

Granular Resources Inventory
- Mackenzie Valley -
Aklavik - 107 B W $\frac{1}{2}$



D002961



GRANULAR RESOURCE INVENTORY - MACKENZIE

AKLAVIK NTS 107 B W $\frac{1}{2}$

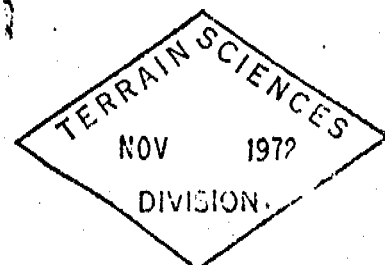
Scale (1:125,000)

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and Northern Affairs



SUMMARY

In the Aklavik map area; west half, unconsolidated sand and gravel is found only in the glaciofluvial and fluvial deposits in the foothills of the Richardson Mountains. The coherent sandstone and limestone bedrock of the Richardson Mountains can be crushed or ripped for aggregate. Access to these rock units in the mountains is difficult.

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INTRODUCTION

This report attempts to assess the quality and quantity of granular material available for construction from both unconsolidated and bedrock sources. Sand and gravel of glaciofluvial and fluvial origin are good sources of construction material; sands and silts of lacustrine and marine origin are considered poorer construction material.

Bedrock, such as limestone and sandstone, is evaluated as a source of aggregate if it is coherent and resistant to weathering in its natural state. Shales are considered as a source for subgrade material.

The information in this report and on the accompanying map has been compiled largely from published and unpublished Geological Survey manuscripts and from personal communication with officers of the Geological Survey of Canada. Supplementary data on depths, thicknesses, texture and ice content have been obtained from confidential reports of other government departments and from industry. Field checking was carried out during the summer of 1972.

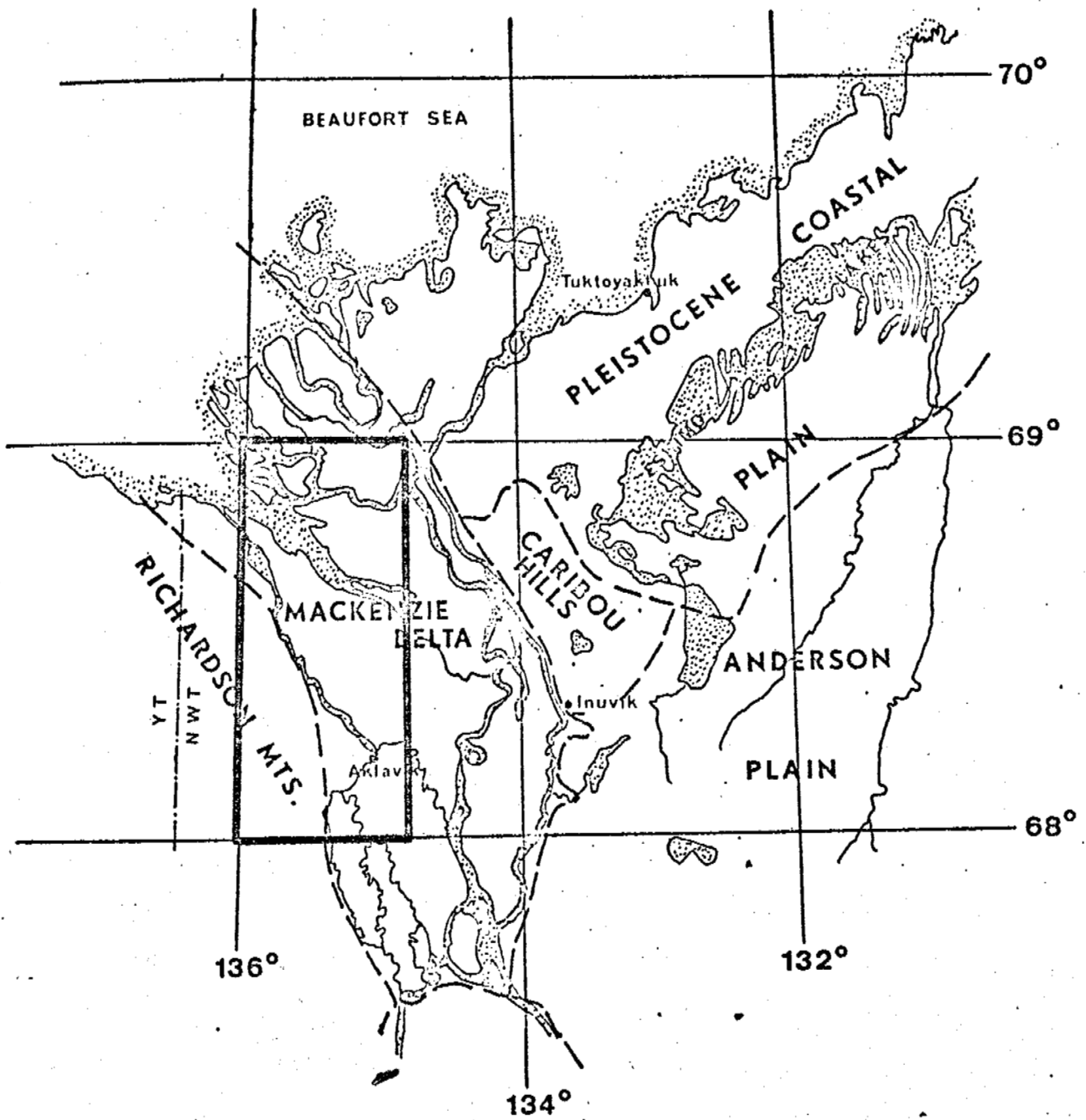
The basic document used in this compilation and from which all areal data were derived, is a surficial geology map of Aklavik, west half, at a scale of 1:250,000 (Rampton, 1970). It is indexed as G.S.C. Open File Number 21 and may be viewed at Geological Survey of Canada offices in Ottawa, Calgary and Vancouver. Ozalid copies may be obtained commercially at nominal cost. A derived map for unconsolidated granular material has been produced at a scale of 1:125,000 from this surficial geology map.

