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U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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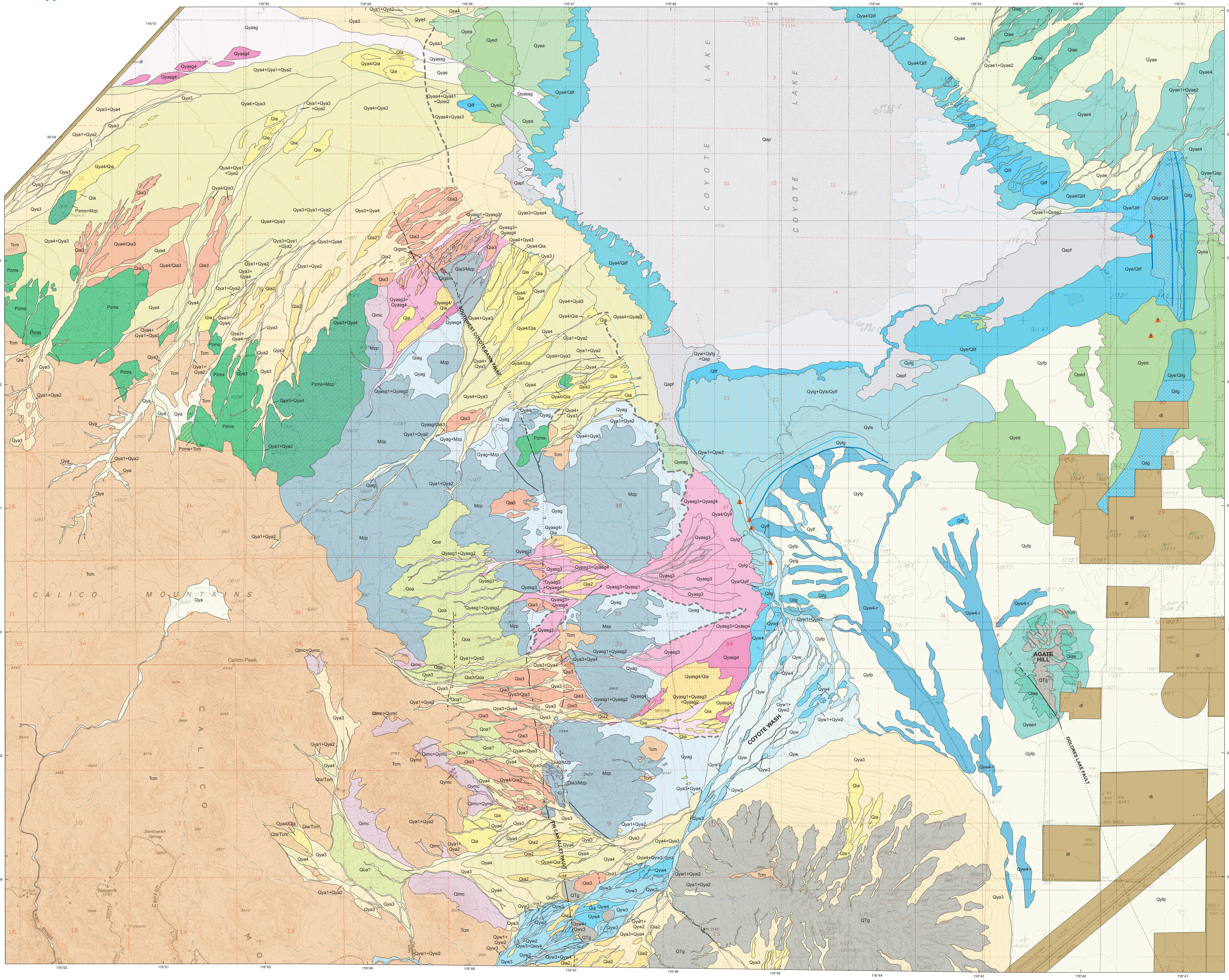
Pamphlet accompanies map
Surficial Geologic Map of a Calico Mountains Piedmont and Part of Coyote Lake, Mojave Desert, San Bernardino, California
1:24,000-scale quadrangles, California
SHEET 1 OF 1



Base from U.S. Geological Survey, 1:24,000, Coyote Lake, 1986; Alvord Mountains West, 1986 ; Yermo, 1970 and Harvard Hill, 1982 CA

Universal Transverse Mercator Projection
1983 North American Datum
Transverse Mercator, Zone 11

