Prepared as part of the STATEMAP component of the National Cooperative Geologic Mapping Program in cooperation with the U.S. Geological Survey



## ALLUVIAL DEPOSITS OF THE HUMBOLDT RIVER, REESE RIVER, AND ROCK CREEK

Alluvium of the Humboldt River, Reese River, Rock Creek, and related *overflow channels* are active and *abandoned floodplain terrace surfaces*. These deposits are divided into *floodplain deposits* and *meander-belt deposits*, although some overlap is present 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 or 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 are conspicuous on aerial photographs and topographic maps. They typically have complex surface morphology with local relief as much as 3 m associated with multiple, sinuous abandoned channels and adjacent floodplain surfaces. Old meander-belt deposits are easily distinguished in aerial photographs by the presence of multiple, overlapping, meander-scroll patterns. They are, however, typically flat due to burial by younger sediments (with a few exceptions). All but the youngest meander-belt units include a variety of fluvial, eolian, and local lacustrine deposits (small playas and pans). In the following descriptions, ages are reported in *calibrated calendar years before* 1950 AD (*cal yr BP*). See table 1, the geochronic diagram, and related references for corresponding $^{14}C$ years and additional information.

### Floodplain Deposits

**Qf$_t$** **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 and abundant gastropod shells are common in areas immediately adjacent to active channels and 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$_t$ is known to have occurred between the present and about 750ñ1,000 cal yr BP from the basis of *dated stratigraphy* in the *Argenta Quadrangle* (House and others, 2000), but may have begun as early as about 2,000 cal yr BP, when much of the Qf$_{1b}$ floodplain terrace was abandoned.

**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 the 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 on the floodplain surface. Age range of Qf$_{1a}$ is uncertain and is tentatively based on radiocarbon ages from the Argenta Quadrangle (House and others, 2000), where Qf$_{1a}$ deposits overlie a buried, organic-rich floodplain surface with an age of about 750 cal yr BP.

**Qf$_{1b}$** **(about 750 to 2,000 cal yr BP)** A slightly higher (as much as 1 m) floodplain surface typically found in direct association with recently abandoned and infrequently flooded meander belts Qm$_{1b}$ and Qm$_{1c}$, 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$_t$. 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 and surfaces of abandoned floodplains that are rarely, if ever, extensively inundated by the Humboldt River, Reese River, or their tributaries. It is notable, however, that much of the undifferentiated Qf$_t$ surface in and near the town of Battle Mountain was flooded by the Reese River in February 1962 (Thomas and Lamke, 1962). Qf$_2$ deposits are characterized by flat, featureless surfaces overlain by a mantle of eolian silt and minor sand ranging from 10 cm to more than 1 m thick. In general, thickness of eolian deposits reflects relative age of the surface and is one criterion for differentiating subunits of Qf$_2$. Thin interbeds of eolian silt are common in floodplain sediments beneath the surficial eolian mantle. Organic-rich sediments and gastropod shells are common, but are most typical of Qf$_{2a}$.

**Qf$_{2a}$** **(about 2,000 to 3,500 cal yr BP)** A generally flat floodplain surface that typically flanks abandoned meander belt Qm$_{2a}$, and buries older belts Qm$_{2b}$, Qm$_{2c}$, and Qm$_4$. Surface has a generally thin *cover* (5 to 20 cm) of eolian sediment and is topographically separated from Qf$_t$ surfaces by as much as 1.5 m. In aerial photographs, parts of underlying meander belts are discernible through the relatively thin and discontinuous eolian cover. In some cases the 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. Locally, Qf$_{2a}$ is a relatively thin deposit of floodplain mud and sand that disconformably overlies Qf$_{2b}$. In northeast part of quadrangle, Qf$_{2a}$ includes several sinuous, narrow ridges that stand as much as 2.5 m above surrounding floodplain and are composed of organic-rich deposits of mud and fine sand with abundant gastropod shells. These features occur in association with Qm$_4$ deposits where they generally follow paleochannel traces. Origin of these deposits and associated landforms is uncertain. They may be natural levees that flanked an older, obscured meander belt (Qm?$_{2b}$?), or they may reflect accretion of fluvial and eolian sediments onto relatively densely vegetated, moist areas associated with groundwater in underlying Qm$_4$ gravels. A radiocarbon age from organic mud near the crest of one ridge (table 1, sample E) is consistent with ages from other organic mud layers and gastropod shells in younger Qm$_{2a}$ gravels (table 1, sample B) and isolated Qf$_{2a}$ floodplain deposits (table 1, samples A and C).

