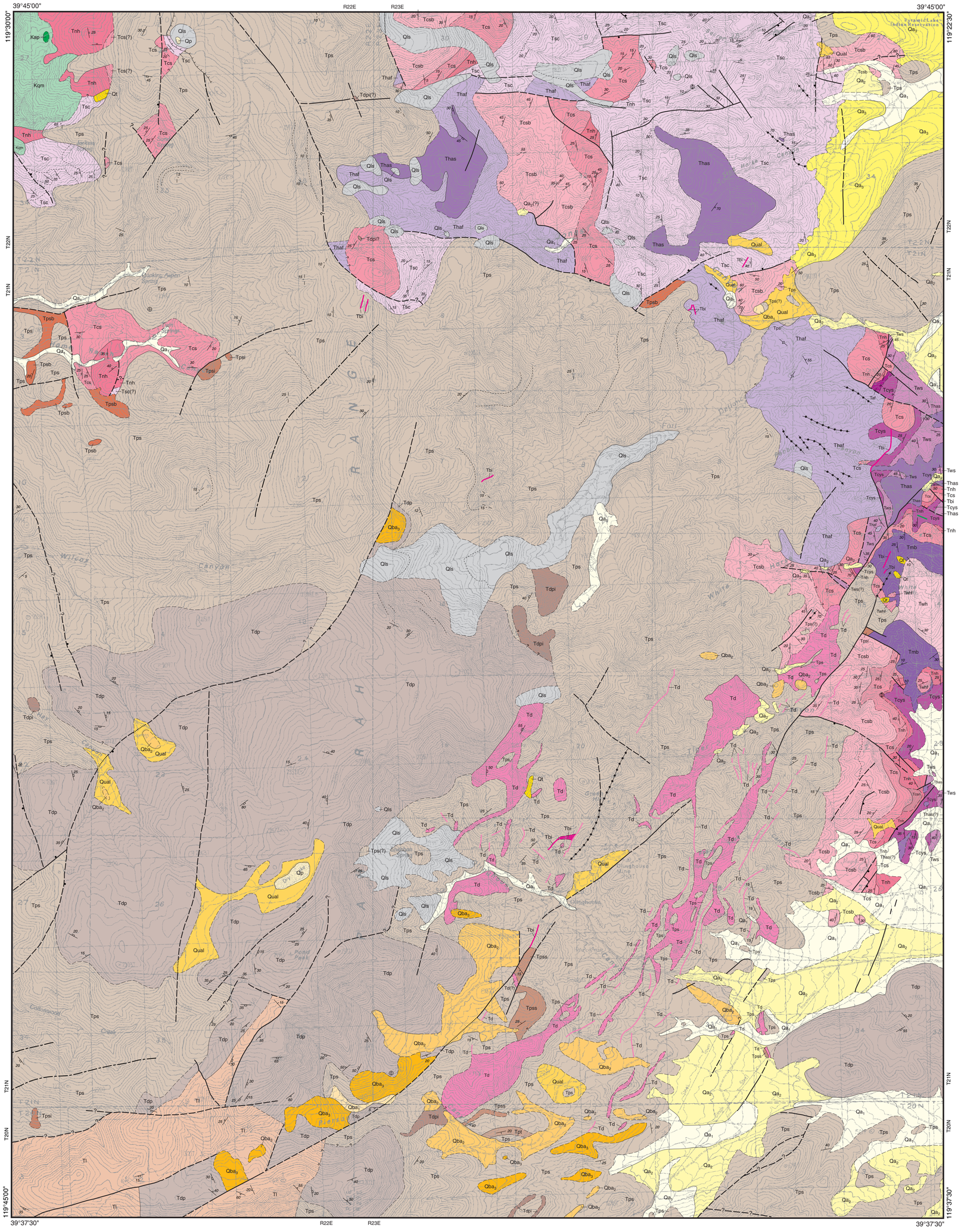


PRELIMINARY GEOLOGIC MAP OF THE OLINGHOUSE QUADRANGLE, NEVADA

Larry J. Garside and Harold F. Bonham

2001

Scale 1:24,000

0 0.5 1 kilometer

0 0.5 1 mile

0 1000 2000 3000 4000 5000 feet

CONTOUR INTERVAL 10 METERS

Base map: U.S. Geological Survey Olinghouse 7.5' Quadrangle, DRG

Qp **Playa deposits** Grayish-white, fine-grained silt and clay deposited in a small, fault-controlled depression on Pond Peak and in a landslide-controlled depression in the northwest part of the quadrangle.

