Data Visualization & Design

Week 9

Announcements

Group Project Due Date:

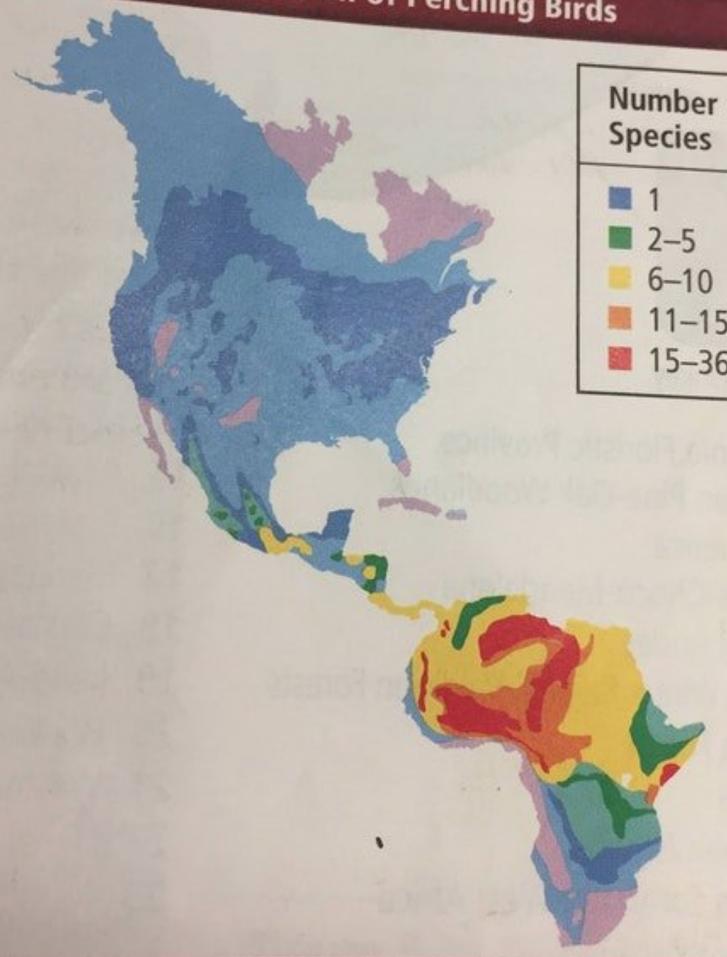
Saturday, March 30th at 11:59PM

This week in **visualization…**

5.1

Living Environment St 1 K1: 1.1a; K3: 3.1a

Distribution of Perching Birds



Hudson Yards Is Manhattan's Biggest, Newest, Slickest Gated Community.

Is This the Neighborhood New York Deserves?

By Michael Kimmelman
Architecture critic, The New York Times

March 14, 2019

1. Introduction to **Mapping**
2. Group Project **Critique**
3. Studio: Creating a **Choropleth Map** in Tableau

1. Introduction to **Mapping**
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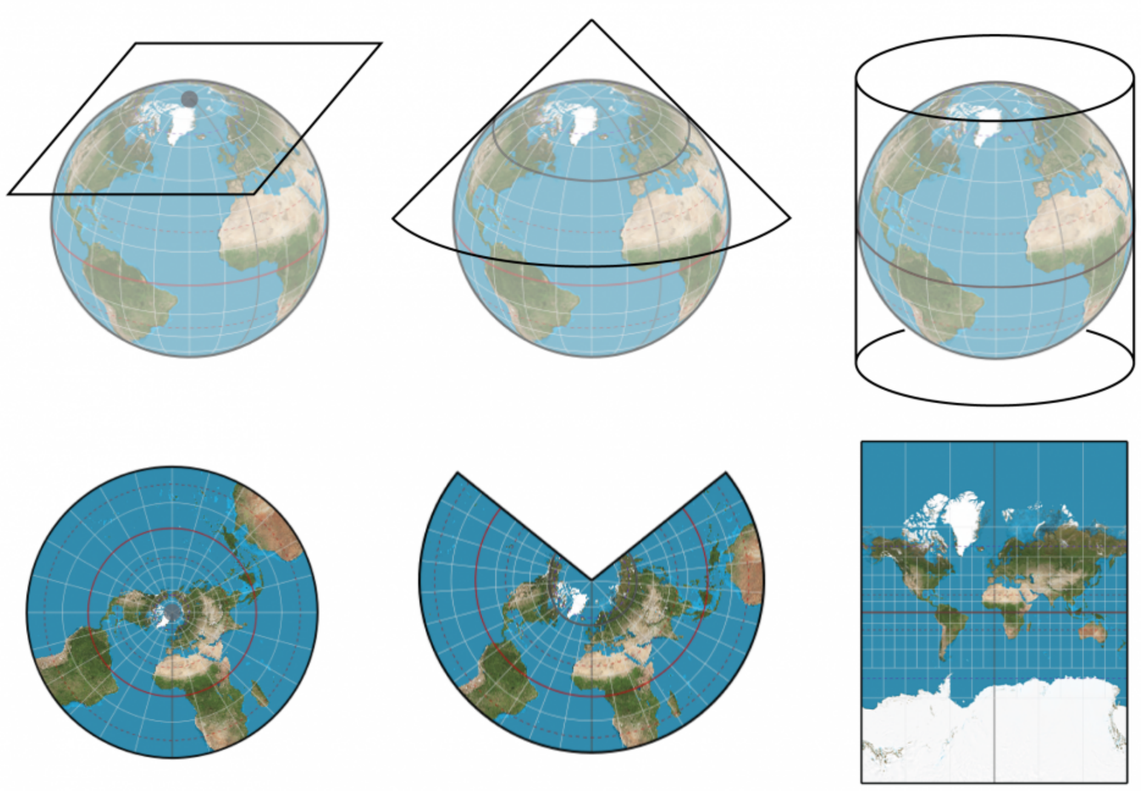
Projections

