CruiseComp
Forest Inventory Module
User Manual

Feb 2, 2010

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1 FOREST INVENTORY MODULE

1.1. INTRODUCTION

The **Industrial Forestry Service Forest Inventory Module**, greatly increases the value and versatility of **CruiseComp** software. This module allows the user to select trees for calculating site index, summarizing cruise data and a variety of calculated fields into customizable stand layers by plot and timber type.

The main objective is to display the characteristics for each **timber type** or **stratum**.

1.2. SITE PRODUCTIVITY

Site Productivity is summarized by **timber type** and plot with the following attributes:

Basal area
Basal area species composition
Gross merch volume
Gross merch volume species composition
Primary and Secondary leading species:
- Site tree average height
- Site tree average counted age
- Site tree average total age
- Site Index

The program will also summarize the **Site trees** with the average, minimum, and maximum ranges for **Height, Counted Age, Total Age** and **Site Index**.

1.3. STAND STRUCTURE

There are times when it may be important to summarize timber types into different layers. For instance, a forester may want to know if a particular forest stand has enough timber volume to warrant a selective cut, while still leaving enough understory trees. Inventory Foresters can now generate summaries that indicate which **timber types** have multi-aged layers and which ones are even aged stands. The **Forest Inventory Module** permits the user to break the stand down into different age groups, dbh classes, height classes and species.

1.4. FOREST INVENTORY MAIN SCREEN

There are two main sections to the **Forest Inventory Module**:

1. Site Index calculations
2. Customizable timber layers

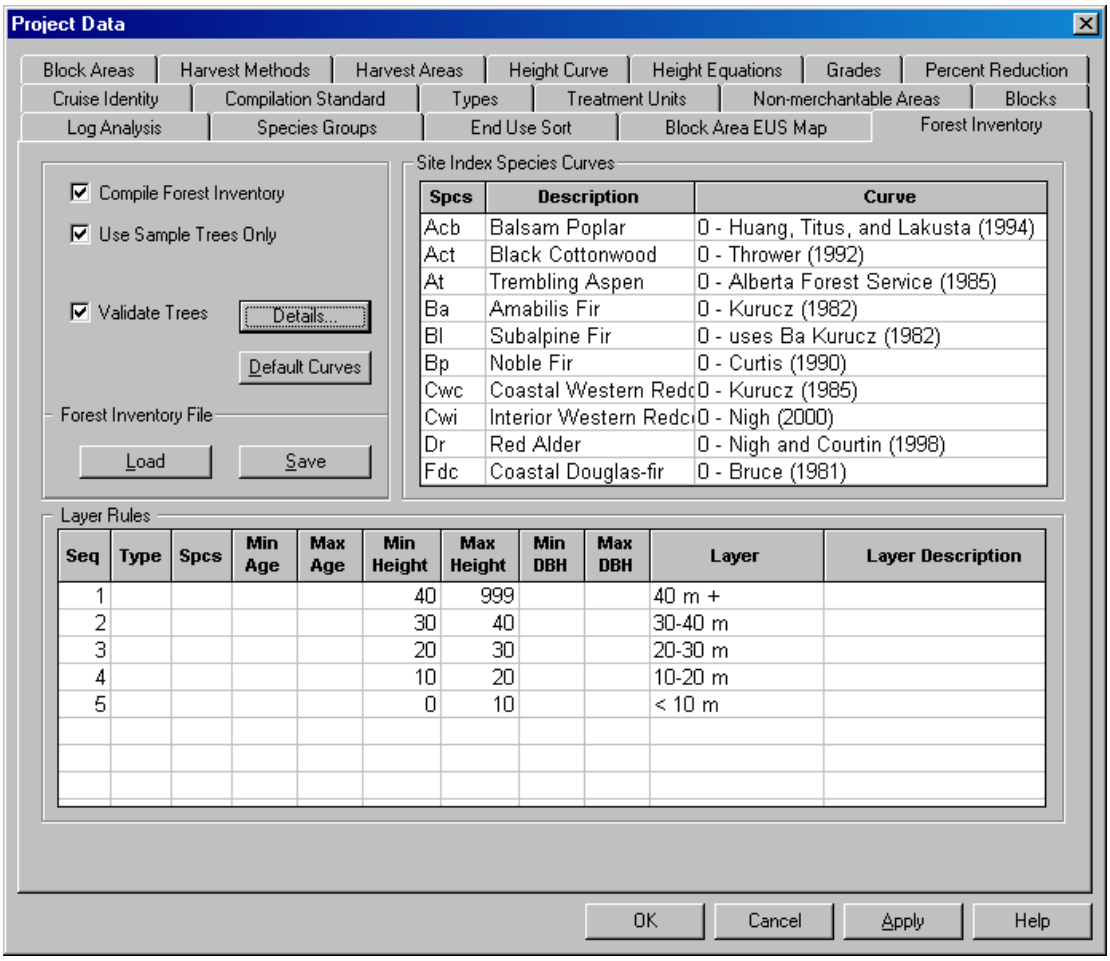
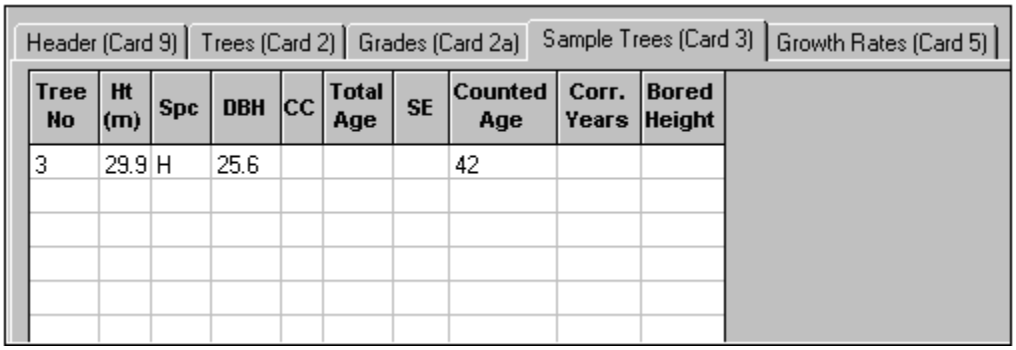


Figure 1 - Forest Inventory Main Screen

1.5. DATA ENTRY

The cruise data must include as a minimum, **height**, **species**, **dbh**, and either **counted age** and/or **total age,** for each sample tree entered into the **Sample Trees Card** (card 3).



