

Using the Forestry Reclamation Approach in the Western Gulf Region: Impacts on *Pinus taeda* Seedling Growth and Survival¹

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Abstract: While land reclamation efforts of surface mines have considerably increased stability since the implementation of SMCRA (Surface Mining Control and Reclamation Act), research suggests that resulting soil compaction 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 that minimizes soil compaction. The FRA has not yet been tested in the western Gulf Coastal Plain. This study adapted FRA methods for soils and common silviculture 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 used in the region with that of an unmined control and the FRA-style low compaction treatment. Following soil reclamation, we hand-planted containerized loblolly pine (*Pinus taeda*) seedlings of a western Gulf provenance. After three growing seasons, seedlings in the FRA plots had significantly higher tree volumes ($p < 0.0001$) when compared to the other two treatments, and a 97% survival rate, while pan-scraper plots had a survival of 86%. Soils samples revealed FRA plots had significantly lower bulk densities than the other two treatments. Between year one and year two tree volumes on control plots increased by 233 cm³, scraper plots by 141 cm³ and FRA plots by 969 cm³. These preliminary results suggest reclamation practices modeled after FRA methods may benefit tree growth and survival in the western Gulf.³

Additional Key Words: Silviculture, mining reclamation, tree physiology, soil compaction.

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 3. Work reported here was conducted near 31° 12' 16.9884" N, 95° 23' 14.4564" W.