**Qf$_{2b}$** **(about 3,500 to 5,600 cal yr BP)** A flat, generally featureless floodplain terrace 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. Qf$_{2b}$ terrace surfaces range from 0.5 to 1.5 m higher than Qf$_{2a}$. Qf$_{2b}$ deposits have fewer and less distinct organic-rich beds and fewer gastropod shells than Qf$_t$ 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 (Qtm). In adjacent Stony Point Quadrangle, some Qf$_{2b}$ exposures contain beds of reworked tephra up to 1.5 m thick overlying a clean tephra bed as much as 10 cm thick (Ramelli and others, 2001). At two sites on opposite sides of the floodplain, gastropod shells from base of Qf$_{2b}$ yielded ages of about 5,500 and 5,600 cal yr BP (table 1, samples K and L).

**Qf$_s$*** **Prominent buried floodplain surface (about 7,600 [pre-Mazama] to 10,900 cal yr BP)** Distinct, composite floodplain deposit of the Humboldt River often directly overlain by Mazama tephra (Qtm) and burying cross-stratified coarse sand and gravel of Qm$_4$. Qf$_s$ is 0.5ñ1 m thick and is exposed only in gravel pits and cut-banks in map area. Unit includes as many as four thin beds of organic-rich, dark gray to black mud and sand and one or two thin, interlayered beds of yellowish-tan eolian silt. The same stratigraphic relation of tephra overlying organic-rich mud was described in Winnemucca area by Hawley and Wilson (1965) and in Valmy area by Elston and others (1981). Unit is typically cut by Qm$_{2b}$ and Qm$_{2c}$ gravels and overlain by floodplain and eolian deposits associated with units Qf$_{2a}$ and Qf$_{2b}$. A buried, organic-rich floodplain surface (uppermost Qf$_s$) directly beneath Qf$_{2b}$ at a depth of 1.5ñ1.75 m yielded an age of about 7,500 cal yr BP (table 1, sample M). Ages of about 9,650 and 10,900 cal yr BP were acquired from organic sediment in middle and immediately below the base of unit, respectively (table 1, samples N and O).
*Exposed only in cross section A-Aí.

**Qf$_4$** **Older abandoned floodplain terraces (late Pleistocene, >10,900 cal yr BP)** Abandoned floodplain terrace of the Reese River preserved along south and west margins of Holocene floodplain. Qf$_4$ terrace forms an extensive surface at lower end of Reese River Valley and just beyond confluence of Reese River and Humboldt River valleys along northeast flank of Battle Mountain. Buried paleomeander traces are clearly discernible in aerial photographs (mapped as Qf$_4$/Qm$_4$) over large parts of terrace. Outer margins of terrace are commonly blanketed by a mantle of eolian silt and fine sand as much as 1 m thick. Extensive fields of low, stabilized dunes composed of fine to medium sand occur on interior parts of Qf$_4$ terrace. Dunes have a generally linear, but irregular morphology and exhibit a distinctive fuzzyí texture in aerial photographs. Locally, eolian mantle may be several meters thick and is mapped separately (Qd) where it is particularly extensive and obscures underlying floodplain and paleomeander morphology. Gravel-pit exposures in Qf$_4$ deposits near south edge of quadrangle contain several meters of cross-bedded gravel with interbedded sand lenses overlain by bedded fluvial sand and silt overlain by 50ñ100 cm of eolian silt. Generally correlative to Qm$_4$ deposits of the Humboldt River.

Primary mapping responsibilities:
House: Quaternary river deposits; Ramelli: Quaternary piedmont and slope deposits. Fieldwork done in 1997-2001.
Wrucke: Paleozoic bedrock. Fieldwork done in 1996-1997.

