Lecture 11
Bias in Mapping
Introduction

“Not only is it easy to lie with maps, it's essential.”

- First sentence in How to Lie with Maps by Mark Monmonier
Why Do Maps Lie?

Maps have a dual purpose: not only to inform their audience, but also to impress them — to persuade, to make a point, to sell a product.

Maps reflect the interest of their cartographers — and people can easily be fooled.
Why Must Maps Lie?

🌟 They must be selective in the information they present

− “selective truth” (aka omission)

http://www.gis.unbc.ca
**Why Must Maps Lie?**

- They require projections, which distort angles, area or shapes.
Who Says North is “Up”?
Who Says North is “Up”?
Who Says North is “Up”?
Who Says North is "Up"?

Daily calorie supply, as percentage of requirements 1996

- 135 or greater
- 126 to 134
- 115 to 125
- 90 to 114
- 80 to 89
- 79 or less
- No data
Why Must Maps Lie?

Maps inherently have a scale
- Maps at small scale leave out detail included in large-scale maps

"Lying with Maps", Statistical Science, Aug. 2005
Why Must Maps Lie?

- Lines must be displaced, smoothed or simplified and area features simplified for readability’s sake.

The following four display panels are labelled with the data’s production scale:

- 1:20,000
- 1:50,000
- 1:250,000
- 1:1,000,000

Decreasing Data Capture Scale

Increasing Generalization

All four panels have the same display scale*.

*Actual display scale of the figure above depends on your computer monitor size.
How Maps Lie

🌟 Advertising suggesting that your store is in a convenient location

http://go.owu.edu
How Maps Lie

Advertising suggesting that your store is in a convenient location
How Maps Lie

Advertising suggesting that your store is in a convenient location

http://go.owu.edu
How Maps Lie

Show that your rail line is more direct than it actually is

FIGURE 5.1. Engineering department's map of the Helter, Skelter and Northern Railway.

FIGURE 5.2. Advertising and timetable map of the Helter, Skelter and Northern Railway.
How Maps Influence

⁻ Using influential (or racist) symbols
Can maps introduce racial bias?

https://www.gislounge.com/mapping-equality-locating-racial-bias/
How Maps Influence

Use of color and symbols vs. black and white

Color can attract attention to an otherwise unattractive map and make an area seem more interesting. Using symbols further increases visual interest, and can make people want to go to an area, rather than just show where things are.

“Rhetoric in Graphic Design”, Barbara Emanuel
How Maps Influence

“Eleven Rules for Polishing the Cartographic Image”

1. Be shrewdly selective
2. Frame strategically
3. Accentuate the positive
4. If caught, have a story
5. Minimize the negative
6. Dazzle with detail
7. Persuade with pap
8. Distract with aerial photographs and historical maps
9. Generalize creatively
10. Enchant with elegance
11. When all else fails, try bribery

Also see http://www.citylab.com/design/2015/06/when-maps-lie/396761/
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

**Fig. 2.** Crude birth rates, 2000, by state, based on equal-intervals cut-points and plotted on a visibility base map.
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

**Fig. 3.** Crude birth rates, 2000, by state, based on quantile cut-points and plotted on a visibility base map.
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

![Diagram showing births per 1,000 population with states Arizona, Texas, and Utah marked.]

FIG. 4. *Number line describes variation in the data for Figures 2 and 3.*
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

Fig. 5. Crude birth rates, 2000, by state, categorized to suggest dangerously low rates overall.
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

Fig. 6. Crude birth rates, 2000, by state, categorized to suggest dangerously high rates overall.
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

Births: United States, 2000

6.2 - 13.6 14.6 - 39.7 43.0 - 67.9 69.3 - 115.6 120.3 - 532.0

FIG. 7. The darker-is-more-intense metaphor of choropleth maps offers a potentially misleading view of numbers of births.
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

FIG. 8. The bigger-means-more metaphor of this dot-array map affords a more appropriate treatment of the count data in Figure 7.
How Maps Can Mislead

Choropleth maps and the impact of different class breaks

Referent: Rate of Population Change, Percentage, 1960 to 1970

Classed Variable: Net-Migration Rate, Percentage, 1960 to 1970

Fig. 9. The two lower maps are different representations of the same data. An optimization algorithm found cut-points intended to yield displays that look very similar (lower left) and very dissimilar (lower right) to the map at the top. Cut-points for the upper map include 0.0, which separates gains from losses, and 13.3, the national rate.
Maps and Politics/Propaganda

Long history of governments using maps to influence citizens, to promote certain agendas, make impressions...

