

ECOLOGICAL ASPECTS OF CELLULOSIC BIOMASS SUPPLY FROM WHOLE-TREE CHIPPING AND SLASH REMOVAL

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Currently, corn and soybean are the primary feedstocks producing ethanol and biodiesel, respectively. However, it is unlikely that these crops will be sufficient to meet biofuel demands, particularly since they are also important food sources. Cellulosic ethanol has the potential to replace 30 percent of U.S. petroleum use. The collection of post-logging forest residues, or logging slash, is a vital component of a cellulosic biomass supply for biofuel production. Pine plantations produce the majority of harvested forest volume in the U.S. South and are projected to increase 53 percent in area by 2050. Projections estimate that two-thirds of the national softwood harvest will occur on plantations, which cover 20 percent of the U.S. forest base. Clearly, pine plantations have an important role in producing biofuel feedstocks. However, whole-tree chipping (i.e., removal of all above-stump biomass) may have deleterious impacts on site productivity and ecosystem services with the removal of high amounts of logging slash. Forest harvesting can reduce the base saturation of soils, and this reduction intensifies with the amount of biomass removed. Whole-tree harvesting also can reduce cycling of soil carbon, thus modifying soil properties and reducing future productivity. The quantity, size, distribution, and decay status of woody debris in forests influence plant and animal community composition and diversity. However, removal of logging slash has the potential to negatively impact several species groups. We summarize current knowledge regarding environmental dimensions of whole-tree chipping and logging slash removal in the U.S. South and identify critical information gaps related to sustainable cellulosic biomass supply.

KEY WORDS: biodiversity, harvesting, nutrient cycling, slash, soil carbon, woody debris

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