Preparing Market Adjusted Based Base Period Prices for Forest Service Timber Sales

And using them in a 2400-17 appraisal form to compute an Advertised Rate

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Part 1 Introduction

The objective of Forest Service appraisals is to determine fair market value. There can be situations when the current Transaction Evidence Appraisal system (TEA) does not provide Base Period Prices that reflect a fair market value starting point for appraisals (see Appendix 3). When those situations occur, then an alternative approach is needed.

The purpose of this handbook is to explain one alternative approach. It explains the data and recommended methods to prepare quarterly market adjusted Base Period Prices (ABPPs) for National Forest timber and explain how to use those ABPPs in preparing U.S. Forest Service Timber appraisals.

This market based (MB) approach follows current quarterly end product prices and uses them to produce an estimate of market adjusted BPP for stumpage for the most recent quarter. The market adjustment factor is the ratio of the most recent quarter's end product price divided by the sale volume weighted average of the end product prices during the base period. The end product prices are prices for products that are made from the stumpage. For sawtimber and some nonsawtimber this includes lumber prices and for some nonsawtimber it includes a price index for wood pulp.

The details of the initial development of the market-based approach for estimating BPP including our initial equation estimates and various test results are described in FPL-GTR-242[1]. There we presented the arguments for the species/product groupings for appraisal groups, observations about BPPs as an estimate of fair market value, and the choice of major appraisal zones. Since the publication of the GTR we have altered our major appraisal zones in the west to follow FS regional boundaries except for the traditional Eastside/Westside division in R6. We have also simplified the computation and no longer use separate steps to compute an initial base period price using a markup equation and a market correction factor to give a final base period price.

The approach considers markets for stumpage in 6 species and products groups – 2 species groups (hardwood and softwood) and 3 stumpage products (sawtimber, nonsawtimber, fuelwood) - although the number varies by appraisal zone. For example, there are no hardwood species groups in the western appraisal zones. In practice the species for the fuelwood product is not distinguished leading to just five products.

[1] Haynes, Richard W.; Skog, Kenneth E., Aubuchon, Richard. 2016. A process to establish and use base period prices for National forest System transaction evidence timber appraisal. General Technical Report FPL-GTR-242. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 43 p. https://www.fs.usda.gov/treesearch/pubs/54605

We envision that the market-based approach can be used with the basic framework and steps used in the current transactions evidence appraisal (TEA) system with several differences.

1. The process recognizes major appraisal zones (z1) and, within these zones, local appraisal zones with selected national forests (z2). The national forests in each major appraisal zone are shown in the Appendix 1.
2. The first step is computation of a volume weighted average of stumpage sales values for a recent base period of 4 or more quarters - a base period price (BPP) - for each of potentially 5 appraisal groups. The sales included in the averages are from a local appraisal zone z2.
3. The second step is computation of a market correction factor F (a ratio) to update each BPP value from the base period to an adjusted base period price (ABPP) for the most recent quarter q. The adjustment is determined by the change in end product price (e.g. lumber) from a base period average to the value in the most recent quarter available. The change to BPP is made by multiplying BPP by the ratio of most recent quarter end product price divided by the base period average end product price. Note: the end product price series (e.g. a particular lumber price series) used to update BPP values are the same for all local appraisal zones (z2) within a given large appraisal zone (z1).
4. The third step is to multiply each appraisal group's BPP by its market correction factor F to give adjusted base period prices (ABPP).
5. We advocate starting an appraisal with a volume weighted average of ABPP values across all appraisal groups where the weights are determined by the volume of each product group in the sale. This would be followed by applying volume weighted cost adjustments. Taking this approach emphasizes the need to consider how costs are apportioned between sawtimber and nonsawtimber products. If Indicated Advertised Rates are needed for each or selected appraisal group, then weighted average of ABPPs and weighted average costs would not be used.
6. We streamlined the various quality adjustments, unusual adjustments, market adjustments and competition adjustments.
7. Like many current appraisal processes, we prepare a current market adjustment to the BPP. This adjustment tailors the BPP to market conditions in the most recent quarter.
8. We recognize the need for unusual adjustments to allow for unique circumstances associated with a sale.
9. For a given sale, cost adjustments will be applied to the adjusted BPP to provide a Predicted Bid Rate. There is uncertainty in the Predicted Bid Rate because our BPP includes the effect of estimated (uncertain) average base period costs and costs adjustments that are uncertain for each new sale. We propose to manage the risk of overestimating Predicted Bid Rate by applying a roll-back factor to estimate the Indicated Advertised Rate. Guidance for establishing this roll-back factor will be discussed in a later section.

The MB approach like the TEA approach requires identification of mill locations (appraisal points) that are available for processing timber from a sale into finished products. Current

manual direction requires an appraisal point (to estimate haul costs) "where the manufacturing facility is capable of processing the end product that is being appraised". The market-based approach for both hardwood and softwood sawtimber explicitly relies on prices for finished and often grade stamped lumber products. These product prices are mostly composite prices that average prices for products of various grades and species commonly marketed together.

The implication of this for MB sale appraisals is that sawtimber is assumed to be utilized for finished lumber or other graded products like piles or telephone poles. In sales where potential purchasers are small mills that cut rough full sawn lumber (often for local markets or to be shipped elsewhere for remanufacture), we suggest the appraiser use either the nonsawtimber ABPP or make an "unusual adjustment" if they want to use the sawtimber ABPP. Without some type of adjustment, both TEA and MB systems will likely over-appraise these sales of relatively low value timber.

The TOOLs

Figure 1 indicates the data inputs, and calculation TOOLS used to estimate BPP, market correction factors and ABPP for each appraisal group. The following is a brief overview of each tool.