Tree No	Ht (m)	Spc	DBH	CC	Total Age	SE	Counted Age	Corr. Years	Bored Height
3	29.9	H	25.6				42		

Figure 2 - Sample trees (Card 3)

The **CC** (Crown Class), **Corr. Years** and **Bored height** fields are optional.

1.1.1 Validations

CruiseComp runs a set of validation checks on the forest inventory data to help ensure the integrity of the results.

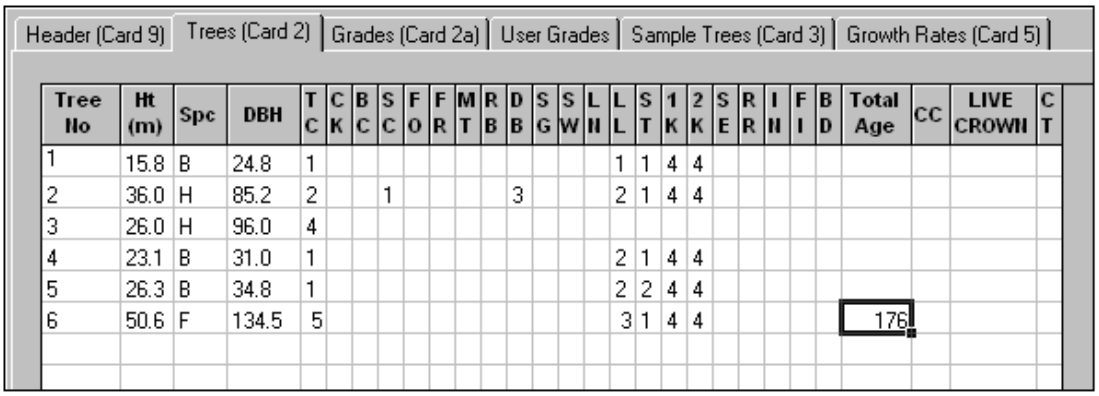
Total Age If the **Total Age** does not equal the sum of the **Counted Age** plus the **Corr. Years**, a validation error will occur.

Counted Age **CruiseComp** first looks to use the **Counted Age** to calculate **Site Index**. If the data only has the **Total Age**, the program will take it and convert it to a **Counted Age**.

CC If the **crown class** is provided and the value is 1 (dominant) or 2 (co-dominant), the program will treat the sample tree as a **site tree**. If the **crown class** is a 3 (intermediate) or 4 (suppressed), the program will remove those trees as **site trees** because they are generally considered to be not suitable.

Bored Height The site index program uses a bored height of 1.3m plus/minus 0.3 m. It is not necessary to enter a bored height. However, if the entered bored height is not between 1.0m and 1.6m, the sample tree will be removed from the calculations.

1.5.1. Additional Field in the 2 card (trees card)



Tree No	Ht (m)	Spc	DBH	TC	CK	BC	SC	FO	FR	MT	RB	DB	SG	SW	LH	LL	ST	1K	2K	SE	RR	IN	FI	BD	Total Age	CC	LIVE CROWN	CT
1	15.8	B	24.8	1												1	1	4	4									
2	36.0	H	85.2	2			1					3				2	1	4	4									
3	26.0	H	96.0	4																								
4	23.1	B	31.0	1												2	1	4	4									
5	26.3	B	34.8	1												2	2	4	4									
6	50.6	F	134.5	5												3	1	4	4						176			

Figure 3 - Total age field on the 2Card (Trees Card)

In order to break a timber type into more than one age layer, it will be necessary to have an age for every tree. This can be done in a field called **Total Age** on the **Trees Card** (Card2). If the total age is not entered for a tree, the program assigns each tree an age based on the midpoint of the **Age in Tens** for the plot. For instance, if there were no tree ages for a plot with the **Age in Tens** of 07, then each tree would be assigned an age of 65 (midpoint between 60-69 yrs).

Two validations are performed on the **Total Age** column in the **Trees Card** (2 card), one for mature tree class 5 or 7 trees and one for immature tree class 8 & 9 trees.

If the total age has not been entered in the **Trees Card** (card 2) for any of these trees, a validation warning will be displayed, stating that there is no total age. Tree class does not specify an age but only that the tree is mature or immature. If you are summarizing layers based on age, estimate any missing ages. If the total age is missing for these trees, they will be assigned the average age of the plot, which defeats the whole purpose of summarizing the timber type by age groups.

1.6. SITE INDEX SPECIES CURVES

The **Forest Inventory Module** allows the user to quickly calculate the **site index** for all site trees. This eliminates the need to spend valuable time manually calculating the site index for individual trees in the field or office. Keypunch your compilation as you normally would, while ensuring that the sample tree data has been entered. The program calculates the site indexes as a part of your normal compilation.

Check the **Compile Forest Inventory** check box to calculate the site index.

Each tree species in British Columbia has at least one site index curve to choose from. Many species have several different site index equations to choose from.

If you would like to change the site curve for a species, click on the **Site Index Species Curves** box to make it active. Then click on the curve showing for that species and a list of available curves will drop down. Click on the desired curve to select it.

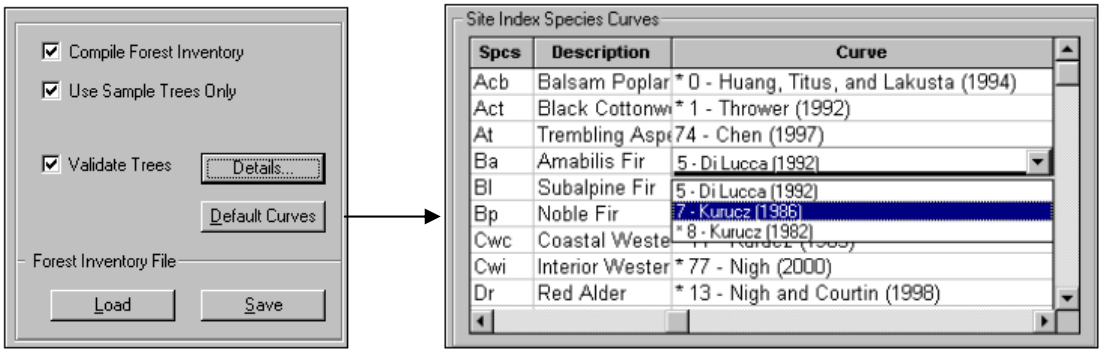


Figure 4 - Site Index Species Curves

To return to the **B.C. Ministry of Forests'** recommended curves for all the species, click the **Default Curves** button.

1.7. SITE INDEX TREE SELECTION

There are several ways that cruise data can be used to calculate site index.

1.1.2 Site Index Calculation without Site Tree Validation

Checking the **Use Sample Trees Only** box, means only trees from the **Sample Trees (card 3)** of all plots will be used to calculate the age of the stand and the site index.

