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# MANITOBA'S FORESTS



M. Grandmaison

*T*he trees and forests of Manitoba hold something for everyone: wildlife habitat, watershed protection, erosion control, ecosystem stability, recreation, employment, carbon storage, and aesthetic and spiritual values. The forests are also a vital part of Manitoba's economy, which is the focus of this report.

The tables and facts presented on the following pages show the most significant characteristics of the Manitoba forest sector. Emphasis is on the forest industry and the forest land base from which trees are harvested. Most of the information presented here is based on data collected in 1991 Manitoba forest industry surveys.

*"In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations."*

Our Common Future: The Report of the World Commission on Environment and Development, 1987.

## ***A Shared Commitment to Sustainable Development***

Both the Government of Canada and Province of Manitoba are committed to the principles of sustainable development. The Province of Manitoba has established policies to achieve sustainable development of its forests as part of an overall Sustainable Development Strategy. Forestry Canada, a federal

department, has demonstrated its ongoing commitment to the forest sector through research and development, forestry agreements with Manitoba, and Green Plan initiatives such as the Model Forest Network.

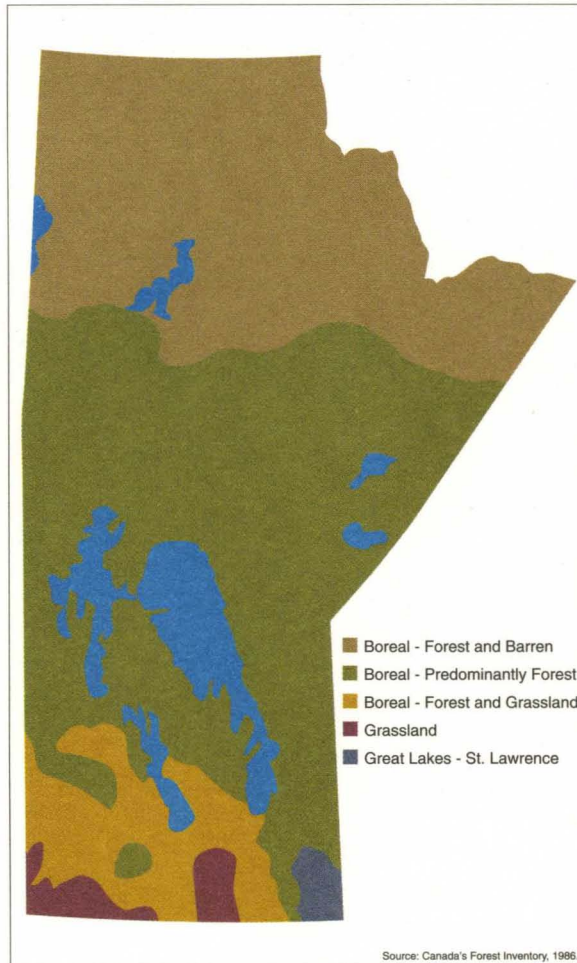
# F OREST LANDS AND RESOURCES

## A Province Rich In Forest Resources

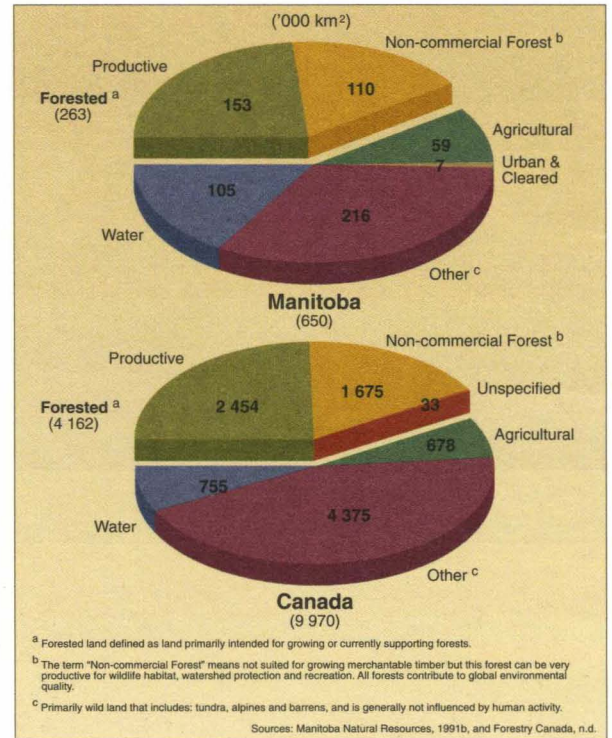
Manitoba is a province with an abundance of forest resources. Approximately 40 per cent of the province is classified as forested land, of which 57 per cent is considered productive for timber management. The province has about the same proportions of forests and productive forest lands as the entire country.

The largest proportion (92 per cent) of Manitoba's forests grow on provincial Crown lands. Private landowners make up the second largest ownership category, at seven per cent. Federal Crown lands, mainly on Indian Reserves, comprise one per cent of forest lands.

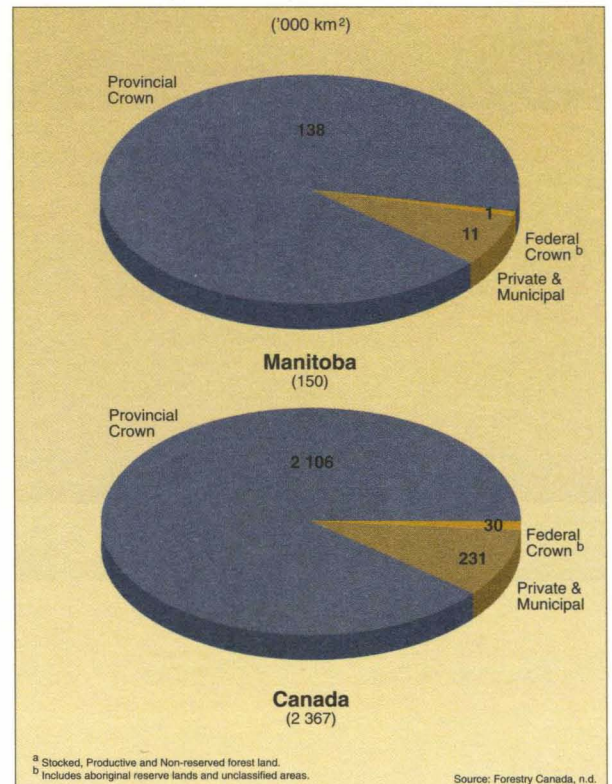
## Forest Regions of Manitoba



## Area Classification



## Ownership<sup>a</sup>



## Principal Uses of Manitoba's Tree Species

### Softwood Species



**White and black spruce** (*Picea glauca* (Moench) Voss and *Picea mariana* (Mill.) B.S.P.) are nearly indistinguishable in their wood structure. The wood is light coloured, has low weight when dried, is soft, resilient and straight grained, and has good machining

