PRELIMINARY GEOLOGIC MAP OF THE NORTH HALF OF THE FERNLEY WEST QUADRANGLE, LYON, STOREY, AND WASHOE COUNTIES, NEVADA

James E. Faulds and Alan R. Ramelli

2006

MANMADE DEPOSITS

Qx **Manmade deposits** Includes highway fill, graded railroad bed, and canal

Qm **Mine waste**

DEPOSITS OF THE TRUCKEE RIVER

Terrace deposits of the Truckee River

Qty$_1$ **Active channel and floodplain deposits** (late Holocene) Historically active channel and floodplain deposits forming terraces about 2 m above modern river level.

Qty$_2$ **Abandoned channel and floodplain deposits** (late Holocene) Recently abandoned channel and floodplain deposits forming terraces up to 3 m above modern river level.

Qtw **Wadsworth terrace** (early Holocene) Deposits equivalent to the Wadsworth terrace; about 15-20 m above modern river level.

ALLUVIAL-FAN, EOLIAN, PLAYA, AND LANDSLIDE DEPOSITS

Qa **Recent alluvial deposits** (late Holocene) Alluvial deposits within ephemeral and recently active washes.

Qpl **Playa deposits** (Holocene) Ephemeral playa deposits; silt and mud in small closed depressions.

Qc **Colluvium** (late Holocene to middle Pleistocene) Colluvium developed mainly at the base of resistant volcanic units.

Young alluvial-fan deposits of the Truckee River canyon and nearby areas

Qfy **Undifferentiated young alluvial fan deposits** (Holocene)

Qfy$_1$ **Young alluvial fan deposits - Truckee River Canyon** (late Holocene) Young alluvial-fan deposits generally originating within drainages eroded into the margins of the Truckee River canyon; predominantly silt and sand reworked from lacustrine sediment.

Qfy$_2$ **Young alluvial fan deposits – Post-Sehoo alluvial piedmonts** (middle Holocene) Young alluvial-fan deposits generally originating in the upper drainages of post-Sehoo alluvial piedmonts; silty to sandy, subangular pebble to cobble gravel inset into older pre-Sehoo alluvial fans and deposited as an alluvial veneer on middle Sehoo lacustrine deposits following recession of the lake.

Qfe **Fallon and Turupah Alloformations, undifferentiated.** (Holocene) Brown, medium, well-sorted eolian sand derived from underlying lake sand; sand sheets and dunes ranging in thickness from a thin (<1 m) veneer to >10 m; typically occurs as curvilinear dunes capping middle Sehoo-age lake deposits at the crests of river bluffs.

Wyemaha Alloformation

Qw **Interlacustral, subaerial deposits** (late to middle Pleistocene) Interlacustral, subaerial deposits separating the Eetza and Sehoo Alloformations.

Qfw **Alluvial-fan deposit** (late to middle Pleistocene) Alluvial-fan deposit of the Wyemaha interlacustral interval.

Paiute Alloformation

Qp **Interlacustral subaerial deposits** (middle Pleistocene) Interlacustral subaerial deposits separating the Eetza Alloformation from older lacustrine

Qfp **Alluvial-fan deposits** (middle Pleistocene) Alluvial-fan deposits of the Paiute interlacustral interval. Best exposed in an embayment on the south side of the Truckee River, opposite the Wadsworth Exit.

QTf **Older alluvial-fan deposits** (Pliocene to early Pleistocene)

DEPOSITS OF LAKE LAHONTAN

Sehoo Alloformation (late Pleistocene)

Qst **Tufa** Isolated tufa deposits; only locally mapped.

Qsm **Middle member of the Sehoo Alloformation** Brown to gray silt, sand, and mud.

Qsmb **Beach deposits** Near- and onshore gravelly beach deposits of the middle member of the Sehoo Alloformation.

Qslm **Lower and middle member of the Sehoo Alloformation, undifferentiated**

Eetza Alloformation (middle Pleistocene)

Qe **Silt, sand, and mud** Dark brown to whitish, generally well-stratified silt, sand, and mud.

Qess **Sand and gravel** Fluvial and subaerial sand and gravel of the intralacustral S-Bar-S Allomember.

QTpe **Lacustrine deposits** (Pleistocene to Pliocene) Lacustrine deposits of pre-Eetza age, undifferentiated.

TERTIARY-QUATERNARY DEPOSITS

QTg **Gravels** (early Pleistocene to late Miocene) Unconsolidated, poorly exposed subrounded to rounded pebble to boulders of mafic to intermediate volcanic rock; boulders up to 3 m long. Age unknown.

MIOCENE UNITS

Tpby **Porphyritic basalt** (late Miocene) Porphyritic basaltic or basaltic andesite lavas containing ~10% plagioclase phenocrysts up to 1 cm long.

