

The removal of high concentrations of metals from acidic, metal-laden coal mine discharge (CMD) is a significant problem for both operating and abandoned coal mines through the US. One of most common and least expensive ways to clean up CMD in impacted areas is through the construction of biologically-active limestone beds designed to attenuate the metals – metals such as Mn are transformed (e.g., oxidized) from a soluble form to an insoluble mineral form by microbial activity and retained within the treatment bed. We have identified a diverse community of bacteria, fungi, and algae that are capable of promoting Mn oxidation in these treatment systems. Through a combination of culture-dependent and culture-independent approaches, we have been examining the microbial mechanisms, physiologies, and community dynamics that promote Mn oxidation. Ultimately, these studies will inform the strategies for remediating metal-polluted environments worldwide.