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Quaternary Fault and Fold Database of the United States

As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the interactive fault map.

San Andres Mountains fault, northern section (Class A) No. 2053a

Last Review Date: 2015-12-21

Compiled in cooperation with the New Mexico Bureau of Geology & Mineral Resources

citation for this record: **Machette, M.N., and Jochems, A.P., compilers, 2015, Fault number 2053a, San Andres Mountains fault, northern section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 12/14/2020 02:22 PM.**

Synopsis	**General:** Little is known about this long and possibly hazardous fault owing to its location on the White Sands Missile Range, which has limited access. The fault is shown on a number of small-scale regional maps, and a limited study of fault scarp morphology by the compiler has been used to suggest a model for segmentation of the fault, which has not been tested by paleoseismic studies or numerical dating. **Sections:** This fault has 3 sections. Machette (1987 #847) suggested three segments for the fault based on fault geometry

	and scarp morphology data. However, these data are not compelling from a seismogenic sense, and the segments are treated as sections herein.
Name comments	**General:** The young fault scarps along the eastern margin of the San Andres Mountains were first recognized by Kelley (1955 #989) during his bedrock mapping of the mountains. Because of restricted access to White Sands Proving Grounds (Missile Range) since the mid 1940s, the fault's history is still largely unstudied. Machette (1987 #847) named the fault for its position along the eastern margin of the San Andres Mountains. The fault extends from the latitude of Capital Peak, in the northern part of the White Sands Proving Ground, south to Antelope Hill, just south of U.S. Highway 70, where it joins the Organ Mountains fault [2052]. Seager (1981 #968) suggested that the San Andres Mountains fault extends north to Mockingbird Gap, a prominent graben-shaped valley that bisects the northern end of the San Andres Mountains. **Section:** The northern section of the fault extends from about due east of Capital Peak south to Rhodes Canyon, which marks a prominent eastward concavity in the fault. The section boundary is based on a 3-km-long gap in surface faulting, as well as a change in fault strike and degree of scarp preservation (Machette, 1987 #847). **Fault ID:** Referred to as fault 3 on figure 1 and table 2 of Machette (1987 #847) and fault 11 on figure 1 of Machette (1987 #960).
County(s) and State(s)	SIERRA COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Based on aerial reconnaissance mapping by Machette, topographic map interpretation at 1:24,000 scale, and a 1:125,000-scale map of Weir (1965 #982); also shown in a general manner on 1:1,000,000-scale map of Woodward and others (1978 #986). Bachman and Harbour (1970 #988) showed three photo lineaments along the eastern margin of the San Andres Mountains, but did not confirm that they were of fault

	origin. The location of th4 fault was digitized at 1:24,000 scale using photogrammetry to accurately map its trace from these sources.
Geologic setting	This north-trending fault forms the eastern margin of the San Andres Mountains and the western margin of the Tularosa basin (Neogene). The fault has uplifted the San Andres Mountains into a westward-tilted block and exposed Precambrian and lower Paleozoic rocks along most of the footwall. The hanging wall block is characterized by a thick sequence of Tertiary and Quaternary basin-fill sediment; those deposits faulted at the surface are primarily of middle to late Quaternary age.
Length (km)	This section is 26 km of a total fault length of 113 km.
Average strike	N25°E (for section) versus N2°E (for whole fault)
Sense of movement	Normal *Comments:* Inferred from drilling and gravity measurements in the southern part of the Tularosa Basin. Seager (1981 #968) estimated there may be as much as 4–5 km of throw across the Organ Mountains fault, San Andres Mountains fault, and similar (major) buried faults on the west side of the Tularosa Basin.
Dip Direction	E *Comments:* High-angle dip inferred from exposures of the adjacent Organ Mountains fault [2052], which joins the San Andres fault on the south.
Paleoseismology studies	
Geomorphic expression	The fault forms scarps that are mostly continuous on unconsolidated surficial deposits and poorly consolidated basin-fill deposits from 3 km north of Rhodes Canyon to north of Salinas Peak, and discontinuous scarps as far north as Capital Peak. No morphometric studies, other than characterizations of scarp height (Machette, unpubl. data, 1996), have been conducted due to limited access in this area.
Age of faulted surficial	No detailed work has been done on the age of faulted materials along this section of the fault. However, a brief reconnaissance by

deposits	Machette (unpubl. data, 1996) suggests that the older faulted landforms are underlain by early to middle Pleistocene sediment equivalent to the Camp Rice Formation as mapped to the west. Scarps on these deposits are large, probably in the 10–20 m range. Piedmont-slope and alluvial-fan surfaces of suspected late to middle Pleistocene age are offset 2–8 m. No scarps were noted on alluvium of suspected Holocene or latest Pleistocene age (<15 ka). The age of these deposits are estimated from degree of landform preservation, occasional glimpses of soils on the deposits, and geomorphic position.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Timing based on offset of late Pleistocene deposits; however, the most recent movement is probably pre-latest Pleistocene (>15 ka).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip rate inferred from 2- to 8-m-high scarps on middle and late Pleistocene landforms; the scarps are smaller and appear older than those on the central section of the fault [2053b].
Date and Compiler(s)	2015 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#988 Bachman, G.O., and Harbour, R.L., 1970, Geologic map of the northern part of the San Andres Mountains, central New Mexico: U.S. Geological Survey Miscellaneous Geologic Investigations I-600, 1 sheet, scale 1:62,500. #989 Kelley, V.C., 1955, Regional tectonics of south-central New Mexico, *in* Guidebook of south-central New Mexico: New Mexico Geological Society, 6th Field Conference, November 11-13, 1955, Guidebook, p. 96-104. #847 Machette, M.N., 1987, Preliminary assessment of paleoseismicity at White Sands Missile Range, southern New Mexico—Evidence for recency of faulting, fault segmentation,

	and repeat intervals for major earthquakes in the region: U.S. Geological Survey Open-File Report 87-444, 46 p. #960 Machette, M.N., 1987, Preliminary assessment of Quaternary faulting near Truth or Consequences, New Mexico: U.S. Geological Survey Open-File Report 87-652, 40 p. #968 Seager, W.R., 1981, Geology of Organ Mountains and southern San Andres Mountains, New Mexico: New Mexico Bureau of Mines and Mineral Resources Memoir 36, 97 p., 4 pls. #982 Weir, J.E., Jr., 1965, Geology and availability of ground water in the northern part of the White Sands Missile Range and vicinity New Mexico: U.S. Geological Survey Water-Supply Paper 1801, 78 p., 1 pl., scale 1:125,000. #986 Woodward, L.A., Callender, J.F., Seager, W.R., Chapin, C.E., Gries, J.C., Shaffer, W.L., and Zilinski, R.E., 1978, Tectonic map of Rio Grande rift region in New Mexico, Chihuahua, and Texas, *in* Hawley, J.W., ed., Guidebook to Rio Grande rift in New Mexico and Colorado: New Mexico Bureau of Mines and Mineral Resources Circular 163, 1 pl., scale 1:1,000,000.