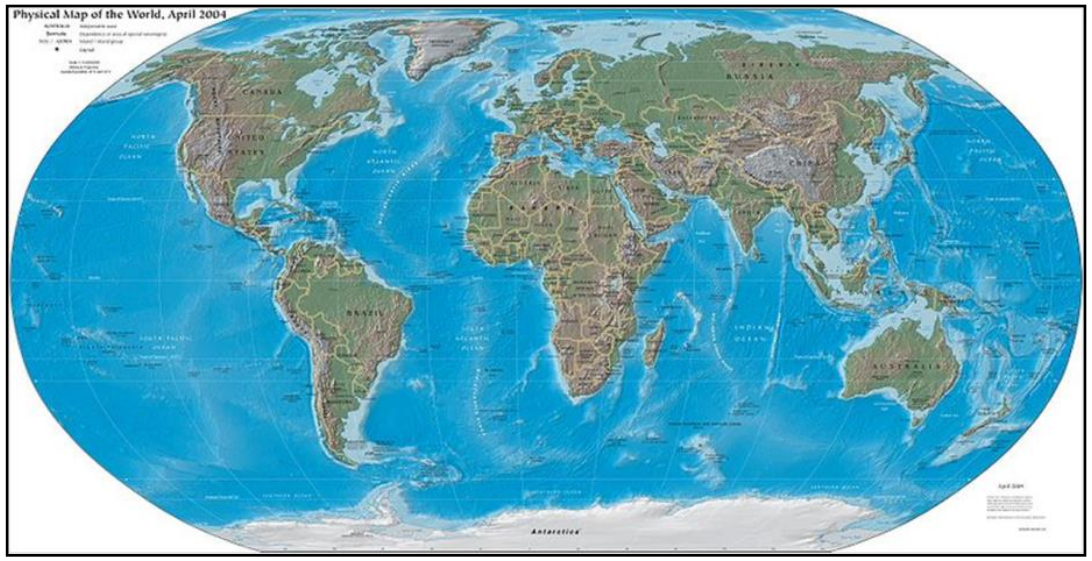
What is a map?

How does it differ from a globe?

Two-dimensional (flat) representation of……..a three-dimensional (spherical) object

- **Reference Maps: "real world"**



Landmarks

Roads

Mountains

Rivers

Political

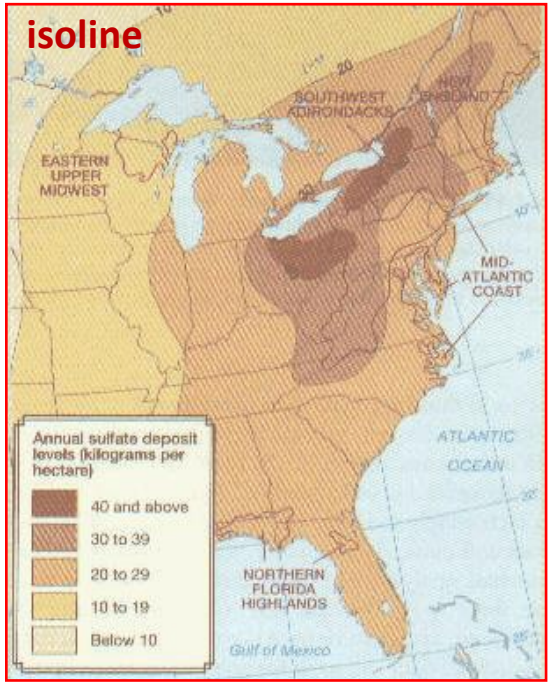
Reference maps tell us what we should find when we go somewhere, although the detail that can be shown on a map will depend on the scale at which it is drawn. The larger the area, the less detail (simplification). The smaller the area, the more detail.

Topological maps are a special case of reference maps. They aren't "to scale" (distances are often distorted)… these are used to show us how a network (like the subway system shown here for Washington, D.C.) is connected. What we need to know: what lines take us to what places, where the stops are, and how are the different lines interconnected…

