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Elsinore fault zone, Chino section (Class A) No. 126b

Last Review Date: 1998-12-01

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Synopsis	**General:** A major dextral strike-slip fault zone that is part of the San Andreas fault system. Research studies have been done to assess faulting on most of the sections, and have documented Holocene activity for the length of the fault zone with a slip rate around 4–5 mm/yr. Multiple events have only been dated on the Whittier fault and Glen Ivy North fault strand, so interaction between faults and adjacent sections is not well-known. Multiple strands within several sections mean that the studies are not always fully representative of the whole section. Numerous consulting reports (not summarized herein) that have addressed location and recency of faulting are on file with the State of California, California Geological Survey, as part of the records of their Alquist-Priolo Earthquake Fault Zoning Program. **Sections:** This fault has 7 sections. Sections are selected

	following the segmentation from Working Group on California Earthquake Probabilities (1995 #4945) from north to south: Whittier section [126a], Chino section [126b], Glen Ivy section [126c], Temecula section [126d], Julian section [126e], Coyote Mountain section [126f], with addition of Laguna Salada section [126g] as used by Petersen and others (1996 #4860) and Chino fault (paired with the Whittier fault by Rockwell and others, 1992 #6431).Anderson and others (1989 #6372) also identified same segments, with addition of Chupamiertos and Sierra Mayor segments in Baja California (not included in this summary); Wesnousky (1986 #5305) defined four segments, combining the Whittier, Chino and Glen Ivy into his segment A, Temecula into segment B, Julian into segment C, and the Coyote Mountain and Laguna Salada sections into segment D.
Name comments	**General:** **Section:** This is fault #431 of Jennings (1994 #2878); shown by Lawson (1908 #4969), the Chino fault was named by English (1926 #6411); fault extends along the east side of the Puente Hills from west of Chino to vicinity of Corona, where it merges into the Main Street fault of the Glen Ivy section. **Fault ID:** Refers to numbers 431 (Chino fault), 444 (Whittier fault), 446 (Fresno, Tin Mine and Main Street faults), 460 (Wildomar fault), 461 (Glen Ivy North fault), 462 (Glen Ivy South fault), 467 (Willard fault), 469 (Wolf Valley fault), 470 (unnamed faults flanking Agua Tibia Mountain), 482 (Earthquake Valley), 483 & 496 (Elsinore fault), and 511 (Laguna Salada fault) of Jennings (1994 #2878); and numbers 10 (Chino fault), 12 (Whittier fault), 13 (Main Street fault), 14 (Fresno-Eagle fault), 15 (Tin Mine fault), 16 (Glen Ivy North fault), 17 (Glen Ivy South fault), 18 (Wildomar fault), 19 (Willard fault), 20 (Wolf Valley 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:* Location of traces based on mapping by Woodward-Clyde Consultants (1980 #6449) and Treiman (2002 #6441) at

	1:24,000; southern part (in Riverside County) modified after 1:24,000-scale mapping of Weber (1977 #6448) and Treiman (2002 #6441).
Geologic setting	The Elsinore fault zone is a major dextral shear system, parallel to the southern San Andreas fault [1], that accommodates about 5 mm/yr of the Pacific-North American Plate boundary slip. The northern elements of the fault zone, the Chino and Whittier faults, bound the Puente Hills, an uplifted block of Tertiary sediments. The Glen Ivy section forms the northeast boundary of the Santa Ana Mountains, and, together with the Temecula section, forms the Elsinore trough. To the southeast the fault zone (Temecula, Julian, and Coyote Mountain sections) cuts diagonally across various Peninsular Range batholithic and pre-batholithic metamorphic terrain until it reaches the southwestern margin of the Salton Trough as the Laguna Salada fault. Total strike-slip is reported to be as much as 40 km but is more likely only 10–15 km, and total vertical separation is about 200 m (Hull and Nicholson, 1992 #6416).
Length (km)	This section is 20 km of a total fault length of 306 km.
Average strike	N42°W (for section) versus N51°W (for whole fault)
Sense of movement	Reverse *Comments:* Ratio of horizontal to vertical is not determined, but reverse is interpreted to be dominant by Heath and others (1982 #6415) based on tectonic model.
Dip	50–67° W. *Comments:* Dips from oil well data - 59–67° W. from Durham and Yerkes (1964 #6408); 50° W. from Olson (1977 #6426); shallower dips observed near surface.
Paleoseismology studies	Site 126-13 by Walls and Gath (2001 #6447)--trench across the principal surface trace exposed Miocene Puente Formation in fault contact with alluvium and buried soils.
Geomorphic expression	Saddles, deflected drainages, linear drainage, modified scarps.
Age of faulted surficial	Late Quaternary alluvial fan (125–500 ka in Heath and others,

surficial deposits	1982 #6415).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Walls and Gath (2001 #6447) reported that at least one surface rupturing earthquake has occurred in the past 9, 598 yr. A faulted Abk soil horizon within 1 m of the ground surface suggests the event was late Holocene.
Recurrence interval	*Comments:* Recurrence interval is not reported by Walls and Gath (2001 #6447); however, they do reported that the penultimate event occurred between 9.5 and 11.6 ka.
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Heath and others (1982 #6415) estimated a vertical slip rate of 0.06 mm/yr based on a deformed paleosurface, and assumed that the lateral rate was less than this at Prado dam. Mills and Collender (1995 #6424) estimated a vertical displacement rate of 0.14–0.25 mm/yr based on at least two events as indicated in their trenches. Coupled with their suggestion of roughly equal horizontal and vertical components, this would approximately double the above rates. Gath (2000 #6412) postulated that up to 2 mm/yr of dextral slip from the Elsinore fault zone is partitioned to the Chino fault, but some of this may be absorbed by folding. Walls and Gath (2001 #6447) revised this estimate, suggesting that 2.3–3.9 mm/yr NW strain is accommodated by faulting on the Chino fault and folding in adjacent terrain. Based on trench evidence for a most recent event and a penultimate event they estimated a minimum dextral slip rate of 0.3–0.5 mm/yr, a rate that is not too far off from the earlier estimate of Mills and Collender (1995 #6424). Slip rate assigned to this part of the fault by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 1.0 mm/yr (with minimum and maximum assigned slip rates of 0 mm/yr and 2 mm/yr, respectively.
Date and Compiler(s)	1998 Jerome A. Treiman, California Geological Survey
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