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San Andreas fault zone, Mojave section (Class A) No. 1h

Last Review Date: 2002-12-10

Compiled in cooperation with the California Geological Survey

citation for this record: Bryant, W.A., and Lundberg, M., compilers, 2002, Fault number 1h, San Andreas fault zone, Mojave 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 02:20 PM.

Synopsis	**General:** The 1,100-km-long San Andreas fault zone is the principal element of the San Andreas fault system, a network of faults with predominantly dextral strike-slip displacement that collectively accommodates the majority of relative N-S motion between the North American and Pacific plates. Major elements of the San Andreas fault system include the Bartlett Springs [29], Maacama [30], Rodgers Creek [32], Green Valley [37], Calaveras [54], Hayward [55], San Gregorio [60], San Jacinto [125], Elsinore [126], and Imperial [132] fault zones. In this compilation, the San Andreas fault zone is considered to be the

Holocene and historically active dextral strike-slip fault that extends along most of coastal California from its complex junction with the Mendocino fault zone [18] on the north, southeast to the northern Transverse Range and inland to the Salton Sea, where a well-defined zone of seismicity (the Brawley Seismic Zone [124]) transfers slip to the Imperial fault [132] along a right-releasing step. Two major surface-rupturing earthquakes have occurred in historic time: the 1857 Fort Tejon (Sieh, 1978 #5775) and 1906 San Francisco (Lawson, 1908 #4969) earthquakes. Additional historic surface rupturing earthquakes include the unnamed 1812 earthquake along the Mojave section [1h] (Jacoby and others, 1988 #4962; Sieh and others, 1989 #5779; Fumal and others, 2002 #5726) and the northern part of the San Bernardino Mountains section [1i] (Weldon and Sieh, 1985 #5806; Jacoby and others, 1987 #4961; 1988 #4962), and a large earthquake in the San Francisco Bay area that occurred in 1838 that was probably on the Peninsula section [1c] of the San Andreas fault (Toppozada and Borchardt, 1998 #5493; Bakun, 1999 #4790). Historic fault creep at rates as high as 32 mm/yr characterizes the 132-km-long Creeping section [1e] in central California (Burford and Harsh, 1980 #4806). The creep rate gradually tapers off to 0 mm/yr at the northwestern and southeastern ends of this section. The northern and southern ends of the Creeping section [1e] are transitional to the surface-rupture termination points of the 1906 earthquake to the north and 1857 earthquake to the south. Creep at rates as high as 4 mm/yr also has been measured on the Coachella section [1j] (Sieh and Williams, 1990 #5780). The San Andreas fault zone is the most extensively studied fault in California, and perhaps in the world. The fault zone first gained international scientific attention immediately following the great 1906 San Francisco earthquake. Lawson's 1908 report summarizing the investigation of the 1906 earthquake contained the first integrated description of the San Andreas fault, which was recognized as extending from Point Delgada in the north to Whitewater Canyon southeast of San Bernardino in the south, and formed the underlying basis for our modern studies of paleoseismology and earthquake geology (Prentice, 1999 #5755). More than 5,000 articles, maps, and publications describing various aspects of the San Andreas fault that have been produced since Lawson's pioneering work. In addition, there are about 1,000 site-specific fault rupture investigation reports (and maps) filed with the California Geological Survey in compliance with the Alquist-Priolo Earthquake Fault Zoning Act (Hart and Bryant, 1997 #4856). For this compilation, 51 detailed paleoseismic study sites along the fault zone are summarized. The fastest, generally accepted Holocene slip rate for the San Andreas fault is along the Cholame-Carrizo section [1g], which lies in the medial portion of the 1,100-km-long fault zone. Here, Sieh and Jahns (1984 #5778) reported a preferred late Holocene dextral slip rate of 33.9±2.9 mm/yr. In and south of the San Francisco Bay area, a significant portion of dextral slip is partitioned onto several faults of the San Andreas fault system, including the San Gregorio [60] on the west, and the Calaveras [54] and Hayward [55] faults on the east. Hall and others (1999 #4954) reported a late Holocene slip rate of 17±4 mm/yr for the Peninsula section [1c]. North of the Golden Gate, dextral slip