

Description of Map Units

Holocene Deposits

- af** Artificial Fill. Artificially-emplaced material along road beds, embankments and in developed areas. Material varies from natural sand, gravel, or till to various artificial waste materials. Thickness varies.
- Ha** Alluvium. Silt, sand, and gravel deposited by modern streams. Includes stream channel, bar, and floodplain deposits. Wetland deposits are common within these areas and are not distinguished. Thickness in tributary valleys is typically less than 3 meters, although the depth may be much greater in the valleys of the larger streams.
- Hal** Alluvial Terrace Deposits. Silt, sand, and gravel deposited on terraces above the modern floodplains of streams. They are composed of a variety of channel, bar, and floodplain deposits. Generally less than 5 meters thick.
- Haf** Alluvial Fan Deposits. Boulder, pebble, and cobble gravel and pebbly sand deposited at sites where steep, stream gradients are sharply reduced. Common at the mouths of steep tributaries where they meet the main stream. Generally less than 5 meters thick.
- Hw** Wetland Deposits. Accumulations of organic matter and/or clastic sediment in low-lying areas. Includes a wide variety of wetland types. Commonly overlaying other deposits such as alluvium, lacustrine sediment, or till. Only larger deposits are shown.
- Hta** Talus. Fans or aprons of fallen blocks of angular rock at the bases of bedrock cliffs. May contain colluvial (slope-wash) deposits as well. Of variable thickness.
- Hc** Colluvium. Fans or aprons of slope-wash sediment that have accumulated at the base of steep slope segments. Thickness is highly variable, although usually less than 3 meters.

Pleistocene Deposits

- Pl** Lacustrine Deposits, Undifferentiated. Coarse- to fine-grained sediment deposited in a glacial lake.
- Plc** Lacustrine Deposits, Coarse-grained. Well-sorted sand, pebbly sand and/or sandy gravel deposited in shoreline, shallow water, or lake bottom environments of a glacial lake.
- Plf** Lacustrine Deposits, Fine-grained. Clay, silt, and very fine to fine sand deposited in deeper waters. Commonly laminated. Deposited in distal lake bottom environment of a glacial lake.
- Pldhi** Lacustrine Deposits, Delta. Well-sorted sand and gravel deposited in glacial Lake Hitchcock at the mouth of a tributary stream. Includes topset and foreset beds.
- Ple** Esker Deposits. Elongate ridge of ice-contact stratified sand and gravel deposited by glacial meltwater streams in tunnels within or beneath the glacial ice. Low eskers are exposed at the inlet and outlet of Ricker Pond.
- Pt** Till. Very dense to loose, unsorted to very poorly sorted material deposited directly from glacial ice. Contains a wide range of grain sizes, from clay or silt up to large boulders. Throughout much of the quadrangle the matrix is dominated by fine to medium sand. Surface boulders are very common, especially in areas on or down-glacier (~SSE) from areas of granite bedrock. Thickness is highly variable, from less than 3 meters to greater than 30 meters. Areas near the tops of hills that are mapped as till may include colluvium and talus deposits and/or have less than one meter to bedrock.

Quaternary Deposits

- Qg** Sand and Gravel, Undifferentiated. Encompasses a wide variety of coarse-grained surficial materials in cases where information is inadequate to determine age and environment of deposition. Some of these deposits in this quadrangle may be older alluvial fan deposits or glacial outwash.

Map Symbols

- ▲ Surficial Field Station
- Bedrock Outcrop
- Shallow Bedrock
- ↑ Glacial Striation
- ◆ Glacial Boulder
- Well
- × Quarry
- × Sand and Gravel Site
- Contacts (All Are Approximate)
- Abandoned Channel
- Crag and Tail
- Esker
- Meltwater Channel
- Moraine
- Till Bench
- Glacial Lake Hitchcock
- Quadrangle
- Index Contours (100 foot)
- Contours (20 foot)

Definitions

Abandoned Channel. A segment of stream channel that is still exposed at the Earth's surface that has been cut off from the remainder of the stream. Includes oxbows and other abandoned channel segments on modern floodplains as well as older features preserved on alluvial terraces.

Crag and Tail. A streamlined hill or ridge, consisting of a knob of resistant bedrock with an elongate body of more erodible bedrock, till, or both, on its lee or down-glacier side. In this quadrangle the features are oriented approximately NNW - SSE.

Glacial Striation. Ice flow direction from glacial striations or grooves.