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First edition, first printing, 2001
Printed by Bear Industries, Sparks, Nevada
Edited by Dick Meeuwig
Cartography by Robert Chaney and Susan Tingley

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-0006284).

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### Meander-Belt Deposits

**Active and most recently abandoned meander belts (present to about 2,000 cal yr BP)** Deposits of modern and 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 except in areas influenced by channel straightening and check-dam construction, each of which have enhanced historical channel incision. Qm$_t$ meander belts include modern and a series of recently abandoned belts. Three subunits of young belts are recognized (Qm$_{1a}$, Qm$_{1b}$, and Qm$_{1c}$) based on crosscutting relations among individual meander belts.

**Qm$_{1a}$** **(present to about 750 cal yr BP)** Modern, active meander belt of the Humboldt River. Age is difficult to determine, but it is known to have been the active meander belt in 1854 on the basis of General Land Office (GLO) Survey Maps. Maximum age based on assumption that unit is coeval with Qf$_{1a}$, but is uncertain.

**Qm$_{1b}$** **(1910 AD to about 750 cal yr BP)** Most recently abandoned meander belt of the Humboldt River, currently occupied by Rock Creek. The Humboldt River occupied this meander belt until it avulsed approximately 30 km upstream at Dunphy Ranch during a large flood in February 1910. At that time, the Humboldt River reportedly assumed the course of "Argenta Slough" (also called "South Channel" on 1854 GLO maps; Foster, 1933). Maximum age based on assuming a connection with Qm$_{1a}$ prior to 1910 AD.

**Qm$_{1c}$** **(about 750 to 2,000 cal yr BP)** Oldest abandoned meander belt associated with Qf$_{1b}$ currently occupied by the Reese River. Age is uncertain, but belt is cut by Qm$_{1b}$ just north of the town of Battle Mountain, and it appears to be morphologically related to Qf$_{1b}$ in the same general area.

**Qm$_{2a}$** **Abandoned meander belts (about 2,000 to 5,600 cal yr BP)** Typically less well-preserved abandoned meander belts of the Humboldt River. Evident in aerial photographs as complexly overprinted *meander scrolls except in the case of one particularly* well-preserved belt. **Qm$_2$** Typically overlain by coeval and younger floodplain deposits (Qf$_{2a}$ and Qf$_{2b}$) and minor eolian deposits. Composition ranges from sand- and gravel-rich lateral accretion deposits to fine-grained vertical accretion deposits of fluvial mud and sand. Calibrated radiocarbon ages from Qm$_2$ gravels and overlying Qf$_{2a}$ floodplain muds range from about 2,160 to 3,000 cal yr BP.

**Qm$_{2a}$** **(about 2,000 to 2,300? cal yr BP)** A notably well-preserved, abandoned Humboldt River meander belt that traverses east part of the valley bottom along a northwesterly trend, generally parallel to the modern belt. 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). Qm$_{2a}$ is flanked by a Qf$_{2a}$ surface with an age range of 2,000 to 2,300 cal yr BP (table 1, sample C), which approximates time of abandonment. In one location, the youngest Qm$_{2a}$ channel is cut into underlying floodplain sediments dated at about 3,500 cal yr BP (table 1, sample H).

**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$_{2b}$ deposits. Surface topography is generally planar due to younger alluvial cover, although buried meanders are evident in aerial photographs. Gastropod shells from a silt lens in cross-stratified Qm$_{2b}$ gravels obviously crosscut by Qm$_{2a}$ yielded an age of about 2,300 cal yr BP (table 1, sample B).

**Qm$_{2c}$** **(about 3,000 to 5,600 cal yr BP)** Poorly preserved overprinted meander belts overlain by Qf$_{2a}$ and Qf$_{2b}$ deposits. Presumably coeval with all or part of Qf$_{2b}$.

