PC-Cruise and CE-Cruise User's Manual



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PC-Cruise

The PC-Cruise software module is an advanced, integrated GPS/GIS based approach to timber cruising. PC-Cruise is designed to be used for the following applications: GPS/GIS mapping/navigation/data collection, timber cruising project planning and design, customized tree inventory data collection, calculation of weights/volumes from collected cruise data, report output and integration of cruise data into your GIS.

The PC-Cruise software is designed on top of the existing CMT software called PC-Mapper. Therefore, all the functions and capabilities found in the PC-Mapper software are available in the PC-Cruise software in addition to the added timber cruising functions.

PC-Cruise is written for use on an IBM or compatible PC running Microsoft Windows version 98, Windows 2000 or Windows XP. It is designed to work with several different CMT GPS receivers as well as other GPS systems capable of outputting data in the NMEA-0183 format. When connected to a GPS receiver, PC-Cruise takes control of the receiver, records data and displays SV tracking information, position and other useful indicators.

PC-Cruise can be used as a stand-alone timber cruise data collection program in the field (operating on a Tablet PC or Notebook PC). Alternatively, PC-Cruise can be used in conjunction with the CMT CE-Cruise timber cruise data collection software designed for Windows CE PDA units. When used in conjunction with CE-Cruise, the PC-Cruise software is used primarily as a GIS and planning tool as well as a cruise data processing engine and reporting tool. CE-Cruise takes over as the cruise data collection program used in the field to record tree data at sampling points/plots.

The following sections will provide detailed information regarding the operation of PC-Cruise software. For information about the general usage of PC-Mapper, please refer to the PC-Mapper Reference Guide.

First, we will start with a general overview of the capabilities of the software and a general data collection summary. There are three major concepts presented in this manual: Cruise Preparation/Fundamentals, Inventory/Data Collection and Reports/Computations. The manual will present, in detail, the definition and function of the preparation, mapping and reporting tools.

The data collection routines are presented in an interface that will maximize the speed of data collection. Time is critical throughout the cruising process since there are large quantities of data to be recorded.

CE-Cruise

The CE-Cruise software module is an integrated GPS/GIS based field data collection software used for timber cruising/inventory. CE-Cruise is designed for use in the following applications: GPS/GIS mapping/navigation/data collection, timber cruising and customized tree inventory data collection, and weight/volume summaries from collected cruise data.

The CE-Cruise software is designed on top of the existing CMT software called CE Cruise. Therefore, all the functions and capabilities found in the CE Cruise software are available in the CE-Cruise software in addition to the added timber cruising functions.

CE-Cruise is written for use on a Windows CE Pocket PC unit running Windows CE 3.0 or later and Pocket PC 2002 or later. It is designed to work with several different CMT GPS receivers as well as other GPS systems capable of outputting data in the NMEA-0183 format. When connected to a GPS receiver, CE-Cruise takes control of the receiver, records data and displays SV tracking information, position and other useful indicators.

CE-Cruise should be in conjunction with the PC-Cruise software. CE-Cruise is a timber cruise data collection program designed for field data collection. After a field session, the CE-Cruise data is downloaded to the PC via PC-Cruise. The PC-Cruise software is used primarily as a GIS and planning

tool as well as a cruise data processing engine and reporting tool. CE-Cruise takes over as the cruise data collection program used in the field to record tree data at sampling points/plots.

The following sections will provide detailed information regarding the operation of the CE-Cruise software. For information about the general usage of CE Cruise, please refer to the CE Cruise Reference Guide.

First, we will start with a general overview of the capabilities of the software and a general data collection summary. The manual will present, in detail, the definition and function of the data collection tools.

The data collection routines are presented in an interface that will maximize the speed of data collection. Time is critical throughout the cruising process since there are large quantities of data to be recorded.

PC-Cruise Software



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1.1 Hardware and Software Requirements

To operate PC-Cruise, you will need the following:

- a) IBM PC or compatible with at least a Pentium processor.
- b) Microsoft Windows 98, Windows XP or Windows 2000.
- c) A minimum of 256 Megabytes of RAM (512 MB or more recommended).
- d) Mouse or touch-screen stylus (a touch screen PC with stylus is strongly recommended).

1.2 Installing PC-Cruise on your PC under Windows

To install PC-Cruise on your PC, please follow these steps:

- 1. Insert the CD-ROM with PC-Cruise software into the CD-ROM drive. The installation program should start automatically. If the installation starts, skip to Step 3. If not, continue to Step 2.
- 2. Start Windows and open the Windows Run dialog box using the Start/Run option. In the Run dialog box, type D:\setup or E:\setup (where D: or E: is the letter of the CD-ROM drive) in the Command Line field and click on the OK button.
- 3. A dialog box will be displayed. Click on the "Next" button and follow the prompts provided by the Setup program. The Setup will automatically install PC-Cruise on your hard disk and create a program group and icon in Windows. The default program group is entitled: "PC-Cruise". The total amount of disk space occupied by PC-Cruise when installed is approximately 115 Megabytes.
- 4. Follow the on-screen instructions and restart Windows to complete the installation.

1.3 Starting PC-Cruise from Windows

After PC-Cruise has been installed, PC-Cruise is ready to use. On your Windows desktop, locate



the PC-Cruise icon shown: PC-CRUISE

Double click on the PC-Cruise icon. Immediately, the following screen will be displayed:

Here - [PCGPS1.FMP]								_ 8 ×
H File Edit Map Topic Sheet Cruise Coll □	io <u>U</u> tilities <u>G</u> PS <u>V</u> iew <u>W</u> indow <u>H</u> e ● ⊡ #10 53 18: 10 × 1 ×	lep ▶2 1 cm : 01	Meters					<u>_8×</u>
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Forester's Tools :		22 🕸 A8 🌒 🌞 📐 🗓	 ⋒≠* ≙ ?					
	1							
For Help, press F1	J			ИТМ	NAD 83	10	1.0	499998.4

The next section will discuss the basic tools and fundamentals of the PC-Cruise software.

Section 2 – PC-Cruise Fundamentals

This section presents basic terminology and concepts of PC-Cruise. Please carefully read this chapter to fully understand the basic fundamentals of PC-Cruise.

2.1 The Cruise View

In PC-Cruise, all cruise data entry, management and reporting is done within the Cruise View. To turn on the Cruise View, click on the Toggle Cruise View icon found directly above the Topic View area

After toggling the Cruise View icon on, the Cruise View is displayed to the right of the Map View::

Location	J.		
Section\Township\Range Lot\District Location County: Section: Township: Range: Tract ID: Tract Area: 0.0 Acres Description: Cruise: Cruise Date: 05/17/2005 Stand ID Stand ID Stand Tune Cruise Method Cover Tune	Location		
County: Section: Township: Range: Tract ID: Tract Area: 0.0 Acres Description:	Section\Township\Range	C Location	
Tract ID: Tract Area: 0.0 Acres Description: Cruiser: Cruise Date: 05/17/2005	County: Section:	Township: Range:	_
Tract ID: Tract Area: 0.0 Acres Description: Cruise: Cruise Date: 05/17/2005 Stand ID Stand Tune Cruise Method Cover Tune Description			
Description: Cruise: Cruise: Cruise Date: 05/17/2005 Cruise Method Cover Type Description	Tract ID: Tract Area: 0.0 A	cres	
Cruiser: Cruise Date: 05/17/2005	Description:		_
Cruiser: Cruise Date: 05/17/2005 ▼ Stand ID Stand Tune Cruise Method Cover Tune Description			
Stand ID Stand Tupe Cruise Method Cover Tupe Description	Uruiser: Uruise Date: 05/17/2005		
erana i y erana	Stand ID Stand Type Cruise Method Cov	ver Type Description	

The Cruise View is presented at the right of your Map View to enable you to simultaneously view your tract/stand map in the Map View and view the associated cruise data in the Cruise View.

The Cruise View may be expanded to cover the Topic and Map Views for maximum viewing area of your cruise data.

To expand the Cruise View to the maximum extents, click on the Full Screen button located in the upper

left corner of the Cruise View window . The Cruise View will be expanded to cover the entire area below the Forester's Toolbar.

When the Cruise View is in full screen mode, the Full Screen button gets changed to the Half Screen

button as shown: E. Click on the Half Screen button to reduce the Cruise View back to the original half screen size.

The size of the Cruise View window may also be manually adjusted to the desired size by clicking and holding down the left mouse button on the left pane of the window. With the left mouse button held down, you can drag to the right (to decrease window size) or to the left to increase the window size. Release the mouse button at the desired window size.

2.2 PC-Cruise Toolbar

Once you have turned on the Cruise View, you will see the Cruise Toolbar at the top of the Cruise View. The main PC-Cruise Toolbar is displayed below. The Toolbar elements are explained in the following sections.



The Tool Bar contains icons that provide quick access to PC-Cruise functions. Tool Bar functions can be activated by clicking the mouse once on an active icon. Functions that are inactive have icons that appear dull and gray. Simply click on an active icon to access the associated PC-Cruise function.

A brief description of each icon's function is displayed next to the icon when the mouse pointer is placed on the icon, and is also displayed below:



2.3 Summary of Steps for Cruise Data Collection

The following outline describes the general procedure for using PC-Cruise to enter data and produce reports for your timber cruising application:

- 1) **Prepare the map** for the land tract and the timber stands from collected GPS data, by digitizing, or by entering deed calls.
- 2) Create grid points for the stands using the Utilities/Create Grid function or the Cruising Grid icon on the Forester's Toolbar. These grid points can help you navigate to the center of your sampling plot to collect tree data. Normally, the grid points are downloaded to your PDA that runs the CE-Cruise. If your PDA is equipped with a GPS receiver, CE-Cruise can guide you to the selected target points.
- 3) Define the tree species, product classes and tree volume/weight computation methods.
- 4) Set up the merchandise classes and the tree measurement data fields.
- 5) Complete the **Cruise Header** information form to identify the landowner as well as the name and location of the Working Tract.
- 6) Specify the **Working Stands** to be included in the cruise and also specify the cruise method to be used for a particular stand: 100%Tally, Plot, Point, DOUBLE POINT.
- 7) Save the ***.fmp** job file. If you will be using your PDA to record tree data in CE Cruise, then also save a copy of the job in the ***.pmp** format and then **transfer it to your PDA**.
- 8) Use the GPS to guide you to your first plot/point.
- 9) Select the cruise job and the stand to be cruised, then add the first plot. The plot index number will be automatically filled in for you. Optionally, associate the plot number with the corresponding cruising grid point. The plot/point coordinates are shown for you and may be updated in real-time using your GPS receiver.

- 10) At each sample plot/point, **add a tree record** for each tree to be cruised and enter the tree measurement data. Then add another plot and record the tree data for the new plot.
- 11) The **tree quantity** will be displayed for each tree cruised. If you wish, you may view a summary of the tract volume; stand volume or the plot/point volume at any time.
- 12) When you have finished collecting tree data using CE-Cruise, **transfer the data to PC-Cruise**. You may wish to save a copy of the transferred job file in the *.fmp format.
- 13) In PC-Cruise, you may view and/or print out the detailed volume/weight report in various formats. You may opt to have the tree quantities for the tract and stands saved as feature attributes that can be displayed in the Sheet View.
- 14) You may use PC-Cruise to combine the cruise data from different cruise jobs.
- 15) Complete your map by adding additional elements, such as a background image. Use the Plot Preview function to print out your map. Save the *.fmp map.
- **Please note:** Some of the above steps refer to the use of the CE-Cruise in the field for tree data recording and navigation. However, the PC-Cruise is also capable of GPS navigation, GPS data collection as well as entering and recording tree data.

2.3.1 Generating the Cruise Map for the Cruising Session

For generating the cruise map, you can use your existing data that covers your area in question. For example, you can use your existing map containing **Tracts and Stands**. Also, PC-Cruise can be used to digitize your tracts and stands from scratch for the timber cruise area using an aerial photo or other background data as a guide.

2.3.2 Specifying the Tract and Entering Header Information

Turn on the Cruise View and select the **Working Tract** from the pull-down menu of available tracts. Complete the header information used for the timber cruise and the specified tract. The cruising data will be specific to the selected tract. A separate file must be used to store cruise data found in a different tract.

2.3.3 Selecting the Merchandising Classes and Computation Methods

This process will take some time to get set up the way you want it. However, once you have it set up the

way you want, you can skip this step for future cruises and simply start collecting data. Click on the **Merchandising Class** table. This table will be used to specify stem profiles, volume tables/equations, species codes, product codes and min/max acceptable parameters. This process is discussed in detail later in the manual. For instructions on detailed preparation of the merchandising classes and computation methods, please refer to Section 3.1.

2.3.4 Adding Stands and Choosing Cruise Type

- a) Once the tract has been specified and your desired products and species have all been classified in the product table, you are now ready to add stands that are found within the tract (or overlap its boundary) to the list to be included in the timber cruise.
- b) After clicking on the Add Stand button, you are presented with a dialog that allows you to specify the StandID (only those stands that fall within the working Tract or overlap the working Tract will be available for selection). Select the StandID from the pull-down menu. Notice how the highlighted stand is also highlighted as the working stand in the map view.

- c) Choose Cover type and Stand Type (optional). The Stand Area will automatically be shown and filled in for you. Specify the Stand Age if desired and then choose from the available Cruise types: 100%, Plot, Point, or DOUBLE POINT.
- d) Depending on the Cruise Type specified, enter any remaining data parameters. Specify the **default species and products** for the stand. It is recommended to choose those species or products that will be used most often as the default.

2.3.5 Adding Plots/Points and Associating Grid Points

- a) Click on the **Edit Trees** button to go to the Plot/Point entry area. If there are no plots/points entered for the working Stand, then the Edit Plot/Point dialog will be shown immediately when entering the Plot/Point entry area. The Plot/Point Index is automatically started at 1 and will increment by one for you as you add additional plots/points.
- b) The Plot/Point ID field allows you to pick from the map view a Grid Point created from previous steps. The association of the plot/point to a grid point in the Map View is not required, but is beneficial to visually see the location of the plot. If you use GPS while cruising, the GPS can be used to guide you to the specified plot/point center to start sampling in the correct location.

2.3.6 Entering Tree Data

- a) Click on the **Add Tree** button to add a tree to the sample plot/point and begin specifying the tree species and product.
- b) Fill in the remaining fields that you have specified to be included in the tree data collection.

2.3.7 Transferring cruise jobs to your Mobile Device

Use this function to transfer files between the PC-Cruise and the CE Cruise software. To view the data files stored in your mobile device or to transfer your cruising job and cruising template to your mobile device, select Utilities/Mobile Device Interface display the following dialog:

obile Device Inter	face		
File Type			
Jobs	C FeatList	C BaseMap	C Shape Files
C System	C Photo/Image	C Almanac	C Geoid03
Mobile Device Path:	My Documents	Јор	
PC Path:	C:\PCCRUISE		
Files	On Mobile Device:	Files (On PC:
File Space:		MYCR	UISE.PMP
Total(KB):			
44360		Del	Del
Free(KB):		>	Exit
16904			
		<	

Specify the appropriate folders on the PC and the Mobile Device.

Select the appropriate file type, highlight one or more files, then click on \rightarrow or \leftarrow to transfer the files in the corresponding direction.

2.4 Cruise Preparation

Effective Timber Cruising Preparation involves:

- a) Mapping the area to be cruised using a GPS unit or by digitizing the tracts and stands using a georeferenced aerial photograph.
- b) After analyzing and stratifying the stands, creating a Cruising Grid for the stands to be cruised where the grid interval and grid direction provide an effective number of sampling plots and in locations that will provide a good representative sample for each plot inventoried. This may require additional study of the stand topography and related features to create the best plan of attack.
- c) Associating your plots/points with the Cruising Grid in PC-GPS in a logical order so navigation in the field to the plot center of each sample plot can be done while minimizing travel time in the field. Additionally, the association of sample plots with the cruising grid in PC-GPS will assist in viewing the locations of the sample plots in your map.
- d) Spending time carefully setting up the proper tables or equations to be used for specific products and species. Only specify the data fields that you want to collect. PC-Cruise is flexible about which fields you want to record for each tree. You can save a lot of time by eliminating the collection of extraneous data.

2.4.1 The Tracts/Stands Map

The Tracts/Stands map is used to generate the Cruising Grid points which will become the plot centers of your sampling points. It is strongly recommended to use the Forester's Toolkit functions for creation of the Tracts and Stands because of the automatic acreage summaries (and weight/volume summaries after

tree data collection) generated when using these features as well as the important association between Tracts and Stands. Tracts (main unit) and Stands (sub-unit) may be renamed to fit your application, but it is important to maintain the structure between Tracts and Stands should you choose to rename them (renaming can be done under the Forester's Toolkit Settings). In the Forester's Toolkit, the Tract is the largest block of land. The tracts are sub-divided into smaller pieces called Stands usually based on the similarity between tree species and growth forms (ultimately used to determine the timber product).

Weight, volume calculations and reporting may be done at the Tract, Stand, or Point/Plot level. The Tract is usually identified by the location of the land (address information) and/or the landowner's name. Stands have unique identifiers and naming conventions, but typically belong to a larger piece of land under the same ownership (e.g. the Tract).

The creation of Tracts and Stands is usually accomplished using one of three methods:

A) GPS data collection of all tracts and stands

B) Heads-up Digitization of tracts and stands viewed from a georeferenced aerial photograph.

C) Creation of tracts and stands using deed call (text) input.

Each of the above techniques are valid methods for creating Tracts and Stands, but attention and care need to be taken during the creation of these features in order to mitigate position error of the boundaries. Any error introduced here will ultimately affect your volume and weight calculations for your map because the acreage is used in these calculations. Please refer to the PC-GPS Reference Guide for more information on digitizing features and performing GPS Differential Correction on GPS data. The deed call function is discussed in Section 2.4.3.

PC-Cruise will only allow one cruising job per FMP file to keep file and data management simple. Therefore, for cruising jobs, it is recommended that you use one Tract per map file. There is no limit to the number of stands that occur in a Tract. You can always combine cruise data from different jobs later on.

Also, it is important to remember that a Stand is simply a sub-division of the Tract. Therefore, Stands should fall inside the specified or working Tract. It is OK for the Stands to share the outside Tract boundary. An option is available which allows you to freely pick Tracts or Stands (that may not be related) for the purpose of performing weight/volume computations. This option is presented later on in the manual.

When using the Forester's Toolkit to create your Tracts and Stands (and following the guidelines above), PC-Cruise will automatically create the association between the Tracts and Stands for you, so there are no further steps required to associate Tracts and Stands once you have them created in your Map. An example is shown with Tracts and related Stands:



2.4.2 The Cruising Grid

The Cruising Grid icon is used to create the grid points (on the selected or working Stands) to be used as the tree data point/plot center and as a guide for navigation. To use this function to create the cruising grid points, select the desired area in the Map View and click on the Cruising Grid icon 🔂 found in the Forester's toolbar. The Grid Property dialog box is displayed:

Grid Property	×
Start Point / Orientation	
Charl Daint	Get Start Point: By Mouse
Lat: 44*33'48.3'N	
Lon: 123°15'52.3'W	
☐ Offset	
C Orientation	
030.0*	By Segment By 2 Nodes
 Grid Nodes C Lines Scale X-Dir: 100.0 Feet Y-Dir: 100.0 Feet Cross Size: 5 pixels 	 Fixed on Map ✓ Transparent Boundary Nodes: 6 Boundary Create Points from Grid Result Topic:
OK Cancel	Preview Help

Start Point

The beginning coordinates for the grid are listed in these fields. Click the **By Mouse** button to select the beginning coordinates for the grid with your mouse cursor. The coordinates are shown.

Offset

Place a check mark in this box to apply an offset to the starting point if desired.

Orientation

Use this function to specify the orientation of the grid. You may type in an angle if it is known. Valid entries for this field range from 0 to 360. Alternatively, you may click on the **By Segment** button to select a line whose orientation will be used to apply to the grid. If no lines are available (or the line is not suitable to be used for grid orientation), click on the **By 2 Nodes** button to select any two nodes in the map to be used to calculate the angle between the points. In this manner, grids can be aligned parallel to roads or streams or other features for maximum sampling efficiency.

Fixed on Map option

The Fixed on Map option is used to freeze the grid to its current location. When this option is selected, the grid cannot be moved using the mouse. When this option is not selected, the grid can be moved using the mouse. Use the View/Configure/Default Grid menu to set the default for this option.

Transparent

The transparent option is the default. When this option is selected, the grid is transparent, such that the Area below the grid can be viewed. When this option is not selected, the grid will be displayed as a solid hatch pattern. The Area below the grid will not be visible. Use the View/Configure/Default Grid menu to set the default for this option.

Boundary Node No.

The number of nodes on the perimeter of the Area Feature is listed in this field. This field cannot be edited.

Boundary

Change the color/pattern of the grid boundary line using this option.

Grid Nodes or Lines

Choose the "Grid Nodes" option if you want the grid to appear as a series of tick marks. Choose the "line" option if you want the grid to appear as a series of lines. If the line option is chosen, you may specify if you want the lines to appear in the X-direction, Y-direction or in both directions. Also, you may choose different colors and line patterns for the lines in the X-direction and Y-direction independently. If you desire the line pattern and color to be the same for lines in both the X-direction and Y-direction, choose Both. Use the View/Configure menu option to set the default grid type to be "Grid Nodes" or "Lines".

Create Points from Grid or Create Lines from Grid

Check this option if you want to have tick marks shown for the Point Features created from the grid (for use in navigation, contouring, etc.) or Line Features created from the grid. Use the View/Configure menu option to set the default grid type to be "Grid Nodes" or "Lines". If Point Features are desired at the grid intersections, select the "Grid Nodes" option under the Default Grid dialog. If Line Features are desired, choose the "Lines" option in the Default Grid dialog. It is recommended to use the Grid Nodes option for the purpose of timber cruising. The point features that get created can be established as the sample plot center and can be uploaded to your GPS system for navigation guidance to the proper sample plot center.

Grid Scale

The scale for the placement of the grid ticks or lines is placed in this field. To change the scale, input a new number and click the **Preview** button. The unit of measure can be changed using the unit option under Map/Coordinate System. Use the View/Configure menu option to set the default scale for the grid.

Cross size and Grid Color (available only if "Grid Nodes" is selected)

The size of the grid ticks is listed in this field. To change the size of the grid ticks, input a new number and click the Preview button. Also, click on the **Grid Color** button to change the color of the tick marks. Use the View/Configure menu option to set the default grid size and color.

Click the **Preview** button to implement any changes made and view them in the Map View. To accept changes and exit, click the **OK** button.

2.4.3 Utilities/Create Deed Call

Use the Utilities/Create Deed Call function to input calls from a legal metes and bounds description, title deed or other text description of a parcel of land to map out the boundary and create an area feature in your map.

This function has two purposes:

- a) Create the text description of bearings and distances for a specified boundary or
- b) Create an area feature in your map by entering in the description of bearings and distances into the Calls menu.

Creating calls from an existing area feature

This section describes the procedure for selecting an existing area feature in your map and creating the bearing and distance calls for each segment of the area.

Please Note: This function only works for area features.

The following example illustrates creating the text description of bearings and distances for the "Block001" feature found in the CMT tutorial file: cmttut.ftr.

Steps:

- 1. In the map view, click on the area feature you wish to create calls for (i.e. the Block001 area feature) so it is highlighted.
- 2. Select Utilities/Create Deed Call. The following dialog window is displayed:

Deed Feature	Input Length
Topic: BLOCK	VIII: Chains
Feature ID: BLOCK001	🔽 US Survey Unit
Pattern	Input Angle
Description:	Angle Unit: 📀 DMS 🕤 Degree
	C Mils C Grads
	Angle System: 🔿 Azimuth 💽 Bearing
First Node Coordinate System Name: LLA	Lat: 44*33'46.081''N
Datum: WGS 84	Lon: 123°15'46.962''W
Zone: Unit: Feet	MSL: 268.221
Change	Pick Node by Mouse

- 3. The Feature Information screen is presented. The topic, FeatureID and the area pattern are displayed for your reference.
- 4. A text description may be entered in the **Description** box (up to 64 characters) to help describe the deed call feature.
- 5. The coordinate system may be changed to view the coordinates of the first node of the selected feature for confirmation. This is an optional step.
- Specify the units of measurement for the length information using the pull-down menu. If using U.S. units of measurement, be sure to check the box US Survey Unit. This option is selected for you by default.
- Specify the desired Angle method for the calls. Available choices for Angle System include: Azimuth or Bearing. If Azimuth is chosen, also specify the Azimuth System: North or South. Also specify the Angle Unit with choices of: DMS, Decimal Degrees (Degree), Mils or Grads.
- 8. Next, click on the **Calls** tab to see the call descriptions. The following dialog is shown:

	Bearing	Horizontal	
-		Distance	New Calls for New Featur
1	NZ0 0321.707 E	2.525	Recreate Calls from Featu
2	C10°27'/2 050'/	J. J2J	
3	010 27 42.000 W	9.044	Clear All
4	363 26 33.616 E	3.473	Create/Update Feature
	Horizontal Angle:	20°03'21.707''E	5 2 0302 W
	-	q	510°274
Sur	nmary .F.rror: 10.0000		E010-27-41
Sur Y	nmary -Error: 0.0000	US Ch	12 47 47US C

9. The calls are displayed in the upper left corner table for your reference. A graphical representation of the calls along with labels are displayed in the lower right corner. A brief summary of the total area and any errors (i.e. differences between the starting and ending points) in the X and Y directions are shown for your reference. Edits may be made to the calls by clicking on the row number of the line segment and then editing the data in the Horizontal Distance and Azimuth/Bearing fields. Additionally, segment type may be changed from a straight line (line segment) to a curve by using the pull-down menu. The currently selected segment is highlighted in red in the graphical view. Zoom tools are available for your convenience to zoom in or zoom out to portions of the graphical view.

