

Part 1:

- 1.) ***Can you think of reasons why working with this layer in an Albers Equal Area Conic Projection would be better than in a GCS? Why would it be a better choice than a conformal or equidistant projection?***

Albers Equal Area Conic projection is used as it provides minimal distortion in the specific area that we are working in. This projection uses two standard parallels to accomplish this. GCS projection is based on minimal distortion along the equator, the only standard parallel, and areas such as the Northeast US are distorted east and west.

- 2.) ***What happens when there is no common field such as the FIPS field to join the attribute data to the spatial data? What happens if there are more records in the data table than the shapefile? (i.e. what if the census table had all 50 states)?***

If there were no common field at all, nothing would happen to the table you were trying to join data to, the shapefile. If there were more records on the data table than the shapefile, only those with matching FIPS would be added. Additionally if the data table had fewer entries, only those matching would join to the shapefile and the shapefile would be missing data of interest for some states.

- 3.) ***Which states have the highest values?***

By visual observation after classification, NY has the highest White population represented as the highest class, with PA, OH, MI, IL falling into the class below that. These can also be determined by sorting the data table by the WHITE column and selecting first the highest record, and then a few below it. Selections can be identified by their corresponding selection of polygons on the map. Names of states have been joined from the data table as well for if something was too small to see visually or if the areas at hand weren't as obvious as state named boundaries.

- 4.) ***What states have the highest proportion of white population?***

By visual observations of the thematic map, West Virginia, Maine, New Hampshire and Vermont have the highest proportion of white population with respect to total population for each state.

Part 2:

- 1.) ***How many states, including Washington DC, have more than 250 physicians per 100,000 population? Of those particular states, how many have per capita incomes below \$16,000?***

There are 7 states that have more than 250 physicians per 100,000 population. Of these, 2 states have per capita incomes below \$16,000. These were determined using selection queries.

- 2.) Which two states have the lowest percent of their population above 75 years of age? What is the area in square miles of each of those states?**

Maryland and Virginia have the lowest percent of their population being above 75 years of age, found by sorting the 75_ANDUP field from lowest to highest, taking the 2 lowest records. Additionally the area of Maryland is 9919 sq Miles and Virginia has an area of 39,876 sq miles.

- 3.) How does an ArcGIS shapefile connect all of the information it contains to point, line, and polygon features?**

An ArcGIS shapefile use coordinates, or nodes, to represent points by themselves, or to join two nodes to generate a line. Multiple lines of a similar attribute may be combined to generate a polygon. All of which can be their own record and can be used to analyze one with respect to another if wanted, such as points inside a polygon.

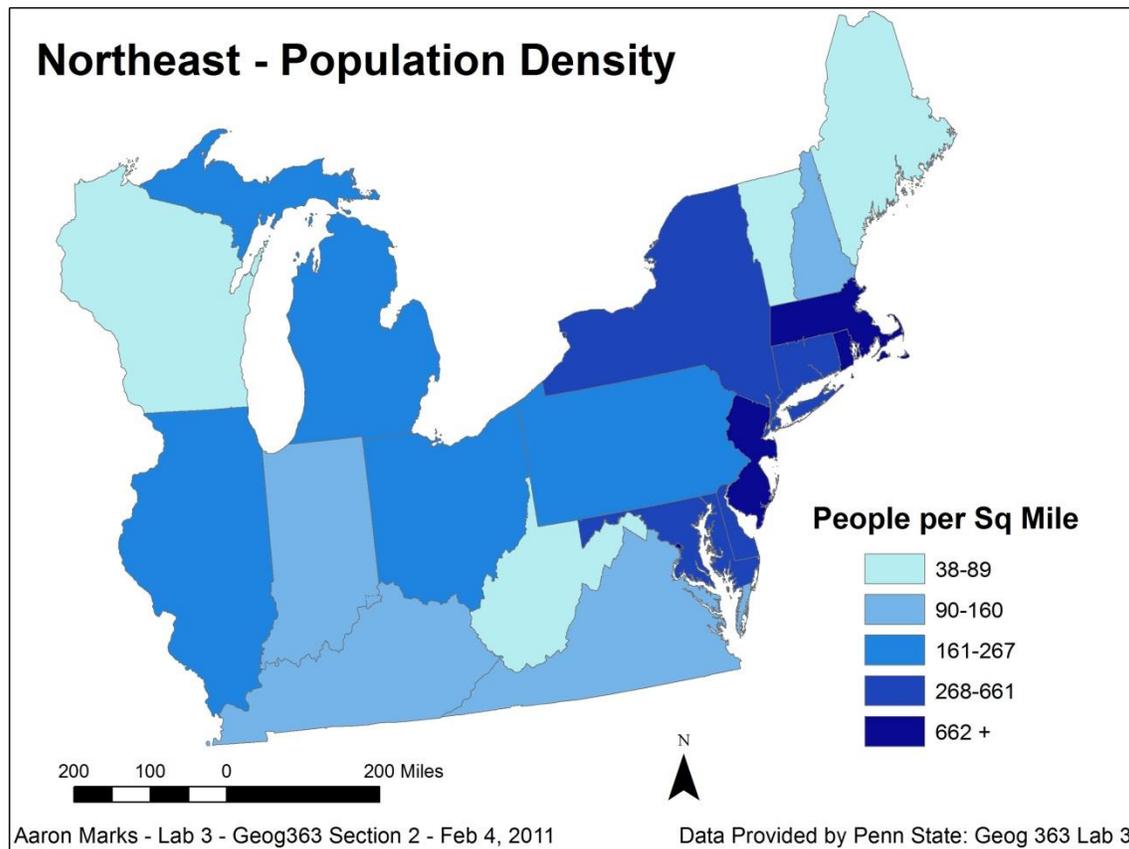
- 4.) In addition to the .shp and .dbf name some other file formats that ArcGIS can work with.**

In addition to the .shp and .dbf files, ArcGIS can also work with the needed .shx files and can also make use of .sbx, .prj and .xml files depending on what is needed.

- 5.) An ArcMap document (.mxd) file can be regarded as an __index‘ or __pointer‘ file. Explain why while explaining how ArcMap data files are stored.**

An ArcMap file, or .mxd, isn't a file like a power point is, but rather a "pointer" file. While the Power Point file will save the text, images, and animations into one file, a .mxd uses paths of databases rather than actually storing it itself. The file tells the program where to find the layers and respective data. If the data is moved the .mxd file will be looking for where the data was originally being pulled from and will have to be re-routed in order to work with the data that was moved

6.) Part 3: Thematic Map and Analysis



For this map I chose to represent population density amongst the states using the population of each state normalized to the area of each state. As you can clearly see from the legend the dark blue states such as New Jersey, Rhode Island, and Massachusetts have the highest population per square mile. The Quintile classification method set an equal number of states per group, or color range. I chose this method with map aesthetics in mind; I wasn't trying to give any area in particular importance over other areas which other classification methods are capable of. The reason behind some of the smaller states having some of the higher population per area may be due to the fact that it only takes one decent sized city in the state to effect this rate. Small states with low rates probably don't have a very large city in them such as Vermont. Larger states can be described the same way; New York for example has multiple large cities within its large area and therefor falls into one of the higher categories. Larger states with a lower ratio probably contain fewer cities or more open land such as forests or agriculture land use. The addition of points for cities, and perhaps scaled symbology, would further some of this reasoning.