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Quaternary Fault and Fold Database of the United States

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Klamath graben fault system, East Klamath Lake section (Class A) No. 843b

Last Review Date: 2002-12-06

citation for this record: **Personius, S.F., compiler, 2002, Fault number 843b, Klamath graben fault system, East Klamath Lake section, 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 03:15 PM.**

Synopsis	**General:** The Klamath graben fault system is a group of north and northwest-trer normal faults that form a complex graben system that confines the Klamath Lake at the intersection of the northwestern Basin and Range and Cascade Mountains i southern Oregon. These faults offset upper Miocene to Holocene volcanic rocks a Pleistocene and Holocene valley-fill sediments. The Klamath graben fault system divided into three sections—the West Klamath Lake section, the East Klamath La section, and the south Klamath Lake section. The West Klamath Lake and south Klamath Lake sections in part show evidence of latest Quaternary displacement; youngest displacement on the East Klamath Lake section occurred in the Quatern **Sections:** This fault has 3 sections. The Klamath graben fault system is divided ir three sections herein, following the subdivisions of Geomatrix Consultants, Inc. (#3593)—the West Klamath Lake section, the East Klamath Lake section, and the Klamath Lake section of the Klamath graben fault system.

Name comments	**General:** The overall fault system is generally referred to as the Klamath graben maps of the region; individual fault names include the East Klamath Lake fault zo (Klinger and others, 1996 #3729; Bacon and others, 1997 #3516; 1999 #3499) an West Klamath Lake fault zone (Hawkins and others, 1989 #3548; Klinger and oth 1996 #3729). Geomatrix Consultants, Inc. (1995 #3593) informally include faults the southern part of the graben system in their South Klamath graben source zone Herein we retain the following names as sections of the Klamath graben fault sys the West Klamath Lake section, the East Klamath Lake section, and the south Kla Lake section. **Section:** This part of the fault system is included in the East Klamath Lake fault z by Klinger and others (1996 #3729) and Bacon and others (1997 #3516; 1999 #3 and in the East Klamath graben fault by Geomatrix Consultants, Inc. (1995 #359 **Fault ID:** This group of structures is included in fault number 37 of Pezzopane (#3544) and fault number 52 of Geomatrix Consultants, Inc. (1995 #3593). This is number 52a of Geomatrix Consultants, Inc. (1995 #3593).
County(s) and State(s)	KLAMATH COUNTY, OREGON
Physiographic province(s)	CASCADE-SIERRA MOUNTAINS BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Location of fault from ORActiveFaults (http://www.oregongeology.org/arcgis/rest/services/Public/ORActiveFaults/MapS downloaded 06/02/2016) attributed to Jenks (2007 #7794).
Geologic setting	The Klamath graben fault system is a group of north-and northwest-trending norr faults that form a complex graben system at the intersection of the northwestern E and Range and Cascade Mountains in southern Oregon. Mount Mazama and Crat Lake may be localized at the intersection of the Klamath graben with the Cascade volcanic province (Bacon, 1983 #3787; Bacon and Nathenson, 1996 #3541; Bacc others, 1997 #3516). Parts of this fault system were originally mapped by Peterso McIntyre (1970 #3791), Smith and others (1982 #3493), Smith (1983 #3556; 198 #3555), Moring (1983 #3554), Hawkins and others (1989 #3548), Walker and MacLeod (1991 #3646), Sherrod and Pickthorn (1992 #3567), Bacon and others (#3516), and Sherrod and Smith (2000 #5165). These faults offset upper Miocene Holocene volcanic rocks and Pleistocene and Holocene valley-fill sediments.
Length (km)	This section is 25 km of a total fault length of 148 km.
Average strike	N15°W (for section) versus N17°W (for whole fault)

