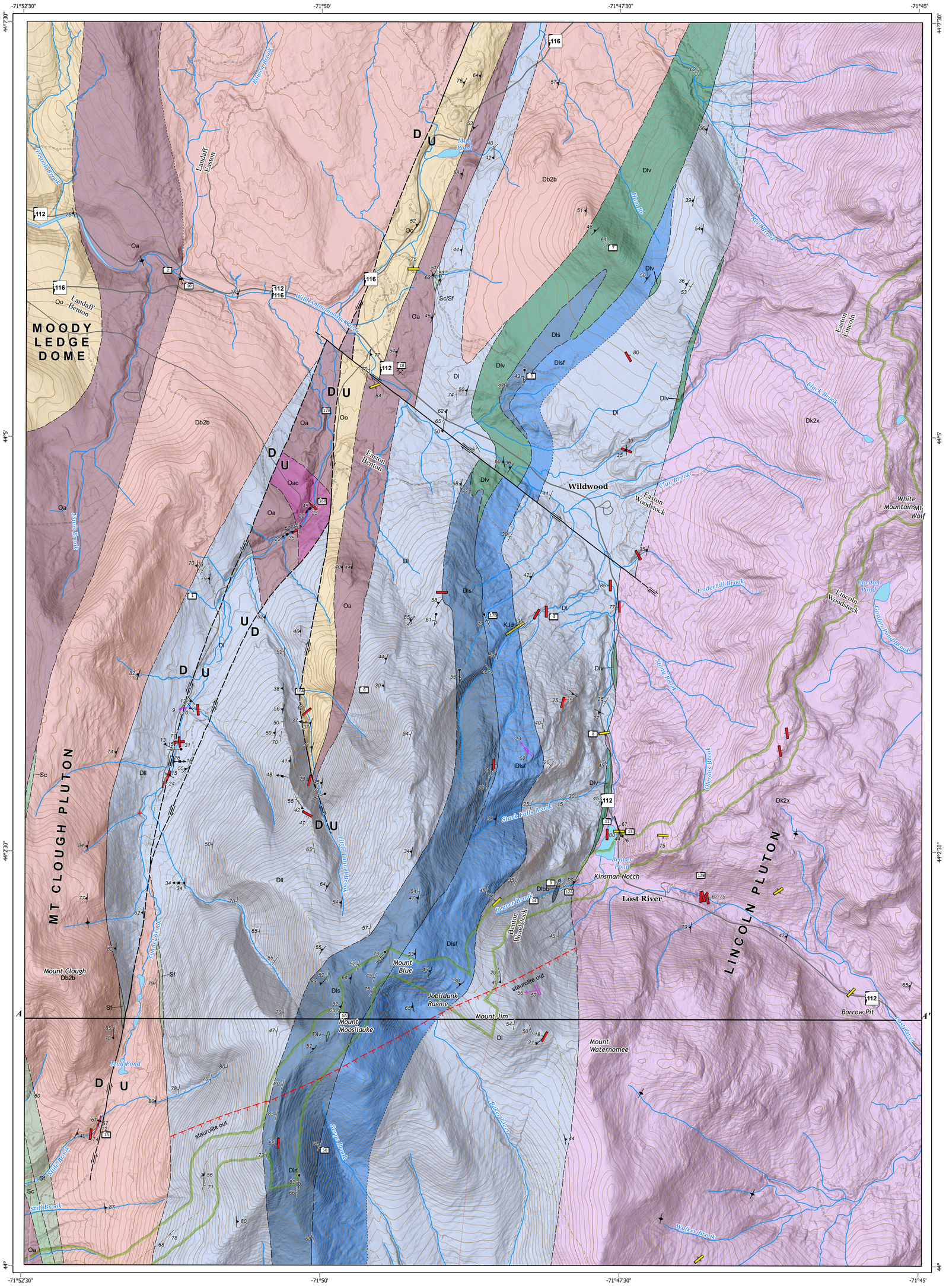
Bedrock Geologic Map of the Mount Moosilauke 7.5' Quadrangle, New Hampshire, 2022



