Protecting Minnesota's Forests While Utilizing Biomass Resources

An overview of the Minnesota Forest Resources Council's *Forest Biomass Harvesting Guidelines*

What is Biomass?

Biomass is the organic material produced by plants, such as leaves, roots, seeds and stalks. Forest biomass (also called *woody biomass*) includes materials such as wood or bark, sawdust, timber slash, brush and mill scrap. Energy crops, such as poplars, willows, switchgrass, alfalfa, corn starch and soybean oil can also be sources of biomass.

Woody Biomass Harvesting includes the process of cutting, collecting and removing biomass from forested sites and other brushland or open land management sites. It involves removing more woody materials from a site than is typical during timber harvesting and may include removing residuals such as tree tops and limbs, small-diameter trees, dead trees, down logs, brush and stumps. It may also include removal of woody materials from sites where timber harvesting does not typically occur.

Why is Biomass Important?

The harvest and use of biomass has recently grown as the result of many factors. These factors include greater public awareness of environmentally friendly products, increasing national security concerns regarding use of imported fossil fuels, growing consumer demand and market interest in renewable materials, and various state and federal incentives for producing renewable energy.

Over time, non-renewable resources, such as fossil fuels, are being depleted making renewable resources increasingly important for meeting our growing energy needs. Biomass is a renewable resource that can be produced through forestry and farming practices. Renewable resources can provide a consistent and reliable supply each year. Biomass is one of a number of sustainable renewable energy resources that can create stable jobs, promote economic growth and address multiple ecological needs when harvested responsibly.

Photo courtesy of Dovetail Partners, Inc.

Wood chips are an example of woody biomass that can be used to produce energy.

What is the MFRC?

Minnesota Forest Resources Council

The Minnesota Forest Resources Council (MFRC) was established by the Sustainable Forest Resources Act of 1995 to promote long-term sustainable management of Minnesota's forests.

For more information about the MFRC and to download a complete copy of the guidelines, visit: www.frc.state.mn.us or call: (651) 603-0109.

Why are Biomass Harvesting Guidelines Important?

As new biomass projects and business opportunities are created, and demand for biomass increases, it is critical that biomass harvesting is done in a responsible manner in order to protect water quality, maintain long-term site productivity, and retain biodiversity and wildlife habitat. The *Biomass Harvesting Guidelines* address **wildlife and biodiversity, water quality, riparian management zones,** and **soil productivity**. Experts from these fields contributed to the development of the guidelines.

Biomass Harvesting Guidelines Protect:

- Cultural Resources
- Soils
- Riparian Areas
- Water Quality, Quantity, and Wetlands
- Wildlife Habitat
- Native Plant Communities

Biomass Harvesting Guidelines Help Reduce:

- Rutting and soil depression
- Soil compaction and erosion
- Nutrient depletion
- Nonpoint source water pollution
- Sensitive site disturbance
- Loss of habitat

How Were the Biomass Harvesting Guidelines Developed?

The *Biomass Harvesting Guidelines* were developed in 2007 by the Minnesota Forest Resources Council (MFRC) to maintain and enhance the resiliency of Minnesota's public and private forests. The *Biomass Harvesting Guidelines* serve as supplemental chapters to the MFRC's *Forest Management Guidelines*, which were developed in 1998 and revised in 2005. Together, these guidelines address a full range of forest management considerations and help protect Minnesota's forests while utilizing them in a sustainable manner.

Key Considerations	Biomass Harvesting Guidelines
Wildlife and Biodiversity	It is recommended that 33% of fine woody debris and brush is retained on-site during biomass harvesting to sustain forest stand biodiversity, soil health and wildlife habitat.
Water Quality	Keep non-merchantable material and coarse woody debris in the filter strip areas adjacent to water bodies. Install erosion control devices where appropriate to reduce sedimentation of stream, lakes and wetlands.
Riparian Management Zones	Biomass harvesting should be avoided in riparian areas or in leave tree retention clumps.
S**oil Productivity**	Biomass harvesting should be avoided on nutrient-poor organic soils deeper than 24 inches. Roads, landings and stockpiles should be planned to occupy a minimized amount of the site.

Guidelines Key Considerations

Wildlife and Biodiversity

The *Biomass Harvesting Guidelines* address wildlife and biodiversity considerations through the retention of important natural structural components of the forest during harvesting.

Protected wildlife and biodiversity components include:

- Snags: standing dead trees – important for wildlife nesting and habitat
- Fine woody debris: tree tops, limbs, and woody debris less than 6 inches in diameter – for nutrient cycle and soil health
- Coarse woody debris: down logs, stumps, and fallen limbs of more than 6 inches in diameter – for wildlife habitat and soil health
- Stumps – for soil health and nutrients
- Brush – for wildlife and biodiversity

The *Biomass Harvesting Guidelines* recommend retaining coarse woody debris, snags and stumps, as well as some fine woody debris and brush.

It is recommended that **33% of fine woody debris and brush is retained** on-site during biomass harvesting in order to sustain forest stand biodiversity, soil health and wildlife habitat.

Water Quality

Biomass harvesting can increase the potential for sediment movement into water bodies. To prevent water quality impacts the *Biomass Harvesting Guidelines* provide guidance for protections. The guidance includes retaining non-merchantable material and course woody debris in the filter strip areas adjacent to water bodies.

Riparian Management Zones

The *Forest Management Guidelines* address the removal and disturbance of trees in riparian management zones. The *Biomass Harvesting Guidelines* limit removal of biomass from riparian management zones and provide direction on the importance of balancing harvesting with the protection of biodiversity. Biomass harvesting should be avoided in riparian areas and in tree retention clumps.

Soil Productivity

The *Biomass Harvesting Guidelines* help to maintain the productive capacity of forest soils by identifying and reducing negative impacts biomass harvesting can have on soil resources. The guidelines seek to protect the nutrient capital of Minnesota's forests. Biomass harvesting should be avoided on nutrient-poor or shallow soils.

Photo courtesy of Dovetail Partners, Inc.

Biomass Harvesting Guidelines Do's and Don'ts

DO'S	DON'TS
During Biomass Harvesting:	***Avoid Biomass Harvesting:***
• Plan roads, landings and stockpiles to occupy a minimized amount of the site • Ensure that landings are in a condition to regenerate native vegetation after use, including tree regeneration • Avoid site re-entry to collect biomass after harvesting *(this reduces potential for soil compaction and damage to regeneration)* • Install erosion control devices where appropriate to reduce sedimentation of stream, lakes and wetlands • Retain and scatter at least one third of the fine woody debris on the site • Encourage native seed mixes and avoid introduction of invasive species • Retain slash piles that show evidence of use by wildlife • Leave all snags, retain stumps and limit disturbance of pre-existing coarse woody debris	• Within 25 feet of a dry wash bank, except for tops and limbs of trees • On nutrient-poor organic soils deeper than 24 inches *(These sites typically have sparse (25-75%) cover that is predominantly (>90%) black spruce and stunted (<30 feet high).)* • On aspen or hardwood cover types on shallow soils (8 inches or less) over bedrock • On erosion-prone sites (e.g. steep slopes of 35% or more) • In areas that impact sensitive native plant communities and where rare species are present • In riparian areas or leave tree retention clumps • In a manner that removes the forest floor, litter layer or root systems; these resources must be left within the forest

Photo courtesy of Dovetail Partners, Inc.

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