GEOLOGIC MAP OF THE SOZA CANYON 7½' QUADRANGLE, COCHISE AND PIMA COUNTIES, ARIZONA

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Arizona Geological Survey Digital Geologic Map 61 (DGM-61), version 2.0

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1:24,000 scale

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(also available in Adobe pdf format on CD-ROM)

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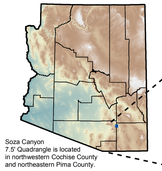
Location Index Map

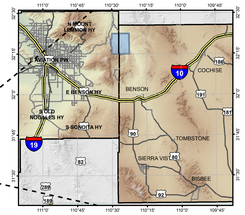
Quadrangle Location Shown in Blue



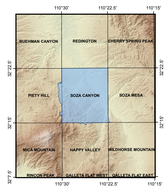
Soza Canyon 7.5' Quadrangle is located in northwestern Cochise County and northeastern Pima County.

Cochise and Pima Counties

Mapped Area Shown in Blue



Adjoining 7.5' Quadrangles



Map Symbol Explanation

Bedding
- bedding, horizontal
- bedding, inclined
- bedding, inclined, approximate
- bedding, inclined crenulated or warped
- bedding, inclined with tops known
- bedding, overturned
- apparent dip
- bedding, vertical

Foliation, Tectonic
- generic foliation, inclined
- generic foliation, inclined
- inclined gneissic foliation
- transposed bedding, inclined

Igneous primary
- generic primary igneous foliation, inclined

Mylonite series
- weak protomylonite
- protomylonite
- mylonite
- mylonitic lineation

Joint
- inclined joint

Fold Hinge
- minor folds

Lineation
- generic lineation, within measured foliation
- lineation with up-dip transport indicators
- lineation with down-dip transport indicators
- lineation, penetrative 'f'-fabric

Fault data
- slickenside striae lineation
- fault attitude
- fault or vein orientation
- mineralized vein showing attitude

Contacts
- approximate contact
- accurate contact
- scratch contact
- queried dashed contact
- concealed contact

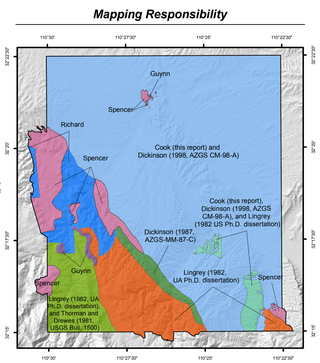
Dikes
- intermediate dike
- mafic dike
- dike of map unit Tapi
- non-foliated hornblende dacite
- andesitic dike

Faults and Shear Zones
- fault, accurate
- fault, approximate
- fault, thrust, accurate
- fault, thrust, approximate
- fault, concealed
- fault, approximate, hypothetical
- fault, low-angle, accurate
- fault, low-angle, approximate
- fault, detachment, accurate
- fault, detachment, approximate
- shear zone, low-angle normal, accurate
- shear zone, low-angle normal, approximate

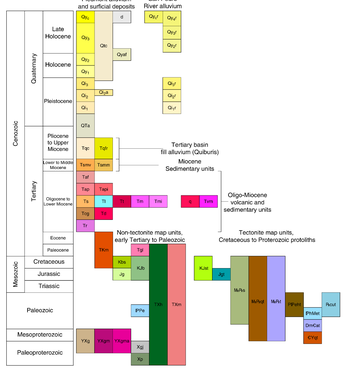
Fold Hinge Surface Trace
- fold hinge surface trace, accurate

Marker Beds
- limestone marker bed in Mineta Formation
- andesite flow in Mineta Formation
- tephra in Mineta Formation
- conglomerate marker bed in tectonite
- unidentified marker bed in tectonite

Mapping Responsibility



Unit Correlation



Topographic base from USGS 1:24,000 scale quadrangle series.
North American Datum of 1983 (NAD83). Projection and 1,000-meter grid: Universal Transverse Mercator, zone 12.

SCALE 1:24,000

1 0.5 0 1 Miles

1 0.5 0 1 Kilometers

0 1000 2000 3000 4000 5000 Feet

contour interval 40 feet

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Map Unit Descriptions

Other units

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

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

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

San Pedro River alluvium

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

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

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

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

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

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

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

Piedmont alluvium and surficial deposits

Qyf — **Modern stream channel deposits** - unconsolidated, very poorly sorted sandy to cobbly ephemeral piedmont channel deposits.

Qyf — **Latest Holocene alluvium** - intermittent tributary channel deposits and low-lying piedmont channel terraces flanking active drainages.

