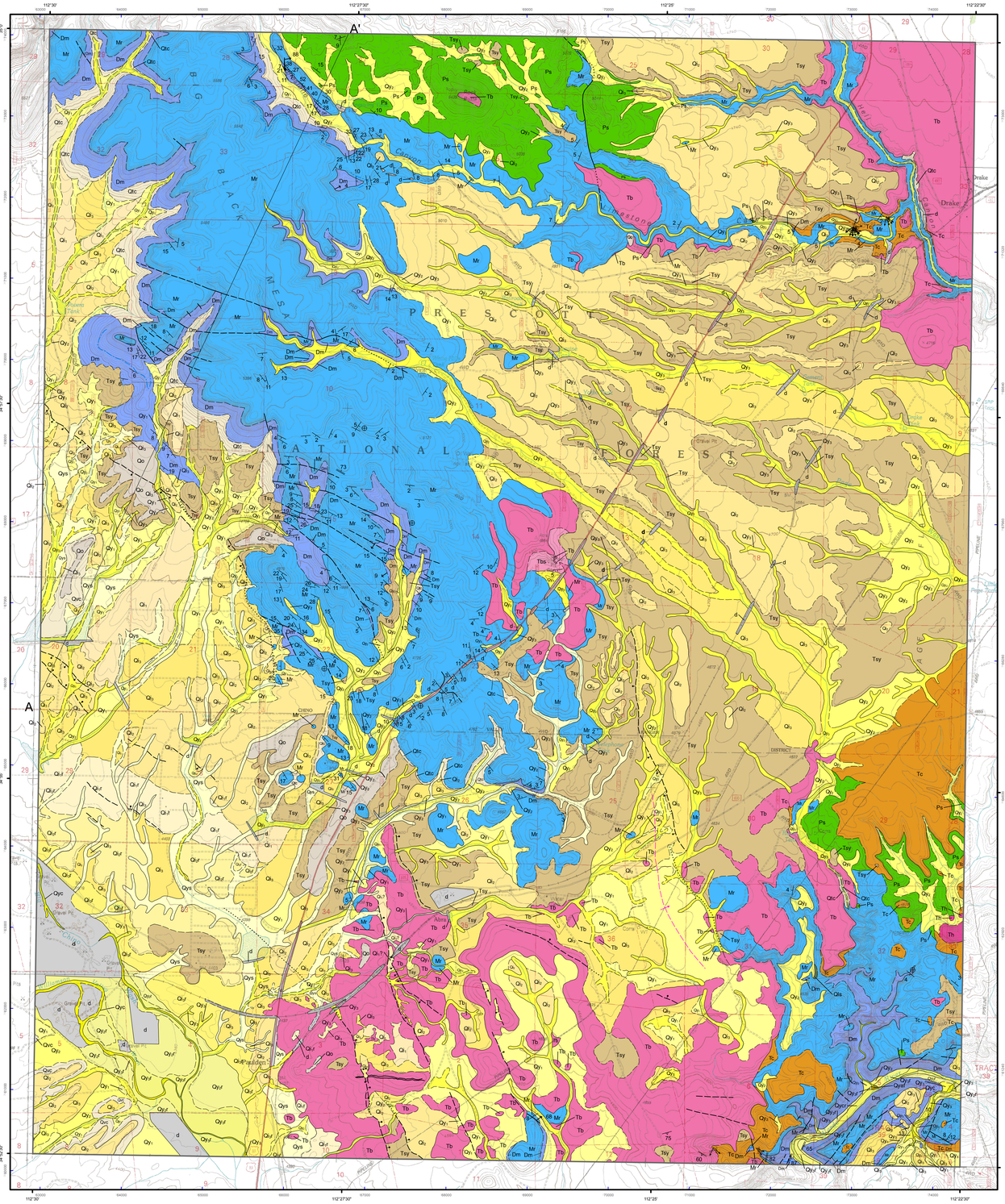


Topographic base from USGS 1:24,000 Quadrangle Series.
Seamless basemap generated using iGage All Topo Pro software.

Projection Information:
North American Datum of 1983.
1000-meter Universal Transverse Mercator
grid tics, zone 12, shown in blue.

