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DEPARTMENT OF ENERGY, MINES AND RESOURCES
MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES

LEGEND TO ACCOMPANY BIOPHYSICAL REGIONS MAPS 49 C (Baumann Fiord) AND 59 D (Graham Island)

Geological and geomorphological compilation by D.A. Hodgson, vegetation by S.A. Edlund;
based on field work in 1974 and airphoto interpretation in 1974-75.

PURPOSE OF BIOPHYSICAL MAPS

In the eastern Queen Elizabeth Islands, there are too many combinations of the criteria used to form surficial materials units (see concurrent maps and legend) for such units to be used as the key to an interpretive legend. A new system, of biophysical units, was therefore devised to form a framework for the interpretive legend. Based on surficial materials, topography, drainage characteristics, and vegetation, 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 (itself drawn on a topographic base). The maps and legend will be better understood if used in conjunction with the materials legend.

UNIT DESIGNATIONS

Units are grouped into areas of generally similar characteristics (particularly materials, genesis, topography). The groups are identified by whole numbers, and described in the first entry of each legend panel. Units within each group are identified as a decimal fraction. 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.

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).

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

Hummocks: Tracts of dome-shaped features, 10 cm - 1 m diameter, to 50 cm in 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 generally appear to have developed by erosion along dessication polygon cracks.

Ice-wedge Polygons: Ice wedges arranged in polygonal patterns. Polygon diameters commonly 5 - 30 m, wedges to 5 m in width just below the active layer, tapering out at 3 - 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 the wedge is raised, to form low-centre polygons.

Seepage Lines: Linear parallel or subparallel concentrations of surface run-off 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: is understood to be the slow flowing from higher to lower ground of masses of waste saturated with water, after the original definition by Andersson (J.G. Andersson, J. Geol., v. 14, p. 91-112).

Solifluction lobes are 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 drain or evaporate throughout the summer. Ponds are often initiated over ice wedges.

Wadi: Broad flat-floored ephemeral watercourse, common in unconsolidated sand and silt.

FOOTNOTES

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. MATERIALS DESIGNATOR
   A list of the main surficial material unit designations 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.
4. SURFICIAL MATERIALS
   For greater detail, see surficial materials underlay and legend.
5. GROUND ICE
   Observations in the field area were restricted to rare natural exposures, and to 15 shallow (<2 m) holes drilled with a CRREL-type barrel in a few fine-grained units. Comments are based mainly on experience gained during a more extensive drilling program carried out on the Fosheim Peninsula of Ellesmere Island in 1973.
6. 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:

   10% Carex stans-Eriophorum / 70% Moss

   5% Saxifraga oppositifolia barrens.

   Within each unit several communites may be described; an asterisk (*) denotes the most common community.

7,8. SENSITIVITY AND TRAFFICABILITY RATINGS
   Tentative ratings of each unit have been made. Ratings are commonly based on field observations of disturbed areas or of vehicle movements in similar areas of the Fosheim Peninsula, rather than in map areas 49 C or 59 D where there have been few vehicle passes.
   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.

7. 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: probably 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.

   Asterisk * indicates 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.
8. 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 snow-melt and heavy rain periods / Second value for summer.
   1. Easily traversible
   2. Traversible, with slight or local difficulty
   3. Difficult

