Biomass

DEVELOPING FOREST BIOMASS REMOVAL GUIDELINES TO ENSURE ENVIRONMENTAL SUSTAINABILITY

Canadian Forest Service (CFS) researchers are undertaking research to determine how much biomass, by species of tree and by ecosystem type, can safely be removed from forests while still maintaining healthy ecological functions. The information gained from studies now underway will help forest managers better understand the limits to biomass harvesting. It will also help managers determine the best approaches to harvesting biomass in a sustainable way.

Slash piles left after processing logs at roadside

In Canada, logging residue (or slash) is typically piled and burned to increase plantable area or reduce insect, disease and wildfire risk, or left on-site to decompose. Slash has been used for generating bioenergy in some European countries for decades, and some of these countries have been assessing how much to take, how much to leave and the best way to convert slash to energy. In Sweden, 25% of energy production in 2016 was from biomass, of which slash (harvest residues) was the largest single component. They were also the first jurisdiction to formulate forest biomass harvesting guidelines (1986). These guidelines and later revisions (2002, 2008) have been applied by forest managers and equipment operators in Sweden for over 30 years.

Forest biomass harvesting guidelines, whether stand-alone or incorporated within sustainable forest management manuals, advise foresters and equipment operators how best to remove biomass in a way that balances the use of harvesting residues for energy while ensuring that their removal from forest sites is environmentally sustainable. It may seem premature to develop guidelines before the bioproducts sector is firmly established in Canada, but doing so demonstrates a forward-looking approach that anticipates a future in which operational removals of harvesting residue will increase because of its value as feedstock for a growing bioproducts sector, including bioenergy production. Having guidelines in place can

Cutover after harvest

Canada

Grinding roadside residue in preparation for transportation

also help build public trust, or social license, which may become increasingly important as the bioenergy and bioproducts sector grows.

Bioenergy hasn't been a major cost-effective energy solution in Canada yet; however, demand for bioproducts is growing rapidly worldwide and provides a major economic opportunity for Canada, given our nation's abundance of forest biomass and the forest sector's commitment to transformation. Change may come through a combination of carbon reduction policies and incentives (and penalties) and improved energy conversion technologies. Reductions in production costs are making the use of forest harvesting residues increasingly attractive. Renewable energy generated from currently unused woody material from logged sites is an attractive climate change mitigation option because the carbon in biomass originated in the atmosphere, was taken by growing trees through photosynthesis, is released back into the atmosphere through bioenergy conversion, and will be taken back up by trees in the regenerating forest. If not used for energy, the carbon in harvesting residue will be largely released to the atmosphere instantaneously if it is burned, or over years or decades, depending on the material, through decomposition. Unlike wind and solar power, which is intermittent, bioenergy can be produced continuously to generate a secure and steady supply of energy. However, harvesting residues left on-site are also important for sustaining site productivity, biodiversity, water quality and long-term soil carbon storage.

The burning of slash piles is a traditional forestry practice and it remains a common wood-waste disposal method in forest management today.

It is inevitable that current removal rates will increase once harvesting residue has economic value. Although harvesting operations typically remove about 50% of residues on-site, it can be as high as 90% in Finland (Thiffault *et al.* 2014), which has a high rate of bioenergy production. Operational removal rates in some parts of Canada are already as high as 70% to 80% (Thiffault *et al.* 2014), which are the limits of recommended thresholds in some European countries. Practices that are currently considered sustainable could well change in the near future, and some jurisdictions may want to get ahead of the trend and generate guidelines to ensure that future removals will be environmentally sustainable – as the process of developing guidelines takes time.

To this end, Dr Brian Titus of the Pacific Forestry Centre is leading an international group of scientists in a review of

Biomass boiler, Teslin Tlingit, Yukon

biomass removal guidelines from around the world. The expert group of 16 scientists from 11 countries is generating a reference document to accompany the review to give future guideline developers easy access to the core information in existing guidelines. The objective is to produce materials which will help agencies tailor international best practises and experiences to suit their own circumstances. Top of mind for the group is considering the audience: those who will develop or apply guidelines in the field, as well as other professionals or the public who have an interest in this aspect of forest management. The review will be particularly of interest to foresters operating in northern temperate and boreal forests, including Canada.

The team of researchers have examined 32 existing harvesting biomass guidelines or related documents from around the world that apply to all or part of 43 levels of government, mainly in North America and Europe. The review considered commonalities and differences, highlighting unique features such as indicators for identifying sensitive sites, and identifying approaches in guideline development.

The report, Review of current guidelines for sustainable removal of harvesting residue from forest sites, will be published in 2020.

Further Reading

Forest bioeconomy, bioenergy and bioproducts
https://www.nrcan.gc.ca/forests/industry/bioproducts/13315

Bioenergy from biomass
https://www.nrcan.gc.ca/forests/industry/bioproducts/13323

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