



Summary and Analysis of Provincial and Territorial Timber Supply Status Reports

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Introduction

This report presents a summary and analysis of the provincial and territorial timber supply status reports (TSSRs)¹ that were prepared for the conference Timber Supply in Canada: Challenges and Choices (Kananaskis, Alberta, November 16-18, 1994). In general, the status reports by the provinces and territories were intended to address the following topics:

- describe the current and prospective timber supply;
- identify the key issues and conflicts;
- outline the underlying management philosophy;
- describe how the processes for determining supply are changing;
- list the actions taken to address sustainable development objectives; and
- highlight the opportunities for expansion based on intensive silviculture or other actions.

This report identifies some of the factors and considerations that determine timber supply, how timber supply is measured, and the current state and outlook for timber supply in the provinces and territories of Canada, as reported at the conference. We have tried to provide an analysis of the reports, focusing on the similarities and differences between provinces and territories in terms of the key issues, problems, conflicts and opportunities. We also provide a summary of the future supply outlook. We have tried to point out where information is missing and its importance. A key objective of the conference was to try and assess how we are doing in our aim of working toward sustainable development. This report reviews the various actions and processes that are underway across the country to address these new needs.

While the report attempts to draw general conclusions regarding the state of Canada's timber supply, it is difficult to do so definitively with incomplete or out-of-date information. Provinces are continually in the process of updating

¹Timber Supply Status Reports have been prepared and submitted to the Canadian Forest Service, Policy, Economics and International Affairs Directorate by each province participating in the conference, and by Manitoba and the Northwest Territories. Quebec and the Yukon Territory did not participate in the conference or submit a TSSR.



their timber-supply analyses, the completion of which does not necessarily correspond with conference deadlines; a more complete supply outlook will be possible when both Ontario and British Columbia have completed their respective new timber-supply analyses. In addition, Quebec and the Yukon did not attend the conference nor submit a TSSR. Inclusion of information for Quebec and the Yukon would provide a fuller national picture.²

Our task was to interpret the reports from the provinces and territories, and develop a national picture. Doing so required that on occasion we had to “read between the lines” of individual TSSRs or use supplementary information (e.g., the *Compendium of Canadian Forestry Statistics*). While we did try to contact authors to clarify points in their reports, it was not always possible to do so, and some of our interpretations have not been corroborated by representatives from all provinces and territories.

We begin with the definition of terms and concepts needed to discuss timber supply. The next section presents the steps in the process of estimating of timber supply and the determination of rates of cut, and compares the various methods used. This is followed by a discussion of the outlook for timber supply under current management practices, the opportunities for expanding the supply, and the issues and problems that might result or are resulting in supply contractions. This is followed by an examination of the progress made by the Northwest Territories and the provinces toward sustainable development of their forest landbases and industrial forest sectors. A final section makes some observations and draws conclusions.

²For information on Quebec and the Yukon Territory’s timber-supply situation, see the *Compendium of Canadian Forestry Statistics 1993* (CCFM 1994). See also Quebec’s *Forest Resources and Industry: Statistical Information 1994 Edition* (Ministère des Forêts 1994).



Definition of Terms

One of the difficulties in discussing the timber supply of the provinces and territories of Canada is terminology. There is a lack of common terminology for basic timber-supply concepts, and worse, different meanings are attributed to some commonly used terms. In order to compare and contrast the timber supply situations, when common terminology is lacking we have arbitrarily chosen terms and set definitions for some key timber-supply concepts.

Timber supply

Timber supply is the rate at which timber is made available for harvesting.³ It is an estimate of the potential flow of wood fibre out of the forests and into mills.

This flow is caused by the demand for roundwood, and ultimately by the consumer demand for forest products, but it is shaped to a large extent by public policy and regulations. Although log production is taken from the standing stock of timber (i.e., the existing forest), in the long run we cannot harvest more than we grow. So the productivity of the forest is also a factor governing the supply of timber. Finally, the topography and accessibility of the forest affect the cost of timber recovery, and limit the supply of timber that is economically available.

These four factors—the economic environment, the policy framework, the biological productivity and the topography of the forest—are all considered when estimating timber supply. However, the provinces and territories of Canada vary widely in their emphasis, interpretation and measurement of each factor.

These supply factors in turn govern the extent of the landbase that is available and operable for timber production, as well as the intensity of production (or yield) that is possible on that landbase. Both of these intermediate factors—the landbase and the yield—are required information for estimating timber supply.

Long-term sustained yield

The long-term sustained yield, or LTSY, is the estimated amount of merchantable fibre that could be harvested annually from the replacement forest produced by current and scheduled forest management practices.⁴ It is a measure of the biological productivity of a forest for a given level of management.⁵

³D.H. Williams. 1994. What are the Key Factors Influencing Timber Supply? Presented at Timber Supply in Canada: Challenges and Choices, Kananaskis, Alberta. November 16-18, 1994.

⁴Both LTSY and "Long-run Sustained Yield" or LRSY (same definition as LTSY) are used by the various provinces. We have chosen LTSY for this report, following the usage in *Forest Management* (Davis and Johnson).

⁵The sustainability of the Long-term Sustained Yield, as it is typically calculated, was questioned by some participants of the conference, who argued *inter alia* that productivity of forest sites could decrease over successive rotations.



In the context of timber supply, the “long term” is the period after the transition to harvesting second growth. In the long term, harvesting policy usually requires that harvest levels be less than or equal to LTSY.

AACs

The allowable annual cut (AAC) is a short-term measure of timber supply that reflects the quantity of timber that the regulating agency (generally the province or territory) is willing to make available for harvest, under current conditions, from a specific geographic area for a defined period of time. These conditions will include the state of the forest and the prevailing policy and economic environment. The AAC may be determined through a calculation, or be selected through a process that includes knowledge of LTSY, the results of timber-supply analyses, and other studies.

For forest land areas that are unregulated, i.e., their rates of harvest are not under the control of the province (such as most private lands), the concept of an “allowable” cut is inappropriate and another term may be used. Provinces, for example, may make an estimate of sustainable harvest levels from these unregulated private lands. Also, some provinces estimate measures of timber supply that are only loosely related to actual harvest levels. However, we have used the term “AAC” to refer to all estimates of short-term timber supply compiled by the provinces and territories, and we will qualify the term where necessary.

Two perspectives on the nature of an AAC prevail in Canada. That there are two differing perspectives is not widely recognized, and this leads to confusion when discussing timber supply and opportunities to expand current harvest levels.

The first perspective views the AAC as a harvest level designated by a regulating agency with the expectation that it be harvested entirely, on average, over some arbitrary regulation period (e.g., 5 years in Alberta). There may be a penalty associated with this expectation (e.g., “use it or lose it” in BC). This view implies that the regulating agency has accurately identified the economic margins of operability and merchantability, i.e., the current extensive margin. Whatever is included in the AAC is assumed to be economic to harvest.

The second perspective is that the AAC is an upper limit on the harvest that is physically and biologically feasible, and that may be attained in the future when markets and technology render it profitable. Under this perspective, the industry finds its own economic margins within the AAC. In general, current harvest levels will be less than the AAC because not all areas are economically operable at present.

Some factors are at work that tend to ensure that AACs at any particular point in time do not reflect the “true” picture. For example, AACs and their supporting landbases and utilization assumptions are determined every five or ten years, whereas economic margins move continuously. It is therefore unlikely that an AAC can be set accurately at the “average” economic margin.



Furthermore, a province may have allocated an AAC to a company subject to construction or expansion of a mill, and the harvest level would not reflect that allocation until the mill was completed. Finally, a province may, as a matter of policy, hold in reserve some operable lands of merchantable timber to meet future unspecified needs.

