

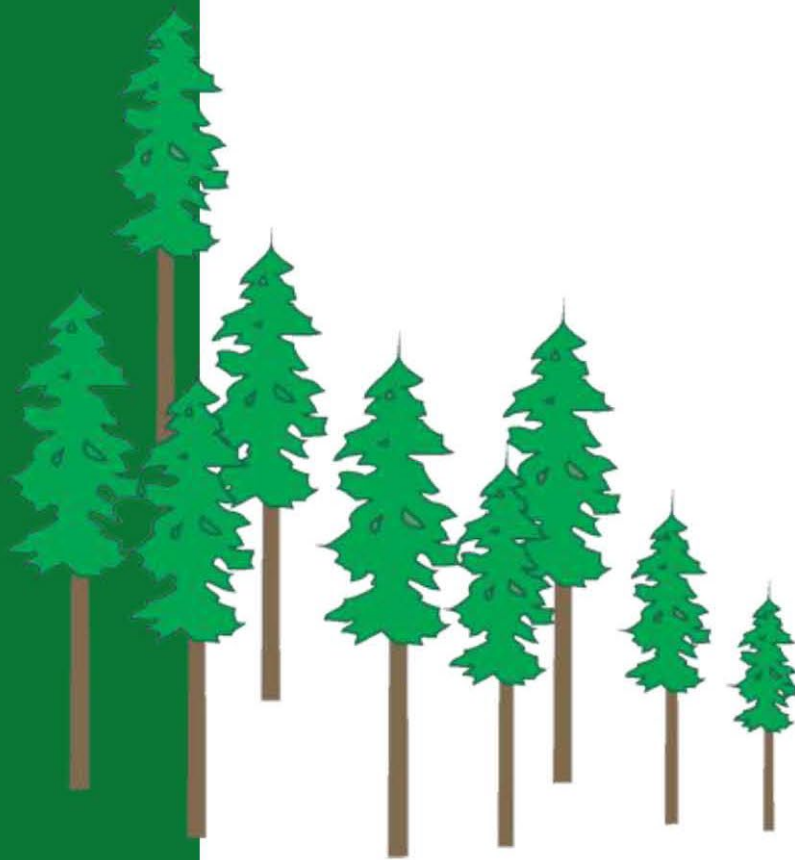


# **COAST MARKET PRICING SYSTEM**

**Update – 2021**

**December 15, 2021**

Timber Pricing  
Branch



## **1. INTRODUCTION**

The purpose of this paper is to provide an overview of the December 15, 2021 update to the Coast Market Pricing System (MPS). <sup>1</sup>

## **2. AUCTION DATASET**

The auction dataset used in the update contains winning bids and data from 838 sales over the 15-year period July 1, 2006 through June 30, 2021.

## **3. FINAL ESTIMATED WINNING BID EQUATIONS**

There were some changes in the 2021 Coast MPS Update.

The hemlock lumber composite was reworked to more accurately reflect values of hemlock lumber production on the Coast.

A variable for “other conifer” was added to improve relationship in estimated winning bids between species. “Other conifer” means conifer species other than fir, cedar, cypress and hemlock.

The export share variable was dropped since it was found to be insignificant.

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<sup>1</sup> This paper is not intended to provide the basis for calculating stumpage rates nor should it be used as guidance for interpreting the legal policies and procedures for calculating stumpage rates, which are contained in the *Coast Appraisal Manual (CAM)*. The *Coast Appraisal Manual* contains the policies and procedures referred to in Section 105 of the *Forest Act*.

### 3. ESTIMATED WINNING BID REGRESSIONS

#### 3.1.a) 2021 Winning Bid – Loss Factor Cruise

For cutting permits where the cruise data comes from a standard “Loss Factor” cruise.

