

AMANDA RODRIGUES, Wadsworth Dept of Civil and Environmental Engineering, West Virginia University, Morgantown, WV, 26506, BRADY WATTERS, Wadsworth Dept of Civil and Environmental Engineering, West Virginia University, Morgantown, WV, 26506, JOHN QUARANTA, Wadsworth Dept of Civil and Environmental Engineering, West Virginia University, Morgantown, WV, 26506, LESLIE HOPKINSON, Wadsworth Dept of Civil and Environmental Engineering, West Virginia University, Morgantown, WV, 26506. Evaluation of the use of AMD sludge as soil amendment

The treatment of acid mine drainage (AMD) involves chemical treatments to raise pH and precipitate solubilized metals. The byproduct of this process is an AMD sludge precipitate, and its management and disposal are a continuous environmental concern. This study evaluated the application of AMD sludge as a soil amendment to support vegetation establishment. A small-scale growth study was completed with six treatments composed by different percentages of topsoil and AMD sludge: i) 100% topsoil (100T), ii) 10% sludge, and 90% topsoil (10S90T), iii) 20% sludge and 80% topsoil (20S80T), iv) 30% sludge and 70% topsoil (30S70T), v) 40% sludge and 60% topsoil (40S60T), and vi) 50% sludge and 50% topsoil (50S50T). Four replications of each treatment were considered. Ground cover was monitored weekly for nine weeks (September 29, 2021 – December 2, 2021). Stem length and biomass were measured. Non-parametric testing analyzed differences in ground cover, stem height, and biomass. Ground cover ranged from 14.6% to 70.1% across all treatments at the end of the study period. The 100% topsoil treatment had the greatest median ground cover (=60.6%); however, no statistical differences were determined among the 100T, 20S80T, 30S70T, 40S60T, and 50S50T treatments. Biomass ranged from 1.41 to 6.22 g, and average stem length varied from 3.6 to 5.3 cm. These preliminary results suggest AMD sludge may be considered for land application as an alternative means of disposal. Generally, treatments with greater amounts of sludge performed better than those with lower sludge amounts. Additional testing at field scale is needed.