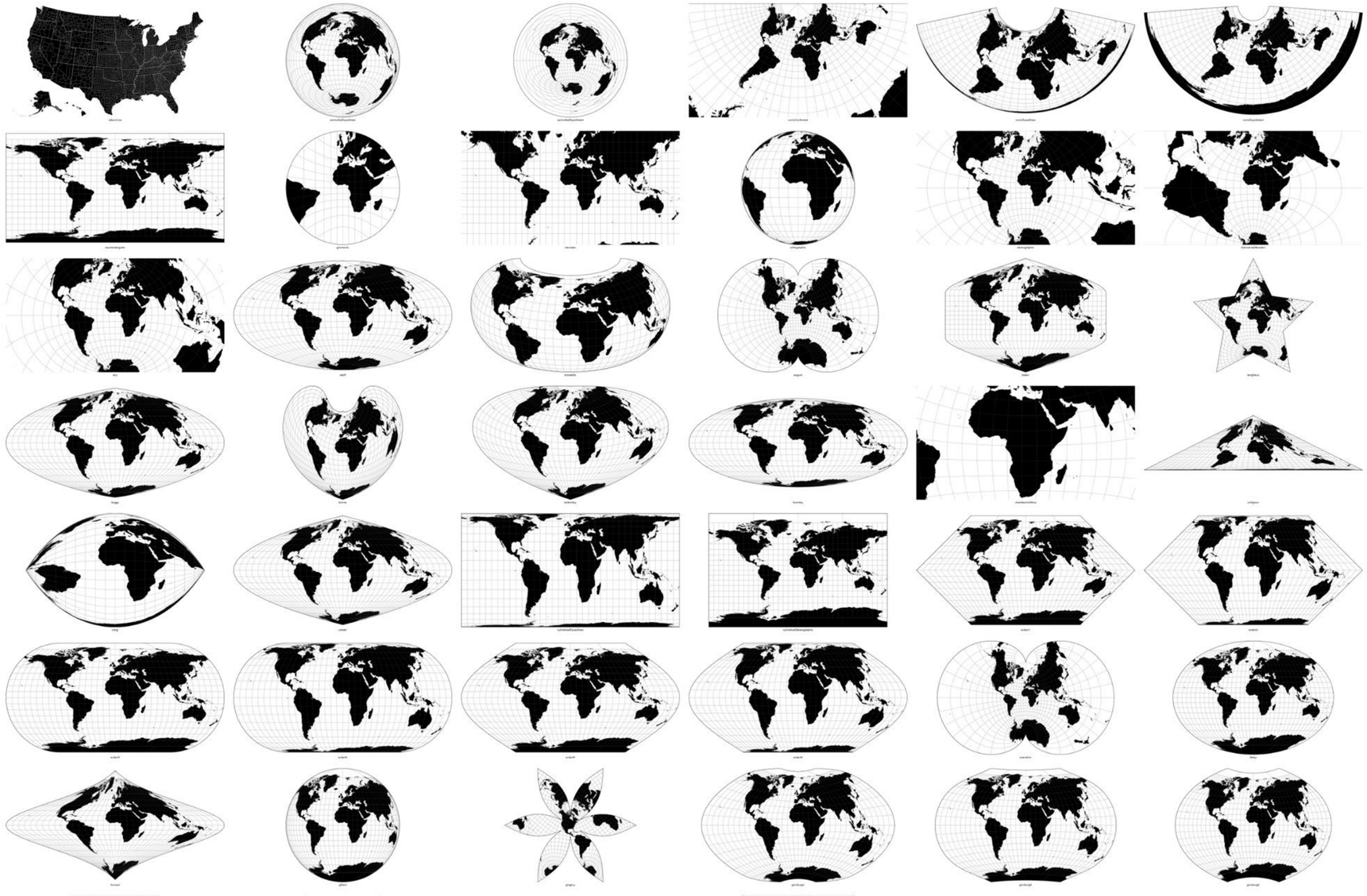
How to make the (round) earth flat?

Map projection

- Map is generally a 2D projection of a place on earth.
- Our earth is a sphere.
- The method of “unwrapping the sphere” is called projection
- All map projections distort the surface

