AZGS OFR 99-18, Picacho Mtns.
Plate 1 of 2

Rock Units

Qs **Surficial deposits** (Holocene and Late Pleistocene) -- Undifferentiated sand, gravel, silt and clay.

Qyd **Debris-flow deposits** (Holocene) -- Non-indurated, matrix poor to matrix rich, very coarse boulder gravel deposited by historic debris flows.

Qtc **Talus and colluvium** (Holocene and Pleistocene) -- Non-consolidated talus and colluvium on hill slopes.

Qy **Low terrace and alluvial fan deposits** (Holocene) -- Undifferentiated deposits equivalent to Qya and Qma

Qy_2f **Fine-grained basin-fill deposits** (late Holocene) -- Non-indurated sand and gravel in well defined channels.

Qy_2r **Alluvium in major active channels and floodplains** (late Holocene) -- Non-indurated to weakly indurated silt to coarse sand with lenses of rounded gravel. Very little soil developed on surfaces.

Qy_2 **Alluvium in active floodplains and fans** (late Holocene) -- Weakly indurated to non-indurated sand to boulder gravel, grading to sand and silt away from mountains. Soil is not developed, and surfaces typically not dissected.

Qy_1f **Fine-grained basin fill deposits** (late Holocene to middle Holocene) -- Fine-grained, non-indurated to poorly indurated deposits, with slight soil development.

Qy_1 **Alluvium on undissected terraces and alluvial fans** (middle Holocene to early Holocene) -- Weakly to moderately indurated sand and gravel, generally finer grained than late Holocene alluvium (Qya). Soil is weakly to moderately developed.

Qlyf **Fine-grained deposits** (Holocene and Late Pleistocene) -- Weakly indurated, fine-grained (<2 mm), well stratified sand and well rounded gravel. Soils typically contain argillic horizons or moderately developed calcic horizons.

Ql **Alluvium on slightly dissected fans** (Late Pleistocene) -- Weakly indurated sand and gravel deposits, grain size significantly larger than in younger alluvial fan deposits. Soil is well developed with argillic or calcic horizons. Desert pavement discontinuous and moderately developed.

Qlr **Fluvial deposits** (Late Pleistocene) -- Deposits of well stratified sand and well rounded gravel. Silty sand covers the surface in most places, but granule to pebble desert pavement is locally present. Soils have calcic horizons.

Qm **Alluvium on relict, moderately dissected fans** (Middle Pleistocene) -- Weakly indurated sand and gravel deposits, generally non-consolidated. Clasts are significantly larger than in Holocene alluvial fan deposits. Soils have petrocalcic horizons; argillic horizon may be present. Desert pavement is well developed, but discontinuous.

Qmf **Fine-grained basin fill** (Middle Pleistocene) -- Fine-grained deposits (<2mm), soils commonly have petrocalcic horizons and silica-cemented duripans; argillic horizons may or may not be preserved.

Qo **Alluvium on old, dissected fans** (Early Pleistocene) -- Moderately indurated sand and gravel to sandy conglomerate. Soil mostly removed by erosion, and petrocalcic horizon crops out at surface. Desert pavement well developed, but discontinuous.

Thc **Hydrothermal carbonate** (Miocene or Oligocene) -- Tan weathering, massive to banded carbonate, mostly calcite, permeates fault zone between altered Tertiary volcanic rocks and crushed, chloritized granite (YXg).

Tvs **Volcanic lithic sandstones and bedded pyroclastic rocks** (Miocene or Late Oligocene) -- Thin-bedded, fine-grained tuff to coarse-grained, massive tuff breccia and medium-grained volcaniclastic sandstone and cobble-boulder conglomerate.

Tau **Crystal-poor andesite** (Early Miocene or Late Oligocene) -- Crystal-poor, pyroxene-porphyritic lavas of probable trachyte, basaltic andesite, or andesitic composition characterized by pyroxene-porphyritic texture and finer grained sparse plagioclase phenocrysts.

Tai **Intrusive andesite** (Early Miocene or Late Oligocene) -- Very-fine grained crystal poor intrusive andesite, resembles crystal-poor andesite.

Td **Biotite dacite** (Early Miocene or Late Oligocene) -- Crystal-rich, biotite- or hornblende-phyric dacitic lava.

Tdx **Dacitic volcaniclastic rocks** (Early Miocene or Late Oligocene) -- Volcanic-lithic sandstone and conglomerate, and tuff. Clasts are mostly dacite resembling unit Td.

Tap **Crystal-rich andesite** (Early Miocene or Late Oligocene) -- Crystal-poor to crystal-rich lava flows of andesitic character characterized by abundant 1-2 mm diameter plagioclase phenocrysts; interbedded with thin volcaniclastic and pyroclastic units or in amalgamated sequences.

Tax **Plagioclase-porphyritic andesite breccia** (Early Miocene or Late Oligocene) -- Crystal-poor to moderately crystal-rich andesitic lava breccia, tuff breccia and probable epiclastic breccias interbedded locally with thin, crystal-poor, plagioclase-phyric lavas.

