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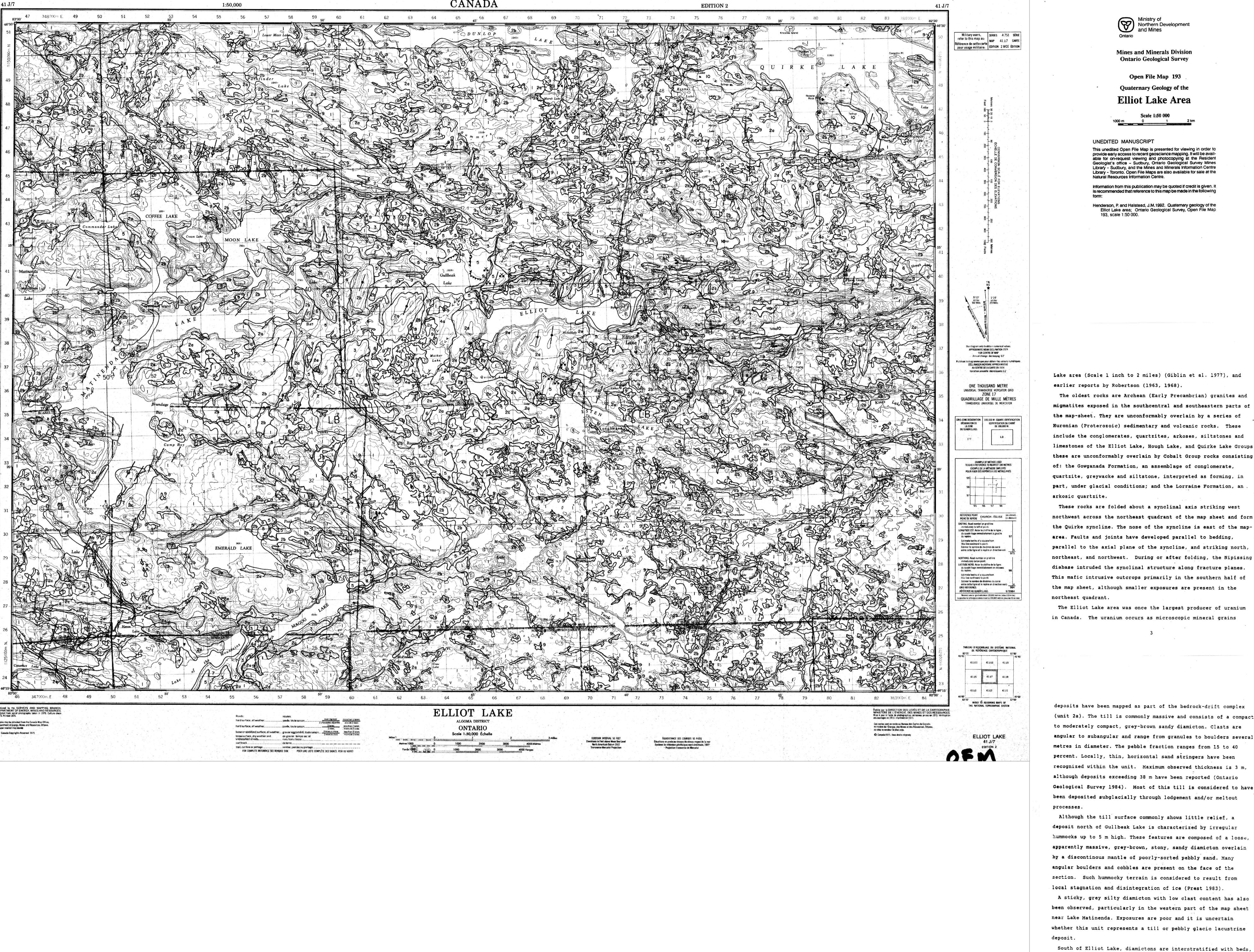
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UNEDITED MANUSCRIPT Henderson, P. and Halstead, J.M.1992. Quaternary geology of the Elliot Lake area; Ontario Geological Survey, Open File Map 193, scale 1:50 000. Lake area (Scale 1 inch to 2 miles) (Giblin et al. 1977), and

earlier reports by Robertson (1963, 1968). The oldest rocks are Archean (Early Precambrian) granites and migmatites exposed in the southcentral and southeastern parts of the map-sheet. They are unconformably overlain by a series of Huronian (Proterozoic) sedimentary and volcanic rocks. These include the conglomerates, quartzites, arkoses, siltstones and limestones of the Elliot Lake, Hough Lake, and Quirke Lake Groups these are unconformably overlain by Cobalt Group rocks consisting of: the Gowganada Formation, an assemblage of conglomerate, quartzite, greywacke and siltstone, interpreted as forming, in part, under glacial conditions; and the Lorraine Formation, an These rocks are folded about a synclinal axis striking west

