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FIT3179 Data Visualisation

Week 08: Main Points

Dr Grace Ting Chai Wen



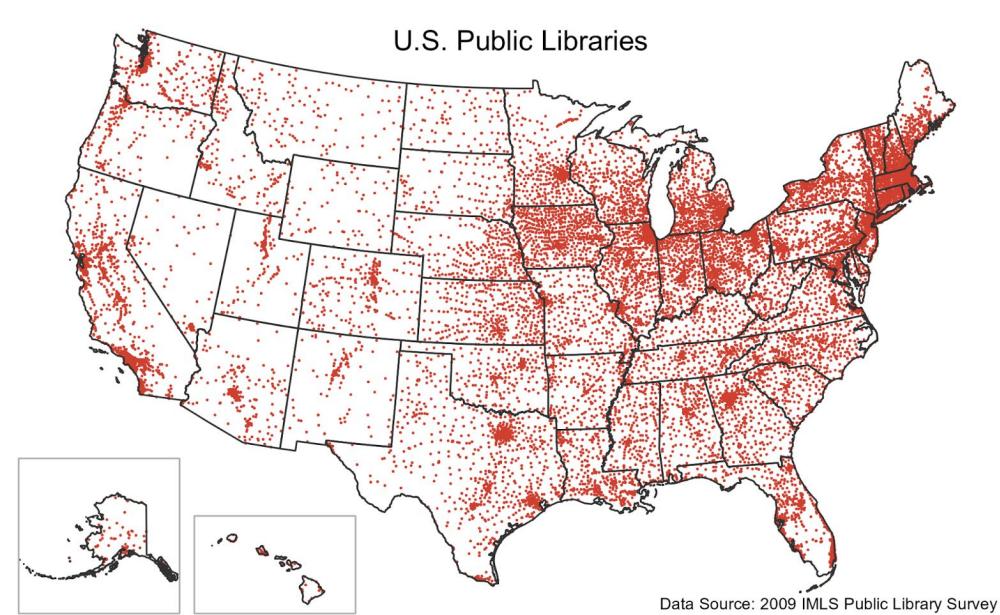
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Map Visualisations

- **Dot Maps**
- **Proportional Symbol Maps**
- **Choropleth Maps**
- **Bin Maps**

- show spatial distribution (**where** located) & **density**
- geographical **points** or regions, a point could represent n observations (quantitative attribute) for that region
 - e.g. if $n = 100$ cases and a region has 300 cases then draw 3 points in that region

