

### Description of Map Units

(Not necessarily in stratigraphic order; minerals listed in order of increasing abundance)

- CRETACEOUS POST-METAMORPHIC INTRUSIVE ROCKS**
- Kd Lamprophyre, camptonite, or diabasic dikes
  - Kt Trachyte dikes
  - Kfd Spherulitic felsic dike
  - Ks Undifferentiated, medium-grained, hornblende-biotite syenite and lesser granite at Mount Ascutney
  - Kgd Undifferentiated, coarse-grained, hornblende-biotite gabbro and medium to coarse-grained, locally porphyritic, biotite-hornblende diorite at Mount Ascutney
- CRETACEOUS CONTACT METAMORPHIC ROCKS AT MOUNT ASCUTNEY**
- hmf Hornfels
  - kch Cordierite hornfels
- DEVONIAN AND CRETACEOUS LATE-METAMORPHIC TO POST-METAMORPHIC ROCKS**
- KDq Quartz veins
- DEVONIAN LATE-METAMORPHIC INTRUSIVE ROCKS**
- Dg Massive to weakly foliated, muscovite-biotite-quartz-microcline-plagioclase granite to granodiorite dikes and sills that cross-cut foliated country rocks
- ROCKS OF THE NEW HAMPSHIRE SEQUENCE**
- DSf Sulfidic, pyrrhotite-biotite-chlorite-muscovite-plagioclase-quartz granulite and schist, interlayered with massive epidote-quartz-calcite-dolomite marble
  - Scu Silurian Cough Formation
  - Scu Well bedded vitreous quartzite, biotite-chlorite-muscovite-plagioclase-quartz schist, plagioclase-muscovite-garnet-quartz-chlorite schist with garnet porphyroblasts, and discontinuous horizons of muscovite-plagioclase-quartz polymictic conglomerate near base
  - Sci Massive polymictic conglomerate with chlorite-muscovite-plagioclase-quartz schistose to granular quartzite, and horizons of gray carbonaceous sulfidic schist near base
  - Op Ordovician Partridge Formation
  - Op Rusty- and tan-weathering, dark- to light-gray, pyrrhotite-limonite-muscovite-chlorite-plagioclase-quartz + garnet + staurolite schist, and minor epidote-chlorite-hornblende-plagioclase amphibolite
  - DSb Silurian and Devonian? unnamed schist unit
  - DSb Dark-gray to blackish-gray weathering, finely laminated, carbonaceous, pyrrhotite-plagioclase-chlorite-quartz-muscovite schist and phyllite
- ROCKS OF THE CONNECTICUT VALLEY SEQUENCE**
- DSwl Dark- to light-gray, locally rusty weathering, lustrous, carbonaceous chlorite-muscovite-plagioclase-quartz schist and phyllite with interbedded dark blue-gray, dark-brown weathering, siliceous limestone, quartz-rich grey schist, and gray calcareous to non-calcareous quartzite
  - DSw Dark- to light-gray, lustrous, carbonaceous chlorite-muscovite-plagioclase-quartz schist and phyllite, locally interbedded with thin gray quartzite, tan to gray feldspathic quartzite, and gritty plagioclase-quartz granulites
  - DSwq Gray quartzite and tan to gray feldspathic quartzite
  - DSwbs Dark-gray muscovite-chlorite-plagioclase-quartz-rich schist and quartzite
  - DSwb Dark-gray to coaly black, fine-grained, carbonaceous, biotite-plagioclase-chlorite-muscovite-quartz schist with bronze-colored muscovite porphyroblasts, and light-gray to tan, medium-grained chlorite-muscovite-plagioclase-quartz metagranite
  - DSwac Quartz-pebble and cobble conglomerate with limonite-chlorite-muscovite-quartz matrix
  - DSwc Dark-gray plagioclase-chlorite-muscovite-quartz schist and phyllite with zones of matrix-supported quartzite-pebble, vein-quartz-pebble, and rare metasilstone-pebble conglomerate
  - DSwvl Silurian and Lower Devonian Metavolcanic Rocks of the Waits River Formation