Areal extent of granular deposits was measured by planimeter. Average thickness for each deposit was estimated from the data mentioned above and reduced according to such

variables as drainage, height above the water table and amount of ground ice. A volume of granular material for each deposit was estimated from these considerations of area and thickness. These estimated volumes of available sand and gravel appear in a tabular summary at the end of the report.

A bedrock geology map has been prepared as an overlay sheet from a manuscript bedrock map at a scale of 1:125,000 of the Aklavik map area, west half (Norris, 1972). The rock units are grouped according to gross lithology and age on this map. The map indicates the availability of bedrock for construction purposes as an alternative to unconsolidated material.

For convenience in description, areas of granular material are numbered in Roman numerals. Each area is sequentially listed in the Tabular Summary of materials in the report.



AKLAVIK WEST 1/2

PHYSIOGRAPHIC REGIONS



after Fyles 1971

GENERAL GEOLOGY AND PHYSIOGRAPHY

The Aklavik map area, west half, contains two major physiographic regions: the Richardson Mountains in the west and the Mackenzie Delta in the east (see Figure 1). The Mackenzie Delta is composed entirely of silt and clay and characterized by an abundance of deltaic lakes. Sand and gravel suitable for construction is found only in the foothills and valleys of the Richardson Mountains. Bedrock, exposed only in the mountains, consists of sandstones, limestones and shales.

Unconsolidated Deposits

Glaciofluvial Deposits, sand and gravel, 10, 10a

Gravel and mixtures of sand and gravel have been deposited in a glacial meltwater channel in the foothills of the Richardson Mountains. Sand and Gravel of unit "10a" is covered by approximately 6 feet of organic material. The unconsolidated granular material of glaciofluvial origin is only 10'-15' thick but because of good drainage the ice content is low and therefore approximately 80% of the material is available as a granular resource.

Fluvial Deposits, sand and gravel, 2, 4

Interbedded sand and gravel is found along streams that have their sources in the Richardson Mountains. These fluvial deposits occur in terraces or streambeds. The terrace deposits are up to 50' thick but deposits of the streambeds are only between 10' and 15' thick. Both types of deposits contain approximately 60% available granular material.

