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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.

Stonewall anticline (Class A) No. 786

Last Review Date: 2002-04-19

citation for this record: **Personius, S.F., compiler, 2002, Fault number 786, Stonewall 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 03:16 PM.**

Synopsis	The north-northwest-striking, west-verging, doubly plunging Stonewall anticline is one of numerous structures in a fold and thrust belt [784] that deforms sediments underlying the continental slope and shelf in the forearc of the Cascadia subduction zone [781]. The fold is located on the continental shelf, in an area underlain by a rigid basement of Siletz River Volcanics (Siletzia terrane); folds in this region have longer wavelengths than the closely spaced folds and faults in the accretionary wedge underlying the continental slope. The Stonewall anticline folds Miocene through Pleistocene sediment, and warps a late Pleistocene sea-level lowstand wave-cut platform and an antecedent drowned stream channel of the Yaquina River. An age range of 11–14.5 ka was assumed for the latter features, so the youngest deformation occurred in the latest Quaternary. As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic deformation on this structure is always

	related to great megathrust earthquakes on the subduction zone, or whether some deformation is related to smaller earthquakes in the overriding North American Plate.
Name comments	The Stonewall anticline is a north-northwest-striking, west-verging anticline mapped, named, and described in detail by Yeats and others (1998 #4085). The Newport syncline is located in the hanging wall of an inferred east-dipping reverse fault that underlies the anticline (Yeats and others, 1998 #4085; McNeill and others, 2000 #5060). Wong and others (1999 #4073; 2000 #5137) included the Stonewall Bank fault in their analysis of earthquake hazards in the Portland area.
County(s) and State(s)	LINCOLN COUNTY, OREGON (offshore) TILLAMOOK COUNTY, OREGON (offshore)
Physiographic province(s)	PACIFIC BORDER (offshore)
Reliability of location	Poor Compiled at 1:500,000 scale. *Comments:* The axial traces are from ~1:1,250,000-scale figure of Yeats and others (1998 #4085).
Geologic setting	The north-northwest-striking, west-verging, doubly plunging Stonewall anticline is one of numerous structures in a fold and thrust belt [784] that deforms sediments underlying the continental slope and shelf in the forearc of the Cascadia subduction zone [781] (Goldfinger and others, 1992 #464; Yeats and others, 1998 #4085). The Stonewall anticline is located on the continental shelf, in an area underlain by the Siletz River Volcanics (Siletzia terrane). Folds in this region have longer wavelengths than the closely spaced folds and faults in the accretionary wedge underlying the continental slope; this pattern is probably controlled by the more rigid basement of the Siletzia terrane (Trehu and others, 1994 #4234; Yeats and others, 1998 #4085; Fleming and Trehu, 1999 #4237; McNeill and others, 2000 #5060). As with other folds and faults located in the Cascadia forearc, it is unknown if coseismic deformation on this structure is always related to great megathrust earthquakes on the subduction zone, or whether some deformation is related to smaller earthquakes in the overriding North American Plate (Goldfinger and others, 1992 #464; Goldfinger, 1994 #3972; Goldfinger and others, 1997 #4090; Yeats and others, 1998

	#4085; McNeill and others, 1998 #4089).
Length (km)	70 km.
Average strike	N13°W
Sense of movement	Anticline *Comments:* The Stonewall anticline plunges to the north and south. Yeats and others (1998 #4085) and McNeill and others (2000 #5060) infer the presence of an east-dipping blind reverse fault beneath the anticline, with the Newport syncline in the hanging wall of the inferred reverse fault.
Dip	65–70° E. *Comments:* The Stonewall anticline plunges to the north and south and is west-vergent, with dips of 25° on the west flank and 15–18° on the east flank (Yeats and others, 1998 #4085). Yeats and others (1998 #4085) infer the presence of a blind reverse fault dipping 65–70° east beneath the anticline. Wong and others (1999 #4073; 2000 #5137) used an inferred dip of 70° northeast in their analysis of earthquake hazards associated with their Stonewall Bank fault.
Paleoseismology studies	
Geomorphic expression	The Stonewall anticline folds Miocene through Pleistocene sediments on the continental shelf; the fold also warps a submerged wave cut platform associated with a late Pleistocene sea-level lowstand, and an antecedent drowned stream channel of the Yaquina River (Yeats and others, 1998 #4085).
Age of faulted surficial deposits	The Stonewall anticline folds Miocene through Pleistocene sediments on the continental shelf; the fold also warps a submerged wave cut platform associated with a late Pleistocene sea-level lowstand, and an antecedent drowned stream channel of the Yaquina (Yeats and others, 1998 #4085; McNeill and others, 2000 #5060). Yeats and others (1998 #4085) used an assumed age range of 11–14.5 ka for these features.
Historic earthquake	
Most recent	latest Quaternary (<15 ka)

prehistoric deformation	*Comments:* The Stonewall anticline warps features associated with the late Pleistocene sea-level lowstand, which Yeats and others (1998 #4085) assigned ages of 11–14.5 ka, indicating most recent deformation in the latest Quaternary.
Recurrence interval	
Slip-rate category	Between 1.0 and 5.0 mm/yr *Comments:* Yeats and others (1998 #4085) used vertical uplift of 10–13 m of the submerged thalweg of the Yaquina River, assumed ages of 11–12 ka, and estimated dip of 65–70° to calculate a post-latest Pleistocene slip rate of 0.9–1.3 mm/yr on the inferred east-dipping blind reverse fault beneath the Stonewall anticline. These short-term rates are comparable to long-term rates of 0.4–0.6 mm/yr or 1.0–1.1 mm/yr, depending on when deformation of the prominent Pliocene-Miocene unconformity was initiated. Wong and others (1999 #4073; 2000 #5137) used slip rates of 0.4–1.3 mm/yr in their analysis of earthquake hazards associated with their Stonewall Bank fault.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
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