Scale 1:24,000

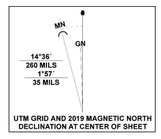
6,000 3,000 0 6,000 Feet

1 0.5 0 1 Miles

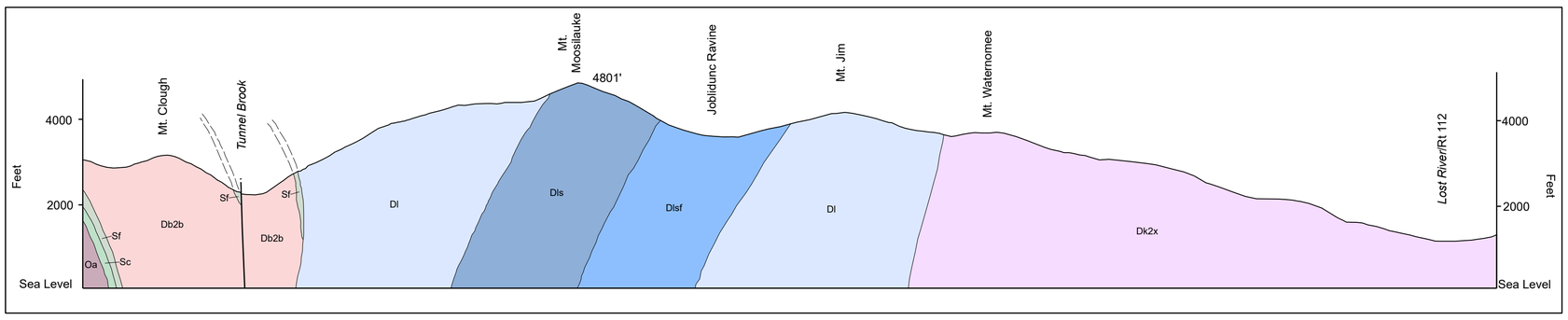
1 0.5 0 1 Kilometers

Lisbon	Sugar Hill	Franconia
East Haverhill	Mt. Moosilauke	Lincoln
Warren	Mount Kineo	Woodstock

Topographic basemap from The National Map, including the National Hydrography Dataset and Geographic Names Information System. Projection: North American Datum 1983 New Hampshire State Plane Feet. Contour interval 40 feet. Multidirectional hillshade produced from high resolution (1 meter) LiDAR data.



Interpretive Cross Section A - A' (No Vertical Exaggeration)



DESCRIPTION OF MAP UNITS

INTRUSIVE ROCKS

Post-tectonic sills and dikes (Mesozoic) — A variety of mafic rocks (diabase, gabbro, diorite, quartz-diorite and camptonite) and silicic rocks (bostonite, syenite). A 2 m-thick aphyric basalt dike, striking due east and dipping 46 degrees south, is well exposed cutting Kinsman Granite in a road cut on the east side of Rt. 112. Details on many of the dikes were reported by Billings (1937).

Pegmatite sills and dikes — At least three generations of pegmatitic granite cut the Paleozoic rocks. They include Acadian, deformed stringers to younger, planar, through-going dikes, which mostly parallel the common joint directions: NNE, E-W and N-S. Pegmatite dikes are especially common along Tunnel Brook valley, apparently associated with the Mud Pond fault.

Db2b — **Bethlehem Gneiss (Devonian)** — Coarse- to medium-grained quartz-feldspar-biotite-muscovite well foliated granodiorite gneiss. Locally contains biotite schist xenoliths parallel to foliation. Well exposed in slides and brooks on east slope of Mt. Clough. Lyons et al., 1997, cite a U/Pb zircon age of 410 +/- 5 Ma.

Dk2x — **Kinsman Granodiorite (Devonian) —** Coarse porphyritic quartz-feldspar-biotite-muscovite-garnet granodiorite gneiss with K-feldspars up to 7 cm in length. Locally with schist and hornblende gneiss xenoliths near contact with Littleton Formation. Type locality in Kinsman Notch. Barreiro and Aleinikoff (1985) estimated the U/Pb zircon age at 413 +/- 5 Ma.

Oo — **Oliverian Granite (Ordovician) —** Strongly foliated medium-grained white to pale gray granitic gneiss, with thin biotite-rich layers and lenses. Moench and Aleinikoff (2002) obtained a zircon U/Pb age of 435 +/- 3 Ma from a sample collected from good exposures in the Wild Ammonoosuc River at the Tunnel Stream Road bridge, south of Rt. 112 in Wildwood. Similar gneiss forms the core of the Moody Ledge dome on the western edge of the quadrangle. Moench and Aleinikoff (2002) dated zircons from that body at 450 +/- 2 Ma. They suggest that zircons with the younger age at Tunnel Brook may have formed during high-temperature shearing.

METASEDIMENTARY AND METAVOLCANIC ROCKS

Dl — **Undifferentiated Littleton Formation (Devonian)** — Dark to light gray, medium-grained, biotite +/- sillimanite +/- garnet +/- staurolite schist and fine-grained granofels, locally a laminated metaturbidite. Layers are typically less than 2 cm thick. Sillimanite porphyroblasts after andalusite are common in some areas, but fine sillimanite in the matrix is nearly ubiquitous.

Dlbb — **Beaver Brook member of Littleton** — Calc-silicate beds and pods in biotite schist. Oriskany brachiopod fossils were described by Boucot and Rumble (1978).

