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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.

Healdsburg fault (Class A) No. 31

Last Review Date: 1998-09-10

Compiled in cooperation with the California Geological Survey

citation for this record: **Hart, E.W., compiler, 1998, Fault number 31, Healdsburg fault, 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 02:51 PM.**

Synopsis	High-angle dextral fault extending about 25 km northwest from the vicinity of Windsor Creek where it connects with the Rodgers Creek fault [32]. Farther north it may merge with the subparallel Alexander fault zone of Gealey (1951 #4854). Based on geology and geomorphology, Gealy (1951 #4854), Brown (1970 #1320), Blake and others (1971 #4797) and Huffman and Armstrong (1980 #4862) interpreted multiple traces in a zone 1–2 km wide, some of which were considered to be "recently active." Based on this work, much of the Healdsburg fault was zoned under the Alquist-Priolo Earthquake Fault Zoning Act in 1976. However, the zones were withdrawn in 1983 following changes in the zoning criteria and studies by Bryant (1982 #5251) who concluded that the fault lacked evidence of Holocene activity

	northwest of the Windsor Creek vicinity. That part of the Healdsburg fault south of Windsor Creek has been assigned to the Rodgers Creek fault [32] with which it connects. Seismically, however, the Healdsburg fault appears to be a northwest extension of the Rodgers Creek fault and defines part of the complex seismic stepover with the Maacama fault [30] to the north (Jennings, 1994 #2878; Goter and others, 1994 #4855). Offset of the Plio-Pleistocene Glen Ellen Formation (Fox, 1983 #5252) northwest of Healdsburg indicates significant Quaternary displacement and anomalous topography near Healdsburg suggests late Quaternary movement locally (Herd and others, 1977 #4858). Results of most site investigations for development are inconclusive (Bryant, 1982 #5251), but faulted Holocene deposits were reported at two sites north of Healdsburg (Harlan Tait Associates, 1996 #5254; Kleinfelder, 1996 #5255).
Name comments	Partly mapped (inferred) but not named by Willis and Wood (1922 #5256). First mapped in detail and named by Gealy (1951 #4854) within the Healdsburg 15-minute quadrangle. Extended to the southeast by Brown (1970 #1320), Fox and others (1973 #5253) and Huffman and Armstrong (1980 #4862) who also identified recently active traces. That part of the fault southeast of Windsor Creek is considered here to be part of the active Rodgers Creek fault [32]. **Fault ID:** Refers to number 142 (Healdsburg fault) of Jennings (1994 #2878).
County(s) and State(s)	SONOMA COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 and 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 1:24,000-scale maps by Bryant (1982 #5251) and Delattre (2011) and 1:250,000-scale map by Bortugno (1982).
Geologic setting	Dextral fault offsets all Plio-Pleistocene and older formations and locally offsets alluvium of probable Holocene age (Gealey, 1951

	#4854; Huffman and Armstrong, 1980 #4862; Kleinfelder, 1996 #5255). Maximum offset unknown, but probably at least a few kilometers based on significant truncation of older units and connection with the Rodgers Creek fault [32] to the south (Huffman and Armstrong, 1980 #4862; Bryant, 1982 #5251). Zone of seismicity indicates historic activity at depth (Goter and others, 1994 #4855) and focal mechanism for an earthquake north of Windsor is consistent with dextral slip on this northwest-trending fault (Wong, 1991 #5257). The Healdsburg fault, as defined here, appears to be a northwest extension of the Rodgers Creek fault that is still partly Holocene-active and perhaps part of the right-step connection with the Maacama fault [30] to the north and east (Jennings, 1994 #2878).
Length (km)	31 km.
Average strike	N41°W
Sense of movement	Right lateral *Comments:* Based on geomorphology , geology, and seismicity and connection with Rodgers Creek fault [32] to south (Gealey, 1951 #4854; Huffman and Armstrong, 1980 #4862; Bryant, 1982 #5251; Wong, 1991 #5257).
Dip Direction	V *Comments:* Assumed to be vertical to near vertical by Gealey (1951 #4854); also indicated by focal mechanism (Wong, 1991 #5257).
Paleoseismology studies	Kleinfelder (1996 #5255) exposed two faults in exploratory trenches that offset young alluvium and soils of probable Holocene age at site 31-1. The faults are steeply dipping and strike N 42° W. to N.64° W. No age-dates were determined, although a sample of unfaulted organic soil (sag pond deposits ?) was submitted to USGS for dating (S. Korbay, personal commun., 1996). At site 31-2, Harlan Tait Assoc. (1996 #5254) exposed a trace of the Healdsburg fault just north of Healdsburg that offsets "Holocene colluvium" in trench 4. The shears constitute a northeast-dipping zone with apparent strike-slip and reverse components.