Both perspectives on AACs have advantages and disadvantages, which will not be discussed here. However, it is important to understand this aspect of an AAC when considering the opportunities for expansion of the harvest. If an AAC significantly exceeds the current harvest level, the implication is that future harvests can expand up to the AAC when economic conditions allow. Indeed, the AAC itself might increase as the economic environment becomes more favourable. But if the AAC is intended to be located at the economic margin, and the current harvest equals (more or less) the AAC, then it is not clear (without further information) whether there is supply available for expansion beyond the margin.

AAC landbase

The most problematic aspect of comparing the various methods of estimating timber supply used across Canada is the definition of the landbase for which AACs are determined—referred to here as the “AAC landbase.” The AAC landbase is often described as the landbase “supporting” the AAC. We use three definitions for AAC landbases.

1. Administratively available landbase: The definition of the AAC landbase begins with the productive forest area, which is reduced to an “administratively available” portion by excluding lands that are reserved for other forest values or to protect environmentally sensitive areas.⁶
2. Operable landbase: Most jurisdictions undertake further reductions beyond the administratively available land area to account for economic factors, including stands with unmerchantable types, minimum log size, poorly stocked sites, and losses due to decay, insects or fire. If all submarginal stands are excluded, the AAC landbase is coincident with the extensive margin of timber management, and every stand is operable under current average market conditions (i.e., the first perspective outlined above).
3. Intermediate landbase: Submarginal stands may be included in the AAC landbase due to the dictates of forest policy or because identifying submarginal stands is too difficult. In this situation, the AAC landbase will be intermediate between the administratively available and the extensive margin landbase.

⁶The productive forest area is defined differently for each province and territory.



Utilization assumptions

The intensity of timber utilization must be specified when estimating timber supply. For comparative purposes, we classify utilization as merchantable⁷ or gross utilization. The precise definition of merchantability varies by province and may specify diameter limits, volume per hectare, species and operability conditions. The term “gross utilization” generally indicates that the harvest volume may include timber that is currently not merchantable.

Levels of management

Measures of timber supply such as L_{TSY} and AAC are based on an expectation of a specified level of forest management. We have adopted the terms and definitions from the 1993 Compendium of Canadian Forestry Statistics.

- Extensive: current protection from fires and insects; forest renewal with natural regeneration only
- Basic: extensive management plus artificial regeneration where necessary
- Intensive: basic management, plus stand improvement of juvenile stands and acceleration of artificial regeneration.

How are AACs determined?

Methods of timber-supply analysis

Timber-supply analysis is the identification and quantification of timber production possibilities, from forest inventory data, and growth and yield data, subject to management assumptions.

In the provinces and territories of Canada, timber supply is analyzed by formula methods or by scenario analysis. Formula methods calculate an AAC from inventory and yield tables according to some management objective, such as the attainment of a normal forest. Scenario methods use a more elaborate model to forecast future harvests and forest states, subject to assumptions regarding silvicultural inputs and operating rules. The forest models used in Canada include simulation models and linear programming models.

⁷Merchantability is the dimensions of a tree or stand that can be technologically and economically harvested and manufactured into products.



Formula methods of supply analysis are used in Labrador, Ontario, Manitoba, Saskatchewan and the Northwest Territories. Labrador and Manitoba employ the area control method⁸ while Saskatchewan uses a volume-based formula.⁹ The objective of both area- and volume-based formula methods is to calculate a harvest level that can be sustained for a rotation without reducing the LTSY. Periodic recalculation ensures that the harvest level is gradually reduced to the LTSY, if current harvest levels exceed LTSY.

Ontario also uses the area control method, but applies it to the administratively available landbase to calculate total allowable (annual) depletion. This is the maximum annual depletion (MAD) from all causes that can occur over a rotation without reducing the LTSY. An AAC is calculated by computing the volume of the timber on the area of MAD and reducing its expected losses due to fire, insects, disease and wind.

As noted earlier, Ontario is in the process of converting from this area-based formula approach, to a linear programming model known as the "Strategic Forest Management Model" (SFMM). New assessments of Ontario's AACs based on SFMM are scheduled for release in 1995.

Newfoundland (Insular), Prince Edward Island and New Brunswick all use the FORMAN forest simulation model to explore alternative forest-management scenarios. Harvest levels for small private lands have been analyzed in New Brunswick using the WOODSTOCK model, while large freehold lands use FORMAN. Nova Scotia has developed its own modeling system, named the "Strategic Analysis of Wood Supply," or SAWS.

AACs for management units in Alberta have been determined by a range of methods, including an area-volume allotment check, Timber RAM, FORMAN and COMPLAN/TRENDS. Forest Management Agreement tenure holders may use any model that addresses the analysis parameters specified by the province's AAC guidelines and that has been approved for use by the Alberta Lands and Forest Service.

British Columbia also employs a simulation model (the Forest Service Simulator, FS-SIM) to test alternative management scenarios. The Forest Service model approximates the effects of spatial restrictions on harvests such as cut-block adjacency and green-up rules. Alberta expects to incorporate spatial harvesting constraints into their modeling process in the future.

Determination of the AAC

AACs are determined from the results of the timber-supply analysis. In situations where a formula method is used, the AAC may be the direct result of the calculation, or subject to subsequent netdowns. Scenario-analysis methods require the selection of a desirable scenario, from which the AAC is obtained directly or after a subsequent process. In other words, while an AAC number or series of numbers may be calculated, in many cases this number is

⁸AAC = (net commercial forest area/rotation age) x average volume per unit area.

⁹AAC = (total mature volume/rotation age) + mean annual increment of immature stands (Hanzlik's Formula).



subsequently reviewed, and other factors are considered before a final “official” AAC is determined for an area.

Most provinces explicitly or implicitly define their AACs in terms of sustainable harvest levels, although the exact relationship of AAC to LTSY varies substantially.

Newfoundland describes its AAC as the sustainable harvest level, but the details of calculation were not available to the authors.

Prince Edward Island does not specify an AAC *per se* because of the very high proportion of private ownership of the productive forest area, but it refers to its harvest forecasts as sustainable harvest levels, where harvest levels are based on biological limits.¹⁰

Nova Scotia defines its AAC as the maximum non-declining yield that may be obtained over a rotation.

New Brunswick describes its AAC as the maximum non-declining yield that may be obtained over an 80-year planning horizon.

In the past, Ontario defined its AAC as the net allowable depletion; its new definition was not clear from the documents available to the authors.

Manitoba defines its AAC as the average volume that may be harvested yearly and sustained continuously throughout the length of the rotation.

Saskatchewan does not use the term “AAC” but it determines a Harvest Volume Schedule (HVS), which it defines as the amount of wood that can be made available from the existing forest on an annual basis without jeopardizing the LTSY.¹¹

Alberta’s AAC is determined according to the principle that the harvest should not exceed the volume grown each year. Harvest levels are forecast over two rotations and are compared to the LTSY to determine their acceptability. The volume harvested in any particular year can exceed the AAC, provided there is balance over the regulatory period (five years).

British Columbia’s AAC is not calculated, but is set administratively based on analyses of timber supply, socioeconomic impacts, and other advice. It typically departs substantially from the LTSY, due to the availability of old growth with higher yields than can be expected in subsequent rotations.¹²

AACs in the Northwest Territories are calculated by rationing the standing stock over the rotation; where inventory information is inadequate, the AAC is set by professional judgement.

¹⁰The use here of the term “sustainable harvest levels” is confusing to the authors. Charts of “sustainable harvest levels” over time for PEI show harvest levels fluctuating widely.

