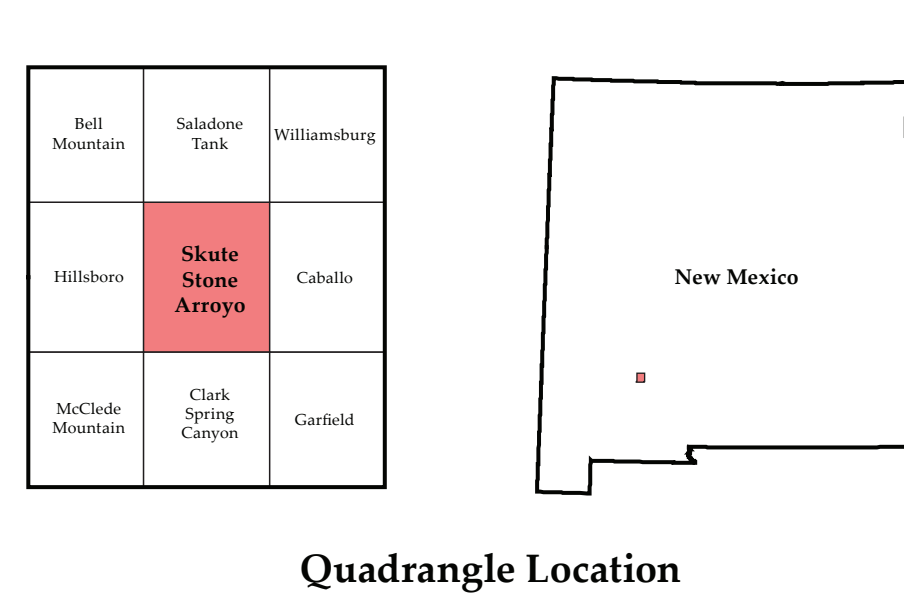
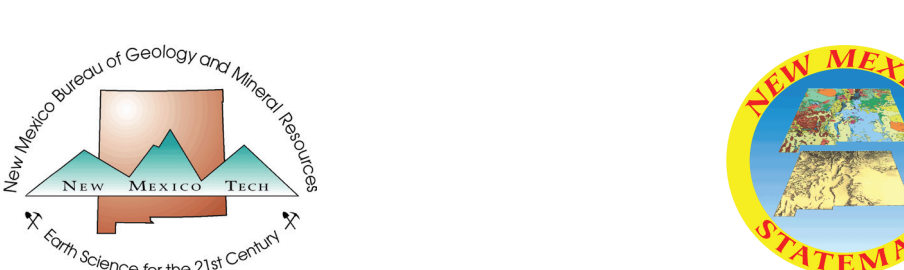


Base map from U.S. Geological Survey 2010.
North American Datum of 1983 (NAD83) World Geodetic System of 1984 (WGS84).
Projection and 1000-meter grid: Universal Transverse Mercator, Zone 13S.
100,000-foot base: New Mexico Coordinate System of 1983 (NMCS83), datum: NAD83.
Roads: ©2006-2010 TomTom
Hydrography: National Hydrography Dataset, 2006
Contours: National Elevation Dataset, 2006



