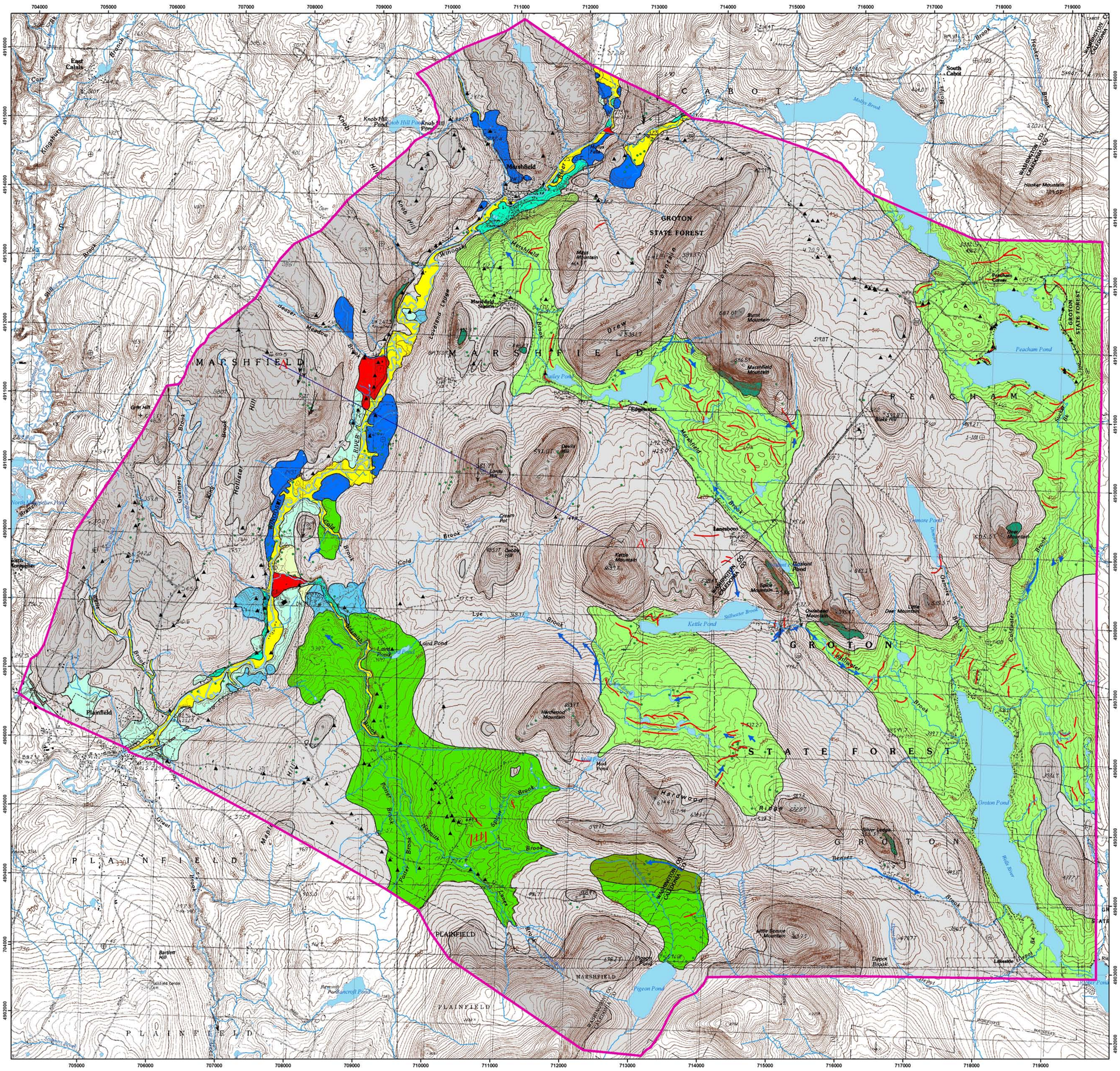
VGS Open File Report VG08-4, Plate 1
Surficial Geologic Map of the Knox Mountains Area, Vermont




Base maps from USGS Topographic Quadrangles.
Quadrangle names printed in black italics.
Coordinate System: Vermont State Plane, meters, NAD 83.
Geographic coordinates shown at topo corners are in NAD 83.
Topographic contour interval: 6 meters/20 feet.
Cartography by George Springston and Marjorie Gale
This map is not a survey and is for planning purposes only.
September 28, 2008.

