



### DESCRIPTION OF MAP UNITS

Qa	<b>Alluvium (Holocene)</b> —Poorly sorted gravel, sand, and silt; generally; gravels contain fragments of Tertiary volcanic rock. Thickness decreases to less than 30 ft (9 m)
Qig	<b>Pediment and terrace gravel (Holocene and Pleistocene)</b> —Cobble and gravel deposits that consist chiefly of rounded basaltic andesite (Tdbb) cobbles. Pediment gravels are most extensive along the interfluves on southwest side of Sycamore Creek, where the gravels are as much as 80 ft (25 m) thick and are about 100 ft (30 m) above present drainage. Older, more extensive smaller terrace gravel deposits occur along the upper tributaries of Sycamore Creek
Qr	<b>Fan deposits (Holocene and Pleistocene)</b> —Chiefly subangular to angular, poorly sorted, and somewhat clayey sand and silt, locally heavily cemented and deposited by sheetflood processes. Fan deposits are most extensive in the Bear Valley area where they are as much as 150 ft (45 m) thick
Trm	<b>Rhyolite of Mule Creek (Miocene)</b> <b>Rhyolite flow members</b> —The rhyolite—Very light gray to white, low-laminated, aphanitic to slightly porphyritic rhyolite flows that are locally autoclastic. Rhyolite generally contains less than 10 percent phenocrysts of sanidine and biopyroxene quartz. The groundmass is felted to blackish glass, with a slight micaceous, greenish gray alteration at the contact with vitrophyre. (This 0.15 ft), black, slightly porphyritic (vm) are locally intercalated within the rhyolite but are more common at the base. An X-ray spectroscopic analysis of the rhyolite from Red House (see table 1) yielded the following K-Ar age (w.) showed 75.5 percent SiO <sub>2</sub> , 2.98 percent Na <sub>2</sub> O, and 2.67 percent K <sub>2</sub> O (analysis) (A.J. Bartel, K. Stewart, and J. Taggart, written communication, 1986). The rhyolite probably correlates with the rhyolite west of Mule Creek, dated by Weber (1963) with 2.47 Ma. The rhyolite is about 18.3 m from obsidian nodules. Most recently Marvin and others (1987) reported an age of 17.7±0.6 m. from the same rhyolite. A rhyolite concentrate from a rhyolite flow in sec. 18, T. 16 S., R. 18 W., in the adjoining Cliff Creek drainage to the east, yielded a K-Ar age of 21.3±0.7 m. and was called the Rhyolite of Sycamore Camp (Franklin, 1987). The total aggregate thickness of rhyolite and vitrophyre is about 200 ft (60 m)
Trim	<b>Rhyolite and radial dikes—Lignite</b> —Dark-gray, sugary-textured rhyolite plug near Sycamore Tank has a radial dike (rd) that is slightly north of the central plug. The rhyolite plug has evenly disseminated biotite plates 1 mm or less across that impart a "salt and pepper" texture to the rhyolite. Stubby oligoclase (An <sub>25</sub> ) phenocrysts, about 1 mm across, comprise as much as 10 percent of the rhyolite and biotite about 3 percent. There are two varieties of biotite, a dusky brown and a pale-green biotite. The dikes contain lesser amounts of phenocrysts and are commonly aphyric. Most dikes are less than 50 ft (15 m) across
Tlm	<b>Pyroclastic units—Vergine</b> —Dark-gray to black, blocky, clayey, thin-bedded to massive air-fall tuff with thin interbeds of tuffaceous sandstone. Tuff contains abundant non-collapsed pumice fragments up to 2 cm across; some pumice is altered to light greenish gray. Generally less than 10 percent of the tuff is composed of angular to subangular reddish-brown, angular, dacitic tuffite fragments are abundant in the basal part of the air-fall tuff. Maximum thickness about 250 ft (75 m)
Trss	<b>Sandstone—Yellowish-gray to brownish-gray, thin-bedded, coarse-grained sandstone</b> —The sandstone is medium to coarse grained with cut and fill structures suggest a fluvial origin. Discontinuous unit with a maximum thickness of about 50 ft (15 m)
Trsq	<b>Sedimentary breccia—Dark-brownish-gray, thick-bedded to massive, poorly sorted, sedimentary breccia</b> —The breccia is composed of angular to subangular andesite up to 5 cm across. Outcrop near Rock House Tank is about 40 ft (12 m) thick
Tdbb	<b>Bearwallow Mountain Andesite (Miocene and Oligocene)</b> <b>Andesite—Dark-gray, dark gray, and dark-purplish gray, porphyritic lava flows</b> that comprise the shield volcano. Lava flows contain 15 to 35 percent labradorite (An <sub>65-85</sub> ) phenocrysts up to 2 mm across and 4 to 7 percent clinopyroxene. The groundmass is felted to micaceous, greenish gray and contains as much as 6 percent olivine as granules interstitial to the feldspar microlites. The groundmass is felted to pilotitic. Two chemical analyses from andesite collected in the Crookson Peak quadrangle indicate the following composition: 73.8 percent SiO <sub>2</sub> , 3.8 percent Na <sub>2</sub> O, and 3.1 and 3.3 percent K <sub>2</sub> O (analysis) (S. Skinner, U.S. Geological Survey, written communication, 1979). Whole rock K-Ar ages from the Brushy Radar dome site in the Crookson Peak quadrangle were 23.7±0.5 m.y. (analysis) (S. Skinner, 1980; Marvin and others, 1987, p. 121; Marvin and others, 1987)
Thx	<b>Basaltic andesite autobreccias—Dark-gray, massive breccias</b> with angular blocks of basaltic andesite up to 30 cm across. The coarse sandy interstitial material consists of comminuted basaltic andesite fragments of large and minor amount of phenocrysts. Lenses like unit near base of flow west of Rock House Tank has a maximum thickness of about 50 ft (15 m)
Teab	<b>Coarse-grained porphyritic andesite lava flows—Dark-gray to medium-light-gray, coarse-grained lava flows</b> with a "turkey-track" texture formed by abundant euhedral plagioclase laths as much as 2 cm long. Basal member of Bearwallow Mountain Andesite weathers dusky reddish brown and has a distinctive vuggy groundmass. Rock typically contains 25 to 27 percent andesine and oligoclase phenocrysts, 1 percent of flow pseudomorphs after oxyhornblende(?), and 0.3 to 2 percent

