51-8 - DOCUMENTING A GEOBIOLOGICAL TRAGEDY: THE EXPOSURE OF GREAT SALT LAKE'S MICROBIALITES AND THE UNDERGRADUATE RESEARCHERS AT THE VANGUARD

Carie Frantz, C. Gibby, R. Nilson, J. Aeschlimann, R. Athalye, C. Christensen, A. Degrange, H. Dolan, C. Ellsworth, J. Gibby, J. Imolega, M. Nguyen, G. Nielson, C. Patiño, C. Penrod, A. Sihapanya, C. Stern, K. Whipple, L. Wilcock, B. Baxter

Great Salt Lake is home to extensive microbialite reefs that host an active, carbonate-precipitating surface microbial community. In addition to their importance to our understanding of lacustrine microbial carbonates, Great Salt Lake's microbialites play a critical role in the modern Great Salt Lake ecosystem. However, they are in danger. Over a century of diversion of water from the rivers that feed Great Salt Lake, combined with the current megadrought, have shrunk the lake to historic low levels, subaerially exposing well over half of the lake's microbialites. Exposure quickly "bleaches" the microbialites and negates their ecosystem function. Here, we present the results of microbialite monitoring during two consecutive summers where new historic low lake level records were set. The monitoring work was conducted by several teams of faculty-mentored undergraduate researchers at two universities in Utah, both as part of independent research projects and as part of an intensive summer research program aimed at the recruitment and retention of diverse aspiring geoscientists. We measured several indicators of microbial community health and robustness, including surface pigmentation, chlorophyll fluorescence, light and confocal laser scanning microscopy, pigment extractions, DNA extractions, and 16S + 18S DNA sequencing. Field observations, field incubation experiments, and laboratory experiments suggest that while surface bleaching impacts primary productivity in the microbialites, a portion of the community survives for months or perhaps even years following subaerial exposure and can recover when exposed again to lake water. Thus, if Great Salt Lake rebounds soon by some combination of societal shifts in water use and high precipitation years, the microbialite community may be able to recover.