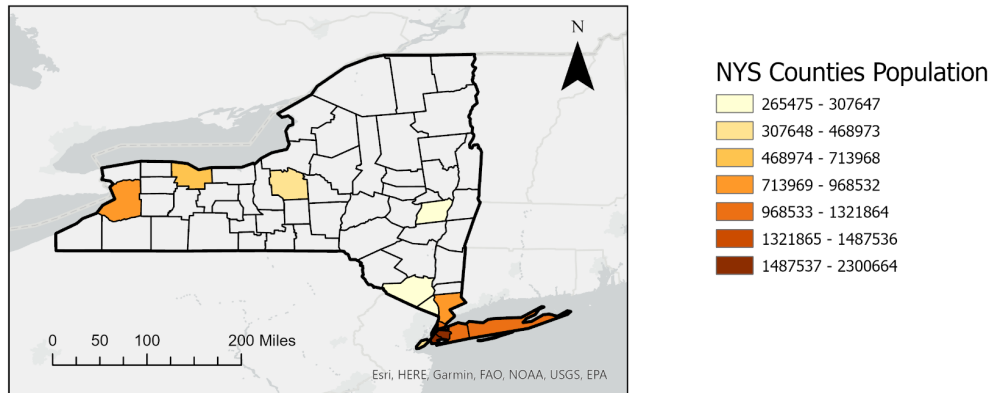**Map #1**

Basic Classification of NYS Counties

River Strumwasser

ArcPro's automatic grouping for counties of
population greater than 300 thousand as of 2010.
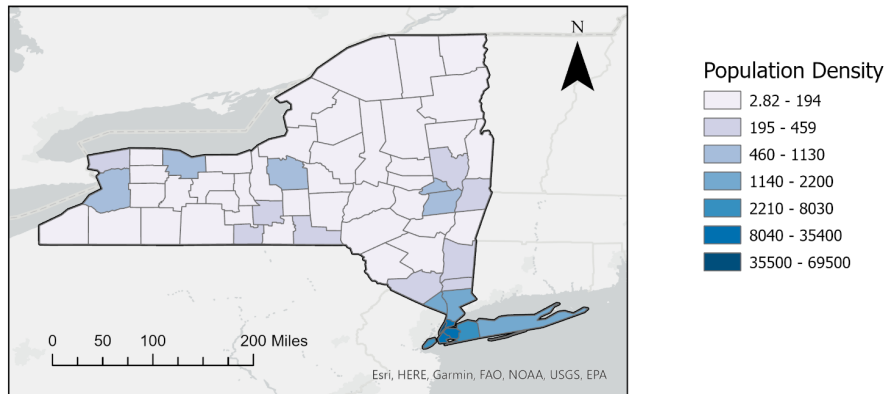
9/5/23

NYS Counties Population

- 265475 - 307647
- 307648 - 468973
- 468974 - 713968
- 713969 - 968532
- 968533 - 1321864
- 1321865 - 1487536
- 1487537 - 2300664

Map #2

Natural Breaks for Pop Density

River Strumwasser

A naturally-divided map of the population density
of counties in NYS, as of 2010. Population density
rounded to 3 significant figures.

9/5/23

Population Density
- 2.82 - 194
- 195 - 459
- 460 - 1130
- 1140 - 2200
- 2210 - 8030
- 8040 - 35400
- 35500 - 69500

Map #3

Equal Intervals for Pop Density

River Strumwasser

A map of the population density of counties in NYS, as of 2010, divided into equal intervals. Population density rounded to 3 significant figures.
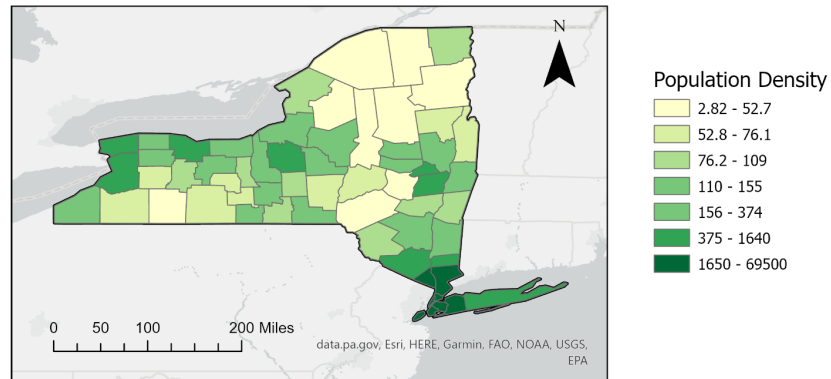
9/5/23

