



Choosing the Best ArcGIS Online Basemap for Your Maps and Apps

Andrew Green, Jessica Acosta Rodriguez, Andy Skinner

Technical Workshop

Introduction

Andrew Green



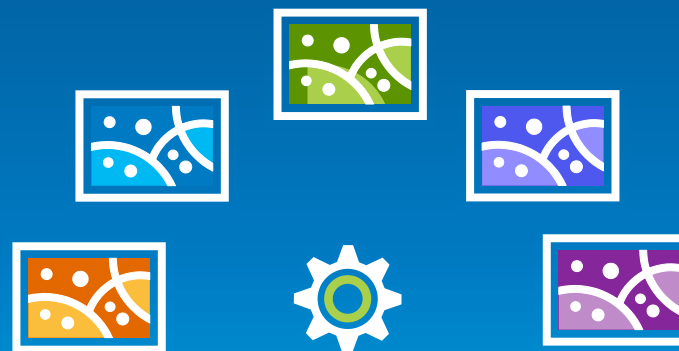
Workshop Outline

- **Goal:**
 - **Maximize the presentation of your maps & apps beginning with the selection of the best basemap for your data**

- **Basemap overview**

- **Selection criteria matrix**

- **Evaluation & examples**



Gallery of Basemaps

Basemaps provide a foundation to your web maps and applications

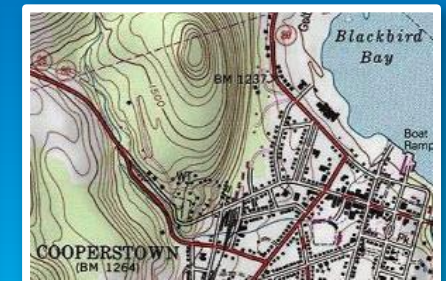
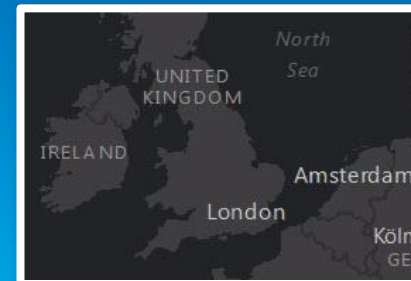
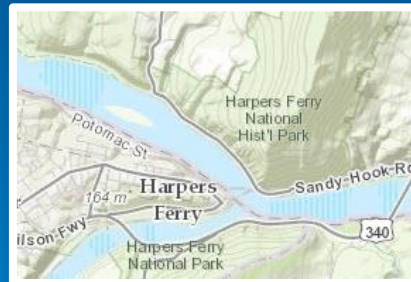


- Ready-to-use
- Reference
- Multi-scale
- Variety of basemaps

A screenshot of the ArcGIS Living Atlas of the World interface. The main page shows a navigation menu with 'Basemaps' selected. Below the menu, there are several map thumbnails with labels like 'Streets', 'Topographic', and 'World Imagery'. A 'Basemap' dialog box is open in the foreground, titled 'Select a basemap'. It displays a grid of nine basemap options: Imagery, Imagery with Labels, Streets, Topographic, Terrain with Labels, Light Gray Canvas, National Geographic, Oceans, and OpenStreetMap. Each option has a small thumbnail preview.

Basemaps

- Imagery (w/ Labels)
- Street Map
- Topographic Map
- National Geographic
- Light Gray Canvas
- Ocean Basemap
- Terrain with Labels
- Dark Gray Canvas
- Shaded Relief
- Physical
- Historical
- Other & User generated



Terms

- **Scale Levels**
- **Content**
- **Multi-scale**
- **Saturation**
- **Qualitative**
- **Quantitative**

Small scale

(0)

1:591M

Mid-scale

(10)

1:577k

Large scale

(19)

1:1k



Terms

- Scale Levels
- Content
- Multi-scale
- Saturation
- Qualitative
- Quantitative

- Street Map
- Topographic Map
- Reference Overlays
- Light Gray Canvas (to 9k)



-  591M to 4k (urban areas to 1k)
-  591M to 72k

Terms

- **Scale Levels**

- **Content**

- **Multi-scale**

- **Saturation**

- **Qualitative**

- **Quantitative**



- **Physical**

- Global down to 2M

- **Terrain with Labels**

- Global down to 1M & US down to 72k

- **Ocean**

- Global down to 577k & Locally down to 9k

- **National Geographic**

- Global down to 144k & US down to 9k

Terms

- Scale Levels
- Content
- Multi-scale
- Saturation
- Qualitative
- Quantitative

• Commercial



• Contributor



• Open Source



Terms

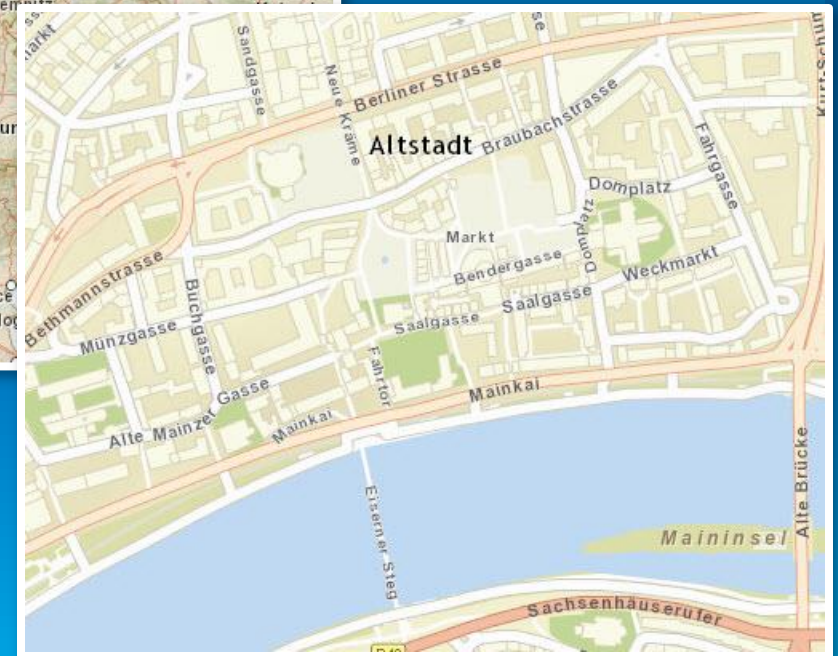
- Scale Levels
- Content
- Multi-scale
- Saturation
- Qualitative
- Quantitative



Small scale



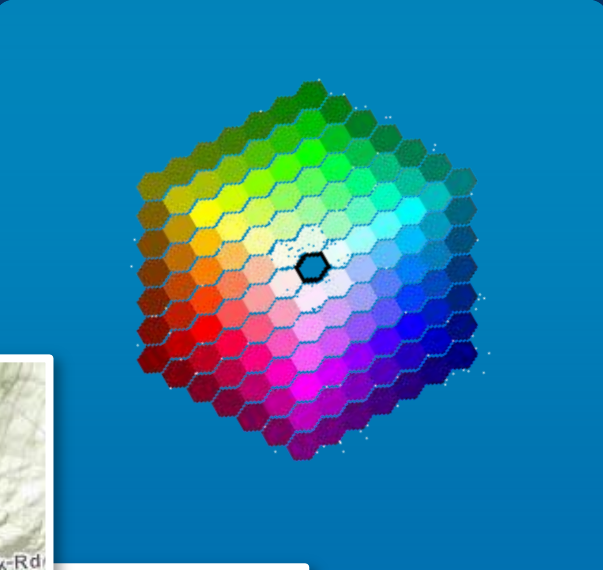
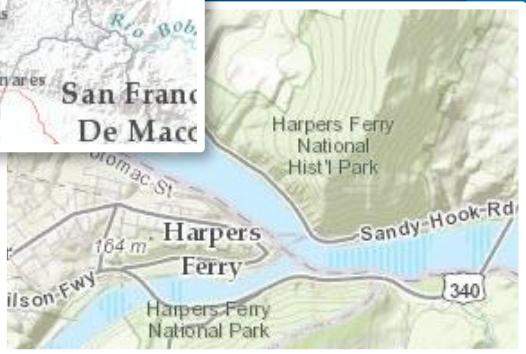
Mid scale



Large scale

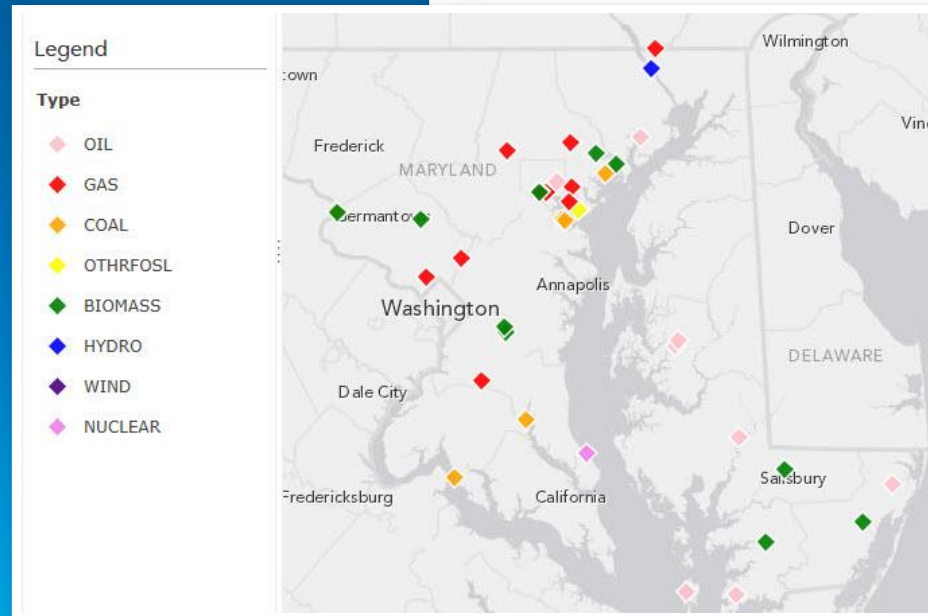
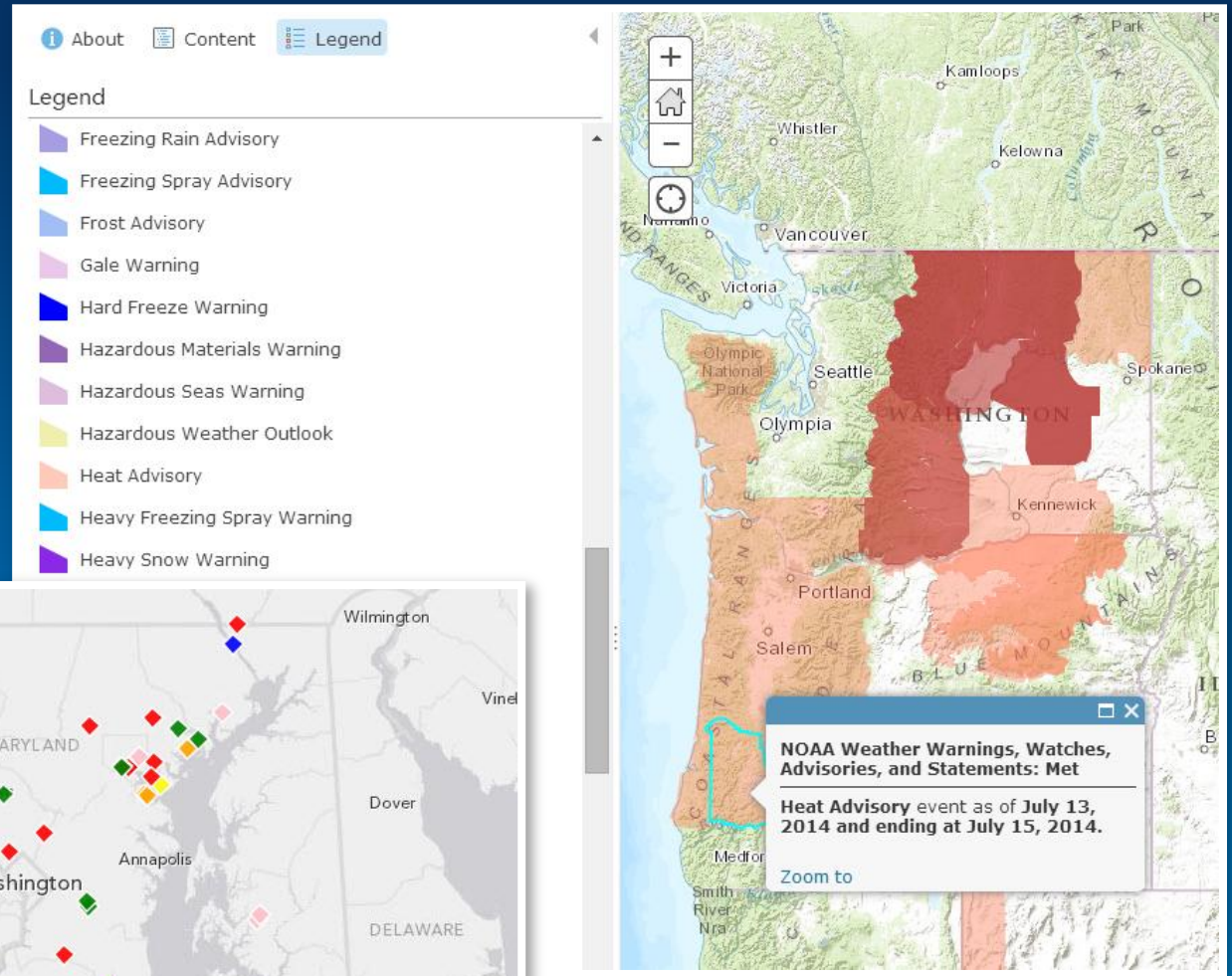
Terms

- Scale Levels
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- Multi-scale
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- Qualitative
- Quantitative



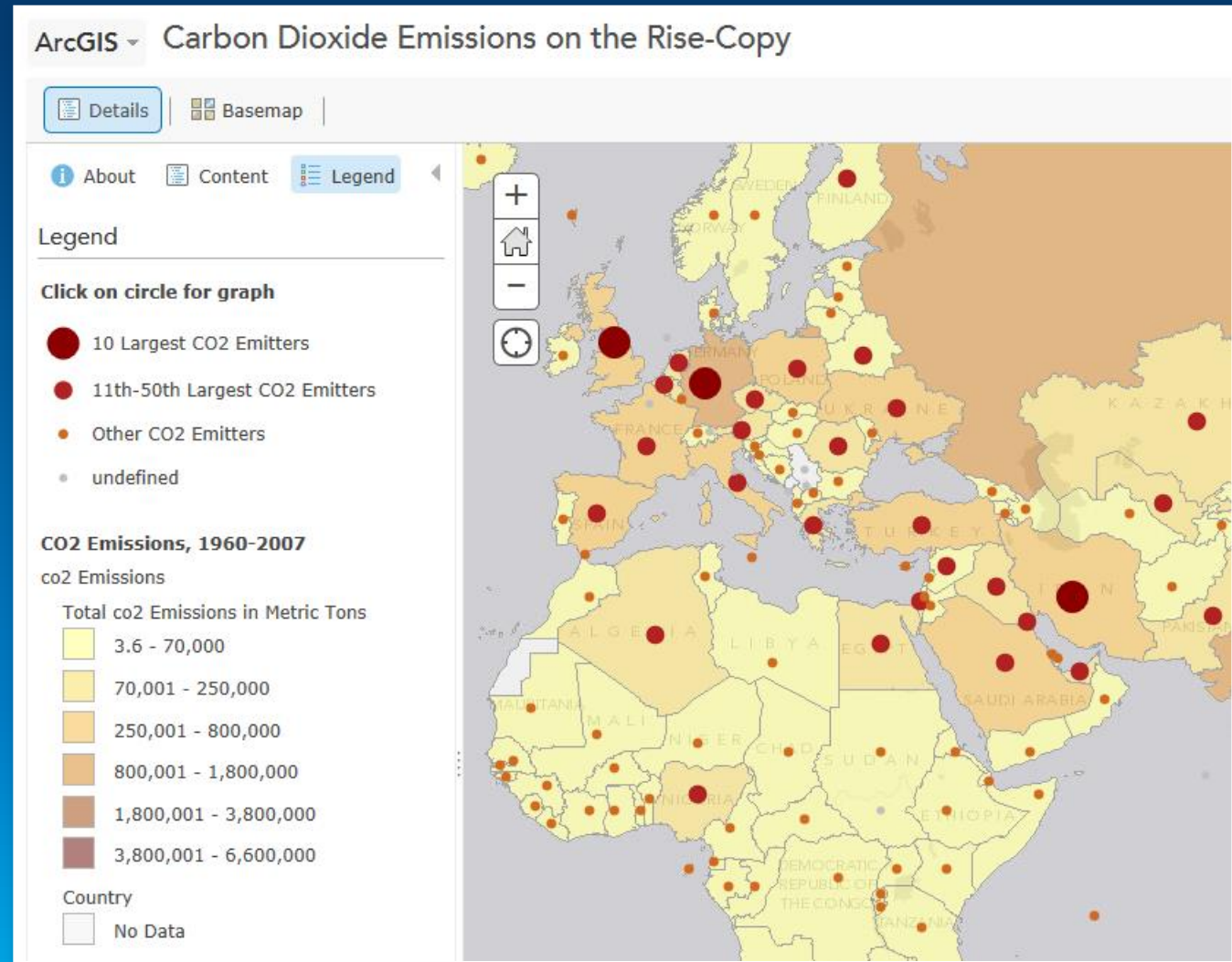
Terms

- Scale Levels
- Content
- Multi-scale
- Saturation
- Qualitative
- Quantitative



Terms

- Scale Levels
- Content
- Multi-scale
- Saturation
- Qualitative
- Quantitative

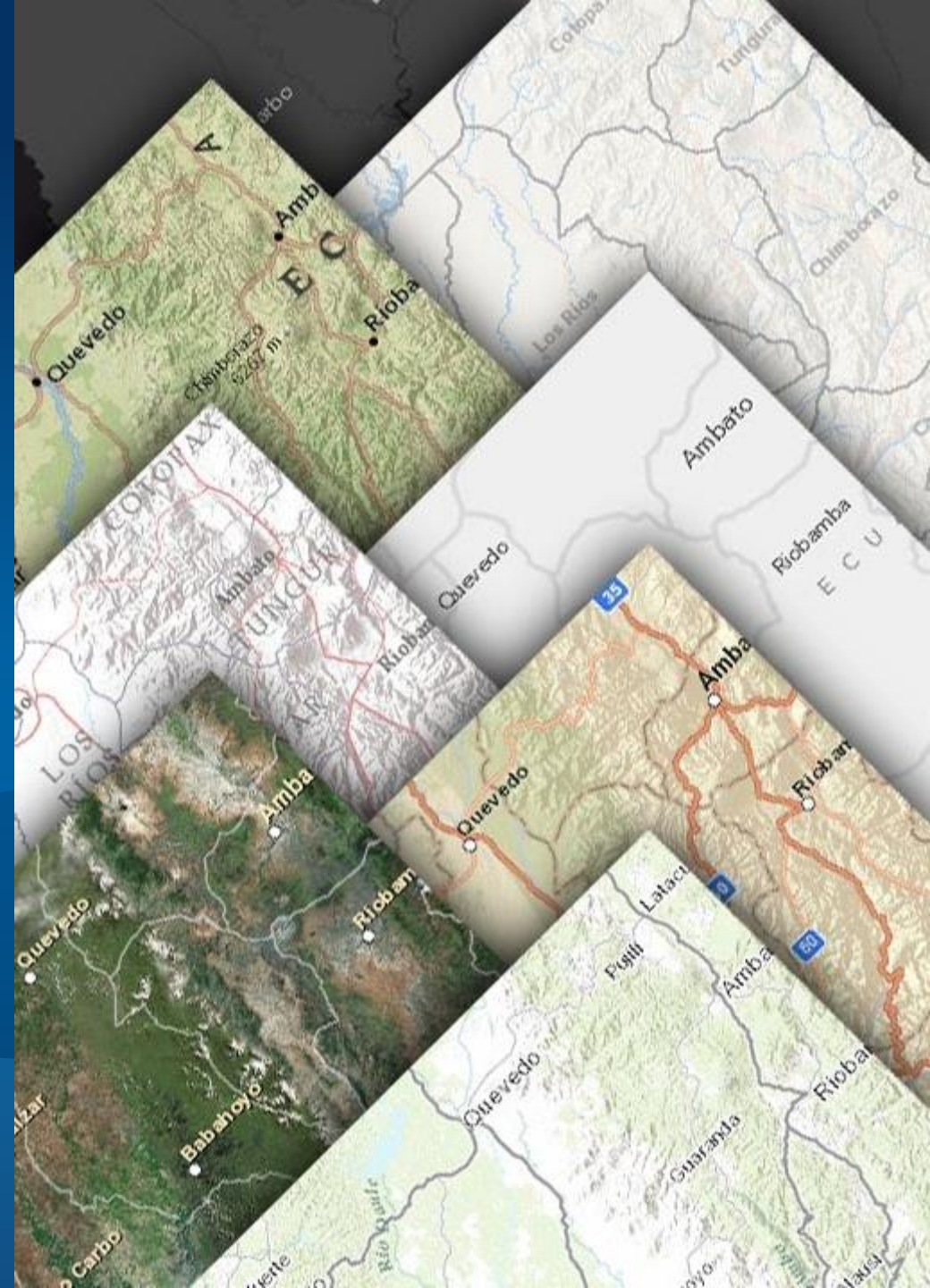


ArcGIS Online Basemap Matrix

	HIGH CONTENT HIGH SATURATION	HIGH CONTENT MEDIUM SATURATION	LOW CONTENT LOW SATURATION	LOW CONTENT HIGH SATURATION
QUALITATIVE POINTS	National Geographic	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
	Imagery with labels/Hybrid			
QUANTITATIVE POINTS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
		Oceans	Terrain with labels	
LINES	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
QUALITATIVE POLYGONS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
			Terrain with labels	
QUANTITATIVE POLYGONS	Imagery with labels/Hybrid	Oceans	Light Gray Canvas...	Dark Gray Canvas

Which Basemap?

Andy Skinner



Which Basemap?

- What is your subject?