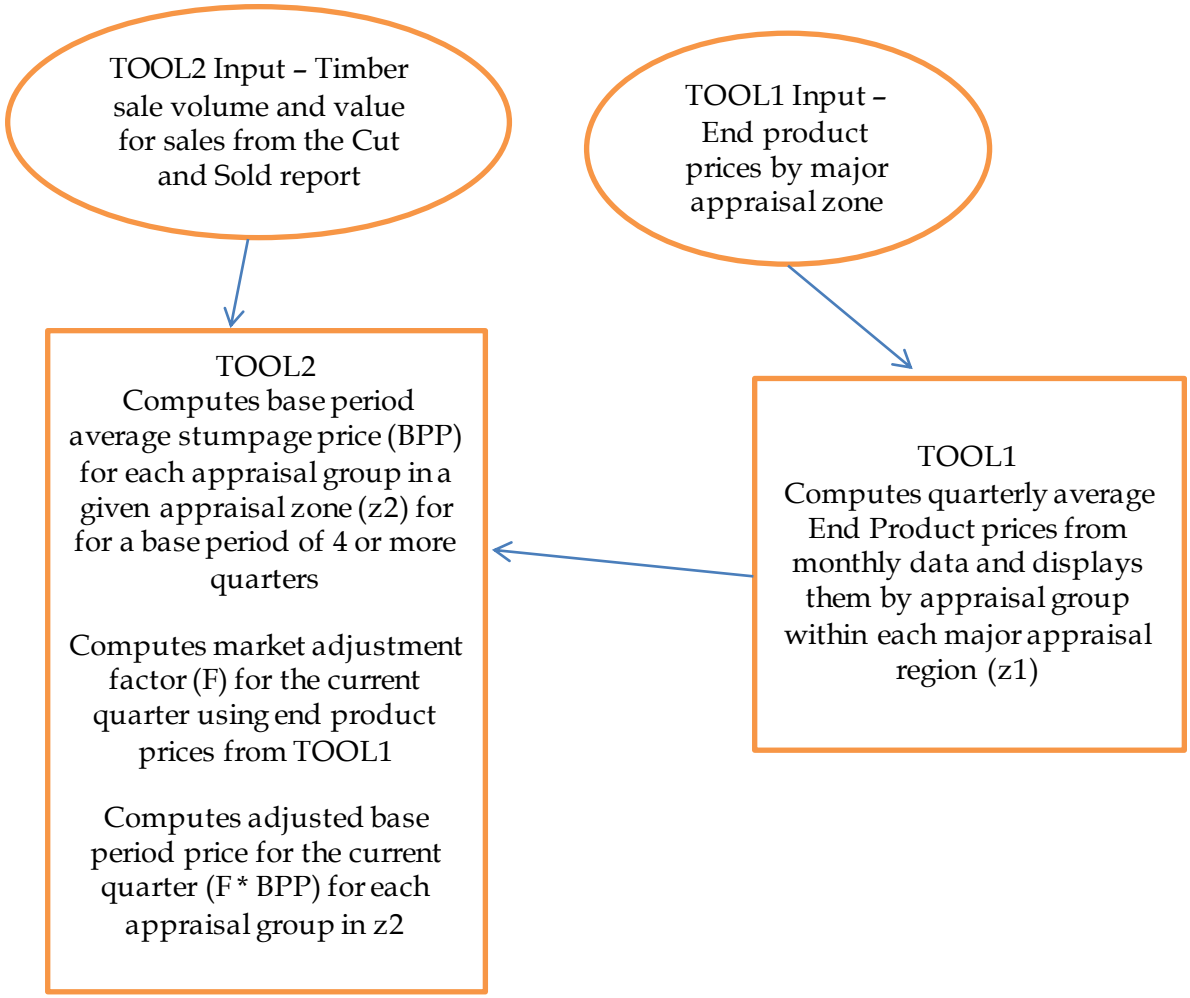
TOOL1 summarizes price data for timber end products from market reports (softwood lumber, hardwood lumber, and wood pulp) for recent past quarters in the base period, and up to the most recent quarter available. These end product prices are used in TOOL2 to compute market correction factors (F) for BPPs for any collection of forests (z2) within a major appraisal zone z1[2].

TOOL2 computes the market correction factor F for each appraisal group in an appraisal zone z2, for a given current quarter, q, and base period using data from TOOL1. TOOL2 also uses data on individual timber sales volume and value (specially downloaded from the Forest Service Cut and Sold database) for each national forest in z2 to summarize sale volume and value by 5 appraisal groups (or stumpage products) - softwood and hardwood sawtimber, softwood and hardwood nonsawtimber, and fuelwood for each of 4 or more past quarters. The volume and value data are used to compute base period prices (BPP) for appraisal zone z2. The end product price data from TOOL1 and volume data from TOOL2 are used to compute the market adjustment factors, F. Adjusted BPP (ABPP), for each appraisal group, is computed as the product of BPP and F.

Sheet names in the Excel TOOL1 and TOOL2 workbooks are shown in *italics* below.

[2] Softwood lumber, low value hardwood lumber and wood pulp prices are averages for the three months in each quarter where the month's prices are the observed price for the first weekly reported price each month. High value (grade) hardwood lumber prices are a species weighted average where the quarter's price is the price observed for the first Friday of a quarter.

Figure 1. Process model for TOOL1 and TOOL2



Part 2 TOOL1 - Updating End Product Market Prices

The process of updating end product market prices starts with entering monthly data in the sheet "*Market Prices by Month SFT HWD*" for six composite softwood lumber prices from Random Lengths, one producer price index from the US Bureau of Labor Statistics database, and nineteen species prices from the Hardwood Market Report. For each data series you need to scroll down the columns referenced watching for the correct date (always shown to the left).

1. Update Market Pulp price index Column N
    a. Data source: Producer Price Index Series WPU09110501 https://alfred.stlouisfed.org/series?seid=WPU09110501. Current data can be obtained by rolling the cursor over the first bar graph in the PPI index report: Producer Price Index by Commodity for Pulp, Paper, and Allied Products: Wood Pulp (WPU09110501). The Red bars are preliminary estimates and the blue bars are revised estimates. Use the latest red bar but check to see if recent months have been revised.
    b. Historical Data to date can be downloaded by clicking DOWNLOAD.
    c. The Market pulp index is entered in column N and the monthly price is calculated in column P.
2. Update Softwood and Hardwood Monthly Prices
    a. Starting in column D, update six composite softwood lumber prices, for each month enter the price for the first week with a Thursday from Random Lengths Weekly Report – Table titled Lumber Composite Price Comparisons. Column J is computed from entered data.
    b. Starting in column S, update nineteen 4/4 1C lumber species prices, for the first Friday of each month from the Hardwood Market Report. There are three different hardwood price series as shown in Table 1.

Table 1. List of species from the Hardwood Market Report used in each of the hardwood lumber market prices

High Value, #1C 4/4 Appalachian Hardwoods	Low Value, North Northern Hardwoods	Low Value, South Southern Hardwoods
Ash	N. Aspen #1C 4/4	S. Sap Gum #1C 4/4
Basswood	N. Aspen #2A 4/4	Appalachian Yellow Poplar #1C 4/4
Beech	Cants-Green	S. Pallet Cants-Green
Birch		S. Board-Road-Green
Cherry		
Hickory		
Hard Maple-#1&2		
Soft Maple-SAP&BTR		
Red Oak		
White Oak		
Poplar		
Walnut		

The volume weighted #1C price (Column AE) is computed using weights[3] from the *"Assumptions_Est_Coefficients"* worksheet. The averages (Columns AK for the North and AQ for the South) for low value hardwoods are averages of selected species data. The hardwood lumber prices are repeated for convenience next to the softwood lumber prices in columns K, L, and M,

After price data are entered, several steps are completed automatically to produce a table which contains end product prices (averaged by quarter) and allocated to each major appraisal zone (z1) and appraisal group (softwood and hardwood, sawtimber and non sawtimber). This final table is in the sheet "*MKT prices by Zone and Quarter*". For the first step the end product prices are averaged by quarter in sheet "*MKT Prices by Quarter SFT HWD*". For the second step the quarterly prices are allocated to each appraisal group in each major appraisal zone in sheet "*MKT Prices by Zone and Quarter*". Table 2 shows how the end product prices are assigned to appraisal groups for each region (z1). It also shows the source of price data for each end product.

[3] These weights represent the historic relative production of species reported in the Hardwood Market Report and were developed Bill Leopold at the Northern Research Station.

Table 2. Crosswalk from data sources and end product prices, to appraisal zones and appraisal Groups

Data Source	Product Price series	Appraisal Zones	Appraisal Group(s)
Hardwood Market Report	Appalachian Hardwoods	R9, R8	Hardwood sawtimber
	Northern Low value Hardwoods	R9	Low value Hardwood sawtimber
	Southern Low value Hardwoods	R8	Low value Hardwood sawtimber
Random Lengths (RL) Composites Quarterly data	Coast (average of coast dry and Green DF)	R6 Westside	Softwood sawtimber & Softwood nonsawtimber
	Inland	R1, R5, R6 Eastside	Softwood sawtimber & Softwood nonsawtimber
	SP (Southern Pine)	Southeast (R8), Midsouth (R8) & Mark Twain National Forest	Softwood sawtimber
	West SPF	R2, R3, R4	Softwood sawtimber & Softwood nonsawtimber
	East SPF	Lake States (R9), NE (R9)	Softwood sawtimber
US BLS Producer Price Index for wood pulp		Southeast (R8), Midsouth (R8) & Mark Twain National Forest, Lake States (R9), NE (R9)	Softwood nonsawtimber and Hardwood nonsawtimber

Part 3 TOOL2 - Computing Base Period Price, Market Adjustment factor and Adjusted Base Period Price

The method described here is simplified from an original method that began by preparing markup equations to predict an initial base period price for an appraisal group in a current quarter for a large appraisal zone z1. The simplified method is equivalent to the original method but does not require estimation and use of markup equations (see Appendix 2).