## REFERENCES CITED

- Finnett, T.L., 1987, Geologic map of the Cliff quadrangle, Grant County, New Mexico: U.S. Geological Survey Miscellaneous Investigations Series Map I-1768, scale 1:62,500.
- Marvin, F.W., 1950, Bickerman, M., Mehner, H.H., and Ratté, J.C., 1987, Isotopic ages of post-Palaeozoic igneous rocks bordering the southern margin of the Colorado quadrangle, Arizona-New Mexico: New Mexico Institute of Mining and Technology Bulletin 118, 63 pp.
- Strangway, P.W., Simpson, J.W., and York, D.D., 1976, Paleomagnetic studies of volcanic rocks from the Flagstaff Plutonic area of Arizona and New Mexico, in *Conozoic volcanism in southwestern New Mexico*, New Mexico Geological Society Special Paper no. 5, p. 119-124.
- Weber, R.H., and Bassett, W.A., 1963, K-Ar ages of Tertiary volcanic and intrusive rocks in Socorro, Catron, and Grant Counties, New Mexico: New Mexico Geological Society Guidebook 14th, p. 220-223.

Table 1.--Chemical analyses of Miocene and Oligocene volcanic rocks from the Applegate Mountain quadrangle

[N=not determined; \*Total iron reported as  $\text{Fe}_2\text{O}_3$ ; (LOI)=loss on ignition--900 °C. Analyses by X-ray spectroscopy and single solution methods by N. Skinner, 1979, and P. Briggs, 1980, U.S. Geological Survey]

Rock Type	Rhyolite	Andesite
Field No.	SR-37-83	SRX-124-78
Map Unit	Tm	Tbhd
sp. gr.	N	2.66
SiO <sub>2</sub>	75.5	61.0
Al <sub>2</sub> O <sub>3</sub>	12.7	16.2
Fe <sub>2</sub> O <sub>3</sub>	*101	3.5
FeO	N	2.3
MgO	.17	2.1
CaO	.62	4.9
Na <sub>2</sub> O	2.98	3.8
K <sub>2</sub> O	5.20	3.1
TiO <sub>2</sub>	.16	.90
P <sub>2</sub> O <sub>5</sub>	<.05	.33
MnO	.02	.05
H <sub>2</sub> O*	N	.98
H <sub>2</sub> O	N	.06
(LOI)	0.57	N
Total	99	100

### SAMPLE LOCATIONS

Sample SR-37-83: Rhyolite of Mule Creek  
Location - Rock House Canyon; SE1/4SE1/4 sec. 24, T. 16 S.,  
R. 19 W.

Sample SRX-124-78: Andesite of Bearwallow Mountain  
Location - Road cut near North Fork of Sycamore Creek;  
SE1/4SW1/4 sec. 27, T. 15 S., R. 19 W.

This map is preliminary and has not been reviewed for conformity with U. S. Geological Survey editorial standards nor with the North American stratigraphic code.