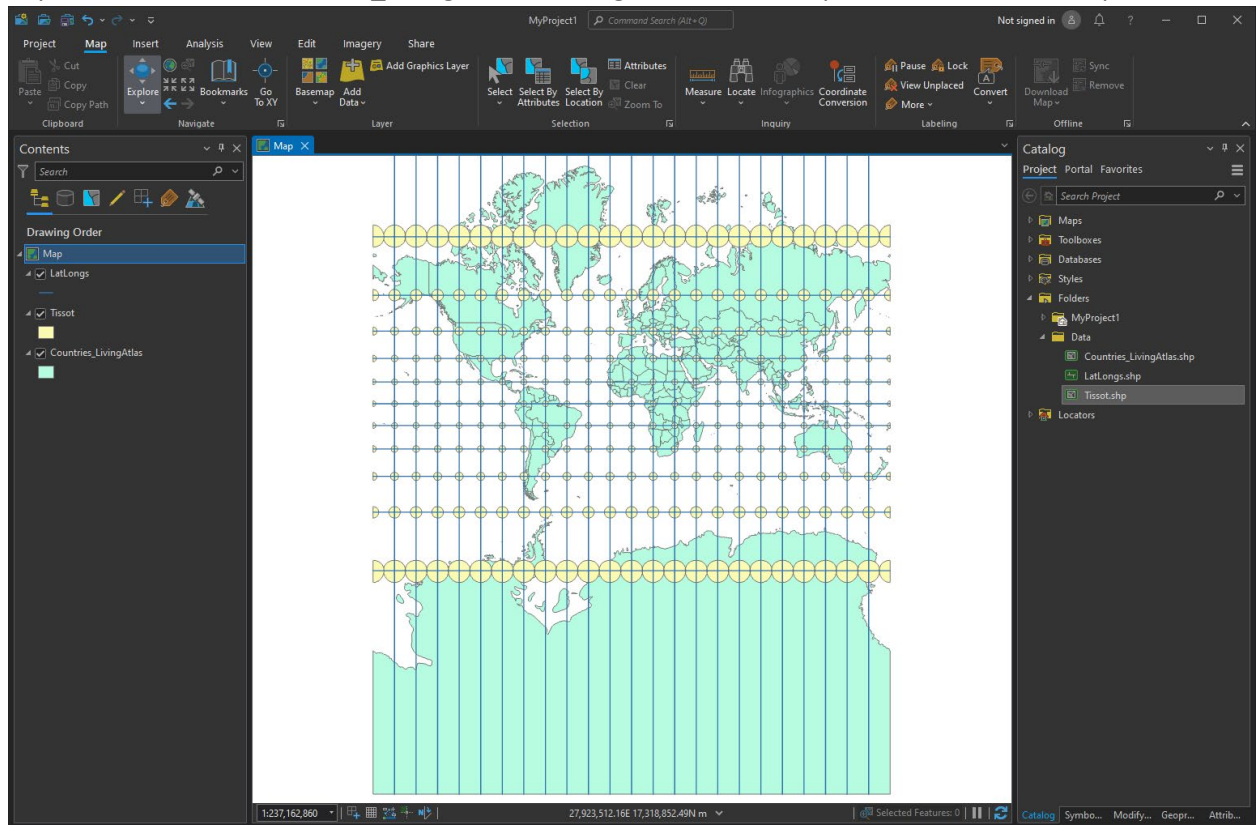


## Exercise 2: Map Projections

Working with Map Projections. Data for this exercise are provided in the class.

### Add Data

1. Create a new ArcGIS Project. Save your project as **Exercise2\_Projections**.
2. Click **Add Data** button and navigate to **Exercise 2 > Data** folder. Press Ctrl button on the keyboard and select **Countries\_LivingAtlas**, **LatLongs**, and **Tissot** shapefiles to add to ArcMap.



