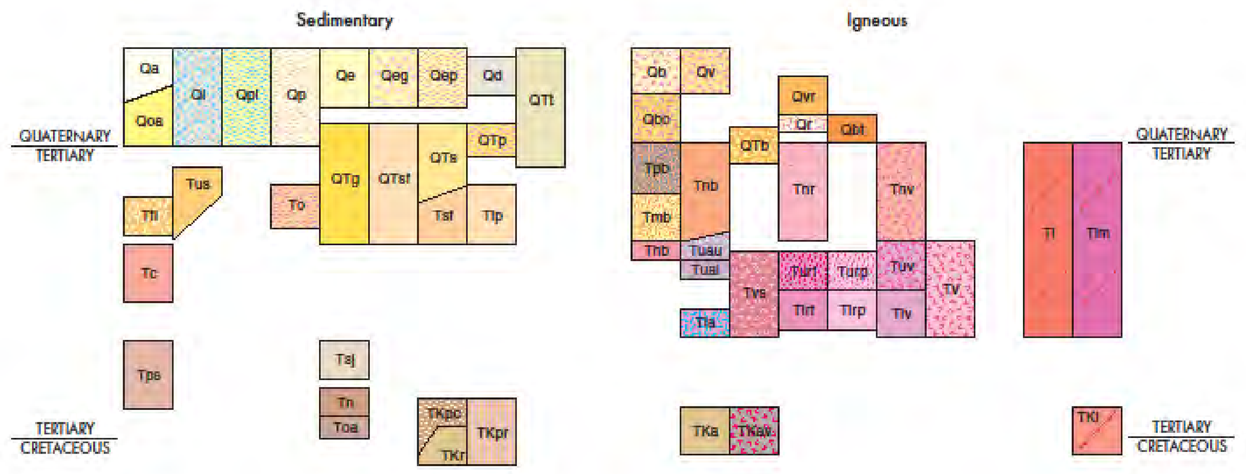
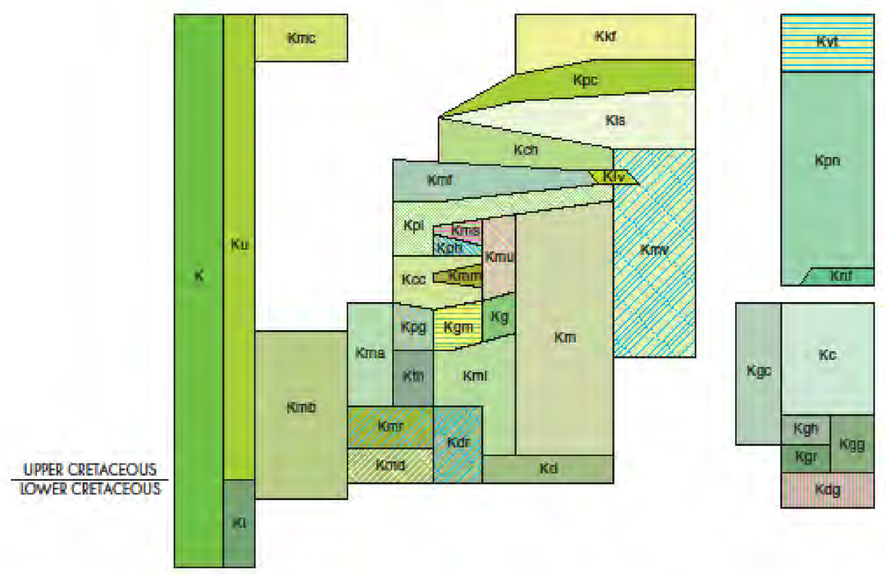
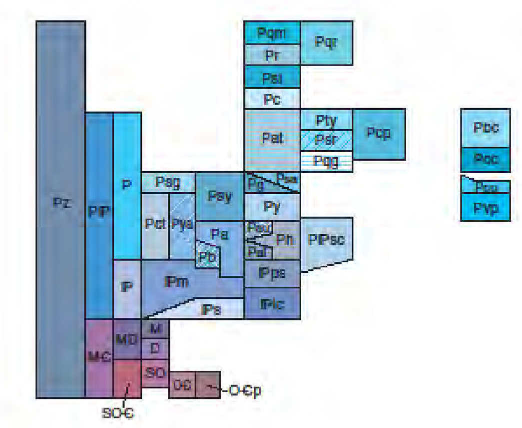
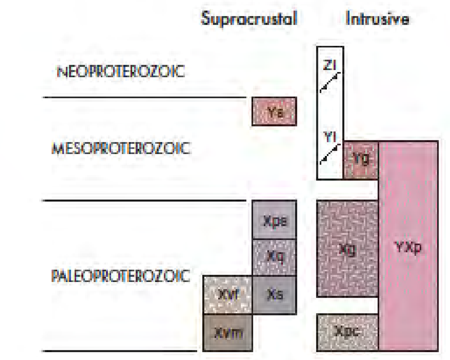








DESCRIPTION OF MAP UNITS

QUATERNARY

Qa Alluvium (Holocene to upper Pleistocene)