Population Density
- 2.82 - 11600
- 11700 - 23200
- 23300 - 34700
- 34800 - 46300
- 46400 - 57900
- 58000 - 69500

Esri, HERE, Garmin, FAO, NOAA, USGS, EPA

Map #4

Quantiles for Pop Density

River Strumwasser

9/7/23

A map of the population density of counties in NYS, as of 2010, divided into seven quantiles. Population density rounded to 3 significant figures.

Population Density

- 2.82 - 52.7
- 52.8 - 76.1
- 76.2 - 109
- 110 - 155
- 156 - 374
- 375 - 1640
- 1650 - 69500

0   50   100   200 Miles
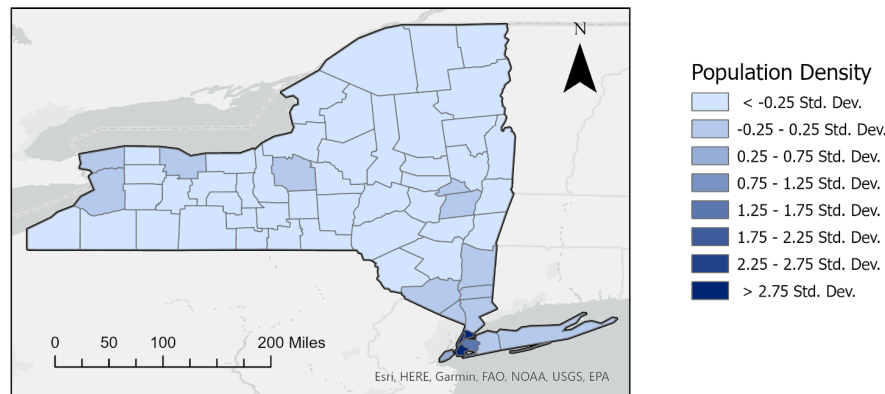
data.pa.gov, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA

Map #5

Standard Deviation for Pop Density

A map of the population density of counties in NYS, as of 2010, divided into 8 classes of 1/2 of a standard deviation from the mean.
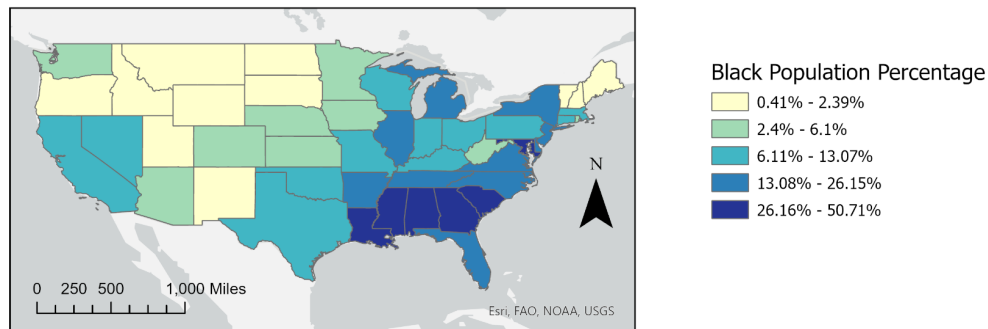
River Strumwasser

9/7/23

Reflection Question 1: Choose two maps and discuss the differences in patterns based on classification schemes. Which do you feel provides a better representation of population density? Provide a brief discussion of your reasoning.

Between Equal Intervals (Map #3) and Quantiles (Map #4), I believe that equal intervals show population density in a more accurate way. Although quantiles are much more visually appealing and understandable, the variable size of classes can be misleading when trying to show the difference in population density between each other. This can be abated by making the color identifier for a quantile darker based on how far away from the smallest one it is, but this makes for a more confusing legend. Equal intervals, despite the fact that they conceal a significant amount of information comparing similar population densities, shows the true scale of the difference between the least and most dense areas.

