



Top Tips for Making Beautiful, Informative Maps

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Cartography Webinar

April 13, 2017

Topics Covered In This Webinar

1. Introduction to Cartography

What is cartography?

2. Tips For Creating Good Maps

Simple design strategies

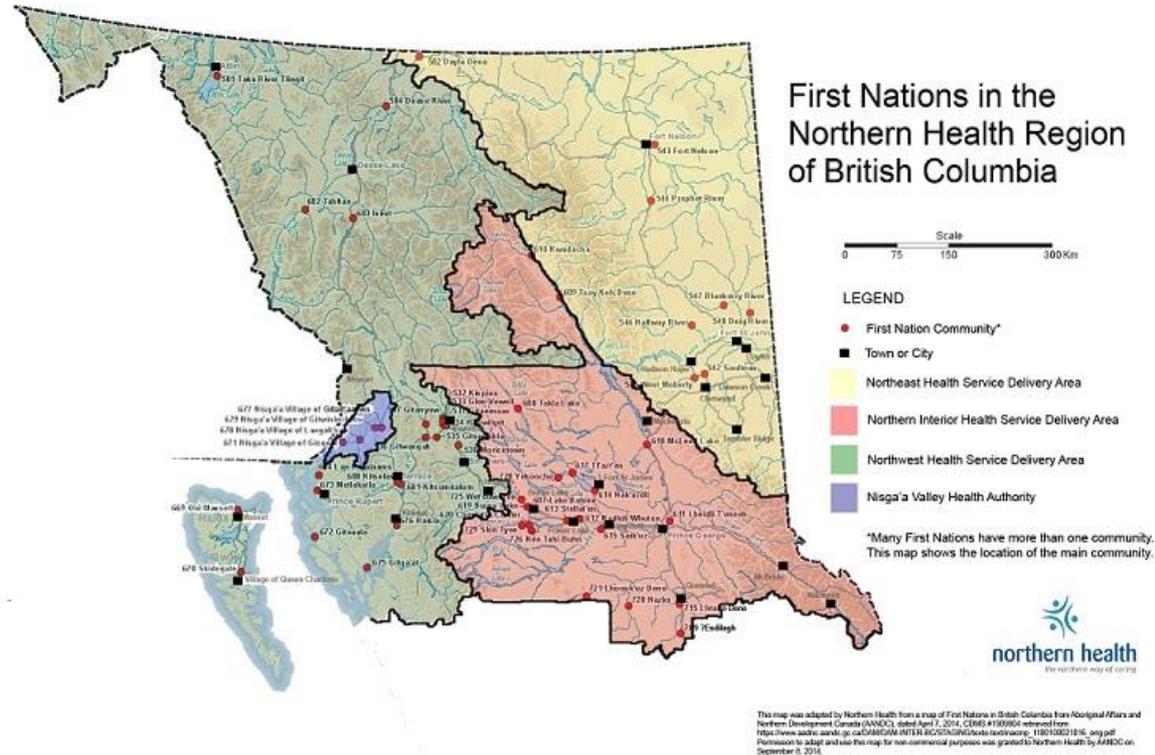
3. Common Mistakes

And their solutions

Introduction to Cartography

What is Cartography

- Cartography is the *art* of telling a story with a map.
- The *art* of telling a story with a map is accomplished through a combination of many elements, including color, layout, theme, font, and symbolization



Map Credit: Northernhealth.ca

Why Cartography Matters

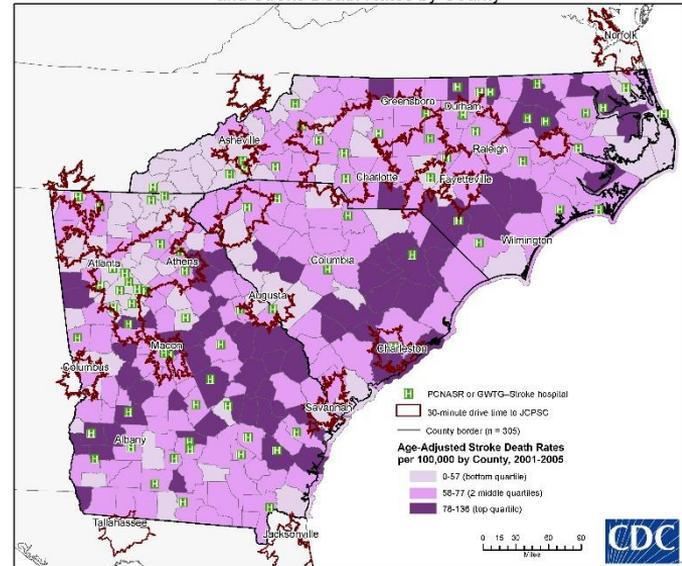
*Good design is clear thinking
made visible ~ Edward Tufte*

- Enhances communication of spatial data
- Clarifies the story contained in the data so we can deliver our story in a clear and concise manner.
- Design impacts how the map is read and interpreted.
- Presents an opportunity to visually engage your audience.
- Good map design will both answer a question, and prompt further questions.

The Audience Informs Map Design

- **Public Health Professionals**
 - Can handle technical and complex information.
 - Can be very detailed.

30-Minute Drive Time Areas to a Joint Commission-Certified Primary Stroke Center, Locations of Paul Coverdell National Acute Stroke Registry (PCNASR) or Get With the Guidelines-Stroke (GWTG-Stroke) Hospitals and Stroke Death Rates by County

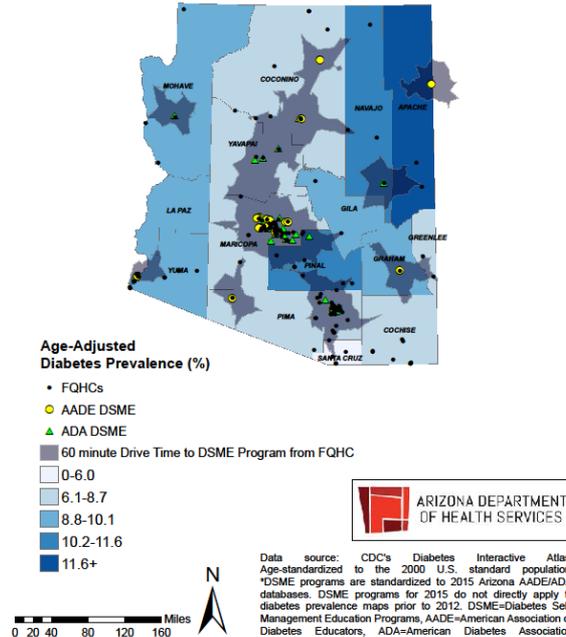


The Audience Informs Map Design

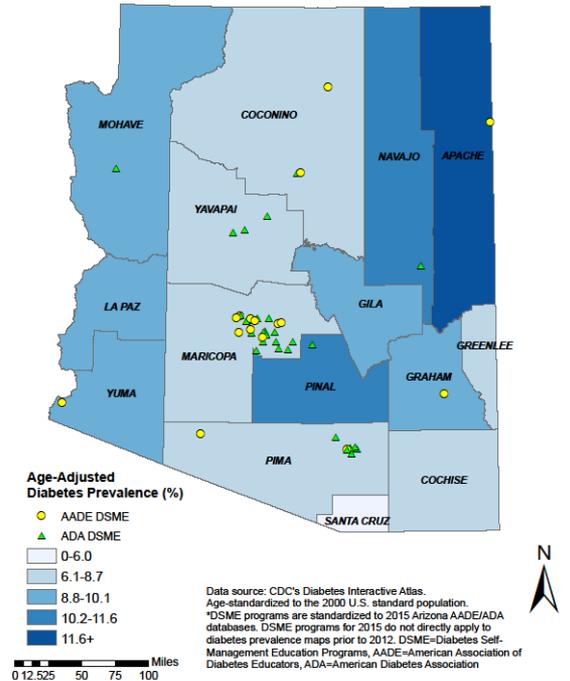
- Policy Makers
 - Be concise

These maps were featured in the American Diabetes Association policy briefs, 2016, as part of their annual Arizona Diabetes Day at the Capitol.

