

# 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](#).

## Tillamook Bay fault zone (Class A) No. 881

Last Review Date: 2017-05-17

*citation for this record:* Personius, S.F., compiler, 2002, Fault number 881, Tillamook Bay 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 03:14 PM.

<b>Synopsis</b>	The Tillamook Bay fault zone is a major northwest-striking fault that offsets the Eocene Tillamook Volcanics on the west flank of the Coast Range. The fault zone about 4 km of down-southwest vertical separation and about 20 km of left-lateral slip displacement in Eocene Tillamook Volcanics. No displacements in Quaternary deposits have been documented, but the fault zone parallels the mountain front that controls the northeastern margin of Tillamook Bay, and thus has geomorphic expression consistent with Quaternary displacement. As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic displacements on this fault are always related to great megathrust earthquakes on the subduction zone, or whether some displacements are related to smaller earthquakes in the North American Plate.
<b>Name comments</b>	The Tillamook Bay fault zone was mapped by Schlicker and others (1972 #4167) Wells and others (1983 #3583; 1994 #3988). The fault was named the Tillamook fault by Goldfinger and others (1992 #446) and mapped and named the Tillamook fault zone by Wells and others (1994 #3988).
<b>County(s) and</b>	

<b>County(s) and State(s)</b>	TILLAMOOK COUNTY, OREGON
<b>Physiographic province(s)</b>	PACIFIC BORDER
<b>Reliability of location</b>	Good Compiled at 1:62,500 scale.  <i>Comments:</i> Location of fault from ORActiveFaults ( <a href="http://www.oregongeology.org/arcgis/rest/services/Public/ORActiveFaults/MapServer">http://www.oregongeology.org/arcgis/rest/services/Public/ORActiveFaults/MapServer</a> downloaded 06/02/2016) attributed to 1:62,500-scale mapping of Wells and others (1994 #3988).
<b>Geologic setting</b>	The Tillamook Bay fault zone is a major northwest-striking fault that offsets the Eocene Tillamook Volcanics on the west flank of the Coast Range uplift (Schlicker and others, 1972 #4167; Wells and others, 1994 #3988). The fault zone has about 4 km down-southwest vertical separation and about 20 kilometers of left-lateral strike-slip displacement in Eocene Tillamook Volcanics (Wells and others, 1994 #3988). This fault has been reported as the projection of strike-slip faults offshore (Goldfinger and others, 1992 #446), but later mapping shows this relationship to be unlikely (Goldfinger and others, 1992 #464; McNeill and others, 1998 #4089). McNeill and others (1998 #4089) infer from structures visible on a north-south seismic reflection profile located about 100 km offshore that Tillamook Bay is underlain by an active syncline, but dip patterns in the bedrock surrounding the bay (Wells and others, 1994 #3988) do not support this inference. As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic displacements on this fault are always related to great megathrust earthquakes on the subduction zone, or whether some displacements are related to smaller earthquakes in the North American Plate.
<b>Length (km)</b>	32 km.
<b>Average strike</b>	N56°W
<b>Sense of movement</b>	Reverse, Left lateral  <i>Comments:</i> Geologic mapping and local slickenside exposures indicate oblique (reverse sinistral) displacement on the Tillamook Bay fault zone (Wells and others, 1994 #3988).
<b>Dip Direction</b>	NE  <i>Comments:</i> No fault dip data are reported (Schlicker and others, 1972 #4167; Wells and others, 1983 #3583; Wells and others, 1994 #3988), but the linear trace and presumed reverse-oblique sense of slip suggest a steep dip. Presumed dip direction is NE assuming oblique (reverse-sinistral), down-southwest displacement on the Tillamook Bay fault zone.

