

Woody Biomass for Energy in Michigan

TOPICS FOR DISCUSSION AND INQUIRY

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Environmental Risks of Woody Biomass Harvesting

Won't biomass harvesting ruin our forests? That's a good question, and the answer is a resounding "NO," with some caveats mentioned below. Some of the often discussed possible environmental risks of woody biomass harvesting are the effects on soil nutrient and water cycles, depletion of nutrients from over-utilization of woody debris, and certain risks from short-term woody biomass plantations and other energy plantations.

Most of the soil nutrient and water cycles would be largely unaffected by biomass harvesting, except for some short-term disturbances.¹ Effects vary widely and are site-specific. Of course, certain soil types, such as infertile sands, would likely sustain certain loss, such as calcium, if harvesting occurred too frequently. Energy plantations would be higher risk on these soils, but plantations are unlikely to be established on these kinds of soils. Adhering to biomass harvesting guidelines would minimize or eliminate risks. The majority of our forest land should be able to support sustainable harvest levels of both timber products and biomass for energy.



Shredded bark and wood.

Sources of forest biomass vary. One of the more talked about sources is logging slash, the material left behind after a traditional timber harvest operation. With some technological innovation and a more stable market, much of this slash could contribute to energy feedstocks without harm to the forest or soils. Slash collection would not be a 100 percent removal of biomass because of the difficulty of collection. Most of the nutrient-laden material, such as leaves and small twigs, would most often be left onsite. Some will always be left behind, either intentionally or by economic necessity, sufficient to maintain forest sustainability. Logging slash, however, represents a rather small proportion of potential woody biomass supply. The threat of depletion of nutrients from over-utilization of woody debris should be minimal.

The largest pool of woody biomass comes from annual forest growth. Michigan forests have experienced some of the greatest net growth volume accumulations in the nation.² Our forests could contribute vast amounts of woody biomass in a sustainable manner. Even if we capture 25 percent of that annual growth, significant inroads will be made into reducing fossil fuel consumption and building a more sustainable energy economy.



Slash to be processed at a log landing.

Large volumes of Michigan forest consist of currently non-commercial species and size classes. Additional wood markets would extend commercial status to a wider range of material, increasing the profitability of timber sales, and expanding forest management alternatives. Current non-commercial thinning might be made commercial if markets were created. At the same time, harvest would increase forest growth, productivity, and vigor.

Lastly, energy plantations with fast-growing species such as willow and poplar could make significant contributions to woody feedstock supplies. Energy plantations would not likely be carved out of existing natural forests but would more likely be grown on a portion of the millions of acres of retired farmland in Michigan. These trees would be produced much as agricultural crops are grown but with less intensive management and fewer energy and chemical inputs.

It is certainly possible that over-harvesting could potentially lead to degradation of ecological services, particularly the functions of soil productivity and biodiversity. However, biomass harvesting done

according to research-based guidelines will minimize or avoid most, if not all, environmental risks. Indeed, such harvesting can actually enhance certain forest values, such as habitat quality, regeneration, visual quality, and biodiversity. With such guidelines in place, vast amounts of Michigan forest would be eligible for relatively risk-free biomass-for-energy harvesting. The forestry community monitors ecological trends and makes adjustments in practices as needed. Few communities are more acutely aware of the inherent risks and benefits than forest managers and researchers.

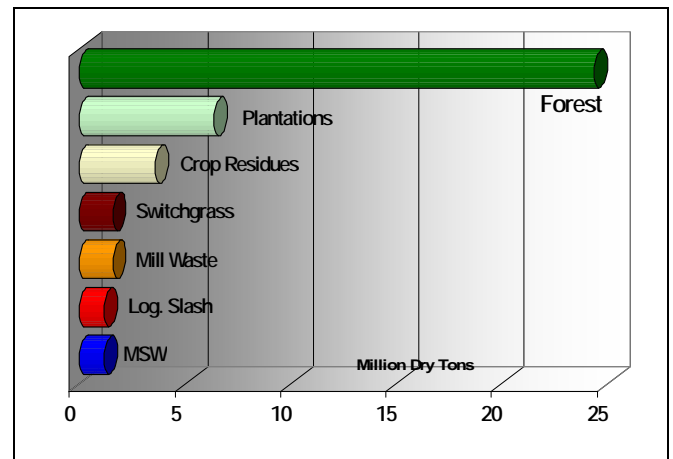
Minimizing risks involves consideration of factors such as season, harvest volume, and site characteristics. For example, an alder swamp, a potentially sensitive site, might be able to sustain harvests only once every several decades and only during cold spells during winters with light snow cover and deep frost. The alder would be regenerated, to the benefit of a suite of wildlife species. In regions with large areas of abundant mature alder, regenerated areas would enhance biodiversity, especially at the community level.

The largest pool of potential renewable energy in Michigan lies within our forests, possibly more than wind, solar, and agricultural wastes combined.⁴ In order to grow a sustainable energy economy and reduce fossil fuel consumption, we will need to employ all renewable energy sources, as well as practice better conservation, improve consumption technology, and become more efficient. Developing any renewable energy resource will involve experimentation, risk, and a learning process. This will take time and perseverance and will not produce immediate gratification. The timeline in successful

countries, such as Sweden, has been 15 to 20 years. We might expect to shorten that time period by building on their experiences.

Perhaps, the highest environmental risk involves maintaining the status quo and continuing to consume unnecessarily large quantities of fossil fuels. Extraction, processing, and burning of fossil fuels has more negative environmental consequences than proposed alternative energy sources. Eventually, we will begin to run out of fossil fuels, but long before that, the increasing cost of fossil fuels will affect our economies.

Research, development, and implementation of renewable energy resources tend to build economies, especially more sustainable economies. It would seem that working to develop renewable sources offers better choices than maintaining current trends.



Potential 40 million dry tons of biomass in Michigan. Plantations of willow and hybrid poplar. Switchgrass on USDA CRP land. MSW is municipal solid waste. Estimates by Raymond O. Miller, Michigan State University.³

¹ Hacker, J.J. 2007. Effects of Logging Residue Removal on Forest Sites: A Literature Review. (Eau Claire, Wisc.) West Central Wisconsin Regional Planning Commission. 20 p.

² U.S. Department of Agriculture, Forest Service. 2008. Forest Inventory Mapmaker. Version 3.0. Newtown Square, Pa. Northern Research Station.

<http://www.ncrs2.fs.fed.us/4801/fiadbfim30/wcfim30.asp>.

³ Miller, R.O., (unpublished data). Michigan State University Upper Peninsula Tree Improvement Center, Escanaba, Michigan. About 24 million dry tons, based on calculations using USDA Forest Service data.

⁴ Pugh, Scott, et al. 2008. Michigan's Forest Resources, 2007. Research Note NRS-28. (Newtown Square, Penn.) U.S. Department of Agriculture, Forest Service, Northern Research Station, 2 p. and U.S. Department of Energy, Energy Information Agency. Available at: www.eia.doe.gov. 2008. and *Conversion factors used: 80 cubic feet/cord and 5,740,000 btu's/green ton.*



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