Geomorphic Reclamation and Landscape Heterogeneity: A landscape approach to quantify geomorphic stability and vegetation community diversity

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Abstract: Mining across the Rocky Mountain West has led to drastic land alteration. The industry provides vital contributions to the economy of Wyoming, but requires sustainable reclamation in a challenging semi-arid climate. Traditional reclamation rebuilds the landscape by creating long, uniform slopes and terraces. An alternative practice is geomorphic reclamation which has gained popularity for its heightened attention to constructing natural drainages and topography to the restored landscape. Geomorphic designs incorporate the natural geomorphology of the landscape, emphasizing drainages and complex topographies. Two surface mines in Wyoming reclaimed nearly a decade ago by the Wyoming Department of Environmental Quality (DEQ), Abandoned Mine Lands group (AML); present a unique opportunity to compare both methods of reclamation and study the environmental outcomes of geomorphic principals where water and vegetation establishment is a limiting factor. Our proposed efficiency assessments of traditional and geomorphic reclamation methods include remote sensing and field surveys of wildlife habitat and vegetation cover, density and diversity. Additionally, we will make comparisons of erosional susceptibility between sites through hydrological modeling applications, plant growth capacity through differences in soil health parameters and an assessment of topographic diversity. Presented data will report results of remote sensing analysis to determine landscape-scale differences in topographic and vegetative diversity between traditional and geomorphic sites. Landscape-scale data will be combined with field surveys to evaluate the extent to which geomorphic reclamation improves plant-available water storage and increases vegetative diversity.

Additional Key Words: erosion modeling, restoration ecology, mine reclamation, soil quality

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