

BUFFALO MOUNTAIN MINING AREA

LOCATION

Buffalo Mountain is located at the north end of the Tobin Range, north of Smelser Pass. It extends northeast to Lone Tree Hill near Interstate Highway 80, 10 km northwest of Valmy. Mines and prospects occur on both the east and west sides of the mountain. The area is joined on the south by the Iron Hat mining district, in which are included the properties just north of Smelser Pass.

HISTORY

Little is known concerning the history of the mines and prospects on Buffalo Mountain. The mines on Lone Tree Hill probably were worked in the early 1900's. Manganese occurrences were known in southeastern Humboldt and northeastern Pershing County in the early 1900's, but most of the production, and probably the exploration of minor properties, was done during or between the two world wars. Recent rotary drilling (1984) at copper prospects on the southeastern flank of Buffalo Mountain and in the vicinity of Smelser Pass (Iron Hat district) may have been in search of precious metals. Rotary drilling in S33, T34N, R42E and S1, T33N, R41E, at the northeast end of Buffalo Mountain is also reported to be for precious metals.

GEOLOGIC SETTING

Buffalo Mountain is underlain by Pennsylvanian and Permian rocks of the Havallah sequence which are intruded by a large mass of coarsely crystalline granodiorite (Cretaceous) that makes up most of the southwestern half of the range (Willden, 1964, p. 92).

ORE DEPOSITS

Several minor manganese deposits are reported from Buffalo Mountain, especially along the northwestern side and at the northern end of the range. Six individual properties are reported (Southern Pacific Co., 1964, p. 96; Southern Pacific Co., 1959), none of them are believed to have been productive (Willden, 1964, p. 93). Manganese deposits in marine rocks of the Havallah sequence are syngenetic deposits. Many of them are stratabound, although epigenetic deposits and occurrences are also known, and are believed to represent the plumbing system of the submarine hot springs that deposited the manganese (Snyder, 1978, p. 743). Manganese prospects are reported in S5, 6, 8 and 9, T33N, R41E, in S33, T34, R41E, and in S19 and 30, T34N, R42E (Southern Pacific Co., 1964, p. 96).

Numerous prospect pits, bulldozer cuts, and shallow underground workings are located in an area of about 2 km² at the northeast end of Buffalo Mountain. The prospects consist of gossan, oxide-copper minerals, and spotty vein quartz along high-angle or thrust faults cutting chert of the Havallah sequence. Dikes and small intrusive masses of Cretaceous

quartz monzonite intrude the Havallah nearby. Sparse pyrite and chalcopryite are present at one locality, and galena at another. Silver and gold mineralization is reported from prospects in SE/4 SE/4 S36, T34N, R41E, and suspected elsewhere.

Mines and prospects on Lone Tree Hill northeast of the northeast end of Buffalo Mountain explore high-angle fault zones in Ordovician Valmy Quartzite. Iron oxides and sparse oxide copper minerals occur with chalcedonic quartz along 1 m wide crush zones. The workings are probably for precious metals.

A small copper prospect (vein quartz and oxide copper minerals) is present in quartz monzonite on the southeastern side of Buffalo Mountain. Nearby copper prospects to the south are included in the Iron Hat mining district.

SELECTED REFERENCES

Snyder, W. S. (1978) Manganese deposited by submarine hot springs in chert-greenstone complexes, western United States: *Geology*, v. 6, p. 741-744.

Southern Pacific Co. (1959) Areal economic geology, T33-34, R41-42E.

Southern Pacific Co. (1954) Minerals for industry, v. 1, p. 96.

Willden, Ronald (1964) Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines and Geology Bulletin 59.

PROPERTY NAME: Name Unknown

OTHER NAMES: _____

MINERAL COMMODITY(IES): Cu

TYPE OF DEPOSIT: Mineralized fault zone

ACCESSIBILITY: _____

OWNERSHIP: _____

PRODUCTION: None? or very minor

HISTORY: _____

County: Humboldt

Mining District: Buffalo Mountain Area

AMS Sheet: Winnemucca

Quad Sheet: Brooks Spring 7 1/2'
SE/4NW/4 NW/4

Sec. 33, T 34N, R 42E

Coordinate (UTM):

North 4 5 1 4 3 6 0 m

East 0 4 7 8 2 3 0 m

Zone + 11

DEVELOPMENT: Two adits, a few short vertical stopes, and numerous (more recent) bulldozer cuts.

