GAO

Fact Sheet for the Vice Chairman, Joint Economic Committee, U.S. Congress

December 1986

CANADIAN TIMBER

Cost and Pricing Data for Timber Harvested in British Columbia

GAO/RCED-87-55FS

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-225881

December 30, 1986

The Honorable James Abdnor
Vice Chairman, Joint Economic Committee
Congress of the United States

Dear Mr. Vice Chairman:

In a November 18, 1985, letter, you requested that we obtain information on the costs and prices of timber sold from government-owned lands in western Canada from 1981 through 1985. You indicated that the Joint Economic Committee was considering the question of whether the Canadian government was selling timber from its lands at prices that gave the Canadian forest products industry an unfair competitive advantage in the U.S domestic market You said that the cost and pricing data you requested would assist the Joint Economic Committee in its evaluation of the need either for further study of the timber harvest pricing and regulatory programs of the United States, or for possible negotiations with Canada regarding timber sold from government lands.

In accordance with your request and subsequent discussions with your office, this fact sheet presents the available average cost and pricing data on the major species of timber sold by the government of British Columbia for 1981 through 1985. Much of the information contained in this fact sheet was presented to your staff in an earlier briefing As agreed, we have not attempted to interpret or draw conclusions from the cost and pricing data we obtained from British Columbia, nor did we compare it with domestic data

Section 2 of the fact sheet deals with average stumpage prices (value of standing timber) in the Coastal and Interior regions of British Columbia, your primary concern. Generally, the average stumpage prices are higher and the volumes harvested are lower in the Coastal region than in the Interior region. In 1985, the Coastal region harvested 2.9 billion board feet at an average stumpage price of $24.08 per thousand board feet, whereas the Interior region harvested 8.6 billion board feet at an average stumpage price of $5.36 per thousand board feet.

Sections 3 to 7 summarize the data we obtained on your other specific questions relating to (1) road costs incurred to harvest timber, (2) timber harvesting costs, (3) utilization ratios (measure of the relationship between the amount of timber processed and the amount of

finished lumber produced) of timber harvested, (4) lumber manufacturing costs, and (5) sizes of timber put into sawmills. These data were available only through 1984.

The information in this fact sheet, denominated in Canadian dollars, was obtained from British Columbia Ministry of Forests records or from special analyses prepared specifically for us by the Ministry in those instances where data were not readily available. Details on our scope, methodology, and data limitations are discussed in section 1 of this fact sheet.

In response to a petition from U.S. softwood manufacturers, the International Trade Commission (ITC) determined in July 1986 that there was a reasonable indication that the U.S. softwood lumber industry was being materially injured by reason of allegedly subsidized imports from Canada. On July 13, 1986, ITC sent this matter to the International Trade Administration (ITA) for preliminary subsidy determination. On October 16, 1986, ITA issued its preliminary determination, which said that Canada subsidizes its lumber production by 15 percent. ITA's final ruling is due on December 30, 1986.

Our review was performed between January and October 1986. Officials of the British Columbia Ministry of Forests reviewed a draft of this fact sheet and their comments have been incorporated where appropriate

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this fact sheet until 30 days from the date of this letter. At that time we will send copies to the Director of the Office of Management and Budget and other interested parties. Copies will be available to others upon request. Should you need further information, please contact me at (202) 275-5138.

Major contributors are listed in appendix I.

Sincerely yours,

Brian P. Crowley

Brian P. Crowley
Senior Associate Director

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Abbreviations

GAO	General Accounting Office
ITA	International Trade Administration
ITC	International Trade Commission
MBF	thousand board feet
RCED	Resources, Community, and Economic Development Division

Introduction

Background

Imports of Canadian softwood lumber to the United States have increased dramatically over the past 9 years, accounting for 32 percent of the U.S. market in 1985. In 1975, Canada exported about 10.3 billion board feet of softwood lumber to this country, with a value of about U.S. $1.8 billion. In 1985, these exports had risen to about 14.5 billion board feet at an estimated value of about U.S. $2.9 billion—an increase of 40 percent in volume and 56 percent in value.

Canadian softwood lumber production has increased about 29 percent in the last 9 years, while U.S. production has declined. U.S. softwood lumber demand increased by 1 billion board feet from 1984 to 1985, and Canada supplied nearly all of the lumber to meet that increased demand.