10. If no further changes are desired, then click on the Save As button to call up the following dialog:

Save As							1	? ×
Save jn: 🔁	test		•	È	<u></u>	T		
🗿 newtest.do	:f			_	-	_	_	_
🖹 test.dcf								
File <u>n</u> ame:	block				_	2	<u>S</u> ave	
	, 				_			
Save as type:	Deed Call fil	e(*.dct)		-	-		Lancel	

11. Specify the folder and the file name in which to save the deed calls. The file extension will be *.DCF (Deed call file). This is an ASCII text file, which may be opened and viewed with any text editor. Click on the Save button to save the file. The following is a sample output of the DCF file for the above 'Block' example:

```
[Location]
File: Cmttut.ftr
Topic: BLOCK
Feature_ID: BLOCK001
Desciption:
[Coordinate_System]
// Coordinate System and the First Node
Coordinate_System: LLA
Datum: WGS_84
First_Node_Unit: Feet
First_Node_Loc: 123°15'46.962"W 44°33'46.081"N 268.221
[Record_Unit]
Length_Unit: US_Chains
Angle_Unit: DMS
Angle_System: Bearing
[Records]
N20°03'21.707"E 4.881
N70°03'02.449"W 3.525
S19°27'42.958"W 4.844
S69°26'55.616"E 3.475
[Summary]
X-Error: 0.0000 US Chains
Y-Error: 0.0000 US Chains
Area: 17.0160 Sq.Ch (1.7016 Ac)
```

12. The Records section of the text may be further edited to complete the deed call description.

Deed Call Labels

Click on the Labels tab to set options for labeling your features with the deed call text. The following dialog is displayed:

Position Unit Dec	oration Eont	1		
10		- E.		1
Line Segment Seament Lenath:		C Below	C None	
Angle:	C Above	Below	C None	
Arc Segment				
Arc Length:	Outside		C None	
Radius Length:	C Outside	Inside	C None	
Create Label				
C Create label alwa	ys.			
On't create labe	l if label is large	er than the seg	ment.	

Use the options provided to set the position and appearance of the labels for the angles and line segments of the deed call area feature.

Click the **Position** tab and select the desired options for positioning the labels. You may opt not to display those labels that are longer than the corresponding line segments. For example, you would not want to label all those short segments of an area feature that is made up of hundreds or thousands of one-second GPS fixes. On the other hand, an area feature created from the bearings and distances that you enter as deed calls lends itself well to labeling.

Click the Unit tab to set the units for the length and angle labels.

Click the **Decoration** tab and specify whether or not to display the length unit and any user-defined text. You may have them positioned at the head (Prefix) or tail (Suffix) of the label.

Click the Font tab to specify the font style, font size and color of the labels.

Go back to the **Calls** page to see a preview of the labeled deed calls.

When you create or update the feature by clicking the Create/Update Feature button on the Feature Information page, the labels will be displayed in Map View.

Creating an area feature from a set of deed calls

This section describes the procedure for inputting bearing and distance calls for each segment of an area feature to create the area feature in your map view.

Steps:

1. In a blank or existing map file, select **Utilities/Create Deed Call**. The following dialog window is displayed:

Deed Feature	Input Length
Topic: DeedCall	Unit: Feet
Feature ID: DeedCall001	🔽 US Survey Unit
Pattern	
Description	Angle Unit: O DMS O Degree
Description.	C Mils C Grads
	Angle System: 💿 Azimuth 🔿 Bearing
	Azimuth System: 💿 North 🔿 South
First Node Coordinate System Name: UTM	N: 0.000
Datum: NAD 83	E: J0.000
Zone: 10 Unit: US Feet	MSL: 0.000
Change	Pick Node by Mouse

- 2. If you are using an existing file, select the topic that you want to create the new area feature in. If you are not using an existing file, then it is recommended to choose the 'DeedCall' topic. The FeatureID and topic will automatically be created for you upon creation of the feature.
- 3. Enter an optional text description (up to 64 characters) to help describe the deed call feature.
- 4. Choose the Coordinate System, datum and units of measurement for the first node of the call.
- 5. Specify the units of measurement for the input length. US Survey feet is the default selection.
- 6. Specify the Input Angle method: either Azimuth or Bearing and also choose between DMS, Decimal Degrees (Degree), Mils or Grads.
- 7. Type in the coordinates for the first node or select the location by clicking on a location in the map with your mouse. To pick a location on the map with your mouse, click on the **Pick Node by Mouse** button. After selecting this button, you will be taken to the Map View and your mouse pointer will turn into a crosshairs. Click on an existing node or point feature to select those coordinates. An existing node or point feature must be selected with your mouse (you cannot select a floating location) to establish the starting point. After selecting the point, you will be returned to the Feature Information dialog and the coordinates of the selected point will be displayed for you.
- 8. Once the beginning point has been established, click on the **Calls** tab to begin inputting the call information. The following screen is shown:

ature Infi	ormation Calls			
	Horz. Angle	Horz. Diatance	Chord Length	Load Save As New Calls for New Feature Recreate Calls from Feature
 Add Segr	ment Type:		, Q []	Clear All Greate/Update Feature
Summar, Y-Erro X-Erro	y 	US Ft US Ft		

9. Click on the **Add** button to enter a new call record into the fields shown:

Segment Type: Li	ne Segment 📃
Horizontal Distance	32.808
Horizontal Angle	000.000000*

For segment type, choose between options of **line segment** for straight lines, or **curve segment** to define a curve. Type in the horizontal distance from the starting point and also specify the horizontal angle using the angle system specified (from Step 6).

For curves, specify the size and length of the curve by inputting a combination of: radius, arc length, chord length, and/or central angle. The tangent direction of the curve (right or left) should also be specified at this time along with the direction angle of the curve from the last node. Select the **continuous** option if the new section is to continue in the direction of the last defined curve or line segment.

Segment Type: 🚺	irve Segment 🔽
Radius 💌	32.808
Central Angle 📃	120.000000°
Tangent Direction 💌	000.000000*
Curve Direction:	Right 💌

A preview of the calls is shown in the lower right corner of the Calls dialog window:



10. After all calls have been entered, you may choose to create the deed call feature in the existing map, or you can save it for addition to a different map at a later time.

To create the deed call feature in the existing map, click on the **Create/Update Feature** button. If the feature does not exist in the current map, it will automatically be created for you and placed in the topic specified in Step 2. Also use the **Create/Update Feature** button if any changes have been made to the deed calls. Upon clicking on this button, you will be prompted if you want to "Recreate the Area Feature?" Choose **Yes** to update and overwrite the existing feature or **No** to abort the update.

To save the deed call feature, click on the **Save As** button. Specify the folder and the file name to save the deed calls. The file extension will be *.**DCF (Deed call file)**. This is an ASCII text file which may be opened and viewed with any text editor. Click on the **Save** button to save the file. The saved deed call feature may be accessed from different maps and loaded by clicking on the **Load** button and then selecting the desired *.DCF file.

Click on the **Clear All** button to clear all existing deed calls from the list and start a new deed call feature. Alternatively, click on the **New Calls for New Feature** button to accept changes and update/create the deed call feature and start the next deed call entry using the same specified topic (the FeatureID will automatically be incremented). If changes have been made or the deed call feature has not yet been saved or created in the map, you will be prompted to update/create the area feature or to save changes before proceeding.

2.4.4 Image Transparency

PC-Cruise has the ability to adjust the opacity/transparency of images in your Map. This function is useful when displaying an aerial photo on top of a CMT BaseMap or when using an aerial photo and topographic map simultaneously. Call up the Image Shape Properties Dialog Box for this purpose by double-clicking on the image in the Map View.

The Image Shape Properties Dialog is displayed and can be used to view the Control Points that are used to geo-reference your digital image. Here, you can also adjust the transparency of the image.

To show or hide the control points of an image in the Map View:

- 1. Double-click the image of interest. If you wish to switch to a different geo-referenced image, simply click the **File button** and select the desired image file.
- 2. Check or uncheck the Show Control Points on Bitmap box:
 - Check this box if you want to show the control points in the Map View
 - Do not check this box if you want to hide the control points in the Map View
- 3. Click the **OK** button.

To change the transparency of an image in the Map View:

- 1. Double-click the image of interest. If you wish to switch to a different geo-referenced image, simply click the **File button** and select the desired image file.
- 2. Drag the Transparency control marker to adjust the opacity of the image.
- 3. Click the **OK** button.

2.5 Cruise Menu Options

The following sections describe the functions accessed under the Cruise pull-down menu.

2.5.1 Default Setup

To access the default settings menu for the Cruise View, select the Cruise pull-down menu and then choose Default Setup. The following dialog is displayed:

Patterns	
	Working Tract
	Working Stand
	Working Point/Plot
Quantity (Computation Methods
	Quantity Methods
Combine (Cruises
Combine C Mer	Cruises ge plots by Plot#
Combine C Mer	Cruises ge plots by Plot# ge plots by Plot ID
Combine C Mer C Mer C App	Cruises ge plots by Plot# ge plots by Plot ID vend plots by renumbering the imported plots
Combine C Mer C Mer C App Z Match	Cruises ge plots by Plot# ge plots by Plot ID end plots by renumbering the imported plots cruise data with tract/stand data
Combine I C Mer C Mer C App Z Match I Z Disable	Cruises ge plots by Plot# ge plots by Plot ID rend plots by renumbering the imported plots cruise data with tract/stand data e the Exclude/Include toggles.

Use this dialog to enter or edit the default settings for the timber cruising jobs.

Working Tract/ Working Stand/ Working Point/Plot: Click on one of the three buttons to change the pattern/symbol and color of the working item for easy identification in the Map View.

Combine Cruises: Choose from one of three methods to combine cruise data into one job. When combining an imported stand with an existing stand having the same Stand ID, the following options are available for combining the imported plots with the existing plots:

Merge plots by Plot#: The tree data from each imported plot will be added to the tree data for an existing plot having the same Plot#. Any imported plot with a Plot# different from the existing Plot#'s will be added as a new plot. The Plot# is the plot index number assigned to each plot.

Merge plots by Plot ID: The tree data from each imported plot will be added to the tree data for an existing plot having the same Plot ID. The Plot ID is the ID number of the grid point that you have optionally associated with the cruising plot.

Append plots by renumbering the imported plots: When an imported plot has the same Plot# as an existing plot, the imported plot will be renumbered and added to the end of the list of existing plots.

These settings apply to all cruise jobs and remain the same until you change it again.

Please note: There is a distinction between the terms "Merge" and "Append". If you made the wrong choice and obtained unintended results, use File/Close to close the job and select "No" when program prompts you to save the changes.

Match cruise data with tract/stand data: This important setting determines whether or not you will be forced to choose from existing tracts and stands in your map or whether you can simply enter tree data without having any existing tracts or stands. By default, this option is turned **ON** which means that you must have and choose from available tracts in the Map View for your cruise. When this option is on, only stands that fall inside or overlap the working tract are acceptable choices for entering cruise data.

Additionally, the program will check to make sure that the Tract ID, Stand IDs and Grid Point IDs that you enter in Cruise View correspond to the actual tract, stands and grid points in Map View.

When this option is turned **OFF**, you are not forced to choose one of the areas in the tracts topic for the TractID (any area or no area are acceptable choices). Additionally, for stands, you may type in the FeatureID for any existing area in the Map View or choose a stand for entering Cruise data.

When you want to enter some cruise data simply to check numbers, volumes and weights without actually cruising the tract and stand, make sure this option is turned OFF and you will have the greatest flexibility about what you enter for your working tract or stand.

When actually performing a timber cruise on a tract and stand, it is highly recommended that you have this option turned ON and that you choose from existing tracts and stands in your map. Click OK to accept your settings and close the dialog window. You are now ready to turn on the Cruise View in PC-Cruise and start collecting tree data or use CE Cruise to collect tree data in the field. These procedures are covered in the following section.

Disable the Exclude/Include Icons: Check this option if you DO NOT want to be able to exclude trees, plots or stands from quantity calculations. When this option is checked all of the Exclude icons will be grayed out and cannot be activated until this option is unchecked.

When this option is unchecked, you will be able to exclude tree data at the tree level, plot level or stand level from being included in quantity calculations. The data will not be deleted and will be available for viewing; it is simply excluded from calculations. Trees, plots or stands that have been marked for exclusion are highlighted in a dark gray background.

These settings apply to all cruise jobs and remain the same until you change them again.

2.5.2 Defining Quantity Computation Methods

Click on the **Quantity Methods** button to access the Define/Edit Computation Methods setup dialog. Use this dialog to define and edit the user-definable tree Quantity Computation Methods.

Please note: Use the "Merchandise Class" tool icon in the Cruise View to associate specific computation methods with the desired species and products. This process is discussed in Section 3.5.

The following dialog is displayed after clicking on the **Quantity Methods** button:

Define/Edit Computa	ation Method	×
Select Method by:	Mesavage/Girard Table Power Equation 9-Terms Equation	C User-defined Table C Honer Equation C National Volume Estimator Library(NVEL)
Method:	MesavageVolumeTable-Doyle	Edit
	<u>0</u> K	Help

You may edit the following computation methods or change their specifications:

- Mesavage/Girard Table
- Power Equation
- Honer Equation
- 9-Terms Equation
- User-defined Table
- National Volume Estimator Library (NVEL)

To select an existing built-in or user-defined equation or table, simply click on the radio button for that type of method then select the appropriate item from the pull-down menu. Suppose you have previously defined and saved a volume table named "MY LOCAL VOL TBL1". To select that table, you would first select the **User-defined Table** method type then select "MY LOCAL VOL TBL1" from the pull-down menu for the **Method** box. Other computation methods may provide additional levels of selection options.

Many formulas, equations, volume tables and weight tables for computing tree quantities have been developed by the researchers at the USDA Forest Service, various universities and other organizations. PC-Cruise provides a number of built-in equations and tables that are ready to use. It also provides the tools for you to enter your own volume equations, volume tables and weight tables.

There is no one universal equation that applies to all species of trees in the various geographic regions. It is important to select the appropriate equation or table that applies to the tree species in the region of interest. It is also important to know the underlying assumptions of each equation or table and the measurement data required.

FC stands for Form Class. "Form Class" is defined as the percentage ratio of the diameter inside the bark at the top of the first 16-foot log (17.3 feet from ground) to the diameter outside the bark at breast height (4.5 feet from ground). This parameter is required for many tree quantity computation equations and tables such as the Mesavage and Girard form class volume tables. When you define a product, you may specify a default FC value to be used for that product. Turning on the FC data entry field lets you override the default FC value. If the form class of the trees stays the same as the default value, then there is no need to show the FC data field while entering the cruise data.

Details about each type of computation method are provided:

Built-in Equations and Tables

Built-in Stem Profile: The built-in stem profile equations will compute tree volumes for various tree species. These equations are consecutively numbered and are named after the **species** to which they apply. Select the appropriate equation for the natural or planted tree species to be cruised. Also make sure you select the appropriate **Region** so the correct stem profile coefficients will be used for the trees cruised in that region.

Mark the **"Volume Outside Bark"** checkbox if you wish to get the outside-bark volume estimates. Otherwise, the reported volume will be the inside-bark volume.

To report tree weight for a product that uses a Built-in Stem Profile equation, you must provide the conversion factor in the weight-to-volume **Ratio** field in the Method Setup dialog.

Please note: The Built-in Stem Profile method does not directly make use of the data in the #Logs/#Sticks fields. Suppose you have both the **Hm** and **#Logs/#Sticks** tree measurement fields turned on, and you enter Hm = 30. The program will automatically convert this to #Logs/#Sticks = 1.5 (for 16 ft logs and MinLen = ½ log). However, the volume computed will be for a merchantable height of 30 ft, not 24 ft (=1.5 x 16). If you want the volume computed based on the number of logs or sticks, then enter the number of logs or sticks in the #Logs/#Sticks field.

Following are the descriptions of the tree measurement requirements stipulated by the research papers on which the built-in stem profile equations are based.

1. Alexander Clark III, Ray A. Souter and Bryce E. Schlaegel, "Stem Profile Equations for Southern Tree Species", USDA Forest Service Research Paper SE-282, 1991

These stem profile equations were developed for estimating merchantable stem volumes for **59 southern softwood and hardwood tree species and species groups**. They can compute volumes based on one of the following measurement modes:

DBH plus Ht (total tree height from ground)
DBH + Hx (height to a 4-, 7-, or 9-inch top diameter, outside bark)
DBH + Ht + Hm (merchantable height above the stump)
DBH + Hx + Hm (merchantable height above the stump)

If you use one of these equations, then you must record either the **total tree height Ht** or the tree height **Hx** measured to a **4-inch**, **7-inch** or **9-inch** top diameter **(outside bark)**. The model based on DBH and height to a 4-inch top can be applied to all trees having DBH greater than 5 inches and height to 4-ich top greater than 17.3 feet. The model based on DBH and height to a 7-inch top can be applied to as than 9 inches and height to 7-ich top greater than 17.3 feet. The model based on DBH no less than 9 inches and height to 7-ich top greater than 17.3 feet. The model based on DBH no less than 9 inches and height to 8 applied to hardwood trees having DBH no less than 11 inches and height to 9-ich top greater than 17.3 feet.

If you will be recording tree height to a 4-inch, 7-inch or 9-inch top diameter, then turn on the **Top Dia.** (**Dx**) tree measurement data field. When this checkbox is marked, the **Ht** field will display as **Hx** in the tree data entry form in the Tree Data View.

The Built-in Stem Profile equations can compute volumes based on just the tree height **Ht** or **Hx** if that is the only recorded tree height measurement. If you also record the merchantable height **Hm**, then the grade tree product volume will be computed to the merchantable small end diameter (**Mer. Top Dia.**) defined for the product. Please keep in mind that the merchantable height Hm may not exceed Ht or Hx.

The difference between the total tree volume and the grade tree product volume is called **topwood**. If the total tree height is recorded, you have the option to report topwood to the tree top (zero small end diameter) or to the pulpwood height defined for the product. If the height Hx to a 7-inch or 9-inch top diameter is recorded instead of Ht, then topwood can only be computed to a **4-inch** top diameter.

 Matney, T. G., J. D. Hodges, A.D. Sullivan, and R. J. Ledbetter, Tree Profile and Volume Ratio Equations for Sweetgum and Cherrybark Oak Trees, Southern Journal of Applied Forestry 1985, 9(10):222-227, 1985

These stem profile equations apply to **sweetgum and cherrybark oak trees in Mississippi**. They can compute volumes based on one of the following measurement modes: **DBH plus Ht** (total tree height) **DBH + Ht + Hm** (merchantable height)

3. Julia R. Ledbetter; Thomas G. Matney; Alfred D. Sullivan, Tree Profile and Volume Ratio Equations for Loblolly Pine Trees on Cutover Site-Prepared lands, South. J. Appl. For. 10:241-244, Nov. 1986

These stem profile equations apply to **loblolly pine trees in Mississippi, Alabama, Louisiana and Arkansas**. They can compute volumes based on one of the following measurement modes: **DBH plus Ht** (total tree height) **DBH + Ht + Hm** (merchantable height)

4. V.C. Baldwin, Jr.; D.P. Feduccia, Compatible Tree-Volume and Upper-Stem Diameter Equations for Plantation Loblolly Pines in the West Gulf Region, South. J. Appl. For., 15(2):92-97, 1991

These stem profile equations apply to planted thinned and unthinned loblolly pine trees in the West Gulf region. They can compute volumes based on one of the following measurement modes:

DBH plus Ht (total tree height) **DBH + Ht + Hm** (merchantable height)

Built-in Volume Equation: The built-in volume equations will compute tree volumes and weights for various tree species. These equations are consecutively numbered and are named after the **species** to which they apply. Select the appropriate equation for the natural or planted tree species to be cruised. Also make sure you select the appropriate **Region** so the correct stem profile coefficients will be used for the trees cruised in that region.

If you wish to estimate the outside-bark volume, then make sure the **"Outside-bark estimates"** checkbox is marked. If the equation that you selected only provides inside-bark or out-side bark estimates but not both, then the check box would not be displayed.

Please note: The Built-in Volume Equations do not directly make use of the data in the #Logs/#Sticks fields. Suppose you have both the **Hm** and **#Logs/#Sticks** tree measurement fields turned on, and you enter Hm = 30. The program will automatically convert this to #Logs/#Sticks = 1.5 (for 16 ft logs and MinLen = $\frac{1}{2}$ Log). However, the volume computed will be for a merchantable height of 30 ft, not 24 ft (=1.5 x 16). If you want the volume computed based on the number of logs or sticks, then enter the number of logs or sticks in the #Logs/#Sticks field.

Following are the descriptions of the tree measurement requirements stipulated by the research papers on which the built-in volume equations are based.

 Alexander Clark III, Douglas R. Philips and Douglas J. Frederick, "Weight, Volume and Physical Properties of Major Hardwood Species in the Gulf and Atlantic Coastal Plains", USDA Forest Service Research Paper SE-250, 1985

Alexander Clark III and James G. Shroeder, "Weight, Volume and Physical Properties of Major Hardwood Species in the in the Southern Appalachian Mountains", USDA Forest Experiment Station Research Paper SE-253, 1986

Alexander Clark III, Douglas R. Philips and Douglas J. Frederick, "Weight, Volume and Physical Properties of Major Hardwood Species in the Piedmont", USDA Forest Service Research Paper SE-255, 1986

Alexander Clark III, Douglas R. Philips and Douglas J. Frederick, "Weight, Volume and Physical Properties of Major Hardwood Species in the Upland-South", USDA Forest Service Research Paper SE-257, 1986

The equations based on the above papers apply to **major hardwood species in the referenced Southern regions**. Select the specific species name or one of these general categories: "Soft Hardwoods", "Hard Hardwoods" and "All Species". These equations can compute **volume** based on one of the following measurement modes:

DBH only

DBH plus Ht (total tree height)

DBH + H4 (height to a 4-inch top diameter, outside bark) **DBH + Hm** (merchantable height)

When both the Ht/H4 and Hm fields are turned on, the Hm data is used for computing grade tree volume.

 Alexander Clark III and Joseph R. Saucier, "Tables for Estimating Total-Tree Weights, Stem Weights, and Volumes of Planted and Natural Southern Pines in the Southeast", Georgia Forest Research Paper 79, September, 1990

The equations based on this paper apply to **natural southern pines in the Coastal Plains and the Piedmont region, natural and planted slash pine trees in the Coastal Plains and planted Ioblolly pine trees in the Piedmont region**. They can compute **weight** and **volume** based on one of the following measurement modes:

DBH plus Ht (total tree height) **DBH + H4** (height to a 4-inch top diameter, outside bark)

The equation for natural slash pine also supports Hm (merchantable height).

3. Ray Newbold, Clark Baldwin & Gary Hill, "Weight & Volume for Planted Loblolly in North LA", US Dept of Agriculture, Forest Service Research Paper SRS-026, Southern Research Station

The equations based on the above paper apply to **planted loblolly pine trees in North Louisiana**. They can compute **weight** and **volume** based on the following:

DBH plus Ht (total tree height) DBH + Ht + H4 (in this case, height to a 3-inch top diameter, outside bark) DBH + Hm (merchantable height)

Please note that these equations do not support the function to compute the volume to a non-zero minimum top diameter based on the total height.

4. Reams, G.A; A.D. Sullivan; T.G. Matney; R.R. Stevens, "Estimating Above-Ground Biomass of Slash Pine and Sweetgum", MAFES Technical Bulletin 110, 28 pp, 1982

The equations based on this paper apply to **natural slash pine** and **natural sweetgum** trees in **Mississippi**. They can compute **weight** and **volume** based on the **total tree height Ht**.

 V.C. Baldwin Jr. and J.R. Saucier, "Above Ground Weight and Volume of Unthinned Planted Longleaf Pine on West Gulf Forest Sites", Southeastern Forest Experiment Station, New Orleans, Louisiana, Research Paper SO-191, June 1983

The equations based on this paper apply to **thinned and unthinned planted longleaf pine trees in the West Gulf region**. They can compute **weight** and **volume** based on the **total tree height Ht**.

6. Alexander Clark III; James G. Schroeder, Weight, Volume and Physical Properties of Major Hardwood Species in Southern Appalachian Mountains, USDA For. Serv. Res. Pap. SE-253, 1986

The equations based on this paper apply to **major hardwood tree species** in the **Southern Appalachian Mountains**. They can compute **weight** and **volume** based on the **total tree height Ht**.

Mesavage/Girard Table: PC-Cruise provides all the Mesavage/Girard volume tables for 16-ft logs as built in volume tables. PC-Cruise EX also provides the Mason Bruce and Girard Volume Tables for 32 ft Logs.

