

SOURCE AREA DELINEATION OF RUSSELL CAVE NATIONAL MONUMENT AND CHICKAMAUGA AND CHATTANOOGA NATIONAL MILITARY PARKS

*Brian D. Sakofsky
Nicholas Crawford Ph.D.
Center for Cave and Karst Studies
Department of Geography & Geology
Western Kentucky University*

Abstract

In an effort to better understand groundwater flow under two of its national parks, the National Park Service gave a grant to the Center for Cave and Karst Studies to conduct a source-area delineation for Lookout Mountain National Military Park and Russell Cave National Monument. Both sites have similar karst landscapes and geologic stratigraphy. Lookout Mountain is a synclinal mountain that lies within the Folded Appalachians. Its stratigraphy mimics that of the nearby Cumberland Plateau. The caves tend to be oriented along the strike and there are numerous vertical shafts where cave streams drop off resistant stratigraphic layers. Russell Cave National Monument lies within Doran Cove, Alabama and Tennessee, and has near-horizontal structure and Cumberland Plateau stratigraphy. Cave streams drop off the same resistant stratigraphic layers and tend to flow through caves that follow stress-relief fractures that parallel the valley walls.

Dye tracer tests in the vicinity of Russell Cave showed that the watershed for Russell Cave encompasses all of Doran Cove. Tracer tests atop Lookout Mountain indicate that cave streams are trapped by the synclinal structure of Lookout Mountain and flow along the strike. The cave streams take a stair-step pattern as they breach confining layers and descend through the Pennington, Bangor, and Monteagle Limestones. This hydrogeologic research has identified the major flow routes of the karst aquifers under Lookout Mountain and Doran Cove, and has also delimited the drainage basins (source areas) for the major cave streams and springs.

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