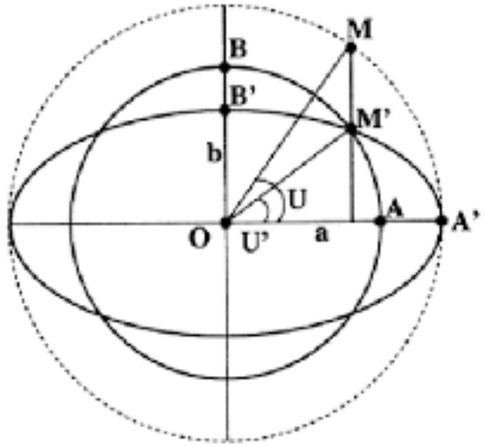


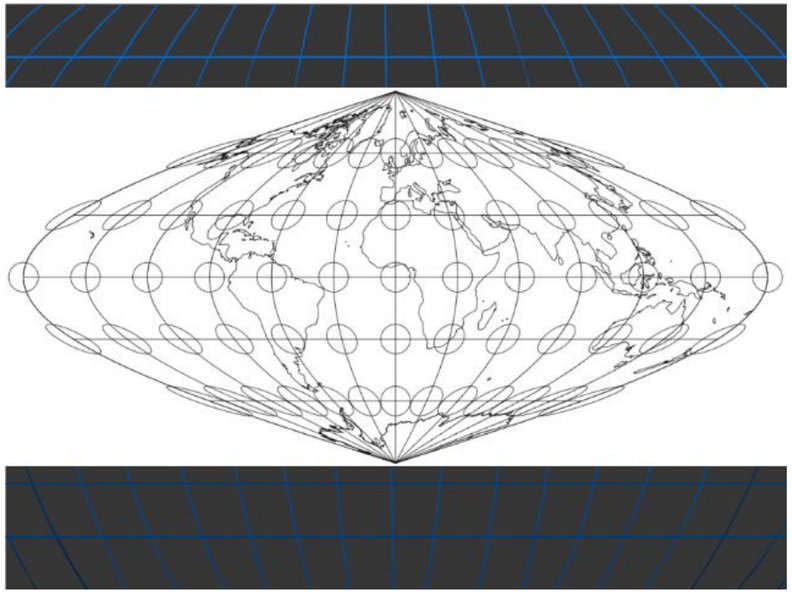
Every Map Projection



Tissot’s Indicatrix

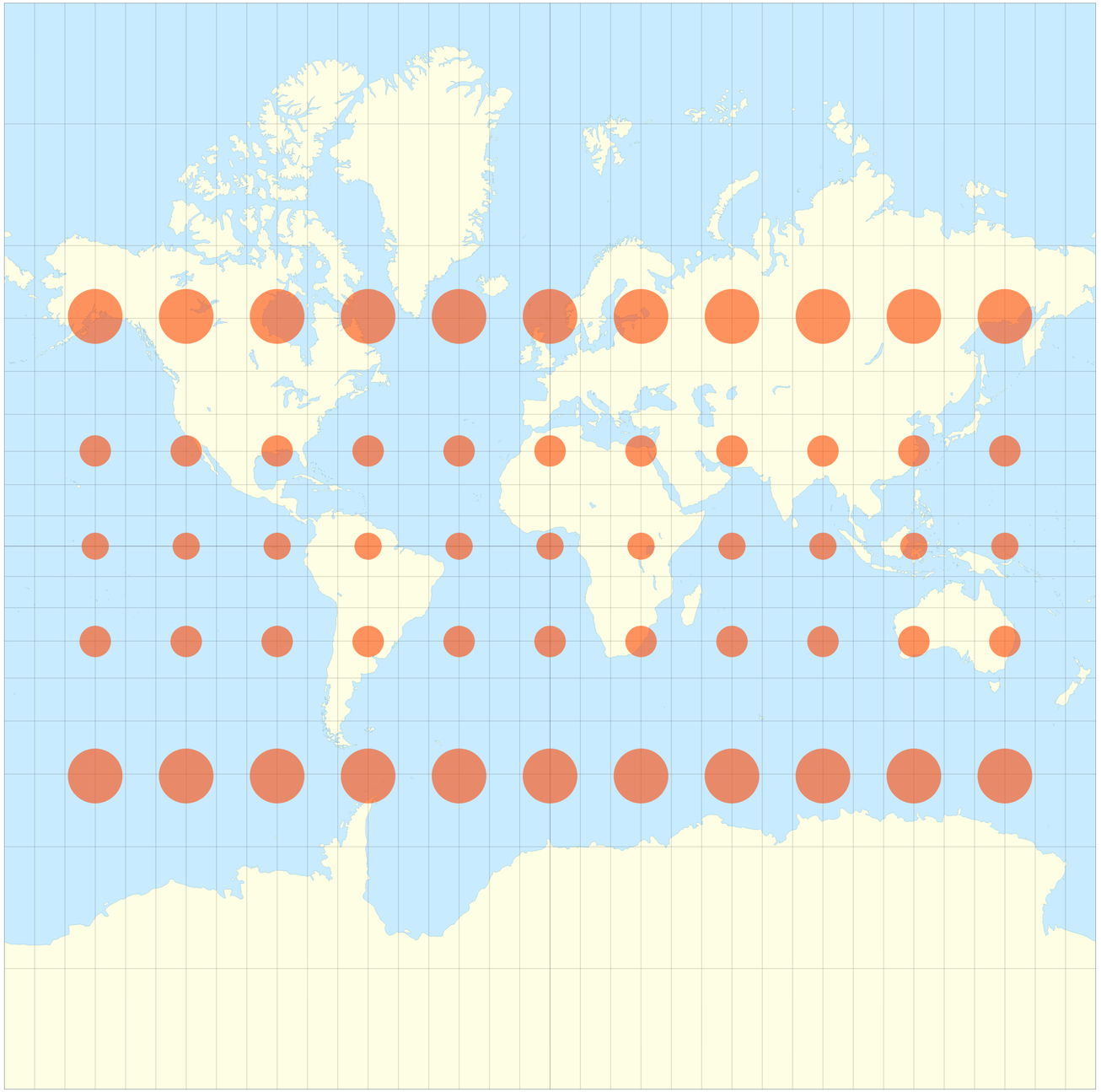
- Helps to quantify distortion and projection properties





Projection Types

- Mercator (most familiar) world projection
- North America & Europe Appear to be larger than they are
- Choose a map projection that best depicts your visualization
- [The True Size]



Map Types

How to represent different kinds of geospatial data?