The U.S. softwood lumber industry has attempted to restrict the flow of lumber from Canada. For example, in October 1982 it petitioned the Department of Commerce's International Trade Administration (ITA) and the International Trade Commission (ITC) to impose countervailing duties (tariffs) on Canadian softwood lumber imports, claiming that the Canadian government was unfairly subsidizing the Canadian lumber industry. ITC is responsible for determining if an industry is being materially injured by imports, whereas ITA determines the extent to which imports have any unfair price advantage and arrives at a countervailing duty to offset any such advantage. In May 1983 ITA ruled against the petitioners, deciding that there were no countervailable subsidies. Such action by ITA terminated the investigation by both ITA and ITC

Recently, the U.S. shake and shingle manufacturers petitioned ITC, charging that Canadian imports had materially damaged their industry. On the basis of ITC's determination of injury, the President approved duties on imports for the next 5 years. Encouraged by this and an ITA ruling concerning importation of carbon black from Mexico, the softwood lumber industry again petitioned ITA and ITC in May 1986 for countervailing duties on softwood lumber imports, claiming that the Canadian federal and provincial governments subsidized lumber producers, principally by selling government-owned timber at less-than-fair-market-value stumpage rates (value of standing timber before the tree is cut) and, to a lesser degree, through reduced transportation costs and reforestation requirements and certain loan, grant, and export-assistance programs.

In July 1986, ITC completed its investigation and determined that there was a reasonable indication that the domestic industry producing softwood lumber had been materially injured by reason of allegedly subsidized imports from Canada On July 13, 1986, ITC sent this matter to ITA for a preliminary subsidy determination. On October 16, 1986, ITA issued its preliminary determination, which said that Canada subsidizes its lumber production by 15 percent ITA's final ruling is due on December 30, 1986

In addition to these administrative appeals, the U.S. softwood lumber industry has appealed to the Congress for assistance in reducing softwood lumber imports from Canada. A number of bills to do this were introduced during the 99th Congress.

Objectives, Scope, and Methodology

In a November 18, 1985, letter, the Vice Chairman of the Joint Economic Committee asked us to provide certain information relating to the pricing and costs of timber in western Canada The Committee's basic concern was that the pricing and regulatory differences between timber harvested from government lands in western Canada and the timber cut from Forest Service lands in the United States may provide an unfair competitive advantage to the Canadian forest products industry in the U S domestic market To assist the Committee in evaluating the need either for further study of the timber harvest pricing and regulatory programs of the United States or possible negotiations with Canada regarding timber sold from government lands, we agreed to answer the following questions:

- What were the average stumpage prices per thousand board feet for the major British Columbia timber species from 1981 through 1985?
- What were the average British Columbia timber harvest road costs per thousand board feet from 1981 through 1985?
- What were the average timber harvesting costs in British Columbia from 1981 through 1985?
- What were the average utilization ratios of timber processed in British Columbia from 1981 through 1985?
- What were the average lumber manufacturing costs in British Columbia from 1981 through 1985?
- What were the average piece sizes of timber put into sawmills in British Columbia from 1981 through 1985?

To obtain the requested information, we reviewed and analyzed data available on the Canadian lumber import issue These data included.

(1) the ITC April 1982 and October 1985 reports on Conditions Relating to the Importation of Softwood Lumber Into the United States, (2) the ITC November 1982 and July 1986 preliminary determinations of material injuries, (3) the ITA May 1983 final negative countervailing duty determination on certain softwood products from Canada, (4) the May 1986 petition to ITC and ITA by the Coalition for Fair Lumber Imports on behalf of U.S. softwood manufacturers, (5) British Columbia's August 1986 response to the ITC countervailing duty questionnaire, and (6) the October 16, 1986, ITA positive preliminary countervailing duty determination on certain softwood products from Canada

We interviewed officials of the British Columbia Ministry of Forests We also reviewed Ministry timber appraisal files, purchaser cost reports, audit reports, and other records; and, we requested that Ministry officials prepare several special cost analyses for us that we verified on a limited basis During our verification work, Ministry officials allowed us access to certain cost information that the Ministry had received from provincial timber purchasers. In addition, we interviewed officials of U.S timber industry associations, the Forest Service, ITC, and ITA to obtain the domestic perspective on the Canadian lumber import issue

