

# MARKET POTENTIAL FOR ALBERTA'S POPLAR PRODUCTS

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## Introduction

Economically accessible softwood timber is diminishing in Canada, and interest is growing in the abundant and under-utilized poplar resource. Among the poplars, trembling aspen, *Populus tremuloides* Mich., is by far the most important; together with balsam poplar, *Populus balsamifera* L., and black cottonwood, *Populus trichocarpa* Torr and Gray, it accounts for about 11% of the total Canadian growing stock and over half of all hardwoods (Zsuffa *et al.* 1979). In Alberta, one third of the total growing stock is poplar, 83% of which is aspen. Alberta poplar makes up one-quarter of the Canadian poplar inventory.

Until the last decade this vast resource in Alberta was virtually ignored. For example, from 1962 to 1966, about 85,800 m<sup>3</sup> of poplar logs (mainly aspen) were harvested annually (Jackson 1966). But between 1980 and 1987, poplar cut in Alberta increased from 2.4% to 15.4% of the total harvest. A milestone in aspen utilization occurred in 1983 with the start-up of the first oriented strand board (OSB) mill with 250 MM sq. ft. (3/8 in.) annual capacity. Since then, two more OSB mills have been put into operation; one was a conversion from a waferboard mill. A new aspen chemi-thermomechanical pulp mill for the production of bleached flash dried pulp is under construction. Trials to utilize aspen in Alberta for bleached kraft pulp are also promising. But many challenges remain in improving the utilization of aspen in Alberta: (1) efficient use of the abundant mill residues; (2) development of markets for conventional and new products; and, (3) the continued intense competition from spruce, pine and fir (SPF) products.

In this paper:

1. we describe the size of the North American poplar resource with emphasis on Alberta;
2. we evaluate present utilization of this resource; and,
3. we outline market potential for Alberta's poplar products.

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## The Size of the North American Poplar Resource

Alberta has in the green (forest) zone about 725 million  $m^3$  (tA 603.9  $m^3$ , bP 121.1  $m^3$ ) of growing stock of poplars. This is slightly below the volume for these species in Ontario but more than the supply of poplars in British Columbia and Quebec combined. In comparison, the three Lake States (Michigan, Minnesota, Wisconsin) with a significant poplar resource have a total of about 345 million  $m^3$ , which is mainly aspen (Figure 1).

In Alberta, most of the mature poplar with merchantable volumes preferred by industry is on Crown lands in the north-central and northern part of the province (Woodbridge, Reed and Associates, Ltd., 1985). Mature poplar stands reach minimum merchantable volume of 50  $m^3/ha$  by 50 years and 90  $m^3/ha$  by 70 years. Poplar stand volume continues to increase past that age, but so does the incidence of stain and decay. These are two of the most important factors limiting the utilization of aspen and balsam poplar (Hiratsuka and Loman 1984). Stain is a discoloration of wood by microorganisms or other physiological causes, and it may or may not be the early stage of incipient decay. In early decay, the wood is discolored but firm; in advanced decay, the wood is softened and loses structural strength. Stands 70 to 90 years of age usually have 4-5% decay<sup>2</sup>; this may increase to about 25% or more in 120- to 130-year-old stands. This may render some stands unprofitable to harvest for most products except panelboards. Stands at 140 years normally have a high incidence of decay, and by 150 years they are usually "broken up" and unusable (Northern Alberta Development Council 1985). Thus, the best opportunity for poplar utilization is between 60 to 85 years of age when the trees are fairly large, yet sound enough to harvest.

Forest industry development hinges on sufficient annual allowable cut (AAC) (Figure 2) and continuous timber supply, which depends on a regular age class distribution on the supply area. A good proportion of mature and overmature poplar timber is in the Slave Lake, Footner Lake, Peace River, and Grande Prairie Forests (Woodbridge, Reed and Associates 1985). However, all forests in central and northern Alberta have a sufficient supply of mature poplars and a suitable age class distribution to support a viable poplar-based forest industry. A limited supply of aspen, balsam poplar, and black cottonwood is available on private lands in the agriculture zone.

