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Quaternary Fault and Fold Database of the United States

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Raymond fault (Class A) No. 103

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Synopsis	Holocene active steeply north-dipping sinistral strike slip fault. Fault location is well known from geomorphic expression and mapping (Buwalda, 1940 #5954; Crook and others, 1987 #5956). In addition, several trenching studies have provided data on Holocene activity (Crook and others, 1987 #5956; Weaver and Dolan, 2000 #5928). Crook and others (1987 #5956) reported a recurrence interval of 3,000 to 4,500 yr, and Marin and others (2000 #5960) reported a minimum sinistral slip rate of 1.5 mm/yr.
Name comments	Recognition of a generalized fault zone in this vicinity was first published by Lawson and others (1908 #5925); the greater portion of the Raymond fault (east from Arroyo Seco) was first mapped in a more specific fashion by Miller (1928 #5961); "Raymond fault", a name apparently already in use, was published by Eckis (1934 #5957, p. 127). "Raymond Hill fault" reportedly used by Johnson and Warren (1927 #5958) as cited by Yerkes and others

	(1965 #5930); fault is also part of "Santa Monica segment" of the "Anacapa Lineament" of Hill (1928 #4959) and the "Santa Monica fault system" of Barbat (1958 #5953). **Fault ID:** Refers to number 394 (Raymond fault) of Jennings (1994 #2878) and number 81 (Raymond fault) of Ziony and Yerkes (1985 #5931).
County(s) and State(s)	LOS ANGELES COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Location of fault from Qt_flt_ver_3-0_Final_WGS84_polyline.shp (Bryant, W.A., written communication to K.Haller, August 15, 2017) attributed to Weber and others (1980 #7951), Crook and others (1987 #5956), and Treiman (1991 #8323, 2013 #7952) .
Geologic setting	North dipping sinistral fault is part of east-west fault system (also including Anacapa-Dume [100], Malibu Coast [99], Santa Monica [101], and Hollywood [102] faults) that has accommodated 80° of clockwise rotation of the western Transverse Ranges and perhaps as much as 60 km sinistral slip since early Miocene (Hornafius and others, 1986 #5922); with the Hollywood [102]-Santa Monica [101] faults forming the northern limit to the Los Angeles Basin (Yerkes and others, 1965 #5930; Wright, 1991 #5950).
Length (km)	25 km.
Average strike	N75°E
Sense of movement	Left lateral *Comments:* (Jones and others, 1990 #5959; Petersen and others, 1996 #4860; Weaver and Dolan, 2000 #5928)
Dip	70–80° N. *Comments:* Dip based on mapping and corroborated by focal mechanism of 1988 Pasadena earthquake and projection to

	surface trace (Buwalda, 1940 #5954; Jones and others, 1990 #5959).
Paleoseismology studies	Site 103-1, Sierra Madre Boulevard: trench exposed main fault zone and provided data on rupture history prior to most recent event; 14C age control (Weaver and Dolan, 2000 #5928). Site 103-2, San Marino High School: trench exposed two branches of fault and provided evidence for multiple rupture events and maximum age for most recent event; 14C age control (Crook and others, 1987 #5956). Site 103-3, Sunny Slope Reservoir: trench exposed two faults and provided evidence for multiple fault rupture events and maximum age of most recent event; 14C age control (Crook and others, 1987 #5956). Site 103-4, Eaton Wash: 3-D trenching and 14C age control from deposits incised by latest Pleistocene offset channel established minimum slip-rate (Marin and others, 2000 #5960). Site 103-5, L.A. County Arboretum: trench across southern strand bounding pressure ridge provided data, building on prior studies, to constrain most recent surface rupture; 14C age control (Weaver and Dolan, 2000 #5928)
Geomorphic expression	The fault is expressed by scarps, pressure ridges, and closed depressions (Bryant, 1978 #5955).
Age of faulted surficial deposits	Holocene and late Pleistocene (11–200 ka) alluvial fan deposits and surfaces (Crook and others, 1987 #5956; Weaver and Dolan, 2000 #5928) are faulted.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* The most recent event occurred 1–2 k.y. ago (Crook and others, 1987 #5956; Weaver and Dolan, 2000 #5928).
Recurrence interval	3–4 k.y. (<36 ka) *Comments:* Crook and others (1987 #5956) reported a recurrence interval of 3,000 to 4,500 yr, based on the recognition of 8 events

	in the past 36,000 yr and the assumption that some events were not detected.
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Marin and others (2000 #5960) reported a minimum sinistral slip rate of at least 1.5 mm/yr, based on 44 m of sinistral offset of a gravel-filled channel. A single date of 25,400±160 14C yr BP from a charcoal fragment obtained from a silty sand unit in which the offset channel had incised provides a maximum age of displacement. Walls and others (1998 #5927) predict 1.5±0.5 mm/yr based on model; Clark and others (1984 #2876) incorporated in Petersen and Wesnousky (1994 #5962) derive a vertical slip rate of 0.10–0.22 mm/yr from sedimentation rate in sag pond (Crook and others, 1987 #5956) and assume that this rate is equivalent to vertical separation rate. Slip rate assigned by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 0.5 mm/yr (with minimum and maximum assigned slip rates of 0.2 mm/yr and 0.8 mm/yr, respectively).
Date and Compiler(s)	2000 Jerome A. Treiman, California Geological Survey William A. Bryant, California Geological Survey
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