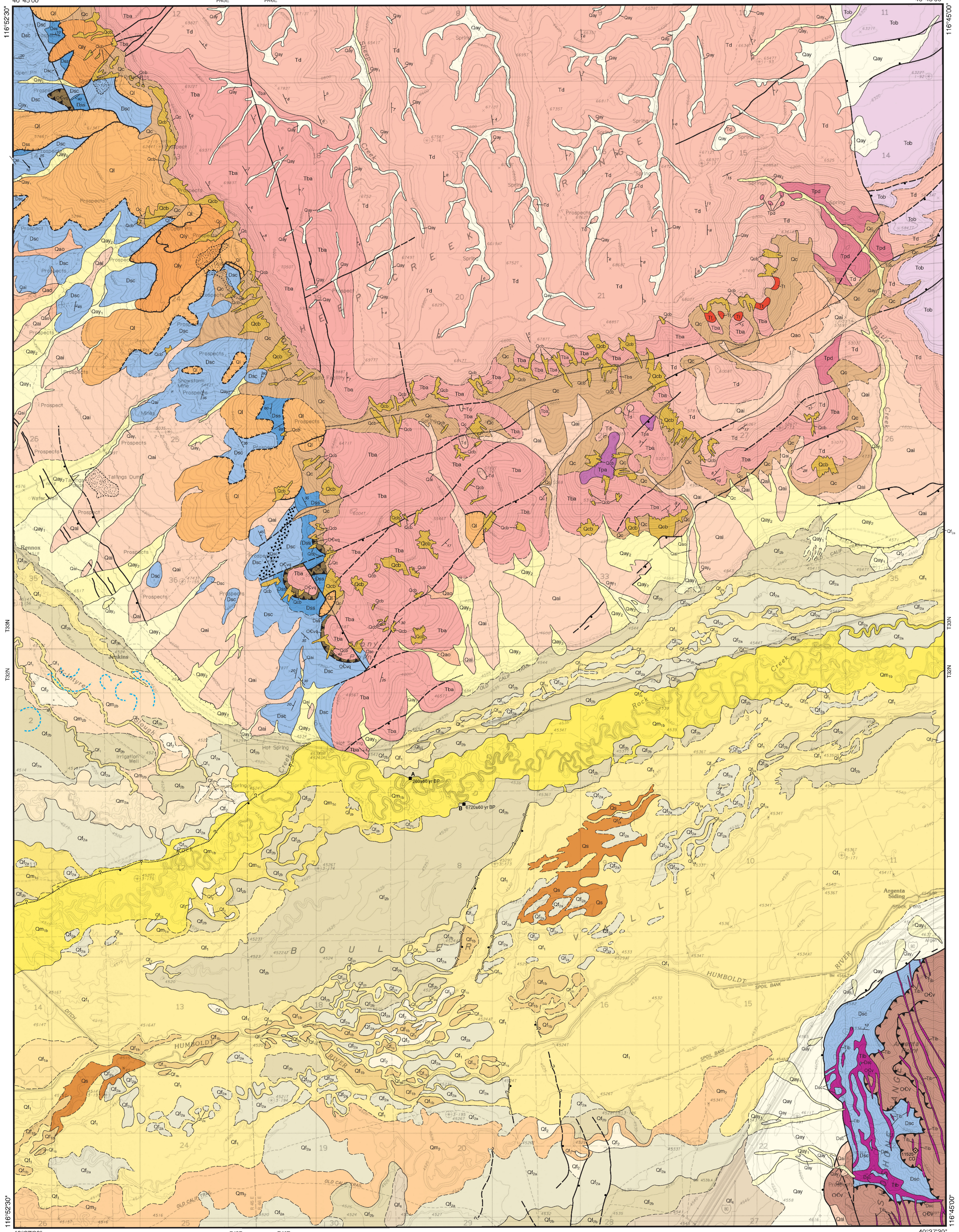


ALLUVIAL DEPOSITS OF HUMBOLDT RIVER AND ROCK CREEK

Alluvium of Humboldt River, Rock Creek, and related overflow channels on active and abandoned floodplain terrace surfaces. Divided into *floodplain deposits, meander-belt deposits*, and *splay deposits* although some overlap occurs and many contacts are thus approximate or transitional. Active floodplains and abandoned floodplain terrace surfaces are generally flat, but local topographic irregularities related to incised channels, levees, and eolian dunes are common. Floodplain deposits predominantly include valley-flat and backswamp deposits composed of unconsolidated, vertically accreted layers of fluvial mud and sand. Organic-rich mud is common. All but the youngest floodplain deposits are covered by a mantle of eolian silt and minor sand as much as 1 m thick, although thicker deposits may occur locally. Older floodplain units are generally flat and featureless and include a variety of undivided fluvial, eolian, and minor lacustrine deposits. In many cases, floodplain deposits form relatively thin veneers over meander-belt deposits. Meander-belt deposits include a complex assemblage of fine-grained vertical accretion (floodplain/overbank) deposits of mud and sand interspersed with coarser channel and lateral accretion (point-bar) deposits of sand and gravel. Deposits of mud and sand in oxbow lakes and cutoff channels are also common. Young meander belts, which are conspicuous on aerial photographs and topographic maps, typically have complex surface morphology with local relief as much as 3 m associated with multiple, sinuous abandoned channels and adjacent floodplain surfaces. Greater incision and channel widening have occurred locally due to channel straightening and check-dam construction. Old meander-belt deposits, which are less extensive than on adjacent Battle Mountain Quadrangle, are distinguished by multiple, overlapping, meander-scroll patterns, but are typically flat due to burial by younger sediments. All but the youngest meander-belt units include a variety of fluvial, eolian, and local lacustrine deposits (small playas and pans). House and others (2001) described a more complete sequence of river deposits, including a cross section depicting stratigraphic relations, additional units (i.e., Qf_3, Qm_{1a}, Qm_{2c}, and Qm_4), and 15 additional radiocarbon ages. In the following descriptions, ages are reported in calibrated calendar years before 1950 AD (cal yr BP). See table 1, the correlation diagram, and related references for corresponding ^{14}C years and additional information.