To use trees from the main cruise plot, leave the **Use Sample Trees Only** box unchecked. The largest diameter tree of each tree species will be selected from each layer in each plot and will be used to calculate the site index. If the tree does not have a total age, **CruiseComp** will use the mid point of the **Age in Tens** for that layer in that plot as the age for that tree.

1.1.3 Site Index Calculation with Site Tree Validation

There is much debate on what constitutes an acceptable site index tree. The **Site Index Tree Selection Interface** allows the user to set the criteria for selecting suitable site index trees.

Click on the **Details** button to open up the **Site Index Tree Selection Interface**. Here the user can decide whether or not to use Crown Class 3 and 4 trees, damage trees or lean trees.

Under normal circumstances it is not recommended that these trees be used as site trees. Check or leave these boxes unchecked as appropriate.

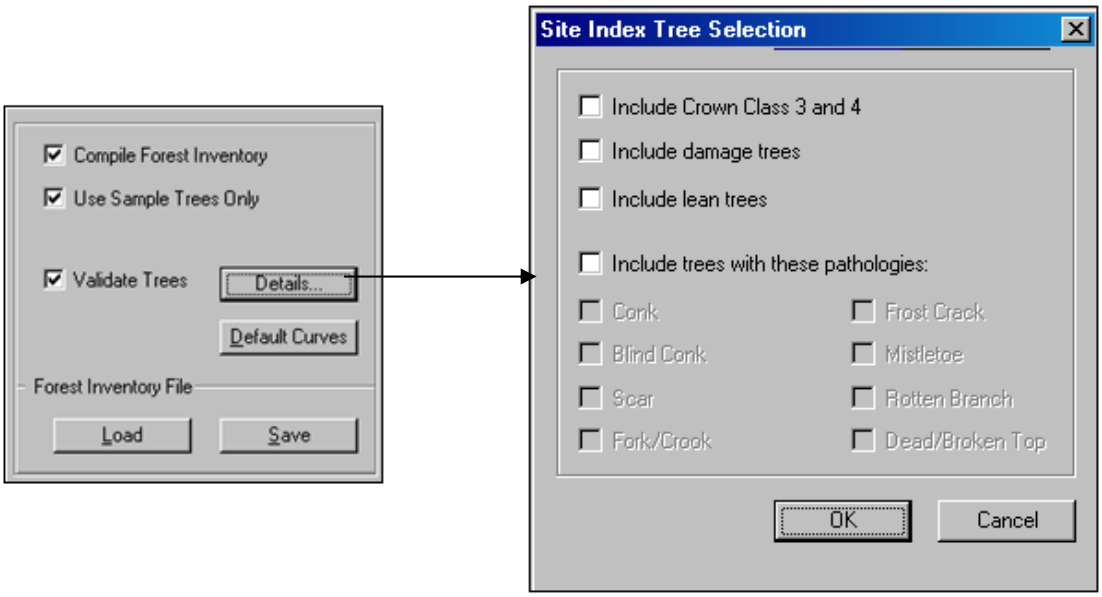


Figure 5 - Site Index Tree Selection

If there are not enough ideal site trees, some trees with certain pathological remarks may have to be included. Tree growth is adversely impacted by fork/crooks, mistletoe or dead/broken tops and therefore will not give a true representation of site index. However, if a significant number of trees in a timber type have these conditions it may be necessary to include them to get an idea of the site index for that stand.

Click on the checkbox called **Include trees with these pathologies** (see figure 5) and then check any pathological remarks that are considered to be acceptable for site trees.

When the pathology checkboxes are grayed out, any trees with those path remarks will be excluded even if one or more of the boxes are checked off. To enable the validation of pathological remarks, the **Include trees with these pathologies** checkbox must be checked.

Once the **Site Index Tree Selection** criteria section is complete, click **OK**. When the **Validate Trees** box is checked, and the data is compiled, the program compares any potential site trees against the validation criteria, rejecting any that are not acceptable.

Validate Trees can be used on **Use Sample Trees Only** or on all trees.

When the **Use Sample Trees Only** box is unchecked, and the largest diameter tree of a given species in the main plot is rejected, the program will look at the next largest tree of that species in that plot. If all trees of a given species in a plot are not acceptable, the program will not use any trees of that species in that plot.

1.8. LAYER RULES

The **Layer Rules** interface, located at the bottom of the **Forest Inventory** module interface, allows the user to customize how the timber types will get broken down into layers. Layers can be created using the following attributes: **Type**, **Species**, **Age**, **Height**, **and DBH**.

Layer Rules

Seq	Type	Spcs	Min Age	Max Age	Min Height	Max Height	Min DBH	Max DBH	Layer	Layer Description
10			121	999					121 yrs +	
20			80	121					80 - 121 yrs	
30			60	80					60 - 80 yrs	
40			40	60					40 - 60 yrs	
50			1	40					1 - 40 yrs	

Figure 6 - Layer Rules

1.1.4 Description of Field Names:

Seq — The sequence is a number given to the layer and sorts the layers in numerical order from 1 to 9999. This number organizes how the layers will be displayed in the reports. (Sequence number 1 starts at the top and 9999 will be at the bottom)

Type — The type number is entered if the user would like to specify layers for a specific timber type. For instance, you could set up specific layers for a timber type and then completely different layers for all other timber types.

Spcs — Create layers by Species. For instance, instead of having age classes for all species combined, you could break it down by age class and grouped by species.

Min Age — Enter the minimum age for a given age class layer.

Max Age — Enter the maximum age for a given age class layer.

Min Height — Enter the minimum height for a given height class layer.

Max Height — Enter the maximum height for a given height class layer.

Min DBH — Enter the minimum dbh for a given dbh class layer.

Max DBH — Enter the maximum dbh for a given dbh class layer.

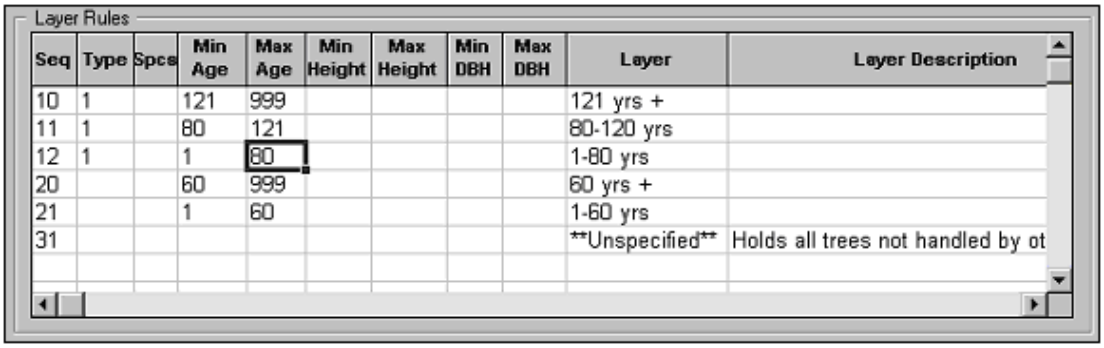
Layer — Enter in the name of the layer that you want to describe the layer. Each layer must have a layer name.