¹¹The HVS is a schedule of short-term timber supply and appears to be equivalent to a schedule of AACs.

¹²Timber is surplus in the sense that the standing stock has a higher yield than the yields expected from future stands harvested at the culmination of the mean annual increment or some other specified rotation.



Underlying assumptions

A number of key assumptions have been made by the regulating agencies when determining the level of AAC. These include definitions of the productive forest landbase and the AAC landbase, utilization, level of forest management, and private land assumptions. Assumptions made in each of the provinces and territories are shown in Table 1.

Productive forest land

The definition of the productive forest area (PFA) is the starting point for determining the AAC. Definitions vary widely by province and territory. In some cases the definitions are precise (e.g., Alberta) and in others, quite arbitrary (e.g., Manitoba). An imprecise definition of productive forest land does not really matter, as long as subsequent landbase reductions for the analysis result in an AAC landbase that can sustain current timber-harvesting levels indefinitely. However, if land is included in the PFA that cannot sustain timber productivity through repeated cycles of timber harvesting, and, this land is part of the AAC landbase, then future harvest levels will be reduced.



Table 1 Assumptions regarding landbase, utilization and forest management implicit in the AAC determination.

Province/ territory	Definition of productive forest land (PFA)	Private land % of PFA	AAC ¹ landbase	Utilization assumption	Level of management	Analysis method
Newfoundland						
Insular	all forest capable of producing 35 m ³ /ha or more at rotation	2%	operable	merchantable	basic	scenario
Labrador	all forest capable of producing 35 m ³ /ha or more at rotation				extensive	formula
Prince Edward Island	land that supports, or recently supported, a crop of trees	93%	available	merchantable	intensive	scenario
Nova Scotia	areas that are forested or regenerating to forest, excluding sugar woods and Christmas tree production areas	72%	operable	merchantable	intensive	scenario
New Brunswick	all land capable of supporting a merchantable volume in a reasonable length of time	51%	operable	merchantable	intensive	scenario
Ontario	the area of "productive forest" that has been inventoried by the province	13%	available	n/a	basic	formula
Manitoba	all forest land capable of producing merchantable wood	7%	operable	merchantable	basic	formula
Saskatchewan	all land capable of supporting a merchantable stand in a reasonable length of time	3%	operable	merchantable	basic	formula
Alberta	forest lands capable of yielding 50 m ³ /ha by 140 years of age, without enhancement through human activities	5%	operable	merchantable	basic	scenario
British Columbia	Crown-owned forest land available for forestry	4%	operable	merchantable	intensive	scenario
Northwest Territories	stands on specified management units and site classes above a specified age	0%	operable	merchantable	extensive	formula

¹ The AAC landbase is the forest land expected to support timber harvesting in the long term. The term is applied in this paper to all provinces and territories.
n/a not available



Private land

The highest proportion of the PFA in private land is in the Maritime provinces, and generally decreases as one moves west across the country. The proportion of the PFA that is private land is important because AACs can generally only be regulated (i.e., subject to harvesting limits) on Crown lands. In some cases, private land may be regulated if it is included in a tenure arrangement, such as the tree farm licences in British Columbia. However, most private land in the Maritimes is unregulated, and harvest rates are determined by market conditions and the land owners' preferences. Harvest forecasts calculated for private lands in the Maritimes are estimates of sustainable harvest levels, rather than AACs.¹³ If forecasts are made for private lands, assumptions must be made about how often and when owners will decide to harvest.

Private land makes up about 8% of Canada's non-reserved productive forest area, yet it contributes almost 19% of industrial roundwood production. It is the source of most of the provincial timber supply in PEI and Nova Scotia, and composes half the supply in New Brunswick. It is also important in Ontario, making up about 20% of the total net merchantable volume of roundwood produced in 1992.

A key cause of confusion when comparisons of AACs and harvests are made, particularly at the aggregate region or national level, is the exclusion of some estimates of private land "AACs" or sustainable harvest levels. Generally, reported harvest levels include both Crown and private lands, yet often AACs are only reported for Crown and "regulated private" lands, not all private lands. This is an important consideration, particularly in BC, where unregulated harvest levels average approximately 10 million m³.

AAC landbase

All provinces, except Prince Edward Island and Ontario, purport to net down the productive forest area to an operable landbase upon which they determine their AAC.¹⁴ Prince Edward Island assumes that the entire PFA supports its AAC; Ontario excludes private and federal land, protection forest, and inventoried but "inactive" PFA, but makes no deductions for reasons of operability (including access).

Utilization

The intensity of utilization of timber assumed on the AAC landbase is classified as merchantable by all the provinces except Ontario. Harvests in Ontario are currently regulated according to an area-based method, and specification of

¹³Sustainable harvest levels are calculated for private lands by the provincial forestry agencies in Nova Scotia and Prince Edward Island. In New Brunswick, the sustainable harvest levels are determined by large industrial freehold owners and by the marketing boards that serve the owners of small private lands.

¹⁴As with the other Maritime provinces, Prince Edward Island does not set AACs for private land. For simplicity of terminology, we have used "AAC" to refer to potential harvest levels for private lands estimated by PEI.



volume utilization standards are unnecessary prior to converting the area of the annual harvest to volume.¹⁵

Level of management

As noted above, various scenarios are often considered for the analysis of timber supply. These may reflect different levels of forest management. The level of management required to support the current AAC varies by region. Extensive management is assumed for the Northwest Territories and Labrador, and basic management is specified for Ontario, Manitoba, Saskatchewan and Alberta.

Intensive management is necessary to support the current AAC in Nova Scotia, New Brunswick and British Columbia. The Nova Scotia AAC assumes planting and stand tending by all ownerships. The New Brunswick AAC is based on the expectation of planting and spacing on Crown and industrial forest lands.

British Columbia requires that silviculture treatments be carried out to ensure the establishment of a free-growing tree crop within a specified period of time after harvest. Consequently, the AAC is based on a level of forest management that varies between basic and intensive.

Current AACs and harvest levels

A comparison of current harvest levels and AACs is not necessarily a good indication of whether a region is harvesting at a sustainable level, given the differences in AAC definitions. However, Table 2 lists the current total AACs and harvest levels for the provinces and territories. Note that the current harvest levels are the last reported harvest levels available to the authors and may vary as to the year reported.

Insular Newfoundland's AAC is fully committed, i.e., the harvest equals the AAC. The AAC has been reduced from 1.8 million m³ in 1988 to 1.5 million m³ (preliminary) in 1994, largely due to reductions in the PFA and a reassessment of the productivity of managed stands. The demand for timber on Crown and industrial lands on the island exceeds supply by 12-15%. Some of this shortfall is made up through log imports.

The situation in Labrador is the opposite, with supply (600 000 m³/yr) exceeding demand (220 000 m³/yr).

The PFA of Prince Edward Island is mainly under private ownership (93%), and harvests are unregulated. The current softwood sawlog harvest is 153% of the potential supply, whereas softwood pulpwood and hardwood are 22% and 109%, respectively.

Ontario's current softwood harvest is 54% of AAC and the hardwood harvest is only 22% of AAC.

¹⁵Ontario is in the process of converting from an area-based to a volume-based definition of AAC and future timber supply.



The current harvest level for Alberta softwoods is 89% of the softwood AAC, but the AAC is fully committed and will be fully utilized by currently planned capacity. The hardwood harvest is only 32% of the AAC. Private lands in 1992-93 were estimated to have contributed 661 000 m³ of softwood and 336 000 m³ of hardwood.

