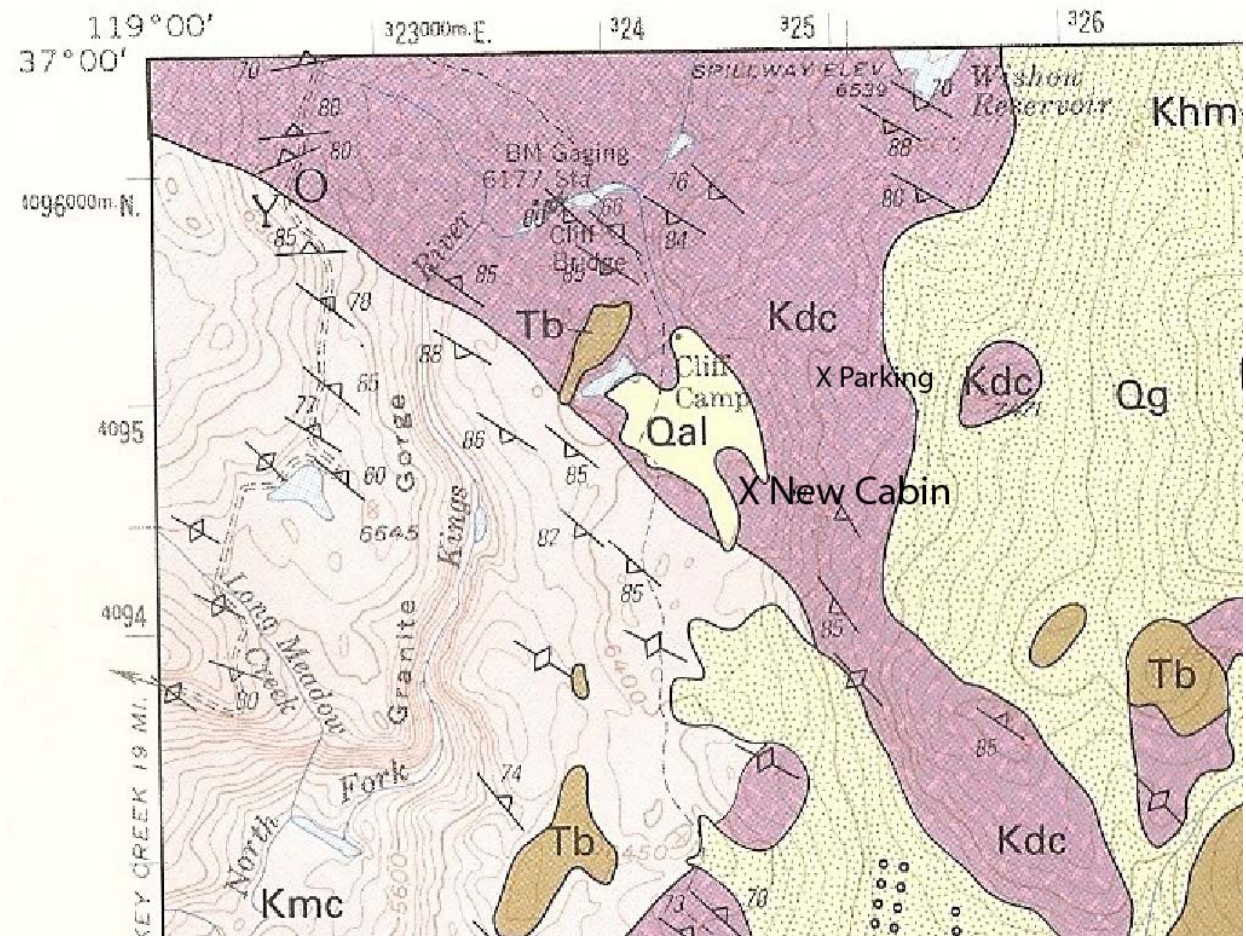
Rock Types of Cliff Camp

From "Geology of the Tehipite Dome Quadrangle" and “Geology of Blackcap Mtn Quadrangle” maps.

