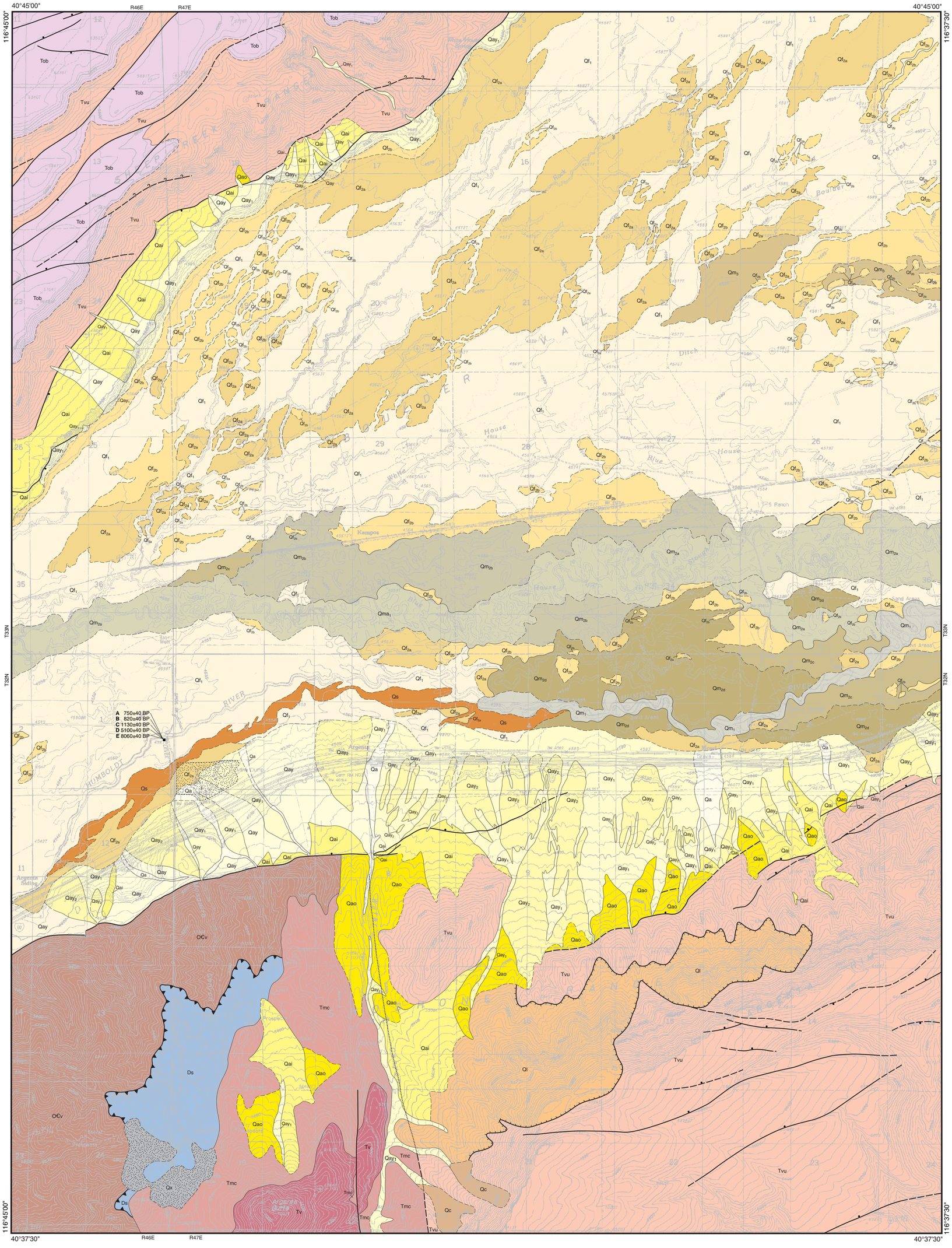

RIVERINE DEPOSITS

Alluvium of the Humboldt River, Rock Creek, and principal overflow channels on the floodplain. These deposits are divided into floodplain and meander-belt units. Floodplain deposits include valley-flat and backswamp deposits that are composed predominantly of vertically accreted layers of fluvial mud and sand. All but the youngest floodplain deposits are covered with a variably thick (up to 1 m) mantle of eolian silt and sand. Meander-belt deposits include a more complex assemblage of fine-grained vertical accretion (overbank) deposits interspersed with coarser (sand to gravel) lateral accretion (point-bar) deposits, and backwater deposits in oxbow lakes and cutoff channels. Older meander-belt deposits are easily distinguished in aerial photographs by the presence of multiple, overlapping, meander scrolls. All but the youngest meander-belt units inevitably contain a variety of younger fluvial, eolian, and local lacustrine deposits (small playas); but they are mapped as meander-belts to best characterize the history of the Humboldt River. Intermediate-age floodplain units are generally flat and featureless and may also contain a variety of younger, localized fluvial, eolian, and local lacustrine deposits that have not been judiciously differentiated for the sake of clarity. The oldest floodplain surface has extensive eolian dunes and sandsheets that have not been differentiated for the same reason.

Floodplain Deposits

Qf_1 Deposits of frequently inundated, low-lying areas near major channels, meander-belts, and anastomosing channel networks. Also includes overflow channels that distribute flow between the active floodplain and areas distant from the principal active floodplains. Unit is composed principally of fine-grained vertical accretion (overbank) deposits of mud and sand. Dark gray surface deposits of organic-rich mud with abundant gastropod shells are typical of this unit in areas immediately adjacent to active channels and in backswamp settings. Unit also includes natural levees and local splays of sand and minor gravel associated with significant overbank flow or levee breaches (man-made and natural levees). Aerial photographs, historical accounts, and a radiocarbon date from the base of the unit in a deep channel cut (radiocarbon samples A-C) indicate that Qf_1 spans the interval between the present and approximately 1000 yr BP. This unit spans an extensive portion of the map in Boulder Valley and inevitably includes small areas of somewhat older floodplain deposits (Qf_2).