Diabetes Prevalence and 60 Minute Drive Time Areas to Diabetes Self-Management Education Programs from FQHCs, 2012

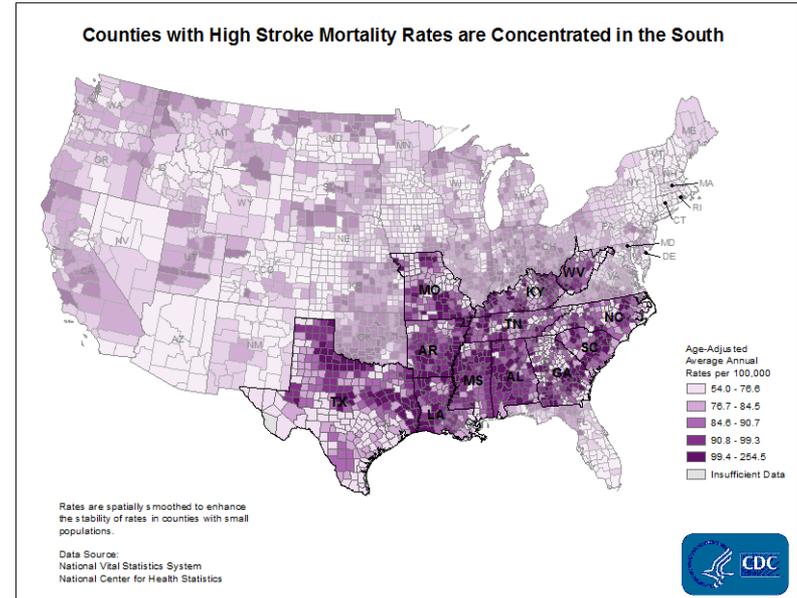


Arizona Diabetes Prevalence and Diabetes Self-Management Education Programs, 2012



The Audience Informs Map Design

- **General Public**
 - Simplify the content.
 - Be very explicit and explanatory.
 - Fewer details.



Color

- Color can have cultural significance
- Standard **green** and **red** combinations are hard for people with color-blindness to distinguish from one another.
- People with low vision will have a hard time distinguishing between colors with **low contrast**.
- Connect color to the feature in a way that meets common convention; **water**, **vegetation**, **Alarm**

You don't have to use color. Gray scale can be very effective as a background.

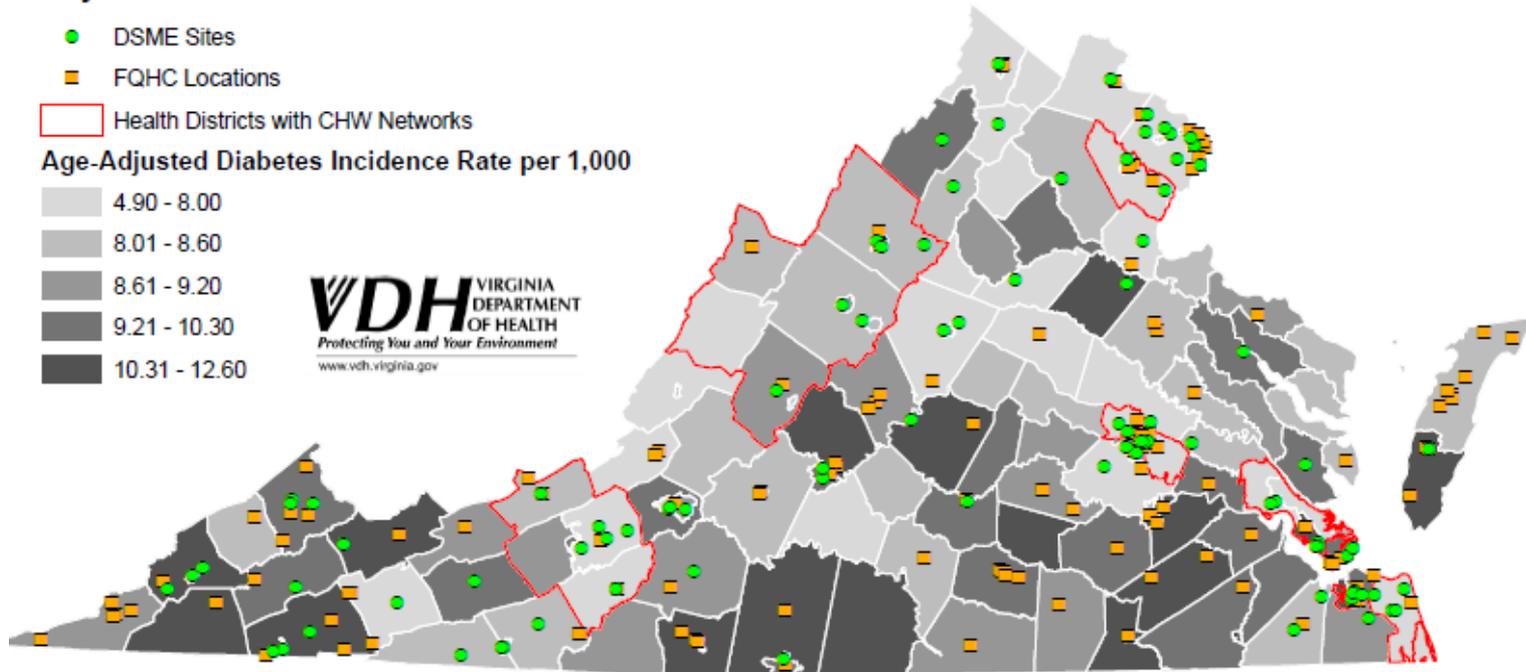
Key

- DSME Sites
- FQHC Locations
- Health Districts with CHW Networks

Age-Adjusted Diabetes Incidence Rate per 1,000

- 4.90 - 8.00
- 8.01 - 8.60
- 8.61 - 9.20
- 9.21 - 10.30
- 10.31 - 12.60

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OF HEALTH
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www.vdh.virginia.gov



0 15 30 60 90 120
Miles

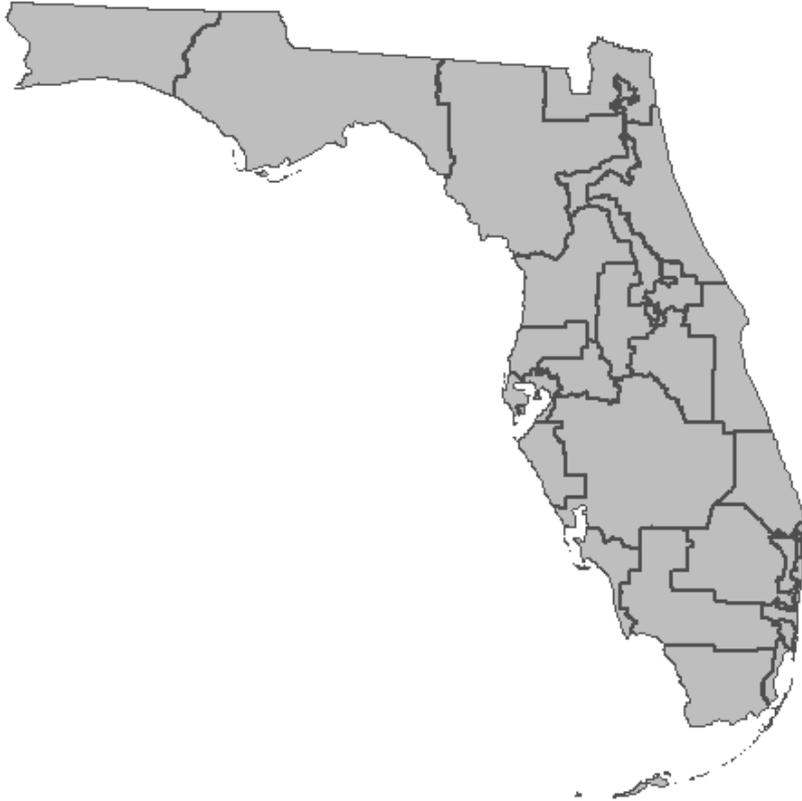
Pre-attentive Visual Processing

We assign quantitative meaning to some attributes pre-attentively, even though they have no explicit value attached to them.