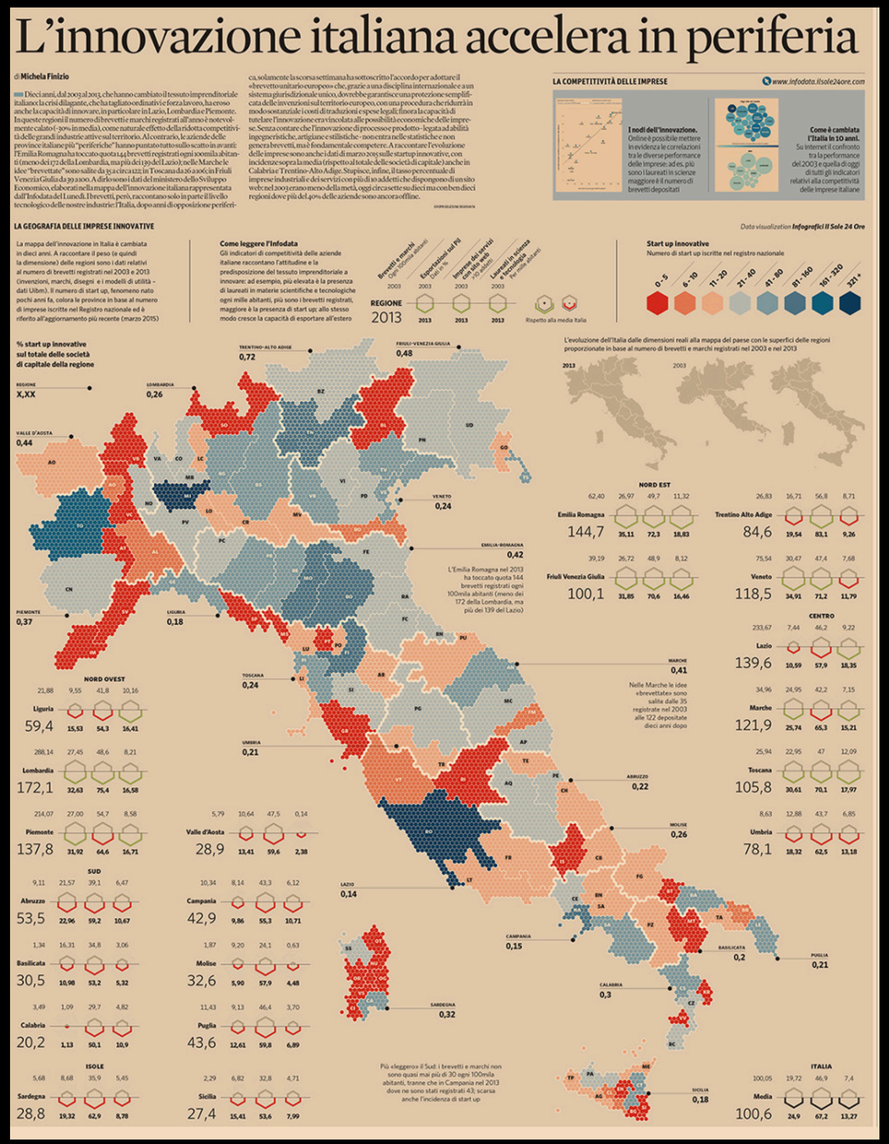
Map Types

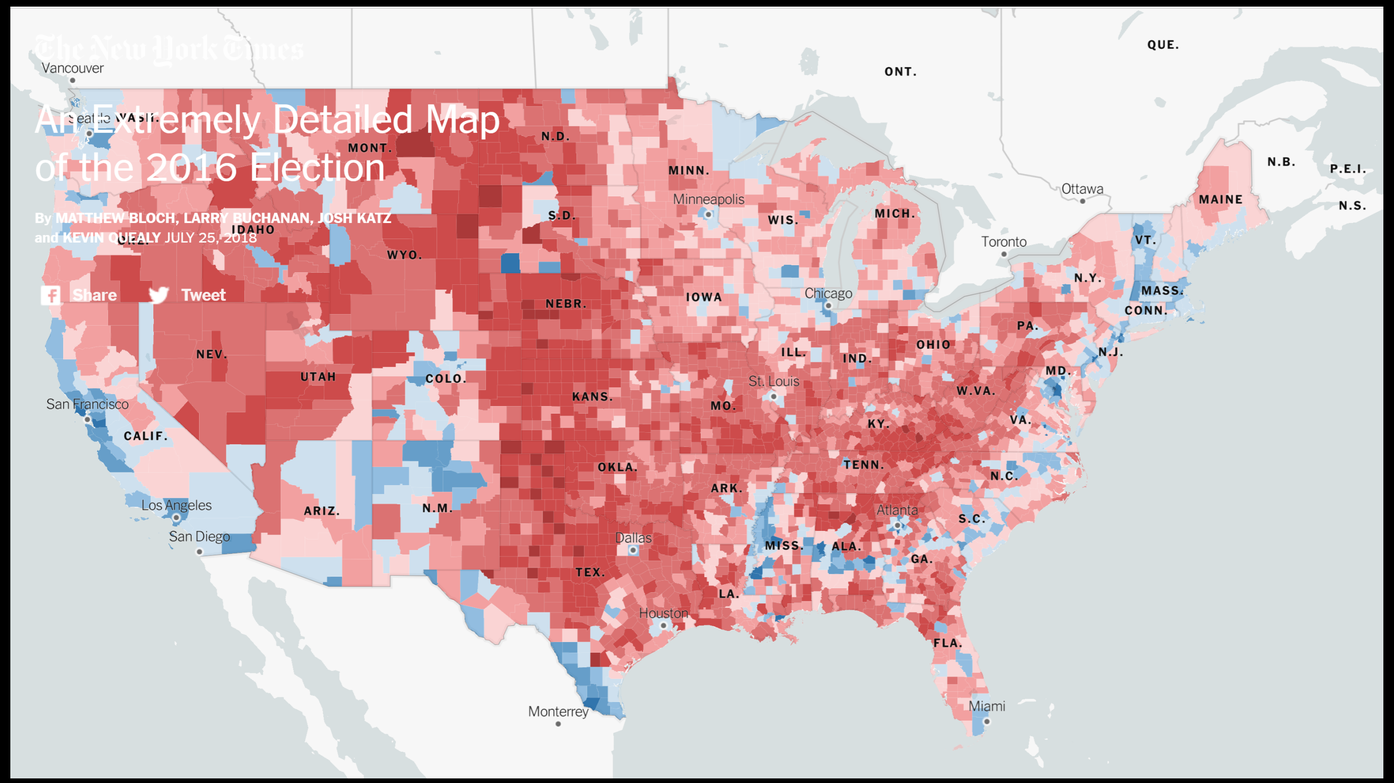
- **Reference** — Spatial without emphasis (ex. Topographic features, transportation routes)
- **Thematic** — Special theme or focus (ex. Precipitation)
- **Special purpose** — Industry-specific (ex. Navigation map)

Elements of a Thematic Map

- Scale
- Base map & thematic data
- Cartographic generalization
  - Selection
  - Classification
  - Simplification
  - Symbolization
- Qualitative or quantitative