Layer Description — (Optional) A field that can be used to more completely describe the layer. This field is not necessary to fill in.

1.1.5 Examples of how the Layer Rules work:

1.1.5.1 One type with its own layers and all other types with a different set of layers

It may be necessary to create a different set of age class layers for one type and another set of age class layers for the rest of the types. For example:


Layer Rules

Seq	Type	Spcs	Min Age	Max Age	Min Height	Max Height	Min DBH	Max DBH	Layer	Layer Description
10	1		121	999					121 yrs +	
11	1		80	121					80-120 yrs	
12	1		1	80					1-80 yrs	
20			60	999					60 yrs +	
21			1	60					1-60 yrs	
31									**Unspecified**	Holds all trees not handled by ot

Figure 7 - Layer Rules Screen

The report below gives an example of the **Forest Inventory by Type report** using figure 7 as the setup.

Type	Layer	Basal Area m2/ha	Species%	Gross Merch m3/ha	Species%	Primary species Sp	Hght	C.Age	T.Age	SI	Secondary species Sp	Hght	C.Age	T.Age	SI
1	121 yrs +	1.9	F100	26.4	F100										
	80-120 yrs	67.9	F74 H22 C4	912.4	F82 H16 C2	F	52.2	107	114	36					
2	60 yrs +	50.1	F78 H18 C4	720.9	F81 H16 C3	F	53.1	99	106	37	H	48.0	98	103	33
3	60 yrs +	66.0	F77 H23	914.7	F80 H20	F	48.5	89	97	36	H	47.1	89	94	34
4	60 yrs +	59.0	F88 H10 C2	836.5	F89 H10 C1	F	46.5	90	98	34	H	40.9	91	96	29
5	60 yrs +	61.3	F74 H17 D9	830.4	F76 H17 D7										
6	60 yrs +	59.8	F83 H10 D6	778.2	F86 H8 D5	F	45.8	73	80	37					
7	60 yrs +	59.8	F81 H7 C6	773.2	F85 H6 C5	F	47.2	71	78	39					
8	60 yrs +	61.2	F76 H14 D8	819.7	F79 H13 D7	F	42.2	72	80	34					
9	60 yrs +	55.5	F71 H18 C8	758.8	F73 H20 C5	F	47.3	75	82	38					
10	60 yrs +	17.5	C70 F30	175.5	C56 F44										
	1-60 yrs	21.0	D67 H33	201.8	D75 H25										
11	60 yrs +	72.5	F91 H6 C3	1043.4	F92 H6 C2	F	44.7	98	106	32					

The program first looks to the smallest sequence number and starts sorting the trees that are contained there first. Once these trees have been assigned a layer, they are no longer available for another layer. The program goes through each layer in sequential numeric order until all trees in the compilation have been sorted into a layer.

Sequence number assignment must be considered very carefully. Always give the more specific layers, a sequence number that is smaller than a less specific layer. For example, while referring to figure 7, if the layers in type 1 were given sequence numbers of 50, 51 and 52, all trees greater than 60 years old would be assigned to sequence 20 leaving no trees for number 50 & 51, and only some trees for number 52.

Any trees are not assigned to a layer, are placed into an unspecified layer. The user can compile the data, review the layer results and then make adjustments to the layer rules if some trees were mis-placed.

1.1.5.2 Using layers to summarize height layers

Another way to get an idea of a timber stand's structure is to break it down into height classes. The example below examines this option:

Layer Rules

Seq	Type	Spcs	Min Age	Max Age	Min Height	Max Height	Min DBH	Max DBH	Layer	Layer Description
1					50.0	999.0			> 50 m	
2					40.0	50.0			40 - 50 m	
3					30.0	40.0			30 - 40 m	
4					20.0	30.0			20 - 30 m	
5					10.0	20.0			10 - 20 m	
6					1.0	10.0			< 10 m	

Figure 8 - Example forest inventory by height classes

Type	Layer	Basal Area m2/ha	Species%	Gross Merch m3/ha	Species%	Primary species Sp	Hght	C.Age	T.Age	SI	Secondary species Sp	Hght	C.Age	T.Age	SI
1	> 50 m	33.9	F100	523.0	F100	F	52.2	107	114	36					
	40 - 50 m	16.3	F92 C8	227.7	F94 C6										
	30 - 40 m	5.6	H66 F34	73.9	H68 F32										
	20 - 30 m	9.2	H80 F20	94.4	H81 F19										
	10 - 20 m	3.7	H100	15.7	H100										
	< 10 m	1.2	C100	4.2	C100										
2	> 50 m	23.8	F100	376.1	F100	F	53.1	99	106	37					
	40 - 50 m	17.4	F74 H26	265.0	F69 H31						H	48.0	98	103	33
	30 - 40 m	2.2	F100	26.2	F100										
	20 - 30 m	6.7	H67 C33	53.5	H68 C32										
3	> 50 m	20.0	F100	309.1	F100	F	51.2	88	95	38					
	40 - 50 m	26.3	F83 H17	397.2	F79 H21	F	47.2	90	98	35	H	47.1	89	94	34
	30 - 40 m	12.1	F75 H25	155.0	F71 H29										
	20 - 30 m	4.5	H100	38.1	H100										
	10 - 20 m	3.0	H100	15.3	H100										
4	> 50 m	27.8	F96 H4	431.8	F95 H5										
	40 - 50 m	19.4	F89 H11	279.6	F88 H12	F	46.5	90	98	34	H	40.9	91	96	29
	30 - 40 m	8.9	F89 H11	104.2	F88 H12										
	20 - 30 m	1.0	H100	9.5	H100										
	10 - 20 m	1.8	H57 C43	11.2	H58 C42										

1.1.5.3 Using layers to summarize height and dbh classes

This example shows an example for of uneven age management of drybelt Douglas-Fir stands.