Explanatory Variable	2021 Winning Bid	
	Coefficient	t-Statistic
Constant	-16.274	-3.5105
Number of Bidders	3.7986	17.4008
Cedar Lumber High Grade	0.1905	16.1441
Cedar Lumber Mid Grade	0.0833	12.8154
Fir Lumber High and Mid Grade	0.4025	15.8465
Hemlock Lumber High Grade	0.1480	6.2447
Hemlock Lumber Mid Grade	0.0278	2.1221
Cypress Lumber High and Mid Grade	0.0267	4.3770
Old Growth LN (Volume per Log)	10.4239	3.3876
LN (Volume per Hectare/1000)	18.3411	7.9536
Conventional Slope	-0.2970	-7.4436
Heli Land Drop	-43.636	-13.7005
Heli Water Drop	-42.443	-10.0400
Location	-0.0892	-6.9147
Isolated	-9.5545	-6.3531
Lumpsum	-3.2977	-2.4415
North American and Japanese Housing Starts	0.0112	6.2222
Harvest Volume	1.0611	3.9966
Other Conifer	20.6962	4.5769
<b>Number of Observations</b>	838	
<b>Adjusted R<sup>2</sup></b>	0.7785	

Note: LN means natural logarithm

### 3.1.b) 2021 Number of Bidders – Loss Factor Cruise

	2021 NB	
Explanatory Variable	Coefficient	t-Statistic
Constant	-1.5133	-3.6518
Predicted Bid	0.0517	20.6800
Lumpsum	-0.0071	-0.0445
District Average Number of Bidders	0.5544	7.9427
LN(Volume/1000)	0.2999	2.7615
FRZ	-0.8422	-3.7216
<b>Number of Observations</b>	838	
<b>Adjusted R<sup>2</sup></b>	0.440	

Note: LN means natural logarithm

### 3.2.a) 2020 Winning Bid – Call Grade Net Factor Cruise

There is a second set of EWB regressions (and a second EWB equation in the CAM) for appraisals where the cruise data is derived from an alternative cruising method known as “Call Grade Net Factor”. In these regressions, the BCTS auction data also derives from Call Grade Net Factor cruises. This method is used for non-BCTS cruise based cutting permits.

Explanatory Variable	2021 Winning Bid	
	Coefficient	t-Statistic
Constant	0.5223	0.0937
Number of Bidders	3.6265	13.9803
Cedar Lumber High Grade	0.1410	13.5577
Cedar Lumber Mid Grade	0.0558	7.9714
Fir Lumber High and Mid Grade	0.2570	11.4732
Hemlock Lumber High Grade	-0.0118	-1.0926
Hemlock Lumber Mid Grade	-0.0011	-0.1897
Cypress Lumber High and Mid Grade	0.0726	3.8617
Old Growth LN (Volume per Log)	18.0388	5.2700
LN (Volume per Hectare/1000)	25.3914	9.4620
Conventional Slope	-0.4221	-8.9618
Heli Land Drop	-49.039	-12.6006
Heli Water Drop	-36.436	-7.0054
Location	-0.0979	-6.2756
Isolated	-8.8333	-4.8511
Lumpsum	-4.4978	-3.1043
North American and Japanese Housing Starts	0.0258	10.7500
Harvest Volume	0.8629	3.0056
<b>Number of Observations</b>	607	
<b>Adjusted R<sup>2</sup></b>	0.802	

Note: LN means natural logarithm

### 3.2.b) 2021 Number of Bidders – Call Grade Net Factor Cruise

	2021 NB	
Explanatory Variable	Coefficient	t-Statistic
Constant	-0.6785	-1.3657
Predicted Bid	0.0471	15.7000
District Average Number of Bidders	0.5074	5.9694
LN(Volume/1000)	0.1407	1.0469
Lumpsum	0.1564	0.8670
Number of Observations	607	
Adjusted R <sup>2</sup>	0.410	

Note: LN means natural logarithm

#### 4. SPECIFIED OPERATIONS

The auction dataset used to develop MPS is comprised of 838 auctions. There are some harvesting situations that are not well represented in the auction dataset (for example, inland water transportation) and therefore, a specified operation cost estimate is used in the calculation of stumpage rates. See Appendix 2 for definitions of each specified operation.

The specified operations are shown below.

