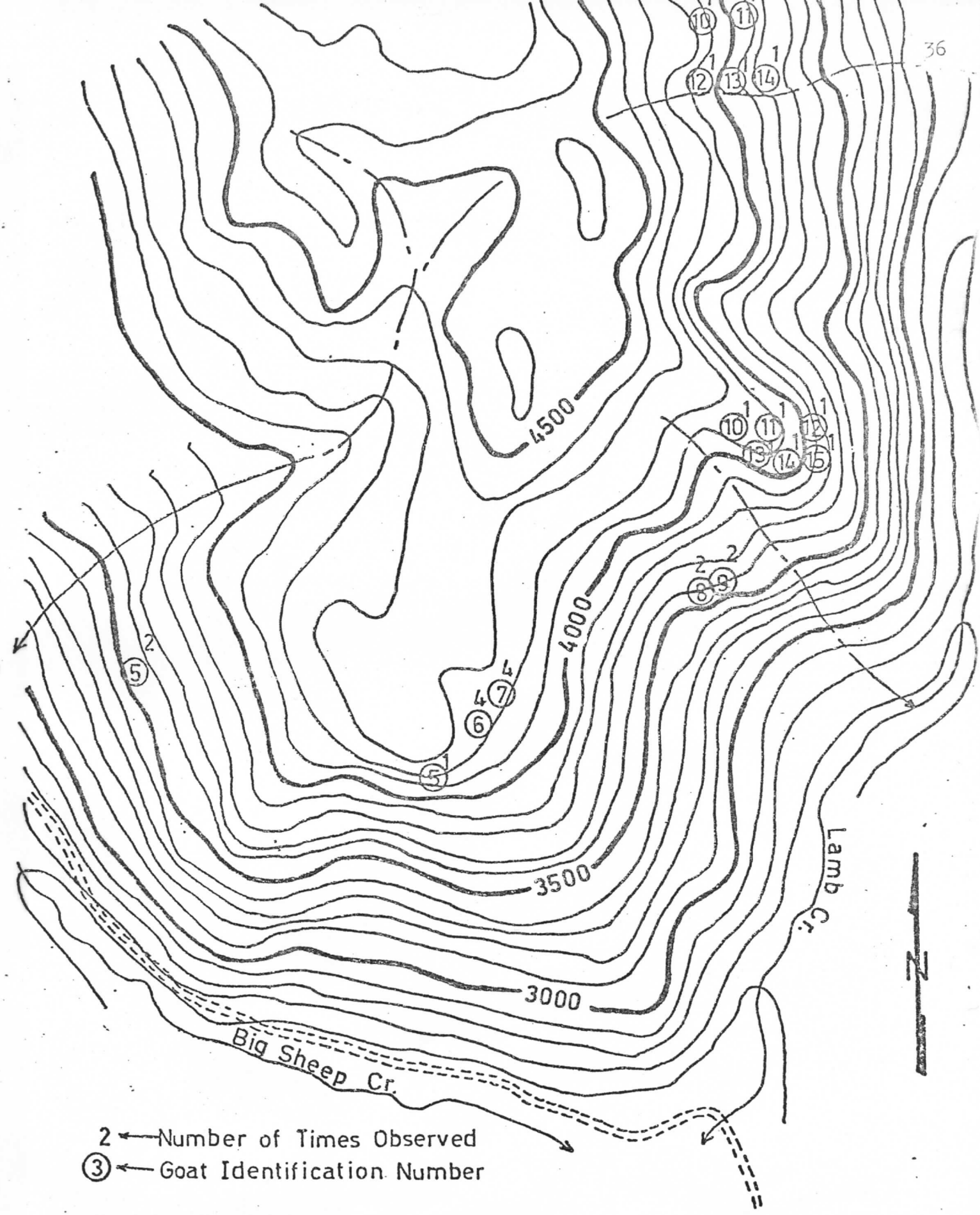
