

FNR 65

Lab 3: Projections

Name: _____ Date: _____

This week we work with projections.

All GIS data are stored with geospatial information. This information may be correct or it may be incorrect. The information typically refers to the Geographic Coordinate System (GCS) and the Projection. The projection/GCS information is usually stored in a special file, or possibly embedded within the GIS data itself. If the projection/GCS information is correct, it is simple to change the projection of the data to suit one's needs. Sometimes data are in a projection that optimizes for distance, but needs to be reprojected into a projection that optimizes for area.

We will use some GIS data to help us visualize how spatial data are distorted with different projections. We will also measure distances between specific coordinates to determine how distances change with different projections. Then we will use some county outline data to calculate areas when the data are projected in different projections.

Part I. Distances

Locate the data for this lab on the Y drive and place a copy in the two locations you have been using for your lab data. Remember, the D drive is where we want to have our data during our lab (since the computer has faster access to a local drive). There are three data sets: lat_long_net_10, lat_long_net_10_labels, and county. Once the data are placed on the D drive, add all three data sets to an ArcMap Table of Contents (TOC) (using ArcCatalog). Add the labels data twice. Make sure the net data are on the bottom and the labels data are on top (in the TOC).

Right click on the labels data and select the "labels" tab in the "Layer Properties" dialog box. Select "lat" for the "Label Field" and choose a text color. Check the checkbox labeled "label features in this layer." Click OK. For the second labels dataset, do the same, but select "long" for the "Label Field." Now each point has a latitude and longitude label associated with it.

Right click on the net data to get to "properties" and select the "symbology" tab. Choose Quantities in the "Show" box and then select "lat" in the Fields/Value area of the symbology property box. For the color ramp, select a rainbow color scheme so that red is on the left and blue is on the right. Enter 12 Classes in the "Classification" area of this dialog box. The southern hemisphere will have warm colors and the northern hemisphere will have cool colors.

While in the properties dialog box for the net data, select the "source" tab. This is where there is information about the directory location of the data itself, plus the projection/GCS information for the data. Enter the following information:

Filename and location: _____

Geometry Type: _____ GCS: _____

Datum: _____ Units: _____

Click OK to exit that dialog box.

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Go to “View/Data Frame Properties” and click on the “Coordinate System” tab. Select a few different projections and note how the geometry of the rectangular net changes. Choose the following projections: DNAG, Fuller, Robinson, NAD 1927 California (Teale) Albers (Meters), NAD 1983 UTM zone 10N, and Robinson. For each projection, measure the distance between the coordinate labels for 15 N 195 E and 15 S 275 E

<u>Projection</u>	<u>Distance (units?)</u>
WGS 1984	_____
DNAG	_____
Fuller	_____
NAD 1927 California (Teale) Albers (Meters)	_____
NAD 1983 UTM zone 10N	_____
Robinson	_____

Use the website to determine the distance between these two coordinates: 15 N 175 E and 15 S 65 E

<http://www.nhc.noaa.gov/gccalc.shtml>

Distance (units?) _____

Which projection is the best projection for determining distance for this region of the world?

Part II. Areas:

We will use the county shapefile to calculate areas for the above different projections.

Right click on the county shapefile in the TOC and select “open attribute table.” Note the fields and records for each county. There is a field called AREA. We will be recalculating the area for these data after changing the projection, for each of the above six projections. After recalculating the area, we will export the table to a text file and compile the data in excel. We will then plot the data in excel to observe the variation in areas for the different projections.