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

Qyp — **Late Holocene alluvium** - planar terrace deposits located along incised drainages, broad low-relief distal fan deposits onlapping onto Holocene river alluvium, and infrequently active tributary drainage deposits.

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

Qlf — **Late Pleistocene alluvial fan and terrace deposits** - relatively planar, reddish terraces mantled by angular to sub-angular pebbles to cobbles.

Qlf — **Middle to late Pleistocene alluvial fan and terrace deposits** - broad planar fan terraces capping Quiburis basin fill deposits, inset into older, more well-rounded alluvial deposits, or lining significant piedmont drainages.

Qlaf — **Middle to late Pleistocene alluvial fan and terrace deposits (younger member)** - broad planar fan terraces found capping Quiburis basin fill deposits, typically inset into slightly older Qlf deposits.

Qf — **Early to middle Pleistocene alluvial fan and terrace deposits** - high-standing, moderately to well-rounded alluvial deposits exhibiting strong carbonate accumulation (where preserved) capping underlying Quiburis basin fill deposits.

QTa — **Late Pliocene to early Pleistocene fan gravel** - coarse, moderately to well-consolidated gravelly deposits capping high rounded ridges.

Tertiary Basin Fill alluvium

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

Tqfr — **Pliocene Quiburis basin fill deposits, fanglomerate unit of Roble Canyon** - moderately indurated conglomerate in upper Roble Canyon and locally in Soza Canyon.

Bedrock units

Miocene sedimentary units

Tsmv — **Conglomerate, San Manuel Formation, volcaniclastic Soza Canyon facies** - Clasts are derived primarily from volcanic rock like those that make up most of the Galiuro mountains as well as locally exposed, depositionally underlying bedrock in lower Soza Canyon (Dickinson, 1991).

Tsmm — **Conglomerate, San Manuel Formation, metamorphiclastic Paige Canyon facies** - Clasts are derived primarily from metamorphic tectonites like those that form nearby bedrock in the Little Rincon Mountains (Dickinson, 1991).

Oligo-Miocene volcanic and sedimentary units

Tvm — **Mafic volcanics of lower Soza Canyon (Oligo-Miocene)** - Dark gray to black, somewhat crystal poor lava flow breccia and local flow cores.

Tq — **Vein Quartz**

Tsf — **Small-feldspar andesite porphyry (Oligo-Miocene)** - Pale to medium brown to reddish brown andesite porphyry that contains 4-10%, 1-3 mm plagioclase, 1-3%, <2 mm hornblende.

Tap — **Andesite porphyry lava flows (Oligo-Miocene)** - Medium to dark gray to dark brown, generally massive lava flows with conspicuous, 10-50%, 3-30 mm, tabular, plagioclase phenocrysts ("Turkey-track porphyry" of Cooper, 1961).

Tapi — **Andesite porphyry intrusion (Oligo-Miocene)**

Tm — **Mafic lava flows (Oligo-Miocene)** - Intermediate to mafic lava flows, aphyric to crystal poor with 1%, 1-5 mm black pyroxene.

Tmi — **Mafic intrusion (Oligo-Miocene)** - Mafic lava similar to that in nearby flows of map unit Tm here has steep irregular contact with intruded granite.

Tt — **Ash-fall tuff (Oligo-Miocene)**

Tl — **Limestone of the Mineta Formation (Oligo-Miocene)** - Medium gray, bedded limestone, with oncolitic concretions(?).

Ts — **Sandstone and siltstone of the Mineta Formation (Oligo-Miocene)** - Coarse to fine sandstone, sandy siltstone, and siltstone, locally with 0.2-2 m thick gypsiferous siltstone beds and 1-4 m thick limestone beds.

Tcg — **Conglomerate of the Mineta Formation (Oligo-Miocene)** - Basal Tertiary conglomerate consists dominated by granite clasts near its base with increasing fractions of other rock types up section.

Td — **Dacite lava (Oligo-Miocene)** - Intermediate composition volcanics with 5-7%, <3mm biotite, 15% feldspar, of which a small fraction is sanidine(?), and 1-2% oxidized pyrite(?). Unit is exposed over a small area southeast of Bar LY ranch where it forms a lens within tilted conglomerate.

Tr — **Rhyolite lava (Oligo-Miocene)** - Quartz-biotite porphyry with locally fragmental texture. Volcanic-lithic fragments are not stretched or flattened. Uncertain if this is lava or pyroclastic unit.

