Quaternary

Artificial Deposits

af — **Artifical fill (Modern)–**Compacted mud, sand, and gravel.

Colluvial Deposits

Qc — **Colluvium (Holocene)–**Gravel and sand deposited along steep slopes. Poorly sorted and unstructured, with weak to absent soil development. 1-4 m thick.

Qca — **Alluvium and colluvium, undifferentiated (middle? Pleistocene to Holocene)–**Alluvial and colluvial gravels along streams within the highlands, undifferentiated. 0 to 6 m thick.

Qtal — **Talus (Holocene)–**Poorly sorted angular pebbles to boulders deposited along steep slopes with little to no matrix material. 1-4 m thick.

Qls — **Landslides (Holocene)–**Deposits of large, semicohesive blocks derived from uphill escarpments of competent rock. 1-6 m thick.

Alluvium of Tortolita Canyon

Qfty — **Younger alluvial fan sediment (Holocene)–**Pebbles to minor boulders with matrix of very fine to very coarse sand with minor silt and clay. No notable soil development. 2-4 m-thick.

Qtt2 — **Younger terrace sediment of Tortolita Canyon (upper Pleistocene)–**Surface is 4-5 m above modern stream grade.

Qtt1 — **Older terrace of Tortolita Canyon (lower to upper Pleistocene)–**Surface is 5-8 m above modern stream grade.

Qfto2 — **Intermediate alluvial fan sediment (Pleistocene)–**Alluvial fan whose surface grades into terrace unit Qtt1.

Qfto1 — **Older alluvial fan sediment (Pleistocene)–**Alluvial fan whose surface appears to be geomorphically above that of terrace unit Qtt1.

Alluvial Deposits

Qah — **Historic alluvium (0-150? years old)–**Sandy gravels deposited by historic discharge events. Very poorly to moderately sorted, subangular to subrounded, pebbles to local boulders, in well bedded deposits with no notable soil development. 1 to 3+ m thick.

Qahgf — **Historic gully-mouth fan alluvium (Historic)–**Interfingering gravel and sand deposits in distributary fans at the mouths of active gullies. Very poorly to poorly sorted, sand to pebbles to cobbles, in bars and swales that fine downstream. No notable soil development. <1 to 2 m thick.

Qay2 — **Younger alluvium, younger subunit (middle to upper Holocene)–**Brownish-gray sand and gravelly sand with local pebble interbeds. Poorly sorted, medium to fine sand, in weakly bedded to massive deposits, with rare paleochannels of well-bedded pebbles. Weak soil development, with up to Stage I carbonate and/or gypsum accumulation, and brownish gray colors (10YR 3/2 to 7.5YR 5/3). 0.5 to locally 4 m thick.

Qay2h — **Younger alluvium, younger subunit, and historic alluvium, undifferentiated (middle Holocene to Recent)–**Units Qay2 and Qah, undifferentiated. 1 to 4 m thick.

Qay1 — **Younger alluvium, older subunit (lower Holocene)–**Brown pebbles and sands with rare cobbles. Poorly sorted pebbles and rare cobbles fining downstream to fine to coarse sand with rare pebbles. Well-bedded to massive, typically fining upwards. Moderate soil development, with up to Stage II+ carbonate accumulation, Stage I gypsum accumulation, weak clay illuviation textures, and local reddish brown (5YR 5/2) colors (more commonly 7.5YR 4/2 to 6/3 browns). 1 to 4 m thick.

Qay — **Younger alluvium, undifferentiated (Holocene)–**Units Qay2 and Qay1 undifferentiated. 0.5 to 4 m thick.

Qayh — **Younger alluvium and historic alluvium, undifferentiated (Holocene to Recent)–**Units Qay and Qah, undifferentiated. 1 to 4 m thick.

Qai — **Intermediate-aged alluvium (uppermost Pleistocene)–**Reddish-brown, often clay-rich sands and pebbly sands with local gravel interbeds. Poorly to moderately sorted, locally well-bedded in paleochannels, typically massive. Moderately strong soil development, with up to Stage II+ carbonate accumulation, Stage I gypsum accumulation, common clay illuviation textures, rare disintegrating clasts, and common reddish brown (5YR 4/3 to 6/3) colors. 0 to 2 m thick.

