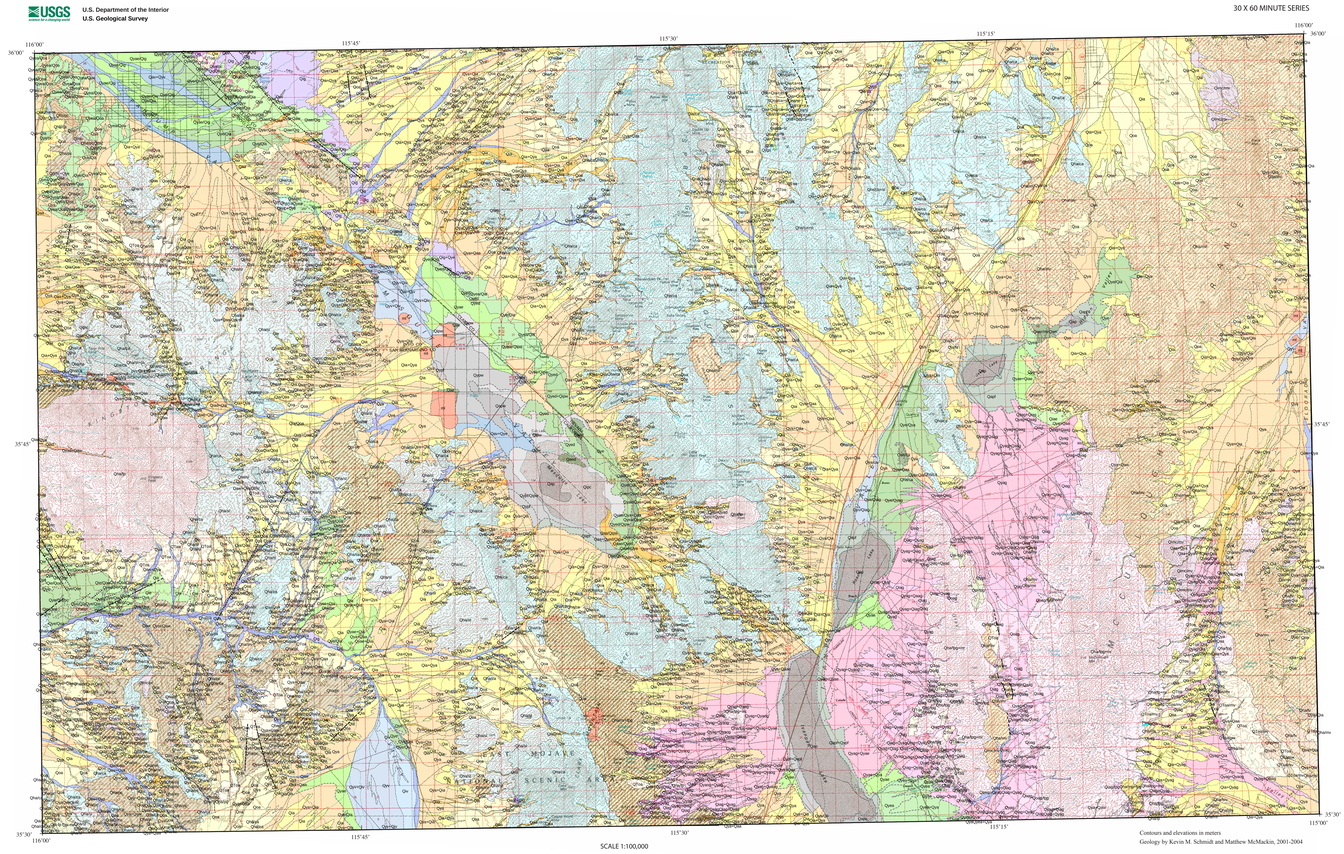
Open File Report 2006-1035
Pamphlet accompanies map
Preliminary Surficial Geologic map of the Mesquite Lake
30' X 60' quadrangle, California and Nevada
SHEET 1 OF 1



PRELIMINARY SURFICIAL GEOLOGIC MAP OF THE MESQUITE LAKE 30' X 60' QUADRANGLE, CALIFORNIA AND NEVADA

By

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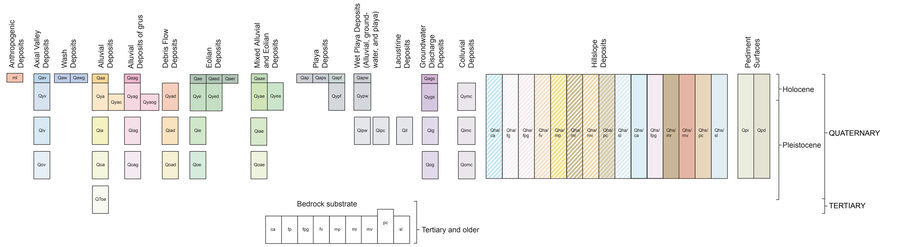
INDEX MAP