from the San Gregorio fault zone [60] may be transferred to the North Coast section [1b] along a right-releasing step. Reported late Holocene slip rates for the North Coast section [1b] range from a minimum value of 16–18 mm/yr reported by Noller and others (1996 #5748) to a maximum value of 25.5±2.5 mm/yr reported by Prentice (1989 #5754). To the south, the San Andreas fault zone is delineated by an extremely complex zone of dextral strike-slip, reverse-oblique, and thrust faults in the southeastern Transverse Ranges. Fault nomenclature in the San Gorgonio Pass area is complex and different workers have assigned faults different names. West-northwest of San Gorgonio Pass Dibblee (1964 #1340; 1968 #4817; 1982 #4841) termed the principal active strand of the San Andreas fault located along the foot of the San Bernardino Mountains the South Branch San Andreas fault, which is referred to as the San Andreas fault by Allen (1957 #4787) and San Bernardino strand San Andreas fault by Matti and others (1992 #5735). For this compilation, this strand will be referred to as the San Andreas fault (South Branch). A fault that strikes sub-parallel located to the north was called the North Branch San Andreas fault by Dibblee (1964 #1340; 1968 #4817) and is referred to as the Mill Creek fault by Allen (1957 #4787), Matti and others (1992 #5735), and Jennings (1994 #2878). This strand will be referred to as the Mill Creek fault in this compilation. East-southeast of San Gorgonio Pass two principal dextral strike-slip faults comprise the Holocene active San Andreas fault zone. The southern trace has been referred to as the South Branch San Andreas fault by Dibblee (1967 #1345; 1981 #4840) and Jennings (1994 #2878); Matti and others (1992 #5735) refer to this trace as the Coachella Valley segment, Banning fault. This branch will be referred to as the South Branch San Andreas fault (Banning strand) in this compilation. The northern trace is referred to as the North Branch San Andreas fault by Dibblee (1967 #1345; 1981 #4840) and Jennings (1994 #2878); Mission Creek fault by Allen (1957 #4787); Matti and others (1992 #5735) named this trace the Coachella Valley segment, San Andreas fault and will be referred to as the North Branch San Andreas fault (Coachella strand) in this compilation. Refer to Matti and others (1992 #5735) for a detailed discussion of San Andreas fault nomenclature for the Mojave [1h], San Bernardino [1i], and Coachella [1j] sections. Weldon and Sieh (1985 #5806) reported a Holocene slip rate of 24±4 mm/yr at the northern end of the San Bernardino Mountains section [1i]. Harden and Matti (1989 #4955) reported a preferred Holocene slip rate of 14 mm/yr to 25 mm/yr near Yucaipa along the San Andreas fault (South Branch). Keller and others (1982 #4964) reported a preferred late Quaternary slip rate of 23 mm/yr to 35 mm/yr for the Coachella section [1j] near Biskra Palms. Surface-exposure age constraints (10Be-26Al) of the offset alluvial fan complex at Biskra Palms yields a better constrained late Quaternary dextral slip rate of 23.3±3.5 mm/yr (van der Woerd and others, 2001 #5800). Several average values of recurrence have been reported for the fault zone; in general they range from a little more than 100 to as much as 450 yr. The North Coast section [1b] ranges from 180–260 yr (Niemi and Hall, 1992 #5747) to 200≠400 yr for the past 2 k.y. (Prentice, 1989 #5754). The Santa Cruz Mountains section [1d] is 247-266 yr (Schwartz and others, 1998 #5771) and the Cholame-Carrizo section [1g] is 160–450 yr (Sieh and Jahns, 1984 #5778; Grant and Sieh, 1994 #4950; Sims, 1994 #5787; Stone and others, 2002 #5792). Recurrence intervals for the Mojave section [1h] are well-constrained based on paleoseismic studies by Sieh and others (1989 #5779), Biasi and others (2002 #5724) and Fumal and others (1993 #624; 2002 #5725). Sieh and others (1989 #5779) reported an average recurrence interval of 132 yr for the time interval AD 734 to 1857 at Pallett Creek, whereas Biasi and others (2002 #5724) refined the average recurrence interval at 135 yr. Fumal and others (2002 #5725) reported an average recurrence interval of 105 yr for the past 500 yr at Wrightwood. An average recurrence interval of 150–275 yr has been reported for the northern San Bernardino Mountains section by Weldon and Sieh (1985 #5806), Seitz and Weldon (1994 #5772), and Yule and others (2001 #4948). The Coachella section [1j] averages large earthquakes about 207–233 yr based on Sieh (1986 #5777).