APPROXIMATE MEAN DECLINATION, 2011

SCALE 1:24,000

CONTOUR INTERVAL 40 FEET

Description of Map Units

Verde River and Big Chino Wash Deposits

Qyr — **Active river channel deposits** - Deposits are dominantly unconsolidated, very poorly sorted sandy to cobbly beds exhibiting bar and swale microtopography but can range from fine silty beds to coarse gravelly bars in meandering reaches based on position within the channel. Clasts are typically well-rounded but may be angular to sub angular to subrounded with generally low sphericity. Clast lithologies include mixed latite and basalt, Paleozoic limestone and chert, mixed meta-sedimentary and meta-igneous, and felsic granitoids. Qyr deposits are typically unvegetated to lightly vegetated and exhibit no soil development. Qyrc deposits are entrenched from 30 cm to 10 meters or more below adjacent early historical floodplain deposits depending on location, geomorphic relationship, and local channel conditions. These deposits are the first to become submerged during moderate to extreme flow events and can be subject to deep, high velocity flow and lateral bank erosion. In some areas, channel deposits are very thin to discontinuous exposing underlying bedrock. Extent of channel deposit and exposed bedrock varies and shifts with significant flooding.

Qyrz — **Historical valley-floor deposits** - Terrace deposits that occupy elevations from 1 to 2 meters above Qyrc or Qyr deposits and are inset below the pre-incision historical floodplain. These surfaces are generally planar but exhibit bar and swale microtopography. Although no soil development is present, dense grasses and small mesquite trees abound. Sediments composing these deposits are poorly sorted silt, sand, pebbles and cobbles. Pebbles and cobbles are well-rounded to sub-angular. Trough crossbedding, ripple marks, and stacked channel deposits viewable in cross-section indicate deposition in a low to moderate energy braided stream environment. These deposits are prone to flooding during extreme flow events, and undercutting and rapid erosion of Qyzr surfaces is possible during lower flow events.

Qyrz — **Latest Holocene to historical river terrace deposits** - Deposits associated with the floodplain that existed prior to early historical entrenchment of the Verde River. Qyzr deposits are associated with broadly planar surfaces that locally retain the shape of historical river meanders. Qyzr surfaces are up to 7 meters above modern Qycr deposits and are the most extensive river terraces in the valley. Qyzr deposits are typically fine grained floodplain deposits with occasional pebbly to cobbly interbeds. Dense mesquite bosque and tall grass is typically present on these surfaces except where historic plowing or grazing has taken place. These surfaces appear predominantly fine grained at the surface due in part to the input of organic matter and windblown dust deposition but are composed of interfingering coarse sandy to pebbly braided channel and fine sand to silty river floodplain deposits. Where Qyzr deposits are moderately to deeply incised they not subject to inundation by river floods, but they may be flood-prone in areas with less channel incision. Qyzr deposits are subject to catastrophic bank failure due to undercutting and lateral erosion during flow events. Distal piedmont fan deposits (Qyzf and Qyaf) onlap onto Qyzr deposits although an interfingering relationship likely exits in the subsurface.

Qyrf — **Late to early Holocene river terrace deposits** - Deposits associated with slightly higher terraces that represent either higher elements of the early historical floodplain or remnants of older Holocene aggradation periods. These fine-grained terrace deposits commonly have been disturbed by plowing or cattle grazing. When undisturbed, Qyrf deposits are densely vegetated by mature mesquite trees (mesquite bosque) and tall grasses. Soil development is moderate and surface color ranges from 10 to 7.5 YR 4/4. Due to the dense vegetation input of organic matter at the surface is high and often results in a thin (< 10 cm) organic soil horizon. A light dusting (incipient stage I) calcium carbonate accumulation is evident on the undersides of some buried clasts. Qyrf surfaces are up to 7 meters above the active channel in highly incised locales and typically are less than 1.5 m higher than adjacent Qyzr surfaces.

Qlir — **Late Pleistocene terrace deposits** - Weakly consolidated, gravelly, sandy river terrace deposits 3 to 10m above active channels. Gravel clasts are lithologically diverse and commonly subrounded to well-rounded. Soil development consists of Stage II calcic horizon development and slightly reddened weak argillic horizons. Surface color typically is light orange.

