2M/06 MAP AREA

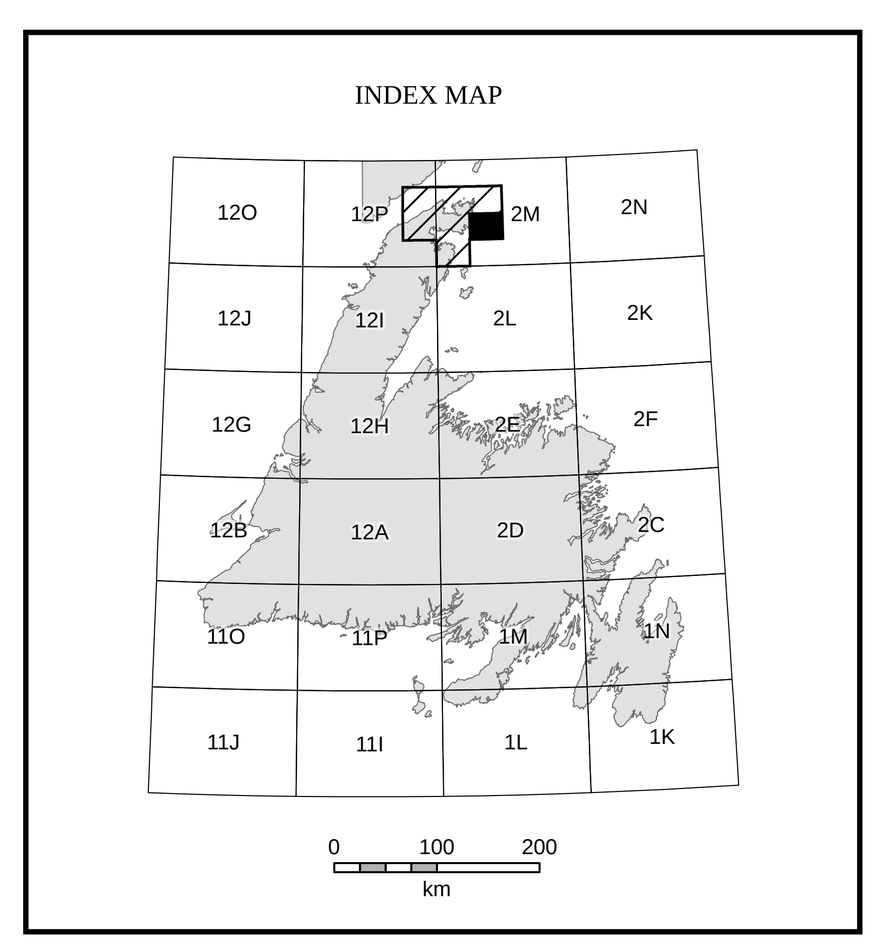
Methods and Map Projection
Field mapping was undertaken and completed during the 2018 and 2019 field seasons; the survey used trucks, all-terrain vehicles (ATVs), boat and foot traverses. Field information was collected using a Trimble unit (with GPS). Field observation sites are marked by an "x" on the map. This surficial map was created using ortho imagery (taken from Department of Forestry, Newfoundland and Labrador) and hill-shade is derived from Newfoundland and Labrador 5m Digital Elevation Model (Department of Fisheries, Forestry and Agriculture GeoHub) in ArcGIS pro™.

