Visualizing Geodata

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Slides are based on https://serialmentor.com/dataviz/geospatial-data.html

Overview

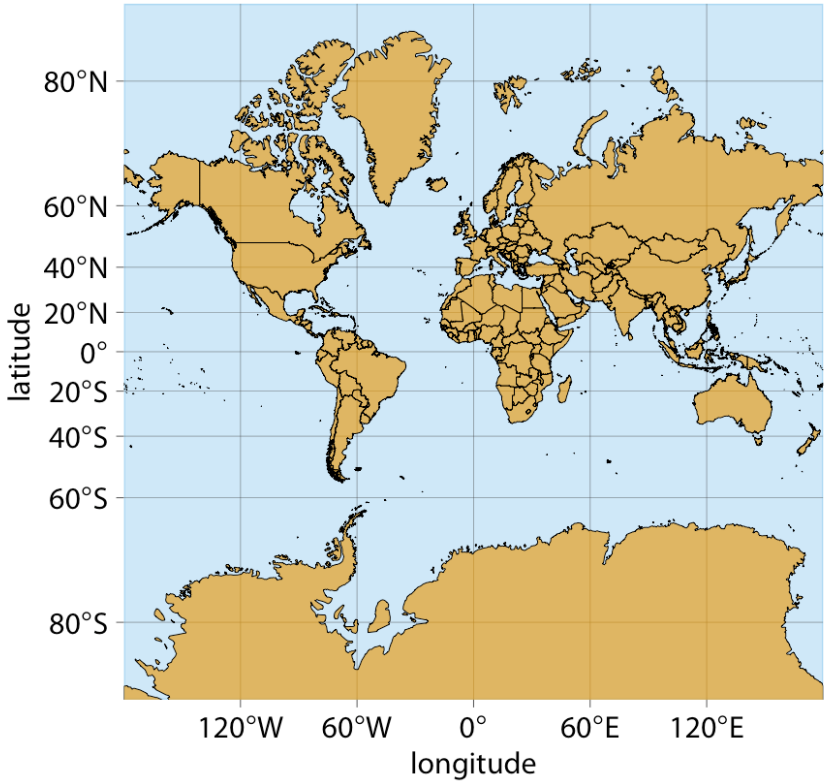
1. Basics: projections
2. Working with multiple layers
3. Specific plot types:
    1. Choropleth mapping
    2. Cartograms

The earth is approximately a sphere

- To specify a location on the earth, we need:
  - where we are located along the direction of the equator (the longitude),
  - how close we are to either pole when moving perpendicular to the equator (the latitude),
  - how far we are from the earth's center (the altitude).

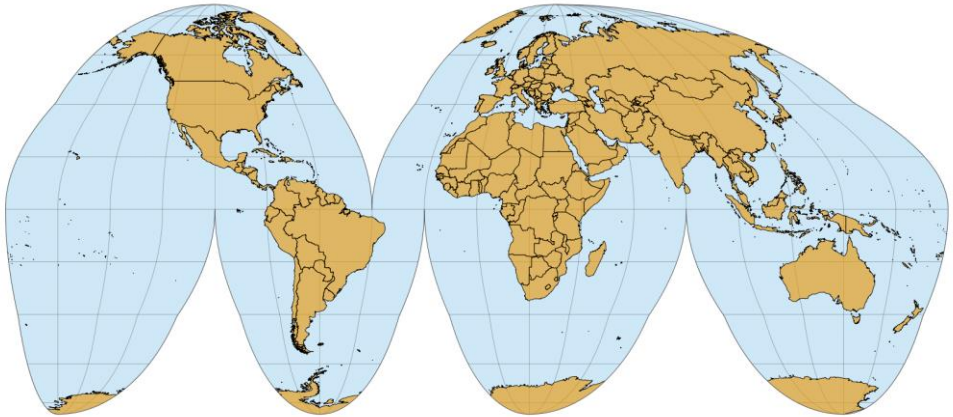
The Mercator projection

- Developed in the 16th century for nautical navigation
- A conformal projection
  - Accurately represents shapes
  - Has severe area distortions

