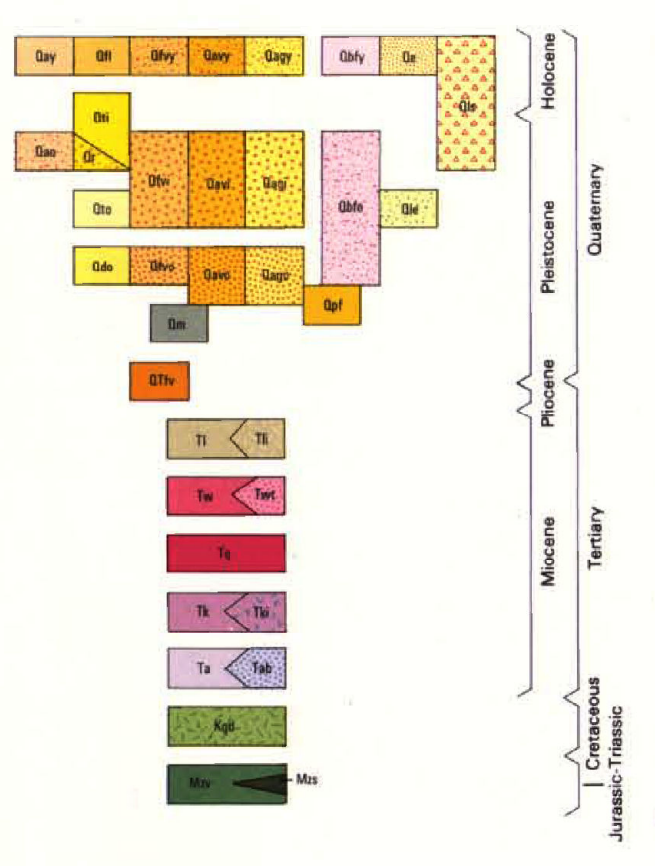
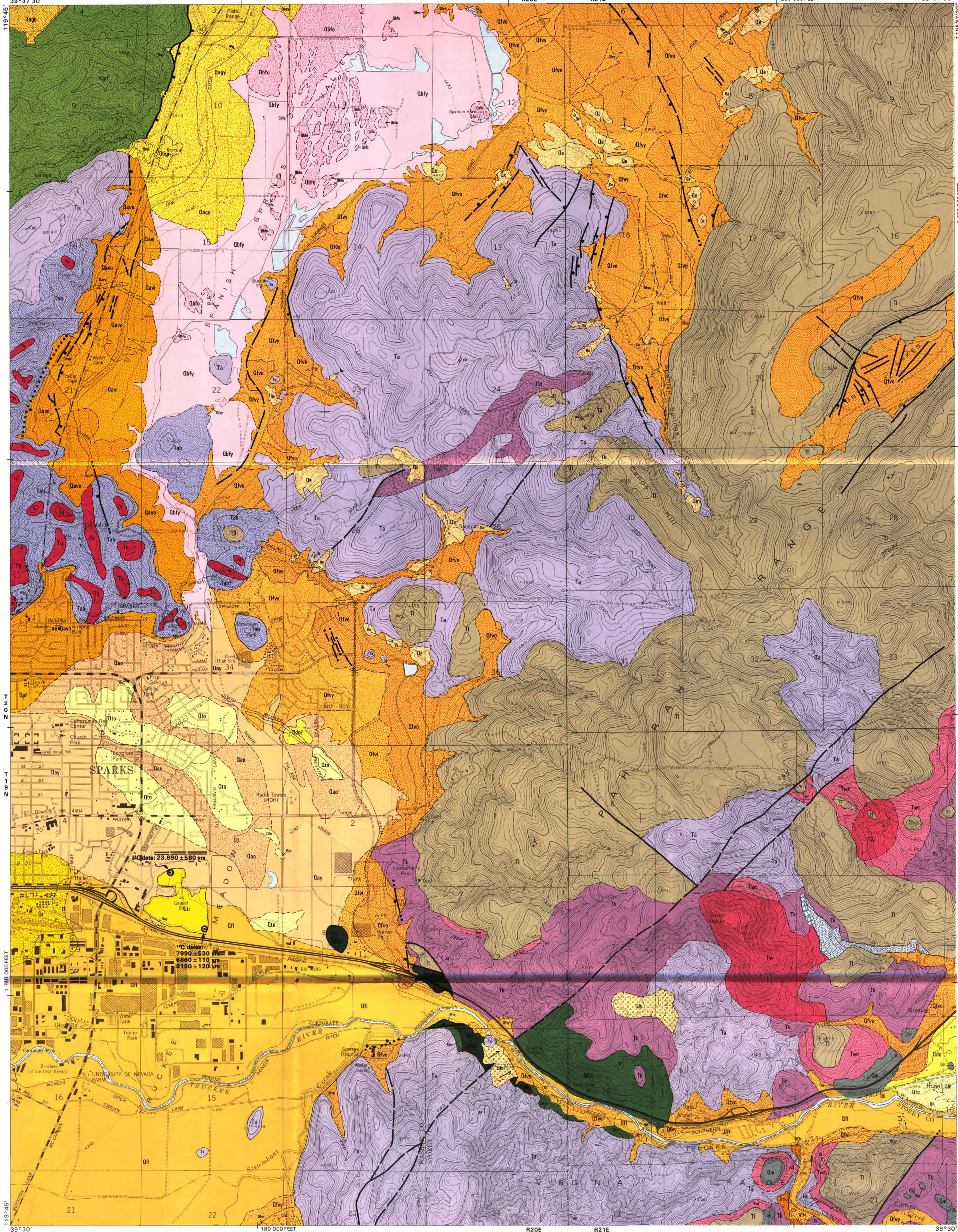


