Creating a New Portfolio with LMS 2.0

A landscape portfolio in LMS consists of a series of files that contain information about a collection of stands[1]. The stands may comprise the physical attributes of an actual landscape or be a collection of representative stands for a desired analysis. In GIS, stands are referred to as polygons and usually make up a collection of management subdivisions that combine to form a landscape. A landscape usually represents a collection of stands within a single ownership or watershed. The landscape may be of any size – from one stand made up of just a few acres or tens of thousands of acres contained within many stands.

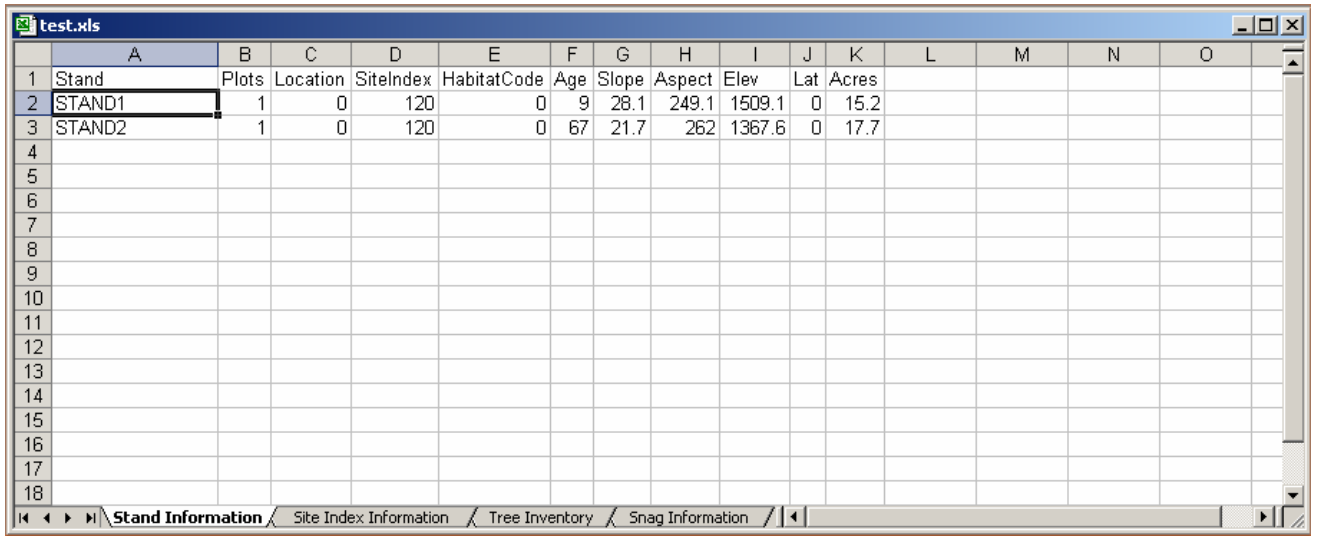
Inventory Information

The minimum information needed to create an LMS portfolio is a small amount of stand level information (Site Index, Age, Acres, etc) and information about the individual tree characteristics in each stand. For landscape visualization additional spatial information consisting of elevation and stand location coordinates is required. Additional GIS information on the hydrological and transportation attributes of the landscape is desirable as well. Setup for spatial information will be covered in an additional section in this document, to be provided later.

[1] A stand is a management unit with an area boundary that is spatially defined by past or anticipated management practices, disturbance events, topographical features, survey lines, or roads. Stands may range in size from just a few acres to several hundred acres.

Stand Level Information

The table below shows an example for the format for the stand level information used by LMS. It consists of a name for the stand, plots (which is currently always 1), location (the forest code if using FVS), Site Index, Habitat Code (if using an FVS variant that uses this for site quality), Age, Slope, Aspect, Elevation, Latitude, and Acres. The example below was created in Excel and includes information for two stands. NOTE: the first line are comments to help during data entry, the semi-colon (;) must appear at the beginning of the line so that LMS will ignore the line when it processes the file. For general applications the plots, location, habitat code, and latitude should left with values of 1 or 0 as shown.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Stand	Plots	Location	SiteIndex	HabitatCode	Age	Slope	Aspect	Elev	Lat	Acres				
2	STAND1	1	0	120	0	9	28.1	249.1	1509.1	0	15.2				
3	STAND2	1	0	120	0	67	21.7	262	1367.6	0	17.7				
4															
5															
6															
7															
8															
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17															
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Tree Level Information