Tdy **Diatomite** (late Miocene) White, generally massive diatomite intercalated in Tpby.

Tl **Limestone** (late to middle Miocene) Massive limestone or tufa deposit mantling basalt. May be Quaternary rather than Miocene in age.

Tvs **Volcanic conglomerate and litharenite** (late to middle Miocene) Pale grayish white to light gray, massive to weakly bedded, matrix supported, poorly sorted conglomerate and poorly sorted, coarse-grained, moderately indurated, noncalcareous litharenite. Clasts are angular to subangular and are primarily composed of mafic to intermediate volcanic rock. Crops out directly above and beneath Tpd.

Tpd **Porphyritic dacite flows** (late to middle Miocene) Pale gray, weathering reddish-brown, porphyritic dacite or rhyodacite lavas containing 20-50% phenocrysts of plagioclase(to ~ 1cm long), hornblende, and biotite.

Tda **Porphyritic andesite or dacite lavas** (late to middle Miocene) Porphyritic andesite or dacite lavas containing 5-20% phenocrysts of plagioclase, lesser hornblende (up to 1 cm long), and sparse biotite.

Tbb **Basalt breccia** (late to middle Miocene) Massive basaltic breccia consisting of crudely layered beds of poorly to moderately indurated, clast-supported angular to subangular fragments of basalt ranging from a few centimeters to ~2 m long; only mapped where well exposed; locally includes minor basalt flows.

Ts **Litharenite** (late to middle Miocene) Massive to locally well-bedded, fine- to medium-grained, moderately sorted, generally poorly indurated, noncalcareous, pale brown to grayish-brown feldspathic litharenite interbedded with matrix-supported pebble conglomerate, which contains subangular clasts of basalt.

Tbs **Volcanic litharenite** (late to middle Miocene) Massive, generally poorly indurated, noncalcareous, moderately sorted, medium- to coarse-grained greenish-gray litharenite consisting primarily of basalt grains and lesser feldspar.

Tbc **Conglomerate-sedimentary breccia** (late to middle Miocene) Matrix-supported, poorly sorted, massive, pebble-cobble conglomerate or sedimentary breccia containing angular to subangular clasts of vesicular basalt in a matrix of coarse-grained litharenite.

Tab **Altered basalt** (late to middle Miocene) Propylitically altered, greenish-gray basalt lavas.

Tb **Aphanitic olivine basalt flows and breccia** (late to middle Miocene) Essentially aphanitic, generally vesicular, medium to dark gray basalt flows commonly with ~5-10% phenocrysts of olivine to ~2-3 mm long. Olivine is generally altered to iddingsite.

Tfpb **Finely porphyritic basalt** (late to middle Miocene) Finely porphyritic basalt lavas containing 10-20% phenocrysts of plagioclase (to ~ 5 mm long) and lesser olivine.

Tte **Tephra (ash-fall deposit)** (late to middle Miocene) Light gray, ash-fall deposit consisting of glass shards; mapped only where unusually thick (~ 2 m) and well exposed.

Tssh **Silicified shale** (late to middle Miocene) Silicified shale and/or diatomite; only locally mapped.

Tsh **Shale, siltstone, and tuffaceous sandstone** (late to middle Miocene) White to pale yellowish brown or pale gray, commonly fossiliferous shale and lesser siltstone and tuffaceous sandstone. Fossils include leaf imprints, carbonaceous wood, and gastropods.

Td **Diatomite** (late to middle Miocene) White, generally massive diatomite and lesser siltstone and sandstone.

Tds **Diatomaceous shale** (late to middle Miocene) White, fissile diatomaceous shale and lesser siltstone.

Tat **Altered tuff** (late to middle Miocene) Greenish-white, altered and slightly silicified nonwelded tuff (Tt).

Tt **Nonwelded tuffs** (late to middle Miocene) Massive, white, generally crystal-poor nonwelded tuffs containing ~2-10% phenocrysts of feldspar (sanidine and/or plagioclase), ±quartz, and biotite; includes lesser amounts of tuffaceous sandstone and pebble conglomerate.

Ttq **Nonwelded quartz bearing tuff** (late to middle Miocene) Massive, white, crystal-poor nonwelded tuff containing ~5-10 phenocrysts of feldspar, quartz, and biotite; only locally mapped; locally includes minor intercalated tuffaceous sandstone and conglomerate.

Tts **Tuffaceous sedimentary rocks** (late to middle Miocene) White to light gray, generally medium to coarse-grained, weakly to moderately indurated, noncalcareous tuffaceous sandstone and matrix-supported pebble conglomerate; locally includes minor nonwelded tuffs and ash-fall deposits.