Choropleth


L'innovazione italiana accelera in periferia
di Michela Finizio
Dieci anni, dal 2003 al 2013, che hanno cambiato il tessuto imprenditoriale italiano: la crisi dilagante, che ha tagliato ordinativi e forza lavoro, ha eroso anche la capacità di innovare, in particolare in Lazio, Lombardia e Piemonte. In queste regioni il numero di brevetti e marchi registrati all'anno è notevolmente calato (-30% in media), come naturale effetto della flaridotta competitività delle grandi industrie attive sul territorio. Al contrario, le aziende delle province italiane più "periferiche" hanno puntato tutto sullo scatto in avanti: l'Emilia Romagna ha toccato quota 144 brevetti registrati ogni 100mila abitanti (meno dei 172 della Lombardia, ma più dei 139 del Lazio), nelle Marche le idee "brevettate" sono salite da 35 a circa 122; in Toscana da 26 a 106; in Friuli Venezia Giulia da 39 a 100. A dirlo sono i dati del ministero dello Sviluppo Economico, elaborati nella mappa dell'Innovazione italiana rappresentata dall'Infodata del Lunedì. I brevetti, però, raccontano solo in parte il livello tecnologico delle nostre industrie: l'Italia, dopo anni di opposizione periferica, solamente la scorsa settimana ha sottoscritto l'accordo per adottare il «brevetto unitario europeo» che, grazie a una disciplina internazionale e a un sistema giurisdizionale unico, dovrebbe garantisce una protezione semplificata delle invenzioni sul territorio europeo, con una procedura che riduttrà in modo sostanziale i costi di traduzioni e spese legali, finora la capacità di tutelare l'innovazione era vincolata alle possibilità economiche delle imprese. Senza contare che l'innovazione di processo e prodotto - legata ad abilità ingegneristiche, artigiane e stilistiche - non entra nelle statistiche e non genera brevetti, ma è fondamentale competere. A raccontare l'evoluzione delle imprese sono anche i dati di marzo 2015 sulle startup innovative, con incidenze sopra la media (rispetto al totale delle società di capitale) anche in Calabria e Trentino-Alto Adige. Stupisce, infine, il tasso percentuale di imprese industriali e dei servizi con più di 10 addetti che dispongono di un sito web nel 2003 (erano meno della metà, oggi circa sette su dieci ma con ben dieci regioni dove più del 40% delle aziende sono ancora offline.
LA COMPETITIVITÀ DELLE IMPRESE
www.infodata.ilsole24ore.com
I nodi dell'innovazione.
Come è cambiata l'Italia in 10 anni.
LA GEOGRAFIA DELLE IMPRESE INNOVATIVE
Data visualization Infografici Il Sole 24 Ore
Come leggere l'Infodata
Start up innovative
% start up innovative sul totale delle società di capitale della regione
L'evoluzione dell'Italia delle dimensioni reali alla mappa del paese con le superfici delle regioni proporzionate in base al numero di brevetti e marchi registrati nel 2003 e nel 2013
NORD EST
Emilia Romagna 144,7
Trentino Alto Adige 84,6
Friuli Venezia Giulia 100,1
Veneto 118,5
CENTRO
Lazio 139,6
Marche 121,9
Toscana 105,8
Umbria 78,1
NORD OVEST
Liguria 59,4
Lombardia 172,1
Piemonte 137,8
Valle d'Aosta 28,9
SUD
Abruzzo 53,5
Campania 42,9
Basilicata 30,5
Molise 32,6
Calabria 20,2
Puglia 43,6
ISOLE
Sardegna 28,8
Sicilia 27,4
ITALIA
Media 100,6


The New York Times
An Extremely Detailed Map of the 2016 Election
By MATTHEW BLOCH, LARRY BUCHANAN, JOSH KATZ and KEVIN QUEALY JULY 25, 2016
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KANS.
MO.
St. Louis
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TENN.
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ALA.
MISS.
Los Angeles
San Diego
ARIZ.
N.M.
Dallas
TEX.
LA.
Houston
FLA.
Miami
Monterrey

Choropleth

- Polygon
- Shaded regions
- Variability and difference
- Predefined boundaries

Considerations

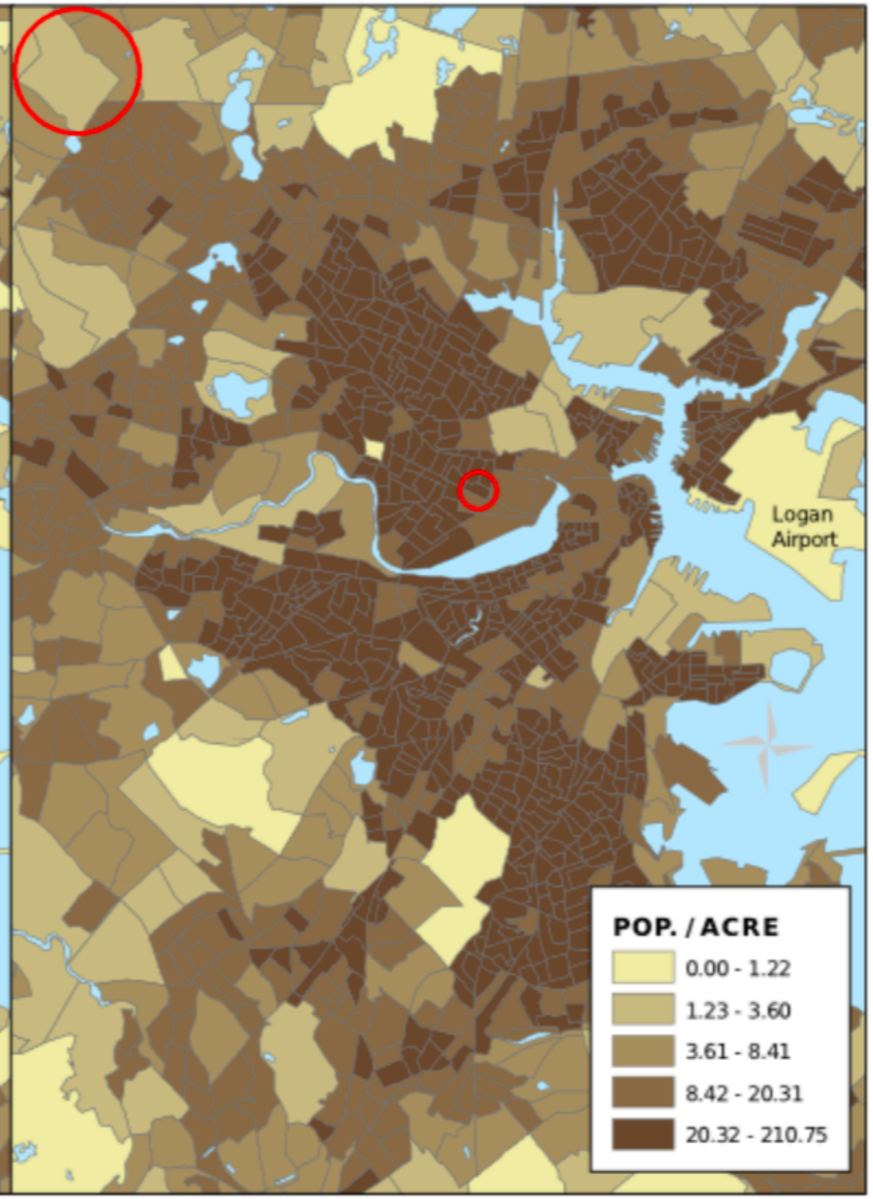
- Bucketing
- Level of abstraction
- Modifiable areal unit problem (MAUP) or problem with aggregation
- Can overemphasize difference