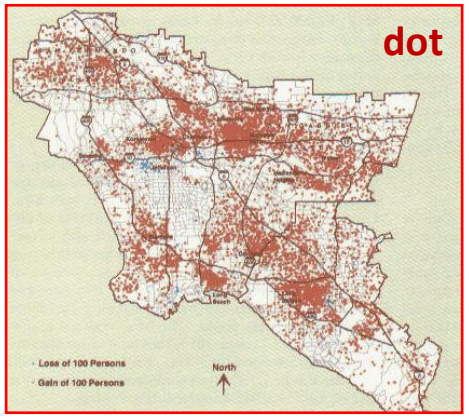
Topological (network) Map

Thematic Maps

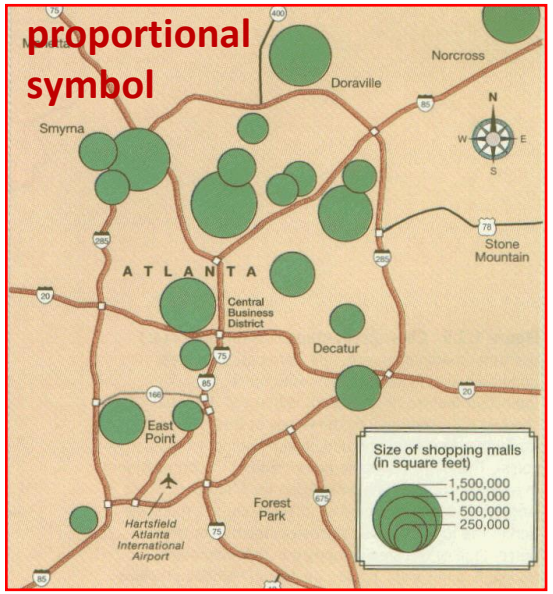
isoline



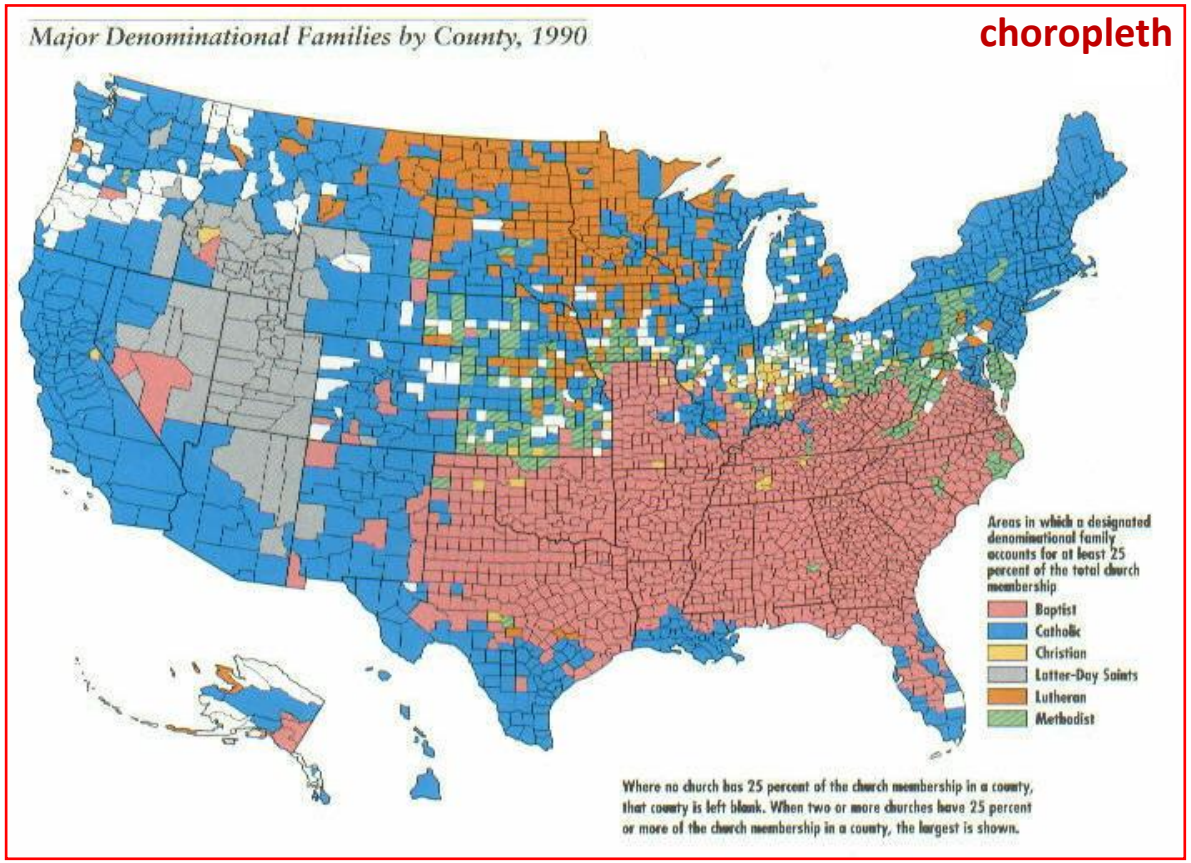
dot



proportional symbol

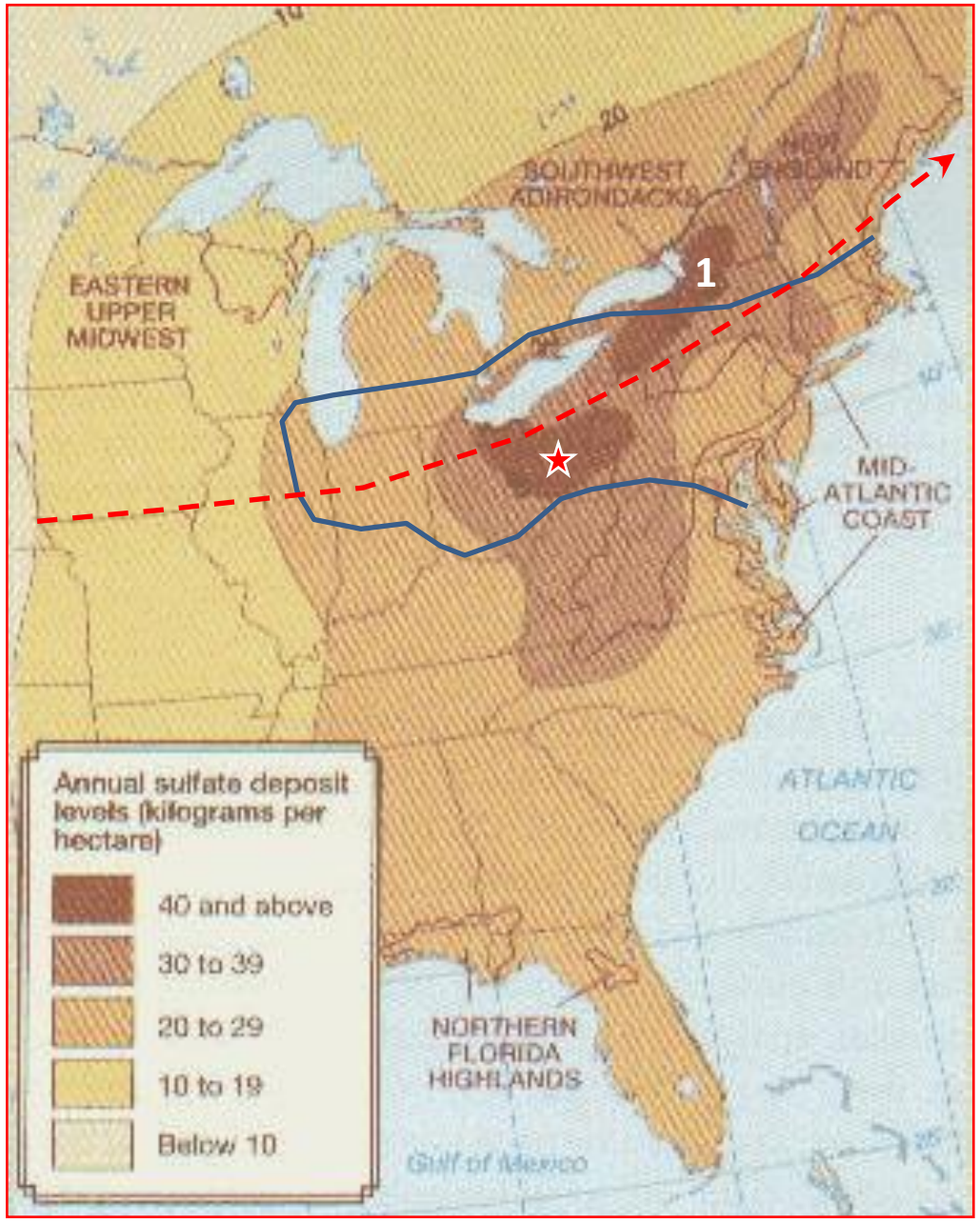


choropleth



Where reference maps tell us something about what is visibly there (and sometimes "invisible" things like political boundaries)… Thematic maps we use to analyze "activity" – pollution (isoline), population change (dot), how shopping centers are distributed in the area (proportional symbol), what religions are dominant in different areas (choropleth). Isoline maps are used often in human geography; they are better suited for physical and environmental geography… we will look at some dot maps and some proportional symbol maps, but most of the ones we will use in class will be choropleth maps.

Interpreting Thematic Maps: Isoline Maps



Isoline maps are made by connecting places of equal value… at left, this map is made by taking measurements of sulfates in soils at many (thousands) of different locations. After the soil is analyzed for its sulfate content, the location of where the sample was taken is mapped, and the sulfates value assigned to it. Once all the samples are mapped, we can draw a line from one point (sample) to another… eventually we end up with a map like this one, where we can see where the highest concentrations of sulfates are found. High levels of sulfate deposits in soils are associated with pollution, mainly from the burning of coal. Into the 1970s (after the EPA was created), a lot of industries used coal to generate the electricity or steam power needed to operate the industries, or, in the case of the steel mills, to run the smelting and processing of metals in the foundries, and by electric utilities.