Map #6

Percentage of Black Population in the U.S.   River Strumwasser

A geometrically-divided (chosen to better represent areas of   9/7/23
low black population) map of the percentage of the population
of the continental U.S. by state, as of 2010, identifying as
black. Population percentage rounded to 2 decimal places.

Black Population Percentage
- 0.41% - 2.39%
- 2.4% - 6.1%
- 6.11% - 13.07%
- 13.08% - 26.15%
- 26.16% - 50.71%

0   250 500   1,000 Miles

N

Esri, FAO, NOAA, USGS

This map does a great job of displaying two important regional patterns for black populations:

clustering around cities (and thus states which contain them), and a population core around the

Cotton Belt. Maryland is a notable state here, having a high black population percentage

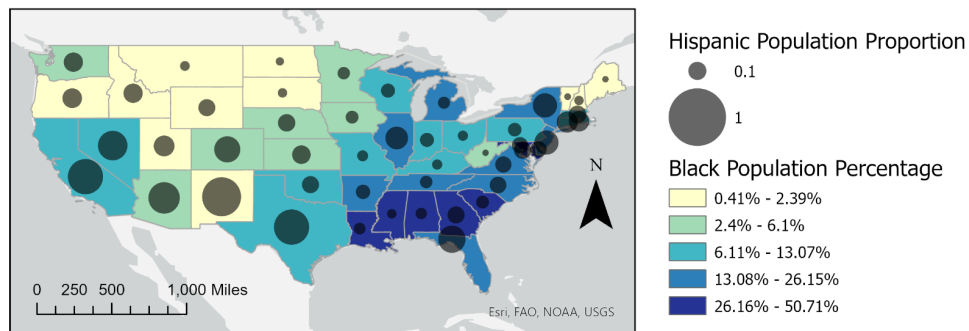resulting from the overlap of both patterns.

Map #7

Comparison of U.S. Black & Hispanic Pop.

River Strumwasser

9/7/23

A multivariate comparison of the proportion of the total population of the Continental U.S. between the geometrically-divided Black population percentage (rounded to 2 decimal places) and the Hispanic population proportion.

Hispanic Population Proportion
- 0.1
- 1

Black Population Percentage
- 0.41% - 2.39%
- 2.4% - 6.1%
- 6.11% - 13.07%
- 13.08% - 26.15%
- 26.16% - 50.71%

0   250 500   1,000 Miles

Esri, FAO, NOAA, USGS

Multiple symbols chosen over bivariate colors due to ease of comprehension, and to avoid the

information loss that comes with a bivariate 2x2 categorization leaving only four categories.

PERBLK/ PERHISP

BLACK / POP2010
HISPANIC / POP2010

High
Low
     Low   High

— R2 = 0.01

PERHISP

PERBLK
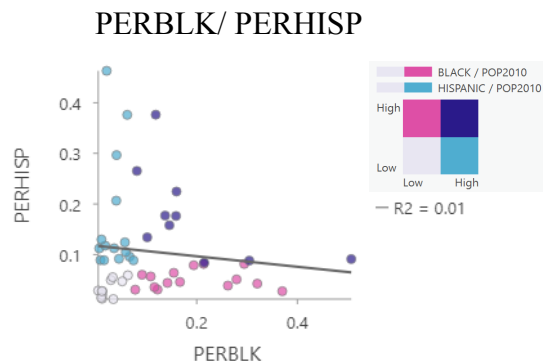
Reflection Question 2a: Do you see a relationship between Black and Hispanic state populations? Briefly explain how this relationship changes across space. Which version of these multivariate maps communicates this relationship better?

The black population proportion is highest around urban areas and the Cotton Belt, while the Hispanic population is highest around urban areas and the Mexican border. These two population proportions have a visible intersection in states containing populous cities. However, in the two non-overlapping cluster regions, only one dominant population percentage is visible, and thus they are not influencing one another, and do not correlate with one another. Despite my use of multiple symbols in my map, I believe the map with bivariate coloring better represents this relationship. Although the usage of four color categories disregards a significant amount of information, it cleanly divides states in alignment with the distribution pattern described.

2b. Having completed the scatterplot, What is the nature of the relationship? What is the R2? Does this confirm your visual interpretation?

Visually, two are very clearly not correlated. The R2 = -0.01, which represents an extremely weak inverse relationship, supporting the conclusion of low correlation between the two population distributions.