Qlir — **Middle to late Pleistocene river terrace deposits** - Terrace deposits are similar to Qi3r deposits but occupying higher positions in the landscape. Terrace surfaces are slightly to moderately rounded. Clast composition is diverse. Well-rounded pebbles to cobbles with stage I-II calcium carbonate accumulation armor Qi2r surfaces. Vegetation is sparse, consisting of small shrubs and grasses. Qi2r soils are moderately well developed, reddened (5yr), clay argillic horizons, with obvious clay skins and subangular to angular blocky structure. Underlying soil carbonate development is typically stage II to III, with abundant carbonate through at least 1 m of the soil profile. Soil development is more evident in finer grained sections. Qi2r surfaces are typically found as high-standing isolated mounds surrounded by distal fan alluvium or as small terraces inset into older fan or basin fill alluvium. Along the Babocomari River Qi2r terraces are 10-20 meters above the active channel.

Qir — **Early to middle Pleistocene river terrace deposits** - Deposits are associated with high-standing, well-rounded river gravel terraces. Where Qi1r deposits are extensive, remnant planar caps are preserved near the center of the surface. Qi1r deposits are composed of very well rounded to well rounded pebbles and cobbles from diverse lithologies. Cross-bedded sands with pebbly stringers are interbedded throughout. Near-surface cobbly beds exhibit stage I+ calcium carbonate accumulation. Moderately to strongly calcium carbonate coated clasts or cemented aggregates of clasts mantle the flanks of Qi1r deposits, but clay accumulation is variable, probably due to poor surface preservation. Where surfaces are well-preserved, Qi1r soils are reddened (5-2.5YR), clay argillic horizons, with obvious clay skins and subangular to angular blocky structure. Underlying soil carbonate development is typically stage III-IV, with abundant carbonate through at least 1 m of the soil profile. Sparse small shrubs, weeds, and cacti are present on these surfaces.

Piedmont Deposits

Qyf — **Active tributary channel alluvium** - none

Qyf — **Latest Holocene alluvium** - Unconsolidated sand, silt and gravel deposits associated with active drainages. Includes sand, cobbles and boulders in channels, and more extensive sand and silt in low terrace deposits and in unincised valley axes. Fine-grained deposits generally are brown to gray.

Qyf — **Late Holocene alluvium** - Unconsolidated sand, silt and gravel deposits with weak soil development associated with broad valley floors, low terraces and sheetflood areas. Channels included in this unit are small and discontinuous. Deposits are predominantly sand and silt, but deposits in upper piedmont areas include cobbles and small boulders. Topographic relief across Qyf surfaces is generally very low.

Qys — **Fine-grained sheetflood deposits** - Laterally extensive, unconsolidated fine-grained alluvium in areas with little lateral topographic relief. These sediments are dark brown to light gray in color and consist of sand, silt, clay and minor gravel. In the valley floor, Qys deposits are primarily derived from fine-grained basin deposits and may contain moderate amounts of gypsum fragments.

Qyf — **Early to late Holocene alluvium** - Forms low-lying fan and terrace deposits adjacent to tributaries and Big Chino Wash. These deposits are unconsolidated and loose silt and gravel size clasts with a light to medium gray-brown soil. Gullies may be incised into this unit along Big Chino Wash floodplain extending up to 8m into the deposit. Thickness ranges from zero to 1.5 meters.

Qyaf — **Early to late Holocene rock avalanche deposit** - Gravel-rich, very angular clasts derived from localized units and steep slopes adjacent to Little Chino fault zone.

Qli — **Late Pleistocene alluvium** - Alluvial strath-terrace deposits adjacent to modern streams and washes. Qli3 terraces are elevated between 10 and 30 feet (3 and 9 meters). Qli3 deposits are unconsolidated fine to coarse alluvium consisting of predominantly gravel and cobbly-size clasts derived from regional sources (Big Chino Wash) to locally derived clasts from adjacent terrace and bedrock outcrops. Clasts derived from Big Chino Wash include felsic and mafic granitoids, metamorphic argillite, psammite and quartzite and limestone. Locally-derived clasts include predominantly limestone, latite and basalt, most likely derived from unit Tsy. Clasts are subangular to subrounded consisting of gravel, cobbles and occasional boulders. These deposits generally exhibit reddish-brown soils and light to moderate calcium carbonate accumulation (stage II to III). The soil color varies with position in the piedmont and valley floor due to differences in the parent material (volcaniclastic-rich Tsy to the north and northeast, and mixed limestone and volcanic lithologies in the Big Chino valley). Vegetation is predominantly sage brush and grass, and juniper.

