

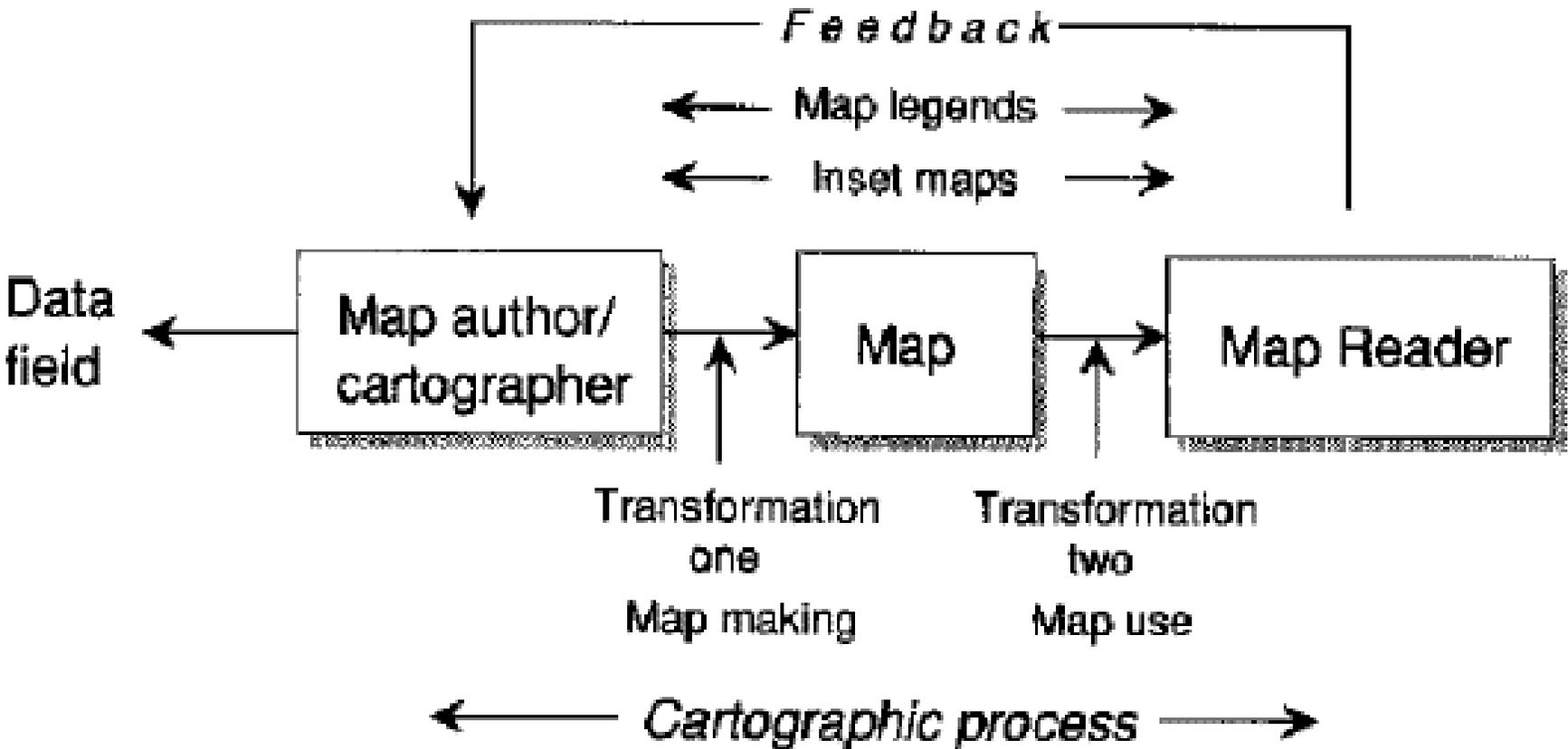
Geog183: Cartographic Design and Geovisualization Spring Quarter 2020

# Lecture 9: Principles of map design and layout

# Cartographic Design

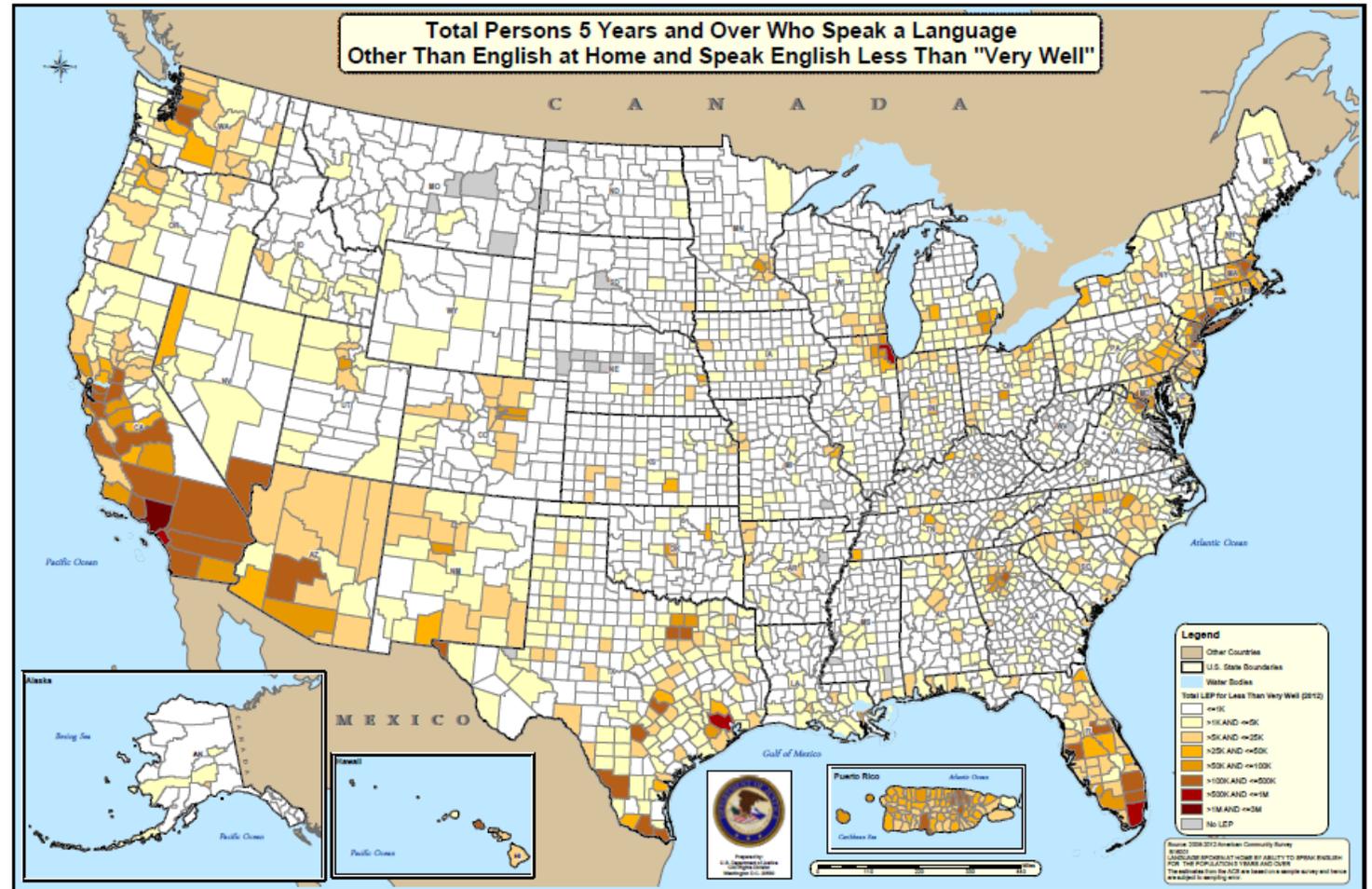
- Mental and physical map creation process
- Design relates to appearance, effectiveness in information communication
- Base level: follow rules, guidelines and conventions
- Increasing body of research on how maps work
- Even so, many maps can be created to solve a task, is there an optimum?
- Artistic element “guided less by experiment and more by intuition and critical examination”
- Significant overlap with graphic design more generally, e.g. text

# The Mapping Process



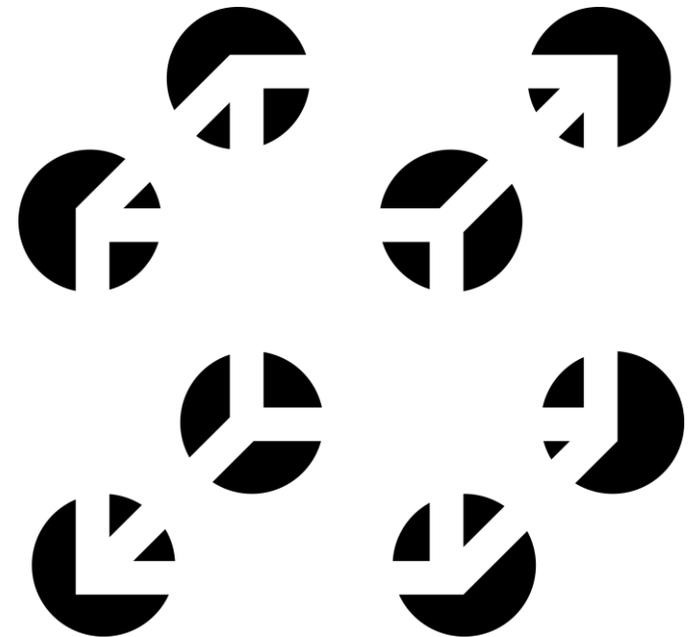
# Slocum's Map Elements

- Frame and neat line
- Mapped area (figure)
- Inset
- Title and subtitle
- Legend
- Data source
- Scale
- Orientation



# Gestalt

- Map consists of elements
- Human cognition is based on clumping
- Elements seen both individually and holistically
- Eye seeks similarity, proximity, continuity, closure
- Symmetry, simplicity, balance favored



# Clumping



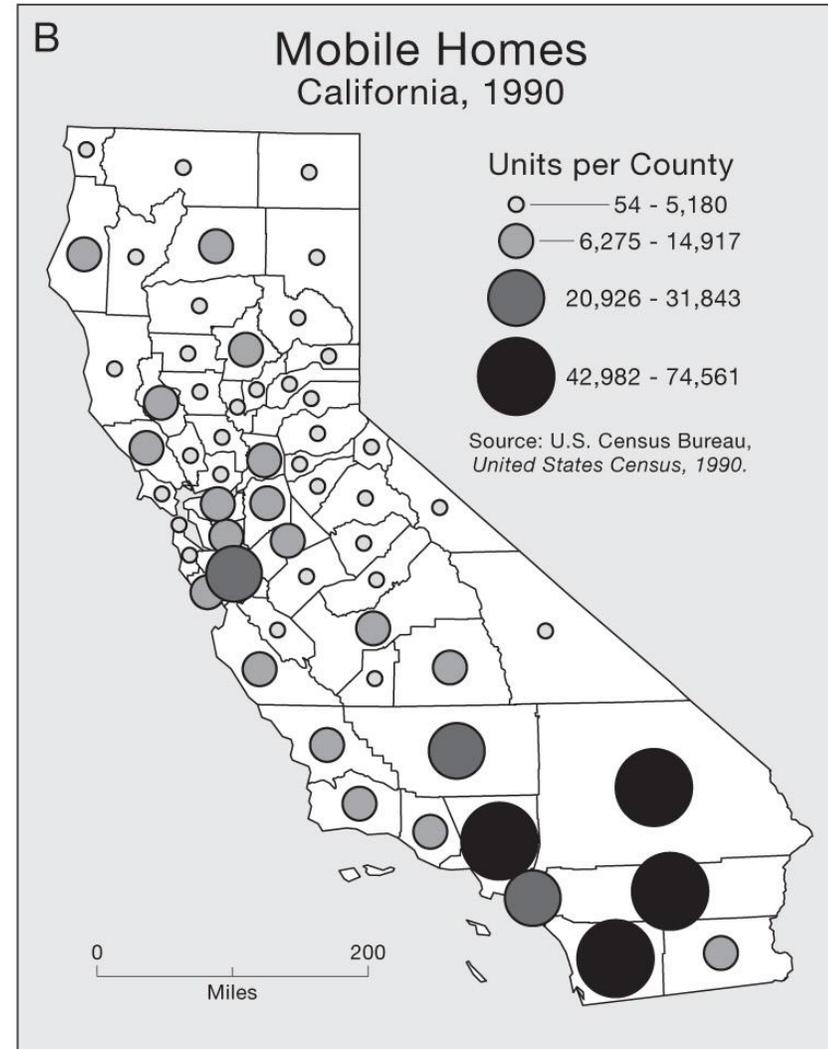
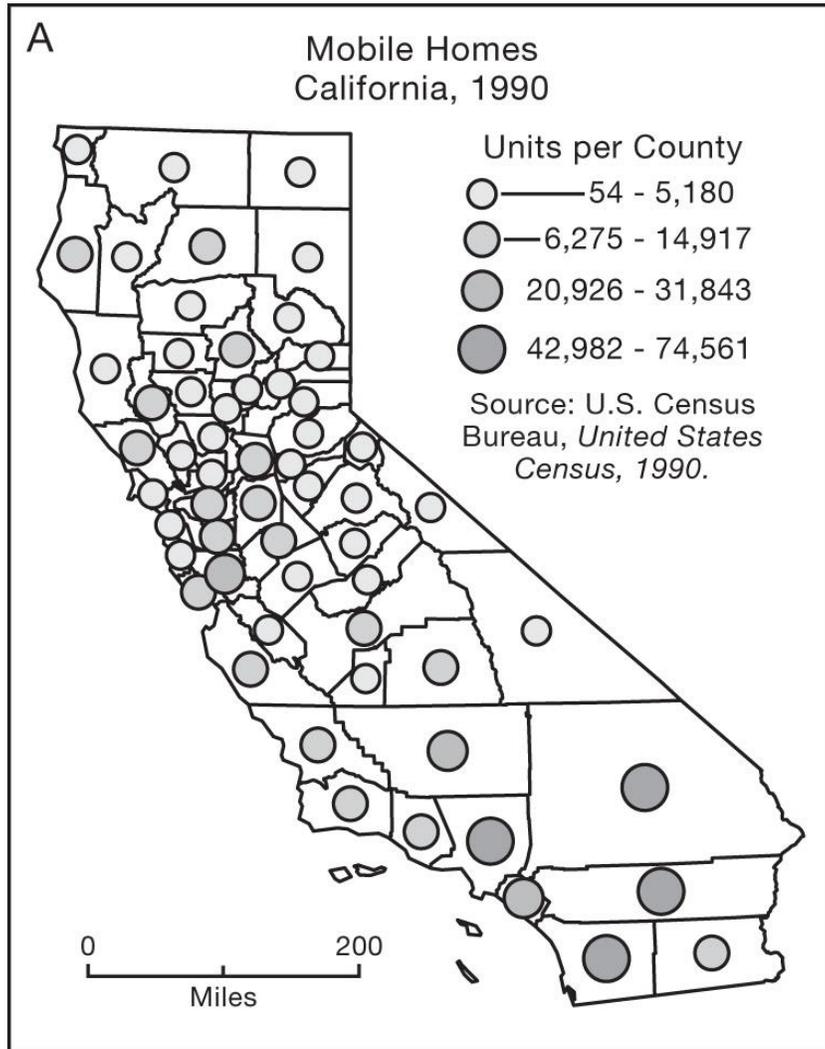
# Water bodies