Floodplain Deposits

Qf_1 Active floodplains and channels (present to about 2,000 cal yr BP) Deposits of fluvial mud and sand in frequently inundated, low-lying areas near major channels and meander belts. Includes sloughs and overflow channels that connect active floodplains and meander belts to widely separated parts of the valley bottom. Unit is composed largely of well-stratified fine-grained vertical accretion (overbank) deposits of mud and sand. Dark gray deposits of organic-rich mud with abundant gastropod shells are common in areas immediately adjacent to active channels and in low-lying backswamp areas. Unit also includes natural levees and local splays of sand and minor gravel associated with significant overbank flow or breaches of artificial and natural levees. Deposition of Qf_1 is known to have occurred between the present and about 750–1,000 cal yr BP on basis of dated stratigraphy in Argenta Quadrangle (House and others, 2000), but may have begun as early as about 2,000 cal yr BP, when much of Qf_{2a} floodplain terrace was abandoned.

Qf_{1a} Qf_{1a} (present to about 750 cal yr BP) Deposits of fluvial mud and sand in low-lying floodplain and backswamp areas adjacent to active channels and meander belts. Qf_{1a} comprises lowest floodplain surface relative to active channels and meander belts, and is subject to frequent inundation. Composition is typically organic-rich mud and interlayered beds of silt and fine sand. Gastropod shells are common in organic mud. Locally, slightly sinuous to nearly straight channels and sloughs that parallel principal drainage courses are common. Age range of Qf_{1a} is uncertain and is based on radiocarbon ages from Argenta Quadrangle, where Qf_{1a} overlies a buried, organic-rich floodplain surface with an age of about 750 cal yr BP (House and others, 2000).

Qf_{1b} Qf_{1b} (about 750 to 2,000 cal yr BP) Deposits of a slightly higher (as much as 1 m) floodplain surface typically found in direct association with recently abandoned and infrequently flooded meander belt Qm_{1b}, and with other areas of moderately frequent, widespread inundation. Composition is predominantly vertical accretion deposits of sand and mud, essentially the same as Qf_{1a}. Qf_{1b} can only be differentiated when adjacent to Qf_{1a} because of slight topographic separation, otherwise units are combined and mapped as undifferentiated Qf_1. Qf_{1a} and Qf_{1b} may be partly coeval, although most of Qf_{1b} is likely associated with older channels and meander belts.

Qf_2 Abandoned floodplain terraces (about 2,000 to 5,600 cal yr BP) Deposits of abandoned floodplain surfaces that are rarely, if ever, extensively inundated by flooding of modern Humboldt River or related tributaries. Qf_2 terraces are characterized by flat, featureless surfaces capped by a mantle of eolian silt and minor sand ranging from 10 cm to more than 1 m thick. In general, thickness of eolian deposit reflects relative age of surface and is one criterion for differentiating subunits. Thin interbeds of eolian silt are common in floodplain sediments beneath surficial eolian mantle. Organic-rich sediments and gastropod shells are common, but are most typical of Qf_{2a}.

Qf_{2a} Qf_{2a} (about 2,000 to 3,500 cal yr BP) Deposits of generally flat floodplain terraces that typically flank abandoned meander belt Qm_{2a}, and bury older belt Qm_{2b}. Qf_{2a} surfaces are topographically separated from Qf_1 surfaces by as much as 1.5 m. Locally, Qf_{2a} is a relatively thin deposit of floodplain mud and sand that disconformably overlies Qf_{2b}. In aerial photographs, parts of underlying meander belts are discernible through a relatively thin (5 to 20 cm) and discontinuous eolian cover. In some cases, contact between Qf_{2a} and adjacent, abandoned meander belts is arbitrary. Radiocarbon ages from shells and organic sediment from uppermost beds of organic-rich floodplain mud in Qf_{2a} range from about 2,060 to 2,600 cal yr BP (House and others, 2001).