Water



Recreation



Demographic



Physical



Traffic



Location



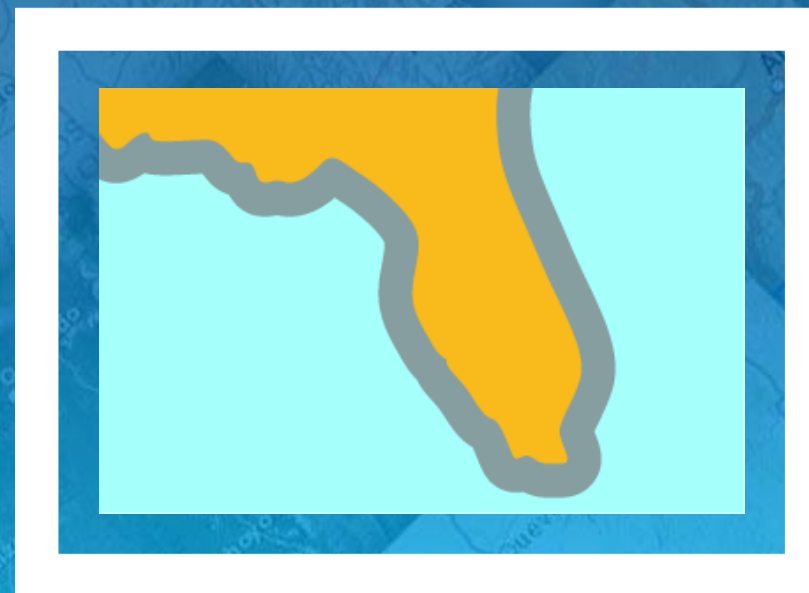
Which Basemap?

- **What is your subject?**
- **What kind of data are you using (Point/Line/Polygon)?**



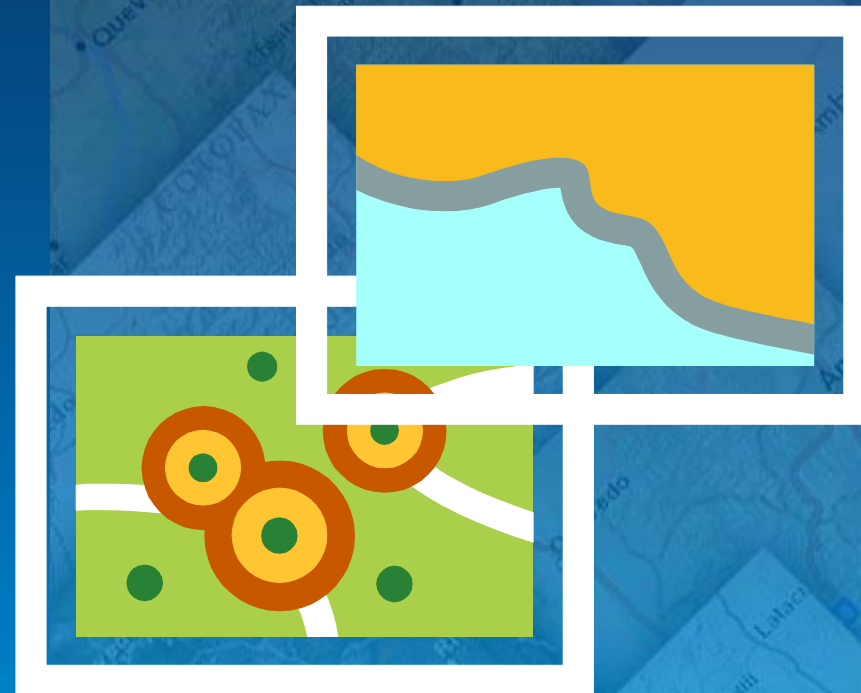
Which Basemap?

- What is your subject?
- What kind of data are you using (Point/Line/Polygon)?
- What is the geographic extent of your data?



Which Basemap?

- What is your subject?
- What kind of data are you using (Point/Line/Polygon)?
- What is the geographic extent of your data?
- What scales are most appropriate for your data?



Which Basemap?

- **What is your subject?**
- **What kind of data are you using (Point/Line/Polygon)?**
- **What is the geographic extent of your data?**
- **What scales are most appropriate for your data?**

- **Are you trying to find a basemap to use with an existing map?...**



Some questions to ask when choosing a basemap

- **What is your subject?**
- **What kind of data are you using (Point/Line/Polygon)?**
- **What is the geographic extent of your data?**
- **What scales are most appropriate for your data?**

- **Are you trying to find a basemap to use with an existing map?...**
- **... or are you building a new map on top of your preferred basemap?**



High Content and High Saturation

Jessica Acosta Rodriguez

	HIGH CONTENT HIGH SATURATION
QUALITATIVE POINTS	National Geographic Street Imagery with labels/Hybrid
QUANTITATIVE POINTS	Imagery with labels/Hybrid
LINES	Imagery with labels/Hybrid Street
QUALITATIVE POLYGONS	Imagery with labels/Hybrid
QUANTITATIVE POLYGONS	Imagery with labels/Hybrid

World Street Map

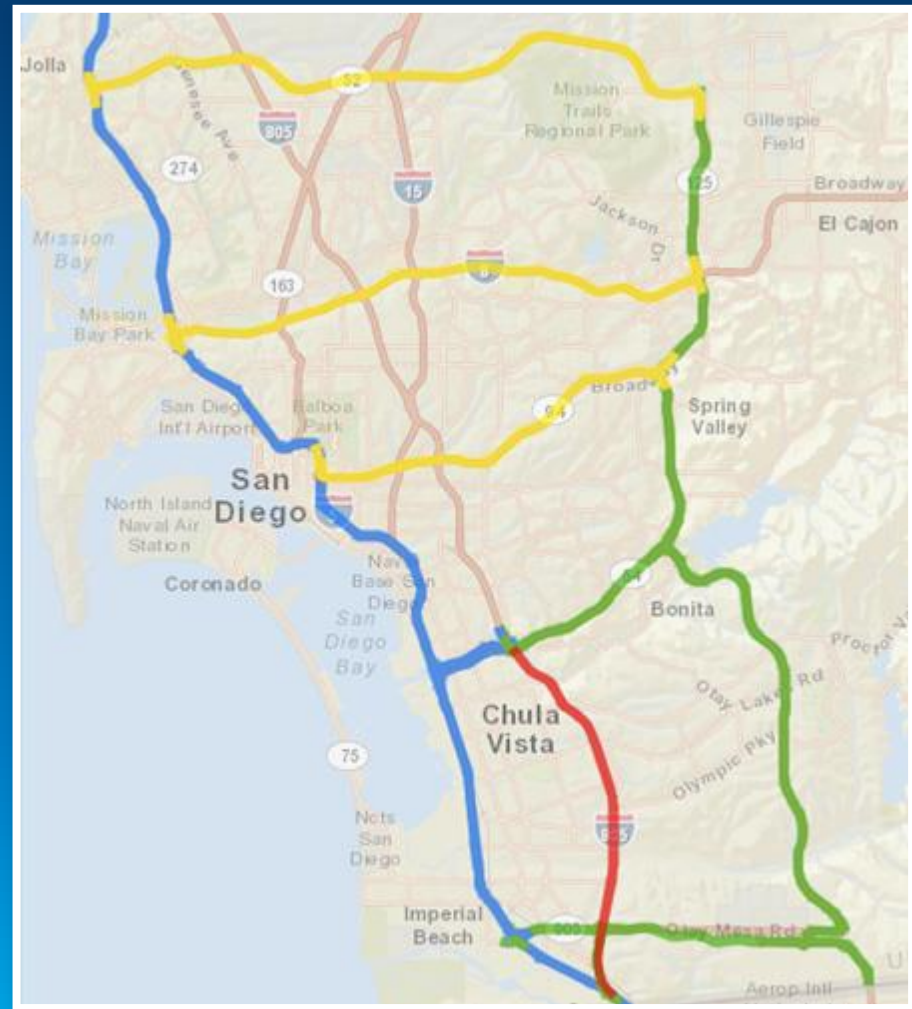
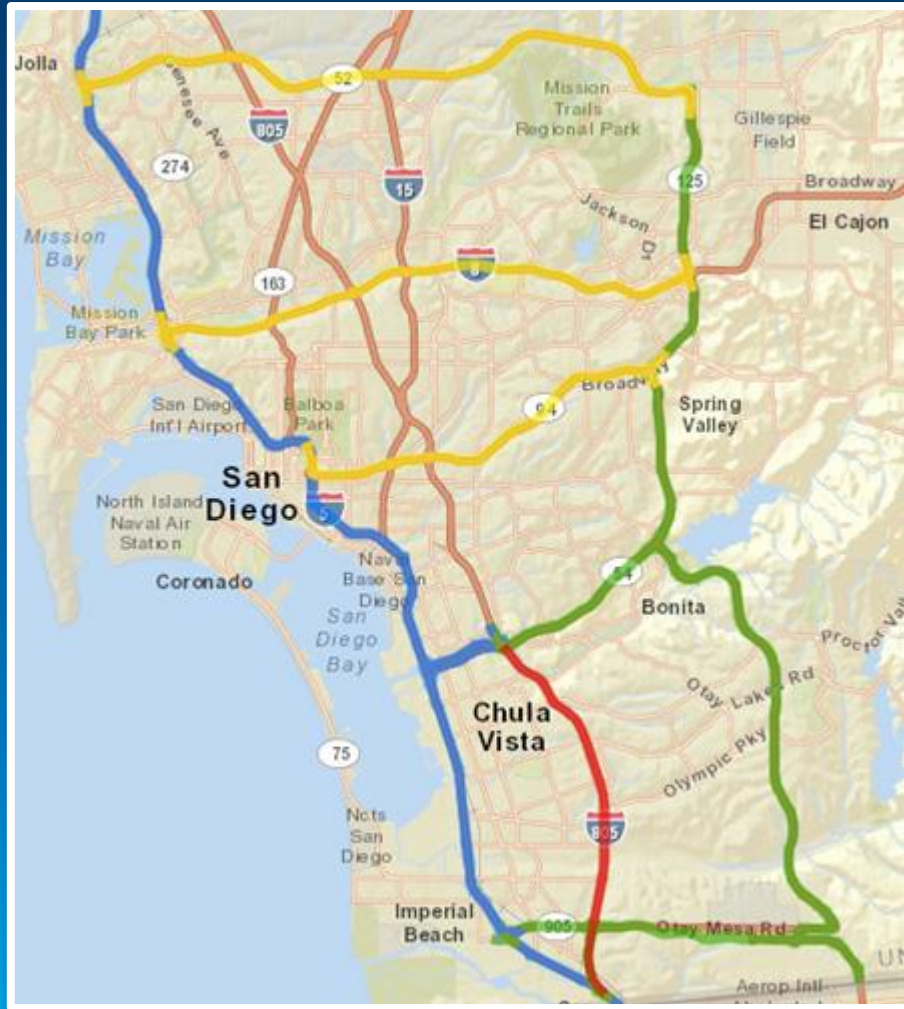
- Reference map and a basemap
- Emphasis on transportation-related features
- Reference map for routing purposes
- Great for overlaying qualitative point and line data



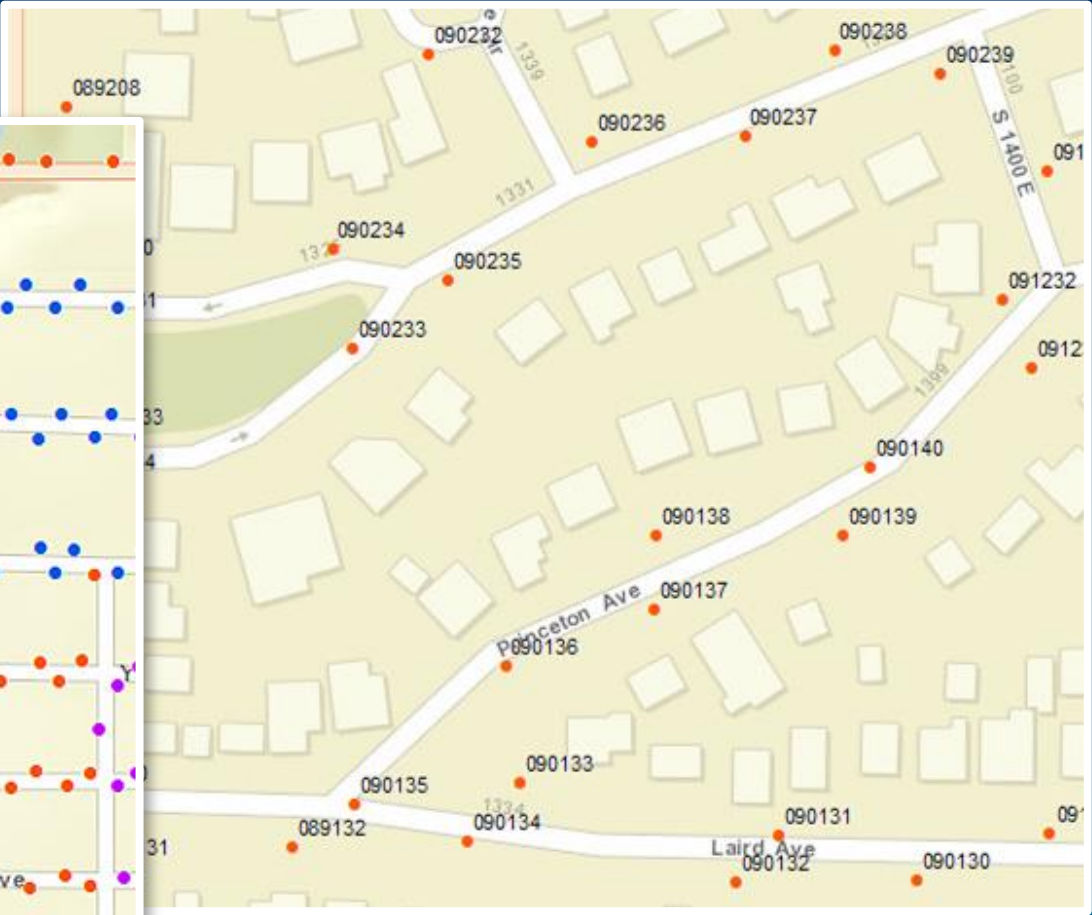
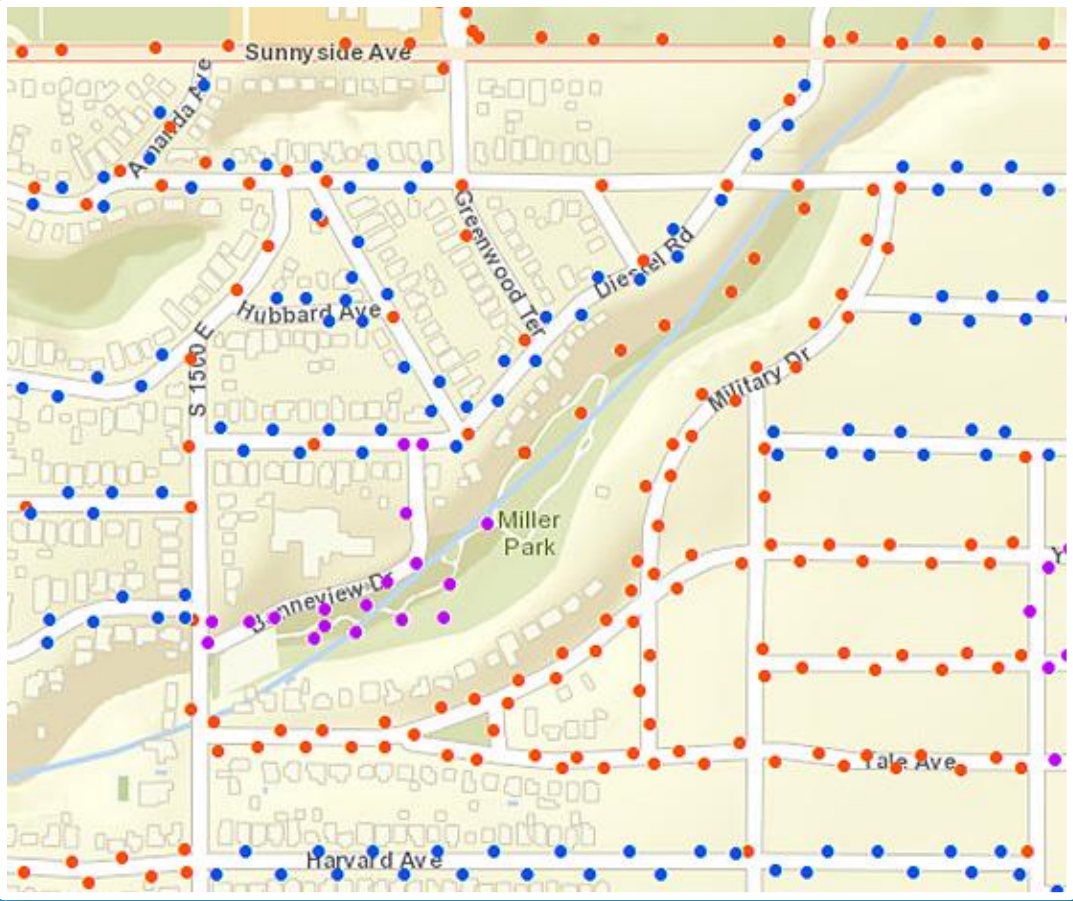
City of Lee's Summit (MO) Snow Removal web map



