Cartographic / Poster Design

Thanks Peter Neivert, ESRI, David Rumsey
Resource

http://video.esri.com/watch/655/
map-makeovers-how-to-make-your-map-great
What is Cartography?

“The art, science, and technology of making maps of the earth or other celestial bodies” (Robinson, et al)

• Complex task

  • Reducing large areas
  • Think in visual terms
  • Software options for design
  • Software options for presentation
  • Unlimited options with color, symbols, placement
  • Convey your “answer(s)” to a spatial question
“The art..
“The art..”

Hokkaido-Chizu Company Ltd.
“The **art**...
"The science..."
“The technology....
Three Types of Maps

• **General (Reference) Maps**
  • large variety of information
  • symbology gives equal importance to everything
  • primary aim is legibility
• Examples
  • USGS 7.5’ topographic maps
    • landforms, contour lines, roads, railroads, trails, other transportation, pipelines, powerlines, buildings, urban areas, boundaries, survey markers, the public land survey system, rivers, lakes, marshes, vegetation, buildings, etc.

• Your average Road Map
  • roads, road symbols, places, measurements, boundaries, water features, etc.
Three Types of Maps

• General (Reference) Maps
  • large variety of information
  • symbology gives equal importance to everything
  • primary aim is legibility
    • USGS 7.5’ topographic maps
      • landforms, contour lines, roads, railroads, trails, other transportation, pipelines, powerlines, buildings, urban areas, boundaries, survey markers, the public land survey system, rivers, lakes, marshes, vegetation, buildings, etc.

• Thematic Maps
  • limited themes of information
  • symbology emphasizes the most important aspect
  • primary aim is communication
    • e.g. soil map, geologic map, population distribution
Three Types of Maps

- **Thematic Map Subset > Analysis Maps**
  - same as thematic maps, +
    - depict the results of specific analysis
    - objective is to convey the meaning of the analysis results to the reader
  - ancillary information
    - only added to the map if it is necessary to further explain the meaning of the analysis results
    - additional graphics
    - text to explain how the analysis was done
      - flow diagrams of the steps in the geographic analysis (e.g., Model Builder models)
    - graphs
Your Poster / Oral (Powerpoint)

• May have a combination of all three

  • General reference map (primarily a locus map)
    • Inset(s)

  • Thematic map
    • Initial steps towards analysis

  • Analysis map
    • Your results
Presenting Data Visually

Know Your Message

• Keep your question(s) in mind
• Each poster panel / slide should aid the message
Presenting Data Visually

Know Your Message
• Keep your question(s) in mind
• Each poster panel / slide should aid the message

Know Your Audience
• Powerpoint - peers
• Poster Session – mixed bag
Presenting Data Visually

Know Your Message
  • Keep your question(s) in mind
  • Each poster panel / slide should aid the message

Know Your Audience
  • Powerpoint - peers
  • Poster Session – mixed bag

Design for the media
  • Powerpoint
  • Poster
Effective Poster IS

- a VISUAL communication tool – even more so with GIS
- The VISUAL is the MAP(s)
- The MAP(s) conveys / informs
Effective Poster IS NOT

- a research paper stuck to a board.
Your Cartographic Objectives

• Highlight Analysis Results

• Highlight spatial relationships

• Convey information about your methods
  • more so in the powerpoint presentation
  • minimal in poster

• Make it easy for the reader to comprehend complex events / relationships
Carte Figurative des pertes successives en hommes de l'Armée Française dans la Campagne de Russie 1812-1813.


Les nombres d'hommes présents sont exprimés par de longues lignes colorées à raison d'une millimètre pour une mille hommes ; ils sont le plus écrit en travers des lignes. Le rouleau représente les hommes qui étaient en Russie le 1er août qui en octobre. Les traverses qui ont servi à tracer la carte sont indiquées dans le rouleau par le nom de M. Clément, de l'Armée des Armées, de Chabert et de la journaliste de l'Illustre, plus enfin le 28 octobre.