Sense of movement	Normal *Comments:* This section is mapped as a normal or high-angle fault by Peterson ar McIntyre (1970 #3791), Walker and MacLeod (1991 #3646), Sherrod and Pickth (1992 #3567), Pezzopane (1993 #3544), Bacon and others (1997 #3516), and She and Smith (2000 #5165).
Dip Direction	W *Comments:* No structural data on the dip of this fault have been published, but Geomatrix Consultants, Inc. (1995 #3593) used an estimated dip of 70° in their modeling of earthquake potential of their East Klamath graben fault.
Paleoseismology studies	
Geomorphic expression	The northwest-trending East Klamath Lake section is coincident with a prominen to 250-m-high escarpment on middle Pliocene basalt along its length (Sherrod an Pickthorn, 1992 #3567). No fault scarps on Quaternary surficial deposits have be described, but Weldon and others (2002 #5648) observed lineaments across Quat deposits on 1:100,000-scale DEMs of the area. This section extends from Crater l National Park south to the vicinity of Agency Lake. Further south, the more activ eastern margin of the Klamath graben steps eastward and is included in the South Klamath Lake section.
Age of faulted surficial deposits	The East Klamath Lake section offsets middle Pliocene basalt along the eastern n of the Klamath graben (Sherrod and Pickthorn, 1992 #3567). The fault is mapped buried by Plio-Pleistocene sediments, Quaternary surficial deposits, and Holocen flow deposits of the climactic eruption of Mount Mazama (Walker and MacLeod, #3646; Sherrod and Pickthorn, 1992 #3567; Sherrod and Smith, 2000 #5165).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* No detailed information on age of most recent faulting has been desc but Pezzopane (1993 #3544) and two subsequent compilations (Geomatrix Consu Inc., 1995 #3593; Madin and Mabey, 1996 #3575) infer middle and late Quaterna (<700-780 ka) displacement on the East Klamath Lake section. A more recent compilation (Weldon and others, 2002 #5648) inferred Quaternary (<1.6 Ma) displacement. Given the lack of evidence of displacement in Plio-Pleistocene and Quaternary surficial deposits, the latter age is retained herein until further studies conducted.

Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Geomatrix Consultants, Inc. (1995 #3593) used estimated slip rates o 0.15–0.5 mm/yr in their analysis of earthquake hazards associated with the variou parts of the Klamath graben fault system. Given the lack of evidence of displacen in Quaternary surficial deposits and the 70- to 250-m-high escarpment that marks fault in middle Pliocene rocks, lower rates of slip seem more likely.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#3787 Bacon, C.R., 1983, Eruptive history of Mount Mazama and Crater Lake Caldera, Cascade Range, USA: Journal of Volcanology and Geothermal Researcl 18, p. 57–115. #3541 Bacon, C.R., and Nathenson, M., 1996, Geothermal resources in the Crate Area, Oregon: U.S. Geological Survey Open-File Report 96-663, 34 p. #3499 Bacon, C.R., Lanphere, M.A., and Champion, D.E., 1999, Late Quaternary rate and seismic hazards of the West Klamath Lake fault zone near Crater Lake, Oregon Cascades: Geology, v. 27, no. 1, p. 43-46. #3516 Bacon, C.R., Mastin, L.G., Scott, K.M., and Nathenson, M., 1997, Volcanc earthquake hazards in the Crater Lake region, Oregon: U.S. Geological Survey O File Report 97-487, 30 p., 1 pl., scale 1:100,000. #3593 Geomatrix Consultants, Inc., 1995, Seismic design mapping, State of Oreg Technical report to Oregon Department of Transportation, Salem, Oregon, under Contract 11688, January 1995, unpaginated, 5 pls., scale 1:1,250,000. #3548 Hawkins, F.F., Foley, L.L., and LaForge, R.C., 1989, Seismotectonic study Fish Lake and Fourmile Lake Dams, Rogue River Basin Project, Oregon: U.S. Bu of Reclamation Seismotectonic Report 89-3, 26 p., 2 pls. #7794 Jenks, M.D., 2007, Geologic compilation map of part of the Upper Klamat Basin, Klamath County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-2007-05, 7 p., scale 1:100,000. #3729 Klinger, R.E., Vetter, U.R., and Ryter, D.W., 1996, Seismotectonic study fc Gerber Dam Klamath Project, California-Oregon: U.S. Bureau of Reclamation Seismotectonic Report 96-1, 51 p., 1 pl. #3575 Madin, I.P., and Mabey, M.A., 1996, Earthquake hazard maps for Oregon:

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mineral resources of eastern Klamath County and western Lake County, Oregon:
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Holocene volcanic and related rocks of the Cascade Range, Oregon: U.S. Geolog
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Questions or comments?