EXPLANATION

- anticline, approximately located
- anticline, inferred
- anticline, inferred, plunging
- contact, approximately located
- contact, certain
- contact, gradational
- fault, approximately located
- fault, certain
- fault, concealed
- fault, queried
- lineament, approximately located

CORRELATION OF MAP UNITS



LIST OF MAP UNITS

(Detailed descriptions of map units are in the accommpanying pamphlet.)

QUATERNARY SURFICIAL DEPOSITS

Anthropogenic deposits

- **af** — **Made land or artificial fill (latest Holocene)**

Axial valley deposits

- **Qav** — **Active valley-axis deposit (latest Holocene)**
- **Qyv** — **Young valley-axis deposit (Holocene and latest Pleistocene)**
- **Qiv** — **Intermediate valley-axis deposit (late and middle Pleistocene)**
- **Qov** — **Older valley-axis deposit (early Pleistocene)**

Wash deposits

- **Qaw** — **Active wash deposit (latest Holocene)– Includes:**
- **Qawg** — **Active wash deposit dominantly composed of grus (latest Holocene)**

Alluvial and debris flow deposits

- **Qaa** — **Active alluvial fan deposit (latest Holocene)– Includes:**
- **Qaag** — **Active alluvial fan deposit composed of grus (latest Holocene)**
- **Qya** — **Young alluvial fan deposit (Holocene and latest Pleistocene)– Includes:**
- **Qyao** — **Older young alluvial fan (early Holocene and latest Pleistocene)**
- **Qyag** — **Young alluvial fan deposit composed of grus (Holocene and latest Pleistocene)**
- **Qyaog** — **Older young alluvial fan composed of debris flow deposits and grus (early Holocene and latest Pleistocene)**
- **Qydf** — **Young alluvial fan composed of debris flow deposits (Holocene and latest Pleistocene)**
- **Qia** — **Intermediate alluvial fan deposit (late and middle Pleistocene)– Includes:**
- **Qiag** — **Intermediate alluvial fan deposit composed of grus (late and middle Pleistocene)**
- **Qiad** — **Intermediate alluvial fan composed of debris flow deposits (late and middle Pleistocene)**
- **Qoa** — **Old alluvial fan deposit (early and middle Pleistocene)– Includes:**
- **Qoag** — **Old alluvial fan deposit composed of grus (middle and early Pleistocene)**
- **Qoad** — **Old alluvial fan composed of debris flow deposits (middle and early Pleistocene)**
- **QTos** — **Oldest Quaternary–Tertiary alluvial fan deposit (early Pleistocene and Pliocene)**

Eolian deposits

- **Qae** — **Active eolian sand deposit (latest Holocene)– Includes:**
- **Qaed** — **Active eolian sand dune deposit (latest Holocene)**
- **Qaer** — **Active eolian sand ramp deposit (latest Holocene)**
- **Qye** — **Young eolian sand deposit (Holocene and latest Pleistocene)– Includes:**
- **Qyed** — **Young eolian sand dune deposit (Holocene and latest Pleistocene)**
- **Qie** — **Intermediate eolian sand deposit (late and middle Pleistocene)**
- **Qoe** — **Old eolian sand deposit (middle and early Pleistocene)**

Mixed alluvial and eolian deposits

- **Qiae** — **Active mixed alluvial and eolian sand deposit (latest Holocene)**
- **Qyae** — **Young mixed alluvial and eolian sand deposit (Holocene and latest Pleistocene)**
- **Qyea** — **Young mixed eolian sand and alluvial deposit (Holocene and latest Pleistocene)**
- **Qiae** — **Intermediate mixed alluvial and eolian sand deposit (late and middle Pleistocene)**
- **Qoae** — **Old mixed alluvial and eolian sand deposit (middle and early Pleistocene)**

Playa, wet playa, and groundwater discharge deposits

- **Qap** — **Active playa deposit (latest Holocene)– Includes:**
- **Qaps** — **Active playa sandy facies deposit (latest Holocene)**
- **Qapf** — **Active playa fringe deposit (latest Holocene)**
- **Qypf** — **Young playa fringe deposit (Holocene and latest Pleistocene)**
- **Qapw** — **Active wet playa deposit (latest Holocene)**
- **Qypw** — **Young wet playa deposit (Holocene and latest Pleistocene)**
- **Qipw** — **Intermediate wet playa deposit (late and middle Pleistocene)**
- **Qipc** — **Intermediate crystal body playa deposit (late and middle Pleistocene)**
- **Qil** — **Intermediate lacustrine deposit (late and middle Pleistocene)**