ACTIVITY AT TIME OF EXAMINATION: None

GEOLOGY: Gossan, oxide copper minerals (chrysocolla, malachite) occur with spotty quartz vein matter in the footwall of a N10E, 40NW fault zone. The wallrock is light gray chert, probably Pumpernickel Formation (Pennsylvanian). Marsh and Erickson (1977) show this mineralized fault as a Thrust fault which emplaces Havellah Formation over Pumpernickel. They also show dikes and small intrusive bodies of quartz monzonite nearby, and under the description of that rock unit report on oxide copper shows in the vicinity with sparse pyrite and chalcopyrite. The quartz monzonite is 87 m.y. old. The copper minerals at this prospect occur from 1 to 4m below the fault plane. A 1m-wide crush zone occurs above the main fault plane.

REMARKS: Photo LG 842-2 was taken of the open cut and short adit with a small powder house built under the fault plane workings. Sample 2312 is of select gossan and oxide-copper-bearing rock.

REFERENCES: Marsh, S.P. and Erickson, R.L. (1977) Geologic map of the Brooks Spring quadrangle, Humboldt County, Nevada: U.S. Geological Survey Map GQ-1366.

EXAMINER: L.J. Garside

DATE VISITED: 25 Jul 84

PROPERTY NAME: Jasper Claims
OTHER NAMES: _____
MINERAL COMMODITY(IES): Unknown, probably Au or Ag
TYPE OF DEPOSIT: vein
ACCESSIBILITY: _____
OWNERSHIP: Unknown
PRODUCTION: None or minor
HISTORY: _____

County: Humboldt
Mining District: Buffalo Mountain Area
AMS Sheet: Winnemucca
Quad Sheet: Valmy 7½'
SW/4 NW/4
Sec. 12, T 34N, R 42E
Coordinate (UTM):
North 4 5 2 0 7 0 0 m
East 0 4 8 2 8 0 0 m
Zone 11

DEVELOPMENT: Approximately 4 short adits and 2 shallow shafts. A diamond drill hole was drilled on a drill road below the adits on the west side of the hill.

ACTIVITY AT TIME OF EXAMINATION: None.

GEOLOGY: A number of small workings, spread over about 0.2 Km², explore fault zones in light gray to white Valmy Quartzite (Ordovician). The major horizontal workings follow a N60W, 70SW fault zone on the east side of Lone Tree Hill. This zone possibly may extend across the hill to 2 adits and a shaft on the west side, where a N60W, 90° fault is present in one adit. A shaft and prospect pit near the crest of the hill are on a due N, 90° fault. All the faults consist of approximately a 1m wide breccia zone which is stained with iron-oxide minerals, locally with oxide copper minerals, and is locally cemented with drusy to chalcedonic quartz vein matter. Malachite is present as coatings and fracture fillings on samples from some dumps.

REMARKS: Sample 2310 is a grab from the dump of an adit. Photo LG 841-30 is of the reddish dumps at the property.

REFERENCES: _____

EXAMINER: L.J. Garside

DATE VISITED: 23 Jun 84

PROPERTY NAME: Iron Point Claims

OTHER NAMES: _____

MINERAL COMMODITY(IES): Au?

TYPE OF DEPOSIT: Unknown

ACCESSIBILITY: _____

OWNERSHIP: Claims 3-4 km to the north (Buffalo Group) are owned by the Southern Pacific Land Co.

PRODUCTION: _____

HISTORY: Probably the work here was done in the last 2-4 years

County: Humboldt

Mining District: Buffalo Mountain Area

AMS Sheet: Winnemucca

Quad Sheet: Brooks Spring 7 1/2'

SW/4 SW/4

Sec. 1, T 33N, R 41E

Coordinate (UTM):

North 4 5 1 1 7 1 0 m

East 0 4 7 3 2 0 0 m

Zone _____

DEVELOPMENT: Several km of bulldozer roads, cuts, and a number of rotary drill holes

ACTIVITY AT TIME OF EXAMINATION: None.

GEOLOGY: Mineral exploration activity here appears to be centered on north-trending shear zones which cut granodiorite and intruded quartzite., which is, according to Marsh and Erickson (1977), Havellah Formation (Pennsylvanian-Permian). The shear zones are heavily stained and coated with iron oxide minerals, and are locally silicified. The granodiorite in the shear zones is commonly argillized. The shear zones are generally high angle. This area is in the contact zone between metasedimentary rocks and granodiorite. Most of the rock exposed in trenches near the sample point is granodiorite.