You may select from one of three log rules: Scribner, Doyle or International 1/4 inch. For the 32 ft log volume tables, select the "Girard_Bruce_32ft_VolTable" option.

To view the table contents, click on the **Method** button in the "Default Quantity Computation Methods and Tree Measurement Fields" screen. Select "Mesavage/Girard Table". With the appropriate Mesavage/Girard table name displayed in the **Method** box, click the **Edit** button to display the **Edit Mesavage/Girard Volume Table** dialog:

dit Mesavage	e/Girard	l Volum	e Table	;									
Table Name:	Mesav	/ageVolu	ımeTable	e-Doyle			Region:						
DBH Uni	it Inch		Hg	t Unit: 🖡	#Logs		Quantiț	y Unit:	Board F	t.	Lo	og Len: 16	
FC:	65	•								Add	Del	Cancel <u>O</u> K	
DBH\#Logs	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0		
10	6.00	7.00	7.00	8.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00		
11	10.00	12.00	13.00	14.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00		
12	14.00	17.00	19.00	20.00	21.00	22.00	23.00	0.00	0.00	0.00	0.00		
13	20.00	25.00	29.00	31.00	33.00	34.00	35.00	0.00	0.00	0.00	0.00		
14	26.00	32.00	38.00	41.00	44.00	46.00	47.00	0.00	0.00	0.00	0.00		
15	34.00	42.00	50.00	55.00	60.00	63.00	65.00	0.00	0.00	0.00	0.00		
16	41.00	51.00	61.00	68.00	75.00	79.00	83.00	0.00	0.00	0.00	0.00		
17	50.00	63.00	76.00	86.00	95.00	100.00	106.00	0.00	0.00	0.00	0.00		
18	59.00	75.00	91.00	103.00	114.00	121.00	128.00	0.00	0.00	0.00	0.00		
19	70.00	90.00	110.00	125.00	139.00	148.00	157.00	0.00	0.00	0.00	0.00		
20	81.00	105.00	129.00	146.00	163.00	174.00	185.00	193.00	201.00	0.00	0.00		
21	94.00	122.00	151.00	171.00	192.00	205.00	219.00	230.00	240.00	0.00	0.00		
22	106.00	139.00	172.00	196.00	220.00	236.00	252.00	266.00	279.00	0.00	0.00		
23	121.00	159.00	197.00	226.00	255.00	272.00	290.00	308.00	325.00	0.00	0.00		
24	135.00	178.00	221.00	255.00	289.00	308.00	327.00	349.00	371.00	0.00	0.00		
25	151.00	200.00	249.00	288.00	326.00	350.00	374.00	399.00	424.00	0.00	0.00		
26	166.00	221.00	276.00	320.00	363.00	392.00	420.00	448.00	476.00	0.00	0.00		
27	184.00	246.00	308.00	357.00	406.00	439.00	470.00	503.00	535.00	0.00	0.00		-

From the pull-down list for the **FC** field, select the form class of interest to you. The corresponding volume table will be displayed.

If you will never use some of the Mesavage/Girard volume tables, you may use the **Del** button to delete them. Click the OK button to save the changes made in this dialog, or click the Cancel button to abandon the changes.

You can easily re-build a Mesavage/Girard Table as follows:

- 1. Select an existing table for the log rule that you want to use.
- 2. Enter the new FC value and then click the Add button.
- 3. Click the **OK** button to save the changes made in this dialog, or click the **Cancel** button to abandon the changes.

The volumes estimated by using the Mesavage/Girard volume tables are reported in board feet. If you wish to have the tree quantities reported as weights in tons, enter the appropriate tons per unit volume factor into the **Ratio (Ton/Unit)** field and select the **Weight** option for the **Report by** field in the "Method 1 Setup" or "Method 2 Setup" dialog.

Please note: The weight per unit volume conversion factor will be used if the selected computation method does not directly yield the weights.

To automatically resize the table columns, double-click anywhere in the column title area.

For reporting purposes, PC-Cruise also lets you assign current dollar values to the different quantity units so you can get total quantity (weight, volume, etc.) and also the calculated dollar value in your report output.

Click on the button under the **Method 1 Name** column for the specific species and product to call up the Method 1 and Value Setup dialog to choose a computation method and value (values only available for Method 1 computation methods):

Method 1 and Value Se	etup		X
Select Method by:	Built-in Stem Profile Mesavage/Girard Table Power Equation 9-Terms Equation	 Built-in Volume Equation User-defined Table Honer Equation 	
Method:	MesavageVolumeTable-Scribner	×	
Quantity Type: Region:	Volume(Board Ft)		
Report by: Report Unit: Report Value (\$/Board Ft):	Volume C Weight Board Ft 2.370370		
None		<u>C</u> ancel <u>H</u> elp	

User-definable Equations and Tables

Power Equation: You may use the Power Equation option to enter your own volume equation if the relationship between the computed volume, the DBH value, the height (H) value and the Form Class (FC) value can be described in the following format:

$Volume = a + b * DBH^{c} * H^{d} * FC^{e}$

When you select the Power Equation option from the "Define/Edit Computation Method" dialog and click on the **New** button, the **New Power Model** dialog will be displayed:

Equatio	n Nan	ne: 🛛			_	_	1
Region	:	Ĺ					
• Vol	ume	Οv	Veight	Quant	ity Unit:	CuFt	
• Tot	al Heig	ght (Mercl	hantable l	Height	O #	Logs/Sticks
Coeffici	ients:						
a:	0						Cancel
b:	0		-			-	
c:	0		-				<u>0</u> K
d:	0		-			-	
e:	0		-				
	10						
	ne = a	+ b * (F	BH ^ cl	(h ^ H) *	* (FC ^ e	el	

Enter a descriptive name for your equation.

You must specify the correct parameters for the power equation. Select "Volume" for a volume equation, or select "Weight" for a weight equation. "Quantity Unit" is the unit specified for the power equation. For example, if the equation yields weights in pounds, then select "Lbs". (You will select the unit for reporting tree quantities in the "Set up Merchandise Classes and Data Fields" screen.) Select "Total Height", "Merchantable Height", or "#Logs/Sticks", in accordance with what's specified for the power equation you are entering. If the "H" in the power equation is meant to be merchantable height but you selected "#Logs/Sticks", you will get incorrect tree quantity results.

As an example, let's enter one of the Built-in Volume Equations using the Power Equation format. In the paper titled "Tables for Estimating Total-Tree Weights, Stem Weights, and Volumes of Planted and Natural Southern Pines in the Southeast", written by Alexander Clark III and Joseph R. Saucier (Georgia Forest Research Paper 79, September, 1990), the equation for predicted green weight of stem wood and bark to saw-log top for southern pine in the Piedmont based on d.b.h. (D) and saw-log merchantable height (Hm), is presented as follows:

Volume = 0.44802(D^2)^0.92193(Hm)^0.90894

To enter this as a Power Model equation, use the following coefficients:

a = 0 b = 0.44802 c = 1.84386 d = 0.90894 e = 0

Select Weight (Lbs) and Merchantable Height as required by this equation. If you wish to see the weight reported in tons, then select "Tons" as the reporting unit in the " Set up Merchandise Classes and Data Fields " screen.

This equation also requires that you include a 0.5-foot stump allowance. This means that you will need to add the stump height to the merchantable height above the stump then enter it into the Hm (merchantable
height) data field. If you use the Built-in Volume Equations, the 0.5 foot stump allowance will be automatically taken care of and you will simply enter the merchantable height above the stump into the Hm data field.

If you are using a volume equation that depends on the tree height only, then set the coefficients a, c and e to "0" and set d to "1". If you keep the species/product specifications the same, then you still must enter a valid DBH (any valid DBH will do) to pass the error check. If you do not wish to enter any DBH value, then you must set the **Min DBH** field in the Edit Product List window to "0".

Click the **OK** button to save the new equation.

Honer Equation: You may use the Honer Equation option to enter your own volume equation if the relationship between the computed volume, the DBH value and the height value (H) can be described in the following format:

$$Volume = \frac{DBH^2}{(a + b / H)}$$

When you select the Honer Equation option in the computation method setup dialog, the New Honer Model dialog will be displayed:

			-
ne:			
C Weight	Quantity Unit:	CuFt	•
ght C Mercl	hantable Height	C #Logs/	/Sticks
		<u>C</u> an <u>O</u> ł	
VEDILA DEDILA L	Z		
	ne:	ne: Weight Quantity Unit: ght C Merchantable Height	ne: CWeight Quantity Unit: CuFt ght CMerchantable Height C#Logs/

Enter a descriptive name for your equation.

Make sure that the corresponding tree measurement field is turned on for the tree data entry form. For example, if the equation requires total tree height, then make sure that you select the Total Height option in the above screen and turn on the Total Height (Ht) field in the quantity computation method specification.

You must specify the correct parameters for the Honer equation. Select "Volume" for a volume equation, or select "Weight" for a weight equation. "Quantity Unit" is the unit specified for the Honer equation. For example, if the equation yields weights in pounds, then select "Lbs". (You will select the unit for reporting tree quantities in the " Set up Merchandise Classes and Data Fields " screen.) Select "Total Height", "Merchantable Height", or "#Logs/Sticks", in accordance with what's specified for the Honer equation you are entering. If the "H" in the Honer equation is meant to be merchantable height but you selected "#Logs/Sticks", you will get incorrect tree quantity results.

Enter the appropriate coefficients into the data fields provided. If any coefficient does not apply, simply leave it as "0". For example, if your equation does not contain the height, then leave the coefficient **"b"** at "0".

Click the **OK** button to save the new equation.

9-Terms Equation: The 9-Terms Equation is a "catch-all" format that attempts to accommodate most of the commonly used volume equations. If your equation cannot be entered using the Power model or the Honer model, then try using the following format:

$VoI = a + b*DBH^2*H^2 + c*DBH^2*H + d*DBH*H^2 + e*DBH^2 + f*H^2 + g*DBH*H + h*DBH + I*H$

When you select the **9-Terms Equation** option from the "Define/Edit Computation Method" dialog and click on the **New** button, the **New 9-Terms Model** dialog will be displayed.

	in Name:	<u> </u>			
Region	:				
• Vol	ume O	Weight	Quantity Unit:	CuFt	1
Tot	al Height	C Merc	hantable Height	C #	Logs/Sticks
	3				-
Coeffici	ents:				
	0		0		
a:	J°	—			<u>C</u> ancel
b:	0	g:	0	-	8
C:	0	h:	0		<u>0</u> K
	0	i:	0		
d:	100	—	1		
d: e:	0				

Enter a descriptive name for your equation.

Make sure that the corresponding tree measurement field is turned on for the tree data entry form. For example, if the equation requires total tree height, then make sure that you select the Total Height option in the above screen and turn on the Total Height (Ht) field in the quantity computation method specification.

Enter the appropriate coefficients into the data fields provided. If any coefficient does not apply, simply leave it as "0".

You must specify the correct parameters for the 9-terms equation. Select "Volume" for a volume equation, or select "Weight" for a weight equation. "Quantity Unit" is the unit specified for the 9-terms equation. For example, if the equation yields weights in pounds, then select "Lbs". (You will select the unit for reporting tree quantities in the "Set up Merchandise Classes and Data Fields" screen.) Select "Total Height", "Merchantable Height", or "#Logs/Sticks", in accordance with what's specified for the 9-terms equation you are entering. If the "H" in the 9-terms equation is meant to be merchantable height but you selected "#Logs/Sticks", you will get incorrect tree quantity results.

Click the **OK** button to save the new equation.

User-defined Table: You may create a volume or weight table by setting up the table parameters then entering the table values. Once the equation or table has been defined, you may select it for any Species/Product class listed in the "Default Quantity Computation Methods and Tree Measurement Fields" screen or the "Set up Merchandise Classes and Data Fields" screen.

able Name:	My Vo	ol Table			R	egion:	SE			🖸 Volume 🛛 Weight
DBH	Inch	i <u>–</u>	Hgt	Unit:	#Logs	•	Volume	Unit:	Board F	Log Len(Ft): 16.00 Cance
FC Re	equired:			(Multiple	FC table:	s permitte	ed)		Add Del Import Export OK
Table Size DBH M	inimum: nlu	10		Maxim	um: 3 0		Inte	erval: 2	2	Rows: 11
Height Mi	niy nimum:	20		Maxim	um: 60	1	Inte	erval: 5	5.0	Columns: 9
DBH\#Logs	20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
12				· · · · · · · · · · · · · · · · · · ·	0.00	0.00	10 march 140	2		
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
14 16	0.00 0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
12 14 16 18	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00	0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	
14 16 18 20	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	
14 16 18 20 22	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	
14 16 18 20 22 24	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	
14 16 18 20 22 22 24 26	0.00 0.00 0.00 0.00 0.00 0.00 0.00									
14 16 18 20 22 24 26 28	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0									

To create a new volume or weight table, follow these steps:

- 1. In the "Define/Edit Computation Method" dialog, select "User-defined Table" then click the New button to display the "Edit Volume/Weight Table" dialog.
- 2. Enter the name for the new table into the "**Table Name**" data field. For your own reference, enter the name of the applicable region into the "**Region**" field. If you are going to be using multiple user-defined volume tables, it is recommended that you use a table naming convention or code which can

be used to easily identify the table (e.g. incorporate the region name, product or species into the name).

- 3. Select Volume if you are defining a volume table, or select Weight if you are defining a weight table.
- 4. Select the unit for the DBH values. (Currently, the only available selection is "Inch".)
- 5. Select the tree height unit from the pull-down list for the Hgt unit field. The choices are: Feet(Ht) for total tree height, Feet(Hm) for merchantable height, #Logs for number of logs, or #Sticks for number of sticks. Make sure that the corresponding tree measurement field is turned on for the tree data entry form. For example, if the table is based on the number of logs, then make sure that you select the #Logs option in the above screen and turn on the #Logs/#Sticks field in the quantity computation method specification.

If you select #Logs or #Sticks, then enter the log length or stick length into the "Log Len(Ft)" field.

- 6. Select the Volume Unit or Weight Unit to be used.
- 7. If the table is defined for a particular form class, then mark the **"FC required"** checkbox and enter the FC value into the data field. If a FC value is specified, the table can only be applied to the tree species/product classes for which this FC value has been specified either in the product specification or during cruise data collection.
- 8. In the **Table size** section, specify the span of DBH and Height values for the table. Also specify the interval between the table rows and columns. The resultant number of table rows and columns will be displayed in the **"Rows"** and **"Columns"** fields, respectively.

If you need to adjust the table size, do it now then click the "Update" button.

To accommodate tables that start with a 1/2 log, the Height Minimum field will accept 0 as input. For such a table, set the height interval to be 0.5, and make sure that the first column of the table is filled with 0's.

- **Please note:** If you adjust the table size after entering the table values, all the previously entered data will be erased!
- 9. To enter a local table with the DBH value as the only variable, mark the "DBH only" checkbox. In this case, only one column of cells will be provided for you to enter the multiplication factors for the various diameter sizes.
- 10. Click the **Add** button to create the blank table form.
- 11. Enter the table values into the appropriate cells. To automatically resize the table columns, **doubleclick** anywhere in the column title area.
- 12. Click the **OK** button to save the newly created table and close this dialog.

To add multiple Form Class tables under the same table name, follow these steps:

If form class (FC) values are used, you may add multiple form class tables under the same table name. Each of these tables will share the same parameters as the existing table except for the FC value. When you associate this set of tables with a Species/Product class, PC-Cruise will apply the appropriate FC table based on the default FC specified for the product in the Product List. If you specify a FC value during cruise data collection, that FC value will be used instead of the default product FC value.

- 1. Create a new user-defined table as described above.
- 2. In the "Define/Edit Computation Method" dialog, select the **User-defined Table** option then select the existing user-defined table name.
- 3. Click the Edit button to display the "Edit Volume/Weight Table" dialog.
- 4. Enter a new FC value into the data field by the **"FC Required:**" screen prompt and then click the **Add** button. A new table will be added and shown.

- 5. If you wish to change the table size, do so now then click the Update button.
- 6. If you change the table parameters such as Volume/Weight table type, Hgt Unit, Volume Unit, Log Len(Ft), the changes apply to all FC tables under the same table name.
- 7. Enter the table values into the appropriate cells.
- 8. Click the **OK** button to save the newly created table and close this dialog.

To select a table from the group to use for a species/product class, you will first select the table name, click the **Edit** button then select the appropriate FC and click **OK**.

To edit an existing user-defined volume or weight table, follow these steps:

- 1. In the "Define/Edit Computation Method" dialog, select "User-defined Table" option then select the existing user-defined table name.
- 2. Click the Edit button to display the "Edit Volume/Weight Table" dialog.
- 3. Change the parameters as necessary. Except for the form class (FC) value, the parameters are just table descriptors. No data conversion will be performed when you change these parameters.

For example, switching from "Ft(Hm)" to "#Logs" will tell the program to interpret the table column titles as number of logs. It will not convert the merchantable height (Hm) values in the table into "**number of logs**" values.

If you wish to add a FC value, then you should enter the new FC value then use the **Add** button to add a new form for entering the new table values.

- Please note: If you adjust the table size, then all the previously entered data for the displayed table will be wiped out when you click the **Update** button!
- 4. Change or enter the table values as necessary.
- 5. Click the **OK** button to save the edited table and close this dialog.

You may use the **Del** button to delete any unwanted table.

To export the displayed volume table to a text file, click the **Export** button then enter the destination file name. You may save the table as a *.csv (comma-separated variables) file or a *.txt file. You may open the *.csv file using the Microsoft [®] Excel program. You may use any text editor to read the *.txt file.

Importing user-defined tables:

You may import the table values from a text file by using the **Import** button. Make sure the text file conforms to the proper format for importing into PC-Cruise.

For example, let's import the following volume table for estimating the merchantable rough cordwood volume contained in a second growth southern pine tree (Form Class 75-79; Average 77). The row titles are **DBH** in inches and the column titles are **total tree height (Ht)** in feet. (Source: William, David L. and William C. Hopkins, Converting Factors for Southern Pine Products, Louisiana Agricultural Experiment Station Bulletin No. 626, 1968)

DBH/H	t 30	40	50	60	70	80	90	100
6	0.036	0.045	0.052	0.058	0.068			
8	0.069	0.081	0.096	0.109	0.122	0.136		
10	0	0.124	0.148	0.170	0.192	0.213	0.232	
12	0	0.174	0.207	0.236	0.269	0.295	0.328	0.357

14 0 0 0.282 0.321 0.360 0.399 0.443 0.482

Copy the above table into a text editor and save it as "RoughCordsPines77.txt".

Please note: The first field (DBH/Ht) on the first row may be left blank but it may not be a numeral. In addition, on the remaining rows, you must enter 0 for any leading blank volume data fields.)

Suppose we want to import this table and use it for the Longleaf Pine/Pine Pulpwood product class. Select this product class then click on the name displayed under Method1 Name. In the Method 1 Setup screen select **"User-defined Table"** then click on the **New** button. Enter a name for the table, such as "Pine Rough Cords". Optionally, enter "South" into the Region field. Make sure the "Volume" mode is selected, DBH is in "Inch", Hgt Unit is in "Feet(Ht)" and Volume Unit is "Cord". Mark the "FC Required" checkbox and enter "77" for the Form Class.

Now, click on the Import button and select the file named "RoughCordsPines77.txt".

Check that the table has imported properly, and then click on the **OK** button to save it. This table may be used to obtain a rough cordwood volume estimate for any other southern pine trees with Form Class ranging from 75 to 79. If you will be working with a Form Class other than 77, then enter that Form Class in the box by the "FC Required" checkbox and import the table for that Form Class also. If you do not want the program to match and verify the form class for you, you may turn off the "FC Required" field.

If you have a volume or weight table in *.xls format, then use the "Save As" function in the Microsoft [®] Excel program to save the file in the comma-separated-values format *.csv. PC-Cruise will accept *.csv files as *.txt files for importing tables.

To see the volumes reported in cords, please make sure that the "Report Unit for Cubic Volume" is set to "Cord" in the "Set up Merchandise Classes and Data Fields" screen. Please note that unless a cord-based volume table is used, the volume reported in cords will be "solid cords".

Click the **OK** button to save the changes made in this dialog, or click the **Cancel** button to abandon the changes.

Exporting a User-Defined Table:

To export the displayed volume table to a file in ASCII **text** format, **CSV** (comma separated values) format or **Excel (.xls)** format, click the **Export** button then enter the destination file name.

National Volume Estimator Library (NVEL):

The National Volume Estimator Library is provided by the Forest Management Service Center, USDA Forest Service. It contains the standing tree volume estimators used by the Forest Service. Most likely you will not need all of these volume estimators for your cruising jobs. PC-Cruise lets you select just those equations that you need. It will also convert the selected equations into volume tables that will be used by CE-Cruise.

To add an equation to the Active Equation List:

- In the "Define/Edit Computation Method" dialog, select "National Volume Estimator Library (NVEL)" to display the "Select equation from the National Volume Estimator Library (NVEL)" dialog. If "National Volume Estimator Library (NVEL)" is already selected, then first click on a different option then reselect this item.
- 2. Select the appropriate Region, Species and Forest. For Region 8, also select the District.
- 3. Select the appropriate equation listed under "**Volume Model**". The corresponding equation number will be highlighted. Information about the volume equation numbers is provided in the USDA document named Volume_Equation_Numbers_06242005.doc. A copy of this file can be found in your PC-Cruise program folder.

- 4. Click the Select button to add the selected equation to the Active Equation List. Repeat to add as many equations as you wish. The equations are sorted in ascending alphanumeric order. To remove an equation from the list, first highlight that equation then click on the Delete button.
- Enter the appropriate Stump Height, Mer. TopDia and Height Type for Created Table. These pieces
 of information are also used for creating the corresponding volume tables that will be used by CECruise.
- Click OK to finalize the Active Equation List and return to the "Define/Edit Computation Method" dialog.

By adding the equations to the Active Equation List, you make them available in the **Method** pull-down box in the "Method 1/2 and Value Setup" and "Define/Edit Computation Method" screens. The region number, equation number and species name will be displayed to help you select the desired equation. Each USDA Forest Service region, forest and district is represented by a code using the following format:

Rrr_Fff Rrr_Fff_Ddd (for Region 8 only)

R stands for Region, **F** stands for Forest and **D** stands for District. **rr**, **ff** and **dd** are the two-digit region number, forest number and district number, respectively.

The NVEL Volume Estimator Models

The NVEL Volume Estimator models are grouped below by considering the effect of Ht/Hm on Volume Computation. Additional notes are also provided to help you select the appropriate equations for your cruising job.

1. Only Ht affects the Volume:

Kemp Equation (Region 1) Chojnacky Equation (Region 2,4) Edminster Equation (Region 2) Pillsbury and Kikley equation (Region 5) Larson Volume Equation (Region 10) Demars Profile Model (Region 10)

Please note: 1) If Ht is not entered, program will issue an error message.

- 2) When preparing the active equation list, the only available Height Type for building the table for use by CE-Cruise is "Total Height".
- 3) For TopDia \geq 10,Pillsbury and Kikley equations output 0.

2. Only Hm affects the Volume:

Sharpnack Profile Model (Region 5) Lasher Equation (Region 8)

Please note: 1) If Hm is not entered, program will issue an error message. 2) When preparing the active equation list, the only available Height Type for building the table for use by CE-Cruise is "Merchantable Height".

3. Both Ht and Hm affect the Volume:

Flewelling Profile Model (region 1,2,4,6,10)

Please note: When preparing the active equation list, you may choose "Merchantable Height" or "Total Height" as the Height Type for building the table for use by CE-Cruise.

4. Ht is required, but volume is also affected by Hm, if entered:

Czaplewski Profile Model (Region 2) Rustagi Profile Model (Region 4) Wensel Olsen Profile (Region 5)

Please note: When preparing the active equation list, the only available Height Type for building the table for use by CE-Cruise is "Total Height".

5. Either Ht or Hm may be entered for computing the volume; Ht has priority.

Chojnacky equation (Region 3) Eager Mill Study Equation (Region 3) Behre Hyperbola (Region 6) Hann and Bare equation (Region3)

Please note: When preparing the active equation list, you may choose "Merchantable Height" or "Total Height" as the Height Type for building the table for use by CE-Cruise.

If both Ht and Hm are entered, then only Ht will be used by the NVEL equation. If you select "Merchantable Height" as the Height Type for building the table for use by CE-Cruise, then the volume results on PC-Cruise will be different from those calculated by CE-Cruise.

6. Either Ht or Hm may be entered for computing the volume; Hm has priority.

Clark Profile Model (Region 8)

Please note: When preparing the active equation list, you may choose "Merchantable Height" or "Total Height" as the Height Type for building the table for use by CE-Cruise.

If both Ht and Hm are entered, then only Hm will be used by the NVEL equation. If you select "Total Height" as the Height Type for building the table for use by CE-Cruise, then the volume results on PC-Cruise will be different from those calculated by CE-Cruise.

For the Region 8 equations using the Clark Profile model, you may specify the Reference Height H0, H4, H7 or H9, which is the height to a 4", 7" or 9" top diameter outside bark, respectively. The 3rd character of the equation number is used to indicate the top diameter.