Northern Development and Mines

Mines and Minerals Division

Ontario Geological Survey

Open File Map 193

Quaternary Geology of the

Elliot Lake Area

Scale 1:50 000

10011

commended that reference to this map be made in the following

his unedited Open File Map is presented for viewing in

PHANEROZOIC

QUATERNARY

10 Mine tailings:

PLEISTOCENE

9 Swamp and organic deposits: peat, muck, marshland

Glaciolacustrine fine-grained deposits: silt and clay;

minor sand; massive, laminated or rhythmicallly

5 Glaciofluvial outwash deposits: stratified sand and gravel; boulders.

4b Subaqueous fan deposits.

4 Ice-contact stratified drift: complexly interstratified sand and gravel; minor diamicton, silt and clay.

3 Till: silty sand to sandy diamicton; generally massive,

(primarily uraninite, brannerite and monazite) in the matrix of

local pyritic sheets of quartz-pebble conglomerate near the base

of the Huronian sequence. Ten mines have been developed in major

ore zones on the north limb of the syncline near Quirke Lake, and

on the south limb east of Elliot Lake townsite; however, with the

discovery of higher grade deposits elsewhere and the collapse of

present. Production is scheduled to cease within the next few

In addition to uranium, gold, copper and several associated

Potential for copper-nickel and silver-cobalt mineralization has

During the last (presumably Late Wisconsin) glaciation, ice

flowed southerly to south-southwesterly across the map area, as

indicated by bedrock striae and glacially streamlined landforms.

The predominant striae trend is 190°, but orientations range from

170° to 255° degrees. This variation results primarily from the

Ice recessional features are limited to short eskers and other

linear ridges interpreted as eskers. Esker segments are generally

ice-contact deposits, particularly subaqueous fans. The

rugged bedrock topography of the region.

minerals have also been noted in the area, particularly

adjacent map-sheets to the east and north (Springer 1977).

also been associated with the mafic dikes and sills of the

Nipissing diabase.

QUATERNARY GEOLOGY

the uranium market, only two mine remains operational at

Bedrock-drift complex: thin (less than 1 m) discontinuous

drift cover over bedrock; thicker drift accumulations may ocally subdue bedrock topography.

4a Kames, kame terraces, eskers and leeside

8 Alluvium: sand, silt, organics; minor gravel

northwest across the northeast quadrant of the map sheet and form the Quirke syncline. The nose of the syncline is east of the maparea. Faults and joints have developed parallel to bedding, parallel to the axial plane of the syncline, and striking north, northeast, and northwest. During or after folding, the Nipissing diabase intruded the synclinal structure along fracture planes. This mafic intrusive outcrops primarily in the southern half of the map sheet, although smaller exposures are present in the The Elliot Lake area was once the largest producer of uranium

in Canada. The uranium occurs as microscopic mineral grains

deposits have been mapped as part of the bedrock-drift complex (unit 2a). The till is commonly massive and consists of a compact to moderately compact, grey-brown sandy diamicton. Clasts are angular to subangular and range from granules to boulders several metres in diameter. The pebble fraction ranges from 15 to 40 percent. Locally, thin, horizontal sand stringers have been recognized within the unit. Maximum observed thickness is 3 m, although deposits exceeding 38 m have been reported (Ontario Geological Survey 1984). Most of this till is considered to have been deposited subglacially through lodgement and/or meltout base level.