Sections: This fault has 10 sections. From north to south they are the Shelter Cove [1a], North Coast [1b], Peninsula [1c], Santa

	Cruz Mountains [1d], Creeping [1e], Parkfield [1f], Cholame-Carrizo [1g], Mojave [1h], San Bernardino Mountains [1i], and Coachella [1j] sections. Different behavior patterns along different parts of the San Andreas fault where first noticed when Steinbrugge and Zacher (1960 #5791) documented creep along the fault in central California. Since that time, other workers have proposed various segmentation models for the San Andreas fault including five segments by Allen (1968 #4788), eight segments by Wallace (1970 #1423), 12 segments by Sykes and Nishenko (1984 #5794), Petersen and others (1996 #4860), the Working Group on California Earthquake Probabilities (1988 #5494; 1995 #4945; 1999 #4946), and the Working Group on Northern California Earthquake Probabilities (1996 #1216). Some segment boundaries are well documented or constrained for the San Andreas fault zone, whereas others are not. For this compilation, boundaries generally are similar to those described in models adopted by the Working Group on California Earthquake Probabilities (1988 #5494; 1990 #549; 1995 #4945; 1999 #4946), the Working Group on Northern California Earthquake Probabilities (1996 #1216), and Petersen and others (1996 #4860).
Name comments	**General:** Traces of the San Andreas fault were first mapped in northern California by Lawson (1893 #4967) and were first named the San Andreas rift by Lawson (1895 #4968) after the type locality of the fault in the San Andreas Valley (San Mateo County, California). North of San Francisco, Anderson (1899 #4789) mapped traces of the fault on the Point Reyes Peninsula, but did not name the fault. Schuyler (1896–1897 #5769) described parts of the fault zone in southern California for a 200-mi (about 320-km) length through Kern, Los Angeles, and San Bernardino Counties and referred to the fault not as the San Andreas but as the "great earthquake crack", referring to surface fault ruptures associated with the 1857 Fort Tejon earthquake. The significance and extent of the San Andreas fault was not recognized until after the 1906 San Francisco earthquake. J.C. Branner and S. Tabor proposed the name Portola-Tomales for the fault zone, but A.C. Lawson (1908 #4969) preferred the term "San Andreas fault" (Hill, 1981 #4958). For this compilation, we use San Andreas fault zone owing to the complex nature and multiple strands (or faults) that comprise the structure. **Section:** Mojave section extends from its junction with the Cholame-Carrizo section [1g] in the vicinity of Three Points southeast to a few kilometers northwest of Cajon Pass. This

