CANADIAN WILDLIFE SERVICE

ELLESMERE ISLAND RANGE STUDIES

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June 13, 1972
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DEPARTMENT OF THE ENVIRONMENT

PART I

ELLESMERE ISLAND

This report is Part I of two reports on preliminary range studies during 1971. Part II will report on Bathurst and Devon island studies. Certain of the maps are numbered consecutively in Parts I and II, and recommendations for research and management are based on both reports.

ELLESMERE ISLAND RANGE STUDIES

INTRODUCTION

Range studies were conducted on some of the Queen Elizabeth Islands in 1971 to obtain data on high arctic vegetation types, their relationships to topography, and the applicability to tundra vegetation of certain methods of measuring vegetational cover and standing crop of forage. This report will present the information obtained on vegetation types on Ellesmere Island. Observations of muskoxen, Peary caribou, and arctic hares are included.

Field work was carried out on Ellesmere Island between the 13 July and 4 August, 1971.

Two approaches were followed:

(1) combined ground and aerial surveys centred on the Eureka area, and

(2) extensive aerial reconnaissance, with limited ground checks of more distant areas.

The more intensive studies on the Fosheim Peninsula and adjacent areas served to identify and define major terrain units which might be of value in classifying muskox, caribou, and hare ranges, and which could be identified both from the air and from aerial photographs. Such a simple terrain classification could form a basis for more detailed studies and for an extensive inventory of wildlife habitats. The Fosheim Peninsula was particularly appropriate for the work described here for four reasons:

(i) it is a major population centre for both muskoxen and hares,

(ii) it has been the site of previous muskox studies,

(iii) it is readily accessible from Eureka, and

(iv) it is the centre of a rapidly expanding program of oil and gas exploration.

METHODS

On the basis of short reconnaissance flights, literature reviews, and discussions with other investigators, camps were established at two sites:

(A) twenty-one miles N.N.W. of Eureka, near Iceberg Point (80°16'N, 85°12'W) and

(B) eight miles north of Eureka, at Eastwind Lake (80°6'N, 85°35'W).

Studies at each site included:

- limited quantitative analyses of the plant communities,
- descriptions of major terrain units,
- collections of plant and soil samples,
- observations on the mammals of the area,
- a photographic record.

In addition to the two above locations, brief visits were made to three other sites:

(C) "Pen Lake" ($80^{o}8'N$, $84^{o}23'W$),

(D) a lake sixteen miles E.N.E. of Cape Lockwood ($80^{o}22'N$, $82^{o}15'W$), and

(E) the Sawtooth Mountains ($79^{o}29'N$, $83^{o}10'W$).

Qualitative descriptions of terrain type, were made at Sites A and B. Those descriptions are incomplete, but more detailed information will become available following further identification and verification of specimens and with the results of soil analyses. Sites were divided into terrain units for uniform analysis. Frequency and cover were estimated in two terrain units at Sites A and B. In Terrain Unit 1-a, Frost Hummock Patterned Ground, at Site A line-intercept method was used to determine frequency and cover values. Three parallel lines, twenty metres apart, were established along the contours of a 10^{o} - 15^{o}, north-facing slope. The results will be presented later by Hubert.

All study plots were permanently marked by dowels, and, at Site A, painted boulders were placed at the ends of each transect. Aerial photographs were taken of these sites from a height of 30-m (Plate 1).

In Terrain Unit 2, Salix-Dryas-Dominated Plain, at both Sites A and B three parallel, 30-metre lines were arranged 20 metres apart on a south-facing slope with an average gradient of 5°. The slope was dry with widely scattered boulders and stones. Frequency and cover estimates were made using a point frame (Plate 2). Seven plots, located at 5-metre intervals along the transect, were analysed by reading 50 points at each, using a 10-point frame spaced at 10-cm intervals. Plots were located on alternate sides of the tape. Low-level aerial photographs were taken (Plate 3).

