Jump to Navigation

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Hunting Creek-Berryessa fault system, Lake Berryessa section (Class A) No. 35c

Last Review Date: 2000-04-28

Compiled in cooperation with the California Geological Survey

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Synopsis	**General:** The Hunting Creek-Berryessa is an active (Holocene) dextral strike-slip fault system associated with the larger San Andreas fault system. The Hunting Creek-Berryessa fault system extends from the vicinity of Wilson Valley south-southeast to the Cedar Roughs area west of Lake Berryessa. In this compilation, the fault zone is divided from north to south into the Wilson [35a], Hunting Creek [35b], and Lake Berryessa [35a] sections. The Wilson section probably transfers dextral slip to the Bartlett Springs fault system [29]. The Hunting Creek-Berryessa fault system is expressed as a zone of discontinuous fault traces as

	much as 3.5 km wide. The Hunting Creek-Berryessa fault system locally is delineated by geomorphic evidence of Holocene dextral strike-slip displacement, predominantly along the Hunting Creek fault, which comprises the Hunting Creek section (Bryant, 1982 #5307; 1983 #5308). An investigation by Steffen, Robertson, and Kirsten, and Woodward-Clyde Consultants (1983 #5310) demonstrated latest Pleistocene and probable Holocene displacement along traces of the Hunting Creek fault. The investigation by Steffen and others (1983 #5310) inferred a late Pleistocene dextral slip rate of 0.09–0.4 mm/yr, based on apparent vertical separation of a late Pleistocene to Holocene colluvium. Bryant (1983 #5308) argued that the geomorphic expression of the Hunting Creek fault indicated a dextral slip rate of at least 1 mm/yr. **Sections:** This fault has 3 sections. The Hunting Creek-Berryessa fault system is divided into three sections in this compilation. From north to south, the sections are Wilson [35a], Hunting Creek [35b], and Lake Berryessa [35b]. The section boundaries are based in general on a change in geomorphic expression of the faults. The medial Hunting Creek section is delineated by geomorphic evidence of Holocene dextral slip. Both the Wilson and Lake Berryessa sections lack ephemeral geomorphic features indicative of Holocene offset, but are delineated by geomorphic evidence of late Quaternary displacement and they locally offset late Quaternary deposits. Steffen and others (1983 #5310) divided the Hunting Creek fault into 3 segments: from north to south they are the Rieff Road segment, the Dunnigan Hill segment, and the Mysterious Valley segment. There is insufficient data to confirm whether these are seismogenic segments.
Name comments	**General:** The name Hunting Creek-Berryessa fault zone was first used by the Working Group on Northern California Earthquake Potential (1996 #1216) to associate a number of discontinuous dextral and dextral reverse, generally northwest-striking faults in the north-central Coast Ranges, west of Lake Berryessa and east of Clear Lake. Named faults comprising the Hunting Creek-Berryessa fault zone include the Wilson, Kennedy, and Hunting faults first mapped by Lawton (1956 #5237), and the Hunting Creek fault first mapped in part by Averitt (1945 #5306), Herd (written commun., 1981 #5309, in Bryant, 1982 #5307), and Bryant (1982 #5307). Bryant (1982 #5307) first suggested the name Hunting Creek fault. Faults southeast of the Hunting Creek fault include the Putah Creek, Pope Creek, and Maxwell faults, all of which were first named by Wagner (1975 #5312). Additional

	unnamed northwest-striking faults associated with the Hunting Creek-Berryessa fault system were first mapped by Taliaferro (1943 #5311) and Fox and others (1973 #5253). **Section:** This section extends from the Mysterious Valley area of Napa County southeast to near the Spanish Flat Resort and is characterized by a more westerly strike than the Hunting Creek section [35b]. The Lake Berryessa section is comprised by the Putah Creek, Pope Creek, Maxwell Creek (all first named by Wagner, 1975 #5312), and other unnamed northwest-striking faults. Traces of the unnamed northwest-trending faults were first mapped by Taliaferro (1943 #5311) and later by Fox and others (1973 #5253). **Fault ID:** Refers to numbers 121 (Hunting fault) and 122 (Hunting Creek fault) of Jennings (1994 #2878) and number C5 (Hunting Creek-Berryessa fault zone) of Working Group on Northern California Earthquake Potential (1996 #1216).
County(s) and State(s)	NAPA COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:12,000 and 1:750,000 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 mapping by Lienkaemper (2012), 1:12,000-scale map by Wagner (1975), and 1:750,000-scale map by Jennings (1994)/
Geologic setting	The Hunting Creek-Berryessa fault system is a significant dextral to dextral reverse fault zone that is associated with the larger San Andreas fault system. The fault zone is located in the northern Coast Ranges of California and extends from the vicinity of Wilson Valley south-southeast to the Cedar Roughs area west of Lake Berryessa. Herd (written commun., 1981 #5309, in Bryant, 1982 #5307) inferred that dextral slip is carried from the Green Valley fault zone [37] along the Hunting Creek-Berryessa fault system and then north to the Bartlett Springs fault system [29]. A structural link between the Green Valley fault zone [37] and the southern part of the Hunting Creek-Berryessa fault system is

