AGR 1515

ArcGIS, while similar to Global Mapper, has a significantly larger capability, allowing us to perform a wide array of functions.

Start by creating an account, if you haven't already. An invitation has been sent to your email.

Next, open ArcGIS on your computer. It will prompt you to log in. Enter your log-in info. Press continue, and enter your unique username and password for ESRI that you have created.
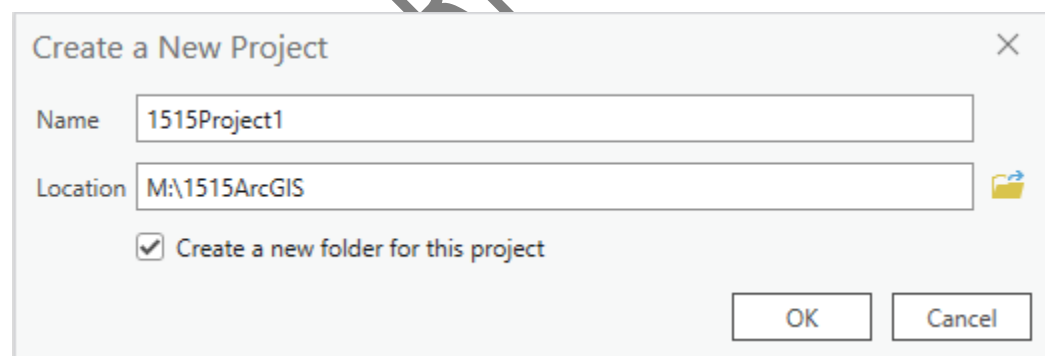
Next, create a new project by clicking on Map.
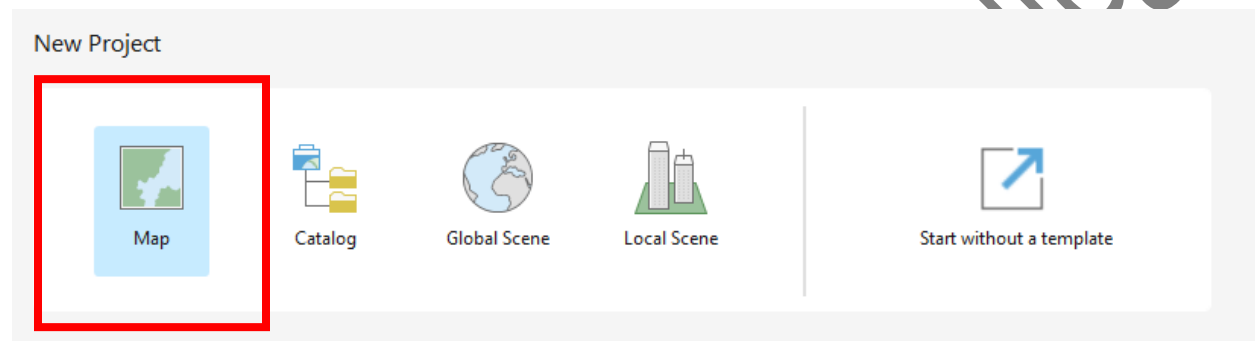
Select a file name. For today, enter "1515Project1" and select a location.
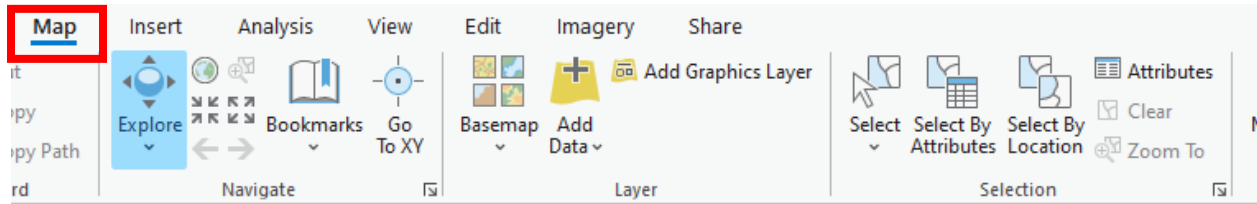
**At this time, go to my computer, open your server folder, and create a folder called "1515ArcGIS"

Select the box that says create a new folder for this project.