Ql Landslide deposits and colluvium (Holocene to Pleistocene)—Landslide deposits on western flanks of Socorro Mountains not shown for clarity

Qpl Lacustrine and playa deposits (Holocene)—Includes associated alluvial and eolian deposits of major lake basins

Qp Piedmont alluvial deposits (Holocene to lower Pleistocene)—Includes deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slope, and alluvial fans. May locally include uppermost Pliocene deposits

Qe Eolian deposits (Holocene to middle Pleistocene)

Qeg Gypsiferous eolian deposits (Holocene to middle Pleistocene)

Qep Eolian and piedmont deposits (Holocene to middle Pleistocene)—Interlayed eolian sands and piedmont-slope deposits along the eastern flank of the Pecos River valley, primarily between Roswell and Carlsbad. Typically capped by thin eolian deposits

Qd Glacial deposits; till and outwash (upper to middle Pleistocene)

Qoa Older alluvial deposits of upland plains and piedmont areas, and calcic soils and eolian cover sediments of High Plains region (middle to lower Pleistocene)—Includes scattered lacustrine, playa, and alluvial deposits of the Tahoka, Double Tanks, Tule, Blackwater Draw, and Gatuña Formations, the latter of which may be Pliocene at base; outcrops, however, are basically of Quaternary deposits

Qb Basaltic to andesitic lava flows (Holocene to middle Pleistocene)—Flows south of Grants and west of Carrizozo are Holocene. Includes minor vent deposits

Qv Basaltic tephra and lavas near vents (upper to middle Pleistocene)—Tuff rings, maars, cinder cones, and minor proximal lavas. Includes maars at Kilbourne Hole and Zuni Salt Lake

Qbo Basaltic to andesitic lava flows (middle to lower Pleistocene)—Includes vent deposits

Qvr Ring-fracture rhyolite lava domes of the Valles caldera (uppermost to lower Pleistocene)—Upper members of the Valles Rhyolite in Jemez Mountains. Includes 60-ka Banco Bonito and El Cajete Members on south margin of caldera

Qr Older rhyolite lavas and early volcaniclastic sedimentary fill deposits of the Valles caldera (lower Pleistocene)—Units are associated with resurgent doming or predate doming of the caldera core. Includes minor middle Pleistocene tuffs of the upper Valles Rhyolite on north side of caldera

Qbt Bandelier Tuff (lower Pleistocene)—Includes large blocks of older andesite in caldera-collapse breccia facies locally exposed on resurgent dome of the Valles caldera

QUATERNARY and TERTIARY

QTt Travertine (Holocene to Pliocene)—Includes some pedogenic carbonate south of Sierra Ladrones

QTp Older piedmont alluvial deposits and shallow basin fill (middle Pleistocene to uppermost Pliocene)—Includes Quemado Formation and in northeast, high-level pediment gravels

QTs Upper Santa Fe Group (middle Pleistocene to uppermost Miocene)—Includes Camp Rice, Fort Hancock, Palomas, Sierra Ladrones, Arroyo Ojito, Ancha, Puye, and Alamosa Formations

QTsf Santa Fe Group, undivided (middle Pleistocene to uppermost Oligocene)—Basin fill of the Rio Grande rift. Locally represents upper Miocene formations of the middle Santa Fe Group in the northern Albuquerque Basin

QTg Gila Group, Formation, or Conglomerate (middle Pleistocene to uppermost Oligocene?)—Includes Mimbres Formation and several informal units in southwestern basins

QTb Basaltic to andesitic lava flows (upper Pleistocene to lower Pliocene)—Includes minor vent deposits

TERTIARY

Tus Upper Tertiary sedimentary units (Pliocene to upper Oligocene)—Includes Bidahochi Formation (Pliocene to upper Miocene), Picuris Formation, (Miocene to Oligocene), Las Feveras Formation (Pliocene), lower Gila Group units in the southwest, and unnamed Pliocene unit in northwestern Socorro County

To Ogallala Formation (lower Pliocene to middle Miocene)—Alluvial and eolian deposits, and petrocalcic soils of the southern High Plains. Locally includes Qoa

Tfl Fence Lake Formation (Miocene)—Conglomerate and conglomeratic sandstone, coarse fluvial volcaniclastic sediments, minor eolian facies, and pedogenic carbonates of the southern Colorado Plateau region

Tsf Lower Santa Fe Group (upper Miocene to uppermost Oligocene)—Includes Hayner Ranch, Rincon Valley, Popotosa, Cochiti, Tesuque, Chamita, Abiquiu, Zia, and other formations

Tlp Los Pinos Formation of lower Santa Fe Group (Miocene and upper Oligocene)—Includes Carson Conglomerate (Dane and Bachman, 1965) in Tusas Mountains–San Luis Basin area

Tc Chuska Sandstone (middle to upper Oligocene)—Restricted to Chuska Mountains

Tpb Basaltic to andesitic lava flows (Pliocene)—Includes minor vent deposits and small shield volcanoes. Flows are commonly interbedded in the Santa Fe and Gila Groups

Tmb Basaltic to andesitic lava flows (Miocene)—Includes minor vent deposits. Flows are commonly interbedded in the Santa Fe and Gila Groups