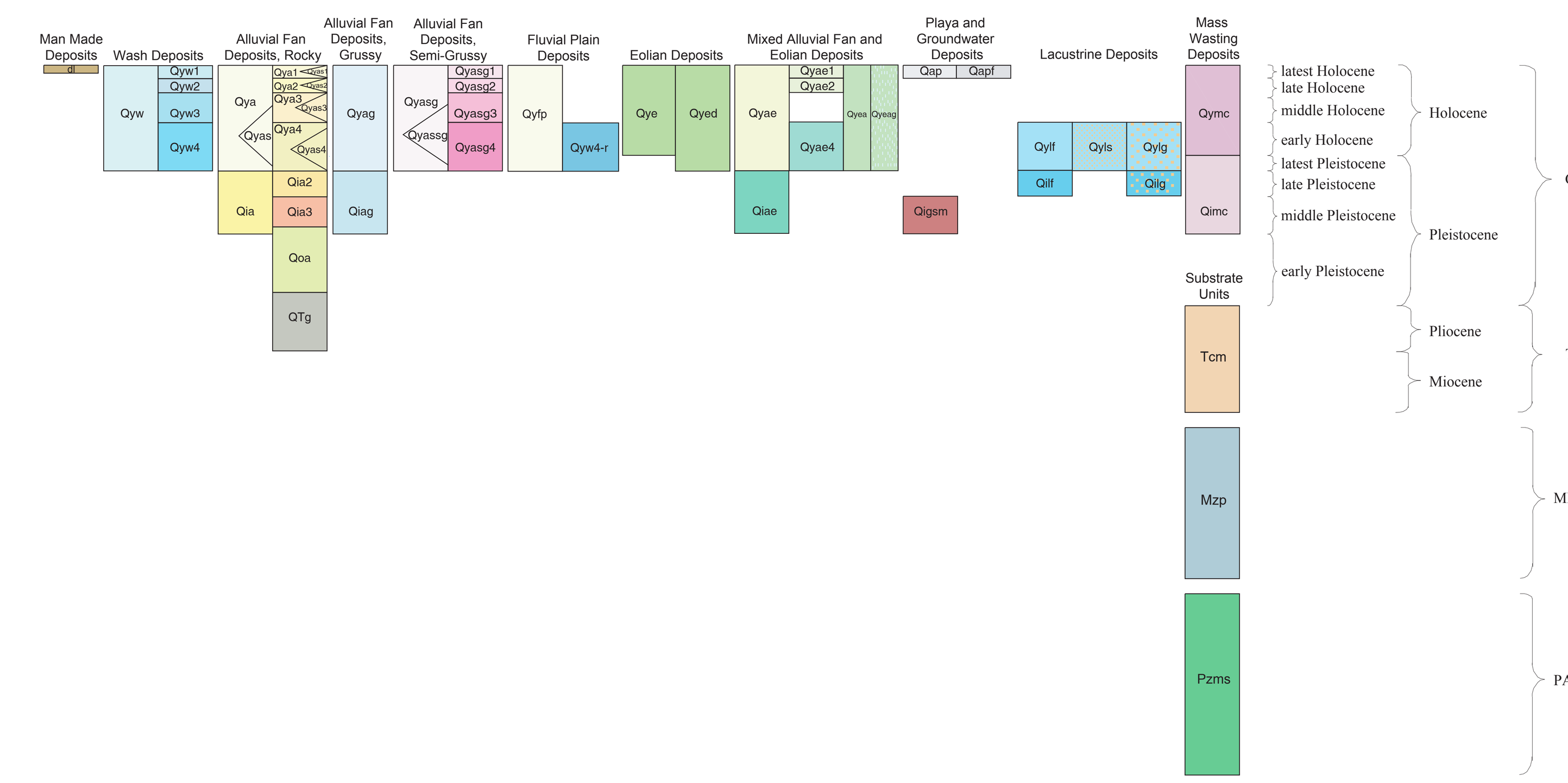
TRUE NORTH — MAGNETIC NORTH — 15½°
APPROXIMATE MEAN DECLINATION, 1993

SCALE 1:24 000
1 — 1/2 — 0 — 1 MILE
1 — .5 — 0 — 1 KILOMETER
CONTOUR INTERVAL 10, 20 AND 40 FEET

CALIF
QUADRANGLE LOCATION

Geology mapped in 2003-2005 by Stephanie L. Dudash
Digital database by Stephanie L. Dudash

