ArcGIS Pro instructions for classification of Planet imagery for SAV mapping.

1. **Load images in project**
2. **Mosaic tiles**
3. **Composite with DEM raster**
4. **Load existing schema or make a new schema**
5. **Generate training patches**
6. **Classify image**
7. **Using Python scripts to batch process imagery**

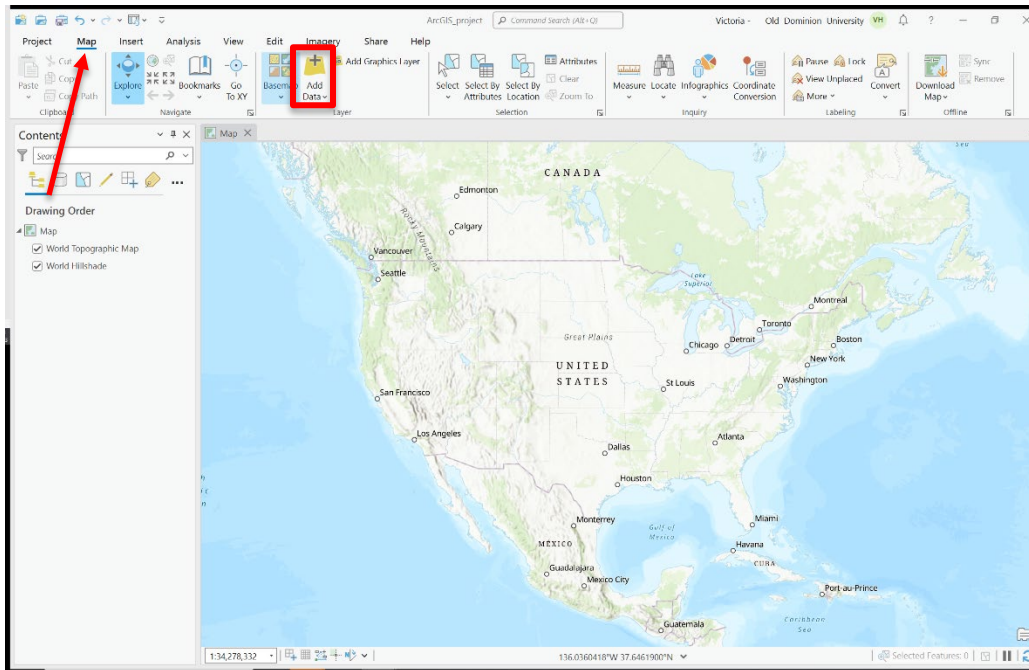**Before you come to the workshop.**

You will need either ArcGIS Image Analyst or ArcGIS Spatial Analyst.

1. **Load images in project**
   Open ArcGIS, make a blank map template. I recommend making a new folder for your project. Place all your files into this folder.
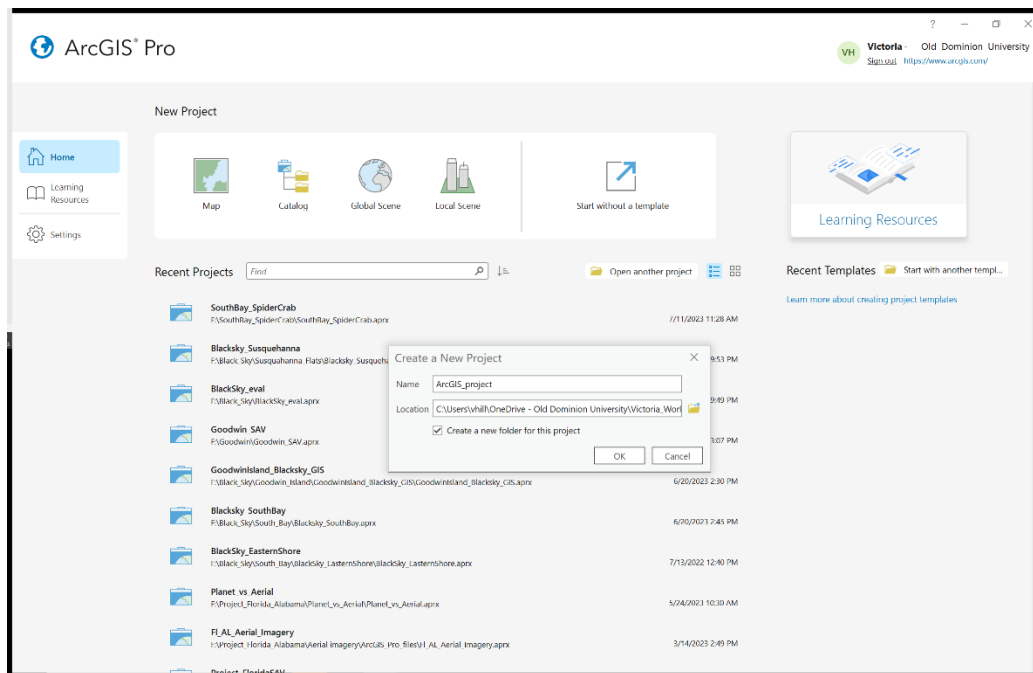
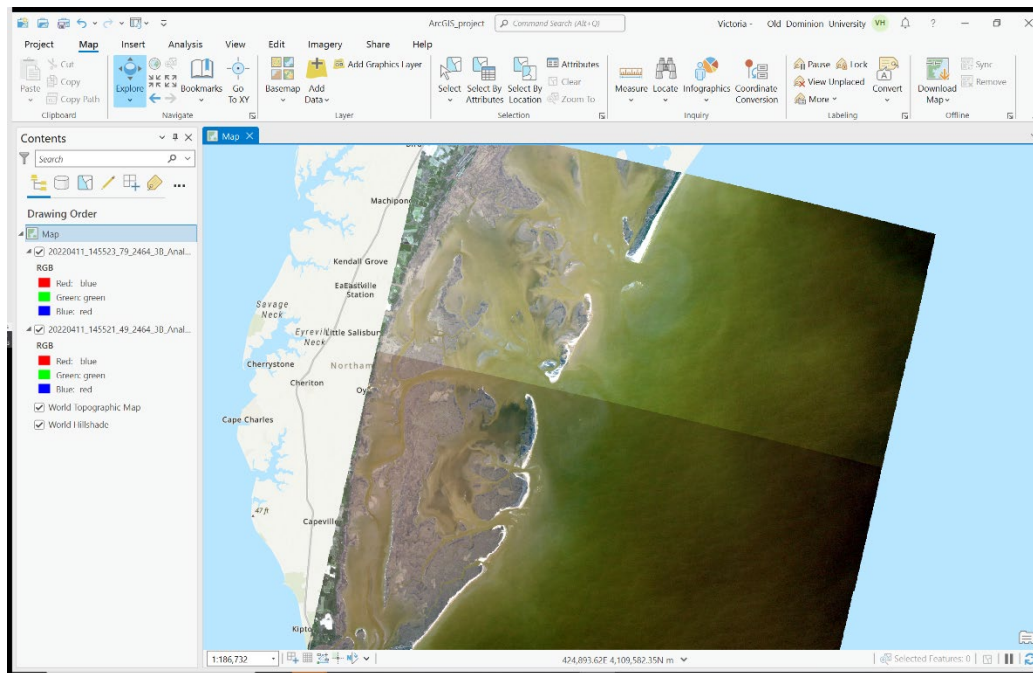   Click on Map on the top toolbar, and then click on the Add Data Icon