> ICE-CONTACT STRATIFIED DRIFT Significant deposits of ice-contact stratified drift (unit 4) are concentrated around Gullbeak Lake and in the northeastern quadrant of the map sheet. Less extensive accumulations are found in the southwestern quadrant. Ice-contact sediments are extremely variable, but generally consist of stratified to substratified sand and cobble to pebble gravel with minor diamicton and silt and silt and clay rhythmites. Sorting is variable and deformation structures, including faulting and contorted bedding related to dewatering and/or melting of buried ice, are common. The icecontact material occurs in valleys oriented both parallel and transverse to ice flow direction. Deposits in the Gullbeak and McCabe lake areas include small

varying in thickness, of massive, coarse to fine sand commonly overlain by poorly sorted cobble gravels which occasionally grade upward to stratified, clast supported cobble gravels, containing subangular to subrounded clasts. In one section, a channe) infilled with poorly sorted gravel appears to incise the diamicton. The sand/diamicton sequences are interpreted as ice marginal deposits, probably sediment flows, into a proglacial lake. Overlying gravels suggest erosion and/or reworking of the diamicton and deposition of outwash by rivers draining to a lower

short but commonly appear aligned to form "trains" up to 3 km long. The eskers are low, approximately 5 m high, with fairly narrow crests and steeply dipping sides. North of Gullbeak Lake, the ridges of gravel and sand occur at the valley edge adjacent to a bedrock knob are interpreted as eskers, however, they may represent small ice recessional moraines. South of Gullbeak Lake, the ice-contact deposits consist of low hummocks and numerous small ponds or swamps which are interpreted as kames and kettles, respectively. These deposits suggest that glacial ice was trapped and stagnated in the Gullbeak-Mather lake area. A similar genesis is proposed for deposits in the vicinity of McCabe, Crotch and May lakes. This area is directly north of a high, east trending ridge which may have impeded glacier flow, consequently trapping ice in the valleys to the north. Boissineau (1965, 1968) has proposed that the McCabe-Crotch lake ice-contact deposits and those north of Gullbeak Lake mark an ice

Bedrock, undifferentiated: predominantly bare outcrop with drift accumulations locallized in depressions on bedrock surface.

Note: map units indicate dominant material to a depth of 1 m.

orientation, paleocurrent data and sedimentology of these

features indicates that a large proglacial lake fronted the ice

margin as it receded northward. Fine-grained glacio lacustrine

sediments are present in depressions below approximately 320m

not been observed at elevations exceeding 395 m (1300 feet).

Because the map-area lies within the Lake Huron drainage basin

suggested by Coleman (in Boissonneau 1968; p.104). Boissonneau

(1968), however, proposed ice margin stabilization just north of

with water levels at approximately 335 m (1100 feet) (Whiskey Lake

Elliot Lake during initial drainage of the large proglacial lake

lacustrine deposits on the northwestern shore of Esten Lake, and

Moraine). The extensive outwash deposits around Gullbeak and

Elliot Lakes at this elevation, the sedimentology of glacio

ice-contact deposits in the McCabe Lake area (northeastern

quadrant) support this interpretation. The implication is,

therefore, that higher elevation sandy glacio lacustrine and

subaqueous fan deposits in the north (near Quirke and Dunlop

As the ice retreated and lake levels fell, outwash sands and

gravels were deposited by meltwaters flowing from the glacier

These sediments are confined to major structurally-controlle?

lakes) were formed in a locallized ice dammed lake.

valleys with drainage generally to the south, although

all glacio lacustrine deposits are possibly related to glacia

Lake Algonquin and/or post-Algonquin Lake phases, as first

(1050 feet) elevation while sandy glacio lacustrine deposits have

recessional position referred to as the Whiskey Lake Moraine. The remainder of the ice-contact sediments in the map area are interpreted as subaqueous fan deposits, formed at or near the ice margin where subglacial rivers empty into the proglacial lake. These deposits are distinguished from other ice-contact sediments by upward and distal facies changes to planar, rippled, and cross-bedded sand, and silt, commonly rhythmically bedded. Dropstones may be present. Where observed in north trending valleys, subaqueous fan deposits can be overlain by glaciofluvial

outwash exceeding lm thickness. Under these conditions, the sediments are mapped as outwash deposits (unit 5).

GLACIOFLUVIAL OUTWASH DEPOSITS Deposits of glaciofluvial outwash (unit 5) are widespread in the map area. They are confined, primarily, to bedrock controlled valleys and were deposited by glacial meltwater rivers draining south, southwest and southeast. The most significant accumulations occur in the northern and central parts of the mapsheet: south of Dunlop Lake, and south and west of Gullbeak and Elliot lakes. The deposits consist of discontinuous beds of horizontally stratified pebble to boulder gravel, pebbly sand and coarse to medium sand in varying proportions. The coarser grained sediments are generally poorly sorted to unsorted with subangular to rounded clasts. Structures include planar and trough crossbedding of varying scales and current ripples. The surficial expression of these deposits is horizontal with subdued relief. In highland areas south of Dunlop Lake outwash deposits occur below 412 m (1350 feet). Deposits west of Gullbeak Lake form a broad plain at approximately 335 m (1100 feet). This plain contains large depressions interpreted as being caused by the melting of buried ice. This plain has the geomorphic expression of a delta; however no evidence of forset bedding is present in pits excavated within the deposit. The 3 to 5 m high sections expose approximately 2 m of horizontally stratified, clast-