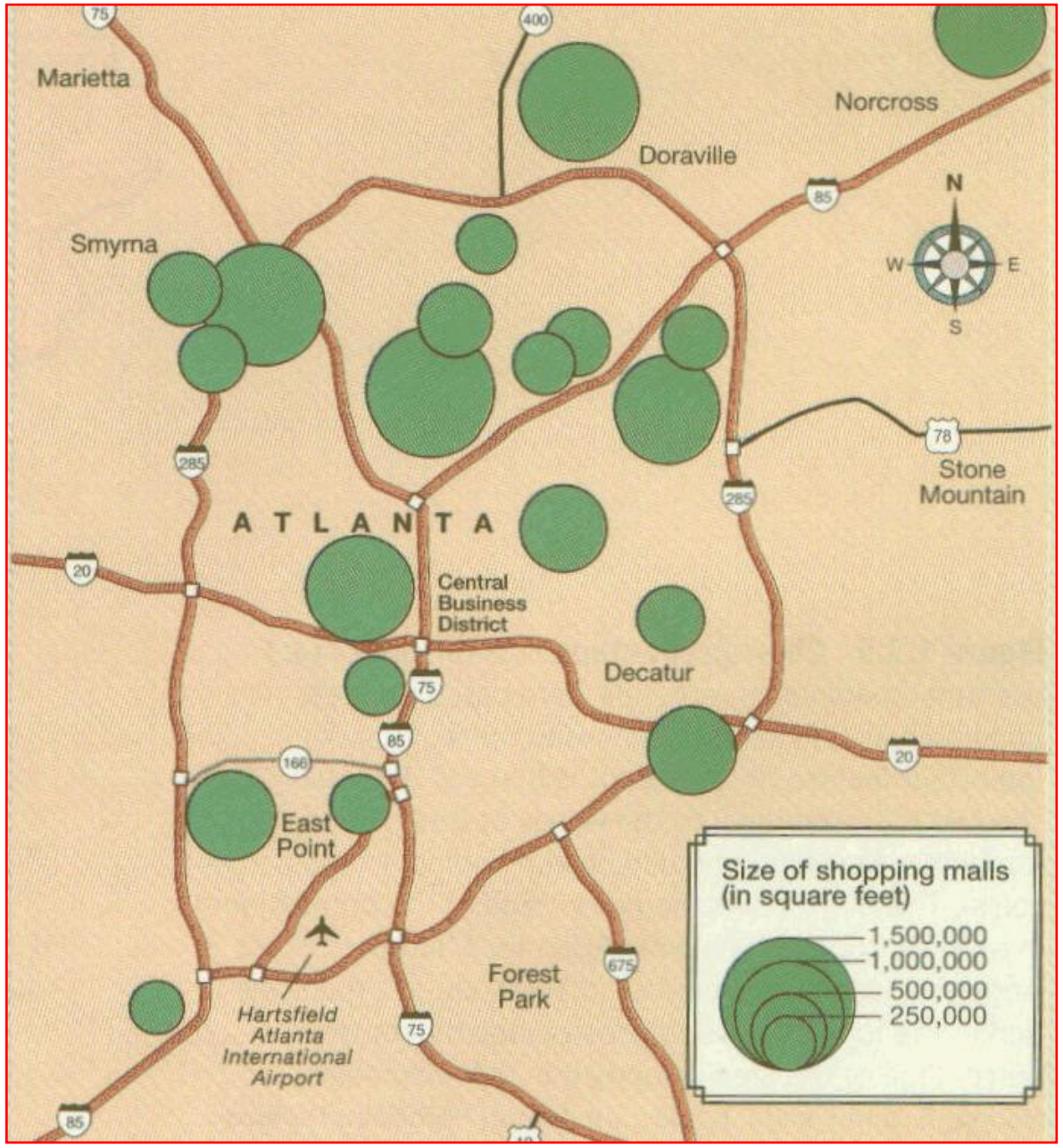
Interpretation: Note where the red star is on the map. It is not surprising that this area has very high levels of sulfates in soils, as this is the heart of the "Industrial Revolution" in the US from 1850 to 1950. The area outlined in blue is the approximate boundary of the "Manufacturing Belt" or "Industrial Heartland" of the US. Most US heavy industries were located in this area until the 1960s.

But… notice that the area marked "1" also has very high levels of sulfates as well, but lies outside the manufacturing region. In fact, there is no manufacturing in this area as this is protected land (the Adirondack National Forest).

Why are sulfate deposits in this area so high? Sulfates are emitted primarily from smokestacks, which until the 1970s were largely uncontrolled. Those sulfate particulates get carried by the wind currents (the average flows across the year shown by the red dotted line), and becomes an attractor or water vapor. When the atmosphere becomes saturated with water, we get precipitation… and in this case, with that precipitation, the sulfates get deposited in soils, plants, and waterways. Thus, even though none of that pollution is generated in the Adirondacks… the forest there became heavily polluted.

Note: Isoline maps aren't especially useful in human geography – they work better for certain physical and environmental uses. We will look at an example of this in Chapter 10 on Urban Geography.

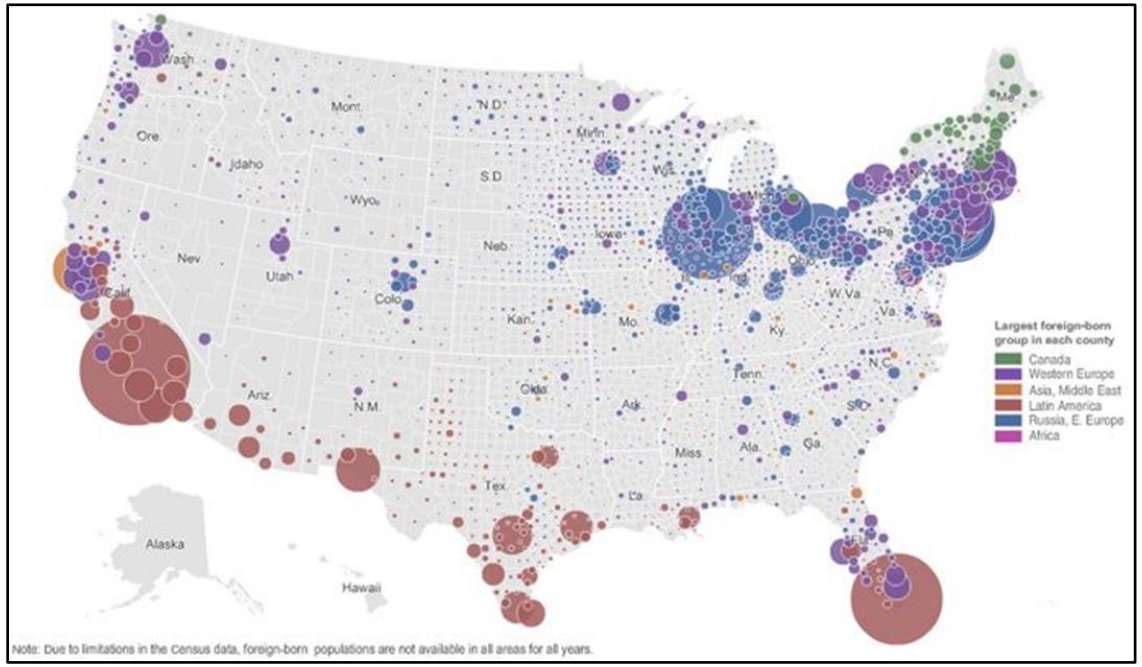
Interpreting Thematic Maps: Proportional Symbol Maps



