Geologic Map of the San Pedro River, Babocomari River and Aravaipa Creek Corridors, Southeastern Arizona

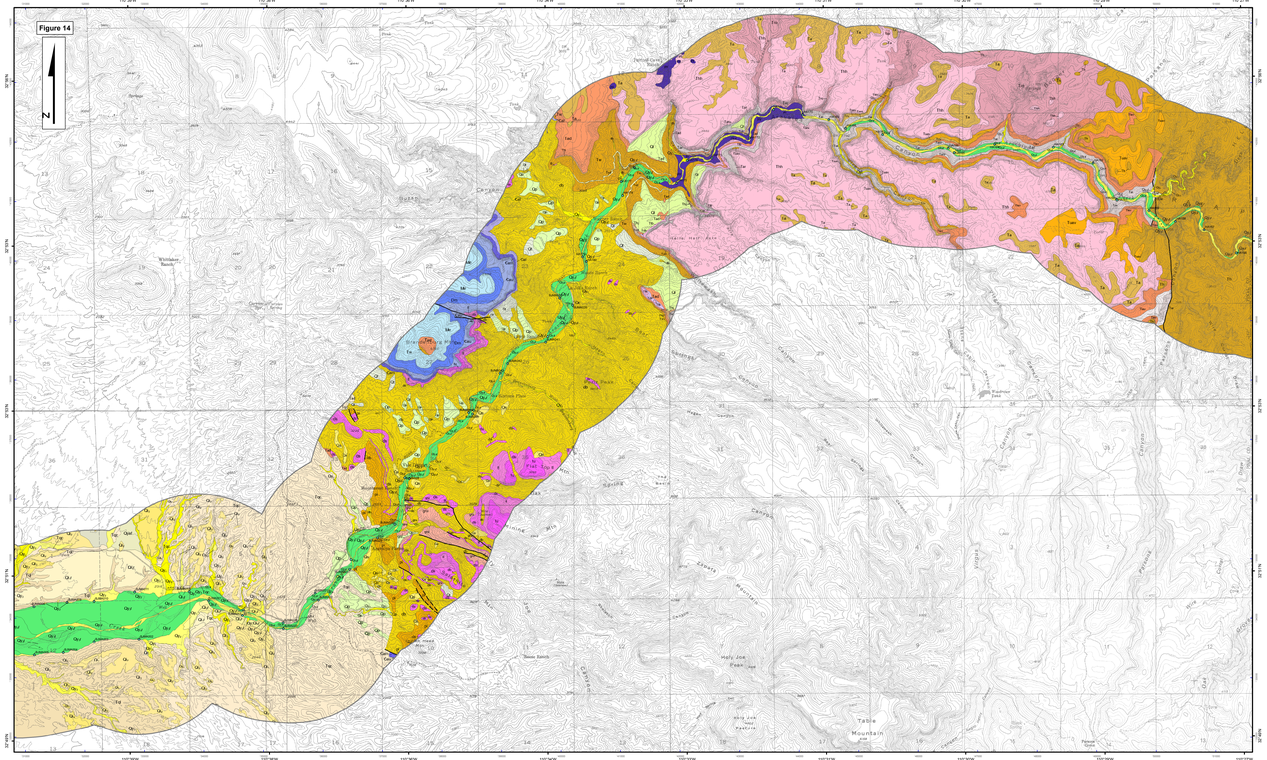
by
Joseph P. Cook, Erica R. Bigio,
Brian J. MacFarlane, Andrew L. Kowler
and Philip A Pearthree