The simplified method begins with estimation of the Base Period Price (BPP), for a given appraisal group g, in a local appraisal zone (z2) as the volume weighted average of high bids for sales in the local zone over a base period of several recent quarters (Equation 1). We use a base period of 4 quarters, but it could be longer. The appraisal zone z2 could include all the national forests in large appraisal zone z1 or a subset of national forests or districts within z1.

$$BPP(z2,g,b) = \sum_{i=1}^{n} VAL(z2,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i) \qquad (1)$$

VAL(z2,g,i) is the total high bid value (from the Cut and Sold database) for stumpage in quarter i, for an appraisal group g, in appraisal zone z2

VOL(z2,g,i) is the total volume of timber sold in quarter i, appraisal group g, in appraisal zone z2.

b is the base period with n quarters

i is the index for quarters in the base period

A market adjustment factor (F) is computed to adjust the BPP from market conditions during the base period (the end product prices during the base period) to the market conditions during the most recent quarter being used (the end product price in the most recent quarter) (Equation 2). The denominator of Equation 2 gives the volume weighted average end product price where the volume weights – by quarter - are the appraisal group volumes sold in each quarter of the base period. The numerator is the end product price for the most recent quarter available for the current appraisal.

$$F(z2,g,b,q) = \frac{PP(z1,g,q)}{\sum_{i=1}^{n} VOL(z2,g,i) * PP(z1,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)} \qquad (2)$$

PP(z1,g,q or i) is the end product price (from product price reports), for appraisal group g in appraisal zone z1, in quarter q or i.

q is the most recent quarter for which PP values are available

n is the number of quarters in the base period b

i is the index for quarters in the base period

The base period price (BPP) is adjusted to market conditions during the most recent quarter q by multiplying by correction factor F (Equation 3).

$$ABPP(z2,g,b,q) = F(z2,g,b,q) * BPP(z2,g,b) \quad (3)$$

Choosing Appraisal zone z2 and Base period b

The appraisal zone for a sale (z2) may be a major appraisal zone (z1) or it may be a sub zone within z1. The sub zones should not include parts of 2 more major appraisal zones. The sub zones may be combinations of national forests or combinations of national forest districts. If they are combinations of districts, then data from the Cut and Sold database needs to be obtained on volume and value of sales by district for each quarter in the base period. This data is needed to compute base period volumes and values used in Equations 1 and 2.

The quarters in base period b should match the quarters used to compute average base period costs that are used to make cost adjustments for the appraisal.

The choice of appraisal zone z2 and base period b determines the base period sales that will be used to compute Base Period Price (equation 1). If the number of sales is small, a single sale with significant volume and either quite high or low costs, or quite high or low competition can skew the average high bid and over represent cost conditions relative to a longer-term average of cost conditions. The number of high bids used to compute BPP (from the cut and sold database) should be known. If the number of sales is low **(about 8-10)** then we recommend enlarging the appraisal zone (z2) and/or expanding the number or quarters in the base period. The larger number of sales is needed if sale high bids were quite variable. The smaller number of sales is needed if sale high bids are less variable.

Tool 2 Overview

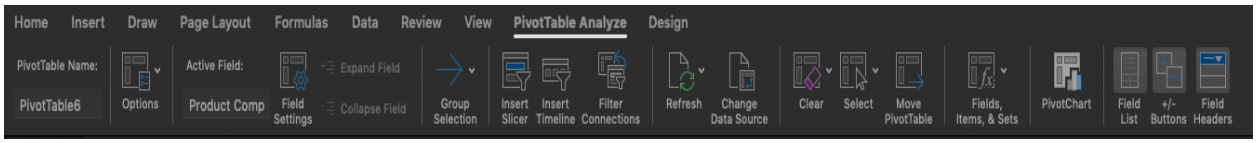
Tool2 computes base period price - BPP(z2,g,b), market adjustment factor - F(z2,g,b), and adjusted base period price for a recent quarter q – ABPP(z2,g,b,q), for each appraisal group g in appraisal zone z2 for a given base period b. It also computes the BPP for fuelwood.

Base Period Price - BPP(z2,g,b)

Computation of BPP requires data on base period sales from the Forest Service Cut and Sold database. Lines of data are needed on the volume and value of timber sold for each appraisal group g in the appraisal zone z2 for each quarter in the base period b. We used data from a recent 4 quarter period from the Cut and Sold database. A pivot table is used to summarize volume and value from individual sales by appraisal group and quarter. (Step 11 below)

If the appraisal zone z2 is a sub zone of z1 composed of national forests or districts, a filter is needed with the pivot table to select specific national forests or districts to be included. To have

a filter box appear (where forests or districts can be selected) click on any shaded header in the pivot table to show PivotTable Tools Analyze (above the spreadsheet), then click on Insert Slicer. Select Forest_name, or District_name to create the box with forests or districts to select. Select the forests or districts to be included in the appraisal sub zone.



Market Adjustment Factor - F(z2,g,b,q)

The end product prices – PP – for the numerator and denominator of Equation 2 are obtained from TOOL1 sheet "MKT Prices by Zone and Quarter". The denominator of F is the volume weighted average of end product prices during the base period. Note: There is no market adjustment factor for fuelwood. The fuelwood BPP is used as the starting point for an appraisal instead of an adjusted BPP.

An Example TOOL2 Excel Workbook

We show steps to compute BPP, F and ABPP for appraisal groups in a subzone of national forests in Forest Service Region 4 for a 4-quarter base period FY18.2-FY19.1 and a most recent quarter – FY19.4. The z2 includes the following national forests: Ashley, Bridger-Teton, Caribou/Targhee, Dixie, Fishlake, Manti-Lasal, and Uinta-Wasatch-Cache.

Following are steps to construct TOOL2 in an Excel workbook. See the Excel workbook **TOOL2 Example for R4**.

Step 1- Determine the large appraisal zone z1 and the quarters in the base period (typically 4). For our example z1 is Forest Service Region 4 and the base period is FY18.2-FY19.1 Note that we include all sales data for all of zone z1 (R4) not just for the subzone forests. This allows for optional modification of the forests in zone z2. Also determine the current quarter for the market adjusted BPP. We choose FY19.4.

Step 2 – Collect data on timber sales from the Cut and Sold database that includes all sales during the base period quarters for the appraisal zone z1 and place in one or more Excel sheets of a new Excel workbook or add sheets to the TOOL2 example Excel workbook. See tabs *FY2018* and *FY2019Q1*. Data variables are shown in Table 3.

