LEGEND

SURFICIAL DEPOSITS

QUATERNARY

HOLOCENE - LATE WISCONSINAN

MA/OW **MARINE - ALLUVIAL AND OUTWASH DEPOSITS (MA,OW):** **MA*:** silty clay, sand and gravel; forms estuarine deposits, alluvial floodplains and alluvial channel deposits. **OW*:** silt, sand and gravel; massive to horizontally bedded; channel sequences common; forms flat plains and terraced deposits.

IC **ICE-CONTACT DEPOSITS (IC):** silty sand, gravel and boulders, abrupt grain size transition from shallow- to steeply-dipping beds; faulting is common; clasts reflect provenance of surrounding till; may be interstratified with till; forms kames, kame terraces, ice contact deltas and eskers; thickness 1-15 m.

LATE - MIDDLE WISCONSINAN

GSRT / MSRT **SHELBURNE RIVER TILL:** Occurs as granite (GSRT) and greywacke-slate (MSRT) lithological facies; loose, texture varies from a sandy matrix-rich to a stony, clast supported till; colour varies from white (10YR8/1)** to very pale brown (10YR7/3); nonweathered appearance; occurs as hummocks, ridges and a rolling ground moraine; deposits are crudely stratified; spatially associated with kames and eskers; exhibits extensive onlap of clasts down-ice onto adjacent bedrock units; renewal distances*** vary from 0.1 km to > 5 km; matrix may be derived from up-ice lithologies and may not reflect the composition of the pebble fraction; thickness varies from 1-3 m in areas of ground moraine to 10-15 m on hummocks and ridges; the major transport direction is toward the southeast with lesser transport toward the south and west.

BEAVER RIVER TILL: Divided into ablation, ground moraine and drumlin-derived units.

GTC / GWC / SLC Ablation moraine*: May occur as granite (GTC), greywacke (GWC) and slate (SLC) lithological facies; loose, matrix supported till containing intrabeds of silt, sand and gravel; colour varies from very pale brown (10YR7/4) to yellowish-brown (10YR5/4); forms hummocks and ridges with associated ice-contact deposits; locally derived or may exhibit extensive onlap of clasts and matrix down-ice onto adjacent rock types; renewal distances vary from 0.1 to 6 km; thickness 1-10 m; glacial transport is toward the southeast and south.

GTB / GWB / SLB Ground moraine: Subdivided into granite (GTB) and greywacke-slate (GWB/SLB) lithological facies; structureless stony matrix, though sandier varieties with minor washed zones around boulders are common; colour varies from light yellowish-brown (10YR6/4) to dark yellowish-brown (10YR4/4) in the granitic facies, light olive-brown (2.5Y5/4) in the greywacke and slate facies; generally forms a featureless ground moraine; exhibits rapid lithological change down-ice of bedrock contacts, > 90% of clasts are transported less than 1 km; renewal distances vary from tens to hundreds of metres; thickness 1-6 m; glacial transport directions are difficult to determine due to short renewal distance, it is southeastward across most of the South Mountain Batholith (SMB); however, northward, northwestward and westward dispersal was mapped in the northern and western margins of the SMB.

GTB(D) Drumlin-derived moraine (GTB(D)*: Loose, medium- to coarse-grained, sandy matrix, moderately stony, minor washing; colour is brown (10YR5/3) to dark yellowish-brown (10YR4/4); till mantles and forms a ground moraine between drumlins; nongranitic lithologies are incorporated from stratigraphically older tills; matrix composition is in part dependent on composition of reworked older till; thickness 1-4 m; actual glacial transport directions are the same as those of the ground moraine unit; however, a strong southeast transport was inherited from older, reworked southeast-transported till(s).

LT **LAWRENCETOWN TILL*** (LT): Muddy to sandy till, moderately compact, jointed, greenish mottling in the weathered zone; colour varies from dark reddish-brown (2.5YR3/4) to strong brown (7.5YR4/6); occurs as a ground moraine and drumlins; clast lithologies vary from 10-90% local bedrock to 10-90% non-granitic clasts derived from as far as 90 km, distal sources are the metasedimentary volcanic massif complex of the Cobequid Highlands, Meguma Group, metasedimentary and volcanic rocks of the White Rock, New Canaan, Kentville and Torbrook formations, and North Mountain basalt; renewal distances vary from hundreds of metres to tens of kilometres; thickness is 1-2 m as a ground moraine and 4-30 m as drumlins; dispersal direction varies from southward to southeastward.