British Columbia's current harvest level is 93% of its AAC, due to cut control regulations that allow the harvest to fluctuate around the AAC.¹⁶ Also, an additional 10 719 000 m³ of harvest was obtained from unregulated lands in 1993-94.¹⁷

Note that insular Newfoundland, Prince Edward Island (softwood sawlogs), New Brunswick, Nova Scotia (softwood) and British Columbia report harvest levels near or equal to their AACs. If harvesting in these provinces is occurring across the full forest profile of sites and types considered to contribute to the AAC, then it's likely that the AAC is located at the economic margin.

However, Labrador, Ontario, Manitoba, Saskatchewan, Alberta (hardwood) and the Northwest Territories are harvesting well below their AACs. This suggests that the AAC is located beyond the economic margin at which the companies have chosen to operate, and that these provinces and territories have "reserve" timber supply.

¹⁶Harvest levels in British Columbia may exceed AACs in any given year, but they must average out to the AAC over a five-year term.

¹⁷Unregulated timber-productive lands in BC include federal lands, timber licences and private land.



Table 2 Timber supply outlook summary.

Supply component	Level of management		AAC '000 m ³	Harvest '000 m ³	Harvest % AAC	— Supply Forecast '000 m ³ /yr—			
						1994	2000	2010	Horizon
Newfoundland									
Insular SW	basic	*	2 130	2 130	100%	2 130	n/r	n/r	2 130
Labrador SW	extensive	*	600	220	37%	600	n/r	n/r	2 130
All Owners, SW			2 730	2 350	86%	2 730	n/r	n/r	4 260
Prince Edward Island									
All Owners, SW Sawlog	extensive					85	85	50	30
All Owners, SW Pulpwood	extensive					144	194	203	50
All Owners, SW	extensive					229	279	253	80
All Owners, HD	extensive					142	n/r	n/r	145
All Owners, SW Sawlog	intensive/1	*	110	168	153%	110	110	110	160
All Owners, SW Pulpwood	intensive/1	*	208	46	22%	208	267	235	199
All Owners, SW	intensive/1	*	318	335	105%	318	377	345	359
All Owners, HD	intensive/1	*	183	199	109%	183	n/r	n/r	317
New Brunswick									
Small Freehold SW	extensive	*	1 700	1 700	100%	1 700	1 700	1 700	1 700
Small Freehold HD	extensive	*	1 500	1 500	100%	1 500	1 500	1 500	1 500
Private Industrial SW	intensive/1	*	1 700	1 700	100%	1 700	1 700	1 700	1 700
Private Industrial HD	intensive/1	*	3 400	3 400	100%	700	700	700	700
Provincial SW	intensive/1	*	3 400	3 400	100%	3 400	3 400	3 400	3 460
Provincial HD	intensive/1	*	1 700	1 700	100%	1 700	1 700	1 700	1 700
Provincial SW	intensive/2					3 400	n/r	n/r	5 100
Nova Scotia									
All Owners, SW	extensive					2 500	2 625	2 792	3 100
All Owners, HD	extensive					1 200	1 275	1 375	1 700
All Owners, SW	basic					2 700	2 875	3 108	3 600
All Owners, HD	basic					1 300	1 375	1 475	1 700
All Owners, SW	intensive/1	*	3 750	3 592	96%	3 750	4 136	4 654	6 000
All Owners, HD	intensive/1	*	1 500	657	44%	1 500	1 625	1 792	2 100
All Owners, SW	intensive/2					5 250	5 793	6 516	8 500
All Owners, HD	intensive/2					2 100	2 200	2 200	2 300
Ontario									
Provincial, SW	basic	*	31 224	16 728	54%				
Provincial, HD	basic	*	16 157	3 617	22%				
All Owners, SW	basic	*				22 150	21 250	19 750	28 000
All Owners, HD	basic	*				13 030	12 875	12 625	19 000
All Owners, SW	intensive					25 150	24 250	22 750	30 000
All Owners, HD	intensive					14 575	14 125	13 375	23 000



Supply component	Level of management		AAC '000 m ³	Harvest '000 m ³	Harvest % AAC	— Supply Forecast '000 m ³ /yr—			
						1994	2000	2010	Horizon
Manitoba									
Provincial SW	basic	*	4 919	1 601	33%	4 919	4 919	4 919	12 409
Provincial HD	basic	*	2 120	151	7%	2 120	2 120	2 120	7 416
Private SW	n/r	*	n/a	n/r	n/a	49	49	49	n/r
Private HD	n/r	*	n/a	n/r	n/a	573	573	573	n/r
Saskatchewan									
Provincial SW	basic	*	3 810	2 230	59%	3 810	n/r	n/r	3 792
Provincial HD	basic	*	3 164	861	27%	3 164	n/r	n/r	3 153
Alberta									
Provincial SW	basic	*	12 930	11 500	89%	12 930	n/r	n/r	12 930
Provincial HD	basic	*	9 559	3 093	32%	9 559	n/r	n/r	9 559
Private SW	n/r		n/a	661	n/a	n/r	n/r	n/r	n/r
Private HD	n/r		n/a	336	n/a	n/r	n/r	n/r	n/r
British Columbia									
All Owners, Regulated	intensive/1	*	69 067	64 565	93%	71 588	66 854	63 708	53 090
All Owners, Regulated	intensive/2		2 520	3 013	120%	71 588	69 213	68 427	76 292
All Owners, Unregulated	n/r	*	n/a	10 719	n/a	n/r	n/r	n/r	n/r
Northwest Territories									
Provincial SW	extensive	*	150	100	67%	150	n/r	n/r	2 722
Provincial HD	extensive	*	25	25	100%	25	n/r	n/r	10 500

SW softwood
 HD hardwood
 * status quo management
 n/r not reported
 n/a not applicable



Timber supply outlook

Status quo supply outlook

Looking into the future is a risky business. Assumptions, values and economic conditions can change significantly over time. For this reason, most provinces redo their analyses on a regular basis, generally every five years. The most recent forecasts of timber supply by the provinces and territories under one or more management assumptions are shown in Table 2. The status quo level of management for each province or territory is marked with an asterisk. The supply forecasts were obtained from the status reports provided by each province and territory; in some cases supply levels were interpolated. Where none were supplied, figures were obtained from other sources.¹⁸ "Horizon" supply values are LTSYs where available, or the most distant value provided in the supply forecast.

No forecasts of future supply for Insular Newfoundland, Labrador or the Northwest Territories were available for this study. Projected future harvest levels for Manitoba, Saskatchewan and Alberta can be inferred to be constant and sustainable for at least one rotation from the definitions of AAC provided in their TSSRs.

Under the status quo of extensive management, Prince Edward Island's present rate of harvest of softwood sawlogs is not sustainable; available supply is forecast to drop from 85 000 m³ per year to 50 000 m³ per year by 2010, and to 30 000 m³ per year at the end of the forecast period (2070). During this period, the average softwood log harvested will be smaller, causing an increase in the availability of softwood pulp. The availability of hardwood would also increase under this scenario.

New Brunswick's status quo management for provincial and industrial forest lands is intensive management; extensive management is assumed for small freehold woodlands. Under status quo management, both the hardwood AAC (1 700 000 m³/yr) and softwood AAC (3 451 000 m³/yr) are sustainable to the planning horizon.

Under status quo management (intensive silviculture), Nova Scotia's softwood and hardwood resources are both expected to support increasing levels of harvest. The sustainable harvest level is projected to increase by 60% and 38% for softwood and hardwood, respectively, by the year 2055.

