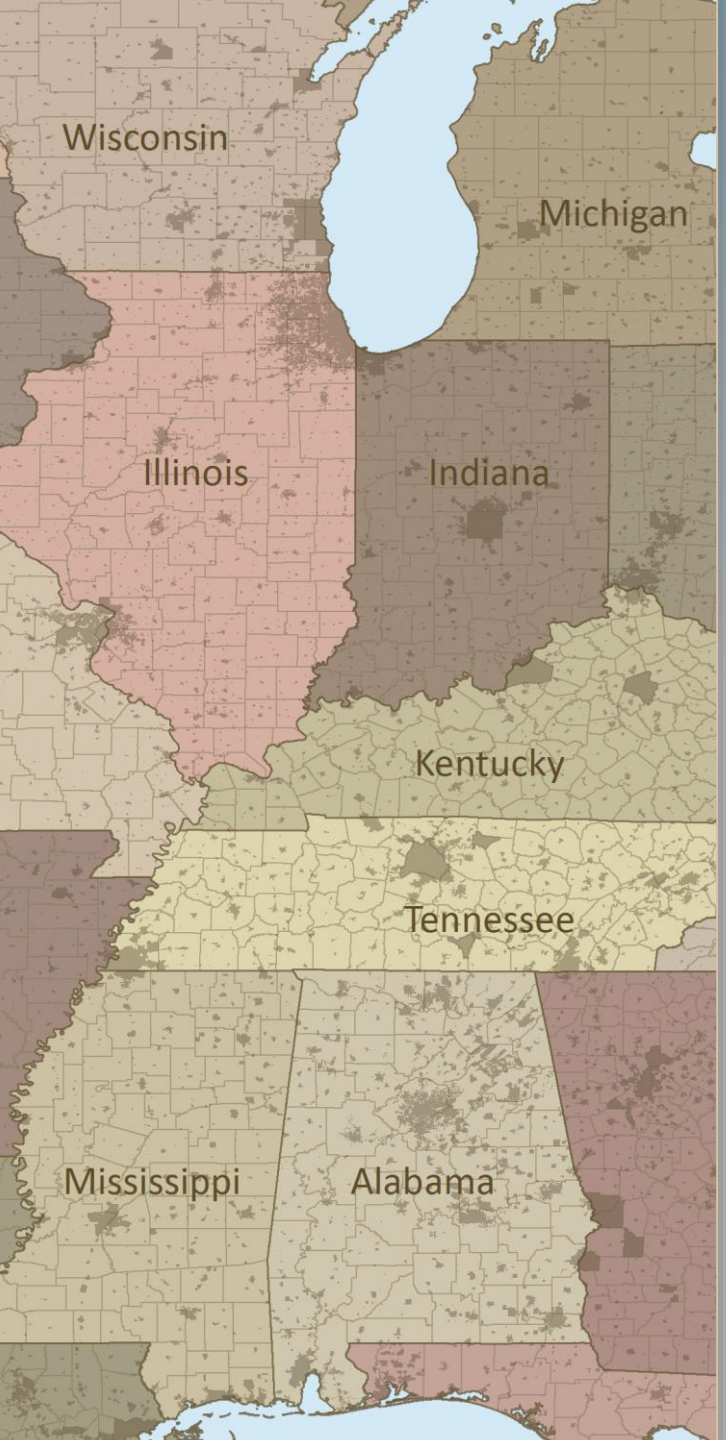


Making

maps

that ***WORK***

- Why This Workshop?

- Learn a few key cartographic principles
  - Many professionals using GIS don't have background in cartography, color or design
- Learn how to share those principles
  - Help others create clear maps

NOTE: This simple workshop is not a substitute for formal cartography training.

Your industry may contain specific cartographic standards that differ from suggestions here:

If this occurs, FOLLOW your industry standards.

GOAL

Help others to see/understand the results of <u>your</u> efforts

- Create Clear & Useful Information products
- Manipulating graphic properties of map elements
  - *Carefully & accurately represent information*
  - *Create visual hierarchy*
  - *Maintain clarity and legibility*

Artistic merit is <u>not</u> the main goal

Communication.

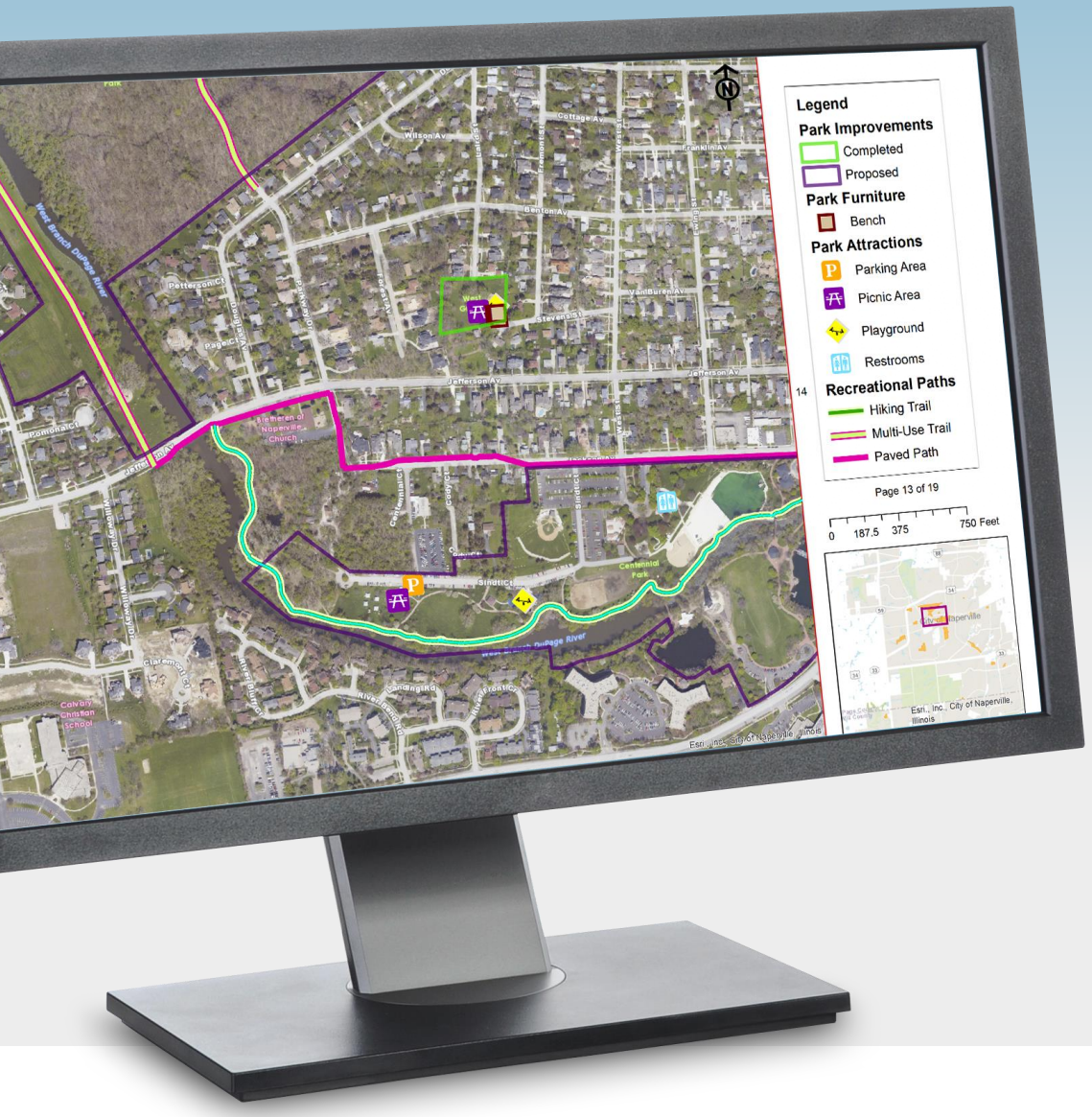
Why do some maps resonate?

Let's take a tour of maps that work.

Examples

Purpose.

Making Maps that Work.



People expect to:

easily discover, use, make & share maps…

on any device anywhere, anytime.

Map WILL communicate - something.

Is your map ready?

Getting ready

Who is the map for?

In/Out of peer group?

How will they access the map?

Static - printed, Image file, PDF

Interactive – Web Maps & Web pages

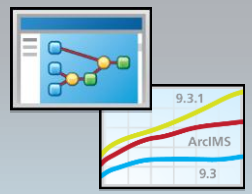
(set scale dependencies? chose the right basemap?)