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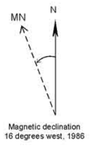
0 0.5 1 2 Miles

0 0.5 1 2 3 4 5 Kilometers

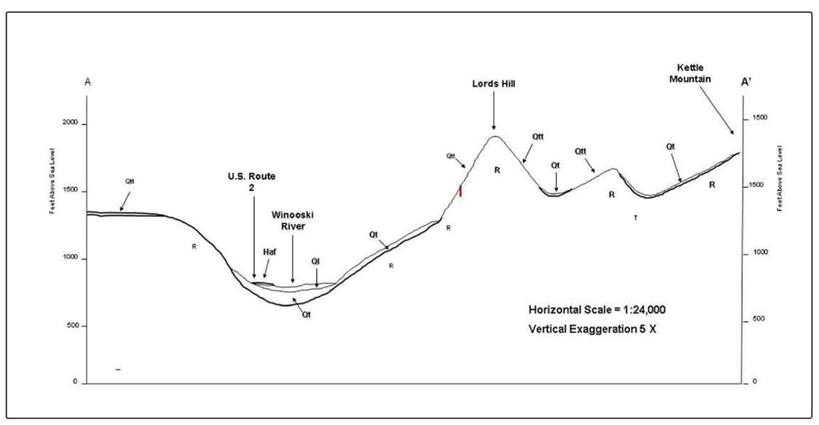



Magnetic declination
16 degrees west, 1986

# Surficial Geologic Map of the Knox Mountains Area, Marshfield and Peacham, Vermont

by
George Springston and Jonathan Kim

2008




## Legend

### Description of Map Units

**f** — Artificial Fill. Artificially emplaced earth along rail beds, road beds, embankments and low lying areas. There is extensive fill along the interstate and along road approaches to the interstate.

**gf** — Graded or Filled. Areas of extensive grading and/or filling, commonly associated with buildings, parking lots, or roads.

HOLOCENE DEPOSITS

**Haf** — Alluvial Fan Deposits. Pebble gravel, cobble gravel, boulder gravel, and pebbly sand deposited at the mouths of tributary streams to the Winooski River. Commonly less than 5 meters in thickness.

**Hal** — Alluvium. Silt, sand, pebble gravel, cobble gravel, and boulder gravel deposited by modern streams. Deposits include stream channel and bar deposits and finer-grained floodplain deposits. Minor wetland deposits are common. Thickness is highly variable with the deposits along the smaller streams typically less than 3 meters thick. Thicknesses in the Winooski River floodplain are greater. Permeability usually intermediate to low. Can be good aquifer if sufficiently thick but of limited aerial extent. These areas are typically flooded yearly or every few years.

**Hft** — Fan-Terrace Deposits. Pebble and cobble gravel and pebbly sand deposited on top of lake bottom deposits of glacial Lake Winooski subsequent to drainage of the lake. The gravel and sand are commonly less than 3 meters thick. Found near the mouths of present day tributaries to the Winooski.

**Hst** — Stream Terrace Deposits. Silt, sand, pebble gravel, cobble gravel, and boulder gravel deposited on terraces above the modern floodplains of streams. Deposits of mappable size are limited to the Winooski River valley. Generally less than 5 meters thick. Variable permeability but usually intermediate. Fair to good aquifer. The terrace surfaces are rarely flooded, if at all. However, these deposits are highly erodible and are quite susceptible to stream erosion and slope failure.

**Hta** — Talus Deposits. Accumulations of angular to subangular boulders at the bases of prominent cliffs.

PLEISTOCENE DEPOSITS

**Pl** — Lake Deposits, Undifferentiated. Fine grained varved or thinly laminated deposits of silt and silty clay and well sorted, laminated very fine to medium sand, accumulated in glacial Lake Winooski. Thickness typically increases from less than a meter on the valley side to 10 or more meters in the valley bottom. Poorly drained and with poor aquifer potential. Prone to stream bank failures and headward erosion of the slopes.