Interstate 805 Closure, Detours & Alt Routes web map



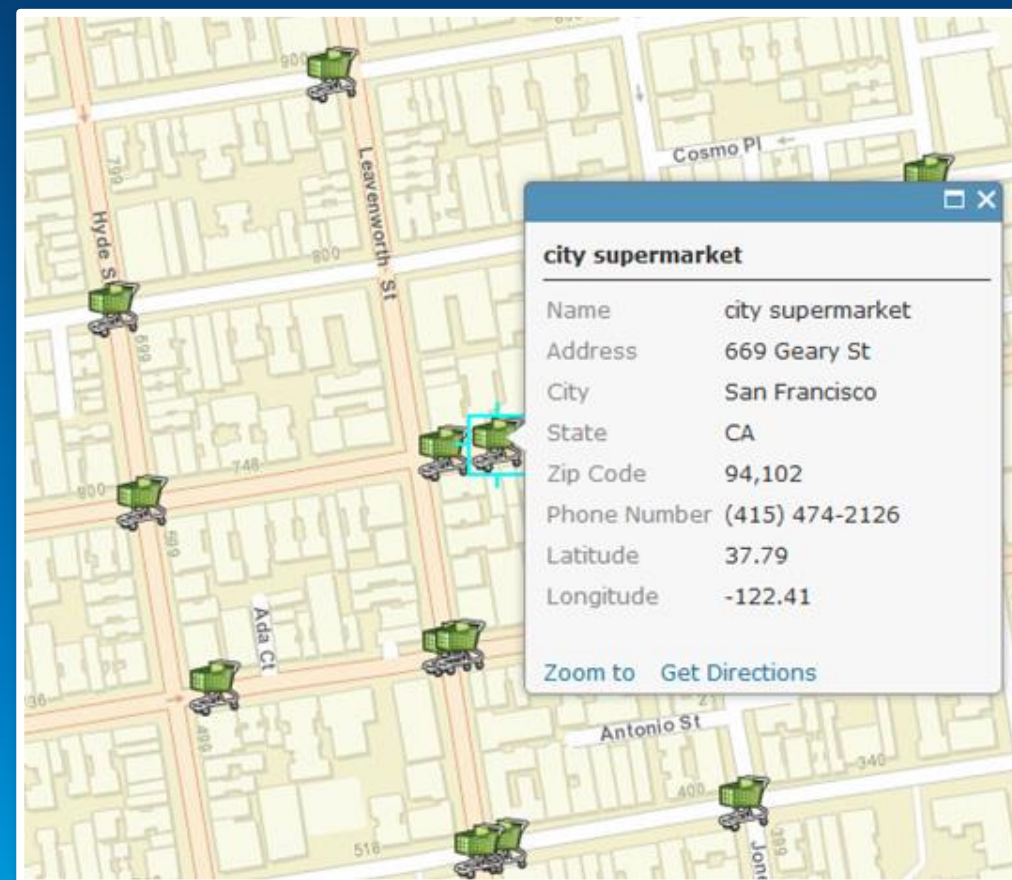
Salt Lake City Street Lighting web map



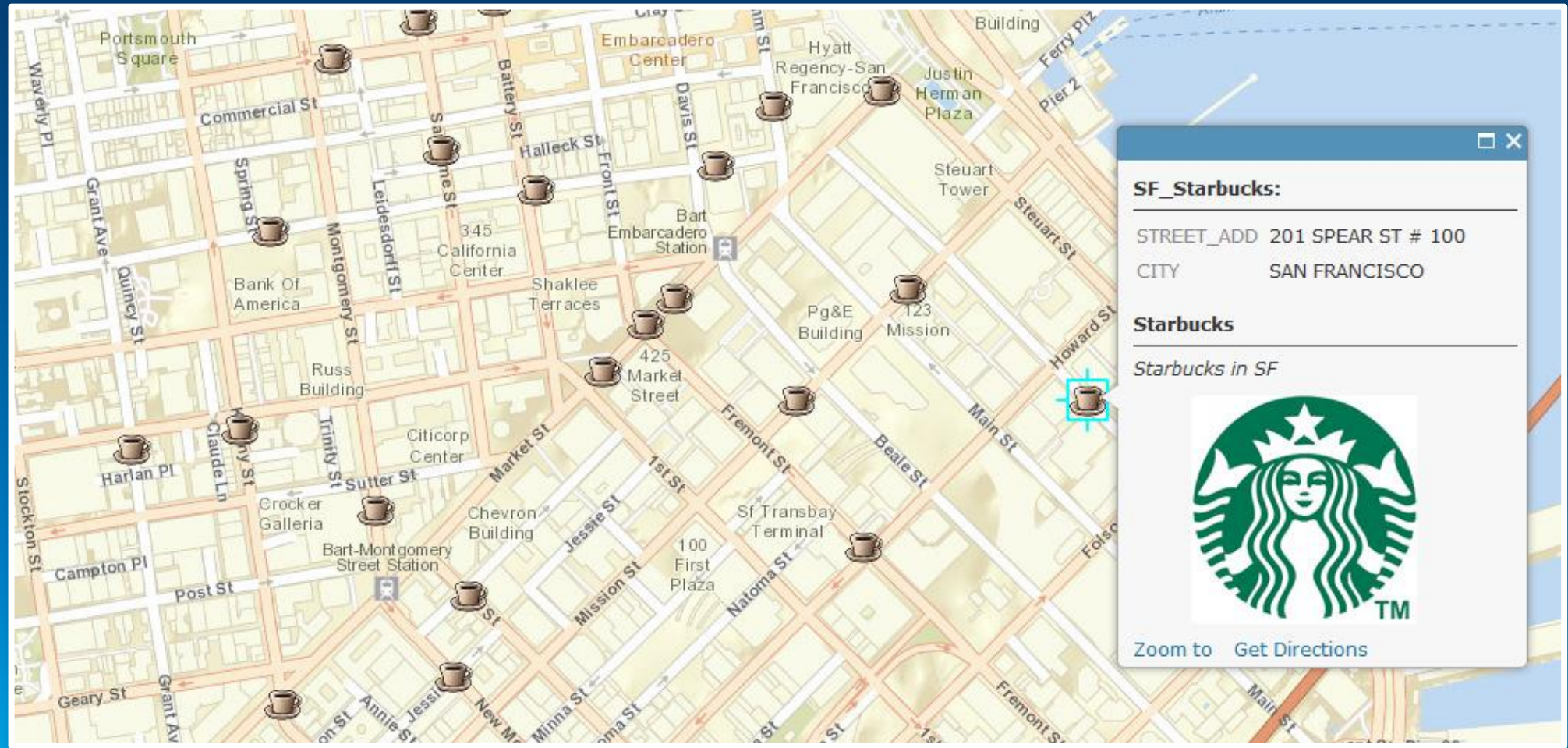
Hennepin County Transportation web map



Location of waterwheels in Munich web map



Locations of Starbucks in San Francisco web map

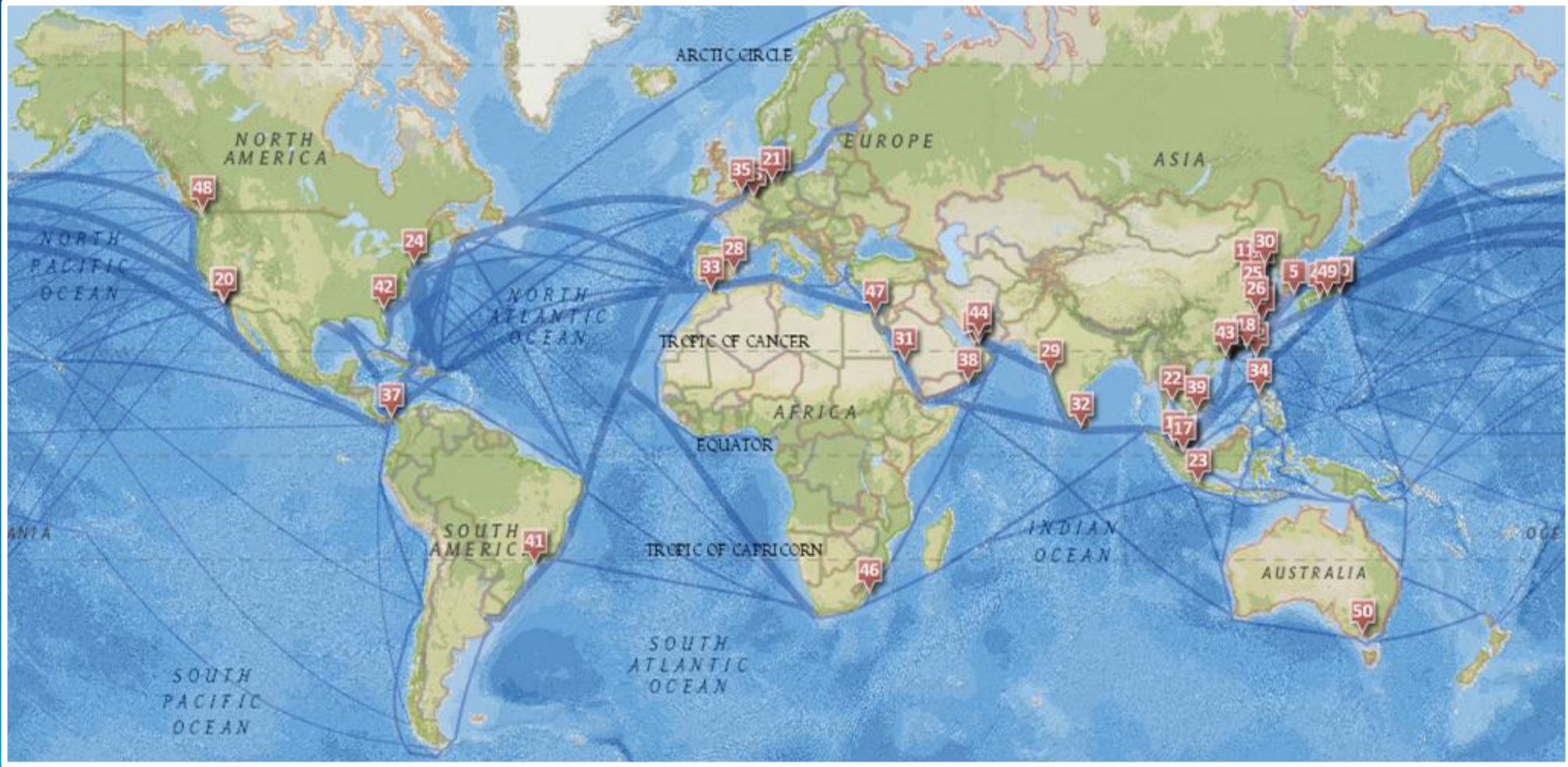


National Geographic Map

- For users who want to display minimal data
- Reference map with a vibrant, highly detailed background
- National Geographic boundary treatment and proprietary fonts
- Recommended for mid-small scale point data overlay



Fifty Largest Ports Story Map



Mexico's Historical Monuments Story Map



Brazil's Soccer Stadiums Story Map

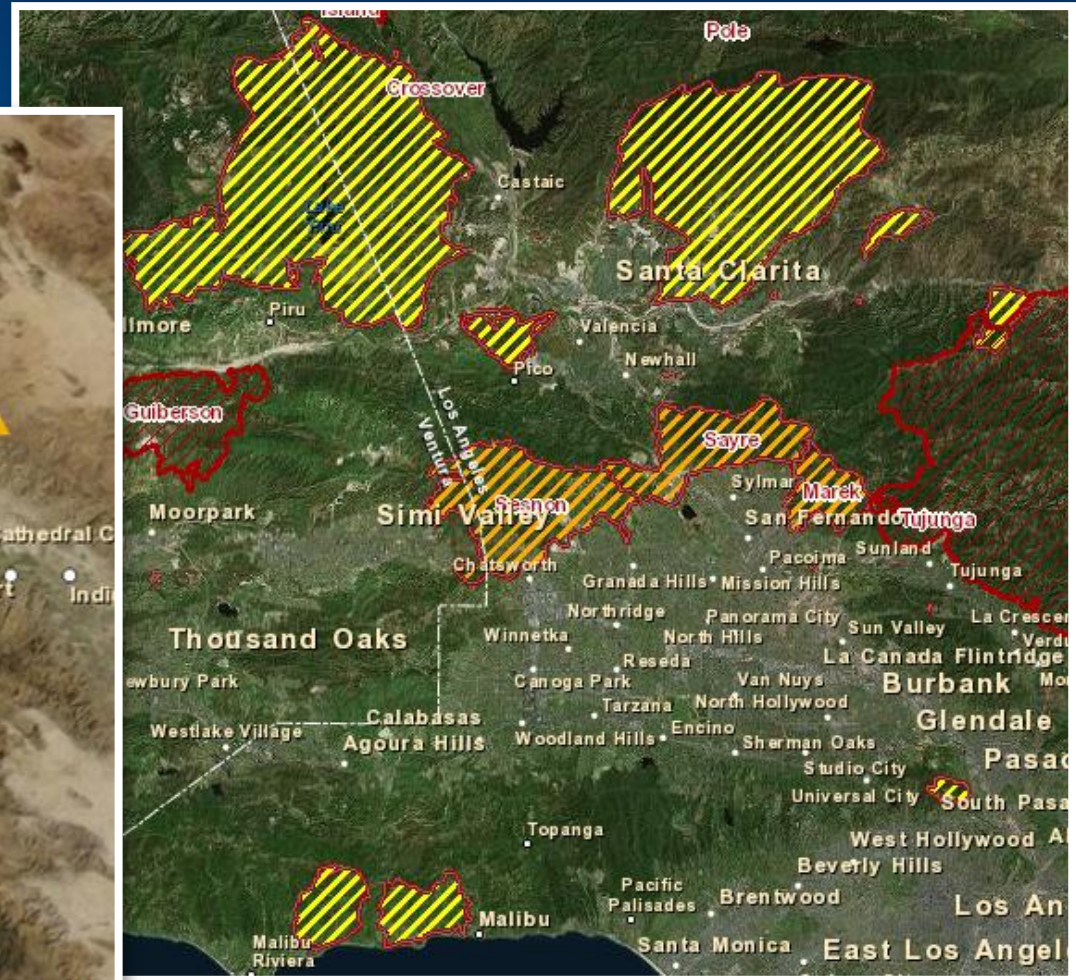


Imagery with Labels

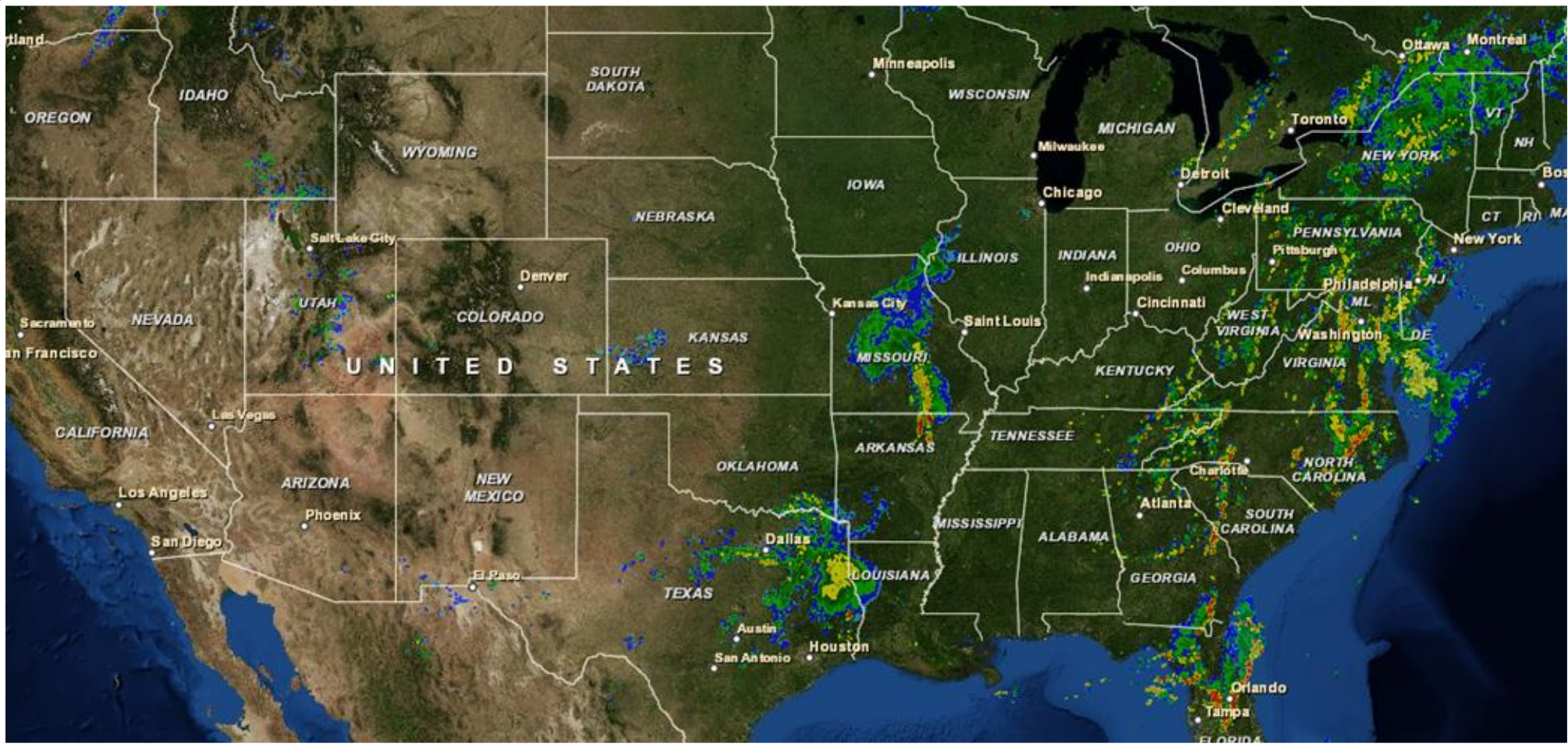
- Imagery + Boundaries & Places map services combined
- Labels serve as a reference framework for the Imagery service
- Labels with bold, vibrant colors, thick black halos
- Great for point, line, polygon data overlay



California Fire History web map



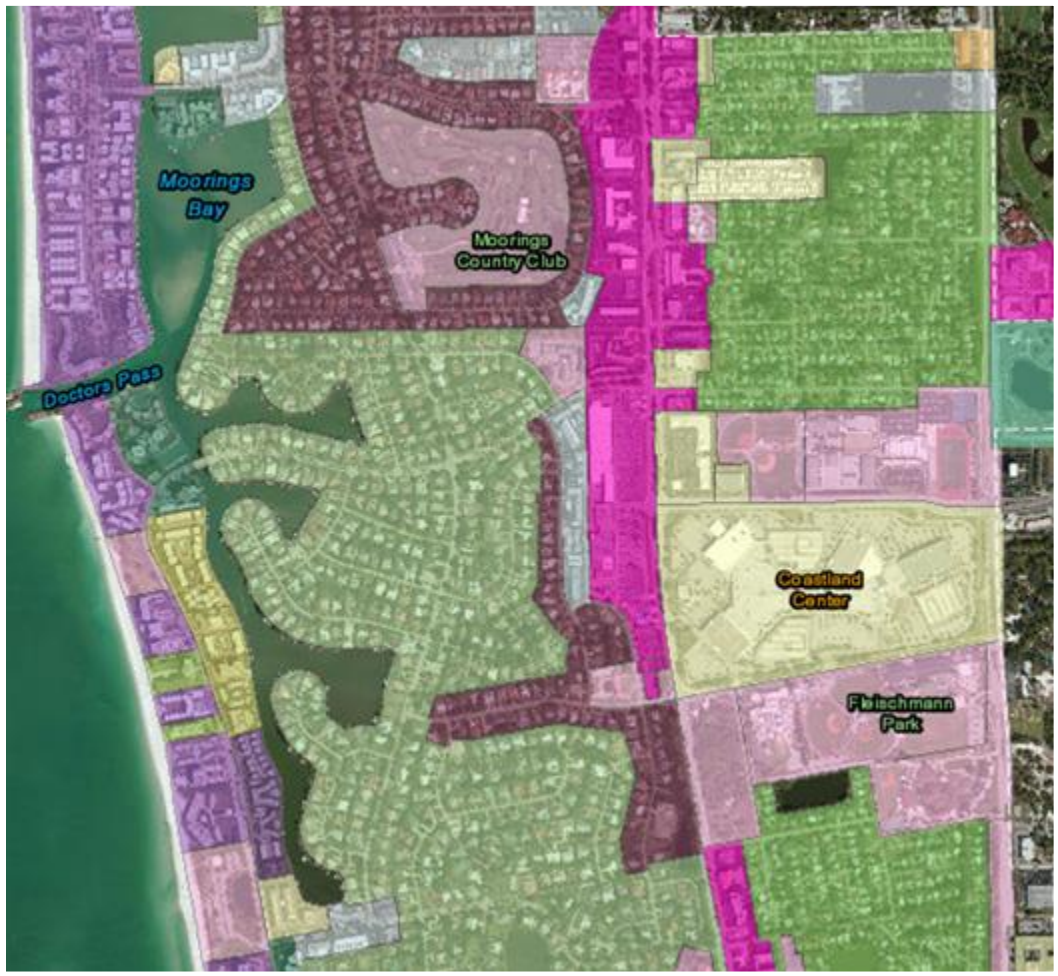
Severe Weather Public Information web map



