

GRAVEL RESOURCE INVENTORY OF NEWFOUNDLAND PROJECT

by D.G. Vanderveer and F. Kirby

INTRODUCTION

The Gravel Resource Inventory was begun in 1975 as part of the Surficial and Glacial Mapping Project. During 1977 a separate project was started to sample and carry out sieve analyses in areas (Figure 1) previously mapped surficially (Vanderveer, 1977; Grant, 1973; and Brookes, 1974) but not sampled. This work is supplemented by sampling and sieving conducted by the Surficial and Glacial Mapping Project (Vanderveer and Sparkes, this volume).

The purpose of the project is to sample, sieve, test for moisture content and collect pebble and rock samples as a means of obtaining geotechnical and lithological data for the management of the aggregate resources in the Province. In addition, the locations of existing and abandoned pits and quarries are being mapped and reports filed concerning quarry activity on Crown Lands.

FIELD PROGRAM

Vehicular traverses were conducted along most roads accessible by 4-wheel drive vehicle; short foot traverses were conducted in some cases. Generally, sample sites were limited to existing natural (stream or coastal cuts) or man-made (road cuts, pits and quarry excavations, etc.) exposures, although some pits were hand dug when necessary and where feasible within the limitations of the project.

Sample spacing was normally 500 to 750 m in areas of potential gravel resources (e.g. glaciofluvial, fluvial, deltaic or esker deposits) and 1000 to 2000 m in areas of other glacial deposits.

Field sieve analyses and moisture tests were usually

conducted on every second or third sample if the deposit remained consistent along the traverse route; otherwise, analyses were done at every sample location. During sieve analyses approximately 10 to 20 kg of material was sampled, weighed and sieved through a bank of five 30 cm diameter sieves (sizes 63 mm, 31.5 mm, 16 mm, 8 mm and 4 mm). If a sample had a high silt-clay content (determined visually) and/or a high moisture content (determined using a speedy moisture tester), the 4 mm sieve was not used because of clogging problems. The sample weights retained on each of the field sieves and canvas were recorded on GRANULAR SIEVE ANALYSIS, FORM A (Figure 2). Recorded information also included N.T.S. map number, sample number, U.T.M. coordinates, deposit type, vegetation, sample description, exposure description and percent water content.

A 200-500 gm split of the minus 4 mm (or -8 mm if the 4 mm sieve was not used) sand fraction and a split (200 to 300 pebbles) of the 16 mm retained pebble fraction of each sieved sample were saved for laboratory sieve and lithological studies.

A bulk sample (500 to 1000 gm) minus any larger stone was taken when sieve analyses were not conducted and returned to the lab for sieve analyses. All samples were taken from fresh unweathered exposures and from below the normal soil horizon wherever possible. Where exposures permitted, channel sampling or multiple spot sampling was used to ensure a representative sample. More than one sample was collected from sites where different grades or types of material were encountered that might be exploited or excavated separately.

A reference collection of bedrock samples was compiled during the field traverses for each study area as an aid to the pebble lithology investigations.

