Learning the Landscape Management System

Objective

Demonstrate use of Landscape Management System (LMS) using a task/problem based learning approach.

Task Outline

- Compare Arithmetic Average Diameter (AveDBH) and Quadratic Mean Diameter (DBHq or QMD)
- Examine Mean Diameter Change
- Comparative Thinning Analysis
- View shed Analysis

Arithmetic Average Diameter (AveDBH) versus Quadratic Mean Diameter (DBHq)

- Learning Objective:
  - Compare arithmetic average and quadratic mean diameter
  - Demonstrate Tables, Stand Visualization (SVS), and use of Excel

AveDBH versus DBHq

Why compare arithmetic and quadratic mean diameter?

Quadratic Mean Diameter has a long history of use in Forestry. It is frequently used in the Forestry literature as "average diameter". Need to be careful and try and figure out which average is being used.

Comparing arithmetic average to the quadratic mean diameter gives insight into the structure of the stand. The more similar more likely a narrow diameter range, single canopy layer.

AveDBH versus DBHq

Roadmap:

- Inventory Table
- Compute Arithmetic and Quadratic Mean Diameter from Inventory Table using Excel
- Summary Table
- SVS

AveDBH versus DBHq

The arithmetic average (AveDBH) is an average, weighted by TPA, of all diameters for the stand.

It is computed by summing the diameters multiplied by the expansion factor (TPA) for each record and then dividing by the total TPA.

$$AveDBH = \sum (DBH_i * TPA_i) / \sum TPA_i$$

The Quadratic Mean Diameter (DBHq) is the diameter of the tree of mean basal area.

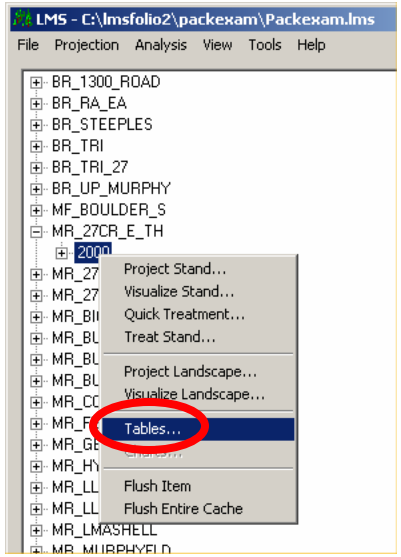
It is computed by converting the individual diameters to basal area, multiplying the basal area times the expansion factor (TPA), summing the basal area, dividing by the total TPA to get mean basal area, then converting that mean basal area back to diameter.

$$DBHq = \sqrt{\left(\sum DBH_i^2 * 0.005454 * TPA_i\right) / \left(\sum TPA_i\right) / 0.005454}$$

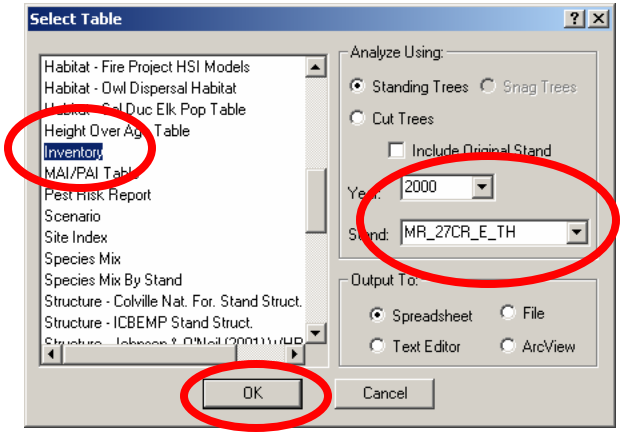
AveDBH versus DBHq

Computing Average and Quadratic Diameter:

Start by getting the Inventory Table for a single stand. In this example we right click on the 2000 year for the stand MR_27CR_E_TH, and from the LMS Context menu select Tables.



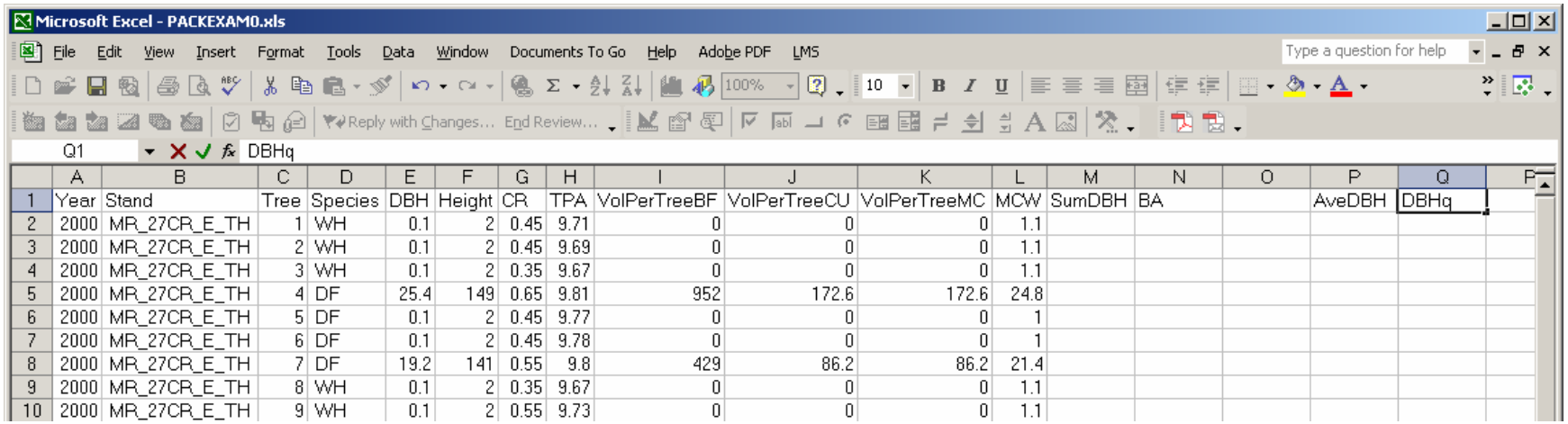
From the Select Table dialog locate and select the Inventory table. Send the output for Standing Trees to the Spreadsheet. Notice that the Year and Stand are already selected.



AveDBH versus DBHq

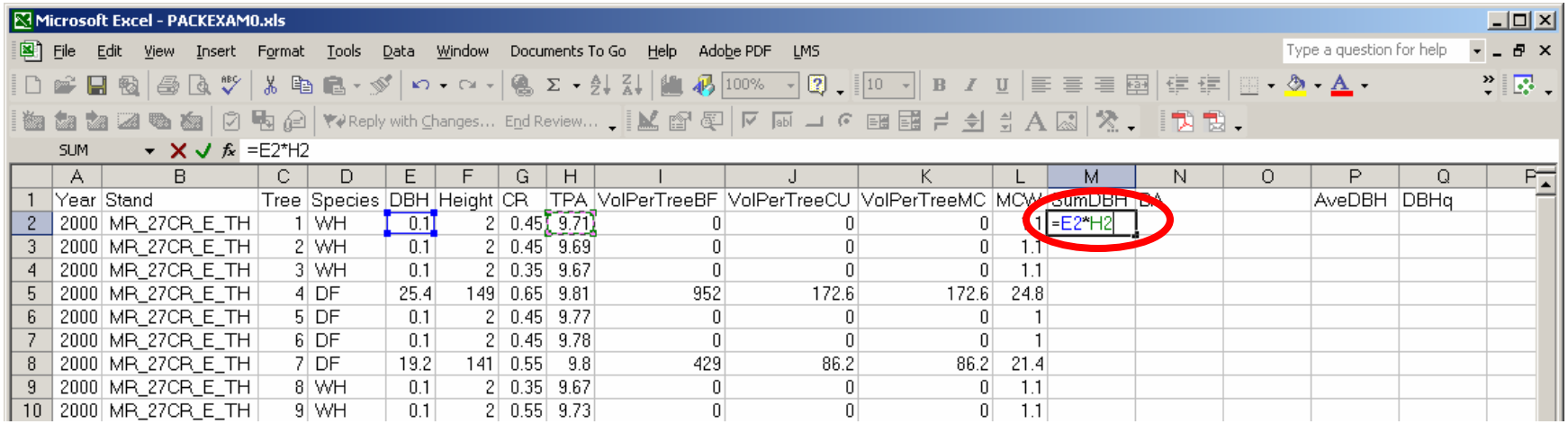
Enter column heading for our calculations of average and quadratic mean diameter.

Enter “SumDBH” into cell M1, “BA” into cell N1, “AveDBH” into cell P1, and “DBHq” into cell O1.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1					
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1					
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1					
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8					
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1					
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1					
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4					
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1					
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1					

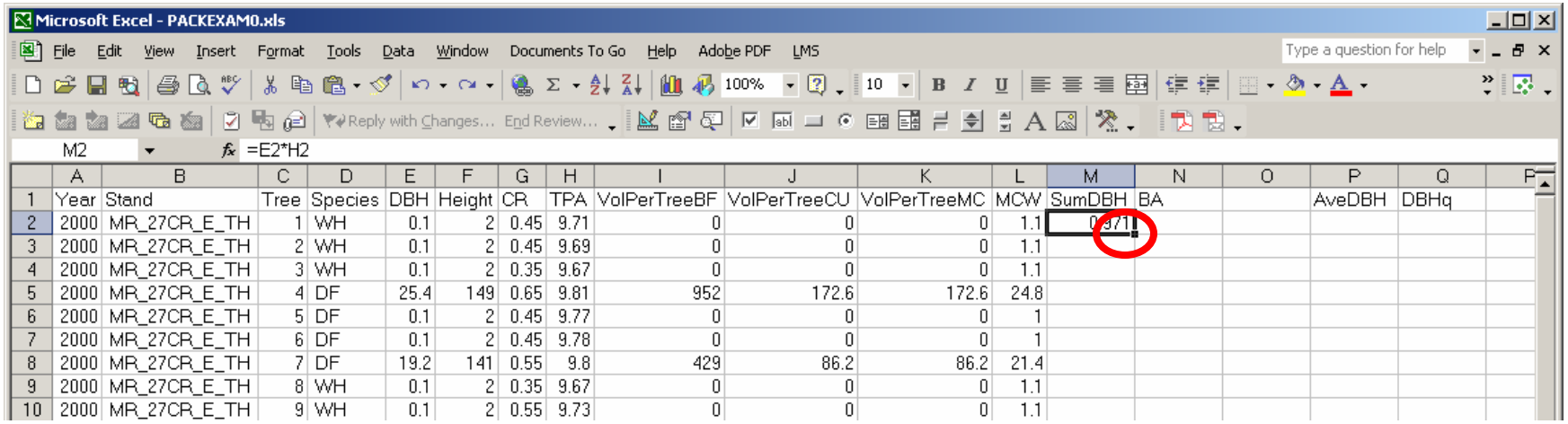
AveDBH versus DBHq



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq	
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1	=E2*H2					
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1						
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1						
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8						
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1						
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1						
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4						
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1						
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1						

Enter the formula, =E2*H2, for the sum of diameters for the record in cell M2. This is the sum of diameters for this inventory record, which will be used for the weighted average.

AveDBH versus DBHq

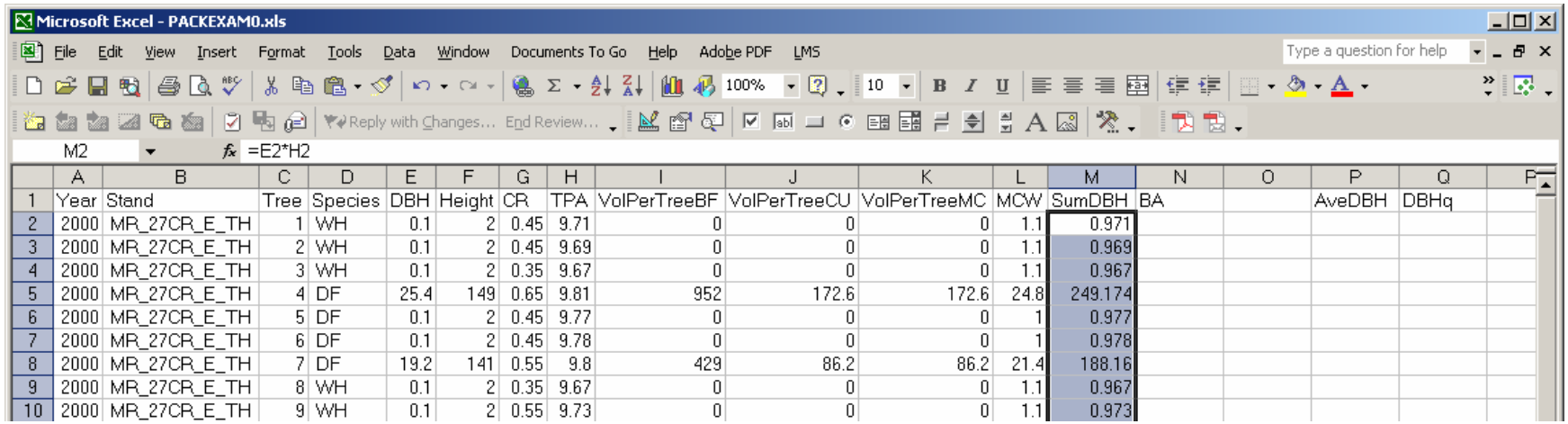


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1	0.971				
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1					
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1					
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8					
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1					
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1					
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4					
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1					
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1					

We can fill in the rest of the column with the correct formula by using Excel's AutoFill feature. Click on the cell with the formula, then double click the black square on the bottom right corner of the cell, this will automatically "fill" the rest of the column.

AveDBH versus DBHq

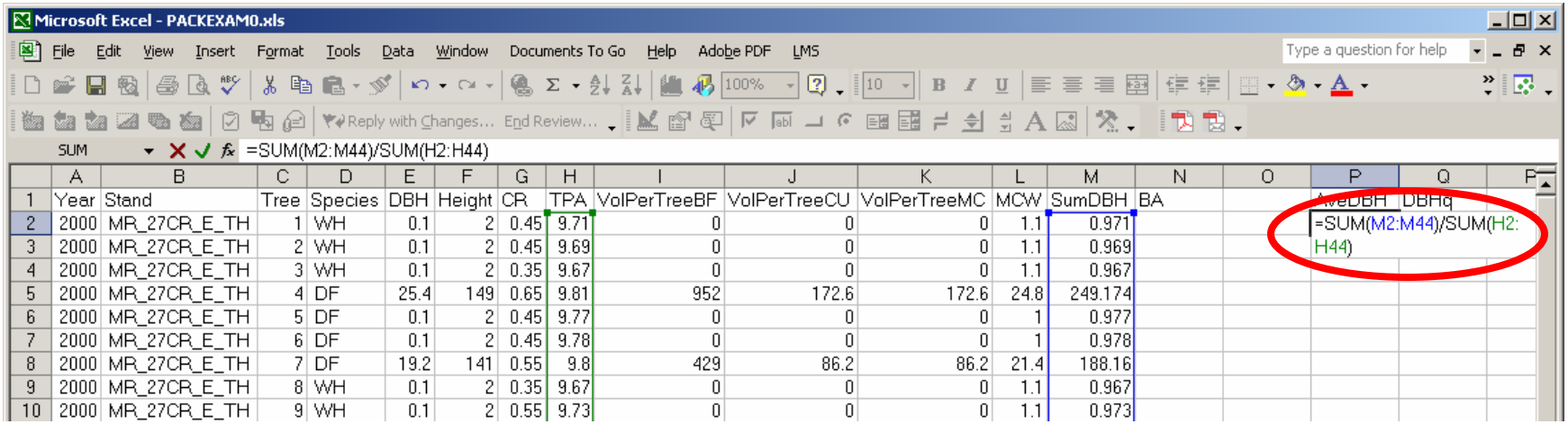
After AutoFill has worked we see the column of filled cells highlighted.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1	0.971				
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1	0.969				
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967				
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8	249.174				
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1	0.977				
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1	0.978				
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4	188.16				
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967				
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1	0.973				

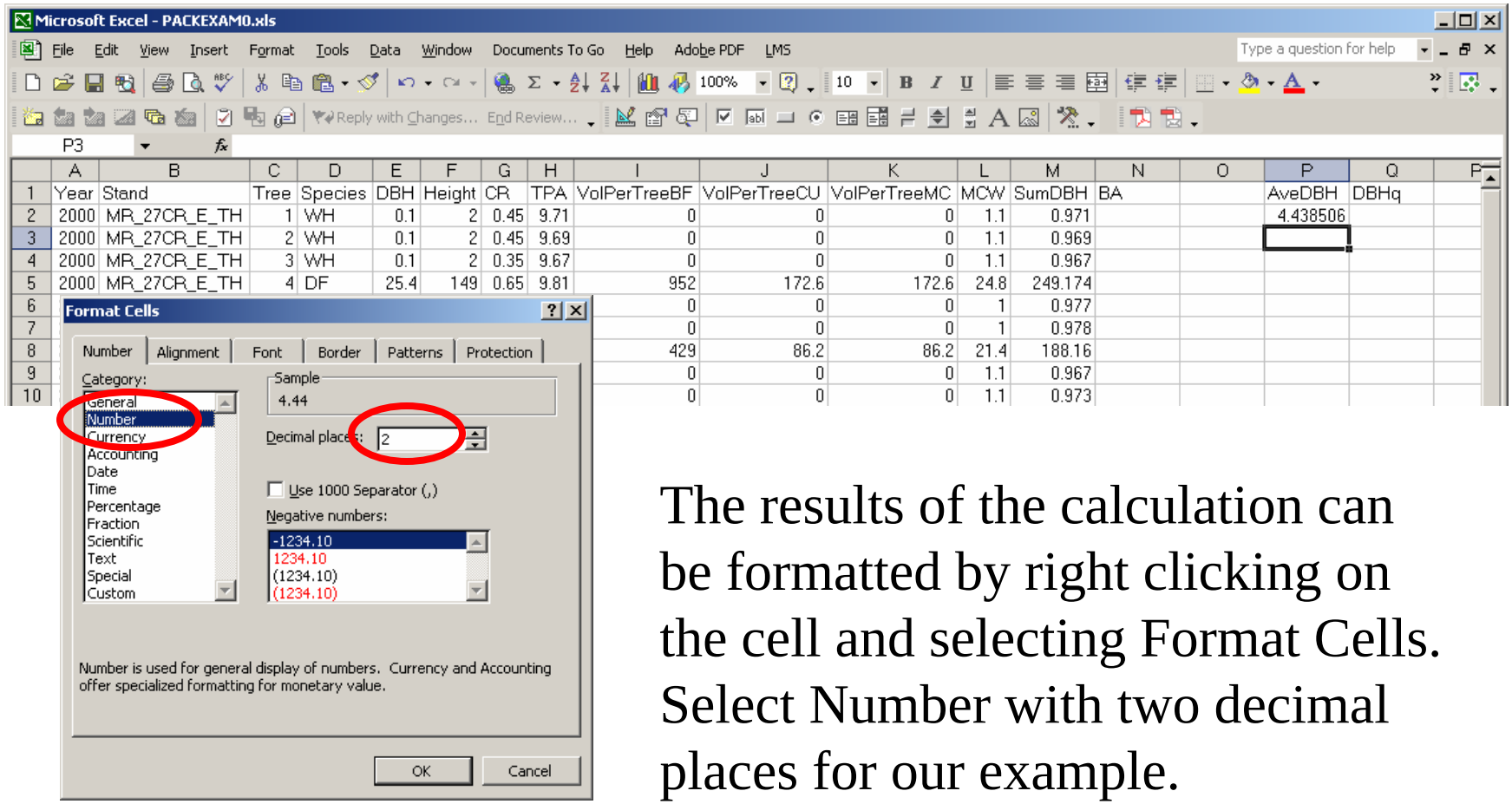
AveDBH versus DBHq

We can now compute the weighted arithmetic average by dividing the sum of diameters (M) by the sum of TPA (H). Enter the formula, =SUM(M2:M44)/SUM(H2:H44), into cell P2.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1	0.971				
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1	0.969				
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967				
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8	249.174				
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1	0.977				
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1	0.978				
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4	188.16				
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967				
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1	0.973				

AveDBH versus DBHq



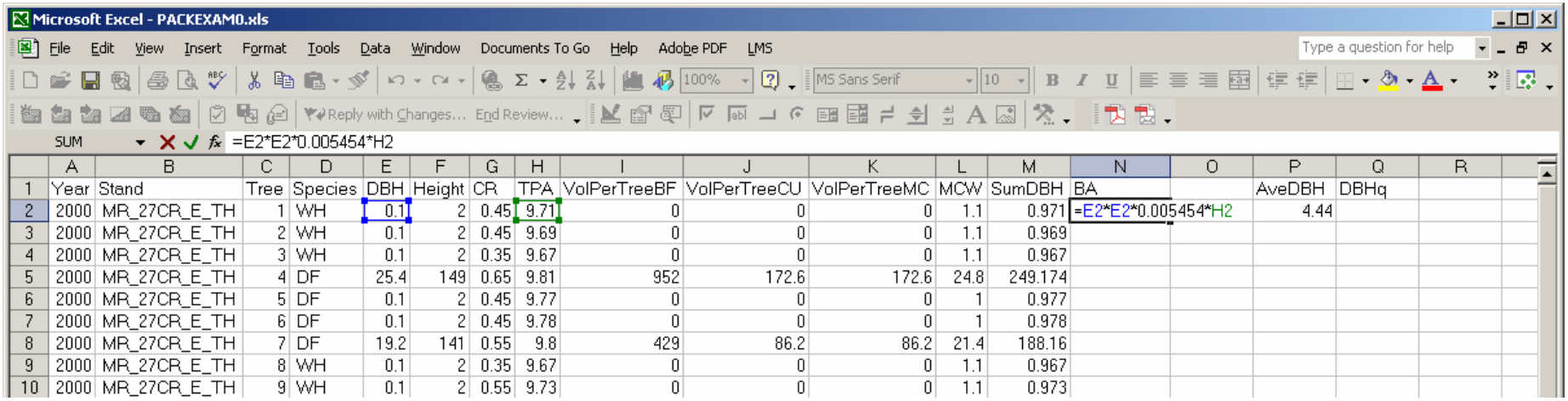
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1	0.971			4.438506	
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1	0.969				
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967				
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8	249.174				
6									0	0	0	1	0.977				
7									0	0	0	1	0.978				
8									429	86.2	86.2	21.4	188.16				
9									0	0	0	1.1	0.967				
10									0	0	0	1.1	0.973				

The results of the calculation can be formatted by right clicking on the cell and selecting Format Cells. Select Number with two decimal places for our example.

AveDBH versus DBHq

The basal area can be computed using the BA=D^2*0.005454 formula. Enter the formula, =E2*E2*0.005454*H2, in cell N2. Remember that the H2 is used to compute the weighted average because we may have more than one tree of each size.

You can also use E2^2 instead of E2*E2 for diameter squared.

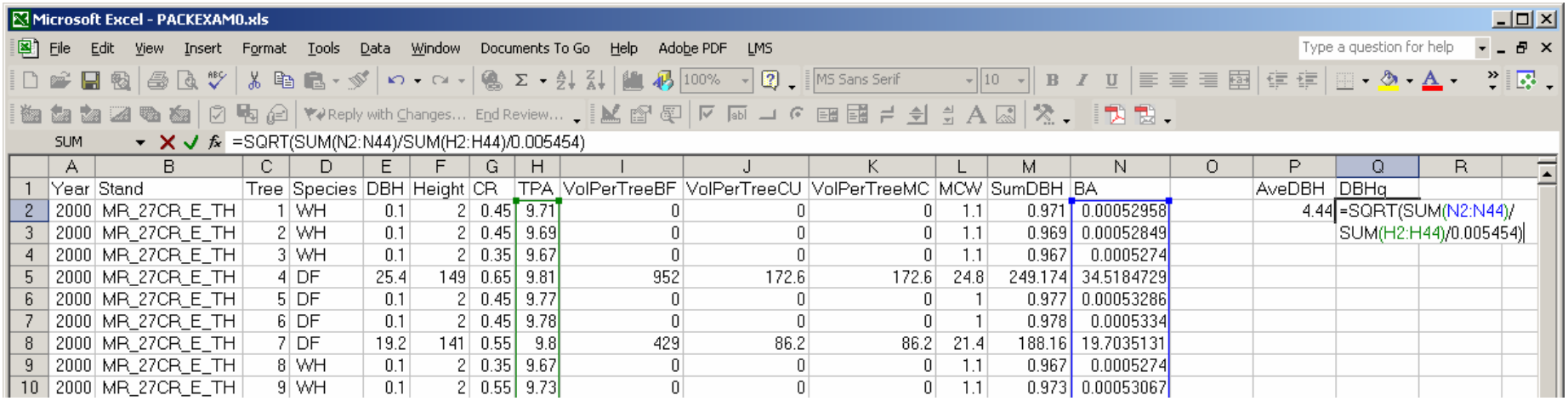


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq	
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1	0.971	=E2*E2*0.005454*H2		4.44		
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1	0.969					
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967					
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8	249.174					
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1	0.977					
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1	0.978					
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4	188.16					
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967					
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1	0.973					

AveDBH versus DBHq

Use AutoFill to fill in the rest of the values for column N.

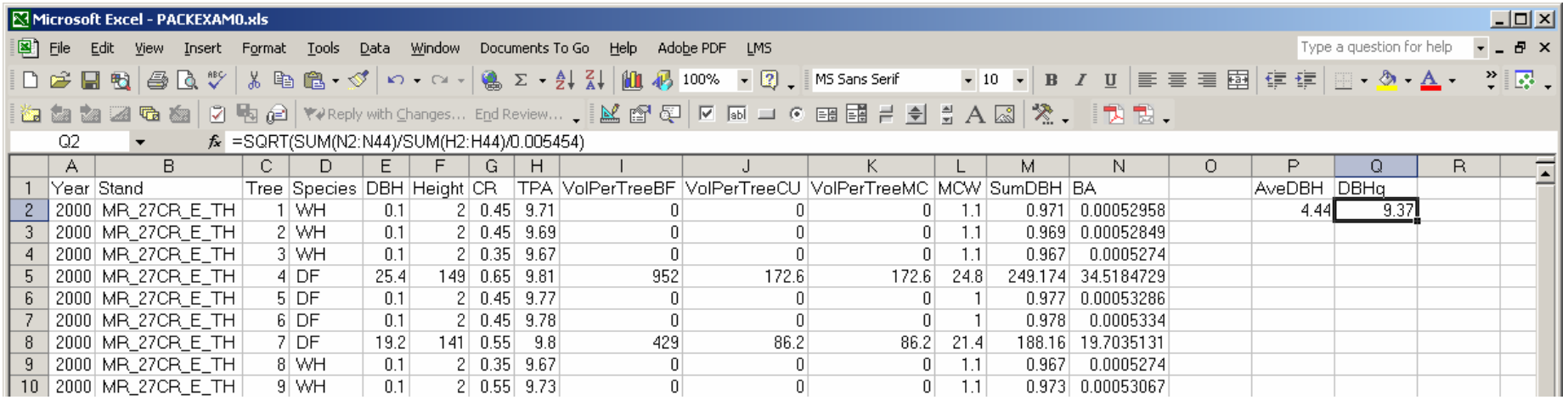
The Quadratic mean diameter is computed using the following formula. Enter the formula, =SQRT(SUM(N2:N44)/SUM(H2:H44)/0.005454), into cell Q2.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq	
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1	0.971	0.00052958		4.44	=SQRT(SUM(N2:N44)/	
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1	0.969	0.00052849			SUM(H2:H44)/0.005454)	
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967	0.0005274				
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8	249.174	34.5184729				
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1	0.977	0.00053286				
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1	0.978	0.0005334				
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4	188.16	19.7035131				
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967	0.0005274				
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1	0.973	0.00053067				

AveDBH versus DBHq

We can format the result for DBHq using Format Cells. Display the result using two decimal places.

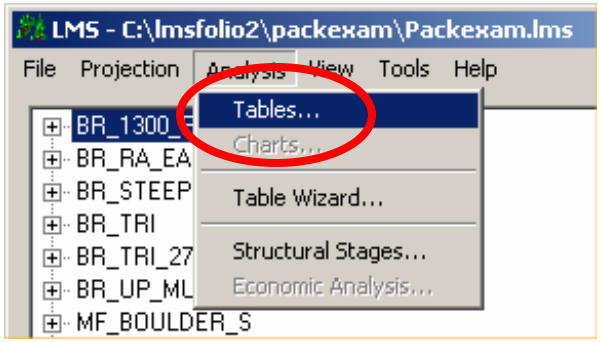


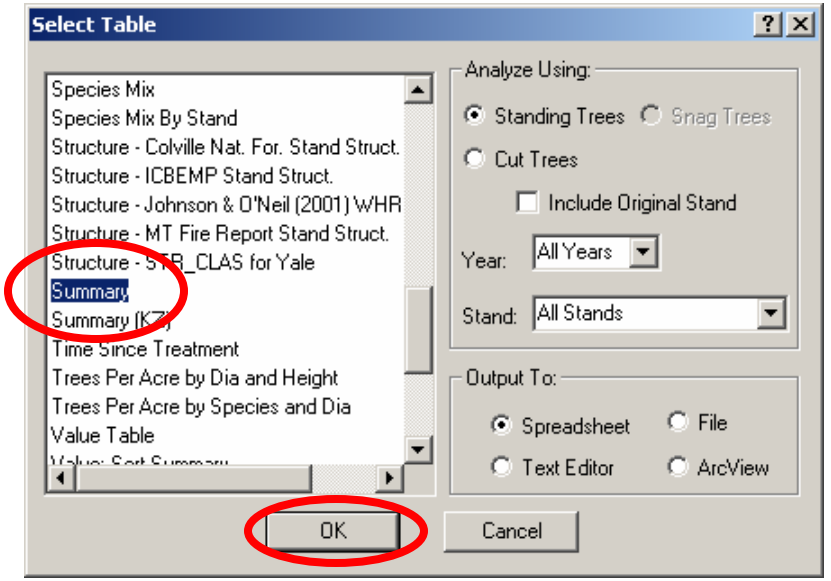
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Year	Stand	Tree	Species	DBH	Height	CR	TPA	VolPerTreeBF	VolPerTreeCU	VolPerTreeMC	MCW	SumDBH	BA		AveDBH	DBHq	
2	2000	MR_27CR_E_TH	1	WH	0.1	2	0.45	9.71	0	0	0	1.1	0.971	0.00052958		4.44	9.37	
3	2000	MR_27CR_E_TH	2	WH	0.1	2	0.45	9.69	0	0	0	1.1	0.969	0.00052849				
4	2000	MR_27CR_E_TH	3	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967	0.0005274				
5	2000	MR_27CR_E_TH	4	DF	25.4	149	0.65	9.81	952	172.6	172.6	24.8	249.174	34.5184729				
6	2000	MR_27CR_E_TH	5	DF	0.1	2	0.45	9.77	0	0	0	1	0.977	0.00053286				
7	2000	MR_27CR_E_TH	6	DF	0.1	2	0.45	9.78	0	0	0	1	0.978	0.0005334				
8	2000	MR_27CR_E_TH	7	DF	19.2	141	0.55	9.8	429	86.2	86.2	21.4	188.16	19.7035131				
9	2000	MR_27CR_E_TH	8	WH	0.1	2	0.35	9.67	0	0	0	1.1	0.967	0.0005274				
10	2000	MR_27CR_E_TH	9	WH	0.1	2	0.55	9.73	0	0	0	1.1	0.973	0.00053067				

The arithmetic and quadratic mean diameters can also be displayed using the Summary Table in LMS.

