Surficial Geologic Map of the Smarts Mountain 7.5' Quadrangle, New Hampshire

By

Carol T. Hildreth

Correlation of Map Units

Qs  Qal  af
Qcb  Qlb
Qtb  Qgu
Qgb  Qmr
Qhb
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Description of Map Units

A thin, discontinuous layer of windblown sand and silt, generally mixed with underlying glacial deposits by frost action and bioturbation, is present near the ground surface over much of the area but is not shown.

af  ARTIFICIAL FILL—Manmade. Material varies from natural sand and gravel to quarry waste to sanitary landfill, includes highway and railroad embankments and dredge spoil areas. This material is mapped only where it can be identified using topographic contour lines or where actually observed. Minor artificial fill is present in virtually all developed areas and bridge abutments throughout the quadrangle. Thickness of fill varies.

Qal  STREAM ALLUVIUM (HOLOCENE)—Sand, silt, gravel and muck in floodplains along present rivers and streams. As much as 3 m (10 ft) thick. Extent of alluvium indicates most areas flooded in the past that may be subject to future flooding. In places the unit is indistinguishable from, grades into, or is interbedded with swamp deposits (Qs). Note: Well-sorted surficial materials along the margins of the Connecticut River are mapped as Qst deposits because the river level is 6-12 m (20-40 ft) higher than it would be naturally, due to the Wilder Dam, just a few miles downstream in the Hanover quadrangle.

Qs  SWAMP DEPOSITS (HOLOCENE)—Muck, peat, silt and sand deposited in poorly drained areas. Generally 0.5 to 3 m (1 to 10 ft) thick. In places the unit is indistinguishable from, grades into, or is interbedded with Stream Alluvium (Qal deposits). These materials are equivalent to those mapped as wetland deposits by other mappers.

Qcb  CLOG BROOK DEPOSITS (HOLOCENE)—Sand, silt and gravel glaciofluvial and glaciolacustrine deposits laid down by glacial meltwater in contact with or beyond adjacent ice as kame-delta, shore, and nearshore outwash. As much as 6 meters (20 feet) thick.

Qjb  JACOBS BROOK DEPOSITS (HOLOCENE)—Sand, silt and gravel glaciofluvial deposits laid down by glacial meltwaters in contact with or beyond nearby ice as kame-delta, alluvial fan and its outwash deposits. As much as 9 meters (30 feet) thick.
Qgu UNDIFFERENTIATED ICE-CONTACT MELTWATER DEPOSITS (PLEISTOCENE)—Sand and gravel deposited in contact with or beyond the ice margin by meltwater streams; as much as 3 meters (10 feet) thick.

Qtb GLACIOFLUVIAL DEPOSITS OF TROUT BROOK (PLEISTOCENE)—Glaciofluvial sand and gravel deposited by glacial meltwaters flowing westward to glacial Lake Upham (Lougée, 1935) in the Connecticut valley; as much as 3 meters (10 feet) thick.

Qgb GLACIOFLUVIAL AND GLACIOLACUSTRINE DEPOSITS OF GRANT BROOK (PLEISTOCENE)—Sand, gravel, silt and clay deposited by glacial meltwater in contact with or beyond adjacent ice as kame-delta, shore, nearshore, outwash and bottom-set beds of a small temporary glacial lake impounded by the till hills about 0.6 miles (1 km) west of Lyme Center. Varve clay sections have been found in this unit near Lyme Center. Erosion of the till hills eventually drained the lake. Potholes occur in the bedrock channel of the Brook upstream from the bridge just east of the till gorge. Deposits are as much as 6 meters (20 feet) thick.

Qhb GLACIOFLUVIAL DEPOSITS OF HEWES BROOK (PLEISTOCENE)—Sand, silt, gravel deposited by meltwater streams in the Hewes Brook valley, initially graded southward to a spillway at about 700 feet elevation and later westward through the till hill that the modern stream has cut through; as much as 6 meters (20 feet) thick.

Qmr GLACIOFLUVIAL DEPOSITS OF MASCOMA RIVER (PLEISTOCENE)—Sand, gravel and silt deposited by south-flowing meltwater in contact with or beyond adjacent ice primarily as outwash deposits As much as 12 meters (40 feet) thick.

Qt TILL (PLEISTOCENE)—Light- to dark-gray, nonsorted to poorly sorted mixture of clay, silt, sand, pebbles, cobbles and boulders; a predominantly sandy diamicton containing some gravel and sand. Varying proportions of silt and sand form the matrix, which ranges from loose to compact and contains a variety of irregularly shaped rock fragments, most of which are less than 4 inches (10 cm) long. Most of the uplands in the quadrangle are mantled by till deposited directly by the ice sheet. Generally underlies most other deposits. Thickness varies and generally is less than 6 m (20 ft) but is probably more than 30 m (100 ft) under some drumlins and streamlined hills. Denny (1958, p. 76-77) described sandy and compact till in the valley of Stoney Brook, near the south edge of the adjacent Enfield map.

Bedrock Exposures. Not all individual outcrops are shown on the map. Solid dots indicate individual outcrops; ruled pattern indicates area of abundant exposures and areas where surficial deposits are generally less than 3 meters (10 feet) thick. Mapped in part from aerial photographs, soil surveys (Homer, 1999), bedrock mapping data from Peter Thompson (personal communication, 2008), and previous geologic and materials maps (Denny, 1958; Hadley and Chapman, 1939; and Lyons and others, 1997).

Glacial striation - Point of observation is either at point of arrow or at dot at center of arrow. Line shows ice-flow direction inferred from striations on bedrock, Number is azimuth (in degrees) of flow direction.

Glacial striation from Goldthwaite and others (1951) — direction and location (at tip of arrow) are approximate.

Direction of meltwater or meteoric water flow over outwash, alluvium or till deposit.
Drumlin form or streamlined hill – Indicates general direction of glacial ice movement.

Contact – Boundary between units, approximately located.

Area of abundant boulders on land surface.

Moraine ridge – Line shows inferred crest of moraine ridge interpreted to have been deposited at the glacier margin.

**P3 Photo spot**

MATERIALS OBSERVATIONS—Surficial materials in exposures, well holes and test holes. Letters indicate texture in decreasing order of abundance. Number indicates thickness in feet.

- g = gravel,  b = boulder,  c = cobble,  p = pebble,
- s = sand (as separate beds; not including sand as matrix of gravel)
- F = very fine sand,  L = silt,  Y = clay,  t = till,  st = sandy till
- B = bedrock,  R = refusal

WELL- AND TEST-HOLE DATA—Approximately located from New Hampshire Department of Environmental Services, Water Resource Division, Concord, N.H

40 Ø Well or test hole reported as ending in bedrock or refusal. Number is reported depth to bedrock.

TEXTURE OF STRATIFIED DEPOSITS—Indicated to a depth of at least ½ meter (~1.5 feet).

- Pebble to boulder gravel
- Mixed sand and gravel
- Sand
- Sand, fine sand, silt and clay
- Borrow pit
- Borrow pit, abandoned
REFERENCES