**Qm$_4$** **Older abandoned meander belts (late Pleistocene, >10,900 cal yr BP)** Abandoned, complexly overprinted, large meander belts (ëmega-meandersí) of the Humboldt River and Reese River. Characterized by considerably larger channel and meander dimensions than Holocene meander belts, indicating much higher streamflow in each river during the latest Pleistocene. Qm$_4$ meanders of the Humboldt River are clearly discernible in northeast and north-central parts of quadrangle, although they are almost continuously buried by as much as 2 m of younger fluvial and eolian deposits (Qf$_2$); most of surface is mapped as Qf$_2$/Qm$_4$ to illustrate this relation. Gravel pits in this area exploit Qm$_4$ gravels resulting in excellent exposures, and pits are thus mapped as Qm$_4$. Small, widely dispersed exposures of Qm$_4$ point-bar gravels occur locally, but are unmapped. Reese River Qm$_4$ meanders are smaller than Humboldt River Qm$_4$ meanders, but are notable because the modern Reese River does not have a meandering pattern in this area, except where it occupies an abandoned Humboldt River meander belt (Qm$_{1c}$). Reese River Qm$_4$ meanders are discernible through a cover of Qf$_4$ floodplain alluvium and eolian deposits, and are thus mapped as Qf$_4$/Qm$_4$ (see discussion of Qf$_4$). Qf$_4$ deposits directly overlie Qm$_4$ gravels in two gravel-pit exposures near North Battle Mountain. A sample of organic-rich mud from base of Qf$_4$, 1 m below Mazama tephra and immediately above meander-belt sand and gravel yielded an age of about 10,900 cal yr BP (table 1, sample O), indicating a latest Pleistocene minimum age for Qm$_4$. Qm$_4$ is likely correlative to deposits of more well-preserved mega-meanders described downstream by Elston and others (1981) and Davis (1978a), who attributed them to Late Sehoo time (about 10,000 to 8,800 cal yr BP; see Morrison, 1991) on the basis of geomorphic, archaeological, and stratigraphic relations. However, Qm$_4$ meander dimensions are not as large as those described by Davis (1990) for features near Rye Patch Reservoir.

### TEPHRA DEPOSIT

**Qtm** **Mazama tephra (about 7,630 cal yr BP)** Fine-grained, rhyodacitic volcanic ash from Plinian eruption of Mount Mazama (Crater Lake), Oregon (Kittleman, 1973). Determination based on petrographic similarity with known samples (Davis, 1978b) and bracketing radiocarbon ages from this quadrangle and the adjacent Stony Point Quadrangle (Ramelli and others, 2001). Age determination (7,627 ± 150 cal yr BP) based on Zdanowicz and others (1999). Tephra occurs as a thin (5-20 cm), conspicuously white horizon in some cutbank and gravel pit exposures.

### EOLIAN DEPOSITS

**Qd** **Eolian dunes (present to late Pleistocene)** Dunes composed of fine to medium sand. Generally a few tens of centimeters to a few meters relief above adjacent surfaces. An extensive field of stabilized dunes overlies large areas of the Reese River floodplain in west part of quadrangle (see discussion of Qf$_4$).

**Qe** **Other eolian deposits (present to late Pleistocene)** Fine-grained eolian and reworked eolian deposits composed of predominantly silt and fine sand that mantle parts of lower piedmont and floodplain surfaces. As much as 2 m or more thick on distal parts of some alluvial fans. Extensive eolian deposits in north-central part of quadrangle overlie Qf$_{2b}$ floodplain surfaces. Mantles of eolian silt and fine sand are common on all but the youngest and most active alluvial surfaces, but are mapped only where they constitute significant surficial deposits.

### PIEDMONT AND SLOPE DEPOSITS

Coarse-grained alluvial fan deposits originating from Sheep Creek Range and Battle Mountain, and various landslide deposits originating from west escarpment 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 dominantly 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 basalt and andesite sequence exposed at top of escarpment east of quadrangle and Paleozoic rocks (Devonian Slaven Chert and minor Cambrian and Ordovician Valmy Formation) that crop out along west slope of range (Ramelli and others, 2001). Fan deposits flanking Battle Mountain consist of pebble to cobble gravels derived from Eocene and Oligocene rocks (Caetano Tuff and granitic intrusions) and Paleozoic rocks (primarily Pennsylvanian and Permian Antler Peak Limestone, but also including Cambrian Harmony Formation) (Stewart and McKee, 1977; Theodore and Jones, 1992). Landslide deposits range in composition from poorly sorted, angular boulders to debris flow deposits of silt, sand, and boulders.