- **Length:** longer = greater
- **2D Position:** Higher and farther to the right = greater
- **Width:** wider = greater
- **Size:** Bigger = greater
- **Intensity:** Darker = greater
- **Blur:** Clearer = greater

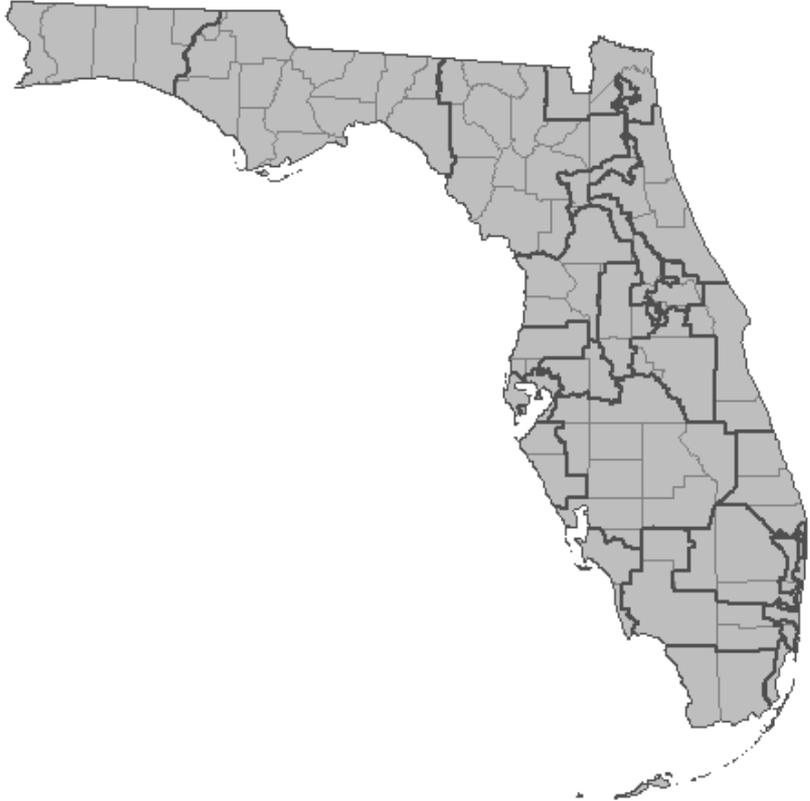
Tips for Creating Good Maps

A strategy for symbolizing multiple boundary categories: use color, width, and dashed lines to visualize hierarchy.



**Congressional
Districts**

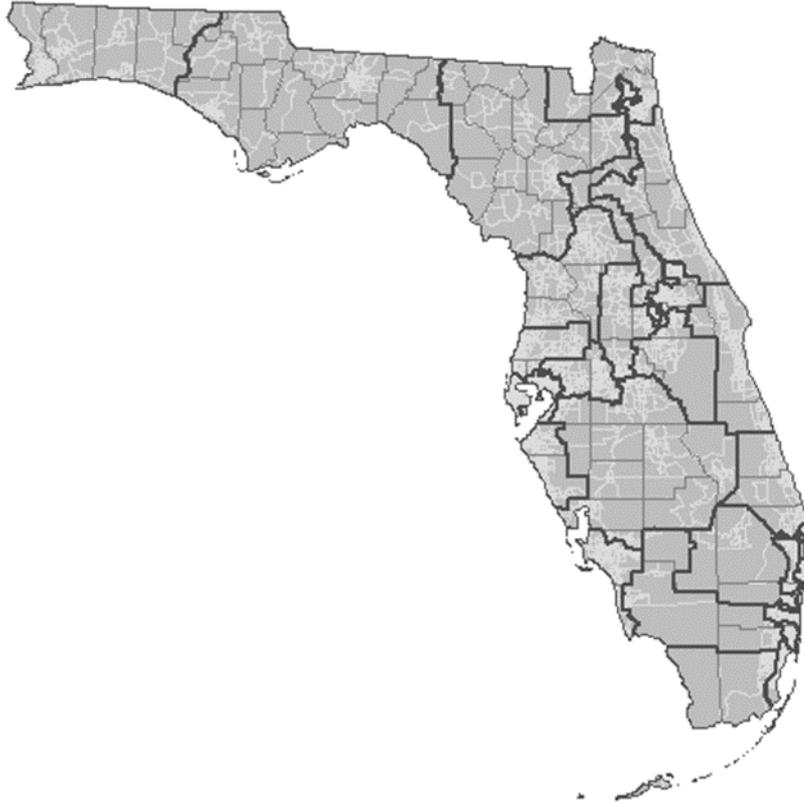
A strategy for symbolizing multiple boundary categories: use color, width, and dashed lines to visualize hierarchy.



**Congressional
Districts**

Counties

A strategy for symbolizing multiple boundary categories: use color, width, and dashed lines to visualize hierarchy.

