THE POTENTIAL FOR CARBON SEQUESTRATION IN SOILS ON LIGNITE COAL MINELANDS IN EAST TEXAS

Author: Cynthia A. Blake

Global warming is becoming an ever-important topic in the world today. In 1998, it was estimated that 40.5% of U.S. anthropogenic CO_2 emissions was attributed to the combustion of fossil fuels during the generation of electricity (U.S. Department of Energy 2000a). In an attempt to mitigate emissions, electric utility companies have become interested in the potential of forests to sequester large amounts of carbon in their above- and below-ground biomass as well as in the soils. It has been estimated that if the world's deforested lands were reforested and properly managed, they could have the potential to sequester five billion megagrams of carbon per year (Kimmins 1997b). To effectively manage forests to store carbon, it is important to study the role forest soils play in the carbon sequestration process. These soils have the potential to store up to 59% of the total carbon pool within a forest ecosystem (Birdsey 1992). This study examined the biological potential of storing carbon in the soils and the economic potential of storing carbon in the soils and trees grown on reclaimed lignite coal minelands in East Texas. Results show that up to stand age 16, these mine soils may be a net source of CO_2 rather than a net sink because lignite carbon, which is subject to microbial decomposition, exceeds modern organic carbon in the soil up to this point.

Masters Thesis
School of Forestry
Stephen F. Austin State University
Nacogdoches, Texas 75962