



**SURFICIAL DEPOSITS**

**Basin fill (Quaternary)** Unconsolidated sand and silt filling Dixie Valley.

**Younger alluvium (Quaternary)** Unconsolidated alluvium, colluvium, talus, and other surficial deposits. Mostly alluvium in active drainages and colluvium along range front.

**Talus (Quaternary)** Mostly rubble from granite porphyry dikes (Tgp). Only larger deposits mapped.

**Beach gravels (Quaternary)** Sandy pebble gravel and gravely sand. Forms small remnants of shoreline at about 1094 m elevation in center of Dixie Valley.

**Younger alluvial-fan deposits (Quaternary)** Unconsolidated fluvial and debris-flow deposits consisting of unsorted to poorly sorted, coarse-grained sandy pebble to boulder gravel and gravely sand locally containing angular blocks of granite as much as 3 m across. Undissected to weakly dissected. Equivalent to young alluvial-fan deposits and intermediate-age alluvial-fan deposits units of Bell and Katzer (1987) in the IXL Canyon Quadrangle.

**Older alluvium (Quaternary)** Unconsolidated alluvium. Poorly sorted sandy gravel containing well-rounded cobbles. Forms gravel terraces as high as 15 m above adjacent drainages in East Lee, Poco, and Coyote Canyons.

**Older alluvial-fan deposits (Quaternary)** Unconsolidated fluvial and debris-flow deposits consisting of unsorted to poorly sorted, coarse-grained sandy pebble to boulder gravel and gravely sand locally containing angular blocks of granite as much as 3 m across. Forms deeply dissected alluvial fan remnants locally bounded by piedmont faults.

**VOLCANIC, SEDIMENTARY, AND PLUTONIC ROCKS**

**Rhyolite (Miocene?)** White to light-gray, crystal-poor rhyolite containing about 10% fine- to medium-grained phenocrysts consisting of K-feldspar, plagioclase, and less abundant quartz and biotite in a microcline groundmass. Forms small outcrops just east of Dixie Valley fault along north edge of quadrangle.

**Basalt intrusion (Miocene)** Narrow dike of dark-gray, fine-grained pyroxene diabase intruding older rhyolite, dacite and andesite, older tuff, and silicic intrusive rocks and Freeman Creek pluton.

**Diabase (Miocene)** Dikes of dark-reddish-brown to black, fine-grained pyroxene diabase intruding older rhyolite, dacite and andesite, older tuff, and silicic intrusive rocks and Freeman Creek pluton.

**Andesite (Miocene)** Small outcrops of dark reddish-brown to black, glassy to devitrified, coarsely porphyritic andesite and dacite lava flows and flow breccias. Only present near the mouth of East Lee Canyon.

**Sedimentary rocks (Miocene)** Small outcrops of white to yellowish-gray, volcanoclastic sandstone, siltstone, and possible conglomerate. Only present near the mouth of East Lee Canyon.

**Granite porphyry (Miocene)** Composite dike of white, pink, and orange-gray biotite granite and biotite rhyolite porphyry. Texture of dike is vesicular. On its west side, it is a porphyrophanitic rhyolite containing about 20% fine- to coarse-grained phenocrysts of altered feldspar, biopyroxene, quartz, and minor chloritized biotite in an altered aphanitic groundmass. On its east side, it is a medium-grained granite porphyry containing about 5% altered biotite. Commonly hydrothermally altered (argillite or sericitic alteration) with abundant pyrite. Intrudes IXL and Freeman Creek plutons, older rhyolite, dacite and andesite, and older tuff units. Tufts of Job Canyon and Elevenmile Canyon, and megabreccia of Government Trail Canyon.