EARLY WISCONSINAN (?)

HT **HARTLEN TILL (HT)*:** Occurs as granite (GTA) and slate (STA) lithological facies; sandy, compact till, clast-rich, fissile; colour varies from strong brown (7.5YR4/6) in granite facies to olive (5Y5/3) in slate facies; generally forms or cores drumlins; clast lithology dominated by local bedrock lithologies; 10-35 percent of clasts transported 20-25 km; thickness 1-10 m; glacial transport is toward the southeast with lesser transport toward the east-southeast(?).

PRE-WISCONSINAN

R **RESIDUUM (R)*:** Chemically-weathered bedrock; commonly develops a soil-like consistency due to in situ weathering followed by glacial mixing; may retain hypidiomorphic granular texture of parent granite, preservation of K-feldspar megacrysts and hydrothermally altered fracture zones; restricted to the topographically higher regions of the Southern Uplands; thickness varies from a veneer to > 3 m.

D **BEDROCK (D)*:** Glacially-scoured bedrock; areas of discontinuous till veneer and B-horizon soil developed to bedrock; bedrock structure and large scale features of glacial erosion are easily discernible on aerial photographs.

* Indicates units not mapped on this map sheet.

** All colours from Munsell Soil Colour Chart.

*** Renewal distance is the distance required by a given rock type (measured from the proximal contact of the up-ice lithology) to increase its proportion in till from 0% to 50% (Pettoniemi, 1985).

LEGEND

TILL CLAST LITHOLOGIES

1. **Scrag Lake monzogranite:** white to grey, medium- to coarse-grained, megacrystic; biotite (12-18%), muscovite and cordierite (trace).
2. **Davis Lake leucomonzogranite:** light grey to blue-grey, medium- to coarse-grained, megacrystic; biotite (4-8%), muscovite (1-2%).
3. **Dog Lake leucomonzogranite:** buff, pink, porphyritic; biotite (4-6%), muscovite (1-2%).
4. **East Kemptville leucogranite:** buff to cream, medium-grained, equigranular; biotite (2%), muscovite (2-5%) and topaz (trace); includes other highly altered granites.
5. **Sabeans / Salmon Lake leucogranite / monzogranite*:** buff, light- to white-grey, fine- to medium-grained; biotite (5-10%), muscovite (trace-2%).
6. **Meguma Group:** green slate and metawacke.
7. **Foreign:** basalt, diorite, rhyolite, mafic dyke, indurated sandstone, red, green and white quartzite, silicious volcanic breccia, buff, red and grey metasediments.

Rock units are in part simplified after Ham and MacDonald, 1991. Numbers in boxes correspond with numbers on bars of the till clast histograms and also to rock units on simplified bedrock geology map (Figure 1) after Ham and MacDonald, 1991.

*Bedrock unit not shown on Figure 1.

REFERENCES

Finck, P.W., Boner, F.J. and Graves, R.M.
1990: Heavy Mineral Till Geochemistry (Tin) of the Western South Mountain Batholith; Nova Scotia Department of Mines and Energy, Open File Report 90-005, 41p.

Ham, L.J. and MacDonald, M.A.
1991: Preliminary Geological Map of Wentworth Lake (21A/04); Nova Scotia Department of Mines and Energy, Open File Map 91-020, scale 1:50 000.

Peltoniemi, H.
1985: Till Lithology and Glacial Transport in Kuhmo, Eastern Finland; Boreas, v. 14, p. 67-74.

