



Classification and Delineation of Subsurface Karst Potential Using Electrical Resistivity in the Manning and Shell Mountain Regions, Fort Hood Military Installation, Texas

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ABSTRACT

The Fort Hood Military Installation is home to one of the largest active duty military post in the United States. Located in the Lampasas Cut Plain in Coryell County, Texas, the installation covers an area of over 880 and is characterized by Lower Cretaceous carbonates from the Trinity and Fredericksburg groups. In the western section, the Manning and Shell Mountain regions are used for advanced military training exercises such as live fire testing and heavy vehicle maneuvering. Scientific research by range managers in the Fort Hood training areas have identified a significant number of surficial and subsurface karst features including caves, shelter caves, sinks, and springs. Recent studies have employed remote sensing and geoanalytical methods to create geographically referenced databases of potential karst depressions, many associated with known features.

This study utilized electrical resistivity to characterize and delineate subsurface karst potential associated with known surface phenomena in the Manning and Shell Mountain regions. Cave maps from the Division of Natural Resource Management at Fort Hood were used to identify inaccessible subsurface voids or infilled passages that could not be explored by traditional cave mapping exercises. Resistivity surveys were conducted using two types of geophysical equipment: the AGI SuperSting using the Wenner array method were used at study sites with adequate soil cover for electrode penetration; for areas with significant exposed bedrock, the Geometrics OhmMapper was utilized. Results from these surveys support a significant presence of subsurface karst features associated with existing caves and surficial depressions, and are potentially related to a widespread network of interconnected void space. These data will provide insight for future research in karst landscapes, and support range management plans for military training and natural resource management.