  - DSwvl Felsic volcanic member - Silvery-green muscovite-quartz-chlorite-plagioclase phyllite to schist; light-gray to whitish pale-gray, fine-grained, feldspathic schist and granulite locally with quartz and plagioclase porphyroblasts, and light-gray, massive, fine- to medium-grained, feldspathic granulites with quartz and plagioclase porphyroblasts, and gneiss; contains accessory sulfides
  - DSwv Heterogeneous, laminated to layered, green and white, in places rusty-weathering, fine- to medium-grained, muscovite + biotite-chlorite-quartz-plagioclase schist; silvery-green, fine- to medium-grained muscovite + biotite-chlorite-quartz-plagioclase schist; gray-green, medium-grained, muscovite + biotite-chlorite-quartz-plagioclase granulite; gray to light-gray, + carbonate + garnet-biotite-chlorite-muscovite-quartz-plagioclase granulite with quartz and quartz porphyroblasts; gneiss; and silvery gray, rusty weathering calcite-muscovite-chlorite-quartz-plagioclase schist. Contains accessory calcite and limonite
  - DSwq Silvery-gray to light-gray, in places rusty weathering, epidote-muscovite-biotite-chlorite-garnet-hornblende-quartz-plagioclase schist with distinctive sprays of hornblende and large garnet porphyroblasts of biotite, coarse calcite and prismatic light-gray biotite-quartz granulite like Omf
  - DSwb Massive, fine-grained epidote-chlorite-hornblende-plagioclase amphibolite with white plagioclase porphyroblasts
  - DSwag Laminated to massive, epidote-carbonate-actinolite-chlorite-plagioclase gneiss
  - DSwng Medium- to very coarse-grained, epidote-chlorite + garnet-hornblende-plagioclase gneiss with roughly equal percentages of hornblende and plagioclase
  - DSwl Light-gray, tan-weathering, biotite-quartz-plagioclase gneiss, and medium-gray, feldspathic biotite quartzite and granulites
  - DSn Lower Devonian and Silurian Northfield Formation
  - DSn Dark-gray to silvery gray, carbonaceous, fine-grained, muscovite-biotite-plagioclase-quartz schist or phyllite with garnet porphyroblasts
  - DSng Medium- to dark-gray to steel-gray-weathering, biotite-plagioclase-quartz granulites, impure quartzite and minor quartz-pebble conglomerate
  - DSnc Light-gray-green to gray-weathering, medium-grained zoned-magnetite-phyllite-calcite-silicate granulites
  - DSv Silurian and Devonian unnamed amphibolite, quartzite, and volcanoclastic rocks
  - DSv Heterogeneous unit of interbedded rusty, slabby quartz-amphibolite, gray quartzite, feldspathic granulites and biotite schist
  - DSa Slabby quartz-amphibolite
- PRE-SILURIAN COVER SEQUENCE ROCKS**
- Ochb Ordovician Cram Hill Formation
  - Ochb Dark-gray to dull-black weathering, very fine-grained, siliceous phyllite and phyllitic metasilstone, pale gray-green, to steel-gray-weathering, sulfidic, cummingtonite-magnetite-plagioclase-quartz amphibolite, and very rusty, mangiferous garnet quartzite and cotecite
  - Ochg Hornblende-plagioclase gneiss
  - Ochg Medium- to coarse-grained, garnet-biotite-hornblende-plagioclase-quartz granulites with sprays of large hornblende, biotite amphibolite, and hornblende-garnet amphibolite
  - Ochs Pale gray-brown, to whitish tan-weathering, fine-grained, biotite-garnet-muscovite schist and carbonaceous phyllite; dark-gray to light-gray rusty-weathering siliceous phyllite or schist and quartzite. Locally contains garnet quartzite or cotecite ("c" on map)