The tree level information in LMS is comprised of a tree list inventory. A tree list inventory represents individual trees that are measured in each stand. Each measured tree also has an expansion factor that indicates how many trees the measured tree represents on a per acre basis. This inventory can be developed by summarizing a number of inventory sampling protocols (fixed plot, variable plot, or nested designs). The table below shows an example of the inventory. It consists of the Year the inventory data was collected, the Stand name, Tree number, Species, Diameter (DBH), Height, Crown Ratio, Expansion (or trees per acre), Board Foot, Cubic Foot, and Merch. Cubic Foot Volume Per Tree, Maximum Crown Width. The height, crown ratio, volume, and crown width values are optional and will be "filled in" by the growth model; however, providing these values will help to create an inventory that best represents the stands.

test.xls

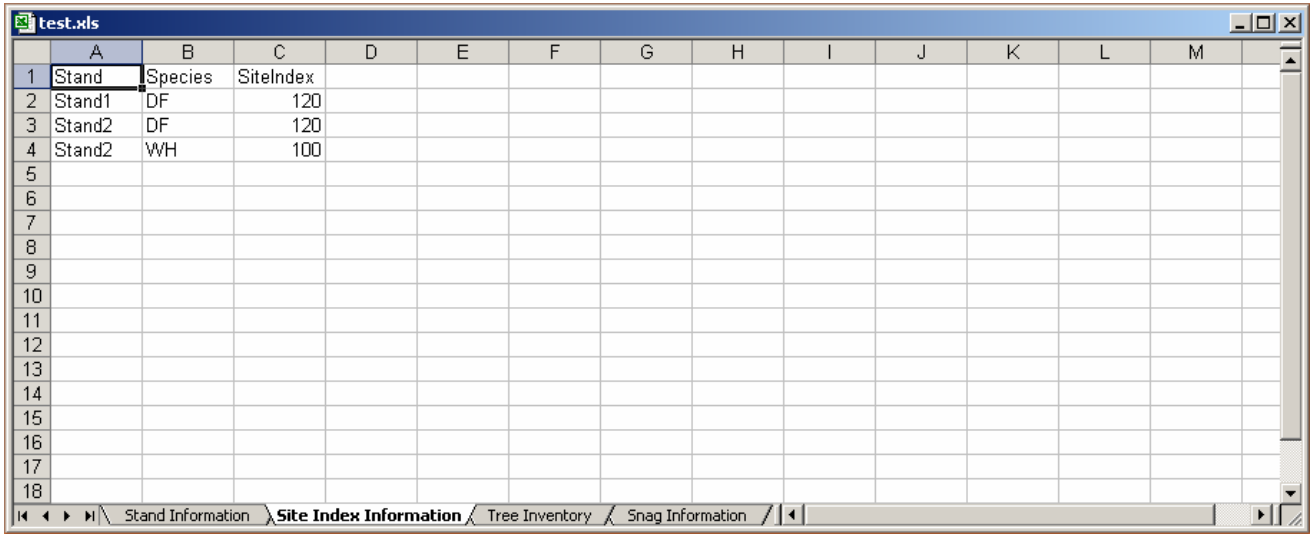
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	; Year	Stand	Tree#	Species	DBH	Height	CrwnRatio	Exp	VolPerTree	CubicVol	MCubicVol	MCW			
2	2000	STAND1	1	DF	18.1	126	0.54	2.44	340	0	0	20.7			
3	2000	STAND1	2	DF	16.7	125	0.53	2.44	298	0	0	19.8			
4	2000	STAND1	3	DF	16.3	103	0.52	2.44	236	0	0	19.6			
5	2000	STAND1	4	DF	19.8	131.7	0.58	2.45	424	0	0	21.7			
6	2000	STAND1	5	DF	22.1	127	0.59	2.45	623	0	0	23			
7	2000	STAND1	6	DF	11.5	77.4	0.46	2.44	80	0	0	16.2			
8	2000	STAND1	7	RA	9.9	61	0.25	2.42	75	0	0	21.1			
9	2000	STAND1	8	DF	10.4	69.3	0.4	2.44	67	0	0	15.4			
10	2000	STAND1	9	DF	13.3	86.5	0.51	2.44	154	0	0	17.6			
11	2000	STAND1	10	DF	18.4	123.1	0.56	2.44	340	0	0	20.9			
12	2000	STAND1	11	DF	13.1	85.4	0.5	2.44	154	0	0	17.4			
13	2000	STAND1	12	DF	10.9	73.2	0.43	2.44	80	0	0	15.8			
14	2000	STAND1	13	DF	19.6	118.5	0.58	2.45	398	0	0	21.6			
15	2000	STAND1	14	DF	18.3	113.5	0.56	2.44	313	0	0	20.8			
16	2000	STAND1	15	DF	11.9	77.4	0.48	2.44	92	0	0	16.6			
17	2000	STAND1	16	DF	16.4	104	0.53	2.44	236	0	0	19.6			
18	2000	STAND1	17	DF	19.4	115.6	0.58	2.45	349	0	0	21.5			