Qao — **Older alluvium, undifferentiated (Pleistocene)–**Gravel and sand deposits characterized by strongly developed carbonate horizons, buried soils, and coarse gravel sizes. Generally assigned to either Qao2 or Qao1 based on the relative height of the surface capping each deposit. Poorly to moderately sorted pebbles to local boulders in well-bedded and commonly cross-bedded deposits, grading to massive sands downstream. Strong soil development, with up to Stage III+ carbonate accumulation, Stage I gypsum accumulation, local clay-rich textures, rare disintegrating clasts, and reddish brown (2.5YR 4/3 to 5YR 6/3) colors. 1 to 10+ m thick.

Qao2 — **Older alluvium, younger subunit (upper? Pleistocene)–**Qao deposits capped by a surface inset upon that of Qao1. 1 to 3 m thick.

Qao1 — **Older alluvium, older subunit (middle? to upper Pleistocene)–**Qao deposits capped by a surface inset up by those of Qao2. 1 to 10+ m thick.

QTa — **High-level alluvium (upper Pliocene? to lower Pleistocene)–**Coarse gravels characterized by very strongly developed carbonate horizons and relatively shallow bedrock. Very poorly sorted pebbles to boulders, commonly heavily cemented by carbonate. Strong soil development, with up to Stage IV carbonate accumulation. Very poorly exposed. 1 to 35+ m thick.

Tertiary Volcanic Deposits

Sierra Blanca Volcanics

Tcp — **Church Mountain phonolite (Oligocene)–**Light gray to dark gray, weathering to beige, buff, and reddish orange, crystal-rich flows with variable lithic content and sparse pumice. Phenocrysts are dominantly medium to coarse grained potassium feldspar and plagioclase feldspar, with local sparse to common fine to medium grained biotite and amphibole. Includes interbedded volcaniclastic sediments, fine grained lava flows, and sparse vitrophyres that grade upward to Tcp. K-Ar age of 31.8 Ma (Weber 1971), new Ar/Ar age of 32.7 Ma. Up to 500 m thick.

Tnt — **Nogal Peak trachyte (Oligocene)–**White to pale pinkish gray, slightly porphyritic to aphyric trachyte lavas. Sparse phenocrysts of plagioclase, biotite, and hornblende. Includes intercalated flow breccias. 25 m thick.

Tkcf — **Lava flow of Kountz Canyon (Oligocene)–**Crystal-rich feldspar-pyroxene porphyry flows. Feldspar phenocrysts to 7 mm across and zoned, pyroxene to 2 mm across. Up to 25 m thick.

Tgpfl/Tgpfu — **Lava flows of Gaylord Peak (Oligocene)–**Gray to pink, crystal-rich feldspar-pyroxene porphyry flows. Feldspar up to 7 mm across and equant to elongate, pyroxene up to 4 mm across. Fine-grained to aphanitic matrix. Upper flow up to 150 m thick; lower flow up to 50 m thick.

Walker Volcanic Breccia

Twd — **Unit of Double Diamond Peaks, undivided (Oligocene)–**Intercalated plagioclase-phyric porphyry lavas, plagioclase- and amphibole-phyric porphyry lavas, and pebble to locally boulder conglomerates. Typically assigned to either Twdf or Twds depending on whether flows or sediments dominate, respectively. Up to ~280 m thick

Twdf — **Unit of Double Diamond Peaks, flow-dominated subunit (Oligocene)–**Brownish gray to light purplish gray to bluish gray plagioclase, plagioclase-amphibole, and plagioclase-pyroxene porphyry lava flows. Textures from sparse (<1%) and fine-grained (<1 mm across) porphyries to crystal-rich (up to 20%), medium-grained (up to 5 mm across) porphyries. Includes rare intercalated conglomerate beds. Up to 280 m thick.