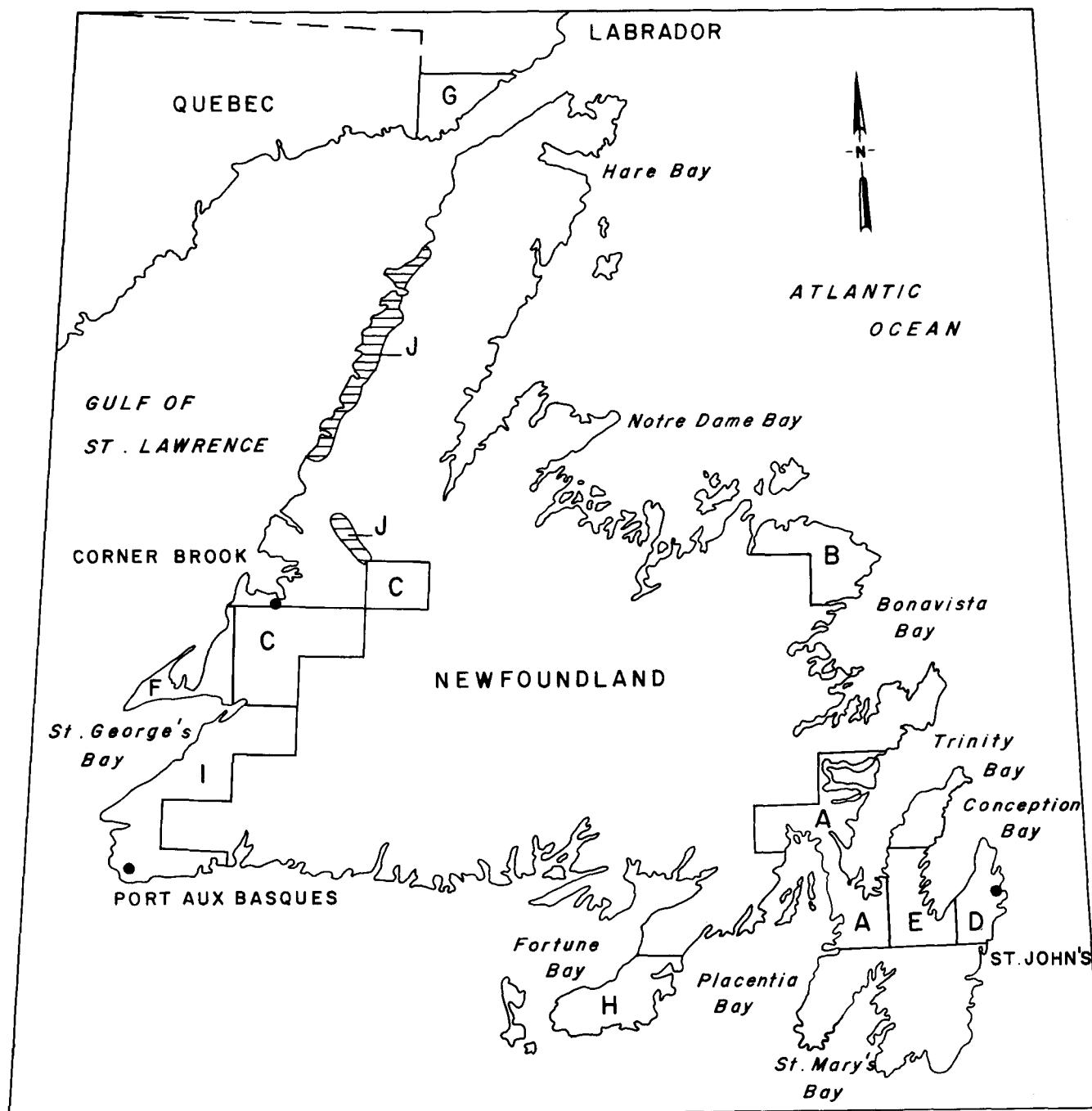


FIGURE 1

Gravel Resource Inventory of Newfoundland

- | | |
|------------------------------|-------------------------------|
| A. Avalon Isthmus** | F. Stephenville-Port au Port* |
| B. Wesleyville-Carmanville** | G. Southern Labrador* |
| C. Deer Lake-Harry's River** | H. Burin Peninsula |
| D. St. John's | I. Southwest Newfoundland |
| E. Holyrood-Harbour Grace* | J. Great Northern Peninsula |

* sampled in 1977 by the Surficial and Glacial Mapping Project (Vanderveer & Sparkes, this Volume)

** sampled in 1975 by the Surficial and Glacial Mapping Project (Vanderveer, 1976).

GRANULAR SIEVE ANALYSIS, FORM A

MINERAL DEVELOPMENT DIVISION
DEPT. OF MINES AND ENERGY
YR. MO. day

MAP NO.		PROJECT NO.		AREA		COLLECTOR		DATE 77/ /											
SAMPLE NUMBER	FIELD SITE NUMBER	UTM COORDINATES			DUPLICATE	TYPE	SAMPLE			EXPOSURE		% H ₂ O of wet	FIELD SIEVE ANALYSES						
		ZONE	EAST	NORTH			TYPE	POSITION	COLOUR	SIZE CLASS	TYPE		THICKNESS (meters)	WEIGHTS		RETAINED (WT in —)			
													TOTAL SAMPLE WEIGHT	+63mm	+31.5mm	+16mm	+8mm	+4mm	-4mm CANVAS
column #→	10		20		30					40		50		60			70		80
1	77-																		
	REMARKS																		
2	77-																		
	REMARKS																		
3	77-																		
	REMARKS																		
4	77-																		
	REMARKS																		
5	77-																		
	REMARKS																		
6	77-																		
	REMARKS																		
7	77-																		
	REMARKS																		
8	77-																		
	REMARKS																		
9	77-																		
	REMARKS																		
10	77-																		
	REMARKS																		
DATE SHIPPED: ANALYST: DATE RECEIVED:					COMMENTS:														

Figure 2

LABORATORY ANALYSIS, FORM B

MINERAL DEVELOPMENT DIVISION
DEPT. OF MINES AND ENERGY

MAP NO.

PROJECT NO.