Our review was conducted between January and October 1986. Our work was performed principally at the Ministry of Forests in Victoria, British Columbia, and at the Forest Service's region 6 office in Portland, Oregon. In accordance with the wishes of the Committee staff, we did not draw conclusions from the information obtained from the Ministry, nor did we compare the information with the cost and price data used by the U S Forest Service in its timber appraisal process. We provided the Ministry an opportunity to review and comment on a draft of this report Its comments have been incorporated as appropriate

Data Limitations

The information contained in this report, denominated in Canadian dollars, comes primarily from Ministry files, records, and reports However, when certain data requested from the Ministry on road, harvesting, and manufacturing costs were not readily available, Ministry officials developed it for us The information prepared by these officials was based on a sample of British Columbia harvesting and manufacturing costs through 1984. Data for 1985 were not available at the time of our review We reviewed the methodology used by the Ministry to develop the information requested and performed limited testing of its validity and reliability In addition, we compared the road, harvesting, and manufacturing costs provided by the Ministry with the data reported by the

Ministry in its August 1986 response to ITC's countervailing duty questionnaire and with similar data developed by an international firm of certified public accountants, representing a British Columbia logging association. Both the methodology used and the information developed by the Ministry appear reasonable.

British Columbia Timber Harvest Information

For timber harvesting purposes, British Columbia is divided into Coastal and Interior regions (see fig. 1 1). The Coastal region is that area west of the Coast Mountains, the northern extension of the Cascade Mountains of Washington and Oregon. This region has high precipitation, rugged terrain, and generally moderate to cool temperatures. In general, growth rates in this region are significantly higher than in the Interior region, which lies east of the mountains and is colder and drier. These factors tend to retard growth and interrupt harvesting activities in the Interior region. The following information describes the magnitude of the British Columbia timber operations and its relationship to the U S. market.

- Ninety percent of harvestable timber in British Columbia is on provincial land, 9 percent on private land, and 1 percent on federal land.
- British Columbia has 113 million acres (21 percent) of the total productive forest land in Canada.
- British Columbia has 3.2 trillion board feet (48 percent) of the total volume of softwood timber in Canada.
- British Columbia produced over 14 billion board feet (63 percent) of the 22.3 billion board feet of softwood lumber manufactured in Canada in 1985.
- British Columbia directly exported 8.3 billion board feet of softwood lumber to the United States in 1985 In addition, a portion of the 1.5 billion board feet shipped to other Canadian provinces was exported to the United States