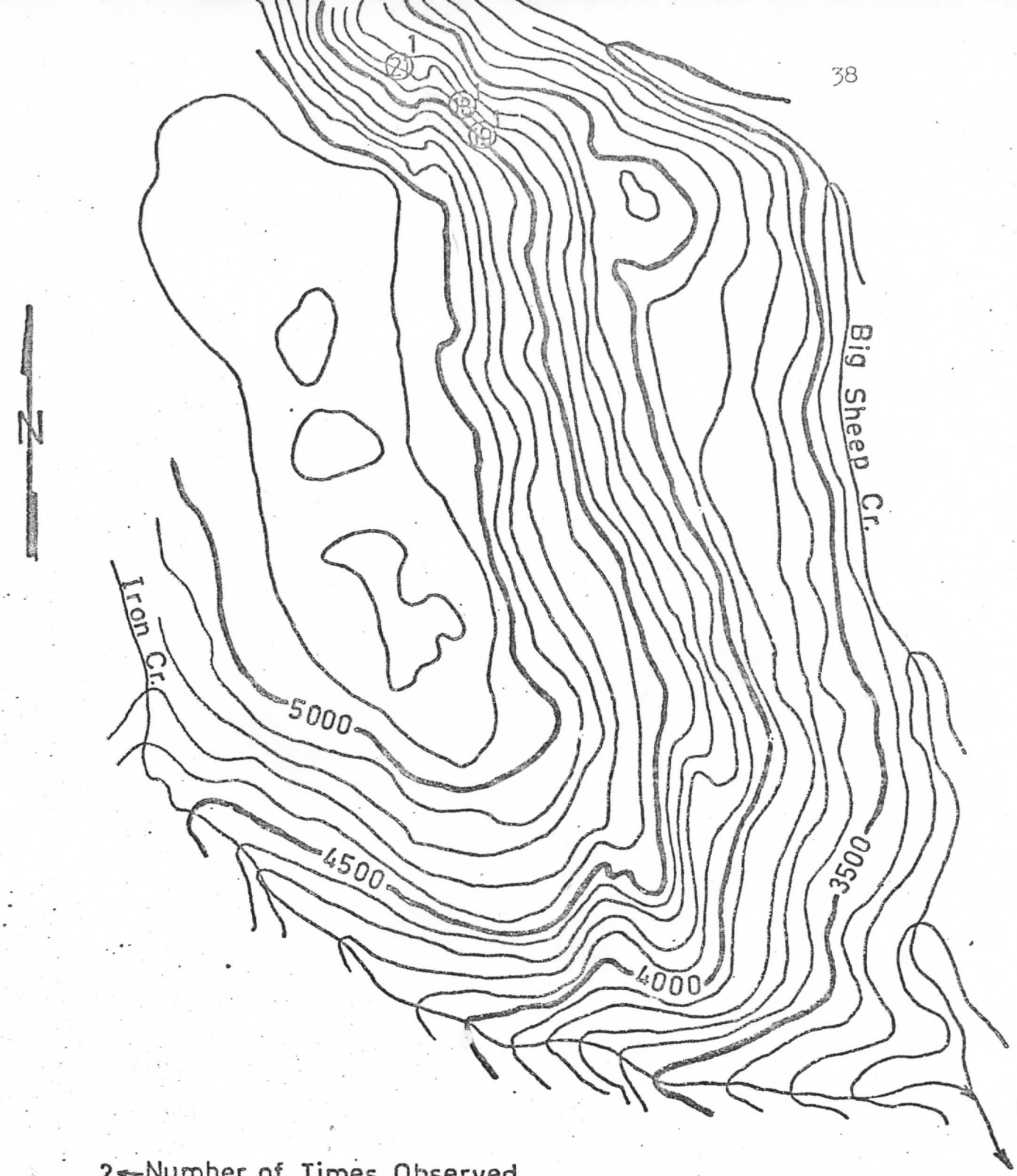