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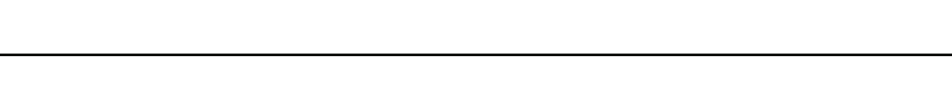
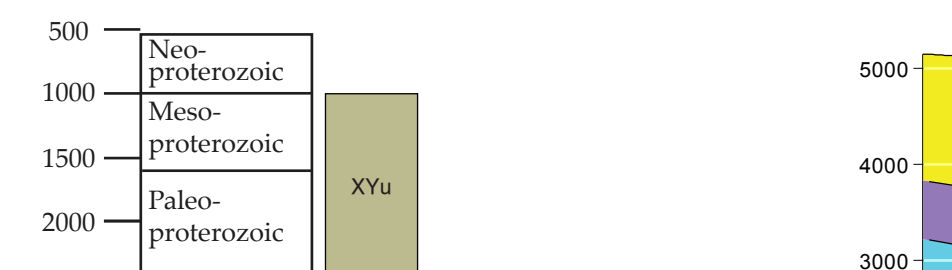
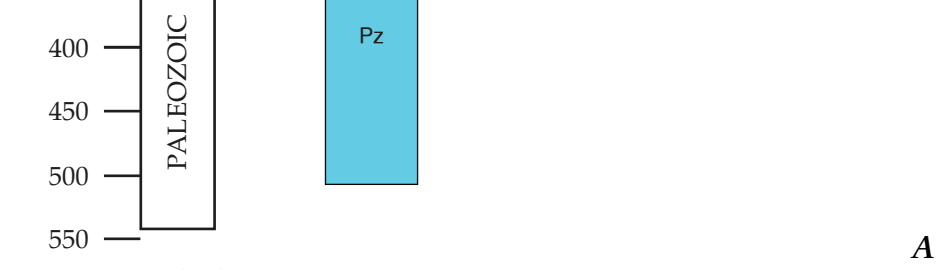
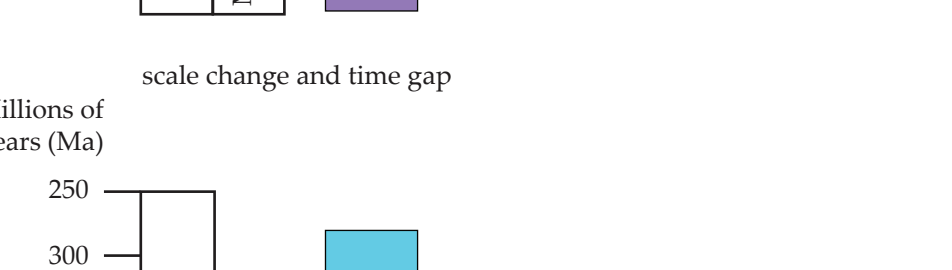
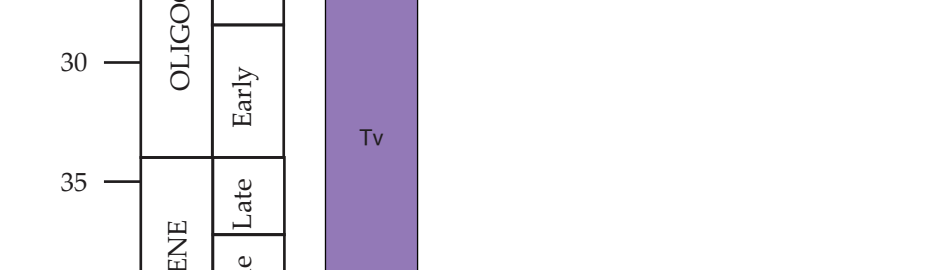
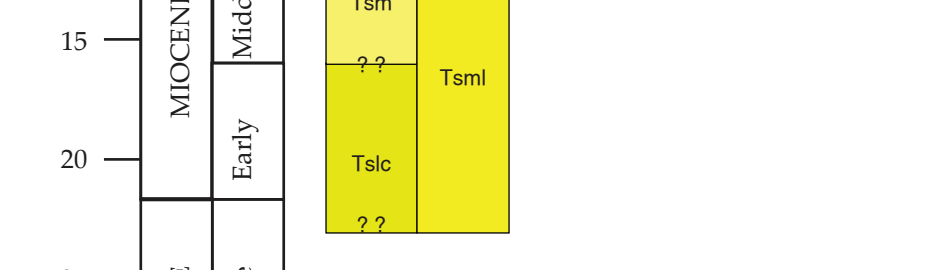