Qal	The Meadow	Holocene 10 Ka	**Alluvium** underlying meadows; mainly sand ponded behind glacial moraines and gravel in stream valleys.
Qg	Hoffman mtn slope	Pleistocene 12 Ka to 2.8 Ma	**Glacial deposits**, undifferentiated
Tb	Lava Mtn	Pliocene 2.8 to 5.3 Ma	**Basalt** - many separate basalt flows and one near-vertical dike. Composition ranges from alkalic, potassic-alkalic, to ultra-potassic basalt.
Kbc	Spanish Mtn	Cretaceous 86 Ma	**Brush Canyon Granite** to the South: medium-colored, porphyritic, 6% mafic, 86 Ma
Kmc	Granite Gorge	Cretaceous 88 to 89 Ma	**KcKinley Grove Granodiorite** to the West: medium-colored, 10% mafic, medium-grained, perthite phenocrysts, 88-89 Ma
Kmg	Crown Valley	Cretaceous 96 Ma	**Mount Givens Granodiorite/Granite** to the East: medium-colored, 12% mafic, 96 Ma
Kdc	Cliff Camp	Cretaceous 104 Ma	**Dinkey Creek Granodiorite** at the cabin and north: dark-colored, 18% mafic, medium-grained, strongly foliated, abundant mafic inclusions, 104 Ma
Khm	Mount Hoffman	Cretaceous	**Granite of Mount Hoffman** is a very small pluton to the east: Medium-grained light-colored equigranular granite containing about 5% mafic minerals.
M	Kings Caverns	Jurassic-Triassic	**Marble** eroded into caverns about 4 miles south of the cabin: coarsely crystalline, schistose to gneissose, white to light gray, commonly cavernous marble. Dolomitic in places.
qz	Wishon Reservoir	Mesozoic	**Quartzite with calcareous layers.** The Victoria Tungsten mine lies within this rock type along Woodchuck creek just above Wishon Reservoir’s high water. It was discovered and worked during WWII because of the shortage of tungsten.



Granite – three types of mineral grains:

1. Gray translucent quartz,
2. white feldspars, and
3. black mafic minerals such as biotite mica, and hornblende amphibole.

Granite cools very slowly under at least 1000 ft of overlying rock. The grains are usually intertwined and equal-sized. Sometimes minerals such as hornblende had started to crystallize first and are now seen as larger single crystals called phenocrysts amongst the smaller groundmass of regular granite.

Quartz veins, Aplite and Pegmatite dikes are formed during late solidification of plutons. The rock overlying and insulating the plutons is known as country rock. It is often sedimentary rock such as sandstone, mudstone, and limestone. The extreme temperatures and pressures strongly metamorphose this rock commonly producing felsite and marble where in direct contact with a pluton and into schist and quarzite farther away.

Some minerals do not crystallize until after the outer parts of the pluton have hardened. This is especially true of minerals dissolved in water under extreme temperatures and pressures. The outer parts of the pluton cool first and shrink. The pressure of this hydrothermal solution grows so large that cracks open in the outer pluton extending into the surrounding country rock. The hydrothermal solution then shoots into these crevices, cools rapidly and precipitates quartz, gold, and many other valuable

minerals and beautiful crystals. This is the origin of quartz veins and the gold that drew people to California in 1849.

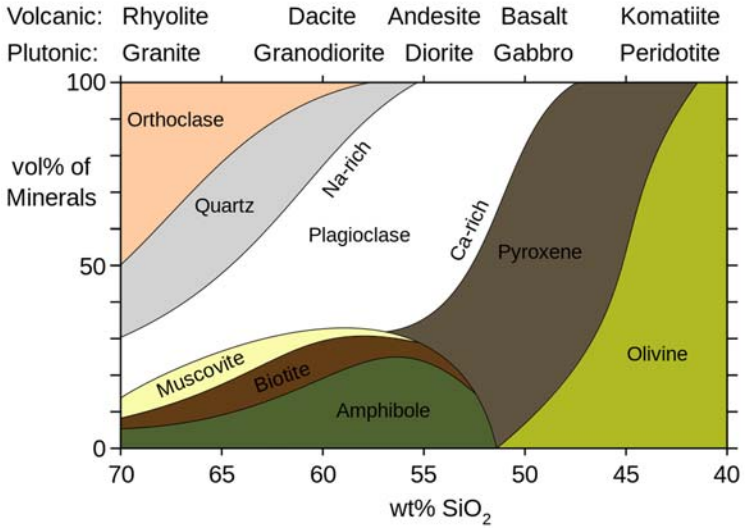
The country rock that was intruded by the granitic plutons falls into two types:
Kings Terrane: (in the foothills and lower Sierra)

Late Triassic to Early Jurassic (200 Ma) – sedimentary, submarine-fan system, mud, sand, limestone – metamorphosed by intrusion, quartzite, schist, felsite, and marble.

Goddard Terrane: (in the High Sierra)

Devonian period of Paleozoic Era (400 Ma) – volcanic flows such as rhyolite and dacite, and marine deposits such as sandstone and mudstone.

Mafic minerals – silicates rich in **ma**gnesium and iron (**f**erric). Generally dark to black. Olivine, pyroxene, amphibole (hornblende), and biotite.
Felsic minerals – silicates rich in **fel**dspar and **si**lica. Generally light-colored. Examples: Quartz, muscovite mica, Plagioclase (Ca-Na) and orthoclase (K) feldspar.



Density (specific gravity)

Material	g/cm^3 (sp. gr.)	lb/ft^3
Water	1	62.4
Aluminum	2.6	162
Crust average	2.6	162
Granite	2.8	175
Basalt	2.9	181
Mantle average	4.5	281
Steel	8	490
Lead	11	708
Gold	19	1190

Granite with equigranular crystals 	Granite with black hornblende phenocrysts 
Plagioclase Feldspar: 	Quartz: 
Biotite Mica: 	Hornblende (amphibole):