subhorizontally stratified medium to fine sand and pebbly sand Beds are massive to planar and trough cross-bedded. A high energy environment, possibly a sheet flow, is required to produce the coarse boulder outwash gravels. Such conditions may have occurred during the initial drainage of Lake Algonquin (?) wher the ice margin was just north of the Gullbeak Lake area. Alternatively, the deposit may represent the sudden discharge of a smaller ice-dammed lake occurring after the drainage of the large proglacial lake when the glacier margin was further nort! Criteria distinguishing the underlying sands as subaqueous or subaerial glaciofluvial deposits have not been recognized. Measured paleocurrent directions in these sandy sediments

formation as a broad sand plain.

indicate a fanning out of the flow from the north and suggest Although the main source of outwash sediment dwindled as the glacier receded north from the Elliot Lake area, sedimentation continued in response to lowering glacial lake levels and the melting of residual ice blocks trapped within bedrock basins (eg. Gullbeak-Mather lake region). Valleys draining into Matinenda Lake and other lower elevation lakes are commonly infilled with outwash deposits regardless of the valley orientation. Sand and gravel overlying fine-grained glaciolacustrine deposits in these low areas suggests a late stage response of river drainage to

these base level changes.

North of Gullbeak Lake and in several other narrow valleys within the map area, significant accumulations of large boulder have been observed. These deposits do not form a mappable unit; however, their presence suggests a lag concentrate formed through high energy fluvial erosion and transport of the finer sediments

GLACIOLACUSTRINE DEPOSITS Deposits of glaciolacustine sand (unit 6) and silt and clay (unit 7) are concentrated in low-lying areas. They occur primarily in the southern half of the map sheet, although sandy

deposits are present south of Dunlop and Quirke lakes at an elevation of approximately 395 m (1300 feet). Sandy glaciolacustrine sediments formed either ice marginally in association with subaqueous fans or in shallow water glaciolacustrine environments such as estuaries or deltas. Sout and east of Dunlop Lake, excavated pits in subageous fan deposits reveal over 7 m of bedded, fine to coarse sand and silt with minor pebbly sand. Graded bedding, current ripples and trough cross-stratification are common. Large-scale (0.5 m) rhythmitc bedding consists of sequences grading upward from planar laminated sand, to cross-laminated sand, to sinusoidal rippled sand, to silt (greater than 1 cm thick). Dropstones have been observed. These deposits indicate that a proglacial lake must have fronted an ice margin north of Dunlop Lake. Although more

MARGINAL NOTES

extending across the southwest quadrant from the central part of

Bedrock surfaces are commonly striated and outcrops extensively

grooved and sculpted by glacial processes. South and west of

flow have been recognized on airphotos. These, predominantly

Gullbeak and Elliot lakes, a group of broad, elongated landforms

approximately 2 km long by 400 m wide, oriented parallel to ice

bedrock features, are believed to be glacially moulded. They are

till with smooth surface relief. Within the northeast quadrant of

commonly observed. These are believed to form from the action of

commonly covered by a discontinuous veneer (less than 1 m) cf

the map area and on bedrock surfaces outcropping in sand and

confined, high energy meltwater flows in subglacial channels.

Because of the lack of sediment, the geomorphology of the

and south-central portion of the map sheet is underlain by

characterized by broad plains averaging 290 m (950 feet)

elevation with relief ranging from 15 to 30 m. The Middle

with topographic relief ranging from moderate to high.

Archean granitoid rocks. Although locally rugged, this area i

Precambrian (Huronian) sequence outcrops in the northern and

western portions of the map-area. Differential erosion of these

layered sedimentary rocks has produced a ridged bedrock surface

Spectacular quartzite escarpments occur east of Elliot Lake, on

the prominent east-trending ridge housing the fire observation

television and microwave towers, and on Matinenda and Coffee

supported boulder to cobble gravels containing lenses of cross-

bedded coarse sand and pebbly sand. This is overlain by

Elliot Lake area is controlled by bedrock geology. The southeast

gravel pits, p-forms and other erosional features are also

the map area; and by boat in Lake Matinenda and Moon Lake.

