

GRANULAR RESOURCE INVENTORY -

- MACKENZIE -

MALLOCH HILL NTS 97F

(1:125,000)

Produced for Indian and Northern
Affairs

by Dept. of Energy, Mines and
Resources



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GRANULAR RESOURCE INVENTORY - MACKENZIE

MALLOCH HILL NTS 97F

(1:125,000)

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for - Department of Indian and Northern
Affairs



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Malloch Hill:	
physiographic regions	

Maps 1) Unconsolidated granular materials	
and granular resource areas (1 sheet)	

SUMMARY

The Malloch Hill map area, 97F, has abundant sources of unconsolidated coarse granular material. Most of these deposits are glaciofluvial in origin but there are a few marine and fluvial deposits which are potential granular sources. Ground ice content and accessibility are factors affecting the availability. The shale bedrock has low ice content and is easily rippable; therefore it could be used as a construction material.

INTRODUCTION

This report attempts to assess the quantity of granular material available for construction. Both unconsolidated and bedrock sources are considered. Glaciofluvial and fluvial materials are considered first rate sources of sand and gravel. Lacustrine and marine deposits are of variable quality whereas eolian material is of limited use because of its fine texture. Generally, moraines have only been considered where they are known to be hummocky and to contain some coarse granular material. Terminal moraines are usually considered to be sources of granular material whereas ground moraines are not.

The shale bedrock is non-resistant, ice-free and can easily be ripped. It could be used for road fill and other construction uses.

The information which appears in this report and on the accompanying map has been compiled largely from published and unpublished manuscripts and personal communication with officers of the Geological Survey of Canada. Supplementary data, mainly on depths, thicknesses and, in some cases, on texture of deposits have been obtained from confidential reports of other government departments and industry. (See appendix for details on information sources.)

The basic document used in this compilation is a surficial geology map at a scale of 1:125,000 (Rampton, 1972a). It is indexed as GSC Open File Number 96 and may be viewed at Geological Survey of Canada offices in Ottawa, Calgary and Vancouver; ozalid copies may be obtained at nominal cost. All areal data are derived from this source; all major and most minor unconsolidated deposits of

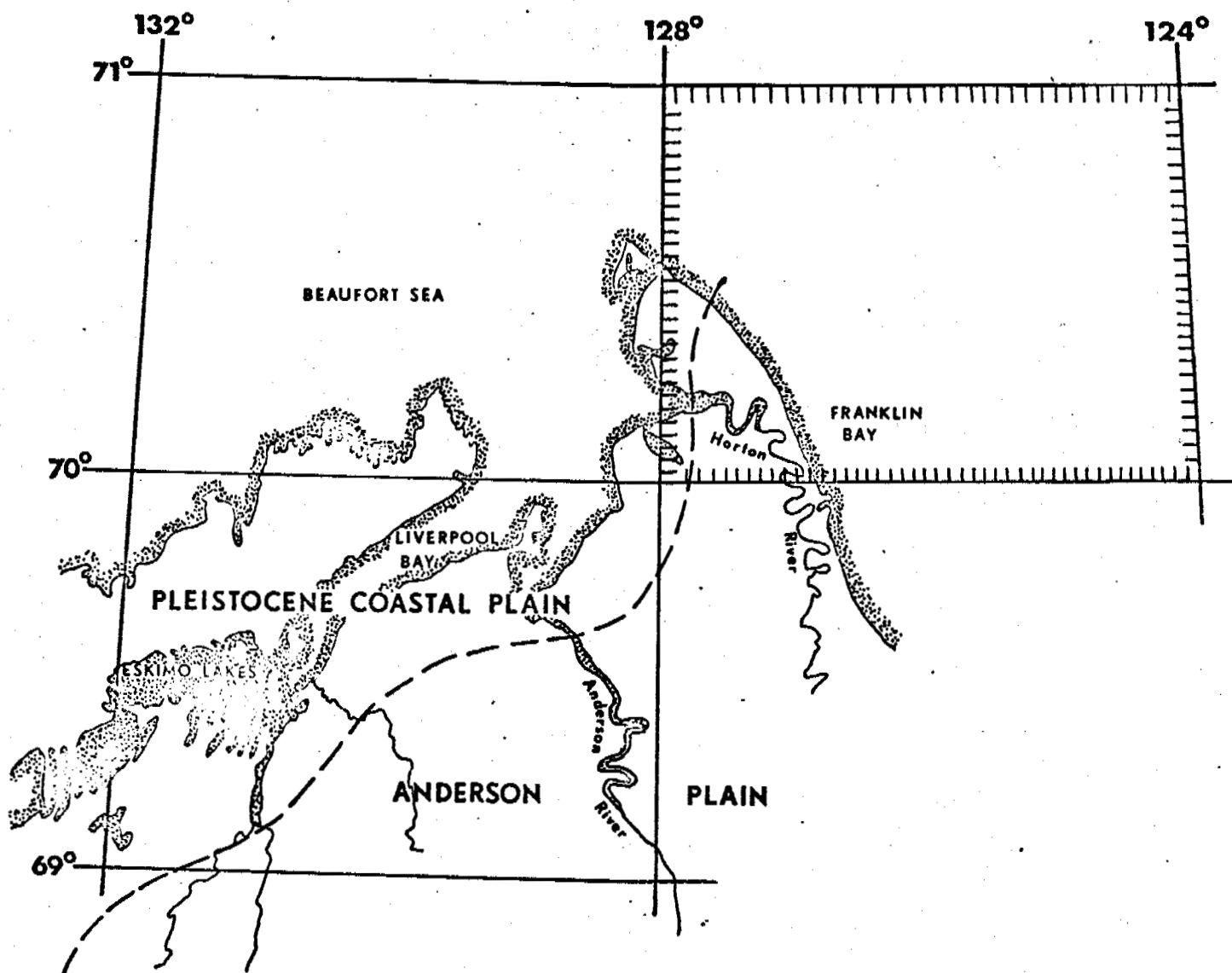
granular material are represented at this scale.

