

LONG-TERM EFFECTS OF HERBACEOUS SPECIES AND TREES ON RECLAIMED MINE SOIL PROPERTIES¹

K. McMillen², M. Letalik, A. O. Abaye, C. E. Zipper, E. Carver, and A.G.Fannon-Osborne

Abstract: The selection of plant species is critical for successful establishment and long-term maintenance of vegetation on reclaimed surface mined soils. Over long terms, the plant species present on reclaimed coal mine sites may also influence surface soil properties and, by extension, related site properties such as surface hydrology. We conducted research to compare effects of 4 herbaceous species on reclaimed mine soil properties over 20 years, and to compare these herbaceous species' effects to those produced by planted trees. The herbaceous experimental treatments were installed in summer 1990 on partially reclaimed mine soils. The experimental design was a complete block, with each plant-species treatments replicated 4 times. Prior to revegetation, a composted mixture of wood chips and biosolids was mixed into the soil to provide initial nutrients. No other fertilizer was applied after the initial fertilization. The plots have been mowed annually to stimulate re-growth. The plant species with greatest persistence and biomass production over two decades are switchgrass, sericea lespedeza, reed canarygrass, tall fescue, and crownvetch. An adjacent area, reclaimed in association with the herbaceous experimental area, was planted with herbaceous species initially and then replanted with trees of various species in the early 1990s. In summer of 2011, the herbaceous vegetation plots and six locations within the adjacent area planted with trees were sampled and characterized for soil properties. Switchgrass produced more above-ground biomass than any other species, and sericea lespedeza had the shallowest rooting depth. Vegetation with more intricate root systems gave rise to increased soil development.

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² K. McMillen, E. Carver, and M. Letalik are undergraduate students, A.O. Abaye is Professor, and C.E. Zipper is Associate Professor, Department of Crop and Soil Environmental Sciences, Virginia Tech, Blacksburg VA 24061. A.G. Fannon-Osborne is Associate Extension Agent, Agriculture and Natural Resources/Mined Land Restoration, Virginia Cooperative Extension, Wise VA