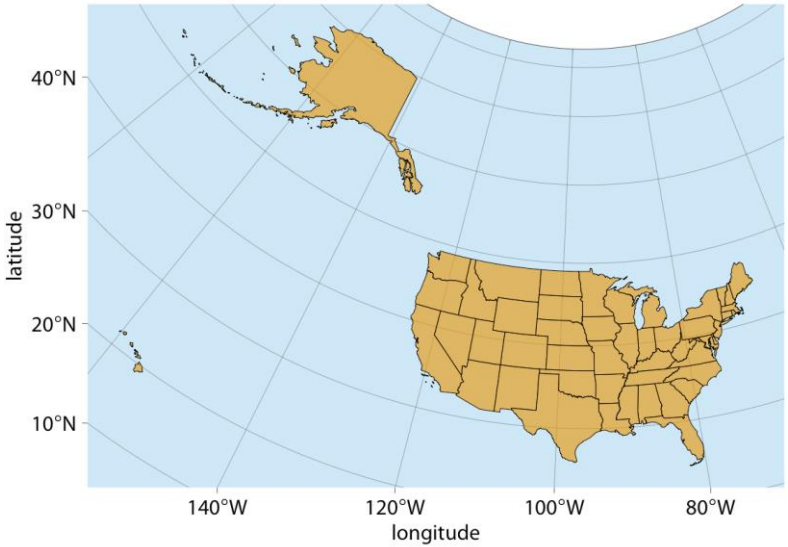


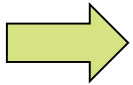
The Goode homolosine

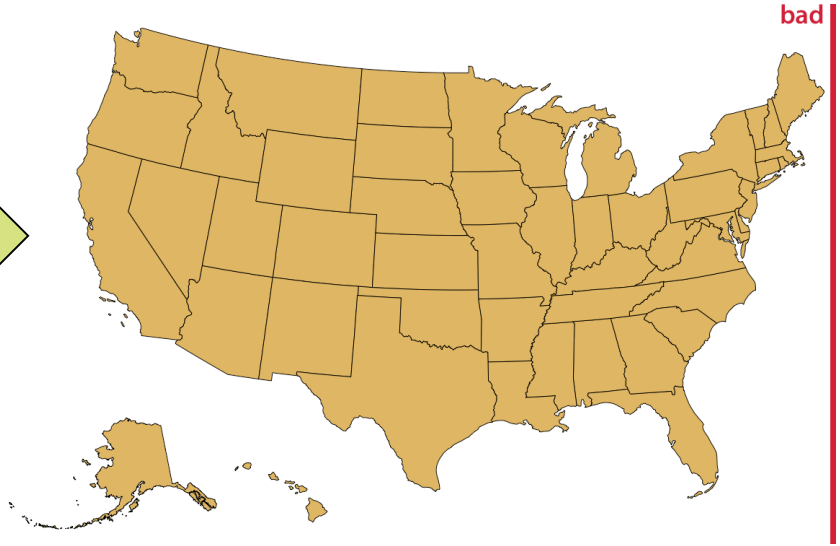
- Developed in 1923 by Goode for nautical navigation
- A conformal projection
  - preserve areas
  - approximately preserve angle