RESULTS

TERRAIN UNITS

A number of broad terrain units, based on patterns of vegetation and relief, are proposed. A cursory investigation of plant distribution in the area suggests that available water supply controls plant species composition and cover on any given site. Secondary factors, which may achieve primary importance in some areas, include microclimate and nutrient availability. Relief plays an important role in determining moisture gradients within an area and may operate on both micro and macro/ scales. The units listed below are not exclusive in that many of the species listed are common to several units. Differences are reflected in differences in frequency and cover of plant species as shown clearly in the photographs accompanying the report.

The terrain units described here are:

(1) Patterned ground

(a) frost hummocks

(b) low-centred ice-wedge polygons

(c) high-centred ice-wedge polygons

(2) Salix - Dryas Plains

(3) Lake basins

(4) Stream banks

(5) Areas of surface runoff, impeded drainage, and seepage slopes

(6) Exposed bedrock, talus, and other stony substrates

Detailed descriptions of the terrain units follow.

(1) Patterned Ground

(a) Frost hummocks

Frost hummocks (Plate 4) occur extensively throughout the area around Site 1, particularly on north- and west-facing slopes. Analyses indicate that *Salix arctica* dominates the tops, with lichens and mosses distributed on both tops and sides. Other species occurring in these areas include *Carex* spp., *Oxyria digyna*, *Stellaria longipes*, *Saxifraga oppositifolia*, *Papaver radicatum*, and *Draba* spp. The interstices are usually devoid of vegetation and, judging by the numerous droppings, are often used as winter runways by lemmings (*Dicrostonyx groenlandicus*). The development of hummock fields on slopes varying from 2^{o} - 20^{o}, is related to frost heave processes in association with seepage from late melting snow patches. *Cassiope tetragona* patches indicate that snow is present on these slopes until early summer. The hummocks are somewhat spherical in shape and are characteristically 24-48 cm in diameter. They may coalesce to form elongate ridges oriented downslope. They have a mineral core and single-grain structure of loam materials. Roots of *Salix arctica* penetrated throughout the active layer to an observed depth of 42 cm. No horizon development or organic accumulation was observed.

The willows on the hummocks exhibit vigorous growth but woody twigs are less evident in comparison with those seen on other terrain types.

The hummocks observed in the area of Site A are similar in many respects to those of similar, sheltered areas at Sites C and E. Species composition may be quite variable, although *Salix* is dominant in terms of frequency and abundance. At Site E the numerous mosses and lichens, together with vascular plants such as *Alopecurus alpinus*, *Dryas integrifolia*, and *Cerastium regellii*, further diversify the vegetation of this terrain unit and add substantially to the ground cover.

The frost hummocks described here are similar in vegetation, structure, and formation to those described by Raup (1965) in Greenland.

A herd of nine muskoxen (2♂♂, 3♀♀, 1 yearling, 3 calves) was observed feeding on an area of Salix-dominated frost hummocks. Closer inspection revealed that the buds and shoots of this species had been clipped (see Plate 4) (cf. Tener 1965 p. 20). Foliose and crustose lichens, which form a cover on some of the exposed hummock surfaces, were not utilized.

(b) Low-centred ice-wedge polygons

This type is seen throughout the area and is characterised by networks of low polygonal ridges with small pools in the centres. Representative types were examined in four localities (Plate 5). Low-centred polygons are the result of ice-wedge formation and are particularly well developed in old lake beds and areas of impeded drainage. Tapering ice-wedges are formed as water freezes in thermal-contraction cracks. Repeated cracking in winter with the addition of water during melt leads to further wedge growth and the formation of ridges along their margins. Central depressions thus created impeded drainage and cause the eventual formation of ponds. Large ice wedges may partially thaw during the summer months forming water-filled troughs.

The pools and troughs are colonised initially by mosses which, with the build up of organic matter, are succeeded by emergent vascular plants such as Eriophorum scheuchzeri. A typical example is shown in Plate 6. Grasses and sedges such as Arctagrostis latifolia and Carex stans become established on the drier sites. Ultimately, the body of the polygon is dominated by a meadow type of vegetation with Salix arctica on the drier ridges. These low-centred polygons are major feeding areas for muskoxen, hares, and occasionally, snow geese. Hare were observed to graze the trough vegetation at Site A (Plate 7), and appeared to utilize the plants common to the area, e.g. Pedicularis sp., Carex stans, Arctagrostis latifolia, and Salix arctica (buds and leaves). Sites of this type merge into hummocky meadows, which may also occupy old lake basins, and are characterised by a low species diversity and a continuous cover of sedges, grasses, and mosses (Eriophorum scheuchzeri, Carex stans, and Arctagrostis latifolia).

