

Map Symbolization

Everything on a map is a symbol. A map symbol is a visual mark systematically linked to the data and concepts shown on a map. Consciously and critically choose symbols that help your map do what you want it to do.

symbol by relationship

Some map symbols *intuitively* suggest general kinds of data.



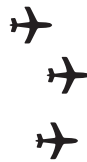
A map showing the population of different cities uses circle sizes from small to large: sizes vary in *amount*, as do the data.

A map showing restaurants, antique stores, and museums in a town uses different shapes: shapes vary in *kind*, as do the data.



symbol by resemblance

Other map symbols *look* like particular data or concepts.



A map showing the location of airports uses an airplane symbol for airports: the symbol *looks* like an airplane, and is associated with an airport.

Maps in a war atlas use red symbols to show the location of battles: the symbol *looks* like an explosion, and is associated with a battle. People often associate red with danger or conflict.



symbol by convention

Some symbols “make sense” even though they may not entirely make sense.



The U.S. Geological Survey uses the Christian cross to symbolize all places of worship - church, mosque, synagogue. We know what they mean, though it's not very politically correct.

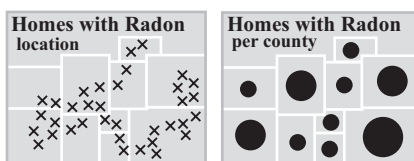
A map showing the earth's oceans uses blue for water. But is water out in the real world blue? Not usually. Blue on a map, however, suggests water - it's a *convention*.

If you depart from conventions (color your oceans their actual color) you could confuse your map's readers.



Basic **map symbolization** issues include:

1 Different kinds of data: data at points, along lines, and in areas; differences in kind and number; individual or aggregate data.



2 The visual variables: choosing map symbols.

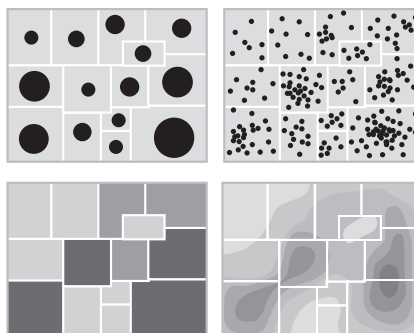
The visual variable **size** readily implies...

...variation in **quantity**.

The visual variable **shape** readily implies...

...variation in **quality**.

3 Symbolizing aggregate data: guidelines for choosing among choropleth, graduated symbol, dot, and surface maps.



2b

Visual variables described and illustrated

Understanding the nature of visual variables will help you select map symbols which clearly make the point you want your map to make.

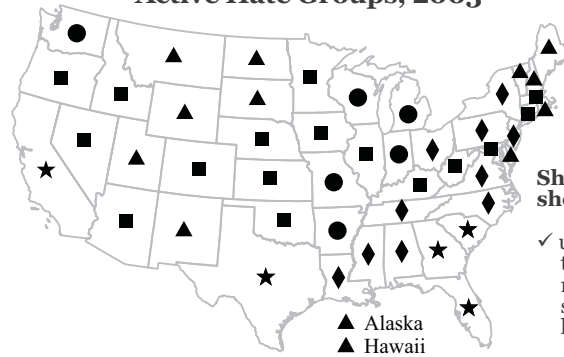
shape

Map symbols with different shapes intuitively imply differences in quality. A square is not more or less than a circle, but is different in kind. Map symbol shapes can be pictorial or abstract.



Poor use of shape:

Active Hate Groups, 2003



Shape is a poor choice for showing quantitative data

✓ using shape makes it difficult to see the patterns on the map, as the symbols do not suggest the order (low to high) in the data.

Good use of shape:

Shape is a good choice for showing qualitative data

✓ different shapes suggest the qualitatively different groups.

Dominant Hate Group, 2003

- ▲ KKK
- ⚡ Neo-Nazi
- ✋ Black Separatist
- ⊠ Neo-Confederate
- † Christian Identity
- ☠ Racist Skinhead



3a

Symbolizing aggregate data: choropleth maps

The **choropleth map** is one of the most common mapping techniques for data grouped into areas - counties, provinces, states, countries, etc. Choropleth maps vary the shading of each area along with the data value associated with the area.

appropriate data

✓ *derived data (densities, rates), sometimes totals*

Mapping *total numbers* with a choropleth map is often *not* recommended, particularly when the areas on the map vary in size. A large area may have more people simply because it covers a larger area.

If you map *totals* (bold, below) and classify the data, an area with 100 people will likely be in a *different* class than the area with 500 people. The visual difference between the areas is the result of the *unequal size of the areas*.



Mapping totals with a choropleth map can be OK! A marketing company maps the total number of Polish-speaking U.S. citizens by county in the U.S., to assist in a plan to market Polish greeting cards. In this case, what is most important is where the most Polish-speaking folks are. But do consider a graduated symbol map for totals: it may better serve your needs.

Mapping *derived data*, like *population per square mile*, takes into account the varying size of areas on the map.

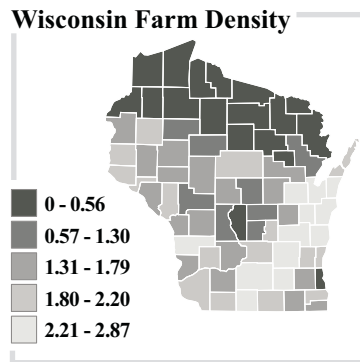
If you map *densities* (bold, below) and classify the data, both areas have 10 people per square mile and will be in the *same* class.



Your goals for your map drive map choices! There is no absolute “best” kind of data for a choropleth map – independent of your goals for your map. *Be aware of the problem of mapping totals with a choropleth map*, but if your goals require totals, just do it. *Then* create a graduated symbol map of the same data, and compare the maps. Please use your brain when making maps.

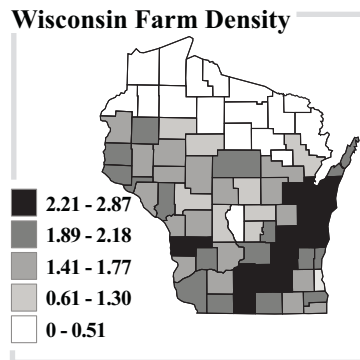
design issues shading

Poor value & legend:



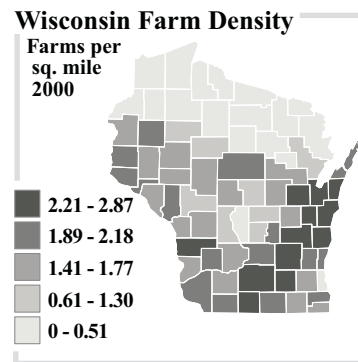
- ✓ dark means less is not intuitive.
- ✓ smaller values at *top* of legend are not intuitive.

Poor value & boundaries:



- ✓ black blends with boundaries.
- ✓ white suggests no data.
- ✓ boundaries stand out too much.

Good value & legend & boundaries:



- ✓ dark means more to most people.
- ✓ non-continuous legend, with larger values at the top and a title which explains the numbers in the legend.
- ✓ overall smoother feel without black and white in addition to removing the problems they cause.
- ✓ boundaries less dominant but distinct.