

Biomass to Biofuels in the Woodlot...

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Fact Sheet Series

Woody biomass is a term used for all living or recently living plant materials; such as solid wood, bark, leaves, twigs, branches, seeds, and roots. Biomass is then considered a material used for energy feedstocks. Biofuels are then the various products that are removed to provide a variety of energy sources – heat, power, electricity, and transportation fuels.

In woodlot management, the forester and the landowner work at growing and caring for the forest for the production of wood, wildlife, recreation, water quality, and aesthetics. This management will enhance a full range of benefits and functions to the woodlot as well as provide regeneration benefits for a healthy future forest. Growing healthy trees will often accomplish the goals of the woodlot owner sooner. A healthy forest produces faster growth sooner and faster growing trees are often more resilient to damages including insect and disease.



Managed, uneven aged woodlot.

The use of woody biomass is not a new notion to many woodland owners that have been managing their woodlots through the removal of firewood. The harvesting of trees with evidence of disease; those that may be growing crooked; or those growing densely arranged in order to manage the remainder crop trees as the “keepers” and the future of the woodlot has been a management tool for biofuel production as a heat source to many.



Reduce defective trees for fuelwood.

As an energy source, wood chips have been used for years in cogeneration plants to produce heat, steam, or electricity for a large facility to run. The wood used in this process is that of wood waste – sawdust, scraps, or that which has been harvested as pulpwood.

In more recent years, biofuels have been processed directly at woodlots and then the chips hauled to various facilities to use for bioenergy, pellets for heating, and most recent research for vehicle fuel. From a woodlot management perspective a biomass harvest does have some merit. Biomass is typically considered to be the removal of wood that has low value and is not considered merchantable in any of the traditional markets. One example might be a pre-commercial thinning. This is generally a harvest when the woodlot has the potential to improve the stand health and productivity of the woodlot by removing undesirables and controlling the stand density. A second example would be when a woodlot may have been high-graded (removal of the high quality trees and leaving all poor quality species); not only would this improve the stand health, but also reduces the rotation length to the next harvest. A biomass harvest can also be combined with a commercial harvest to improve the health of the forest for the future.



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There are many benefits to a well-executed harvest, some of those include the improved health and vigor of the stand; improve the species composition; increase crop tree quality; and to enhance other important attributes of the stand including wildlife habitat. Typically, a harvest is not just for woody biomass, but woody biomass is just one more product of the managed harvest of a woodlot.



Overstocked, poorly managed forest stand.

There are various potential disadvantages of a biomass harvest in a woodlot, and many of these are quite similar to a poorly managed timber harvest. As in any logging operation, there is the possibility of erosion and sedimentation situations due to the lack of water quality management practices for improving these areas. Another drawback that could occur could be the damage to advanced regeneration and the remainder crop trees in the woodlot. The major consideration of any biofuel harvest is not to remove all of the woody debris within the woodlot. Doing so could lead to nutrient deficiencies in the stand. Research has shown in leaving 15 to 30 percent of the biomass material on a site, this will prevent against habitat loss and nutrient depletion. In most cases stumps and roots are not removed unless the stand is being cleared for reforestation or development purposes.

Woody debris, whether it is downed woody debris, fine woody debris, or course woody debris improves forest habitat for amphibians, reptiles, small mammals, and invertebrate



Mechanized harvesting operation.

predators. Course woody debris left behind can also increase the chance of forest regeneration in areas of increased deer browse. Sustainable forest management practices plans for the future by considering soil, wildlife, and water resources; in addition timber resources for both the short term and long term considerations.



The improvements.

Web pages of interest:

U.S. Forest Service – Woody Biomass Utilization
<http://www.fs.fed.us/woodybiomass/>

Penn State – Biomass Energy Center <http://www.bioenergy.psu.edu/resources.asp>

eXtension – Wood Energy <http://www.extension.org/wood%20energy>

Michigan Forest Biofuels Research <http://www.michiganforestbiofuels.org/>

Michigan Society of American Foresters – Links to Woody Biomass Utilization and Emerging Technology <http://michigansaf.org/ForestInfo/Biomass>