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LEGEND TO ACCOMPANY BIOPHYSICAL REGIONS MAPS FOR 49G, 49H and 340B south

Geological and geomorphological compilation by D.A. Hodgson, vegetation by S.A. Edlund;
based on field work in 1972-74 and airphoto interpretation.

INTRODUCTION

Biophysical maps are intended to provide the point information required for most land use activities, rather than present a broad, regional view.

In the eastern Queen Elizabeth Islands, there is too great a variety of surficial materials units (see maps and legend) for such units to be used as the key to an interpretive legend. A system of biophysical units was therefore devised to form a framework for the interpretive legend. Based on surficial materials, morphology, drainage characteristics, and vegetation (which were considered the most significant attributes of the land), it provides a limited number of units to which comments can be keyed.

Variations in surficial materials were considered the most important factor in drawing up the biophysical units, and thus the materials map is used as the base map for presentation. The maps and biophysical legend will be better understood if used in conjunction with the materials legend.

Users interested in a comprehensive description of this mapping system should refer to:

Hodgson, D.A.

1975: The terrain mapping and evaluation system adopted for the eastern Queen Elizabeth Islands; in Report of Activities, Part C; Geol. Surv. Can., Paper 75-1C, p. 95-100.

Reprints are available from the author.

UNIT DESIGNATIONS

The system has two tiers: groups of units (regions) identified by whole numbers and described in the first entry of each legend panel; and the individual units, identified by decimal fractions after the group number. Numbers are assigned solely as identifiers, and although the same decimal fraction recurs in different groups, no relationship is intended to be drawn between them.

Though assembly of units and groups of units is based on an appreciation of land attributes, these units are essentially a convenience for handling data; the regional boundaries in particular should not be thought of as enclosing 'natural' geographical areas, other than perhaps at a broad reconnaissance scale.

Note that fluvial deposits frequently transect two or more units, and may not be separated out on the biophysical map. They can be identified on the surficial underlay.

GLOSSARY

Terms not adequately defined in, or used here in a different sense from, standard texts such as the American Geological Institute Glossary (A.G.I., 1972) or the Encyclopaedia of Geomorphology (Ed. by R.W. Rhodes; Reinhold, 1968).

Desiccation Polygons: Cracks forming polygons generally 10 cm - 1 m diameter. These can form during either summer or winter desiccation, and are most prevalent on bare, fine-grained materials. Cracks may extend below the active layer as thin (<5 cm) wedges (='single ice' veins).

Hummocks: Tracts of dome-shaped soil mounds, 10 cm - 1 m diameter, to 50 cm height, prevalent in fine-grained materials, vegetated or bare. Numerous origins for this type of feature are suggested in the literature, and more than one cause is possible on Ellesmere Island, however they commonly appear to have developed by erosion along desiccation polygon cracks.

Ice-wedge Polygons: Ice wedges arranged in polygonal patterns. Polygon diameters commonly measure 5 - 30 m, with wedges to 5 m in width just below the active layer, tapering out at 2 - 10 m depth. In the upper 2 m of permafrost where ice-wedge polygons are present, wedge ice commonly represents 10-20% of the surficial material. The active layer above the ice wedge may be undisturbed, masking the presence of the wedge. More commonly, the surface is depressed to form a trough to 50 cm (exceptionally 2 m) deep, and to 2 m (exceptionally 5 m) wide, providing high-centre polygons. More rarely, the surface above or at the edge of the wedge is raised, to form low-centre polygons. Particularly wide and deep troughs are described as 'high amplitude'.

Seepage Lines: Linear parallel or subparallel concentrations of surface runoff or moisture, on slopes >1°, in zones generally 0.25 to 2 m (occasionally >5 m) wide, generally spaced at intervals of 0.5 to 2 m (occasionally 5 m). Minor topographic expression (i.e., negligible erosion); usually identified by downslope lineation of hummock troughs, or by conspicuous sorted or non-sorted stripes. Usually more densely vegetated than adjacent areas; often mossy. Flow or seepage may take place only during snowmelt or prolonged rainfall, or continue throughout the summer. Solifluction is ubiquitous on such slopes.