Determine Map Type:

- General or “Reference” Map
- Thematic Map

Asset Management	Planning & Analysis	Field Mobility	Operational Awareness	Constituent Engagement/ Public Outreach
Collect, Organize, & Exchange Data on Specific Resources.	Transform Data Into Actionable Information	Get Information Into and Out of the Field. Timely. Accurate. Nonrepetitive.	Understand the State of the Organization. Disseminate Information Where and When it is Needed	Share What you Know with the public, Get Feedback and Help others Make Informed Decisions

Different patterns need different maps



Support Business Patterns

Static | Interactive

Multi-focus | Single-focus

Don’t forget – Maps go where people go

Digital, interactive maps have special considerations

Locational

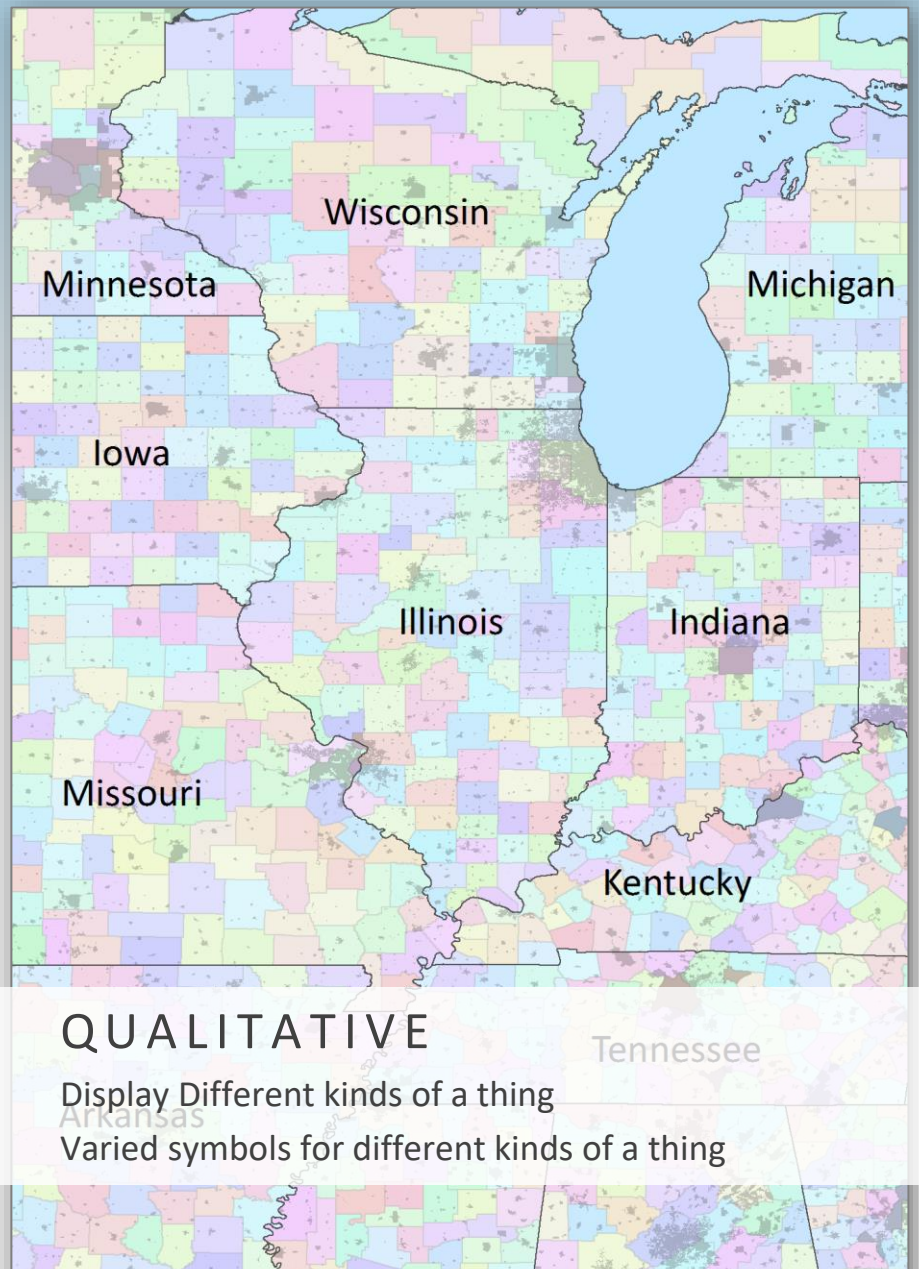
Positional

Display a Variety of Features for a Variety of Users

Often has more information than any single user needs

General Maps

Thematic Maps



QUALITATIVE

Display Different kinds of a thing

Varied symbols for different kinds of a thing

QUANTITATIVE

Display a range of quantities kinds of a thing

Graduated symbols for a range of values

Cartographic principles.

How people learn and gain understanding from maps hasn't changed.

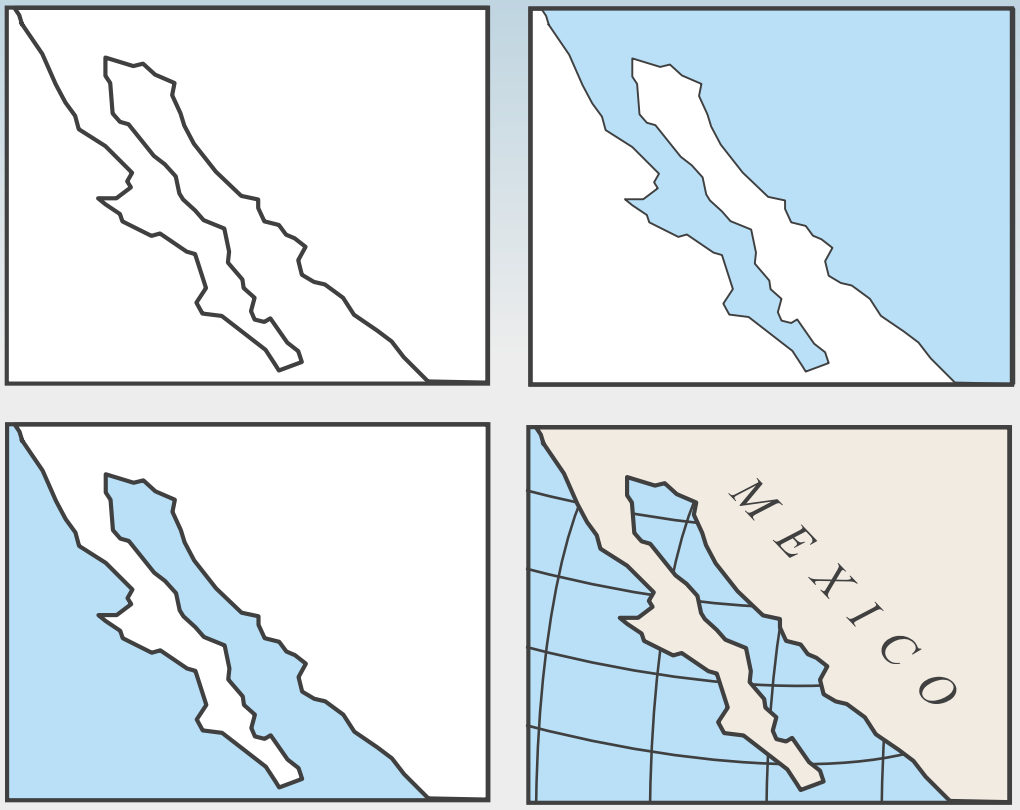
Hierarchy.

First things first.

Figure-Ground example

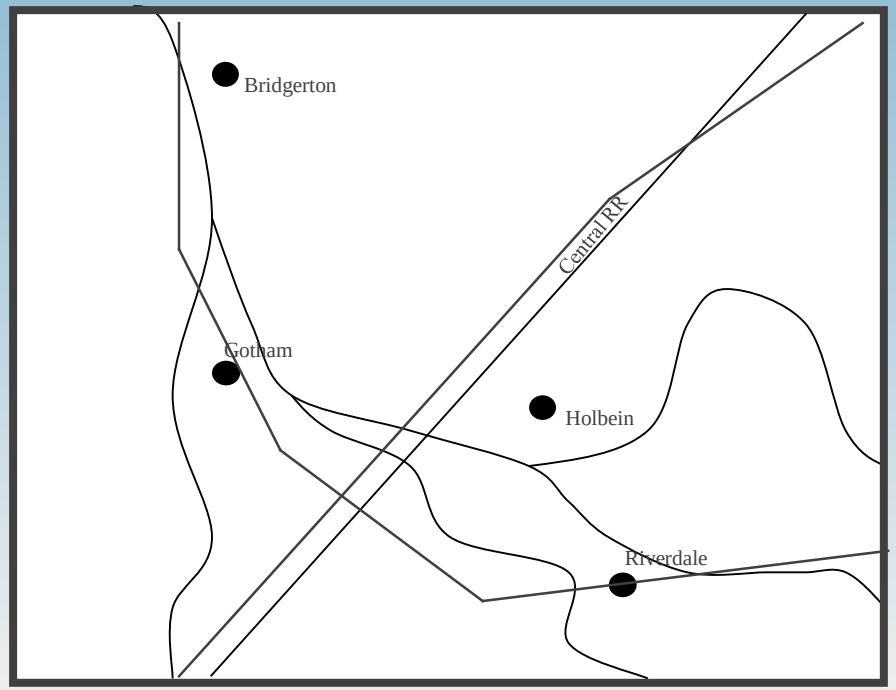
What's important?

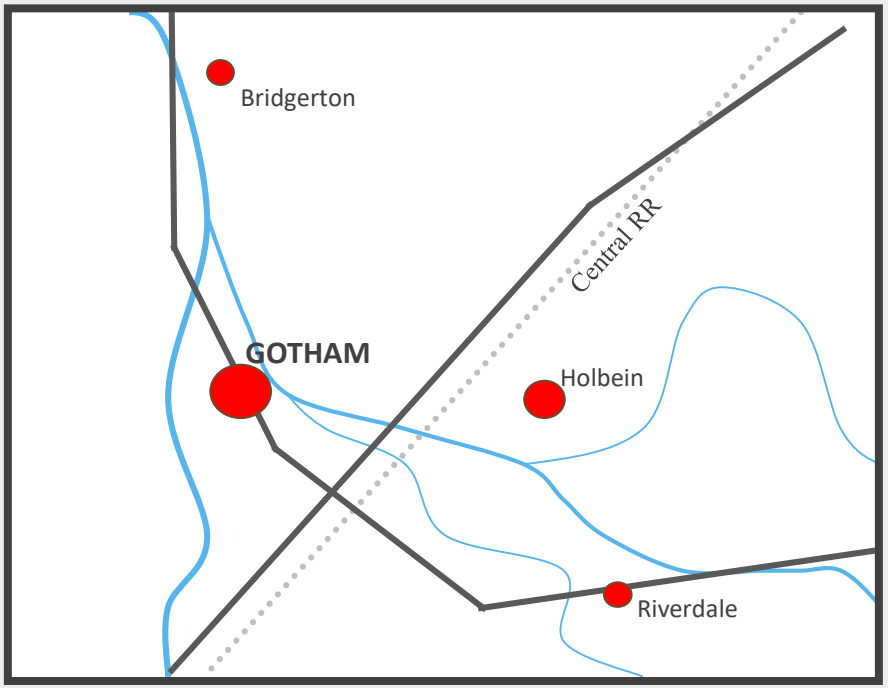
Creating Visual Hierarchy



Use line weight, shading, & text to create depth.