properties. Both species are in great demand for pulp, paper and newsprint manufacturing because of their long fibres and low resin content. The wood is also highly valued for lumber. As lumber, it is used in all forms of building construction and in general millwork. Spruce is both Manitoba's and Canada's most important wood species in terms of volume harvested.



**Balsam fir** (*Abies balsamea* (L.) Mill.) is similar to spruce in most

physical characteristics although fir is less resilient and has lower strength properties than spruce. Balsam fir is used for many of the same purposes as spruce. Fir is graded and marketed in the species grouping spruce-pine-fir.



**Jack pine** (*Pinus banksiana* Lamb.) wood is light brown in colour, has medium strength and hardness characteristics, and machines and finishes well. Pine is used for pulp and paper, newsprint, lumber, treated wood products such as railway ties, posts and poles.



**Eastern white cedar** (*Thuja occidentalis* L.) seasons well without warping, has good machining qualities and is lighter in weight than any of the other commercial species. Due to its pleasing aroma, cedar is often used for interior finishing work. Cedar is also used for

exterior finishing, outdoor furniture and posts owing to its durability and resistance to decay.



**Tamarack or larch** (*Larix laricina* (Du Roi) K. Koch) is not in great demand partly because of its limited availability. The wood is moderately hard and heavy, is somewhat oily, and tends to have a spiral grain that makes it undesirable for most lumber uses. Neverthe-

less, its strength, durability and moderate resistance to decay makes it suited for special purposes such as floor planking, building skids, pilings, posts and poles.

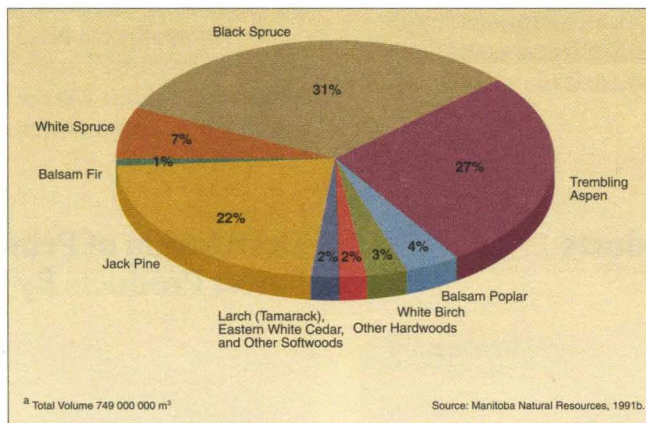
### Hardwood Species

**Trembling aspen** (*Populus tremuloides* Michx.) commonly referred to as poplar, makes up the majority of hardwood volume available in Manitoba and is the only hardwood species used commercially to any great extent. The wood is white to grayish-white in colour, relatively resistant to wear, usually straight grained with a fine, even texture, and comparable to spruce in strength. The wood, when properly seasoned, works well, holds



nails satisfactorily, and takes a good finish. Due to its general availability and increased customer acceptance, the use of aspen is steadily increasing. Aspen is used for making paperboard, roofing felt, lumber, pallets, boxes, furniture stock, flooring, and fuelwood and for interior finish and trim. Uses in other provinces include oriented strand board, particle board and fibreboard.

### Volume of Forest Growing Stock by Species<sup>a</sup>



### Balsam poplar

(*Populus balsamifera* L.) also known as poplar, is similar to trembling aspen in most wood characteristics, although balsam poplar has a coarser texture and a higher incidence of wet pockets in the wood. These drawbacks and the availability of trembling aspen have detracted from increased use for balsam poplar. Balsam poplar can be used for most of the same products as aspen.



**White birch** (*Betula papyrifera* Marsh.), green ash (*Fraxinus pennsylvanica* Marsh. var. *subintegerrima* (Vahl) Fern.), white elm (*Ulmus americana* L.) and bur oak (*Quercus macrocarpa* Michx.) are other hardwood species that have limited commercial use as furniture stock, interior finishing, flooring and fuelwood.



The white spruce has earned its status as Manitoba's provincial tree because of its widespread distribution, resilience, attractiveness and the many benefits it has provided to people and the environment.



# Harvesting and Utilization

## Allowable Cut Ensures Timber Supplies to Serve Industry

Foresters calculate how much wood will be produced on a hectare of land in a given year for a particular forest area, based on the species of trees, types of soils, and ages of trees present. The calculation is adjusted to protect other values, such as critical wildlife habitat or to accommodate for losses from fire, insects and disease.

**ALLOWABLE CUT** – The volume of wood that may be harvested, under management, for a given period.

The calculation determines the Annual Allowable Cut, which ensures a continuous supply of timber to support established forest operations and to help develop new industries.

In 1991, the Annual Allowable Cut from provincial Crown lands was about 8.3 million cubic metres of wood per year, 63 per cent of which was coniferous and 37 per cent deciduous species. Black spruce and jack pine make up 62 per cent of the total provincial Annual Allowable Cut, followed by trembling aspen, which makes up a further 22 per cent of the total available harvest volume. The average annual harvest from 1986 to 1991 was about 1.7 million cubic metres.