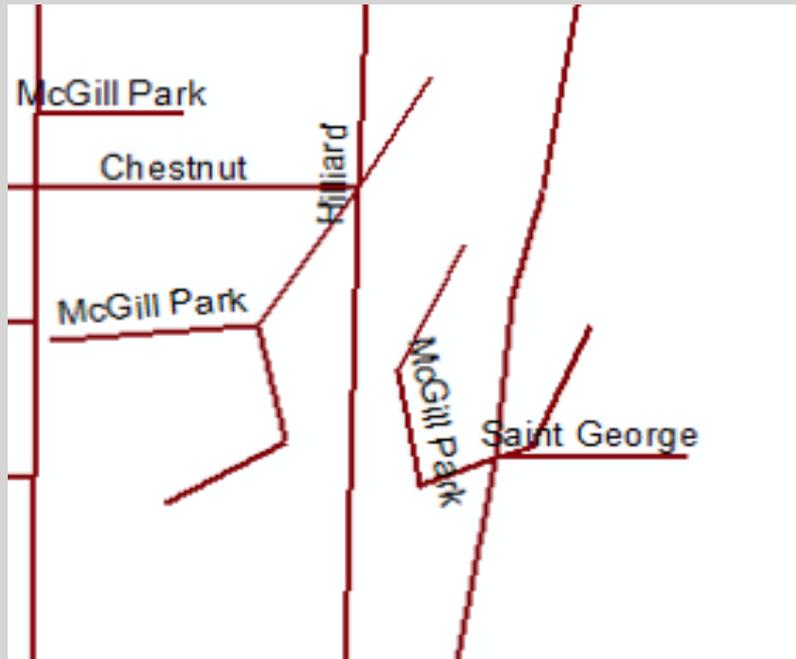


**Congressional
Districts**

Counties

Census
Tracts

De-clutter Your Map

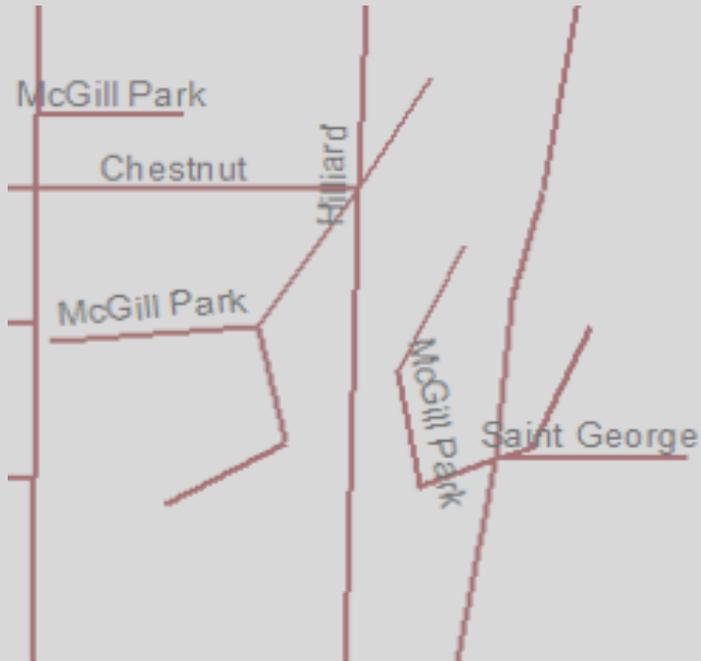


Street labels placed without halo's

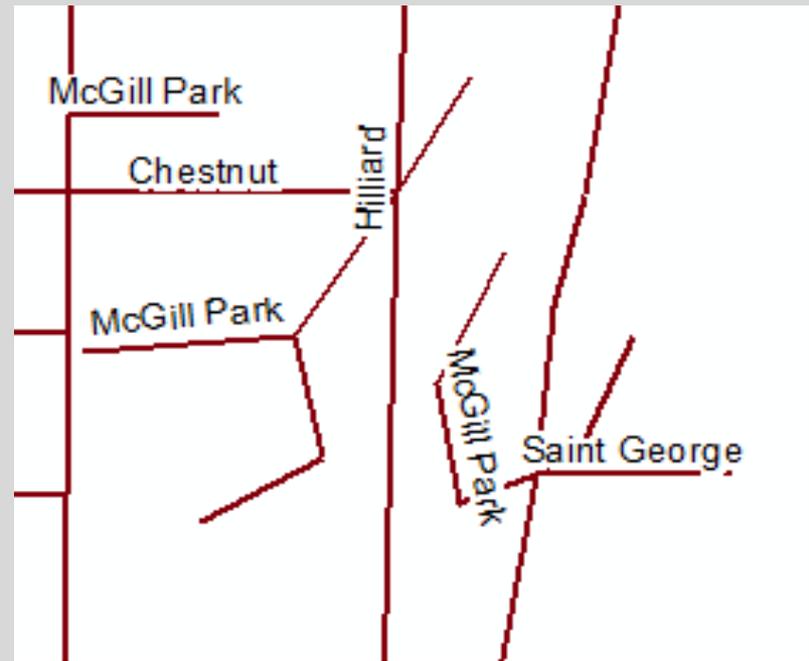


Streets labeled with a 1 point halo in the same color as the background

De-clutter Your Map

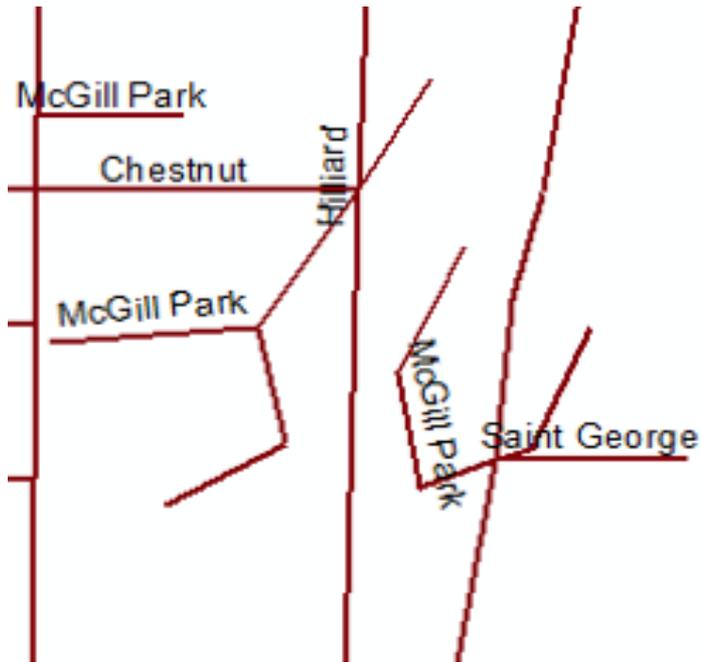


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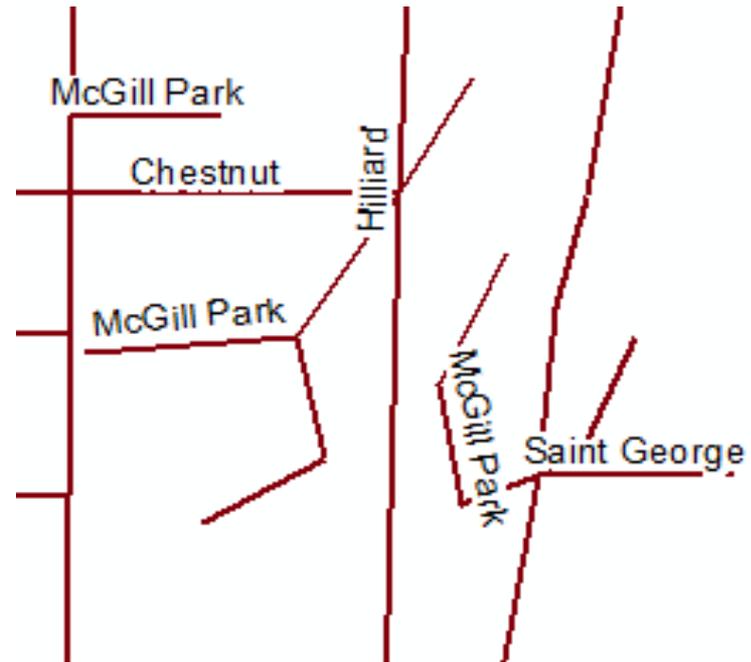


Streets labeled with a 1 point halo in the same color as the background

De-clutter Your Map



Street labels placed without halo's



Streets labeled with a 1 point halo in the same color as the background

De-cluttering Continued.....

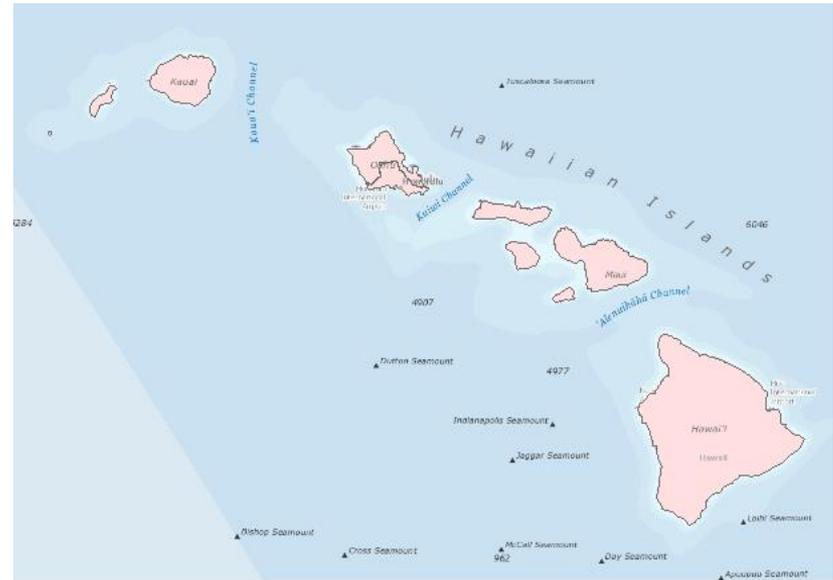
- Use label expressions to add an attribute value to your label, instead of using a symbol to represent the value.
- You can find the script used to format these labels in the PDF document attached to this webinar under 'Using Label Expressions'.



Use Basemaps Judiciously



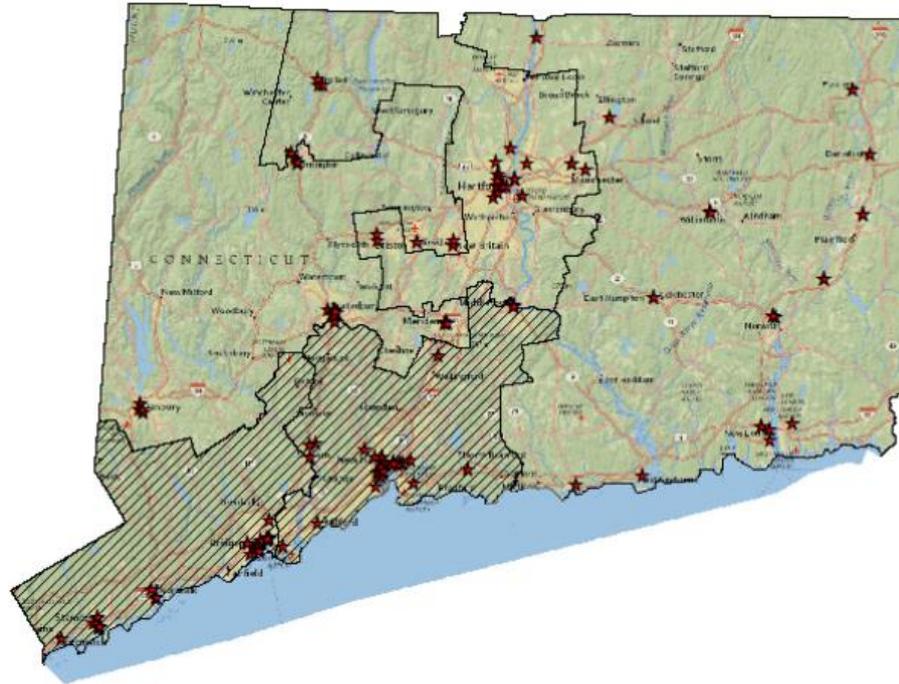
The addition of this base map adds spatial reference, but also takes the focus off of the operational data.



Here, the base map has been dimmed by 35% and no longer takes the focus off of the operational data.

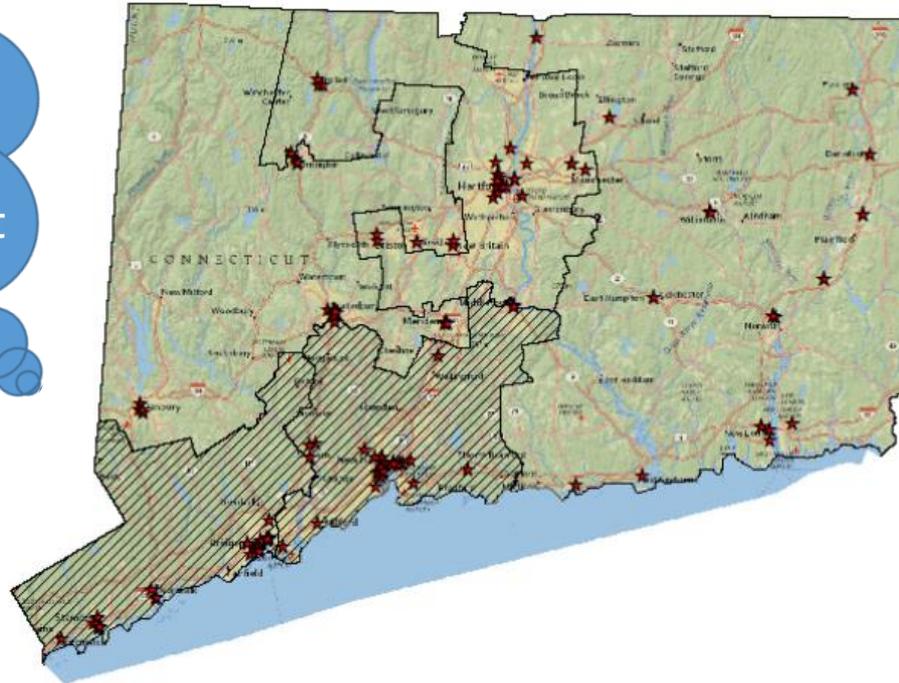
More on Basemaps.....