<http://moslermaps.blogspot.com/2013/07/dot-distribution-map.html>

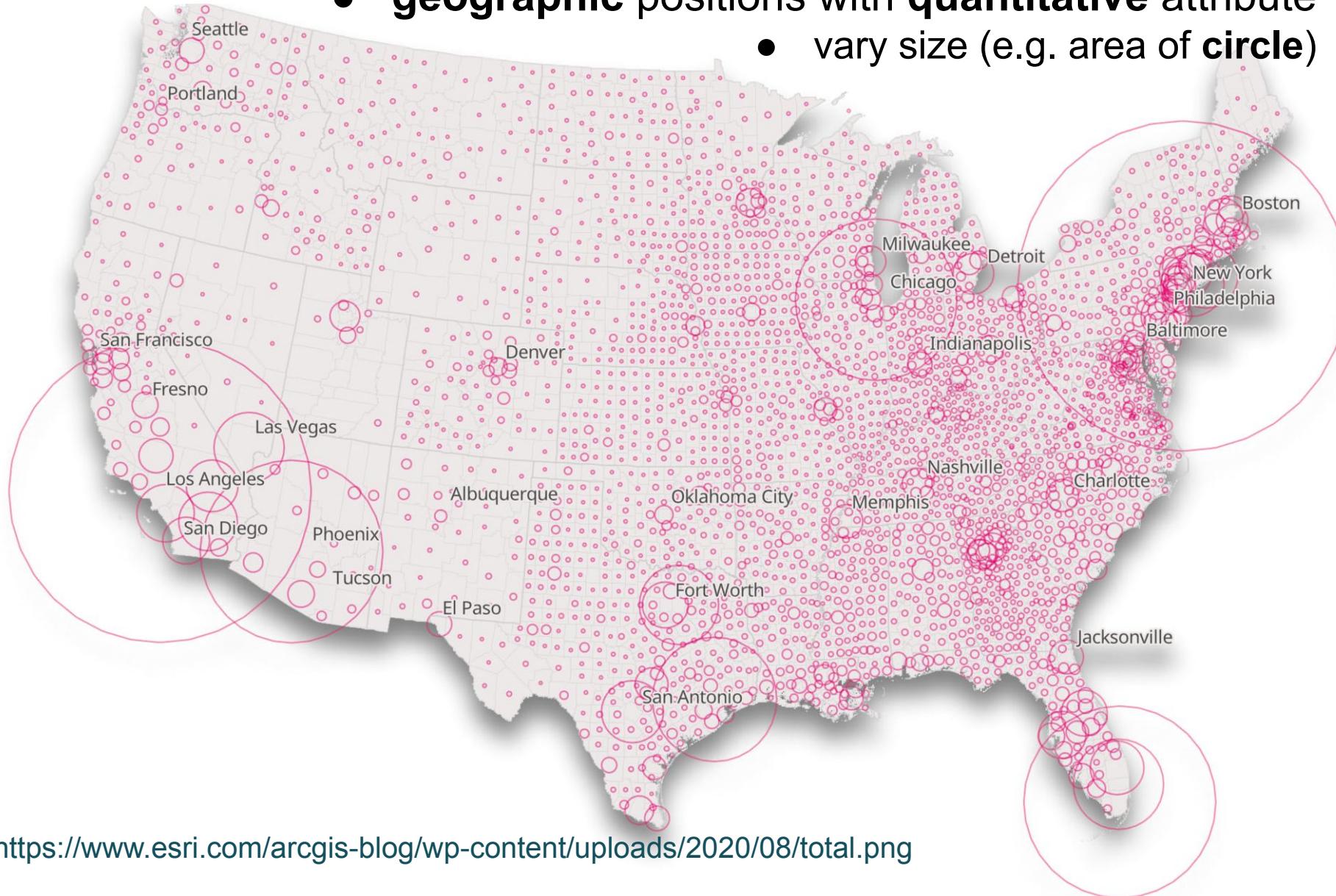


Proportional Symbol Maps



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- geographic positions with **quantitative** attribute
 - vary size (e.g. area of circle)



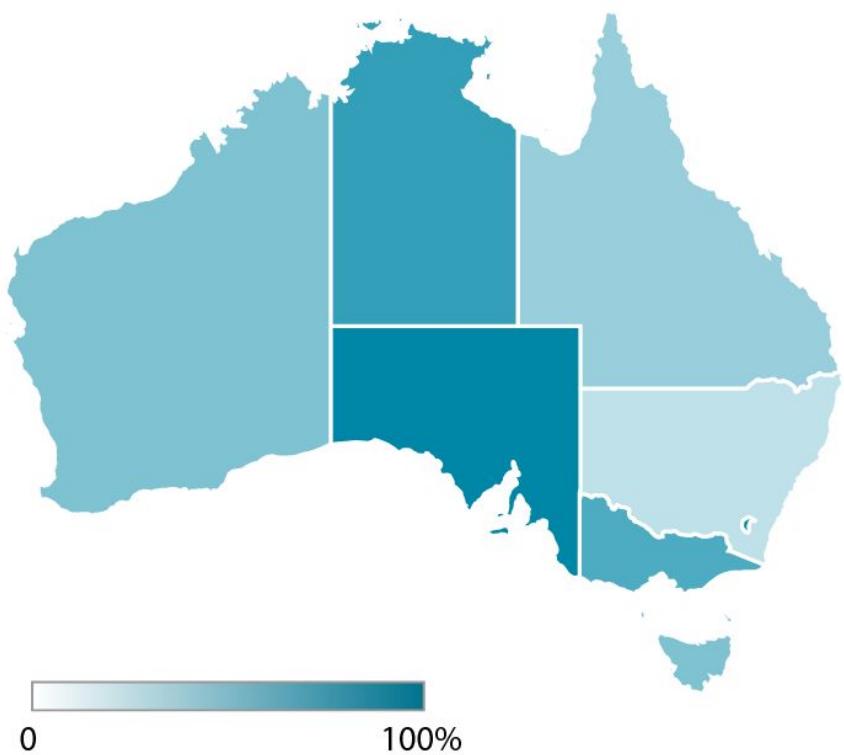
Proportional Symbol Maps

- geographic positions with **quantitative** attribute
- vary size (e.g. length of bar)