CORRELATION OF MAP UNITS



LIST OF MAP UNITS

Man Made Deposits

- dl — Disturbed land (Recent)

Wash Deposits

- Qyw — Young wash deposits, undifferentiated (Holocene to latest Pleistocene)
- Qyw1 — Young wash deposits, unit 1 (latest Holocene)
- Qyw2 — Young wash deposits, unit 2 (late Holocene)
- Qyw3 — Young wash deposits, unit 3 (late to middle Holocene)
- Qyw4 — Young wash deposits, unit 4 (early Holocene to latest Pleistocene)
- Qyw1+Qyw2 — Young wash deposits, units 1 and 2 (latest to late Holocene)
- Qyw3+Qyw4 — Young wash deposits, units 3 and 4 (late Holocene to latest Pleistocene)
- Qyw4+Qyw3 — Young wash deposits, units 4 and 3 (late Holocene to latest Pleistocene)
- Qyw+Qylg+Qap — Young wash deposits, undifferentiated + young lacustrine gravels + active playa deposits (Holocene to latest Pleistocene)

Alluvial Fan Deposits, Rocky

- Qya — Young alluvial fan deposits, undifferentiated (Holocene to latest Pleistocene)
- Qyas — Young alluvial fan deposits, sandy matrix, undifferentiated (Holocene to latest Pleistocene)
- Qya1 — Young alluvial fan deposits, unit 1 (latest Holocene)
- Qyas1 — Young alluvial fan deposits, sandy matrix, unit 1 (latest Holocene)
- Qya2 — Young alluvial fan deposits, unit 2 (late Holocene)
- Qyas2 — Young alluvial fan deposits, sandy matrix, unit 2 (late Holocene)
- Qya3 — Young alluvial fan deposits, unit 3 (late to middle Holocene)
- Qyas3 — Young alluvial fan deposits, sandy matrix, unit 3 (late to middle Holocene)
- Qya4 — Young alluvial fan deposits, unit 4 (early Holocene to latest Pleistocene)
- Qyas4 — Young alluvial fan deposits, sandy matrix, unit 4 (early Holocene to latest Pleistocene)
- Qia — Intermediate alluvial fan deposits, undifferentiated (late to middle Pleistocene)
- Qia2 — Intermediate alluvial fan deposits, unit 2 (late Pleistocene), queried where age uncertain
- Qia3 — Intermediate alluvial fan deposits, unit 3 (middle Pleistocene)
- Qoa — Old alluvial fan deposits (middle to early Pleistocene), queried where age uncertain
- QTg — Gravel (early Pleistocene to Pliocene)
- Qya/Qylf — Young alluvial fan deposits over young lacustrine fines (Holocene to latest Pleistocene)
- Qya/Qilf — Young alluvial fan deposits, undifferentiated over intermediate lacustrine fines (Holocene to late Pleistocene)
- Qya1+Qya2 — Young alluvial fan deposits, units 1 and 2 (latest to late Holocene)
- Qya3+Qya1+Qya2 — Young alluvial fan deposits, units 3, 1, and 2 (latest to middle Holocene)
- Qya3+Qya4 — Young alluvial fan deposits, units 3 and 4 (late Holocene to latest Pleistocene)
- Qyas3+Qyas4 — Young alluvial fan deposits, sandy matrix, units 3 and 4 (late Holocene to latest Pleistocene)
- Qya3/Qia3 — Young alluvial fan deposits, unit 3 over intermediate alluvial fan deposits, unit 3 (late to middle Holocene and middle Pleistocene)
- Qya4+Qya1+Qya2 — Young alluvial fan deposits, units 4, 1, and 2 (latest Holocene to latest Pleistocene)
- Qya4+Qya3 — Young alluvial fan deposits, units 4 and 3 (late Holocene to latest Pleistocene)
- Qyas4+Qyas1+Qyas2 — Young alluvial fan deposits, sandy matrix, units 4, 1, and 2 (latest Holocene to latest Pleistocene)
- Qyas4+Qyas3 — Young alluvial fan deposits, sandy matrix, units 4 and 3 (late Holocene to latest Pleistocene)
- Qya4/Qia — Young alluvial fan deposits, unit 4 over intermediate alluvial fan deposits (early Holocene to middle Pleistocene)
- Qya4/Qia3 — Young alluvial fan deposits, unit 4 over intermediate alluvial fan deposits, unit 3 (early Holocene to latest Pleistocene and middle Pleistocene)
- Qya4/Qylf — Young alluvial fan deposits, unit 4 over young lacustrine fines (early Holocene to latest Pleistocene)
- Qya4/Qilf — Young alluvial fan deposits, unit 4 over intermediate lacustrine fines (early Holocene to late Pleistocene)
- Qia/Tcm — Intermediate alluvial fan deposits over rocks of the Calico Mountains (late to middle Pleistocene and Tertiary)
- Qia3/Qoa — Intermediate alluvial fan deposits, unit 3 over old alluvial fan deposits (middle to early Pleistocene)
- Qia3/Mzp — Intermediate alluvial fan deposits, unit 3 over plutonic rocks (middle Pleistocene and Mesozoic)