Look at the
number of lakes
in Connecticut!



Basemaps, What's The Story Again?

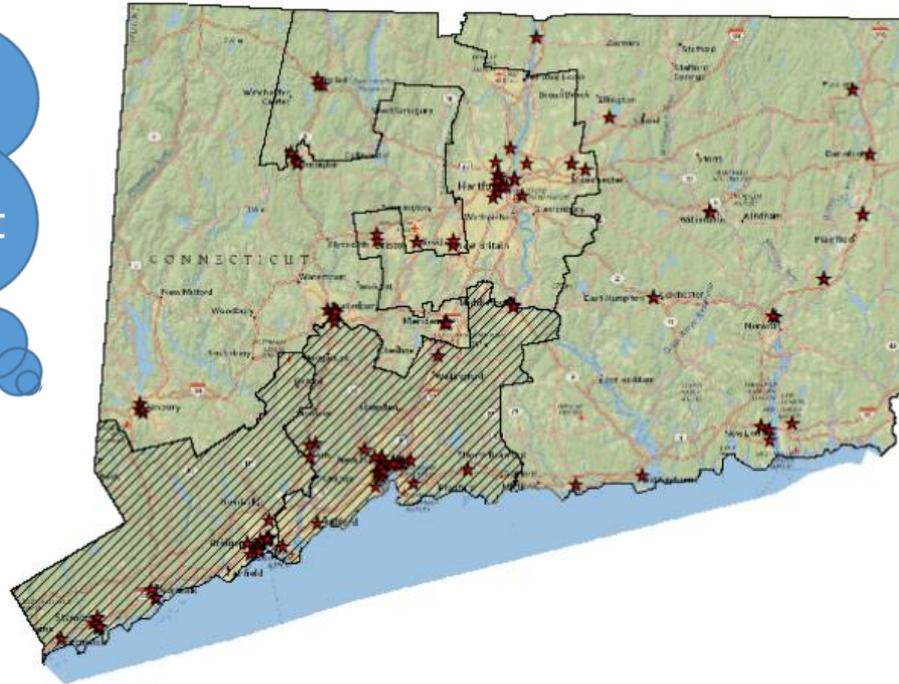
Are those mountains?
Could be some good hiking in the western part of the state.



Look at the number of lakes in Connecticut!

Basemaps, What's The Story Again?

Are those mountains?
Could be some good hiking in the western part of the state.



Look at the number of lakes in Connecticut!

So many locations are close the shore; must be spectacular views!

Another Basemap Issue: Service Layer Credits

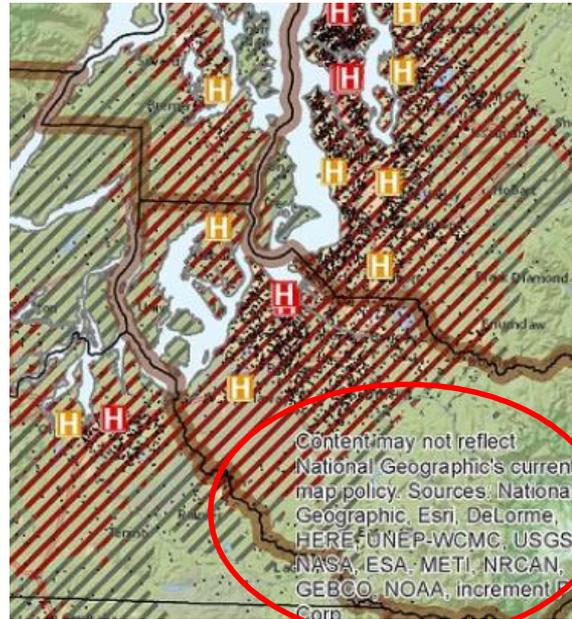
- Service Layer Credits can easily be moved so that they don't interfere with the map data.

In ArcMap:

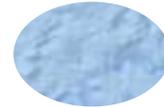
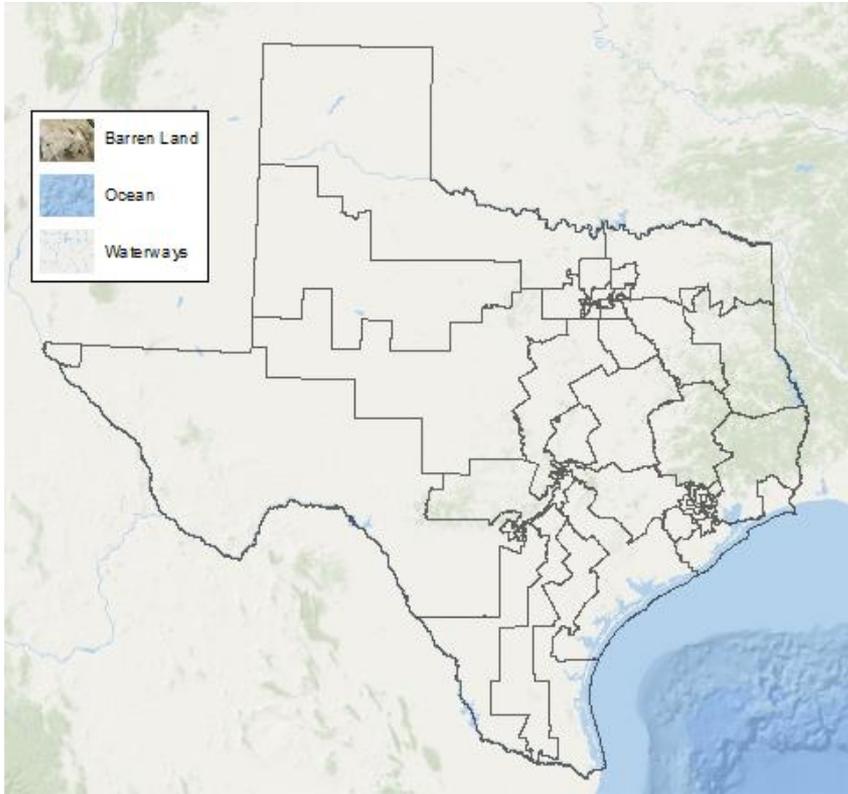
Insert → Dynamic Text

→ Service Layer Credits

This will allow you to move the credits to another spot on the map or move them off the map entirely.



Customize the Legend



- Use the *'insert shape, fill shape'* functions in MS Word to easily give your legend a custom look with screen shots from your map.

Use the formatting options within ArcMap to customize your legend.



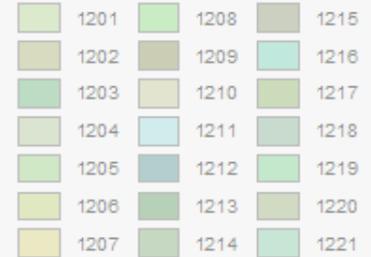
74 - 77 (8)

78 (5)