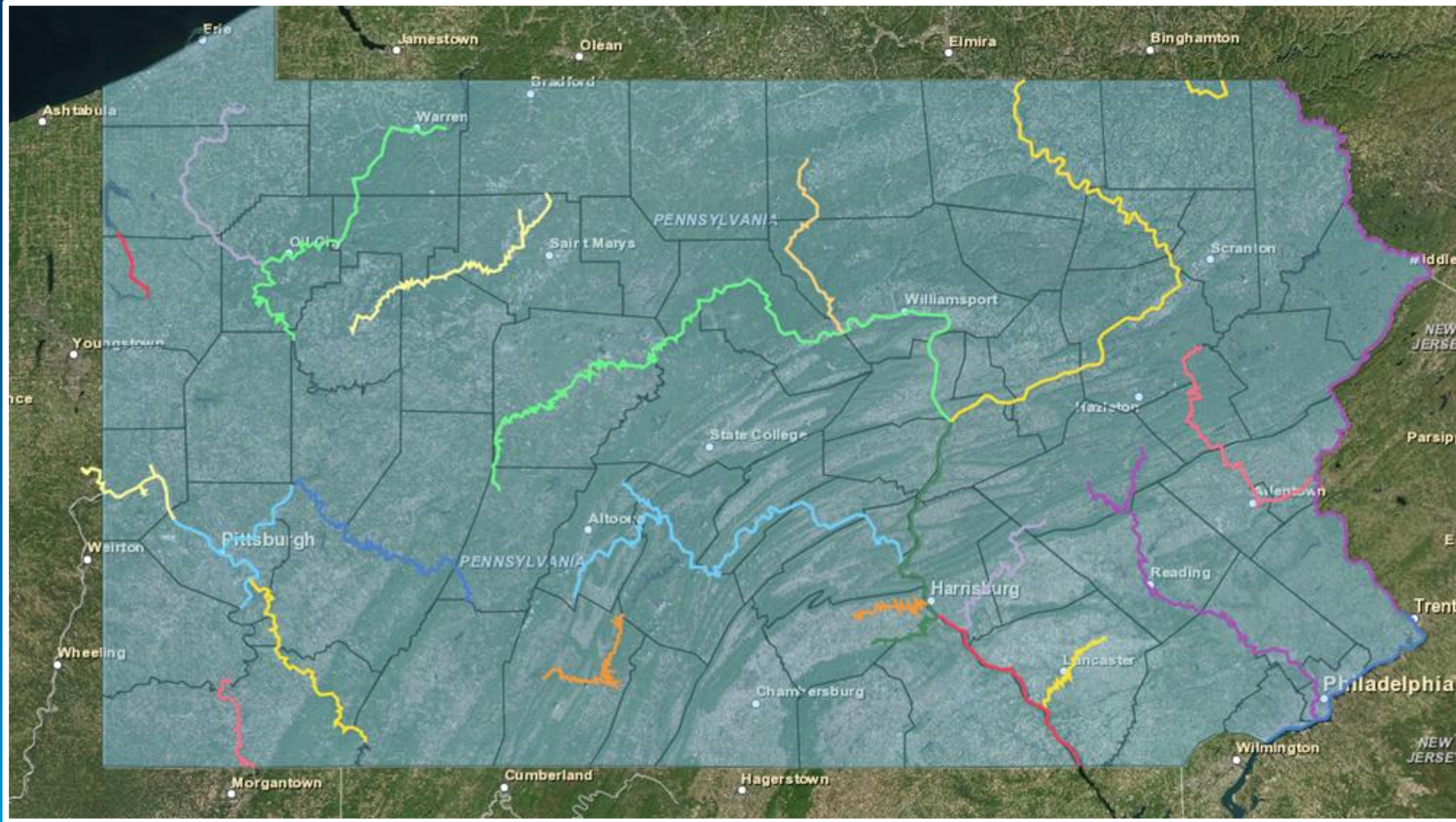
USGS Recent Earthquakes web map



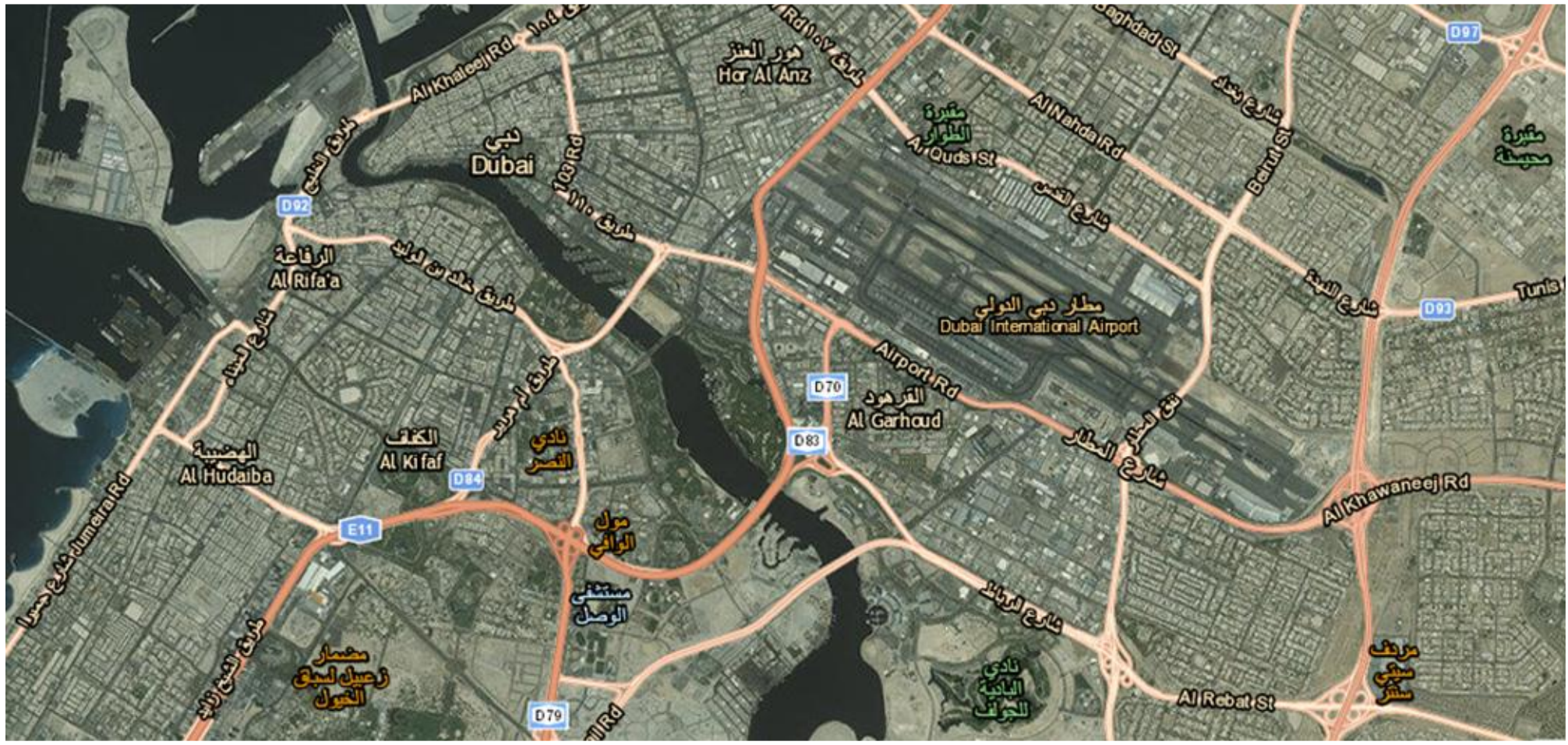
City of Naples, FL: Zoning web map



PA Water Trails web map



Imagery with Labels + World Transportation together

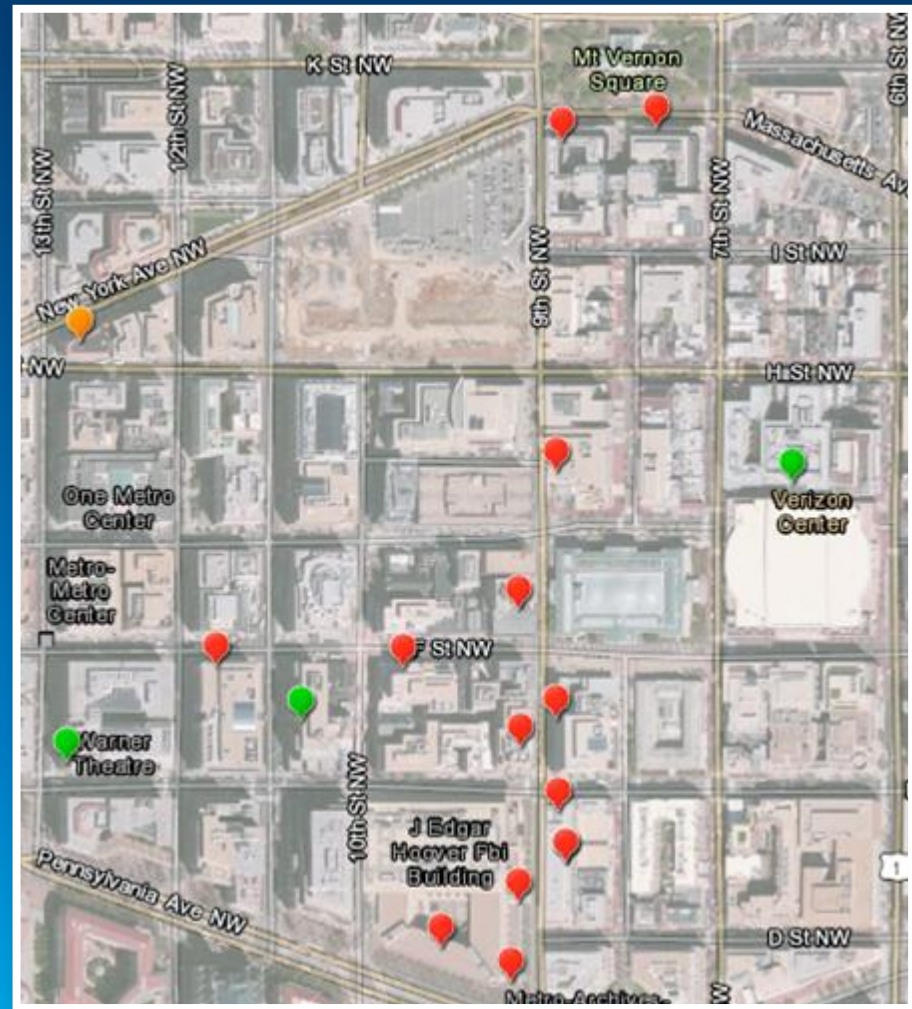
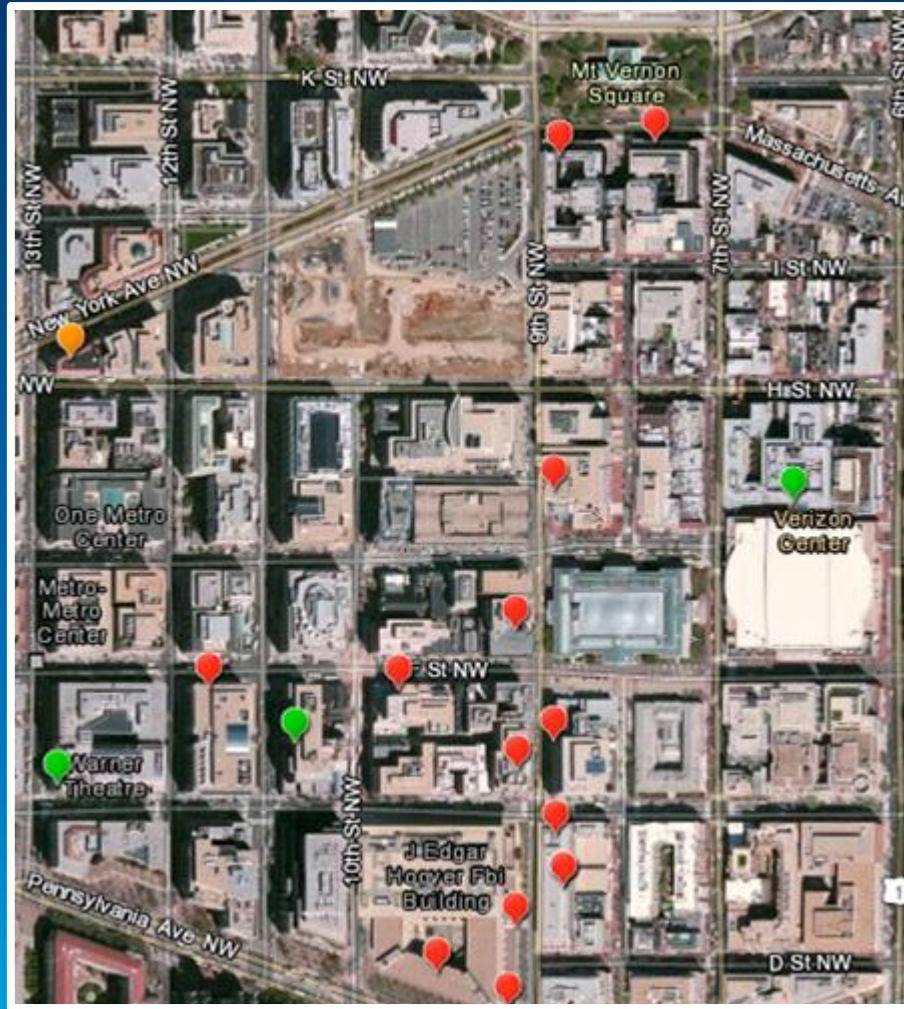


Hybrid Map

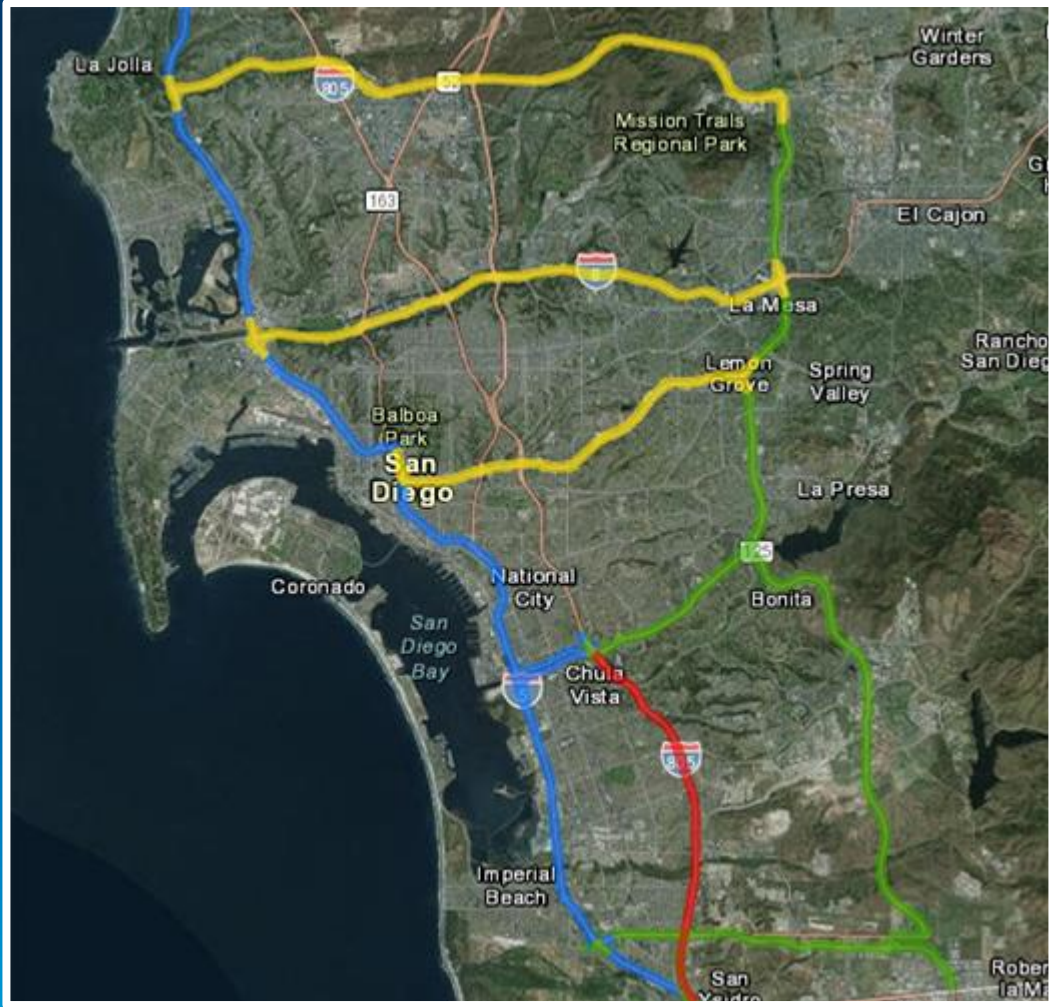
- World Imagery with Labels + World Transportation map services combined
- Updated cartographic design
- Works as a basemap and as a reference map
- Great for point, line, polygon data overlay



DC Cinema and Theater web map



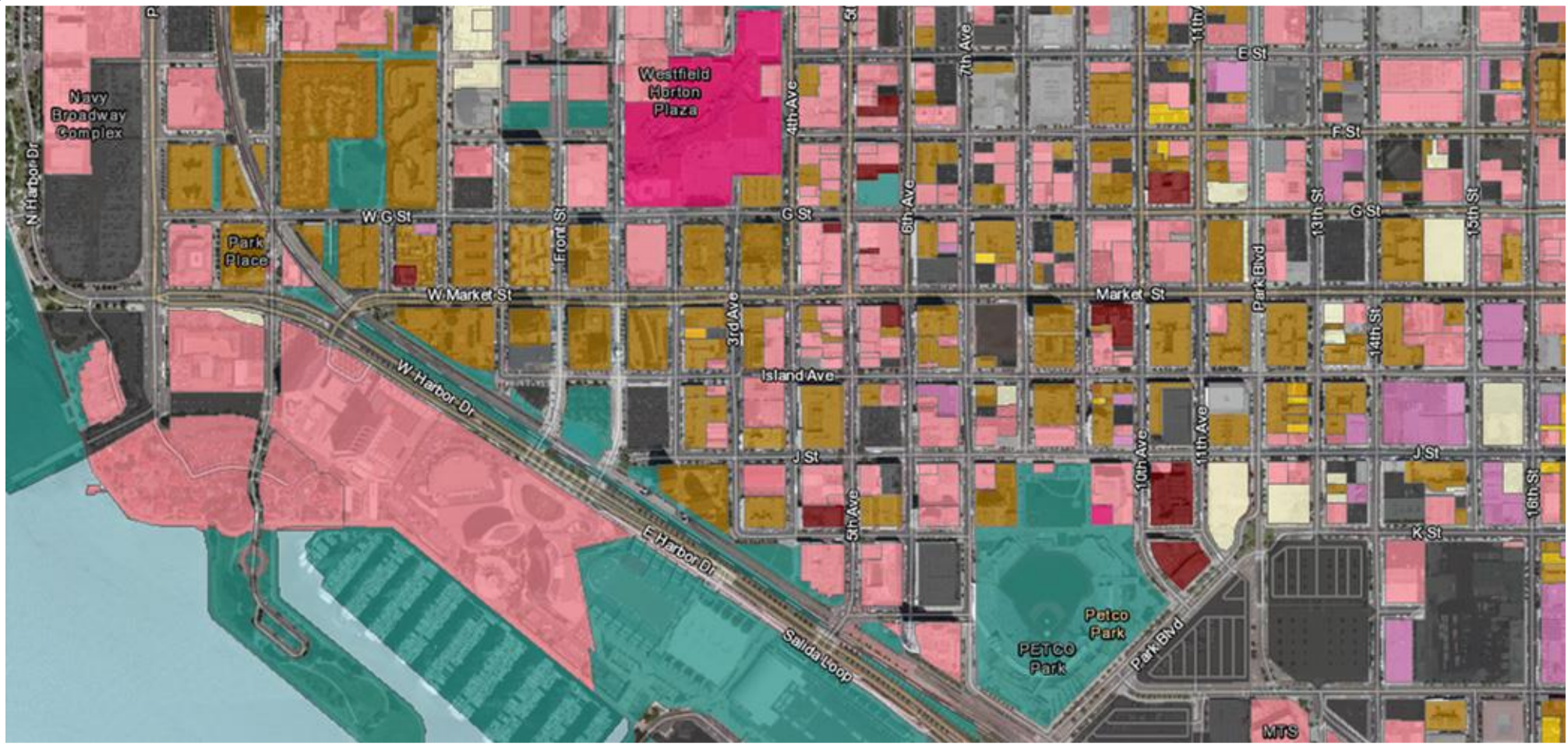
Interstate 805 Closure, Detours & Alt Routes web map



Charlotte's Sunday Uptown Street Access web map



San Diego Zoning web map



ArcGIS Online Basemap Matrix

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LINES	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
QUALITATIVE POLYGONS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
			Terrain with labels	
QUANTITATIVE POLYGONS	Imagery with labels/Hybrid	Oceans	Light Gray Canvas...	Dark Gray Canvas