Forestry harvesting guidelines in Manitoba vary according to the management prescription for the forest stand and the topography of the area to be cut. Forestry companies that harvest on Crown land are required to comply with these guidelines.

Normally, cut blocks vary in size and shape up to 100 hectares. Larger areas are harvested under certain conditions: salvage harvesting after a major fire, insect or disease infestation or blowdown.

## Primary Forest Products in Manitoba

Product	1991 Production <sup>a</sup> (Metric)
Lumber <sup>b</sup> ..... (Dimension Boards & Timbers)	740 000 m <sup>3</sup>
Treated Products	
Lumber .....	109 200 m <sup>3</sup>
Posts, Poles, & Rails .....	43 000 m <sup>3</sup>
Miscellaneous Wood Products (Ties and House Logs).....	
Fuelwood .....	17 000 m <sup>3</sup>
Logs and Pulpwood.....	98 105 m <sup>3</sup>
Wood Chips .....	173 300 m <sup>3</sup>
Insulation and Fibreboard Sheeting (3/8" basis).....	92 500 t
Particle Board (3/4" basis).....	26 800 m <sup>3</sup>
Newsprint .....	30 800 m <sup>3</sup>
Kraft Pulp and Paper.....	122 600 t
Paper and Roofing Products.....	123 900 t
9 100 t	

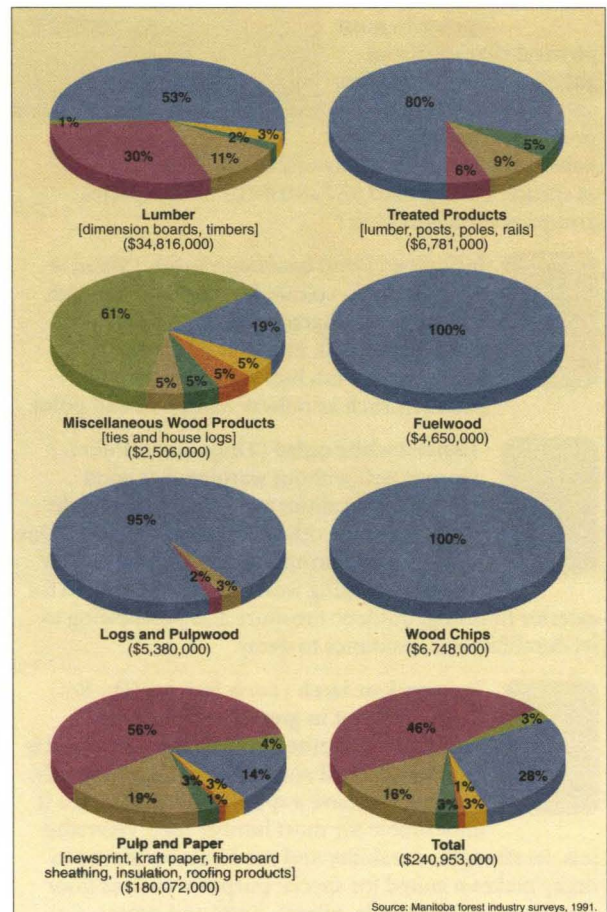
m<sup>3</sup> = cubic metres    t = tonnes

<sup>a</sup> Most recent available total roundwood production is 1,552,354 m<sup>3</sup> (1990-91).

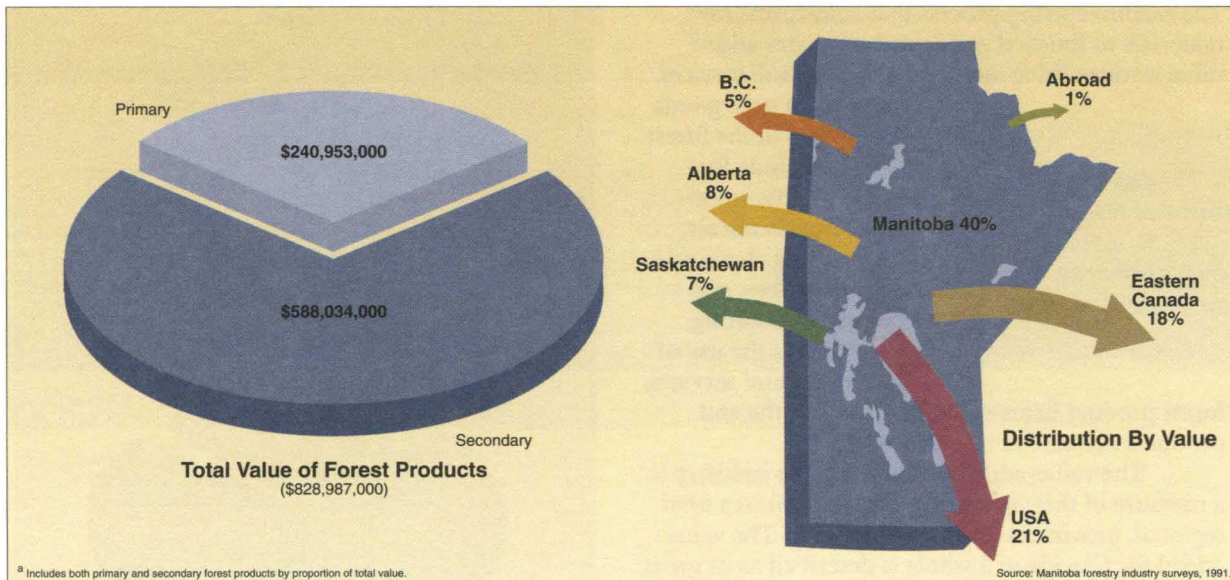
<sup>b</sup> Includes independent planing mills' production of 169,500 m<sup>3</sup>, which includes rough lumber produced by sawmill industries.

Source: Manitoba forest industry surveys, 1991.