Qlo — **Middle to late Pleistocene alluvium** - Unconsolidated, poorly cemented coarse-grained alluvium forming broad planar terrace surfaces capping basin fill and bedrock surfaces. Clast lithologies include mixed latite and basalt, sedimentary chert and limestone. Exotic lithologies of felsic granitoids are present along Tb bedrock north of the Verde River knickpoint. These deposits generally exhibit moderate calcium carbonate accumulation (stage II to IV), with soil color generally reddish-brown. An organic-rich A-soil horizon ranges from 0 to 15cm thick. Bedding is crudely latered to massive with coarse matrix- to clast-supported silt, sand and gravel . Varnish and pavement development are generally poor to absent. Clay-coated gravel-size sedimentary chert form a poor gravel lag surface. These deposits stand in relief ranging from 60 to 80 feet (18 to 24 meters) above active channel floor. Thickness ranges from zero to 8 meters overlying semi-consolidated Tertiary basin fill deposits and bedrock. One-seed juniper commonly caps and flanks the Qi2 surface. Colluvial wedges extend several Tens of meters from the Qi2 surface commonly associated with sage brush and scattered juniper.

Qli — **Early to middle Pleistocene alluvium** - Alluvial terrace deposits forming broad planar surfaces to localized smooth rounded hills. Qli1 terraces are elevated above the Big Chino Wash floodplain between 40 to 100 feet (12 to 32 meters). Qli1 deposits are unconsolidated to poorly cemented coarse-grained alluvium consisting of predominantly gravel-size clasts derived from exotic and local source terrains. Thickness of Qli1 deposits range from 0 to as much as 8 meters. Clast lithologies include quartzite, felsic granitoids, sandstone, sedimentary chert, basalt and latite, mica-schist and argillite. Clasts are generally subrounded to occasionally rounded with low to moderate sphericity. Varnish and pavement are weak to moderate. Qli1 deposits exhibit moderate to high calcium carbonate accumulation (stage III to IV) although modern organic-rich soils are commonly superimposed. Soils support grass and juniper.

Qo — **Early Pleistocene alluvium** - Distributed in the mid- to upper-elevations within the Granite Creek Mountains and along the bordering foothills to the south and southwest. Geomorphology characterized by well-rounded hills with float of gravel, cobbles, and boulders that commonly creep to the angle of repose, often obscuring the basal contact of this unit. The upper parts of well-preserved hills are often flat-topped with less than 1-degree slopes. Preserved terrace surfaces exhibit little to no desert varnish and/or desert pavement. Soil development is pervasive laterally and soils are commonly too thick (>20-30 cm) to allow for abundant or adequate exposures for more detailed observations of this unit.

Other Deposits

Qvc — **Regolith and colluvium formed on basin-fill deposits** - In situ deposits mantling gentle to moderate slopes on fine-grained basin-fill deposits. Deposits commonly are sand, silt and clay, with minor clasts of reworked carbonate and fine gravel. Soil development is generally weak.

Qtc — **Quaternary talus and colluvium** - none

Qls — **Landslide deposits** - Semi-coherent blocks and slabs of bedrock units in landslide masses.

d — **Disturbed ground** - none

Bedrock Units

Tsy — **Younger siliciclastic rocks (Tertiary)** - Poorly indurated sandstone, conglomerate, siltstone and mudstone. The strata are buff to red adjacent to Supai Formation uplands in the north and central part of the map area, and white to cream adjacent to Paleozoic carbonate outcrops in the southwest. Bedding is defined by discontinuous, lenticular conglomerate and sandstone lenses within a background of fairly massive, generally thicker, poorly organized sandstone, siltstone, mudstone, and claystone. The relative abundance of conglomerate to other lithologies increases with proximity to bedrock uplands. Zones of white calcite cementation define resistant ribs mostly parallel to bedding, but also as irregular patches, veins, burrows and rhizoliths. Caliche horizons exposed in roadcuts are often sharply truncated upwards. Subangular to sub-rounded clasts in conglomerate match bedrock outcrops in nearby uplands; limestone and dolostone to the south, and red sandstone and siltstone in the central and northern parts. Thickness ranges from 0 to 160 feet (0 to 50 m).