Dlsf — **Stark Falls member of Littleton** — Massive, dark gray, medium-grained biotite-rich sillimanite +/- garnet +/- staurolite schist. Well exposed along the Appalachian Trail south of Mt. Blue, but named by Konrad (1989) for outcrops in Stark Falls Brook.

Dlv — **Metavolcanic member of Littleton** — Dark greenish-black, coarse- to fine-grained amphibolite, salt-and-pepper biotite gneiss (andesitic to dacitic), and fine-grained rhyolitic felsite. Found in association with the Summit member, especially towards the north, and locally as a thin layer along the contact with Kinsman Granodiorite.

Dls — **Summit member of Littleton** — Rusty-weathering, well bedded in 3 to 30 cm slabby layers, medium-grained biotite +/- sillimanite +/- garnet +/- staurolite metagraywacke granofels. This facies holds up the summit ridge of Mount Moosilauke. Contains rare amphibolite clasts.

Sc/Sf — **Clough Quartzite and Fitch Formation, undifferentiated**

Sf — **Fitch Formation (Silurian)** — Massive to thinly bedded, fine-grained gray granofels. Found along the eastern contact between Bethlehem Gneiss and lower Littleton Formation, and at the western contact in a brook at the very edge of the quadrangle. Also in an unnamed brook north of Rt. 112 and east of Rt. 116.

Sc — **Clough Quartzite (Silurian)** — Massive white to gray quartzite with local conglomerate. Found in the East Haverhill quadrangle, 150 m downstream from Fitch Formation in the SW corner of the map. Clough boulders are common in that corner of the Mount Moosilauke quadrangle. Also as one thin layer of gray quartzite in an unnamed brook north of Rt. 112.

Oa — **Ammonoosuc Volcanics (Ordovician)** — Fine-grained hornblende gneiss or amphibolite, locally with epidote-rich layers and lenses, and fine-grained felsite. Best exposed in the Wild Ammonoosuc River.

Oac — **Calc-silicate member of Ammonoosuc** — Thinly bedded sulfidic calc-silicate granofels resembling Francestown Formation, and well bedded, gray to white calc-silicate granofels interbedded with hornblende gneiss. Restricted to a set of outcrops in Tunnel Brook that are interpreted as a fault slice.

EXPLANATION OF MAP SYMBOLS

Contacts and faults

- Contact, solid where certain, dashed where approximate, dotted where concealed
- Oblique thrust fault with left lateral strike-slip component. D - downthrown block, U - upthrown block
- Oblique thrust fault with left lateral strike-slip component, approximately located
- Oblique thrust fault with left lateral strike-slip component. D - downthrown block, U - upthrown block
- Oblique thrust fault with right lateral strike-slip component, approximately located

Strike and dip of bedding (S_0)

- Overturned graded beds
- Inclined bed

Strike and dip of S_1 nappe-stage foliation

- Inclined S_1 nappe-stage foliation
- Inclined S_1 nappe-stage foliation, for multiple observations at one locality
- foliation, vertical, S1
- Inclined S_1 foliation where parallel to bedding

Strike and dip of shear foliation

- Inclined shear zone, indeterminate sense of shear
- Inclined shear zone, S-shaped, counterclockwise sense of shear, for multiple observations at one locality
- Inclined shear zone, S-shaped, clockwise sense of shear, for multiple observations at one locality

Strike and dip of S_4 foliation

- Inclined S_4 foliation

Strike and dip of S_4 shear foliation

- Inclined shear zone, S4, S-shaped, counterclockwise sense of shear
- Vertical shear zone, S4, S-shaped, counterclockwise sense of shear
- Inclined foliation, S4, for multiple observations at one locality

Trend and plunge of lineations

- Crenulation lineation (L_1)
- Mineral lineation
- Intersection lineation (S_0 X S_1)
- Inclined slickenline

Fold features

- Axial plane of F_3 fold
- Axis of F_1 nappe-stage fold

Strike and dip faults, dikes, and veins

- Inclined fault
- Fault, late (younger)
- Inclined KJd dike
- Vertical KJd dike
- Inclined pegmatite dike
- Vertical pegmatite dike
- Vertical pegmatite veins
- Pegmatite dike, indeterminate orientation

Metamorphic isograd

- Staurolite-out isograd, approximate

Photos

- 1 — Labeled with photo number. See companion document for photographs.

Basemap features

- Iron mine
- 2 — US Route
- 116 — State Route
- Local Road
- Not Maintained
- Railroad
- Lidar Contours (40-foot intervals)
- Stream
- Water

Bedrock Geologic Map of the Mount Moosilauke 7.5' Quadrangle, New Hampshire

Geology by Peter J. Thompson, 2021-2022
Some structural data from Billings (1937) and Konrad (1989)
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Maps and map pamphlets can be found at https://www.des.nh.gov/land/geology
Document library at www.des.nh.gov/resource-center/publications?keys=geology

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