Twds — **Unit of Double Diamond Peaks, sediment-dominated subunit (Oligocene).** Purplish gray to gray pebble to cobble to locally bouldery volcaniclastic conglomerates. Very poorly to poorly sorted, angular to subrounded clasts of dominantly plagioclase porphyry lavas. Locally appears to fill map-scale paleocanyons. Includes rare intercalated lavas. Up to 140 m thick.

Twas — **Tuff of Argentina Springs (Oligocene)–**Black to gray to yellowish tan, poorly welded to densely welded and strongly flow-foliated (rheomorphic), lithic-rich ignimbrite. Locally abundant phenocrysts of sanidine, plagioclase, and biotite up to 5 mm across, with sparse quartz and hornblende(?). Along north flank of Church Mountain, includes an intercalated volcaniclastic interval. 40 to 120 m thick.

Twr — **Unit of Rattlesnake Canyon, undivided (upper Eocene? to Oligocene).**

Twrtau — **Unit of Rattlesnake Canyon, upper (basaltic) trachyandesite subunit (upper Eocene? to Oligocene)–**Light purplish gray to medium gray plagioclase porphyry lava flows. Plagioclase phenocrysts are common (3-15%) and up to 9 mm across. Locally common pyroxene phenocrysts are up to 3 mm across. 0 to 30 m thick.

Twrtbu — **Unit of Rattlesnake Canyon, upper trachybasalt subunit (Upper Eocene? to Oligocene)-** Upper section of light gray aphanitic lava flows. 0 to 6 m thick.

Twrfp — **Unit of Rattlesnake Canyon, fine-grained flow with small pyroxene phenocrysts (upper Eocene? to Oligocene)–**Dark gray-brown to medium gray plagioclase-pyroxene porphyry lava flows. Phenocrysts are common (15-20%) and up to 2 mm across, of subequal plagioclase and pyroxene. 0 to 100+ m thick.

Twrvs — **Unit of Rattlesnake Canyon, volcaniclastic sedimentary subunit (upper Eocene? to Oligocene)–** Dark reddish to purplish gray to medium gray, matrix-supported pebble to cobble conglomerates. Poorly sorted and typically massive, with clasts of aphyric and plagioclase-phyric lavas. Includes rare intercalated aphyric lavas. 10 to 110 m thick.

Twrtbl — **Unit of Rattlesnake Canyon, lower trachybasalt subunit (upper Eocene? to Oligocene)–**Dark gray, fine-grained to aphanitic trachybasaltic lava flows. Phenocrysts are fine (up to 1 mm across) and of plagioclase, pyroxene, and sparse iddingsitized olivine. Includes rare intercalated conglomerate beds. 0 to 75 m thick.

Twrtap — **Coarse plagioclase porphyritic trachybasalt to basaltic trachyandesite (upper Eocene? to Oligocene)–**Distinctive dark gray to gray coarse plagioclase porphyry lava flow. Elongate plagioclase phenocrysts are abundant (15-25%) and very coarse (1-2 cm across). 1 to 4 m thick.

Twrtal — **Unit of Rattlesnake Canyon, lower (basaltic) trachyandesite subunit (upper Eocene? to Oligocene)–**Reddish brown to gray plagioclase-pyroxene porphyry lava flows. Crystal-poor to crystal-rich (5-25%) with fine to coarse (<5 to 10 mm across) phenocrysts. Includes rare intercalated aphanitic lava flows. Gradational basal contact. 35 to 290 m thick.

Twrta — **Unit of Rattlesnake Canyon, trachyandesitic subunits, undivided (upper Eocene? to Oligocene)–**Plagioclase porphyry lavas with limited stratigraphic context.

Twrtb — **Unit of Rattlesnake Canyon, trachybasaltic subunits, undivided (upper Eocene? to Oligocene)–**Fine-grained to aphanitic lavas with limited stratigraphic context.