Solifluction Lobes: may be evident on all types of unconsolidated material, but are most prominent on coarse materials. They may attain very large dimensions in this region, e.g., toe heights to 4 m, widths to 15 m, lengths to 50 m.

Thaw/thermokarst Ponds: formed where melting of ground ice and the subsequent depression of the ground surface forms closed basins which trap water and accelerate the process. The water may evaporate throughout the summer. Ponds are often initiated over ice wedges.

COLUMN HEADINGS

1. UNIT
   Shown on biophysical regions map. The first entry is a general description of the group of units (e.g. 1); subsequent entries describe the individual units (e.g. 1.1, 1.2).
2. MATERIAL DESIGNATOR
   A list of the main surficial materials that occur within the biophysical group or unit. For explanation, see surficial materials legend.
3. TOPOGRAPHY
   Each entry is headed by the range of relief in the group or unit. Values are given first in feet, as they were taken from a topographic map. Elsewhere in the legend, metric units are used.
   Gentle slopes: $\frac{1}{2}$ - 5°
   Moderate slopes: 5 - 15°
   Steep slopes: >15°
   Cliffs: >35°
4. DRAINAGE, etc.
   Drainage universally poor during snowmelt period -- which may extend throughout the 'summer' below perennial snowbanks (especially on north-facing slopes).
   Drainage descriptions (good/well drained, moderately good/fair, imperfect, poor) apply to the period following snowmelt. They are approximations of average conditions in the active layer -- which is commonly desiccated at the surface, but saturated over the frost table.
5. SURFICIAL MATERIALS
   For greater detail, see surficial materials underlay and legend.
6. GROUND ICE
   Observations of excess ice other than ice wedges were restricted to rare natural exposures, and to 150 shallow holes, most drilled in fine grained materials to <2 m with a CRREL - type auger, a few deeper holes drilled in coarser materials with a Winkie diamond drill.
7. VEGETATION
   Broad plant communities are generally named for the dominant vascular plants. The estimated composition and plant cover is stratified and is shown in fraction form. The upper stratum (the numerator), is composed of vascular plants: grasses, sedges, rushes, dwarf shrubs and herbs. The lower stratum (the denominator), often just a thin surface veneer, is cryptogamic. When the denominator is missing, there is an absence of a lower stratum. Examples:
   $\frac{\text{10\% Carex stans-Eriophorum}}{\text{70\% Moss}}$
   5% Saxifraga oppositifolia barrens.
   Within each unit several communites may be described; an asterisk (*) denotes the most common community.

8,9. SENSITIVITY AND TRAFFICABILITY RATINGS
   Tentative ratings of each unit have been made, commonly based on field observations of disturbed areas.
   Three periods of the year are recognized in the ratings.
   Winter: Temperature of surficial materials is below freezing-point. Snow cover general, though some areas may be blown clear.
   Snowmelt: Period of snow ablation by melting, with air temperatures consistently above freezing-point. Generally from mid-June to mid-July for this region, but variable areally and by altitude, and may only extend over 1-2 weeks at any one location. Can extend through the summer below perennial snowbanks. The active layer is shallow, with a high moisture content, often supersaturated. Even gravels may be near a fluid state, and most mass movement takes place in this period.
   Summer: From the end of snowmelt to the onset of the winter freeze-up in late August. Generally a period of evaporation from the active layer, especially from the upper 5 cm in unvegetated areas, and dessication of fine-grained materials. Precipitation mainly rain; usually light or of short duration, on rare occasions heavy (ca. 5 mm in a 24-hour period). Total precipitation for June-August ca. 50 mm.