AveDBH versus DBHq

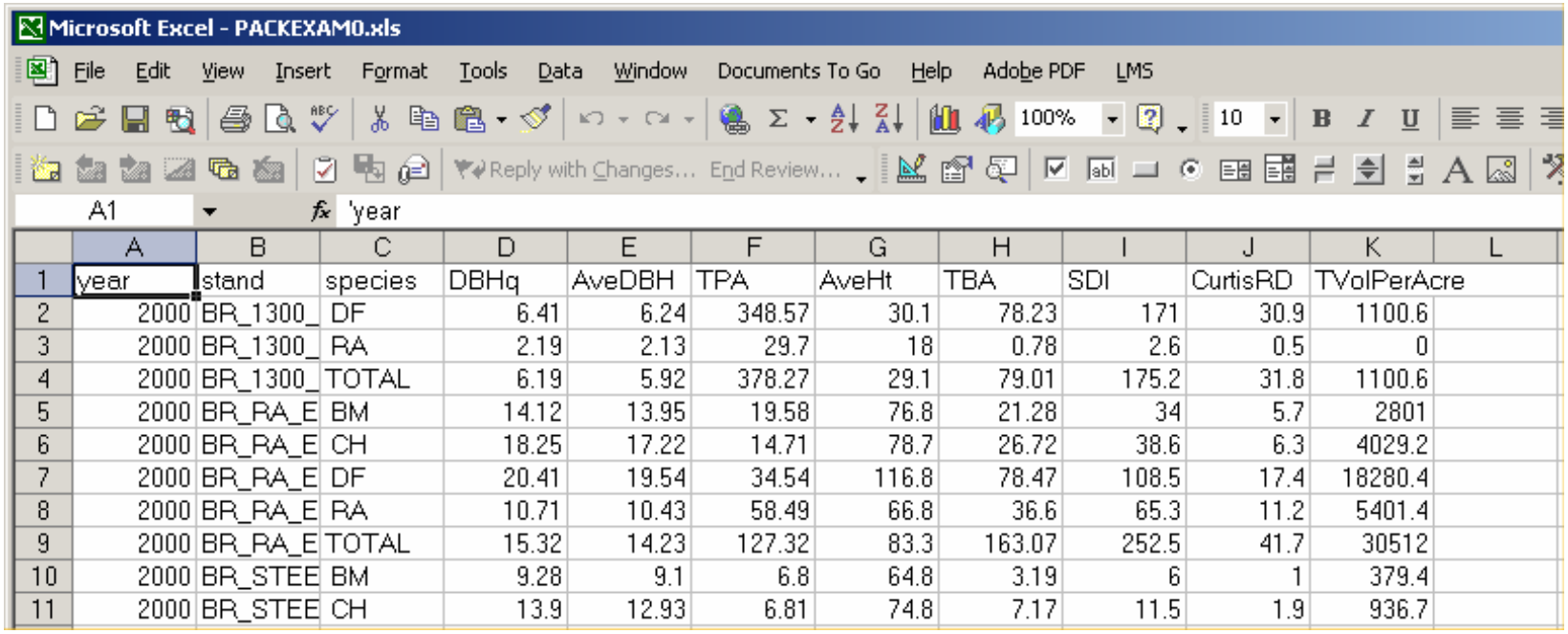
Retrieve the Summary Table from LMS using the Analysis/Tables menu command.





Navigate in the Select Table dialog to find the Summary Table. Send the output for Standing Trees to the Spreadsheet.

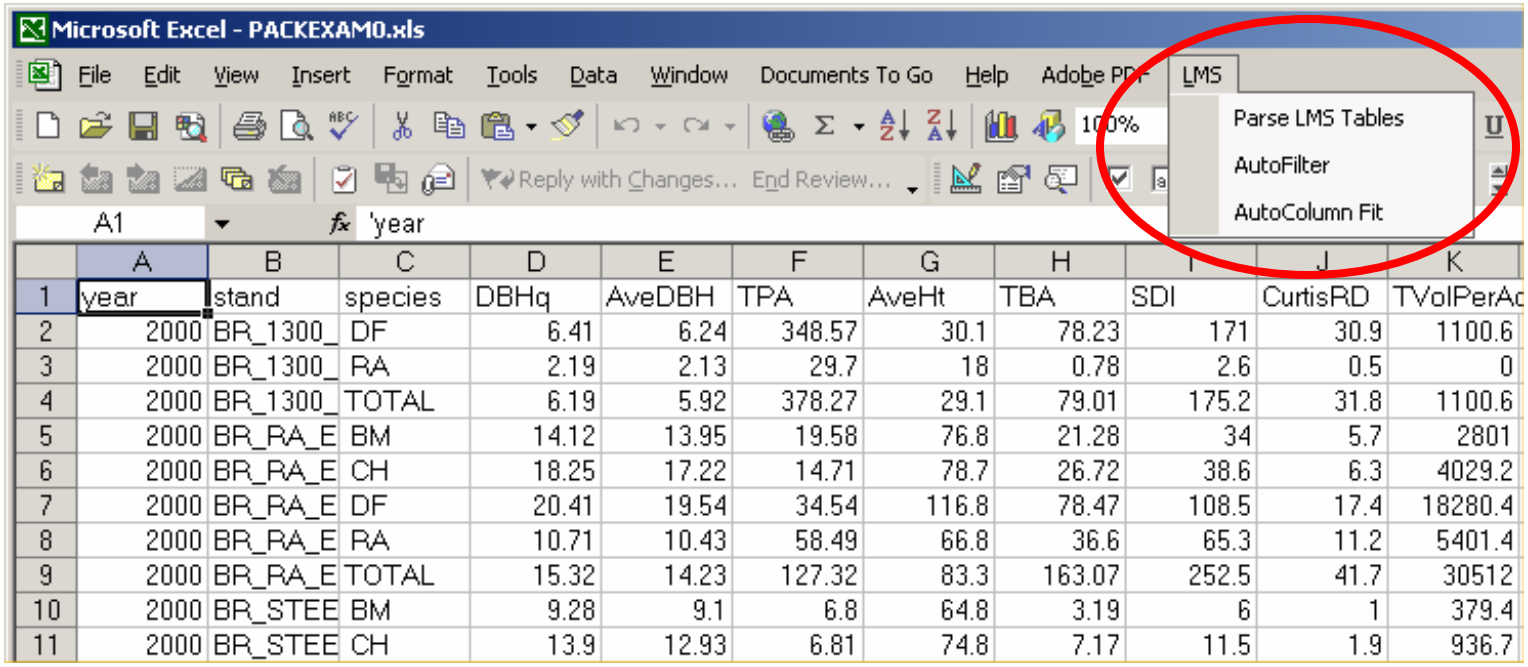
AveDBH versus DBHq



	A	B	C	D	E	F	G	H	I	J	K	L
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre	
2	2000	BR_1300_	DF	6.41	6.24	348.57	30.1	78.23	171	30.9	1100.6	
3	2000	BR_1300_	RA	2.19	2.13	29.7	18	0.78	2.6	0.5	0	
4	2000	BR_1300_	TOTAL	6.19	5.92	378.27	29.1	79.01	175.2	31.8	1100.6	
5	2000	BR_RA_E	BM	14.12	13.95	19.58	76.8	21.28	34	5.7	2801	
6	2000	BR_RA_E	CH	18.25	17.22	14.71	78.7	26.72	38.6	6.3	4029.2	
7	2000	BR_RA_E	DF	20.41	19.54	34.54	116.8	78.47	108.5	17.4	18280.4	
8	2000	BR_RA_E	RA	10.71	10.43	58.49	66.8	36.6	65.3	11.2	5401.4	
9	2000	BR_RA_E	TOTAL	15.32	14.23	127.32	83.3	163.07	252.5	41.7	30512	
10	2000	BR_STEE	BM	9.28	9.1	6.8	64.8	3.19	6	1	379.4	
11	2000	BR_STEE	CH	13.9	12.93	6.81	74.8	7.17	11.5	1.9	936.7	

The Summary Table will come up in Excel, showing the Year, Stand, Species, DBHq, AveDBH, TPA, AveHt, TBA, SDI, CurtisRD, and TVolPerAcre. DBHq is the Quadratic Mean Diameter.

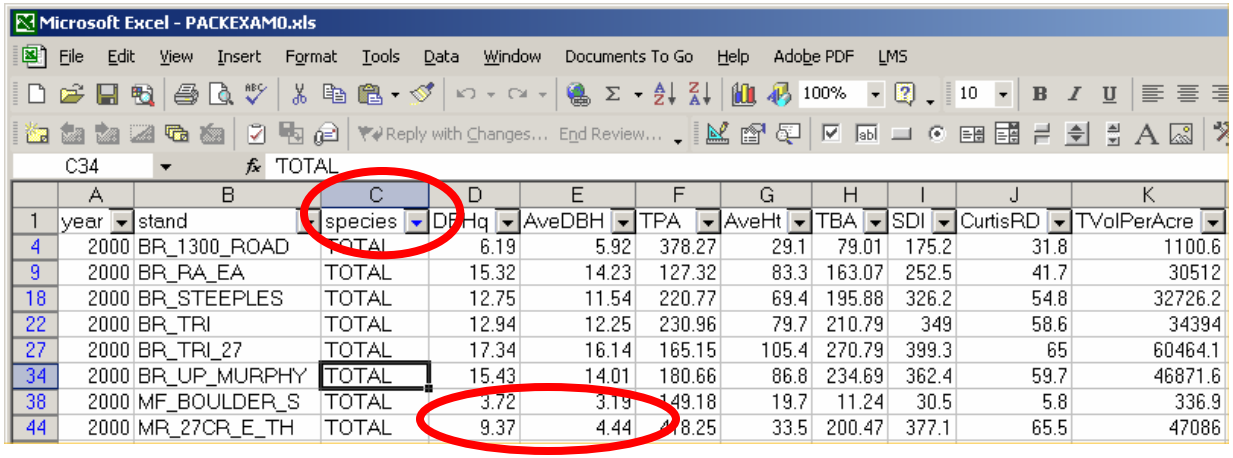
AveDBH versus DBHq



	A	B	C	D	E	F	G	H	I	J	K
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAc
2	2000	BR_1300_	DF	6.41	6.24	348.57	30.1	78.23	171	30.9	1100.6
3	2000	BR_1300_	RA	2.19	2.13	29.7	18	0.78	2.6	0.5	0
4	2000	BR_1300_	TOTAL	6.19	5.92	378.27	29.1	79.01	175.2	31.8	1100.6
5	2000	BR_RA_E	BM	14.12	13.95	19.58	76.8	21.28	34	5.7	2801
6	2000	BR_RA_E	CH	18.25	17.22	14.71	78.7	26.72	38.6	6.3	4029.2
7	2000	BR_RA_E	DF	20.41	19.54	34.54	116.8	78.47	108.5	17.4	18280.4
8	2000	BR_RA_E	RA	10.71	10.43	58.49	66.8	36.6	65.3	11.2	5401.4
9	2000	BR_RA_E	TOTAL	15.32	14.23	127.32	83.3	163.07	252.5	41.7	30512
10	2000	BR_STEE	BM	9.28	9.1	6.8	64.8	3.19	6	1	379.4
11	2000	BR_STEE	CH	13.9	12.93	6.81	74.8	7.17	11.5	1.9	936.7

The Summary Table displays the information by species and a total for the stand. You can select the TOTAL lines by using Filters in Excel. Select the LMS menu, and select AutoFilter, then AutoColumn Fit.

AveDBH versus DBHq



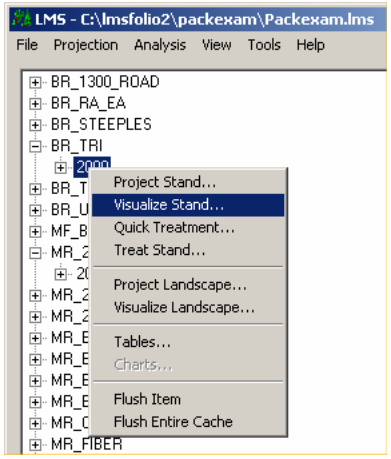
	A	B	C	D	E	F	G	H	I	J	K
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre
4	2000	BR_1300_ROAD	TOTAL	6.19	5.92	378.27	29.1	79.01	175.2	31.8	1100.6
9	2000	BR_RA_EA	TOTAL	15.32	14.23	127.32	83.3	163.07	252.5	41.7	30512
18	2000	BR_STEEPLES	TOTAL	12.75	11.54	220.77	69.4	195.88	326.2	54.8	32726.2
22	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79	349	58.6	34394
27	2000	BR_TRI_27	TOTAL	17.34	16.14	165.15	105.4	270.79	399.3	65	60464.1
34	2000	BR_UP_MURPHY	TOTAL	15.43	14.01	180.66	86.8	234.69	362.4	59.7	46871.6
38	2000	MF_BOULDER_S	TOTAL	3.72	3.19	149.18	19.7	11.24	30.5	5.8	336.9
44	2000	MR_27CR_E_TH	TOTAL	9.37	4.44	478.25	33.5	200.47	377.1	65.5	47086

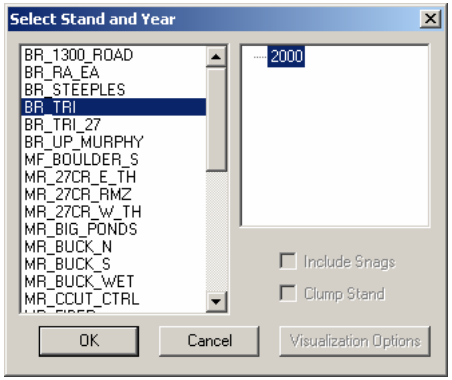
Select TOTAL from the list of species codes when you use the drop down menu next to species. For MR_27CR_E_TH the results from the summary table are the same as our calculations in Excel. Notice that for other stands the value for DBHq and AveDBH are more similar, with AveDBH being smaller. The difference between the two is an indication of diameter distribution uniformity.

AveDBH versus DBHq

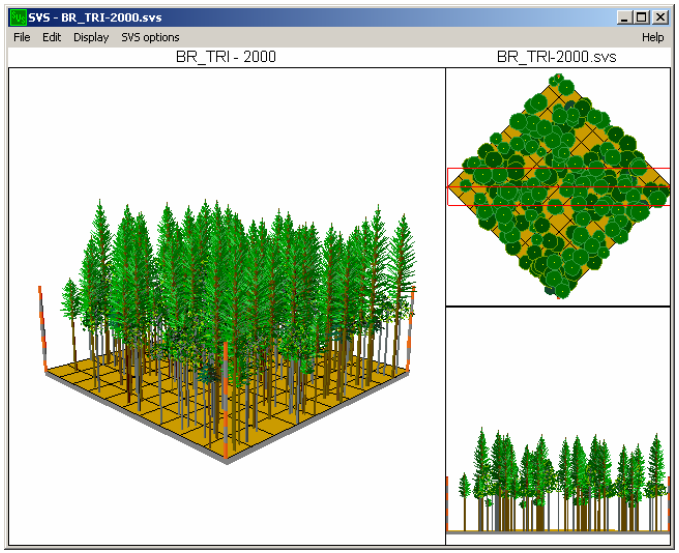
We can examine the diameter distribution using the Stand Visualization System (SVS).

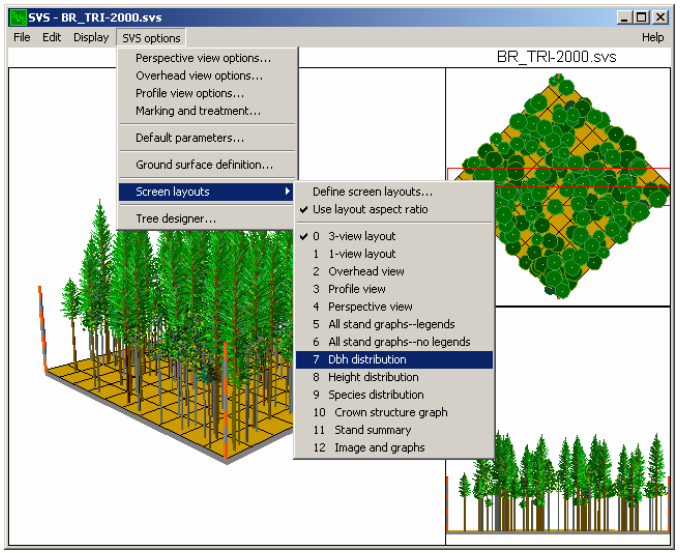
Use a right click on the year to bring up the LMS Context menu, and select Visualize Stand. Use the Select Stand and Year dialog to change or confirm you stand and year for the visualization. Click OK to display the visualization.





AveDBH versus DBHq





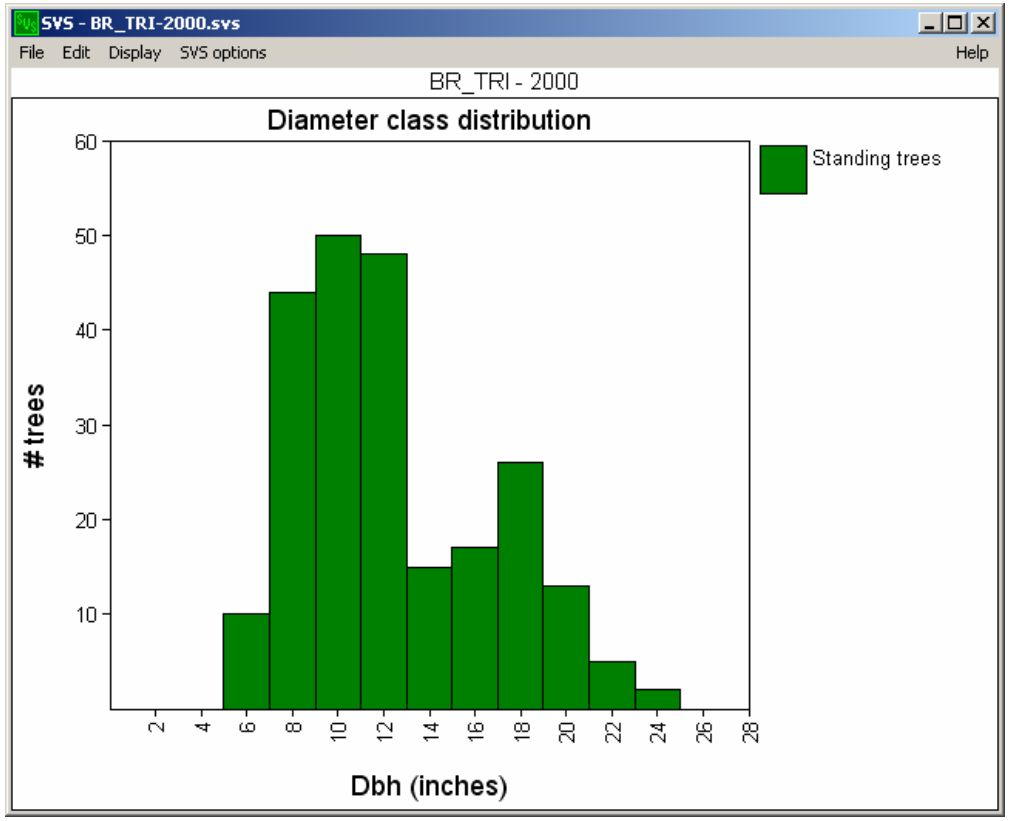
SVS will come up in one of many different layouts. Select the SVS options/Screen layouts/Dbh distribution to display a graphic of the diameter distribution for the selected stand.

Note: The next time SVS is run it will display in the last selected layout.

AveDBH versus DBHq

The Diameter class distribution layout shows the number of trees per acre by 2 inch diameter classes.

With this we can see the shape of the distribution. In this example we have more small trees than large trees.



AveDBH versus DBHq

Microsoft Excel - PACKEXAM0.xls

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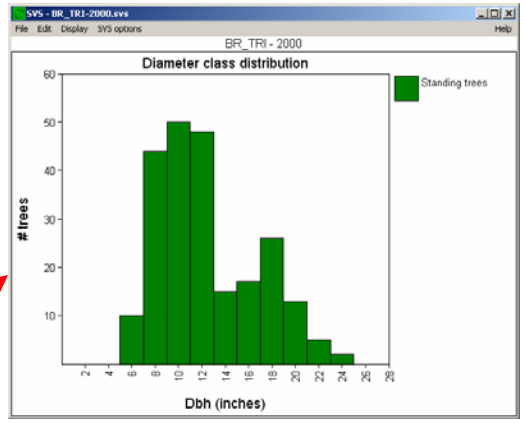
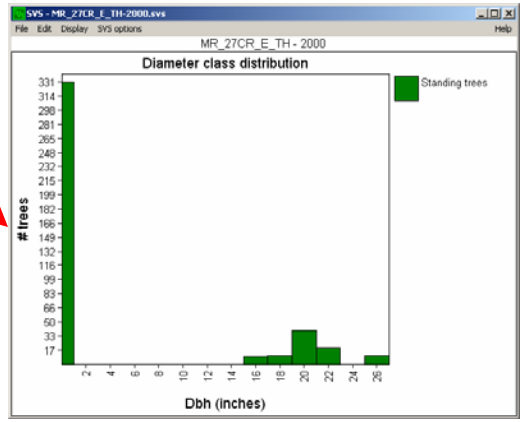
Reply with Changes... End Review

C34 fx TOTAL

	A	B	C	D	E
1	year	stand	species	DBHq	AveDBH
4	2000	BR_1300_ROAD	TOTAL	6.19	5.92
9	2000	BR_RA_EA	TOTAL	15.32	14.23
18	2000	BR_STEEPLES	TOTAL	12.75	11.54
22	2000	BR_TRI	TOTAL	12.94	12.25
27	2000	BR_TRI_27	TOTAL	17.34	16.14
34	2000	BR_UP_MURPHY	TOTAL	15.43	14.01
38	2000	MF_BOULDER_S	TOTAL	3.72	3.19
44	2000	MR_27CR_E_TH	TOTAL	9.37	4.44





The difference between DBHq and AveDBH give an indication of the shape of the distribution, the more different the more skewed or bimodal the distribution will be.

AveDBH versus DBHq

Why use DBHq?

Gives greater weight to large trees and is equal to or greater than the arithmetic mean (Curtis & Marshall 2000).

If the primary interest in diameter is to permit calculation of basal area or volume, then a better average is the quadratic mean (Husch et al. 2003)

More stable for modeling purposes (better correlated to stand density, directly convertible to basal area).

Curtis, R. O. and D. D. Marshall. 2000. Why Quadratic Mean Diameter? Western Journal of Applied Forestry. 15(3): 137-139.

Husch, B., T. W. Beers, and J. A. Kershaw, Jr. 2003. Forest Menuration (4th Edition). John Wiley & Sons, Hoboken, New Jersey. Pages 33, 92, 166.

AveDBH versus DBHq

Assignment:

Compute the arithmetic average and quadratic mean diameter for a stand (not MR_27CR_E_TH) using the Inventory Table and compare you answers to the answers in the Summary Table.

Comment on the stand structure based on arithemetic average versus quadratic mean and the diameter distribution.

Examine Mean Diameter Change

- Learning Objective:
  - Examine how mean diameter changes through growth and from treatments
  - Demonstrate Tables, Stand Projection, Treatments, Excel

Mean Diameter Change

- Change from growth
  - Individual trees will increase, increasing mean diameter
  - Small trees will die, also increasing mean diameter
- Change from treatment
  - Change depends on trees removed
  - Thin from below will increase
  - Thin from above will decrease
- Change from treatment and growth

Mean Diameter Change

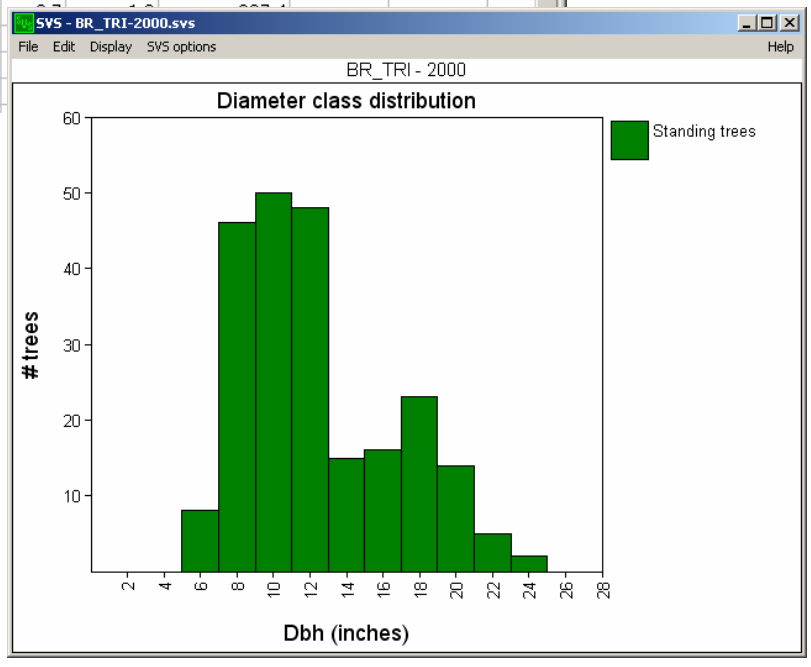
Roadmap

- Stand Projection
- Summary Table
- Excel
- Treatments
- Excel Charts

Mean Diameter – Change from Growth

Microsoft Excel - PACKEXAM0.xls

	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre
2	2000	BR_TRI	DF	14.78	13.99	126.96	91.6	151.26	237.6	39.3	26320.7
3	2000	BR_TRI	RA	10.3	10.19	96.75	65.4	55.97	101.4	17.4	7685.9
4	2000	BR_TRI	WH	9.49	9.27	7.25	62.7	3.56			
5	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79			

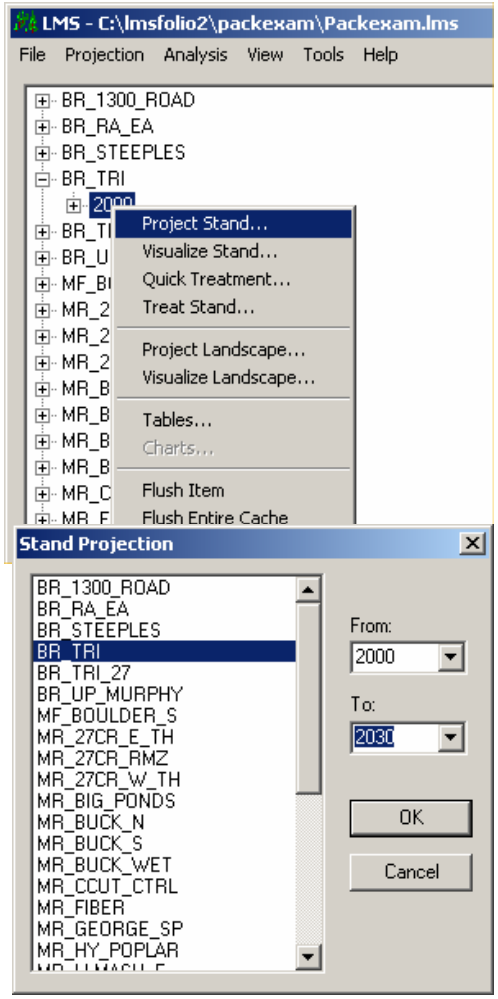


The stand BR_TRI starts with a DBHq of 12.94 inches. This mean diameter comes from the diameter distribution shown to the right.

Mean Diameter – Change from Growth

Growth of the inventory can be simulated using Stand Projection. Right click on the year 2000 for stand BR_TRI to bring up the LMS Context Menu, select Project Stand to bring up the Stand Projection Dialog. Select the To Year (use 2030) to indicate how far LMS should run the simulation. Click OK when ready.

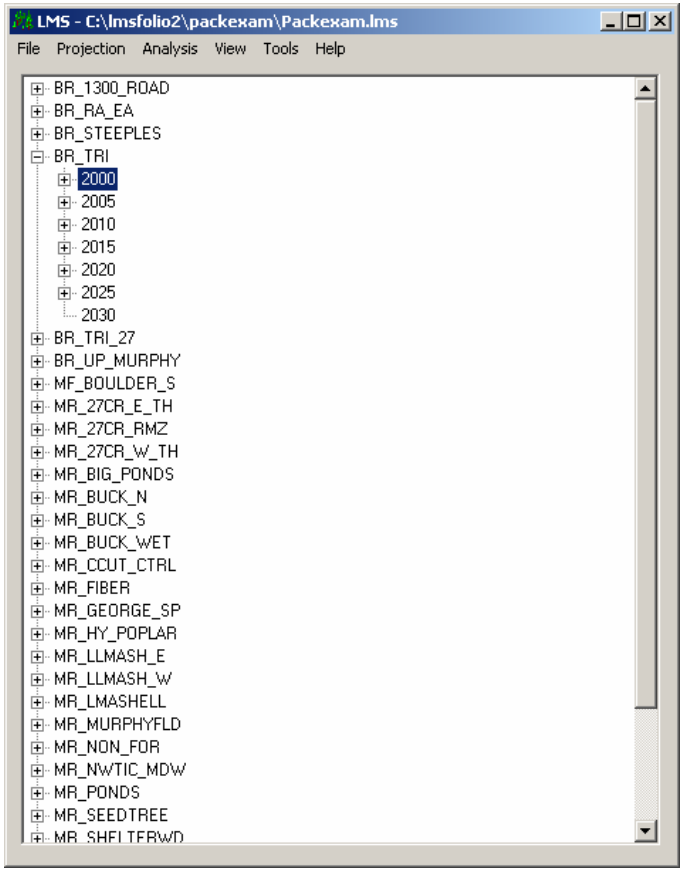
The growth model will be run in the background, resulting in a “DOS box” for each stand and year.