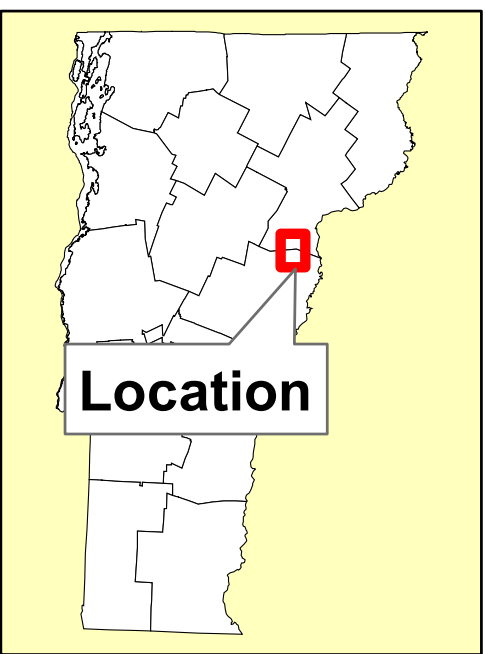
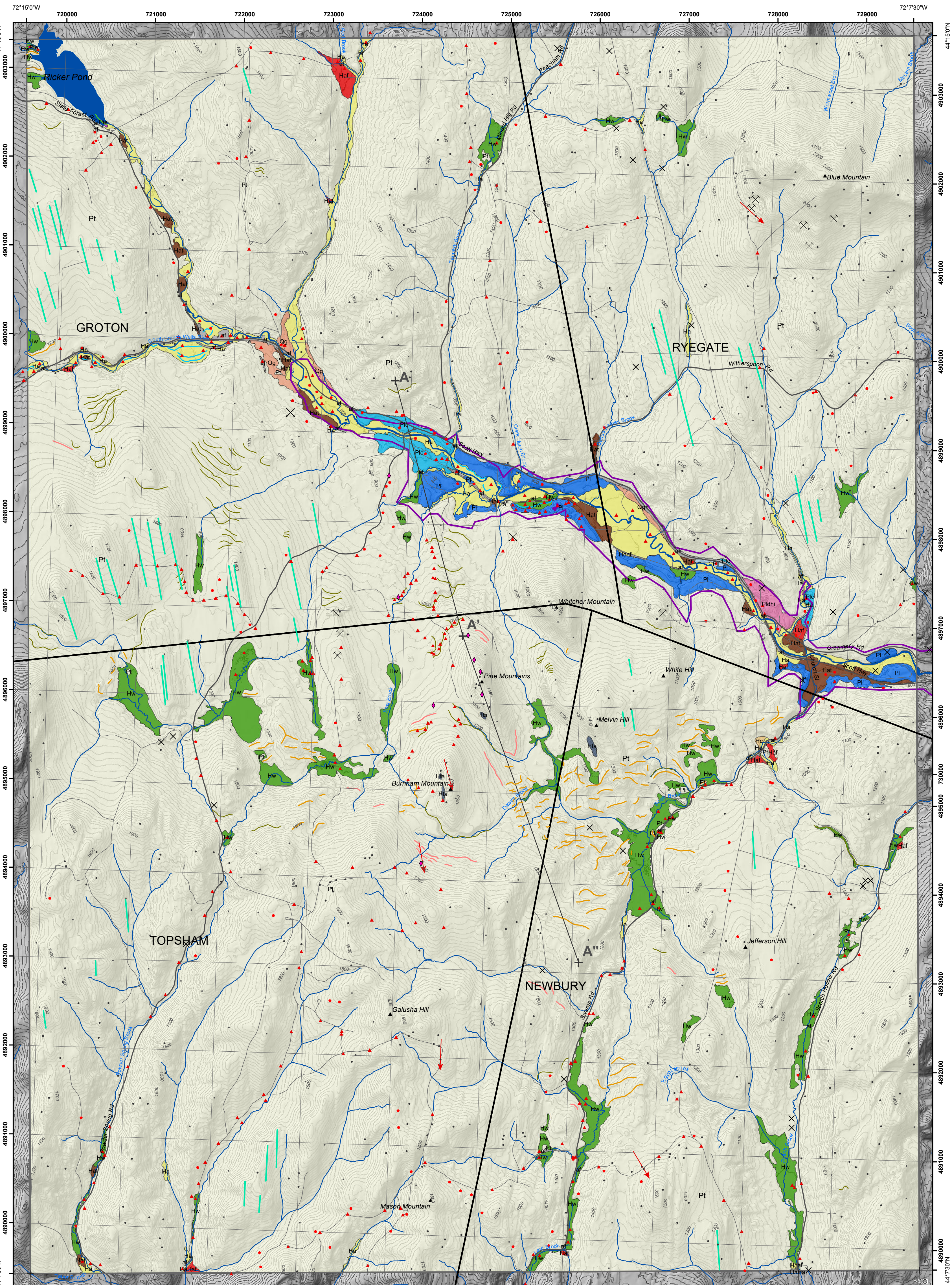
Meltwater Channel. Channel formed by glacial meltwater flowing away from or parallel to a glacial margin. Channels formed by stream erosion of a hillside in contact with the margin of glacial ice commonly run across a hillside and may terminate abruptly. Multiple channels on the same slope may have formed as the ice-margin retreated progressively down slope.