Table 3. Timber sales data from the Cut and Sold database

Variable	Type (numbers are likely to be in text form)	Example values
REPORT_FY	Number	2018
REPORT_QUARTER	Number	1, 2, 3, 4
REGION_CODE	Number	1, 2, 3, 4, 5, 6, 8, 9, 10
REGION_NAME	Text	Intermountain Region
FOREST_CODE	Number	1, 2, 3, …
FOREST_NAME	Text	Sawtooth National Forest
DISTRICT_CODE	Number	1, 2, 3, …
DISTRICT_NAME	Text	Fairfield Ranger District
SALE_NUMBER	Number	17551
SALE_NAME	Text	Mis Libby
CONVERTIBLE_NONCONVERTIBLE	Text	C
CONTRACT_SPECIES_CODE	text or number	A, 108, 180, AS, AF
CONTRACT_SPECIES_DESCRIPTION	Text	Douglas-fir, Lodgepole Pine
PRODUCT	Number	1, 3, 6, 7, 8 …
PRODUCT_DESCRIPTION	Text	Sawtimber, Non-Saw, Posts …
STEWARDSHIP_INDICATOR	text	Y, N
CONTRACT_FORM_TYPE	text and number	6T, 6, 2, 3, 4T, …
SOLD_VOLUME_CCF	number	1132.5
SOLD_VALUE	number	1206.66
BID_METHOD_DESCRIPTION	Text	Sealed Bid, Oral Auction …

Step 3 – In our example sheets FY*2018* and *FY2019Q1* have a filter in row 1 and that filter is used in column C to screen out all regions except R4 (if needed). In column P the filter screens out stewardship sales (code=Y). When data is available indicating Good Neighbor Authority sales they would be screened out also. In column T the filter is used to screen out all types of sales except Sealed Bid and Oral Auction. We combine the data from sheets *FY2018* and *FY2019*Q1 in sheet *1- Base period sales*. In sheet *1- Base period sales* we need to convert the sale volume and value variables in columns R and S from text to numbers. Highlight a column to adjust. From the Excel top command line, Select Data > Text to Columns, then follow the steps. This conversion is needed to allow later Pivot table calculations.

Step 4- The Excel workbook **TOOL2 Example for R4** has a sheet *Added Variables* which, in a future step will be added to sheet *1- Base Period Sales*. For any new spreadsheet for another appraisal zone and base period add the *Added Variables* sheet "as is" to the new spreadsheet (to retain formulas, column positions, and proper cell references).

Step 5- In sheet *Added Variables,* in columns AB and AC is a table that shows how Product_Description in the sales data set will be converted to a new variable – Product Component. Check to see if changes are needed where Product Descriptions are classified as nonsawtimber.

Step 6- Copy, from TOOL1, the sheet *MKT Prices by Zone and Quarter* to a sheet of the same name in TOOL2. We will use these end product prices (PP) to compute market adjustment factors F.

Step 7- Copy columns U to AH in sheet *Added Variables* to columns U to AH in sheet *1- Base period sales.* Afterword, in sheet *1- Base Period Sales* there should not be #N/A in columns U to AD for rows that have sales data. **NOTE** – sheet *1- Base period sales* in the example Excel worksheet *is* set to allow 2000 rows of sales data. If there are more rows, change the formulas in column AH to row values more than 2001 and extend the formulas in columns U, X, AA, AD and AH beyond 2001 rows. Note – A unique sale number is created in column U. It is a combination of the sale_number in col I, the forest_code in col E, and the Region_code in col C.

Step 8- In sheet *1- Base Period Sales* select columns A to U. Create a pivot table using those columns and place it in a new sheet by selecting Excel top line commands – Insert > Pivot table. In our example this pivot table is in *2- Pivot- Total Value by Sale*.

Step 9- In sheet *2- Pivot- Total Value by Sale*, in the section PivotTable Fields, drag the variable Unique Sale number to the Row box. Drag the variable Sold Value to the Values box. The table created to the left will have a left column with a Unique Sale number for each sale and a right column with the total sale value for each sale in the data set. There is zero value for some sales. The Values box should show Sum of Sold_Value. If not, click on small "*i"* symbol immediately to the right and select "sum".

Step 10- From sheet *2- Pivot- Total Value by Sale* copy the values in columns A and B (not the header or "blank" line, Grand total line, or the first line with a zero sale ID) to sheet *1- Base period Sales* columns AE and AF (under the headers). Column AG shows a value 1 if the total value for a sale in column AE is greater than or equal to $2000. Columns AE and AG serve as a look up table to indicate in column AH if the data row is part of a sale with total value greater than or equal to $2000 (value=1). Create a filter in the first row of sheet *1- Base period sales* and screen column AH to only keep rows with values of 1 (sales value is greater than or equal to $2000). Copy Columns A to AH from sheet *1- Base period Sales* and paste in a new sheet as Values and Source Formatting. Our new sheet is *3- Base Period Sales as Values*.

Step 11- In sheet *3- Base Period sales as Values* select columns A to AH. Create a pivot table using those columns – from the Excel top command line select Insert > PivotTable. Place the pivot table in a new tab. Our new sheet is *4- Pivot- Vol & Val by Prod_Qtr*. In the new sheet, in the section PivotTable Fields, drag the variables shown in Table 4 to the Columns, Rows and Values Boxes.

Table 4. Pivot table variables to produce total sale value and volume by appraisal group, and fiscal year quarter

Columns	Species Code Index Match Product Component
Rows	APP_ZONE REPORT_FY REPORT_QUARTER
Values	SOLD_VOLUME_CCF SOLD_VALUE

The Values box should show Sum of Sold_Volume_CCF and Sum of Sold_Value. If not, click on small "*i"* symbol immediately to the right and select "sum".

Step 12- Remove unneeded values from the pivot table by 1) In cell B3 select the Column labels filter and deselect #N/A and blank, 2) In cell A6 select the Row labels filter and deselect #N/A and blank 3) When the PivotTable Fields are showing, select the excel top line command Design > Subtotals > Don't show subtotals, and select Design > Grand Totals > Off for rows and columns.

Step 13- When the PivotTable Fields are showing, insert a "Slicer" to select sales data from only selected national forest by selecting the excel top line command PivotTable Analyze > Insert Slicer > Forest_Name. In the Slicer box select the multi-select icon next to Forest_Name. Then select the national forests in zone z2 - Ashley, Bridger-Teton, Caribou/Targhee, Dixie, Fishlake, Manti-Lasal and Uinta-Wasatch-Cache. The pivot table now computes total volume and value by quarter for those forests.

Step 14- In sheet *4- Pivot- Vol & Val by Prod_Qtr* prepare a table of end product market prices for softwood sawtimber and softwood nonsawtimber by quarter for R4 by linking to values in sheet *MKT Prices by Zone and Quarter*. See the table in *4- Pivot- Vol & Val by Prod_Qtr*. Title of the table is "R4 End Mkt Prices from Tool2 sheet *"MKT Prices by zone and* Quarter". Note: This table format in Example TOOL2 (cells E22:G33) could be copied and pasted to the new sheet as starting point. Links to end product market prices would need to be made manually in each cell of the table.

Step 15- In sheet *4- Pivot- Vol & Val by Prod_Qtr* prepare a table which computes, for each appraisal group, 1) BPP for FY18.2-FY19.1, 2) Volume weighted end product prices for FY18.2-FY19.1, 3) Market correction factor F for quarter FY19.4, 4) the market adjusted BPP for FY19.4. and 5) the volume weighted average fuelwood price using data from the pivot table. For softwood non sawtimber and sawtimber, the BPPs are **$5.13** and **28.47 per CCF,** respectively. The **market adjustment factors for FY19.4** are **0.65** and **0.86**, respectively. Even though the end use product prices used to adjust sawtimber and nonsawtimber are the same in

each past quarter, the adjustment factors differ because the quarterly sale volume weights on end product prices differ between sawtimber and nonsawtimber. The adjusted BPPs are **3.32** and **24.44 per CCF**. The fuelwood BPP is **$9.92. These three stumpage prices would be the starting point for a timber appraisal in FY20.1 for forests in zone 2 of R4.**

Note: The table format in the Example TOOL2 for BPP, F and ABPP (cells K10:O18) could be copied and pasted as starting point. Links to actual stumpage volumes, values and predicted prices would need to be made manually in cells of the table. The table would need to be expanded when hardwood stumpage values are included.

