

Cost Effectiveness Analysis of Geomorphic Reclamation¹

Roger Coupal*, Kristina Hufford, and Kurt Reid Fleisher²

Abstract: Energy development is an important economic activity in Wyoming and many States in the Rocky Mountain West. These activities supply high paying jobs for communities and are a major contributor to the State Government tax base. Along with these activities and contributions though are ecological damages that can affect ecosystem services that other industries depend upon. This analysis assesses the cost effectiveness of geomorphic reclamation compared to traditional using different indicators. The goal of geomorphic reclamation is to achieve a steady-state landscape between forces and resistances (Troy and Chuse 2004), creating a more stable environment ecological restoration. We use the AML project on the Day Loma Uranium Mining District in Central Wyoming as our case study. We start with a risk adjusted avoided cost comparison or re-remediation on traditional reclaimed areas that have rill and gully erosional problems. We then expand the analysis using a risk adjusted cost effectiveness approach from ongoing work by Fleisher and Hufford (2019) that measure species richness and biodiversity between the two approaches. This latter approach can be used to manage species of concern that depend on the ecosystems. The evidence to date is that in semi-arid areas in Wyoming, though the costs of geomorphic approaches are higher, the costs of re-remediation on traditional approaches make geomorphic reclamation potentially less expensive. Preliminary discounted cost differential estimates make Geomorphic slightly less expensive ranging from 2.5 percent less to 8 percent more, depending upon likelihood of erosion events and relative earthwork costs. Biological indicators perform better in cost effectiveness.

Additional Key Words: Economic efficiency, ecosystem services.

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2. Roger Coupal (* presenter), Professor, Agricultural and Applied Economics, University of Wyoming; Kristina Hufford, associate professor, Ecosystems Science and Management, University of Wyoming; Kurt Reid Fleisher, Graduate Student, Ecosystem Science and Management, University of Wyoming.