Twbf — **Unit of Barber Ridge, conglomerate-and breccia-dominated subunit (upper Eocene to Oligocene).–**Medium gray to reddish and purplish gray pebble to cobble conglomerates and breccias. Poorly sorted pebbles to cobbles and local boulders of plagioclase-pyroxene porphyries of varying textures. Exposed thickness is 40 to 115 m.

Twbs — **Unit of Barber Ridge, conglomerate-and breccia-dominated subunit (upper Eocene to Oligocene).–**Medium gray to reddish and purplish gray pebble to cobble conglomerates and breccias. Poorly sorted pebbles to cobbles and local boulders of plagioclase-pyroxene porphyries of varying textures. Exposed thickness is 40 to 115 m.

Tertiary and Mesozoic Sedimentary Rocks

Tsc — **Sanders Canyon Formation (upper Eocene)–**Interbedded maroon to red floodplain deposits and light gray, sandy channel-fills. Sandstones are of poorly to moderately sorted, subangular, fine to medium sands rich in volcanic lithics (25-60%), with sparse (<1%) fine to coarse pebbles of plagioclase porphyries. Conformable basal contact. 150 to 400 m thick.

Tertiary Intrusive Rocks

Tscf — **Sanders Canyon Formation, fine-grained subunit (upper Eocene)–**Maroon to red floodplain deposits. Locates areas of the Sanders Canyon Formation where the floodplain deposits dominate.

Stocks and Map-Scale Sills

Tcm — **Cub Mountain Formation (lower to middle Eocene)–**Interbedded white to pale yellow to light reddish gray, arkosic sandstones and reddish mudstones. Sandstones are of moderately to well sorted, subangular to rounded, medium sands rich in quartz (30-70%) in massive to cross-stratified paleochannels. Sparse fine pebbles of quartzite, rhyolite, and chert. 370-570 m thick.

Mesozoic Sedimentary Rocks

Kccu — **Crevasse Canyon Formation, upper part (upper Cretaceous)–**Intercalated yellow channel-fill sandstones and yellowish-green floodplain deposits. Sandstones are moderately to well sorted, subangular to subrounded, fine to medium sands of mainly quartz and lesser feldspars and lithic grains. Sparse pebbles of rhyolite, felsic intrusives, quartzite, and chert. 250-270 m thick.

Kccl — **Crevasse Canyon Formation, lower part (upper Cretaceous)–**Strata similar to that of unit Kccu, but the proportion of floodplain sediment exceeds that of sandstone channel-fills. 280-300 m thick.

Rialto Stock

Tirm — **Monzonite (Oligocene)–**Gray, weakly porphyritic fine- to medium-grained monzonite. Contains phenocrysts of plagioclase and small pyroxene. Intrudes Tirs/Tirp.

Tirfw — **Fine-grained white syenite (Oligocene)–**White, fine-grained equigranular syenite. Hand lens-visible mineralogy of potassium feldspar, altered mafic minerals, and sparse quartz. Gradational contact with Tirs/Tirp.

Tirs/Tirp — **Syenite to syenite porphyry (Oligocene)–**Greenish gray, medium- to coarse-grained syenite. Hand lens-visible mineralogy of plagioclase, potassium feldspar, pyroxene, hornblende, and biotite. Slightly porphyritic center (Tirp) has 4-7 mm across potassium feldspar phenocrysts. K-Ar age of 31.4 Ma (Thompson, 1973).

Tirtc — **Syenite porphyry of Tortolita Canyon (Oligocene)–**Coarse porphyry syenite. Medium-grained matrix of potassium feldspar, hornblende, and trace biotite surrounds 1-2 cm long, elongate, embayed potassium feldspar phenocrysts. Intruded by Tirs/Tirp.

Tirfg — **Fine-grained gray syenite (Oligocene)–**Dark gray, fine-grained, sparsely porphyritic syenite. Phenocrysts of green amazonite, pink orthoclase, pyroxene, and biotite. Intruded by Tirs/Tirp.

Tirx — **Xenolith-rich margins of the Rialto stock (Oligocene)–**Angular to subrounded blocks of fine-grained syenite and Walker volcanics included within medium- to fine-grained syenite near the margins of the Rialto stock.