Tb — **Basalt lava (Tertiary)** - Basaltic lava containing 5-7% olivine phenocrysts up to 8mm, and up to10% <2mm plagioclase phenocrysts in a plagioclase microlite-rich matrix. Some of the flows in the south contain 12-15% <1mm clinopyroxene, and 5-7% <1mm orthopyroxene. The lava fills valleys and paleocanyons. A vent complex in the central part of the map area includes a large area of weakly bedded scoria (Tbs). 0-30m thick.

Tbs — **Scoria (Tertiary)** - Basaltic scoria, weakly bedded to massive 0-10m thick.

Th — **Hornblende latite (Tertiary)** - Hornblende-porphyritic latite containing 5-15%, 1-10mm hornblende phenocrysts.

Tc — **Conglomerate (Tertiary)** - Massive, typically rubbly and poorly preserved outcrops of conglomerate, pebbly sandstone, and lesser arkosic, lithic-rich sandstone. The unit is weakly medium- to thick-bedded as defined by pebble trains and diffuse channelized conglomeratic zones within pebbly sandstone. Clasts consist of varying amounts of quartzite, quartz sandstone, limestone, schist, argillite/siltstone, mafic granitoid, and felsic granitoid. Clasts range in size from pebbles to boulders up to several meters, and in shape from rounded to angular. Most are sub-rounded to sub-angular pebbles and cobbles. Schist, limestone, and argillite clasts are typically strongly nonequant and define imbrication. Tertiary volcanic clasts are absent and distinguish this unit from younger, typically strongly volcaniclastic conglomerate and sandstone (Tsy) that overlies the Tertiary volcanics. 0-20m thick.

Ps — **Supai Formation (Permian)** - Red sandstone, siltstone, shale, and minor carbonate. Sandstone, orange to light red and buff, is invariably fine-grained, and well-sorted. Sandstone occurs in a background of red siltstone, mudstone, and shale which constitute the bulk of the formation, especially towards the base. A series of 1-2m thick ledge-forming carbonates occur in the lower part. The carbonate, chiefly dolostone, is finely recrystallized, typically strongly brecciated, and intensely altered and silicified to shades of pink, orange, red and light green. Angular pebbles and cobbles of white, cream, pink and orange tinted chert and/or cryptocrystalline quartz weathered from these beds litter colluvial slopes in the lower part of the unit. Dark red to black (specular hematite) concretions are abundant. Upwards, sandstone increases in relative abundance and makes up nearly half of the formation. These range from thin- to thick-bedded and are typically low-angle cross-stratified to plane-bedded. Calcareous concretions are common throughout, as are light green to cream reduction spots. 0-50m thick.

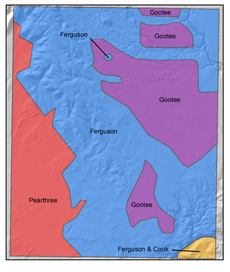
Mr — **Redwall Limestone (Mississippian)** - Cliff-forming limestone, and minor dolostone in medium- to thick-bedded, mostly tabular, amalgamated sets. Most of the unit consists of recrystallized, cherty, skeletal packstone and grainstone with abundant crinoid columnals, brachiopods, bryozoans, and echinoid spines. Chert occurs in irregularly interconnected, bread loaf-shaped, bed-parallel masses. A persistent, 10-20m thick, unconformity bounded unit of light brown calcarenite defines the base of the formation throughout the map area which is characteristically devoid of chert, weakly recrystallized, and low-angle cross-stratified. Kreiger (1965) cautions that since this basal unit resembles the underlying Martin Limestone, it may locally be included with that unit. In some areas, a marker bed shown at the base of the formation corresponds to the top of this unit and corresponds to a reddish matrix, karst breccia up to 5m thick that grades down into the basal unit. The breccia is sharply overlain by thick-bedded cherty limestone typical of the bulk of the formation. The lower unit sharply overlies a similar, although typically thicker and more recessive karst breccia at the top of the Martin Limestone. Locally, at the contact, a medium-grained to granule quartz sandy laminated to thin-bedded limestone is present. 55-75m thick.