Qf_2 **Qf_{2a}** **Qf_{2b}** Deposits and surfaces of abandoned floodplains that are rarely to never inundated by the modern Humboldt River or Rock Creek. Qf_2 deposits are characterized by flat, featureless surfaces overlain by a mantle of eolian silt and minor sand that ranges from 10 cm to more than 1 m thick. In general, the thickness of the eolian deposits reflects the relative age of the surface and is one criteria for differentiating subunits within Qf_2. In all cases, layers of organic mud and interbedded fluvial sands and eolian silt are common beneath the surficial eolian mantle.

This unit is subdivided into the following two units: **Qf_{2a}** A flat and featureless deposit that typically flanks abandoned meander-belts (older Qm_2 and Qm_3), has a generally thin cover (5 to 20 cm) of eolian sediment and is topographically separated from Qf_1 deposits by as much as 1.5 m, often less. In aerial photographs, portions of underlying meandering channel remnants are often discernible below this unit because of the relatively thin eolian cover. Radiocarbon dates from shells and organic sediment from the uppermost organic-rich floodplain mud in Qf_{2a} exposures in the Battle Mountain Quadrangle (House and others, 2001) range from approximately 2060 to 2600 calibrated yr BP. Locally, Qf_{2a} is a relatively thin deposit of floodplain mud that overlies Qf_{2b} along an erosional disconformity. **Qf_{2b}** A flat, generally featureless floodplain surface and underlying deposit with a thicker and more extensive veneer of eolian silt than Qf_{2a} (up to 1 m thick).This deposit is conspicuously white in aerial photographs. Deposit surface ranges from 0.5 to 1.5 m higher than Qf_{2b} where they are immediately adjacent to one another. In numerous exposures, Qf_{2b} sediments comprise a 1.5- to 2.0-m-thick layer of interbedded fluvial (dominant) and eolian sediment that immediately overlie Mazama Tephra (7626±150 cal. yr BP; Zdanowicz and others, 1999) which, in turn, overlies organic-rich floodplain mud. The tephra on mud contact represents the base of the deposit. This relation was described in the Winnemucca area by Hawley and Wilson (1965) who termed the underlying floodplain surface as the Turupah Formation. Elston and others (1981) also recognized this stratigraphic relation in the Valmy area. Organic mud below reworked tephra (presumably Mazama but as yet indeterminate) in the this quadrangle yielded a calibrated radiocarbon date of approximately 5800 yr BP., and gastropod shells from above an organic-rich buried soil in Qf_{2b} in the Battle Mountain Quadrangle (House and others, 2001) yielded a date of approximately 5500 cal. yr BP. These samples are from horizons that overlie an organic soil that yielded a calibrated ^{14}C date of approximately 9000 yr BP.