Ontario's harvest forecasts in Table 2 have been established using a different landbase and method of calculation than the current AAC shown in the same table, reflecting the change in analysis methods for their new assessment (to be released in 1995). Ontario's softwood AAC is expected to decline as much as 20% from its 1994 level before increasing 26% by the year 2135. Under status quo management (basic), this decline will continue until the middle of the next century. The availability of the hardwood resource is expected to remain

¹⁸ Missing supply figures were most often obtained from the 1993 *Compendium of Canadian Forestry Statistics*.



relatively stable until the middle of the next century, after which it will increase substantially (46% by 2135).

Alberta's AAC is projected to remain constant, with harvest levels increasing toward the AAC to meet current commitments to industry. Private lands in Alberta are generally harvested for permanent removal of timber (i.e., clearing of land for agriculture) rather than sustained yield, and so the current historically high harvest levels are unlikely to be maintained in the long term.

Under status quo management, preliminary findings of an ongoing review of timber supply in BC suggest that AACs will decline by 5% in 1995, and by 20% over the next century.¹⁹

In the short term, the modest AACs of the Northwest Territories appear supportable. However, until the AAC calculations are supported by improved growth and yield information, it will be difficult to judge the long-term sustainability of the resource.

A sum-up of the AACs in this table shows that, under the status quo management, current AACs for Canada (excluding Quebec and Yukon) sum to 135 634 000 m³ for softwoods and 39 287 000 m³ for hardwoods. By 2010, the forecast AAC level will fall to 123 953 for softwoods, a reduction of 9%, and rise to 43 969 for hardwoods, an increase of 12%.

Opportunities to expand supply

The AACs shown in Table 2 are based on various assumptions; key among these are the level of management and the degree of utilization. A number of opportunities for increasing the supply of timber were indicated by conference presenters and by the TSSRs from the provinces, focusing particularly on the opportunities afforded if these two factors were to change. The various cited possibilities have been categorized into five groups (Table 3).

Intensification of silviculture

Intensification of silviculture was mentioned in most provincial presentations at the conference and listed in most TSSRs as an opportunity to sustain or expand current AACs. When available, supply forecasts under intensified management are included in Table 2.

Newfoundland expects increased planting and spacing to offset current and future supply deficits, especially a forecast shortage of sawlogs. No projections of supply based on additional silviculture were provided.

Prince Edward Island estimates that intensive silviculture (planting and precommercial thinning) would forestall the decline in availability of softwood sawlogs that is projected under status quo management. The availability of softwood pulp logs would also increase.

¹⁹Based on an extrapolation from 25 Timber Supply Areas or 70% of the TSA landbase.



Table 3 Opportunities for expanding timber supply.

Opportunity	Province/territory
Intensification of silviculture	
stand tending	Alta, NS, PEI, NB, Nfld
planting	Nfld, NB, NS
reforestation of abandoned farmland, fire barrens	NS, NWT
tree improvement	Alta, NB, Nfld
pre-commercial thinning	NB, NS, Nfld
Improved utilization	
mill technology to use small diameter logs	Alta, Sask, Man, NS, PEI
additional species, especially hardwoods	Man, Ont, NWT, NS, NB
products: finger-jointing, pelletizing	Alta
timber currently outside the AAC	Nfld
chips from sawmill residue	Nfld
Forest protection	Man, NS
Log imports	Nfld, BC
Improved access	NWT

New Brunswick proposes to expand the present intensive management of its softwood resource, eventually increasing the sustainable harvest level by 48% to 5 100 000 m³ per year.

Nova Scotia estimates that intensification of silviculture (stand renewal and tending) by all ownerships could immediately increase the sustainable harvest by 25% for softwood and hardwood. Rehabilitation of abandoned farmlands, fire barrens and understocked stands represents another possible increment of supply. Commercial thinning also is mentioned as a possibility.

Ontario proposes intensive management of its softwood resource to mitigate the projected decline in softwood availability that is forecast to occur in the middle of the next century. Intensive management could, in the long term, increase the sustainable harvest level by 35% for softwood and 76% for hardwood.

Manitoba mentions intensive forest management as an opportunity to increase harvest volumes, but provides no forecasts of supply.

Neither Saskatchewan nor the Northwest Territories mention intensive management as a likely strategy for expanding future harvest levels. The Northwest Territories lists rehabilitation of fire barrens as a possible increment of supply.

Alberta cites expanded planting programs, thinning, weeding and clearing as practices with the potential for increasing harvest levels. Planting has been undertaken with the objective of minimizing regeneration lag and shortening rotations. Manual and mechanical vegetation-management programs have been



initiated and will likely be expanded. The province has also embarked on a genetics and tree improvement program; over the next 30 years, Alberta expects yield improvements of 30-40% from this program.

BC is undertaking a program of enhanced silviculture to help offset forecast supply reductions. The program involves crop tending (increasing thinning, spacing, pruning and fertilization) and the commercial thinning of stands approaching maturity. Under this management regime, harvest levels are forecast to decline through the middle of the next century by 5-7% before increasing to about 6% above the current AAC.

Improved utilization

Improved utilization can take a number of forms. The increased utilization of the hardwood resource was key among these. The hardwood resource is generally underutilized across the country. Although the reporting provinces and territories identify a total hardwood AAC of 39 287 000 m³, only 15 503 000 m³ (39%) is currently harvested.

Newfoundland plans to increase the utilization of chips from sawmill residue and to seek incremental supplies of wood that are currently outside the AAC.

Ontario harvests only 38% of its available hardwood resource and views the remainder as a major opportunity to expand harvest levels. Planned capacity includes 1.6 billion square feet of oriented strandboard (OSB) production and 42 million board feet of hardwood lumber. In addition to the conventional hardwood AAC, there exists 3 million m³ of low grade (tolerant) hardwoods that are currently not utilized.

Fuller utilization of small diameter and short trees and a wider range of species are cited as Manitoba's best opportunities to significantly increase wood supply. Recent high prices have already resulted in improved utilization, increasing production. Harvest levels will increase in response to new utilization technology.

Saskatchewan requires improved utilization of small softwood timber to mitigate over-harvesting in some lease areas. The retooling and restructuring of existing mills is regarded as necessary to ensure that harvest levels are sustainable.

Alberta cites recent high market prices for encouraging the investment in thin-kerf saws and scanners that have increased recovery and allowed the utilization of small logs. High prices have also made it possible to recover timber that was previously economically inaccessible, thus expanding the operable landbase. Adoption of medium-density fibreboard (MDF), particle board, finger-jointing, pelletizing and OSB technology has allowed the utilization of by-products that were previously considered waste, as well as the utilization of previously unmerchantable species.



Forest protection

Enhanced protection of the standing stock was mentioned as an opportunity to increase supply by Nova Scotia and Manitoba. Rapid identification and salvage of stands that have succumbed to insects, disease, blowdown or wildfire could potentially add 10% to Nova Scotia's AAC.

Log imports

Insular Newfoundland currently imports softwood logs from Labrador, Prince Edward Island and Quebec, and regards increasing log imports as a feasible strategy to mitigate supply shortages. British Columbia currently imports logs from private lands in Alberta.

Improved access

The greatest opportunity for increased supply in the Northwest Territories is the development of access to its extensive aspen resource. Current strong lumber prices will make this activity economically viable.

Possible causes of supply reductions

While there are a number of opportunities for expansion of the timber supply, it is clear that numerous issues and problems were identified that could lead to supply reductions. Table 4 lists the issues mentioned in the conference presentations or in the provincial and territorial TSSRs.

Current or impending softwood scarcity

In general, there is a perceived scarcity of the softwood resource in many regions, as softwood AACs are beginning to be reduced in response to a number of factors, resulting in reductions in softwood harvest levels.



