Microbial Communities at a Highly Efficient Acid Mine Drainage Site

C. GRETTENBERGER[1]*, A. PEARCE[2], W. BURGOS[3], K. BIBBY[4] AND J. MACALADY[1,2]

[1]Pennsylvania State University, Ecology Program, University Park, PA 16803
(*correspondence: christygrettenberger@gmail.com)
[2]Pennsylvania State University, Geosciences Department, University Park, PA 16803
[3]Pennsylvania State University, Department of Civil and Environmental Engineering , University Park, PA 16803
[4]The University of Pittsburgh , Department of Civil and Environmental Engineering, Pittsburgh, PA 15260

Acid mine drainage (AMD) is recognized as “the most important and widespread industry related pollution problem. “ Roughly 8,000 km of streams in the northern Appalachian Plateau in the eastern US have been severely polluted by AMD. Unfortunately, traditional remediation systems are not particularly effective and the estimated cost of AMD remediation using existing technologies is nearly is substantial. Biological passive treatment using acidophilic iron-oxidizing bacteria has been proposed as a promising alternative to the traditional treatment systems. Harnessing the power of bacterial oxidation may be a more cost and labor-efficient method of treating AMD.

Scalp Level Run is a unique AMD site because iron is removed from this system five to ten times faster than at any other location. Because this rapid rate is observed both in controlled laboratory experiments and in the field, it is likely being driven by a unique and useful microbial community. We used high throughput sequence analysis and fluorescent in situ hybridization (FISH) to characterize the microbial community at Scalp Level Run. FISH was also used to identify the dominant genera in five other AMD systems. Results will help to elucidate the role that that microbial communities may play in improving passive treatment systems by increasing efficiency and reducing costs.