VISTA QUAD

GEOLOGY



**Qay** Alluvium of the Truckee Meadows. Gray to brown, pebble to cobble sand and medium sand, silty sand, and sandy silt; derived from reworking of Truckee deposits and deposition along drainage basins from Sun Valley and Spanish Springs Valley; typically occurs as veneer overlying Qao. Soils have A-C to cambic B profiles. **Qao** Brown, medium sand and silty sand with scattered well-rounded volcanic and granitic pebbles and cobbles; derived largely from reworking of Qto, but may in part include Qti. Soil typically has argillic B horizon about 30 cm (12 in.) thick.

**Qof** Floodplain deposits of the Truckee River. Light gray to dark gray-brown silt, sandy silt, and clayey silt with local lenses of well-rounded pebble to cobble gravel; derived from mainstream and overbank deposition by the Truckee River; includes oxbow lakes and old channels. Locally contains peat layers. <sup>14</sup>C dated at 2130 ± 165 years (Bingler and Bonham, 1978). Soils have A-C to cambic B profiles.

**Qob** Toga Outwash. Gray, sandy pebble to cobble gravel exposed in Helms gravel pit; contains layers and lenses of light brown fine sandy silt, fine to medium sand, and light gray clayey silt. Occurs only in subsurface; total extent is uncertain; thickness is at least 23 m (75 ft). Interbedded layers of peat and twigs have yielded <sup>14</sup>C dates ranging from 6860 to 23,690 years (see map).

**Qor** Fluvial gravel of the Truckee River. Gray, sandy, cobble to boulder gravel composed dominantly of well-rounded volcanic and granitic clasts; derived from river channeling through Qto. Probably stratigraphically equivalent to Qao, and may in part include Qti. Soil has 30-45 cm (12-18 in.) thick argillic B horizon. Mapped as Qto by Bonham and Bingler (1973).

