Types of Visualizations (Beyond Numeric/Statistical) Maps

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MAPS

Maps

- One of the oldest types of visualizations
- Common factor is that the layout is related to the actual geography
  - Not necessarily exact positions, though
  - Sometimes relative relationships between regions is all that's important
- Projections (globe to a plane) can play a large role in perception

Map Projections

- Projecting 3D to 2D always gives some distortions

- Many possible projections
  - Conformal:
    - Preserve angles between directions
    - *Locally* accurate (but NOT globally)
  - Equal Area:
    - Preserve measure of regions
  - Equidistant:
    - Preserve distance from some point or line

Choropleth Map

- Specified geographic regions are color-coded
- Each region has a uniform value
- Danger of misrepresentation

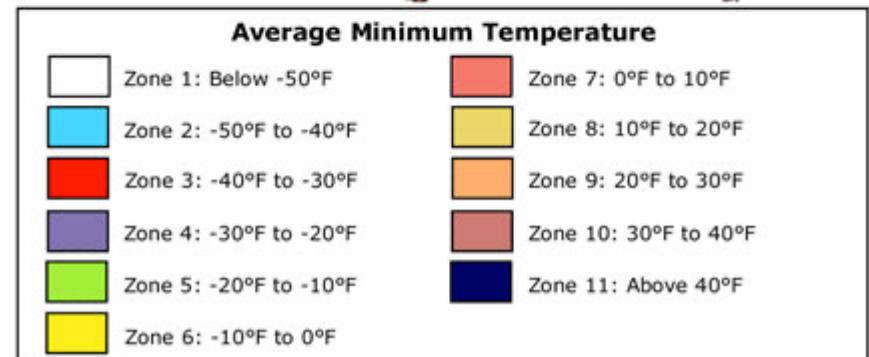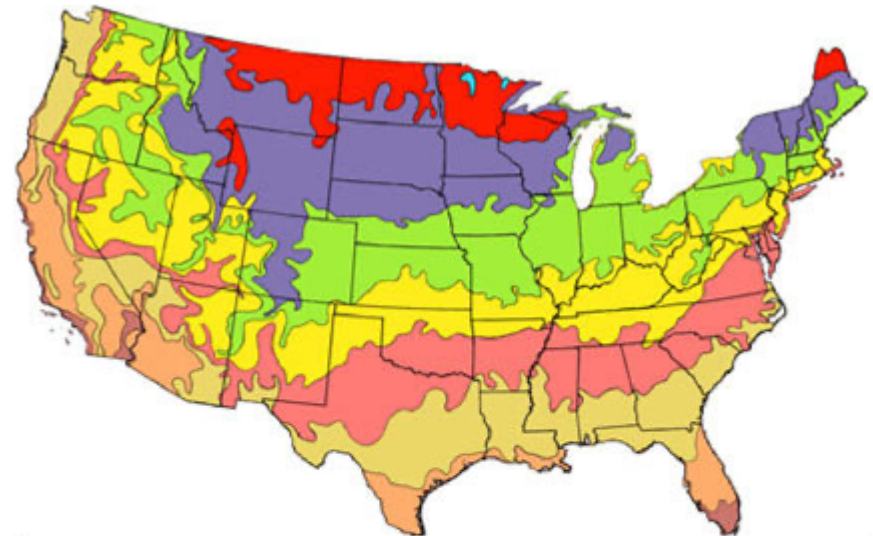
Image from:https://www.infragistics.com/help/reveal/choropleth-map
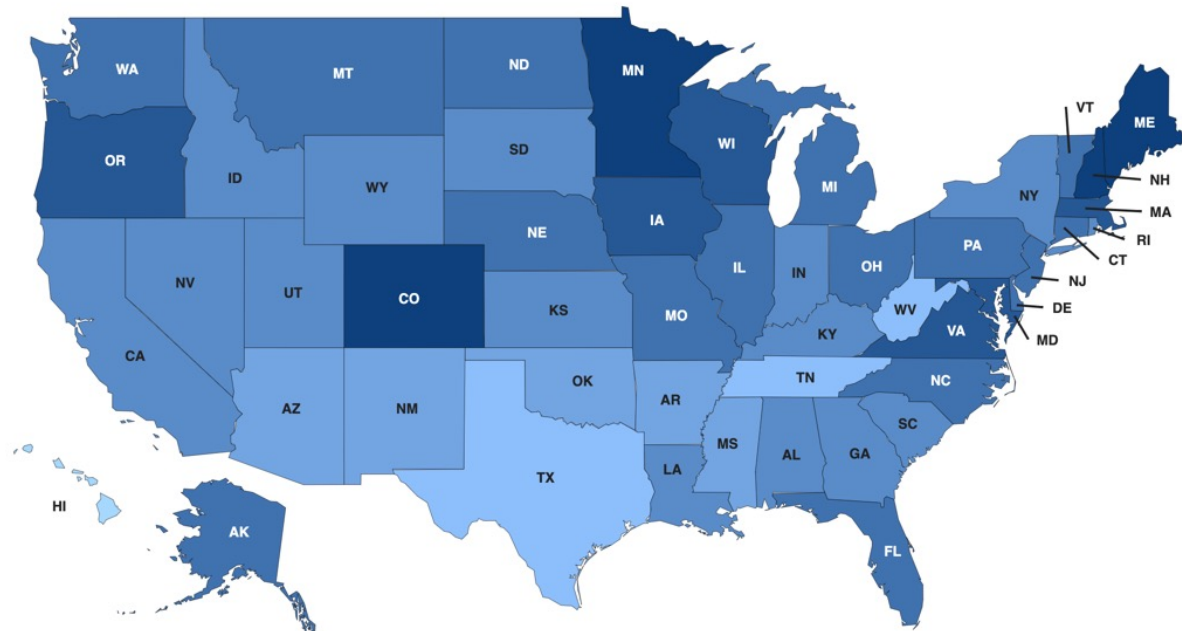
Prism Map