In Alberta, most of the 11.4 million  $m^3$  poplar AAC is within 80 km of existing mills and potential manufacturing sites. This distance is an average haul distance for the forest industry in Canada. In Alberta and Saskatchewan, log haul distances beyond 80 km for poplar are considered uneconomic. (Northern Alberta Development Council 1985). From the 11.4 million  $m^3$  of accessible AAC within an 80 km radius of existing mills or potentially suitable mill sites, only 1.3 million  $m^3$  was cut in 1986-87. An additional 2.1 million  $m^3$  was allocated but not cut, and 8.0 million  $m^3$  was uncommitted (Morgan 1987).

2 Personal communication, D. Morgan, Alberta Forestry Lands and Wildlife, June 1987.

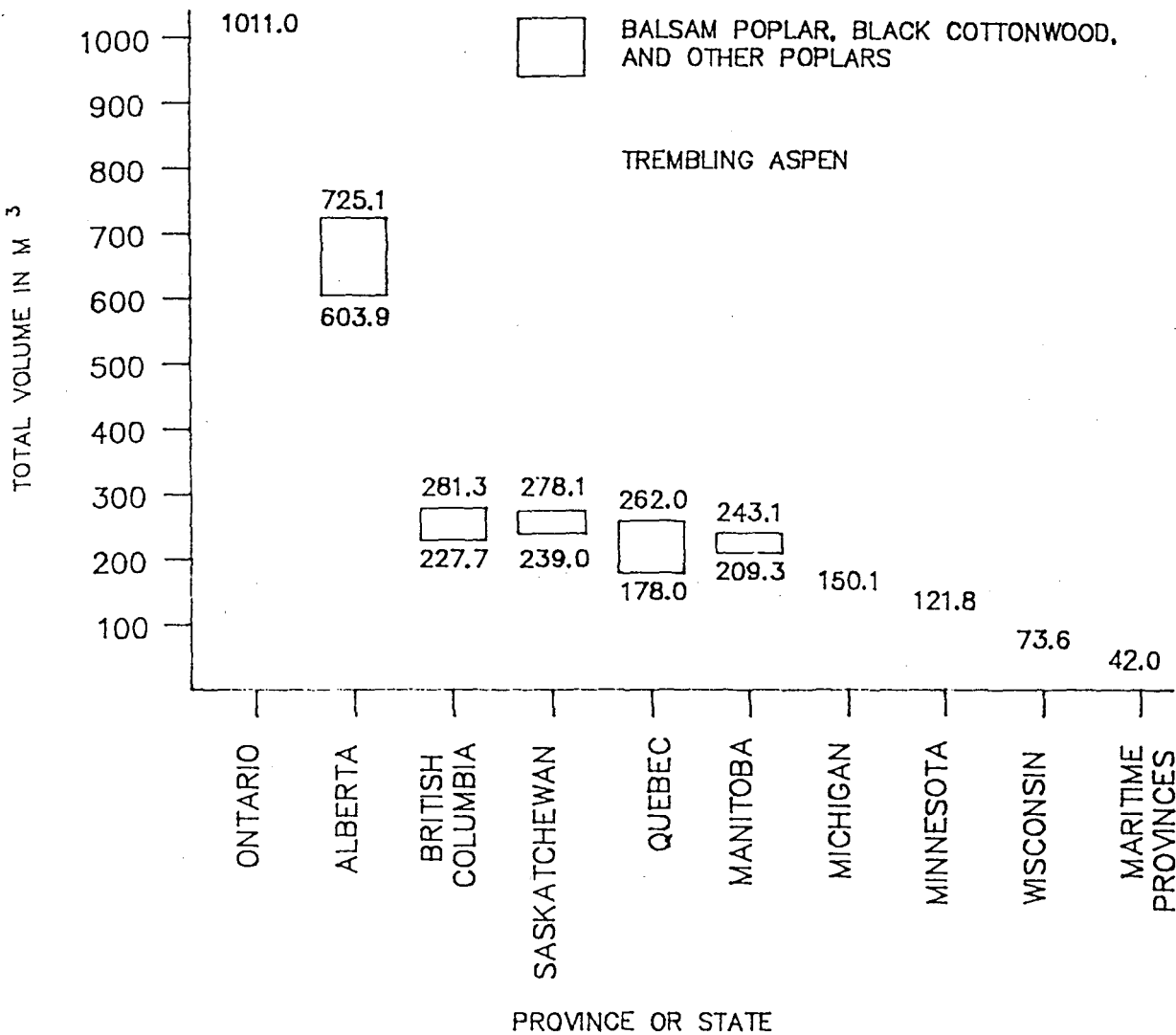


Figure 1. Poplar growing stock<sup>3</sup> in major producing regions<sup>4</sup> in Canada and the U.S., 1987.