Tnb Basaltic to andesitic lava flows (Neogene)—Includes minor vent deposits. Flows are commonly interbedded in the Santa Fe and Gila Groups

Tnr Silicic to intermediate volcanic rocks (Neogene, mostly Miocene)—Rhyolite and dacite flows with associated minor tuffs. Commonly interbedded with Santa Fe or Gila Groups sedimentary units. Dacitic lavas in northern Jemez Mountains are Pliocene

Tnv Intermediate to silicic volcanic rocks (Neogene)—Mostly andesitic to dacitic stratovolcanoes. Includes rhyolite lavas and tuffs in the Jemez Mountains. Volcanoes in Jemez Mountains and eastern Colfax County are upper Miocene. Mount Taylor and composite volcanoes in the Taos Plateau volcanic field are Pliocene

Thb Hinsdale Basalt (Miocene and upper Oligocene)—Northern Taos and eastern Rio Arriba Counties; basalt flows interbedded with Los Pinos Formation

Tuau Upper middle Tertiary basaltic andesites and andesites of the Mogollon Group (lower Miocene and uppermost Oligocene, 22–26 Ma)—Includes Bearwallow Mountain Andesite and basaltic andesite of Mangas Mountain; also near vent basaltic lavas and shallow intrusions in the Chuska Mountains

Tual Lower-upper middle Tertiary basaltic andesites and andesites of the Mogollon Group (upper Oligocene, 26–29 Ma)—Includes La Jara Peak Basaltic Andesite, Uvas Basaltic Andesite, basaltic andesites of Poverty Creek and Twin Peaks, Squirrel Springs Canyon Andesite, Razorback Basalt, Bear Springs Basalt, flows of Gila Flat, Salt Creek Formation, Middle Mountain Formation, and the Alum Mountain Group. Pre Amalia Tuff lavas in the Questa caldera are dominantly silicic andesites and dacites; elsewhere silicic lavas are a minor component of Tual

Tvs Middle Tertiary volcaniclastic sedimentary units (Oligocene to upper Eocene)—Mostly syneruptive volcaniclastic sedimentary aprons. Lower units dominantly derived from volcanic highlands of andesitic to dacitic composition. Locally includes minor lavas and tuffs. Younger units (above and intertongued with Mogollon Group tuffs, Turp) include upper Bell Top Formation, South Crosby Peak Formation, and upper Spears Group units near Quemado. Older units (below and intertongued with Datil Group tuffs, Tlrp) include Palm Park, lower Bell Top, Espinaso and Pueblo Creek Formations and lower Spears Group formations such as Rincon Windmill, Chavez Canyon, and Dog Springs

Turf Upper middle Tertiary rhyolitic lavas and local tuffs (upper Oligocene, 24–29 Ma)—Includes Taylor Creek Rhyolite, Fanney Rhyolite, rhyolite of Rocky Canyon, rhyolite of Hardy Ridge, and upper rhyolite members of the Luis Lopez and Sawmill Canyon formations

Tlrf Lower middle Tertiary rhyolitic lavas and local tuffs (lower Oligocene to upper Eocene, 36–31 Ma)—Includes Mimbres Peak Formation, rhyolite of Cedar Hills, and other units in the Bootheel region

Turp Upper middle Tertiary rhyolitic pyroclastic rocks of the Mogollon Group, ash-flow tuffs (upper Oligocene, 24–30 Ma)—Regional ash-flow tuffs include the La Jencia, Vicks Peak, Lemitar, South Canyon, Bloodgood Canyon, Shelly Peak, Davis Canyon, Park, Rhyolite Canyon, Apache Spring and Amalia Tuffs; the tuffs of Horseshoe Canyon, Diamond Creek, Garcia Camp, Caronita Canyon, Turkey Springs, and Little Mineral Creek; and the Jordan Canyon Formation. Includes some locally erupted lavas and tuffs within thick intracaldera units; includes minor volcaniclastic sedimentary units between thin outflow sheets

Tlrp Lower middle Tertiary rhyolitic to dacitic pyroclastic rocks of the Datil Group, ash-flow tuffs (lower Oligocene to upper Eocene, 31–36 Ma)—Regional ash-flow tuffs include Hells Mesa, Kneeling Nun, Caballo Blanco, Datil Well, Lebya Well, Rock House Canyon, Blue Canyon, Sugarlump, Oak Creek, Bluff Creek, Gillespie, Box Canyon, Cooney, and Chiquito Peak Tuffs; the tuffs of Steins Mountain, Black Bill Canyon, Woodhaul Canyon, and Farr Ranch; tuffs of the Organ cauldron, and lower tuffs in the Bell Top Formation. Includes some locally erupted lavas and tuffs within thick intracaldera units; includes minor volcaniclastic sedimentary units and lavas between thin outflow sheets

Tla Lower middle Tertiary andesitic to dacitic lavas and pyroclastic flow breccias (upper to middle Eocene, 33–43 Ma)—Includes Rubio Peak Formation, Orejon Andesite, andesite of Dry Leggett Canyon, andesite of Telephone Canyon, and other units in southwestern, central, and northern New Mexico. Locally includes minor mafic lavas. Ancient landslide blocks of Madera Limestone, as much as one mile long, occur within Rubio Peak lavas in the central Black Range, west of Winston