GROUP/UNIT[1]	MATERIALS DESIGNATOR[2]	TOPOGRAPHY, LANDFORM GENESIS[3]	DRAINAGE, ACTIVE LAYER PROCESSES AND MICRORELIEF	SURFICIAL MATERIALS[4]	GROUND ICE[5]	VEGETATION[6]	SENSITIVITY[7] Magnitude	Form	TRAFFICABILITY[8] Roughness	Traction
1 Graham Island	f,s Mv/KR ; minor Mb, Fd*	Altitude: 0-200' (0-60m) Flat to gently inclined coastal foreland, generally 2-12km wide. Seaward gradient <1°, except for the inner 0.5km, where the surface rises with concave slopes to 5°. The foreland is a marine-planed platform of poorly-lithified shales, siltstones and sandstones, overlain by marine sediments ranging from a discontinuous veneer to thick stratified deposits. Crossed by sub-parallel streams, ca. 0.1 to 1km spacing, in flat-floored channels 2-10m deep.	Drainage generally fair to poor: moist fine-grained sediments for much of summer. Unorganised on flat marine sediments. Broad seepage lines and scattered rills on marine sediment slopes >0.5°. On discontinuous marine veneer and washed rock, seepage lines, rills and shallow gullies. Thin colluvial sheet is flowing downslope adjacent to inland bluffs (e.g. Buckingham I). Some flowslides in stream bluffs. Ice-wedge polygon networks ubiquitous; locally with broad thermokarst troughs and thaw lakes. Dessication cracks (1m dia.) and hummocks. Active layer depth maximum ca. 45cm (fines), 55cm (sand); 5-20cm beneath vegetation.	Marine sediments vary from fine sand to clay, depending on subjacent and adjacent bedrock (fissile shales and siltstones, friable sandstones). Residual weathered shale and siltstone predominantly small platy (<1cm) fragments with silt; minor clay (shale) or fine sand (siltstone). Fluvial deposits are closely related to source rock material: fine sand, minor gravel, from upstream sandstone; platy fragments, silt, from shale and siltstone	Ice-wedge polygon networks general. Segregated ice contents of over 50% noted in the few holes drilled (to 2m) in (thick) marine sediments. Probably similar values in veneer. 0-50% segregated ice content expected in residual weathered bedrock, other than in ice wedges.	Communities are based on Luzula nivalis tussock vegetation. Lower stratum varies with moisture availability-- from none to a patina, to a moss component. Luzula with a dense moss-patina stratum covers at least 70% of the area. When there is water impounding, Alopecurus/Moss community occurs. Puccinellia-Stellaria halophytic community often occurs on the inter-tidal flats. Species diversity is low. Monocots are the dominant vascular plant. Dwarf shrubs (Salix, Potentilla, Dryas) extremely rare; herbs are very limited.	3	A B C*	2 Roughness difficulty: mainly streams, normal to coast, spaced 0.1 to 2km, incised 1 to 20m.	3/2
1.1	fsM/c + Mv/KR	0-200' (0-60m) Topography as 1. Marine sediments from 50cm to 3m+ thick, overlying poorly lithified shales, minor siltstone-sandstone. Main streams 0.5-2km spacing, in steep-sided channels 2-10m deep. Pro-grading deltas at major stream mouths.	See 1, for marine sediments. Seepage lines over most of unit (nonsorted stripes).	Stratified marine sediments, predominantly fines, minor sand; overlying clay, lesser silt. Fine sand, silt beach material at and adjacent to modern shoreline.	See 1.	<10% Luzula nivalis / to 90% moss (+ patina) meadow-- most common community. Alopecurus and Carex maritima locally important. <5% Luzula nivalis (± Saxifrages) barrens on drier sites.	3	A B C*	2	3/2
1.2	f Mv/KR + M	0-200' (0-60m) Topography as 1. Marine sediment veneer to discontinuous cover; thicker near modern shoreline. Overlying poorly-lithified sandstones, siltstones, shale. Stream systems close-spaced (<0.5km), sub-parallel to dendritic; shallow (1-3m) channels. Subunit a: Minor gullying.	See 1, for discontinuous marine veneer.	Stratified marine sediments: fines minor sand; overlying friable sandstone, fissile siltstone shale. Sand, silt beach material at and adjacent to modern shoreline. Local thin peat deposits. Silt, fine sand and shale fragments in stream channels and deltas.	Ice-wedge polygons 50% of unit. Segregated ice, see 1.	<10% Luzula nivalis (±Salix) / to 90% moss (+ patina) meadow*-most common. Dicot diversity somewhat greater: Cerastium regelii, C. alpinum, Cardamine sp. Ranunculus sulphureus, Papaver radicatum, Saxifraga species. locally impounded water: >5% Alopecurus (emergent) / 90% moss. drier areas: Luzula nivalis barrens. Subunit a: <2% Luzula nivalis barrens	3	A B C*	2	3/2
1.3	ø Mv/R & srMb & pOv; øs Mv/R	0-200' (0-60m) Topography as 1. Marine sediment veneer to discontinuous cover; thicker near modern shoreline. Overlying poorly lithified sandstones, siltstones, minor shale. Subdued, widely spaced beach ridges over ca.50% of unit. Stream systems close-spaced (0.1-0.5km), subparallel; shallow (1-3m) channels. Prograding deltas at major channel mouths. Subunit a: Minor gullying.	See 1, for discontinuous marine veneer. Broad seepage line (nonsorted) over ca.30% of unit. Where beach ridges present, drainage impeded, and organic deposits accumulating in swales	Marine sediments, including beach ridges: fine sand, silt, minor shale fragments; overlying friable sandstone, fissile siltstone, shale. Thin (to 50cm) organic deposits over 25% of unit on Graham I, mainly in swales. Fine sand, silt, shale fragments, minor gravel in streams and deltas.	Ice-wedge polygons discontinuous. Probably high segregated ice content in fine-grained deposits, especially below organics.	5-20% Luzula nivalis / to 80% patina tussock steppe*-most common community. Alopecurus, Polytrichum & Rhacomitrium locally significant. Seepage channels--moss dominated almost exclusively. Subunit a: <2% Luzula nivalis barren--most common. fine-grained marine deposits may have a sparse Phippsia-Puccinellia barrens community. Inter-tidal zone may have a Puccinellia-Stellaria halophytic community.	3	A B*	2	3/2
