# LAB REPORT
# SRINIVAS KONREDDY

Question 1: Answer the following in full sentences.

1a. If I have a 20 kilometer grid cell, what is the area of a cell?
Ans1a. The area of a cell would be 400 square kilometers

1b. If I download a dataset that says the resolution is 2 kilometers, how much area does one cell take up in square meters?
Ans1b. The area would be 4000000 square meters

1c. If I download a dataset that says the resolution is 50 meters, how much area does one cell take up in square kilometers?
Ans1c. The area would be 0.0025 square kilometers

Question 2: How many levels of ecoregions are there in the finest grained EcoRegions dataset that is available? There are three levels of ecoregions in the dataset
Ans2. Is this a nested hierarchy? Yes, it is a nested hierarchy

Question 3: How many: (Answer in one complete sentence.)
Level 1 codes does the study area have? There are 2 Level 1 codes
Level 2 codes does the study area have? There are 4 Level 2 codes
Level 3 codes does the study area have? There are 9 Level 3 codes

Question 4: How many cells are in your new raster? What is the *area* of your new raster (in km^2)?
Answer 4: There are 510,961 cells in the new raster. Since the cell size is 1 km, the area would be 510961*1=510961, the area of the raster would be 510,961 square kilometers.

Question 5: What is your equation for computing error?
Answer 5: The formula for computing error is (grid area-actual area)/actual area

5a: Which ecoregion did the raster overestimate the area the most?
Ans 5a. Interior Plateau is the region for which the raster overestimated the most
What is the error? The error is 0.083%

5b: Which ecoregion did the raster underestimate the area the most?
Ans5b. Blue Ridge is the region for which the raster underestimated the most

What is the error? The error is 0.155%

Question 6: Q6 is ON YOUR OWN (AFTER CLASS):

6a: How many cells does your output raster have? (remember to write in full sentences).
Ans6a. The output raster has 31,935

6b: Make a table that shows the ERROR for each Level III ecoregion.

| ECOREGION | ERROR (%) |
|---|---|
| Blue Ridge | -0.700 |
| Southwestern Appalachians | -0.445 |
| Southern Coastal Plain | -0.201 |
| Middle Atlantic Coastal Plain | -0.149 |
| Ridge and Valley | -0.021 |
| Southeastern Plains | 0.064 |
| Piedmont | 0.077 |
| Southern Florida Coastal Plain | 0.546 |
| Interior Plateau | 0.703 |

6c: What do you think---Is your error generally greater or less than when you did it for the 1 KM cell size raster?
The 4 km raster has more error compared to the 1 km raster.

Since a larger cell size (4 km) results in more generalized data, it tends to introduce higher errors. This is clear from the table, where regions like "Interior Plateau" (0.703%) and "Southern Florida Coastal Plain" (0.546%) show noticeable errors. On the other hand, the 1 km raster has a finer resolution, which captures more detail and reduces error.

Overall, the 4 km raster generally has a higher error than the 1 km raster.

Question 7: How many people live in Georgia, according to the vector dataset?
Answer 7: The total number of people living in Georgia are 9,687,653

