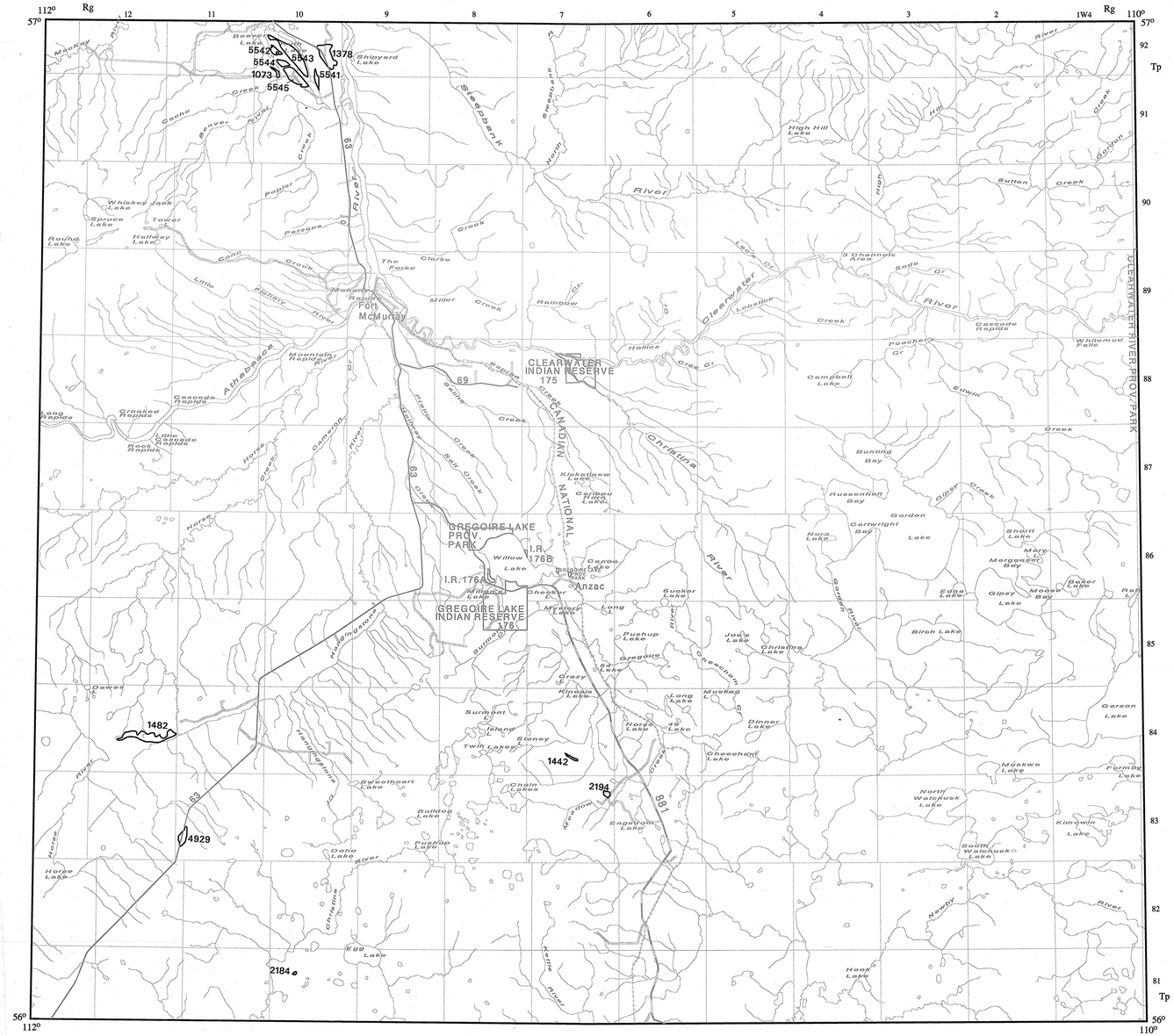


Sand and Gravel Resources of Waterways Map Area (NTS 74D)

