

## Supplementing Canadian Wood Pulp Demand with Hemp Biomass

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April 28, 2020

### Abstract:

The COVID-19 pandemic has created instability

in the global supply chain of pulpwood and pulp, negatively impacting the tissue, craft, and broader paper and cardboard markets. The pulpwood shortages in British Columbia that have caused mill closures have been created by Canada's reduction in timber harvesting for solid wood products

as well as a diminishing availability of recovered paper (Boynton, 2019). The timber markets that produce solid wood products for construction are currently producing no or low amounts of material effectively cutting off the pulpwood supply in western Canada whose pulp mills depend on the treetops from those harvested to produce their pulpwood supply.

The Canadian pulp mills are in a unique situation to mitigate their pulpwood supply shortages by utilizing Canada's established hemp agriculture biomass production, which is second in the world only to China, to supplement shortages in the pulpwood market. Canadian hemp seed farmers produce hemp biomass that could be used to effectively bridge the wood pulp shortage and provide Canadian pulping and tissue mills with an alternative fiber resource.

### Canadian Hemp Biomass:

Industrial hemp fiber biomass can be used as an

alternative source of material for pulp. Hemp fiber has been successfully used for paper production around the world for a few thousand years, so this is not a new concept (Hashim, 2019). Hemp blend toilet paper is currently available for retail and commercial purchases from China on



Alibaba (<https://www.alibaba.com/showroom/china-hemp-toilet-paper.html>). Though there is limited data on the exact adjustments mills would require to utilize this resource, initial research shows that existing mills should be able to process hemp into usable pulp without major overhauls

or changes to existing production lines. Prior to the Covid-19 shutdowns, Canna Markets Group was in a direct discussion with a North American tissue mill regarding the specifics of utilizing hemp pulp in a 100-ton hemp/hemp blend tissue order. The mill representative felt confident that the most challenging issue would be determining what blend percentage would or should be worked with (i.e 45%hemp/55%wood to 100% hemp).

Preliminary studies comparing hemp pulp to wood pulp for paper production are favorable and indicate that hemp can successfully be used to replace at least a portion of pulpwood biomass (Dewey and Merrill, 1916; Malachowska et. al, 2015) Hemp pulp has several advantages over pulpwood, including the following: Hemp pulp has a high cellulose concentration. On average trees are 30% cellulose and 70% non-cellulose material. Hemp averages 50-80% cellulose (Malachowska et. al, 2015).

Hemp has lower lignin content than wood, con-



taining between 5-24% lignin, while wood contains 20-35% lignin (Dewey and Merrill, 1916). Hemp biomass averages approximately 2 tons per acre annually. Clearcut harvests generate roughly 80-105 tons of timber per acre while thinning harvests generate between 25-40 tons of timber per acre (Thomas, n.d.). Rotation time for timber harvest is 20-30 years, while hemp fields can potentially

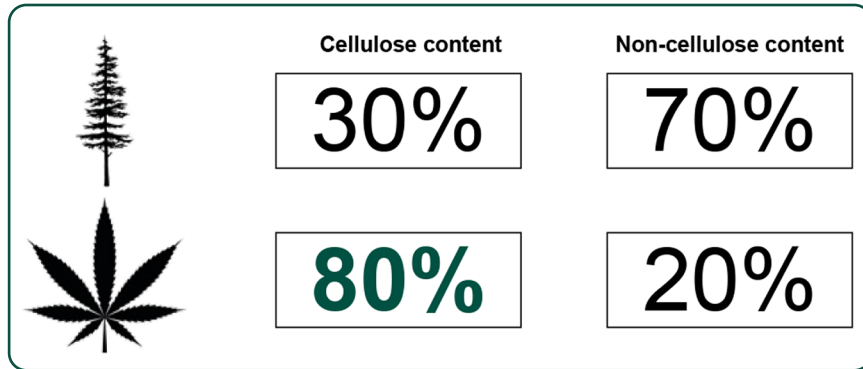
be planted and harvested twice a year if growing conditions are favorable. Over a 20 year period, hemp biomass production could theoretically be comparable to clearcut biomass harvest per acre, but with advantages in paper production because of the greater cellulose and lower lignin content.

