

GEOLOGY OF PRESIDIO AREA, PRESIDIO COUNTY, TEXAS

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ABSTRACT

The first detailed geologic map of the Presidio Area shows the distribution of stratigraphic units with ages ranging from Permian to Recent and total thickness greater than 8,000 feet. Guadalupian and Comanchean rock crop out only along a broad, southeast-plunging fold that extends from the Chinati Mountains into eastern Presidio Area and laps onto the northeast flank of the eroded fold. Late Cenozoic normal faults southwest of the Cretaceous outcrops are part of the boundary of the Presidio Bolson; fine-grained bolson deposits and overlying pediment gravel and alluvium crop out southwest of the faults.

An early Guadalupian near-shore deposit, the only Paleozoic formation exposed in the Presidio Area, was slightly deformed and truncated before the Cretaceous episode of marine deposition began. The five Comanchean formations that crop out in the Presidio Area are, in ascending order: Presidio Formation, Shafter Limestone, 'Del Carmen Limestone,' 'Sue Peaks Formation,' and 'Santa Elena Limestone.'

Laramide deformation produced the broad, gentle fold that extends southeastward from the Chinati Mountains into the Presidio Area. Erosion stripped Gulfian and uppermost Comanchean strata from the fold and cut deeply into older rock; but the eroded remnant stood as high, dissected ridgeway when Tertiary volcanism began.

Tertiary volcanic rock exposed in the Presidio Area is divided into six formations: (in order of decreasing age) Morita Ranch Formation (new name), Mitchell Mesa Tuff, the Correlative Tascotal and 'Fresno' Formations, "Perdiz Conglomerate," and Rawls Formation.

The Morita Ranch Formation and "Perdiz Conglomerate," separated by an angular unconformity, crop out in north-central Presidio Area. Lavas extruded from vents near the southeast end of the Chinati Mountains after several hundred feet of volcanic rock blanketed part of Trans-Pecos Texas make up the

Morita Ranch Formation. The Perdiz Conglomerate,' deposited as a fan, is composed of coarse detritus from the Chinati Mountains.

The Mitchell Mesa, 'Fresno,' and Rawls Formations crop out in southeastern Presidio Area. The Mitchell Mesa Tuff, deposited from an ash flow that spread over most of Presidio County, overlies more than 2,000 feet of volcanic rock at some places. Lava and ash-flow tuff in the 'Fresno' and Rawls Formations accumulated around vents in the Bofecillos Mountains. A porphyritic basalt (Tr9) in the Rawls Formation is the youngest volcanic rock in the Presidio Area and may be the youngest in Trans-Pecos Texas.

The Tascotal, "Perdiz," and Rawls Formations crop out in northeastern Presidio Area. The Tascotal is the northern facies of the 'Fresno Formation.' The overlying Perdiz thins eastward from the Chinati Mountains and pinches out within the map area. The Rawls Formation extends northward from the Bofecillos Mountains and overlies the "Perdiz Conglomerate" or Tascotal Formation.

The West Chinati zone of late-Cenozoic normal faults is the northeastern boundary of the Presidio Bolson. Post-Rawls displacement has depressed the bolson block several hundred to a few thousand feet. As much as 3,000 feet of sediment accumulated in western Presidio Area before Pleistocene integration of the Rio Grande drainage system ended the episode of basin filling. Since it became a through-flowing stream, the Rio Grande has cut 500 to 1,000 feet into the bolson deposits. Remnants of four widespread, gravel-covered pediments form broad steps rising from the river. The pediments and their overlying gravel sheets probably represent pluvial episodes in the Pleistocene.