(c) High-centred polygons

Continued ice-wedge formation may eventually result in the development of high-centred polygons which are somewhat smaller and less abundant than the low-centred variety. A typical example is illustrated in Plate 8. The lightly vegetated, eroding centres are separated by deep (up to 2m), sometimes dry, interstices which may represent the melting out of former wedges. Pools of water are commonly present in these interstices, and the margins are well vegetated with mosses and emergent grasses and sedges.

In general, the formation of patterned ground contributes to the diversification of microtopography, and thus of the vegetation, throughout the area.

(2) Salix-Dryas Plain (Plate 9)

The results for Site A are given in Tables 1 and 2. Total vegetation cover, based on 1050 points, was 24.9% with 24.2% being contributed by *Salix arctica*. The high percentage of exposed rock and mineral soil (75.1%) is similar to the 85.5% recorded by Tener (1954) for the Eureka area and the 67% for Lake Hazen (Tener 1965). A second area similar to that described above was sampled on the southwest shore of Eastwind Lake (Site B). Many more plant species are represented there, and vegetative cover is 13% higher. Three species are dominant: *Dryas integrifolia*, *Salix arctica*, and *Carex rupestris*. Lichens, particularly *Physcia muscigena*, *Thamnolia vermicularis*, and *Peltigera* spp. are also abundant, although cover is low (4%). Bare ground composes a high percentage of the area (61%). Results are presented in Tables 3 and 4.

The Salix arctica-Dryas integrifolia terrain unit is by far the most widespread unit in the area travelled. It is characterised by a gently undulating landscape with the very low vegetation cover as described above. The most exposed, dry sites may be devoid of plant life. On slopes, nets and patches of Salix occur, particularly in interhummock depressions. Various other species occur including Melandrium apetalum, Cerastium regelii, Potentilla rubricaulis, and Carex rupestris, in addition to many of the species found on the frost-hummock type. Papaver radicatum is common throughout. These species contribute little to the overall vegetation cover of the area. The microtopography of this unit is quite variable ranging from earth hummocks up to 30 cm in height, e.g. Cape Lockwood, to flat featureless ground, e.g. Site A. The potential instability of the ground in the area is suggested by the presence of mud slumps and flows and numerous old flow scars to the south of Slidre Fiord (Plate 10) on gradients probably less than 5°. This unit is the most important, being widely used by muskoxen, hare, lemmings, and caribou. The impact of hare may be considerable in some areas as shown in Plate 11.

A soil profile examined at Site A revealed no horizon development or organic accumulation. The root zone of Salix extended to 36 cm and the active layer to 48 cm. The silty-clay soil was virtually stonefree, moist, and had a crumb structure.

(3) Lake Basins

Pen Lake area (Site C) is typical of lake basin vegetation on the Fosheim Peninsula, and parallels can be drawn with many of the lake areas visited, e. g. Eastwind Lake and lakes at Site D. Microtopography is varied, and distinctive vegetation patterns can be recognised. Many of these are found in those units described above, e. g. frost hummocks.

(a) Emergent vegetation

The vegetation along the waters edge is dominated by Hippurus vulgaris and Eriophorum scheuchzeri.

(b) Lakeshore (Plate 13)

On the banks, mosses dominate the wet sites (see Plate 13) with prominent cushions of Drepanocladus, Calliergon, Mnium, and Bryum with Aulacomnium strikingly developed on slightly drier substrates. Saxifraga hirculus is very common along the lakeshore with Salix arctica, Arctagrostis latifolia, and Carex stans on more mesic sites. On dry, frost-heaved soil Saxifraga ticuspidata cushions are found.

(c) Lower hill slopes

Dryas integrifolia dominates with Salix arctica on the hummocky lower slopes and merges with the snow-bed vegetation.