Dm — **Martin Limestone (Devonian)** - Dolostone, minor quartz sandstone, and minor quartzite granule-pebble, carbonate-matrix conglomerate. The unit is dominated by tabular sets of amalgamated, medium- to thick-bedded, variably thin-ribbon cherty, light tan to brown dolostone. The strata are interbedded with 5-30%, ledge and/or cliff-forming, algal laminated, vuggy, thin- to medium-bedded dolostone intervals up to 5m thick. The formation is characteristically devoid of recognizable fossils except for a single, persistent spiriferid brachiopod (*Atrypa*?) quartz-sandy coquina bed up to 2m thick near the base of the formation. Strata below the coquina include interbeds of light green shale that are probably correlative with a problematic, ~20m thick unit mapped between the Martin and the Tapeats in the southeasterly adjacent Chino Valley North 7.5' Quadrangle (Gootee et al., 2010). Limited and poor exposures preclude mapping this unit in this area. 105-140m thick.

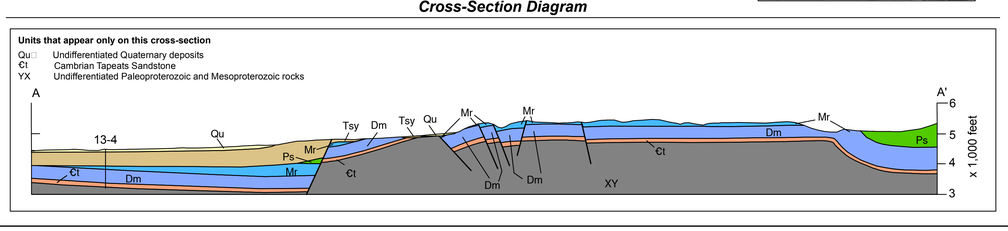
Line and Structure Symbol Descriptions

- accurately located contact
- approximately located contact
- accurately located fault
- approximately located fault
- accurately located normal fault, bar and ball on downthrown block
- approximately located normal fault, bar and ball on downthrown block
- concealed fault, sense of slip unspecified
- concealed normal fault, bar and ball on downthrown block
- monocline
- horizontal bedding
- strike and dip of bedding
- foliation
- strike and dip of minor fault
- trend of slickenline lineation
- trend of paleocurrent
- dip of contact

Mapping Responsibility



Cross-Section Diagram



GEOLOGIC MAP OF THE PAULDEN 7 ½' QUADRANGLE, YAVAPAI COUNTY, ARIZONA

Arizona Geological Survey Digital Geologic Map DGM-91, version 1.0

Scale 1:24,000

By
Charles A. Ferguson, Brian F. Gootee, Philip A. Pearthree, and Joseph P. Cook

February 2012

Citation for this map:
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Introduction

This geologic map covers the southeastern ends of Big Chino Valley and Big Black Mesa, and part of Page Flat and Hell Canyon, in Yavapai County north of Prescott. Mapping was conducted under the National Cooperative Geologic Mapping Program, with funding provided by the U.S. Geological Survey and the Arizona Geological Survey. The map was developed through field mapping and aerial photointerpretation, and was compiled digitally using ESRI ArcGIS software over a 7 ½' U.S. Geological Survey topographic base and digital orthophoto bases (National Agricultural Imagery Program, 2007, 2010).

The Paulden 7.5' quadrangle is host to Arizona's first exploratory oil well which was drilled in 1903 (Rauzi, 2001). That well, the Chino Valley Oil Development and Anthony Oil and Refining #1 in section 27, T18N, R2W, also known as the Hesbitt Well, reached a depth of just over 2000 feet and did not penetrate crystalline basement. Later attempts in 1913 and in the late 1930's and 40's penetrated Precambrian granite and reached depths ranging from 1200 to 2060 feet. Although none of these were productive, one, the Chino Valley Oil Development Company's State #1 Walton (13-4), drilled in 1938 in the NE/4 of the SW/4 of section 20, T18N, R2W provides the best record of the Paleozoic strata encountered at depth, and is used in our cross-section. The great unconformity between Paleozoic strata and Precambrian basement rocks occurs at 1305 feet in this well.