Table 4 Summary of issues and problems that may reduce timber supply.

Issue	Province/territory
Softwood shortage	
1. Current softwood shortage puts downward pressure on harvest levels	Nfld, NB, BC
2. Future softwood shortage constrains industrial development	Ont
3. AAC nearly or fully allocated. Harvest at or exceeds HVS or LTSY	All except NWT
4. In last two years harvest levels increased rapidly and significantly because of high prices	NWT, PEI, NS
Shrinking AAC landbase	
5. Harvesting landbase shrinking because of increased emphasis on non-timber resources Conflicts between timber production and non-consumptive uses of forest	BC, Alta, Sask, NS, Nfld, NB
6. Want/need to increase proportion of area in Protected Area Status	BC, Ont, NB
7. Conservation of old-growth types	BC, Ont
8. Landbase security for forest industry	BC, Ont
Funding for management constrained	
9. Securing funding for silviculture activities	NS
10. Improving quality of low-grade tolerant hardwood forests	Ont
Private ownership of land constrains timber production	
11. Private land very significant proportion of economically operable forest land	PEI, NS, NB, Ont
12. Private land unregulated and current harvest levels may be unsustainable	Sask, PEI, NB, Alta
Forest management impacts timber supply	
13. Harvesting guidelines increasing the cost of supply	BC
14. Fire protection creating overmature forest structure	Ont
15. Mixedwood and hardwood cover types replacing original spruce and mixed softwood types	Ont
Pest/pathogen problems reduce potential supply	
16. Early mortality (mortality at 40-60 years) of old-field white spruce stands	PEI
Fuelwood	
17. Fuelwood competes with commercial timber uses	NWT, PEI



As described in earlier sections, Newfoundland, New Brunswick and British Columbia are all currently experiencing scarcity of softwood timber. Newfoundland has recently revised its softwood AAC downwards by 300 000 m³ and needs to import logs to meet industrial demand. New Brunswick's recent (1992) management plan reduced its softwood AAC by 18% and forecasts tightening its supply situation for the next 20 years. British Columbia's current Timber Supply Review will result in an immediate reduction in AACs of about 5%, and begin a downward trend that is forecast to ultimately reduce harvest levels by 20%. Ontario forecasts a declining softwood supply until the middle of the next century.

In other provinces (Nova Scotia, Saskatchewan and Alberta) the softwood AAC is nearly or fully allocated, or over-allocated in some local situations. Prince Edward Island, which is entirely unregulated, notes that private land owners have responded to recent high prices by accelerating current harvests, with potentially detrimental implications for future harvests.

The current or impending scarcity of softwood supply in Canada is the result of reaching either physical or economic limits, and is exacerbated by issues and trends that will further tighten these limits.

Shrinking AAC landbase

The issue most frequently cited as contributing to reductions in timber supply is the shrinking AAC landbase. In general, reductions in landbase cause a proportional reduction in LTSY. Short-term measures, such as the AAC, are usually adjusted to reflect the reduction in LTSY.

Reductions in the area available for timber production was mentioned as an issue for at least six of the provinces: British Columbia, Alberta, Saskatchewan, Nova Scotia, Newfoundland and New Brunswick. Reasons for landbase reductions include:

- the increasing social value of non-timber resources and non-consumptive uses of the forest;
- the conflicts between timber production and non-consumptive uses;
- the desire to increase the area of land in protected area status to meet the goals of sustainable development; and
- the conservation of old growth.

A reciprocal, or complementary, perspective on landbase issues is that of landbase security for different forest users and uses. Although landbase security is usually presented as a timber industry demand, reserving representative areas of ecosystems in "protected areas" is a way to secure land for preservation or protection of various non-timber values and attributes. The current interest in land-use zoning in British Columbia exemplifies this attitude.

Landbase security for the forest industry and conservation of old-growth timber were specifically mentioned as issues in British Columbia and Ontario.



Constrained funding for management

Securing funding for silvicultural activities was cited as an issue only by Nova Scotia. In Ontario, improving the quality of low-grade tolerant hardwood stands was cited as an important issue, and may be interpreted as an issue with respect to securing funding for management activities.

Of course this has been an issue in other provinces for many years, and has been dealt with in different ways, including federal-provincial forestry agreements. In British Columbia, the Forest Renewal Plan has been devised as a way to secure long-term funding for silvicultural activities. The BC Forest Renewal Plan is a surcharge on stumpage that will be earmarked for activities expected to support increases in long-term harvest levels. Ontario has developed a similar strategy, the Silvicultural Trust Fund, and the Northwest Territories collects a \$2.50 reforestation charge above its stumpage charge.

Private land

As noted earlier in this report, private forest land contributes timber harvests at a level that is disproportionately high relative to its area. The unregulated nature of private land is viewed as problematic by some provinces; concerns were expressed that the owners of farm woodlots in Saskatchewan, Nova Scotia and Prince Edward Island have recently been harvesting at unsustainable levels in response to the prevalent high prices. Private forest land in Alberta is generally harvested to clear the land for other uses, such as agriculture.

Forest management impacts on timber supply

British Columbia's adoption of a new code governing forest operations will raise standards for riparian area management and maintenance of biodiversity.²⁰ If the code generally raises the cost of harvesting, timber supply that is currently considered in the AAC landbase could become economically inoperable.

In Ontario, two aspects of management were mentioned as important issues. The first is that fire protection is creating a forest that is predominantly overmature. The second issue is the conversion of spruce and mixed softwood cover types, to mixedwoods and hardwood types.

Pest/pathogen problems

In Prince Edward Island, a considerable portion of the timber supply is found on old-field spruce stands. For as yet unknown reasons, these stands suffer from early mortality, so that rotation ages are said to be about 40 to 60 years for such stands. Although nationally insignificant, this is a serious local problem.

²⁰Ministry of Forests, 1994. *British Columbia's Forest Practices Code – Proposed Forest Practices*. Victoria, British Columbia, 216 pages.



Fuelwood competition for industrial timber

The Northwest Territories and Prince Edward Island differ from other provinces in that their timber has a relatively low value for manufacturing compared to its value for firewood. There are two reasons for this. First, fuel oil and electricity are relatively expensive in both locations, and secondly, the markets for industrial forest products are relatively poor because of poor access (NWT) and long distance to markets (NWT and PEI). Recently though, high demand for sawlogs has increased the prices for sawlog timber and pushed harvest levels up.

A further complication is that about 75% of fuelwood and firewood comes from private lands. If private land owners receive higher prices for their timber from industrial customers, then the price of fuelwood will rise or fuelwood shortages will occur.

Although this is not a significant issue nationally, it may have an important impact on the local cost of living.

Timber supply and sustainable development

A key objective of the conference was to assess how we are doing in our aim of working toward sustainable development objectives, particularly those laid out in the National Forest Strategy and the Forest Accord. Documentation of progress toward sustainable development by the conference presentations and the TSSRs was not as complete as hoped for. This does not necessarily indicate that progress has not been made, but it seems that the provinces and territories focused most of their efforts for the conference on the task of reporting the estimation process and state of their supplies of timber. In addition, the issue of sustainable development is more pressing in some provinces and territories than in others. The progress reported is tabulated here in two formats.

Table 5 lists the policy, legislation and other initiatives described at the conference or in the TSSRs that support sustainable forest management. The "not reporting" (nr) status does not indicate that the province or territory has not undertaken any initiatives toward sustainable management; it only means that it was not reported at the conference or in the TSSR.