REMARKS: Photo 28 is of the most-explored hill. Sample 2903 was taken in the lowest trench. It is a grab sample across the iron-stained part of the trench.

REFERENCES: Marsh and Erickson, 1977.

EXAMINER: L.J. Garside

DATE VISITED: 30 Sep 84

PROPERTY NAME: Name Unknown

OTHER NAMES: Donna Leigh Claims (1982, near canyon mouth)

MINERAL COMMODITY(IES): Mn

TYPE OF DEPOSIT: Syngenetic exhalative?

ACCESSIBILITY: _____

OWNERSHIP: _____

PRODUCTION: None

HISTORY: _____

County: Humboldt

Mining District: Buffalo Mountain Area

AMS Sheet: Winnemucca

Quad Sheet: GoldRun Creek 7 1/2'

c SE/4 NW/4

Sec. 8, T 33N, R 41E

Coordinate (UTM):

North 4 5 1 1 0 9 3 1 0 m

East 0 4 6 7 1 9 1 0 m

Zone 11

DEVELOPMENT: Shallow prospect pit. Others in the vicinity are shown on the topo map.

ACTIVITY AT TIME OF EXAMINATION: None.

GEOLOGY: Black manganese oxide minerals, quartz, minor rhodenite and a honey-yellow mineral occur in a strataform? zone exposed in a small pit. The massive manganese - oxide minerals occur in a zone up to 8m thick. The north (footwall) side is a quartz-rich rock that resembles quartzite (recrystallized). The south side of the zone is mainly granodiorite porphyry, but a small amount of the quartz-rich rock is present also. The attitude of the footwall contact is N45W, 75SW. The wallrock is Pennsylvanian Pumpernickel Formation (see Marsh and Erickson, 1978). This property and others in this canyon are described in a Southern Pacific Co. report on minerals on and adjacent to SP lands(p.95). The manganese zone does not appear to be laterally extensive; possibly it is cut out by faults or dikes.

REMARKS: Photo LG842-6 is of the footwall contact, hammer for scale. Sample 2314 is of massive manganese ore.

REFERENCES: Marsh, S.P. and Erickson, R.L. (1978) Geologic map of the GoldRun Creek quadrangle, Humboldt County, Nevada: U.S. Geological Survey Map GQ - 1407. Southern Pacific Co. 1964 Southern Pacific Co. (1964) Minerals for Industry, V.I. p. 95.

EXAMINER: _____

L. J. Garside

DATE VISITED: _____

25 Jul 84

PROPERTY NAME: Name Unknown

OTHER NAMES: _____

MINERAL COMMODITY(IES): Cu

TYPE OF DEPOSIT: Vein?

ACCESSIBILITY: _____

OWNERSHIP: _____

PRODUCTION: None

HISTORY: _____

County: Humboldt

Mining District: Buffalo Mountain Area

AMS Sheet: Winnemucca

Quad Sheet: Cherry Creek NE 7 1/2'

SE/4 NW/4 SW/4

Sec. 15, T 33N, R 41E

Coordinate (UTM):

North 4 5 0 8 8 3 0 m

East 0 4 7 0 0 8 0 m

Zone 11

DEVELOPMENT: 3 shallow prospect pits; bulldozer road.

ACTIVITY AT TIME OF EXAMINATION: None. However Duval Corporation has recently (1984?) drilled 2 rotary holes about 2-2.5 km to the south in S22 and 28. These are on Duval placer claims and encountered unaltered quartz monzonite. See also BYL claims 7 km south.

GEOLOGY: Sparse green oxide copper minerals, gossan, and quartz vein matter occur associated with a 1-2m wide aplite dike which cuts quartz monzonite. Rare pyrite was noted. The aplite dike was noted in another pit with sparse associated iron-oxide minerals. The quartz monzonite adjacent to these dikes is unaltered.

REMARKS: Sample 2317 is select copper-stained aplite, gossan and quartz vein matter. Photo LG 842-9 is of the sampled pit.

REFERENCES: _____

EXAMINER: L.J. Garside

DATE VISITED: 26 Jul 84

PROPERTY NAME: Name Unknown

OTHER NAMES:

MINERAL COMMODITY(IES): Au? or Ag?

