PREPARING FOR A FOREST BIOMASS INDUSTRY IN NEWFOUNDLAND AND LABRADOR

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ABSTRACT

Newfoundland and Labrador forests are generally made up of small trees and have low yields (35-120m³/ha). There is currently no commercial forest industry in Labrador and, in Newfoundland, the forest industry has been significantly downsized in recent years as a result of two pulp and paper mill closures. There is one pulp and paper mill still operating in Newfoundland and eight large sawmills are responsible for the majority of lumber produced in the province.

The closure of the two pulp and paper mills resulted in the loss of a significant market for small diameter trees. Small diameter trees were used to offset sawlog harvesting costs and, as a result, sawmills have had to close or adapt. Upgrades to increase sawmill efficiency and the utilization to unconventional forest products (ie: forest biomass) has helped the forest industry survive.

A number of challenges arise from an industry shift towards the utilization of forest biomass. Industry must adapt harvesting, transportation, handling and processing operations and also enter into new markets. Government, who own approximately 95% of forest land in the Province, must adapt management practices to reflect a changing industry. Government will assist industry with the introduction of new technology and techniques associated with utilizing forest biomass. As well, Government is addressing related issues associated with forest management including harvesting regulations, inventory estimates and tracking, volume allocations and social implications.

Keywords: Biomass, Guidelines, Harvesting, Administration

INTRODUCTION

Geographic Location and Forests of Newfoundland and Labrador

Newfoundland and Labrador (NL), the eastern-most Canadian province, is made up an island (Newfoundland) and a section of the Canadian mainland east of Quebec (Labrador). Newfoundland and Labrador cover 11 million and 29 million hectares, respectively, for a total of approximately 40 million hectares in land base (Figure 1).

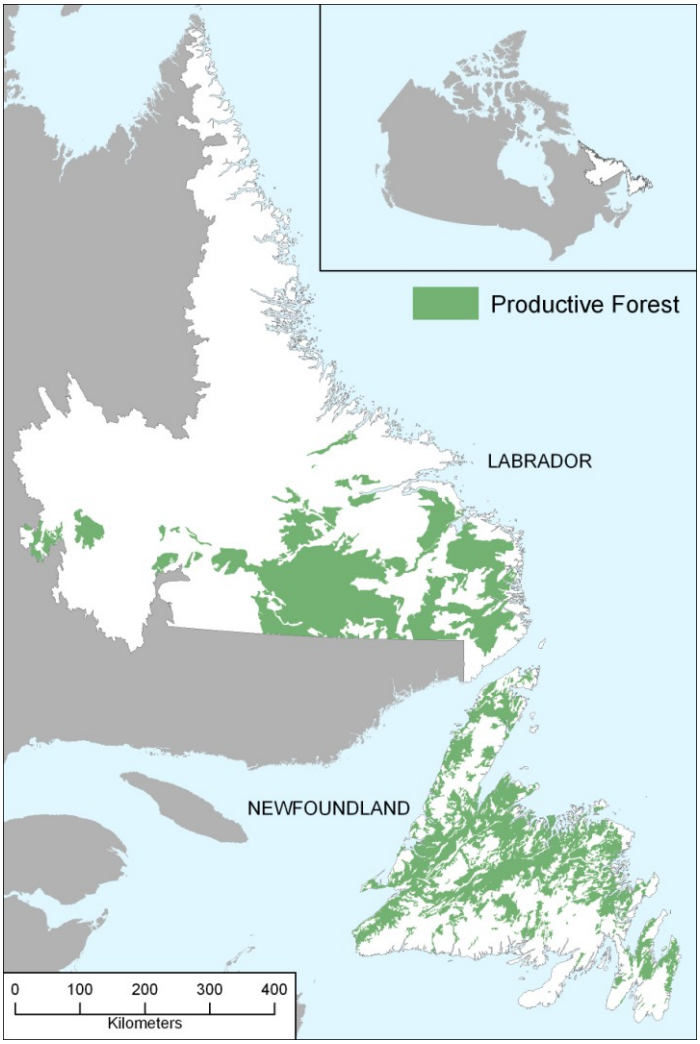
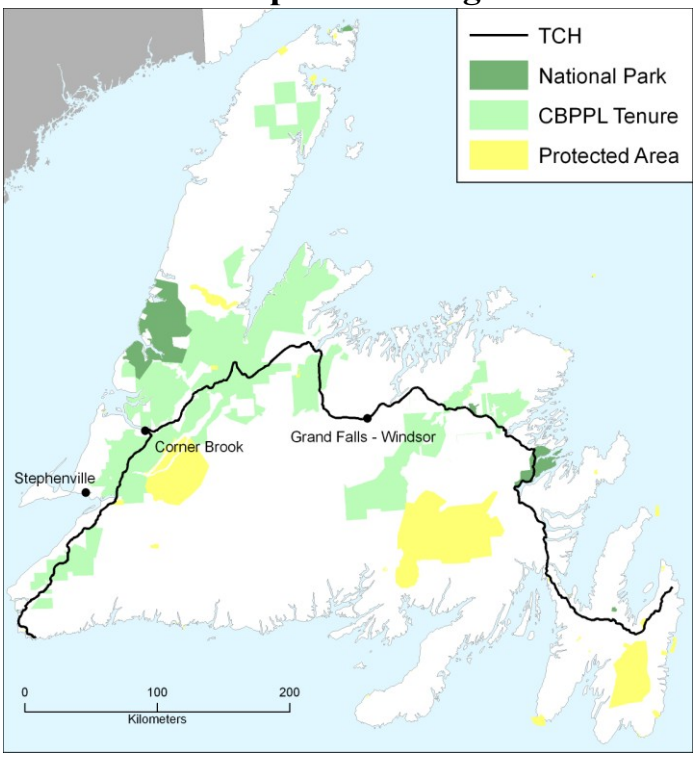


