INTRODUCTION

Strip-mining is a common practice in the Gulf Coastal Plain, with some individual mines spanning over 10,000 acres. Loblolly pine (Pinus taeda L.) plantations are a widespread reclamation landuse in east Texas, although the productivity of these plantations compared to those on unmined lands is not well-documented. The objective of our study is to quantify current site quality of loblolly pine plantations on two mines as compared to stands on unmined soils. The two mines differ in the method of overburden replacement (Fig. 1). Substituting mixed overburden for topsoil generally results in no distinction of original soil layers following reclamation (Beckville Mine, BM), while removing and mixing the pre-mining upper, oxidized soil layers for topsoil in the post-mining reclamation areas creates some stratification (Oak Hill Mine, OHM).

METHODS

We quantified 72 stands on two east Texas Luminant mines: 48 stands at BM and 24 stands at OHM (Fig. 2). Stands were selected to sample at least one for every year of planting from 1984-2011 for BM and 1988-2011 for OHM. Some years were not available and plots were selected from the prior or the following year in those cases. Table 1 shows stand data. In each stand all trees within a single quarter-acre sample plot were measured. Plots were located randomly and had rectangular dimensions of 66 ft along the direction of the rows and 164 ft across the rows. Analyses involved height by age regression using the formula from Coble and Lee (2006):

\[ \text{Height} = b_0 (1 - e^{-b_1 \text{Age}})^{b_2} \]

Mean site index prior to mining was estimated from the USGS Web Soil Survey and extrapolated to current productivity levels from base age 50 years natural stands by adding 10 feet to the height at age 25 to account for improved genetics and silviculture.

RESULTS

Preliminary results show site index was 51.6 ft at 25 years and 59.4 ft at 25 years for BM and OHM, respectively (Fig. 3). This is less than the mean site index across east Texas of 69 ft (Coble and Lee 2006). The current site index at BM is 18.4 ft lower than prior site index at BM of 70 ft. The current site index at OHM is 6.6 ft lower than prior site index at OHM of 66 ft. All regression coefficients were significantly different between mines at the 0.05 confidence level. Additionally the pre-mining site index estimates fell outside the 95% confidence intervals for both mines.

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LITERATURE CITED