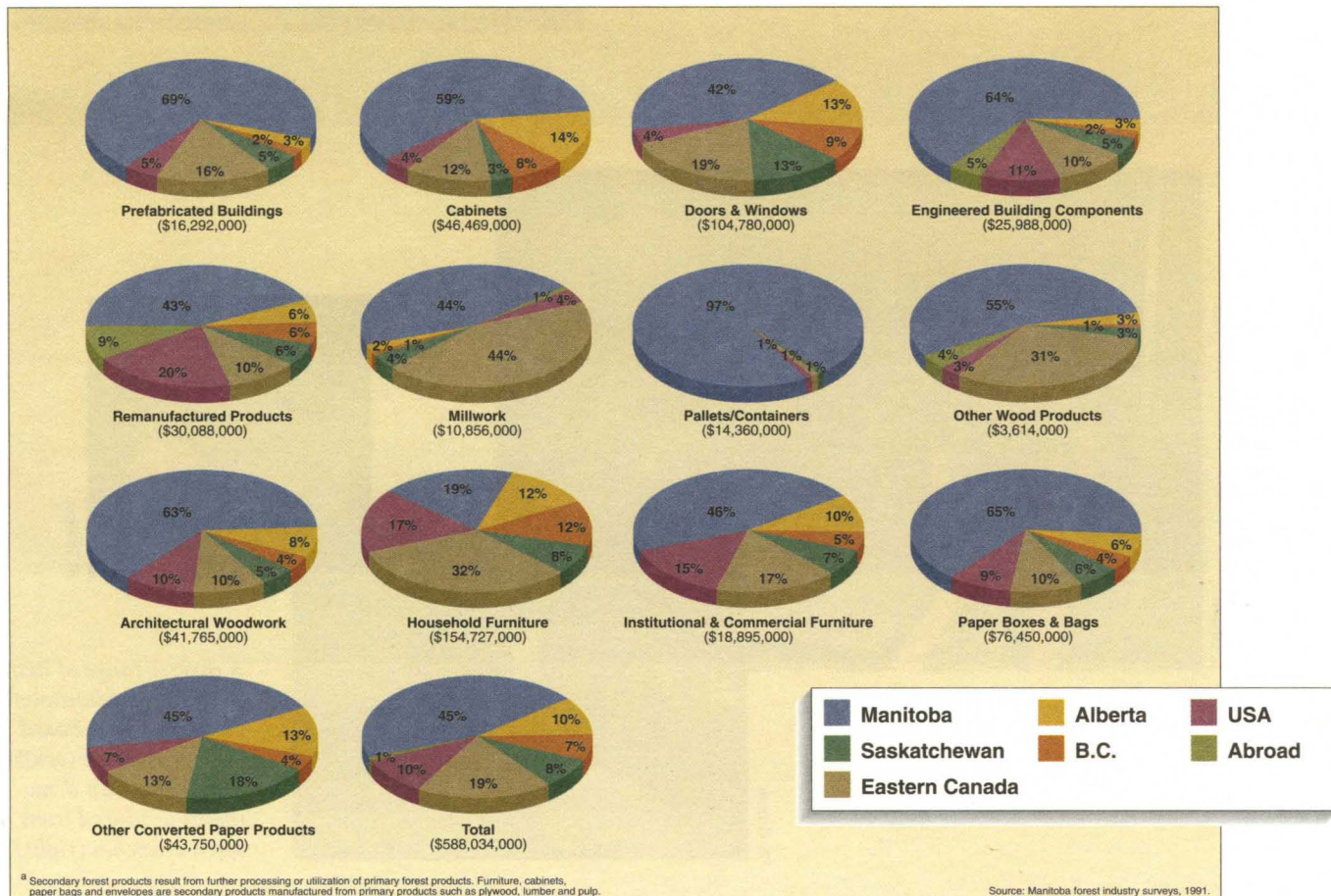
## Destination of Primary Forest Products By Value



## Market Destination of Manitoba's Forest Products<sup>a</sup>



## Destination of Secondary Forest Products By Value<sup>a</sup>



## Adding Value Generates Income

The manufacturing process that transforms raw materials to finished goods and generates added value involves using intermediate goods and services.

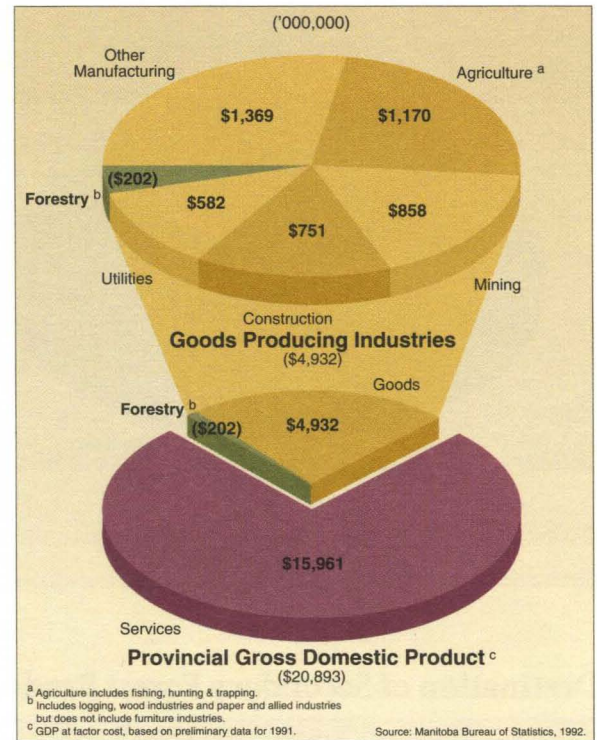
**VALUE-ADDED** – The difference between total revenue and the cost of all purchased materials, supplies and services. It includes payments to labour, depreciation, profits and taxes.

Examples of such goods and services in the forest industry include fuel and electricity, wood-preserving chemicals, pulp-treating chemicals, contracting fees, and legal and accounting fees. Without the use of these goods and services,

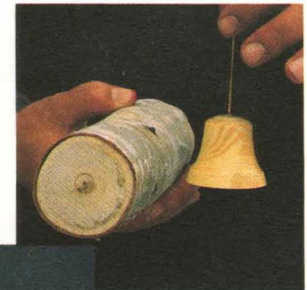
forest product firms could not produce the end products demanded by consumers.