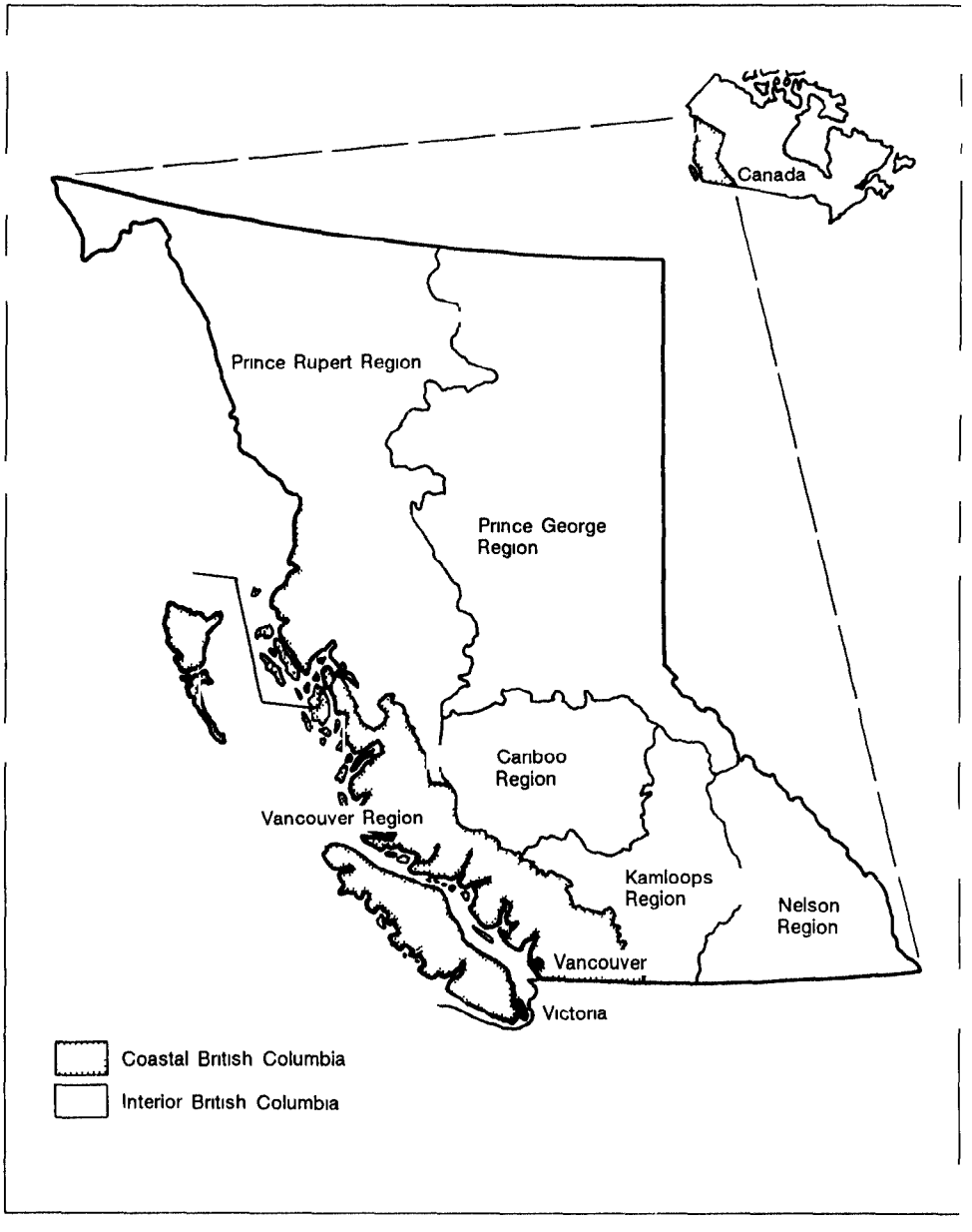
British Columbia Timber Appraisal Process

The Ministry uses the residual value appraisal method to determine the value of its standing timber (stumpage price). Under this method, the Ministry computes the selling prices of end products, subtracts an estimate for the purchaser's harvesting and manufacturing costs and an allowance for the purchaser's risk and profit, to arrive at the appraised value. The stumpage prices are subject to monthly adjustments based on end-product selling price fluctuations and to an annual reappraisal. Timber purchasers pay at the adjusted rate in effect for each species during the month the timber is cut and measured. If the appraised stumpage price is less than a minimum amount prescribed by Ministry

regulations—3 percent in the Interior and either 6 or 8 percent on the Coast of the average market value—then the minimum rate becomes the stumpage price.

While the residual value appraisal method is used to appraise both Coastal and Interior timber sales, the Ministry uses different bases. Coastal appraisals are based on log prices because logs are considered end products and there is an active log market on the Coast from which the Ministry can obtain prices needed to calculate average market values. However, Interior appraisals are based on the average market values for finished lumber at the Canadian mill and a regulated price for by-product chips.

Figure 1.1: Forest Regions of British Columbia



Average Stumpage Prices for Major British Columbia Timber Species for Fiscal Years 1981 Through 1985

Average Stumpage Prices Received From Major Timber Purchasers

Stumpage price is the monetary value of standing timber before the trees are cut British Columbia bases its stumpage prices on a residual value appraisal method that takes into account three components—the selling price of end products, allowances for production and operating costs, and allowances for profit and risk.

About 93 percent of British Columbia timber is sold to major purchasers, with the remaining amount going to small businesses The timber is sold to purchasers at the appraised price or minimum price. The prices shown in table 2.1 represent the average actual amounts purchasers were billed before the Ministry allowed any credits for work done by the purchasers, such as performing reforestation work or building roads. According to Ministry officials, since 1982 most of the timber was sold for the minimum prices prescribed in the Ministry's regulations.

The Ministry provided us with the average stumpage prices per cubic meter received from purchasers for major species of timber under 10- to 25-year licenses with the Ministry for fiscal years 1981-85. We converted cubic meters to thousand board feet (MBF) using a conversion factor provided by the Ministry.

