

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](#).

Cedar Mountain fault system, Mahogany Mountain section (Class A) No. 2a

Last Review Date: 2000-04-06

Compiled in cooperation with the California Geological Survey

citation for this record: Bryant, W.A., compiler, 2000, Fault number 2a, Cedar Mountain fault system, Mahogany Mountain 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 02:23 PM.

Synopsis

General: Complex, 44-km-long fault system consisting of north-striking normal faults that offset latest Pleistocene and Holocene volcanic rocks, glacial, and alluvial deposits (Williams, 1949 #4894; Wood, 1960 #4896; Bryant, 1990 #4889). The Cedar Mountain fault system is comprised of the Cedar Mountain, Mahogany Mountain, Mt. Hebron, Meiss Lake, and Ikes Mountain faults. Detailed reconnaissance level mapping by Wood (1960 #4896) and Bryant (1990 #4889) is at 1:62,500 scale. There are no detailed studies for any of these faults. Bryant (1990 #4889) estimated a late Pleistocene slip rate of 0.2 mm/yr for a

strand of the East Cedar Mountain fault, based on offset late Tioga equivalent outwash deposits. Historic surface fault rupture was associated with the 08/01/1978 Stephens Pass earthquake (Bennett and others, 1979 #3326).

Sections: This fault has 4 sections. It is proposed in this fault compilation that the Cedar Mountain, Mahogany Mountain, Mt. Hebron fault zones, and Ikes Mountain and Stephens Pass faults be collectively referred to as the Cedar Mountain fault system. Individual sections include the Mahogany Mountain section [2a], Cedar Mountain section [2b], Ikes Mtn.-Mt. Hebron section [2c], and the Stephens Pass section [2d].

**Name
comments**

General: Cedar Mountain fault system is a complex group of generally north- to north-northwest-striking normal faults along the boundary between the Cascade Ranges and the Modoc Plateau. First mapped, but not named, by Williams (1949 #4894) and Wood (1960 #4896). Bryant (1990 #4889) first proposed the names Cedar Mountain fault zone, West Cedar Mountain fault, East Cedar Mountain fault, Meiss Lake fault, Mahogany Mountain fault zone, and Mt. Hebron fault zone for structures within this fault system. The Stephens Pass fault was unmapped prior to the ML 4.6 Stephens Pass earthquake of 08/01/1978. This fault system should not be confused with the faults [1324] that were activated in western Nevada during the 12/21/1932 Cedar Mountain earthquake.

Section: The Mahogany Mountain section borders the northeastern side of Butte Valley in Siskiyou County and extends from the Oregon border southeast to the vicinity just north of Red Rock Valley. The Mahogany Mountain section is delineated by the Mahogany Mountain fault zone. Wood (1960 #4896) first mapped the fault zone and Bryant (1990 #4889) first proposed the name Mahogany Mountain for the fault zone.

Fault ID: Refers to Jennings (1994 #2878) fault numbers 1 (Mahogany Mountain fault zone), 2 (Ikes Mountain fault and unnamed faults in Butte Valley), 2A (Meiss Lake fault), 3 (Mt. Hebron fault zone), and 4 (Cedar Mountain fault zone), 11 (Cedar Mountain fault zone, southern part), and 22 (Stephens Pass fault), and fault number NE04 (Cedar Mtn. fault) of Working Group on Northern California Earthquake Potential (1996 #1216).