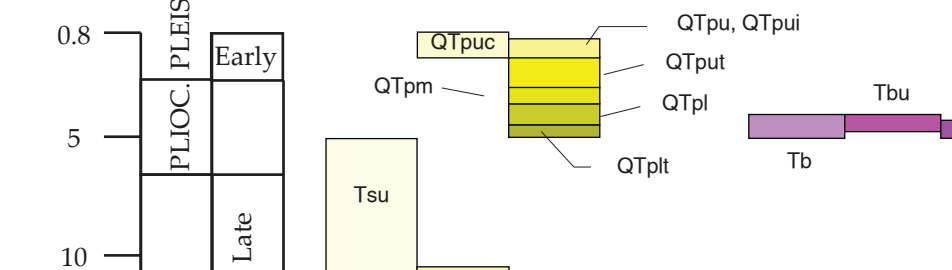
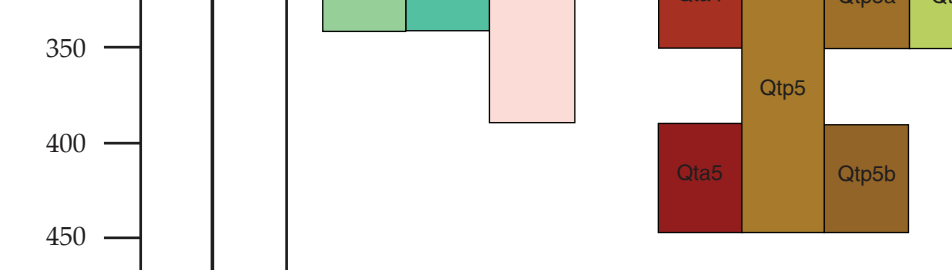
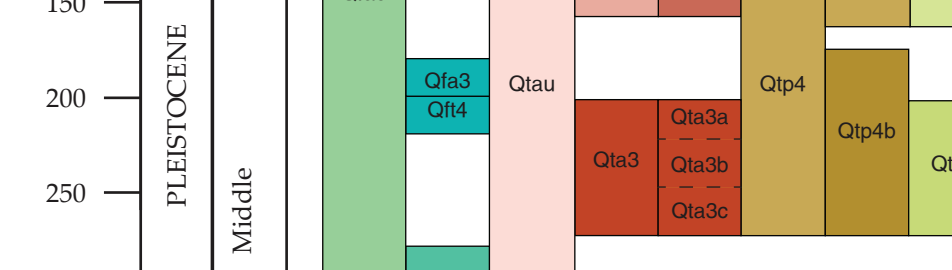
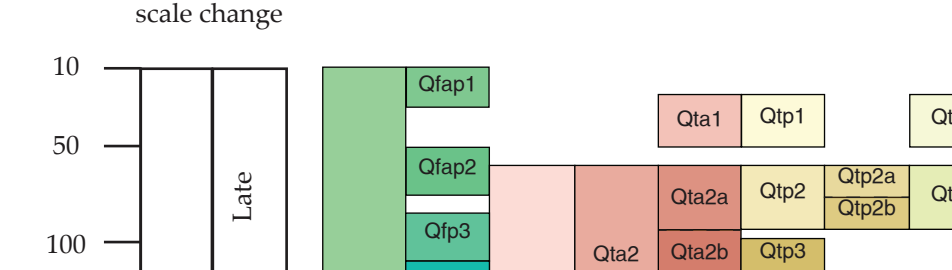
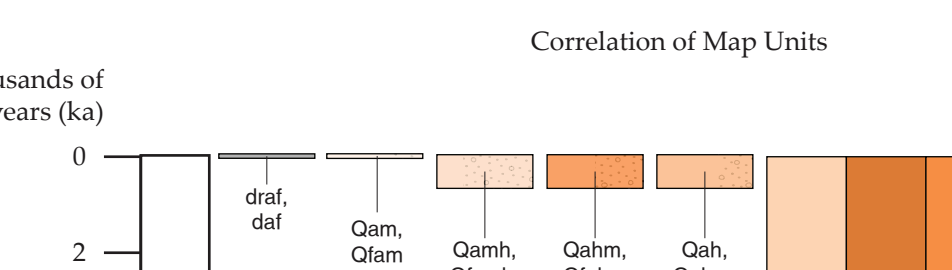
Geologic Map of the Skute Stone Arroyo 7.5-Minute Quadrangle, Sierra County, New Mexico