Table 2.1: Average Stumpage Prices Received From Major Timber Purchases in Coastal and Interior British Columbia, Fiscal Years 1981-85[a]

Dollars in Canadian

	Volume (millions of board feet)[b]					Price (per thousand board feet)[c]				
Species	**1981**	**1982**	**1983**	**1984**	**1985**	**1981**	**1982**	**1983**	**1984**	**1985**
Coastal British Columbia										
Balsam	644	418	446	618	533	$50 92	$15 66	$15 17	$15 44	$13 45
Cedar	684	531	557	766	718	39 74	17 55	18 90	38 07	46 17
Cypress	106	72	52	106	86	288 20	93 31	50 60	56 43	49 14
Douglas fir	289	239	237	280	275	71 93	34 02	26 03	20 25	20 79
Hemlock	1,289	962	1,018	1,319	1,140	51 57	14 31	14.09	14.42	12.26
Larch	0	0	0	0	0	•	•	•	•	•
Lodgepole pine	2	0[d]	1	0[d]	1	12 74	11.56	6 32	12.15	6 26
Spruce	142	143	136	134	141	172 64	59 02	62 75	36.02	38 50
White pine	6	5	3	4	4	36 94	13 82	10 42	10 21	10 15
Other	6	9	2	2	1	11 93	16 63	7 40	7 45	6 91
All species[e]	**3,168**	**2,379**	**2,452**	**3,229**	**2,899**	**$63.99**	**$22.30**	**$19.98**	**$23.00**	**$24.08**
Interior British Columbia										
Balsam	908	759	671	893	893	$7 04	$ 5 36	$ 4 40	$ 5 36	$ 5 08
Cedar	317	289	202	348	306	9 35	7 90	7 13	9 08	8 35
Cypress	1	1	1	0[d]	0	64 29	39 36	24 65	21 97	•
Douglas fir	713	616	621	691	711	14 94	9 22	5 18	6 36	6 08
Hemlock	503	289	142	261	319	4 27	4 13	3 50	3 54	3 63
Larch	61	46	60	68	65	7 45	6 36	5 54	6 13	5 99
Lodgepole pine	2,706	2,269	2,457	3,025	2,925	5 72	5.49	3 81	4 95	4 63
Spruce	2,771	2,657	2,848	3,451	3,315	12 03	6 17	4 90	5 77	5 54
White pine	48	36	28	30	29	43 31	25 79	9 13	17 12	30 60
Other	19	20	29	28	22	14 85	8 90	5 18	3 81	5 86
All species[e]	**8,047**	**6,982**	**7,059**	**8,795**	**8,585**	**$ 9.17**	**$ 6.22**	**$ 4.54**	**$ 5.58**	**$ 5.36**

[a]British Columbia fiscal years run from April 1 to March 31 Does not include timber license arrangements under which British Columbia receives a small annual rental payment and royalty for the timber harvested According to the Ministry, 6 4 million cubic meters was harvested under timber licensing arrangements (9 percent of the total of 68 6 million cubic meters harvested from government lands in 1985)

[b]Based on a conversion factors of 1 cubic meter equalling 185 board feet (Scribner log scale) for Coastal British Columbia and 220 board feet (lumber tally) for Interior British Columbia These factors were provided by the Ministry

[c]Based on conversion factors of 5 4 cubic meters equalling 1,000 board feet (Scribner log scale) for Coastal British Columbia and 4 54 cubic meters equalling 1,000 board feet (lumber tally) for Interior British Columbia These factors were provided by the Ministry Prices were provided by the Ministry and represent gross stumpage prices before any credits were allowed for work done by the purchasers

[d]Less than one half million board feet

[e]Prices expressed as a weighted average

Average Stumpage Prices Received From Small Business Timber Sale Program

Ministry officials also provided us with the average stumpage prices received from small business timber sale purchasers. (See table 2.2.) About 7 percent of British Columbia's timber is sold under the province's small business timber sale program. Purchasers bid competitively for this timber, starting at rates established by residual value appraisals. Stumpage prices received from small business purchasers were significantly higher than the prices received from major timber purchasers. However, unlike the major purchasers, small business purchasers have no responsibilities for the forest land, incur no forest management costs, and thus receive no credits for building roads or carrying out reforesting activities. These activities are performed and paid for by the Ministry, which tends to explain the higher stumpage prices paid by small business.

