Extended Legend

SURFICIAL GEOLOGY AND LANDFORMS

for parts of

Aklavik (107B), Blow River (117A), Demarcation Point (117C), Herschel Island (117D)

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Map-unit name and notations	Nature of material and thickness	Permafrost and ice content	Distribution and Stratigraphy	Comments on geomorphology, surface drainage, and natural hazards	Degradation following surface disturbance
F-Fluvial Deposits A-floodplain with active deposition 1-floodplain and low level terrace 2-low and intermediate level terrace 3-intermediate level terrace 4-high level terrace 5-pediment surface F f-clay, silt, and fine sand a-sand or gravel s-sand g-gravel p-floodplain f-fan t-terrace glacially deformed Example: $g F^{A}_{p}$ - Gravel floodplain with annual deposition -organic cover of 2 to 12 feet -bedrock within 5 to 70 feet of surface	1. Fine-grained ($_{f}F$). Thinly bedded clay, silt and sand is generally highly organic, and contains occasional peat layers. Alluvial fans contain some beds and lenses of gravel and sand, especially near their apex. Thickness generally exceeds 20 feet; alluvial fans and the Mackenzie River floodplain may be more than 100 feet thick.	Taliks under stream channels. Excess ice generally ranges between 5 and 20 per cent. Peat, where present, usually has a higher ice content.	Covers large area along the eastern flanks of the Richardson Mts; forms Mackenzie Delta. Where bedrock is within 70 feet of the surface, deposits generally lie directly on bedrock. In areas of thick unconsolidated sediments, underlying deposits are known to be marine clay and till and include a variety of other materials.	Shallow poorly-drained channels occassionally present; channels usually peat filled on terraces. Drainage is generally poor, and shallow pools of water and thermokarst ponds and lakes are common. Alluvial fans have gentle slopes to them, but drainage is only moderate. Floodplains with active deposition are generally inundated once a year, other floodplains less frequently. Thermal niching and collapse of resulting overhangs occurs along actively eroding banks.	Thermokarst subsidence of 5-8 feet can be expected where an icy organic cover exists; otherwise 2-5 feet of subsidence. Local thermokarst erosion and gullying may occur near scarps and where flooding occurs. Newly thawed ground is unstable.
	2. Coarse-grained ($_{a}F$, $_{s}F$ and $_{g}F$) Most gravels are coarse and bouldery. Gravels found west of long. 139° are relatively clean compared to those found east of long. 139°, which are diluted by fines from shale units. A veneer of silt and peat is generally present except on active floodplains. Where the veneer thickens to more than two feet the unit is prefixed as $\frac{f}{a}$, $\frac{f}{s}$ or $\frac{f}{g}$.	Taliks under stream channels. An open-system pingo on the Malcolm River fan attests to local intrapermafrost taliks. Excess ice is generally negligible except in veneers of silt.	Found along all major streams; covers a large part of the coastal plain between Alaska and the Firth River; occur frequently on pediments. Where bedrock is within 70 feet of the surface, deposits lie directly on bedrock. In areas of thick unconsolidated sediment, they undoubtedly lie on a number of materials.	Generally surface has a braided pattern, although this may be obliterated by peat development on terraces. Drainage is poor on broad flat terraces, small pools of water being common. Floodplains with active deposition are generally inundated once a year, other floodplains less frequently. Aufeis accumulates on some floodplains causing channel shifts.	Thermokarst subsidence of 5-8 feet can be expected where an icy organic cover exists. Some gullying of sandy sediments near scarps is possible.
	3. Glacially-deformed (F_{G}). Gravel containing some sandy beds. Logs and woody detritus are common within unit. Deformation gives local thickness of up to 200 feet.	Negligible excess ice presents.	Outcrop on the coastal ridge between Kay and King Points. They are interbedded with marine and estuarine deposits and may be capped by thin till or glaciofluvial gravels.	Deposits form well-drained and high ridges.	Gullying near scarps may occur.
ε-Estuarine Deposits A-active deposition f-clay, silt and fine sand → ε ← p-plain	Material is similar to fine-grained fluvial deposits. Thicknesses range from 10 to 100 feet. Logs and organic detritus common throughout.	Excess ice of 5 to 20 per cent to be expected.	Located on the distal edge of deltas where marine and fresh-water deposition is occurring.	Poorly drained because of flatness and low elevation. Subject to inundation during floods and storm tides.	Thermokarst subsidence of 2-5 feet. Minor gullying during floods. Newly thawed ground is unstable.
M-Marine Deposits A-active deposition M f-clay, silt and fine sand a-sand or gravel s-sand gravel p-tidal flat b-beach G-glacially deformed -marine gravel or pebbly sand beach	1. Fine-grained($_{f}M_{p}$). Tidal deposits are generally high in organic content, and logs and woody detritus are common. Occasional stringer of beach gravel may be present. Generally 5-10 feet thick.	Excess ice of 5 to 20 per cent to be expected	Located on the landward side of spits. They commonly occupy drained basins and lie directly on lacustrine deposits.	Poorly drained because of flatness and low elevation. Subject to inundation during storm tides.	Thermokarst subsidence of 2-5 feet. Newly thawed ground is unstable.
