New Brunswick Private Woodlot Stumpage Values

Stumpage Study Results - October 2016 to September 2017

New Brunswick Forest Products Commission

Contents

INTRODUCTION

What is the purpose of this report?

This report provides the results of a study which was undertaken to determine the value of forest products in the form of standing trees on private woodlots in New Brunswick. The value of standing trees is commonly referred to as stumpage and, for the purpose of this report, is the value paid to the owner(s) of the trees by the person(s) harvesting those trees. In New Brunswick, royalties for timber harvested from Crown forests have historically been based upon the fair market value of private woodlot stumpage prices. Since 1982, the Government has conducted periodic studies of fair market stumpage values from private woodlots in New Brunswick to base the Crown royalty values upon.

Who conducted this study?

The New Brunswick Forest Products Commission (Commission) is an independent body established under the *Natural Products Act* and the *Forest Products Act*. Among the various duties of the Commission, there are two sub-sections of the *Forest Products Act* that specifically relate to this type of study:

11(a) to examine and consider data relevant to the production and sales of purchased primary forest products; and

11(e) to conduct inquiries on the following matters with respect to primary forest products:

- *(i) The cost of production, distribution and transportation;*
- *(ii) Prices, markets and systems of classification; and*
- (iii) *Any other matter related to marketing.*

The Commission engaged PricewaterhouseCoopers, LLP (PwC) to conduct specified procedures for the validation of stumpage transaction data collected for this study. As a multinational professional services network, PwC is globally the largest firm of its kind with more than 100 years of experience in Canada, focusing on assurance, advisory and tax services for public, private, and government clients in the areas of corporate accountability, risk management, structuring and mergers, and performance and process improvement.

Why study stumpage values?

The value of standing timber is typically referred to as stumpage. It is the value offered to a landowner by a party interested in harvesting the landowner's timber. Section 59(1) of the *Crown Lands and Forests Act* provides that royalty rates for stumpage on Crown lands shall be based on the fair market value of standing timber.

The purpose of this study is to compile a database of stumpage transactions from private woodlots in New Brunswick during a fixed period of time and, using average values of forest products in standing timber throughout the Province, determine provincial average stumpage values. Those average values can be referred to as the fair market value of standing timber.

There are approximately 42,000 private woodlot owners in the Province, and hundreds of purchasers, including forest products processing facilities and over 200 private forestry contractors. For this study period, stumpage data was collected from over 500 private woodlots around the Province, including detailed stumpage sale data from over 15,800 transactions. Timber from private woodlots is also shipped to, and imported from, neighboring Canadian provinces such as Nova Scotia and the United States, but principally the state of Maine. The free inflow and outflow of wood products impact prices that private woodlot owners are paid for stumpage in New Brunswick.

Private woodlots represent almost thirty percent (30%) of the Province's forested land and were the source of approximately 2.1 Million cubic meters of forest products during the study period. When combined with the estimated 500,000 cubic meters of annual hardwood firewood production from private woodlots, this represents one hundred percent (100%) of the sustainable annual allowable cut that was recommended in the 2012 *Private Forest Task Force Report* commissioned by the New Brunswick Government.

During the study period eighty-two percent (82%) of the forest products produced from private woodlots were processed by mills in New Brunswick, with the remaining volume shipped to other provinces or countries. Approximately ninety percent (90%) of private woodlot stumpage purchases were made by third-party forestry contractors, with the remainder purchased by mills. Combined, privately owned industrial forest land and private woodlots represent approximately fifty percent (50%) of the forested land and production of primary forest products in the province.

The value of standing trees to the landowner is based on several factors. These factors can be categorized in four (4) general ways:

1. market/macro-economic factors (e.g., finished product value, import/exports, exchange rates),
2. land/forest conditions (e.g., tree size, terrain),
3. landowner policies/standards (e.g., harvest treatments, tree utilization expectations), and
4. operational efficiencies (e.g., road infrastructure, distance to mill, job size)

The value of stumpage on any one woodlot can be dependent upon these and other factors and can therefore vary throughout the Province. The objective of this study is to generate statistically accurate average values for stumpage sold from private woodlots in the Province for the twelve-month period between October 2016 and September 2017.

How was the study conducted?

From the mid-1980s until the present study, the Department of Natural Resources and Energy Development (NRED) determined fair market values based on periodic surveys of private land stumpage transactions in New Brunswick and the greater Maritime region. Such surveys were conducted because of the legal requirement that all royalty rates for stumpage on Crown lands be based on the fair market value of the standing timber. The surveys were conducted by independent consultants, such as AGFOR Inc. and Nortek Resource Solutions Inc., using the available means of collecting information and data at the time. Information from individual private woodlot owners was provided to independent consultants on a confidential basis and was subject to verification. The surveys were conducted every two to five years with Crown stumpage rates indexed to lumber prices in the interim years.

The Commission was engaged in the fall of 2015 by NRED to develop an enhanced stumpage study methodology in collaboration with PricewaterhouseCoopers, LLC. The methodology utilized in the study is detailed in a report titled 'New Brunswick Private Woodlot Stumpage Values – Stumpage Study Methodology', dated July 2016. This report is the result of the third annual compilation of stumpage values by the Commission.

Utilizing advances in information technology and record keeping, the Commission's authority to obtain relevant information, and the improved services offered by Forest Products Marketing Boards, the present study implements improvements to make the collection and analysis of private stumpage data even more robust. These include the following:

1. Employing the Commission to conduct the study, as an entity that possesses legal authority to collect the type of data required. Based upon the legal authority, the Commission requires all relevant parties to provide the necessary information.
2. Requiring parties involved in stumpage transactions to participate. By requiring parties to participate, the system will not be voluntary. It will be mandatory, ensuring comprehensive data collection.
3. Standardizing the data collection process. By standardizing the data collection process, the Commission will enhance the quality of the data and eliminate inconsistent record-keeping.
4. Having a third-party auditor verify transactions, assess the quality of reporting, and ensure valid methodologies. This ensures fair and impartial methodologies, information gathering and accuracy of data. This is an important element of the enhanced system.
5. Applying sound statistical analysis. This is important to ensure the data is interpreted properly to avoid uncertainty in the results.
6. Creating a goal of compiling a robust dataset of private woodlot, product-specific stumpage transaction prices in the Province. By creating a complete dataset of the product-specific transactions that can be updated monthly when fully implemented, the Commission will be able to evaluate stumpage markets on a more frequent basis.
7. Increasing the scope of information gathered from each transaction, including transaction specific identifiers such as transportation certificate number, load scale slip number, property identification number, volume, unit of measure, stumpage value and gross delivered value. This provides the Commission with significantly more information, permitting increased analysis and verification.
8. Enabling the Commission to more frequently analyze stumpage values to ensure that the information reflects current private market conditions. This allows the Commission to calculate FMVs on an annual basis.

The submitted data was treated with high confidentiality and a version of each submission remains on file with the Commission in its original form. When the data was added to the database, the transactions were assigned a number code in order to provide reference to the respondent for data validation purposes while ensuring anonymity.