Non-tectonite map units, early Tertiary to Pennsylvanian

TKm — **Mafic intrusive rocks in metamorphic tectonites and along shear zones (Tertiary to Cretaceous)** - Dark greenish gray, moderately to strongly chloritized, very fine- to fine-grained mafic intrusive rocks that occur in sheets within metamorphic tectonites and along thrust faults placing muscovite granite on Bisbee group in the same area.

Kbs — **Sandstone, Bisbee Group (upper Jurassic to middle Cretaceous)** - Mostly medium to fine grained, quartz-rich sandstone. Includes silty, fine grained sandstone, siltstone, calcareous siltstone, and conglomerate with subrounded quartzite clasts up to 10 cm diameter.

Kcb — **Bisbee Group, undivided (Cretaceous to Jurassic)** - Carbonate, siltstone, sandstone, and conglomerate of the Bisbee Group, undivided.

Jg — **Glance Conglomerate member of the Bisbee Group (Jurassic)** - Several-meter-thick pebbly sandstone and conglomerate.

PPe — **Earp Formation of the Naco Group (Pennsylvania to Permian)** - Interbedded fine grained quartzose sandstone and variably silty to pure limestone (mapped by Lingrey, 1982).

Tectonite map units, Mesozoic and Paleozoic protoliths

JgC — **Glance Conglomerate member of the Bisbee Group, tectonite (Jurassic protolith)** - Several-meter-thick pebbly sandstone and conglomerate.

MvMs — **Greenschist (Mesozoic to Paleozoic protolith)** - Phyllite to very fine grained metasandstone in the Blueneck Mine area. Unit has strong foliation that could be transposed bedding.

MvMzt — **Quartzite tectonite (Mesozoic to Paleozoic protolith)**

MzMs — **Metasedimentary tectonite, undivided (Mesozoic to Paleozoic protolith)** - Metamorphic tectonite that consists of interlayered marble, calc-silicates, metasandstone, phyllite, and quartzite.

PPeMs — **Tectonite derived from Horquilla Limestone and Earp Formation, undivided (Pennsylvanian to Permian protolith)** - Interbedded marble and calc-silicate (Lingrey, 1982).

PMMet — **Marble tectonite derived from Escabrosa Limestone and Horquilla Limestone, undivided (Mississippian to Pennsylvanian protolith)** - Typically calcite marble and slightly siliceous calcite marble (mapped by Lingrey, 1982).

DmCat — **Tectonite derived from Abrigo Formation and Martin Formation, undivided (Devonian and Cambrian protoliths)** - Calcite and dolomite marble and variably siliceous marble and calc-silicates (mapped by Lingrey, 1982).

CYqt — **Dripping Spring Quartzite and Bolsa Quartzite, undivided, tectonite (Middle Proterozoic and Cambrian protoliths)**

Chimney Canyon klippe, southwest Espiritu Canyon

KJsl — **Sandy and conglomeratic tectonite derived from Bisbee Group (Jurassic to Cretaceous protolith)**

Jcvt — **Carbonate tectonite derived from upper Paleozoic limestone and dolostone (upper Paleozoic protolith)** - Calcite marble tectonite, locally containing very fine sand or siliceous stringers.

Tertiary to Proterozoic crystalline-rock map units

Tgl — **Heterogeneous pegmatitic leucogranite (Eocene)** - Leucogranite that varies from highly heterogeneous and pegmatitic to medium to fine grained muscovite granite.

TKh — **Hornblendite (Paleoproterozoic to Tertiary)** - Consists of 85-90% 2-10 mm hornblende and interstitial plagioclase.

TXm — **Fine-grained, mafic biotite granitoid (Paleoproterozoic to Tertiary)**

YXg — **Biotite granite, undivided (Paleoproterozoic or Mesoproterozoic)** - Porphyritic biotite granite described as "porphyritic biotite quartz monzonite to granodiorite" (Lingrey, 1982).

YXgm — **Porphyritic two-mica granite (Paleoproterozoic or Mesoproterozoic)** - Coarse-grained, two-mica granite, with 1-3% 1-2 mm muscovite, 5-10%, 2-8 mm clots of biotite, and tabular, red K-feldspar up to 4 cm long.

YXgma — **Leucogranitic phase of porphyritic two-mica granite (Paleoproterozoic or Mesoproterozoic)**

Xgj — **Johnny Lyon granodiorite (Paleoproterozoic)** - Medium-grained biotite granite with blocky, 1-4 cm long, K-feldspar megacrysts that make up 10-25% of the rock unit, and <5-10% mafic minerals, most of which is probably biotite but is generally too altered for definitive identification.

Xs — **Pinal Schist (Paleoproterozoic)** - Very fine- to fine-grained quartz-mica schist.