Present trends and future prospects for poplar utilization in Alberta

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Abstract

Between 1980 and 1990, poplar (mainly trembling aspen, *Populus tremuloides* Michx.) harvested on Crown and private lands in Alberta increased from 2.4 to 24.7% of the total harvest. In 1987-90, three oriented strandboard mills used more than 40% of the 1.4 million m³ of annual harvest of poplar from Crown and private lands. By the year 2000, the poplar harvest of five pulp and paper mills to be built between 1990 and 2000 is expected to reach about 8.5 million m³. By then, the pulp and paper industry will use about four-fifths of all poplar cut in Alberta.

Résumé

Entre 1980 et 1990, le peuplier (principalement le peuplier faux-tremble *Populus tremuloides* Michx.) récolté sur les terres publiques et privées de l'Alberta est passé de 2.4 à 24.7% de la récolte totale. En 1987-90, trois usines de panneaux à fibre orientée ont utilisé plus de 40% des 1.4 millions de m³ de la récolte annuelle de peuplier des terres publiques et privées. D'ici l'an 2000, la récolte de peuplier effectuée par les cinq usines de pâtes et papier qui seront construites entre 1990 et 2000 devrait atteindre près de 8.5 millions de m³. A ce moment, l'industrie des pâtes et papier utilisera près des quatre cinquièmes de tout le peuplier récolté en Alberta.

Introduction

Trembling aspen (*Populus tremuloides* Michx.) is by far the most important poplar in Canada. Together with balsam poplar (*Populus balsamifera* L.) and black cottonwood (*Populus trichocarpa* Torr. and Gray), poplar species account for about 11% of the total Canadian growing stock and over half of all the hardwoods (Zsuffa *et al.* 1979). Alberta poplar makes up a quarter of the Canadian poplar inventory. In Alberta, a third of the total growing stock is poplar and birch (about 830 million m³), and four-fifths of this is aspen; yet only 24.7% of the annual allowable hardwood cut (AAC) of 10.4 million m³ was used in 1990. This paper discusses historical and present trends, and outlines the future direction for poplar utilization in Alberta.

Past Uses

Until 1983 only a small fraction of the large deciduous resource in Alberta was used. From 1962 to 1966, about 85 800 m³ of poplar logs (mainly aspen) were harvested annually (Jackson 1966). Poplar was used mainly for veneer and plywood (75%), and the remainder for lumber and fuelwood (Jackson 1966). Balsam poplar veneer and plywood were first manufactured by Northern Plywood Ltd. in Grande Prairie starting in 1953 (Fregren 1980). The company was subsequently taken over by CANFOR. Aspen lumber and studs were produced by several small mills, the largest of which was the North American Stud Company operated in Slave Lake between 1971 and 1975. The pattern of poplar use has gradually changed, however, largely owing to increased aspen utilization for panel products in the early 1980s.

Present Utilization

A milestone in aspen and poplar utilization in Alberta was the start-up of the aspenite flakeboard mill by the Alberta Aspen Board Ltd. at Slave Lake in 1974-75. After a year of operation the mill closed because of low demand for the

product and problems associated with aspen processing. In 1981 Alberta's first waferboard mill (WB) with an annual capacity of 160 million sq. ft. was started up at the same site by Weldwood Canada Limited. Since then, two new oriented strandboard (OSB) mills have come on stream, and the waferboard mill has since been converted to OSB. Oriented strandboard is marketed and used as a plywood substitute for sidewall sheathing, roofing, flooring, and other applications. The proportion of OSB used for these purposes has been gradually increasing as OSB has gained wider acceptance. As a result, poplar harvested on Crown and private lands in Alberta increased over tenfold between 1980 and 1990, from 2.4% to 24.7% (Fig. 1) of the total harvest.

