



Geophysical Characterization of Inactive Mine Tailings - A First Step for Revegetation

Markus Tuller (1), Grey S. Nearing (2), Scott B. Jones (3), and Robert Heinse (4)

(1) The University of Arizona, Department of Soil, Water and Environmental Science, Tucson, AZ, USA
(mtuller@cals.arizona.edu), (2) The University of Arizona, Department of Hydrology and Water Resources, Tucson, AZ, USA, (3) Utah State University, Department of Plants, Soils, and Climate, Logan, UT, USA, (4) University of Idaho, Department of Plant, Soil, and Entomological Sciences, Moscow, ID, USA

The ability to sustain native vegetation on inactive mine tailings mitigates numerous environmental issues such as mass movement due to wind and water, leaching of hazardous chemicals, as well as aesthetic concerns. Mine tailings commonly exhibit a gradient of narrow particle size distributions similar to river delta sediment patterns, which result in poor plant water availability. To develop strategies for optimizing hydrological conditions in mine tailings in the arid Southwest we conducted an electromagnetic induction (EMI) surface survey and applied electrical resistivity imaging (ERI) along selected transects of an inactive tailings site. EMI and ERI data were applied in conjunction with geostatistical analysis to determine contrasting locations for core sampling. The obtained resistivity data and determined correlations with physicochemical and mineralogical properties were used to generate detailed maps of investigated tailings properties. Resultant maps are used in combination with numerical modeling to propose cost-efficient designs for vegetative tailings covers.