6.2 International Factors

We believe that a timber scarcity is developing world-wide and will tend over the long term to create a new, higher, base-level price structure than is evident in the historic data on which this report is based. Again, this advocates the use of an optimism factor on the part of forest management practitioners. New price levels, and hence new stem value increments, will emerge but we believe the trend will be upward in terms of absolute value. New values can be determined by factoring upward the present tabular values on the basis of the conservative but best available assumption that relative values will remain the same between log grades.

We also believe that the present impetus for more free international trade will favour British Columbia pricing levels, because of the perceived scarcity element. Trend predictions in this regard, however, are impossible because of the fluidity of interventionist motives which are always present and always politically attractive. These factors are entirely unpredictable so the best available prediction is probably a continuation of the present state.

6.3 Price Trends of Specific Value Determinants

We believe the value of aesthetically attractive "appearance" lumber products ("clears" and tight-grained "uppers") will tend to rise at an accelerating rate in future as old-growth timber supplies diminish. Although products from second-growth stands will have very different characteristics than products from old-growth stands, the increasing scarcity of the appearance grades will produce premium price differentials. We believe that the log grades

generating these products will tend to increase in value in tandem with old-growth products, although probably at a lower level. The resulting lumber grades will not be the same product but will obtain an accelerating premium price in future, depending on the development of substitutes.

We believe our tables relating to these products to be very conservative. They are based on the best available data, which is very limited, and present only the historic case. (Again, we note the existence of other data relating to old-growth appearance grade relationships which may be indicative of future second-growth log values). The appearance grade increment value tables in this report can be factored upward if the above trend becomes evident.

6.4 Survey of Predictions

The general survey of predictions within the provincial forest sector understandably provides no overall consensus. There is no general consistency of predictions but three areas warrant comment:

* There is a perception of a developing timber scarcity, but this is not unanimous.

* While not unanimous, there is consensus that product price cycles are inevitable but, despite them, there is a non-inflationary upward trend.

* There is a trend toward fibre-based and reconstituted products and to utilization of deciduous species, particularly western red alder and the aspens.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The result contained in the graphs and tables of this report provide a new useable method for practitioners to forecast financial effects of certain silvicultural prescriptions.

The derivation of the value differential data was based on a simple and practical methodology and on a very limited available data base. This is an essential first step but obviously in future both sophistication of method and augmentation and refinement of the data base will be required. The process of developing more sophisticated methodologies is well underway with respect to coastal Douglas-fir. However, it is expected that there will remain a shortage of analytical capability for the Interior and for other species unless parallel work is undertaken. Much more empirically determined recovery and throughput data will be needed to verify results of models.

As a conclusion it is evident that the effect of diameter on value takes place within a narrow band of log diameters from 15 to 25 cm. It is within this range that yield of lumber increases dramatically. Between 20 and 25 cm, stem values tend to plateau and then rise again on the expectation of recovering premium lumber grades on the coast and wider dimension widths in the interior. The effect of diameter on conversion costs is relatively insignificant once the impact of value recovery has been accounted for.

With regard to trends, the conclusion is that real values are trending upward in both coniferous and certain deciduous species. This warrants use of an optimism factor by practitioners evaluating silvicultural prescriptions in coniferous stands. It also may warrant re-examination of programmes applied to certain deciduous species, notably red alder and poplar species.

APPENDIX I

LIST OF COMPANIES, ORGANIZATIONS AND INDIVIDUALS CONSULTED

B.C. Ministry of Forests
- Valuation Branch
- Research Branch, Victoria and Vernon, B.C.
- Scaling, Vancouver Region

B.C. Forest Products Ltd.
Cariboo Lumber Manufacturers Association
Carroll Hatch (International) Ltd.
Council of Forest Industries of B.C.
Crown Forest Industries Ltd.
Demaerschalk, J.P. PhD.
Doman Industries Ltd.
Forest Economics and Policy Analysis Project
Forintek Canada Corp.
Leach, Howard A. P.Eng.
Lignum Sales Ltd.
MacMillan Bloedel Ltd.
Porter Engineering Ltd.
Schmidt, Ralph PhD.
Shearwater Scaling and Grading Ltd.
Statistics Canada
Terminal Sawmills Ltd.
Trans Pacific Trading
Weldwood of Canada Ltd.
Western Forest Products Ltd.
Westport Export Ltd.
Widman Management Ltd.

