# Selecting the Perfect Basemap

JESSICA ACOSTA, ANDREW GREEN, ANDY SKINNER

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# Introduction

ANDREW GREEN

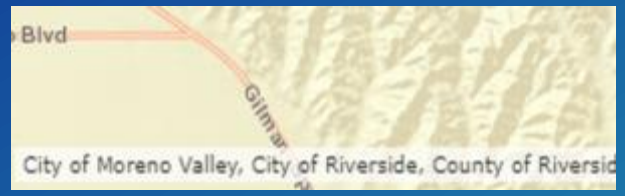
# Workshop Outline

- Goal:
  - Maximize the presentation of your maps & apps…
    beginning with the selection of the best basemap for your data
- Basemap overview
  - Raster options & “New” Vector basemaps
- Selection criteria matrix
- Evaluation & examples

# Terms

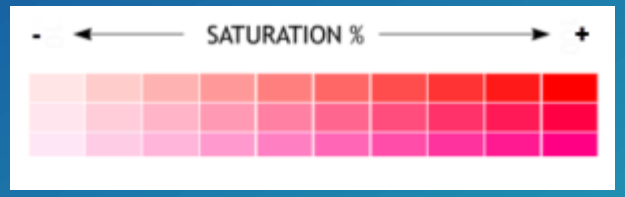
- Scale Levels


- Content

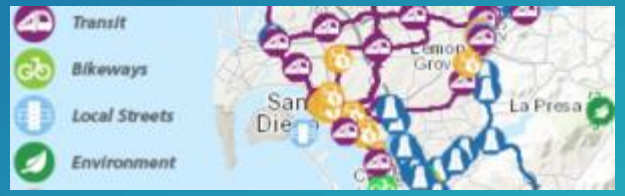



- Multi-Scale


- Saturation




- Qualitative

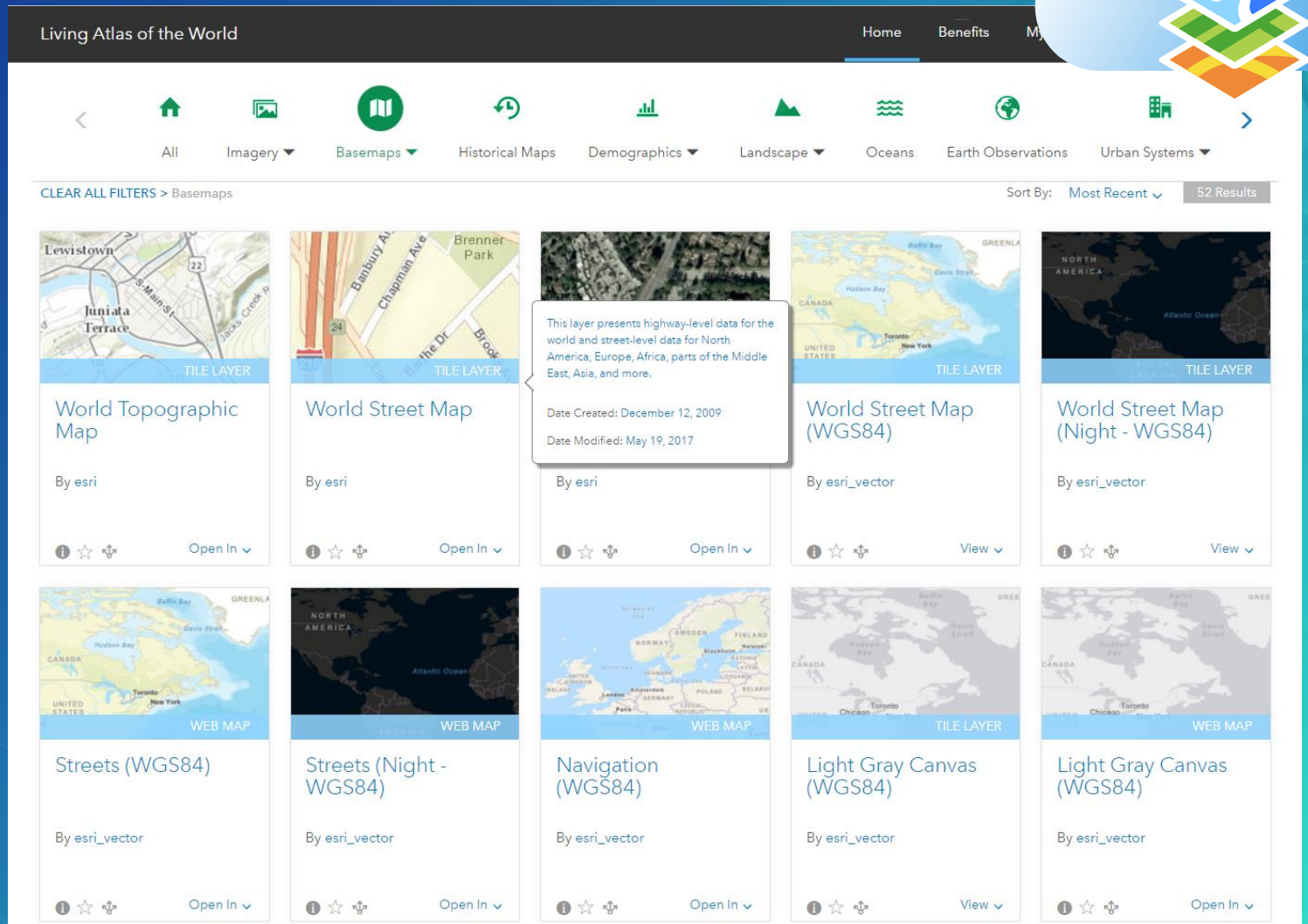



- Quantitative

# Living Atlas of the World

## Basemaps provide a foundation to your web maps and applications

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

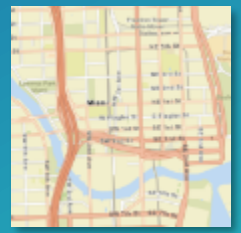


# Basemaps

- Street Map
- Topographic Map
- Light Gray Canvas
- Dark Gray Canvas
- Terrain with Labels
- Imagery (w/ Labels)
- National Geographic
