

Abstract

Sinkholes are naturally occurring geologic phenomena which form when karst erosion causes the surface to collapse. Karst formations can be found globally as a result of water eroding soluble bedrock which creates features such as fissures, caves, and sinkholes. In the United States, every state except Rhode Island has the presence of karst terrain and, therefore, the potential of developing sinkholes. Sinkhole formation can negatively impact society, manifesting mostly as property damage, and in some tragic cases, causing a loss of life. There is a lack of protocols for tracking and recording sinkhole events data nationally. The sinkhole inventories that are available do not include all sinkhole activity and are primarily found among different State Geological Surveys (SGS) databases.

The objective of this thesis was to create a single unified geodatabase (UG) schema based on existing SGS sinkhole databases. The majority of SGS sinkhole data is in the public domain and is of an authoritative source while only two states are utilizing Volunteered Geographic Information (VGI). Two states, in particular, Florida and Kentucky, influenced the geodatabase design because of their developed structure and relative completeness respectively. The proposed UG combines authoritative and VGI elements from multiple databases. It is composed of two feature classes and three tables that are joined by primary and foreign keys. Additional design elements stem from database design theory and sinkhole research studies. The geodatabase design was tested by implementing a prototype database for a portion of Florida. The design was evaluated against the needs of three potential user communities: geologists, insurance fraud investigators, and the general public. Based on these fundamentals, a single UG template was created that can be implemented at the SGS level, and lay the foundations for a national geodatabase in the future.