**Freeman Creek pluton (Miocene)** Light- to dark-gray to pinkish-gray, fine- to coarse-grained, equigranular to porphyritic biotite granite and biotite-hornblende granodiorite. A composite intrusion consisting of at least three textural phases: (1) coarse-grained porphyritic biotite granite containing about 5 to 7% fine-grained anhedral biotite that locally replaces hornblende and abundant pink anhedral to subangular K-feldspar phenocrysts as long as 1.5 cm; (2) medium-grained, sparsely porphyritic to equigranular biotite granite containing about 5% fine-grained, anhedral biotite and sparse small (<1 cm) white K-feldspar phenocrysts; and (3) fine- to medium-grained biotite-hornblende granodiorite porphyry containing about 10 to 15% fine-grained biotite and hornblende and local fine-grained clinopyroxene, small (1-3 mm) dark-gray quartz eyes, scattered 5- to 10-mm white K-feldspar and dark-gray plagioclase phenocrysts set in a fine-grained microgranular groundmass of quartz and feldspar. Phase 1 occurs mostly southeast of Job Peak, whereas phases 2 and 3 are present between Little Box Canyon and 2 km south of Freeman Creek. Phase 3 may form inclusions in phase 2 near the mouth of Freeman Creek and also is present near the top of the pluton on both sides of Freeman Creek. South of Freeman Creek the contact between phases 2 and 3 appears gradational; elsewhere, contacts between phases 2 and 3 appear sharp and intrusive. Contacts between phases 1 and 2 and other phases have not been observed. Biotite K-Ar age of 22.8 ± 0.6 Ma from granodiorite of phase 3 collected about 0.5 km south of Freeman Creek (E. H. McKee, written commun., 1991). Intruded by granite porphyry, rhyolite porphyry, and diabase dikes (units Tgp, Tsi, and Td, respectively).

**SYMBOLS**

**Contact** Dashed where approximately located.

**High-angle normal fault** Dashed where inferred; dotted where contoured. Bar and ball on downthrown side. In cross section, arrows show relative direction of movement.

**Inferred low-angle normal fault** Double ticks on upper plate.

**Strike and dip of compaction foliation**

64  
Inclined  
Vertical

**Strike and dip of flow banding**

50  
Inclined  
Vertical

**Strike and dip of inclined bedding**

31

**Dikes** Parts of older rhyolite (Tor), silicic intrusive rocks (Tsi), diabase (Td), and basal intrusion (Tbi) units, respectively.

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**VOLCANIC, SEDIMENTARY, AND PLUTONIC ROCKS**

**Rhyolite (Miocene?)** White to light-gray, crystal-poor rhyolite containing about 10% fine- to medium-grained phenocrysts consisting of K-feldspar, plagioclase, and less abundant quartz and biotite in a microcline groundmass. Forms small outcrops just east of Dixie Valley fault along north edge of quadrangle.

**Basalt intrusion (Miocene)** Narrow dike of dark-gray, fine-grained pyroxene diabase intruding older rhyolite, dacite and andesite, older tuff, and silicic intrusive rocks and Freeman Creek pluton.

**Diabase (Miocene)** Dikes of dark-reddish-brown to black, fine-grained pyroxene diabase intruding older rhyolite, dacite and andesite, older tuff, and silicic intrusive rocks and Freeman Creek pluton.

**Andesite (Miocene)** Small outcrops of dark reddish-brown to black, glassy to devitrified, coarsely porphyritic andesite and dacite lava flows and flow breccias. Only present near the mouth of East Lee Canyon.

**Sedimentary rocks (Miocene)** Small outcrops of white to yellowish-gray, volcanoclastic sandstone, siltstone, and possible conglomerate. Only present near the mouth of East Lee Canyon.

**Granite porphyry (Miocene)** Composite dike of white, pink, and orange-gray biotite granite and biotite rhyolite porphyry. Texture of dike is vesicular. On its west side, it is a porphyrophanitic rhyolite containing about 20% fine- to coarse-grained phenocrysts of altered feldspar, biopyroxene, quartz, and minor chloritized biotite in an altered aphanitic groundmass. On its east side, it is a medium-grained granite porphyry containing about 5% altered biotite. Commonly hydrothermally altered (argillite or sericitic alteration) with abundant pyrite. Intrudes IXL and Freeman Creek plutons, older rhyolite, dacite and andesite, and older tuff units. Tufts of Job Canyon and Elevenmile Canyon, and megabreccia of Government Trail Canyon.