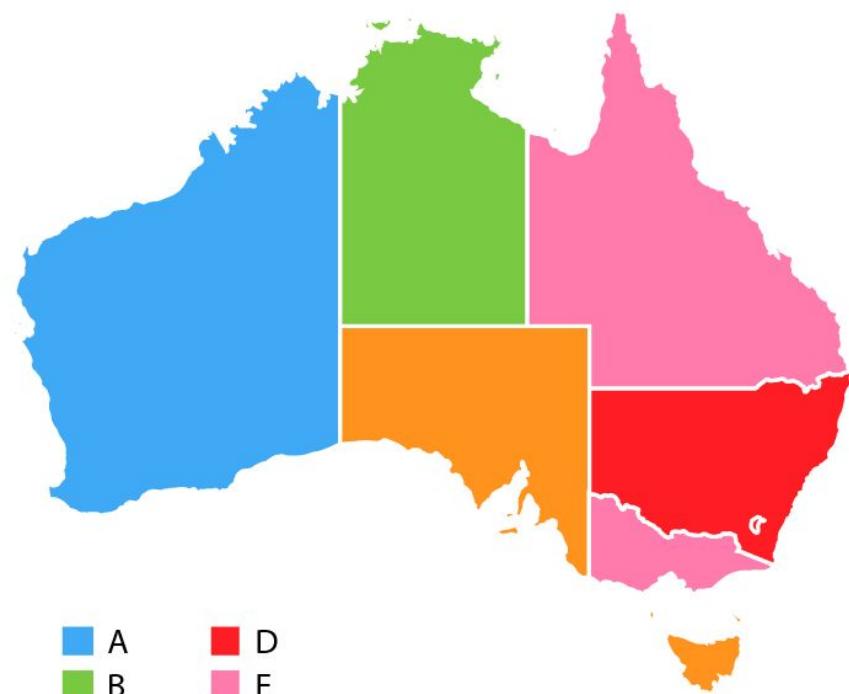


- very simple
- have **areas**/regions
- areas have **colour** which encodes
 - **quantitative** attribute: luminance
 - **categorical** attribute: hue

Quantitative



Categorical



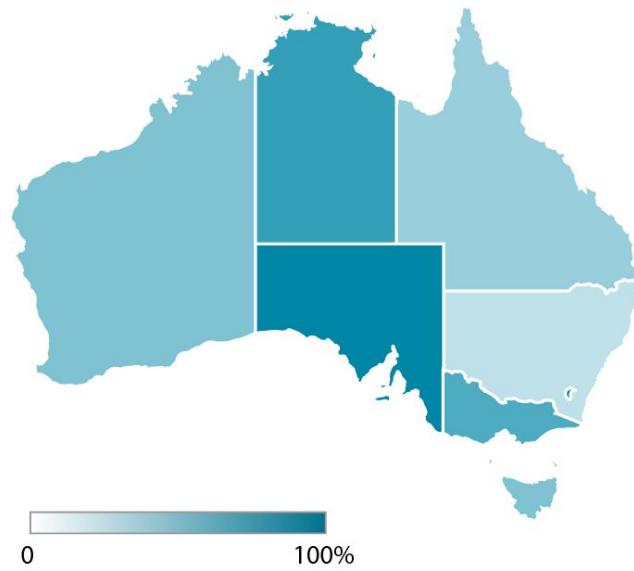
Left: vary the luminance (quantitative attribute)

Right: change the hue (categorical attribute)