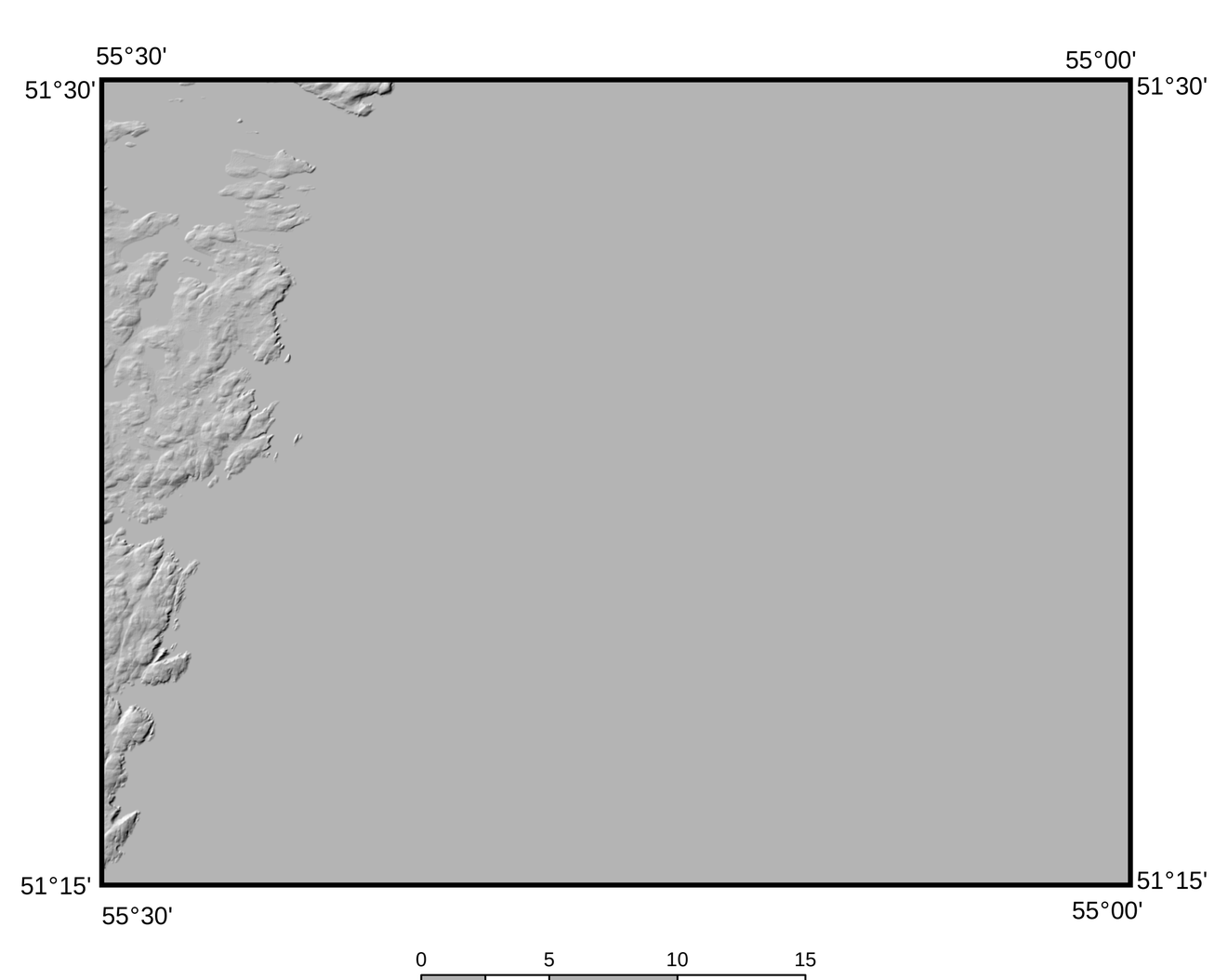
Location and Physiography
This map sheet is located on the northeastern tip of the GNP between the latitudes 51°15′N and 51°30′N and longitudes 55°00′W and 55°30′W. The study area is easily accessible from regional Highway 430 that connects to the Trans-Canada Highway and to routes 432, 433, 435, 436 and 437. The highest elevation in the map area is approximately 100 m above sea level (asl) and the lowest elevation is sea level. Relief is low, with areas of higher elevation dominated by exposed bedrock (and having variable moss cover) and those of lower elevation dominated by organics (bog). The climate is near Arctic (Hare, 1952) and the region is classified as "forest-tundra", a transitional zone characterized by moss, shrub, stunted spruce and tamarack (Grant, 1992). Moss, stunted pine, and fir trees in the map area dominate vegetation.