Qf_{2b} Qf_{2b} (about 3,500 to 5,600 cal yr BP) Deposits of flat, generally featureless floodplain terraces with a thicker (as much as 1 m) and more continuous mantle of eolian silt and fine sand than Qf_{2a}. Conspicuously white in aerial photographs, and includes a prominent, 1.5- by 5-km terrace adjacent to Stony Point. Qf_{2b} surfaces range from 0.5 to 1.5 m higher than Qf_{2a} surfaces. Qf_{2b} deposits have fewer and less distinct organic-rich beds and fewer gastropod shells than Qf_1 and Qf_{2a} deposits. In many exposures, Qf_{2b} is composed of 1.5 to 2.0 m of interbedded fluvial (dominant) and eolian sediments immediately overlying Mazama tephra (7,627 ± 150 cal yr BP; Zdanowicz and others, 1999). Cut-bank exposures of Qf_{2b} along Qm_{1b} channel occupied by Rock Creek contain beds of reworked Mazama tephra up to 1.5 m thick overlying a clean tephra bed as much as 10 cm thick. At one of these sites, organic mud buried by Mazama tephra yielded an age of about 7,600 cal yr BP (table 1, sample B); this deposit, designated as Qf_3, is not mapped here but is described and shown in cross section by House and others (2001). Gastropod shells from base of Qf_{2b} yielded ages of about 5,500 and 5,600 cal yr BP (House and others, 2001).

Qf_4 Older abandoned floodplain terraces (late Pleistocene, >10,900 cal yr BP) Deposits of abandoned floodplain terraces of Humboldt River or Reese River preserved only near south edge of quadrangle. Surfaces are commonly blanketed by an unmapped mantle of eolian silt and fine sand as much as 1 m thick. Irregular, stabilized dunes composed of fine to medium sand are locally as much as several meters thick. Equivalent Reese River Qf_4 deposits exposed in gravel pits consist of several meters of cross-bedded gravel with interbedded sand lenses overlain by bedded fluvial sand and silt overlain by 50–100 cm of eolian silt and sand (House and others, 2001).

Meander-Belt Deposits

Most recently abandoned meander belts (1910 AD to about 2,000 cal yr BP) Deposits of most recently abandoned Humboldt River meander belts. Composition ranges from well-sorted, cross-stratified lateral accretion deposits of sand and gravel to well-sorted, horizontally stratified vertical accretion deposits of sand and organic-rich mud. Surface typically has complex topography characterized by a very sinuous main channel interspersed among abandoned channels, floodplain surface remnants, and ephemeral oxbow lakes. Local relief rarely exceeds 3 m. Divided into two subunits (Qm_{1b} and Qm_{1c}) on basis of crosscutting relations. After abandonment of Qm_{1b} meander belt in 1910, Humboldt River occupied multiple channels in lower Boulder Valley. Channel straightening between 1933 and 1940 redirected Humboldt River, which has yet to establish a mappable active meander belt across quadrangle. House and others (2001) divide an active meander belt (Qm_{1a}) approximately 3 km west of quadrangle at downstream limit of major channel-straightening efforts.

Qm_{1b} Qm_{1b} (1910 AD to about 750 cal yr BP) Deposits of most recently abandoned meander belt of Humboldt River, currently occupied by Rock Creek. Humboldt River occupied this belt until it avulsed approximately 30 km upstream at Dunphy Ranch during a large flood in February 1910 (Foster, 1933). At that time, Humboldt River reportedly assumed course of "Argenta Slough" (also called "South Channel" on 1854 GLO maps). Floodplain mud within Qm_{1b} yielded an age of about 300 cal yr BP (table 1, sample A). Maximum age based on assuming a connection with Qm_{1a} prior to 1910 AD (House and others, 2001).

Qm_{1c} Qm_{1c} (about 750 to 2,000 cal yr BP) Deposits of oldest abandoned meander belt associated with Qf_1. Age is uncertain, but belt is cut by Qm_{1b}.

Qm_2 Abandoned meander belts (about 2,000 to 5,600 cal yr BP) Deposits of typically less well-preserved, abandoned meander belts of Humboldt River. Composition ranges from sand- and gravel-rich lateral accretion deposits to fine-grained vertical accretion deposits of fluvial mud and sand. Generally overlain by coeval and younger floodplain deposits and minor eolian deposits (Qf_{2a} and Qf_{2b}). Evident in aerial photographs as complexly overprinted meander scrolls except in the case of one particularly well-preserved belt (Qm_{2a}). Calibrated radiocarbon ages from Qm_2 gravels and overlying Qf_{2a} floodplain muds range from about 2,160 to 3,000 cal yr BP (House and others, 2001).

Qm_{2a} Qm_{2a} (about 2,000 to 2,300? cal yr BP) Deposits of a notably well-preserved, abandoned Humboldt River meander belt that diverges from meander belt Qm_{1b} near west edge of quadrangle. Unit is the most well-preserved, continuous, abandoned meander belt in quadrangle. Pristine morphology is a strong indication of channel avulsion (possibly co-seismic or flood-related). In Battle Mountain Quadrangle, Qm_{2a} is flanked by a Qf_{2a} surface with an age range of 2,000 to 2,300 cal yr BP, the approximate time of abandonment (House and others, 2001).

Qm_{2b} Qm_{2b} (about 2,300 cal yr BP to 3,000 yr BP) Complex of multiple, overprinted meander scrolls crosscut by Qm_{2a} and typically overlain by Qf_{2a} deposits. Surface is generally flat due to younger alluvial cover, although buried meanders are conspicuous in aerial photographs. Gastropod shells from floodplain mud within Qm_{2b} yielded an age of about 3,000 cal yr BP (House and others, 2001).

