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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.**

## Collayomi fault zone (Class A) No. 34

**Last Review Date: 2000-05-03**

## Compiled in cooperation with the California Geological Survey

***citation for this record:*** **Bryant, W.A., compiler, 2000, Fault number 34, Collayomi 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 02:51 PM.**

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| **Synopsis** | This dextral strike-slip fault bounds the southwestern side of the Clear Lake basin in the northern Coast Ranges. Mapping by McLaughlin (1978 #5304) and Hearn and others (1976 #5302; 1995 #5233) shows a complex, 0.4-0.9 km wide zone of predominantly dextral strike-slip faults that offset the Pleistocene Clear Lake Volcanics and, locally, late Pleistocene terrace deposits. Geomorphic expression of the fault zone indicates late Quaternary dextral offset, but the fault lacks geomorphic evidence of Holocene displacement (Bryant, 1982 #5300). Clark and others, based on mapping by Hearn and others (1976 #5302), calculated a late Pleistocene slip rate of 0-1 mm/yr. Wesnousky (1986 #5305) reported a preferred slip rate of 0.1 mm/yr for the |

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| | Collayomi fault, whereas Hearn and others (1988 #5303) estimated a dextral slip rate of 0.7-0.9 mm/yr. There are no detailed studies for the Collayomi fault zone. |
| **Name comments** | Collayomi fault was first mapped and named by Brice (1953 #5299) in the northern Collayomi Valley.<br><br>**Fault ID:** Refers to number 120 (Collayomi fault) of Jennings (1994 #2878) and number L08 (Collayomi fault) of Working Group on Northern California Earthquake Potential (1996 #1216). |
| **County(s) and State(s)** | SONOMA COUNTY, CALIFORNIA<br>LAKE COUNTY, CALIFORNIA |
| **Physiographic province(s)** | PACIFIC BORDER |
| **Reliability of location** | Good<br>Compiled at 1:62,500 scale.<br><br>*Comments:* Location based on digital revisions to Jennings (1994 #2878) using original mapping at 1:24,000-scale by Hearn and others (1976 #5302; 1995 #5233), Herd (written commun., 1982 in Bryant, 1982 #5300), and Bryant (1982 #5300); and at 1:62,500-scale by Brice (1953 #5299). |
| **Geologic setting** | Near vertical dextral fault zone that bounds the southwestern side of the Clear Lake basin, an actively deforming basin formed primarily by shear and tensional stresses within the San Andreas fault system and modified by eruption of the Clear Lake Volcanics and subsequent subsidence (Hearn and others, 1988 #5303). Collayomi fault zone is as much as 0.9 km wide and extends from the Camelback Ridge area southeast to Middletown. The maximum dextral displacement is not known, but Hearn and others (1988 #5303) reported an apparent 1.1 km of dextral displacement for 1.5 Ma andesite of the Clear Lake Volcanics. |
| **Length (km)** | 30 km. |
| **Average strike** | N43°W |
| **Sense of movement** | Right lateral<br><br>*Comments:* Hearn and others (1995 #5233) mapped the Collayomi fault as a dextral strike-slip fault. Donnelly and others (1976 #5301) and Hearn and others (1976 #5302; 1988 #5303) |

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| | reported that the 0.5-0.6 Ma Thurston Creek rhyolite is dextrally offset about 365 m along a strand of the Collayomi fault. Hearn and others (1988 #5303) reported an apparent 1.1 km of dextral displacement for 1.5 Ma andesite of the Clear Lake Volcanics. The geomorphic expression of the Collayomi fault is consistent with predominantly dextral displacement (Bryant, 1982 #5300). |
| **Dip** | 90°<br><br>*Comments:* Hearn and others (1995 #5233) show the Collaymi as a vertical fault zone in their cross sections A-A', B-B', and C-C'. |
| **Paleoseismology studies** | |
| **Geomorphic expression** | The Collayomi fault is delineated by geomorphic features indicative of late Quaternary dextral strike-slip displacement: these include broad linear troughs, dextrally deflected ridges and drainages, linear ridges and drainages, linear troughs, sidehill benches, and linear dissected scarps (Bryant, 1982 #5300). The fault lacks geomorphic evidence of systematic dextral offset of drainages and ephemeral geomorphic features, which are considered indicative of Holocene displacement (Bryant, 1982 #5300). |
| **Age of faulted surficial deposits** | The Collayomi fault offsets late to middle Pleistocene volcanic rocks of the Clear Lake Volcanics. Offset rocks include the 0.6 Ma (K-Ar) Thurston Creek rhyolite, ~0.3-0.4 Ma (K-Ar) Dacite of Benson Ridge, middle Pleistocene (0.13-0.6 Ma) Kelseyville Formation, and late Pleistocene older terrace deposits (Hearn and others, 1995 #5233). Holocene alluvium is juxtaposed against Clear Lake Volcanics locally (Hearn and others, 1995 #5233), but it is not clear if the alluvium is offset (Bryant, 1982 #5300). Latest Pleistocene and Holocene terrace and alluvial deposits conceal traces of the Collayomi fault zone. |
| **Historic earthquake** | |
| **Most recent prehistoric deformation** | late Quaternary (<130 ka)<br><br>*Comments:* The most recent paleoevent is not known. The Collayomi fault zone offsets late Quaternary rocks of the Clear Lake Volcanics and late Pleistocene terrace deposits (Hearn and others, 1995 #5233), but latest Pleistocene and Holocene terrace |

