



CRUISE PROCESSING USER'S GUIDE

Washington Office
Forest Management Service Center
Fort Collins, Colorado

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Introduction

The *CruiseProcessing* program has undergone some enhancements and changes in the past four years. It still provides accurate volume calculations and necessary reports for a timber sale. This documentation provides the user with guidance in working with the program and producing the required reports. Some special symbols were used in this documentation to draw attention to important points or tips.



This symbol represents an idea, tip or hint to aid the user through a screen or process. These items are not necessary to successfully complete a given process but will make it faster or easier.



This symbol represents a note and offers additional clarification or definition. Not reading the note is not harmful.



This symbol represents a potential problem or serious issue.

Who to call



Questions, comments, problems, or just want to talk? Here are two people who would like to hear from you:

Ken Cormier, Group Leader, Measurements Group
Phone: 970-295-5779
email: kcormier@fs.fed.us

Barbara E. Menzel, Programmer/Analyst, Measurements Group
Phone: 970-295-5775
email: bmenzel@fs.fed.us

GETTING STARTED

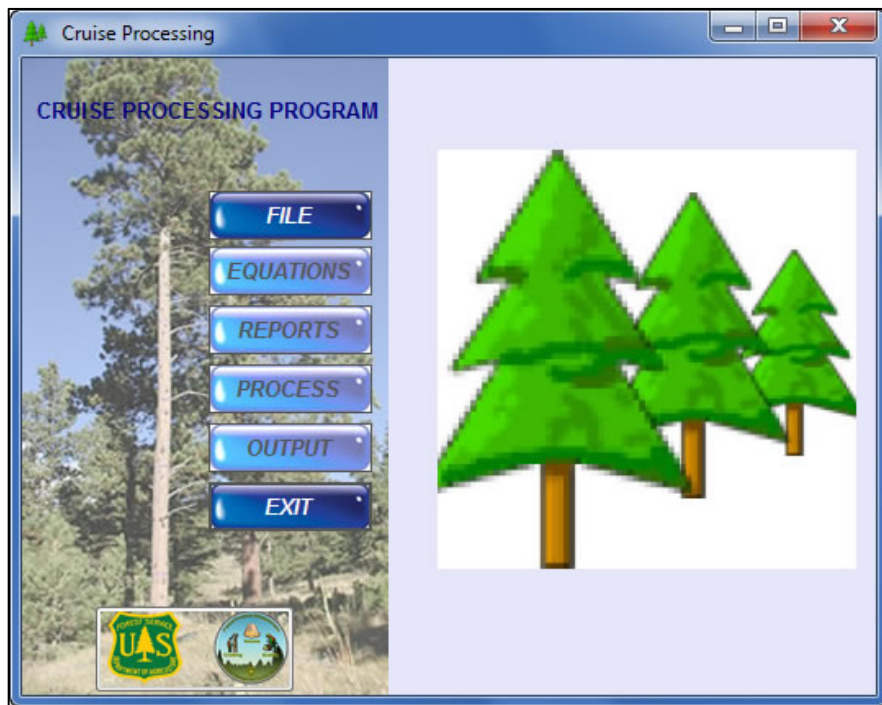
A formal installation program is available for *CruiseProcessing*. Simply download the file from the website and place on the desktop. Double click to start the installation process. No special permissions are required for this installation. Everything is installed in a folder called C:\ProgramFiles\FMSC. For users outside the Forest Service, the installation program allows the directory to be changed. Like other installation programs just follow the prompts and the program is effortlessly installed.



NOTE: All window examples in this user's guide were generated in Windows 7.

MAIN WINDOW

The Main Window in *CruiseProcessing* consists of six buttons. Each button represents a task or function to be accomplished. The **About** button is in the lower left corner with the shields. When a main button is clicked, additional buttons are displayed on the right portion of the window. Initially, most of the buttons are disabled until a file is opened.



FILE – Allows the user to open existing files for processing.

EQUATIONS – Enter equations for volume or value as well as select the type of volume to calculate along with choosing to calculate biomass.

REPORTS – Select from nearly 150 basic and regional reports using pulldown lists.

PROCESS – Performs edit checks of the data, prepares data for processing, and calculates all requested volumes, values and/or weights/biomass.

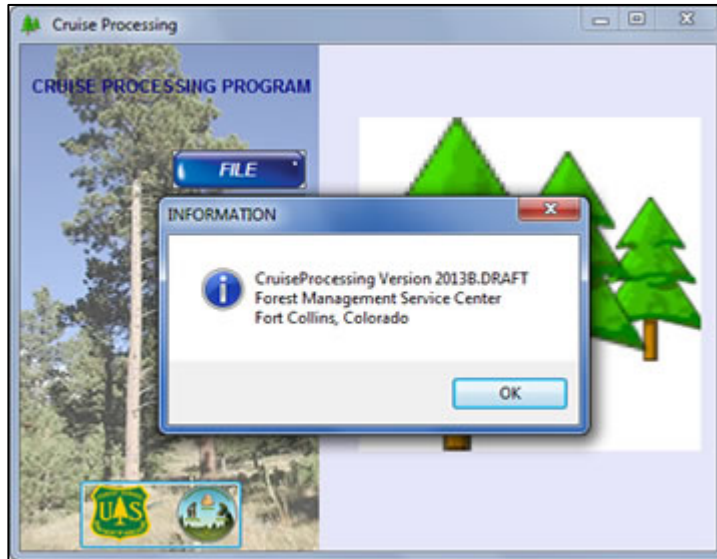
OUTPUT – Six additional buttons are displayed when the Output button is clicked. The text output file is created in this menu as well as optional HTML and PDF files. CSV files can also be created and Print Preview is accessed through this menu. Add Local Volume is also accessed in this menu.

EXIT – Closes the program.



Once a file has been opened for processing, the filename appears in the title bar of the window at the top. It may be shortened due to space limitations at the top but the main portion of the filename is displayed.

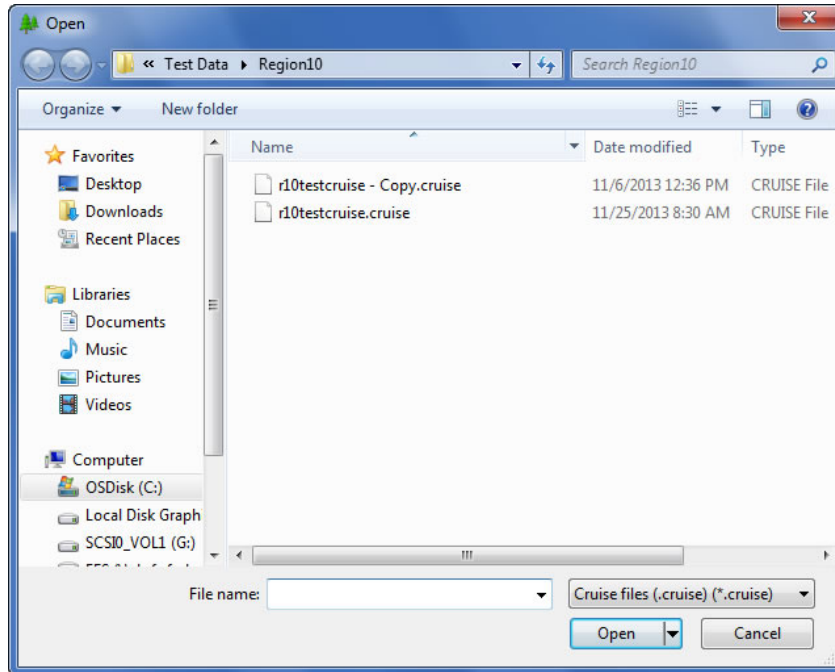
Clicking the **About** button in the lower left corner displays general information about the program.





FILE SELECTION

When the **FILE** button on the **Main Menu** is clicked, the standard file **Open** window is displayed. All files in the current directory with an extension of **.cruise** are displayed. The user may navigate away from the current directory using the directory structure on the left. Alternatively, to open a file in the current directory, click on the filename and then click the **Open** button at lower right. (*NOTE: This example was run under Windows 7 so a Windows XP window would look slightly different.*)



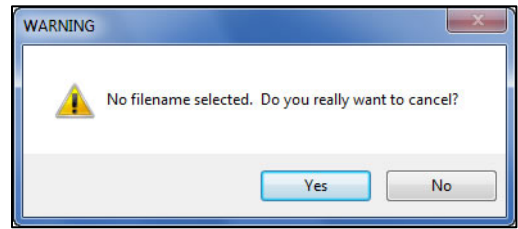
Select An Existing File

An existing cruise object could come from one of two sources. It could have been created in *FScruiser/CruiseManager*. Alternatively, it could have been created as a production cruise in the *CruiseDesign* program. Either program can use a template file (**.cut**) to create the cruise file.

Any equation may already exist in a template file. If not, equations may need to be added to the file. See the ***Equation Selection*** section below for details on adding equations.

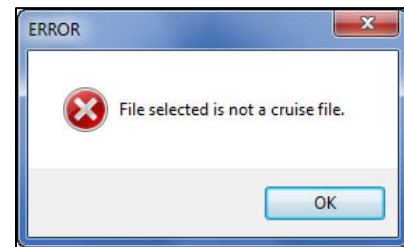
Additionally, reports may have been recorded in the template file. If not, reports need to be added or modified. See the section on ***Reports*** below for details on modifying the reports list.

Once the file is opened, the browse window closes automatically. The **Cancel** button is used to exit the window if opened by mistake or if no filename can be found. If Cancel is clicked before a filename is selected, no other button on the Main Menu is enabled. The warning message at right is displayed when the Cancel button is clicked.



Potential Errors

This version of CruiseProcessing seems to have fewer errors when opening a file. In the future, potential errors could arise which would expand this section. However, as of this version, only the error shown at right could happen when trying to open a file.



Click the **OK** button to close the window and either **Exit** the program or try opening another file.


Update – Occasionally, an error is displayed indicating errors were found that must be corrected in *CruiseManager* or *FScruiser*. Close *CruiseProcessing* and open the file in either of those programs to determine and correct the error.

Editing a Template File (.CUT)

Regional template files can now be edited in *CruiseProcessing*. Editing is restricted to volume equations and reports. All other functions are disabled.

With a few exceptions, volume equations can be edited or added for any region. Exceptions include Regions 8 and 9, Region 6 and BLM. For Region 6, template files for each individual forest may be edited.

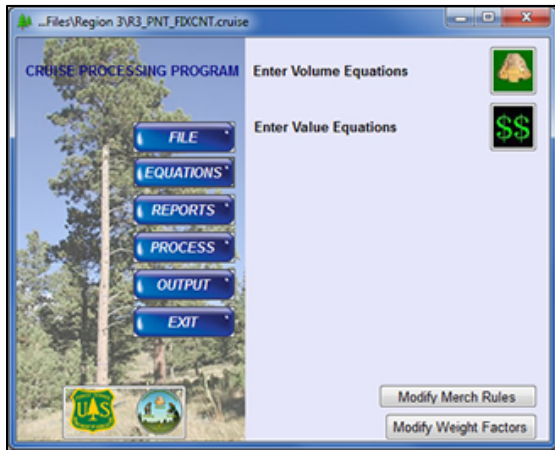
When the browse window is opened, template files are not shown in the list in the lower right corner. Simply open the list and select **All files** to be displayed. Then select the template file to edit. Recall template files have an extension of **.CUT** instead of the regular cruise extension. Once the file is open, the Main Menu only shows Equations and Reports buttons as active. Edits and additions are done in the same manner as for a regular cruise file.

 ***It is important to make a backup copy of the template file to be edited. Alternatively, the user can save the updates with a different filename. If this is not done, the original template file will be overwritten. If this is not desired, MAKE A BACKUP OF THE ORIGINAL TEMPLATE FILE.***



EQUATION SELECTION

When the **EQUATIONS** button is clicked, the following window is displayed. On the right side of the window, two buttons are now available. In general, this example shows buttons for entering volume equations and value equations. There are two additional buttons in the lower right corner. One allows modification of weight factors and the second allows modification of merchandizing rules. More on these two buttons is provided below.

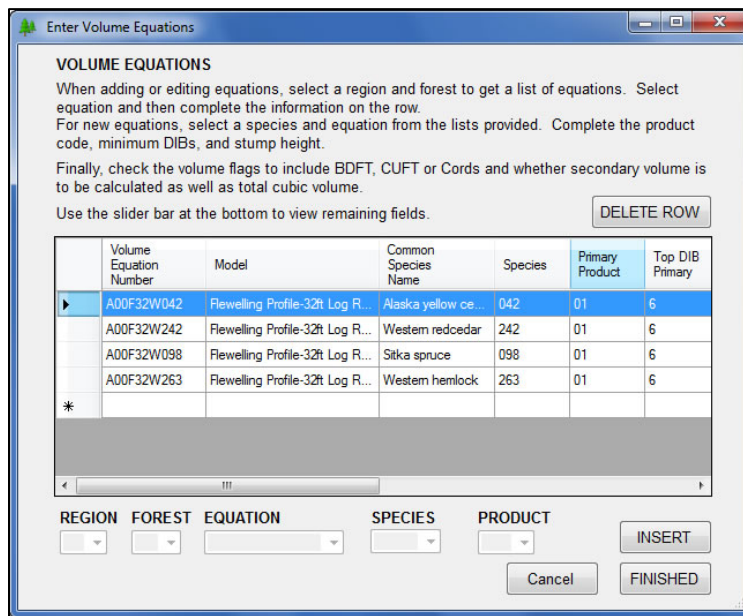


If the cruise is from **Region 8** or **Region 9**, a different configuration of buttons is displayed. Volume equation entry for those regions is described below.

First, let's take a look at how other regions enter volume equations.

Entering Volume Equations and Requesting Biomass

If the cruise file is an FScruiser file created using a template, the Volume Equation window would appear as follows:



In some instances, the *Volume Equation Number*, *Model Name* and *Common Species Name* could be blank and only a list of Species codes and Primary Product code is shown. In that situation, the equation information needs to be added. First, let's finish the steps to complete these equation numbers.

Completing Existing Equation Numbers

Let's make the window a little bigger by clicking the lower right corner with the mouse and resizing the window to look like this.

VOLUME EQUATIONS

When adding or editing equations, select a region and forest to get a list of equations. Select equation and then complete the information on the row.
For new equations, select a species and equation from the lists provided. Complete the product code, minimum DIBs, and stump height.
Finally, check the volume flags to include BDFT, CUFT or Cords and whether secondary volume is to be calculated as well as total cubic volume.
Use the slider bar at the bottom to view remaining fields.

DELETE ROW

Volume Equation Number	Model	Common Species Name	Species	Primary Product	Top DIB Primary	Top DIB Secondary	Stump Height	Calc Total Cubic	Calc BDFT Primary	Calc CUFT Primary	Calc Cords	Calc Topwood	Calc Biomass
A00F32W042	Rewelling Profile-32R Log R...	Alaska yellow ce...	042	01	6	0	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A00F32W242	Rewelling Profile-32R Log R...	Western redcedar	242	01	6	0	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A00F32W098	Rewelling Profile-32R Log R...	Sitka spruce	098	01	6	6	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
A00F32W263	Rewelling Profile-32R Log R...	Western hemlock	263	01	6	6	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
*								<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REGION: FOREST: EQUATION: SPECIES: PRODUCT:

Cancel FINISHED INSERT

1. **Top DIB Primary and Top DIB Secondary** – If no values are entered in these fields, simply click the box and type in the desired value for each field.
2. **Stump Height** – Enter the desired stump height in this box.
3. **Volume check boxes** – These boxes are checked for the desired volume type for each equation listed. Clicking the box either checks or unchecks it depending on the current state.
4. **Calc Biomass** – It may be apparent by now, there is no weight equation window any more. Mainstem and topwood weight are calculated in the National Biomass Equation Library (NBEL) so there really are no equation numbers for weight any more. **Appendix H** details the components returned from NBEL when this box is checked.

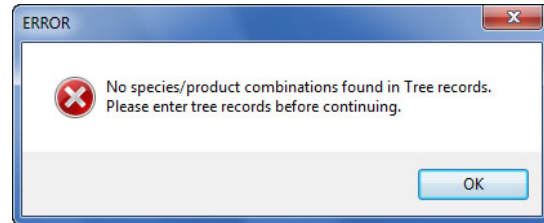
So what happens if a new equation number is needed for a species? The steps below show how a new equation is entered.

1. Click on the very first column to highlight a new row at the bottom of the list.
2. At the bottom of the window, the Region, Forest, Equation, Species and Product boxes are enabled.
3. Use the pulldown list to select the **REGION**.
4. Then select the **FOREST** from the next pulldown list.
5. Select the appropriate equation number from the next list.
6. Then select the **SPECIES** code and associated **PRODUCT** code.
7. Click the **INSERT** button at far right to add the equation to the list.

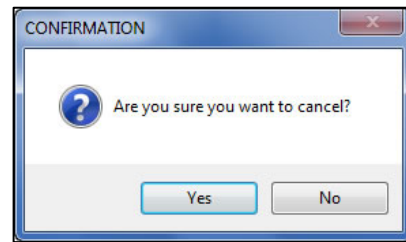
- As above, enter the top DIB primary and secondary fields, the stump height and click the check box(es) for the desired volume and/or biomass to be calculated.

Now, what about the other buttons in the window?

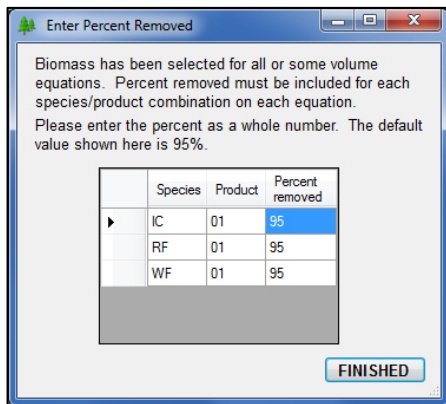
The species and product codes in files with no equations entered are pulled from the tree records. Sometimes, a new cruise file already contains volume equations for some species but not for others. There is no need to select volume equations for all species listed if you are certain those species are not going to be collected in this cruise. Simply highlight the desired row and click the **DELETE ROW** button to remove that species and/or volume equation. If no tree records were collected and the Volume Equation window is opened, an error message is given and no equation information may be recorded.



The **CANCEL** button can be used to close the window without saving any changes or additions. A warning message is displayed to confirm the cancel action. Simply click **YES** or **NO** to dismiss the window. Be aware clicking **YES** is **not** going to save any changes made. Clicking **NO** causes the equation window to remain open.



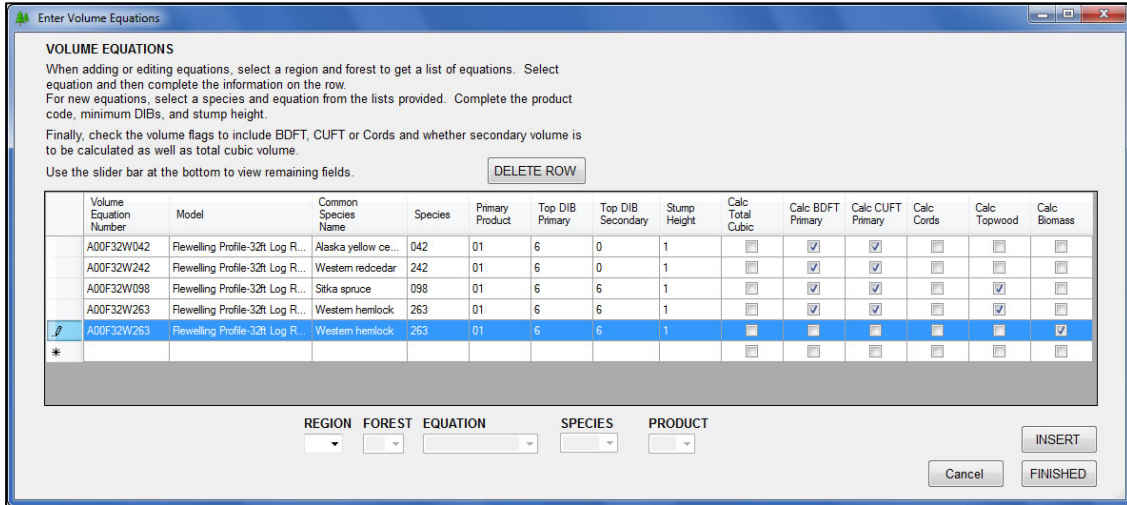
When everything is correctly updated or added, click the **FINISHED** button to close the window and save everything.



If biomass was requested, the **Percent Removed** must be entered for each species/product combination. A small window is displayed for entry of percent removed. A grid is shown with each species/product combination and the default percent removed of 95%. Type in a different percent removed as needed. Click the **FINISHED** button to save the data and close the window.

NOTE: *The Flewelling Profile Model now returns stump and tip volume. In order to get this volume, the Total Cubic flag must be checked when Flewelling equations are used.*


One difference in this method of entering equations is now the grid at the bottom with all the equation numbers can be edited. For example, if the stump heights changed for all the equations, you can now click in the Stump Height field and type in the different number for each row. Just be sure to click the **FINISHED** button to save those changes.

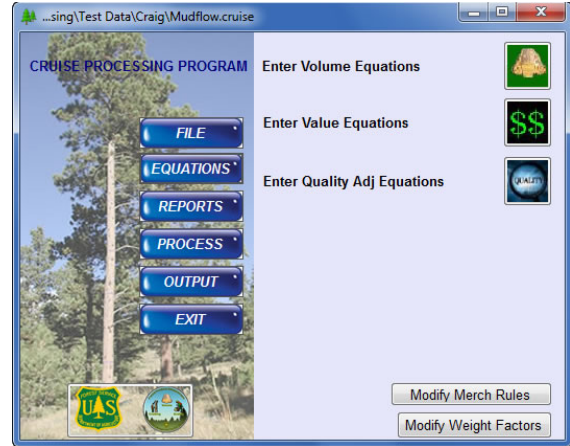


X Button – The X button in the upper right corner of the window functions like Cancel when clicked. **No data is saved when this button is selected.** This functionality is subject to change in the future.

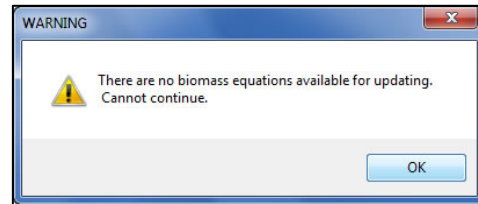
Modify Weight Factors

This button is located in the lower right corner of the **EQUATIONS** window. Weight factors for biomass equations could change for an individual sale so this button allows these factors to be modified. They are stored with the cruise and not with the regional defaults for the biomass equations.


 **Only Measurement Specialists have permission to change weight factors. This feature has a security question before it can be accessed.**

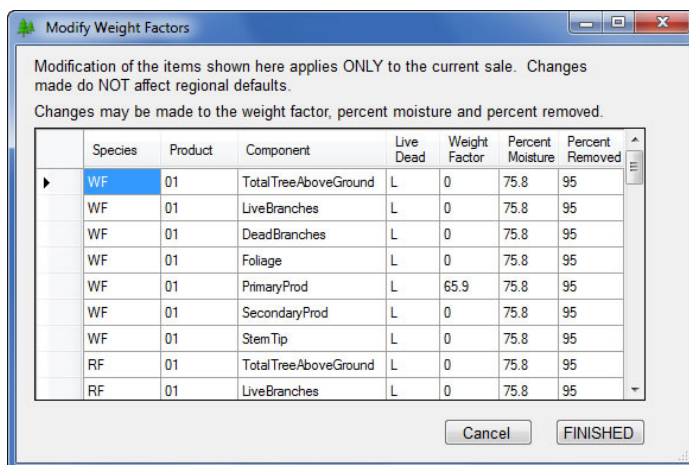


If there are no biomass equations to edit, a warning message is displayed. Click **OK** to dismiss the message.

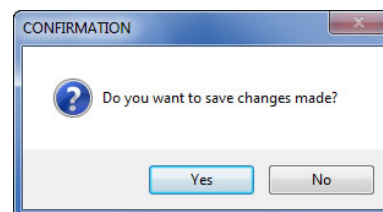


If the answer to the security question is accepted and there are equations to edit, a window is displayed where weight factors as well as percent moisture and percent removed can be modified. Note the message at the top of the window. **Changes made in this window apply to the current sale only.**

 **NOTE:** The following columns are read-only and the data in those columns cannot be modified: *Species, Product, Component, and LiveDead.*



To make changes, click in the desired cell and type in the data. When all changes have been made, click **FINISHED** to save the changes and close the window. A confirmation message is displayed. Clicking **YES** saves the changes and closes all windows. Clicking **NO** closes the message box and leaves the **Modify Weight Factors** window open.



Modify Merch Rules

When this button is clicked, the following window is opened. It is not password protected at this time. Changes made to merchandizing rules in this window apply to the **current sale only**. They are not saved as regional defaults. Additionally, changes are only made to non-sawtimber products. And, the changes apply to current volume equations for all species assigned that particular equation. A description of each field is given below.

Modify Merchandizing Rules

To view merchandizing rules for a non-sawtimber product, select a product from the list below.

Non-sawtimber Products: 08

If no changes have made to the merch rules, the values shown here are from the regional merch rules. If changes have been made to the merch rules, those values are shown below. Use the buttons below to scroll through the list to see each set of rules by equation number. When finished making modifications, click the FINISHED button below to apply changes to every species for the non-sawtimber product.

Current Volume Equation: 500W02W202

Trim (<1): 0.5

Minimum log length: 2

Maximum log length: 16

Segmentation logic: 22 -- Top placed with next lowest log

Minimum merch length: 8

Segment Length: Even length only (default) Odd length allowed

Stump height: 0.5

Top DIB: 1

Previous Next FINISHED

Current Volume Equation – displays the equation currently available for modification. It is read only and changes made apply to all species/products assigned the current volume equation.

Non-sawtimber Products – if more than one product code is used for these products, the list becomes a pulldown with all product codes listed. Selecting one from the list populates the remaining items in the window with either the regional defaults or any existing values for each item.

Trim (<1) – enter the desired value for trim.

Minimum and Maximum log length – each of these items can be modified by clicking either the up or down arrow. The value cannot be less than 2 and increments by 2 when the up arrow is clicked.

Segmentation logic – currently, four options are available for segmentation logic:

- 21 -- If top seg < 1/2 nom log len, combine with next lowest log
- 22 -- Top placed with next lowest log and segmented
- 23 -- Top segment stands on its own

- 24 -- If top seg < 1/4 log len drop the top. If top >= 1/4 and <= 3/4 nom length, top is 1/2 of nom log length, else top is nom log len.

Select the option to be used by clicking on one item.

Minimum merch length – this works in a similar manner as the min/max log length items and increments by 2 when the up arrow is clicked.

Segment Length – the default in the program is **even length only** so the radio button is automatically selected. To use odd length instead, simply click the button next to **Odd length allowed**. Only one of these buttons can be selected.

Stump height and Top DIB – enter the desired value for each of these items.

Clicking the **Next** or **Previous** button displays the appropriate volume equation information for modifying. The list circles around when the last or first record is encountered. So when the **Previous** button is clicked at the beginning of the list, the last record is displayed. Conversely, clicking **Next** at the end of the list, displays the first record in the list.

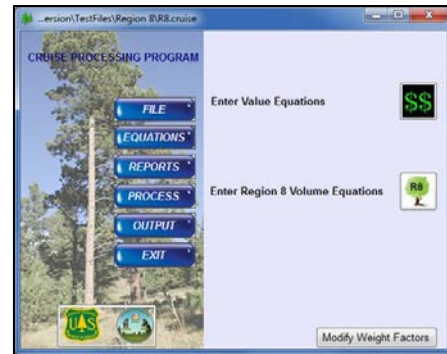
When modifications are complete, click the **FINISHED** button to close the window and save the changes.



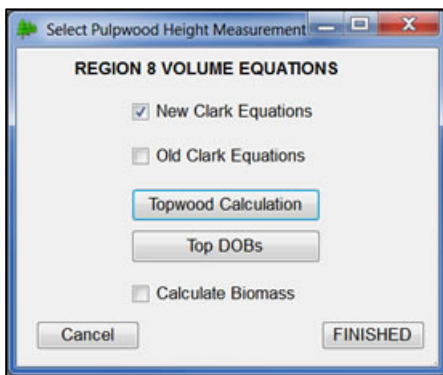
NOTE: *When this window is initially displayed, the buttons Previous, Next and FINISHED are disabled. Once a nonsawtimber product is selected, these buttons are enabled. However, if only one volume equation is noted for that nonsawtimber product, the Previous and Next buttons remain disabled. This is because there are no volume equations to scroll through. The FINISHED button will be available to save any edits made for that one equation.*

Region 8 Volume Equation Entry

When a file from Region 8 is detected and the **EQUATIONS** button is clicked, the window at right is displayed. It is slightly different from the general equation window shown above. The button at the top is gone and an additional button just for Region 8 is shown at the bottom of the list.

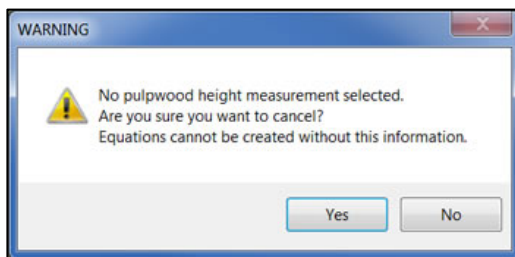
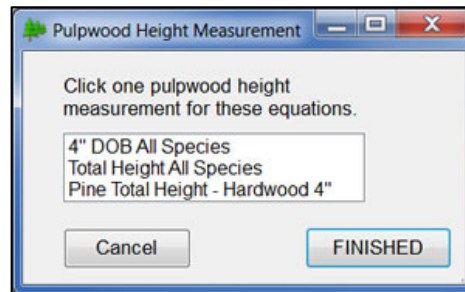


Clicking the **R8** button displays the following window. There are two equation options, **new Clark Equations** and **old Clark Equations**. The new Clark Equations do not require an indication of pulpwood height measurement. Click on one or the other option to start the process.



For the new Clark equations, the topwood calculation for each species can still be selected as described below. Additionally, the top DOBs can be modified regardless of product.

The old Clark equations function as before. These do require a selection of pulpwood height measurement. When this checkbox is selected, the following window opens where the measurement can be selected.

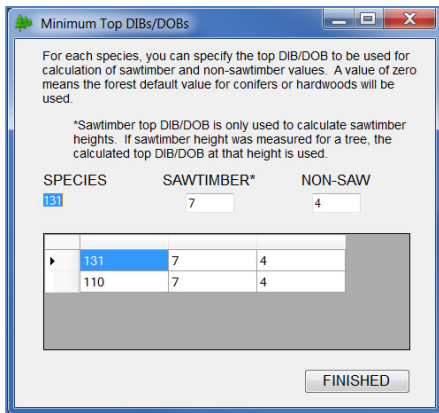
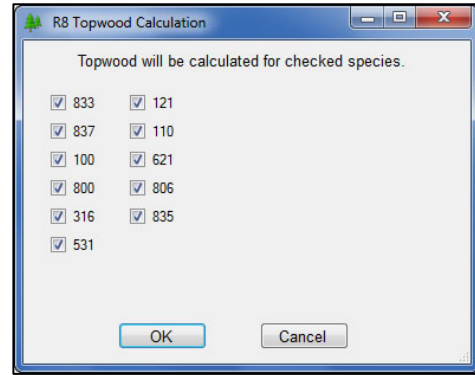


It is necessary for a measurement to be selected for the equations to be created. Click **FINISHED** when the selection has been made and to close the window. Clicking the **Cancel** button without selecting a measurement displays a warning message.

Additionally, the topwood calculation can be set for select species as well as modification of the top DOBs by species. See below for more details on using these functions.

If topwood is to be calculated, click on the **Topwood Calculation** button. From this window, check the species (or uncheck) the species to indicate topwood is (or is not) to be calculated.

Clicking the **OK** button adds the appropriate equations or flags for topwood into the table. Clicking **Cancel** without clicking **OK** does not add equations. Clicking **Cancel** after **OK** merely closes the window.



When the **Top DOBs** button is clicked, the window at left is displayed. The DOB for an individual species can be changed by placing the cursor in the sawtimber or non-saw box and typing in the updated DOB. The new DOB is placed in the appropriate box in the grid below. **NOTE:** The grid **CANNOT** be edited directly. Also, see below for further description of this window under Region 9 Volume Equations.

When modifications are complete, click the **FINISHED** button to save the changes and close the window. It is important to note that changes made are applied to the current cruise and do not affect any regional defaults.

Check with the Regional Measurement Specialist for questions regarding use of this window.

Adding Biomass Equations for Region 8

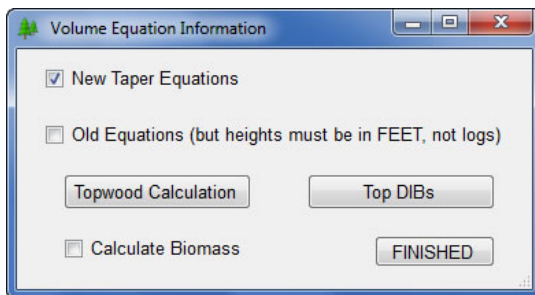
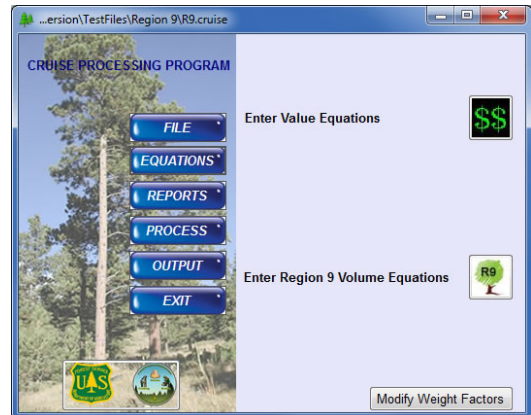
A new checkbox has been added to the main window for Region 8 Volume Equations. As mentioned above, no weight equations are entered in *CruiseProcessing*. All weight and biomass calculations are now done through the biomass library. For Region 8 users to get biomass and weight, this checkbox was added. When this is checked, the biomass library is called to get the Region 8 default equations. If there are no default equations for this region, the national default is used. Biomass equations are stored in the file for every species.

X Button – The X button in the upper right corner of the window functions like Cancel when clicked. **No data is saved when this button is selected.** This functionality is subject to change in the future.

NOTE: *Template files for Region 8 volume equations cannot be edited. Volume equations for cruise files will need to be created by selecting Region 8 Equations in the Equations window.*

Region 9 Volume Equation Entry

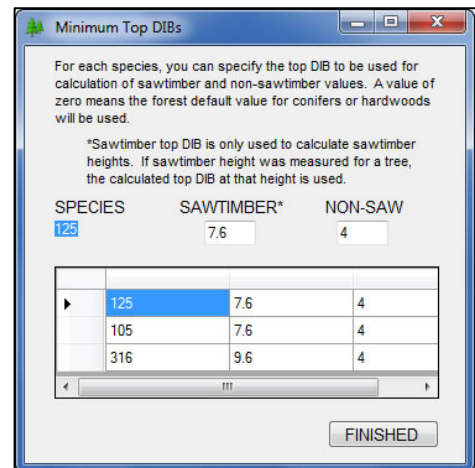
When a file from Region 9 is detected and the **EQUATIONS** button is clicked, the equations menu appears as shown at right. Clicking the **R9** button shows the following window.



The user can select the set of volume equations to be used. The old equations are those used in the older National Cruise program. The new equations are the more flexible taper model equations based on the work of Clark and others. **Heights must be recorded in feet in order to use the new equations.**

When the New Equations are selected, the **Top DIBs** button is enabled. This button opens a separate window allowing the user to specify the minimum upper diameter (inside the bark) to which volumes are calculated.

When the **Top DIBs** button is clicked the window at right is displayed, although the species codes will match those in the cruise file. The user can change the sawtimber and non-sawtimber DIB values used for volume calculations. This is done for a particular species by clicking on the record in the bottom box displaying the species code to be changed. A value of zero means the default values are used.

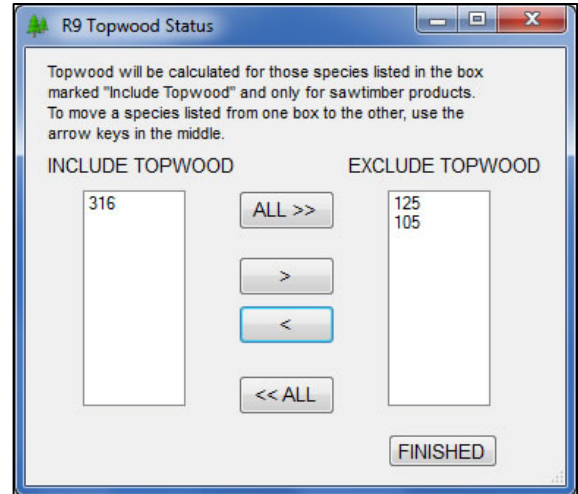


In the example at right, species 316 was selected and the sawtimber DIB changed to 9.6 and the non-sawtimber DIB changed to 4.0. This means all non-sawtimber volumes (pulpwood, posts, topwood, etc.) for species 316 are calculated to a 4-inch top. For any sawtimber tree with no sawtimber height recorded, the sawtimber height is calculated to the point where the tree is 8 inches in diameter inside the bark. Please note the value entered as the sawtimber DIB is ignored for trees with a sawtimber height recorded. For those trees the diameter calculated at the recorded sawtimber height is used for the calculation of sawtimber volume.

Once all the desired DIBs have been modified, clicking the **FINISHED** button saves the changes and returns to the previous window. Clicking the X button in the upper-right of the window

cancels any changes made. *Please note that opening the Top DIBs window again without first exiting the volume equation window will undo any changes just made. Changes are not written to the cruise object until the Volume Equation window is closed.*

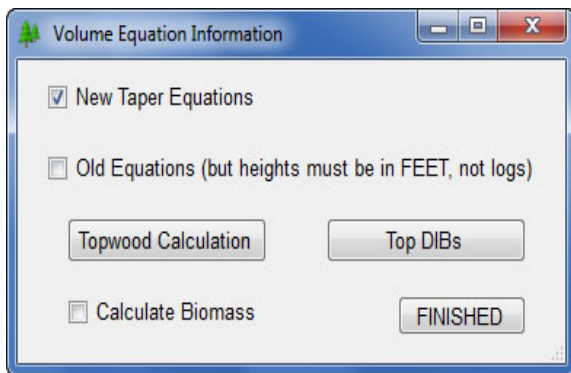
For both type of equations (new and old), the **Topwood Calculation** button displays the window shown at right, although the species codes will be for the sawtimber species found in the cruise object. As the message at the top indicates, any species listed in the **Include Topwood** box has topwood included when the volumes are calculated. The arrow buttons in the middle of the window are used to move species codes from one window to the other.



In the example to the right, species 316 moved to the **Include Topwood** box by highlighting it in the right box and clicking on the left arrow button in the middle. When volumes are calculated, topwood for species 316 will be included in the calculations.

When all the species listed in either box are to be moved to the other box, use the **ALL>>** or **<<ALL** buttons to do the move in one click.

Clicking the **FINISHED** button saves the selections made and closes the window. Clicking the X button in the upper-right of the window cancels any changes made.



Adding Biomass Equations for Region 9

A new checkbox has been added to the main window for Region 9 Volume Equations. As mentioned above, no weight equations are entered in CruiseProcessing. All weight and biomass calculations are now done through the biomass library. For Region 9 users to get biomass and weight, this checkbox was added. When this is checked, the biomass library is called to get the Region 9 default equations. If there are no default equations for this region, the national default is

used. Biomass equations are stored in the file for every species.



NOTE: *Template files for Region 9 volume equations cannot be edited. Volume equations for cruise files will need to be created by selecting Region 9 Equations in the Equations window.*

Value Equations Window

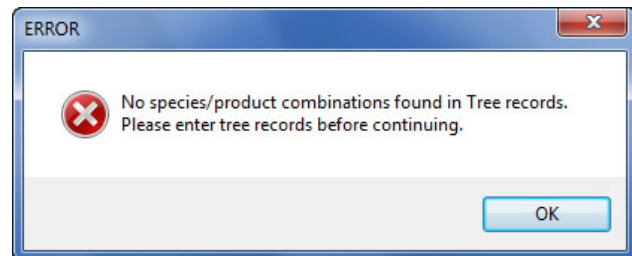
Similar to the **Volume Equations** window, this window displays all the information associated with **Value Equations**. The major difference is the entry and display of the coefficients needed to calculate value. A grid is shown with a list of species and primary product already entered. Completing the list is described below. A list of available value equations can be found in **Appendix B**.

Value Equation Number	Species	Primary Product	Grade	Coefficient 1	Coefficient 2	Coefficient 3	Coefficient 4	Coefficient 5
042	01	01	0	0	0	0	0	0
098	01		0	0	0	0	0	0
242	01		0	0	0	0	0	0
263	01		0	0	0	0	0	0
*								

As with the Volume Equations window, clicking on a new row enables the **REGION**, **EQUATION**, **SPECIES** and **PRIMARY PRODUCT** items at the bottom of the window. To enter the new row, select the Region then the equation number, species and primary product from the pulldown boxes. Next, click the **INSERT** button to add the row to the list.

