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Newport-Inglewood-Rose Canyon fault zone, south Los Angeles Basin section (Class A) No. 127b

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Compiled in cooperation with the California Geological Survey

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Synopsis	**General:** Data on this fault zone is variable. Fault locations onshore and in some limited offshore areas are generally well located. The large central portion of the fault zone is offshore and less well defined. Urbanization in the San Diego area has also somewhat limited the accurate location of some of the fault strands. The northern onshore portion is demonstrably Holocene based on numerous geotechnical studies as well as the historic Long Beach

	earthquake. The southern onshore portion, through San Diego, is also demonstrably active based on geotechnical and research studies. The intermediate offshore portion is presumed Holocene based on sparse evidence of displacement of presumed young Holocene sediments offshore as well as its continuity to the better-defined onshore sections. There are three detailed study sites along the fault zone. Grant and others (1997 #1366) reported evidence for 3–5 earthquakes in the past 11.7 ka, but stated that the recurrence interval varied from 1,200 yr to 3,000 yr. Slip rate is not fully constrained, but appears to be approximately 1.0±0.5 mm/yr in the north, increasing to 1.5±0.5 mm/yr in the south. **Sections:** This fault has 7 sections. Section designations after Fischer and Mills (1991 #6468) who designated three segments offshore, two segments onshore south of La Jolla and one southern segment within the Los Angeles basin (thereby implying a northern, 7th segment as well). Sections were distinguished based on asperities (bends), steps and seismicity. The division of the Los Angeles basin part of the fault zone into two segments is based on slight differences in geometry (discussed by several workers, including Wright (1991 #5950), seismicity differences (Hauksson, 1987 #6475), and the subsurface extent of the 1933 Long Beach earthquake rupture (Wesnousky, 1986 #5305; Hauksson and Gross, 1991 #6476). Fischer (1992 #6467) designates one additional segment offshore. Working Group on California Earthquake Probabilities (1995 #4945) and Petersen and others (1996 #4860) identify three sections: Newport-Inglewood, Newport-Inglewood offshore and Rose Canyon (the latter including offshore faults north to Oceanside).
Name comments	**General:** Entire fault zone referred to as Newport-Inglewood-Rose Canyon fault zone by Greene and others (1979 #6470). Newport-Inglewood fault: onshore structural zone first recognized as a zone of folding by Mendenhall (1905 #6488). Hamlin (1918 #6473) associated seismicity and faulting with the zone; first mapped and named by Taber (1920 #6491) as the Inglewood-Newport-San Onofre fault; called Newport-Inglewood fault by Hoots (1931 #5921). Eaton (1933 #6463) was first to suggest continuity to Rose Canyon fault in the San Diego area; offshore portion was called the South Coast Offshore fault by utility consultants (Southern California Edison Co. and San Diego Gas and Electric Co., 1972 #6490), and the South Coast Offshore Zone of Deformation by Woodward-Clyde Consultants (1979 #6496). Rose Canyon fault: Fairbanks (1893 #6466) suggested presence of fault and Ellis and Lee (1919 #6465) were the first to show part of the fault on a map.

	Hanna (1926 #6474) referred to the Soledad Mountain fault; Hertlein and Grant (1939 #6477) were the first to refer to the Rose Canyon fault; Kennedy (1975 #6478) and Kennedy and others (1975 #6480) mapped the fault in greater detail. See sections 127f and g for additional fault strands. **Section:** Section name from Fischer and Mills (1991 #6468); includes Cherry-Hill fault, Northeast Flank fault, Reservoir Hill fault, Seal Beach fault, and North and South Branch Newport-Inglewood faults; North Branch fault has also been called the High School fault; section extends southeastward from the Dominguez Hills to Newport Beach. **Fault ID:** Refers to numbers 434 (Potrero, Inglewood and Avalon-Compton faults), 439 (South Branch, Newport-Inglewood fault zone), 440 (North Branch, Newport-Inglewood fault zone), 441 (Cherry-Hill, Reservoir Hill and Seal Beach faults), 465 (Newport Inglewood-Rose Canyon fault zone, offshore), 487 (Mission Bay fault), 490 (Coronado fault, offshore), 490A (Spanish Bight fault, offshore), 491 (Rose Canyon fault zone), 492 (Old Town fault), and 493A (Silver Strand fault, offshore) of Jennings (1994 #2878). Also refers to numbers 30 (Newport-Inglewood, north section) and 31 (Newport-Inglewood, south section) of Hecker and others (1998 #6118), and to numbers 25 (Inglewood fault), 26 (Potrero fault), 27 (Avalon-Compton fault), 28 (Cherry-Hill fault), 29 (Reservoir Hill fault), 30 (Newport-Inglewood North Branch), 31 (Newport-Inglewood, South Branch), and 32 (Faults offshore of San Clemente) of Ziony and Yerkes (1985 #5931).
County(s) and State(s)	LOS ANGELES COUNTY, CALIFORNIA ORANGE COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000; 1:31,680; 1:48,000 and unspecified scale. *Comments:* Location of fault from Qt_flt_ver_3-0_Final_WGS84_polyline.shp (Bryant, W.A., written communication to K.Haller, August 15, 2017) attributed to Bryant (1985, 1988), California Department of Water Resources (1966), Guptil and Heath (1981), Morton and Miller(1981), and Poland and others (1956).