Tat **Crystal-rich trachytic texture andesite** (Early Miocene or Late Oligocene) -- Gray, plagioclase- and pyroxene-phyric andesite lava with a distinctive trachytic texture defined by aligned plagioclase lathes.

Tao **Older andesite** (Early Miocene or Late Oligocene) -- Andesitic lava flows characterized by sparse pyroxene crystals and less abundant, finer-grained plagioclase crystals; nearly identical to upper crystal-poor andesite (Tau), but are generally slightly more crystal-rich, and are interbedded with nonvolcaniclastic conglomerate (Tc).

Tc **Arksic sandstone and conglomerate** (Early Miocene or Late Oligocene) -- Medium- to thick-bedded, pebble- to boulder conglomerate and pebbly sandstone that weathers to a purple gray color and forms rounded outcrops.

Tdf **Felsic dikes** (Miocene to Oligocene) -- Aphyric to crystal poor, light-colored dikes and irregular pods. Porphyritic dikes contain up to several percent biotite up to 1 mm diameter, and 5-20% quartz, plagioclase and K-feldspar crystals about 1 mm in diameter in an aphanitic groundmass.

Tdg **Granophyre dikes** (Miocene or Late Oligocene) -- Fine-grained, holocrystalline biotite granite or granodiorite dikes.

Tm **Intrusive mafic rocks** (Miocene or Oligocene) -- Dark gray, very fine-grained diorite.

TXm **Diorite and amphibolite** (Miocene, Early Tertiary, Cretaceous or Early Proterozoic) -- Dark colored, texturally variable fine-grained diorite, microdiorite, gabbro, and mafic gneiss.

Tgm **Barnett Well Granite and felsic dikes** (Miocene or Late Oligocene) -- Mixed unit consisting of Barnett Well Granite (Tg) intruded by abundant, sub-parallel felsic dikes.

TKpr **Picacho Mountains granite and dikes** (Miocene or Early Oligocene) -- Mixed unit consisting of 40-50% dikes that form a boxwork intruding Picacho Mountains Granite.

Tdi **Intermediate-composition dikes** (Miocene or Late Oligocene) -- Very fine-grained, homogranular, biotite granodiorite to diorite dikes that consist of 10-20% anhedral 1 mm-diameter quartz, 4-10% 0.5-1mm diameter biotite flakes, and 80% subhedral to anhedral 0.5-1 mm diameter feldspar

Tdm **Mafic dikes** (Miocene or Oligocene) -- Dark gray-green to black, very fine-grained, aphyric or slightly porphyritic dikes, commonly with a weak cleavage. The dikes are non-resistant and crop out poorly.

Tg **Barnett Well Granite** (Miocene or Late Oligocene) -- Medium- to fine-grained, equigranular biotite granite or granodiorite; typically non-foliated and massive, weathers to rounded boulders. Rock consists of about 20-40% quartz, 60-80% feldspar, and 2-5 % biotite. Grain size is typically 1-2 mm, with sparse subhedral feldspar crystals 2-3 mm in diameter scattered through the rock.

TKgh **Picacho Reservoir hornblende granitoid** (Miocene, Late Oligocene, Early Tertiary or Late Cretaceous) -- Medium- to coarse-grained homogranular granite, quartz monzonite, quartz monzodiorite, and granodiorite. Consists of 12-24% quartz, 24-34% orthoclase, 35-50% plagioclase, and 10-23% mafic minerals--predominantly hornblende.

TKnp **Newman Peak Leucogranite** (Eocene to Late Cretaceous) -- Medium-grained, equigranular, homogeneous, muscovite granite, locally contains garnet. Pegmatites are common, especially near contacts with underlying rocks.

Picacho Mountains Granite (Eocene to Cretaceous)

Texturally and compositionally variable granitoid complex, ranging from medium-grained, biotite±muscovite granite or granodiorite to faintly heterogeneous layered granitoids to heterogeneous gneiss with local layers of augen gneiss and muscovite granite. This unit is distinguished from the Barnett Well granite (Tg) by its coarser-grained character, wider variation in grain size in hand samples, and the absence of ubiquitous gneissic foliation in the Barnett Well granite (Tg).

TKp Aplite and pegmatite-

TKpm Main biotite-muscovite phase -- Moderately to strongly foliated, biotite-bearing, medium-grained granite, locally slightly K-spar porphyritic.

TKm Muscovite-rich phase -- Granite contains 2-5% muscovite in 1-4 mm diameter flakes, 1-4% biotite in 1-3 mm flakes, 60-80% feldspar in subhedral 4-6 mm diameter grains, and 20-40% quartz in slightly flattened 2-4 mm diameter grains. Contacts with main phases are gradational over 10-20 m.

TKpp Pegmatite-rich phase -- Like main phase, but contains >10% variably foliated, coarse-grained, locally garnet-bearing pegmatite dikes and sills, and typically contains noticeably more muscovite than main phase.

TKpg Gneissic phase (Eocene to Cretaceous) -- Distinctly gneissic and heterogeneous granitoid. Similar in character to main phase, but vague compositional banding becomes ubiquitous and obvious, and lithologic variability is greater.