by
Koning, Daniel J.; Jochems, Andrew P.; Cikoski, Colin T.

New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Place, Socorro, NM 87801

Explanation of Map Symbols

- Contact—Identify and existence certain, location accurate where solid and approximate where dashed. Identify and existence questionable where queried.
- Gradational contact—Identify and existence certain, location accurate where solid and approximate where dashed.
- Normal fault—Identify and existence certain, location accurate where solid, approximate where long dashed, inferred where short dashed, contacts where dotted. Location and existence questionable where queried.
- Scarp on normal fault—Identify and existence certain, location accurate where solid and approximate where dashed. Identify and existence questionable where queried.
- Horizontal bedding
- Inclined bedding
- Inclined fault (2nd option)
- Vertical or near-vertical fault (1st option)
- Inclined slickline, groove, or striation on fault surface (1st option)
- Minor inclined joint (1st option)
- Sediment transport direction determined from crossbeds
- Sediment transport direction determined from imbrication
- Fluvial transport direction
- Sample locality—location of radiometrically dated sample
- Sample locality—Showing sample number
- Dike (1st option)—Identify and existence certain, location accurate
- Cross section line
- Label Leader: circle indicates inclusion in the label.



Description of Map Units

(full unit descriptions can be found in Appendix I)

- Anthropogenic**
 - dam-related artificial fill**—Valley bottom sand and gravel that has been moved by humans to form dams for impounding water or tailings.
 - Dredging-related sandy**—Sandy pebbles and cobbles in mounds, usually conical shaped, or in rows that are up to 5 m tall; these are the product of gold panner dredging along modern valley floors in the northwest part of the quadrangle.
- Sedimentary**
 - Modern alluvium**—Coarse sand and gravel underlying the floors of active channels. Sedimentary characteristics similar to those of unit Qm. Gravel comprised of pebbles with 15-30% cobbles and 10-15% boulders. Sand is mostly medium to very coarse grained. Surface is unvarnished and exhibits much bar-and-swale relief. Inferred scoured basal contact and an estimated thickness of 1.5 m.
 - Modern and historical alluvium, undivided**—Modern alluvium (Qm) and subordinate historical alluvium (Qh). See detailed descriptions of these individual units.
 - Modern and younger alluvium, undivided**—Active alluvium and subordinate younger alluvium. See descriptions for Qm and Qm.
 - Historical alluvium**—Valley floor sediment typically displaying well-defined beds of pebbly sand and sandy gravel. Very weakly developed topsoil, a weak Stage I calcic horizon. Surface has distinct bar-and-swale relief (10-30 cm) and no- to very weak-clast varnishing. Gravel consist of pebbles, subordinate cobbles, and lesser boulders (0-5%). Sand is brown and mostly medium to very coarse grained. 2.4 m thick.
 - Historical alluvium in Animas and Pechra Creeks**—Interbedded floodplain deposits and channelfills underlying much of Animas Creek and Pechra Creek valleys. Floodplain deposits consist of very fine to medium-grained sand, silty-clay, very fine to medium-grained sand, and silt. Channel-fills consist of sandy gravel and pebbly sand. Tread commonly lies 1-2 m above modern stream grade. No to very weak surface clast varnishing. 2.40 m thick.
 - Historical and subordinate modern alluvium, undivided**—Historical alluvium (Qh) and subordinate modern alluvium (Qm). See detailed descriptions of these individual units.
 - Historical alluvium and younger alluvium, undivided**—Historical alluvium (Qh) and subordinate younger alluvium (Qm). See detailed descriptions of these individual units.
 - Recent alluvium (historical + modern)**—Valley-floor sediment that includes subequal proportions of historical (Qh) and modern alluvium (Qm). See detailed descriptions of these individual units.
 - Recent alluvium (historical + modern) and younger alluvium, undivided**—Recent alluvium (Qh and Qm) grouped together as a "recent" deposit and subordinate younger alluvium (Qm). See detailed descriptions of these individual units.
 - Younger alluvium, undivided**—Brown, relatively fine sand interbedded with subequal to minor gravelly beds. Mostly sandy gravel in small, steep canyons. Compared to Qh bedding is slightly less distinct (because of bioturbation or weak cumulate soil development) and the deposit has more sand beds comparably less bar-and-swale relief and surface clasts are weakly varnished. Weakly consolidated and 1.4 m thick.
 - Younger alluvium and modern alluvium, undivided**—Younger alluvium and subordinate active alluvium, the latter typically occupying an incised channel. See descriptions for Qm and Qm above.
 - Younger alluvium and historic alluvium, undivided**—Younger alluvium and subordinate historic alluvium. See descriptions for Qm and Qm above.
 - Younger alluvium and modern alluvium (historical + modern) alluvium, undivided**—Younger alluvium (Qm) and subordinate historic and modern alluvium (Qh and Qm) grouped together as a "recent" deposit. See descriptions for these individual units.