As previously mentioned, to verify the transaction level data that was collected for this study, the Commission engaged PwC to carry out the specified procedures developed for the study. The results of the data verification process are found in Appendix A.

STUDY RESULTS

What information was requested?

The analysis in the stumpage study conducted by the Commission in 2016 was based on details of transactions where wood originating from a private woodlot was harvested and sold as product specific and transaction-based stumpage. The same information was requested from previous respondents for the time period of October 1, 2016 to September 30, 2017. Product specific and transaction-based stumpage means that a monetary exchange was transacted between a woodlot owner and the person(s) conducting the harvesting of timber on the woodlot owner's land on the basis of an individual load or part thereof. Seven of the eight respondents from the previous study provided transaction-based data for the new study period. One of the previous respondents did not conduct or administer private woodlot stumpage operations during the new study period. The requested information is shown in Table 1 below.

Table 1. Data collected by the Commission from Boards and Forest Product Processing Facilities.

Data Field	Description / Purpose
TC #	Transportation certificate number for the transaction – one of two possible methods of linking the transaction to stumpage paid to the woodlot owner for the transaction.
Load Slip #	Load or Scale slip number for the transaction - one of two possible methods of linking the transaction to stumpage paid to the woodlot owner for the transaction.
Date	Date that the transaction occurred (delivery or scale date).
PID #	Property Identification number for the private woodlot from which the transaction originated. This information is used for two purposes, first for Commission staff to verify that the property is a valid private woodlot; secondly to allow for Commission staff to assign the map grid number within which the private woodlot is located. The Department of Natural Resources (DNR) map grid location is used to assign a transportation distance for each transaction.
Species	Species of the forest products sold. This is to be used as the primary sorting field for the various timber classes. Species is also used to establish the appropriate conversion factor to convert the volume to solid cubic meters.
Product	Product of the forest products sold. This is used as the secondary sorting field for the various timber classes, or an indication of treelength (denoting a full-length felled tree with multiple timber classes such as sawlog, studwood, etc.). Product is also used to establish the appropriate conversion factor to convert the volume to solid cubic meters.
Volume	Volume of the transaction as verifiable by the TC# or load slip #. It is used as the primary factor in converting the volume to solid cubic meters.
Unit of Measure	Unit of measure used to quantify the volume of the transaction at the destination. Unit of measure is used to establish the appropriate conversion factor to convert the volume to solid cubic meters.
Destination Mill	Delivery destination of the wood products in each transaction.
Stumpage Paid	Gross dollar ($) value paid to the woodlot owner for the transaction.
Delivered Value	Gross dollar ($) value of the transaction delivered at the mill gate.
MB Region	Forest Products Marketing Board region within which the harvesting occurred for each transaction.

One of the objectives of the current study was to expand upon the sample volume of data collected while also improving the regional representation of data from around the Province. To accomplish this objective, the Commission developed and distributed a questionnaire to 88 private forestry contractors. The questionnaire consisted of two forms for the respondents to complete and return; one for transaction-based stumpage agreements and the other for lump-sum stumpage transactions that occurred during the study period. For transaction (product) based stumpage agreements, contractors were requested to supply summaries of the rates paid for the various products and the volume of the

products that were harvested by woodlot. For lump-sum agreements, contractors were requested to supply summaries of the lump-sum value paid for the wood harvested and the volumes of the various products that were harvested by woodlot.

How much data was received?

The three data types were received, compiled and stored in separate databases. For each data type, the Commission was able to sort the data by species/product group and calculate the total volume represented in each. Table 2 summarizes the total volume by species/product group received in each data type.

Table 2. Total volume represented from each data type received in the study by species/product group.

Volume of Data Collected (m3)				
Species/Product*	Transactional	Contractor Stumpage**	Contractor Lump-Sum**	Total
CEDSAW	6,643	647	3	7,293
HWDPW	142,540	21,619	1,554	165,713
HWDSL	2,715	1,583	-	4,298
MXDBM	332	-	-	332
OSRWB	691	-	-	691
OSSL	2,377	639	-	3,016
PISL	6,332	666	-	6,998
SPFRWB	86,366	10,654	1,684	98,704
SPFSL	70,826	7,159	2,116	80,101
SPFST	154,292	21,498	3,441	179,231
SPFTL	14,429	-	-	14,429
TOTALS	488,566	64,465	8,798	560,806

** - See Table 5 for explanation of species and products terms used.*

*** - Contractor data collected was at woodlot level detail (i.e. not transaction level) and does not overlap with transactional data.*

The Commission also determined the total production volume of private woodlot forest products during the study period using reporting that is regularly filed with the Commission by the seven Forest Products Marketing Boards. It is known that a certain percentage of private woodlot production is conducted by owners/operators (i.e. producers who own the woodlot from which the products are being harvested). Historically, the Forest Products Marketing Boards estimated that 20% of the total annual production is conducted by individuals harvesting their own timber (i.e. No stumpage agreement).

To determine a more accurate response to that question, the Commission collected transaction level data from each of the seven Forest Products Marketing Boards within an earlier study period and determined the number of transactions where the woodlot owner was the producer of the forest products. As a result, the Commission determined that 27% of the private woodlot transactions in the Province were conducted by the owner of the wood. Consequently, the Commission has resolved that 73% of the total production is conducted under some form of a stumpage agreement between the owner and the

harvester of the wood. Using that proportion, the total production numbers and stumpage harvest levels could then be used to evaluate the proportions that the collected data represented. Table 3 summarizes total production, estimated stumpage harvest levels compared to the volume of data collected by species/product group.

Table 3. Total production, estimated stumpage harvest levels and volume of data collected from New Brunswick private woodlots.

Species/Product Group	Total Production (m3)	Stumpage Harvest (m3) *	Data Collected (m3)	% of Stumpage Harvest
CEDSAW	47,358	34,571	7,293	21%
HWDPW	694,111	506,701	165,713	33%
HWDSL	47,976	35,022	4,298	12%
MXDBM	31,621	23,083	332	1%
OSRWB	3,370	2,460	691	28%
OSSL	11,404	8,325	3,016	36%
PISL	21,078	15,387	6,998	45%
SPFRWB	262,198	191,404	98,704	52%
SPFSL	330,490	241,258	80,101	33%
SPFST	608,923	444,514	178,929	40%
SPFTL	50,536	36,891	14,429	39%
TOTALS	2,109,065	1,539,616	560,504	36%

** - Calculated as 73% of total private woodlot production*

The level of detail in the current submitted data was such that the Commission was able to determine prices paid for the species/product groups within each woodlot. By assuming that each woodlot represents a stumpage agreement, combined with the species/product pricing associated within each agreement, the Commission was able to align the study data with metrics that were used in past surveys. This enabled the Commission to conduct a direct comparison between the current study response level and those of previous surveys. Table 4 provides a comparison of the response level from the current study to the previous four (4) surveys where stumpage agreements and price points were used as the metrics.

Table 4. Response levels: current study vs. previous four (4) studies completed.