Table 2.2: Average Stumpage Prices Received From Small Business Timber Sale Program in British Columbia, Fiscal Years 1981-85[a]

Dollars in Canadian

	Volume (millions of board feet)[b]					Price (per thousand board feet)[c]				
Forest Region	**1981**	**1982**	**1983**	**1984**	**1985**	**1981**	**1982**	**1983**	**1984**	**1985**
Cariboo	51	64	93	142	166	$28 19	$26 33	$11 89	$13 85	$18 52
Kamloops	24	44	42	96	122	15 48	25 06	22 16	29 87	33 78
Nelson	3	8	41	72	80	31 78	20 07	9 76	17 16	16 84
Prince George	20	94	168	239	271	29 92	31 24	18 70	15 80	22 84
Prince Rupert										
Coastal	3	13	24	45	56	14 69	26 84	16 42	25 97	27 49
Interior	38	60	126	164	166	12 17	16 25	11 44	15 39	14 35
Vancouver										
Coastal	14	28	47	76	112	62 21	62 53	41 42	48 92	55 94
Interior	0	0	0	0	7	•	•	•	•	68 51
All regions[d]										
Coastal	**17**	**41**	**71**	**121**	**168**	**$53.03**	**$51.52**	**$33.10**	**$40.45**	**$46.44**
Interior	**136**	**270**	**470**	**713**	**812**	**$21.84**	**$25.42**	**$14.94**	**$17.34**	**$21.70**

[a]British Columbia fiscal years run from April 1 to March 31

[b]Based on conversion factors of 1 cubic meter equalling 185 board feet (Scribner log scale) for Coastal British Columbia and 1 cubic meter equalling 220 board feet (lumber tally) for Interior British Columbia These factors were provided by the Ministry

[c]Based on conversion factors of 5 4 cubic meters equalling 1,000 board feet (Scribner log scale) for Coastal British Columbia and 4 54 cubic meters equalling 1,000 board feet (lumber tally) for Interior British Columbia These factors were provided by the Ministry

[d]Prices expressed as a weighted average

Average Timber Harvest Road Costs for British Columbia From 1981 Through 1984

Timber harvest roads in British Columbia are financed in three ways—by timber purchasers who are reimbursed by the Ministry with purchaser credits, by timber purchasers who receive allowances that lower the appraised stumpage prices, and by the Ministry from appropriated funds. The major roads, which often serve other purchasers and the public, are built by timber purchasers and usually become part of the provincial road system. These permanent roads are paid for by the province with timber purchaser credits. Most of the roads into stands of timber from the major harvest roads are built by timber purchasers at their expense. The estimated costs of constructing these roads are included in the residual appraisal cost allowance used to determine stumpage prices A few roads are built with appropriated funds—principally for timber sold under the small business timber sale program.

The Ministry does not collect road cost data that show Coastal or Interior road costs per unit of harvest However, at our request, Ministry officials calculated the average Coastal road cost per cubic meter of timber developed (road construction costs divided by timber volume estimated to be harvested) by the logging companies. We converted cubic meters to MBF using a conversion factor provided by the Ministry The Ministry used its Coastal timber harvesting cost survey to calculate the road costs for 1981 through 1984. Data for 1985 were not available at the time of our review. The Ministry's coastal survey contains harvesting cost data, including road costs, on logging companies that harvest about 25 percent of the 5.6 billion board feet of timber harvested annually in Coastal British Columbia. Table 3.1 shows the results.

An international firm of certified public accountants, representing a British Columbia logging association, studied Coastal timber harvesting costs in 1983 and 1984. The firm reported average road costs for these 2 years of $27 49 and $26.51 per MBF, respectively Ministry officials explained that the average road costs reported by the firm are different than the average calculated by the Ministry because the firm used only cost data from members of the logging association in its study; the Ministry used cost data from members of the association as well as from other logging companies.

Ministry officials said that similar average road cost information is not available for the Interior. However, in an effort to illustrate the relationship between Interior and Coastal road construction costs, they said that in 1984, the average timber road cost per kilometer was $65,649 and $10,304 for the Coast and Interior, respectively They also noted that

road costs may change significantly depending upon terrain, soil conditions, and rainfall amounts.