Meander-belt Deposits

Qm_1 Deposits of the modern Humboldt River meander-belt. Composition includes coarse sand to predominantly pebble-gravel lateral accretion deposits and vertical accretion deposits of organic-mud and sand. Deposit surface typically has complex topography characterized by a very sinuous main channel interspersed among abandoned channels and intermittent oxbow lakes. Local relief rarely exceeds 3 m except in portions influenced by channel straightening and check dam construction, each of which have enhanced historical channel incision.

Qm_2 **Qm_{2a}** **Qm_{2b}** **Qm_{2c}** **Qm_{2d}** Abandoned meander-belts of the Humboldt River. This unit includes the most recently abandoned meander-belts on the basis of generally pristine morphology, proximity to the present meander-belt (in instances where the modern river's position has not been altered by human intervention) and crosscutting relationships with the modern and older meander-belts. In some areas, this unit can be subdivided on the basis of crosscutting relationships between individual meander-belts, and these are indicated by a sequential alphabetic scheme: Qm_{2a}, Qm_{2b}, Qm_{2c}, and Qm_{2d}. Qm_{2a} includes the meander-belt currently occupied by Rock Creek and Blue House Slough because it was the active Humboldt River meander-belt between 1910 and at least 1854, known from the basis of 1854 General Land Office (GLO) Survey Maps and historical accounts of a channel avulsion on the Dunphy Ranch in February 1910, in which the Humboldt River assumed the course of the "Argenta Slough" (also called the "South Channel" on the GLO maps; Foster, 1933). Qm_2 meander-belts are likely coeval with the floodplain unit Qf_{2a} and possibly a portion of Qf_{2b}.

Qm_3 Abandoned, poorly to moderately well-preserved meander-belts of the Humboldt River. Evident in aerial photographs as numerous, complexly overprinted meander scrolls. Locally overlain by presumably coeval floodplain mud and younger eolian silt and fine sand. Composition ranges from sand-and gravel-rich lateral accretion deposits to fine-grained vertical accretion deposits of fluvial mud and sand. Radiocarbon dates from Qm_3 gravels and overlying floodplain muds in the Stony Point and the Battle Mountain Quadrangle (Ramelli and others, 2001; House and others, 2001) range from 2280±40 to 3960±40 yr BP (approximately 2160-4520 cal. yr BP). Qm_3 meander-belts are likely coeval with floodplain unit Qf_{2b}.

Splay

Qs Splay deposits of sand and silt associated with localized concentrations of overbank flow along the present and recently abandoned courses of the Humboldt River and Rock Creek. Typically located on floodplain and abandoned meander-belt surfaces associated with unconfined flow adjacent to active channels and broad overflow areas adjacent to meander-belts. The extensive splay along the Humboldt River in this map may be the result of the channel avulsion in 1910.

PIEDMONT AND SLOPE DEPOSITS

Coarse-grained alluvial fan deposits originating from the Sheep Creek and Shoshone Ranges in the northwest and south parts of the quadrangle, respectively. Gravel deposits are typically angular to subrounded, poorly to moderately sorted, and poorly to moderately stratified. Fan deposits flanking the Sheep Creek Range consist of pebble to boulder gravels derived from Miocene volcanic rocks. Fan deposits flanking the Shoshone Range consist of pebble to cobble gravels derived from Paleozoic carbonate rocks and Miocene volcanic rocks.

