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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.

unnamed Siuslaw River anticline (Class A) No. 887

Last Review Date: 2002-05-31

citation for this record: **Personius, S.F., compiler, 2002, Fault number 887, unnamed Siuslaw River anticline, 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.**

Synopsis	The unnamed anticline on the Siuslaw River is a north-striking, southward plunging fold that deforms sedimentary rocks of the Eocene Tyee Formation in the forearc of the Cascadia subduction zone. The fold is parallel to numerous folds imaged in the offshore accretionary wedge, and thus may be formed by compression related to ongoing subduction of the Juan de Fuca plate. The Quaternary extent of the anticline is based on deformation of a flight of fluvial terraces that lie 70–120 m above the present channel of the Siuslaw River downstream from Mapleton. The deformed terraces are restricted to the north side of the river, which indicates southward migration of the Siuslaw River channel during the Quaternary; this relationship is consistent with the southward plunging fold geometry; the terrace may correlate to marine terraces near the coast suggesting that most of the terraces were formed >200 ka. As with other folds

	and faults located in the Cascadia forearc, it is unknown if coseismic displacements on this fold 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.
Name comments	This unnamed anticline on the Siuslaw River was first mapped in Eocene bedrock by Baldwin (1956 #4164); the fold is included in some geologic compilations (Walker and Duncan, 1989 #3581; Walker and MacLeod, 1991 #3646), but not others (Schlicker and Deacon, 1974 #4155).
County(s) and State(s)	LANE COUNTY, OREGON
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* The axial trace is from 1:675,000-scale (approximate) figure from Nelson (1992 #4277), modified from 1:62,500-scale mapping of Baldwin (1956 #4164) and Schlicker and Deacon (1974 #4155).
Geologic setting	The unnamed anticline on the Siuslaw River is a north-striking, southward plunging fold that deforms sedimentary rocks of the Eocene Tyee Formation in the forearc of the Cascadia subduction zone. The fold is parallel to numerous folds imaged in the offshore accretionary wedge (Goldfinger and others, 1992 #464), and thus may be formed by compression related to ongoing subduction of the Juan de Fuca plate. As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic displacements on this fold 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.
Length (km)	12 km.
Average strike	N10°W
Sense of movement	Anticline

Dip	6° to 14° *Comments:* The opposing fold limbs dip 6° to 14° to the east and west (Baldwin, 1956 #4164; Schlicker and Deacon, 1974 #4155). The fold is south plunging.
Paleoseismology studies	
Geomorphic expression	The Quaternary extent of the unnamed Siuslaw River anticline is based on deformation of a flight of fluvial terraces mapped on the north side of the Siuslaw River, downstream from Mapleton. Baldwin (1956 #4164) first mapped these terraces, but Schlicker and Deacon (p. 25, 1974 #4155) were the first to recognize that these terrace remnants have a much steeper gradient than the modern river and thus were probably folded or uplifted. Adams (1984 #4120) used the mapping of Schlicker and Deacon (1974 #4155) to profile the western limb of the fold, and attributed the anomalously steep profile to regional seaward tilting of the Coast Range. Personius (1993 #4165) mapped these terraces in more detail, recognized the existence of several sets of deformed terrace surfaces at heights of 70–120 m above the present channel, and demonstrated the eastward folding of terrace remnants on the eastern limb of the anticline. Personius (1993 #4165) also noted the restriction of older terraces to the north side of the river, which indicates southward migration of the Siuslaw River channel during the Quaternary; this relationship is consistent with the southward plunging fold geometry mapped by Baldwin (1956 #4164).
Age of faulted surficial deposits	Young terraces dated to the early Holocene are apparently undeformed, and although undated, the deformed terraces may project to marine terraces at the coast that are probably older than 200 ka (Personius, 1993 #4165). Nelson and Personius (1996 #4128) found no evidence of Holocene or latest Pleistocene deformation along the unnamed Siuslaw River anticline.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* If the deformed fluvial terraces correlate with oxygen isotope stage 7 (>200 ka) marine terrace platforms (Personius, 1993 #4165), then this fold has been active in the middle and late

	Quaternary. Restriction of older terraces to the north side of the river may indicate southward migration of the Siuslaw River channel throughout the Quaternary (Personius, 1993 #4165). The unnamed Siuslaw River anticline is not shown on any regional compilation of Quaternary structures (Goldfinger and others, 1992 #464; Pezzopane, 1993 #3544; Geomatrix Consultants Inc., 1995 #3593; Madin and Mabey, 1996 #3575).
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Personius (1995 #4130) calculated bedrock incision rates of about 0.2 mm/yr and Kelsey and others (1996 #4111) calculated long-term coastal uplift rates of about 0.1 mm/yr in the vicinity of the Siuslaw River; the rate of uplift of the unnamed Siuslaw River anticline must exceed these background or regional rates, and thus is the slip-rate category of 0.2–1.0 mm/yr is assigned.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#4120 Adams, J., 1984, Active deformation of the Pacific northwest continental margin: Tectonics, v. 3, no. 4, p. 449-472. #4164 Baldwin, E.M., 1956, Geologic map of the lower Siuslaw River Area, Oregon: U.S. Geological Survey Oil and Gas Investigations Map OM-186, 1 sheet, scale 1:62,500. #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. #464 Goldfinger, C., Kulm, L.D., Yeats, R.S., Mitchell, C., Weldon, R., II, Peterson, 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. #4111 Kelsey, H.M., Ticknor, R.L., Bockheim, J.G., and Mitchell, C.E., 1996, Quaternary upper pl. deformation in coastal Oregon:

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

#4155 Schlicker, H.G., and Deacon, R.J., 1974, Environmental geology of Coastal Lane County, Oregon: State of Oregon, Department of Geology and Mineral Industries Bulletin 85, 116 p., 3 pls.

#3581 Walker, G.W., and Duncan, R.A., 1989, Geologic map of the Salem 1 by 2 quadrangle, western Oregon: U.S. Geological Survey Miscellaneous Investigations Map I-1893, 1 sheet, scale 1:250,000.

	#3646 Walker, G.W., and MacLeod, N.S., 1991, Geologic map of Oregon: U.S. Geological Survey, Special Geologic Map, 2 sheets, scale 1:500,000.