In-Lab Assignment: Map 1

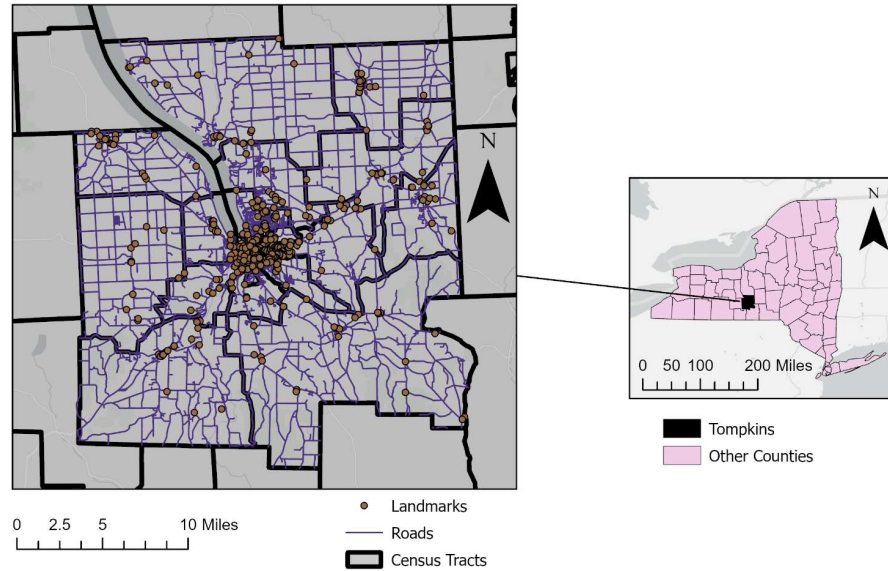## Map 1: Notable Features of Tompkins County

Map highlighting roads, landmarks, and census tracts
of Tompkins County. Context map of NYS counties included.
Projection: NAD 1983 StatePlane New York Central FIPS 3102 (Feet)

River Strumwasser
9/12/2023

N

0   2.5   5   10 Miles

- Landmarks
— Roads
☐ Census Tracts

N

0   50 100   200 Miles

■ Tompkins
▨ Other Counties

1. What is the unit of these measurements? Identify the correct projection. Explain what method you utilized to do this. Discuss how you identified the units, and the location, and selected the projection.

When you right-click on Tompkins_County_Soils and go into Properties… > Source, you can see the units for its spatial extent, which are in degrees. The degree units give a hint that the projection system is measured in coordinates. The given coordinate extent boundaries correspond well to the area of Tompkins county (42.6-42.2 deg N, 76.2–76.7 deg W), thus I defined the area with the GCS NAD 1983 2011 projection to align our use of NAD 1983 2011 with the layer's degree coordinate units.

2. Explain what you did to project it to UTM. What is the difference between defining a projection and projecting a layer?

First I used the define projection function to set it to NAD 1983 2011 (with it as the output and Tompkins_County_Soils as the input), and then used the project function to change the projection to NAD 1983 UTM Zone 18N projection, by setting it as the output. Defining projections are for when the file does not have a projection system, while projecting is used to translate a file from an existing projection to a new one.
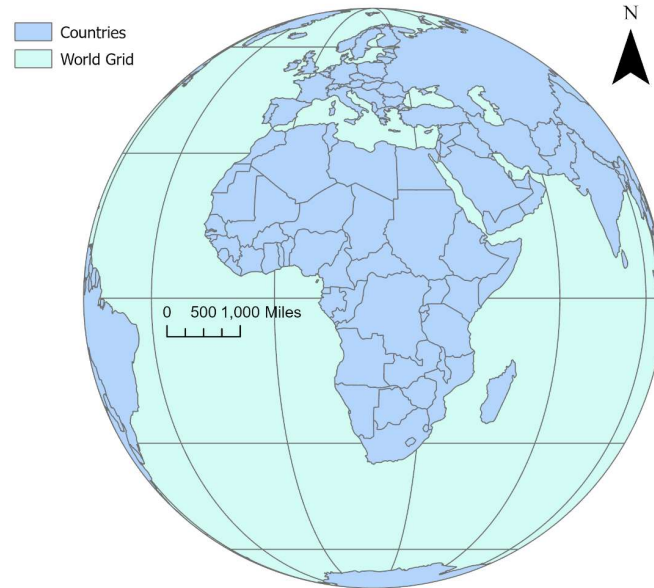
3. Is "Mollweide" a better choice for a world projection? Why or why not? Use a screenshot to illustrate your description.
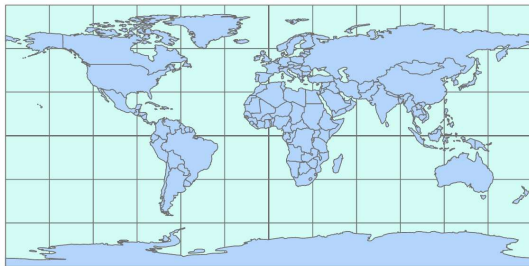
Although it distorts many aspects of the original projection, Mollweide presents the idea that locations approaching the poles are close to each other, whereas the original map has a long line at the top that makes the polar regions look extremely far away, when they're very close together in reality. Thus, I agree that it's a better choice for a world projection.