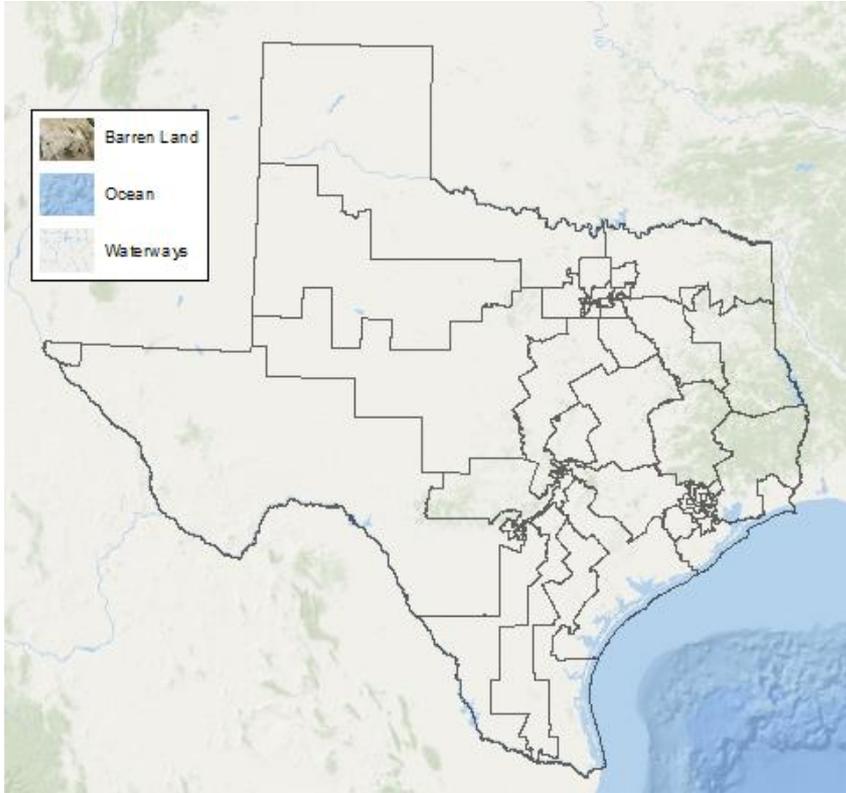
79 - 80 (5)

81 - 82 (5)

83 - 84 (4)



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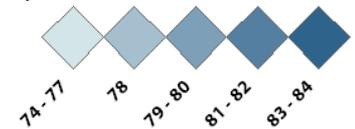
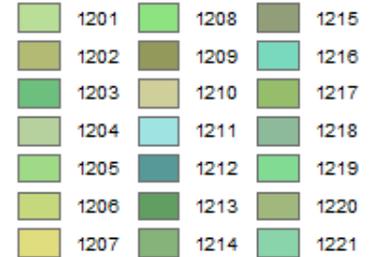
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Quick Tips

- To set a default font for your MXD, use the Drawing toolbar to choose your desired font. This will prevent ArcGIS from defaulting to Arial every time you need to work with the font for this particular MXD.



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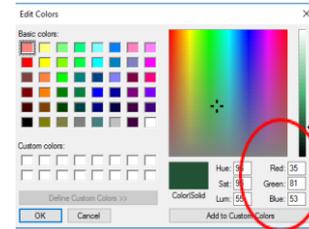


➤ Do you see a color online that you would like to use in a map you are creating and need to know the RGB values? Follow these steps to get the RGB values:

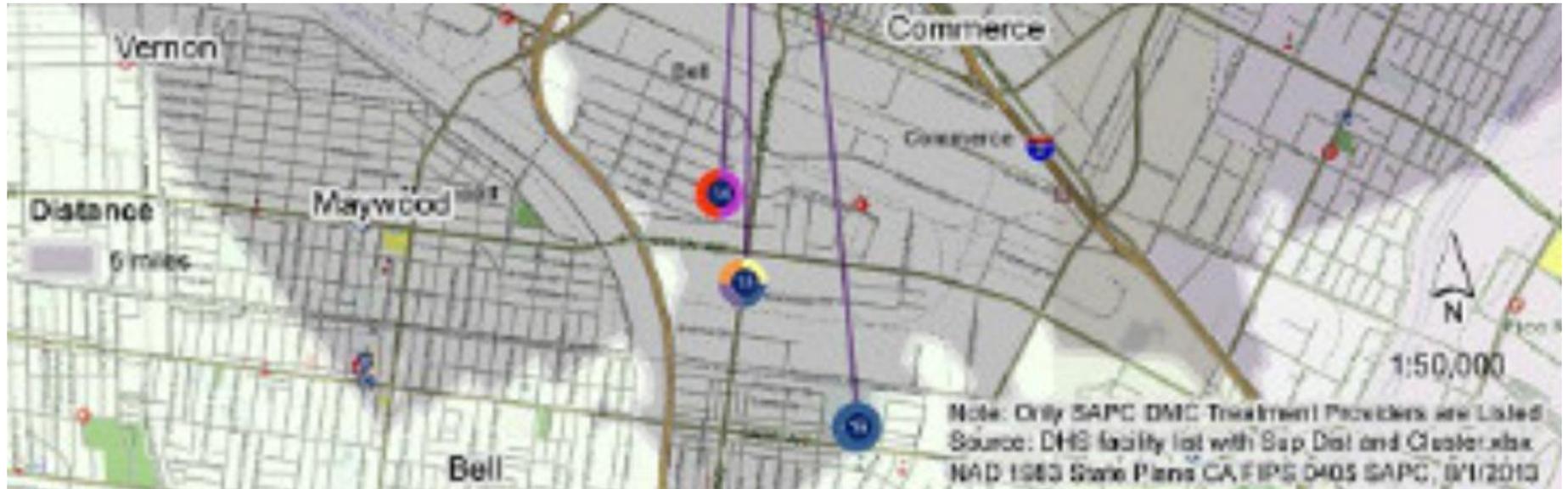
- Take a screenshot of the desired color or colors using the 'print screen' key on your keyboard.
- Paste the image into MS Paint 
- Click on the color selector icon, the eyedropper, and then click on the color of interest in the image you pasted into Paint.
- In the tool ribbon, this color should appear as one of your color choices. Select it and then choose 'edit color'.



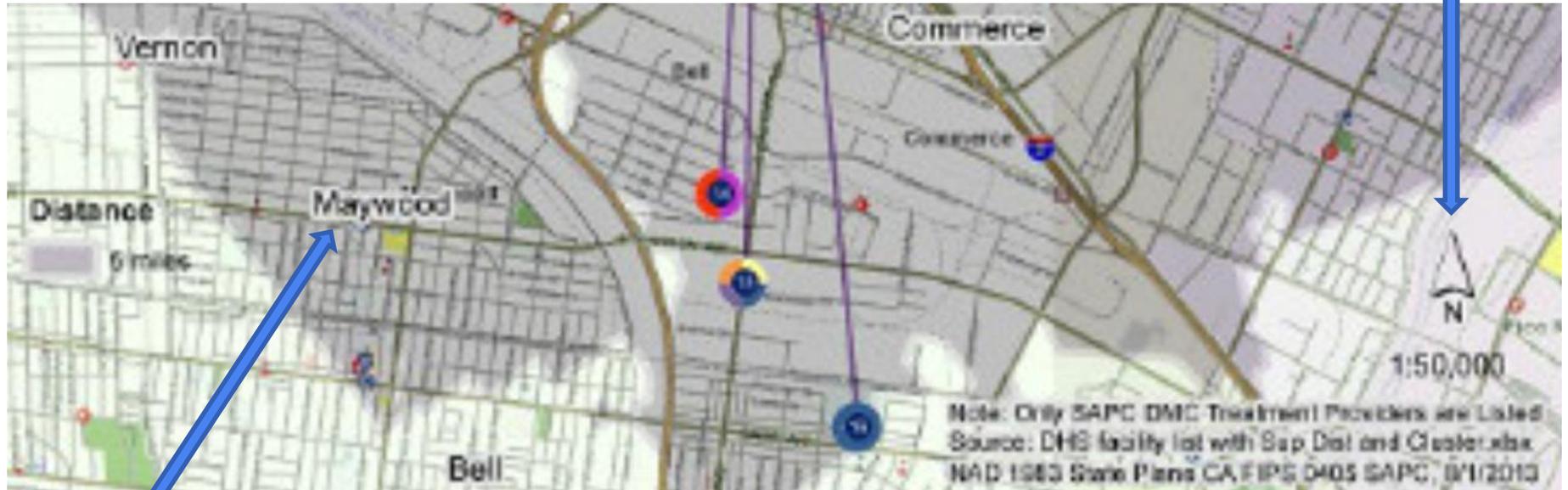
- The RGB values for that color will appear in a dialogue box!



What Can Be Improved With This Map?



What Can Be Improved With This Map?



What Can Be Improved With This Map?



Legend

- Helicopter base, CAH/N
- Helicopter base at PCI
- Hospitals with limited PCI
- Hospitals with 24/7 PCI
- CAH/No PCI capability

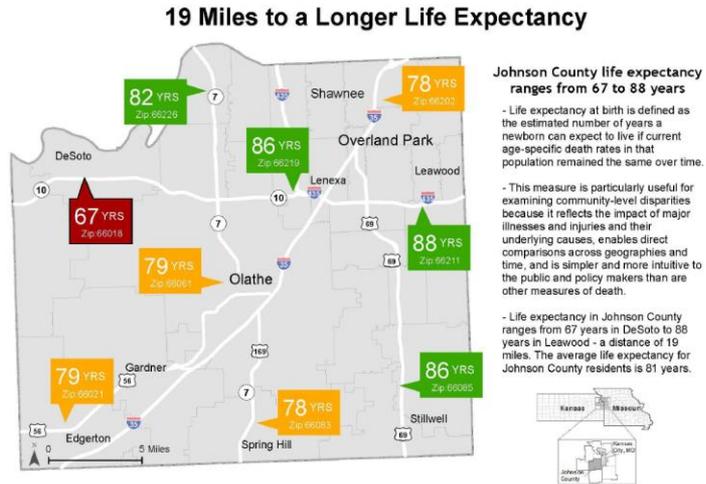
Common Mistakes

Mistake: Using the wrong scale for your analysis

Using the wrong scale for your analysis may imply results that are invalid.