Stand Information | Site Index Information | Tree Inventory | Snag Information

Site Index Information

The growth models in LMS can use site index information so scale the growth rates for stands. The stand level information includes a single site index value, which is the site index for the default species for the growth model and variant used (see the model information in the LMS 2.0/FVS Documentation program folder).

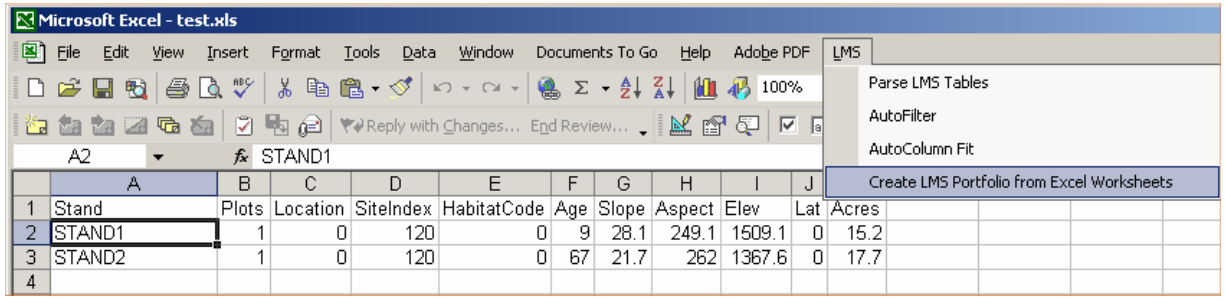
You can also provide species specific site index information for you portfolio. The Site Index Information tab in the test.xls file includes an example. Both stands are given a DF site index of 120, and Stand2 is given a lower site index for WH.



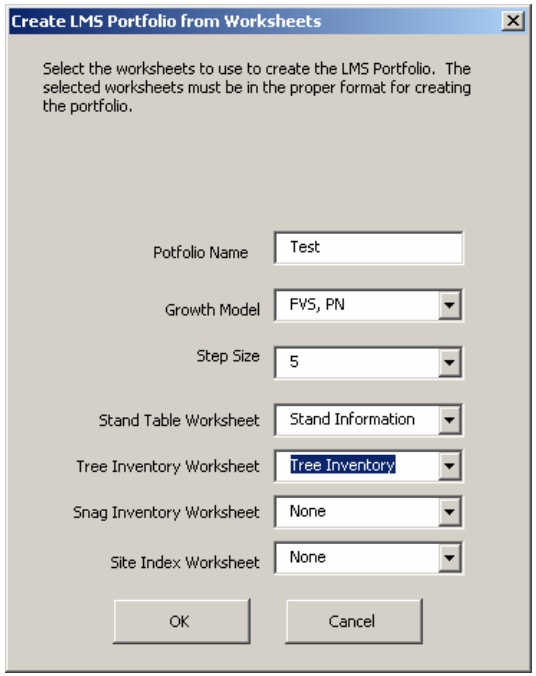
	A	B	C
1	Stand	Species	SiteIndex
2	Stand1	DF	120
3	Stand2	DF	120
4	Stand2	WH	100

Creating a New Portfolio from Excel

You can create a new portfolio from Excel using the “Create LMS Portfolio from Excel Worksheets command on the LMS Menu. Selecting this will bring up a dialog that you use to select the remaining information to needed to create a LMS portfolio.



