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Quaternary Fault and Fold Database of the United States

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Gold Hill fault zone, northern section (Class A) No. 2094a

Last Review Date: 2016-02-12

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

citation for this record: **Machette, M.N., and Jochems, A.P., compilers, 2016, Fault number 2094a, Gold Hill fault zone, 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 02:21 PM.**

Synopsis	**General:** The Gold Hill fault zone is marked by discontinuous, en echelon southwest-facing scarps along the southwestern flank of a southern prong of the Big Burro Mountains. The scarps record evidence of multiple faulting events in the middle to late Pleistocene. Other than a few scarp profiles, no detailed studies have been made of the Quaternary history of the fault. **Sections:** This fault has 2 sections. The sections are defined herein on the basis of apparent recency of movement and fault trace geometry. The northern section extends from Round

	Mountain on the north to Gold Hill Canyon on the south. The southern section, which is poorly studied, extends from Gold Hill Canyon (more basinward) southeast across the piedmont toward Ninetysix Ranch to within about 4 km west of Separ Road (Ninetysix Ranch 7.5-minute quadrangle, New Mexico).
Name comments	**General:** The fault zone was first mapped as largely concealed beneath alluvium by Hedlund (1978 #1043), but Machette and others (1986 #1033) mapped Quaternary scarps that are partly coincident with Hedlund's concealed trace. Machette and others (1986 #1033) applied the Gold Hill name to the fault, but in retrospect they should have applied a different name because the Gold Hill fault of Hedlund (1978 #1043) is entirely within Precambrian bedrock. The fault zone is located about 20 km northeast of Lordsburg, New Mexico. **Section:** The northern section is defined herein as extending from Round Mountain on the north to Gold Hill Canyon on the south. **Fault ID:** Fault number 11 of Machette and others (1986 #1033).
County(s) and State(s)	GRANT COUNTY, NEW MEXICO HIDALGO COUNTY, NEW MEXICO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Mostly mapped at 1:24,000 scale using original trace from 1:250,000-scale map of Machette and others (1986 #1033), itself compiled at 1:24,000-scale from aerial photographs, combined with accurate placement using photogrammetric methods. Traces at the northern and southern ends of the section digitized from 1:250,000-scale map of Machette and others (1986 #1033). Drewes and others (1985 #1034) showed the generalized trace of the entire fault on their 1:250,000-scale map. Hedlund's (1978 #1043) map shows the Quaternary fault trace as largely concealed (inferred) and was not used in this compilation.
Geologic setting	This fault is subparallel to Hedlund's (1978 #1043) Gold Hill fault zone, which is entirely within Precambrian bedrock. The Quaternary trace of the Quaternary Gold Hill fault zone is marked by discontinuous, en echelon southwest-facing scarps on piedmont-slope deposits along the southwestern flank of the

	Burro Mountains. Regional geologic mapping by Drewes and others (1985 #1034) showed the fault in a similar but less continuous manner than mapping by Machette and others (1986 #1033).
Length (km)	This section is 10 km of a total fault length of 24 km.
Average strike	N27°W (for section) versus N44°W,N57°W (for whole fault)
Sense of movement	Normal
Dip Direction	SW
Paleoseismology studies	
Geomorphic expression	Scarps along the northern section are discontinuous but large, where preserved. Near Round Mountain (and Hoodoo Canyon), Machette and others (1986 #1033) measured two scarps with heights of 6 m and 8.5 m on older alluvial fans. The larger scarp has two pronounced bevels on the upper surface suggesting that both it and the smaller scarp are probably a result of multiple faulting events (>2 and 2 events, respectively). This inference is also supported by the large height and surface offset (5.8 m and 2.9 m, respectively) for the smaller of the two scarps. Near the south end of the section, a very subdued scarp is preserved on an alluvial-fan deposit, whereas the fault appears to be buried by younger alluvium that forms inset fan-head terraces. The latter scarp has a height of about 2 m (offset of 0.6 m) and a maximum scarp-slope angle of 5° superposed on the 3° southwest slope of the fan. This small discordance in slope angles suggests a late Pleistocene (but not latest Pleistocene) age, such as recorded on the 100-ka Santa Rita fault scarp (Pearthree and Calvo, 1987 #1023).
Age of faulted surficial deposits	The high-level piedmont surfaces on the northern part of the section are probably middle Pleistocene in age. Here, Machette found older alluvial fans that have strongly developed soils (thick Bt and K horizons) that are probably hundreds of thousands of years old (200–500 ka). The younger alluvial fans (faulted by a single event) have moderately developed soils (Bt and K horizons) and are probably of latest middle Pleistocene age (130–200 ka). The unfaulted fan-head terraces that are inset into the younger and older fans are probably latest Pleistocene to Holocene in age. These age estimates are based on soil

	development, degree of dissection, and landform preservation.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The age assignment is based on offset of latest middle Pleistocene fan surfaces, subdued scarp morphology comparable to that of 100-ka scarps in Arizona (Pearthree and Calvo, 1987 #1023), and discontinuous preservation of scarps.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Low slip-rate category assigned based on small scarps (3 m) on late Pleistocene deposits.
Date and Compiler(s)	2016 Michael N. Machette, U.S. Geological Survey, Retired Andrew P. Jochems, New Mexico Bureau of Geology & Mineral Resources
References	#1034 Drewes, H., Houser, B.B., Hedlund, D.C., Richter, D.H., Thorman, C.H., and Finnell, T.L., 1985, Geologic map of the Silver City 1° x 2° quadrangle New Mexico and Arizona: U.S. Geological Survey Miscellaneous Investigations Map I-1310-C, 1 sheet, scale 1:250,000. #1043 Hedlund, D.C., 1978, Geologic map of the Gold Hill quadrangle, Hidalgo and Grant Counties, New Mexico: U.S. Geological Survey Miscellaneous Field Studies Map MF-1035, 1 sheet, scale 1:24,000. #1033 Machette, M.N., Personius, S.F., Menges, C.M., and Pearthree, P.A., 1986, Map showing Quaternary and Pliocene faults in the Silver City 1° x 2° quadrangle and the Douglas 1° x 2° quadrangle, southeastern Arizona and southwestern New Mexico: U.S. Geological Survey Miscellaneous Field Studies Map MF-1465-C, 12 p. pamphlet, 1 sheet, scale 1:250,000. #1023 Pearthree, P.A., and Calvo, S.S., 1987, The Santa Rita fault zone—Evidence for large magnitude earthquakes with very long recurrence intervals, Basin and Range province of southeastern Arizona: Bulletin of the Seismological Society of America, v. 77,

	p. 97-116.