Simplification

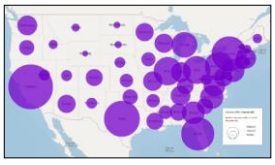
All Maps Simplify

- Maps are smaller than what they portray
  - Limited number of features can be mapped
  - Must classify and generalize

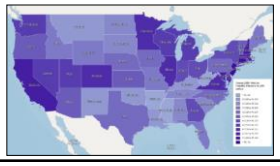
Classification

Classic Thematic Maps

Proportional Symbol Map



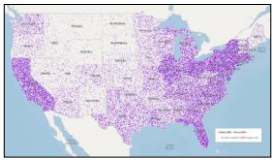
Dot Map



Choropleth Map

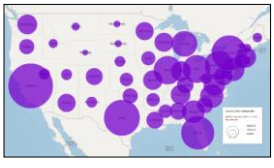
Dot Maps

- Dot represents fixed quantity
  - Pro: great for density and pattern
  - Con: need to deal with location/placement
- Tricky: what does the dot mean?



Proportional Symbol maps

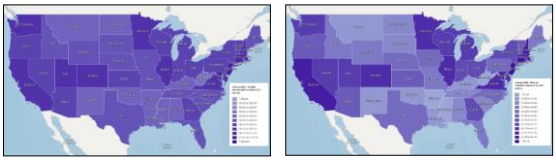
- Symbol size scales with quantity
  - Pro: symbol size conveys information
  - Con: does not handle large ranges well
- Tricky: can viewer compare circles?



Choropleth Maps

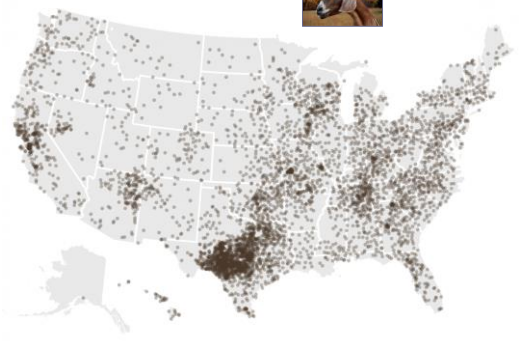
choros — place
plethos — value

- Visual variable varies with quantity
  - Pro: Easy to make
  - Con: Lots of choices (hue, unit of analysis, etc.)
- Tricky: how do you classify data?



This is literally every goat in the United States.

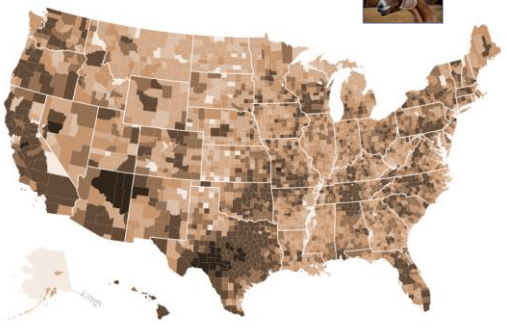
One dot = 500 goats.



WASHINGTONPOST.COM/**WONKBLOG** Source: USDA Agricultural Census

Goat population, by county

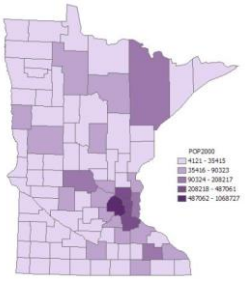
0 A few 5 250 500 1,000 10,000



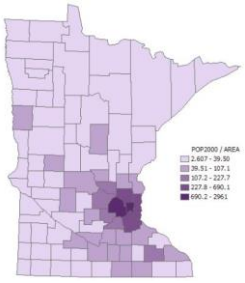
SOURCE: 2012 USDA Agricultural Census. Published Jan 12, 2015

Standardization

Raw Counts



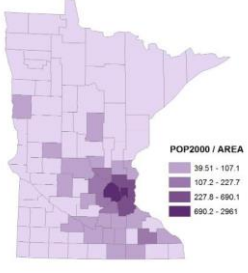
Standardized



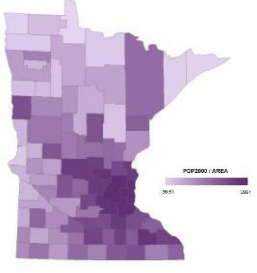
Consider whether you have an *area* problem

Classification

Classed
Pro: more control over map
Con: decide on # classes and classification

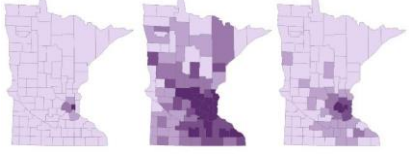


Unclassed
Pro: no decisions to make
Con: humans can have trouble reading it



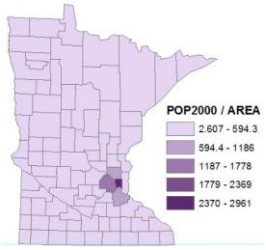
Classification Approaches

- Equal interval
- Quantiles
- Natural breaks
- *Others…*



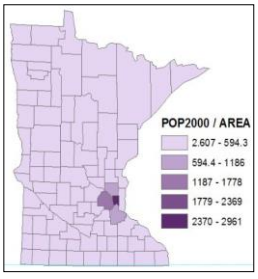
Equal Interval

- Each class is an 'equal range' of numeric values (data)
- Keep in mind
  - Easy to do
  - Sometimes hard to see distinctions