There can be projection problems even for one country







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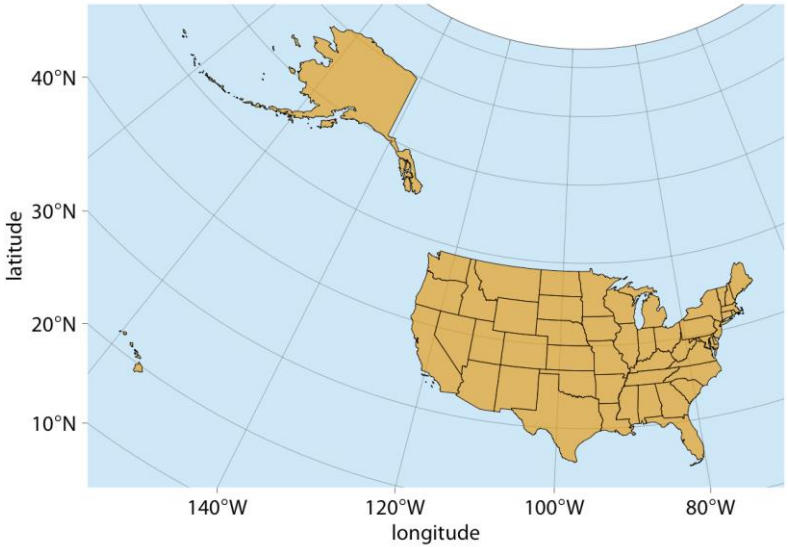
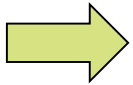
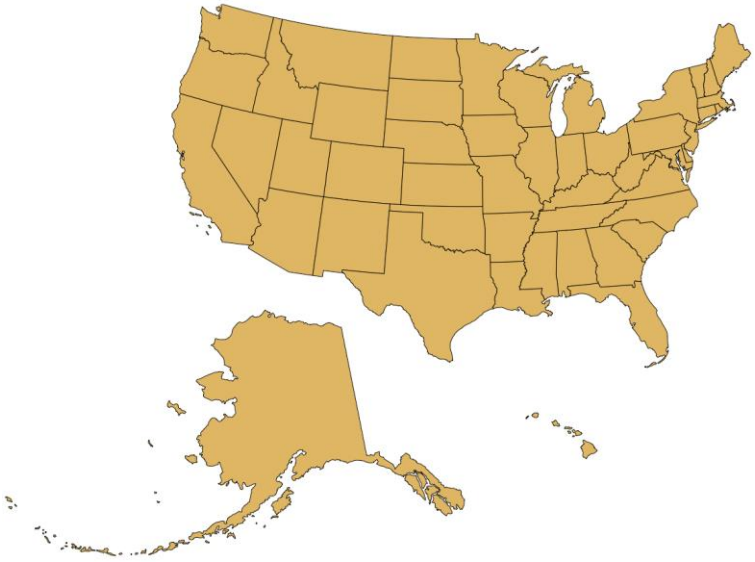
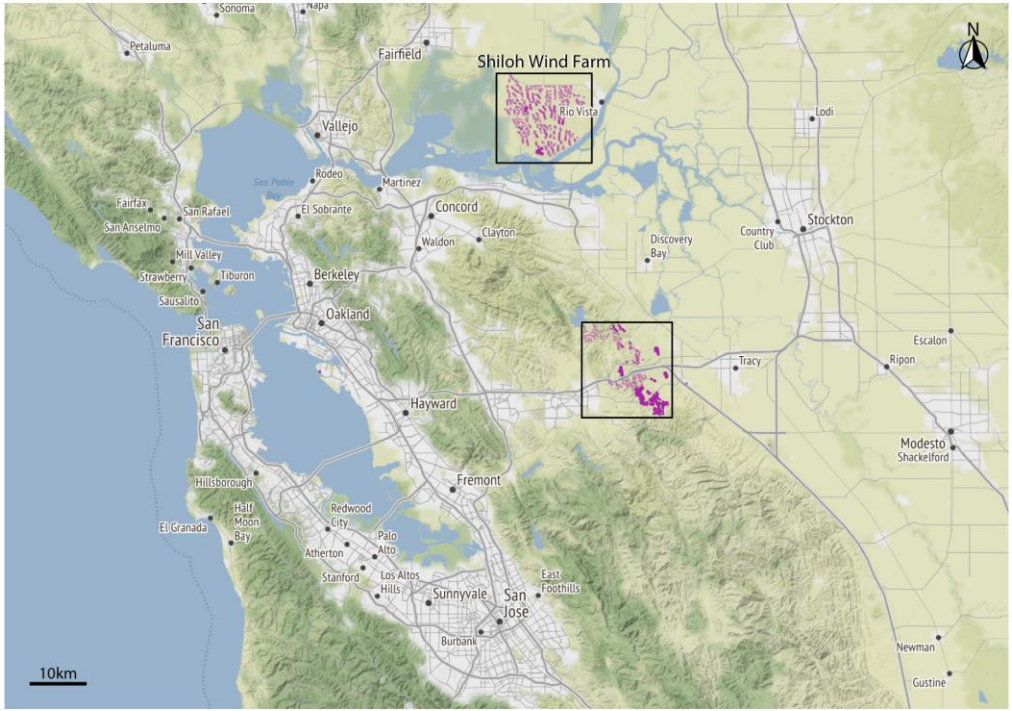