The symbols on the map are a calculated ratio, so that the size of the symbol (in this case, circles) varies by the information each one represents. Here, the symbols give us an idea the size of large shopping centers in Atlanta, GA (note: this is 1980 data). With this, we can visualize 2 things: (1) the size of the shopping centers, and (2) where those shopping centers are.

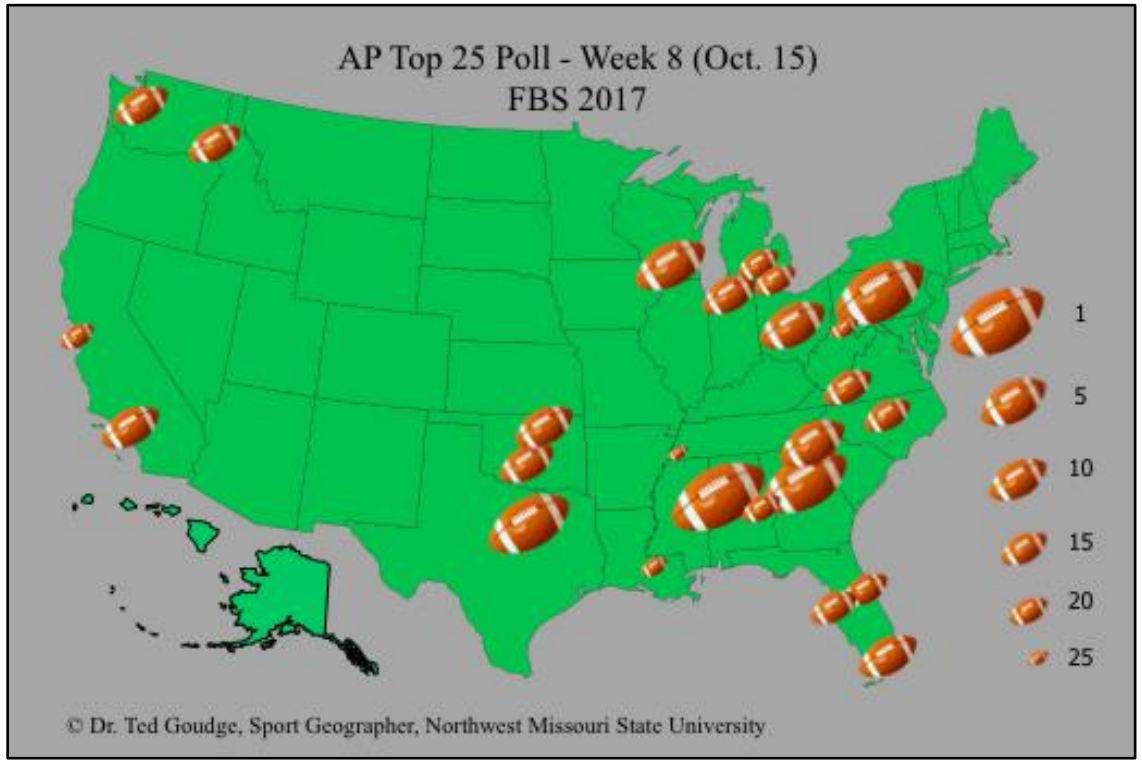
Interpretation: There is something very odd about the map… notice where Interstate 20 cuts across Atlanta E ← → W, just below the Central Business District ("downtown"). One characteristic that is immediately notable… far more shopping centers are located in the northern part of the Atlanta area than in the southern part of the city. In fact, there are very few shopping centers in the southern part of Atlanta, and really only 2 large centers (but these are both accessible by the beltway).

Why? Further investigation shows that the southern side of the city is also the lowest income part of Atlanta. Retailers will locate their stores where there are people with higher levels of disposable income. Thus… most shopping centers are in north Atlanta.