Specified Operations	December 2021 Update
Skyline Logging (over 600 metres)	Appraised as heli
Inland Water Log Transportation	\$13.12/m3
Tree Crown Modification	\$30.41/tree (old growth)
	\$16.78/tree (2nd growth)
Barging	\$10.30/m3 to \$14.33/m3
Clayoquot Sound Operating Costs	\$11.11/m3
Ecosystem Based Management	\$7.85/m3
Haul Distance Above 100km	\$0.163/m3 per km beyond 100km
High Development Cost (only applies to BCTS upset rates)	See Section 4.4.7 of the Coast Appraisal Manual

## 5. TENURE OBLIGATION ADJUSTMENTS

As outlined in the Coast Tenure Obligations Adjustment paper (dated July 1, 2012), the adjustments are based on cost surveys.

The tenure obligation adjustments are shown below.

<b>Tenure Obligations</b>	<b>December 2021 Update</b>
Forest Planning & Administration Cost	\$14.33/m3
Low Volume Cost	\$9.29/m3
Road Development Cost	See Section 5.3 of CAM
Road Management Cost	\$2.68/m3
Road Use Charges	Approved actuals
Basic Silviculture Cost	\$2.80-\$5.95/m3
BCTS Infrastructure	\$0.19/m3
Low Grade Adjustment	See Section 5.7 of CAM
Return to Forest Management	1.082

## 6. SUMMARY

The new final equation, specified operations and tenure obligation adjustments will be used to calculate stumpage rates for appraisals on the Coast, starting December 15, 2021.



## APPENDIX 1 - COAST MPS DECEMBER 2021 UPDATE FINAL REGRESSIONS

### A1.a) Final Loss Factor Winning Bid

Dependent Variable: WB_FILA_FINAL*159.57/CPI	Coefficient	Standard Error	T-Stat
(Intercept)	-16.2740	4.6358	-3.5105
NB	3.7986	0.2183	17.4008
`CEDAR*CE_HG*CEDAR_LUMBER_AMV*159.57/CPI`	0.1905	0.0118	16.1441
`CEDAR*CE_MG*CEDAR_LUMBER_AMV*159.57/CPI`	0.0833	0.0065	12.8154
`FIR*(FI_HG+FI_MG)*FIR_VL_HYBRID_NEW*159.57/CPI`	0.4025	0.0254	15.8465
`CYPRESS*(CY_HG+CY_MG)*CYP_LUM_SCE*159.57/CPI`	0.1480	0.0237	6.2447
`HEMLOCK*HE_HG*HEM_NEWVAR*159.57/CPI`	0.0278	0.0131	2.1221
`HEMLOCK*HE_MG*HEM_NEWVAR*159.57/CPI`	0.0267	0.0061	4.3770
`LOG(VPL)*OG_FR`	10.4239	3.0771	3.3876
`LOG(VPH/1000)`	18.3411	2.3060	7.9536
`SLOPE*(1-HELI)`	-0.2970	0.0399	-7.4436
HELI_LAND	-43.6360	3.1850	-13.7005
HELI_WATER	-42.4430	4.2274	-10.0400
LOCATION	-0.0892	0.0129	-6.9147
ISOLATED	-9.5545	1.5039	-6.3531
LUMPSUM	-3.2977	1.3507	-2.4415
NAJ_STARTS_12MR	0.0112	0.0018	6.2222
HARV_AAC_ADJ	1.0611	0.2655	3.9966
OtherCONIFERS	20.6962	4.5219	4.5769
N	838		
Adj-R2	0.7785		

### A1.b) Final Loss Factor Cruise Number of Bidders

Dependent Variable: NB	Coefficient	Standard Error	T-Stat
(Intercept)	-1.5133	0.4144	-3.6518
WB_FILA_FINAL*159.57/CPI	0.0517	0.0025	20.6800
LUMPSUM	-0.0071	0.1596	-0.0445
DANB	0.5544	0.0698	7.9427
`LOG(VOL/1000)`	0.2999	0.1086	2.7615
`FRZ_POLICY_DATE*(1-LUMPSUM)`	-0.8422	0.2263	-3.7216
N	838		
Adj-R2	0.440		

