

# Geomorphic Reclamation and Landscape Heterogeneity: Results of Vegetation Analysis and Implications for Wildlife<sup>1</sup>

Kurt Fleisher<sup>2</sup>, Kristina M. Hufford<sup>2</sup>, Peter D. Stahl

**Abstract:** Severe land disturbance is a consequence of surface mining operations. These disturbances damage the environment by causing pollution, by destroying habitats, by diminishing land aesthetics, and by creating hazards, which threaten public and private property. In Wyoming, anthropogenic disturbances caused by infrastructure development for resource extraction contribute to habitat loss for wildlife species such as Greater Sage-grouse (*Centrocercus urophasianus*) and pronghorn (*Antilocapra americana*). Changes in the plant community have the potential to alter an ecosystem via changes in structure and function, with a corresponding loss of habitat quality. Reclamation serves to mitigate the effects of mining by reconstructing the landscape to its former status. The traditional reclamation method results in terrestrial rebuild that is characterized by uniformity in slope in which topsoil is spread across the manufactured landscape. In contrast, geomorphic reclamation intends to mimic heterogeneous landforms that are not susceptible to severe erosional processes. The geomorphic design incorporates drainages, slopes, and aspects that naturally blend into the surrounding environment. Two surface mines in western Wyoming present an opportunity to compare reclamation methods and study the environmental outcomes of the geomorphic technique. We assessed differences in plant community recovery across reclamation types and undisturbed rangeland, with particular interest in the consequences for wildlife habitat and vegetation density, composition, and diversity. Data include nadir image analyses that allow for an efficient landscape-level assessment of vegetation functional groups between traditional and geomorphic sites; and BLM Assessment Inventory and Monitoring (AIM) vegetation transects that describe plant community characteristics, such as canopy cover, vegetation height, and species data at a finer scale. Initial results indicate that vegetation at both traditional and geomorphic reclamation sites differs significantly from nearby undisturbed rangeland. We will discuss results and describe similarities and differences between geomorphic and traditional reclamation methods for resulting plant community diversity and habitat quality indices.

Additional Key Words: restoration ecology, mine reclamation, plant community

- 
1. Oral paper presented at the 2018 National Meeting of the American Society of Mining and Reclamation, St. Louis, MO: The Gateway to Land Reclamation, June 3 - 7, 2018. Published by ASMR; 1305 Weathervane Dr., Champaign, IL 61821.
  2. Kurt Fleisher, Graduate Student in Rangeland Ecology & Watershed Management, University of Wyoming, Laramie, WY, 82071; Kristina Hufford, Associate Professor in Restoration Ecology, Department of Ecosystem Science and Management, University of Wyoming, Laramie, WY 82071; Peter Stahl, Director, Wyoming Reclamation and Restoration Center; University of Wyoming, Laramie, WY 82071.