Splay Deposits

Qs Splay deposits (late to middle? Holocene) Extensive splay deposits of sand and silt associated with widespread overbank flow along modern and recently abandoned courses of Humboldt River and Rock Creek. Typically located on young floodplain and abandoned meander-belt surfaces. Local, undivided splay deposits are common on Qf_1 surfaces.

PIEDMONT AND SLOPE DEPOSITS

Coarse-grained alluvial fan deposits originating from Sheep Creek Range and Shoshone Range, dominantly fine-grained valley fill in upland areas of Sheep Creek Range, colluvial deposits on moderate to steep slopes of Sheep Creek Range, and landslide deposits along west slope of Sheep Creek Range. Alluvial fan deposits are typically angular to subrounded, poorly to moderately sorted, and poorly to moderately stratified. Surficial deposits contain large amounts of fine-grained eolian or reworked eolian material (predominantly fine sand) principally derived from adjacent Humboldt River floodplain. A mostly eolian deposit caps all but the youngest alluvial gravels and thickens from a few tens of centimeters at fan heads to a few meters on distal parts of fans. Fan deposits flanking Sheep Creek Range consist of pebble to boulder gravels derived from Miocene volcanic rocks that comprise most of range and Paleozoic rocks that crop out along west slope of range. Fan deposits flanking Shoshone Range consist of pebble to cobble gravels derived from Paleozoic rocks and Miocene intrusive rocks.

Alluvial Fan Deposits

Qay Active and most recently abandoned alluvial fans (present to late Pleistocene) Young, coarse-grained alluvial fan deposits and dominantly fine-grained valley fill in upland areas of Sheep Creek Range.

Qay_1 Qay_1 (present to middle Holocene) Alluvial fan deposits with surfaces characterized by fresh to subdued bar-and-swale morphology. Slightly inset below adjacent older surfaces at fan heads, but have minimal topographic separation at mid-fan and distal locations. Surface clasts have weak to incipient rock varnish. Soils are typically A-C profiles with a 0- to 5-cm-thick Av horizon (vesicular A) and a 30- to 50-cm-thick Bk horizon (Stage I $CaCO_3$ with noncontinuous clast coatings).

Qay_2 Qay_2 (early Holocene to late Pleistocene) Alluvial fan deposits with fully smoothed surfaces generally inset slightly below adjacent older surfaces at fan heads, but have minimal topographic separation at mid-fan and distal locations. Surface clasts have moderate to dark rock varnish. Soils typically consist of a 5- to 10-cm-thick Av (vesicular A) horizon, 10- to 20-cm-thick Bw (cambic) horizon, and a 50- to 100-cm-thick Bk horizon (Stage I $CaCO_3$ with continuous coatings as much as 1 mm thick).

Qai Inactive alluvial fans (late Pleistocene) Intermediate-age alluvial fan deposits with fully smoothed surfaces having minimal topographic separation from adjacent Qao surfaces. Surface dominated by fine-grained eolian material, but small, localized areas of desert pavement comprise a small percentage of surface. Surface clasts have dark rock varnish. Soils typically consist of a 10- to 20-cm-thick Av (vesicular A) horizon, a 15- to 30-cm-thick unstructured A horizon (eolian cap), a 20- to 40-cm-thick Bt (argillic) horizon which is typically overprinted with Stage I $CaCO_3$ (Btk), and a 30- to 60-cm-thick Stage II+ to Stage III $CaCO_3$ horizon (Bk or Bkm). Locally, upper soil horizons are erosionally stripped, especially at remnant edges.

Qao Older inactive alluvial fans (late to middle? Pleistocene) Old alluvial fan deposits with fully smoothed, dissected, and broadly rounded surfaces. Exposed at surface only near fan heads. Surface expression similar to Qai, with dominant fine-grained eolian cover, and small, localized areas of desert pavement. Surface clasts have dark rock varnish. Soils typically consist of a 10- to 20-cm-thick vesicular A horizon (Av), a 15- to 30-cm-thick unstructured eolian silt cap (A), a 20- to 40-cm-thick argillic horizon overprinted with Stage I $CaCO_3$ (Btk), and a 50- to 100-cm-thick Stage III-IV $CaCO_3$ horizon (Bkm). Commonly, upper soil horizons are erosionally stripped, especially on rounded surfaces.

Mass-Wasting Deposits

Qly Young landslide deposits (late Holocene to latest Pleistocene?) Largely debris flows or rock avalanche deposits of unconsolidated sand- to boulder-sized clasts as much as 2 m wide. Holocene to latest Pleistocene(?) age on basis of lack of dissection, hummocky topography, and topographic position filling drainages.

Ql Old landslide deposits (Pleistocene) Largely debris flows or rock avalanche deposits of unconsolidated sand- to boulder-sized clasts as much as 2 m wide. Locally comprising highly fractured and partly disorganized but largely intact masses of Tertiary basalt and andesite (Tba) from high escarpment in Sheep Creek Range. Pleistocene age on basis of deep erosion of deposits and burial of lower parts beneath alluvial fans.