Glacial History
The study areas were affected by the 25–10 ka BP, Late Wisconsinan Glaciation. During glacial advance, glaciers originating in the Long Range Mountains flowed northeast into the area. This initial flow is well documented by abundant large-scale glacial features such as flutings, stoss and lee bedforms. During the glacial maximum between 19.5 and 15 ka BP, the Laurentide Ice Sheet (LIS) crossed over the Strait of Belle Isle and flowed over the northern tip of the GNP. The coalescence of glaciers from the Long Range Mountains and the LIS resulted in a flow that was initially east-northeast and then finally southeastward. Deglaciation may have commenced between 13–10 ka BP (Grant, 1986). During deglaciation, ice sheets disintegrated primarily via ablation and ice-stagnation. As the ice sheets shrunk, they became topographically controlled and retreated back towards the primary ice centres (the Long Range Mountains). Glacial melting resulted in the discharge of meltwater, that carved meltwater channels into weakened bedrock as well as the deposition of glaciofluvial sediment. Deglaciation was mainly complete by 10 ka BP (Grant, 1992). Deglaciation resulted in the isostatic rebound of the study area; ^{14}C dates of seashells suggest that atleast part of the study area was still submerged at 8.5 ka BP(Liverman, 1994).

Surficial Sediments and Landform Features
Bare (R) and concealed bedrock (Rc; concealed by vegetation such as trees, moss and shrubs) are the most prevalent surficial units in the study area. A few, bi-directional, flutings are mapped in the northern part of the map area. These are oriented northeast-southwest, southeast-northwest, east-west and north-south. Of these, the northeast–southwest flow is correlated to glacial advance and the southeast-northwest-ward flow is correlated with glacial maximum. The east–west and north–south flows likely represent localized movement that was topographically controlled. Till is the oldest sediment unit documented in the study area. It is mapped as a veneer (Tv; <1 m) in bedrock lows. Along the coast, the bedrock is overlain by a variable cover of postglacial, littoral, marine deposits (M). These are characterized by crudely- to well-stratified, medium to coarse sand, and pebbly to bouldery gravel that are primarily mapped as a veneer (Mv). The youngest deposits in the region are organic deposits (O), consisting of muskeg, bog and fen. These are prevalent in the coastal lowlands and bedrock depressions inland and can be observed overlying bedrock.

