

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](#).

Cascade fault (Class A) No. 627

Last Review Date: 2003-06-12

Compiled in cooperation with the Idaho Geological Survey

citation for this record: Personius, S.F., and Adema, G.W., compilers, 2003, Fault number 627, Cascade 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 03:03 PM.

Synopsis

The Cascade fault forms the western margin of Cascade Valley just east of Long Valley in western Idaho, and is part of the western Idaho fault belt. Cascade Valley is a north-trending graben filled with Tertiary and Quaternary sediment. Alluvium from the North Fork Payette River and glacial deposits of Pinedale and Bull Lake age cover much of the fault trace. The fault displaces Cretaceous and older crystalline rocks in a down-to-the-east sense of displacement. The fault is marked by a degraded 150-m-high alluvially embayed bedrock escarpment along the western margin of Cascade Valley, but the escarpment is not marked by aligned springs, vegetation lineaments, or triangular facets indicative of young faulting. The fault does not

	<p>appear to offset glacial deposits of Pinedale and Bull Lake age, so youngest movement must predate the 140-150 ka age of the latter deposits. However, Plio-Pleistocene sediments near Pearsol Creek are tilted 10° to 20° westward into either the Cascade fault or the southern section of the Long Valley fault zone [628b]. Based on pollen assemblages, these deposits are thought to be glacio-lacustrine sediments associated with a pre-Bull-Lake glacial episode, and thus their deformation reflects a period of deformation some time in the Plio-Pleistocene prior to deposition of Bull-Lake-equivalent deposits.</p>
<p>Name comments</p>	<p>This fault forms the western margin of Cascade valley and was probably named after the valley or the nearby town of Cascade. The fault has been mapped by Newcomb (1970 #3761), Schmidt and Mackin (1970 #512), Mitchell and Bennett (1979 #5894), and Fitzgerald (1982 #5886).</p> <p>Fault ID: This fault is the southern part of fault number 220 in the fault compilation of Witkind (1975 #320).</p>
<p>County(s) and State(s)</p>	<p>VALLEY COUNTY, IDAHO</p>
<p>Physiographic province(s)</p>	<p>NORTHERN ROCKY MOUNTAINS</p>
<p>Reliability of location</p>	<p>Good Compiled at 1:250,000 scale.</p> <p><i>Comments:</i> Fault is from 1:250,000-scale mapping of Knudsen and others (1996 #5889).</p>
<p>Geologic setting</p>	<p>The Cascade fault forms the western margin of Cascade Valley just east of Long Valley in western Idaho. Cascade Valley is a north-trending graben filled with Tertiary and Quaternary sediment (Kinoshita, 1962 #5897; Schmidt and Mackin, 1970 #512). Alluvium from the North Fork Payette River and glacial deposits of Pinedale and Bull Lake age cover much of the fault trace. The fault zone displaces Cretaceous and older crystalline rocks in a down-to-the-east sense of displacement (Schmidt and Mackin, 1970 #512; Mitchell and Bennett, 1979 #5894; Fitzgerald, 1982 #5886). The fault is part of the western Idaho fault belt of Hamilton (1963 #6040), a system of north-striking normal faults formed along the western margin of the Idaho batholith.</p>

Length (km)	11 km.
Average strike	N0°E
Sense of movement	Normal <i>Comments:</i> The Cascade fault is mapped as a normal fault by Newcomb (1970 #3761), Schmidt and Mackin (1970 #512), Mitchell and Bennett (1979 #5894), Fitzgerald (1982 #5886), and Knudsen and others (1996 #5889).
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	The Cascade fault is marked by a degraded 150-m-high alluvially embayed bedrock escarpment along the western margin of Cascade Valley (Knudsen and others, 1996 #5889). Much of the mapped fault trace is covered by alluvial deposits of the North Fork Payette River, but the escarpment is not marked by aligned springs, vegetation lineaments, or triangular facets indicative of young faulting. (Knudsen and others, 1996 #5889).
Age of faulted surficial deposits	The Cascade fault offsets Cretaceous and older crystalline rocks, but does not appear to offset glacial deposits of Pinedale and Bull Lake age (Schmidt and Mackin, 1970 #512; Knudsen and others, 1996 #5889). Schmidt and Mackin (1970 #512) and Knudsen and others (1996 #5889) noted Plio-Pleistocene sediments near Pearsol Creek that are tilted 10° to 20° westward into either the Cascade fault or the southern section of the Long Valley fault zone [628b]. Based on pollen assemblages, these deposits are thought to be glacio-lacustrine sediments associated with a pre-Bull-Lake glacial episode, and thus their deformation reflects a period of deformation some time in the Plio-Pleistocene prior to deposition of Bull-Lake-equivalent deposits (Schmidt and Mackin, 1970 #512; Knudsen and others, 1996 #5889).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> The degraded 150-m-high alluvially embayed bedrock escarpment along the western margin of Cascade Valley may be indicative of Quaternary displacement, but a lack of fault