Typical map consists of a number of layers



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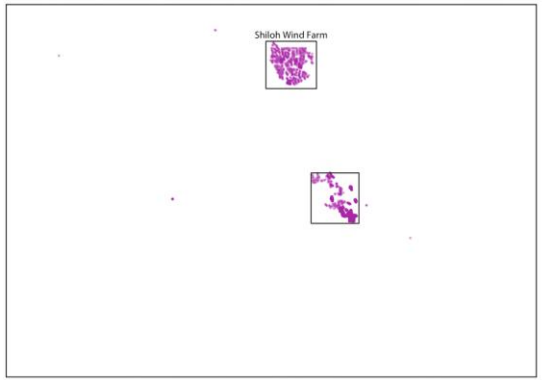
Typical map consists of a number of layers

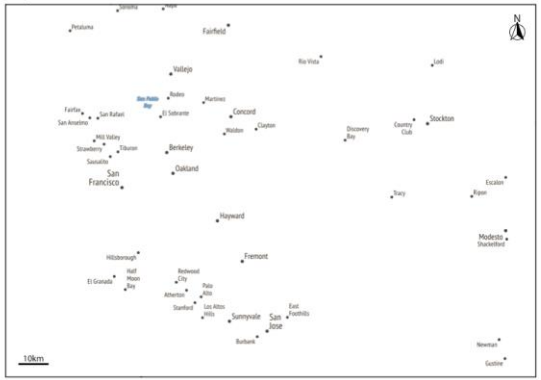
terrain

roads

wind turbines