Solution: Appropriate Scale and Spatial Reference



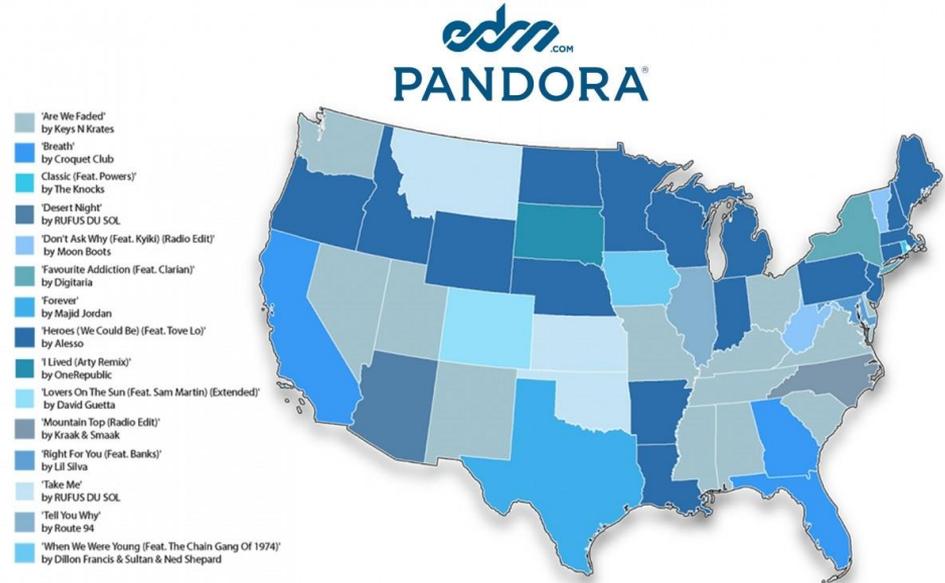
Data Source: Kansas Department of Health and Environment Death Data, 2009-13
Produced By: Johnson County Department of Health and Environment

JOHNSON
COUNTY
KANSAS

- **Solution:** This is a county level map that uses multiple insets to convey the location of the county relative to the metropolitan region it is a part of, as well as the location of the county relative to the state. The audience is not overwhelmed with extraneous location data that is not relevant to the analysis or presentation.
- Also note the excellent use of visual hierarchy used in this map.

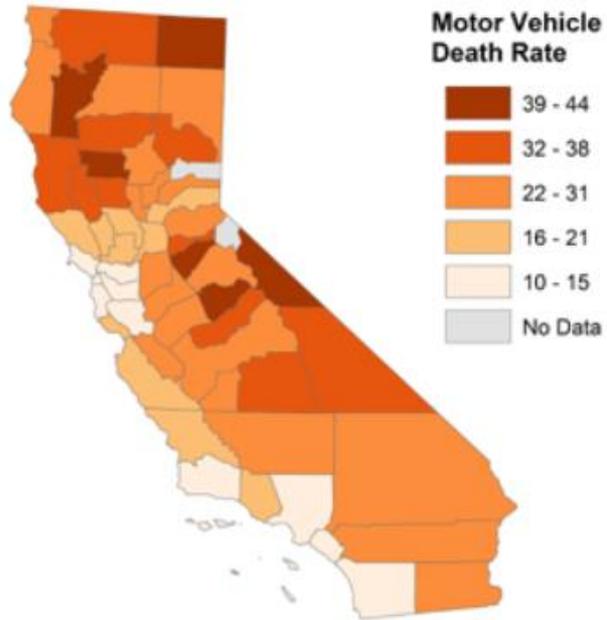
Mistake: Using quantitative color schemes to represent qualitative data, and vice versa

- The use of hue indicates a relationship between the categories that doesn't exist: more of something or less of something.

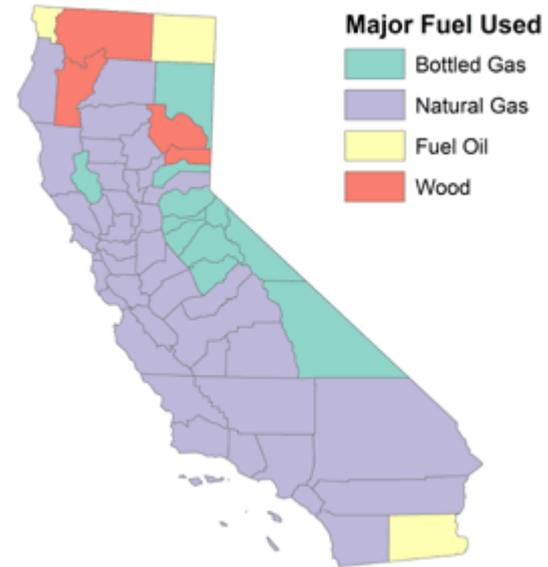


Solution:

Quantitative data with a quantitative color scheme.

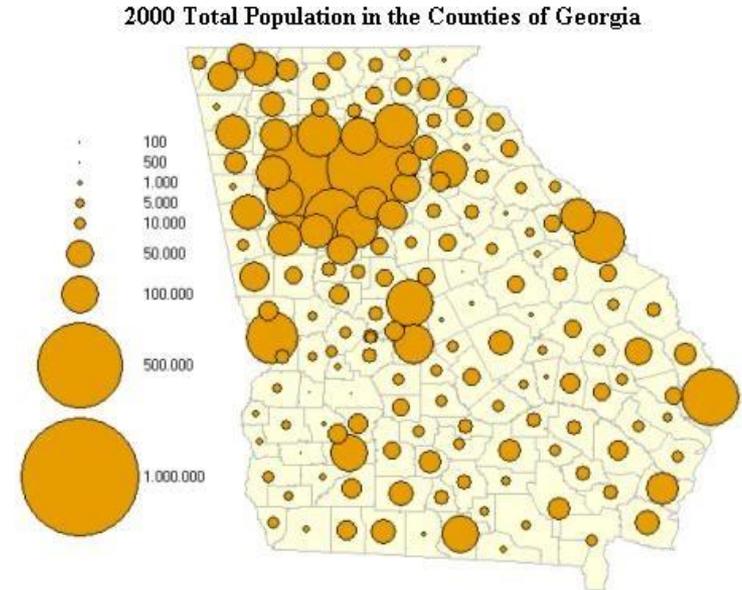


Qualitative data with a qualitative color scheme.



Mistake: Symbolizing a map in a way that makes the data on the map hard to understand

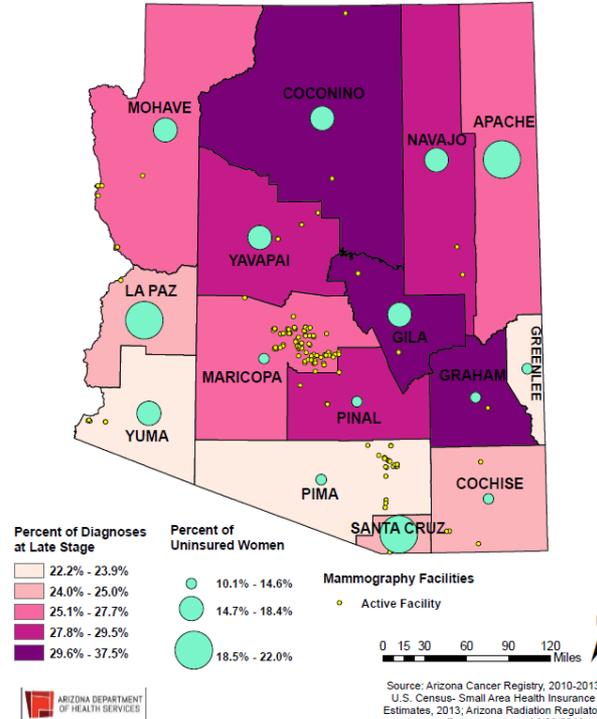
- In this case, it is impossible to tell what county each dot represents because the counties are hidden from view by the size of the dots. Also, the value that each dot represents is hard to interpret because of the number of classes and their proximate sizes.