TYPE OF DEPOSIT: Vein

ACCESSIBILITY:

OWNERSHIP:

PRODUCTION: None

HISTORY:

County: Humboldt

Mining District: Buffalo Mountain

AMS Sheet: Winnemucca

Quad Sheet: BrooksSpring 7 1/2'

SW/4 NE/4 NE/4

Sec. 31 T 34N R 42E

Coordinate (UTM):

North 4 5 1 4 3 8 0 m

East 0 4 7 5 8 9 0 m

Zone 11

DEVELOPMENT: Shallow shaft, 2 short adits, several small pits.

ACTIVITY AT TIME OF EXAMINATION: None.

GEOLOGY: Ocherous gossan and spotty vein quartz occur along one or more N30-40W, high-angle faults in light gray chert. Rare pyrite remnants were noted. The zone of faults is less than 25 m wide; mineralized faults are defined by pits and adits. Some crustiform quartz-gossan (originally sulfide) banding was noted in one pit. Marsh and Erickson show a northwest-trending fault here in Pumpernickel Formation (Pennsylvanian). A dike of quartz monzonite is shown nearby to the west.

Similar oxide copper and gossan prospects are exposed in trenches in S/2 S29, T34N, R42E directly adjacent to the intrusive mass of quartz monzonite.

Considering the minor nature of the prospects, there has been a considerable amount of bulldozer trenching in an area of 6-7km². Bulldozer roads in E/2 S30, T34N, R42E are not shown on the revised (1981) Topo sheet, and are certainly less than 5 years old. The roads are for drill pads for rotary drill holes, presumably for precious metals. This activity may be related to claim staking of the Buffalo claims with PVC pipe.

REMARKS: Photo LG 842-3 is of the collar of a shallow, caved shaft. Sample 2313 is grab from gossan and quartz vein matter from a shallow pit a few meters west of the shaft. Photo 4 is of the bulldozer trenches near sample 2312 and in S29; Photo 5 is of the roads and cuts in E/2 S29.

REFERENCES:

EXAMINER: L.J. Garside

DATE VISITED: 25 Jul 84

The floor of Pumpernickel Valley to the northeast has an average elevation of about 4,600 feet and Buffalo Valley to the south is about 5,000 feet above sea level.

Buffalo Mountain was mapped by Ferguson and others (1952) and was not visited by me. Both the northeastern part

TABLE 8. Production by year for given commodities from the Blue Mountain-Krumm Hills-Winnemucca Mountain area (includes the Winnemucca, Barrett Springs, and Ten Mile districts).

