Text and references accompanying Nevada Bureau of Mines and Geology Open-File Report 14-7

Preliminary Geologic Map of the Mount Rose Quadrangle, Washoe County, Nevada

by

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DESCRIPTION OF MAP UNITS

Quaternary Deposits

Qx – Disturbed areas and fill (Historic) – Delineated only where extensive or masking key geologic relations.

Qa – Alluvial deposits in recently active washes (late Holocene to Historic) – Moderately to well sorted sand and gravel. Includes fine-grained deposits around springs and in ponded or low-gradient areas.

Qay – Young alluvial deposits (latest Pleistocene to Holocene) – Moderately to well sorted sand and gravel. Locally forms terraces up to several meters above active washes. Includes recently active washes that are too small to distinguish at map scale.

Qai – Intermediate-aged alluvial deposits (late Pleistocene) – Moderately to well sorted sand and gravel. Surfaces are typically smoothed. Correlative with Qgm_2 and Qgm_3 deposits.

Qao – Older alluvial deposits (middle Pleistocene) – Moderately to well sorted sand and gravel. Surfaces are typically smoothed and erosionally rounded.

Qgm – Undivided glacial moraine deposits (late Pleistocene) – Unsorted or poorly sorted sand, gravel and boulders (till). Includes undivided Qgm_2 and Qgm_3 deposits.

Qgm_1 – Young glacial deposits (Holocene) – Unsorted or poorly sorted sand, gravel and boulders (till). Granitic rocks unweathered. Generally form small, nonvegetated moraines below cirque headwalls. Likely formed during the "Little Ice Age" that ended in the mid-1800s.

Qgm_2 – Glacial deposits (late Pleistocene) – Unsorted or poorly sorted sand, gravel and boulders (till). Granitic rocks slightly weathered and typically abundant on surfaces. Commonly form sharp crested moraines. Equivalent to the Tioga Till of Blackwelder (1931).

Qgm_3 – Glacial deposits (late Pleistocene) – Unsorted or poorly sorted sand, gravel and boulders (till). Granitic rocks typically moderately to highly weathered. Surfaces typically smoother, with fewer preserved boulders, relative to Qgm_2. Equivalent to the Tahoe Till of Blackwelder (1931).

Qgmo – Older glacial deposits (middle Pleistocene) – Unsorted or poorly sorted sand, gravel and boulders (till). Observed only as poorly preserved remnants above Qgm_3. Granitic rocks entirely decomposed. Likely equivalent to the Donner Lake glaciation of Birkeland (1964).

Qgo – Undivided glacial outwash deposits (late Pleistocene) – Moderately to well sorted sand, gravel and boulders.

Qgo_2 – Glacial outwash deposits (late Pleistocene) – Moderately to well sorted sand, gravel and boulders. Typically located downstream, and grade to, Qgm_2 deposits.

Qgo_3 – Glacial outwash deposits (late Pleistocene) – Moderately to well sorted sand, gravel and boulders. Typically located downstream, and grade to, Qgm_3 deposits.

Qli – Lacustrine deposits (late Pleistocene) – Beach deposits not exposed in the map area but inferred from preserved shorelines at an elevation of about 1950 m. Shorelines appear to crosscut Qgo_3 deposits and therefore postdate, or correlate with, Qgm_3 deposits.

Qlo – Lacustrine deposits (Pleistocene) – Well sorted sand and pebble gravel forming beach deposits at or below about 1980 m. Age is poorly constrained, but well-developed soils indicate they predate Qgm_3.

Qls_{1983} – Landslide deposits (Historic) – Deposits of the May, 1983 slope failure. Dominantly consist of poorly to moderately sorted, angular, unweathered granitic boulders.

Qls – Landslide deposits (late Pleistocene to Holocene) – Slope failure deposits with a wide range in characteristics and composition. Locally dominated by highly fractured or jumbled bedrock, with a varying percentage of poorly to moderately sorted gravel. Typically form uneven, hummocky surfaces.

Qc – Colluvial deposits (late Pleistocene to Holocene) – Poorly to well sorted sand and gravel mantling steep to moderate slopes. Typically contain a high percentage of resistant volcanic clasts derived from upslope outcrop.

Qt – Talus deposits (Holocene) – Moderately to well-sorted boulder deposits. Typically nonvegetated.

QTs – Older alluvial deposits (Pliocene to early Pleistocene) – Poorly to moderately sorted sand, gravel and boulder deposits. May include older glacial deposits. Cap relatively high erosion surfaces in the northwest part of Incline Village. Highly weathered to depths of several meters.