1.4	fs Mb + Mv/KR & pOv	0-100' (0-30m) Inclined surface (1-2°) with marine sediment cover, including beach ridges. Thicker, coarser, better-drained deposits adjacent to major streams, which are incised to 20m depth into underlying sandstone and siltstone.	Seepage lines general between major streams. Beach ridges especially prominent and well-drained adjacent to major streams, but swales poorly-drained, with discontinuous organic deposits.	Marine sediments: fines, coarser materials in beaches. Overlying friable sandstone, siltstone. Thin (to 50cm) organic deposits in swales.	See 1.3	<10% Luzula nivalis / to 90% moss (+ patina) meadow*-most common. Local impounded water: 5% Alopecurus (emergent) Drier areas--Luzula nivalis 90% moss (+ Saxifrages) barrens. Intertidal flats: Puccinellia-Stellaria halophytic community.	3	A*B*C*	2	3/2
1.5	f Mv/KR	50-200' (15-60m) Inclined (1-3°) surface with veneer of marine sediments overlying sandstone and siltstone. Rare incised streams.	Seepage lines general.	Marine sediment veneer: fines, minor sand, gravel; overlying friable sandstone, and siltstone.	See 1.	5-20% Luzula nivalis / to 80% patina tussock steppe--most common. Drier areas: Luzula nivalis barrens.	3	A B C*	1	3/2
1.6	f Mv/KR ; rf K1 RC pk	100-200' (15-60m) Flat to gently inclined surface (0 to 1°), with veneer of marine sediments overlying fissile shales. Strongly dissected (>50% unit) by tributaries of the Rancher River, and a finer gully network. Thaw ponds common on flats.	Marine veneered surface poorly drained, with thaw ponds common in the broad ice-wedge troughs. Dissected areas drained by a fine network of gullys.	Marine sediments: fines, minor organic deposits on flats. Exposed fissile shales in dissected areas, weathered to platy fragments silt, minor clay.	See 1.	5-10% Luzula nivalis / to 80% patina (moss) tussock steppe* on marine sediments. Drier areas: Luzula nivalis barrens on shales. thaw ponds: 5% Alopecurus (emergent) / 90% moss	3	A B C*	3	3/2
1.7	f, fsM, Mb, Fd*	<10' (<3m) Modern shoreline marine and fluvial sediments (thick to veneer). Intertidal flats. Low beach ridges. Prograding fluvial deltas.	Stream channels continue from inland units, plus seepage lines where beach ridges not present. Lagoons and thaw ponds.	Tidal flats: silt, fine sand. Beaches: fine to medium sand. Plane surfaces: fines to sand. Deltas: fines to sand.	Ice wedges inland from modern beach. Segregated ice values unknown.	<10% Luzula - Alopecurus (Juncus) / to 90% moss-patina meadow*-most common. Intertidal flats - Puccinellia phryganodes-Stellaria humifusa (Cochlearia) sparse halophytic community.	2	B	1	2/2
1.8	ø, s, f Mv/R + C	100-200' (30-60m) Gently to moderately inclined (1-5°) surface, with marine sediment veneer to discontinuous cover, and colluvium. Adjacent to rock (mainly sandstone) bluffs. Stream channels sub-parallel, 0.1 to 1km spacing, incised 1-5m.	Drainage varies from good, via close-spaced streams, rills on washed sandstone, to fair via seepage lines on finer marine sediments. Subdued solifluction lobes on steeper slopes.	Marine sediments, colluvium. Mainly: fine sand, silt, minor clay, coarse sand.	Ice-wedge polygons discontinuous. Segregated ice, see 1.	<5% Luzula nivalis ± 2% salix / 50% patina (+ moss) steppe*. Drier and more active areas: <5% Luzula nivalis barrens.	3	A B C	2	3/2
1.9	ør Mb & pOv	0-100' (0-30m) Flights of raised beach ridges; subdued form, with broad peat-veneered swales.	Swales poorly drained. Seepage line from swales commonly overtop ridges. Ice-wedge polygons general. Possible palsen.	Ridges: shale and siltstone fragments, minor silt and fine sand. Swales: mainly peat, minor fines, active layer 10cm thick.	See 1. Probably high ice content in peat.	Raised edges around ponds and beach ridges: <10% Luzula-Carex maritima / to 80% moss-patina. Swales: <5% Alopecurus (emergent) / 90% moss	3	A*B	1	2/2
1.10	sø, fr Fd*/K1R ; fr Fp	0-100' (0-30m) Complex of modern braided fluvial floodplains and deltas, and inactive surfaces, separated by 5-15m bluffs. Minor areas of marine sediment veneer. The deltaic deposits are similar in character to underlying poorly-consolidated shales, siltstones, sandstones.	Drainage of inactive surfaces poorly organised, with broad depressed polygon troughs, often enlarged by thaw ponds. On bluffs, rilling and minor gullying and slides.	Active floodplains and deltas: shale and siltstone fragments, silt, fine sand, minor gravel. Inactive deltaic deposits: stratified siltstone and shale fragments, fine sand, silt, 1-5m thick; mainly over shale and siltstone.	Ice-wedge polygons on inactive surfaces. Segregated ice content not known, but possibly high.	Active delta: vegetation-free*. Inactive deltaic deposits: a. dry areas <2% Luzula nivalis barrens b. interfluvial areas 5-20% Luzula nivalis / to 80% patina c. High centre polygons centres: sparse Luzula barrens troughs: 10-20% Luzula-Polytrichum d. Thaw ponds: <5% Alopecurus (emergent) / 90% moss	2-3	A*B C*	2	3/2
1.11	fr Mv/R + Fd*	0-100' (0-30m) Combination of units 1.2 and 1.10; i.e. modern and inactive fluvial/deltaic deposits, and marine veneer.	See 1.2 and 1.10.	See 1.2 and 1.10. Mainly fine-grained.	See 1.	Swales: <10% Luzula nivalis / to 90% moss (+ patina). Ridges: sparse Luzula nivalis (+Saxifrages) barrens. local ponding: <5% Alopecurus (emergent) / 90% moss	3	A B C*	2	3/2