The number of acres of industrial hemp planted in Canada over the last few years has been substantial and hemp pulp production could easily supplement the pulp and paper industry to replace some of the pulpwood biomass. The number of

acres of industrial hemp grown in 2017 in Canada was 138,000 (Stephenson and Herald, 2018). In 2018, 77,800 acres of industrial hemp were planted; 30,000 acres in Alberta, 27,100 acres in Saskatchewan, 11,500 acres in Manitoba (USDA Foreign Agricultural Services, 2019). The estimated number of acres planted for 2019 is double that of acres planted in 2018, possibly as much as 170,000 acres (Arnason et. al, 2019). The

number of acres available for planting for 2020 is at least as much as 170,000 acres, if not more. Canadian Pulp Mills are in a strong position to coordinate with existing Canadian hemp farms in 2020 to secure purchasing relationships for the

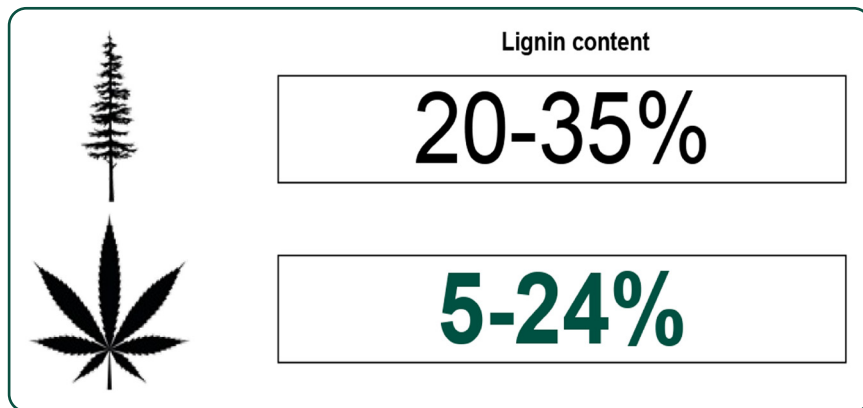
2020 agricultural growing season. Pulp mills can secure existing hemp biomass acreage as well as purchase additional acreage to be planted for the 2020 harvest



based on estimated demand.