(d) Snow bed

Cassiope tetragona patches are found in sheltered sites along the base of banks where snow accumulates (Plate 14). A continuous cover of vegetation may occur including Salix arctica, Peltigera aphthosa, Dryas integrifolia, Oxyria digyna, Saxifraga oppositifolia, Pedicularis spp., and Polytrichum sp.

(e) Upper slope

On the upper slope, on frost hummocks, Dryas ad Salix are co-dominant with the occurrence of small tussocks of Carex misandra. Lichens occur frequently over the sides of hummocks. Species include Cetraria cucullata and Peltigera aphthosa.

(f) Ridge

At the top of the slope there is a transition to Dryas - hummock tundra of the type described under Dryas-Salix-dominated plains.

(g) Enriched site

A large sandstone erratic on the ridge was frequently used as a bird perch and the vegetation around the base was abundant but limited in extent. Grasses were well established including Poa. sp. and Juncus biglumis. This site is typical of areas enriched by droppings and carcasses (Plate 15).

(4) Stream Banks

The vegetation patterns developed in this unit are quite variable and range from those typical of sedge-moss-dominated lakeshores, meadows, and seepage areas to those of well-drained, lightly vegetated substrates. Where the stream has incised into unconsolidated materials, steep cut banks may be formed on which a number of distinctive communities may develop. The communities observed along a creek at Site D are similar to those described for the Lake Basin unit. Snow-bed seepage vegetation, frost hummocks, and *Salix-Dryas*-dominated slopes are all represented. Muskoxen were frequently observed in these areas, both in summer and in winter.

(5) Surface Runoff, Impeded Drainage, and Moss-Seepage Slopes

(a) Runoff pathways

Many of the better vegetated sites are associated with broad surface-runoff pathways and are particularly well developed in certain areas of the Fosheim Peninsula, e. g. on the south and east sides of Eastwind Lake (Plate 16). They have developed over gently sloping ground to the west of Blacktop Ridge. A continuous vegetation cover is often formed, composed of sedges (*Carex stans*, *Eriophorum scheuchzeri*, and *E. triste*), grasses (*Alopecurus alpinus*), and mosses. The vegetation is similar in many ways to that developed on the low-centred ice-wedge polygons described above.

(b) Impeded drainage

In areas where drainage is impeded, a wet-meadow vegetation may develop. This commonly occurs between bedrock ridges, and a typical example is seen between the parallel beds of Blacktop Ridge (Plate 17). These sheltered sites commonly exhibit an abundant growth of vegetation.

Both of the preceding types are utilized by muskoxen and hares and both are prominent in the Fosheim Peninsula area.

(c) Moss seepage slope

A modification of type (i) is the moss "seepage" slope. These are areas of high moss cover (often dominated by Bryum spp.) which form on slopes below late-melting snow patches. These sites are usually supersaturated throughout the entire growing season. The active layer is shallow and vascular plants are not well established. These seepage slopes characterize the vegetation of the wet valleys to the north of Greely Fiord (Plate 18).

(6) Bedrock, Talus, and other Stony Materials

Plant development in this unit is dependent on the availability of suitable substrate, shelter, and adequate moisture for growth. Consequently only a few scattered vascular plants grow especially at the edge of small streams. In very coarse gravels, cobbles, and boulders Epilobium latifolium may be prominent (Plate 19). Plate 20 illustrates plant growth forms on the boulder strewn slopes of Lake Tuborg. On finer materials, Salix arctica, Dryas integrifolia, Saxifraga oppositifolia, and S. tricuspidata may dominate. Crustose and foliose lichens are not well developed in many areas and probably do not occur in sufficient quantities to be of much value to either muskoxen or caribou.

AERIAL SURVEYS

Extensive aerial surveys were undertaken in a number of areas, and, for convenience are briefly described under the following regional headings:

1. Bjorne Peninsula
2. Greely Fiord - Otto Fiord
3. Raanes Peninsula and Eastern Axel Heiberg
4. Lake Hazen - Alert Plateau; north coast Ellesmere Island.

Annotated flight lines and wildlife observations are recorded on the accompanying 1:500,000 maps.

(1) Bjorne Peninsula

A survey for large mammals was conducted on 23 July 1971 and was designed to repeat those transects established by Tener in 1961. Six lines, eight miles apart and covering 158 miles were flown (Map 1).