Hillslope and Valley Margin Deposits (Quaternary)

Hillslope Deposits

Older colluvium—Sandy pebble-cobble gravel with a brown (ZYR 5.0-4) matrix. Found along Pechra Creek in west part of quad. Gravel consist of 85-95% pebbles and 5-15% cobbles that are matrix-supported, angular to subrounded, and poorly sorted. Pebbles commonly aligned in slope-parallel fabric, particularly in upper 1.5-2 m. Deposit is graded to fine-grained valley fill stop Qp1. Unconsolidated and ~9 m thick.

Modern alluvium on alluvial fans—Modern alluvium deposited on alluvial fans. Very thin to thin beds and common clay imbrication. No surface clast varnishing. No topsoil. 0.50 m of surface relief due to channel forms, bars, and pebble-boulder sieve deposits. Weak to moderate-vegetative cover with larger plants showing signs of burial. Unit commonly progresses over historic valley fill stop Qp1. Unconsolidated and ~3 m thick.

Modern and historic alluvium on alluvial fans—Modern alluvium (Qm) and subordinate historical alluvium (Qh) deposited on alluvial fans. See descriptions of Qm and Qh. <1 m thick.

Historical alluvium on alluvial fans—Sandy gravel and subordinate gravely sand deposited on alluvial fans. Very thin to medium-lenticular beds that slope away from fan apex. Surface exhibits up to 1 ft of bar-and-swale relief and is commonly cobbly. Soil development not evident or very weak with thin CaCO3 precipitation around clasts and weak ped development. Weakly consolidated. Mostly 1.3 m thick.

Recent alluvium (modern + historic) on alluvial fans—Alluvial fan sediment that includes subequal proportions of historical (Qh) and modern alluvium (Qm). See detailed descriptions of these individual units.

Historical and modern alluvium on alluvial fans, undivided—Historical alluvium (Qh) and subordinate modern alluvium (Qm) deposited on alluvial fans. See descriptions of Qh and Qm. <1 m thick.

Historic and younger alluvium in alluvial fans, undivided—Historic alluvium (Qh) and subordinate younger alluvium (Qm) deposited on alluvial fans. See descriptions of Qh and Qm. <1 m thick.