Layer 1 - > 12.5cm

Layer 2 - 7.5 – 12.5 cm

Layer 3 - > 1.3m and < 7.5cm

Layer 4 - < 1.3m

Layer Rules

Seq	Type	Spcs	Min Age	Max Age	Min Height	Max Height	Min DBH	Max DBH	Layer	Layer Description
10							12.5	999	>12.5cm	
20							7.5	12.5	7.5-12.5cm	
30					1.3	999	0.1	7.5	>1.3m - <7.5cm	
40					0.1	1.3			<1.3m	

Figure 9 - Layers for height & DBH

Type	Layer	Species	Net Merch m3/ha	Net Merch %	Merch Stems/ha LiveDP	Merch Stems/ha Snags	Merch BA/ha LiveDP	Merch BA/ha Snags	All Stems/ha LiveDP	All Stems/ha Snags	All BA/ha LiveDP	All BA/ha Snags	Avg Height	Avg DBH	Volume /Tree
1	>12.5cm	Doug-Fir	106	71	233.4	10.3	16.3	2.3	349.0	20.6	18.2	2.4	22.1	29.8	0.45
		Spruce	30	20	43.3	1.0	3.1	0.1	55.7	7.3	3.3	0.3	27.5	30.1	0.69
		L.P.Pine	10	7	95.9	10.1	2.1	0.1	106.0		2.2		14.3	16.5	0.11
		Aspen	2	1	11.1	5.0	0.4	0.1	24.2	11.7	0.6	0.3	16.7	21.0	0.20
		Cottonwood	1	0	1.3		0.1		1.3		0.1		15.5	34.9	0.46
		Total	148	100	385.0	26.5	21.9	2.7	536.3	39.5	24.5	2.9	22.4	26.9	0.39
	7.5-12.5cm	Aspen							32.6		0.3				
		Doug-Fir							340.9	52.5	2.4	0.4			
		L.P.Pine							111.9		0.8				
		Spruce							13.0		0.1				
		Total							498.5	52.5	3.6	0.4			
	>1.3m - <7.5cm	Doug-Fir							676.6	174.4	1.8	0.4			
		L.P.Pine							38.6		0.1				
		Total							715.2	174.4	1.9	0.4			
	<1.3m	Doug-Fir							5.1		0.0				
		L.P.Pine							5.1		0.0				
		Spruce							5.1		0.0				
		Total							15.4		0.0				

1.1.5.4 Example of height and diameter classes.

Layer Rules

Seq	Type	Spcs	Min Age	Max Age	Min Height	Max Height	Min DBH	Max DBH	Layer	Layer Description
10	1				30.0	999.0	50.0	999.0	>30m - >50cm	
11	1				30.0	999.0	30.0	50.0	>30m - 30-50cm	
12	1				30.0	999.0	1.0	30.0	>30m - <30cm	
20	1				20.0	30.0	50.0	999.0	20-30m - >50cm	
21	1				20.0	30.0	30.0	50.0	20-30m - 30-50cm	
22	1				20.0	30.0	1.0	30.0	20-30m - <30cm	
30	1				10.0	20.0	50.0	999.0	10-20m - >50cm	

Figure 10 - Height and DBH classes used together.

Type	Layer	Basal Area m2/ha	Species%	Gross Merch m3/ha	Species%	Primary species Sp	Hght	C.Age	T.Age	SI	Secondary species Sp	Hght	C.Age	T.Age	SI
1	>30m - >50cm	40.7	F97 C3	614.8	F98 C2	F	52.2	107	114	36					
	>30m - 30-50cm	15.0	F75 H25	209.8	F76 H24										
	20-30m - 30-50cm	3.7	H100	32.8	H100										
	20-30m - <30cm	5.6	H66 F34	61.6	H71 F29	H	29.9	42	47	34					
	10-20m - <30cm	3.7	H100	15.7	H100										
	<10m	1.2	C100	4.2	C100										
2	Unspecified	50.1	F78 H18 C4	720.9	F81 H16 C3	F	53.1	99	106	37	H	48.0	98	103	33
3	Unspecified	66.0	F77 H23	914.7	F80 H20	F	48.5	89	97	36	H	47.1	89	94	34
4	Unspecified	59.0	F88 H10 C2	836.5	F89 H10 C1	F	46.5	90	98	34	H	40.9	91	96	29
5	Unspecified	61.3	F74 H17 D9	830.4	F76 H17 D7										
6	Unspecified	59.8	F83 H10 D6	778.2	F86 H8 D5	F	45.8	73	80	37					
7	Unspecified	59.8	F81 H7 C6	773.2	F85 H6 C5	F	47.2	71	78	39					
8	Unspecified	61.2	F76 H14 D8	819.7	F79 H13 D7	F	42.2	72	80	34					
9	Unspecified	55.5	F71 H18 C8	758.8	F73 H20 C5	F	47.3	75	82	38					
10	Unspecified	38.5	D36 C32 F14	377.4	D40 C26 F21										
11	Unspecified	72.5	F91 H6 C3	1043.4	F92 H6 C2	F	44.7	98	106	32					

As you can see in the report above, only type 1 had the dbh and height classes specified. The trees without a layer assigned have been deemed unspecified.

1.9. SAVING FOREST INVENTORY SETTINGS

As stated earlier, it may be of value to create and save one or more versions of forest inventory settings rather than manually re-entering them with each new dataset. The **Forest Inventory Module** allows the user to create as many forest inventory files (*.fiv) as required. When the settings have been finalized, click the **Save** button located at the mid left of the forest inventory screen.

