Geologic Map of the Arroyo Seco Quadrangle, Taos County, New Mexico

By

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New Mexico Bureau of Geology and Mineral Resources
Open-file Digital Geologic Map OF-GM 170

Scale 1:24,000

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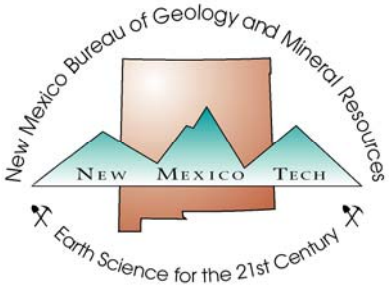

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Unit Descriptions for Arroyo Seco, NM Quadrangles

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Surficial Deposits

Qal **Stream channel and valley-floor alluvium, and active floodplains (Holocene)** - poorly to moderately sorted sand, pebbles, and boulders; clasts of granitic, metamorphic, volcanic, and sandstone rock types; clasts along Rio Hondo dominated by granitic rock types, quartzite and basalt; clasts along tributaries draining the western side of the Rio Grande dominated by volcanic rock types; weak to no soil development (correlative with unit QHa of Rawling, 2004).

Qc **Colluvial mantle on slopes, undifferentiated (middle Pleistocene to Holocene)** - poorly-sorted sand, pebbles and boulders; prevalent along bases of mountain-front facets; in northwestern part of Arroyo Hondo quadrangle (west of Rio Grande), consists of thin mantle overlying volcanic bedrock.

Ql **Landslide deposit (Pleistocene to Holocene)** - lobate accumulations of poorly sorted soil and rock debris on slopes marked by hummocky topography and downslope-facing scarps. Derived from bedrock and glacial deposits, and includes small earth flow, block-slump, and block-slide deposits (Lipman and Read, 1989).

Qfy **Young alluvial-fan and stream terrace deposits (latest Pleistocene to Holocene)** - poorly sorted silt, sand, pebbles, cobbles, and boulders; clasts primarily of quartzite, schist, granite, and volcanic rock types; associated soils have stage I calcium carbonate development; includes unit Qt8 of Kelson (1986).

Qt7 **Stream terrace deposits (early to middle Holocene)** - poorly sorted silt, sand, pebbles, cobbles, and boulders; clasts primarily of quartzite, schist, granite, and volcanic rock types; associated soils have stage I calcium carbonate development; typically present as thin (< 5 m) alluvial deposit on strath surface cut on volcanic bedrock or Blueberry Hill deposit.

Qf6 **Alluvial fan deposits (latest Pleistocene)** - poorly sorted silt, sand, pebbles, and cobbles. Probably correlative with alluvial unit Qt6.

Qt6 **Stream terrace deposits (latest Pleistocene)** - poorly sorted silt, sand, pebbles, cobbles, and boulders; clasts primarily of quartzite, schist, granite, and volcanic rock types; associated soils have stage I to II calcium carbonate development; typically present as thin (< 5 m) alluvial deposit on strath surface cut on volcanic bedrock or Blueberry Hill deposit; associated with the Q6 surface of Kelson (1986).

Qt5 **Stream terrace deposits (late Pleistocene)** - poorly sorted silt, sand, pebbles, cobbles, and boulders; clasts primarily of quartzite, schist, granite, and volcanic rock types; associated soils have stage II to III calcium carbonate development; typically present as thin (< 5 m) alluvial deposit on strath surface cut on volcanic bedrock or Blueberry Hill deposit; associated with the Q5 surface of Kelson (1986).

Qt4 **Stream terrace deposits (middle to late Pleistocene)** - poorly sorted silt, sand, pebbles, cobbles, and boulders; clasts primarily of quartzite, schist, granite, and volcanic rock types; associated soils have stage III calcium carbonate development, argillic Bt soil horizons and 10YR to 7.5YR hues in Bt horizons; typically present as thin (< 5 m) alluvial deposit on strath surface cut on volcanic bedrock or Blueberry Hill deposit; associated with the Q4 surface of Kelson (1986).

Qfu **Undifferentiated alluvial fan deposits (middle to late Pleistocene)** - probably correlative with alluvial units Qt2 through Qt5; poorly sorted silt, sand, pebbles, and cobbles; not correlated to other fan units because of lack of well-defined age control, clear stratigraphic position, and distinct lithologic characteristics.