Qt **Talus** Coarse, angular rock fragments derived from adjacent rock units and deposited on steep slopes. Mapped only locally where extensive or conceals contacts between older units.

Qa_1 **Young alluvium** Poorly sorted Holocene deposits of boulder- to silt-sized material deposited on alluvial fans and as channel deposits along drainages in upland areas. Fan surfaces commonly exhibit bar-and-swale surface morphology and are minimally dissected. Desert pavement is not commonly developed and clasts are caliche coated. Rare boulders 1 m.

Qa_2 **Intermediate-age alluvium** Poorly sorted Pleistocene deposits of boulder- to silt-sized material deposited on alluvial fans. Fan surfaces are commonly darker due to development of desert pavement of rock-varnish-coated cobbles and are moderately dissected. Clasts are caliche cemented where observed in pits. Below 1337 m elevation shoreline features of the last highstand of Pleistocene Lake Lahontan (~13 ^{14}C ky BP, Adams and others, 1999) cut these fans.

Qa_3 **Old alluvium** Poorly sorted middle(?) Pleistocene deposits of boulder- to silt-sized material deposited on a single, large fan in the northeast Olinghouse Quadrangle and adjacent northwest Wadsworth Quadrangles (Dead Ox Wash and vicinity). Fan surface is deeply dissected.

Qual **Upland alluvium** Deposits of alluvial fans, colluvium, and stream deposits; includes coarse basin-fill material in fault-controlled upland basins.

Qls **Landslide deposits** Holocene and Pleistocene chaotic masses of boulder- to clay-sized material resulting from debris slides and slumps, rock avalanches(?), and translational landslides. Includes some colluvium and talus. Older deposits that have been dissected by Holocene stream courses are difficult to recognize.

Qba_1 **Younger boulder alluvium** Coarse, poorly sorted boulder and cobble alluvium and colluvium.

Qba_2 **Intermediate-age boulder alluvium** Coarse, poorly sorted boulder and cobble alluvium and colluvium. Found as intermediate-elevation remnant pediment deposits on bedrock in areas of lower relief, and as steep-slope deposits on the mountain front.

Qba_3 **Older boulder alluvium** Coarse, poorly sorted boulder and cobble alluvium and colluvium. Found as the highest and most dissected remnant pediment deposits on bedrock in areas of lower relief and as steep slope deposits on the mountain front.

Tl **Lousetown Formation** Dark-gray- to dark-reddish-brown-weathering, dark-gray flows of olivine basalt and basaltic andesite. Massive to vesicular or microvesicular, locally platy jointed. In one thin section, phenocrysts (10 %) of elongate plagioclase (0.1-0.2 x 0.5 mm) and olivine (0.5 mm, partly to completely altered to iddingsite) are found in a groundmass of plagioclase and pyroxene microlites and glass. Intersertal and pilotaxitic, locally with rare xenocrysts of quartz and hornblende (completely altered to pyroxene + Fe-Ti oxides). Vesicles open or thinly coated with hyaline opal. The thin-sectioned rock contains 56% silica and has been K-Ar dated (whole rock) at 6.7 Ma (Garside and others, 2000).Thickness <100 m southwest of Pond Peak.

Tdp **Tdpi** **Dacite of Pond Peak** Light-brown-weathering, light-gray flows and domes, and lesser flow breccias, lahars, and small intrusive masses of pyroxene-hornblende dacite (68-69% SiO_2). Local flow banding and platy flow jointing; rarely lithophysal or spherulitic. Contains phenocrysts (10-15%) of clear to spongy plagioclase (10-12%, typically 1 mm, rarely to 2.5 mm), black, elongate hornblende (~1%, 1.2 mm; rarely thinly rimmed by fine pyroxene and Fe-Ti oxides), green orthopyroxene (0-1%, 0.4 mm), and trace magnetite (0.2 mm) in a locally flow-banded, pilotaxitic to felted groundmass of plagioclase microlites and glass. **Tdpi,** fine-grained, intrusive dikes or small irregular masses, commonly with steep flow foliation and glassy contacts. Dated by K-Ar methods at 8.3 Ma. Garside and others, 2000, table 2 and appendix 1).

