Jump to Navigation

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 fault zone near and offshore of Duck Creek (Class A) No. 584

Last Review Date: 2003-09-03

citation for this record: **McCrory, P.A., compiler, 2003, Fault number 584, unnamed fault zone near and offshore of Duck Creek, 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 03:04 PM.**

Synopsis	The unnamed fault zone near and offshore of Duck Creek is a 2-km-wide zone of thrust and reverse faults (McCrory, 1997 #6323; McCrory and others, 2002 #5864). The zone consists of short discontinuous faults and folds that together form a fault zone at least 20 km long. This fault zone is located north of a broader convergent zone associated with a major forearc block boundary. In this region, late Cenozoic structures trend sub-parallel to the continental slope, consistent with contraction related to subduction (McCrory and others, 2002 #5864). The onshore portion of the fault zone displaces late Pleistocene gravels (McCrory, 1997 #6323). The southwestern strand of this zone is an outlier and likely is not part of the fault zone senso stricto.
Name	McCrory and others (2002 #5864) first mapped offshore fault

comments	strands of the unnamed fault zone near and offshore of Duck Creek, based primarily on new USGS high-resolution seismic reflection data (Foster and others, 1999 #6317; 1999 #6318; 2001 #6319) and sidescan-sonar data (McCrory and others, 2003 #6324; McCrory and others, 2003 #6325) collected in 1997 and 1998. The location and interpretation of recent activity on late Cenozoic faults previously mapped in the offshore area (Grim and Bennett, 1969 #6320; Wagner and others, 1986 #5670; Wolf and others, 1997 #6305) are superceded by this more recent publication (McCrory, 1997 #6323; McCrory and others, 2002 #5864). McCrory (1997 #6323) first noted and mapped the onshore fault traces of this fault zone. Onshore faults of this zone cross Duck Creek and extend northwest and southeast of the creek; offshore fault traces extend farther to the north-northwest from the mouth of Duck Creek.
County(s) and State(s)	GRAYS HARBOR COUNTY, WASHINGTON
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Locations of the offshore fault-traces are based on mapping of McCrory and others (2002 #5864) from seismic reflection profiles with 5-km spacing. Two of these traces appear to extend onshore (McCrory, 1997 #6323; McCrory and others, 2002 #5864). Available data are not sufficient to determine the full southeastern extent of the fault zone. For example, an onshore anticlinal structure mapped to the southeast (plate 1A in McCrory and others, 2002 #5864), but not shown herein, might extend this fault zone another 5 km to the southeast.
Geologic setting	North of Cape Elizabeth, structures shift progressively from an east-northeast orientation to a north-northwest orientation across a 6-km-wide area. North-northwest-striking faults of the unnamed fault zone, near and offshore of Duck Creek, occur directly north of that shift in orientations. North of this fault zone, north-northwest-striking faults on the continental shelf generally do not project onshore; rather, they tend to lie offshore subparallel the coastline. The north-northwest orientation of structures in this region is consistent with subduction-related contraction, perhaps driven by interplate coupling far from the deformation front

	(McCrory and others, 2002 #5864). Some faults of this zone and some faults to the north show evidence of ongoing contraction, disrupt the late Pleistocene erosional unconformity, and offset the seafloor. Some of these faults also elevate Neogene bedrock to the seafloor. For example, a fault about 20 km west of the Queets River (plate 2I, shot point 9000 in McCrory and others, 2002 #5864) disrupts the seafloor and underpins local bedrock outcrops along the seafloor.Where north-northwest-striking faults of this region extend onshore, such as those in this fault zone, they displace late Quaternary marine-terrace deposits (McCrory, 1996 #6321; McCrory and others, 2002 #5864) along thrust and reverse faults that have offsets of as much as 0.5 m, with cumulative offsets up to 2 m.
Length (km)	19 km.
Average strike	N35°W
Sense of movement	Thrust *Comments:* Subsidiary faults associated with the two mapped onshore faults of this fault zone show thrust and reverse offsets (McCrory and others, 2002 #5864). Seismic reflection data suggests significant, or pure, dip-slip offset along most or all of these offshore faults and they are inferred to be thrust or reverse faults because of their association with offshore anticlines or with thrust and reverse faults and anticlines mapped onshore (McCrory and others, 2002 #5864). The actual fault planes of the offshore faults, however, cannot be resolved with available seismic reflection data.
Dip	27° SW. to 87° NE. *Comments:* McCrory and others (1996 #6321) report dips for various faults observed onshore, which are associated with the two mapped, onshore fault strands. The two onshore fault strands are mapped as northeast-dipping thrust faults (plate 1A in McCrory and others, 2002 #5864). Seismic reflection data implies down-to-the-southwest dip-slip offsets along three offshore fault strands and down-to-the-south dip-slip along the southwestern (outlier) strand (plates 1A and 2B in McCrory and others, 2002 #5864). These offshore fault strands are inferred to be thrust or reverse faults, based on these apparent dip-slip offsets and their association with mapped thrust and reverse faults and anticlines nearby. Offset directions discussed above, therefore suggest that