A derived map for granular material has been produced from the basic surficial geology map in close association with the field geologist. His field observations provide additional data on thickness, texture, ice content, drainage, and the variability of the map units.

To supplement thickness and textural data, additional information was gathered from seismic shot hole records and samples, and from other drill hole logs.

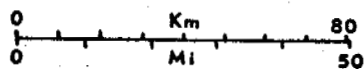
Areal extent of deposits were estimated by planimetric means. Average thickness for each deposit was estimated from the data mentioned above and adjusted according to several other variables such as drainage, height above water table, and amount of ice. From this, a volume of granular material was estimated. All estimated volumes of material appear in a tabular summary at the end of the paper.

For purposes of description, areas of granular material are outlined on the surficial geology map and are numbered to correspond to a tabular summary of materials. Areas which appear to have little material with respect to anticipated demand or areas which require more detailed work are discussed in the report.



MALLOCH HILL

PHYSIOGRAPHIC REGIONS



after RAMPTON 1971

GENERAL GEOLOGY AND PHYSIOGRAPHY

Two physiographic regions divide the Malloch Hill map area roughly north-south: the Pleistocene Coastal Plain to the west and the Anderson Plain to the east. Bedrock is close to the surface but not exposed in much of the area and is covered by a colluvium (weathered and incoherent bedrock) veneer. The surficial deposits are morainal, glaciofluvial, fluvial, lacustrine and marine in origin. It is believed that just the eastern coastline was covered by continental glaciers.

The bedrock of the Malloch Hill area consists entirely of shale. Covering this shale are a number of glacial, fluvial and marine unconsolidated deposits. South of Fitten Point, on the east coast, an end moraine has formed small isolated morainal till deposits. West of these deposits, glaciofluvial outwash plains consist of coarse granular material which was later cut by a glacial outwash channel forming coarse granular glaciofluvial terrace deposits. Post glacial activity has formed finer grained fluvial terrace deposits. To the north, marine silts and clays were formed by coastal wave action. Later thermokarst activity has produced lakes in which lacustrine silts and clays were deposited. Wind action has formed a number of fine sandy eolian deposits. Recent coastal wave action has produced a small number of sand and gravel spits.

Unconsolidated Deposits

Glaciofluvial Deposits

Glaciofluvial deposits occur in two forms in this map area: glaciofluvial outwash plains and glaciofluvial terrace deposits. The outwash plains are found along the east coast and to the west of the leading edge of the glacier. They contain coarse

granular material. The terrace deposits roughly following the Horton River vary in composition from coarse gravel in the east to sand in the west.

These deposits vary in thickness from 20 to 40 feet. Approximately 80% of the material is available for construction purposes.

Fluvial deposits, sand sFt

The fluvial deposits are reworked glaciofluvial plain and terrace deposits and are found along the Horton River. Compared with the glaciofluvial material, the fluvial deposits are a poorer source of construction material due to high ground ice content in the sand, and due to the low relief which is covered by muskeg. The deposits average 20' in thickness but only 10% of this is considered available and usable.