High Content and Medium Saturation

Andrew Green

HIGH CONTENT MEDIUM SATURATION

QUALITATIVE
POINTS

Topographic

Oceans

QUANTITATIVE
POINTS

Topographic

Oceans

LINES

Topographic

Oceans

QUALITATIVE
POLYGONS

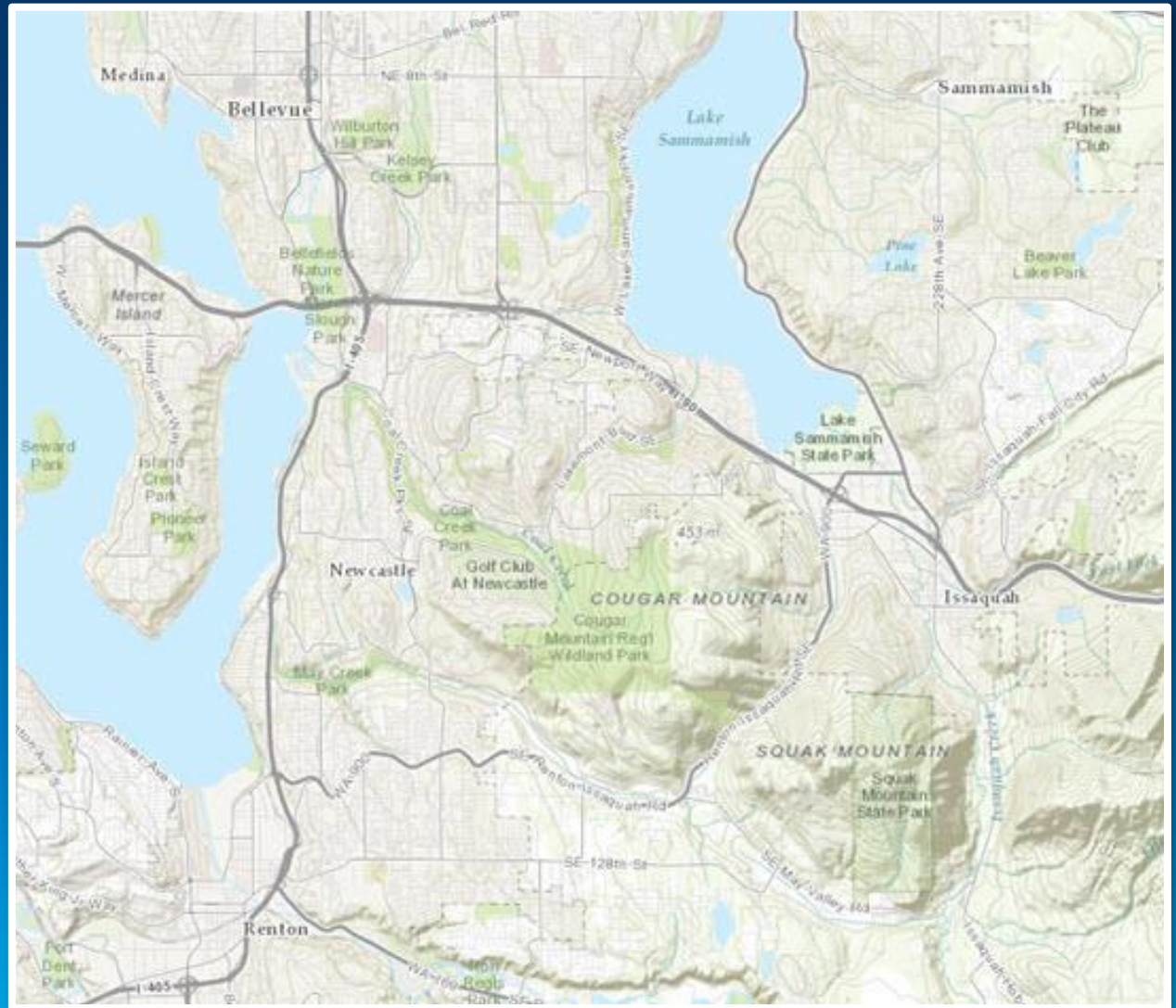
Topographic

QUANTITATIVE
POLYGONS

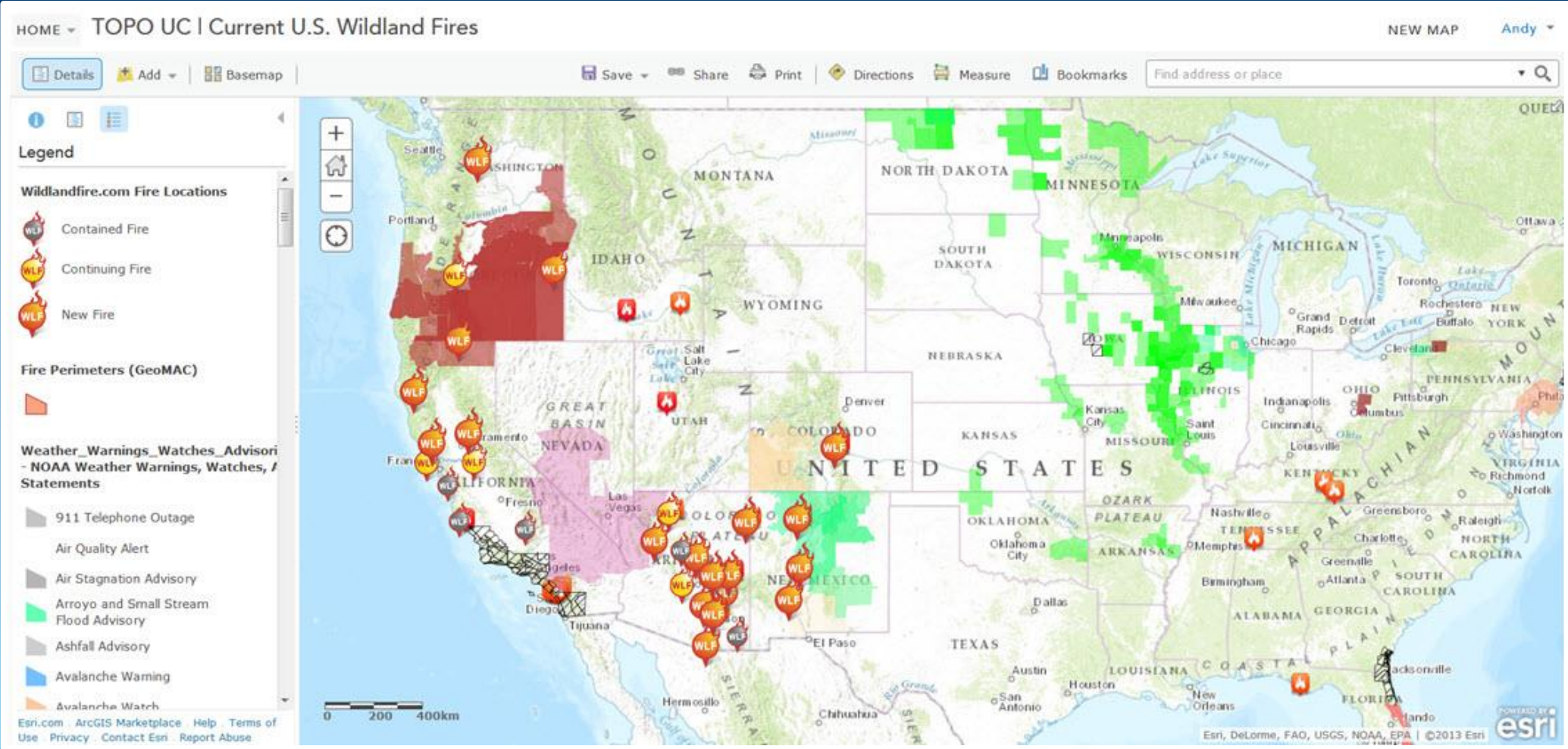
Oceans

Topographic Map

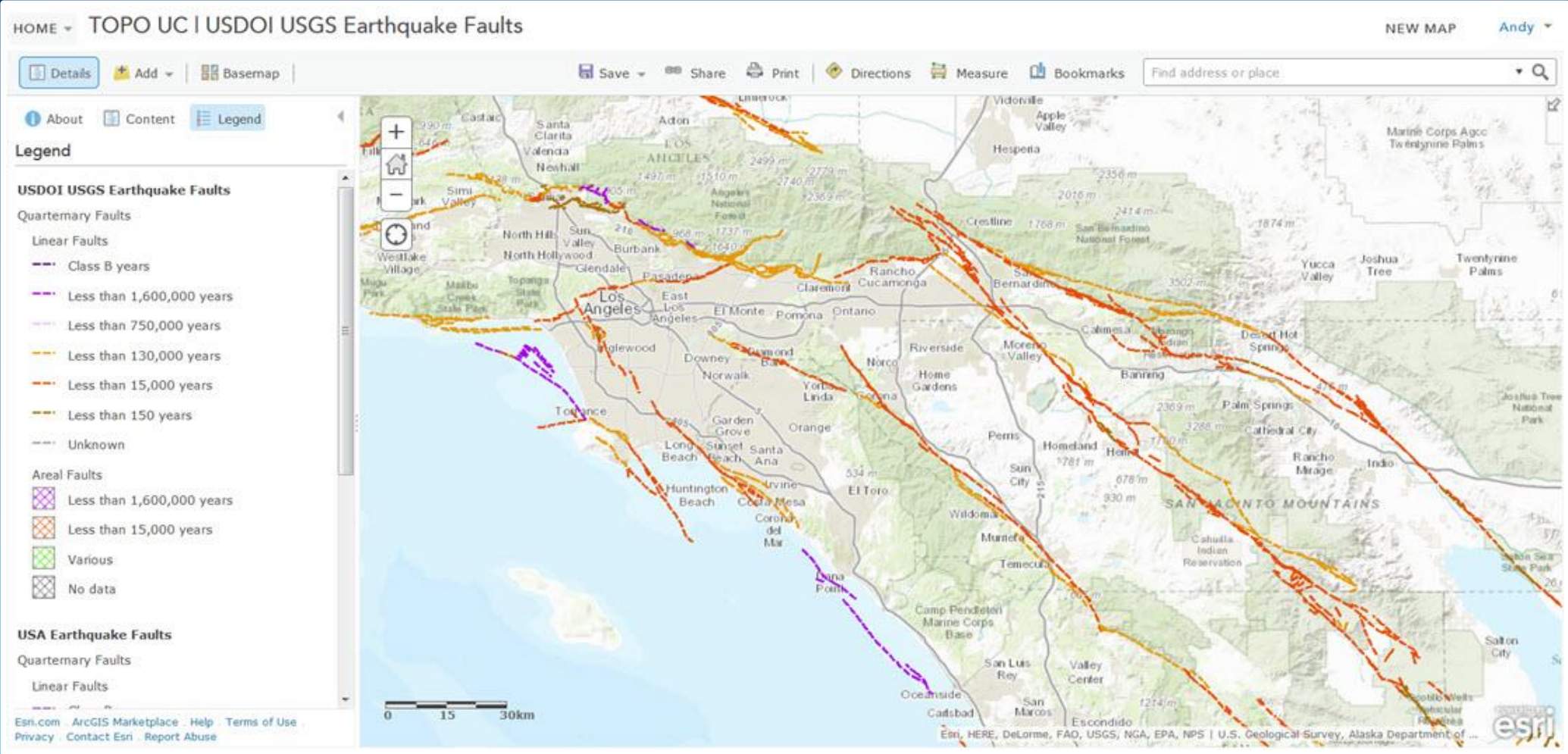
- **Community Map**
- **Reference map and a basemap**
- **Emphasis on physical features**
- **Muted color palette**
- **Great for overlaying all data**



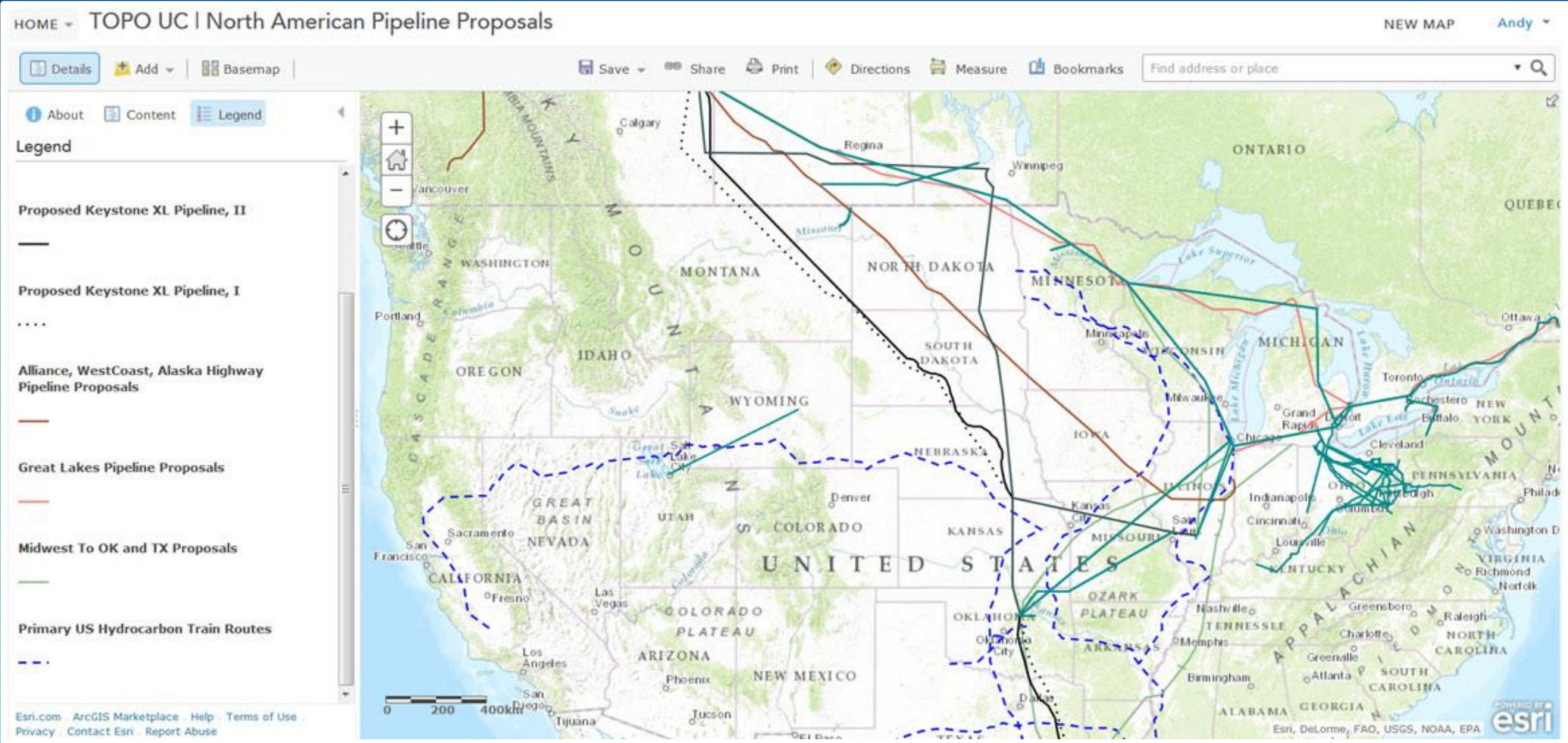
Topographic Map



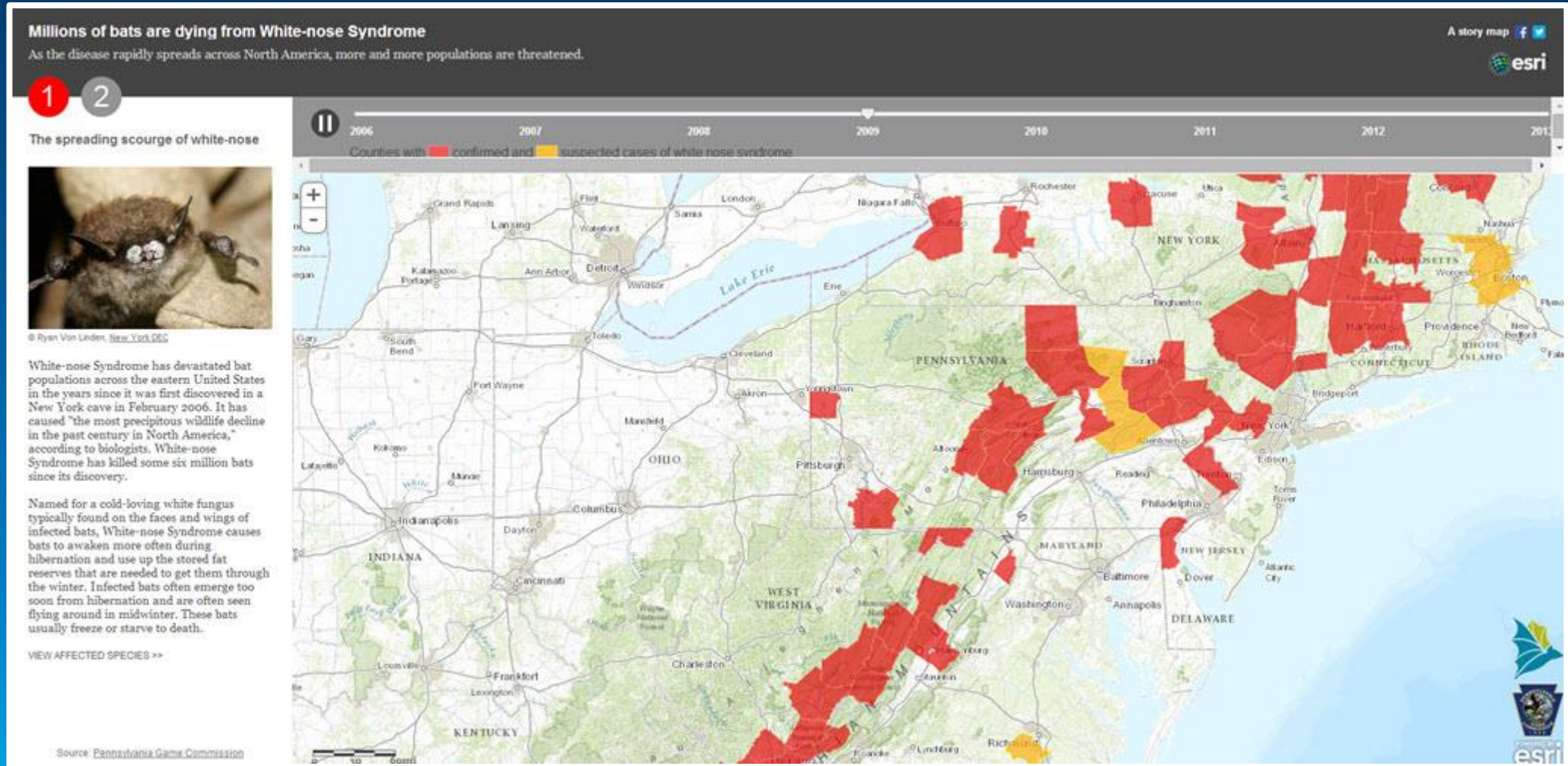
Topographic Map



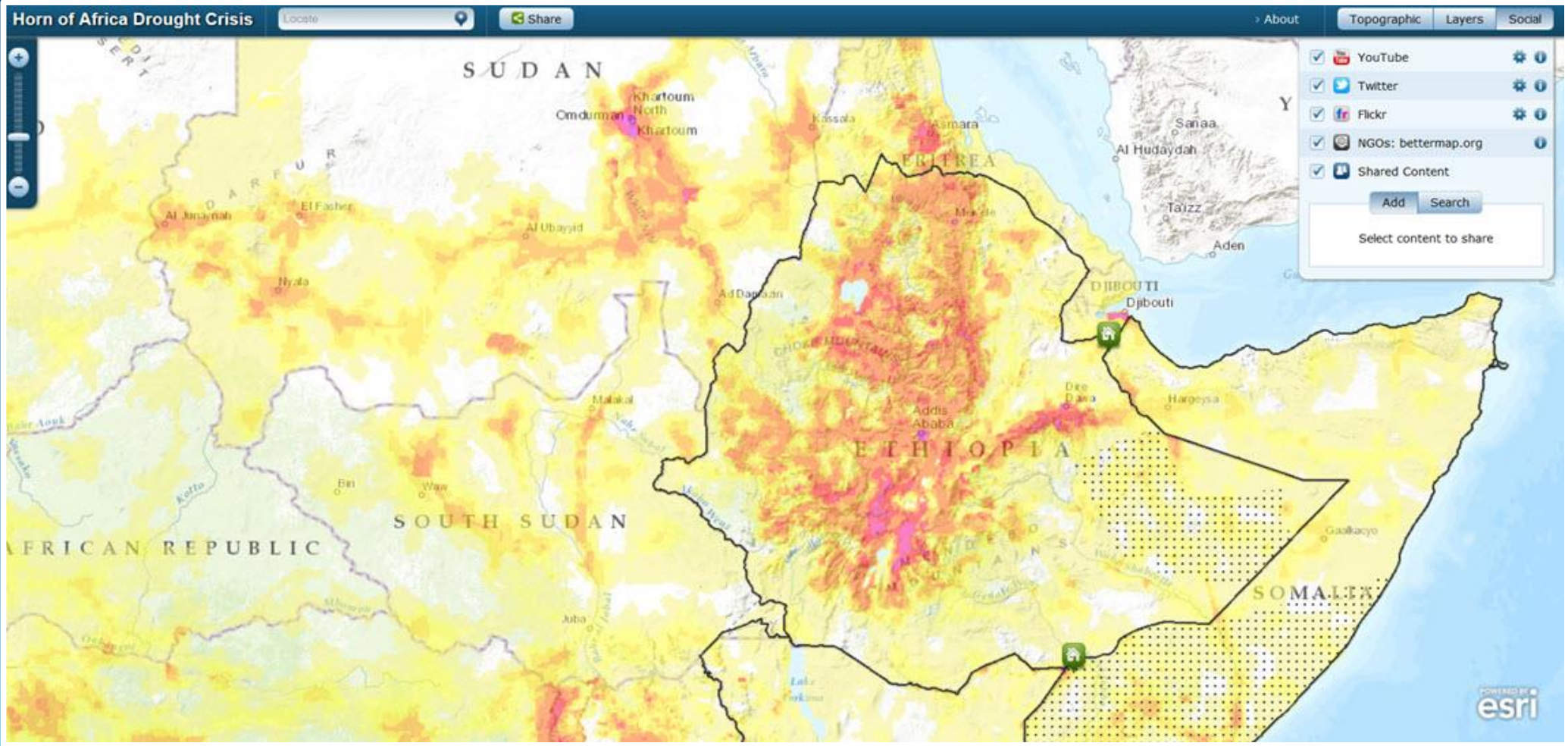
Topographic Map



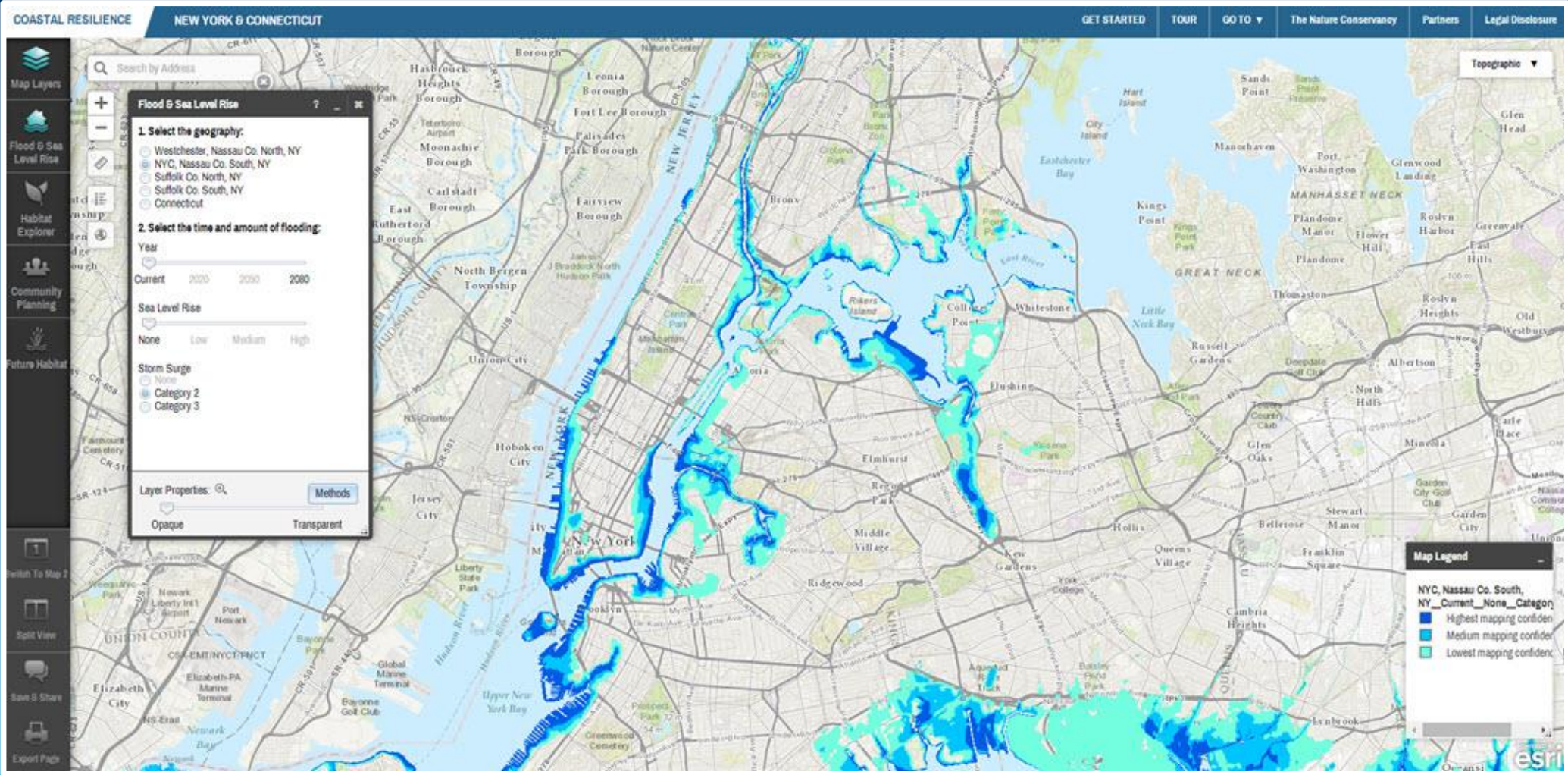
Topographic Map



Topographic Map

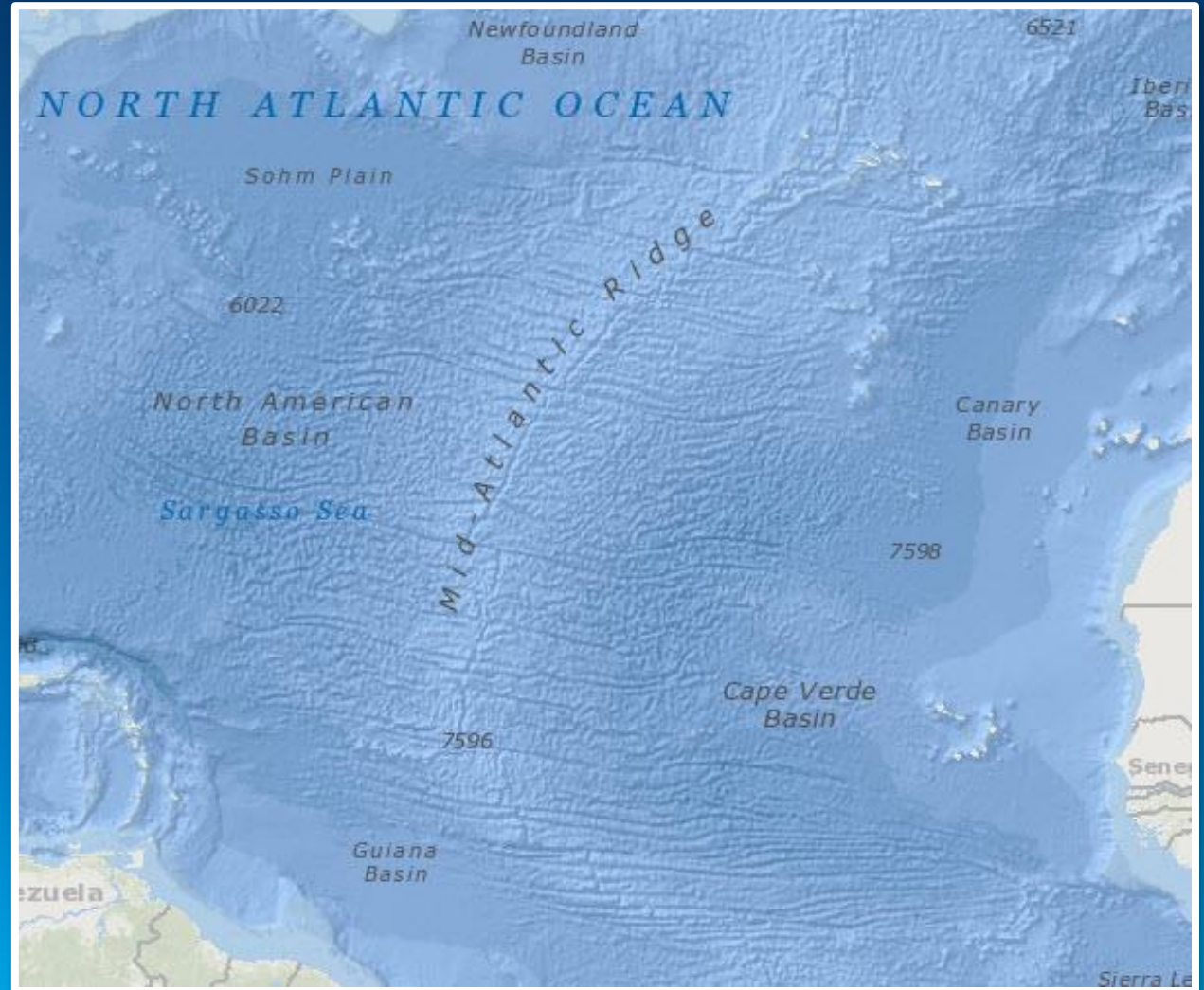


Topographic Map



Oceans Map

- Reference map and a basemap
- Oceans and undersea features
- Base layer
- Reference layer
- Map Sandwich



Oceans Map

The Real Pirates of the Caribbean

A story map [f](#) [t](#) [c](#)

Explore the travels and exploits of five real pirates of the Caribbean. Click through the tabs to track the adventures of each pirate overlaid on Spanish ports and pirate strongholds in the area. Zoom into the map to see additional detail.