Choropleth rule

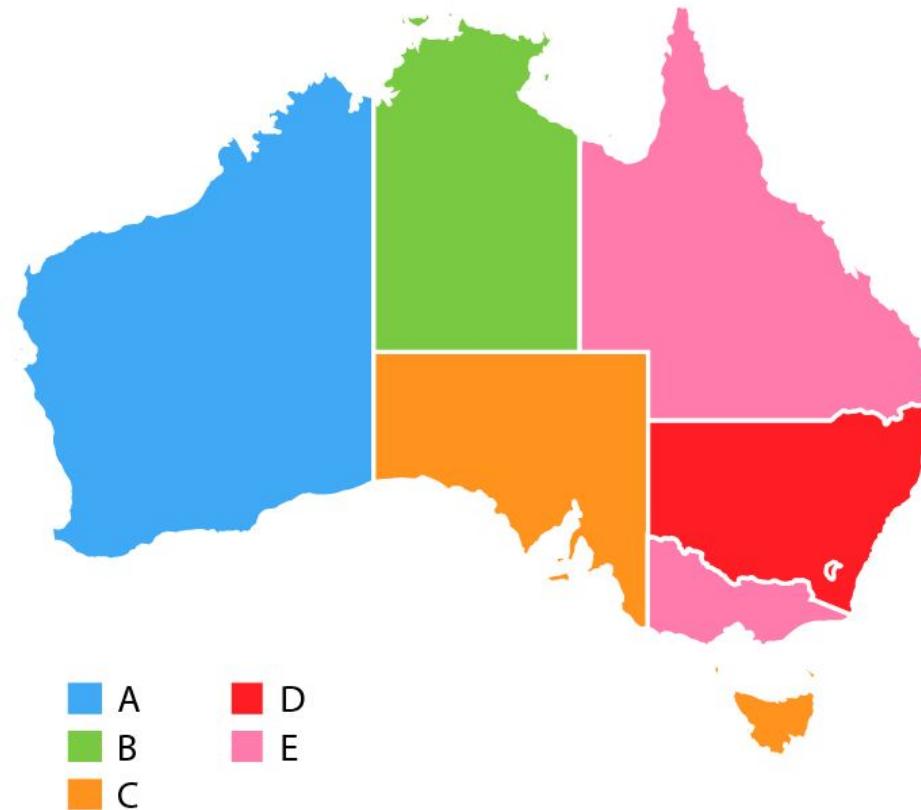
Generally do **not** map **raw** values, but

- normalise values by area if possible
- use **percentages** otherwise



- Primarily **luminance** or saturation changes [Munzner]: the higher/lower the value, the darker/whiter
 - that's just how our brain works
 - but cannot too many steps: else we cannot differentiate
- Slight change in **hue** is possible, but has mainly aesthetically function. Change hue for diverging distributions / categorical

