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

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# LEGEND TO ACCOMPANY SURFICIAL GEOLOGY/GEOMORPHOLOGY MAPS OF BOOTHIA PENINSULA AND SIMPSON PENINSULA, N.W.T.

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| MAP UNIT | MATERIAL | LANDFORM: ORIGIN | LANDFORM: TOPOGRAPHY | DRAINAGE | THICKNESS OF ACTIVE LAYER (est. range in metres based on field observations, Aug. 1974) | GROUND ICE | ADDITIONS COMMENTS |
|---|---|---|---|---|---|---|---|
| tMv | till; mostly sandy and high in igneous rock detritus where unit overlies Precambrian bedrock; mostly silty and high in carbonate rock detritus where unit overlies Paleozoic bedrock | ground moraine | commonly gently to strongly irregular where unit overlies Precambrian bedrock; gently irregular to broadly rolling where unit overlies Paleozoic bedrock; scattered outcrops of bedrock | units overlying Precambrian bedrock are commonly well-drained; units overlying Paleozoic bedrock are well to moderately drained | 0.8 - 1.2 | limited subsurface information indicates the presence of ice crystals, coatings, and lenses, ice content variable arealy and with depth; slightly greater ice content may be expected in the silty tills which overlie Paleozoic bedrock; ice-wedge troughs and polygons occur infrequently, usually on the crests of rises, suggesting that ice wedges occur infrequently | Sandy till suitable as fill material; solifluction processes are commonly active over short distances downslope from bedrock outcrops; content of frost-riven boulders is commonly quite high near bedrock outcrops, making ground vehicle access difficult, areas of till veneer are common thoroughout much of the map area; areas of till plain primarily occur in the Willerstead Inlet-Shepherd Bay area and along the north and east coasts of Simpson Peninsula; gravel beach ridges are scattered on the surface below elevations of about 200 m (650 ft) a.s.l. |
| tMp | | | little or no apparent relief; units with inclined surfaces are marked with the appropriate slope designator (see "Explanation Map Symbols") | moderately to poorly drained | | | |
| tM(m,h,r) | as above; hummocks and ridges are commonly stony to very stony | mainly disintegration moraine | broadly rolling to hummocky or ridged; relief of units is generally greatest west of Sanagak Lake | predominantly well-drained; moderately to poorly drained on broadly rolling terrain northwest of Spence Bay | | | as above; limited quantities of coarse aggregate in hummocks and ridges; common west of Sanagak, Krusenstern, and Netsilik Lakes and south of Lady Melville Lake |
| (s,g,b)Iv | sand, gravel, boulders | ice-contact outwash | commonly reflects the gently to strongly irregular relief of underlying granitic bedrock | well-drained | 0.6 in sand, increasing to 1.3 in gravel | abundant ice wedges, as shown by the presence of numerous ice-wedges troughs and high centred polygons; no subsurface information available | limited source of fine to coarse aggregate; occurs at widely scattered localities primarily within areas of "granitic" bedrock |
| (s,g)I(h,m,r,k) | sand, gravel | | gently to strongly irregular; occur as isolated features or clusters of features, often along a linear trend | | | | major source of aggregate; large deposits occur on the east side of the Wrottesley River valley and in the region between Josephine River and Sanagak Lake |
| (s,g)Ip(k) | | | flat to gently irregular; surfaces commonly marked by numerous closed depressions with local relief of 2 to 10 m; these deposits are often elongate in outline due to deposition within structurally controlled bedrock depressions | | | | occur primarily in the region between Murchison Lake and the Arrowsmith River, where they form a good source of mainly coarse aggregate; often associated with proglacial outwash and southwest-northeast trending eskers |
| (s,g)It | | terraced ice-contact outwash | flat to gently irregular; surfaces are separated from the adjacent, commonly lower, terrain by a break in slope; the maximum height of this slope is indicated on the map by a relief designator | | | | limited source of fine and coarse aggregate, occur at widely scattered localities primarily within areas of granitic bedrock |
| (g,b,)Fv | gravel, boulders | proglacial outwash | relief is variable, reflecting topography of underlying material | | 0.8 to 1.3 in gravel | | mostly poor source of aggregate; limited amounts of aggregate may be recovered locally |
| (s,g)Fp(k) | sand, gravel | | flat to gently irregular; surfaces commonly marked by pits and/or abandoned channels 1 to 3 m in depth | | 0.6 - 1.3 | | large deposits occur in the region between Murchison Lake and the Arrowsmith River; a good local source of fine to coarse aggregate; often associated with ice-contact outwash |
| (s,g,)Ft | | terraced proglacial outwash | flat to gently irregular surfaces along the sides of valleys and often adjacent to major rivers; surfaces are separated from the adjacent terrain by a break in slope,; shallow abandoned channels mark some surfaces | | | | common but widely scattered, primarily in areas of granitic bedrock; generally less than 10 m thick; deposits up to 30 m in thickness occur in the valleys of the Lord Lindsay River and Agnew River; good local source of aggregate |
| (s,g)Dp | sand, gravel, minor amounts of silt | delta | nearly flat surfaces marked in places by shallow abandoned channels 1 to 3 m deep; low-centered polygons with 1 to 2 m relief are abundant on the finer grained deposits | well-drained except in areas with numerous low-centred polygons, such areas are poorly drained and often contain numerous small ponds of standing water | | as above; areas of sand and silt commonly contain numerous ice wedges in the form of low-centred polygons | poor drainage and high ice-content limits the potential use of sDp as a source of aggregate |
| gDt | gravel | terraced delta | one or more relatively level or gently inclined surfaces, commonly bounded along the upper edge by a steep ascending slope and along the lower edge by a steep descending slope; relief variable; shallow abandoned channels 1 to 2 m deep mark the surface of some terraces | well-drained | 0.8 - 1.3 | ice wedges occur infrequently, as suggested by the sporadic occurrence of ice-wedge troughs and high-centred polygons; no subsurface information available | an uncommon landform; locally a good source of coarse aggregate |