	2. Coarse-grained (a,s or $g^{A}_{b}M$) Beach deposits are generally clean sand and gravel; may contain occasional fragment of wood. Deposits in spits may reach thicknesses of 30 feet, in narrow beaches they probably range between 5-15 feet.	Active layer may be in excess of 6 feet on spits and beaches. Excess ice generally absent or negligible.	Large spits are common between Clarence Lagoon and Herschel Island, and at Stokes, Kay and Shingle Points. Underlying deposits are generally exposed in base of adjacent cliffs. Occasionally beach materials cap tidal deposits.	Spits and beaches are well drained - subject to inundation and erosion during storms.	Trenches may be eroded if lagoonal drainage becomes established along disturbance. Increased rate of spit and beach migration and retreat of adjacent cliffs possible if a major amount of material removed.
	3. Glacially deformed. Clay and silt content generally exceeds 90 per cent; occasionally thinly bedded fine sand and silt will be present. Deposits are over 100 feet thick.	Excess ice is absent throughout much of the sequence, but large icy beds are present. Reticulate ice occassionally present in clay.	Compose most of Herschel Island and outcrop on the ridge between Kay and King Points. They are interbedded with fluvial deposits and can be capped by a veneer of till or outwash.	Form high positive areas on coastal plains. On flat areas, drainage is poor and pools of water will be present. Retrogressive thaw flow-slides occur on oversteepened slopes where icy beds are exposed. Thermal niching and block slumping is common along the coast.	Minor thermokarst subsidence may occur on flat areas; gullying on sloping areas. Retrogressive thaw flow-slides on slopes where they are underlain by icy beds. Newly thawed ground is unstable until dehydrated below the plastic limit.
L-Lacustrine Deposits No modifier indicates thermokarst origin G-glaciolacustrine (?) L f-clay, silt or fine sand a-sand or gravel p-plain -organic cover of 2 to 12 feet -bedrock within 5 to 70 feet of surface	Generally thinly bedded silty clay, silt and silty fine sand with some layers being high in organic content; mossy peat beds occasionally present. Deposits contain some sand and gravel near shorelines. Where sand and gravel are predominant textural prefix indicates such. Peat commonly caps sequence. Glaciolacustrine deposits are generally clayey. Deposits range from 10 to 30 feet in thickness.	Taliks may be present under recently drained lakes at shallow depth. Excess ice contents of 5-40 per cent are common. Higher percentages of excess ice common in the upper part of the unit and in overlying peat.	Extremely common in morainic areas and frequent on pediment surfaces. Also common on estuarine and fluvial deposits. Thermokarst lacustrine deposits generally lie on the material surrounding them. Glaciolacustrine deposits generally lie on morainal deposits, colluvium or bedrock along the limit of glaciation.	Flat to gently sloping; generally with poor surface drainage as indicated by many small tundra pools. Polygonal patterns well developed with water in troughs. Small scarps within basins attest to coalescing lake basins.	Thermokarst subsidence of 5 to 10 feet can be expected. Thermokarst erosion and gullying will occur near scarps. Active layer detachment failures and retrogressive thaw flow-slides may occur in glaciolacustrine deposits where steep slopes previously formed are bared. Newly thawed ground is unstable.
C-Colluvium C f-clay, silt and fine sand a-sand or gravel sized colluvium r-rubble, boulder-sized common No modifier indicates a mixture of above types 1-slope less than 5° 2-slope of 5 to 15° 3-slope greater than 15° t-terraced e-eroded, local slopes steeper than slope class indicated -organic cover 2 to 12 feet -bedrock within 5 to 70 feet of surface -bedrock within 0 to 10 feet of surface	1. Fine-grained ($_{f}C$). High in organic content generally; contains occasional lenses and beds of sand, gravel and rubble. Material is generally derived from underlying shale, argillite or till. Generally 5 to 20 feet thick, but may be thicker towards base of slopes.	Excess ice commonly between 30 and 60 per cent; ice lenses very common.	Common on gentle to moderate slopes underlain by shale or argillite. Also present on stream-cut and wave-cut scarps. Common on pediment surfaces. Generally overlies bedrock but at edges of valley bottoms it may overlie fluvial, glaciofluvial or morainic deposits.	Solifluction lobes and terraces are common phenomena of colluvium covered slopes in mountainous areas. Solifluction lobes and terraces seem stable at present. Active-layer detachement failures frequently occur on this unit. Vegetated slopes probably moving an average of one half inch per year.	Thermokarst subsidence of 2 - 10 feet to be expected on gentle slopes; thermokarst erosion and gullying, active-layer detachment failures and retrogressive thaw flow-slides on steeper slopes. Newly thawed ground is unstable until dehydrated below the materials plastic limit.
