thematic maps

adam okulicz-kozaryn

adam.okulicz.kozaryn@gmail.com

this version: Thursday 8th February, 2018 16:10

outline

misc

basics again

basic descriptive statistics

thematic mapping

classification methods

thematic mapping

heatmaps

layers-properties: labels and metadata

outline

how is qgis so far?

- what doesn't work?
- what shall i cover more/again?

outline

variable definitions...

- be very clear about what you are measuring
  - put it either on the map, or into metadata, or into "codebook" or into appendix
  - but have to have it somewhere !
  - eg do we have small breweries that are at some bars ? how exactly is a brewery defined ?
  - eg what is exactly a bike lane–do we include paths in parks? does it have to be designated for bikes only ?

map labeling

- must have a legend
- must have a self explanatory title/caption
- self-explanatory means that if I give it to a random person that person will understand what is it about
- in other words it will pass "a grandma test"
  - give it to your grandma and she must be able to understand it
  - if she doesn't, then it isn't clear enough

questions

- a question was how to deselect features:
  - there is a tool with red color for deselecting
  - let's select and deselect something

outline

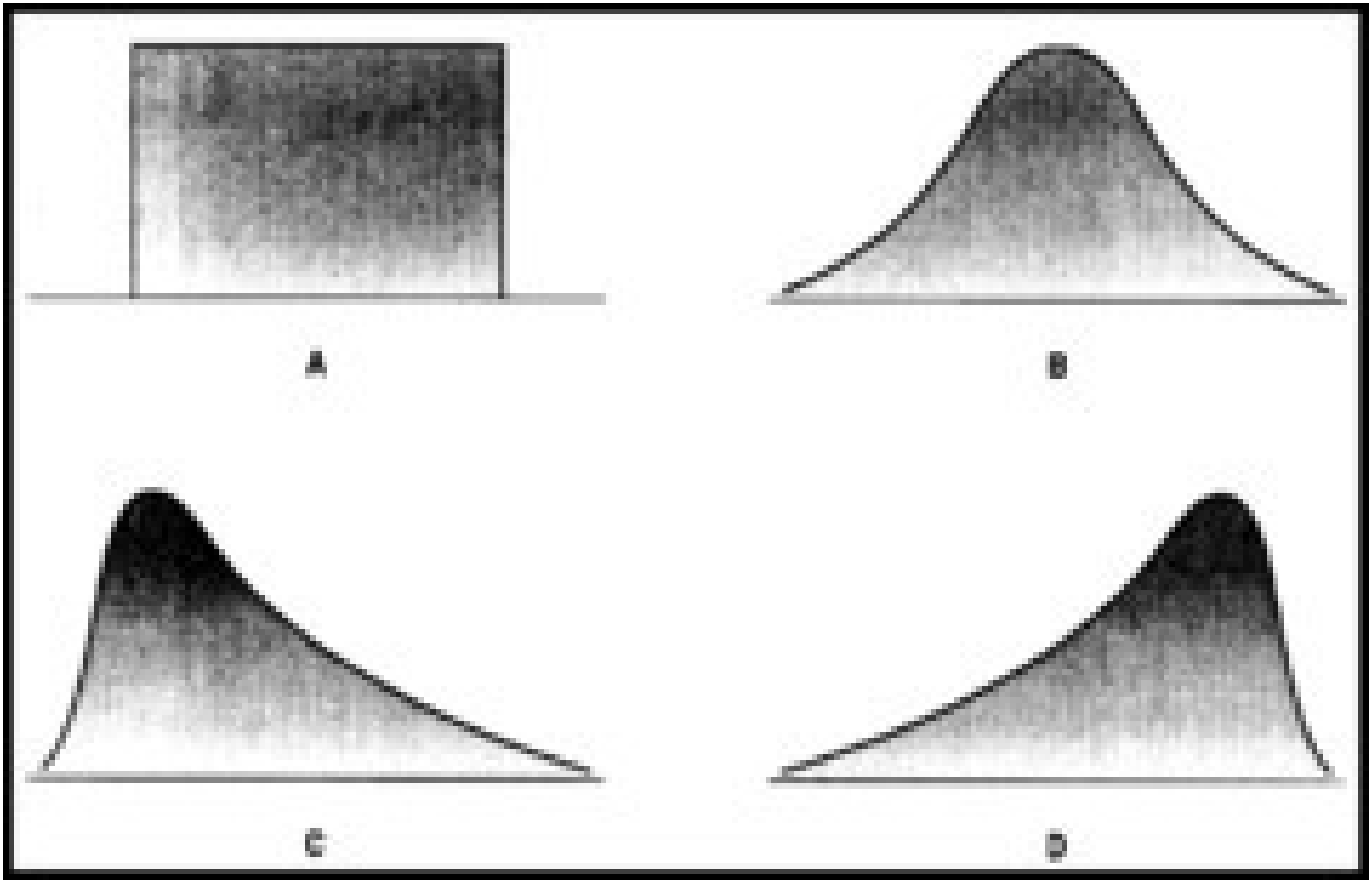
why? it's a gis class

- important to know a little for understanding thematic mapping
- again, thematic mapping is about classifying values into bins
- it all depends on how the vales are distributed
- you need to know something about distributions
- again: Properties-Style-histogram tab

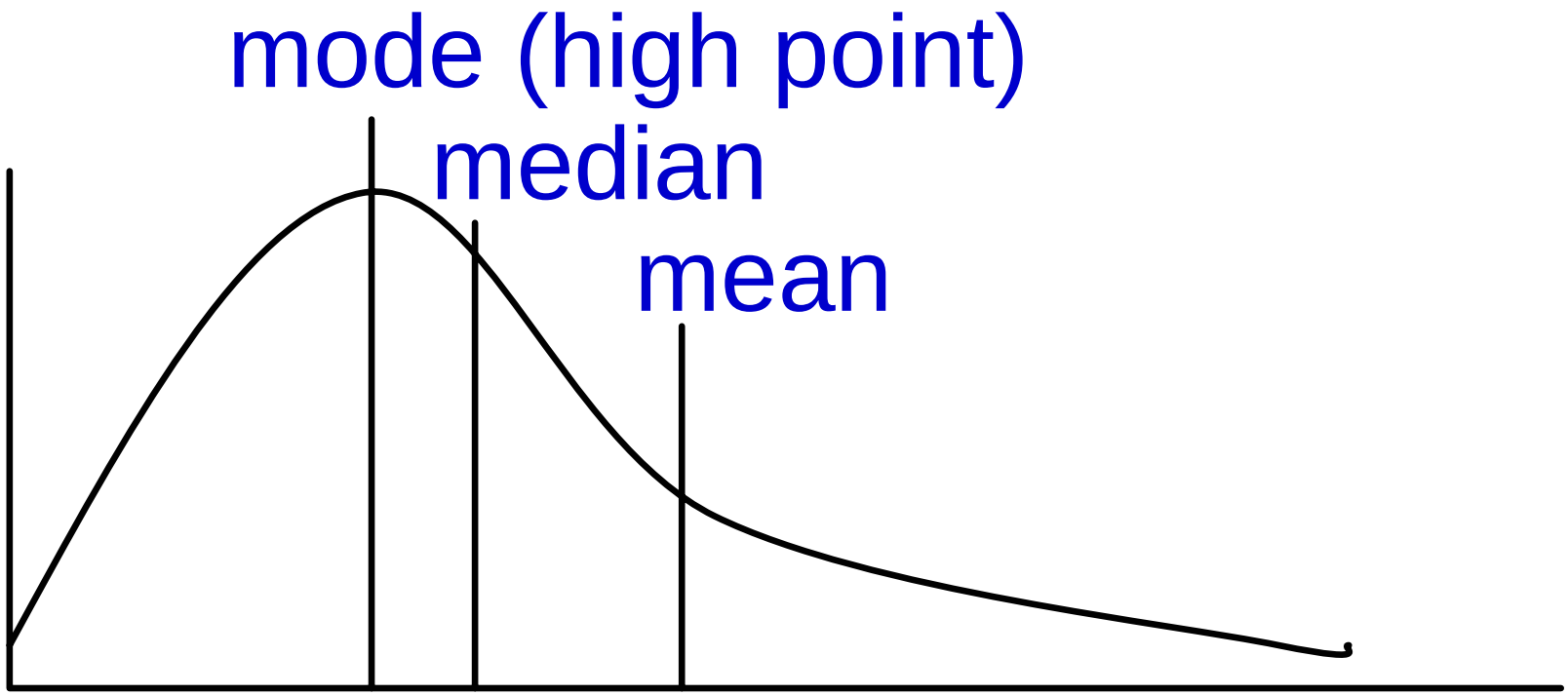
central tendency and skewness

- eg: 1, 2, 2, 3, 12 (right skewed)
- median: middle value 2 (if even take the mean of the middle two)
- mean $\frac{1+2+2+3+12}{5}=4$ (affected by extremes)
- left skewed: $\mu < M$
- right skewed: $\mu > M$