IMPORTANT:

Ratios, NOT raw counts!!

Total Population of 2000 Census Block Groups

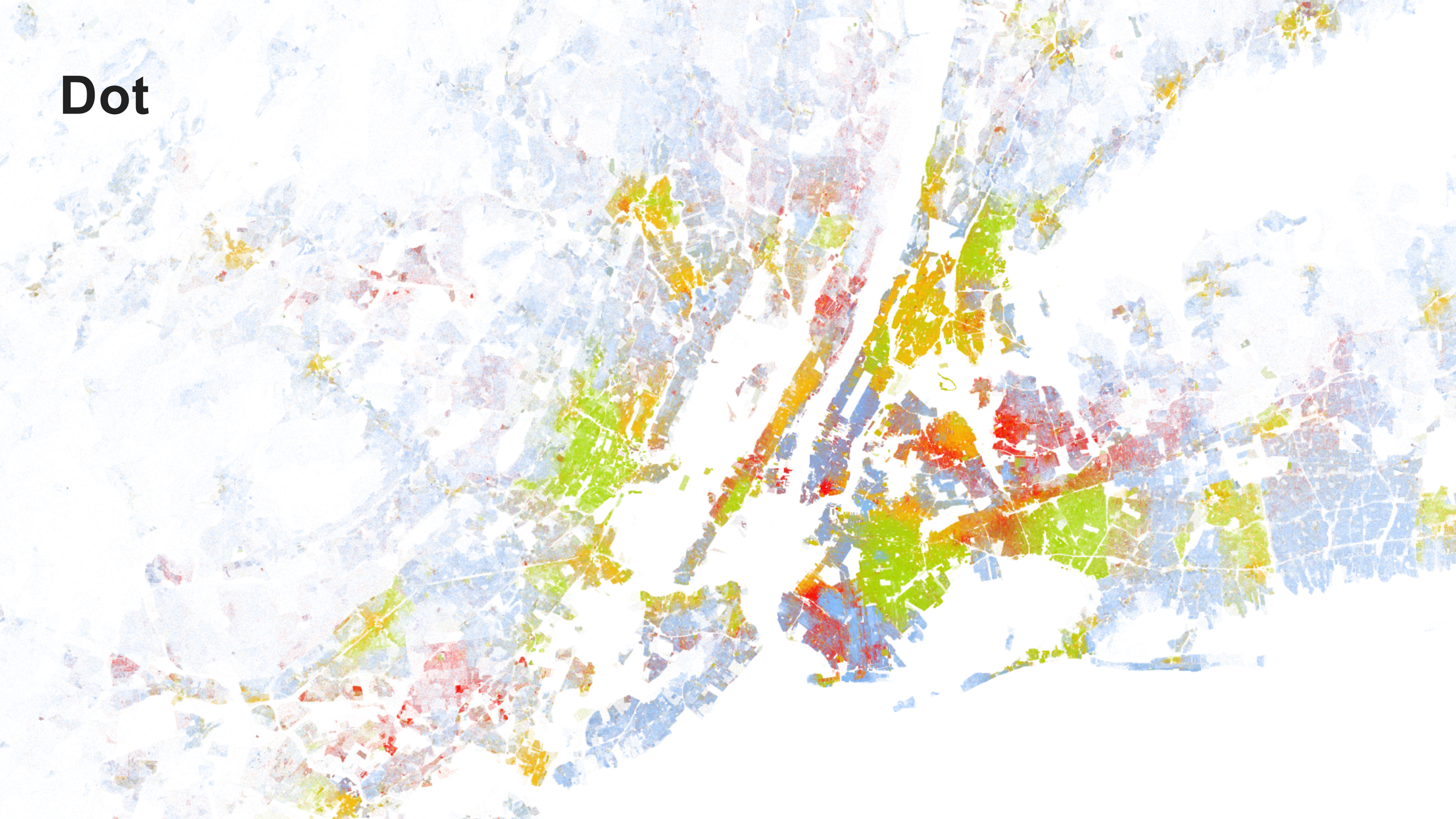
Population Density of 2000 Census Block Groups



IMPORTANT:

Ratios, NOT raw counts!!

Dot



Dot

- Point
- Spatial density

Considerations

- Especially reductive — isolated events
- High-density areas make comparisons difficult