The value-added generated by an industry is a measure of that industry's contribution to a total regional, provincial or national income. The value-added for Canada as a whole is described as its gross domestic product.

## Value-added: Provincial



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D. Pronger



D. Grievies

A diverse range of items comes from Manitoba's forests: particle board (left), furniture (centre), and paper-thin ornaments produced from birch branches (right).

## Woodlot Owners Retain Forests, Explore New Opportunities

Seven per cent of Manitoba's productive forest lands are privately owned and woodlot owners play several roles in the forest economy. In retaining their forests, they conserve soil, ensure watershed stability and provide a home for wildlife.

In harvesting their forests, woodlot owners produce traditional wood fibre and timber. They are also pursuing new development opportunities such as producing high-quality maple syrup by tapping the sap from Manitoba maple, which commonly grows beside rivers and streams and in woodlots and shelterbelts across southern Manitoba. The Trappist Fathers of Holland, Manitoba, have produced maple syrup for their own use since 1983.

Some landowners are experimenting with growing shiitake and oyster mushrooms on oak and poplar logs.

The Woodlot Association of Manitoba promotes the development of private-land forests as well as the integration and involvement of other sectors including agriculture, wildlife and fisheries. The organization sponsors field days and workshops throughout the year.

The Manitoba Christmas Tree Grower's Association promotes the management and marketing of Christmas trees and other products such as wreaths and tree stands.



D. Pronger

*Christmas tree plantations in Manitoba provide Scots pines and other species to city and rural markets.*



D. Pronger

*An 80-year-old basswood is cut carefully so it can be used for wood carving.*

## Science and Technology Essential Elements

Research and technology development are essential to environmental quality and a competitive economic position. Forestry Canada plays a major role in forest science and forestry development, carried out in close cooperation with a variety of forest-sector stakeholders including the Province of Manitoba, universities, forest companies, and privately and cooperatively funded institutions.

Research is conducted in two major areas – forest management and harvesting, and forest products development. Basic research in forest management increases the knowledge of the biological processes that shape Canada's ecosystems. Basic research in forest product development leads

to an understanding of the chemical and physical properties of wood. This knowledge allows researchers and industry to develop new and improved products and processes.

Applied research draws on that knowledge to devise forest management and harvesting practices for the sustained use of Canada's forest resources.

Two examples of how technology is contributing to the sustainable development of Manitoba's forests include the use of computer scanning devices that assess logs to maximize useable cuts and the use of thinner saw blades. Both innovations increase the volume of useable wood recovered from each tree.

# *E*MPLOYMENT BENEFITS

## Forest Industry Provides One Job in 30 in Manitoba

In the forest industry, direct employment includes all persons directly employed in logging and processing plants for both primary and secondary forest industries.

**EMPLOYMENT MULTIPLIER –**  
*A value that when multiplied by the direct employment of a given industry indicates the total direct and indirect employment generated by that industry.*

Indirect employment includes all persons employed as a result of forest industry activity, for example, sales personnel in local retail outlets, those who supply the forestry complex with intermediate goods,

and government employees required to maintain community services.

Indirect employment also results from export-oriented manufacturing activities.

In Manitoba, one job in 30 is directly or indirectly dependent on the forest industry. The forest environment also provides other employment opportunities through tourism, recreation and related activities.

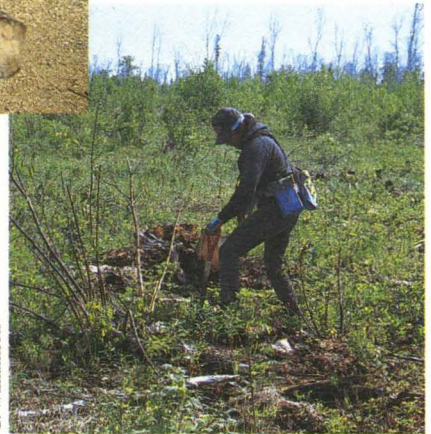


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*Direct employment in the forest industry includes harvesting activities (top), producing timber products (center), and reforestation (bottom).*



G. Williamson



## Employment in the Manitoba Forest Industry

	No. of Firms	Direct Employment (person-years)	Indirect Employment (person-years)	Total Employment (person-years)	Employment Multiplier <sup>a</sup>
<b>PRIMARY INDUSTRY</b>					
Sawmills					
Production <sup>b</sup> : > 5MM fbm	3	303	546	849	2.803
Production: 1 MM fbm – 5 MM fbm	8	138	249	387	2.803
Production: 100 M fbm – 1 MM fbm	10	32	58	90	2.803
Production: < 100 M fbm	103	20	36	56	2.803
Independent Planing Mills	4	62	112	174	2.803
Wood Treating Plants	2	39	36	75	1.912
Pulp, Paper and Fibreboard Mills	5	1 265	2 901	4 166	3.293
Commercial Fuelwood Producers	41	24	10	34	1.424
Miscellaneous Wood-using Industries	6	34	31	65	1.912
Independent Log Producers	n/a	87	37	124	1.424
<b>TOTAL</b>	<b>182</b>	<b>2 004</b>	<b>4 016</b>	<b>6 020</b>	<b>3.004<sup>c</sup></b>
<b>SECONDARY INDUSTRY</b>					
Sash, Door and other Millwork Industries (SIC 254) <sup>d</sup>	142	2 670	1 482	4 152	1.555
Wooden Box and Pallet Industries (SIC 256)	11	408	216	624	1.53
Coffin and Casket Industry (SIC 258)	1	6	3	9	1.467
Other Wood Industries (SIC 259)	14	91	83	174	1.912
Household Furniture Industries (SIC 261)	41	1 855	967	2 822	1.521
Office Furniture Industries (SIC 264)	9	109	57	166	1.521
Other Furniture and Fixture Industries (SIC 269)	57	822	428	1 250	1.521
Asphalt Roofing Industry (SIC 272)	1	75	114	189	2.525
Paper Box and Bag Industry (SIC 273)	11	481	353	834	1.734
Miscellaneous Paper Converting Industries (SIC 279)	6	247	176	423	1.713
<b>TOTAL</b>	<b>293</b>	<b>6 764</b>	<b>3 879</b>	<b>10 643</b>	<b>1.573<sup>c</sup></b>
<b>PRIMARY AND SECONDARY FOREST INDUSTRY TOTAL</b>	<b>475</b>	<b>8 768</b>	<b>7 895</b>	<b>16 663</b>	<b>1.900<sup>c</sup></b>

<sup>a</sup>The multipliers used in this table are derived from the Manitoba Bureau of Statistics and are presented as weighted averages to reflect the forest industry classification system used in this report.