Colluvial Deposits

Qc Colluvium (present to late Pleistocene) Colluvial deposits composed of poorly to moderately sorted, angular, pebble to boulder gravels and sand on moderate to steep hillslopes. Generally consist of Miocene volcanic clasts with fine-sand matrix. Grades downslope into alluvial fan deposits. Generally a few meters or less thick.

Qcb Boulder-dominated colluvium (present to late Pleistocene) Boulder-dominated colluvial deposits (stone stripes) generally on steep hillslopes. Talus and sieve deposits consisting of moderately to well-sorted, angular, generally cobble- to boulder-sized Miocene volcanic clasts. Commonly dark due to thick coatings of rock varnish. Commonly grade into Qc deposits.

BEDROCK UNITS

Tob Olivine basalt (Miocene) Dark-gray to black olivine basalt lava flows. Contain scattered, small (< 2 mm) olivine phenocrysts in a fine-grained, subophitic groundmass of plagioclase, clinopyroxene, ilmenite, and magnetite. Abundant, fine-grained cavities give rocks a diktytaxitic texture. Small (< l cm) vesicles are common near tops of flows. Whole rock $^{40}Ar/^{39}Ar$ age of 14.7±0.2 Ma from a sample collected in Izzenhood Spring Quadrangle (John and Wrucke, 2002). Minimum thickness of 100 to 150 m along northeast edge of map area. Thin (< 2 m thick) bed of dark-orange crystal-lithic rhyolite(?) air-fall tuff present locally along west side of unit; sanidine $^{40}Ar/^{39}Ar$ age of 14.94±0.04 Ma from tuff collected in Izzenhood Spring Quadrangle (John and Wrucke, 2002).

Tpd Porphyritic dacite (Miocene) Black, reddish-brown, and lavender-gray, porphyritic high-potassium dacite containing 5 to 20% 0.1- to 4-mm phenocrysts of plagioclase, clinopyroxene, ilmenite, magnetite, and minor olivine. Phenocrysts commonly form small glomeroporphyritic clots. Forms small intrusions in northeast part of quadrangle along Battle Creek. Margins of intrusions are black vitrophyre. Locally in upper few meters, vitrophyre is strongly vesiculated and scoriaceous. Vitrophyre grades downward and inward into irregular zones of spherulitic devitrified dacite characterized by abundant reddish-brown spherulites 0.5 to 6 cm wide. Spherulitic zones grade downward and inward to massive, dark-red to lavender-gray, devitrified dacite that is subhorizontally layered. Intrudes trachydacite unit. Plagioclase $^{40}Ar/^{39}Ar$ age of 15.35±0.10 Ma from a sample collected in Izzenhood Spring Quadrangle (John and Wrucke, 2002).

Tpa Platy andesite (Miocene) Small outcrops of dark gray, platy jointed, sparsely porphyritic andesite. Contain less than 1% fine-grained phenocrysts of plagioclase and clinopyroxene in fine-grained allotriomorphic granular groundmass of plagioclase, clinopyroxene, and opaque oxide minerals. Overlies trachydacite unit and basalt and andesite sequence near center of quadrangle on south flank of Sheep Creek Range. Maximum thickness is about 30 m.

Td Trachydacite (Miocene) Black to light-gray, aphanitic to fine-grained, moderately porphyritic trachydacite lava flows. Most of unit is sparsely porphyritic and contains 1 to 2% fine- to medium-grained plagioclase, olivine, and/or clinopyroxene and sparse sieve-textured sanidine phenocrysts in trachytic to pilotaxitic groundmass of plagioclase and Fe-oxide minerals. Uppermost flows along south flank of Sheep Creek Range commonly contain 5 to 7% fine-grained plagioclase, clinopyroxene, and sanidine phenocrysts. Consists of several flows marked by glassy, highly vesicular flow tops and devitrified, massive flow interiors that commonly have platy joints. Vesicles commonly are elongated into narrow tubes several cm long. Plagioclase $^{40}Ar/^{39}Ar$ age of 15.42±0.08 Ma from a sample collected in Izzenhood Spring Quadrangle (John and Wrucke, 2002). Minimum thickness is about 500 to 600 m in north-central part of quadrangle.

Tt Basalt and andesite tuff (Miocene) Dark-brown to brick-red to orange, finely bedded, poorly to densely welded, moderately porphyritic basalt to andesite tuff. Contains 10 to 20% fine- to medium-grained plagioclase, clinopyroxene, olivine, and opaque oxide phenocrysts in variably devitrified groundmass. Small lithic fragments of basalt and/or andesite locally abundant. Forms small outcrops as much as 80 m thick overlying basalt and andesite sequence and underlying trachydacite unit along south flank of Sheep Creek Range in northeast part of quadrangle.

Tba Basalt and andesite sequence (Miocene) Black to light-gray, aphanitic to sparsely porphyritic basalt and basaltic andesite lava flows. Contains sparse, fine-grained plagioclase, olivine, and/or clinopyroxene phenocrysts in intergranular to intersertal groundmass of plagioclase, clinopyroxene, olivine, ilmenite, and magnetite. Consists of as many as 20 thin flows marked by highly vesicular, glassy flow tops and devitrified, massive flow interiors. Unit is about 250 to 300 m thick along cliff faces on northwest side of quadrangle. Unconformably overlies Paleozoic rocks. Whole-rock $^{40}Ar/^{39}Ar$ age of 15.57±0.10 Ma on a lava flow collected at base of sequence (John and Wrucke, 2002) and whole-rock K-Ar age of 15.2±0.5 Ma on a flow collected near top of sequence at radio tower at southwest corner of Sheep Creek Range (age recalculated from McKee and Silberman (1970) using modern decay constants).

