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Quaternary Fault and Fold Database of the United States

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Bald Mountain-Big Lagoon fault zone (Class A) No. 12

Last Review Date: 1999-04-27

Compiled in cooperation with the California Geological Survey

citation for this record: **Hart, E.W., compiler, 1999, Fault number 12, Bald Mountain-Big Lagoon fault zone, 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 02:17 PM.**

Synopsis	The Bald Mountain fault is a bedrock fault extending 55-60 km onshore southeast of Big Lagoon and is mapped as a northeast-dipping thrust (Blake and others, 1967 #4914); (Jennings, 1977 #4901). Although no Quaternary units are shown as offset on maps (for example Strand, 1963 #4921), Carver (1989, personal communication to C.W. Jennings) reports that the fault cuts the sediment of the lower Pleistocene Falor Formation, east of Big Lagoon. The fault also may extend another 65 km offshore to the northwest where it offsets Quaternary sediment along a northeast-dipping thrust fault as by Clarke (1992 #4092). Carver (1987

	#4918; 1992 #4919) shows the Big Lagoon fault on small scale maps as an 18-19 km long northeast-dipping thrust about 1-2 km southwest of and parallel to the Bald Mountain fault. He indicates that this fault offsets the "Klamath saprolite" (a late Neogene erosion surface) 550 m vertically and calculated a slip rate of 1.9 mm/yr, assuming that faulting was initiated at 0.7 Ma. In a later report, Carver (1992 #4919) gives a dip-slip rate of 1.8 mm/yr based on offset of the Falor Formation (lower Pleistocene). Carver (personal commun., and 1992 #4919) states that the Falor Formation offset is exposed in roadcuts east of Big Lagoon. Cashman and others (1981 #4920) map the Big Lagoon fault as a north-trending fault along the eastern margin of Big Lagoon where it is shown to offset Pleistocene marine-terrace deposits. They and Aalto and others (1981 #4897) extend the fault southward as a bedrock fault that juxtaposes two units of the Franciscan Complex. They do not indicate the dip of the fault. Their work is summarized in Wagner and Saucedo (1987 #4893) and predates that of Carver. Except where the fault traces converge just east of Big Lagoon, the Big Lagoon fault of Cashman and others (1981 #4920) is a separate fault from the Big Lagoon fault of Carver (1987 #4918; 1992 #4919) and has a different trend. Therefore, the Big Lagoon fault of Carver probably should be identified either 1) by a different designation or 2) as a strand of the Bald Mountain fault. McCrory (1996 #1217), using data from Carver (1987 #4918; 1992 #4919) but assuming the commencement of faulting was at 1 Ma, calculates a dip-slip rate of 1.1(?) mm/yr on the Bald Mountain-Big Lagoon fault zone. Petersen and others (1996 #4860) cite McCrory (1996 #1217) as a source, but give a slip rate of 0.5 mm/yr, a length of 88?9 km and designate the structure as the Big Lagoon-Bald Mountain fault.
Name comments	Bald Mountain fault was mapped and apparently named by Manning and Ogle (1950 #4903); later extended to Big Lagoon by Irwin (1960 #4900), and recognized as a thrust fault by Blake and others (1967 #4914). The Big Lagoon fault was named by Cashman and others (1981 #4920), but generally follows an unnamed bedrock fault mapped by Irwin (1960 #4900). **Fault ID:** Refers to numbers 33 (Bald Mountain fault), 34 (Big Lagoon fault), and 16 (Bald Mountain-Big Lagoon fault zone, offshore) of Jennings (1994 #2878).
County(s) and	HUMBOLDT COUNTY, CALIFORNIA

