

Suitability of a Reforestation Growth-Medium Prepared by Two Methods at a Lignite Surface Mine¹

Hannah Z. Angel², Hans M. Williams³, and Jeremy P. Stovall⁴

Study Description: Two sites reclaimed using different methodologies (scraper pan verses truck and shovel) will be sampled to determine the effects of equipment on soil physical and chemical properties. First year growth and survival of pine seedlings will be sampled to determine response of vegetation to four soil tillage techniques.

ABSTRACT: Since 1974, Luminant has planted over 36 million trees on reclaimed lignite surface mine operations in east Texas. Over the decades, the use of improved reclamation techniques on Luminant's mined lands have resulted in quality reclamation with over 76,000 acres reforested to productivity levels similar to that found on undisturbed lands. The development of new reclamation methodologies offers opportunities to improve productivity potential of planted trees at Luminant's Martin Lake Oak Hill Mine in east Texas. Historically, the haulback or the 'truck and shovel' method has been used at this mine. This conventional reclamation method uses haul or dump trucks for the selective transport and placement of oxidized overburden to serve as the growth medium for reforestation. The transport and placement of the overburden can also be accomplished using tractor-pulled scraper pans. However, there is a lack of information regarding the effects of scraper pans on mine soil compaction and seedling survival and growth. This research will evaluate soil physical and chemical properties, particularly soil bulk density, between two sites at the Oak Hill Mine that were reclaimed using different equipment methods (scraper pans verses the conventional haulback method). At the scraper pan site, the effects of four different soil tillage techniques on soil physical and chemical properties will be studied, as well as the influence of the tillage treatments on loblolly pine establishment and growth. Tillage techniques include: disking (30-35 cm depth), ripping (120 cm depth) and disking (30-35 cm depth), cross-ripping and disking, and no tillage (control).

¹ Poster presented at the 2015 National Convention of the Society of American Foresters, Baton Rouge, LA. November 3 - 7, 2015.

² Hannah Z. Angel, Forestry Graduate Student, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962.

³ Hans M. Williams, Interim Dean and Nelson Distinguished Professor, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962.

⁴ Jeremy P. Stovall, Associate Professor, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX 75962.