The **GRADE** and **COEFFICIENT** fields are completed by the user with the appropriate values for the equation.

Sometimes, a new cruise file already contains value equations for some species but not for others. There is no need to select value equations for all species listed if you are certain those species are not going to be collected in this cruise. Simply highlight the desired row and click the **DELETE ROW** button to remove that species and/or value equation. If no tree records were collected and the Value Equation window is opened, an error message is given and no equation information may be recorded.



Once the list is complete, click the **FINISHED** button to save the changes and close the window.

X Button – The X button in the upper right corner of the window functions like Cancel when clicked. **No data is saved when this button is selected.** This functionality is subject to change in the future.

Quality Adjustment Equations Window (Region 3)



NOTE: This section has been removed at the request of the Region 3 Measurement Specialist.

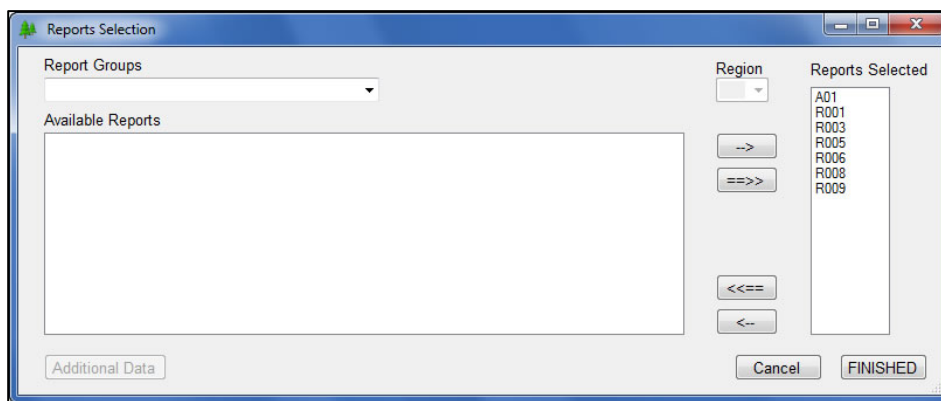
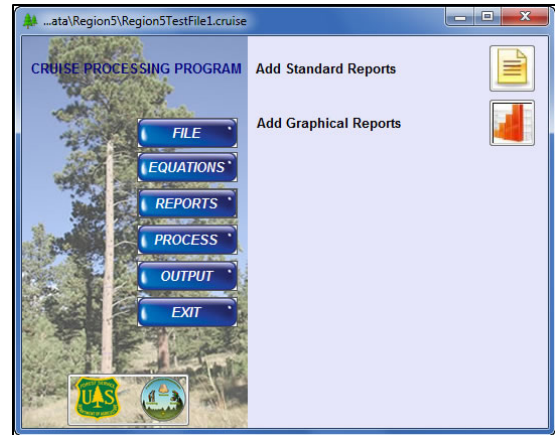


REPORTS SECTION

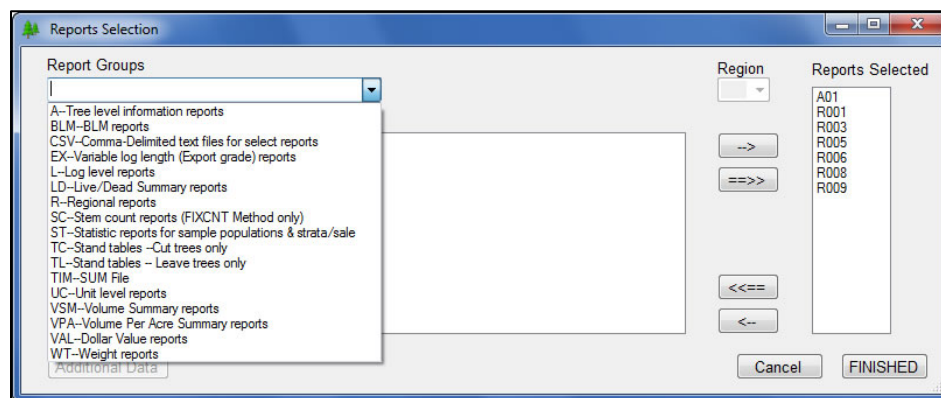
Modifying the Reports List

When the **REPORTS** button is clicked on the main menu, two buttons appear. The first button, **Add Standard Reports**, allows the user to make changes to the reports list or add reports if none have been selected. The second button, **Add Graphical Reports**, is described below.

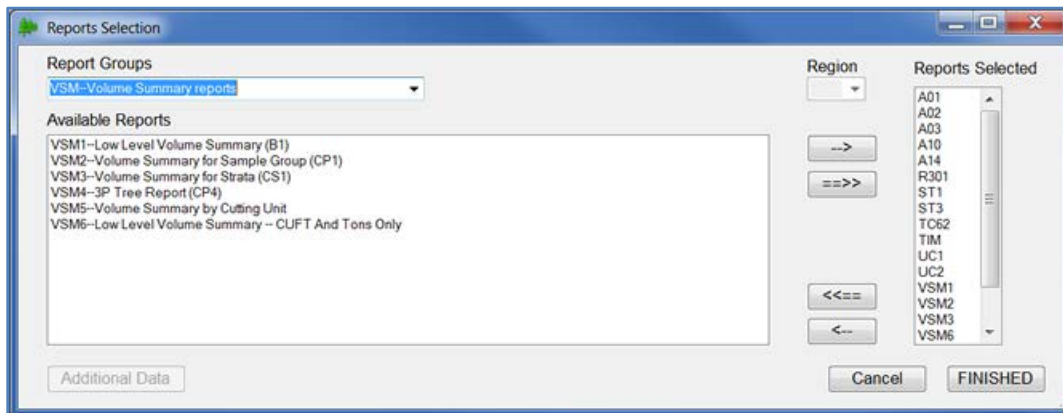
The **Reports Selection** window is separated into three main sections.



Report Groups contains a list of all the report categories as shown in *Appendix D* (except for graphs which are described later).



When a group is selected, all available reports within the group are displayed in the **Available Reports** window on the left. One or more reports are selected from this window and the appropriate arrow in the middle is clicked to move the report to the **Reports Selected** window on the right.



After all reports are added, click the **Finished** button to close the window and save the reports selected.

Conversely, if reports are to be removed from the **Reports Selected** list, simply highlight the desired report and click the last button in the middle, the left pointing arrow. The report is removed from the list.

The third button in the list (<< = =), when clicked, removes **ALL** of the reports in the **Reports Selected** window. This would be starting the reports selection from scratch. *Use this button with caution.* If the Finished button is clicked after clicking this arrow button, **NO REPORTS ARE SAVED IN THE CRUISE OBJECT.**

The **X button** in the upper right corner of the window functions like **Cancel** when clicked. **No data is saved when this button is selected.** No warning message is given when the X button is clicked. Changes made are **NOT** saved. This functionality is subject to change in the future.

Selecting Regional Reports

To select a regional report, select the appropriate group (**R – Regional reports**) and the **Region** window at upper middle is enabled. Use the pulldown list to select a region and the available reports are displayed in the window on the left (**Available Reports**). Select from these regional reports just as any of the standard reports.

Slash Loading Summary Report (WT2 and WT3)

The WT2 and WT3 reports estimate the oven-dry weight of slash generated from the trees to be cut in the cruise using the Biomass Library which is part of the Volume Library. In the WT2, the data are reported by strata, one page per stratum, with an overall sale summary on the last page. The WT3 reports data by cutting unit, one page per unit. Each report estimates the dry weight of branches, needles, unutilized top wood, and cull volume the user estimates will be left on the unit. The WT2 includes a section for damaged small trees.

Selecting the Report

The Slash Loading Summary reports (WT2 and WT3) are selected by clicking on the appropriate group in the Report Groups list. No additional information is required as the biomass portion of the Volume Library handles all the information necessary for this report.

Fraction Left in the Woods

Since the percent removed was entered when biomass was selected in the volume equations, FLIW is now calculated in the report as 1.0 minus the percent removed.

Additional Data for Select Reports

When certain reports are selected, the **Additional Data** button in the lower left corner is enabled.

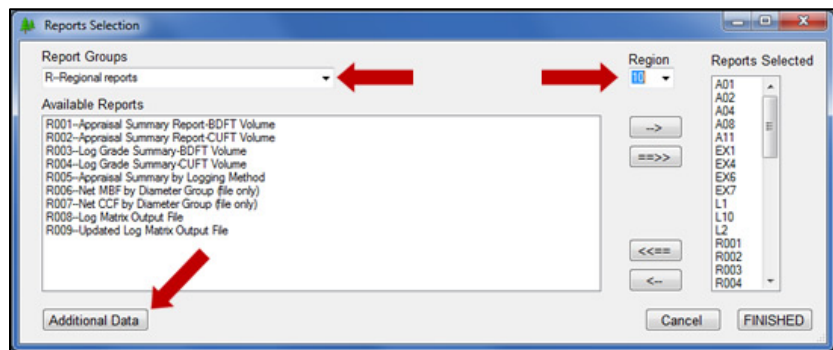
Currently, only Region 10 Regional Reports will need additional data. This is where the Log Matrix for report R008 and R009 is loaded and updated. The steps for accessing the Log Matrix are shown here:

1. Select **Reports** from the **Main Menu**.

2. Select **Add Standard Reports**.

3. From the pulldown list in **Report Groups**, click on **Regional reports**.

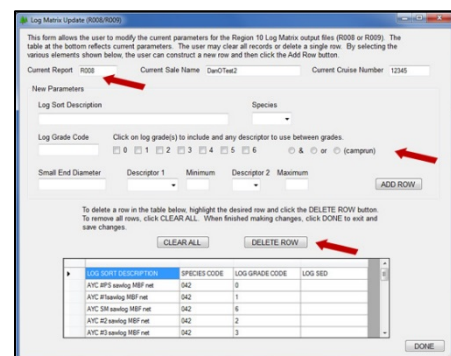
4. From the pulldown list **Region**, click on **10**. The available regional reports are displayed in the box. The **Additional Data** button is now enabled.



5. Click on **Additional Data**.

6. Only authorized users are allowed to modify the log matrix. **A password is required to access the edit screen.** A series of questions guide the user through the process of editing the log matrix for these reports.

7. The window at right is displayed. Since the log matrix is different for each report, each is displayed separately. If no records existed in the log matrix table, this list will show the default values. These can be edited by adding or deleting rows. Rows cannot be edited in the grid at the bottom. To update data in a particular row, delete the row and then complete the information fields at the top and then click on **ADD ROW**. Alternatively, enter the log sort description for the row and complete the rest of the fields. Click

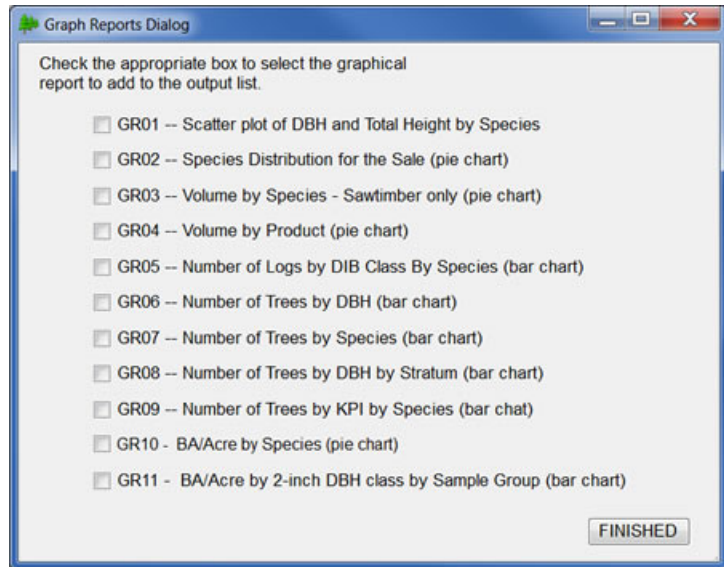


on **ADD ROW** and the updated row is placed in the grid at the bottom. Delete the original row to prevent duplicates.

8. When all edits are complete, click on the **DONE** button to close the window and save the edits.
9. If report selection is complete, click on the **FINISHED** button to close the **Reports** window.

Add Graphical Reports

This new section gives users several types of graphs to include in the output file. When this button is clicked, a menu is shown with the various graphical reports currently available. In this example, three reports have been selected and are added to the reports list. At this point in the program, this is the only thing that needs to be completed. Further description of the process is included in the **Output Section** below. Descriptions and examples of each graph are given in *Appendix D*. Click the **FINISHED** button to save the selections and close the window.



If graphs are no longer needed, they may be removed from the reports list as any other report is deleted. Simply open the regular reports list and use the arrows to remove any highlighted graph report.



NOTE: GR09 displays data from 3P strata ONLY. GR10 and GR11 display information from strata utilizing a Basal Area Factor.

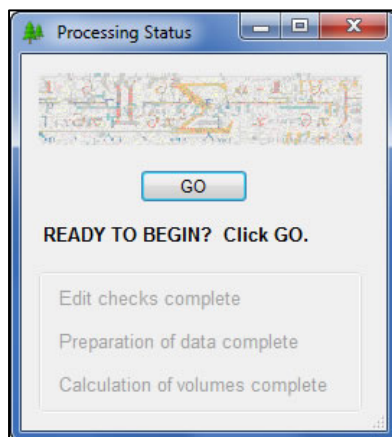


PROCESS DATA SECTION

Processing Data

When the **PROCESS** button is clicked on the Main window, this **Processing Status** window is displayed. Three things happen in this section:

- Data is edit checked
- Data is prepared for remaining calculations
- Volumes, value and/or biomass are calculated



How to start processing...

Click the **GO** button to begin the process.

What happens after GO...

Once the GO button is clicked, edit checking starts. Edit checking is very thorough and might take quite some time to complete depending on the size of the file. The cursor becomes the “wait” signal as the checks are completed.

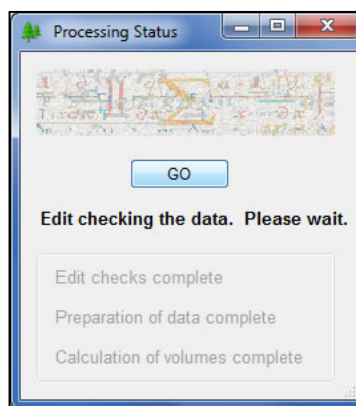


Most edit checks completed in the DOS version of NatCRS and the current version of CruiseProcessing have been included in the new CruiseProcessing.

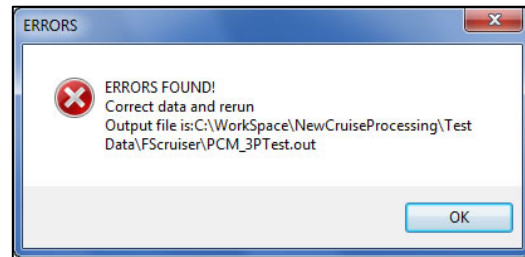
Several new checks have been added to the new program. Some interrelationships between tables necessitated additional checks which would normally have passed the edit checks in previous versions. A list of potential error messages is located in **Appendix G**.

What happens during edit checking...

As the data is checked, the **Processing Status** window indicates the edit checks are progressing. If the data passes all of the edit checks, the status shows **Edit checks complete**.



If the data fails the edit checks, a message is displayed. Clicking **OK** dismisses the window.



These are considered fatal errors and stop the processing. It does **NOT** terminate the entire program. An error report (see example below) is generated and can be printed for review. The error report also automatically opens in the preview window. When the preview window is closed, the program terminates to prevent the text output file from being generated on erroneous data. A maximum of 200 errors automatically stops processing and generates the error report.

If any CruiseManager/FScruiser errors are detected, this error report also opens in a preview window for review. When the window is closed, the program terminates.

Notice the warning message gives the complete filename for the output file containing the error report.

If the cruise is being processed before all data has been collected, some strata may not have any trees recorded. This situation no longer stops processing. It could be the cruisers simply wish to see how data collection is progressing. Whatever the reason may be, a warning message is displayed allowing the user to decide if they wish to continue with processing.

Error Report Example

Here's an example of a very short error report. A description of each column --

- **Table name** – indicates which table contains the error
- **Error message** – the error number along with the text message
- **ST** – stratum number
- **CU** – cutting unit number
- **PL** – plot number
- **TR** – tree number
- **LG** – log number
- **SP** – species code
- **SG** – sample group
- **PR** – primary product
- **EQ** – equation number



Since the new system does not permit editing a text file, errors need to be corrected using the data entry program, *FScruiser* or *CruiseManager*.

The report shows the source of the errors, either *CruiseProcessing* or *FScruiser/CruiseManager*. Once the errors have been corrected, the data can then be reprocessed.

```
RUN DATE & TIME 10/14/2014 3:33:49 PM                                     PAGE 1
FILENAME: C:\Workspace\NewCruiseProcessing\Test Data\FScruiser\Jeff\STR.out
                                **** ERROR REPORT ****
                                FOR CRUISE NUMBER
                                70002

THESE ERRORS WERE GENERATED BY CruiseProcessing

TABLE
Tree          4-Secondary top DIB is greater than primary top DIB      01 001      1 --- DF    DF 01
Tree          32-No height recorded for this tree                      01 001      1 --- DF    DF 01

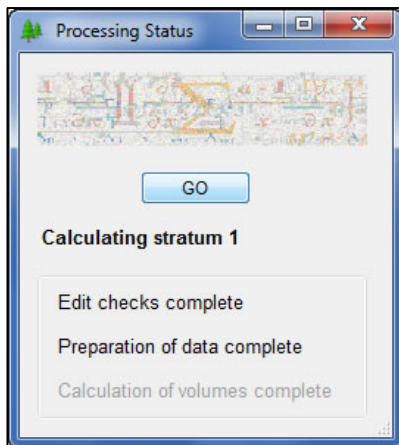
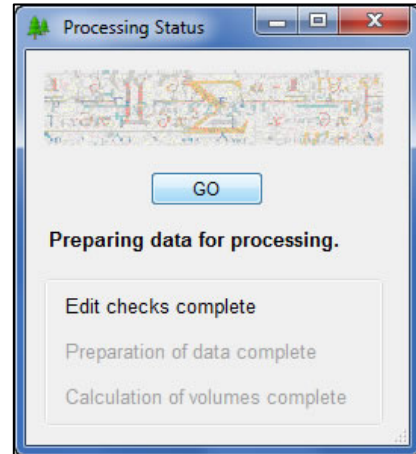
Order of Identification Elements
Some elements may be blank
ST = Stratum
CU = Cutting Unit
PL = Plot
TR = Tree number
LG = log number
SP = Species
SG = Sample Group
PR = Primary Product
EQ = Equation
```

Errors from FScruiser

In the new system, some error checking has been moved to *FScruiser*. Prior to the edit checks done in *CruiseProcessing*, the program checks for errors noted in the file from *FScruiser*. An error report similar to the one above is created and allows the user to check on these errors and correct them in *FScruiser* or *Cruise Manager* as needed.

After a clean edit check...

When the edit checks are completed and the data is ready for processing, the status window indicates the edit checks are complete and data is being prepared for processing.

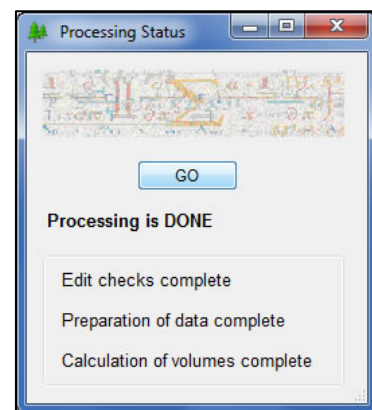



Preparing Data

In this step, the data is grouped by identifying factors such as sample groups, strata, cutting units, etc. Number of trees is calculated. KPI and counts are summed. Expansion factors are calculated. Once the preparatory work is completed, the status window indicates everything is ready for volume calculations.

Calculating Volumes

Now the program is grinding out volumes: BDFT, CUFT or cords for primary and/or secondary products as indicated by the Volume Equations table. All of the volumes calculated are stored in the tree calculated values table and/or log table as appropriate. If value and biomass were requested, these calculations are also completed at this time and are stored in the database. Once calculating volumes is complete, the status window indicates processing is totally finished.



 **NOTE:** Be aware that once calculations are completed the window remains open for a few seconds and closes automatically whenever all data is saved and the database is closed. **BE PATIENT! DO NOT CLOSE THE WINDOW USING THE X BUTTON ON THE UPPER RIGHT. JUST WAIT UNTIL THE WINDOW CLOSSES ON ITS OWN.**

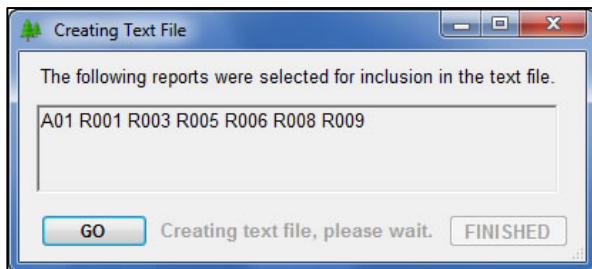
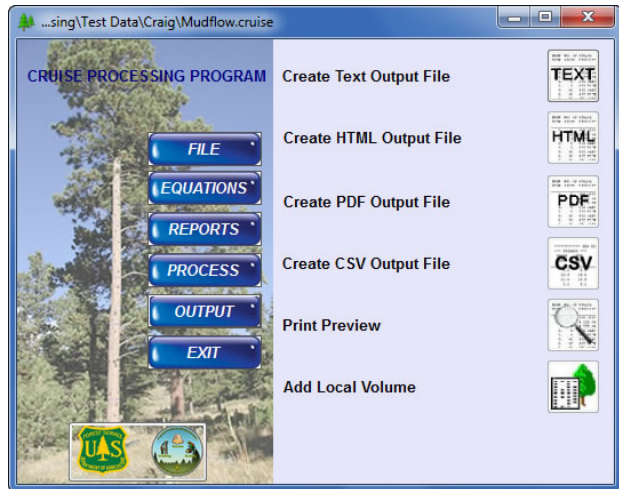


OUTPUT SECTION

Generating Reports

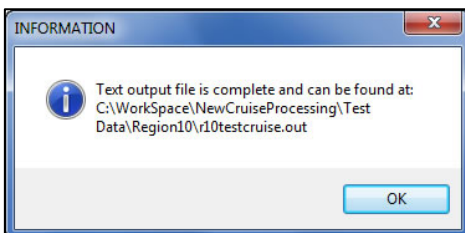
When equation numbers have been selected, reports selected, and processing completed, the output file can be created. The **OUTPUT** button displays a submenu of options for generating reports.

- Create Text Output File
- Create HTML Output File
- Create PDF Output File
- Create CSV Output File
- Print Preview
- Add Local Volume



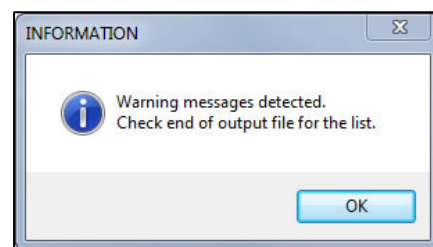
Create Text Output File

Clicking on the **TEXT** button opens a small window showing the reports selected. If the reports list is satisfactory, click the **GO** button to generate the output file. As the reports are created, the grayed out text becomes black and the wait cursor activated.



When all the reports are completed, a message is shown indicating where the output file is located. Close the window by clicking the **OK** button.

Occasionally, warning messages are added at the end of the text output file. In previous versions of the program, users may not have been aware these warnings were generated. Now, a message box is displayed directing the user to check the end of the output file for these warning messages.

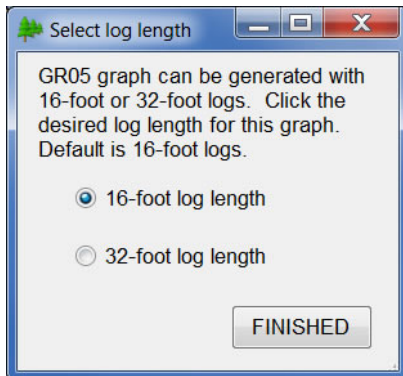
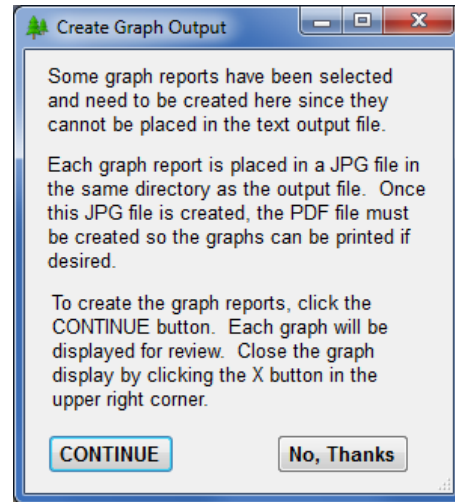


Graphs in the Reports List

When **Graphs** are included in the reports list, the numbers are shown in the list just like other reports. However, what happens is different.

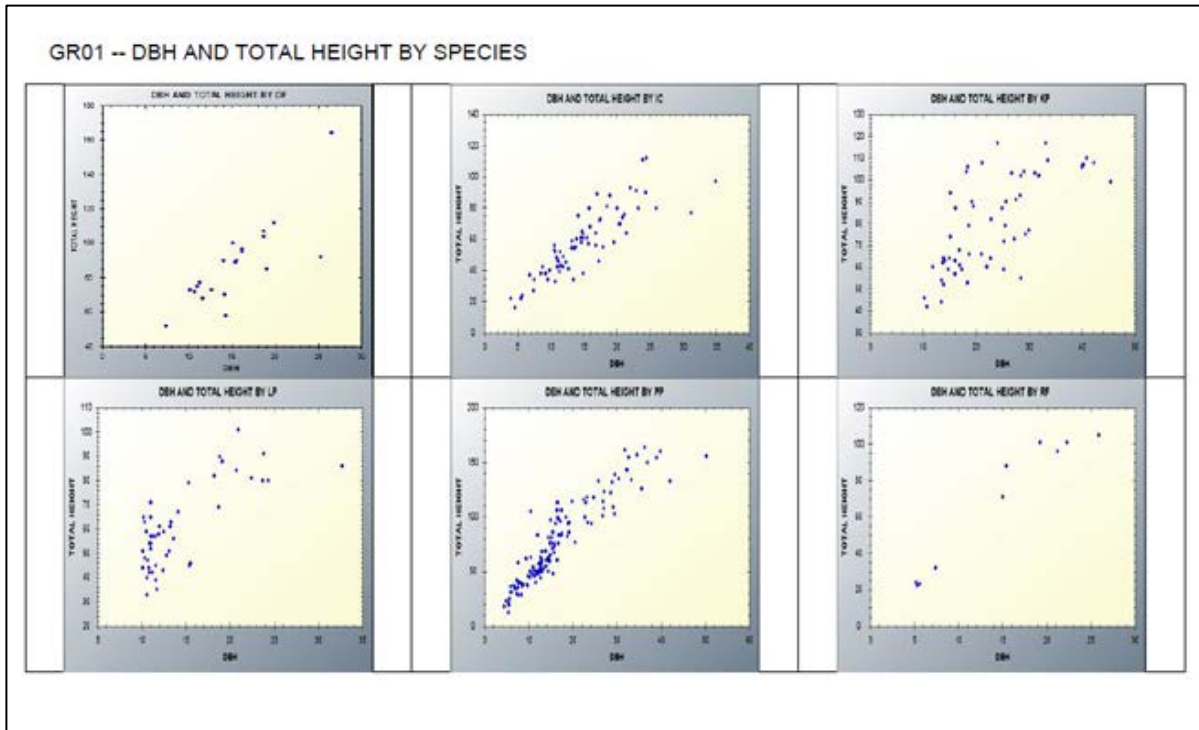
The window at right is displayed, giving the user the option to continue with producing the graphs. All graphs are created as **JPG** files which cannot be placed in the text output file. When they are generated, all are placed in the same directory as the cruise file and in a separate folder titled “Graphs”.

When **CONTINUE** is clicked, each graph is displayed for the user to review. In some instances, one graph per species is shown depending on the graph selected. After reviewing the graph, close the window using the red X button in the upper right corner of the window. The output window is displayed again and clicking the **FINISHED** button closes the window.



NOTE: The GR05 graph has been modified to allow the user a choice between 16-foot and 32-foot log lengths. Click on one or the other to have logs of those lengths only in the graph. Any log length other than 16 or 32 will be dropped from the graph.

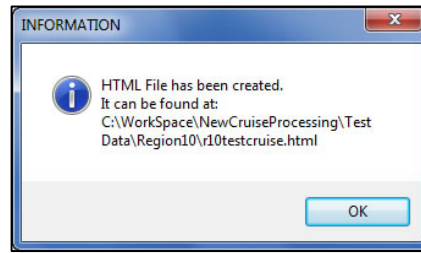
Since the graphs are stored in a separate folder and are individual JPG files, they may be printed as individual pages. And, since they are not added to the text output file, another option is to create the PDF file where the graphs are added at the bottom of the file. Here's a simple example of how they are displayed in the PDF file. This happens to be the first graph report which shows a scatterplot for each species in the cruise. Other graphs would display in a similar manner.



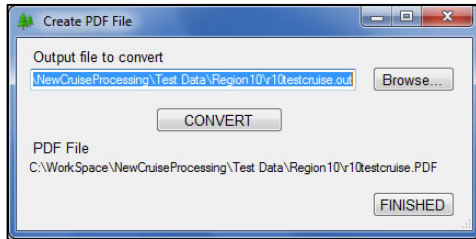
See *Appendix D* for a complete explanation of each graph.

Creating HTML Output

Clicking the second button on the menu creates an **HTML** file from the text file. The process automatically starts and displays an information message when complete and where it can be found.

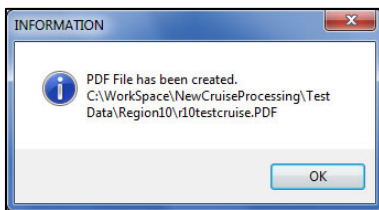
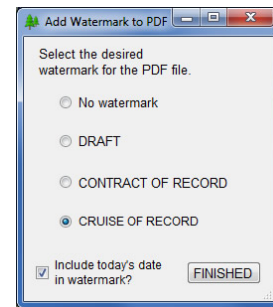


Creating a PDF File



Clicking the third button on the menu creates a PDF file. In this case, a small window opens allowing the user to select the file to convert to a PDF. The text output file **MUST** be created prior to requesting a PDF conversion. The current output file is shown as the default or use the **Browse...** button to locate the text file to convert. Click the **CONVERT** button to start the process.

Before the file is completed, the user is given the option to add a watermark to the file. Four options are available: No watermark; “DRAFT” watermark; “CONTRACT OF RECORD” watermark or “CRUISE OF RECORD” watermark. The default is no watermark. Another option is to include the current date in the watermark. Simply click on the options desired and click **FINISHED** to close the window.



When the conversion is complete, note the path and filename of the PDF file and click **FINISHED** to close the window.

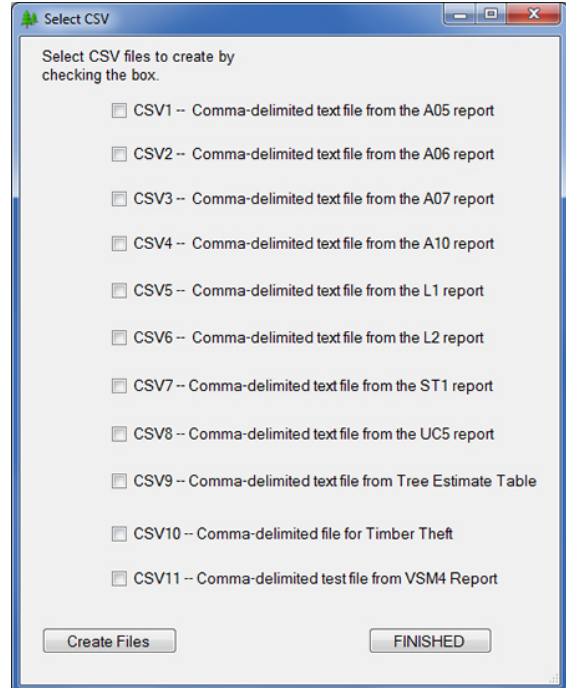
As mentioned above, if graphs were created, they are automatically added at the end of the PDF file.

Creating CSV Files

When this button is clicked, the list of possible CSV files is displayed. Eleven CSV files are now available. The text output file **must** be generated before these files are created. The associated report must be requested in the text file for the CSV file to get created. For example, CSV2 uses the A05 report to create the file so the A05 report must be requested in the text file. Simply check each box for the desired CSV files and click the **Create Files** button to begin the process. A message is displayed when all requested CSV files have been created. Click the **FINISHED** button to close the window.

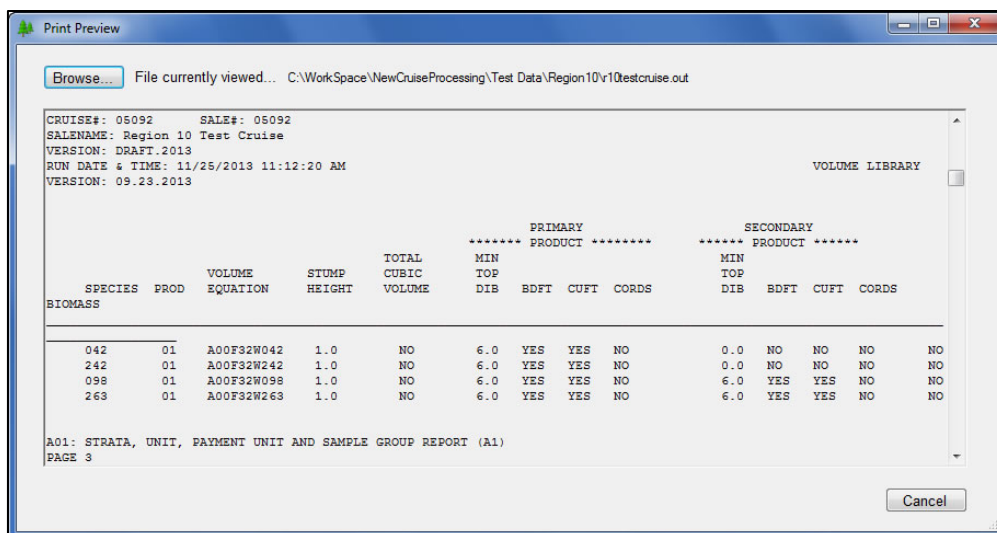


NOTE: Only one CSV file does not require a corresponding text report. CSV9 uses two to three tables from the cruise file to generate the necessary data for the CSV file.



Print Preview

Clicking the **PREVIEW** button on the menu opens a preview window of the current text output file. The window may be resized by dragging the lower right corner with the mouse. Scroll bars may also be used to move the text around for viewing. Other output files may be viewed by using the **Browse...** button to navigate to their location for opening. When finished reviewing the file, click **Cancel** to close the window.



Report Not Available



Currently, not all reports are available in *CruiseProcessing*. If a report is requested but is not currently available, no warning is displayed.

If an unavailable report is necessary to your area, please contact your Regional Measurement Specialist or the Forest Management Service Center in Fort Collins, Colorado, to request the report be included in *CruiseProcessing*. See the contacts list at the beginning of this document. Regional contacts are listed at the end of each release bulletin.



Once the program has been started, the filename can be changed any number of times. When filenames are changed then the data needs to be processed. Again, if it has not been processed, the program indicates the file must be processed to continue.

Add Local Volume

Previous versions of *CruiseProcessing* included the **Local Volume Table** option. This option is now available in this version of the program. It is accessed differently as described below.

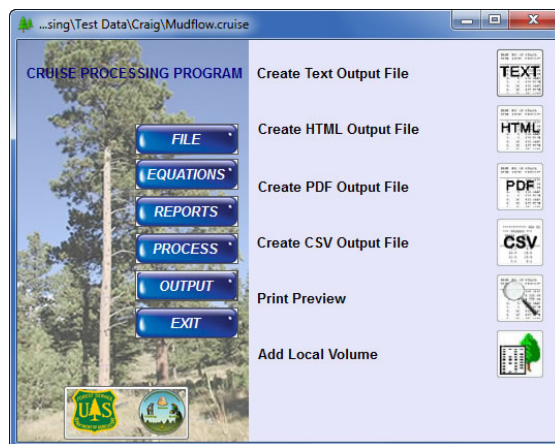
Introduction

With Tree Measurement sales, some amount of incidental, or add on, volume needs to be determined quickly and easily. One such method would be using a simple local volume table, designed to determine the gross or net volume of a tree from a DBH measurement. Development of such tables can be intimidating, requiring both the knowledge of regression techniques and software to do the analysis.

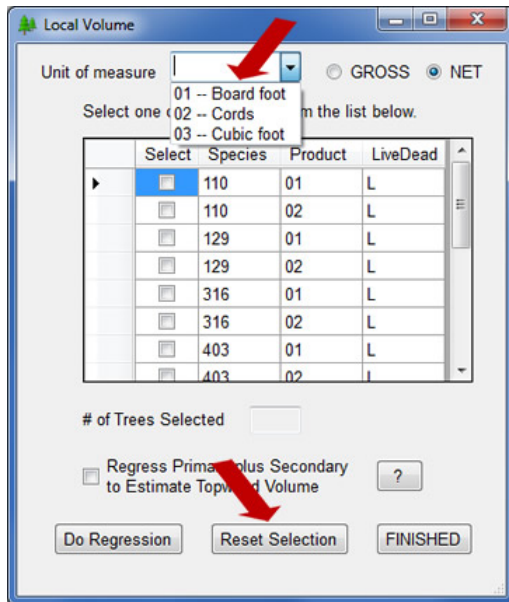
The **Local Volume Table** option was designed to guide the user through the process of creating these local volume tables from the cruise data for the sale. Although no prior experience with regression analysis is necessary to utilize this part of the program, it is recommended the user read **Appendix J: Basic Regression Analysis** at the end of this document before using this option for the first time. The Local Volume Table option requires the cruise data to be processed and the text output file created before the analysis can be completed.

Getting Started

In the **Output** menu, the last button in the list is **Add Local Volume**. As with the other buttons in this list, the text file must be created before the rest of the buttons are enabled. In many cases, this is because the text output file is used to create other files or, in this case, additional reports are added at the end of the file.



Select Species Combinations



When **Add Local Volume** button is clicked, the window at left is opened. At the top, unit of measure can be selected from the pulldown list. Then, the associated volume is displayed and the user selects whether gross or net. The default is net volume. Make sure the volume requested has been calculated previously in the program.

The available species/product/livedead combinations from the comparison cruise are shown in the grid. By clicking the checkbox in the **Select** column, the associated combination is used in the regression. Multiple boxes may be checked and all combinations selected are used in the regression. Unselect a group by unchecking the box. A single species group may also be selected rather than multiple groups. As combinations are selected, the **# of Trees Selected** is

updated with the total measured trees available. The groups are sorted by species.

Once the regression for the currently selected group or groups is complete, another selection can be made. The **Reset Selection** button removes all checkmarks from the groups selected and a new set can be created by checking the boxes for the desired groups.

Regress Topwood if it Exists

To request a local volume table containing topwood or secondary product, click in the box next to **Regress Primary plus Secondary to Estimate Topwood Volume**. Topwood is the amount of volume existing between the primary product minimum top diameter and the secondary product minimum top diameter. Past studies have shown there is no good relationship between the topwood volume and DBH. To create any sort of meaningful regression analysis for topwood, the Local Volume Table option takes the following steps:

1. A regression analysis is completed for the primary product volumes.
2. For each tree, the secondary product volume is combined with the primary product volume.
3. A second regression analysis is done on the combined volume.
4. To create the topwood volume table, the predicted primary product volume is subtracted from the predicted combined volume, leaving the predicted secondary product, which is used to create the topwood volume table.

If there is no topwood, the primary product regression analysis gives the same results as the combined volume regression analysis, which produces zero predicted topwood volumes.

Regression Analysis

To start a regression analysis based on the selected species group and volume, click the **Do Regression** button. The program produces the results of four regression models defined as follows:

- Linear Model – Simple linear regression model of the form $Y = a + bX$.