Tuv Upper middle Tertiary volcanic rocks (lower Miocene to upper Oligocene, younger than 30 Ma)—Mostly a combination of basaltic andesite lavas and rhyolitic ash-flow tuffs of the Mogollon Group (Tuau + Tual + Turp). Includes locally erupted lavas and tuffs in some calderas

Tlv Lower middle Tertiary volcanic rocks (lower Oligocene to upper Eocene, older than 31 Ma)—Mostly intermediate lavas of the lower Datil Group and intermediate volcaniclastic sediments of the lower Spears Group (Tla + Tvs). Locally includes ash-flow tuffs of the upper Datil Group (Tlrp). Includes intermediate volcaniclastic sedimentary rocks of the Conejos Formation in northern New Mexico

Tv Middle Tertiary volcanic rocks, undifferentiated (lower Miocene to upper Eocene)—Includes the predominantly andesitic to dacitic stratovolcano complex at Sierra Blanca (Oligocene to upper Eocene) and many smaller outliers

Ti Tertiary intrusive rocks of intermediate to silicic composition (Pliocene to Eocene)—Includes monzonitic to granitic plutons, stocks, laccoliths, and porphyritic dikes in deeply eroded magmatic centers; and andesitic, dacitic, or rhyolitic plugs and dikes near cauldrons or stratovolcanoes. In the Latir field, fine-grained rhyolitic dikes commonly cut coarse-grained granitic plutons. Includes alkaline laccoliths, plugs, and dikes in Colfax County. North-trending dikes near Capitan include some mafic diabase dikes

Tim Tertiary mafic intrusive rocks (Pliocene to upper Eocene)—Includes many long basaltic andesite dikes of Oligocene age near Pie Town, Acoma, Riley, Chupadera, Truth or Consequences, Roswell, Raton, and Dulce; and several elongate or shoestring-like sills of basalt or basaltic andesite. Also includes basaltic necks of Pliocene age that dot the landscape northeast of Mount Taylor. Where dikes extend into Quaternary alluvium the contact is an unconformity

Tps Paleogene sedimentary units—Includes Baca, Galisteo, El Rito, Blanco Basin, Hart Mine, Love Ranch, Lobo, Sanders Canyon, Skunk Ranch, Timberlake, and Cub Mountain Formations

Tsj San Jose Formation (Eocene)—San Juan Basin

Tn Nacimiento Formation (Paleocene)—San Juan Basin

Toa Ojo Alamo Formation (Paleocene)—San Juan Basin

TERTIARY and CRETACEOUS

TKpc Poison Canyon Formation (Paleocene and Upper Cretaceous)—Proximal conglomerates and sandstones in western Raton Basin, generally lacking coal beds. Cretaceous beds mostly restricted to subsurface

TKr Raton Formation (Paleocene and Upper Cretaceous)—Distal sandstones, mudstones, and coal beds in eastern Raton Basin. Middle barren zone laterally equivalent to Poison Canyon Formation. K/T boundary discontinuously exposed about 100 m above basal conglomerate in areas southwest of Raton

TKpr Poison Canyon and Raton Formations (Paleocene and Upper Cretaceous)—Broadly intertonguing conglomeratic sandstones, sandstones and mudstones; minor coal beds

TKa Animas Formation (Paleocene and Upper Cretaceous)—Volcaniclastic sedimentary rocks of intermediate composition in northern San Juan Basin

TKav Tertiary-Cretaceous andesitic to dacitic lavas and pyroclastic breccias (Paleocene and Upper Cretaceous)—Includes many remnants of eruptive centers in Grant and Hidalgo Counties and Upper Cretaceous andesitic lavas in Sierra County

TKi Tertiary-Cretaceous intrusive rocks (Paleocene and Upper Cretaceous)—Includes granodiorite to quartz monzonite stocks and plutons at Hanover, Fierro, Tyrone, Lordsburg, and the 73 Ma quartz monzonite porphyry stock at Copper Flats in Sierra County. Also includes many northeast-trending monzonite porphyry dikes in the Silver City region

CRETACEOUS

K Cretaceous rocks, undivided

Ku Upper Cretaceous rocks of southwestern New Mexico, undivided (Maastrichtian to Cenomanian for most part, although Beartooth and Sarten Formations are in part Albian)—Includes Virden Formation in northern Hidalgo County, Ringbone Formation in Hidalgo, Luna, and Grant Counties, Beartooth and Sarten Formations in Luna and Grant Counties, Mancos Shale in Silver City area

Kmc McRae Formation (Maastrichtian)—Engle Basin–Cutter sag area

Kvt Vermejo Formation and Trinidad Sandstone (Maastrichtian to Campanian)

Kkf Kirtland and Fruitland Formations (Campanian)—Coal-bearing, primarily in the Fruitland

Kpc Pictured Cliffs Sandstone (Campanian)—Prominent, cliff-forming marine sandstone

Kls Lewis Shale (Campanian)—Marine shale and mudstone

Kpn Pierre Shale and Niobrara Formation (Campanian to Coniacian)

Knf Fort Hays Limestone Member of Niobrara Formation (Coniacian to Turonian)

Kmv Mesaverde Group (Campanian to Turonian)—Includes Cliff House Sandstone, Menefee Formation and Point Lookout Sandstone.