Report Period	Stumpage Agreements	Price Points
Oct 2016 to Sept 2017	*509*	*3,383**
Oct 2015 to Sept 2016	655	5,167
Oct 2014 to Sept 2015	461	2,650
December 2013	102	741
June 2011	156	716

** Number of stumpage agreements and price points are affected by the size of harvest jobs, number of participants who purchased or administered stumpage agreements, and overall production levels.*

How was the response data organized and interpreted?

To establish species product groups, the Commission adopted an approach to group species and/or products that would be most likely applied in the establishment of stumpage agreements between a woodlot owner and the person wishing to harvest an owner's trees. The Commission also considered species/product groups that were likely to be used for Crown timber harvests. Table 5 is a summary of the various species and product groups that were used to analyze stumpage values in this study.

Table 5. Species and Products groups used in the study.

SPECIES	PRODUCT	GROUP
CEDAR	SAWLOG	CEDSAW
CEDAR	STUD	
CEDAR	SHINGLEWOOD	
CEDAR	TREELENGTH	
POPLAR	CHIPS	HWDPW
HARDWOOD	CHIPS	
HARDWOOD	PULPWOOD	
POPLAR	PULPWOOD	
HARDWOOD	SAWLOG	HWDSL
MIXED	BIOMASS	MXDBM
RED PINE	PULPWOOD	OSRWB**
HEMLOCK	PULPWOOD	
WHITE PINE	PULPWOOD	
TAMARACK	PULPWOOD	
RED PINE	SAWLOG	OSSL
TAMARACK	SAWLOG	
HEMLOCK	SAWLOG	
WHITE PINE	SAWLOG	PISL
SPF*	ROUNDWOOD BIOMASS	SPFRWB**
SPF*	CHIPS	
SPF*	PULPWOOD	
SPF*	SAWLOG	SPFSL
SPF*	STUD	SPFST
SPF*	TREELENGTH	SPFTL

** SPF = Spruce, Fir, Jack Pine*
*** RWB = Round wood biomass, including pulpwood and chips produced at the harvest site.*

Often, in larger collections of data, values that are significantly higher or lower than the average are commonly referred to as outliers. Outliers can sometimes indicate faulty data, flawed procedures or cases where data is influenced by unknown or abnormal factors. Within the two largest datasets (transactional and contractor stumpage), the Commission explored methods by which to identify and deal with outliers.

Ultimately, the Commission applied the approach used in its previous study period. This approach consists of sorting the stumpage values ($/m3) from lowest to highest for each species/product group. Once values were sorted, transactions located below the fifth (5^{th}) and above the ninety-fifth (95^{th}) percentiles were identified and excluded from the statistical calculations for each species/product group.

Once the outliers were identified for exclusion, a number of statistical calculations were performed. The primary objective of the study was to determine the mean or average stumpage value of the various species/product groups for the Province. In past surveys, a variety of methods were used to calculate the average stumpage value, such as weighted averages, simple arithmetic mean, or interquartile mean. The descriptive statistics calculated for the species/product groups are detailed in Table 6 below.

Table 6. Summary of descriptive statistics calculated for the species/product groups.

Statistic	Description
Species/Product	Grouping of the species and products for a timber class to be described.
Mean	Simple arithmetic mean is the sum of the values in a numeric data field divided by the number of records found in that data field. In the case of this study, the field of interest was the stumpage value expressed in dollars per cubic meter ($/m3). For each species/product group, the stumpage values per cubic meter for each transaction were totaled and divided by the number of transactions in the group. This method was also used for the Maine report referred to above.
Standard Deviation	For each species/product group the standard deviation was calculated as an indicator of the variability of the data. Standard deviation is a number used to tell how measurements for a group are spread out from the average (mean) or expected value.
Minimum	Lowest stumpage value ($/m3) within the species/product groups.
Maximum	Highest stumpage value ($/m3) within the species/product groups.
Response Volume	Total volume (m3) of the transactions in the collected data for each species/product group.
Number of Data Points	Total number of data points used to conduct the calculations.
Confidence Interval	When calculating a mean using the response data, the confidence interval is the range of values within which there is a certain percentage of confidence that the true mean falls within.

The Commission used the same formula used in the previous study to calculate confidence intervals for each species/product group, as follows:

Confidence interval = $\mu \pm Z_{\alpha/2}*(s/\sqrt{n})$
Where: μ = mean of stumpage / m3
$Z_{\alpha/2}$ = $Z\alpha/2$ is the critical value of the Normal distribution at $\alpha/2$
99% Confidence Level - $Z\alpha/2 = 2.575$
s = standard deviation
n = total # of data points in the response data

It should be noted that due to the robustness of the dataset, the Commission was able to apply a significant confidence level of ninety-nine percent (99%) for these calculations. This means that if a

response of equal size were collected in a separate study, there would be a ninety-nine percent (99%) probability that the result would fall within the confidence interval either above or below the mean.

Response size and variability are two of the most influential factors when considering confidence level and calculating confidence interval, also known as margin of error. Standard deviation (or standard error) is an indicator of the variability of the data received. The Commission tested the impact of increased standard deviation and decreased response sizes to gauge the reliability of the data and confidence interval calculations. For example, if the standard deviation of SPFST stumpage was doubled to $5.42, the impact on confidence interval would result in an increase of plus or minus $0.11/$m^3$. For the same group, reducing the response size to one quarter of the actual response size would have the same effect.

For this reason, the Commission can be confident that the sample sizes are more than adequate to give a reasonable representation of the stumpage values being paid for primary forest products on private woodlots in New Brunswick. This is especially true in the case of the species products groups that are produced most in terms of volume, such as SPFRWB, SPFSL, SPFST, and HWDPW, where the confidence intervals (margins of error) are typically less than plus or minus 2% of the mean stumpage value.

What are the Provincial results?

In the Commission's previous study, the Provincial Weighted Mean was chosen by the Commission to reflect the fair market value of primary forest products harvested from private woodlots in New Brunswick. The Commission still analyzes the arithmetic mean of the species/products groups as part of that work. Table 7 summarizes the statistics calculated for each species/product group specific to the arithmetic mean that is used as part of the study.

Table 7. Descriptive statistics of stumpage by species/product group for the entire dataset with outliers excluded. Confidence intervals were calculated using a confidence level of ninety-nine percent (99%).