Groundwater discharge deposits

- **Qagd** — **Active groundwater discharge deposit (latest Holocene)**
- **Qygd** — **Young groundwater discharge deposit (Holocene and latest Pleistocene)**
- **Qigd** — **Intermediate groundwater discharge deposit (late and middle Pleistocene)**
- **Qogd** — **Old groundwater discharge deposit (middle and early Pleistocene)**

Colluvial and hillslope deposits

Hillslope environment– Hillslopes are characterized by patchy distribution of bare rock, thin deposits weathered from rock, and materials transported short distances by gravity and carried by water. Hillslope deposits are labeled uniformly regardless of the transport mechanism. The spatial distribution is typically irregular although thicker, aerially consistent units were distinguished as colluvium. Divided into:

- **Qcmc** — **Young colluvial deposit (Holocene and latest Pleistocene)**
- **Qimc** — **Intermediate colluvial deposit (late and middle Pleistocene)**
- **Qomc** — **Older colluvial deposit (middle and early Pleistocene)**
- **Qhaca** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying carbonate bedrock**
- **Qhafp** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying felsic plutonic bedrock**
- **Qhafpt** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying felsic plutonic bedrock that weather to grus**
- **Qhafv** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying felsic volcanic bedrock**
- **Qhamp** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying mafic plutonic bedrock**
- **Qhamv** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying metamorphic bedrock**
- **Qhamv** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying mafic volcanic bedrock**
- **Qhasc** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying partly consolidated bedrock**
- **Qhasi** — **Abundant hillslope deposit (Holocene and Pleistocene) overlying siliciclastic bedrock**
- **Qhsca** — **Sparse hillslope deposit (Holocene and Pleistocene) overlying carbonate bedrock**
- **Qhsfpt** — **Sparse hillslope deposit (Holocene and Pleistocene) overlying felsic plutonic bedrock that weather to grus**
- **Qhsfv** — **Sparse hillslope deposit (Holocene and Pleistocene) overlying felsic volcanic bedrock**
- **Qhsmv** — **Sparse hillslope deposit (Holocene and Pleistocene) overlying mafic volcanic bedrock**
- **Qhssc** — **Sparse hillslope deposit (Holocene and Pleistocene) overlying partly consolidated bedrock**
- **Qhssi** — **Sparse hillslope deposit (Holocene and Pleistocene) overlying siliciclastic bedrock**

Pediment surfaces– Gently-sloping erosional surfaces in various stages of erosion and burial. Generally forms in felsic granite that weathers to grus (fpg) and partly consolidated (pc) materials. Substrate materials indicated after hyphen (-) in unit symbol. Excellent examples of pediments can be found in the Kingston Range and northern Lucy Gray Mountains. Divided into two general classes defined by the degree of dissection:

- **Qpi-fp** — **Incised pediment in felsic plutonic rocks**
- **Qpi-fpg** — **Incised pediment in felsic plutonic rocks that weather to grus**
- **Qpi-mv** — **Incised pediment in metamorphic rocks**
- **Qpd-ca** — **Deeply dissected pediment in carbonate rocks**

Bedrock substrate materials

(Tertiary and older)– Shallowly buried rock and partly consolidated materials that lie under surficial deposits, and under pediment and hillslope veneers. Ages range from Pliocene to early Proterozoic. Bedlford and Miller (1998) is the primary source of digital bedrock mapping data. Bedrock in the western half of the quadrangle is taken largely from unpublished mapping of bedrock by McMackin. The following are subdivided into categories based on initial chemical composition, weathering characteristics, and erosional products. No color is shown for bedrock as units occur only with overlying Quaternary units (e.g., Qba/ca).