  - Ochq Steel-gray to yellow-tan-weathering quartzite and quartz pebble conglomerate
  - Ochv Heterogeneous unit consisting of well-layered, felsic biotite-hornblende-quartz-plagioclase gneiss, hornblende-biotite-plagioclase amphibolite, hornblende-plagioclase granulites and gneiss, rusty-weathering biotite-muscovite-quartz schist, feldspathic granulite, and cotecite
  - Omr Ordovician intrusive rocks of the North River Igneous Suite
  - Omr Massive, medium-grained, biotite + garnet-quartz-plagioclase tonalitic gneiss
  - Omr Ordovician Moretown Formation
  - Omr Light-gray to pinkish-gray-weathering, pin-striped, + hornblende-biotite-plagioclase-quartz granulite and quartzite
  - Omhfs Light-gray to gray-green, chlorite-muscovite-biotite-plagioclase-quartz schist and granulites with sprays of hornblende and large porphyroblasts of biotite, coarse calcite and prismatic light-gray biotite-quartz granulite like Omf
  - Omr Dark-gray to rusty-brown-weathering, sulfidic, muscovite-biotite-quartz-plagioclase schist and amphibolite
  - Omsa Rusty-weathering hornblende amphibolite
  - Omb Dark-gray to silvery-gray, garnet-biotite-muscovite carbonaceous schist, and associated rusty-weathering muscovite-biotite-quartz schist
  - Omcq Light-tan-weathering muscovite-biotite-plagioclase quartzite
  - Omg Light-gray to gray-green-weathering, garnet-biotite-chlorite-muscovite-quartz schist and schistose biotite-garnet-plagioclase-quartz granulites
  - Omg Light-green to pale-gray-green, lustrous, chlorite-biotite-muscovite-quartz schist and light-gray feldspathic granulite, coarse-grained garnet schist, pin-striped, chlorite-muscovite-plagioclase-quartz schist and granulite; cotecite ("c" on map); and amphibolite
  - Oma Epidote-biotite-hornblende and hornblende-plagioclase amphibolite
- MIDDLE PROTEROZOIC CORE ROCKS OF THE CHESTER DOVE**
- Yt Intrusive Rocks of the Mount Holly Complex
  - Yt Bailey Mills Tonalite Gneiss - Coarse-biotite-flecked, medium-grained, biotite-quartz-plagioclase tonalite gneiss that passes into more leucocratic, biotite-tonalitic gneiss
  - Yia Augen gneiss facies of the Bailey Mills Tonalite Gneiss - Very-well foliated, mylonitic, biotite tonalite gneiss with plagioclase augen set in a mylonitic biotite-rich matrix
  - Ygg Biotite-quartz-microcline-plagioclase granite to migmatite gneiss
  - Ycfs Metasedimentary and Metavolcanic Rocks of the Cavendish Formation
  - Ycfs Either rusty-weathering, light- to medium-dark-gray, white-plagioclase-spotted, biotite-quartz granulite or a biotite-rich porphyroblastic schist with isolated augen of plagioclase set in a phyllosilic matrix of biotite, muscovite, epidote, and quartz
  - Ycm Phylloepite-calcite-dolomite and quartz-knotted marble, actinolite-rich dolomite marble, phylloepite-lacit?-tonalite-dolomite marble; all associated with calc-silicate gneiss and/or actinolite gneiss
  - Other layered gneiss of the Mount Holly Complex
  - Ybg Biotite-quartz-plagioclase + epidote gneiss; magnetite-muscovite-biotite-plagioclase-quartz gneiss and hornblende-spotted gneiss; biotite-rich plagioclase-quartz gneiss and epidote quartzite; and slate-spotted biotite-quartz gneiss
  - Ya Biotite-hornblende and hornblende-garnet-plagioclase amphibolite
  - Yrg Rusty muscovite-biotite-plagioclase-quartz gneiss, schistose quartzite, biotite-garnet quartzite, and rusty sulfidic amphibolite