Miscellaneous Sills

Titlc — **Trachyte sill of Little Cub Mountain (Oligocene)–**Fine-grained trachyte. Hand lens-visible mineralogy dominated by feldspar, with rare unidentified mafic grains (3-8%). 0 to 100 m thick.

Tihss — **Syenitic sill of Hughes Hill (Oligocene)–**Light gray to yellowish gray porphyritic syenite. Phenocrysts of potassium feldspar (5-10%, 1 to 8 mm across), plagioclase (2-3%, up to 1 mm across), hornblende (~1%, up to 1 mm across), and biotite (<<1%). Fine-grained matrix. 0 to 20 m thick.

Tidsb — **Alkali basalt porphyry of Diamond Spring (Oligocene)–**Purplish gray to dark gray coarse plagioclase porphyry basalt. Plagioclase phenocrysts are flattened broad lathes 0.1 to 2 cm across (coraser in Tidsb1) and up to 35% of rock.

Mafic-intermediate Intrusions

Tiwb — **Alkali basalt porphyry of Wind Canyon (Oligocene)–**Medium to dark gray, coarse plagioclase ± fine pyroxene porphyry basalt. Phenocrysts are plagioclase (9-20 mm across, 5-10%) and pyroxene (up to 3 mm across, 0-2%). Aphyric to fine-grained matrix of plagioclase, pyroxene, and other mafic grains.

Tibu — **Basaltic porphyry instrusions, undivided (Oligocene)–**Medium to dark gray, coarse plagioclase ± fine pyroxene porphyry basalts. Small outcrops of rocks similar to Tidsb and Tiwb with poorly exposed contacts, interpreted to be mafic intrusive bodies.

Tipm — **Monzodiorite of Pine Canyon (Oligocene)–**Light gray to medium gray, fine- to medium-grained monzodiorite. Crystals are <1 to 2 mm across of potassium feldspar, plagioclase (up to 30%), amphibole (up to 15%), and biotite (up to 5%).

Dikes and Thin Sills

Felsic Dikes and Sills

Tit — **Fine-grained to aphyric trachyte dikes (Oligocene)–**White to light gray, aphanitic to sparsely porphyritic trachytes. Sparse feldspar phenocrysts up to 1 mm across. Up to 1 m thick.

Tis — **Medium-grained syenite dikes (Oligocene)–**Pink, medium-grained, equigranular synites. Composed of potassium feldspar, green pyroxene, occasional biotite and sparse quartz. Up to 20 m thick.

Tisp — **Porphyritic syenite dikes (Oligocene)–**White to light gray and light tan, potassium feldspar ± plagioclase porphyry syenites. Potassium feldspar phenocrysts 2 to 8 mm across, up to 15% of rock, plagioclase 1-4 mm across, up to 5% of rock. Up to 7 m wide.

Tiss — **Porphyritic syenite sills (Oligocene)–**Light pink to light tan, potassium feldspar porphyry syenite sills. Similar in appearance to Tisp dikes. Up to 1 m thick.

Tif — **Felsite dikes (Oligocene)–**White, fine-grained, aphyric, felsic dikes. 1 to 5 m thick.

Tim — **Megacrystal trachyte porphyry (Oligocene)–**Greenish gray, coarse porphyry dikes and sills. "Megacrysts" of embayed hornblende and/or green pyroxene, up to 4 cm across. Up to 20 m across.

Mafic-intermediate dikes

Timd — **Monzodiorite dikes (Oligocene)–**Light gray to medium gray, k-feldspar-plagioclase-amphibole-biotite dikes. Identical in appearance to Tipm. Up to 2 m thick.

Titp — **Trachytic porphyry dikes (Oligocene)–**Light to dark gray, plagioclase porphyry dikes. Plagioclase phenocrysts are 10 to 20 mm long lathes and are 15 to 25% of the rock. Fine-grained matrix of feldspars and pyroxene. 1 to 4 m thick.