The map displays the Caribbean Sea and surrounding landmasses, including Mexico, Central America, and the Caribbean islands. Key features include:

- Spanish Ports and Strongholds:** Marked with red squares and skull-and-crossbones icons. Locations include Veracruz/San Juan de Ulloa, Havana, and Cartagena.
- Pirate Strongholds:** Marked with skull-and-crossbones icons. Locations include Port Royal (Jamaica) and Tortuga (Haiti).
- Treasure Fleets:** Represented by blue lines and arrows, showing routes like the 'NUEVA ESPAÑA FLEET' and 'COMBINED FLEET'.
- Historic Sites:** Marked with yellow squares. Locations include Zacatecas, Mexico City, and Santo Domingo.
- Spanish Mines:** Marked with grey circles. Locations include Zacatecas and Mexico City.
- Henry Morgan's Travels:** Represented by green lines and arrows, showing his approximate route from Port Royal to Havana and back.
- Assumed Routes:** Represented by dashed lines.

LEGEND

- Henry Morgan**
 - Henry Morgan's travels
 - Approximate route
 - Assumed route
- The Real Pirates of the Caribbean**
 - Historic Sites
 - Spanish City and/or Port
 - Spanish Mine
 - Pirate Stronghold
 - Approximate route of the Treasure Fleets
- The Treasure Fleet**

2 François l'Olonnais

3 Calico Jack Rackham

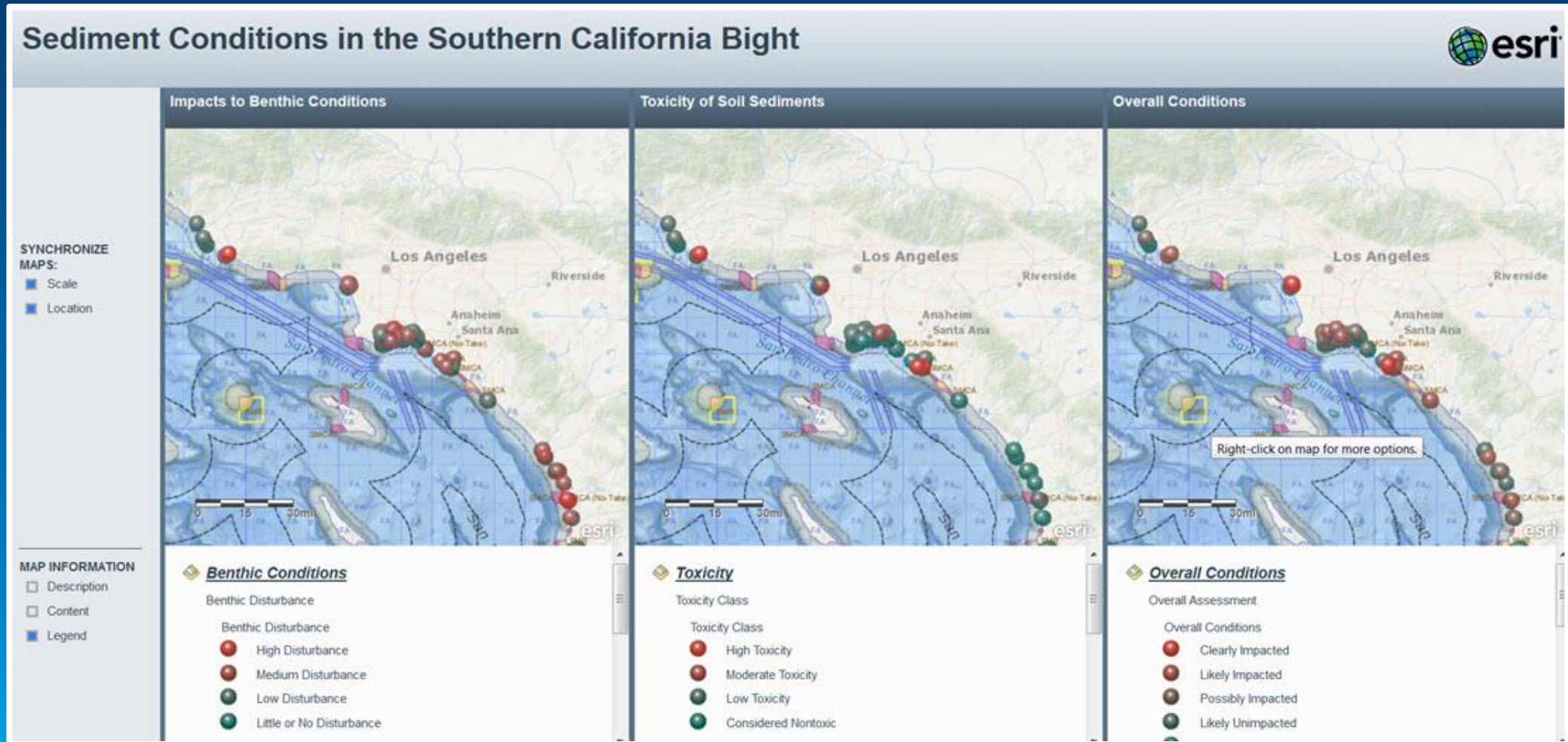
4 Henry Morgan

Henry Morgan is often considered the quintessential 'pirate,' although he was actually a privateer with the backing of England until 1670. Operating primarily out of Port Royal, Morgan was an admiral in the Royal Navy and eventually became a lieutenant governor of Jamaica.

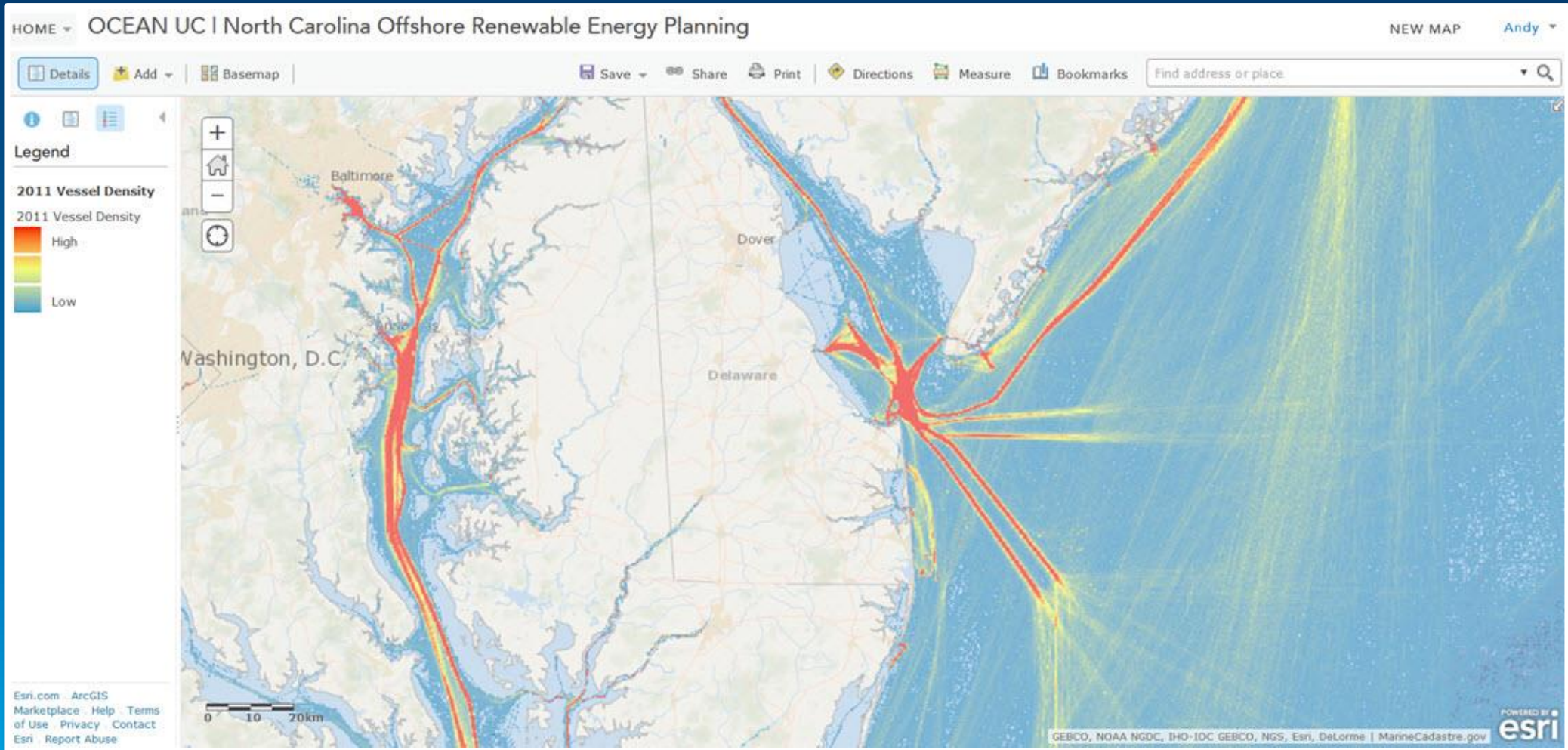
5 Edward Teach (Blackbeard)

Powered by **esri**

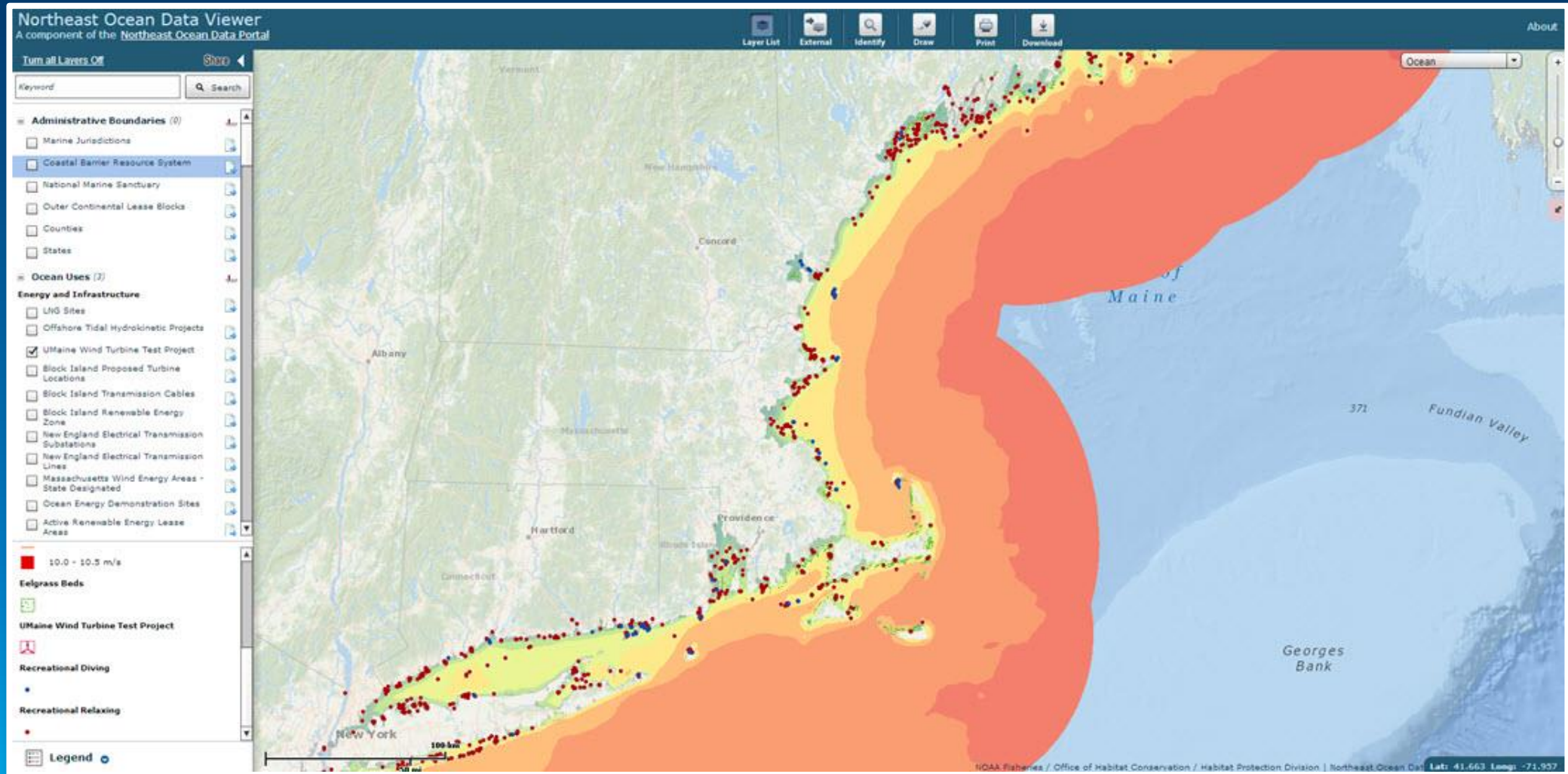
Oceans Map



Oceans Map



Oceans Map



ArcGIS Online Basemap Matrix

	HIGH CONTENT HIGH SATURATION	HIGH CONTENT MEDIUM SATURATION	LOW CONTENT LOW SATURATION	LOW CONTENT HIGH SATURATION
QUALITATIVE POINTS	National Geographic	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
	Imagery with labels/Hybrid			
QUANTITATIVE POINTS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
		Oceans	Terrain with labels	
LINES	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
QUALITATIVE POLYGONS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
			Terrain with labels	
QUANTITATIVE POLYGONS	Imagery with labels/Hybrid	Oceans	Light Gray Canvas...	Dark Gray Canvas



Low Content and Low Saturation

Andy Skinner

LOW CONTENT LOW SATURATION

QUALITATIVE
POINTS

Light Gray Canvas

Terrain with labels

QUANTITATIVE
POINTS

Light Gray Canvas

Terrain with labels

LINES

Light Gray Canvas

Terrain with labels

QUALITATIVE
POLYGONS

Light Gray Canvas

Terrain with labels

QUANTITATIVE
POLYGONS

Light Gray Canvas...

The 'Map Sandwich' concept

Using the Light Gray Canvas Map as an example



Oceans
Imagery with Labels
Hybrid



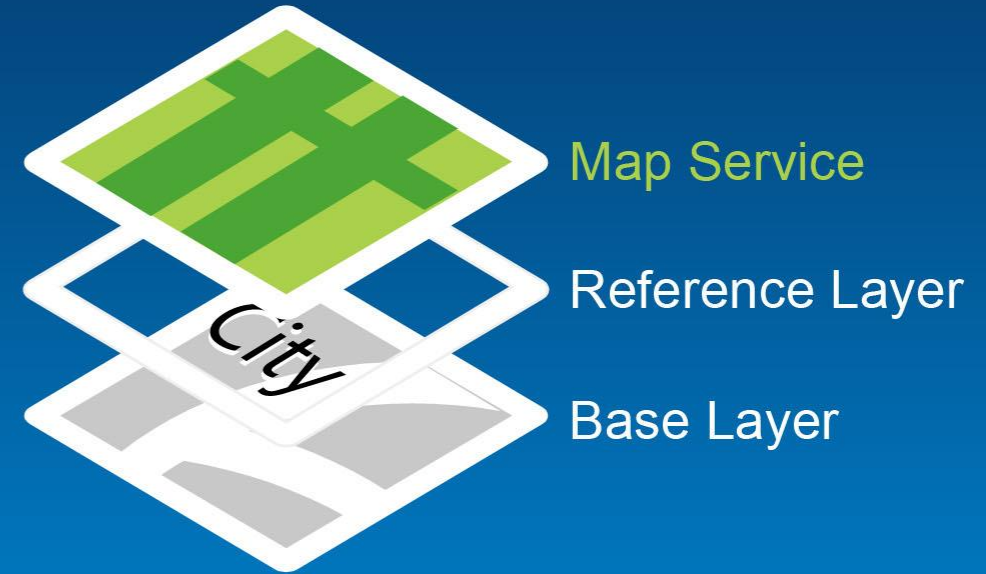
Terrain with Labels
Light Gray Canvas Map
Dark Gray Canvas Map

The 'Map Sandwich' concept

Using the Light Gray Canvas Map as an example



Cached Service



Feature Service



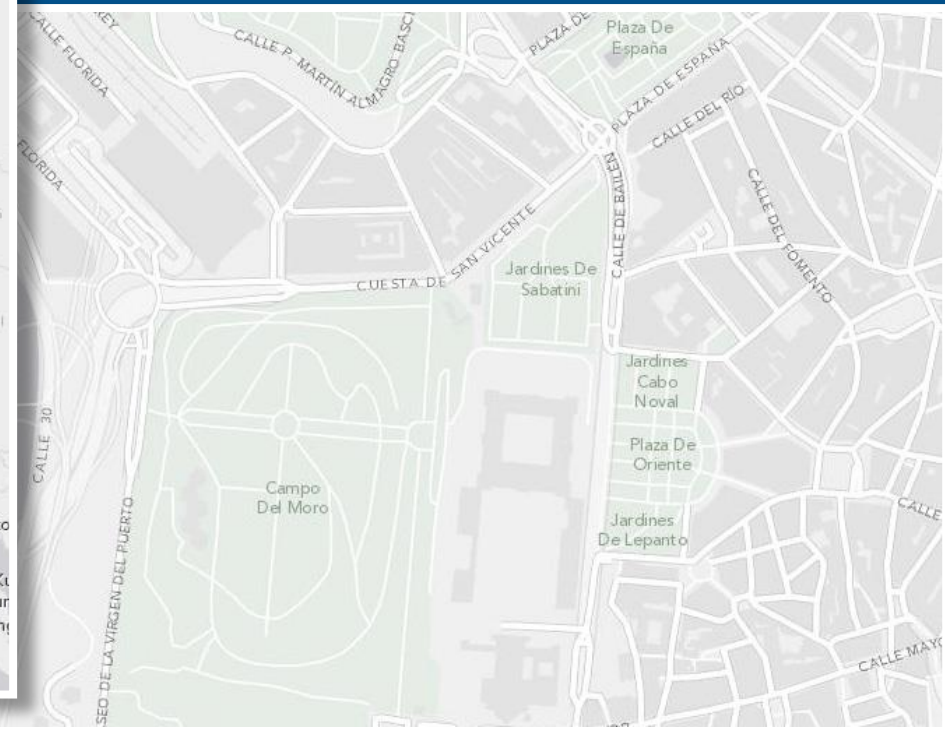
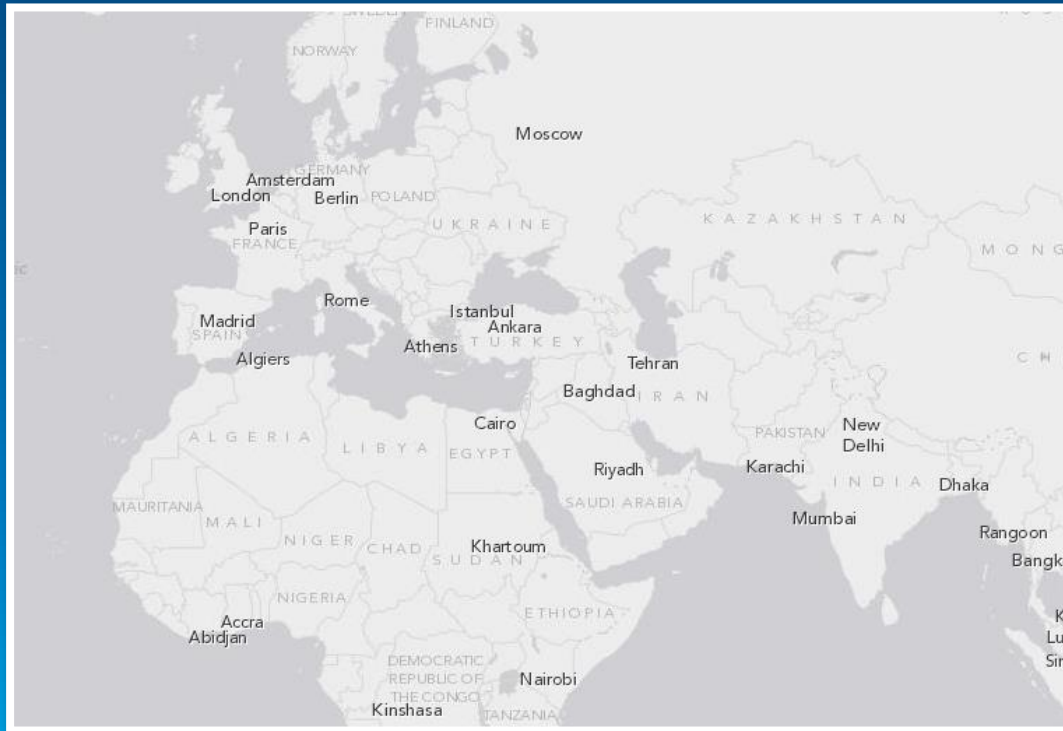
Oceans
Imagery with Labels
Hybrid