# Slocum's design process

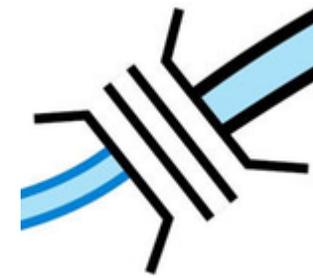
- Choose reproduction method
- Select scale and projection appropriate for theme
- Classification and symbolization method
- Select map elements required
- Rank symbols and elements into an “intellectual hierarchy”
- Create a sketch map for design experiments
- Test map on audience before making final version

# Visual hierarchy

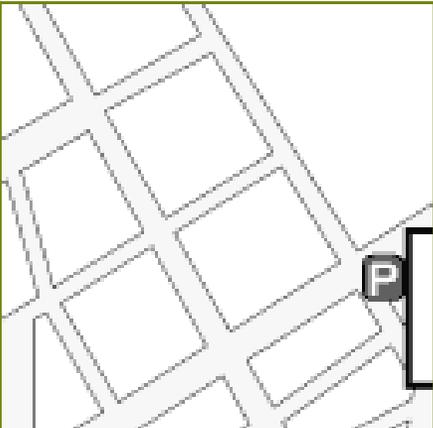
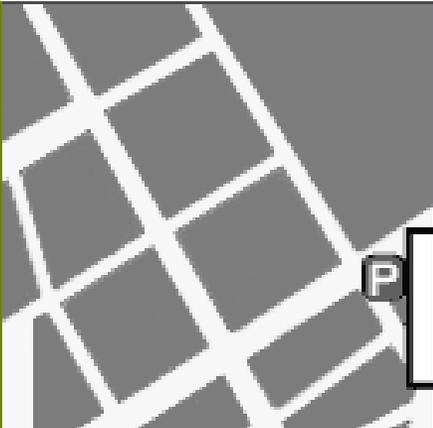


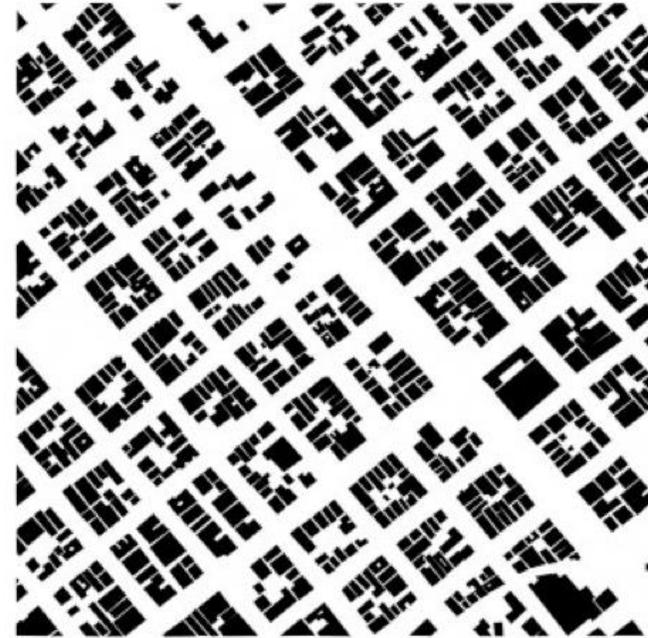
# Tricks for creating a visual hierarchy

- Create figure-ground contrast
- Figure isolation, vignette
- Line weight and type
- Color, shading and transparency
- Drop shadows, halos, masks, gaps
- Symbol overlap
- Extrusion, shading and 3D effects



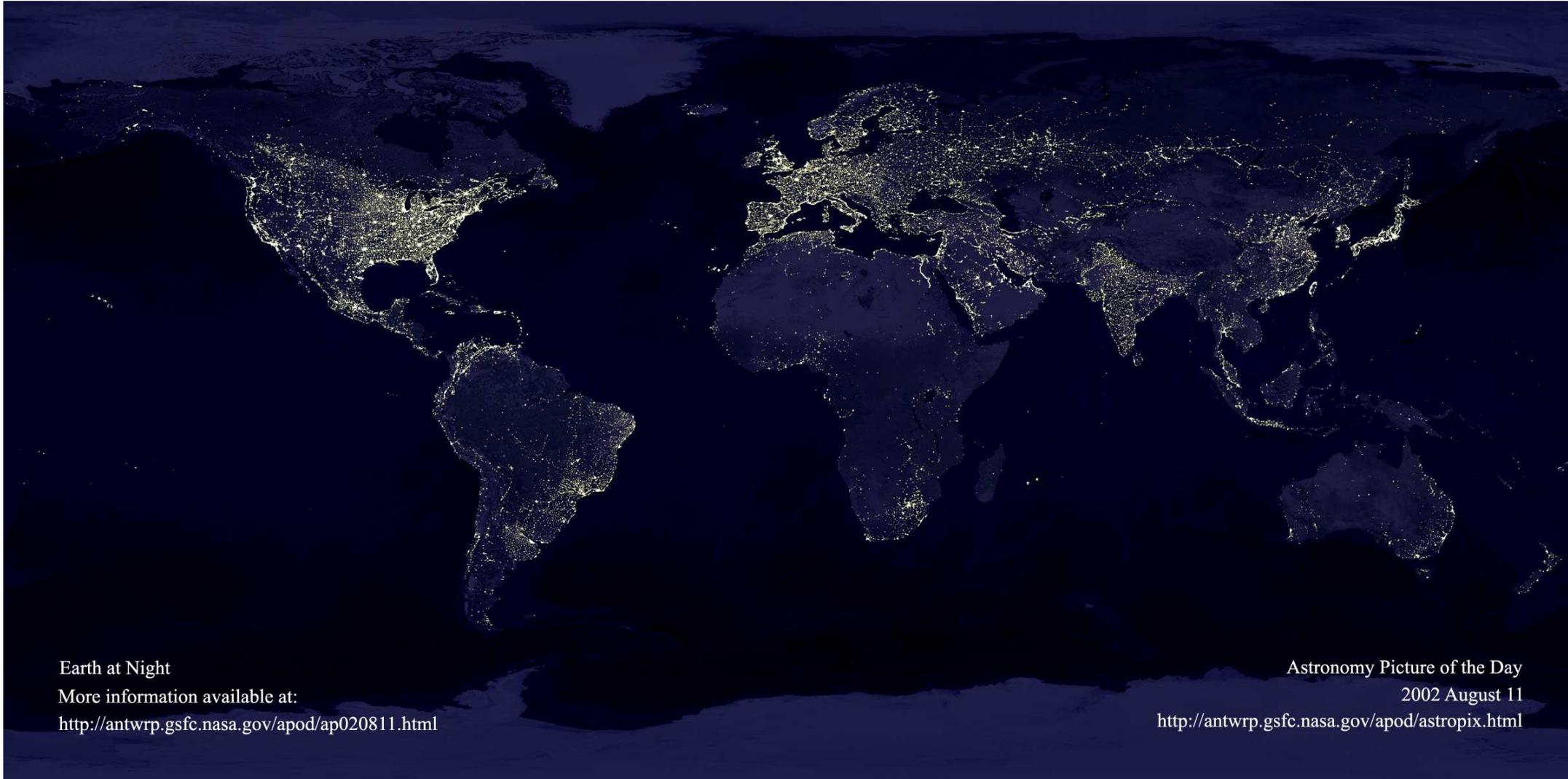
# Figure-Ground

				
	Poor Figure/Ground, Visual Noise		Better	





# Inverse convention



Earth at Night

More information available at:

<http://antwrp.gsfc.nasa.gov/apod/ap020811.html>

Astronomy Picture of the Day

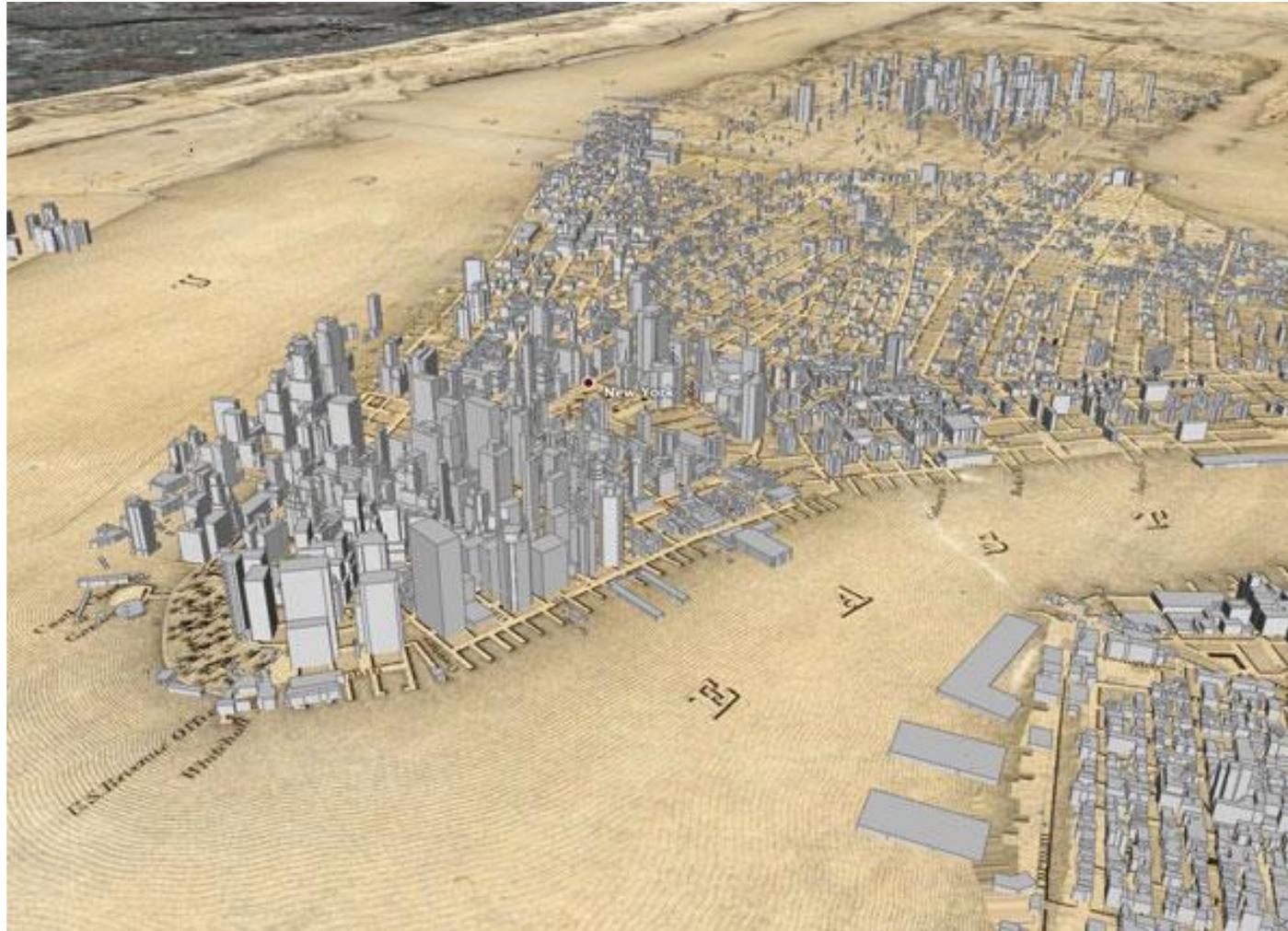
2002 August 11

<http://antwrp.gsfc.nasa.gov/apod/astropix.html>

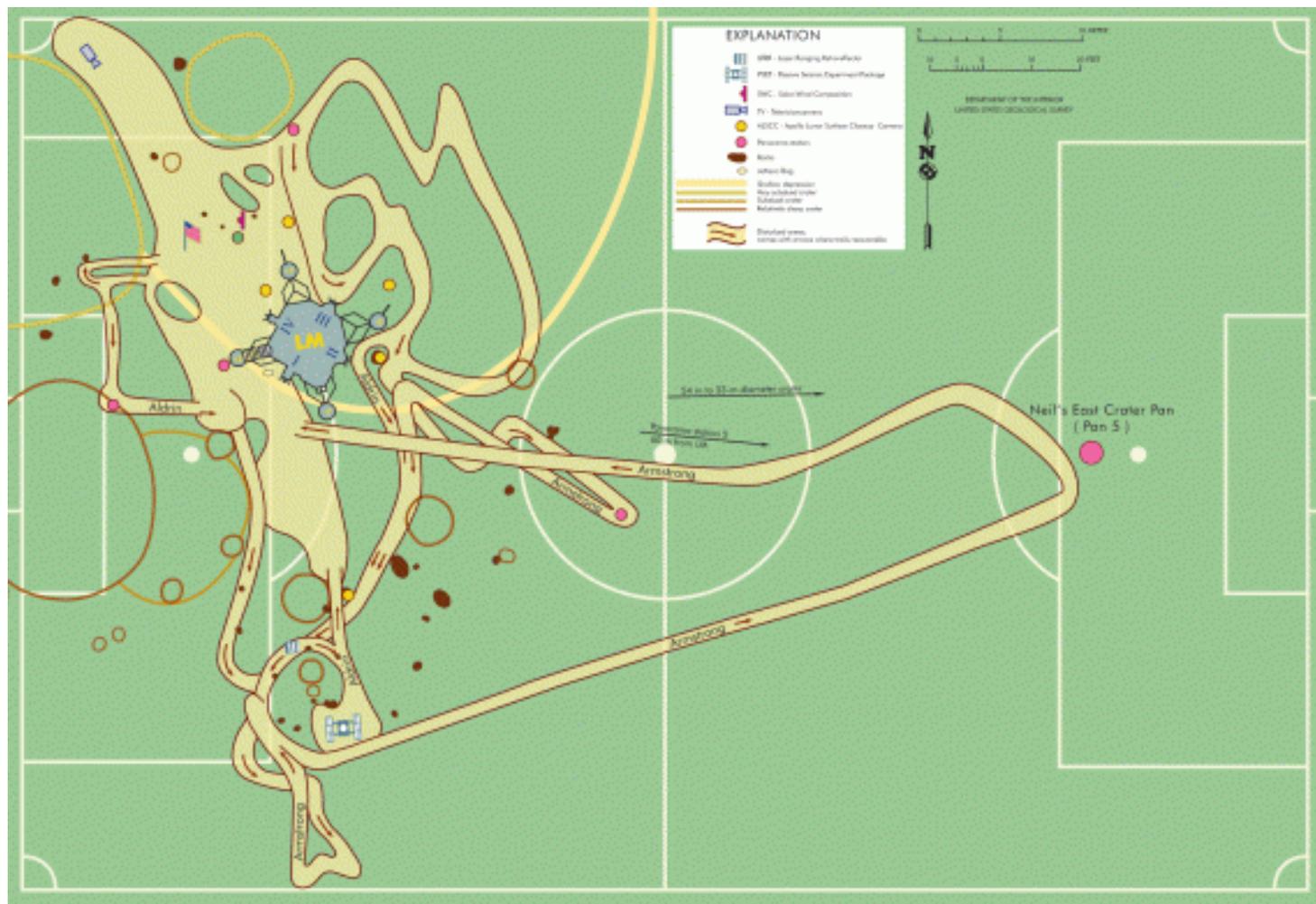
# Leave out the unknown



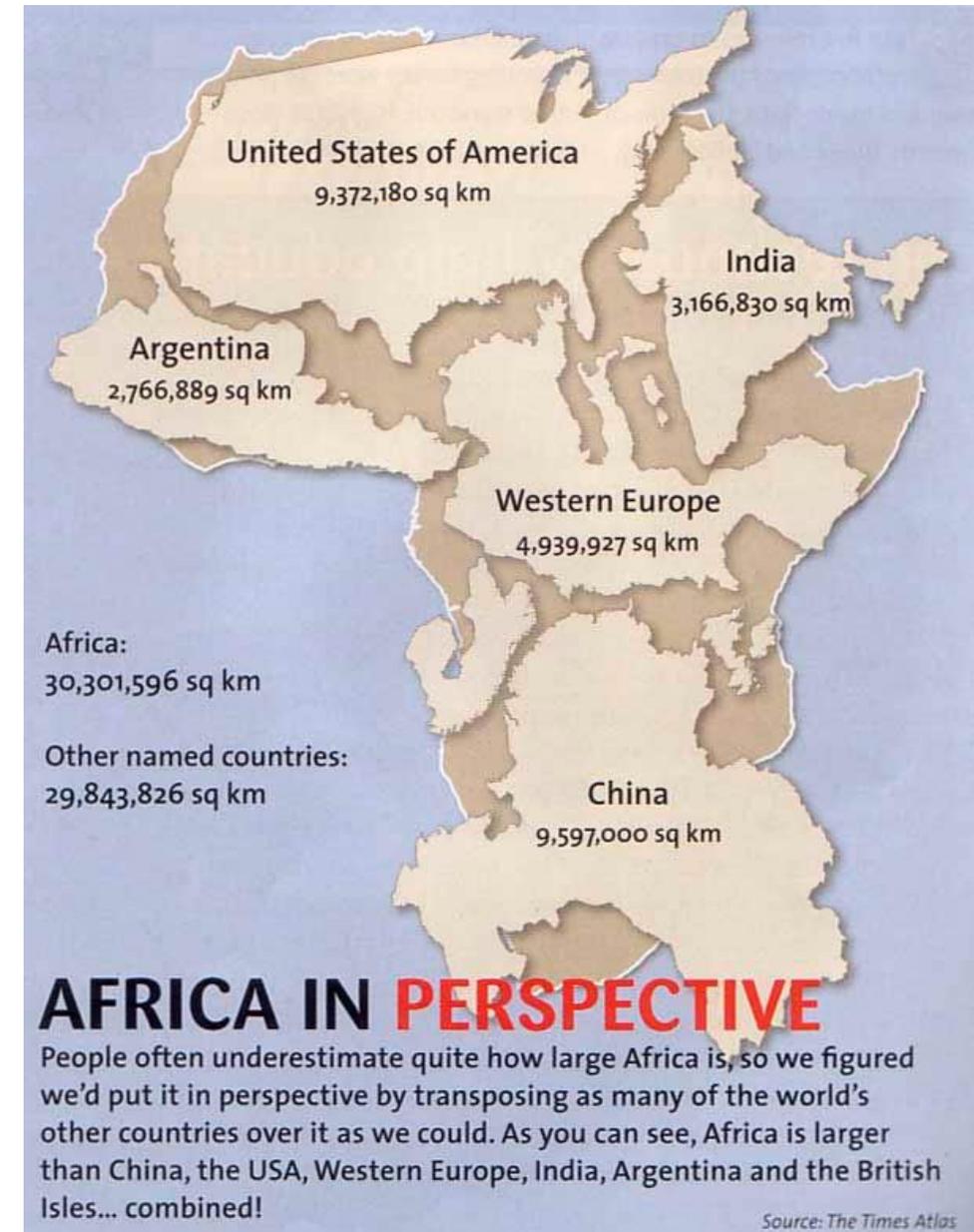
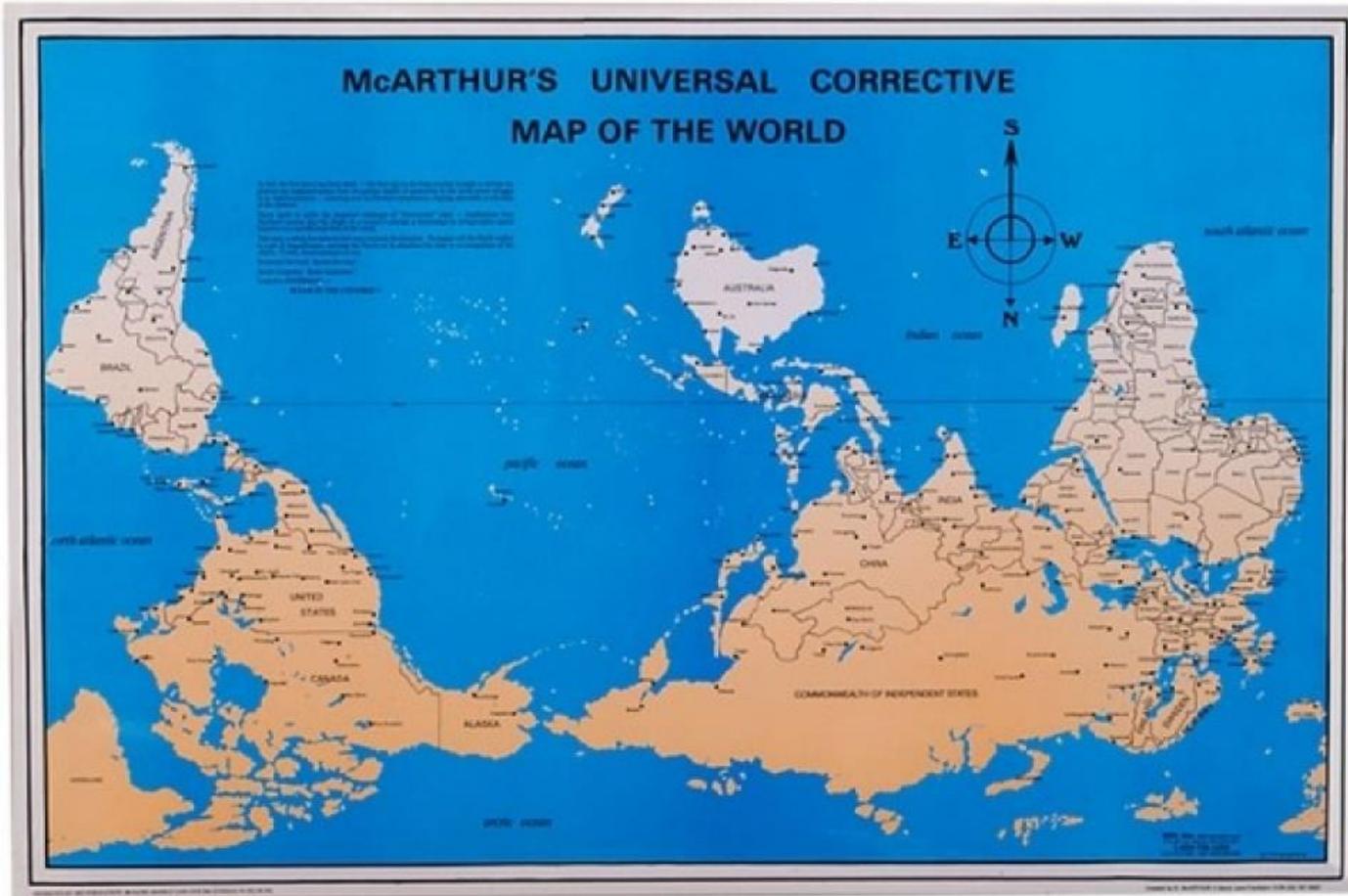
View, perspective, color scheme,  
unanticipated elements