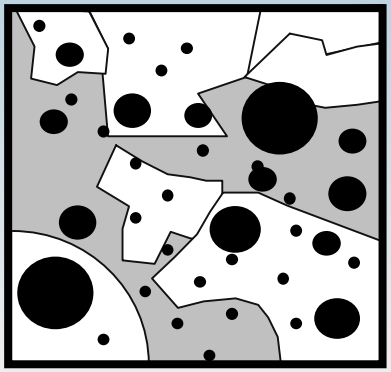
- Visual Contrast
  - Basis for Seeing
    - Aids differentiation
    - Creates hierarchy
  - Creating Contrast
    - Value
    - Size
    - Shape
    - Some Colors

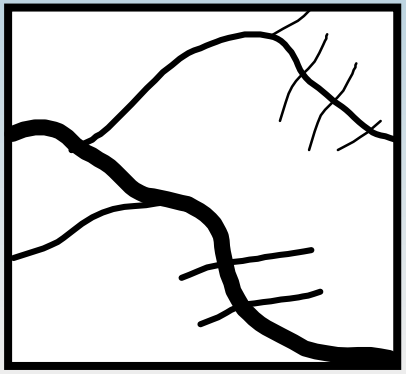




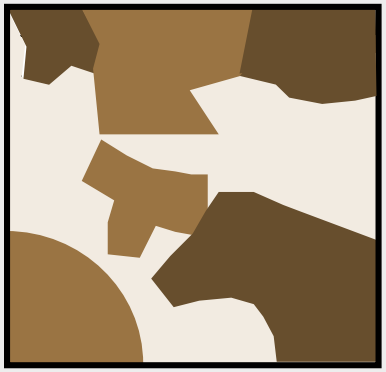
Visual Contrast: Examples

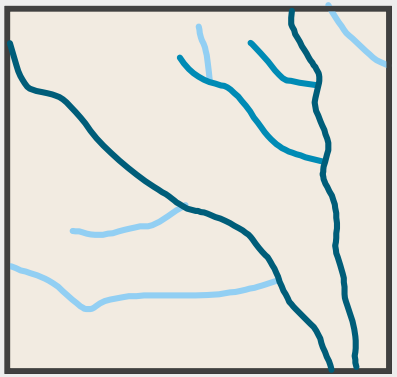
Size





Value





Color

- Delineate Features
- More Details &

  Design Possibilities
- More Visual Interest
- Clarify Facts

Emotion.

The meaning of color.

Understanding Color

Hue, Saturation & Brightness

Different color models for different uses

TECHNICAL MODELS

RGB (*Red-Blue-Green*)

- Screen Display

CMYK (*Cyan-Magenta-Yellow-Black*)

- Printing/Plotting

INTUITIVE MODEL

HSV (*Hue-Saturation-Value*)

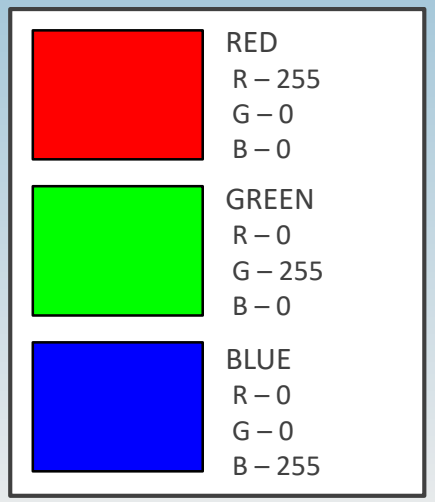
- Easily manipulated

Technical Color models

RGB (*Red-Green-Blue*)

CRT display LIGHT MODEL

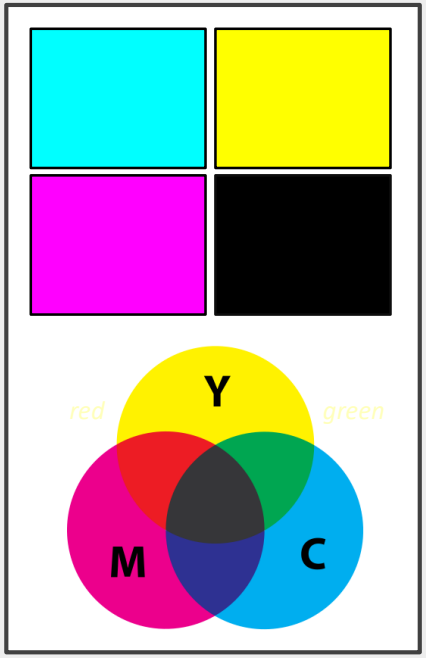
An Additive Color Model uses light emitted directly from a source. The additive reproduction process usually uses red, green and blue light to produce the other colors.
Combining one of these additive primary colors with another in equal amounts produces the additive secondary colors cyan, magenta, and yellow.



CMYK (*Cyan-Magenta-Yellow-Black*)

Printing PIGMENT MODEL

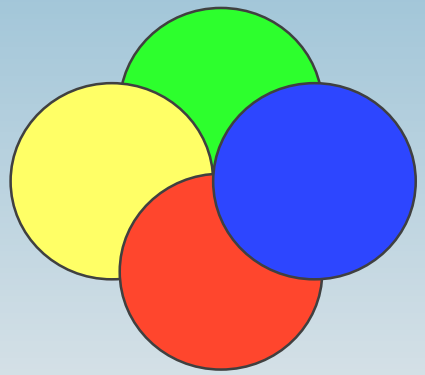
A Subtractive Color Model uses the mixing of pigment colorants to create a full range of colors. “Color” is visible when pigments subtract, (that is, absorb) some wavelengths of light and reflect the others. The segment (color) of the electromagnetic spectrum reflected by the pigment is the ‘color’ that is visible.
Combining one of these subtractive primary colors with another in equal amounts produces the subtractive secondary colors red, green, and blue



Color

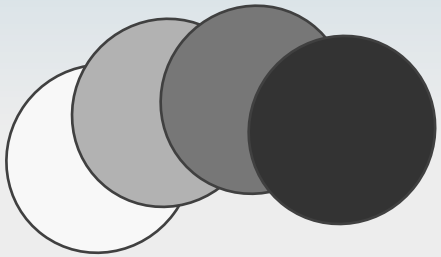
Hue (H)

What We Mean by “Color”



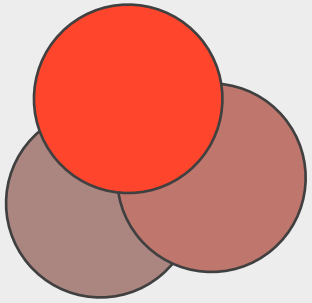
Value (V)

“Light and Dark”



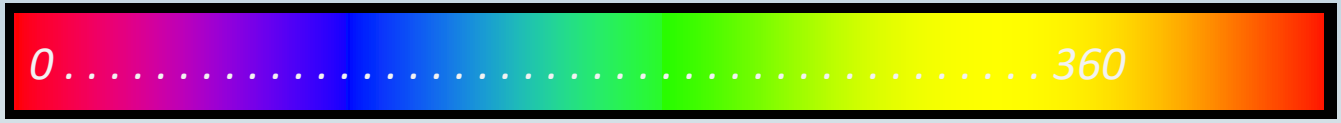
Saturation (S) - Intensity of a Hue

Larger areas with high saturation appear intense



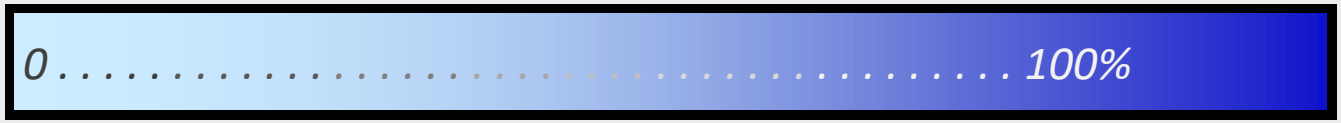
HSV: the ‘Intuitive’ Color Model

Hue - What we mean by ‘color’



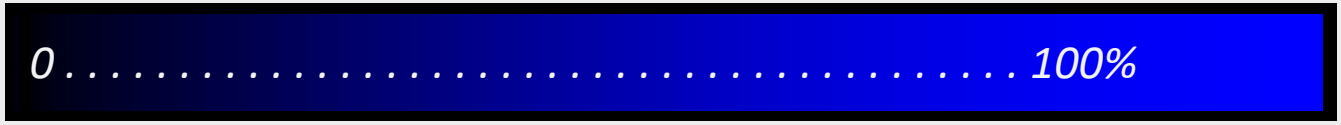
All the colors of the rainbow

Saturation - How much ‘color’



Adding color/pigment . . . . .