APPENDIX II

EXAMPLES OF DERIVATION OF STEM VALUES FOR THE COAST AND INTERIOR

Extracts from the computer model.

Table 1: Coastal Douglas-fir

Table 2: Interior Douglas-fir

Table 3: Sample Derivation of Interior Residual Value Data Point.

TABLE 1

EXAMPLE SHOWING DERIVATION OF SECOND-GROWTH STEM VALUES

SPECIES: COASTAL DOUGLAS-FIR

GRADE	Avg Log Price ($/m3)	Avg top Diam. (cm)	Diam. Limits (cm)	2nd Growth Est Value ($/m3)
CNS	$19.62	13		$22.00
J	40.87	24	10-36	40.87
GANG	49.46	28		45.00
I	58.37	48	38+/50+	49.00
H	69.59	60	30+/50+	60.00
D	119.23	90	76+	

INTERPOLATION OF VALUES

Top Dia (cm)	Est. Value ($/m3)	Top Dia (cm)	Est. Value ($/m3)
10	$20.00	20	$33.15
11	20.70	21	34.90
12	21.39	22	36.65
13	22.09	23	38.40
14	22.79	24	40.15
15	23.48	25	41.91
16	25.42	30	45.40
17	27.35	35	46.40
18	29.28	40	47.40
19	31.21	45	48.40
		50	50.83

DOUGLAS-FIR STEM VALUES

dbh class (cm)	tree height (m)	merch. stem (m)	taper (cm/m)		LOG 1	LOG 2	LOG 3	LOG 4	STEM VALUE $/stem	STEM VALUE $/m3
25	40	24.2	0.646	top	10.0	14.0	18.0	22.0		
				butt	14.0	18.0	22.0	25.6		
				length	6.19	6.19	6.19	5.64		
				price	$20.00	$22.79	$29.28	$36.65		
				volume	0.07	0.13	0.20	0.25	0.648	
				VALUE	$1.44	$2.88	$5.76	$9.28	$19.36	$29.86

STEM VALUE ($ per whole stem)

dbh (cm)	height class 20 m	25 m	30 m	35 m	40 m
20	$4.04	$5.95	$7.16	$8.30	$9.34
25	9.54	12.25	14.32	16.44	19.36
30	16.01	21.09	25.00	29.40	33.48

STEM VALUE ($/cubic metre)

dbh (cm)	height class 20 m	25 m	30 m	35 m	40 m
20	$21.64	$23.31	$23.62	$24.09	$23.84
25	27.30	29.15	28.78	28.76	29.86
30	30.82	33.83	33.85	34.72	34.80

TABLE 2

EXAMPLE OF DETERMINATION OF STEM VALUES AT THE MILL GATE

Species: INTERIOR DOUGLAS-FIR

Top Diameter: 10 cm

Height Class: 40 metres

TREE DESCRIPTIONS:

		stem										
		top				Top Diameter of 5 m. Logs (First Log at Butt)						
dbh (cm)	taper (cm/m)	length (m)	length (m)	volume (m3)	butt diam 0	1	2	3	4	5	6	7
20	0.52	19.35	20.35	0.387	20.52	17.9	15.3	12.8	10.2	10.0	0.0	0.0
25	0.65	15.48	24.22	0.643	25.65	22.4	19.2	16.0	12.7	10.0	0.0	0.0
30	0.78	12.90	26.80	0.951	30.78	26.9	23.0	19.1	15.3	11.4	10.0	0.0
35	0.90	11.06	28.64	1.311	35.90	31.4	26.9	22.3	17.8	13.3	10.0	0.0
40	1.03	9.68	30.03	1.725	41.03	35.9	30.7	25.5	20.4	15.2	10.0	10.0
45	1.16	8.60	31.10	2.192	46.16	40.3	34.5	28.7	22.9	17.1	11.3	10.0
50	1.29	7.74	31.96	2.714	51.29	44.8	38.4	31.9	25.5	19.0	12.5	10.0

LOG VOLUMES (m^3)

DBH (cm)	Butt	2nd	3rd	4th	5th	6th	7th
20	0.145	0.109	0.078	0.052	0.003	0.000	0.000
25	0.227	0.170	0.122	0.081	0.043	0.000	0.000
30	0.327	0.245	0.175	0.117	0.070	0.016	0.000
35	0.445	0.334	0.238	0.159	0.096	0.039	0.000
40	0.581	0.436	0.311	0.208	0.125	0.063	0.000
45	0.736	0.552	0.394	0.263	0.158	0.080	0.010
50	0.908	0.681	0.486	0.324	0.195	0.099	0.020

VALUE OF FIVE METRE LOGS ($/pc.)

