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Quaternary Fault and Fold Database of the United States

As of January 12, 2017, the USGS maintains a limited number of metadata fields that characterize the Quaternary faults and folds of the United States. For the most up-to-date information, please refer to the interactive fault map.

Los Osos fault zone, Estero Bay section (Class A) No. 79a

Last Review Date: 2016-12-01

citation for this record: **Hanson, K.L., and Bryant, W.A., compilers, 2016, Fault number 79a, Los Osos fault zone, Estero Bay 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 03:16 PM.**

Synopsis	**General:** Detailed mapping of surficial deposits and paleoseismic trenching investigations (PG&E, 1988 #7833; Lettis and Hall, 1994 #7842) and mapping (Nitchman, 1988 #7846) provide evidence for late Quaternary and locally, Holocene activity along the Los Osos fault zone. These studies confirmed many of the bedrock fault traces mapped by Hall and others (1979 #7840) and identified additional traces within the zone. The central portion of the fault zone meets the criteria of "sufficiently active and well-defined" to warrant zoning under the Alquist-Priolo Special Studies Zone Act (Bryant and Hart, 2007 #7836; Treiman, 1989 #7847). **Sections:** This fault has 4 sections. PG&E (1988 #7833) and Lettis and Hall (1994 #7842) define segments along the fault zone based on differences in physical (*i.e.*, spatial coincidence with

	distinct topographic elements of the San Luis/Pismo structural block (Lettis and others, 1994), en echelon separation of fault traces, intersection with known or inferred branching or crossing structures, and geomorphic character as a range-front fault or intra-range fault) and behavioral (*i.e.*, recency of activity and late Quaternary slip rate). From west to east, these segments are referred to as the Estero Bay, Irish Hills, Lopez Reservoir, and Newsom Ridge segments. Although paleoseismic studies conducted on the two central sections of the fault provide sufficient data to define at least one seismogenic segment boundary, additional data on timing and recency of activity are needed on the two end sections to verify these as seismogenic segments. Segments defined by Lettis and Hall (1989 #7842) are herein described as sections.
Name comments	**General:** Initially mapped by Hall and others (1979 #7840); southwest part of fault as mapped by PG&E (1988 #7833) and Lettis and Hall (1994 #7842) coincides with the Edna fault as mapped by Hall (1973 #7838) and Hall and others (1979 #7840). **Section:** Defined as Estero Bay segment by PG&E (1988 #7833) and Lettis and Hall (1994 #7842); this section, which lies entirely offshore, extends from the Hosgri fault zone in Estero Bay to the northwestern margin of the Irish Hills. **Fault ID:** Refers to number 285 (Los Osos fault zone) of Jennings (1994 #2878).
County(s) and State(s)	SAN LUIS OBISPO COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Poor Compiled at 1:250,000 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 1:250,000-scale map by Lettis and others (2004). Available geophysical and bathymetric data suggest that this section is a diffuse, structurally complex zone (1 to 2 km wide) that extends offshore as the northwestern projection of the Irish Hills section (PG&E, 1988 #7833; Lettis and others, 2004 #7844). Fault is inferred to lie along the northeastern margin of a series of NW

	trending 10- to 25-m-high bedrock ridges.
Geologic setting	Southwest-dipping reverse fault bounding northern margin of the San Luis Range; fault has a complex history of strike-slip and dip-slip displacement (Hall, 1981 #7839; Lettis and Hall, 1994 #7842). Hall (1981 #7839) interprets the southwestern part of the fault to have experienced late Cenozoic dextral strike-slip and to be part of a larger system of late Cenozoic NW-trending strike-slip faults that are responsible for creating the late Tertiary Santa Maria, Pismo, and Huasna pull-apart depositional basins. An alternative tectonic model (Namson and Davis, 1990 #7845) interprets the presence of an active detachment fault beneath the San Luis Range and does not identify nor discuss implications of an active fault along the northeastern margin of the range.
Length (km)	km.
Average strike	
Sense of movement	Reverse *Comments:* In the current tectonic environment down-to-the-northeast scarps suggest reverse displacement on SW dipping fault.
Dip Direction	SW
Paleoseismology studies	
Geomorphic expression	Trace marked by several NE facing scarps that border a series of NW-trending ridges that likely represent the northwestern continuation of the San Luis/Pismo structural block (Lettis and Hanson, 1992 #7841; Lettis and Hall, 1994 #7842; Lettis and others, 1994 #7843).
Age of faulted surficial deposits	May displace post-Wisconsin (18 ka) sediment.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Possibly post-glacial (<18 ka)

Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Not well constrained; probably less than rate for adjacent Irish Hills section.
Date and Compiler(s)	2016 Kathryn L. Hanson, AMEC Environment & Infrastructure (AMEC E&I) William A. Bryant, California Geological Survey
References	#7836 Bryant, W.A., and Hart, E.W., 2007, Fault-rupture hazard zones in California: California Geological Survey Special Publication 42, 42 p., ftp://ftp.consrv.ca.gov/pub/dmg/pubs/sp/Sp42.pdf. #7838 Hall, C.A., Jr., 1973, Geology of the Arroyo Grande quadrangle, California: California Division of Mines and Geology Map Sheet 24, scale 1:48,000, 8 p. #7839 Hall, C.A., Jr., 1981, Map of geology along the Little Pine fault, parts of the Sisquoc, Foxen Canyon, Zaca Lake, Bold Mountain, Los Olivos, and Figueroa Mountain quadrangles, Santa Barbara County, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1285, scale 1:24,000. #7840 Hall, C.A., Jr., Ernst, W.G., Prior, S.W., and Wiese, J.W., 1979, Geologic map of the San Luis Obispo-San Simeon region, California: U.S. Geological Survey Miscellaneous Investigations Series I-1097, 3 sheets, scale 1:48,000. #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. #7842 Lettis, W.R., and Hall, N.T., 1994, Los Osos fault zone, San Luis Obispo County, California, *in* Alterman, I.B., McMullen, R.B., Cluff, L.S., and Slemmons, D.B., eds., Seismotectonics of the central California Coast Ranges: Boulder, Colorado, Geological Society of America Special Paper 292, p. 73–102.

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#7845 Namson, J.S., and Davis, T.L., 1990, Late Cenozoic fold and thrust belt of the southern Coast Ranges and Santa Maria Basin, California: American Association of Petroleum Geologists Bulletin, v. 74, p. 467–492.

#7846 Nitchman, S.P., 1988, Tectonic geomorphology and neotectonics of the San Luis Range, San Luis Obispo County, California: University of Nevada at Reno, unpublished Master"s thesis, 120 p.

#7833 Pacific Gas and Electric (PG&E), 1988, Final report of the Diablo Canyon Long Term Seismic Program for the Diablo Canyon Power Plant: U.S. Nuclear Regulatory Commission Docket Nos. 50-275 and 50-323.

#7847 Treiman, J.A., 1989, Los Osos Fault Zone, San Luis Obispo County, California: California Department of Conservation, Division of Mines and Geology Fault Evaluation Report FER-200, 11 p., 1 plate.