- **ca** — **Carbonate rocks**
- **fp** — **Felsic plutonic rocks**
- **fpg** — **Felsic plutonic rocks that weather to grus**
- **fv** — **Felsic volcanic rocks**
- **mp** — **Mafic plutonic rocks**
- **mv** — **Metamorphic rocks**
- **mv** — **Mafic volcanic rocks**
- **pc** — **Partly consolidated**
- **si** — **Siliciclastic rocks**

CLASSIFICATION OF MAP UNITS

Classification of the Quaternary geologic units presented here is based upon previous research by Yount and others (1994), and shares similarities with Birkeland, and others (1991) and Birkeland (1999), such that the first two characters in a label designate the relative age followed by a geomorphic process label and a subsequent modifier. The first letter is the period (Quaternary), the second letter is the relative age, the third letter is an abbreviation for the process type, and the fourth letter is reserved for an additional modifier of the process, age, or material. The relative ages of the units are sequentially presented beginning with the youngest surface or deposit. For example, a Qyx surface is "active", Qyx is "young", Qix is "intermediate", and Qvx is "old"; where x is a placeholder for deposit process or landscape position such as a (alluvium), e (eolian), or p (playa). Unless observed in the field and specifically mapped, it is possible that a given age geologic unit may be composed of a variety of subunits. For instance, alluvial units may have significant contributions from eolian or mass wasting deposits. Hence subunits such as mass wasting deposits are more common than represented, but could not be reliably deciphered from remote sensing techniques.

Active surfaces have received deposition within the last few decades (Qax) or centuries. They are characterized by loose sediment and are prone to flooding and sediment transport. They are typically unvegetated or moderately vegetated and have rough microtopography such as strongly developed bar and swale or debris-flow morphology such as lobes and levees. Active surfaces are small in area on alluvial fans and form discrete channels. Young surfaces (Qyx) are middle and early Holocene in age but are abandoned or receive sediment infrequently. They are characterized by loose to slightly compact sediments. Soil is thin and weakly developed and typically expressed as an incipient to weak, sandy vesicular horizon (Av), weak cambic horizon (Bw), and Stage I carbonate horizons (Bk to Bkm). Young surfaces are moderately vegetated, especially with shrubs, and have fairly smooth microtopography, with moderate to faint remnants of bar and swale topography. Although no desert pavement or incipient pavement is generally present, the surface clasts have incipient varnish. Intermediate surfaces (Qix) are late and middle Pleistocene in age and have been abandoned for tens to hundreds of thousands of years. Sediments can be loose but are commonly compact. On these intermediate surfaces, desert pavement is moderately to well-developed with moderate to strong varnish on surface clasts of alluvium, except at high altitude. Microtopography of the surface is flat, lacking the original depositional morphology, but may exhibit weak to moderate incision locally. Pedogenic soil is moderately to well-developed with a silty Av horizon, moderately to strongly developed Bt horizon and Stage I+ to III+ calcic horizon (Gile, 1966; 1965; Machette, 1985). Time-dependent processes such as pedogenesis, varnish development, and the vertical separation between units were best judged from field relations.

Unit descriptions presented in the pamphlet are formatted in the following general sequence of 1) grain size, size range, color, and composition, 2) sedimentary structures, rounding, consolidation, 3) surface morphology, 4) soil development, 5) inset relations with other units, 6) characteristic landforms and landscape positions, 7) vegetation characteristics, 8) human implications, and/or any diagnostic features. The following primary categories are grouped by depositional transport process with units presented from youngest to oldest.

Composite symbols

Surficial geologic units commonly exist as thin (<2 m) veneers over older units including bedrock. In areas where this relationship is common, the unit designators are shown on the map separated by a slash (/). The younger, or overlying, unit is indicated first. Thus, Qya/Qoa indicates an area where a veneer of young alluvial fan deposits overlies old alluvial fan deposits and Qya/Qpg indicates an area where a veneer of young alluvial fan deposits overlies felsic plutonic rock that weathers to grus. An example of Quaternary deposits over ca=al bedrock is depicted in Figure 4 of accompanying pamphlet.

The lateral extent of individual deposits is commonly so small that each deposit cannot be shown individually at the database map scale. Areas made up of deposits too small to show individually, are indicated by deposits (representing more than 20% of the area) separated by a plus sign (+), with the most common deposit listed first. Thus, Qya + Qia indicates an area with both Qya and Qia deposits and associated surfaces, and that Qya is more common than Qia; other deposits in the area compose less than 20%. Where a slash separates mixed units, the assemblage of mixed units combined by (+) sign are treated as a unit. For instance the unit Qaae/Qaa+Qya indicates that Qaae overlies the mixed unit Qaa+Qya. Similarly, Qia+Qya/Qaa indicates that the mixed unit Qia+Qya overlies Qaa.

See accompanying pamphlet for complete description of map units and cited references.
Geologic data also available as digital Geographic Information System files.

Not edited for U.S. Geological Survey cartographic standards
Digital map layout and cartography by Kevin M. Schmidt
Color and pattern selections on geologic map by Kevin M. Schmidt

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