	A	B	C	D	E	F	G	H	I	J	
1	Stand	Plots	Location	SiteIndex	HabitatCode	Age	Slope	Aspect	Elev	Lat	Acres
2	STAND1	1	0	120	0	9	28.1	249.1	1509.1	0	15.2
3	STAND2	1	0	120	0	67	21.7	262	1367.6	0	17.7
4											

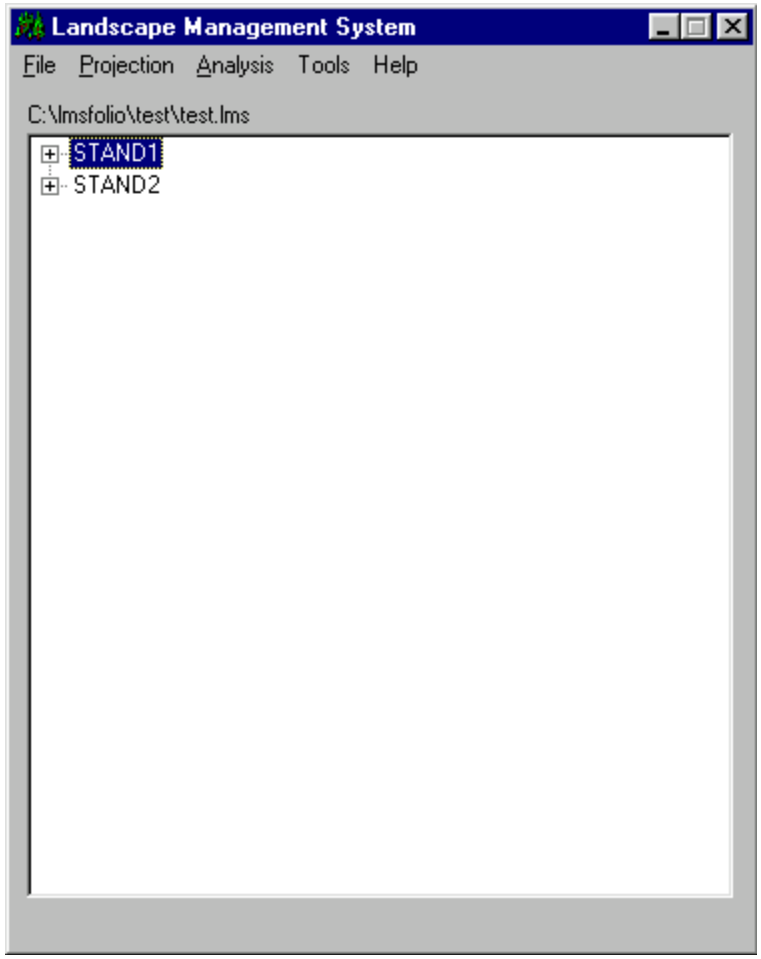


Enter a name for the portfolio (the new portfolio will automatically created in the lmsfolio2/”name” directory. Select the desired growth model, step size for the growth model, and the worksheets containing the desired information. The Stand and Tree Inventory worksheets are required at a minimum.

The worksheets must all be contained in the same Excel file, and must be in the proper format.

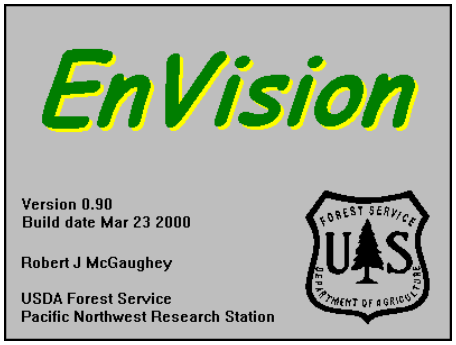
Use the **File|Open Portfolio** command to locate and open the portfolio that was just been created.

After the portfolio is loaded you will have a list of two stands on the LMS application. Since the GIS attributes were not entered, the landscape visualization function will not operate, however, all other LMS functions including stand visualization are now available for use.