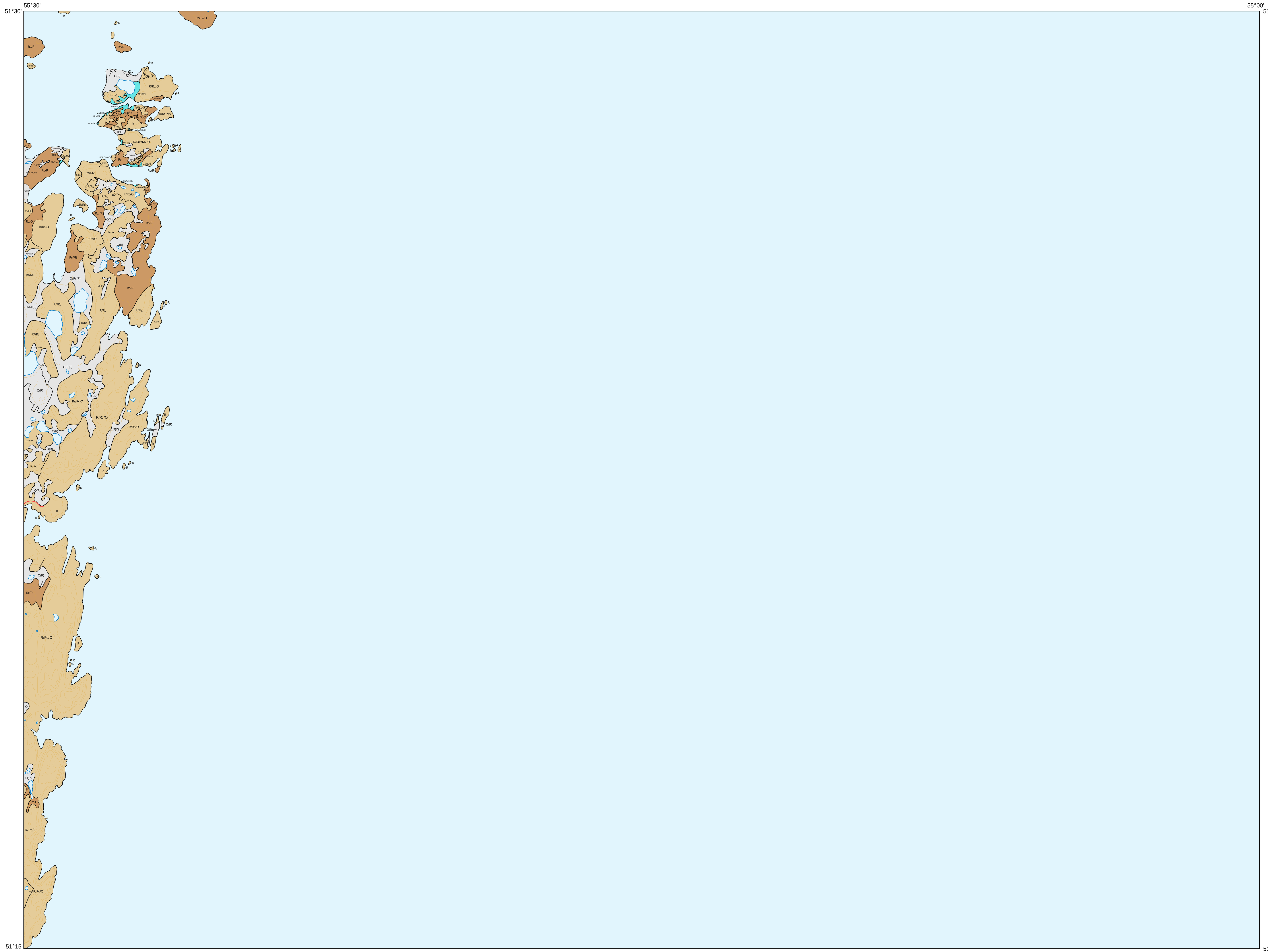
INDEX MAP





Digital Hillshade Surface Model (DSM) of the Quirpon map area from Newfoundland and Labrador 5m Digital Elevation Model (Department of Fisheries, Forestry and Agriculture GeoHub) in ArcGIS pro™. The image provides terrain information not readily illustrated on the surficial map. Terrain variability is evident, with areas of bedrock highlighted as rougher textured (consistent with surficial map), and areas of thicker till shown as smooth textured.

Newfoundland & Labrador



MAP 2025-04

SURFICIAL GEOLOGY OF NTS 2M/06 MAP AREA

OPEN FILE 002M/06/0128

Scale 1:50 000

0 1 2 3 4 5
km

Elevations are in metres above sea level. Contour interval is 10 m.

LEGEND

GENETIC CLASSIFICATION

Category	Depositional Environment	Origin and Material Characteristics
O	Bog	Poorly drained accumulations of peat, peat moss and other organic matter; developed in areas of poor drainage
F	Fluvial	Alluvium consisting of silt and clay to bouldery gravel, forms terraces and plains associated with modern stream channels, their floodplains and deltas; usually less than 1 m thick; deposited by fluvial action at, or below, maximum flood levels
C	Colluvial	Coarse-grained bedrock-derived materials; may include sand, silt or clay; accumulates on the lower parts, or at the base of steep rock faces; transported by gravity
E	Aeolian	Medium- to fine-grained sand and silt, well sorted, poorly compacted; commonly forms dunes up to 10 m high; transported and deposited by wind
G	Glaciofluvial	Fine-grained sand to coarse-grained cobbly gravel; forms plains, ridges (eskers), hummocks, terraces and deltas; generally greater than 1 m thick; deposited as outwash in an ice-contact or proglacial position
L	Lacustrine	Silt, clay, gravel and sand; forms as plains and blankets; silt and clay is deposited in freshwater lakes from suspension, sand and silt by lake-floor currents, gravel and sand by shoreline wave action
M	Marine	Clay, silt, gravel and diamicton; sand is present in some places, generally moderately to well sorted and commonly stratified, but may be massive; forms beach ridges, deltas, terraces and bars deposited in a marine environment; gravel and sand are formed by shoreline wave action; may include shells, clay and silt deposited from suspension and turbidity currents; gravel is generally a wave washed lag
Tv Tb, Te, Tp, T Td, Tl, Tr Th, Tk	Glacial	Includes all types of till; composed of diamicton; transported and subsequently deposited by/or from glacier ice with no significant sorting by water. These include relatively thin (Tv) or thicker (Tb, Te, Tp, T) till with little or no surface expression; features produced by actively flowing ice (Td, Tl, Tr) or sediment deposited through ice disintegration (Th, Tk)
R Rc	Rock	Bedrock, either exposed (R) or concealed by vegetation (Rc)