### Explore Map Projections

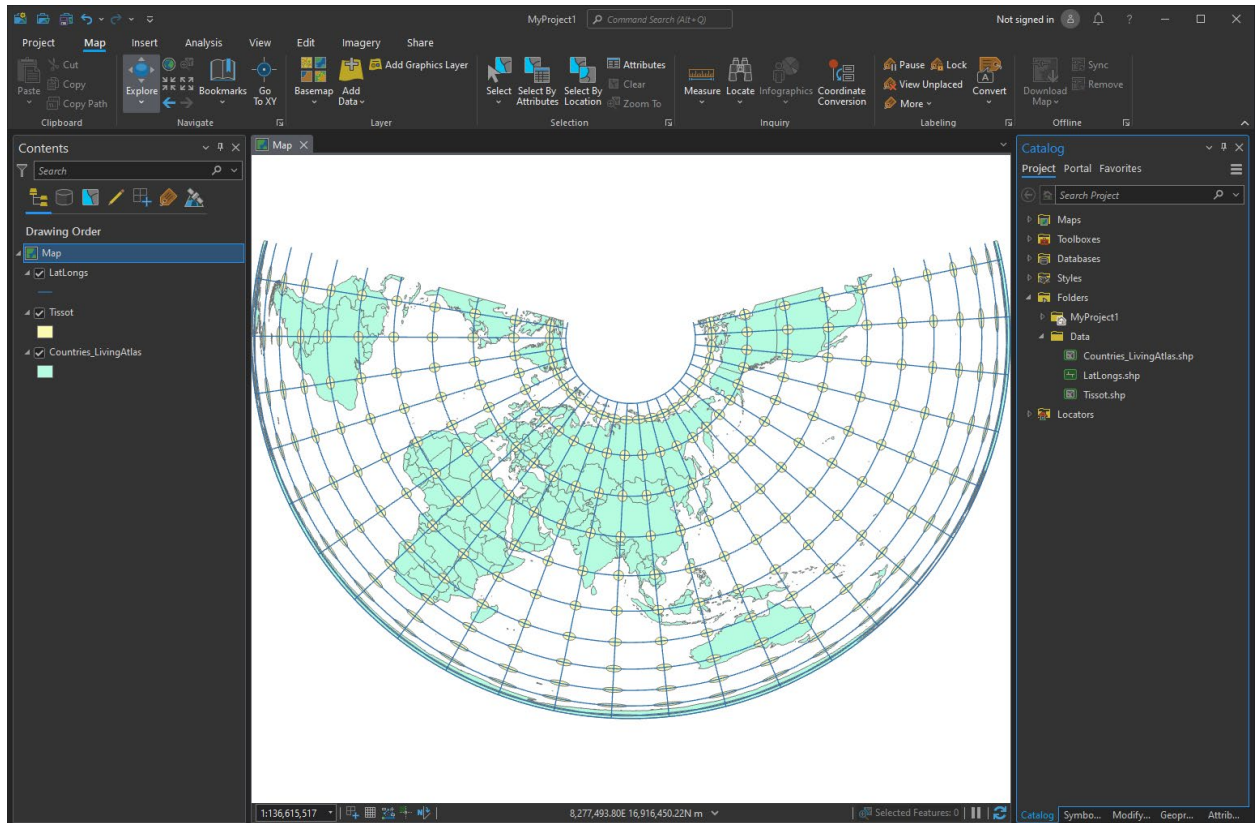
3. In the **Contents** pane, right click **Properties** on **Map** to access **Map Properties**. Click on **Coordinate Systems** tab.
4. In the search bar type **Plate Carree** for the data projection and hit enter key on the keyboard. Select the projection under **Projected Coordinate Systems > World > WGS 1984 Plate Carree** and click **OK** to apply the coordinate system. View you map data transformation. *"Plate Carree" is French for "Flat Square." This projection wraps the latitude and longitude grid to form a uniform grid.*

Follow Step 4 procedure to explore the following map projections:

5. **Conformal Map Projections:** Search for term 'auxiliary' in search bar and select **Projected Coordinate Systems > World > WGS 1984 Web Mercator (auxiliary sphere)** and click **OK**.