Recent alluvium (historical + modern) and younger alluvium in alluvial fans, undivided—Historic and modern alluvium (Qh and Qm) and younger alluvium (Qm) grouped together as a "recent" deposit and subordinate younger alluvium (Qm) deposited on alluvial fans. See descriptions of Qh, Qm, and Qm. Up to ~50 m thick.

Younger alluvium on alluvial fans—Alluvial fan sediment composed of interbedded sandy gravel with minor to subequal fine-dominated sand; gravelly sand to sandy gravel at the mouths of small steep gullies. Surface is generally eroded and lacks a notable soil (no more than stage I morphology). Surface exhibits subequal to no bar and swale topography (>20 cm relief), weak clast varnishing, and a weak desert pavement. Up to ~6 m thick.

Younger alluvium and modern alluvium on alluvial fans—Younger alluvium (Qm) and subordinate modern alluvium (Qm) deposited on alluvial fans. See descriptions of Qm and Qm. Up to ~6 m thick.

Younger alluvium and historic alluvium on alluvial fans—Younger alluvium (Qm) and subordinate historic alluvium (Qh) deposited on alluvial fans. See descriptions of Qm and Qh. Up to ~6 m thick.

Younger alluvium and recent (modern + historic) alluvium on alluvial fans—Younger alluvium (Qm) and subordinate recent alluvium (grouped modern and historic alluvium, Qm and Qh) deposited on alluvial fans. See descriptions of Qm, Qh, and Qm. Up to ~6 m thick.

Older alluvium on alluvial fans, undivided—Alluvial fan with sandy gravel and sand. Gravel is subrounded (mostly to rounded), very poorly sorted, and consists of pebbles, cobbles, and 25% boulders. Surface clasts are moderately to well varnished. 1.00 m thick.

Older alluvial fan deposits whose surfaces grade to the trends of terrace deposits Qp2 and Qp1—Alluvial fan sandy gravel and gravelly sand that have progressed over the trends of the lower terraces in Animas and Pechra Creeks. Qp1 and Qp1. 1.4 m thick.

Older alluvial fan deposits whose surfaces grade to the trends of terrace deposits Qp2 and Qp1—Alluvial fan sandy gravel (minor pebbly sand) in vogue, thin to medium, lenticular to tabular beds. Gravel comprised of pebbles with 25-45% cobbles. 10-15% fine boulders. Matrix consists of brown (ZYR 5.0-4), very fine to very coarse-grained sand with 5-7% clay-silt. Subequal matrix vs. clast-supported (imbricated) beds. Moderately consolidated. Surface is commonly eroded. 1.3 m thick.

Older alluvial fan deposits whose surfaces grade to the trends of terrace deposits Qp2 and Qp1—Alluvial fan sandy gravel (minor pebbly sand) in vogue, thin to medium, lenticular to tabular beds. Gravel comprised of pebbles with 25-45% cobbles. 10-15% fine boulders. Matrix consists of brown (ZYR 5.0-4), very fine to very coarse-grained sand with 5-7% clay-silt. Subequal matrix vs. clast-supported (imbricated) beds. Moderately consolidated. Surface is commonly eroded. 1.3 m thick.

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Valley Floor Deposits (Quaternary)