INTRODUCTION Quaternary mapping of the Elliot Lake map area (NTS 41J/7) wa

Geological boundary, approximate

Esker, flow direction assumed

Glacially streamlined bedrock features

... Area of till with hummocky topography

CREDITS

southeasterly and southwesterly flow is recorded mainly in the

sediment as sandy lake plain and other glaciolacustrine deposits.

southern half of the map-area. Receding glacial lake waters

reworked much of the till in lower areas and redeposited the

Although the Lake Huron basin is known to have supported a

sequence of lakes at differing levels during and following

deglaciation, few detailed data are available in the northern

basin. Boissonneau (1968) interpretes water levels at 335 m

(1100ft) in the Elliot Lake area as Main Lake Algonquin. This

agrees with the recontructed Main Lake Algonquin water plane in

the Huron Basin of Lewis and Anderson (1989), and indicates that

deglaciation of the Elliot Lake area occurred at approximately

The Quaternary cover in the Elliot Lake area is generally thin

and discontiuous. Significant accumulations are restricted to the

the map-area is bare bedrock (unit 1) and, to a lesser extent the

bedrock-drift complex (unit 2), which includes a thin (less than

occur primarily in the northern and southern portions of the map

centre of the map-sheet and major valleys where sand and gravel

deposits over 15 m have been observed. The dominant terrane in

1 m) discontinuous drift cover. These bedrock-dominated areas

sheet and may represent a lack of deposition by ice and/or the

reworking and removal of previously deposited material

10,800 years BP.

DRIFT THICKNESS AND BEDROCK TOPOGRAPHY

Ice contact terrace

Glacial striation

X Small bedrock outcrop

Geology by P.J. Henderson and J.M. Halstead, 1990

🏅 Sand and gravel pi

Y Tailings dams

carried out in 1990 as part of a larger geological/geochemica program designed by the Ontario Geological Survey to create a mineral exploration database in the region. The emphasis of th study was to determine the distribution and type of Quaternar sediments and landforms, and to establish a strategy for drift prospecting in the map-area and surrounding region. Mapping was based extensively on interpretation of air photos at a scale of 1:15,840 and 1:54,000, and field observations. Field methods included the examination of man-made and natura! exposures, test pits, and soil probe samples. Although many san and gravel pits have been opened in the Elliot Lake area to provide aggregate for highway, mine road, and original townsit construction, a large percentage are now depleted and abandon Access to the area is limited to Highway 108, the primary road servicing the townsite of Elliot Lake and points north, mine access roads in the northeast quadrant, and forestry and service roads in the central and southeast quadrant. Access to the western half of the map-area was provided by: the hydro road extending across the northwest quadrant; the gas pipeline road

Previous investigations related to the Quaternary geology of the area have concentrated on extensive regional mapping and, specific resource evaluation. The surficial geology and glacial

service the southwestern corner of the map-area.

Secondary highways, accessed through the town of Blind River

history of the Timiskaming-Algoma area of northeastern Ontario was interpreted by Boissonneau (1965, 1968), based on air phot interpretation with limited ground-truthing. Regional engineering terrain conditions in the Blind River area (NTS 41J/SE) are summarized by VanDine (1980). Smith and Belcher (1957) and the Ontario Geological Survey (1984) have mapped and assessed aggregate resources in the Elliot Lake/Quirke Lake area. The authors wish to thank the following: Ralph Grant (Conservation Officer, Elliot Lake Office, Ministry of Natura constraints indicate that the sandy deposits overlie Resources), for sharing his facilities and considerable knowledg of the area; W. Farquhar and R. Cyr, owner/operators of local pi and logging operations, for providing access to their properties levels and nearshore deposition in the glaciolacustrine and insights into sediment distribution; C.L. Baker, P.J. Barnet M.B. McClenaghan and A.F. Bajc, Ontario Geological Survey, f administrative assistance and helpful discussions; and the sta Algonquin (?): Boissonneau, 1968) was not ice marginal. of the Blind River Office, Ministry of Natural Resources. forset beds dipping northeast into the lake. The delta

# BEDROCK GEOLOGY

Information on the bedrock geology of the Elliot Lake area has been obtained from a compilation map of the Blind River-Ellio

principal joint directions. Consequently, drainage systems, bot'

past and present, are subjected to this geological control.