- Ocean Basemap
- Shaded Relief
- Physical
- Streets with Relief
- Streets at Night
- Navigation Map
- Imagery Hybrid
- Other & User Generated









# ArcGIS Online Basemap Matrix

| | HIGH CONTENT HIGH SATURATION | HIGH CONTENT MEDIUM SATURATION | LOW CONTENT LOW SATURATION | LOW CONTENT HIGH SATURATION |
|---|---|---|---|---|
| QUALITATIVE POINTS | Street Map<br>Street Map Night<br>Imagery Hybrid<br>National Geographic | Topographic Map<br>Navigation<br>Oceans | Light Gray Canvas<br>Terrain with labels | Dark Gray Canvas |
| QUANTITATIVE POINTS | Imagery Hybrid | Topographic Map<br>Navigation<br>Oceans | Light Gray Canvas<br>Terrain with labels | Dark Gray Canvas |
| LINES | Street Map<br>Imagery Hybrid | Topographic Map<br>Navigation<br>Oceans | Light Gray Canvas<br>Terrain with labels | Dark Gray Canvas |
| QUALITATIVE POLYGONS | Imagery Hybrid | Topographic Map | Light Gray Canvas<br>Terrain with labels | Dark Gray Canvas |
| QUANTITATIVE POLYGONS | Imagery Hybrid | Oceans | Light Gray Canvas | Dark Gray Canvas |