Tita — **Porphyritic trachyandesite dikes (Oligocene)–**Light gray to purplish gray plagioclase-pyroxene porphyry dikes. Phenocrysts are 1 to 10 mm across, and 5-10% of rock. 1 to 12 m wide.

Tig — **Equigranular alkali gabbro-syenogabbro dikes (Oligocene)–**Salt and pepper, fine- to medium-grained, equigranular dikes and small sills. Plagioclase and pyroxene phenocrysts. 2 to 6 m wide.

Titb — **Aphyric trachybasalt dikes (Oligocene)–**Dark gray, aphanetic to sparsely porphyritic dikes. Sparse phenocrysts of plagioclase. Up to 1 m wide.

Titap — **Coarse-grained basaltic trachyandesite porphyry dikes (Oligocene)–**Dark gray to purplish gray, coarse plagioclase porphyry dikes. Plagioclase phenocrysts are white rounded lathes 1 to 2 cm across, 20-40% of the rock. Local medium to coarse amphibole phenocrysts. <1 to 3 m thick.

Tip — **Plagioclase-phyric trachyandesite porphyry dikes (Oligocene)–**Medium to dark gray to purplish, bluish, and greenish gray and tan, plagioclase ± amphibole porphyry dikes. Sparse to common (<1 to 60%) plagioclase phenocrysts up to 9 mm across, amphibole is absent to 30% of rock, up to 5 mm across. Up to 4 m thick.

Units Only In Cross-Section

Projected from Cub Mountain quadrangle (Koning, 2011).

Kccda — **Crevasse Canyon Formation, Dalton Sandstone(?) (Upper Cretaceous)**

Kccdi — **Crevasee Canyon Formation, Dilco Member (Upper Cretaceous)**

Kgs — **Gallup Sandstone (Upper Cretaceous)**

Km — **Mancos Shale and Tres Hermanos Formations (Upper Cretaceous)**

Kd — **Dakota Formation (Upper Cretaceous)**

Ŧm — **Moenkopi Formation (Middle Triassic)**

pre-Ŧm — **Pre-Moenkopi Formation units, including San Andreas and Yeso Formations.**

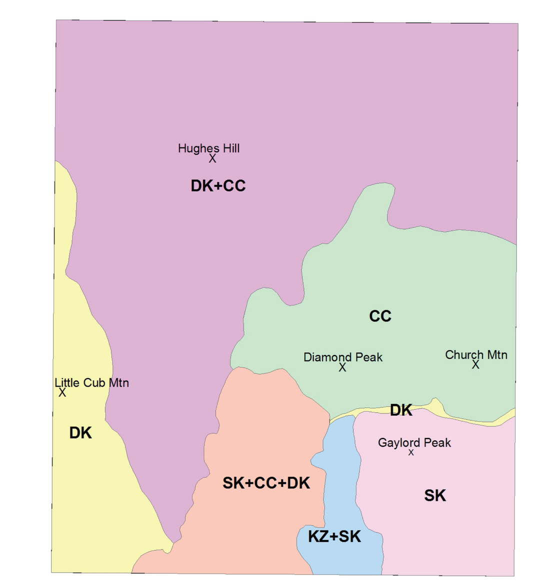


FIGURE 02–Mapping responsibility diagram. CC- Colin Cikoski, DK- Dan Koning, SK- Shari Kelley, KZ- Kate Zeigler.