	section was originally designated as the Mojave segment by the Working Group on California Earthquake probabilities (1988 #5494), based on the relatively uniform 4 m slip for the 1857 earthquake (Sieh, 1978 #920). The northern boundary of the Mojave section near Three Points is based on a slip gradient in the 1857 earthquake where slip decreased from an average dextral displacement of 7 m to an average dextral displacement of 3 m (Sieh, 1978 #920). The southern boundary coincides with the southern terminus of the 1857 rupture and the complex juncture with the San Jacinto fault zone [125]. The Mojave segment was adopted by Petersen and others (1996 #4860) and the Working Group on California Earthquake Probabilities (1995 #4945). **Fault ID:** Refers to Jennings (1994 #2878) numbers 87 (San Andreas fault (SAF) Shelter Cove), 116 (SAF splays), 119 (SAF Fort Ross to Manchester), 145 (SAF offshore), 147 (SAF offshore Bolinas), 162 (SAF boundary faults), 194 (SAF San Francisco to Watsonville), 217 (SAF 1989 ground fractures), 234 (SAF San Juan Bautista to Priest Valley), 240 (SAF historic creep), 278 (SAF Priest Valley to Cuyama), 311 (SAF Cuyama to Palmdale), 358 (SAF Palmdale to Cajon Canyon), 360 (SAF 1812 rupture), 427 (Mill Creek), 427A (SAF Cajon Canyon to Burro Flats), 452 (SAF South Branch), 453 (SAF North Branch), 472 (SAF Indio to Salton Sea), 477 (SAF Bombay Beach and vicinity), 452 (SAF South Branch), 449 (Banning fault western part), and 450 (Mission Creek fault), and numbers A1 (SAF 1906 rupture), A2 (SAF Peninsula), A3 (SAF Santa Cruz Mountains), and A7 (SAF creeping section) of the Working Group on Northern California Earthquake potential (1996 #1216).
County(s) and State(s)	SAN BERNARDINO COUNTY, CALIFORNIA LOS ANGELES COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER BASIN AND RANGE
Reliability of location	Good Compiled at 1:62,500 scale. *Comments:* Location based on digital revisions to Jennings (1994 #2878) 1:750,000-scale map using original mapping by Dibblee (1997 #4842), Morton and others (1991 #5745), and Ross (1969 #487) at 1:24,000 scale; mapping by Barrows and others (1985 #4796) at 1:12,000; mapping by Ponti and others (1981 #5752) at 1:62,500 scale.

Geologic setting	The San Andreas fault zone is a major dextral strike-slip fault zone that extends for about 1,100 km along the western side of California. It is near the coast in northern California, but stays entirely inland to the south of San Francisco, extending all the way to the northern Gulf of California in Mexico. The San Andreas fault zone is the principal element of a network of dextral strike-slip faults that constitute the San Andreas fault system that collectively accommodates the majority of relative N-S motion between the Pacific and North American plates (Wallace, 1990 #5804). Wilson (1965 #4947) first proposed that the San Andreas fault was a transform fault connecting two spreading oceanic ridges between the Pacific and North American plates. The San Andreas fault zone extends from the Salton Trough near Bombay Beach northwest to its complex junction with the Mendocino fault zone [18] near Punta Gorda. At the southern end of the fault zone near Bombay Beach, dextral slip is transferred to the Imperial fault [132] along a right-releasing step-over delineated by a zone of seismicity referred to as the Brawley Seismic Zone [124]. The San Andreas fault traverses the length of the Coast Ranges geomorphic subprovince and forms the boundary between the Transverse Range and Mojave Desert geomorphic subprovinces as well as the boundary between the Salton Trough and Mojave Desert geomorphic subprovinces. Noble (1926 #1592) was the first to suggest a large amount of dextral slip (38 km) on the San Andreas fault. Hill and Dibblee (1953 #923) postulated that as much as 560 km of dextral slip has occurred on the basis of proposed correlation of Mesozoic basement rocks. Post-early Miocene cumulative dextral slip is approximately 315 km, based on correlation of the Neenach Volcanic Formation (22.5–24.1 Ma minimum K-Ar age reported in Sims, 1993 #5786) on the east side of the fault zone with early Miocene Pinnacles Formation (24.2±0.5 Ma average K-Ar age reported in Sims, 1993 #5786) on the west side of the fault (Matthews, 1976 #931). Stanley (1987 #5790) reported 325–330 km of post late Oligocene dextral slip and 320–325 km of post-early Miocene dextral slip. Further discussions of the displacement history the San Andreas fault zone are included in Powell (1993 #5753), Weldon and others (1993 #5807), and Matti and Morton (1993 #5737).
Length (km)	This section is 112 km of a total fault length of 1082 km.
Average strike	N67°W
Sense of	Right lateral