- Regions are displayed as 3D prisms
  - Height corresponds to value
  - Alternative: 3D bar per region
- Issue: occlusion

Manhattan Housing Units

By Census Tract (Source: American Community Survey)

Image from: https://www.caliper.com/maptsamp.htm

Isarithmic Map

- Regions identified that cross geopolitical boundaries

- Can be categorical data or numerical

- Numerical data can be binned (histogram) or smoothly interpolated

Average Minimum Temperature

Zone 1: Below -50°F	Zone 7: 0°F to 10°F
Zone 2: -50°F to -40°F	Zone 8: 10°F to 20°F
Zone 3: -40°F to -30°F	Zone 9: 20°F to 30°F
Zone 4: -30°F to -20°F	Zone 10: 30°F to 40°F
Zone 5: -20°F to -10°F	Zone 11: Above 40°F
Zone 6: -10°F to 0°F	

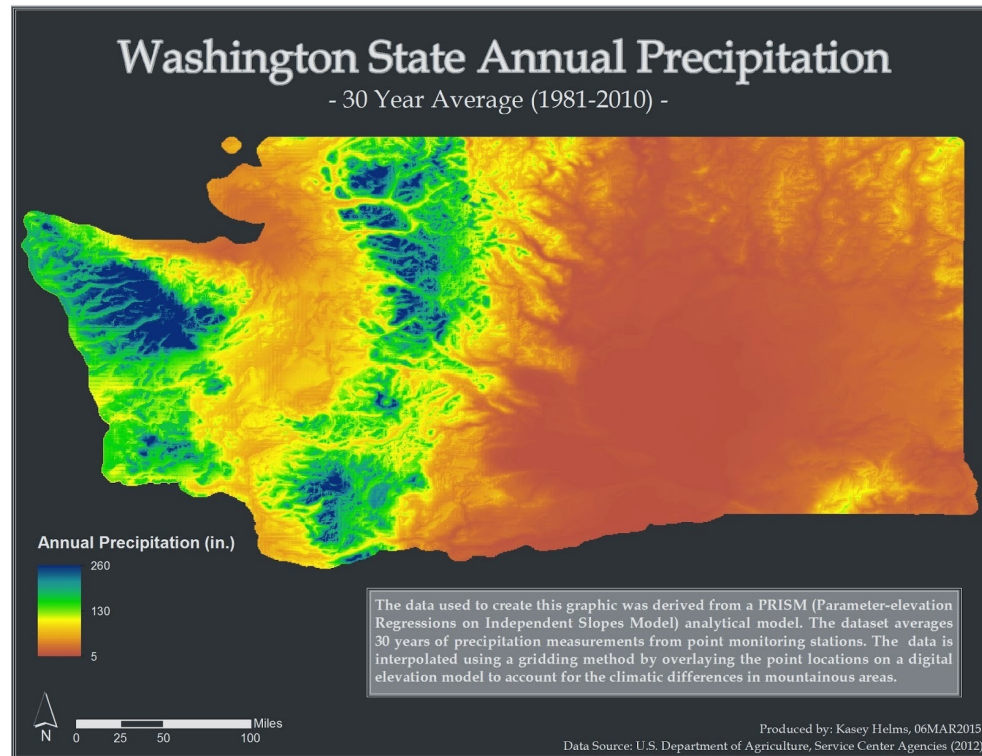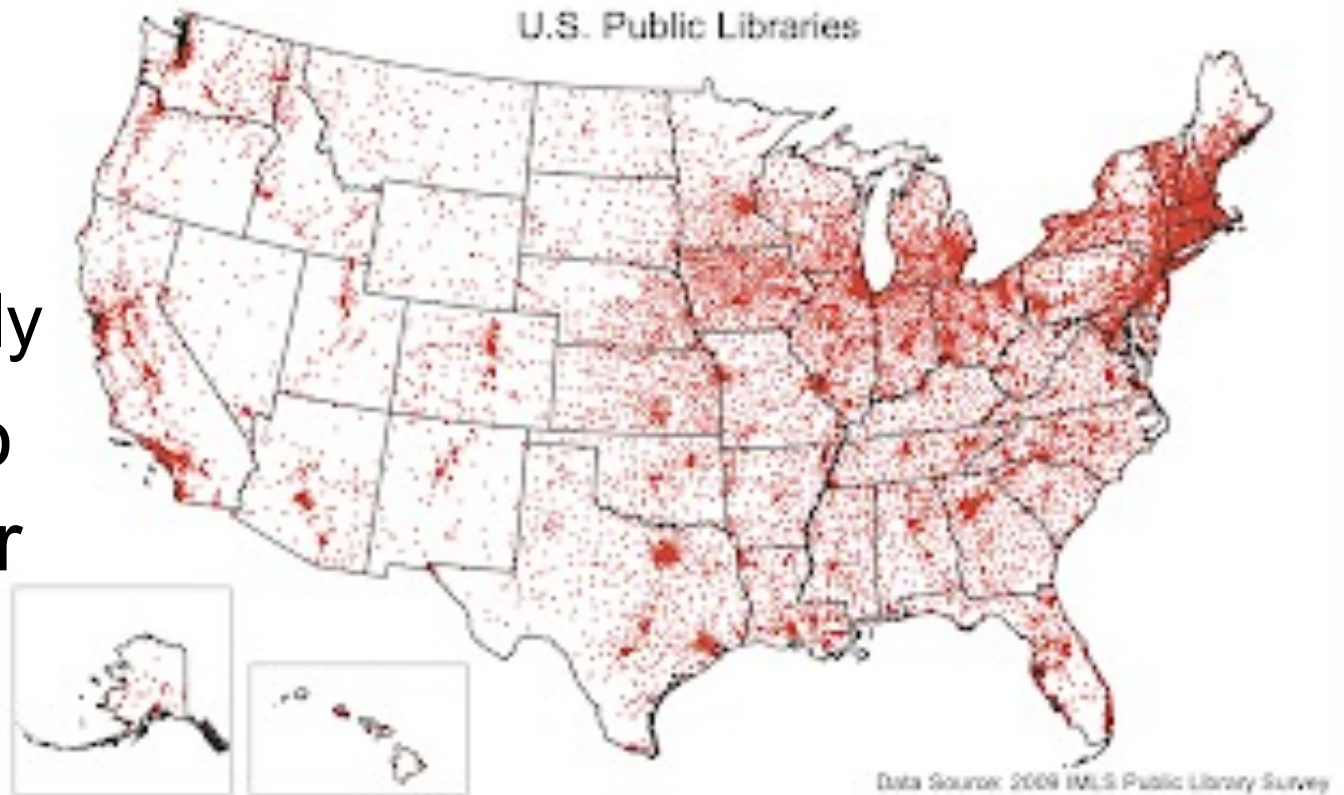Image from: https://freezoysiagrassplugs.com/shipping.html