**County(s) and
State(s)**

KLAMATH COUNTY, OREGON
SISKIYOU COUNTY, CALIFORNIA

Physiographic province(s)	CASCADE-SIERRA MOUNTAINS
Reliability of location	<p>Good Compiled at 1:62,500 scale.</p> <p><i>Comments:</i> Based on digital revisions to Jennings (1994 #2878) using original mapping by Wood (1960 #4896) and Bryant (1990 #4889) at 1:62,500 scale.</p>
Geologic setting	<p>Complex system of generally north-striking normal faults that extends from the Oregon border south to the Stephens Pass area in northeastern California. The northern end of the Cedar Mountain fault system may extend into Oregon as the Sky Lakes fault zone [844]. The southern extent of the fault system is poorly understood and not mapped in detail. The fault zone is the result of east-west extension and is located along the boundary between the Cascade Ranges and the Modoc Plateau. The fault zone bounds Butte Valley, a structurally controlled closed drainage basin. Cumulative vertical displacement is not known, but scarps on late Tertiary bedrock suggest a minimum cumulative Quaternary vertical displacement of 500 m along the Mahogany Mountain fault. Scarp heights on Cedar Mountain, a Pliocene-Pleistocene volcanic cone, suggest a minimum cumulative Pleistocene displacement of 60 m.</p>
Length (km)	This section is 33 km of a total fault length of 69 km.
Average strike	N26°W (for section) versus N16°W (for whole fault)
Sense of movement	<p>Normal</p> <p><i>Comments:</i> Maximum down-to-southeast vertical displacement is unknown, but scarps on late Tertiary volcanic bedrock suggest minimum cumulative vertical offset of about 500 m (Bryant, 1990 #4889).</p>
Dip	<p>50°–70° SW</p> <p><i>Comments:</i> Unknown, presumed 50°–70° to the SW. Dip direction based on well-defined SW-facing bedrock scarp along the northeast side of Butte Valley (Wood, 1960 #4896; Bryant, 1990 #4889).</p>
Paleoseismology	

studies	
Geomorphic expression	Western branch of Mahogany Mountain fault zone is delineated by moderately to well-defined bedrock escarpment, a linear band of non-vegetated talus and a well-defined, approximately 2-m-high, SW-facing scarp on latest Pleistocene to Holocene alluvium (Bryant, 1990 #4889).
Age of faulted surficial deposits	Pliocene-Pleistocene volcanic rocks of the High Cascades series are offset (Wood, 1960 #4896). Fault offsets latest Pleistocene to Holocene alluvium in Butte Valley. Estimated age of alluvium in Butte Valley is based on soil profile development (Bryant, 1990 #4889).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) <i>Comments:</i> Age of most recent paleoevent is unknown. Bryant (1990 #4889) reported a 2-m- high scarp on alluvium where Mahogany Mountain fault crosses Butte Valley. Age of alluvium is not known, but Bryant (1990 #4889) estimated that it is latest Pleistocene to Holocene based on soil profile development.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr <i>Comments:</i> See comments for Cedar Mountain section [2b].
Date and Compiler(s)	2000 William A. Bryant, California Geological Survey
References	#3326 Bennett, J.H., Sherburne, R.W., Cramer, C.H., Chesterman, C.W., and Chapman, R.H., 1979, Stephens Pass earthquakes, Mount Shasta-August 1978: California Geology, v. 32, p. 27-34. #4889 Bryant, W.A., 1990, Stephens Pass fault and faults in the Butte Valley area, Siskiyou County: California Division of Mines and Geology Fault Evaluation Report FER-210. #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.

#4894 Williams, H., 1949, Geology of the Macdoel quadrangle: California Division of Mines and Geology Bulletin 151, 60 p., scale 1:125,000.

#4896 Wood, P.R., 1960, Geology and ground-water features of the Butte Valley region, Siskiyou County, California: U.S. Geological Survey Water-Supply Paper 1491, 150 p.

#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.

[Questions or comments?](#)

[Facebook](#) [Twitter](#) [Google](#) [Email](#)

[Hazards](#)

[Design](#) [Ground Motions](#) [Seismic Hazard Maps & Site-Specific Data](#) [Faults](#) [Scenarios](#)

[Earthquakes](#) [Hazards](#) [Data](#) [Education](#) [Monitoring](#) [Research](#)

[Home](#) [About Us](#) [Contacts](#) [Legal](#)