

Description of Map Units to Accompany
Geologic Map of the Edgewood 7.5' Quadrangle

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Quaternary Map Units

General

Surficial deposits in the map area consist of upland-valley and piedmont alluvium and colluvium derived from weathering of shale, limestone, and sandstone of the Pennsylvanian Madera Group. Sediment transport is towards the east and the topographically closed Estancia basin (Fig. 1). West-to-east drainage is diverted on the western side of the map area by a north-to-south-trending bedrock ridge. Drainage across this ridge occurs through a gap located near Interstate Highway 40. Drainage from the eastern side of the bedrock upland flows onto the piedmont of the northern Estancia basin. Dncutting and an overall basinward shift in deposition on the piedmont have resulted in a stepped sequence of surficial deposits that are generalized on the map to include an older unit that caps the highest interfluvial summits (Qp2), and younger inset fills (Qp3-4 and Qa). The large, north-to-south trending valley on the western edge of the map area contains a complex of erosional surfaces and inset fills, reflecting the overall dncutting that has occurred on the piedmont to the east. Surficial deposits in this area are mapped together with valley-fill deposits in bedrock uplands as a single, undifferentiated unit (Qva).

Absolute ages for Quaternary map units on the Edgewood quadrangle are not available. Relative ages for piedmont alluvial units are indicated by inset relationships. Older piedmont deposits contain well-developed, pedogenic accumulations of carbonate (stage II to stage III carbonate development), suggesting late and perhaps middle Pleistocene ages for units Qp2 and Qp3. Little is known regarding the age of older, unconsolidated sediments of the Estancia basin, which are covered by the surficial deposits shown on the map. These older basin-fill deposits may range in age from Pliocene to late Miocene (Smith, 1957). Geologic events leading to topographic closure of the Estancia basin, and the timing of basin-closure, are also speculative.

Unconsolidated deposits in the Estancia basin generally reach a maximum thickness towards the basin axis (to the east of the map area) of ~120 m (New Mexico State Engineer, 1967). Maximum thickness of unconsolidated sediments on the piedmont within the map area is on the order of 30 to 40 m, based on well-driller's logs for the area. Unconsolidated deposits in upland valleys and in the large valley on the western edge of the map are generally on the order of 10 m thick or less, but may be 20 m thick or more in places.

Description of Map Units

Qa- Valley-floor alluvium. Holocene. Predominantly silt, sand, and clay in modern drainage channels and underlying floodplains. Coarser grained materials occur in some areas. Unit is inset into unit Qp and older deposits of unit Qva, and interfingers with younger alluvial and colluvial deposits of Qva and unit Qc along drainage foot slopes. Includes unmapped bedrock exposures in scoured channel reaches. Unit is generally less than 3 m thick.

Qc- Colluvium mantling side slopes of drainages in piedmont alluvium. Holocene to late Pleistocene (?). Derived from erosion of piedmont surficial deposits and older, basin-fill deposits. Includes unmapped deposits of units Qp2-4. Interfingers with valley-floor alluvium along drainage foot slopes. Unit is estimated to be less than 5 m thick.

Qp- Middle and upper piedmont-slope alluvium and colluvium, undifferentiated. Holocene to middle Pleistocene (?). Includes alluvial fan and coalescent alluvial fan complex along western uplands of the Estancia basin, and younger, inset alluvial fills. Predominantly silt and sand, with coarser grained beds dominated by sand and gravel occurring along mountain fronts and along high-order drainages. Undivided unit (Qp) is generally mapped along the upper piedmont slope, where it forms a relatively thin mantle (generally less than 10m thick) over bedrock highs, and grades into alluvial and colluvial deposits of upland valleys. Three map units (Qp2-4) are differentiated on the Edgewood quadrangle. Unit Qp1 (not recognized on the Edgewood quadrangle) is mapped a few miles north of the map area in the vicinity of South Mountain.

Qp4- Piedmont alluvium, inset into unit Qp3 and older piedmont deposits. Holocene (?) to Late Pleistocene. Predominantly sand and silt, with varying amounts of gravel. Represented in the map area by deposits along Bachelor Draw. Estimated thickness is about 3 m.

Qp3- Piedmont alluvium, inset into unit Qp2 and older piedmont deposits. Late to middle (?) Pleistocene. Predominantly sand and silt, with varying amounts of gravel. Unit comprises areally extensive deposits that occur along major drainages and extend to upper piedmont slopes. Estimated thickness is 3 m or more.

Qp2- Piedmont alluvium, underlies highest, interfluvial summits in map area. Late to middle Pleistocene. Predominantly sand and silt, with varying amounts of gravel. Consists of coalescent alluvial fans along upper piedmont slopes, forming an extensive, sheet-like deposit (?) basinward on top of older, basin- and valley-fill deposits of the Estancia basin.