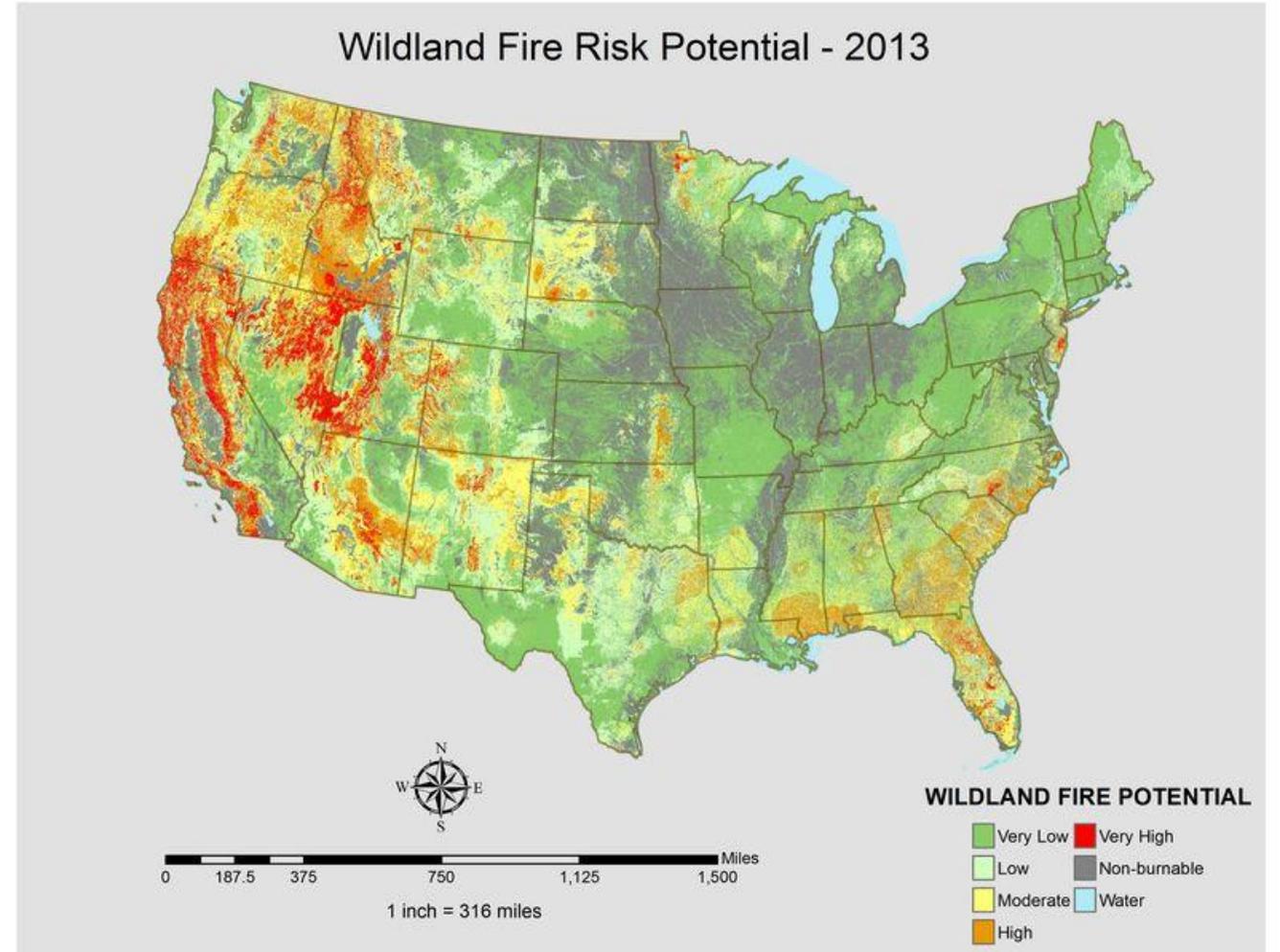
# Apollo 11 lunar lander



# Perspective



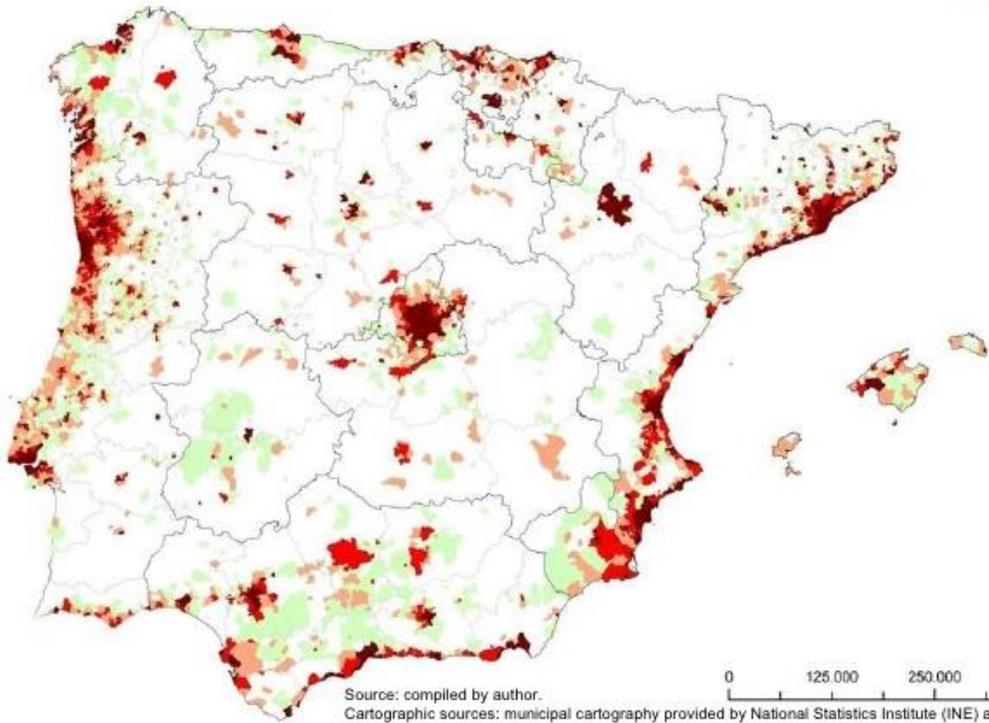
# Counter-convention



# Symmetry

Territorial context

## Population density in the Iberian Peninsula



Source: compiled by author.  
Cartographic sources: municipal cartography provided by National Statistics Institute (INE) as support of the PX-Map tool and Carta Administrativa Oficial de Portugal (CAOP) provided by Instituto Geográfico Português (IGP).  
Data sources: National Statistics Institute (INE) and Statistics Portugal (INE).

Application of the RIN guidelines in Spain at various scales

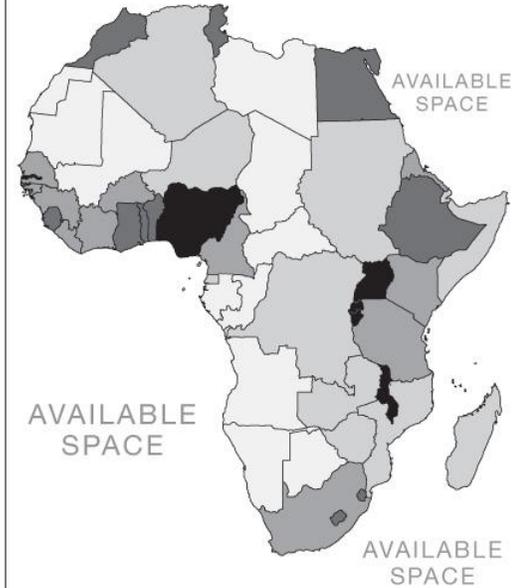
10

A

AVAILABLE SPACE

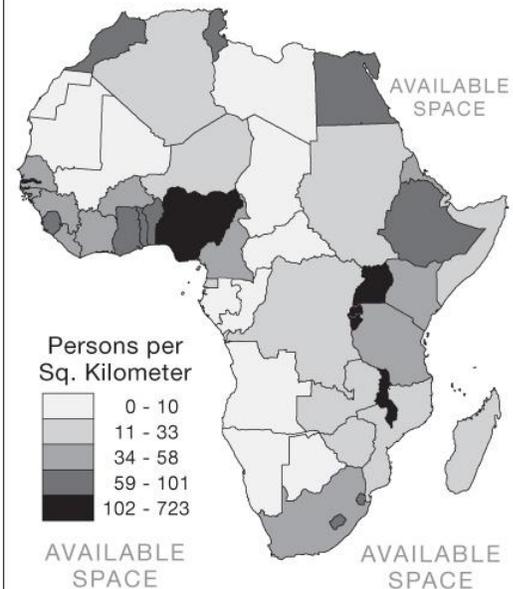
B

## Population Density



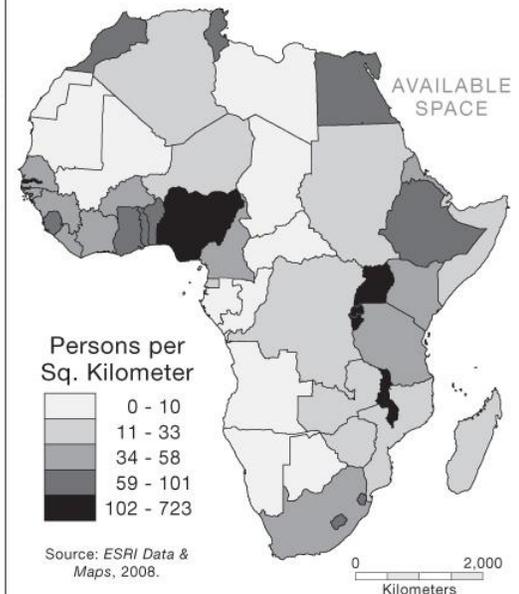
C

## Population Density



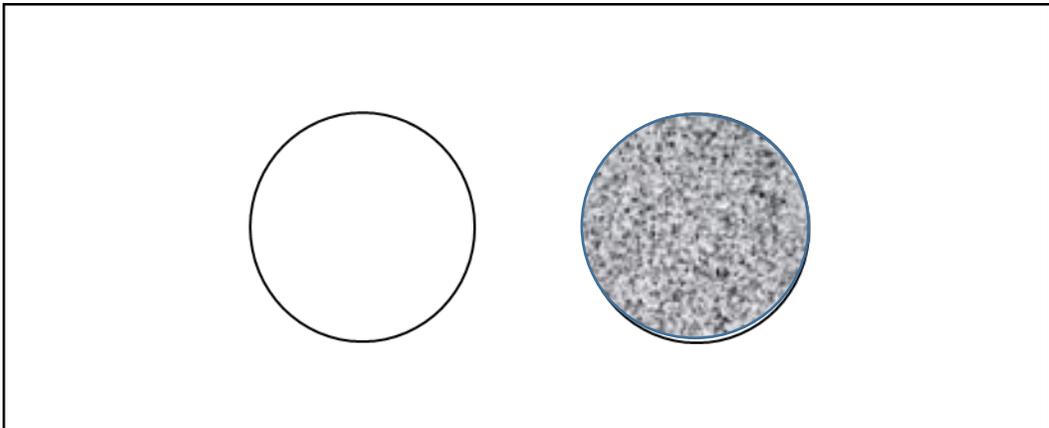
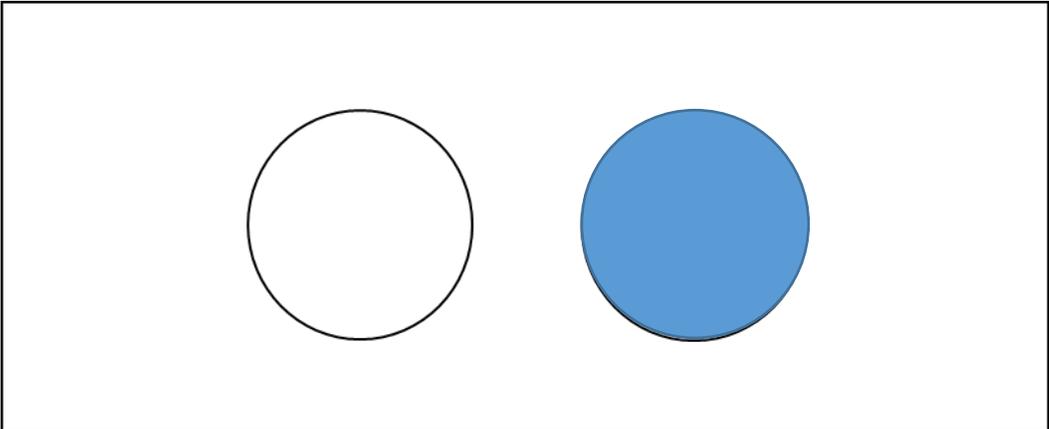
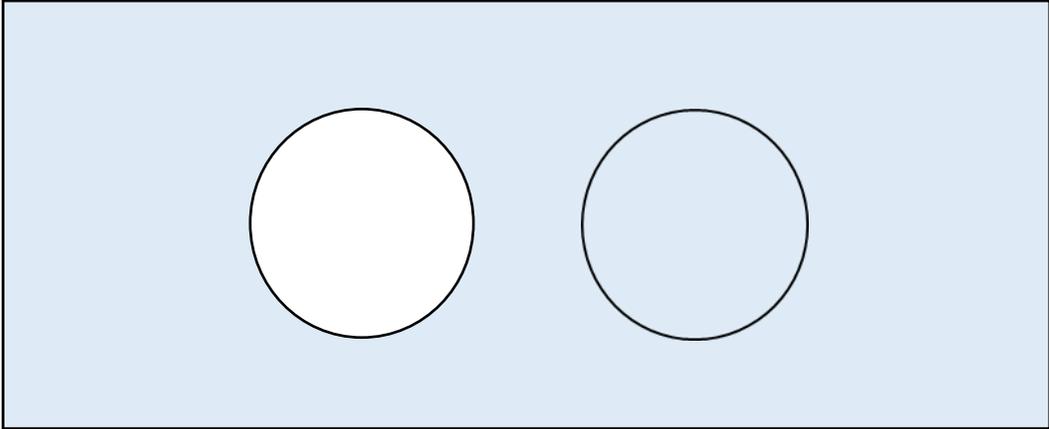
D