Species/ Product Group	Provincial Mean ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Response Volume (m³)	Total Harvest Volume (m³)	Confidence Interval ($/m³)
CEDSAW	$ 17.79	$ 3.42	$ 9.81	$ 23.65	6,463	47,358	± $ 0.56
HWDPW	$ 9.30	$ 3.35	$ 2.80	$ 16.08	147,095	694,111	± $ 0.13
HWDSL	$ 22.87	$ 7.36	$ 12.12	$ 53.57	4,100	47,976	± $ 1.71
OSRWB	$ 4.81	$ 2.38	$ 1.85	$ 7.67	620	3,370	± $ 1.34
OSSL	$ 10.78	$ 5.33	$ 4.52	$ 32.83	2,849	11,404	± $ 1.60
PISL	$ 15.10	$ 4.50	$ 6.61	$ 29.20	6,455	21,078	± $ 0.66
SPFRWB	$ 4.81	$ 1.73	$ 0.93	$ 9.24	87,412	262,198	± $ 0.09
SPFSL	$ 17.02	$ 3.79	$ 9.03	$ 28.89	69,939	330,490	± $ 0.21
SPFST	$ 15.81	$ 2.71	$ 7.85	$ 24.43	157,941	608,923	± $ 0.11
SPFTL*	$ 12.73	$ 3.61	$ 5.92	$ 20.50	9,696	50,536	± $ 0.56

** - SPFTL stumpage data is limited to data from one Board region and reflects specialized transactions and demand during the study period. For this reason, the Commission does not recommend using this figure as a basis for SPF treelength FMV on Crown land where treelength rates are used.*

The Commission maintains that a provincial average stumpage value is best determined using the arithmetic mean of the data collected for each Marketing Board region and then weighted by the corresponding production. Marketing Board region stumpage values and production levels are detailed in Appendix B. Where there was no regional stumpage data for a species/product group, the Provincial arithmetic mean was used as a proxy. Table 8 summarizes the results of the calculations that were conducted for each species/product group weighted mean of the data and results that were determined in the previous study. The Commission recommends that the Weighted Provincial Mean be considered as the "Fair Market Value" for the species/products groups listed.

Table 8. Current and previous study stumpage value results by species/product group for New Brunswick.

Species/ Product Group	Current Weighted Provincial Mean ($/m3)	Previous Study Provincial Mean ($/m3)
CEDSAW	$ 16.93	$ 17.60
HWDPW	$ 10.13	$ 12.24
HWDSL	$ 22.42	$ 30.65
OSRWB	$ 5.21	$ 5.33
OSSL	$ 10.61	$ 8.16
PISL	$ 16.77	$ 16.95
SPFRWB	$ 4.51	$ 5.41
SPFSL	$ 19.06	$ 20.17
SPFST	$ 16.77	$ 16.68
SPFTL*	$ 13.77	$ 16.23

** - SPFTL stumpage data is limited to data from one Board region and reflects specialized transactions and demand during the study period. For this reason, the Commission does not recommend using this figure as a basis for SPF treelength FMV on Crown land where treelength rates are used.*

SUPPLEMENTARY ANALYSES

As previously mentioned, the data collected was compiled in three separate databases, allowing for separate analyses to be conducted on each type of data collected. In the case of the detailed transactional data and the contractor-provided stumpage agreement data, the databases were similar enough that would also allow for some merging of the data. In any case, the data structure within each dataset facilitated a number of possibilities in terms of statistical analysis, many of which were explored during the previous study.

How do lump-sum stumpage transactions compare to transactional data?

The current study included data collected for lump-sum stumpage transactions, whereby the total value paid for all of the wood harvested was reported, as well as the volume by species and product. It was determined that the most practical comparison of the collected lump-sum data and equivalent from the other datasets would be to simply calculate the overall average stumpage value per cubic meter for the entire lump-sum dataset. A similar calculation could be conducted for the other two datasets for comparison. The average values per cubic meter that resulted from those calculations are compared in Table 9 below.

Table 9. Comparison of average lump-sum stumpage value per cubic meter ($/m3) from each data set.

Transactional Data (avg.)	Contractor Stumpage Data (avg.)	Lump-sum Data (avg.)
$ 12.39 / m3	$ 13.03 / m3	$ 10.26 / m3

Despite the above method, the Commission also looked at possible ways to "assign" values to each of the individual species/product groups that were represented within each lump-sum transaction. The following method was used to assign values to the individual species/products groupings:

STEP 1: Calculate the Lump Sum average per-unit stumpage price: Lump sum $ divided by total scaled volume
Data sources: Lump sum price and species/product volumes from Producer records

STEP 2: Calculate the stumpage value using the Provincial Avg. Per-Unit prices for each species/product multiplied by the species/product volume from Producer records.

Data sources: Per-unit stumpage price database and species/product volume from Producer records

STEP 3: Calculate the % difference in the lump sum paid vs the calculated stumpage value in step 2

STEP 4: Calculate the Adjusted Per-Unit Stumpage Prices for the Lump Sum block using the % difference in Step 3 applied to the applicable Provincial Per-Unit Stumpage price.

Sample Calculation

"A" Lump Sum Payment: $100,000
Submitted Volume: 7,000 m3

"B" Average Stumpage Price: $14.29 per m3

Products:	"C" Volume (m3)	"D" Provincial Avg. Stumpage ($/m3)	Calculated Stumpage Value (=C x D)	Assigned ($/m3) Stumpage Prices (=D/1-E)
SPF Sawlogs	1,000	$ 17.02	$ 17,020	$ 20.91
SPF Studwood	2,000	$ 15.81	$ 31,620	$ 19.43
SPF Pulpwood	1,000	$ 4.81	$ 4,810	$ 5.91
PO Pulpwood	2,500	$ 9.31	$ 23,275	$ 11.44
MH Firewood	500	$ 9.31	$ 4,655	$ 11.44
Total	7,000		$ 81,380	$ 14.29
			"E" = 18.62%	

"B" = Average Per Unit Stumpage Price: Lump sum stumpage sales data reported by private wood producer or woodlot owner.

"C" = Volume as submitted by producer or woodlot owner by species/product group and converted to cubic meters (m3).

"D" = Provincial Per-Unit Stumpage Value: Taken from per-unit provincial stumpage price data (sample calculation used the prices published in the NB Stumpage Study Results - October 2014-September 2015)

"E" = % Difference in Lump Sum vs Calculated Stumpage Value: Calculated Stumpage value is the Provincial Avg per-unit price multiplied by volume for each species/product in the lump sum block.

The above calculation was completed for each lump-sum data submission and summarized. The proximity in the results of the analysis of the submitted lump-sum stumpage data compared to the other data submitted in this current study indicates, and the Commission concludes that when conducting lump-sum stumpage transactions, harvesting contractors must be calculating the total value of the transaction by using individual species/product rates that are consistent with the species/product transaction-based stumpage values around the Province. Due to both the proximity of the results and the relatively small volume of lump-sum transactions, there is little to no impact on province-wide average stumpage values resulting from the inclusion or non-inclusion of lump-sum transactions (as demonstrated in Appendix C – Other Analyses Completed). The Commission determined not to include the data from lump-sum transactions in the weighted Provincial Mean calculation.

What does the data submitted by contractors tell us?

The main difference in these two data sets was that the transactional dataset included detail down to the load (or part thereof) level. Contractor stumpage data was submitted in a fashion that captured the rates paid and total volumes produced on private woodlots. Although the two datasets differed in this fashion, each allowed for similar types of analyses to be conducted.

Once outliers were identified on each dataset, the analyses described above in table 7 were conducted on each dataset separately. The results of those analyses are summarized in tables 10 and 11. Because

the data fields in each dataset were identical, the two datasets were then combined together, and the same statistical descriptions were conducted on the combined dataset as summarized in table 12 below.

Table 10. Descriptive statistics of stumpage by species/product group for the transactional dataset with outliers excluded. Confidence intervals were calculated using a confidence level of ninety-nine percent (99%).