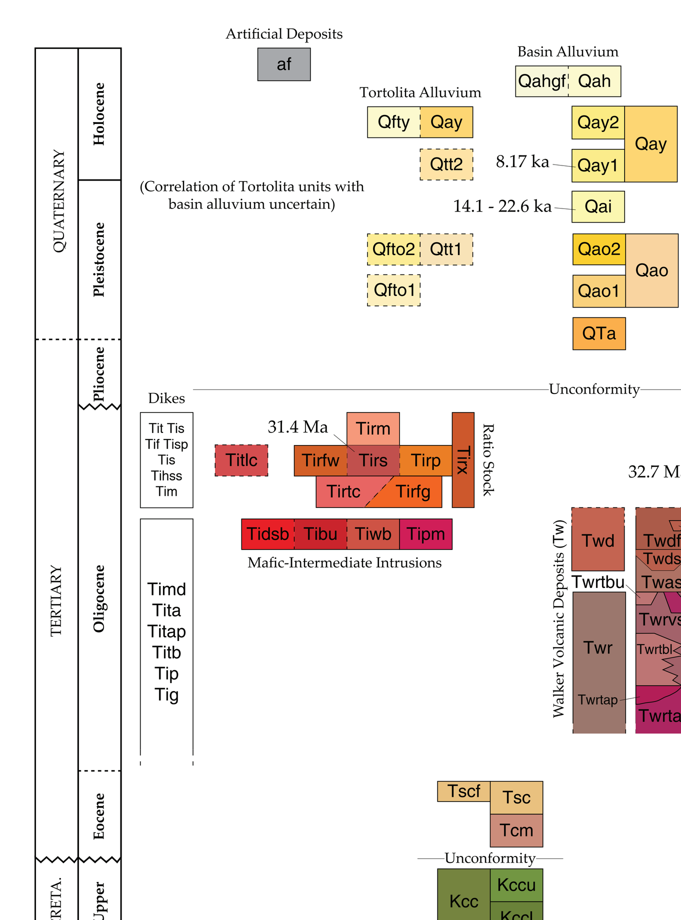
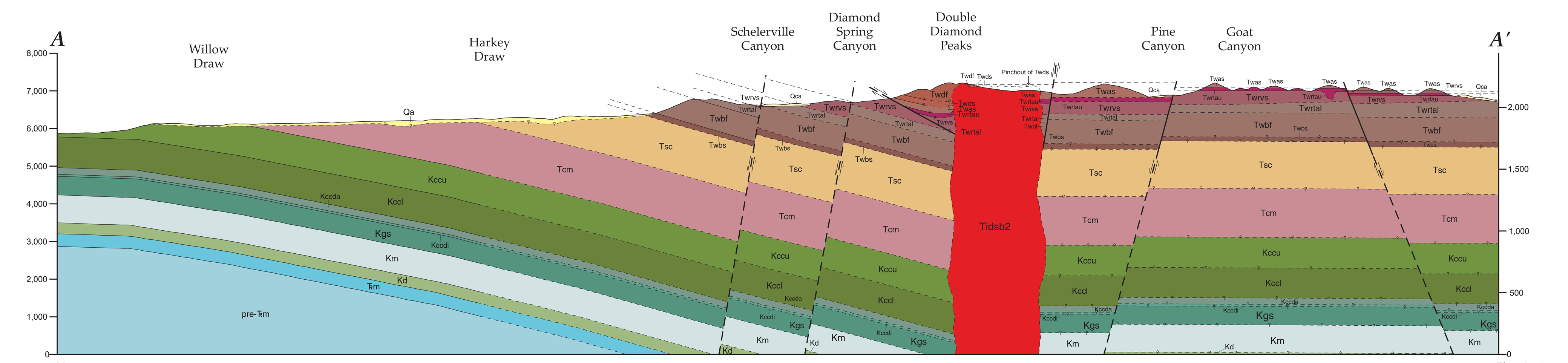


FIGURE 01–View of the Church Mountain highlands from the west. The Double Diamond Peaks (grass-covered hills in foreground) are underlain by gently-dipping volcanic and volcaniclastics of the upper Walker Fm. Diamond Peak (right background) is underlain by similar, though altered, rocks. Church Mountain (left background) is underlain by the Church Mountain phonolite (gray cliffs on right side).

FIGURE 03–Cliffs of Church Mountain phonolite above think pile of talus and colluvium. View is of Church Mountain from the northwest.

FIGURE 04–Gully cut exposes some of the soil characteristics used to differentiate units. Gray unit with white carbonate patches at base is Qao; medial, thin, brown deposit is Qay1; brownish gray uppermost deposit is Qay2. For scale, Qay2 is ~1.25 m thick.