Value - Light & dark of ‘color’

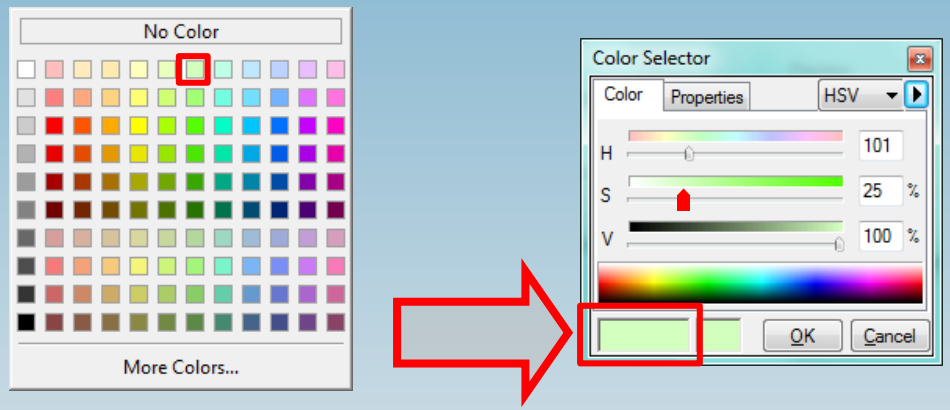


. . . . . Adding black

MANIPULATING
HUE
SATURATION
VALUE

In this example – the HUE stays constant:
Watch how Saturation changes from 25% up to 100%, then notice how Value level drops to 90% then to 45%.

How do the colors look??



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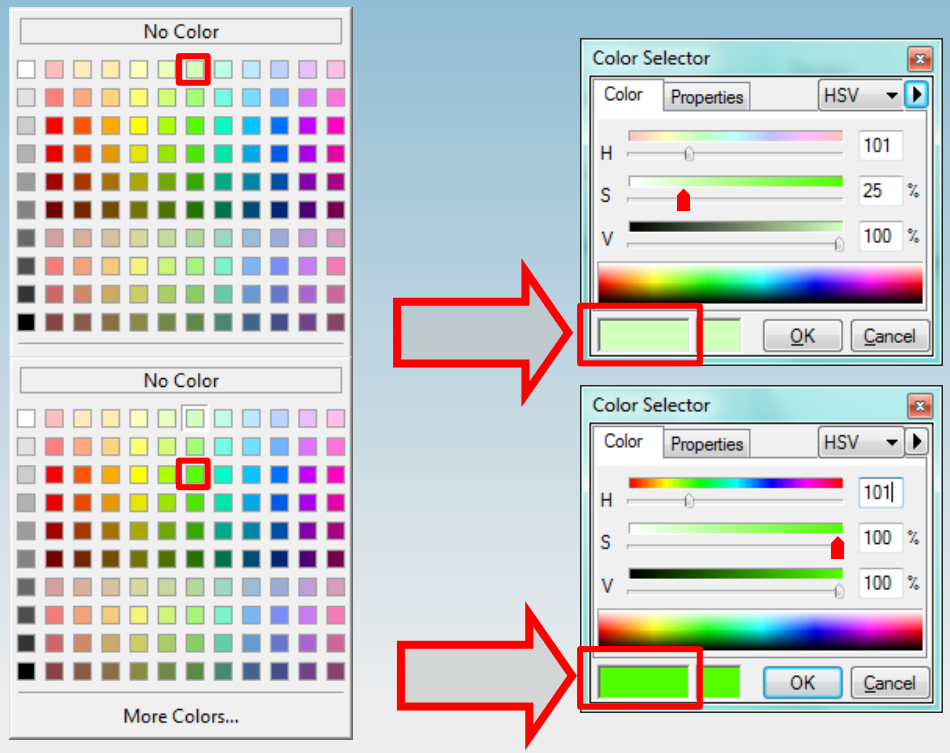

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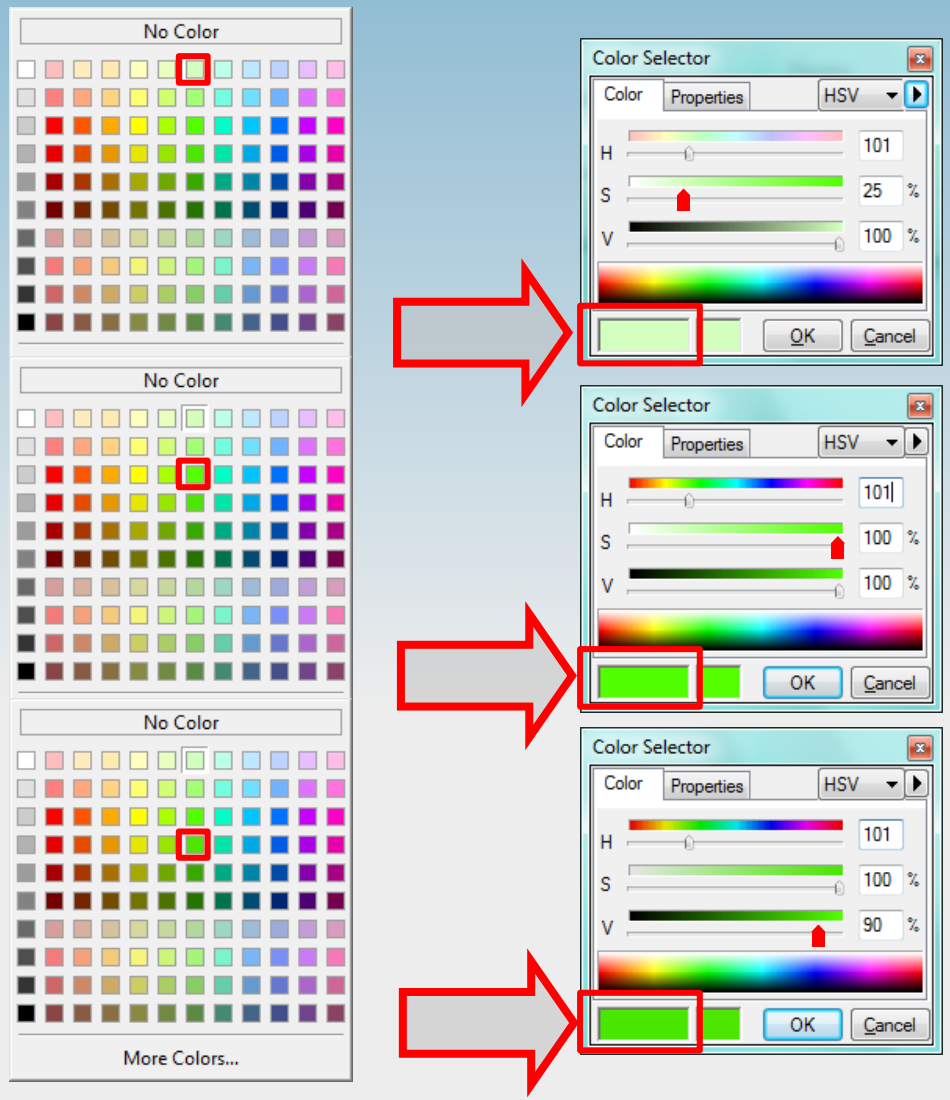

