Installation

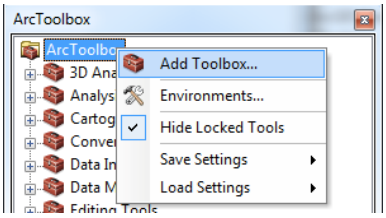
The Slope Class Script tool is an ArcGIS toolbox that contains a Python script. To execute the Python script via ArcGIS, the toolbox file (Slope Class Toolbox.tbx) must be added to the ArcGIS ArcToolbox or accessed through the ArcGIS Catalog browser.

The following link provides instructions for adding a Toolbox to the ArcToolbox Window:

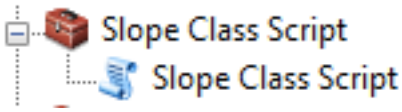
http://help.arcgis.com/en/arcgisdesktop/10.0/help/index.html#//003q0000001m000000.htm

To add the toolbox into ArcToolbox so it consistently appears in new ArcMap workspaces, use ArcCatalog to install the toolbox.

1. Open ArcCatalog and click the 'ArcToolbox window' icon ( )
2. The ArcToolbox window will open. Right-click on the primary ArcToolbox toolbox and click 'Add Toolbox'



3. In the file selection dialog, browse to Slope Class Script.tbx and click Open.
4. The toolbox will be added to the ArcToolbox window. Now the tool will persist within ArcToolbox for all future ArcCatalog or ArcMap sessions.



Instructions

The tool (Figure 1) accepts four required parameters and one optional parameter. Parameter error-checking is built into the tool, so if incorrect values or files are submitted, the tool will not run and the user will be notified of the error. The following table details the tool parameters and expected values:

Tool Parameter	Expected Value
Select Slope Raster (required)	Enter the path to a slope raster derived from a digital elevation model or LiDAR. The raster must be in a projected coordinate system or the tool will not run.
Set Slope Raster Reclass Values (required)	This table of values is used to reclassify the original slope raster. In the 'Old values' field, enter non-overlapping ranges of values. In the 'New values' field, enter numbers unique to each range of values.

Input Minimum Delineation Size (acres) (required)	Enter a number that represents the minimum delineation size (in acres) for slope class cell clusters. Groups of reclassified slope class raster cells with areas less than the minimum delineation size will not be included in the final output.
Select Geodatabase for Output (required)	Browse to and select a file geodatabase that will contain temporary files and store the final output. It is optimal to use a new or empty file geodatabase so files are not overwritten.
Delete Temporary Files? (optional)	If this option is selected, temporary files will be deleted from the file geodatabase. However, some important intermediate raster files will not be deleted.

When all parameters have been entered, click 'OK' on the tool dialog. The script will start running and progress will be indicated in the script dialog progress window. Custom messages are printed to the progress window. If an error occurs, a message with red text will appear in the dialog. Once the script is finished running, the final slope polygons feature class will be added to the ArcMap display. If the 'Delete Temporary Files?' parameter is checked, only four files should remain in the output database:

1. **SlopePolygons** – The final attributed feature class containing generalized slope polygons.
2. **FinalRaster** – The final raster from which the SlopePolygons feature class is derived
3. **Stage1_FinalRaster** – The raster file after initial Stage 1 generalization
4. **Reclassified_Slope** – The original reclassified slope raster using the values entered in the tool reclassification table