Tertiary Volcanic and Sedimentary Rocks

Tpba – Platy plagioclase porphyritic basaltic andesite (Miocene) – Dark gray porphyritic basaltic andesite lavas that contain ~20% phenocrysts of thin, platy plagioclase (2–15 mm long). Only exposed in the northeastern corner of the quadrangle

Tha – Hornblende porphyritic andesite (Miocene) – Medium gray porphyritic andesite lavas that contain ~15% phenocrysts of hornblende (12–14%, 1–8 mm long) and plagioclase (1–3%, 1–3 mm long). Limited to two outcrops in the lower part of the Tertiary section in the north-central and central parts of the map area.

Tcpa – Coarse-grained plagioclase-hornblende porphyritic andesite (Miocene) – Medium gray porphyritic dacite domes and lavas that contain ~25–35% phenocrysts of plagioclase (15–28%, 2–8 mm long, and up to 13 mm long), hornblende (5–10%, 2–6 mm long, and up to 12 mm long), and pyroxene (0–5%, 1–2 mm). Forms thick flow-banded flows and domes located mostly in the southern part of the map area.

Tppc – Coarse-grained plagioclase-hornblende porphyritic andesite (Miocene) – Medium-light gray porphyritic andesite lavas that contain ~40% phenocrysts of plagioclase (30%, 2–3 mm long) and pyroxene (10%, 1–2 mm long and up to 5 mm long). This unit is less extensive than Tppa and was locally grouped with Tppa lavas.

Tppa – Plagioclase-pyroxene porphyritic andesite (Miocene) – Light to dark gray porphyritic andesite lavas that contain ~20–35% phenocrysts of plagioclase (15–28%, 1–2 mm long and up to 3 mm long), pyroxene (5–10%, 1–2 mm long, and up to 3 mm long), and hornblende (0–2% phenocrysts, 1–5 mm long). This unit contains numerous thin, 1–3 m-thick beds of intercalated volcanic sedimentary rocks that were lumped with this map unit. This unit is the most abundant lava lithology across the map area, locally resting on Mesozoic basement and also atop sections of Tertiary map units. In particular this unit dominates the ancestral volcanic center in the North Fork and main forks of Gray Creek.

Tba – Sparsely porphyritic basaltic andesite (Miocene) – Medium to dark gray sparsely porphyritic basaltic andesite lavas that contain 5–8% phenocrysts of plagioclase (5–7%, 1–2 mm long) and pyroxene (<1–1%, 1 mm long).

Tpxba – Pyroxene-plagioclase porphyritic basaltic andesite (Miocene) – Medium gray porphyritic andesite lavas that contain ~20–35% phenocrysts of plagioclase (10–20%, 1–5 mm long) and pyroxene (10–15%, 1–8 mm long, mostly 3–4 mm long). Found locally within the lower, middle, and capping sections of the Tertiary map units.

Tpxbabr – Pyroxene-plagioclase porphyritic basaltic andesite breccia (Miocene) – Angular and subangular clast- and matrix-supported breccia composed entirely of Tpxa clasts. Probably derived from a combination of pyroclastic black and ash flows, rock avalanches, and flow breccias.

Tpha – Plagioclase-hornblende-pyroxene porphyritic andesite (Miocene) – Medium to light gray porphyritic andesite and lesser dacite lavas that contain ~22–35% phenocrysts of plagioclase (13–30%, 1–4 mm), hornblende (2–8%, 1–5 mm long), and pyroxene (1–6%, 1–3 m long).

Tphabr – Plagioclase-hornblende-pyroxene porphyritic andesite breccia (Miocene) – Angular and subangular clast- and matrix-supported breccia composed entirely of Tpha clasts. Probably derived from a combination of pyroclastic black and ash flows, rock avalanches, and flow breccias.

Td – Plagioclase-biotite porphyritic Dacite (Miocene) – Light gray porphyritic dacite(?) that contains 10% phenocrysts of plagioclase (8%, 1-4 mm) and biotite (2%, 1-2 mm).

Tbta – Plagioclase-pyroxene porphyritic basaltic trachyandesite (Miocene) – Medium-dark gray porphyritic basaltic trachyandesite that contains 25% phenocrysts of plagioclase (15%, 1-3mm long) and pyroxene (10%, 1-2mm-long and up 3mm long). Essentially identical to Tppa in hand sample. Distinguished by geochemical analyses and plots on a TAS diagram.

Tmbr – Mafic breccia (Miocene) – Dark gray-brown, predominantly matrix-supported with lesser clast-supported, angular breccia composed of Tb, Tba, and Tppa clasts. Clasts locally exhibit radial cooling fractures. Interpreted as dominantly pyroclastic in origin.