Species/ Product Group	Provincial Mean* ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Volume of data (m³)	Number of Data Points	Confidence Interval ($/m³)
CEDSAW	$ 17.72	$ 3.42	$ 9.81	$ 23.65	5,859	244	± $ 0.56
HWDPW	$ 9.30	$ 3.35	$ 2.80	$ 16.08	128,389	4,316	± $ 0.13
HWDSL	$ 22.87	$ 7.36	$ 12.12	$ 53.57	2,517	123	± $ 1.71
OSRWB	$ 4.81	$ 2.38	$ 1.85	$ 7.67	620	21	± $ 1.34
OSSL	$ 10.96	$ 5.41	$ 4.82	$ 32.83	2,210	69	± $ 1.68
PISL	$ 15.09	$ 4.53	$ 4.53	$ 29.20	5,880	306	± $ 0.67
SPFRWB	$ 4.81	$ 1.72	$ 0.93	$ 9.24	77,701	2,607	± $ 0.09
SPFSL	$ 17.00	$ 3.78	$ 10.03	$ 25.08	63,410	2,177	± $ 0.21
SPFST	$ 15.80	$ 2.70	$ 10.67	$ 22.76	139,900	4,118	± $ 0.11
SPFTL	$ 12.73	$ 3.61	$ 5.92	$ 20.50	9,696	275	± $ 0.56

** - Arithmetic mean (not weighted by regional production).*

Table 11. Descriptive statistics of stumpage by species/product group for the contractor stumpage dataset with outliers excluded. Confidence intervals were calculated using a confidence level of ninety-nine percent (99%).

Species/ Product Group	Provincial Mean* ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Volume of data (m³)	Number of Data Points	Confidence Interval ($/m³)
CEDSAW	$ 20.29	$ 2.27	$ 17.17	$ 22.50	604	7	± $ 2.27
HWDPW	$ 9.54	$ 3.72	$ 4.20	$ 19.00	18,706	52	± $ 1.33
HWDSL	$ 21.34	$ 7.59	$ 16.60	$ 30.09	1,583	3	± $ 11.28
OSRWB	-	-	-	-	-	-	-
OSSL	$ 8.23	$ 3.48	$ 4.52	$ 11.52	639	5	± $ 4.01
PISL	$ 15.41	$ 2.10	$ 13.16	$ 17.86	576	5	± $ 2.42
SPFRWB	$ 4.42	$ 2.02	$ 2.08	$ 7.35	9,710	22	± $ 1.11
SPFSL	$ 18.40	$ 4.46	$ 9.03	$ 28.89	6,529	25	± $ 2.30
SPFST	$ 17.06	$ 3.67	$ 7.85	$ 24.43	18,041	31	± $ 1.70
SPFTL	-	-	-	-	-	-	-

** - Arithmetic mean (not weighted by regional production).*

Table 12. Descriptive statistics of stumpage by species/product group for the combined datasets with outliers excluded. Confidence intervals were calculated using a confidence level of ninety-nine percent (99%).

Species/ Product Group	Provincial Mean* ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Volume of data (m³)	Number of Data Points	Confidence Interval* ($/m³)
CEDSAW	$ 17.79	$ 3.42	$ 9.81	$ 23.65	6,463	251	± $ 0.56
HWDPW	$ 9.31	$ 3.36	$ 2.80	$ 19.00	147,095	4,368	± $ 0.13
HWDSL	$ 22.84	$ 7.34	$ 12.12	$ 3.57	4,100	126	± $ 1.68
OSRWB	$ 4.81	$ 2.38	$ 1.85	$ 7.67	620	21	± $ 1.34
OSSL	$ 10.78	$ 5.33	$ 4.52	$ 32.83	2,849	74	± $ 1.60
PISL	$ 15.10	$ 4.50	$ 6.61	$ 29.20	6,455	311	± $ 0.66
SPFRWB	$ 4.81	$ 1.73	$ 0.93	$ 9.24	87,412	2,629	± $ 0.09
SPFSL	$ 17.02	$ 3.79	$ 9.03	$ 28.89	69,939	2,202	± $ 0.21
SPFST	$ 15.81	$ 2.71	$ 7.85	$ 24.43	157,941	4,149	± $ 0.11
SPFTL	$ 12.73	$ 3.61	$ 5.92	$ 20.50	9,696	275	± $ 0.56

** - Arithmetic mean (not weighted by regional production).*

How was the data distributed across species / product groups?

The following table illustrates how the data was distributed across broader species/product groups. This was used to assess size of data response relative to the estimated production of forest products originating from stumpage operations in New Brunswick during the study period. Table 13 summarizes those results.

Table 13. Summary of collected data relative to stumpage production for combined species/product groups.

Species/Product Group	Softwood Saw Material		
	Volume of Data (m3)	Stumpage Production (m3)	% of Production
CEDSAW	7,293	34,571	21
OSSL	3,016	8,325	36
PISL	6,998	15,387	45
SPFSL	80,101	241,258	33
SPFST	178,929	444,514	40
SPFTL	14,429	36,891	39
TOTAL	***290,766***	***780,946***	***37***
	Softwood Pulpwood Material		
OSRWB	691	2,460	28
SPFRWB	98,704	191,404	52
TOTAL	***99,395***	***193,864***	***51***
	Hardwood Products		
HWDPW	165,713	506,701	33
HWDSL	4,298	35,022	12
TOTAL	***170,011***	***541,723***	***31***

What are the differences between arithmetic and weighted mean stumpage values?

In its first study, the Commission used the arithmetic mean of stumpage values to determine the provincial average. Regional averages were also determined in the previous study. Due to gaps in regional data, calculating regionally-production-weighted values to determine a provincial average was not chosen as the preferred calculation. Doing so would have required assumptions that could have brought into question the validity of the results.

For the current study, and through the additional effort in collecting a larger and more regionally distributed dataset (see Table 14 below), the Commission was able to explore the option of weighting regional stumpage values by the production within each region to determine a representative provincial average stumpage value for each species/product group.

Table 14. Regional distribution of all stumpage data collected by the Commission for the current study.

Species/Product Group	Volume of Data Collected by Marketing Board Region (m3)						
	CV	MAD	NSH	NTH	SENB	SNB	YSC
CEDSAW	3,145	14	0	771	447	1,069	1,847
HWDPW	15,061	1,541	0	15,089	13,329	97,447	32,091
HWDSL	1.317	1,583	0	0	0	1,694	528
OSRWB	346	0	0	7	0	305	32
OSSL	0	0	0	580	75	1,791	645
PISL	338	0	0	240	231	4,308	1,914
SPFRWB	0	851	0	7,365	9,152	77,981	5,608
SPFSL	6,155	1,781	0	5,407	3,569	42,801	20,455
SPFST	2,102	1,906	0	40,951	14,231	94,732	24,913
SPFTL	11,569	0	0	0	0	0	2,859

Note: Shaded cells denote products that were not produced in the Marketing Board region during the study period.