**Qay** **Active and most recently abandoned alluvial fans and channels (present to late Pleistocene)** Young, coarse-grained alluvial fan and ephemeral stream deposits.

**Qay$_1$** **Qay$_1$ (present to middle Holocene)** Alluvial fan and ephemeral stream 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$_1$ also includes local sandy, ephemeral channels that drain piedmont and floodplain surfaces.

**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, a 10- to 20-cm-thick Bw (cambic) horizon, and a 50- to 100-cm-thick Bk horizon (Stage I CaCO$_3$ with continuous coatings up to 1 mm thick).

**Qai** **Inactive alluvial fan-terraces (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 fan-terraces (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.

**Ql** **Landslide deposits (Pleistocene)** Largely complex mixtures of rock avalanche and debris flow deposits composed of loosely consolidated clasts of basalt and andesite ranging from silt to angular boulders several meters across. Unit also contains partly disorganized and locally intact highly fractured basalt flows from the escarpment east of the quadrangle.

### BEDROCK UNITS

#### Antler Peak Limestone (Permian and Pennsylvanian)

**PPam** **Micrite dominated facies** Gray micritic limestone, sand and pebble micrite, biomicrite, and dolomite (Theodore and Jones, 1992).

**PPas** **Siliciclastic-dominated facies** Pale-brown to gray-orange calcareous shale, fine-grained calcareous sandstone, dolomite, and thin beds and nodules of chert (Theodore and Jones, 1992).

#### Slaven Chert (Devonian)

**Dsc** **Chert** Black to medium-gray thin-bedded chert in planar to wavy beds commonly 2 to 10 cm thick in sections below and above sandstone (Dss). Thin interbeds of black argillite and coatings of argillite on chert beds are considerably less abundant than normal for the Slaven. Thickness on the order of 300 m below sandstone unit and about 100 m in the quadrangle above sandstone, but chert above sandstone is lower part of a much thicker section exposed north and northeast of quadrangle.

**Dss** **Sandstone** Medium to dark gray, fine-grained, laminated to cross laminated. Commonly weathers reddish brown to yellow brown and locally to pale yellow, dark brown, medium gray, and black. Contains limestone 2 m thick near mountain front and north border of the quadrangle. Limestone is medium gray, massive to laminated, and contains 10 to 90% sandstone in irregular masses. Limestone has yielded *Polygnathus serotinus* and *Belodella* spp. conodont elements, together considered to be at boundary of Early and Middle Devonian (A. Harris, written commun. 1998).

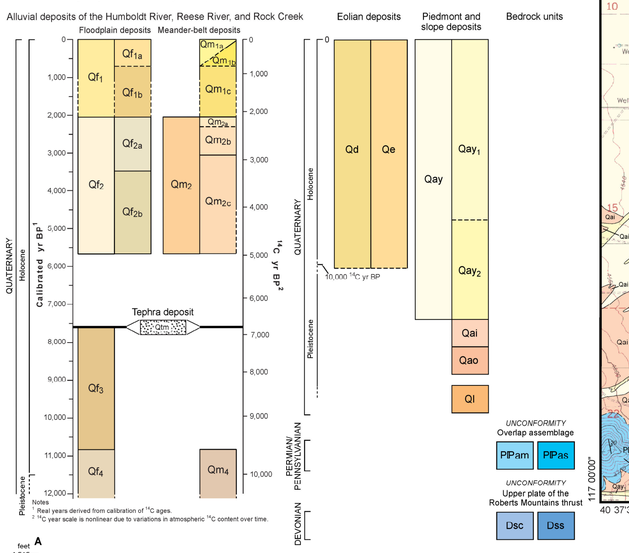
Scale 1:24,000
0 0.5 1 kilometer
0 0.5 1 mile
0 1000 2000 3000 4000 5000 feet
CONTOUR INTERVAL 20 FEET
SUPPLEMENTARY CONTOUR INTERVAL 5 FEET