Presently, the entire eastern half of the map-area drains

eastward through the Serpent River system. Flow through Dunlop

and Quirke lakes continues east around the nose of the Quirke

syncline before turning southward to enter rivers flowing into

Lake Huron. North Nordic, Westner, Horne and Elliot lakes drain

initially westward, then eastward into the Esten-Depot-McCarthy

lakes system and the Serpent River. The principal lakes in the

northwestern quadrant of the map area eventually drain into

trends is dependant upon: an understanding of the effects of the lakes. The general elevation in the northeast quadrant of the rugged bedrock topography on glacier flow; the complexity of the map sheet is 396 to 427 m (1300 to 1400 feet). In the northwes bedrock geology, particularly within the synclinal structure; and quadrant, elevations are lower, averaging 366 m (1200 feet). Valleys within the map area are oriented east, parallel to th strike of sedimentary formations, and along north-trending, northwest and northeast linears, apparently controlled by the

> The Timiskaming-Algoma Area; Canadian Journal of Earth Sciences, v. 4, no.1, p.97-109.

GLACIAL SEDIMENTS

Matinenda Lake and the Blind River

Thick deposits of till (greater than 1 m; unit 3) are confined to upland areas and occur commonly in depressions and on the flanks of bedrock knobs and ridges in the northern and central parts of the map area. In areas of abundant rock outcrop where till is of variable thickness or less than 1 m thick, the

Eschman, D.F. and Karrow, P.F. 1985. Huron Basin Glacial Lakes A Review; in Quaternary Evolution of the Great Lakes; Geological Association of Canada Special Paper 30, p.79-94.

Giblin, P.E., Leahy, E.J., and Robertson, J.A. 1977. Geological Compilation of the Blind River-Elliot Lake Sheet, Districts of Algoma and Sudbury; Ontario Geological Survey Preliminary Map P. 304 (1977 Revision), Geological Compilation Series, scale 1:125,720 or 1 inch to 2 miles.

Springer, Janet 1977. Ontario Mineral Potential, Elind River Sheet and Part of Sault Ste. Marie Sheet, Districts of Algoma, Sudbury, and Manitoulin; Ontario Geological Survey,

was not related to those occupying the Huron basin, but was of is indicated. The delta is tentatively correlated to the limited extent due to ice damming of the narrow valleys draining Nipissing transgression (Eschman and Karrow 1985). the area. The present day drainage of Dunlop Lake is to the Glaciolacustrine silts and clays (unit 7) are restricted to east, through Quirke Lake. elevations below 320 m (1050 feet). Within subaqueous fan With the exception of the deposits discussed above, the sequences west of Esten Lake the unit overlies sandy remainder of the sandy glaciolacustrine sediments were observe glaciolacustrine sediments and consists of silt-clay couplets

detailed examination is required, it is possible that the lake

at elevations below 335 m (1100 feet). East of Elliot Lake

sections up to 6 m high consist of statified, rhythmically

environment by meltwater rivers. The latter interpretation

apparently overlies organic-rich sediment containing wood

fragments, although these deposits were never observed in

thick, that contain many subangular pebbles and granules. These fine sediments are overlain by a series of beds 10 to 30 cm thick bedded, fining upward sequences of medium to fine sand and si with very few pebbles or granules. Beds vary from 1 to 4 cm thick consisting of massive to fining upward sands interbedded with and are horizontal with minor faulting. This sequence appears to diamictons. These sequences are interpreted as sediment flows represent sedimentation from suspension, possibly as underflows into a proglacial lake and suggest an advance, possibly minor, of into a lake. Although the contact was never observed, elevationthe ice margin. The thickest deposits (2 to 4 m sections) of fine-grained glaciolacustrine silt and clay. This suggests either a readvance glaciolacustrine sediment occur in the southwest quadrant of the of the ice margin into the proglacial lake, or a lowering of lake map sheet and in shoreline exposures on Lake Matinenda. In this area, they consist of brown-red brown, silty clay-clay couplets (varves?) varying in thickness from millimeters to 1 cm, with implies that the proglacial lake at 335 m elevation (Main Lak occasional interbeds of medium to coarse sand. The deposits may be overlain by minor amounts of outwash sand and gravel, as South of Lake of the Mountains a small delta was observed wit discussed earlier.