AREA

COLLECTOR

DATE 77/ /
YR. MO. day

SAMPLE NUMBER	LAB NUMBER	S I E V E	SIEVE ANALYSES WEIGHTS RETAINED (grams)								PEBBLE LITHOLOGY TYPES					
			SIEVED WEIGHT	2 Ø	1 Ø	0 Ø	1 Ø	2 Ø	3 Ø	4 Ø	pan	A	B	C	D	E
Column # →	10			20		30		40		50		60		70		80
1 77-																
REMARKS																
2 77-																
REMARKS																
3 77-																
REMARKS																
4 77-																
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5 77-																
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6 77-																
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7 77-																
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8 77-																
REMARKS																
9 77-																
REMARKS																
10 77-																
REMARKS																
DATE SHIPPED:			COMMENTS:													
ANALYST:																
DATE RECEIVED:																

Figure 3

SAMPLE 76-276 WEIGHT 19.8 KG
MAP IN/7 WATER 5.90%
SITE 9

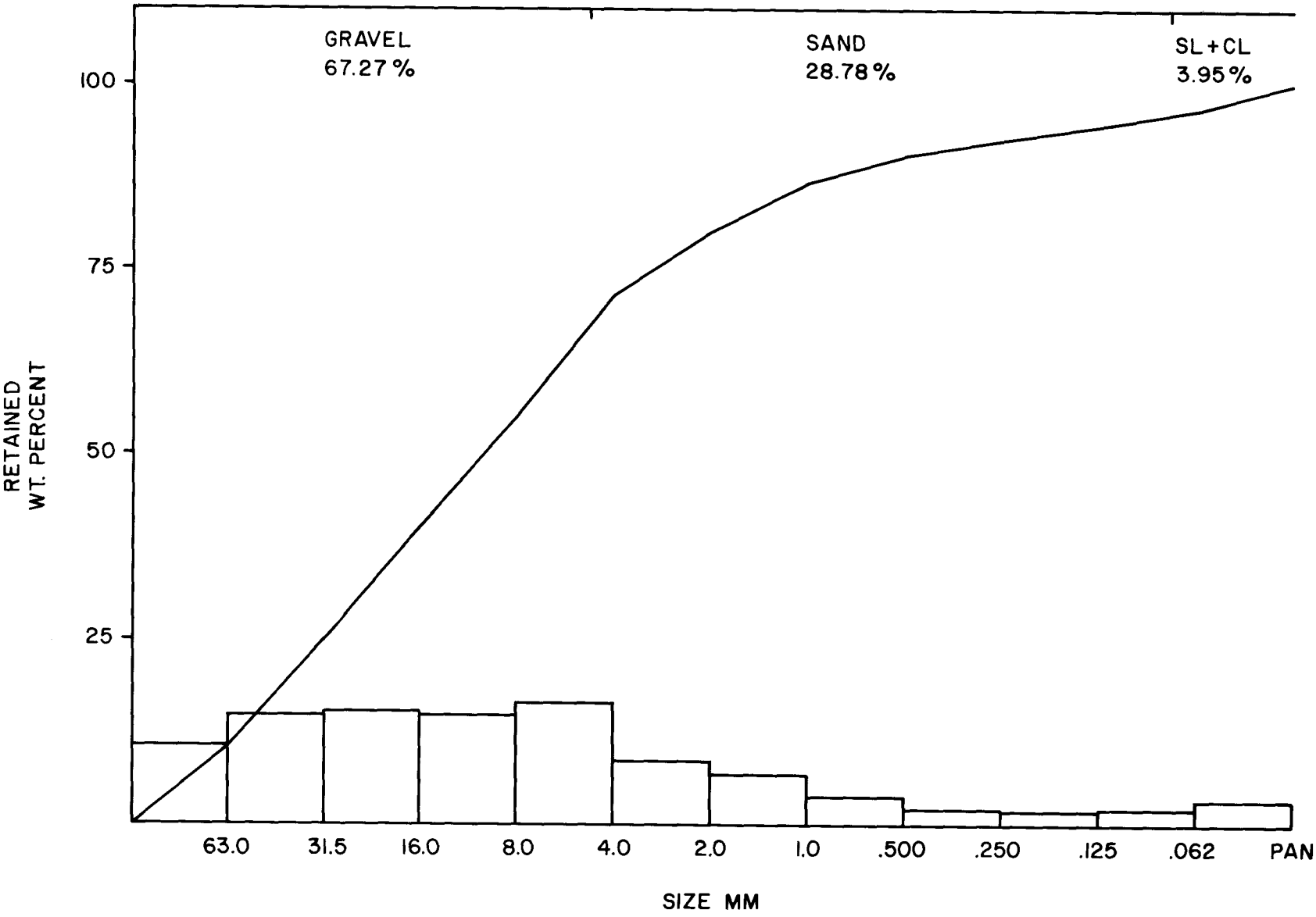


Figure 4

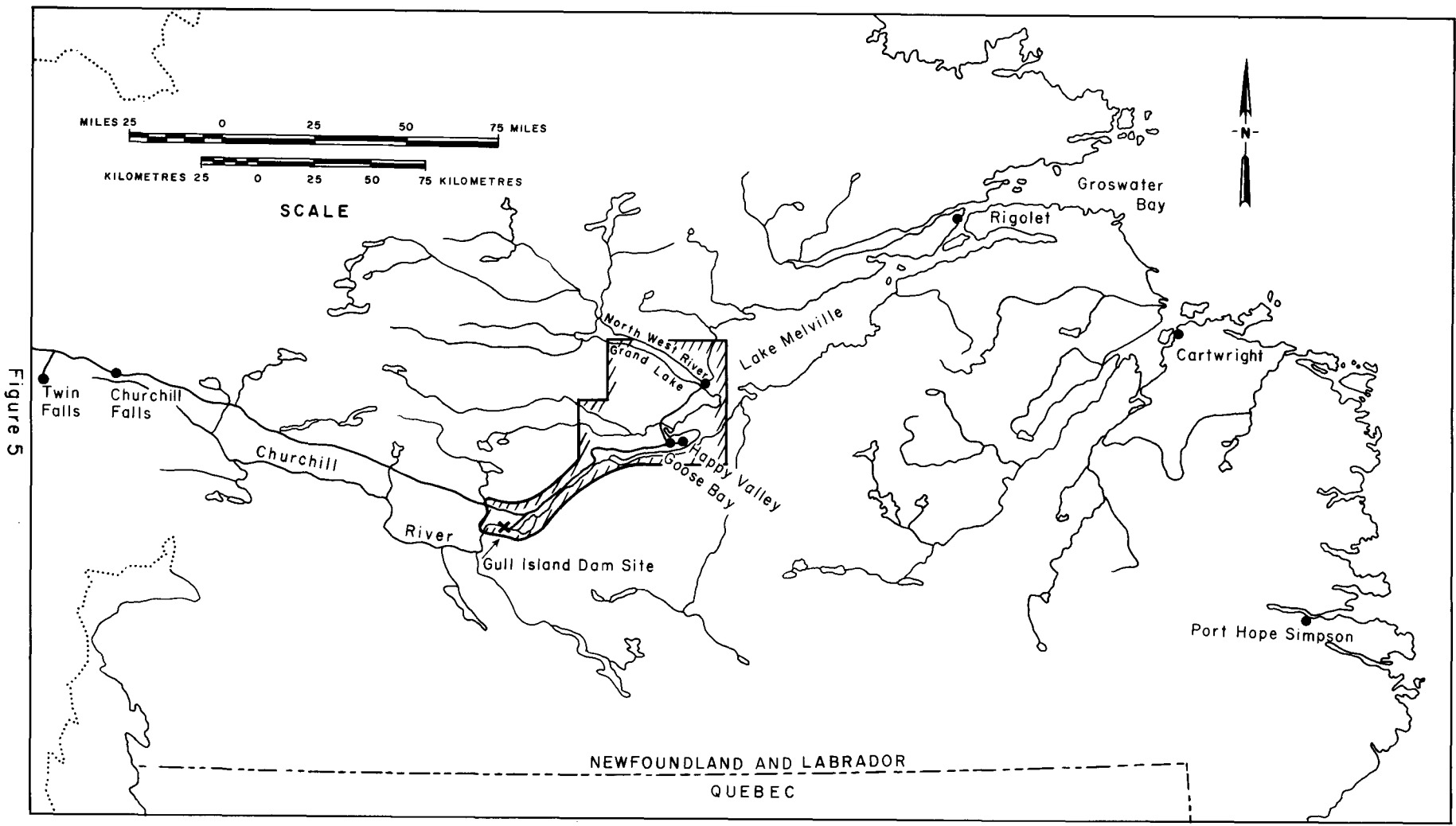


Figure 5

SURFICIAL AND GLACIAL MAPPING
GRAVEL RESOURCE INVENTORY

LABORATORY PROGRAM

The laboratory program consists of sieve analyses of the sand fraction and lithological studies of the pebble fraction of each sample returned from the field.