								STEM VALUE	
dbh	Butt	2nd	3rd	4th	5th	6th	7th	TOTAL	$/m3
20	$4.52	$3.22	$2.12	$1.36	$0.03	$0.00	$0.00	$11.26	$29.11
25	7.57	5.49	3.60	2.21	1.13	0.00	0.00	19.99	31.09
30	11.20	8.26	5.64	3.45	1.88	0.19	0.00	30.63	32.22
35	17.30	11.43	7.94	4.94	2.66	1.02	0.00	45.30	34.55
40	24.64	16.50	10.60	6.77	3.70	1.66	0.00	63.87	37.03
45	32.82	22.95	14.13	8.76	4.92	2.14	0.12	85.83	39.15
50	40.17	30.37	18.90	11.05	6.22	2.70	0.24	109.64	40.39

Table 3

SAMPLE DERIVATION OF INTERIOR RESIDUAL VALUE DATA POINT
(For logs with top diameter of 27.7 cm)

165 LOGS WITH 27.7 cm AVERAGE TOP DIAMETER (Range 25.4 to 30.2 cm)

Percentage Distribution of Lumber Grades and Sizes Recovered

Lumber Dimensions (inches)	SELECT	GRADE 1	GRADE 2	GRADE 3	GRADE 4	TOTALS
1 X 4	0.0	0.7	0.6	0.5	0.2	2.0
1 X 6	0.0	0.1	0.1	0.0	0.1	0.3
2 X 4	0.4	1.3	3.8	0.8	0.6	6.9
2 X 6	1.1	8.7	16.3	4.3	1.0	31.4
2 X 8	10.8	17.1	23.0	3.5	0.7	55.1
2 X 10	0.5	1.0	2.3	0.6	0.0	4.4
TOTALS:	12.8	28.9	46.1	9.7	2.6	100

Weighted Average Lumber Sales Return -- $/Mfbm

	SELECT	GRADE 1	GRADE 2	GRADE 3	GRADE 4	TOTALS
1 X 4	0.00	1.51	1.34	0.77	0.09	3.72
1 X 6	0.00	0.28	0.29	0.00	0.06	0.62
2 X 4	0.83	2.69	8.16	1.32	0.26	13.26
2 X 6	2.29	18.10	35.27	6.98	0.43	63.06
2 X 8	22.46	35.57	42.93	4.90	0.26	106.12
2 X 10	1.28	2.56	6.15	1.20	0.00	11.20
TOTALS:	26.86	60.71	94.15	15.17	1.10	197.98

RECOVERY		VALUE	$/m3
Lumber:	265 LRF 15047 fbm	Sales	$52.46
		chip sales +	$ 4.54 *
Chips :	21.5% Chips 0.0312 BDU/pc. 0.344 m3 per pc.	manuf. costs -	$22.26 **
		Log Value	$34.74

NOTES- * chip price = $50.00/BDU net FOB mill
** manufacturing costs = $84.00/Mfbm net of fuel values

APPENDIX III

SENSITIVITY OF STEM VALUES TO HIGH SMALLWOOD CONVERSION COSTS

The following tables show the sensitivity of Douglas-fir values to increased milling costs that may be associated with logs of small diameter. (See page 15 and the footnote on page 16).

Cost increases of 50% for logs with a top diameter of 12.5 cm. have been inserted into the consultant's computer model. As top diameter increased, the cost increase was lessened down to 0% at 18 cm. top diameter.

It was found that stem values were reduced by amounts ranging from 21.5%, for stems measuring 20 cm. dbh by 15 m tree height, to 1.0% for stems measuring 50 cm. and 40 m height. Hence, if value differentials are to be determined for stems of a size to be more commonly regarded as economically mature, the possible error attributable to underestimated small log conversion costs will be minimal.

