Lab 8a: Large woody debris availability for habitat

For two weeks we'll be playing with the GPS units (yeah!) and LiDAR data to look at woody debris in the Arb. Yes, you will get to go outside.

Due: Monday 7 November for class.

Task: Complete the data downloads and exploration here. Come to class with these questions answered and your data ready to go.

Turn in: Have these pieces ready to go. Nothing to hand in yet.

Overview: This weekend you'll be downloading some LiDAR data from the OSIP (Ohio State Imagery Program) website and learning a bit about what LiDAR is. The data download part should be reasonably quick.

Part A: Download LiDAR and explore the file type a bit

1. If you haven't been to OSIPs website before, you can find it by googling for it. Then go to "Data Downloads Map Application" to download by tile. You do NOT want to download the entire county. Yikes that will take a long time. Zoom way in on Oberlin until an aerial photo shows up to replace the basic google map. Then you can use the select tool to choose the tile that you want. Download the 4 LiDAR files from OSIP that cover most of town. One contains Plum Creek in the Arb next to the bike path, one is just north of it, one contains most of campus, and one is just east of the Arb[1]. You do NOT want to download the entire county. Yikes that will take a long time.
2. You will see 5 choices in the box next to the map: Tiff, Sid, LiDAR, GRID, and ASCII. While Grid would be great if all we needed was the ground, we need the trees as well, so get the LiDAR file. We are interested in a larger area, but we'll just stick with a single file to deal with this week.
3. Download the Tiff or Sid file as well so you can see an aerial photo of what we're looking at. Plus, it will be cool to drape over the hillshade later on. We will also download the Grid file because we need some coordinate system information from it.
4. Unzip the LiDAR file. What type of file is it?

5. This is not a file format that you're familiar with, so take a moment to ask Uncle Google about the format. What did you find out?

6. Then go to ArcGIS Help (or the resource center) and search for information about the LAS file format. What else did you learn?

7. Can ArcMap read LAS files directly? If not, what will you need to do in order to use LAS files in ArcMap?

[1] Tile numbers: N2040585, N2040590, N2045590, N2045585

8. Locate a tool to create an LAS dataset and run it on your LAS file. What is an LAS dataset? How is that different from an LAS file?

9. We need a coordinate system for our file and don't have one. OSIP kindly did not embed that information into the LAS file anywhere either (you can use a tool called LASTools, the LASInfo tool, specifically, to find this out. Since the data aren't there, I'm not going to have you do it. However, you may want to add the LASTools website to your word doc of useful websites). What other ways can you think of to try to find out a coordinate system for this file?

10. There are a few options. 1) We can guess and see if it goes into the right place over other Oberlin data. 2) We can download other data from OSIP for the same tile and get the projection from that. Since we already downloaded the Tiff or Sid and Grid for the same tile, open them and see what the coordinate system is for it. What is it? Using your internet skills, figure out if the vertical coordinate system is meters or feet. Write down the horizontal coordinate system and the vertical (z) units here:

Part B: Use the point file information tool to create shapefiles to get some information about your .las file.

1. ArcToolbox has a tool called the **Point File Information Tool** that will create a polygon file, with 1 polygon for each LAS tile. Although this does not open the LAS files, it does allow you to visualize the locations of the polygons and get needed information such as average point spacing.
2. Search for the Point File Information Tool.
    i. For input, select all the LAS files in your folder. Be sure the **Input Browse for:** is set to **Files,** and the Input File format is set to **LAS**.
    ii. Browse to a location, and name the output file.
    iii. Be sure to add the **coordinate system** that you determined using the other OSIP data (this is not optional if you want to get any meaningful scale-related information or if you want to have other georeferenced data line up with this file, both of which you will do in the next step).
3. Launch a new ArcMap if it's not open already, and add the Point Information File. Add your Grid and aerial photo (Tiff or Sid), so that you can see where the tile is.
4. Open the attribute table. What information is included in the attribute table?

5. Write down the average point spacing to the nearest 10^{th}.
6. We still need to get the point classification information.
7. So we will run the tool again. This time scroll down and check the box that says summarize by class code. This gets us the point classifications. What classes are available?

8. Ask Uncle Google about LiDAR classes. What do these mean?