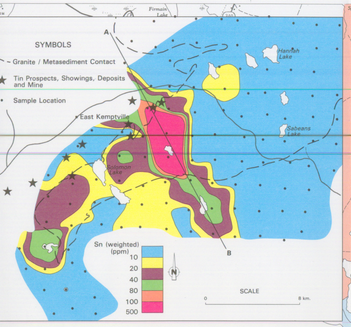


FIGURE 4. This figure shows the dispersal of tin in Shelburne River Till within the study area (modified from Finck et al., 1990). Glacial dispersal of contact and shear related tin mineralization along the northwest edge of the Davis Lake Pluton mirrors the combined clast dispersal of granite and metasedimentary clasts (Figures 2 and 3). The "East Kemptville composite dispersion train" (Finck et al.,1990) incorporates tin from several source areas including the East Kemptville mine, the Baby Zone (west of the mine), the Duck Pond deposit, and several other tin showings (prospects) along the northwest margin of the pluton and within the East Kemptville shear zone. Due to multiple granite- and metasediment-hosted tin source areas the tin dispersal train should show geochemical patterns reflecting this dual provenance. Large-scale dispersal of tin from along the northwest margin of the Davis Lake Pluton is further illustrated by the broad band of tin and the spatial association of metasedimentary clasts in the till overlying the "western neck" of the Davis Lake Pluton (Figures 3 and 4).

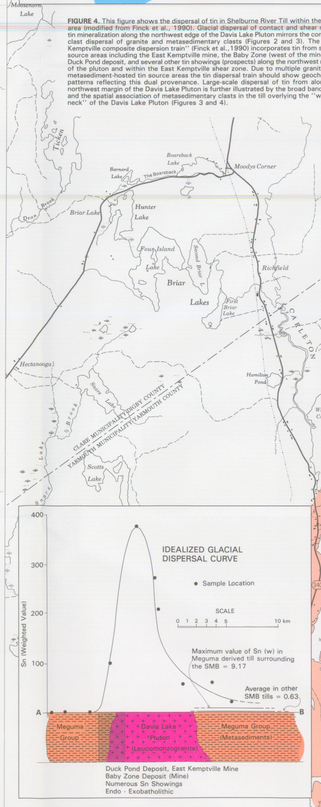
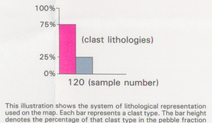


FIGURE 5. This figure illustrates the "textbook" glacial dispersal of tin as reflected by a section (A-B, Figure 4) from northwest of the Duck Pond Deposit to southeast of Mosseffy Lake. Rapid uptake of tin is observed over the endobatholithic and exobatholithic zones. Values of tin (weighted) mimic a classic exponential decay curve. The curve also illustrates the extremely high background tin concentration in till over 15 km southeast of the source areas, as compared with other metasedimentary tills elsewhere surrounding the South Mountain Batholith.

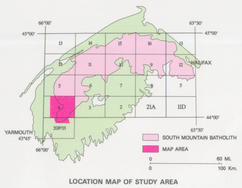


This illustration shows the system of lithological representation used on the map. Each bar represents a clast type. The bar height denotes the percentage of that clast type in the pebble fraction of the till. Clast lithologies on histograms are keyed to the legend. Axis of histograms defines sample location.

SYMBOLS

- Surficial contact (abrupt, gradational, assumed)
- Granite / Metasediment bedrock contact from Ham and MacDonald, 1991.
- Lineaments (based on airphotograph interpretation)
- Moraine (minor)
- Ablation hummock
- Esker, flow direction (known, unknown) < < < < < > < > < > < >
- Kettle
- Drumlin
- Composition of surficial material or position of geological contact is uncertain. ?

Planimetric base from National Topographic Series, Department of Energy, Mines and Resources, Ottawa. Updated from aerial photography that was available in May, 1988
Cartography by Land Registration and Information Service, Amherst, Nova Scotia.



LOCATION MAP OF STUDY AREA

LOCATION MAP

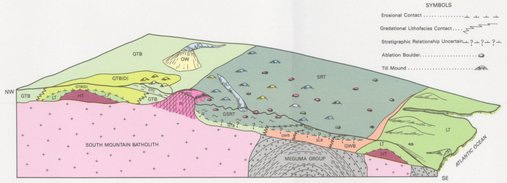


FIGURE 6. Block diagram illustrating the spatial and temporal relationships observed or inferred between till units, their lithofacies and the relationships between till and underlying bedrock geology on the South Mountain Batholith. The horizontal and vertical scales are schematic.