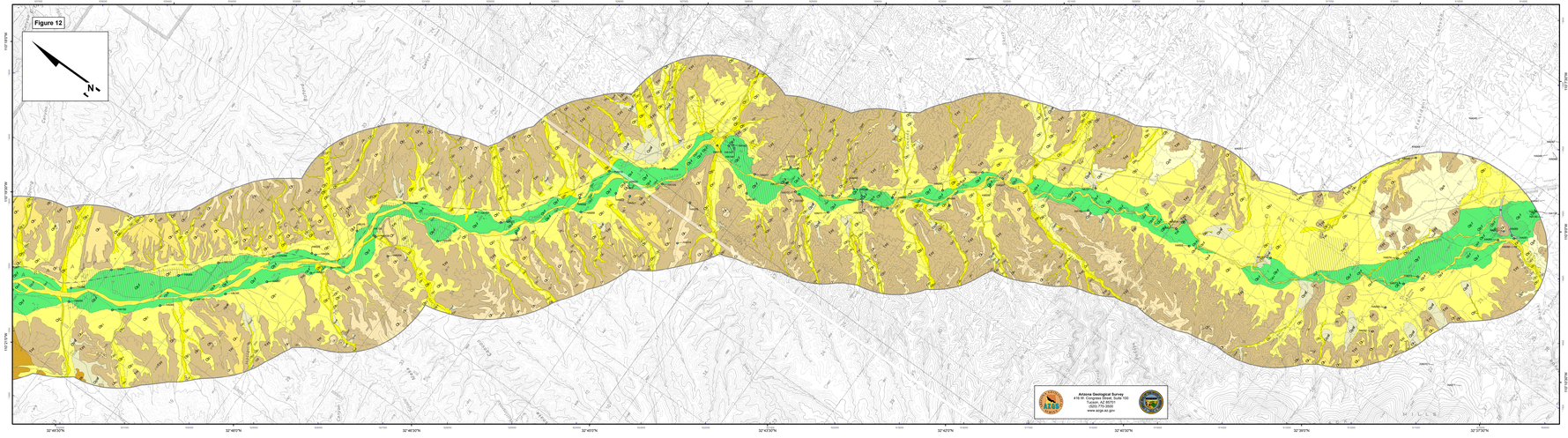
October 2009

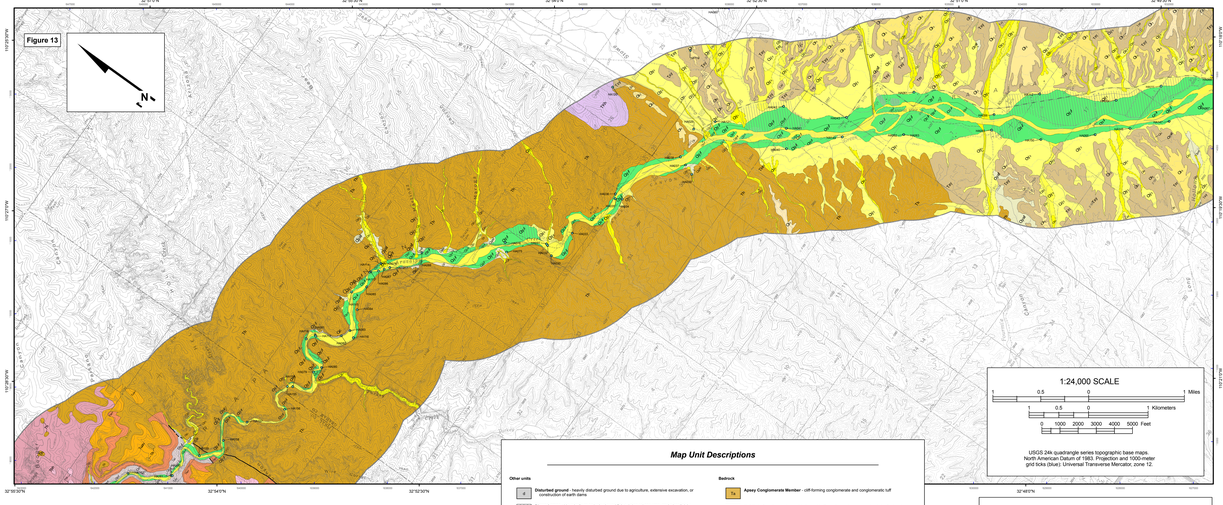
Digital Map DM-RM-1F, version 1.1

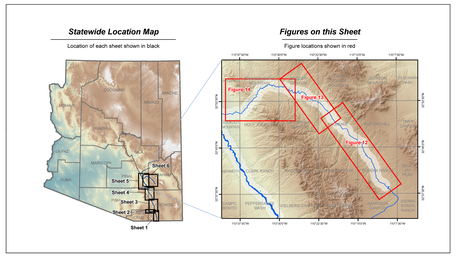
Funding for this project was provided by the
Arizona Department of Water Resources

USGS 24k quadrangle series topographic base maps.
North American Datum of 1983. Projection and 1000-meter
grid ticks (blue): Universal Transverse Mercator, zone 12.