Until recently, hardwood (poplar) pulp was produced only in Ontario and Quebec. In 1986, Procter and Gamble at Grande Prairie undertook trial production of aspen bleached kraft pulp (Table 1). Financially viable and readily marketable poplar pulp and paper products that have been identified for Alberta include chemithermomechanical pulps (CTMP), bleached (sulfate) kraft pulps (BKP), market mechanical pulps, newsprint, and printing and writing papers (Woodbridge, Reed and Associates Ltd. 1985). In August 1988, the new Millar Western combined softwood and aspen CTMP mill at Whitecourt started manufacturing up to 265 000 tonnes (t) of bleached flash-dried pulp. This mill alone will increase poplar utilization for pulp from 15.4% (Table 1) in 1988 to about 30% in 1989, which in turn was further increased by Daishowa to 50.9% in 1990 (Table 1).

The attempts to make solid wood products from poplars has been plagued with a number of problems such as excessive wetness, furry and warping during drying, and stiff competition from relatively abundant and higher value softwood (spruce, pine, and fir) products. Despite the low demand for poplar solid wood products, 118 small sawmills in Alberta produced about 13 million fbm (Table 1) of poplar dimension lumber, timbers, and boards in 1990-91. The low capital and operating costs of these small sawmills allow them to utilize poplar despite relatively low prices for poplar solid wood products. Poplar lumber is used in the construction of houses, garages, and utility buildings. Poplar is also utilized for tongue-and-groove panelling, feature walls, doors

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Figure 1. Poplars cut as a percentage of total harvest in Alberta between 1980 and 1990. *It includes volume of poplars cut from private lands. Sources: Alberta Forestry, Lands and Wildlife, Edmonton, Alberta, and telephone survey of poplar-using industries in Alberta by the author, March 1991.

and windows, flooring for houses and barns, and truck and trailer decking. Lumber production can be profitable from these mills, which are located near high-quality poplar stands and close to local lumber markets. A good opportunity exists in secondary manufacturing of this lumber for pipeline skids, skid racks, dunnage, pallets, furniture, and other products. Two mills in Spruce Gove and Wildwood build aspen day-care furniture, school shelving, and computer tables.

Future Prospects

Future direction in poplar utilization includes a significant increase in deciduous pulp production by new mills at Peace River, Slave Lake, Athabasca, and Whitecourt and expanded production of existing mills, e.g., Grande Prairie. These mills will utilize large volumes of aspen and balsam poplar by the late 1990s (Table 2). The start-up harvest levels at these facilities are expected to be lower than indicated in Table 2.

The new mills in Alberta will market bleached kraft pulp locally and overseas to Japan and South Korea, which now import almost one-half of their supply from Brazil (Carroll-Hatch (International) Ltd. 1983). Alberta's poplar pulp and paper mills will be competitive internationally (Jaakko Pöyry International Oy 1983) because of low stumpage and energy costs.

These new forestry developments which utilize aspen and balsam poplar, will substantially increase employment in the forestry sector. About 3 200 direct and 6 500 direct person-years of employment will be generated when these projects

reach their full capacity. The estimated capital cost of these mills is about \$4 billion.

Even with these new mills coming on stream in the 1990s, some room for expansion exists for the pulp industry in the two remaining timber development areas of High Prairie and High Level — Fort Vermillion and in remanufacturing of primary poplar wood products into high-value secondary products. The furniture mills at Spruce Grove and Wildwood are good examples of this.

Conclusions

With these expansions, most or all of the poplar AAC (10.4 million m³) is expected to be used in Alberta by the year 2000. Several major challenges remain:

- (1) expanded profitable use of balsam poplar, which presently is underutilized;
- (2) reduction of poplar sawmill residues;
- (3) development of off-shore markets for higher-value added secondary poplar-using products such as the Jaegar "I Beam" and the Alberta Research Council's patented process for "Waveboard"; and
- (4) development of hybrid poplar short-rotation plantations near the mills to accommodate an increased demand for cheap fibre in the future.

