Revegetation success at several Montana sites using soil amendments[1]

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Abstract:

Remediation of metal enriched soil, overburden, subsoil, and waste using amendments is an evolving low cost technology for mitigating water quality and vegetation impacts at legacy mine and smelter sites. Revegetation of mine sites is often technically difficult and costly due to local shortages of high quality growth media and presence of inhibitory rootzone conditions on site. Combination of elevated metals, low pH, and low fertility create challenging conditions for seeding and planting as well as serving as a source for metal leaching to shallow groundwater. Furthermore, risk-based action levels for soil cleanups for human health protection may require removals of contamination for human health considerations leaving behind residual subsoil with elevated metals and a shortage of organic matter. Short and long-term monitoring at several reclaimed sites was performed and provides examples of soil remediation efficacy and validation of risk reduction targets. Soil amendment prescriptions will be presented with examples of field implementation, revegetation success, and post-reclamation soil assessment. Plant community demographics, soil chemical characteristics, and remedial decision making under the Superfund law will be discussed using sites from Western Montana. Typical soil amendments applied include lime, compost, and fertilizer. Results show companion reductions in metal mobility and increased soil fertility at sites with robust vegetation while sites with poorer vegetation outcomes show persistent limitations due to metals, pH, and fertility.

Additional Key Words: phytotoxicity, metal mobility, soil remediation

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[1] Oral paper presented at the 2017 National Meeting of the American Society of Mining and Reclamation, Morgantown, WV: ***What's Next for Reclamation?*** April 9 - 13, 2017. Published by ASMR, 1305 Weathervane Dr. Champaign, IL 61821.

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