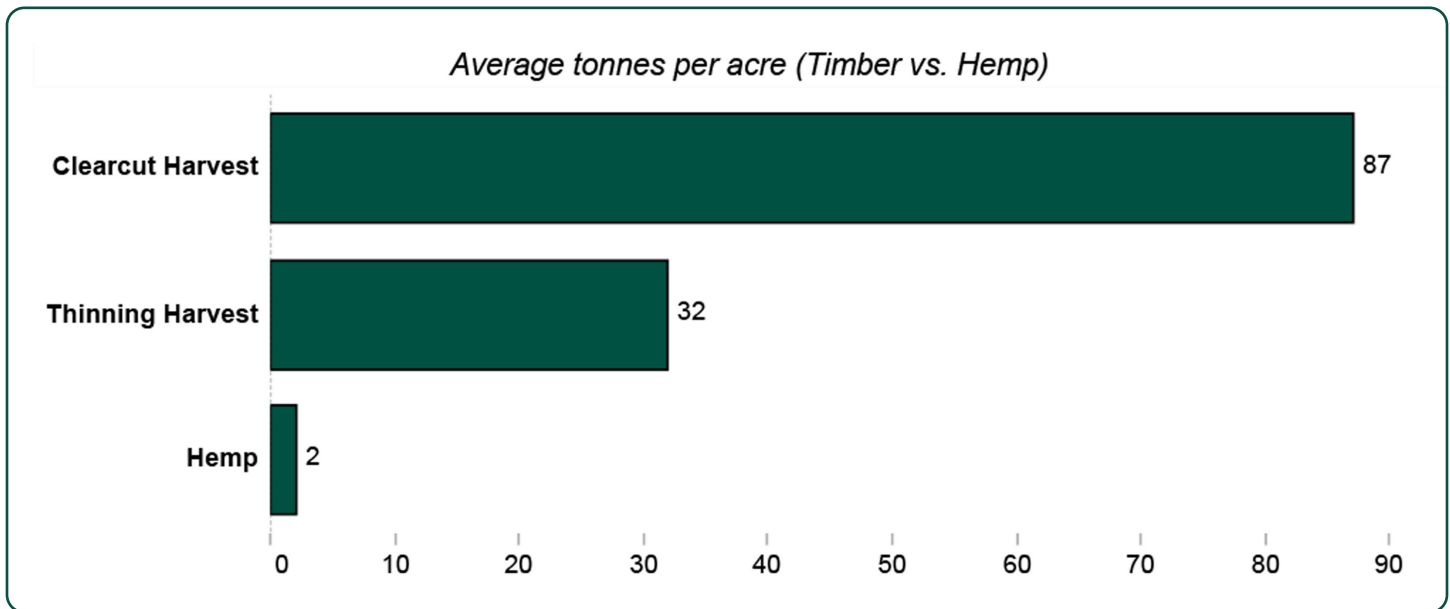
Existing Canadian pulp mills are located throughout Canada (see 2019 Pulp, Paper, and Bioeconomy Map) and could establish relationships with hemp farmers to secure biomass from 2020 acreage to supplement or offset some of the loss of biomass from decreased timber harvest and re-

claimed paper due to COVID-19. Pulp and paper mills that are adjusting capacity during COVID-19 include mills in Quebec, British Columbia, and Ontario (Pulp and Paper Canada, 2020). Additionally,



many sawmills have made the decision to temporarily close, reducing pulpwood necessary for pulp and paper mills across Canada (Canadian Forest Industry, 2020). These pulp and paper mills could establish relationships with hemp farmers across Canada to offset some of these shortages.

Alberta, in particular, may be able to provide a



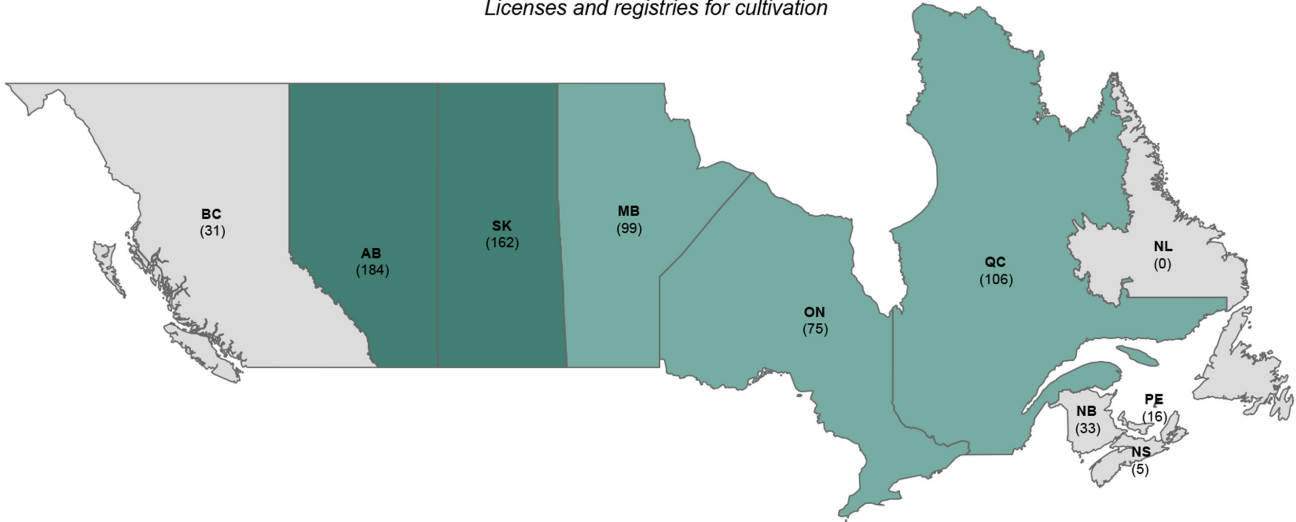
large portion of hemp biomass in 2020 as the predicted number of acres to be planted is higher for 2020 than the previous year (Tech Life Today, 2019). Additionally, it is one of the only places in the world that has a fiber processing pilot plant that processes bales of industrial hemp stalks so that they can be used for paper, textiles, etc. (Inotech, Alberta).