Isarithmic Map

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Image from: https://kmh76.blogspot.com/2015/03/module-8-isarithmic-maps.html

Dot Map

- Dot per instance
  - Shows density naturally

- Can also use color for dots

U.S. Public Libraries

Data Source: 2009 IMLS Public Library Survey

Image from: https://moslermaps.blogspot.com/2013/07/dot-distribution-map.html

Dot Map

- Dot per instance
  - Shows density naturally
- Can also use color for dots

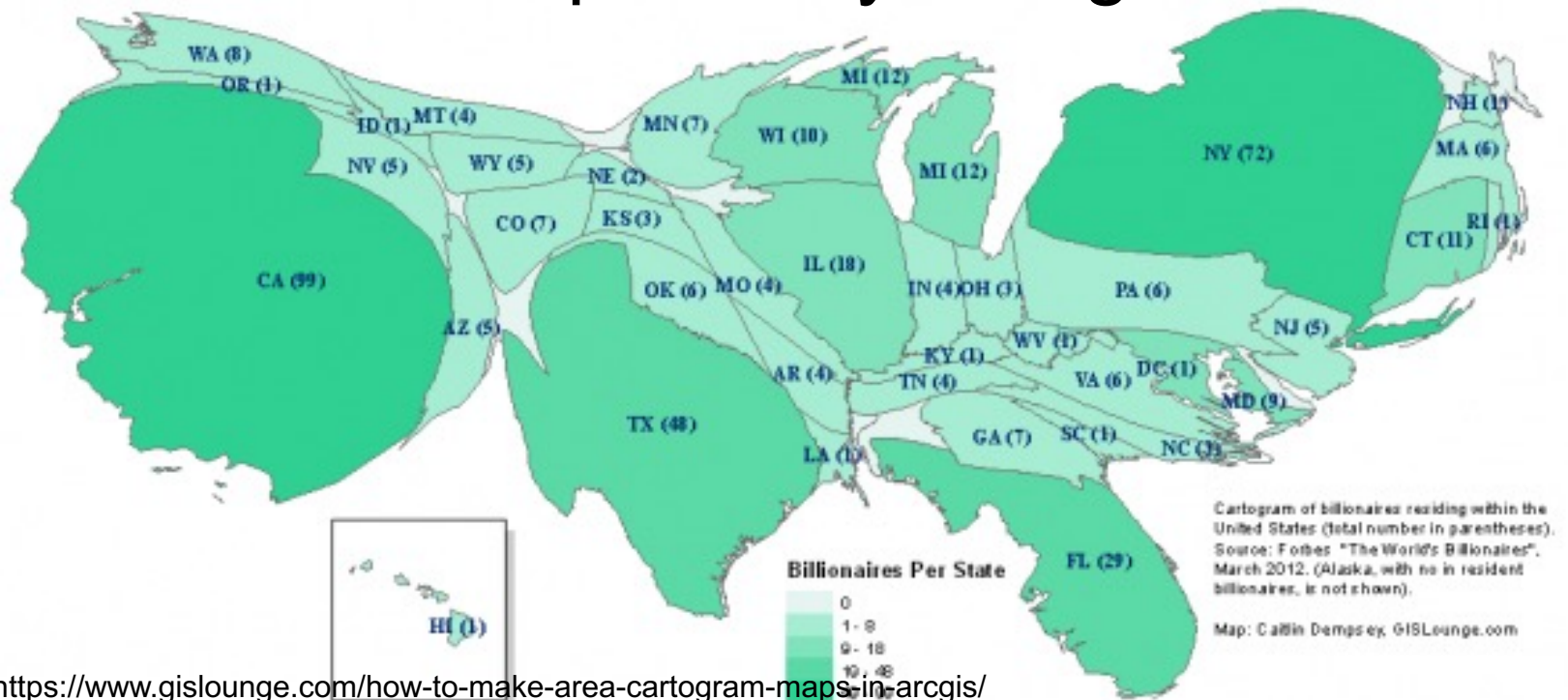Image from: https://www.6sqft.com/colorful-dot-maps-paint-a-picture-of-immigration-in-the-u-s/
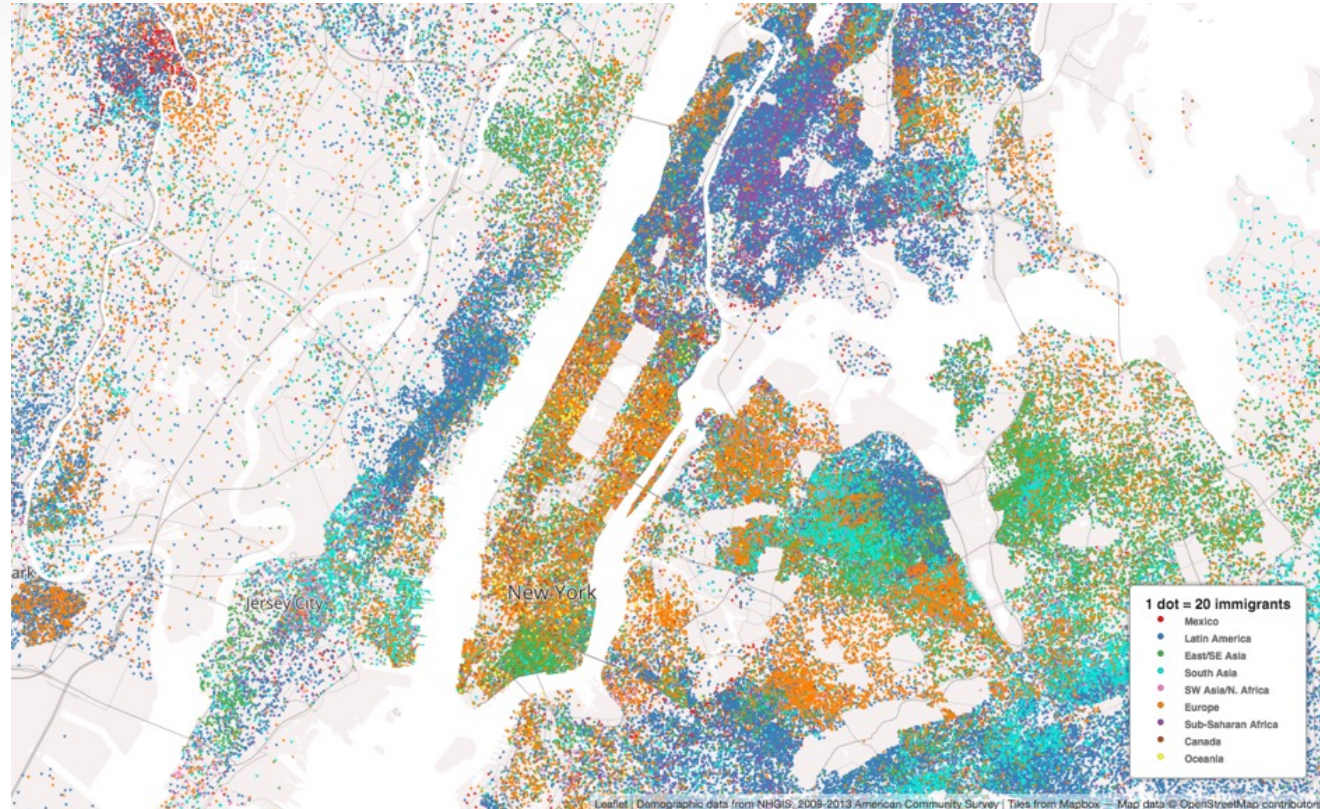
Flow Map