| (s,f)Mv | clay, silt, sand | marine offshore | relief is variable, reflecting topography of underlying material; earth and vegetation hummocks with 20 to 30 cm relief are abundant on the silt and clay | commonly moderately drained | 0.2 - 0.6 in clay and silt: 0.6 - 0.8 in sand | massive ground ice often forms a layer 20 to 40 cm thick just below or at the permafrost table in silty deposits; below this layer the ice commonly is in the form of a 3-dimensional reticulate network; moisture contents of 25 to 50% are common in silt, possibly 20% or more of the total water content is unfrozen, visual estimates of ice content indicate extreme variation (0 to 60%) with depth; flat-lying sandy deposits contain numerous ice wedges, as shown by the repeated occurrence of low-centred and high-centred ice-wedge polygons | common below 200 m (650 ft) a.s.l. in areas of granitic bedrock; ground travel during the summer months is extremely difficult over areas with numerous earth hummocks |
| (f,s)Mp | | | nearly flat or gently irregular surfaces; earth and vegetation hummocks abundant on clay and silt; sand surfaces are commonly about 1 m higher than adjacent silt and clay surfaces | clay and silt are poorly drained, standing water accumulates in interhummock areas; sand surfaces are well-drained except in areas with numerous low-centred polygons, which often contain small ponds of standing water | | | covers extensive tracts of land in the lower Murchison River and Kellett River basins; alluvial erosion has deeply and intricately dissected the marine silts in the Pelly Bay region; low-angle skin flows are common along the banks of the Murchison River, its tributaries, and Castor and Pollux River |
| gMv | gravel; high in angular carbonate rock detritus where deposit overlies Paleozoic bedrock; high in igneous rock detritus where deposit overlies granitic bedrock | marine nearshore, including beaches, spits, and bars | relief is variable primarily reflecting topography of underlying material; in areas of Paleozoic bedrock, deposit is commonly in the form of a series of broad, low ridges or mounds less than 1 m in height and conforming in outline to the contours of the underlying bedrock surface; scattered outcrops of frost-shattered bedrock | predominantly well drained; poorly to moderately drained in low areas between ridges and mounds where finer-grained sediments have accumulated | 0.8 to 1.3 | ice-wedges infrequent, as suggested by the sporadic occurrence of ice-wedge troughs; no subsurface information available | a good source of coarse aggregate occurring extensively in areas of Paleozoic bedrock; numerous gravel beach ridges 2 to 3 metres high and continuous for tens of kilometers are associated with these deposits; sorted circles common and well-developed |
| gMr | | | single ridge or series of ridges, and intervening low areas; local relief less than 5 m | | | | excellent source of coarse aggregate primarily in areas of Paleozoic bedrock |
| gMp | | | commonly gently dipping surfaces marked by a series of narrow, low-relief (0.5 m or less) terrace-like steps | well-drained | | | frequently situated within bedrock depressions and valleys at or near the present coastline; good source of coarse aggregate |
| (s,g)Av | sand, gravel | alluvial floodplain | reflects topography of underlying material, normally flat | inactive floodplains and terraces are commonly poorly drained due to the abundance of low-centred ice-wedge polygons, which often contain small ponds of standing water | 0.6 to 1.3 | ice wedges occur frequently on fine-grained inactive floodplains and terraces, as suggested by the presence of numerous ice-wedge troughs and low-centred polygons; no subsurface information available | limited amounts of aggregate may be recovered locally |
| (s,g)Ap | | | nearly flat surfaces marked in places by shallow channels usually less than 1 m deep; low-centred polygons with 1 to 2 m relief are abundant on inactive, finer grained deposits | | | | potential for use of sAp as a source of aggregate is considered low due to poor drainage and high ground ice content |
| (s,g)Af | | alluvial fan | gently sloping surfaces forming a segment of a very low cone, commonly at places where there is a noticeable change in stream gradient; abandoned channels are present on some fan surfaces | | | | inactive fans occur only rarely and form a limited, local source of fine to coarse aggregate |
| (s,g)At | | alluvial terrace | as for gDt | | | | good source of fine to coarse aggregate |
| sEv | sand | eolian | numerous ridges, hummocks and gently undulating surfaces with less than 1.5 m relief | well-drained | 0.6 to 0.8 | no subsurface information available | limited local source of fine aggregate situated at the north end of Tukingayuk Lake (70°03'N, 93°12'W; NTS 57F); about 80% of area stabilized by vegetation; overlies thick deposits of gravelly ice-contact outwash |
| $^{g}R$ | mostly Precambrian granitic rocks | preglacial and glacial erosion | gently to strongly irregular, relief variable and indicated on map by appropriate symbol (see "Explanation Map Symbols"); slope angles are normally quite variable but generally steeper as relief increases | well-drained | no subsurface information available | no subsurface information available | depressions often contain scattered thin drift deposits; large areas of frost-shattered granitic bedrock (felsenmeer) are shown on the map by incorportion of the letter "B" at the end of the bedrock symbol (e.g., $^{g}R_{3}B$), small areas of felsenmeer have not been mapped, ground access in these areas would be difficult; colluvial (talus) deposits consisting primarily of frost-shattered bedrock have accumulated at the base of most scarps; many bedrock landforms reflect structural trends which are somewhat modified by preglacial and glacial erosion. |
| $^{c}R$ | mostly Paleozoic carbonate rocks | | broadly rolling to nearly flat | | | | |
| $^{c}Rp$ | | as above; bedding surface or surfaces | nearly flat; often inclined slightly | | | | |

