

Soil changes during stockpiling and after reclamation at three Wyoming natural gas production areas¹

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Abstract: Successful reclamation following typical soil salvage, stockpiling, and respreading practices at natural gas wells is often hindered by salt-affected soils, weed invasions, and slow plant establishment. Study sites were established pre-disturbance at nine planned natural gas well pads at the Wamsutter, Jonah, and Pinedale Anticline production areas. Soil physical, chemical, and biological properties in the top 15 cm were tracked for eight years, from predisturbance, through stockpiling, immediately after reclamation, and one, two, and eight years afterward. Cover by planted native species was recorded each season. Results indicate that soil organic carbon (C) content dropped from around 1.8 to about 0.8%. Total soil nitrogen (N) dropped by a similar magnitude, from around 0.15 to around 0.11%, while salt and clay contents increased. Soil C and N were conserved in deep, dry stockpiles then rapidly decomposed following respreading. Native vegetation began to become established at some of the study sites and soil C and N did concentrations were variable but increasing during the sampling period. Although total N dropped, plant-available N increased following respreading of salvaged and stockpiled soils. The results suggests that deep stockpiling may not lead to detrimental changes in semiarid areas, and that there is a need for practices that conserve N mineralized from organic matter during the reclamation process.

Additional Key Words: semiarid, sagebrush-steppe vegetation, Aridisols, soil organic matter, salt-affected soils.

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