The results are given in the appendix. Sixteen muskoxen were counted, all off transect. Tener (1963) reported 11 muskoxen off transect for this area in early August 1961, and a total of 60 for the Baumann Fiord area.

An interesting feature of Bjorne Peninsula is the extensive lowland plain extending around the north coast and in places exceeding two miles in width (Map 1). The lowland is characterized by a well defined series of raised beaches and numerous ponds and pools associated with low-centred polygons (Plate 21). The area is poorly drained with numerous north flowing creeks. Vegetation appears to be well developed, with sedge-moss meadows around pools, bordering streams, and along seepage zones. This lowland presents a marked contrast to the arid, dissected sandstone plateau to the south and east, which supports little signs of plant or animal life (Plate 22).

Particularly noteworthy is the apparent absence of muskoxen, caribou, hares, and snow geese from the lowlands at the time of the survey. It could be interesting to conduct ground studies in the area and compare it, on the basis of quantitative and qualitative vegetation analyses, with other wet lowlands found on the Hazen - Alert Plateau, Cape Sparbo (Devon Island), and the Goodsir - Bracebridge Inlet area of Bathurst Island. Availability and utilization of vegetation on the Bjorne Peninsula during the winter months should be assessed.

(2) Greely Fiord - Otto Fiord Area

The peninsulas between Greely and Otto fiords were surveyed on 24 July 1971. Particular emphasis was given to the valleys at the head of Esayoo and Ooblayah bays, and those in the vicinity of the Blue and Blackwelder mountains. Flight lines, terrain conditions, and wildlife observations are plotted on the Greely Fiord Map Sheet (Map 2).

The area is mountainous, with the land above 1000m frequently capped by ice sheets. Valley glaciers are numerous. In contrast, several broad, low, and predominantly well vegetated valleys, trending S.W. to N.E., interdigitate with the mountain ridges. Seepage slopes, frost hummocks, patterned ground, and snow-bed communities are particularly prominent in the valleys. A typical sequence, in the Mount Leith area, is as follows: *Salix-Dryas* heath on exposed ridges, a high moss cover on the steep upper valley slopes, with snow bed communities and frost hummocks on the lower areas. Patterned ground, e.g. low-centred polygons, is commonly found on the flat, poorly-drained, valley floors. A small collection of plants was made at Mt. Leith ($80^{\circ}47'$N, $81^{\circ}45'$W). The vegetation was typical of frost hummock and snow-bed types with a well-developed lichen flora. Prominent species, in addition to those described above, include lichens *Peltigera aphthosa*, *Stereocaulon* sp., *Cladonia chlorophaea*, *Cetraria* cucullata, the grass Alopecurus alpinus and the moss Rhacomitrium uliginosum. In several areas, e.g. the Neil Peninsula, a continuous cover of Salix-Dryas heath was noted, and Papaver radicatum appeared to be common throughout.

North of Otto Fiord the valleys are less extensive and not as well vegetated. Salix and Dryas occur in dry sites, and a high moss cover appears to dominate the lower seepage slopes. The valleys of some rivers, e.g. on Otto Fiord (81°6'N, 87°2'W) and near Borup Fiord (80°43'N, 83°50'W), are often characterized by braided channels flowing in broad, gravelly, boulder-strewn floodplains (Plate 23). A variety of vascular plants, including Epilobium latifolium, are commonly found in these sites. Generally, the vegetation includes scattered cushion-forming plants, e.g. Silene acaulis, and lichens.

Wildlife Observations: Details are given in the appendix (Map 4). Muskoxen were observed in herds in most valleys south of Otto Fiord. Caribou were not seen, but cast antlers suggests their presence in former times. Snow geese were also noted on lakes throughout the area. A total of 103 were recorded, including 2 breeding pairs and 12 non-breeders on a river at 81°6'N, 87°2'W (Otto Fiord). Hare do not appear to be numerous in the area, only scattered individuals having been noted.

(3) Raanes Peninsula and Eastern Axel Heiberg

The vegetation of these areas is similar in most respects to that described for the Otto Fiord - Greely Fiord area and adjacent Fosheim Peninsula. Muskox and caribou distribution are shown on the Bache Peninsula map sheet (Map 3).