The idea of supplementing industrial hemp biomass for depleted or missing pulpwood material inventory will not solve all of the current

COVID-19 2020 supply chain issues being experienced by the pulp and paper industries. At best industrial hemp biomass used for pulp could potentially offer a path forward to create a redundant source of raw material for pulp mills in Canada and North America as early as Fall 2020, but only on a limited scale to provide a broad level of proof of concept. Once the viability of the hemp pulp biomass is fully vetted, large scale industrial hemp agriculture can be a companion resource to support the pulp and paper industries.

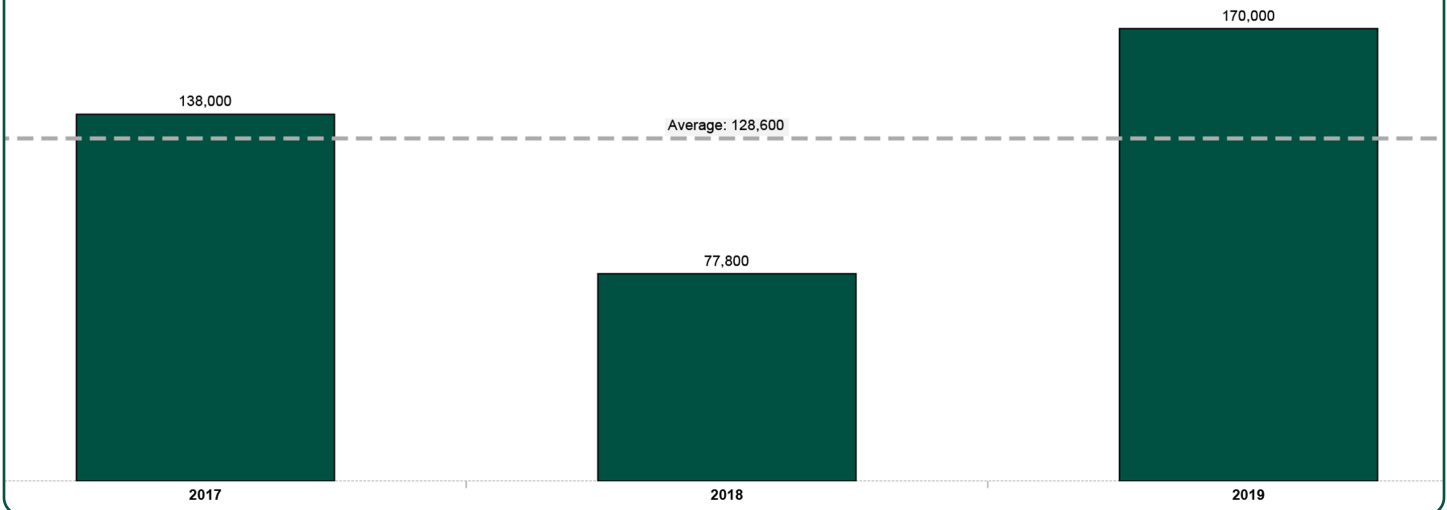


Licenses and registries for cultivation



Current Canadian Hemp Agricultural Production Statistics

Available Canadian acres per growing season





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