Navigate to the location of the image file that you want to load. ***IF YOU DON'T SEE YOUR FILE AND YOU JUST PLACED IT IN THE FOLDER YOU WILL NEED TO REFRESH THE VIEW****CLICK THE LITTLE CIRCLE WITH AN ARROW ICON NEXT TO THE DIRECTORY PATH. It may take a minute or so to load the images.
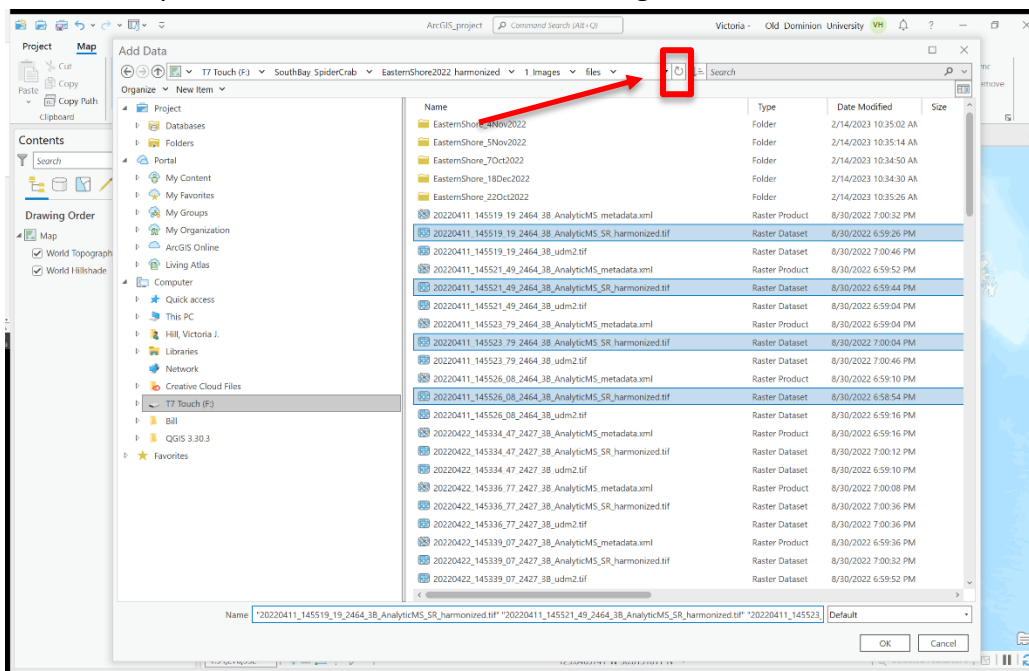
2. Mosaic

If you have more than 1 tile for the same day from the same sensor, I recommend that you mosaic them into one image. Use