Qf1 **Alluvial fan deposits (middle Pleistocene)** - poorly sorted silt, sand, and rare pebbles; clasts primarily of granitic, intermediate volcanic, basalt, and metamorphic rock types; stage III and IV calcium carbonate development where preserved, although soil horizons are commonly affected by surface erosion; correlative with Unit Q1p of Kelson (1986); ash probably within Qf1 deposits at locality on Ranchos de Taos quadrangle near Stakeout Road dated at 1.27□0.02 Ma (^{40}Ar-^{39}Ar method, W. McIntosh, personal communication, 1996); deposit is more than 5 m thick in northeastern part of quadrangle, and is thinner from northeast to southwest; differentiated from unit QTbh by larger clast size (Kelson, 1986), less oxidation, poor sorting, absence of abundant manganese oxide staining, and clasts that are less weathered.

QTsf **Old alluvium (late Tertiary? to middle? Pleistocene)** - poorly sorted sand, pebbles, and cobbles; clasts of basalt, quartzite, other metamorphic rock types, and volcanic rock types; locally high percentage of angular to subangular quartzite pebbles and cobbles; may be correlative with Blueberry Hill deposit (QTbh), and with unit QTg in the Arroyo Hondo quadrangle just to the west; present along piedmont between Sangre de

Cristo range front and Rio Grande gorge north of Rio Hondo; correlative with Lama Formation of Lambert (1966); contains ash layer in road cut near Cerro Negro (UTM 439989, 4044603).

Qm **Moraine and till (Pleistocene)** - Terminal and lateral moraines, and thick valley-bottom till. Poorly sorted and generally unstratified clay, silt, and sand containing erratic boulders; characterized by hummocky or ridged topography. Some till was mapped with colluvium (Lipman and Read, 1989).

QTbh **Blueberry Hill deposit (late Tertiary? to middle Pleistocene)** - poorly sorted silt, sand and pebbles; commonly cross-bedded, and stained with black manganese oxide and yellowish-orange iron oxide coatings; oxidized; clasts are weathered or grussified; contains distinct discontinuous sandy interbeds; clasts are granitic rock types, quartzite, metamorphic rock types, and volcanic rock types; commonly crudely imbricated; imbrication suggests westerly flow direction in area north of Taos Municipal Airport; based on exposures at southwestern end of Blueberry Hill, thickness exceeds 25 m; may be considerably more; deposit may interfinger with unit QTsf; correlative with "Basin Fill deposit" of Kelson (1986).

Tertiary Igneous Rocks

Td **Cerro Negro dacite (late Miocene)** - Dark gray to black extensively fractured two-pyroxene dacite; age is 5.7 Ma (McIntosh et al., 2004).

Tgy **Lucero Peak Pluton (Miocene)** - White to pale pink, medium to coarse grained equigranular granite to quartz monzonite (Lipman and Read, 1989).

Tg **Biotite granite (Oligocene)** - Granitic roof phase of the Rio Hondo pluton emplaced in the Questa caldera at about 26 Ma, during volcanism and caldera formation. Medium-grained and equigranular, with sparse aplite and no hornblende (Lipman and Read, 1989).

Tgd **Rio Hondo Pluton (Oligocene)** - White to pale grayish-orange, medium- to fine- grained, massive to locally foliated granodiorite. White to pale orange, aphanitic-porphyritic border facies has quartz phenocrysts and local breccia. Has potassium feldspar phenocrysts up to 4 cm in size. Generally forms rounded outcrops with abundant grus (Lipman and Read, 1989).

Ta **Andesitic lava flows (Oligocene)** - Purplish-gray to gray, aphanitic to porphyritic andesite lava flows and flow breccias, with minor interbedded volcaniclastic sediments. Phenocrysts include plagioclase and hornblende (Lipman and Read, 1989).

Tqi **Latite and quartz latite (Miocene and Oligocene)** - Light tan to gray latite and quartz latite, often stained rust brown, with 15-30% phenocrysts of sanidine, pyroxene and/or hornblende, sparse quartz, and altered cubes of pyrite. Plagioclase phenocrysts to several centimeters in length are present. Occurs as dikes up to 20 m wide and elongate intrusive masses north of the Lawrence Ranch (Lipman and Read, 1989).