Mean Diameter – Change from Growth

After the growth model finishes running the tree view in LMS will contain an entry for each year from 2000 through 2030.

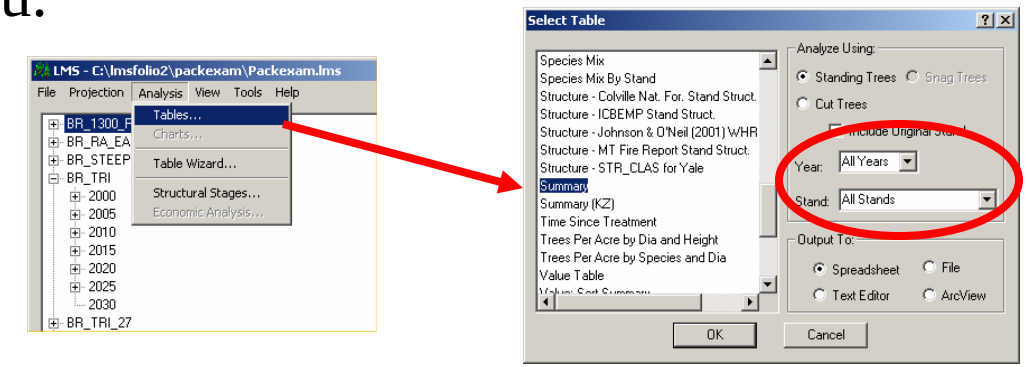
Tables and visualizations can now be viewed for the inventories for each year.



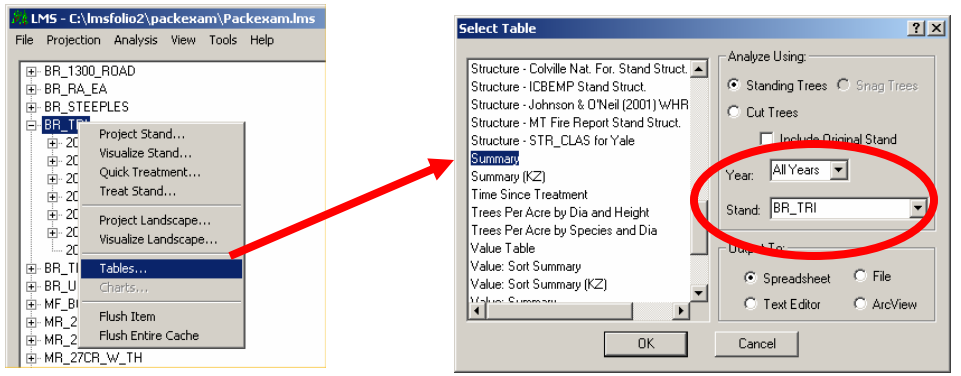
Mean Diameter – Change from Growth

Retrieve the Summary Table using either the Analysis Menu or the LMS Context Menu.

Note: Using the Analysis Menu will select all stands by default.



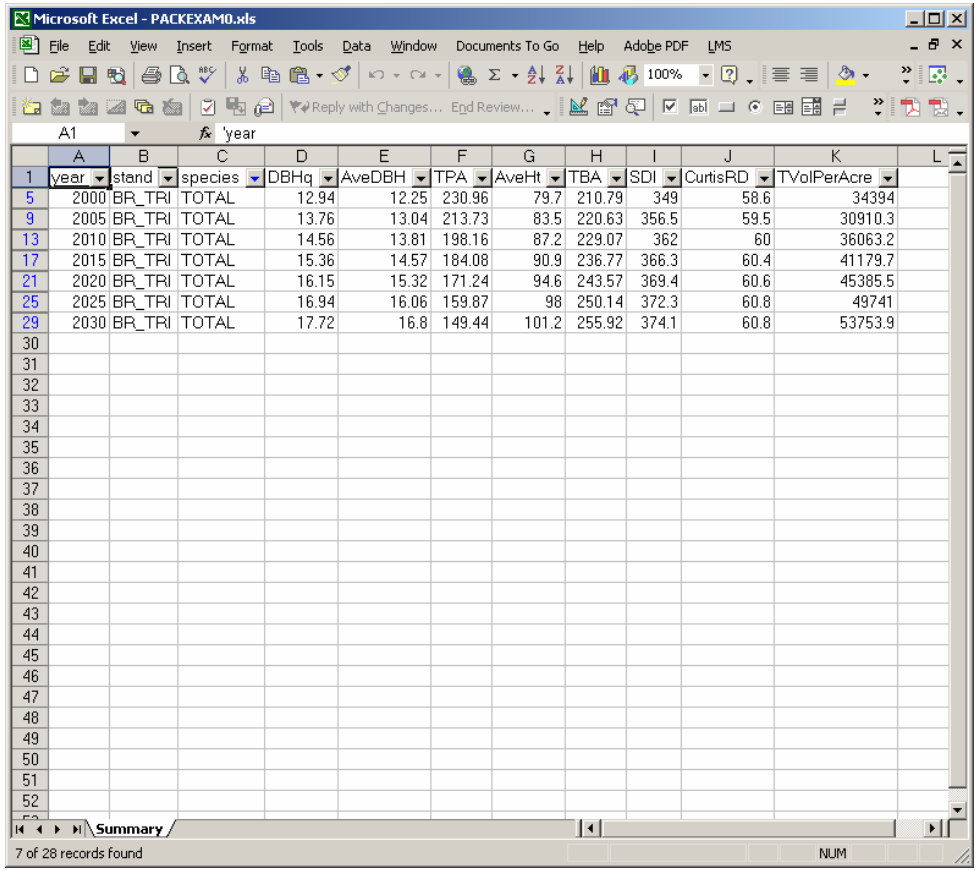
Using the Context Menu will select the BRI_TRI stand automatically.



Mean Diameter – Change from Growth

Use the Excel LMS Menu to AutoFilter and then select the TOTAL lines for the BR_TRI stand.

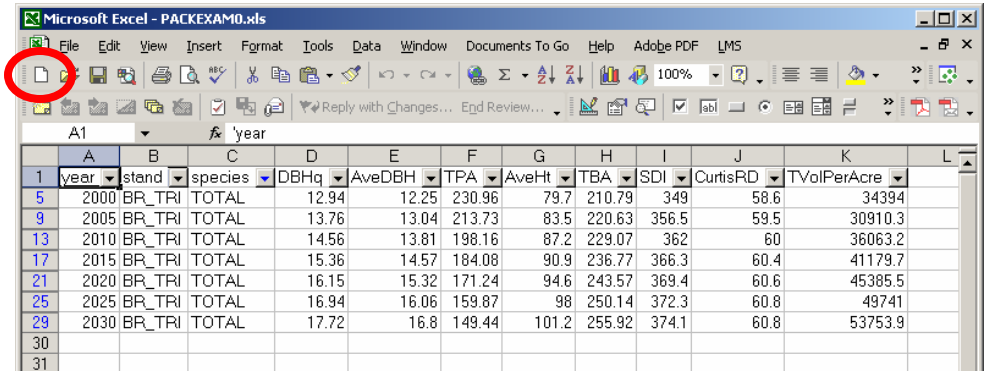
Notice that the BRI_TRI stand grows about 0.8 inch each 5 year period.



	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre
5	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79	349	58.6	34394
9	2005	BR_TRI	TOTAL	13.76	13.04	213.73	83.5	220.63	356.5	59.5	30910.3
13	2010	BR_TRI	TOTAL	14.56	13.81	198.16	87.2	229.07	362	60	36063.2
17	2015	BR_TRI	TOTAL	15.36	14.57	184.08	90.9	236.77	366.3	60.4	41179.7
21	2020	BR_TRI	TOTAL	16.15	15.32	171.24	94.6	243.57	369.4	60.6	45385.5
25	2025	BR_TRI	TOTAL	16.94	16.06	159.87	98	250.14	372.3	60.8	49741
29	2030	BR_TRI	TOTAL	17.72	16.8	149.44	101.2	255.92	374.1	60.8	53753.9

Mean Diameter – Change from Growth

We want to store these values for later use so that we can compare different growth patterns.



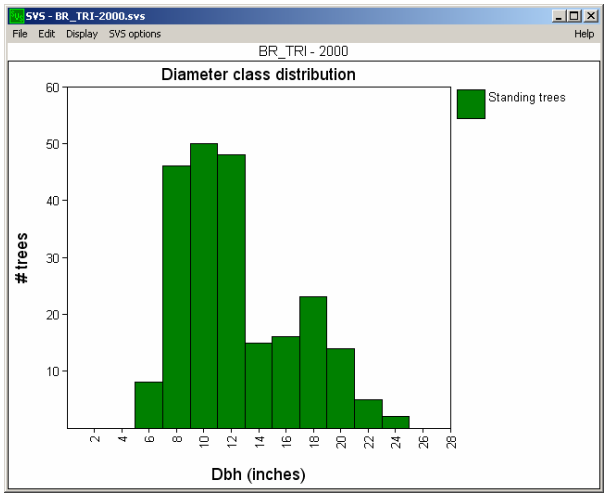
	A	B	C	D	E	F	G	H	I	J	K
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre
5	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79	349	58.6	34394
9	2005	BR_TRI	TOTAL	13.76	13.04	213.73	83.5	220.63	356.5	59.5	30910.3
13	2010	BR_TRI	TOTAL	14.56	13.81	198.16	87.2	229.07	362	60	36063.2
17	2015	BR_TRI	TOTAL	15.36	14.57	184.08	90.9	236.77	366.3	60.4	41179.7
21	2020	BR_TRI	TOTAL	16.15	15.32	171.24	94.6	243.57	369.4	60.6	45385.5
25	2025	BR_TRI	TOTAL	16.94	16.06	159.87	98	250.14	372.3	60.8	49741
29	2030	BR_TRI	TOTAL	17.72	16.8	149.44	101.2	255.92	374.1	60.8	53753.9
30											
31											

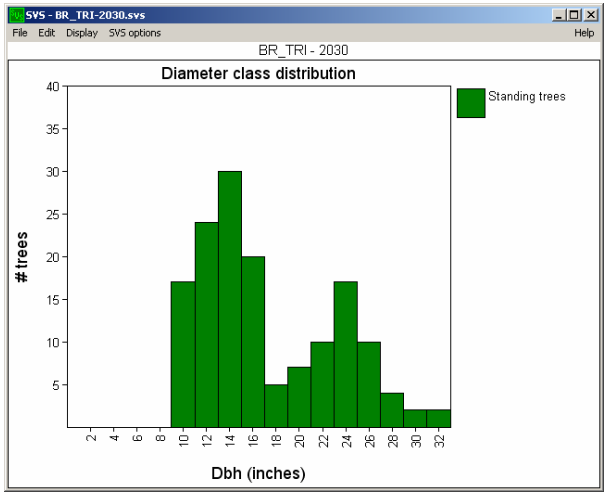
Copy columns A and D to a new worksheet. Click the A column and then while holding down the CTRL key click the D column. Then use CTRL-C to copy. Create a new worksheet by clicking the New button highlighted above. Then paste, using CTRL-V, into cell A1. Change the heading in column B to “NoThin”. Save this file for later use (save it in the C:\lmsfolio2\packexam directory as Tutorial1.xls).

Mean Diameter – Change from Growth

Examining the diameter distributions (Context Menu, Visualize Stand for 2000 and 2030) to see how the distribution has changed.

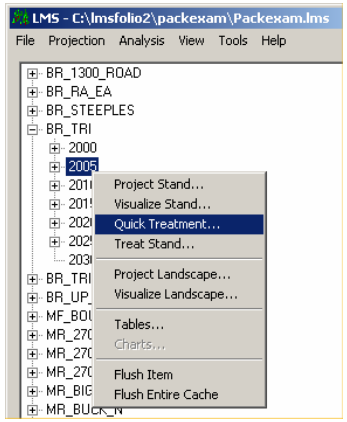
Notice that the distribution has shifted to the right, with the upper portion (14-24” in 2000) shifting mostly together, while the left portion (4-12” in 2000) is decreasing in tree numbers.

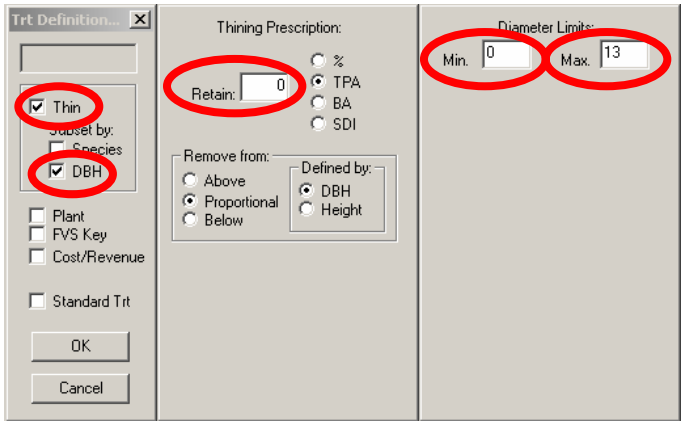




Mean Diameter – Change from Treatments

Thinning will directly change the DBHq. Right click on the year 2005 for stand BR_TRI. From the Context Menu select Quick Treatment. Check Thin, Check DBH, enter 0 for Min and 13 for Max. This will remove all the small trees in the stand.

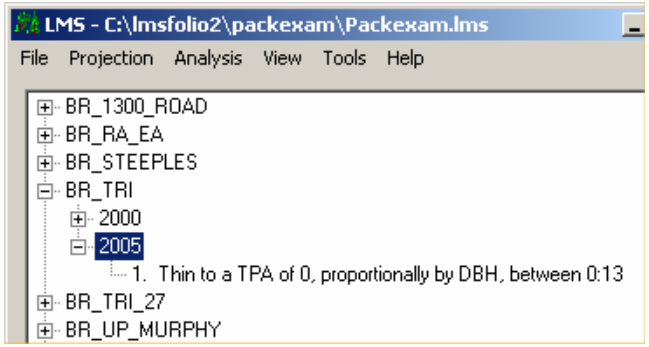


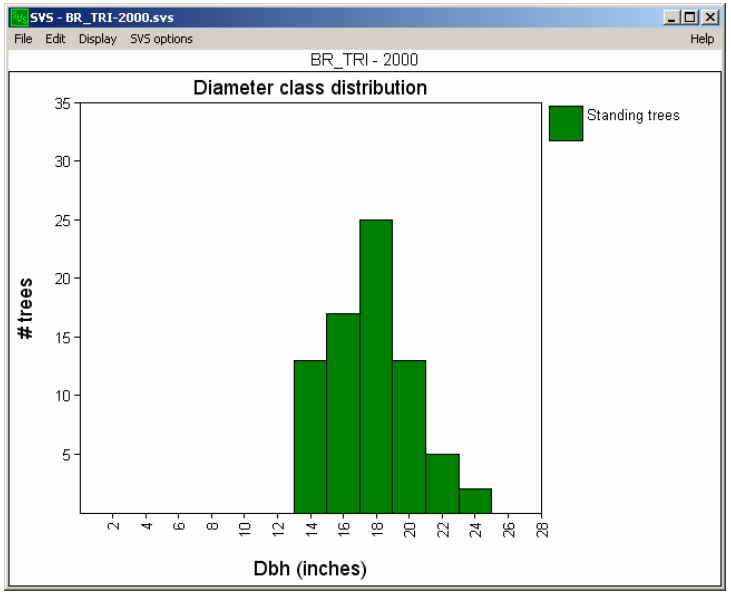


Mean Diameter – Change from Treatments

After the treatment the background of LMS will display the treatment that was applied (click the + to open the tree view if necessary). Note that projections after the treatment year have been erased.

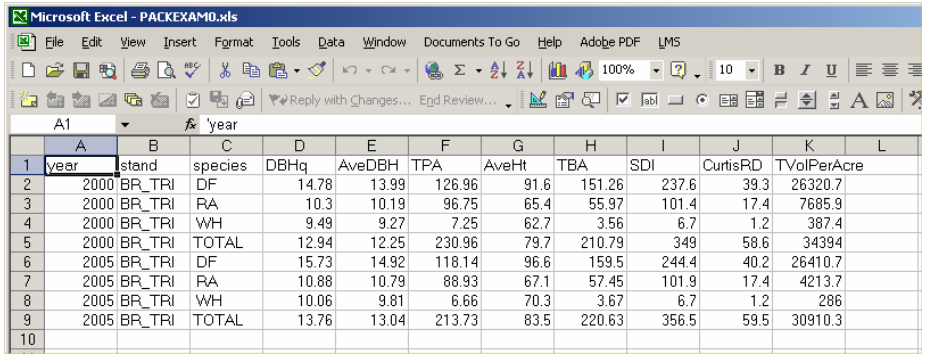
Examining the diameter distributions shows that we removed all trees below 13 inches.





Mean Diameter – Change from Treatments

To the right is a comparison of the before treatment and after treatment stand statistics.


Microsoft Excel - PACKEXAM0.xls

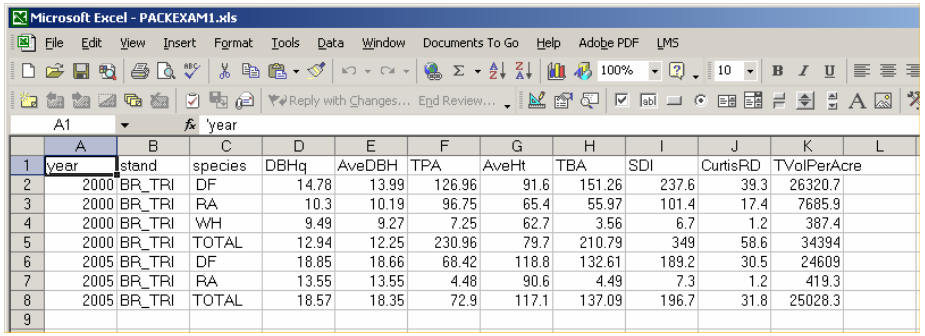
File Edit View Insert Format Tools Data Window Documents To Go Help Adobe PDF LMS

A1 'year

	A	B	C	D	E	F	G	H	I	J	K	L
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre	
2	2000	BR_TRI	DF	14.78	13.99	126.96	91.6	151.26	237.6	39.3	26320.7	
3	2000	BR_TRI	RA	10.3	10.19	96.75	65.4	55.97	101.4	17.4	7685.9	
4	2000	BR_TRI	WH	9.49	9.27	7.25	62.7	3.56	6.7	1.2	387.4	
5	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79	349	58.6	34394	
6	2005	BR_TRI	DF	15.73	14.92	118.14	96.6	159.5	244.4	40.2	26410.7	
7	2005	BR_TRI	RA	10.88	10.79	88.93	67.1	57.45	101.9	17.4	4213.7	
8	2005	BR_TRI	WH	10.06	9.81	6.66	70.3	3.67	6.7	1.2	286	
9	2005	BR_TRI	TOTAL	13.76	13.04	213.73	83.5	220.63	356.5	59.5	30910.3	
10												

Original BR_TRI stand statistics

Notice that the thinning of smaller diameters removed the all WH, most of the RA, and almost half the DF.


Microsoft Excel - PACKEXAM1.xls

File Edit View Insert Format Tools Data Window Documents To Go Help Adobe PDF LMS

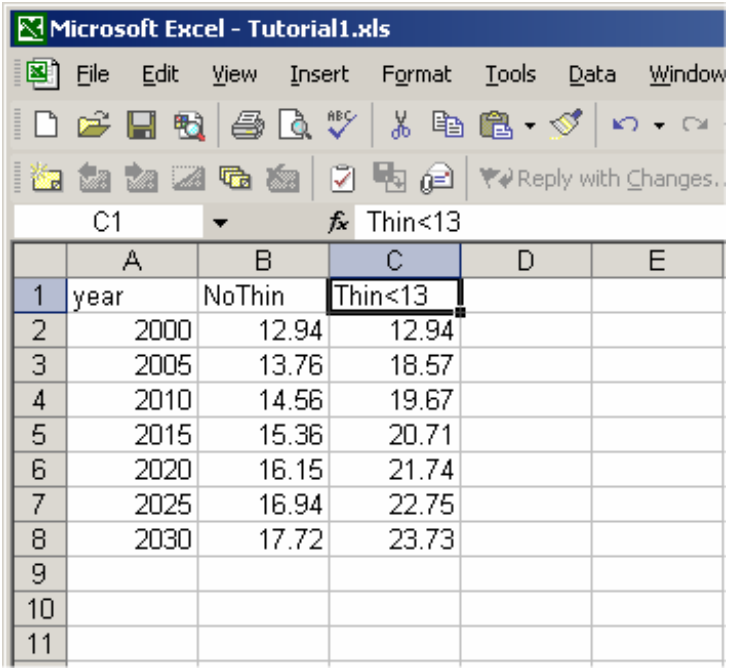
A1 'year

	A	B	C	D	E	F	G	H	I	J	K	L
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre	
2	2000	BR_TRI	DF	14.78	13.99	126.96	91.6	151.26	237.6	39.3	26320.7	
3	2000	BR_TRI	RA	10.3	10.19	96.75	65.4	55.97	101.4	17.4	7685.9	
4	2000	BR_TRI	WH	9.49	9.27	7.25	62.7	3.56	6.7	1.2	387.4	
5	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79	349	58.6	34394	
6	2005	BR_TRI	DF	18.85	18.66	68.42	118.8	132.61	189.2	30.5	24609	
7	2005	BR_TRI	RA	13.55	13.55	4.48	90.6	4.49	7.3	1.2	419.3	
8	2005	BR_TRI	TOTAL	18.57	18.35	72.9	117.1	137.09	196.7	31.8	25028.3	
9												

Treated BR_TRI stand statistics

Mean Diameter – Change from Treatments

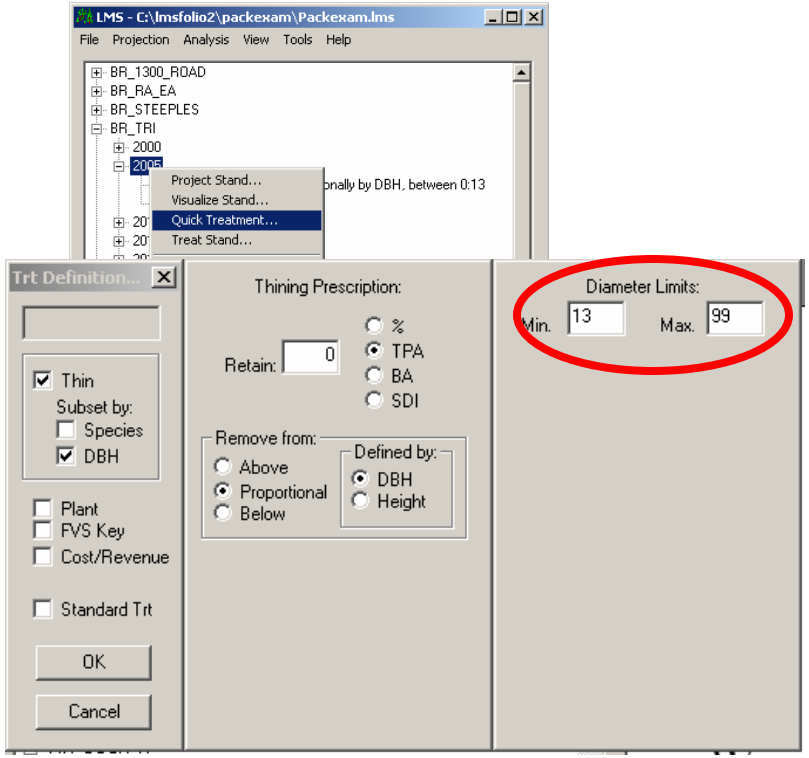
Project the stand the rest of the way out to 2030. Then retrieve the Summary Table for the treated stand and copy the values for DBHq (column D) to the Tutorial1.xls worksheet. Re-label the column "Thin<13". The result should look similar to the example at right.

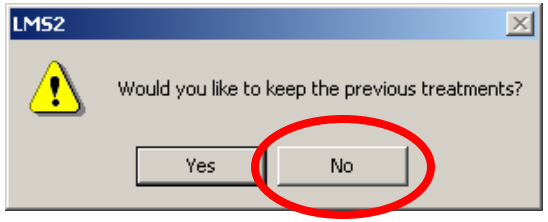


	A	B	C	D	E
1	year	NoThin	Thin<13		
2	2000	12.94	12.94		
3	2005	13.76	18.57		
4	2010	14.56	19.67		
5	2015	15.36	20.71		
6	2020	16.15	21.74		
7	2025	16.94	22.75		
8	2030	17.72	23.73		
9					
10					
11					

Mean Diameter – Change from Treatments

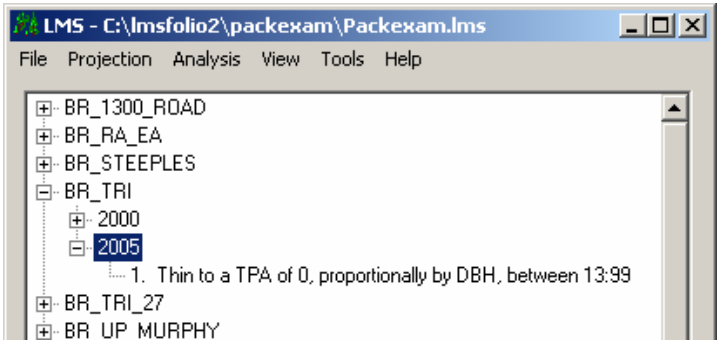
We can try another thinning on this stand by right clicking on 2005 and selecting Quick Treatments from the context menu. Treat the stand by retaining 0 trees between 13 and 99 inches. LMS will ask you if you want to keep the previous treatments. Answer No.



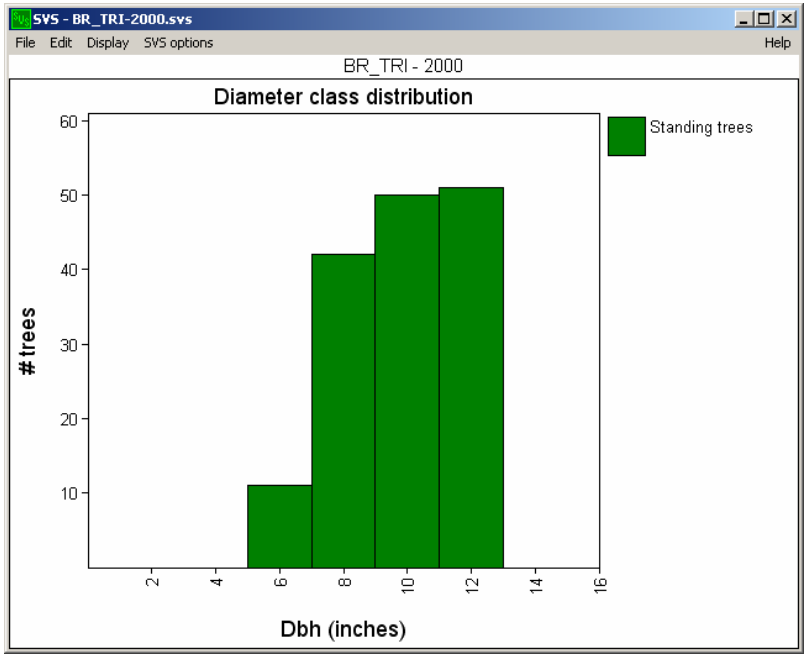


Mean Diameter – Change from Treatments

The resulting treatment shows up in the background of LMS.

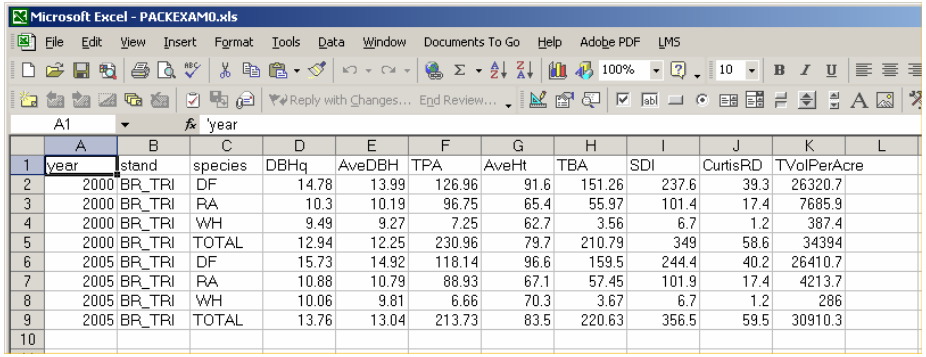


And the resulting diameter distribution should look like the picture at the right.



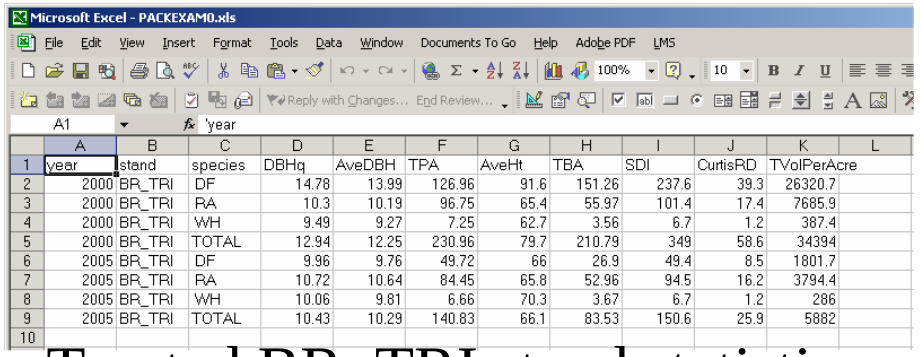
Mean Diameter – Change from Treatments

This thinning of larger diameters removes most of the DF, leaving all of the WH and only removing 4 RA from the stand.