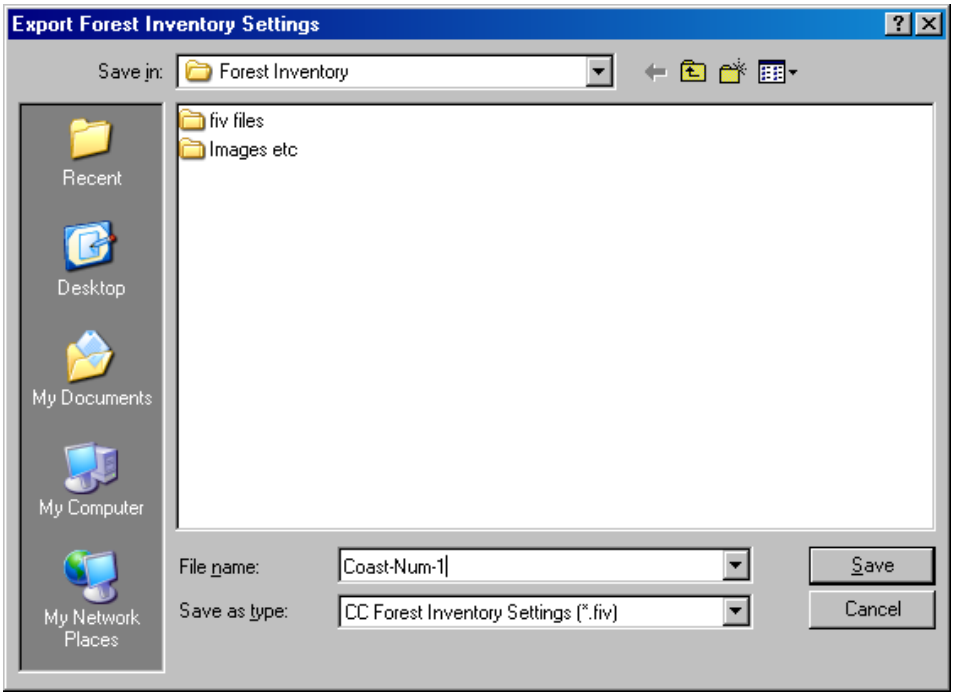


Figure 11 - Saving an fiv file

A dialog box will open up, prompting you to name the saved file and copy the file to a folder. It is recommended that you store all your forest inventory files in one folder to keep your files better organized.

1.10. LOADING A FOREST INVENTORY FILE:

Click on the **Load** button on the **Forest Inventory** interface, and choose the folder where your *.fiv files are located. Select the required file and open it.

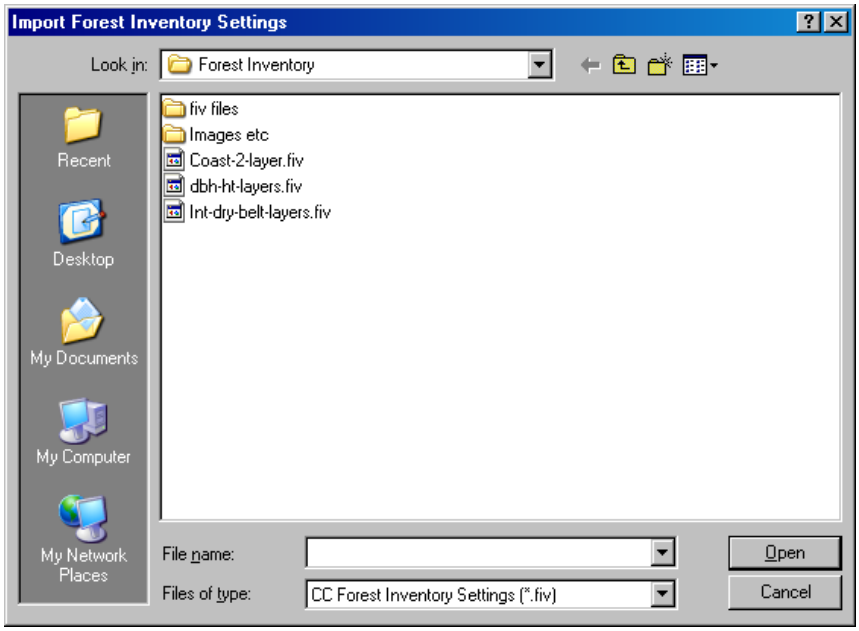


Figure 12 - Opening the .fiv file

After clicking the **Open** button, the program imports the ".fiv" file into the new **CruiseComp** file. The following message box appears.

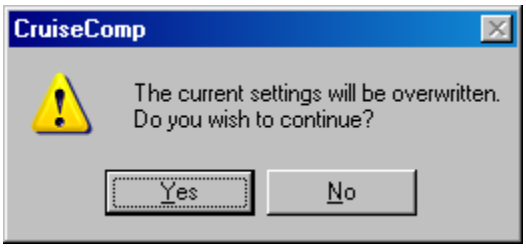


Figure 13 - Prompt when importing an fiv file

If you'd like to override the old settings with the new file, click Yes. If you want to keep the old settings click No.

If you need to create a new F**orest Inventory file** that is similar to an existing one, open the existing one edit it, then save it with a new name.

1.11. REPORTS

There are seven reports available in the **Forest Inventory Module**.

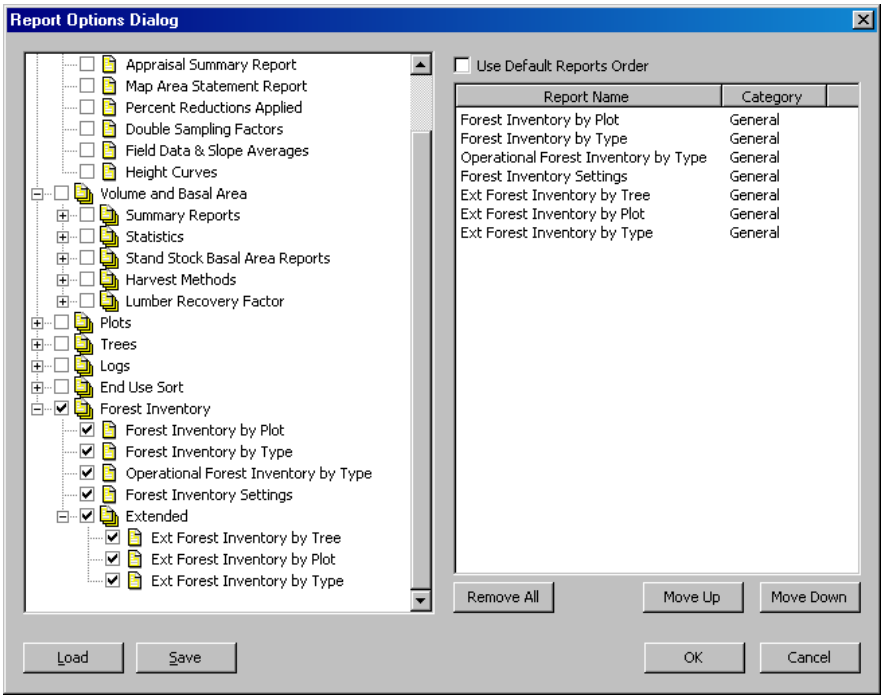


Figure 14 - Choosing forest inventory reports

The reports are:

1. Forest Inventory by Type

Type	Layer	Basal Area m2/ha	Basal Area Species%	Gross Merch m3/ha	Gross Merch Species%	Primary species Sp	Hght	C.Age	T.Age	SI	Secondary species Sp	Hght	C.Age	T.Age	SI
1	80 - 121 yrs	66.1	Fd79 Hw17 Cw4	898.1	Fd87 Hw11 Cw2	Fd	52.2	107	114	36					
	40 - 60 yrs	3.7	Hw100	43.7	Hw100	Hw	29.9	42	47	34					
2	80 - 121 yrs	50.1	Fd78 Hw18 Cw4	720.9	Fd81 Hw16 Cw3	Fd	53.1	99	106	37	Hw	48.0	98	103	33
3	80 - 121 yrs	66.0	Fd77 Hw23	914.7	Fd80 Hw20	Fd	48.5	89	97	36	Hw	47.1	89	94	34
4	80 - 121 yrs	59.0	Fd88 Hw10 Cw2	836.5	Fd89 Hw10 Cw1	Fd	46.5	90	98	34	Hw	40.9	91	96	29
5	80 - 121 yrs	61.3	Fd74 Hw17 Dr9	830.4	Fd76 Hw17 Dr7										
6	80 - 121 yrs	1.1	Fd100	15.3	Fd100	Fd	45.2	74	81	36					
	60 - 80 yrs	58.6	Fd82 Hw11 Dr6	762.9	Fd86 Hw8 Dr5	Fd	46.9	72	79	38					
7	80 - 121 yrs	1.4	Cw100	14.8	Cw100										
	60 - 80 yrs	58.4	Fd83 Hw7 Dr6	758.4	Fd86 Hw6 Dr5	Fd	47.2	71	78	39					
8	80 - 121 yrs	59.2	Fd76 Hw14 Dr8	792.9	Fd78 Hw14 Dr7										
	60 - 80 yrs	2.0	Fd100	26.8	Fd100	Fd	42.2	72	80	34					
9	80 - 121 yrs	55.5	Fd71 Hw18 Cw8	758.8	Fd73 Hw20 Cw5	Fd	47.3	75	82	38					
10	80 - 121 yrs	17.5	Cw70 Fd30	175.5	Cw56 Fd44										
	40 - 60 yrs	21.0	Dr67 Hw33	201.8	Dr75 Hw25										
11	80 - 121 yrs	72.5	Fd91 Hw6 Cw3	1043.4	Fd92 Hw6 Cw2	Fd	44.7	98	106	32					

2. Forest Inventory by Plot

Type	Blck	Strp	Plot	Layer	Basal Area m2/ha	Basal Area Species%	Gross Merch m3/ha	Gross Merch Species%	Primary species Sp	Hght	C.Age	T.Age	SI	Secondary species Sp	Hght	C.Age	T.Age	SI
1	041		9	>30m - >50cm	47.0	F100	734.7	F100	F	52.8	99	106	37					
				>30m - 30-50cm	18.8	F100	280.6	F100										
			10	>30m - >50cm	34.3	F82 C18	502.1	F86 C14	F	53.5	111	118	36					
				10-20m - <30cm	18.4	H100	78.4	H100										
			11	>30m - >50cm	37.6	F100	558.2	F100										
				>30m - 30-50cm	28.2	F100	381.4	F100										
				20-30m - <30cm	18.4	H100	218.4	H100	H	29.9	42	47	34					
			12	>30m - >50cm	28.2	F100	433.0	F100	F	50.4	110	118	34					
				>30m - 30-50cm	18.4	H100	251.5	H100										
			13	>30m - >50cm	56.4	F100	846.0	F100										
				>30m - 30-50cm	9.4	F100	135.5	F100										
				20-30m - 30-50cm	18.4	H100	163.9	H100										
				20-30m - <30cm	9.4	F100	89.5	F100										
				<10m	6.1	C100	20.8	C100										
2	042		3	Unspecified	39.0	F100	560.5	F100	F	51.5	103	110	36					
			4	Unspecified	52.7	H51 F49	856.4	H57 F43	H	48.0	98	103	33					
			5	Unspecified	65.0	F100	1024.7	F100	F	57.0	96	103	40					
			6	Unspecified	26.4	F49 C51	269.9	F62 C38										
			7	Unspecified	91.7	F71 H29	1199.6	F82 H18										
			8	Unspecified	26.0	F100	414.4	F100	F	50.8	97	104	36					

3. Ext Forest Inventory by Type

Type	Samples	Species	Layer	Height	CountAge	TotalAge	SiteIndex
1	3	Doug-Fir	>30m - >50cm	52.2 (50.4-53.5)	107 (99-111)	114 (106-118)	35.7 (34.1-37.1)
	1	Hemlock	20-30m - <30cm	29.9	42	47	33.7
2	3	Doug-Fir	Unspecified	53.1 (50.8-57.0)	99 (96-103)	106 (103-110)	37.3 (35.7-40.3)
	1	Hemlock	Unspecified	48.0	98	103	32.9
3	3	Doug-Fir	Unspecified	48.5 (46.5-51.2)	89 (86-94)	97 (94-102)	35.8 (34.6-37.8)
	1	Hemlock	Unspecified	47.1	89	94	34.0
4	1	Doug-Fir	Unspecified	46.5	90	98	34.2
	1	Hemlock	Unspecified	40.9	91	96	28.5
6	3	Doug-Fir	Unspecified	45.8 (44.8-46.9)	73 (72-74)	80 (79-81)	37.0 (36.3-38.2)
7	2	Doug-Fir	Unspecified	47.2 (46.2-48.2)	71 (70-72)	78 (77-79)	38.7 (37.6-39.8)
8	1	Doug-Fir	Unspecified	42.2	72	80	34.5
9	2	Doug-Fir	Unspecified	47.3 (45.8-48.7)	75 (74-75)	82 (81-82)	37.8 (36.8-38.8)
10	1	Hemlock	Unspecified	20.4	45	51	22.1
11	1	Doug-Fir	Unspecified	44.7	98	106	31.8

4. Ext Forest Inventory by Plot

Type	Samples	Species	Layer	Height	CountAge	TotalAge	SiteIndex
1	3	Doug-Fir	>30m - >50cm	52.2 (50.4-53.5)	107 (99-111)	114 (106-118)	35.7 (34.1-37.1)
	1	Hemlock	20-30m - <30cm	29.9	42	47	33.7
2	3	Doug-Fir	Unspecified	53.1 (50.8-57.0)	99 (96-103)	106 (103-110)	37.3 (35.7-40.3)
	1	Hemlock	Unspecified	48.0	98	103	32.9
3	3	Doug-Fir	Unspecified	48.5 (46.5-51.2)	89 (86-94)	97 (94-102)	35.8 (34.6-37.8)
	1	Hemlock	Unspecified	47.1	89	94	34.0
4	1	Doug-Fir	Unspecified	46.5	90	98	34.2
	1	Hemlock	Unspecified	40.9	91	96	28.5
6	3	Doug-Fir	Unspecified	45.8 (44.8-46.9)	73 (72-74)	80 (79-81)	37.0 (36.3-38.2)
7	2	Doug-Fir	Unspecified	47.2 (46.2-48.2)	71 (70-72)	78 (77-79)	38.7 (37.6-39.8)
8	1	Doug-Fir	Unspecified	42.2	72	80	34.5
9	2	Doug-Fir	Unspecified	47.3 (45.8-48.7)	75 (74-75)	82 (81-82)	37.8 (36.8-38.8)
10	1	Hemlock	Unspecified	20.4	45	51	22.1
11	1	Doug-Fir	Unspecified	44.7	98	106	31.8