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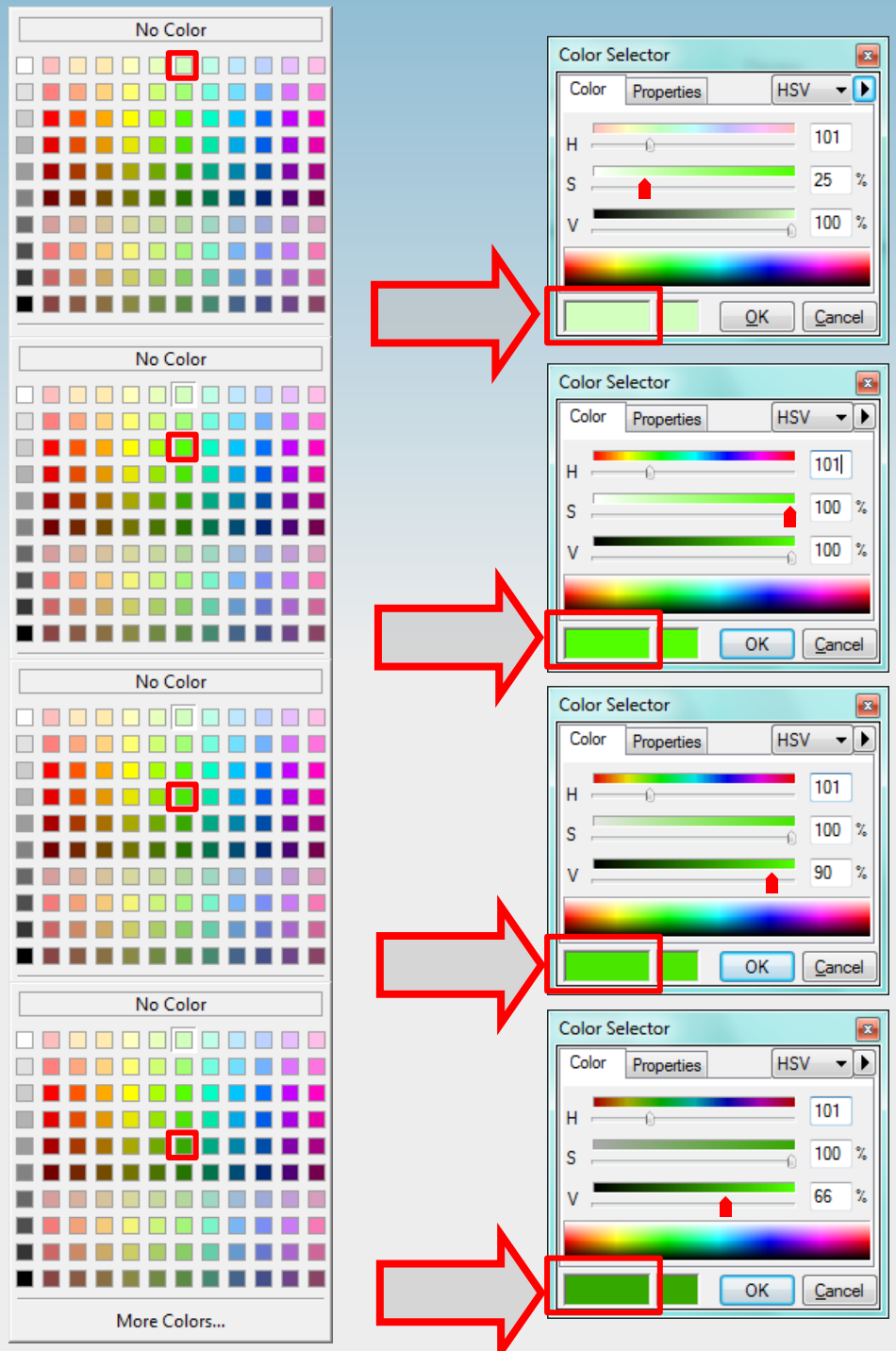
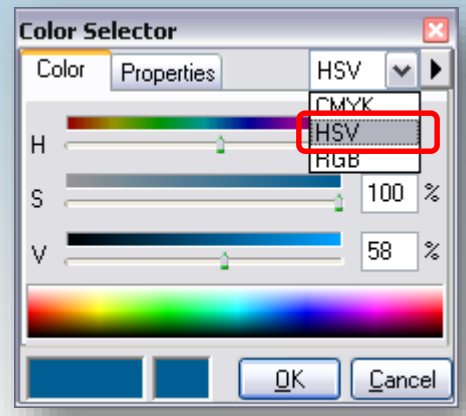


ArcMap's Advanced Color Selection Tools

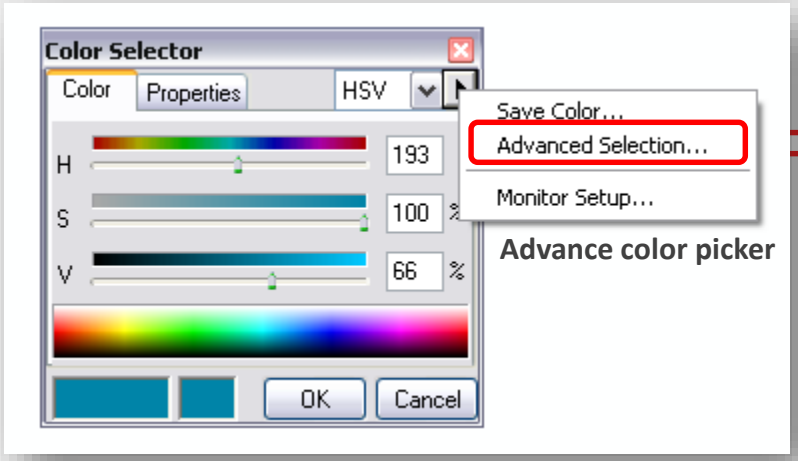
SIMPLE COLOR SELECTON



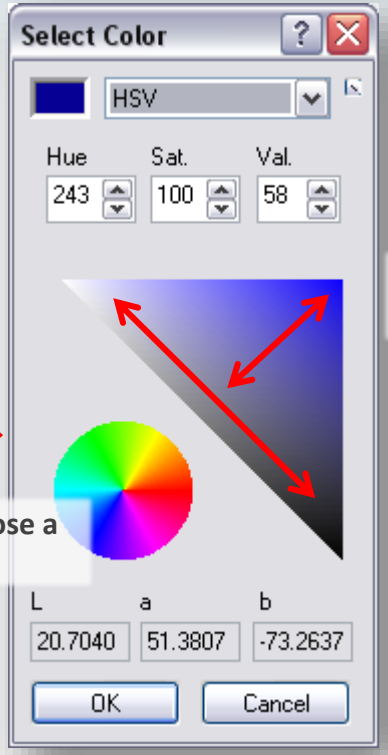
a) choose a Color Model (HSV)

b) adjust the color
Choose a HUE
Choose Saturation level
Choose Value level

ADVANCED COLOR SELECTON



Advance color picker



a) choose a Hue

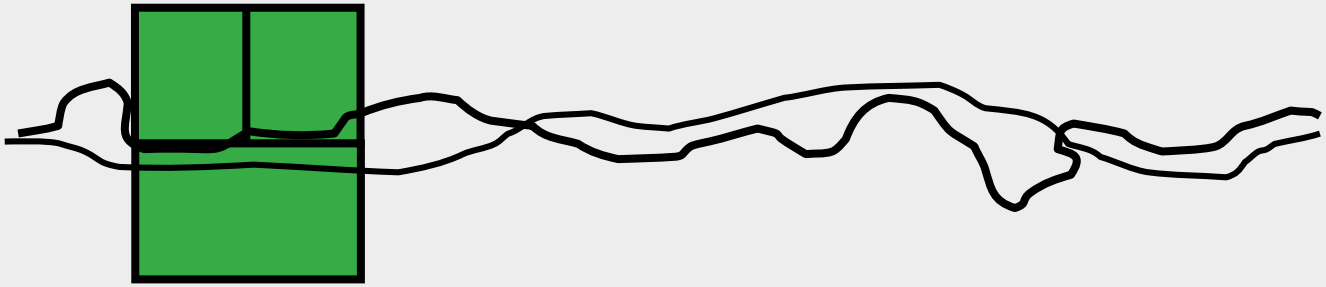
b) Adjust the Saturation

c) adjust the Value

Using HSV for effect

Manipulate HSV to create colors that go well together

- Select the same color for polygon fill & outline
- Open the ArcMap color editor and drop the “Value” of the outline, or turn it off together
- Can be used to reduce confusion between polygonal boundaries and linear features



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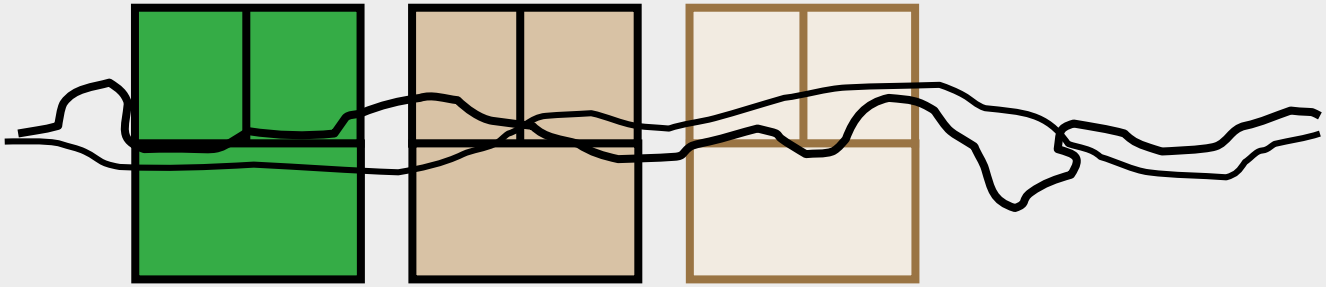
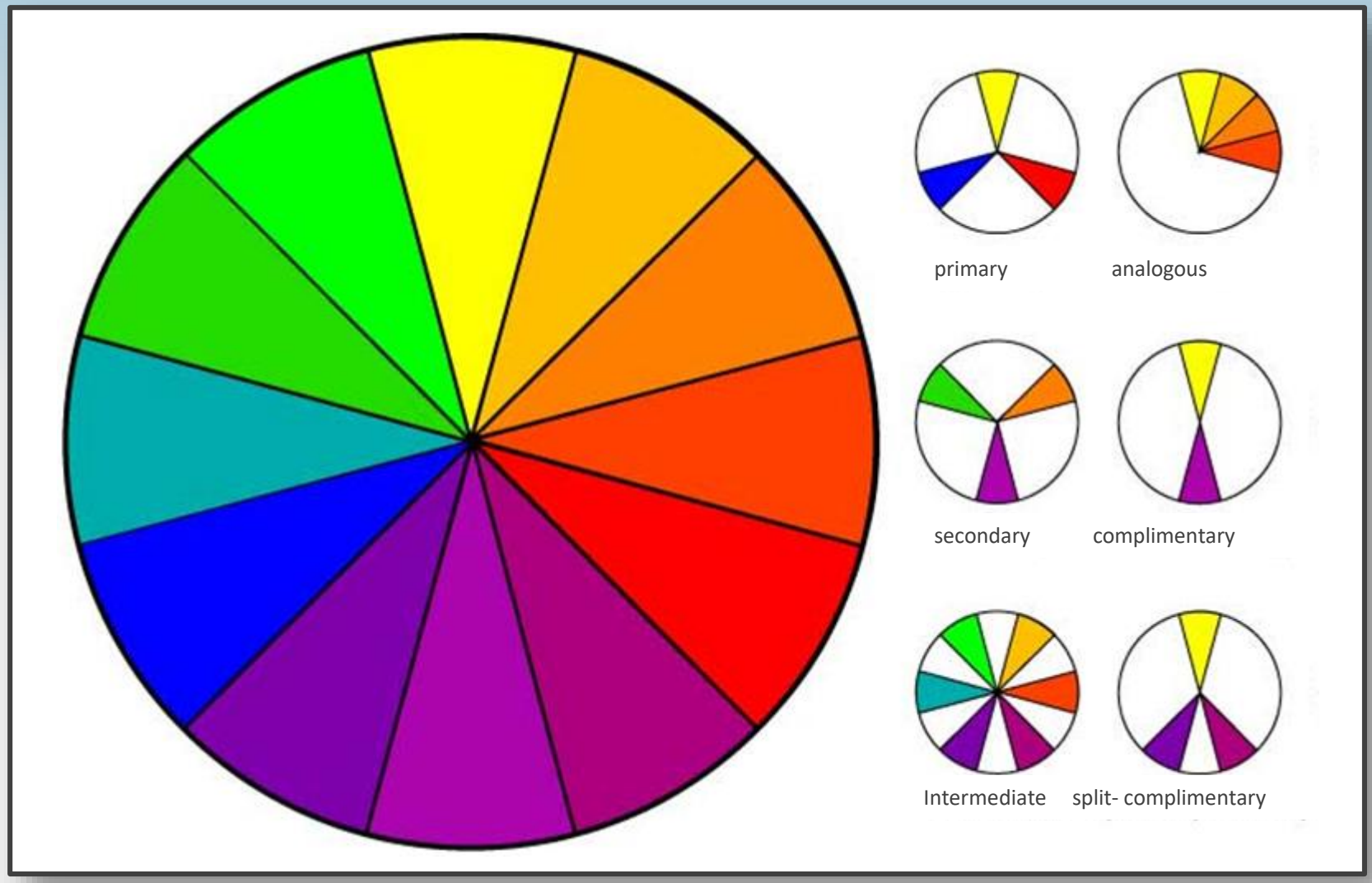