	A	B	C	D	E	F	G	H	I	J	K	L
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre	
2	2000	BR_TRI	DF	14.78	13.99	126.96	91.6	151.26	237.6	39.3	26320.7	
3	2000	BR_TRI	RA	10.3	10.19	96.75	65.4	55.97	101.4	17.4	7685.9	
4	2000	BR_TRI	WH	9.49	9.27	7.25	62.7	3.56	6.7	1.2	387.4	
5	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79	349	58.6	34394	
6	2005	BR_TRI	DF	15.73	14.92	118.14	96.6	159.5	244.4	40.2	26410.7	
7	2005	BR_TRI	RA	10.88	10.79	88.93	67.1	57.45	101.9	17.4	4213.7	
8	2005	BR_TRI	WH	10.06	9.81	6.66	70.3	3.67	6.7	1.2	286	
9	2005	BR_TRI	TOTAL	13.76	13.04	213.73	83.5	220.63	356.5	59.5	30910.3	
10												

Original BR_TRI stand statistics

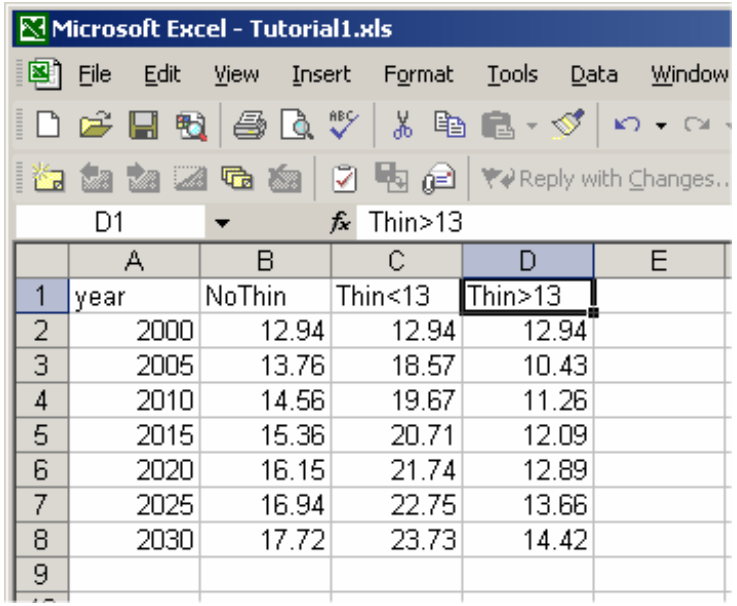


	A	B	C	D	E	F	G	H	I	J	K	L
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre	
2	2000	BR_TRI	DF	14.78	13.99	126.96	91.6	151.26	237.6	39.3	26320.7	
3	2000	BR_TRI	RA	10.3	10.19	96.75	65.4	55.97	101.4	17.4	7685.9	
4	2000	BR_TRI	WH	9.49	9.27	7.25	62.7	3.56	6.7	1.2	387.4	
5	2000	BR_TRI	TOTAL	12.94	12.25	230.96	79.7	210.79	349	58.6	34394	
6	2005	BR_TRI	DF	9.96	9.76	49.72	66	26.9	49.4	8.5	1801.7	
7	2005	BR_TRI	RA	10.72	10.64	84.45	65.8	52.96	94.5	16.2	3794.4	
8	2005	BR_TRI	WH	10.06	9.81	6.66	70.3	3.67	6.7	1.2	286	
9	2005	BR_TRI	TOTAL	10.43	10.29	140.83	66.1	83.53	150.6	25.9	5882	
10												

Treated BR_TRI stand statistics

Mean Diameter – Change from Treatments and Growth

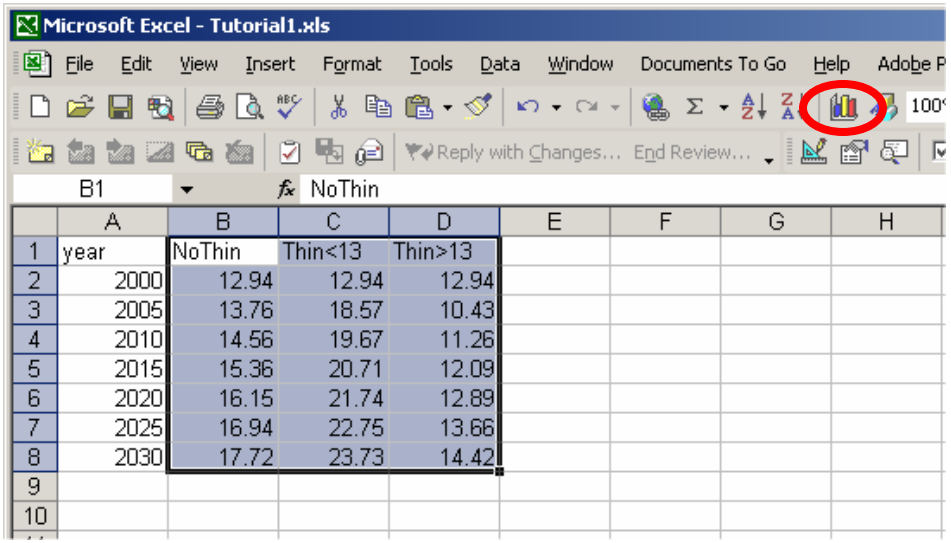
Project the stand the rest of the way out to 2030. Then retrieve the Summary Table for the treated stand and copy the values for DBHq (column D) to the Tutorial1.xls worksheet. Re-label the column "Thin>13". The result should look similar to the example at right.



	A	B	C	D	E
1	year	NoThin	Thin<13	Thin>13	
2	2000	12.94	12.94	12.94	
3	2005	13.76	18.57	10.43	
4	2010	14.56	19.67	11.26	
5	2015	15.36	20.71	12.09	
6	2020	16.15	21.74	12.89	
7	2025	16.94	22.75	13.66	
8	2030	17.72	23.73	14.42	
9					

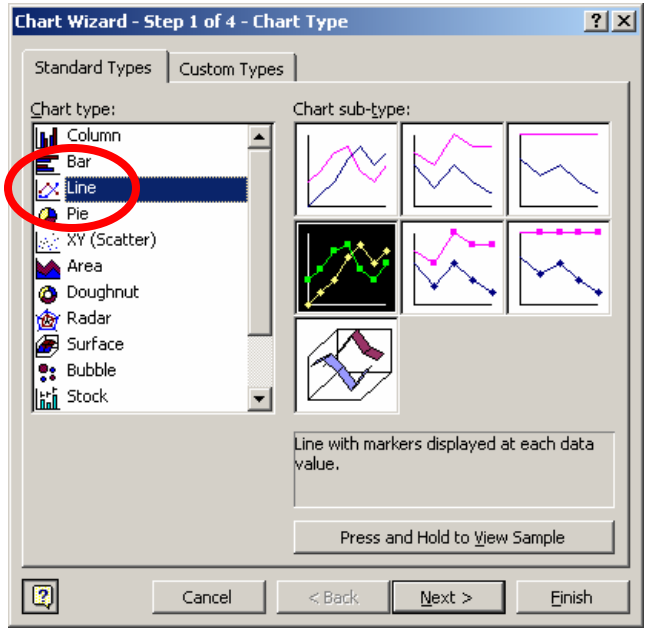
Mean Diameter – Change from Treatments and Growth

Select the range of data shown at the right and then click the Chart Wizard button (highlighted at right) to create a chart of diameter change through time.

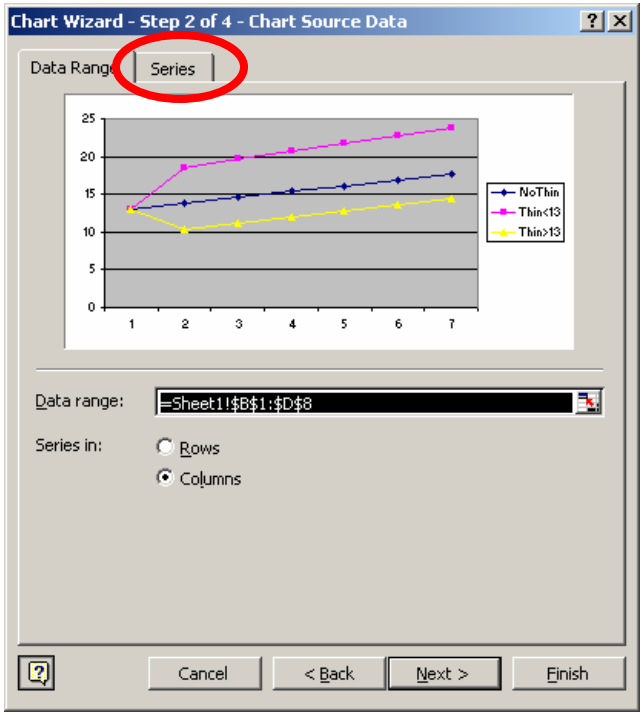


	A	B	C	D	E	F	G	H
1	year	NoThin	Thin<13	Thin>13				
2	2000	12.94	12.94	12.94				
3	2005	13.76	18.57	10.43				
4	2010	14.56	19.67	11.26				
5	2015	15.36	20.71	12.09				
6	2020	16.15	21.74	12.89				
7	2025	16.94	22.75	13.66				
8	2030	17.72	23.73	14.42				
9								
10								

Mean Diameter – Change from Treatments

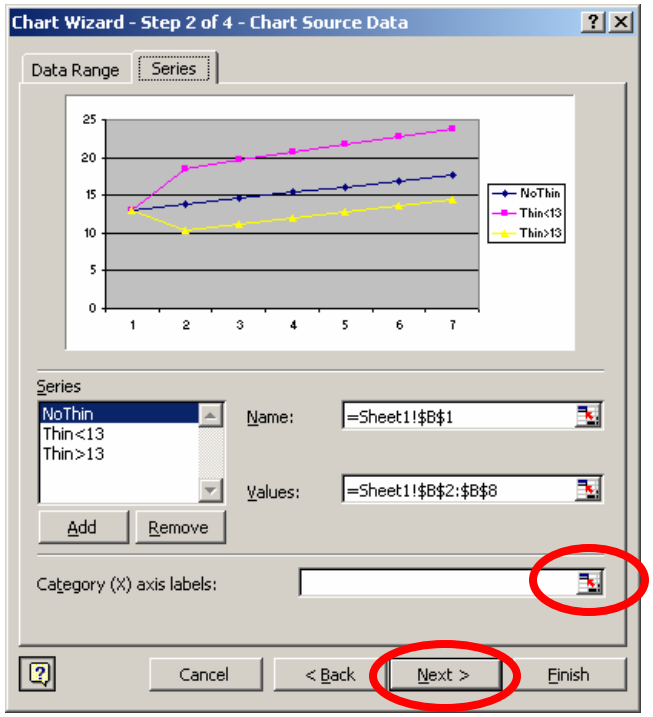


1) Select Line for the type of chart.

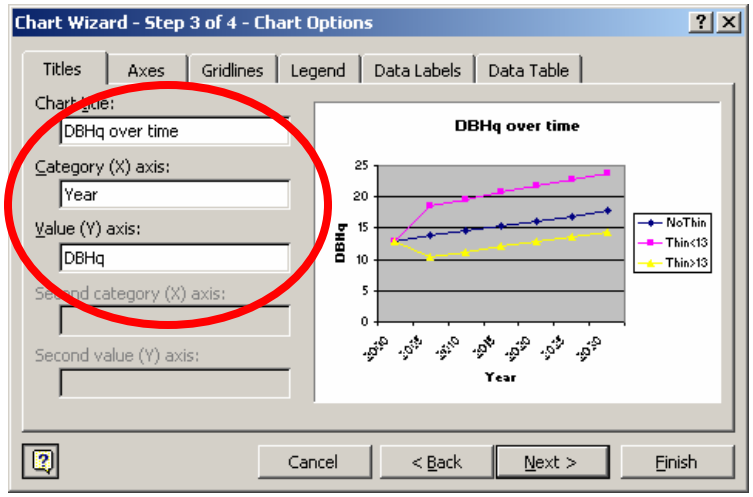


2) Select the Series tab so that we can add the years for X axis labels.

Mean Diameter – Change from Treatments

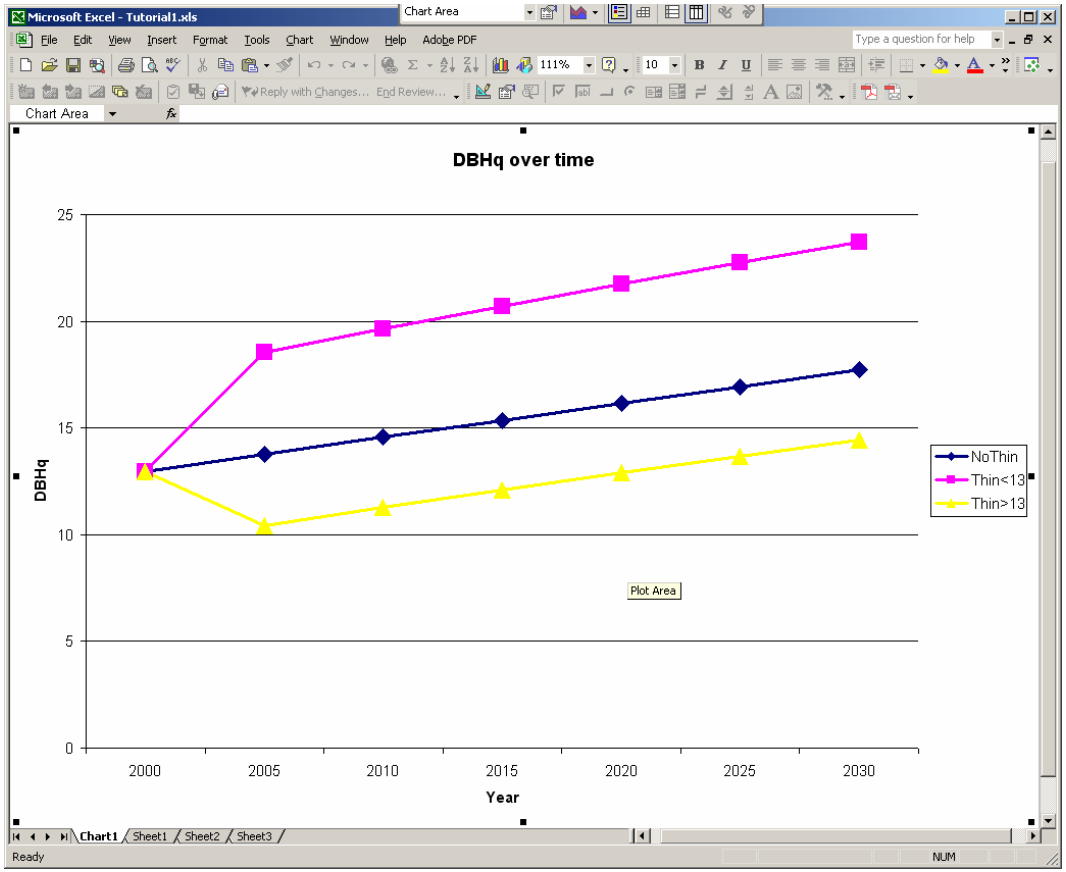


Category (X) labels can be selected. Select Next to continue.



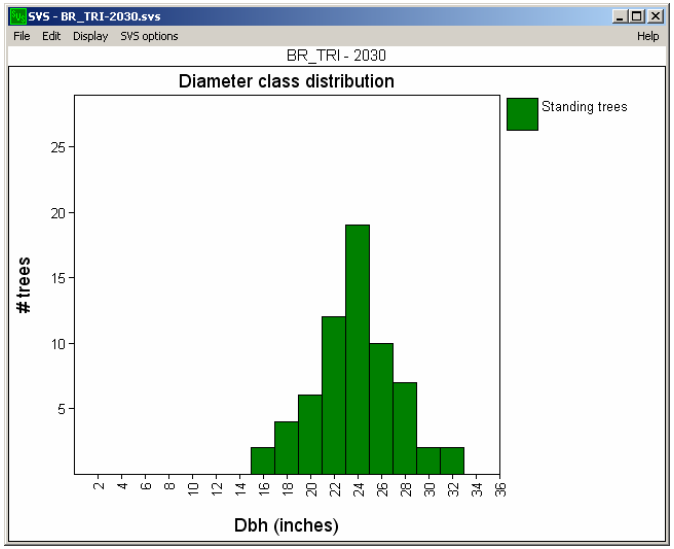
Enter Chart title and axis labels.

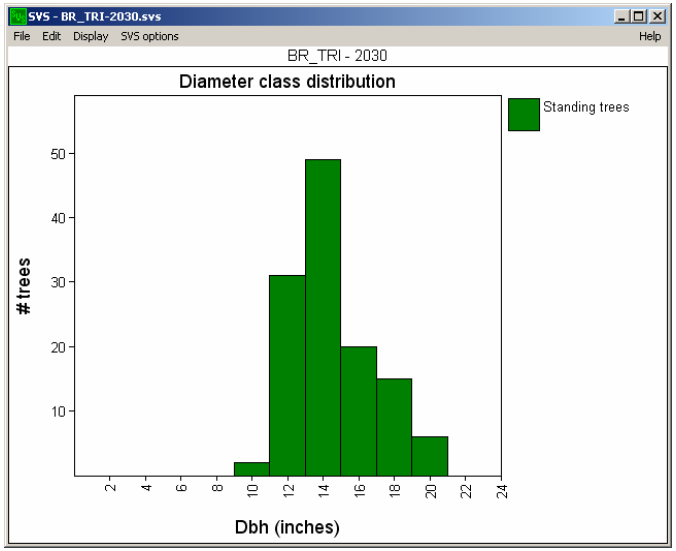
Mean Diameter – Change from Treatments



Mean Diameter – Change from Treatments and Growth

Below are the resulting diameter distributions from these two treatments.





Mean Diameter – Change from Treatments and Growth

Assignment:

Compare the volume growth of different stand using two simple treatments.

Use volume from the Summary Table. Use similar treatments (simple treatments) for the selected stand.

Comparative Thinning Analysis

- Learning Objective:
  - Compare alternative thinning strategies on stand development
  - Demonstrate Subset portfolio, Edit Portfolio, Tables, Treatments, Scenarios

Comparative Thinning Analysis

Roadmap:

- Subset Portfolio
- Edit Stands
- Treatments
- Scenario files

Comparative Thinning Analysis

BR_UP_MURPHY

Compare original stand, with remove BM,RA

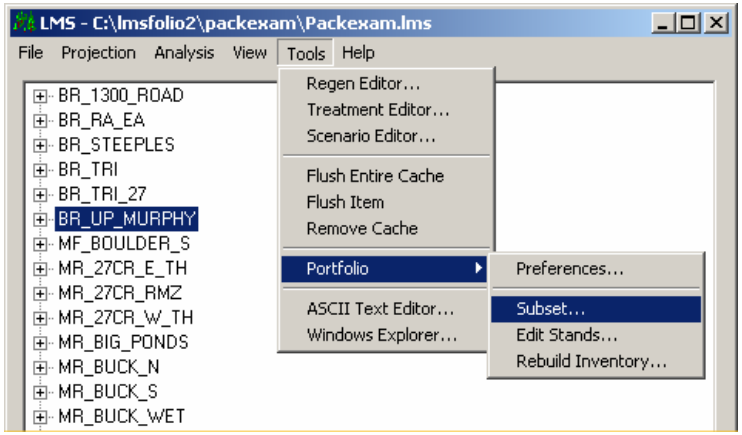
Thin from below

Mid canopy thing of DF (maybe SDI based)

Comparative Thinning Analysis

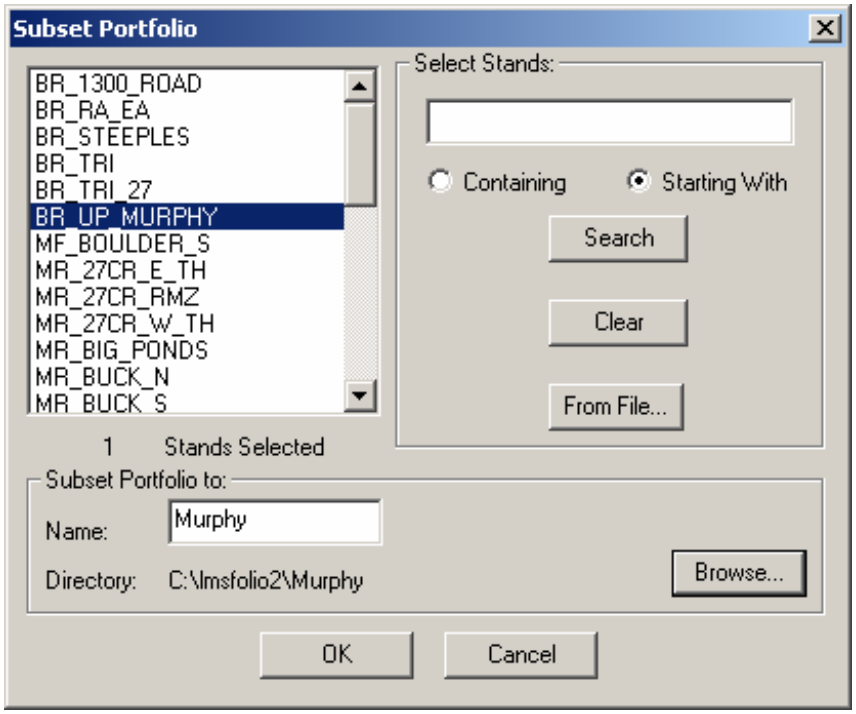
We can do a comparison of treatments on a single stand by creating a new portfolio that contains the inventory information for that stand.

Use the Tools/Portfolio/Subset menu command to open the Subset Portfolio Dialog.

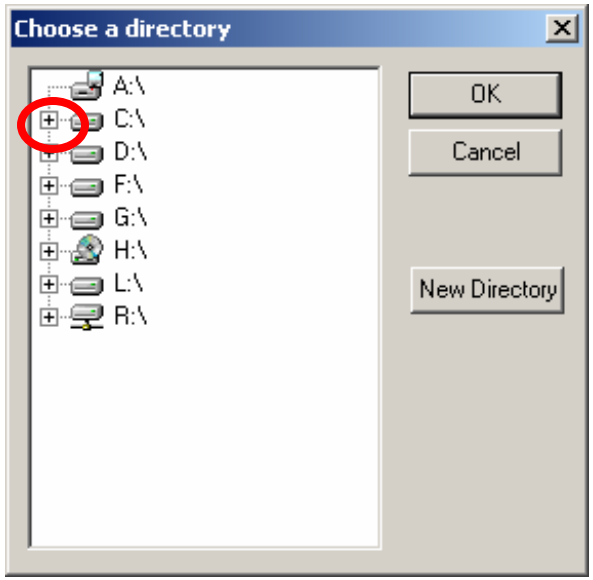


Comparative Thinning Analysis

The Subset Portfolio Dialog allows you to select one or more stands to be copied to a new portfolio. Click on the stand names you want (BR_UP_MURPHY for our example), enter a name (Murphy for our example), and Browse to select a directory.



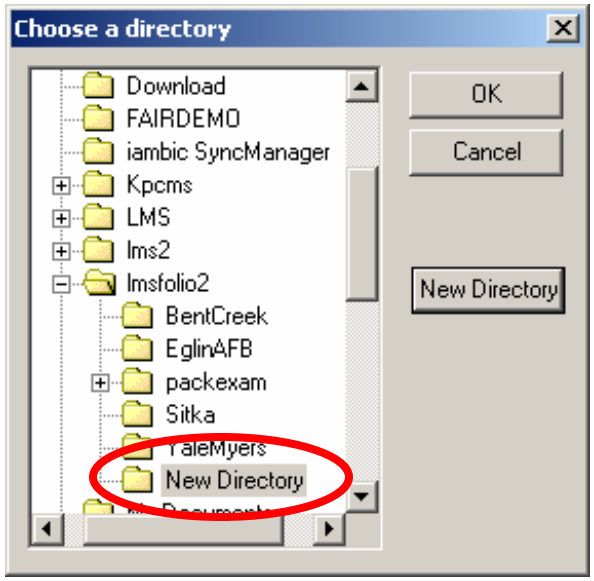
Comparative Thinning Analysis



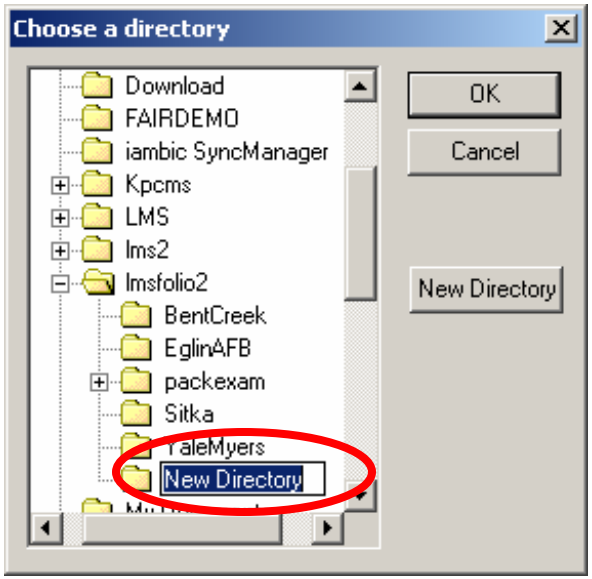
Browse to the lmsfolio2 directory on the C: drive by opening the tree view in the Choose directory Dialog.

If the desired directory does not exist click the New Directory button to create the directory.

Comparative Thinning Analysis



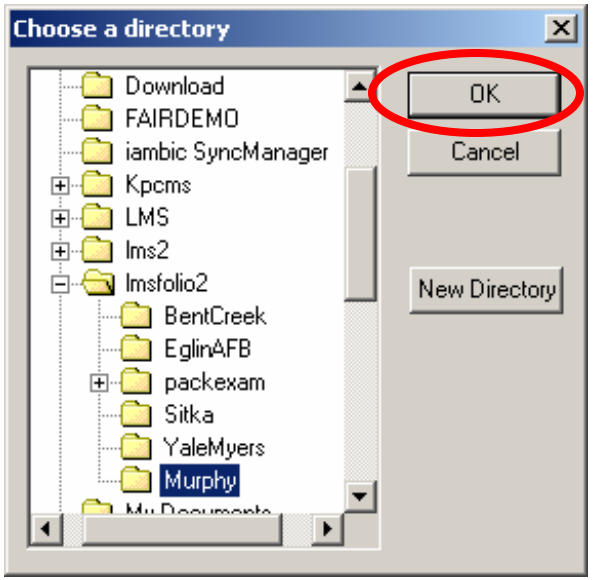
LMS will create a new directory with the default name “New Directory”, which you will need to rename. Note: The directory name must not include spaces.



To rename the directory, click the directory and then click again to open the edit box (click twice slowly). Enter the name “Murphy”.

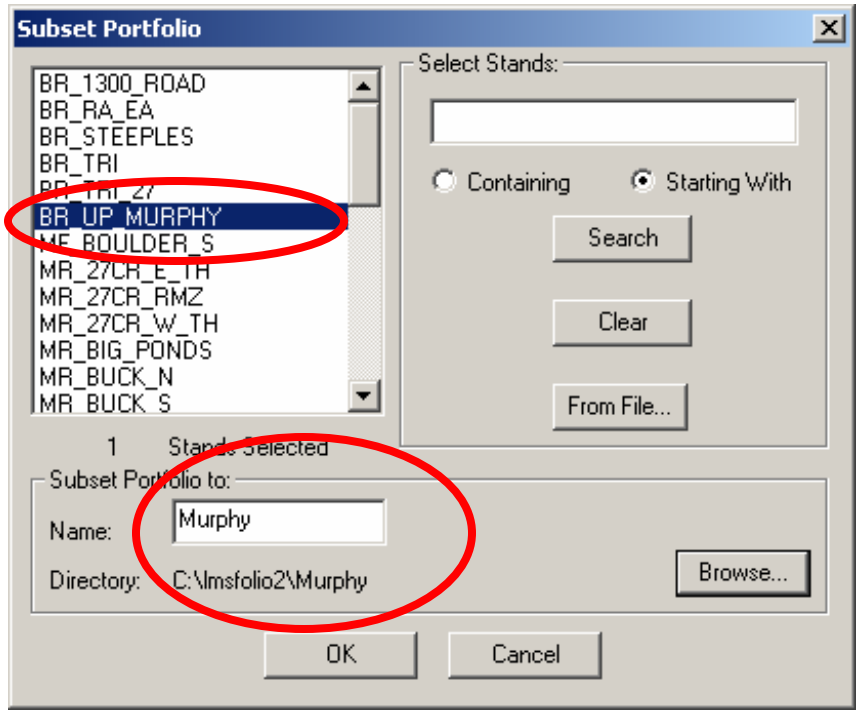
Comparative Thinning Analysis

After the directory is renamed click OK to select that directory.



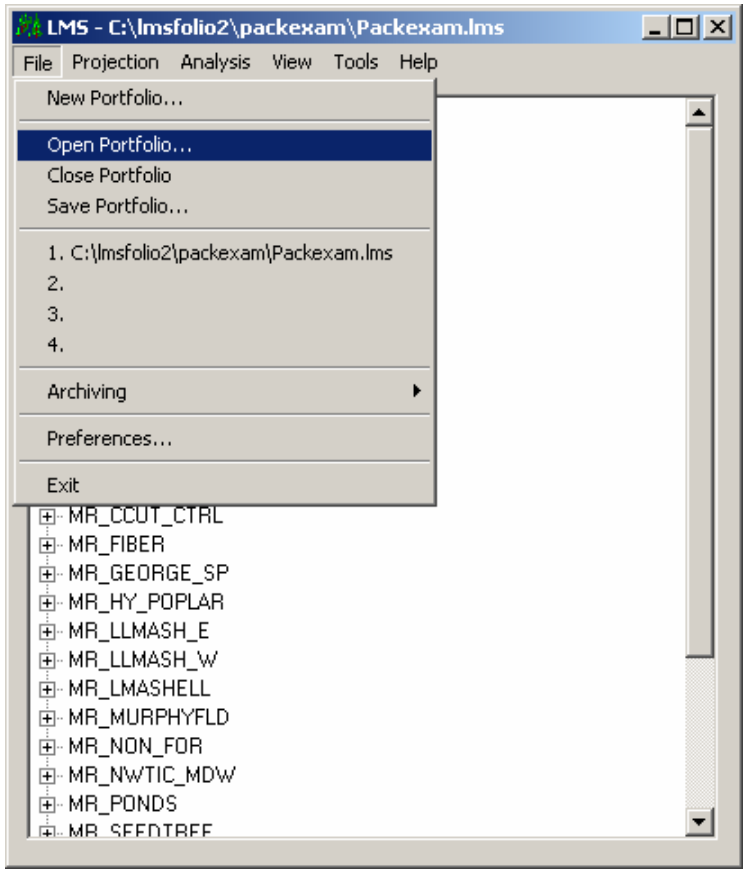
Comparative Thinning Analysis

You will be returned to the Subset Portfolio Dialog. Click OK to have LMS copy the selected stand into the new portfolio.