5. Ext Forest Inventory by Tree

Type	Block	Strip	Plot	Tree	Samples	Species	Layer	Height	CountAge	TotalAge	SiteIndex
1	041		9	8	1	Doug-Fir	>30m - >50cm	52.8	99	106	37.1
			10	5	1	Doug-Fir	>30m - >50cm	53.5	111	118	35.9
			11	3	1	Hemlock	20-30m - <30cm	29.9	42	47	33.7
			12	2	1	Doug-Fir	>30m - >50cm	50.4	110	118	34.1
2	042		3	3	1	Doug-Fir	Unspecified	51.5	103	110	35.7
			4	4	1	Hemlock	Unspecified	48.0	98	103	32.9
			5	5	1	Doug-Fir	Unspecified	57.0	96	103	40.3
			8	2	1	Doug-Fir	Unspecified	50.8	97	104	36.1
3	051		90	2	1	Doug-Fir	Unspecified	51.2	88	95	37.8
			94	2	1	Doug-Fir	Unspecified	46.5	86	94	34.9
				8	1	Hemlock	Unspecified	47.1	89	94	34.0
			99	4	1	Doug-Fir	Unspecified	47.9	94	102	34.6
4	061		2	3	1	Hemlock	Unspecified	40.9	91	96	28.5
			92	2	1	Doug-Fir	Unspecified	46.5	90	98	34.2
6	072		34	4	1	Doug-Fir	Unspecified	46.9	72	79	38.2
			35	3	1	Doug-Fir	Unspecified	45.6	74	81	36.7
			41	4	1	Doug-Fir	Unspecified	44.8	73	80	36.3

6. Operational Forest Inventory

Type	Layer	Species	Net Merch m3/ha	Net Merch %	Merch Stems/ha LiveDP	Merch Stems/ha Snags	Merch BA/ha LiveDP	Merch BA/ha Snags	All Stems/ha LiveDP	All Stems/ha Snags	All BA/ha LiveDP	All BA/ha Snags	Avg Height	Avg DBH	Volume /Tree
1	40 m +	Doug-Fir	83	100	20.6		7.1						41.5	66.4	4.04
		Total	83	100	20.6		7.1						41.5	66.4	4.04
	30-40 m	Hemlock	283	65	158.3		22.2						34.2	42.3	1.79
		Doug-Fir	99	23	46.4		8.9						38.2	49.5	2.13
		W.R.Cedar	52	12	17.6		5.4						34.0	62.8	2.98
		Total	434	100	222.2		36.5						35.1	45.8	1.95
	20-30 m	W.R.Cedar	75	49	128.0		8.2						26.3	28.5	0.59
		Hemlock	43	29	133.7		4.9						24.9	21.7	0.32
		Birch	24	16	75.0		2.3						29.8	19.9	0.32
		Cottonwood	8	6	8.8		0.9						29.5	35.6	0.94
		Total	150	100	345.5		16.3						26.6	24.5	0.44
	10-20 m	W.R.Cedar	12	100	95.0		2.7						12.8	19.1	0.13
		Total	12	100	95.0		2.7						12.8	19.1	0.13

7. Forest Inventory Settings

```
Input trees: Card 3 only.

Species    Curve Description
Acb      * Huang, Titus, and Lakusta (1994)
Act      * Thrower (1992)
At       * Alberta Forest Service (1985)
Ba       * Kurucz (1982)
Bl       * uses Ba Kurucz (1982)
Bp       * Curtis (1990)
Cwc      * Kurucz (1985)
Cwi      * Nigh (2000)
Dr       * Nigh and Courtin (1998)
Fdc      * Bruce (1981)
Fdi      * Thrower and Goudie (1992)
Hm       * Means, Campbell, Johnson (1988)
Hwc      * Wiley (1978)
Hwi      * Nigh (1998)
Lw       * Milner (1992)
Pli      * Nigh (1999)
Pw       * Curtis, Diaz, and Clendenen (1990)
Py       * Hann and Scrivani (1986)
Sb       * Alberta Forest Service (1985)
Se       * Chen and Klinka (2000)
Ss       * Nigh (1997)
Sw       * Nigh/Love (2000) + Goudie (1984) (pla)

Rules:
ELSE IF( (type = 1) AND (30.0 <= height < 999.0) AND (50.0 <= dbh < 999.0) ) ASSIGN TO: >30m - >50cm
ELSE IF( (type = 1) AND (30.0 <= height < 999.0) AND (30.0 <= dbh < 50.0) ) ASSIGN TO: >30m - 30-50cm
ELSE IF( (type = 1) AND (30.0 <= height < 999.0) AND (1.0 <= dbh < 30.0) ) ASSIGN TO: >30m - <30cm
ELSE IF( (type = 1) AND (20.0 <= height < 30.0) AND (50.0 <= dbh < 999.0) ) ASSIGN TO: 20-30m - >50cm
ELSE IF( (type = 1) AND (20.0 <= height < 30.0) AND (30.0 <= dbh < 50.0) ) ASSIGN TO: 20-30m - 30-50cm
ELSE IF( (type = 1) AND (20.0 <= height < 30.0) AND (1.0 <= dbh < 30.0) ) ASSIGN TO: 20-30m - <30cm
ELSE IF( (type = 1) AND (10.0 <= height < 20.0) AND (50.0 <= dbh < 999.0) ) ASSIGN TO: 10-20m - >50cm
ELSE IF( (type = 1) AND (10.0 <= height < 20.0) AND (30.0 <= dbh < 50.0) ) ASSIGN TO: 10-20m - 30-50cm
ELSE IF( (type = 1) AND (10.0 <= height < 20.0) AND (1.0 <= dbh < 30.0) ) ASSIGN TO: 10-20m - <30cm
ELSE IF( (type = 1) AND (1.0 <= height < 10.0) AND (1.0 <= dbh < 999.0) ) ASSIGN TO: <10m
ELSE ASSIGN TO: Unspecified
ELSE ASSIGN TO: **Unspecified**
```