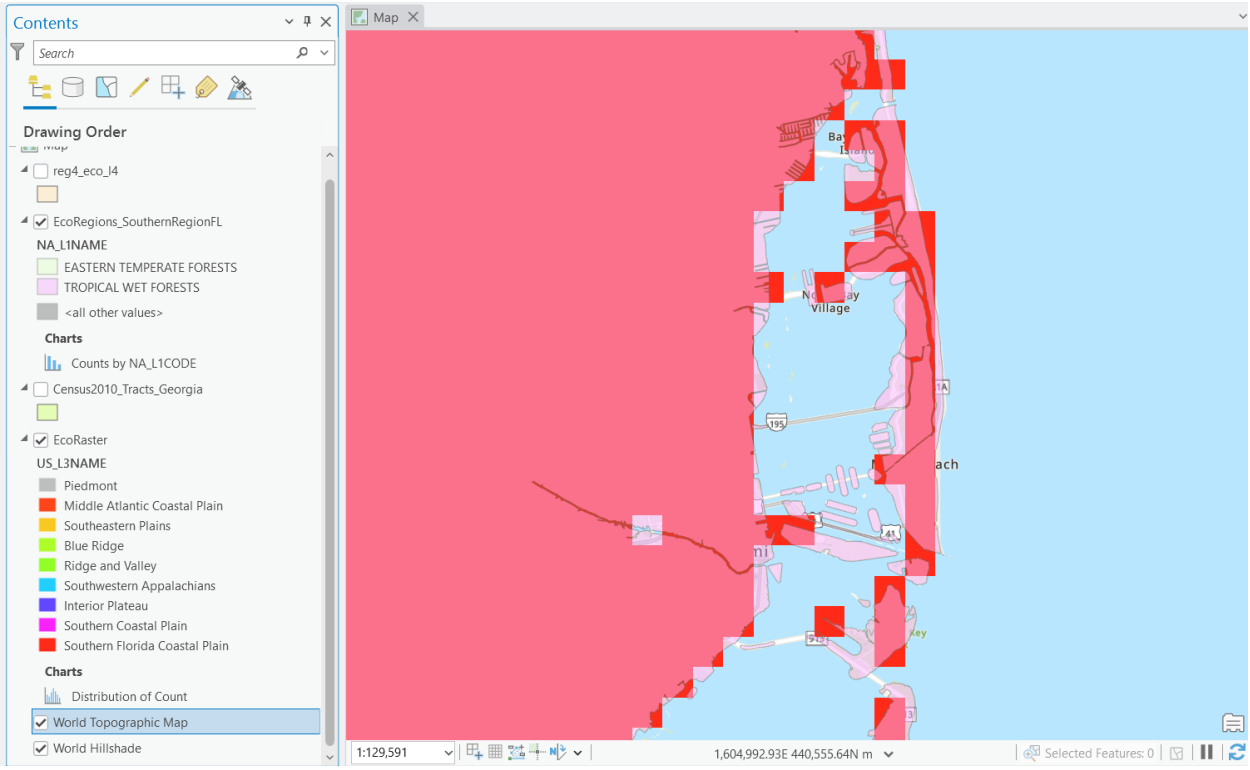
Question 8: How many people are represented in the raster?
Answer 8. There are 9,925,921 people represented in the raster

Question 9: Did we gain or lose population through the conversion process—how much?
Answer 9: We lost 238,268 people through the conversion process

Question 10: How many people live in each ecoregion in Georgia? Make a table below.