Click OK. You'll now find yourself in the main ArcGIS screen.

Along the top, select Map.

There, you'll find various tools, such as basemap, add data, etc.

Click on basemap and change it to Imagery Hybrid. This allows the background to be world imagery, with markers included, like road signs, etc.
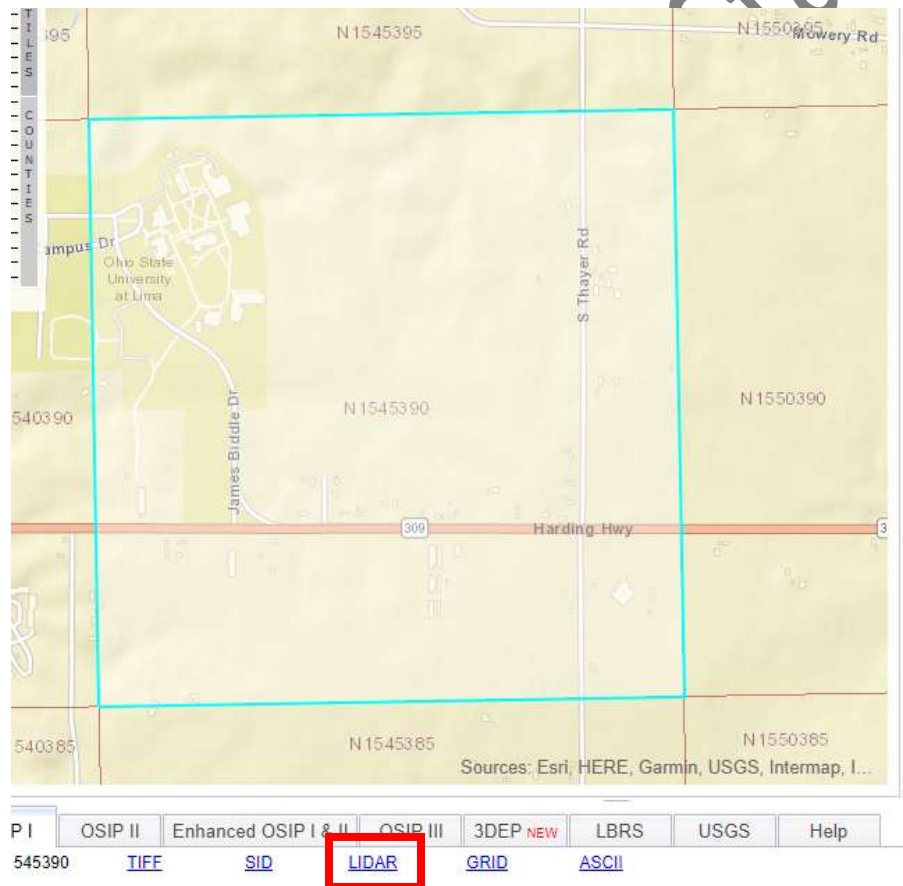
Today, we're going to import some data into our map.

Go to OGRIP, as we've done before, and we'll select some lidar data.
https://gis5.oit.ohio.gov/geodatadownload/

Zoom into campus under OSIP 1, and click on the block called N1545390 until it is highlighted blue.

Click on LIDAR below it.

Go to your downloads folder, right click on the .zip file, and click on Extract All. Change the destination folder to be the same as your project folder. Then click Extract. Extracting to this location will make it easier to find in ArcGIS.
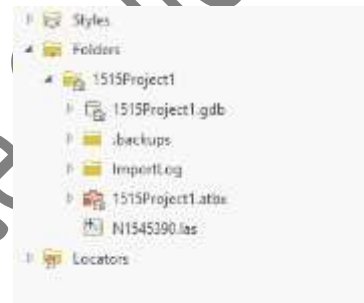
Files will be extracted to this folder:

M:\1515ArcGIS\1515Project1   Browse...

☑ Show extracted files when complete

Now, we need to add it to our project.

Go back to ArcGIS and in the bottom right corner, select Catalog. Expand "Folders" and expand "1515Project1." There, you'll find the .las file we just put there.

Right click on the file, and select "Add to current map." You'll notice that a blue notification will appear in the upper right corner alerting us to an unknown coordinate system, so our data won't appear. We need to define the projection. At the top of the screen, select "Analysis" and then "Tools".