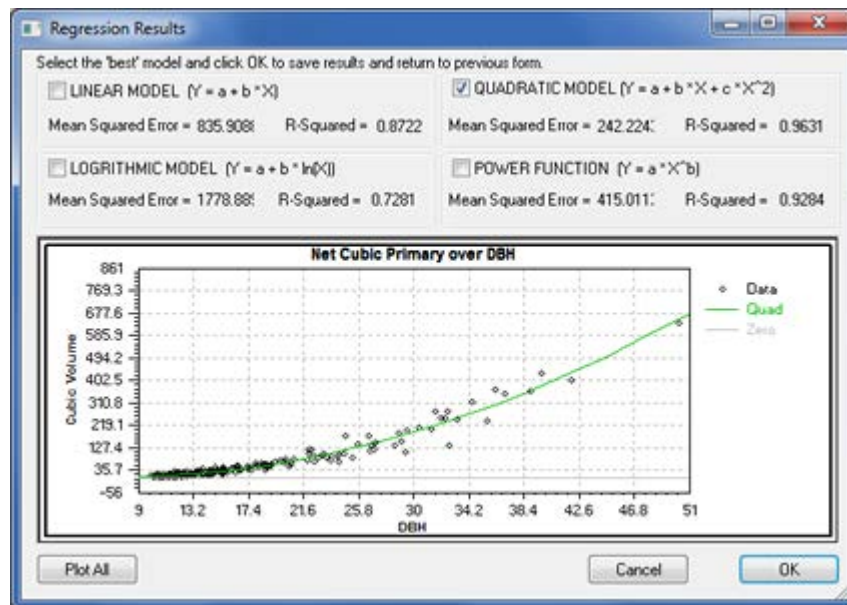
- Quadratic Model – Multivariate regression model of the form $Y = a + bX + c(X^2)$.
- Log Model – Log linear regression model of the form $Y = a + b(\ln(X))$ (uses the natural log function).
- Power Function – Exponential regression model of the form $Y = aX^b$.

These four regression models are commonly used regression models and describe a wide variety of shapes and curves. The regression analyses for this program are done utilizing a matrix class library called MatClass developed by C.R. Birchenhall, Dept. of Econometrics and Social Statistics, University of Manchester, UK. The results of several MatClass regression analyses were tested against the results of SAS regression analyses and showed no noticeable differences in the output statistics.

When the four regression analyses are completed, Regression Results are displayed.

Regression Results

For each of the four regression models, the model description, Mean Squared Error and R-Squared variables are displayed at the top of the **Regression Results** form. The lower part of the form is devoted to a graph of the currently selected regression equation overlaid on top of the data points. The regression analysis producing the lowest Mean Squared Error (MSE) is selected by default.

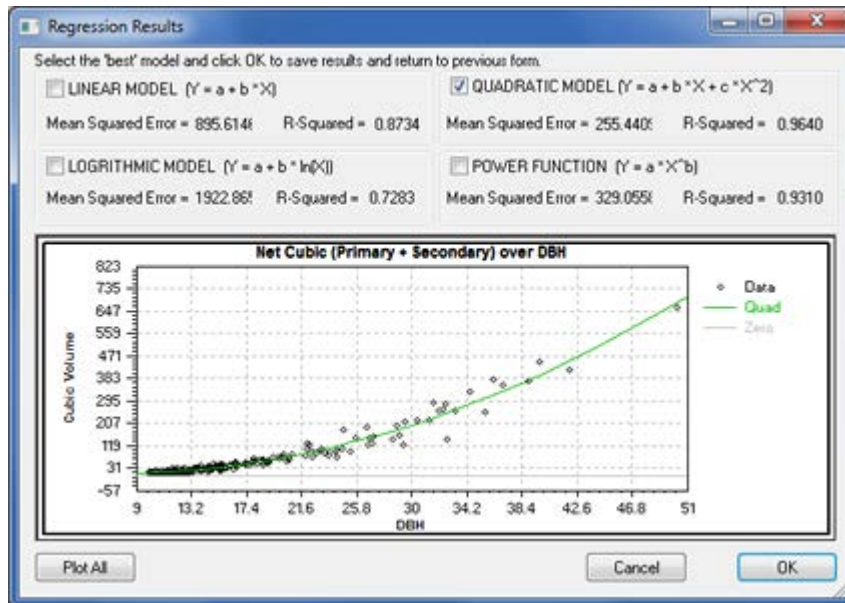


To see the graphs of the other models, select the equation by checking the box to the left of the model. The Plot All button at bottom left overlays all four regression equations for a quick comparison of the equations. If no regression models are selected, only the data is displayed in the graph without a regression line.



NOTE: If the Cancel button is clicked, no regression information is captured and saved. When the program tries to append the reports at the bottom of the text output file, a warning message lets the user know this could not be done because of no data.

If the topwood button was selected then another graph is displayed showing the results. This would open when the **OK** button on the first graph is clicked. When **OK** is clicked on this graph, the program returns to the first window where other combinations may be selected and regressed. Notice the title of the graph now reflects **Primary + Secondary**.



Selecting the Best Model

Now that the regression analysis has been completed on four different models, how is the Best Fit model determined? The **Local Volume Table** option allows the user to evaluate the models using both statistical and visual criteria. The Best Fit model is the model performing the best both statistically and visually. First, let's define those terms.

Statistical Evaluation compares the R-Squared and Mean Squared Errors between the given models to find the model giving the best mathematical fit.

Visual Evaluation examines the plot of the regression line through the data either one model at a time or through all four models to determine whether the model displays any bias, inconsistencies, or illogical behavior such as predicting negative values.

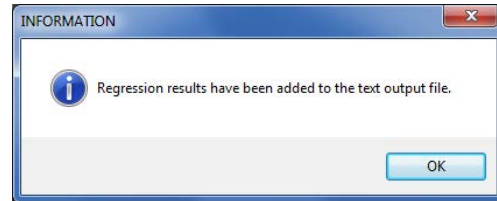
So what constitutes a Best-Fit model? Ideally, it is the model with the highest R-Squared value, with the smallest Mean Squared Error, and has a regression line running cleanly through the middle of the data points. If there are two models with high R-Squared values, small Mean Squared Error and good looking plots, then use smallest Mean Squared Error to make the decision. If the model with the highest R-Squared and smallest MSE shows a bias in the plot (negative volumes at the end of the line) then choose the next highest R-Squared and next smallest MSE combination, provided the plot looks appropriate. Remember, we're looking for the "best-fit" model, not necessarily the one with the highest R-Squared value.

Also, be aware the R-Squared for the “best-fit” model might be less than 0.50. This may be especially true with predicting net volumes. This is acceptable. There is no “magic” R-Squared value to shoot for. Collecting data on more trees will not necessarily increase the R-Squared value. If there is a lot of variability in the data, as is typical with net volumes, great R-Squared values may not be possible. For more information, see *Appendix J*.

Once the Best-Fit equation is identified, check the box next to the equation name and click **OK**. This saves the information for that equation for later reference or use.

Reports

When the **FINISHED** button is clicked on the first window, the reports are added to the text output file, an information message is displayed, and the windows close.



Local Volume Tables

```

LOCAL VOLUME TABLE REPORT - NetCUFT Primary
CRUISE #: 88888 SALE #: 88888
SALENAME: r8test
RUN DATE & TIME: 9/26/2014 2:39:52 PM

Species 110/121
Product 01
L/D L
DBH-----
12 12.39
13 16.82
14 22.17
15 28.43
16 35.60
17 43.67
18 52.66
19 62.57
20 73.38
21 85.10
22 97.73
    
```

A table of predicted volume by DBH and species/product/livedead is produced for each volume type regressed. The table only displays predicted volumes for the range of DBHs existing in the cruise data file, plus and minus one inch. For diameters falling outside of the range of cruise diameters, the program prints out dashes. These tables can be used to add additional volume to the sale where the cruise data was collected or can be used as volume estimates in a 3P cruise. All combinations regressed show in the report and may span multiple pages. This example shows only one.

Regression Results

The regression report displays the results of the regression analysis. For each volume, the report displays the species/produce/livedead group, the model form, sample size, R-squared. Mean Square Error, and the actual equation with coefficients. This information should be maintained to document the volume tables. Up to six combinations may appear in the report. This example shows only one.

```

LOCAL VOLUME TABLE REPORT - NetCUFT Primary - Regression Results
CRUISE #: 88888 SALE #: 88888
SALENAME: r8test
RUN DATE & TIME: 9/26/2014 2:39:52 PM

Species 110/121 Product 01 Live/Dead L
Model Number RSquare MS Error Min Max Equation
Quadratic 16 0.9835 8.3768 12.2 21.1 30.208121 + -6.950503*DBH + 0.455449*DBH*DBH
    
```


Appendices

Appendix A

VOLUME EQUATIONS BY REGION

CRUISE PROCESSING VOLUME EQUATION NUMBERS (to be used after NATCRS ver. 7)

These are a little confusing but are set up to work Nationwide.

The Logic

First character is a Geographic Code

I = INGY-Flewelling model*

F = Westside (R6) Flewelling model*

1 = Region 1

2 = Region 2

3 = Region 3

4 = Region 4

5 = Region 5

6 = Region 6

8 = Region 8

9 = Region 9

A = Region 10 (Alaska)

H = Hawaii

B = BLM Washington Oregon

M = US Army Corps of Engineers

05 = Proprietary models. Cannot release code in non-executable form.

Second and third character is a Subregional Code based on Forest, Defined Area, Log Length, or some other numerical code.

EXAMPLES

Region Wide Model

00 = No Subregional Code – Region Wide Application

INGY Subregional Codes (Both Taper and Bark Models)

11 = East Cascade

12 = Okanogan

13 = Blue Mountains

14 = Kootenai

15 = Central Idaho

Region 1 Subregional Code is used to identify model types

01 = Byrne Direct Volume Estimators

02 = Other (Kemp) Direct Volume Estimators

03 = Other (Kemp) Direct Volume Estimators

04 = Other (Kemp) Direct Volume Estimators

05 = Other (Kemp) Direct Volume Estimators

06 = Other (Kemp) Direct Volume Estimators

Region 2 Subregional Codes are based on Forest Number or Estimator Type

03 = Black Hills (Ponderosa pine)

02 = Bighorn (Lodgepole pine)

13 = San Juan (Flewelling model)

12 = Myers volume estimator

10 = Other (?) volume estimator

13 = Other (?) volume estimator for Black Hills

Region 4 Subregional Codes are based on Forest Number when applicable or some numerical code when more than one forest is involved.

- 01 = Other code
- 02 = Other code
- 03 = Other code
- 05 = Caribou Forest
- 07 = Dixie Forest

Region 6 and Region 10 Subregional Codes based on Log Length

- 16 = Sixteen foot log length
- 32 = Thirty two foot log length

Region 8 Subregional codes for profile models are based on R8 Definitions.

The first number is a geographic code and the second is a reference height.

<u>First Number (Geo. Code)</u>	<u>Second Number (Ref. Ht)</u>
1_ = Coastal Plain	_0 = Height to tip
2_ = Piedmont	_4 = Height to a 4 inch dob
3_ = Appalachian Mtns	_7 = Height to a 7 inch dob
4_ = Upper Coastal Plain	_9 = Height to a 9 inch dob
5_ = Deep South	
6_ = Arkansas	
7_ = Delta / St.Francis	
9_ = Southwide	

Region 8 Subregional codes used for the Direct Volume Estimators are by Group Codes (01 – 32)

Fourth, Fifth, Sixth characters defines the model

- BEH = Behre's Hyperbola
- CLK = Alexander Clark et.al. profile model
- CZ2 = Czaplewski's 2 point profile model
- CZ3 = Czaplewski's 3 point profile model
- DEM = DeMars Volume Models
- DVE = Direct Volume Estimators (regression models)
- FW2 = Flewelling's 2 point profile model
- FW3 = Flewelling's 3 point profile model
- JB2 = Jim Brickell 2 point profile model
- MAT = Mathis (Rastigi and Loveless profile model)
- SN2 = Sharpnack's 2 point profile model
- WO2 = Wensel and Olsen 2 point profile model

Seventh character defines Western or Eastern U.S

- W = Regions 1,2,3,4,5
- E = Region 8,9
- Exception: Region 6, W/E defines Westside/Eastside of Region 6.

Eighth, Ninth, Tenth character defines species (Forest Survey Hndbk)

- Examples
- 202 = Douglas Fir
- 205 = West Coast Douglas Fir R6
- 017 = Grand Fir
- 122 = Ponderosa Pine
- 108 = Lodgepole Pine
- 242 = Western Red Cedar
- 093 = Engelmann Spruce
- 800 = Oak species in general
- 802 = White oak
- 746 = Quaking Aspen

EXAMPLES OF SPECIES AND AREA SPECIFIC PROFILE MODELS

I00FW2W202 = INGY Douglas Fir 2 Pnt Model

I00FW3W202 = INGY Douglas Fir 3 Pnt Model

I00FW2W017 = INGY Grand fir Flewelling 2 Pnt Model – No Sub Region

I11FW3W017 = INGY Grand fir 2 Pnt Model – Sub Region East Cascade

200CZ2W122 = Region 2 Pond. Pine Czaplewski 2 Pt Model – Region wide

203FW2W122 = Region 2 Pond. Pine Flewelling 2 Pt Model – Black Hills N.F.

407FW2W093 = Region 4 Engelmann Spr Flewelling 2 Pnt Model – Dixie N.F.

407MATW093 = Region 4 Engelmann Spr Mathis Model – Dixie N.F.

500DVEW060 = Region 5 Juniper Direct Volume Estimator – Region wide

500WO2W117 = Region 5 Sugar Pine Wensel & Olsen 2 Pnt Model – Region Wide

616BEHW000 = Region 6 All Species Behre's Hyperbola – 16 foot log lengths

601DVEW015 = Region 6 White Fir Direct Volume Estimator – West Side

839CLKE802 = Region 8 White Oak Clark Profile Model – Appalachian Mtns – 9
inch dob reference height

809DVEE802 = Region 8 White Oak Direct Volume Estimator – Group Code 9

REGION 1 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Balsam fir	ABBA	All	I00FW2W012	Flewelling Profile Model
Cottonwood	POIN23	All	102DVEW740	Kemp Equation
Douglas fir	PSME	All	I00FW2W202	Flewelling Profile Model
Engelmann spruce	PIEN	All	I00FW2W093	Flewelling Profile Model
Grand fir	ABGR	All	I00FW2W017	Flewelling Profile Model
Larch	LAOC	All	I00FW2W073	Flewelling Profile Model
Limber pine	PIFL2	All	I00FW2W073	Flewelling Profile Model
Lodgepole pine	PICO	All	I00FW2W108	Flewelling Profile Model
Mountain hemlock	TSME	All	I00FW2W260	Flewelling Profile Model
Ponderosa pine	PIPO	All*	I00FW2W122	Flewelling Profile Model
Ponderosa pine	PIPO	8	203FW2W122	Flewelling Profile Model
Quaking aspen	POTR5	All	102DVEW746	Kemp Equation
Subalpine fir	ABLA	All	I00FW2W019	Flewelling Profile Model
Western hemlock	TSHE	All	I00FW2W260	Flewelling Profile Model
Western larch	LAOC	All	I00FW2W073	Flewelling Profile Model
Western redcedar	THPL	All	I00FW2W242	Flewelling Profile Model
Western white pine	PIMO3	All	I00FW2W119	Flewelling Profile Model
Whitebark pine	PIAL	All	I00FW2W012	Flewelling Profile Model

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 2 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Bur oak	QUMA2	All	200DVEW823	Chojnacky Equation
Douglas fir	PSME	All	200FW2W202	Flewelling Profile Model
Engelmann spruce	PIEN	All	407FW2W093	Flewelling Profile Model
Gambel oak	QUGA	All	200DVEW814	Chojnacky Equation
Lodgepole pine	PICO	All *	200FW2W108	Flewelling Profile Model
Lodgepole pine	PICO	2,14	202FW2W108	Flewelling Profile Model
Mountain mahogany	CELEI	All	200DVEW475	Chojnacky Equation
Oneseed juniper	JUMO	All	200DVEW069	Chojnacky Equation
Other hardwoods		All	200DVEW998	Chojnacky Equation
Pinyon pine	PIED	All	200DVEW106	Chojnacky Equation
Ponderosa pine	PIPO	All *	200FW2W122	Flewelling Profile Model
Ponderosa pine	PIPO	3	203FW2W122	Flewelling Profile Model
Ponderosa pine	PIPO	13	213FW2W122	Flewelling Profile Model
Quaking aspen	POTR5	All	200FW2W746	Flewelling Profile Model
Rocky Mountain juniper	JUSC2	All	200DVEW066	Chojnacky Equation
Subalpine fir	ABLA	All	100FW2W019	Flewelling Profile Model
Utah juniper	JUOS	All	200DVEW065	Chojnacky Equation
White fir	ABCO	All	200FW2W015	Flewelling Profile Model

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 3 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Black maple	ACNI5	All	300DVEW314	Chojnacky Equation
Common juniper	JUCO6	All	300DVEW060	Chojnacky Equation
Douglas fir	PSME	All *	301DVEW202	Hann and Bare Equation
Douglas fir	PSME	2	302DVEW202	Hann and Bare Equation Carson
Douglas fir	PSME	3	302DVEW202	Hann and Bare Equation Cibola
Douglas fir	PSME	7	302DVEW202	Hann and Bare Equation Kaibab
Douglas fir	PSME	10	301FW2W202	Flewelling Profile Model
Engelmann spruce	PIEN	All	300DVEW093	Hann and Bare Equation
Limber pine	PIFL2	All	300DVEW113	Hann and Bare Equation
Maple	ACER	All	300DVEW310	Chojnacky Equation
Oak	QUESPP	All	300DVEW800	Chojnacky Equation
Other species		All	300DVEW999	Chojnacky Equation
Ponderosa pine	PIPO	All *	300DVEW122	Eager Mill Study
Ponderosa pine	PIPO	1,4,7, 12	300FW2W122	Flewelling Profile Model
Ponderosa pine	PIPO	10	301FW2W122	Flewelling Profile Model
Quaking aspen	POTR5	All	300DVEW746	Hann and Bare Equation
Twoneedle pinyon	PIED	All	300DVEW106	Chojnacky Equation
White fir	ABCO	All *	301DVEW015	Hann and Bare Equation
White fir	ABCO	2	302DVEW015	Hann and Bare Equation Carson
White fir	ABCO	3	302DVEW015	Hann and Bare Equation Cibola
White fir	ABCO	7	302DVEW015	Hann and Bare Equation Kaibab
White fir	ABCO	10	301FW2W015	Flewelling Profile Model
White pine	PIST3	10	301FW2W108	Flewelling Profile Model

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 4 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Blue spruce	PIPU	All*	400MATW093	Rustagi Profile Model
Blue spruce	PIPU	2,12,13	I15FW2W093	Flewelling Profile Model
Blue spruce	PIPU	7	407FW2W093	Flewelling Profile Model
Blue spruce	PIPU	8	407MATW093	Rustagi Profile Model
California red fir	ABMA	9,17	400MATW020	Rustagi Profile Model
Douglas fir	PSME	All *	400MATW202	Rustagi Profile Model
Douglas fir	PSME	2,12,13	I15FW2W202	Flewelling Profile Model
Douglas fir	PSME	5	405MATW202	Rustagi Profile Model Caribou
Engelmann spruce	PIEN	All *	400MATW093	Rustagi Profile Model
Engelmann spruce	PIEN	2,12,13	I15FW2W093	Flewelling Profile Model Central Idaho
Engelmann spruce	PIEN	7	407FW2W093	Flewelling Profile Model Dixie
Engelmann spruce	PIEN	8	407MATW093	Rustagi Profile Model
Grand fir	ABGR	All *	400MATW015	Rustagi Profile Model
Grand fir	ABGR	2,12,13	I15FW2W017	Flewelling Profile Model Central Idaho
Incense cedar	CADE27	9,17	400MATW081	Rustagi Profile Model
Limber pine	PIFL2	All*	400MATW108	Rustagi Profile Model
Limber pine	PIFL2	9,17	401MATW108	Rustagi Profile Model
Lodgepole pine	PICO	All *	400MATW108	Rustagi Profile Model
Lodgepole pine	PICO	9,17	401MATW108	Rustagi Profile Model Humboldt
Mountain hemlock	TSME	9,17	401MATW015	Rustagi Profile Model
Mountain mahogany	CERCO	All	400DVEW475	Chojnacky equation
Other hardwoods		All	400DVEW998	Chojnacky equation
Pinyon pine	PIED	All	400DVEW106	Chojnacky equation
Ponderosa pine	PIPO	All *	400MATW122	Rustagi Profile Model
Ponderosa pine	PIPO	1	401MATW122	Rustagi Profile Model Ashley
Ponderosa pine	PIPO	2,12,13	I15FW2W122	Flewelling Profile Model Central Idaho
Ponderosa pine	PIPO	7,8,10,18,19	402MATW122	Rustagi Profile Model Dixie
Ponderosa pine	PIPO	9,17	403MATW122	Rustagi Profile Model Humboldt
Quaking aspen	POTR5	All	400MATW746	Rustagi Profile Model
Rocky Mountain juniper	JUSC2	All	400DVEW066	Chojnacky equation
Single leaf pinyon pine	PIMO	All	400DVEW133	Chojnacky equation
Subalpine fir	ABLA	All *	400MATW019	Rustagi Profile Model
Subalpine fir	ABLA	5	405MATW019	Rustagi Profile Model Caribou
Sugar pine	PILA	9,17	400MATW117	Rustagi Profile Model
Utah juniper-Great Basin	JUOS	All	400DVEW065	Chojnacky equation
Utah juniper-Colorado Plateau	JUOS	All	401DVEW065	Chojnacky equation
Western juniper	JUOC	All	400DVEW064	Chojnacky equation
Western larch	LAOC	2,6,12,13,14	400MATW073	Rustagi Profile Model
Western white pine	PIMO3	9,17	400MATW117	Rustagi Profile Model
White fir	ABCO	All *	400MATW015	Rustagi Profile Model

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Blue spruce	PIPU	All*	400MATW093	Rustagi Profile Model
White fir	ABCO	2,12,13	I15FW2W017	Flewelling Profile Model Central Idaho
White fir	ABCO	9,17	401MATW015	Rustagi Profile Model Humboldt
Whitebark pine	PIAL	All*	400MATW108	Rustagi Profile Model
Whitebark pine	PIAL	9,17	401MATW108	Rustagi Profile Model

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 5 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Bigleaf maple	ACMA3	All	500DVEW312	Pillsbury and Kirkley Regression Equation
Blue oak	QUDO	All	500DVEW807	Pillsbury and Kirkley Regression Equation
California black oak	QUKE	All	500DVEW818	Pillsbury and Kirkley Regression Equation
California laurel	UMCA	All	500DVEW981	Pillsbury and Kirkley Regression Equation
California live oak	QUAG	All	500DVEW801	Pillsbury and Kirkley Regression Equation
California red fir	ABMA	All	500WO2W020	Wensel and Olsen Profile Model
California red fir	ABMA	5, 6, 8, 9, 10, 14	532WO2W020	Wensel and Olsen Profile Model-Scribner 32
California white oak	QULO	All	500DVEW821	Pillsbury and Kirkley Regression Equation
Canyon live oak	QUCH2	All	500DVEW805	Pillsbury and Kirkley Regression Equation
Common juniper	JUCO6	All	500DVEW060	Pillsbury and Kirkley Regression Equation
Douglas fir	PSME	All	500WO2W202	Wensel and Olsen Profile Model
Douglas fir	PSME	5, 6, 8, 9, 10, 14	532WO2W202	Wensel and Olsen Profile Model-Scribner 32
Engelmann's oak	QUEN	All	500DVEW811	Pillsbury and Kirkley Regression Equation
Engelmann spruce	PIEN	All	500WO2W015	Wensel and Olsen Profile Model
Giant sequoia	SEGI2	All	500DVEW212	Pillsbury and Kirkley Regression Equation
Golden chinkapin	CAPU9	All	500DVEW431	Pillsbury and Kirkley Regression Equation
Grand fir	ABGR	All	115FW2W017	Flewelling-Central Idaho Model
Incense cedar	CADE27	All	500WO2W081	Wensel and Olsen Profile Model
Incense cedar	CADE27	5, 6, 8, 9, 10, 14	532WO2W081	Wensel and Olsen Profile Model-Scribner 32
Interior live oak	QUWI2	All	500DVEW839	Pillsbury and Kirkley Regression Equation
Jeffrey pine	PIJE	All	500WO2W116	Wensel and Olsen Profile Model
Jeffrey pine	PIJE	5, 6, 8, 9, 10, 14	532WO2W116	Wensel and Olsen Profile Model-Scribner 32
Lodgepole pine	PICO	All	500WO2W108	Wensel and Olsen Profile Model
Lodgepole pine	PICO	5, 6, 8, 9, 10, 14	532WO2W108	Wensel and Olsen Profile Model-Scribner 32
Mountain hemlock	TSME	All	500WO2W015	Wensel and Olsen Profile Model
Oregon white oak	QUGA4	All	500DVEW815	Pillsbury and Kirkley Regression Equation
Pacific madrone	ARME	All	500DVEW361	Pillsbury and Kirkley Regression Equation
Ponderosa pine	PIPO	All	500WO2W122	Wensel and Olsen Profile Model
Ponderosa pine	PIPO	5, 6, 8, 9, 10, 14	532WO2W122	Wensel and Olsen Profile Model-Scribner 32
Red alder	ALRU2	All	500DVEW351	Pillsbury and Kirkley Regression Equation
Redwood	SESE3	All	500WO2W211	Wensel and Olsen Profile Model
Redwood	SESE3	5, 6, 8, 9, 10, 14	532WO2W211	Wensel and Olsen Profile Model-Scribner 32
Sugar pine	ABGR	All	500WO2W117	Wensel and Olsen Profile Model
Sugar pine	ABGR	5, 6, 8, 9, 10, 14	532WO2W117	Wensel and Olsen Profile Model-Scribner 32
Tanoak	LIDE3	All	500DVEW631	Pillsbury and Kirkley Regression Equation
Western white pine	PIMO3	All	500WO2W117	Wensel and Olsen Profile Model
White fir	ABCO	All	500WO2W015	Wensel and Olsen Profile Model
White fir	ABCO	5, 6, 8, 9, 10, 14	532WO2W015	Wensel and Olsen Profile Model-Scribner 32

HAWAII VOLUME EQUATIONS.

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Koa	ACBE	All	616BEHW000	Behre's Hyperbola
Ohia	HYRE	All	H00SN2W671	Sharpnack Equations
Robustus Eucalyptus	EUTO11	All	H00SN2W510	Sharpnack Equations
Saligna Eucalyptus	EUTO11	All	H01SN2W510	Sharpnack Equations

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers

REGION 6 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
All coniferous		All	616BEHW000	Behre's Hyperbola

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

For further information on stem profile volume equation numbers, please contact the Region 6 Measurements Specialist.

REGION 7 (BLM) Total Tree Height or Height in 16 Foot Logs

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Douglas fir/Cascade	PSME	ALL	B01BEHW202	Behre's Hyperbola
Douglas fir/Coast	PSME	ALL	B02BEHW202	Behre's Hyperbola
Douglas fir/Southwest	PSME	ALL	B03BEHW202	Behre's Hyperbola
Redwood	SESE3	ALL	B00BEHW211	Behre's Hyperbola
Pond. pine/Yellow	PIPO	ALL	B00BEHW122	Behre's Hyperbola
Jeffery pine	PIJE	ALL	B00BEHW116	Behre's Hyperbola
Sugar pine	PILA	ALL	B00BEHW117	Behre's Hyperbola
Western white pine	PIMO3	ALL	B00BEHW119	Behre's Hyperbola
Lodgepole pine	PICO	ALL	B00BEHW108	Behre's Hyperbola
Pacific yew	TABR2	ALL	B00BEHW231	Behre's Hyperbola
Tan oak	LIDE3	ALL	B00BEHW631	Behre's Hyperbola
Red alder	ALRU2	ALL	B00BEHW351	Behre's Hyperbola
Oregon myrtle		ALL	B00BEHW998	Behre's Hyperbola
Big leaf maple	ACMA3	ALL	B00BEHW312	Behre's Hyperbola
Pacific madrone	ARME	ALL	B00BEHW361	Behre's Hyperbola
Golden chinquapin	CHCHC4	ALL	B00BEHW431	Behre's Hyperbola
Oregon ash	FRLA	ALL	B00BEHW542	Behre's Hyperbola
Black cottonwood	POBAT	ALL	B00BEHW747	Behre's Hyperbola
Oak species	QUESPP	ALL	B00BEHW800	Behre's Hyperbola
White fir/Westside	ABCO	ALL	B00BEHW015	Behre's Hyperbola
Shasta red fir	ABSH	ALL	B00BEHW021	Behre's Hyperbola
Grand fir	ABGR	ALL	B00BEHW017	Behre's Hyperbola
Pacific. silver fir	ABAM	ALL	B00BEHW011	Behre's Hyperbola
Noble fir	ABPR	ALL	B00BEHW022	Behre's Hyperbola
Engelmann spruce	PIEN	ALL	B00BEHW093	Behre's Hyperbola
Sitka spruce	PISI	ALL	B00BEHW098	Behre's Hyperbola
Hemlock	TSHE	ALL	B00BEHW260	Behre's Hyperbola
Incense cedar	CADE27	ALL	B00BEHW081	Behre's Hyperbola
Alaska cedar	CHNO	ALL	B00BEHW042	Behre's Hyperbola
Port Orford cedar	CHLA	ALL	B00BEHW041	Behre's Hyperbola
Western red cedar	THPL	ALL	B00BEHW242	Behre's Hyperbola
Western larch	LAOC	ALL	B00BEHW073	Behre's Hyperbola
Misc. species	UNLSPP	ALL	B00BEHW999	Behre's Hyperbola

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 7 (BLM) Total Tree Height or Height in 32 foot Logs

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Douglas fir/Cascade	PSME	ALL	B01B32W202	Behre's Hyperbola
Douglas fir/Coast	PSME	ALL	B02B32W202	Behre's Hyperbola
Douglas fir/Southwest	PSME	ALL	B03B32W202	Behre's Hyperbola
Redwood	SESE3	ALL	B00B32W211	Behre's Hyperbola
Pond. pine/Yellow	PIPO	ALL	B00B32W122	Behre's Hyperbola
Jeffery pine	PIJE	ALL	B00B32W116	Behre's Hyperbola
Sugar pine	PILA	ALL	B00B32W117	Behre's Hyperbola
Western white pine	PIMO3	ALL	B00B32W119	Behre's Hyperbola
Lodgepole pine	PICO	ALL	B00B32W108	Behre's Hyperbola
Pacific yew	TABR2	ALL	B00B32W231	Behre's Hyperbola
Tan oak	LIDE3	ALL	B00B32W631	Behre's Hyperbola
Red alder	ALRU2	ALL	B00B32W351	Behre's Hyperbola
Oregon myrtle		ALL	B00B32W998	Behre's Hyperbola
Big leaf maple	ACMA3	ALL	B00B32W312	Behre's Hyperbola
Pacific madrone	ARME	ALL	B00B32W361	Behre's Hyperbola
Golden chinquapin	CHCHC4	ALL	B00B32W431	Behre's Hyperbola
Oregon ash	FRLA	ALL	B00B32W542	Behre's Hyperbola
Black cottonwood	POBAT	ALL	B00B32W747	Behre's Hyperbola
Oak species	QUESPP	ALL	B00B32W800	Behre's Hyperbola
White fir/Westside	ABCO	ALL	B00B32W015	Behre's Hyperbola
Shasta red fir	ABSH	ALL	B00B32W021	Behre's Hyperbola
Grand fir	ABGR	ALL	B00B32W017	Behre's Hyperbola
Pacific. silver fir	ABAM	ALL	B00B32W011	Behre's Hyperbola
Noble fir	ABPR	ALL	B00B32W022	Behre's Hyperbola
Engelmann spruce	PIEN	ALL	B00B32W093	Behre's Hyperbola
Sitka spruce	PISI	ALL	B00B32W098	Behre's Hyperbola
Hemlock	TSHE	ALL	B00B32W260	Behre's Hyperbola
Incense cedar	CADE27	ALL	B00B32W081	Behre's Hyperbola
Alaska cedar	CHNO	ALL	B00B32W042	Behre's Hyperbola
Port Orford cedar	CHLA	ALL	B00B32W041	Behre's Hyperbola
Western red cedar	THPL	ALL	B00B32W242	Behre's Hyperbola
Western larch	LAOC	ALL	B00B32W073	Behre's Hyperbola
Misc. species	UNLSPP	ALL	B00B32W999	Behre's Hyperbola

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 8 – Board Foot Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>District</i>	<i>Equation Number</i>	<i>Model Description</i>
All		All	All	825DVEE***	Lasher Equations – Bdft
All		3	1,2,3,4,5,6,7	801DVEE***	Lasher Equations – Bdft
All		4	1,2,3,4,5,6	801DVEE***	Lasher Equations – Bdft
All		11	2,4,5,6,7,8,9,11	801DVEE***	Lasher Equations – Bdft
All		12	2	801DVEE***	Lasher Equations – Bdft
All		6	1,2,3,4,5	802DVEE***	Lasher Equations – Bdft
All		5	1,2,4,5,6	803DVEE***	Lasher Equations – Bdft
All		10	1,2,3,4,5,6	804DVEE***	Lasher Equations – Bdft
All		10	7	805DVEE***	Lasher Equations – Bdft
All		1	8	806DVEE***	Lasher Equations – Bdft
All		11	3	807DVEE***	Lasher Equations – Bdft
All		11	10	808DVEE***	Lasher Equations – Bdft
All		6	6	809DVEE***	Lasher Equations – Bdft
All		2	11,12,13,14,15,16,17	810DVEE***	Lasher Equations – Bdft
All		8	1,2,3,4,5,6	811DVEE***	Lasher Equations – Bdft
All		14	1,2,3,4,5,6	812DVEE***	Lasher Equations – Bdft
All		1	1	813DVEE***	Lasher Equations – Bdft
All		1	5,6	814DVEE***	Lasher Equations – Bdft
All		1	3	815DVEE***	Lasher Equations – Bdft
All		1	4	816DVEE***	Lasher Equations – Bdft
All		1	7	817DVEE***	Lasher Equations – Bdft
All		7	6	818DVEE***	Lasher Equations – Bdft
All		7	1,10	819DVEE***	Lasher Equations – Bdft
All		7	2,3	820DVEE***	Lasher Equations – Bdft
All		7	4,8	821DVEE***	Lasher Equations – Bdft
All		7	5	822DVEE***	Lasher Equations – Bdft
All		7	7,17	823DVEE***	Lasher Equations – Bdft
All		12	1,3,7,8	824DVEE***	Lasher Equations – Bdft
All		12	5,6	825DVEE***	Lasher Equations – Bdft
All		13	1	826DVEE***	Lasher Equations – Bdft
All		13	3,6	827DVEE***	Lasher Equations – Bdft
All		13	5,7	828DVEE***	Lasher Equations – Bdft
All		13	2,4	829DVEE***	Lasher Equations – Bdft
All		9	1,6	830DVEE***	Lasher Equations – Bdft
All		9	2,3,4,5,7,8,9,10,11	831DVEE***	Lasher Equations – Bdft
All		9	12	832DVEE***	Lasher Equations – Bdft

¹ Replace *** with three digit FSH code.

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

Region 8 – Cubic Foot Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>District</i>	<i>Height Type</i>	<i>Equation Number</i>	<i>Model Description</i>
Multiple		1	All	Total	840CLKE***	Clark Profile Model
Multiple, Pulpwood		1	All	4 inch top	844CLKE***	Clark Profile Model
Softwoods, Sawtimber		1	All	7 inch top	847CLKE***	Clark Profile Model
Hardwoods, Sawtimber		1	All	9 inch top	849CLKE***	Clark Profile Model
Multiple		1	3	Total	810CLKE***	Clark Profile Model
Multiple, Pulpwood		1	3	4 inch top	814CLKE***	Clark Profile Model
Softwoods, Sawtimber		1	3	7 inch top	817CLKE***	Clark Profile Model
Hardwoods, Sawtimber		1	3	9 inch top	819CLKE***	Clark Profile Model
Multiple		2,3,4,8,11	All	Total	830CLKE***	Clark Profile Model
Multiple, Pulpwood		2,3,4,8,11	All	4 inch top	834CLKE***	Clark Profile Model
Softwoods, Sawtimber		2,3,4,8,11	All	7 inch top	837CLKE***	Clark Profile Model
Hardwoods, Sawtimber		2,3,4,8,11	All	9 inch top	839CLKE***	Clark Profile Model
Multiple		3	8	Total	820CLKE***	Clark Profile Model
Multiple, Pulpwood		3	8	4 inch top	824CLKE***	Clark Profile Model
Softwoods, Sawtimber		3	8	7 inch top	827CLKE***	Clark Profile Model
Hardwoods, Sawtimber		3	8	9 inch top	829CLKE***	Clark Profile Model
Multiple		5	All	Total	810CLKE***	Clark Profile Model
Multiple, Pulpwood		5	All	4 inch top	814CLKE***	Clark Profile Model
Softwoods, Sawtimber		5	All	7 inch top	817CLKE***	Clark Profile Model
Hardwoods, Sawtimber		5	All	9 inch top	819CLKE***	Clark Profile Model
Multiple		6,7,13	All	Total	850CLKE***	Clark Profile Model
Multiple, Pulpwood		6,7,13	All	4 inch top	854CLKE***	Clark Profile Model
Softwoods, Sawtimber		6,7,13	All	7 inch top	857CLKE***	Clark Profile Model
Hardwoods, Sawtimber		6,7,13	All	9 inch top	859CLKE***	Clark Profile Model
Multiple		7	6	Total	870CLKE***	Clark Profile Model
Multiple, Pulpwood		7	6	4 inch top	874CLKE***	Clark Profile Model
Softwoods, Sawtimber		7	6	7 inch top	877CLKE***	Clark Profile Model
Hardwoods, Sawtimber		7	6	9 inch top	879CLKE***	Clark Profile Model
Multiple		7	7,17	Total	840CLKE***	Clark Profile Model
Multiple, Pulpwood		7	7,17	4 inch top	844CLKE***	Clark Profile Model
Softwoods, Sawtimber		7	7,17	7 inch top	847CLKE***	Clark Profile Model
Hardwoods, Sawtimber		7	7,17	9 inch top	849CLKE***	Clark Profile Model
Multiple		9,10	All	Total	860CLKE***	Clark Profile Model
Multiple, Pulpwood		9,10	All	4 inch top	864CLKE***	Clark Profile Model
Softwoods, Sawtimber		9,10	All	7 inch top	867CLKE***	Clark Profile Model
Hardwoods, Sawtimber		9,10	All	9 inch top	869CLKE***	Clark Profile Model
Multiple		10	3	Total	810CLKE***	Clark Profile Model
Multiple, Pulpwood		10	3	4 inch top	814CLKE***	Clark Profile Model
Softwoods, Sawtimber		10	3	7 inch top	817CLKE***	Clark Profile Model
Hardwoods, Sawtimber		10	3	9 inch top	819CLKE***	Clark Profile Model
Multiple		10	10	Total	820CLKE***	Clark Profile Model

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>District</i>	<i>Height Type</i>	<i>Equation Number</i>	<i>Model Description</i>
Multiple		1	All	Total	840CLKE***	Clark Profile Model
Multiple, Pulpwood		10	10	4 inch top	824CLKE***	Clark Profile Model
Softwoods, Sawtimber		10	10	7 inch top	827CLKE***	Clark Profile Model
Hardwoods, Sawtimber		10	10	9 inch top	829CLKE***	Clark Profile Model
Multiple		12	All	Total	820CLKE***	Clark Profile Model
Multiple, Pulpwood		12	All	4 inch top	824CLKE***	Clark Profile Model
Softwoods, Sawtimber		12	All	7 inch top	827CLKE***	Clark Profile Model
Hardwoods, Sawtimber		12	All	9 inch top	829CLKE***	Clark Profile Model
Multiple		12	2	Total	830CLKE***	Clark Profile Model
Multiple, Pulpwood		12	2	4 inch top	834CLKE***	Clark Profile Model
Softwoods, Sawtimber		12	2	7 inch top	837CLKE***	Clark Profile Model
Hardwoods, Sawtimber		12	2	9 inch top	839CLKE***	Clark Profile Model
Multiple		12	5	Total	810CLKE***	Clark Profile Model
Multiple, Pulpwood		12	5	4 inch top	814CLKE***	Clark Profile Model
Softwoods, Sawtimber		12	5	7 inch top	817CLKE***	Clark Profile Model
Hardwoods, Sawtimber		12	5	9 inch top	819CLKE***	Clark Profile Model
Multiple		All	All	Total	890CLKE***	Clark Profile Model
Multiple, Pulpwood		All	All	4 inch top	894CLKE***	Clark Profile Model
Softwoods, Sawtimber		All	All	7 inch top	897CLKE***	Clark Profile Model
Hardwoods, Sawtimber		All	All	9 inch top	899CLKE***	Clark Profile Model

² Replace *** with three digit FSH code.