Within the data, it is clear that there are regional differences in the stumpage rates paid for specific products. These differences are mostly attributed to the availability of markets and overall demand for a specific product. For example, most sawmills in the eastern region of New Brunswick are mills that purchase and process spruce/fir/jack pine (SPF) studwood into lumber and there are fewer mills purchasing SPF sawlogs. The opposite is the case on the western side of the Province, where there are more mills that purchase SPF sawlogs. Due to the decreased demand for SPF sawlogs in the eastern side of the Province, stumpage values tend to be lower, as well as the overall production of that specific product. Through weighting of the stumpage values by the production in each region, the Commission can balance the strengths and weaknesses in the regional markets and develop a representative Provincial average for each of the species products groups.

Tables of the results of calculations by Marketing Board region are found in Appendix B. It is important to note that for specific species/product groups within each region where there was no data collected, they were excluded from the Provincial calculation. Where the lack of data occurred was generally in the

less common species/products groups. Species/product groups where there was no data collected represented less than 2% of the total production.

What is the relationship between stumpage and delivered value?

In the current study, the Commission included the gross delivered value (value paid for the product delivered to the mill) of the products reported in addition to the stumpage collected in the transactional data. The mean delivered value was then calculated using the arithmetic mean of the gross delivered value reported in the transactions. Table 15 below shows the relationship between stumpage value and the delivered value of the products during the study period. A more detailed analysis by month is found in Appendix D.

Table 15. Relationship between Stumpage Value and Delivered Value.

Species/Product Group	Mean Stumpage ($/m3)	Mean Delivered Value ($/m3)	Stumpage as % of Delivered Value
CEDSAW	$ 17.72	$ 73.95	24
HWDPW	$ 9.30	$ 48.71	19
HWDSL	$ 22.84	$ 67.07	34
OSRWB	$ 4.81	$ 25.98	19
OSSL	$ 10.96	$ 52.21	21
PISL	$ 15.09	$ 57.82	26
SPFRWB	$ 4.81	$ 40.15	12
SPFSL	$ 17.00	$ 57.95	29
SPFST	$ 15.80	$ 55.03	29
SPFTL	$ 12.73	$ 49.61	26

How have average stumpage values changed over the past 3 studies?

With three consecutive years of data collected now, the Commission also conducted calculations to compare individual study periods to 3-year averages. In table 16 below, comparisons were completed for an average of the individual study period values by species / product combination, as well as an overall mean of the data for the 3 study periods combined. The weighted mean of the combined periods are weighted by production by Marketing Board region. The mean of all stumpage data is simply the arithmetic mean of the data from the 3 periods combined.

Table 16. Comparison of mean stumpage values over 3 study periods.

Species/ Product Group	Study Period 1	Study Period 2	Study Period 3	Weighted Mean of 3 Periods	Mean of All Stumpage Data
CEDSAW	$ 19.62	$ 17.60	$ 16.93	$ 17.66	$ 17.83
HWDPW	$ 10.00	$ 12.24	$ 10.13	$ 11.12	$ 10.70
HWDSL	$ 19.69	$ 30.65	$ 22.42	$ 22.11	$ 21.45
OSRWB	$ 4.40	$ 5.33	$ 5.21	$ 5.13	$ 5.21
OSSL	$ 9.19	$ 8.16	$ 10.61	$ 8.80	$ 8.94
PISL	$ 15.23	$ 16.95	$ 16.77	$ 16.64	$ 15.28
SPFRWB	$ 5.98	$ 5.41	$ 4.51	$ 5.47	$ 5.23
SPFSL	$ 19.01	$ 20.17	$ 19.06	$ 20.13	$ 17.92
SPFST	$ 15.93	$ 16.68	$ 16.77	$ 16.80	$ 15.82
SPFTL	$ 12.29	$ 16.50	$ 13.77	$ 15.18	$ 14.43

How do mill purchased stumpage values compare to contractor purchased stumpage values?

As previously mentioned in the report, approximately 10% of the stumpage purchased from private woodlots in New Brunswick is negotiated directly between a mill and a woodlot owner, and 90% negotiated between an independent forestry contractor and a woodlot owner. It should be noted that mill submitted data represents 100% of the mill-purchased stumpage during the study period. The data allows the Commission to conduct a comparison of the two stumpage purchase methods. Table 17 demonstrates the arithmetic mean of stumpage values paid by mills and by contractors.

Table 17. Comparison of values between mill purchased and contractor purchased stumpage data.

Species/ Product Group	Mill Purchased Stumpage ($/m3)	Mill Purchased Data Volume (m3)	Contractor Purchased Stumpage ($/m3)	Contractor Purchased Data Volume (m3)
CEDSAW	$ 12.09	485	$ 18.21	5,978
HWDPW	$ 8.16	70,155	$ 10.49	76,940
HWDSL	$ 22.52	874	$ 23.05	3,225
OSRWB	*No Data*	0	$ 4.81	620
OSSL	$ 6.72	614	$ 12.61	2,235
PISL	$ 15.03	2,503	$ 15.12	3,953
SPFRWB	$ 4.47	38,625	$ 5.04	48,787
SPFSL	$ 19.55	24,193	$ 15.84	45,746
SPFST	$ 16.66	45,666	$ 15.44	112,276
SPFTL	*No Data*	0	$ 12.73	9,696

APPENDIX A

DATA VERIFICATION RESULTS

Summary of Data Verification Results

The Commission engaged PricewaterhouseCoopers LLC to conduct Specified Procedures in order to verify data provided to the Commission for the purpose of this study. The objective of the verification was to ensure that the data provided to the Commission aligned with source documentation held by the various organizations that provided data. In order to match the transactions, PwC compared the following data fields to transaction source documentation from each data source: Date, TC#, Species, Product, Volume, Unit of Measure and Stumpage Paid. The following table summarizes exceptions discovered between the data provided and the source documentation for the transactions that were selected for verification. The following commentary describes the exceptions that were discovered and the degree of impact, if any, they may have on the stumpage calculations conducted by the Commission.

Data Source	# of Selections	Date	TC#	Species	Product	Volume	Unit of Measure	Stumpage Paid
1	22	0	0	0	0	0	0	0
2	30	0	0	1	0	0	0	1
3	30	0	0	0	0	0	0	0
4	30	0	0	0	0	0	0	0
5	30	0	0	0	1	0	0	0
6	30	0	0	0	0	0	0	0
8	27	0	0	0	0	0	0	0
9	27	0	0	0	0	0	0	0
Totals	226	0	0	1	1	0	0	1

DATE

There were no exceptions identified with Date between the data and the source documentation.

TRANSPORTATION CERTIFICATE NUMBER (TC#)

There were no exceptions identified with TC#/Load slip# between the data and the source documentation.

SPECIES

There was one (1) exception for Species. For that exception, the data indicated the species as POP (poplar) and the source documentation indicated HWD (mixed hardwood). This exception is considered to be insignificant as POP and HWD species are combined in the HWDPW and HWDSL species products groups.