Figure 27 - Observed locations of goats on Goat Mountain-South.

on Iron Mountain. (Fig. 28.) A single (adult male.) was observed on Mount Jeldness (Fig. 29.) on seven occasions during the study. (Table 2.)

Sixty percent of forty observations were of single goats, while twenty-seven and one-half percent of forty observations were of groups of two. (Table 3.) The largest group observed contained six goats and consisted of three females and three kids. Any grouping which did occur, was generally females and kids. Adult males were generally observed alone or with another adult male. Observations on February 4, 1976, showed three adult males and one adult of unknown sex grouped together. This grouping appeared to be the result of a limited winter use area.



2←Number of Times Observed
③←Goat Identification Number

IRON MOUNTAIN

Scale=1in.:1/5 mi.

Figure 28 – Observed locations of goats on Iron Mountain.

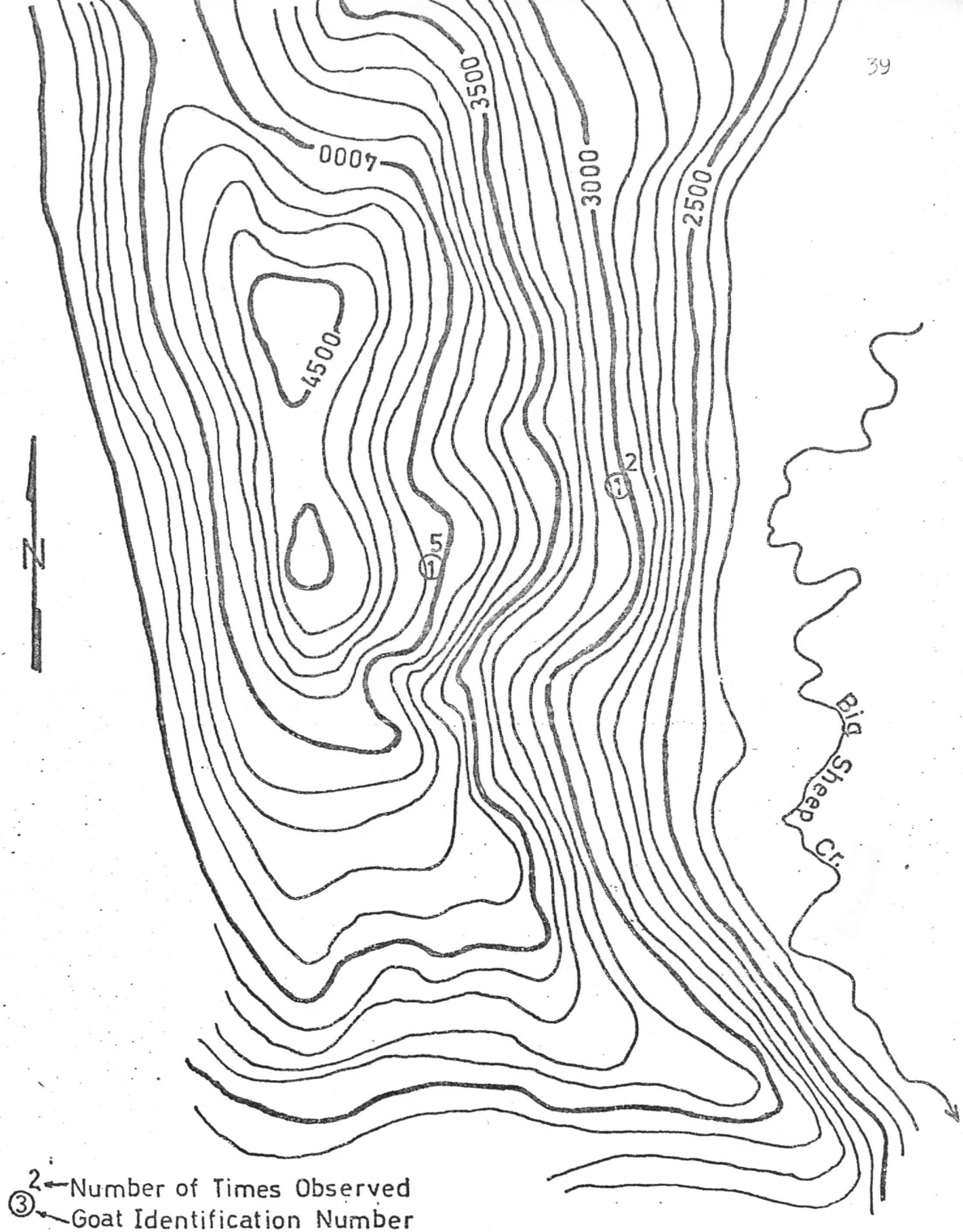


Figure 29 - Observed locations of goats on Mount Jeldness.

TABLE 3. Sizes of mountain goat groups seen, October, 1974 through February, 1976.

Group Size	Number of Observations	Percent of Total Observations
1	24	60.0
2	11	27.5
3	01	2.5
4	02	5.0
5	01	2.5
6	01	2.5

CONCLUSIONS AND RECOMMENDATIONS

Due to time and financial restraints imposed upon this study, the amount of information we could gather was limited. However, this study has provided basic information concerning population numbers, composition, and distribution of the Rocky Mountain goat herd in the Big Sheep Creek drainage.

The population of the goat herd utilizing the study area was estimated at thirty-one animals. The stability of the goat herd is not known as recruitment rates or mortality rates were not established during the study. Adult females and kids tend to group, while adult males were often seen alone or in the company of another adult male.

The goats utilized different locations in the study area, depending upon the season. In the winter the goats preferred the sparsely vegetated areas of south and south-east aspects. In the fall the goats preferred the heavily vegetated areas of east and west aspects. We found the fall and winter use areas in the study area to be small and limited.