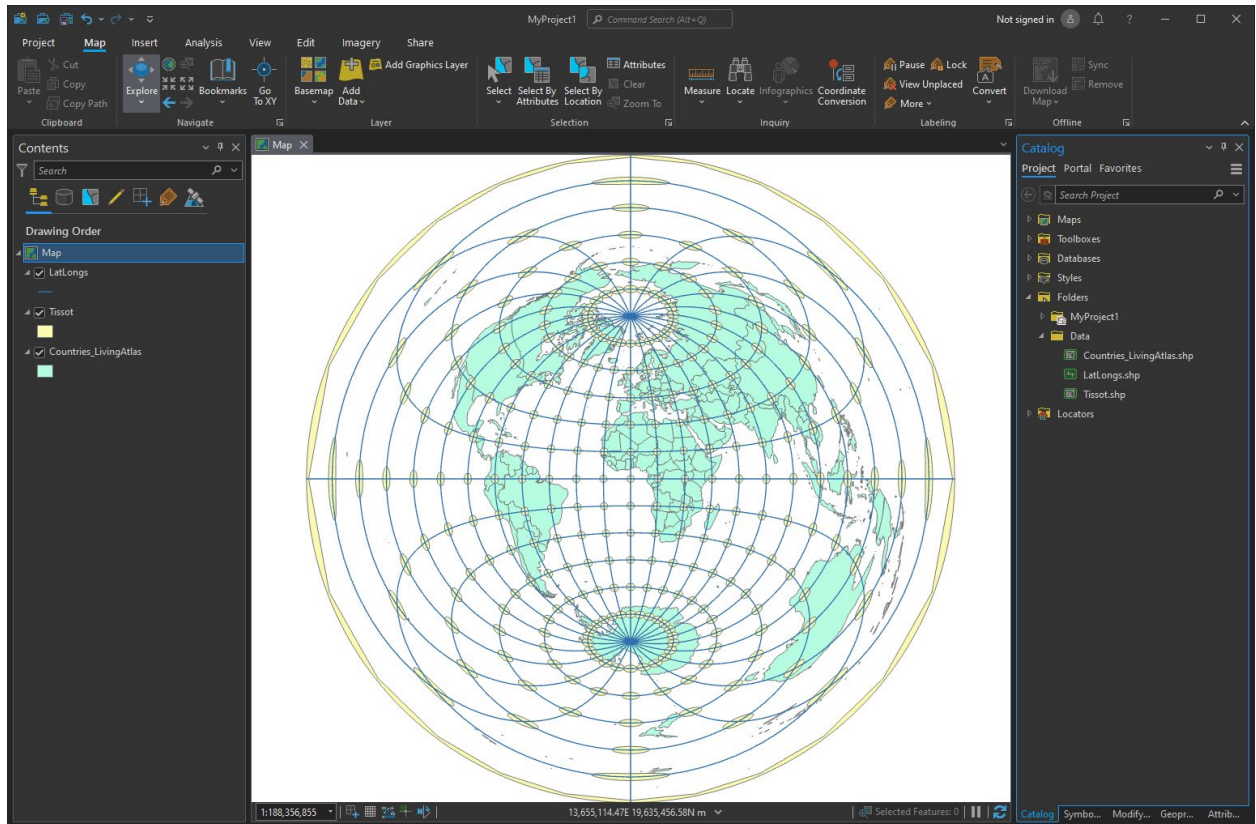
The map redraws, showing data in Mercator projection. The Mercator projection is commonly used on web mapping platforms. This projection preserves shapes but distorts size significantly when moved towards poles.

6. **Equal Area Projections:** Search for term 'north albers' in search bar and select **Projected Coordinate Systems > Continental > Asia > Asia North Albers Equal Area Conic** and click **OK**. The map redraws, showing data in Asia North Albers Equal Area Conic projection.