PRODUCT

There was one (1) exception for Product. For that record, the data indicated a product of SL (sawlog) and the source documents indicated a product of PWD (pulpwood). In this particular instance, the products were purchased at a mill that does not typically purchase sawlog material. The Commission searched the full database for more instances of the same occurrence and none were found. For that reason, this exception would have little or no impact to the analyses completed with the data.

VOLUME

There were no exceptions identified with Volume between the data and the source documentation.

UNIT OF MEASURE

There were no exceptions identified in the unit of measure field between the data and the source documentation.

STUMPAGE PAID

There was one (1) exception identified in the Stumpage Paid field of data. With that record, the data indicated a stumpage paid value of $417.70 and the source documentation indicated a stumpage paid value of $422.72. By dividing the stumpage paid value by the volume (m3) of the transaction, it results in a difference of $0.18/m3. This exception would have little or no impact on the analyses completed with the data.

CONCLUSION

The Commission notes that there has been a significant reduction in the exceptions identified between the previous study and the current study. Based on the results of the previous study verification exercise, the Commission implemented some tighter controls on the data submission and standardization processes. It should also be noted that the data providers gained experience from the previous study and were better accustomed to the data preparation process.

Based on the above substantiations of the exceptions found in the verification of the data and the fact that all the transactions could be verified, the Commission is confident that the data used to conduct calculations of average stumpage values are representative of stumpage transactions for the time period of the study. The exceptions identified, have little or no impact on the calculations and fall within the expected margin of error that was applied in selecting the transactions for verification.

APPENDIX B

MARKETING BOARD REGION RESULTS

Marketing Board Region Results

The Commission conducted identical calculations of descriptive statistics using data at the Board region level, including arithmetic mean, standard deviation, minimum, maximum, response volume, total harvest and confidence interval (based on a confidence level of 99%) for the Board region data collected. Shaded rows indicate situations where there was insufficient data to conduct confidence interval calculations, and in some cases, species/product groups that were not produced within the Marketing Board region.

Carleton-Victoria (CV)

Species/ Product Group	Mean ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Response Volume (m³)	Number of Data Points	Confidence Interval* ($/m³)
CEDSAW	$ 19.61	$ 2.35	$ 10.77	$ 22.80	3,050	120	± $ 0.55
HWDPW	$ 13.40	$ 2.13	$ 6.43	$ 16.08	12,605	447	± $ 0.26
HWDSL	$ 16.42	$ 6.89	$ 9.96	$ 50.70	1,285	49	± $ 2.53
OSRWB	$ 6.02	$ 2.17	$ 2.26	$ 7.48	346	9	± $ 1.86
OSSL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
PISL	$ 12.50	$ 0.00	$ 12.50	$ 12.50	338	8	± $ 0.00
SPFRWB	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
SPFSL	$ 15.89	$ 2.97	$ 10.32	$ 23.66	5,785	253	± $ 0.48
SPFST	$ 16.00	$ 1.74	$ 12.16	$ 18.04	2,032	56	± $ 0.60
SPFTL	$ 14.05	$ 2.55	$ 9.38	$ 20.50	7,586	222	± $ 0.44

Madawaska (MAD)

Species/ Product Group	Mean ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Response Volume (m³)	Number of Data Points	Confidence Interval* ($/m³)
CEDSAW	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
HWDPW	$ 10.90	$ 2.54	$ 7.21	$ 13.03	701	4	± $ 3.27
HWDSL	$ 21.34	$ 7.59	$ 16.60	$ 30.09	1,583	3	± $11.28
OSRWB	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
OSSL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
PISL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
SPFRWB	$ 3.47	$ 0.88	$ 2.84	$ 4.09	315	2	± $ 1.60
SPFSL	$ 28.89	$ 0.00	$ 28.89	$ 28.89	270	1	± $ 0.00
SPFST	$ 23.24	$ 0.00	$ 23.24	$ 23.24	756	1	± $ 6.32
SPFTL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00

North Shore (NSH)

NO DATA

Northumberland (NTH)

Species/ Product Group	Mean ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Response Volume (m³)	Number of Data Points	Confidence Interval* ($/m³)
CEDSAW	$ 16.96	$ 0.78	$ 14.10	$ 17.17	700	30	± $ 0.37
HWDPW	$ 8.05	$ 1.79	$ 3.33	$ 12.12	14,976	459	± $ 0.21
HWDSL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
OSRWB	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
OSSL	$ 6.13	$ 2.79	$ 4.52	$ 9.35	502	3	± $ 4.15
PISL	$ 19.91	$ 3.49	$ 17.44	$ 22.37	42	2	± $ 6.35
SPFRWB	$ 5.18	$ 1.80	$ 2.09	$ 9.24	6,509	202	± $ 0.33
SPFSL	$ 19.38	$ 3.60	$ 10.93	$ 25.08	4,009	99	± $ 0.93
SPFST	$ 16.38	$ 2.59	$ 10.90	$ 21.80	38,314	889	± $ 0.22
SPFTL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00

South East New Brunswick (SENB)

Species/ Product Group	Mean ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Response Volume (m³)	Number of Data Points	Confidence Interval* ($/m³)
CEDSAW	$ 19.59	$ 5.44	$ 9.87	$ 22.50	447	5	± $ 6.26
HWDPW	$ 7.70	$ 1.50	$ 4.19	$ 11.53	11,120	54	± $ 0.53
HWDSL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
OSRWB	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
OSSL	$ 11.38	$ 0.21	$ 11.23	$ 11.52	75	2	± $ 0.38
PISL	$ 12.43	$ 1.11	$ 10.17	$ 14.30	123	8	± $ 1.01
SPFRWB	$ 3.74	$ 2.22	$ 0.93	$ 8.79	7,089	70	± $ 0.68
SPFSL	$ 19.03	$ 3.10	$ 9.03	$ 24.80	2,541	34	± $ 1.37
SPFST	$ 16.46	$ 2.66	$ 7.85	$ 20.50	9,398	83	± $ 0.75
SPFTL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00

Southern New Brunswick (SNB)

Species/ Product Group	Mean ($/m³)	Standard Deviation	Minimum ($/m³)	Maximum ($/m³)	Response Volume (m³)	Number of Data Points	Confidence Interval* ($/m³)
CEDSAW	$ 16.90	$ 4.10	$ 10.58	$ 22.07	803	46	± $ 1.56
HWDPW	$ 8.45	$ 3.15	$ 2.80	$ 15.96	80,209	2,445	± $ 0.16
HWDSL	$ 21.51	$ 8.01	$ 7.94	$ 37.75	1,450	75	± $ 2.38
OSRWB	$ 3.91	$ 2.18	$ 1.85	$ 7.67	274	12	± $ 1.62
OSSL	$ 10.60	$ 6.05	$ 4.82	$ 32.83	1,627	53	± $ 2.14
PISL	$ 14.47	$ 4.25	$ 6.61	$ 29.20	4,041	237	± $ 0.71
SPFRWB	$ 4.85	$ 1.70	$ 0.98	$ 9.04	68,684	2,220	± $ 0.09
SPFSL	$ 16.67	$ 3.36	$ 10.03	$ 25.08	40,143	1,409	± $ 0.23
SPFST	$ 15.45	$ 2.68	$ 10.67	$ 22.76	87,492	2,668	± $ 0.13
SPFTL	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00