Marine deposits, gravel. g^A_r(7)

Spits are constantly being formed and modified by coastal wave action in Harrowby and Franklin Bays. These spits are derived from coarse glaciofluvial material and therefore consist of coarse granular material. Seventy per cent of the deposits are available as a granular resource but accessibility to the deposits is a problem.

Eolian deposits, sand sE

Eolian deposits are sand deposits which have been reworked by wind action. These small deposits, generally spits, occur in the northern portion of the map area as a thin veneer over marine and lacustrine deposits.

BEDROCK GEOLOGY

Generally, the flat lying Upper Cretaceous shale is overlain by a colluvium veneer which is mainly clay. The shale is exposed along the coast and parts of the Horton River where it forms steep banks. It is generally non-resistant, ice-free and can easily be ripped. Along the east coast, smoldering coal seams are locally called the Smoking Mountains.

MATERIALS

The best sources of coarse grained unconsolidated granular material are the glaciofluvial plain and terrace deposits. Along the coast, the actively forming marine deposits are coarse grained but but their geographical position makes access very difficult. The sandy fluvial deposits are located in muskeg areas with a high water table. These deposits are therefore a poorer source of construction material than the glaciofluvial units.

Shale bedrock is ice-free and rippable, therefore it could be a potential construction material.

TABULAR SUMMARY

Description and Material	Area (sq. mi.)	Estimated Average Thickness (ft.)	Estimated Volume of Granular Material (yds ³ x 10 ⁶)	
			total	available
Area I HARROWBY BAY -NORTH				
a) <u>sF^G_t</u> glaciofluvial terraces sand.	10.15	20	211.26	63.37
Area II BRITON POINT				
a) <u>gF^G_{pt}</u> glaciocluvial plains and terraces; gravel.	35.6	40	740.99	148.19
Area III FRANKLIN BAY				
a) <u>gF^G_{tp}</u> glaciofluvial plains and terraces; gravel.	12.17	40	669.53	133.90
Area IV				
a) <u>gF^G_t</u> glaciofluvial terrace; gravel.	6.95	40	144.65	28.92
b) <u>E</u> eolian undifferentiated; fine grained.	13.65			
Area V				
a) <u>gF^G_t</u> glaciofluvial terraces; gravel.	12.42	40	258.41	51.68
Area VI SOUTH HARROWBY BAY				
a) <u>gF^G_t</u> glaciofluvial terraces; gravel.	26.70	40	555.78	111.96
b) <u>sgF^G_t</u> glaciofluvial terraces; sand and gravel.	2.77	40	57.68	17.30
c) <u>g^mA_r</u> marine actively forming beaches and ridges; gravel.	.24	8	1.21	.21

SOURCES OF INFORMATION

MacKay, J.R.

- 1963: The Mackenzie Delta Area; N.W.T.; Can. Dept. Mines Tech. Survey Geog. Br., Mem. 8.

Rampton, V.N.

- 1971a: Manuscript Surficial Geology Map of Malloch Hill, Geol. Surv. Can., Open File number 96.
- 1971a: Surficial deposits of portion of Mackenzie Delta, Stanton, Cape Dalhousie and Malloch Hill map sheets, Geol. Surv. Can. (in preparation).
- 1971c: An Outline of the Quaternary Geology of the Lower Mackenzie Region: Pleistocene geology and geomorphology, Mackenzie and Keewatin districts, N.W.T., Edited by J.G. Fyles et al. 24th Inter. Geol. Cong., Guidebook A30.

Prest, V.K., Grant, D.R. and Rampton, V.N.

- 1967: Glacial Map of Canada; Geol. Surv. Can., map 1253A.

APPENDIX I, Part I

Unconsolidated Granular Materials

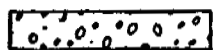
Each map sheet has a surficial geology legend (see appendix I, part 4). This legend, differentiated by means of patterns only indicates granular material, classified by genetic characteristics. In some cases only part of a map unit has been patterned, indicating that only that portion is considered a suitable source for granular material.

Legend

GLACIOFLUVIAL



coarse grained granular material, cobbles, pebbles, gravel, may be mixed with some coarse sand.

