TREE TIPS
RESEARCH SUMMARIES
February 2009

Forestry Research Partnership Project No. 140-702
Paludification Project

THE AIM

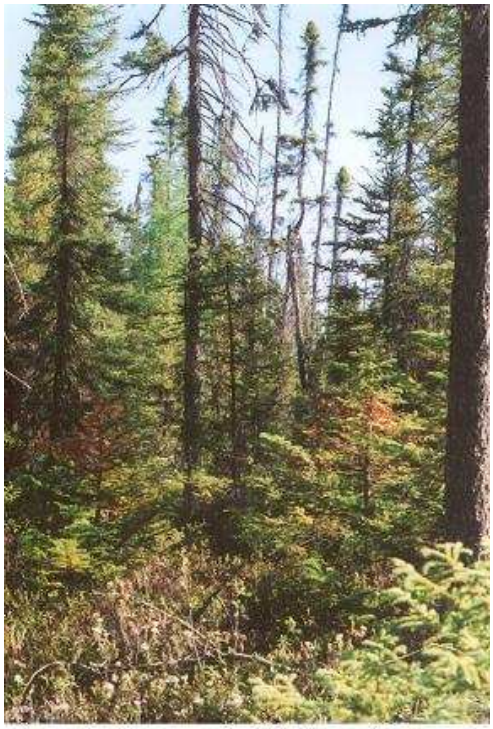
Figure 1.0: Open paludified stand: How best to harvest it?

This project was formally initiated in 2006, but builds on several years of research on paludification on the Clay Belt, which seem to indicate that current harvest methods are not regenerating stands to the same level of productivity.

Paludification is a process where organic material accumulates on the forest floor creating a cold, water-logged environment, and as a result tree growth is reduced. Ultimately, paludification leads to the conversion of forest stands into low productivity forested peatlands. It occurs in certain areas on earth where the landscape is relatively flat and soil drainage is poor, due to permafrost, soil texture or other factors. Paludification is a dominant process in the absence of forest fire on the Clay Belt where slight slopes and fine soils are common and occurs not only in depressions, but also on moderate slopes. While high severity forest fires can reverse paludification, low severity fires that kill the trees but leave the organic matter can speed up paludification. There is a concern that current harvesting techniques that minimise disturbance to the soil may mimic low severity fires and enhance this process. The purpose of this project is to determine how to best manage paludified stands so they maintain their long-term productivity.

The objective of this project is to evaluate retrospectively how silvicultural methods that disturb the surface soil affect the paludification process, and more specifically the moss cover type and growth and tree growth.

THE APPROACH

Thirty paludified sites that had been harvested by either a clear cut in the summer, a clear cut in the winter or CLAAG between 1974 and 1996 were identified. Two types of data were collected in each site: tree productivity data [stocking (number of trees in given area), height of trees, and recent growth of trees] and paludification data [depth of peat, decomposition level of peat, and abundance of plants on the forest floor (e.g. Labrador tea, *Sphagnum* mosses, feather mosses etc)]. Analyses were carried out to link the tree productivity data to the paludification data, taking into account the difference in age of the sites.

THE TREE TIP

The results show that there are three times more trees over three meters in height in the sites harvested by clear cuts carried out in the summer than in sites harvested by clear cuts carried out in the winter or CLAAG. These taller trees in all harvest types grew in pockets of particularly good soil conditions, with more decomposed peat that contained higher levels of nutrients. Consequently we can conclude that the summer clear cuts created more good sites for tree growth.

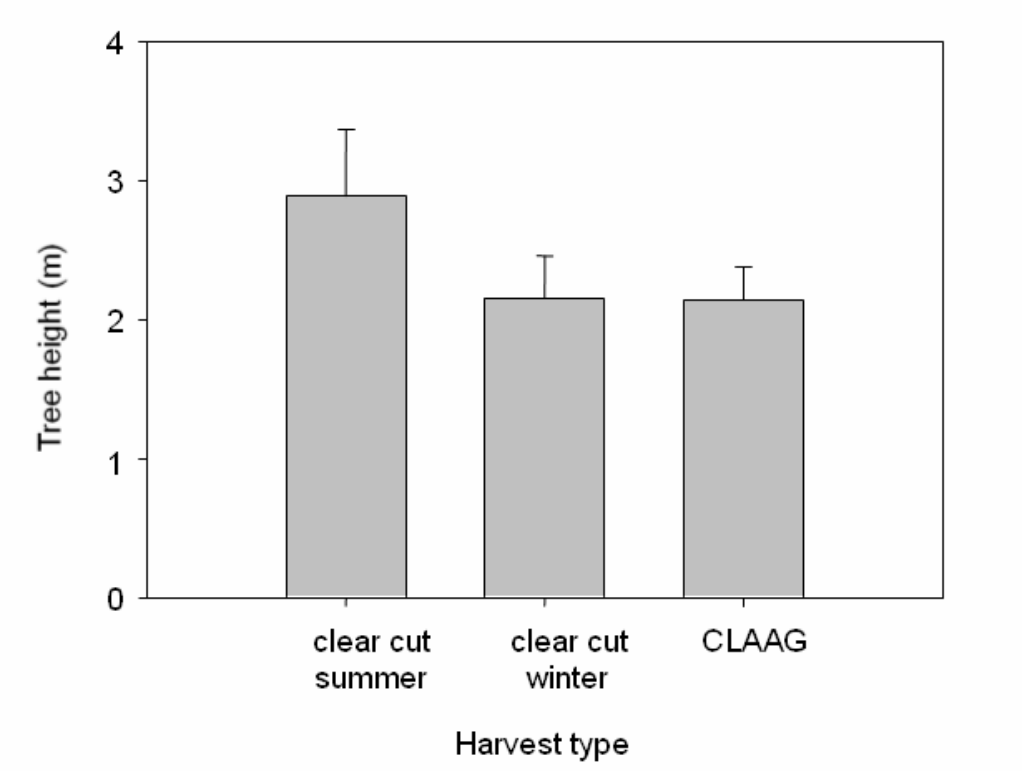

Figure 1.1: Average tree height in sites harvested by a summer clear cut, winter clear cut or CLAAG. Differences observed take into account differences in stand age. Mean height in summer clear cut is higher as there is a greater proportion of trees over 3 meters in height

These fairly revolutionary results will hopefully be tested in the near future in operational trials where measures will be taken before and after harvest in order to better understand the relationship between the harvested stand, the type of harvest and the regenerating stand.

This project is part of a larger project that is examining other management options such as prescribed burning, as well as remote sensing techniques to be able to determine which stands on a landscape scale need special attention during harvest, because of paludification.

THE TEAM

The success of this project is dependent on many team members:

- Benoit Lafleur, (UQAT)
- Louis Dumas (Tembec)
- Sonia Légaré (Tembec)
- David Paré (Canadian Forest Service)
- Yves Bergeron (UQAT)
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The larger project includes many other partners:

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