Step 16- Copy sheet *4- Pivot- Vol & Val by Prod_Qtr* to a new sheet. In our example see *5-Pivot Sale Cnt by prod and Qtr*. In the new sheet we compute the number of sales used to compute the sawtimber, nonsawtimber, and fuelwood BPPS. Click on the blue header to make the PivotTable Fields appear. Remove the entries in the Values box (sum of sold value, sum of sold volume). Drag Region_Name to the values box (this is an arbitrary choice to produce a count of data lines in the pivot table for each quarter/product). Drag the variable Unique sale number to the bottom of the Rows box. The pivot table will now contain counts of number of data lines (could be several per sale) used to compute the fuelwood, nonsawtimber and sawtimber values in the pivot table in sheet *4- Pivot- Vol & Val by Prod_Qtr*. To calculate the count of sales rather than count of data rows enter the count( ) function at the bottom of each product column in the pivot table (fuelwood, nonsawtimber, sawtimber). In the count function include the range of cells above that cover the quarters in the base period. In the example spreadsheet the count of sales are **10, 6, and 18** for fuelwood, nonsawtimber, and sawtimber, respectively. These counts are above the suggested minimums (8-10) for fuelwood and sawtimber and somewhat below for nonsawtimber.

Part 4 Roll-back factors

This section provides recommendations on roll-back factor that are somewhat more specific when using the Market Based Base Period Price than are provided in FS Handbook 2409.18 chapter 40.

One purpose of a roll-back factor is to allow for variation in the possible competition for a sale with lower competition possibly resulting in lower high bid than the historic average predicted high bid. Another purpose is to avoid no bid by recognizing that there is uncertainty in appraisal prediction of high bid and uncertainty in markets and competition.

A guideline associated with attaining these goals is to have the average weighted advertised rate for sales over a 4-quarter period (in an appraisal zone) fall in a range of 70% to 85% of the average weighted high bid for those sales. FS Handbook 2409.18 chapter 40 states “An objective of TEA is to establish advertised rates where the the ratio of advertised rates to bid rates will be within the 70 to 85 percent range in competitive areas. The performance range may exceed 85 percent in non-competitive areas. This ratio is based on the previous 4 calendar

quarters and measured on a weighted volume basis (FSM 2422.1). If the advertised rates exceed 85 percent of bid rates in competitive areas, there is an increased tendency for Forests to receive no-bid sales. When a Forest's average advertised rates are less than 70 percent of bid rates, the appraisal is doing a poor job of estimating fair market value.

Applying the roll-back factor

If the predicted bid rate (the predicted high bid) is accurate and we apply a fixed roll-back percent to the predicted high bid, then we are increasing the likely bid premium by a fixed percent of predicted high bid for each sale. If, as an alternative, we apply a fixed percent roll-back to the Base Period Price or adjusted Base Period Price (before cost adjustments) then the predicted bid premium will vary as a percent of predicted high bid. With roll-back as a percent of BPP then the dollar value of roll-back could be a large percent reduction in predicted bid if costs are high resulting in much more room for low bidding. Conversely, if costs are low (additions to BPP) then the percent reduction in predicted bid will be low, with greater likelihood of no bid. We recommend applying the roll-back to predicted bid rate to result in a fixed percent predicted bid premium rather than applying it to BPP which can result in a varying percent of predicted bid premium.

Roll-back if a sale is in a competitive area

FS Handbook 2409.18 chapter 40 gives an example of what may be considered a competitive area - "For example, define a competitive market area or appraisal zone as an appraisal zone where sales data show that bid premiums are greater than 5 percent of the advertised rate and 60 percent of the volume receives at least a 5 percent bid premium." We recommend this or a similar definition to determine if a sale is in a competitive area.

For sales in a competitive area - If we assume the estimate of our BPP and correction with cost adjustments results in an unbiased estimate of predicted bid (is accurate on average over many sales) then we could apply a roll-back between 15% and 30% to meet the guideline to have average advertised rate be 70% to 85% of average high bid over 4 quarters. To avoid the risk of falling below the 70% target it seems prudent to limit roll-back to 25%. We recommend a default roll-back of 15% of the predicted bid rate. This recommendation assumes there is no or little volume in appraisal groups over the 4-quarter period that were deficit and were appraised at base rates. When sales have appraisal groups that were deficit are assigned base rates are included in computing the average advertised rate over a 4 quarter period and compared average high bid for the 4 quarters we assume it is possible and acceptable for the average advertised rate to exceed the 85% of the average high bid if roll-back were set at 15%.

Adjustments to the default 15% percent roll-back - There are several potential issues that would **not** warrant a change in roll-back.

- Quality of timber differs notably from base period average – use a quality correction to the BPP
- Operational conditions differ notably from base period average – modify stump to truck cost.
- Market prices for end products have increased or decreased up to the prior quarter – the Market BPP takes into account region-wide changes in end product prices up through the prior quarter.
- Anticipated change in end use markets over the contract period – use escalation procedure to change initial accepted high bid prices after the contract is awarded.

A roll-back of more than 15% may be warranted if we have information suggesting our predicted rate will be biased high – for example if the sale is in a part of the local appraisal zone (z2) where mills/users make products of lower value from logs for a particular appraisal group than the local zone-wide (z2) average, or if cost adjustments for the appraisal are deviations from z1 average costs (versus zone 2 average costs) and the average costs for local zone z2 are higher than for z1 then, after costs adjustments the predicted rate would be biased high. Conversely, if we have information suggesting our predicted bid rate is biased low, we could select a roll-back of 10%.

Roll-back if a sale is in a non-competitive area

As stated in in FS Handbook 2409.18 chapter 40 – "In noncompetitive markets, a roll-back factor of from 0 to 5 percent should be used to arrive at the indicated advertised rate.

Part 5 Preparing a 2400-17 using Adjusted Base Period Prices, Cost Adjustments and a Roll-Back Factor

The pilot studies have used a spread sheet shown in Figure 2 that mimics the 2400-17 form. It has four parts. Values in the table are usually volume weighted averages (across both species and product groups) for costs and prices. Sometimes there are volume weighted averages separately for sawtimber, nonsawtimber and fuelwood for softwoods and hardwoods depending on how different regions consider product groups. The form has been applied in Regions that have a history of selling mixed product sales (sawtimber, pulpwood, posts and poles, and commercial fuelwood) and others that sell sawtimber and all else sales. In the former case there are sometimes differences between our form and current practice in the apportionment of costs across product groups (sawtimber, nonsawtimber fuelwood), while in the later the nonsawtimber/ and or biomass products removal and use may be treated as an additional cost center for sawtimber instead of an appraisal group (see item 2 g below).

Appraisal begins with estimates of a base period price for each of 5 appraisal groups – softwood and hardwood for each of sawtimber, nonsawtimber and fuelwood (hardwood and softwood combined).