- Shows movement from one geographic region to another

- Uses arrows to show flow

- Width of arrows shows amount

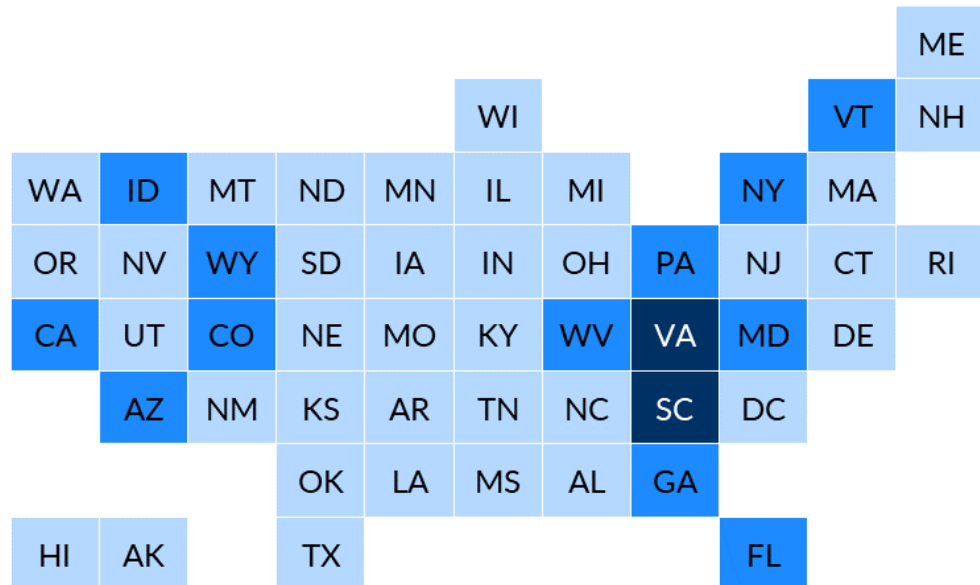WORLDWIDE IMMIGRATION TO THE UNITED STATES BY REGION
NUMBER OF IMMIGRANTS IN 2007

NORTH AMERICA

EUROPE

ASIA

120,821

339,355

94,711

383,508

6,101

AFRICA

106,525

SOUTH AMERICA

OCEANIA

Percent of Total Immigrants Per U.S. State

0.0 - 1.99 %   2.0 - 4.99 %   5.0 - 9.99 %   10.0 - 19.99 %   20.0 - 22.0 %

N

0   2,500   5,000   10,000
Kilometers

Projection: Winkel Tripel
Data Source: U.S. Dept. of Homeland Security's Office of Immigration Statistics

Date: 3/13/2016
Cartographer: Melissa Thrush

Image from:http://melissathrush.blogspot.com/2016/03/flow-line-mapping.html

Area Cartogram

- Adjust area to reflect value
- Can also use color
- Maintain relative proximity of regions

