FNR 66
Spatial Data Analysis in GIS
Lab 1: Basic GIS Skills

This lab includes some basic GIS skills. We will take analog spatial data, georeference those data, screen digitize features from the newly georeferenced map, build a database for the newly digitized data, populate the database, and query these new data with some existing GIS data. The output will be a map with symbology that helps visualize the queried data. Please include a table or plot of the queried data as an inset in the map. Don't forget the basics (name, date, source of data, legend, projection, scale bar, north arrow). The main question to ask yourself (about your map), is this usable?

There are two directories that are mapped to your student accounts. The "shared" drive contains read only GIS data. The "student shared" drive is where you will place the GIS data for your work in this class. In the "shared" drive, there is a directory named "../FNR_66/DATA." This is where I will place GIS data that you will use for your labs (unless otherwise directed). In the "student shared" drive, there is also a directory named "../FNR_66." Please create a directory named with your last name (e.g. "../FNR_66/patton/"). Within that directory, create directories named "lab_01," "lab_02," etc. You will want to place your GIS data here, along with any maps or other outputs.

1. Acquire unreferenced map. Georeference the map.
    a. Use the PRISM map, note the projection (NAD83 UTM zone 10). Copy the FNR_66\DATA\activities\activity_01\prism_precip_annual_20121119_600.png file to your working directory (aka lab_01).
    b. Download the ..\FNR_66\DATA\county.shp and humboldt.shp shapefiles into your working directory (these will be used to (1) georeference the map and (2) clip your digitized data.
    c. Launch ArcMAP, set the coordinate system, turn on the georeferencing extension, save your mxd file somewhere (lab_01).
    d. Add the county GIS data, add the PRISM raster
    e. Georeference the prism rater to the county data. Turn on the georeferencing extension. Select the png file, create links (the first click is on the unreferenced map and the second click is to the georeferenced data (e.g. the county lines). Evaluate the rms errors, save your mxd file, save the link table, then "rectify" and choose an output filename and format. Save this new georeferenced image into your "lab_01" directory.
    f. Save the mxd file again and close ArcMap
2. Digitize vectors or polygons using the linework on the georeferenced map.
    a. Launch a new ArcMAP project, set the coordinate system to UTM NAD83 UTM zone 10, save MXD file in your lab_01 directory.
    b. Add your georeferenced PRISM raster

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c. In ArcCATALOG create a new polygon shapefile in the same directory you saved the PRISM raster, give the shapefile a name like “precip_MAP_cont” add the shapefile to your MXD, save save save.
d. Open the table and add a field named “MAP_inch” (use “double”)
e. Turn on the “editor” extension, begin editing the shapefile
f. Digitize the contours for 80, 100, 120, 140, and 160 for Humboldt county, if any contour extends beyond the county line digitize the contour, stop editing and save the shapefile. Input the contour value after you digitize each contour. You may want to designate no color for the fill of your polygons.
g. After you are done digitizing, use georeferencing/clip to clip the digitized contours to Humboldt county, save the new shapefile something like “precip_MAP_cont_hum”
h. In the table, add another field called “area_km” (use “float” with precision of 14)
i. Use “calculate geometry” in the field “area_km” to calculate the area for each polygon (remember to use km).
j. Repeat this same exercise to determine the area, in km^2, for Humboldt county.
k. Add a field to your “precip_MAP_cont_hum” shapefile named something like “perct_hum” (float, precision 0)
l. Use the field calculator to determine the percent of the county that each contour polygon represents, generate a table that lists these different contours and their percentage of the county.

3. Prepare a map that uses symbols that help the reader visualize the results of your work.
4. Add a table or chart/plot that summarizes the results of this calculation.
5. Email a pdf of your map to Jason-patton@redwoods.edu