	Bay fault zone (Wells and others, 1994 #3988).
<b>Paleoseismology studies</b>	
<b>Geomorphic expression</b>	The Tillamook Bay fault zone forms and controls the northeast margin of Tillamook Bay (Wells and Snavely, 1992 #4300; Wells and others, 1994 #3988), a large low along the northern Oregon coast. The fault parallels the mountain front between Garibaldi and the Wilson River, suggesting structural control.
<b>Age of faulted surficial deposits</b>	The Tillamook Bay fault zone offsets Miocene and older bedrock units in the vicinity of Tillamook Bay (Schlicker and others, 1972 #4167; Wells and others, 1983 #3583; Wells and others, 1994 #3988). The fault is mapped as buried in older Pleistocene fluvial terrace deposits and Holocene alluvium (Schlicker and others, 1972 #4167; Wells and others, 1983 #3583; Wells and others, 1994 #3988), but Quaternary deposits have not been examined in detail for evidence of offset (R.E. Wells, pers. comm. 2000).
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> Pezzopane (1993 #3544) Geomatrix Consultants, Inc. (1995 #3593), Madin and Mabey (1996 #3575) mapped the Tillamook Bay fault zone as active in the Quaternary (<1.6–1.8 Ma). Given the equivocal evidence for Quaternary displacement, the fault is mapped as Quaternary herein.
<b>Recurrence interval</b>	
<b>Slip-rate category</b>	Less than 0.2 mm/yr <i>Comments:</i> No detailed slip rate data have been published. Given the limited evidence of Quaternary displacement, low rates of slip are likely.
<b>Date and Compiler(s)</b>	2002 Stephen F. Personius, U.S. Geological Survey
<b>References</b>	#3593 Geomatrix Consultants, Inc., 1995, Seismic design mapping, State of Oregon Technical report to Oregon Department of Transportation, Salem, Oregon, under Contract 11688, January 1995, unpaginated, 5 pls., scale 1:1,250,000.  #446 Goldfinger, C., Kulm, L.D., Yeats, R.S., Appelgate, B., MacKay, M.E., and Moore, G.F., 1992, Transverse structural trends along the Oregon convergent margin: Implications for Cascadia earthquake potential and crustal rotations: <i>Geology</i> , v. 20, p. 141-144.

#464 Goldfinger, C., Kulm, L.D., Yeats, R.S., Mitchell, C., Weldon, R., II, Peters C., Darienzo, M., Grant, W., and Priest, G.R., 1992, Neotectonic map of the Oregon continental margin and adjacent abyssal plain: State of Oregon, Department of Geology and Mineral Industries Open-File Report 0-92-4, 17 p., 2 pls.

#3575 Madin, I.P., and Mabey, M.A., 1996, Earthquake hazard maps for Oregon: of Oregon, Department of Geology and Mineral Industries Geological Map Series: GMS-100, 1 sheet.

#4089 McNeill, L.C., Goldfinger, C., Yeats, R.S., and Kulm, L.D., 1998, The effect of upper pl. deformation on records of prehistoric Cascadia subduction zone earthquakes *in* Stewart, I.S., and Vita-Finzi, C., eds., Coastal tectonics: Geological Society Special Publication No. 146, p. 321-342.

#3544 Pezzopane, S.K., 1993, Active faults and earthquake ground motions in Oregon: Eugene, Oregon, University of Oregon, unpublished Ph.D. dissertation, 208 p.

#4167 Schlicker, H.G., Deacon, R.J., Beaulieu, J.D., and Olcott, G.W., 1972, Environmental geology of the coastal region of Tillamook and Clatsop Counties, Oregon: State of Oregon, Department of Geology and Mineral Industries Bulletin 164 p., 18 pls., scale 1:62,500.

#4300 Wells, R.E., and Snavely, P.D., Jr., 1992, Quaternary thrust faulting at Netarts Bay, northern Oregon coast: Geological Society of America Abstracts with Programs v. 24, no. 5, p. 89.

#3583 Wells, R.E., Niem, A.R., MacLeod, N.S., Snavely, P.D., Jr., and Niem, W., 1983, Preliminary geologic map of the west half of the Vancouver (Washington-Oregon) 1 x 2 quadrangle: U.S. Geological Survey Open-File Report 83-591, 1 sheet, scale 1:250,000.

#3988 Wells, R.E., Snavely, P.D., MacLeod, N.S., Kelly, M.M., and Parker, M.J., 1994, Geologic map of the Tillamook Highlands, northwest Oregon Coast Range: U.S. Geological Survey Open-File Report 94-21, 24 p., 2 pls., scale 1:62,500.

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