Proportional Symbol

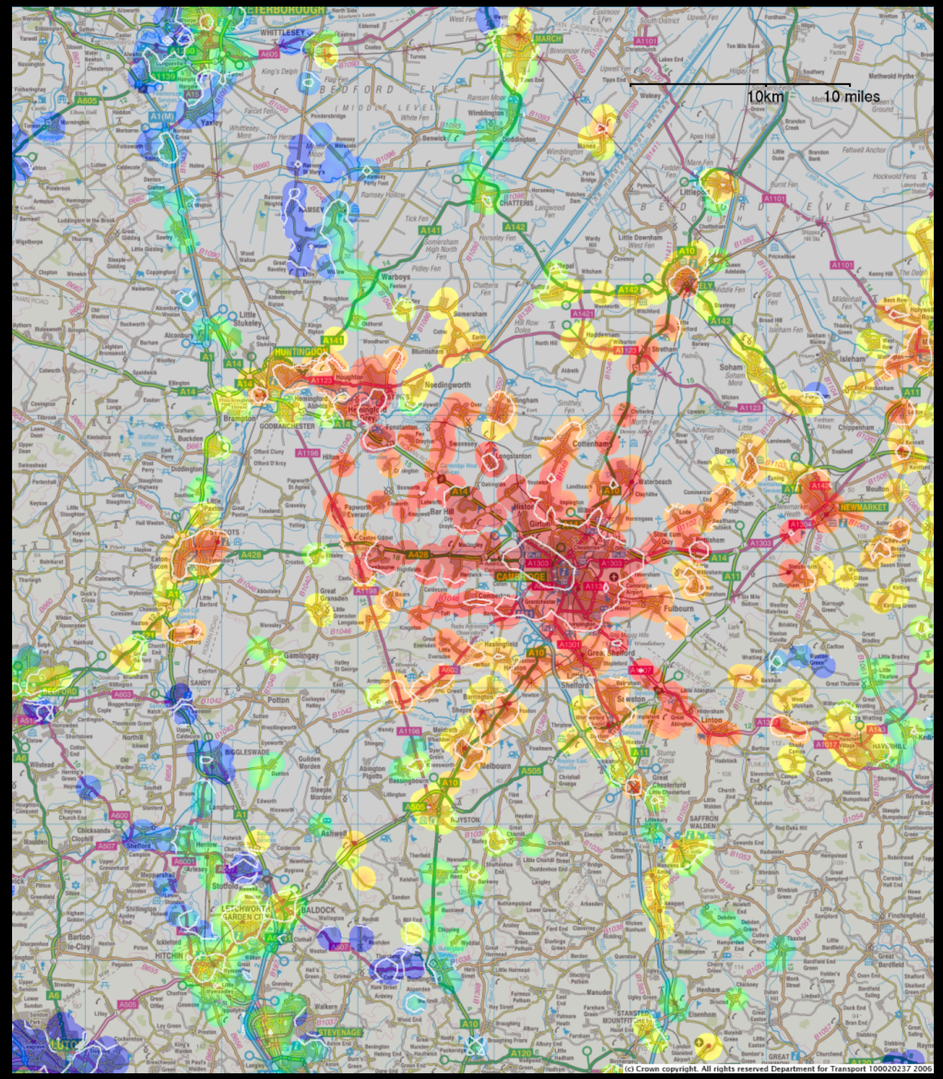
Proportional Symbol

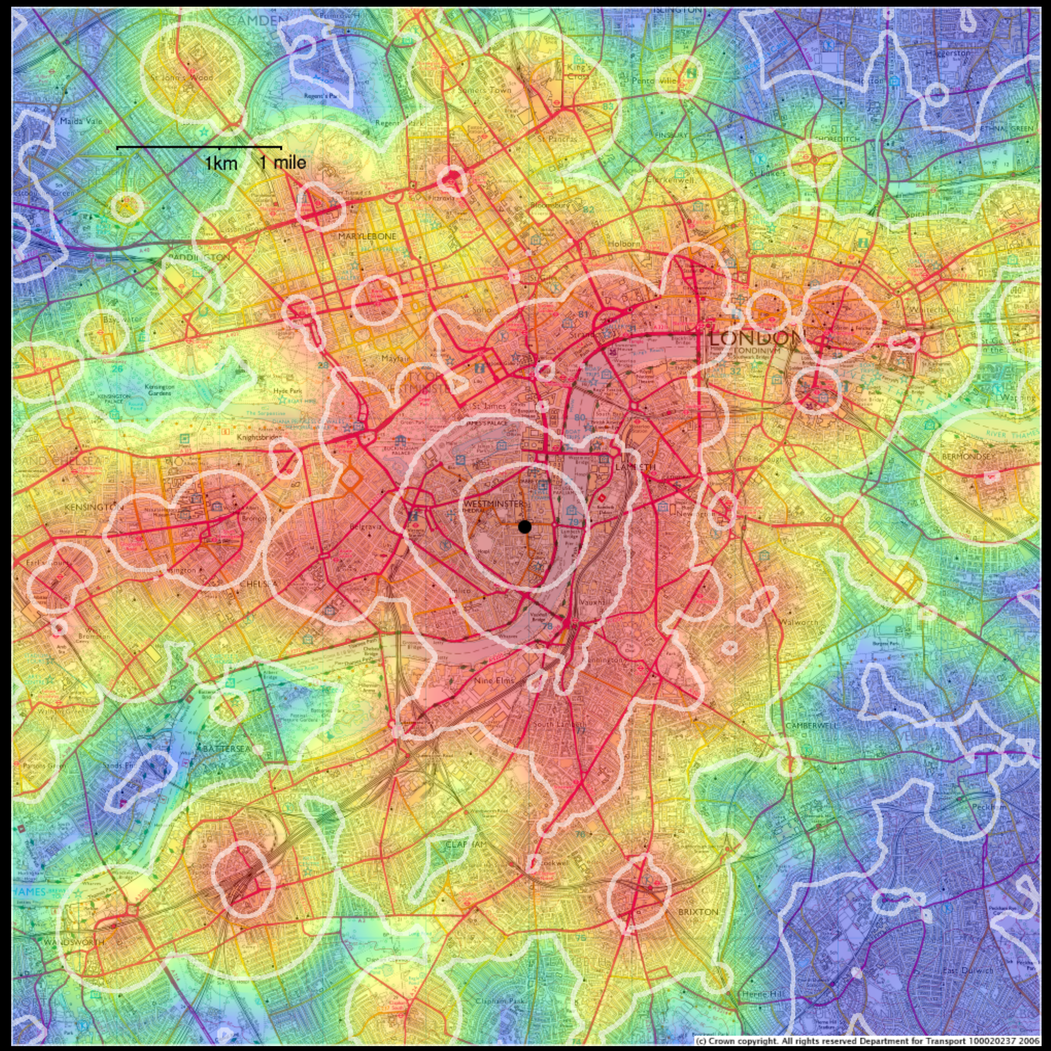
- Point
- Larger symbol = more at location
- Most often, area of proportional 2D symbol encodes data
- Possible to create compound symbols