Moraine. Narrow ridge of till and/or water-lain sediment deposited in the marginal zone of a glacier. In this quadrangle the moraines are composed of till with a matrix of fine- to medium-sand.

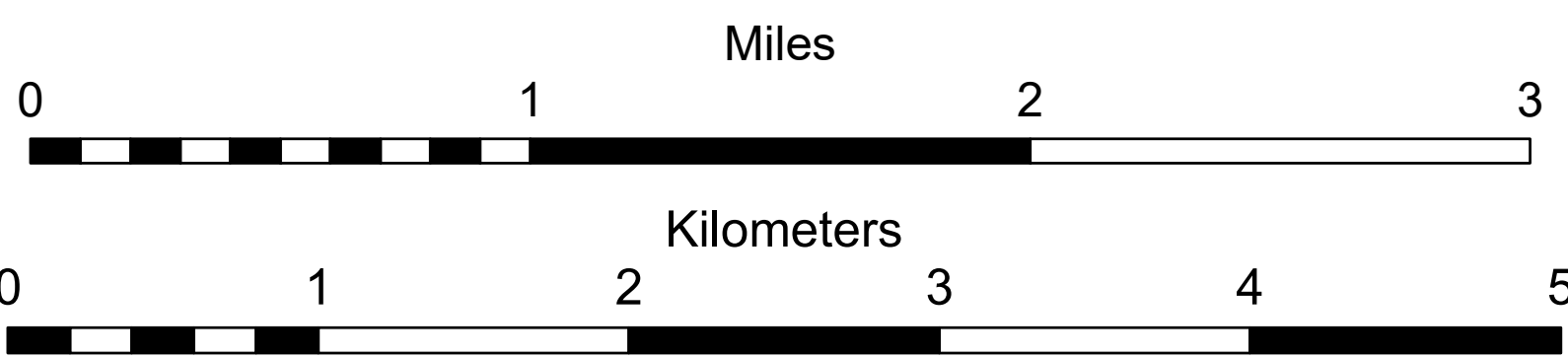
Till Bench. Distinct benches oriented parallel to contours with level or gently sloping tops. The features are underlain by till. Similar features on both flanks of Mount Mansfield in the Green Mountains of northern Vermont have been interpreted to be a type of lateral moraine by Wright (2019).

Reference

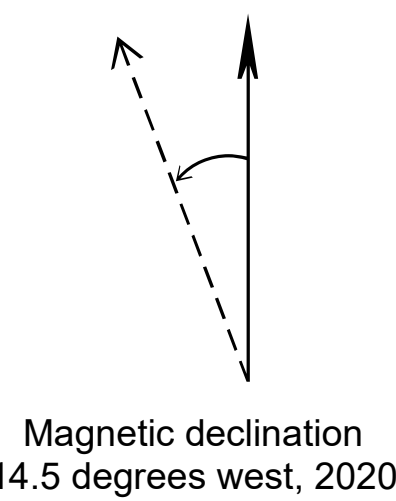
Wright, S.F., 2019, Lateral recessional moraines in the Green Mountains of Northern Vermont: Geological Society of America, Northeastern Section, Abstracts with Programs, v. 51, no. 1, paper 13-7.