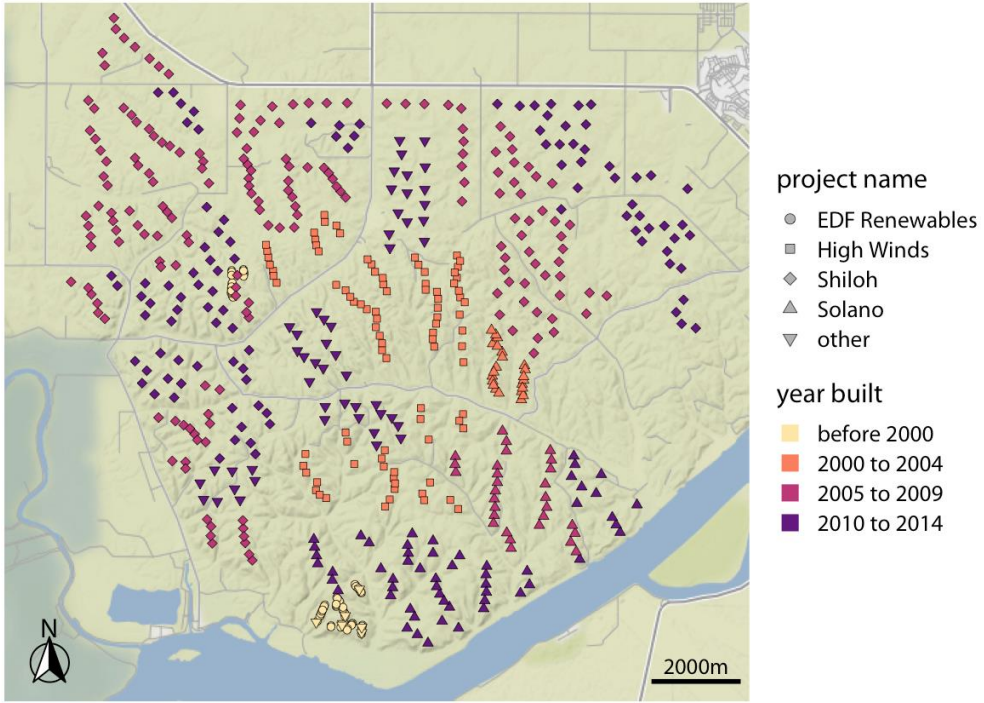


city labels, scale bar



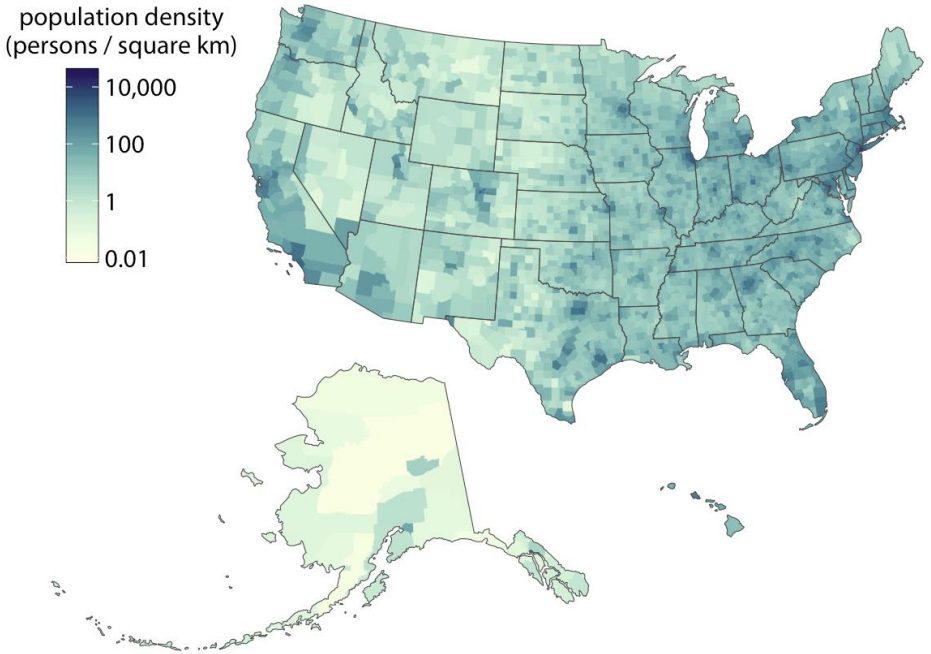
When plotting maps we use the same principles

- We use color and shapes
- The message is the process of development of wind turbines