RECOMMENDATIONS

As a result of this study, we have arrived at several recommendations and reasons why they should be implemented.

A further and more intensive study of the goat herd should be undertaken for the following reasons:

1) To find the mortality and recruitment rate of the

goat herd, thereby establishing the stability of the herd.

2) To monitor the activities of the goat herd on a seasonal and yearly basis.

3) To establish the carrying capacity of the areas utilized by the goats.

As the distribution of the goats is confined to specific areas, these areas must be protected from the following human activities:

1) No resource extraction of any type to be allowed in these areas.

2) Due to the increase in winter recreation, the areas utilized by goats must be protected from winter recreation activities.

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Appendix A

GOAT IDENTIFICATION NUMBER # 1

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 05/74	Male	Mt. Jeldness	→ observed on east side of mountain
Oct. 06/74		Mt. Jeldness	
Oct. 12/74		Mt. Jeldness	→ in draws, rocky,
Oct. 19/74		Mt. Jeldness	→ on two occasions seen low down on mt., may have been going for water, was climbing at times
Oct. 20/74		Mt. Jeldness	
Nov. 09/74		Mt. Jeldness	→ in fall of 75 we did not see him on mt.
Nov. 15/74		Mt. Jeldness	→ searched mt. for tracks or any sign but none at all
			→ had been on mt. for previous 4 yrs. as we had seen him prior to study
			→ elevation ≈ 4,000 ft.

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 2

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 26/74	Female	Nursery	→ seen on east slopes in fall when warm, shadier, and treed draws; → observed alone on all observations except for one (Feb. 28/76), than was with goats #3 & #4 → moved to south side of hill in winter. elevation ≈ 4,000 ft.
Sept. 17/75		Nursery	
Oct. 04/75		Nursery	
Oct. 08/75		Nursery	
Oct. 18/75		Nursery	
Oct. 28/75		Nursery	
Feb. 04/76		Nursery	
Feb. 28/76		Nursery	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 3