Bedrock Geology

The bedrock that underlies the Mackenzie Delta is at a depth generally greater than 100 feet and therefore is not considered in this report. Bedrock of the Richardson Mountains

consists of sandstones, shales and limestone varying in age from Permian to Cretaceous.

The higher, more resistant peaks of the Richardson Mountains consist of coherent Jurassic and Cretaceous sandstone. Both the Jurassic Bug Creek Sandstone and the Lower Cretaceous sandstone consist of clean quartz with bedding between 1/2"-1" thick. The Lower Cretaceous sandstone is the weaker rock with flaggy, platy.

Less coherent rocks are the Permian shales and limestones and the Jurassic shales. The Permian Sadlerchit Formation consists of fissile shales and siltstones with thick interbedded layers of more coherent limestone. The Jurassic Husky Formation comprises shales with interbeds of sandstone.

The least coherent rock unit in the Aklavik area of the Richardson Mountains is the Lower Cretaceous shale and siltstone unit. It is easily eroded and found in the valleys and low-lying regions of the mountains.

Although rocks suitable for aggregate are available in the Richardson Mountains, access to these potential sources is difficult.

MATERIALS

Sand and gravel in the Aklavik map area, west half, is found in the glaciofluvial and fluvial deposits of the foothills of the Richardson Mountains. In general, the deposits vary from 10' to 50' thick and contain a large percentage of available granular material. They have good drainage, low water tables and a low ground ice content. Some granular deposits may be covered by several feet of organic material.

Abundant bedrock which can be crushed for good aggregate material occurs in the Richardson Mountains. Two such formations are the Jurassic Bug Creek Sandstone and the Lower Cretaceous sandstone. Other rock units can be crushed or ripped for construction uses such as fill or subgrade material. Access to all the rock units in the mountains is difficult.

TABULAR SUMMARY

Description and Material	Area (sq. mi.)	Estimated Average Thickness (ft.)	Estimated Volume of Granular Material	
			(yd ³ x 10 ⁶) total	available
AREA I CACHE CREEK				
a) 2 fluvial terrace; sand and gravel.	.78	20	16.25	9.75
b) 2 fluvial terrace; sand and gravel	.19	20	4.06	2.43
c) 2 fluvial terrace; sand and gravel.	.78	20	16.25	9.75
AREA II BEAVER HOUSE CREEK				
2 fluvial terraces; sand and gravel.	.19	20	4.06	2.46
AREA III SOUTH OF BEAVER HOUSE CREEK				
a) 2 fluvial terrace; sand and gravel.	.59	20	12.20	7.32
b) 2 fluvial terrace; sand and gravel.	.19	20	4.06	2.43
c) 2 fluvial terrace; sand and gravel.	1.17	20	24.37	14.62
d) 10 glaciofluvial; channelled; gravel.	.39	15	6.10	4.88
e) 10a glaciofluvial; channel- led; sand and gravel.	1.56	15	24.40	19.52

Description and Material	Area (sq. mi.)	Estimated Average Thickness (ft.)	Estimated Volume of Granular Material ($\text{yd}^3 \times 10^6$)	
			total	available
AREA IV WILLOW RIVER				
a) 4 fluvial terrace; sand and gravel.	.78	20	16.25	9.75
b) 2 fluvial terrace; sand and gravel.	1.36	20	28.43	12.05
c) 2 fluvial terrace; sand and gravel.	1.95	20	40.62	24.37

SOURCES OF INFORMATION

Bostock, H.S.

1967: Physiographic Regions of Canada, Geol. Surv. Can.,
map 1254A.

Hughes, O.L.

1972: Surficial Geology of Northern Yukon Territory and
Northwestern District of Mackenzie, Northwest
Territories; Geol. Surv. Can., Paper 69-36.

Jeletzky, J.A.

1958: Uppermost Jurassic and Cretaceous Rocks of Aklavik
Range, Northeastern Richardson Mountains, Northwest
Territories, Geol. Surv. Can. Paper 58-2.

Norris, D.K.