Tib Intrusive basaltic andesite (Miocene) Black fine-grained rock in numerous northwest-trending dikes emplaced along southwest margin of northern Nevada rift in southeast corner of quadrangle. One wide dike trends west-northwest. Consists of intergranular labradorite and augite. Weathers brown to greenish brown. Specimens from basaltic andesite dikes in adjacent Argenta and Mule Canyon Quadrangles yielded, respectively, whole-rock $^{40}Ar/^{39}Ar$ ages of 16.13±0.9 Ma and 16.4±0.4 Ma (R.J. Fleck, oral commun., 2001).

Slaven Chert (Devonian)

Dsc Chert In central and northwest parts of quadrangle consists of medium-gray to black chert with subordinate amounts of greenish-gray chert widely but poorly exposed along west flank of Sheep Creek Range. Interlayered with dark-gray to dark-greenish-gray argillite and sparse medium- to dark-gray sandstone. Chert commonly in beds 2 to 10 cm thick, forming ribbon chert, commonly with interlayered argillite 0.5 to 3 cm thick. Argillite also present as separate sequences in thicknesses of several meters. Chert bedding planes and much of argillite altered medium-light-gray to light grayish-green and locally stained brown and yellow brown from Fe-oxide minerals. Unit contains medium- to dark-gray barite in beds 1 to 30 cm thick in sequences as thick as about 5 m as exposed at barite mines. Chert and argillite locally deformed into complex folds. Brecciated, in part thoroughly recrystallized, and locally cut by numerous quartz veins in north-northeast-striking fault zone about 100 m wide near south end of Sheep Creek Range. In southeast part of quadrangle, unit consists of black chert and conspicuous sequences 3 to 7 m thick of medium-gray to black sandstone and quartzite separated by sequences of chert commonly 10 m or more thick. Sandstone and quartzite composed of fine- and medium-grained quartz and sparse grains of black chert. Bedding not evident. Thickness difficult to determine but likely is at least 150 m, base not exposed. Age from lithologic correlation with sections of Slaven Chert widely exposed in Shoshone Range and in adjacent parts of Battle Mountain Quadrangle likely is Early to Late Devonian. Age in Shoshone Range likely Early to Middle Devonian based on fossils in coextensive section to south in Bateman Spring Quadrangle (J.K. Cluer, written commun., 2001).

Dss Sandstone Dark-gray, very fine- to fine-grained feldspathic sandstone exposed in northwest part of quadrangle. Unit more widely exposed in Battle Mountain Quadrangle to west. Sandstone is bimodal, consisting of about 1% rounded grains about 0.15 mm wide in a finer-grained matrix of quartz, plagioclase (20%), minor K-feldspar, sparse white mica, and variable amounts of calcite cement. Bedding planes commonly obscure but locally have planar laminations. Weathers light brown to dark brown. On basis of conodonts identified from associated limestone in adjacent Battle Mountain Quadrangle, unit may be Early to Middle Devonian in age (House and others, 2001).

Valmy Formation (Ordovician and Cambrian)

O€v Valmy Formation, undivided Interbedded argillite and quartzite and minor amounts of limestone. Argillite medium gray to black, thin bedded, and poorly exposed. Contains many quartzite beds 0.5 to 7 m thick. Quartzite, commonly well exposed, mostly well rounded medium-grained quartz with small percentage of coarse grains in fine-grained matrix of angular quartz and rare microcline. Quartzite particularly abundant high in section above local thrust fault. Unit locally contains dark-gray, bluish-gray-weathering laminated limestone in sections several meters thick, best exposed on ridge crest 1 km northwest of southeast corner of quadrangle. Exposed thickness of unit not readily determined but probably at least 300 m. Ordovician age on basis of correlation with Valmy Formation to south in Shoshone Range (Gilluly and Gates, 1965). Cambrian age on basis of identification by Anita Harris (written commun., 1998) of conodont elements from limestone at USGS collection no. 11525-CO as *Cordylodus proavus* Muller, indicating the *Co. proavus Zone* into succeeding *Co. intermedius Zone*. These determinations indicate a very late Late Cambrian age.

O€vq Quartzite Thin unit at south end of Sheep Creek Range. Light- to medium-gray, consisting of about 10% well rounded quartz grains 0.3 to 0.7 mm wide scattered in seriate sizes into a tight mosaic of fine- to medium-size angular to rounded quartz grains. Generally exposed in prominent massive outcrops lacking clear evidence of bedding. Southernmost exposures overlain by 5 m of black thin-bedded chert containing abundant red-brown Fe-oxide minerals on fracture planes. Maximum thickness about 25 m.

References

Davis, J.O., 1978, Late Sehoo discharge of the Humboldt River: Stratigraphic archeology at the North Valmy power plant, Humboldt County, Nevada: Geological Society of America Abstracts with Programs, v. 10, p. 386.