## Population Density

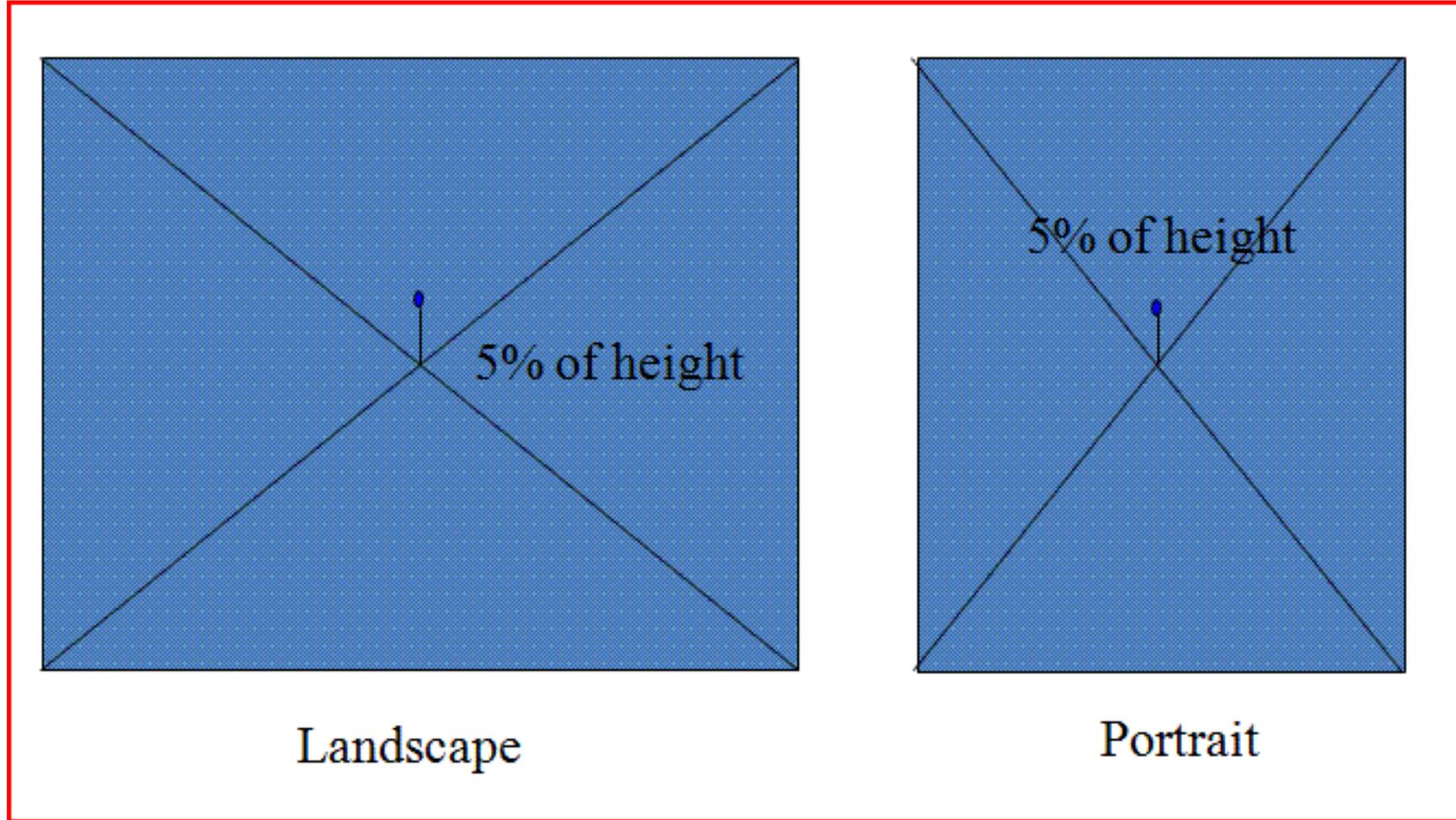


# Visual balance

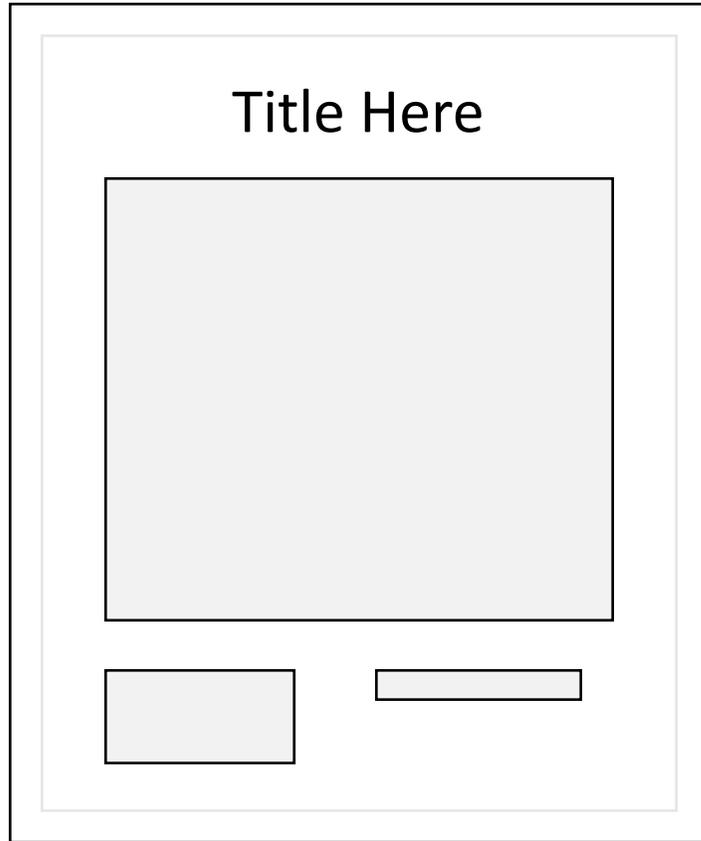
- The size of the symbols
- The pattern of the symbols
- The color of the symbols
- The visual hierarchy of the symbols and elements
- The location of the elements with respect to each other and the visual center of the map



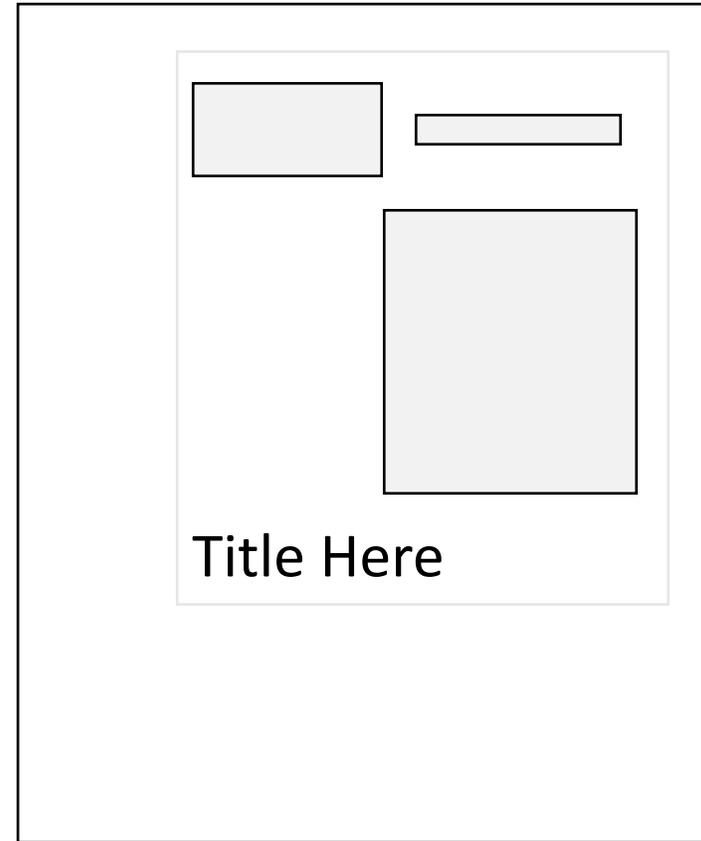
# Visual center



# Visual balance and layout



**Good**

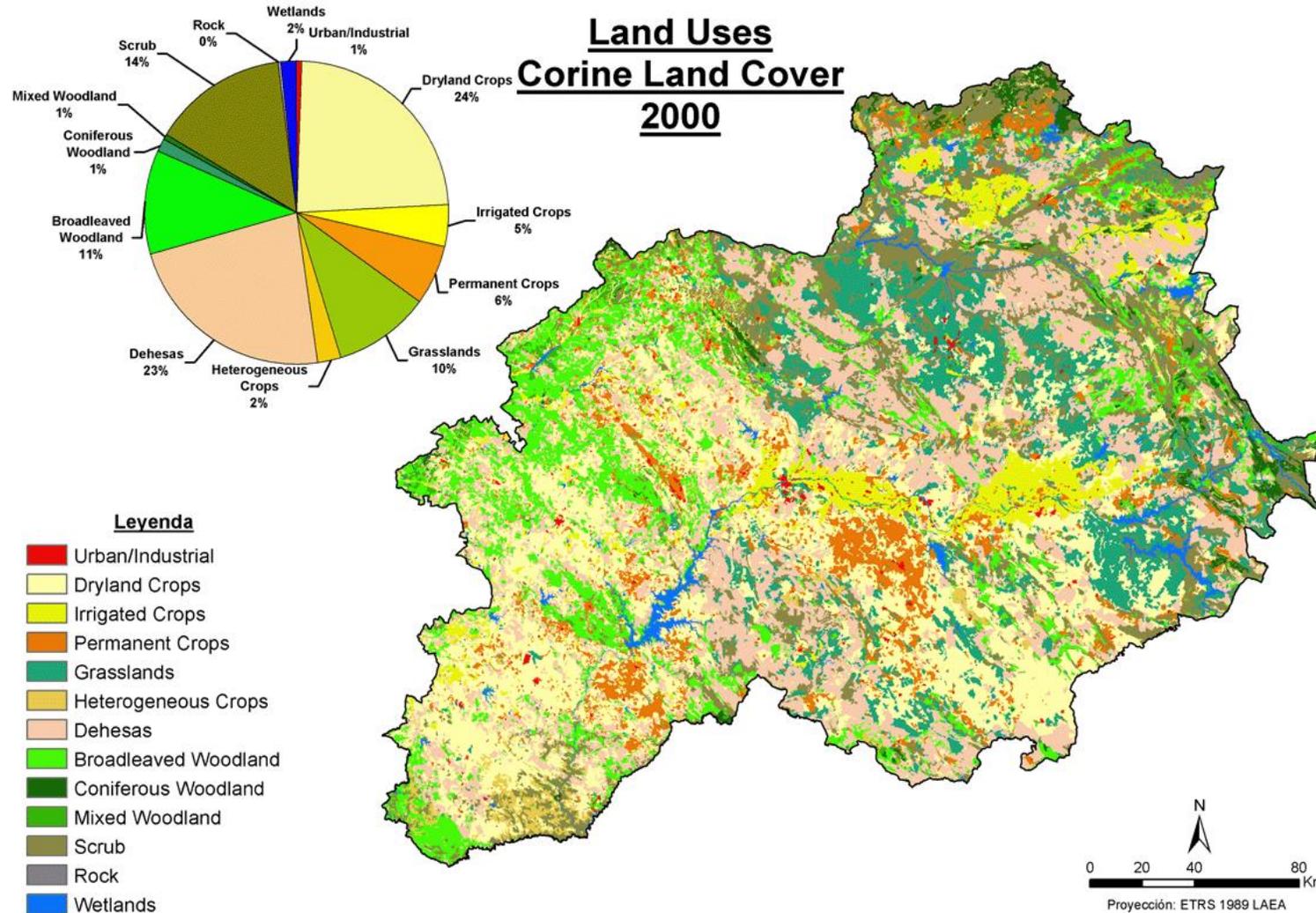


**Bad**

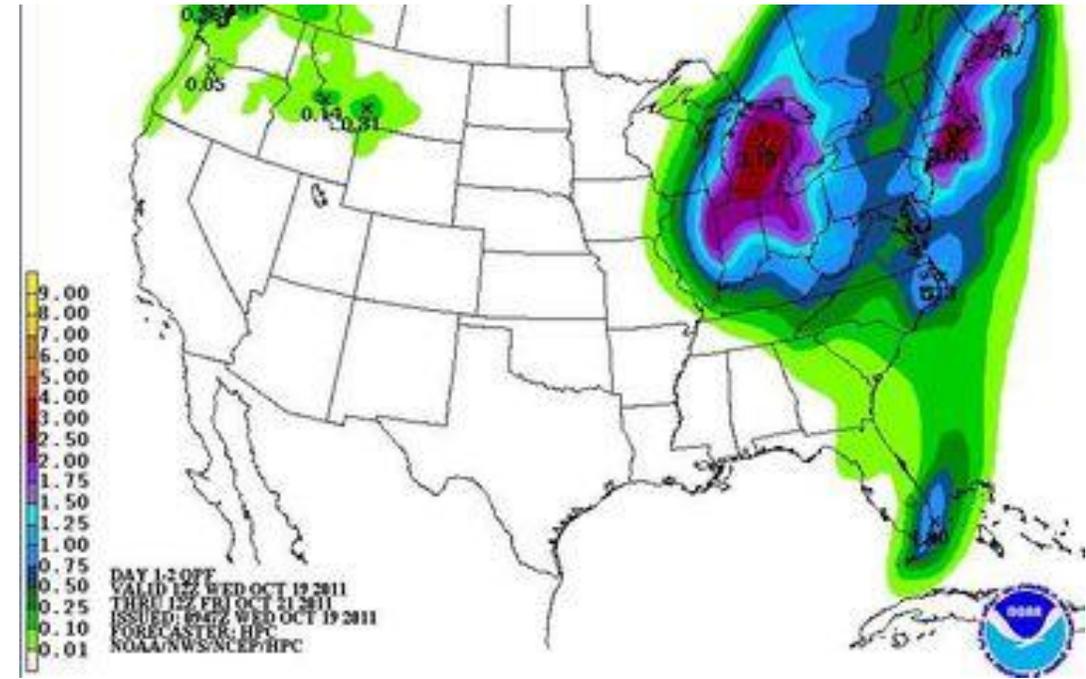
# Visual balance

- Left right
- Top down
- Several smaller objects can counter one larger
- Sensitive to alignment
- Text and legend can be used to fill spaces
- Including graticule or unmapped area to neat line can work well