RECENT SEDIMENTS

Mappable deposits of modern alluvium (unit 8) are rare. In

Boissonneau, A.N. 1965. Surficial Geology, Algoma, Sudbury,

Timiskaming and Nipissing; Ontario Department of Lands a

Forests, Map S465, scale 1:506,880 or 1 inch to 8 miles.

Lewis, C.F.M. and Anderson, T.W. 1989. Oscillations of level

sand cool phases of the Laurentian Great Lakes caused by

of Paleolimnology, v. 2, p.99-146.

inflows from glacial Lakes Agassiz and Barlow-Ojibway; Journal

---1968. Glacial History of Northeastern Ontaric II.

section. A lake level of approximately 198 m (650 feet) elevation

overlain by laminated fine sand-silt-clay rhythmites, 1 to 2 cm

Moon Lake, and Brundage and Camp Bays, Matinenda Lake. These deposits consist of organic-rich fine to very fine sand and sile Swamps and organic deposits (unit 9) are common along the courses of small streams in bedrock dominated areas and within depressions in the bedrock surface. In the southeastern and southcentral parts of the map-areas, these deposits may be thir and underlain by glaciolacustine fine-grained sediments. Mine tailing deposits (unit 10) are present in the northeast quadrant of the map area. They contain the waste products of uranium milling and are confined to valleys in the bedrock surface by huge dams constructed, at least in part, of impermeable bentonite clay. Some attempt has been made to revegetate these areas.

general, rivers are downgrading and eroding into previously

deposited glacial sediments. Some modern accumulations are found

along the flood plain of the Blind River and Black River. Small

deltas are also present at the mouths of rivers draining into

APPLIED QUATERNARY GEOLOGY Glaciofluvial outwash deposits of the Ellict Lake map area provide adequate supplies of aggregate resources for all local

construction needs. The general quality of the coarse aggregate is good to excellent. The occurrence of uranium minerals in quartz-pebble conglomerates of certain Huronian formations may result in high levels of radioactivity within specific outwash

> VanDine, D.F.M 1980. Blind River Area (NTS 41J/SE), Districts of Algoma, Manitoulin and Sudbury; Ontario Geological Survey,

glacio lacustrine sediments.

deposits. Site testing has been recommended before aggregate is

Potenial mineralization (other than uranium) is fairly high in

map areas north, east and west of Elliot Lake (Springer 1977).

Specific areas of high mineral concentration may, in some cases,

be identified through drift prospecting, specifically till

composition reflects the bedrock composition of the up-ice

terrain. In the Elliot Lake area, the evidence indicates that

(1100 feet), the apparent level of the large proglacial lake

covering the area, thicker, unweathered deposits of till are

on the sides of bedrock knobs and ridges. At lower elevations

(less than 335 m), till is preserved in areas of local high

generally found in upland areas, particularly in depressions and

relief. When the relief is low to moderate, much of the till has

been reworked as glacial lake levels fell, and redeposited in low

areas as fine sand or silt deposits. Some till accumulations may

be preserved on protected flanks of bedrock highs, or underlying

Because of the thin sandy and nature of the till, geochemical

(silt plus clay) may be useful. The interpretation of dispersal

Northern Ontario Engineering Geology Terrain Study 98, 14p.

analysis for trace elements of the less than 0.063 mm fraction

glacial ice flowed south-southwest across the area depositing a

patchy veneer of till over bedrock. At elevations exceeding 335 m

analyses. Because the till is eroded directly from bedrock, its

used for structural concrete or building foundation backfill

(Ontario Geological Survey 1984).

Geological Survey of Canada, Miscellaneous Report 23, 119p.

Algoma; Ontario Department of Mines, GR 13, 88p.

Smith, D.J. and Belcher, J.C. 1357. Granular Materials

Investigation in the Elliot Lake-Quirke Lake Area; Ontario Department of Mines, Plan 2575 (unpublished).

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Ontario Geological Survey 1984. Aggregate Resources Inventory of

the Town of Elliot Lake, Algoma District; Ontario Geological

Survey, Aggregate Resources Inventory Paper 91, 36p.

Robertson, J.A. 1963. Townships 155, 156, 161, 162, District of

---1968. Geology of Township 149 and Township 150, District of Algoma; Ontario Department of Mines, GR 57, 162p.

Preliminary Map P. 1513, Mineral Deposits Series, scale 1:250,000.