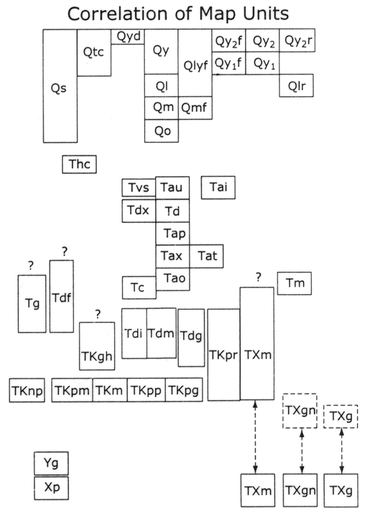
TXgn **Gneiss** (Middle Tertiary, Cretaceous, or Early Proterozoic) -- Heterogeneous, banded gneiss; generally more quartzofeldspathic and heterogeneous than Pinal Schist.

TXg **Hornblende-K-feldspar granitoid and gneiss** (Eocene, Cretaceous or Early Proterozoic) -- Foliated to gneissic granitoid characterized by the presence of hornblende and 1-3 cm diameter K-feldspar porphyroblasts/phenocrysts.

YXg **Granite** (Middle Proterozoic or Early Proterozoic) -- Equigranular to weakly porphyritic, medium- to coarse-grained, non-mylonitic granite that is directly beneath the andesite klippe in the southeastern Picacho Mountains. Also includes a large, elongate block of granite in the crystal-poor andesite unit (Tau) near the summit of Picacho Peak.

Xp **Pinal Schist** (Early Proterozoic) -- Fine-grained, quartz + feldspar + biotite + muscovite schist and psammite. Mapped in outcrops that clearly have sedimentary protolith with <20% granitic component.

Correlation of Map Units



Symbols

FOLIATION; strike and dip

Broken and wavy lines may be used to indicate approximate measurements or curviplanar foliation in conjunction with any symbol

Primary foliation

BEDDING

upright | vertical | irregular | approximate

FLOW FOLIATION

igneous flow foliation in plutons

Tectonic foliations

GENERIC FOLIATION

Differentiated foliations

COMPOSITIONAL BANDING (GNEISSIC)

WEAK DIFFERENTIATED FOLIATION, PARALLEL TO WEAK SHAPE FOLIATION

Mylonite series ('b' next to dip value indicates that fabric is present in a thin band or shear zone)

WEAK SHAPE FABRIC (generally L>S)

WELL DEVELOPED S-TECTONITE

PROTOMYLONITE (significant grain size reduction; no arrow on lineation indicates sense of shear is indeterminant)

MYLONITE (with lineation indicated; arrow head on lineation indicates sense of shear if known--top relative to bottom)

ULTRAMYLONITE (flinty, laminated tectonite)

Disjunct foliation

JOINT, inclined; arrow indicates orientation of striae in joint surface

JOINT, vertical

LINEAR FEATURES; trend and plunge

LINEATIONS

Mineral lineation in L-tectonites

CONTACTS

Solid lines indicate precise location, dashed lines approximate location, dashed with queries very approximate, and dotted inferred beneath younger blanketing or intrusive units.

intrusive or depositional contact

FAULTS

ball on down-thrown side, arrow indicates dip, box arrow indicates orientation of slickenside striations

MISCELLANEOUS

Tie line joining regions underlain by same map unit

Silicified zone

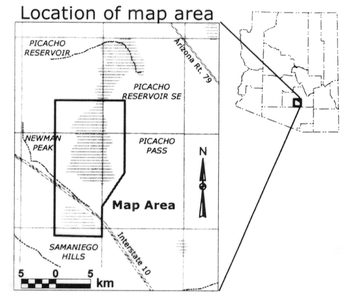
Earth Fissure

(M) Mineralized site described in text

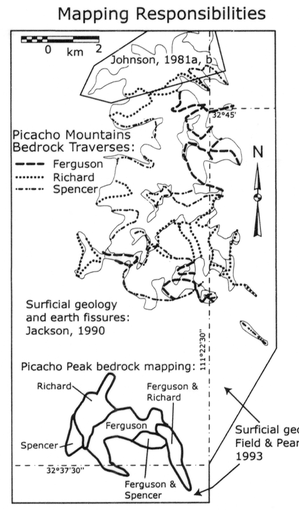
Sample location

Well with subsurface data

Location of map area



Mapping Responsibilities



Base map from USGS 7.5' topographic quadrangle maps: Picacho Reservoir, Picacho Reservoir SE, Newman Peak, Picacho Pass and Samaniego Hills

Mapping jointly funded by the Arizona Geological Survey and the U. S. Geological Survey under STATEMAP Program contract #98HQAG2064.

SCALE 1:24 000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

N MN 13°

Geologic map of the Picacho Mountains and Picacho Peak, Pinal County, Southern Arizona

by
Stephen M. Richard, Jon E. Spencer, Charles A. Ferguson, and Philip A. Pearthree

1999
Arizona Geological Survey Open-File Report 99-18

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