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| | and alluvial deposits are not displaced. Bryant (1982 #5300) reported that the Collayomi fault zone lacks ephemeral geomorphic features indicative of Holocene dextral strike-slip offset. Pampeyan (1979 #1245) classified the Collayomi fault zone as active in the late Pleistocene, but it lacks evidence of Holocene displacement. |
| **Recurrence interval** | |
| **Slip-rate category** | Between 0.2 and 1.0 mm/yr<br><br>*Comments:* Clark and others (1984 #2876) reported a poorly constrained dextral displacement of 0-0.5 km for the 0.5-0.6 Ma Thurston Creek rhyolite, which yields a minimum late and middle Quaternary dextral slip rate of 0 mm/yr and a maximum slip rate of about 1.0 mm/yr. Wesnousky (1986 #5305) reported a preferred slip rate of 0.1 mm/yr for the Collayomi fault, whereas Hearn and others (1988 #5303) estimated a dextral slip rate of 0.7-0.9 mm/yr. |
| **Date and Compiler(s)** | 2000<br>William A. Bryant, California Geological Survey |
| **References** | #5299 Brice, J.C., 1953, Geology of Lower Lake quadrangle, California: California Division of Mines and Geology Bulletin 166, scale 1:62,500.<br><br>#5300 Bryant, W.A., 1982, Konocti Bay fault, Collayomi fault, Big Valley fault and other unnamed fault segments in the Clear Lake area: California Division of Mines and Geology Fault Evaluation Report 132, microfiche copy in California Division of Mines and Geology Open-File Report 90-10, scale 1:24,000.<br><br>#2876 Clark, M.M., Harms, K.H., Lienkaemper, J.J., Harwood, D.S., Lajoie, K.R., Matti, J.C., Perkins, J.A., Rymer, M.J., Sarna-Wojcicki, A.M., Sharp, R.V., Sims, J.D., Tinsley, J.C., III, and Ziony, J.I., 1984, Preliminary slip rate table and map of late Quaternary faults of California: U.S. Geological Survey Open-File Report 84-106, 12 p., 5 plates, scale 1:1,000,000.<br><br>#5301 Donnelly, J.M., McLaughlin, R.J., Goff, F.E., and Hearn, B.C., Jr., 1976, Active faulting in The Geysers-Clear Lake area, northern California: Geological Society of America Abstracts with Programs, v. 8, no. 3, p. 369-370. |

#5302 Hearn, B.C., Jr., Donelly, J.M., and Goff, F.E., 1976, Preliminary geologic map and cross-section of the Clear Lake volcanic field, Lake County, California: U.S. Geological Survey Open-File Report 76-751, scale 1:24,000.

#5233 Hearn, B.C., Jr., Donnelly-Nolan, J.M., and Goff, F.E., 1995, Geologic map and structure sections of the Clear Lake volcanics, northern California: U.S. Geological Survey Miscellaneous Investigations Map I-2362, scale 1:24,000.

#5303 Hearn, B.C., Jr., McLaughlin, R.J., and Donnelly-Nolan, J.M., 1988, Tectonic framework of the Clear Lake Basin, California, *in* Sims, J.D., ed., Late Quaternary climate, tectonism, and sedimentation in Clear Lake, northern California Coast Ranges: Geological Society of America Special Paper 214, p. 9–20.

#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.

#5304 McLaughlin, R.J., 1978, Preliminary geologic map and structural sections of the central Mayacmas Mountains and The Geysers steam field, Sonoma, Lake, and Mendocino Counties, California: U.S. Geological Survey Open-File Report 78-389, scale 1:24,000.

#1245 Pampeyan, E.H., 1979, Preliminary map showing recency of faulting in coastal north-central California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1070, 13 p. pamphlet, 3 sheets.

#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.

#5305 Wesnousky, S.G., 1986, Earthquakes, Quaternary faults, and seismic hazards in California: Journal of Geophysical Research, v. 91, no. B12, p. 12,587-12,631.

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| | #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. |