**Plb** — Lake Silt and Silty Clay. Fine grained varved or thinly laminated deposits of silt and silty clay accumulated in the deeper portions of glacial Lake Winooski lake basins. Thickness typically increases from less than a meter on the valley side to 10 or more meters in the valley bottom. Poorly drained and with poor aquifer potential. Prone to stream bank failures and headward erosion of the slopes.

**Pls** — Lake Sand. Well to moderately sorted, laminated very fine to medium sand deposited in shallow waters or on shorelines of glacial Lake Winooski. Of variable thickness; commonly ranging from less than 1 meter to greater than 10 meters in thickness. Prone to gullying and stream bank erosion. Found on higher parts of terraces in the Winooski River valley. Moderately good aquifer if thick, poor if thin.

**Pt** — Till. Extremely poorly sorted diamict with abundant angular to subangular clasts. Matrix is typically dominated by silt or silty fine sand. Clasts range in size up to large boulders. Surface boulders are commmonly abundant. Deposits are typically unstratified. Thickness generally greater than 3 meters but rock outcrops may be common. Generally low permeability and poor aquifer potential.

**Pts** — Sandy till. Extremely poorly sorted diamict with abundant angular to subangular clasts. Matrix is typically dominated by fine sand. Clasts range in size up to large boulders. Deposits are typically unstratified, although minor lenses of stratified sand and gravel are found. Thicknesses appear to range from about 3 to 10 meters. Topography is commonly hummocky and moraine ridges are common. Surface boulders are very abundant, with many large blocks on the moraine crests. Permeability may be low to moderate and these deposits probably have limited aquifer potential.

**Ptt** — Thin till. Similar to till described above, but thickness generally less than 2 to 3 meters with rock outcrops abundant. Surface boulders or erratics are common. Occurs on moderate to steep hill and mountain slopes and summit areas. Generally low to moderate permeability. Generally poor aquifer potential.

**Ptth** — Thick till. Similar to the sandy till described above, but of anomalous thickness (exceeding 30 meters in places) and overlying a variety of bedded sands, gravels and silts. Found in the Naismith Brook valley in the west-central part of the project area. Generally low to moderate permeability in the till but the stratified deposits below may have higher permeability and may have better aquifer potential.

**Ptw** — Washed Till. Similar to the tills described above, but with an extremely bouldery surface with little matrix left between the boulders. Found in the saddle between Nasmith Brook and Beaver Brook, north of Pigeon Pond. This may be the result of winnowing of the fines out from between the boulders by glacial meltwater.

### Explanation of Symbols

- Bedrock outcrops
- Striation
- Moraine ridge - Ridge of till interpreted to have formed in marginal zone of glacier
- Outwash channel
- Field Stations
- Wells
- Project area boundary
- Line of cross-section

Research supported by the Vermont Geological Survey, Dept. of Environmental Conservation, VT ANR. This geologic map was funded in part by the USGS National Cooperative Mapping Program. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

Field Area Location

Published by:
The Vermont Geological Survey
Laurence Becker, State Geologist
103 South Main St., Logue Cottage
Waterbury, VT 05671-2420
http://www.anr.state.vt.us/dec/geo/vgs.htm

## Legend

- Depth to bedrock, 20' contour interval
- Bedrock outcrop
- Located water wells
- Project area boundary

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Cartography by George Springston,
Norwich University Department of Geology and Environmental Science.
This map is not a survey and is for planning purposes only.
May 19, 2008.

1:24,000

0 0.5 1 2 Miles

0 0.5 1 2 3 4 Kilometers

MN N

Magnetic declination
16 degrees west, 1986

# Depth to Bedrock Map of the Knox Mountains Area, Marshfield and Peacham, Vermont

by

George Springston, 2008

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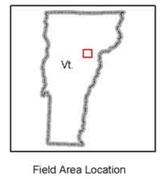


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