movement	*Comments:* Well-defined geomorphic expression of dextral strike-slip faulting (Ross, 1969 #487; Barrows and others, 1985 #4796), dextral displacement associated with 1857 Fort Tejon earthquake (Sieh, 1978 #920). Detailed studies (Sieh, 1978 #5775; 1984 #5776; Schwartz and Weldon, 1987 #5770; Salyards and others, 1992 #5766) have documented amount of dextrally offset stream channels and late Holocene alluvium.
Dip Direction	V *Comments:* Vertical dip based on linear geomorphic expression of fault. Vertical to near vertical fault zone expressed in trench exposures by Sieh (1978 #5775; 1984 #5776), Fumal and others (1993 #624; 2002 #5725) and Schwartz and Weldon (1987 #5770).
Paleoseismology studies	There are six detailed paleoseismology studies for three sites along the Mojave section. In addition, there are over 300 site-specific fault rupture hazard investigations along this section involving trenching done in compliance with the Alquist-Priolo Earthquake Fault Zoning Act of 1972 (Hart and Bryant, 1997 #4856). Pallett Creek site (1-1 and 1-50). This classic site has been the focus of four recurrence-interval studies (Sieh, 1978 #5775; 1984 #5776; Sieh and others, 1989 #5779; Biasi and others, 2002 #5724) and two slip-rate studies (Sieh, 1984 #5776; Salyards and others, 1992 #5766) over the past 25 yr. Initially, Sieh (1978 #5775) excavated and logged two fault-normal backhoe trenches, a bulldozer cut, and three hand-excavated stream bank exposures. Late Holocene marsh deposits of a historically entrenched terrace recorded evidence of at least nine large surface-rupturing earthquakes since the 6th century AD Radiocarbon dating of in situ peat layers allowed Sieh (1978 #5775) to construct a precise event chronology at Pallett Creek. Six years later, Sieh (1984 #5776) excavated a 3-dimensional trench along the strike of the San Andreas fault in order to better constrain the amount of lateral displacement and timing of surface rupturing earthquakes that had occurred at the Pallett Creek site. About 130 vertical exposures were logged in detail in this 3-D excavation. Sieh (1984 #5776) identified 12 earthquakes between

AD 1857 and AD 261 recorded at Pallett Creek. Cumulative dextral slip of about 10 m was documented by reconstructing isopach contours of fluvial and marsh deposits. The 10 m of dextral slip occurred between AD 735 and AD 1857, indicating a late Holocene slip rate of about 9 mm/yr.

In 1989, Sieh and others (1989 #5779) revisited the Pallett Creek site to better document the timing of late Holocene earthquakes by using an improved method of high-precision conventional radiocarbon analysis and to improve the average recurrence interval determined for large surface-rupturing earthquakes along the Mojave section.

Salyards and others (1992 #5766) used the large fault normal trench excavated in the Sieh (1984 #5776) study to collect 264 samples of late Holocene marsh deposits for paleomagnetic analysis. This 53-m-wide transect normal to the strike of the San Andreas fault was designed to better constrain the amount of cumulative dextral slip at the Pallett Creek site. Half of the sample population was from a unit deposited immediately after Sieh and others' (1989 #5779) event V that occurred about AD 1480. The other half of the sample population was collected from a deposit slightly older than AD 1480. Results of the analysis indicate that there had been significant clockwise rotation of units that accounted for previously unrecognized, but significant component of dextral slip at the Pallett Creek site.

Littlerock site (1-14). Studies by Schwartz and Weldon (1987 #5770) involved the excavation of at least one trench at a site near Littlerock in order to better constrain the late Holocene slip rate along the Mojave section. The site is delineated by a well-defined, 3- to 7-m-wide fault zone that offsets an alluvial fill sequence and post-fill pond and colluvial sediments. Charcoal within the alluvial fill deposits yielded a 14C age of 3,150±220 14C yr BP.