Equal Interval Choropleth

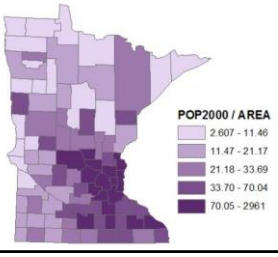
Maximum = Ramsey County = **2,961** people/mile²
Minimum = Lake of the Woods = **2.6** people/mile²
Range = Max – Min = **2,958**
Classes = 5 classes
Interval = Range ÷ Classes (5) = **591.7**



3	9	13	17	24	33	44	70	186
3	10	15	18	25	33	46	73	228
5	10	15	19	25	34	48	74	482
5	10	15	20	25	34	49	88	600
5	10	15	21	26	36	53	94	690
5	10	15	21	26	38	55	97	1746
7	11	16	22	26	39	56	101	2961
7	11	17	22	27	42	63	126	
8	12	17	23	29	43	68	150	
9	13	17	24	29	44	70	184	

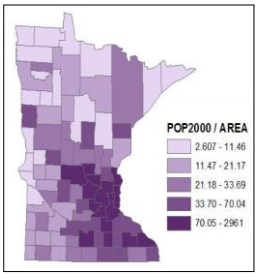
Quantiles

- Each class is an equal number of areal units (observations)
- Keep in mind
  - Easy to do
  - Easy to read
  - Sometimes arbitrary



Quantile Choropleth

Units = Number of counties = 87
Classes = 5
Quantile = Units ÷ Classes(5) = 17 (approximate)



3	9	13	17	24	33	44	70	186
3	10	15	18	25	33	46	73	228
5	10	15	19	25	34	48	74	482
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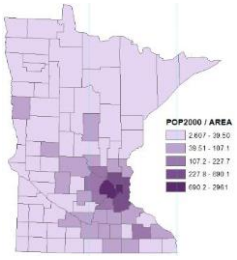
8	12	17	23	29	43	68	150	
9	13	17	24	29	44	70	184	

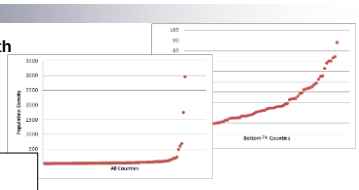
Natural Breaks

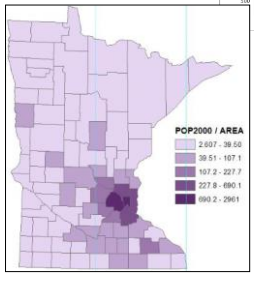
- Each class defined by data gaps
- Keep in mind
  - Can be subjective
  - Computers getting better at it



Natural Break Choropleth

Each class is where you think there is a gap





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3	10	15	18	25	33	46	73	228
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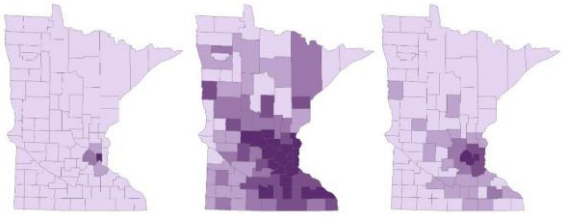
8	12	17	23	29	43	68	150	
9	13	17	24	29	44	70	184	

Three Maps, Three Messages



Equal interval | Quantiles | Natural Breaks

All three based on same data

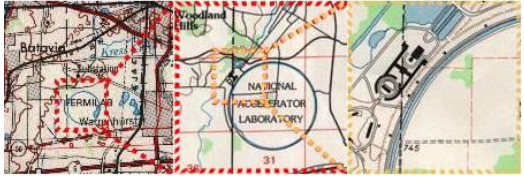
Generalization

Scale and Generalization

Scale selection

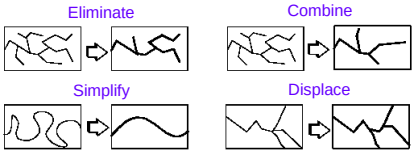
Small	Map scale	Large
Large	Mapped earth area	Small
Less	Information detail	More

