

Detailed Mapping of Leonard Mountain, Glass Mountains, West Texas

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This project produced the first detailed, 1:12,000-scale map of Leonard Mountain in the Glass Mountains of West Texas. Leonard Mountain is located 13 km northeast of Marathon Texas, mostly in the BOSS Ranch. The map includes cross-sections, formation descriptions of Middle - Upper Pennsylvanian, Wolfcampian, and lower Leonardian strata, stereographic projections, and contact orientation calculations. Previous mapping covering this area was conducted at less detailed scales: King (1930, 1:63,160), King (1937, 1:125,000). Many stratigraphic studies have included Leonard Mountain sections: Ross (1963, 1987), Cooper and Grant (1964), Cys (1981), Flores et al. (1987), Ross and Ross (2003), Jansen (2014). Our geologic map distinguishes eight map units: Pennsylvanian Gaptank Formation, Wolfcampian Lenox Hills Formation, Leonardian Hess, Skinner Ranch, and Cathedral Mountain Formations, Tertiary igneous intrusions, and Quaternary landslides and older alluvium. Permian rocks were deposited on the southern shelf of the Delaware Basin near the northernmost exposed Marathon-Ouachita thrust (Hickman et al., 2009). The Permian succession was tilted during the late Paleozoic Marathon-Ouachita orogeny and during the Cretaceous-Tertiary Laramide orogeny (Ross, 1987).

Detailed mapping reveals: 1) tight folds in the Gaptank Fm underlie an angular unconformity, 2) an angular unconformity separates the Lenox Hills Formation from the overlying Hess and Skinner Ranch Formations, 3) the well-exposed Skinner Ranch – Hess contact is a facies boundary, and 4) Quaternary landslides containing tilted blocks cover large parts of the southeastern and southwestern flanks of Leonard Mountain. This detailed geologic map provides a three-dimensional interpretation of Leonard Mountain geology that complements measured sections and sequence stratigraphic studies.