For example, equations 890CLKE***, 894CLKE***, 897CLKE***, 899CLKE*** are the equations corresponding to H0, H4, H7 and H9, respectively. For simplicity, PC-Cruise uses 89HCLKE*** to indicate all of these four equations. PC-Cruise determines which equation to use based on the contents of the Dx data field in the Tree Data View.

7. The input height type is "#Log".

Forest 0 (All) for Region 9 outputs cubic volumes; all the other Forests for Region 9 output board foot volumes.

- **Please note:** When preparing the active equation list, only "Merchantable #Logs" is available as the Height Type for building the table for use by CE-Cruise. Currently, the log length is assumed to be 16 ft when creating the tables for CE-Cruise. Therefore, you should also set the Log/Stick Length in the Product List to be 16 ft.
- Also note: The volume tables produced for the Behre Hyperbola model (Region 6) and the Sharpnack Profile model (Region 5) contain form class (FC) values. Currently, the range of form classes supported is from 65 to 90.

For some unknown reason, equation 400DVEW066 will not yield a volume result.

The names for Forests 18, 24, 31 of Region 9 cannot be found. Therefore, these forests are only listed by their forest numbers.

2.5.3 Pre-Cruise Analysis

Before cruising a tract of timber, it is helpful to estimate the number of required sample plots/points. Under-sampling may yield inaccurate results, whereas over-sampling is costly.

The Pre-Cruise Analysis dialog provides data fields for you to specify the sampling error objective and to enter the estimated yields, acreages and variability based on experience or obtained from a quick preliminary cruise. The Pre-Cruise Analysis is discussed in detail in Section 3.4.

2.5.4 Combine Cruise Data

Multiple cruises may be combined into one file using this function. Select the cruise data to import and combine with the cruise job you are working on. The following dialog is displayed:

Combine Cruise Data	
Directory:	Change Directory
Choose Cruise file to combine with:	
Mycruise.fmp	
<u>OK</u>	Cancel

Use the settings in the Default Setup to specify how to combine or append the cruise data.

In CE-Cruise, the "**SaveAs**" function allows users to change the target folder for saving their jobs (such as saving to a SD card).

At the end of a cruise involving multiple cruisers, various cruisers may put their SD cards into the cruise leader's PDA in order to copy their jobs to the leader's PDA. The leader can then come back to the office and use PC-Cruise to combine the jobs.

Please Note:	Each cruiser should use a different job file name to prevent the job files from being overwritten.
Also Note:	This function is not available while the Tree View is open. Close the Tree View by returning to the Cruise (Tract) View screen.

2.5.5 Virtual Tree (A what-if tool)

This tool is provided in **PC-Cruise EX** as a volume calculator with a graphic display to help you quickly see the volume of a log segment by specifying the starting and ending height values for a stem. Options are available to compute the volume based on the **d.i.b.** (diameter inside bark) or **d.o.b.** (diameter outside bark). To call up the virtual tree dialog, select the Cruise pull-down menu and then select "**Virtual Tree**". The following dialog is displayed:

Height 60.0	Diameter <	Height:	Species:	Hard H	dw. Pulp		•
	60	.0	Product:	Hardwo	od Pulpw	bod	-
			Method:	Built-in S	Stem Profi	le	
}		Ð	Region:	SE A	PP MTNS	Î	
1		ອງ			🖲 d.i.b	🔿 d.o.b	
}		<u> </u>	I	DBH:	12		
38.0	5.5	8		FC:	80		
			Total He	eight:	60		
ĺ			Lower	r Hgt:	0.5		
			Upper	r Hgt:	38		
			Vol	ume:	17.40		
						Record	
		Y ratio:			Vie	ew Records	
4.5	10.9	5 🔟					
0.5	14.0					Exit	

First, select the species and product for the tree. Then, specify the **DBH**, **FC** and **Total Height**. Enter the lower height and upper height to define the section of interest on the tree. Based on this information, the program displays a simple sketch of the stem cross-section and shows the location of the DBH using a dashed line.

Please note: The Virtual Tree function uses the merchandise classes in the default setup.

The program displays the bottom end of the log segment as a red line across the stem profile to indicate the location. The top end of the log segment is shown as a blue line. The volume of this log segment is then calculated and automatically displayed for your reference.

A "**Record**" button is provided to temporarily record your results. Click on this button to append the volume to a temporary text file.

Please note: The recorded text file is erased when you exit and restart the PC-Cruise software. If you need to save the information in this file, please use a text editor to open vtrecord.txt then use SAVE AS to save it to a different file name.

Use the "View Records" button to call up and display the temporary text file containing the tree measurements and volumes you recorded during your virtual tree session.

Section 3 – Inventory Data Collection

This section describes and specifies the requirements for entering tree data into PC-Cruise. A typical application is for a user to be in the forest, using a touch screen PC Tablet or notebook PC, visually identifying the tree inventory data and entering this information into PC-Cruise for each sample plot observed in the forest.

This section will discuss four major parts of the data collection in PC-Cruise:

- Preparing Computation Methods
- Preparing Product/Species Lists and Merchandising Classes
- Cruise Header Information
- Entering Tree Inventory Data

3.1 Preparing the Merchandise Classes

PC-Cruise can be customized for the types of trees and products that you commonly cruise. For the greatest efficiency, PC-Cruise can be configured and streamlined to focus only on the tree species in your area and the products created from those species. Additionally, you can specify which volume tables, stem profiles and other equations (Section 2.5.2) you wish to use to calculate quantities. The process of associating the computation methods to the merchandising classes is discussed in Section 3.5. It is important to spend some time setting up the PC-Cruise software to meet your needs in this section. By doing so, you will save a lot of time in the field during the actual tree data collection.

To call up the Merchandise Class dialog, click on the King icon found in the PC-Cruise toolbar. The following dialog window is displayed:

Code	Species Name	e	Product Name	- 21	Mul	lti-	Method1 Name Method2 N	ame
	opeoles Hame			-	Produ	uct	Monod Hand	<u>Ado</u>
-	Sweet gum	-	Hardwood Sawtimber	-	Opt	-	E G&A CP-2-Sweetgum VE-SE G&A CP-2-Sweet	tgum
-	Sweet gum	-	Hardwood Pulpwood	-	Opt	-	E G&A CP-2-Sweetgum VE-SE G&A CP-2-Sweet	tgum <u>D</u> e
-	White Oak	-	Hardwood Sawtimber	-	Opt	-	E G&A CP-9-White oak 🛛 👻 VE-SE G&A CP-9-White	oak
-	White Oak	-	Hardwood Pulpwood	-	Opt		E G&A CP-9-White oak 💦 💎 VE-SE G&A CP-9-White	oak
)						_		<u> </u>
roduc [,]	it tinDBH M	1axDB	H Mer.TopDia		Мах	End	Log/Stick Lenoth Stump Height Default FC(%)	
roduc M	it linDBH M 5.0	1axDB 20.0	H Mer.TopDia 3.0		Max	End	Log/Stick Length Stump Height Default FC(%) 5.25 0.5 80	
roduc M 1easu	tinDBH M 5.0 rement Fields Settin	laxDB 20.0 ng	H Mer.TopDia 3.0		Max 2	(End	Log/Stick Length Stump Height Default FC(%) 5.25 0.5 80	
'roduc M 1easu	t tinDBH M 5.0 rement Fields Settin Tract Layer	1axDB 20.0 ng	H Mer.TopDia 3.0 Stand Layer		Max	End 22.0 Pl	Log/Stick Length Stump Height Default FC(%) 5.25 0.5 80 yer Tree Layer Cock setting	for PDA Privile
Produc M 1easu	t tinDBH M 5.0 rement Fields Settin Tract Layer Unit and Confidence	1axDB 20.0 ng	H Mer. TopDia 3.0 Stand Layer rval Setting		Max 2	End 22.0 Pl	Log/Stick Length Stump Height Default FC(%) 5.25 0.5 80 yer Tree Layer Lock setting	for PDA Privile
roduc M teasu teport Rep	tinDBH M 5.0 rement Fields Settin Tract Layer Unit and Confidence port Unit for Log Rul	1axDB 20.0 ng ce Inte ile:	H Mer. TopDia 3.0 Stand Layer rval Setting Board Ft		Max 2	Ænd 22.0 Pl	Log/Stick Length Stump Height Default FC(%) 5.25 0.5 80 yer Tree Layer Cock setting t Unit for Weight:	for PDA Privile
roduc M teasu teport Rep	tinDBH M 5.0 rement Fields Settin Tract Layer Unit and Confidence port Unit for Log Rul port Unit for Cubic V	1axDB 20.0 ng 	H Mer. TopDia 3.0 Stand Layer rval Setting Board Ft : CuFt	-	Max 2	End 22.0 Pl	Log/Stick Length Stump Height Default FC(%) 5.25 0.5 80 yer Tree Layer Lock setting t Unit for Weight: Tons I lence Interval for Statistics Report: 95% I	for PDA Privile

The six columns at the top of the dialog show the selected species and its code, their associated product name, options for multiple product data entry (multiple product options are in the Cruise EX Version only) and also two methods for computing and calculating the weight or volume.

Listed below the table are the defaults and acceptable range of parameters for the currently selected (highlighted) row.

For your convenience, the **Product section** of this screen displays the product specification parameters for the highlighted record. All displayed diameters are <u>outside bark</u> measurements.

A wide variety of species and products are listed for you by default. These may be deleted or changed at your discretion.

The **Save As Default** button at the bottom of the dialog is used to set the current cruising settings (also called the "cruising template") to be used **by default for all new jobs**.

You can also use cruising templates from existing jobs. If you are starting a new job and you want to use a cruising template that you already established in another job, you can use the **Load Setup** button to select a cruising template from an existing job. The **Load Setup** button is available only before you enter any tree measurement data. When you click on the **Load Setup** button, the following dialog is displayed:



Highlight the desired cruise template and click **OK** to select and use it for your new cruising job. Use the **Change Dir** button to access a different folder or drive to locate your cruising template. Choose **Cancel** to abort without loading a cruising template. Select the **<<Default>>** option to load and use the cruising template that you have specified to be the default cruising template.

3.1.1 Multiple Product and Variable Length Log Data Entry

In **PC-Cruise EX**, you may set up the program to optionally or automatically display the Multi-Product Variable-Length Log Data Entry Form for a Species/Product class. This form lets you enter a number of logs in different lengths. You may enter logs of different product classes for the same tree stem. This setup is provided under the "Set up Merchandise Classes and Data Fields" dialog window. Choose from one of three options:

Mul Prod	ti- uct
Opt	•
Opt	
0n	
Off	

- **On:** Multi-product window will always pop-up after key parameters are entered, such as DBH and Ht (or Hx and Dx). Multi-product information is required.
- Off: Multi-product window not available for the selected entry.
- **Opt:** Multi-product window will pop-up when you press the F3 key after the key parameters are entered such as DBH and Ht (or Hx and Dx). Multi-product information is optional.

If a tree record contains multi-product information, then the Multi-Product window will pop up whenever you point to it.

Mu	lti-Product Type : Opti	al				×	
	Product		Leng	gth	% Def.	Top Dia.	Taper Class: 80.0
1	5 - Hardwood Sawtimber	-	16.0	-	0.0 🗸	19.0	Totallien: Dr. D
2	7 - Hardwood Pulpwood	•	5.2	-	0.0 🗸	18.5	1000r2011.
3	1 - Cull	•	0.0	-	0.0 🗸	18.5	Cutoff: 50.8
						F	Log Quantity: 42.33 CuFt 36.96 CuF Del Add <u>H</u> elp

This form lets you enter a number of logs in different lengths for the same tree stem if a built-in Stem Profile is used for volume/weight computation. DBH and Ht/Hx are required data fields. The logs you enter may be for different product classes, such as sawlogs and pulpwood. You may also enter one or more Cull segments between log segments. The unused top portion is lumped as topwood.

When the Multi-Product Form first comes up, the program automatically populates the first log record with the suggested log length for the main product class. You may accept it or change it as appropriate.

Click the **Add** button to add a log. Each log entry will be verified against the product specifications. As you enter the length of each log into the "Length" field, the small-end diameter is computed and displayed in the "TopDia" field. An error message is issued if the TopDia value exceeds the MerTopDia defined for the product. MerTopDia is the small-end diameter of the merchantable stem. The total log length is computed and displayed in the "Total Len" field.

Please note: If "MinLen" in the "Edit Product List" window is set to "1 Log" or "1/2 Log", you may only enter log lengths that are multiples of the minimum product length. If you will be entering odd log lengths, then set MinLen to "1 FT" or "0.1 FT" as appropriate for your application.

The program verifies each log entry against the product specifications. As each log is entered, the small-end diameter is computed and displayed in the "**TopDia**" field. An error message is issued if the

TopDia value exceeds the **MerTopDia** defined for the product. **MerTopDia** is the small-end diameter of the merchantable stem. The total log length is computed and displayed in the "Total Len" field.

If you did not enter a merchantable stem length in the "**Hm**" field of the main tree record, then the computed merchantable stem length is displayed in the "Cutoff" field to serve as a stopper for your log entries. An error message will be issued when you attempt to enter a log length that causes the total length to exceed the cutoff length. If you entered a merchantable stem length in the "**Hm**" field, then that will serve as the cutoff length.

You may optionally enter a percent deduction for the log into the "% Def." field. This will affect the volume/weight computation but not reduce the length or change the small end diameter. If a segment of the stem is cull, then enter it as a Cull product.

Click the **Del** button to delete the highlighted log. The total length and top diameters will be recomputed. For a species/product class with the multi-product option set to "Opt", the Multi-Product window will close when all logs have been deleted. If the product/species has the multi-product option set to "On", then at least one log must remain in the Multi-Product window.

Please note: When the Multi-Product window is active, the reported tree volume is based on the information in the Multi-Product window rather than the merchantable stem length in the main tree record.

3.1.2 User Defined Measurement Fields

PC-Cruise EX provides the facility for setting up your own data entry fields. The default tree measurement fields in the regular PC-Cruise software are discussed in Section 3.5.1. In PC-Cruise EX, you may define your own editable data entry fields at the Tract, Stand, Plot and Tree data collection levels. You may even specify pre-defined data values or drop-down pick lists for these user-defined data fields. The setup for these data fields is accessed under the "**Set up Merchandise Classes and Data Fields**" dialog window. There are four buttons available to customize the data fields at the different levels:

 Measurement Fields Setting 				
Tract Layer	Stand Layer	Plot Layer	Tree Layer	Lock setting for PDA

Click on the button to select the layer that you want to edit. For example, to add a new data field to the initial Tract View screen (containing Land Owner information, etc.), select the "**Tract Layer**" button. An editor screen will appear which guides you through the process of adding the user-defined fields that you wish to add. The editor is configured in a "wizard" style to make the process easier. For tract, stand and plot level editing, a button is created on the respective data entry form which, when clicked, calls up the user-defined data entry form to be completed. For example, at the tract level, a button will appear on the initial tree data view screen:

Address: 500 MAKE BELIEV	E LANE	City:	
ation		-	
Section\Township\Range	C Lot\District	Continue	
County: MB COUNTY	Location: MB LOCA	TION	
			NEW BUTTON
	ract Area: J200.0 Acr	es	1
scription: HARDWOOD INVENTOR	łΥ		1

The **Tract**, **Stand** and **Plot** Layer User Fields Setup dialogs are blank when called up indicating that you can add a custom data field to these existing screens. However, you may not modify the existing built-in data fields.

The **Tree Layer** is probably where you will do most of your editing for your custom data collection needs. The following dialog is displayed when you click on the "**Tree Layer**" button:

Jsed	Order	Name	Description	Editor Type	Data Type	Lists	Value Range	Default Value
v	1	Tree#	Tree Number	EditBox	Integer	1	10	
5	2	Species	Species	DropDown	Text			
V	3	Product	Product	DropDown	Text			
1	4	M/C	Measure or Count	DropList	Text		1	
1	5	Rep	Repetition	DropDown	Integer	Edit 🔻	Edit 🔻	
•	6	DBH\n(In)	Diameter at Breast Height(in Inch)	DropDown	Decimal	Edit 🔻	Edit 🔻	
~	9	Ht/Hx\n(Ft)	Total Height/Form Height(in Feet)	DropDown	Decimal	Edit 🔻	Edit 🔻	
7	7	Hm\n(Ft)	Merchantable Height(in Feet)	DropDown	Decimal	Edit 🔻	Edit 🔻	
•	8	#Logs/\nSticks	Number of Logs or Sticks	DropDown	Decimal	Edit 🔻	Edit 🔻	
Г	0	Dx\n(ln)	Top Diameter(in Inch)	DropDown	Decimal	Edit 🔻	Edit 🔻	
Г	0	Defect\n(%)	Percent of Defect	DropDown	Integer	Edit 🔻	Edit 🔻	
	0	FC	Form Class	DropDown	Integer	Edit 🔻	ित्तक 👻	
	: B	luilt-In	: Used by System					

The data fields shown in the dialog box are defined as follows:

Used: Tells the software whether or not this field will be displayed in the program during data collection.

Order: Controls the display order for data collection. As a result of changing the order of the userdefined fields, the tree data input screen will be modified so that one field follows another in the specified order.

Name: Name of the field that will appear in the program.

Description: Textual description of the name field.

Editor Type: Tells the program what type of input will be used for data entry of this field.

Available choices for Editor Type are:

EditBox: Values must be typed in by hand. Default values and a range of acceptable values can be defined.

DropList/Edit: You may enter data into this field. A pull-down list is displayed when you click on the down arrow. Default values can be defined.

DropList: You may only select a value from the pull-down list. List is automatically displayed. Default values can be defined as well.

CheckBox: Used as a marker field by placing a check mark in the box. Can be used to indicate "Yes" or "True" if the box is marked. Leave the box unchecked to indicate "No" or "False" for the specified description.

Date: Inserts today's date or a specified date or even a range of dates.

Time: Inserts the time.

Latitude: Type in the latitude of the current position.

Longitude: Type in the longitude of the current position.

Data Type: Specifies the valid type of data that can be entered: text, integer or decimal.

Lists: When active, this button will display as "Edit". Click on the edit button to edit the pre-defined list of values or enter new values. To add a value, enter it into the "New Value" field in the List Items window then click on the "Add" button.

Value Range: Specify a range of valid values for the specified data field.

Default Value: Used as the default entry for the specified data field.

The rows highlighted in pink are required fields used by the Cruising software and must be active (i.e. you cannot uncheck the "**Used**" box). However, you may still edit the field names, field width, display order and alignment options for these special fields. To make changes, highlight the desired field and clicking on the "**Edit**" button.

After clicking on the "**Edit**" button, an editor screen will appear which guides you through the process of editing available fields for the user-defined field you are currently editing. The editor is configured in a "wizard" style to make the process easier.

The pick lists for built-in data fields such as: DBH, tree height, #Logs/Sticks, Rep (repetitions or frequency) and FC (Form Class) may be edited.

For example, if you regularly work with DBH = 12, 14 and 16, you may shorten the default list to contain just 12, 14, and 16.

There is an option in the "Valid Values" dialog-editing window for easily duplicating the data field by using the **Duplicate Tree** button. There is a check-box titled: "**Duplicate by using the DUP** function". When this option is marked, the value entered in the custom data field will be duplicated for the next added tree.

3.1.3 V-BAR Options

PC-Cruise EX also provides the "**Default VBAR**" and "**Default VBAR 2**" setup fields in the Quantity Computation Methods and Tree Measurement Fields dialog. For the **Dbl Point By Point** cruising method, the default V-BAR will be applied when the calculated "**student t**" is less than the "**critical t**".

When the correlation between the volume and basal area passes the significance test, then the computed V-BAR will be used for reporting the expanded volumes. Stem volume and basal area are generally highly correlated. The "student t" test helps ensure that a sufficient number of trees have been sampled for each species/product class before the computed V-BAR is used.

Enter the default V-BAR for computing "Quantity 1" into the "Default VBAR" field. Enter the default V-BAR for computing "Quantity 2" into the "Default VBAR 2" field. If these fields are blank or 0, the V-BAR computed from the measurement data will always be used.

3.1.4 Security and Fool-Proofing

In PC-Cruise EX, a "**Privilege**" setting is provided for you to specify a password for protecting the cruise setup so that other users may not change it. The cruise leader may set up the cruising system then lock the settings of the tree measurement fields to prevent the essential setup from being changed on the PC and on the PDA. A password would be required to make changes to the system.

Click on the "**Merchandise Class**" tool icon then click on the "**Privilege**" button to display the Privilege Setting screen:

rivilege Setting	
New Password:	Apply
	ОК

Initially, the Privileged User checkbox is marked, authorizing you to assign a password, if you wish. Enter a password containing 4 to 8 characters then click the "**Apply**" button. **Once the password has been assigned, unmark the Privileged User checkbox to protect the merchandise classes and tree measurement settings**. When these settings are protected, you will not be able to change them unless you enter the correct password.

To modify the protected merchandise class and tree measurement settings, first click on the "**Privilege**" button. Enter your password then click the "**Validate**" button. If your password matches that on record, then the Privileged User checkbox will be marked and you may go about making the desired changes.

After you have specified the merchandise classes and tree measurement fields, you may click on the "Lock Setting for PDA" checkbox so the cruiser will not be able to change the global and local cruise settings on the PDA.

The privilege setting is also available on the PDA. If the settings in CE-Cruise have not been "locked" by PC-Cruise, then the privileged cruiser may lock them to prevent inadvertent changes.

3.2 Set up the Species List

Use the Edit Species List window to choose those species to be included in your timber cruise job.

Default Setting

To set up the default species list, select the **Cruise/Default Setup** and click on the **Default Merchandise Classes** button and then click on the **Species** button. These specifications will apply to any new jobs created afterwards, but do not affect the currently active cruise job.

Current Cruise Job Setting

To change the specifications for the currently open job, access the Merchandise Classes tool icon via the Cruise View and then click on the **Species** button at the right of the " Set up Merchandise Classes and Data Fields" dialog window.

Creating a new Species List

Using one of the methods described above, click on the **Species** button at the right of the screen. The Edit Species List dialog is displayed:

Edit Species List	
Built-in Species List:	Active Species List:
acacia ailanthus Allegheny chinkapin American basswood American beech American chestnut American chestnut American holly American hornbeam, musclewood American hornbeam, musclewood American nountain-ash apple sp. ash Atlantic white-cedar Austrian pine baldcypress balsam fir balsam poplar basswood bear oak, scrub oak Beech bigleaf magnolia bigtooth aspen birch sp.	Species Code Assign Num.Code

All available species to choose from are listed in the left column. To include a species in your cruising list, simply highlight the species and use the \rightarrow button to move it to the right column (titled Active Species List). To copy one or more species over to the Active Species List, use the Ctrl or Shift key to help select the desired species names then use the \rightarrow button.

The species shown in the Built-in Species List are listed alphabetically for easier identification. The species listed in the Active Species List will be assigned a numeric code for quick identification in the field. Choose from the species in the Built-in Species List and move them over to the Active Species List.

It is recommended that you add species to the Active Species List in the order of most commonly used species to least commonly used species (i.e. list the species in order of most common to least common rather than in alphabetical order). In this manner, the species that you use most often will be assigned the numeric code of "1" and the second most used species will be assigned the code "2" and so forth. Assigning the numeric codes to the Active Species List can be done manually by typing in the desired number code under the "Code" column in the Active Species List. There is an automatic method of assigning the numeric codes that is done at the end of the species selection process.

The order of the species listed in the Active Species List may be changed by clicking on and highlighting the desired species and using the **Up** and **Down** buttons to move the species to the correct location.

Use the **Del** button to delete the currently highlighted species and use the **Del All** button to delete all of the species in the Active Species List.

To define a species not found in the Built-in Species List, click on the **New** button. A blank cell will be appended to the bottom of the list.

Once all desired species have been selected and moved over to the Active Species List and the species order has been finalized, you can now automatically assign the numeric codes to the Active Species List. Click on the **Assign Num. Code** button. PC-Cruise will confirm that you want to reassign the numeric codes. Choose "Yes" to continue. PC-Cruise will assign a numeric code to each species in descending order. **Make sure you really want to have the species codes reassigned in this manner before you confirm the action.**

Choose OK to save changes or click Cancel to abort changes.

Please Note: Any changes you make to the active species list via the Merchandise Classes tool icon

will only affect the currently active job. They do not affect the default setup. Any changes you make to the active species list via the Cruise/Default Setup will only affect the new jobs that are created afterwards. They do not affect the currently active job.

Editing an existing Species List

To edit the list of species used in your timber cruise, click on the **Species** button at the right of the screen. The Edit Species List dialog is displayed:

cacia	Species	Code		
Ilegheny chinkapin	Douglas fir	1		Assign Num Co
merican basswood 🛛 🛁	Hard Hdw. Pulp - oak, hickory	2		
merican beech merican chestnut	Soft Hdw. Pulp - gums, poplars	3		
merican elm	Cypress Pulpwood	4		
merican holly merican hornbeam, musclewood	> Cherrybark Oak	5		<u>0</u> K
merican mountain-ash	Red Oak	6		
opie sp. sh	White Oak	7		Cancel
tlantic white-cedar	Water & Willow Oak	8		
ustrian pine aldovoress	Chestnut Oak	9		
alsam fir	Overcup Oak	10		Help
aisam popiar asswood	Yellow Poplar	11		
ear oak, scrub oak	Sucamore	12		
eech aleaf maanolia	Ash	13		
gtooth aspen rch sp.	Hickory	14	-	

Use the methods and procedures described for creating a new species list to re-order, delete or re-assign numeric codes to the existing Active Species List.