### A2.a) Final Call Grade Net Factor Winning Bid

Dependent Variable: WB_FILA_FINAL*159.57/CPI	Coefficient	Standard Error	T-Stat
(Intercept)	0.5223	-5.5726	0.0937
NB	3.6265	-0.2594	13.9803
`CEDAR*CE_HG*CEDAR_LUMBER_AMV*159.57/CPI`	0.1410	-0.0104	13.5577
`CEDAR*CE_MG*CEDAR_LUMBER_AMV*159.57/CPI`	0.0558	-0.0070	7.9714
`FIR_ALL_GRADES*FIR_VL_HYBRID_NEW*159.57/CPI`	0.2570	-0.0224	11.4732
`HEMLOCK*HE_HG*HEM_NEWVAR*159.57/CPI`	-0.0118	-0.0108	-1.0926
`HEMLOCK*HE_MG*HEM_NEWVAR*159.57/CPI`	-0.0011	-0.0058	-0.1897
`CYPRESS*(CY_HG+CY_MG)*CYP_LUM_SCE*159.57/CPI`	0.0726	-0.0188	3.8617
`LOG(VPL)*OG_FR`	18.0388	-3.4229	5.2700
`LOG(VPH/1000)`	25.3914	-2.6835	9.4620
`SLOPE*(1-HELI)`	-0.4221	-0.0471	-8.9618
HELI_LAND	-49.039	-3.8918	-12.6006
HELI_WATER	-36.436	-5.2011	-7.0054
LOCATION	-0.0979	-0.0156	-6.2756
ISOLATED	-8.8333	-1.8209	-4.8511
LUMPSUM	-4.4978	-1.4489	-3.1043
NAJ_starts_12MR	0.0258	-0.0024	10.7500
HARV_AAC_ADJ	0.8629	-0.2871	3.0056
N	607		
Adj-R2	0.802		

### A2.b) Final Call Grade Net Factor Cruise Number of Bidders

Dependent Variable: NB	Coefficient	Standard Error	T-Stat
(Intercept)	-0.6785	0.4968	-1.3657
RWB_FILA_159.57_NB_AllC_cgnf	0.0471	0.0030	15.7000
DANB	0.5074	0.0850	5.9694
`LOG(VOL/1000)`	0.1407	0.1344	1.0469
LUMPSUM	0.1564	0.1804	0.8670
N	607		
Adj-R2	0.4100		

## Appendix 2 - Variables and Definitions

Predicted Bid	Used in the Number of Bidders equation: The estimated winning bid for the cutting authority from the corresponding winning bid equation, expressed in \$/m <sup>3</sup> .
Cedar Lumber High Grade	A composite of cedar lumber prices (C\$/mfbm, net of duties) times the fraction of the coniferous net cruise volume that is cedar and grade D through H.
Cedar Lumber Mid Grade	A composite of cedar lumber prices (C\$/mfbm, net of duties) times the fraction of the coniferous net cruise volume that is cedar and grade U through I.
Fir Lumber High Grade	A composite of fir veneer and lumber prices (C\$/m <sup>3</sup> , net of duties) times the fraction of the coniferous net cruise volume that is fir and grade B through H.
Fir Lumber Mid Grade	A composite of fir veneer and lumber prices (C\$/m <sup>3</sup> , net of duties) times the fraction of the coniferous net cruise volume that is fir and grade U through I.
Hemlock Lumber High Grade	An index of hemlock lumber prices (Stats Can, 2010=100, net of duties) times the fraction of the coniferous net cruise volume that is hemlock and grade D through H.
Hemlock Lumber Mid Grade	An index of hemlock lumber prices (Stats Can, 2010=100, net of duties) times the fraction of the coniferous net cruise volume that is hemlock and grade I or J.
Cypress Lumber High and Mid Grade	Average cypress lumber export price (C\$/m <sup>3</sup> , net of duties) times the fraction of the coniferous net cruise volume that is cypress and grade D through U.
Old Growth LN(Volume per Log)	The natural logarithm of the volume per tree times the fraction of the coniferous volume that is old growth.
LN(Volume per Hectare/1000)	The natural logarithm of the coniferous volume per hectare divided by 1000.
Helicopter Land Drop	For land drop only: The fraction of the total net cruise volume, including deciduous volume, of timber in a cutting authority area that must be helicopter yarded or yarded by skyline where logs are fully suspended more than 600 m in a straight line to the centre of the closest possible landing. This is calculated by dividing the total volume of timber that must be helicopter yarded or skyline yarded over 600 m by the total net cruise volume of the cutting authority area. HELILAND is in decimal form, rounded to 2 decimal places.
Helicopter Water Drop	As for “Helicopter Land Drop” but applies to the fraction that is water dropped.