# Same for posters, information graphics



# Balance and content



**Conrad Hackett** @conradhackett · 4 okt..

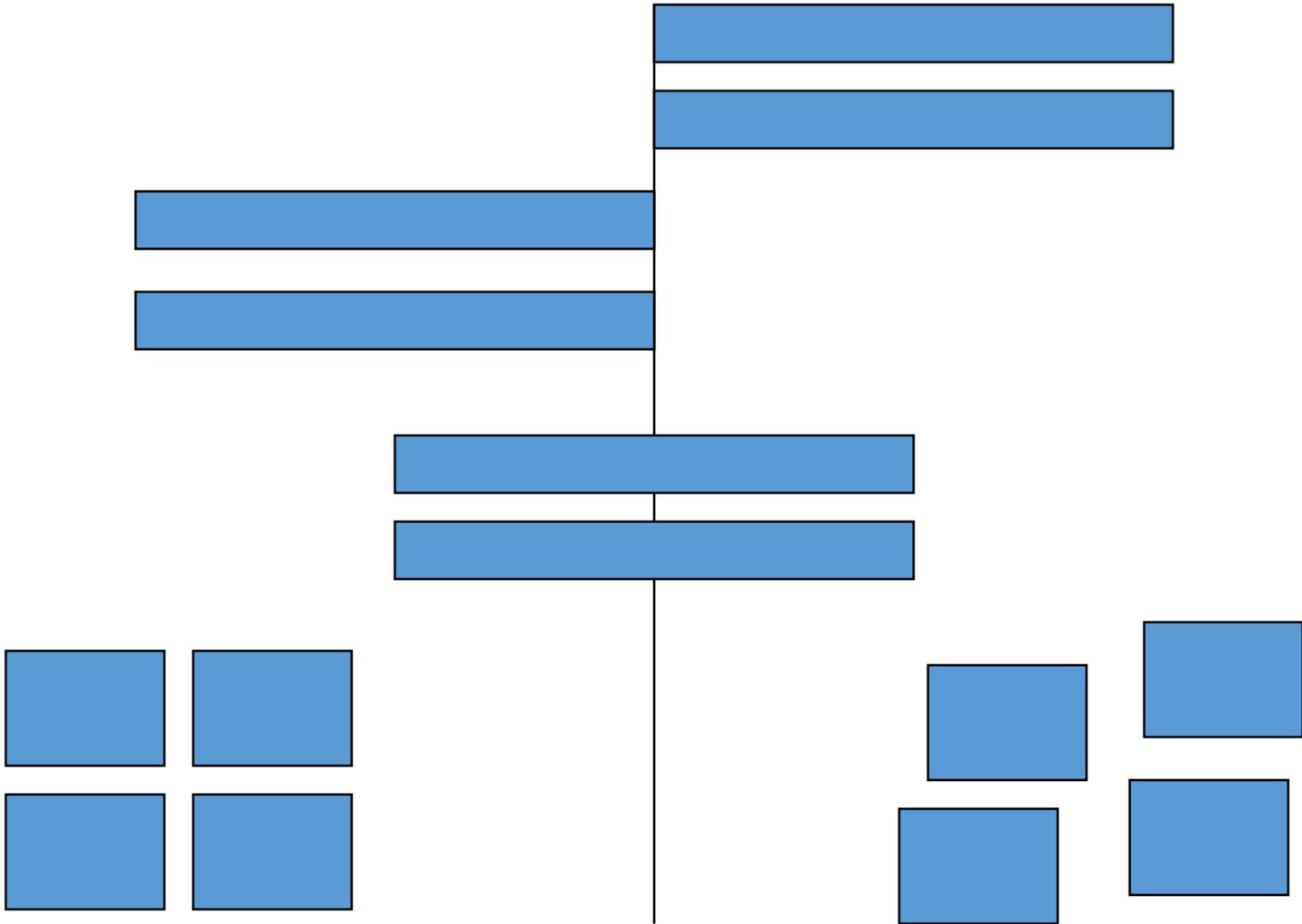
50% of China's GDP comes from the areas in orange, 50% comes from the areas in grey

[foreignpolicy.com/articles/2014/...](http://foreignpolicy.com/articles/2014/...)

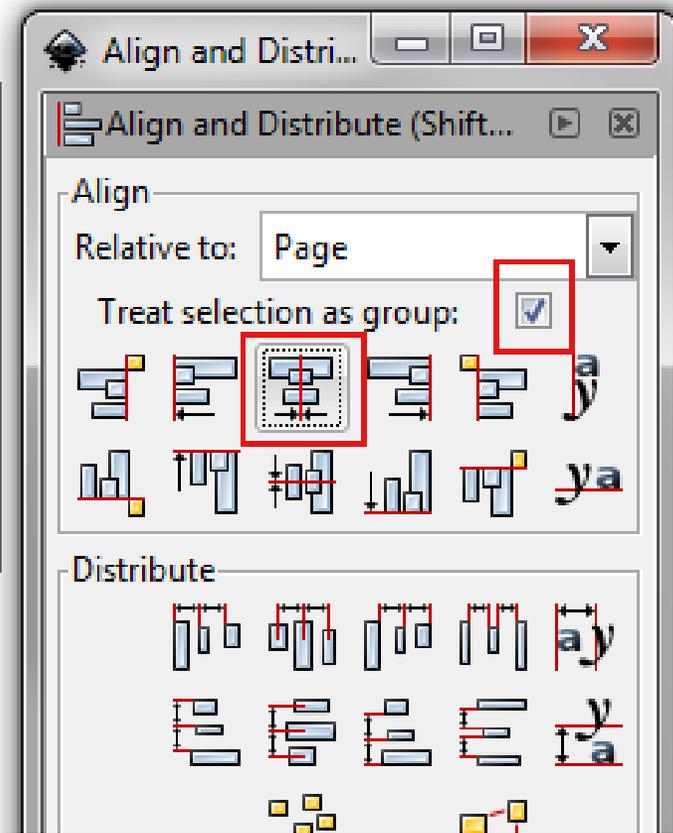
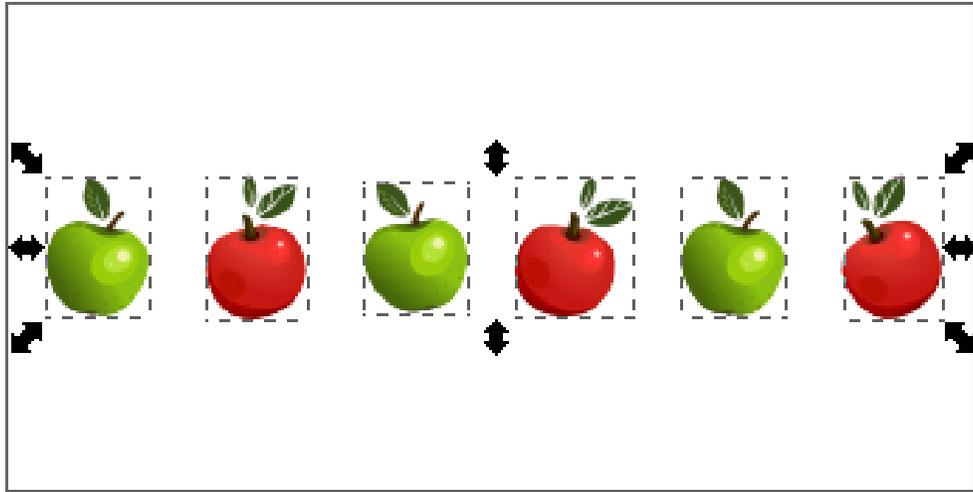
← Beantwoorden ↻ Retweeten ★ Favoriet Instapaper



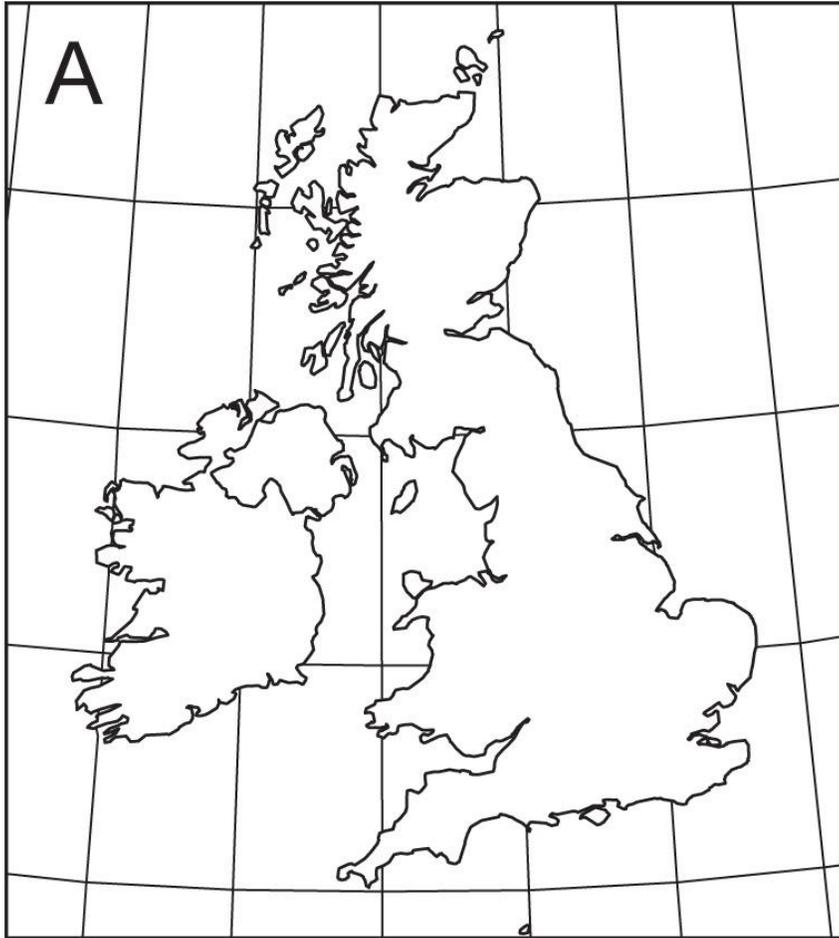
# Alignment: precision matters



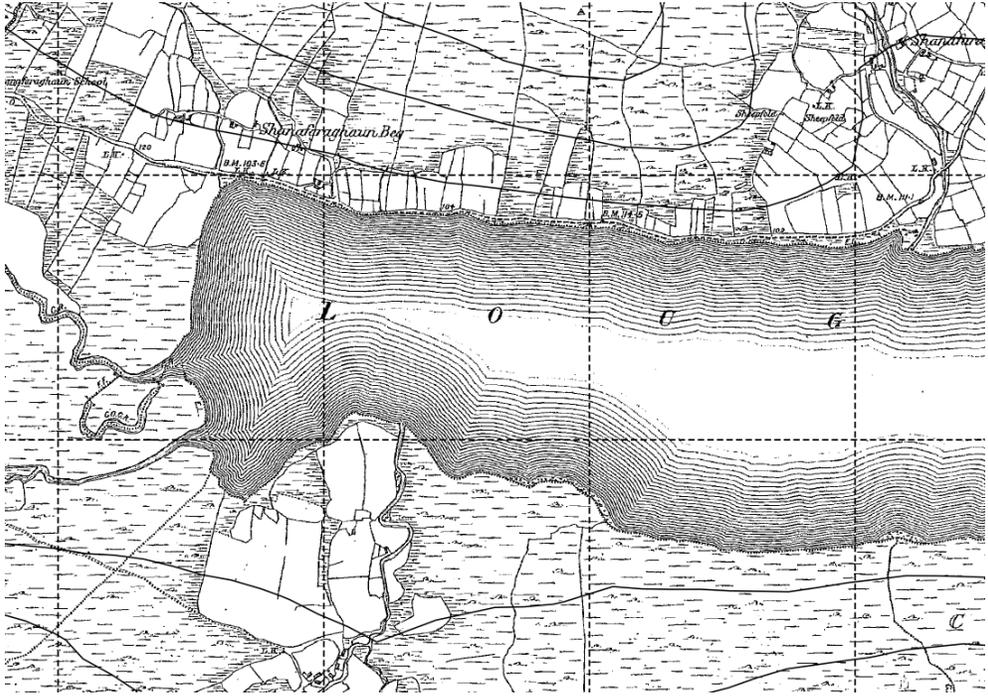
Select and group  
Align and distribute  
Snap



# Screening

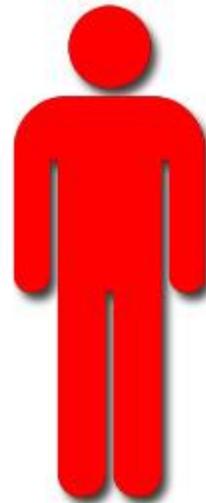


# Vignettes

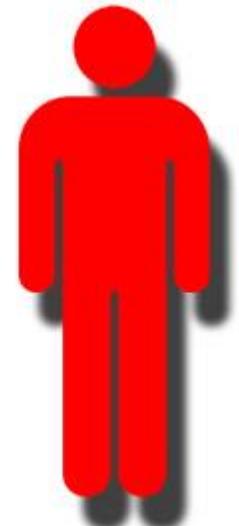


# Drop shadows in Inkscape

- Select feature -> group
- Copy and paste
- Select new object, change color to gray or black
- Optionally blur
- Displace it slightly
- Push it into the background
- Separate function for text