1. Establish an Adjusted Base Period Price for each appraisal group

A Base Period Price (BPP) is calculated for sawtimber and nonsawtimber (softwood and hardwood) and fuelwood for a local appraisal zone z2 for a recent base period using TOOL2. These prices would be placed in the red colored cells P - R, row 6 in Figure 2.

The BPP for each appraisal group is adjusted for recent market conditions (factor F) as computed in TOOL2 for the most recent quarter. The factors are entered in the red cells O – Q, row 10. The resulting market adjusted based prices (ABPP) are averaged across all appraisal groups and placed in cell J9.

For TEA appraisals, a volume weighted base period price is also calculated using base period prices for all appraisal groups (placed in cell I9). Our BPP and the TEA BPP should be the same if they are based on the same set of screened sales in the same base period. The TEA approach may apply a market (or zone) adjustment in cell I10. The TEA adjusted base period price is in cell I11.

The market adjusted BPP for TEA is in cell I11 and for the MB approach, it is in cell J9.

2. Establish Sale Cost Adjustments as differences from Average Base Period Costs (column I, rows 13 to 35)

a) Stump to Truck
b) Haul Costs
c) Road Maintenance
d) Environmental (sometimes called contractual)
e) Temporary Development Costs
f) Specified Road Costs (for Region 5 only)
g) [If nonsawtimber and/or biomass are always deficit for an area they should be set up as a cost center]

In preparing the per ccf costs for multiproduct sales it is important to include costs to harvest all required trees. The appropriate costs are the total costs for all trees not just the sawtimber proportion. Even if small and cull trees will be treated as yarded unmerchantable material (YUM) their costs still need to be included. In computing cost per ccf all trees should be included in the total volume and all tree removal costs should be included in the total costs.

In preparing costs there may be different processing locations for different products/ volumes in the sale. For example, sawtimber might be appraised to a sawmill location cutting dimension lumber while nonsawtimber or fuelwood could be appraised to the location of a fuelwood or local post and pole producer. In this case haul costs per ccf would be volume weighted average haul cost to the two appraisal points.

3. Establish any unusual cost adjustment (cell I37)

An unusual cost adjustment should rarely be used. It may be a quality adjustment to reflect exceptionally high- or low-quality material. Only some products may have an adjustment. Specified road costs are treated as an unusual cost adjustment except for Region 5 where they are treated as a cost center.

4. Establish the Predicted Bid Rate = Adjusted BPP +/- Sale costs adjustments. +/- Unusual adjustment

Costs adjustments are differences in sale specific costs from base period average costs. If nonsawtimber or fuelwood are always deficit appraisal groups they should be treated as cost centers.

The Predicted Bid Rate for the TEA and MB appraisals are shown in cells I41 and J41, respectively.

5. Compute Indicated Advertised Rate

If the sale is in a competitive zone, there is open competition for the sale (e.g. sealed bid, oral auction) and the appraisal is above base rate then we suggest a 15% roll-back applied to the predicted bid rate with option to increase if there is exceptionally high uncertainty in cost factors or decrease if there is exceptionally low uncertainty in cost factors. If a sale is offered for bid in a non competitive zone a 0-5% rollback is appropriate. If the sale is not open to competition (e.g. direct, negotiated) then there would be no roll-back is appropriate as indicated in FS Handbook 2409.18 chapter 40.

Indicated Advertised Rates for TEA and MB appraisals are in cells I48 and J48, respectively.

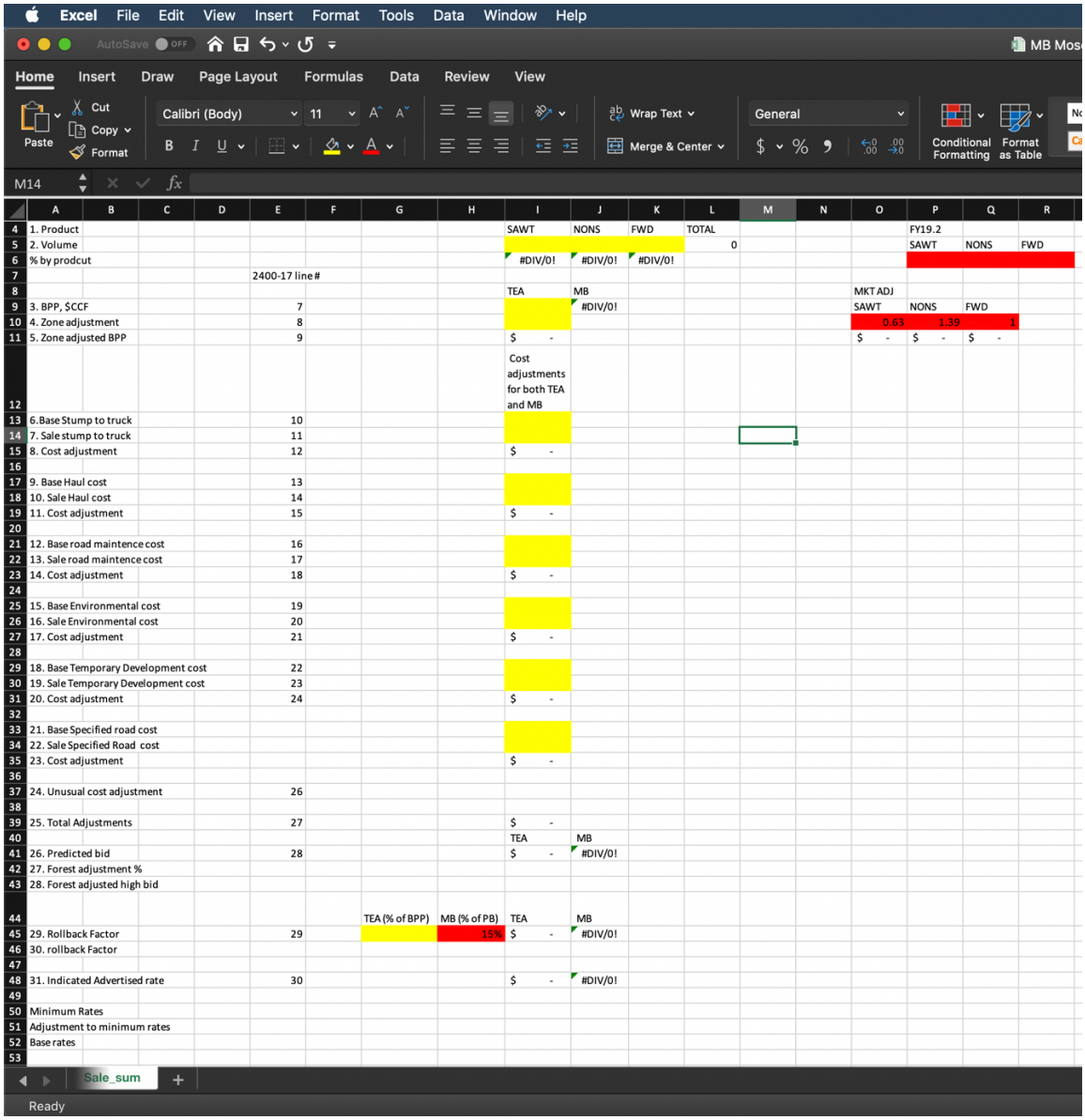

Excel File Edit View Insert Format Tools Data Window Help
Home Insert Draw Page Layout Formulas Data Review View
Paste Cut Copy Format
Calibri (Body) 11
Wrap Text
Merge & Center
General
Conditional Formatting
Format as Table
M14
1. Product
2. Volume
% by prodcut
2400-17 line #
3. BPP, $CCF
4. Zone adjustment
5. Zone adjusted BPP
Cost adjustments for both TEA and MB
6.Base Stump to truck
7. Sale stump to truck
8. Cost adjustment
9. Base Haul cost
10. Sale Haul cost
11. Cost adjustment
12. Base road maintence cost
13. Sale road maintence cost
14. Cost adjustment
15. Base Environmental cost
16. Sale Environmental cost
17. Cost adjustment
18. Base Temporary Development cost
19. Sale Temporary Development cost
20. Cost adjustment
21. Base Specified road cost
22. Sale Specified Road cost
23. Cost adjustment
24. Unusual cost adjustment
25. Total Adjustments
26. Predicted bid
27. Forest adjustment %
28. Forest adjusted high bid
29. Rollback Factor
30. rollback Factor
31. Indicated Advertised rate
Minimum Rates
Adjustment to minimum rates
Base rates
SAWT NONS FWD TOTAL
FY19.2
TEA MB
MKT ADJ
TEA (% of BPP) MB (% of PB)
15%
Sale_sum
Ready