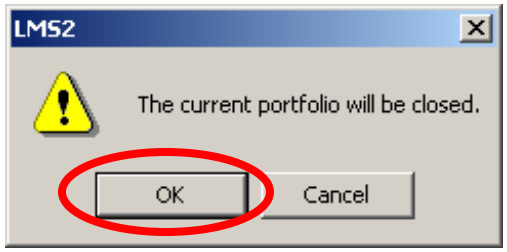


Comparative Thinning Analysis

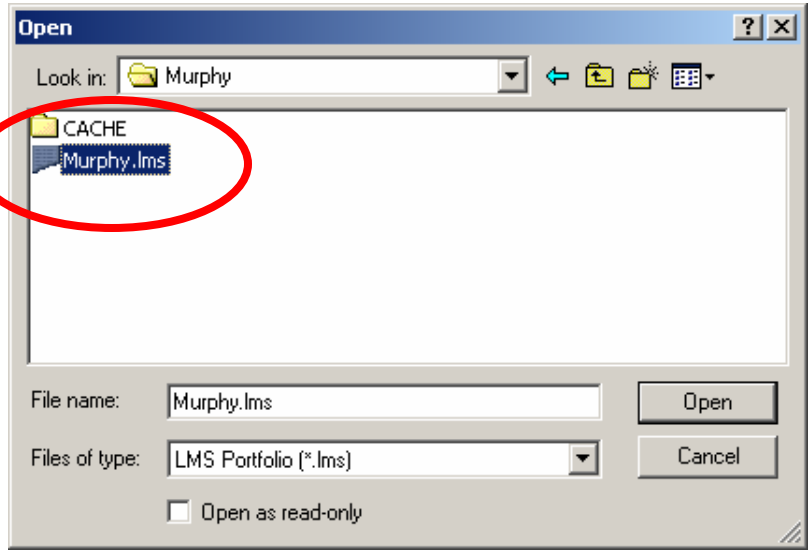
Next we need to open the newly created portfolio. Use the File/Open Portfolio Menu command.



Comparative Thinning Analysis

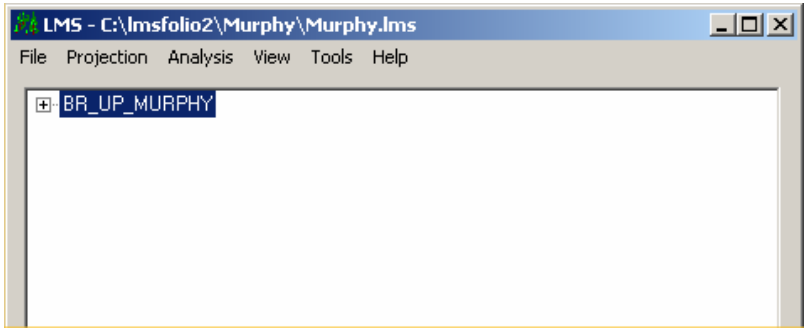


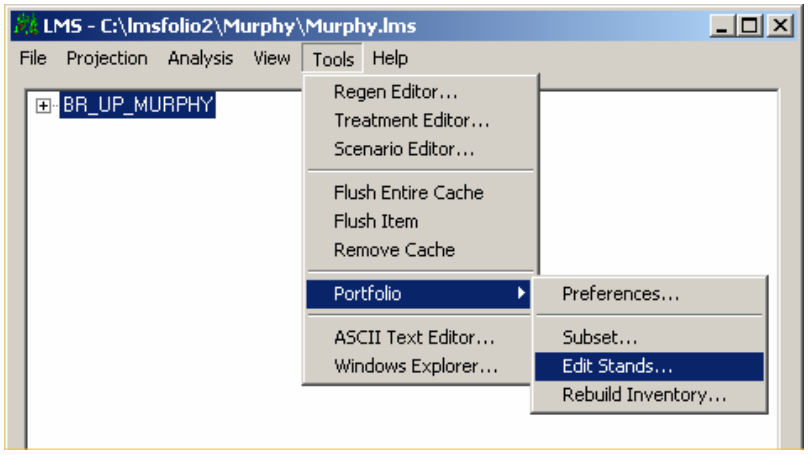
You will be prompted that the current portfolio will be close.



Then browse to the Murphy directory and select the Murphy.lms file to open the portfolio.

Comparative Thinning Analysis

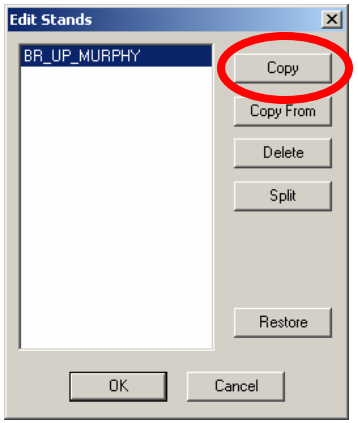




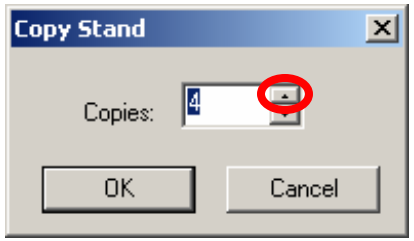
We now have a portfolio that contains only one stand. We can use the Tools/Portfolio/Edit Stands menu command to make modifications to this portfolio.

Comparative Thinning Analysis

With the Edit Stands Dialog we can highlight the BR_UP_MURPHY stand and then click the Copy button. This allows us to pick how many copies of the stand we want.

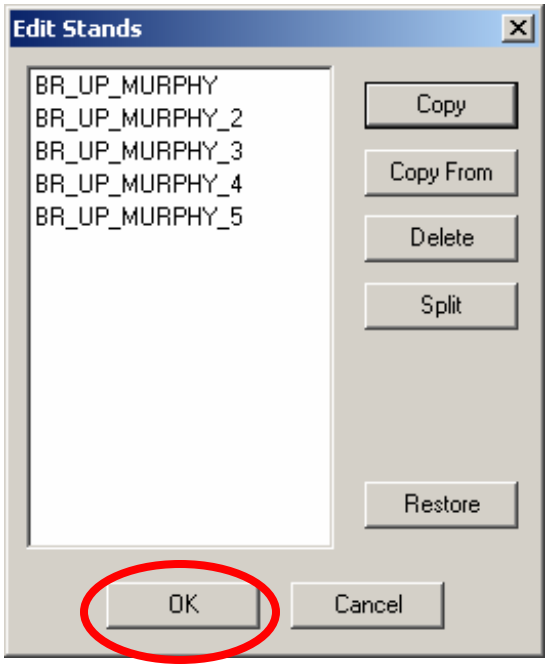


Select 4 copies using the scroll buttons and then click the OK button.



Comparative Thinning Analysis

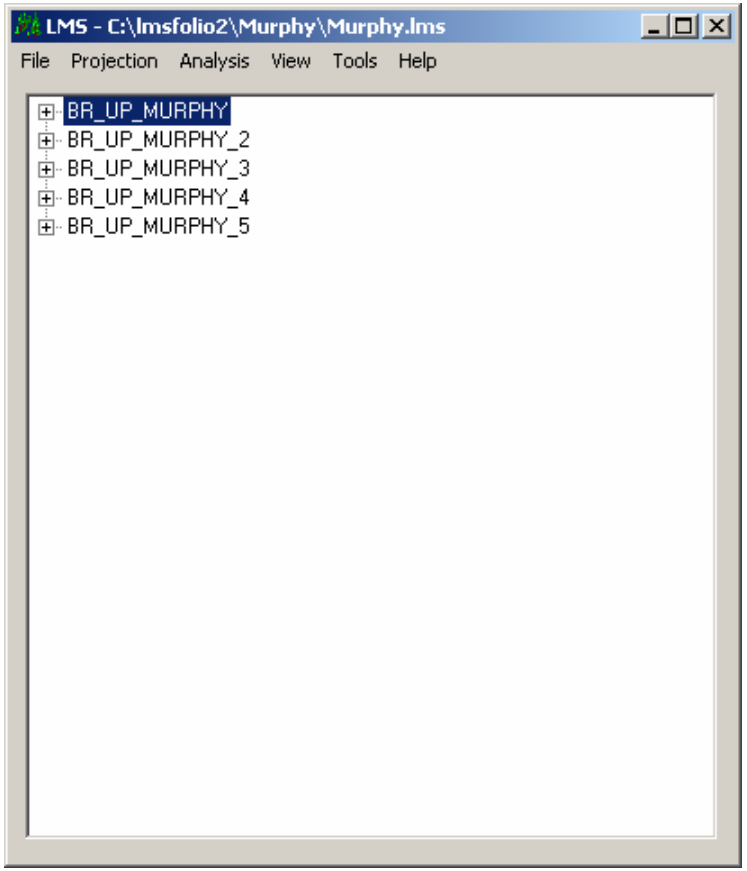
The Edit Stands Dialog will now show 5 stands. Click OK to finish.



Comparative Thinning Analysis

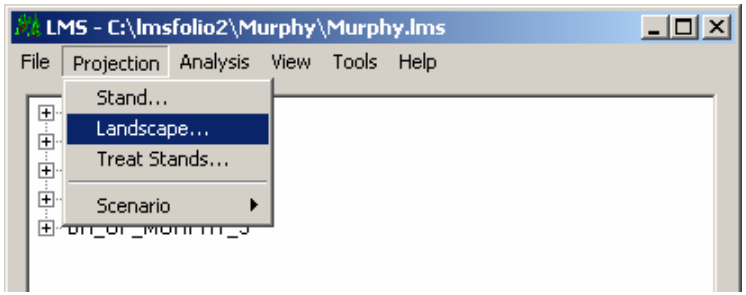
We now have a portfolio with 5 copies of the inventory for the BR_UP_MURPHY stand.

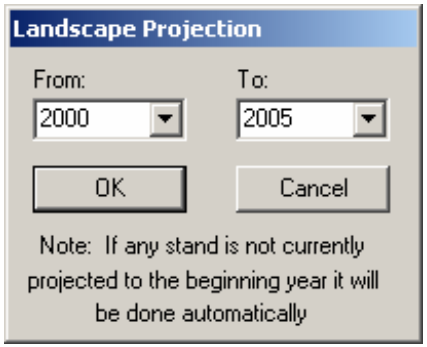
We can now treat each stand differently and then compare the results of treatment directly.



Comparative Thinning Analysis

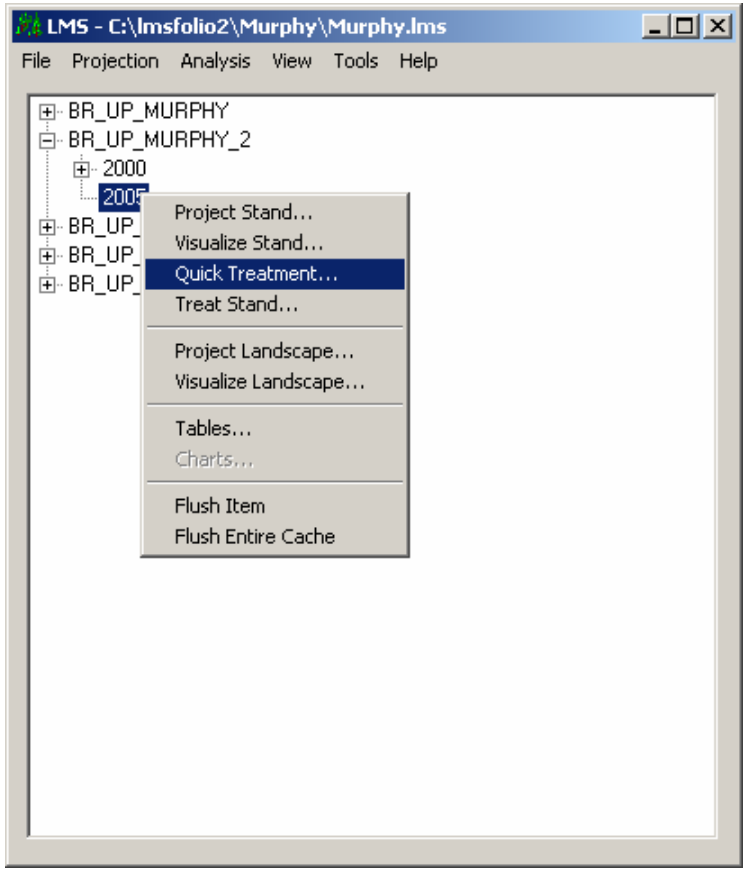
Start by projection all stands out one cycle to 2005. Use Projection/Landscape to bring up the Landscape Projection Dialog. Project from 2000 to 2005, then click OK.





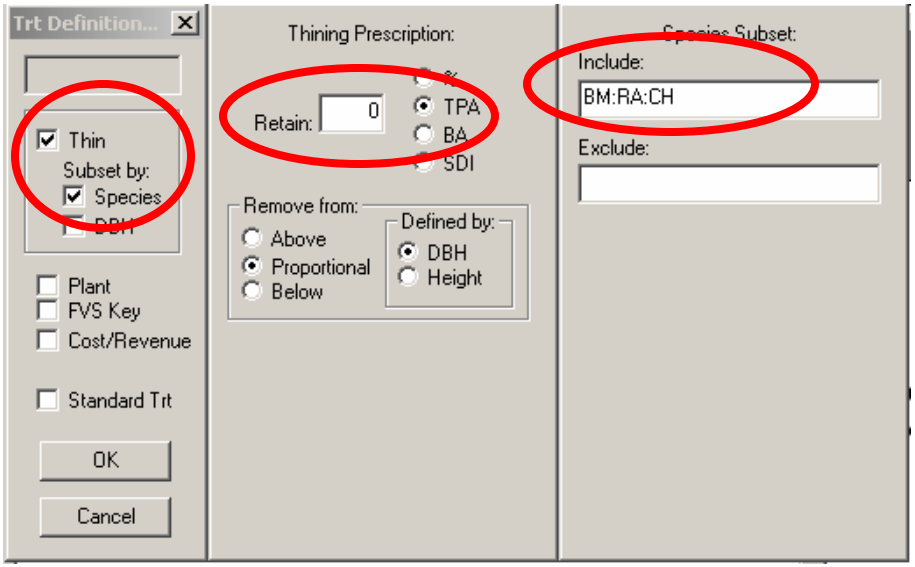
Comparative Thinning Analysis

For our first treatment right click on the 2005 next to stand BR_UP_MURPHY_2 and select Quick Treatment from the context menu.



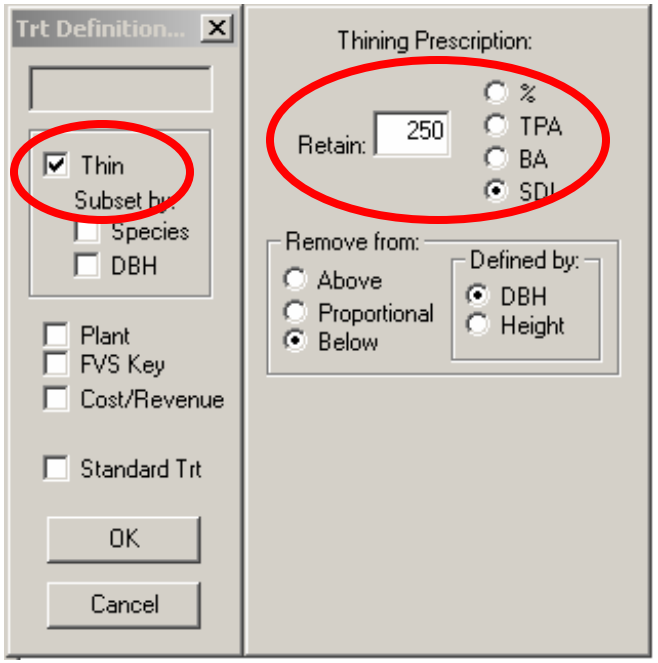
Comparative Thinning Analysis

From the treatment dialog select Thin, Retain 0 TPA, select Species, then enter BM:RA:CH under include. This will perform a hardwood control treatment for this stand.



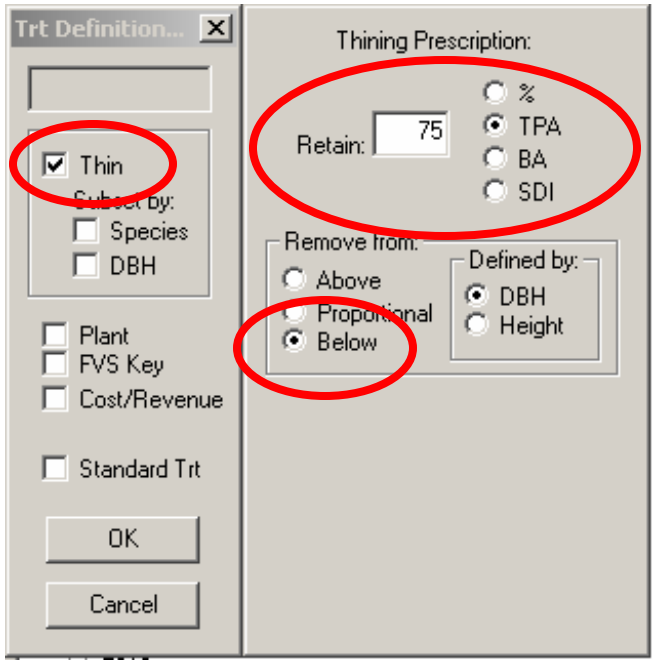
Comparative Thinning Analysis

For stand BR_UP_MURPHY_3 thin the stand to a target SDI of 250.



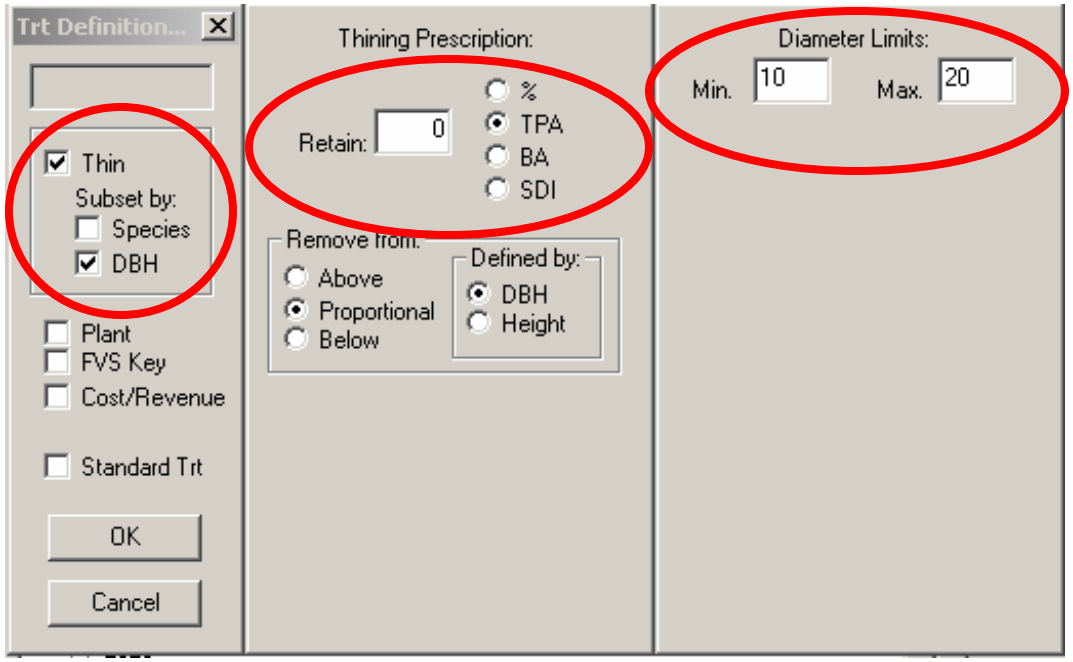
Comparative Thinning Analysis

For BR_UP_MURPHY_4 thin the stand to 75 TPA from below.



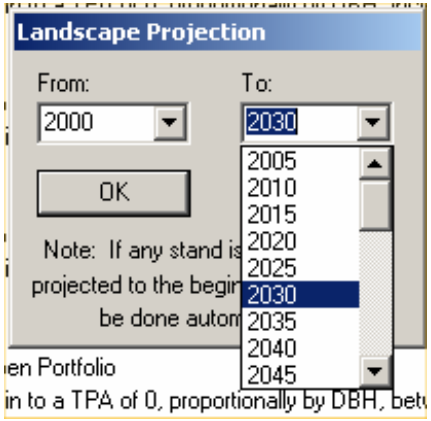
Comparative Thinning Analysis

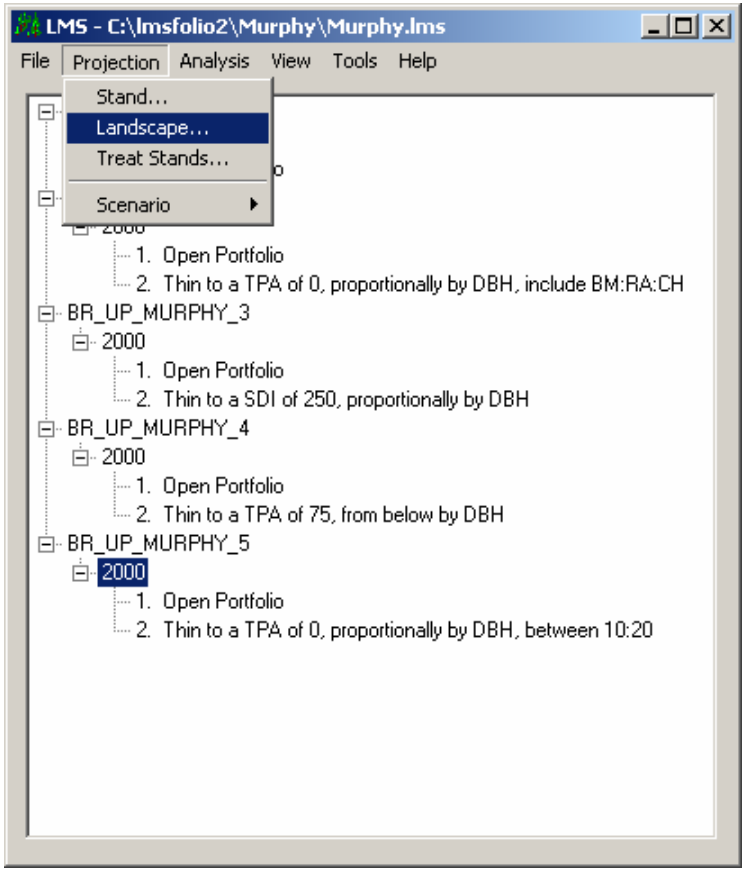
For BR_UP_MURPHY_5 thin the stand to 0 TPA between 10 and 20 inches.



Comparative Thinning Analysis

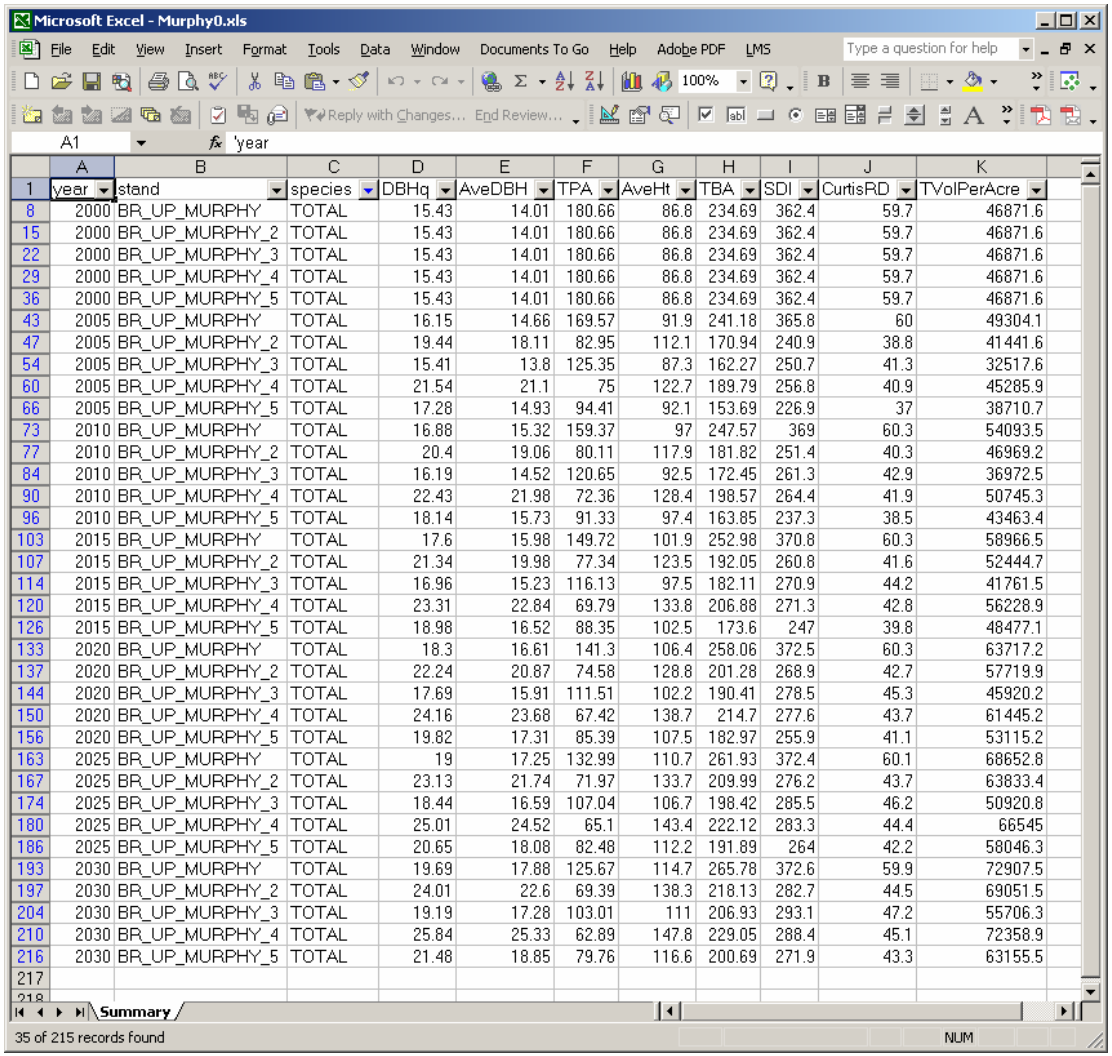
Now we need to grow the stand out to compare the treatments. Use the Projection/Landscape Menu command. Select To 2030 in the Landscape Projection Dialog.





Comparative Thinning Analysis

After projection we can now examine how each of the stands develop over time in response to the treatments.