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1 Baumann Fiord	Mainly r,s,f,o RC (Kb, CPbc, Pv)	Altitude: 500-2300' (150-700 m) Mountain ridges trending NW-SE. Slopes commonly 5 to 35°. Surface of residual weathered bedrock and colluvium, overlying a variety of clastic and carbonate rocks. The resistance to erosion of this group is due to the intrusion of basic dykes and sills.	Mainly unchannelled seepage on crests and upper and steeper slopes. Rills and seepage lines near base of slopes and on gentle facets. Upper slopes well drained. Lower slopes moderately well drained, except gentle slope facets poor. Solifluction lobes to 2 m high general. Talus on steep slopes (>20°). Sorted stripes in seepage lines.	Resistant carbonates, sandstones and intrusive rocks; friable sandstones; well- to poorly-lithified shales and siltstones. Overlain by residual weathering products and colluvium: rubble of boulder to platy shale size, sand, minor fines general, but locally high over recessive beds and lower slopes.	Minor - pore ice only, except segregated ice possible in fine-grained materials on less well drained gentle slopes.	This unit is extremely poorly vegetated. Some areas are virtually devoid of vegetation. Saxifraga oppositifolia barrens are the most common community. Crustose lichen communities occur on some rubble.	1-2	A*C*	3	2/1
1.1	Kb,CPbc ro RC	500-1900' (150-580 m) Dissected mountain ridges. See 1.	Mainly well-drained steep slopes. See 1.	Resistant carbonate, sandstones and intrusive rocks; some friable sandstone. Weathers to rubble, sand; minor outcrop.	Pore ice only.	<5% Saxifraga oppositifolia barrens.* Dicots such as Papaver, Saxifraga cernua, S, caespitosa, Salix arctica, Oxyria, Cerastium, Stellaria, and Dryas occasionally occur. Monocots are rare.	1	C*	3	1/1
1.2	Cc,CPbc rso RC	100-2300' (300-700 m) Dome-shaped mountain, elongated N-S. Slopes 0 to 35°. Succession of differentially weathered minor scarps to 5 m high, especially on rounded summit.	Well- to moderately-drained. Some poorly-drained gentle slope facets at lower elevations. See 1.	As 1.1, plus minor fines.	See 1	No vegetation was found on this unit.* Localized bryophytic communities may occur in association with late-lying snowbeds.	1	C*	3	2/1
1.3	Pv-I rfo RC	800-1900' (240-580 m) Dissected scarps joining 1.1 to 1.2. Long slope facets, 1-10°, with steep segments. Developed on shales and siltstones, greatly strengthened by sills and dykes.	Generally moderately-drained but poorly-drained gentle slope facets common. See 1.	Mainly well- to poorly-lithified shales and siltstones, with resistent dykes and sills; overlain by rubble and minor fines on upper and steeper slopes, fines and rubble on lower and gentler slopes.	See 1	Two major types of communites occur which are related to the nature of the surficial materials: a. rubble: crustose lichens often cover the exposed faces of the boulders. b. fines: <2% Saxifraga-Papaver radicatum barrens. Bryophytic communities may occur in seepage channels and in protected areas.	2	A*C*	3	3/1