D.W. Scafe & W.A.D. Edwards, 2000

Scale 1: 250,000

5 0 5 10 15 20 Kilometres

5 0 10 15 Miles

North American Datum 1983 Transverse Mercator Projection

Deposit ID Number	Resource Category	Gravel (m³)	Sand and Gravel (m³)	Sand (m³)	Overburden Thickness (m)	Sand and Gravel Thickness (m)	Area (ha)	Study Level	Source	Genesis	Reference
2184	Unsubstantiated		*		0.1		9.7	4	AGS	Kame	17a
4929	Prospective	3959207		4751048	0.5	7.0	125.7	3	AGS	Kame	17a,b
2194	Prospective	1252745		901097	0.1	5.5	39.9	3	AGS	Glaciofluvial	17a
1482	Unsubstantiated	755742		1763397	0.1	0.6	419.9	4	AGS	Glaciofluvial	17a
1442	Prospective	77115		595890	0.1	2.8	25.0	3	AGS	Glaciofluvial	
1073	Prospective	167666		81293	1.0	0.8	31.8	3	AGS	Glaciofluvial	17a
5541	Unsubstantiated	202872		473368	0.1	1.1	61.5	4	AGS	Glaciofluvial	17a
5542	Confirmed	298265		553921	0.1	1.3	65.6	3	AGS	Glaciofluvial	17a,c
5543	Confirmed	344606		5169093	0.1	1.9	453.4	3	AGS	Glaciofluvial	17a,c
5544	Confirmed		*				70.5	3	AGS	Glaciofluvial	17a,c
5545	Confirmed	3673032		1574156	0.1	1.9	276.2	3	AGS	Glaciofluvial	17a,c
1378	Unsubstantiated		?				325.6	5			17a,c

17a = Fox, J.C. 1980. Sand and gravel resources of the Athabasca Oil Sands region, northeastern Alberta. Alberta Geological Survey OFR 1980-7.
17b = Scafe, D.W., W.A.D. Edwards and D.R. Boisvert 1988. Sand and gravel resources of the Ft. McMurray area. Alberta Geological Survey OFR 1988-16.
17c = Fox, J.C. 1986. Aggregate Resources of the Ruth Lake map area 74D/13. Alberta Geological Survey OFM 1986-06, 1: 50 000 scale.

? = material is probably present.
* = material is present but insufficient data are available to make an estimate of volume.

Aggregate Map Definitions Of Headings And Terms

Deposit ID Number
Areas delineated on the map are potential sources of sand and/or gravel. Each potential deposit is labelled with an unique, four digit number (ID). This ID number is used to relate deposit location and area information from the map with the deposit properties described in the legend.

Resource Category
The possibility of finding granular material in economic quantity is estimated for each area. This possibility is expressed in the legend as one of three categories: Confirmed resources, Prospective resources, and Unsubstantiated resources. These resource categories are defined as follows:

Confirmed resource Areas are placed in this category if sand and/or gravel occurs in sufficient quantity for exploitation under favourable marketing and land use management conditions. Information about the deposit is adequate for developing a pit plan or to support detailed resource management and strategic planning.

Prospective resource Areas are placed in this category if over one metre thickness of sand and/or gravel is confirmed in at least one site. Estimates of quantities are approximate as compared to the measured (Confirmed) resource volumes. Prospective resource areas are good targets for more detailed mineral aggregate exploration and should be considered as priorities in regional land use planning and resource management.

Unsubstantiated resource Areas are placed in this category if granular potential is indicated based on very limited information. Unsubstantiated resource areas should be treated as resources for future study. Sometimes detailed technical data are available for part of a deposit and limited data are available for the entire deposit. In this case quantities are calculated independently from the different sources of data and reported as two descriptions (Confirmed and Prospective) in the legend for the same deposit area.

