AN ABSTRACT OF A THESIS

AN INVESTIGATION OF WATER QUALITY IN TWO CAVE SYSTEMS LOCATED IN TENNESSEE'S HIGHLAND RIM PHYSIOGRAPHIC PROVINCE

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The water quality in two cave systems was investigated and compared against each other and against the water quality of associated Level IV subecoregion reference streams. One cave is set in an undeveloped area of Putnam County, Tennessee, and the other in the vicinity of development associated with Clarksville, Tennessee. Both cave systems are located in the physiographic region known as the Highland Rim.

Water samples were collected and field parameters measured over a three-year period. These water samples were analyzed according to a suite of inorganic, organic, and general water quality constituents. Statistical and graphical analytical tools were utilized to compare these systems. Organic constituents were rarely detected.

The statistical water quality of samples collected from these cave systems was found to be statistically different for several inorganic constituents, general water quality constituents, and field parameters both between the caves and between the Level IV subecoregions associated with each cave system and its recharge area. It appears that the water quality of Level IV subecoregion reference streams cannot be assumed to be reflective of the water quality in either cave system or the spring. Many of the constituents and field parameters identified as being statistically different between Dunbar Cave and Bridge Creek Cave have been linked to developed land use, including agriculture. In these cases, the water quality in Dunbar Cave most resembled water quality affected by development and farming.