After a cruise has been performed, and you are trying to edit the Active Species List, you may notice that some of the species are highlighted in a color. This indicates that either a tree record is using the species or a merchandising class is using the species.

(light blue color) = species is being used by a merchandising class and cannot be deleted.

(light green color) = species is being used by a tree record and cannot be deleted.

The species highlighted in red is the currently selected species.

Choose OK to save changes or click Cancel to abort changes.

Please Note: Any changes you make to the active species list via the Merchandise Classes tool icon will only affect the currently active job. They do not affect the default setup. Any changes you make to the active species list via the Cruise/Default Setup will only affect the new jobs that are created afterwards. They do not affect the currently active job.

3.3 Set up the Product List

Once the species to be used in the timber cruise have been defined, you can now create a customized list of products to be used for your timber cruise.

Default Setting

To set up the default product list, select the **Cruise/Default Setup** and click on the "Default Merchandise Classes" button and then click on the "Products" button. These specifications will apply to any new jobs created afterwards, but do not affect the currently active cruise job.

Current Cruise Job Setting

To change the specifications for the currently open job, access the Merchandise Classes tool icon via the Cruise View and then click on the **Products** button at the right of the "Set up Merchandise Classes and Data Fields" dialog window.

Using one of the above methods, click on the **Products** button to display the Edit Product List dialog:

Product Name	Product Code	Min DBH	Max DBH	Mer. TopDia	Max EndDia	Pulp TopDia	Log/Stick Length	MinLen	Stump Height	Default FC	Add
Pine Sawtimber	2	13.0	30.0	12.0	40.0	4.0	16.00	1/2 Log 👻	0.5	79	
Pine Pulpwood	3	5.0	20.0	2.0	22.0	4.0	5.25	0.1 FT 👻	0.5	79	Del
Pine Chip-n-Saw	4	10.0	15.0	8.0	40.0	4.0	16.00	1 FT 👻	0.5	79	
Hardwood Sawtimber	5	14.0	30.0	10.0	40.0	4.0	16.00	1/2 Log 👻	0.5	80	
Hardwood Pallet	6	10.0	17.0	8.0	40.0	4.0	16.00	0.1 FT 👻	0.5	80	<u>o</u> K
Hardwood Pulpwood	7	5.0	20.0	3.0	22.0	4.0	5.25	1 FT 👻	0.5	80	1
Cull	1	24.0	0.0	0.0	0.0	0.0	0.00	0.1 FT 👻	0.0	0	
Slash Pine Sawtimber	8	10.0	30.0	8.0	40.0	2.0	16.00	1 Log 👻	0.5	78	<u> </u>
Slash Pine Pulpwood	9	6.0	20.0	2.0	22.0	2.0	5.25	1/2 Log 👻	0.5	78	

Use this dialog to define the specifications for the tree product classes that you will be working with. Use the **Add** button to add a new product record to the list. For each product class, enter the product specification into the following fields. Please note that all diameters are outside bark measurements. The fields are defined:

Product Name:	Enter an appropriate name for the product class You may define a CULL product class and have the culled trees reported as a separate product class.
Product Code:	Assign an alphanumeric code to the product class.
Min DBH:	Specify the smallest DBH that the trees in this product class may have.
Max DBH:	Specify the largest DBH that the trees in this product class may have.
Mer. TopDia:	Enter the small-end diameter (outside bark) for the merchantable portion of the tree in this product class.
Max EndDia:	Enter the maximum large-end diameter acceptable by the mill for the product.

Pulp TopDia:	Enter the pulpwood top diameter. This will be used for computing topwood when Computation Method 1 is a built-in stem profile equation.
Log/Stick Length:	Specify the default length of a log or stick/bolt. For example, if the stick length is 5.3 ft and you enter 3 into the "#Logs/#Sticks" field, you are effectively entering a merchantable height of 15.9 ft. Conversely, when you enter 15.9 ft into the "Hm" field, the program will automatically segment the stem into 3 logs. Also see the description for MinLen provided below.
MinLen:	Specify how the stem length should be rounded for the product. The options are: 0.1 ft, 1ft, 1/2 Log and 1 Log. For example, suppose the MinLen is set to be 1 ft. When you enter a merchantable Height (Hm) of 17.2 ft, the program would use 17 ft for the volume computation. If you wish to compute the volume for the full 17.2 ft, then you should specify MinLen to be 0.1 ft. Now, suppose the Log/Stick Length is set to 5.3 ft and MinLen is set to be 1 log. When you enter a merchantable Height (Hm) of 19 ft, the program would segment the stem to 3 sticks (3 x 5.3 ft = 15.9 ft). For methods requiring #Logs/Sticks to compute the volume, 3 logs would be used. If you set the MinLen to be 1/2 log, the program would use 3.5 sticks (3.5 x 5.3 ft = 18.55 ft) for volume computations based on #Logs/Sticks.
Stump Height:	Define the stump height for the trees in this product class.
Default FC:	Specify the form class percentage to be used when a quantity computation method calls for this information.
Please Note:	Any changes you make to the product list via the Merchandise Classes tool icon will only affect the currently active job. They do not affect the default setup. Any changes you make to the product list via the Cruise/Default Setup will only affect the new jobs that are created afterwards. They do not affect the currently active job

After a cruise has been performed, and you are trying to edit the Product List, you may notice that some of the products are highlighted in color. This indicates that either a tree record is using the product or a merchandising class is using the product. Please see the following color guide for identification:

(Light blue color) = product is being used by a merchandising class and cannot be deleted.

(Light green color) = product is being used by a tree record and cannot be deleted.

The product highlighted in red is the currently selected product. Use the **Del** button to delete the highlighted product record.

Choose **OK** to save changes or click **Cancel** to abort changes.

Please Note: Any changes you make to the product list via the Merchandise Classes tool icon will only affect the currently active job. They do not affect the default setup. Any changes you make to the product list via the Cruise/Default Setup will only affect the new jobs that are created afterwards. They do not affect the currently active job.

3.4 Pre-Cruise Analysis

Before cruising a tract of timber by using one of the sampling methods, it is helpful to estimate the number of required sample plots/points. Under-sampling may yield inaccurate results, whereas over-sampling is costly.

The Pre-Cruise Analysis dialog provides data fields for you to specify the sampling error objective and to enter the estimated yields, acreages and variability based on experience or obtained from a quick preliminary cruise.

You may do the analysis for one stand or a group of stands. Call up the Pre-Cruise Analysis dialog by choosing Cruise/Pre-Cruise Analysis. The following dialog is displayed:

-	, i or Horo	Acies	CV %	Cost	Total Y	%Y	Fraction	Points		
S001Cmtt	2904.70	0.51	175.71	1.00	1489.94	61	107.18	19		
S004Cmttu01	3212.81	0.56	85.11	1.00	1790.42	35	29.79	5]	
S003Cmttu01	785.16	0.30	67.96	1.00	236.92	4	2.72	0		
										_

Click the "Add" button to add a new record. Then enter the appropriate estimates:

- **Est. Y/Acre** is the stem volume, weight or value that each acre is expected to yield.
- Acres is the size of the stand.
- Est. CV% is the estimated coefficient of variation among the plots/points in the stand.
- Weighted CV% is the weighted average coefficient of variation for a cruise involving multiple stands.
- Population Size (N)" applies to the Plot and Simple Point sampling methods. Enter the total number (N) of plots or points in the tract from which n samples are chosen. If N is a very large value and may be considered infinite (n/N < .005), then you may leave this field blank.</p>

The recommended sample size is displayed in the #Sample Points field. If there are multiple stands in the cruise, the sample points will be distributed to the various stands based on the variability and relative cost information that you have entered for each stand.

• Total plots needed is the sum of the required plots for all the stands.

PC-Cruise EX provides the following additional fields for Pre-Cruise Analysis:

- Student t" setting. "Student t" is the number of standard errors of estimate that makes up the half-width of the confidence interval. The two most popular choices are provided in the drop-down list: 1 and 2. A Student t of 2 is usually used to compute the 95% confidence limits for a large sample size (>30). You may enter some other value as appropriate for your application.
- ▶ "Population Size (N)". This field applies to the Plot and Simple Point sampling methods. Enter the total number (N) of plots or points from which n samples are chosen. If this is a very large value and may be considered infinite (n/N < .005), then you may leave this field blank.</p>
- Fields to allow for cost consideration in computing optimum sample size for double point sampling.

If some of the stands are more costly to cruise than others in the same tract, you may wish to take this into consideration when figuring the optimum number of sample points to distribute to each stand. For example, if Stand 1 is on a hill and about one and a half times as

expensive to cruise than Stand 2 and Stand 3, then enter 1.5 into the "**Relative Cost**" field for Stand 1 and leave this value at 1 for Stand 2 and Stand 3.

It is usually more expensive to measure a tree than to count a tree. For the **Double Point by** Point cruising method, you may enter the relative cost of putting in a volume plot (Cvol) as compared to putting in a basal-area-only plot (Cba). Data fields are provided for the coefficient of variation of V-BAR (Est. CVvol %) and the correlation coefficient (Correl.Coeff.) for the volume and basal area. The program will display the suggested number of count (BA) points and volume points. The sample size computation method is based on "Sampling Techniques for Forest Resource Inventory" by Barry D. Shiver & Bruce E. Borders, John Wiley & Sons, Inc., 1996. For the **Double Point by Tree** cruising method, you may enter the relative cost of measuring a sample tree (Cvol) as compared to the cost of taking an accurate tree count at a sample point (Cba). Separate fields are provided for the coefficient of variation of V-BAR (Est. CVvol %) and the coefficient of variation of the tree count per sample point (Est. CVba %). The program will display the suggested number of sample points to cruise and the number of trees to measure. You may also use this method to find the number of count points and volume points for the Double Point by Point method - The number of sample points will be the number of count points; divide the total number of volume trees by the number of sample trees per point to find the number of volume points. The sample size computation method is based on "Log Scaling and Timber Cruising" by John F. Bell and J. R. Dilworth, O.S.U. Book Stores, Inc., 1989.

If you wish to base the analysis on a previously cruised tract or stand that is very similar to the planned cruise job, then click the button labeled "Get the parameters from selected job". The relevant parameters will be automatically extracted from the selected cruise job to compute the suggested number of plots. Select the correct sampling method to display the results.

To delete a record, first highlight it then click the **Delete** button.

Click **OK** to save the changes and exit or choose **Cancel** to close the dialog and abort changes.

3.5 Associating Computation Methods with Merchandise Classes

Tree quantities are usually reported as volumes or weights. You must tell the program which formula, equation or table to use for computing the tree quantity for each species/product class.

Recall that the tree quantity computation methods were accessed from the **Cruise/Default Setup** option and then by clicking on the **Quantity Methods** button. This process was discussed in Section 2.5.2.

To associate these quantity computation methods with the product merchandise classes and the tree

measurement fields for the currently active job, click the Merchandise Classes tool icon K from the Cruise View. The Setup Merchandise Classes and Data Fields dialog is displayed:

ode Species	Name	Product Name		Multi Produ	i- ict	Method1 N	lame		Method2 Name	Ar
 Sweet gum 	-	Hardwood Sawtimber	-	Opt	▼ VE-SE G	&A CP-2-Swee	etgum 🔻	VE-SE G	&A CP-2-Sweetgum	
Sweet gum	-	Hardwood Pulpwood	-	Opt	VE-SE G	&A CP-2-Swee	etgum 🔻	VE-SE G	&A CP-2-Sweetgum	D
▼ White Oak	-	Hardwood Sawtimber	-	Opt	VE-SE G	&A CP-9-White	e oak 🛛 🔻	VE-SE G	&A CP-9-White oak	
🔽 White Oak	-	Hardwood Pulpwood	-	Opt	▼ VE-SE G	&A CP-9-White	e oak 🔹 🔻	VE-SE G	&A CP-9-White oak	
										<u>S</u> pe
										Prod
			_						F	
oduct MinDBH	MaxDBł 20.0	H Mer.TopDia		MaxE 2'	EndDia	Log/Stick Length	Stump Heigh	it Def	ault FC(%)	-
oduct MinDBH 5.0 easurement Fields	MaxDBH 20.0 Setting	H Mer.TopDia 3.0		MaxE 22	EndDia 2.0	Log/Stick Length 5.25	Stump Heigh 0.5	it Def	ault FC(%)	
oduct MinDBH 5.0 easurement Fields Tract Layer	MaxDBH 20.0 Setting	H Mer.TopDia 3.0 Stand Layer		MaxE 22	EndDia 2.0 Plot Layer	Log/Stick Length 5.25	Stump Heigh 0.5 Tree Layer	it Def	ault FC(%) 80 Lock setting for PDA	Pri <u>v</u> i
oduct MinDBH 5.0 easurement Fields Tract Layer eport Unit and Cor	MaxDBH 20.0 Setting	H Mer. TopDia 3.0 Stand Layer rval Setting		MaxE 2:	EndDia 2.0 Plot Layer	Log/Stick Length 5.25	Stump Heigh 0.5 Tree Layer	t Def	ault FC(%) 80 Lock setting for PDA	Pri <u>v</u> i
oduct MinDBH 5.0 easurement Fields Tract Layer eport Unit and Cor Report Unit for Lu	MaxDBH 20.0 Setting fidence Inte og Rule:	H Mer. TopDia 3.0 Stand Layer rval Setting Board Ft		MaxE 22	EndDia 2.0 Plot Layer Report Ur	Log/Stick Length 5.25	Stump Heigh 0.5 Tree Layer	t Def	ault FC(%) 80 Lock setting for PDA	Pri <u>v</u> i
oduct MinDBH 5.0 easurement Fields Tract Layer eport Unit and Cor Report Unit for L Report Unit for C	MaxDBH 20.0 Setting 	H Mer. TopDia 3.0 Stand Layer Ival Setting Board Ft CuFt	•	MaxE 22	EndDia 2.0 Plot Layer Report Ur Confidenc	Log/Stick Length 5.25 it for Weight: e Interval for S	Stump Heigh 0.5 Tree Layer	t Def	ault FC(%) 80 Lock setting for PDA	Pri <u>v</u> i

Click on the button under the **Method 1 Name** column for the specific species and product to call up the Method 1 and Value Setup dialog:

Method 1 and Value Se	tup		×
Select Method by:	C Built-in Stem Profile Mesavage/Girard Table C Power Equation C 9-Terms Equation	Built-in Volume Equation User-defined Table Honer Equation	
Method:	MesavageVolumeTable-Scribner	T	
Quantity Type:	Volume(Board Ft)		
Region:			
Report by:	♥ Volume C Weight		
Report Unit:	Board Ft		
Report Value (\$/Board Ft):	2.370370		
None	<u>o</u> ĸ	Cancel Help	

Choose a computation method and value (values only available for Method 1 computation methods):

The **Quantity type** field shows the volume or weight unit being used for the selected computation method.

By default, the stem quantities computed by the built-in stem profile or volume equations include the tree bark. If you wish to estimate the inside-bark stem volume, then uncheck the **Volume Outside Bark** box.

If you are using one of the built-in volume equations and wish to estimate the outside-bark volume, then check the **Outside-bark estimates** box. If the equation that you selected only provides inside-bark or outside-bark estimates but not both, then the check box would not be displayed.

The **Region** field shows the name of the region for which the selected computation method is applicable. For a user-defined method, this is the region name that you entered when you defined the computation method. For the Built-in Stem Profile method, select the appropriate region from the displayed pull-down list so the correct stem profile coefficients will be used for the trees cruised in that region.

Use the **Report by** field to specify whether you wish the tree quantities to be reported by **Volume** or **Weight**. The reporting unit displayed is the one you specified in the "Setup Merchandise Classes and Data Fields" screen.

If the selected computation method does not compute the weights, the **"Ratio (Tons/Unit)"** field will be displayed when you select the "Weight" option. The weight per unit volume conversion factor you specify will be used to convert volumes to approximate weights. Naturally, if you require accurate weight reports, you should either select a suitable built-in equation or create a user-defined weight table for the species/product class..

For converting the computed volume quantities into dollar values, enter the appropriate dollars per unit volume factor into the **"Report Value (\$/Unit)"** or the **"Report Topwood Value (\$/Unit)"** field. This factor will be used when you select a cruise report that contains dollar value as a reported item. The reporting unit displayed is what you set up in the "Setup Merchandise Classes and Data Fields" screen.

Click the **OK** button to save the selection of the computation method and close the dialog. Click the **Cancel** button to abandon the current selection and close the dialog.

Outline for the merchandise setup procedure:

- 1. Click on the **Species** button and prepare a Species List containing the tree species that you will be cruising (described in Section 3.2).
- 2. Click on the **Products** button and set up a Product List containing the products for which the cruised trees are intended (described in Section 3.3).
- For each tree species, select the product class and the method to be used for computing the tree quantity. As the quantity computation method may be different for the same tree species used for different products, you may need to set up a different Species/Product record for each different tree product.

For each Species/Product class, you may select up to two Quantity Computation Methods. Click on the cell in the **Method1 Name** column to select the first computation method. Click on the cell in the **Method2 Name** column to select the second computation method. Make sure that the method you select is appropriate for the species/product class to which it will be applied. Quantity computation methods are discussed in detail in Section 2.5.2.

If the computation method you selected previously was renamed or deleted from the system, you will see its name highlighted in yellow. In that case, please select a currently valid method for the affected Species/Product class.

- 4. Use the Add or Del buttons to add or delete a Species/Product/Methods record. The Add button will duplicate the currently highlighted record. You may then change it as needed. The Species/Product list will be automatically sorted by the Species Code.
- 5. Click on **OK** to save the settings or click on **Cancel** to abandon the changes.

3.5.1 Tree Measurement Fields

The **Tree Measurement Fields Setting section** of this screen lists the tree measurement fields that you may wish to use for the tree data during the timber cruise data collection session. Your selection of the tree measurement data fields must be consistent with the tree quantity computation methods specified for the tree species/product class. If you turned off some fields to expedite data collection, you must turn them back on to see the correct volume results if the quantity computation method depends on those data fields. PC-Cruise EX users have the option of customizing these fields (see Section 3.1.2).

The **Diameter at Breast Height (DBH)** is a required tree dimension field for a measured tree. Use the User Defined Tree Measurement Fields editor to access other data fields that you wish to display in the Tree Data View during data collection.

Total Height (Ht)	Turn on the Total Height (Ht) data field if you use a computation method that calls for total tree height. For example, if you use a volume table that is based on DBH and total tree height in feet, then you must enter data into the Ht field in order to have the volume computed for the tree.
TopDia. (Dx)	If you use a Built-in Stem Profile equation for the trees cruised, then you must record either the total tree height Ht or the tree height Hx measured to a 4-inch , 7-inch or 9-inch top diameter (outside bark). If you will be recording tree height to a 4 inch, 7 inch or 9 inch top diameter, then turn on the Top Dia. (Dx) data field. When this checkbox is marked, the Ht field will display as Hx in the tree data entry form in the Tree Data View.
	The Built-in Volume Equation can also compute volume to a 4-inch top diameter.
	If you are not using the Built-in Stem Profile or Built-in Volume Equation computation method, then do not turn on the Dx field.
Merch. Height (Hm)	Hm stands for the merchantable height, which is the entire length of the merchantable section from stump to the minimum end diameter specified for the product. The minimum end diameter and the log/stick length are defined in the Product List .
	Alternatively, the merchantable height may be entered in terms of the number of logs or sticks (#Logs/#Sticks) of a predefined length.
	The merchantable height will be rounded down to the nearest 0.1 ft or 1 ft based on what you specify as the minimum product length (MinLen) in the Product List.
#Logs/#Sticks	If your user-defined volume table or equation is based on #Logs/Sticks, you may turn on either or both of the Height (Hm) and #Logs/#Sticks data fields. When you enter data into one of these fields, the program will calculate the corresponding value for the other field.
	Please note that the Built-in Stem Profile and Built-in Volume Equations in PC-Cruise do not directly make use of the number of logs or sticks to compute volume. If you enter merchantable height in number of logs or sticks, these equations use the corresponding Hm for volume computation.
	The merchantable height in #Logs/Sticks will be rounded down to the nearest 1/2 log or full log length based on what you specify as the minimum product length (MinLen) in the Product List.

Defect% If you will be taking deductions for defects, then turn on the **Defect%** data field. The defect percentage will be applied to the entire computed tree quantity. Suppose the tree volume computed from the tree dimensions is 40 board feet. A 20% deduction will reduce the usable volume to 32 board feet. **Repetitions (Rep)** If you activate the **Repetitions (Rep)** field, then when you encounter one or more sample trees belonging to the same species/product class and having essentially the same dimensions, you just need to enter the tree measurements once; enter the count of duplicates into the Rep data field. FC FC stands for "Form Class", which is defined as the percentage ratio of the diameter inside the bark at the top of the first 16-foot log (17.3 feet from the ground) to the diameter outside the bark at breast height (4.5 feet from the ground). This parameter is required for many tree quantity computation equations and tables such as the Mesavage and Girard form class volume tables. When you define a product, you may specify a default FC value to be used for that product. Turning on the **FC** data entry field lets you override the default FC value. If the form class of the trees stays the same as the default value, then there is no need to show the FC data field while entering the cruise data.

Turn on the Age and Description fields if you wish to record the age and a description of the tree.

Choose **OK** to save changes or click **Cancel** to abort changes.

3.5.2 Reporting Units and Confidence Interval Setting

You can specify the units of measurement for the various quantity report output in the Setup Merchandise Classes and Data Fields dialog. There are three different quantity types for which you can specify the units:

- a) Log Rule Volume Choose from the pull-down menu the available unit types: Board Ft or MBF (Thousand Board Feet).
- b) Cubic Volume Choose from the pull-down menu the available unit types: CuFt (Cubic Feet), Cord (solid cord, not "stacked wood" cord) or CuYard (Cubic Yards).
- c) Weight Choose from the pull-down menu the available unit types: Tons or Lbs (pounds).

There is also an option to specify the **confidence interval** to use when reporting statistical data. Choose one of the available selections: 60%, 68%, 70%, 80%, 95%, 98% or 99%.

3.6 Filling in the Cruise Header

Turn on the Cruise View to begin entering data for the Cruise Job in the Cruise Header. To turn on the

Cruise View, click on the Toggle Cruise View icon found directly above the Topic View area

After toggling the Cruise View icon on, the Cruise View is displayed to the right of the Map View. The Cruise View is displayed:

1 🔁 🖍 🖪 🦾 🔟 🌌 🦀 🎉 🌲
Land Owner(s):
Address: City:
Location
Section\Township\Range C Lot\District C Location
County: Section: Township: Range:
Tract ID: Tract Area: 0.0 Acres
Cruiser: Cruise Date: 05/17/2005
Stand ID Stand Type Cruise Method Cover Type Description

This page displays the header information for the currently active cruise. It also lists any existing tree stand data records for the cruised tract. If the cruise data is entered for stands in the Map View, then selecting a stand record in the Cruise View will highlight the corresponding stand shape in the Map View.

To expand the Cruise Header and Cruise View to the maximum extents, click on the Full Screen button

located in the upper left corner of the Cruise View window cover the entire screen below the Forester's Toolbar.

When the Cruise View is in full screen mode, the Full Screen button is changed to the Half Screen button

as shown: E. Click on the Half Screen button to reduce the Cruise View back to the original half screen size.

Land Owner(s): Enter the name of the landowner or owners in this field. Also enter the address information for the tract, if desired.

Location: To further define the location of the cruise, choose from one of three methods to identify the location:

- a) Section/Township/Range Enter the county where the land resides as well as the section, township and range information.
- b) Lot/District Choose this option to specify the county, tax lot and district for the land.
- c) Location If the above methods are not known or not needed, choose this option to simply enter the county for the land as well as a brief description of the land location.

Tract ID: Click on the pull-down menu to select from the list of available tracts found in the job. Once the tract is specified and a stand is added, the Tract ID cannot be changed and will be grayed out. For simplicity, PC-Cruise will only store one cruising job per tract per file. If your map contains more than one tract and you wish to collect cruise data for the other tracts, you will need to open the job under a different name and then specify the other Tract to store cruise data.

The tract ID that gets specified in this step is called the **working tract** and is highlighted in the Map View for easy identification.

Please note: If the "Match cruise data with tract/stand data" checkbox under Cruise/Default Setup is checked, then you may only work with a tract that exists in the currently open *.fmp job. In this case, the Tract ID field will contain a pull-down list of existing tracts from which you may select. If you do not select from the list but enter any odd Tract ID, the program will not permit you to add a stand record to this cruise. If you do not care about matching the cruise data with the map data, then uncheck the "Match cruise data with tract/stand data" checkbox under Cruise/Default Setup.

Also note: PC-Cruise will only store one cruise job per FMP file.

