
FORUM: PERSISTENT COLIFORM CONTAMINATION IN LECHUGUILLA CAVE POOLS

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As an active explorer, surveyor and student of Lechuguilla Cave from 1986 to 1999, I am concerned about some of the recommendations in Hunter *et al.* (2000) (*JCKS* 66(3), 102-110). The paper states that "...Red Lake...has been closed for several years due to coliform contamination...Lechuguilla's drinking pools are few and far between and should be regarded as both valuable drinking water resources and research study sites. If coliform contamination in these environments persists, then the resources may have to be put off limits to avoid negative human health and safety issues. Alternative methods for controlling coliform introduction and amelioration of the techniques employed to obtain drinking-water from cave pools may make such draconian measures unnecessary. However, such management decisions are complex."

I do not understand why any water sources should be put off limits on the grounds of microbial risk to cavers' health and safety. Should not simple iodine disinfection or other water purification systems (recommended later in the paper in any case) be sufficient to render any Lechuguilla Cave water safe for drinking? The continued, and in my opinion unnecessary, closure of the campsite using Red Lake water has had significant negative effects. It has made survey trips to the west end of the cave two hours longer from camp, thus reducing surveyor productivity, increasing physical impact on the travel route, and increasing caver fatigue, which makes accidents more likely.

Some of the amelioration methods suggested by Hunter *et al.*'s study (notably changing water collection tubing to silicone or Teflon) are valuable and can be implemented without undesirable effects. Others are problematic—particularly "packing out all fecal and urine waste in properly sealed containers would also help reduce new sources of contamination."

Fecal waste is already routinely packed out, and has been since early in the exploration. Packing out urine, however, has not been required because it would place an excessive burden on explorers. Individuals' urine-production rates vary widely, but range up to more than a gallon per 24 hours, so on a typical six-day camp trip, a caver could need to store and haul out up to 50+ pounds of urine, which is more weight than the entire load that most cavers carry *into* the cave. Such a requirement would overburden or exclude those who couldn't handle this, and/or encourage minimal fluid consumption, again with undesirable productivity, health and safety implications.

Other recommendations, such as wearing clean boot covers and Tyvek suits when approaching pools, are less blatantly troublesome, but nevertheless add incrementally to the already complex protocols required by the Park for work in the cave. Proposed new requirements should be critically considered, because each new one makes it more complicated and difficult to do everything properly, takes more time and effort away from primary goals, and makes trips less enjoyable. I believe that this has already gone past a reasonable balance between protecting the cave and expediting exploration, resulting in fewer experienced personnel who remain interested in working in Lechuguilla.

I encourage microbiologists working in the cave to focus on ways to facilitate renewed exploration. Several of the best remaining unexplored leads would involve traversing water and have been kept off limits for several years, on grounds that they must be kept microbially pristine. I propose that if no researchers have committed to study these locations within a reasonable time, they should be released to exploration. Microbiologists could assist by devising practical techniques for crossing water with minimal contamination.