When you select tools, it will bring up a tab on the right side of your screen called "Geoprocessing." In Find Tools, search for "Define Projection, and select that tool.
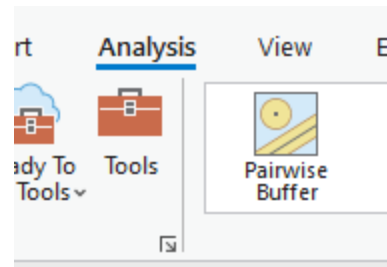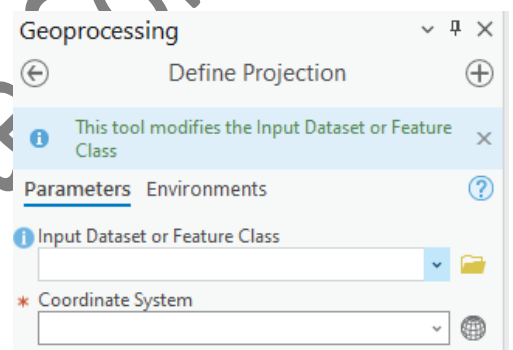
Define Projection

When looking at the XML file associated with our lidar dataset, you can find that the projection is based on the state plane coordinate system, north region. That means, we need to define our projection to match this.

Select the .las file in the input dataset option.

Near coordinate system, click on the world symbol on the right.

This will pull up all coordinate systems preloaded into ArcGIS.

To find the state plane coordinate system, select "Projected Coordinate System," scroll down and select "State Plane," Scroll down and select "NAD 1983 (2011)(US Feet)," Then scroll and find Ohio North Projection.

Click the "run" button in the bottom right to run the projection definition. Soon, your lidar data will be displayed on your screen. If you believe you made an error, right click on the dataset in contents on the left, and select "Zoom to Layer." This will return you to wherever the layer is located on the map.

Manipulating a LAS Dataset

On the left where all of your datasets are displayed, you can "deselect" them at any time by clicking on the checkmark. This may come in handy when you have multiple layers of data that you'd like to view at any given time.

Now, let's create a digital elevation model, or a sort of shaded image of the elevation of our area.

Go back to tools, and search for "LAS Dataset to Raster," and select that tool. Select your dataset from the pull-down menu, and leave all else as default.

Click Run, and observe the image that comes up.

What do you see? What are all of the white splotches and rectangles? If we wanted to find the elevation of the ground, do we want these displayed?

Removing buildings from digital elevation model (DEM).

Okay, so we want to remove these buildings, but this requires a few steps.

First, we need to go back to our original .las file, and define the ground points.

Select the .las file in the contents pane, and you'll notice a few new tools pop up on the top.
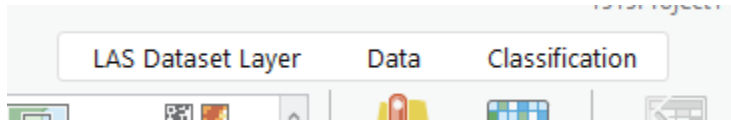
Select "Classification." On the left, you'll find "Automated Classification." Let's first use the "Classify Ground" tool. Pull up the tool, and select Run in the bottom right. Leave all parameters as they are.

Secondly, let's also classify buildings, which is also under automated classification. Again, leave all parameters as they are, and Run.

Now, we've classified our points as ground and building, so we can create a DEM based only on the ground points.