Sources: *Personal communications, June 1987*

*Alberta, D. J. Morgan, Alberta For. Lands & Wild., Gross merch. vol., Green Zone, 1987 data;*

*Ontario, J. E. Osborn, OMNR, Gross tot. vol., aspen & poplars combined, 1987 data;*

*British Columbia, R. Quenet, B. C. Min. For., Net merch. vol. (decay out) 17.5 cm dbh + 81 years, 1986 data;*

*Saskatchewan, D. G. Lindenau, Sask. Parks, Recr. and Cult., Gross merch. vol., 1987 data;*

*Quebec, D. Demers, Min., de l'Energie, Mines et Res., Gross tot. vol., 1987 data;*

*Manitoba, J. Becker, Man. Nat. Res., Gross merch. vol., 1986 data;*

*Maritime Provinces, G. M. Bonnor, 1982. Canada's forest inventory, 1981. Gross merch. vol.;*

*Michigan, Wisconsin, J. Krantz, Min. Nat. Res., Minnesota, B. Smith, U.S. For. Serv., NCFES, 1987 data; and*

*Minnesota aspen resource, aspen current use 1984-85, Min. Nat. Res. 1985.*

3 Growing stock on Crown patented, State lands and private lands.

4 Small poplar growing stock occurs in a number of the States, Provinces and Territories.

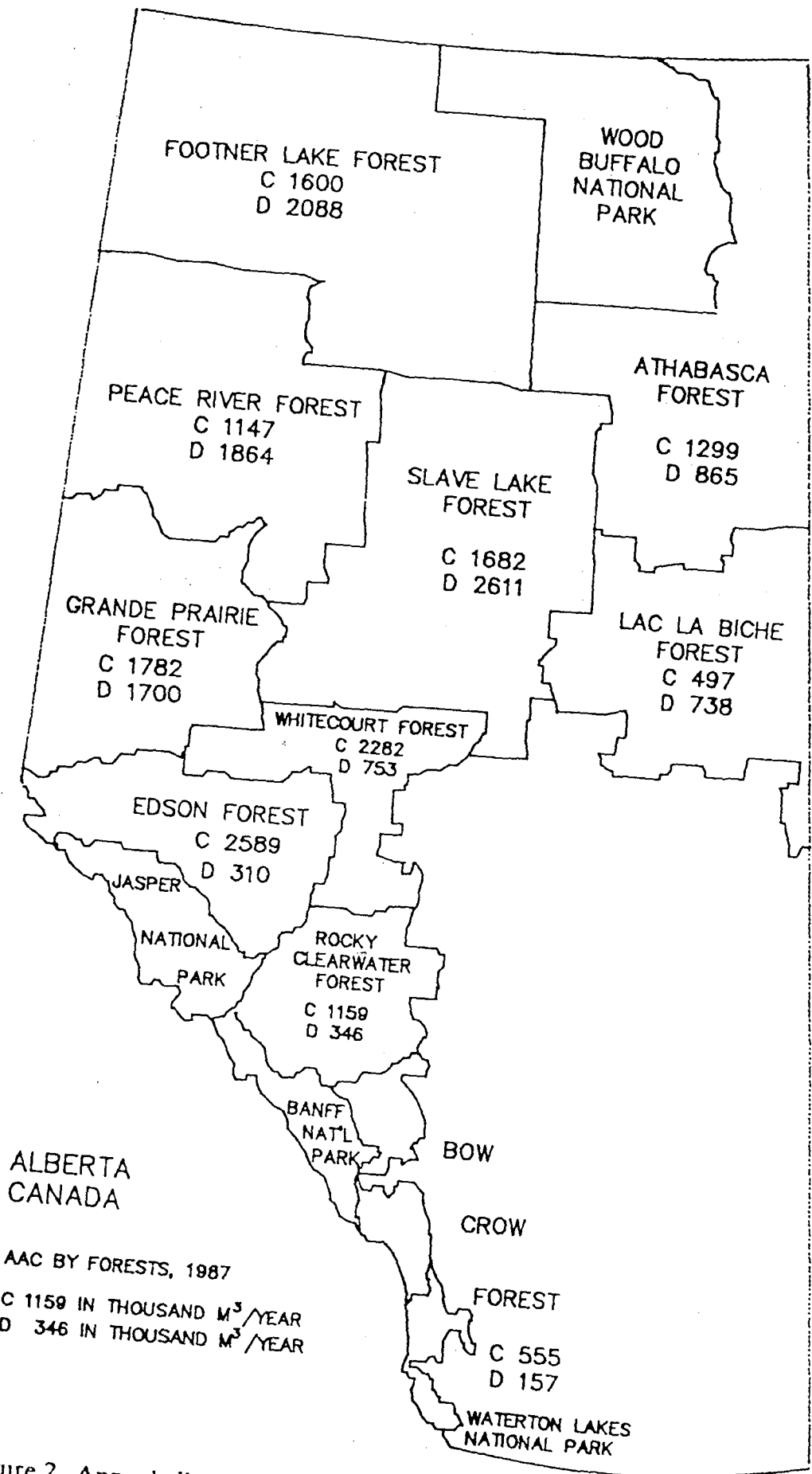


Figure 2. Annual allowable cut (AAC) of coniferous (C.) and deciduous (D. mostly poplar) species in Alberta by Forests in 1987 (Alberta Forest Service map).

## Annual Harvest of Poplars in Alberta

Poplar harvest (mainly aspen), more than doubled from 1980-81 to 1983-84 (Table 1); this was primarily because of the demand from the first OSB mill, which started operation in late 1983. Poplar harvest increased to nearly 700,000 m<sup>3</sup> in 1985-86, partly because of the use of aspen in production trials for bleached kraft pulp, and to nearly 1.3 million m<sup>3</sup> in 1986-87 because of the use of this species for expanding OSB production. In 1986-87, 90.1% of the poplar harvest was from Crown Lands, and 9.9% was from private lands. About two-thirds of the harvest came from Timber Quotas, 14.2% from Forest Management Agreement Areas, 12.8% from Commercial Timber Permits; and a small volume came from Local Timber Permits and Forest Products Permits (Table 2).