Wrightwood site (1-26 and 1-51). A decade of study by Fumal and others (1993 #624; 2002 #5725) and Weldon and others (2002 #5808) has focused on a site located about 3 km northwest of Wrightwood. Fumal and others excavated and logged a total of 38 trenches (fault normal and fault-parallel) and creek bank exposures in order to identify and constrain the timing and recurrence of past large surface-rupturing earthquakes. At the Wrightwood site, the San Andreas fault crosses Swarthout and Government Creeks and is delineated by a 5- to 7-m-wide

	principal trace and a 50-m-wide secondary fault to the southwest, forming a 150 m-wide pull apart basin. Oldest deposits exposed are 6,800-yr-old fluvial deposits, based on radiocarbon dating of detrital charcoal. These deposits are overlain by a thick section of debris-flow deposits that are interbedded with peat layers. Fumal and others (2002 #5725) found structural and stratigraphic evidence for 14 large earthquakes that occurred along this section of the southern San Andreas fault during the past 1500 yr. Weldon and others (2002 #5808) determined the amount of dextral slip that occurred at the site in 1857 and the cumulative dextral displacement that has occurred in the past 14 events.
Geomorphic expression	The Mojave section is delineated by well-defined geomorphic features characteristic of Holocene dextral offset such as dextrally deflected and offset drainages, dextrally offset ridges, linear drainages and ridges, aligned saddles and benches, closed depressions, linear scarps on alluvium, linear troughs, sidehill benches, shutter ridges, and linear vegetation contrasts (Ross, 1969 #487; Barrows and others, 1985 #4796).
Age of faulted surficial deposits	Mojave section offsets all units older than 1857 (date of historic earthquake). Sieh and others (1989 #5779) and Fumal and others (1993 #624; 2002 #5725) document evidence of faulted late Holocene and historic alluvial and marsh deposits at Pallett Creek and Wrightwood sites, respectively. Peat layers at both of these sites yield well-constrained dendro-corrected radiocarbon ages.
Historic earthquake	Fort Tejon earthquake 1857
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* The most recent event on the Mojave section was the 1857 Fort Tejon earthquake: the penultimate event on the southern Mojave section occurred in 1812 (Sieh and others, 1989 #5779; Fumal and others, 1993 #624; 2002 #5725). Fumal and others (1993 #624) reported that it is possible that event X at Pallett Creek, interpreted to be the 1812 event by Sieh and others (1989 #5779), may in fact correlate with their event 3 at Wrightwood, which is thought to have occurred between AD 1647–1717.
Recurrence interval	100–135 yr (average for past 2 k.y.)

Comments: Sieh and others (1989 #5779) reported an average recurrence interval of 132 yr for the last ten earthquakes (interval from AD 734 to AD 1857) at Pallett Creek. This recurrence interval is based on high-precision radiocarbon dating of in situ peat layers deposited in a marsh environment during the last approximately 2,000 yr. The event chronology at Pallett Creek established by Sieh and others (1989 #5779) is as follows: Event Z: 1857 Event X: 1812 (radiocarbon dates fall between 1675–1701 and 1753–1817). Jacoby and others (1987 #4961; 1988 #4962) reported that an earthquake in 1812 distressed trees in the immediate vicinity of the southern Mojave section. Sieh and others (1989 #5779) concluded that, given the data interpreted from tree-ring analysis, the 1812 date seemed most plausible based on the radiocarbon dates constraining event X. Event V: 1480 (1465–1495) Event T: 1346 (1329–1363) Event R: 1100 (1035–1165) Event N: 1048 (1015–1081) Event I: 997 (981–1013) Event F: 797 (775–819) Event D: 734 (721–747) Event C: 671 (658–684) Event B: Before 529. Biasi and others (2002 #5724) refined the event chronology at Pallett Creek by applying statistical methods to previously published data of Sieh and others (1989 #5779) and calculated an average recurrence interval of 135 yr. The revised event chronology is as follows: Event Z: 1857 Event X: 1812 (1758–1837) Event V: 1496–1599 Event T: 1343–1370 Event R: 1046–1113 Event N: 1031–1096 Event I: 914–986 Event F: 803–868 Event D: 749–775 Event C: 614–666 Fumal and others (2002 #5725) reported an average recurrence interval of 105 yr for the past 1,500 yr, based on conventional radiocarbon dating of offset peat beds exposed by trenching in Swarthout Canyon near Wrightwood. This contrasts with the 132 to 135 yr average recurrence interval at Pallett Creek reported by Sieh and others (1989 #5779) and Biasi and others (2002 #5724), respectively. The event chronology at Wrightwood presented by Fumal and others (1993 #624) is as follows: Event 1: 1857 Event 2: 1812 Event 3: 1700 (1680–1730) Event 4: 1610 (1500–1650) Event 5: 1470 (1450–1490) Fumal and others (1993 #624) reported that it is possible that event X at Pallett Creek, interpreted to be the 1812 event by Sieh and others (1989 #5779), may in fact correlate with their event 3 at Wrightwood, which has been assigned the date of AD 1700 (1680– 1730). Event 5 (AD 1470) at Wrightwood correlates with event V (AD 1480) at Pallett Creek. Fumal and others (2002 #5725) refined and expanded the event chronology at Wrightwood site, documenting 14 surface-rupturing earthquakes in the past 1,500 yr. Event dates reported by Fumal and others (2002 #5725) are as follows: Event 1: 1857