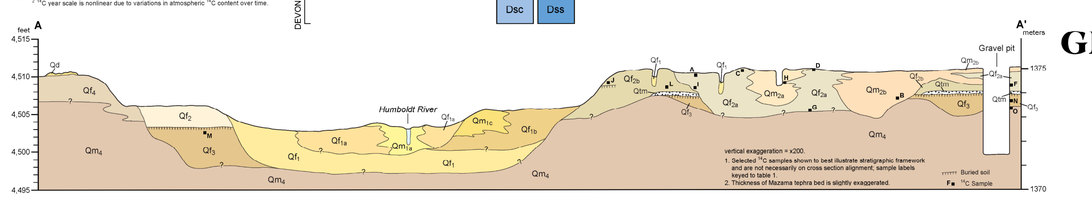
Base map: U.S. Geological Survey Battle Mountain 7.5' Quadrangle, 1985

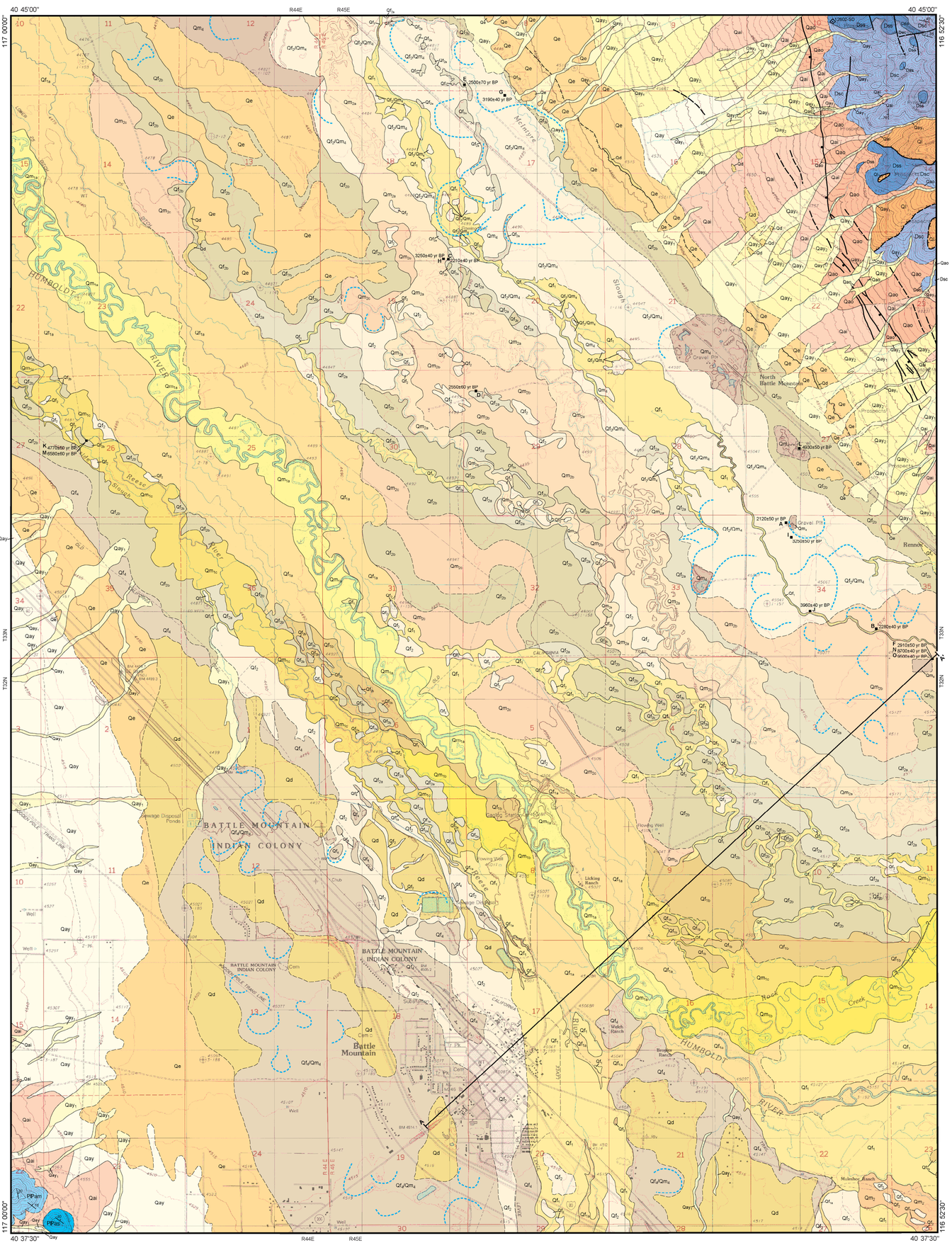
Table 1. Radiocarbon Sample Information

| 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-111353 | soil | 10 | Qf$_5$/Qm$_4$ | Qf$_{2a}$ | Surface organic soil below gravel pit spoils | 2,120 ± 50 | 2,300ñ2,250<br>2,165ñ1,955 |
| B | Beta-154717 | shell | 210 | Qm$_{2b}$ | Qm$_{2b}$ | Silt lens in bedded gravel | 2,280 ± 40 | 2,350ñ2,300<br>2,260ñ2,160 |
| C | Beta-156257 | soil | 5ñ10 | Qf$_{2a}$ | Qf$_{2a}$ | Near-surface organic soil | 2,210 ± 40 | 2,330ñ2,120 |
| D | Beta-118686 | soil | 10 | Qf$_{2a}$ | Qf$_{2a}$ | Organic floodplain mud at surface | 2,550 ± 60 | 2,765ñ2,435<br>2,415ñ2,375 |
| E | Beta-118685 | soil | 10ñ20 | Qf$_{2a}$ | Qf$_{2a}$ | Organic mud on crest of levee/fluvial ridge | 2,500 ± 70 | 2,756ñ2,350 |
| F | Beta-129626 | shell | 130 | Qm$_{2b}$ | Qf$_{2a}$ | Floodplain mud ~80 cm above Mazama tephra | 2,910 ± 50 | 3,220ñ2,890 |
| G | Beta-154720 | shell | 200 | Qf$_2$/Qm$_4$ | Qf$_{2a}$ | Floodplain mud and sand below eolian veneer and organic soil; above fluvial sand and gravel | 3,190 ± 40 | 3,470ñ3,350 |
| H | Beta-150256 | soil | 5ñ10 | Qm$_{2a}$ | Qf$_{2a}$ | Exhumed organic soil in abandoned channel | 3,250 ± 40 | 3,570ñ3,380 |