State(s)	HUMBOLDT COUNTY, CALIFORNIA
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Poor Compiled at 1:750,000 scale. *Comments:* Location based on digital revisions to Jennings (1994 #2878) at 1:750,000 scale
Geologic setting	The Bald Mountain fault is a northeast-dipping thrust fault that extends 55-60 km southeast from Big Lagoon and is shown to only offset rocks of the Franciscan Complex of late Mesozoic age (Manning and Ogle, 1950 #4903; Wagner and Saucedo, 1987 #4893). The Big Lagoon fault, as mapped by Cashman and others (1981 #4920) and Wagner and Saucedo (1987 #4893) also is a bedrock fault that only locally offsets Pleistocene marine-terrace deposits on the eastern side of Big Lagoon. The two faults appear to merge at Big Lagoon and may extend another 65 km offshore to the where the Bald Mountain-Big Lagoon fault zone is interpreted as a northeast-dipping thrust that offsets and upwarps Quaternary sedimentary units (Clarke, 1992 #4092). The Bald Mountain-Big Lagoon fault zone is one of the easterly thrusts of a contractural thrust/fold belt within the accretionary wedge that developed above the Cascadia subduction zone [781] (Carver, 1992 #4919). Based on 545 m of vertical offset of the Klamath saprolite (a late Neogene erosion surface) and an assumed initiation of faulting at 0.7 Ma, Carver (1987 #4918; 1992 #4919) interpreted 1,300 m of dip-slip on the northeast-dipping Big Lagoon thrust fault (which may also include displacement on the parallel and adjacent Bald Mountain fault).
Length (km)	124 km.
Average strike	N22°W
Sense of movement	Thrust *Comments:* Carver (1992 #4919) and McCrory (1996 #1217).
Dip	30° NE *Comments:* Assumed by McCrory (1996 #1217) based on discussion by Carver (1987 #4918; 1992 #4919).

Paleoseismology studies	
Geomorphic expression	Information not available, much of fault is offshore.
Age of faulted surficial deposits	Sediment of the Lower Pleistocene Falor Formation (Carver, 1992 #4919) and unpublished data). Cashman and others (1981 #4920) show Pleistocene marine-terrace deposits offset by Big Lagoon fault near its approximate merger with the Bald Mountain fault.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Carver (1987 #4918; 1992 #4919)
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Carver (1992 #4919) determined 1.8 mm/yr, whereas McCrory (1996 #1217) calculated 1.1(?) mm/yr.
Date and Compiler(s)	1999 Earl W. Hart, California Geological Survey
References	#4897 Aalto, K.R., Cashman, P.H., Cashman, S.M., and Kelsey, H.M., 1981, Geology of the Coast Ranges, Del Norte and northern Humboldt Counties, California: Unpublished report and maps for California Division of Mines and Geology Data Base Augmentation Program, scale 1:24,000 and 1:62,500. #4914 Blake, M.C., Jr., Irwin, W.P., and Coleman, R.G., 1967, Upside-down metamorphic zonation, blueschist facies, along a regional thrust in California and Oregon: U.S. Geological Survey Professional Paper 575-C, 9 p. #4918 Carver, G.A., 1987, Late Cenozoic tectonics of the Eel River basin region, coastal northern California, *in* Schymiczek, H., and Suchsland, R., eds., Tectonics, sedimentation and evolution of the Eel River and associated coastal basins of northern California: San Joaquin Geological Society Miscellaneous Publication 37, p. 61-71.

#4919 Carver, G.A., 1992, Late Cenozoic tectonics of coastal northern California, *in* Carver, G.A., and Aalto, K.R., eds., Field guide to the late Cenozoic subduction tectonics and sedimentation of northern coastal California: American Association of Petroleum Geologists, v. GB-71, p. 1-9.

#4920 Cashman, P.H., Cashman, S.M., and Kelsey, 1981, Geology of the Rodgers Peak quadrangle, Humboldt County, California: California Division of Mines and Geology Open-File Report 82-14, scale 1:24,000.

#4092 Clarke, S.H., Jr., 1992, Geology of the Eel River Basin and adjacent region—Implications for Late Cenozoic tectonics of the southern Cascadian subduction zone and Mendocino Triple Junction: The America Association of Petroleum Geologists Bulletin, v. 76, no. 2, p. 199–224.

#4900 Irwin, W.P., 1960, Geologic reconnaissance of the northern Coast Ranges and Klamath Mountains, California, with a summary of the mineral resources: California Division of Mines Bulletin 179, 80 p., 1 pl., scale 1:500,000.

#4901 Jennings, C.W., 1977, Geologic map of California: California Division of Mines and Geology Geologic Data Map 2, scale 1:750,000.

#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.

#4903 Manning, G.A., and Ogle, B.A., 1950, Geology of the Blue Lake quadrangle, California: California Division of Mines and Geology Bulletin 148, 36 p., 3 pls., scale 1:62,500.

#1217 McCrory, P.A., 1996, Evaluation of fault hazards, northern coastal California: U.S. Geological Survey Open-File Report 96-656, 87 p., 2 pls.

#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. #4921 Strand, R.G., 1963, Geologic map of California, Olaf P. Jennings Edition, Weed Sheet: California Division of Mines and Geology, scale 1:250,000. #4893 Wagner, D.L., and Saucedo, G.J., 1987, Geologic map of the Weed quadrangle: Department of Conservation, Division of Mines and Geology Regional Geologic Map Series 4A, scale 1:250,000.