Analysis | Tools |Mosaic to new raster
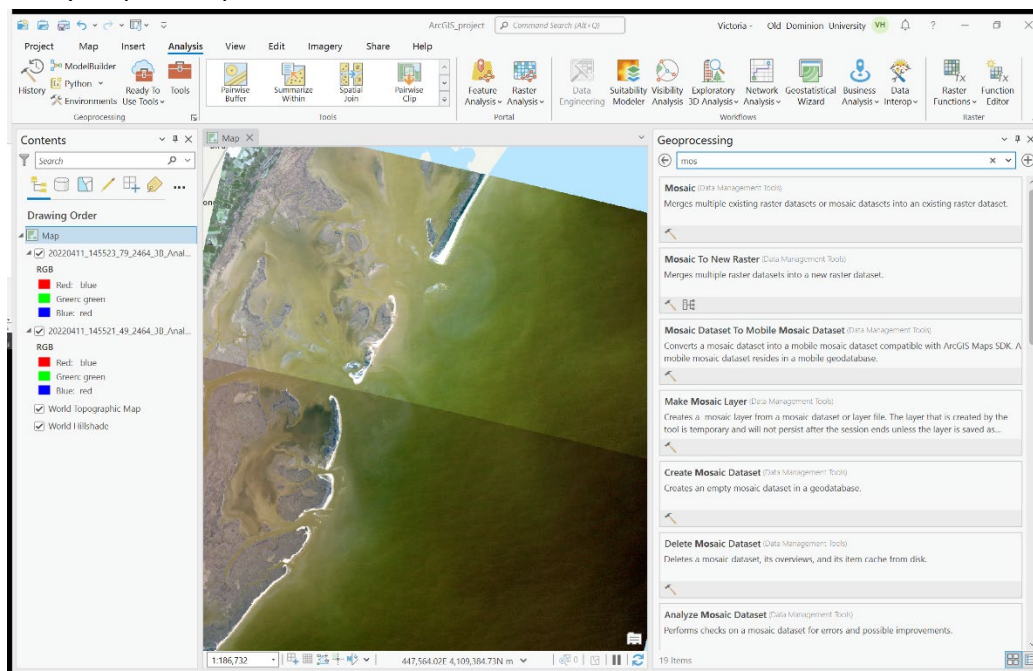
Select your tiles to mosaic and set an output file. I recommend the following naming style, which preserves the date and sensor number:
20200108_152926_1009_3B_AnalyticMS_SR_harmonized_clip.tif
to; 20200108_1009_mosaic.tif
Use the spatial reference from existing images, make sure to enter the number of bands, it will be the same as your input tiles. Make sure to select the correct pixel type, you can check the original tiles by right clicking in them, selecting properties and source. Original Planet files are 16 bit unsigned.
A new raster will be made.
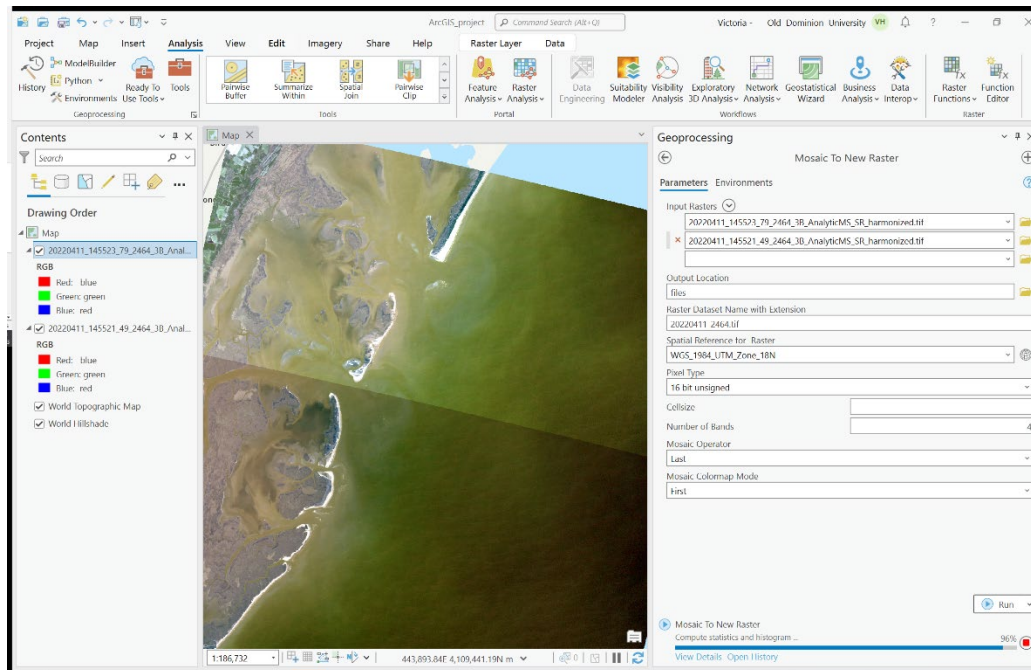
You will want to make all pixels outside of your valid image pixels equal to NaN so that it doesn't impact your classification later in the process. Use
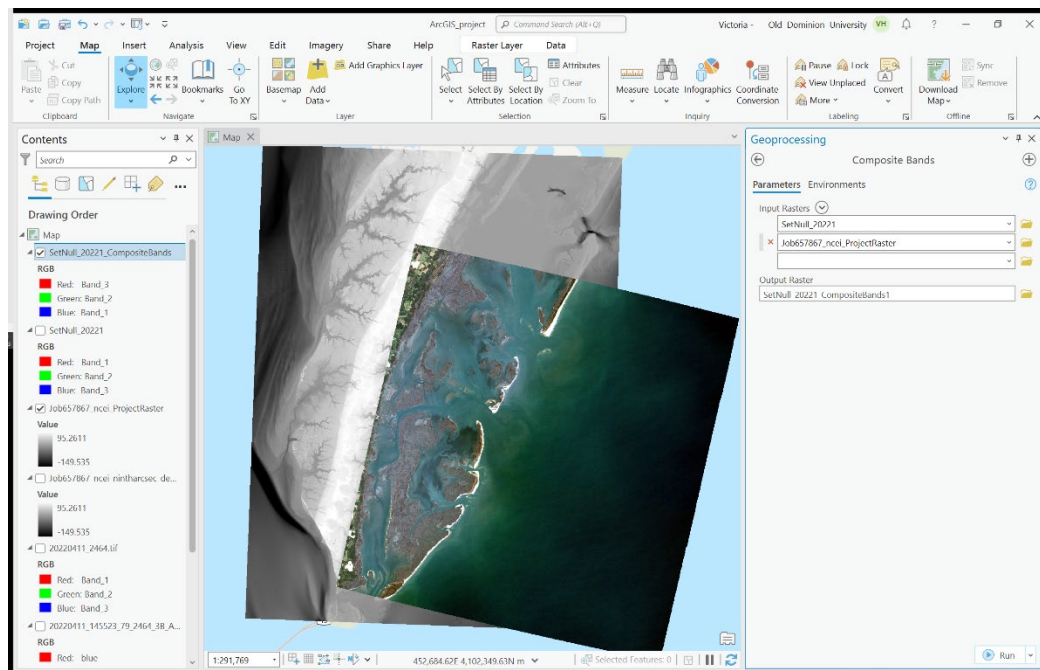Analysis | Tools |Setnull.
Your mosaic image is the input conditional file, the expression is "Where VALUE is equal to 0", your false file is the mosaic file. The resulting raster has all pixels where the value was 0 set to NaN