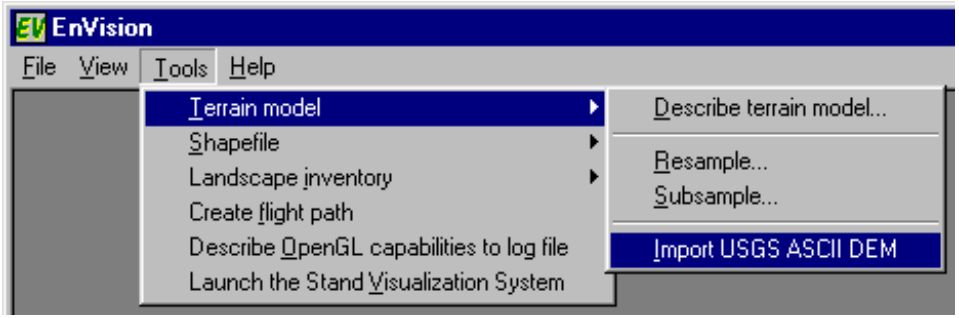
LMS2, EnVision, and Landscape Visualization

LMS Version 2.0 uses new visualization software called **EnVision**. This program has been developed at the University of Washington by Bob McGaughey of the USDA Forest Service. EnVision combines digital elevation information (DEM, DTM), GIS layers such as stand boundaries, roads , and streams (ESRI shapefiles), stand attributes (sdb files) and tree inventory information (inv files) to create images of trees displayed on landscapes. **Note: all spatial data must be in the same map projection.**



EnVision downloads to your computer automatically when LMS2 is installed. To open EnVision outside of LMS2, go to the Windows Explorer and click LMS2/EnVision/ then double click EnVision.exe.

Elevation Data Conversion

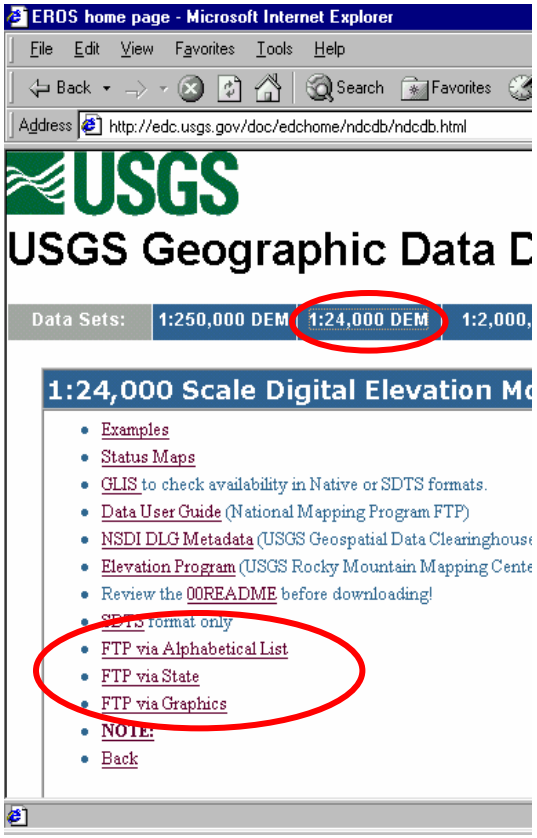


The elevation data for EnVision must be in the **PC-Plans Binary DTM format**. EnVision comes with a conversion program (**imprtdem.exe**) that converts **USGS 7.5 minute DEM** files to the PC-Plans format. Imprtdem.exe can be run from the Envision Tools menu.

The USGS DEM files can be created from Arc Info, using the LATTICEDEM command:

```
LATTICEDEM <in_lattice> <out_dem> {z_factor}
```

Elevation data can also be downloaded from the USGS mapping server: http://edc.usgs.gov/doc/edchome/ndcdb/ndcdb.html
Click on the 1:24,000 DEM button and then download via one of the FTP links (Alphabetical, via State, or via Graphics). The files downloaded are SDTS (Each 7.5-minute DEM is based on 30- by 30-meter data spacing with the Universal Transverse Mercator (UTM) projection) files stored in a compressed tar file (.tar.gz). These files which can be unarchived using WinZip (http://www.winzip.com/). Unarchive the files to a temporary directory then they can be converted using Envision to create the required PC-Plans DTM file. The new **DTM** should be saved to a new directory, named for **YourPortfolio**, in C:\lmsfolio2\.