Image from:https://www.gislounge.com/how-to-make-area-cartogram-maps-in-arcgis/

Grid Map

- Use squares/ hexes to define region

- Color code grid values

Image from: https://depictdatastudio.com/charts/tile-grid-and-hex-maps/

Grid Map

- Use squares/ hexes to define region

- Color code grid values

Democratic District

Republican District

Image from: https://218and51.com/dungeons-dragons-meets-congressional-geography/
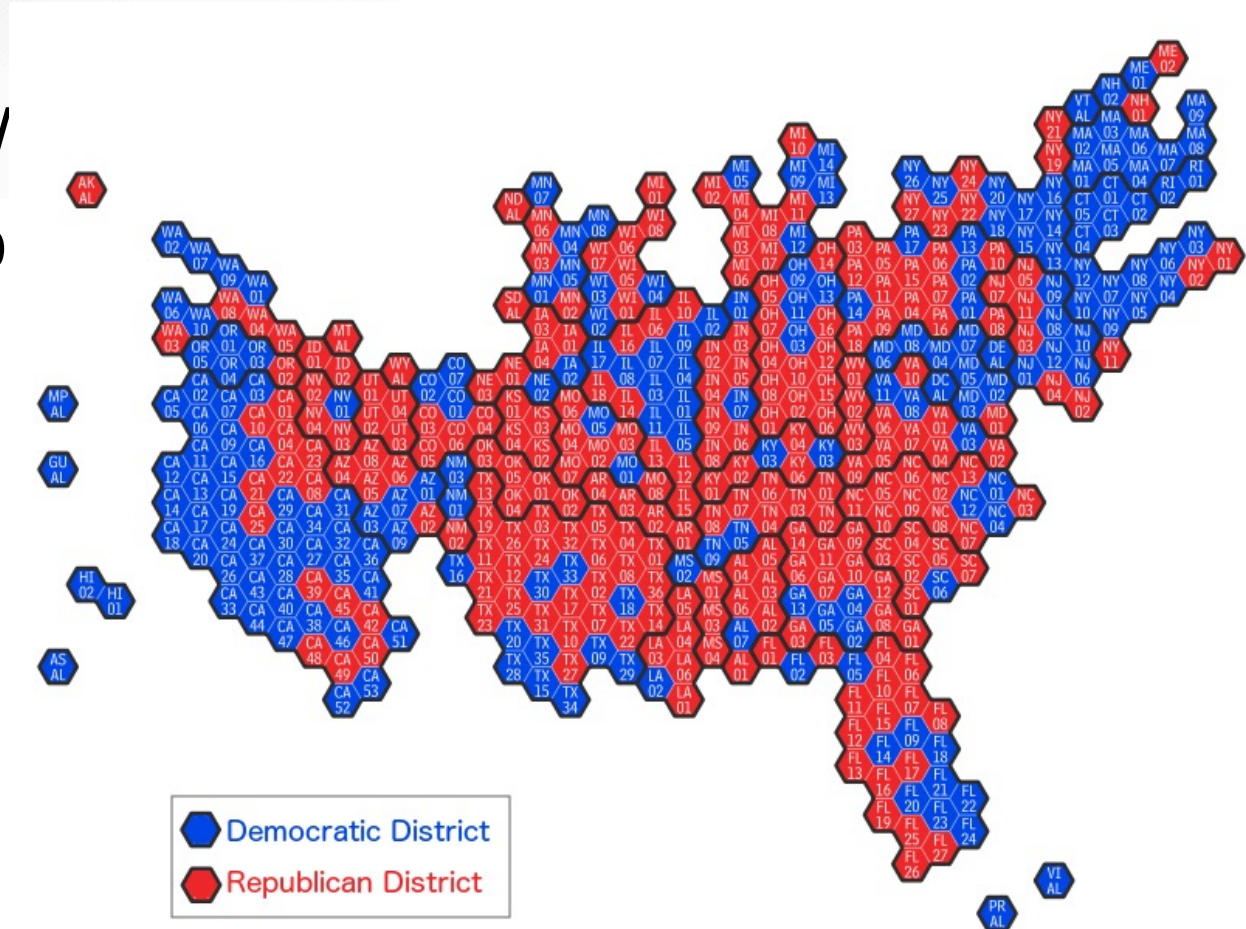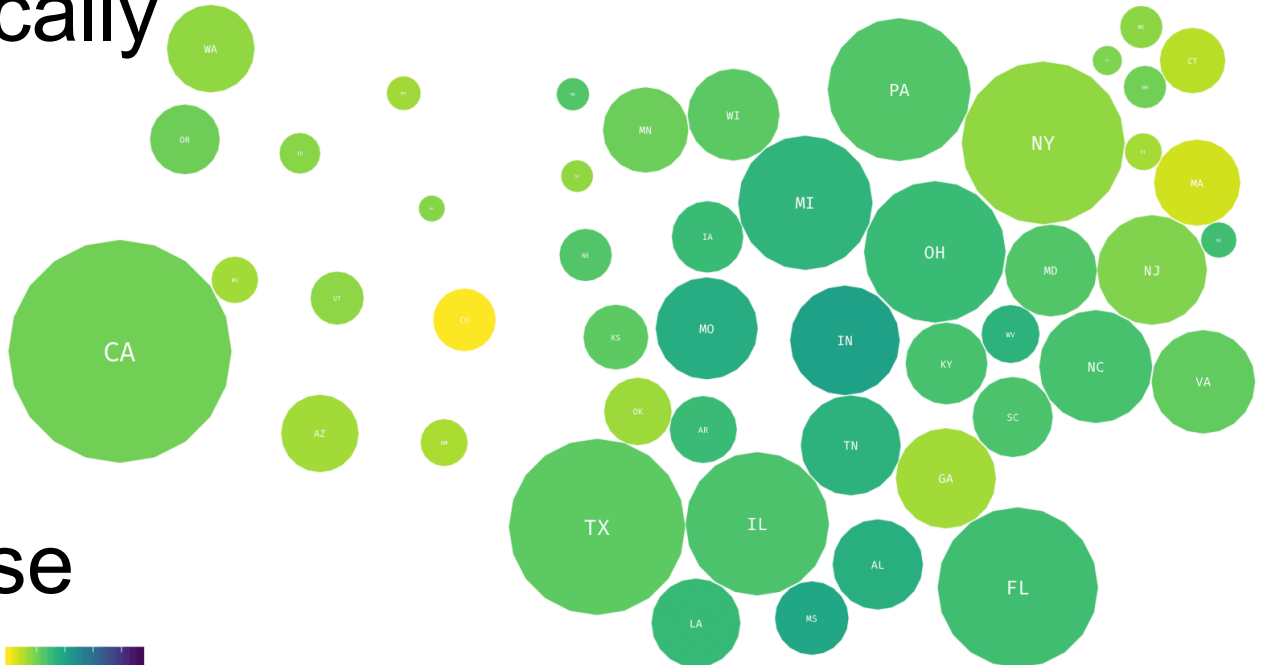
Proportional Symbol Map