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2 Baumann Fiord	s, ø, r,o RC,CR (K, J, Ki, Pv)	Altitude: 200-1400' (60-430 m) Scarplands, dissected slopes and low plateaus, low hills. Developed on weathered and colluviated, generally gently to moderately dipping, resistant to friable or poorly-lithified, Mesozoic clastic sediments. Differential weathering of strata common at macro to micro scale. At lower elevations (<120 m), the surface has been washed, but not greatly modified during the postglacial high sea level. Dissected by dendritic to sub-parallel stream systems, with broad, braided beds. Tributaries and gullies are wadi-like in form.	Drainage variable according to slope and surficial materials: e.g., steep slopes and/or rubble-sand deposits are well-drained by unconfined seepage: flats and gentle slopes on fine-grained materials, poorly drained. Seepage lines, solifluction common; local gullying. Ice-wedge polygons on fine-grained materials. Active layer maximum: ca. 45 cm (fines), 60 cm (sand), 60 cm+ gravel and rubble; 5-30 cm beneath vegetation.	Residual weathered bedrock and colluvium: mainly medium to fine sand and silt, minor rubble, outcrop; locally fines. Underlain by friable sandstone, resistant sandstone and siltstone, recessive poorly-lithified shales and sandstones. Stream floodplains and terraces mainly sand and gravel.	Mainly pore ice in sands, gravels and coarser clastic rocks. Low to high segregated ice values expected in fine-grained materials. Ice-wedge polygons discontinuous, mainly on fine-grained recessive beds.	Saxifraga oppositifolia barrens are very common on well-drained materials. Salix-Saxifraga communities occur where more mesic conditions prevail. Luzula, Dryas, Carex nardina, C. rupestris, and Alopecurus alpinus are often locally present in some abundance. Where impounding occurs, a Carex-Eriophorum (*Salix-Alopecurus) marsh community is common. A sparse monocot barrens is found on areas with a predominance of fine, poorly-drained materials. Bryophytic communities locally occur in association with late-lying snowbeds, seepage channels and protected areas.	1-3	variable	2 Roughness difficulty mainly steep grades on rock scarps, and subparallel incised streams.	-
2.1	søro K,J RC	200-1000' (60-300 m) Scarps and mesas developed on gently-dipping to flat-lying sandstone and siltstone. Dissected by stream valleys to 100 m deep, with cliffs and slopes >35° common.	Upper and middle slopes well drained by unconfined seepage. Lower slopes moderately well drained by seepage lines.	Residual weathered bedrock and colluvium: upper slopes mainly sand, sandstone and siltstone rubble, outcrop; lower slopes sand, silt, minor rubble. Underlain by resistant to friable sandstones and siltstones.	See 2	A sparse Saxifraga oppositifolia barrens* is widespread. Luzula occasionally reaches co-dominant status. Crests are nearly devoid of vegetation. Lower slopes: <5% Saxifraga-Salix / (±moss-patina) meadow. Dryas is often present.	1	A*	3	2/1
2.2	øsro K RC	300-1400' (90-430 m) Hills and scarplands, slopes mainly 5° to 35°, developed on gently-dipping to flat-lying sandstone and siltstone. Less rugged than 2.1, more long slopes.	Upper slopes as 2.1. Middle and lower slopes moderately to poorly drained by seepage lines. Some solifluction lobes.	Residual weathered bedrock and colluvium: mainly silt and sand, minor rubble; more sandstone rubble and minor outcrop on upper slopes.	Segregated ice possible below silty low-angle slopes. See 2.	Crests and upper slopes: sparse Saxifraga oppositifolia barrens. Lower slopes: 5-10% Salix-Saxifraga / (to 60% moss-patina) meadow*. Dryas, Carex nardina, C. rupestris locally important.	2	AC*	2	3/1
2.3	søro Kb+s RC; so Pv? RC	200-1000' (60-300 m) Hills, ridges, some scarps, developed on steep to moderately WSW-dipping generally resistant sandstone and siltstone. Differentially weathered at macro to micro scale. The NW-SW lineation of relief broken by V-shaped cross valleys at 1-3 km intervals, draining group 1 units. Slopes mainly 2°-15°.	Unconfined seepage, some solifluction lobes, sorted stripes on coarse-grained upper slopes. Elsewhere, seepage lines, solifluction, solifluction lobes on steeper slopes. Ice-wedge polygons on recessive beds.	On resistant sandstones and siltstones; upper slopes mantled with residual weathering products - rubble, sand, minor fines and outcrop; lower slopes mainly colluvium - sand, silt, minor rubble. On recessive beds: friable sandstones, siltstone, minor shale: weathering products and colluvium silt, sand, minor rubble and outcrop.	See 2	Crests and upper slopes: 5-10% Saxifraga oppositifolia barrens.* Luzula and Salix frequently occur in slight depressions. Papaver is quite common. Lower slopes & valleys: 5-10% Salix (+Luzula) / 20-50% moss-patina meadow. Dryas, Carex rupestris and C. nardina locally important.	1	A*B*	2	2/1
2.4	sø Kh RC	200-600' (60-180 m) Low hills and ridges, minor scarps on moderately to gently WSW-dipping sandstone, siltstone, minor shale. W flowing streams, with braided channels to 100 m wide, with short, partially incised, tributaries. Slopes mainly <1°-5°.	Seepage lines, minor solifluction lobes, gullying. Ice-wedge polygons over >50% of unit.	Residual weathered bedrock, colluvium on lower elevation slopes. Mainly fine-medium sand, silt; minor sandstone and siltstone rubble, clay. Outcrop of friable sandstones and siltstones on scattered scarps. Rare dykes. Floodplains: gravel and sand.	See 2. Ice-wedge polygons >50% of unit.	Well-drained surfaces and polygon centres: Sparse Saxifraga oppositifolia barrens. Lower slopes, moderately-drained surfaces: 5-20% Salix (+5% Luzula) / 40-80% moss-patina. Ponds: 5-10% Eriophorum-Carex stans (+Alopecurus) / to 90% moss	2	A*B	2	2/1
2.5	søo Ki RC	200-400' (60-120 m) Horizontal to moderately dipping friable sandstone exposed at the seaward margins of group 4 gravels. The unit has been marine washed, but landforms and deposits are mainly subaerial in origin (weathered bedrock and colluvium). Slopes mainly 1-10° on E side of Bjorne, 2-20° on W side; steeper scarps common. Streams close-spaced (<0.3 km). Streams and gullies flat-floored, commonly incised 1-10 m.	Drainage good; mainly via seepage lines to gullies. Solifluction not as prominent as in other group 2 units. Ice-wedge polygons scattered.	Residual weathered bedrock, colluvium: sand and silt derived from friable sandstones, minor siltstone.	See 2. Ice-wedge polygons scattered.	Much of this unit is devoid of vetetation.* Occasionally Saxifraga barrens are found. Minor poorly drained areas have a Salix/moss-patina meadow vegetation.	1	A* C*	2	2/1
2.6	sø, sr, sg K CR	200-1000' (60-300 m), locally to sea level. Subdued hills, and slopes 1°-15°, developed on recessive siltstone, sandstone and shale. Thick mantle of residual weathered bedrock and/or colluvium.	Seepage lines solifluction. Discontinuous ice-wedge polygons.	Residual weathered bedrock and/or colluvium: fine and medium sand, silt; minor rubble and gravel.	See 2.	At higher elevations, a monocot barrens occurs. At lower elevations: 5-20% Salix Alopecurus / 50-75% moss-patina meadow*. Dryas, Carex nardina, C. rupestris, Luzula and Saxifrage occur on areas with gravels.	2	A*B*C*	2	3/2
2.7	øg, fg Pv CR; fsg K CR	200-1000' (60-300 m) Gentle to moderate slopes, 0.5-10°, developed on recessive shale and siltstone. Streams partially incised; minor gullying. Thick mantle of residual weathered bedrock, minor colluvium.	Drainage moderate to poor. Seepage lines, minor gullying, solifluction lobes. Ice-wedge polygons over much of unit. Broad troughs common.	Residual weathered bedrock and colluvium: clay, silt; minor fine sand and gravel. Underlain by poorly-lithified shale and siltstone. Stream floodplains: sand, gravel, fines.	Ice-wedge polygons general. Possibly high values for segregated ice.	A sparse monocot barrens* is common: species include Luzula, Alopecurus alpinus, Phippsia, Puccinellia, and Festuca. Draba and Braya are common. Saxifrages are rare.	3	ABC	1	3/2