Table 3.1: Average Road Costs for Coastal British Columbia, 1981-84[a]

Dollars in Canadian

Year	Volume[b] (millions of board feet)	Cost[c] (per thousand board feet)
1981	1,151	$20 63
1982	884	22 68
1983	1,504	21 82
1984	1,399	25 65

[a]This information, prepared for GAO by the Ministry, is based on the results of the Ministry's Coastal timber harvesting cost survey, a survey of 25 Coastal logging companies that harvest approximately 20-25 percent of the almost 5 6 billion board feet of timber harvested annually in Coastal British Columbia

[b]Based on a conversion factor of 1 cubic meter equalling 185 board feet (Scribner log scale) This factor was provided by the Ministry

[c]Based on a conversion factor of 5 4 cubic meters equalling 1,000 boaard feet (Scribner log scale) This factor was provided by the Ministry Road construction costs per thousand board feet are based on the volumes of timber developed, not the volumes of timber harvested

Average Timber Harvesting Costs in British Columbia From 1981 Through 1984

Average Timber Harvesting Costs for Coastal British Columbia

Coastal harvesting costs are those costs incurred by the purchaser to cut a tree, haul the log from the forest, and deliver it to the log market. Since 1977, the Ministry has collected information on Coastal harvesting costs through annual timber harvesting cost surveys to determine the average harvesting costs of an efficient logging operator The survey is based on data obtained from 25 Coastal logging operations that harvest about 25 percent of the timber harvested annually in British Columbia. At our request, the Ministry used the cost survey data to calculate the average Coastal harvesting costs per cubic meter for 1981 through 1984. Data for 1985 were not available at the time of our review We converted cubic meters to MBF using a conversion factor provided by the Ministry (See table 4 1)

Independent reports prepared by an international firm of certified public accountants for a British Columbia logging association showed slightly higher harvesting costs for 1983 and 1984—$234.63 and $247 91 per MBF, respectively—than those provided by the Ministry Ministry officials explained that these differences occurred because the firm used only the harvesting costs of members of the logging association, while the Ministry's survey included costs from both association members and nonassociation companies Generally, the association members are larger companies with higher overhead costs

Average Timber Harvesting Costs for Interior British Columbia

Interior harvesting costs are those costs incurred by the purchasers to cut a tree and deliver the log to a processing facility The Ministry has collected information on Interior harvesting costs since 1977, but not in a manner that would allow it to calculate harvesting cost averages for 1981 and 1982 Therefore, the Ministry could only provide us with average Interior harvesting costs for 1983 and 1984. (See table 4 1.) These costs were calculated as described below

In 1983 the Ministry began collecting harvesting cost information through a survey of timber purchasers and by computing Interior-wide averages. However, in 1984 the Ministry decided that a more appropriate method would be to obtain the costs incurred per cubic meter by timber purchasers from contracts with logging companies. In 1984, the Ministry used a sample of about 1,400 such contracts to calculate a weighted-average harvesting cost for Interior British Columbia. We converted cubic meters to MBF using a conversion factor provided by the Ministry Data for 1985 were not available at the time of our review

Table 4.1: Average Timber Harvesting Costs for Coastal and Interior British Columbia, 1981-84[a]

Dollars in Canadian

Year	Cost[b] (per thousand board feet)
Coastal British Columbia	
1981	$232.74
1982	237.55
1983	227.29
1984	244.19
Interior British Columbia	
1981[c]	•
1982[c]	•
1983[d]	$105 60
1984[e]	106 24

[a]Information for Coastal British Columbia, prepared for GAO by the Ministry, is based on the results of the Ministry's Coastal timber harvesting cost survey, a survey of 25 Coastal logging companies that harvest approximately 20-25 percent of the almost 5 6 billion board feet of timber harvested annually in Coastal British Columbia

[b]Based on a conversion ffactor of 5 4 cubic meters equalling 1,000 board feet (Scribner log scale) for Coastal British Columbia and a conversion factor of 4 54 cubic meters equalling 1,000 board feet (lumber tally) for Interior British Columbia These factors were provided by the Ministry

[c]Data not available

[d]Data based on Interior timber harvesting cost surveys completed by 35 purchasers who account for 40 percent of the timber harvest

[e]Data based on Ministry review of 1,400 timber harvesting contracts between timber purchasers and logging companies

Average Utilization Ratios of Timber Processed in British Columbia From 1981 Through 1984

A timber utilization ratio is a measure of the relationship between the amount of timber processed and the amount of finished lumber produced. Such a ratio cannot be calculated for the British Columbia Interior because the timber input into sawmills is measured in one system while the finished lumber is measured in another; the two measurement systems are not comparable. Similarly, utilization ratios cannot be calculated for Coastal British Columbia because neither mill input nor output data are collected by the Ministry