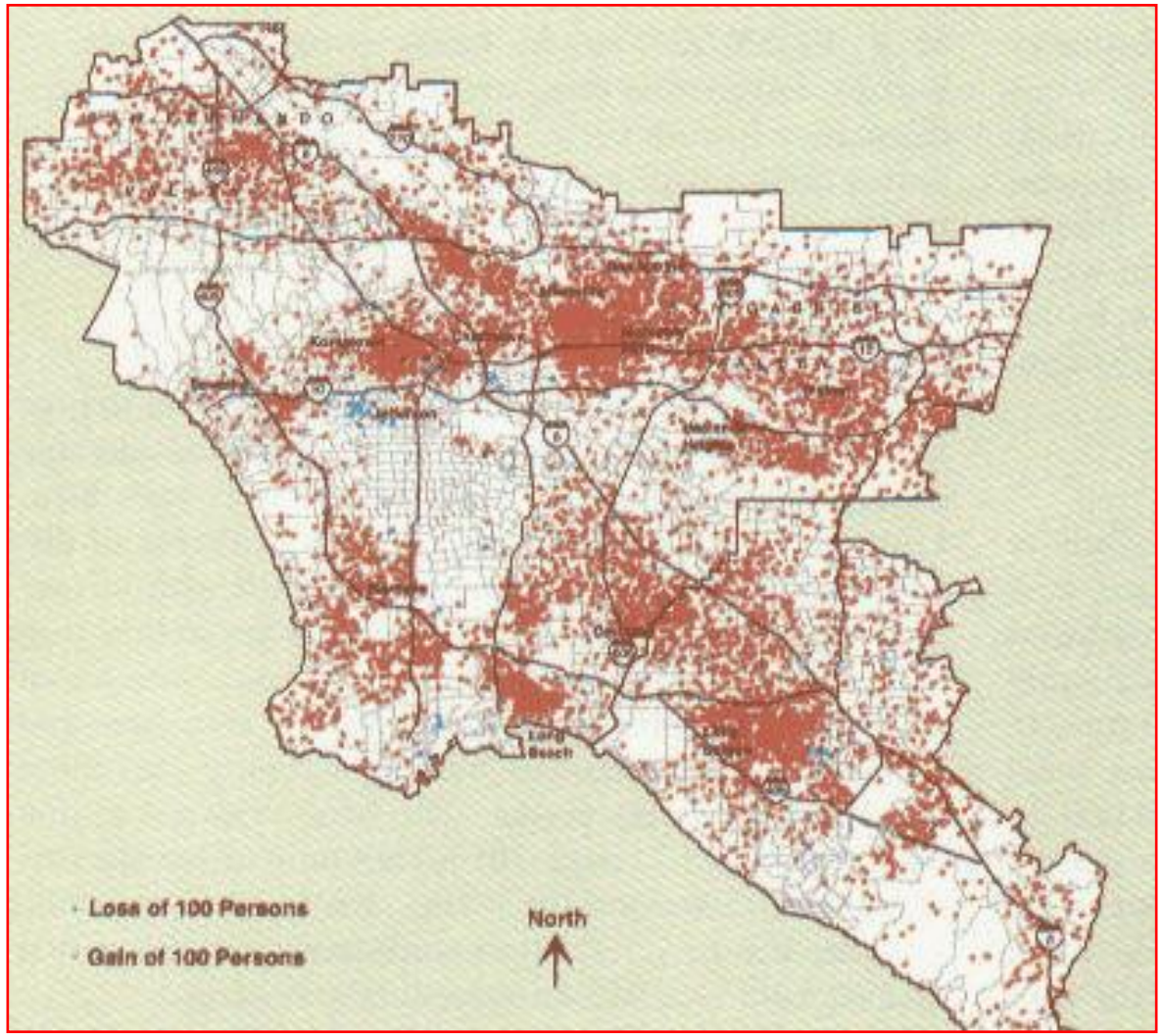


The symbols most often used are circles, but any symbol can be used, such as the proportionally-sized footballs in the lower left map that describes the rankings of the teams in the Top 25 in one poll in the 2017 season.

Proportional symbol maps can also be combined with pie charts as in the lower right map. This maps shows the size of the population of each state using a proportional circle. Each circle is a pie chart that shows the distribution of ancestry in each state's population.