GROUP/UNIT[1]	MATERIALS DESIGNATOR[2]	TOPOGRAPHY, LANDFORM GENESIS[3]	DRAINAGE, ACTIVE LAYER PROCESSES AND MICRORELIEF	SURFICIAL MATERIALS[4]	GROUND ICE[5]	VEGETATION[6]	SENSITIVITY[7] Magnitude	Form	TRAFFICABILITY[8] Roughness	Traction
3 Baumann Fiord	Mainly: r, s, ø, f, o RC, CR (Pa,CPbc,Cc)	Altitude: 0-1700' (0-520m) Rolling upland, hills; scarps and ridges in SE, dissected upland in W with cliffs to 300m high. Developed on upper Paleozoic carbonates (generally resistant) and clastic rocks (resistant to poorly-lithified). Mantled with weathering products. Slopes over carbonates and resistant sandstones mainly smooth concavo-convex or rectalinear, 1-20°. Friable to poorly lithified clastics in S and W are highly dissected. Differential weathering of strata common. Rivers and main tributaries on resistant rocks braided, broad, rarely incised in valley floors.	Unchannelled seepage, well-drained, on coarser materials/resistant beds. Fine-grained materials/recessive beds have seepage lines: generally well to moderately drained on upper slopes; moderately to poorly drained on lower slopes and gently inclined slope segments, especially below steep segments or rock outcrop. Sorted nets and stripes, solifluction lobes, talus slopes on coarser materials. Seepage lines (non-sorted stripes) local ice-wedge polygons, on finer-grained materials. Active layer maximum ca. 40cm in fines, 55cm+ on coarse materials.	Residual weathered bedrock and colluvium of carbonate and quartzose sandstone rubble, fine sand, silt, coarse sand, silt stone and friable sandstone rubble, outcrop, clay gravel. Underlain by highly resistant dolomite, limestone and quartzose sandstone, friable sandstones, siltstones, minor shale and conglomerate. Stream floodplains and terraces mainly gravel and sand.	No observations on ice. Probably pore ice only in coarser clastics, though interstitial ice could exceed 25% by volume in rubble. Low to moderate segregated ice values possible in fine-grained sediments. Some ice-wedge polygons on fine-grained sediments.	Sparse saxifrage barrens cover most of the area. Where fines are present, Salix and Dryas become locally co-dominant. Some areas are devoid of vegetation. Silty bands carry a Puccinellia-Braya barrens vegetation. Certain rubbly beaches support only a Cetraria-Alectoria lichen barrens. Bryophytic communities are often found in association with seepage channels and late-lying snowbeds.	2-1	variable	2-3	3-2/2-1
3.1	r, rs Pa,CPbc,Pd RC	200-1600' (60-490m) Smooth hills to 250m high, with generally convex slopes; rounded E-W trending ridges, cut on occasion by steep-sided V-shape valleys. Underlain by resistant carbonates and sandstones.	See 3 for coarser materials/resistant beds. Solifluction lobes to 1.5m high on slopes > 2°.	Residual weathered bedrock, minor colluvium: rubble, mainly fragments 1-25cm diameter, minor sand and silt. Derived from underlying gently folded quartzose sandstone, and limestones.	See 3.	<2% Saxifraga oppositifolia barrens.* Occasionally Braya, Draba, Poa, Festuca and Puccinellia are found. Some areas are devoid of vegetation.	1	C*	3	1/1
3.2	rø CPbc RC; rø Pa CR	0-1700' (0-520m) Gross topography similar to 3.1. Underlain by resistant and recessive carbonates and sandstones, differentially weathered to form a succession of minor scarps. Weathered mantle, colluvium.	See 3. Combination resistant and recessive beds.	Residual weathered bedrock and colluvium, combination of 3.1 and 3.3.	See 3.	<5% Saxifraga oppositifolia barrens.* Some areas are devoid of vegetation. Siltier bands have a sparse Puccinellia-Braya barrens vegetation. Oxyria, and Cerastium alpinum are commonly present.	2	A*C*	2	2/1
3.3	ør, øg CPbc CR	400-1100' (120-340m) Valley bottom slopes and basins of rock-controlled topography; isolated ridges. Slopes generally <10°, often >2 km in length. Mantled by colluvium derived from weathering products of underlying carbonates and clastics. Local stream incision and gullying.	See 3. Combination resistant and recessive beds. Scattered flowslides.	Colluvium, residual weathered bedrock, derived from recessive to resistant carbonates and clastics. Silt, fine sand; minor gravel, rubble, clay. Streams: gravel and sand.	See 3. Local ice-wedge polygons.	5-10% Saxifraga oppositifolia-Papaver barrens.* Salix arctica and Dryas may be present in minor depressions, reaching co-dominant status, locally. Some areas are devoid of vegetation.	2	A B*C*	2	3/2
3.4	sfro, fsro Cc RC	0-1000' (0-300m) Major scarps and valleys, with succession of superimposed minor scarps resulting from differential weathering of beds. Dissected by deep valleys and gorges to 250m with adjacent gullying. Cliffs to 300m on Baumann Fiord shore. Underlain by flat-lying to inclined, resistant to recessive clastics, minor carbonates.	See 3. Combination resistant and recessive beds. Scattered flowslides.	Colluvium, residual weathered bedrock, derived from recessive to resistant carbonates and clastics. Silt, fine sand; minor gravel, rubble, clay. Streams: gravel and sand.	See 3. Local ice-wedge polygons.	<1% Saxifraga oppositifolia barrens. Papaver, Draba, and Thamnolia vermicularis may be present. Most of the area is devoid of vegetation.*	2	A B*C	3	3/2
3.5	fsro, ør Cc CR	0-1200' (0-370m) Rolling upland, basins, long slopes, developed on recessive to resistant beds. Slopes generally 1-15°. Colluvium and residual weathered bedrock.	See 3. Mainly recessive/fine grained. Close pattern of sub-parallel streams and rills, with intervening seepage lines; minor gullying, scattered flow slides.	Colluvium, and residual weathering products of underlying and upslope clastics (see 3.5). Sand, silt, clay, sandstone and siltstone rubble, gravel, outcrop.	See 3.	<5% Saxifraga-Salix barrens.* Dryas, Polygonum, Draba, and Cerastium are common. Monocots are rare. Locally impeded draingage: 5-10% Carex-Eriophorum (+ Salix) / 75% moss	2	A B C	2	3/2
3.6	gr Mb	0-400' (0-130m) Flights of postglacial raised granular beaches, superimposed on slopes of 1-5°; underlain by resistant carbonates and clastics. Above ca. 15m elevation, beaches are low amplitude, ridges generally <0.5m high. Below 15m, ridges are more prominent. Stream beds with braided channels. If terraces present, usually low; except that within 60m of present sea level, multiple terraces and delta surfaces occur on main streams.	Generally unconfined seepage, some standing water in swales at low elevations. Ice-wedge cracks. Sorted stone nets scattered. Barely perceptible solifluction lobes on steeper slopes (>5°C). Ice-wedge polygons on inactive surfaces.	Beach material: angular limestone, (minor sandstone) rubble; some silty sand in swales; possibly locally underlain by fine-grained marine sediments. Constructed on highly resistant dolomites, limestones, minor quartz sandstone. Sand, gravel, minor fines. Granular delta surfaces may represent a 1-3 m veneer over fine-grained deposits.	See 3 Ice-wedges common. Ice-wedge polygons on inactive surfaces. Segregated ice in fine-grained deltaic sediments.	Ridges are practically devoid of vegetation. In the interstices of boulders, an Alectoria-Cetraria lichen barrens may occur. Species included are: Alectoria ochroleuca, A. nigricans, Cetraria nivalis, C. cucullata, C. tilesii, Thamnolia vermicularis. Rare occurrences of Saxifraga oppositifolia and Papaver radicatum.	1	variable	2	1/1