<sup>b</sup>MM fbm = million foot board measure; M fbm = thousand foot board measure.

<sup>c</sup>Implied multiplier

<sup>d</sup>Standard Industrial Classification system.

Sources: Manitoba forest industry surveys, 1991, and Manitoba Bureau of Statistics, 1985.

# OTHER FOREST USES

**FORESTS...FOR FIBRE, FAUNA, FLORA, FUN AND OUR FUTURE –**  
*Manitoba has established a policy that “selected areas, representative of all Manitoba’s natural forest ecosystems, shall be designated to preserve and retain natural species, and genetic and ecological diversity”.*



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## A Multiple Use Resource

### FISH

	<b>1991</b>
Angling Licences ('000).....	176
Estimated Revenue ('000).....	\$1,634
Estimated Recreation Days ('000).....	2 380
Commercial Fish Catch <sup>a</sup> ('000 kg).....	13 512
Estimated Market Value <sup>a</sup> ('000).....	\$10,135

### GAME

Hunting Licences ('000).....	156
Estimated Revenue ('000).....	\$2,670
Estimated Recreation Days ('000).....	684

### TRAPPING

Trapper Licences ('000).....	7
Estimated Value of Harvest ('000).....	\$1,125

### OUTDOOR RECREATION<sup>b</sup>

Visitors ('000).....	5 208
Camping Parties ('000).....	184
Estimated Park Permit Revenue ('000)	\$6,505

### WATERSHED BENEFITS

Net Mean Annual Yield <sup>c</sup> in	
River Discharges ('000 000 m <sup>3</sup> ).....	20 680

<sup>a</sup> 1989-90 figures.

<sup>b</sup> Combined provincial and federal park figures.

<sup>c</sup> Difference between outflow and inflow river discharges, with the majority of water being produced in a forested area.

Sources: Manitoba Natural Resources, 1991a; Adamowicz, W., 1992; and Kurz, W.A. et al., 1992.

**Forest Management Guidelines for Wildlife in Manitoba** serves as a guide to resource managers in forest management planning and the integration of forest and wildlife management activities.

## Forest Policy Objectives

Manitoba's forest policies were developed through an extensive public consultation process as part of the province's sustainable development strategy. Forest strategy workshops and public meetings were held throughout the province in 1990. The policy objectives derived from that process are:

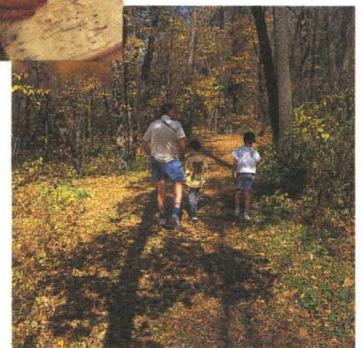
- To ensure and promote forest activities that are environmentally sound and maintain the environmental integrity of the forest ecosystem.
- To supply and allocate forest resources on a sustainable basis, which balances environmental, social, and economic benefits and opportunities to Manitobans.
- To protect human life, property, employment opportunities and valuable forest resources.
- To promote efficient use of forest land and resources and encourage development of an integrated and diversified economy.
- To foster and promote increased development and management of woodlots and shelterbelts for commercial and conservation purposes on private and Crown lands in the agricultural zone of Manitoba.
- To foster and promote establishment, expansion and protection of urban forests on public and private lands.
- To ensure plans are prepared and implemented for Manitoba's forests and that these plans recognize the interests and concerns of all forest users and the needs and characteristics of the forest ecosystem.
- To improve the quality of information used in planning, decision making and integrated forest management.
- To improve understanding of the inter-relationships between the global environment, the forest ecosystem and the economy to enhance informed decision making.

*Delicate and elaborate symmetrical patterns are produced by taking a very thin sheet of birch bark, folding it several times, and biting into it, according to a design the artist has visualized in her mind. The bitten designs were used for patterns for beadwork and other decorative purposes.*



D. Pronger

*Forests provide a wide range of recreation opportunities such as walking trails at La Barriere Park.*



D. Pronger



D. Pronger

*Students learn about forests and forestry techniques, such as increment boring used to determine a tree's age, at the Manitoba Forestry Association's education centre in the Sandilands Provincial Forest in south-eastern Manitoba.*

## Forest Renewal

Left to nature, the boreal forest reaching maturity enters a stage of degeneration where tree growth and activity decrease. The forest gradually declines

until a natural disaster such as fire, infestation of insects or disease, or a windstorm sweeps through the forest, ending the stage and ushering in a period of renewal.

Natural forest regeneration is usually irregular, however. Some

“pockets” of forest exist where fire, insects or wind do not completely destroy the old growth. The period of succession in these pockets is much slower, since the old trees must die naturally to open up the forest canopy to enhance new growth. This creates uneven-aged timber stands growing beside more even-aged stands created by fire or other natural conditions. Both types of forest are addressed in managing for sustainable development.

Timber harvesting also opens up forest lands for renewal, but in a more planned way.

