

## Logging residue: the overlooked “green gold” of Canada’s forests?

With the growing interest in bioproducts and renewable energy sources, how can we assess the availability of logging residue in Canada? At the Canadian Forest Service, researchers used field data combined with estimates obtained through remote sensing of cut rates and stand characteristics for Canada’s managed forests. This enabled them to create a map to help estimate potentially available logging residue across the entire territory over the coming decades.

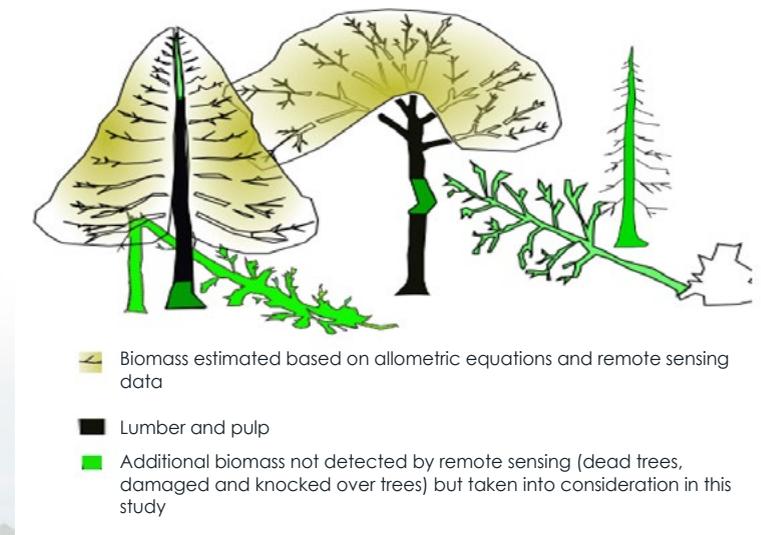
Logging generates considerable amounts of residue, which often remains in logged areas or along roadsides. Long considered forest waste, this biomass is in fact of interest both economically and ecologically. Indeed, forest biomass can help reduce dependence on fossil fuels. It can be transformed into solid fuels such as ecological logs, wood pellets and chips, into biofuels such as cellulosic ethanol, or industrial chemical bioproducts, textiles or pharmaceutical and personal hygiene products.

### What is logging residue?

Logging residue is composed of, among other things, branches, trunks with defects or excessive curvature, and any species or sizes of trees that are of no value to the operator, but that could not be left standing for silvicultural or operational reasons.

### Where is this lucrative residue to be found?

The answer is simple: in forests that are about to be harvested! This answer does, however, raise a new



question: how can we estimate the quantity and location of logging residue in Canada in the near future?

Almost all mapped estimates of the availability of this raw material are based on recently logged areas. However, to obtain data that is more in line with reality, this estimate can only be made using data on areas that will be logged in the future. Here, one of the difficulties encountered is that it is impossible to put together maps

of future logging activities over large areas, because local forest management plans vary from one region to another.

Scientists from the Canadian Forest Service therefore sought to identify the location of future logging residue and ascertain the quantities that could be available annually over the next few years at a scale of 100 km<sup>2</sup> for all of Canada’s managed forests located on public land.

To do so, they developed a methodology employing satellite imagery. Remote sensing products developed from satellite images were used both to establish the cut rate for the last 30 years at the unit of forest management scale and to identify mature forests

They compared these estimates locally with evaluations carried out in the field. The researchers assumed that the average harvest rate of managed units would remain steady. This approach should be more in line with reality, as it is based on stands which have not yet been harvested and which are mapped at a resolution of 250 m.

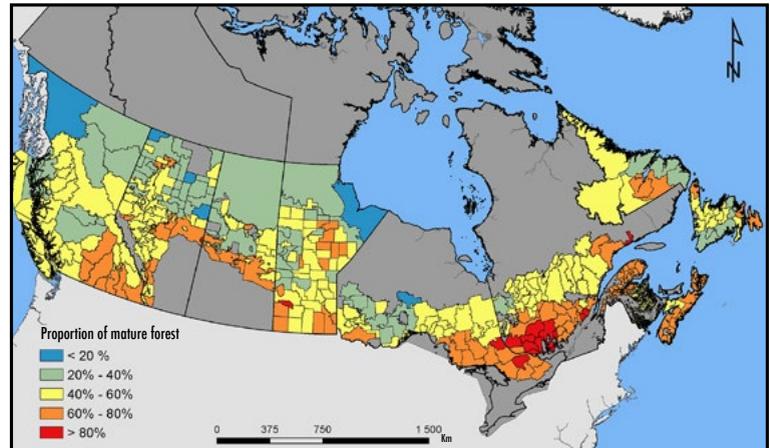
### Maps that talk

For Canada's managed forests as a whole, the research results give an estimate of the national annual availability of logging residue at an average of 21 million dry tons per year. The researchers were also able to:

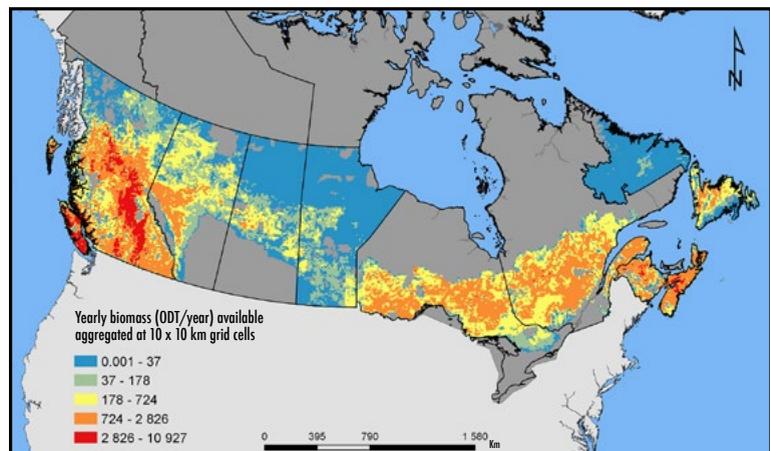
1. Create a map of mature forests for harvesting (Map 1);
2. Estimate an annual harvest rate based on data from the last three decades;
3. Estimate the forest residue that could be available for the future (Map 2).

### Caution is advised, but usefulness is proven

Since the method assumes that the average harvest rate observed during the past 30 years will be maintained, the results should be used with caution. Unforeseen economic events or major natural disturbances can have a significant effect on actual cut rates. For example, the area harvested annually in Canada between 1985 and 2005 was approximately 1 million hectares.



Map 1. Proportion of mature forests within Canada's managed public forests (2011).



Map 2. Map of the spatial distribution throughout Canada's managed forests of future available forest residue (dry tons/year) per 100 km<sup>2</sup> (2011-2031). It is possible, by consulting the [dataset associated with this map](#), to assess the short-term regional potential of logging residue biomass.

It then declined to about 600,000 hectares in 2009, following a drop in the U.S. housing construction market during the 2007-2008 global financial crisis. Subsequently, it increased slightly up until 2015, although remaining 10% lower than in 2005.

These research results will serve as the basis for economic development projects aimed at promoting forest residue use. This residue can become a source of income for local communities and for the forest industry, and at the same time contribute to the country's bioeconomy.

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