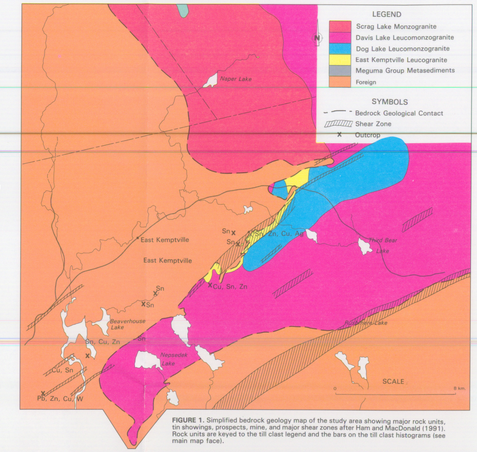


FIGURE 1. Simplified bedrock geology map of the study area showing major rock units, tin showings, prospects, mine, and major shear zones after Ham and MacDonald (1991). Rock units are keyed to the till clast legend and the bars on the till clast histograms (see main map face).

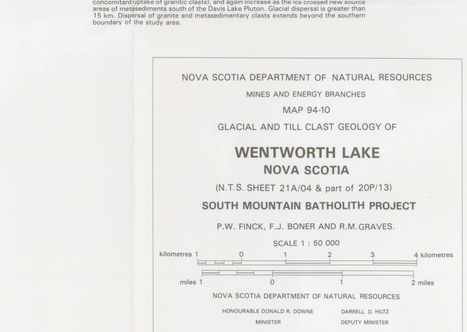


FIGURE 2. This figure shows the percentage of granite clasts in surface till (Shelburne River Till) in the study area. Large-scale glacial dispersal of granite clasts south of the Davis Lake Pluton over Meguma Group metasediments is demonstrated. Although dispersal of granite clasts appears greater in the eastern half of the study area than in the western half, this is not true. The percentage of granite clasts in surface till reflects the size of the granite body, i.e. the source area of a particular rock type, up ice. The decrease in the percentage of granite clasts south of the western end of the Davis Lake Pluton reflects the "necking" of the Davis Lake Pluton in this area.

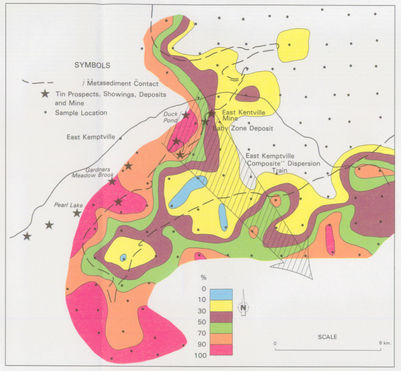


FIGURE 3. This figure shows the percentage of Meguma Group metasediments in surface till (Shelburne River Till) within the study area. Large-scale glacial dispersal of metasedimentary rocks from the area north of the Davis Lake Pluton, across and south of the pluton,is demonstrated. Percentages of metasediments are high north of the pluton, decrease as the till was transported across the western neck of the pluton (with concomitant uptake of granitic clasts), and again increase as the ice crossed the source areas of metasediments south of the Davis Lake Pluton. Glacial dispersal is greater than 15 km. Dispersal of granite and metasedimentary clasts extends beyond the southern boundary of the study area.

NOVA SCOTIA DEPARTMENT OF NATURAL RESOURCES
MINES AND ENERGY BRANCHES
MAP 94-10
GLACIAL AND TILL CLAST GEOLOGY OF

WENTWORTH LAKE
NOVA SCOTIA

(N.T.S. SHEET 21A/04 & part of 20P/13)

SOUTH MOUNTAIN BATHOLITH PROJECT

P.W. FINCK, F.J. BONER AND R.M.GRAVES.

SCALE 1 : 50 000

kilometres 1 0 1 2 3 4 kilometres
miles 1 0 1 2 miles

NOVA SCOTIA DEPARTMENT OF NATURAL RESOURCES
HONOURABLE DONALD R. DOWNE, MINISTER
DARRELL D. HILTZ, DEPUTY MINISTER
HALIFAX, NOVA SCOTIA
1994

Nova Scotia Department of Natural Resources
Canada-Nova Scotia Mineral Development Agreement