Tract Area: This field will automatically be filled in for you based on the Tract ID specified. PC-Cruise allows you to change the number listed in this field to run reports based on different tract acreages. Changing the value here will NOT change the actual tract acreage in the Map View. It is recommended that you do not change the value in this field unless necessary for computing tree weights/volumes.

Description: Type in a textual description of the cruise for easier identification (maximum is 128 characters) of the cruise data.

Cruiser: Type in the cruiser name or initials (maximum is 30 characters). This identifier is useful when combining cruises for the same tract from different files.

Cruise Date: Specify the date of the cruise. For new cruise jobs, the current date will be selected by default. Once the date has been specified and saved for a specific job, it will be retained.

If you have defined your own tract-level data fields using **PC-Cruise EX**, then a button named **"User-defined Tract Data"** will be available. Press this button then enter the data into the user-defined data fields.

Please note: When you save the currently open *.fmp job, all cruise data will be saved along with the GPS data and map data.

3.7 Stand Data

Once the tract information has been defined using the Cruise Header, you are ready to pick a stand to be

cruised and define the cruise method. Click on the **Add Stand** icon ²⁰⁰/₂₀₀ to call up the Add Stand dialog:

Add Stand			X
Stand ID:			
Cover Type:	Planted	•	
Stand Type:			
Stand Area:	0.0	Acres	
Stand Age:	10		
Cruise Method:	Plot	T	
Plot Size: 1/	5	Acres	
Description:			
_ Default			
Species: None			<u>S</u> elect
Product: None			None
<u>E</u> dit Trees	<u>0</u> K	<u>C</u> ancel	Help

Use this dialog to pick or specify the stand to be cruised using the **Stand ID** field. The Stand ID that gets specified in this step is called the **working stand** and is highlighted in the Map View for easy identification.

To automatically resize the columns of the stand record list, **double-click** anywhere in the column title area.

To access an existing stand record and change the associated data, highlight the desired stand in the

Cruise View and then click on the **Edit Stand** icon **b** to open the Stand Information dialog.

To exclude an existing stand from quantity computations, highlight the stand then click on the **Exclude**

Stand icon. Click this icon again if you change your mind and decide to have this stand included. If you do not wish to use this function, you may mark the "**Disable the Exclude/Include toggles**" check box in the Cruise Setup page

Please note: If the "Match cruise data with tract/stand data" checkbox under Cruise/Default Setup is marked, then you may only select a stand that exists in the currently open *.fmp job. Otherwise, you may enter any Stand ID.

Select the appropriate **Cover Type** for the stand (available options are Planted or Natural) and also enter the appropriate information for **Stand Type**.

Please note: For the Stand Type field, PC-Cruise will automatically enter the type of stand for you if you have already defined the Stand Type for your stand in the Sheet View when you created the Stand.

If the selected stand exists in the Map View, then its acreage will be automatically entered into the **Stand Area** field. Otherwise, you may enter the acreage yourself.

Optionally, enter the average age of the trees into the Stand Age field.

Please note: For the Stand Age field, PC-Cruise will automatically enter the age for the stand for you if you have already defined the age for your stand in the Sheet View when you created the Stand.

Select the appropriate **Cruise Method** to be used for the stand. The available options are:

 100% Tally - With the "100% Tally" method, every tree in the stand is tallied and tree samples are selected for measurement without bias. You may measure all trees in the stand for sales of species or products of exceptionally high values.

Additional options for 100% Tally

When adding stands to be cruised using the 100% Tally method, you may set the tally interval by using the M/C (Measure/Count) ratio field provided on the dialog window.

Cruise Method:	100% Tally 🔽		•		
Tree M/C Ratio:	1	¥	:	3	•

For 100% cruises, you can set the M (measure) option to: 9999 and set the C (Count) field to 1.

Built-in options allow for other ratios of measured and counted trees for specifying the tally interval. For example, if you will be measuring one tree and counting the following three trees, then set the M/C Ratio to "1:3". This ratio applies separately to each species.

- **Plot** For the "Fixed Plot" area-sampling method, you would specify the appropriate sample plot size for the cruise, for example: 1/5 acre. Each tree within each plot boundary will be measured as a sample tree.
- **Point** With "Simple Point Sampling", you would specify the appropriate BAF (Basal Area Factor) as the sample selection criterion. All point-sampled trees on all points are measured. If you are using PC-Cruise EX, you may enter variable-length multiple products by using the Multi-Product Data Entry Form.
- Double Point The "Double Point Sampling" method is a ratio double sampling method. Like the simple point sampling method, it uses the BAF as the criterion for selecting the sample trees. The difference is that sample trees are counted at all points but tree measurements are only taken on some proportion of the points. The Double Point method provides the "Point M/C Ratio" field for you to specify the ratio of the measured points to counted points. For example, you would specify "1:3" if you plan to measure one point and count 3 points and repeat this pattern while cruising the stand. More information about the data collection for Double Point Sampling is provided in Section 3.8. PC-Cruise EX also provides a Double Point by Tree sampling method.

Optionally, enter a description into the **Description** field (maximum 128 characters).

To speed up the data entry process, you may click on the **Select** button to define a default species and a default product for the stand. The default species and product will be automatically displayed by default whenever you add a new tree record. If you do not wish to define a default species then select the **None** button.

Choose **OK** to save changes and return to the Cruise View or click on the **Edit Trees** icon **to** proceed to the Tree Data View. Choose **Cancel** to abort saving changes and return to the Cruise View.

When you save the currently open job, the GPS data and map data will be saved in the **<job>.fmp** file, the cruise data and the local merchandising table will be saved in the **<job>.crz** file, and the quantity computation methods will be saved in the **cruise.met** file. The default merchandising table and the cruise template will be saved in the **cruise.tem** file. The cruise template includes the species/product setup, the selection of tree measurement fields as well as some option settings.

3.8 Tree Data View

The Tree Data View shows the tree data records for the cruising plot/point you are working on. It also displays the Stand ID of the currently active tree stand, which is also highlighted in the Map View for easy visual identification.

From the Cruise View, click on the Edit Trees icon 🗭 to go to the Tree Data View. Click on the 📥 icon

to toggle to a full-screen view or click on the 🖳 icon to toggle back to a half-screen view.

In the half-screen view, you may adjust the width of the Cruise View by dragging the divider between the Map View and the Tree Data View. To designate the Tree Data View or the Map View as the active window, click once anywhere in the corresponding view area.

To automatically resize the columns of the tree record list, **double-click** anywhere in the column title area.

The **Plot/Point** field contains a pull-down list of index numbers for the fixed-area plots or point-sampling points in the currently active stand. To work with an existing plot or point, simply select its index number from this pull-down list.

3.8.1 Creating a new Plot/Point

To create a new plot/point, click on the **Add Plot/Point** icon to add a new plot to the working Stand. The Plot/Point Information dialog is displayed:

Method: Plot	_ ^		
Plot/Point Index: 1 Plot/Point ID:		<u>P</u> ick	Browse
Description:			
T No Tally	🦵 Ignore Tally		
Location Lat: 44*33'4	8.314''N		
Lon: 123°15	'52.315''W	<u>S</u> tore	Position
MSL: 0.000			

Use this dialog to assign a Plot/Point Index number to the plot/point to be cruised. The Plot/Point index number will be automatically incremented for each new plot added. Duplicate plot numbers are not allowed.

By default, the coordinates shown for the plot location are those of the center of the currently active job.

You may tie the cruise data for the plot/point with the actual grid point at the plot center. This will permit you to see the corresponding grid point highlighted whenever you are working on a plot. In addition, when you click on a grid point, any plot data associated with that grid will be displayed in the Tree Data View. To tie the data for a plot with a grid point, click on the **Pick** button and use the cross-hairs pointer to select the appropriate grid point in the Map View. Or, click the **Browse** button and select the desired Point ID. The selected grid point will be displayed in the **Plot/Point ID** field. If the **"Match cruise data with tract/stand data"** checkbox under Cruise/Default Setup is marked, then you may only select a point that lies within the boundary of the stand containing the plot you are working with. It is up to you to select the correct grid point to represent the cruised plot in the Map View.

You may record the position of the plot center by connecting a compatible GPS receiver to your PC. If you wish to use this position to update the coordinates of a grid point, specify its Feature ID in the Plot/Point ID field then click the **Store Position** button. If you wish to store the GPS position as a new point feature, then enter the new Feature ID and click the **Store Position** button. You will then specify the appropriate Topic Name in the **Store GPS Position** dialog. To start recording the GPS position, enter the desired session length in seconds then click the **Start** button.

Put a check in the **No Tally** checkbox if you want the cruise data for this plot to not be included in the tree quantity computation. Even with this option checked, the plot still counts as a valid plot. It would be as if this plot had no trees in it.

If you want the plot to be completely ignored, then check the **Ignore Tally** box. In this case, the plot does not count as a plot in this stand; it would be as if this plot did not exist at all.

Choose **OK** to save changes and return to the Tree Data View for tree data entry or click **Cancel** to abort saving changes and return to the Cruise View.

3.8.2 Editing an Existing Plot/Point

To edit an existing plot/point, first select the plot/point from the "Point:" pull-down menu or use the **Prev** and **Next** buttons to find the correct plot/point number. Once you have selected the correct plot/point,

click on the **Edit Plot/Point** icon to call up the Plot/Point Information dialog. You can use the "Prev" and "Next" buttons on this dialog to quickly and easily scroll through the tree data for the different plots available for the stand. Plot/point information may also be selected by clicking and selecting the plot/point in the Map View. The associated tree data is displayed for the appropriate plot/point.

CRU01 Plot Size: 1/	1 Acres
Grid Poi008	ick <u>B</u> rows
Exclude Plot/Point	
34*43'55.550''N 089*14'29.514''₩	Store Position
	RU01 Plot Size: 17 Image: Size of the second sec

In PC-Cruise EX, a "Move" button is available on the "Plot/Point Information" screen.

You can click this button to pop-up a window, which allows you to move the active plot to a different stand. The **Move Plot/Point Data** dialog is displayed:

Move Plot/Point	Data	×
Moved Plot/Point	ID: Grid Poi008	Plot Index: 1
	Source Position	Destination Position
Stand Index/ID:	1. S001MYCRU01	1. S001MYCRU01
Method:	Plot	Plot
#Plots In Stand:	10	10
Sequence Index:	1	C Nth
		C Start
		End
		C Plot Index 11
	<u>G</u> O <u>C</u> ancel	

Specify the destination position by selecting the target stand from the pull-down menu. Four options are displayed for the target plot index:

Nth: Select this option to move the plot/point to the specified sequence index for the selected stand. Suppose the plots in the target stand are numbered 1, 4, 5, 6 and 10. To insert the active Plot#7, you could specify N = 5.

Start: Select this option to move the plot/point to be the beginning plot of the selected stand.

End: Select this option to move the plot/point to the last plot of the selected stand.

Plot Index: Select this option to directly specify the location by the plot/point index.

When selecting one of the first three options, the corresponding plot index will be displayed for reference and cannot be changed.

If you specify a target plot number that is a duplicate of one of the existent plots, then all of the following plots will be renumbered automatically.

If the plot/point data is tied to a specific grid point location, it is your responsibility to move the stand boundary on the map so that PC-Cruise can match that grid point with the other stand in the map.

3.8.3 Exclude/Include an Existing Plot/Point

To exclude the currently active plot from being included in quantity summary calculations, click on the

Exclude/Include Plot/Point icon ^{IMA}. When the Plot/Point has been excluded, PC-Cruise will show the text: "Exclude Plot/Point" directly beneath the Plot/Point number indicating that it has been excluded. To include this plot/point back in the calculations, click on the Exclude/Include icon again.

3.9 Entering Tree Data for a Plot/Point

Once you have established the plot/point, you are now ready to start collecting tree data.
1. To add a new tree record, click on the Append Tree icon 🕮

Before entering any tree data, make sure that the correct computation methods and the correct product merchandising specifications have been selected for the tree species tallied. You can check by calling up the Set up Merchandise Classes and Data Fields dialog by first clicking on the Return

 ${f 1}$ icon to go back to the Cruise View and then click on the Merchandise Classes tool icon ${f K}$ this dialog, you can also specify which tree data entry fields are to be displayed in the Tree View (see Section 3.5.1). Mark the measurement data fields required by the quantity computation methods that will be used for the cruise.

Selecting the correct species and product class for each tree is as important as entering the tree measurements accurately. The Species field contains the list of active species codes and species names. The **Product** field provides only the product codes/product classes that have been associated with the selected species.

From the Cruise Header screen, click on the Edit Trees icon 🕋 to get back to the Tree Data View if you went out to check your computation methods.

💢 🧱 🖗 🍁 💥 🕌 🎦 🞇 🖉 🇀 🕚									
Plot: 1 Frey Next Stand ID: S001MYCRU01									
	Tree#	Species		Product		Rep	DBH (In)	Hm (Ft)	#Logs/ Sticks
1	1	1 - Sweet gum	-	5 - Hardwood Sawtimber	-	1	14.0	24.0	1.5
2	2	1 - Sweet gum	•	5 - Hardwood Sawtimber	-	3	16.0	32.0	2.0
3	3	1 - Sweet gum	•	5 - Hardwood Sawtimber	•	8	14.0	32.0	2.0
4	4	1 - Sweet gum	•	7 - Hardwood Pulpwood	-	4	10.0	40.0	7.5
5	5	1 - Sweet gum	•	7 - Hardwood Pulpwood	-	11	8.0	40.0	7.5
6	6	1 - Sweet gum	•	5 - Hardwood Sawtimber	•	15	12.0	50.0	3.0
7 7 7 1 - Sweet gum 5 - Hardwood Sawtimber 2 18.0 40.0 2.5									
Log/S	itick Leng	gth: 16.00 Stump Height:0.5	5 M	inTopDia: 10.0					
Volum	ne: 20.8	31 CuFt	1	/olume2: 0.66 Tons					

2. After clicking on the Append Tree icon, a new tree is added to the plot/point. You may arrow up or down to move from one tree record (row) to another. Arrow left or right to move to the previous or next cell, respectively. Also, you can use the TAB or ENTER key to move to the next cell. You may also click on any cell and then work with the highlighted record.

The Tree # automatically starts at 1 and increments by 1 tree each time you click on the Append Tree icon.

3. Select the Species from the pull-down menu of available options.

The **Product** field will list only those products that you have defined for the selected species.

To duplicate the currently highlighted tree record, click on the Duplicate Tree Record tool icon Δ new record will be appended for the same tree species/product class, ready for you to enter the tree dimensions.

4. Repetitions (Rep)

To record trees that are basically the same in species, product class, size, form and age, instead of entering multiple records with identical data values, you may enter the data once and then enter the number of repetitions in the **Rep** data column.

- 5. Enter the diameter at breast height (4.5 feet above ground) into the DBH field.
- 6. Enter the total tree height into the Ht field if it is required by the computation method used for the tree. The Hm field is for entering the merchantable height (above stump) as one measured length, such as "40" (Ft).

Alternatively, you may enter the merchantable portion of the tree in terms of the **number of logs or sticks** of the tree product. For example, you could enter "2.5" logs into the **#Logs/Sticks** field.

The **Hm** and **#Logs/Sticks** fields are related to each other. When you enter data into one of these two fields, the data in the other field will be automatically recalculated. If the computation method is based on the merchantable height, then enter the correct merchantable height measurement into the **Hm** field during data collection. If the computation method is based on the number of logs or sticks, then enter the correct number of logs or sticks into the "#L" field during data collection.

If you use a Built-in Stem Profile equation for the trees cruised, then you must record either the total tree height **Ht** or the tree height **Hx** measured to a **4-inch**, **7-inch** or **9-inch** top diameter **(outside bark)**. If you will be recording tree height to a 4 inch, 7 inch or 9 inch top diameter, then select the appropriate value (4, 7, or 9) for the **Dx** data field and enter the corresponding height into the **Hx** field. The Built-in Volume_Equation can also compute volume to a 4-inch top diameter. (Dx = 0 corresponds to measuring the total tree height.)

If a Built-in Stem Profile equation is used and the Hm entered is not compatible with the Ht, the program will alert you to that effect. You may accept the Hm proposed by the stem profile mode. If the tree is actually better than predicted by the model, you could adjust the total tree height **Ht** so the predicted Hm agrees with what you see. In this case, the computed topwood may be overstated.

- 7. Enter the appropriate **form class** value into the **FC** field if the computation method used calls for this piece of information. If you do not activate the **FC** field for such computation methods, then the quantity will be computed **using the default form class** specified in the Edit Product List.
- 8. If the Age and Description fields are used, then enter the appropriate information for the tree.
- 9. To take a deduction from the computed tree quantity, use the **%Defect** data field to enter the estimated defect percentage.
- **Please note:** PC-Cruise will warn you if you have any blank tree records. You can choose to accept them or delete them when prompted.

The major differences in data entry for the various cruise methods are described below:

Data Entry for the 100% Cruise Method

- Tally every tree in the stand.
- If the tree is to be measured, select "M" in the "C/M" data column then enter the tree measurements.
- If the tree is only counted but not measured, then select "C" in the "C/M" data column. In this case, you will not be able to enter data into the tree measurement data fields.

Data Entry for the Fixed Plot Method

• Enter the tree measurements for every tree within the boundary of each plot in the stand. If you are using PC-Cruise EX, you may enter variable-length multiple products by using the Multi-Product Data Entry Form.

Data Entry for the Simple Point Sampling Method

• At each point, enter the tree measurements for each sample tree that meets the BAF (Basal Area Factor) selection criterion for the stand. If you are using PC-Cruise EX, you may enter variable-length multiple products by using the Multi-Product Data Entry Form.

Data Entry for the Double Point (by Point) Method

The Double Point method is a ratio double point sampling method that does not require you to
measure the sample trees at all of the points in the stand. Like the simple point sampling method, it
uses the BAF as the criterion for selecting the sample trees. The difference is that sample trees are
counted at all points but tree measurements are only taken on some proportion of the points.
Essentially, the sample trees are clustered at the volume points. PC-Cruise provides a "Point M/C
Ratio" field for you to specify the ratio of the measured points to counted points. It will help you keep
track of the measured and counted points.

For example, you would specify "1 : 3" if you plan to measure the trees at one point and only count the trees for the following 3 points and repeat this pattern while cruising the stand. So, when you add the first plot, all trees in that plot will default to the "M" (Measure) status in the **M/C** status column. The trees in the next 3 plots will default to the "C" status, and so on.

Caution: You are permitted to change a measured point (volume point) to a counted point (count point) by selecting the "C" status for any of its tree records. However, doing so will change the status for all the tree records and erase all the measurement data that you have entered for this point. Switching back to the "M" status will NOT recover the erased tree data.

The **M/C count status field** keeps track of the total measured and counted trees for the plot. This count is kept separately for each species.

Data Entry for the Double Point (by Tree) Method

PC-Cruise EX provides a variation of the Double Point sampling method called **Dbl Point By Tree** method. With this method all trees are counted at each point but only a portion of the trees is measured for volume at each point. This permits the sample trees to be well distributed throughout the timber stand. In contrast, with the **Dbl Point By Point** method, all trees are counted at each point and, for a fraction of the points, all trees are measured for volume. The **Dbl Point by Point** method allows you to specify a "Point M/C ratio". The sample trees are clustered at the volume points. With the **Dbl Point By Tree** method, all trees are to be counted at each point but only a portion of the trees at each point are to be measured for volume.

For this method, you may specify a "**Tree M/C Ratio**" (ratio of volume trees to count trees) in the Stand Information dialog. If you wish to measure only one volume tree per plot then set the Tree M/C Ratio to 1/9999. A Tree M/C Ratio of "1:0" means all trees will be measured.

An **M**<->**C** tool is provided to easily switch between the Measure/Count modes for adding a tree when the Measure/Count ratio is 0:1 or 1:0.



During data collection, you may temporarily switch to a "**count-only**" mode by using the **M**<->**C** checkbox in PC-Cruise EX or the **M/C** tool icon in CE-Cruise EX. When you activate this switch, the M/C Ratio is reversed. This is useful when you wish to count all the trees at a point then measure the volume trees. So, you would first set the Tree M/C Ratio in the Stand Information window to "0:1". This means all new tree records will be "count trees" (or, basal area trees). After counting all the trees for the point, you would activate the M<->C tool to switch to the reverse ratio "1:0". Any tree records that you add to this point will now be "measure trees" (volume trees). This is only a temporary switch. When you add a new plot, the specification in the M/C Ratio field governs.

PC-Cruise EX will display the total measured and counted trees for the plot in the M/C (Measure/Count) Status field. This count is kept separately for each species.

For each highlighted tree record, the Log/Stick Length, Species, Product, Stump Height and tree quantities are displayed at the bottom of the Tree Data View. If a tree quantity cannot be computed from the data you entered, an error message will be displayed.

To exclude a tree record from quantity computations, highlight the desired tree record and then click on

the **Exclude/Include Tree** icon A. Excluded tree records are highlighted as gray rows. You may include an excluded tree record by clicking on the tree record and then clicking on the Exclude/Include Tree icon.

Please note: If the Exclude Tree icon is grayed out, this means that you have checked the option for "Disable the Exclude/Include toggles" found under the Cruise/Setup menu.

After a plot/point has been cruised, PC-Cruise will change the symbol of the cruised plot to be the 8th symbol in the CMT Default symbol library. This **cruised plot indicator** is displayed in the Map View. This helps you tell at a glance which points have been cruised.



3.9.1 Tree Data Entry Utilities

PC-Cruise provides some utilities for determining tree heights, whether a tree should be included in the sample or not, etc. These utilities are explained below:

Slope Correction Calculator - Use this function to help you convert a slope distance to a horizontal distance or vice versa. Start by entering the slope percentage and either the slope distance or the horizontal distance. The remaining field will be calculated automatically for you. This function will only apply to the currently highlighted tree record.

Leaning Tree Calculator - This function is used to determine the true height of a tree that is tilted or leaning. Enter the measured tree height as well as the horizontal distance (this is the distance from the base of the tree to the projected point of the tip of the tree on the ground). The true tree height will automatically be computed and displayed.

If you wish to use the computed tree height as the total height of the currently highlighted tree, check the "Apply True Height to the Ht of current tree" box before clicking on the Exit button. The computed tree height will be automatically entered into the Ht (total tree height) field for the highlighted tree record.

Limiting Distance Calculator - Use this tool to determine whether or not a questionable tree should be included as a sample tree for point sampling.

Enter the DBH (Diameter at Breast Height) for the tree in question. Also enter the measured distance and slope percent from the center of the stake to the face of the tree at DBH. The percent slope defaults to 0. Based on the BAF (Basal Area Factor) for the stand and the DBH measurement, this function will calculate the limiting horizontal distance and compare it with the horizontal distance obtained from the measured distance and slope. If the measured distance is equal or less than the limiting distance, the tree is "IN", i.e. it IS a sample tree. If the measured distance is greater than the limiting distance the tree is "OUT" and will not be sampled.

3.9.2 Summary reports

Plot/Point Volume

To see the summary of the tree quantities (volumes or weights) for the active plot, click on the **Plot/Point Volume** icon in the Tree Data View. This tool will display a text report of the tree quantities (volume and/or weight) computed for the plot or point cruised. The quantities are summarized by product types.

Use the **"Sample Expansion per Acre"** option to see the computed "per acre" figures. Please note that the pre acre figure for a plot is just that part of the plot's contribution to the per acre figure for the stand.

Select the **"Sample Expansion Total"** option to see the "blown-up" (expanded) total quantities or value for the stand or tract. Please note that the "expanded total" figure for a plot is just that part of the plot's contribution to the expanded total for the stand.

Stand Volume

To see the summary of the tree quantities (volumes or weights) for the entire stand, click on the Stand

Volume icon **1**. This tool will display a summary of the tree quantities (volume and/or weight) computed for the currently active stand cruised. The quantities are summarized by product types.

Select the "No Expansion" option to see the tree quantities or value for just the cruised sample trees.

Select the "Sample Expansion per Acre" option to see the computed "per acre" figures.

Select the **"Sample Expansion Total"** option to see the "blown-up" (expanded) total quantities or value for the stand.

Click on to go back to the Cruise Header screen to run final reports or tract volume reports. Cruise reports are discussed in the next section.

Tract Volume

To see the summary of the tree quantities (volume and/or weight) computed for the cruised tract, click on

the **Tract Volume** icon found in the Cruise Header toolbar. The quantities shown are summarized by product types.

Select the "No Expansion" option to see the tree quantities or value for just the cruised sample trees.

Select the "Sample Expansion per Acre" option to see the computed "per acre" figures.

Select the **"Sample Expansion Total"** option to see the "blown-up" (expanded) total quantities or value for the tract.

Please note: When you save the currently open *.fmp job, all cruise data will be saved along with the GPS data and map data.

Section 4 – Cruise Reports and Quantity Computation Methods

This section will discuss the reporting capabilities for your cruise as well as different methods for computing valuable weight or volume information.

4.1 Cruise Reports

From the Cruise Header screen, click on the icon to bring up the Cruise Report dialog. You may then select the report format and view or print the desired report. You may also request the program to save the volumes or weights as stand or tract attributes when it closes the Cruise Report dialog screen.