Alluvial Fan Deposits

Qay_1 **Qay_2** **Qay** **Qai** **Qao** **Qay_1 (Late Holocene)** **Qay_2 (Holocene)** Fan-terrace remnants characterized by subdued to fully smoothed bar-and-swale surface 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 0- to 5-cm-thick Av horizon (vesicular A) and 30- to 50-cm-thick Bk horizon (Stage I $CaCO_3$ with noncontinuous clast coatings (i.e., filaments)). **Qay_3 (late Pleistocene to early Holocene)** Fully smoothed fan-terrace remnants 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 5- to 10-cm-thick Av (vesicular A) horizon, 10- to 20-cm-thick Bw (cambic) horizon, and 50- to 100-cm-thick Bk horizon (Stage I $CaCO_3$ with continuous coatings up to 1 mm thick). **Qai (late Pleistocene)** Fully smoothed fan-terrace remnants with variable topographic separation from adjacent Qao surfaces. Surface clasts have dark rock varnish. Soils typically consist of 10- to 20-cm-thick Av (vesicular A) horizon, 15- to 30-cm-thick unstructured A horizon (eolian cap), 20- to 40-cm-thick Bt (argillic) horizon which is typically overprinted with Stage I $CaCO_3$ (Btk), and 30- to 60-cm-thick Stage II+ to Stage III $CaCO_3$ horizon (Bk or Bkm). **Qao (middle? to late Pleistocene)** Fully smoothed, dissected, and broadly rounded fan-terrace remnants preserved only near fan heads. Surface expression similar to Qai. Surface clasts have dark rock varnish. Soils typically consist of 10- to 20-cm-thick vesicular A horizon (Av), 15- to 30-cm-thick unstructured eolian silt cap (A), 20- to 40-cm-thick argillic horizon overprinted with Stage I $CaCO_3$ (Btk), and 50- to 100-cm-thick Stage III-IV $CaCO_3$ horizon (Bkm); upper soil horizons are often erosionally stripped, especially on rounded remnant shoulders.

Landslide Deposits

Ql **Landslide deposits (Pleistocene)** Dislocated masses of Tertiary volcanic and sedimentary rocks on escarpment of Argenta Rim.

Colluvial Deposits

Colluvial deposits (late Pleistocene and Holocene) Poorly to moderately sorted, angular, pebble to boulder gravels and sand deposited on moderate to steep hillslopes. Generally consist of Tertiary volcanic clasts with a fine-sand matrix. Grades downslope into alluvial deposits. Generally a few to several meters thick.

Qx **Mine workings**

BEDROCK UNITS (generalized)

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, very fine-grained cavities give the 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 the Izzenhood Spring Quadrangle (John and Wrucke, 1999). 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.

Tv **Volcanic rocks (Miocene)** Composite unit consisting mostly of andesite flows and welded tuffs with porphyritic dacite and trachyandesite flows capping Argenta Butte. most rocks are fine-grained to aphyric, containing sparse phenocrysts of plagioclase, clinopyroxene, ilmenite, magnetite, and olivine. Porphyritic dacite flows contain 5-20% phenocrysts of plagioclase, clinopyroxene, ilmenite, magnetite, and olivine. In adjacent Mule Canyon Quadrangle to south, andesite welded tuff gave a whole-rock $^{40}Ar/^{39}Ar$ age of 15.85±0.08 Ma, an andesite lava flow gave a whole-rock $^{40}Ar/^{39}Ar$ age of 15.2±0.8 Ma, and plagioclase from a porphyritic dacite flow gave an $^{40}Ar/^{39}Ar$ age of 15.33±0.09 Ma (John and others, 2000). Thickness about 200 m at Argenta Butte.

Tmc **Mule Canyon sequence (Miocene)** Basalt and andesite flows and pyroclastic rocks in formation defined by John and others (2000) for Mule Canyon Quadrangle to south. Most rocks fine grained, rarely porphyritic, and contain sparse phenocrysts of pagioclase, clinopyroxene, magnetite, ilmenite, and locally olivine. Preliminary $^{40}Ar/^{39}Ar$ of 15.85±0.08 Ma obtained from andesite tuff near top of sequence in Mule Canyon Quadrangle to south (John and others, 2000). Thickness about 120 m.

Tvu **Volcanic rock, undivided (Miocene)** Compsite unit consisting locally of sedimentary rocks at base overlain by four volcanic subunits, from oldest to youngest: (1) basalt and andesite flows and minor wleded tuffs, (2) porphyritic dacite flows, (3) trachydacite flows, and (4) olivine basalt flows. Most volcanic rocks are fine-grained to aphyric. Porphyritic dacite flows contain 5-20% phenocrysts of plagioclase, clinopyroxene, ilmenite, magnetite, and olivine. Trachydacite flows contain 1-2% phenocrysts of plagioclase, clinopyroxene, magnetite, and olivine. Olivine basalts contain scattered small olivine phenocrysts. Thin beds of rhyolite tuff locally present between units 3 and 4. Andesite welded tuff from near top of unit 1 yielded a whole-rock $^{40}Ar/^{39}Ar$ age of 15.85±0.08 Ma, andesite from top of unit 1 gave a whole-rock $^{40}Ar/^{39}Ar$ age of 15.2±0.8 Ma, plagioclase from unit 2 gave $^{40}Ar/^{39}Ar$ age of 15.33±0.09 Ma, and two whole-rock samples of unit 4 both gave $^{40}Ar/^{39}Ar$ of 14.7±0.2 Ma (John and others, 2000). Sanidine from rhyolite tuff between units 3 and 4 in Izzenhood Spring Quadrangle to northwest gave an $^{40}Ar/^{39}Ar$ age of 14.9±0.04 Ma (John and others, 2000). Thickness about 400-500 m on escarpment of Argenta Rim.