Tbi **Basaltic intrusive rocks** Narrow dikes (commonly 1-3 m) and small, irregular intrusive bodies of basalt or basaltic andesite that cut flows of Tps and older rocks. These rocks are fine grained, dark gray, sparsely porphyritic, with trachytic to felted textures, and only rarely vesicular. One sample from a canyon between Olinghouse Canyon and Green Hill contains phenocrysts (~3%) of elongate plagioclase (2-3%, 0.4-3 mm long) and minor pyroxene (<0.4 mm) in a groundmass of plagioclase laths (<0.2 mm long), fine pyroxene(?) and glass(?). This rock is propylitically altered, containing pyrite, chlorite, and calcite. One dike from this area is reported to contain fragments of Td (Geasan, 1980), and thus be younger than that unit; however, some basaltic intrusive rocks of the quadrangle may be sources for rocks of unit Tps, and thus of equivalent age.

Td **Hornblende dacite** Dikes and irregular intrusive masses, including rare sills(?), which form an intrusive screen cutting predominantly Tps in the main part of the Olinghouse mining district. Narrow (~1 m) dikes are locally flow banded and have finer grained margins. Pale-orange-weathering, yellowish-gray, hydrothermally altered porphyritic rock which originally contained phenocrysts (10-25%) of plagioclase (1-2.5 mm) and a few percent each of flow-aligned hornblende (elongate to distinctly acicular, 3 x 10 mm) and equant pyroxene (<1 mm) in a finely crystalline groundmass of flow-aligned microlites or more equant feldspar and quartz(?). Textures are commonly pilotaxitic although some samples are nearly seriate; fine-grained phaneritic groundmass textures are also reported (Bonham, 1969; Geasan, 1980). Rarely, quartz phenocrysts (commonly <0.5 mm, rarely 3 mm) are observed as are darker, cognate inclusions (1 mm). Cubes of limonite after pyrite are common in some samples, and the dikes are variably but nearly ubiquitously altered to mixtures of epidote, chlorite, calcite, sericite, and adularia? (as patchy plagioclase replacements). Considered to be predominantly dacitic based on phenocryst mineralogy and major-element chemistry (Geasan, 1980, table 10). One uncommonly fresh-appearing dike from the southeast flank of Green Hill contains phenocrysts of unaltered basaltic hornblende, slightly adularized(?) plagioclase, and variably chlortized pyroxene. Hornblende from this rock was dated at 10.39 Ma (Garside and others, 2000, table 1), suggesting that at least some dikes are synmineralization (dated as 10.46 Ma on vein adularia from Green Hill).