Trp **Porphyritic rhyolite (Miocene and Oligocene)** - White to light tan to light gray porphyritic rhyolite typically containing 5-20% phenocrysts of quartz, sanidine, and sparse plagioclase and biotite. Occurs as dikes 1-10 m wide and local irregular and shallow intrusions (Lipman and Read, 1989). Generally only observed as float.

Tri **Aphanitic rhyolite (Miocene and Oligocene)** - Aphanitic to sparsely porphyritic rhyolite, otherwise similar to Trp (Lipman and Read, 1989).

Tapi **Porphyritic andesite and dacite (Miocene and Oligocene)** - Fine-grained dark gray aphanitic and porphyritic andesite and minor basalt. Where present, phenocrysts include hornblende, plagioclase, biotite, and little or no quartz or sanidine (Lipman and Read, 1989).

Tqk **Potassium feldspar quartz latite (Miocene and Oligocene)** - Coarsely porphyritic light-gray quartz latite containing potassium feldspar phenocrysts as long as 5 cm (Lipman and Read, 1989).

Trt **Amalia Tuff (Oligocene)** - Pinkish-red welded rhyolite tuff with fiamme to 5 cm in length, abundant phenocrysts of quartz and sanidine, and volcanic lithic fragments. Miggins et al. (2002) reported a ^{40}Ar-^{39}Ar sanidine age of approximately 25.1 Ma. Erupted from the Questa caldera to the east (Lipman and Reed, 1989).

Tt **Tuff of Tetilla Peak (Oligocene)** - Quartz-rich, light-colored, weakly welded, rhyolitic ash-flow tuff containing abundant small volcanic fragments. Contains 10-30% phenocrysts of quartz, sanidine, plagioclase and sparse chloritized biotite. Lithic fragments mostly andesite and quartz-bearing rhyolite (Lipman and Read, 1989).

Proterozoic Igneous and Metamorphic Rocks

Xd **Diabase (early Paleozoic or late Proterozoic(?))** - Nonfoliated dark gray-green medium to fine-grained rocks with well preserved ophitic texture (Lipman and Read, 1989).

Xqc **Quartz monzonite of Columbine Creek (early Proterozoic)** - White to gray to pale tan, moderately to strongly foliated quartz monzonite. Recrystallized to sugary textured, non foliated rock near Tertiary plutons. Age is 1730 Ma (Lipman and Reed, 1989).

Xq **Quartzite (early Proterozoic)** - White to gray, massive, vitreous quartzite with crossbeds defined by heavy mineral concentrations. Pervasively fractured into decimeter-scale, angular lozenges by joints, irregular fractures, and bedding (Lipman and Read, 1989).

Xms **Biotite muscovite schist and gneiss (early Proterozoic)** - Medium- to coarse-grained, thinly layered to massive, lustrous quartz mica schist and gneiss. Commonly contains sillimanite. Locally contains garnet, andalusite and cordierite (Lipman and Read, 1989).

Xfg **Felsic gneiss (early Proterozoic)** - Pale gray to orange-brown, micaceous, weakly to moderately foliated, quartzofeldspathic gneiss locally grading to micaceous quartzite. Commonly interlayered with amphibolite and amphibole gneiss (Lipman and Read, 1989).

Xa **Amphibolite (early Proterozoic)** - Thinly layered to massive, fine- to coarse-grained, medium green to dark green to black amphibolite and amphibole gneiss. Locally contains calc-silicate gneiss, biotite-hornblende gneiss, felsic gneiss, and muscovite biotite schist (Lipman and Read, 1989).

Xx **Dos Equis Formation (late Quaternary to Recent)** - common glassy crystals containing inscriptions such as “cervesa mas fina” and “Alcohol by volume 4.5%”; commonly encountered in excavations on public land, near aluminum nodules, shotgun pellet casings, and used diapers; no age control except that most depositional mechanisms in the study area range in age from 12 to 18 years.

Xu **Proterozoic undivided (Proterozoic)** - undivided Proterozoic crystalline rocks shown in cross section only.

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