Map Unit Descriptions

Other units

d — **Disturbed ground** - heavily disturbed ground due to agriculture, extensive excavation, or construction of earth dams

Powed areas - historically or actively plowed fields, irrigated pastures, and other lightly disturbed ground

Qtc — **Quaternary tinkhipus talus and colluvium** - unconsolidated to weakly consolidated, very poorly sorted angular rock debris deposited at the base of bedrock slopes

River alluvium

Qcr — **Active river channel deposits** - unconsolidated, very poorly sorted sandy to cobbly beds in active river channels

Qcr1 — **Flood channel and low terrace deposits** - unconsolidated sand, gravel and silt deposits on bars, low terraces and flood channels

Qcr2 — **Historical river terrace deposits** - unconsolidated sand, gravel and silt deposits on low terraces inset below the abandoned early historical floodplain

Qcr3 — **Latest Holocene to historical river terrace deposits** - silt, clay, sand and minor gravel deposits underlying the early historical floodplain

Qcr4 — **Late to early Holocene river terrace deposits** - silt, clay, sand and minor gravel terrace deposits slightly above the early historical floodplain

Qcr5 — **Late Pleistocene river terrace deposits** - gravelly, sandy river terrace deposits up to 25 m above the active river channel

Qcr6 — **Middle to late Pleistocene river terrace deposits** - older, higher gravelly, sandy river terrace deposits

Qcr7 — **Early to middle Pleistocene river terrace deposits** - oldest, highest preserved gravelly, sandy river terrace deposits

Piedmont alluvium and surficial deposits

Qa — **Modern stream channel deposits** - active channel deposits composed of very poorly-sorted sand, pebbles, and cobbles with some boulders to moderately-sorted sand and pebbles

Qa1 — **Latest Holocene alluvium** - unconsolidated, very poorly sorted silty to cobbly low terrace and overflow channel deposits

Qaaf — **Late Holocene alluvium, active fan deposits** - active portions of young fan deposits exhibiting distributary drainage patterns

Qa2 — **Late Holocene alluvium** - coarse terrace deposits located along incised drainages, broad low-relief distal fan deposits unlapping onto Holocene river alluvium, and infrequently active tributary drainage deposits

Qa3 — **Older Holocene alluvium** - broad, low-relief, undulating fan deposits exhibiting widespread, shallow braided drainage patterns

Qa4 — **Holocene fine-grained deposits** - unconsolidated alluvium derived predominantly from basin fill deposits

Qt — **Tatus** - rock debris consisting of large angular blocks to silt-sized particles, locally cemented with calcite

Qs — **Surficial deposits, undivided** - includes fine-grained colluvium and alluvium, talus, and some pediment and terrace gravels

Ql — **Landslide deposits** - coneat largely of Galiuro Volcanics, locally cemented with calcite

Qp — **Pediment gravel veneer** - subangular pebbles and cobbles, includes some pediments and terraces stripped of gravels

Qc — **Late Pleistocene alluvial fan and terrace deposits** - weakly consolidated sandy gravel deposits with moderate soil development

Qc2 — **Middle to late Pleistocene alluvial fan and terrace deposits** - weakly consolidated sandy gravel deposits with strong soil development

Qc3 — **Early to middle Pleistocene alluvial fan and terrace deposits** - high, moderately consolidated gravelly deposits with strong soil development

Tertiary basin fill alluvium

Tsp — **Late Miocene to Pliocene Quiburis deposits, alluvial fan facies** - sandy to gravelly, moderately to strongly indurated alluvial fan deposits

Tsp — **Late Miocene to Pliocene deposits** - moderately to strongly indurated conglomerate and sandstone basin fill deposits

Bedrock

Ka — **Apsey Conglomerate Member** - cliff-forming conglomerate and conglomeratic tuff

Kh — **Hell Hole Conglomerate** - well-indurated tuff conglomerate composed mainly of volcanic debris; includes few beds of tuff and ash

Tmr — **Hells Half Acre Tuff member** - air fall, vitric, nonwelded to slightly welded ash flow, and well-sorted rhyolite tuffs

Tha — **Hells Half Acre Rhyolite-obsidian** - flow banded obsidian to rhyolite flow breccias

Tvpa — **Virgus Canyon upper Andesite** - fine-grained, amygdaloidal andesite with small phenocrysts of plagioclase

Tvc — **Virgus Canyon Conglomerate** - pebbles and cobbles derived from lower andesite of Virgus Canyon

Tvla — **Virgus Canyon lower Andesite** - coarsely porphyritic (Turkey Track) andesite

Tanc — **Aravaipa Member, nonwelded zone** - slope-forming white tuff

Tavz — **Aravaipa Member, welded zones** - partly welded, welded, and lower nonwelded tuff

Tbz — **Bear Springs Canyon Conglomerate** - sourced from older members of the Galiuro Volcanics, andesite, and diabase

Tbs — **Bear Springs Canyon Tuff** - rhyolitic ash-flow tuff

Tcd — **Conglomerate of Depression Canyon** - composed of older rocks, including older members of the Galiuro Volcanics

Tdd — **Depression Canyon Andesite** - massive, flow-banded, to agglomeratic, gray, brown, and olive andesite

Thz — **Holy Joe Member** - quartz-latite ash-flow tuff

Tw — **Whitetail(?) Conglomerate** - composed of pebbles and cobbles of Precambrian and Paleozoic rocks