Distance=5px

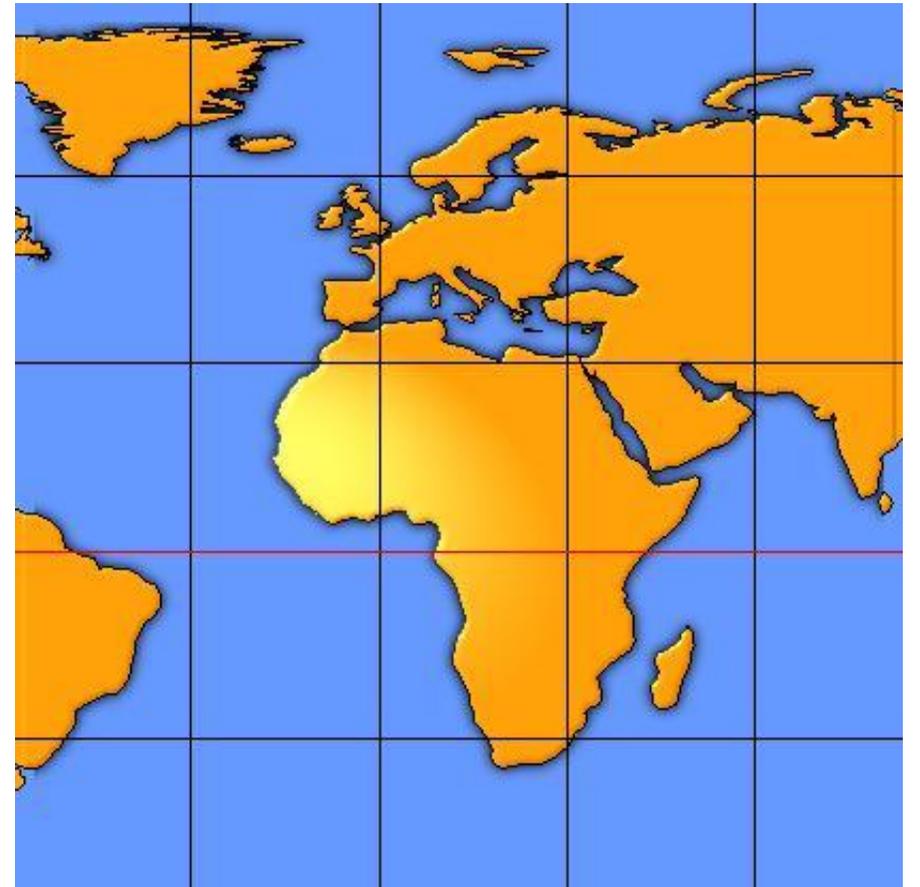


Distance=20px

# Drop shadow coastline

## Emboss, highlight

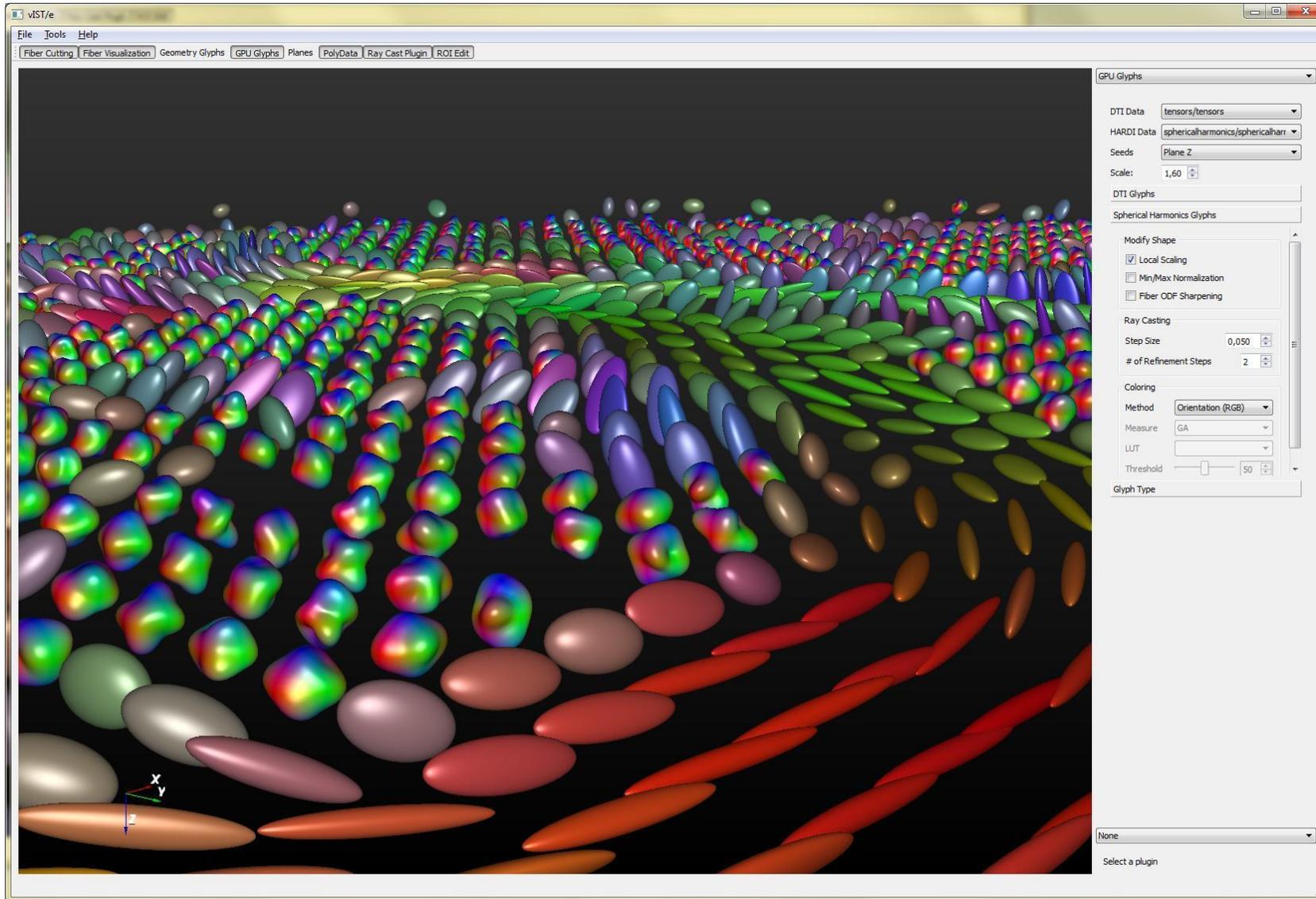
United States of America



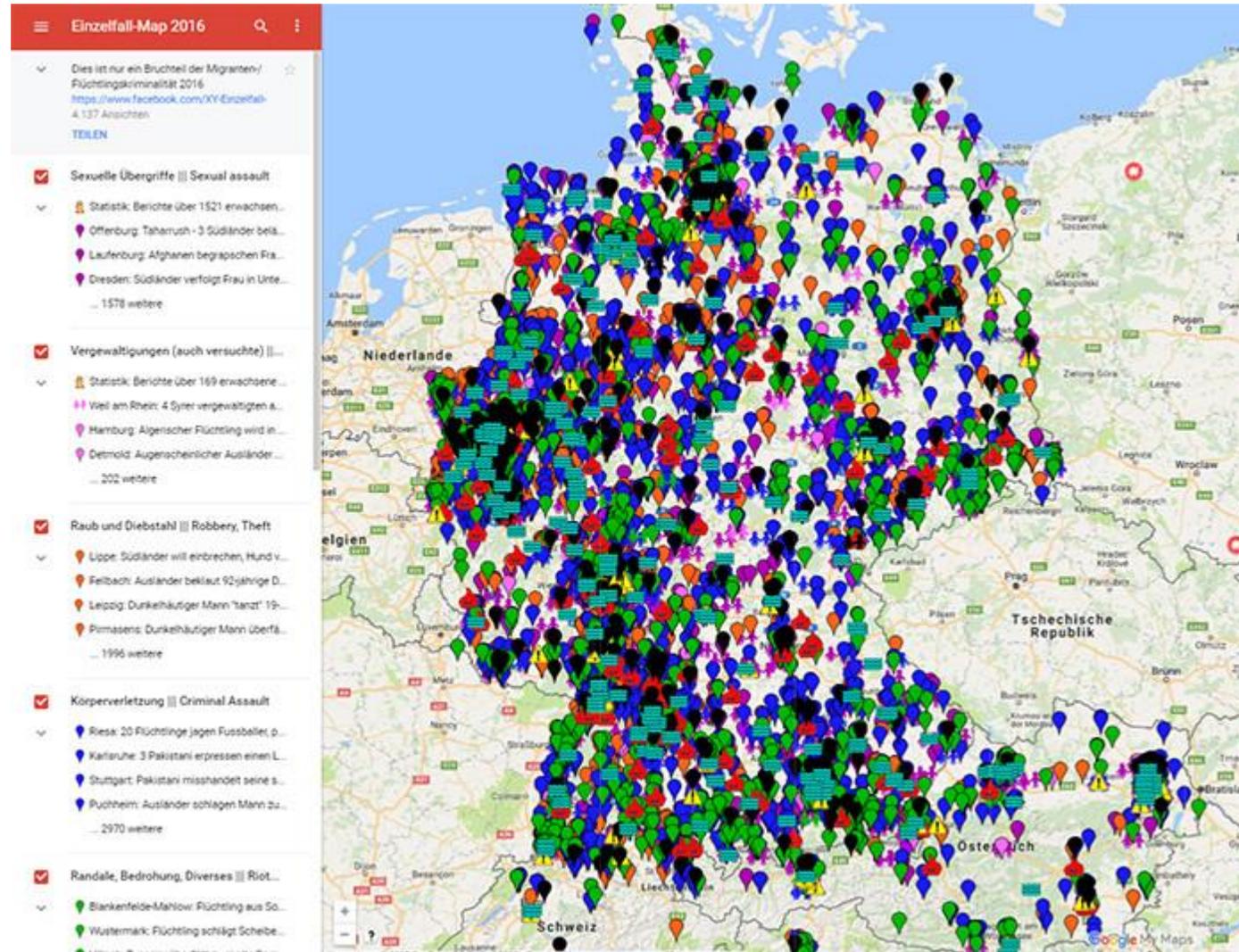




# Symbol complexity



# Good vs. Bad design



# Good vs. Bad design

## District of Columbia Home Sales: 2012

@ruSERIOUSINGme



# Good vs. Bad Design

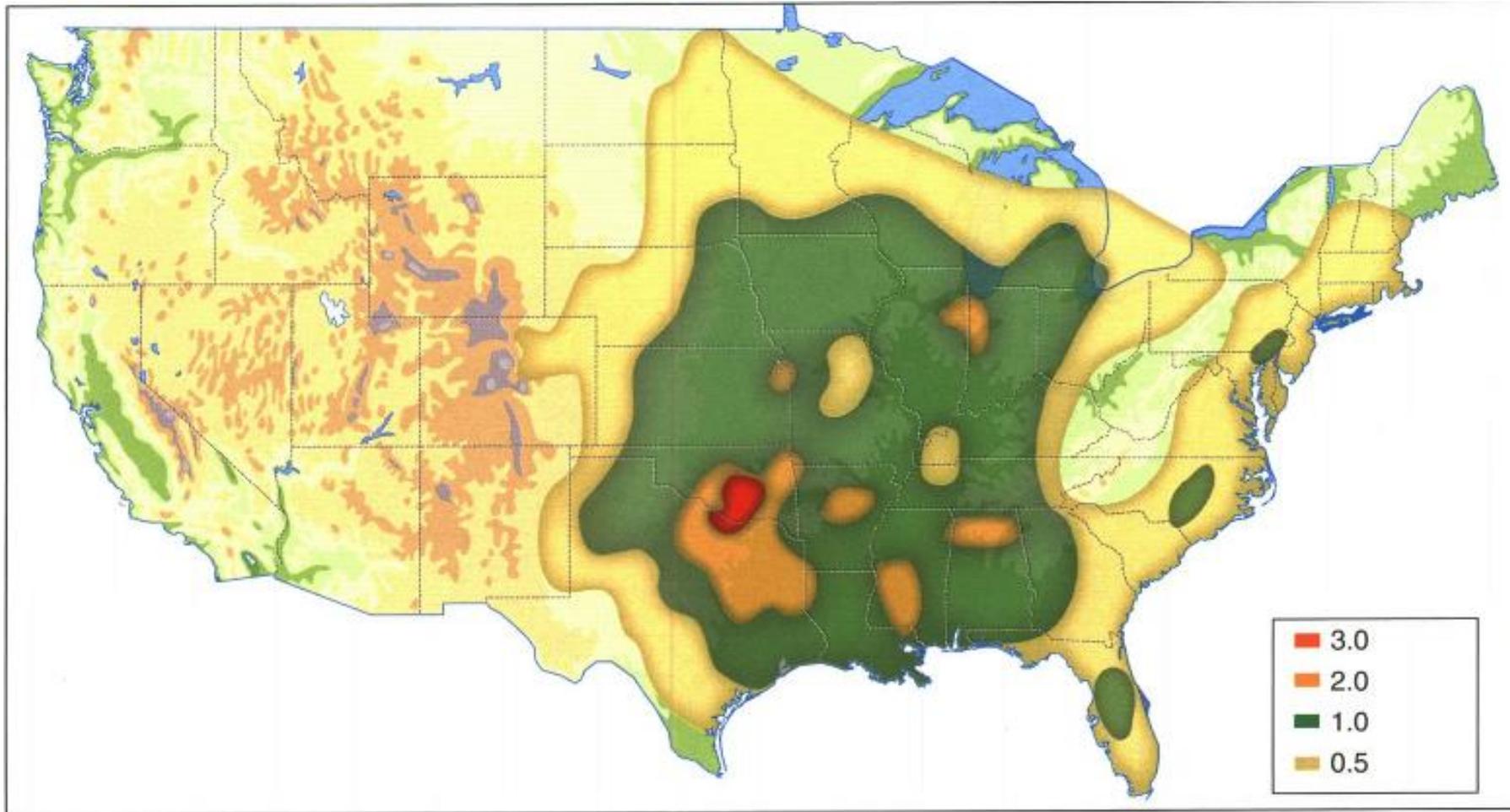
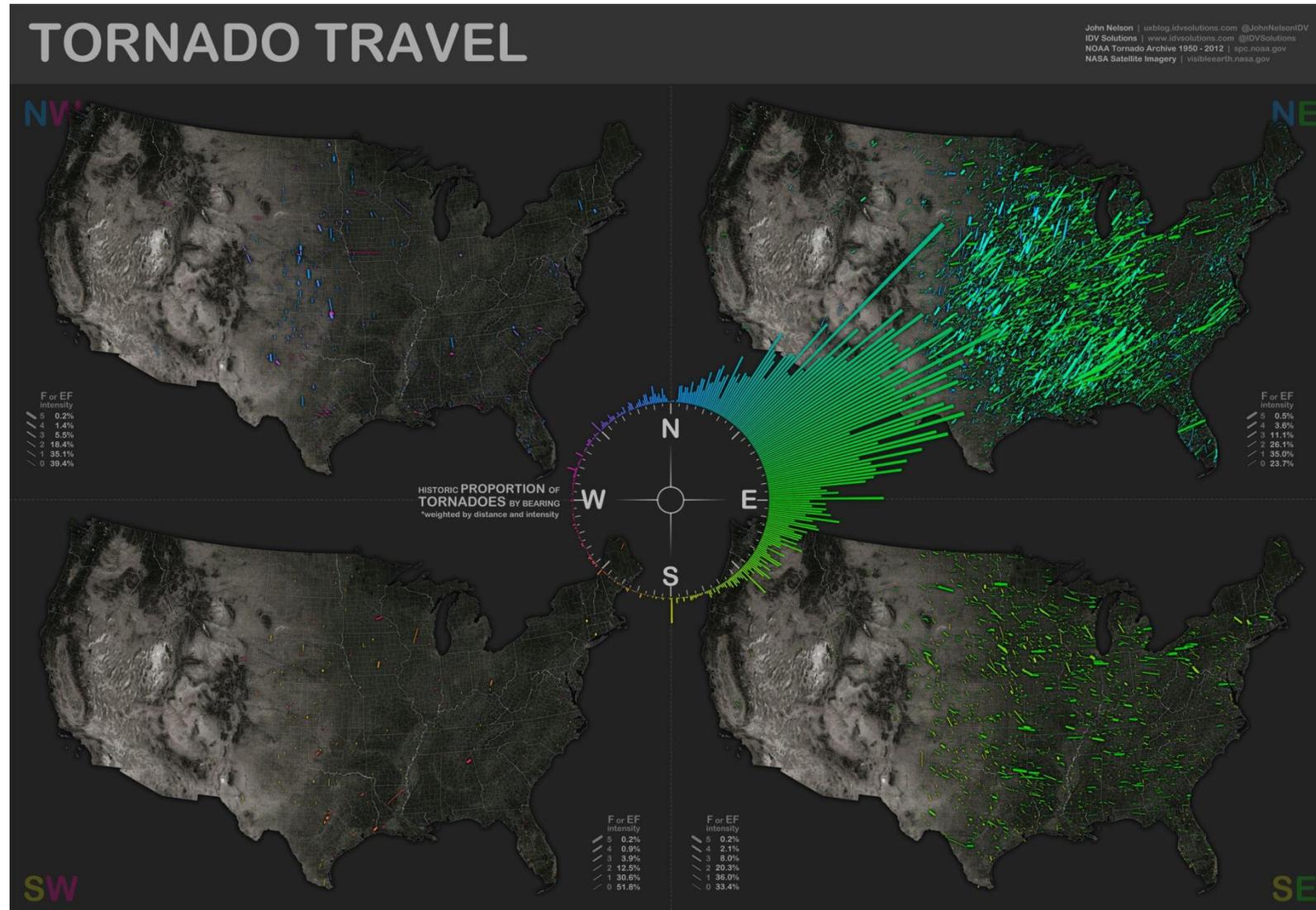
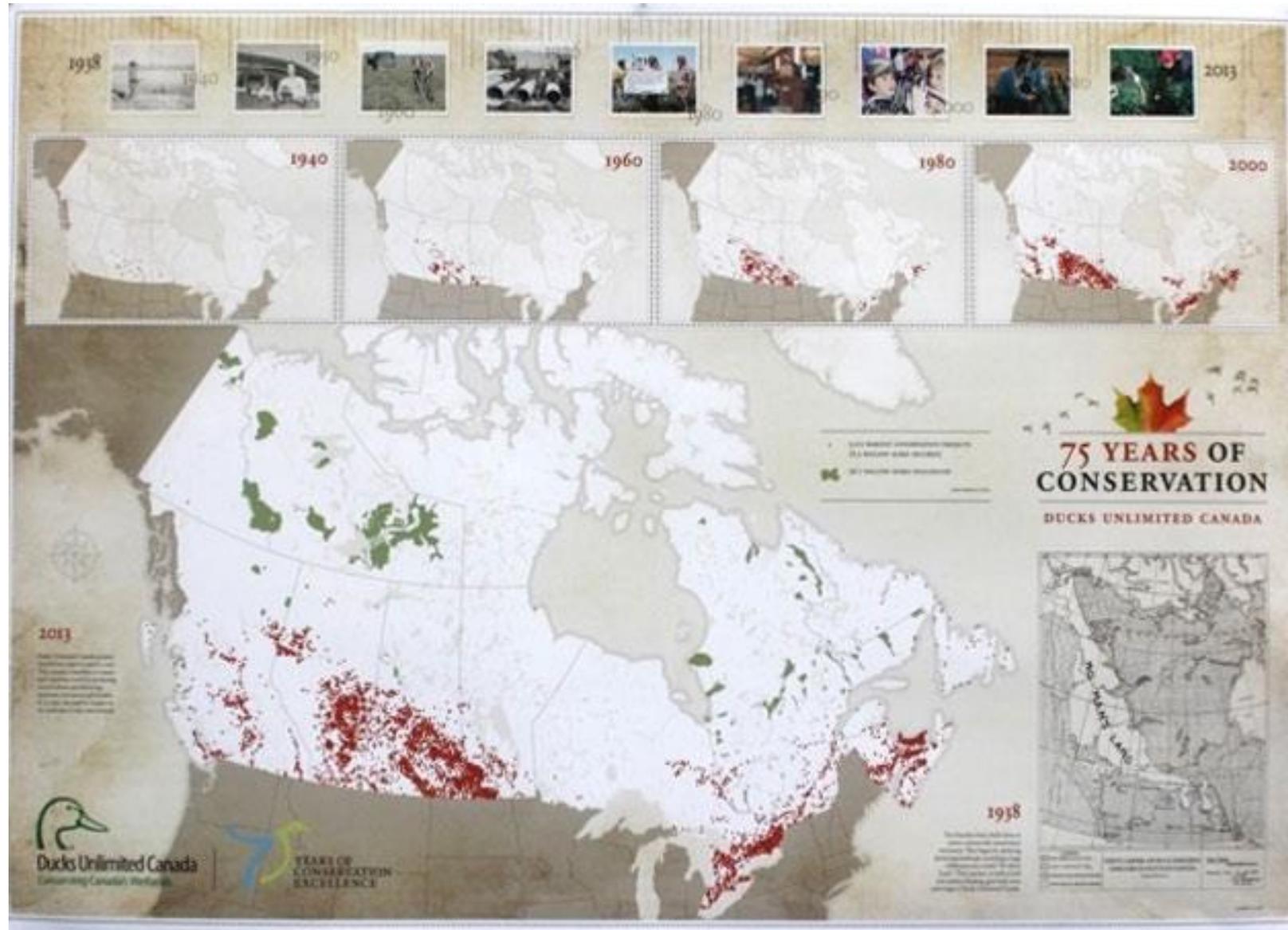


Figure 1.47 Annual incidence of tornadoes in the United States. Central, eastern and north eastern states are most affected. Source: Redrawn from Monmonier 1998.

