

Impacts of a Modified Forestry Reclamation Approach on Seedling Growth and Survival on Reclaimed Mines in the Western Gulf¹

Cassie Phillips^{2*}, Jeremy Stovall, Hans Williams, Ken Farrish

Abstract: Surface mining reclamation has resulted in increasingly more stable land use post mining since the implementation of SMCRA, or the Surface Mining Control and Reclamation Act in 1977. While land reclamation efforts have increased stability considerably, research suggests that soil compaction as a result of the implementation of SMCRA hinders the productivity of forests post-mining. The Forestry Reclamation Approach (FRA) was developed to improve forest health in the Appalachian region through a five-step process. This process emphasizes minimizing soil compaction and using proper tree planting techniques. The FRA has not yet been tested in the western Gulf Coastal Plain where shrink-swell clay soils and severe droughts affect land reclamation practices. This study adapted the FRA methods for the soils and common silvicultural practices of the western Gulf. The two-acre study site was installed with a randomized block design with three replicates comparing conventional pan-scraper reclamation methods of the region with that of an unmined control and the FRA-style low compaction treatment. Following soil reclamation, we hand-planted containerized loblolly pine seedlings of a western Gulf provenance. Consistent with intensively managed plantation forests in this region, no cover crops were planted; this will help to optimize tree growth and reduce herbaceous competition. After one growing season, seedlings in the FRA plots had a 97% survival rate with a mean height of 43.06 cm. Soils samples revealed FRA plots also had the lowest bulk density of all the plots. Vegetative analysis on all plots revealed the control plot to have the most vegetation per 1 m² at 433.05 g. Photosynthesis and respiration data will be collected to further evaluate the health and productivity of trees in all plots.

-
1. Oral paper presented at the 2018 National Meeting of the American Society of Mining and Reclamation, St. Louis, MO: The Gateway to Land Reclamation, June 207. 2018.
 2. Cassie Phillips, Environmental Science Graduate Student; Jeremy Stovall, Associate Professor of Silviculture; Hans Williams, Dean of the Arthur Temple College of Forestry & Agriculture; Kenneth Farrish, Director of Division of Environmental Science, Stephen F. Austin State University, Nacogdoches, TX 75962.