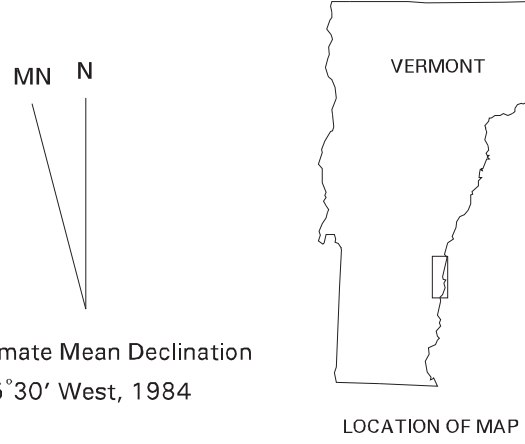
### Explanation of Map Symbols

- Contacts
- Outcrops (areas of exposed bedrock examined in this study)
- Thrust fault, teeth on upper plate
- Shear zone
- High angle fault: U = up and D = down, arrows show lateral offset

This plate is a paper representation of the digital bedrock geologic information for the Vermont part of the Mount Ascutney and Springfield quadrangles located in Windsor county, Vermont. All of the bedrock geology data were obtained from Walsh and others (1996), and were digitally compiled on a personal computer system using PC ARC/INFO version 5.4.2 by Environmental Systems Research Institute, Inc. The data shown on the geologic units and outcrop map were exported to ARC/INFO version 7.0 where solid color fill patterns were generated, and faults were drawn using symbols from a fileset (alcrvwg.in) from ALACARTE software (Fitzgibbon and Wentworth, 1991). The compilation procedures discussed in Walsh and others (1996) were used in the preparation of this report, with the exception of the topography. The topography was obtained from photographic negative separates of contour lines from the Mount Ascutney and Springfield (1984 edition) U.S.G.S. 7.5 x 15 minute topographic quadrangles. The negatives were scanned on an IDEAL FSS 8000 raster-format scanner. The raster image was vectorized using GTX CSR Contour version 2.00 by GTX Corporation, Inc., and converted into an unattributed line coverage in ARC/INFO version 7.0.

This plate is a derivative product and should not serve as the primary source for the complete geologic information for this area; the correct reference should be number 2 below:

- Fitzgibbon, T.T., and Wentworth, C.M., 1991, ALACARTE user interface: AMI, code and demonstration maps, Version 1.0: U.S. Geological Survey Open-File Report 91-587.
- Walsh, G.J., Armstrong, T.R., and Ratcliffe, N.M., 1996, Preliminary bedrock geologic map of the Vermont part of the 7.5 x 15 minute Mount Ascutney and Springfield quadrangles, Windsor County, Vermont: U.S. Geological Survey Open-File Report 96-733, scale 1:24,000.
- Walsh, G.J., Ratcliffe, N.M., Dudley, J.B., and Merrifield, T., 1994, Digital bedrock geologic map of the Mount Holly and Ludlow quadrangles, Vermont: U.S. Geological Survey Open-File Report 94-229, scale 1:24,000.



## Digital Bedrock Geologic Map of the Vermont Part of the 7.5 x 15 Minute Mount Ascutney and Springfield Quadrangles, Vermont

by

G.J. Walsh<sup>1</sup>, T.R. Armstrong<sup>1</sup>, and N.M. Ratcliffe<sup>1</sup>

1996

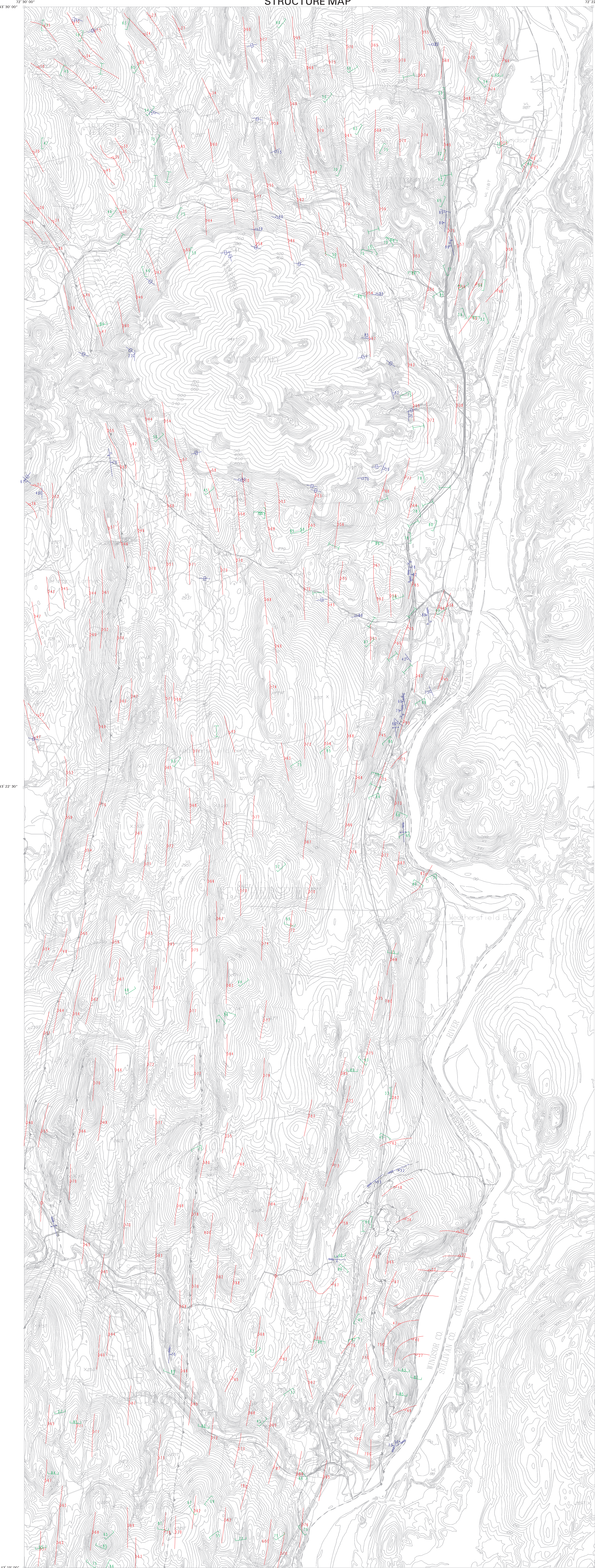
AFFILIATIONS:  
U.S. Geological Survey  
Reston, Virginia 20192  
Vermont Agency of Natural Resources,  
Vermont Geological Survey  
Waterbury, Vermont 05671