Map 2: The World from Space, Africa centered   River Strumwasser
Projection: The World from Space, from ArcPro GIS   9/14/2023
Map data from Cornell CRP 4080's Lab 3 homework data

Countries
World Grid

N

0   500 1,000 Miles

4.

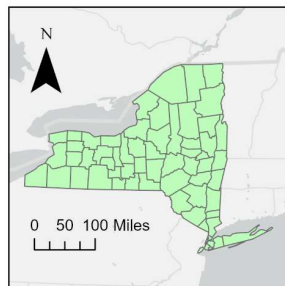## Map 3: NYS Counties in Different Projections

Map displaying NY Counties in different projections
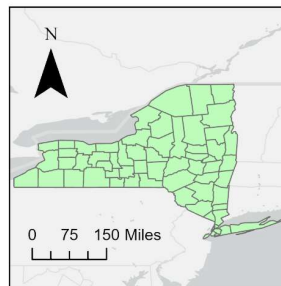Projection labeled, from ArcPro GIS
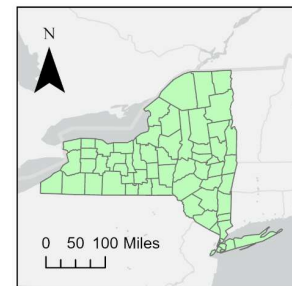Map data from Cornell CRP 4080's Lab 3 homework data

River Strumwasser
9/14/2023

Projection: PCS NAD 1983 UTM Zone 18N

Projection: GCS NAD 1983

Projection: The World from Space, custom
centering around Ithaca, NY, USA

☐ NY Counties

Discuss some of the differences between these projections. Why does the northern boundary of the United States (49th parallel) appear flat when using geographic coordinates, and curved when using a projected coordinate system?

The GCS NAD 1983 projection is a flat cylindrical projection, thus latitudes lay flat, while they do not for the other two. The space projection is the most shape-accurate, being a direct centered view from space which in definition preserves shape well, but it's not much more accurate than the PCS NAD 1983 UTM 18N projection, which uses a projection that represents the specific region displayed uniquely well. These contrast to the GCS, which horizontally stretches the map (as it is approaching the poles from the equator).

The northern boundary of the US is flat with a GCS because latitudes are rolled out flat, which makes a longitude appear horizontal. However, on a PCS, this is not always the case, and a curved distortion to represent Earth's real shape may distort these latitudes to appear curved.

Map 4: Map of USA using Projection for NYS   River Strumwasser
Map of US States using a projection selected to represent NY counties.   9/14/2023
Projection: NAD 1983 UTM Zone 18N
Map data from Cornell CRP 4080's Lab 3 homework data

Discuss how issues of directional and distance accuracy affect your view

The map curves upwards away from the centered latitude, which rotates areas more clockwise the more leftward they are, which distorts direction. The globe section is also projected, which leaves the outer edges of the map appearing squashed together to be horizontally closer than reality. The polar pull of the map also distorts the vertical direction.
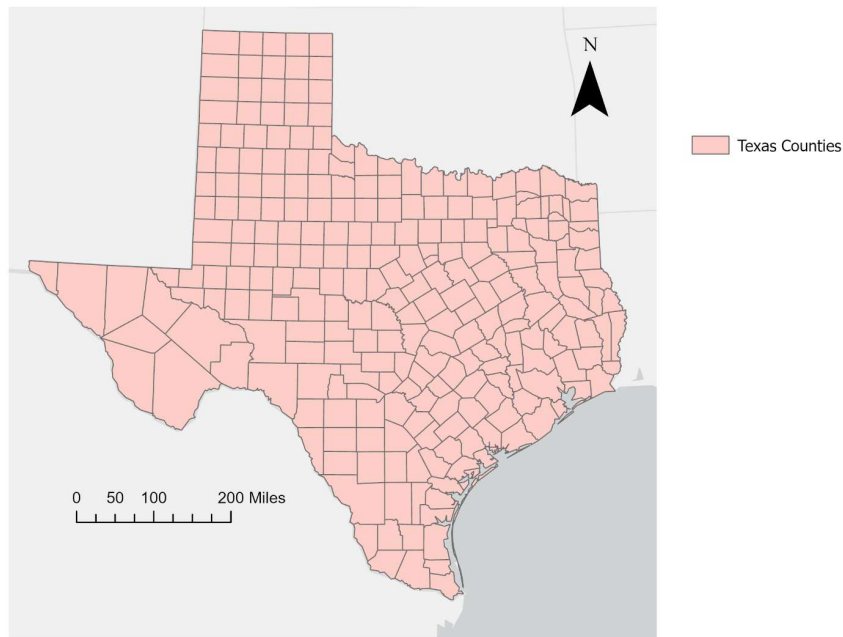
5.

Map 5: Texan Counties
Map of Texan Counties with an accurately representative projection
Projection: NAD 1983 UTM Zone 14N
Map data from Cornell CRP 4080's Lab 3 homework data

River Strumwasser
9/14/2023

Explain what projection you chose and why

I chose the NAD 1983 UTM Zone 14N projection, as most of Texas is contained within UTM Zone 14N, with almost perfect centering, similarly to how most of New York is mostly contained within Zone 18N. Since UTM zone projections are well representative for areas within the zone of the projection, I chose to use it for Texas's counties.