this is a whole bag of tools

- we switch gears a little and discuss
  - more advanced topics beyond mapping
  - more like typical GIS/IT stuff
- we will just cover few tools
- there are dozens of them
- you may present some of those for extra credit
  - let me know– some may not be useful for this class
- those that i think are especially useful are covered below
- most are under 'Vector', and also 'Plugins'

dissolve

- nj_counties
  `https://docs.google.com/uc?id=1xJDhcRCkgv7k4tNCa72Oog5bohV6dTB2&export=download`
- dissolve into a larger area
  - (get rid of inside boundaries)
- Vector-Geopocessing Tools-Dissolve
  - nj_counties
- uncheck “Dissolve all”
  - otherwhise it will dissolve all
- “dissolve field:” REGION

dissolve your way

- can dissolve into your own categories/definitions
- let's take regions and dissolve into south and north jersey
- Open attribute table-toggle editing-New column-integer: 'southNorth'
  - sort on REGION and mark southern regions with 1, and the rest with 0
  - may also highlight the row to see which county is where
- Vector-Geopocessing tools-Dissolve
- "Dissolve field:" southNorth
- often you will have to do something like this
- no way to find a shapefile for South Jersey online!

simplify polygons

- remember from principles: simplify as much as possible
- simplifying polygons means dropping vertexes, so that polygons are defined by fewer coordinates draw
- it reduces size of a file
- Vector-Geometry tools-Simplify geometries
  - Input: 'nj_counties'
- play with "tolerance" to achieve desired simplicity
  - try 1000–turn off/on to compare to orginal: see the difference?
  - can also simplify lines (fewer nodes)
- and i guess you can also simplify points (fewer dec points)
  - reference `http://gis.stackexchange.com/questions/25914/how-to-smooth-generalize-a-polygon-in-qgis`

`http://stackoverflow.com/questions/1849928/how-to-intelligently-degrade-or-smooth-gis-data-simplifying-polygons`

centroids

- calculate a center of a polygon or turn polygon into a point
  - useful when merging non-overlapping polygons–say congressional districts and counties
  - then you can calculate centroid of one of those and merge with polygons of the other layer if a centroid is in that polygon using spatial merge
- draw a picture
- Vector-Geometry tools-Polygon centroids
  - Input: nj counties

centroids

- note: the new shapefile will have the same data
- can now map another variable and overlay on another variable
- can map both points and polygons with some symbology
- let's map population for polygons
  - and population density for points
  - note: make points bigger to see symbology well
- this solves the problem of showing 2 vars in one map

buffering

- kind of opposite of centroids:
- buffer (circle) around a point or poly or line; eg:
  - 'dry zone' around schools
  - waste processing plants and houses
  - 2-mile heavy pollution around hwy
  - walkability to healthy stores, etc
- load nj universities
  - `https://sites.google.com/site/adamokuliczkozaryn/gis_int/hsip_colleges.zip`
- Vector-Geoprocessing Tools-Fixed Distance Buffer
- use 20,000 feet (buffer size is in map units)
- Properties-Metadata or even -General: unit is US ft
- note: buffer is a new layer and then can spatially merge it with another layer

example: environmental problems around univ

- download and add to qgis
  - `https://docs.google.com/uc?id=1T_n1y_Mj5yQiWpZwrbuuFFwmIVJ2QWFZ&export=download`
- make smaller, say size of .4 so can better see

MMQGIS-Combine-Spatial Join

- Output: Buffer
- Spatial Operator: Contains
- Data (Join) Layer: NJ contaminated sites
- Attribute Operation: Sum
- Fields: NAME

investigate

- open attr table of merged shapefile
- go to last column 'COUNT' and click 2x to sort descending
- under 'NAME' we find that 'NEW JERSEY MEDICAL SCHOOL'
  - has biggest problem! over thousand contaminated sites
- select say 3 rows at top
- click at the top 'zoom map to selected features'
  - a lot of overlap there
- but from the table can select schools with greatest problems
  - and take some measures to help with the situation

related: select by location (say id problematic ones)

- say select polluted sites within 1000 ft from a school
- Vector-Geoprocessing Tools-Fixed Distance Buffer
- Vector-Research Tools-Select by location
- Layer to select from: NJ Contaminated Sites
- Additional layer (intersection layer): Buffer
- Gemetric predicate: within
- and then: NJ contaminated sites-Save As
  - check 'Save only selected features'
  - and save as csv
  - got 80 places we can call and ask to clean up