LiDAR Processing Guide

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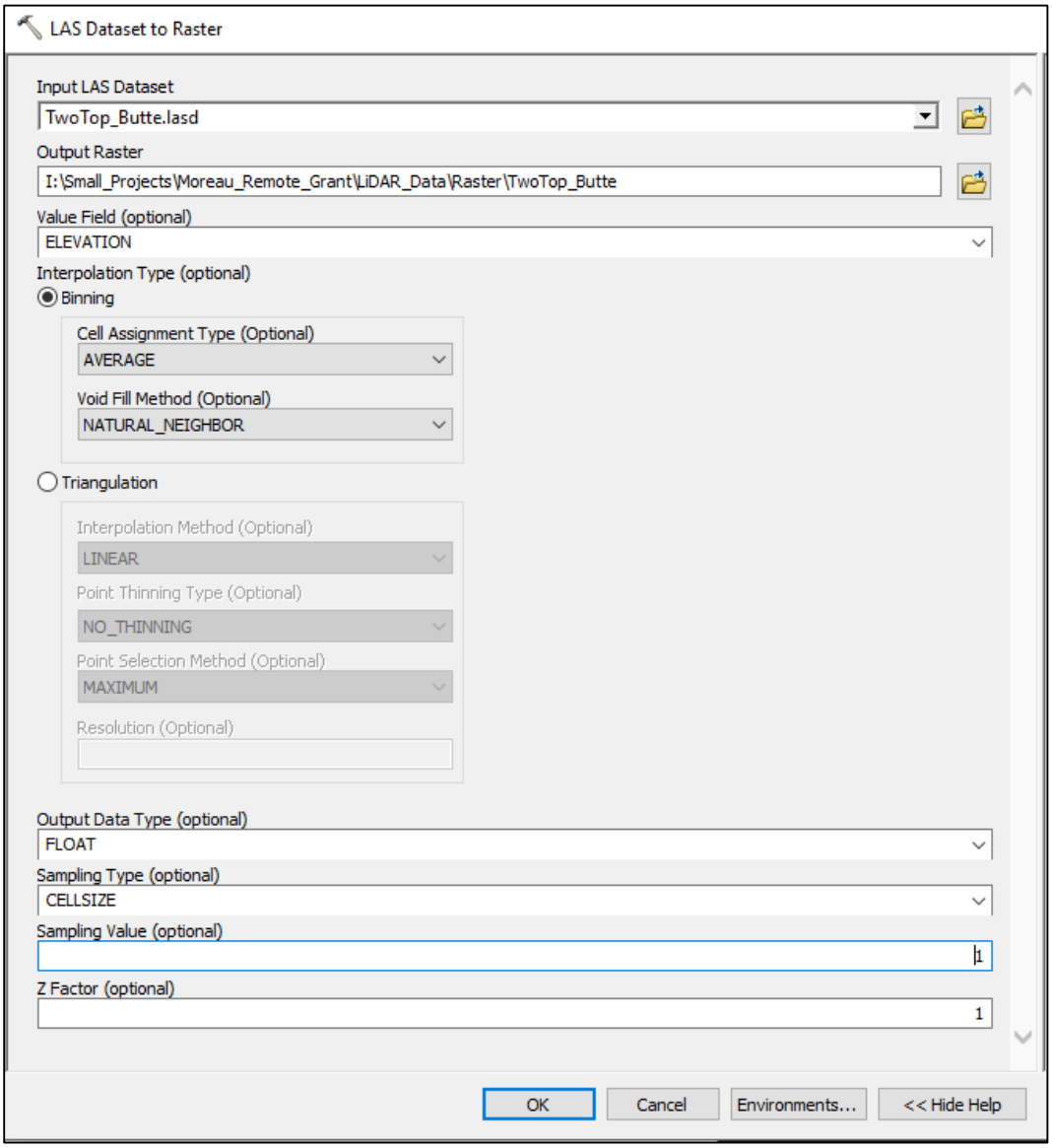
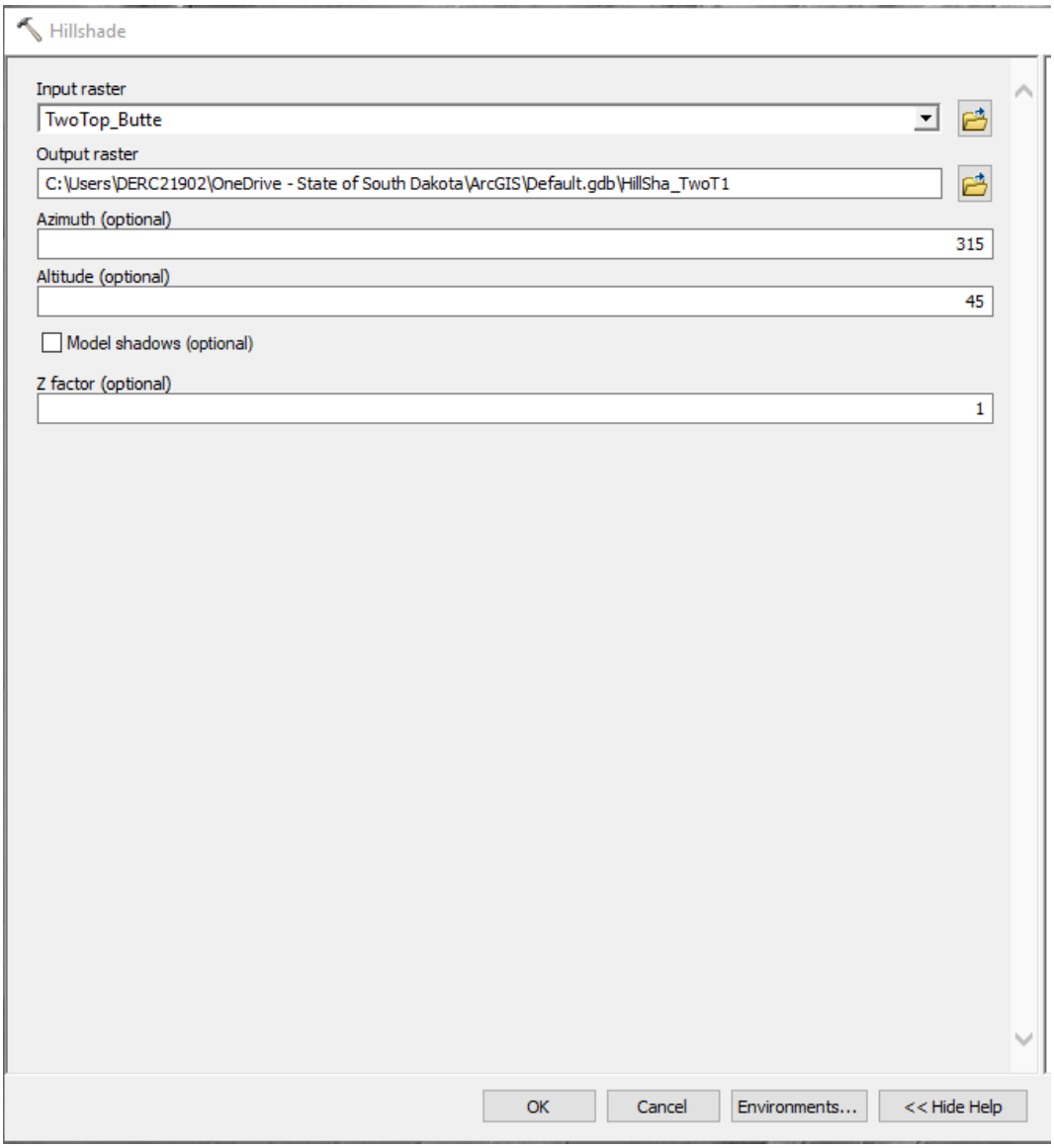
This guide outlines the steps that were taken to process LiDAR for the study areas as part of this project. However, since LiDAR data is gathered at different times by different agencies, the format that is made available for download can vary from region to region. For example, when the study areas for this project were processed the only available format for download was the LAZ files—which require several more steps to process than areas where uncompressed LAS files or DEM source data are available. In short, this guide may not be applicable if the data format available differs from compressed LAZ files. However, if LAS data is available, you can skip steps 6–11, and if DEM source data is available, you can skip steps 6–18.