## EXPLANATION OF MAP SYMBOLS

### DOMINANT TEXTURE

b - boulders
g - gravel
s - sand
f - silt and fine sand
f - clay to fine sand
c - clay
t - till

### MORPHOLOGY

p - plain
m - rolling
h - hummocky
r - ridged
t - terraced
k - kettled
f - fan

### MORPHOLOGIC MODIFIER

D - dissected
W - washed
B - boulder-covered

### BEDROCK TYPE

(Superscript)

g - granitic
c - carbonate

### RELIEF CLASS

(Subscript)

1 - less than 5 metres
2 - 5 to 20 metres
3 - 21 to 50 metres
4 - greater than 50 metres

### ORIGIN

M - morainal
I - Ice-contact outwash
F - proglacial outwash
M - marine
D - deltaic
A - alluvial (inactive)
A - alluvial (active)
E - eolian
R - bedrock

### SLOPE CLASS

1 - less than 5 degrees
2 - 6 to 15 degrees
3 - 16 to 35 degrees
4 - greater than 35 degrees

Drumlin, drumlinoid (ice direction indicated, not indicated)
Crag- and tail (ice movement in direction of arrow)
Fluting (ice direction indicated, not indicated)
Moraine ridge
Esker (direction of flow assumed, uncertain)
Pingo
Meltwater channel (large, small)
Abandoned beach ridge
Escarpment
Slump
Retrogressive thaw/flow slide
Ice-wedge polygons (areas known to contain ice wedges)

### COMPOSITE UNITS

/ first of units is more than 80% of total unit area
- first of units covers 60 - 80% of total unit area
= units are of roughly equal proportions

Note: units which comprise less than 5% of the total area of another unit are not mapped

### STRATIGRAPHY

Veneer units (less than 1.5 m thick) are indicated by the lower case letter "v" after the generic symbol. A horizontal line separates the veneer unit symbols from the symbols representing the underlying unit

EXAMPLE:

Origin, Morphology or Stratigraphy; Texture; Lithology; Relief class; Slope class; Morphologic modifier

$$\frac{gMv}{^{c}R_{1}} \Big/ {}^{c}R_{1}W$$

indicates a complex unit in which more than 80% of the surface area consists of a gravel marine veneer overlying carbonate rock with less than 5 metres relief and slopes less than 5 degrees. Up to 20% of the area consists of carbonate rock outcrop with scattered deposits of marine origin.

