**GEOG 3231/5231**

**Projections in-class**

***Reprojecting data***

In this mapping exercise we will work through the process of reprojecting data to make a copies of a shapefile with a different projection. This is often a necessary step in preparing data for GIS analyses.

Data source: US Census

* Download *projections\_inclass.zip* from D2L & extract the folder to your workspace on the C: drive.
* Start a new AcrMap project and save it in your projections folder.

**Determine the native projection (spatial reference/coordinate system) of the USA data.**

* Examine the data in the ArcCatalog sidebar:
  + What is the spatial reference of this data?
  + What are the shortcomings of this projection?

**Examine the effect of ArcMap’s “on the fly” data frame projection functionality**

* Drag the*lower48usa*layerinto the map
  + Right click on the data frame and go to Properties > Coordinate system
  + What spatial reference is the data frame using to draw the map?
  + Why is this projection being applied?
* Switch to layout view and create a graticule to provide lat/long reference
  + Data frame Properties > Grids tab > New grid
  + Set appropriate degree divisions (10 to 30 usually works well)
* Insert a new data frame, drag the US file into it & set the data frame coordinate system to display the map using the ***World Mercator*** projection
  + Is this projection appropriate for the continental US?
  + Why or why not?
* Copy & paste to create another new data frame, then set the coordinate system to ***UTM zone 10N***
  + Is this projection suitable?
  + For what region is UTM zone 10 North designed?

**Re-project the data via export to create a copy with different spatial reference (.prj)**

* Insert another new data frame, add *lower48usa* & change the data frame coordinate system to the ***USA Contiguous Lambert Conformal Conic*** projection
* Export the US layer to your projections folder on the C drive
  + Name the new shapefile something that reflects this projection
  + Select use “the data frame” as the coordinate system option and click OK
* What map properties are preserved by this conformal projection?

**Re-project the data via ArcToolbox to create a copy with different spatial reference (.prj)**

* Flip open the ArcToolbox sidebar
* Expand the Data Management toolboxes to locate and then launch the “Project” tool
* Complete the menu options, be sure the new file is going to your projections project folder
* Select the ***USA Contiguous Albers Equal Area Conic*** projection
* What map properties are preserved by this projection?
* Insert a new data frame and add the new layer.
* Name the data frame & add lat/long grid lines with appropriate degree divisions.