Pour mieux faire juger à l'œil l'omnipotence de l'armée, je suppose que les corps du général Bénéra et du général Davoust qui avaient été attachés à Moscou, à Malakoff, etc., étaient, en octobre, sujets. Qui en situation, avec l'armée.
How to Achieve Objectives

• Great maps / posters take time and planning
  • sketch it out

• Assign meaningful symbology

• Be selective about what is shown
  • Don’t put everything in
  • Each item on the poster should have a REASON for being there

• Audience will have limited time – make each slide / poster panel have a “point”
Things to Avoid
Things to Avoid

Excessive “Stuff”
Things to Avoid
Things to Avoid

“Non-Data” Ink
Things to Avoid

“Non-Data” Ink
Things to Avoid

Oversized Legends, Scale Bars, and North Arrows
Things to Avoid

Oversized Legends, Scale Bars, and North Arrows
Caution!

Placement of Legends, Scale Bars and North Arrows
Things to Avoid
The Hawaiian honeycreepers (Drepanidae) represent a superb illustration of evolutionary radiation, with a single colonization event giving rise to 19 extant and at least 10 extinct species [Curnutt, J. & Pimm, S. (2001) Stud. Avian Biol. 22, 15–30]. They also represent a dramatic example of anthropogenic extinction. Crop and pasture land has replaced their forest habitat, and human introductions of predators and diseases, particularly of mosquitoes and avian malaria, has eliminated them from the remaining low- and mid-elevation forests. Landscape analyses of three high-elevation forest refuges show that anthropogenic climate change is likely to combine with past land-use changes and biological invasions to drive several of the remaining species to extinction, especially on the islands of Kauai and Hawaii.

Fossil evidence shows that the Hawaiian Islands were once home to more than 100 endemic species and subspecies of land and water birds (1). The arrival of Polynesians and, subsequently, Europeans and other colonists ended the isolation that fostered the evolution of this diverse avifauna. Currently, 48 of the more than 100 original species are listed as extant; however, 11 of these species have not been seen in more than a decade and are probably extinct (2). To date, extinctions of the honeycreepers in particular have been driven largely by habitat loss, introduced predators, and diseases (3–6). Habitat loss began ......
Use of Color

• Connotation
  - Reds - Danger, “stop”, Heat, “a lot of”
  - Blues – Cold, Depth, Water, “less of”
  - Greens – Vegetation, “go”, lower elevations
  - Browns – Land, middle elevations

Rule of thumb – try to represent reality

• Convention
  - Geology
  - Hydrology
Qualitative Color Schemes

• Different colors represent different things
  • land use, soil type, building type, positive/negative
• Categories
• Colors do not imply magnitude
• Colors should still “work” together
Qualitative Color Schemes

• Different colors represent different things
  • land use, soil type, building type, positive/negative
• Categories
• Colors do not imply magnitude
• Colors should still “work” together

Quantitative Color Schemes

• Different colors represent different ranges
  • elevation, percentage, “amount of”, “number of”
• Quantities
• Colors do imply magnitude
• Colors should still “work” together
Maximum of 7 shades of the same color
Maximum of 12 Individual Colors

Land Use in 2005

- Airports (and associated facilities)
- Beaches
- Brushland (shrub and brush areas, reforestation)
- Cemeteries
- Commercial (sale of products and services)
- Commercial/Industrial Mixed
- Commercial/Residential Mixed
- Confined Feeding Operations
- Cropland (tillable)
- Deciduous Forest (>80% hardwood)
- Developed Recreation (all recreation)
- High Density Residential (<1.8 acre lots)
- Idle Agriculture (abandoned fields and orchards)
- Industrial (manufacturing, design, assembly, etc.)
- Institutional (schools, hospitals, churches, etc.)
- Low Density Residential (>2 acre lots)
- Medium Density Residential (1 to 1/4 acre lots)
- Medium High Density Residential (1/4 to 1/8 acre lots)
- Medium Low Density Residential (1 to 2 acre lots)
- Mines, Quarries and Gravel Pits
- Mixed Bare Areas
- Mixed Forest
- Orchards, Groves, Nurseries
- Other Transportation (terminals, docks, etc.)
- Pasture (agricultural not suitable for tillage)
- Power Lines (100' or more width)
- Railroads (and associated facilities)
- Roads (divided highways >200' plus related faci
- Rock Outcrops
- Sandy Areas (not beaches)
- Softwood Forest (>80% softwood)
- Transitional Areas (urban open)
- Vacant Land
- Waste Disposal (landfills, junkyards, etc.)
- Water
- Water and Sewage Treatment
- Wetland
LEGENDS