Source: U.S. Census Bureau, Census 2000

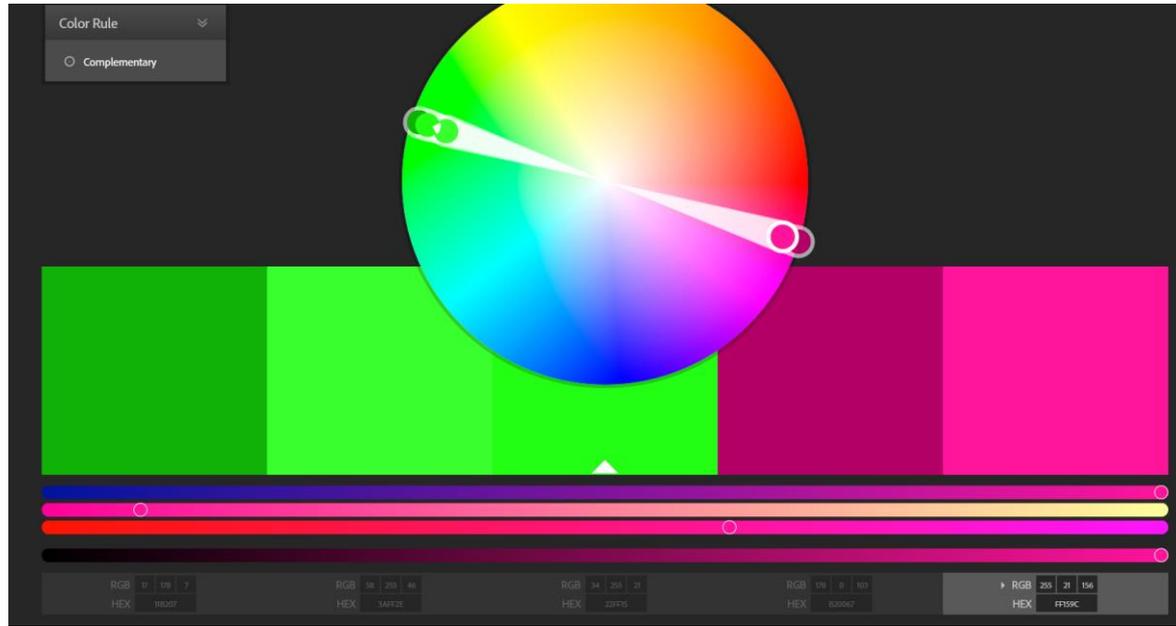
Solution: Limit the number of classes used, and create symbols whose sizes are easy to discern from one another.

Female Late Stage Breast Cancer Diagnosis Compared to Percent of Uninsured Women and Active Mammography Facilities by County



Resources

- Adobe Color CC



<https://color.adobe.com/create/color-wheel/>

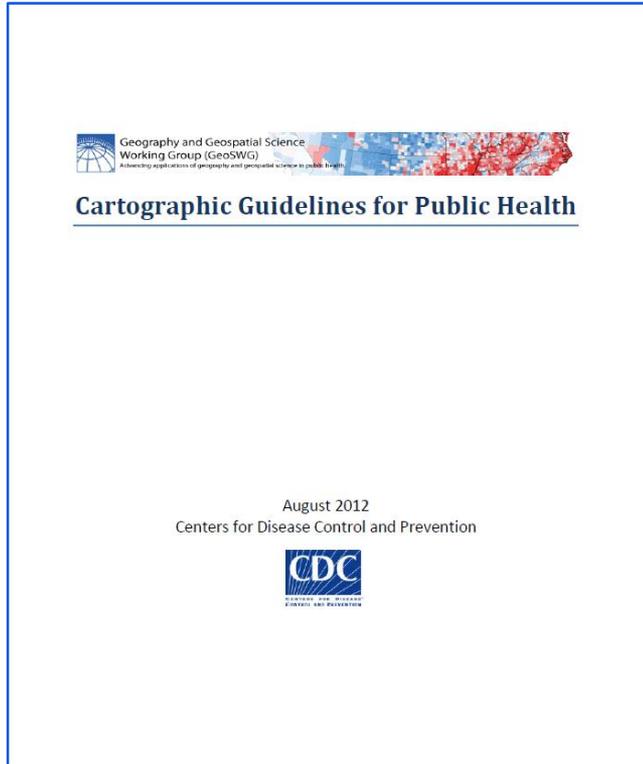
Supplemental Documents

- You can find the following Documents attached to this webinar:
- Data resources
- How to dim basemaps
- How to download data from the CDC Interactive Atlas of HD & ST
- How to format lines and boundaries
- How to add halo's to labels
- How to get RGB values from a screenshot
- How to use label expressions
- How to remove metadata from a basemap
- CDC's Cartographic Guidelines for Public Health

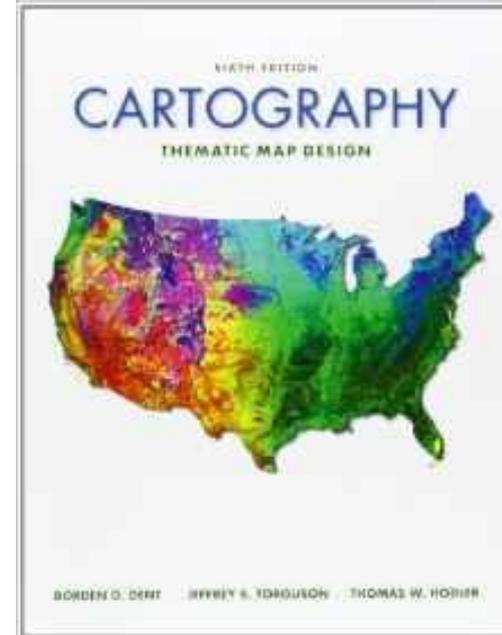
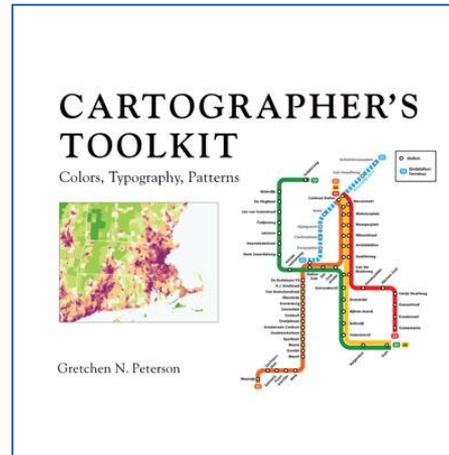
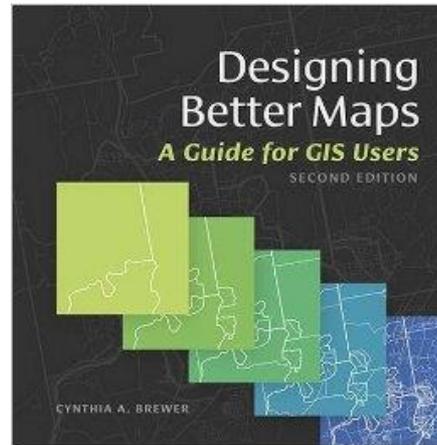
Data Sources

- For a full listing of data sources, visit the Chronic Disease GIS Exchange
- cdc.gov/dhdsp/maps/gisx/index.html
 - Public Health Data Resources
 - Geospatial Data Resources
 - Social Determinants of Health Data Resources
 - Environmental Health Data Resources

Cartography Resources



Cartographic Guidelines for Public Health is available for download at no cost at cdc.gov/dhdsp/maps/gisx/resources/tips-creating-ph-maps.html



Division for Heart Disease and Stroke Prevention Resources

Chronic Disease GIS Exchange



Interactive Atlas



National Heart Disease and Stroke Maps



Social Determinants of Health



Data Trends and Maps



Data and Statistical Resources



Web Resources

- **Colorbrewer2.org**
 - Color according to data type and/or media type
- **Color-hex.com**
 - Great for quantitative, sequential hue colorways
- **Naturalearthdata.com**
 - Basemaps appropriately generalized according to scale
- **Cartotalk.com**
 - Cartography forum
- **Inkscape.org**
 - Free, open source alternative to Adobe Illustrator

A Special Thank You To The Following People For Their Contribution To This Webinar

Omar Contreras - Arizona Department of Health Services

James Kelley - Mississippi State Department of Health

Jamie Forrest - Florida Department of Health

Erica Smith - Maryland Department of Health and Mental Hygiene

Joshua Tootoo – Children’s Environmental Health Initiative

Mary Catherine Jones – National Association of Chronic Disease Directors

Michele Casper – Centers for Disease Control and Prevention

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