**Qot** Tahoma Outwash. Gray, sandy, cobble to boulder gravel with lenses of light brown to light gray medium sand and light gray clayey silt. Gravel and sand are well stratified with fluvial crossbedding, and are moderately to poorly sorted. Gravel composed dominantly of well-rounded volcanic and granitic clasts; derived from river channeling through Qto. Probable stratigraphically equivalent to Qao, and may in part include Qti. Soils have 30-45 cm (12-18 in.) thick argillic B horizon. Mapped as Qto by Bonham and Bingler (1973).

**Qov** Tahoma Formation. Light gray silt, sandy silt, and light brown medium sand of late Pleistocene Lake Lahontan; massive to well bedded. Westernmost occurrence in Truckee Canyon is at Mustang where unit is interbedded with Qto. Soil typically has a strongly developed argillic B horizon 30 cm (12 in.) thick (the Churchill Soil).

**Qod** Donner Lake Outwash. Gray to brown, sandy cobble to boulder gravel composed dominantly of well-rounded volcanic and granitic clasts. At Mustang deposit, is deeply channelled and contains giant Mvz boulders 3 m (10 ft) or more in diameter. Soil typically has a strongly developed argillic B horizon 60-100 cm (2-3 ft) thick underlain by a siliceous and calcareous duripan about 60 cm (2 ft) thick.

**Qovh** Alluvial-fan deposits of the Virginia and Pah Rah Ranges. Qovh Deposits derived from andesitic, basaltic, and, locally, metamorphic rocks of the Virginia and Pah Rah Ranges; generally poorly sorted, subangular to subrounded clasts. Qovh in Truckee Meadows and Spanish Springs Valley, deposits are gray to brown silty sand and pebbly medium sand; in the Truckee Canyon, deposits are gray sandy cobble to boulder gravel. Soils have A-C to cambic B profiles. Qovh: gray silty, pebbly sand and brown sandy pebble to cobble gravel. Soil typically has argillic B horizon about 30 cm (12 in.) thick. Qovh: brown sandy to boulder gravel; in Spanish Springs Valley, unit also consists of brown medium sand and is widely veneered by unmappped silt and sand. Soil typically has a strongly developed argillic B horizon 60-100 cm (2-3 ft) thick underlain by a siliceous and calcareous duripan 60-100 cm (2-3 ft) thick.

**Qovv** Alluvial-fan deposits of the Pyramid Lake Highway. Deposits derived from altered volcanic and unaltered granitic rocks of the Qovh. Weiskind Hills and the range separating Sun Valley and Spanish Springs Valley; generally poorly sorted, subangular to subrounded clasts. Qovv: gray, volcanic, pebbly to cobble sand. Soils have A-C to cambic B profiles. Qovv: brown, granitic, pebbly sand. Soils have A-C to cambic B profiles. Qovv: gray, volcanic, pebbly sand and pebble to cobble gravel; forms thin (<3 m) veneer over Qov. Soil has a strongly developed argillic B horizon 45-60 cm (18-24 in.) thick. Qovv: gray, volcanic, sandy, pebble to cobble gravel. Soil has strongly developed argillic B horizon 1.2-1.8 m (4-5 ft) thick. Qovv: brown, granitic, pebbly sand. Soil has an argillic horizon 45-60 cm (18-24 in.) thick underlain by a siliceous and calcareous duripan about 1 m (3 ft) thick.

**Qobv** Basin-fill deposits of Spanish Springs Valley. Generally fine-grained deposits derived from volcanic and granitic alluvial-fan sources. Qobv: light gray to brown, silty, clayey sand and sandy silt and clay. Soils have A-C to cambic B profiles. Qobv: light gray to brown sand, and silty, clayey sand. Soils generally have argillic or natric B horizons and locally have duripans.

**Qoe** Eolian sand deposits. Light brown, well-sorted, medium sand; only major dunes or sheets mapped; inactive; deposits generally have a moderately to strongly developed cambic soil.