Year	Gold (oz)	Silver (oz)	Copper (lb)	Lead (lb)	Zinc (lb)	Total Production— Tons Gross Value
1912	172	—	—	—	—	27
1913	174	—	—	—	—	234
1914	175	—	—	—	—	12,050
1915	176	—	—	—	—	423
1916	177	—	—	—	—	32,465
1917	178	—	—	—	—	221
1918	179	—	—	—	—	17,195
1919	180	—	—	—	—	110
1920	181	—	—	—	—	3,102
1921	182	—	—	—	—	460
1922	183	—	—	—	—	8,915
1923	184	—	—	—	—	1,911
1924	185	—	—	—	—	23,995
1925	186	—	—	—	—	378
1926	187	—	—	—	—	84
1927	188	—	—	—	—	124
1928	189	—	—	—	—	960
1929	190	—	—	—	—	43,979
1930	191	—	—	—	—	3,600
1931	192	—	—	—	—	16,512
1932	193	—	—	—	—	4,205
1933	194	—	—	—	—	1,300
1934	195	—	—	—	—	3,778
1935	196	—	—	—	—	4,888
1936	197	—	—	—	—	1,380
1937	198	—	—	—	—	2,227
1938	199	—	—	—	—	27,282
1939	200	—	—	—	—	6,689
1940	201	—	—	—	—	3,500
1941	202	—	—	—	—	9,314
1942	203	—	—	—	—	5,244
1943	204	—	—	—	—	8,052
1944	205	—	—	—	—	6,072
1945	206	—	—	—	—	1,467
1946	207	—	—	—	—	4,697
1947	208	—	—	—	—	226
1948	209	—	—	—	—	5,949
1949	210	—	—	—	—	16,227
1950	211	—	—	—	—	9,805
1951	212	—	—	—	—	4,194
1952	213	—	—	—	—	6,826
1953	214	—	—	—	—	15,103
1954	215	—	—	—	—	23,996
1955	216	—	—	—	—	68,227
1956	217	—	—	—	—	1,855
1957	218	—	—	—	—	6,826
1958	219	—	—	—	—	13,103
1959	220	—	—	—	—	23,996
1960	221	—	—	—	—	68,227
1961	222	—	—	—	—	1,855
1962	223	—	—	—	—	6,826
1963	224	—	—	—	—	13,103
1964	225	—	—	—	—	23,996
1965	226	—	—	—	—	68,227
1966	227	—	—	—	—	1,855
1967	228	—	—	—	—	6,826
1968	229	—	—	—	—	13,103
1969	230	—	—	—	—	23,996
1970	231	—	—	—	—	68,227
1971	232	—	—	—	—	1,855
1972	233	—	—	—	—	6,826
1973	234	—	—	—	—	13,103
1974	235	—	—	—	—	23,996
1975	236	—	—	—	—	68,227
1976	237	—	—	—	—	1,855
1977	238	—	—	—	—	6,826
1978	239	—	—	—	—	13,103
1979	240	—	—	—	—	23,996
1980	241	—	—	—	—	68,227
1981	242	—	—	—	—	1,855
1982	243	—	—	—	—	6,826
1983	244	—	—	—	—	13,103
1984	245	—	—	—	—	23,996
1985	246	—	—	—	—	68,227
1986	247	—	—	—	—	1,855
1987	248	—	—	—	—	6,826
1988	249	—	—	—	—	13,103
1989	250	—	—	—	—	23,996
1990	251	—	—	—	—	68,227
1991	252	—	—	—	—	1,855
1992	253	—	—	—	—	6,826
1993	254	—	—	—	—	13,103
1994	255	—	—	—	—	23,996
1995	256	—	—	—	—	68,227
1996	257	—	—	—	—	1,855
1997	258	—	—	—	—	6,826
1998	259	—	—	—	—	13,103
1999	260	—	—	—	—	23,996
2000	261	—	—	—	—	68,227
2001	262	—	—	—	—	1,855
2002	263	—	—	—	—	6,826
2003	264	—	—	—	—	13,103
2004	265	—	—	—	—	23,996
2005	266	—	—	—	—	68,227
2006	267	—	—	—	—	1,855
2007	268	—	—	—	—	6,826
2008	269	—	—	—	—	13,103
2009	270	—	—	—	—	23,996
2010	271	—	—	—	—	68,227
2011	272	—	—	—	—	1,855
2012	273	—	—	—	—	6,826
2013	274	—	—	—	—	13,103
2014	275	—	—	—	—	23,996
2015	276	—	—	—	—	68,227
2016	277	—	—	—	—	1,855
2017	278	—	—	—	—	6,826
2018	279	—	—	—	—	13,103
2019	280	—	—	—	—	23,996
2020	281	—	—	—	—	68,227
2021	282	—	—	—	—	1,855
2022	283	—	—	—	—	6,826
2023	284	—	—	—	—	13,103
2024	285	—	—	—	—	23,996
2025	286	—	—	—	—	68,227
2026	287	—	—	—	—	1,855
2027	288	—	—	—	—	6,826
2028	289	—	—	—	—	13,103
2029	290	—	—	—	—	23,996
2030	291	—	—	—	—	68,227
2031	292	—	—	—	—	1,855
2032	293	—	—	—	—	6,826
2033	294	—	—	—	—	13,103
2034	295	—	—	—	—	23,996
2035	296	—	—	—	—	68,227
2036	297	—	—	—	—	1,855
2037	298	—	—	—	—	6,826
2038	299	—	—	—	—	13,103
2039	300	—	—	—	—	23,996
2040	301	—	—	—	—	68,227
2041	302	—	—	—	—	1,855
2042	303	—	—	—	—	6,826
2043	304	—	—	—	—	13,103
2044	305	—	—	—	—	23,996
2045	306	—	—	—	—	68,227
2046	307	—	—	—	—	1,855
2047	308	—	—	—	—	6,826
2048	309	—	—	—	—	13,103
2049	310	—	—	—	—	23,996
2050	311	—	—	—	—	68,227
2051	312	—	—	—	—	1,855
2052	313	—	—	—	—	6,826
2053	314	—	—	—	—	13,103
2054	315	—	—	—	—	23,996
2055	316	—	—	—	—	68,227
2056	317	—	—	—	—	1,855
2057	318	—	—	—	—	6,826
2058	319	—	—	—	—	13,103
2059	320	—	—	—	—	23,996
2060	321	—	—	—	—	68,227
2061	322	—	—	—	—	1,855
2062	323	—	—	—	—	6,826
2063	324	—	—	—	—	13,103
2064	325	—	—	—	—	23,996
2065	326	—	—	—	—	68,227
2066	327	—	—	—	—	1,855
2067	328	—	—	—	—	6,826
2068	329	—	—	—	—	13,103
2069	330	—	—	—	—	23,996
2070	331	—	—	—	—	68,227
2071	332	—	—	—	—	1,855
2072	333	—	—	—	—	6,826
2073	334	—	—	—	—	13,103
2074	335	—	—	—	—	23,996
2075	336	—	—	—	—	68,227
2076	337	—	—	—	—	1,855
2077	338	—	—	—	—	6,826
2078	339	—	—	—	—	13,103
2079	340	—	—	—	—	23,996
2080	341	—	—	—	—	68,227
2081	342	—	—	—	—	1,855
2082	343	—	—	—	—	6,826
2083	344	—	—	—	—	13,103
2084	345	—	—	—	—	23,996
2085	346	—	—	—	—	68,227
2086	347	—	—	—	—	1,855
2087	348	—	—	—	—	6,826
2088	349	—	—	—	—	13,103
2089	350	—	—	—	—	23,996
2090	351	—	—	—	—	68,227
2091	352	—	—	—	—	1,855
2092	353	—	—	—	—	6,826
2093	354	—	—	—	—	13,103
2094	355	—	—	—	—	23,996
2095	356	—	—	—	—	68,227
2096	357	—	—	—	—	1,855
2097	358	—	—	—	—	6,826
2098	359	—	—	—	—	13,103
2099	360	—	—	—	—	23,996
2100	361	—	—	—	—	68,227

