Stand Level Nutrient and Carbon Content Across One Rotation of Loblolly Pine Plantations on a Reclaimed Surface Mine[1]

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Abstract. Understanding temporal changes in nutrients and carbon (C) in aboveground tree biomass over many years can provide information regarding ecosystem recovery following a disturbance. Loblolly pine (*Pinus taeda*) trees growing on reclaimed mined lands in east Texas exhibit similar productivity compared to unmined lands. However, it is unclear how carbon and nutrients in aboveground components affect growth rates or differ from forests on undisturbed land. Numerous studies have previously assessed loblolly pine aboveground biomass, C, and nutrient contents; however, similar data have not been collected on mined lands for loblolly pine in the Gulf States region. Using a chronosequence approach, we investigated C, N, Ca, Mg, K, and P contents for first rotation loblolly pine growing on reclaimed mined lands in east Texas over a 32 year period. Elemental contents were analyzed using a CN analyzer and ICP, and results were then scaled using previously published allometric relationships for these stands to an individual tree and stand level basis by three tissue components (foliage, branches, and stem wood). Generally, stands on mined lands followed similar trends in nutrient and carbon contents to values reported in the literature for stands on unmined land.

Additional Key Words: Biomass productivity, carbon sequestration, tree age sequence

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