Microsoft Excel - Murphy0.xls

File Edit View Insert Format Tools Data Window Documents To Go Help Adobe PDF LMS

A1 'year

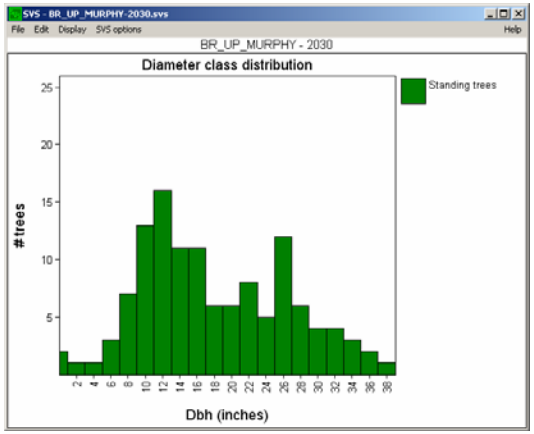
	A	B	C	D	E	F	G	H	I	J	K
1	year	stand	species	DBHq	AveDBH	TPA	AveHt	TBA	SDI	CurtisRD	TVolPerAcre
8	2000	BR_UP_MURPHY	TOTAL	15.43	14.01	180.66	86.8	234.69	362.4	59.7	46871.6
15	2000	BR_UP_MURPHY_2	TOTAL	15.43	14.01	180.66	86.8	234.69	362.4	59.7	46871.6
22	2000	BR_UP_MURPHY_3	TOTAL	15.43	14.01	180.66	86.8	234.69	362.4	59.7	46871.6
29	2000	BR_UP_MURPHY_4	TOTAL	15.43	14.01	180.66	86.8	234.69	362.4	59.7	46871.6
36	2000	BR_UP_MURPHY_5	TOTAL	15.43	14.01	180.66	86.8	234.69	362.4	59.7	46871.6
43	2005	BR_UP_MURPHY	TOTAL	16.15	14.66	169.57	91.9	241.18	365.8	60	49304.1
47	2005	BR_UP_MURPHY_2	TOTAL	19.44	18.11	82.95	112.1	170.94	240.9	38.8	41441.6
54	2005	BR_UP_MURPHY_3	TOTAL	15.41	13.8	125.35	87.3	162.27	250.7	41.3	32517.6
60	2005	BR_UP_MURPHY_4	TOTAL	21.54	21.1	75	122.7	189.79	256.8	40.9	45285.9
66	2005	BR_UP_MURPHY_5	TOTAL	17.28	14.93	94.41	92.1	153.69	226.9	37	38710.7
73	2010	BR_UP_MURPHY	TOTAL	16.88	15.32	159.37	97	247.57	369	60.3	54093.5
77	2010	BR_UP_MURPHY_2	TOTAL	20.4	19.06	80.11	117.9	181.82	251.4	40.3	46969.2
84	2010	BR_UP_MURPHY_3	TOTAL	16.19	14.52	120.65	92.5	172.45	261.3	42.9	36972.5
90	2010	BR_UP_MURPHY_4	TOTAL	22.43	21.98	72.36	128.4	198.57	264.4	41.9	50745.3
96	2010	BR_UP_MURPHY_5	TOTAL	18.14	15.73	91.33	97.4	163.85	237.3	38.5	43463.4
103	2015	BR_UP_MURPHY	TOTAL	17.6	15.98	149.72	101.9	252.98	370.8	60.3	58966.5
107	2015	BR_UP_MURPHY_2	TOTAL	21.34	19.98	77.34	123.5	192.05	260.8	41.6	52444.7
114	2015	BR_UP_MURPHY_3	TOTAL	16.96	15.23	116.13	97.5	182.11	270.9	44.2	41761.5
120	2015	BR_UP_MURPHY_4	TOTAL	23.31	22.84	69.79	133.8	206.88	271.3	42.8	56228.9
126	2015	BR_UP_MURPHY_5	TOTAL	18.98	16.52	88.35	102.5	173.6	247	39.8	48477.1
133	2020	BR_UP_MURPHY	TOTAL	18.3	16.61	141.3	106.4	258.06	372.5	60.3	63717.2
137	2020	BR_UP_MURPHY_2	TOTAL	22.24	20.87	74.58	128.8	201.28	268.9	42.7	57719.9
144	2020	BR_UP_MURPHY_3	TOTAL	17.69	15.91	111.51	102.2	190.41	278.5	45.3	45920.2
150	2020	BR_UP_MURPHY_4	TOTAL	24.16	23.68	67.42	138.7	214.7	277.6	43.7	61445.2
156	2020	BR_UP_MURPHY_5	TOTAL	19.82	17.31	85.39	107.5	182.97	255.9	41.1	53115.2
163	2025	BR_UP_MURPHY	TOTAL	19	17.25	132.99	110.7	261.93	372.4	60.1	68652.8
167	2025	BR_UP_MURPHY_2	TOTAL	23.13	21.74	71.97	133.7	209.99	276.2	43.7	63833.4
174	2025	BR_UP_MURPHY_3	TOTAL	18.44	16.59	107.04	106.7	198.42	285.5	46.2	50920.8
180	2025	BR_UP_MURPHY_4	TOTAL	25.01	24.52	65.1	143.4	222.12	283.3	44.4	66545
186	2025	BR_UP_MURPHY_5	TOTAL	20.65	18.08	82.48	112.2	191.89	264	42.2	58046.3
193	2030	BR_UP_MURPHY	TOTAL	19.69	17.88	125.67	114.7	265.78	372.6	59.9	72907.5
197	2030	BR_UP_MURPHY_2	TOTAL	24.01	22.6	69.39	138.3	218.13	282.7	44.5	69051.5
204	2030	BR_UP_MURPHY_3	TOTAL	19.19	17.28	103.01	111	206.93	293.1	47.2	55706.3
210	2030	BR_UP_MURPHY_4	TOTAL	25.84	25.33	62.89	147.8	229.05	288.4	45.1	72358.9
216	2030	BR_UP_MURPHY_5	TOTAL	21.48	18.85	79.76	116.6	200.69	271.9	43.3	63155.5
217											

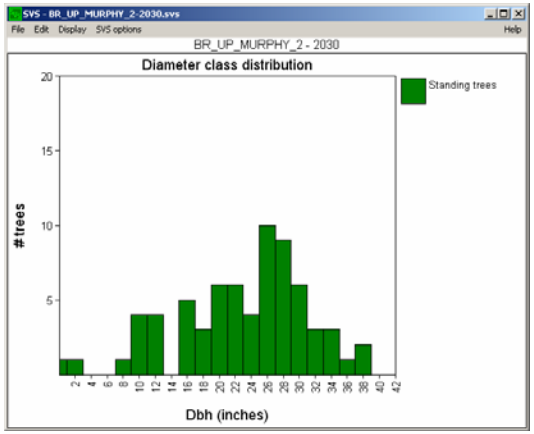
Summary

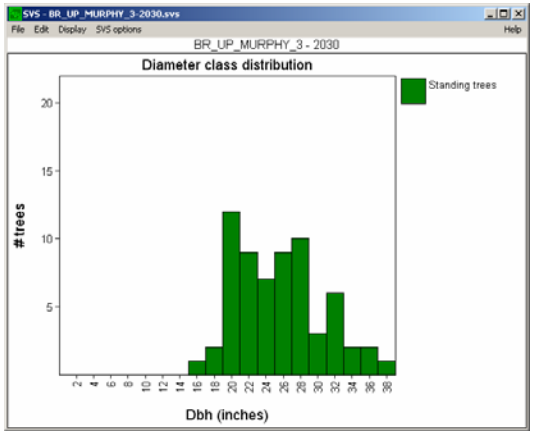
35 of 215 records found NUM

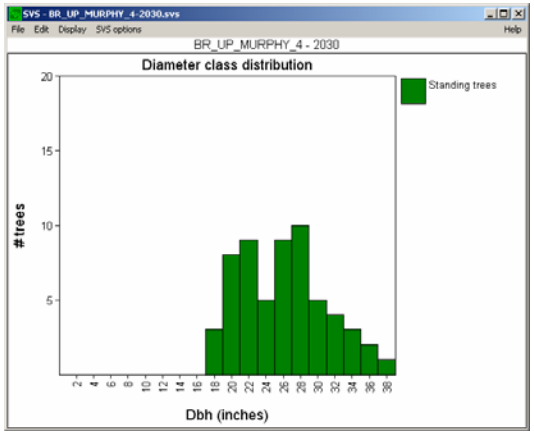
Comparative Thinning Analysis

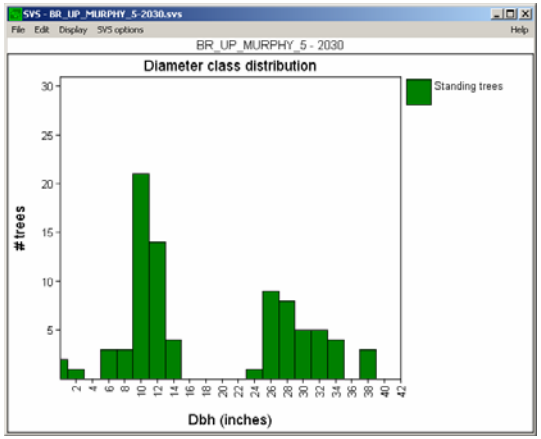
We can also compare the differences in diameter distributions using SVS.







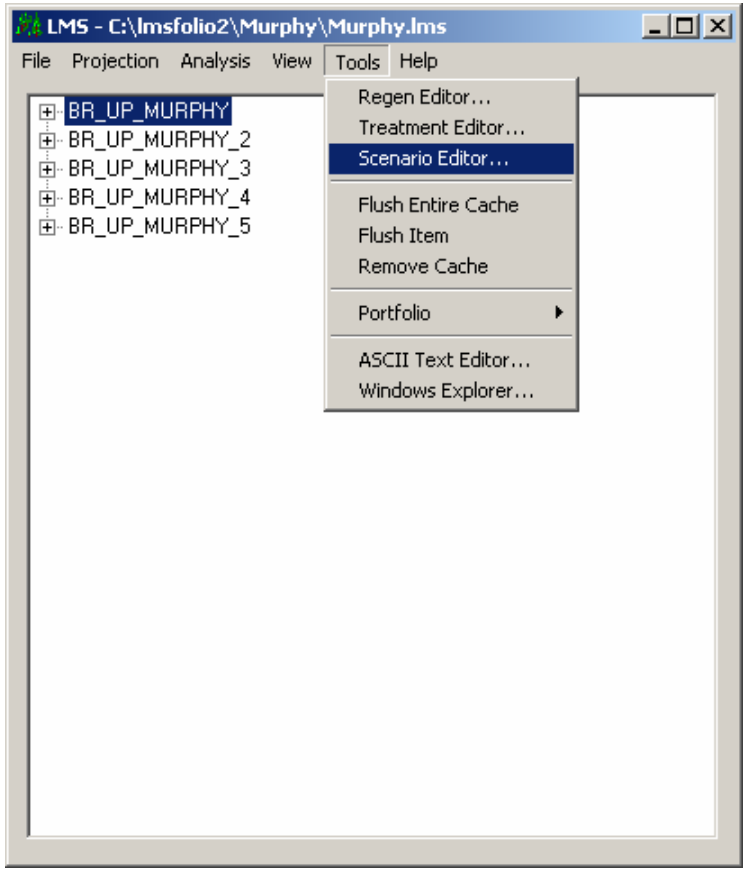




Comparative Thinning Analysis - Scenario files

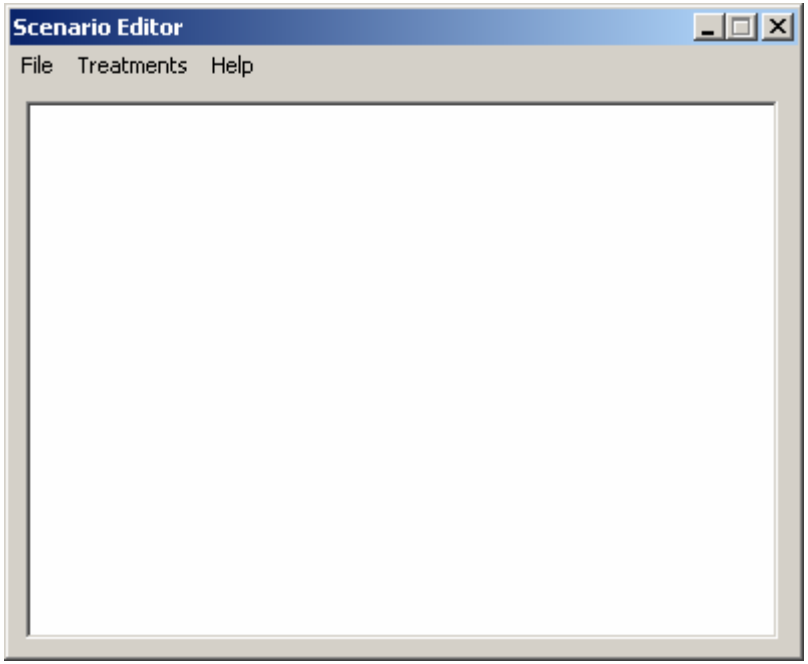
We can also create a scenario file to perform out treatments. The advantages of a scenario file include: you only specify treatments (all stands are automatically grown) and you can re-run a simulation by running the scenario file.

Use Tools/Scenario Editor to create a scenario file.

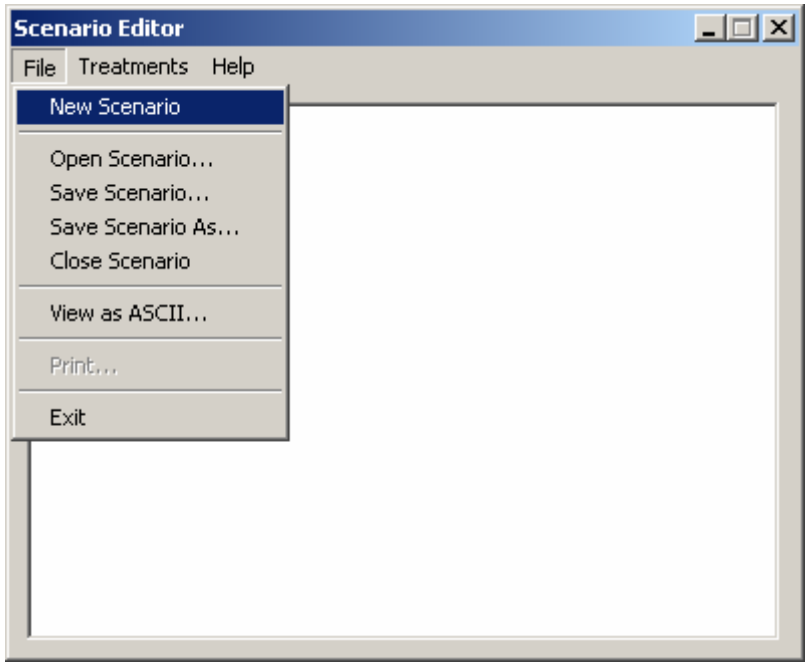


Comparative Thinning Analysis - Scenario files

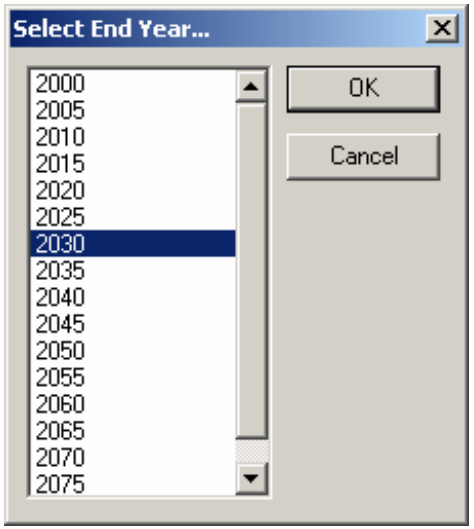
The Scenario Editor will open with a blank screen.



Comparative Thinning Analysis - Scenario files



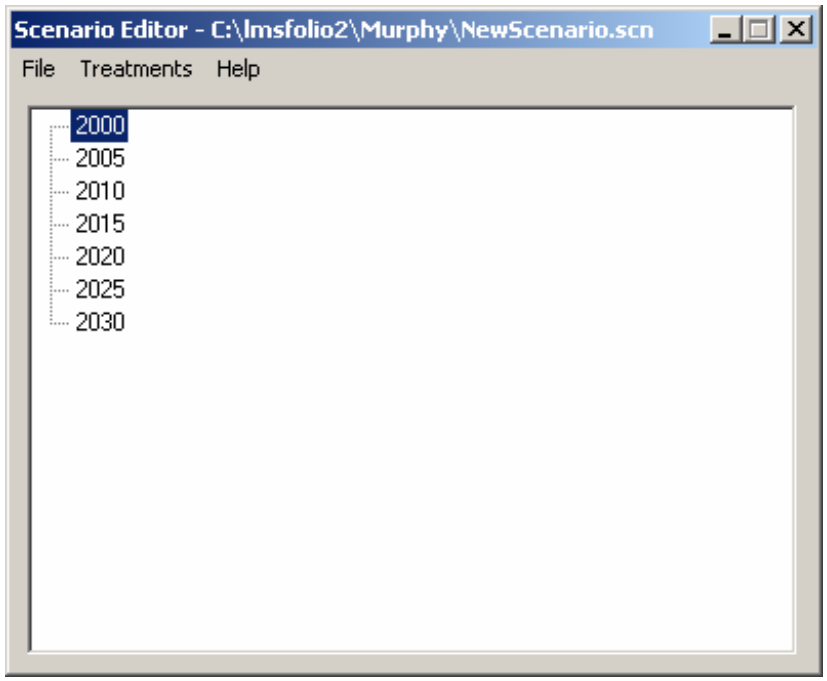
Use File/New Scenario to create a new scenario file.



Select 2030 as the end year for the scenario.

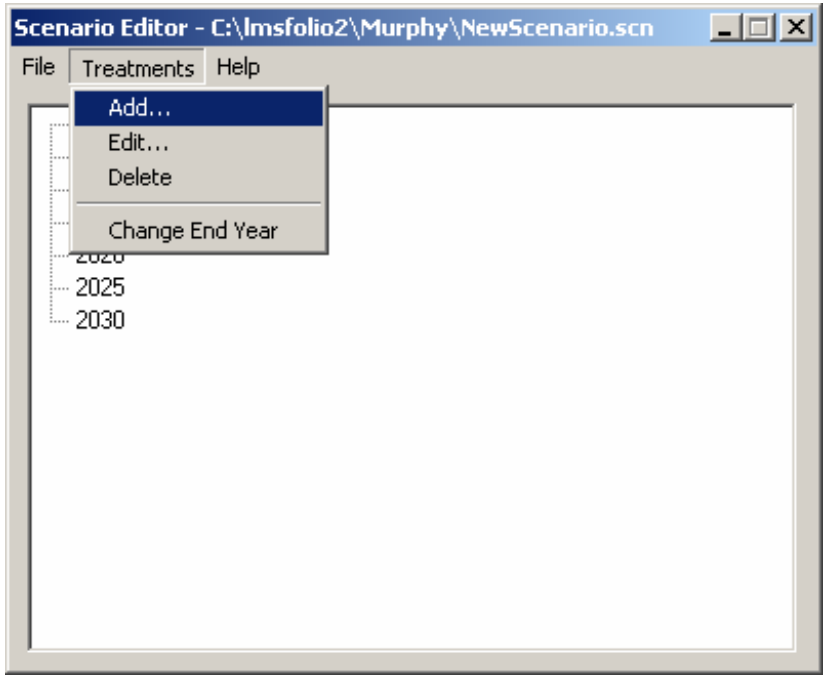
Comparative Thinning Analysis - Scenario files

The new scenario file begins with a list of the years in the simulation.



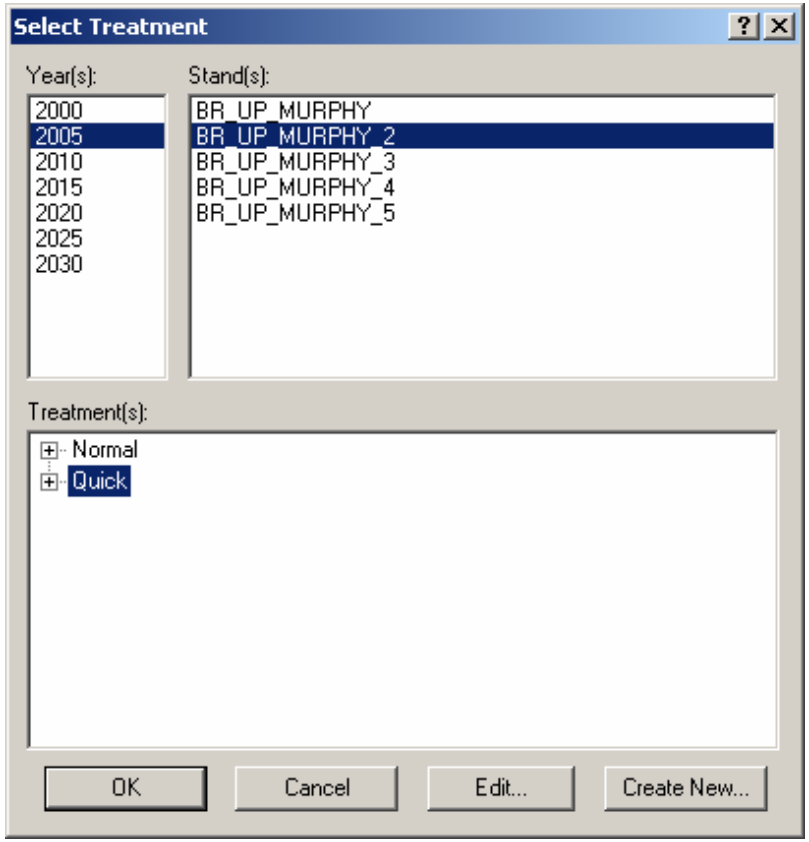
Comparative Thinning Analysis - Scenario files

Treatments can be added using Treatments/Add or the context menu (right click on a year) and select Add.



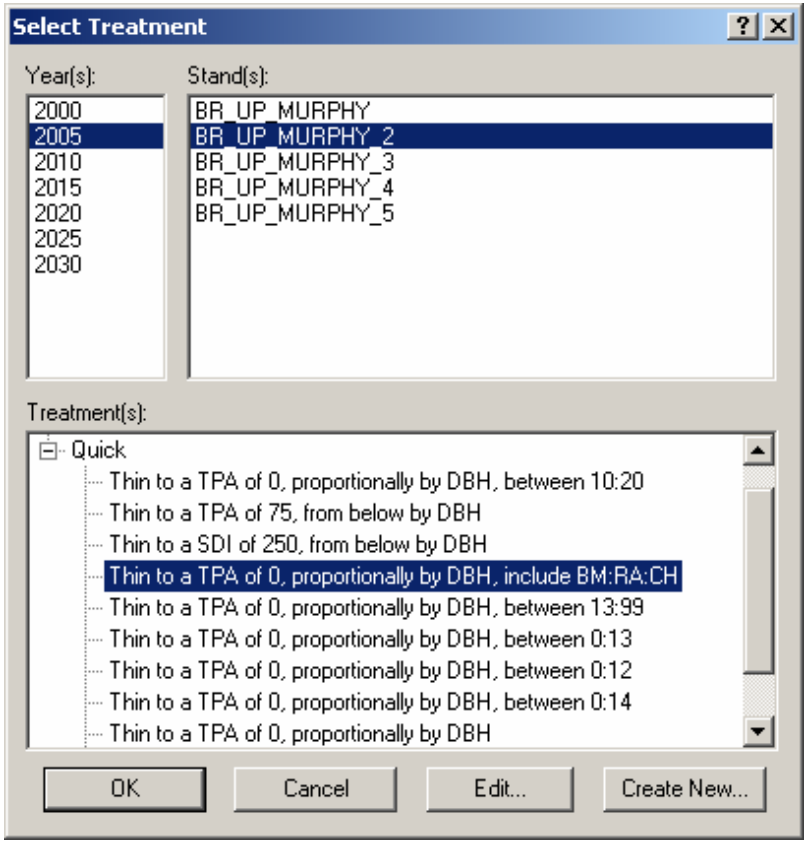
Comparative Thinning Analysis - Scenario files

The Select Treatment Dialog will appear. You can select the Year, Stand Name, and then select from Normal Treatments (memorized treatments) or Quick Treatments (last 10 interactive treatments).



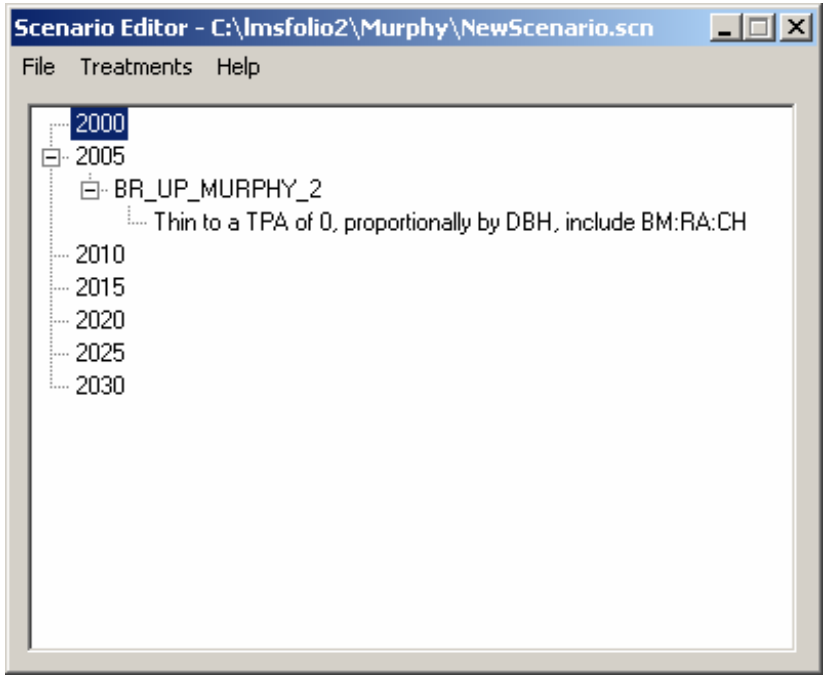
Comparative Thinning Analysis - Scenario files

Since we performed the desired treatments interactively they appear in the Quick Treatments list. Just select the desired treatment and click OK.



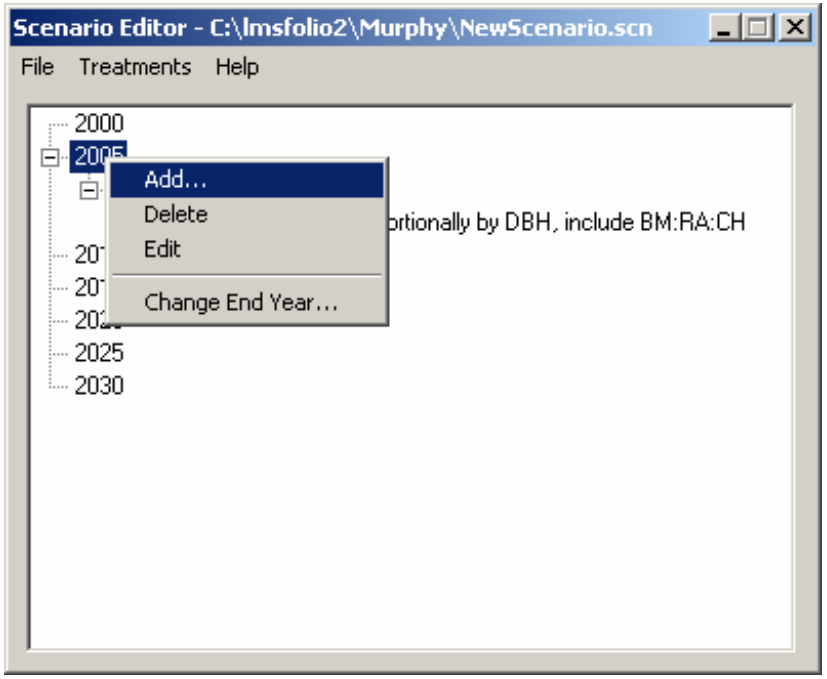
Comparative Thinning Analysis - Scenario files

After selecting the treatment it will show up in the Scenario Editor associated with the year and stand selected.



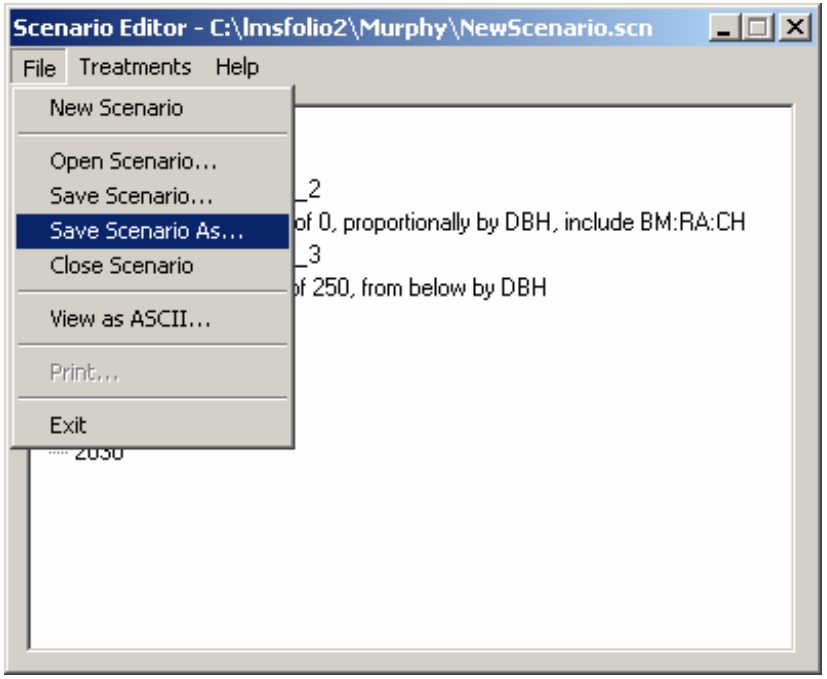
Comparative Thinning Analysis - Scenario files

Select Add again to create additional treatments. Treatments can also be Deleted, or Edited.



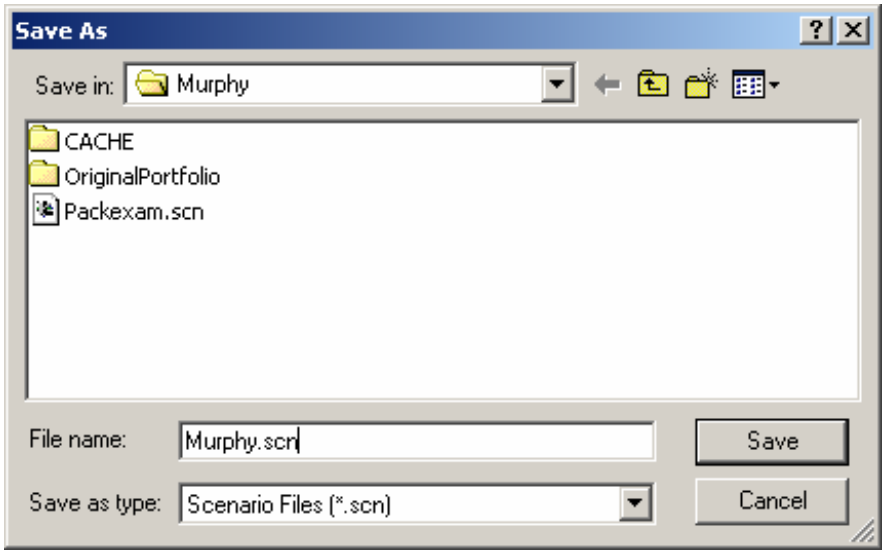
Comparative Thinning Analysis - Scenario files

When you are done save the Scenario file…



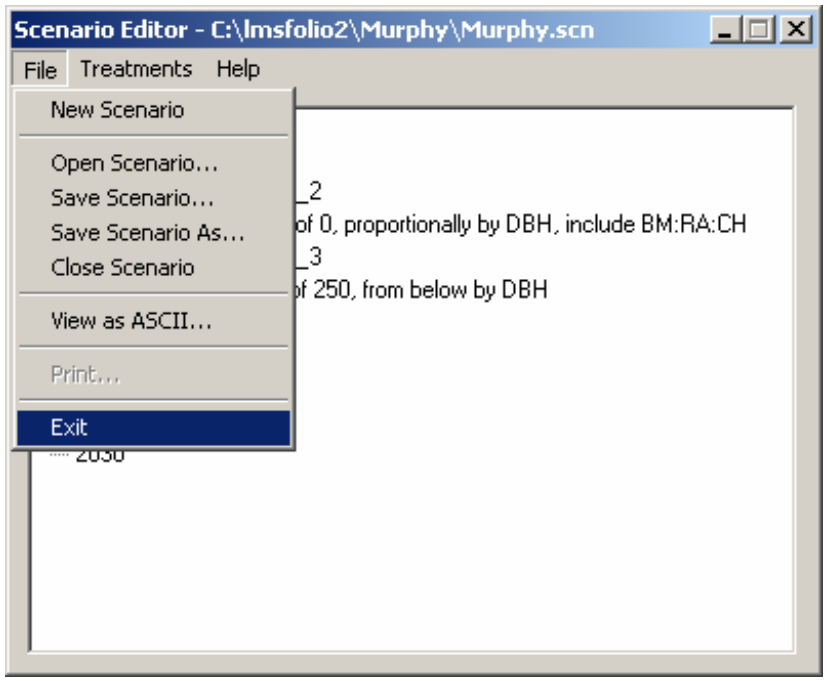
Comparative Thinning Analysis - Scenario files

…Browse to the lmsfolio2/Murphy directory and save the scenario as Murphy.scn



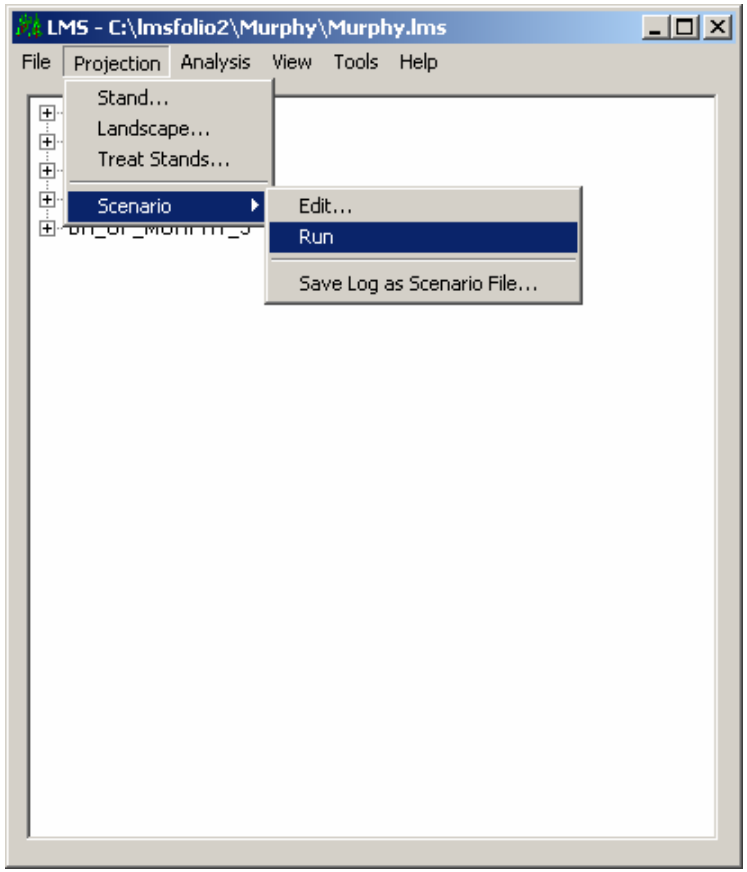
Comparative Thinning Analysis - Scenario files

When done, exit the Scenario Editor.