To do this, we want to only display the ground points. Go to the **Contents** pane, and right click on the .las file, and select Properties. Then, select LAS Filter, and unselect all but ground, as shown below.
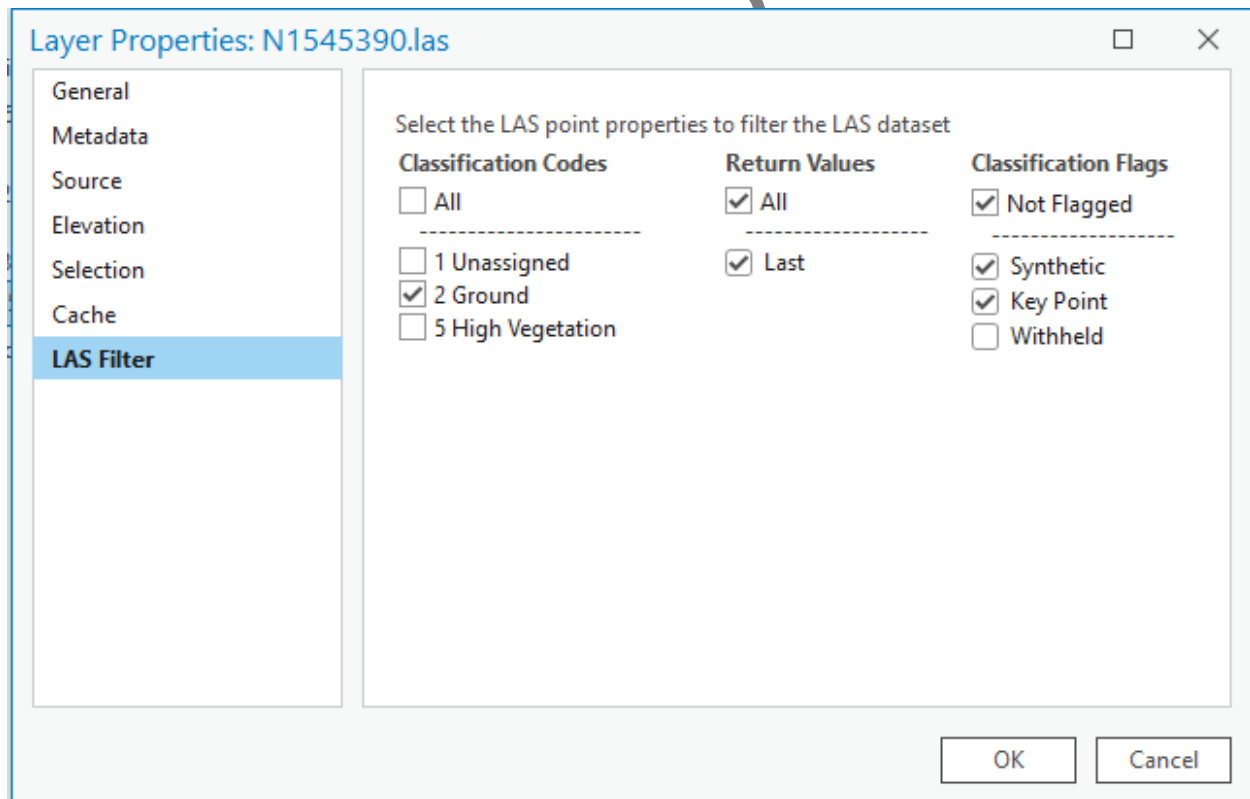
Click OK.

If you zoom into some of the campus buildings, you'll notice that those points disappeared, which is what we were trying to do.
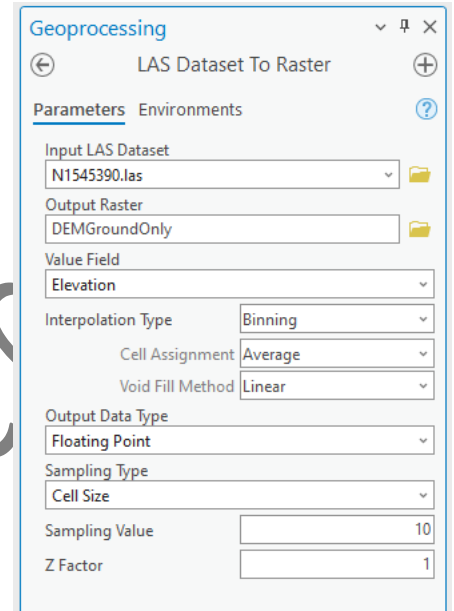
Now, let's go back to our tool called "LAS Dataset to Raster" and create a ground-only DEM, so we can see the difference. **This time, let's name our output dataset as "DEMGroundOnly"**

Click Run.

Another DEM will show up under Contents on the left.

Now, you can select and deselect each of these DEM's to see what this elevation model looks like with and without building and vegetation points.

Why might this become important when looking at watersheds and agriculture fields?

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