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

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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 San Jacinto Valley portion of Claremont fault (no. 447), Hot Springs fault (no. 458), and Casa Loma fault (no. 457) of Jennings (1994 #2878); also Park Hill fault. Preceding faults correspond to four segments of Sanders and Magistrale (1997 #6396). Claremont fault named by Fraser (1931 #6379), but the name has been applied both to the Holocene fault at the southwest margin of the San Timoteo badlands (Fraser, 1931 #6379; Jennings, 1994 #2878) and to an older sub-parallel fault strand roughly 0.5-1.0 km to the northeast (Department of Water Resources, 1959 #6377; Rogers, 1965 #505; Shuler,1953 #6881). However, current usage of the name is for the Holocene main strand of the fault zone in the San Bernardino-San Jacinto Valley area (Hart, 1977 #6381; Kahle, 1987 #6880; Morton, D.M., personal commun., 1999); Hot Springs fault named and diagrammatically mapped by R.T. Hill (as shown by Arnold, 1918 #6373) and later remapped by Fraser (1931 #6379); Casa Loma fault named by (Department of Water Resources, 1959 #6377); Park Hill fault named by (Department of

	Water Resources, 1959 #6377); the southeastern part of the Casa Loma fault has also been called the Bautista Creek fault (Department of Water Resources, 1959 #6377). The southern end of the main part of this section is at the concealed juncture where the Casa Loma and Claremont faults join to form the Clark fault (Working Group on California Earthquake Probabilities, 1995 #4945); although the subsidiary Hot Springs fault continues further to the southeast, overlapping the northern Anza section. **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
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Traces based on 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 59 km of a total fault length of 244 km.
Average strike	(for section) versus N58°W (for whole fault)
Sense of movement	Right lateral, Normal *Comments:* Claremont fault is principally dextral with perhaps some reverse (Proctor, 1962 #6392); Casa Loma appears to be mainly normal (Department of Water Resources, 1959 #6377), but Rasmussen (1981 #6393) reports evidence of dextral component.
Dip	70° NE. *Comments:* San Jacinto [Claremont] fault measured in aqueduct tunnel (Department of Water Resources, 1959 #6377); Casa Loma fault dips 35?-53? NE.
Paleoseismology studies	
Geomorphic expression	Claremont fault marked by faceted ridges, notches, scarps, linear gullies and ponded alluvium. Casa Loma fault marked by sinuous scarps, linear gullies and ponded alluvium. Hot Springs fault marked by scarps. Area between Claremont and Casa Loma faults is a sediment filled graben and area between Casa Loma and Park Hill faults is a pressure ridge.
Age of faulted surficial deposits	Fault offsets Holocene younger alluvium in San Jacinto Valley (Morton, 1972 #6387, 1978 #6388); Plio-Pleistocene Bautista beds of Fraser (1931 #6379).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Historic pre-instrumental events include M6.8 or 6.9 on the Claremont fault (04/21/1918) and M6.4 on the Casa Loma (12/25/1899).

Recurrence interval	65-98 yr *Comments:* Estimate for Casa Loma fault (Rasmussen, 1981 #6393).
Slip-rate category	Greater than 5.0 mm/yr *Comments:* Reported slip rates include Working Group on California Earthquake Probabilities (1988 #5494) estimate of 12.0?6.0 mm/yr based on data from the Clark fault, to the south, 8-12 mm/yr (Sharp, 1981 #6398); 13-26 mm/yr, between 43-67 ka and 7-13 mm/yr between 305-700 ka (Kendrick and others, 1994 #6383); Wesnousky (1986 #5305) assigned 10 mm/yr. 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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