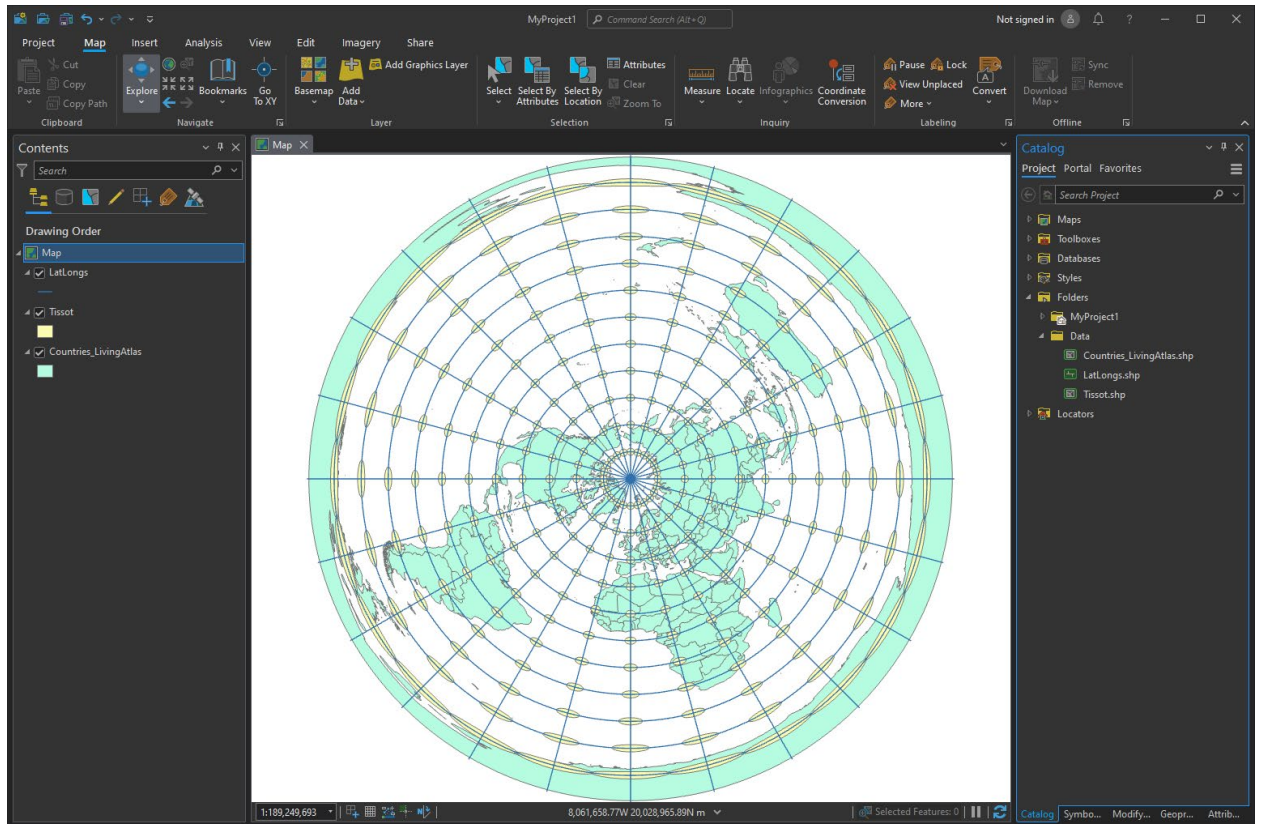
Equal Area projections preserves size/area of geographic features while distorting the shape. Since, the projection is for Asia, shape distortion in Asia is minimal compared to other parts of the world.

7. **Equidistant Map Projections:** Search for the term 'equidistant' in the search bar and select **Projected Coordinate System > World > Azimuthal Equidistant (World)** and click **OK**. The map redraws, showing data in Azimuthal Equidistant projection.



This projection does not preserve shapes or sizes of places. It stretches, twists, or squashes them, instead. But distances are preserved between places, not everywhere.

8. **Azimuthal Map Projections:** Search for the term 'azimuthal' in the search bar and select **Projected Coordinate System > Polar > North Pole Azimuthal Equidistant** and click **OK**. The map redraws, showing data in North Pole Azimuthal Equidistant projection.



Direction is preserved for these projections. Whereas shape, area and possibly distance are distorted.