INTERIOR DOUGLAS-FIR

(Compare these tables with table 5.21, page 44)

CHANGE IN STEM VALUE ($/whole stem)

DBH	Tree height in metres					
(cm)	15	20	25	30	35	40
20	-$0.95	-$1.25	-$1.28	-$1.38	-$1.59	-$1.77
25	-0.96	-0.83	-1.21	-1.24	-1.20	-1.56
30	-1.09	-1.08	-0.74	-1.19	-1.17	-1.10
35	-1.08	-0.75	-0.98	-1.04	-1.18	-1.23
40	-1.13	-1.04	-0.97	-1.02	-0.98	-1.17
45	-0.89	-1.13	-0.77	-1.02	-0.83	-0.94
50	-0.67	-1.18	-1.00	-1.04	-0.99	-0.77

CHANGE IN STEM VALUE ($/cubic metre)

DBH	Tree height in metres					
(cm)	15	20	25	30	35	40
20	-$6.00	-$6.09	-$5.12	-$4.69	-$4.66	-$4.59
25	-3.63	-2.44	-2.93	-2.52	-2.11	-2.44
30	-2.80	-2.16	-1.21	-1.64	-1.40	-1.16
35	-2.02	-1.09	-1.16	-1.04	-1.01	-0.93
40	-1.62	-1.14	-0.87	-0.77	-0.65	-0.67
45	-1.00	-0.98	-0.55	-0.61	-0.43	-0.43
50	-0.62	-0.83	-0.58	-0.50	-0.42	-0.28

APPENDIX IV

REFERENCES AND LITERATURE CITED

Cahill, J.M., Snellgrove, T.A. and T.D. Fahey. The Case for Pruning Young-Growth Stands of Douglas-fir. Douglas-fir: Stand Management for the Future. College of Forest Resources, University of Washington. Contribution No. 55: (123-131). 1986.

Dobie, J. Small Log Sawmill Yields in the B.C. Interior. Fisheries and Environment Canada. VP-X-167, April, 1978.

Dobie, J and D.M. Wright. Economics of Thinning and Pruning -- A Case Study. Forestry Chronicle 54(1):34-38.

Ernst, S. and Fahey, T.D. Changes in Product Recovery of Douglas-fir From Old Growth to Young Growth. Douglas-fir: Stand Management for the Future. College of Forest Resources, University of Washington. Contribution No. 55:(103-107). 1986.

Fahey, T.D. and D.C. Martin. Lumber Recovery from Second-Growth Douglas-fir. PNW Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. Research Paper PNW-177. 1974.

Fight, R.D. and D.G. Briggs. Importance of Tree Size and Volume Removed in Silvicultural Decisions. Douglas Fir: Stand Management for the Future. College of Forest Resources, University of Washington. Contrib. No. 55:(317-322). 1986.

Fight, R.D., Cahill, J.M., Fahey, T.D., and Snellgrove, T.A. A New Look at Pruning Coast Douglas-fir. Western Journal of Applied Forestry. 3(2): 46-48, April 1988.

Johnson, J.A. Wood Quality and Its Relationship to Uses, Grades, and Prices: Past, Present and Future. Douglas Fir: Stand Management for the Future. College of Forest Resources, University of Washington. Contribution N. 55:(143-148).

Kellogg, R.M. and R.W. Kennedy. Implications of Douglas-fir Wood Quality Relative to Practical End Use. Douglas-fir: Stand Management for the Future. College of Forest Resources, University of Washington. Contribution No. 55:(97-102). 1986.

Middleton, G.R. Values from Second Growth Timber, A Review and Status Report. Forintek Canada Corp. for Canadian Forestry Service. Contract No. 02-40-12-407 (1985).

Middleton, G.R., Munro, B.D. and D.M. Wright. Evaluating Douglas-fir Tree Quality in the British Columbia Interior. Forintek Canada Corp., Special Publication No. SP 19, June 1985.

Nawitka Resource Consultants Ltd. Impact of Intensive Forestry Practices on Net Stand Values in British Columbia. Forest Resource Development Agreement, Canada/B.C. Report 014 (ISSN 0835 0752) 1987.

Sessions, J., Mann, J.W., and J.D. Brodie. Technical Advances in Wood Utilization, Quality Premiums for Stumpage, and Profitability of Forest Investment. From: Assessing Timberland Investment Opportunities, Proceedings 47346 Forest Products Research Society, Madison, WI. 1986.

Smith, W.R. and G. Briggs. Juvenile Wood: Has it Come of Age? University of Washington ...