	these offshore faults also dip mostly to the northeast, perhaps at low-steep angles like those onshore. The vertical exaggeration of seismic reflection data, however, precludes accurate determination of fault dip (all strands with dips >30? appear to have vertical dips).
Paleoseismology studies	
Geomorphic expression	The onshore fault strands underlie a 13-km-long topographic ridge that rises to 150 m in elevation.
Age of faulted surficial deposits	Late Quaternary onshore (<150 ka). The age of offshore deposits at the seafloor varies across the shelf. Faulted seafloor deposits could be as young as Holocene in areas with active sediment accumulation, however, the sediments exposed at the surface have not been dated directly.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Onshore, the late Quaternary (<150 ka) age assignment is based on offset of marine-terrace deposits along onshore fault strands (McCrory, 1996 #6321). Offshore, latest Quaternary (<20ka) movement is suggested for two offshore fault strands, and late Quaternary (<150 ka) for the other offshore strand (plate 1A in McCrory and others, 2002 #5864). The offshore age estimates above are based on offset or deformation of: (1) the seafloor, considered less than 20 ka; (2) a late Pleistocene erosional surface, estimated to have been cut between 150 and 20 ka; or (3) an early-middle Pleistocene unconformity cut at either 600 ka or 900 ka (McCrory and others, 2002 #5864). Herein these strands are assigned to latest Quaternary and late Quaternary age categories, even though the upper age limits of these categories are <15 ka and <130 ka, respectively.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No information has been reported on rates of slip for these faults. Based mostly on this lack of information, a conservative rate of less than 0.2 mm/yr is tentatively assigned

	herein.
Date and Compiler(s)	2003 Patricia A. McCrory, U.S. Geological Survey
References	#6319 Foster, D.S., McCrory, P.A., and O'Brien, T.F., 2001, Archive of boomer subbottom data collected during USGS cruise MCAR 97013 (M1-97-WO) Washington shelf, 7-14 July, 1997: U.S. Geological Survey Open-File Report 01-048, 3 CD-ROM set. #6317 Foster, D.S., McCrory, P.A., Danforth, W.W., and O?Brien, T.J., 1999, Archive of chirp subbottom data collected during USGS cruise MCAR 98008 (M3-98-WO) Washington shelf, 24 June-5 July, 1998: U.S. Geological Survey Open-File Report 99-591, 2 CD-ROM set. #6318 Foster, D.S., McCrory, P.A., Danforth, W.W., and O?Brien, T.J., 1999, Archive of boomer and sparker subbottom data collected during USGS cruise MCAR 98008 (M3-98-WO) Washington shelf, 24 June-5 July, 1998: U.S. Geological Survey Open-File Report 99-592, 3 CD-ROM set. #6320 Grim, unpublished M.S. thesis, and Bennett, L.C., Jr., 1969, Shallow seismic profiling of the continental shelf off Grays Harbor, Washington: Seattle, University of Washington, Department of Oceanography Special Report 41, p. 72-92. #6321 McCrory, P.A., 1996, Tectonic model explaining divergent contraction directions along the Cascadia margin, Washington: Geology, v. 24, p. 929-932. #6323 McCrory, P.A., 1997, Evidence for Quaternary tectonism along the Washington coast: Washington Geology, v. 25, no. 4, p. 14-20. #6325 McCrory, P.A., Danforth, W.W., Foster, D.S., and O?Brien, T.F., 2001, Archive of the ISIS sidescan sonar and DGPS navigation field data collected on USGS Cruise AR5-97-WO, 6 July-14 July, 1997: U. S. Geological Survey Open-File Report 01-508, 2 DVD-ROM set. #6324 McCrory, P.A., Danforth, W.W., O?Brien, T.F., and Foster, D.S.,, 2003, Archive of the sidescan-sonar data and DGPS navigation data collected during USGS cruise 98008; Washington

	shelf, 24 June-5 July, 1998: U.S. Geological Survey Open-File Report 01-507, 2 DVD-ROM set. #5864 McCrory, P.A., Foster, D.S., Danforth, W.W., and Hamer, M.R., 2002, Crustal deformation at the leading edge of the Oregon Coast Range block, offshore Washington (Columbia River to Hoh River): U.S. Geological Survey Professional Paper 1661-A, 47 p., 2 pls. #5670 Wagner, H.C., Batatian, L.D., Lambert, T.M., and Tomson, J.H., 1986, Preliminary geologic framework studies showing bathymetry, locations of geophysical tracklines and exploratory wells, sea-floor geology and deeper geologic structures, magnetic contours, and inferred thickness of Tertiary rocks on the continental shelf and upper continental slope off southwestern Washington between latitudes 46° N and 48°30'N and from the Washington coast to 125°20'W: Washington State Department of Natural Resources Open-File Report 86-1, 8 p., 6, scale 1:250,000. #6305 Wolf, S.C., Hamer, M.R., and McCrory, P.A., 1997, Quaternary geologic investigations on the inner shelf offshore northern Oregon-southern Washington: U.S. Geological Survey Open-File Report 97-677, 4 sheets, scale 1:500,000.