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 8 Species List for Volume Equation Numbers

Hardwood Species

<i>Species Name</i>	<i>Species Code</i>	<i>Species Name</i>	<i>Species Code</i>	<i>Species Name</i>	<i>Species Code</i>
American sycamore	731	Green ash	544	Soft Hardwoods/Acacia	300
Basswood	950	Hackberry	460	Sourwood	711
Beech	531	Hard hardwoods	500	Southern magnolia	652
Birch	370	Hickory	400	Southern red oak	812
Black cherry	762	Honeylocust	550	Sugar maple	318
Black locust	901	Laurel oak	820	Swamp chestnut oak	825
Black maple	314	Magnolia	650	Swamp tupelo	694
Black oak	837	Northern red oak	833	Swamp white oak	804
Black tupelo	693	Nuttall oak	828	Sweetbay	653
Black walnut	602	Oak	800	Sweetgum	611
Blue ash	546	Overcup oak	822	Water oak	827
Boxelder	313	Pecan	404	Water tupelo	691
Buckeye	330	Pin oak	830	White ash	541
Bur oak	823	Post oak	835	White oak	802
Butternut	601	Pumpkin ash	545	Willow	920
Cherrybark oak	813	Red maple	316	Willow oak	831
Chestnut oak	832	Sassafras	930	Yellow poplar	621
Chinkapin oak	826	Scarlet oak	806		
Common persimmon	521	Shingle oak	817		
Cucumbertree	651	Shumard oak	834		
Eastern cottonwood	742	Silver maple	317		
Elm	970	Silverbell	580		

Softwood Species

<i>Species Name</i>	<i>Species Code</i>
Baldcypress	221
Eastern hemlock	261
Eastern redcedar	268
Eastern white pine	129
Loblolly pine	131
Longleaf pine	121
Pine	100
Pitch pine	126
Pond pine	128
Pondcypress	222
Sand pine	107
Shortleaf pine	110
Slash pine	111
Spruce	197
Spruce pine	115
Table mountain pine	123
Virginia pine	132

REGION 9 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
All		ALL	900DVEE***	Gevorkiantz Volume Equation
All		ALL	900CLKE***	Clark Volume Equations
All		ALL	925DVEE***	Hahn Volume Equations*

³ Replace *** with three digit species code.

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

*-- Not normally used for timber sales.

REGION 9 Species List for Volume Equation Numbers

Hardwood Species

<i>Species Name</i>	<i>Species Code</i>	<i>Species Name</i>	<i>Species Code</i>	<i>Species Name</i>	<i>Species Code</i>
American basswood	951	Dogwood spp.	490	Rock elm	977
American beech	531	Eastern cottonwood	742	Sassafras	931
American chestnut	421	Eastern redbud	471	Scarlet oak	806
American elm	972	Elm spp.	970	Serviceberry	356
American mountain ash	935	Flowering dogwood	491	Shagbark hickory	407
American sycamore	731	Gray birch	379	Shellbark hickory	405
Balsam poplar	741	Green ash	544	Shingle oak	817
Bear oak	816	Hackberry spp.	460	Shumard oak	834
Bigleaf magnolia	654	Hickory spp.	400	Silver maple	317
Bigtooth aspen	743	Honeylocust	552	Slippery elm	975
Bitternut hickory	402	Ironwood/Hophornbeam	701	Sourwood	711
Black ash	543	Kentucky coffeetree	571	Southern red oak	812
Black cherry	762	Kentucky yellowwood	481	Striped maple	315
Black hickory	408	Mockernut hickory	409	Sugar maple	318
Black locust	901	Mountain magnolia	655	Swamp chestnut oak	825
Black maple	314	Mountain maple	319	Swamp cottonwood	744
Black oak	837	Northern catalpa	452	Swamp tupelo	694
Black walnut	602	Northern pin oak	809	Swamp white oak	804
Black willow	922	Northern red oak	833	Sweet birch	372
Blackgum	694	Oak spp.	800	Sweetgum	611
Blackjack oak	824	Ohio buckeye	331	Water tupelo	691
Blue-beech/Hornbeam	391	Osage orange	641	White ash	541
Boxelder	313	Overcup oak	822	White basswood	952
Buckeye spp.	330	Paper birch	375	White oak	802
Bur oak	823	Pecan	404	Willow oak	831
Butternut	601	Pignut hickory	403	Willow spp.	920
Cherrybark oak	813	Pin cherry	761	Winged elm	971
Chestnut oak	832	Pin oak	830	Yellow birch	371
Chinkapin oak	826	Post oak	835	Yellow buckeye	332
Common hackberry	462	Quaking aspen	746	Yellow-poplar/Tuliptree	621
Common persimmon	521	Red maple	316		
Cucumbertree	651	River birch	373		

REGION 9 Species List for Volume Equation Numbers -- continued

Softwood Species

<i>Species Name</i>	<i>Species Code</i>
Australian pine	136
Baldcypress	221
Balsam fir	012
Black spruce	095
Eastern hemlock	261
Eastern redcedar	068
Eastern white pine	129
Engelmann spruce	093
Jack pine	105
Loblolly pine	131
Northern white-cedar	241
Norway spruce	091
Pitch pine	126
Red pine	125
Red spruce	097
Scotch pine	130
Shortleaf pine	110
Table Mountain pine	123
Tamarack	071
Virginia pine	132
White spruce	094

REGION 10 – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Alaska yellow cedar	CHNO	5	A00F32W042	Flewelling Profile Model (32 foot log rule)
Black spruce	PIMA	4	A00DVEW094	Larson Volume Equation
Cottonwood	POBAT	4	A00DVEW747	Larson Volume Equation
Mountain hemlock	TSHE	4	A01DEMW263	Demars Profile Model
Paper birch	BEPAP	4	A00DVEW375	Larson Volume Equation
Quaking aspen	POTR5	4	A00DVEW746	Larson Volume Equation
Red alder	ALRU2	All	A32CURW351	Curtis Profile Model - 32 foot logs
Sitka spruce	PISI	All	A00F32W098	Flewelling Profile Model (32 foot log rule)
Sitka spruce-second growth	PISI	5	A02F32W098	Flewelling Profile-32ft Log Rule
Western hemlock	TSHE	All	A00F32W263	Flewelling Profile Model (32 foot log rule)
Western hemlock-second growth	TSHE	5	A02F32W263	Flewelling Profile-32ft Log Rule
Western redcedar	THPL	5	A00F32W242	Flewelling Profile Model (32 foot log rule)
White spruce	PIGL	4	A00DVEW094	Larson Volume Equation

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

REGION 11 – DEPARTMENT OF DEFENSE – Volume Equations

<i>Species</i>	<i>Code</i>	<i>Forest</i>	<i>Equation Number</i>	<i>Model Description</i>
Douglas fir	PSME	All	F00FW2W202	Flewelling Profile Model
Douglas fir	PSME	All	F02FW2W202	Flewelling Profile Model
Douglas fir	PSME	All	F07FW2W202	Flewelling Profile Model
Douglas fir	PSME	All	F00F32W202	Flewelling Profile-32ft Log Rule
Douglas fir	PSME	All	F02F32W202	Flewelling Profile-32ft Log Rule
Douglas fir	PSME	All	F07F32W202	Flewelling Profile-32ft Log Rule
Western hemlock	TSHE	All	F00FW2W263	Flewelling Profile Model
Western hemlock	TSHE	All	F02FW2W263	Flewelling Profile Model
Western hemlock	TSHE	All	F07FW2W263	Flewelling Profile Model
Western hemlock	TSHE	All	F00F32W263	Flewelling Profile-32ft Log Rule
Western hemlock	TSHE	All	F02F32W263	Flewelling Profile-32ft Log Rule
Western hemlock	TSHE	All	F07F32W263	Flewelling Profile-32ft Log Rule
Western redcedar	THPL	All	F00FW2W242	Flewelling Profile Model
Western redcedar	THPL	All	F02FW2W242	Flewelling Profile Model
Western redcedar	THPL	All	F07FW2W242	Flewelling Profile Model
Western redcedar	THPL	All	F00F32W242	Flewelling Profile-32ft Log Rule
Western redcedar	THPL	All	F02F32W242	Flewelling Profile-32ft Log Rule
Western redcedar	THPL	All	F07F32W242	Flewelling Profile-32ft Log Rule
Other Species		All	616BEHW000	Behre's Hyperbola
Other Species		All	628BEHW000	Behre's Hyperbola

All = Equation good for all Forest or Districts.

All* = All Forests or Districts except for the following rows with defined Forest or District numbers.

INGY

Flewelling
2 point

	Equation #
Douglas Fir	I00FW2W202
Western Larch	I00FW2W073
Grand Fir	I00FW2W017
Ponderosa pine	I00FW2W122
Lodgepole pine	I00FW2W108
Western red cedar	I00FW2W242
Mountain Hemlock	I00FW2W260
White Pine	I00FW2W119
Engelmann spruce	I00FW2W093
Alpine Fir	I00FW2W019
Balsam fir	I00FW2W012

Subregional Codes

(replace 1st 3 letters)

I00 =	Area Wide
I11 =	East Cascade
I12 =	Okanogan
I13 =	Blue Mountains
I14 =	Kootenai
I15 =	Central Idaho
I21 =	Canada Fiz D
I22 =	Canada Fiz E
I23 =	Canada Fiz F

Flewelling
3 point

Douglas Fir	I00FW3W204
Western Larch	I00FW3W073
Grand Fir	I00FW3W017
Ponderosa pine	I00FW3W122
Lodgepole pine	I00FW3W108
Western red cedar	I00FW3W242
Mountain Hemlock	I00FW3W260
White Pine	I00FW3W119
Engelmann spruce	I00FW3W093
Alpine Fir	I00FW3W019
Balsam fir	I00FW3W012

WESTSIDE

Flewelling
2 point

	Equation #
Douglas Fir	F00FW2W202
Western red cedar	F00FW2W242
Western Hemlock	F00FW2W263

Subregional Codes

(replace first 3 letters)

F00 =	Area wide
F01 =	CO Oregon Coast
F02 =	EV Oregon East Valley
F03 =	NO Washington North
F04 =	RS Washington Rain

Shadow

F05 =	SO Washington South
F06 =	WE Washington West
F07 =	WV Oregon West Valley
F08 =	WC Washington Coast

Flewelling
3 point

	Equation #
Douglas Fir	F00FW3W202
Western red cedar	F00FW3W242
Western Hemlock	F00FW3W263

MERCHANDIZING RULES APPLIED TO PROFILE MODELS BY REGION

Region 1:

Scribner Decimal C

Only even log lengths

Maximum log length is 16 feet

Minimum log length is 8 feet

Minimum log length for topwood logs is 8 feet

Segmentation logic:

Logs are divided into 16 foot logs. If the top log is greater than 2 feet and less than 16 feet, it is added to the previous log and split into two nearly equal even lengths. (ie: A 16 and an 8 foot log become two 12 foot logs).

A 6 inch trim allowance will be accounted for when determining number of logs in a tree.

If no stump height is recorded, it defaults to a one foot stump.

If no minimum merchantable top diameter is recorded, 5.6 inches is used.

If no minimum merchantable top diameter for topwood is recorded, 4.0 inches is used.

At least one 8 foot log must be present for the tree to be considered merchantable.

Region 2:

Scribner Decimal C

Only even log lengths

Maximum log length is 16 feet

Minimum log length is 8 feet

Minimum log length for topwood logs is 2 feet

Segmentation logic:

Logs are divided into 16 foot logs. If the top log is greater than 2 feet and less than 16 feet, it is added to the previous log and split into two nearly equal even lengths. (ie: A 16 and an 8 foot log become two 12 foot logs)

A 6 inch trim allowance is accounted for when determining number of logs in a tree.

If no stump height is recorded, it defaults to a one foot stump.

If no minimum merchantable top diameter is recorded, 6.0 inches is used.

If no minimum merchantable top diameter for topwood is recorded, 4.0 inches is used.

At least one 8 foot log must be present for the tree to be considered merchantable.

Region 3:

No profile models in use.

Region 4:

Scribner Decimal C

Only even log lengths

Maximum log length is 16 feet

Minimum log length is 8 feet

Minimum log length for topwood logs is 2 feet

Segmentation logic:

Logs are divided into 16 foot logs. If the top log is greater than 2 feet and less than 16 feet, it is added to the previous log and split into two nearly equal even lengths. (ie: A 16 and an 8 foot log become two 12 foot logs).

A 6 inch trim allowance is accounted for when determining number of logs in a tree.

If no stump height is recorded, it defaults to a one foot stump.

If no minimum merchantable top diameter is recorded, 6.0 inches is used.

If no minimum merchantable top diameter for topwood is recorded, 4.0 inches is used.

At least one 8 foot log must be present for the tree to be considered merchantable.

Region 5:

Scribner Decimal C

Only even log lengths

Maximum log length is 16 feet

Minimum log length is 8 feet

Minimum log length for topwood logs is 2 feet

Segmentation logic:

Logs are divided into 16 foot logs. If the top log is greater than 2 feet and less than 16 feet, it is added to the previous log and split into two nearly equal even lengths. (ie: A 16 and an 8 foot log become two 12 foot logs).

A 6 inch trim allowance is accounted for when determining number of logs in a tree.

If no stump height is recorded, it defaults to a one foot stump.

If no minimum merchantable top diameter is recorded, 6.0 inches is used.

If no minimum merchantable top diameter for topwood is recorded, 4.0 inches is used.

At least one 8 foot log must be present for the tree to be considered merchantable.

Region 6:

Scribner factor volume reported to nearest board foot.

Only even log lengths

Maximum log length is 16 feet

Minimum log length is 2 feet

Minimum log length for topwood logs is 2 feet

Segmentation logic:

Logs are divided into 16 foot logs with the top log standing on its own. (ie: A 16 and an 8 foot log stay 16 and 8 foot logs).

A 6 inch trim allowance is accounted for when determining number of logs in a tree.

If no stump height is recorded, no stump height is accounted for.

If no minimum merchantable top diameter is recorded, 2.0 inches is used.

If no minimum merchantable top diameter for topwood is recorded, 2.0 inches is used.

At least one 8 foot log must be present for the tree to be considered merchantable.

To calculate board foot volumes for 32 foot logs, the first two logs are added together, the volume computed using the small end diameter for the top log using the total log length, and the volume is prorated back to the two logs. The next two logs are added together and so on up the tree.

Region 8:

No external merchandizing rules applied to their profile models.

Region 9:

No profile models in use.

Region 10:

Scribner Decimal C

Only even log lengths

Maximum log length is 16 feet

Minimum log length is 8 feet

Minimum log length for topwood logs is 8 feet

Segmentation logic:

Logs are divided into 16 foot logs with the top log standing on its own. (ie: A 16 and an 8 foot log stay 16 and 8 foot logs).

A 6 inch trim allowance is accounted for when determining number of logs in a tree.

If no stump height is recorded, a 1.0 stump height is used.

If no minimum merchantable top diameter is recorded, 6.0 inches is used.

If no minimum merchantable top diameter for topwood is recorded, 4.0 inches is used.

At least one 8 foot log must be present for the tree to be considered merchantable.

To calculate board foot volumes for 32 foot logs, the first two logs are added together, the volume computed using the small end diameter for the top log using the total log length, and the volume is prorated back to the two logs. The next two logs are added together and so on up the tree.

BLM – Washington and Oregon:

Scribner factor volume reported to nearest board foot.

Only even log lengths

Maximum log length is 16 feet

Minimum log length is 2 feet

Minimum log length for topwood logs is 2 feet

Segmentation logic:

Logs are divided into 16 foot logs with the top log standing on its own. (ie: A 16 and an 8 foot log stay 16 and 8 foot logs).

A 6 inch trim allowance is accounted for when determining number of logs in a tree.

If no stump height is recorded, a 1.0 stump height is used.

If no minimum merchantable top diameter is recorded, 5.0 inches is used.

If no minimum merchantable top diameter for topwood is recorded, 2.0 inches is used.

At least one 8 foot log must be present for the tree to be considered merchantable.

To calculate board foot volumes for 32 foot logs, the first two logs are added together, the volume computed using the small end diameter for the top log using the total log length, and the volume is prorated back to the two logs. The next two logs are added together and so on up the tree.

Appendix B

Value Equations

VALUE EQUATIONS

NOTE: All dollar values for BDFT are entered as dollars per thousand. All dollar values for CUFT are entered as dollars per hundred. Cord wood values are dollars per cord.

REGION 1	
EQUATION	Description
VLPP0101	\$(1) times Gross BDFT primary product volume
VLPP0102	\$(1) times Net BDFT primary product volume
VLPP0103	\$(1) times Gross CUFT primary product volume
VLPP0104	\$(1) times Net CUFT primary product volume
VLPP0106	\$(1) times Gross BDFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0107	\$(1) times Net BDFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0110	\$(1) times Gross CUFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0112	\$(1) times Net CUFT primary product volume + \$(2) times Net CUFT secondary product volume
REGION 2	
EQUATION	Description
VLPP0201	\$(1) times Gross BDFT primary product volume
VLPP0202	\$(1) times Net BDFT primary product volume
VLPP0203	\$(1) times Gross CUFT primary product volume
VLPP0204	\$(1) times Net CUFT primary product volume
VLPP0206	\$(1) times Gross BDFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0207	\$(1) times Net BDFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0210	\$(1) times Gross CUFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0212	\$(1) times Net CUFT primary product volume + \$(2) times Net CUFT secondary product volume
REGION 3	
EQUATION	Description
VLPP0301	\$(1) times Gross BDFT primary product volume
VLPP0302	\$(1) times Net BDFT primary product volume
VLPP0303	\$(1) times Gross CUFT primary product volume
VLPP0304	\$(1) times Net CUFT primary product volume
VLPP0306	\$(1) times Gross BDFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0307	\$(1) times Net BDFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0310	\$(1) times Gross CUFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0312	\$(1) times Net CUFT primary product volume + \$(2) times Net CUFT secondary product volume
REGION 4	
EQUATION	Description
VLPP0401	Mature PP live
VLPP0402	Mature PP dead
VLPP0403	Immature PP live
VLPP0404	Immature PP dead
REGION 5	
EQUATION	Description
VLPP0501	\$(1) times Gross BDFT primary product volume
VLPP0502	\$(1) times Net BDFT primary product volume

VLPP0503	\$(1) times Gross CUFT primary product volume
VLPP0504	\$(1) times Net CUFT primary product volume
VLPP0506	\$(1) times Gross BDFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0507	\$(1) times Net BDFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0510	\$(1) times Gross CUFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0512	\$(1) times Net CUFT primary product volume + \$(2) times Net CUFT secondary product volume
REGION 6	
Contact R6 Forest Products for information.	
REGION 7 (BLM)	
Value equation numbers are similar to the following: VLPP0701, VLPP0702, VLPP0703, etc. The value is the sum of value for the logs. The equation uses five coefficients.	
REGION 8	
EQUATION	Description
VLPP0801	\$(1) times Gross BDFT primary product volume
VLPP0802	\$(1) times Net BDFT primary product volume
VLPP0803	\$(1) times Gross CUFT primary product volume
VLPP0804	\$(1) times Net CUFT primary product volume
VLPP0806	\$(1) times Gross BDFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0807	\$(1) times Net BDFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0810	\$(1) times Gross CUFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0812	\$(1) times Net CUFT primary product volume + \$(2) times Net CUFT secondary product volume
REGION 9	
EQUATION	Description
VLPP0901	\$(1) times Gross BDFT primary product volume
VLPP0902	\$(1) times Net BDFT primary product volume
VLPP0903	\$(1) times Gross CUFT primary product volume
VLPP0904	\$(1) times Net CUFT primary product volume
VLPP0905	\$(1) times Cord Wood primary product volume
VLPP0906	\$(1) times Gross BDFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0907	\$(1) times Net BDFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0908	\$(1) times Gross BDFT primary product volume + \$(2) times Cord Wood secondary product volume
VLPP0909	\$(1) times Net BDFT primary product volume + \$(1) times Cord Wood secondary product volume
VLPP0910	\$(1) times Gross CUFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0911	\$(1) times Gross CUFT primary product volume + \$(2) times Cord Wood secondary product volume
VLPP0912	\$(1) times Net CUFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0913	\$(1) times Net CUFT primary product volume + \$(2) times Cord Wood secondary product volume
VLPP0914	\$(1) times Cord Wood primary product volume + \$(2) times Cord Wood secondary product volume
REGION 10	
EQUATION	Description
VLPP0001	\$(1) times Gross BDFT primary product volume
VLPP0002	\$(1) times Net BDFT primary product volume
VLPP0003	\$(1) times Gross CUFT primary product volume
VLPP0004	\$(1) times Net CUFT primary product volume
VLPP0006	\$(1) times Gross BDFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0007	\$(1) times Net BDFT primary product volume + \$(2) times Net CUFT secondary product volume
VLPP0010	\$(1) times Gross CUFT primary product volume + \$(2) times Gross CUFT secondary product volume
VLPP0012	\$(1) times Net CUFT primary product volume + \$(2) times Net CUFT secondary product volume

NOTE: Value coefficients are region dependent. Contact your Regional Measurement Specialist for the values in your area.

Appendix C

VALID CODES FOR CERTAIN FIELDS

CRUISE METHOD CODES

100	Classic 100%
3P	Classic 3P
3PFIX	3P Fixed Biomass (not currently available)
3PPNT	3P Point Biomass
FIX	Fixed Plot
F3P	Fixed Plot with 3P subsample
PNT	Point (Variable Plot)
P3P	Point with 3P subsample
STR	Sample Tree
S3P	Sample Tree with 3P subsample
PCM	Point Count/Measure Tree
FCM	Fixed Count/Measure
FIXCNT	Fixed Count

LOGGING METHOD CODES

401	Manual logging
410	Animal
420	Tractor
421	Rubber tired skidder
422	Hard track (track driven from rear)
423	Soft track (track driven from front)
430	Single span skyline\
431	Single span gravity outhaul lt 1300 ft.
432	Single span haulback outhaul lt 1300 ft.
433	Single span gravity outhaul lt 1800 ft.
434	Single span haulback outhaul lt 1800 ft.
435	Single span skyline gt 1800 ft.
440	Multispan
441	Multispan - uphill
442	Multispan - downhill
450	Highlead
451	Grabinski
452	Track loader/jammer
453	Loader logging
454	Other logging
460	Colddeck and swing
461	Highlead colddeck/skyline swing
462	Highlead colddeck/highlead swing
464	Other colddeck

- 470 Balloon
- 480 Helicopter
- 481 Helicopter - small
- 482 Helicopter - medium
- 483 Helicopter - large
- 490 Utilizer - chip
- 491 Mechanized systems (felling/bucking/delimbing)
- 492 Cut to length

PRODUCT CODES

- 01 Sawtimber
- 02 Pulpwood
- 03 Poles
- 04 Pilings
- 05 Mine Props
- 06 Posts
- 07 Fuelwood
- 08 Non-sawtimber
- 09 Ties
- 10 Coop Bolts
- 11 Acid/Dist.
- 12 Float Logs
- 13 Trap Float
- 14 Misc-Conv.
- 15 Christmas Trees
- 16 Nav Stores
- 17 Non Conv.
- 18 Cull Logs
- 19 Sm Rnd Wd
- 20 Grn Bio Cv
- 21 Dry Bio Cv
- 26 Sp Wood Pr

UNIT OF MEASURE CODES

- 01 Board feet
- 02 Cords
- 03 Cubic feet
- 04 Piece count
- 05 Weight

Appendix D

REPORTS AVAILABLE FROM THE CRUISE PROCESSING PROGRAM

A summary of report groupings and the type of information displayed is as follows:

<u>Report Grouping</u>	<u>Type of Information Displayed</u>
A	Raw data and tree level information
BLM	BLM reports
CSV	Comma-delimited text files for select reports
EX	Variable Log Length (Export Grade) reports
GR	Graphs
L	Log level reports
LD	Live/dead Summary reports
LV	Leave tree reports
R	Regional requested reports – Reports are coded for the region represented. Example: R101-R199 for Region 1 reports and R301-R399 for Region 3 reports, etc.
SC	Stem Count reports (FIXCNT Method only)
ST	Statistic reports for sample populations & strata/sale
TC	Stand tables – cut trees only – 1” and 2” diameter class
TL	Stand tables – leave trees only – 1” and 2” diameter class
TIM	SUM file for Timber Information Manager
UC	Unit level reports
VSM	Volume Summary reports
VPA	Volume Per Acre Summary reports
VAL	Dollar value reports
WT	Weight reports

Listed below are the report names and a brief description of the contents. Examples of some of the reports are shown after the list. Reports available in the current version of *CruiseProcessing* are noted with a check mark. Some reports have been slightly modified for the new program and are noted with an asterisk.

With the addition of the FIXCNT method and the use of unit-of-measure code 04 (piece count), statistics are now shown for this UOM in the ST reports. While the column heading reads “VOLUME”, the UOM actually drives what value is used in this column. Here’s a breakdown of how UOM works in these reports for this column.

UOM	VOLUME contains
01	BDFT volume (gross or net depending on the report selected)
02	Cord volume
03	CUFT volume (gross or net depending on the report selected)
04	Piece count (no gross or net)
05	CUFT volume (gross or net depending on the report selected)

New Report Numbers

For new report numbers, the older report number is listed in the description.

A REPORTS -- Listing of Raw Data and Individual Tree Information			
<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
A01	Listing of strata, cutting unit, payment unit and sample group information. (A1)	✓	
A02	Listing of plot information (A1)	✓	
A03	Listing of individual tree measurements and characteristics. (A2)	✓	
A04	Listing of count table information. (A2)	✓	
A05	Listing of primary and secondary product gross and net cubic foot volume information for each tree and per acre/per strata. (A5)	✓	
A06	Listing of primary and secondary product \$ value for each tree and per acre/per strata. (A6)	✓	
A07	Listing of primary and secondary product gross and net board foot for each tree and per acre/per strata. (A7)	✓	
A08	Listing of log grade information. (A3)	✓	
A09	Listing of log detail information for Fall, Buck and Scale. (A4)		
A10	Listing of calculated biomass weights by component: primary, secondary, foliage, live branches, dead branches, and total tree. Values are displayed as green pounds. Expansion factors are included in the report. (A9)	✓	
A11	Net BDFT volume and estimated number of trees by tree grade (A12)	✓	
A12	Net CUFT volume and estimated number of trees by tree grade (A13)	✓	
A13	Listing of Geospatial Information – one or more pages list the X, Y and Z coordinates and Metadata for the plot table. One or more pages are also generated for each measured tree in the tree table and include the X, Y and Z coordinates as well as the Metadata. (A14)	✓	
A14	Summary of Species Based on Unit Level Data – grouped into three sections, this report shows average BA per acre, estimated number of trees, or number of sample trees depending on method. The groups are area-based methods, tree-based methods tallied by species and tree-based methods tallied by sample group.	✓	
A15	Merchandizing Rules for Current Sale – shows volume	✓	

equation, product, trim, minimum log length primary product, maximum log length secondary, segmentation logic, minimum merch length, even/odd segment, and whether it was modified or not.

REPORT A01

The A01 report consists of four sections, one each for Stratum, Cutting Unit, Payment Unit and Sample Group information. These examples show a portion of each section.

A01: STRATA, UNIT, PAYMENT UNIT AND SAMPLE GROUP REPORT (A1) PAGE 4									
CRUISE#: 20002 SALE#: 20002									
SALENAME: R2 Test VERSION: DRAFT.2013									
RUN DATE & TIME: 12/12/2013 12:51:31 PM VOLUME LIBRARY VERSION: 09.23.2013									
CRUISE NO.	STRATA NO.	CRUISE METHOD	STRATA ACRES	BAF	FLOT SIZE	NO. OF PLOTS	STRATA DESCRIPTION	DATE	
								MM	YYYY
20002	1	100	18.00	0.00	0	0	100	72	009
20002	10	PCM	18.00	20.00	0	7	PCM	72	009
20002	11	FCM	18.00	0.00	5	10	FCM	72	009
20002	2	3P	18.00	0.00	0	0	3P	72	009
20002	3	3PPNT	50.00	20.00	0	18	3PPNT	72	009
20002	4	FIX	18.00	0.00	5	12	FIX	72	009
20002	5	F3P	18.00	0.00	5	10	F3P	72	009
20002	6	PNT	18.00	20.00	0	13	PNT	72	009
20002	7	P3P	18.00	20.00	0	12	P3P	72	009
20002	8	STR	18.00	0.00	0	0	STR	72	009
20002	9	S3P	18.00	0.00	0	0	S3P	72	009

A01: STRATA, UNIT, PAYMENT UNIT AND SAMPLE GROUP REPORT (A1) PAGE 3						
CRUISE#: 20002 SALE#: 20002						
SALENAME: R2 Test VERSION: DRAFT.2013						
RUN DATE & TIME: 12/12/2013 12:51:31 PM VOLUME LIBRARY VERSION: 09.23.2013						
CRUISE NO.	CUTTING UNIT NO.	CUTTING UNIT ACRES	CUTTING UNIT DESCRIPTION	LOG METHOD	PAYMENT UNIT NO.	
20002	1	18.00		421	1	
20002	10	18.00		421	10	
20002	11	18.00		421	11	
20002	2	18.00		421	2	
20002	3	50.00		421	3	
20002	4	18.00		421	4	
20002	5	18.00		421	5	
20002	6	18.00		451	6	
20002	7	18.00		420	7	
20002	8	18.00		492	8	
20002	9	18.00		421	9	
TOTAL SALE ACRES:		230.00				

A01: STRATA, UNIT, PAYMENT UNIT AND SAMPLE GROUP REPORT (A1) PAGE 5				
CRUISE#: 20002 SALE#: 20002				
SALENAME: R2 Test VERSION: DRAFT.2013				
RUN DATE & TIME: 12/12/2013 12:51:31 PM VOLUME LIBRARY VERSION: 09.23.2013				
CRUISE NO.	CUTTING UNIT	STRATUM	PAYMENT UNIT	
20002	1	1	1	
20002	10	10	10	
20002	11	11	11	
20002	2	2	2	
20002	3	3	3	
20002	4	4	4	
20002	5	5	5	
20002	6	6	6	
20002	7	7	7	
20002	8	8	8	
20002	9	9	9	

REPORT A01 continued

A01: STRATA, UNIT, PAYMENT UNIT AND SAMPLE GROUP REPORT (A1)	PAGE 6	
CRUISE#: 20002 SALE#: 20002		
SALENAME: R2 Test	VERSION: DRAFT.2013	
RUN DATE & TIME: 12/12/2013 12:51:31 PM	VOLUME LIBRARY VERSION: 09.23.2013	
STRATUM	SAMPLE GROUP	DESCRIPTION
1		
2	E	E
2	P	P
2	L	L
3		
4		
5		
6		
7		
8	E	E
8	L	L
8	P	P
9		E
10		
11		

REPORT A02

A02: PLOT INFORMATION REPORT (A1)	PAGE 8						
CRUISE#: 20002 SALE#: 20002							
SALENAME: R2 Test	VERSION: DRAFT.2013						
RUN DATE & TIME: 12/12/2013 12:51:31 PM	VOLUME LIBRARY VERSION: 09.23.2013						
CRUISE NO.	PLOT NO.	CUTTING UNIT NO.	STRATA NO.	SLOPE %	ASPECT	PLOT KPI	NULL PLOT?
20002	6	4	4	0	0	0	
20002	7	4	4	0	0	0	YES
20002	8	4	4	0	0	0	
20002	9	4	4	0	0	0	
20002	10	4	4	0	0	0	
20002	11	4	4	0	0	0	
20002	12	4	4	0	0	0	
20002	1	5	5	0	0	0	
20002	2	5	5	0	0	0	
20002	3	5	5	0	0	0	
20002	4	5	5	0	0	0	
20002	5	5	5	0	0	0	
20002	6	5	5	0	0	0	
20002	7	5	5	0	0	0	
20002	8	5	5	0	0	0	
20002	9	5	5	0	0	0	
20002	10	5	5	0	0	0	
20002	1	6	6	0	0	0	
20002	2	6	6	0	0	0	
20002	3	6	6	0	0	0	
20002	4	6	6	0	0	0	YES
20002	5	6	6	0	0	0	
20002	6	6	6	0	0	0	
20002	7	6	6	0	0	0	
20002	8	6	6	0	0	0	
20002	9	6	6	0	0	0	
20002	10	6	6	0	0	0	

REPORT A03

A03: LISTING OF TREE MEASUREMENTS AND CHARACTERISTICS (A2) PAGE 10
 CRUISE#: 20002 SALE#: 20002 VERSION: DRAFT.2013
 SALENAME: R2 Test VOLUME LIBRARY VERSION: 09.23.2013
 RUN DATE & TIME: 12/12/2013 12:51:31 PM

S	T	R	U	P	T	C	H	I	D	E	D	T
1	1	2	PP	01	02	CM	1	03	5	CL	L	11.1 36
1	1	3	LP	01	02	CM	1	03	5	CL	L	11.6 51
1	1	4	PP	01	02	CM	1	03	5	CL	L	11.9 47
1	1	5	ES	01	02	CM	1	03	4	CL	L	8.1 45
1	1	6	LP	01	02	CM	1	03	5	CL	L	9.5 44
1	1	7	PP	01	02	CM	1	03	5	CL	L	11.1 55
1	1	8	PP	01	02	CM	1	03	5	CL	L	11.4 53

REPORT A04

A04: COUNT TABLE INFORMATION (A2) PAGE 25
 CRUISE#: 20002 SALE#: 20002 VERSION: DRAFT.2013
 SALENAME: R2 Test VOLUME LIBRARY VERSION: 09.23.2013
 RUN DATE & TIME: 12/12/2013 12:51:31 PM

THE FOLLOWING INFORMATION IS PROVIDED FOR TREE-BASED METHODS AND REPRESENTS WHAT ONCE WERE COUNT RECORDS

CUTTING UNIT	STRATUM	SAMPLE GROUP	SPECIES	FREQUENCY	K2 VALUE	TALLY COUNT	KPI	DESCRIPTION
2	2	E	ES	0	0	100	578	E
2	2	P	PP	0	0	219	477	P
2	2	L	LP	0	0	110	497	L
8	8	E	ES	0	0	240	0	E
8	8	L	LP	0	0	201	0	L
8	8	P	PP	0	0	211	0	P
9	9		ES	0	0	331	0	E
9	9		LP	0	0	347	0	L
9	9		PP	0	0	388	0	P

REPORT A05

A05: CUBIC FOOT PRIMARY AND SECONDARY PRODUCT PAGE 26
 VOLUME INFORMATION (A5)
 CRUISE#: 20002 SALE#: 20002 VERSION: DRAFT.2013
 SALENAME: R2 Test VOLUME LIBRARY VERSION: 09.23.2013
 RUN DATE & TIME: 12/12/2013 12:51:31 PM

S	T	R	U	P	T	C	H	***** PER TREE *****				***** PER ACRE/PER STRATA *****						
								*** PRIMARY ***		** SECONDARY **		** PRIMARY **		** SECONDARY **				
A	T	I	O	E	E	O	G	GROSS CUFT	NET CUFT	GROSS CUFT	NET CUFT	TREE FAC	CHAR FAC	EXP FAC	GROSS CUFT	NET CUFT	GROSS CUFT	NET CUFT
1	1	2	PP	11.1	36	6.2	5.9	0.0	0.0	0.000	0.000	1.000	6.2	5.9	0.0	0.0		
1	1	3	LP	11.6	51	13.9	13.2	0.0	0.0	0.000	0.000	1.000	13.9	13.2	0.0	0.0		
1	1	4	PP	11.9	47	11.4	10.8	0.0	0.0	0.000	0.000	1.000	11.4	10.8	0.0	0.0		
1	1	5	ES	8.1	45	3.2	3.1	0.0	0.0	0.000	0.000	1.000	3.2	3.1	0.0	0.0		
1	1	6	LP	9.5	44	8.0	7.6	0.0	0.0	0.000	0.000	1.000	8.0	7.6	0.0	0.0		
1	1	7	PP	11.1	55	10.1	9.6	0.0	0.0	0.000	0.000	1.000	10.1	9.6	0.0	0.0		
1	1	8	PP	11.4	52	11.0	10.5	0.0	0.0	0.000	0.000	1.000	11.0	10.5	0.0	0.0		
1	1	9	ES	9.7	44	6.7	6.4	0.0	0.0	0.000	0.000	1.000	6.7	6.4	0.0	0.0		
1	1	10	LP	18.8	75	59.3	56.3	0.0	0.0	0.000	0.000	1.000	59.3	56.3	0.0	0.0		
1	1	11	LP	7.6	47	3.7	3.5	0.0	0.0	0.000	0.000	1.000	3.7	3.5	0.0	0.0		
1	1	12	LP	10.0	50	9.3	8.8	0.0	0.0	0.000	0.000	1.000	9.3	8.8	0.0	0.0		
1	1	13	LP	11.1	65	17.6	16.7	0.0	0.0	0.000	0.000	1.000	17.6	16.7	0.0	0.0		
1	1	14	LP	13.0	67	25.5	24.2	0.0	0.0	0.000	0.000	1.000	25.5	24.2	0.0	0.0		
1	1	15	LP	12.9	65	24.9	23.7	0.0	0.0	0.000	0.000	1.000	24.9	23.7	0.0	0.0		

REPORT A13

A13: LISTING OF GEOSPATIAL INFORMATION (A13) PAGE 45
 TREE TABLE INFORMATION
 CRUISE#: 20002 SALE#: 20002
 SALENAME: P2 Test VERSION: DRAFT.2013
 RUN DATE & TIME: 12/12/2013 12:51:31 PM VOLUME LIBRARY VERSION: 09.23.2013

S	T	U	P	T	A	M	L	B	T	I	O	K	A	T	T	E	SG	X-METERS	Y-METERS	Z-CMUT	METADATA
1	2	2	492855.000	4490020.200	1526.200	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.007728,	Point:	1010,	Polygon:	1						
2	2	2	492855.100	4490068.300	1531.700	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.336580,	Point:	1212,	Polygon:	1						
3	2	2	492855.200	4490020.200	1526.200	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.007728,	Point:	1020,	Polygon:	1						
4	2	2	492855.300	4490068.300	1531.700	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.336580,	Point:	1222,	Polygon:	1						
5	2	2	492855.400	4490020.200	1526.200	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.007728,	Point:	1030,	Polygon:	1						
6	2	2	492855.500	4490068.300	1531.700	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.336580,	Point:	1232,	Polygon:	1						
7	2	2	492855.600	4490020.200	1526.200	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.007728,	Point:	1040,	Polygon:	1						
8	2	2	492855.700	4490068.300	1531.700	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.007728,	Point:	1050,	Polygon:	1						
9	2	2	492855.800	4490068.300	1526.200	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.336580,	Point:	1242,	Polygon:	1						
1	1	2	492855.900	4490020.200	1531.700	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.336580,	Point:	1252,	Polygon:	1						
2	1	2	493193.000	4490068.300	1526.200	test01.tt,	UTM Zone 13,	NAD83,	GFS	Accu:	2.007728,	Point:	1060,	Polygon:	1						

REPORT A14

A14: SUMMARY OF SPECIES BASED ON UNIT LEVEL DATA PAGE 15
 FOR CUT TREES ONLY
 FOR PRIMARY PRODUCT ONLY
 CRUISE#: 88888 SALE#: 88888
 SALENAME: r8test VERSION: DRAFT.2014
 RUN DATE & TIME: 3/11/2014 10:04:57 AM VOLUME LIBRARY VERSION: 02.27.2014

U	N	I	T	T	A	R	E	O	S	M	P	E	A	V	E	S	T	N	O	S	A	M	P
T	A	P	S	D	ACRE	TREES	TREES																
3	60	zp	100	02			24																
3	60	ps	121	01			6																
3	60	hs	316	01			12																
3	60	hs	621	01			12																
3	60	zh	800	02			24																
4	70	zp	100	02			20																
4	70	ps	110	01			10																
4	70	ps	121	01			10																
4	70	hs	621	01			10																
4	70	zh	800	02			25																
4	70	hs	806	01			10																
4	70	hs	835	01			5																
5	80	zp	100	02		10																	
5	80	ps	110	01		5																	
5	80	ps	121	01		5																	
5	80	hs	316	01		10																	
5	80	hs	621	01		5																	
5	80	zh	800	02		10																	
5	80	hs	835	01		5																	

TREE BASED CUTTING UNITS -- TALLY BY SPECIES

2	03	zp	100	02		436																		
2	03	zh	800	02		541																		
2	03	ps	110	01		323																		
2	03	hs	316	01		273																		
2	03	ps	121	01		0																		
2	03	hs	531	01		0																		
2	03	hs	806	01		0																		
2	03	hs	835	01		0																		
2	03	hs	621	01		0																		
2	12	zp	100	02		436																		
2	12	zh	800	02		541																		
2	12	ps	110	01		323																		
2	12	hs	316	01		273																		
2	12	ps	121	01		0																		

REPORT A15


A15: MERCHANDIZING RULES FOR CURRENT SALE								PAGE 37
SAWTIMBER AND NON-SAWTIMBER PRODUCTS								
CRUISE#: 002		SALE#: 002		VERSION: DRAFT.2017				
SALENAME: Amelia Creek								
RUN DATE & TIME: 4/5/2017 9:25:07 AM				VOLUME LIBRARY VERSION: 02.27.2017				
VOLUME EQUATION	PRODUCT	TRIM	MIN LOG LENGTH PRIMARY	MAX LOG LENGTH PRIMARY	SEGMENTATION LOGIC	MIN MERCH LENGTH	EVEN/ODD SEGMENT	MODIFIED?
I00FW2W202	01	0.0	0	0	0	0	0	N/A
I00FW2W093	01	0.0	0	0	0	0	0	N/A
I00FW2W108	01	0.0	0	0	0	0	0	N/A
I00FW2W108	01	0.0	0	0	0	0	0	N/A
I00FW2W019	01	0.0	0	0	0	0	0	N/A
I00FW2W019	08	0.5	2	16	22	8	2	YES
I00FW2W202	08	0.5	2	16	22	8	2	YES
I00FW2W093	08	0.5	2	16	22	8	2	YES
I00FW2W108	08	0.5	2	16	22	8	2	YES

SEGMENT DESCRIPTIONS

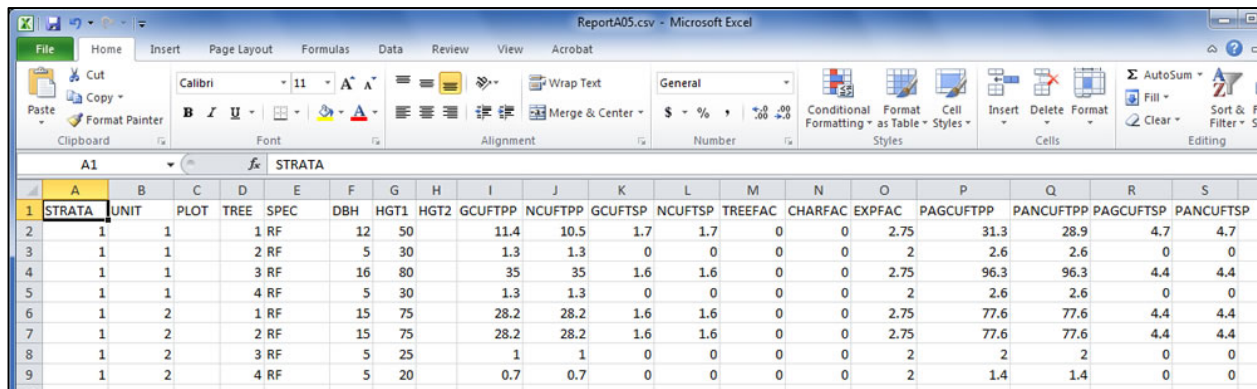
- 21 -- If top seg < 1/2 nom log len, combine with next lowest log
- 22 -- Top placed with next lowest log and segmented
- 23 -- Top segment stands on its own
- 24 -- If top seg < 1/4 log len drop the top. If top >= 1/4 and <= 3/4 nom length, top is 1/2 of nom log length, else top is nom log len.