Qva- Upland valley-fill alluvium and colluvium, undifferentiated. Holocene to middle Pleistocene (?). Predominantly silt, sand, and gravel grading into relatively coarse-grained colluvial wedges along valley backslopes. Consists of a complex of eroded, older deposits, and younger inset fills along higher-order drainages. Includes unmapped bedrock exposures along valley backslopes. Thickness ranges from a few meters or less in upland valleys and over bedrock highs, to an estimated 10 m or more along trunk drainages.

Qcr- Hillslope colluvium, alluvium, and residuum on valley backslopes and interfluvial summits in bedrock uplands. Predominantly silt, clay, and sand. Derived from weathering of the Madera Group (residuum on relatively flat-laying areas), and from downslope transport of these materials. Scattered occurrences of broken fragments of pedogenic carbonate occur locally where the deposit is relatively thin. Mapped where accumulations cover extensive areas and are sufficiently thick to support large areas of grass cover. Includes areas of unmapped bedrock exposures. Unit ranges from less than one to several meters in thickness.

Bedrock Map Units

General

Surface exposures of bedrock in the map area are limited to the upper part of the Pennsylvanian Madera Group. The middle and upper Pennsylvanian (Desmoinian-Virgilian) Madera Group includes marine and marginal-marine carbonate and clastic sediments that consist of interbedded limestone, shale, sandstone, and minor conglomeratic sandstone. The thickness of the Madera Group in the vicinity of the Sandia and Manzano Mountains ranges from about 400 m (Kelley and Northrop, 1975) to perhaps 580 m (Read et al., 1944, measured section 14), or more, and has traditionally been divided (e.g. Read et al., 1944; Kelley and Northrop, 1975) into a lower unit containing a larger proportion of marine limestone and calcareous shale (“lower gray limestone”), and an upper unit containing a large proportion of clastic beds (“upper arkosic limestone”). The Madera Group gradationally overlies rocks of the middle Pennsylvanian Sandia Formation (Atokan), which is also marine to marginal marine in origin and is dominated by clastics. The Sandia Formation generally overlies Precambrian crystalline rocks in the area, although a thin (less than 20 m thick), discontinuous sequence of limestone and shale deposited during the Mississippian (?) occurs between the Sandia Formation and Precambrian basement at several localities in the Sandia and Manzano Mountains (Kelley and Northrop, 1975; Myers, 1988). The Madera Group is overlain by Permian redbeds of the Abo Formation, or, to the south of the map area, by the Bursum Formation (Wolfcampian) which grades upward into the Abo Formation (Lucas et al., 2000).

Subdivision of the Madera Group in the Manzano and Manzanita Mountains was formalized by Myers (1973), who elevated the Madera to group status and designated two formations within the Madera- the Los Moyos Formation and overlying Wild Cow Formation. Myers (1973, 1988) also included the Bursum Formation in the Madera Group. The Los Moyos and Wild Cow formations generally correspond to the earlier, lithostratigraphic concept of lower gray limestone and upper arkosic limestone units of the Madera "Formation". Myers (1973, 1988) determined that most of the Los Moyos Formation lies within the fusulinid zone of *Beedeina*, indicating that the unit is correlative to the Desmoinian series of the mid-continent. The overlying Wild Cow Formation lies within the zone of *Triticites*, and was subdivided by Myers (1973) into three members. The three members in ascending order are the Sol se Mete, Pine Shadow, and La Casa members. Each of the three members conceptually consists of a basal clastic sequence that grades upward into carbonate shelf limestones. Regional correlation of fusulinid assemblages in the Wild Cow Formation suggest that the Sol se Mete is correlative to Missourian, the Pine Shadow lower Virgilian, and the La Casa upper Virgilian to Wolfcampian strata of the mid continent (Myers, 1988, Fig. 4). As noted by Myers (1973), the Los Moyos and Wild Cow formations are probably equivalent to the Gray Mesa and Atrasado members of the Madera limestone, as defined by Kelley and Wood (1946) in the vicinity of the Lucero uplift. Recent recommendations to simplify the stratigraphic nomenclature of Pennsylvanian strata in the region (Kues, 2000) suggest that the formation names Los Moyos and Wild Cow may eventually be abandoned in favor of the names Gray Mesa and Atrasado, which have precedence. Subdivision of the Madera Group on the Edgewood quadrangle is depicted here using the informal stratigraphic names of "lower" and "upper", in keeping with recent geologic mapping on the adjacent Sedillo quadrangle (Read et al., 1998). The "lower" and "upper" Madera Group units as used here are intended to be synonymous with the Los Moyos and Wild Cow formations of Myers (1973). Preliminary examination of fusulinids collected during this study indicate that all surface exposures of the Madera Group on the Edgewood quadrangle fall within the zone of *Triticites*, and pertain to the upper unit (Wild Cow Formation) of the Madera Group. Inflated forms of *Triticites*, which characterize assemblages in the La Casa Member (Myers, 1988, Plates 8-12), were not found in the study area. On this basis it appears that the Madera Group on the Edgewood quadrangle pertains to the middle, and perhaps lower parts (Pine Shadow and Sol se Mete members, respectively) of the Wild Cow Formation.