Tpr **Porphyritic rhyolite** (late to middle Miocene) Porphyritic rhyolite or rhyodacite containing ~50% phenocrysts of altered feldspar (to ~1 cm long), biotite, lesser quartz (some quartz is rosy), and sparse hornblende.

Tr **Rhyolite** (late to middle Miocene) Pale brown, crystal-poor rhyolite lava containing ~2% phenocrysts of sanidine, quartz, and biotite.

Tpc **Pyramid sequence conglomerate and sedimentary breccia** (middle Miocene) Pale brown, matrix-supported, poorly to moderately sorted, pebble conglomerate and litharenite intercalated in sequences of basalt flows.

Tpb **Pyramid sequence aphanitic basalt** (middle Miocene) Aphanitic, generally vesicular basalt flows containing <10% phenocrysts of olivine and plagioclase.

Tpp' **Pyramid sequence finely porphyritic basalt** (middle Miocene) Porphyritic basalt flows containing ~10-20% phenocrysts of plagioclase to ~5 mm long.

Tpp **Pyramid sequence porphyritic basalt** (middle Miocene) Coarsely porphyritic basalt flows containing up to ~30% plagioclase phenocrysts as large as 2.3 cm long.

Tpac **Conglomerate** (middle to early Miocene) Pale reddish-brown to grayish-brown, poorly sorted, weakly to moderately indurated, calcareous, matrix-supported pebble conglomerate and litharenite intercalated in Tpa; clasts are subangular to subrounded and composed of mafic to intermediate volcanic rock and sparse ash-flow tuff.

Tpau **Porphyritic andesite** (middle to early Miocene) Thick and massive light to medium-gray porphyritic andesite or dacite flow containing 25-35% phenocrysts of plagioclase (to ~6 mm long), hornblende, and lesser biotite; locally forms a distinctive, cliff-forming unit at top of Tpa.

Tpa **Porphyritic andesite** (middle to early Miocene) Light to medium-gray porphyritic andesite and dacite flows containing 20-35% phenocrysts of plagioclase (to ~6 mm long), hornblende, ± clinopyroxene, and lesser biotite.

Tc **Conglomerate** (middle to early Miocene) Poorly sorted, matrix-supported, moderately indurated, noncalcareous light gray conglomerate containing subrounded to rounded clasts of porphyritic hornblende andesite and aphanitic basalt to 50 cm long.

OLIGOCENE ASH-FLOW TUFFS AND RELATED UNITS

Tpha **Altered tuff of Painted Hills** (late Oligocene) Propylitically altered tuff of Painted Hills; feldspars and groundmass altered to clays.

Tph **Tuff of Painted Hills** (late Oligocene) Densely welded, crystal-rich, pale brown to pale reddish-brown ash-flow tuff with ~40% phenocrysts of sanidine, plagioclase, biotite, and quartz.

Ttso **Tuffaceous sandstone** (late Oligocene) Reddish-brown, poorly indurated, poorly sorted, medium-grained litharenite mainly composed of reworked Tcs.

Tphl **Lower Tuff of Painted Hills** (late Oligocene) White, poorly welded ash-flow tuff; contains ~20-25% phenocrysts of sanidine, biotite, and lesser quartz; includes lithics of finely porphyritic andesite.

Tcs **Tuff of Chimney Spring** (late Oligocene) Pinkish-gray, weathering reddish-brown, densely welded ash-flow tuff containing 25-35% phenocrysts of sanidine (commonly adularescent), smoky quartz, plagioclase, and biotite; 25.1 Ma.

Tnh **Nine Hill Tuff** (late Oligocene) Light gray to pale purplish-gray, densely welded ash-flow tuff containing ~5-20% phenocrysts of generally altered feldspars (sanidine, plagioclase, and anorthoclase) and lesser biotite; generally becomes more crystal rich up section; characterized by abundant gray to brown fiamme; 25.3 Ma.

Tmp? **Tuff of Mickey Pass** (late Oligocene) White, weakly welded ash-flow tuff containing 20-25% phenocrysts of plagioclase, biotite, and smoky quartz.

Tcc **Tuff of Campbell Creek** (late Oligocene) White to pale reddish-brown, moderately to densely welded ash-flow tuff containing 1-5% phenocrysts of sanidine, quartz, and lesser biotite; quartz is commonly vermicular and locally smoky; 28.8 Ma.

Te **Tuff "e" of Haskell Peak** (late Oligocene) White to pinkish-gray, poorly welded ash-flow tuff containing ~25% phenocrysts of sanidine, plagioclase, biotite, and quartz; more crystal rich and less common vermicular quartz than Tcc.

Td **Tuff of Dogskin Mountain** (late Oligocene) White to purplish-gray, moderately to densely welded ash-flow tuff containing ~10-20% phenocrysts of plagioclase, biotite, and trace of quartz.

