### Lab 7: Visualization of Geographic Data

**Introduction**

This lab will introduce you to GIS techniques for symbolizing, classifying, and fine-tuning both the visualization of your geographic data as well as the overall map layout.

**Instructions**

Based on the assigned readings for this week, answer questions in Part I of this lab. Then proceed to the next Parts and complete the hands-on exercises. Before working with the lab data, copy it from the course website onto your flash drive.

**Deliverables**

Answer the following questions and produce the required outputs. Your lab document should be typed, well organized, and submitted based on the “How To” guidelines provided in the course syllabus.

**PART I – Assigned Readings**

***Textbook – Bolstad (Chaps. 4 and 9, pgs. 164-175; 359-366)***

1. What is cartography and what is its primary purpose?
2. Describe and give an example of when to use the following types of classification: Defined interval, equal interval, quantile, and Natural breaks.

***Textbook – Brewer (Chaps. 1, 3, 5 and 7)***

1. Describe an example of designing a map for a particular audience.
2. How would you design a map that will be viewed from an overhead projector?
3. What is “visual hierarchy” and how does it relate to map layout design?
4. When should you use an equal area projection for your map?
5. List the two export formats that are well suited for displaying maps on the Web.
6. In sequential color schemes, what do darker colors represent?
7. What is [www.ColorBrewer.org](http://www.ColorBrewer.org) ?
8. When would you use a diverging color scheme?
9. Provide an example of a color association that may be offensive to map readers.
10. What is a good website to use to view what color-blind readers see on a map?
11. What key technique should you follow when making a color map that will also be printed on a blank and white printer?
12. Which method should be used first in ArcMap: dynamic labeling or annotation?
13. If you want to place a label on the left side of a point feature, should the label be left-aligned, right-aligned, or centered?
14. Are serif fonts commonly used to label cultural features or physical features?
15. How should you position point feature labels for coastal and shoreline features?
16. Why might you add a “Note” section to your map layout?
17. When should you not use a north arrow on your map?

***ESRI ArcGIS 10 Online Help Files***

1. In a unique values layer, how are features drawn?
2. List five methods that you can use to represent quantity on a map.
3. When would you want to use a map ratio (normalization) to show quantitative data?
4. How do you access the Classification dialog box when mapping quantities?

**PART II: Classifications**

Quantitative data displayed in a GIS is usually grouped into classes. A number of standard methods are available for you to choose from, but each method can result in very different maps.

* To start, download the Lab 7 data from Dropbox. Extract the files to a local drive on your computer. In the ‘Part2’ folder ***open the USPop.MXD map file***. (Do not open a blank map and add data!)
* You will see a map of the United States showing *population density* (people per square mile) *by state*. The attribute field used to display the population density data is POP90\_SQMI. The data has been divided into five classes using four different standard methods.

1. **What are the different classification methods used? Which one is most appropriate for displaying the POP90\_SQMI data?**

* Next, look at the layer that maps *total population* (Total Pop Natural Breaks). Compare this layer with its “rival sibling” layer (Natural Breaks) that maps population normalized by area (density map).

1. **How does the total population map differ from the population density map for the same classification method (natural breaks)? What are the advantages/disadvantages of mapping total population compared with mapping population density?**

* Now look at the layers that show the three classifications of *population density by county* (County Pop Quantiles, County Pop Equal Intervals, County Pop Natural Breaks).

1. **Which classification method do you think works best for displaying the county data? Explain why.**

* Finally, look at the raster layer that shows population density calculated from vector data (Calculated Pop Density).

1. **How does this map differ from the others you have looked at in this exercise? Do you think it is better or worse for showing population density? Explain.**

**PART III: Map Design Practice – Multnomah County Map**

In this exercise, you will make two presentation-quality maps, which you’ll share with fellow classmates and receive feedback for making revisions.

* Review the datasets provided in the Lab 7, Part 3 folder. Select a group of datasets for creating two similar maps of the **Multnomah County area**.
* **Designing Map #1**: Using your selected datasets, create a presentation-quality map that adheres to these guidelines:
* The *map theme* is up to you.
* The study area is anywhere within the *Multnomah County area*.
* Use as many *datasets* as necessary to convey your purpose (note that you DO NOT have to use every dataset that is posted – a variety is provided so that you would have some options).
* Design the map to be in *COLOR*, and to fit on an *8.5”x11”*size page.
* Apply symbology and labeling as needed to support the map theme.
* Include as many *map elements* as you deem appropriate (e.g. north arrow, title, legend, map author name, data source, legend, etc.)

1. **Export your initial version of Map #1 as a JPEG, and insert into your lab document.**
2. **Answer the following questions about Map #1:**
   1. **What is your map purpose?**
   2. **Who is your audience?**
   3. **For what medium (paper, digital, website page) was your map designed? Think about factors such as viewing distance and color quality.**
   4. **How is your map layout linked to the map purpose? Consider how visual hierarchy, map elements, and map projection influence this.**

* **Designing Map #2**: Create an alternative version of Map #1. Use exactly the same datasets as those used for Map #1. Choose one of these audience types to serve as your audience for Map #2:
  + *Color Vision Impaired, OR*
  + *Has access only to a Black and White printer.*

1. **Export your initial version of Map #2 as a JPEG, and insert into your lab document.**
2. **What cartographic techniques did you use to create Map #2?**
3. **\*\*\*BRING COLOR PRINTOUTS OF BOTH MAPS TO OUR CLASS MEETING ON MARCH 5, 2015**. Be prepared to share your printouts with fellow classmates and receive feedback on how to revise your maps.\*\*\*
4. **Export your *revised* maps as a JPEG and insert into your lab document (you should have two versions of each map).**