1. All the LiDAR raw data is available for download from https://viewer.nationalmap.gov/basic/
2. On the left side of the page, select the type of data to be searched. In this case it will be Elevation>LiDAR point cloud (or whatever data format is available for your area).
3. Navigate to your area of interest (AOI). Use the point or polygon selection tool to select an AOI. Click "Find Products."
4. The data is available in 1 km^2 tiles. Select the tiles you want to download and add them to your cart.
5. If you have a large selection of files, you will need to install the UGet download manager and follow the steps below. If you are only downloading a few files, move on to step 6.
    a. Once your selection is complete, view the cart and click "Export URLs to Text."
    b. Save this file somewhere you will be saving the raw LiDAR data.
    c. Open the UGet download manager. Click "File>Batch Downloads>.txt file download."
    d. Select the text file that was generated in step 5a.
    e. The program will show all the files you selected are ready to be downloaded. Select "OK."
    f. Once completed, locate the default location in which the files were downloaded and move them to your projects Raw Data folder.
6. If the data was only available in LAZ format, it will need to be decompressed. LASTools is used to complete this.
7. In the bin folder for LASTools, open the laszip.exe file and maximize the window.
8. Click "Browse," in the directory field type the drive you need to access and click "Go."
9. Navigate to the folder where you saved the LAZ files. Make sure the wildcard field says *.laz and click "Add". This will add all the LAZ files in that folder and show you the boundary tiles.
10. On the right hand side of the screen, click "DECOMPRESS", then "Start."
11. Once complete, those files should now be converted to .las files and are ready to be added to GIS and combined into an LAS data set.
12. In ArcCatalog, create a folder called "Data_Sets" in your project folder.
13. Right click that folder and click "Create LAS Data Set" and name it.
14. Right click the new data set and click "Properties." Click the "LAS Files" tab and click "Add Files."

15. Add all of your .las files for that area.
16. Click the “Statistics” tab and click the “Calculate” box.
17. Once it is done calculating, add the data set to ArcMap. You will need to activate “3d Analyst” in your extensions settings.
18. Open the LAS Dataset to Raster tool.
    a. 

    b. Make sure the settings match what is above. Click “OK.”
19. Once a raster is made, we need to create a hillshade model.
20. In Arc Toolbox, open the hillshade tool (3d Analyst).

21. 

    a. Add the raster to the “Input raster” box, select your output location, and set your desired azimuth (light source angle) and altitude (light source altitude). Leave z factor at 1 and click “OK”.

That concludes the process for converting raw LiDAR point cloud data into a useable hillshade format.