Comparative Thinning Analysis - Scenario files

The scenario file can then be run using the Projection/Scenario/Run menu command.



Comparative Thinning Analysis

Assignment

- Create and run a scenario file to implement the treatments for this portfolio.

View shed Analysis

- Learning Objective:
  - Demonstrate Landscape Visualization (EnVision), viewpoints

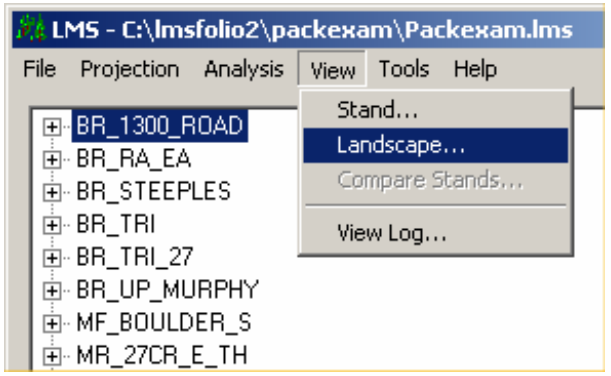
View shed Analysis

Roadmap

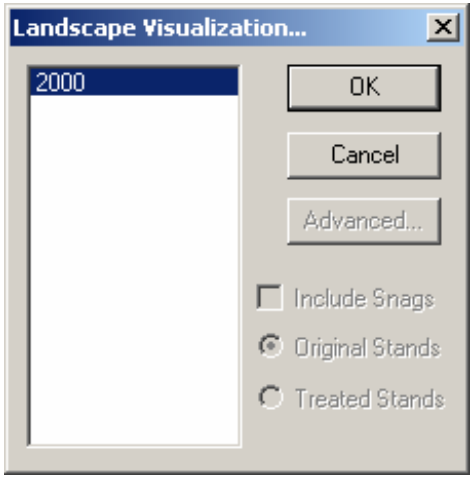
- Introduction to EnVision
- Overlays in EnVision
- Viewpoints
- Saving viewpoints (.epj file and .vpt file)

View shed Analysis

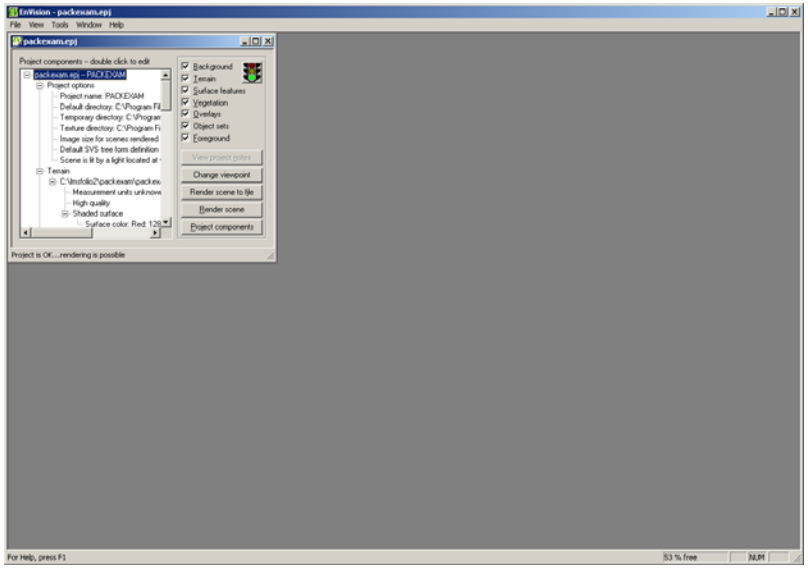
Landscape visualization is done using the View/Landscape menu command in LMS.

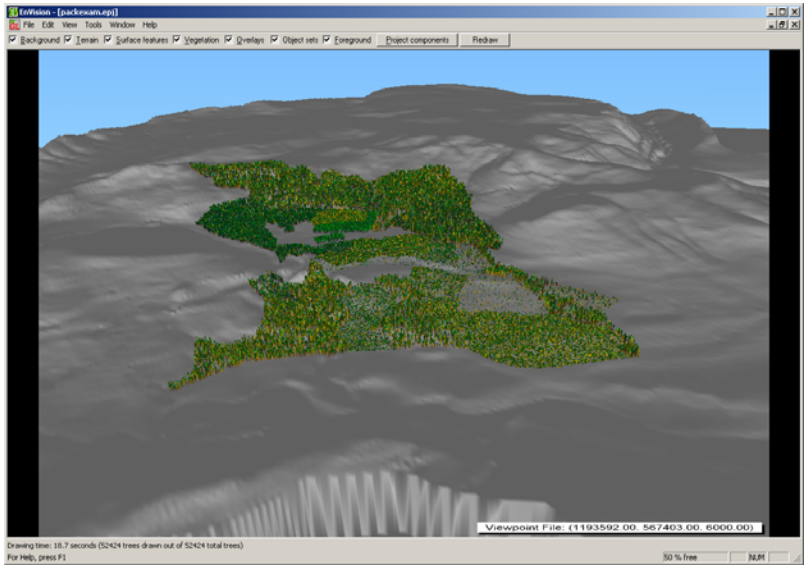


The Landscape Visualization dialog will appear allowing you to confirm the year for the visualization and if you want snags or treated stands if applicable.



View shed Analysis

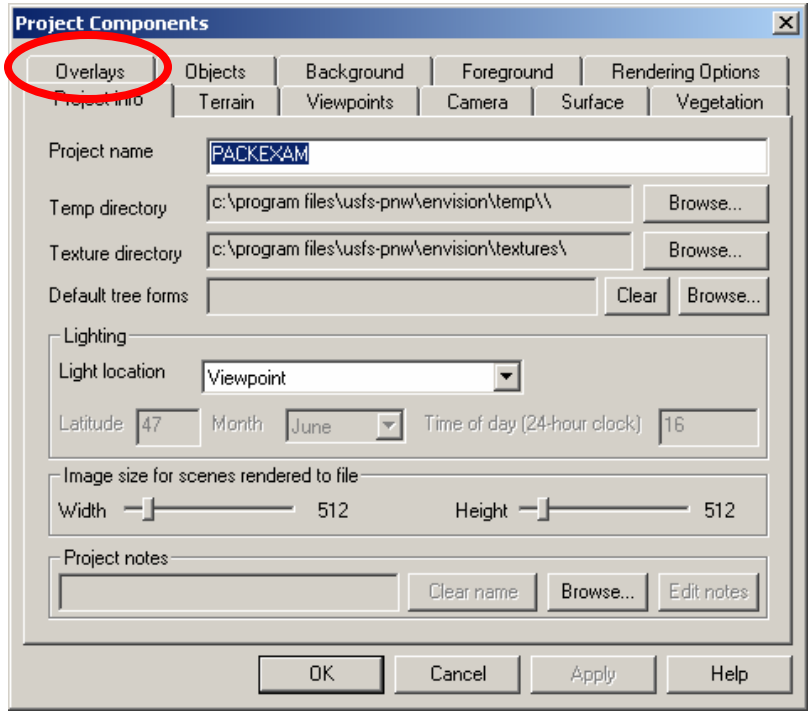




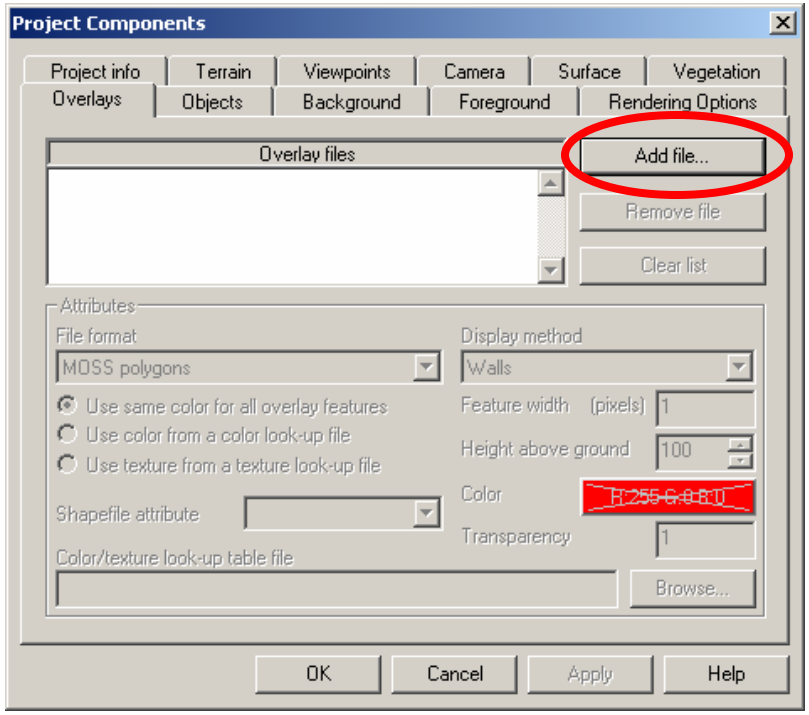
EnVision will come up with the Project Components Dialog. Click Render Scene to show the visualization.

After a few moments EnVision should draw the ground surface, and then start drawing trees on the ground.

View shed Analysis

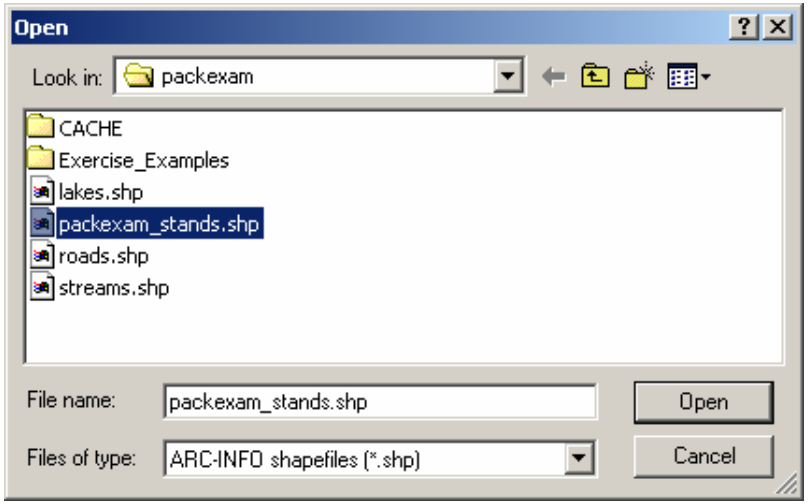


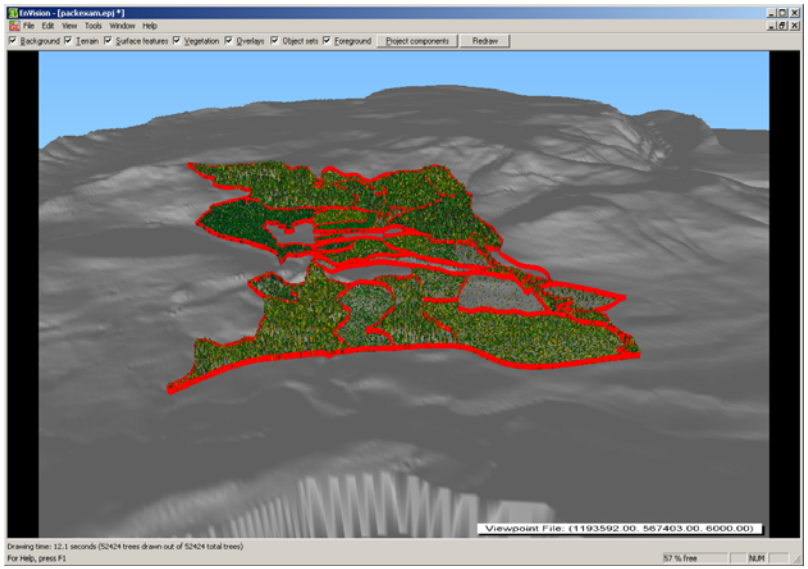
To add Overlays, Click Project Components and then select the Overlays tab.



Click Add file…

View shed Analysis

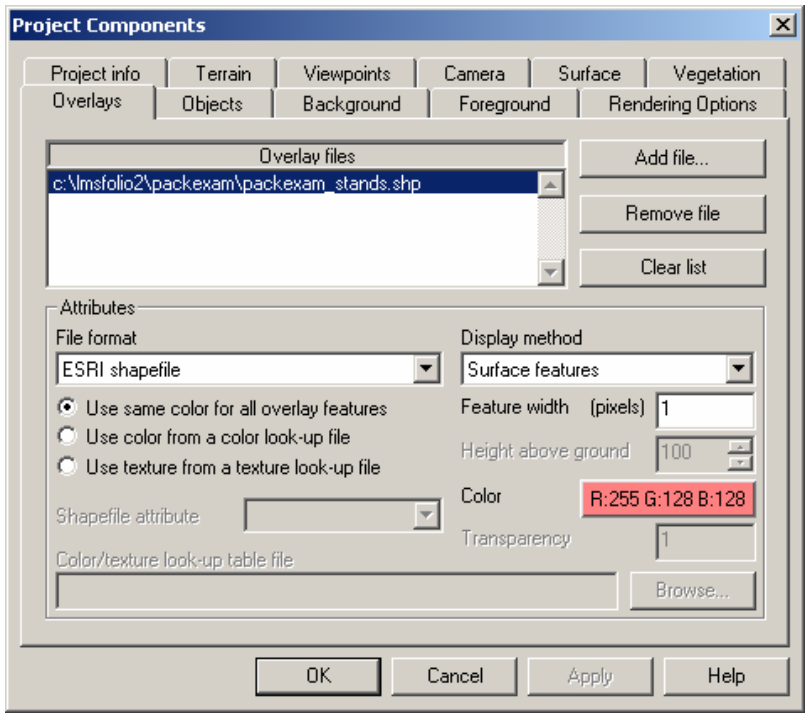




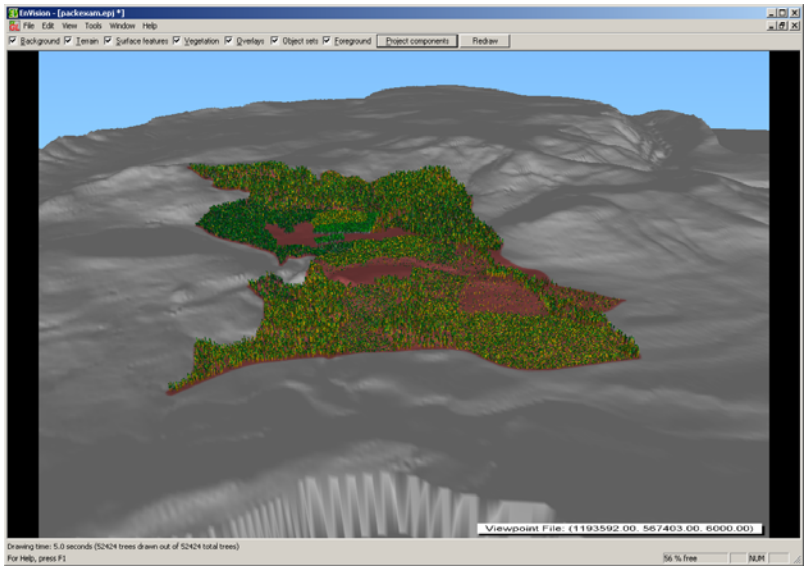
Browse to locate the packexam_stands.shp file in the lmsfolio2/packexam directory.

Accept the defaults, click OK and EnVision will re-draw the sceen with walls where the stand boundaries are located.

View shed Analysis



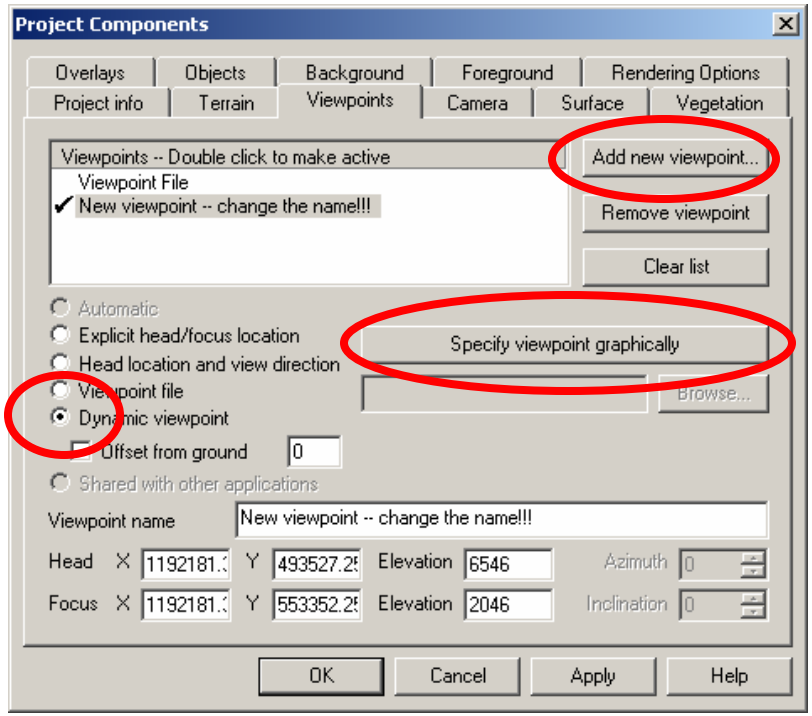
Change the Display Method to Surface features and change the color.



Click OK and the scene will be re-drawn with the ground surface colored. This allows us to see where are stands are as we move around in the scene.

View shed Analysis

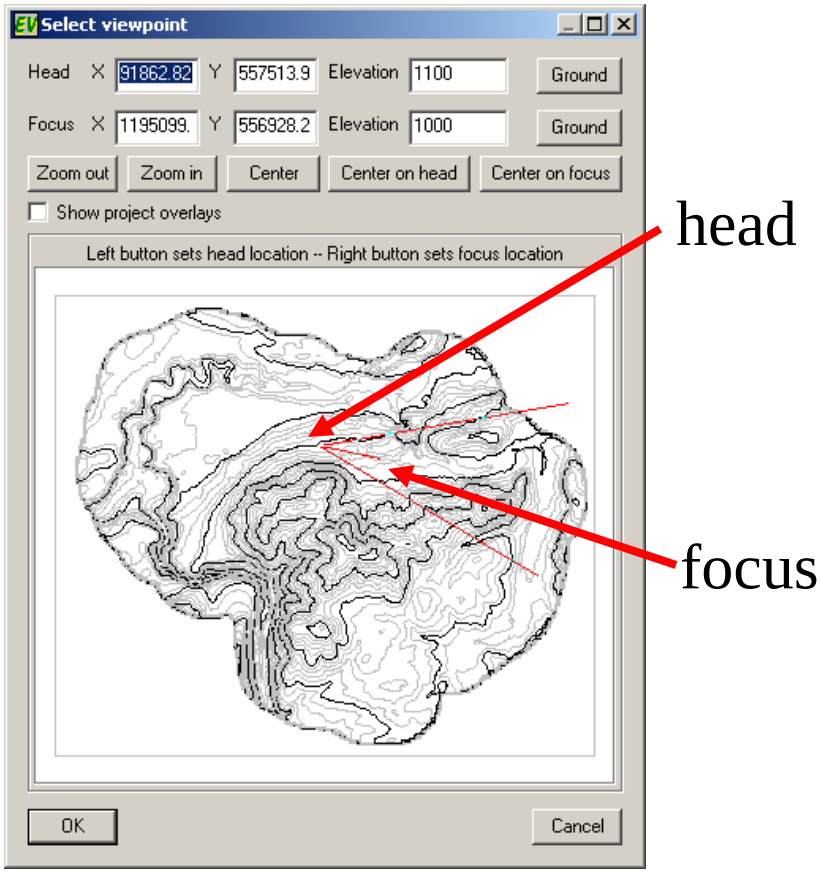
To change how we view that landscape, select Project Components again, then select the Viewpoints tab. This allows us to “manage” the viewpoints EnVision knows about. You will see a default viewpoint defined by LMS for the portfolio.



Click Add new viewpoint to create a new viewpoint. Click Dynamic viewpoint and then click Specify viewpoint graphically.

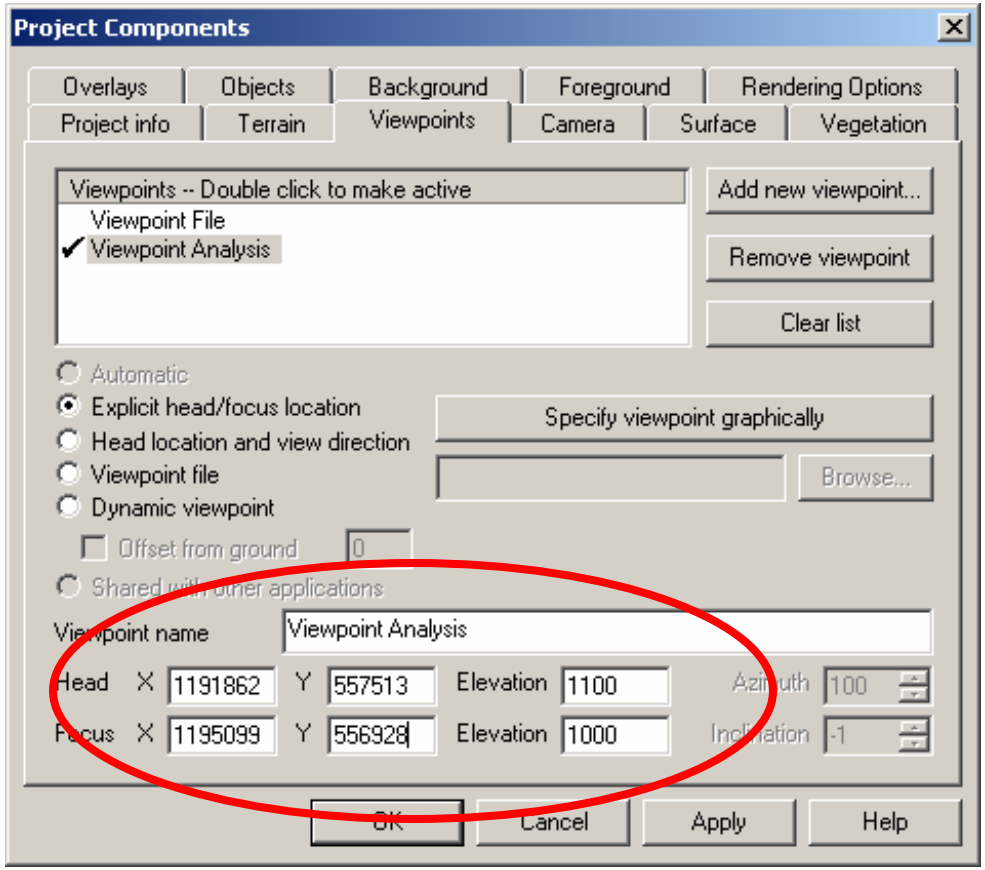
View shed Analysis

The select viewpoint dialog allows use to move around where we are looking from (head) and where we are looking to (focus). You can reset the values by entering the number or clicking in the planimetric view. Use the left mouse button for the head location and the right mouse button for the focus location.



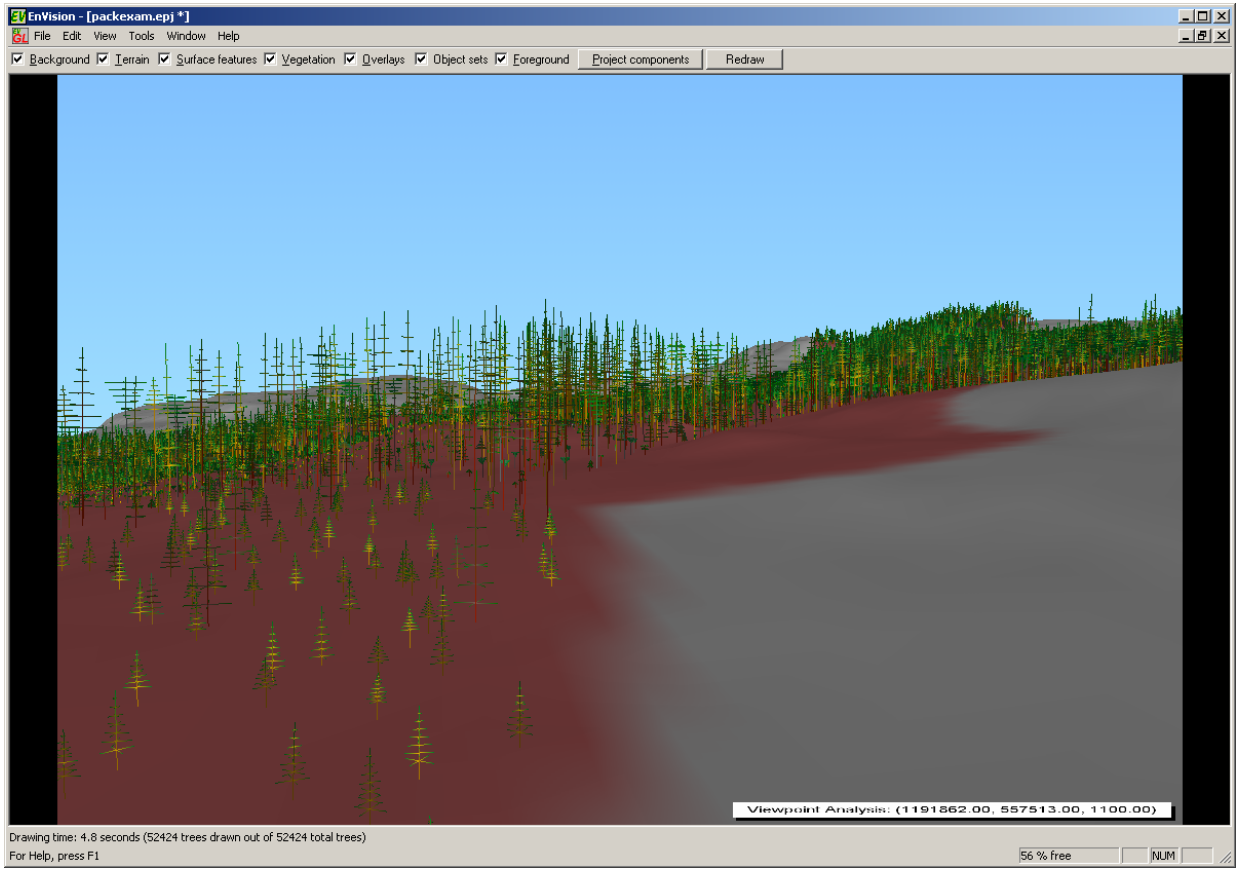
View shed Analysis

Enter the coordinates show at the right for a new viewpoint. Click OK on the Select viewpoint dialog and then rename the viewpoint to "Viewpoint Analysis".



View shed Analysis

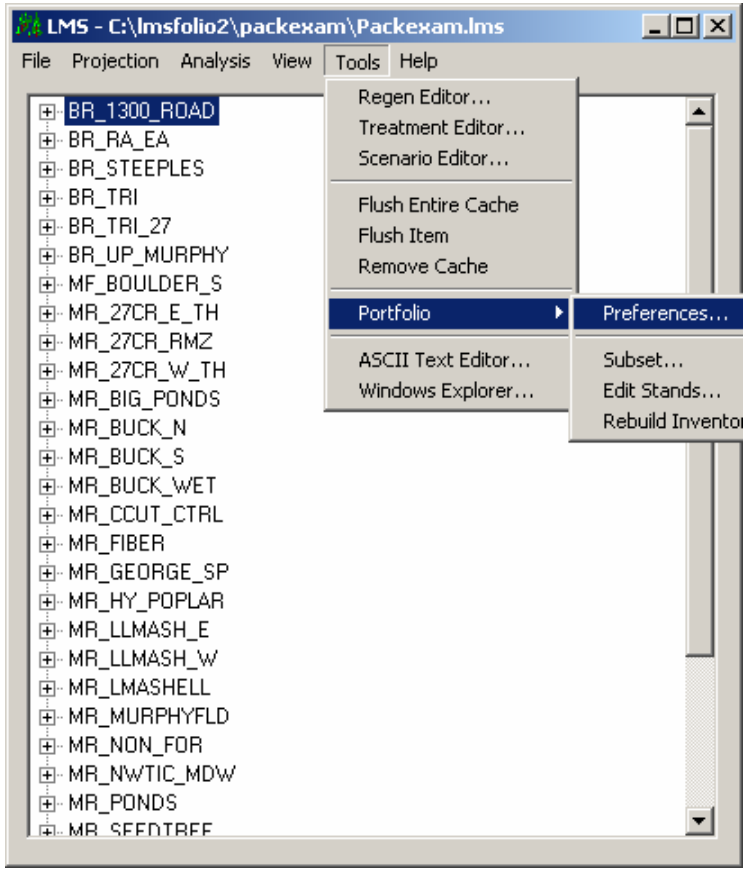
The scene now draws from the new viewpoint.



View shed Analysis

By default LMS constructs the landscape visualization with fewer trees than the actual number to speed the visualization.

