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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.

Faults of Thebes Gap area, English Hill fault zone (Class A) No. 1027a

Last Review Date: 1997-11-17

citation for this record: **Harrison, R.W., compiler, 1997, Fault number 1027a, Faults of Thebes Gap area, English Hill fault zone, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, https://earthquakes.usgs.gov/hazards/qfaults, accessed 01/04/2021 10:24 AM.**

Synopsis	**General:** Quaternary faulting at English Hill was first recognized in the early 1940s and described as a northeast-striking graben that down dropped the late Wisconsinan Peoria Loess (Stewart, 1942 #2825). No further investigations were made on faulting at English Hill until the 1990s when the U.S. Geological Survey (USGS) and the Missouri Department of Natural Resources/Division of Geology and Land Survey (MDNR/DGLS) began cooperative studies in the area. These studies included trenching and geophysical investigations. Quaternary faulting along the Commerce fault was first recognized in 1994 from exposures in a road cut in Commerce, Missouri; the Happy Hollow fault and Sassafras Canyon faults were discovered in 1997 from fault-exploration trenching; and Quaternary faulting along the Albrecht Creek fault was discovered from detailed geologic mapping in 1994. The possibility of Quaternary faulting

	at the intersection of the English Hill and Albrecht Creek faults was raised by detailed geologic mapping and was substantiated by the Lambert trench. **Sections:** This fault has 6 sections. The faults discussed in detail in the following sections are part of a complex network of faults mapped by Harrison (1999 #2821). The individual "sections" described below are not sections of a single, continuous fault, but rather are descriptions of parts of individual faults that are members of this complex system. The lengths of these individual faults is difficult to determine because they are part of an array of subparallel and interconnected faults that merge and diverge along strike. Because of these complex relations, it is difficult, if not impossible, to clearly identify terminations of specific faults. The major faults in the complex system of faults in the Thebes Gap area trend north-northeasterly to northeasterly, but the converging and diverging character of the individual faults makes it difficult to identify termination points and thus compute an average strike.
Name comments	**General:** The individual named faults discussed here are not sections of a single long fault. Instead, they are individual strands in a fault complex. They have different strikes, dips, slip senses, and slip histories, and they are only the best studied faults in an unnamed complex of named and unnamed faults that covers most of two adjacent 7.5-minute quadrangles. Most individual faults in the fault complex, and the longest faults, strike northeasterly to north-northeasterly, but numerous shorter cross faults strike easterly and northwest. Several Quaternary faults occur in the Thebes Gap area. The better known faults recognized to date are: English Hill fault zone, Commerce fault, Happy Hollow fault, Sassafras Canyon faults, Albrecht Creek fault, and Lambert trench at intersection of English Hill and Albrecht Creek faults.
County(s) and State(s)	SCOTT COUNTY, MISSOURI ALEXANDER COUNTY, ILLINOIS
Physiographic province(s)	COASTAL PLAIN
Reliability of location	Good Compiled at 1:172,000 scale. *Comments:* The fault zone was mapped at a scale of 1:24,000 by Harrison (1999 #2821). Fault locations in trenches, cut banks, and road cuts are well known; extensions along strike are poorly constrained because of dense vegetation, extensive colluvial