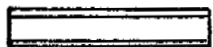


mixed or interbedded sand and gravel

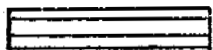


predominantly sand or sand with undesirable fines

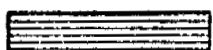
GLACIOLACUSTRINE



gravel lacustrine



sand and gravel



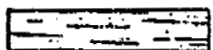
sand

FLUVIAL



fluvial (only sand and gravel deposits are coloured)

MORAINAL

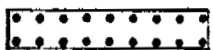


morainal deposit

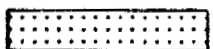
MARINE



coarse grained granular material, cobbles, pebbles, gravel, may be mixed with coarse sand



mixed or interbedded sand and gravel



predominantly sand or sand with undesirable fines

EOLIAN



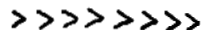
usually fine and medium sandy material only

COLLUVIUM



only the pattered area is coarse grained

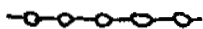
Symbols



eskers



gravel mounds

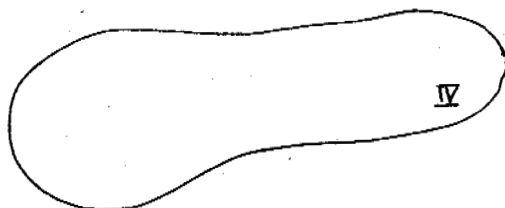


morainal ridge found within moraine

APPENDIX I, Part II

Granular Resource Units

I Granular Resource areas (black)



granular resource area

(see text corresponding description)

(v)

APPENDIX I, Part IV

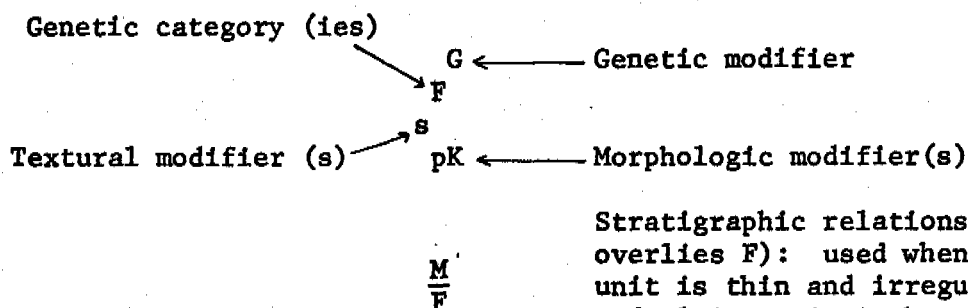
Surficial Geology and Landforms

Malloch Hill (97F), Mackenzie Delta (107C), Staton (107D),

and Cape Dalhousie (107E) map-areas

V.N. Rampton

Landform unit notation



Genetic Categories

C - colluvial
E - eolian
F - fluvial
L - lacustrine
M - morainal
(M) - marine
O - organic (see symbol for organic)
R - bedrock
U - undifferentiated or unknown,
commonly M or L

Textural Modifiers

c - clay, clayey
s - silt or interbedded clay
silt and fine sand
s - sand, sandy
g - gravel, gravelly
sh - shale

Morphologic Modifiers

e - eroded, gullied
f - fan
h - hummocky
m - rolling
p - plain
r - ridged, beach
t - terrace
v - veneer²
G - glaciated³
K - thermokarst⁵

¹. Mainly used to separate glaciofluvial deposits (F^G) from nonglacial fluvial deposits (F); to separate late Pleistocene glaciolacustrine deposits (LG) from lacustrine deposits of thermokarst origin (L); to indicate areas where the responsible genetic process is still active (A).



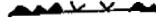


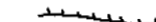






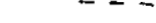
². Veneer indicates known thickness of category is less than 15 feet, commonly only 3 feet or less. Surface is flat or gently rolling.

3.

Glaciated indicates that map-unit has been topographically modified by glaciation even though till is not always easily identified on surface of map-unit.

Thermokarst indicates that a hummocky topography has developed as a result of subsidence and erosion where frozen sediments or ground ice have melted.

Symbols

- | | |
|---|---|
|  | - beach ridge or spit (sand or gravel) |
|  | - former beach ridge or spit (sand or gravel; gravel) |
|  | - sea cliff or escarpment, >25 ft., constantly or periodically undercut (v indicates escarpment partly cut in bedrock) |
|  | - former sea cliff (partly cut in bedrock) |
|  | - abandoned glaciolacustrine shoreline, marked by cliff beaches, etc. |
|  | - stream-cut escarpment, constantly or periodically undercut (v indicates escarpment partly cut in bedrock) |
|  | - former stream-cut escarpment (v indicates escarpment partly cut in bedrock) |
|  | - standing water covering > 30 percent of area |
|  | - organic deposit, 5 to 15 ft. thick |
|  | - active, or recently active, blow-out |
|  | - ground observation point |
|  | - area of aerial observation |
|  | - boundaries (defined, approximate, assumed) |