Volume (cubic metres) Volumes are listed for Confirmed resources if the detailed technical data (Study level 1 or 2) resides with Alberta Geological Survey (AGS). If this level of data is known to exist but does not reside with AGS a reference to the data proprietor is provided (see Source). Volumes are calculated using a depth determined from a grid of testholes, the digital area shown on the map, and a material character determined from multiple grain size analyses. Gravel is defined as material >4.75 mm in size and sand is defined as material <4.75 mm and >0.75 mm. Volumes listed for Prospective resources are calculated from a depth at one or more testholes or exposures, the digital area shown on the map, and one or more sample analyses. Note that volume calculations reflect the situation at the time when the data were current. Quantity estimates generally are inappropriate for areas identified under the heading Unsubstantiated resources. Quantity estimates sometimes are given if available evidence is strongly supported by a geological model or there is detailed evidence from nearby deposits. Such estimates should be considered as speculative. Unsubstantiated resource calculations use geological assumptions to estimate deposit thickness and material composition, and the digital area shown on the map. These geological assumptions require the correct identification of deposit genesis and more completely known, neighbouring deposits of the same origin.

Overburden Thickness (metres) Overburden is material, such as soil, clay, silt, or till, which covers a sand and gravel deposit and is not a source of mineral aggregate. An average thickness calculated from multiple sites is reported for deposits studied at levels 1 or 2. The thickness measured at a single or several sites is reported for areas studied at level 3. At study levels 4 and 5 there is no direct evidence of overburden thickness. If an overburden thickness is reported it is based on geological assumptions.

Sand & Gravel Thickness (metres) Sand and/or gravel thickness is an average established from multiple testholes if the deposit is studied at study levels 1 or 2. Sand and/or gravel thickness is established from a testhole, natural exposure, or pit exposure if the deposit is studied at study level 3. Deposit thickness is assumed from geological interpretation if the deposit is studied at study levels 4 or 5.

Deposit Area (hectares) Deposit area is the surface area of the deposit as shown on this map and calculated from the digital data.

Study Level The study level describes the intensity of investigation or detail of mapping by the Alberta Geological Survey. Five levels of investigation of sand and gravel deposits are defined as follows:

Level 1 A very detailed investigation of all or part of a deposit and includes a grid of testholes and multiple sample analyses. This level of study is adequate to locate and define sufficient quantities and kinds of aggregate for economic development of the deposit and can provide an accurate base of information for resource or land use management.

Level 2 A detailed investigation of a deposit that includes multiple testholes and sample analyses. This level of study establishes continuity of the granular materials and confirms the economic viability of a deposit. Study level 2 information can provide an accurate base of information for resource or land use management.

Level 3 An investigation which confirms (testhole, natural or pit exposure) the presence of sand and/or gravel over 1 m thickness. The distribution of sand and/or gravel may be extrapolated or estimated but economic viability is not confirmed without further testing. A deposit identified at study level 3 is a good target for mineral aggregate exploration and provides a regional context for managing the aggregate resource.

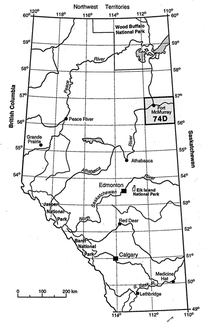
Level 4 An investigation based on very limited, surface information or indirect evidence (airborne reconnaissance, remote sensing data) supported by evidence of granular occurrence in a neighbouring deposit of similar origin. This level of study provides a regional perspective on the potential for aggregate resources and may be useful in land use management or for exploration in remote regions.

Level 5 Information derived through remote sensing or indirect evidence only. No field checking or sampling is undertaken. At this level, sites with potential for sand or gravel are delineated but the presence of granular materials is unconfirmed. Information at this level provides a starting point for gravel searches and gives some indication of granular potential in unexplored regions.

Source Sources of data for the area are listed. In some cases government departments other than the Alberta Geological Survey or industry may be sources of information.

Genesis The genesis of the deposit is postulated. Genesis can be a useful guide to understanding the composition and geometry of a deposit and the regional distribution of deposits. The terms used to describe the deposits are commonly used in Alberta.

Reference Any published sources of information on the deposit are listed.



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Digital Sand and Gravel Map
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G.I.S. Design and Compilation by D. K.Chao and M.C. Price

EUB Alberta Energy and Utilities Board | AGS Alberta Geological Survey