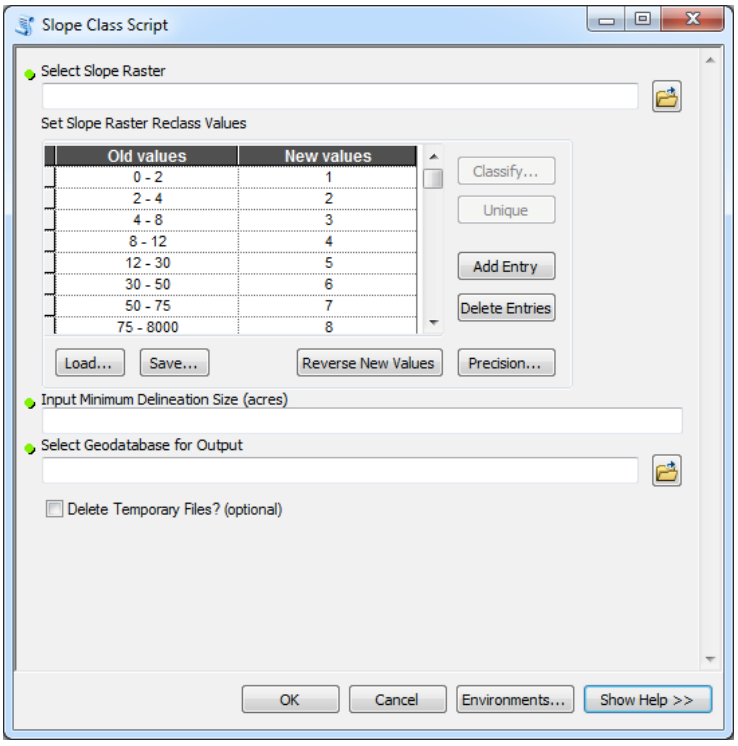


Figure 1. The GUI for the Slope Class Script

Tips

Dealing with high resolution data

High resolution elevation data derived from LiDAR varies widely in the amount of processing applied to the resulting product. Artifacts or anomalies that do not represent the bare-earth elevation may occur in LiDAR derived DEMs. It is common to perform neighborhood operations such as Focal mean on the DEM prior to the creation of slope maps to filter and smooth the resulting surface and minimize the effects of these artifacts.

A routine to reduce the effect of dead fall, dense understory or dense herbaceous vegetation like cattails has proven useful:

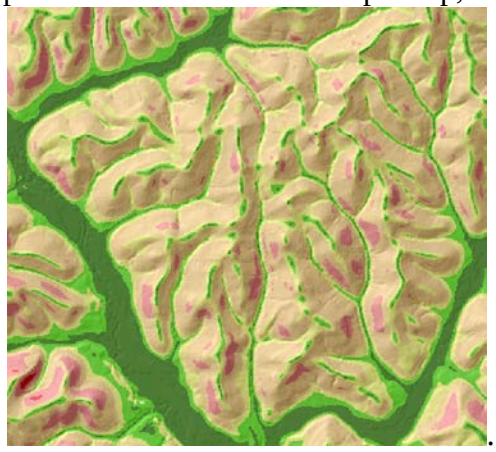
1) **Focal statistics –** minimum, using a two cell radius
2) **Focal statistics –** maximum, using two cell radius on the output of step 1
3) **Focal statistics –** mean, using two cell radius on the output of step 2

Processing time

Larger files may take 4-8 hours to process, depending on the CPU and available RAM. If the script crashes with no error, one potential solution would be to subset the slope file into smaller extents using a tool like Extract by Mask. This will require joining and editing of the resulting polygons from each subset.

Appendix

There are 3 parts referred to in the script dialog progress window during execution of the script. Stage 1 performs a reclass of the slope map, resulting in a file named “Reclassified_Slope”(Fig. 2)

 . Figure 2. Reclassified_Slope

A generalization routine is then performed on the entire layer using three progressively larger clusters of cells resulting in a file named **“**Stage1_FinalRaster” (Fig. 3).

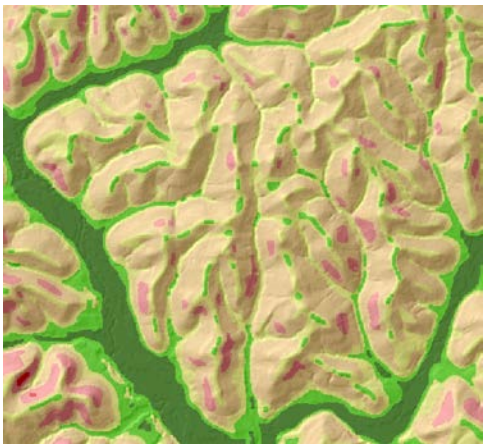


Figure 3. Stage1_FinalRaster

The Stage 2 process works by having adjacent slope classes generalized independently, increasing the likelihood that slope classes will be generalized into a similar, adjacent slope class. For example, the first process has 0-2 and 2-4 percent slope classes extracted and generalized using a specified cluster size, the second process has 2-4 and 4-8 percent slope classes extracted and generalized, etc.