	conjectural, due to the discontinuous pattern of faulting that characterizes the Hunting Creek-Berryessa fault system. This discontinuous pattern of faulting is exacerbated by massive landslides along much of the projected fault trend between the Cedar Roughs area at the southern end of the Hunting Creek-Berryessa fault system and the Wooden Valley area at the northern end of the Green Valley fault zone [37]. Dextral slip is transferred to the Bartlett Springs fault system [29] along a zone of dextral reverse faults that include the Hunting, Wilson, and Kennedy faults of Lawton (1956 #5237). The amount of cumulative dextral slip along the Hunting Creek-Berryessa fault system is unknown. Lawton (1956 #5237) reported that the Hunting fault might vertically offset the Mesozoic Sulfur Creek Formation as much as 1.2 km, based on assumptions of the stratigraphic relationships between serpentinite units (Mesozoic Franciscan Complex) and the Mesozoic Sulfur Creek Formation. Lower Cretaceous sedimentary rocks of the Little Valley Formation may be vertically separated about 300 m along the Wilson fault, based on cross section I-J of Lawton (1956 #5237); the amount of dextral displacement is not documented.
Length (km)	This section is 28 km of a total fault length of 56 km.
Average strike	N36°W (for section) versus N35°W (for whole fault)
Sense of movement	Right lateral *Comments:* Wagner (1975 #5312) reported that the Maxwell Creek fault has a northeast-dipping reverse sense of movement. Displacements have not been reported for the other faults that comprise the Berryessa section. However, their geomorphic expression is consistent with steeply dipping to vertical strike-slip faults and the large-scale dextral drainage deflections indicate predominately dextral strike-slip offset.
Dip Direction	V *Comments:* Dip angles have not been reported, but are presumed to be steeply dipping to vertical on the basis of the linear strike of geomorphic features across topography (Bryant, 1982 #5307; 1983 #5308).
Paleoseismology studies	

Geomorphic expression	Strands of the Berryessa section are marked by geomorphic features indicative of Quaternary strike-slip faulting, including linear drainages, large scale dextral stream deflections (Bryant, 1982 #5307). Massive landslide deposits locally conceal or obscure the faults expression.
Age of faulted surficial deposits	Wagner (1975 #5312) reported that rocks of the Pliocene-Pleistocene Cache Formation is offset by the Putah Creek and Pope Creek faults. The Pope Creek fault is inferred to offset overlying Pleistocene Clear Lake Volcanic rocks (Wagner, 1975 #5312).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* The timing of the most recent paleoevent has not been established. Wagner (1975 #5312) reported that the Pope Creek fault may offset Pleistocene Clear Lake Volcanic rocks and that the Cedar Roughs fault is delineated by youthful geomorphic features. Bryant (1982 #5307) attributed the youthful geomorphic expression of the Cedar Roughs fault to shaking-induced ridge-top spreading and suggests that the geomorphic expression of the faults the comprise the Berryessa section is not indicative of Holocene activity.
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* See slip rate discussion for fault section 35b.
Date and Compiler(s)	2000 William A. Bryant, California Geological Survey
References	#5306 Averitt, P., 1945, Quicksilver deposits of the Knoxville District, Napa, Yolo, and Lake Counties, California: California Journal of Mines and Geology, v. 41, no. 2, p. 65-89, map scale 1:48,000. #5307 Bryant, W.A., 1982, Hunting Creek fault, Napa, Lake, and Yolo Counties: California Division of Mines and Geology Fault Evaluation Report 137, microfiche copy in Division of Mines and Geology Open-File Report 90-10, 8 p., scale 1:24,000.

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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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#5311 Taliaferro, N.L., 1943, Franciscan-Knoxville problem: American Association of Petroleum Geologists Bulletin, v. 27, no. 2, p. 109-219.

	#5312 Wagner, D.L., 1975, Geologic map and sections of the Walter Springs area, Napa County, California: San Jose, California State University, unpublished M.S. thesis, 68 p., scale 1:12,000. #1216 Working Group on Northern California Earthquake Potential (WGNCEP), 1996, Database of potential sources for earthquakes larger than magnitude 6 in northern California: U.S. Geological Survey Open-File Report 96-705, 40 p.