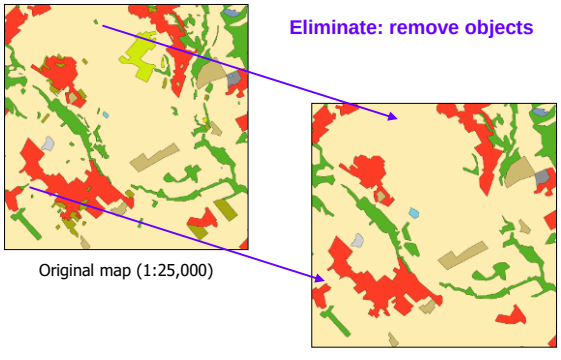
1:250,000 | 1:100,000 | 1:24,000



Generalization

- Eliminate: remove objects
- Combine: merge, aggregate, amalgamate
- Simplify: smooth or remove complexity
- Displace: move or enhance

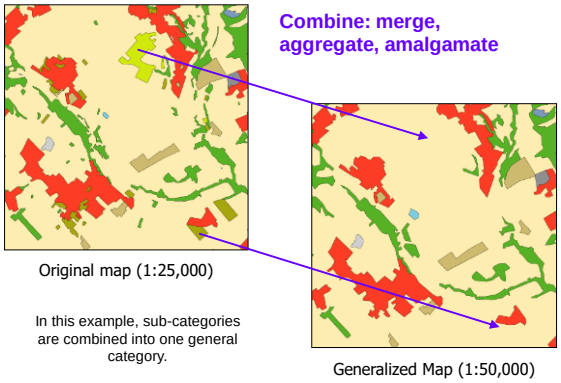




Eliminate: remove objects

Original map (1:25,000)

Generalized Map (1:50,000)

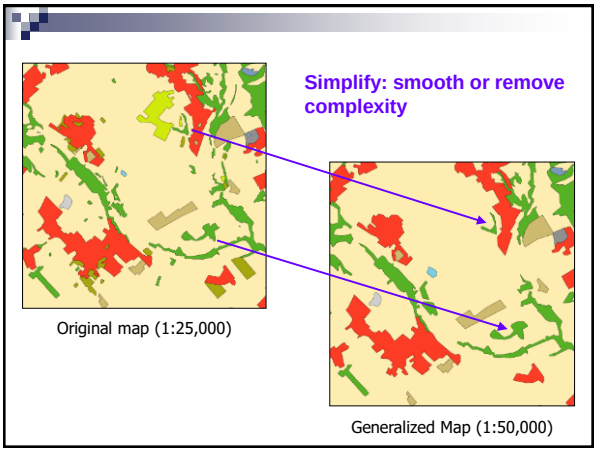


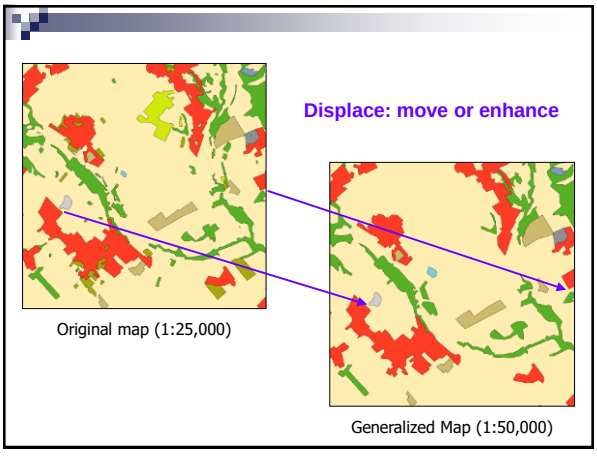
Combine: merge, aggregate, amalgamate

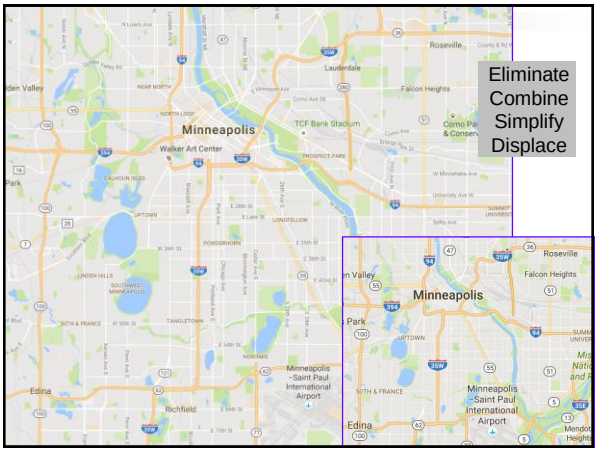
Original map (1:25,000)

In this example, sub-categories are combined into one general category.

Generalized Map (1:50,000)


Simplify: smooth or remove complexity
Original map (1:25,000)
Generalized Map (1:50,000)


Displace: move or enhance
Original map (1:25,000)
Generalized Map (1:50,000)


Eliminate
Combine
Simplify
Displace
Minneapolis
Roseville
Falcon Heights
Edina
Minneapolis Saint Paul International Airport
Richfield

Conclusion

- Common maps
- Classification
  - Equal Interval
  - Quantiles
  - Natural Breaks
- Generalization
  - Eliminate
  - Combine
  - Simplify
  - Displace