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TRAJECTORIES OF WATER QUALITY PARAMETERS AND ENDANGERED BIOTA IN CAVE SPRINGS CAVE, ARKANSAS

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ABSTRACT

The Ozark Plateaus are a karst physiographic region with many caves that harbor troglobites (obligate cave fauna), some of which are rare and endangered. Cave Springs Cave, in Benton County, Arkansas, contains several of these animals including Ozark Cavefish (*Amblyopsis rosae*), a cave amphipod (*Stygobromus ozarkensis*), and gray bats (*Myotis grisescens*). Monitoring of these species during the past two decades has revealed an increase in cavefish, possible extirpation of the amphipod, and a decrease in numbers of gray bats during this time. Concurrently, the water quality has declined. Statistically significant trends of increase in conductivity, nitrate, zinc, and lead occurred. Several metals are present in toxic concentrations in the water, sediments, and tissues of troglophilic (facultative cave fauna) crayfish (*Orconectes punctimanus*). The phthalates DEP and DEHP, which are thought to be carcinogens and hormone disruptors, are present in the water and crayfish tissue. No pesticides have been detected in the cave water, crayfish tissue, or bat guano. Fecal coliform densities regularly exceed Arkansas' water quality standards in samples collected upstream of the area where bats roost. Furthermore, concentrations of nutrients, metals, and total coliform bacteria were highest during storm flows. This indicates that pollution of the ground water may originate from land application of confined animal wastes (primarily poultry lifter) or from septic system leachate in the recharge area of this cave spring. Reduction or cessation of the land application of municipal sewage sludge and confined animal waste in cave recharge zones is recommended.