Tb – Sparsely porphyritic basalt (Miocene) – Dark gray sparsely porphyritic basalt that contains 10-15% phenocrysts of plagioclase (7–10%, 0.5–2 mm long), pyroxene (3–5%, 0.5-1.5 mm long), and olivine(?). This unit is represented by a single lava flow resting on Kgr and overlain by Tmbr in the north-central part of the map.

Tvs – Volcanic sedimentary rocks (Miocene) – Coarse-grained, generally poorly sorted, thin- to thick-bedded, or massive volcanic sedimentary rocks of predominantly polylithologic composition. Interpreted deposition through mudflows, lahars, pyroclastic flows, landslide breccia, and fluvial processes. Dominant clast lithology is Tppa. This unit is typically interbedded with Tppa flows, and solitary, thin andesite flows were locally lumped with this unit.

Tcg – Conglomerate (late Oligocene to Miocene) – Well-rounded to subrounded matrix- and clast-supported fluvial(?) conglomerate with clasts composed of Tertiary volcanic and Mesozoic granitic clasts. The primary exposure of this unit is along the southern margin where it sits on Mesozoic granite and underlies the Tertiary volcanic section. Similar sediments form thin (<2 m thick) beds and lenses in Tvs.

Tertiary Intrusive Rocks and Veins

Tqv – Quartz veins (Miocene) – Hydrothermal, microcrystalline, silica veins exposed in Tertiary volcanic bedrock in the northwestern quarter of the quadrangle. Veins range from 10 to 100 cm wide.

Tui – Intrusive rocks, undivided (Miocene) – Primarily dikes observed in the field from afar and/or on air photos, specific lithology of individual outcrops not yet determined and are probably either Tppi or Tphai. Dikes range from 3–8 m wide.

Tbi – Basalt (Miocene) – Dark gray sparsely porphyritic basaltic andesite dikes that contain 10-15% phenocrysts of plagioclase (5–8%, 0.5–1.5 mm long), pyroxene (5–7%, 0.5-1.5 mm long), and olivine(?). This unit forms two intrusive bodies, the largest is 1.25 km-long and 0.25 km-wide.

Tphdi' – Younger plagioclase-hornblende-pyroxene porphyritic dacite (Miocene) – Identical in hand-sample composition to Tphdi. Forms a single 10–35 meter wide dike that cuts a 1 km wide body of Tphdi and surrounding Tppa lavas. Cross-cutting relationships dictate that this unit is younger than some of Tphdi, but not necessarily all Tphdi.

Tphdi – Plagioclase-hornblende-pyroxene porphyritic dacite and andesite (Miocene) – Light gray porphyritic dikes and endogenous domes that contain ~15% phenocrysts of plagioclase (8–12%, 1–3 mm long), hornblende (3–7%, 2–7 mm long), and pyroxene (<1%, 1 mm long). Geochemical analyses indicate that this unit ranges in composition from dacite to high-silica andesite. This unit consists of 3 large endogenous domes in the northwest quarter of the map area 0.4 to 1.0 km-wide by 0.9 to 1.9 km- long, a single small plug 60 m-wide, and one dike 30-40 meters-wide.

Tphai – Plagioclase-hornblende-pyroxene porphyritic andesite (Miocene) – Medium gray porphyritic andesite dikes that contain ~20–25% phenocrysts of plagioclase (20–22%, 1–4 mm), hornblende (2–4%, 1–3 mm long), and pyroxene (<1–2%, 1–2 m long). These dikes range from 3–8 m-wide and up to 50 m-wide.

Tppi – Plagioclase-pyroxene porphyritic andesite (Miocene) – Light to dark gray porphyritic andesite dikes that contain ~20–25% phenocrysts of plagioclase (18–19%, 1–2 mm long and up to 3 mm long), pyroxene (5–6%, 1–2 mm long, and up to 3 mm long), and hornblende (1% phenocrysts, 1–5 mm long). This unit forms dikes 3–8 m wide and several plugs across the map area.

Tbai – Basaltic andesite (Miocene) – Medium to dark gray sparsely porphyritic basaltic andesite dikes that contain 2–5% phenocrysts of plagioclase (2–4%, 1–2 mm long) and pyroxene (<1–1%, 1 mm long). This unit forms thin dikes, 1–3 m wide and plugs.

Mesozoic Basement

Kgr – Undivided granitic pluton(s?) (Cretaceous) – Composed of granite, granodiorite, quartz monzonite, monzodiorite, and diorite. Locally contains abundant mafic enclaves (up to 50% by volume).

JŦmu – Undivided metamorphic roof pendants (Triassic and/or Jurassic) – Hornfels-grade volcanic and sedimentary metapmorphic roof pendents intruded and surrounded by Kgr and locally onlapped with Tertiary volcanic rocks or Quaternary sediments. The most extensive outcrops are in the Whites Creek drainage in the northeast part of the quadrangle.

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