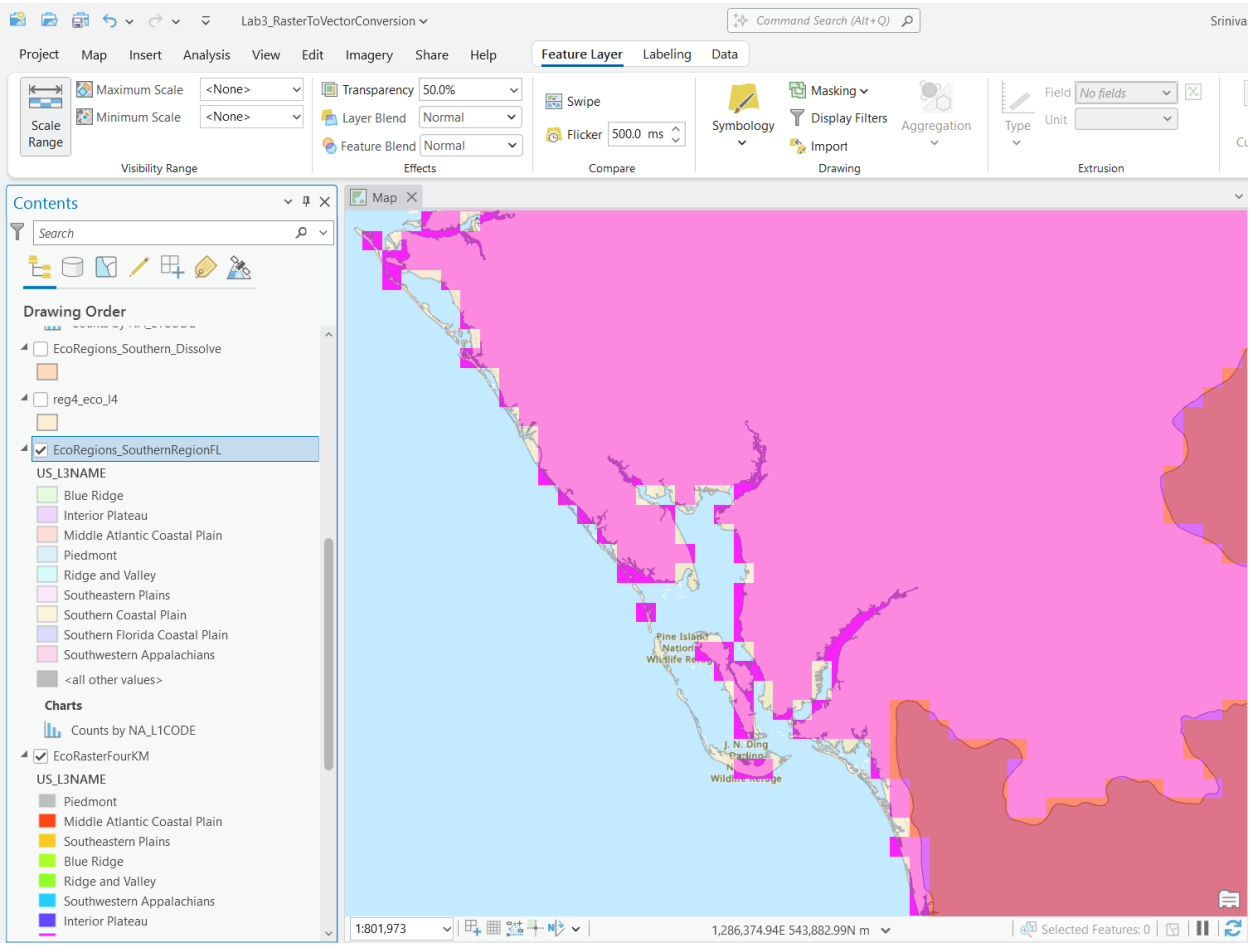
| ECOREGION | Population (from the raster) |
|---|---|
| Southwestern Appalachians | 19,851 |
| Blue Ridge | 219,145 |
| Ridge and Valley | 555,176 |
| Southern Coastal Plain | 812,098 |
| Southeastern Plains | 1,858,020 |
| Piedmont | 6,416,906 |

**Graphic 1:** Screen cap an image where the grid cells did not fit very well or represent an area well. For full credit, please 1) show the vector lines of the eco regions (no polygon fill) on top of the cells and 2) describe any discontinuous grid cells (i.e., cut off or 'hanging') or loss of detail in the *figure caption. A figure caption is a set of sentences that describes an image. Your figure captions are part of the points you get for graphics when you turn in graphics (when noted to add a caption). More descriptive captions are better.*