Davis, J.O., 1990, Giant meanders on the Humboldt River near Rye Patch Nevada due to catastrophic flooding: Geological Society of America Abstracts with Programs, v. 22, no. 7, p. A309.

Elston, R.G., Davis, J.O., Clerico, S., Clerico, R., and Becker, A., 1981, Archeology of section 20, North Valmy power plant, Humboldt County, Nevada: Social Sciences Technical Report No. 19, Desert Research Institute, Reno, Nevada, 227 p.

Foster, L.J., 1933, Report on Humboldt River Investigations, Nevada: U. S. Bureau of Reclamation, Denver, Colorado, 116 p., 9 plates.

Gilluly, J., and Gates, O., 1965, Tectonic and igneous geology of the northern Shoshone Range, Nevada: U.S. Geological Survey Professional Paper 465, 153 p.

Hawley, J.W., and Wilson, W.E. III, 1965, Quaternary geology of the Winnemucca area, Nevada: University of Nevada, Desert Research Institute, Technical Report 5, 66 p.

House, P.K., Ramelli, A.R., and Wrucke, C.T., 2001, Geologic map of the Battle Mountain Quadrangle, Lander County, Nevada: Nevada Bureau of Mines and Geology Map 130, scale 1:24,000.

House, P.K., Ramelli, A.R., Wrucke, C.T., and John, D.A., 2000, Geologic map of the Argenta Quadrangle, Nevada: Nevada Bureau of Mines and Geology Open-File Report 2000-7, scale 1:24,000.

John, D.A., and Wrucke, C.T., 2002, Geologic map of the Izzenhood Spring Quadrangle, Lander County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-2668, scale 1:24,000.

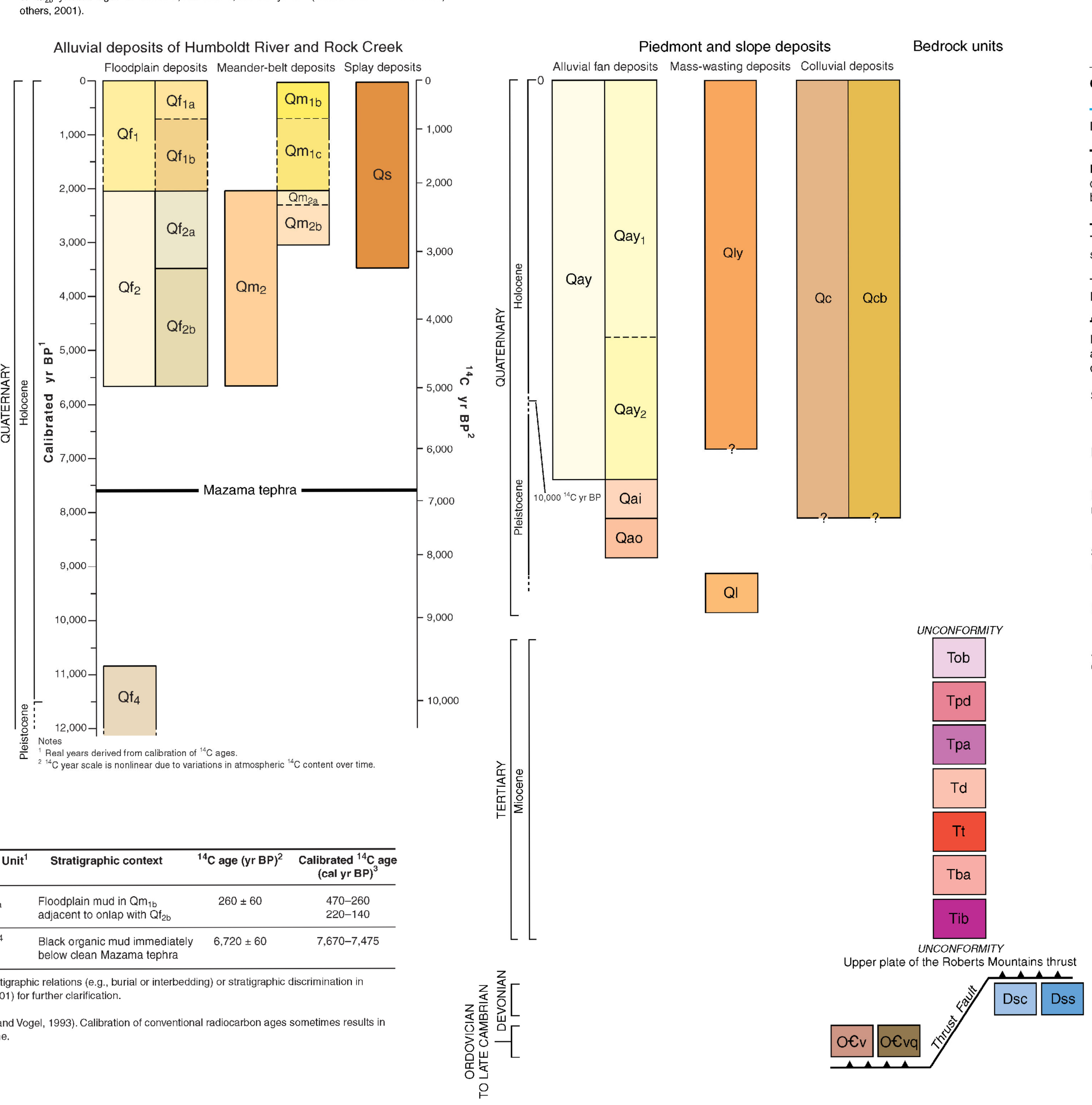
McKee, E.H., and Silberman, M.L., 1970, Geochronology of Tertiary igneous rocks in central Nevada: Geological Society of America Bulletin, v. 81, no. 8, p. 2317-2328.