CSV REPORTS -- Comma-delimited output text files
From selected Reports

Report	Description	Available	Modified
CSV1	From Report A05 Cubic Foot Volume Report	✓	
CSV2	From Report A06 Dollar Value Report	✓	
CSV3	From Report A07 Board Foot Volume Report	✓	
CSV4	From Report A10 Biomass Weights Report	✓	
CSV5	From Report L1 Log Level Report	✓	
CSV6	From Report L2 Log Stock Table Report	✓	
CSV7	From Report ST1 Statistics for Sample Group	✓	
CSV8	From Report UC5 Per Unit Volume – Sawtimber and Pulpwood	✓	
CSV9	From Tree Estimate Table (3P strata ONLY)	✓	
CSV10	Comma-delimited output file for import into Timber Theft program	✓	
CSV11	Comma-delimited output file for data in the VSM4 report	✓	

 **NOTE:** It is critical to have the corresponding standard report included in the text output file before the CSV file can be created. CSV9 is the only exception because it is only created for 3P strata.

REPORT CSV1



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	STRATA	UNIT	PLOT	TREE	SPEC	DBH	HGT1	HGT2	GCUFTPP	NCUFTPP	GCUFTSP	NCUFTSP	TREEFAC	CHARFAC	EXPFAC	PAGCUFTPP	PANCUFTPP	PAGCUFTSP	PANCUFTSP
2	1	1		1	RF	12	50		11.4	10.5	1.7	1.7	0	0	2.75	31.3	28.9	4.7	4.7
3	1	1		2	RF	5	30		1.3	1.3	0	0	0	0	2	2.6	2.6	0	0
4	1	1		3	RF	16	80		35	35	1.6	1.6	0	0	2.75	96.3	96.3	4.4	4.4
5	1	1		4	RF	5	30		1.3	1.3	0	0	0	0	2	2.6	2.6	0	0
6	1	2		1	RF	15	75		28.2	28.2	1.6	1.6	0	0	2.75	77.6	77.6	4.4	4.4
7	1	2		2	RF	15	75		28.2	28.2	1.6	1.6	0	0	2.75	77.6	77.6	4.4	4.4
8	1	2		3	RF	5	25		1	1	0	0	0	0	2	2	2	0	0
9	1	2		4	RF	5	20		0.7	0.7	0	0	0	0	2	1.4	1.4	0	0

CURRENTLY UNAVAILABLE

EX REPORTS -- Variable Log Length Reports

These reports deal with variable log length information used for export grade cruises. All values are for cut trees only.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
EX1	A listing of log detail information when Cruise Type in the key file is "V". Lists strata, unit, plot, tree, log number, species, log sort code, log grade code, log length, and percent defect.		
EX2	Export Sort and Grade Edit Checks – This report must be requested by the user. It does not run automatically when Cruise Type is "V". There are five possible error conditions generated in this report. If the log sort is incorrect or missing, the record is listed with stars in the sort field. The same error can occur for log grade with similar results. The record is also printed if the log length, log diameter, or BDFT volume is below the required minimum. If errors are detected, the PROGRAM IS STOPPED . A warning message is displayed on screen alerting the user that errors were found and listed in this report.		
EX3	Export Sort and Grade Minimums Report – This report displays the current log sort and grade codes along with current minimums. Fields shown are sort, grade, code, name, minimum diameter, minimum length, minimum BDFT, and minimum defect.		
EX4	Sort/Grade Log Stock Table – Report displays net MBF by species and sort/grade combinations. Each table displays the species, the log DIB small end 1 inch diameter class, and the sort/grade combinations. Sort/grade totals are shown at the bottom along with a total for the species.		
EX5	Same as report EX4 only reports net CCF.		
EX6	Volume by Species/Sort/Grade Within Unit for Each Stratum – Report displays BDFT and CUFT volume by species/sort/grade combinations. Fields shown include strata, unit, species, log sort, grade, estimated number of logs, gross and net BDFT volume, gross and net CUFT volume, percent defect, and average length. Subtotals are shown for each unit and each stratum with an overall total at the end of the report.		
EX7	Volume by Species/Sort/Grade for Each Stratum – This report shows volumes by species/sort/grade		

EX REPORTS -- Variable Log Length Reports

These reports deal with variable log length information used for export grade cruises. All values are for cut trees only.

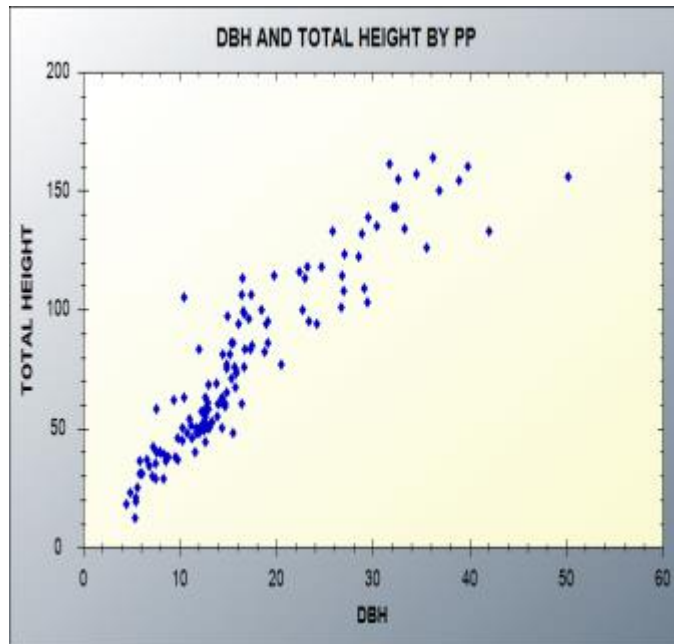
<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
	combinations. Fields include strata, species, log sort, grade, estimated number of logs, gross and net BDFT volume, gross and net CUFT volume, percent defect, and average length. Subtotals by strata are also shown. At the end of the report, a summary of species/sort/grade totals for all strata is displayed followed by an overall report total.		

GR REPORTS -- *Graphs*

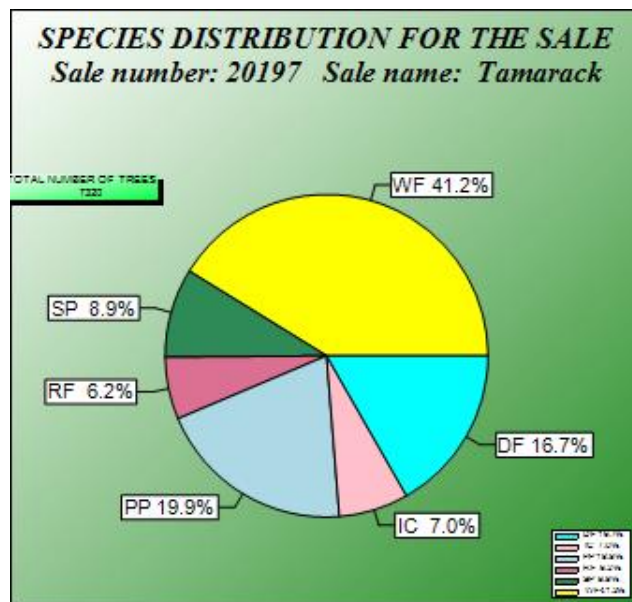
Graph selections include scatter plot, pie chart or bar chart forms. Data graphed varies and may include DBH for each species or species distribution for the sale

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
GR01	Scatter plot of DBH and Total Height for each species – produces one graph per species	✓	
GR02	Species Distribution for the Sale – produces one pie chart for the sale	✓	
GR03	Volume by Species – Sawtimber Only – produces a pie chart for each species	✓	
GR04	Volume by Product – produces a pie chart for each product	✓	
GR05	Number of logs by DIB class by Species – produces a bar chart for each species. Option is available to use 16-foot or 32-foot log lengths in the graph.	✓	
GR06	Number of Trees by DBH – produces a bar chart for the sale	✓	
GR07	Number of Trees by Species – produces a bar chart for each species	✓	
GR08	Number of Trees by DBH by Stratum -- produces a bar chart for each stratum	✓	
GR09	Number of Trees by KPI by Species – produces a bar chart for each species (3P Strata ONLY)	✓	
GR10	Basal Area Per Acre by Species by Stratum – pie chart (ONLY For Stratum with Basal Area Factor)	✓	
GR11	Basal Area Per Acre by Sample Group – bar chart (ONLY For Stratum with Basal Area Factor)	✓	

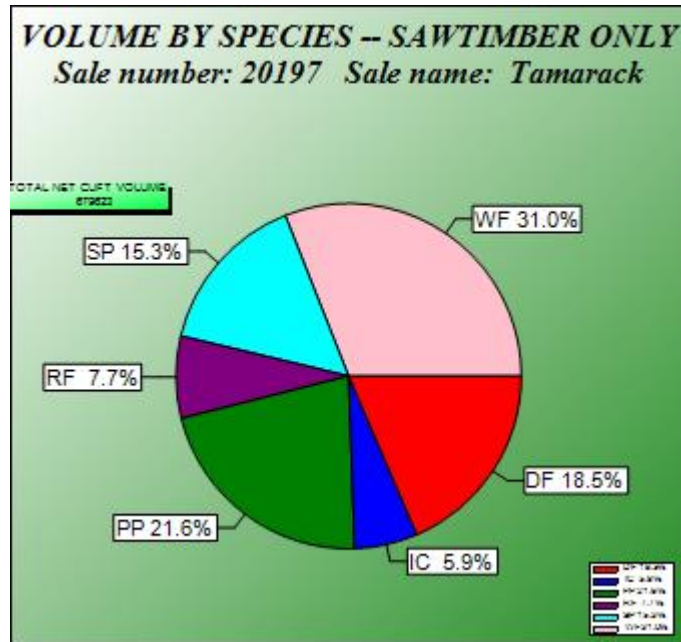
GR01



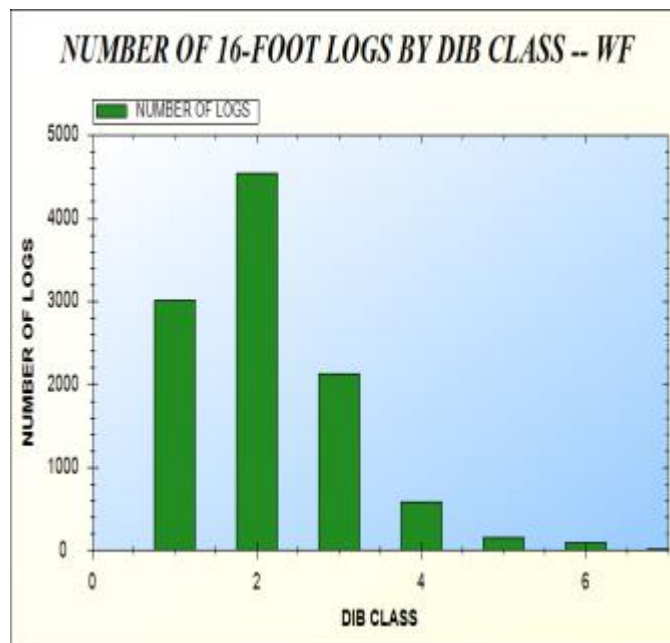
GR02



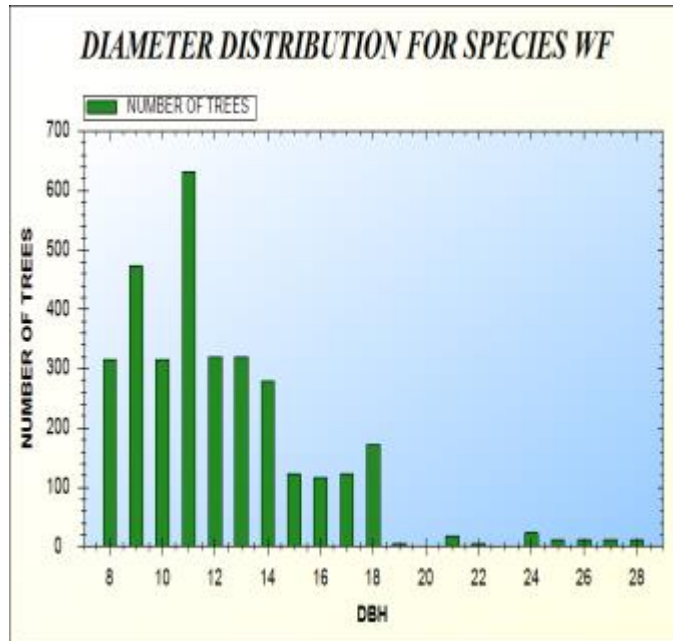
GR03



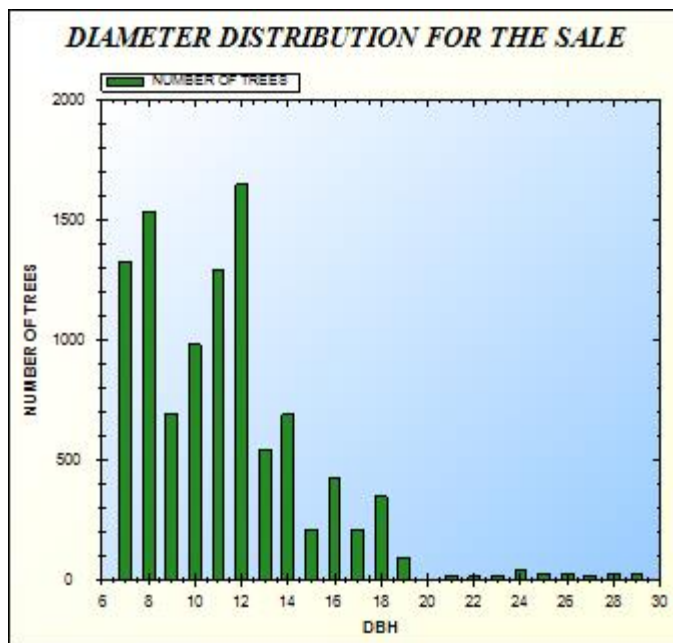
GR05



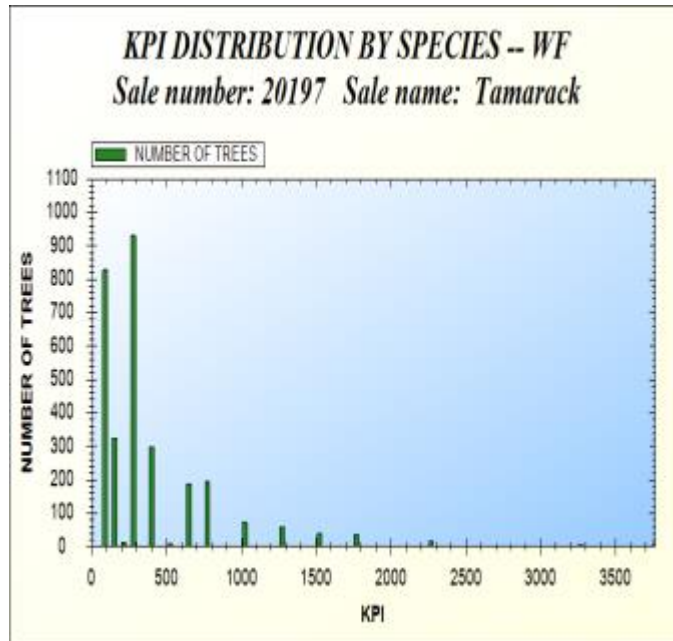
GR06



GR07



GR09



L REPORTS -- Log Level Reports

These reports deal with log level detail and are used where log grade information is entered.

Log Stock Tables – Information Displayed by Species and 3” Diameter Classes.

Diameter Range is from 6 to 84 Inches.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
L1	A listing of each log with the log volume, diameter, species, grade and expansion factor as well as gross volume, gross removed volume, and net volume for board foot and cubic foot volumes. When Cruise Type in the Key file is “V”, this report displays Variable Log Length” as the header.	✓	
L2	Net board foot volumes by species, log dib class, and grade. Reports: grade totals, total net volume, cull log, defect, and overall totals.	✓	
L3	Same as ‘L2’ except results are put in an output file. Format of file: species index, log dib class, and totals for log grades 1 – 7.		
L4	Net cubic foot volumes by species, log dib class, and grade. Reports: grade totals, total net volume, cull log, defect, and overall totals.		
L5	Same as ‘L4’ except results are put in an output file. Format of file: species index, log dib class, and totals for log grades 1 – 7.		
L6	Same as ‘L3’ except the species code is written to the output file instead of the species index. Format of file: species code, log dib class, and totals for log grades 1 – 7.		
L7	Same as ‘L5’ except the species code is written to the output file instead of the species index. Format of file: species code, log dib class, and totals for log grades 1 – 7.		
L8	Primary Product, Secondary Product, and Total – Board and Cubic Foot – Gross and Net Volumes and Number of Trees – by species and log dib class.	✓	
L9	Same as report L8 except volumes totaled across all species.		

L REPORTS -- Log Level Reports

These reports deal with log level detail and are used where log grade information is entered.

Log Stock Tables – Information Displayed by Species and 3” Diameter Classes.
Diameter Range is from 6 to 84 Inches.

Report	Description	Available	Modified
L10	Log counts and volume by log length and species for primary product only. Report is by 1-inch diameter class. NOTE: Lengths less than 8 feet are not included in this report.	✓	

REPORT L1

L1: LOG GRADE FILE													PAGE 7						
CRUISE#: 06002 SALE#: 06002													VERSION: DRAFT.2013						
SALENAME: Region 6 Test File too													VOLUME LIBRARY VERSION: 09.23.2013						
RUN DATE & TIME: 12/12/2013 1:46:49 PM																			
U																			
S	P	P	O	L	S	L	L	D	D	G	D								
T	R	R	F	O	M	G	L	E	G	E	R								
A	N	L	R	I	U	E	N	I	G	A	E	C							
T	I	O	E	E	C	A	U	A	A	T	D	C	V						
A	T	T	E	S	T	S	M	M	M	H	E	T	B	GROSS	BDFT	NET	GROSS	CUBIC	NET
														BDFT	REMVD	BDFT	CUBIC	REMVD	CUBIC
10 10a	3 LP	01 03	1	11.5	0.0	16.0	1	4	0	67.0	0.0	64.0	13.2	0.0	12.7	4	1.000		
10 10a	4 LP	01 03	1	11.5	0.0	16.0	1	4	0	67.0	0.0	64.0	13.2	0.0	12.7	4	1.000		
10 10a	4 LP	01 03	2	5.0	11.5	8.0	1	3	0	9.0	0.0	9.0	3.2	0.0	3.1	2	1.000		
10 10a	5 LP	01 03	1	11.5	0.0	16.0	1	4	0	67.0	0.0	64.0	13.2	0.0	12.7	4	1.000		
10 10a	5 LP	01 03	2	5.0	11.5	8.0	1	3	0	9.0	0.0	9.0	3.2	0.0	3.1	2	1.000		
10 10a	6 LP	01 03	1	11.5	0.0	16.0	1	4	0	67.0	0.0	64.0	13.2	0.0	12.7	4	1.000		
10 10a	6 LP	01 03	2	5.0	11.5	16.0	1	5	0	17.0	0.0	16.0	6.4	0.0	6.1	2	1.000		
10 10a	7 LP	01 03	1	11.5	0.0	16.0	1	4	0	67.0	0.0	64.0	13.2	0.0	12.7	4	1.000		
10 10a	7 LP	01 03	2	6.2	11.5	16.0	1	4	0	20.0	0.0	19.0	6.9	0.0	6.6	2	1.000		
10 10a	8 LP	01 03	1	11.5	0.0	16.0	1	4	0	67.0	0.0	64.0	13.2	0.0	12.7	4	1.000		
10 10a	8 LP	01 03	2	7.7	11.5	16.0	1	4	0	30.0	0.0	29.0	8.1	0.0	7.8	3	1.000		

REPORT L2

L2: LOG STOCK TABLE - MSF										PAGE 87			
CRUISE#: 06002 SALE#: 06002										VERSION: DRAFT.2013			
SALENAME: Region 6 Test File too										VOLUME LIBRARY VERSION: 09.23.2013			
RUN DATE & TIME: 12/12/2013 1:46:49 PM													
TABLE 24 - REPORT FOR SPECIES: 098													
LOG	***** NET VOLUMES *****									TOTAL			TOTAL NET
DIB										NET	CULL LOG	DEFECT	+ CULL LOG
CLASS	GRADE 0	GRADE 1	GRADE 2	GRADE 3	GRADE 4	GRADE 5	GRADE 6	GRADE 7		VOLUME	GRD=8,9	GRD=1-7	+ DEFECT
1	0.00	27.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.66	0.00	3.18	30.84
6	0.00	5.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.72	0.00	0.64	6.36
9	0.00	11.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.13	0.00	1.27	12.40
11	0.00	19.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.07	0.00	2.23	21.30
TOTALS	0.00	63.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.58	0.00	7.31	70.89

REPORT L8

L8: LOG STOCK TABLE - BOARD AND CUBIC											PAGE 103	
CRUISE#: 06002 SALE#: 06002											VERSION: DRAFT.2013	
SALENAME: Region 6 Test File too											VOLUME LIBRARY VERSION: 09.23.2013	
RUN DATE & TIME: 12/12/2013 1:46:49 PM												
TABLE 39 - REPORT FOR SPECIES: 017												
LOG DIB CLASS	# OF LOGS	***** PRIMARY PRODUCT *****			**** SECONDARY PRODUCT ****			***** TOTAL *****				
		GROSS BDFT	NET BDFT	GROSS CUFT	NET CUFT	# OF LOGS	GROSS CUFT	NET CUFT	# OF LOGS	GROSS CUFT	NET CUFT	
3	10013.0	53809.0	53809.0	13265.2	13265.2	0.0	0.0	0.0	10013.0	13265.2	13265.2	
5	11262.0	125135.0	111371.0	21022.6	18895.3	0.0	0.0	0.0	11262.0	21022.6	18895.3	
6	7507.0	150140.0	135126.0	27776.6	24773.8	0.0	0.0	0.0	7507.0	27776.6	24773.8	
TOTALS	28782.0	329084.0	300306.0	62064.4	56934.3	0.0	0.0	0.0	28782.0	62064.4	56934.3	

REPORT L10

This report potentially has three sections. The format is the same for all three. The first section shown below reflects log counts by length and diameter class. If cubic foot volume was calculated the second section appears. And, if board foot volume was calculated, the third section appears. Each section appears for each species in the data.

L10: LOG COUNTS AND VOLUME BY LENGTH AND SPECIES														PAGE 25	
FOR CUT TREES ONLY - BY 1" DIAMETER CLASS															
(5-inch class = 4.6 - 5.5 inches; 9-inch class = 8.6 - 9.5 inches, and so on.)															
CRUISE#: 06002 SALE#: 06002														VERSION: DRAFT.2013	
SALENAME: Region 6 Test File too														VOLUME LIBRARY VERSION: 09.23.2013	
RUN DATE & TIME: 12/12/2013 1:46:49 PM															
NOTE: THIS REPORT DOES NOT INCLUDE ANY COUNT OF THE SECONDARY PRODUCT OR CULL LOGS															
SPECIES - 017 - LOG COUNTS															
LENGTH	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	TOTALS	
3	1	1	2503	3753	3753	0	0	0	0	0	0	0	0	10013	
5	1	2503	1251	1	3753	0	0	0	0	0	0	0	0	11262	
6	0	0	0	0	7507	0	0	0	0	0	0	0	0	7507	
TOTALS	2	2504	3754	3754	15013	0	0	0	0	0	0	0	0	28782	

L10: LOG COUNTS AND VOLUME BY LENGTH AND SPECIES														PAGE 26	
FOR CUT TREES ONLY - BY 1" DIAMETER CLASS															
(5-inch class = 4.6 - 5.5 inches; 9-inch class = 8.6 - 9.5 inches, and so on.)															
CRUISE#: 06002 SALE#: 06002														VERSION: DRAFT.2013	
SALENAME: Region 6 Test File too														VOLUME LIBRARY VERSION: 09.23.2013	
RUN DATE & TIME: 12/12/2013 1:46:49 PM															
NOTE: THIS REPORT DOES NOT INCLUDE ANY COUNT OF THE SECONDARY PRODUCT OR CULL LOGS															
SPECIES - 017 - NET CCF VOLUME															
LENGTH	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	TOTALS	
3	0	0	28	49	56	0	0	0	0	0	0	0	0	133	
5	0	38	23	0	103	0	0	0	0	0	0	0	0	189	
6	0	0	0	0	248	0	0	0	0	0	0	0	0	248	
TOTALS	0	38	50	49	407	0	0	0	0	0	0	0	0	569	

LD REPORTS – Live/Dead Volume

Live/Dead volume by a variety of combinations: Product and Species; Cutting Unit, Product and Species; Payment Unit, Product and Species; and Logging Method, Product and Species.

Report	Description	Available	Modified
LD1	Live/Dead cubic foot volume by product and species (CS4)	✓	
LD2	Live/Dead board foot volume by product and species (CS5)	✓	
LD3	Live/Dead cubic foot volume by cutting unit, product and species (CS6)	✓	
LD4	Live/Dead board foot volume by cutting unit, product and species (CS7)	✓	
LD5	Live/Dead cubic foot volume by payment unit, product and species (CS8)	✓	
LD6	Live/Dead board foot volume by payment unit, product and species (CS9)	✓	
LD7	Live/Dead cubic foot volume by logging method, product and species (CS10)	✓	
LD8	Live/Dead board foot volume by product and species (CS11)	✓	

REPORT LD1

LD1: LIVE/DEAD VOLUME BY PRODUCT AND SPECIES - CUFT (CS4)													PAGE 3		
FOR THE SALE															
FOR CUT TREES ONLY															
CRUISE#: 20002 SALE#: 20002															
SALENAME: R2 Test													VERSION: DRAFT.2013		
RUN DATE & TIME: 12/12/2013 2:04:49 PM													VOLUME LIBRARY VERSION: 09.23.2013		
P	S	LIVE			DEAD			OTHER			TOTAL				
U	I	EST.	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET		
C	E		TREES	CUFT	CUFT		TREES	CUFT	CUFT		TREES	CUFT	CUFT		
T	S														
01	ES	2728	51547	49483	0	0	0	0	0	0	2728	51547	49483		
	LP	4170	83449	79297	0	0	0	0	0	0	4170	83449	79297		
	PP	2099	42551	40435	0	0	0	0	0	0	2099	42551	40435		
01	TOTAL	8997	177546	169215	0	0	0	0	0	0	8997	177546	169215		
14	AS	7192	144123	136965	0	0	0	0	0	0	7192	144123	136965		
	LP	0	0	0	387	5025	4774	0	0	0	387	5025	4774		
14	TOTAL	7192	144123	136965	387	5025	4774	0	0	0	7579	149148	141739		
TOTALS		16189	321669	306180	387	5025	4774	0	0	0	16576	326693	310954		

NOTE: Volumes include primary, secondary and recovered for each product number.
 Net cubic or board includes recovered volume if present.
 Number of trees includes only primary values even though no volume may appear.

REPORT LD3

LD3: LIVE/DEAD VOLUME BY CUTTING UNIT, PRODUCT AND SPECIES - CUFT (CS6)												PAGE 5	
FOR THE SALE													
FOR CUT TREES ONLY													
CRUISE#: 20002 SALE#: 20002													
SALENAME: R2 Test													
RUN DATE & TIME: 12/12/2013 2:04:49 PM													
VERSION: DRAFT.2013													
VOLUME LIBRARY VERSION: 09.23.2013													
C	U	P	S										
T	R	P	O	E									
U	D	C											
N	U	I	EST.										
I	C	E	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET
T	T	S	TREES	CUFT	CUFT	TREES	CUFT	CUFT	TREES	CUFT	TREES	CUFT	CUFT
01 TOTAL			0	0	0	0	0	0	0	0	0	0	0
14	AS	359597	7206153	6848246	0	0	0	0	0	0	359597	7206153	6848246
	LP	0	0	0	0	0	0	0	0	0	0	0	0
14 TOTAL			359597	7206153	6848246	0	0	0	0	0	359597	7206153	6848246
CUTTING UNIT													
3	TOTAL		359597	7206153	6848246	0	0	0	0	0	359597	7206153	6848246

REPORT LD5

LD5: LIVE/DEAD VOLUME BY PAYMENT UNIT, PRODUCT AND SPECIES - CUFT (CS8)												PAGE 7	
FOR THE SALE													
FOR CUT TREES ONLY													
CRUISE#: 20002 SALE#: 20002													
SALENAME: R2 Test													
RUN DATE & TIME: 12/12/2013 2:04:49 PM													
VERSION: DRAFT.2013													
VOLUME LIBRARY VERSION: 09.23.2013													
P	A	P	S										
Y	R	P	O	E									
U	D	C											
N	U	I	EST.										
I	C	E	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET
T	T	S	TREES	CUFT	CUFT	TREES	CUFT	CUFT	TREES	CUFT	TREES	CUFT	CUFT
1	01	ES	2	10	10	0	0	0	0	0	2	10	10
		LP	10	191	181	0	0	0	0	0	10	191	181
		PP	4	39	37	0	0	0	0	0	4	39	37
01 TOTAL			16	239	227	0	0	0	0	0	16	239	227
14	AS	0	0	0	0	0	0	0	0	0	0	0	0
	LP	0	0	0	0	0	0	0	0	0	0	0	0
14 TOTAL			0	0	0	0	0	0	0	0	0	0	0
PAYMENT UNIT													
1	TOTAL		16	239	227	0	0	0	0	0	16	239	227

REPORT LD7

LD7: LIVE/DEAD VOLUME BY LOGGING METHOD, PRODUCT AND SPECIES - CUFT (CS10)												PAGE 10		
FOR THE SALE														
FOR CUT TREES ONLY														
CRUISE#: 20002 SALE#: 20002														
SALENAME: R2 Test														
RUN DATE & TIME: 12/12/2013 2:04:49 PM														
VERSION: DRAFT.2013														
VOLUME LIBRARY VERSION: 09.23.2013														
L	O	P	S											
G	R	P	O	E										
M	D	C												
E	U	I	EST.											
T	C	E	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET	EST.	NO OF	GROSS	NET	
H	T	S	TREES	CUFT	CUFT	TREES	CUFT	CUFT	TREES	CUFT	TREES	CUFT	CUFT	
421	01	ES	14651	201339	193065	0	0	0	0	0	14651	201339	193065	
		LP	27638	515654	490157	0	0	0	0	0	27638	515654	490157	
		DP	9448	279245	265465	0	0	0	0	0	9448	279245	265465	
01 TOTAL			51737	996238	948687	0	0	0	0	0	51737	996238	948687	
14	AS	359597	7206153	6848246	0	0	0	0	0	0	359597	7206153	6848246	
	LP	0	0	0	0	6967	90442	85930	0	0	0	6967	90442	85930
14 TOTAL			359597	7206153	6848246	6967	90442	85930	0	0	359597	7206153	6934176	
LOGGING METHOD														
421	TOTAL		411335	8202391	7796934	6967	90442	85930	0	0	418302	8292833	7882864	

LV REPORTS – Leave Tree Reports

Leave Tree reports correspond to cut tree reports as shown in the descriptions below. These reports contain leave trees only. Two summary reports, two statistics reports and one unit level report are available. These reports have the same format as the corresponding report so no examples are shown here.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
LV01	Volume Summary for Sample Group – corresponds to the VSM2 report.	✓	
LV02	Volume Summary for Strata – corresponds to the VSM3 report	✓	
LV03	Net Volume Statistics for Sample Group – corresponds to the ST1 report	✓	
LV04	Gross Volume Statistics for Sample Group – corresponds to the ST2 report	✓	
LV05	Volume by Species within Cutting Unit Across All Stratum – corresponds to the UC5 report	✓	

Region 10 Reports			
<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
R001	Appraisal summary report for board foot by species and showing logging adjustment characteristics.	✓	
R002	Same as 'R001' except shows cubic foot volumes.	✓	
R003	Log grade summary board foot sale volume by species by grade.	✓	
R004	Same as 'R003' except shows cubic foot volumes.	✓	
R005	Appraisal summary report by Logging Method. For cut trees and primary product by cubic foot volume. Displays logging method, species, product, scale defect %, woods defect %, total gross removed, gross per acre removed, average log volume, total net CCF, net CCF per acre, estimated number of trees, trees per acre, mean DBH, mean height, logs per CCF, standing gross per acre, and acres.	✓	
R006	Summary of net board foot volume by species, diameter and log grade. Now reported as MBF. Creates a flat file only.	✓	
R007	Same as R006 only reports net cubic foot volume. Now reports as CCF.	✓	
R008	Log Matrix Output File** – A comma-delimited file which includes sale name, cruise number, log sort description, species, log grade, log diameter, standing gross MBF, gross removed MBF, net volume MBF, and net utility MBF.	✓	
R009	Log Matrix Output File** – A comma-delimited file with the same format as the R008 but the individual categories are different from R008 report.	✓	

** To update the **Log Matrix**, see the section on **Reports**.

REPORT R001

R001: APPRAISAL SUMMARY REPORT-BDFT VOLUME			PAGE 27
CRUISE#: 12345		SALE#: 12345	
SALENAME: DanOTest2			VERSION: DRAFT.2017
RUN DATE & TIME: 3/6/2017 12:57:06 PM			VOLUME LIBRARY VERSION: 02.27.2017
SALE VOLUMES (MBF) BY SPECIES			
Species	GROSS Sawlog Removed	NET Sawlog Removed	
242	6.885	5.309	
263	9.532	6.622	
042	2.865	2.106	
098	12.987	10.632	
All Species	32.269	24.668	
LOGGING CHARACTERISTICS			
No. of 32-Ft Logs/MBF Gross removed		4.37	
Avg. MBF Net removed per 32 ft. log		0.175	
Avg. MBF Net removed per acre		24.668	
Avg. Scaling Defect %		23.56	
Mean DBH (for cut trees)		19.4	
Average cut tree volume, Net MBF		0.321	
Sale MBF/CCF conversion		0.48	

REPORT R003

R003: LOG GRADE SUMMARY-BDFT VOLUME								PAGE 54
SALE VOLUME (MBF) BY SPECIES BY GRADE								
CRUISE#: New7		SALE#: New7						VERSION: DRAFT.2017
SALENAME: NewTest								VOLUME LIBRARY VERSION: 11.21.2016
RUN DATE & TIME: 2/23/2017 3:27:36 PM								
GRADE		242	263	263Y	042	098	98Y	
0	STD GRS	0.00	0.44	0.00	0.00	4.20	0.00	
	NET	0.00	0.32	0.00	0.00	2.67	0.00	
	NET %	0.00 %	0.07 %	0.00 %	0.00 %	1.65 %	0.00 %	
1	STD GRS	0.00	0.00	0.00	0.75	14.46	0.00	
	NET	0.00	0.00	0.00	0.55	9.52	0.00	
	NET %	0.00 %	0.00 %	0.00 %	0.35 %	5.87 %	0.00 %	
2	STD GRS	0.00	281.09	0.00	61.64	143.70	0.00	
	NET	0.00	190.69	0.00	43.35	114.95	0.00	
	NET %	0.00 %	40.44 %	0.00 %	27.53 %	70.86 %	0.00 %	
3	STD GRS	0.05	409.03	83.90	148.78	42.72	119.90	
	NET	0.04	280.50	78.12	111.92	35.08	118.89	
	NET %	0.01 %	59.49 %	100.00 %	71.07 %	21.62 %	100.00 %	
4	STD GRS	0.00	0.00	0.00	0.00	0.00	0.00	
	NET	0.00	0.00	0.00	0.00	0.00	0.00	

REPORT R005

ROOS: APPRAISAL SUMMARY BY LOGGING METHOD															PAGE 17	
FOR CUT TREES ONLY - PRIMARY PRODUCT ONLY																
-- CUBIC FOOT --																
CRUISE#: 67991 SALE#: 67991																
SALENAME: Region10 Test Sale																
RUN DATE & TIME: 8- 4-2004 16: 1:51																
VERSION: DRAFT.2004B																
VOLUME LIBRARY VERSION: 07.29.2004																
L	P															
O	S	R														
C	P	O														
E	D															
M	C	U	TOTAL	GROSS/	AVERAGE	TOTAL	NET								STANDING	
T	I	C	GROSS	ACRE	LOG	NET	CCF/	ESTIM	TREES/	MEAN	MEAN	LOGS/	GROSS/			
H	E	T	REMOVED	REMOVED	VOLUME	CCF	ACRE	TREES	ACRE	DBH	HGT	CCF	ACRE	ACRES		
SCALE	WOODS															
DEF %	DEF %															
042	01	54.2	55.5	204	1	0.31	94	0	10141	30.3	18.5	0.2	3.3	0.6	335	
098	01	30.6	32.7	163	0	0.29	113	0	4112	12.3	20.6	0.2	3.4	0.5		
242	01	33.6	35.6	190	95	0.32	127	63	144	72.0	27.8	89.4	3.1	98.2		
260	01	45.4	47.0	466	1	0.26	255	1	23617	70.7	18.0	0.3	3.9	1.4		
TOTAL			42.6	44.3	1024	3	0.28	588	2	38014	113.8	18.5	0.6	3.6	3.2	
430	042	01	39.7	40.7	4656	6	0.17	2806	4	10278	14.2	16.7	65.3	6.1	6.5	724
430	098	01	8.7	11.3	3224	4	0.41	2943	4	1557	2.2	27.7	104.2	2.5	4.6	
430	242	01	47.4	48.2	10960	15	0.30	5267	8	13274	18.3	20.5	64.3	3.3	15.4	

REPORT R006

Note: This is a flat file only. Nothing appears in the reports output file.

NET BOARD FOOT VOLUME (MBF) BY DIAMETER GROUP FOR: 05074								
Sale#	Species	Diam Group	Peel/Select	#1 Saw	#2 Saw	#3 Saw	Special Mill	
05074	098	06 - 11	0.00	0.00	0.00	1094.52	0.00	
05074	098	12 - 17	0.00	0.00	1571.13	725.53	59.77	
05074	098	18 - 23	0.00	0.00	1343.32	489.67	164.48	
05074	098	24+	0.00	29.11	935.77	92.14	78.71	
05074	263	06 - 11	0.00	0.00	0.00	149.75	0.00	
05074	263	12 - 17	0.00	0.00	115.18	74.91	16.47	
05074	263	18 - 23	0.00	0.00	85.24	25.96	63.57	
05074	263	24+	0.00	0.00	0.00	0.00	0.00	

REPORT R008

Note: This is a flat file only. Nothing appears in the reports output file.

