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

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, which extends from the vicinity of Twin Sisters in Yolo County southeast to Mysterious Valley in Napa County, is comprise by the Hunting Creek fault. The Hunting Creek fault was first mapped in part by Averitt (1945 #5306). Herd (written commun., 1981 #5309, in Bryant, 1982 #5307) first suggested that the Hunting Creek fault was an active dextral strike-slip fault and that it may be the northern continuation of the Green Valley fault zone [37], based on the fault's youthful geomorphic expression and possible association with a zone of seismicity along the northward projection of the Green Valley fault [37]. Bryant (1982 #5307) first used the name Hunting Creek fault. The northern Hunting Creek fault may complexly join with the Hunting fault of Lawton (1956 #5237). **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)	LAKE COUNTY, CALIFORNIA NAPA COUNTY, CALIFORNIA YOLO COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 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 1:24,000-scale map by Bryant (1982 #5307), and mapping by Lienkaemper (2010, 2012) .
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 17 km of a total fault length of 56 km.
Average strike	N12°W (for section) versus N35°W (for whole fault)
Sense of movement	Right lateral *Comments:* The total amount of dextral displacement is unknown, but well defined geomorphic features are characteristic of dextral strike-slip offset (Bryant, 1982 #5307), (1983 #5308).
Dip Direction	V *Comments:* Assumed to be vertical to steeply dipping based on general linearity of surface traces. Trench investigation by Steffen and others (1983 #5310) exposed near vertical to vertical dipping fault planes along the Hunting Creek fault.
Paleoseismology	Detailed investigations were conducted at site 35-1 by Steffen,

studies	Robertson, and Kirsten, and Woodward-Clyde Consultants (1983 #5310) for the McLaughlin Gold Mine project. Eleven fault normal trenches were excavated across traces of the Hunting Creek fault in order to determine fault location and recency (Bryant, 1983 #5308 for discussion of trench observations). Steffen and others (1983 #5310) reported a near-vertical, dextral strike-slip fault zone, but concluded that the evidence for a northward continuation of the Green Valley fault zone [37] was not convincing, principally because they did not observe a continuous fault zone from the northern end of the Green Valley fault near Wooden Valley north to the Mysterious Valley area. Results of the investigation show that the Hunting Creek fault offsets late Pleistocene and Holocene colluvial and soil deposits.
Geomorphic expression	The Hunting Creek fault is delineated by well defined geomorphic features indicative of Holocene dextral strike-slip displacement, such as dextrally deflected and offset drainages, dextrally deflected ridges, shutter ridges, linear troughs, sidehill benches, and linear scarps (Bryant, 1982 #5307; 1983 #5308).
Age of faulted surficial deposits	The Hunting Creek fault mainly offset Mesozoic Franciscan serpentinites, but locally upper Pleistocene and Holocene soils and colluvium are displaced. A trench investigation by Steffen and others (1983 #5310) reported that offset colluvium was considered to be 32–75 ka, based on soil-profile development. Bryant (1983 #5308) reported that the 32–75 ka colluvium was overlain by Holocene colluvium that was also offset.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Steffen and others (1983 #5310) concluded that the Hunting Creek fault last ruptured about 32 ka, based on stratigraphic relations exposed in their trenches. Bryant (1983 #5308) reported an alternative interpretation for this trench data and concluded that the Hunting Creek fault has offset Holocene colluvial deposits and that the geomorphic features delineating the Hunting Creek fault support Holocene displacement.
Recurrence interval	
Slip-rate	Between 1.0 and 5.0 mm/yr

category	*Comments:* Steffen and others (1983 #5310) reported a partial late Pleistocene slip rate of 0.09–0.4 mm/yr, based on an apparent vertical separation of a paleosol unit and the plunge of one set of striations along the fault plane observed in trench T-3. Bryant (1983 #5308) disagreed with this assessment, stating that geomorphic expression of the fault is indicative of a larger slip rate, probably equal to or greater than 1 mm/yr, comparable to that of the Greenville fault zone [53]. It is possible that the slip rate may be as high as 5 mm/yr, based on the well defined geomorphic expression within a terrain characterized by massive landsliding and rapid erosion rates.
Date and Compiler(s)	2000 William A. Bryant, California Geological Survey
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