8. SENSITIVITY
   This is considered to be the susceptibility of an area to disturbance, where disturbance is a man-initiated change in surface characteristics. Disturbance may be caused by direct action of man, or occur subsequent to such action as a result of a change in the equilibrium of natural processes. In the latter case, most physical changes of the surface take place during the summer, even if the initiating activity occurred in winter. Original surface conditions may be naturally restored, though it is more likely that changes will be permanent.
   Magnitude - the probability of disturbance occurring, and the degree to which it occurs.
   1. LOW: possibly medium, locally high, during snowmelt or prolonged rainfall. No disturbance or minor at other times.
   2. MEDIUM: probably high during snowmelt or prolonged rainfall. Disturbance of part or all of the area of activity, but processes not expected to expand disturbance beyond this area.
   3. HIGH: disturbance of all or substantial part of area of activity, and processes likely to expand disturbance beyond this area. Expected to hinder continued activities.

   Form - the probable form of disturbance
   A. Disruption of surface drainage, especially by:
      (i) Concentration, leading to erosion (e.g., culverting only a small percentage of the seepage lines or gullies which cross a road route).
      (ii) Ponding, leading to a) overflow and thus erosion;
      b) thermal erosion under and adjacent to standing water;
   B. Thermal erosion: initiation or acceleration of ground ice thaw, especially critical over massive ground ice or ice wedges. Caused by stripping vegetation, excavation, ponding water.
   C. Slope failure; instability potential, after excavating or loading. Includes areas where mass-movement processes very active.

   Lower case letters indicate only part of the unit affected: e.g., slope failure on stream banks, thermal erosion of ice wedges which cover only part of the unit.

9. TRAFFICABILITY
   Assessment of terrain in terms of performance of arctic tracked vehicles.
   Roughness or grade.
   1. Easily traversible in all directions.
   2. Traversible, but with difficulty locally or in some directions.
   3. Difficult or impossible.

   Traction - includes assessment of ability of surface to bear the vehicle. First value for snowmelt and heavy rain periods / Second value for summer.
   1. Easily traversible
   2. Traversible, with slight or local difficulty
   3. Difficult

   Traction is not normally a problem in winter.