## Forest management ensures productive forests

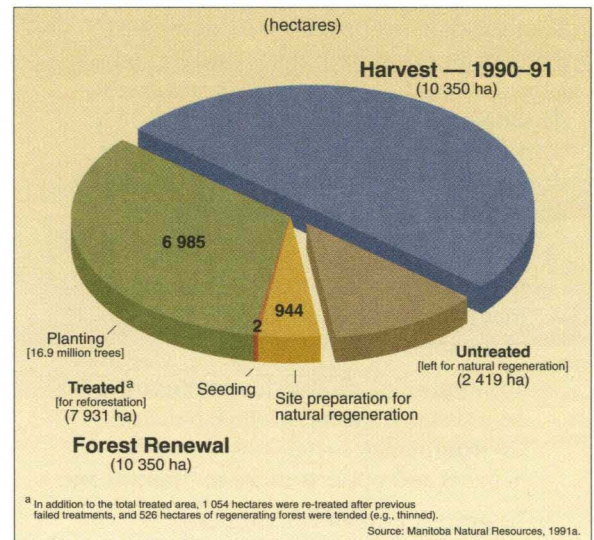
Reforestation is a priority of the Manitoba Natural Resources Forestry Branch, ensuring that forests regenerate to standards based on the original composition of tree species and timber stands.

Harvested areas, insect and disease depleted forests, and burned forests are regenerated both naturally (untreated) and “manually” and cared for through activities such as thinning and juvenile spacing.

Manual reforestation usually begins with preparation of the forest floor to assist the next generation of trees. It involves a range of techniques, for example, using bulldozers with equipment designed to mulch the surface litter with mineral soils in preparation for natural regeneration, seeding or planting nursery seedlings. Over 66.5 million trees were planted in Manitoba from 1986 to 1990 to replace the estimated 50 million trees harvested during that period.

**SILVICULTURE** – The theory and practice of controlling the establishment, composition, growth, and quality of forest stands to achieve the biological and economic objectives of forest management.

## Silvicultural Activities 1991



R.A. Bohning

Tree nurseries operated by the provincial government and private industry provide a ready supply of seedlings for planned reforestation programs across the province every year.

Approximately 20 per cent of harvested areas are left to regenerate on their own, but the process does not always produce marketable trees quickly. Willow, alder and hazel sometimes invade the site. Eventually the forest may support marketable species, but the overall process takes decades longer than if the site had been reforested using good silvicultural techniques.

The province's two largest forest companies, Abitibi-Price Inc. and Repap Manitoba are responsible for forest renewal activities within their Forest Management License areas.

### ***Surveys document forest regeneration***

Regeneration surveys are conducted in areas following harvesting, fire or reforestation treatment to document the degree of softwood and hardwood regeneration and provide an assessment of seedling quantity, quality and spatial distribution. Surveys are undertaken by the Forestry Branch Silviculture Section and by forest company representatives on their Forest Management License areas.

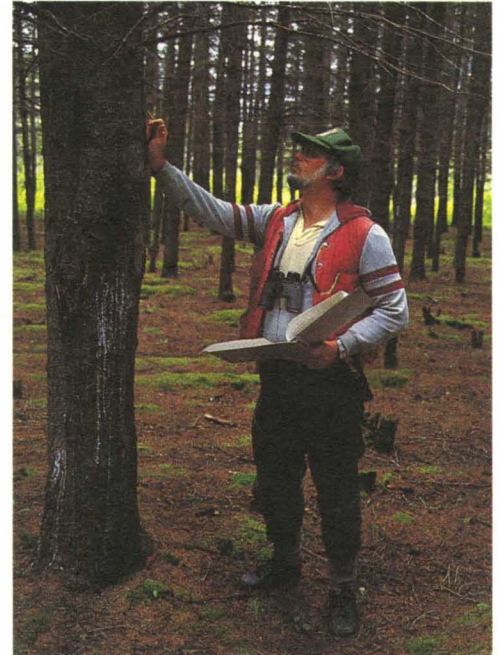
Most areas are surveyed three to seven years following depletion to identify seedlings which meet established growth standards. Areas identified as not satisfactorily restocked are monitored to assess performance and growth trends. Every three years, the Regeneration Performance Assessment Program measures the growth of planted and naturally regenerating seedlings and the impact of silvicultural treatments. Survival, height, stem diameter, and the number of stems per hectare of planted and naturally regenerating softwoods and hardwoods are recorded.

Following each assessment, the information gathered is used to determine what further silvicultural treatment is needed before the next assessment occurs.

## **Forest Protection**

The greatest problems in any forest are insects and diseases or forest fires. Forest protection is therefore a key element of forest management.

*Permanent sample plots established by the province's Forestry Branch are study areas where foresters determine growth and yield on various species of trees growing under different forest conditions throughout the province. An insect and disease technician assesses a tree for pest damage.*



### ***Insects and diseases***

Minimizing the destructive impact of insects and diseases on the forest resource is an important aspect of forest management. Pest surveys are conducted annually to determine the health of the forest and infestation levels of major forest pests such as jack pine budworm, spruce budworm and dwarf mistletoe. Other major pests that are assessed and studied by researchers include Armillaria root rot, western gall rust, large aspen tortrix and the forest tent caterpillar. Treatments range from aerial spraying of a biological insecticide, to implementation of better silvicultural management techniques, to salvage logging or sanitation thinning and pruning.

Urban forests are not immune from diseases and insects either. Dutch elm disease, spread by the elm bark beetle, is probably the mostly widely known. With the assistance of the Forestry Branch, more than 50 rural and urban municipalities, including the City of Winnipeg, have implemented control and management programs.

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## Fire

Fire has an enormous impact on Manitoba's forest resources, as was evident in 1989. Drought and hot, windy weather that year created ideal conditions for forest fires, which resulted in a catastrophic fire season producing 1 226 fires that consumed over 3.6 million hectares of forest and generated fire-fighting costs exceeding \$63 million. These statistics broke all previous records for destruction and costs. On average there are 425 fires annually consuming 186 000 hectares of forest, of which approximately 50% contains productive timber. Fire burns on average more than eight times the area of productive forest harvested annually.

Wildfire management includes prevention programs such as a toll-free number (1-800-782-0076) for fire reporting by the public, an early detection program using aircraft patrols, lightning locator sites and lookout towers.

