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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.

Joseph Flats area faults and syncline (Class B) No. 2468

Last Review Date: 1999-10-01

Compiled in cooperation with the Utah Geological Survey

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Synopsis	Poorly understood transverse structures in the Joseph Flats area. Thin-skinned deformation argues against the potential for large earthquakes on these structures within the upper plate. The deformational history and earthquake potential of the postulated transverse zone may have little relevance for major structures (the Elsinore and Dry Wash faults) that extend to the north and south. Therefore, we consider these structures to be Class B features. However, The seismically active Elsinore area experienced five magnitude 5+ earthquakes (in 1910 and 1921), and is one of the few areas in Utah where seismicity coincides with mapped

	Quaternary structures
Name comments	**Fault ID:** Refers to fault number 9-9 of Hecker (1993 #642).
County(s) and State(s)	SEVIER COUNTY, UTAH
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:50,000 scale. *Comments:* Mapped or discussed by Callaghan and Parker (1961 #4558), Anderson and Miller (1979 #4494), Cunningham and others (1983 #4495), Arabasz and Julander (1986 #421), and Anderson and Barnhard (1992 #612). Fault traces from mapping of Callaghan and Parker (1961 #4558) and Cunningham and others (1983 #4495).
Geologic setting	Transverse fault and syncline in the Joseph Flats area. The alluvial basin beneath Joseph Flats may be related to the southward projection of the syncline (mapped at the southern end of the Pavant Range), and may represent sagging adjacent to the northern terminus of the left-lateral Dry Wash fault [2496]. A 1981 cluster of microearthquakes centered in the area of Quaternary deformation had focal mechanisms associated with predominately dip-slip faulting and a depth distribution consistent with seismic reflection evidence of a shallow (5-km deep) zone of detachment beneath the area (Arabasz and Julander, 1986 #421). Thin-skinned deformation argues against the potential for large earthquakes on faults within the upper plate. The deformational history and earthquake potential of the postulated transverse zone may have little relevance for major structures (the Elsinore and Dry Wash faults) that extend to the north and south.
Length (km)	4 km.
Average strike	N38°E
Sense of movement	Left lateral *Comments:* A gravity profile shows a gravity low beneath the central portion of the basin and no anomaly at the fault, consistent with a synclinal origin for the basin and a predominately strike-

	slip origin for the fault. Focal mechanism data indicate both left- and right-lateral slip on a northeasterly trending nodal plane, but right-lateral slip is considered anomalous and not reflective of a regional stress field (Arabasz and Julander, 1986 #421).
Dip Direction	NW
Paleoseismology studies	
Geomorphic expression	Accommodation of deformation within the juncture between the incompatible Dry Wash [2496] and Elsinore [2470] faults implies the presence of a transverse structure buried beneath the alluvial gap between Joseph Flats and the Sevier Valley. The northern end of the Dry Wash fault shows a significant component of dip-slip displacement, although the fault lies on-strike with the Elsinore fault, which has an opposing sense of vertical displacement. In this area, tilted remnants of four stream terraces (Callaghan and Parker, 1961 #4558) show increasing eastward tilts with age; an anomalous channel pattern (abrupt change from reticular to sinuous/braided) where the Sevier River crosses the projection of the fault indicates recent uplift, perhaps related to compression at the terminus of the left-lateral fault. A 3-m-high scarp ~0.5 km southeast of the Dry Wash fault is formed on the youngest terrace.
Age of faulted surficial deposits	Middle and late Quaternary.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:*
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* By assigning a range of ages to the tilted terraces and the underlying tilted Miocene to Pleistocene Sevier River Formation and dimensions to the rotated block, Anderson and Barnhard (1992 #612) computed uplift rates ranging from 0.1 to 1.0 mm/yr, with values near the low end assumed to be most

	reasonable. Thus we categorize the fault sand associated syncline as having slip or uplift rates of <0.2 mm/yr.
Date and Compiler(s)	1999 Bill D. Black, Utah Geological Survey Suzanne Hecker, U.S. Geological Survey
References	#4494 Anderson, L.W., and Miller, D.G., 1979, Quaternary fault map of Utah: Long Beach, California, Fugro, Inc, 35 p. pamphlet, scale 1:500,000. #612 Anderson, R.E., and Barnhard, T.P., 1992, Neotectonic framework of the central Sevier Valley area, Utah, and its relationship to seismicity, *in* Gori, P.L., and Hays, W.W., eds., Assessment of regional earthquake hazards and risk along the Wasatch front, Utah: U.S. Geological Survey Professional Paper 1500, p. F1-F47. #421 Arabasz, W.J., and Julander, D.R., 1986, Geometry of seismically active faults and crustal deformation within the Basin and Range-Colorado Plateau transition in Utah, *in* Mayer, L., ed., Extensional tectonics of the southwestern Unites States—A perspective on processes and kinematics: Geological Society of America Special Paper 208, p. 43-74. #4558 Callaghan, E., and Parker, R.L., 1961, Geologic map of the Monroe quadrangle, Utah: U.S. Geological Survey Geologic quadrangle Map GQ-155, scale 1:62,500. #4495 Cunningham, C.G., Steven, T.A., Rowley, P.D., Glassgold, L.B., and Anderson, J.J., 1983, Geologic map of the Tushar Mountains and adjoining areas, Marysvale volcanic field, Utah: U.S. Geological Survey Miscellaneous Investigations Map I-1430, scale 1:50,000. #642 Hecker, S., 1993, Quaternary tectonics of Utah with emphasis on earthquake-hazard characterization: Utah Geological Survey Bulletin 127, 157 p., 6 pls., scale 1:500,000.