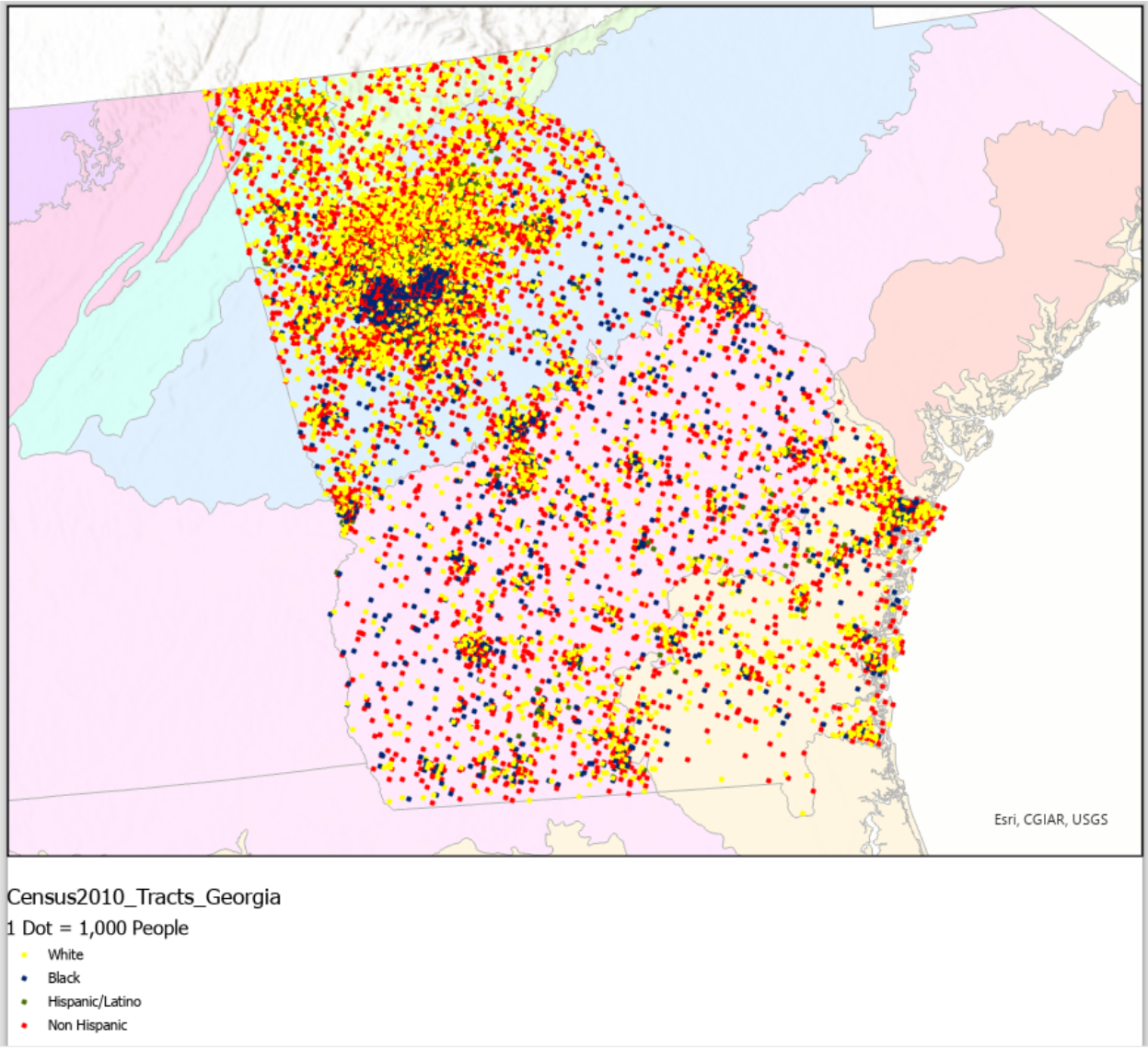

The figure depicts the Florida coast, particularly the Miami Metropolitan region, where raster cells extend into water bodies and do not fully cover some land areas. A small gap in coverage is evident in the center, where a single raster cell fails to include part of the study area. These "hanging" or cut-off cells are primarily found along the coastal regions.

**(Graphic 2—from "on your own"):** Screen cap an area where the 5k raster did not represent the vector data well and describe what you see in a caption. For full points, make your raster partially transparent or put the lines of the vector data on top of the raster so someone can clearly see mismatches and you can prove a point through the visualization.




In the above figure where the cell size is 4km, the first noticeable thing is that there are fewer gaps in the raster when compared to the previous raster which had a cell size of 1km. However, there is a greater number of cells hanging off the border which is the most noticeable around boundaries and the coastline where raster cells are crossing geographic tracts. While using a bigger cell size might reduce the number of missing cells, there is a greater chance of misclassification of features.

Graphic 3: Make a dot density map of different racial backgrounds on top of the ecoregions. Make the different racial backgrounds a different color and overlay them atop of the ecoregions. (Remove any tract borders!!). Give it all the proper map elements and a caption explaining what is going on. *This map may take a while to get it looking great.*




In the figure above, we can see the ethnic distribution of the population for the state of Georgia. Each dot represents a 1000 people and each denotes color denotes a specific ethnic group from the Census Data.