Considerations

- Overlapping symbols
- Ambiguous centers
- Can get congested

Isopleth (Contour)





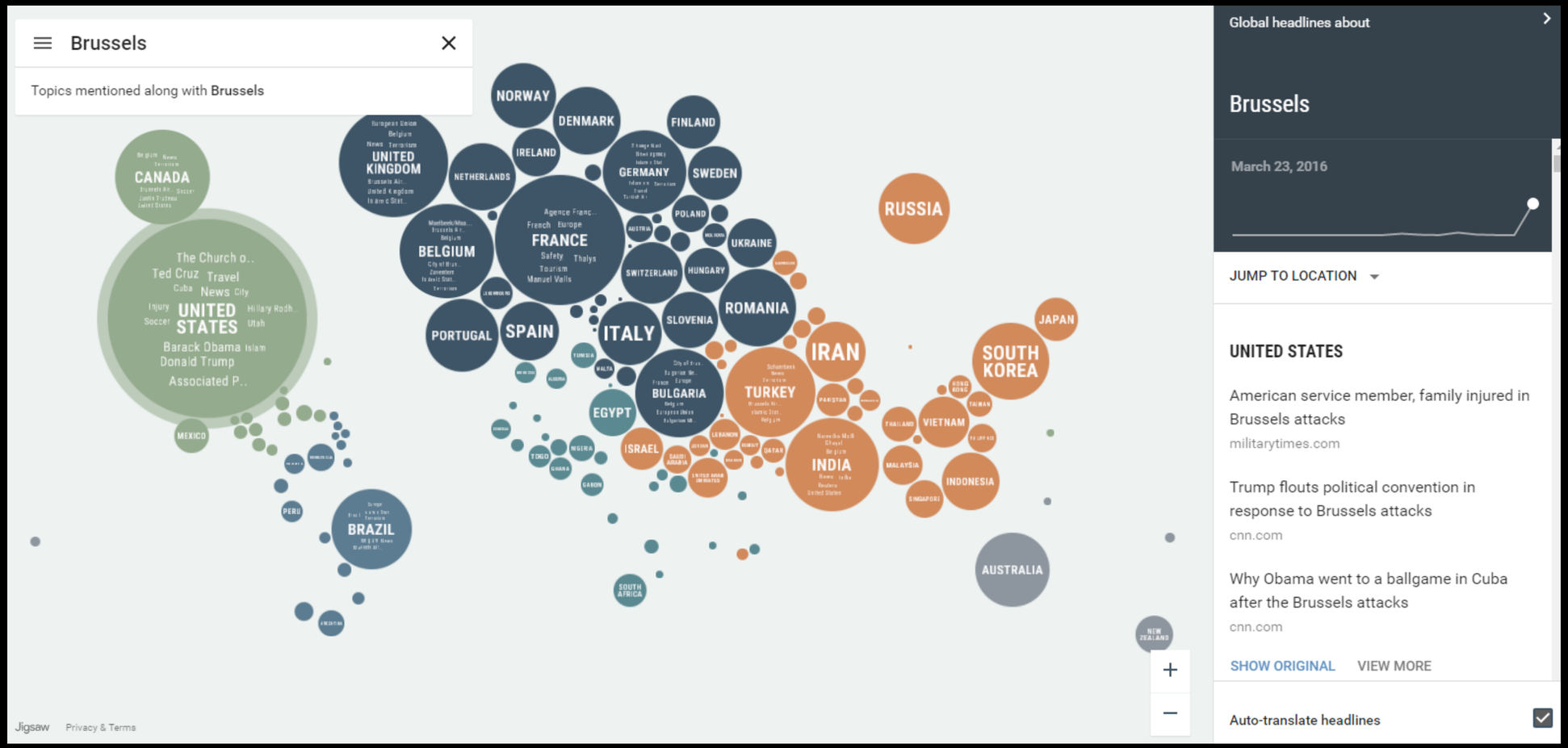
Isopleth (Contour)

- Data not grouped into predefined boundaries
- Good for showing gradual change between areas

Considerations

- Not good for showing discontinuous distributions
- Need lots of data

Cartogram


Brussels
Topics mentioned along with Brussels
CANADA
UNITED KINGDOM
NORWAY
DENMARK
FINLAND
IRELAND
NETHERLANDS
GERMANY
SWEDEN
POLAND
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American service member, family injured in Brussels attacks
militarytimes.com
Trump flouts political convention in response to Brussels attacks
cnn.com
Why Obama went to a ballgame in Cuba after the Brussels attacks
cnn.com
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VIEW MORE
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Cartogram

- Substitutes thematic mapping variable for land area
- Tries to preserve general features

Considerations

- Distortion

1. Introduction to **Mapping**
2. Group Project **Critique**
3. Studio: Creating a **Choropleth Map** in Tableau

1. What does this piece **communicate**?
2. Does it fulfill the designers' **intent**?
3. In what ways could it **improve**?

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Studio

Mapping in Tableau: **Acceptable File Types**

- **ESRI shapefiles**: The folder must contain .shp, .shx, .dbf, and .prj files.
- **ESRI File Geodatabases**: The folder must contain the .zip of the File Geodatabase's .gdb.
- **MapInfo tables:** The folder must contain .TAB, .DAT, .MAP, and .ID or .MID and .MIF files.
- **KML files**: The folder must contain the .kmlfile. (No other files are required.)
- **GeoJSON files**: The folder must contain the .geojson file. (No other files are required.)
- **TopoJSON files**: The folder must contain the .json file. (No other files are required.)

To create a choropleth map, you need..

- Quantitative or qualitative values
- Location names (if recognized by Tableau), or custom polygons

Basic Map Building Blocks

- **Columns shelf:** Longitude (continuous measure, longitude geographic role assigned)
- **Rows shelf:** Latitude (continuous measure, latitude geographic role assigned)
- **Detail:** One or more geographic units (dimensions with geographic roles assigned)
- **Color:** Measure or dimension
- **Mark type:** Automatic or Map

https://github.com/emilyfuhrman/datavis_design/blob/master/2019_Spring/Studios/06_Creating_a_Choropleth_Map_in_Tableau.md