	sedimentation, and the blanket-like nature of Quaternary loess that covers the area.
Geologic setting	The Thebes Gap area is located at the head of the Mississippi Embayment, approximately 15–20 miles north of the New Madrid seismic zone. Numerous north-north-east- to northeast-striking strike-slip faults and associated normal faults, high-angle reverse faults, folds, and transtensional pull-apart grabens have been recognized in the area (Harrison and Schultz, 1994 #2822; Harrison, 1999 #2821; Harrison and others, 1999 #3415). These structures have had a long-lived and complex Phanerozoic tectonic history. Fault-zone kinematics indicate an overall right-lateral sense of movement on the north-northeast- to north-east-striking faults. However, individual faults typically display complex patterns. Step-overs in displacement between different strands have produced zones of transtension and transpression.
Length (km)	km.
Average strike	
Sense of movement	Various *Comments:* Strike-slip, thrust, normal, and high-angle reverse faults are all represented at English Hill (Harrison and others,1997 #2823; 1999 #3415; Nelson and others,1999 #3918).
Dip Direction	NW; SE; NE; V *Comments:* Harrison and others (1999 #3415) and Nelson and others (1999 #3918) report dips of 8–90°.
Paleoseismology studies	English Hill site (1027-2): Location given here is the approximate center of the English Hill site and its 11 trenches at 37?08'N., 89?30'W.; center W1/2, sec. 34, T. 29 N., R. 14 E.(Palmer and others, 1997 #1364; Harrison and others, 1997 #2823; Palmer and others, 1997 #2824; Nelson and others, 1999 #3918).
Geomorphic expression	Subtle breaks in slope observed along some faults at English Hill.
Age of faulted surficial deposits	At least six and possibly seven Quaternary fault episodes are recognized at English Hill (Harrison and others, 1997 #2823; 1999 #3415). Faulted deposits include Pliocene-Pleistocene Mounds Gravel, Sangamon Geosol, Wisconsinan Roxana Silt, late

	Wisconsinan Peoria Loess, and Holocene colluvial-wedge deposits. The identification of faulted loesses was confirmed by thermoluminescence dating (Harrison and others, 1997 #2823; Nelson and others, 1999 #3918). Faulted Holocene colluvial-wedge material contains charcoal that has yielded bimodal 14C ages: eight samples from 4,980-4,740 yr BP and 1,310-1,210 yr BP (Harrison and others, 1999 #3415).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:*
Recurrence interval	*Comments:* No individual earthquakes have been recognized, so no recurrence interval can be calculated.
Slip-rate category	Less than 0.2 mm/yr *Comments:* No slip rate has been reported. However, a sustained slip rate of 0.2 mm/yr would produce a cumulative slip of more than 2 m in Holocene time, which should leave a detectable geologic record. In the absence of any significant geomorphic expression of the fault, a slip rate of less than 0.2 mm/yr seems likely.
Date and Compiler(s)	1997 Richard W. Harrison, U.S. Geological Survey
References	#2821 Harrison, R.W., 1999, Geologic map of the Thebes 7.5-minute quadrangle, Illinois and Missouri: U.S. Geological Survey Geologic quadrangle Map GQ-1779, scale 1:24,000. #2822 Harrison, R.W., and Schultz, A., 1994, Strike-slip faulting at Thebes Gap, Missouri-Illinois—Implications for New Madrid tectonism: Tectonics, v. 13, no. 2, p. 246-257. #3415 Harrison, R.W., Hoffman, D., Vaugn, J.D., Palmer, J.R., Wiscombe, C.L., McGeehin, J.P., Stephenson, W.J., Odum, J.K., Williams, R.A., and Forman, S.L., 1999, An example of neotectonism in a continental interior—Thebes Gap, Midcontinent, United States: Tectonophysics, v. 305, no. 1-3, p. 399-417.

	#2823 Harrison, R.W., Palmer, J.R., Hoffman, D., Vaughn, J.D., Forman, S.L., McGeehin, J., and Frederiksen, N.O., 1997, Profiles and documentation of fault-exploration trenches in the English Hill area, Scott City 7.5-minute quadrangle, Missouri: U.S. Geological Survey Open-File Report 97-474, 111 p. #3918 Nelson, W.J., Harrison, R.W., and Hoffman, D., 1999, Neotectonics of the northern Mississippi embayment: Illinois State Geological Survey Guidebook 30, 34 p. #2824 Palmer, J.R., Hoffman, D., Stephenson, W.J., Odorn, J.K., and Williams, R.A., 1997, Shallow seismic reflection profiles and geologic structure in the Benton Hills, southeast Missouri: Engineering Geology, v. 46, p. 217-233. #1364 Palmer, J.R., Shoemaker, M., Hoffman, D., Anderson, N.L., Vaughn, J.D., and Harrison, R.W., 1997, Seismic evidence of Quaternary faulting in the Benton Hills area, southeast Missouri: Seismological Research Letters, v. 68, p. 650-661. #2825 Stewart, D.R., 194, The Mesozoic and Cenozoic geology of southeastern Missouri: Missouri Division of Geology and Water Resources, 115 p.