Twl — **Rhyolite tuff bed within Whitetail Conglomerate** - white rhyolite tuff bed (0.25 ft thick) in Aravaipa Canyon

TKhv — **Horse Mountain Volcanics** - silicic lava, tuff, welded tuff, obsidian, and vitrophyre

Ma — **Escabrosa Limestone** - massive, cliff-forming, thick-bedded, mostly coarsegrained limestone

Ms — **Martin Formation** - slope-forming shale unit with interbedded limestone beds

Kap — **Abrigo Formation, upper member** - cliff-forming, mostly poorly sorted, cross-bedded, dolomitic and glauconitic sandstone

Kal — **Abrigo Formation, middle member** - cliff-forming mostly poorly sorted sandstone and argillaceous sandstone

Kal — **Abrigo Formation, lower member** - thin-bedded, slope-forming mudstone, siltstone, and sandy mudstone

Jd — **Diabase** - diabase

Ꞓs — **Troy Quartzite, upper unit** - sandstone, quartzite, and granule to small-pebble conglomerate

Ꞓl — **Troy Quartzite, lower unit** - conglomerate and sandstone

Ꞓq — **Dripping Springs Quartzite** - feldspathic to arkosic quartzite and siltstone

Pp — **Porphyry** - massive to slightly foliated, fine-grained porphyritic rock

gP1 — **Granitic rocks, undivided** - granodiorite or nonporphyritic quartz monzonite

p — **Pinal schist** - flows, tuffs, and flow breccias of andesitic composition

Bedrock and surficial geologic mapping for areas outside the lateral limits of Holocene river alluvium was compiled from the following sources

Krieger, M.H., 1968, Geologic map of the Brandenburg Mountain quadrangle, Pinal County, Arizona: U.S. Geological Survey Geologic Quadrangle Map GQ-668, 3 p., 1 sheet, scale 1:24,000.

Krieger, M.H., 1968, Geologic map of the Holy Joe Peak quadrangle, Pinal County, Arizona: U.S. Geological Survey Geologic Quadrangle Map GQ-669, 4 p., 1 sheet, scale 1:24,000.

Simons, F.S., 1964, Geology of the Klondyke quadrangle, Graham and Pinal Counties, Arizona [Klondyke, Oak Grove Canyon, Cobre Grande Mtn., and Booger Canyon 7½' min]: U.S. Geological Survey Professional Paper 461, 173 p.

Young, J.J., Spencer, J.E., MacFarlane, B.J., and Richard, S.M., 2009, Geologic map of the Lookout Mountain 7½' quadrangle, Pinal County, Arizona: Arizona Geological Survey Digital Geologic Map 66 (DGM-66), version 1.0, 1 sheet, layout scale:24,000, with text.

1:24,000 SCALE

1 0.5 0 1 Miles

1 0.5 0 Kilometers

0 1000 2000 3000 4000 5000 Feet

USGS 24k quadrangle series topographic base maps.
North American Datum of 1983. Projection and 1000-meter
grid ticks (blue): Universal Transverse Mercator, zone 12.

Boundaries of Holocene River Alluvium

Thin, Solid Line
Clearly defined, accurately located contacts between Holocene river alluvium and bounding geologic units such as bedrock hillslopes, abruptly incised channels or alluvial terraces, and distinct edges of small, steep alluvial fans and talus slopes. Line location accurate to within 50 feet.

Thin, Dashed Line
Subtle or gradational contacts between Holocene river alluvium and bounding geologic units. These boundaries are often associated with very low relief distal alluvial fan onlap onto Holocene river alluvium and are often located in historically plowed fields. Line location accurate to within 100 feet.

Thin, Dotted Line
Approximately located boundary between Holocene river alluvium and bounding geologic units. Dotted line boundaries are reserved for areas which are significantly disturbed by anthropogenic activity. Placement of dotted line boundaries is based on a combination of field verification and historical aerial photo and topographic data interpretation. Line location accurate to within 500 feet depending on level of disturbance (plowed vs. paved, original topography maintained/obliterated etc.)

Waypoint Location, showing station identification

Other Geologic Lines

Thin, Solid Line
Accurate contact

Thin, Dashed Line
Approximate contact

Thin, Dotted Line
Concealed contact

Hashed Line
Gradational Contact

Solid, Bold Line
Accurate Fault

Dashed, Bold Line
Approximate Fault

Dotted, Bold Line
Concealed Fault

Arizona Geological Survey
416 W. Congress Street, Suite 100
Tucson, AZ 85701
(520) 770-3500
www.azgs.az.gov