Instead of utilization ratios, the Ministry uses lumber recovery factors in the Interior. A lumber recovery factor is similar to a timber utilization ratio in that it is used to estimate the volume of finished lumber in board feet that can be produced from a given volume of logs measured in cubic meters

Using the Ministry's Interior manufacturing cost survey data, which includes input and output data, we calculated the average lumber recovery factors for Interior British Columbia sawmills from 1981 through 1984. Data for 1985 were not available at the time of our review. Our analysis showed that the lumber recovery factors were increasing, indicating that sawmills were improving their efficiency. That is, the average amount of lumber (board feet) these sawmills manufactured from a cubic meter of timber increased by about 12 percent for stud (2x4's) sawmills and 4 percent for random dimension sawmills. (See table 5.1.)

Table 5.1: Average Lumber Recovery Factors for Random Dimension and Stud Sawmills, Interior British Columbia, 1981-84

	Lumber recovery factor[a]			
Mill Type	**1981**	**1982**	**1983**	**1984**
Random dimension	212	216	220	222
Stud	211	197	225	236
Total weighted average	**211**	**212**	**221**	**225**

[a]Lumber recovery factor is the estimated volume of lumber in board feet that can be produced from 1 cubic meter of timber

Average Lumber Manufacturing Costs in British Columbia From 1981 Through 1984

Manufacturing costs include the milling and overhead expenditures associated with turning logs into lumber. Manufacturing costs start when the logs are unloaded from the truck in the mill yard and end when the finished lumber is put into the railroad cars for shipment

The Ministry provided us the average lumber manufacturing costs for the Interior from 1981 through 1984. Data for 1985 were not available at the time of our review. (See table 6.1.) The average manufacturing costs for the Interior were calculated by the Ministry from cost and volume data provided annually by about 60 sawmills that manufactured approximately 75 percent of the lumber produced in the Interior. No lumber manufacturing costs were calculated by the Ministry or are available for Coastal British Columbia.

Since the early 1970's, an international firm of certified public accountants has reviewed the Ministry's Interior sawmilling costs In 1985, the firm concluded that the Ministry's manufacturing cost allowances used in its 1984 timber appraisals were about equal to industry costs.

Table 6.1: Average Lumber Manufacturing Costs for Interior British Columbia, 1981-84[a]

Dollars in Canadian

	Average manufacturing costs (per thousand board feet)			
Mill type	**1981**	**1982**	**1983**	**1984**
Random dimension	$113 62	$112 10	$104 44	$109 70
Stud	103 12	109.07	105 66	103 76
Total weighted average	**$111.38**	**$111.60**	**$104.74**	**$108.17**

[a]The average manufacturing costs for the Interior were calculated by the Ministry from cost and volume data provided annually by about 60 sawmills that manufacture approximately 75 percent of the lumber produced in the Interior

Average Diameter of Major Commerical Timber Species at Minimum Harvest Age in British Columbia

Ministry officials said that they do not have statistics showing the average sizes of timber processed by sawmills in British Columbia from 1981 through 1985. However, they suggested that the best available estimate of average sizes could be obtained from the Ministry's latest long-range forest plan—the 1984 forest and range resource analysis. They provided us with the analysis that contained data showing the average diameter at the minimum harvest age for the major commercial timber species from British Columbia's four harvesting zones. (See table 7.1.)

Because much of the timber harvested today is older than the minimum harvesting age shown in the analysis, Ministry officials said, the analysis may underestimate the average sizes in the harvest. They also said that the average diameter may vary substantially depending on such factors as soil types, rainfall amounts, and terrain.

Table 7.1: Average Diameter of Major Commercial Timber Species at Minimum Harvest Age in British Columbia[a]

Age in years, average diameter in inches

		Average diameter			
Species	Age	South Coast	North Coast	South Interior	North Interior
Fir	120	15 7	•	10 2	12 6
Cedar	120	19 3	17 7	•	12 6
Hemlock	120	15 4	13 4	13 4	12 6
Balsam	120	14 6	•	11 8	11 4
Spruce	120	16 9	19 3	11 8	12.6
Lodgepole pine	80	10 2	10 2	7 9	9 4

[a]Data from Ministry's 1984 Forest and Range Resource Analysis

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