A sample report is shown:

Cruise Report						_	
Type: 2. Stand: #Trees, Quantities 1-2, Mean	is, Total By DBH,	Product and Spe	cies 🔽	🔽 Save Quantities a	as Attributes upo	on exit	
C No Expansion Sample Expansion F	Per Acre 🛛 O S	ample Expansion	n Total	Show error messa	ige		
				<u>S</u> aveAs <u>P</u>	int <u>E</u> >	kit <u>H</u> elp	
PC-Cruise	e Report (9	Sample Expa	ansion Per <i>i</i>	Acre)			-
T001MYCRU01 Owner:MB TREE FARM 500 MAKE BELIEVE LANE, , MB COUNTY, MB LOCATION	Cruiser:J	Stand JJ	l: #Trees, (Quantities 1 & By DBH, Pro	k 2, Means oduct and 05/	s, Total Species /05/2005	
Stand: S001MYCRU01 Method Type: Plot Description: NATURAL HARDWOOD	Cover Typ Plot Size D LOW DENSI	be: Natural e(Acres): 1 ITY 5 CHAIM	L L / 1 NS X 4 CHAII	Stand Type: Area(Acres): NS 10% CRUISH	100.00 E#Points:	10 10%	
Product Species	DBH (inches)	#Trees	Quantity1	Quantity2	Basal Area	Mean Mer.Ht	
Hardwood Sawtimber Sweet gum	14 16 18 20	4.1 10.8 8.7 0.2	CuFt 123.7 413.5 413.3 14.0	Tons 3.9 13.0 12.9 0.4	SqFt 4.4 15.1 15.4 0.4	Ft 38.4 38.0 37.8 48.0	
QuadMnDBH/MnHt/Subtotals	16.5	23.8	964.5	30.2	35.3	38.1	
Product Total	16.5	23.8	964.5	30.2	35.3	38.1	-

You may obtain a report on the cruise data and the computed quantities and/or values at the tree, stand or tract level. Select one of the available report formats to display the corresponding cruise report. Following are some of the available report formats:

List All Tree Data

Stand: #Trees, Quantity 1-2, Means, Total by DBH, Product and Species

- Stand: #Trees, Quantity 1 and Value, Total by Product and Species
- Stand: Quantity 1 Statistics
- Stand: Quantity 2 Statistics
- **Stand: Basal Area Statistics**
- **Stand: Value Statistics**
- Stand and Stock Table

Tract: #Trees, Quantity 1-2, Means, Total by DBH, Product and Species

Tract: #Trees, Quantity 1-2, Quantity and Value, Total by Product and Species

Tract: Quantity 1 Statistics

Tract: Quantity 2 Statistics

Tract: Basal Area Statistics

Tract: Value Statistics

Tract: Topwood Quantity 1 and Value, Total by Product and Species

For example, the "Stand: #Trees, Quantities 1-2, Means, Total by DBH, Products and Species" report will show the number of trees, the quantities computed using Method 1 and Method 2, as well as the mean basal area and mean merchantable height categorized by DBH class, product class and species for the stand.

When not cruising using the 100% tally method, statistics reports are shown on a per plot basis. Statistic report options include the Student's t value in terms of degree of freedom as well as confidence interval at the following intervals: 60%, 68%, 70%, 80%, 90%, 95% and 99%.

To constrain the width of the report, tree values will only be reported for the tree quantities computed using the "Method 1" computation method.

Stock Table

A **stock table** report format has been added to the PC-Cruise EX version to summarize the trees in terms of number of logs by DBH classes. The new report is available under the reports option as: "**Report #21** Tract: #Trees, Quantity 1 stock Table by DBH, Products and #Logs" as shown:

Cruise Report													
Type: 21. T	ract: #Trees, Qu ion	uantities 1 Stock ample Expansion	Table By DBH, Per Acre C	Product and ‡ Sample Expa	Logs 💌	IZ Sa I∏ SI	ave Quantities a: now error messaj	s Attributes up ge	on exit				
r						Sav	veAs <u>P</u> ri	nt <u>E</u> :	ait <u>H</u>	elp			
TOOLMYCEL	101	PC-Crui:	se Report	(Sample 1	Expansion 1 Tract: 0	Per Acre) s 1 Stock	Table					
Owner:MB	TREE FARM	ANF	Cruiser	:LL	By	DBH, Pro	oduct and	#Logs					
MB COUNTY	MB LOCA	TION		To	tal Sample	i Area(Ad	05/05 cres): 2 #Points	/2005 00.00 : 20					
Product(U DBH	Init) 1 Logs	1.5 Logs	2 Logs 2	.5 Logs	3 Logs 3	.5 Logs	4 Logs 4	.5 Logs	5 Logs	5.5 Logs	6 Logs	6+ Logs	Total
Hardwood 14 16 18 20 24	Sawtimber 14.36 32.05 0.00 0.00 0.00 0.00	(CuFt) 81.37 159.85 36.41 0.00 0.00	0.00 52.56 70.63 0.00 2.52	0.00 0.00 0.00 0.00 0.00 0.00	95.74 244.46 107.05 0.00 2.52								
Total	46.41	277.64	125.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	449.76
Hardwood 8 10 12 14 16	Pulpwood(0.00 0.00 0.00 0.00 0.00 0.00	Tons) 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	6.96 7.22 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	0.00 15.70 5.38 0.00 0.00	6.96 22.92 5.38 0.00 0.00						
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.18	0.00	21.08	35.26

For products that use the **Built-in Stem Profile** computation method, there is an option to report the pulpwood top portion of a grade tree, known as the **topwood**. If you wish to have the topwood computed and reported, you must use the Built-in Stem Profile method and record either the total height Ht or the height measured to a 4-inch, 7-inch (softwood) or 9-inch (hardwood) top diameter.

When you select the report named "Tract: Topwood Quantity 1 and Value, Total by Product and Species", you may choose how the topwood will be computed:

- A) Compute topwood to total height. In this case, you must record the total tree height.
- B) Compute topwood to pulpwood height.

In this case, you must also specify the pulpwood top diameter in the "Edit Product Lists" screen.

Please note: If you cruise to the height Hx corresponding to the 7- or 9-inch top diameter Dx, then the program will only compute topwood to a top diameter of 4 inches.

The topwood quantity and value will only be reported for those trees using the Built-in Stem-Profile as the "Method 1" computation method. You may specify the topwood unit value when you select the built-in computation method.

Select the **"No Expansion"** option to see the tree quantities or value for just the cruised sample trees. This option is not available for tract statistics when any stand in the cruise is performed using the method: "100% Tally".

Select the "Sample Expansion per Acre" option to see the computed "per acre" figures.

Select the **"Sample Expansion Total"** option to see the "blown-up" (expanded) total quantities or value for the stand or tract.

If the cruise data was entered for a Tract feature in the currently active job map, you may save the reported tree volumes or weights as additional feature attributes for the tract and the stands within that tract. To do so, mark the "**Save Quantities as attributes upon exit**" checkbox before closing the Cruise Report dialog.

Please Note: PC-Cruise will report the tree quantity for each tree in the unit that is appropriate for the quantity computation method. It will be able to summarize the quantities for each Product Class, for each Stand and for the entire Tract provided that the same unit is used for reporting the tree quantities. If within a stand, some volumes are reported board feet and others are reported in cubic feet, then the total stand volume will be reported as "N/A".

Similarly, the "Save the quantities as attributes upon exit" function will only work when the entire cruise uses the same unit for reporting tree quantities.

The **PC-Cruise EX** version will permit the use of different reporting units for different products within the same stand. Quantities are summarized and totaled for each reporting unit. An example is shown:

Stand: S002MYCRU01 Method Type: Point Description: NATURAL HARDWOOD	Cover Type: Natural BAF: 20.00 MEDIUM DENSITY SIMPLE POINT					
Product Species	DBH (inches)	#Trees	Quantity1			
Hardwood Sawtimber White Oak	14 16 18	9.4 17.2 5.7	CuFt 191.5 488.9 214.1			
QuadMnDBH/MnHt/Subtotals	15.8	32.2	894.5			
Product Total	15.8	32.2	894.5			
Hardwood Pulpwood White Oak	8 10 12	17.2 33.0 5.1	Tons 13.9 45.8 10.8			
QuadMnDBH/MnHt/Subtotals	9.6	55.3	70.5			
Product Total	9.6	55.3	70.5			
Stand Total		87.5	CuFt 894.5 Tons 70.5			

Mark the **"Show error messages"** checkbox to display any error messages, such as "This tree has been excluded." or "This stand has been excluded."

To save the report as a **text** file or a **.xls** file, click the **SaveAs** button then enter the target file name in the Save As dialog window.

Click on the **Print** button to send the report to your printer. If the report is wider than the paper size, the program will notify you. You may click **YES** to continue, and then click the Properties button in the **Print dialog** to switch to a landscape layout to continue printing.

To close the Cruise Report window, click on **Exit** or the "Close" (x) button. If the "**Save Quantities as** attributes upon exit" checkbox is marked and the cruise data was entered for a Tract feature in the currently active job map, the reported tree quantities will be added as feature attributes for the Tract and Stand topics (provided that all quantities are reported in the same units).

CE Cruise Field Software



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5.1 Hardware and Software Requirements

To operate CE Cruise, you will need the following:

- a) Windows CE Pocket PC PDA mobile device running Pocket PC 2002 or later.
- b) A minimum of 64 Megabytes of RAM (128 MB or more recommended).
- c) At least 1 Megabyte of free program storage space on your Windows CE device is required.

5.2 Installing CE Cruise on your Mobile Device

Before installing CE Cruise, please do the following:

- 1. Uninstall any previously installed CE Cruise software from your Mobile Device by deleting the 'cmtapp' folder found under the 'Program Files' folder on your Mobile Device.
- 2. Make sure that no other applications are open on your PC and your Mobile Device.

To install CE Cruise on your Mobile Device, please follow these steps:

- 1. Insert the installation CD-ROM into your CD-ROM drive. This CD-ROM contains the following software:
 - a) Microsoft Active Sync 3.x this software is used for communication between CE Cruise and your PC. You may already have this software installed on your PC if you already own and have been using your Mobile Device.
 - b) CMT CE Cruise this is the installation file for the CE Cruise software to go on your Mobile Device.
- Upon inserting the installation CD-ROM in your PC, the installation should automatically start. If it does not, click Start and then click the Run option. In the Run dialog box, enter the appropriate CD-ROM drive designation and "AUTORUN" in the "Command line:" or "Open:" field and click on the OK button. (Example: D:\CECRUISE\AUTORUN).
- 3. If Microsoft Active Sync is not already installed on your PC, please click on the "Install Microsoft Active Sync 3.x" button. This will initiate the installation program. Please follow the installation instructions on the PC. If Microsoft Active Sync is already installed on your PC, please go to the next step.
- 4. To install CE Cruise: click on the "Install CE Cruise" button. This will start the installation for the CE Cruise software. Follow the installation instructions on your PC to complete the installation.

5.3 Starting CE Cruise on your Mobile Device

After CE Cruise has been installed, CE Cruise is ready to use. On your Mobile Device, click on the Start button and then locate the CE Cruise icon shown:

Click on the CE Cruise icon. Immediately, the following screen will be displayed:



The next section will discuss the basic tools and fundamentals of the CE Cruise software.

Section 6 – CE Cruise Fundamentals

This section presents basic terminology and concepts of CE Cruise. Please carefully read this chapter to fully understand the basic fundamentals of CE Cruise.

6.1 The Cruise Header

In CE Cruise, the beginning of your tree data entry starts with the Cruise Header. If you have already set up your cruising job in PC-Cruise and then transferred it to the CE Cruise, the Cruise Header should already be completed for you. To turn on the Cruise Header, click on the Tree Data icon found directly

above the Map View area

After clicking on the Tree Data icon, the Cruise Header is displayed:

2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Land Owner(s): James Smith
Addr: 413 SW Jefferson Ave.
City: Corvallis State:
Location
Cnty: Benton
Sect: S19 Twnshp: T9N
Range: R6E
Tract ID: T001test01 220.0441 Acre
Desc: Multiple use land parcel
Cruiser: Will Date: 5/5/05 🔻
Tract Stands
OFF
<i>ß</i> CE Cruise 🔤 🗕 📢 9:37 😣

Please note: The Cruise Header screen will be displayed when you first access the Tree Data icon after starting CE Cruise. If you have already been entering tree data in CE Cruise and go the Map View screen and then come back to enter more tree data. CE Cruise will remember the last used screen and display it for you.

This page displays the header information for the currently active cruise. Clicking on the Stands tab at the bottom of the screen will lists any existing tree stand data records for the cruised tract. If the cruise data is entered for stands in the Map View, then selecting a stand record will highlight the corresponding stand shape in the Map View.

Land Owner(s): Enter the name of the landowner or owners in this field. Also enter the address information for the tract, if desired.

Location: To further define the location of the cruise, choose from one of three methods to identify the location:

- a) Section/Township/Range Enter the county where the land resides as well as the section, township and range information.
- b) Lot/District Choose this option to specify the county, tax lot and district for the land.
- c) Location If the above methods are not known or not needed, choose this option to simply enter the county for the land as well as a brief description of the land location.

Tract ID: Click on the pull-down menu to select from the list of available tracts found in the job. Once the tract is specified and a stand is added, the Tract ID cannot be changed and will be grayed out (until all stands are deleted). For simplicity, CE Cruise will only store one cruising job per tract per file. If your map contains more than one tract and you wish to collect cruise data for the other tracts, you will need to open the job under a different name and then specify the other Tract to store cruise data.

The tract ID that gets specified in this step is called the **working tract** and is highlighted in the Map View for easy identification.

Please note: If the "Match cruise data with tract/stand data" checkbox under Menu/Setup/Cruise Setup

(or click on the is icon) is checked, then you may only work with a tract that exists in the currently open *.fmp job. In this case, the Tract ID field will contain a pull-down list of existing tracts from which you may select. If you do not select from the list but enter any odd Tract ID, the program will not permit you to add a stand record to this cruise. If you do not care about matching the cruise data with the map data, then uncheck the "Match cruise data with tract/stand data" checkbox under Menu/Setup/Cruise Setup (or by clicking on the is icon).

Also note: When you save the currently open *.pmp job, all cruise data will be saved along with the GPS job data.

Tract Area: This field will automatically be filled in for you based on the Tract ID specified. CE Cruise allows you to change the number listed in this field to run reports based on different tract acreages. Changing the value here will NOT change the actual tract acreage in the Map View. It is recommended that you do not change the value in this field unless necessary for computing tree weights/volumes.

Description: Type in a textual description of the cruise for easier identification (maximum is 128 characters) of the cruise data.

Cruiser: Type in the cruiser name or initials (maximum is 30 characters). This identifier is useful when combining cruises for the same tract from different files.

Cruise Date: Specify the date of the cruise. For new cruise jobs, the current date will be selected by default. Once the date has been specified and saved for a specific job, it will be retained.

Please note: When you save the currently open *.fmp job, all cruise data will be saved along with the GPS data and map data.

6.2 CE Cruise Tools found on the Cruise Header

Once you have clicked on the Tree Data icon, you will see some of the CE Cruise tools at the top of the window. The main CE Cruise tools are displayed below. They are explained in the following sections.

These icons provide quick access to CE Cruise functions. Tool Bar functions can be activated by clicking the mouse once on an active icon. Functions that are inactive have icons that appear dull and gray. Simply click on an active icon to access the associated CE Cruise function.

A brief description of each icon's function is displayed below:

Quantity Report Summary for Tract or Stand
Setup Screen
💽 Cruise View
🔯 Map View

6.3 Summary of Steps for Cruise Data Collection

The following section describes an overview for data collection in CE Cruise. Detailed descriptions for each step will follow in subsequent sections. Here is a general outline for use of the CE Cruise software for tree inventory data collection:

- 1. **Complete the Cruise Header.** Specify the **Working Tract** for the Cruise Job and complete the **Cruise Header** information for further identification of the cruise job and landowner information.
- 2. Specify the **Working Stands** to be included in the cruise and also specify the **cruise method** to be used for a particular stand: 100%, Plot, Point, Double Point.
- 3. Associate the cruising grid point with the desired plot within the Working Stand and assign an index number for the plot/point (the index will be automatically filled in and incremented for you). Add description, and other special instructions such as: No Tally or Ignore Tally. The plot/point coordinates are shown for you and may be used for navigation as well as updated in real-time using your GPS receiver.
- 4. **Enter tree data** for the current plot/point. Continue appending trees for the sample area until complete. Use the GPS to guide you to your next plot/point and then enter tree data again.
- 5. Run summary reports in CE Cruise for trees, points/plots, stands and/or tracts. Alternatively, download cruise data to the PC and get detailed reports by **calculating weights and volumes** for individual trees, stands and/or tracts.
- 6. Combine cruises or prepare and print out weight/volume reports in PC-Cruise.

6.3.1 Generating the Cruise Map for the Cruising Session

For generating the cruise map, you can use your existing data that covers your area in question. For example, you can use your existing map containing **Tracts and Stands**. Also, CE Cruise can be used to digitize your tracts and stands from scratch for the timber cruise area using an aerial photo or other background data as a guide. When digitizing new tract or stand data it is important to create these new area features in their respective topics (i.e. new tracts get put in the Tracts topic and new stands get put in the Stands topic).

6.3.2 Specifying the Tract and Entering Header Information

Turn on the Cruise Header and select the **Working Tract** from the pull-down menu of available tracts. Complete the header information used for the timber cruise and the specified tract. The cruising data will be specific to the selected tract. A separate file must be used to store cruise data found in a different tract.

6.3.3 Selecting the Merchandising Classes and Computation Methods

This process requires the use of PC-Cruise. For instructions on detailed preparation of the merchandising classes and computation methods, please refer to Section 2.5.2.

6.3.4 Adding Stands and Choosing Cruise Type

- 1. Once the tract has been specified and your desired products and species have all been classified in the product table, you are now ready to add stands that are found within the tract (or overlap its boundary) to the list to be included in the timber cruise.
- 2. After clicking on the **Stands** tab at the bottom of the window ______, you are presented with the Stands page, which lists any existing stand records. If no Stands are listed, click on the **Add**

Stand button to pick a stand on the **Stand Info** screen. Choose a stand from the pull-down menu (only those stands that fall within the working Tract or overlap the working Tract will be available for selection if the "Match Cruise data with tract/stand data" is checked). Select the StandID from the list that you wish to use. This is called the **Working Stand.** The working stand

will be highlighted in the Cruise View and can be viewed by clicking on the 🔯 icon. To edit an

existing stand or to view the information for an existing stand, click on the Stand Info icon

- Choose Cover type and Stand Type (optional). The Stand Area will automatically be shown for you. Specify the Stand Age if desired and then choose from the available Cruise types: 100%, Plot, Point, or Point Count / Measure by Plot (DOUBLE POINT).
- 4. Depending on the Cruise Type specified, enter any remaining data parameters. Specify the **default species and products** for the stand by clicking on the **Sp/Product tab** at the bottom of the screen. It is recommended to choose those species or products that will be used most often as the default.
- 5. Proceed to the Tree View screen by clicking on the Tree Data button 📤.

6.3.5 Adding Plots/Points and Associating Grid Points

1. Once at the Tree View screen, you can click on the **Add Plot** icon to add a Plot/Point to the selected stand and call up the Plot Info dialog. If there are existing plots/points entered for the

working Stand, then click on the **Plot/Point Info** icon to call up the Plot Info dialog. The Plot Info dialog is used to specify the Plot/Point Index number. The Plot /Point ID is automatically started at 1 and will increment by one for you as you add additional plots/points. You can also manually number the plots/points.

- 2. In the Plot Info screen, the **Plot/Point ID** field allows you to pick from the map view a Grid Point created from the Cruising Grid function in PC-Cruise. The association of the plot/point to a grid point in the Map View is not required, but is beneficial to visually see the location of the plot. Additionally, if you use GPS while timber cruising, the GPS can be used to guide you to the specified plot/point center to start sampling in the correct location.
- An optional description can be entered for the plot and you can also choose to "Ignore Tally" for the plot or choose "No Tally" for the plot. These options are discussed in greater detail in later sections.
- 4. To exclude a plot/point from being included in any quantity computations, click on the **Exclude/Include Plot** icon in the Tree View screen.

6.3.6 Entering Tree Data

- 1. In the Tree View screen, click on the **Append Tree** icon **and** to add a tree to the sample plot/point and begin specifying the tree species, product information and tree measurement fields.
- 2. Fill in the remaining fields that you have specified to be included in the tree data collection.

6.4 Cruise Defaults Setup Screen

To access both the local and global default settings menu for CE Cruise, select Menu/Setup/Cruise

Setup. Alternatively, click on the Setup icon icon found in the Cruise Header window or the Stands window. The following dialog is displayed:

Cruise Setup	✓?
Working Tract	
Working Stand	
Working Point/Ple	ot 🗙
Match cruise data	a with tract/stand data de/Include toggles.
Global Local	
OFF	
🎊 CE Cruise	📢 11:32 🚫

Global Settings

Use the **Global Setup** tab to enter or edit the default settings for all timber cruising jobs.

Working Tract/ Working Stand/ Working Point/Plot: Click on one of the three buttons to change the pattern/symbol and color of the working item for easy identification in the Cruise View.

Match cruise data with tract/stand data: This important setting determines whether or not you will be forced to choose from existing tracts and stands in your map or whether you can simply enter tree data without having any existing tracts or stands. By default, this option is turned ON which means that you must have and choose from available tracts in the Map View for your cruise. When this option is on, only stands that fall inside or overlap the working tract are acceptable choices for entering cruise data.

Additionally, the program will check to make sure that the Tract ID, Stand IDs and Grid Point IDs that you enter in Cruise View correspond to the actual tract, stands and grid points in Map View.

When this option is turned OFF, you are not forced to choose one of the areas in the tracts topic for the Tract ID (any area or no area are acceptable choices). Additionally, for stands, you may type in the FeatureID for any existing area in the Map View or choose a stand for entering Cruise data.

When you want to enter some cruise data simply to check numbers, volumes and weights without actually cruising the tract and stand, make sure this option is turned OFF and you will have the greatest flexibility about what you enter for your working tract or stand.

When actually performing a timber cruise on a tract and stand, it is highly recommended that you have this option turned ON and that you choose from existing tracts and stands in your map.

Disable the Exclude/Include toggles: Leave this option unchecked if you with to be able to exclude some cruised data from quantity computations. When this option is checked, you will not be able to exclude stands, plots or trees from quantity computations and all data will be included in the report summary.

Click on the **V** icon to accept your settings and close the dialog window.

Local Settings

Use the **Local Setup** tab to enter or edit the default settings for the current timber cruising job. If the settings for the job were "locked" in the PC-Cruise EX setup before the job was transferred over, then you may not make changes to the local settings.

Cruise Setup	✓ × ?
Repetitions(Reps) Merch. Height(Hm) Top Dia. (Dx) FC Description	 Total Height(Ht) #Logs/Sticks %Defect Age
Report Cubic Unit:	CuFt 👻
Report LogRule Unit:	Board Ft 🛛 👻
Report Weight Unit:	Tons 👻
Working Topics: Tract	s Stands
ACQ	
🏂 CE Cruise	4 € 9:19 🛞

Tree Measurement Fields: Select the fields to include in the data entry form for the active job. Make sure that the selection of the data fields are compatible with the tree quantity computation methods used. These options are discussed in greater detail in the next section.

You can also specify the units of measurement for your various quantity summary reports in the Local Cruise Setup screen. There are three different quantity types for which you can specify the units:

- a) Log Rule Choose from the pull-down menu the available unit types: Board Ft or MBF (Thousand Board Feet).
- b) **Cubic Volume** Choose from the pull-down menu the available unit types: CuFt (Cubic Feet), Cord or CuYard (Cubic Yards).
- c) Weight Choose from the pull-down menu the available unit types: Tons or Lbs (pounds).

The working tract and stand topic names for the active job are also displayed on this page.

CE Cruise EX provides a "**Privilege**" button to let you set up a password to protect your cruise settings. When password protection is active, you may change the cruise settings only after entering the correct password, in which case the "**Privileged User**" checkbox will be marked. You may not be a privileged user if the job has been locked by the privilege setup in **PC-Cruise EX**.

These settings apply to only the open cruise job.

Click on the **V** icon to accept your settings and close the dialog window.

Section 7 – Inventory/Data Collection

This section describes and specifies the requirements for entering tree data into CE Cruise. This section will discuss two major parts of the data collection in CE Cruise:

- Cruise Header Information
- Entering Tree Inventory Data

Before clicking on the Measure Trees icon in CE Cruise to start collecting tree inventory data, choose Menu/Current Job in CE Cruise to select the .PMP file you created in PC-Cruise and then exported and sent over to your Mobile Device. It is possible to collect tree inventory data in CE Cruise by starting a new, blank job and copying a cruise template from another existing job. However, it is recommended that you establish the job in PC-Cruise first and then transfer it to the PDA so you have the correct product codes and merchandising classes specified for the job. Only copy the cruise template over to a different job if you are using the same species and products configuration. Otherwise, create a new template.