skew

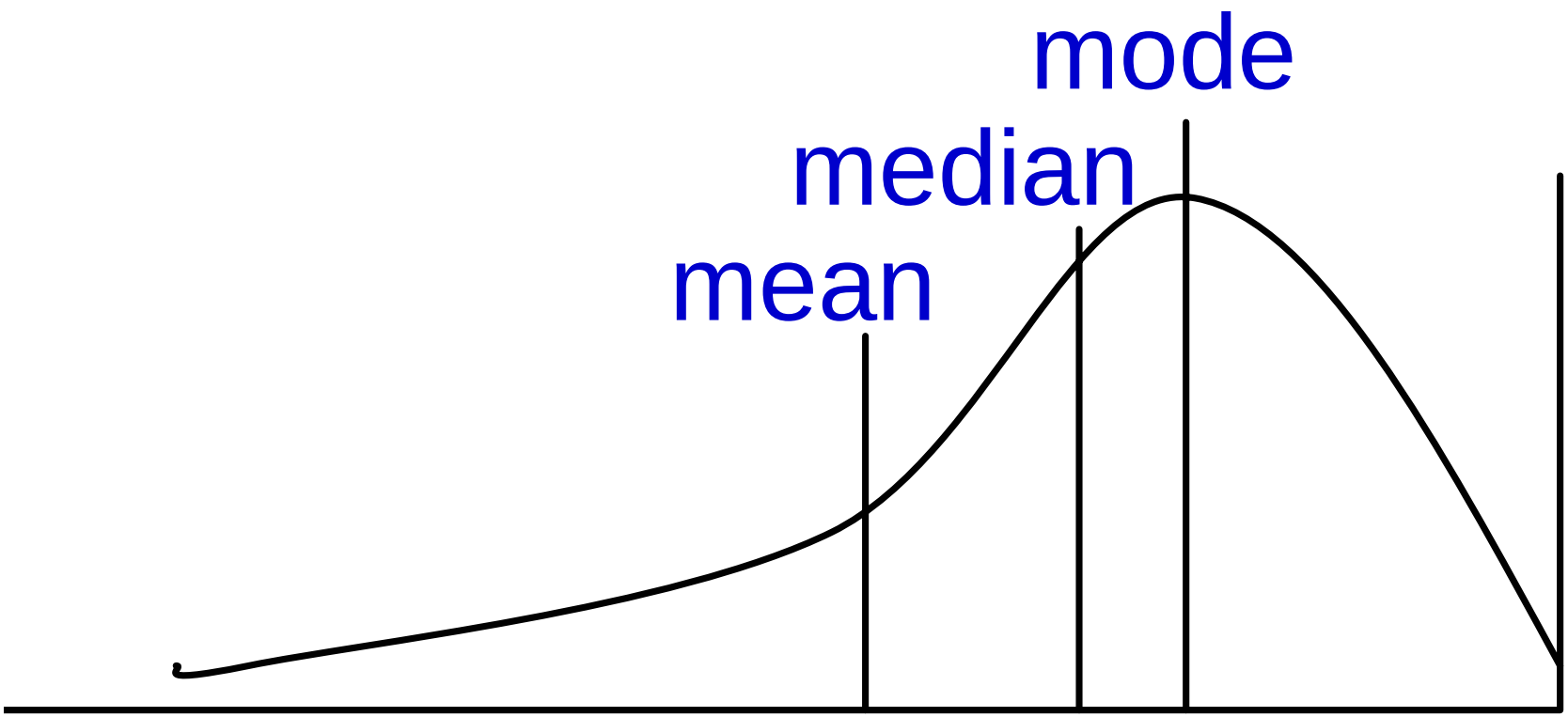


right skew



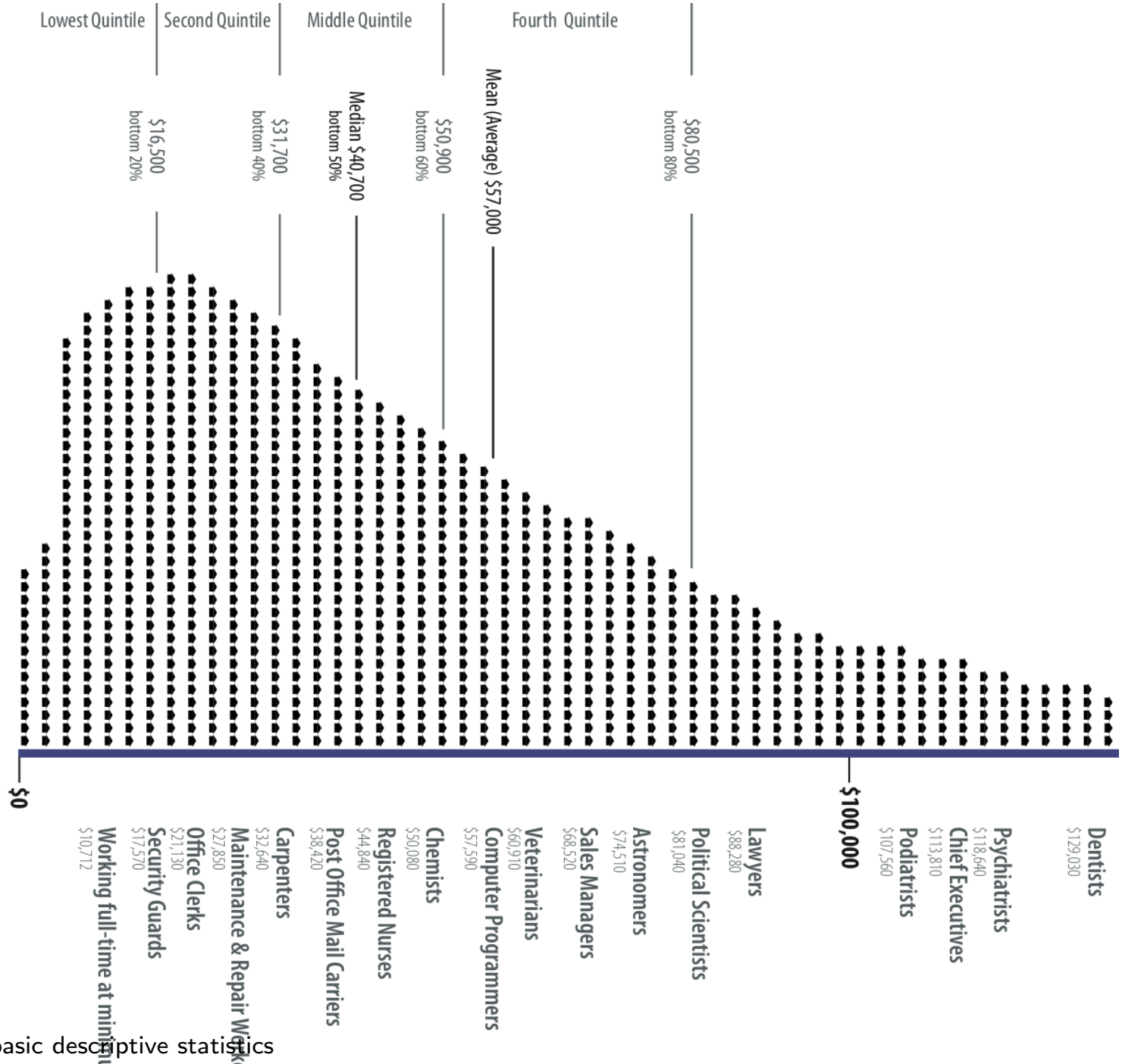
◇

left skew



◇

income distribution



outline

standardization-always think about the meaning

- nj counties https://drive.google.com/open?id=1xJDhcRCkgv7k4tNCa72Oog5bohV6dTB2
- it's not meaningful (for most purposes) to rank U/As by population given the fact they differ in size
- most of the time you want to standardize by area ("per sq km") or by population ("per capita")
- or by specific area and by specific population
  - eg much of some area may be water or forest
  - similar with populations-they may only work or sleep in some area, (Cherry Hill is a bedroom city) etc etc
  - eg Cape May has many liquor stores per capita (just because nobody lives there)

generate a new variable

- "Open Field Calculator"
- "Output filed name": "pd10" [qgis doesn't like long var names!]
- "Output field type": "Decimal number (real)
  - and bump up precision to say 10 (decimal points)
- calculate $POP2010/SQ\_MILES$ (can select from variables drop-down)
- map it and compare to the original
- big difference–the county next to NYC is much more dense than everything else

what do we see ? (the distribution)