Tps **Tpt** **Tpss** **Tpsi** **Tpsb** **Pyramid sequence Tps,** undivided basaltic flows, fewer poorly exposed basaltic pyroclastic rocks, and locally, thin, discontinuous epiclastic and silicic pyroclastic beds (where not mapped separately). Flows (~2-10 m) are massive to locally vesicular and brecciated, very dark-gray basalt and basaltic andesite, consisting of sparse to common phenocrysts of plagioclase (<5-40%, 0.25-2 mm), olivine (1-3%; 0.4-3 mm, rarely 5 mm), and commonly sparse pyroxene (0-5%, 2 mm) in a trachytic to pilotaxitic (rarely intergranular to ophitic) groundmass of magnetite, plagioclase, and pyroxene microlites, and sparse brown glass. Olivine is commonly partly to completely replaced by iddingsite, and rare, rounded quartz xenocrysts(?) (1 mm) and rectilinear clots of fine magnetite (possibly ghosts of basaltic hornblende) are locally observed. Vesicles (rarely up to several centimeters in diameter) are locally rimmed or filled with chlorite(?), epidote, banded cryptocrystalline silica (agate), calcite, and the zeolites heulandite and mordenite. Basaltic pyroclastic rocks include bedded reddish-brown scoria (commonly with steep initial dips) and propylitized breccias which have rounded to angular light grayish green scoriaceous clasts (<1 to several centimeters) in a fine-grained, yellowish-gray tuffaceous matrix. Thin (1-2 m), discontinuous, lacustrine, thinly laminated, dark shale (with leaf fossils and rare fish bones and scales) and volcaniclastic sandstone crop out locally, particularly in Pierson Canyon (Axelrod, 1995) and near the base of Tps between White Horse and Tiger Canyons. The Pyramid sequence has been mapped as Chloropagus Formation in Pierson Canyon (Axelrod, 1995) and to the south of the quadrangle (Rose, 1969). Age probably 11-13 Ma (see Garside and others, 2000; Stewart and others, 1994). Thickness 1 km or more??? **Tpt,** <30 m thick rhyolitic welded ash-flow tuff and associated nonwelded surge(?) material intercalated in basalt flows; vitrophyre consists of phenocrysts (~5%) of plagioclase (1.6 x 4 mm), quartz (~1 mm) and sparse biotite, hornblende, and pyroxene. K-Ar age of 11.7 Ma on biotite (Garside and others, 1993). **Tpss,** White to very pale-orange, massive to plane-laminated and cross-bedded, subaerial(?) and lacustrine deposits of silicic ash, pumice lapilli, and small phenocrysts of biotite, quartz, and feldspar. Rare plant fossils (reeds, etc.) observed in the tuffs. **Tpsi,** intrusive basaltic rocks similar to Tps flows and interpreted to be of similar age. **Tpsb,** Boulder gravels at and near the base of Tps flows in Home Ranch and Jones Canyons. Coarse boulder gravels consisting of cobbles and boulders (1 x 2 m) of older ash-flow tuffs and hornblende andesites; includes minor basalt scoria, tuffaceous sandstone, and silicic lapilli tuff.

Twh **Twhf** **Rhyolite of White Hill** Very light-gray and pinkish-gray rhyolite (76% SiO_2), locally flow banded and spherulitic. Flow dome; obvious flows mapped as **Twhf**. Consists of phenocrysts (15-20%) of rounded to equant and embayed to vermicular smoky quartz (~10%, 1-2 mm), plagioclase (~4%, 1-4 mm long), alkali feldspar (~3%, 1-3 mm), and books of biotite (1%, 0.4-0.8 mm) in a fine-grained, originally devitrified groundmass of alkali feldspar and quartz. Biotite is chloritized and light-colored minerals are altered to sericite and calcite. Alkali feldspar is found mainly as skeletal remnants.

Tmb **Megabreccia** Poorly exposed unit apparently consisting almost entirely of small to large (<1 cm to 5 m) angular to subrounded clasts of ash-flow tuffs (units Tcys, Tnh, Tcs, and Tcsb) as well as sparse clasts of amygdaloidal basalt and hornblende andesite. Overlies and cuts(?) across ash-flow tuff units, of which it contains clasts. Matrix of megabreccia is apparently pyroclastic, containing phenocrysts similar to those of Twh (Geasan, 1980). Spatially associated with, and intruded by, Twh domes.

Thas **Hornblende andesite of Stud Horse Canyon** Intrusive bodies of light-gray to medium-dark-gray dacite(?), consisting of phenocrysts (30%) of equant to elongate plagioclase (15-25%, 0.04-2.5 mm, rarely 2 x 5 mm), elongate hornblende (~8%, < 0.5 x 2.4 mm), trace small (~0.2 mm) quartz, locally small biotite(trace to 2%), and orthopyroxene (<3%, 1.2 mm) in a fine-grained holocrystalline anhedral-granular or pilotaxitic groundmass of predominantly plagioclase and magnetite. An age of 20.8 Ma (K-Ar on hornblende; Garside and others, 2000, table 2) may be slightly too young, as the unit is suspected to be related to Thaf.

Thaf **Hornblende andesite of Fort Defiance Creek** Flows, domes(?), and lahars(?) of hornblende andesite which are intruded by and probably genetically related to Thds. Light- brownish-gray-weathering, purplish-gray or medium-dark-gray porphyritic rocks containing phenocrysts of equant to elongate plagioclase (15-20%, 2 mm),elongate hornblende (5-10%, <1 x 5 mm), orthopyroxene (1%, 0.04 mm), trace biotite (<0.4 mm), and accessory magnetite (2%) in a perlitic glassy to microcrystalline groundmass. Includes both monolithologic and heterolithologic breccias (lahars?); massive rocks are only very rarely flow-banded. $^{39}Ar/^{40}Ar$ dated at 22.25 Ma (Garside and others, 2000, table 1).