**Table 1:** Annual harvest of poplars<sup>5</sup> in Alberta<sup>6</sup> 1980-1987

	Total volume cut (all species)	Poplar cut (m <sup>3</sup> )	Poplar Cut (% of total)
1980-81	5 453 301	131 777	2.4
1981-82	5 564 033	182 114	3.3
1982-83	5 560 131	172 107	3.1
1983-84	7 314 091	522 033	7.1
1984-85	6 600 271	472 301	7.2
1985-86	6 960 000	696 730	11.4
1986-87 <sup>7</sup>	8 357 512	1 285 877 <sup>8</sup>	15.4

Source: Alberta Energy and Natural Resources, 1982-1986.

Personal communication, R. Dunigan, Alberta Forestry, Lands and Wildlife, June 1987.

5 Trembling aspen, 97%, balsam poplar, 2% and black cottonwood, 1%.

6 Excludes poplar harvested and used for firewood.

7 Personal communication, R. Dunigan Alberta Forestry, Lands and Wildlife, June, 1987.

8 Includes 115,802 m<sup>3</sup> harvested for OSB and lumber on private lands and 11,500 m<sup>3</sup> harvested for firewood on Crown lands.

## Poplar Use by Product in Alberta in 1986-87

The three OSB mills in 1986-87 used 81.7% (1,050,000 m<sup>3</sup>) of all the poplar (aspen only) harvested in Alberta. At the present, OSB manufacturing is the most profitable poplar use and seems to have the best future potential. Increasingly, OSB displaces plywood and waferboard for wall sheathing, roofing, flooring, and other applications, even though the prices for the former have risen about 20% in the last 5 years (Widman Management Ltd. 1987).

**Table 2:** Annual harvest of poplars from Crown lands in Alberta, 1986-87 by various timber dispositions.

Timber disposition	Timber Quotas	Forest Management Agreements	Commercial Timber Permits	Local Timber Permits	Forest Product Permits <sup>9</sup>
Volume in %	63.2	14.2	12.8	9.1	0.7

Source: R. Dunigan, *Alberta Forestry, Lands and Wildlife*, June 1987.