**Freeman Creek pluton (Miocene)** Light- to dark-gray to pinkish-gray, fine- to coarse-grained, equigranular to porphyritic biotite granite and biotite-hornblende granodiorite. A composite intrusion consisting of at least three textural phases: (1) coarse-grained porphyritic biotite granite containing about 5 to 7% fine-grained anhedral biotite that locally replaces hornblende and abundant pink anhedral to subangular K-feldspar phenocrysts as long as 1.5 cm; (2) medium-grained, sparsely porphyritic to equigranular biotite granite containing about 5% fine-grained, anhedral biotite and sparse small (<1 cm) white K-feldspar phenocrysts; and (3) fine- to medium-grained biotite-hornblende granodiorite porphyry containing about 10 to 15% fine-grained biotite and hornblende and local fine-grained clinopyroxene, small (1-3 mm) dark-gray quartz eyes, scattered 5- to 10-mm white K-feldspar and dark-gray plagioclase phenocrysts set in a fine-grained microgranular groundmass of quartz and feldspar. Phase 1 occurs mostly southeast of Job Peak, whereas phases 2 and 3 are present between Little Box Canyon and 2 km south of Freeman Creek. Phase 3 may form inclusions in phase 2 near the mouth of Freeman Creek and also is present near the top of the pluton on both sides of Freeman Creek. South of Freeman Creek the contact between phases 2 and 3 appears gradational; elsewhere, contacts between phases 2 and 3 appear sharp and intrusive. Contacts between phases 1 and 2 and other phases have not been observed. Biotite K-Ar age of 22.8 ± 0.6 Ma from granodiorite of phase 3 collected about 0.5 km south of Freeman Creek (E. H. McKee, written commun., 1991). Intruded by granite porphyry, rhyolite porphyry, and diabase dikes (units Tgp, Tsi, and Td, respectively).

**Ts1** Silicic intrusive rocks (Miocene and Oligocene?) Numerous texturally and compositionally distinct silicic dikes and domes and minor pyroclastic aprons and lava flows. Includes aphyric felsite, sparsely porphyritic biotite rhyolite and quartz rhyolite, coarsely porphyritic biotite-quartz-plagioclase-K-feldspar rhyolite(?) porphyry, and coarsely porphyritic biotite-hornblende-plagioclase dacite porphyry. Most rocks are strongly argillite or propylitically altered, although glassy domes are present locally along west side of Stillwater Range west of the Job Peak Quadrangle. Age of unit is considered to range from about 25 to 18 Ma based on K-Ar ages of (1) 24.2 ± 0.8 and 24.8 ± 0.8 Ma from biotite from glassy rhyolite domes in Table Mountain Quadrangle; (2) 15.3 ± 0.5 Ma from partially chloritized biotite from a rhyolite dike in Elevenmile Canyon in La Plata Canyon Quadrangle; (3) 22.6 ± 0.7 Ma from hornblende from a biotite-hornblende dacite porphyry in Poco Canyon in Table Mountain Quadrangle; (4) 25.8 ± 1.1 Ma from biotite from a devitrified rhyolite dike in East Lee Canyon; (5) 19.5 ± 0.6 Ma from biotite from a devitrified aphyric dacite near Prouette Mountain in the Prouette Mountain Quadrangle; (6) 20.9 ± 0.6 Ma from sanidine from a devitrified rhyolite intrusion at mouth of Poco Canyon in Table Mountain Quadrangle; and (7) 22.4 ± 0.7 Ma from sanidine in a devitrified rhyolite lava flow that unconformably overlies tuff of Poco Canyon in Poco Canyon in Table Mountain Quadrangle (all ages from E. H. McKee, written commun., 1988-1993).

**Tyr** Younger rhyolite (Miocene or Oligocene?) Red, light-purple, green, black, and gray, generally sparsely porphyritic rhyolite lava flows, flow breccia, shallow intrusive rocks, and minor welded tuff. Generally contains 5 to 10% fine- to medium-grained phenocrysts of white K-feldspar and minor plagioclase and altered biotite(?) in a devitrified aphanitic groundmass. Locally strongly flow banded. Locally includes thin, interbedded sequences of coarse-grained, volcanoclastic sandstone and conglomerate and accretionary fault tuff. Intrudes tufts of Poco Canyon, Lee Canyon, and Elevenmile Canyon. Generally equivalent to the latte flows, tufts, and breccias unit of Page (1985, unit T-1).