Tcsb **Upper, biotite-bearing tuff of Chimney Spring** Light-gray or light-purplish-gray, locally reddish-brown-weathering, crystal-rich rhyolitic ash-flow tuff, commonly moderately to slightly welded and containing sparse white to pinkish-gray pumice (commonly 5 x 20 mm). Contains phenocrysts (25-35%) of rounded, corroded, and vermicular quartz (5-20%, 3 mm), plagioclase (10-25%, <2.5 mm), equant sanidine (0-10 %, 1.5 mm), biotite (<5%, ~1 mm, rarely 3 mm), Fe-Ti oxides (0.2 mm), and locally, magnetite-rimmed basaltic hornblende (0-2%, 1 mm, rarely 0.6 x 2 mm). Local indistinct columnar jointing. Probably consists of more than one cooling unit, as an abrupt change in welding is observed in mid-unit south of Tiger Canyon (Geasan, 1980). Basal 1-1.5 m zone above Tcs consists of finely laminated to cross-bedded tuff (ground surge?). Probably equivalent to unit Tcsb of the Moses Rock Quadrangle (Castor and others, 1999), which is believed to be 24.74 Ma (Garside and others, 2000, table 1).

Tcs **Tcsn** **Tuff of Chimney Spring** Moderate reddish-brown-weathering, ledge-forming, slightly to moderately welded rhyolitic ash-flow tuff. Contains pheochrysts (~25%) of commonly smoky or reddish, corroded, embayed, and vermicular quartz (<10%, 1-2 mm), equant, chatoyant sanidine (~10%, 1-2 mm), a few percent plagioclase, rare altered biotite (<1%, 1 mm in diameter), and accessory Fe-Ti oxides. Contains sparse, indistinct pumice (most 3 x 12 mm, but locally up to 3 x 12 cm) and sparse lithic fragments of flow-banded rhyolite and intermediate volcanic rock (commonly 1 cm, but rarely 4 x 6 cm). Portions weather to rounded, reddish boulders of decomposition. Locally at the base is a ~1 m plane-bedded tuff (ground surge?) that grades upward into basal, nonwelded Tcs. In one area near the east edge of the quadrangle, a thick nonwelded zone in a paleochannel is mapped separately (**Tcsn**). Age, 24.90 Ma (Garside and others, 2000). Thickness ???

Tnh **Nine Hill Tuff** Brownish-weathering, pinkish-gray or grayish, strongly welded rhyolite ash-flow tuff. Contains phenocrysts (~3-15%, ~1 mm) of alkali feldspar, an equal amount to considerably less plagioclase, trace small biotite, and accessory ilmenite(?) (converted to hematite). Locally contains flow-banded(?) rhyolite lithic fragments (<1 cm to 10 x 15 cm) that are similar to Tnh. Commonly partial to complete vapor-phase alteration, with formation of tridymite and alkali feldspar in cavities (former pumice sites); elsewhere devitrified. Distinctive compressed pumice (1:3 to 1:7 aspect ratio) from less than 1 mm x 5 mm to 5 x 25 cm. Thickness ??? 130 m, variable. Deposited on surface which had local topographic relief. Lies on Kgd in northwestern quadrangle and is locally absent below Tcs in northern part of quadrangle. Age ~25.08 Ma (Garside and others, 2000).

Taf **Rhyolitic ash-flow tuff** Pinkish-gray, strongly to slightly welded ash-flow tuff containing phenocrysts (~30 %) of rounded, vermicular quartz (~12%, 1.5 mm), alkali feldspar (~8%, 1.2 mm), plagioclase (~8%, 1.2 mm), and biotite (1%, 1 mm) in a shard-rich matrix. Pumice is strongly to slightly compressed. Rock constituents are partly altered to quartz, sericite, and alkali(?) feldspar. Unit underlies Tnh and overlies typical Tcys in an area near the east edge of the quadrangle along Fort Defiance Creek. Probably correlative with undivided tuffs of Tws and Tcys (see Castor and others, 1999) which may be equivalent to Tsc.