Table 6 was constructed from the list of actions mentioned by the participants or in the TSSRs as evidence of progress toward sustainable development. To show the scope of issues required for comprehensive consideration of sustainable forest management, a list of criteria for sustainable forest management is included. Note that the juxtaposition of the criteria and the list of actions does not imply a one-to-one correspondence between the two. Similar to Table 5, the absence of a province or territory from the list associated with an activity does not necessarily mean that it is not pursuing that activity; it may simply mean that it has not reported it.



Table 5 Sustainable forest management initiatives reported by provinces and territories.

Province/territory	Policy, legislation and other initiatives reported
Newfoundland	n/r
Prince Edward Island	n/r
Nova Scotia	CCFM Sustainable Forests—A Canadian Commitment Integrated Resource Management Strategy Action Plans
New Brunswick	n/r
Ontario	Policy Framework for Sustainable Forests Crown Forest Sustainability Act Forest Industry Action Group Keep It Wild Project Old-growth Conservation Strategy Environmental Assessment Board Silvicultural Trust Fund Forest Management Planning Manual
Manitoba	Long-term Integrated Forest Management Plan
Saskatchewan	Conservation Strategy for Sustainable Development Forest Management Policy Framework Long-term Integrated Forest Resource Management Plan
Alberta	Department of Environmental Protection Natural Resource Policy Framework Alberta Forest Conservation Strategy Natural Resources Conservation Board
British Columbia	Commission on Resources and the Environment Protected Area Strategy Land and Resource Management Planning The Forest Land Reserve Act The BC Treaty Commission The Forest Practices Code The Forest Renewal Plan
Northwest Territories	n/r
n/r	not reported



Table 6 Sustainable forest management activities reported by the provinces and territories.

Criteria for sustainable forest management	Activities	Province/territory
Environmental		
Biodiversity	Conservation of biodiversity	all
Forest condition, ecosystem productivity	Ecosystem management	all
Soil and water conservation	Protected areas	NB, NS, Ont, Sask, BC
Global ecological cycles	Old-growth conservation	Nfld, Ont, BC
Economic—multiple benefits to society		
Productive capacity	Sustained yield (timber)	all
Competitiveness of resource industries	Land-use planning with stakeholders	BC
Non-timber values	Consideration of non-timber values	Nfld, NB, Ont, BC
Contribution to the national economy		
Social—accepting society's responsibility		
Fair and effective decision making	Public consultation and participation	Nfld, NS, Sask, Alta, BC
Informed decision making	Access to information	Ont
Sustainability of forest communities	Cognizance of certification programs	Alta
Respect for Aboriginal rights	Land claims and treaty negotiation	Alta, BC

Policy, legislation and other initiatives

All provinces reported (or inferred) a commitment to sustainable forest management as a matter of policy. Various new policies, legislations, codes, strategies and other initiatives are underway to implement this commitment.

Newfoundland described its public consultation legislation, which provides for stakeholder consultations on the preparation of a forest management plan, on the designation of a timber production forest, and on the issuing or resale of a Crown timber licence, as well as a mechanism for resolving conflicts.

Nova Scotia affirmed its commitment to the Canadian Council of Forest Ministers' National Forest Strategy, and reported the development of an Integrated Resource Management Strategy that defines how area-based ecosystem management will be implemented. Nova Scotia has prepared action plans that include measurable objectives for the state of forest ecosystems in forest management plans on both public and private lands.

In Ontario, in the summer of 1993, a tripartite committee of forest industry, labour and government released a report with the chief recommendation to "develop an assured long-term supply of quality wood resources for industrial



use at competitive cost, within the framework of ecosystem stability." Ontario released its Policy Framework for Sustainable Forests in 1994, which explains the province's objectives and principles for sustaining forests, communities and resource use. The goals, objectives and principles of sustainable forestry that are identified in the policy framework are to be embedded in the Crown Forest Sustainability Act. The Keep It Wild Project (Endangered Spaces) has as its goal the protection of representative areas of all ecoregions across the province by 2000. This project will formally protect a total of 8% of the province's landscape. The goal of the Old Growth Conservation Strategy for Red and White Pine Ecosystems is to ensure that red and white pine ecosystems, including old growth, are present on the landscape of Ontario, both now and in the future. The Environmental Assessment Board of Ontario has confirmed that the timber management approach of Ontario is acceptable, and has defined improvements to planning, implementation, monitoring and reporting of timber management. The Silvicultural Trust Fund will take in fees from stumpage and invest them in forest renewal and silviculture. Finally, a new Forest Management Planning Manual will change the focus of timber management to forest sustainability for multiple use.

Manitoba is developing a long-term integrated forest management plan.

In 1992, Saskatchewan released its Conservation Strategy for Sustainable Development, under which its Forest Management Policy Framework was developed. Saskatchewan is currently developing a long-term integrated forest resource management plan to implement ecosystem management, include all forest values in the planning process, and facilitate public participation in forest management planning.

Alberta has recently (1993) established a Department of Environmental Protection, which is responsible for ensuring ecosystem integrity, among other things. One of the initiatives of this new department is the Alberta Forest Conservation Strategy, a partnership of stakeholders who will decide how Alberta's forests will be managed for public benefit. The Natural Resources Conservation Board provides an impartial process to review projects; public hearings are optional.

British Columbia's sustainable development initiatives fall into two categories: land-use planning and resource management planning.

Current land-use planning initiatives are the Commission on Resources and the Environment (CORE), the Protected Area Strategy (PAS), Land and Resource Management Planning (LRMP), the Forest Land Reserve Act, and the BC Treaty Commission. CORE is charged with developing regional land-use plans from multi-stakeholder input. Part of the CORE process involves the determination of protected areas, identified through the PAS process. LRMP is a process that interprets CORE land-use plans for a sub-region, and produces more specific objectives and guidelines. LRMP considers all resource values, and requires public participation, inter-governmental agency cooperation, and consensus-based land and resource management decisions. The goal of the Forest Land Reserve Act is to provide long-term forest management stability to large private land holdings. The BC Treaty Commission is charged with



negotiating fair and equitable settlements of treaties, land claims and other issues between the Government of BC and the First Nations in BC.

The current resource-planning initiatives in British Columbia that are supportive of sustainable development include the Forest Practices Code (FPC) and the Forest Renewal Plan (FRP). The FPC clarifies and standardizes present forest-management guidelines, rules and procedures, and raises the standards for biological diversity and riparian area management. The FRP is the only initiative specifically designed to provide increased timber supplies. The FRP will invest more than \$2 billion over the next five years in improved regeneration and stand tending, conversion of marginal agricultural land to forest land, increased levels of research and development, habitat rehabilitation, improved utilization, value-added manufacturing, skills training, and community economic development.

A number of key activities seem to be common across most provinces and territories. These include measures to conserve biodiversity, policies to implement ecosystem management, programs for the conservation of protected areas and old growth, management of timber for sustained yield, and land-use planning that includes all stakeholders and provides for fuller consideration of non-timber values. The fuller participation of stakeholders and the public in general is also a widespread trend.

Comments and conclusions

Softwood timber is becoming scarce and harvest levels are forecast to decline in some regions

Harvest levels for softwood are equal to the AACs in six of the jurisdictions reported (Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Alberta and British Columbia) and are forecast to decline in British Columbia.

The AAC landbase of the timber-scarce provinces closely approximates the extensive margin of operations. Despite high prices, the extensive margin can't expand because of limitations of the physical landbase (Prince Edward Island, Nova Scotia and New Brunswick) or, in the case of British Columbia, because of administrative constraints on the landbase.²¹ Of the timber-scarce provinces, only Alberta is likely to have "reserve" timber supply outside the current AAC landbase, and is currently building milling capacity to fully utilize the existing AAC.