	2. Coarse-grained (a or r^{C}) Generally angular chert, sandstone, limestone, granite or volcanics. Boulder-sized rubble generally composed of lithic sandstone, quartz sandstone, of less frequently limestone. Generally 2 to 20 feet thick.	Excess ice is probably negligible.	Common on moderate and steep slopes underlain by chert, sandstone, limestone, granite or volcanics.	Terracettes and other periglacial phenomena are common. Vegetated to partially vegetated slopes are stable. Unvegetated moderate to steep slopes moving an average of one inch per year.	Minor rock falls and slides.
G-Glaciofluvial Deposits G a-sandstone s-sand g-gravel p-outwash plain, valley train t-terrace (kame) h-hummocky (kame complex) No modifier indicates gently sloping surface -isolated kames -organic cover of 2 to 12 feet -bedrock within 5 to 70 feet of surface	Most deposits are coarse gravel but some near the coast between Kay and Shingle Points they are comprised of sand. Gravel and sand are generally cleaner than fluvial deposits. Occasionally a 2 to 10 foot-thick cover of organic silt and peat is present. Deposits generally range between 10 and 50 feet in thickness.	Excess ice is generally negligible, although rarely thick ice lenses may be present. Organic silt and peat overlying the outwash are generally ice-rich.	Glaciofluvial deposits are concentrated in patches along the limit of glaciation, along the inland side of the coastal ridge between Kay and Shingle Points and on the mainland opposite Herschel Island. In areas of shallow bedrock, glaciofluvial deposits generally lie directly on bedrock; in areas of thick unconsolidated deposits, glaciofluvial deposits have been observed overlying fluvial, estuarine, and marine deposits.	Poor surface drainage prevails due to flatness over broad areas; standing pools of water are common. Small scarps within the outwash plains give local well-drained areas. Kame deposits are usually fairly well drained because they have a moderate amount of relief or are on slopes.	Thermokarst subsidence of 2-8 feet can be expected where an icy organic cover exists. Local gullying near scarps in sandy outwash can be expected.
M-Morainic Deposits M No modifier indicates material is a diamicton r-rubble h-hummocky m-rolling p-flat; a few gentle slopes l-slopes reflect bedrock control; generally <5°, but occasionally up to 10°. -organic cover of 2 to 12 feet -bedrock within 5 to 70 feet of surface	Generally a stony, clayey till: stone (>2 mm) content varies between 1 and 50 per cent; highest where till overlies gravel. Locally within coastal plain, slices of deformed marine clay and silt may be included in the unit. Upper 5 feet of till often contains organic silt and peat lenses and stringers; a complex of peat, pond deposits, alluvium and mudflow debris are common within the unit in its upper 5 to 10 feet. Till is often 25 feet thick although it may thin locally on steep slopes and near the edge of scarps, and thicken to more than 60 feet in intermontane valleys.	Excess ice in upper 10 feet is generally 10 to 40 per cent; at greater depth it may be negligible. Thick ice lenses and massive icy beds are common under hills in areas of hummocky and rolling moraine. Icy beds are also present in areas of till overlying bedrock. Glacier ice may be present in the cores of rock glaciers.	Morainal deposits cover 50 per cent of area within the limits of glaciation. On the coastal plain till overlies a variety of materials ranging from marine clay to fluvial gravels (subtill gravels are concentrated near the mouths of the Firth, Babbage and Blow Rivers). In areas where the bedrock is within 100 feet of the surface, the till generally lies directly on the bedrock although locally, especially on glaciated pediment surfaces, gravel may underlie the till.	Gentle slopes less than 5° are common except in areas of hummocky moraine where steep-sided slopes to about 25° are present. Locally slopes to 25° can also be found where streams have incised themselves. Active layer detachment failures are present in areas where the slopes reflect bedrock control. Retrogressive that flow slides are common along actively eroding sea cliffs, stream banks, and lake shores. M Rock glaciers are indicated r^{M}.	Two to eight-foot subsidence is to be expected on flat and gentle areas. Large thermokarst depressions will form, if deposits are thawed to a depth in areas where massive icy bodies form the cores of hills. Active layer detachment failures occur on slopes greater than 5°, and retrogressive thaw flow-slides will result if icy beds or ice-rich sediments are exposed. Some thermokarst erosion will occur on slopes, mainly localized along icy wedges. Newly thawed ground is very unstable until dehydrated below the materials plastic limit.
Rock-Bedrock -bedrock or near-surface bedrock	East of 139° Long., shales and siltstones predominate; quartz sandstones, cherts, carbonates, and volcanics less common. West of 139° Long., argillites and lithic sandstones predominate; cherts, carbonates and shales less common; granite and volcanics infrequently present.	Bedrock outcrops on most hill and ridge crests and steep slopes are generally quartz or lithic sandstone, carbonates or chert. Argillite, shale, and siltstone are more often exposed in river canyons or steep cliffs.	Little or no excess ice is found in rock.	Rock exposures form pinnacles (tors) along mountain tops and ridge crests, infrequently they form hoodoos on slopes. Rock slopes are relatively stable although minor rock falls are common along actively eroding stream-cut scarps.	Disturbance should have little effect on surface or near-surface bedrock.