**Tlc** Tuff of Lee Canyon (Miocene or Oligocene?) Reddish-brown, blue-gray, and lavender-gray, pumice- and biotite-rich high-silica dacite ash-flow tuff. Tuff is devitrified, moderately to densely welded, moderately crystal rich, and generally poor. Strongly flattened, biotite-rich pumice clasts are commonly as long as 10 cm. Generally contains about 30 to 40% medium-grained phenocrysts comprised of plagioclase, less abundant sanidine and quartz, 2 to 3% biotite, and minor hornblende. Lithologically resembles less altered parts of tuff of Elevenmile Canyon but is more pumice rich and generally contains less abundant quartz phenocrysts. Biotite K-Ar age of 24.8 ± 0.6 Ma determined from a sample collected at mouth of Poco Canyon in Table Mountain Quadrangle (E. H. McKee, written commun., 1987).

**Tbr** Megabreccia of Government Trail Canyon (Miocene or Oligocene?) Helical breccia and breccia and breccia-rich tuff consisting of unsorted blocks of older Tertiary igneous units in a moderately welded rhyolite ash-flow tuff matrix. Breccia matrix consists of pale-green, moderately pumiceous, crystal-poor tuff containing about 5 to 10% phenocrysts of quartz and altered feldspar. Pumice fragments are light to dark green, crystal-poor, and generally less than 4 cm in maximum dimension. Breccia fragments range from millimeters to hundreds of meters in maximum dimension and include older rhyolite unit and tufts of Poco Canyon and Job Canyon. Megabreccia blocks are shown schematically in cross section A-A' but are not shown on map. Breccia commonly is clast supported. Unit locally contains thin beds of volcanoclastic sandstone and tuff tuff.

**Tec** Tuff of Elevenmile Canyon (Oligocene?) Black, greenish-gray, and white, crystal-rich rhyolite to high-silica andesite ash-flow tuff. Contains 30-60% phenocrysts of medium-grained plagioclase, less abundant sanidine and quartz, and 1-5% biotite. Generally densely welded. Commonly contains abundant dark-green, chloritized, crystal-rich, flattened pumice clasts as long as 6 cm and abundant fragments of older Tertiary metasedimentary rocks, older rhyolite (Tor), and andesites and sparse clasts of the tuff of Poco Canyon. Generally strongly propylitically or argillite altered or bleached. Biotite K-Ar age of 24.5 ± 0.7 Ma determined on a sample collected in the Table Mountain Quadrangle (E. H. McKee, written commun., 1989). Includes large megabreccia blocks of brecciated black Mesozoic hornfels (h) enclosed in tuff in southwest corner of the quadrangle. Megabreccia blocks in the northwest corner of the quadrangle are shown schematically in cross section A-A' but are not shown on map.

**Tsp** Sandstone and breccia (Oligocene?) Dark-red, reddish-brown and lavender-gray, medium-bedded to massive, quartz-rich sandstone and sedimentary breccia and minor quartz-rich ash-flow tuff. Breccia layers contain abundant pebble- to cobble-size, subangular to subrounded clasts of older rhyolite unit (Tor) and tuff of Poco Canyon in a quartz-rich sand matrix derived in large part from the underlying tuff of Poco Canyon. Present in the Job Peak Quadrangle only south of Coyote Canyon where it overlies the lower cooling unit of tuff of Poco Canyon.

**Tuff of Poco Canyon (Oligocene?)** Compound cooling unit of rhyolite ash-flow tuff where exposed. In Job Peak Quadrangle, however, only lower cooling unit is present. Consists of:

**Tpcl** Lower cooling unit. White, gray, reddish-brown, and greenish-gray, densely welded, crystal-rich rhyolite and high-silica rhyolite ash-flow tuff. Contains 30 to 55% medium-grained phenocrysts comprised of K-feldspar and quartz, less abundant plagioclase, and minor biotite. Generally lithic- and pumice-poor. Commonly hydrothermally altered and recrystallized.

**Txl** IXL pluton (Oligocene?) Dark-gray, fine- to medium-grained, equigranular to porphyritic granodiorite and quartz monzonite. The margins of the pluton have a conspicuous porphyry texture consisting of medium-grained feldspar and scattered biotite and hornblende phenocrysts in a small amount of fine-grained groundmass of quartz, feldspar, and biotite. The color index is about 12 to 15. The lowest exposed part of the pluton along the Dixie Valley fault in the IXL Canyon Quadrangle is an equigranular, medium-grained rock with a color index of about 20 including hornblende crystals containing clinopyroxene cores. Biotite K-Ar ages of 28-29 Ma from samples collected in the IXL Canyon Quadrangle (Stoess and Armstrong, 1971; E. H. McKee, oral commun., 1987).