Alluvial Fan Deposits, Grussy

- Qyag — Young alluvial fan deposits composed of grus, undifferentiated (Holocene to latest Pleistocene)
- Qiag — Intermediate alluvial fan deposits composed of grus, undifferentiated (late to middle Pleistocene)
- Qyag+Mzp — Young alluvial fan deposits composed of grus, undifferentiated and plutonic rocks (Holocene to latest Pleistocene and Mesozoic)

Alluvial Fan Deposits, Semi-Grussy

- Qyasg — Young alluvial fan deposits composed of semi-grus, undifferentiated (Holocene to latest Pleistocene)
- Qyassg — Young alluvial fan deposits composed of semi-grus, undifferentiated, sandy matrix (Holocene to latest Pleistocene)
- Qyasg1 — Young alluvial fan deposits composed of semi-grus, unit 1 (late to middle Holocene)
- Qyasg2 — Young alluvial fan deposits composed of semi-grus, unit 2 (late to middle Holocene)
- Qyasg3 — Young alluvial fan deposits composed of semi-grus, unit 3 (late to middle Holocene)
- Qyasg4 — Young alluvial fan deposits composed of semi-grus, unit 4 (early Holocene to latest Pleistocene)
- Qyasg/Qia3 — Young alluvial fan deposits composed of semi-grus over intermediate alluvial fan deposits (Holocene to latest Pleistocene and middle Pleistocene)
- Qyasg1+Qyasg2 — Young alluvial fan deposits composed of semi-grus, units 1 and2 (latest to late Holocene)
- Qyasg1+Qyasg3+Qyasg2 — Young alluvial fan deposits composed of semi-grus, units 1, 3, and 2 (latest to middle Holocene)
- Qyasg3+Qyasg1 — Young alluvial fan deposits composed of semi-grus, units 3 and 1 (latest to middle Holocene)
- Qyasg3+Qyasg4 — Young alluvial fan deposits composed of semi-grus, units 3 and 4 (late Holocene to latest Pleistocene)
- Qyasg4/Qia — Young alluvial fan deposits composed of semi-grus, unit 4 over intermediate alluvial fan deposits (early Holocene to middle Pleistocene)

Fluvial Plain Deposits

- Qyfp — Young fluvial plain deposits (Holocene to latest Pleistocene)
- Qyw4-r — Young relict wash deposits, unit 4 (early Holocene to latest Pleistocene)

Eolian Deposits

- Qye — Young eolian sand deposits (Holocene)
- Qyed — Young eolian dune deposits (Holocene to latest Pleistocene)
- Qye/Qilf — Young eolian sand over intermediate lacustrine fines (Holocene and late Pleistocene)
- Qye/Qilg — Young eolian sand over intermediate lacustrine gravels (Holocene and late Pleistocene)

Mixed Alluvial Fan and Eolian Deposits

- Qyae — Young mixed alluvial fan and eolian deposits, undifferentiated (Holocene to latest Pleistocene)
- Qyae1 — Young mixed alluvial fan and eolian deposits, unit 1 (latest Holocene)
- Qyae2 — Young mixed alluvial fan and eolian deposits, unit 2 (late Holocene)
- Qyae4 — Young mixed alluvial fan and eolian deposits, unit 4 (early Holocene to latest Pleistocene)
- Qyea — Young mixed eolian and alluvial fan deposits, undifferentiated (Holocene to latest Pleistocene)
- Qyeag — Young mixed eolian and alluvial fan deposits composed of grus, undifferentiated (Holocene to latest Pleistocene)
- Qiae — Intermediate mixed alluvial fan and eolian deposits, undifferentiated (late to middle Pleistocene)
- Qyae/Qap — Young mixed alluvial fan and eolian deposits over active playa (Holocene to latest Pleistocene)
- Qyae1+Qyae2 — Young mixed alluvial fan and eolian deposits, units 1 and 2 (latest to late Holocene)