Two thirds of Alberta's OSB 4 x 8 ft. panels and tongue and groove products are sold in the U.S., mainly in California, Arizona, Washington, and Oregon. The rest is sold in western Canada. Oriented strand board panels 7/16 in. thick are sold mainly in the U.S., and those 3/8 in. thick are sold in Canada.

An aspen/SPF chemi-thermomechanical (CTMP) mill for bleached flash dried pulp is under construction in Whitecourt to start operation in the fall of 1988. The mill will have 177,500 tonnes annual capacity to process a variety of pulps for fluff, which is used for a range of products from diapers to tissue and towel grades. It will also produce pulp suitable for certain printing and writing papers. At full production, this mill will use about 532,000 m<sup>3</sup> of wood annually, of which 50% will be aspen, and 50% will be softwoods. This mill will eventually use aspen only. In the 1986 trial production, the Procter and Gamble softwood bleached kraft pulp mill in Grande Prairie produced about 20,000 tonnes of aspen bleached kraft pulp. In 1987 the same mill plans to produce 25,000 tonnes of pulp.

<sup>9</sup> Includes mostly small disposition of poplars for lumber for own use or for firewood.

In lumber, 91 small sawmills in Alberta produced about 10.6 million board feet of aspen, balsam poplar, and black cottonwood dimension lumber, timbers, and boards in 1986-87 (Table 3), despite an economic downturn. Low capital costs and low overhead of these sawmills make them profitable operations, despite the low demand and relatively low prices for poplar lumber. The dimension lumber is often resawn into pallets, pipeline skids, pipe racks dunnage, and other products. In rural areas, lumber from aspen, balsam poplar, and black cottonwood is used for construction of houses, garages, and other utility buildings. These species are also utilized for tongue and groove panelling, feature walls, doors and windows, flooring for houses and barns. Black cottonwood is used for truck and trailer decking. A firm in west-central Alberta builds aspen day-care furniture, school shelving, and computer tables.

In 1986-87 an alfalfa pelleting mill in central Alberta used 900 m<sup>3</sup> of aspen to produce fibre-rich aspen pellets for cattle feed (Table 3). In this process, aspen wood is first chipped and ground, then pelleted. The pellets seem to be an excellent feed supplement for cattle.

In 1986-87 about 30,000 m<sup>3</sup> of firewood from aspen and other poplars was cut on private lands, and 11,500 m<sup>3</sup> on Crown timber lands. This firewood is frequently cut in spruce-aspen mixed woods on Crown lands; or as part of land clearing for agriculture on private lands.

### **Market Potential for Alberta's Poplar Products**

The most promising market outlook is for OSB. In addition to the three existing OSB mills, two more mills are being planned. The existing mills are trying to expand established markets and open new ones. Markets are expanding in California, Arizona, Washington, and Oregon and are trying to break into other southwestern states. The OSB products are also further diversified and improved. Two of the three mills are experimenting with a variety of home and office furniture using OSB as finish, or core stock for veneer.

Bleached sulfate market pulp, mechanical pulp, newsprint, and printing and writing papers were identified for Alberta aspen as technically and economically viable and readily marketable (Woodbridge, Reed and Associates Ltd. 1985). Production costs in Alberta are competitive with those of British Columbia and the northwest U.S. (Ekono Consulting Ltd. 1986). High wood cost will keep Scandinavian mills from North American and Pacific Rim markets. In the latter, Australian and New Zealander pulp and paper mills will have a cost advantage. However, both have limited wood resources. South American mills will have lower production costs than Alberta mills, but their own need will likely absorb a major share of their production (Ekono Consulting Ltd. 1986). Potential aspen pulp and paper mills in Alberta might sell aspen bleached kraft pulp to Japan and South Korea, who presently import 42% of their need from Brazil (Carroll-Hatch International Ltd. 1983).