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2 Graham Island	rf K1 RC; øro K2 RC; sø K4 RC; fg Mv/R + P?	Altitude: 150-600' (45-180m) Rolling to hilly topography controlled by a NNW-S trending broad syncline, with poorly-lithified shales and siltstones exposed along the axis, and only slightly more resistant sandstones, siltstones, and shales on the flanks. The axis shales are strongly dissected; the flanking hills/plateaus (which commonly have sandstone bluffs on their seaward margins) are less dissected. About 15% of the area is mantled by fine-grained morainal deposits, locally underlain by coarse (preglacial?) fluvial gravels. There are scattered marine deposits, including beaches, below 130m.	Drainage good on highly dissected (gullied) units; fair to poor on low rolling fine-grained units, which are mainly drained by seepage lines: fair to good on fine sand and rubble units. Fine sand to clay sediments moist much of summer. Mass-movement processes (mainly solifluction) general but not prominent. Seepage lines (sorted and non-sorted stripes) are widespread. Occasional solifluction lobes, and flow-slides in stream bluffs. Dessication polygons widespread on sandy materials; develop to on fine-grained slopes, especially moraine. Ice-wedge polygons discontinuous, troughs commonly broad on fine-grained materials (especially weathered shale) commonly enlarged by thaw ponds. Active layer depths for late July, early August, generally 5-40cm. Depths 5-25cm under vegetation, 20-45cm where devoid of vegetation.	Mainly residual weathering products of underlying bedrock: i.e. small platy (1cm) fragments, silt, minor clay, over fissile shale and siltstone ; fine sand, silt, over friable sandstone. A small quantity of coarse-grained materials, mainly: 1) Blocks of fused shale (see 2.8) 2) Minor diabase dykes 3) Boulder gravel, locally(?) underlying moraine (see 2.6) 4) Beach ridge gravel.	Ice-wedge polygons over 50% of the group. 0-50% segregated ice values expected in residual weathered bedrock, other than in ice wedges. Higher ice values in morainal deposits?	On weathered bedrock, Luzula nivalis based communities have developed. The presence of moss or patina lower stratum is dependent on surface moisture availability. A sparse Luzula barrens is found over about 70% of the area. Vascular species diveristy is quite restricted. Dwarf shrubs and dicots are not common. Local areas have a predominantly bryophytic (Rhacomitrium) vegetation. Morainal deposits (15% of area) have a Saxifraga (±Alopecurus) community. A significant moss lower stratum occurs in moist areas. The diversity of vascular plants is greater; a minor dwarf shrub (Dryas, Salix, and Potentilla) component is present, as are grasses and herbs such as Featuca, Phippsia, Saxifraga oppositifolia, S. caespitosa, S. cernua, S. flagellaris, Cerastium alpinum, C. regelii Papaver radicatum, Draba, Cardamine, and Ranunculus sp. On local marine silts--sparse Puccinellia - Alopecurus barrens.	2-3	A B*C*	2 Roughness difficulty mainly gullying, incised rivers, scarps.	3/2-1
2.1	rf K1 RC	150-600' (45-180m) Low rolling to hilly topography developed on fissile shales and siltstones. The unit is strongly dissected by streams and gullies to depths of 25m in dendritic systems. Watersheds and upper slopes relatively undissected on E and S perimeter of unit.	Mainly fluvial drainage in gullies. Ice-wedge polygons with broad troughs, on perimeter watershed (mainly E) and on gully interfluves. Seepage along troughs to gullies.	Mainly residual weathered shale and siltstone: fragments, silt, fine sand. Stream channels similar, plus minor gravel.	See 2.	Sorted fragments: dry: vegetation-free, moist: <10% Luzula/± 40% Rhacomitrium. Fine grained bedrock: <5% Luzula nivalis barrens. High centre polygons: centre; vegetation free. troughs: 1-20% Polytrichum-Rhacomitrium with occasional Luzula tussocks. Local morainal deposits: <5% Saxifraga - Alopecurus / ± moss (to 50% if present.)	3	A B*C*	3	3/2
2.2	fr K RC + Mv ? Mv?	150-400' (45-120m) Flat to low rolling topography, into which main rivers and streams are incised to 20m depth. Underlain by shales and siltstones, probably marine planed at lower elevations in the unit. Partial thin cover of marine (see 1.6) and morainal (see 2.6) deposits, otherwise weathered bedrock, minor colluvium.	Seepage line, runnels, solifluction. Minor gullying. Ice-wedge polygon areas discontinuous, scattered thaw ponds.	Residual weathered shale and siltstone: fragments, silt, fine sand. Discontinuous veneer of morainal deposits (silt, fine sand, shale fragments, gravel) and marine sediments (stratified fines).	See 2.	5-10% Luzula nivalis / to 60% moss-patina tussock steppe*-most common community. Drier areas: sparse Luzula nivalis barrens.	3	A B C*	2	3/2
2.3	øo K2 RC	Altitude: 150-400' (45-120m) Low rolling to low hilly topography developed on siltstone, sandstone; with shale, coal, in subunit a. The unit is dissected over 75% of the area by shallow stream channels and gullys, apart from a plateau at the N end of the unit bordered by a sandstone scarp, ca. 20-50m high.	Gullies, rills, solifluction, local deflation on plateau. Ice-wedge polygons scattered.	Mainly fine sand and silt; some shale, siltstone, sandstone fragments; underlain by siltstone, sandstone; shale and coal in subunit a.	See 2. Ice-wedge polygons scattered.	1-5% Luzula nivalis barrens*-most common community. Depressions may support Polytrichum and Rhacomitrium to 50%.	2	A B*C*	2	3/1