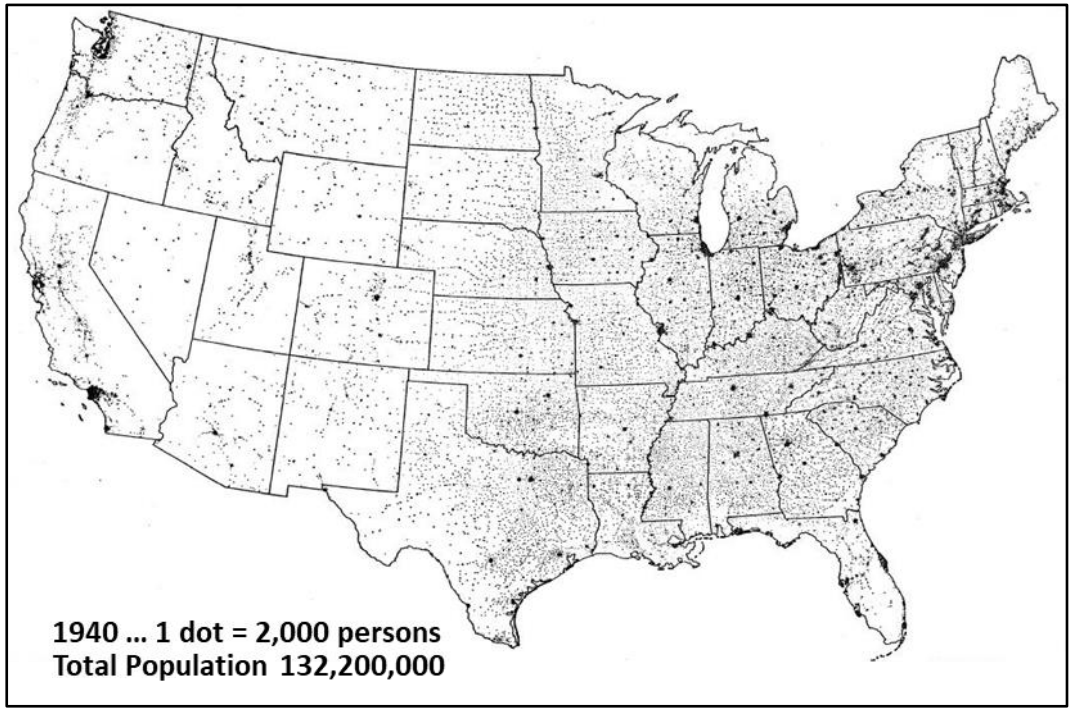
Interpreting Thematic Maps: Dot Maps

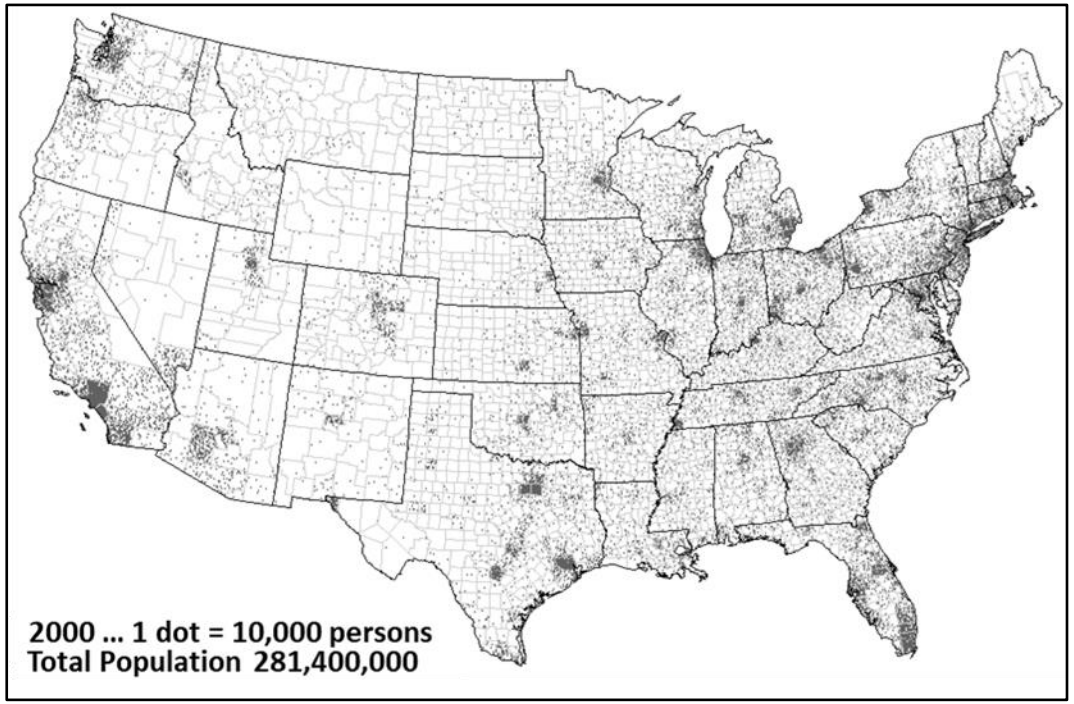


Dot maps are made by assigning a set value to each dot… it could represent a certain number of people (as this map does), or some number of bushels of corn, or the number of vacant homes in an area. This dot map does "double duty"… the dots equal 100 people. The data is based on the 1990 census. Each red dot shows where in the city (this is the Los Angles metropolitan area) that gained 100 Hispanic/LatinX persons; the blue dots show area where there was a loss of 100 Hispanic/LatinX persons. The 1990 census was compared to the population in the LA metro area in the 1980 census.

Interpretation: Note that there are large numbers of neighborhoods throughout the LA area that have grown significantly in Hispanic/LatinX population… and relatively few that have seen a decline in the Hispanic/LatinX population.

This map combines data from two different census periods in order to show the change in population (in this case, from 1970 to 1980).





We can also show the population change by comparing two dot maps to each other.

The two maps at left show the distribution of the US population in 1940 (upper) and in 2000 (lower).