The sieve analyses consisted of drying and splitting the sample to a manageable size (70 to 150 gm); then sieving through a bank of seven sieves (4 mm, 2 mm, 1 mm, 0.5 mm, 0.25 mm, 0.125 mm and 0.062 mm) for each sample of gravel or sand, *i.e.* samples not containing any silt or clay material. The weights retained on each sieve and in the pan were recorded on LABORATORY ANALYSES, FORM B (Figure 3). Glacial tills and other samples of a high silt and/or clay content were treated as follows: 1) the sample was split to 70 to 140 g, 2) deflocculated using a dilute solution of hydrogen peroxide (3 percent H_2O_2), 3) wet sieved through the 0.062 mm sieve, 4) the plus 0.062 mm sand fraction was dried and sieved, and the data recorded as with sand and gravel samples, 5) the minus 0.062 mm fraction (water and silt and clay) was flocculated and settled using magnesium chloride (1N $MgCl_2$), the excess water removed and the resultant silt-clay mixture dried and weighed. The sample and site number, N.T.S. map number, the percents gravel, sand, and silt-clay, the moisture content, and a particle size cumulative curve and a histogram were plotted for each sample (Figure 4).

Pebble lithology studies conducted in 1977 consisted of a review of the geological literature of each study area, the selection of a reference collection of rock specimens for each study area, and the determination of the percentage of each rock type found in each pebble sample. A brief report will be written concerning this study for each area investigated.

RESULTS

During the 1977 field season a total of 161 rocks, 498 till, 363 gravel, 202 sand, 31 mixed sand-silt, 26 clay and 8 organic (shell and plant material) samples were collected from the following areas (Figure 1): (a) St. John's¹, (b) Holyrood-Harbour Grace², (c) Burin Peninsula, (d) Southwestern Newfoundland, (e) Stephenville-Port au Port², (f) Great Northern Peninsula, and (g) southern Labrador².

Pebble lithology studies were conducted on 388 samples collected from the Burin Peninsula, Avalon Isthmus, Deer Lake-Harry's River and the St. John's study areas. A brief outline of the geology, methodology and probable effects of glaciation on the movement from source of the pebbles was compiled separately for each area.

Sampling and sieve analyses previously conducted as part of the Surficial and Glacial Mapping Project

(Vanderveer, 1976, 1977) have contributed data on an additional number of areas, *i.e.* Avalon Isthmus (1N/5, 1N/12, 1N/13, 1M/16, 2C/4), Wesleyville-Carmanville (2E/8, 2F/4, 2F/5, 2F/6) and Deer Lake-Harry's River (12B/9, 12B/16, 12A/13, 12H/3) areas (Figure 1) and the Goose Bay-Gull Island area, Labrador (Figure 5). Some of these sieve data are available through open file release 960 (Avalon Isthmus area) and the rest are available upon request. Data as a result of the 1977 program will be released as it becomes available. An outline of potential areas of aggregate materials and the locations of all samples and of known pits and quarries will be plotted on 1:250,000 topographic base maps for open file release. These data will also be prepared on 1:50,000 base maps together with any sieve or lithological analyses. A summary of the above will be compiled when a complete 1:250,000 N.T.S. map area has been covered by the survey.

Acknowledgements: *The authors wish to thank Garfield Simms (field assistant) and Scott Stoyles (lithological investigator) for their respective contributions to the program.*

Footnotes

Completion of sampling begun in 1976 as part of the 1976 Surficial and Glacial Mapping Project (Vanderveer, 1977).

²Sampled in 1977 as part of the Surficial and Glacial Mapping Project (Vanderveer and Sparkes, this volume.)

REFERENCES

- Brookes, I.A.
1974: Late Wisconsin glaciation of southwestern Newfoundland (with special reference to the Stephenville map area); Geological Survey of Canada, Paper 73-40.
- Grant, D.R.
1973: Surficial geology maps, Newfoundland (11 maps); Geological Survey of Canada, Open File 180.
- Vanderveer, D.G.
1976: Surficial and glacial mapping-granular resource inventory; *in* Report of Activities 1975, Newfoundland Department of Mines and Energy, Mineral Development Division, B.A. Greene (editor); Report 76-1, pages 105-107.
1977: Surficial and glacial mapping-gravel resource inventory; *in* Report of Activities 1976, Newfoundland Department of Mines and Energy, Mineral Development Division, R.V. Gibbons (editor); Report 77-1, pages 90-95.
- Vanderveer, D.G. and Sparkes, B.G.
this volume: Surficial and glacial mapping; *in* Report of Activities 1977, Newfoundland Department of Mines and Energy, Mineral Development Division, R.V. Gibbons (editor); Report 78-1.