Color - relationships *(using colors together)*

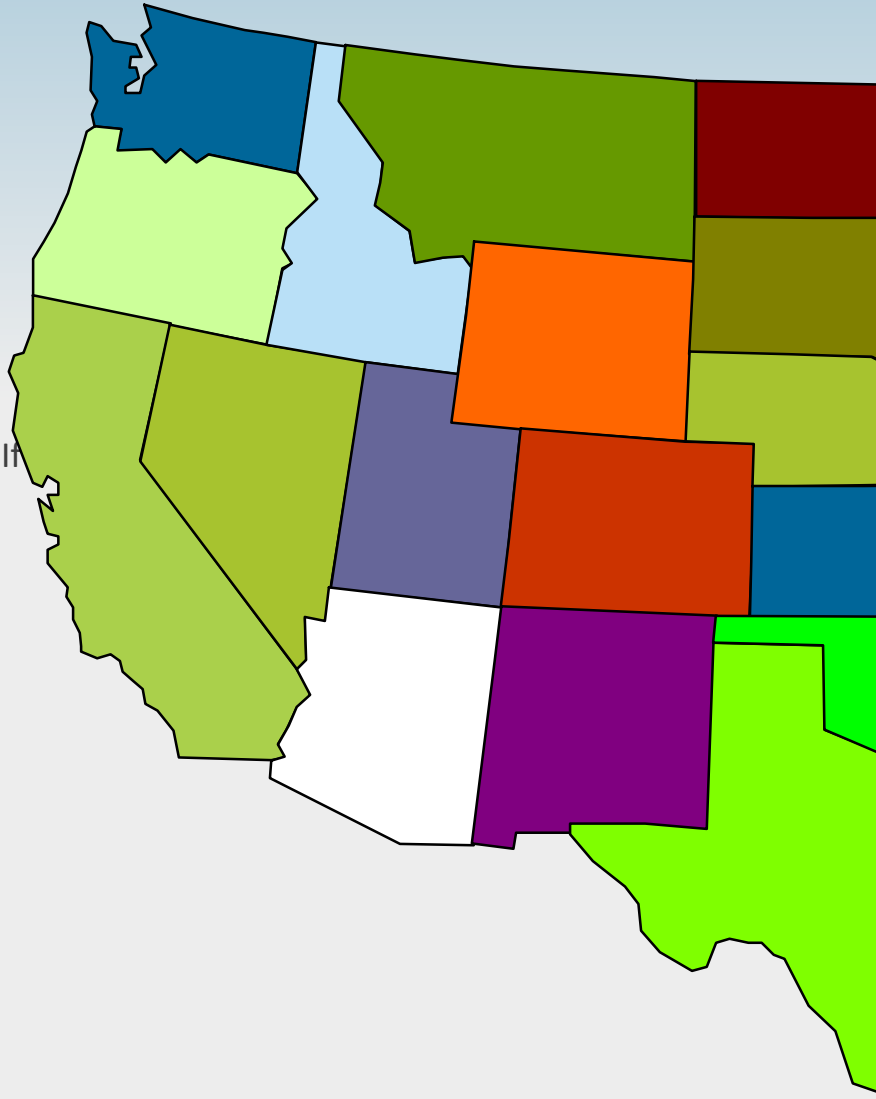


Perception of Graphics

Eye Limitation

- 12 distinct Hues (colors)
- 7 Shades (Value-Saturation)

Make sure colors are easily differentiated by the users. If not, alpha-numeric tags can be helpful.



