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GEOG 181A

30 June 2022

### Unit 3 Part 3 Assignment

#### **What are the differences between Geographic Coordinate Systems and Projected Coordinate Systems?**

Geographic coordinate systems define where the given data is located on the earth's surface. They typically are expressed in terms of degrees of longitude (x-coordinates) and degrees of latitude (y-coordinates), both of which have their units in decimal degrees. Respectively, positive and negative x-coordinates indicate north and south of the equator, and positive and negative y-coordinates indicate east and west of the prime meridian.

Projected coordinate systems, however, flattens the wanted portion of a geographic coordinate system using a specific map projection. Linear measurements are used for the coordinates, and some data can be expressed in a local coordinate system with a relative (false) origin rather than a predefined one. In terms of units, local coordinate systems are usually expressed in feet or meters.

#### **What is on-the-fly projection in ArcGIS Pro?**

On-the-fly projection is a term used to describe what ArcGIS Pro does to resolve data conflicts when you provide data that is in a different coordinate system than your map. Although

not ideal, this feature allows ArcGIS Pro to define individual projections to every individual object in the data so they can all be displayed to a common projection.

**What are the differences between ArcGIS tools: Define Projection and Project?**

The ArcGIS tool “Define projection” changes the metadata that describes the dataset’s current projection. Although it does not change the projection of the dataset, you do need to know what projection the data is in to run the tool. The ARCGIS tool “Project”, however, projects spatial data from one coordinate system to another by changing the projected coordinate systems of all the components of the data (shapefile, raster, geodatabase, etc.). With this tool, you can bring in other data and have their projections match with the projection of the original data without additional hassle, leading to more accurate analysis of it.

**What are the differences between Conformal projection, Equal area projection, Equidistant projection, and Compromise projection?**

Conformal projection preserves the shape of small areas of the land masses so that the scale is the same in all directions at any point while distorting the size of them. Equal area projection, on the other hand, makes the relative sizes of the land masses proportional to the size of the actual land masses while distorting the shapes of them. Equidistant projection is a projection that maintains scale either along one or more lines or from only one/two points to all other points on the map. Compromise projection attempts to minimize and balance all these types of distortion at the cost of making the land masses not have equal area, conformal, or equidistant characteristics.