7.1 Filling in the Cruise Header

In CE Cruise, click on the Measure Trees icon *to enter the Cruising data collection screens.* The Cruise Header is displayed:

29 20 🔺 🛛 • 🖫 😟 🕺 ?
Land Owner(s): James Smith
Addr: 413 SW Jefferson Ave.
City: Corvallis State:
Location
Cnty: Benton
Sect: S19 Twnshp: T9N
Range: R6E
Tract ID: T001test01
Desc: Multiple use land parcel
Cruiser: Will Date: 5/5/05 -
Tract Stands
OFF
🎊 CE Cruise 🛛 🔺 📢 9:37 🛞

This page displays the header information for the currently active cruise. If using a job created in PC-Cruise, then this information should already be filled in. If starting a new job, complete the fields. Information for each field is described as follows:

Land Owner(s): Enter the name of the landowner or owners in this field. Also enter the address information for the tract, if desired.

Location: To further define the location of the cruise complete the requested information. One of the following three methods to identify the location will be displayed (depending on which option was selected in the PC-Cruise software):

a) Section/Township/Range – Enter the county where the land resides as well as the section, township and range information. This option is shown by default if starting a new job in CE Cruise.

- b) Lot/District Choose this option to specify the county, tax lot and district for the land.
- c) Location If the above methods are not known or not needed, choose this option to simply enter the county for the land as well as a brief description of the land location.

Tract ID: Click on the pull-down menu to select from the list of available tracts found in the job. Once the tract is specified and a stand is added, the Tract ID cannot be changed and will be grayed out (until all stands are deleted). For simplicity, CE Cruise will only store one cruising job per tract per file. If your map contains more than one tract and you wish to collect cruise data for the other tracts, you will need to open the job under a different name and then specify the other Tract to store cruise data.

The tract ID that gets specified in this step is called the working tract and is highlighted in the Cruise

View for easy identification. Click on the Cruise View icon 😟 to view the working tract.

Please note: If the "Match cruise data with tract/stand data" checkbox under Cruise/Default Setup is checked, then you may only work with a tract that exists in the currently open *.PMP job. In this case, the Tract ID field will contain a pull-down list of existing tracts from which you may select. If you do not select from the list but enter any odd Tract ID, the program will not permit you to add a stand record to this cruise. If you do not care about matching the cruise data with the map data, then uncheck the "Match cruise data with tract/stand data" checkbox under Cruise/Default Setup.

Also note: CE Cruise will only store one cruise job per PMP file.

Tract Area: This field will automatically be filled in for you based on the Tract ID specified. CE Cruise allows you to change the number listed in this field to run reports based on different tract acreages. Changing the value here will NOT change the actual tract acreage in the Map View. It is recommended that you do not change the value in this field unless necessary for computing tree weights/volumes.

Description: Type in a textual description of the cruise for easier identification (maximum is 128 characters) of the cruise data.

Cruiser: Type in the cruiser name or initials (maximum is 30 characters). This identifier is useful when combining cruises for the same tract from different files.

Cruise Date: Specify the date of the cruise. For new cruise jobs, the current date will be selected by default. Once the date has been specified and saved for a specific job, it will be retained.

Please note: When you save the currently open *.PMP job, all cruise data will automatically be saved along with the GPS data and map data.

7.2 Stand Data

Once the tract information has been defined using the Cruise Header, you are ready to pick a stand to be

cruised and define the cruise method. Click on the **Stand** tab ______ at the bottom of the window to call up the Stands screen:

U	🔻 👯 🏉 🖉	🕺 🔺 💆	💥 ?
	ID	Stand Type	Metho
1	S005test201		Point
2	S003test201	Cypress	Plot
3	SOO1PCGPSO1		Plot
4	S004test201	2233	Plot
1	m t Standa		Þ
		1	6
27	CE Cruise	≝ ^ 	59 😵

Any existing stand records are listed on this page. To access an existing stand and change the associated data, double-click on the row containing the stand or highlight the desired stand and then click

on the **Stand Info** icon e (or double-click on the desired stand). The Stand Information screen is displayed for the selected stand:

Stand Info	🔺 😳 🗸 🗙 ?
Stand ID:	5001MYCRU01 -
Cover Type:	Natural 👻
Stand Type:	NHL
Area: 100.003	Acre Age: 30
Method: Plot Size: 1/	Plot
Desc: NATURAL DENSITY	HARDWOOD LOW 5 CHAINS X 4 CHAINS
Property Sp/Pro	oduct
OFF	
🎊 CE Cruise	🔤 📥 🛛 📢 4:39 😣

To add a stand to the list, click on the **Add Stand** icon . The Stand Info screen is displayed:

Stand Info	🌲 🔁 🗸	∕ <mark>X</mark> ?
Stand ID:		•
Cover Type:		-
Stand Type:		
Area: 0.0000	Acre Age:	
Method: Plot Size: 1/	Acre	•
Desc:		
Property Sp/Pro	duct	
OFF		
🎊 CE Cruise	🔤 🔺 🔫 t	10:04 😣

Use the Stand Info dialog to pick or specify the stand to be cruised using the **Stand ID** field. The Stand ID that gets specified in this step is called the **working stand** and is highlighted in the Cruise View if for easy identification.

Please note: If the "Match cruise data with tract/stand data" checkbox under Cruise/Default Setup is marked, then you may only select a stand that exists in the currently open *.fmp job. Otherwise, you may enter any Stand ID.

Select the appropriate **Cover Type** for the stand (available options are Planted or Natural) and also enter the appropriate information for Stand Type.

If the selected stand exists in the Map View, then its acreage will be automatically entered into the **Stand Area** field. Otherwise, you may enter the acreage yourself.

Optionally, enter the average age of the trees into the Stand Age field.

Select the appropriate Cruise Method to be used for the stand. The available options are:

- **100%** With the "100% Cruise" method, every tree in the stand is tallied and tree samples are selected for measurement without bias.
- **Plot** For the "Fixed Plot" area-sampling method, you would specify the appropriate sample plot size for the cruise, for example: 1/5 acre. Each tree within each plot boundary will be measured as a sample tree.
- **Point** With "Simple Point Sampling", you would specify the appropriate BAF (Basal Area Factor) as the sample selection criterion. All point-sampled trees on all points are measured.
- Double Point This method is a ratio double sampling method. Like the simple point sampling method, it uses the BAF as the criterion for selecting the sample trees. The difference is that sample trees are counted at all points but tree measurements are only taken on some proportion of the points.
- **CE-Cruise EX** also provides a **Double Point by Tree** method. With this method, sample trees are counted at all points and at each point some sample trees are measured.

Optionally, enter a description into the **Description** field (maximum 128 characters).

Setting the default Species/Products

To speed up the tree data entry process, click on the Sp/Product tab at the bottom of the Stand Info screen to define a default species and a default product for the stand using the **Select** button. The default species and product are automatically displayed whenever you add a new tree record. Choose **None** if no default species is desired.

Choose M to save changes or click K to abort saving changes and return to the Stands screen.

Click on the **Trees** icon to proceed to the Tree Data View for adding points/plots and adding tree data.

7.3 Trees View

The Trees View is where you can add or exclude points/plots as well as trees. The Trees View is shown:

▓▓▓ ፼∙▓∙ ₴ ※?						
Plot: 1 🗸 🛧 💌 🤓 🛒 %						
537	Tree#	Sp	Prod	Rep	DBH(In)	Hn
1	1	2	5	1	14.0	=
2	2	1	5	3	16.0	
3	3	1	5	8	14.0	
4	4	1	7	6	6.0	
5	5	1	7	11	8.0	•
< III >						
Stand ID: S001MYCRU01 L/S Len: 16.00 StmpHt: 0.5 MerTDia: 10 Vol: 19.73 CuFt Vol2: 0.67 Tons						
Trees Detail Multi-Product						
OFF						
<i>ह</i> CE Cruise 🛛 📢 4:30 😣						

The Trees View shows the tree data records for the cruising plot/point you are working on. It also displays the Stand ID of the currently active tree stand, which is also highlighted in the Cruise View for easy visual identification.

The **Plot/Point** field contains a pull-down list of index numbers for the fixed-area plots or point-sampling points in the currently active stand. To work with an existing plot or point, simply select its index number from this pull-down list or use the Up and Down arrows to scroll through each plot/point.

7.3.1 Creating a new Plot/Point

To create a new plot/point in the Trees View, click on the **Add Plot/Point** icon ¹⁹⁹⁰ to add a new plot to the working Stand. The Plot/Point Information dialog is displayed:

Plot Info 🛛 💆 🖌 🎗 ?
Stand ID: S004test201
Method: Plot
Plot Size: 1/5 Acres
Plot/Point Index:
Property Location
OFF
🏂 CE Cruise 🔢 🔺 📢 9:17 🗙

Use this dialog to assign a Plot/Point Index number to the plot/point to be cruised. The Plot/Point index number will be automatically incremented for each new plot added. Duplicate plot numbers are not allowed.

Add a description if desired to help describe the plot/point location (128 characters maximum).

Put a check in the **No Tally** checkbox if you want the cruise data for this plot to not be included in the tree quantity computation. Even with this option checked, the plot still counts as a valid plot. It would be as if this plot had no trees in it.

If you want the plot to be completely ignored, then check the **Ignore Tally** box. In this case, the plot does not count as a plot in this stand; it would be as if this plot did not exist at all.

Plot/Point Location

By default, the coordinates shown for the plot location are those of the center of the currently active job. You may tie the cruise data for the plot/point with the actual grid point at the plot center. To do so, click on the "**Pick**" button and use the cross-hairs pointer to select the appropriate grid point in the Map View. The selected grid point will be displayed in the **Plot/Point ID** field. If the "**Match cruise data with tract/stand data**" checkbox under Cruise/Default Setup is marked, then you may only select a point that lies within the boundary of the stand containing the plot you are working with. It is up to you to select the correct grid point to represent the cruised plot in the Map View.

Click on the Location tab at the bottom of the screen to go to the location page. The Location page is shown:

Plot Info	🤨 🗸 🗙 ?
Stand ID: SO	04test201
Method: Plot	
Plot Size: 1/5	Acres
Plot/Point Ind	ex:1 ID:
Lat:	44°33'47.532"N
Lon:	123°15'47.282"W
MSL:	212.32
	Store Position
Property Loca	ation

Information for the Stand ID and cruise method (and plot size if cruise method is plot) are shown along with the index ID and the current position.

You may record the position of the plot center by connecting a compatible GPS receiver to your PC. If you wish to use this position to update the coordinates of a grid point, specify its Feature ID in the Plot/Point ID field then click the **"Store Position"** button. If you wish to store the GPS position as a new point feature, then enter the new Feature ID and click the **"Store Position"** button. You will then specify the appropriate Topic Name in the **"Store GPS Position"** dialog. To start recording the GPS position, enter the desired session length in seconds then click the **"Start"** button.

Sto	re GPS	Position	า	\checkmark	Χ?
[⁵	Session itoring In Sessi	: 20 formation on:		Start	
N	1	2	3	0	
돌	4	5	6		₽
W	7	8	9	_	+ →

You can then choose to view the position in relation to your map in the Cruise View by clicking on the 题
icon, or you can accept the position and return to the Trees screen by clicking on the 🗹 icon. Click on
the 🔀 icon to reject the position and return to the Trees screen.

7.3.2 Editing an Existing Plot/Point

To edit an existing plot/point, first select the plot/point from the "Point:" pull-down menu or use the **Up** and **Down** arrow buttons to find the correct plot/point number. To get information about the Plot/Point, click on

the **Plot Info** icon to call up the Plot Info screen. See Section 7.3.1 for an explanation of the items found on this dialog.

7.3.3 Excluding a Plot/Point

To exclude the currently active plot/point from any quantity calculations or report summaries, highlight the

desired plot/point and click on the **Exclude/Include Plot** icon . The tree data for the plot will be hidden from view and a message at the bottom of the trees screen will indicate that this plot has been excluded. Click on the **Exclude/Include Plot** icon again to include the plot/point again.

7.4 Entering Tree Data for a Plot/Point

Once you have established the plot/point information and location (if desired), you are now ready to start collecting tree data.

1. To add a new tree record to the current plot/point, click on the Append Tree icon

Before entering any tree data, double-check to make sure that the correct data collection fields have been selected for the tree species tallied. You can check by calling up the **Local Cruise Setup** dialog

by first clicking on the **Return to Stands** discored is a stand of the stand of the

the Setup icon . In this dialog, you can specify which tree data entry fields are to be displayed in the Tree View (see Section 6.4). Mark the measurement data fields required by the quantity computation methods that will be used for the cruise. From the Stands screen, click on the Edit Trees

icon 🛃 to get back to the Tree Data View if you went out to check your data entry fields.

2. After clicking on the **Append Tree** icon, a new tree is added to the plot/point and the Tree Detail Information dialog is displayed:

▓▓▓ @ヽ▙▖▟ ॖख़ऄ?					
Plot#: 1					
Tree#		1			
Sp	2 - White Oak	•			
Prod	5 - Hardwood Sawtimbe	•			
Rep	1 🔻				
DBH(In)	14.0 🔻				
Hm(Ft)	24.0 🗸				
#Logs/Sticks	1.5 🗸				
Desc					
L/S Len: 16.00 StmpHt: 0.5 MerTDia: 10 Vol: 19.73 CuFt Vol2: 0.67 Tons					
Trees Detail Multi-Product					
OFF		5.0			
🎊 CE Cruise	12 ▲ 4:31	×			

The Tree # automatically starts at 1 and increments by one each time you click on the **Append Tree** icon.

To duplicate the currently highlighted tree record, click on the **Duplicate Tree Record** tool icon **2**. A new record will be appended for the same tree species/product class, ready for you to enter the tree dimensions.

 Select the Species/Species Code from the pull-down menu of available options. Once the species/species code has been selected, then the remaining data fields will appear allowing you to fill them in. Selecting the correct species and product class for each tree is as important as entering the tree measurements accurately.

The **Product/Product Code** field will list only those products that you have defined for the selected species.

4. Repetitions (Rep)

To record trees that are basically the same in species, product class, size, form and age, instead of entering multiple records with identical data values, you may enter the data once and then enter the number of repetitions in the **Rep** data column.

- 5. Enter the appropriate **form class** value into the **FC** field if the computation method used calls for this piece of information. If you do not activate the **FC** field for such computation methods, then the quantity will be computed using the default form class specified in the Edit Product List in PC-Cruise.
- 6. Enter the diameter at breast height (4.5 feet above ground) into the DBH field. Also, enter the total tree height into the Ht field if it is required by the computation method used for the tree. The Hm field is for entering the merchantable height as one measured length, such as "40" (Ft).

Alternatively, you may enter the merchantable portion of the tree in terms of the **number of logs or sticks** of the tree product. For example, you could enter "2.5" logs into the **#Logs/Sticks** field. The length of the log or stick is established in PC-Cruise in the Edit Product List screen.

The **Hm** and **#Logs/Sticks** fields are related to each other. When you enter data into one of these two fields, the data in the other field will be automatically recalculated.

Some of the built-in tree quantity computation methods make use of the tree height measured to a 4 inch, 7 inch or 9 inch **top diameter**. To enter tree height to a 4 inch, 7 inch or 9 inch top diameter, make sure **Dx** is selected as one of the tree measurement data fields. Select 0, 4, 7, or 9 from the drop-down list for **Dx**. The tree height in the **Hx** field will then be interpreted as the height measured to that top diameter.

If a Built-in Stem Profile equation is used and the Hm entered is not compatible with the Ht, the program will alert you to that effect. You may accept the Hm proposed by the stem profile mode. If the tree is actually better than predicted by the model, you could adjust the total tree height **Ht** so the predicted Hm agrees with what you see. In this case, the computed topwood may be overstated.

- If the Age and %Defect fields are used, then enter the appropriate information for the tree. The %Defect option will take a deduction from the computed tree quantity. Use this field to enter the estimated defect percentage.
- 8. Click on the **Description** tab at the bottom of the screen to enter a description for the entered tree data if desired (maximum 128 characters).

The major differences in data entry for the various cruise methods are described below:

Data Entry for the 100% Cruise Method

- Tally every tree in the stand.
- If the tree is to be measured, select "M" in the "C/M" data column then enter the tree measurements.

• If the tree is only counted but not measured, then select "C" in the "C/M" data column. In this case, you will not be able to enter data into the tree measurement data fields.

Data Entry for the Fixed Plot Method

Ener the tree measurements for every tree within the boundary of each plot in the stand.

Data Entry for the Simple Point Sampling Method

At each point, enter the tree measurements for each sample tree that meets the BAF (Basal Area Factor) selection criterion for the stand.

Data Entry for the Double Point (by Point) Sampling Method

With the Double Point sampling method, you do not need to measure the trees at all of the points in the stand. Instead, you will specify the Point M/C Ratio for the stand. This is the ratio of the measured points to the counted points. Suppose this ratio is "1 : 3". This means that all the tree records for this first point will automatically be designated with the "M" (Measure) status in the "C/M" (Count or Measure) data column. This means you are supposed to measure all sample trees at this point.

The tree records for the next two points will automatically show the "C" (Count) status in the "C/M" (Count or Measure) data column. You will not enter the tree measurements for these trees. When you add the fourth point, you will again be required to enter the measurements for all trees, and so on.

Caution: You are permitted to change a measured point (volume point) to a counted point (count point) by selecting the "C" status for any of its tree records. However, doing so will change the status for all the tree records and erase all the measurement data that you have entered for this point. Switching back to the "M" status will NOT recover the erased tree data.

CE-Cruise EX will display the number of measured trees to counted trees for each species at each point.

Data Entry for the Double Point (by Tree) Sampling Method

With the **Dbl Point By Tree** method, all trees are counted at each point and only a portion of the trees at each point are measured for volume.

For this method, you may specify a "**Tree M/C Ratio**" (ratio of volume trees to count trees) in the Stand Information dialog. If you wish to measure only one volume tree per plot then set the Tree M/C Ratio to 1/9999. A Tree M/C Ratio of "1:0" means all trees will be measured.

During data collection, you may temporarily switch to a "**count-only**" mode by using the **M/C** tool icon in CE-Cruise EX. When you activate this switch, the M/C Ratio is reversed. This is useful when you wish to count all the trees at a point then measure the volume trees. So, you would first set the Tree M/C Ratio in the Stand Information window to "0:1". This means all new tree records will be "count trees" (or, basal area trees). After counting all the trees for the point, you would activate the M<->C tool to switch to the reverse ratio "1:0". Any tree records that you add to this point will now be "measure trees" (volume trees). This is only a temporary switch. When you add a new plot, the specification in the M/C Ratio field governs.

For each highlighted tree record, the Log/Stick Length, Species, Product, Stump Height and tree quantities are displayed at the bottom of the Tree Data View. If a tree quantity cannot be computed from the data you entered, an error message will be displayed.

The tree volume is reported as soon as you have entered sufficient data for the tree and is displayed at the bottom of the screen.

Please note: CE Cruise will allow a blank tree record to be entered only if you add a tree and then click on the science on the science on the science of the science of

Excluding Trees

To exclude an entered tree record from quantity computations, go to the Trees dialog and highlight the

tree record (row) that you wish to exclude and then click on the **Exclude/Include Tree** icon . The excluded row will be highlighted in dark gray and the volume information at the bottom of the screen will indicate that the tree has been excluded.

Please note: If the Exclude Tree icon is grayed out, this means that you have checked the option for "Disable the Exclude/Include toggles" found under the Global Set Up screen.

Multiple Products and Variable Length Tree Data Entry (CE Cruise EX Version only)

CE Cruise EX will let you enter different products with variable log lengths for the same tree. For a tree set up with the "On" or "Opt" status, you may click the "Multi-Product" tab and then enter the logs. You may override the Length and Small End Diameter proposed by the program. Make sure you enter at least one multi-product record for a tree that is set up with the "On" status.

7.4.1 Tree Data Entry Utilities

CE Cruise provides some utilities for determining slope correction, tree heights on leaning trees, finding out whether a tree should be included in the sample or not due to limiting distance, etc. These utilities are

accessed from the tree data collection screens by clicking on the tool pull-down icon **EXES**. Each utility is explained:

Slope Correction Calculator Slope Correction - Use this function to help you convert a slope distance to a horizontal distance or vice versa. Start by entering the slope percentage and either the slope distance or the horizontal distance. The remaining field will automatically be calculated and filled in for you.

Leaning Tree Calculator — Leaning Tree – This function is used to determine the true height of a tree that is tilted or leaning. Enter the measured tree height as well as the horizontal distance (this is the distance from the base of the tree to the projected point of the tip of the tree on the ground). The true tree height will automatically be computed and displayed.

If you wish to use the computed tree height as the total height of the currently highlighted tree, check the

"Apply True Height to the Ht of current tree" box before clicking on the M button. The computed tree height will be automatically entered into the Ht (total tree height) field for the highlighted tree record.

Limiting Distance Calculator Limiting Distance - Use this tool to determine whether or not to include a borderline tree for point sampling. The following dialog is displayed:

Limiting	g Distance			?
	BA	F: 20.0		
		In		
Mea	asured Distanc	e:		Ft
	Percent Slop	e:		%
Limiting	Slope Distanc	e:		
<u>N</u> 1	2	3	0	•
<u> 음</u> 4	5	6	•	4
ັ້ພ 7	' 8	9	-	+ →

Enter the DBH (Diameter at Breast Height) for the tree in question. Also enter the measured distance and slope percent from the center of the stake to the face of the tree at DBH. Based on the BAF (Basal Area Factor) for the stand and the DBH measurement, this function will calculate the limiting horizontal distance and compare it with the horizontal distance obtained from the measured distance and slope. If the measured distance is equal or less than the limiting distance, the tree is "IN", i.e. it IS a sample tree. If the measured distance is greater than the limiting distance the tree is "OUT" and will not be sampled.

After entering data for the last field (e.g. percent slope), the limiting slope distance will automatically be calculated and displayed. Also, a message will automatically appear indicating if the tree in question is IN or OUT.

7.4.2 Summary reports

CE Cruise provides weight/volume summary information for each tree immediately when sufficient information has been entered for the tree. CE Cruise also provides quantity summary reports at the plot, stand and tract level in the field. These reports are accessed from the tree data collection screen by clicking on the tool pull-down icon (tract and stand reports are available from the Tracts or Stands screens as well). Each report type is explained:

Plot/Point Volume

To see the summary of the tree quantities (volumes or weights) for the active plot, click on the **Plot/Point Volume** pull-down option Plot Volume in the Tree Data View. This tool displays a text report of the tree quantities (volume and/or weight) computed for the plot or point cruised. The quantities are summarized by product types.

For the **Sample Expansion** option, select "No" to report just the quantities for the cruised trees. Select the "Per Acre" option to see the contribution of this plot to the expanded per-acre figures. Alternatively, select the "Total" option to see the contribution of this plot to the expanded total for the tract or the stand.

Stand Volume

To see the summary of the tree quantities (volumes or weights) for the entire stand, click on the **Stand Volume** pull-down option Stand Volume. This tool displays a summary of the tree quantities (volume and/or weight) computed for the currently active stand cruised. The quantities are summarized by product types. For the **Sample Expansion** option, select "No" to report just the quantities for the cruised trees. Select the "Per Acre" option to see the contribution of this stand to the expanded per-acre figures. Alternatively, select the "Total" option to see the contribution of this stand to the expanded total for the tract.

Tract Volume

To see the summary of the tree quantities (volume and/or weight) computed for the cruised tract, click on the **Tract Volume** pull-down option Tract Volume. The quantities shown are summarized by product types.

For the **Sample Expansion** option, select "No" to report just the quantities for the cruised trees. Select the "Per Acre" option to see the quantities calculated per-acre. Alternatively, select the "Total" option to see the expanded total quantities for the tract.

Stand Statistics

This report displays the volume basal area and dollar value statistics for the cruised stand. It is advisable to look at the CI %Error when you think you are done with the cruise. If this value does not meet your sampling error objective, then you may need to cruise more sample trees and/or check for data entry error.

Tract Statistics

This report displays the volume basal area and dollar value statistics for the cruised tract.

It is advisable to look at the CI %Error when you think you are done with the cruise. If this value does not meet your sampling error objective, then you may need to cruise more sample trees and/or check for data entry error.

7.4.3 Battery Power Conservation

In **CE Cruise EX**, you now have the option to have the PDA automatically turned off when you are done with the current plot and are adding a new plot. When you get to the next plot, turn on the PDA and continue to work with the new plot record. Although it is easy to turn off the PDA by pressing the on/off button, you may forget to do so and run out of power too soon.

To set up the automatic shutoff, click on the "**A/O**" (Auto Off) tool icon in the "**Trees**" screen so it is depressed. When the "A/O" function is active and you click on the "**ADD Plot**" icon, your PDA will turn itself off automatically. When you turn the PDA back on, the "**Add Plot**" screen will pop up and is ready for you to work with and enter data for the next plot.

Appendix

PC-Cruise and CE Cruise End User License Agreement

This is a legal agreement between you, the End User, and Corvallis Microtechnology, Inc. ("Company"). By opening the package containing PC-Cruise and installing it on your PC or CE Cruise and installing it on your mobile device, you are agreeing to be bound by the terms of this agreement.

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This agreement is governed by the laws of the State of Oregon.

If you have any questions concerning this agreement, please write to: Customer Service, Corvallis Microtechnology, Inc., 413 SW Jefferson Avenue, Corvallis, Oregon 97333, USA.

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