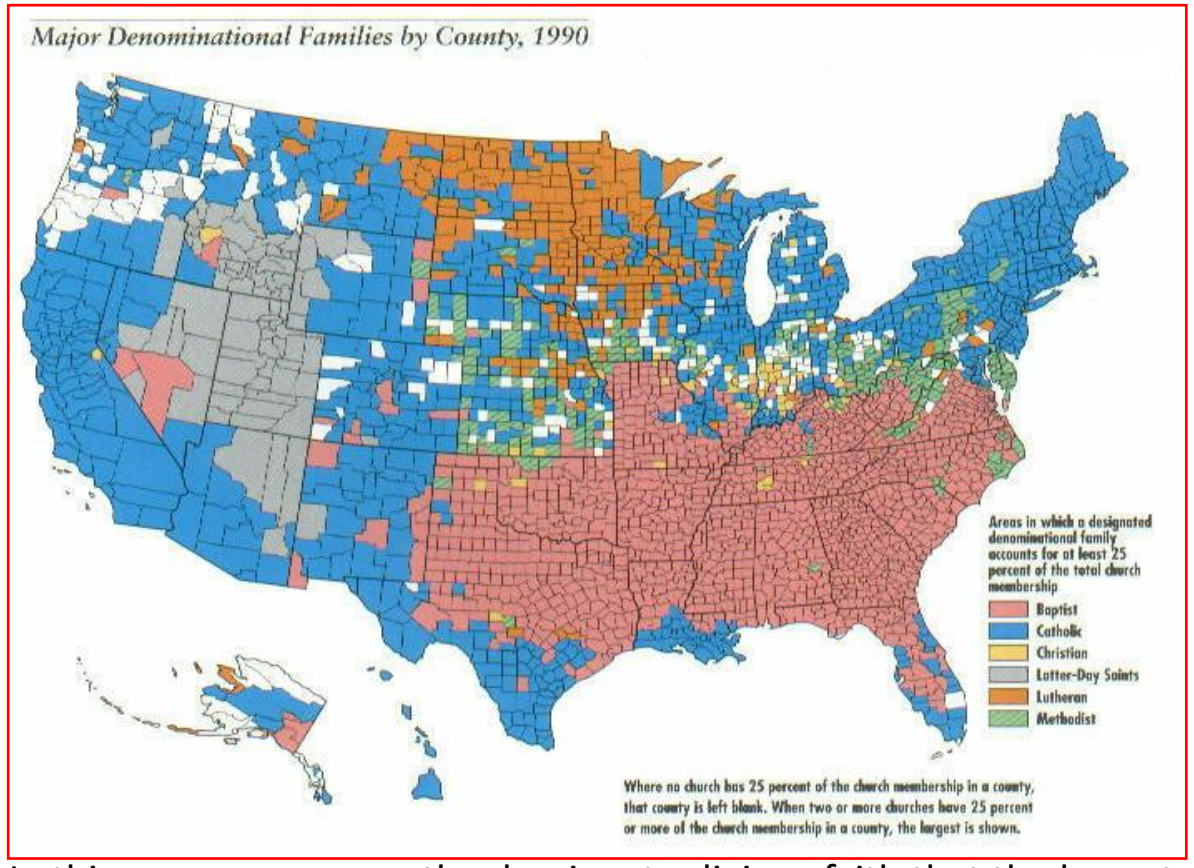
Note that the key for each map is different… in the 1940 map, each dot represents 2000 persons. In the 2000 map, each dot represents 10,000 persons.

Even though the dots on each map are different… we can still get a good sense of the distribution of the population of the country and how where we live has changed.

Note that the east coast and Midwest aren't a lot different… these were the earliest settled areas from colonization through the Industrial Revolution.

Where we can see real change: larger cities in the south (especially Florida), and in the southwest and west.

After WW II, the population moved south and west, in what is often described as the snowbelt to sunbelt migration. New highways, the lack of unions in the south and west, and affordable air conditioning helped drive this. Florida, for example, had less than 2 million people in the state in 1940 - less than the number that now live in the Orlando metropolitan area today. Florida's current population is estimated at 21.3 million (2018).



Interpreting Thematic Maps: Choropleth Maps

Choropleth maps can be made in different ways… one could look at the difference in real numbers, in percentages, in "quotients" (how different areas compare to a larger average; for example, states compared to the nation), and in "named groups." This map is a good example of using named groups because they represent something we all are familiar with.

→ Note: we would classify or group things differently if we were using numbers. For example, if we wanted to show the distribution of people by their income, we might divide them up to show the people in the lowest 25% (low income), those with income in the 25-50% range (low middle income), in the 50-75% range (upper middle income) and people with incomes in the 75-100% range (high income). Like at left, we would then use colors (or grayscales) to visualize where these were.

In this map, we can see the dominant religious faith that the largest number of people in each county say they are a member of (by the 1990 census information). Notable here:

- The reddish area through the south… the "bible belt" (largely Southern Baptist)…
- The orange area in the north-central states… the Lutheran church, brought over to the US by settlers from Scandinavia
- The gray area in the mountain west… the Church of Latter Day Saints, which actually started in New York state, but were successively driven out of state after state because the church originally allowed the practice of polygamy. The Mormons eventually ended up in Utah, which as become the culture hearth of the church.
- Also, the Catholic church has a great deal of influence in the northeast and the southwest, though by different origins. The northeast area was settled by Catholics primarily from western Europe. The southwest influence, though Spanish in origin, is quite different in its Central and South American roots.