

# 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](#).

## Needles graben faults (Class A) No. 1011

Last Review Date: 1998-02-03

### Compiled in cooperation with the Arizona Geological Survey

*citation for this record:* Pearthree, P.A., compiler, 1998, Fault number 1011, Needles graben faults, 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 02:19 PM.

<b>Synopsis</b>	The Needles graben faults are located along the west side of the Black Mountains, which are on the east side of the Mohave Valley along the Colorado River in the Basin and Range province of west-central Arizona. The small, shallow, short, asymmetric graben is formed on Quaternary alluvium. Maximum surface displacement of lower to middle Pleistocene alluvium across the main eastern fault is about 4 m. Middle to upper Pleistocene alluvium is displaced less than 2 m, and upper Pleistocene alluvium is not faulted. Analysis of fault scarp morphology suggests a late Pleistocene age for the youngest faulting event.
<b>Name</b>	Originally identified by Metzger and Loeltz (1973 #2099); also

<b>comments</b>	reported by Bechtold and others (1973 #2094). Mapped, named, and investigated further by Purcell and Miller (1980 #2096); investigated by Menges and Pearthree (1983 #2073), Pearthree and others (1983 #2083), and Anderson and O'Connell (1993 #1440).
<b>County(s) and State(s)</b>	MOHAVE COUNTY, ARIZONA
<b>Physiographic province(s)</b>	BASIN AND RANGE
<b>Reliability of location</b>	Good Compiled at 1:250,000 scale.  <i>Comments:</i> Trace mapped on 1:130,000-scale aerial photographs, transferred to 1:250,000-scale topographic base.
<b>Geologic setting</b>	The Needles Graben is located in the Basin and Range province of west-central Arizona. It is west of the Black Mountains, on the east side of the Mohave Valley along the Colorado River. The graben faults displace Quaternary alluvium that probably ranges in age from early Pleistocene to middle to late Pleistocene.
<b>Length (km)</b>	4 km.
<b>Average strike</b>	N31°W
<b>Sense of movement</b>	Normal  <i>Comments:</i> Inferred from surface displacement and regional geologic relations.
<b>Dip Direction</b>	NE; SW
<b>Paleoseismology studies</b>	
<b>Geomorphic expression</b>	Faulting has generated a fairly low, gentle southwest-facing piedmont fault scarp, and smaller northeast-facing scarps. A shallow, narrow trough has formed between the scarps. Fault scarps on early Pleistocene alluvial fans on the east side of the graben are as much as 6 m high, whereas they are less than 2 m high on an adjacent middle to late Pleistocene alluvial fan.
<b>Age of faulted surficial</b>	Early Pleistocene, middle to late Pleistocene. Age estimates are based on soil development and surficial characteristics of the

<b>deposits</b>	deposits.
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	late Quaternary (<130 ka) <i>Comments:</i> Middle to upper Pleistocene deposits are faulted but Holocene to some upper Pleistocene deposits are not faulted. Analysis of scarp morphology (based on 14 scarp profiles) suggested a late Pleistocene age of youngest faulting (Pearthree and others, 1983 #2083).
<b>Recurrence interval</b>	
<b>Slip-rate category</b>	Less than 0.2 mm/yr <i>Comments:</i> A low slip rate is inferred based on about 4 m of vertical displacement in the middle and late Quaternary (about the past 500 k.y.).
<b>Date and Compiler(s)</b>	1998 Philip A. Pearthree, Arizona Geological Survey
<b>References</b>	#1440 Anderson, L.W., and O'Connell, D.R., 1993, Seismotectonic study of the northern portion of the lower Colorado River, Arizona, California, and Nevada: U.S. Bureau of Reclamation Seismotectonic Report 93-4, 122 p., 3 sheets.  #2094 Bechtold, I.C., Liggett, M.A., and Childs, J.F., 1973, Remote sensing reconnaissance of faulting in alluvium, Lake Mead to Lake Havasu, California, Nevada, and Arizona, <i>in</i> Moran, D.E., ed., Geology, seismicity and environmental impact: Association of Engineering Geologists Special Publication, p. 157-161.  #2073 Menges, C.M., and Pearthree, P.A., 1983, Map of neotectonic (latest Pliocene-Quaternary) deformation in Arizona: Arizona Geological Survey Open-File Report 83-22, 48 p., scale 1:500,000.  #2099 Metzger, D.G., and Loeltz, O.J., 1973, Geohydrology of the Needles area, Arizona, California, and Nevada: U.S. Geological Survey Professional Paper 486-J, 54 p.  #2083 Pearthree, P.A., Menges, C.M., and Mayer, L., 1983,

Distribution, recurrence, and possible tectonic implications of late Quaternary faulting in Arizona: Arizona Geological Survey Open-File Report 83-20, 51 p.

#2096 Purcell, C., and Miller, D.G., 1980, Grabens along the lower Colorado River, California and Arizona, *in* Fife, D.L., and Brown, A.R., eds., *Geology and mineral wealth of the California desert*: South Coast Geological Society, p. 475-484.

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