Figure 2

Appendix 1 Major Appraisal zones, Regions, and National Forests (as shown in the FY18 Cut & Sold Reports)

(Some National Forests may be shown twice to match different spellings etc.)		
APPRAISAL ZONE (z1)	REGION	FOREST_NAMES
0	10	Chugach National Forest
0	10	Tongass National Forest
1	1	Beaverhead/Deerlodge National Forest
1	1	Bitterroot National Forest
1	1	Idaho Panhandle National Forest
1	1	Clearwater National Forest
1	1	Custer National Forest
1	1	Flathead National Forest
1	1	Gallatin National Forest
1	1	Custer Gallatin National Forest
1	1	Helena National Forest
1	1	Kootenai National Forest
1	1	Lewis And Clark National Forest
1	1	Lolo National Forest
1	1	Nez Perce National Forest
1	1	Nez Perce - Clearwater National Forest
1	1	Nez Perce-Clearwater National Forest
2	2	Bighorn National Forest
2	2	Black Hills National Forest
2	2	GrandMesa/Uncompahgre/Gunnison National Forest
2	2	Medicine Bow-Routt National Forest
2	2	Nebraska National Forest
2	2	Rio Grande National Forest
2	2	Arapaho/Roosevelt National Forest
2	2	Pike-San Isabel National Forest
2	2	San Juan National Forest
2	2	Shoshone National Forest
2	2	White River National Forest
3	3	Apache/Sitgreaves National Forest
3	3	Carson National Forest
3	3	Cibola National Forest
3	3	Coconino National Forest
3	3	Coronado National Forest
3	3	Gila National Forest
3	3	Kaibab National Forest
3	3	Lincoln National Forest
3	3	Prescott National Forest

3	3	Santa Fe National Forest
3	3	Tonto National Forest
4	4	Ashley National Forest
4	4	Boise National Forest
4	4	Bridger-Teton National Forest
4	4	Dixie National Forest
4	4	Fishlake National Forest
4	4	Manti-Lasal National Forest
4	4	Payette National Forest
4	4	Salmon-Challis National Forest
4	4	Sawtooth National Forest
4	4	Caribou/Targhee National Forest
4	4	Uinta-Wasatch-Cache National Forest
5	5	Angeles National Forest
5	5	Humboldt & Toiy National Forest
5	5	Cleveland National Forest
5	5	Eldorado National Forest
5	5	Inyo National Forest
5	5	Klamath National Forest
5	5	Lassen National Forest
5	5	Los Padres National Forest
5	5	Mendocino National Forest
5	5	Modoc National Forest
5	5	Six Rivers National Forest
5	5	Plumas National Forest
5	5	San Bernardino National Forest
5	5	Sequoia National Forest
5	5	Shasta-Trinity National Forest
5	5	Sierra National Forest
5	5	Stanislaus National Forest
5	5	Tahoe National Forest
5	5	Lake Tahoe Basin National Forest
6	6	Gifford Pinchot National Forest
6	6	Mt. Baker/Snoqualmie National Forest
6	6	Mt. Hood National Forest
6	6	Olympic National Forest
6	6	Rogue River-Siskiyou National Forest
6	6	Siuslaw National Forest
6	6	Umpqua National Forest
6	6	Willamette National Forest
7	6	Deschutes National Forest
7	6	Fremont-Winema National Forest
7	6	Malheur National Forest

7	6	Ochoco National Forest
7	6	Umatilla National Forest
7	6	Wallowa-Whitman National Forest
7	6	Okanogan-Wenatchee National Forest
7	6	Colville National Forest
8	8	NFS In Alabama National Forest
8	8	Daniel Boone National Forest
8	8	Chattahoochee/Oconee National Forest
8	8	Cherokee National Forest
8	8	NFS In Florida National Forest
8	8	Kisatchie National Forest
8	8	NFS In Mississippi National Forest
8	8	NF Mississippi National Forest
8	8	George Washington & Jefferson National Forest
8	8	NFS in N. Carolina National Forest
8	8	NF N. Carolina National Forest
8	8	Francis Marion National Forest
8	8	Francis Marion-Sumter National Forest
8	8	Land Between The Lakes National Forest
9	8	Ozark St. Francis National Forest
9	8	NFS In Texas National Forest
9	8	Ouachita National Forest
9	9	Mark Twain National Forest
10	9	Chippewa National Forest
10	9	Huron Manistee National Forest
10	9	Ottawa National Forest
10	9	Superior National Forest
10	9	Hiawatha National Forest
10	9	Chequamegon/Nicolet National Forest
11	9	Shawnee National Forest
11	9	Hoosier National Forest
11	9	Wayne National Forest
11	9	Allegheny National Forest
11	9	Monongahela National Forest
11	9	Green Mountain National Forest
11	9	White Mountain National Forest
22	6	Columbia River Gorge National Scenic Area National Forest

Appendix 2 – Estimation of Market Based Base Period Price by the Original Method and the Simplified method

The Original Method

The original method for estimating a market based base period price for Forest Service timber appraisals was described in the Forest Service General Technical Report FPL-GTR-242[4]. This Appendix explains how the simplified method is derived from, and is equivalent to, the original method

The original method estimated an initial base period price for an appraisal group g, in a major appraisal zone z1, using a price markup equation. Each markup equation was estimated using a regression of quarterly average stumpage prices on end product prices such as lumber (Equation 1). The regressions used 20 quarters of data. Stumpage prices were from the Forest Service Cut and Sold database and end product prices were from Random Lengths, The Hardwood Market Report and the US Bureau of Labor Statistics.

$$HB(z1,g,q)= C(z1,g)*PP(z1,g,q) + e(z1,g,q) \quad (1)$$

HB(z1,g,q) is the average high bid (from the Cut and Sold database) for stumpage in an appraisal group g, in an appraisal zone z1, in a given quarter q ,

PP(z1,g,q) is the end product price (from product price reports), for appraisal group g in appraisal zone z1, in quarter q.

C(z1,g) is a regression coefficient determined using 20 quarters of data for HB and PP.

The markup equation is used to predict an initial base period price for the most recent quarter for which end product prices are available (Equation 2). The initial base period prices (IBPP) are for a particular appraisal group g, in a major appraisal group z1 (such as a Forest Service Region), for the most recent quarter q.

$$IBPP(z1,g,q) = C(z1,g)*PP(z1,g,q) \quad (2)$$

IBPP(z1,g,q) is a predicted initial base period price (predicted high bid) for appraisal group g, in appraisal zone z1, and current quarter q.