## EXPLANATION OF TERMS

Texture:

| | |
|---|---|
| boulders | >256 mm |
| gravel | 1 - 256 mm (>25% of deposit) |
| sand | 0.5 - 4 mm |
| silt and fine sand | .002 - .25 mm |
| clay to fine sand | <.25 mm |
| clay | <.002 mm |

Till Predominantly unsorted and unstratified drift consisting of a heterogeneous mixture of clay, silt, sand, gravel and boulders.

Bedrock Type:

GRANITIC A term broadly applied to identify coarse-grained igneous or metamorphic rock containing quartz as an essential component, along with feldspar and mafic minerals; mainly refers to granite and granite gneiss; incudes minor outcrops of carbonate and clastic rocks.

CARBONATE A term intended to identify rocks consisting primrily of carbonate minerals, such as limestone or dolomite. Includes minor occurrences of conglomerate, sandstone, siltstone and shale.

Origin:

MORAINAL Relating to accumulations of unsorted, unstratified glacial drift (till) deposited chiefly by the direct action of glacier ice in a variety of landforms that are primarily independent of control by the surface on which the drift lies.

ICE-CONTACT OUTWASH Landforms consisting of stratified deposits formed in contact with melting glacier ice, such as an esker or kame.

PROGLACIAL OUTWASH Pertaining to the landforms and stratified deposits produced by meltwater flowing from wasting glacier ice.

MARINE Pertaining to materials deposited in marine environments. These may form a blanket of offshore silts and clays, or may occur as a series of marine nearshore features, largely composed of gravel and sand, such as spits, bars and beaches.

DELTAIC Refers to materials deposited in broad, nearly flat, alluvial tracts of land resulting from the accumulation of sediment supplied by a river in such quantities that it is not removed by tides, waves and currents of standing water bodies. Largely refers to fossil forms.

ALLUVIAL Sorted sediments of wide particle size range, transported and deposited by running water in postglacial time. Units are subjectively mapped as active in inactive. Active floodplains are those immediately adjacent to and below the assumed or apparent maximum annual flood level of the river or stream which deposited them. They commonly support only scant vegetation due to yearly flooding and deposition of fresh sediment. The surfaces of inactive floodplains are generally at an elevation of 1 to 3 m above the assumed or apparent maximum annual flood level. Vegetation cover is commonly 100%.

EOLIAN Pertains to deposits such as loess or dune sand whose constituents were transported, and deposited, by wind. Sand dunes are the only type of eolian landform situated within the map area.

BEDROCK A general term for the rock, usually solid, that underlies unconsolidated surficial material, or is exposed. Types of bedrock encountered in the study area are grouped into either "granitic" or "carbonate" classes. (Refer to GSC Papers 61-18, 63-19, and Bulletin 151).

Morphology:

PLAIN A flat and commonly level area, large or small, with little or no apparent relief.

ROLLING A gently to strongly defined succession of low hills or broad undulations that impart a wave effect to the surface.

HUMMOCKY A gently to strongly defined succession of closely spaced mounds, knolls, and hillocks.

RIDGED An area of generally uniform surface possessing well-defined but scattered ridges, such as beach ridges or crevasse fillings.

TERRACED Refers to the presence of one or more, relatively level or gently inclined surfaces, bounded along one edge by a steep ascending slope and along the other by a steep descending slope. Terraces commonly occur along the margin, and above the level of an ocean, lake or river, marking former water levels.

KETTLED An area characterized by numerous steep-sided, bowl- or basin-shaped depressions after containing a small lake or pond. A rare landform within the map-area, occurring in only a few ice-contact, or near-glacial, outwash deposits.

FAN A gently sloping mass of alluvial material forming a segment of a very low cone, commonly at a place where there is a noticeable change in gradient. Only alluvial fans have been mapped. Colluvial fans, deposited chiefly by mass wasting have not been mapped. They are a common landform situated at the base of most scarps in bedrock-dominated terrain.

Morphologic modifier:

DISSECTED A term referring to a network of gullies, ravines, valleys and remnant flat-topped interstream ridges, formed by stream erosion acting upon a relatively even topographic surface.

WASHED A general term referring to landforms which have been modified in some manner by wave action, primarily marine. The process has resulted in the sorting of surface materials, or in the formation of scattered minor beaches. Washed landforms are common below an elevation of 150 m (500 ft.) a.s.l. north of Spence Bay, and below 200 m (650 ft.) a.s.l south of Spence Bay. Within the map area, the highest known occurrence of marine deposits is at an elevation of about 225 m (750 ft.) a.s.l. on an unnamed island in Pelly Bay (68°57'N, 89°58'W).

BOULDER-COVERED Refers to terrain which is covered by boulders of random size and spacing. Primarily identifies areas of felsenmeer. These areas will normally present severe problems of ground vehicle access.

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