Tac? **Tuff of Axehandle Canyon** (late Oligocene) Densely welded, highly altered ash-flow tuff containing ~15% phenocrysts of altered feldspar, biotite, and sparse fine quartz; tentatively correlated with tuff of Axehandle Canyon but also similar to tuffs of Cove Spring and Rattlesnake Canyon.

Tacl **Lower tuff of Axehandle Canyon?** (late Oligocene) Poorly to moderately welded, highly altered ash-flow tuff containing ~25% phenocrysts of altered feldspar and biotite; more crystal rich than Tac; tentatively interpreted as basal, less welded part of Tac but may be a separate tuff.

TERTIARY INTRUSIONS

Tcv **Calcite veins** (late to middle Miocene) Thin (1-2 m thick) veins consisting primarily of calcite.

Tqv **Quartz veins** (late to middle Miocene) Thin (1-2 m thick) veins consisting primarily of quartz.

Tdi **Porphyritic dacite** (late to middle Miocene) Porphyritic dacite-rhyodacite dikes or plugs containing ~15-20% phenocrysts of plagioclase, biotite, and hornblende.

Tbi **Aphanitic olivine basalt dikes** (late to middle Miocene) Aphanitic medium to dark gray basalt dikes commonly with ~5-10% phenocrysts of olivine to ~2-3 mm long.

Tppi **Porphyritic basalt dikes** (middle Miocene) Coarsely porphyritic basalt dikes containing up to ~30% plagioclase phenocrysts as large as ~2 cm long.

Tai **Andesite dikes** (middle to early Miocene) Finely porphyritic hornblende or clinopyroxene bearing andesite or basaltic andesite dikes and plugs.

MESOZOIC BASEMENT

JKcv **Calcite veins** (Late Cretaceous to Jurassic) Calcite veins and skarn-like features near or at contacts between Jm and JKg.

JKd **Diorite** (Late Cretaceous to Jurassic) Fine- to coarse-grained hornblende-biotite diorite; hornblende locally to ~1 cm long.

JKg **Quartz monzonite** (Late Cretaceous to Jurassic) Coarse-grained, massive biotite quartz monzonite; generally slightly altered with mafic constituents altered to chlorite and iron oxides.

Jm **Metamorphic rocks** (Jurassic?) Pale greenish-brown to brown, fine- to medium-grained, well-indurated quartzite, metagraywacke (?), and moderately calcareous metasedimentary rock, with beds up to ~2 cm thick.

Lithologic contact Dashed where inferred or approximately located, dotted where concealed.

Fault Showing dip of fault and trend of striae on fault surface (arrow); ball on downthrown side; double arrows show sense of strike-slip offset; dashed where approximately located, queried where uncertain, dotted where concealed.

Syncline axial trace Showing plunge, dashed where approximately located, queried where uncertain, dotted where concealed.

Anticline axial trace Showing plunge, dashed where approximately located, queried where uncertain, dotted where concealed.

Landslide headwall scarp Hachures point into landslide.

Shoreline scarp Paleo-shoreline scarp of Pleistocene Lake Lahontan. Hachures point into scarp.

Strike and dip of beds

Inclined 70 | Vertical | Horizontal

Strike and dip of flow bands in lava or intrusion

Inclined 70 | Vertical

Strike and dip of compaction foliation in ash-flow tuff

Inclined 70

Adjoining 7.5' quadrangle names

1	2	3
4		5
6	7	8

1 Olinghouse
2 Wadsworth
3 Two Tips
4 Derby Dam
5 Fernley East
6 Martin Canyon
7 Stockton Flat
8 Silver Springs North

Scale 1:24,000

0 0.5 1 Kilometers

0 0.5 1 Miles

0 1,000 2,000 3,000 4,000 5,000 Feet

CONTOUR INTERVAL 10 METERS

Base map:
U.S. Geological Survey Fernley West 7.5' Quadrangle, 1985
Universal Transverse Mercator projection,
1927 North American Datum

Field work 2005-2006
Geologic mapping was supported by the U.S. Geological Survey STATEMAP Program (Agreement No. 05-HQ-AG-0014).

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

First Edition.
Printed by Nevada Bureau of Mines and Geology
Cartography by Gary Johnson

Nevada Bureau of Mines and Geology
University of Nevada, Mail Stop 178
Reno, Nevada 89557-0088
(775) 682-691, ext. 216
www.nbmg.unr.edu, ntmgsales@unr.edu

This map was printed on an electronic plotter directly from digital files. Dimensional calibration may vary between electronic plotters and X and Y directions on the same plotter, and paper may change size due to atmospheric conditions; therefore, scale and proportions may not be exact on plots of this map.