- Anthropogenic**
 - dam-related artificial fill**—Valley bottom sand and gravel that has been moved by humans to form dams for impounding water or tailings.
 - Dredging-related sandy**—Sandy pebbles and cobbles in mounds, usually conical shaped, or in rows that are up to 5 m tall; these are the product of gold panner dredging along modern valley floors in the northwest part of the quadrangle.
- Sedimentary**
 - Modern alluvium**—Coarse sand and gravel underlying the floors of active channels. Sedimentary characteristics similar to those of unit Qm. Gravel comprised of pebbles with 15-30% cobbles and 10-15% boulders. Sand is mostly medium to very coarse grained. Surface is unvarnished and exhibits much bar-and-swale relief. Inferred scoured basal contact and an estimated thickness of 1.5 m.
 - Modern and historical alluvium, undivided**—Modern alluvium (Qm) and subordinate historical alluvium (Qh). See detailed descriptions of these individual units.
 - Modern and younger alluvium, undivided**—Active alluvium and subordinate younger alluvium. See descriptions for Qm and Qm.
 - Historical alluvium**—Valley floor sediment typically displaying well-defined beds of pebbly sand and sandy gravel. Very weakly developed topsoil, a weak Stage I calcic horizon. Surface has distinct bar-and-swale relief (10-30 cm) and no- to very weak-clast varnishing. Gravel consist of pebbles, subordinate cobbles, and lesser boulders (0-5%). Sand is brown and mostly medium to very coarse grained. 2.4 m thick.
 - Historical alluvium in Animas and Pechra Creeks**—Interbedded floodplain deposits and channelfills underlying much of Animas Creek and Pechra Creek valleys. Floodplain deposits consist of very fine to medium-grained sand, silty-clay, very fine to medium-grained sand, and silt. Channel-fills consist of sandy gravel and pebbly sand. Tread commonly lies 1-2 m above modern stream grade. No to very weak surface clast varnishing. 2.40 m thick.
 - Historical and subordinate modern alluvium, undivided**—Historical alluvium (Qh) and subordinate modern alluvium (Qm). See detailed descriptions of these individual units.
 - Historical alluvium and younger alluvium, undivided**—Historical alluvium (Qh) and subordinate younger alluvium (Qm). See detailed descriptions of these individual units.
 - Recent alluvium (historical + modern)**—Valley-floor sediment that includes subequal proportions of historical (Qh) and modern alluvium (Qm). See detailed descriptions of these individual units.
 - Recent alluvium (historical + modern) and younger alluvium, undivided**—Recent alluvium (Qh and Qm) grouped together as a "recent" deposit and subordinate younger alluvium (Qm). See detailed descriptions of these individual units.
 - Younger alluvium, undivided**—Brown, relatively fine sand interbedded with subequal to minor gravelly beds. Mostly sandy gravel in small, steep canyons. Compared to Qh bedding is slightly less distinct (because of bioturbation or weak cumulate soil development) and the deposit has more sand beds comparably less bar-and-swale relief and surface clasts are weakly varnished. Weakly consolidated and 1.4 m thick.
 - Younger alluvium and modern alluvium, undivided**—Younger alluvium and subordinate active alluvium, the latter typically occupying an incised channel. See descriptions for Qm and Qm above.
 - Younger alluvium and historic alluvium, undivided**—Younger alluvium and subordinate historic alluvium. See descriptions for Qm and Qm above.
 - Younger alluvium and modern alluvium (historical + modern) alluvium, undivided**—Younger alluvium (Qm) and subordinate historic and modern alluvium (Qh and Qm) grouped together as a "recent" deposit. See descriptions for these individual units.

Hillslope and Valley Margin Deposits (Quaternary)

Hillslope Deposits

Older colluvium—Sandy pebble-cobble gravel with a brown (ZYR 5.0-4) matrix. Found along Pechra Creek in west part of quad. Gravel consist of 85-95% pebbles and 5-15% cobbles that are matrix-supported, angular to subrounded, and poorly sorted. Pebbles commonly aligned in slope-parallel fabric, particularly in upper 1.5-2 m. Deposit is graded to fine-grained valley fill stop Qp1. Unconsolidated and ~9 m thick.

Modern alluvium on alluvial fans—Modern alluvium deposited on alluvial fans. Very thin to thin beds and common clay imbrication. No surface clast varnishing. No topsoil. 0.50 m of surface relief due to channel forms, bars, and pebble-boulder sieve deposits. Weak to moderate-vegetative cover with larger plants showing signs of burial. Unit commonly progresses over historic valley fill stop Qp1. Unconsolidated and ~3 m thick.