Geologic setting	This fault zone is a major structural element within the Peninsular Ranges. Both onshore, to the north, and in the offshore region the fault zone separates contrasting Mesozoic basement terrane-Catalina Schist on the west and metasediments, intrusives and volcanics to the east (Yerkes and others, 1965 #5930). The onshore Los Angeles basin reach of the fault zone is marked by a northwesterly trending line of generally en echelon anticlinal folds and faults that extends 40 miles from Newport Mesa to the Cheviot Hills along the western side of the Los Angeles Basin (Barrows, 1974 #6460); the zone is tentatively extended northward to the Santa Monica [101] and Hollywood [102] faults by Wright (1991 #5950). The onshore structural zone is an important petroleum-producing region. The offshore reach of the fault zone continues southeastward until offshore of Oceanside where it bends and steps and continues on a more south-southeast trend, paralleling the coastline. The Rose Canyon fault [127e, 127f] comes onshore at La Jolla and is characterized by zones of compression and extension associated with restraining and releasing bends in the faults. The fault zone is locally more than 1 km wide and is composed of both dip-slip and strike-slip en echelon faults that together extend from La Jolla Cove 50 km to San Diego Bay and beyond on the south (Treiman, 1993 #6494).
Length (km)	This section is 34 km of a total fault length of 209 km.
Average strike	N51°W (for section) versus N29°W,N27°W,N31°W (for whole fault)
Sense of movement	Right lateral *Comments:* Legg and Kennedy (1991 #6486) report pure dextral strike slip; supported by seismicity as reported by Hauksson (1990 #6879).
Dip Direction	NE; SW *Comments:* Dip assumed by Petersen and others (1996 #4860); generally high-angle to near vertical, but locally dips either NE or SW (Wright, 1991 #6878).
Paleoseismology studies	Numerous consulting studies (on file with the California Geological Survey, Alquist-Priolo Earthquake Fault Zoning project) have

	addressed location and recency of faulting. Site 127-2: Huntington site by Grant and others (1997 #1366) involved drilling and analyzing 72 CPT borings, spaced between 7 to 30 m apart across the North Branch fault just northwest of Huntington Mesa. Grant and others (1997 #1366) identified at least three and possibly five surface-rupturing earthquakes in the past 11.7 ka. Dates of the events were established using 14C dates from samples collected from continuously cored borings.
Geomorphic expression	Large-scale features include a line of hills underlain by en echelon anticlinal folds and faults; small- to intermediate-scale features include scarps, pressure ridges, deflected drainages, linear drainages, closed depressions and troughs (Bryant, 1988 #6461).
Age of faulted surficial deposits	Holocene alluvial deposits and soils; late Pleistocene Inglewood Formation; late Pleistocene marine and non-marine terrace deposits; Pleistocene Lakewood Formation (Bryant, 1988 #6461).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Timing of most recent paleoevent is poorly constrained. Historic events (without surface rupture) include 1933 M6.3 Long Beach earthquake and perhaps 1812 (12/08/1812); no details available on individual or most recent pre-historic events.
Recurrence interval	1,200–3,000 yr *Comments:* Recurrence interval reported by Freeman and others (1992 #6469) and Grant and others (1997 #1366). Grant and others (1997 #1366) recognized at least three and as many as five surface-rupturing earthquakes in the past 11.7 ka at the Huntington site. The two oldest Holocene events occurred within approximately 1,200 yr of each other, but at least 3,000 yr passed between early and middle Holocene events.
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* 0.5 mm/yr long-term horizontal geologic slip-rate derived from offset facies in oil well logs (Freeman and others, 1992 #6469); Wesnousky (1986 #5305) and Working Group on California Earthquake Probabilities (1995 #4945) assume 1.0

	mm/yr; Clark and others (1984 #2876) reported 0.6–1.2 mm/yr vertical slip rate at Bolsa Chica Mesa which may not be representative of total slip on the deeper seismogenic structure.
Date and Compiler(s)	1999 Jerome A. Treiman, California Geological Survey Matthew Lundberg, California Geological Survey
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