Terrain with Labels
Light Gray Canvas Map
Dark Gray Canvas Map

Light Gray Canvas Map

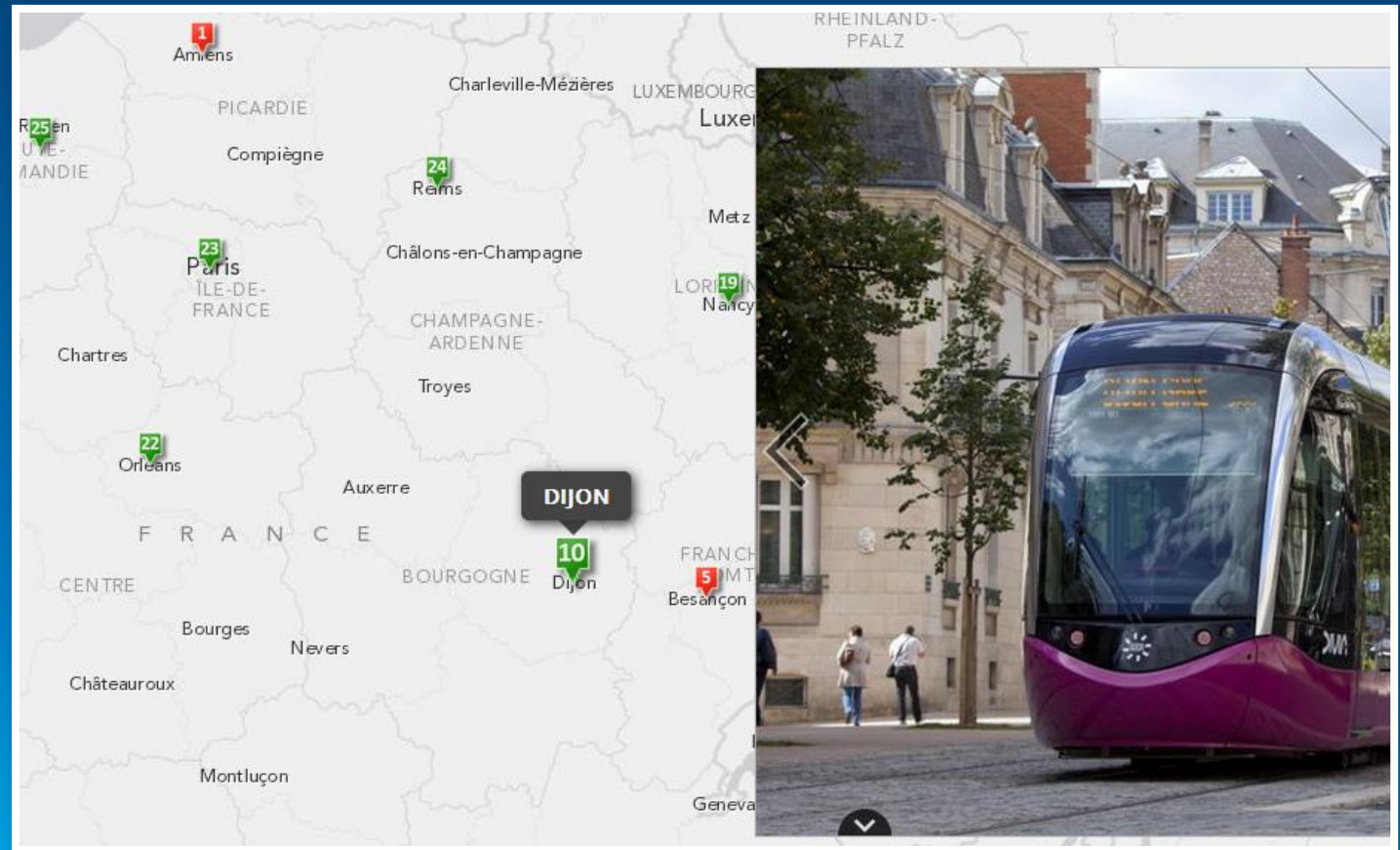
- ‘Stripped down’ map in variations of light gray
- Works with most maps, but is light on content



Using the Basemap with Point Information

Light Gray Canvas Map

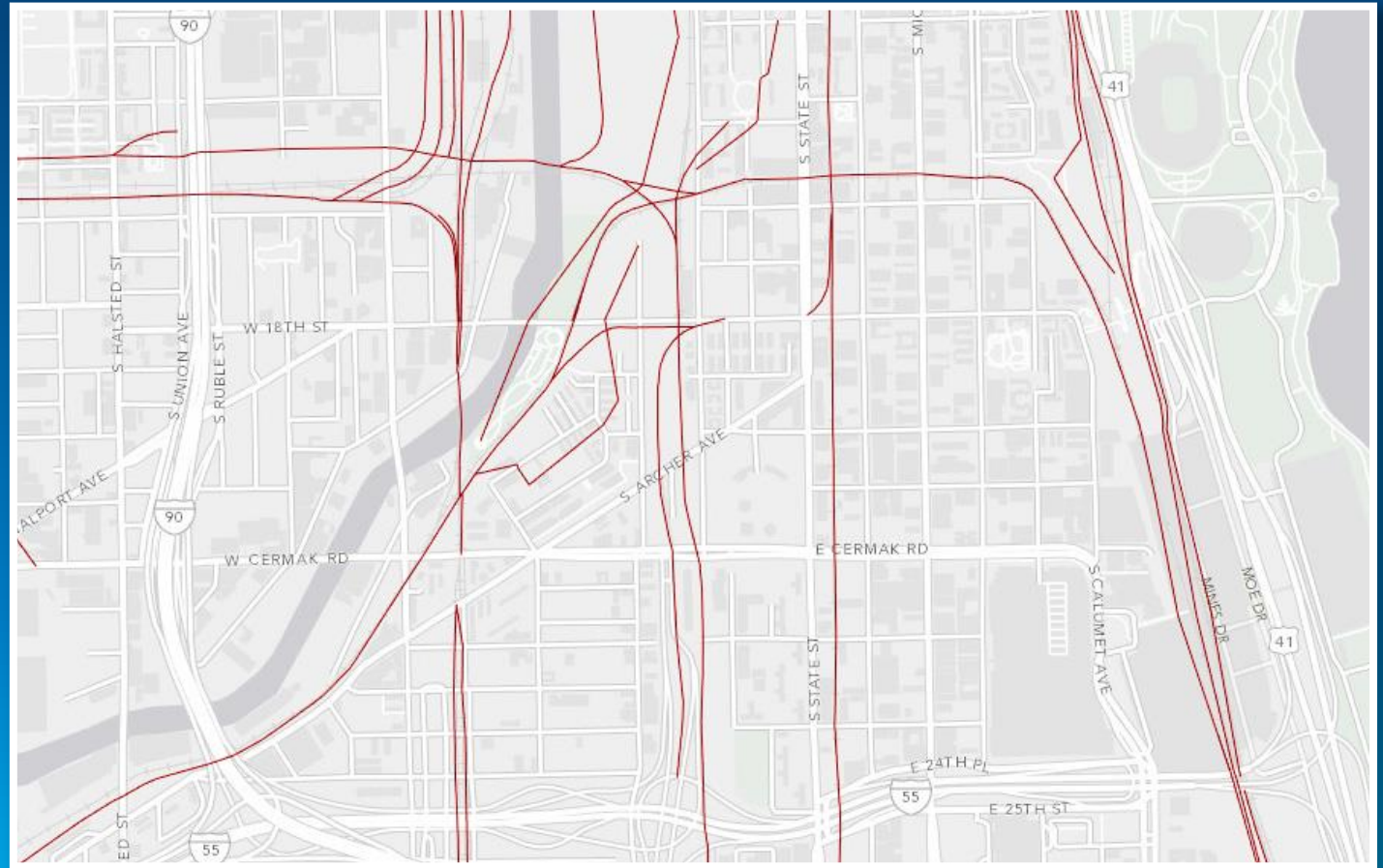
- No real problems with colors
- Does the basemap carry enough detail to support your information?



Using the Basemap with Line Information

Light Gray Canvas Map

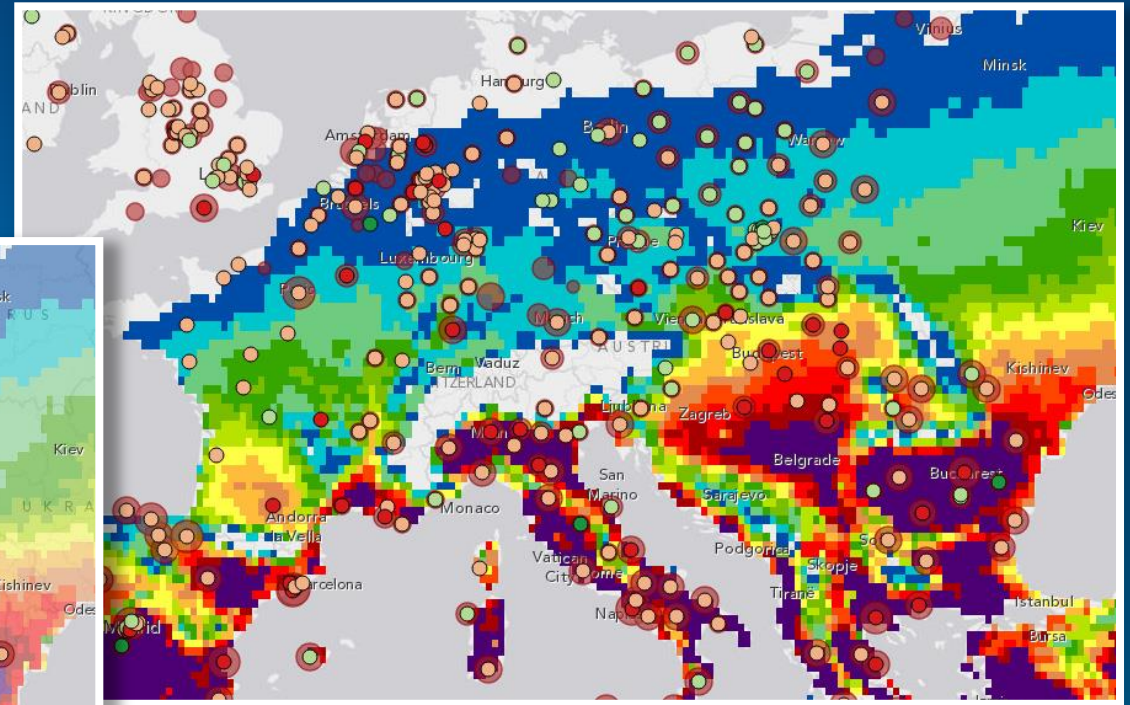
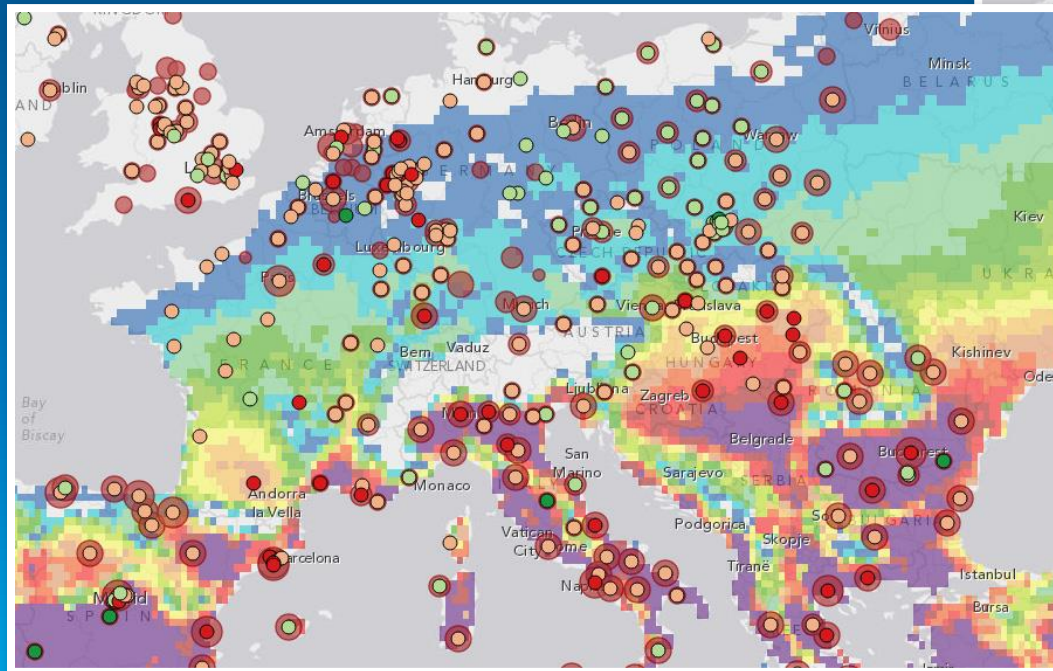
- No color problems
- Some competition from extra content at larger scales, but nothing serious



Using the Basemap with Polygon Information

Light Gray Canvas Map: Heat Wave Risk

- Use transparency to allow the basemap to contribute...



- But use strong colors to compensate for the transparency

Terrain with Labels Basemap

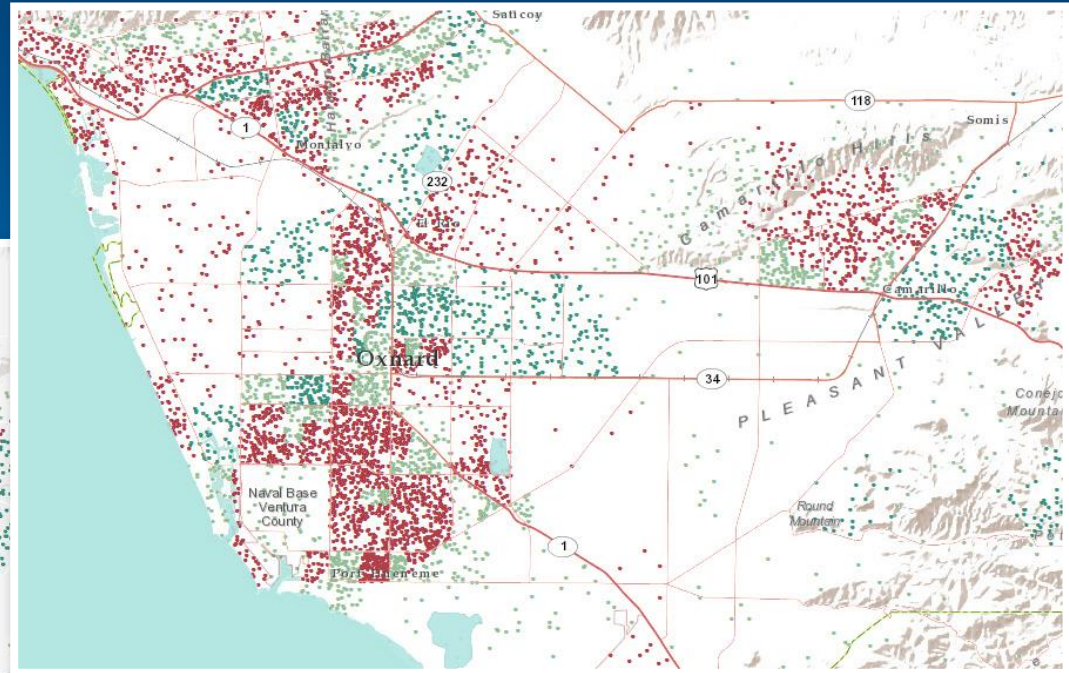
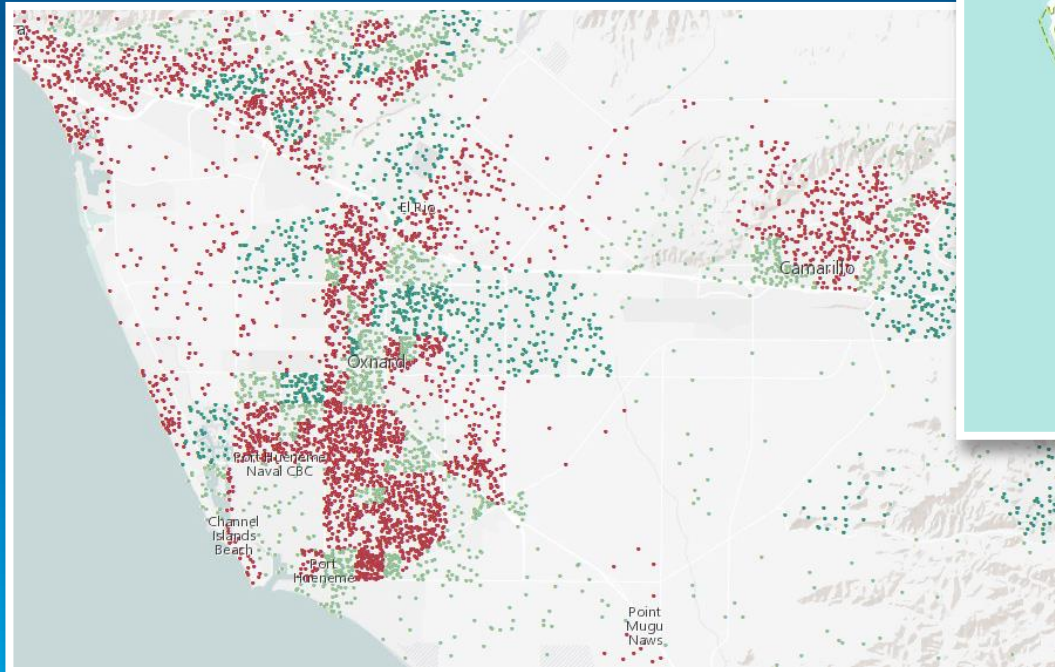
- Neutral base (on land), with a more detailed reference layer
- Does not continue into larger scales



Using the Basemap with Point Information

Terrain with Labels map: Population Growth and Decline

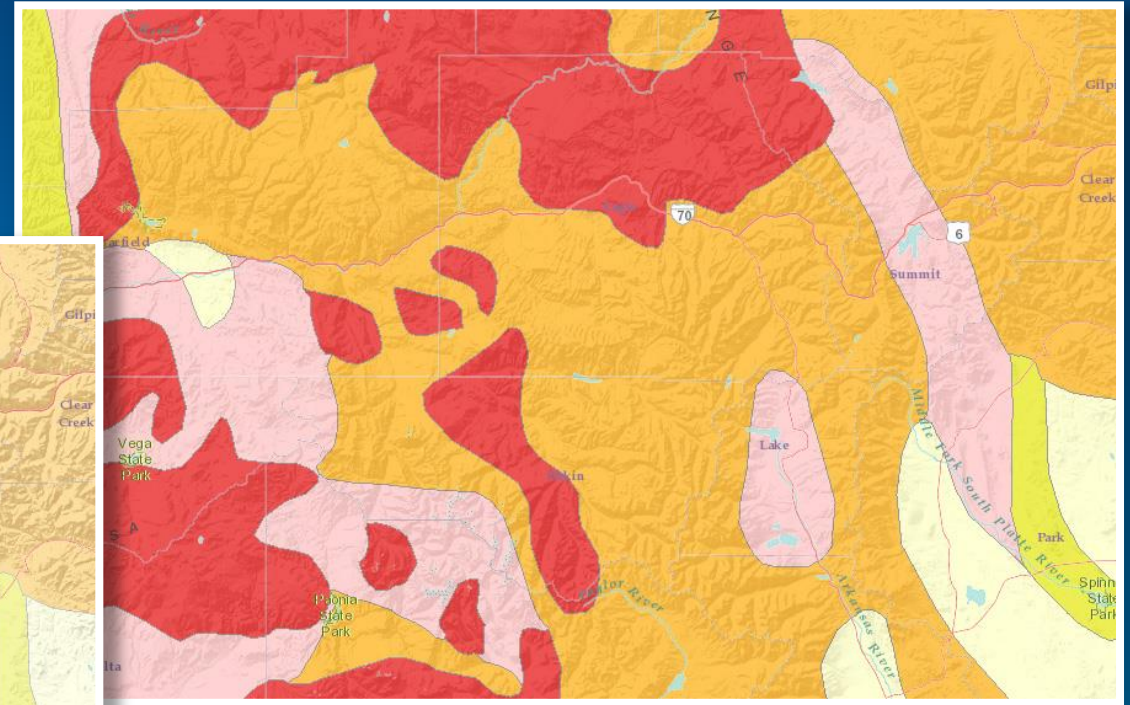
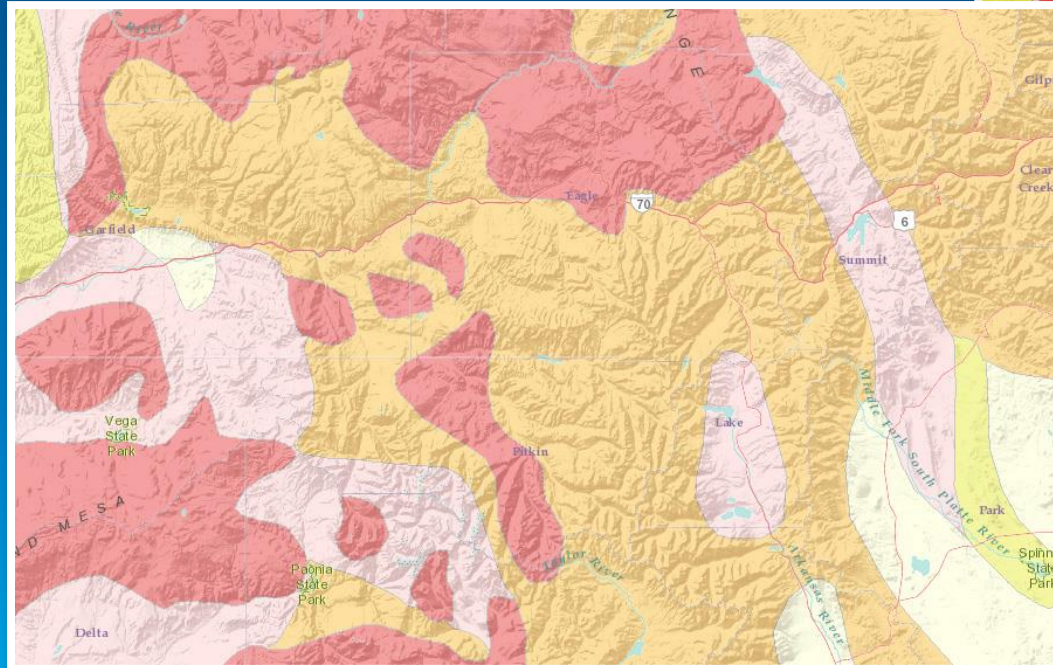
- Most point symbols are OK, but watch for reds and browns
- Consider 'blending' basemaps