(4) Lake Hazen - Alert Plateau; north coast Ellesmere Island

A rapid reconnaissance was made of the area and very few stops were possible for ground studies. The route followed is shown in Maps 4, 5, and 6.

Alert-Hazen area

The floristics and vegetation of this area have been described in some detail by various people associated with the Tanquary Fiord and Lake Hazen Camps, e.g. Tener (1959), and Brassard (1968).

Of some interest are the very extensive areas of low-centred polygons seen in the Turnabout River watershed, northeast of Lake Hazen. These wet lowlands are probably important range areas for the large population of muskoxen recorded here by Tener (1961).

A feature common to much of this region is the development of mosses on slopes and banks where there is some surface seepage, often from late melting snow (Plate 24). These "seepage slopes" and their associated high cover of mosses, e.g. *Bryum* sp., have been casually interpreted as 'lush' herbaceous vegetation. Care should be taken in identifying these features from the air without adequate ground checks.

The lowland area around Alert is characterized by moss-dominated vegetation patterns, particularly on sheltered slopes. Dryas integrifolia, Salix arctica, and Saxifraga oppositifolia are the dominant vascular plants with lesser densities of Papaver radicatum, Taraxacum sp., Saxifraga spp., Potentilla sp., and the lichen Thamnolia vermicularis.

Much of the north coast is ice-covered. Felsenmeer and talus cones are typical features of the nunataks and exposed ridges. Vegetation is restricted to the valleys and, again, mosses dominate wherever there is a suitable substrate, moisture supply, and some protection, e.g. the valleys south of Ward Hunt Island. Fiord slopes are invariably dry, precipitous, and lacking any plant life. In contrast to this the valleys linking the inlets are often well vegetated and exhibit a number of vascular plants in addition to a diverse moss flora.

The most notable of these are the valleys linking McClintock Inlet with Ayles Fiord, the valleys on the south shore of Ayles Fiord, and those linking the arms of Phillips Inlet.

Ayles Fiord and Phillips Inlet have been proposed as possible IBP-CT areas and detailed descriptions will be available on check-sheets. A brief outline of the major features are given here.

Ayles Fiord

The site examined was a steep, terraced valley (82°40'N, 78°55'W); plant and soil collections were made on a south-facing slope. Microtopography was varied with numerous low frost hummocks dominated by Saxifraga oppositifolia. Mosses were abundant in crevices with Aulacomnium turgidum a common species. The vascular flora included Stellaria longipes, Papaver radicatum, Salix arctica, and Cerastium regellii; lichens were represented by Cladonia spp. and Thamnolia vermicularis. Cover was probably less than 20%, much of which was contributed by mosses. The active layer was well-developed (72 cm) in a saturated undifferentiated soil profile.

Phillips Inlet (82°00'N, 86°10'W)

The fiord is precipitous and the principal vegetated areas are found on south-facing slopes of the transverse valleys (Plate 25). Here Papaver radicatum, Cerastium regellii, and Saxifraga oppositifolia dominate the vascular flora, but much of the vegetation cover can be related to a very highly developed network of mosses (Plate 26). The mosses appear to grow in rills associated with surface run-off, and are usually oriented downslope. The height of the net may be 15 cm or more and is particularly prominent in the absence of extensive vascular plant cover. While low in abundance, the lichen flora is quite diverse and is represented by *Cetraria cucullata*, *C. nivalis*, *Peltigera polydactyla*, and *Dactylina arcticum*. The soil profile was similar to that found at Ayles Fiord and was very stony.

Wildlife Observations

Caribou: Caribou were seen in two localities in Area 4: at the Phillips Inlet IBP site (82°00'N, 86°10'W) (5 adults, 1 calf) and on the peninsula north of Emma Fiord (81°27'N, 90°30'W). In July 1971, 12 caribou were noted by station staff at Alert.

Tener (1961) also reported caribou from the Emma Fiord area. The ground in this area is low and undulating with a central wet lowland, a hummocky microrelief, and moss-dominated slopes on higher areas.