GROUP/UNIT[1]	MATERIALS DESIGNATOR[2]	TOPOGRAPHY, LANDFORM GENESIS[3]	DRAINAGE, ACTIVE LAYER PROCESSES AND MICRORELIEF[4]	SURFICIAL MATERIALS[5]	GROUND ICE[6]	VEGETATION[7]	SENSITIVITY[8]		TRAFFICABILITY[9]	
							Magnitude	Form	Roughness	Traction
1		Altitude: 0-2600' (0-800 m). Uplands, with a variety of erosional landforms, including: plateaux, ridges and escarpments (micro to macro scale), long rectalinear and concave slopes, cliffs. Grain of topography trends N-S, controlled by bedrock structure. Little of the group below 150 m which is the approximate limit of late-Pleistocene high sea levels. Developed on Mesozoic (largely Triassic) sediments, predominantly sandstones weathering to sand and rubble. Lesser siltstone, mudstone, shale, providing fines. Resistant basic sills and dykes topographically prominent. Beds folded within a series of N-S trending pitching anticlines and synclines; commonly offset by faults. Landforms appear to be chiefly the product of subaerial erosion, and, locally, glacial erosion. Though the extent of glacial erosion is limited, the results are spectacular (e.g. cliffs where uplands truncated by the Eureka Sound glacial trough). Few identifiable glacial deposits. Small areas of marine planation. Field work for this group largely on the Fosheim Peninsula.	A large number of small drainage basins, rarely containing streams above 3rd order, empty into tidewater or adjacent lowlands. Drainage density is low in low relief units, higher in high relief. The group is generally well drained subsequent to the general snowmelt season, but note: a) Local gentle slopes to flats with fine grained materials may be imperfectly drained following extended rainfall. b) Snowmelt period not synchronous over the group, due to (i) Range of elevation in the group (ii) Cliffs may provide shade. (iii) Deep snowdrifts common in gullies, as snow blocks plateaus. Runoff unconfined, or via seepage lines on coarse materials, via seepage lines, slopewash, runnels on medium and fine grains. Solifluction widespread, though position of contacts between different lithologies of underlying bedrock often still visible. Subdued solifluction lobes on some slopes in 5°- 30° range. Creep, rockfall, avalanches on colluvial fans. Ice-wedge polygons mainly limited to flats and gentle slopes with thick (>2m) cover of unconsolidated material (not necessarily fine grained). Troughs usually low amplitude. Active layer maximum depth ca. 50-70 cm in coarse sand and gravel, 40-50 cm in dry fines. Few depths recorded above 500 m elevation.	Surficial materials predominantly residual material, and colluvium of similar composition. Dominant lithology of underlying bedrock is sandstone, varying from highly resistant to recessive; may be interbedded with siltstone, mudstone and shale. Fine grained sediments common in Tba and Tbl Formations. Resistant basic dykes and sills (diabase, gabbro, basalt) intruded throughout much of the succession. See materials legend for description of Ki, J, Th, Tba, Tbl, I. Beds flat to gently dipping on the generally topographically high axes of anticlines; otherwise gently to steeply dipping, and where different lithologies interbedded, the lithologies appear at the surface in a close-spaced succession. Residual material and colluvium is of medium to fine sand or silt, minor clay and silt particularly below 20-50 cm., with a discontinuous lag cover of sandstone rubble. Some thick rubble areas, and sandstone, siltstone and igneous outcrops. Silt, clay, shale fragments over finer-grained beds. Over inclined beds, residual material textural changes commonly aligned in bands reflecting the strike of underlying bedrock. Thickness of residual material and colluvium highly variable between 0 and 5m, depending on resistance of source rock, inclination of surface, and position on a slope. Colluvial (talus) fans in steeply inclined areas usually of finer texture than residual material. An undetermined (but probably small) quantity of glacial morainal material is mixed with other surficial materials: e.g. limestone and granite erratics, comminuted marine shells. Locally thicker deposits of gravel, sand and fines morainal material. Local deposits of thick pre-glacial fluvial gravel, boulders and sand. Holocene fluvial deposits a minor component of group. Chiefly active channel bed sediments, and fans at base of higher escarpments, of similar composition to parent materials.	