Figure 1: Productive forests of Newfoundland and Labrador

The forests of Newfoundland and Labrador form the most eastern part of the Boreal Forest Region of North America. The forests are made up of relatively small trees, primarily coniferous intermixed with hardwoods. Species variety is limited. Black Spruce (*Picea mariana*) forms about two-thirds of forests in Labrador and one-third in Newfoundland while the remaining forests are dominated by Balsam Fir (*Abies balsamea*). Limited amounts of hardwood and mixed-wood stands exist throughout the province and, where they exist, are dominated by White Birch (*Betula papyrifera*) and Trembeling Aspen (*Populus tremuloides*).

Soils in Newfoundland and Labrador are generally shallow and rocky. As a result of the cool, moist climate nutrient cycling is slow producing few highly productive forests in the province. Productive forest yields generally range from 35m³/ha to 120m³/ha. However, commercial operations are generally not carried out in stands of less than 60m³/ha.

Forest Ownership and Management



Approximately 95% of the 5.6 million hectares of forest land in Newfoundland is owned by the Crown. There is one large, long-term, tenure holder in Newfoundland and Labrador – Corner Brook Pulp and Paper Ltd. (CBPPL) – who manage approximately 1.6 million hectares of forest land on the Island (Figure 2).

There are approximately 5.4 million hectares of forest land in Labrador. Of which, approximately one million hectares (18%) are productive.

Figure 2: Land ownership and management

Forest Industry

Currently, commercial harvesting is limited to Newfoundland where approximately 1.3 million hectares, or 23% of forest land on the Island (11% of Island land base), is productive and operationally available for harvest.

Newfoundland and Labrador's forest industry is undergoing a significant transformation as the historic pulp and paper industry declines in favor of a solid wood products industry and an emerging wood energy sector. A significant volume of domestic fuel wood (firewood) consumption and a small component of value-added wood products, including cabinet doors and flooring, top off the forest products industry in NL.

Newfoundland and Labrador's sawmill industry consists of over 500 sawmills which also include a number of domestic mills. Eight large sawmills account for 80-90% of the approximately 90 million FBM produced annually.

The forest industry peaked from the late 1900s to the early 2000s when there were three pulp and paper mills operating in Newfoundland. However, two of these mills closed in 2005 and 2009 (located in Stephenville and Grand Falls-Windsor, respectively) and the remaining mill , CBPPL, idled two of its four paper machines in 2007 and 2009. To remain competitive and to reduce fiber costs, CBPPL has eliminated fiber purchases from the furthest reaches of the Province; namely the Northern Peninsula, Labrador and parts of central Newfoundland.

Due to a decline in provincial markets for pulpwood, the sawmill industry has had to curtail production (as is the case for Labrador) or to seek an alternate use for small diameter wood. Some sawmills have promoted higher efficiencies with the introduction of new equipment and technology. For example, Sexton Lumber Ltd., the highest producing sawmill in the province, underwent significant mill improvements in 2009-2010 to increase efficiency. Two additional mills plan to undergo upgrades in the near future. Holson Forest Products, located on the Great Northern Peninsula of Newfoundland, has taken the path towards the production of premium wood pellets produced from sawmill residue and currently un-marketable trees (small diameter trees, off-species, and dead trees) while sustaining the harvest of sawlogs to supply their sawmill. Over the past few years, CBPPL has been harvesting forest biomass to produce heat and electricity at their mill to offset Bunker C oil requirements.