1971: Manuscript Bedrock Geology Map of Aklavik West,
Geol. Surv. Can. (unpublished).

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

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

Rampton, V.N.

1970: Surficial Geology Map of Aklavik West Half, GSC Open
File 21.

APPENDIX I, Part I

Unconsolidated Granular Materials

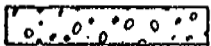
Each map sheet has a surficial geology legend (see appendix). This legend, differentiated by means of patterns, only indicates granular material classified by genetic characteristics. In some cases only part of a map unit has been patterned, indicating that only that portion is considered a suitable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

Legend

GLACIOFLUVIAL



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

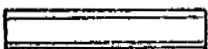


mixed or interbedded sand and gravel

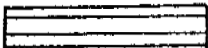


predominantly sand or sand with some fine material

GLACIOLACUSTRINE



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



mixed or interbedded sand and gravel



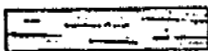
predominantly sand or sand with some fine material

FLUVIAL



only sand and gravel deposits are patterned

MORAINAL

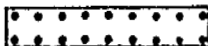


predominantly till; unsorted matrix of silt, clay, and sand imbedded with pebbles, cobbles and boulders

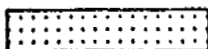
MARINE



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



mixed or interbedded sand and gravel



predominantly sand or sand with some fine material

EOLIAN



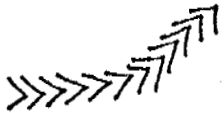
fine and medium sandy material

COLLUVIUM

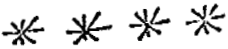


only the patterned area is coarse grained

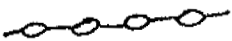
Symbols



eskers



gravel mounds



morainal ridge found within moraine

Bedrock Geology
(black line overlay)




The rock units on the accompanying overlay are a geological grouping according to gross lithology and age.

These units were derived from a more detailed geological map, whose units were subdivided largely on the basis of airphoto and stratigraphic interpretation. The units are identified by a two component code. The first component is upper case and designates age which is followed by a mnemonic designating gross lithology, e.g. Dls - Devonian limestone. When no lithology follows the age component, the unit is composed of many of the rock types listed below.

Legend

Age	Lithology
T - Tertiary	car - carbonate
K - Cretaceous	limestone and/or dolomite
JR - Jurassic	ls - limestone
TR - Triassic	dol - dolomite
Pr - Permian	ss - sandstone
C - Carboniferous	sh - shale
D - Devonian	no mnemonic component
S - Silurian	indicates unit is composed
O - Ordovician	of many of the above rock
C - Cambrian	types
P - Precambrian	

Symbols

	Boundary of bedrock unit (approximate)
	Boundary of bedrock unit inferred in area of surficial cover
	Limit of mapping

APPENDIX I, Part (iii)

GRANULAR RESOURCE UNITS

GRANULAR RESOURCE AREAS (black)



granular resource area (see text for corresponding description)

APPENDIX I, Part (iv)

SURFICIAL GEOLOGY AND LANDFORMS

107 B W/2, 117A, 117C, 117 D

Legend - after V.N. Rampton

Unit	Geomorphology	Material
1	modern floodplain (lacking vegetation)	gravel and sand
2, 2a*	fluvial deposits	gravel and sand
3	marine beach deposits	pebbly gravel
4, 4a	terraced fluvial deposits	gravel and sand
5	alluvial fan deposits	silt and sand
6	deltaic and alluvium deposits	fine sand, silt
7	lacustrine and bog	clay, silt, sand, muck and peat
8	undifferentiated surficial deposits	mainly till
9a, 9b**, 9c**	morainal deposits and glacially deformed marine and fluvial deposits	till, sometimes covering clays, silts, sands and gravels
10, 10a	glaciofluvial deposits	gravel and sand
11	silt	
12, 13	pediment	bevelled bedrock
14	drumlinized till and fluted bedrock	till and bedrock outcrops
15	bedrock and colluvium	bedrock

* 'a' following the unit number indicates an organic cover up to 15'.

** 'b' and 'c' following the unit number indicate an organic cover up to 10'.