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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.

Tule Springs Rims fault (Class A) No. 858

Last Review Date: 2002-12-03

citation for this record: **Personius, S.F., compiler, 2002, Fault number 858, Tule Springs Rims 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 03:16 PM.**

Synopsis	This fault parallels and forms the Tule Springs Rims, prominent west-facing escarpments on Miocene volcanic rocks that form the eastern margin of the Alvo Desert basin, a large graben in the Basin and Range of southeastern Oregon. Thre high fault scarps are present in Quaternary deposits along the rim margin at the n end of the fault, but most of the fault is buried by thick eolian sediments that forn ramps downwind of the Alvord Desert playa. Latest movement appears to have occurred in the Holocene along the northern part of the fault.
Name comments	This fault parallels and forms the Tule Springs Rims, prominent west-facing escarpments in Miocene volcanic rocks that form the eastern margin of the Alvor Desert basin. The fault was originally mapped by Russell (1884 #5099), and is included in the Alvord Desert graben faults of Pezzopane (1993 #3544) and the E Alvord graben fault of Geomatrix Consultants, Inc. (1995 #3593). **Fault ID:** This fault is included in fault number 49 of Pezzopane (1993 #3544) a fault number 62c of Geomatrix Consultants, Inc. (1995 #3593).

County(s) and State(s)	HARNEY COUNTY, OREGON
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:50,000 scale. *Comments:* Location of fault from ORActiveFaults (http://www.oregongeology.org/arcgis/rest/services/Public/ORActiveFaults/MapS downloaded 06/02/2016) attributed to 1:50,000-scale mapping of Turrin and othe (1989 #7799).
Geologic setting	This fault parallels and forms the Tule Springs Rims, prominent west-facing escarpments that form the eastern margin of the Alvord Desert basin. The Alvord Desert basin is a graben controlled on the west by large-scale faulting along the S fault zone [856], and on the east by the fault along the Tule Spring Rims. Faulting along the Tule Springs Rims may be a southern extension of faulting along the southeastern margin of Mickey Basin [857]. The region is underlain by Miocene volcanic rocks (Walker and Repenning, 1965 #3559; Brown and Peterson, 1980 # Walker and MacLeod, 1991 #3646).
Length (km)	33 km.
Average strike	N11°E
Sense of movement	Normal *Comments:* Faults in this zone are mapped as normal or high-angle faults by Wall and Repenning (1965 #3559), Brown and Peterson (1980 #3585), Walker and MacLeod (1991 #3646), Pezzopane (1993 #3544), Geomatrix Consultants, Inc. (#3593), and Weldon and others (2002 #5648).
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	This fault parallels and forms the Tule Springs Rims, prominent west-facing escarpments on Miocene volcanic rocks that form the eastern margin of the Alvo Desert. Three-meter-high fault scarps are present on Quaternary deposits along th margin at the north end of the fault, but most of the fault is buried by thick eolian sediments that form sand ramps downwind of the Alvord Desert playa (Walker ar Repenning, 1965 #3559; Walker and MacLeod, 1991 #3646; Lindberg, 1999 #40 Narwold, 1999 #4045). A series of north-south-striking fractures in playa sedime have been described by Cleary and others (1981 #5649) along the north-central p

	the fault; these features may be young fault scarps (Lindberg, 1999 #4037).
Age of faulted surficial deposits	Alluvial fans of Quaternary age are offset along the northern part of the fault (Lindberg, 1999 #4037); if these fans post-date lacustrine deposits in the area, the must be latest Pleistocene or Holocene in age.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* Lindberg (1999 #4037) used the presence of 3-m-high fault scarps on Quaternary deposits along the northern Tule Springs Rims fault to infer Holocene displacement on the fault along the east side of the Alvord Desert. Unfortunately, of the central and southern parts of the fault is buried by young eolian sediments, youngest movement on this part of the fault is difficult to assess. Pezzopane (199 #3544), Geomatrix Consultants, Inc. (1995 #3593), and Weldon and others (2002 #5648) inferred middle or late Quaternary (<700-780 ka) movement on the fault a the Tule Springs Rims.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No slip studies have been performed on the faults in the Mickey Basi Offsets of about 3 m across Quaternary alluvial fans (Lindberg, 1999 #4037) yiel relatively low rates of late Quaternary slip. Cleary and others (1981 #5649) used gravity data to infer displacements of 350 m to greater than 1300 m in Miocene volcanic rocks and Brown and Peterson (1980 #3585) inferred displacements of 6 1200 m in Miocene volcanic rocks; such data yield low rates of long-term slip. Geomatrix Consultants, Inc. (1995 #3593) estimated slip rates of 0.05-0.2 mm/yr preferred rate of 0.1 mm/yr for faults included in their Eastern Alvord graben fau which includes the Tule Springs Rims fault.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#3585 Brown, D.E., and Peterson, N.V., 1980, Preliminary geology and geotherm resource potential of the Alvord Desert Area, Oregon: State of Oregon, Departme Geology and Mineral Industries Open-File Report O-80-10, 57 p., 2 pls., scale 1:250,000. #5649 Cleary, J., Lange, I.M., Qamar, A.I., and House, H.R., 1981, Gravity, isoto and geochemical study of the Alvord Valley geothermal area, Oregon: Geological Society of America Bulletin, Part II, v. 92, p. 934-962.

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#5099 Russell, I.C., 1884, A geological reconnaissance in southern Oregon: U.S. Geological Survey Fourth Annual Report, p. 431-464.

#7799 Turrin, B.D., Griscom, A., Turner, R.L., Lawson, W.A., Buehler, A.R., and Graham, D.E., 1989, Mineral resources of the Alvord Desert and East Alvord Wilderness Study Areas, Harney and Malheur counties, Oregon: U.S. Geological Survey Bulletin 1739-B, 16 p., 1 pl., 1:50,000 scale.

#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.

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#5648 Weldon, R.J., Fletcher, D.K., Weldon, E.M., Scharer, K.M., and McCrory, 2002, An update of Quaternary faults of central and eastern Oregon: U.S. Geolog Survey Open-File Report 02-301 (CD-ROM), 26 sheets, scale 1:100,000.

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