Kch Cliff House Sandstone (Campanian)—Transgressive marine sandstone

Klv La Ventana Tongue of the Cliff House Sandstone (Turonian)

Kmf Menefee Formation (Campanian to Santonian)—Mudstone, shale, and sandstone; coal-bearing

Kpl Point Lookout Sandstone (Campanian to Santonian)—Regressive marine sandstone in McKinley and Sandoval Counties; the lower, Hosta Tongue, of Point Lookout is transgressive and is separated from main body by the Satan Tongue of Mancos Shale

Kms Satan Tongue of Mancos Shale (Santonian)

Kph Hosta Tongue of Point Lookout Sandstone (Santonian)—Transgressive marine sandstone

Kmm Mulatto Tongue of Mancos Shale (Santonian to Coniacian)

Kcc Crevasse Canyon Formation (Santonian to Coniacian)—Coal-bearing units are Dilco and Gibson Coal Members; other members are Bartlett Barren, Dalton Sandstone, and Borrego Pass Sandstone (or Lentil)

Kg Gallup Sandstone (Turonian)—Generally regressive marine sandstone

Kgm Gallup Sandstone and underlying D-Cross Tongue of the Mancos Shale (Turonian)

Kmr Rio Salado Tongue of the Mancos Shale (Turonian)—Overlies Twowells Tongue of Dakota Sandstone; mapped only where Tres Hermanos Formation or the Atarque Sandstone is present; mapped as Kdr in parts of Socorro County

Kpg Pescado Tongue of the Mancos Shale and Gallup Sandstone (Turonian)—In Zuni Basin only; Pescado is chronostratigraphic equivalent of Juana Lopez Member of Mancos Shale

Kth Tres Hermanos Formation (Turonian)—Formerly designated as lower Gallup Sandstone in the Zuni Basin

Kma Moreno Hill Formation and Atarque Sandstone (Turonian)—In Salt Lake coal field and extreme southern Zuni Basin

Km Mancos Shale (Cenomanian to Campanian)—Divided into upper and lower parts by Gallup Sandstone

Kmu Mancos Shale, upper part (Campanian to Coniacian)

Kml Mancos Shale, lower part (Turonian and Cenomanian)

Kdr Dakota Sandstone (Cenomanian) and Rio Salado Tongue of the Mancos Shale—In northwest Socorro County locally includes overlying Tres Hermanos Formation

Kgc Greenhorn Formation and Carlile Shale, undivided (Turonian to Cenomanian)—Locally includes Graneros Shale

Kc Carlile Shale (Turonian)—Limited to northeastern area

Kgg Greenhorn Formation and Graneros Shale (Turonian and Cenomanian)—Limited to northeastern area

Kgh Greenhorn Formation (Turonian to Cenomanian)—Limited to northeastern area; the upper member (Bridge Creek Limestone Member) can be traced into western area where it is commonly shown as a bed-rank unit in Mancos Shale on detailed maps

Kgr Graneros Shale (Cenomanian)—Limited to northeastern area

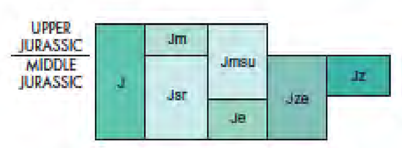
Kmd Intertongued Mancos Shale and Dakota Sandstone of west-central New Mexico (Cenomanian)—Includes the Whitewater Arroyo Tongue of Mancos Shale and the Twowells Tongue of the Dakota

Kd Dakota Sandstone (Cenomanian)—Includes Oak Canyon, Cubero, and Paguate Tongues; includes Clay Mesa Tongue of Mancos Shale

Kdg Upper and Lower Cretaceous rocks of east-central and northeast New Mexico—Consists of Dakota Group, which includes Romeroville Sandstone (Cenomanian), Pajarito Shale, and Mesa Rica Sandstone (Albian); the underlying Tucumcari Shale (Albian) in Tucumcari area; and Glencairn Formation (Albian) in Union County

Kmb Mancos Shale (Cenomanian) and Beartooth and Sarten Formations (Albian)—Mancos includes what was formerly referred to as Colorado Shale, which in turn may include equivalents of Tres Hermanos Formation

Kl Lower Cretaceous, undivided—In northern Lea and Roosevelt Counties includes equivalents of Tucumcari Shale; in Cornudas Mountains includes Campagrande and Cox Formations and Washita Group; at Cerro de Cristo Rey includes several formations of the Fredericksburg and Washita Groups, and the Boquillas Formation (Cenomanian); in the southwest, includes Mojado, U-Bar (Aptian), and Hell-to-Finish Formations, which are equivalent to Bisbee Group of Arizona



JURASSIC

To compare this map nomenclature to the USGS nomenclature, see the diagram included on this sheet (at right)

J Upper and Middle Jurassic rocks, undivided. In southwest includes the basalt-bearing Broken Jug Formation