SALE NAME	CRUISE NUMBER	LOG SORT DESCRIPTION	SPECIES CODE	LOG GRADE CODE	LOG SED	CVOL	STANDING	MBF	CVOL	REMOVED	MBF	NVOL	REMOVED	MBF	NVOL	UTILITY	MBF
Region 10 Test Cruise	,05092,	AYC #PS sawlog	MBF net	,042,	,0	,	,	0.000,	0.000,	0.000,	0.000,	0.000,	0.000,	0.000,	0.000,	0.000,	0.000,
Region 10 Test Cruise	,05092,	AYC #1sawlog	MBF net	,042,	,1	,	,	173.325,	168.124,	96.622,	0.000,	0.000,	0.000,	0.000,	0.000,	0.000,	0.000,
Region 10 Test Cruise	,05092,	AYC SM sawlog	MBF net	,042,	,6	,	,	492.419,	477.689,	296.091,	0.001,	0.001,	0.001,	0.001,	0.001,	0.001,	0.001,
Region 10 Test Cruise	,05092,	AYC #2 sawlog	MBF net	,042,	,2	,	,	745.005,	722.399,	454.062,	0.003,	0.003,	0.003,	0.003,	0.003,	0.003,	0.003,
Region 10 Test Cruise	,05092,	AYC #3 sawlog	MBF net	,042,	,3	,	,	919.663,	891.619,	559.490,	0.012,	0.012,	0.012,	0.012,	0.012,	0.012,	0.012,
Region 10 Test Cruise	,05092,	H 1saw	24+ SED	,263,	,1	,	, 24.0+	948.753,	778.297,	569.460,	142.367,	142.367,	142.367,	142.367,	142.367,	142.367,	142.367,
Region 10 Test Cruise	,05092,	H 2saw	15_0 thru 17_9 SED	,263,	,2	,	, 15.0 thru 17.9	1088.263,	879.842,	708.639,	177.163,	177.163,	177.163,	177.163,	177.163,	177.163,	177.163,
Region 10 Test Cruise	,05092,	H 2saw	18_0 thru 23_9 SED	,263,	,2	,	, 18.0 thru 23.9	2215.589,	1803.255,	1390.862,	347.720,	347.720,	347.720,	347.720,	347.720,	347.720,	347.720,

Region 1 Reports

Report	Description	Available	Modified
R101	Volume Summary by Product and Contract Species -- For cut trees and primary product only. Displays contract species, species, product, unit of measure, average defect % for BDFT and CUFT, gross and net BDFT/CUFT ratio, average DBH, gross and net BDFT and CUFT volume, gross CCF per 16' logs and gross MBF per 16' logs.	✓	
R102	Board Foot Summary by Logging Method by Product for Cut Trees Reports: Gross and net volume, average defect (%), estimated number of trees, gross board foot per acre, net board foot per acre, trees per acre, mean dbh, mean ht, net board foot per tree, net 16' logs per gross MBF, average slope, and total acres.	✓	
R103	Identical to R102 except reports cubic foot volumes.	✓	
R104	Basal Area per unit: reports average DBH and basal area per unit by cut or leave designation. Includes stratum, cutting unit, species, sample group and primary product as well.	✓	

REPORT R101

R101: VOLUME SUMMARY BY PRIMARY PRODUCT AND CONTRACT SPECIES															PAGE 53		
FOR CUT TREES ONLY																	
CRUISE#: 1 SALE#: 1																	
SALENAME: French Gulch															VERSION: DRAFT.2014		
RUN DATE & TIME: 3/11/2014 12:54:55 PM															VOLUME LIBRARY VERSION: 02.27.2014		
***** PRIMARY PRODUCT *****																	
C O N T R A C T S P E C I E S	S P E C I E S	P R O D U C T	R U N	U N I T	A V G D E F		G R O S S	N E T	***** CONTRACT SPECIES *****								
					%	%			BDFT		CUFT		A V G	** G R O S S V O L U M E **	** N E T V O L U M E **	G R O S S	G R O S S
DF	01	03	10	11	5.4099	5.4107	7.1	386199	71388	345672	63887	20.7	38.3				
GF	01	03	30	29	5.5446	5.4909	9.6	1770680	319353	1243943	226544	17.1	30.8				
LP	01	03	16	16	5.3664	5.3629	9.4	1538038	286607	1294997	241473	22.2	41.3				
S	01	03	5	6	5.2151	5.2220	9.9	39326	7541	37165	7117	19.2	36.8				
PRODUCT 01 TOTAL			22	21	5.4623	5.4205	9.1	3734242	684899	2921777	539021	19.6	36.0				
DF	08	03	29	30	5.4050	5.4542	17.2	16493	3051	11653	2137	10.9	20.1				
GF	08	03	26	26	5.3448	5.2865	10.5	58012	10854	42697	8077	15.7	29.4				
LP	08	03	8	8	5.4430	5.4475	10.1	3765544	691817	3456371	634486	20.5	37.7				
PRODUCT 08 TOTAL			9	9	5.4413	5.4455	10.1	3840049	705723	3510721	644699	20.4	37.5				
CONTR SPEC TOTAL			15	15	5.4467	5.4341	9.5	7574291	1390611	6432498	1183720	20.0	36.7				
CONTRACT SPECIES TOTALS			15	15	5.4467	5.4341	9.5	7574291	1390611	6432498	1183720	20.0	36.7				

REPORT R103

R103: SUMMARY BY LOGGING METHOD-CUFT													PAGE 55
FOR CUT TREES ONLY													
-- CUBIC FOOT --													
CRUISE#: 1 SALE#: 1													
SALENAME: French Gulch													VERSION: DRAFT.2014
RUN DATE & TIME: 3/11/2014 12:54:55 PM													VOLUME LIBRARY VERSION: 02.27.2014
L O G D M U T C H T	GROSS CF	TOTAL DEF%	NET CF	ESTIM TREES	GROSS CF/ ACRE	NET CF/ ACRE	TREES/ ACRE	MEAN DBH	MEAN HGT	NET CF/ TREE	16'LOGS/ GROSS CCF	AVG SLOPE	ACRES
420 01 P	238271	20.6	189293	14438	2291	1820	138.8	9.0	76.0	13	20.1	0.0	104.0
01 TOTAL	238271	20.6	189293	14438	2291	1820	138.8	9.0	76.0	13	20.1	0.0	104.0
420 02 R	0	0.0	5716	0	0	55	0.0	0.0	0.0	0	55.0	0.0	N/A
02 TOTAL	0	0.0	5716	0	0	55	0.0	0.0	0.0	0	0.0	0.0	104.0
420 08 P	252795	7.9	232848	12151	2431	2239	116.8	10.0	81.1	19	20.9	0.0	104.0
420 08 R	0	0.0	443	0	0	4	0.0	0.0	0.0	0	4.3	0.0	N/A
08 TOTAL	252795	7.7	233291	12151	2431	2243	116.8	10.0	81.1	19	20.9	0.0	104.0

REPORT R104

R104: BASAL AREA PER UNIT								PAGE 57
FOR CUT AND LEAVE TREES								
CRUISE#: 1 SALE#: 1								
SALENAME: French Gulch								VERSION: DRAFT.2014
RUN DATE & TIME: 3/11/2014 12:54:55 PM								VOLUME LIBRARY VERSION: 02.27.2014
STRATA	CUTTING UNIT	SPECIES	SAMPLE GROUP	PRIMARY PRODUCT	CUT/ LEAVE	AVG DBH	BASAL AREA	
SUBTOTAL					C	10.0	132.1	
UNIT		1 SUBTOTAL				10.0	132.1	
2	5	DF		01	C	8.7	0.7	
2	5	GF		01	C	8.2	21.4	
2	5	LP		01	C	11.3	42.9	
2	5	LP	PW	08	C	8.2	67.9	
SUBTOTAL					C	9.3	132.9	
UNIT		5 SUBTOTAL				9.3	132.9	
2	9	GF		01	C	10.1	21.4	
2	9	LP		01	C	9.0	42.9	
2	9	LP	PW	08	C	11.0	67.9	
SUBTOTAL					C	10.0	132.1	
UNIT		9 SUBTOTAL				10.0	132.1	
2	11	GF		01	C	9.5	21.4	
2	11	LP		01	C	11.2	42.9	
2	11	LP	PW	08	C	12.2	67.9	
SUBTOTAL					C	11.4	132.1	

Region 2 Reports			
<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
R201	Trees per Acre and Net Cubic Volume – Displayed by species and stratum. Includes stratum, species, primary and secondary product, estimated number of trees, trees per acre, net cubic volume for primary and secondary product, net cubic volume per acre for primary and secondary product and stratum acres.	✓	
R202	Percent Defect by Species -- by 1 inch diameter class, board foot volume, primary product only, and cut trees only.	✓	
R203	Same as R202 only reports in cubic feet.	✓	
R204	Percent Defect by Species – by 2 inch diameter class, board foot volume, primary product only, and cut trees only.	✓	
R205	Same as R204 only reports in cubic feet.	✓	
R206	QMD & Average DBH by Species and Contract Species – Primary Product Only – Cut Trees Only -- Reports net CUFT volume, BDFT/CUFT Ratio by contract species, QMD by contract species and average DBH by contract species	✓	
R207	Stewardship Product Summary – Stems Per Acre For cut trees only This report is broken down by cutting unit by stratum and displays the trees per acre and total stems for each species and product. The number of plots in the unit as well as the fixed plot size are also displayed. The average DRC is also shown if it was collected.	✓	
R208	Stewardship Average Product Cost This report for cut trees only shows cutting unit, species and net cubic foot volume. It also shows the percent net volume, pounds per cubic foot, and weight fraction. The summary section includes the scaling defect percent, adjusted weight factor, pounds per CCF, tons per CCF and the cost per ton.	✓	

REPORT R201

R201: TREES PER ACRE & NET CUBIC VOLUME											PAGE 13
BY SPECIES AND STRATA											
FOR CUT TREES ONLY											
CRUISE#: 93002 SALE#: 93002											
SALENAME: WHITE SWAN											VERSION: 08.13.2004B
RUN DATE & TIME: 08-11-2004 10:54:20											VOLUME LIBRARY VERSION: 07.29.2004
STRATUM	SPECIES	PRIMARY PRODUCT	SECONDARY PRODUCT	EST. # TREES	TREES PER ACRE	PRIMARY PRODUCT NET CUBIC		SECONDARY PRODUCT NET CUBIC		STRATUM ACRES	
						VOLUME	PER ACRE	VOLUME	PER ACRE		
01	ES	01	02	10	<1	218	2	0	0	112	
	LP	01	02	4477	40	39013	348	0	0		
	LPD	01	02	365	3	4300	38	0	0		
	LPP	02	02	16413	147	40485	361	0	0		
	TF	01	02	285	3	2471	22	0	0		
01	TOTAL			21550	192	86487	772	0	0	112	
02	LP	01	02	41446	193	372596	1733	0	0	215	
	LPD	01	02	405	2	3656	17	0	0		
02	TOTAL			41852	195	376252	1750	0	0	215	

REPORT R206

R206: QMD & AVE DBH BY SPECIES & CONTRACT SPECIES											PAGE 6
PRIMARY PRODUCT ONLY											
FOR CUT TREES ONLY											
CRUISE#: 25406 SALE#: 25406											
SALENAME: Green Creek 02											VERSION: 08.29.2006B
RUN DATE & TIME: 09-06-2006 13:51:06											VOLUME LIBRARY VERSION: 07.25.2006
CONTRACT SPECIES	SPECIES	NET CUFT VOLUME	BDFT/CUFT RATIO BY CONTR SPP	QMD BY CONTRACT SPECIES	AVG DBH BY CONTRACT SPECIES						
DF	DDF	67863	5.0177	12.6	12.3						
DF	DF	15124	4.1715	10.3	10.0						
DF	RDF	22618	4.3337	10.3	10.1						
CONTRACT SPECIES DF	TOTAL	105604	4.8785	11.5	11.1						
ES	DES	2044	4.9934	15.8	15.7						
CONTRACT SPECIES ES	TOTAL	2044	4.9934	15.8	15.7						
LP	DLP	192	3.9431	12.8	12.3						
LP	LP	1932	5.5352	12.8	12.7						
LP	RLP	5	3.4783	7.7	7.7						
CONTRACT SPECIES LP	TOTAL	2129	4.6772	12.7	12.6						

REPORT R207

R207: STEWARDSHIP PRODUCT SUMMARY - STEMS PER ACRE								PAGE 43
BY CUTTING UNIT BY STRATUM								
FOR CUT TREES ONLY								
CRUISE#: 71405		SALE#: 50211						
SALENAME: LONG JOHN units 1-6								
RUN DATE & TIME: 10-16-2007 10:30:55				VERSION: DRAFT.2007				
				VOLUME LIBRARY VERSION: 07.13.2007				
CUTTING UNIT	STRATUM	# OF PLOTS	FIXED PLOT SIZE	SPECIES	PRODUCT	TOTAL STEMS	TREES PER ACRE	AVG DRC
1	2	0	0	PPP	14	240	11	
1	3	6	20	BSP	14	1	3	
1	3	6	20	PPP	14	16	53	
PRODUCT SUBTOTAL						14	257	68
1	4	6	50	EIO	20	7	58	
PRODUCT SUBTOTAL						20	7	58
2	2	0	0	PPP	14	621	7	
2	3	19	20	BSP	14	3	3	
2	3	19	20	DPP	14	5	5	
2	3	19	20	PPP	14	36	38	
PRODUCT SUBTOTAL						14	665	53
2	4	19	50	EIO	20	19	50	
PRODUCT SUBTOTAL						20	19	50
3	2	0	0	PPP	14	353	17	
3	3	5	20	PPP	14	11	44	
PRODUCT SUBTOTAL						14	364	61
3	4	5	50	EIO	20	4	40	

Region 3 Reports

Report	Description	Available	Modified
R301	A summary by species reporting: Sawtimber (Product '1') - Gross and net cubic foot and board foot volume, average defect (% cubic foot and % board foot), gross bdf to cuft ratio, quadratic mean dbh, total trees Pulpwood (Product '2') - Total trees, gross and net cubic foot volume, average defect (% cubic foot), 4-6" top net sawtimber volume, total net pulpwood volume	✓	

REPORT R301

R301: REGION-3 SYNOPSIS													PAGE 7
CRUISE#: 70211		SALE#: 70211											
SALENAME: PIERCE										VERSION: 04.03.2014B			
RUN DATE & TIME: 5/7/2014 8:55:02 AM										VOLUME LIBRARY VERSION: 03.31.2014			
SPEC	PD	CONT SPEC	*****CCF*****			TOTAL TREES	AVE GROSS CF/TREE	AVE GROSS CF/ACRE	QUAD MEAN DBH	RATIO MBF:CCF	*****MBF*****		CCF TOP
			GROSS	NET	DEF					GROSS	NET		
PP1	01	100	2522	2465	2.3	28591	9	402	10.4	.4262	1075	1051	0
PP	01	122	3909	3843	1.7	20156	19	622	13.6	.4787	1871	1841	0
DF	01	204	139	133	4.2	732	19	22	12.7	.3921	55	52	0
DF	02	NSAW	60	60	0.0	1664	4	10	6.9	.0000	0	0	0
PP	02	NSAW	1467	1466	0.0	37878	4	234	7.3	.0000	0	0	0
WP	02	NSAW	0	0	0.0	1	4	0	8.6	.0000	0	0	0
TOTAL- NSAW			1527	1526	0.0	39543	4	243	7.3	.0000	0	0	0

Region 4 Reports

Report	Description	Available	Modified
R401	Board Foot Summary by Species for Cut Trees and Primary Product Only Reports: Gross and net volume, average defect (%), estimated number of trees, gross board foot per acre, net board foot per acre, trees per acre, quadratic mean dbh, mean ht1, net board foot per tree, net 16' logs per MBF, and mean value per log.	✓	
R402	Identical to R401 except reports cubic foot volumes.	✓	
R403	Board Foot Summary by Logging Method for Cut Trees and Primary Product Only Reports: Gross and net volume, average defect (%), estimated number of trees, gross board foot per acre, net board foot per acre, trees per acre, quadratic mean dbh, mean ht1, net board foot per tree, net 16' logs per MBF, and total acres.	✓	
R404	Identical to R403 except reports cubic foot volumes.	✓	

REPORT R402

R402: SALE APPRAISAL SUMMARY BY SPECIES													PAGE 10
-- CUBIC FOOT --													
FOR CUT TREES ONLY - PRIMARY PRODUCT ONLY													
CRUISE#: 434 SALE#: 434													
SALENAME: Lower Summit													
RUN DATE & TIME: 8- 4-2004 15: 4:40													
VERSION: DRAFT.2004B													
VOLUME LIBRARY VERSION: 07.29.2004													
S	P					GROSS	NET	QUAD	MEAN	NET	16' LOGS/	NET LOG	
P	R					CF/	CF/	TREES/	MEAN	CF/	GROSS	SCALE	
E	O					ACRE	ACRE	ACRE	DBH	TREE	CCF	VALUE/	
C	D								HTL			CCF	
I	U												
E	C	GROSS	TOTAL	NET	ESTIM	GROSS	NET	QUAD	MEAN	NET	16' LOGS/	NET LOG	
S	T	CF	DEF%	CF	TREES	CF/	CF/	TREES/	MEAN	CF/	GROSS	SCALE	
						ACRE	ACRE	ACRE	DBH	TREE	CCF	VALUE/	
												CCF	
DF	01	1116848	8.5	1021777	24591	2057	1882	45.3	12.1	74.1	42	12.9	
PP	01	136015	7.6	125620	1093	250	231	2.0	12.5	72.0	115	11.7	
WF	01	4668	16.0	3923	72	9	7	0.1	16.7	108.8	54	8.9	
TOTALS/AVE		1257531	8.4	1151321	25756	2316	2120	47.4	12.2	74.0	45	12.8	
												N/A	

REPORT R404

R404: SALE APPRAISAL SUMMARY BY LOGGING METHOD													PAGE 12
-- CUBIC FOOT --													
FOR CUT TREES ONLY - PRIMARY PRODUCT ONLY													
CRUISE#: 434 SALE#: 434													
SALENAME: Lower Summit													
RUN DATE & TIME: 8- 4-2004 15: 4:41													
VERSION: DRAFT.2004B													
VOLUME LIBRARY VERSION: 07.29.2004													
L	P					GROSS	NET	QUAD	MEAN	NET	16' LOGS/		
O	R					CF/	CF/	TREES/	MEAN	CF/	GROSS	ACRES	
C	O					ACRE	ACRE	ACRE	DBH	TREE	CCF		
D	D								HTL				
H	U												
T	C	GROSS	TOTAL	NET	ESTIM	GROSS	NET	QUAD	MEAN	NET	16' LOGS/		
H	T	CF	DEF%	CF	TREES	CF/	CF/	TREES/	MEAN	CF/	GROSS	ACRES	
						ACRE	ACRE	ACRE	DBH	TREE	CCF		
420	01	1051423	8.5	962514	23777	2480	2270	56.1	0.0	0.0	40	12.8	
480	01	206108	8.4	188807	1979	1732	1587	16.6	0.0	0.0	95	12.8	
TOTALS/AVE		1257531	8.4	1151321	25756	2316	2120	47.4	0.0	0.0	45	12.8	
												543.0	

Region 5 Reports

Report	Description	Available	Modified
R501	Log Stock Table by Species and Product: Each table contains data for each species and product combination in the file. Data is displayed by log diameter class and includes number of logs, gross BDFT volume, net BDFT volume, gross CUFT volume and net CUFT volume.	✓	

REPORT R501

LOG DIB CLASS	# OF LOGS	GROSS BDFT	NET BDFT	GROSS CUFT	NET CUFT
1	55239.6	0.0	0.0	23318.2	23318.2
3	16057.4	0.0	0.0	12540.2	12540.2
4	12424.7	0.0	0.0	22078.2	22078.2
5	12231.4	0.0	0.0	40477.9	40477.9
TOTALS	95953.1	0.0	0.0	98414.5	98414.5

Region 6 Reports

Report	Description	Available	Modified
R602	Volume by Species and Product within Payment and Cutting Unit across Strata – For cut trees only. Displays payment unit, cutting unit, cutting unit acres, species, product, unit of measure, % defect, and net volume CCF.	✓	
R604	Product Volume Summary – Log Stock Table for cut trees only. Displays a single page for each species and separates volume by log DIB 1” diameter class and then shows gross volume, net volume and % defect for saw timber and non-saw timber. Shows cull logs total volume, total gross volume, and total net volume in separate columns. Volumes are reported as CCF.	✓	
R605	Product Volume Summary – Log Stock Table for cut trees only. Displays same information as R604 only volumes are reported as MBF.	✓	

REPORT R602

R602: VOLUME BY SPECIES & PRODUCT WITHIN PAYMENT AND CUTTING UNIT ACROSS STRATA FOR CUT TREES ONLY										PAGE 27	
CRUISE#: 44444 SALE#: 44444										VERSION: 08.13.2004B	
SALENAME: STR EXAMPLE										VOLUME LIBRARY VERSION: 07.29.2004	
RUN DATE & TIME: 08-11-2004 12:34:01											
PAY UNIT	CUTTING UNIT	UNIT ACRES	LOGGING METHOD	SPECIES	PRODUCT	U OF M	% DEFECT	** NET VOLUME **			
								CCF			
1	10.0			WF	01	03	0	446.56			
1	10.0			WF	08	03	37	6.50			
2	48.0			DF	01	03	0	554.31			
2	48.0			DF	08	03	25	0.03			
2	48.0			HW	08	03	0	251.97			
2	48.0			WF	01	03	0	453.38			
2	48.0			WF	08	03	3	4.29			
3	28.0			DF	01	03	0	569.81			
3	28.0			DF	08	03	25	0.92			
PAYMENT UNIT		TOTALS		-----							
	86.0			DF	01	03	0	1124.12			
	86.0			DF	08	03	25	0.95			
	86.0			HW	08	03	0	251.97			
	86.0			WF	01	03	0	899.95			
	86.0			WF	08	03	27	10.78			
PRODUCT TOTALS											
					01			2024.07			
					08			263.71			
GRAND TOTAL								2287.78			

REPORT R604

R604: PRODUCT VOLUME SUMMARY								PAGE 28	
LOG STOCK TABLE FOR CUT TREES ONLY									
***** CCF *****									
CRUISE#: 44444 SALE#: 44444					VERSION: 08.13.2004B				
SALENAME: STR EXAMPLE					VOLUME LIBRARY VERSION: 07.29.2004				
RUN DATE & TIME: 08-11-2004 12:34:02									
TABLE 1									
REPORT FOR SPECIES: DF									
AVERAGE DBH: 10.5"									
LOG DIB	SAW TIMBER			NON-SAW TIMBER			CULL LOG	TOTAL	TOTAL
SMALL END	***** PRODUCT 01 *****			PRODUCT 08=FS ** PRODUCT 02=BLM			(GRADE 9)	(01+08+9)	(01+08)
1" DIA. CLASS	GROSS	NET	% DEFECT	GROSS	NET	% DEFECT	VOLUME	GROSS VOLUME	NET VOLUME
2	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.00
3	0.00	0.00	0.0	0.00	0.00	0.0	0.00	0.00	0.00
4	183.68	183.68	0.0	0.00	0.00	0.0	0.00	183.68	183.68
5	163.44	163.44	0.0	0.00	0.00	0.0	0.00	163.44	163.44
6	59.32	59.32	0.0	0.00	0.00	0.0	0.00	59.32	59.32
7	190.21	190.21	0.0	0.00	0.00	0.0	0.00	190.21	190.21
8	150.36	150.36	0.0	0.00	0.00	0.0	0.00	150.36	150.36
9	34.38	34.38	0.0	0.30	0.03	90.6	0.00	34.67	34.41
10	71.68	71.68	0.0	0.00	0.00	0.0	0.00	71.68	71.68

BLM Reports

NOTE: All reports create a comma-delimited text file with an extension of CSV

Report	Description	Available	Modified
BLM01	Board Foot Summary by Strata for Cut Trees Only Reports: Quad mean dbh, average gross merch log volume, total net volume, total gross merch volume, total gross volume, recovery, salvage, total number of merch logs, total number of cull logs, total number of merch trees, number of acres, average volume per acre, and percent of gross volume cut. (R701)	✓	
BLM02	Identical to BLM01 except reports cubic foot volumes. (R702)	✓	
BLM03	Board Foot Summary by Unit for Cut Trees Only Reports: Quad mean dbh, average gross merch log volume, total net volume, total gross merch volume, total gross volume, recovery, salvage, total number of merch logs, total number of cull logs, total number of merch trees, number of acres, average volume per acre, and percent of gross volume cut. (R703)	✓	
BLM04	Identical to BLM03 except reports cubic foot volumes. (R704)	✓	
BLM05	Board Foot Summary by Species for Cut Trees Only Reports: Quad mean dbh, average gross merch log volume, total net volume, total gross merch volume, total gross volume, recovery, salvage, total number of merch logs, total number of cull logs, and percent volume by grade. (R705)	✓	
BLM06	Identical to BLM05 except reports cubic foot volumes. (R706)	✓	
BLM07	Board Foot Summary by Unit and Species for Cut Trees Only Reports: Quad mean dbh, average gross merch log volume, total net volume, total gross merch volume, total gross volume, recovery, salvage, total number of merch logs, total number of cull logs, and percent volume by grade. (R707)	✓	
BLM08	Identical to BLM07 except reports cubic foot volumes. (R708)	✓	
BLM09	Log grade by diameter class by species: Displays log grades 0 through 9 along with net volume, defect volume, gross merchantable volume and gross volume by 1" log diameter classes for each species. (R709)	✓	
BLM10	Identical to BLM09 except reports cubic foot volumes. (R710)	✓	

REPORT BLM02

BLM02: CUBIC FOOT STRATA SUMMARY (R702)													PAGE 2	
FOR CUT TREES ONLY														
VOLUMES BASED ON 16 FOOT EQUATIONS														
CRUISE#: 800 SALE#: 800														
SALENAME: Long Nine													VERSION: DRAFT.2013	
RUN DATE & TIME: 12/12/2013 2:21:47 PM													VOLUME LIBRARY VERSION: 09.23.2013	
STRATA NUMBER	QUAD MEAN DBH (INCH)	AVG GM LOG VOLUME (CUFT)	TOTAL NET VOLUME (CUFT)	GROSS MERCH VOLUME (CUFT)	GROSS VOLUME (CUFT)	RCVRY (%)	SLVG (%)	GROSS VOLUME (GRADE 7)	GROSS VOLUME (GRADE 8)	TOTAL # MERCH LOGS	TOTAL # LOGS (GRD 7-9)	NUM TREES*	NUM ACRES	AVG VOL / ACRE (CUFT)
1	33.1	48	49714	54040	64472	77	0	0	0	1116	193	181	15	3314
10	26.3	547	241134	262100	271920	89	0	0	0	479	533	1466	20	12057
2	38.5	72	36695	41012	50064	73	0	0	0	566	161	96	10	3670
3	17.6	18	147814	160860	183414	81	0	0	0	8940	306	2285	60	2464
4	15.4	630	181311	198064	198064	92	0	0	0	315	0	3896	60	3022
5	12.3	463	226389	246500	246500	92	0	0	0	533	0	8417	60	3773
6	24.2	1423	448717	487961	493723	91	0	0	0	343	422	2971	60	7479
7	14.7	10	97729	106277	106277	92	0	0	0	10439	0	2338	60	1629
8	15.1	11	106749	116076	116076	92	0	0	0	10956	0	2477	60	1779
9	13.1	9	32309	34347	34347	94	0	0	0	3946	0	973	60	538
TOTALS-	17.0	45	1568562	1707236	1764855	89	0	0	0	37632	1615	25100	465	3373

REPORT BLM04

BLM04: CUBIC FOOT UNIT SUMMARY (R704)													PAGE 3	
FOR CUT TREES ONLY														
VOLUMES BASED ON 16 FOOT EQUATIONS														
CRUISE#: 800 SALE#: 800														
SALENAME: Long Nine													VERSION: DRAFT.2013	
RUN DATE & TIME: 12/12/2013 2:21:47 PM													VOLUME LIBRARY VERSION: 09.23.2013	
UNIT NUMBER	QUAD MEAN DBH (INCH)	AVG GM LOG VOLUME (CUFT)	TOTAL NET VOLUME (CUFT)	GROSS MERCH VOLUME (CUFT)	GROSS VOLUME (CUFT)	RCVRY (%)	SLVG (%)	GROSS VOLUME (GRADE 7)	GROSS VOLUME (GRADE 8)	TOTAL # MERCH LOGS	TOTAL # LOGS (GRD 7-9)	NUM TREES*	NUM ACRES	AVG VOL / ACRE (CUFT)
1	46.2	71	35107	39162	48132	73	0	0	0	537	165	93	10	3511
1A	47.5	27	14608	15878	16340	89	0	0	0	579	28	88	5	2922
2	38.5	72	36695	41012	50064	73	0	0	0	566	161	96	10	3670
3	17.6	18	147814	160860	183414	81	0	0	0	8940	306	2284	60	2464
4	15.4	10	181311	198064	198064	92	0	0	0	18874	0	3896	60	3022
5	12.3	8	226389	246500	246500	92	0	0	0	31967	0	8417	60	3773
6	24.2	24	448717	487961	493723	91	0	0	0	20581	422	2971	60	7479
7	14.7	10	97729	106277	106277	92	0	0	0	10439	0	2338	60	1629
8	14.6	10	139058	150423	150423	92	0	0	0	14902	0	3450	60	2318
9	26.3	27	241134	262100	271920	89	0	0	0	9580	533	1466	20	12057
TOTALS-	17.2	15	1568562	1707236	1764855	89	0	0	0	116964	1615	25099	405	3873

REPORT BLM06

BLM06: CUBIC FOOT SPECIES SUMMARY (R706)													PAGE 4					
FOR CUT TREES ONLY																		
VOLUMES BASED ON 16 FOOT EQUATIONS																		
CRUISE#: 800 SALE#: 800																		
SALENAME: Long Nine													VERSION: DRAFT.2013					
RUN DATE & TIME: 12/12/2013 2:21:47 PM													VOLUME LIBRARY VERSION: 09.23.2013					
SPECIES	QUAD MEAN DBH (INCH)	AVG GM LOG VOLUME (CUFT)	TOTAL NET VOLUME (CUFT)	GROSS MERCH VOLUME (CUFT)	GROSS VOLUME (CUFT)	RCVRY (%)	SLVG (%)	GROSS VOLUME (GRADE 7)	GROSS VOLUME (GRADE 8)	TOTAL # MERCH LOGS	TOTAL # LOGS (GR 7-9)	NUM TREES*	PERCENT VOLUME BY GRADE					
													1	2	3	4	5	6
202B02	17.3	42	1234696	1344855	1392365	89	0	0	0	32054	1497	19336	3	4	3	57	29	4
263B00	15.9	65	339866	362381	372490	90	0	0	0	5578	117	5764	0	0	0	58	37	5
TOTALS-	16.9	45	1568562	1707236	1764855	89	0	0	0	37632	1615	25100						

REPORT BLM08

BLM08: CUBIC FOOT UNIT AND SPECIES SUMMARY (R708)												PAGE 5	
FOR CUT TREES ONLY													
VOLUMES BASED ON 16 FOOT EQUATIONS													
CRUISE#: 800 SALE#: 800													
SALENAME: Long Nine												VERSION: DRAFT.2013	
RUN DATE & TIME: 12/12/2013 2:21:47 PM												VOLUME LIBRARY VERSION: 09.23.2013	
UNIT NUMBER	SPECIES	QUAD MEAN DBH (INCH)	AVG GM LOG VOLUME (CUFT)	TOTAL NET VOLUME (CUFT)	GROSS MERCH VOLUME (CUFT)	GROSS VOLUME (CUFT)	RCVRY (%)	SLVG (%)	GROSS VOLUME (GRADE 7)	GROSS VOLUME (GRADE 8)	TOTAL # MERCH LOGS	TOTAL # LOGS (GRD 7-9)	EST. NO. TREES
1	202B02	72.3	121	28242	30699	39707	71	0	0	0	254	145	32
1	263B00	22.7	26	6865	7463	8425	81	0	0	0	283	20	61
UNIT 1 TOTALS		46.2	71	35107	38162	48132	73	0	0	0	537	165	93
1A	202B02	46.3	28	14380	15630	16092	89	0	0	0	555	28	78
1A	263B00	55.9	10	228	248	248	92	0	0	0	24	0	10
UNIT 1A TOTALS		47.5	27	14608	15878	16340	89	0	0	0	579	28	88
2	202B02	58.2	121	29730	33356	41430	72	0	0	0	275	140	33
2	263B00	22.0	26	6365	7656	8634	81	0	0	0	291	21	63

REPORT BLM10

BLM10: CUBIC FOOT LOG GRADE -- DIAMETER CLASS BY SPECIES (R710)												PAGE 7		
FOR CUT TREES ONLY														
CRUISE#: 800 SALE#: 800														
SALENAME: Long Nine												VERSION: DRAFT.2013		
RUN DATE & TIME: 12/12/2013 2:21:47 PM												VOLUME LIBRARY VERSION: 09.23.2013		
SPECIES: 202B02														
DIB CLASS	L O G G R A D E					NET VOLUME	LOG GRADE		HD/VIS DEFECT (1-8)	GROSS MERCH	GRADE	GROSS VOLUME		
1"	0	1	2	3	4	5	6	7	8	9	9			
40	441	442	306	0	2337	0	0	3526	0	0	340	3866	1103	4968
41	596	708	1033	0	1191	298	0	3825	0	0	370	4195	643	4837
42	297	1487	0	0	864	0	0	2648	0	0	319	2967	323	3290
43	156	759	0	0	315	0	0	1229	0	0	107	1336	0	1336
44	488	2448	511	0	1659	0	0	5106	0	0	476	5583	1090	6673
45	514	1917	0	0	518	348	0	3296	0	0	287	3583	0	3583
46	174	1186	0	0	723	0	0	2083	0	0	181	2264	189	2453
47	761	2874	0	0	0	0	0	3636	0	0	341	3877	0	3877

Region 8 Reports

Report	Description	Available	Modified
R801	Estimated Sale Volume and Number of Trees. Reports: MBF and CCF by 2 inch DBH class for softwood sawtimber, hardwood sawtimber, softwood pulpwood, and hardwood pulpwood.	✓	
R802	Estimated Sale Volume and Number of Trees. Reports: Estimated number of trees, MBF, CCF, Topwood CCF by Sample Group and Specie.	✓	

REPORT R801

Top of report

REPORT R801: SALE SUMMARY											PAGE 22
BY 2" DIAMETER CLASSES											
FOR CUT TREES ONLY											
CRUISE#: 33333 SALE#: 33333											
SALENAME: R8 Vol Check 081199											
RUN DATE & TIME: 8-4-2004 16:18:35											
VERSION: DRAFT.2004B											
VOLUME LIBRARY VERSION: 07.29.2004											
SALE CUT ACRES: 245.00											
DBH	PINE (SOFTWOOD) SAWTIMBER			HARDWOOD SAWTIMBER			PINE PULPWOOD		HARDWOOD PULPWOOD		
	EST. # OF TREES	MBF	CCF	EST. # OF TREES	MBF	CCF	EST. # OF TREES	CCF	EST. # OF TREES	CCF	
4	0	0.000	0.00	0	0.000	0.00	4199	98.83	1	0.01	
6	0	0.000	0.00	0	0.000	0.00	1038	30.24	133	3.85	
8	0	0.000	0.00	0	0.000	0.00	1238	97.08	574	32.16	
10	10	0.563	0.97	0	0.000	0.00	3953	444.68	220	19.14	
12	236	24.491	40.07	374	33.274	50.99	175	32.72	0	0.00	
14	19	3.429	5.99	83	14.448	23.12	0	0.00	0	0.00	
16	538	107.566	167.97	71	20.594	30.38	0	0.00	0	0.00	
18	15	5.339	7.85	55	20.252	27.08	0	0.00	0	0.00	
20	5	2.458	3.90	16	5.815	8.59	0	0.00	0	0.00	
22	294	188.418	252.76	21	11.186	15.92	0	0.00	0	0.00	
24	10	7.483	11.41	18	14.006	16.93	0	0.00	0	0.00	
26	670	616.042	823.26	68	59.577	60.14	0	0.00	0	0.00	
28	9	12.144	16.97	11	12.382	14.58	0	0.00	0	0.00	
30	0	0.000	0.00	16	22.106	24.61	0	0.00	0	0.00	
32	9	16.829	10.99	16	26.316	33.58	0	0.00	0	0.00	
34	0	0.000	0.00	7	12.639	14.54	0	0.00	0	0.00	

Bottom of report

50	1	5.069	5.38	0	0.000	0.00	0	0.00	0	0.00
52	0	0.000	0.00	0	0.000	0.00	0	0.00	0	0.00
54	0	0.000	0.00	0	0.000	0.00	0	0.00	0	0.00
56	4	22.734	0.24	4	16.693	15.35	0	0.00	0	0.00
58	0	0.000	0.00	0	0.000	0.00	0	0.00	0	0.00
60	2	16.832	14.09	0	0.000	0.00	0	0.00	0	0.00
TOTAL:	1944	1244.669	1646.98	785	344.066	419.37	10603	703.55	929	55.17
							TOPWOOD:	102.22	49.38	
							TOTAL TOPWOOD & PULPWOOD:	805.77	104.54	
***** PER/ACRE *****										
		AVG	AVG	AVG	AVG	AVG UPPER	EST. #			
		BF/TREE	CF/TREE	DBH	SWT HT	STEM HT	OF TREES	MBF	CCF	
PINE SAWTIMBER:		640.	84.7	21.7	55.4	64.2	7.9	5.08	6.72	
HARDWOOD SAWTIMBER:		438.	53.4	17.3	42.5	45.6	3.2	1.40	1.71	
PINE PULPWOOD:			6.6	7.0		35.6	43.3		2.87 (W/TOP)	
HARDWOOD PULPWOOD:			5.9	8.6		28.6	3.8		0.23 (W/TOP)	
TOTAL/AVERAGE:		111.	19.8	9.7	9.9	39.6	58.2	6.48	11.53	

REPORT R802

R802: SALE SUMMARY - ESTIMATED SALE VOLUME AND NUMBER OF TREES						PAGE 23
BY SAMPLE GROUP, SPECIES, AND PRODUCT						
FOR CUT TREES ONLY						
CRUISE#: 33333		SALE#: 33333		VERSION: DRAFT.2004E		
SALENAME: R8 Vol Check 081199				VOLUME LIBRARY VERSION: 07.29.2004		
RUN DATE & TIME: 8- 4-2004 16:18:35						
***** SAWTIMBER *****						
SAMPLE GROUP	SPECIES	EST. # OF TREES	MBF	CCF	TOPWOOD CCF	
HS						
	602	93	23.665	25.23	4.98	
HS TOTAL:		93	23.665	25.23	4.98	
LG						
	762	3	3.837	4.45	0.08	
	806	39	22.427	17.40	1.98	
	833	22	2.689	4.32	1.14	
	837	4	2.004	3.06	0.32	
	950	25	5.841	8.01	1.56	
	970	3	4.647	3.82	0.43	
	LC	0	0.000	0.00	0.00	
LG TOTAL:		95	41.445	41.08	5.53	
MH						
	316	70	15.519	25.42	3.30	

R802: SALE SUMMARY - ESTIMATED SALE VOLUME AND NUMBER OF TREES						PAGE 24
BY SAMPLE GROUP, SPECIES, AND PRODUCT						
FOR CUT TREES ONLY						
CRUISE#: 33333		SALE#: 33333		VERSION: DRAFT.2004E		
SALENAME: R8 Vol Check 081199				VOLUME LIBRARY VERSION: 07.29.2004		
RUN DATE & TIME: 8- 4-2004 16:18:35						
***** PULPWOOD *****						
SAMPLE GROUP	SPECIES	EST. # OF TREES	CCF			
ZH						
	300	133	10.23			
	500	266	17.13			
	800	530	27.81			
	ZH	0	0.00			
ZH TOTAL:		929	55.17			
ZP						
	100	9806	640.25			
	131	627	60.94			
	132	169	2.37			
	ZP	0	0.00			
ZP TOTAL:		10603	703.55			
PULPWOOD TOTAL:		11531	758.72			

SC Reports-- Stem Count Reports

Report	Description	Available	Modified
SC1	Stem Count per Acre by Unit by Species (FIXCNT method only). Primary product only. By 1-inch diameter classes. Report shows piece count for each species by diameter class. A row total and column total are also displayed. If DBH is not collected, no DIB classes are displayed and all values accumulate under a "zero" DIB class (see second example below).	✓	
SC2	Stem Count by Unit by Stratum by Species (FIXCNT method only). Primary product only. By 1-inch diameter classes. Report shows actual tally count for each species by diameter class. A row total and column total are included. If DBH is not collected, no DIB classes are displayed and all values accumulate under a "zero" DIB class. Usually, one unit/stratum combination is displayed per page. The format of the report is similar to the examples shown below for SC1.	✓	
SC3	Stem Count per Acre by Stratum by Species (FIXCNT method only). Primary product only. By 1-inch diameter classes. Report is similar to the first two and has the same format.	✓	

REPORT SC2

SC2: STEM COUNT (TALLY) BY UNIT BY STRATUM BY SPECIES (FIXCNT METHOD ONLY)						PAGE 18
FOR PRIMARY PRODUCT ONLY -- BY 1" DIAMETER CLASS						
(5-inch class = 4.6 - 5.5 inches; 9-inch class = 8.6 - 9.5 inches, and so on.)						
CRUISE#: 60111 SALE#: 60111						
SALENAME: EAGARSOUTH_PONELINE						VERSION: 04.03.2014B
RUN DATE & TIME: 5/7/2014 9:14:23 AM						VOLUME LIBRARY VERSION: 03.31.2014
CUTTING UNIT: 29 STRATUM: 2 NUMBER OF PLOTS -- 4						
SPECIES	DF	PP	WF	WP	TOTALS	
0	47.0	5.2	83.5	10.4	146.1	
1	52.2	0.0	73.1	0.0	125.2	
2	67.8	0.0	52.2	15.6	135.7	
3	57.4	10.5	26.1	0.0	93.9	
4	41.8	0.0	52.2	5.2	99.2	
TOTALS	266.2	15.7	287.0	31.3	600.1	

ST REPORTS -- Statistics For Sample Populations (For Cut Trees Only)

Statistical information is displayed by the following: Strata, product, unit of measure, and/or sample group, sure to measure and stage sample 1/2.