**Qls** Landslide Deposits. Range in age from late Pleistocene to Holocene.

**Qof** Alluvial-fan deposits of Peavine Mountain. Yellow to red-brown, pebbly, silty sand containing altered and unaltered volcanic clasts. Soil has a strongly developed argillic B horizon and may have a duripan.

**Qom** McClellan Peak Olivine Basalt. Flow of black to dark gray basalt with prominent green olivine phenocrysts. Age approximately 900,000 years.

**Qotv** Fanlomerate of Lagomasarino Canyon. Light to dark gray, well-indurated cobble to boulder gravel and sandstone; underlies Qm. Deposit consists of subangular to well-rounded volcanic clasts derived from the Virginia Range; at mouth of canyon deposit is highly altered and decomposed. Soil has an argillic B horizon more than 1.5 m (5 ft) thick.

**Qou** Loupstone Formation. TI: flows of platy basaltic andesite and basalt. Flows typically dark gray to black, dark brown on weathered surfaces. TE: intrusive plugs of basalt and basaltic andesite. Age 8-7 m.y.

**Qov** Washington Hill Rhyolite. TW: rhyolite flow-domes, in part composed of purplish glass, perlite and minor obsidian, sparsely porphyritic with glomeroporphyritic, acidic plagioclase and biotite. TW: rhyolite ash fall tuff, pyroclastic flows, water-laid tuff and tuffaceous mudstone. Equivalent in part to rocks of the Truckee and Coe Valley Formations and the sandstone of Hunter Creek. Age approximately 10 m.y.

**Qv** Quartz siltstone. Resistant ledges composed of quartz, siltite, and minor diaspore, iron oxides and zirconite. Contains pyrite below zone of surficial oxidation.

**Qk** Kate Peak Formation. TK: flows, domes, pyroclastic flows, lahars, plugs and dikes, air-fall tuff and tuffaceous sedimentary rocks. TK: plugs and dikes. Composition chiefly porphyritic dacite and rhyodacite containing prominent phenocrysts of sodic plagioclase, clinopyroxene, and orthopyroxene, hornblende, and usually biotite in a felsitic matrix. Flow rocks typically are somewhat porous, exhibit spheroidal weathering, and are brown. Age 12-15 m.y.

**Qta** Alta Formation. TA: pyroxene, pyroxene-hornblende, and hornblende andesite flows, debris flows, and pyroclastic flows. Phenocrysts of plagioclase (An 40-60) clinopyroxene and/or basaltic hornblende in a fine-grained matrix of plagioclase, pyroxene, hornblende, apatite, and magnetite. Flow rocks typically medium to dark gray on fresh surfaces, weathering to brown shades. TAB: bleached Alta Formation, light-colored rocks derived from both hypogene hydrothermal alteration and supergene alteration of hydrothermally altered and unaltered volcanic clasts. These rocks are typically argillized and consist predominantly of montmorillonite and/or kaolinite. Hydrothermal alteration is time-equivalent to Tq. Qta: andesite. Qta: medium to coarse-grained plutonic rock with sodic plagioclase, microcline, quartz, hornblende and biotite and accessory sphene, magnetite, apatite and zircon. In places hornblende is altered to actinolite, and biotite is chloritized.

**Qm** Peavine sequence. Mvz: meta-andesite and meta-andesite flows, flow breccia and lahars. Meta-andesite has phenocrysts of sodic plagioclase, potassium feldspar and sparse quartz in a fine-grained, recrystallized matrix of biotite, blue-green amphibole, quartz and potassium feldspar. Meta-andesite has sodic plagioclase, epidote, chlorite, actinolite, and biotite. Mvz: red-brown to maroon siltstone, sandstone and conglomerate. Sandstone and conglomerate contain abundant volcanic detritus and appear to be interlayered with metavolcanic rocks.

**Qb** Basin-fill deposits of Spanish Springs Valley. Generally fine-grained deposits derived from volcanic and granitic alluvial-fan sources. Qb: light gray to brown, silty, clayey sand and sandy silt and clay. Soils have A-C to cambic B profiles. Qb: light gray to brown sand, and silty, clayey sand. Soils generally have argillic or natric B horizons and locally have duripans.

