

# SUBSTRATE, GROUND COVER, AND BARK MULCH EFFECTS ON TREE GROWTH AND SURVIVAL ON A RECLAIMED WEST VIRGINIA SURFACE MINE<sup>1</sup>

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**Abstract:** Surface mining in West Virginia has been taking place for nearly a century. Most of the land disturbed was once covered in eastern deciduous forest. Returning the reclaimed land to a productive forest requires the selection and placement of proper soil material and appropriate selection and planting of tree species. In addition to these factors a variety of amendments, such as bark mulch, can be added to mine soil during reclamation. The objectives of this research are to assess soil chemical and physical properties and to evaluate tree survival in weathered brown sandstone and in unweathered gray sandstone treated with and without bark mulch and with and without hydroseeding. At the ICG-Eastern mine in Webster County, WV, a 2.7-hectare demonstration plot, containing eight soil treatment combinations, was planted with a variety of hardwood tree species on 2.5 by 2.5 m spacing. After three years, plots of brown sandstone alone and brown sandstone with hydroseeding had an average pH of 5.1, while gray sandstone and gray sandstone with hydroseeding had a pH of 7.8. Brown and gray sandstone with bark mulch and with bark mulch and hydroseeding had an average pH of 7.4. After three growing seasons average survival across species for brown sandstone alone was 70%, with bark mulch 84%, with hydroseeding 58%, and with bark mulch and hydroseeding 58%, while gray sandstone alone was 72%, with bark mulch 61%, with hydroseeding 39%, and with bark mulch and hydroseeding 72%. Tree survival across treatment combinations for sugar maple was 65%, white pine 75%, northern red oak 70%, and black cherry 82%. Growth in the form of volume index (volume index (cm<sup>3</sup>) = height x diameter<sup>2</sup>) for these four species was sugar maple 10 cm<sup>3</sup>, white pine 94 cm<sup>3</sup>, northern red oak 53 cm<sup>3</sup>, and black cherry 134 cm<sup>3</sup>.

**Additional Key Words:** gray sandstone, tree survival, tree volume, bark mulch, hydroseeding

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