MORPHOLOGY

Modifier	Morphology	Description
a	apron	A relatively gentle slope at the foot of a steeper slope, commonly used to describe colluvium at the base of a rock escarpment; consists of materials derived from the usually steeper upper slope
b	blanket	Any deposit greater than 1.5 m thick; minor irregularities of the underlying unit are masked but the major topographic form is still evident
c	concealed by vegetation	Vegetation mat developed on either colluvial surfaces or a thin layer of angular frost-shattered and frost-heaved rock fragments overlying bedrock; includes areas of shallow (less than 1 m), discontinuous overburden
d	drumlinoid	Elongate ridge(s) between 1.5 and 20 m high, 20 and 300 m wide, and 200 to 5000 m long; ridges have a rounded end pointing in the up-ice direction and gently curving sides that taper in the down-ice direction; exhibit a convex longitudinal profile, commonly with a steeper slope in the up-ice direction; consist of subglacially formed deposits shaped in a streamlined form parallel to the direction of glacial flow; commonly consist of till, although some may contain stratified drift; may have a rock core
e	eroded and dissected	A series of closely spaced gullies or deeply incised channels; can have a dendritic pattern or may be a single straight or arcuate channel; gullies and channels may contain underfit streams
f	fan	A gently sloping accumulation of debris deposited by a stream issuing from a valley onto a lowland; has its apex at the mouth of the valley from which the stream issues; the fan shape results from the deposition of material as the stream swings back and forth across the lowland; fluvial fans are usually derived from eroded glacial and glaciofluvial deposits; glaciofluvial fans (deltas) are deposited in standing water rather than in a terrestrial environment; colluvial fans are derived from bedrock and are usually steeper (i.e., cone shaped)
h	hummock	An apparently random assemblage of knobs, mounds, ridges and depressions without any pronounced parallelism, significant form or orientation; formed by glacial melting during ice stagnation and disintegration; includes subglacial, englacial, supraglacial and stratified materials
k	kettle	A basin or bowl-shaped closed depression or hollow in glacial drift; results from the melting of a buried or partly buried detached block or lens of glacier ice; commonly occurs in association with hummocks
l	lineated	Elongate spindle-shaped ridge(s) between 6 and 60 m high, 75 and 300 m wide and up to 4000 m long; ridges are commonly straight sided, taper at one or both ends, and have a flat longitudinal profile; consists of subglacially formed deposits shaped in a streamlined form parallel to the direction of ice flow; commonly consist of till, although some may contain stratified drift; may have a rock core; includes slope lineated bogs (Ol)
p	plain	A comparatively flat, level, or slightly undulating tract of land; materials are either till, glaciofluvial, alluvial, marine, lacustrine or organic sediments; bedrock features are commonly masked by the overlying sediments
r	ridge	Narrow, elongated and commonly steep-sided feature that rises above the surrounding terrain; materials are either rock, till, glaciofluvial, fluvial, marine, lacustrine, aeolian, or organic sediments; includes string bogs (Or)
t	terrace	Long, narrow, level or gently inclined step-like surface, bounded along one edge by a steeper descending slope or scarp and along the other by a steeper ascending slope or scarp; materials are either till, glaciofluvial, fluvial or lacustrine sediments; generally formed by fluvial and glaciofluvial erosion or marine wave action
v	veneer	Any deposit less than 1.5 m thick; morphology of the underlying unit is evident
w	weathered	A thin layer, generally less than 1 m thick, of frost-heaved and frost-shattered bedrock fragments
x	complex	Commonly used to indicate numerous esker ridges that are closely spaced; can be used where any genetic category exhibits numerous surface expressions in a small area, and in which no single element can be defined at the map scale

