

Mine Soil Health on 2- to 32-Year-Old Reclaimed Pasturelands¹

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Abstract: West Virginia has over 200,000 ha of surface mined land. Many mine sites were reclaimed with salvaged topsoil to depths of 15-30 cm to aid revegetation, but many are rocky and contain low organic matter and plant-available nutrients. Mine soil health is presumed to improve with time since reclamation. Objectives of this study were to determine soil health indicators and to compare two methods (NRCS Soil Quality Test Kit measurements vs standard laboratory/field methods) on mine soils of different ages since reclamation. Four northern West Virginia mine soils with topsoil and reclaimed to pasture (2, 11, 16 and 32 years since reclamation) were selected and soil samples were taken to determine soil health indicators. The results confirmed that soil health improved with time on these mine soils. Using standard tests, bulk density (BD) decreased from 1.53 to 1.37 Mg m⁻³ over 30 years, wet aggregate stability (WA) increased from 5.7 to 6.1 mean weight diameter, saturated hydraulic conductivity (Ks) improved from 0.073 to 0.175 cm min⁻¹, pH went from 6.1 to 7.3, electrical conductivity (EC) increased from 0.20 to 0.44 dS m⁻¹, and soil respiration (RESP) increased from 25 to 78 kg CO₂-C ha⁻¹ day⁻¹. Most measurements between the two methods were similar: pH (NRCS: 6.4; Standard: 6.4), Ks (0.117 vs 0.114 cm min⁻¹), and RESP (45 vs 57 kg CO₂-C ha⁻¹ day⁻¹). This study indicated that mine soil health improves with time since reclamation and that soil health indicators can be evaluated with the NRCS Soil Quality Test Kit.³

Additional Key Words: aggregate stability, bulk density, electrical conductivity, hydraulic conductivity, microbial respiration, mine soil genesis, pH.

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 3. Work reported here was conducted near 39°38'37.46" N; 80°02'12.56" W.