Jm Morrison Formation—Upper Jurassic nonmarine rocks

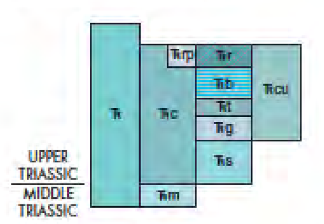
Jmsu Morrison Formation and upper San Rafael Group (lowermost Cretaceous?–upper Jurassic)

Jz Zuni Sandstone (Callovian)—Consists of undivided equivalents of the Summerville Formation and Bluff Sandstone; restricted to Zuni Basin area

Jze Zuni and Entrada Sandstones, undivided

Je Entrada Sandstone (Middle Jurassic)

Jsr San Rafael Group (Middle Jurassic)—Consists of Entrada Sandstone, Todilto and Summerville Formations, Bluff Sandstone, and locally Zuni Sandstone (or only Acoma Tongue of Zuni)



TRIASSIC

Chinle Formation of previous workers (e.g., Stewart et al., 1972) is used here as Chinle Group, following Lucas (1993)

Tr Triassic rocks, undivided—Continental red beds

Trrp Rock Point Formation of Chinle Group (Upper Triassic)—May locally include Wingate Sandstone (Triassic)

Trc Chinle Group (Upper Triassic)—Map unit includes Moenkopi Formation (Middle Triassic) at base in many areas; in eastern part of state the following five formations are mapped:

Trr Redonda Formation (Upper Triassic)

Trb Bull Canyon Formation (Norian)

Trt Trujillo Formation (Norian)

Trg Garita Creek Formation (Carnian)

Trs Santa Rosa Formation (Carnian)—Includes Moenkopi Formation (Middle Triassic) at base in most areas

Trcu Upper Chinle Group, Garita Creek through Redonda Formations, undivided

Trm Moenkopi Formation (Middle Triassic)

PALEOZOIC

Pz Paleozoic rocks, undivided

P Permian rocks, undivided

Pqm Quartermaster Formation (Upper Permian)—Red sandstone and siltstone

Pqr Quartermaster and Rustler Formations (Upper Permian)

Pr Rustler Formation (Upper Permian)—Siltstone, gypsum, sandstone, and dolomite

Psl Salado Formation (Upper Permian)—Evaporite sequence, dominantly halite

Pc Castile Formation (Upper Permian)—Dominantly anhydrite sequence

Pat Artesia Group (Guadalupian)—Shelf facies forming broad south-southeast trending outcrop from Glorieta to Artesia area; includes Tansill, Yates, Seven Rivers, Queen and Grayburg Formations (Guadalupian). May locally include Moenkopi Formation (Triassic) at top

Pty Tansill and Yates Formations (Guadalupian)—Sandstone, siltstone, limestone, dolomite, and anhydrite

Psr Seven Rivers Formation (Guadalupian)—Gypsum, anhydrite, salt, dolomite, and siltstone

Pqg Queen and Grayburg Formations (Guadalupian)—Sandstone, gypsum, anhydrite, dolomite, and red mudstone

Pcp Capitan Formation (Guadalupian)—Limestone (reef facies)

Pbc Bell Canyon Formation (Guadalupian)—Basin facies—sandstone, limestone, and shale

Pcc Cherry Canyon Formation (Guadalupian)—Basin facies—sandstone, limestone, and shale

Psa San Andres Formation (Guadalupian in south, in part Leonardian to north)—Limestone and dolomite with minor shale

Pg Glorieta Sandstone (Leonardian)—Texturally and mineralogically mature, high-silica quartz sandstone

Psg San Andres Limestone and Glorieta Sandstone (Guadalupian and Leonardian)

Pco Cutoff Shale (Leonardian)—In Brokeoff Mountains only

Pvp Victorio Peak Limestone (Leonardian)—In Brokeoff Mountains only

Py Yeso Formation (Leonardian)—Sandstones, siltstones, anhydrite, gypsum, halite, and dolomite

Pa Abo Formation (Wolfcampian)—Red beds, arkosic at base, finer and more mature above; may include limestone beds of Pennsylvanian age (Virgilian) in Zuni Mountains; in Robledo Mountains the Abo may be considered a member of the Hueco Formation

Pau Upper part of Abo Formation (Wolfcampian)

Pal Lower part of Abo Formation (locally Virgilian to Upper Pennsylvanian)

Psy San Andres, Glorieta, and Yeso Formations, undivided

Pya Yeso and Abo Formations, undivided (Lower Permian)

Pct Cutler Formation (Wolfcampian to Upper Pennsylvanian)—Used in northern areas and Chama embayment only

Ph Hueco Formation or Group (Wolfcampian)—Limestone unit restricted to south-central area. Pendejo Tongue of Hueco Formation divides Abo Formation into upper and lower parts in Sacramento Mountains

Pb Bursum Formation (lowermost Permian to uppermost Pennsylvanian)—Shale, arkose, and limestone

PIP Permian and Pennsylvanian rocks, undivided—Includes Concha, Scherrer, Colina, Epitaph, and Earp Formations (Permian) and Horquilla Limestone (Permian to Pennsylvanian)