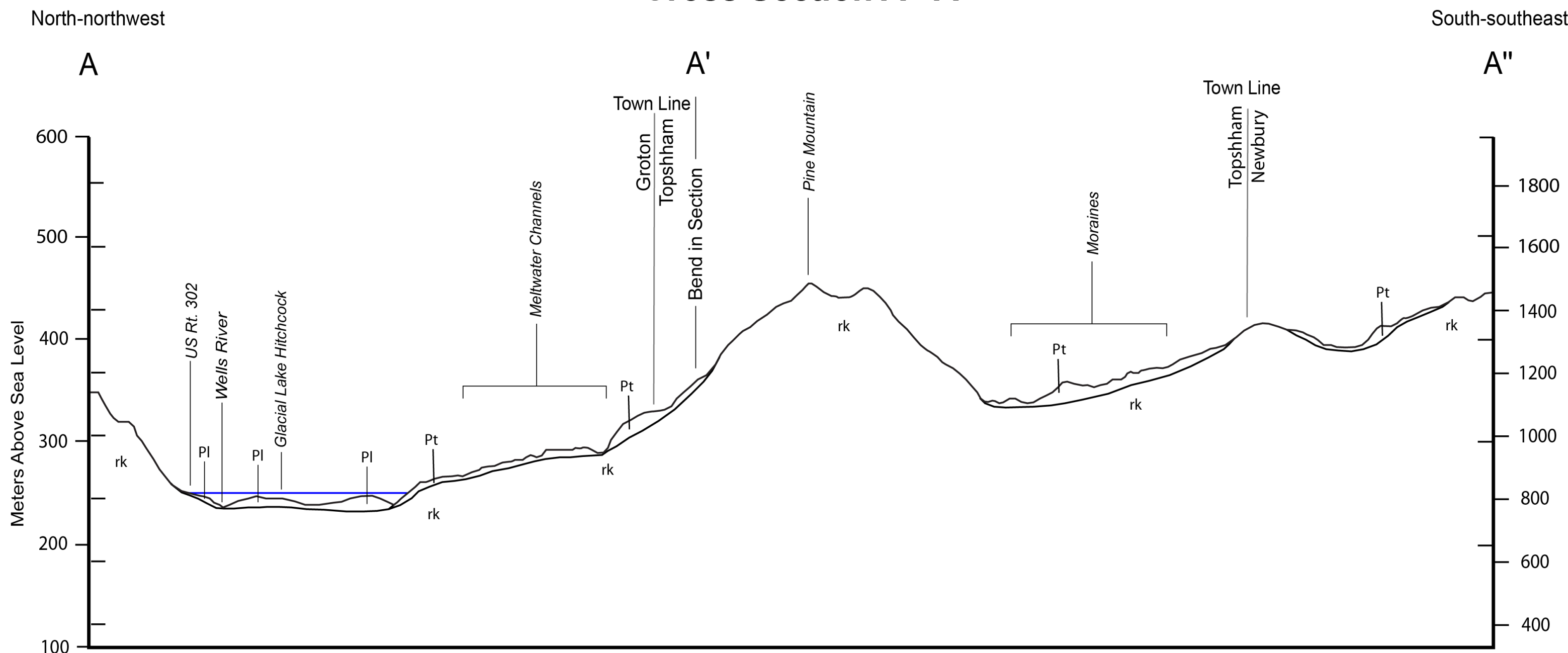
Scale 1:24,000



Contour Interval 20 feet



Cross Section A - A''



Horizontal Scale = 1:24,000
Vertical Exaggeration = 5 X



Looking northeast from Powder Spring Road in Groton toward Blue Mountain.



Falls over granite outcrop on Wells River, downstream of Ricker Pond. Note sub-horizontal sheeting joints.



Typical exposure of rusty-weathering phyllite of Gile Mountain Formation overlain by very thin till. From hills south of the Wells River valley. Pack for scale.



Large granite glacial boulder. These are found throughout the quadrangle, but are especially common in the area south of Groton Village in the central part of the quadrangle. Auger is one meter long.



Typical moderately loose, bouldery, sandy till on west side of Powder Spring Road, Topsham. Shovel for scale.



Dry meltwater channel in bouldery till in Groton north-northwest of Pine Mountain.

Coordinate System: Vermont State Plane, FIPS 4400, NAD 83. Geographic coordinates shown at topo corners are in NAD 83. Grid overlay on map is UTM, Zone 18N, NAD83. Base map data from the Vermont Center for Geographic Information (VCGI). Contours and shaded relief layer derived from 0.7 m lidar DEM, downloaded as a 5.0 m DEM from VCGI. Digital cartography by George Springston, Norwich University, Dept. Earth and Environmental Sciences, March 30, 2020.

Additional bedrock outcrops are derived from the Vermont Geological Survey layer "Bedrock Outcrops" hosted by VCGI.

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Vermont Geological Survey, Dept. of Environmental Conservation
Jonathan Kim, Acting State Geologist
1 National Life Dr., Montpelier, VT
802-522-5401
<http://dec.vermont.gov/geological-survey>



Surficial Geologic Map of the Groton
7 1/2 Minute Quadrangle, Vermont
by
George E. Springston
2020