Map Makeovers: How to Make Your Map Great!
Charlie Frye, Esri, Redlands,
Jim Herries, Esri, Redlands
Session Goals

- Demonstrate cartographic thinking in action
- Instill confidence to think cartographically
Cartographic Thinking Includes

- Geographically informed rationale for communicating
- Creative minimalist design intent
- Communicating through graphics
- Ensuring readability for your map’s intended readers
- Good sensible judgment (in the opinion of others)
- Forced and blatant objectivity
- Clarity

But “cartography” is a cumbersome word…
your map should tell a story that your audience can interpret and relate to
Communication first!

- A map must work… overtly if necessary
- Most things worth communicating need to be tailored with clarity of purpose and:
  - Effort… lots of effort
  - Inspiration… It’s like opportunity: you need to make your own
  - Experience… speed and confidence
- Strive for self-evidence in communication
  - Water is blue
  - Trees are green
  - Full spectrum color ramps for “heat maps”? Really…
The Makeovers

Fukushima Daiichi
Empirical Bayesian Kriging

???(Mystery Map)

Food Deserts
Fukushima Daiichi

Charlie Frye
Before

• What is the story???
After

- Shows radiation and danger levels associated with the Fukushima Diachi reactor after the earthquake in Japan
What was changed?

- Colors
- Map elements (legend, etc.)
- Wording
Original Colors

- Color scheme is confusing
Final Colors

• Light-to-dark color sequence shows a pattern
A Good Title Matters

- Original title doesn’t make sense - what does it mean to an educated layperson?
- Titles that don’t work for thematic maps include:
  - The name of the place shown on the map
  - The data provider
  - The analysis method
Less obscure, but map’s purpose is still unclear
This makes sense
Original Labeling

- Nice art piece!
- What does it mean?
- The dots don’t match???
After the color change

- Is this city important?
- Does this reactor matter?
- What are these rings?
- Is the hillshade necessary?
Much clearer

- Certain cities are in the danger zone
- This is the reactor we are worried about
- Rings show distance
- No hillshade
Original map elements

Legend
- Nuclear Power Plants

Observed Radiation Levels (uSv/h)
- < 0.2
- 0.2 - 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

Radiation Prediction Map
Empirical Bayesian Kriging (uSv/h)
- < 0.2
- 0.2 - 1
- 1 - 2
- 2 - 5
- 5 - 10
- 10 - 25
- 25 - 50
- 50 - 100
- > 100

0 10 20 30 40 Miles
Added map elements

- Added a Standard Error map - why is the error margin significant? Should we panic?
- What are the data sources?
- Where is this located in Japan?
Final map

- Added locator map, explanation of standard error
- Neatly aligned map elements
Brevity v. Accuracy

- This description is specific, but too wordy to fit on the map
- Big paragraphs are hard to read
- Only describes methodology
Speak to your audience

- Give the reader’s eye a place to go
  - data sources and human impact as well as methodology
- Use simpler, broadly approachable language
Relate units to reader

Before

After

Radiation Prediction and Standard Error
(all values in μSv/h)

0.00 – 0.08  Historical Tokyo levels
0.08 – 0.19  Historical Tokyo plus 1mSv/y public limit (ICRP)
0.19 – 2.36  Historical Tokyo plus 20mSv/y worker limit (ICRP)
2.36 – 5.00  Nuclear Emergency Preparedness Manager notifies Japanese Govt. (1999 Special Law for Nuclear Emergency)
5.00 – 26.74  Historical Tokyo plus 250mSv/y emergency Fukushima worker limit (MHLW)
26.74 – 550  Exceeds emergency worker limit
Final Result

- Color and lightness show a pattern; danger and location are clear
- Map elements add to understanding
- Standard error and methodology explained
What was changed?

- Color scheme
- Labeling
- Corporate review
Original Color Scheme

- Qualitative color scheme
- It looks like a land cover map
Final Color Scheme

- Sequential colors show wettest to driest soil
- Readable as drainage classes
Labeling

- What location does this map show?
- Where are the water bodies that affect soil water content?
- Which features are more/less important?
Final Labeling

• Important roads and towns labeled
• Large rivers shown and labeled
• Tributaries shown
• Label colors and sizes follow hierarchy
Corporate Review

- ESRI requires that all maps released to the public be reviewed before publish
Food Deserts

Jim Herries
Food Deserts

- Defined by areas with limited access to affordable and nutritious food
  - Frequently associated with health issues (obesity)
  - Often associated with demographic characteristics
  - Sometimes includes competing destinations in the definition
  - Clear behavioral choice component
  - Access does not automatically result in good choices

- …lots of room to define a food desert, so it’s important that the map is relatable and connects the reader to a definition.
Small Scale Maps
Medium Scale Maps
Large Scale Maps
Scale Matters

- Small and medium scales show national and regional patterns, but are less relatable
- Large scale maps showing neighborhood level information are something the public can relate to
- Would Zillow.com be as successful if it looked like this?
- Not all data is available at the neighborhood level
Before
After

- Shows combined effects of socioeconomic status and significant differences in access
What was changed?

- Methodology
- Colors
Original Methodology

- Which blocks have walk-able access to a supermarket?
- Goal was to put distance measurements in full view
- Partial view of how people access food
Revised Methodology

- Goal was to create a single, relatable measure of the food environment
- Distance is only a part of the story
- Assess areas based on multiple criteria
  - Poverty
  - Car ownership
  - % of income spent on food at home
  - Crime
  - Rural population
  - Distance to and number of restaurants and farmers’ markets
  - Distance to and number of supermarkets
Classification Approach

- Use census block group data
- Interpolate a continuous surface using Natural Neighbor
- Reclassify the surface into 3 categories:
  - 0 = potential problem area (red)
  - 1 = likely not a problem area (yellow)
  - 2 = definitely not a problem area (green)
Raster calculator sum
Original Colors

- Color scheme is culturally ambiguous:
  - Green is good
  - Red is bad (in the US)
  - (But red is good in China)

- Candy?

- People in poverty represented as dots

- Two measures of access shown:
  - Walkable
  - Drivable
Almost Done

- Pre-shaded relief image and text
- Colors look like food
- Bilinear interpolation
Focal Statistics

- FocalMin smoothes the surface used as input for the hillshade and emphasizes the troughs
Hillshade before and after FocalMin
Final Colors

- Red indicates areas with a lower food environment score
- Color breaks based on cell score:
  - >16 is not a problem (squash)
  - <16 and >13 is questionable (cheddar cheese)
  - <13 is a problem (ketchup)
Final Result

- 60% transparency on the hillshade
- Color and hillshade show a pattern
- Neighborhoods with lower access and lower mobility have a lower score (red)
- Hillshade puts the reds in a trough for greater visual effect
Thank you!

QUESTIONS?

Please fill out your evaluations: it helps us improve every year

Special thanks to Claire Steiner: Intern Extraordinaire!