Morrison, R.B., 1991, Quaternary stratigraphic, hydrologic, and climatic history of the Great Basin, with emphasis on Lakes Lahontan, Bonneville, and Tecopa, *in* Morrison, R.B., ed., Quaternary nonglacial geology; Conterminous U.S.: Boulder, Colorado, Geological Society of America, The Geology of North America, v. K-2.

Stuiver, M., Reimer, P.J., Bard, E., Beck, J.W., Burr, G.S., Hughen, K.A., Kromer, B., McCormac, G., van der Plicht, J., and Spurk, M., 1998, INTCAL98 Radiocarbon Age Calibration, 24,000-0 cal yr BP: Radiocarbon, v. 43, p. 1041-1084.

Talma, A.S., and Vogel, J.C., 1993, A simplified approach to calibrating ^{14}C dates: Radiocarbon, v. 35, p. 317-322.

Zdanowicz, C.M., Zielinski, G.A., and Germani, M.S., 1999, Mount Mazama eruption; calendrical age and atmospheric impact assessed: Geology, v. 27, no. 7, p. 621-624.



Notes
[1] Real years derived from calibration of ^{14}C ages.
[2] ^{14}C year scale is nonlinear due to variations in atmospheric ^{14}C content over time.

Contact Dashed where approximately located.

Paleomeander trace

Fault Dashed where approximately located or inferred; dotted where concealed; queried where uncertain; ball on downthrown side.

Thrust fault Dashed where approximately located or inferred; saw teeth on upper plate.

Fluvial scarp

Boundary of landslide deposit Shown where depositional against older units; hachure marks on deposit side of boundary, dashed where approximately located, dotted where concealed.

Strike and dip of beds

20 Inclined

Direction and plunge of fold axis

10

Fossil locality Showing U.S. Geological Survey collection number.

11525-CO

Sample location for ^{14}C analysis, and associated ^{14}C age (see table)

B 6720±60 yr BP

Breccia Silicified fault breccia zone in Slaven Chert.

Areas of significant disturbance due to mineral resource extraction.

GEOLOGIC MAP OF THE STONY POINT QUADRANGLE, LANDER COUNTY, NEVADA

Alan R. Ramelli, P. Kyle House, Chester T. Wrucke, and David A. John

2001

Scale 1:24,000

CONTOUR INTERVAL 40 FEET
SUPPLEMENTARY CONTOUR INTERVAL 5 FEET

Base map: U.S. Geological Survey Stony Point 7.5' Quadrangle, 1985

Table 1. Radiocarbon Sample Information

Sample	Lab ID	Material	Depth (cm)	Map Unit	Sampled Unit[1]	Stratigraphic context	^{14}C age (yr BP)[2]	Calibrated ^{14}C age (cal yr BP)[3]
A	Beta-154714	charcoal	100	Qm_{1b}	Qf_{1a}	Floodplain mud in Qm_{1b} adjacent to onlap with Qf_{2b}	260 ± 60	470–260 220–140
B	Beta-129627	soil	125	Qf_{2b}	Qf_3 [4]	Black organic mud immediately below clean Mazama tephra	6,720 ± 60	7,670–7,475

[1] Discrepancy between map unit and sampled unit indicates complex subsurface stratigraphic relations (e.g., burial or interbedding) or stratigraphic discrimination in outcrop too fine to map accurately. See unit descriptions and House and others (2001) for further clarification.
[2] Uncalibrated radiocarbon age in years before 1950.
[3] Calibrated age in calendar years before 1950 AD (Stuiver and others, 1998; Talma and Vogel, 1993). Calibration of conventional radiocarbon ages sometimes results in more than one age range because of variability in atmospheric ^{14}C content over time.
[4] Unit described and shown on cross section on House and others (2001).

Primary mapping responsibilities:
House and Ramelli: Quaternary river deposits; Ramelli: Quaternary piedmont and slope deposits. Fieldwork done in 1998-2001.
Wrucke: Paleozoic rocks. Fieldwork done in 1996-2001. John: Tertiary volcanic rocks. Fieldwork done in 1998-2000.

Office Review by: John Bell (NBMG), Christopher Henry (NBMG), Jerry Miller (Western Carolina University, Cullowhee, N.C.), Ted Theodore (USGS, Menlo Park).
Field Review by: John Bell (NBMG), Jon Price (NBMG).

First edition, first printing, 2001
Printed by Bear Industries, Sparks, Nevada
Edited by Dick Meeuwig; cartography by Robert Chaney

Geologic mapping was supported by the U.S. Geological Survey STATEMAP Program (Agreement No. 1434-HQ-97-AG-01766). National Science Foundation, Hydrologic Sciences Program (grant EAR-9996284).

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