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 19/74	Female	Nursery	→ seen with goat # 4 on all observations → east side of mt., in timbered draws where cool in fall → moved to south slope in winter (Feb. 28/76) → on top 1/3 of mt. → elevation ≈ 4000 ft
Sept. 29/75		Nursery	
Feb. 28/76		Nursery	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 4

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 19/74	Female	Nursery	— refer to goat #3 data
Sept. 29/75		Nursery	
Feb. 28/76		Nursery	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 5

DATE	SEX	LOCATION	OBSERVATIONS
Sept. 17/75	Male	Goat Mt. South	— on Sept. 17/75 was bedded down on top of rock bluff giving good view, time observed ≈ 2:45
Sept. 20/75		Goat Mt. West	— on Sept. 20/75 was observed west side of mt, ≈ 500 yds. from previous observation was feeding
Oct. 12/75		Goat Mt. West	- on Oct. 12/75 — same ≈ location as Sept. 20/75 when first observed.. Then moved into timber
			→ elevation Sept. 17/75 ≈ 4100 ft
			→ elevation on last two observations ≈ 3500 ft.

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER #6

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 04 | 75	Female	Goat Mt. South	→ has a kid (goat #7) → observed in same area on all sightings → appears to be a travel route where they come out of timber to bed down and feed. → beds down on rock outcrop where has good view of area below → elevation ≈ 4,200 ft.
Oct. 08 | 75		Goat Mt. South	
Oct. 18 | 75		Goat Mt. South	
Feb. 04 | 76		Goat Mt. South	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 7

DATE	SEX	LOCATION	OBSERVATIONS
Oct.04/75	Kid (?)	Goat Mt. South	→ with (goat #6)
Oct.08/75		Goat Mt. South	
Oct.18/75		Goat Mt. South	
Feb.04/76		Goat Mt. South	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 8

DATE	SEX	LOCATION	OBSERVATIONS
Jan. 25/76	Female	Goat Mt. South	— on both observations was in same location.
Feb. 28/76		Goat Mt. South	— feeding in deep snow — browsing on tall shrubs — with goat # 9 both locations — elevation ≈ 3500 ft

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 9

DATE	SEX	LOCATION	OBSERVATIONS
Jan. 25/76	(?)	Goat Mt. South	- with goat # 8 both sightings
Feb. 28/76		Goat Mt. South	- appears smaller than # 8, may be a yearling (classified as 1)
			- could not identify sex

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 10

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 12/75	Female	Goat Mt. East	— one of five in a group on east slope of goat mt. on Oct. 12/75 sightings.
Feb. 04/76		Goat Mt. South	— with a kid — with goats # 11, #12, #13, #14 on Oct. 12/75. # 15 may have been in brush ↑ — on Feb. 04/76 was with goats #11, #12, #13, #14, #15 → bedded together there were 3 nannys, 3 kids. → Feb. 04/76 on south face, warm day, were bedded down on wind swept rock knoll which was bare — elevation ≈ 4,000 ft.

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER #11

DATE	SEX	LOCATION	OBSERVATIONS
Oct.12/75	Female	Goat Mt. East	→ refer to goat # 10 data
Feb.04/76		Goat Mt. South	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER #12

DATE	SEX	LOCATION	OBSERVATIONS
Oct.12/75	Female	Goat Mt. East	→ refer to goat # 10 data
Feb.04/76		Goat Mt. South	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER #13

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 12/75	Kid (?)	Goat Mt. East	→ refer goat #10 data
Feb. 04/76		Goat Mt. South	— could not identify sex

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 14

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 12/75	Kid (?)	Goat Mt. East	refer to goat # 10 data — could not identify sex.
Feb. 04/76		Goat Mt. South	

Appendix A (cont.)

