

INFLUENCE OF VARIABLE TOPSOIL REPLACEMENT DEPTHS ON SOIL AND PLANT CHARACTERISTICS AT A COAL MINE IN NORTHEASTERN WYOMING¹

by

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Abstract: A five-year project was initiated in 1998 to investigate the effect of varying topsoil depths on soil parameters and plant cover and diversity on a coal mine in northeastern Wyoming. Soil and vegetation information was collected for two consecutive growing seasons (2000 and 2001) on reclaimed areas with three topsoil treatment depths, i.e., 15, 30 and 56 cm and from two native reference areas (e.g., upland grassland and breaks grassland) at the mine. The data were analyzed using two-factorial weighted analysis of variance (SAS/STAT Version 6.12). For the soil analysis, pH, EC and SAR were evaluated to determine differences with respect to topsoil depths and vegetation status. Soil pH, EC and SAR in the top 30 cm of the reclaimed soil profile were significantly different from either native reference area on this project; however, statistical differences are not likely biologically significant at this point, but these results support the concept of inversion and mixing of the original soil profile. No significant gradient for pH, EC and SAR exists on the reclaimed treatments within this study. Inherent gradients for pH, EC and SAR were evident on native areas. No significant differences in measured soil or plant parameters were evident by the end of the second growing season in the variable depth treatments, which may reflect the young age of the reclaimed area and/or reduced precipitation during the 2000 and 2001 growing seasons. Previous research has indicated differences in treatment levels do occur over time. One additional sampling period will be conducted in 2002. Differences in treatment will likely be enhanced given time or increased precipitation prior to or during the 2002 growing season.

Additional Keywords: Chemical Properties, Salinity, Vegetation, Climate

¹Paper presented at the 2002 National Meeting of the American Society of Mining and Reclamation, Lexington, Kentucky, June 9-13, 2002. Published by ASMR, 3134 Montavesta Road, Lexington, KY 40502.

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