Land Use and Water Quality Threats to the Mammoth Cave Karst Aquifer, Kentucky

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Abstract

Threats to the health of karst ecosystems, including the Mammoth Cave Karst Aquifer, come from a variety of agricultural, urban, and transportation land use practices. For the Mammoth Cave Karst Aquifer, the U.S. Fish and Wildlife Service has funded the Center for Cave and Karst Studies to:

- classify land use,
- perform a dye-trace investigation to determine if the hydrologic network of the eastern end of the Mammoth Cave System extends into a fourth major drainage basin,
- develop a GIS (Geographic Information System) as a data storage and retrieval tool, and
- investigate potential protection strategies for these areas.

Anderson Level III land use classification at 1:24,000 scale was conducted for 375 square kilometers comprising the Turnhole Bend Basin, Echo River Basin, Pike Spring Basin, Mile 205.7 Spring Basin, Suds Basin, and intermediate drainage areas. Within the Mammoth Cave Karst Aquifer:

182 square kilometers is Forestland
171 square kilometers is Agricultural
19 square kilometers is Urban and Built-up
2,000 square kilometers is Water
1 square kilometer is Barren land.

Suds and Mile 205.7 Spring Basins were included in the study area because they were potential outlets for the dye trace. The results from the dye trace in the northeast portion of Mammoth Cave are pending, but an intermediate receptor within the Pike Basin has already shown positive. A dye trace near Candlelight River conducted within this study emerged at Floating Mill Hollow Spring, thus identifying a new spring basin that communicates with known passages in the Mammoth Cave System. ArcView GIS was used to catalog and analyze the results of the land use classification.