**Qe** Eolian sand deposits. Light brown, well-sorted, medium sand; only major dunes or sheets mapped; inactive; deposits generally have a moderately to strongly developed cambic soil.

**Qls** Landslide Deposits. Range in age from late Pleistocene to Holocene.

**Qof** Alluvial-fan deposits of Peavine Mountain. Yellow to red-brown, pebbly, silty sand containing altered and unaltered volcanic clasts. Soil has a strongly developed argillic B horizon and may have a duripan.

**Qom** McClellan Peak Olivine Basalt. Flow of black to dark gray basalt with prominent green olivine phenocrysts. Age approximately 900,000 years.

**Qotv** Fanlomerate of Lagomasarino Canyon. Light to dark gray, well-indurated cobble to boulder gravel and sandstone; underlies Qm. Deposit consists of subangular to well-rounded volcanic clasts derived from the Virginia Range; at mouth of canyon deposit is highly altered and decomposed. Soil has an argillic B horizon more than 1.5 m (5 ft) thick.

**Qou** Loupstone Formation. TI: flows of platy basaltic andesite and basalt. Flows typically dark gray to black, dark brown on weathered surfaces. TE: intrusive plugs of basalt and basaltic andesite. Age 8-7 m.y.

**Qov** Washington Hill Rhyolite. TW: rhyolite flow-domes, in part composed of purplish glass, perlite and minor obsidian, sparsely porphyritic with glomeroporphyritic, acidic plagioclase and biotite. TW: rhyolite ash fall tuff, pyroclastic flows, water-laid tuff and tuffaceous mudstone. Equivalent in part to rocks of the Truckee and Coe Valley Formations and the sandstone of Hunter Creek. Age approximately 10 m.y.

**Qv** Quartz siltstone. Resistant ledges composed of quartz, siltite, and minor diaspore, iron oxides and zirconite. Contains pyrite below zone of surficial oxidation.

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**Qb** Basin-fill deposits of Spanish Springs Valley. Generally fine-grained deposits derived from volcanic and granitic alluvial-fan sources. Qb: light gray to brown, silty, clayey sand and sandy silt and clay. Soils have A-C to cambic B profiles. Qb: light gray to brown sand, and silty, clayey sand. Soils generally have argillic or natric B horizons and locally have duripans.

**Qe** Eolian sand deposits. Light brown, well-sorted, medium sand; only major dunes or sheets mapped; inactive; deposits generally have a moderately to strongly developed cambic soil.

**Qls** Landslide Deposits. Range in age from late Pleistocene to Holocene.

**Qof** Alluvial-fan deposits of Peavine Mountain. Yellow to red-brown, pebbly, silty sand containing altered and unaltered volcanic clasts. Soil has a strongly developed argillic B horizon and may have a duripan.

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**Qv** Quartz siltstone. Resistant ledges composed of quartz, siltite, and minor diaspore, iron oxides and zirconite. Contains pyrite below zone of surficial oxidation.

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**Qls** Landslide Deposits. Range in age from late Pleistocene to Holocene.

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**John W. Bell and Harold F. Bonham, Jr., 1987**  
Fieldwork in support of the U.S. Geological Survey COGEMAP program

Scale 1:24,000  
CONTOUR INTERVAL 20 FEET  
DOTTED LINES ARE 10-FOOT CONTOURS

0 0.5 1 kilometer  
0 1000 2000 3000 4000 5000 feet

**NEVADA BUREAU OF MINES AND GEOLOGY  
MACKAY SCHOOL OF MINES**

Base map: U.S. Geological Survey Vista 7 1/2' quadrangle, 1982  
First edition, first printing, 1987; 1000 copies  
Printing: Williams and Heinz Map Corp., Washington, D.C.  
Editing: Dick Meuwig  
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