- but wait ! this map is not very useful because there is not much variability in it
- this happens when data are skewed–the county next to NYC is much more dense than anything else (right-skewed, draw distribution)
- Properties-Style, "Histogram" tab, hit "Load values" (have window big or wont open)
- try more classes (draw eq. size bins on the distr)
- or better yet pick some other classification technique
- even if we have 10 classes it doesn't help much
- let's try NATURAL BREAKS (JENKS)

level of analysis

- remember i was repeating myself over and over again that the level matters
- and that usually the lower (finer) the better
- and that the higher, the more information you loose
- here's an example

level of analysis: example

- load NJ_MUNIS
- and map with 5 quantiles POP_DEN2010
  - a huge difference!
  - note many areas next to Philadelphia, NYC and some coastal areas
- the previous map did not showed that at all !
  - Only one county next to NYC showed up because it were small and ALL densely populated
- but the rest of the counties were densely populated only in few subareas

outline

references: very useful!

- let's open both and do first pdf: 7,8: creating classes
- and then do each classification type one by one from BOTH docs
- http://www.gitta.info/Statistics/en/html/StandClass_learningObject2.html
- http://www.ttu.ee/public/e/ehitusteaduskond/Instituudid/Teedeinstituut/Geodeesia_oppetool/oppematerjalid/thematic_map_design.pdf

outline

what do we see ? (the distribution)

- but wait ! this map is not very useful because there is not much variability in it
- this happens when data are skewed–the county next to NYC is much more dense than anything else (right-skewed, draw distribution)
- may try more classes... (draw eq. size bins on the distribution)
- or better yet pick some other classification technique
- even if we have 10 classes it doesn't help much
- let's try NATURAL BREAKS/JENKS

classification methods

- again, always think hard about the distribution of a variable that you are mapping–histogram is one of the best tools
- i like NATURAL BREAKS/JENKS or QUANTILES
- they usually show the data better than equal intervals
- start with many, say 10, and then see if you can shrink it to say 5 or 3 without loosing too much information
- keep in mind graphing principles we covered last week: clarity and parsimony

choice of classification method is critical

- try to be as objective as possible
- never choose a method that shows something that fits your story
- you are a scientist, you have to be objective
- explore the distribution; look at different ways of categorizing the values
- pick the one that is most parsimonious, yet it does represent what is going on
- let the data speak! do not force your story

categorized symbology

- good for categorical data
- what are categorical data ?
- examples ?
- continuous vs ordinal, nominal (multinomial and binary)

categorized symbology–how it works?