Scattered areas of high centre ice-wedge polygons (see micro-relief column). Probably cover <25% of group. Cores from 9 holes (1-5m depth) in this group were examined for ice content. All were in low relief, relatively low elevation (ca. 200m) areas, mainly sandy residual material (unit 1.7). Quantities of excess ice were highly variable both within and between holes, ranging from <5% to >50%. Up to 10% ice in lenses was noted in competent sandstone in one hole. Such values might be expected in similar of finer materials at similar elevations. throughout the group. However, coarser thinner deposits, at higher elevations with more rugged topography (i.e. much of the group) probably have a quite different (lower) ice content.	*a. Well drained areas. 1. Hillcrests & upper slopes. Usually <20% vegetation, some areas devoid of vegetation. 2. Dykes & sills & rubbly materials: Rhacomitrium-Alectoria moss-lichen communities (1-40% cover). Crustose lichens may be found on exposed facets. Occasional herbs: Papaver radicatum, saxifraga tricuspidata on local fines. 3. Shaly materials: Grass (shrub) barrens. Alopecurus, Poa, and Puccinellia sp. most abundant. Potentilla hyparctica & Salix arctica may be present. Draba sp. common herb. 4. Sandy materials: Saxifraga oppositifolia-herb, Saxifraga oppositifolia - Luzula, and Luzula - herb barren communities found. Other vascular plants found may include Papaver radicatum, Oxyria digyna, Silene acaulis, Festuca sp. Saxifraga caespitosa, S. flagellaris, S. nivalis, S. tricuspidata, Epilobium latifolium, Erigeron compositus, Taraxacum sp. Lichens, especially Cetraria sp. & Thamnolia sp. may be scattered on surface, locally. b. Moderately drained areas; gentle, protected slopes (20-80%). Dominated by dwarf shrub communities: Salix arctica & Dryas integrifolia comprising 20-40% cover. Carex rupestris & C. nardina often close associates (2-5%), Monocots may include Festuca sp. Alopecurus alpinus, Kobresia sp. Poa sp. Herbs may include those in a, plus Polygonum viviparum, Ranunculus sp. Eutrema Edwardsii, Draba sp., Lesquerella arctica, Pedicularis arctica, P. capitata, Cerastium sp, Stellaria, Arenaria sp. Melandrium affine. The lower stratum of moss & lichens is usually broken - moss inclose association with shrubs. In protected areas a patina cover may develop. Cassiope tetragona locally at areas with late-lying snowbeds. c. Poorly drained areas: local, usually confined to stream courses & drainage channels: often well vegetated with Monocots such as Carex stans, Eriophorum triste, E Scheuchzeri. Also found in association are Equisetum variagatum, Juncus biglumis, Alopecurus sp. Arctagrostis sp. Dupontia sp. Pleuropogon sp. Polygonum viviparum, Cerastium regellii. Salix arctica (on local highs) Cardamine sp. and Saxifraga. A dense moss layer is often associated with this community (making % cover 80% or more). However sometimes this layer is absent. d. Seepage areas from snowbeds are predominantly & densely, bryophytic. Occasional Ranunculus sp., Saxifraga nivalis & Alopecurus alpinus may occur.	1-2	variable	3-2 Roughness difficulty mainly steep grades.	2/1-2
1.1	ro,rsfo$^{Th,Tba,I}_{RC}$ & rs,sfr Cf	0-2500' (0-760 m). Steep to moderate slopes, minor gentle and flat segments. Cliffs to 500m high in fresh to extremely weathered sandstone, siltstone or shale nearly always present in one or more segments of an E-W profile across a unit. Talus slopes and colluvial fans widespread. Fluvial fans common at base of long slopes, particularly below Blacktop Ridge; where streams flow into tidewater small terraced deltas are common. Areas adjacent to Eureka Sound form margins of a glacial trough. The W side of Blacktop Ridge is probably a glacially eroded fault-controlled escarpment, with a 100m thick sill as a rimrock. Dissected by pre- and post-glacial subaerial erosion. N end of Blacktop ridge dissected by close-spaced interconnected flights of ice-marginal drainage channels.	A low density drainage net of short steep streams. Drainage on steep slopes and coarse materials good; on gentle slopes and flats often imperfect due to quantity of fines and extended snowmelt season (see 1.) Mass wasting very active; rock-fall, avalanche, solifluction, creep, seepage lines, slopewash.	