- Symbols are used to display information
  - Generally size indicates value
  - Could encode more information
- Locations of symbols are geographically centered

European Forestry Production by Country, 2006

Forestry Production in million cubic meters

Image from: http://enb-2011f-jp.blogspot.com/2011/09/proportional-symbol-map.html
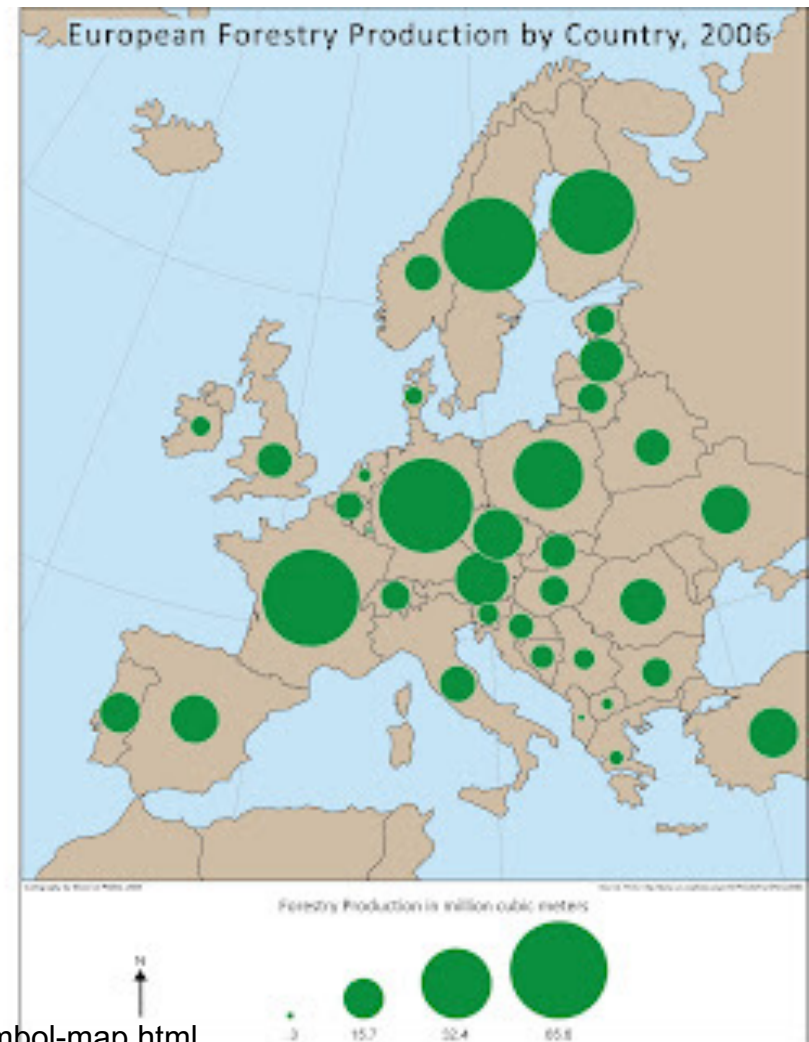
Dorling Cartogram

- Area of circle represents value
  - Can also use color to encode information

- Geographically located

- Can adjust location to ensure fit

- Demers: use squares

Image from:https://rud.is/b/2018/06/03/hello-dorling-creating-dorling-cartograms-from-r-spatial-objects-introducing-prism-skeleton/

Comparison

Image from: https://geography.name/cartogram/