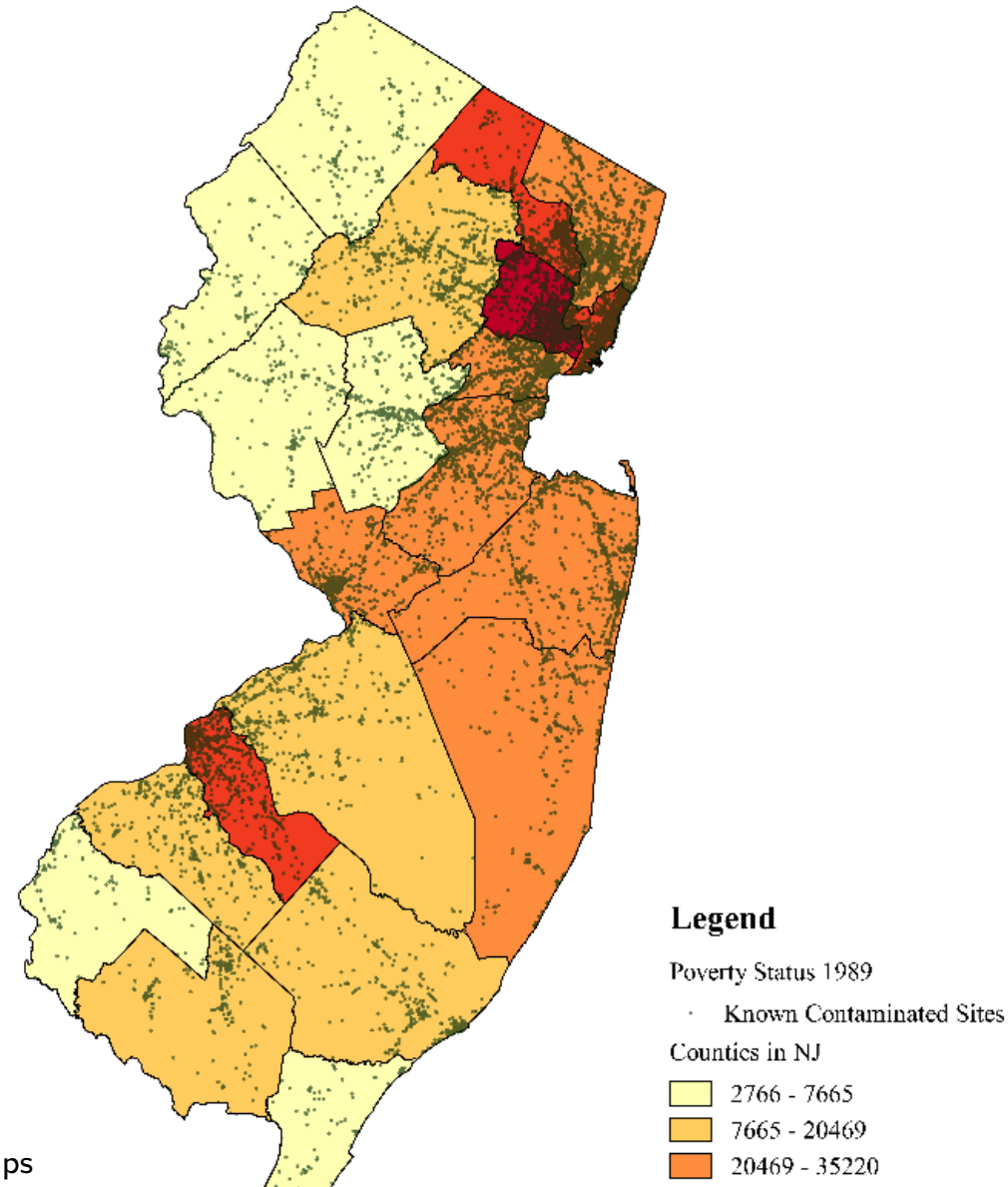
- you can specify your own symbols and/or colors for levels of a variable

bring in universities

- load 2007_11_30_NJ_COLL_UNIV_njsp.shp
- layer-Properties-Style; select "Categorized"
- do CATEGORIZED classify by NAICSDESCR and pick some big symbol for "universities" level
- then we can easily see that there are only 2 universities in South Jersey...
- use the IDENTIFY TOOL (arrow with i) to see what they are
- Aha ! RU-Camden and Rowan–maybe then we should merge them...

outline

Contaminations Sites in New Jersey 1992



contaminations

- this is a pretty good map!
- perfect size and color for contaminated sites!
  - doesn't overlap much but big enough to see
- so you could just do something like that and you are fine!
- but you can do something little more fancy
- and sometimes you probably have to do something little more fancy
  - that is when there are way too many points, like thousands...
  - (well you could zoom in, but if you want to show the whole thing)
- then do a heatmap!

contaminations: too many points? heatmap!

- get
  `https://docs.google.com/uc?id=1T_n1y_Mj5yQiWpZwrbuuFFwmIVJ2QWFZ&export=download`
- load it and...we got a map
  - but lots of points! make them smaller:
  - under style, change size to say .4
- but can also do a heatmap:
  - right click layer-Properties-Style: Heatmap
  - play with Radius to achieve desired heat
  - (at home: overlay with county bounds etc to locate better)
- reference:
  - `http://www.qgistutorials.com/en/docs/creating_heatmaps.html`
  - `https://docs.qgis.org/2.8/en/docs/user_manual/plugins/plugins_heatmap.html`
  - `https://www.mapbox.com/tilemill/docs/guides/designing-heat-maps/`
  - `http://www.digital-geography.com/create-point-density-raster-in-qgis/#.VrtsS_FOkUE`

outline

what else under layers-properties?

- we've covered STYLE...
- let's stick in some LABELS
- can pick some of the text you get when you use IDENTIFY FEATURES TOOL
- from NJ_COUNTIES display COUNTY_LAB
- select a "buffer" to have nice outline–easier to read

label only certain features

- can subset a shapefile, that is select features of interest and save them and load again and then label,
- or there is also another way: `http://anitagraser.com/2015/12/04/how-to-label-only-selected-features-in-qgis-2-8-and-up/`

layers-properties-metadata

- remember i was stressing this is important
- metadata=data about data
- and for now we'll skip the other tabs...