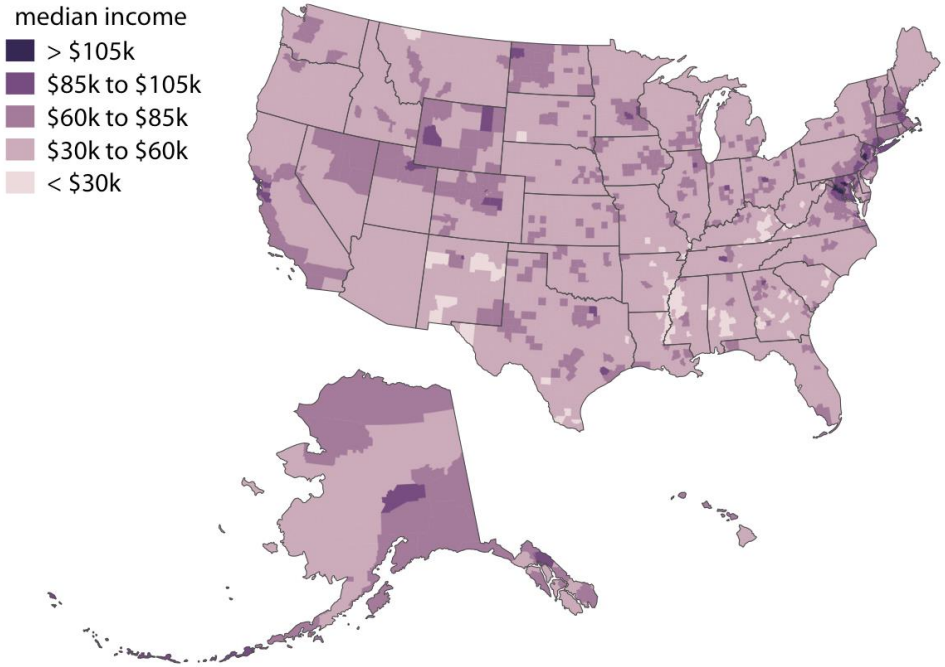


Choropleth mapping is a popular way to display information with maps

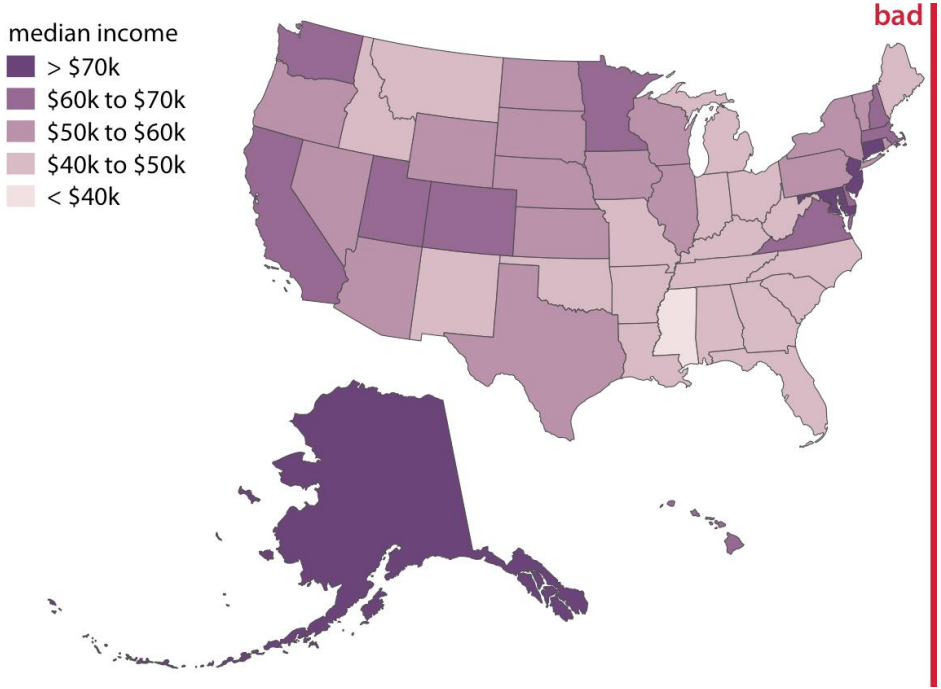
- We want to show how some quantity varies across locations.
- We color individual regions in a map according to the data dimension we display.
- We get *choropleth maps.*



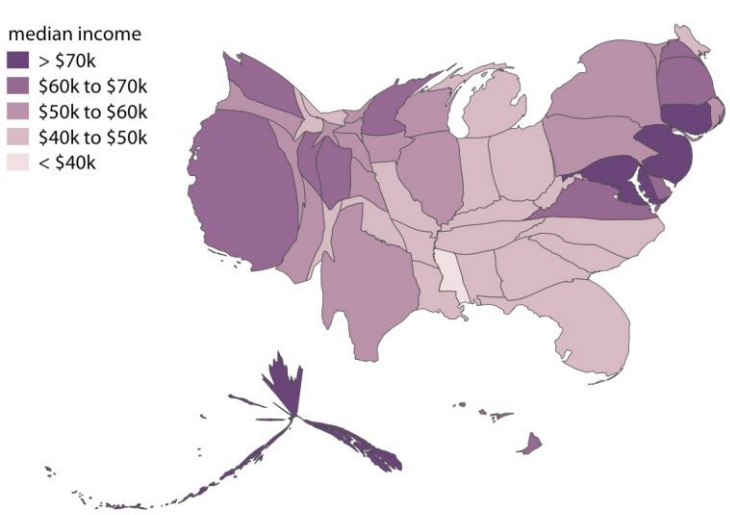
A good idea is to use binned color scale