Stand Boundaries and other Spatial Data Files

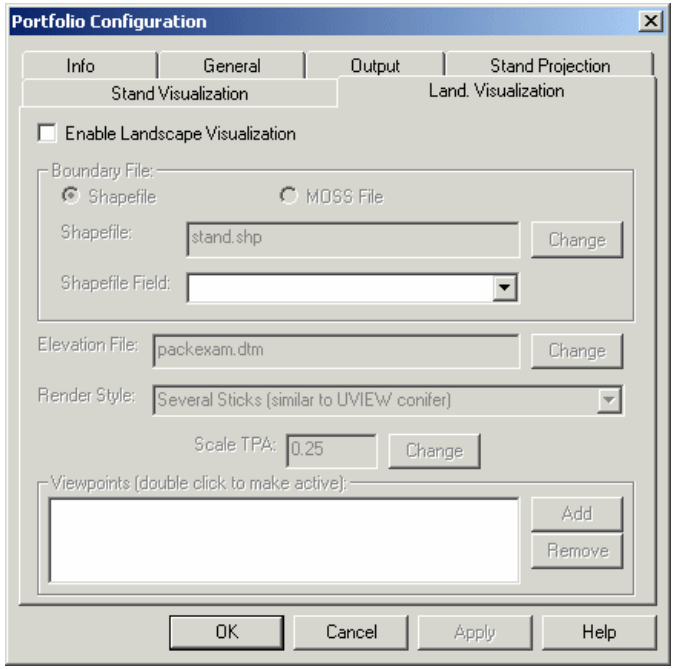
The information about stand boundaries is created in either Arc-Info or Arc-View and should be saved as a shapefile. A shapefile actually contains five files, *.dbf, *.sbn, *.sbx, *.shx, and *.shp**.** While the user enters only the *.shp into the Portfolio Wizard, all files must be present in the portfolio folder. Shapefiles are the preferred format for stand spatial data because they "draw" quickly in EnVision and because they can contain multiple attribute information.

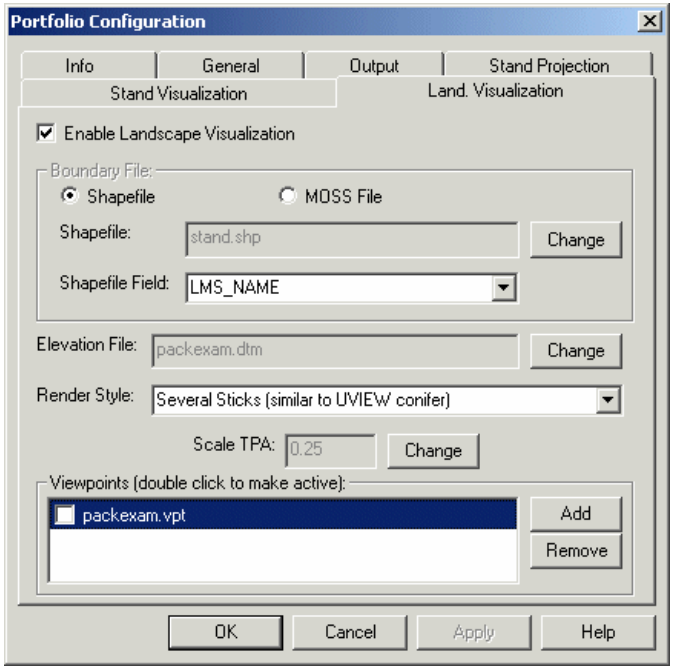
Usually stand boundaries are digitized onto a map projection using an ortho photo or other spatial layer. Additional spatial data such as roads and streams may be available from state or county GIS offices or may also be created using an orthophoto. The addition of roads and streams is not necessary to create an LMS portfolio, however, having these layers will prove valuable if the user intends to plan forest management activities. These new shapefiles should be saved to the same new directory, named for **YourPortfolio**, in C:\lmsfolio2\, where the DTM was also saved.

Setting up Landscape Visualization for Existing Portfolio

If you have an existing portfolio that does not include landscape visualization, but you now have the files required for landscape visualization, this feature can be enabled in LMS using the Tools|Portfolio|Preferences menu command. Select the Visualization tab and use the controls to **Enable** visualization. **Select** the Method - Moss file or Shape file. Set the **scale TPA** and **Shapefile file**. Set the desired **Render Style**. **Browse** for the Moss or Shape file, Elevation Model, and optionally Viewpoint file.

The example to the right shows the Visualization tab before the values have been selected. Below to the right is after the values have been filled in correctly for the Packexam portfolio.





Problems setting up Landscape Visualization

There are a few problems when setting up Landscape Visualization for an existing portfolio. Under some conditions the Render Style control will not be filled in correctly after selecting the other components in the dialog. When this happens click OK with the subset of information filled out and then re-open the dialog to set this information later.

After properly configuring landscape visualization and returning to LMS the View Landscape menu item may still be unavailable. Close and then re-open the portfolio to do landscape visualization.