Muskoxen: Muskoxen were observed in the Alert area at Cape Cresswell (1 ; 1 adult, 2 calves), and have frequently been reported in the vicinity of the meteorological station.

DISCUSSION

Most of the habitats of Ellesmere Island are represented by the six terrain units described. Classification of the land in this way provides a basis for studies of vegetation-animal relationships. Large scale aerial photographs can be used to identify and map terrain units and to estimate the cover and biomass of the principal vegetation components over an extended area, based on ground control from detailed site studies. This would have particular application for the *Salix-Dryas*-dominated plains. Patch area as measured on the photographs could be directly related to cover and standing crop values. Thus, by planimetry, cover and standing crop of major forage species such as *Salix arctica* could be rapidly determined for the whole range. Total production of major forage plants could be approximated in the same way. A study of this type would require substantially more ground work for control purposes, and good quality, low level, vertical photography.

The method has the advantages of being rapid and relatively inexpensive and in part solves the problem of costly, time-consuming ground studies in areas of low vegetation cover.

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Table 1: Percentage cover by line, plot, and species, *Salix-Dryas* Plain, Site A, Fosheim Peninsula (1050 points)

Line	Species	Plot number 1	2	3	4	5	6	7	Mean
1	*Salix arctica*	4	50	12	2	32	36	37	24.6
	Dryas integrifolia				2				0.3
2	*Salix arctica*	38	32	28	0	30	2	4	19.1
	Potentilla rubricaulis			2					0.3
	Poa sp.			2			4	2	1.1
	Melandrium apetalum			T					T
3	*Salix arctica*	4	12	62	2	76	4	42	28.8
	Poa sp.		2						0.3
Average of lines	*Salix arctica*								24.2
	Dryas integrifolia								0.1
	Poa sp.								0.5
	Potentilla rubricaulis								0.1
	Exposed (Rock and soil)								75.1

Note: Omitted values equal zero.

Table 2: Average percentage frequency of plant species in *Salix-Dryas* Plain, Site A, Fosheim Peninsula (150 plots, 50 x 100 cm, 50 points each)

Species	Percentage frequency
Salix arctica	95.0
Dryas integrifolia	4.7
Poa sp.	19.0
Potentilla rubricaulis	4.7

Table 3. Percentage cover by line, plot, and species, Salix-Dryas Plain, Site B, S.W. shore Eastwind Lake, Fosheim Peninsula (1050 points)

Line		Plot number						
		1	2	3	4	5	6	7
1	Salix arctica	2	18	32	46	2	14	-
	Physcia muscigena	6						
	Poa sp.	6						
	Thamnolia vermicularis	2						
	Carex rupestris	6		6	14	4	10	2
	Dryas integrifolia			46	26	22		
2	Salix arctica		22			22	12	
	Physcia muscigena	8	8		2		2	8
	Poa sp.							
	Carex rupestris	8	8	4	10	16	36	10
	Dryas integrifolia	38	24		6		14	4
	Saxifraga oppositifolia		2					
	Moss				4			
	Thamnolia vermicularis						2	
	Hypnum sp.							2
3	Salix arctica		8	6		14		
	Thamnolia vermicularis	2	2		8		8	
	Physcia muscigena	4		4	4	2		
	Carex rupestris		2	30	6		10	8
	Dryas integrifolia		12	42		64	14	
	Peltigera sp.			8				
	Moss			6	2	2		
	Caloplaca sp.					6		

Note: Omitted values equal zero.

Table 4: Average percentage frequency and cover of plant species in *Salix-Dryas* Plain, Site B, S.W. shore Eastwind Lake, Fosheim Peninsula (150 plots, 50 x 100 cm, 50 points each)

	% Cover	% Frequency
Dryas integrifolia	14.9	57.1
Salix arctica	9.4	57.1
Carex rupestris	9.0	85.7
Physcia alpigena	2.3	47.6
Thamnolia vermicularis	1.1	28.6
Moss	0.7	19.0
Peltigera sp.	0.4	4.7
Poa sp.	0.3	4.7
Caloplaca sp.	0.3	4.7
Saxifraga oppositifolia	0.1	4.7
Hypnum sp.	0.1	4.7
Exposed	61.5	---