The Paulden 7.5' quadrangle was previously mapped as part of a regional study of the Prescott – Chino Valley area (Krieger, 1965). We follow Krieger's (1965) criteria for picking the Redwall (Mr) – Martin (Dm) contact. There is a 5-10 m thick basal unit of the Redwall that resembles the Martin which is shown locally as strata below a marker bed in the northern part of the map area. A profound unconformity at the top of the Redwall Limestone (Mr) is marked by extensive alteration and discoloration due most likely to karst weathering. In the southeast corner of the map area, two sink holes - breccia pipes in the Redwall Limestone are filled with Supai Formation siliciclastic rocks (Ps).

Conglomerates that do or do not contain Tertiary volcanic clasts are present in the map area. Pre-volcanic conglomerate (Tc) is fairly thin and discontinuous. Paleocurrents are bimodal; northeasterly to the south and west, and swinging to the east and southeast towards the eastern edge of this map area and the eastern edge of the southerly adjacent Chino Valley North 7.5' quadrangle (Gootee et al., 2010). The older conglomerate records a period of gentle northeasterly tilting of the Chino Valley area with detritus being shed from highlands to the southwest towards a half-graben trough to the east, where paleoflow was to the southeast. The conglomeratic units underlie and interfinger with Oligocene volcanic rocks in the southerly adjacent Chino Valley North 7.5' quadrangle (Riggs et al., 1997; Gootee et al., 2010) and probably correlate with an Oligocene succession of conglomerate in the Verde Valley known as the Beavertail assemblage (Blakey et al., 2011).

Post-volcanic Miocene and Pliocene conglomerate, sandstone, and siltstone (Tsy) are present throughout the map area, and are cut by a series of down-to-the-southwest normal faults along the southwest flank of Big Black Mesa. The mesa is a broad, gently southeast-plunging anticline that is probably Laramide in age. The southwest limb of the anticline is cut by a myriad of northwest-striking high-angle faults, and in one area along US highway 89 (the SW/4 of the SW/4 of section 23, T18N, R2W) a pair of northwest-striking, nearly vertical clastic dikes cut the Redwall Limestone. In the same area, where the road cut allows detailed tracing of individual strata in the Redwall Limestone, a minor northeast-directed thrust fault was recognized. Others probably also exist.

The Paulden quadrangle includes the southeastern part of the Big Chino fault zone, which extends for about 35 miles (55km) from Pichacho Butte in the northwest to the Verde River east of Paulden. The Quaternary history of movement on this fault was investigated by Soule (1978), Pearthree et al (1983), and Euge et al (1992). Our new mapping provides more detail of the fault zone, and we have identified another fault system cutting Quaternary deposits closer to the valley axis (informally named the Pump Tank fault zone) that may be related to the Big Chino fault zone. Pleistocene deposits of various ages are displaced along the main fault zone. Southwest-facing fault scarps formed on the oldest faulted deposits (Qo) are about 60 ft (20m) high; fault scarps formed on the youngest faulted deposits (Qi3) typically are 6 ft (2m) or less in height, but they are likely partially buried by younger deposits (e.g., Euge et al, 1992). There is no evidence of displacement of deposits we estimate to be Holocene in age. The Quaternary fault scarps in addition to numerous faults cutting Paleozoic and Mesozoic bedrock in the Paulden quadrangle probably represent the complex southeastern termination of the Big Chino fault zone. Evidence for Quaternary displacement along the Pump Tank fault zone is discontinuous, but probable fault scarps exist on Qi2, and Qi3 deposits. No Holocene deposits are displaced.