PIPsc Sangre de Cristo Formation (Wolfcampian to Desmoinesian)—In Sangre de Cristo Mountains

IP Pennsylvanian rocks, undivided—In Sangre de Cristo Mountains may include Sandia, Madera, La Pasada, Alamitos, and Flechado Formations; elsewhere may include Bar-B, Nakaye, Red House, Oswaldo, and Syrena Formations

IPm Madera Group (Pennsylvanian)—In Manzano Mountains includes Wild Cow Formation and Los Moyos Limestone; in Lucero Mesa includes Red Tanks, Atrasado, Gray Mesa Formations; in Sacramento Mountains includes the non-Madera Holder, Beeman, and Gobbler Formations. May include strata lumped as Magdalena Group in a few areas

IPs Sandia Formation (Atokan)—Predominantly clastic unit (commonly arkosic) with minor black shales, and limestone in lower part; map unit locally includes Morrowan Osha Canyon Formation in Sierra Nacimiento

IPps Panther Seep Formation (Virgilian)—In Organ, Franklin, and San Andres Mountains

IPlc Lead Camp Formation (Atokan to Missourian)—In San Andres and Organ Mountains

M Mississippian rocks, undivided—Arroyo Peñasco Group in Sangre de Cristo Mountains, Sierra Nacimiento, San Pedro Mountains, and Sandia Mountains; Lake Valley Limestone in south-central New Mexico

MD Mississippian and Devonian rocks, undivided—Includes Helms, Rancheria, Las Cruces, Lake Valley, and Caballero Formations and Escabrosa Group (Mississippian); Percha Shale, Contadero, Sly Gap, and Oñate Formations of south-central New Mexico, and Canutillo Formation of northern Franklin Mountains and Bishops Cap area (Devonian)

MC Mississippian through Cambrian rocks, undivided—Includes Lake Valley Limestone (Mississippian); Devonian rocks, undivided; El Paso Formation and Montoya Group or Formation (Ordovician); and Bliss Sandstone (Ordovician and Cambrian)

D Devonian rocks undivided—Includes Percha Shale, Oñate, and Sly Gap Formations

SO Silurian and Ordovician rocks, undivided

SOC Silurian through Cambrian rocks, undivided

OC Ordovician and Cambrian rocks, undivided—Includes Montoya Formation (or Group), El Paso Formation, and Bliss Sandstone

OCp Ordovician and Cambrian plutonic rocks of Florida Mountains

PROTEROZOIC

Zl Neoproterozoic mafic dikes—Exposed in Taos Range

Yl Mesoproterozoic mafic dikes, diabase, metadiabase, metadiorite—Mainly in Burro Mountains; age not well constrained

Ys Mesoproterozoic sedimentary rocks—Exposed in Sacramento Mountains. present in subsurface in southeastern New Mexico as De Baca Group

Yg Mesoproterozoic granitic plutonic rocks—Mainly 1.45–1.35 Ga megacrystic granites, generally weakly foliated except locally at their margins

YXp Mesoproterozoic and Paleoproterozoic plutonic rocks, undivided

Xg Paleoproterozoic granitic plutonic rocks—Variably foliated granites and granitic gneisses; 1.71–1.65 Ga in northern New Mexico; 1.66–1.65 Ga in central and southern New Mexico

Xps Paleoproterozoic pelitic schist—Includes Rinconada Formation in northern New Mexico and Blue Springs Schist in Manzano Mountains

Xq Paleoproterozoic quartzite—Includes ~1.70 Ga Ortega Quartzite and equivalents in northern New Mexico and ~1.67 Ga quartzites in central New Mexico

Xs Paleoproterozoic metasedimentary rocks—Pelitic schist, quartz-muscovite schist, immature quartzite, and subordinate amphibolite; includes parts of Vadito Group in northern New Mexico, immature metasedimentary rocks of central New Mexico, and Bullard Peak Series mixed supracrustal rocks in Burro Mountains