	These and other site-investigation reports are on file at the California Division of Mines and Geology in San Francisco.
Geomorphic expression	Southeast of U.S. Hwy. 101, the fault is generally defined by broad troughs, scarps, linear, and disrupted drainages suggestive of Quaternary or late Quaternary dextral slip across a broad fault zone, but lacks ephemeral features suggestive of Holocene activity. Northeast of Hwy 101, it is not well-defined geomorphically (Gealey, 1951 #4854; Herd and others, 1977 #4858; Bryant, 1982 #5251; Hart and others, 1983 #4857).
Age of faulted surficial deposits	The Pliocene-Pleistocene Glen Ellen Formation is mapped as being faulted in many places (Blake and others, 1971 #4797; Huffman and Armstrong, 1980 #4862; Fox, 1983 #5252). Faulted alluvium and soil of probable Holocene age are reported in trenches at development sites (Kleinfelder, 1996 #5255; Harlan Tait Associates, 1996 #5254).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Age category assigned based on mapping by Bryant (1982) and Bortugno (1982).
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Based on lack of well-developed geomorphic features with limited evidence of local Holocene surface rupture, historic seismicity, and connection with the Rodgers Creek fault [32].
Date and Compiler(s)	1998 Earl W. Hart, California Geological Survey
References	#4797 Blake, M.C., Jr., Smith, J.T., Wentworth, C.M., and Wright, R.H., 1971, Preliminary geologic map of western Sonoma County and northernmost Marin County, California: U.S. Geological Survey Basic Data Contribution 12, 1 pl., scale 1:62,500. #1320 Brown, R.D., Jr., 1970, Faults that are historically active or that show evidence of geologically young surface displacement,

San Francisco Bay region, a progress report—Oct. 1970: U.S. Geological Survey Open-File Map (U.S. Department of the Interior and U.S. Department of Housing and Urban Development Basic Data Contribution 7), 2 sheets, scale 1:250,000.

#5251 Bryant, W.A., 1982, Chianti, Healdsburg, Alexander, Maacama and related faults, Sonoma County: California Division of Mines and Geology Fault Evaluation Report 135 microfiche copy in California Division of Mines and Geology Open-File Report 90-10, 18 p., scale 1:24,000, parts of 5 quadrangles, scale 1:24,000.

#5252 Fox, K.F., Jr., 1983, Tectonic setting of late Miocene, Pliocene, and Pleistocene rocks in part of the Coast Ranges north of San Francisco, California: U.S. Geological Survey Professional Paper 1239, 33 p., 1 pl.

#5253 Fox, K.F., Sims, J.D., Bartow, J.A., and Helley, E.J., 1973, Preliminary geologic map of eastern Sonoma County and western Napa County, California: San Francisco Bay Region Environment and Resources Planning Study: U.S. Geological Survey Miscellaneous Field Studies Map MF-483 (Basic Data Contribution 56), scale 1:62,500.

#4854 Gealey, W.K., 1951, Geology of the Healdsburg quadrangle, California: California Department of Conservation, Division of Mines and Geology Bulletin 161, 50 p., 3 pls., scale 1:62,500.

#4855 Goter, S.K., Oppenheimer, D.H., Mori, J.J., Savage, M.K., and Masse, R.P., 1994, Earthquakes in California and Nevada: U.S. Geological Survey Open-File Report 94-647, 1 sheet, scale 1:1,000,000.

#5254 Harlan Tait Associates, 1996, Fault and geotechnical investigation, planned Panorama Reservoir, Healdsburg, California: Technical report to , 22 p. (copy of report on file at CDMG-SF as C-918).

#4857 Hart, E.W., Bryant, W.A., and Smith, T.C., 1983, Summary report—Fault evaluation program, 1981-1982 area, northern Coast Ranges region, California: California Department of Conservation, Division of Mines and Geology Open-File Report 83-10, 17 p., 1 pl.

#4858 Herd, D.G., Helley, E.J., and Rogers, B.W., 1977, Map of Quaternary faulting along the southern Maacama fault zone, California: U.S. Geological Survey Open-File Report 77-453, 7, scale 1:24,000.

#4862 Huffman, M.E., and Armstrong, C.F., 1980, Geology for planning in Sonoma County: California Division of Mines and Geology Special Report 120, 31 p., 5 pls., scale 1:62,500.

#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.

#5255 Kleinfelder, I., 1996, Geologic investigation and fault hazard evaluation report, Foss Creek Detention Basin, Healdsburg, California: Unpublished consultant's report, Project No. 41-3100-01, 20 p. (copy of report on file at CDMG-SF as C-919).

#4860 Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation, Division of Mines and Geology Open-File Report 96-08 (also U.S. Geological Open-File Report 96-706), 33 p.

#5256 Willis, B., and Wood, H.D., 1922, Fault map of the state of California: Seismological Society of America, scale 1:506,880.

#5257 Wong, I.G., 1991, Contemporary seismicity, active faulting, and seismic hazards of the Coast Ranges between San Francisco Bay and Healdsburg, California: Journal of Geophysical Research, v. 96, no. B12, p. 19,891-19,904.