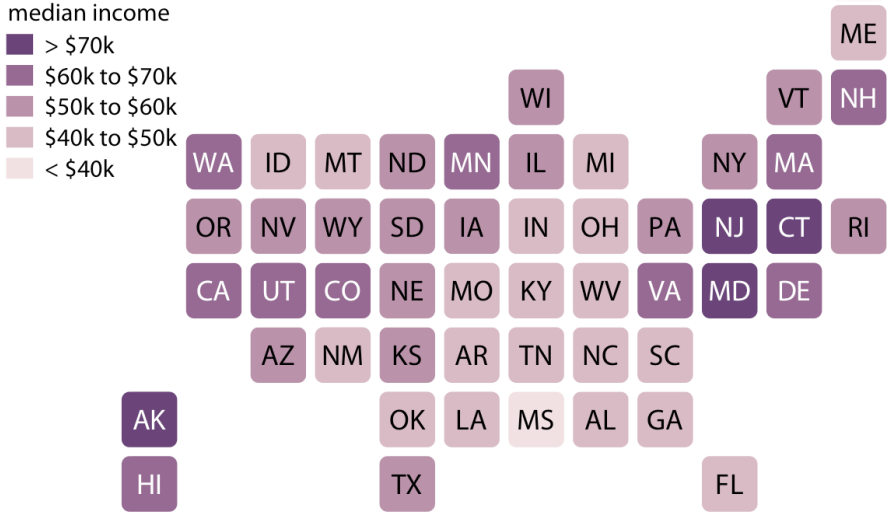


If areas are unequal than perception is wrong

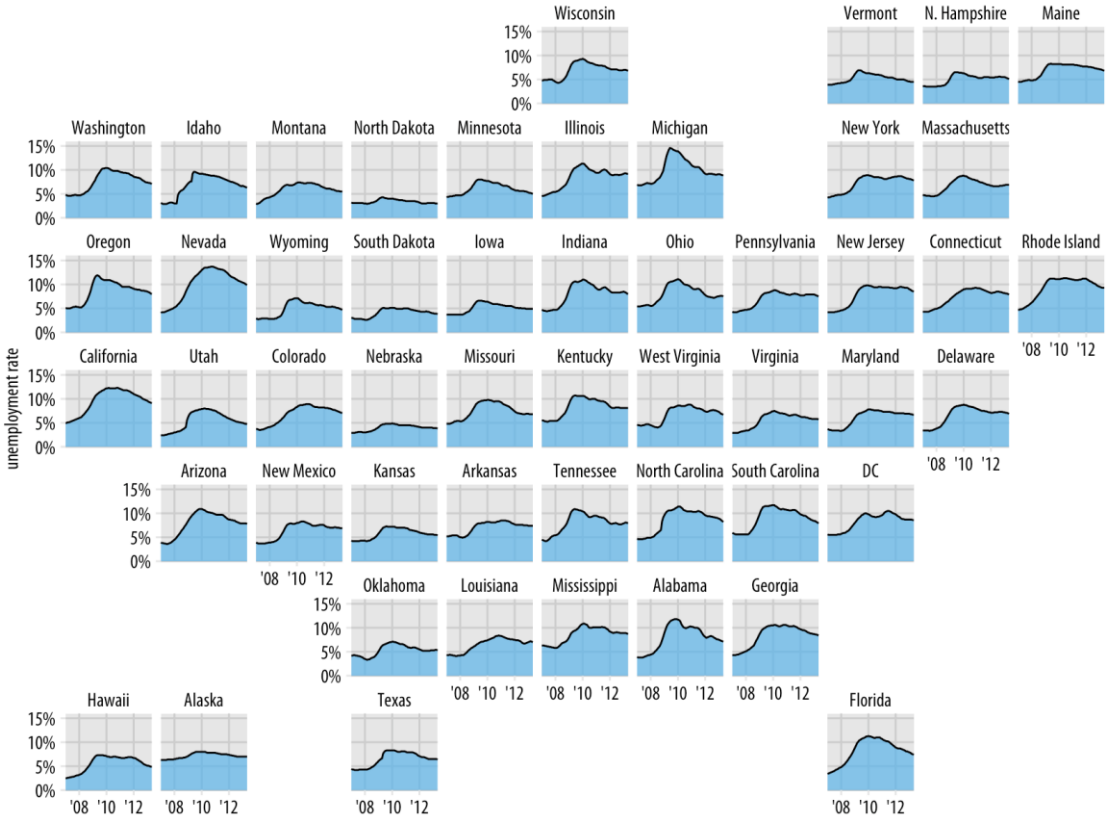


Cartograms work well in this case





Using cartograms we can display more complex concepts



Messages to take home

1. Pay attention to projections issues for maps of large region

2. Keep in mind common principles of visuals design

3. Some specific plot types are more effective in this case