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Table 1. Number of poplar-using industries in Alberta and annual production from crown and private lands and employment 1990-1991¹

Industry	No. plants	Log input ²		Production	Employment in mills and woodlands (person-years)
		m ³	%		
OSB mills ³	3	1,093,100	43.7	670 MM sq. ft ⁴ (3/8-in.)	789
Pulp and paper mills (1990 use)	1 ⁵	91,632	3.7	24 000 t aspen	70
	1	840 000	33.9	182,609 t aspen bleached kraft pulp	600
	1 ⁷	330,000	13.3	100,000 t aspen bleached flash-dried pulp	225
Sawmill-planing mill complexes ⁹ producing 100 M to 1 MM fbm	22	50,675	2.0	11.9 MM fbm	125
Sawmill-planing mill complexes ⁹ producing less than 100 M fbm	96	7,481	0.3	1.7 Mm fbm	61
Firewood producers	Not available	41,500	1.7	Not applicable	Not available
Pallet mills ¹⁰	2	31,300	1.3	208 600 pallets	53
Container mills	1	Not applicable	0.0	Not available	3
Furniture mills	2	430	0.0	400 computer tables	43
				400 shelving units	
				200 pieces day-care furniture	
Cattle feed pelleting mill	1	900	0.0	Aspen cattle pellets	12
Total	129	2,477,017	99.9 ¹¹		1,981

¹Sources: Alberta Forestry, Lands and Wildlife, Edmonton, Alberta, and telephone survey of poplar-using industries in Alberta by the author, 1991.

²Includes poplar logs harvested from Alberta's Crown and private lands and logs purchased outside the province.

³Includes 400 000 m³ of aspen harvested on an FMA and purchased from private lands in 1990-91 by Weyerhaeuser of Canada Ltd. at Drayton Valley, Alberta, which began OSB production in January 1987.

⁴Includes OSB production of 250 MM sq. ft. (3/8-in.) manufactured in 1990.

⁵Softwood pulp mill producing aspen pulp in trial production.

⁶Based on average recovery of 1 t aspen bleached draft pulp from 4.6 m³ of aspen roundwood.

⁷Production of aspen bleached flash-dried pulp mill from January 1 to December 31, 1990.

⁸Based on average recovery of 1 t of aspen flash-dried pulp from 3.66 m³ of aspen and 2.84 m³ of spruce roundwood.

⁹Based on average recovery of poplar lumber in Alberta of 233 fbm/m³.

¹⁰Based on 35 pallets/M fbm of lumber (8.2 pallet/m³).

¹¹Does not add up due to rounding.

Table 2. New and proposed poplar (aspen) pulp and paper mills in Alberta to March 1991 (Alberta Forestry, Lands and Wildlife).

Table 2: New and proposed poplar/aspen/ pulp and paper mills in Alberta to March 1992 (Alberta Forestry, Lands and Wildlife)										
Company	Location	Type of pulp ¹	Date of opening	Species utilization ('000 m ³)		Annual pulp output ² ('000 t)		Capital cost (million \$)	Employment (person-years)	
				Aspen	Softwood	Aspen	Softwood		Direct	Indirect
<i>In operation:</i>										
Millar Western Industries Ltd.	Whitecourt	CTMP producing BFDP	August 1988	315	298	105	105	205	225	450
Alberta Newsprint Company Ltd.	Whitecourt	CTMP newsprint	August 1990	132	500	44	176	360	375	750
Daishowa Canada Co. Ltd.	Peace River	BKP	September 1990	1,194	630	630 ³	110	500	630	1,260
Alberta Energy Co. Ltd.	Slave Lake	CTMP	January 1991	264	53	88	22	168	122	245
<i>In construction:</i>										
Procter and Gamble Cellulose Ltd.	Grande Prairie	BKP	January 1992	690	690	150	150	400	600	1,200
Alberta-Pacific Forest Industries Ltd.	Athabasca	BKP	October 1993	1,800	360	390 ⁴	106	1,300	1,300	2,600
Total				4,395	2,531	1,407	669	2,933	3,252	6,505

¹DFDP = bleached flash-dried pulp; BKP = bleached draft pulp; CTMP = chemithermomechanical pulp.

²Separate aspen and softwood pulp production.

³Based on average recovery of 1 tonne of BKP from 5.19 m³ of aspen and 5.73 m³ of softwood.

⁴Also utilizing balsam poplar.

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