Much colluvium (including fans, talus); residual material; outcrop probably <15% area. Colluvial fans, talus, on steep slopes mainly: rubble of sandstone, siltstone and basic intrusive rocks, minor platy shale fragments; lesser sand and silt; minor clay. Colluvium and residual material on lesser slopes a mixture of sand, gravel, rubble and fines, with proportions varying with source rocks and position on slope (fines dominant at base of slope?). Outcrop mainly: resistant basic sills and dykes; Th sandstone; some Tba shale.	Ice wedges uncommon except on gently inclined to flat fine grained materials. Other excess ice probably has similar distribution to ice wedges.	* Sparse Saxifraga oppositifolia barrens. Parts of area devoid of vegetation. Local seepage areas with dense bryophytic communities.	1	a b	3	2/2
1.2	s,r,f,o$^{Th,Tba,I}_{RC}$	100-2600' (30-800 m). Overall moderately sloping to level; plateaus, hill, summits, adjacent long smooth slopes. Locally knobbly relief, minor escarpments; deep convex-slope valleys and hillsides with moderate to steep slopes. Developed on crests and limbs of anticlines (horizontal to gently inclined beds); mantled by residual material and colluvium; moderately weathered outcrop widespread.	Subsurface seepage on flats and in coarse deposits; seepage lines and runnels general on slopes. Drainage good, locally imperfect. Solifluction general on slopes (though underlying structure often visible, see 1). Low to high amplitude lobes common on moderate or steep slopes.	Residual material and colluvium, 0-2m thick, locally greater? Lag rubble over sand, sand, rubble (sandstone, intrusives, some shale fragments) outcrop, silt, clay. These materials may be mixed (commonly with proportions in above order); or individual grain size ranges may be present in discrete areas not separable at the scale of mapping. Some morainal material incorporated (see 1.). Outcrop of fractured sandstone or intrusive rocks, minor shale.	Few ice wedges. Probably little or no other excess ice except in fine grained deposits > 1 m thick, or locally on flats where residual material thick.	* Much of area devoid of vegetation. Local seepage as in 1.1.	1	ac	2	2/1
1.3	sfr$^{Th,Tba,I}_{CR}$	500-1800' (150-550 m). Long rectalinear or concave slopes, gently to moderately inclined, broken at intervals by steep or cliffed bluffs, 5-10m high, contouring the slopes. Slopes mantled by colluvium overlying shale, mudstone, siltstone. Intruded by basic dykes and sills. The sills, together with sandstone, minor siltstone, are the bluff-formers.	Drainage mainly by seepage in broad runnels, 2-10 m deep, with 50-500 m spacing. Seepage lines between runnels. Drainage generally imperfect; this combined with snowbanks below bluffs (see 1.) creates areas where the active layer is saturated through the 'summer'. Hummocks general in such areas. Solifluction lobes only on steeper unconsolidated slopes.	Colluvium and probably minor residual material; thickness unknown. Mainly silt, clay, lesser sand; includes 5-20% stones (shale, siltstone, sandstone, diabase). Discontinuous thin lag cover of stones. Outcrop in bluffs of intrusive rocks and resistant to friable sandstone and siltstone; also dykes.	Scattered ice wedges. Other excess ice likely, but no values known.	* $\frac{\text{20-40\% Salix-Dryas}}{\text{30\% moss (patina)}}$ on mod. drained materials. Local Saxifraga oppositifolia - herb barrens on well drained Trh and Grass - potentilla barrens on well drained Tba.	2-3	A b c	2	3/2
1.4	s,f,r$^{Th,Tba}_{RC}$, $^{T}_{CR}$	0-2400' (0-730 m). Overall, level to gently sloping, locally moderate to steeply sloping. Dominantly long smooth slopes, with plateau and knobby hill summit areas. Developed on crests and limbs of anticlines (horizontal to gently inclined beds), mantled by residual material and colluvium. Materials finer grained and more recessive than 1.2.	Low density organised drainage. Most drainage on flats to gentle slopes is unorganized, some seepage; on gentle to moderate slopes by numerous seepage lines and runnels. Much solifluction on moderate slopes; some low amplitude lobes. Low to moderate amplitude ice-wedge polygon troughs on flat to gentle slope fine grained materials.	