District Average Number of Bidders	The average number of bidders for the forest district the cutting authority area is located within is listed in Table 4-2 of the CAM.
Conventional Slope	The average side slope (%) of the fraction of the cutting permit that is not helicopter yarded.
Volume	That part of the total net cruise volume in the cutting authority area that is coniferous timber except that where the cutting authority is a timber licence or is issued under a licence with an AAC greater than 10 000 m <sup>3</sup> , then VOL = 36,900. VOL is expressed in m <sup>3</sup> , rounded to the nearest whole number.
CPI	The BC Consumer Price Index approved by the director for use on the effective date of the appraisal, reappraisal or quarterly adjustment.
Location	The net cruise volume weighted average straight line distance measured in kilometres between the geographic centre of each part of a cut block and the nearest major centre that is closest to that part of the cutting authority area.
Isolated	Isolated =1, if all parts of the cutting authority area are accessible by air or water only and is not serviced by public ferry service.
Lumpsum	If the cutting authority is a cruise based competitive timber sale with a stand as a whole rate then LUMPSUM = 1, otherwise LUMPSUM = 0.
Other Conifer	The fraction of coniferous cruise volume that is balsam, spruce, or pine.
North American and Japanese Housing Starts	12-month total of North American and Japanese Housing Starts, as published in the approved stumpage appraisal parameters.
Total Harvest	Rolling 12-month total Coast harvest volume, AAC adjusted, as published in the approved stumpage appraisal parameters.
FRZ	In a fibre recovery zone

## **APPENDIX 3 - MORE DETAIL ON SPECIFIED OPERATIONS**

If sufficient auction data is not available, the ministry will, for those identified situations, implement specified operations.

The specified operations will be used to adjust the MPS stumpage rate for the estimated incremental cost of the identified situation. The explicit assumption is that if a bidder was faced with a similar situation, he or she would lower the bid by the extra cost incurred because of the identified situation.

The situations that may be eligible for specified operations adjustment will be determined according to the following principles:

- The expectation that a bid would be influenced by this situation
- Representation (number of samples, if any, in the auction data set)
- Materiality of estimated cost differential (supported by verifiable financial data); and
- Statistical analysis (including the premise that other represented situations and variables in the MPS database and equations may serve as a proxy for the situation in question).

The ministry, after considering the above and any other relevant technical information, may or may not designate the situation as an identified situation eligible for a specified operation and, if eligible, specify the dollars per cubic metre adjustment.

The ultimate objective is to have a representative auction database and hence, few, if any, specified operations adjustments.

The following are identified as specified operations for the Coast MPS.

**Cost estimates from the current *Coast Appraisal Manual* are used for a – h below.**

### ***a) Skyline Logging***

For those areas within a cutblock that:

- Are 600 metres or greater measured in a straight-line horizontal distance from the centre of the closest possible landing or place where a landing may be located; and
- Are yarded by skyline.

### ***b) Inland Water Transportation***

- Where logs must be towed on Great Central, Owikeno or Powell Lake or other authorized inland water location.

**c) Clayoquot Sound**

- Applies where orders under Section 93.4 of the *Land Act* specific to Clayoquot Sound require a higher level of land use planning and/or different harvesting methods.

**d) Tree Crown Modification**

- To protect the standing trees adjacent a harvested area by trimming tree crowns to reduce sail area and decrease the potential for windthrow damage.

**e) Ecosystem Based Management**

- Applies where orders under Section 93.4 of the *Land Act* specific to the Great Bear Rainforest and Haida Gwaii require a higher level of land use planning and/or different harvesting methods.

**f) Haul Distance Above 100km**

- A specified operation cost estimate for permits with haul distances greater than 100km from the cutting authority area to the appraisal log dump.

**g) BCTS High Development Cost**

- Allows an upset rate reduction for BCTS auction sales with development costs exceeding \$15.59/m<sup>3</sup>.

**h) Barging**

- Allows a specified operation of \$10.30/m<sup>3</sup> for that part of a cutting authority that is barged rather than towed. The specified operation is \$14.33/m<sup>3</sup> if the cutting authority is in Haida Gwaii.