York-Sunbury-Charlotte (YSC)

Species/ Product Group	Mean ($/m^3)	Standard Deviation	Minimum ($/m^3)	Maximum ($/m^3)	Response Volume (m^3)	Number of Data Points	Confidence Interval* ($/m^3)
CEDSAW	$ 14.59	$ 2.86	$ 9.81	$ 23.65	1,464	50	± $ 1.04
HWDPW	$ 10.32	$ 3.30	$ 3.41	$ 19.00	26,811	933	± $ 0.28
HWDSL	$ 22.91	$ 2.90	$ 16.54	$ 31.57	510	25	± $ 1.49
OSRWB	$ 0.00	$ 0.00	$ 0.00	$ 0.00	0	0	± $ 0.00
OSSL	$ 12.17	$ 1.97	$ 9.09	$ 16.31	644	16	± $ 1.27
PISL	$ 18.30	$ 4.58	$ 9.56	$ 26.01	1,911	56	± $ 1.58
SPFRWB	$ 4.15	$ 1.41	$ 1.96	$ 8.72	4,816	135	± $ 0.31
SPFSL	$ 18.14	$ 4.98	$ 10.24	$ 25.92	17,192	406	± $ 0.64
SPFST	$ 16.59	$ 2.85	$ 10.74	$ 24.43	19,950	452	± $ 0.35
SPFTL	$ 7.22	$ 1.65	$ 5.92	$ 12.91	2,110	53	± $ 0.58

APPENDIX C

OTHER ANALYSES COMPLETED

The Commission also explored a number of different methods for calculating provincial averages for fair market value. Below is a description of some of the methods explored and the following table outlines a comparative analysis between the final results and methodology chosen by the Commission and the other methods explored.

Column A – This column contains the arithmetic mean of the transactional dataset with outliers excluded from the calculation as described in the body of the report (results from Table 8).

Column B – This column contains the arithmetic mean of the transactional dataset with outliers included in the calculation. This method was not selected because the Commission wanted to conduct calculations in a manner consistent with the adjacent jurisdiction of Maine, USA.

Column C – This column contains the arithmetic mean of the contractor dataset with outliers excluded from the calculation as described in the body of the report (results from Table 9).

Column D – This column contains the arithmetic mean of the contractor dataset with outliers included in the calculations.

Column E – This column contains the provincial average stumpage rates for the species/product groups weighted by Board region production levels (from Table 13).

Column F – This column contains the average "assigned" stumpage value by species/product group that was calculated using the lump-sum data that was collected.

Column G – This column shows the effect of including the "assigned" stumpage values with the rest of the stumpage data to calculate the average stumpage value by species/product group.

Species/ Product Group	**A**	**B**	**C**	**D**	**E***	**F**	**G**
CEDSAW	$ 17.72	$ 17.89	$ 20.29	$ 20.07	$ 16.93	$ 19.54	$ 16.93
HWDPW	$ 9.30	$ 9.38	$ 9.54	$ 9.97	$ 10.13	$ 7.89	$ 10.10
HWDSL	$ 22.87	$ 28.02	$ 21.34	$ 21.34	$ 22.42	$ 6.59	$ 20.47
OSRWB	$ 4.81	$ 5.45	*No data*	*No data*	$ 5.21	*No data*	$ 5.21
OSSL	$ 10.96	$ 11.95	$ 8.23	$ 8.23	$ 10.61	*No data*	$ 10.61
PISL	$ 15.09	$ 15.84	$ 15.41	$ 15.62	$ 16.77	$ 6.69	$ 16.76
SPFRWB	$ 4.81	$ 4.93	$ 4.42	$ 4.54	$ 4.51	$ 4.11	$ 4.51
SPFSL	$ 17.00	$ 17.08	$ 18.40	$ 18.55	$ 19.06	$ 14.53	$ 19.04
SPFST	$ 15.80	$ 15.97	$ 17.06	$ 17.04	$ 16.77	$ 13.49	$ 16.75
SPFTL	$ 12.73	$ 12.80	*No data*	*No data*	$ 13.77	*No data*	$ 13.77

* - These are the values chosen by the Commission to represent the provincial "Fair Market Value".

APPENDIX D

DELIVERED AND STUMPAGE VALUES BY MONTH

Mean Delivered Value ($/m3) compared to Mean Stumpage Value ($/m3) by Month (Delivered value on top, stumpage value on bottom for each month).

MO.	CEDSAW	HWDPW	HWDSL	OSRWB	OSSL	PISL	SPFRWB	SPFSL	SPFST	SPFTL
OCT	70.79	46.88	73.73	28.96	47.45	61.35	38.44	55.72	53.88	49.21
	13.60	8.66	25.54	7.24	12.38	17.08	5.12	17.03	16.07	13.63
NOV	84.31	49.77	81.29	25.02	47.66	59.54	38.61	57.51	55.36	52.13
	16.95	10.57	30.08	1.85	11.06	15.22	4.91	18.01	15.75	13.04
DEC	72.57	51.32	73.28	28.29	40.32	60.14	38.82	58.10	55.71	53.22
	18.43	10.42	19.22	5.78	16.31	15.84	5.45	17.09	15.90	14.20
JAN	69.83	49.31	66.43	25.02	45.69	54.72	42.93	61.26	57.16	53.90
	19.56	9.66	16.74	6.61	12.16	14.46	5.05	17.92	16.84	15.41
FEB	71.61	50.63	74.95	27.53	55.27	56.61	42.70	62.54	57.38	55.72
	19.10	8.76	20.42	6.97	8.70	13.96	4.54	18.93	17.01	14.82
MAR	75.93	51.54	65.69	25.02	55.04	60.49	39.15	58.75	56.06	53.37
	16.20	10.37	13.25	3.70	16.39	15.12	4.10	17.23	15.16	13.27
APR	81.46	47.94	84.83	25.02	52.79		38.43	54.97	55.09	51.19
	15.84	10.49	21.07	3.70	13.92		4.87	14.94	13.29	8.91
MAY	88.48	45.94	77.60			60.14	34.60	52.57	48.86	48.35
	13.73	10.82	20.93			22.82	4.10	14.34	14.42	11.50
JUN	57.17	48.24	47.01		57.52	56.45	36.27	52.24	49.92	43.63
	15.28	10.03	14.05		9.33	15.06	4.68	14.28	13.66	11.66
JUL	81.83	48.29	58.78		53.03	60.22	36.89	56.20	53.94	46.41
	15.94	9.15	18.93		10.27	8.95	4.61	15.91	14.90	11.45
AUG	80.83	47.43	59.70	19.95	58.69	59.49	38.27	54.17	53.03	45.81
	19.00	8.39	17.96	2.26	9.21	12.31	4.50	15.77	15.68	10.06
SEP	78.31	46.93	78.22			59.28	40.96	55.40	52.71	46.27
	17.47	8.63	21.16			15.84	4.77	15.63	14.89	12.49