**Table 3:** A summary of poplar-using industries in Alberta, 1986-87.

Industry	Number of Firms	Log input (m <sup>3</sup> )	(%) <sup>10</sup>	Production	Employment in mills and woodlands (person-years)
Oriented strand board mills	3	1 050 000	81.7	670 MM sq. ft. (3/8 in)	789
Pulp and Paper <sup>11</sup> mills	1	117 500	9.1	25,000 tonnes <sup>12</sup> aspen bleached kraft pulp	70
Sawmill-planing mill complexes <sup>13</sup> producing 100 M to 1 MM fbm	20	38 940	3.0	9.3 MM fbm	102
Sawmill-planing mill complexes <sup>14</sup> producing less than 100 M fbm (Not in operation)	71 34	5 307	0.4	1.2 MM fbm	41
Firewood producers	n/a	41 500	3.2		n/a
Pallet mills <sup>15</sup>	2	31 300	2.4	208,600 pallets	53
Container mills	1	not applic.	0	n/a	3
Furniture mills		430	0	200 computer tables 200 shelving units 100 day care furn.	12
Cattle feed pelleting mill	1	<u>900</u>	<u>0</u>	Aspen cattle pellets	<u>12</u>
<b>TOTAL</b>		1 285 877	99.8		1 082

10 Totals do not add up to 100% due to rounding.

11 Softwood pulp mill producing aspen pulp in trial production.

12 Based on average recovery of aspen bleached kraft pulp 4.7 m<sup>3</sup>/t.

13 Based on average recovery of poplar lumber in Alberta 233 fbm/m<sup>3</sup>.

14 Based on average recovery of poplar lumber in Alberta 233 fmb/m<sup>3</sup>.

15 Based on 35 pallets/Mfbm of lumber (8.2 pallets/m<sup>3</sup>)



Solid wood products from aspen, balsam poplar, and black cottonwood face stiff competition from the still abundant and higher value spruce, pine and fir products. A window of opportunity exists in secondary remanufacturing of this lumber for furniture and other products. Lumber production can be profitable for the mills close to lumber markets that operate near high quality aspen stands.

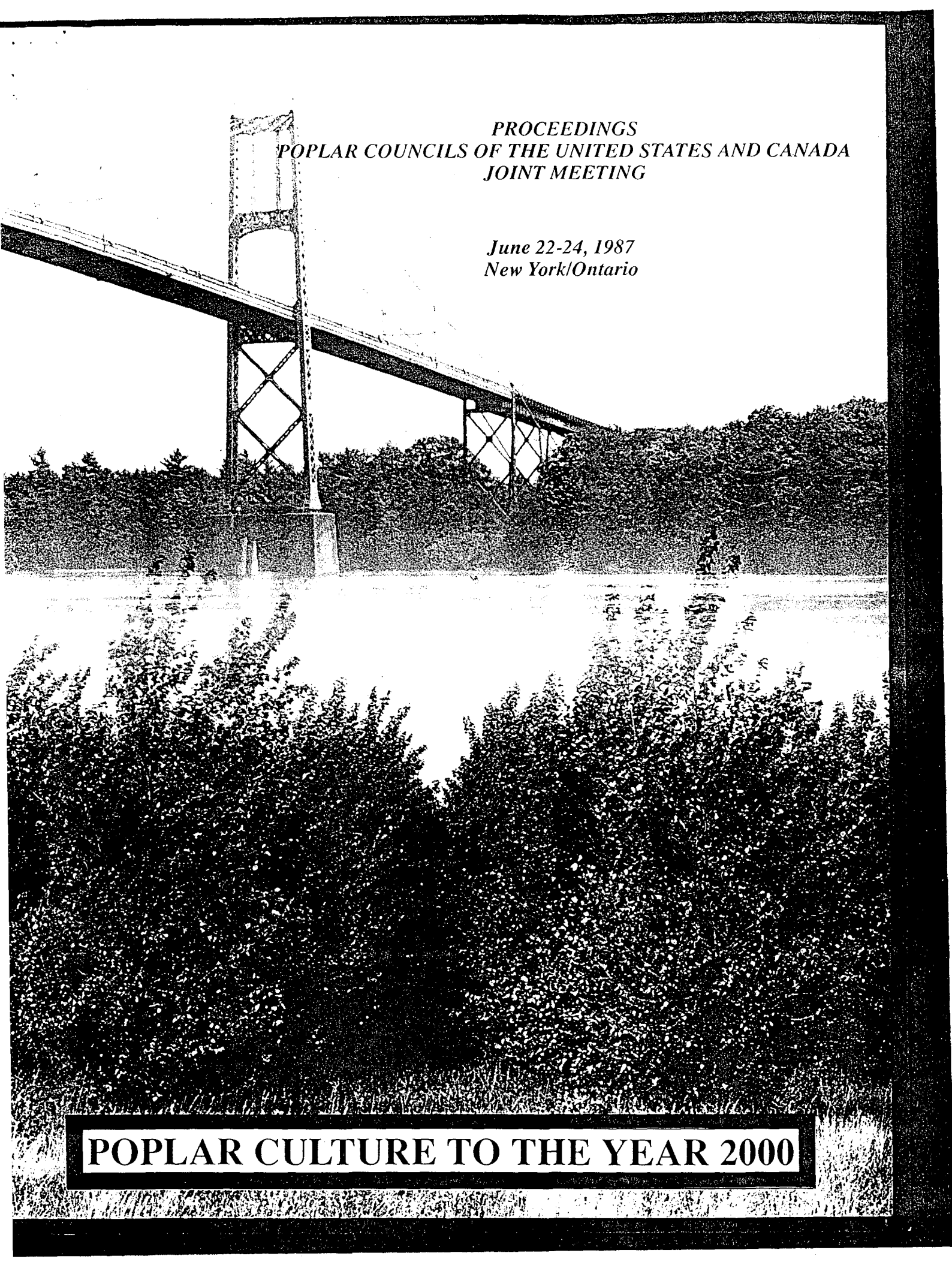
No aspen, balsam poplar, and black cottonwood veneer nor plywood is produced in Alberta at present. The substantial production of aspen plywood in Ontario and Quebec for exterior sheathing suggests a potential for it in Alberta, although OSB may even have a higher potential.