Data for 1972-94, 1916 and 1936 from Couch and Carpenter (1943, p. 69); data for 1975-94, except 1959, from U. S. Bureau of Mines Minerals Yearbooks; data for 1916-1958 from Minerals Resource Office, Area VI, U. S. Bureau of Mines. For years 1907-1915, 1924-26, 1931, 1944, and 1955, production was indicated but details are available.

At the south end of the range are underlain by the Havallah and Pumpernickel Formations, which are intruded by coarsely crystalline granodiorite that makes up most of the southwestern half of the range. The Pumpernickel Formation is exposed in the center of an overturned anticline that trends a little west of north. The granodiorite stock has local border facies of diorite and gabro. A range-front fault has been mapped along the

northeast side of the range and may extend the entire length of the range, as suggested by the rather straight and abrupt east front.

Several small manganese prospects are known along the west side of the range but none have been productive. Pardee and Jones (1920, p. 240-241) describe the O'Brien and Tucker and De la Vega claims, which are located on a ledge of silicified shale that strikes N. 15° W. Manganese oxides are distributed in streaks through the shale in a zone that is up to 40 feet wide and 1,000 feet long along this ledge. The properties were revisited by Roberts who reports (oral communication, 1958) that the manganese oxides in the deposits are surficial and have been derived at least in part from rhodonite that replaces quartzite, shale, and argillite included in formations of late Paleozoic Age.

CALICO MOUNTAINS

The Calico Mountains in the southwest corner of Humboldt County extend due north about 23 miles and are about 6 miles wide. The range is west of the Black Rock Desert and east of the narrow upland valley that drains both northward into High Rock Lake and southward into the Black Rock Desert. Gerlach, which is in Washoe County, about 25 miles to the south on the Western Pacific Railroad, is the nearest town.

The Calico Mountains are underlain by rocks of Tertiary Age except one small area on Donnelly Peak, where both granodiorite of Cretaceous or Tertiary Age and metamorphosed fine-grained clastic sedimentary rocks presumably of Triassic or Jurassic Age are exposed. The Tertiary rocks, which have been subdivided only in the area just south of High Rock Lake, include both sedimentary and volcanic units, but the volcanic rocks are by far the most abundant. The Tertiary sedimentary rocks are dominantly fine grained, in part tuffaceous, and quite similar to the late Tertiary sedimentary rocks elsewhere in the county. The volcanic rocks include basalt, a considerable thickness of porphyritic hornblende andesite, and some rhyolitic to dacitic welded tuffs.

The most obvious structural feature is the eastward tilt of the volcanic rocks in the northern two-thirds of the range, which was caused by normal faulting on both mapped and inferred faults along the west front of the range from south of Donnelly Peak northward to near the hot springs south of Soldier Meadow. This faulting dammed Little High Rock Canyon, which once crossed the Calico Mountains, and produced High