Text. | *Use labeling effectively.*

Text Selection

Qualitative

Vary: color-H > *style* > font

Quantitative

Vary: CASE > **S**ize > font > color-H > color-**V**

Be Aware of Text Color vs Background Color

Limit Text to Three Fonts

Use *style*/CASE - …then color-V and color-H

Label Placement

Help User Read Faster and Easier

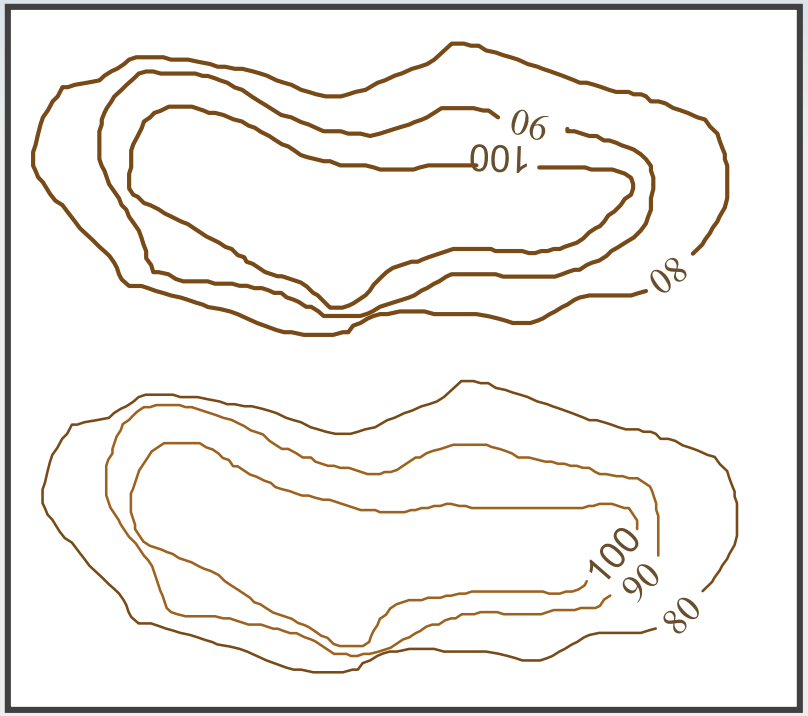
Consistent Placement

Resolve Ambiguity

Combine with symbology

to make feature recognition

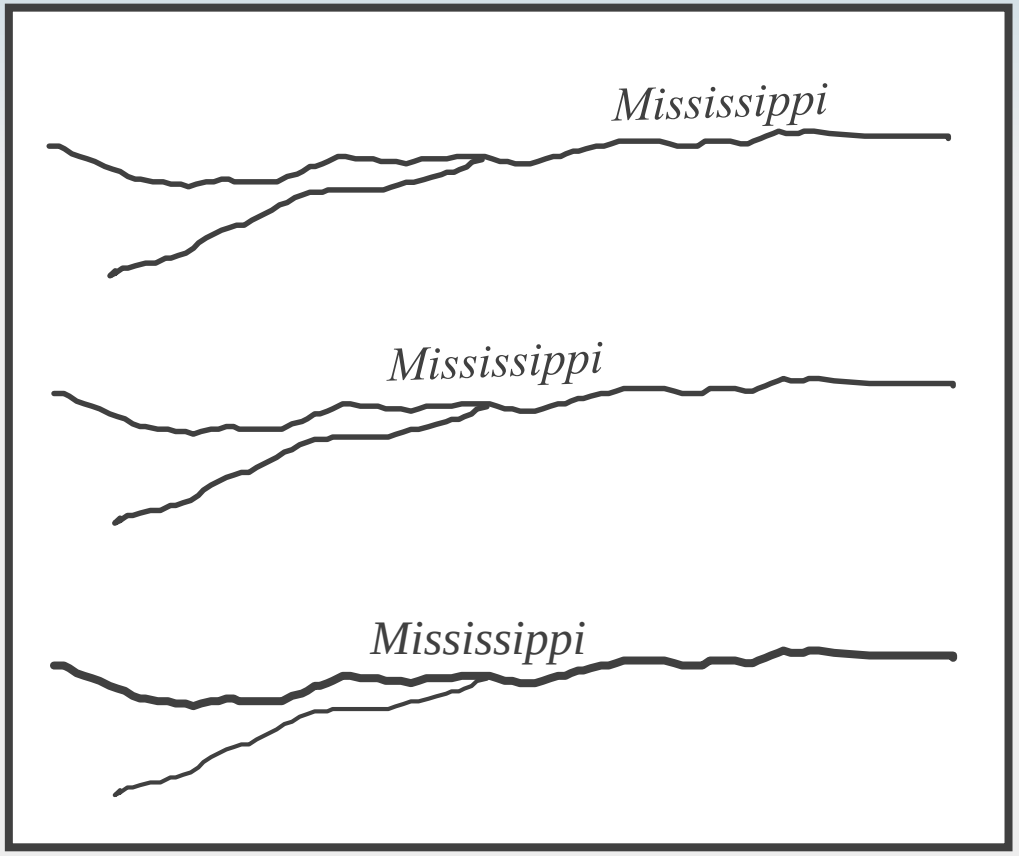
easier

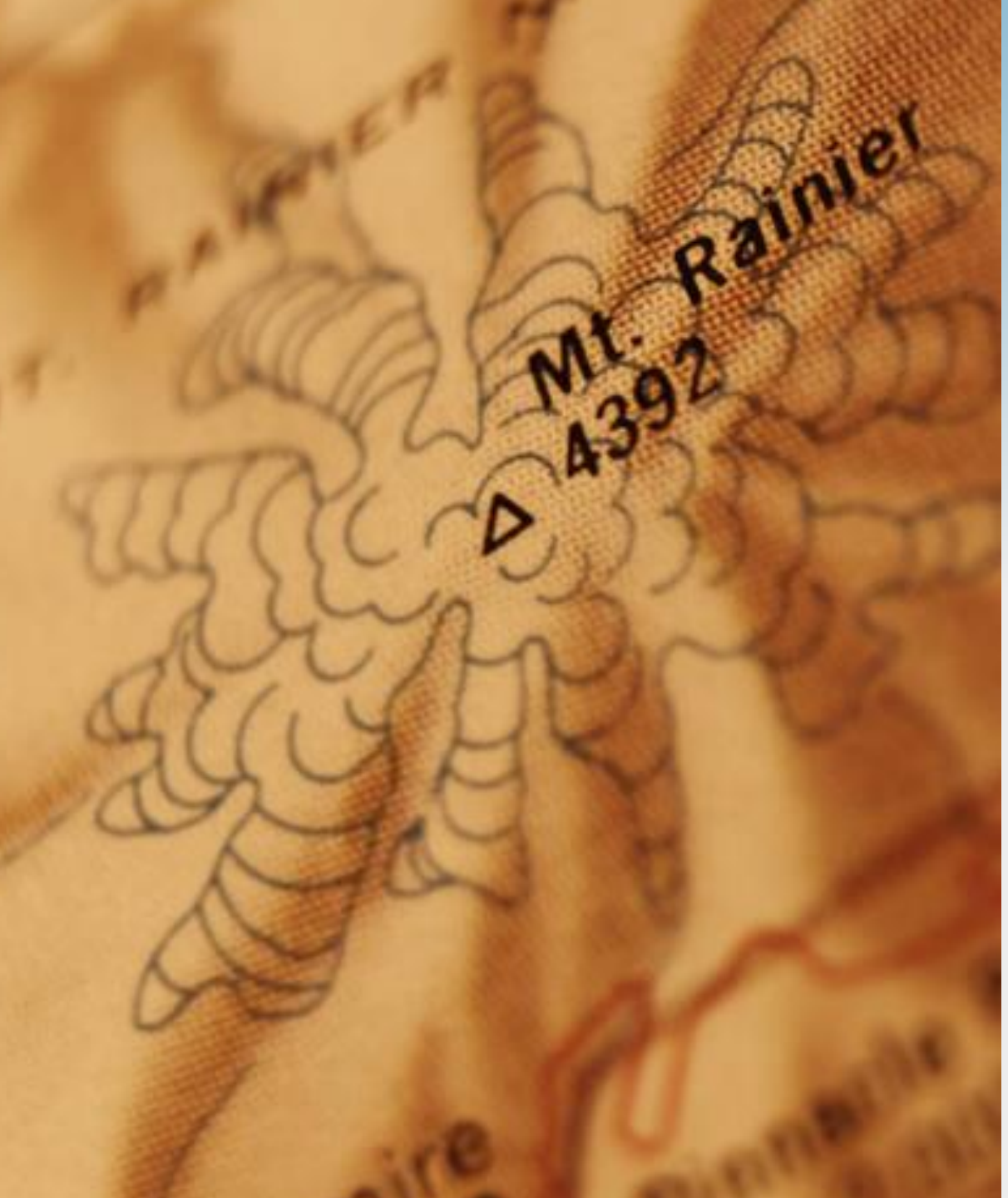


Label Placement

Help User Read Faster and Easier

- Consistent Placement
- Resolve Ambiguity
  - *Combine with symbology to make feature recognition easier*





Point Symbols

- Geometric symbols
  - Simple
  - Quantitative
  - Qualitative
- Icons
  - Recognizable
  - Intuitive
  - Quantitative
  - Qualitative
- Symbols
  - “Picture” images
  - Can busy or complex
  - Qualitative

Log in from the ArcGIS Maps ribbon to Unlock Map.

Southern California Earthquakes

Using Color & Size to differentiate features.

Line Symbol Cheat Sheet

Symbol & Text Selection Cheat Sheet

Display Qualitative Classes

TEXT	Color-H*	Style	Font	
POINT	Color-H	Marker	Size	Label
LINE	Color-H	Marker	Size	Label
AREA	Color-H	Fill/Outline	Label	

Display Quantitative Classes

TEXT	Case	Size	Font	Color-V
POINT	Size	Color-V	Label	Marker
LINE	Size	Color-V	Label	Marker
AREA	Color-V	Fill/Outline	Label	

Note: Limit # of Text Fonts to Three

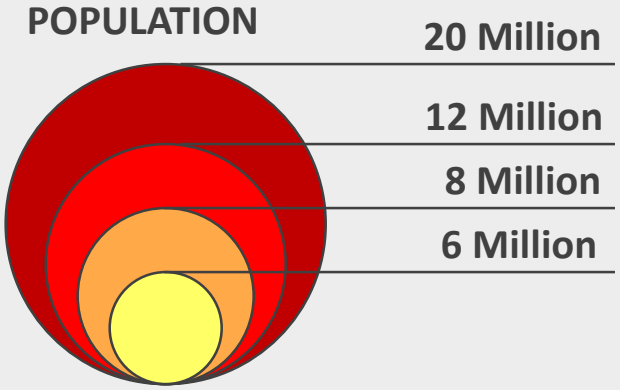
Watch Text Color vs. Background Color!

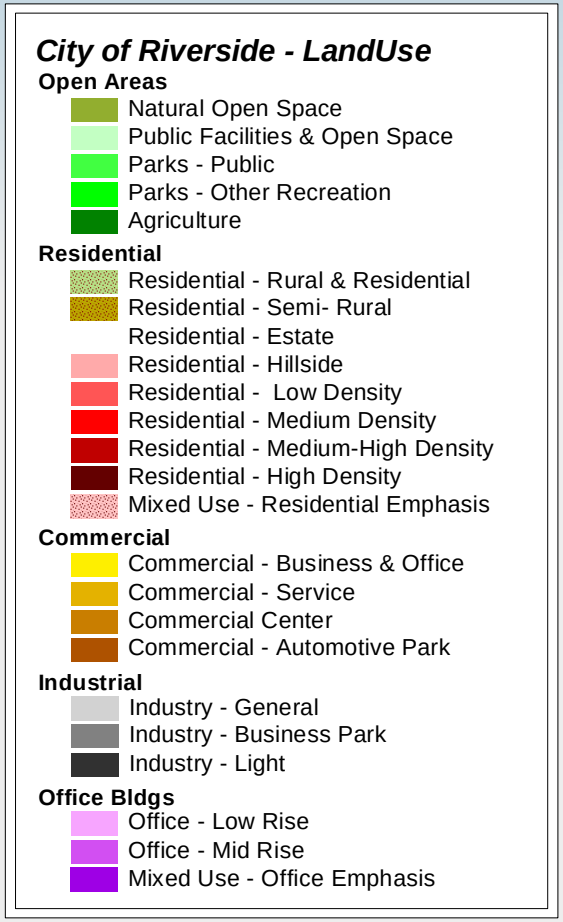
** Be very careful - keep font colors closer to neutral – avoid highly saturated colors.*