[4] Haynes, Richard W.; Skog, Kenneth E., Aubuchon, Richard. 2016. A process to establish and use base period prices for National forest System transaction evidence timber appraisal. General Technical Report FPL-GTR-242. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 43 p. https://www.fs.usda.gov/treesearch/pubs/54605

This IBPP is for all forests within the major appraisal zone z1. The IBPP estimate is based on the average influence of the end product market, as represented by the end product price (PP) and coefficient C. It also contains the influence of harvest and delivery costs for sales over a 20 quarter period.

For a subzone of national forests (z2) within z1, the recent effect of sales costs and end product markets may differ from the average over 20 quarters. So we prepare a factor F1 to adjust the IBPP for recent differences in costs and market influence for the subzone in comparison to the major appraisal zone z1 and 20 quarter time period.

The market adjustment factor F1 is the ratio of 1) actual volume weighted average high bids for sales in a recent base period (e.g 4 quarters) in subzone z2 divided by 2) volume weighted average predicted high bids from markup equations for zone z1 over the same quarters (Equation 3).

$$F1(z2,g,b) = \frac{\sum_{i=1}^{n} VAL(z2,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)}{\sum_{i=1}^{n} VOL(z2,g,i) * C(z1,g) * PP(z1,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)} \qquad (3)$$

F1(z2,g,b) = Volume weighted average high bids for sales in the base period /Volume weighted average equation predicted high bids during the base period.

VAL(z2,g,i) is the total high bid value (from the Cut and Sold database) for stumpage sold in quarter i, for an appraisal group g, in appraisal zone z2

VOL(z2,g,i) is the total volume of timber sold in quarter i, appraisal group g, in appraisal zone z2.

z2 is either the same as zone z1 or a sub zone within z1.

b = the quarters in base period b, q= 1 to n.

The market adjusted BPP (ABPP) for the stumpage in appraisal group g (softwood or hardwood sawtimber or nonsawtimber) , current quarter q, appraisal zone z2, and using base period b is given by

ABPP(z2,g,b,q) = F1(z2,g,b) * IBPP(z1,g,q) (4)

The Simplified Method

The simplified method eliminates the step to prepare markup equations to estimate the initial base period price (IBPP).

Here is how the simplified method is derived from the original method. The objective is to estimate ABPP(z2,g,q) in a simpler way.

Substitute the full formula for F1(z2, g, b) from Equation 3 into Equation 4.

$$ABPP(z2,g,b,q) = \frac{\sum_{i=1}^{n} VAL(z2,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)}{\sum_{i=1}^{n} VOL(z2,g,i) * C(z1,g) * PP(z1,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)} * IBPP(z1,g,q) \qquad (5)$$

Substitute the full formula for IBPP(z1,g,q) from Equation 2 into Equation 5.

$$ABPP(z2,g,q) = \frac{\sum_{i=1}^{n} VAL(z2,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)}{\sum_{i=1}^{n} VOL(z2,g,i) * C(z1,g) * PP(z1,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)} * \mathrm{C(z1,g)} * \mathrm{PP(z1,g,q)} \qquad (6)$$

In Equation 6, cancel markup equation coefficients C in numerator and denominator, move the variable PP from the right to the numerator of the ratio and move the current numerator of the ratio to the right were the variable PP had been.

$$ABPP(z2,g,q) = \frac{\mathrm{PP(z1,g,q)}}{\sum_{i=1}^{n} VOL(z2,g,i) * PP(z1,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)} * \sum_{i=1}^{n} VAL(z2,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i) \qquad (7)$$

In Equation 7 note that the term on the right is the calculation of the base period price for appraisal group g, in zone 2, for base period b. Calculating this base period price (BPP) is the first step in the simplified method described in Part 3.

$$BPP(z2,g,b) = \sum_{i=1}^{n} VAL(z2,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i) \qquad (8, \text{Eqn 1 in Part 3})$$

In Equation 7 the term to the left is the market adjustment factor (F) and the second calculation step in the simplified method.

$$F(z2,g,b,q) = \frac{PP(z1,g,q)}{\sum_{i=1}^{n} VOL(z2,g,i) * PP(z1,g,i) \Big/ \sum_{i=1}^{n} VOL(z2,g,i)} \qquad (9, E\text{qn 2 in Part 3})$$

For the simplified method we have

ABPP(z2,g,b,q) = F(z2,g,b,q) * BPP(z2,g,b) (10, Eqn 3 in Part 3))

Appendix 3 – Conditions and Indications that Transaction Evidence (TEA) Produced Base Period Prices May Be Questionable

Conditions

Any or a combination of items listed below may result in a data base that produces Base Period Prices (BPPs) not reflecting fair market value. In those instances where TEA BPPs do not reflect fair market value, the Market-Based Approach should be considered.

- Limited number of commercial sales in the data base
    - Small sales program or a period of time where few sales are offered
    - In some appraisal zones, the increase in Stewardship and Good Neighbor sales has reduced the number of commercial timber sales to a level below that which would give a reliable estimate of fair market value.
- Questionable applicability of sales in the data base
    - Lack of competition
        - Particularly in combination with TEA's application of a roll-back (competition) factor in setting the advertised rate -- Base Period Prices can substantially decline below fair market value over time; even when primary product prices are increasing.
    - Data base includes outlier sales (bid prices extremely high or low compared to normal expected prices) which skew Base Period Prices
        - Particularly in situations where the size of the sale has an excessive influence on the volume weighted average high bid --- e.g. small number of sales and the outlier is a large sale compared to the others
- Outdated appraisal zones
    - The unit appraising sales is in an appraisal zone that no longer accurately reflects that unit's conditions (ground conditions, harvesting systems, sale costs, products offered, timber quality, etc.)
- Transaction Evidence results are not tracking the market
    - For example – Base Period Prices are increasing while the market is in a decline.
- Sales using Standard Rates do not reflect fair market value
    - Standard Rates are outdated
    - Standard Rates are being applied incorrectly
        - Automatically used when a full appraisal is more appropriate – sale too complex to justify Standard Rates
- Data Base contains appraised deficit sales
    - Sales appraised as deficit and sold may indicate under-estimation of fair market value
    - Sales appraised as deficit and sold may indicate a market area where purchasers are compelled to buy at prices above fair market value because of supply/demand issues. If extensive enough, then over time Base Period Prices could reflect over-valuation.

Indications

Sale results may indicate that Base Period Prices do not reflect fair market value

- Notable fraction of the sales in the data base are sold at or close to advertised rates --- advertised rates compared to high bid rates on a volume weighted basis are consistently greater than an 85% ratio (TEA ratio)
    - May indicate over-estimation of value.
    - See FSM 2422.1
- Notable fraction of the sales in the data base have excessive bid premiums --- TEA ratio consistently falls below 70%.
    - May indicate under-estimation of value
    - See FSM 2422.1
- High number of no-bids
    - May indicate over-estimation of value
        - Canvass purchasers
        - Consider sale conditions – did the appraisal accurately reflect them
- Erratic sale results
    - Winning bids for apparently similar sales quite varied
        - May indicate appraisals do not account for sale conditions in all cases, thus not estimating fair market value correctly
        - May indicate that market conditions at time of sale are not being properly reflected
        - Sales described in the bullet statements above may be skewing Base Period Price estimates
    - Possibility of collusion among bidders
        - Consistent set of bidders with a predictable pattern of bidding