Tcys **Tuff of Coyote Spring** Light-gray, nonwelded to slightly welded, dacite ash-flow tuff with a distinctive phenocryst assemblage (~15-20%) of elongate to equant plagioclase (15%, <2 mm) and biotite (~3%, 0.6-2 mm) in a shard-rich matrix. Biotite and elongate plagioclase are aligned parallel to compaction foliation. Contains a few percent moderately compressed pumice lapilli and commonly sparse pinkish lithic fragments (1-2 cm, rarely 10 cm) of biotite-plagioclase volcanic rock. Locally very lithic rich, containing up to 25% rounded pale purple rhyolitic lithic fragments (0.5-10 cm). Thickness ???? m. Age 29.13 Ma in the Griffith Canyon Quadrangle (Garside and Nials, 1997).

Tws **Tuffs of Whisky Spring** Sequence of several commonly moderately welded rhyolitic ash-flow tuffs. Usually light brown or pale reddish brown weathering, pale-orange to light brown and light pinkish gray rocks containing phenocrysts of platy-fractured sanidine, plagioclase, biotite, and sparse to trace quartz. Moderately welded ash-flow tuffs commonly contain 1-2 mm phenocrysts (~10-15%) of sanidine (~0-10 %), plagioclase (5-15%), biotite (commonly <1%), and rarely, hornblende. A distinctive feature of the tuffs is the shard-rich nature of the matrix, visible in thin section and hand lens. Locally, a "nubbly" weathering surface is observed on rock outcrops; this probably represents closely spaced joints developed in devitrified vitrophyre. Contains compressed pumice (commonly >5%, 1 to several centimeters in diameter) and common lithic fragments (0.5 to several centimeters) of siltstone, and silicic and intermediate volcanic rocks. Consists of several cooling units, some of which are separated in a few places by 1-5 m of tuffaceous and volcaniclastic siltstone, sandstone, and pebbly sandstone (with poorly preserved fossil twigs(?) and leaves at one locality). Commonly contains variable amounts of hydrothermal alteration minerals (sericite, chlorite, epidote, and clays). Thickness ???? m. Three samples from near the base of Tws in the Griffith Canyon Quadrangle average 31.0 Ma (Garside and Nials, 1997); the unit is apparently older than ~29 Ma (Garside and others, 2000, table 1; Garside and Nials, 1997). Probably correlative with a much thicker and more complex group of ash-flow tuffs, Tsc.

Tsc **Tuffs of Secret Canyon** Thick sequence of propylitically altered ash-flow tuffs consisting of multiple cooling units which are distinctly different from overlying Tcs and Tnh. Most of the tuffs contain phenocrysts of biotite (1-2%, 1-2 mm), have plagioclase (1-2 mm) as the dominant (>2:1) or only feldspar (feldspars 10-15%), and are nearly devoid of quartz (0-trace). Tuffs are strongly to slightly welded, commonly contain 5-10% pumice (0.5 x 5 cm, rarely 1 x 20 cm); shards in the matrix are commonly obvious. Ash-flow tuff units vary from ledge-forming to recessive, and consist of light-brownish- or pinkish-gray weathering rocks that are greenish gray or light gray on fresh surfaces. Lithic fragments (<1 to several centimeters) in the tuffs are common and consist predominantly of intermediate volcanic rocks with some metasiltstone. Unit Tsc crops out in Secret and Jones Canyons in the northern part of the quadrangle; it is the stratigraphic equivalent of Tws and Tcys (and resembles them), but is considerably thicker. Thickness ???.

Kap **Aplite** Pinkish-gray aplitic (anhedral granular) rock consisting predominantly of subequal amounts of 0.1-0.2 mm grains of strained quartz, plagioclase, microcline (some as myrmekite), sparse smaller biotite, and Fe-Ti oxides. Irregular body which intrudes Kqm in the northwest part of the quadrangle.

Kqm **Quartz Monzodiorite** Medium-grained, medium-gray rock consisting of euhedral and subhedral elongate plagioclase (~63%, 2 x 7 mm), mostly subhedral hornblende and biotite (~12% each ,5 mm), and anhedral, interstitial quartz (5%, 2 mm), alkali feldspar (7%, 2 mm), and accessory Fe-Ti oxides (1%). Locally, hornblende is mantled by fine-grained biotite.