Each outlined area is assigned a classification consisting of up to two genetic categories and modifiers that designate the types of deposits within each area. Each category within a classification is listed in order of dominance and is separated from the other categories by a slash (e.g., Tv/R). Generally, the areas are divided up so that up to three landforms or deposit types are identified within a given area. The classification system is also used to denote the approximate percentage of landforms occurring within an outlined area, but those that form less than 5 percent of the area are not included in the classification. Three variations of the landform system are as follows:

1. Where two landforms are included in a single map unit, a double slash (//) or single slash (/) is used to separate them, and their relative percentages are (85 - 95) // (5 - 15) for double slash, or (60 - 85) / (15 - 40) for a single slash.
2. A hyphen between two landform types indicates that they are approximately equal in area. For example, Tv-Rc indicates that till veneer and rock concealed by vegetation or a thin regolith are equal in area.
3. A composite symbol is used to show combinations of the above cases. For example, $\frac{F/G}{T}$ indicates that about 60 - 85 percent of the area is covered by fluvial sediment, 15 - 40 percent by glaciofluvial sediments, and is underlain by till.

SYMBOLS

- Geological boundary
- Terrace scarp
- Cirque
- Esker (flow direction known or assumed, unknown)
- Meltwater channel (small, direction known; small, direction unknown; large)
- Crestline of major moraine ridge
- Trend of ribbed moraine or minor moraine ridges
- Beach ridges
- Sand dunes
- Avalanche track
- Small landslide (scar, slope movement)
- Large landslide (scar, slope movement)
- Drumlin (direction known, unknown)
- Crag-and-tail hill
- Till ramp
- Fluting
- Rôche moutonnée
- Striation (direction known, unkown) (numbers indicate relative age)
- Kettle hole (small, large)
- Sinkhole (small, large)
- Observation site
- Delta

Note: All symbols and classifications may not occur on this map.

Surficial geology by S. Hashmi

GIS/Digital cartography by R. Hazarika

The digital topographic database map NTS 2M/06 used here is available from the Surveyor General Branch, Natural Resources, Canada.

Copies of this map may be obtained from the Department of Industry, Energy and Technology, Government of Newfoundland and Labrador, P.O. Box 8700, St. John's, NL, Canada A1B 4J6

This map is subject to revision and modification. Symbols for site location may not be plotted directly at exposure site due to overlap of symbols.

Magnetic declination at the centre of the map is 18.25° West calculated using World magnetic Model (WMM2020) https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml (October, 2023).

North American Datum (NAD) 1927, Zone 21.

Open File 002M/06/1028

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2025: Surficial geology of the (NTS 2M/06) map area. Geological Survey, Department of Industry, Energy, and Technology, Government of Newfoundland and Labrador, Map 2025-04, Open File 002M/06/0128.

References

Grant, D.R.
1986: Surficial geology, St. Anthony-Blanc Sablon, Newfoundland-Québec. Geological Survey of Canada, Map 1610A. Scale 1:125 000.

1992: Quaternary geology of St. Anthony-Blanc-Sablon area, Newfoundland and Québec. Geological Survey of Canada, Memoir 427, 60 pages.

Hare,F.K.
1952. The climate of the island of Newfoundland, a geographical analysis; Geographical Bulletin, Volume. 2, pages 36-88.

Hashmi, S.
2019: Surficial geological survey for assessing mineral resource potential, Great Northern Peninsula: preliminary results. In: Current Research, Newfoundland and Labrador Department of Natural Resources, Geological Survey, Report 19-1, pages 211-225.

Liverman, D.G.E.
1994. Relative sea-level history and isostatic rebound in Newfoundland, Canada. Boreas, Volume 23, pages 217-230.

Note
The surficial geology map (NTS 2M/06) describes the distribution of its surficial sediments and landforms, as well as a summary of its glacial history. Map 2025-04 is one of seven in the series documenting the surficial geology of the Great Northern Peninsula (GNP, Hashmi, 2019). The other map sheets in this series are Raleigh (NTS 2M/12), St. Anthony (NTS 2M/05) and Quirpon (2M/11), St. Julien's area (NTS 2M/04), Big Brook (NTS 12P/09) and Eddie's Cove (NTS 12P/08).