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Elsinore fault zone, Coyote Mountain section (Class A) No. 126f

Last Review Date: 1998-12-01

citation for this record: **Treiman, J.A., compiler, 1998, Fault number 126f, Elsinore fault zone, Coyote Mountain 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 02:16 PM.**

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 section includes Elsinore fault (#496) of Jennings (1994 #2878). **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)	IMPERIAL COUNTY, CALIFORNIA SAN DIEGO COUNTY, CALIFORNIA
Physiographic province(s)	BASIN AND RANGE LOWER CALIFORNIAN
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Location of Holocene traces adapted from State of California Alquist-Priolo Earthquake Fault Zone maps (1:24,000--Agua Caliente Springs, Arroyo Tapiado, Carrizo Mtn. and Sweeney Pass quadrangles) using additional information from Rockwell (1990 #6430) and Clark (1982 #1251).

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 33 km of a total fault length of 306 km.
Average strike	N58°W (for section) versus N51°W (for whole fault)
Sense of movement	Right lateral *Comments:* Reverse offsets due to transpression, but dextral to reverse ratio is 5:1. Some portions of fault are almost entirely dextral (Rockwell, 1990 #6430).
Dip Direction	NE; SE *Comments:* NE with reversal to SE on southwestern portion of fault and "dips shallowly to steeply" (Rockwell, 1990 #6430).
Paleoseismology studies	Coyote Mountains (126-3): field studies by Pinault and Rockwell (1984 #6428), Rockwell and Pinault (1986 #6434) and Rockwell (1990 #6430) describe dextral offset of dozens of late-Holocene geomorphic features along the fault. Offsets fall into several groups, suggesting several Holocene events with 1.3±0.4 m displacement per event.
Geomorphic expression	Sags, shutter-ridges, pressure-ridges, deflected and offset drainages, sidehill benches, and scarps in alluvium (Rockwell, 1990 #6430).
Age of faulted surficial	Holocene alluvial and channel deposits; landslides and debris

surficial deposits	flows.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Timing of most recent event is poorly constrained, but Rockwell (1990 #6430) estimates last event 200–300 yr BP; events estimated at about 400, 1200, and 2000 years ago (? several 100 yr) (Working Group on California Earthquake Probabilities, 1995 #4945 cite personal commun. from Rockwell in 1991).
Recurrence interval	600–1000 yr *Comments:* The 600–1000-yr interval is from Rockwell, as cited by Petersen and Wesnousky (1994 #5962). Working Group on California Earthquake Probabilities (1995 #4945) calculated 625 (+875, -292) yr. There have been no large earthquakes since 1884.
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* 4.0±1 mm/yr (Pinault and Rockwell, 1984 #6428); 3.5 mm/yr (Rockwell, cited by Working Group on California Earthquake Probabilities, 1995 #4945). Slip rate assigned by Petersen and others (1996 #4860) for probabilistic seismic hazard assessment for the State of California was 4.0 mm/yr (with minimum and maximum assigned slip rates of 2.0 mm/yr and 4.0 mm/yr, respectively.
Date and Compiler(s)	1998 Jerome A. Treiman, California Geological Survey
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#2878 Jennings, C.W., 1994, Fault activity map of California and adjacent areas, with locations of recent volcanic eruptions: California Division of Mines and Geology Geologic Data Map 6, 92 p., 2 pls., scale 1:750,000.

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#4945 Working Group on California Earthquake Probabilities, 1995, Seismic hazards in southern California—Probable earthquakes, 1994 to 2024: Bulletin of the Seismological Society of America, v. 85, no. 2, p. 379-439.

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