Stage 3 runs another filter on the mosaiced output of Stage 2, producing a final, generalized slope class raster named “FinalRaster” (Fig. 4)

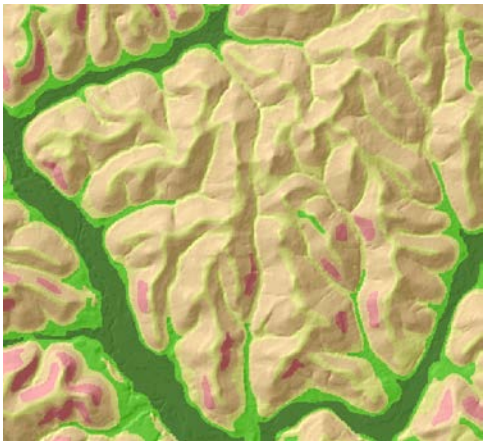


Figure 4. FinalRaster

Finally, a raster to polygon operation is performed, producing a smoothed, attributed polygon file named “SoilPolygons” (Fig. 5)

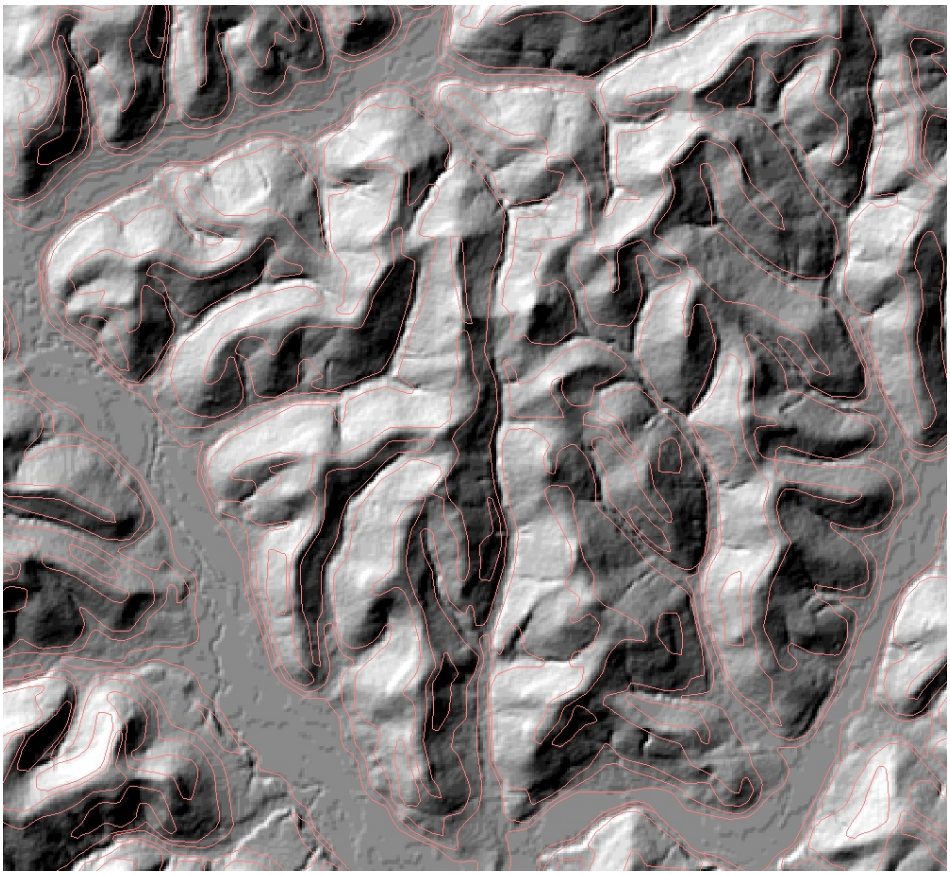


Figure 5. SoilPolygons