2.4	rf, fr K2 RC; øg K4 RC; fg Mv	150-500' (45-150m) Rolling plateau to hilly. Units bounded by escarpments or steep slopes on all but the inland margins. Underlain by sandstone, siltstone, minor shale. Lower parts of the unit are marine washed, and there are remnants of morainal deposits in higher areas. Short steep stream channels and minor gullying dissect the unit margins.	Seepage lines (nonsorted), runnels, drain much of unit. Hummocks widespread. Icewedge polygons discontinuous.	Mainly silt, fine sand, siltstone fragments, minor clay and gravel. Underlain by sandstone, siltstone, minor shale.	See 2.	5-10% Luzula nivalis / to 60% moss-patina tussock steppe*-most common. Drier areas may have sparse Luzula nivalis barrens.	3	A B C*	2	3/2
2.5	r K3 RC	200-500' (60-150m) Mainly slopes 1-5° developed on fused shale. Local scarps	Sorted stripe seepage lines over most of unit. Active layer <20cm thick, though well drained.	Blocks and fragments of residual weathered heat-fused shale and siltstone. Material has low density, but is competent. White, grey, buff, red coloured.	Intersticial segregated ice to 25%.	5-10 Luzula nivalis / to 60% moss-patina Tussock steppe*-most common. Drier areas: spare Luzula nivalis barrens.	1	A*B*C*	2	2/1
2.6	fg K1 Mv/R + bg P?	250-500' (75-150m) Rolling plateau to low hills, developed mainly on shale, locally on sandstone. The unit is mantled by fine-grained morainal deposits, but pre-glacial fluvial (?) bouldery gravels occasionally show through this cover, or are exposed beneath it. Minor gullying and stream incision at the perimeter of the unit.	Seepage lines general on alopes >1° (i.e. 75% of unit). Drainage disorganised on rounded interfluves. Dessication polygons/hummocks general. Ice-wedge polygons general, but troughs not prominent except on interfluves.	Morainal deposits, fine grained, mainly silt and very fine sand, with minor clay, shale fragments and gravel. Underlain at least partially, by bouldery (fluvial(?) gravels, including such exotic rocks as granites. Moraine cover probably >2m thick gravel thickness unknown.	Ice-wedge polygons general. Segregated ice values to 50% likely in moraine.	Morainal deposits: 5-10% Saxifrages (±2% Salix)* / to 60% patina-moss. dominant Saxifrages include Saxifraga oppositifolia, S. caespitosa, and S. flagellaris. Alopecurus and Luzula are occasional. Dry fragmented shales: devoid of vegetation. Moister areas: <10% Luzula / to 40% Rhacomitrium. Seepage areas are predominantly bryophytic communities.	2	A*B C*	2	3/1
2.7	sro K4 RC; øso K4 CR	Altitude: 200-500' (60-150m) Rolling to strike-ridged topography, with escarpments on seaward side of units. Developed on predominantly friable, sandstone, siltstones, minor shale. The escarpments are dissected by steep-sided stream channels and gullies with colluvial deposits accumulating at the base. Remainder of unit has strike-aligned streams with minor (<10m) scarps.	Escarpments well-drained by rills and gullies. Some flow-slides where shale or siltstone exposed. Seepage lines, some rills, over most of unit. Few ice-wedge polygons.	Residual weathered friable sandstone, siltstone: fine sand, silt, coarse sand, minor rubble, minor outcrop. Isolated postglacial (?) beach ridges at ca. 100m, composed of sand, gravel, shells.	See 2. Few ice-wedge polygons.	Beach ridge crests: <5% Saxifraga oppositifolia barren; slopes: Saxifraga-Luzula nivalis barrens. ponds: <5% Alopecurus (emergent) / to 90% moss. Bedrock: Luzula nivalis barrens with occasional saxifrages, Salix acrctica, Dryas & Potentilla hyparctica. Local marine silts: sparse Alopecurus-Puccinellia barrens.	2	A B*C*	2-3	3/1
2.8	rf K1,3 RC	200-550' (60-170m) Rolling to ridged topography, minor scarps, developed on siltstone, shale, fused shale (see 2.5).	Close network of seepage line, rills and streams; local gullying. Sorted stripes prominent on fused shales. Some shallow solifluction lobes. Ice-wedge polygons scattered.	Weathered residual or colluviated shale, siltstone or fused shale: mainly fragments and fines.	Ice-wedge polygons discontinuous. Segregated ice possibly to 25% in fused block interstices.	2% Luzula nivalis barrens*. Rhacomitrium hummocks may be locally significant.	2	A B*C	2	3/2
2.9	øs C + K Rm	150-250' (45-75m) Colluvial and washed rock slopes at foot of sandstone-siltstone escarpment. Slopes 2-10°. Fine network of shallow runnels and gullies.	Runnels, gullies, solifluction lobes, seepage lines. Ice-wedge polygons scattered.	Fine sand, silt, coarse sand.	Possibly to 50% segregated ice in colluvial deposits.	5-10% Luzula nivalis / to 80% patina-moss tussock steppe*. Localised Luzula barrens occur on topographic highs.	3	A B C	3	3/2
2.10	ør K2,3 RC	200-500' (60-75m Knobby, dissected topography, local relief to 25m; developed on siltstone, shale, sandstone and fused shale. Scattered morainal deposits. Slopes 2-15°. Streams incised, with much associated gullying.	Gullies, runnels, seepage lines. Ice-wedge polygons scattered.	Fine sand, silt, fused shale blocks (see 2.5), shale fragments; minor clay.	See 2. Ice-wedge polygons scattered.	A sparse Saxifraga-Alopecurus barrens is most common. Occasional herbs occur. Crustose lichens may be found on shale blocks.	2	A B C*	2	3/2
2.11	øro K2 Rm + K2 CR	Altitude: 100-400' (30-120m) Gently to moderately inclined (1-5°) surface of marine planed snadstone and siltstone greatly dissected by close-spaced (0.1 to 0.3km) network of stream channels and tributary gullys. Discontinuous thin marine deposits, including beach ridges, on undissected surfaces.	Generally well-drained by gullies. Some seepage lines, ice-wedge polygons on undissected surface.	Fine sand, silt, coarse sand rubble.	Pore ice in sandstone; segregated ice 0-50% in residual material.	Sparse Saxifraga-Alopecurus barrens are found on drier sites. On moist seepage slopes, Rhacomitrium and Polytricum stripes are found with occasional monocots and herbs	2	A B*C*	2	3/1