Residual material and colluvium 0-5m thick. Sand, lag rubble over sand, silt, clay, rubble. These materials may be mixed; or individual grain size ranges may be present in discrete areas not separable at the scale of mapping. Some morainal material incorporated (see 1.). Minor outcrop of sandstone, siltstone, shale, on knobby summits; scattered basalt dykes.	Ice wedges in fine to medium grained material on flat to gentle slope surfaces. May also occur in thicker rubble and sand residual deposits. Polygons over >50% unit. Other excess ice likely in thicker fine to medium grained residual and colluvial materials (see 1.).	* $\frac{\text{20-40\% Salix-Dryas (+Luzula)}}{\text{30\% moss (patina)}}$ on mod. drained materials On well drained materials Saxifraga oppositifolia herb barrens, Luzula-Potentilla barrens , Alopecurus grassy barrens. On slightly calcareous, sandy-noncalcareous, & shaly materials, respectively.	2-3	A b c	2	3/2
1.5	rsfo$^{Tba+Th+I}_{RC}$ & rf Cf	0-2600' (0-800 m). A complex unit which is best described as a combination of units 1.1, 1.2 and 1.8, inseparable at the scale of mapping. At the core of the unit are plateaus and long slopes (unit 1.2), dissected by deep valleys and broken by cliffs, escarpments and knobby hill summits (1.1). The unit is edged by cliffs.	See 1.1, 1.2, 1.8.	See 1.1, 1.2, 1.8	See 1.1, 1.2, 1.8.	* Much of area not vegetated. Local Saxifraga oppositifolia barrens.	1	a c	3	2/2
1.6	sfr,rso,sgf... C,CR,Ff,Cf	0-1000' (0-300 m). Gentle to steep slopes, concave to rectalinear in profile, at the base of some of the more rugged areas in group 1. Mainly fluvial and colluvial fans, active and inactive; colluvium. Minor beaches and deltaic deposits below ca. 100 m.	Drainage varies from good on bare recently active fluvial surfaces and upper segments of colluvial fans, to poor on intervening and downslope colluvial deposits. The latter, though often coarse grained, are subject to continual seepage from upslope areas (see 1). Fluvial fans have one or more shifting channels. Solifluction general on all but active fluvial surfaces; lobes on steeper colluvial slopes.	Mainly sand, gravel, minor fines; derived from upslope Th and J sandstones, siltstones, and from intrusive rocks. Minor outcrop. Local areas of thick (pre-glacial) gravel knolls at west base of Blacktop Ridge.	Discontinuous ice wedges. Other excess ice likely in finer materials.	* 10% Saxifraga oppositifolia - Salix barrens. Lower stratum plus greater number of associates on moderately drained materials. Active colluvial & fluvial fans devoid of vegetation. Seepage as in 1.1.	2	A b c	2-3	3/2
1.7	s,si,r,o^{T,J}R,RC,RM	0-1000' (0-300 m). Level to rolling gentle slopes, locally moderate slopes. Developed on inclined well to poorly consolidated Th and J rocks marine planed below ca. 150 m. Above the marine limit topography is generally subdued, though there are areas of close spaced minor scarps (2-10 m high), and scattered higher scarps. Local dissection by streams. Mainly residual material; minor colluvium beach sediments; possible morainal deposits.	Drainage variable, good to imperfect; generally unorganized subsurface seepage, rills on stopes, minor gullying. Solifluction, including lobes, very evident on moderate slopes. Ice wedge networks widespread. Troughs low to moderate amplitude and high centre on Th. High amplitude, including some low centre, on J rocks, impeding drainage.	Residual material, minor colluvium; dominantly sand, minor silt, discontinuous areas of sandstone or siltstone rubble, some lag rubble or gravel over sand. Scattered friable sandstone or siltstone outcrop; outcrop common in incised channels. Below marine limit, scattered sand and gravel beach ridges to 20m wide, 2m thick, underlain in part by silty clay marine sediments.	Ice wedges common in sand and finer materials Some other excess ice. See 1 for description of cores.	* Luzula-Potentilla barrens on well drained materials local Saxifraga oppositifolia barrens on Trh derived materials. When drainage is moderate, Salix-Dryas communities may be found.	2	a b	2	2/1
