

PROGRESS REPORT ON SUBTLE TECTONIC FEATURES INFLUENCING PATHS OF SMALL TO LARGE DRAINAGES CROSSING THE SOUTHEASTERN ALBUQUERQUE BASIN, NEW MEXICO

Alex J Rinehart¹ and David W Love²

¹E&ES Department, New Mexico Institute of Mining & Technology, 801 Leroy Pl, Socorro, NM, 87801, rinehart@nmt.edu

²New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Pl, Socorro, NM, 87801

Paths and patterns of drainages ranging from first-order swales, to larger Abo Arroyo, to the Rio Grande show subtle influences of recently recognized tectonic features in the southeastern Albuquerque basin. Buried structures seen geophysically between the southeastern flank of the Belen subbasin and the mountains to the east have been interpreted as a bedrock high extending northeast from the Joyita Hills. The main subsurface mass extends approximately 20 km east-to-west from the Los Pinos and southern Manzano Mountains to the edge of the modern Rio Grande valley and 30 km southwest-to-northeast from the Joyita Hills to a deep subbasin west of the Hubbell Spring bench. The mass has a steep gravity gradient along its northwestern flank, striking north-northeast. The mass also has highs such as Turututu and lows such as a graben between the Los Pinos Mountains and a Proterozoic outcrop 10 km west of the range. Expression of deformation at the surface is restricted to degraded low-relief fault scarps and peculiar drainage paths. Cibola Canyon and Palo Duro Canyon constructed large fans from the southern Los Pinos Mountains across the area north of the Joyita Hills, but both drainages established entrenched courses trending northwest to join the Rio Grande at upstream obtuse angles. Maes Arroyo and Pino Draw established similar northwest-trending paths. Abo Arroyo deposited a sequence of large fan segments east-west across the buried feature; its present valley veers northwest and west near its junction with the Rio Grande. Abo Arroyo and smaller adjacent drainages are influenced by north-south down-to-the-east normal faults that cut the older segmented fan. These subtle effects suggest multiple scales of interaction between structure, drainage systems, and time, ranging from local stream gradients crossing or paralleling a single fault to the deflection of drainage directions across fans of the large tributaries.

South of Turututu the local graben deflects alluvial fans to the northwest and into north-south swales abutting an east-dipping fault. Given limited soil development and older ancestral Palo Duro deposits interfingering with Rio Grande deposits (obsidian clasts <1.4 Ma) immediately to the west, the west side of the graben has dropped recently. To the north of the graben, Pino Draw reworked Abo fan and Rio Grande sediments north and south of Turututu and built low terraces to the east of the 5-m scarp of an E-dipping normal fault. Pino Draw flattens across the half-horst west of the fault and then steepens on the western edge. Between Turututu and Abo Arroyo, the west-tilted half-horst consisting of a beheaded paleo-Abo fan complex forms a N-S bluff line for ancestral Rio Grande deposits containing obsidian. The post-bluff-line Pleistocene to Holocene swales cutting through the half horst have been uplifted, and occasionally beheaded. Swales have re-oriented recently, turning north-south along the eastern edge of the horst. The largest swales have occupied the same breaches through the half-horst since mid-Pleistocene time. Smaller swales have been isolated through the last ~300-kyrs. The E-dipping fault has continued to slip, shown by small offsets in <100 kyr Abo Arroyo terraces.

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