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San Jacinto fault, San Bernardino Valley section (Class A) No. 125a

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Compiled in cooperation with the California Geological Survey

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Synopsis	**General:** This is the most seismically active fault in southern California, with significant earthquakes (larger than M5.5), including surface rupturing earthquakes in 1968 (M6.6 Borrego Mountain earthquake) and 1987 (M6.6 Superstition Hills and M6.2 Elmore Ranch earthquakes), and numerous smaller shocks within each of its main sections. Slip rates in the northern half of the fault system are around 12 mm/yr but are only around 4 mm/yr for faults in the southern half where strands overlap or are sub-parallel.

	Sections: This fault has 7 sections. Sections taken from segments defined by Working Group on California Earthquake Probabilities (1995 #4945) and by Petersen and others (1996 #4860), and include from north to south into: San Bernardino section [125a], San Jacinto Valley section [125b], Anza section [125c], Coyote Creek section [125d], Borrego Mountain section [125e], Superstition Hills section [125f], and Superstition Mountain section [125g]. Sanders and Magistrale (1997 #6396) defined 18 segments based on inferred and observed historic ruptures and bends or steps in the continuity of the faults (these "segments" are listed under the seven sections described herein). Wesnousky (1986 #5305) divided the fault zone into nine segments, including the entire Claremont fault in the northern segment, including the Casa Loma fault with the Clark fault, and distinguishing the Hot Springs, Thomas Mountain and Buck Ridge faults as separate segments, in addition to the Coyote Creek, Borrego Mountain, Superstition Hills and Superstition Mountain sections as used by Working Group on California Earthquake Probabilities (1995 #4945).
Name comments	**General:** San Jacinto fault named by Lawson and others (1908 #4969). Later mapping of major parts of zone by Fraser (1931 #6379), Dibblee (1954 #6376) and Sharp (1967 #6397). Major named faults within the zone include the Claremont, Casa Loma, Clark, Buck Ridge, Coyote Creek, Superstition Mountain, and Superstition Hills faults. See section discussions for more detail. **Section:** Section represented herein includes Lytle Creek fault (no. 400), Glen Helen fault (no. 402) and San Bernardino Valley portion of Claremont fault (no. 447) of Jennings (1994 #2878); also includes Rialto-Colton fault (no. 429 in Jennings, 1994 #2878) and Loma Linda fault; San Jacinto fault of Morton (in Fife and others, 1974 #6378) appears to be same as Claremont fault. Map of Morton (in Fife and others, 1974 #6378) implies that Loma Linda fault may be southeast extension of Glen Helen fault. Section includes Lytle Creek, Glen Helen, and San Bernardino segments of Sanders and Magistrale (Sanders and Magistrale, 1997 #6396). This section extends southeastward from just south of the Cucamonga fault to where the Loma Linda and Claremont faults join, north of San Jacinto Valley. **Fault ID:** Refers to numbers 400 (Lytle Creek fault), 401 (San Jacinto fault), 402 (Glen Helen fault), 429 (Rialto-Colton fault), 447 (Claremont fault), 457 (Casa Loma fault), 458 (Hot Springs fault), 459 (Clark fault), 471 (Buck Ridge fault), 478 (Coyote

	Mountain fault), 479 & 480 (Coyote Creek fault), 504 (Superstition Hills fault), 505 (Superstition Mountain fault) and 506 (Wienert fault) of Jennings (1994 #2878); numbers 2 (Glen Helen fault), 3 (San Jacinto fault), 4 (Lytle Creek fault), 5 (Claremont fault), 6 (Casa Loma fault), 7 (Hot Springs fault), and 8 Clark fault) of Ziony and Yerkes (1985 #5931).
County(s) and State(s)	RIVERSIDE COUNTY, CALIFORNIA SAN BERNARDINO COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Fault traces from State of California Alquist-Priolo Earthquake Fault Zone maps.
Geologic setting	The San Jacinto fault zone is a major element of the San Andreas fault system in southern California, with historic earthquakes (if not ground rupture) associated with most of its sections. This dextral fault zone branches off from the San Andreas near Cajon pass and extends southeastward through the Peninsular Ranges for 240 km into southwestern Imperial Valley. Sharp (1967 #6397) believes that this is currently the most active strand of the San Andreas system in southern California, but is relatively young, with only about 24 km of total dextral offset. The fault zone may be divided into four principal sections: the Claremont, Clark, Coyote Creek and Superstition sections which are separated by major discontinuities (Sanders and Magistrale, 1997 #6396). The fault zone is further subdivided for seismic-hazard modeling purposes into from 5 to as many as 20 "segments" by various authors. The principal faults within the zone overlap in a right-stepping fashion, with a major overlap (50 km in length) occurring between the Clark and Coyote Creek faults.
Length (km)	This section is 51 km of a total fault length of 244 km.
Average strike	(for section) versus N58°W (for whole fault)
Sense of movement	Right lateral
Dip Direction	NE; SW *Comments:* Lytle Creek--65° SW.; Claremont (San Jacinto)--30–

	40° NE.
Paleoseismology studies	Site 125-4, San Bernardino: three-dimensional trench study documented deflection and offset of a buried Holocene channel; minimum slip rate determined using 14C-dating (Wesnousky and others, 1991 #6403).
Geomorphic expression	Glen Helen fault marked by faceted ridges, scarp, linear and deflected drainages. Claremont fault marked by scarps, linear and deflected drainages, notches, benches and aligned gullies. Rialto-Colton fault has no recognized geomorphic expression and is known principally as a groundwater barrier (Morton in Fife and others, 1974 #6378; Hart, 1977 #6381).
Age of faulted surficial deposits	Holocene fluvial deposits (Wesnousky and others, 1991 #6403); terrace deposits (cited by Wesnousky, 1986 #5305).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Last event post-dates offset channel deposit dated 1931±109 yr BP (Wesnousky and others, 1991 #6403); pre-instrumental historic earthquakes possibly associated with this section include July 22, 1899 (M6.5), July 23, 1923 (M6.3), and April 21, 1918 (M6.8), but surface rupture is not reported from these events (Wesnousky, 1986 #5305).
Recurrence interval	107 yr *Comments:* from Wesnousky (1986 #5305)
Slip-rate category	Greater than 5.0 mm/yr *Comments:* Reported slip rates include 12±6 mm/yr (Working Group on California Earthquake Probabilities, 1995 #4945) based on extrapolation of Anza data; 17 mm/yr for the past 0.7 m.y. (Morton and others, 1986 #6389); 6–13 mm/yr estimated by Prentice and others (1986 #6391); 10 mm/yr on Glen Helen/Lytle Creek faults (Wesnousky, 1986 #5305); 2.5 mm/yr for Lytle Creek fault only (Mezger and Weldon, 1983 #6386); 1.7–3.3 mm/yr minimum slip rate on one strand of Claremont fault, southwest of San Bernardino (Wesnousky and others, 1991

	#6403). Slip rate assigned by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 12.0 mm/yr (with minimum and maximum assigned slip rates of 6.0 mm/yr and 18.0 mm/yr, respectively).
Date and Compiler(s)	1999 Jerome A. Treiman, California Geological Survey Matthew Lundberg, California Geological Survey
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