1.8	srfo, sro$^{Th,J,Ki}_{RC}$ minor sr Cf	0-2000' (0-600 m). Succession of ridges and scarps (2-200m high) at intervals of 10 m - 1 km, commonly N-S or NE-SW trending. Intervening slopes moderate to steep, with some gently sloping or level segments. The unit has been dissected by stream valleys, commonly normal to the strike-aligned ridges, at 1-3 km intervals. Valley sides are steep or cliffed, to 200 m deep. Local gullying, talus slopes. Colluvial and fluvial fans at base of unit. Developed on a differentially eroded succession of sandstones of varying hardness, minor siltstone mudstone and shale, in steeply inclined beds of upper Th, J, and Ki Formations. This unit is developed on lithologies similar to 1.9, but is significantly more rugged.	Low to high density of short steep-profile streams. Drainage generally good, with predominantly steep slopes and coarse to medium grained materials. Areas of talus, colluvial fans, fluvial fans. Solifluction lobes on steep to moderately inclined coarser materials. Seepage lines, runnels on lower sections of most slopes (including the fans).	Residual material and colluvium, lesser outcrop. Mainly sand, sandstone and siltstone rubble and outcrop; minor fines. Ridge tops have a cyclic succession of residual materials though coarser materials predominate. Intervening slopes of colluvium, with mixture of sand, rubble, fines; sandstone and siltstone outcrop in upper sections of steeper slopes.	Ice wedges and possibly other excess ice in the limited areas of flat to gently sloping finer materials	As in 1.7	1	a c	3	2/1
1.9	r,s,o,fTh RC	0-1300' (0-400 m). Broad hills and ridges with level to gently inclined summits and gently to moderately inclined convex to rectalinear slopes. Local areas of close-spaced minor scarps, escarpments with steep slopes and cliffs, knobby outcrop, incised streams. Mainly residual material developed on level to moderately inclined beds of sandstone, lesser siltstone mudstone and shale, of Th Formation. Strike aligned banding of lithologies similar to 1.8.	Drainage patterns are variable due to variety of landforms. Drainage generally good, due to coarse materials. Unconfined seepage general; seepage lines on gentle gradient, finer, slope segments. Low amplitude solifluction lobes common on coarse deposits.	Residual material, lesser colluvium and outcrop. Mainly medium to fine sand and coarse silt with discontinuous lag sandstone and siltstone rubble. Ridges and knolls of fractured sandstone and siltstone outcrop. Minor silt and clay mixed with sand.	Ice wedges common in thicker unconsolidated deposits. Other excess ice probable in the same localities.	* <10% Saxifraga oppositifolia - herb barrens. Local Luzula - herb barrens.	1	a b	2	2/1
1.10	sro^{J,Ki} RC	400-1500' (120-460 m). Succession of escarpments, 10-100 m high, with scarps highly dissected by subaerial erosion. Gullies and hoodoos prominent on scarp faces. Dip slopes gently to moderately inclined. Developed on gently to moderately inclined beds of sandstone lesser siltstone and shale of J and Ki formations. Sandstone and siltstone commonly poorly consolidated.	Moderate density drainage network on dip slopes, high (gullied) on scarps. Sandstone outcrop and unconsolidated sand well drained by unconfined seepage to gullies. Finer materials subject to solifluction, some seepage lines. Moderate amplitude ice-wedge polygon troughs on fine materials.	Residual material, lesser colluvium and outcrop. Mainly medium to fine-grained sand and some coarse silt, often barely distinguishable from poorly consolidated outcrop. A few thin beds of resistant sandstone. Discontinuous lag cover of sandstone pebbles and rubble. Lesser area of silt, clay, shale outcrop, in strike-aligned bands.	Discontinuous ice wedges in flat to moderately sloping unconsolidated sand. Continuous network of wedges in fines. Other excess ice, to 50%, likely in same areas.	* large areas devoid of vegetation, local Luzula - herb & Saxifraga oppositifolia barrens.	2	a b c	2	2/1
1.11	r,s,f,o^{T}CR,^{T}RM	0-700' (0-210 m) Gentle to steep slopes. Marine washed, colluvially reworked hills, and slopes adjacent to group 1.1 at and near Mount Lockwood.	Drainage via close spaced seepage lines and runnels. Seepage for extended period in channels. Numerous solifluction lobes.	Colluvium, residual material, overlying chiefly Tba sediments; some intrusive rocks and Th sediments. Surficial material of rubble of variety of lithologies, sand, some discrete areas of fines. Local gravel and sand beach deposits.	High ice content expected in poorly drained channel floors.	* $\frac{\text{20-40\% Dryas - Salix (+Carex)}}{\text{30\% Moss (+patina)}}$ on moderately drained materials local saxifrage - Salix barrens	2		2	3/2

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