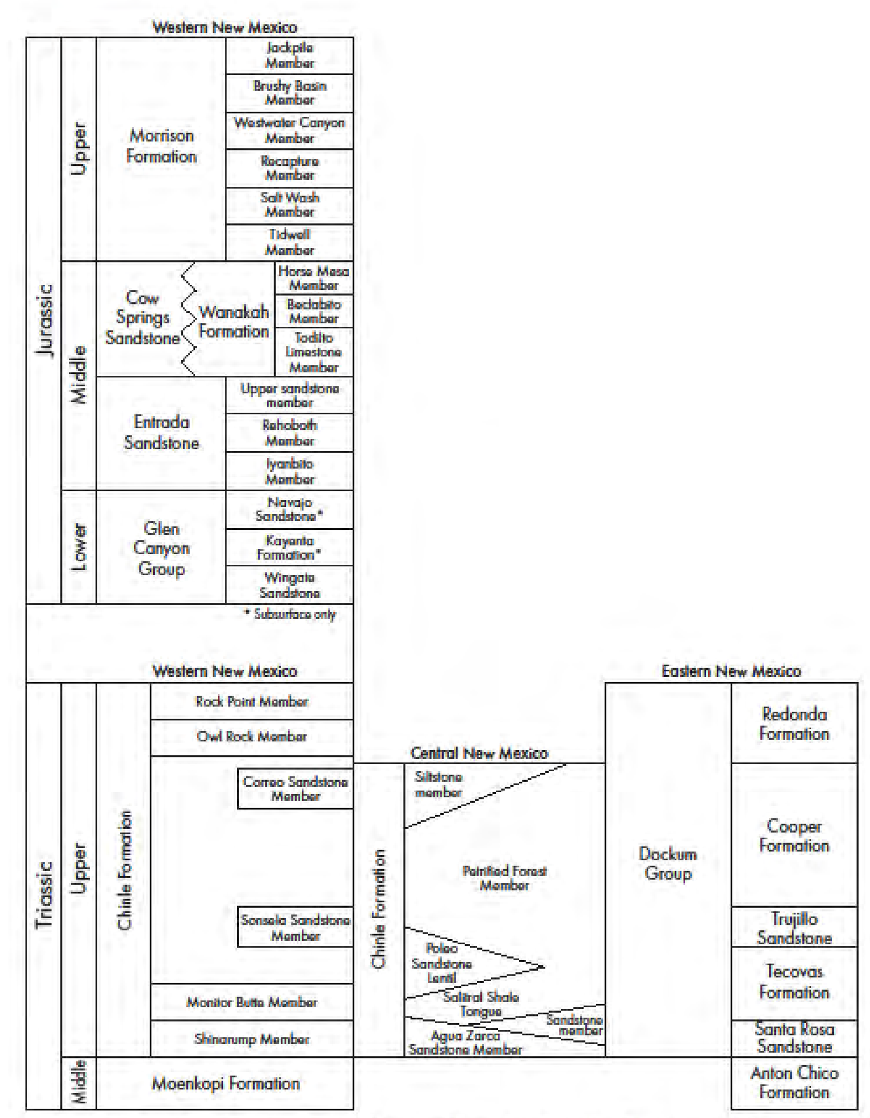
Xvf Paleoproterozoic rhyolite and felsic volcanic schist—Includes 1.70 Ga Vadito Group in northern New Mexico and ~1.68 Ga Sevilleta Metarhyolite in central New Mexico

Xpc Paleoproterozoic calc-alkaline plutonic rocks—Granodiorite, diorite, and gabbro complexes; 1.78–1.71 Ga; interpreted to be intrusive part of juvenile volcanic arc basement

Xvm Paleoproterozoic mafic metavolcanic rocks with subordinate felsic metavolcanic rocks—Includes the 1.78–1.72 Ga Moppin (Tusas Mountains), Gold Hill (Taos Range), and Pecos (Sangre de Cristo Mountains) complexes; interpreted to be supracrustal part of juvenile volcanic arc basement

MAP SYMBOLS

- Contact
- Nomenclature change
- Gradational facies boundary
- Fault—Dashed where approximately located, dotted where concealed
- Tertiary dikes
- Proterozoic dikes
- Proterozoic ductile shear zone
- Playa



Formal stratigraphic terminology of Triassic and Jurassic rocks in New Mexico, as used in the National Geologic Map Database* of the U.S. Geological Survey. This terminology differs significantly from the Triassic and Jurassic stratigraphy represented on this map.

* http://ngmdb.usgs.gov/geolex_gs.html

EXPLANATION FOR

Geologic Map of New Mexico

1:500,000

New Mexico Bureau of Geology and Mineral Resources

Celebrating 75 Years of Service

A DIVISION OF NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY

Peter A. Scholle, State Geologist

2003

PUBLISHED IN COOPERATION WITH THE U.S. GEOLOGICAL SURVEY

This map represents the first substantial revision of the geologic map of New Mexico at this scale since the appearance of the State Geologic Map of New Mexico by Carle H. Dane and George O. Bachman, published in two sheets by the U.S. Geological Survey (in cooperation with the New Mexico Bureau of Mines and Mineral Resources) in 1965. The present compilation was started in 1985 by G. Robert Osburn, under the directorship of Frank Kottlowski. The bulk of the compilation was accomplished between 1987 and 1998 by Orin J. Anderson and Glen E. Jones. Since 1998 the map has been reviewed and revised by many other workers (listed below). The present map reflects substantial revisions to the Anderson and Jones compilation. Earlier versions of that compilation appeared in 1994 as Open-file Report # 408 of the New Mexico Bureau of Mines and Mineral Resources, and in 1997 as Open-file Report 97-52 of the U.S. Geological Survey. Work on this project has spanned the administrations of three directors at the New Mexico Bureau of Geology and Mineral Resources: Frank Kottlowski, Charles Chapin, and Peter Scholle. This map was created in Macromedia Freehand from ArcInfo files created by Greg Green, U.S. Geological Survey.

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Figure 3-1
Geologic Map: Legend
Mineral Resource Potential
U.S. Bureau of Land Management
Rio Puerco Field Office, NM

Source:
-Scholle, P.A., 2003, Geologic Map of New Mexico, 1:500,000: New Mexico Bureau of Geology and Mineral Resources.