Rule: Colour for Categorical Choropleth Maps



- Primarily hue changes, no implicit order

- What data **type** is mapped (quantitative, ordered, categorical)?
- If the data is **quantitative**, is it normalised?
- **Which** colour components (hue, saturation, **luminance**) vary?
- Is the colour **choice** appropriate for the **type** of data?
- Are the class breaks/range and the legend **logical**?



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Terrain Visualisations

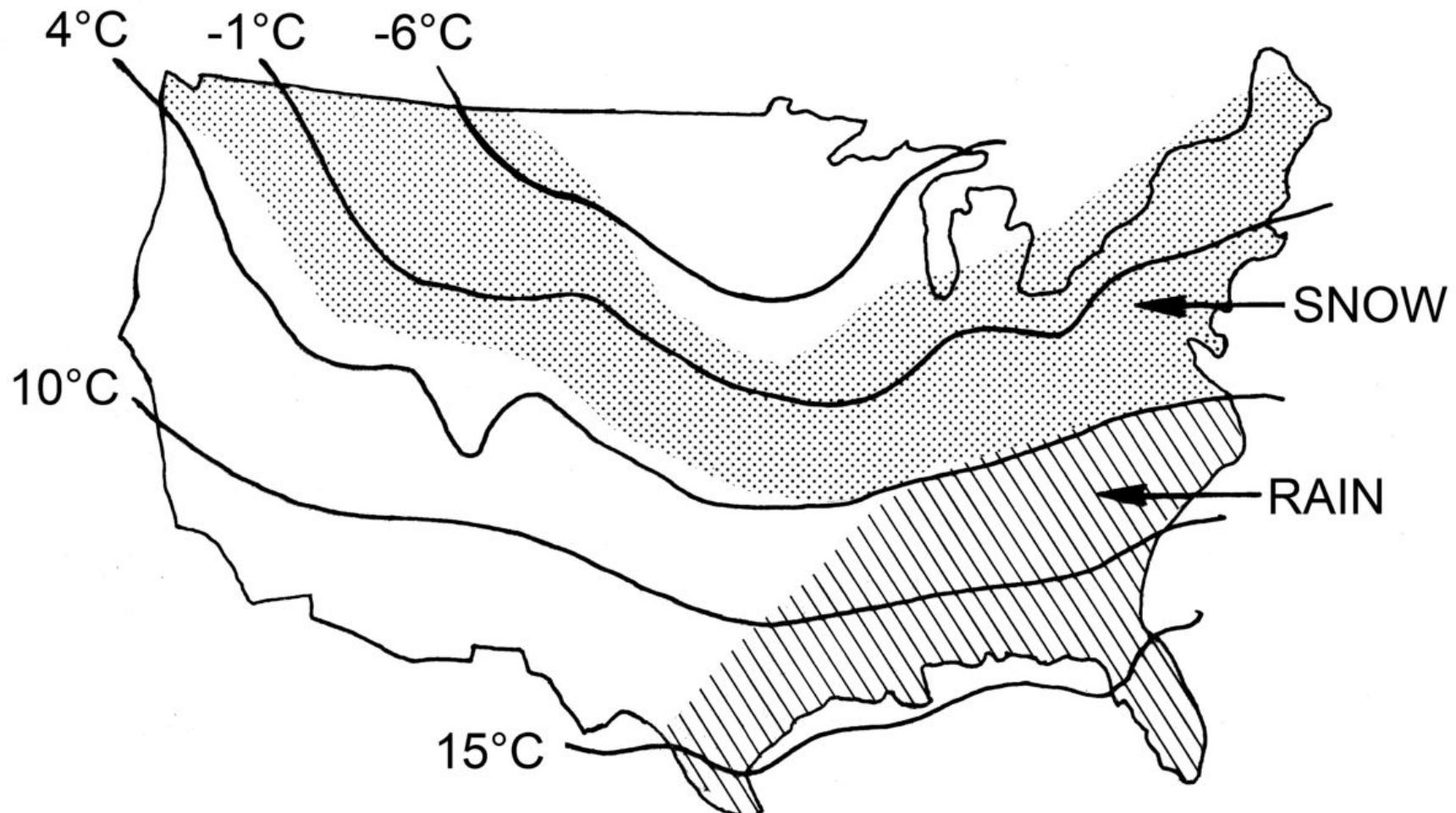
Terrain Visualisations:

Isolines, Scalar fields, Shaded relief

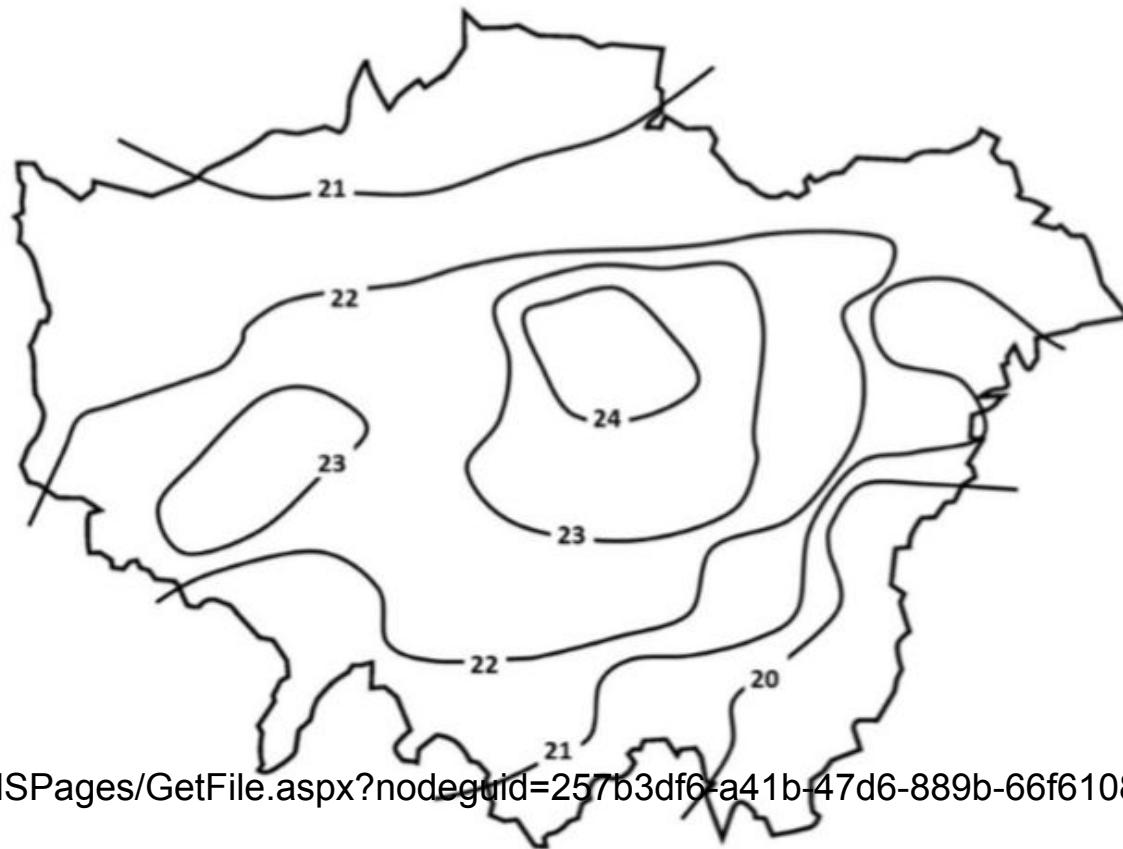
- **Isoline** map

- show numerical data using maps/geography
- relates geography of area with collected data
- draw isolines connecting points of same data value

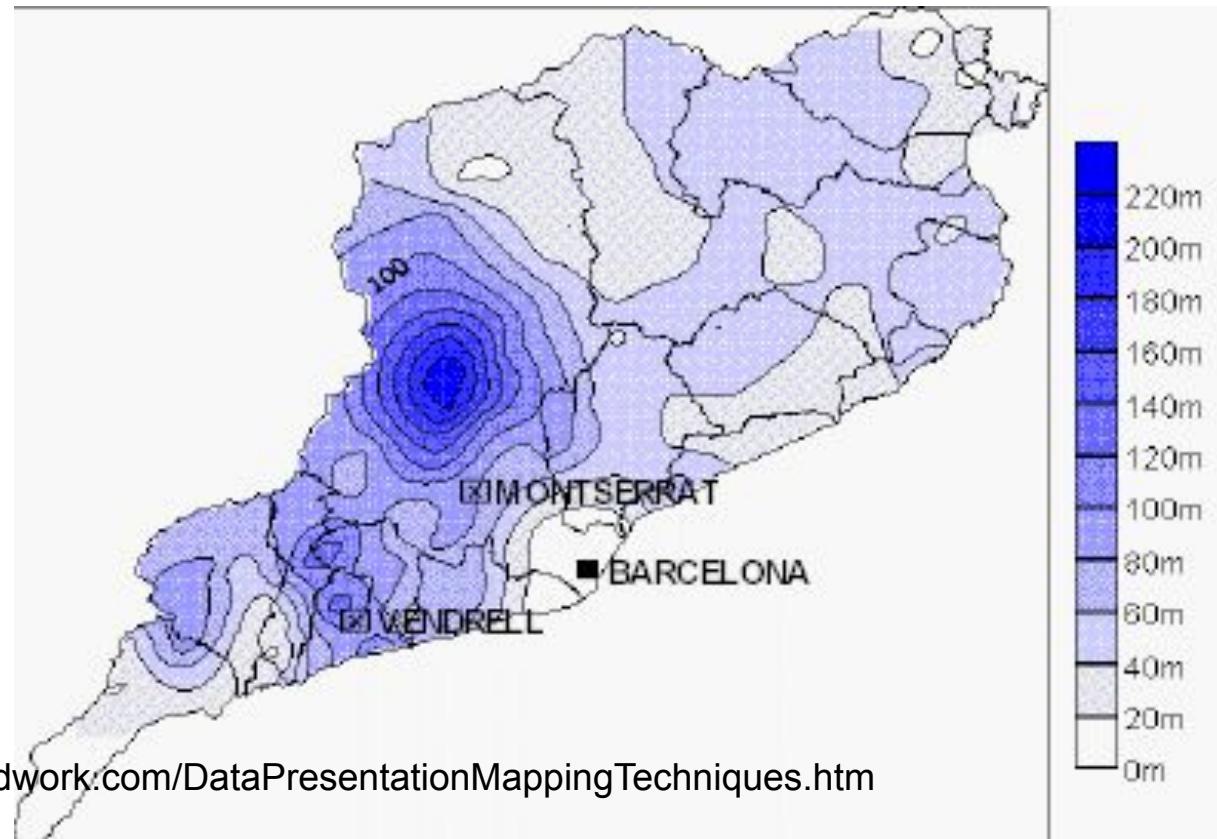
- e.g. Isotherm map
 - isolines connecting points of same temperature