Pre-suppression activities using the Intelligent Fire Management Information System, developed by Forestry Canada and implemented by the Province of Manitoba, combine a computer inventory of forest fuel types, actual and forecasted weather conditions and expected fire behaviour to recommend an optimum deployment of fire suppression resources. This information is used in conjunction with the Alert Response System to allow provincial fire management staff to



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*Jack pine regenerated naturally after a fire in Nopiming Provincial Park.*

pre-position resources to meet expected wildfire conditions. This type of Decision Support System is being expanded and refined as part of the National Fire Information System Pilot Project.

Fire suppression activities focus on providing the latest techniques and tools to trained and certified staff and providing more efficient and cost-effective aircraft support.

## Model Forest Promotes Innovative Forest Management

Situated a one-hour drive northeast of Winnipeg, Manitoba's Model Forest contains a patchwork of boreal ecosystems in its one million hectares. It is the principal wood supply area for Abitibi Price's newsprint mill at Pine Falls as well as for other regional operators. It also contains protected areas, essential wildlife habitat and species (including a threatened herd of woodland caribou), and aquatic systems. A multitude of other forest values and uses (recreation, wild rice production, hunting, fishing and traditional aboriginal pursuits) also characterize the area. The Model Forest is managed by a partnership of over 30 organizations that includes government agencies, environmental organizations, aboriginal groups, private associations, universities, private companies, and special interest and user groups.

The Model Forest is one of 10 across Canada funded by Forestry Canada under Canada's Green Plan.



T. Muir

*Periodic wildlife inventory studies, such as a 1993 survey of moose populations and habitat, are undertaken to monitor the viability of forest animal species in context with other activities occurring in the Model Forest.*

## Sources

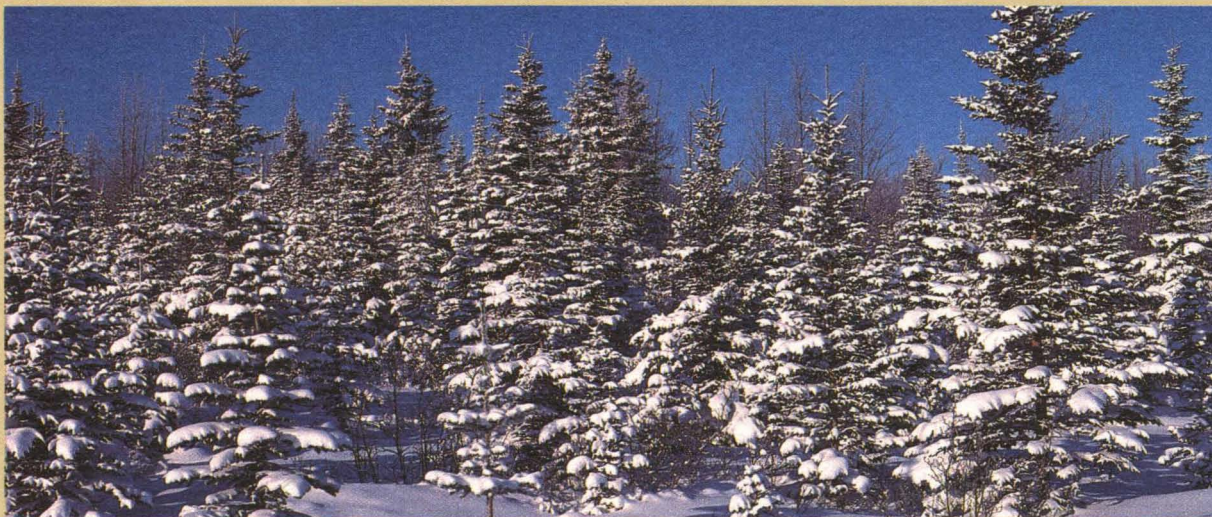
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## Conversion Factors

	<i>Metric</i>	<i>Imperial</i>
	1 hectare (ha)	= 2.471 acres
	1 square kilometre (km <sup>2</sup> )	= 0.386 square miles (mi <sup>2</sup> )
	1 tonne (t)	= 1.102 tons (T)
<b>WOOD CHIPS</b>		
	1 oven-dried tonne	= 0.918 bone dry units (BDU)
<b>SHEET MATERIAL</b> (particle/insulation board)		
	1 cubic metre (m <sup>3</sup> )	= 1,131.0 square feet (ft <sup>2</sup> ) [ $\frac{3}{8}$ " basis]
		= 565.0 square feet (ft <sup>2</sup> ) [ $\frac{3}{4}$ " basis]
<b>ROUNDWOOD</b> (sawlogs, pulpwood & fuelwood)		
	1 cubic metre (m <sup>3</sup> )	= 0.400 cords
<b>Posts and Poles</b>		
	1 cubic metre (m <sup>3</sup> )	= 35.315 cubic feet (ft <sup>3</sup> )
<b>Lumber</b>		
	1 cubic metre (m <sup>3</sup> )	= 177 foot board measure (fbm)
<b>SOLID WOOD CONVERSION</b> (processed lumber)		
	1 cubic metre of solid wood (m <sup>3</sup> )	= 616 foot board measure (fbm)
	M = 1,000	MM = 1,000,000



R.A. Bohning

## Sustaining Global Health

Forests play an important role in global health. Through photosynthesis trees absorb the greenhouse gas carbon dioxide, CO<sub>2</sub>, and convert it to carbohydrates (of which carbon is an essential ingredient). Trees store much of the carbon they absorb, but decomposition and forest fires release carbon back into the atmosphere. Harvested trees continue to retain carbon as forest products. As a result, forest management practises may contribute to alleviating the greenhouse effect by increasing net amounts of stored carbon.

With over 10 per cent of the world's forests, Canada's trees are important in sustaining a healthy global atmosphere. Canadian forests absorb 135 million tonnes of carbon per year, while 58 million tonnes of carbon return to the atmosphere through fires and decomposition. That translates to a net gain of 77 million tonnes of carbon stored in our forests. Manitoba's forests alone store 4.3 million tonnes<sup>1</sup> of this carbon sink.

<sup>1</sup> Based on Manitoba comprising 25 per cent of Canada's Boreal West and 10 per cent of Canada's Subarctic Ecoclimatic zones.

## Credits

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