The distribution of young deposits in the quadrangle provides a reconnaissance level assessment of areas that may be prone to flooding, because they are the cumulative record of deposition in many large floods over the past few thousand years. Areas of active washes and drainageways (Qyc, Qy3, Qyv) are obviously most prone to flooding. Adjacent young geologic units that are slightly higher in the landscape (Qy2, Qys) are likely prone to inundation in large floods, and most of this inundation is shallow sheetflooding. Active drainage corridors typically are incised 5-10 ft (2-3m) below areas of older Holocene deposits (Qy1) and the youngest Pleistocene deposits (Qi3), or these areas are farther from active drainageways, so they generally are not subject to inundation. Flood hazards generally only are a concern along washes and low terraces in areas covered by older Pleistocene deposits and bedrock hillslopes. On the valley floor, much of the Big Chino Wash floodplain has been substantially altered by aggregate extraction. In the southernmost part of the quadrangle where the floodplain is relatively unaltered, the Big Chino channel is quite sinuous and is not deeply incised. In this area, inundation of channels and adjacent overbank areas and lateral bank erosion into young deposits along channels are the primary flood hazards.

References

Blakey, R. C., Ranney, W., and Loseke, R., 2011, Oligocene-early Miocene incision, strike-valley development, and aggradation, Mogollon Rim, Verde Valley region, Arizona – a potential analogue for pre-Grand Canyon Development, in Beard, L.S., Karlstrom, K.E., Young, R.A., and Billingsley, G.H., eds., CRevolution 2—Origin and evolution of the Colorado River system, workshop abstracts: U.S. Geological Survey Open-File Report 2011–1210, 300 p., available at http://pubs.usgs.gov/of/2011/1210/, p. 38-45.

Euge, K.M., Schell, B.A., and Lam, I.P., 1992, Development of seismic acceleration maps for Arizona: Arizona Department of Transportation Report No. AZ92-344, 327 p., 5 sheets, scale 1:1,000,000.

Gootee, B. F., Ferguson, C. A., Spencer, J. E., and Cook, J. P., 2010, Geologic map of the Chino Valley North 7.5' quadrangle, Yavapai County, Arizona: Arizona Geological Survey Digital Geologic Map DGM-80, 1:24,000 scale map, 42 p. text.

Kreiger, M.H., 1965, Geology of the Prescott and Paulden Quadrangles, Arizona: U.S. Geological Survey Professional Paper 467, 127 pp., 5 maps, scale 1:48,000.

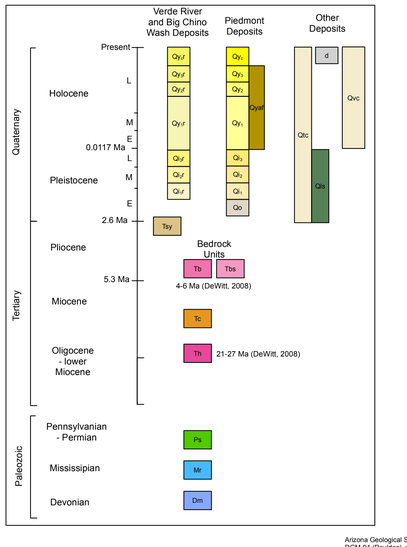
Pearthree, P.A., Menges, C.M., and Mayer, Larry, 1983, Distribution, recurrence, and possible tectonic implications of late Quaternary faulting in Arizona: Arizona Bureau of Geology and Mineral Technology Open-File Report 83-20, 51 p.

Rauzi, S. L., 2001, Arizona has oil and gas potential: Arizona Geological Survey Circular 29, 40 pp.

Riggs, N. R., Hurlbert, J. C., Schroeder, T. J., and Ward, S. A., 1997, The interaction of volcanism and sedimentation in the proximal areas of a mid-Tertiary volcanic dome field, central Arizona, USA: Journal of Sedimentary Research, v. 67, p. 142-153.

Soule, C.H., 1978, Tectonic geomorphology of the Big Chino fault, Yavapai County, Arizona: University of Arizona, M.S. thesis, unpublished, 114 p.

Unit Correlation Diagram



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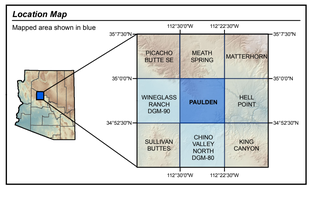
Location Map

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