| I | Beta-113529 | shell | 35 | Qf$_2$/Qm$_4$ | Qf$_{2a}$ | Base of organic mud layer above Mazama tephra | 3,250 ± 50 | 3,580ñ3,365 |
| J | Beta-154716 | shell | 60ñ100 | Qf$_2$/Qm$_4$ | Qf$_{2b}$ | Base of organic mud overlying similar, buried organic mud | 3,960 ± 40 | 4,520ñ4,290 |
| K | Beta-154718 | shell | 100ñ130 | Qf$_{2b}$ | Qf$_{2b}$ | Base of floodplain silt | 4,770 ± 50 | 5,600ñ5,450<br>5,400ñ5,330 |
| L | Beta-154715 | shell | 100 | Qf$_{2b}$ | Qf$_{2b}$ | Base of floodplain and eolian silt above Mazama tephra and cemented sand and gravel | 4,930 ± 50 | 5,740ñ5,590 |
| M | Beta-154719 | soil | 140ñ150 | Qf$_{2b}$ | Qf$_s$ | Surface of buried organic mud | 6,580 ± 60 | 7,580ñ7,410 |
| N | Beta-156641 | soil | 115 | Qm$_{2b}$ | Qf$_s$ | Below Mazama tephra and one buried surface with pavement characteristics | 8,700 ± 40 | 9,760ñ9,550 |
| O | Beta-156642 | soil | 200 | Qm$_{2b}$ | Qm$_4$ | Below Mazama tephra at base of 90 cm floodplain mud deposit. Immediately above lateral accretion sand and gravel | 9,500 ± 40 | 11,070ñ10,950<br>10,940ñ10,830<br>10,800ñ10,660 |

[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 cross section 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.




# GEOLOGIC MAP OF THE BATTLE MOUNTAIN QUADRANGLE, LANDER COUNTY, NEVADA

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2001

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