Using the Basemap with Polygon Information

Terrain with Labels map: Landslide Susceptibility

- Try to use bright colors, and don't use too many categories



ArcGIS Online Basemap Matrix

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	Street	Oceans	Terrain with labels	
	Imagery with labels/Hybrid			
QUANTITATIVE POINTS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
		Oceans	Terrain with labels	
LINES	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
QUALITATIVE POLYGONS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
			Terrain with labels	
QUANTITATIVE POLYGONS	Imagery with labels/Hybrid	Oceans	Light Gray Canvas...	Dark Gray Canvas



Low Content and High Saturation

Andy Skinner

LOW CONTENT
HIGH SATURATION

QUALITATIVE
POINTS

Dark Gray Canvas

QUANTITATIVE
POINTS

Dark Gray Canvas

LINES

Dark Gray Canvas

QUALITATIVE
POLYGONS

Dark Gray Canvas

QUANTITATIVE
POLYGONS

Dark Gray Canvas

Dark Gray Canvas Map

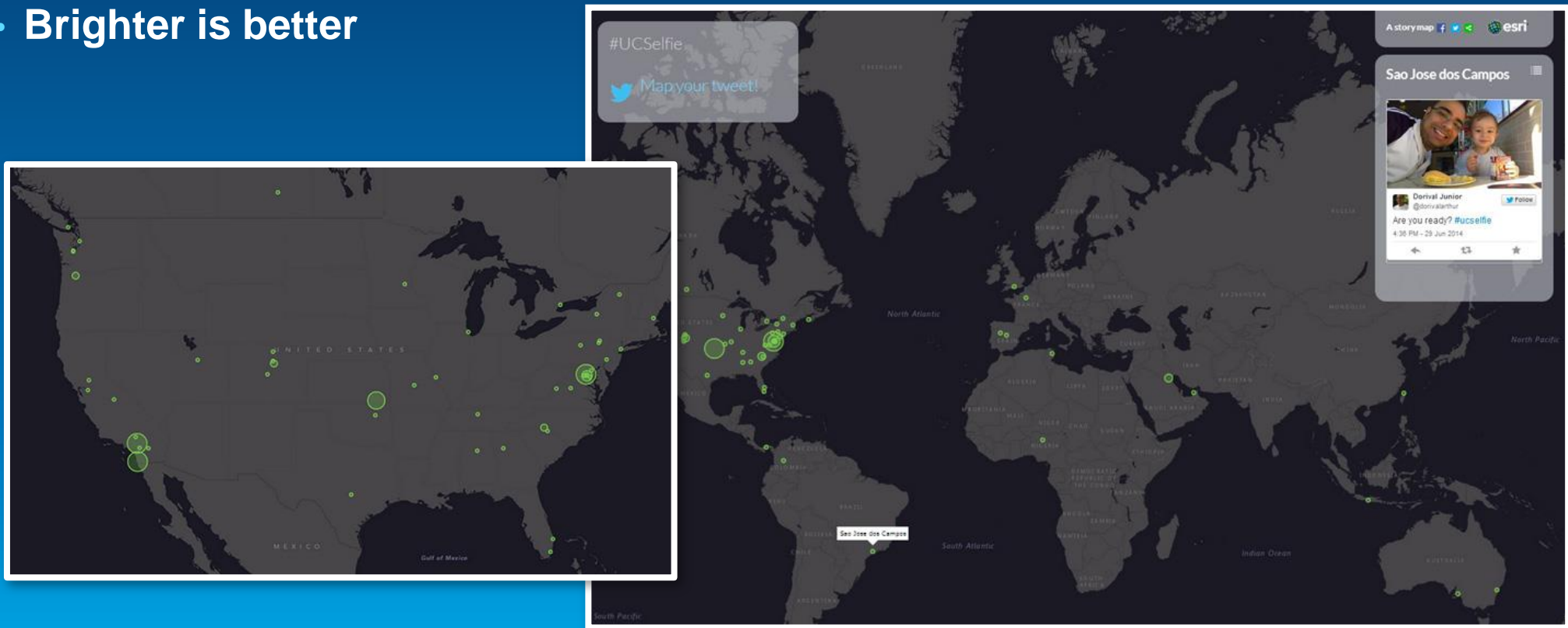
- Dark base, good for ‘high impact’ maps in the right circumstances
- Same ‘stripped down’ content as the Light Gray Canvas Map



Using the Basemap with Point Information

Dark Gray Canvas map: UC Selfie map

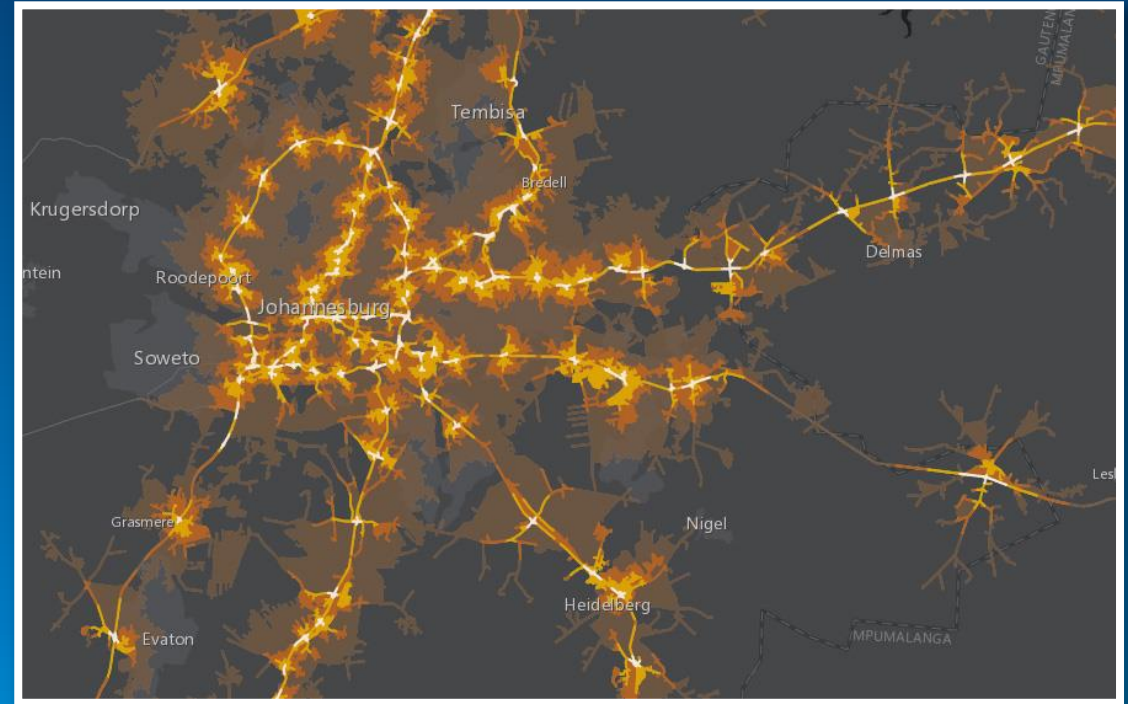
- No color problems (unless you want to use a dark gray or black!)
- Brighter is better



Using the Basemap with Line Information

Dark Gray Canvas Map: Urban Observatory: Highway Access map

- No color issues, but use bright colors...
- ... and use a gradient from dark for weak to bright for strong values



Dark Gray Canvas Map

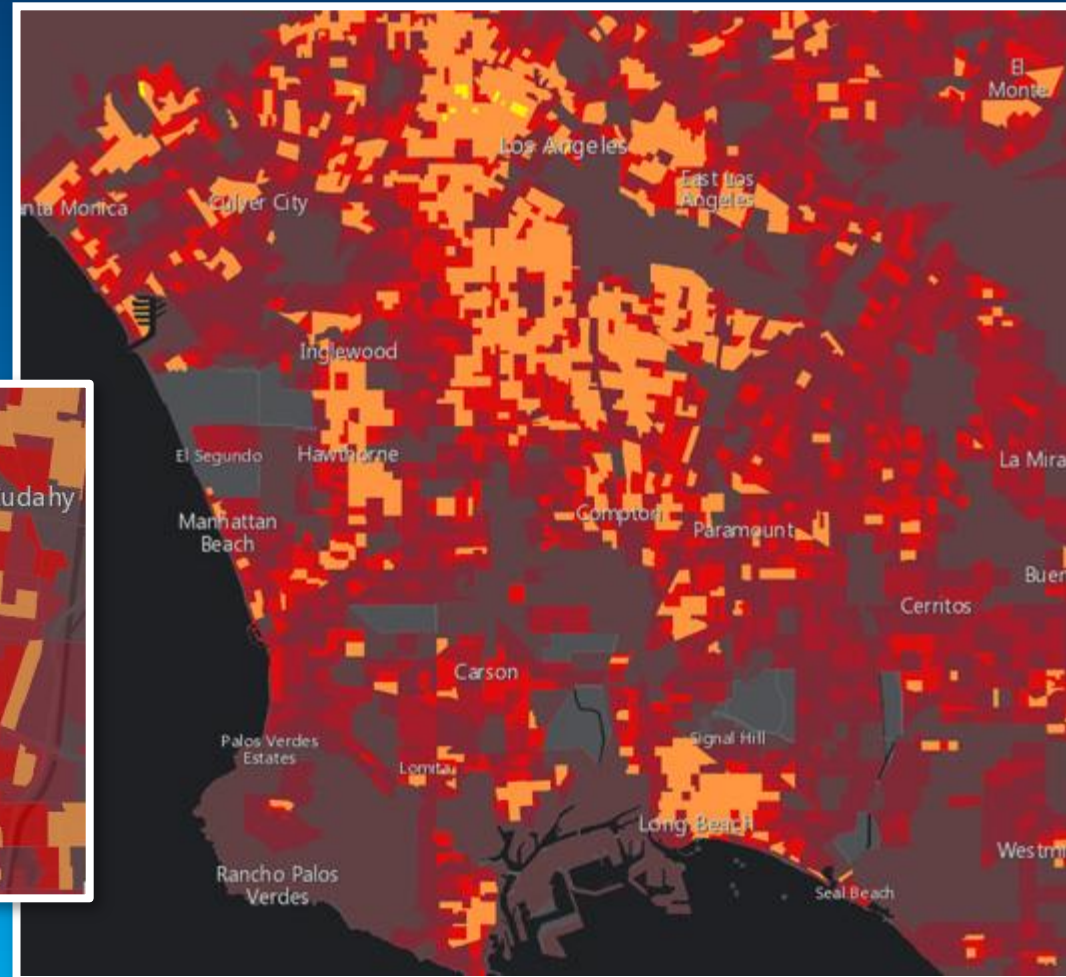
Dark Gray Canvas map: Rio de Janeiro Population Density



Dark Gray Canvas Map

Urban Observatory: Los Angeles Population Density

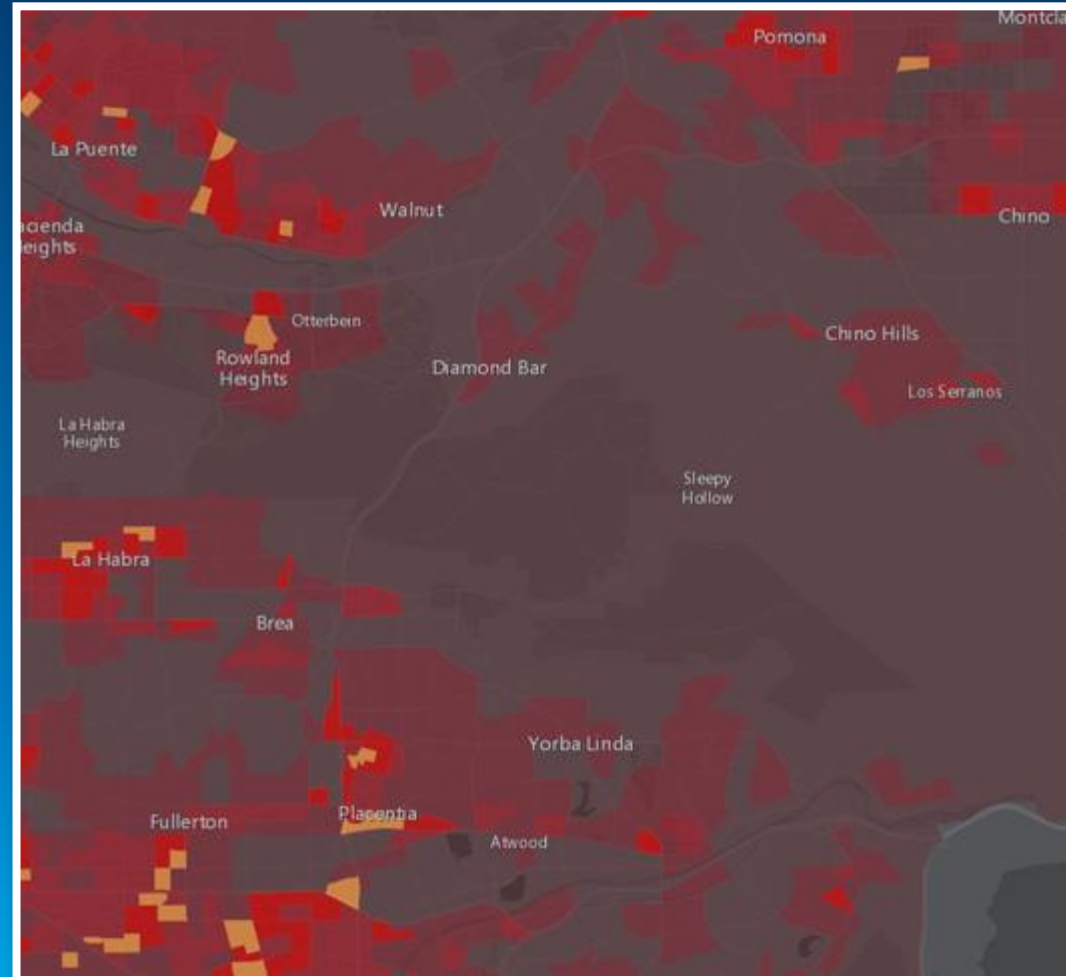
- **Brighter colors represent the highest population density**
- **Darker colors represent the lowest population density**



Dark Gray Canvas Map

Urban Observatory: Los Angeles Population Density

- Be careful with your use of transparency
- Watch for the effect of detail coming through from the basemap
- Make sure that your categories are distinctive



ArcGIS Online Basemap Matrix

	HIGH CONTENT HIGH SATURATION	HIGH CONTENT MEDIUM SATURATION	LOW CONTENT LOW SATURATION	LOW CONTENT HIGH SATURATION
QUALITATIVE POINTS	National Geographic	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
	Imagery with labels/Hybrid			
QUANTITATIVE POINTS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
		Oceans	Terrain with labels	
LINES	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
	Street	Oceans	Terrain with labels	
QUALITATIVE POLYGONS	Imagery with labels/Hybrid	Topographic	Light Gray Canvas	Dark Gray Canvas
			Terrain with labels	
QUANTITATIVE POLYGONS	Imagery with labels/Hybrid	Oceans	Light Gray Canvas...	Dark Gray Canvas



Using any map service as a basemap

- **“Add > Search for Layers” – basemaps that are shared**
- **Adding your basemap directly from the service (“Add Layer from Web”)**
- **Add a basemap on top of another basemap**

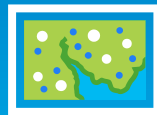
Checklist for the creation of your own basemap

- **Data checklist: format, projection, data processing QA, etc.**
- **Design for the target GIS map application**
- **It should be designed for adding/working with operational layers**
- **Design for a multi-scale basemap in ArcMap**
- **Toggle on/off layers from your basemap**

Conclusion

Choosing the best basemap for your Map or App

- **Know the type of data you are mapping**
 - **Points, Lines, and/or Polygons**
 - **Qualitative or Quantitative**
- **Know your subject, geographic area and scales of your data**



Conclusion

Choosing the best basemap for your Map or App

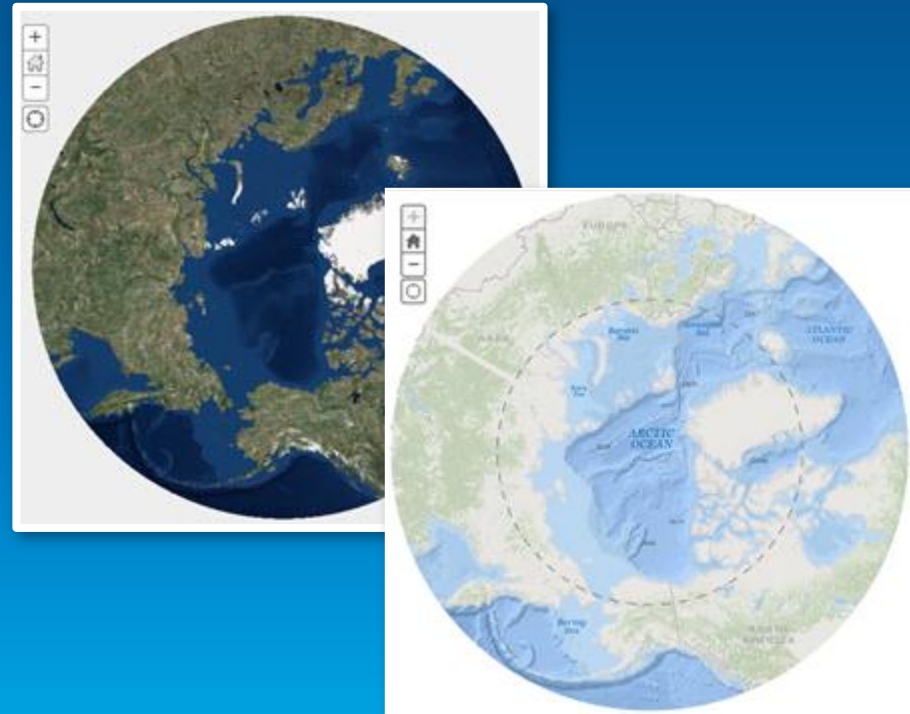
- Know the type of data you are mapping
 - Points, Lines, and/or Polygons
 - Qualitative or Quantitative
- Know your subject, geographic area and scales of your data
- Refer to the matrix to narrow basemap choices
- Decide on the geography and scales of the basemap
- Decide on the content to support the purpose of your map



Basemap Road Ahead

What to expect from ArcGIS.com

- Dark Gray Canvas
- Imagery Hybrid
- Arctic Imagery
- Arctic Oceans



Basemap Road Ahead

What to expect from ArcGIS.com

- Updates to content



Basemap Road Ahead

What to expect from ArcGIS.com

- Updates to content

- Expansion at large scale



Basemap Road Ahead

What to expect from ArcGIS.com

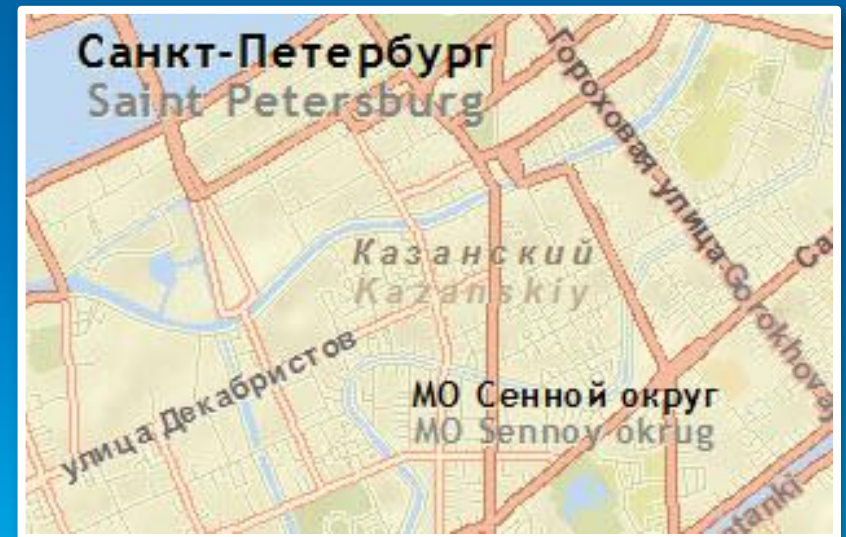
- Updates to content
- Expansion at large scale
- Expand use of Community data



Basemap Road Ahead

What to expect from ArcGIS.com

- Updates to content
- Expansion at large scale
- Expand use of Community data
- Dual Language



Basemap Road Ahead

What to expect from ArcGIS.com

- Updates to content
- Expansion at large scale
- Expand use of Community data
- Dual Language



- Living Atlas of the World

Additional Resources...

Related Technical Workshops and Demo Theater sessions

- **Web Mapping: Finding The Balance Between Simplicity and Interactivity**
- **Designing and Using Cached Map Services**
- **Making Beautiful Maps**
- **Rethinking How You Style Your Web Maps**
- **Best Practices for Map Design**
- **Designing Great Maps for Web and Mobile**

- **Authoring Great Web Maps (Demo Theater)**
- **Best Practices for Authoring Maps for Field Use (Demo Theater)**
- **Cartography: Make Maps That Make Sense (Demo Theater)**

- **ArcGIS Online: An Introduction to the Living Atlas**
- **Content for ArcGIS: The Road Ahead**

Thank you...

Choosing The Best ArcGIS Online Basemap for Your Maps and Apps

- Please fill out the session survey:

First Offering ID: 1212

Second Offering ID: 1320

Online – www.esri.com/ucsessionsurveys

Paper – pick up and put in drop box



Understanding our world.