	Event 2: 1812 Event 3: 1647–1717 Event 4: 1508–1569 Event 5: 1448–1518 Event 6: 1191–1305 Event 7: 1047–1181 Event 8: 957–1056 Event 9: 800–881 Event 10: 736–811 Event 11: 695–740 Event 12: 657–722 Event 13: 551–681 Event 14: 407–628
Slip-rate category	Greater than 5.0 mm/yr *Comments:* Schwartz and Weldon (1987 #5770) reported a preliminary minimum and maximum Holocene slip rate of 16–19 mm/yr and 38 mm/yr, respectively, at the Littlerock site. The maximum slip rate is based on 130 m dextral displacement of a stream channel whose fluvial deposits are 3,150±220 14C yr BP, based on detrital charcoal sampled from the fill deposit. The minimum slip rate is based on 19 m dextral offset of a stream channel that post-dates a 1,000–1,200 yr radiocarbon-dated burn layer at the top of the channel-fill section. Sieh (1984 #5776) reported a minimum late Holocene slip rate of about 9 mm/yr, based on reconstruction of isopach contours of well-dated dextrally offset marsh deposits at Pallett Creek. Sieh concluded that this was an unusually low slip rate and speculated that, because of the proximity of the Pallett Creek site to a large (300-m-wide) left step, significant regional warping may account for a large component of slip at the Pallett Creek site. Salyards and others (1992 #5766) reported a late Holocene slip rate of 35.6±6.7 mm/yr at the Pallett Creek site based on paleomagnetic analysis of marsh sediment deposited just before and just after Sieh and others' (1989 #5779) event V (AD 1480). Relative to a control group of 10 samples collected 50 m from the fault zone, the samples closer to the fault show clockwise rotation of about 30°. Salyards and others interpreted these clockwise rotations to be due to dextral block rotations. The marsh deposit older than event V had a cumulative dextral warp of 14.0±2.9 m during the past three earthquakes and the younger marsh deposit had a cumulative dextral warp of 8.5±1.0 m during the past two earthquakes. Combining the dextral warping with brittle dextral offset reported by Sieh (1984 #5776), Salyards and others (1992 #5766) concluded that 5.5 m of dextral offset occurred in AD 1480, 6.25 m in 1812, and 6.24 m in 1857 at Pallett Creek. Weldon and others (2002 #5808) determined that the 1857 earthquake was associated with 1–2 m of dextral slip at the Wrightwood site. They reported that 6–10 m of dextral slip had accumulated during the past three earthquakes and that 30-60 m of cumulative dextral slip had occurred during the past 14 events (since about 1,600 yr), implying a slip rate of 20–40 mm/yr for the San Andreas fault zone north of its juncture with the San

	Jacinto fault zone [125].
Date and Compiler(s)	2002 William A. Bryant, California Geological Survey Matthew Lundberg, California Geological Survey
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