Playa, Groundwater, and Lacustrine Deposits

- Qap — Active playa deposits (latest Holocene)
- Qapf — Active playa fringe deposits (latest Holocene)
- Qigsm — Intermediate groundwater-discharge spring mound deposits (middle Pleistocene)
- Qylf — Young lacustrine fines (early Holocene to latest Pleistocene)
- Qyls — Young lacustrine sand (early Holocene to latest Pleistocene)
- Qylg — Young lacustrine gravel (early Holocene to latest Pleistocene)
- Qilf — Intermediate lacustrine fines (latest to late Pleistocene)
- Qilg — Intermediate lacustrine gravels (latest to late Pleistocene)
- Qylg+Qyls/Qylf — Young lacustrine gravel + young lacustrine sand over young lacustrine fines (early Holocene to latest Pleistocene)
- Qilg/Qilf — Intermediate lacustrine gravel over intermediate lacustrine fines (latest to late Pleistocene)

Mass Wasting Deposits

- Qymc — Young colluvial deposits (Holocene)
- Qimc — Intermediate colluvial deposits (latest to middle Pleistocene)
- Qimc+Qymc — Intermediate and young colluvial deposits (Holocene to middle Pleistocene)

Substrate

- Tcm — Rocks of the Calico Mountains undivided (Tertiary)
- Mzp — Plutonic rocks (Mesozoic)
- Pzms — Metamorphosed sedimentary rocks (Paleozoic)
- Pzms+Tcm — Rocks of Calico Mountains and metamorphosed sedimentary rocks (Tertiary and Paleozoic)
- Pzms+Mzp — Metamorphosed sedimentary rocks and plutonic rocks (Paleozoic and Mesozoic)

Surficial geologic deposits commonly exist as thin (<2 m) veneers over older units. Where this relation is common, the unit designators are shown separated by a slash (/). Indicated first is the younger or overlying deposit. Qya/Qoa, for example, indicates an area where a veneer of young alluvial fan deposits overlies old alluvial fan deposits and Qya/Mzp indicates an area where a veneer of young alluvial fan deposits overlies Mesozoic plutonic rocks.

The lateral extent of individual deposits is commonly so small that each deposit cannot be shown individually at the map scale. Such areas 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 that Qya is more common than Qia; other deposits in the area comnprise less than 20%.

The mixed deposit (Qya3+Qya4) color convention shows the color of the more common deposit. Mixed deposits that exist as a thin veneer (Qya/Mzp) have the background color of the underlying unit and a pattern with the color of the overlying unit.

EXPLANATION

- **Contact**—All alluvial unit contacts are considered approximately located; gray dashed line where gradational
- **Fault**—Dashed where inferred or approximately located; dotted where concealed
- **Fault queried**—Dotted where concealed
- **Erosional shoreline**—Dotted where concealed
- **Beach barrier crest**
- **Geochronology sample**—Showing map reference number (Table 1)

Table 1. Uncalibrated radiocarbon ages from samples of Anodonta shells collected by D. Miller and S. Dudash.

FIELD SAMPLE NO.	LAB SAMPLE NO.	MAP REFERENCE NO.	UTM COORDINATES	DEPOSITIONAL ENVIRONMENT	^{14}C AGE
SD04CL-1381a	WW5146	7	528542, 3877714	lacustrine sand	15707±45
SD04CL-1381b	WW5147	7	528542, 3877714	lacustrine sand	15910±45
SD04CL-1381c	WW5519	7	528542, 3877714	lacustrine sand	19680±70
SD04CL-1380a	WW5145	8	528440, 3877482	lacustrine sand	15805±45
SD04CL-1337a	WW5144	5	522748, 3874088	lacustrine sand	15100±45
M03SM-1664	WW4562	6	528449, 3878975	sandy mud	19660±70
M055M-2474	WW5355	6	528459, 3878999	sand and gravel	15590±45
M055M-2464	WW5354	3	522443, 3874733	lacustrine sand	13810±35
M055M-2462	WW5353	4	522475, 3874610	lacustrine sand	14335±40
M055M-2418A	WW5351	5	522748, 3874088	lacustrine sand	15825±45
M055M-2418B	WW5352	5	522748, 3874088	lacustrine sand	16175±45
M03SM-1686	WW4564	2	522298, 3875015	sandy mud	13145±45

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By
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