Modern and historic alluvium on alluvial fans—Modern alluvium (Qm) and subordinate historical alluvium (Qh) deposited on alluvial fans. See descriptions of Qm and Qh. <1 m thick.

Historical alluvium on alluvial fans—Sandy gravel and subordinate gravely sand deposited on alluvial fans. Very thin to medium-lenticular beds that slope away from fan apex. Surface exhibits up to 1 ft of bar-and-swale relief and is commonly cobbly. Soil development not evident or very weak with thin CaCO3 precipitation around clasts and weak ped development. Weakly consolidated. Mostly 1.3 m thick.

Recent alluvium (modern + historic) on alluvial fans—Alluvial fan sediment that includes subequal proportions of historical (Qh) and modern alluvium (Qm). See detailed descriptions of these individual units.

Historical and modern alluvium on alluvial fans, undivided—Historical alluvium (Qh) and subordinate modern alluvium (Qm) deposited on alluvial fans. See descriptions of Qh and Qm. <1 m thick.

Historic and younger alluvium in alluvial fans, undivided—Historic alluvium (Qh) and subordinate younger alluvium (Qm) deposited on alluvial fans. See descriptions of Qh and Qm. <1 m thick.

Recent alluvium (historical + modern) and younger alluvium in alluvial fans, undivided—Historic and modern alluvium (Qh and Qm) and younger alluvium (Qm) grouped together as a "recent" deposit and subordinate younger alluvium (Qm) deposited on alluvial fans. See descriptions of Qh, Qm, and Qm. Up to ~50 m thick.

Younger alluvium on alluvial fans—Alluvial fan sediment composed of interbedded sandy gravel with minor to subequal fine-dominated sand; gravelly sand to sandy gravel at the mouths of small steep gullies. Surface is generally eroded and lacks a notable soil (no more than stage I morphology). Surface exhibits subequal to no bar and swale topography (>20 cm relief), weak clast varnishing, and a weak desert pavement. Up to ~6 m thick.

Younger alluvium and modern alluvium on alluvial fans—Younger alluvium (Qm) and subordinate modern alluvium (Qm) deposited on alluvial fans. See descriptions of Qm and Qm. Up to ~6 m thick.

Younger alluvium and historic alluvium on alluvial fans—Younger alluvium (Qm) and subordinate historic alluvium (Qh) deposited on alluvial fans. See descriptions of Qm and Qh. Up to ~6 m thick.

Younger alluvium and recent (modern + historic) alluvium on alluvial fans—Younger alluvium (Qm) and subordinate recent alluvium (grouped modern and historic alluvium, Qm and Qh) deposited on alluvial fans. See descriptions of Qm, Qh, and Qm. Up to ~6 m thick.

Older alluvium on alluvial fans, undivided—Alluvial fan with sandy gravel and sand. Gravel is subrounded (mostly to rounded), very poorly sorted, and consists of pebbles, cobbles, and 25% boulders. Surface clasts are moderately to well varnished. 1.00 m thick.

Older alluvial fan deposits whose surfaces grade to the trends of terrace deposits Qp2 and Qp1—Alluvial fan sandy gravel and gravelly sand that have progressed over the trends of the lower terraces in Animas and Pechra Creeks. Qp1 and Qp1. 1.4 m thick.

Older alluvial fan deposits whose surfaces grade to the trends of terrace deposits Qp2 and Qp1—Alluvial fan sandy gravel (minor pebbly sand) in vogue, thin to medium, lenticular to tabular beds. Gravel comprised of pebbles with 25-45% cobbles. 10-15% fine boulders. Matrix consists of brown (ZYR 5.0-4), very fine to very coarse-grained sand with 5-7% clay-silt. Subequal matrix vs. clast-supported (imbricated) beds. Moderately consolidated. Surface is commonly eroded. 1.3 m thick.

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