Pixels that don't have valid values in all bands
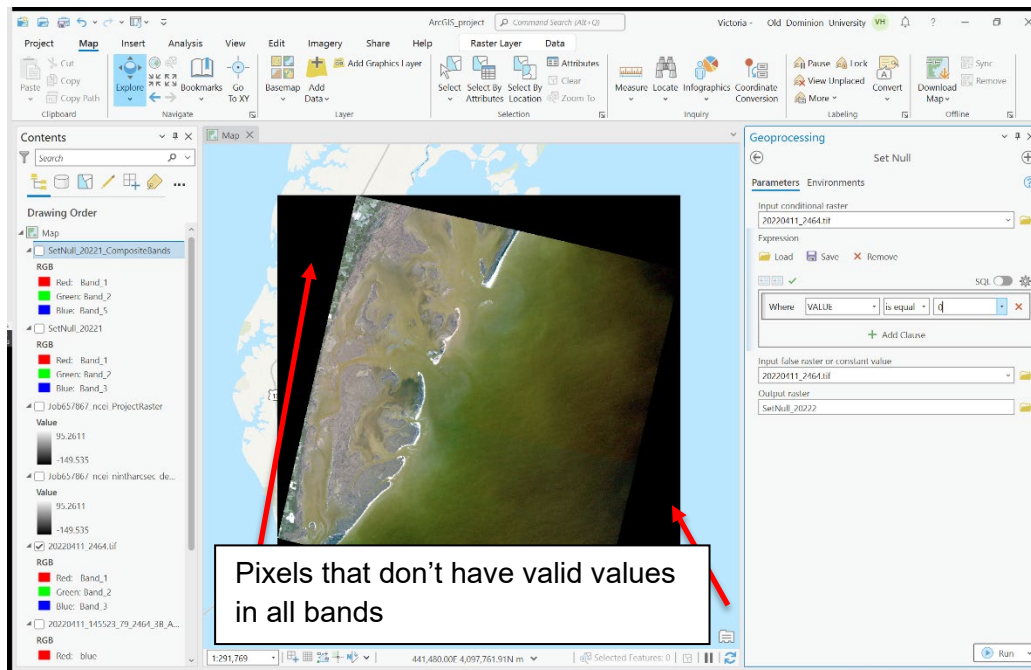
3. **Reproject and resample your downloaded DEM** file to the same projection and cell size as the Planet images. Use existing image to set the projection and cell size.
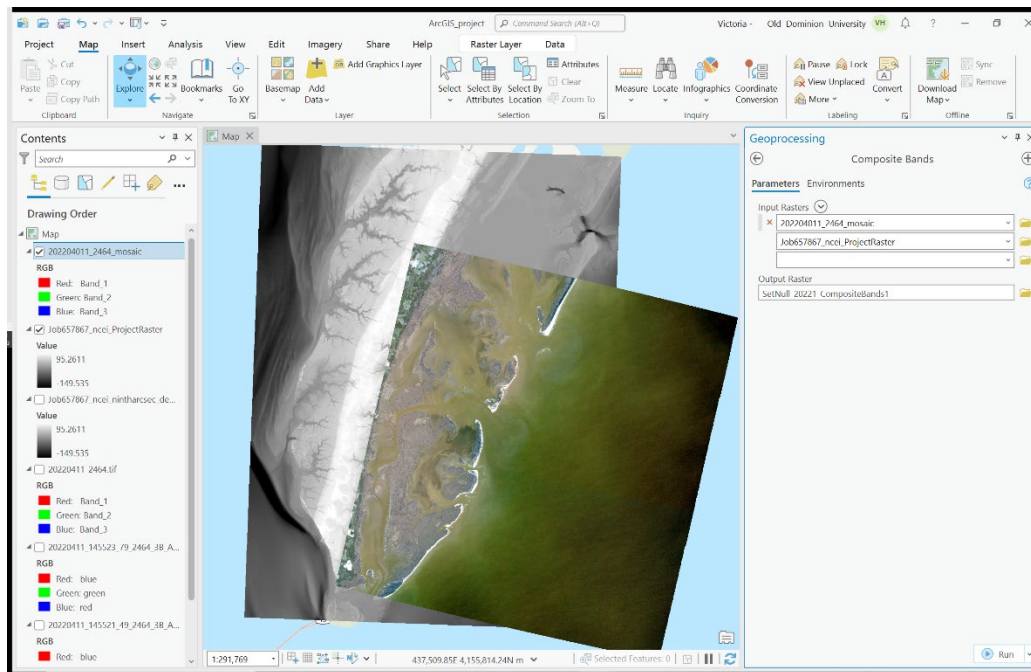   Analysis | Tools |Project raster

