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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.

Split Rock syncline (Class B) No. 778

Last Review Date: 1999-05-20

citation for this record: **Machette, M.N., compiler, 1999, Fault number 778, Split Rock syncline, 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	Some indirect evidence exists for continued Quaternary folding along this syncline. The main evidence for Quaternary deformation is based on anomalous drainage patterns. The syncline was formed during the Miocene and peaked in intensity (of folding) in the Pliocene to early Quaternary. No detailed investigations have been made of this syncline.
Name comments	Named for Split Rock, a low bedrock knob about 3.5 km northeast of U.S. Highway 287 and 15 km northwest of Three Forks, Wyoming. The name Split Rock is used for a variety of features (ranch and mill) in the area. As shown by Geomatrix Consultants (1988 #2973), the trace of the syncline extends from near Gull Canyon at a point 8 km south of Sweetwater Station (on the west), to the Arkansas Basin at a point about 10 km north of the east end of the Ferris Mountains (on the east).
County(s) and	CARBON COUNTY, WYOMING

State(s)	FREMONT COUNTY, WYOMING
Physiographic province(s)	WYOMING BASIN
Reliability of location	Poor Compiled at 1:250,000 scale. *Comments:* The trace of the syncline is poorly defined and based on a reconnaissance map (plate 2) by Geomatrix Consultants (1988 #2973) of the Wyoming Basin at 1:250,000 scale with topographic base. General position is controlled by drainage anomalies and bedding attitudes of pre-Quaternary rock or sediment, hence it is shown as concealed. The syncline was not shown on other regional or state maps at 1:500,000 scale by Witkind (1975 #819) and Geomatrix Consultants (1988 #2980), and at 1:1,000,000 scale by Case and others (1997 #3449).
Geologic setting	The Split Rock syncline is long, gently curving asymmetric downwarp that extends north of but subparallel to the South Granite Mountains fault system [779] and along the south side of the Sweetwater Arch. The syncline is about 125 km long and as much as 45 km wide (Love, 1970 #3445). It skirts the northern margins of Crooks Mountain (on the west), the Green Mountains, and the Ferris Mountains (on the east). Its spatial relation with the South Granite Mountains fault system [779] implies a causal relationship, although this has not been proven.
Length (km)	76 km.
Average strike	N82°W
Sense of movement	Syncline
Dip Direction	N; S *Comments:* Axis of fold is generally west-east and south limb is more steeply dipping than north limb.
Paleoseismology studies	
Geomorphic expression	Forms gentle fold that controls local drainages. The main evidence for its existence as a Quaternary structure is based on drainage patterns. Many streams flowing north from Crooks Mountain and the Green Mountains empty into internally drained

	basins south of the Sweetwater River rather than flowing into the river (Love, cited in Geomatrix Consultants, 1988 #2973). Love interpreted this relationship as showing that the tributary drainages have been influenced by Quaternary deformation (subsidence) of the Split Rock syncline. However, a contrarian position is taken by Geomatrix Consultants (1988 #2980) and Cheryl Jaworowski (written commun., 2000). They argue that the unusual drainage pattern is a result of stream infiltration into underlying poorly consolidated Miocene sandstone and overlying Quaternary deposits and from impoundment by discontinuous eolian deposits that flank the Sweetwater River. On the basis of these contrasting interpretations, we consider the Split Rock syncline to be a suspect, but unproven Class B (Quaternary?) structure.
Age of faulted surficial deposits	Miocene and Pliocene rock and (presumably) early Quaternary sediment.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Based on unusual Quaternary drainage patterns that are inferred to be the result of Quaternary folding.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* A slow uplift (or subsidence) rate is inferred by compiler on the basis possible pre-Quaternary movement, on activity rates for other late Quaternary faults in the region and slip rate on the South Granite Mountains fault system [779], which may be spatially related to the syncline.
Date and Compiler(s)	1999 Michael N. Machette, U.S. Geological Survey, Retired
References	#3449 Case, J.C., Larsen, L.L., Boyd, C.S., and Cannia, J.C., 1997, Earthquake epicenters and suspected active faults with surficial expression in Wyoming: Geological Survey of Wyoming Preliminary Hazards Report 97-1, 1 sheet, scale 1:1,000,000.

	#2973 Geomatrix Consultants, Inc., 1988, Northwestern Wind River Basin seismotectonic evaluation: Technical report to U.S. Department of Interior, Bureau of Reclamation, Denver, under Contract 6-CS-81-07310, 116 p., 3 pls. #2980 Geomatrix Consultants, Inc., 1988, Wyoming Basin geomorphic province seismotectonic evaluation: Technical report to U.S. Department of Interior, Bureau of Reclamation, Denver, under Contract 6-CS-81-07310, 167 p., 2 pls. #3445 Love, J.D., 1970, Cenozoic geology of the Granite Mountain area, central Wyoming: U.S. Geological Survey Professional Paper 495-C, 154 p., 10 pls. #819 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in Wyoming: U.S. Geological Survey Open-File Report 75-279, 35 p. pamphlet, 1 sheet, scale 1:500,000.