

Bedrock of the Stoddard 7.5 minute quadrangle  
Southwest New Hampshire

Submitted by  
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## Explanation of the Bedrock Geology of the Stoddard 7.5 minute quadrangle and accompanying plates.

### Overview

The Stoddard quadrangle is primarily underlain by Kinsman granite (Dk2x) and schist's of the Rangeley Formation (Sr). There are also local granites and pegmatite that are most likely related to intrusion(s) of an equigranular granite called the Concord Granite (Dcl) that contain outliers of Frankestown (Sfr) and Rangeley Formations (Sr) in one location. The geology is presented in four plates. Plate 1 is the lithology and contacts map, Plate 2 shows outcrop locations, Plate 3 shows the structural data and lithology contacts and the final plate is a lightly colored topo sheet with the structural data. At least for the present the Rangeley formation is shown as undifferentiated on the topo sheet shading but is differentiated on the outcrop scale, as more thought is needed to resolve the outcrop patterns of the sub-units.

### Kinsman Granite (Dk2x)

The Kinsman is a large-grained, biotite, garnet granite with cm scale phenocrysts of potassium feldspar (often referred to as megacrysts in the literature). The feldspars define local foliations typically near or around contacts and zones of shear. The garnets approach several centimeters in diameter and are often retrograded to biotite, which is oxidized in places giving the outcrop a rusty appearance.

Outcrop is largely found on the tops of hills and mountains and sometimes on the stoss sides of ruche moutonnees. It is a fairly competent unit and is jointed primarily as a function of exfoliation. Large house sized weathered blocks of Kinsman have been transported and deposited by glaciers into long boulder trains and erratics throughout the eastern 2/3'ds of the quadrangle.

Faulting of the Kinsman in this quadrangle is rare. It appears in one or two locations as a narrow (several centimeter – meter scale) band of close spaced fractures with few kinematic indicators preserved. The brittle fracture sets often have hematite vein mineralization. In the northwest corner of the quadrangle the kinsman is sheared in a northeast trending shear zone in which deformed potassium feldspars indicate dextral motion.

Conversations with property owners in the northeast corner of the quadrangle reveals that the water wells in the area are 300-400 feet in depth and the water is very rusty. This suggests that the pluton in this vicinity is less than 121 meters thick or about 1/10 of a kilometer in thickness and the water is being drawn from within the underlying Rangeley Formation.

One property owner on a hill just to the southwest of Mill Village in Stoddard said his well was 1200 feet deep and although he has great flow the water has to be filtered as it grows a black algae. The lack of rust in this gentleman's water suggests the well water here is not from within the Rangeley formation and the Kinsman at this location (west of the center of the quadrangle, within a kilometer of the western contact with the Rangeley formation) is over a third of a kilometer thick.

### Concord granite (Dclm)

Concord granites are equigranular biotite granites with local garnet. The largest exposure is in the southeast corner of the map in the locality of Goodhue Hill. Within the granites there are outliers of Francestown and Warner formations. Concord granite is also exposed in smaller bodies near and around the contact with the Rangeley formation and on Stacy Hill in the northwest corner of the quadrangle and east of Highland lake. At this location, faulting of the Kinsman Granite in an east side down normal fault exposes the granite. Concord granites are also exposed as sills and dikes throughout the quadrangle.

### Rangeley formation (Sr)

Rocks mapped as Rangeley include sulfidic schist, rusty weathering and gray quartz-biotite, muscovite-plagioclase schist that contain local calc-silicate layers but football-shaped calc-silicate lenses are more common. It also has rare quartz-rich layers that appear sandy. Near the Rangeley-Kinsman contact throughout the map the Rangeley appears to have lost its schistosity most likely due to heating of the Kinsman intrusion. In these areas it appears almost igneous and might be more appropriately called a hornfels. No subdivision of this rock type was attempted.

The sulfidic schist of the Rangeley is called the upper Rangeley (Sru) and the gray schist is called the lower Rangeley (Srl) on the 1997 Geologic map of New Hampshire indicating different depositional depths of the original sediments. The distinctions are made on the shaded topo sheet at each location and further work is being done to resolve outcrop patterns for these rocks types.

The last Rangeley sub-type is known as Rangeley augen gneiss (Sra). This rock has large granitic augen that appear to be pseudomorphed K-spar megacrysts. The augen gneiss member of the Rangeley is found at or around Kinsman-Rangeley contacts and is most likely a result of interaction between the metasedimentary and the igneous rocks during emplacement of the Kinsman granites. The similarity in appearance of the augen gneiss and the Kinsman granites makes distinguishing these units a bit tricky, care must be taken to observe whether they are k-spar megacrysts or biotite granite mimicking the megacrysts.

### Francestown formation (Sfr)

The Francestown formation is a rusty-weathering calc-silicate bearing granulite and schist. It is not exposed in the Stoddard quadrangle except for one or two locations on Goodhue Hill in the very southeast corner of the map. It is correlated with the Smalls Falls formation of the Central Maine Terrane rocks on the 1977 Geologic map of New Hampshire.

### Warner formation (Sw)

The Warner is a thinly bedded calc-silicate granulite. It is also only exposed on Goodhue Hill and vicinity. It is correlated with the Madrid formation of the Central Maine Terrane.

## Faults

There are two main faults within the Stoddard quadrangle. One is a sinistral strike-slip fault found in the western half of the map. It strikes northeasterly toward Highland lake at Mill Village and may continue under the lake giving the lake its southwest trend in an area where the majority of water bodies trend to the southeast. It shears rocks of the Rangeley formation and the fault trace is lost just before the Kinsman contact.

The other fault is a ductile strike-slip shear in the northwest corner of the map. The shear zone is narrow (meter scale) and contains kinematic indicators showing dextral motion through Rangeley and Kinsman formations.