4. Composite bands - add DEM as a 5th (or 9th) band to your image.

Now composite the mosaic image (after setnull) with the DEM raster

Use Analysis | Tools | Composite Bands

Add the DEM raster second in the input raster's so it will be added as the 5th (or 9th) band.

Use naming convention 20200108_1009_composite.tif

5. Classifying

Decide on your classification schema, I am using the schema below. You can make your own, however, always make SAV (seagrass) with a class value of 1. This is important in running the batch codes. You do not need to use all the classes on your schema, but having a master schema that you use instead of a new one for each site is useful for the future.

Class name	Class value
SAV	1
EAV (emergent aquatic veg)	2
Submerged sand	3
Optically deep water	4
Turbid water	5
Ocean deep	6
Beach	7
Marsh	8
Land vegetation (green)	9
Land urban (building, roads etc)	10

With your image selected in the drawing panel on left, click on Imagery on the top toolbar, then Classification tools, then Training samples manager
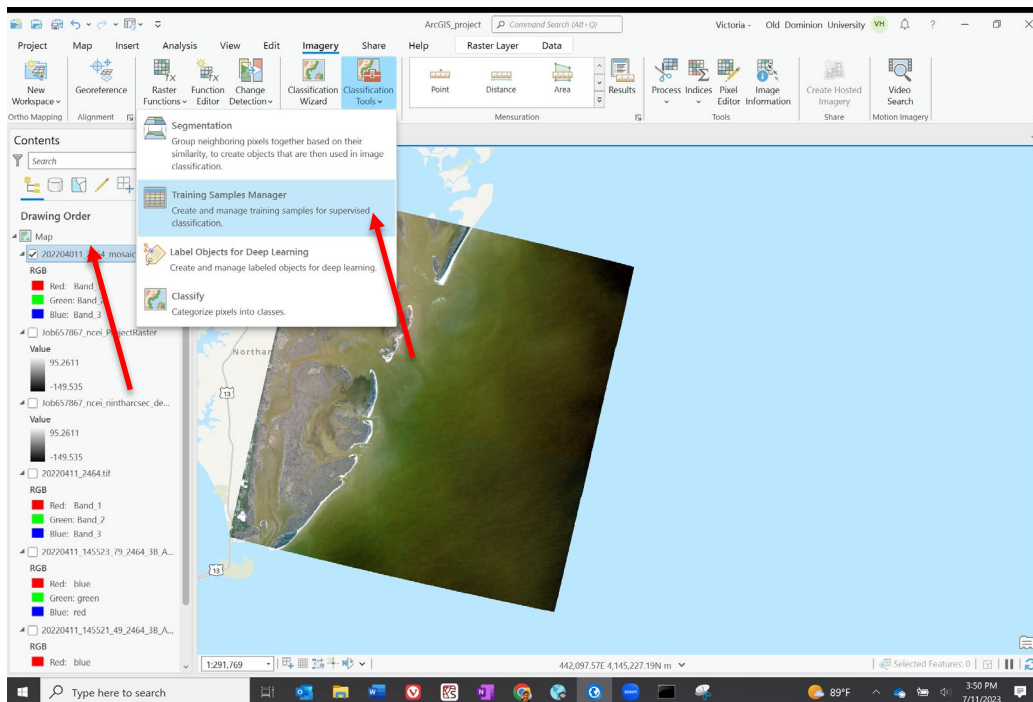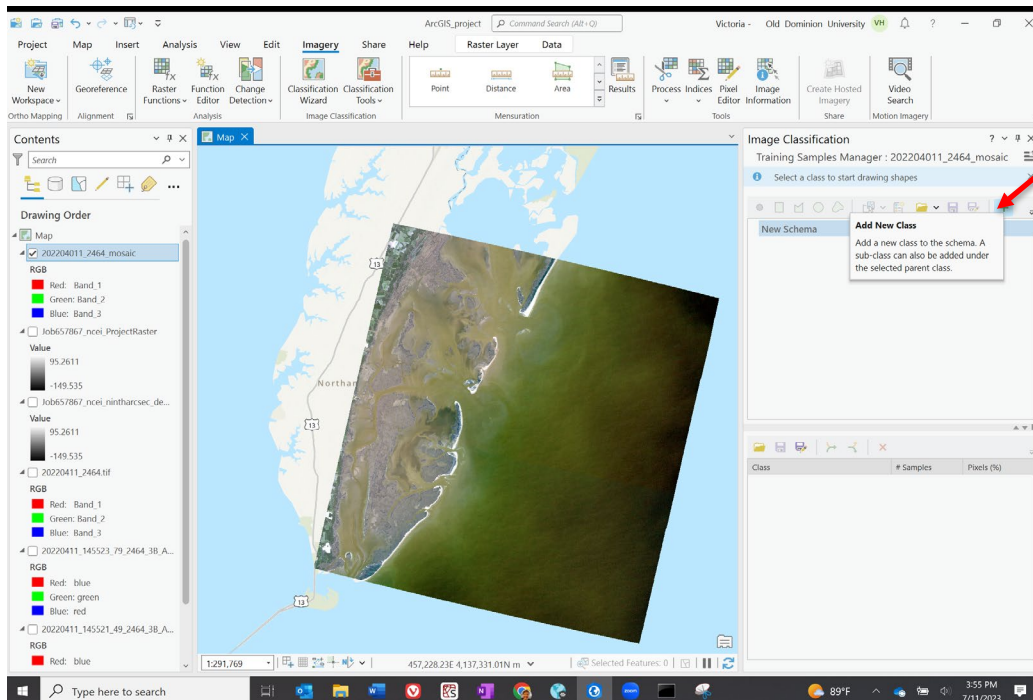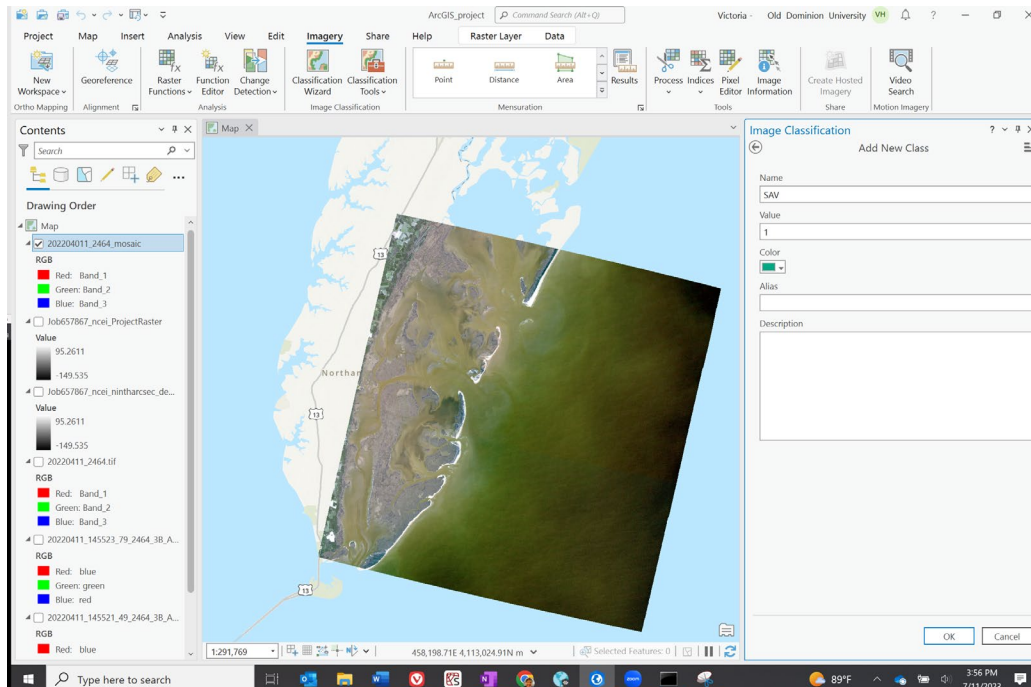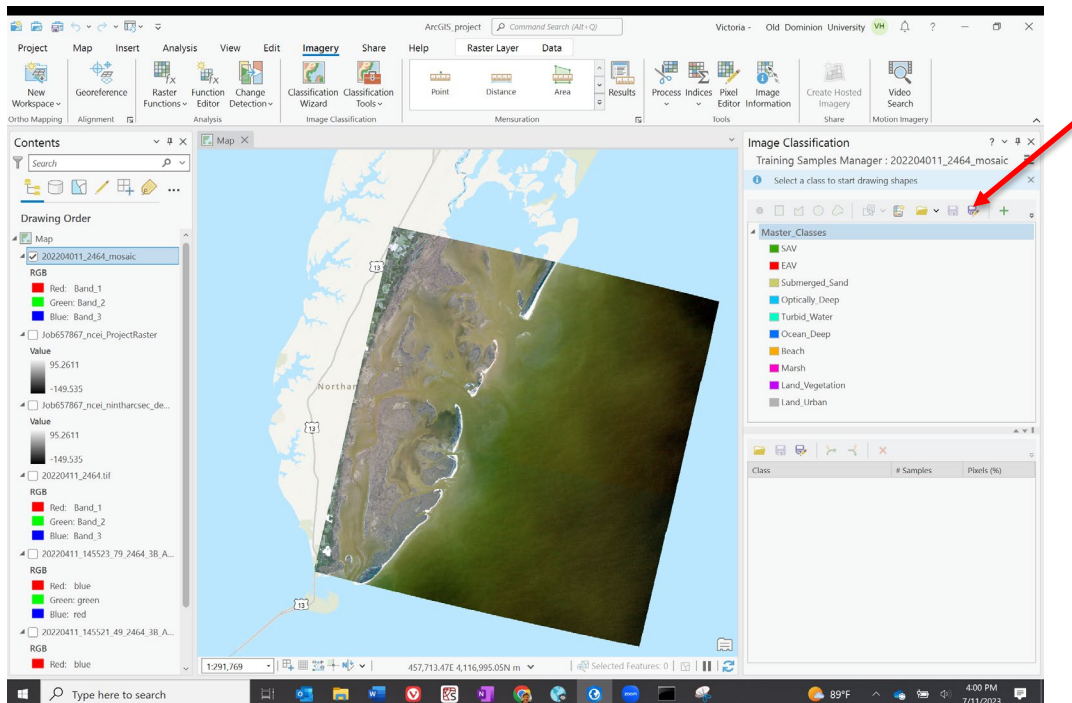
Select "Create New Schema"
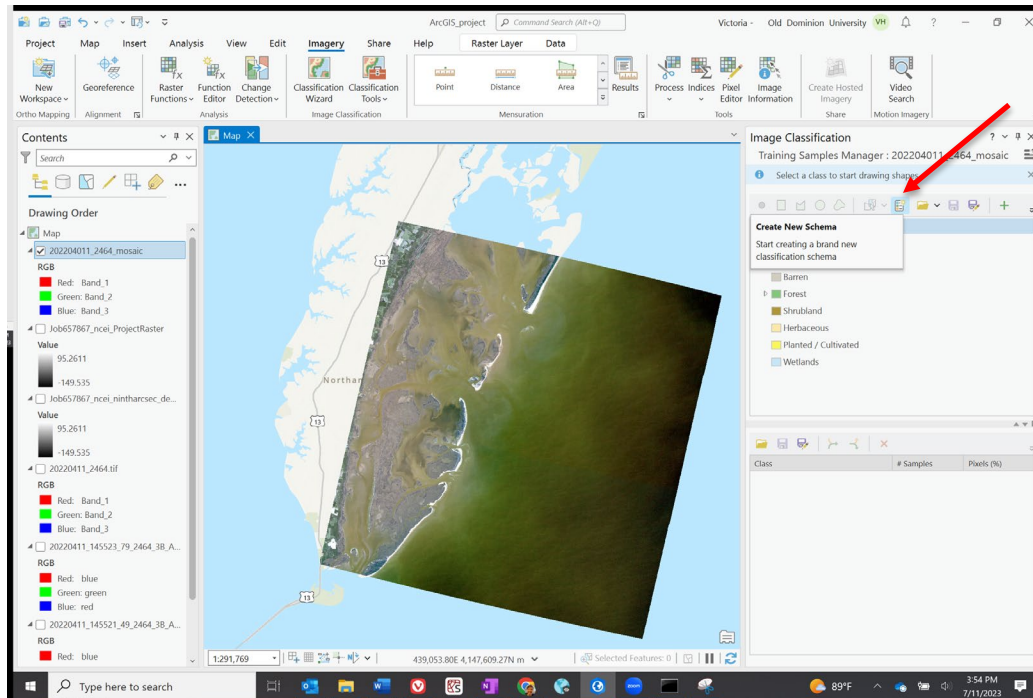
Click on the green cross to add a new class to your schema.