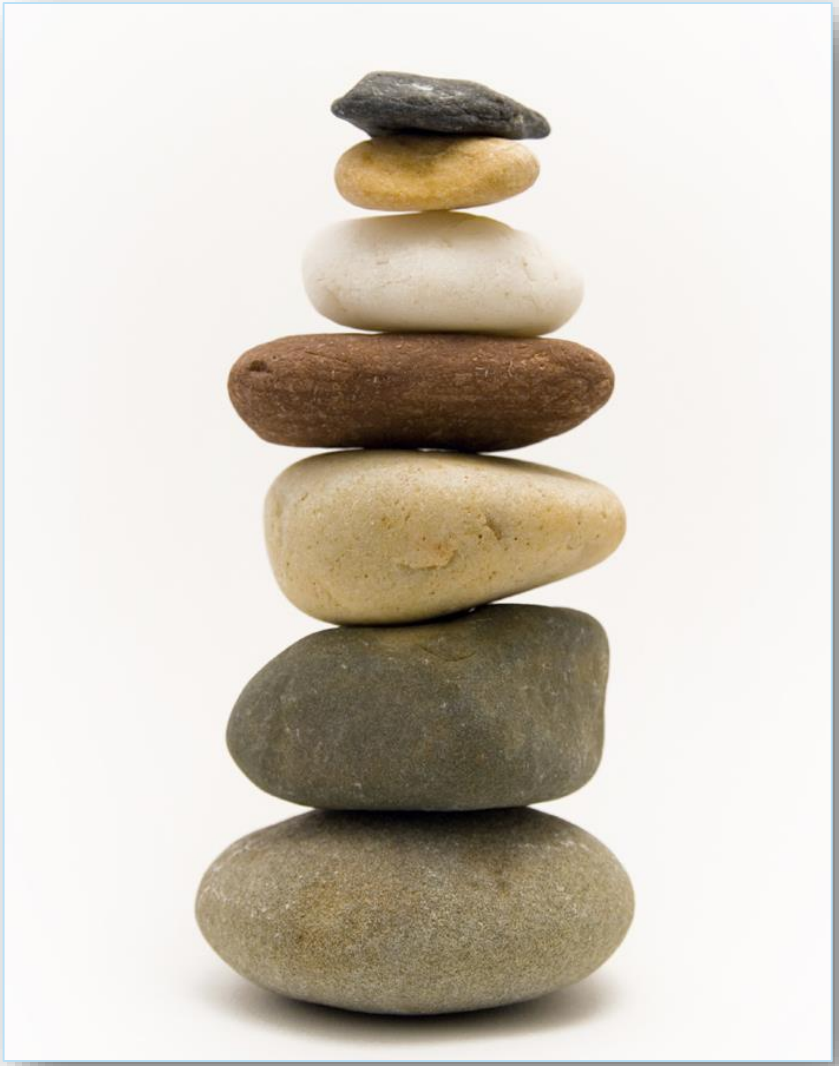
Completing the Map

- Scale Bar/Ratio
- Data Sources
- Classification Methodology
- North Arrow
- Map View
- Print Date
- Data Date
- Neatline
- Legend
- Logo

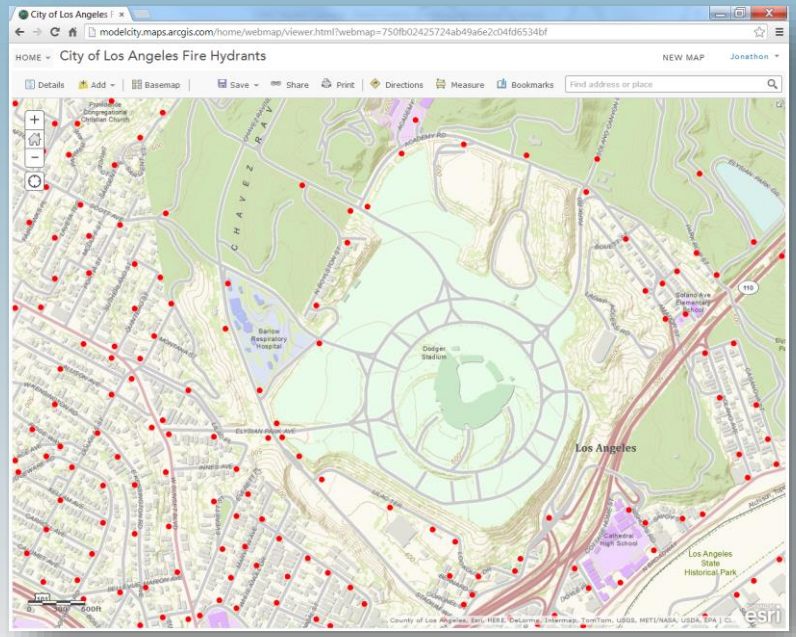
- Study maps for Legend ideas

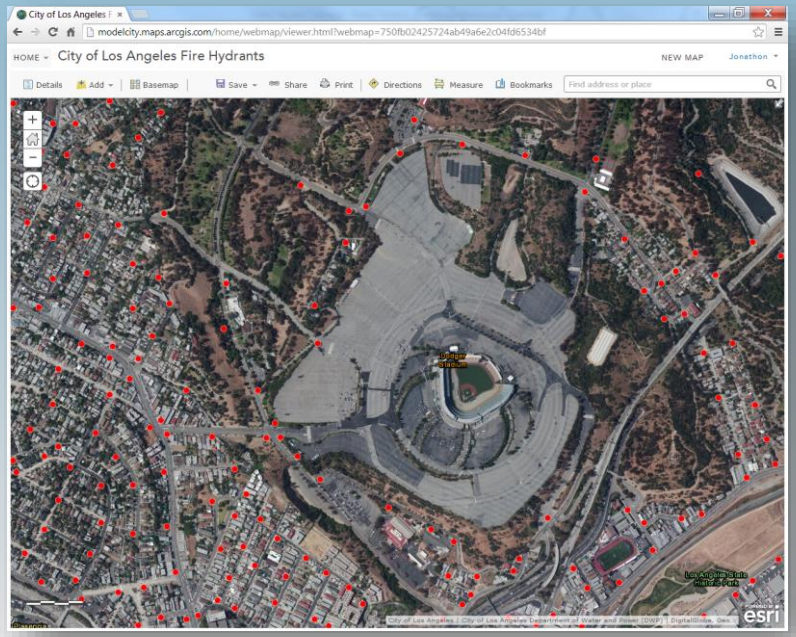






Basemaps. | *From the ground up.*


City of Los Angeles Fire Hydrants
Los Angeles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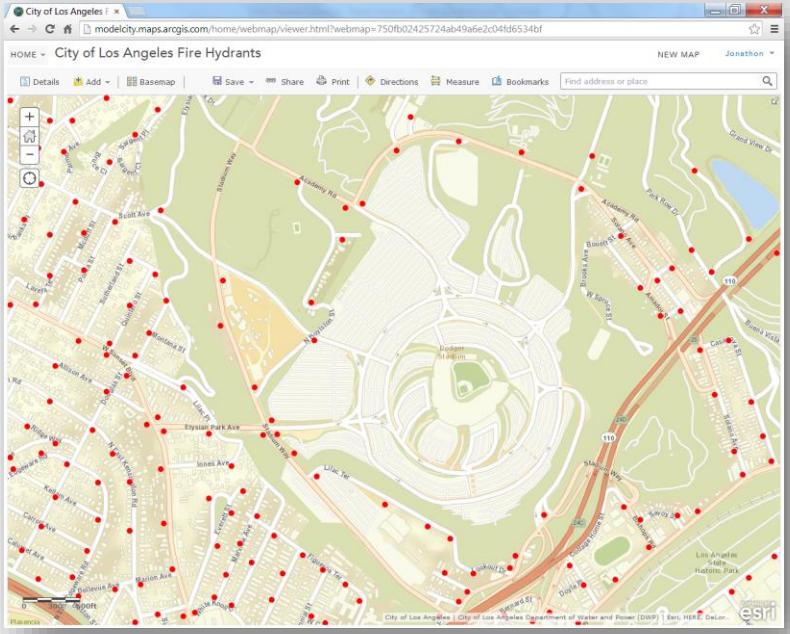
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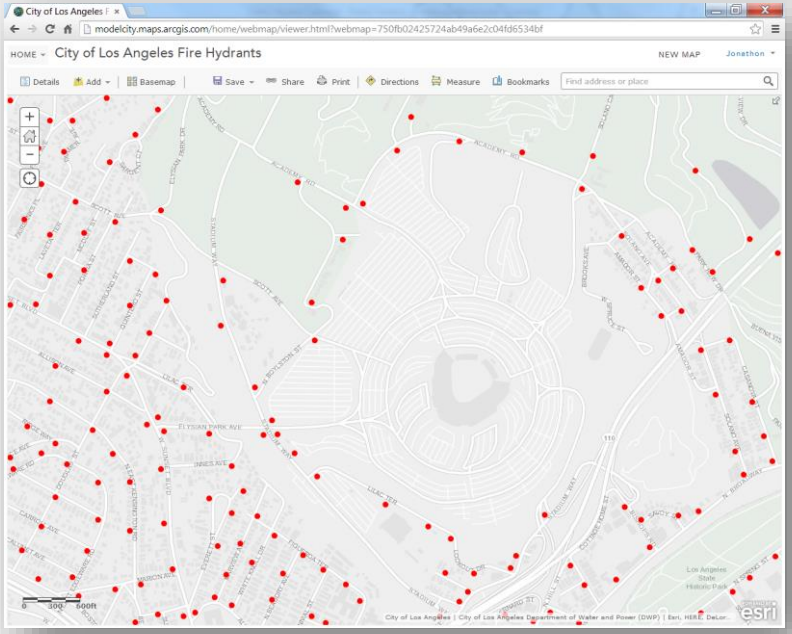
City of Los Angeles Fire Hydrants

ArcGIS Resource Center

http://resources.arcgis.com

Map Book Gallery

http:// www.esri.com/mapmuseum

Storytelling with Maps

http:// storymaps.esri.com/home

Online Color Model

http://r0k.us/graphics/SIHwheel.html

Esri Books

Designing Better Maps: A Guide for GIS Users

Designed Maps: A Sourcebook for GIS Users

Other Books

Thinking About GIS – *Chapter 6*

- Roger Tomlinson

The Elements of Cartography, 6th Edition

- Robertson et al

How to Lie with Maps

- Mark Monmonier

Keep Learning