Legend exactly like map

Earthquakes 1973-2001

Magnitude

- <= 6.0
- 5.0-5.9
- 4.0-4.9
- 3.0-3.9
- 0.0-2.9

The Ring of Fire

Volcanoes and Earthquakes around the Pacific Rim

The Ring of Fire is a zone of frequent earthquakes and volcanic eruptions that encircles the basin of the Pacific Ocean. About 90% of the world’s earthquakes and 91% of the world’s largest earthquakes occur along the Ring of Fire.

The western edge of the North American continent falls along the Ring of Fire. Here, earthquakes are primarily located along the shifting edge between two of the world’s largest plates, the North American and Pacific plates.

However, there have been no “big” earthquakes in Oregon’s brief history.

Earthquakes in Oregon 1840-1998

- <= 5.0
- 4.5-4.9
- 4.0-4.9
- 3.0-3.9
- 2.0-2.9
- 1.5-1.9
- 1.0-1.9
- 0.5-0.9

All of Oregon south of the Cascades is at risk from subduction-zone earthquakes. The amount of earthquake damage at any place will depend on the distance from the fault, local soil conditions, and types of construction.
LEGENDS

LEGENDS THAT CONTAIN FILE NAMES
Titles

The title conveys the main message – THE RESULT - instantly

Snook Growth in Habitats with Differing Abiotic Variability
Titles

The title conveys the main message – THE RESULT - instantly

Snook Growth in Habitats with Differing Abiotic Variability

Abiotic Variability Influences Snook Growth

Simple
Direct
Not “flowery”

*Don’t state the obvious*

- “Using GIS to.....”
- “Map of .....”
Label Placement Convention

Points

1) UR

2) LR

3) UL

4) LL

5) UC

6) LC
Balance

• Arrange for Legibility / Equilibrium
  • From top left and right
  • From top left and down

• Visual Center
  • Primary Map Body
  • Eye falls 5% above intersection of center
  • Thematic Maps vs. Analysis Maps

• Gaps are Okay
  • Preferable to leave at top
Text

- Text boxes
  - Leave space around the text

- Fonts
  - Standard
  - Easy to Read

- Size
  - Standard
  - Easy to Read
  
\textbf{at least} 24 point in text
36 for headings

Don't use anything too fancy. It is hard to read.
Sources

Don’t forget to reference your data sources!
MISC. Tips

• E Size (34 x 44) or less (but not too small either!)

• Make sure you set up the page size before you start designing

• Sketch

• Too many spatial data files in a data frame. Just because you have them doesn’t mean they should be turned on / used in a data frame.

• Do your analyses in different ArcMap documents. Do your layout in a separate ArcMap document.

• You don’t always have to save your ArcMap document. If you are using ArcMap to perform geoprocessing (clips, unions, geocoding, etc.) you can just do the geoprocessing and close ArcMap.
MISC. Tips

• As long as you have the spatial data files on disk you can add them in to something else.

• Typos / Spelling errors!!

• Use your Alignment tools!

• Powerpoint, In Design, Illustrator, Other....
  
  • Export from ArcMap at high enough resolution
  • OK to use but be careful!
Resources

http://mappingcenter.esri.com/

http://colorbrewer2.org/

http://www.typebrewer.org/

http://www.brown.edu/Research/Earthlab
wiki & off home page