- e.g. **contour line**
 - isoline where the data is height



- e.g. **isopleth** map
 - draw isolines
 - then fill range with similar colour or pattern
 - can show gradual change, vs only using boundary lines



- use colour to show value of data sensed from 2D field of geographical area

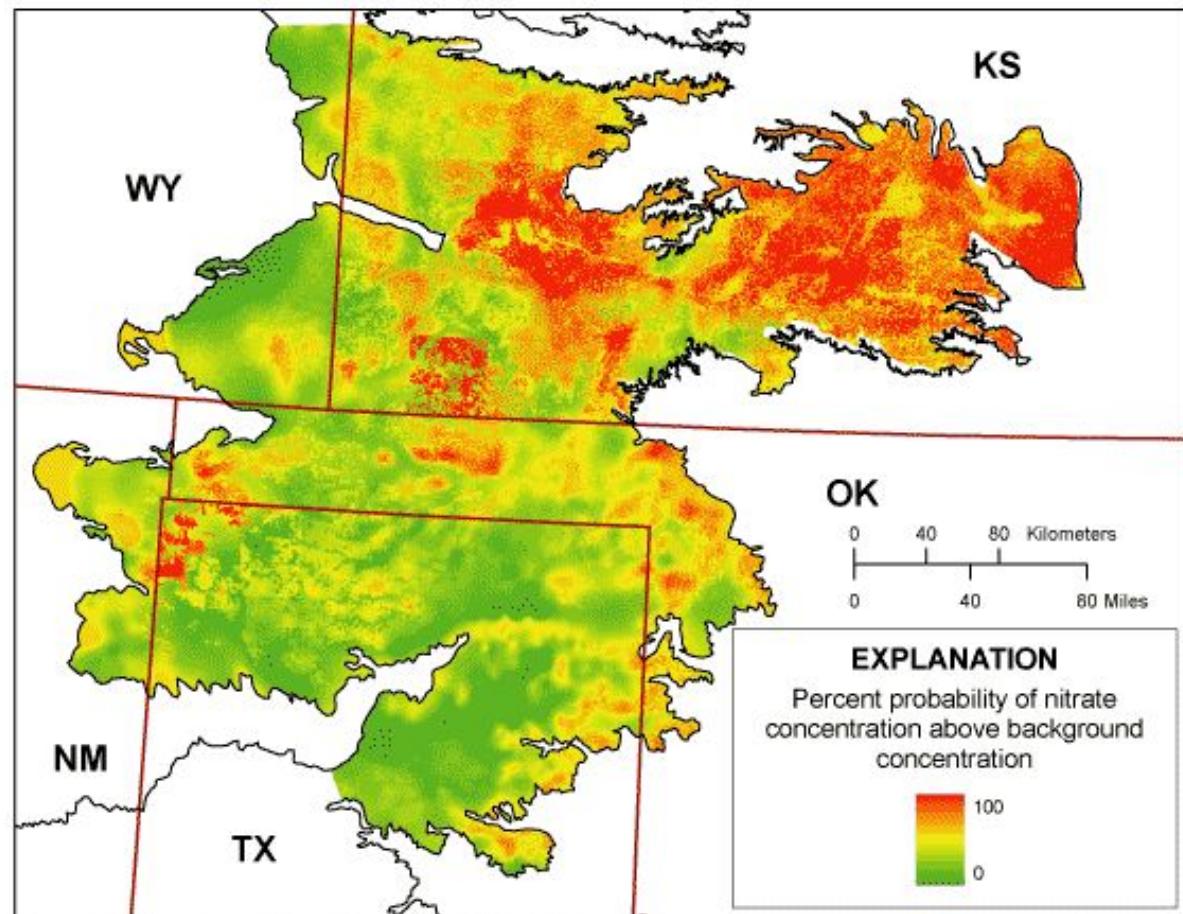


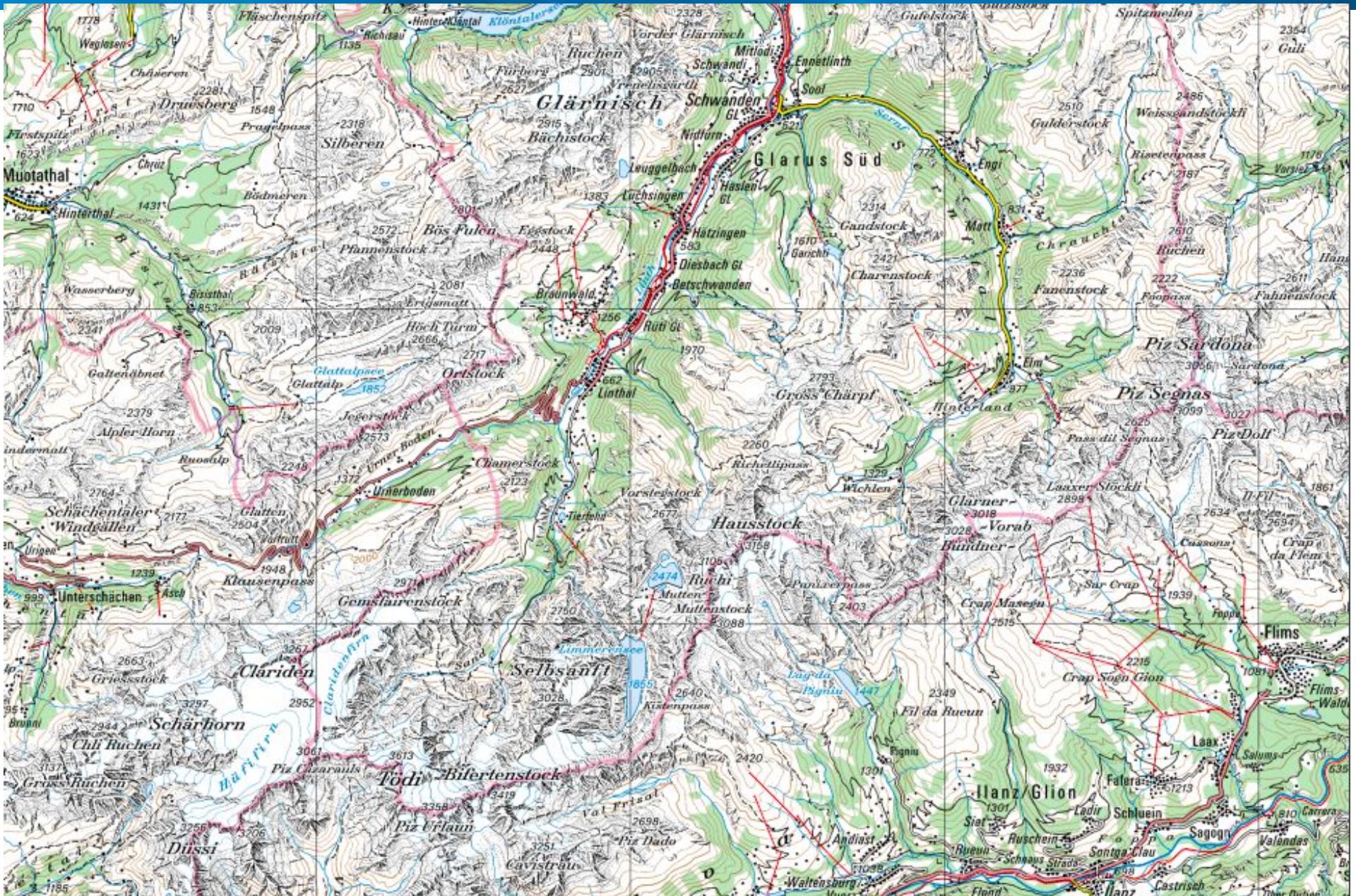
Figure 7. The vulnerability of the central High Plains aquifer to nitrate contamination expressed as a percent probability (the probability data calculated from the probability equation multiplied by 100) of nitrate concentrations in groundwater exceeding a selected threshold concentration (4 milligrams/liter).

- show elevation (variation in height above sea level)



https://www.123rf.com/photo_10768790_australia-shaded-relief-map-with-major-urban-areas-surrounding-territory-greyed-out-colored-according.html

Shaded relief- combined with contour lines and color



Shaded relief



Combination: shaded relief + contour lines



Comparing contours, shaded relief and colour mapping

	+	-
Contour lines	values can be extracted	difficult to read, difficult to extract overview, problematic with very steep and very flat sections
Shaded relief	small details and large forms are both easy to read	only graphical impression, no absolute values can be extracted
Colour mapping	good for showing overview	only approximate values can be extracted. On maps: commonly used green colour for lower areas can be mistaken for landcover.