**Tad** Andesite and dacite (Oligocene?) Light- to dark-green to black, sparsely porphyritic, strongly altered andesite and dacite lava flows, breccias, and intrusions. Includes heterogeneous flow breccia, heterogeneous breccia containing clasts of older rhyolite (Tor) and several types of andesite, and coarsely porphyritic lava flows and (or) shallow intrusive rocks. Most rocks have undergone strong argillite or propylitically alteration.

**Tuff of Job Canyon (Oligocene?)** Consists of:

**Tju** Upper cooling unit. White, light-gray, and green-gray, densely welded, generally lithic-rich and crystal-poor rhyolite to dacite ash-flow tuff. Tuff is devitrified and commonly strongly propylitically or argillite altered. Locally pyritically altered. Generally contains less than 10 to 15% phenocrysts of altered plagioclase and K-feldspar. Highly variable pumice contents. Small (6 cm) lithic fragments of pre-Tertiary metasedimentary rocks and Tertiary volcanic rocks are abundant and much of tuff exposed along crest of range between Poco Canyon and Job Peak contains 30 to 50 vol. % lithic fragments. Locally includes megabreccia blocks of propylitized andesite (a) enclosed in tuff.

**Tcl** Lower cooling unit. Dark-greenish-gray to orange-brown, densely welded, generally crystal-poor rhyolite and dacite ash-flow tuff. Generally contains 10 to 15% phenocrysts of altered plagioclase and potassium feldspar in varying ratios. Locally shows rheomorphic flow textures. Small lithic fragments consisting mostly of the older rhyolite unit (Tor) locally abundant.

**Tds** Dacite and andesite (Oligocene?) Dark-green to black, argillite to coarse-grained, strongly porphyritic dacite and andesite lava flows and shallow intrusive rocks. Most abundant rocks consist of hornblende plagioclase dacite porphyry containing about 30% medium- to coarse-grained phenocrysts of plagioclase, hornblende, and quartz in a microcline crystalline groundmass. Commonly strongly propylitically altered and/or thermally metamorphosed with formation of abundant epidote, calcite, and chlorite. Intrudes and overlies older rhyolite and older tuff units.

**Tor** Older rhyolite (Oligocene?) Red, light-purple, green, black, and gray, generally sparsely porphyritic rhyolite lava flows, flow breccia, shallow intrusive rocks, and minor welded tuff. Generally contains 0 to 10% fine- to medium-grained phenocrysts of white K-feldspar, minor plagioclase, and minor altered biotite(?) in a devitrified aphanitic groundmass. Locally strongly flow banded. Unit is megascopically identical to younger rhyolite unit (Tyr). Generally equivalent to latte flows, tufts, and breccias unit of Page (1985, unit T-1).

**Tol** Older tuff (Oligocene?) At least three separate units of densely welded, lithic- and crystal-rich, pumice-poor rhyolite to dacite ash-flow tuff. Includes (1) dark-green dacite tuff containing about 30 to 35% phenocrysts composed mostly of fine- to medium-grained plagioclase, (2) light-greenish-gray, quartz-rich rhyolite tuff containing about 15 to 20% fine-grained phenocrysts, and (3) dark-green to black, biotite-hornblende dacite tuff containing about 30% medium-grained phenocrysts consisting mostly of plagioclase with 4 to 5% biotite + hornblende. All units are weakly to strongly propylitically altered and thermally metamorphosed with development of abundant hydrothermal epidote and fine-grained biotite. Relative ages of three units uncertain.

2 Volcanic and hypabyssal intrusive rock names based on I.U.G.S. total alkali-silica classification (Le Bas and others, 1986) of whole-rock samples except for high-alkali rhyolite which is used for rocks with >75 wt. % SiO<sub>2</sub>. Plutonic rock names based on I.U.G.S. modal classification (Greene, 1978).

**Scale 1:24,000**

**CONTOUR INTERVAL 40 FEET**

Base map: U.S. Geological Survey Job Peak 7.5' Quadrangle, 1972, photorevised 1982

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See accompanying pamphlet for references and discussion of the general geology and structural history of the southern Stillwater Range.

# GEOLOGIC MAP OF THE JOB PEAK QUADRANGLE, NEVADA

David A. John  
1993