Fiber Supply

Fiber supply was stretched during the early 2000s when three pulp and paper mills operated in Newfoundland. At that time the annual allowable cut (AAC) was approximately 2.4 million m^3. However, the actual volume of wood fiber harvested in 2009 and 2010 was in the order of 1 million m^3. There is currently a surplus of fiber resource available and, if not utilized by the forest industry, these productive forests run the risk of being allocated to other interests such as wildlife, mines and energy, and protected areas (reserves and cottage development areas).

A CHANGING INDUSTRY – FOREST BIOMASS CHALLENGES

Worldwide forest product markets are changing (decline in pulp and paper sector and growth of bioenergy sector). NL's forest industry is adapting by beginning to utilize small diameter trees (pulpwood and smaller) and previously un-merchantable trees (off-species, dead trees) for the production of energy and energy producing products. A number of challenges including administrative and management issues, for Government, and operational challenges, within the industry, will need to be addressed as the Province's forest industry adapts.

Harvesting Guidelines

Mechanical harvesting systems were introduced in the province in the early 1980s. Whole-tree harvesting systems (feller buncher, grapple skidder and slasher at roadside) were evaluated for a number of years but environmental concerns (nutrient removals and ground disturbance) resulted in the adaptation of cut-to-length harvesting systems (harvesters and short-wood forwarders) which is currently the standard mechanical harvesting system in the province. Whole-tree harvesting is not practiced in NL.

Significant focus is being placed on developing forest biomass harvesting guidelines to minimize the effects of harvesting previously unmarketable materials from our forests. Government is working with industry to develop guidelines aimed at sustaining forests, minimizing environmental impacts and encouraging forest biomass industry development. A major environmental concern with forest biomass harvesting is nutrient depletion. There has been minimal research related to soil productivity of NL forests and the majority of NL forests are classified as low to medium capability. For these reasons, Government and industry intend to

take a conservative approach to biomass harvesting and, in keeping with current practices, avoid the removal of branches and foliage from forests during commercial biomass harvesting operations. Exceptions may be made in specific situations or circumstances such as the clearing of right-of-ways or harvesting diseased or infested forest stands. In addition to sustaining nutrient levels, retaining harvesting slash on-site will provide brush mats to help alleviate ground disturbance by machinery.

Inventory and Allocation of Forest Biomass

The development and sustainability of a forest biomass industry will require close estimations of available forest biomass volumes for planning purposes. Some preliminary work has been done to estimate available forest biomass volumes within the context of current forest inventories but more research is required.

Allocation of available forest biomass is another challenge that Government will need to address. Commercial cutting permits (pulpwood and sawlogs) are distributed annually to long-term permit holders – a process that is generally not open to new entrants. It is unclear, at this time, whether or not forest biomass will be made available through traditional fiber allocations or if new allocations will be created. Government has requested forest industry development proposals for the Goose Bay area (Labrador) and central Newfoundland to consume surplus fiber in these regions. At this time, no projects have been approved but it is likely that whatever projects go ahead will include forest biomass harvesting and processing components.

Social Implications

The most prominent social implication related to forest biomass harvesting is the issue of domestic fuel wood (firewood) that is salvaged from traditional harvesting operations. The utilization of small diameter, dead and downed trees as well as off-species (ie: hardwoods) will remove fiber that would previously have been salvaged for firewood. One management option may be to avoid forest biomass harvesting in areas that traditionally have a high demand for firewood salvage.

Operational Challenges (harvesting, transportation and handling)

Operational challenges will also be encountered within the industry. Because current harvesting practices are based on a cut-to-length system a significant proportion of forest biomass is available in the currently un-utilized tree tops and butt-junks (portions of the stem, just above the stump, that are discarded due to rot or flare). Government will work with industry to evaluate new equipment and modifications to current operations to efficiently harvest, transport and handle biomass. Some options may include examining equipment add-ons such as accumulator attachments which allow multi-stem harvesting of small-diameter trees while still using existing harvesting heads. Forwarding tree-length timber rather than short-wood is another opportunity to explore. There may also be potential for in-forest or roadside chipping operations to maximize payload when trucking forest biomass out of the woods. The rate and degree of forest biomass industry development will greatly influence the rate at which new technology and equipment is adapted.

DISCUSSION

World markets for forest products are changing and the forest industry in NL and other jurisdictions is adapting. In NL, a recent move towards non-traditional forest products (ie: wood pellets) is occurring and Government and industry are faced with a number of challenges.

NL has a unique forest industry that is based on a limited fiber yield. We can observe forest biomass industries in other jurisdictions and utilize information and adapt technology, where appropriate. However, NL's forest industry will always be unique and we will have to be innovative in order to survive.

One thing is clear; the forest industry in Newfoundland and Labrador is changing. Industry and Government will have to adapt.