REFERENCES

Adams, K.D., Wesnousky, S.G., and Bills, B.G., 1999, Isostatic rebound, active faulting, and potential geomorphic effects in the Lake Lahontan basin, Nevada and California: Geological Society of America Bulletin, v. 111, p. 1739-1756.

Axelrod, D.I., 1995, The Miocene Purple Mountain flora of western Nevada: University of California Publications in the Geological Sciences, v. 139, p. 1-62.

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, *with a section on* industrial rock and mineral deposits by K.G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 139 p.

Castor, S.B., Garside, L.J., and dePolo, C.M., 1999, Geologic map of the west half of the Moses Rock Quadrangle, Nevada: Nevada Bureau of Mines and Geology Open-File Report 99-11, 1:24,000.

Garside, L.J., and Bonham, H.F., Jr., Tingley, J.V., and McKee, E.H., 1993, Potassium-argon ages of igneous rocks and alteration minerals associated with mineral deposits, western and southern Nevada and eastern California: Isochron/West, no. 59, p. 17-23.

Garside, L.J., Castor, S.B., Henry, C.D., and Faulds, J.E., 2000, Structure, volcanic stratigraphy, and ore deposits of the Pah Rah Range, Washoe County, Nevada: Geological Society of Nevada field trip guidebook, GSN 2000, 180 p.

Garside, L.J. and Nials, F.L., 1997, Geologic map of the Griffith Canyon Quadrangle, Nevada: Nevada Bureau of Mines and Geology Open-File Map 99-4, 1:24,000.

Geasan, D.L., 1980, The geology of a part of the Olinghouse Mining District, Washoe County, Nevada [M.S. thesis]: University of Nevada, Reno, 118 p.

Rose, R.L., 1969, Geology of parts of the Wadsworth and Churchill Butte Quadrangles, Nevada: Nevada Bureau of Mines and Geology Bulletin 71, 27 p.

Stewart, J.H., McKee, E.H., and John, D.A., 1994, Map showing compilation of isotopic ages of Cenozoic rocks in the Reno 1° by 2° Quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2154-D, 1:250,000.

Contact Dashed where approximately located, dotted where concealed, queried where uncertain, short dashed represents form lines or internal contacts.

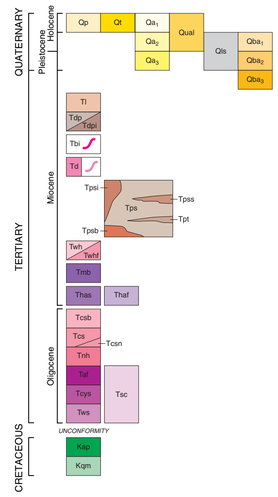
Fault Dashed where approximately located, dotted where concealed, queried where uncertain, ball on downthrown side.

Landslide scarp

Lineament Determined from aerial photography.

Vein Showing dip. Quartz-calcite veins and silicified and argillized fault zones (10.46 Ma on Green Hill, 17.8 Ma in lower Jones Canyon; Garside and others, 2000).

- Inclined bedding, showing strike and dip
- Approximate inclined bedding or flows, showing approximate strike and dip
- Horizontal bedding
- Inclined compaction foliation in ash-flow tuff, showing strike and dip
- Inclined compaction foliation in ash-flow tuff, showing approximate strike and dip
- Horizontal compaction foliation in ash-flow tuff
- Inclined platy jointing in lava, showing strike and dip
- Inclined flow foliation in igneous rock, showing strike and dip
- Vertical or near-vertical flow foliation in igneous rock, showing strike
- Horizontal flow foliation in igneous rock



Field work 1996–1997.

Geologic mapping was supported by the U.S. Geological Survey CO-GEOMAP Program (Agreement No. 188070-03).

DRAFT

Preliminary geologic map.
Has not undergone office or field review.
May be revised before publication.

First edition, first printing, 2001
Printed by Nevada Bureau of Mines and Geology colinghouse 2_27_01 all)
Edited by Dick Meeuwig
Cartography by Robert Chaney and Susan Tingley

Nevada Bureau of Mines and Geology
University of Nevada, Mail Stop 178
Reno, Nevada 89557-0088
(775) 784-6691, ext. 2
www.nbmg.unr.edu; nbmgsales@unr.edu