FIGURE 05 –Clast of the tuff of Argentina Springs, showing strong flow foliation, lithic-rich nature, and feldspar phenocrysts.

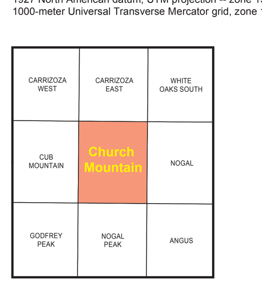


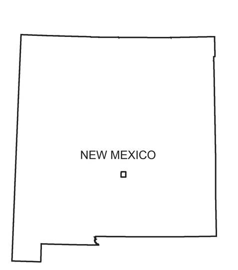
Elevation in meters above sea level

Notes:
-Quaternary only shown where it hides contacts on the ground. Quaternary thicknesses are unconstrained and exaggerated where shown in the highlands.
-Only plutons seen or evidenced by field data are depicted. Numerous additional intrusions could exist at depth.
-Shallowly-dipping fault by Diamond Spring Canyon only appears shallow because of apparent dip, and it was not continued beyond the intrusion because its surface trace beyond the intrusion was not determined
-There is no subsurface control on deep contacts.

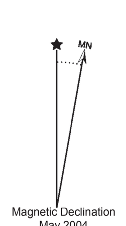
0 5,000 10,000 Feet

Base map from U.S. Geological Survey 1970, from photographs taken 1965, field checked in 1970, edited in 1993.
1927 North American datum, UTM projection -- zone 13N
1000-meter Universal Transverse Mercator grid, zone 13, shown in red



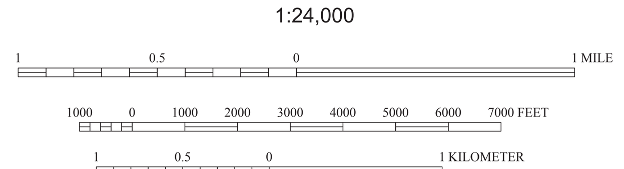


QUADRANGLE LOCATION



Magnetic Declination
May 2004
10° 25' East
At Map Center

1:24,000



CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

New Mexico Bureau of Geology and Mineral Resources
Open-File Geologic Map 215

Mapping of this quadrangle was funded by a matching-funds grant from the STATEMAP program of the National Cooperative Geologic Mapping Act, administered by the U. S. Geological Survey, and by the New Mexico Bureau of Geology and Mineral Resources, (Dr. Peter A. Scholle, *Director and State Geologist*, Dr. J. Michael Timmons, *Geologic Mapping Program Manager*).

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This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu

Geologic map of the Church Mountain quadrangle, Sandoval County, New Mexico.

May 2002

by
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Shari A. Kelley[1], and Kate Zeigler[2]

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MAP SYMBOLS

Contact–Solid where exposed or known; dashed where approximately located; dotted where concealed; queried where uncertain.

Normal fault–Bar and ball on downthrown side; solid where exposed or kn own; dashed where approximately located; dotted where concealed; queried where uncertain in existence.

Strike-slip fault–Showing relative horizontal separation; solid where exposed or known; dashed where approximately located; dotted where concealed; queried where uncertain in existence.

50 **Strike and dip of inclined bedding.**

Horizontal bedding.

Vertical bedding.

Horizontal foliation.

Inclined foliation.

A A′ **Geologic cross section.**

COMMENTS TO MAP USERS

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed, but are plotted by interpretation of the position of a given contact onto a topographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes associated with recent development may not be shown.

Cross sections are constructed based upon the interpretations of the author made from geologic mapping, and available geophysical, and subsurface (drillhole) data. Cross-sections should be used as an aid to understanding the general geologic framework of the map area, and not be the sole source of information for use in locating or designing wells, buildings, roads, or other man-made structures.

The map has not been reviewed according to New Mexico Bureau of Geology and Mineral Resources standards. The contents of the report and map should not be considered final and complete until reviewed and published by the New Mexico Bureau of Geology and Mineral Resources. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the State of New Mexico, or the U.S. Government.