Upper Plate of the Roberts Mountains Thrust Fault

Ds **Slaven Chert (Devonian)** Medium-dark-gray to black chert in beds commonly 2-10 cm thick interbedded with subordinate amounts of dark gray argillite and sparse limestone. Upper part contains thin to thick beds of barite mined at Shelton and Argenta Mines (Stager, 1977). Thickness difficult to estimate because of internal thrust faults and locally contorted beds, but probably no more than about 100 m.

O€v **Valmy Formation (Ordovician and Cambrian?)** Interbedded chert, argillite, quartzite, and sparse limestone. Complexly deformed resulting from internal thrust faults and folding. Thickness probably exceeds 400 m. Ordovician age based on correlation with Valmy Formation farther south in Shoshone Range (Gilluly and Gates, 1965). Cambrian(?) age based on conodonts of late Late Cambrian age in adjacent Stony Point Quadrangle (Ramelli and others, 2001).

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Contact Dashed where approximately located.

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

Thrust fault Saw teeth on upper plate.

Boundary of landslide deposit Hachure marks on deposit side of boundary.

Strike and dip of beds

20 Inclined

Sample location for ^{14}C analysis (see table)

A ■ 750±40 BP

Stipple pattern indicates areas of significant disturbance due to agricultural, commercial, or industrial development.

Field work done in 1999-2001.

DRAFT

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

First edition, first printing 2000 (1113argenta07-17-01.ai)
Printed by Nevada Bureau of Mines and Geology
Cartography by Robert Chaney

Geologic mapping was supported by the U.S. Geological Survey STATEMAP Program (Agreement No. 99-HQ-AG-0058).

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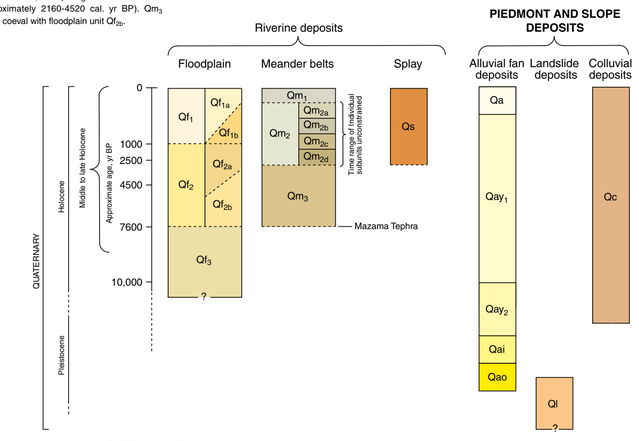

PRELIMINARY GEOLOGIC MAP OF THE ARGENTA QUADRANGLE, LANDER COUNTY, NEVADA

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

2001

Scale 1:24,000

0 0.5 1 kilometer

0 0.5 1 mile

0 1000 2000 3000 4000 5000 feet

CONTOUR INTERVAL 40 FEET
SUPPLEMENTARY CONTOUR INTERVAL 5 FEET

Base map: U.S. Geological Survey Argenta 7.5' Quadrangle, 1985
Digital Raster Graphic (DRG)

Sample	Material	Depth (cm)	Stratigraphic Context	Unit	Conventional ^{14}C date	Calibrated ^{14}C date[1]
A	charcoal	115	Same	Qf_1	750 ± 40	730-655
B	shell	115	Top of buried organic soil, possible base of Qf_1	Qf_1	820 ± 40	790-675
C	soil	115	Same	Qf_1	1130 ± 40	1155-950
D	shell	230	Base of floodplain silt above buried organic mud; base of unit rich with reworked tephra	Qf_{2b}	5100 ± 40	5925-5740
E	shell	280	Base of organic mud overlying gravel	Qf_3?	8060 ± 40	9030-8980 8815-8805

Notes
1. Two-sigma calibrated age range in years before present.