Description of Map Units

Pennsylvanian

|Pmu- Upper Madera Group. Late Pennsylvanian. Equivalent to the Wild Cow Formation of Myers (1973). Approximately 90 m of the Madera Group is partially exposed along the western side of the bedrock ridge that lies along the western side of the map area, and to the east of the ridge along the valley of Arroyo de San Jose on the southwestern corner of the map area. Colluviated hillslopes at the base of the exposed sequence reveal beds of limestone that commonly weather pinkish-gray in color. A variety of marine organisms occur in this limestone-dominated interval, but beds containing abundant fusulinids have not been found. A ~5m-thick interval of red shale and sandstone occurs above the basal, limestone-dominated interval. This clastic interval commonly occurs near the base of the exposed sequence, and may mark the base of the Pine Shadow Member of Myers (1973). Approximately 50 m of interbedded limestone, calcareous shale, and minor shale overlies the red clastic interval. Two fusulinid zones are present in this interval that can be traced over much of the map area, and a prominent ledge of thick-bedded limestone with thin interbeds of calcareous shale and shale occurs about 15 m below the top of the interval. Overlying beds consist of up to 30 m of poorly exposed yellow and gray shale, thin interbeds of nodular-weathering limestone, and thicker beds of limestone and calcareous shale. Two sandstone beds near the base of this interval are depicted on the map (unit |Pmu_{ss}). Exposures of the Madera Group on the western edge of the map area lie to the west of a fault zone that extends north-to-south across the map area. These western outcrops are generally poorly exposed, but appear to be lithologically similar to the upper part of the sequence exposed to the east of the fault zone. Tentative correlations of fusulinid zones are used to estimate amounts of vertical separation across faults. Estimates of structural separation based on offset of fusulinid zones are subject to revision, based on additional appraisals of the fusulinid assemblages. Myers (1988) reported an overall thickness for the Wild Cow Formation of about 230 m in the northern Manzano Mountains. For purposes of constructing the accompanying geologic cross sections, the Sol se Mete Member is assumed to be 65 m thick, and the contact between the Sol se Mete Member and the overlying Pine Shadow Member is assumed to occur just below the red clastic interval that occurs near the base of the exposed sequence.

|Pmu_{ss}- Laterally persistent sandstone beds within unit |Pmu. Includes green, micaceous, silty, fine-grained sandstone, and red, arkosic, coarse-grained sandstone with scattered pebble gravel. Sandstone beds thicken and thin and grade laterally from fine-grained to coarse-grained lithofacies, and commonly occur on benches where they are poorly exposed. Generally on the order of a few meters thick. Widths of outcrops shown on map are exaggerated in places.

[Pml- Lower Madera Group (occurs in subsurface only). Middle Pennsylvanian. Equivalent to the Los Moyos Formation of Myers (1973). Contains a larger proportion of limestone relative to clastics in comparison to the overlying, upper Madera Group map unit. Average thickness of the Los Moyos Formation in the northern Manzano Mountains is on the order of 180 m (Myers, 1988), and this value is reflected in the accompanying cross sections.

[Ps- Sandia Formation (occurs in subsurface only). Middle Pennsylvanian. Predominantly sandstone and shale, with thin interbeds of limestone and calcareous shale. The thickness of the Sandia Formation is variable, ranging up to about 90 m in the Manzano Mountains (Myers, 1988). The Sandia Formation is about 45 m thick, on average, in the vicinity of the Sandia Mountains (Kelley and Northrop, 1975). Pre-Pennsylvanian sedimentary units in the map area, if present, are included in the Sandia Formation in the accompanying cross sections, with an assumed, overall thickness of the Sandia Formation and pre-Pennsylvanian sediments of 60 m.

Proterozoic

Xu- Proterozoic crystalline rocks, undifferentiated (occurs in subsurface only). Information about basement rocks in the map area is lacking, and the accompanying cross sections depict undifferentiated Proterozoic rocks beneath the Sandia Formation.

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