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards, or with the North American Stratigraphic Code. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

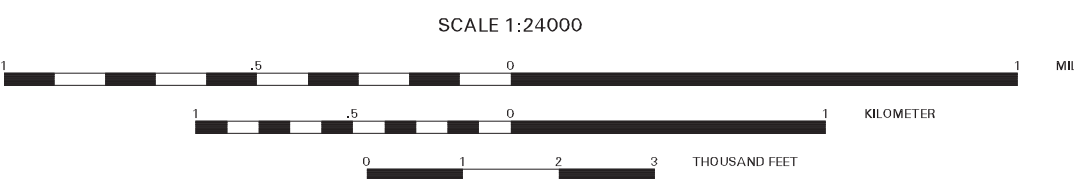
This figure is a map and the data are available from the Vermont Geological Survey. Both parts are available from the Vermont Geological Survey, Waterbury, Vermont 05671.



STRUCTURE MAP



Topography from the Mt. Ascutney, VT-NH 7.5' x 15' quadrangle (1984 edition) and the Springfield, VT-NH 7.5' x 15' quadrangle (1984 edition)  
Contour Interval 6 meters  
Digital map units in State Plane Coordinate System  
National Geodetic Horizontal Datum of 1927  
Roads and town boundaries from the Vermont Center for Geographic Information, Inc.



Geology mapped by Walsh, Armstrong, and Ratcliffe in 1994-1996.  
Digitized by David Dreher, Gregory Walsh, and Douglas Reedy.

Explanation of Map Symbols

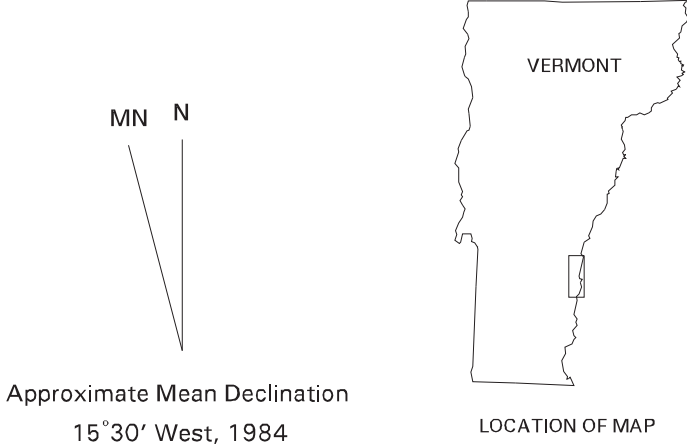
- Foliation
- Strike and dip of inclined foliation on interpretive form-lines
  - Strike and dip of vertical foliation on interpretive form-lines
- Brittle Features
- Relative lateral displacement of brittle fault
  - Relative vertical displacement of brittle fault, U = up and D = down
  - Strike and dip of inclined brittle fault
  - Strike and dip of vertical brittle fault
  - Strike and dip of inclined joint
  - Strike and dip of vertical joint
- Cleavage
- Strike and dip of inclined cleavage
  - Strike and dip of vertical cleavage
- Quarries and Mines
- ? Location approximate
  - gr Granite
  - rm Road Metal
  - X Inactive quarry

This is a derivative structure map.  
More comprehensive data can be found  
in Walsh and others (1996) (see 2 below).

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- Walsh, G.J., Ratcliffe, N.M., Dudley, J.B., and Merrifield, T., 1994, Digital bedrock geologic map of the Mount Holly and Ludlow quadrangles, Vermont: U.S. Geological Survey Open-File Report 94-229, scale 1:24000.



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