A propaganda map is used for the intent of threat, an agent of control, exploitation, and to manipulate and/or emphasize. The propaganda is a tool for power.

This propaganda map was used by the United Kingdom to show what Germany’s secret goals were to taking over Europe. This was a way to get all the people of surrounding countries that were threatened by this portrayal.

www.bl.uk/popups/10.html
Maps and Politics/Propaganda

http://bibliodyssey.blogspot.com/2008/08/dogs-of-war.html
Maps and Politics/Propaganda

http://bibliodyssey.blogspot.com/2008/08/dogs-of-war.html
Maps and Politics/Propaganda

A STUDY IN EMPIRES

GERMANY

THE AGGRESSOR NATION?

GREAT BRITAIN

26% OF THE WORLD
THE BRITISH EMPIRE
Maps and Politics/Propaganda
Maps and Politics/Propaganda
Maps and Politics/Propaganda

"Here are the American bases in the world"
https://persuasivemaps.library.cornell.edu/history-and-academic-literature-of-persuasive-cartography
Maps and Politics/Propaganda

Atrocity against Humanity at the WORLD Trade Center

Nation Values as of 11 Nov 2001
Compiled from Various Sources

2,978 Citizens from 27 Nations perished due to Terrorist attacks upon the USA on Sep: 11 2001.
(ar o11 Aug 2001)

Map by Personalized Map Company
www.nymaps.com
Maps and Politics/Propaganda
Maps and Politics/Propaganda

Also see:

http://news.nationalgeographic.com/2016/10/propaganda-war-maps-gallery/


Did you know that a single presidential ballot from a voter in Wyoming has 347% more weight than a ballot in Florida? Because of the electoral college system, votes are far from equal. Depending on how low your state’s population is, your vote is worth more. The least populated states, such as Wyoming (pop. 500,000), are allotted a minimum of 3 votes. Whereas Tennessee (pop. 5,900,000) is allotted only 11 votes despite having over 10 times the population.

With the electoral college system, American votes are far from equal. Isn’t it time for direct presidential elections, where one vote is one vote?
Maps and Politics/Propaganda

Figure 7.4, Argentinian postage stamps have touted that nation’s claims not only to the Falkland Islands and the British-held islands to their east but also to Antarctica. Like all official maps of Argentina, these postage stamps deny the legitimacy of British occupation with their Spanish label “Islas Malvinas.” Postage stamps bearing maps are also useful propaganda tools for emergent nations and ambitious revolutionary movements.
Maps and Politics/Propaganda

Soviet cartographic disinformation -- maps deliberately in error to conceal secrets or fool the enemy

FIGURE 8.1: Representation of Logashkino and vicinity, on the East Siberian Sea, on various Soviet maps published between 1939 and 1969.
Gerrymandering

The way a political party can manipulate electoral boundaries for political gain

The state Senate district satirized in this cartoon (originally published in the Boston Centinel in 1812) was created by the Massachusetts legislature to favor the incumbent Democratic-Republican party candidates backed by Governor Elbridge Gerry over the Federalists in 1812.
Gerrymandering

**Congressional District 4**

Illinois's 4th congressional district packs two Hispanic areas while remaining contiguous by narrowly tracing Interstate 294.

**Congressional District 12**

North Carolina's 12th congressional district, which is predominantly African-American and liberal.
Gerrymandering

Congressional District 23

California's 23rd congressional district is confined to a narrow strip of coast, another example of the “packing” style of districting. This district was designed to provide for a safe seat for the Democratic Representative.
**Trap Streets**

Non-existent streets included on a map in order to catch plagiarism among cartographic competitors