Report	Description	Available	Modified
ST1	Statistics for Sample Group: Net volume - Number of sample trees, mean X, sum of X, sum of (X*X), standard deviation, coefficient of variation, standard error, sampling error and combined sampling error. Primary, secondary, and recovered product information shown on separate pages. (DP1)	✓	
ST2	Statistics for Sample Group: Gross volume – Number of sample trees, mean X, sum of X, sum of (X*X), standard deviation, coefficient of variation, standard error, sampling error and combined sampling error. Primary, secondary, and recovered product information shown on separate pages. (DP2)	✓	
ST3	Error Term, Volume and Confidence Interval: Gross and Net Volume – volume, error and interval. Primary, secondary, and recovered product information shown on separate pages. (DS1)	✓	
ST4	Error Term, Volume and Confidence Interval: Value - value, error, and confidence interval. Primary, secondary, and recovered product information shown on separate pages. (DS2)	✓	

REPORT ST1

ST1: NET VOLUME STATISTICS FOR SAMPLE GROUP (DP1)															PAGE 3			
FOR CUT TREES ONLY																		
CRUISE#: 20002 SALE#: 20002																		
SALENAME: R2 Test																		
RUN DATE & TIME: 12/12/2013 2:41:46 PM																		
VERSION: DRAFT.2013																		
VOLUME LIBRARY VERSION: 09.23.2013																		
*****PRIMARY PRODUCT NET VOLUME*****																		
S	P	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	
F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	
G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G	
S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	
1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	1/2	
TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	TREES	
N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
16	30	17	43	21	7	107	4	223	4	113	7	107	4	223	4	113	7	
16	0	7	10	21	7	7	4	4	4	4	4	4	4	4	4	4	4	4
2.131	2.447	2.120	2.262	2.086	2.447	2.447	3.182	3.182	3.182	3.182	3.182	3.182	3.182	3.182	3.182	3.182	3.182	3.182
14.2	4.3	21.6	4.3	12.3	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
227.30	30.00	367.57	43.00	259.00	4.14	4.14	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13	2.13
5827.65	130.00	8325.27	189.00	3689.84	3.02	3.02	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
13.1620	0.4880	4.8591	0.6749	4.9775	0.3078	0.3078	0.1811	0.1811	0.1811	0.1811	0.1811	0.1811	0.1811	0.1811	0.1811	0.1811	0.1811	0.1811
92.6493	11.3855	22.4731	15.6965	40.3580	51.9915	51.9915	34.0324	34.0324	34.0324	34.0324	34.0324	34.0324	34.0324	34.0324	34.0324	34.0324	34.0324	34.0324
0.000	0.184	1.178	0.213	1.086	0.116	0.116	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091
0.0000	10.5302	11.5551	11.2278	18.3710	48.0859	48.0859	54.1456	54.1456	54.1456	54.1456	54.1456	54.1456	54.1456	54.1456	54.1456	54.1456	54.1456	54.1456
0.000	15.633	15.633	21.530	21.530	48.086	48.086	54.146	54.146	54.146	54.146	54.146	54.146	54.146	54.146	54.146	54.146	54.146	54.146

REPORT ST3

ST3: ERROR TERM, VOLUME AND CONFIDENCE INTERVAL (DS1) PAGE 6										
PRIMARY PRODUCT VOLUME										
FOR CUT TREES ONLY										
CRUISE#: 20002 SALE#: 20002										
SALENAME: R2 Test VERSION: DRAFT.2013										
RUN DATE & TIME: 12/12/2013 2:41:46 PM VOLUME LIBRARY VERSION: 09.23.2013										
***** PRIMARY PRODUCT GROSS VOLUME *****					***** PRIMARY PRODUCT NET VOLUME *****					
***** 95% CONFIDENCE *****					***** 95% CONFIDENCE *****					
INTERVAL					INTERVAL					
A T M	VOLUME*	ERROR	FROM	TO	VOLUME*	ERROR	FROM	TO		
1	01	03	239.3	0.00	239	239	227.3	0.00	227	227
10	01	03	35074.6	15.66	29580	40569	33358.1	15.63	28143	38573
11	14	03	5024.6	21.52	3943	6106	4773.9	21.53	3746	5802
2	01	03	1734.6	30.23	1210	2259	1655.2	30.22	1155	2155
3	14	03	144123.1	14.78	122818	165428	136964.9	14.76	116742	157187
4	01	03	9355.5	34.03	6172	12539	8921.6	34.00	5888	11955
5	01	03	9126.5	23.36	6994	11259	8717.4	23.36	6681	10754
6	01	03	33687.4	30.22	23509	43866	32114.3	30.18	22423	41806
7	01	03	44000.2	22.88	33934	54066	41914.4	22.87	32931	51498
8	01	03	12347.8	22.32	9592	15104	11795.1	22.34	9160	14430
9	01	03	31979.9	17.71	26316	37644	30511.3	17.71	25107	35916
----- AGGREGATED BY PRODUCT -----										
01	03	177545.8	9.59	160524	194568	169214.7	9.58	153006	185423	
14	03	149147.6	14.30	127815	170480	141738.8	14.29	121490	161987	
----- AGGREGATED BY UNIT OF MEASURE -----										
03	326693.5	8.35	299402	353985	310953.5	8.34	285017	336890		
----- AGGREGATED BY STRATA -----										
1	03	239.3	0.00	239	239	227.3	0.00	227	227	
10	03	35074.6	15.66	29580	40569	33358.1	15.63	28143	38573	
11	03	5024.6	21.52	3943	6106	4773.9	21.53	3746	5802	
2	03	1734.6	30.23	1210	2259	1655.2	30.22	1155	2155	
3	03	144123.1	14.78	122818	165428	136964.9	14.76	116742	157187	
4	03	9355.5	34.03	6172	12539	8921.6	34.00	5888	11955	
5	03	9126.5	23.36	6994	11259	8717.4	23.36	6681	10754	
6	03	33687.4	30.22	23509	43866	32114.3	30.18	22423	41806	

TC REPORTS -- Stand Table Reports

These reports are for cut trees only and are grouped into 1” and 2” diameter classes. TC1 to TC28 -- Information Displayed (for Cut Trees Only) by Species, Product, Unit of Measure, and 2” Diameter Classes. The Diameter Range is from 4 to 96 Inches.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
TC1	Gross board foot primary product volume by species, product and unit of measure for each stratum.	✓	
TC2	Net board foot primary product volume by species, product and unit of measure for each stratum.	✓	
TC3	Gross cubic foot primary product volume by species, product and unit of measure for each stratum.	✓	
TC4	Net cubic foot primary product volume by species, product and unit of measure for each stratum.	✓	
TC5	Cord wood primary product volume by species, product and unit of measure for each stratum.		
TC6	Number of trees by species, product and unit of measure for each stratum.	✓	
TC7	Gross board foot primary product volume by species, product and unit of measure for the sale.		
TC8	Net board foot primary product volume by species, product and unit of measure for the sale.	✓	
TC9	Gross cubic foot primary product volume by species, product and unit of measure for the sale.		
TC10	Net cubic foot primary product volume by species, product and unit of measure for the sale.	✓	
TC11	Cord wood primary product volume by species, product and unit of measure for the sale.		
TC12	Number of trees by species, product and unit of measure for the sale.	✓	
TC13	Gross board foot primary and secondary product volume by species for each stratum.		
TC14	Net board foot primary and secondary product volume by species for each stratum.		
TC15	Gross cubic foot primary and secondary product volume by species for each stratum.		
TC16	Net cubic foot primary and secondary product volume by species for each stratum.		

TC REPORTS -- Stand Table Reports

These reports are for cut trees only and are grouped into 1” and 2” diameter classes. TC1 to TC28 -- Information Displayed (for Cut Trees Only) by Species, Product, Unit of Measure, and 2” Diameter Classes. The Diameter Range is from 4 to 96 Inches.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
TC17	Cord wood primary and secondary product volume by species for each stratum.		
TC18	Number of trees by species for each stratum.		
TC19	Gross board foot primary and secondary product volume by species for the sale.	✓	
TC20	Net board foot primary and secondary product volume by species for the sale.	✓	
TC21	Gross cubic foot primary and secondary product volume by species for the sale.	✓	
TC22	Net cubic foot primary and secondary product volume by species for the sale.	✓	
TC23	Cord wood primary and secondary product volume by species for the sale.		
TC24	Number of trees by species for the sale.	✓	
TC25	Expansion factors by specie, product, and unit of measure for each stratum.		
TC26	Expansion factors by specie, product, and unit of measure for each sale.		
TC27	Expansion factors by species for each stratum.		
TC28	Expansion factors by species for each sale.		

TC51 to TC78 -- The TC’ Reports ‘TC51-TC78’ are identical to the ‘TC1-TC28’ reports except they show counts and volumes by 1” diameter classes from 3 to maximum DBH in inches.

These TC reports are also available –

TC51, TC52, TC53, TC54, TC56, TC57, TC58, TC59, TC60, TC62, TC65, TC71, TC72, TC74

TL REPORTS -- Stand Table Reports

These reports are for leave trees only and are grouped into 1” and 2” diameter classes.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
TL1	Gross board foot primary product volume by species, product and unit of measure for each stratum.		
TL2	Net board foot primary product volume by species, product and unit of measure for each stratum.	✓	
TL3	Gross cubic foot primary product volume by species, product and unit of measure for each stratum.		
TL4	Net cubic foot primary product volume by species, product and unit of measure for each stratum.		
TL5	Cord wood primary product volume by species, product and unit of measure for each stratum.		
TL6	Number of trees by species, product and unit of measure for each stratum.	✓	
TL7	Gross board foot primary product volume by species, product and unit of measure for the sale.	✓	
TL8	Net board foot primary product volume by species, product and unit of measure for the sale.	✓	
TL9	Gross cubic foot primary product volume by species, product and unit of measure for the sale.	✓	
TL10	Net cubic foot primary product volume by species, product and unit of measure for the sale.	✓	
TL11	Cord wood primary product volume by species, product and unit of measure for the sale.		
TL12	Number of trees by species, product and unit of measure for the sale.	✓	
TL13	Gross board foot primary and secondary product volume by species for each stratum.		
TL14	Net board foot primary and secondary product volume by species for each stratum.		
TL15	Gross cubic foot primary and secondary product volume by species for each stratum.		
TL16	Net cubic foot primary and secondary product volume by species for each stratum.		
TL17	Cord wood primary and secondary product volume by species for each stratum.		
TL18	Number of trees by species for each stratum.		

TL REPORTS -- Stand Table Reports

These reports are for leave trees only and are grouped into 1” and 2” diameter classes.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
TL19	Gross board foot primary and secondary product volume by species for the sale.		
TL20	Net board foot primary and secondary product volume by species for the sale.		
TL21	Gross cubic foot primary and secondary product volume by species for the sale.		
TL22	Net cubic foot primary and secondary product volume by species for the sale.		
TL23	Cord wood primary and secondary product volume by species for the sale.		
TL24	Number of trees by species for the sale.		
TL25	Expansion factors by specie, product, and unit of measure for each stratum.		
TL26	Expansion factors by specie, product, and unit of measure for each sale.		
TL27	Expansion factors by species for each stratum.		
TL28	Expansion factors by species for each sale.		

TL51 to TL78 -- The ‘TL’ Reports ‘TL51-TL78’ are identical to the ‘TC1-TC28’ reports except they show counts and volumes for leave trees by 1” diameter classes from 3 to maximum DBH in inches.

These TL reports are also available –
 TL52, TL54, TL56, TL58, TL59, TL60, TL62

REPORT TC1

TC1: STAND TABLE FOR STRATA 1 -- GROSS BDFT VOLUME					PAGE 68
FOR PRIMARY PRODUCT ONLY - BY 2" DIAMETER CLASS					
(12-inch class = 11.0 - 12.9 inches; 14-inch class = 13.0 - 14.9 inches, and so on.)					
CRUISE#: 777		SALE#: 777			
SALENAME: RSTESTER					VERSION: 08.13.2004B
RUN DATE & TIME: 08-11-2004 14:04:43					VOLUME LIBRARY VERSION: 07.29.2004
SPEC	PP	WF			
PROD	01	01			
U OF M	03	03		TOTALS	
1-4	0	0		0	
6	0	0		0	
8	0	0		0	
10	0	429		429	
12	572	1286		1858	
14	2144	0		2144	
16	1715	2715		4430	
18	3573	3001		6573	
20	5430	0		5430	
22	0	7431		7431	
TOTALS	13433	14862		28294	

UC REPORTS -- Unit Level Reports

Volumes, Number of Trees, Average Defect and Bdft to Cuft Ratios by Species or Sample Group Within Cutting Units (All volumes are prorated on a percentage basis). All values are for cut trees only.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
UC1	Per Unit Volume – Main Stem: gross and net board foot, cubic foot, and cords volume, average % defect, gross and net board foot to cubic foot ratios and estimated number of trees. By stratum, unit, species, product and unit of measure.	✓	
UC2	Per Unit Volume – Primary Product: gross and net board foot, cubic foot, and cords volume, average % defect, gross and net board foot to cubic foot ratios and estimated number of trees. By stratum, unit, sample group, product and unit of measure.	✓	
UC3	Per Unit Volume – Sawtimber and pulpwood: gross and net board foot, cubic foot, and cords volume, and estimated number of trees. By stratum, unit, and species. Any recovered volume in the cruise is included with net secondary volume and noted with an “R”.	✓	
UC4	Per Unit Volume – Sawtimber and pulpwood: gross and net board foot, cubic foot, and cords volume, and estimated number of trees. By stratum, unit, and sample group. Any recovered volume in the cruise is included with net secondary volume and noted with an “R”.	✓	
UC5	Per Unit Volume – Sawtimber and pulpwood: gross and net board foot, cubic foot, and cords volume, and estimated number of trees. By unit number across all strata and by species. Any recovered volume in the cruise is included with net secondary volume and noted with an “R”.	✓	
UC6	Per Unit Volume – Sawtimber and pulpwood: gross and net board foot, cubic foot, and cords volume, and estimated number of trees. By unit number across all strata and by sample group. Any recovered volume in the cruise is included with net secondary volume and noted with an “R”.	✓	
UC7	Gross board foot sawtimber (Prod 01) primary product volume by unit number across all strata and by species.	✓	
UC8	Net board foot sawtimber (Prod 01) primary product	✓	

UC REPORTS -- Unit Level Reports

Volumes, Number of Trees, Average Defect and Bdft to Cuft Ratios by Species or Sample Group Within Cutting Units (All volumes are prorated on a percentage basis). All values are for cut trees only.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
	volume by unit number across all strata and by species.		
UC9	Gross cubic foot sawtimber (Prod 01) primary product volume by unit number across all strata and by species.	✓	
UC10	Net cubic foot sawtimber (Prod 01) primary product volume by unit number across all strata and by species.	✓	
UC11	Estimated number of sawtimber (Prod 01) trees by unit number across all strata and by species.	✓	
UC12	Gross cubic foot pulpwood (Prod 02 and topwood) volume by unit number across all strata and by species.	✓	
UC13	Net cubic foot pulpwood (Prod 02 and topwood) volume by unit number across all strata and by species.	✓	
UC14	Cord wood pulpwood (Prod 02 and topwood) volume by unit number across all strata and by species.	✓	
UC15	Estimated number of sawtimber and pulpwood trees by unit number across all strata and by species.	✓	
UC16	Same as UC7 except by sample group instead of species.	✓	
UC17	Same as UC8 except by sample group instead of species.	✓	
UC18	Same as UC9 except by sample group instead of species.	✓	
UC19	Same as UC10 except by sample group instead of species.	✓	
UC20	Same as UC11 except by sample group instead of species.	✓	
UC21	Same as UC12 except by sample group instead of species.	✓	
UC22	Same as UC13 except by sample group instead of species.	✓	
UC23	Same as UC14 except by sample group instead of species.	✓	
UC24	Same as UC15 except by sample group instead of species.	✓	
UC25	Volume Summary by Contract Species & Product	✓	

UC REPORTS -- Unit Level Reports

Volumes, Number of Trees, Average Defect and Bdft to Cuft Ratios by Species or Sample Group Within Cutting Units (All volumes are prorated on a percentage basis). All values are for cut trees only.

Report	Description	Available	Modified
	within Payment and Cutting Unit Across Strata: Displays payment unit, cutting unit, contract species, sawtimber and non-sawtimber CCF. Subtotals by payment unit and a contract species summary are also shown.		
UC26	Volume Summary by Contract Species & Product by Cutting Unit for the Sale: Displays payment unit, cutting unit, contract species, sawtimber and non-sawtimber CCF. No subtotals are shown but a contract species summary is displayed at the end of the report.	✓	

REPORT UC1

UC1: VOLUME BY SPECIES WITHIN CUTTING UNIT FOR EACH STRATUM *											PAGE 74			
FOR CUT TREES ONLY														
CRUISE#: 77777 SALE#: 77777														
SALENAME: PNT EXAMPLE (7.13)											VERSION: 03.07.2008			
RUN DATE & TIME: 02-29-2008 13:23:53											VOLUME LIBRARY VERSION: 10.18.2007			
***** PRIMARY PRODUCT *****														
S	P	U	A	A	CROSS	NET	***** STRATA LEVEL *****							
T	E				BDFT	BDFT	EST.							
R	U	P	B	C	CUFT	CUFT	NO OF	** GROSS VOLUME **	** NET VOLUME **					
A	N	R	D	U			TREES	BDFT	CUFT	BDFT	CUFT			
T	I	O	F	F	RATIO	RATIO					CORDS			
A	T	D	T	T										
1	1A	DF	01	03	6	6	5.2966	5.3001	448	41723	7877	39162	7389	0.00
1	1A	WF	01	03	7	7	5.2675	5.2782	203	17403	3304	16051	3041	0.00
			UNIT 1A	TOTAL	6	6	5.2880	5.2937	652	59126	11181	55213	10430	0.00
1	1B	DF	01	03	6	6	5.2966	5.3001	628	58412	11028	54826	10344	0.00
1	1B	WF	01	03	7	7	5.2675	5.2782	285	24365	4626	22472	4258	0.00
			UNIT 1B	TOTAL	6	6	5.2880	5.2937	912	82777	15654	77298	14602	0.00
1	1C	DF	01	03	6	6	5.2966	5.3001	1255	116824	22056	109653	20689	0.00
1	1C	WF	01	03	7	7	5.2675	5.2782	570	48730	9251	44944	8515	0.00
			UNIT 1C	TOTAL	6	6	5.2880	5.2937	1825	165554	31307	154597	29204	0.00
			STRATA 1	TOTAL	6	6	5.2880	5.2937	3389	307457	58142	287109	54236	0.00

REPORT UC3

UC3: VOLUME BY SPECIES WITHIN CUTTING UNIT FOR EACH STRATUM *												PAGE 76	
FOR CUT TREES ONLY													
CRUISE#: 77777 SALES: 77777													
SALENAME: PNT EXAMPLE (7.13)												VERSION: 03.07.2008	
RUN DATE & TIME: 02-29-2008 13:23:53												VOLUME LIBRARY VERSION: 10.18.2007	
S T R A T A	S P E C I E S	TOTAL	***** SAWTIMBER *****				***** NON-SAWTIMBER *****						
			(PROD = 01 UM = 01, 03)				(PROD NOT = 01 UM = 01, 02, 03)						
		EST.	EST.					(AND ALL SECONDARY & RECOVERED PRODUCT VOLUMES)					
		# OF	# OF	** GROSS VOLUME **		** NET VOLUME **		*** GROSS	***	*** NET	***		
		TREES	TREES	BDFT	CUFT	BDFT	CUFT	BDFT	CUFT	BDFT	CUFT	CORDS	
1	1A	DF	448	448	41723	7877	39162	7389	1008	177	849	149	0.00
1	1A	WF	203	203	17403	3304	16051	3041	460	99	404	87	0.00
UNIT 1A		TOTAL	652	652	59126	11181	55213	10430	1468	276	1253	235	0.00
1	1B	DF	628	628	58412	11028	54826	10344	1411	248	1189	208	0.00
1	1B	WF	285	285	24365	4626	22472	4258	644	138	565	121	0.00
UNIT 1B		TOTAL	912	912	82777	15654	77298	14602	2055	386	1754	329	0.00
1	1C	DF	1255	1255	116824	22056	109653	20689	2823	496	2378	416	0.00
1	1C	WF	570	570	48730	9251	44944	8515	1287	276	1130	242	0.00
UNIT 1C		TOTAL	1825	1825	165554	31307	154597	29204	4110	772	3509	659	0.00
STRATA	1	TOTAL	3389	3389	307457	58142	287109	54236	7633	1434	6516	1223	0.00

REPORT UC25

UC25: VOLUME BY CONTRACT SPECIES & PRODUCT						PAGE 7
WITHIN PAYMENT UNITS ACROSS STRATA						
FOR CUT TREES ONLY						
CRUISE#: 98765 SALE#: 98765						
SALENAME: TIM Volume Summary						VERSION: 08.13.2004B
RUN DATE & TIME: 08-12-2004 14:51:30						VOLUME LIBRARY VERSION: 07.29.2004
	PAYMENT UNIT	ACRES	CONTRACT SPECIES	SANTIMBER CCF	NON-SANTIMBER CCF	
	1		DF	395	46	
			WF	133	22	
	PAYMENT UNIT 1 TOTAL	26	ALL	528	68	
	2		LP	1387	458	
			WF	79	4	
	PAYMENT UNIT 2 TOTAL	45	ALL	1466	462	
CONTRACT SPECIES SUMMARY						
			DF	395		
			LP	1387		
			WF	212		
			NS	---	530	
	GRAND TOTALS	ALL	71	ALL	1994	530

REPORT UC26

UC26: VOLUME SUMMARY BY CONTRACT SPECIES & PRODUCT						PAGE 8
BY CUTTING UNIT FOR THE SALE						
FOR CUT TREES ONLY						
CRUISE#: 98765 SALE#: 98765						
SALENAME: TIM Volume Summary						VERSION: 08.13.2004B
RUN DATE & TIME: 08-12-2004 14:51:30						VOLUME LIBRARY VERSION: 07.29.2004
	CUTTING UNIT	ACRES	CONTRACT SPECIES	SANTIMBER CCF	NON-SANTIMBER CCF	
	1A	5	DF	75.95	8.89	
	1A		WF	25.62	4.16	
	1B	7	DF	106.33	12.45	
	1B		WF	35.87	5.83	
	1C	14	DF	212.66	24.90	
	1C		WF	71.75	11.65	
	2	45	LP	1387.33	458.49	
	2		WF	79.28	3.72	
CONTRACT SPECIES SUMMARY						
			DF	395		
			LP	1387		
			WF	213		
			NS	---	530	
	GRAND TOTALS	ALL	71	ALL	1995	530

VSM REPORTS -- Low Level Volume Summaries

Volume Summary

****** ALL TREES – CUT and LEAVE ******

Characteristics are presented by the following: Cruise, Leave, Product Source, Strata, Sample Group, Sure to Measure, Species, Product, Unit of Measure, Live, Yield Component, Contract Species and Tree Grade.

<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
VSM1	Low Level Volume Summary: Primary, Secondary, and Recovered Product – Number of sample trees (first and second stage), quadratic mean dbh, mean dbh, average defect (% bdft and % cuft) and gross and net bdft to cuft ratio. Strata Level: number of trees, gross and net volume (bdft, cuft, cords). (B1)	✓	
VSM2	Volume Summary for Sample Group: Primary, Secondary, and Recovered Product – Number of sample trees (first and second stage), quadratic mean dbh, mean dbh, mean height, average defect (% bdft, and % cuft), gross and net bdft to cuft ratio. Strata Level: number of trees, gross and net board foot, cubic foot, and cords volume. (CP1)	✓	
VSM3	Volume Summary for Strata: Primary, Secondary, and Recovered Product – Number of sample trees (first and second stage), quadratic mean dbh, mean dbh, mean height, average defect (% bdft and % cuft), gross and net bdft to cuft ratio. Strata Level: Number of trees, gross and net board foot, cubic foot, and cords volume. (CS1)	✓	
VSM4	3P Tree Report – Displays stratum, sample group, cutting unit, tree number, species, DBH, gross and net CUFT volume, expansion factor, KPI, calculated ratio and marker’s initials. Currently, only methods S3P, 3P, and F3P are displayed in this report. (CP4)	✓	
VSM5	Volume Summary by Cutting Unit – Displays cutting unit, product, species, number of trees, gross and net cubic foot volume, secondary net cubic foot volume, QMD and BDFT/CUFT ratio.	✓	
VSM6	Low Level Volume Summary – Displays the same grouping as the VSM1 report. Additionally, shows gross and net cuft to tons ratio, gross and net cuft volume and tons.	NEW	

REPORT VSM1

VSM1: LOW LEVEL VOLUME SUMMARY (B1)
 FOR CUT AND LEAVE TREES
 CRUISE#: 20002 SALE#: 20002
 SALENAME: R2 Test
 RUN DATE & TIME: 12/12/2013 2:52:43 PM

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 VERSION: DRAFT.2013
 VOLUME LIBRARY VERSION: 09.23.2013

S	P	R	S	U	A	M	# OF TREES	QUAD	N	T	AVG DEFT	GROSS NET		STRATA LEVEL									
												%	%	BDFT	BDFT	EST.	VOLUME						
T	E	O	L	M	E	S	MEAS	MEAN	D	H	B	C	U	C	# OF	*** GROSS ***	**** NET ****	***** CORDS *****					
A	I	U	R	F	I	A	O	G	S	G	P	D	U	C	U	F	T	R	T				
A	S	T	E	M	E	K	P	M	D	C	T	R	A	T	R	A	T	R	A				
1	ES	01	P	03	L	C	CL	N	2	8.9	8.9	44.5	2	4	4.040	4.105	2	40	10	39	10	0.0	
1	LP	01	P	03	L	C	CL	N	10	11.9	11.5	57.5	4	5	4.719	4.740	10	900	191	858	181	0.0	
1	PP	01	P	03	L	C	CL	N	4	11.4	11.4	47.5	4	4	3.876	3.886	4	150	39	143	37	0.0	
10	ES	01	P	03	L	C	CL	N	2	9.8	9.7	47.1	5	4	3.781	3.752	349	9446	2499	8974	2392	0.0	
10	LP	01	P	03	L	C	CL	N	11	11.9	11.8	56.1	4	4	4.711	4.728	1297	107932	22911	102982	21781	0.0	
10	PP	01	P	03	L	C	CL	N	4	17.6	17.6	77.1	4	4	5.181	5.185	214	50078	9665	47424	9185	0.0	
11	LP	14	P	03	D	C	CD	N	21	9.3	9.2	63.5	4	4	5.246	5.274	387	26358	5025	25178	4774	0.0	
2	ES	01	P	03	L	C	CL	E	N	7	13.6	13.5	69.9	3	4	4.802	4.806	107	1712	357	1645	342	0.0
2	ES	01	P	03	L	C	CL	E	Y	2	30.2	30.2	114.0	3	4	6.377	6.380	2	2540	398	2439	382	0.0

REPORT VSM2

VSM2: VOLUME SUMMARY FOR SAMPLE GROUP (CPI)
 FOR CUT TREES ONLY
 CRUISE#: 20002 SALE#: 20002
 SALENAME: R2 Test
 RUN DATE & TIME: 12/12/2013 2:52:43 PM

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 VERSION: DRAFT.2013
 VOLUME LIBRARY VERSION: 09.23.2013

S	P	R	S	U	A	M	# OF TREES	QUAD	N	T	AVG DEFT	GROSS NET		STRATA LEVEL						
												%	%	BDFT	BDFT	EST.	VOLUME			
T	E	O	L	M	E	S	MEAS	MEAN	D	H	B	C	U	C	# OF	*** GROSS ***	**** NET ****	***** CORDS *****		
A	I	U	R	F	I	A	O	G	S	G	P	D	U	C	U	F	T	R		
A	S	T	E	M	E	K	P	M	D	C	T	R	A	T	R	A	T	R		
1	01	P	03	N	16	16	11.5	11.2	53.4	4	5	4.555	4.575	16	1090	239	1040	227	0.0	
10	01	P	03	N	17	30	12.3	12.1	56.8	4	4	4.774	4.784	1860	167456	35075	159580	33358	0.0	
11	14	P	03	N	21	43	9.3	9.2	63.5	4	4	5.246	5.274	387	26358	5025	25178	4774	0.0	
2	01	P	03	E	N	7	107	13.6	13.5	69.9	3	4	4.802	4.806	107	1712	357	1645	342	0.0
2	01	P	03	E	Y	2	2	30.2	30.2	114.0	3	4	6.377	6.380	2	2540	398	2439	382	0.0
2	01	P	03	L	N	7	117	13.5	13.4	67.1	4	4	5.034	5.051	117	2000	397	1907	378	0.0
2	01	P	03	P	N	4	223	12.1	11.9	56.6	4	5	4.940	4.969	223	1321	267	1262	254	0.0

REPORT VSM3

VSM3: VOLUME SUMMARY FOR STRATA (CS1)															PAGE 11									
FOR CUT TREES ONLY																								
CRUISE#: 20002					SALE#: 20002					VERSION: DRAFT.2013														
SALENAME: R2 Test																								
VOLUME LIBRARY VERSION: 09.23.2013																								
RUN DATE & TIME: 12/12/2013 2:52:43 PM																								
P	R	O	D	# OF TREES	M	E	A	N	A	V	G	STRATA LEVEL												
S	R	S	U	A	A	A	O		A	D	G	VOLUME												
T	O	O		S	L	Q	N	T	D	B	D	EST.												
R	D	U	O	U	L				B	C		*** GROSS ***												
A	U	R	F	R	I	M	E	A	D	U	C	**** NET ****												
T	C	C		E	E		S	B	F	F		CORDS												
A	T	E	M	D	E	D	B	H	T	T	R	RATIO		RATIO		TREES	B	D	C	B	D	C	C	
1	01	P	03	16	16	11.5	11.2	53.4	4	5	4.555	4.575	16	1090	239	1040	227	0.0						
10	01	P	03	17	30	12.3	12.1	56.8	4	4	4.774	4.784	1860	167456	35075	159580	33358	0.0						
11	14	P	03	21	43	9.3	9.2	63.5	4	4	5.246	5.274	387	26358	5025	25178	4774	0.0						

REPORT VSM4

VSM4: 3P TREE REPORT (CP4)															PAGE 13		
CUFF VOLUME																	
FOR CUT TREES ONLY -- PRIMARY PRODUCT ONLY																	
CRUISE#: 20002					SALE#: 20002					VERSION: DRAFT.2013							
SALENAME: R2 Test																	
VOLUME LIBRARY VERSION: 09.23.2013																	
RUN DATE & TIME: 12/12/2013 2:52:43 PM																	
STRATUM	SAMPLE GROUP	CUTTING UNIT	PLOT	TREE	SPECIES	DBH	GROSS VOLUME	NET VOLUME	EXPANSION FACTOR	KFI	TREE COUNT	RATIO	MARKER'S INITIALS				
2	E	2		1	ES	15.0	29.1	27.9	3.30	25	1	1.116					
				5	ES	12.0	20.6	19.8	3.59	23	1	0.861					
				8	ES	30.6	198.8	190.8	1.00	0	1						
				11	ES	13.3	23.8	22.8	1.84	45	1	0.507					
				14	ES	14.6	31.0	29.8	1.84	45	1	0.662					
				15	ES	14.2	27.7	26.6	1.20	69	1	0.386					
				16	ES	13.9	24.2	23.2	1.25	66	1	0.352					
				17	ES	12.2	15.0	14.4	1.50	55	1	0.262					
				21	ES	29.8	159.5	151.5	1.00	0	1						
								ES					578	100			
				SUBTOTAL		2				569.7	546.8	16.51	578	109			
2	L	2		2	LP	16.2	47.0	44.7	2.37	30	1	1.490					

VPA REPORTS -- Volume Per Acre reports for population

Characteristics are displayed by the following: Strata, Product, Product Source, Unit of Measure, Sample Group and Sure to Measure.

Report	Description	Available	Modified
VPA1	Low Level Volume Per Acre Summary: Primary, Secondary, and Recovered Product - Per Acre Level: Number of trees, gross and net board foot, cubic foot, and cords volume. (B2)	✓	
VPA2	Volume Per Acre Summary by Sample Group: Primary, Secondary, and Recovered Product – Per Acre Level: Number of trees, gross and net board foot, cubic foot, and cords volume. (CP2)	✓	
VPA3	Volume Per Acre Summary by Strata: Primary, Secondary, and Recovered Product – Per Acre Level: Number of trees, gross and net board foot, cubic foot, and cords volume. (CS2)	✓	

REPORT VPA1

VPA1: LOW LEVEL VOLUME PER ACRE SUMMARY (B2)										PAGE 3
FOR CUT AND LEAVE TREES										
CRUISE#: 20002 SALE#: 20002										
SALENAME: R2 Test										VERSION: DRAFT.2013
RUN DATE & TIME: 12/12/2013 2:52:43 PM										VOLUME LIBRARY VERSION: 09.23.2013
<pre> P C R O O D T N S P R S U L S R T S P R S U L S R T T E O O L M E R C D U O L E C S A I U R F I A O G S G P T E C C V V M R T R E A S T E M E E P D M D C </pre>										
*****PER ACRE*****										
EST.										
NO. OF										
*****GROSS*****										
*****NET*****										
TREES	BDFT	CUFT	BDFT	CUFT	CORDS					
1 ES	01 P 03 L C CL N	<1	2	1	2	1	0.0			
1 LP	01 P 03 L C CL N	<1	50	11	48	10	0.0			
1 PP	01 P 03 L C CL N	<1	8	2	8	2	0.0			
10 ES	01 P 03 L C CL N	19	525	139	499	133	0.0			
10 LP	01 P 03 L C CL N	72	5996	1273	5721	1210	0.0			
10 PP	01 P 03 L C CL N	12	2782	537	2646	510	0.0			
11 LP	14 P 03 D C CD N	22	1464	279	1399	265	0.0			
2 ES	01 P 03 L C CL E N	6	95	20	91	19	0.0			
2 ES	01 P 03 L C CL E Y	<1	141	22	136	21	0.0			
2 PP	01 P 03 L C CL E N	12	73	18	70	14	0.0			

REPORT VPA2

VPAs: VOLUME PER ACRE SUMMARY BY STRATA (CS2)										PAGE 6
FOR CUT TREES ONLY										
CRUISE#: 20002					SALE#: 20002					
SALENAME: R2 Test					VERSION: DRAFT.2013					
RUN DATE & TIME: 12/12/2013 2:52:43 PM					VOLUME LIBRARY VERSION: 09.23.2013					
P R O D										
P R O D										
S R S U										
T O O										
R D U O										
A U R F										
T C C										
A T E M										
*****PER ACRE*****										
EST.										
NO. OF										
*****GROSS*****										
*****NET*****										
CORDS										
TREES	BDFT	CUFT	BDFT	CUFT	CORDS					
1	01	P	03	<1	61	13	58	13	0.0	
10	01	P	03	103	9303	1949	8866	1853	0.0	
11	14	P	03	22	1464	279	1399	265	0.0	
2	01	P	03	25	546	96	522	92	0.0	

REPORT VPA3

VPAs: VOLUME PER ACRE SUMMARY BY STRATA (CS2)										PAGE 6
FOR CUT TREES ONLY										
CRUISE#: 20002					SALE#: 20002					
SALENAME: R2 Test					VERSION: DRAFT.2013					
RUN DATE & TIME: 12/12/2013 2:52:43 PM					VOLUME LIBRARY VERSION: 09.23.2013					
P R O D										
P R O D										
S R S U										
T O O										
R D U O										
A U R F										
T C C										
A T E M										
*****PER ACRE*****										
EST.										
NO. OF										
*****GROSS*****										
*****NET*****										
CORDS										
TREES	BDFT	CUFT	BDFT	CUFT	CORDS					
1	01	P	03	<1	61	13	58	13	0.0	
10	01	P	03	103	9303	1949	8866	1853	0.0	
11	14	P	03	22	1464	279	1399	265	0.0	
2	01	P	03	25	546	96	522	92	0.0	

VAL REPORTS -- Value and Weight Reports for Strata and Sale (For Cut Trees Only)

Characteristics are display by the following: Strata, Product, Product Source, and Unit of Measure.