In Manitoba, Saskatchewan, Ontario and the Northwest Territories the actual softwood cut is well below the AAC. These provinces have set AACs that are an upper limit on the harvest that is physically and biologically feasible, and that

²¹Ian Miller notes in his British Columbia TSSR that an area of productive forest land larger than the current AAC landbase is deemed "not available" for timber harvesting.



may be attained in the future when markets and technology render it profitable. Current harvest levels reflect the industries' economic margins within the AAC.

Improved utilization is recognized as an opportunity for increasing the softwood supply

As one would expect, the provinces experiencing scarcity of softwood recognize improving utilization as an opportunity for expanding supply.²²

In Manitoba, Saskatchewan and the Northwest Territories the actual softwood cut is well below the AAC. Improving utilization is cited as an opportunity to expand supply in these provinces also. One might wonder why expanding supply would even be considered if the AAC is not being fully utilized. One answer might be that the marginal cost of an increment of supply from improved utilization is less than the cost of an increment of timber from an increased level of harvest.

British Columbia is the only province to forecast an actual decline in long-term harvest levels under status quo management

Only in British Columbia is the AAC significantly higher than LTSY. The supply of softwood in British Columbia is currently different from that in all of the other provinces and territories because of the availability of old growth, with higher yields than can be expected in subsequent rotations (this is termed a "timber surplus" situation). However, the truth is that in the eastern provinces the transition to management began long ago. If we had estimated timber supply a century ago, Ontario, Quebec, New Brunswick and Nova Scotia would all be in "timber surplus" situations, facing declining timber supplies as they liquidated the old-growth red and white pine forests.

Maintaining softwood AACs will require intensification of management

Maintaining softwood AACs in New Brunswick and Nova Scotia already requires intensive management (i.e., the status quo). Preventing a reduction of softwood AAC in Ontario will require increasing the level of management from basic to intensive silviculture. Mitigating (not preventing) falldown in British Columbia will require silvicultural inputs at a level never before attempted in Canada. Is this level of financing achievable and sustainable in Canada's current fiscal climate? The move to "trust fund" accounts for financing silviculture (e.g., British Columbia and Ontario) is encouraging, but will the industry be able to maintain their contributions at the bottom of the market cycle?

²² The BC situation was reported by personal communication with Ian Miller, author of the BC paper.



Private sector investment seems unlikely. In his conference paper, Don Roberts told us that private investors do not perceive a scarcity of timber in the wider market, and would be unlikely to invest in intensive management in Canada with its low forest-growth rates.²³

The cost of softwood timber production in Canada is rising

Increasing log costs must be passed on to the consumer, covered by efficiency gains by the industry (i.e., improved utilization), or subsidized by the taxpayer.

What are the prospects for passing these costs on to the consumer? Again, to quote Don Roberts, markets work through substitution at many levels. Wood is just not unique enough from an economic perspective to develop and hold significant scarcity value. Also, rising timber costs and scarcity may be a Canadian phenomenon.

Historically, efficiency gains due to improvements in wood processing technology have had a major impact on Canadian production, and will likely respond quickly to rising supply costs and shortages.

Hardwood supplies are underexploited in Canada

In most of Canada, hardwoods are not nearly as important a timber resource as softwoods, with a few notable exceptions. In Prince Edward Island and the Northwest Territories, where hardwoods are the predominant source of fuel, the hardwood AAC is fully utilized. The hardwood AAC is also fully utilized in New Brunswick. While fuelwood is probably important there, much more hardwood is used for industrial manufacturing.

Utilization of the hardwood resource of Ontario, Manitoba, Saskatchewan and Alberta is the largest opportunity to expand timber supply in Canada.

Non-timber resource conflicts occur where the AAC is fully allocated

Wherever the AAC is fully allocated, conflicts with management of non-timber resources become more serious. Evidence for this is found in the claims that the landbase is shrinking in Newfoundland, Nova Scotia, New Brunswick, Saskatchewan, Alberta and British Columbia. (The anomaly in this list is Saskatchewan; because its AAC is not fully allocated, one might wonder why landbase reductions are a concern.)

²³Roberts, Don. Changing Demands on Canada's Forest and its Timber Supply: An Investment Perspective. Presented at Timber Supply in Canada: Challenges and Choices, Kananaskis, Alberta. November, 1994.



Analysis methods differ with the economic value of the resource

Different methods are used for evaluating timber supply across the country. These methods range from classic formulae and area-based approaches, to computerized models of management scenarios. The method used in any province is closely related to the economic importance of timber processing, to the importance of non-timber values such as recreation and wildlife habitat, and to the sensitivity of those other values to damage stemming from timber harvesting. In general, the effort used to estimate timber supply increases with the importance of the industry and with the value and sensitivity of non-timber resources. Where the timber industry is less important, or where there is little potential for conflicts over management, there is little point in expending great effort in modeling timber supply.

Private land provides a disproportionately large share of the national timber supply

Privately owned forest land provides a disproportionately and surprisingly large share of the national timber supply. Forest products companies in Nova Scotia and New Brunswick rely on private forest land particularly heavily, while in Ontario it is a significant source of industrial timber. The strength of the current market for forest products is creating high demand for timber and is pushing prices up for private wood. This trend is having a significant effect on the volumes being cut on private land in Prince Edward Island, Saskatchewan, Alberta and British Columbia (and increasing the industrial use of timber in the Northwest Territories).

All provinces claim to be moving to ecosystem management

The agencies responsible for forest management in virtually every jurisdiction claimed to be moving to "ecosystem management." This is a major shift in forest management that is likely to have significant operating cost and timber supply impacts. The implications of this shift in management philosophy with respect to timber supply must be evaluated. In general, there was little evidence of actual implementation of ecosystem management principles on a widespread basis.

Information on non-timber resources is lacking

Information essential for integrated resources management (IRM) and ecosystem management is felt to be lacking in almost every province and territory. This shortage is more important wherever IRM and ecosystem management considerations are being incorporated into timber-supply analysis in the form of adjustments to yield curves or restrictions on landbase. Especially where cut levels are at or near LTSY, this lack of information is especially troubling because of the uncertainty it places on estimates of sustainable harvest levels, i.e., in British Columbia, Alberta, Ontario, and New Brunswick.



Are the timber-supply projections reported here overly optimistic?

In some provinces, planning has become heavily laden with processes that involve many stakeholders (e.g., British Columbia), or require compliance with other agencies (e.g., Ontario's environmental assessments). Furthermore, inventory and growth and yield information are always questioned, and there are enormous needs for information about non-timber resources. It is difficult to know how likely it is that the future harvest volumes shown in these supply projections can be realized, given so many uncertainties and potential problems.

Concluding remarks

The conference in Kananaskis, Alberta, took place to address the National Forest Strategy action item stating that "Industry and government will assess opportunities to maintain and expand the sustainable supply of timber from public and private lands and, by 1994, the CCFM will sponsor a national workshop to review the results and consider the implications." The status reports by the provinces and territories provided the building blocks for this review. It is clear that while the conference and its proceedings provide an up-to-date summary of timber supply in most of Canada, there are information gaps that are crucial to an assessment of future outlook. Some of these gaps have been identified above—certainly the inclusion of all regions is necessary—as are the results of the ongoing timber-supply analyses in BC and Ontario; but other information needs, such as the value of non-timber resources and the impacts of changing management patterns (e.g., the move to ecosystem management) on supply costs and availability, are important as well. Clearly progress is being made toward sustainable development, but there is much more work to be done in terms of meeting information needs, changing analysis methods to reflect changing values, and implementing real changes in management.