	<p>scarps in Bull-Lake-equivalent deposits indicates that extensive faulting predates the 140-150 ka age (Colman and Pierce, 1986 #5896) of these deposits. Tilting of glacio-lacustrine sediments associated with a pre-Bull-Lake glacial episode probably reflects a period of deformation some time in the Plio-Pleistocene on either the Cascade fault or the southern section of the nearby Long Valley fault [628b] (Schmidt and Mackin, 1970 #512; Knudsen and others, 1996 #5889). The fault is mapped as a lesser Quaternary (<1.6 Ma) structure by Breckenridge and others (2003 #5878).</p>
<p>Recurrence interval</p>	
<p>Slip-rate category</p>	<p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> Knudsen and others (1996 #5889) used Kinoshita's (1962 #5897) estimate of 900 m of valley-fill sediment, an escarpment height of 150 m, and an age of fault initiation of 10 Ma to estimate a long-term slip rate of 0.1 mm/yr across the Cascade fault. No estimates of Quaternary slip rates have been described.</p>
<p>Date and Compiler(s)</p>	<p>2003 Stephen F. Personius, U.S. Geological Survey Guy W. Adema, Idaho Geological Survey</p>
<p>References</p>	<p>#5878 Breckenridge, R.M., Lewis, R.S., Adema, G.W., and Weisz, D.W., 2003, Miocene and younger faults in Idaho: Idaho Geological Survey Map 8, 1 sheet, scale 1:1,000,000.</p> <p>#5896 Colman, S.M., and Pierce, K.L., 1986, Glacial sequence near McCall, Idaho: Weathering rinds, soil development, morphology, and other relative-age criteria: Quaternary Research, v. 25, p. 25-42.</p> <p>#5886 Fitzgerald, J.E., 1982, Geology and basalt stratigraphy of the Weiser Embayment, west-central Idaho, <i>in</i> Bonnicksen, B., and Breckenridge, R.M., eds., Cenozoic geology of Idaho: Idaho Bureau of Mines and Geology Bulletin 26, p. 103-128.</p> <p>#6040 Hamilton, W., 1963, Metamorphism in the Riggins region, western Idaho: U.S. Geological Survey Professional Paper 436, 95 p.</p> <p>#5897 Kinoshita, W.T., 1962, A gravity survey of part of the Long</p>

Valley district, Idaho: U.S. Geological Survey Open-File Report 62-73, 11 p.

#5889 Knudsen, K.L., Wong, I., Sawyer, T.L., Bott, J., Silva, W., and Lettis, W.R., 1996, Seismotectonic evaluation, Cascade Dam, Boise project, west-central Idaho: Final Report prepared for U.S. Department of the Interior, Bureau of Reclamation, 198 p., 3 pls.

#5894 Mitchell, V.E., and Bennett, E.H., 1979, Geologic map of the Baker quadrangle, Idaho: Idaho Bureau of Mines and Geology Geologic Map Series, Baker 2° quadrangle, 1 sheet, scale 1:250,000.

#3761 Newcomb, R.C., 1970, Tectonic structure of the main part of the basalt of the Columbia River Group Washington, Oregon, and Idaho: U.S. Geological Survey Miscellaneous Geologic Investigations I-587, 1 sheet, scale 1:500,000.

#512 Schmidt, D.L., and Mackin, J.H., 1970, Quaternary geology of Long and Bear Valleys, west-central Idaho: U.S. Geological Survey Bulletin 1311-A, 22 p., 2 pls.

#320 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in Idaho: U.S. Geological Survey Open-File Report 75-278, 71 p. pamphlet, 1 sheet, scale 1:500,000.

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