GOAT IDENTIFICATION NUMBER # 15

DATE	SEX	LOCATION	OBSERVATIONS
Feb. 04/76	Kid (?)	Goat Mt. South	– refer to goat # 10 data – could not identify sex – was not spotted on Oct. 12/75 with goats # 10, # 11, # 12, # 13, # 14 but may have been out of sight in timber

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER #16

DATE	SEX	LOCATION	OBSERVATIONS
Nov. 02/74	Male	Goat Mt. Falls	on Nov. 02/74 observation was with goat #17; both goats were bedded down in timber; → ≈ elevation 3500 ft. → on Sept. 24/75 was in same ≈ location; bedded down, appeared to be alone
Sept. 24/75		Goat Mt. Falls	

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 17

DATE	SEX	LOCATION	OBSERVATIONS
Nov. 02/74	Male	Goat Mt. Falls	→ refer to goat # 16 data

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 18

DATE	SEX	LOCATION	OBSERVATIONS
Nov. 02/74	(?)	Goat Mt. Falls	→ could not identify sex
Dec. 31/74		Goat Mt. Falls	→ on Nov. 02/74, was feeding, near valley bottom, approx. elev. 3,200
Sept. 24/75		Goat Mt. Falls	→ on Dec. 31/74 was obsered same area, walking in deep snow, no windswept rock faces near,
			→ on Sept. 24/75, same area as previous observations; bedded down

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 19

DATE	SEX	LOCATION	OBSERVATIONS
Nov. 2/74	Female	Iron Mt.	→ had kid with her → approached ≈ 50 ft. did not seem to disturbed, when moving always waiting for kid to catch-up → ≈ elev. 4300 ft.

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 20

DATE	SEX	LOCATION	OBSERVATIONS
Nov. 02/74	Kid (?)	Iron Mt.	→ could not identify sex → refer goat #19 data → appeared inquisitive at our presence

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 21

DATE	SEX	LOCATION	OBSERVATIONS
Nov. 02/74	Male	Iron Mt.	→ ≈ 200 yards from goats # 19 and #20 → was bedded down on rock bluff → ≈ elevation 4200 ft

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 22

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 06/74	Female	In-Between Mt.	- with goats # 23, 24, 25 - had kid with it - all were bedded down together - elev. ≈ 3,500

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 23

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 06/74	Female	In Between Mt.	- refer to goat # 22 data - had kid

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 24

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 06/74	Kid (?)	In-Between Mt.	- with goats # 22, # 23, # 25 - could not identify sex - refer to goat # 22 data

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 25

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 06/74	Kid (?)	In Between Mt.	- refer to goat #22 data - could not identify sex.

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER #26

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 19/74	Male	In-Between Mt.	Oct. 19/74 - bedded down, alone, ≈ elev. 3800 ft.
Feb. 04/76		In-Between Mt.	Feb. 04/76 - with 3 others; goats # 27, #28, #29 → same area as previous observation → all goats were feeding than bedded down ≈ 12:00

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 27

DATE	SEX	LOCATION	OBSERVATIONS
Oct. 19/74	(?)	In-Between Mt	Oct. 19/74 - feeding, alone, ≈ elev. 5,000 ft.
Feb. 04/76		In-Between Mt.	Feb. 04/76 → believed to be the one with other 3 goats # 26, #28 #29 as in same general location

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER #28

DATE	SEX	LOCATION	OBSERVATIONS
Feb. 04/76	Male	In-Between Mt.	refer goat # 26 data Feb, 04/76

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 29

DATE	SEX	LOCATION	OBSERVATIONS
Feb. 04/76	Male	In Between Mt.	refer goat # 26 data Feb. 04/76

Appendix A (con't.)

GOAT IDENTIFICATION NUMBER # 30

DATE	SEX	LOCATION	OBSERVATIONS
Feb. 04/76	Male	In Between Mt	→ with goat # 31 → first observation of these two goats → ≈ elev. 4000 ft. → feeding on windswept slopes

GOAT IDENTIFICATION NUMBER # 31

DATE	SEX	LOCATION	OBSERVATIONS
Feb. 04/76	Male	In-Between Mt.	refer goat #30 data