Name your new class, start with SAV, give it a value of 1. Click ok, and repeat adding new classes until you have all your classes.


DON'T FORGET TO SAVE YOUR SCHEMA, USE THE LITTLE 3"INCH DISK ICON

You will now create your training patches. Select a class in your schema, select a shape (square, circle, polygon), draw on the map where you want your training patch to be.
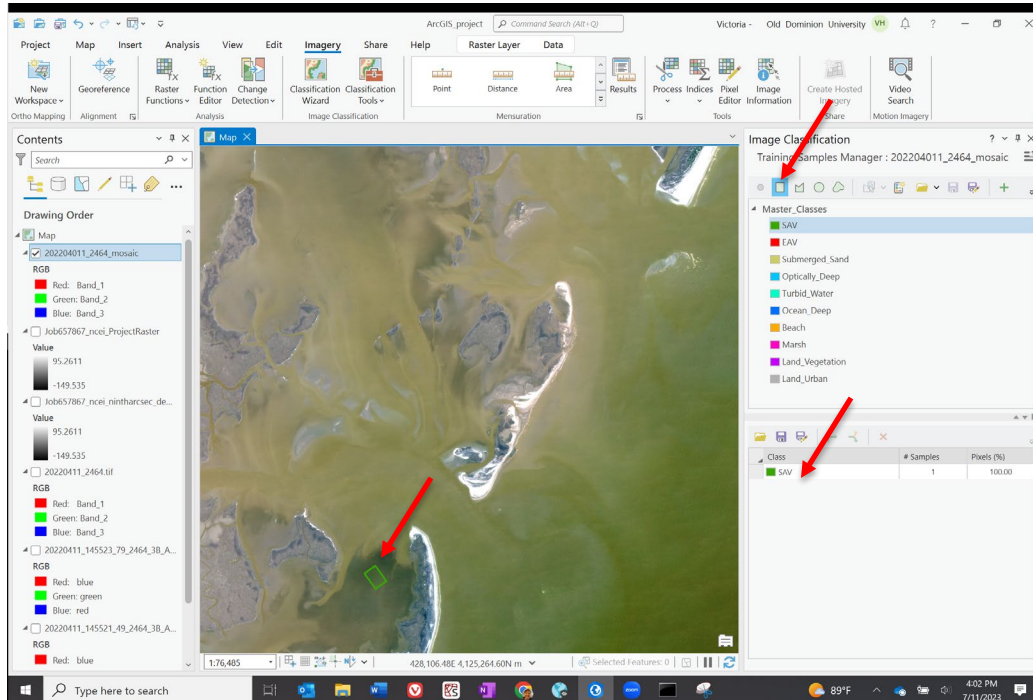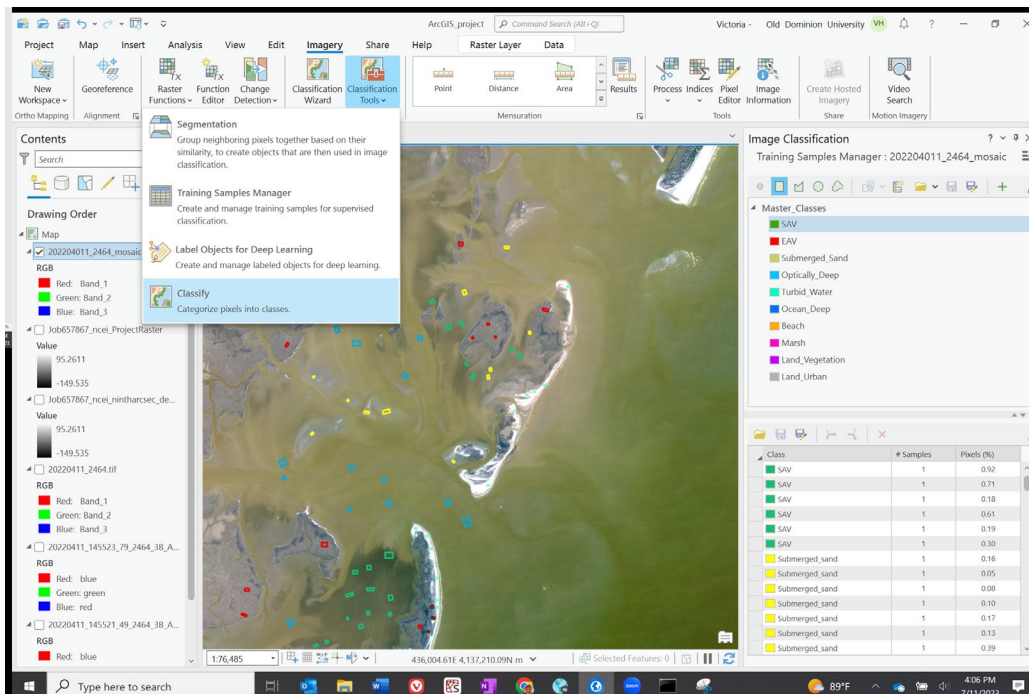

Keep drawing your training patches, select another class and draw patches for that.
DON'T FORGET TO SAVE YOUR TRAINING PATCHES, USE THE LITTLE 3"INCH DISK ICON
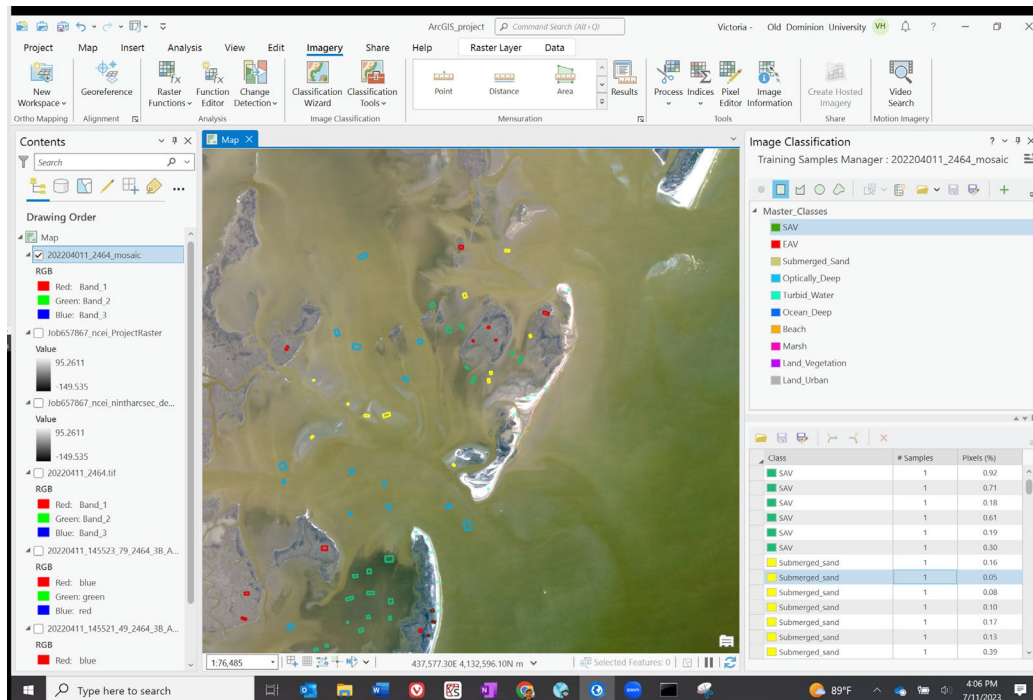
Run classification. Use Classification tools and Classify

Use Support Vector Machine as the classifier, add your new training patches file. Then click run.