Report	Description	Available	Modified
VAL1	Low Level \$ Value Summary: Primary, Secondary, and Recovered Product – Per Acre and Strata Level: \$ value, weight and total cubic foot volume. (B3)	✓	
VAL2	Sample Group \$ Value Summary: Primary, Secondary, and Recovered Product – Per Acre Level and Strata Level: \$ value, weight and total cubic foot volume. (CP3)	✓	
VAL3	Strata \$ Value & Weight Summary: Primary, Secondary, and Recovered Product – Per Acre Level and Strata Level: \$ value, weight and total cubic foot volume. (CS3)	✓	

REPORT VAL1

VAL1: LOW LEVEL \$ VALUE SUMMARY (B3)										PAGE 5			
FOR CUT AND LEAVE TREES													
CRUISE#: 20002 SALE#: 20002													
SALENAME: R2 Test													
RUN DATE & TIME: 12/12/2013 3:14:06 PM													
VERSION: DRAFT.2013													
VOLUME LIBRARY VERSION: 09.23.2013													
P R O D U C T S U M M A R Y 													
S P R S U L S R T T E O O L M E R C D U O L E C S A I U R F I A O G S G P T E C C V V M R T R E A S T E M E E P P M D C													
***** VALUE *****													
***** WEIGHT *****													
***** TOTAL CUFT *****													
STRATA STRATA STRATA													
LEVEL PER ACRE LEVEL PER ACRE LEVEL PER ACRE													
7 ES	01	P	03	L	C	CL	N	5976	332	0	0	0	0
7 LP	01	P	03	L	C	CL	N	14134	785	0	0	0	0
7 PP	01	P	03	L	C	CL	N	4090	227	0	0	0	0
8 ES	01	P	03	L	C	CL	E N	3463	192	0	0	0	0
8 LP	01	P	03	L	C	CL	L N	1287	71	0	0	0	0
8 PP	01	P	03	L	C	CL	P N	2042	113	0	0	0	0
9 ES	01	P	03	L	C	CL	N	6460	359	0	0	0	0
9 LP	01	P	03	L	C	CL	N	6536	363	0	0	0	0
9 PP	01	P	03	L	C	CL	N	4593	255	0	0	0	0
TOTALS -----								179681		0		0	

WT REPORTS – Weight Reports			
<i>Report</i>	<i>Description</i>	<i>Available</i>	<i>Modified</i>
WT1	Report displays weight by species across all strata with a summary by contract species. Data shown includes the cruise species, contract species, product (primary and secondary), gross CUFT volume, the weight factor, pounds standing, percent removed, pounds removed and tons removed. A footnote at the bottom shows how each column was calculated.	✓	
WT2	Slash Loading Summary by Strata: Report displays Dry Tons per Acre for crowns, topwood, cull logs and chunk logs. Weight is broken down by needles, 0-¼”, ¼-1”, 1-3”, and 3” + for each category. Subtotals are shown for each category and an overall total is shown at the end of the report. Details are provided after the report example shown below. At least one page per stratum is generated with an overall sale summary on the last page.	✓	
WT3	Slash Loading Summary by Unit: Report is similar to the WT2 in that weight is broken down by the same categories. The data is organized by cutting unit. See the example below.	✓	
WT4	Weight by Species and Product by Cutting Units – for cut trees only Broken down by cutting units, this report shows the unit acres, species in the unit, green tons for sawtimber (primary product of 01), green tons for non-sawtimber (all other codes) and green tons for non-sawtimber secondary product only. An overall total is displayed at the end of the report.	✓	
WT5	Biomass Sale Summary – for cut trees only Summarizes biomass weight by stratum with an overall sale summary on the last page. Green tons are displayed by species. If main stem weight factors were entered, primary and secondary product weight is displayed. Biomass components are shown for tip, branches (live and dead), and foliage. A stem total as well as an overall total is shown.	✓	

REPORT WT1

WT1: WEIGHT BY SPECIES ACROSS STRATA FOR CUT TREES ONLY			PAGE 107								
CRUISE#: 16002		SALE#: 16002							VERSION: DRAFT.2017		
SALENAME: Lava										VOLUME LIBRARY VERSION: 11.21.2016	
RUN DATE & TIME: 2/24/2017 1:42:33 PM											
CRUISE SPECIES	CONTRACT SPECIES	PRODUCT	GROSS CUFT	(1) WEIGHT FACTOR	(2) POUNDS STANDING	(3) PERCENT REMOVED	(4) POUNDS REMOVED	(5) TONS REMOVED			
IC		01 P	10690	58.00	620020	95.00	589019	294.51			
IC		20 S	2270	86.00	195220	95.00	185459	92.73			
IC		20 P	20151	86.00	1732986	95.00	1646337	823.17			
PP		01 P	457846	68.00	31133528	95.00	29576852	14788.43			
PP		20 S	51942	80.00	4155360	95.00	3947592	1973.80			
PP		20 P	206690	80.00	16535200	95.00	15708440	7854.22			
SP		01 P	268	69.00	18492	95.00	17567	8.78			
SP		20 S	38	80.00	3040	95.00	2888	1.44			
WF		01 P	586644	69.00	40478436	95.00	38454514	19227.26			
WF		20 S	51795	86.00	4454370	95.00	4231652	2115.83			
WF		20 P	245601	86.00	21121686	95.00	20065602	10032.80			
SUMMARY											
CONTRACT SPECIES		PRODUCT					TONS REMOVED				
		01 P					34318.98				
		20 P					18710.19				
		20 S					4183.80				
TOTAL TONS REMOVED							57212.96				
<p>(1) WEIGHT FACTOR = POUNDS PER GROSS CUFT (2) POUNDS STANDING = GROSS CUFT x WEIGHT FACTOR (3) PERCENT REMOVED = % MATERIAL HAULED OUT ON TRUCKS (4) POUNDS REMOVED = POUNDS STANDING x (PERCENT REMOVED/100) (5) TONS REMOVED = POUNDS REMOVED / 2,000</p>											

REPORT WT2

WT2: SLASH LOADING SUMMARY BY STRATA FOR CUT TREES ONLY						PAGE 70
CRUISE#: 01		SALE#: 27102		VERSION: DRAFT.2007		
SALENAME: James Creek Task Order		RUN DATE & TIME: 10-19-2007 07:55:11		VOLUME LIBRARY VERSION: 10.18.2007		
STRATUM: 7						
SLASH LOAD SPECIES						
CROWNS	DF	ES	LP	PP	TOTAL	
NEEDLES	0.00	0.00	0.00	0.00	0.00	
0 - 1/4"	0.00	0.00	0.00	0.00	0.00	
1/4 - 1"	0.00	0.00	0.00	0.00	0.00	
1 - 3"	0.00	0.00	0.00	0.00	0.00	
3"+	0.00	0.00	0.00	0.00	0.00	
3"+						
TOPWOOD	0.00	0.00	0.00	0.00	0.00	
CULL VOLUME	0.00	0.00	0.00	0.00	0.00	
CHUNKS	0.00	0.00	0.00	0.00	0.00	
FLIW	0.65	0.50	0.45	0.75		
DAMAGED SMALL TREES						
NEEDLES	0.16	0.15	0.15	0.23	0.69	
0 - 1/4"	0.08	0.07	0.09	0.03	0.27	
1/4 - 1"	0.11	0.06	0.11	0.18	0.46	
1 - 3"	0.25	0.16	0.43	0.42	1.25	
3"+	0.00	0.00	0.00	0.00	0.00	
% Included	0.90	0.75	0.95	1.00		
TOTAL						STRATUM TOTAL/AC
OVEN DRY TONS/AC	0.60	0.44	0.78	0.85		ALL SPECIES
						2.67

FLIW = Fraction Left in Woods

Details for WT2 Report

NOTE: All component data for this report now comes from the National Biomass Estimator Library (10/2015).

The WT2 report displays estimated slash loading for cut trees only in the cruise. At least one page per stratum is created and includes values for species within the stratum for each category. Outputs are reported as oven dry tons per acre. The components of the report include: crowns, topwood, cull logs, chunks and damaged small trees. Each component is further described as follows:

- Crowns – includes branches, needles and the portion of the stem from 3” to tip. Dry weight is further broken down into – needles, 0 – ¼ inch material, ¼ - 1 inch material, 1- 3 inch material and 3 inch material. A separate column is included for the total.
- Topwood weight – Based on secondary product volume from top DIB of primary product to 3 inch DOB. It uses average oven dry weight factor.
- Cull Logs – Based on volume in logs coded grade 9. It also uses average oven dry weight factor.
- Chunks – Estimates the weight of cull wood bucked out and left in the woods. The user supplies the estimate of the fraction left in the woods. Based on primary product gross minus net volume, excluding cull logs with a grade 9.

During hand felling operations, chunks of the log which are culled for producing boards may be bucked out and left in the woods (for example, the crotch of forks, crooks, etc. These will be the cull chunks smaller than the amount that would cull an entire log.) The cruise report

shows gross and net volume for sawtimber. The difference is the total cull for sawtimber. The total sawtimber cull volume will be made up of cull logs, cull chunks bucked off and left in the woods, and some cull material left on the sawlogs that are shipped to the mill. The volume of the cull chunks left in the woods divided by the (total cull volume - cull logs with a grade 9) is the "fraction left in the woods." The user estimates the fraction based on local experience and timber sale requirements for slash removal.

- Damaged small trees – reported by the same categories as Crown described above.

REPORT WT3

WT3: SLASH LOADING SUMMARY BY CUTTING UNIT FOR CUT TREES ONLY								PAGE 81
CRUISE#: 777		SALE#: 777						VERSION: DRAFT.2007
SALENAME: R5 Test File								VOLUME LIBRARY VERSION: 02.16.2007
RUN DATE & TIME: 06-05-2007 07:53:31								
CUTTING UNIT: 1								
SLASH LOAD SPECIES								
CROWNS		DF	IC	JP	LP	PP	RF	TOTAL
NEEDLES		0.00	0.00	0.00	0.00	0.01	0.00	0.01
0 - 1/4"		0.00	0.00	0.00	0.00	0.00	0.00	0.00
1/4 - 1"		0.00	0.00	0.00	0.00	0.01	0.00	0.01
1 - 3"		0.00	0.00	0.00	0.00	0.01	0.00	0.01
3"+		0.00	0.00	0.00	0.00	0.00	0.00	0.00
3"+								
TOPWOOD		0.00	0.00	0.00	0.00	0.00	0.00	0.00
CULL VOLUME		0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHUNKS		0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLIW		0.55	0.55	0.55	0.55	0.55	0.55	
TOTAL								UNIT TOTAL/AC ALL SPECIES
OVEN DRY TONS/AC		0.00	0.00	0.00	0.00	0.04	0.04	0.08

REPORT WT4

WT4: WEIGHT BY SPECIES AND PRODUCT BY CUTTING UNIT FOR THE SALE FOR CUT TREES ONLY						PAGE 90
CRUISE#: 777		SALE#: 777				VERSION: DRAFT.2007
SALENAME: R5 Test File						VOLUME LIBRARY VERSION: 02.16.2007
RUN DATE & TIME: 06-05-2007 07:53:31						
CUTTING UNIT	ACRES	SPECIES	SAWTIMBER	NON-SAWTIMBER	NON-SAWTIMBER	
			PRIM PROD = 01 GREEN TONS	OTHER PRIM PROD GREEN TONS	SECOND PROD ONLY GREEN TONS	
1	10	DF	36	0	2	
		IC	29	0	3	
		JP	29	0	1	
		LP	10	0	1	
		RF	61	0	3	
		SP	54	0	2	
SUBTOTAL			219	0	12	
2	10	DF	7	0	0	
		PP	56	0	5	
		SP	9	0	0	
		WF	68	0	10	
SUBTOTAL			140	0	15	
3	10	PP	66	0	4	
		WF	81	0	7	
SUBTOTAL			146	0	11	

REPORT WT5

WT5: BIOMASS SALE SUMMARY FOR CUT TREES ONLY								PAGE 23
CRUISE#: 100		SALE#: 100						VERSION: DRAFT.2016
SALENAME: Stumpy/Big Meadow CATX						VOLUME LIBRARY VERSION: 04.19.2016		
RUN DATE & TIME: 5/5/2016 1:19:58 PM								
STRATUM: 1				GREEN TONS				
SPECIES	PRIMARY PRODUCT	SECONDARY PRODUCT	-----BIOMASS COMPONENTS-----			-----STEM WGT-----		
DF	613.7	59.5	0.0	105.8	46.7	841.5	825.7	
ALL SPECUES	613.7	59.5	0.0	105.8	46.7	841.5	825.7	
* WHOLE TREE (ABOVE GROUND) BIOMASS AS CALCULATED USING THE TOT TREE EQN SPECIFIED IN DEFAULTS (REGIONAL) .								
** TOTAL IS THE ADDITION OF PRIMARY PRODUCT, SECONDARY PRODUCT, TIP, BRANCHES AND FOLIAGE.								

WT5: BIOMASS SALE SUMMARY FOR CUT TREES ONLY								PAGE 24
CRUISE#: 100		SALE#: 100						VERSION: DRAFT.2016
SALENAME: Stumpy/Big Meadow CATX						VOLUME LIBRARY VERSION: 04.19.2016		
RUN DATE & TIME: 5/5/2016 1:19:58 PM								
STRATUM: OVERALL SALE SUMMARY				GREEN TONS				
SPECIES	PRIMARY PRODUCT	SECONDARY PRODUCT	-----BIOMASS COMPONENTS-----			-----STEM WGT-----		
DF	613.7	59.5	0.0	105.8	46.7	841.5	825.7	
ALL SPECUES	613.7	59.5	0.0	105.8	46.7	841.5	825.7	
* WHOLE TREE (ABOVE GROUND) BIOMASS AS CALCULATED USING THE TOT TREE EQN SPECIFIED IN DEFAULTS (REGIONAL) .								
** TOTAL IS THE ADDITION OF PRIMARY PRODUCT, SECONDARY PRODUCT, TIP, BRANCHES AND FOLIAGE.								

How is this report put together?

Here is a description of how each column is derived for this report.

Primary Product – calculated in the biomass library (NBEL).

Secondary Product – calculated in the biomass library (NBEL).

Biomass Components –

Tip – calculated from total stem (from NBEL) minus (primary plus secondary product plus live/dead branches plus foliage)

Branches – live branches and dead branches added together. Live and dead branches value returned from NBEL

Foliage – foliage value returned from NBEL

Stem Wgt Merch – the whole tree (above ground) biomass as calculated using the Tot Tree Eqn specified in the Weight Equation Table.

Stem Wgt Total – the total of primary product, secondary product, tip, branches, and foliage

Volume Warning Report

If warnings are detected in the calculation of volumes as well as other calculations, this report appears at the end of the output. In general, it indicates the calculation of volume was not completed for a particular tree in the data. The report shows the strata, cutting unit, plot, and tree number along with a warning message. Possible warning messages are:

NO VOLUME EQUATION MATCH
NO FORM CLASS
DBH LESS THAN ONE
TREE HEIGHT LESS THAN 4.5
D2H IS OUT OF BOUNDS
NO SPECIES MATCH
ILLEGAL PP LOG HEIGHT
ILLEGAL SP LOG HEIGHT
NO UPPER STEM MEASUREMENTS
ILLEGAL UPPER STEM HEIGHT
UNABLE TO FIT PROFILE GIVEN DBH, MERCH HT & TOP DIA
TREE HAS GREATER THAN 20 LOGS
TOP DIAMETER GREATER THAN DBH INSIDE BARK
BARK EQUATION DOES NOT EXIST OR YIELDS NEGATIVE DBHIB
INVALID BIOMASS EQUATION
PRIMARY PRODUCT HEIGHT REQUIRED FOR BIOMASS CALCULATION
SECONDARY PRODUCT HEIGHT REQUIRED FOR BIOMASS CALCULATION
RECOVERABLE DEFECT GREATER THAN SUM OF DEFECTS -- SUM OF
DEFECTS USED IN CALCULATION
SECONDARY PRODUCT WAS BLANK IN SAMPLE GROUPS – DEFAULT
VALUE USED
MORE THAN TWO UOMS DETECTED – THIS FILE WILL NOT LOAD IN TIM
BIOMASS FLAG NOT CHECKED – NO WEIGHT CALCULATED

GLOSSARY OF DEFINITIONS

This list of definitions is by no means exhaustive. Additional definitions can be found in Timber Cruising Handbook – Chapter 30. Formulas for calculating statistics under the different cruise methods can also be found in the Handbook.

Alphanumeric – entries may contain letters and/or numbers.

Area-Based Cruise – volumes are determined based on volume per acre and expanded by the numbers of acres in the stratum.

Basal Area – the cross sectional area of a tree at DBH expressed in square feet.

BAF – basal area factor

Characteristic Factor – used for plot cruises having count and measure trees. It is the total number of trees, counted and measured, divided by the number of measured trees.

Coefficient of variation – a measure of the relative variability and is used to compare the degree of variation between different populations.

Combined Sampling Error – a weighted combination of two or more sampling errors to get one sampling error.

Confidence Interval – the range of values around which the population mean is expected to fall.

Default – value used in a field when no other value is entered.

Expansion Factor – In any sampling scheme, only selected trees are completely measured. The trees that are measured also represent those that were not measured and must be expanded to get a total stand value.

KPI – an estimate of the predicted volume or value of a tree.

Mean – the average value obtained from dividing the sum of sample values by the number of samples.

Numeric – entries contain numbers only.

Sample – a subset of units selected from the population to represent the population.

Sampling Error – expresses the precision of the inventory. It is the percent error of an estimated mean at a desired probability level.

Standard Deviation – a measure of the dispersion of individual samples about the mean.

Standard Error – the standard error of the mean provides an estimate of the sampling error. It describes the variation of multiple sample means about the population. It can be estimated from a single sample as the square root of the sample variance divided by the sample size.

Sum of X squared – the value of all samples, squared, and added together.

Sum of X – the sum of all sample values

t Value – a normal frequency curve is divided into six units of standard deviation, plus and minus 1, 2, and 3. The t value can change based on sample size and may not always be reported as a whole number.

67 percent ($t = 1$) is ± 1 standard deviation

95 percent ($t = 2$) is ± 2 standard deviations

99 percent ($t = 3$) is ± 3 standard deviations

Tree-Based Cruise – a cruise method where volumes are calculated or expanded based on individual tree volumes.

Tree Factor – a factor that expands each measured tree by the number of trees it represents.

Variance – a measure of how the sample unit values such as tree volumes are disbursed around the mean of the unit values.

Appendix F

SYMBOL DEFINITIONS BY SAMPLE SYSTEM

The values of 'N', 'n', 'X' and 'EXP FAC' for allowable sampling methods.

Population – a strata or a sample group within a strata.

EXP FAC – the expansion factor or weight given to an individual tree based on the sampling method used.

TREE BASED SYSTEMS

100% Sample (Code = 100)

N = the number of trees in the population.

n = the number of measured trees in the population. In this case $N = n$.

X = the volume (or value) of a tree.

EXP FAC = the expansion factor or weight will always be equal to 1.

SAMPLE TREE (Code = STR)

N = the number of trees in the population. This is the number of trees counted in the population.

n = the number of measured trees in the population.

X = the volume (or value) of a tree.

EXP FAC = N / n

PROBABILITY PROPORTIONAL TO PREDICTION (3P) (Code = C3P)

N = the number of trees in the population. This is the number of trees for which a prediction (KPI) is made.

n = the number of measured trees in the population.

X = the ratio of an actual measured attribute to the predicted variable (KPI) for a measured tree.

EXP FAC = (the sum of KPIs) / ((n) * KPI of the measured tree)

SAMPLE TREE WITH 3P SUBSAMPLE (Code = S3P)

First Stage

N = the number of trees in the population. This is the number of trees counted in the population.

n = the number of trees for which a predication was made.
X = the predicated attribute (KPI), usually volume or value of a tree.

Second Stage

N = the number of trees for which a prediction (KPI) is made. This is the same as ‘n’ in the first stage.

n = the number of measured trees.

X = the ratio of an actual measured attribute to the predicated variable (KPI) for a measured tree.

TREE FAC = the number of trees counted / the number of trees for which a prediction was made.

CHAR FAC = (the sum of KPIs) / ((n) * KPI of the measured tree)

EXP FAC = (TREE FAC) * (CHAR FAC)

AREA BASED SYSTEMS

POINT or VARIABLE PLOT (Code = PNT)

N = the number of points possible. For practical purposes this is infinite.

n = the number of points taken.

X = the per acre volume (or value) for a point.

TREE FAC = (BAF) / ((.005454) * (DBH * DBH))

EXP FAC = (TREE FAC) / the number of points taken

POINT WITH 3P SUBSAMPLE (Code = P3P)

First Stage

N = the number of points possible. For practical purposes this is infinite.

n = the number of points established.

X = the total of the KPIs (estimated heights) for a point. When calculating the number of sample points needed use expanded volume per point as the X term.

Second Stage

N = the number of trees for which a prediction (KPI) is made.

n = the number of trees measured in the population.

X = a ratio of the measured volume to (KPI * DBH * DBH) for a measured tree.

TREE FAC = (BAF) / ((.005454) * (DBH * DBH))

CHAR FAC = (the sum of KPIs by species) / ((number of measured trees by species) * KPI of the measured tree)

EXP FAC = (((TREE FAC) * (CHAR FAC)) / number of points established)
The number of points is 'n' from the first stage of sample.

POINT WITH COUNT MEASURE PLOTS (Code = PCMPLT)

First Stage

N = the number of points possible. For practical purposes this is infinite.

n = the number of points established.

X = the number of measured trees on a point.

Second Stage

N = number of counted and measured points.

n = number of measured points.

X = the per acre volume or value represented by a measured point

The error term is calculated using the method recommended by Floyd A. Johnson in his Research Note number 201,
Pacific Northwest Forest and Range Experiment Station, January 1961.

TREE FAC = (BAF) / ((.005454) * (DBH * DBH))

CHAR FAC = the total number of trees counted and measured by species divided by the number of measured trees by species.

EXP FAC = ((TREE FAC) * (CHAR FAC)) / number of points established

POINT WITH COUNT MEASURE TREES (Code = PCMTRE)

First Stage

N = the number of points possible. For practical purposes this is infinite.

n = the number of points established.

X = the number of measured trees at a point

Second Stage

N = the number of counted and measured trees.

n = the number of trees measured.

X = the sum of the volume or value to basal area ratio for measured trees on a point.

TREE FAC = (BAF) / ((.005454) * (DBH * DBH))

CHAR FAC = the total number of trees counted and measured by species divided by the number of measured trees by species.

EXP FAC = ((TREE FAC) * (CHAR FAC)) / number of points established

FIXED AREA PLOT (Code = FIX)

N = the number of plots possible. This is the total area sampled divided by the area of a sample plot.

n = the number of plots established.

X = the total volume (or value) represented by a plot.

EXP FAC = denominator of plot size / number of plots established

FIXED AREA PLOT WITH 3P SUBSAMPLE (Code = F3P)

First Stage

N = the number of plots possible. This is the total area sampled divided by the area of a sample plot.

n = the number of plots taken.

X = the total estimated volume or value (the sum of the KPIs) for a plot. This is an unexpanded KPI.

Second Stage

N = the number of trees for which a prediction (KPI) is made.

n = the number of trees measured.

X = the ratio of an actual measured attribute to the predicated volume or value (KPI) for a measured tree.

TREE FAC = the denominator of plot size

CHAR FAC = (the sum of KPIs by species) / ((number of measured trees by species) * KPI of the measured tree)

EXP FAC = (((TREE FAC) * (CHAR FAC)) / number of plots established)

Appendix G

TABLE OF ERROR CODES



Error messages are reported differently in *CruiseProcessing*. In the example printout above, the table containing the error is listed first followed by select identifying fields and the error message. Some of the error messages are generic in nature and field names are added to make the message meaningful. In the error messages listed below, an ellipsis is used to indicate where the field name is placed. The second column in this table, Probable Cause, gives a possible reason for the error to be detected.

ERROR CODE	ERROR MESSAGE	PROBABLE CAUSE
1	Invalid volume, value or quality adjustment equation number	An equation number in one of these tables is not valid.
2	Value or quality adjustment coefficient missing on this record	An equation requiring coefficients is missing one or more coefficients.
3	Must find primary product before secondary product	No primary product flags were checked.
4	Secondary top DIB greater than primary top DIB	On a volume equation record, these values may be switched
5	Duplicate volumes requested on same species/product code	Species/product code entered twice in volume equation table.
6	Same equation number with different top diameters	Different top diameters on two volume equation records.
7	Invalid ... number (for example, stratum, plot, unit)	Inconsistency between tables for select values like stratum.
8	... cannot be blank or empty	Indicates an empty required field.
9	... contains an invalid code	Recorded value not found in validation list
10	Tree count cannot be greater than 1 for this record	Recorded tree count is greater than 1
11	Count/measure code is in error on this record	Certain cruise methods do not allow count trees
12	No volume equation match	No match in volume equations for species/product code
13	More than 20 logs for this tree	More than 20 logs were recorded for this tree
14	Strata/SMPGRP tree must have same UOM, product and cut/leave codes	Either UOM, product, and/or cut/leave codes are different or missing for this stratum/sample group

ERROR CODE	ERROR MESSAGE	PROBABLE CAUSE
15	Plot cannot have both count and measure trees	Count tree in a measured plot
16	Method must have species, product, UOM, and/or leave codes blank	Count tree with species, product, UOM & leave codes filled in
17	Method must have one sample group per strata	More than one sample group per stratum (3PPNT)
18	Cannot have an upper stem diameter greater than DBH	Recorded upper stem diameter is greater than recorded DBH
19	Variable Log Length cruise is missing mandatory fields	Mandatory fields are missing
20	Gross data must be greater or equal to net data	Fall, buck and scale – recorded gross is less than recorded net
21	Species, product or UOM codes must be entered on this record	Tree count is greater than zero or DBH is greater than zero
22	Basal area factor required for Point cruises	BAF not recorded for stratum
23	Fixed plot size required for Fixed Plot cruises	Fixed plot size not recorded for stratum
24	Acres required for area based cruises	Acres not recorded for stratum
25	... table cannot be empty	Indicated table has no records
26	No reports selected	Reports list is empty
27	KPI estimate cannot be zero for this tree	Measured tree with KPI of zero and 3P code is not 3
28	More than one sale record is not allowed	Cruise has more than one sale record
29	Percent Recoverable cannot be greater than Percent Seen Defect	Percent seen defect is less than percent recoverable
30	Sample group has no measured trees	No measured trees recorded for sample group
31	Invalid tree default value key code on tree	Code missing or incorrect – Contact FMSC for help
32	No height recorded for this tree	One of four heights not recorded in tree data

Appendix H

The Biomass Calculation from Volume Estimator Library

1. Primary product, secondary product and stem tip

The biomass calculation for these components (green weight) is using cubic foot volume return from volume estimator library multiply by weight factor.

$$\text{GRNBIO_StemP} = \text{CUFTP} * \text{WF1}$$

$$\text{GRNBIO_StemS} = \text{CUFTS} * \text{WF2}$$

$$\text{GRNBIO_StemTip} = \text{CUFTTip} * \text{WF2}$$

Where

GRNBIO_StemP (lbs) = main stem primary product green weight, including bark,

CUFTP (cf) = main stem primary product wood cubic foot volume,

WF1 (lb/cf) = primary product weight factor for the species, if the species does not have a regional/forest default weight factor in the table above, the national default weight factor will be used (Miles and Smith 2009, Table 1B Column: Avg. green weight of wood and bark (lb.cf)),

GRNBIO_StemS (lbs) = main stem secondary product green weight, including bark,

CUFTS (cf) = main stem secondary product wood cubic foot volume,

WF2 (lb/cf) = secondary product weight factor for the species. If the species does not have a regional/forest default weight factor for the secondary product in the table above, its primary product weight factor will be used. If there is no regional/forest default weight factor for the primary product, the national default weight factor will be used (Miles and Smith 2009, Table 1B Column: Avg. green weight of wood and bark (lb.cf)),

GRNBIO_StemTip (lbs) = main stem tip green weight, including bark.

2. Above ground total, live branches, dead branches, and foliage

If there is a biomass equation in the regional/forest defaults for these biomass components, the biomass will be calculated using the formula of the equation. However, when there is no biomass equation for these biomass components, the biomass is calculated using Component Ratio Method (CRM) with Jenkins et al (2003) equation.

Jenkins' equation calculates Above Ground Total (AGT) biomass for 10 species groups. It also calculates component ratio to AGT for merchantable stem wood and bark, foliage, and roots.

Table 1. Parameters for estimating total aboveground biomass.

Species class	Species group	parameters	
		B ₀	B ₁
Hardwood	Aspen/alder/cottonwood/willow	-2.2094	2.3867
	Soft maple/birch	-1.9123	2.3651
	Mixed hardwood	-2.4800	2.4835
	Hard maple/oak/hickory/beechn	-2.0127	2.4342
Softwood	Cedar/larch	-2.0336	2.2592
	Douglas-fir	-2.2304	2.4435
	True fir/hemlock	-2.5384	2.4814
	Pine	-2.5356	2.4349
	Spruce	-2.0773	2.3323
Woodland	Juniper/oak/mesquite	-0.7152	1.7029

$$\text{DRYBIO_AGT_JENKINS} = 2.2046 * \text{EXP}(B_0 + B_1 * \text{LN}(\text{DBH} * 2.54))$$

Where DRYBIO_ABT_JENKINS (lb) = dry biomass for total aboveground with Jenkins equation, DBH in inches B₀ and B₁ are parameters for Jenkins equation.

Table 2. Parameters for estimating component ratios of total aboveground biomass.

Species class	Biomass component	parameters	
		B ₀	B ₁
Hardwood	Foliage	-4.0813	5.8816
	Coarse roots	-1.6911	0.8160
	Stem bark	-2.0129	-1.6805
	Stem wood	-0.3065	-5.4240
Softwood	Foliage	-2.9584	4.4766
	Coarse roots	-1.5619	0.6614
	Stem bark	-2.0980	-1.1432
	Stem wood	-0.3737	-1.8055

The component proportions of aboveground total biomass is estimated as:

$$\text{RATIO} = \text{EXP}(B_0 + B_1 / (\text{DBH} * 2.54))$$

Where

RATIO = ratio for each component (foliage, coarse roots, merchantable stem wood and bark), FOLIAGE_RATIO for foliage, ROOT_RATIO for coarse roots, BARK_RATIO for stem bark and WOOD_RATIO for stem wood.

Therefore,

$$\text{DRYBIO_FOLIAGE_JENKINS (lb)} = \text{DROBIO_ABT_JENKINS} * \text{FOLIAGE_RATIO}$$

$$\text{DRYBIO_ROOTS_JENKINS} = \text{DROBIO_ABT_JENKINS} * \text{ROOT_RATIO}$$

$$\text{DRYBIO_BARK_JENKINS} = \text{DROBIO_ABT_JENKINS} * \text{BARK_RATIO}$$

$$\text{DRYBIO_WOOD_JENKINS} = \text{DROBIO_ABT_JENKINS} * \text{WOOD_RATIO}$$

The merchantable stem wood biomass can also be estimated from stem wood volume (from stump to 4 in top) and wood density as:

$$\text{DRYBIO_STEM_WOOD} = \text{MERCH_VOL} * \text{WOOD_DENSITY}$$

Where MERCH_VOL = stem wood cubic foot volume from stump to 4 in top, WOOD_DENSITY = species wood density from Miles and Smith (2009). Since the estimation of wood biomass using volume and wood density is more accurate than the estimation from Jenkins' ratio method for a given tree, an adjustment factor is calculated to adjust JENKINS biomass.

$$\text{ADJ_FACTOR} = \text{DRYBIO_STEM_WOOD} / \text{DRYBIO_WOOD_JENKINS}$$

The adjustment factor (ADJ_FACTOR) is applied to the biomass calculated from Jenkins as:

$$\text{DRYBIO_STEM_BARK} = \text{DRYBIO_BARK_JENKINS} * \text{ADJ_FACTOR}$$

$$\text{DRYBIO_AGT} = \text{DRYBIO_AGT_JENKINS} * \text{ADJ_FACTOR}$$

$$\text{DRYBIO_FOLIAGE} = \text{DRYBIO_FOLIAGE_JENKINS} * \text{ADJ_FACTOR}$$

The green biomass is calculated from dry biomass with moisture content (MC). When MC is not listed in the regional default for the species, it will be calculated from the green weight factor and dry weight factor from Miles and Smith (2009) as:

$$\text{MC} = (\text{GRNWF} - \text{DRYWF}) / \text{DRYWF} * 100$$

Where GRNWF = green weight factor, WF1, if there is no WF1 for the species in the regional/forest default, use Avg. green weight of wood and bark (lb.cf) from Miles and Smith (2009);

DRYWF = dry weight factor, i.e. the Avg. oven-dry weight of wood and bark (lb.cf) from Miles and Smith (2009).

$$\text{GRNBIO_AGT} = \text{DRYBIO_AGT} * (1 + \text{MC}/100)$$

$$\text{GRNBIO_FOLIAGE} = \text{DRYBIO_FOLIAGE} * (1 + \text{MC}/100)$$

The branches biomass is calculated by subtracting foliage, merch stem (wood and bark), and stump from the aboveground total biomass.

$$\text{GRNBIO_BRANCHES} = \text{GRNBIO_AGT} - \text{GRNBIO_FOLIAGE} - \text{GRNBIO_StemP} - \text{GRNBIO_StemS} - \text{GRNBIO_STUMP}$$

Where GRNBIO_STUMP = green biomass for stump, stump wood volume multiply by green weight factor.

3. Example of biomass calculation for Cruise Processing

Here is an example to show biomass estimation for a 19-inch tree, Douglas-fir in Region 6 Malheur Forest (Forest number 4).

Regional/Forest default for Douglas-fir: primary weight factor WF1 = 60.7. There is no secondary weight factor, so the calculation will use WF2 = WF1. Also there is no biomass equation in the default for above ground total, live branches, dead branches, foliage and stem tip. Jenkins (2003) and CRM is used for the calculation of component biomass.

The dry weight factor (DWF) from Mile and Smith (2009) is 29.3. So the moisture content (MC) is calculated as: $MC = (WF1 - DWF) / DWF * 100 = (60.7 - 29.3) / 29.3 * 100 = 85.1$

3.1 Stem biomass calculation with cubic volume and weight factor

From volume library (VOLEQ = I12FW2W202, DBH = 19, HTTOT = 86), we get the main stem primary wood volume CUFTP = 57.2, secondary wood volume CUFTS = 1.2, stump volume CUFTStump = 2.0 and tip volume CUFTTip = 0.2. So the biomass for the main stem is:

The main stem primary product: $\text{GRNBIO_StemP} = \text{CUFTP} * \text{WF1} = 57.2 * 60.7 = 3472$

The main stem secondary product: $\text{GRNBIO_StemS} = \text{CUFTS} * \text{WF2} = 1.2 * 60.7 = 72.8$

The main stem tip: $\text{GRNBIO_StemTip} = \text{CUFTTip} * \text{WF2} = 0.17 * 60.7 = 10.3$

The stump: $\text{GRNBIO_STUMP} = \text{CUFTStump} * \text{WF1} = 2.0 * 60.7 = 121.4$

3.2 Biomass calculation with Jenkins' equation

The Jenkins' paired coefficients (B0, B1) needed for Douglas-fir are: (-2.2304, 2.4435) for total aboveground biomass, (-2.9584, 4.4766) for foliage component ratio, and (-0.3737, -1.8055) for stem wood component ratio. Therefore,

$$\begin{aligned} \text{DRYBIO_AGT_JENKINS} &= 2.2046 * \text{EXP}(B_0 + B_1 * \text{LN}(\text{DBH} * 2.54)) \\ &= 2.2046 * \text{EXP}(-2.2304 + 2.4435 * \text{LN}(19 * 2.54)) = 3079.8 \end{aligned}$$

$$\text{FOLIAGE_RATIO} = \text{EXP}(B_0 + B_1 / (\text{DBH} * 2.54)) = \text{EXP}(-2.9584 + 4.4766 / (19 * 2.54)) = 0.0569$$

$$\text{WOOD_RATIO} = \text{EXP}(B_0 + B_1 / (\text{DBH} * 2.54)) = \text{EXP}(-0.3737 - 1.8055 / (19 * 2.54)) = 0.6629$$

$$\text{DRYBIO_FOLIAGE_JENKINS} = \text{DRYBIO_AGT_JENKINS} * \text{FOLIAGE_RATIO} = 3079.8 * 0.0569 = 175.4$$

$$\text{DRYBIO_WOOD_JENKINS} = \text{DRYBIO_AGT_JENKINS} * \text{WOOD_RATIO} = 3079.8 * 0.6629 = 2041.7$$

3.3 The adjustment factor and moisture content to convert dry to green

It is believed that the stem wood biomass calculated from cubic foot volume is more accurate than the estimation from Jenkins' component ratio method, an adjustment factor is calculated.

$$\begin{aligned} \text{DRYBIO_STEM_WOOD} &= \text{MERCH_VOL} * \text{WOOD_DENSITY} = (\text{CUFTP} + \text{CUFTS}) * \text{WOODDEN} \\ &= (57.2 + 1.2) * 28.1 = 1641 \end{aligned}$$

$$\text{ADJ_FACTOR} = \text{DRYBIO_STEM_WOOD} / \text{DRYBIO_WOOD_JENKINS} = 1641 / 2041.7 = 0.8038$$

The moisture content (MC) is calculated from green weight factor and dry weight factor to convert dry to green:

$$\text{MC} = (\text{GRNWF} - \text{DRYWF}) / \text{DRYWF} * 100 = (60.7 - 29.3) / 29.3 * 100 = 85.1$$

$$\begin{aligned} \text{GRNBIO_AGT} &= \text{DRYBIO_AGT_JENKINS} * \text{ADJ_FACTOR} * (1 + \text{MC}/100) \\ &= 2475.4 * 0.8038 * (1 + 85.1/100) = 4581 \end{aligned}$$

$$\begin{aligned} \text{GRNBIO_FOLIAGE} &= \text{DRYBIO_FOLIAGE_JENKINS} * \text{ADJ_FACTOR} * (1 + \text{MC}/100) \\ &= 141.8 * 0.8038 * (1 + 85.1/100) = 262.5 \end{aligned}$$

The branches biomass is calculated from subtracting foliage, stem wood and bark, stump from the aboveground total:

$$\begin{aligned} \text{GRNBIO_BRANCHES} &= \text{GRNBIO_AGT} - \text{GRNBIO_FOLIAGE} - \text{GRNBIO_StemP} - \\ &\text{GRNBIO_StemS} - \text{GRNBIO_STUMP} = 4581 - 262.5 - 3472 - 72.8 - 121.4 = 652.3 \end{aligned}$$

Appendix J

Basic Regression Analysis

Description: The statistical term regression, as used in this document, is comparable to the word prediction. Regression analysis can be described as a statistical tool that utilizes the relation between two or more variables so that one variable can be predicted from the other, or others (Neter and Wassermann, 1974). For example, if we know the relationship, by means of regression analysis, between DBH and gross cubic foot volume, we can predict the gross cubic foot volume of a tree once DBH is known.

Before we can start talking about the mechanics of regression, we need to define some terms. The predictor variable is called the independent variable, and is usually denoted by the letter X. The target variable, or the variable we wish to predict, is called the dependent variable and is usually denoted by the letter Y. In the previous example, DBH would be the independent variable while gross cubic foot volume would be the dependent variable. We will define more terms throughout the discussion.

How regression works

Often, the first step is to plot the dependent variable over the independent variable. This is done to provide some visual evidence of whether the two variables are related. If there is a relationship between the two variables, the plotted points will show a pattern. If the relationship is very strong, the pattern will be very distinct. If the relationship is weak, the plotted points will be more spread out and the pattern will be less definite. In a nutshell, regression analysis plots a single line that best describes that pattern. The line could be straight or curved, but it is always defined by a single equation. A line (assuming a straight line for now) can be described by the equation:

$$Y = a + bX$$

where: a = the y-intercept or where the line crosses the y-axis.

b = slope of the line or how much Y changes with each change in X.

If we substitute our dependent and independent variables for the Y and X variables in the above equation, we will now have an equation for a regression line. To determine the regression line, we must fit or estimate the values for the y-intercept and the slope of the line. These estimated values are known as regression coefficients.

How do we estimate the y-intercept and the slope of the line? One way would be to simply draw a straight line through the center of the data points and then measure its intercept and slope. But there are two problems with this approach. First, different people would draw slightly different lines. Second, there is no guarantee that our line is the “best possible” line. To alleviate both these problems, we employ an objective approach to finding the best possible line.

Since we will be using our line for making predictions, we would like the predicted value of Y (or dependent variable) to be as close as possible to the actual, or observed, value of Y for each

observation. Equivalently, we would like the difference between the predicted value of Y and the actual value of Y to be as small as possible for each observation. This difference between the predicted and the actual value of Y is called the residual and can be thought of as the vertical distance between the plotted data point and the regression line. Because we would like the residual to be small for each observation, we could try summing them to find the line that minimizes the sum of the residuals. Unfortunately, this is not an adequate criterion for choosing a “best fitting” line. Any line that passes through the exact center of the data (or passes through the point described by the mean of X and the mean of Y) has a sum of residuals equal to zero. For such a line, half the values are too small and half are too large and the resulting sum of the residuals equal zero.

To avoid the cancellation of positive and negative values, we square each residual before summing. Now, when we find a line that minimizes the sum of these squared residuals, we have found our “best fitting” line. This procedure is known as the method of least squares or least squares regression.

A regression line can be thought of as a moving average. It gives an average value of Y associated with a particular value of X. Some of the actual values of Y will be above the regression line, or moving average, and some will be below. Using the example defined earlier with gross cubic volume to DBH, our regression line, or moving average, would predict the average gross cubic foot volume for each given DBH.

The next question we will need to ask is how well did our regression line fit our data? Now that we have found what we have defined as our “best fitting” line using least squares regression, we want to know accurately does that line describe the relationship, or pattern, between our dependent and independent variables. One method is to examine the R-Squared or Coefficient of Variation. The R-Squared value is a measure, ranging from 0 to 1, of the percent of variability in the dependent variable that is explained by independent variable. Each dependent variable has some natural variability associated with it. A regression line is trying to account for as much of that natural variability as possible. The R-Squared value is the percent of the variability associated with the dependent variable that the independent variable can account for.

A high R-Squared value means the actual data points fall close to the regression line. If all the data points fall on the regression line, the R-Squared value would be 1.0. If there were no pattern in the data whatsoever, the R-Squared value would be 0. Do not confuse the R-Squared value with a level of confidence. There is no upper limit to shoot for when looking at an R-Squared value. Either a relationship between the dependent and independent variables exists or it does not. No amount of data will give you an R-Squared value of 0.95 if no relationship exists.

For example, let’s take gross cubic volume as our dependent variable. There is some natural variation in gross cubic volume from tree to tree; small trees tend to have small gross cubic foot volumes, while big trees tend to have large gross cubic foot volumes. If we select DBH as our independent variable and run a regression on gross cubic volume, we will probably end up with an R-Squared value close to 1 because DBH is a good indicator of tree size and tree size is a good indicator of gross cubic volume. Let’s say we end up with an R-Squared of 0.9552. We can say that 95.52% of the variability in gross cubic foot volume was associated with DBH.

The Mean Square Error (MSE) is another variable we can use to evaluate how well our model fit the data. The MSE is the residual sum of squares divided by the degrees of freedom. The degree of freedom is defined as the total number of samples minus the number of variables in the regression equation minus one. With our linear equation given above, our degrees of freedom would be the number of samples minus one for the independent variable, minus one, or the number of samples minus two. The MSE is the variance of the regression model and can be used the same way a sampling variance can be used, including building confidence intervals around your regression line.

Selecting a Model

More often than not, the pattern displayed by plotting the dependent over the independent variable will show some sign of curvature. In this case, we would want to use an equation that can accommodate this curvature. The most common equations used to account for curvature in regression are the quadratic, natural logarithmic, and the exponential or power function. Choosing an appropriate regression equation model is just as important as choosing the right predictor variable. If the pattern displays an exponential trend, a linear equation will not fit the data as well as an exponential equation will. When comparing regression equations for the best model, compare the R-Squared value, the MSE, and plots of the residual values. The best model should have the highest R-Squared value, the lowest MSE, and display no discernible pattern in the residual plot.

Citations

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