# Good vs. Bad Design

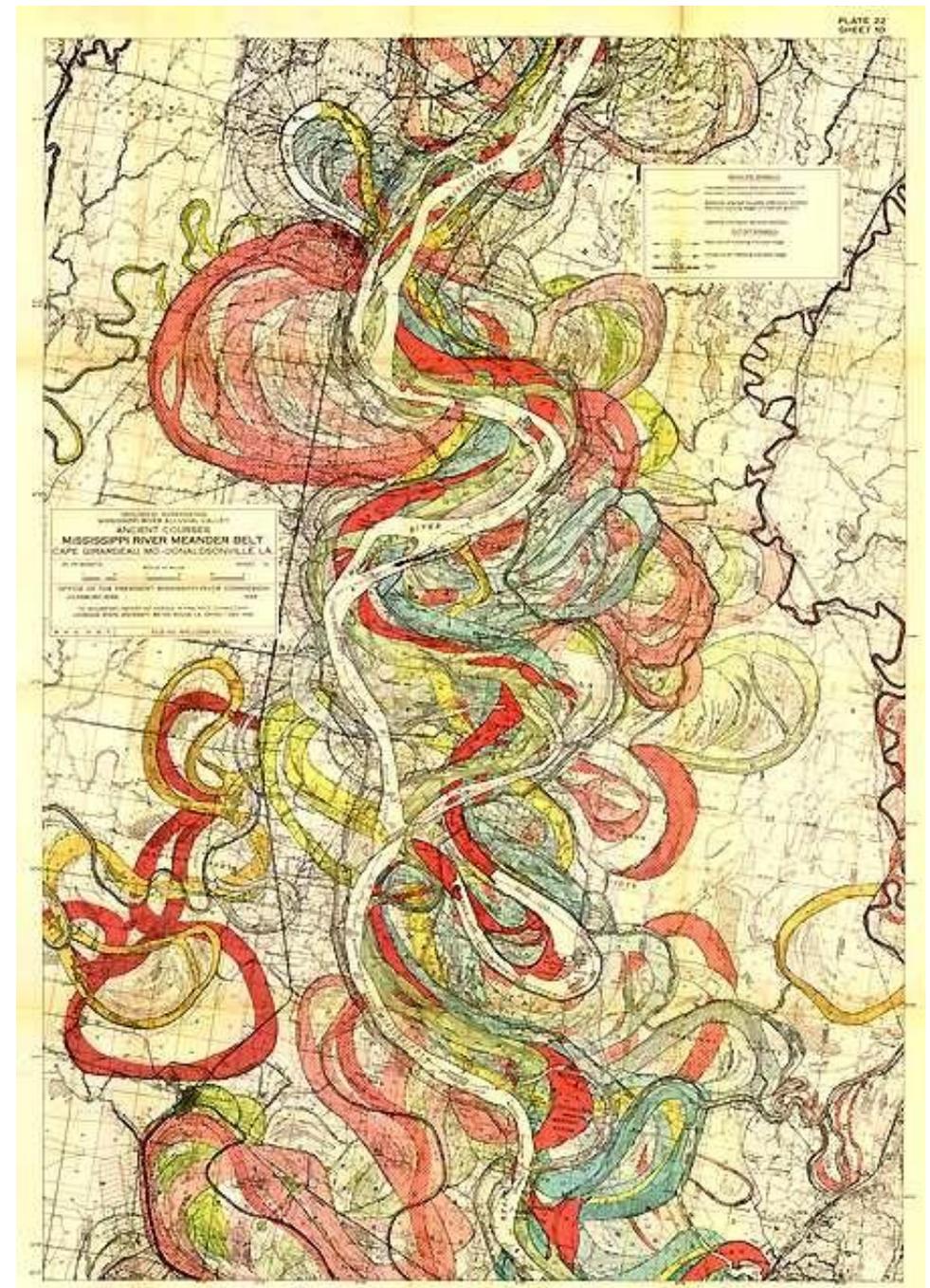


# Good vs. Bad Design



# Good vs. Bad Design

Ancient Courses of the Mississippi River Meander Belt Sheet 10  
geological survey map vintage reproduction 1943



# Summary

- Good design makes map more effective and interpretable
- Eye seeks similarity, proximity, continuity, closure
- Symmetry, simplicity, balance favored
- Figure—ground
- Alignment, balanced layout
- Follow convention, except when you want to emphasize or challenge
- When in doubt, reduce complexity