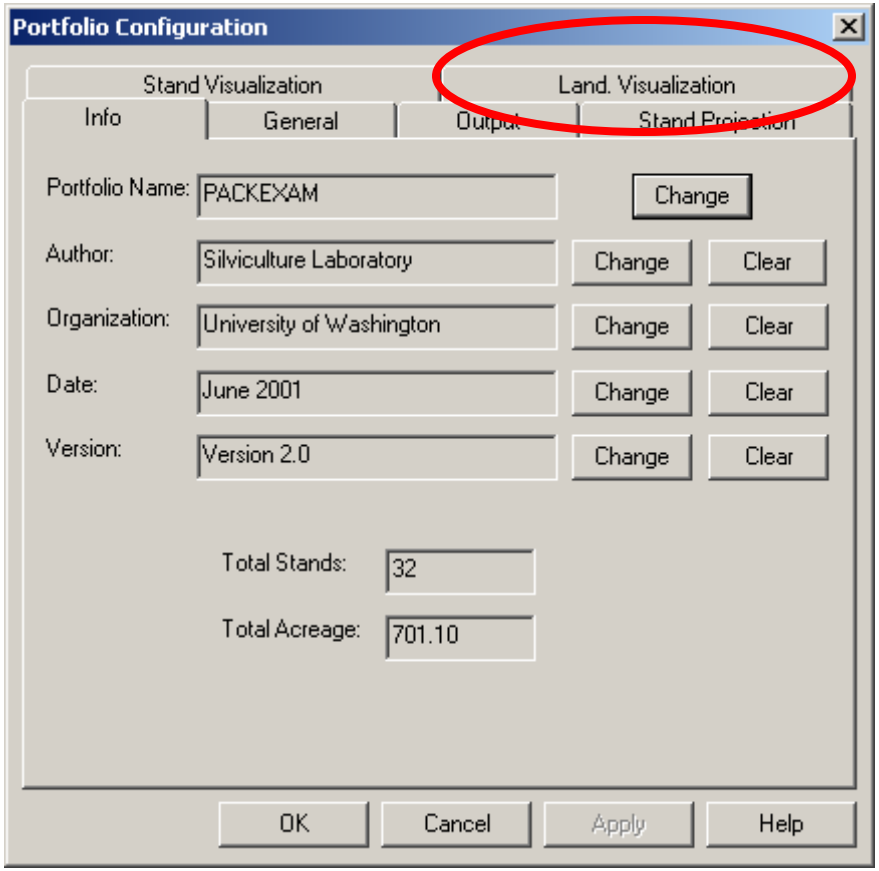
You can control this scaling using the Tools/Portfolio/ Preferences menu command.



View shed Analysis

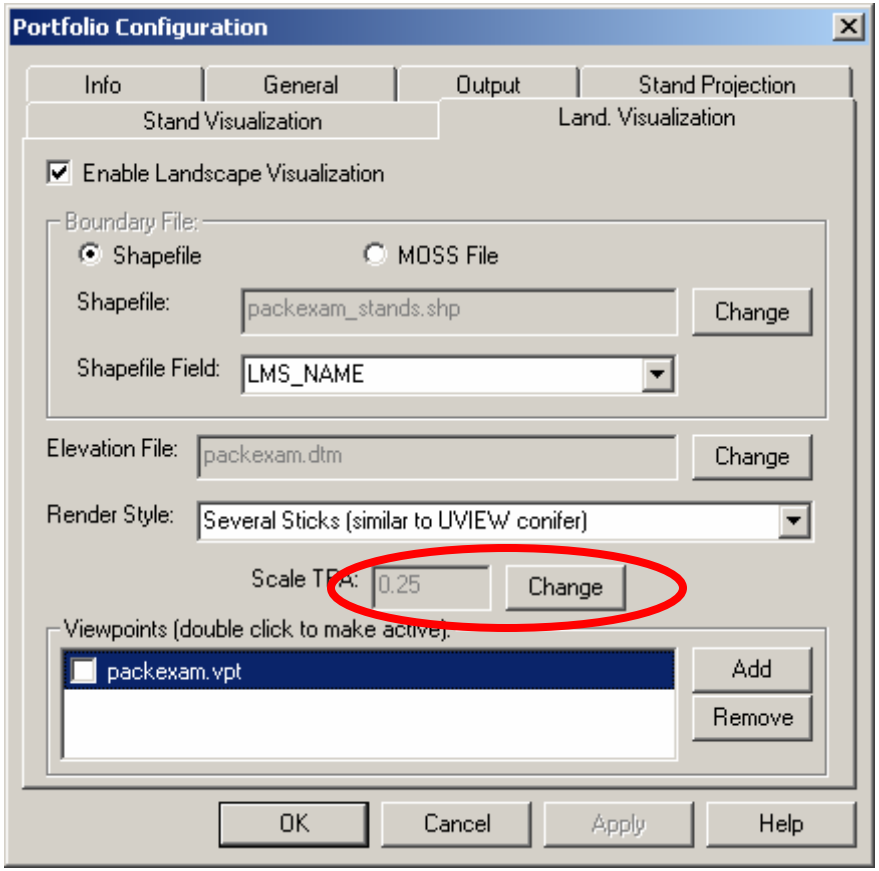
The portfolio configuration dialogs allow you to make a variety of changes to the portfolio.

Click the Land. Visualization tab…



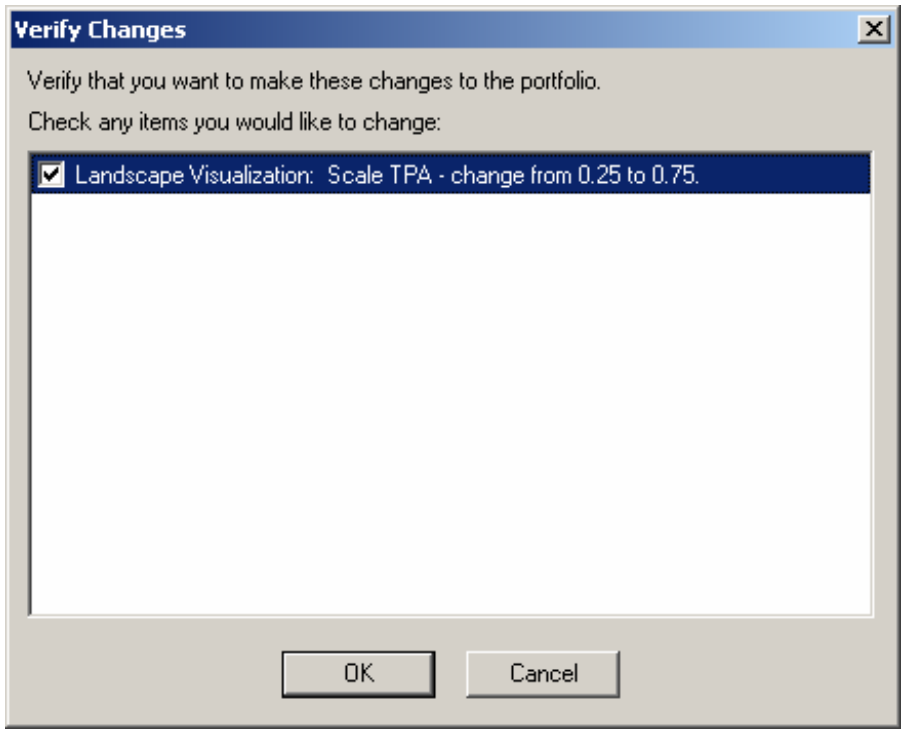
View shed Analysis

The default for this portfolio is to only draw 25% of the actual trees. You can change this by clicking the Change button. Change the value to 0.75. And then click OK.



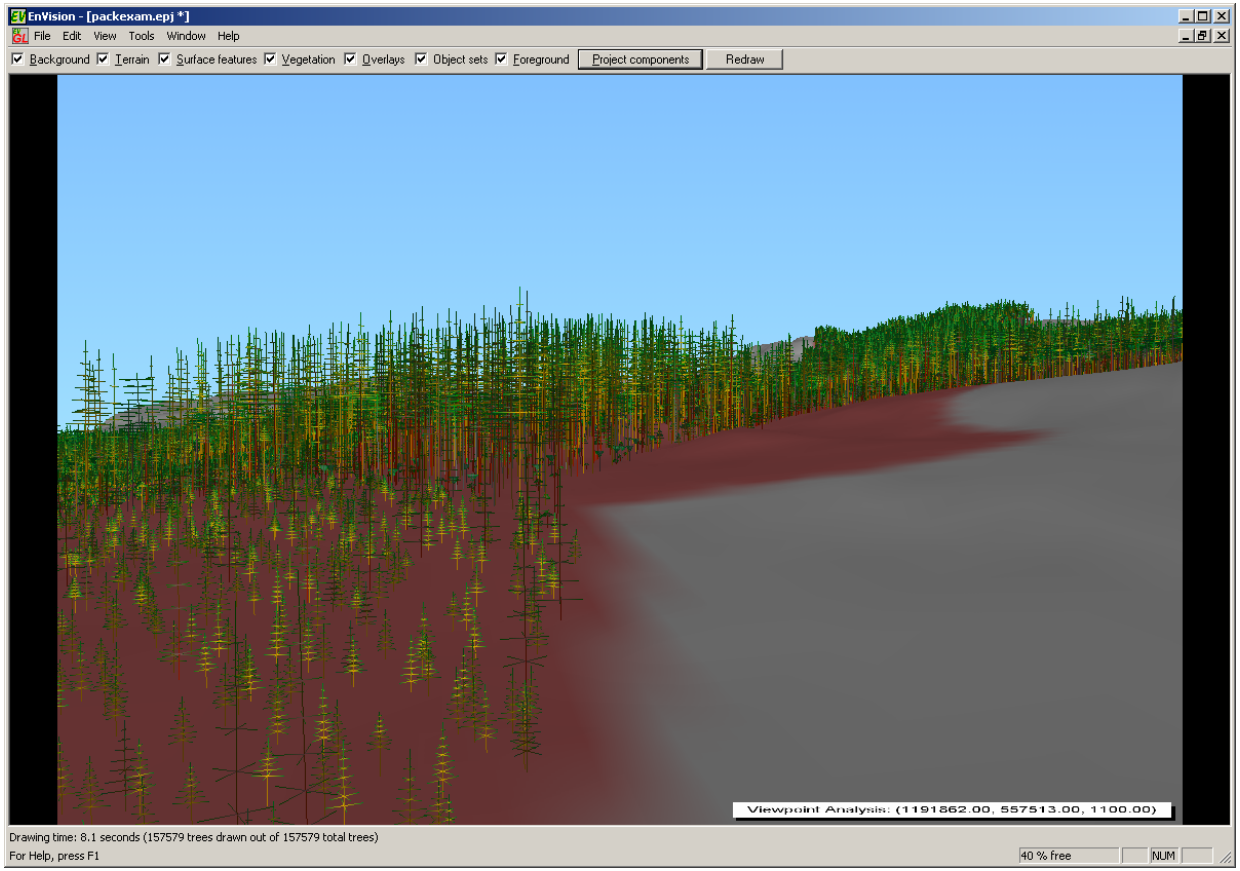
View shed Analysis

LMS will then confirm that you really want to make this change. Click the check box and then click OK.



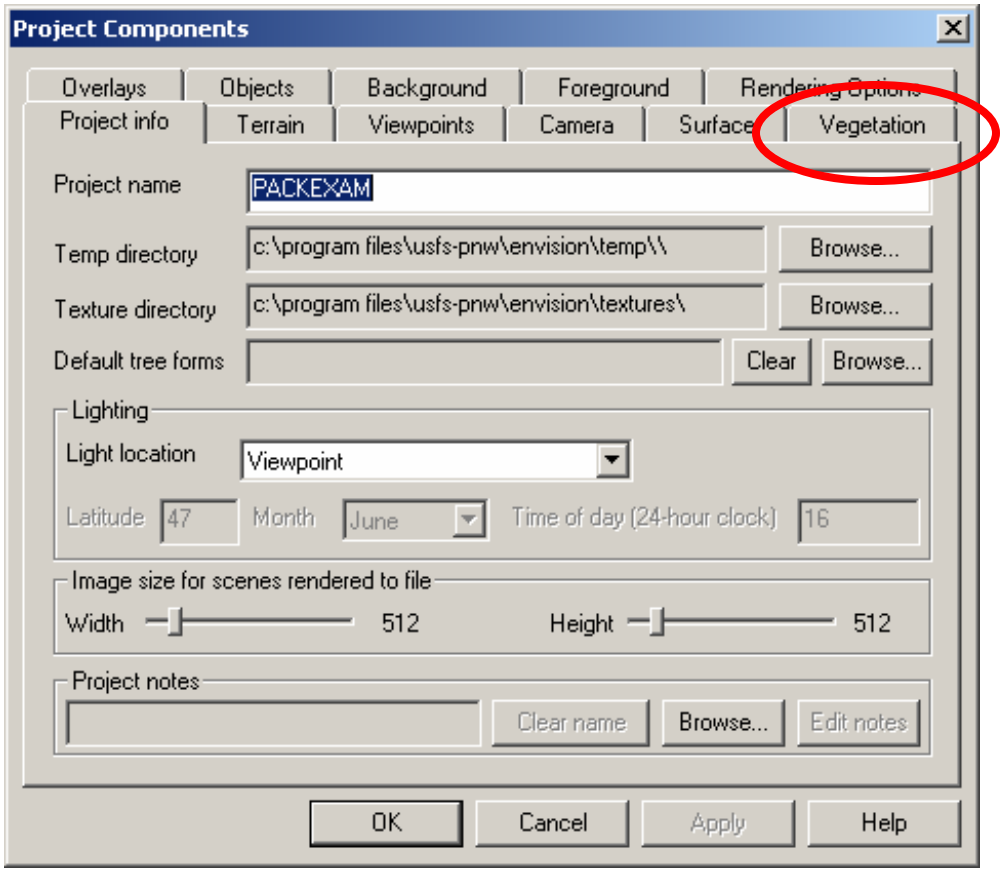
View shed Analysis

Re-running the visualization will result is a denser view.



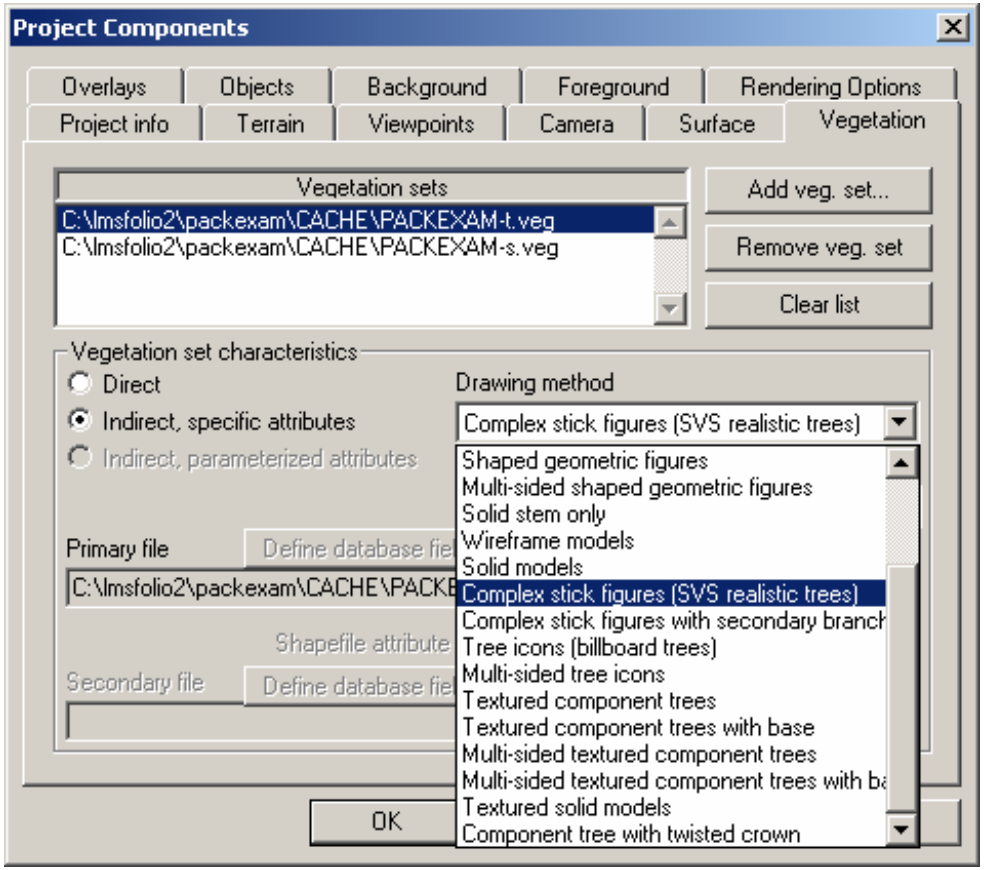
View shed Analysis

Another way to control the appearance of the visualization is to change the way trees are rendered. Select Project Components in EnVision, then select the Vegetation tab.



View shed Analysis

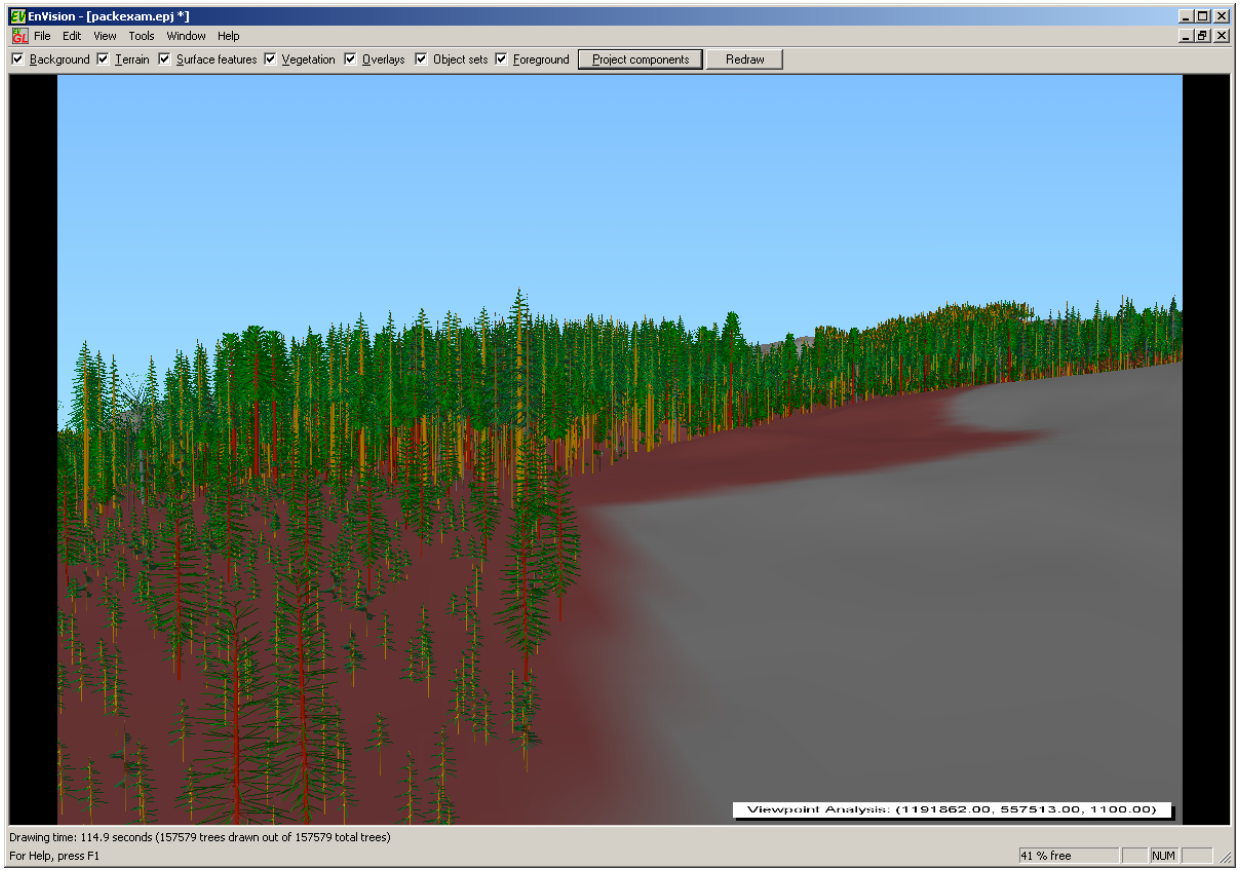
With the PACKEXAM-t.veg line highlighted change the Drawing method to “Complex stick figures” and click OK.



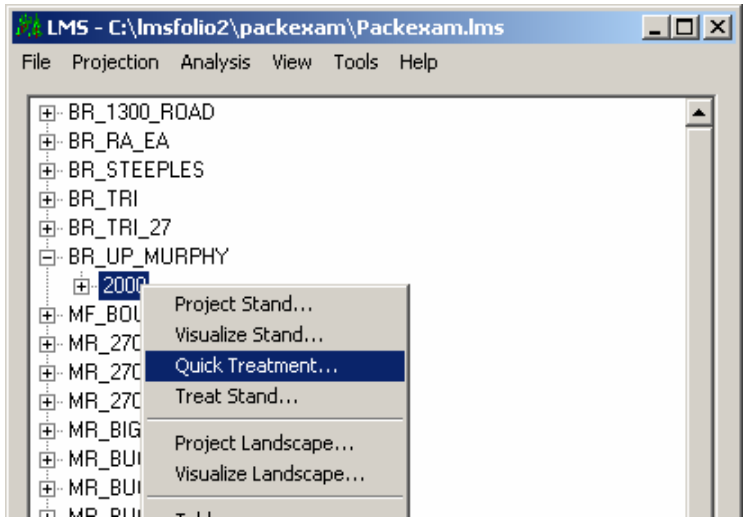
View shed Analysis

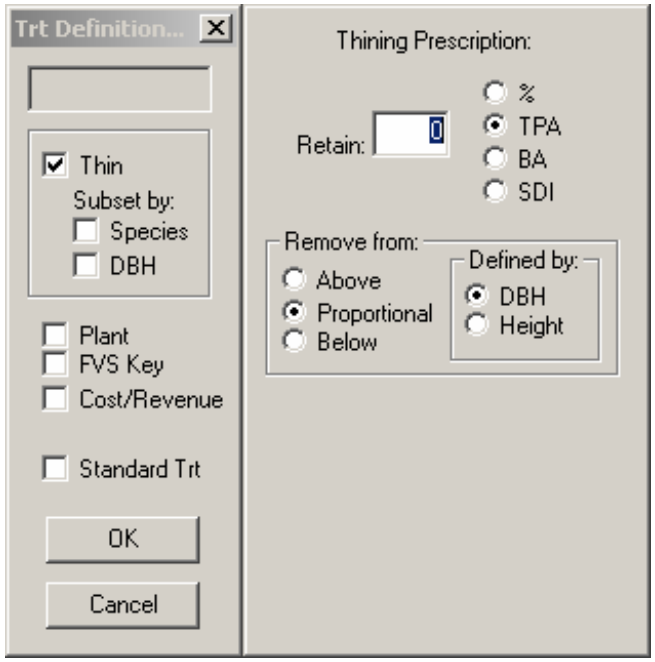
The scene will be re-drawn with more realistic tress.

It takes longer to render the scene in this quality.



View shed Analysis

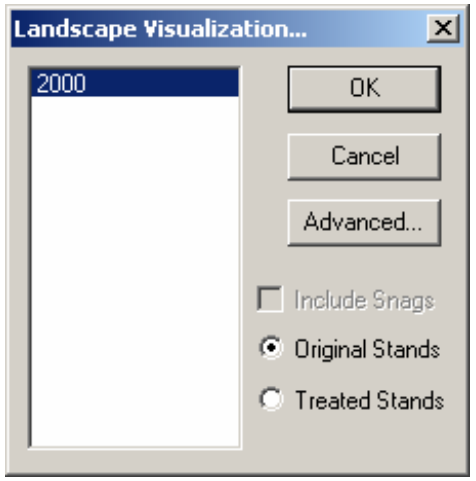




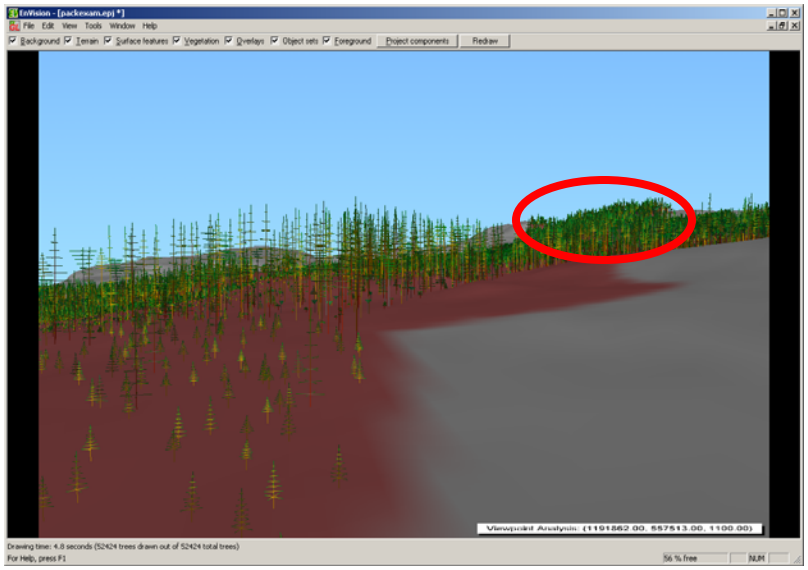
To begin our examination of the visibility of stand treatments let's remove the trees from the BR_UP_MURPHY stand. Re-run the visualization and compare it to before treatment.

View shed Analysis

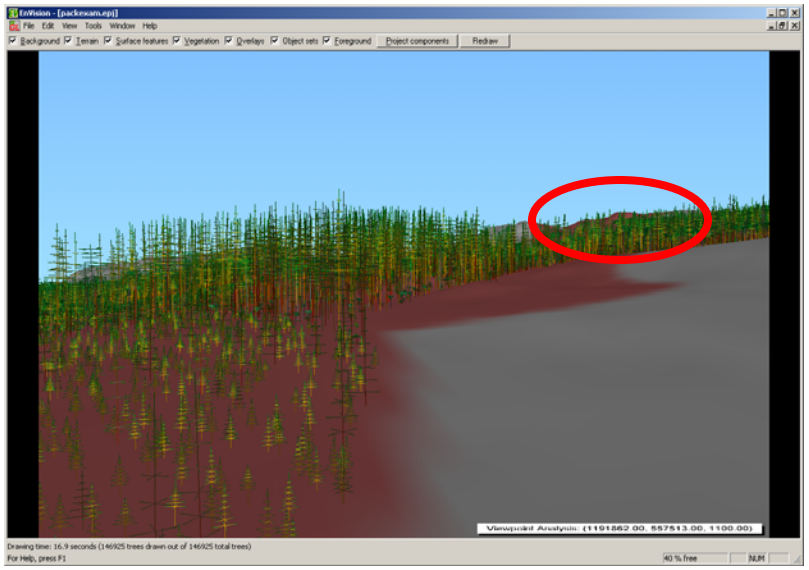
Visualize once with Original Stands and then a second time with Treated Stands to see the effect of the treatment.



View shed Analysis

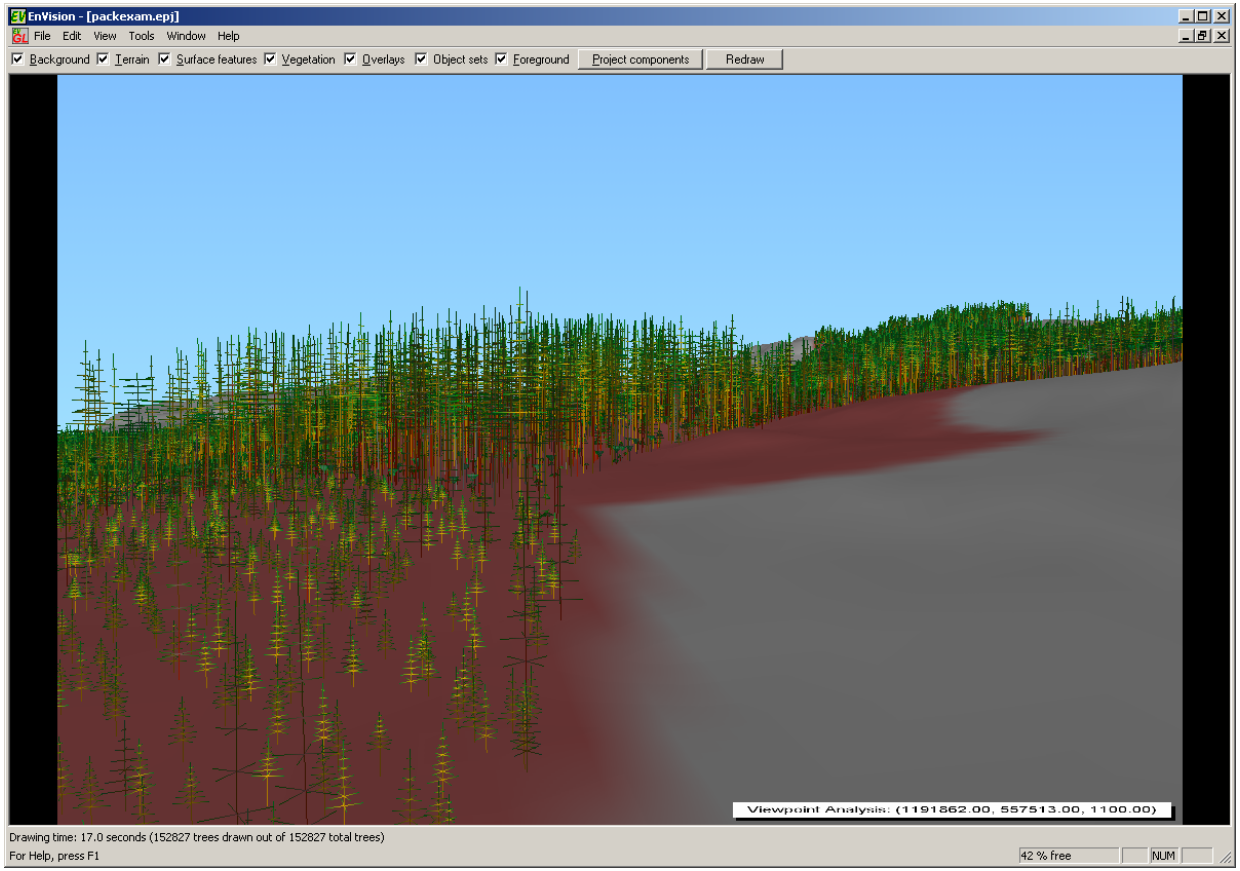


BR_UP_MURPHY 179 TPA.



BR_UP_MURPHY 0 TPA.

View shed Analysis



BR_UP_MURPHY thinned to 100 TPA.

View shed Analysis

- Assignment:

- Examine the visibility of treatments on the following stands: BR_STEEPLES, MR_SUBDIV and MR_27CR_RMZ.

View shed Analysis