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Does incorporating forest slash into the soil improve soil quality?

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Two studies are described that examine the potential of utilizing forest slash to restore degraded soils. Both studies involved loblolly pine (*Pinus taeda* L.) plantations that had been clearcut and replanted with the same species. The broad objectives of these studies include using mulching and tilling to incorporate forest biomass into the soil to: (1) increase the nutrient pool, (2) improve soil physical properties, and (3) increase carbon sinks. The first study was installed in the fall of 1997 on the Lower Coastal Plain in North Carolina, USA. The study compared mulching and tilling with conventional site preparation techniques in two sites: a wet pine flat with a sandy loam horizon over a clay horizon and a pocosin site with deep organic soil. A Rayco Model T275 Hydra-Stumper was used to install the study. The machine was equipped with a 2.4 m horizontal rotating drum with 36 attached swing hammers that mulched logging slash, stumps, and humus layer that remained in the soil surface or was incorporated to approximately 20 cm into the soil. The second study was installed in the fall of 1999 on the Upper Coastal Plain at the Department of Energy's Savannah River Institute located in South Carolina, USA. The treatments were imposed on a sand and clayey soil and included: 1) an unmodified control 2) native slash levels pulverized and tilled into the top 40 cm of the soil and 3) native slash supplemented with an equal amount of organic matter in the form of wood chips and pulverized and incorporated into the plots. A CMI RS500 reclaimer/stabilizer to pulverize coarse-woody debris and stumps and incorporate the organic matter to a depth of 40 cm while tilling.

In 2005 we took some measurements from both studies and found that soil carbon was not significantly different at any depth for either site in contrast to our early findings that showed that the tillage treatments increased soil carbon. Although more variable,

soil nitrogen was also consistent between treatments with the exception of the 15 – 30 cm depth at the South Carolina site. These results suggest that the early influx of material has been decomposed and the system has stabilized. The early growth data indicates that the tillage treatments are growing slightly larger trees resulting in greater stem volume. However, this difference is not substantial. When translated out into stand volume numbers there is not a very large change except for the organic site (North Carolina) where mortality is an issue.