In summary, the potential for poplar utilization is very bright in Alberta. Oriented strand board, bleached sulfates, and mechanical pulps will likely be the major products in the next decade. By the year 2000, 50% or more of the 11.4 million m<sup>3</sup> of the AAC may be used. Regeneration and silviculture of stands following harvest is the forester's dream -- simple and cheap. Two major challenges remain: (1) to find profitable ways to use balsam poplar that is now left behind; (2) to develop new uses, or dispose of the large inventories of overmature aspen.

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*PROCEEDINGS  
POPLAR COUNCILS OF THE UNITED STATES AND CANADA  
JOINT MEETING*

*June 22-24, 1987  
New York/Ontario*

**POPLAR CULTURE TO THE YEAR 2000**

# **PROCEEDINGS**

## **POPLAR CULTURE TO THE YEAR 2000**

**June 22-24, 1987**

**SYRACUSE, NEW YORK/CORNWALL, ONTARIO**

**POPLAR COUNCILS  
OF THE  
UNITED STATES AND CANADA  
JOINT MEETING**

**Program Co-chairmen:**

**Brian Barkley, Ontario Ministry of Natural Resources  
Allan Drew, SUNY College of Environmental Science and Forestry**

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## PREFACE

The 1987 joint meeting of the United States and Canadian Poplar Councils was held in Syracuse, New York and Cornwall, Ontario, in June of 1987. This meeting provided an opportunity to exchange information on various aspects of poplar culture as viewed across the North American continent.

The theme of the meeting, "Poplar Culture to the Year 2000" was chosen in keeping with the subject matter of the upcoming International Poplar Commission meeting to be held in Beijing, China in August and September 1988. The North American viewpoint of this theme was addressed by keynote speakers and highlighted by numerous contributed technical papers and posters. Field trips in New York state and eastern Ontario provided some excellent examples of the work currently underway pertaining to *Populus*, in areas such as genetics, physiology, pathology and silviculture. The meeting was held in cooperation with the Canadian Forestry Service, Domtar Incorporated, New York State Energy Research and Development Authority, Ontario Ministry of Natural Resources, Reynolds Metals Company and the State University of New York, College of Environmental Science and Forestry.

The papers included in these proceedings represent a compilation of the presentations given over the course of the meeting. Minor editorial changes were made to some papers to correct grammar and/or typing errors, otherwise they have been reproduced as they were originally prepared.

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