# Which Basemap?

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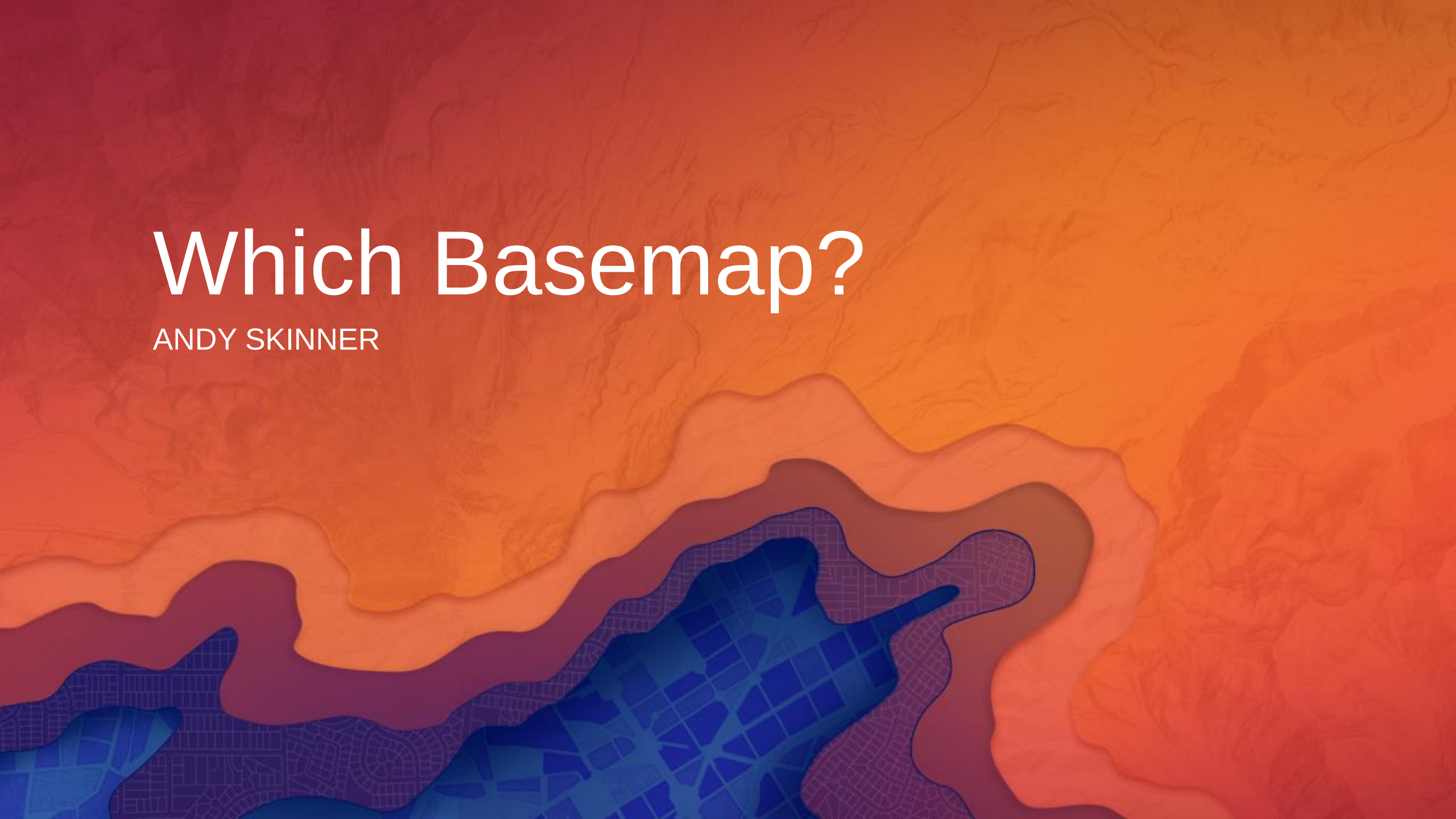


# Which Basemap?

- Cached or Vector Tile?

## Vector Tile Basemaps:

- More responsive
- Updated more frequently
- Full coverage at all scales
- Can be loaded into ArcGIS Pro …
- … but cannot be loaded into ArcMap

## Cached Basemaps:

- Can be used in most environments
- Include some basemaps not available in Vector Tile

# Which Basemap?

- Cached or Vector Tile?
- What is your subject?

Water

Recreation

Demographic

Physical

Traffic

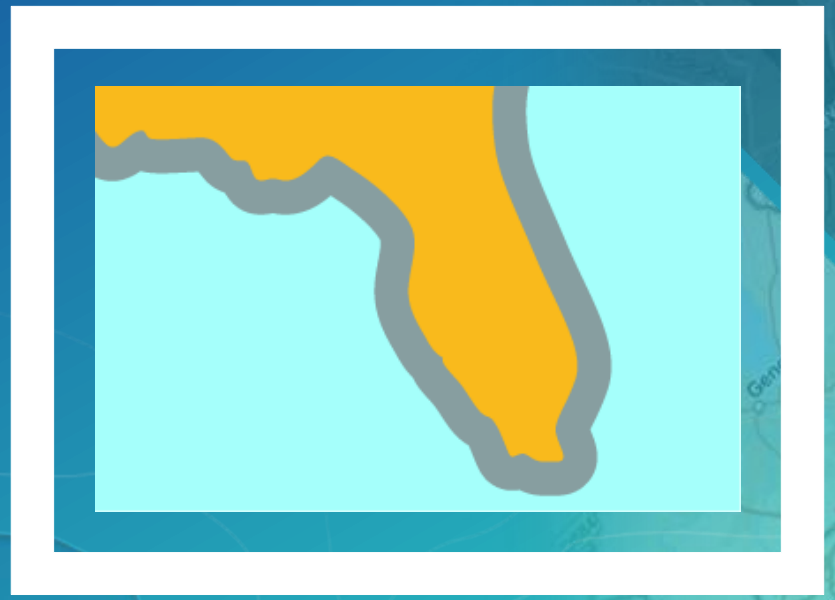
Location

# Which Basemap?

- Cached or Vector Tile?
- What is your subject?
- What kind of data are you using? (Point/Line/Polygon)

# Which Basemap?

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



# Which Basemap?

- Cached or Vector Tile?
- 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?

- Cached or Vector Tile?
- What is your subject?
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- 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?

# Which Basemap?

- Cached or Vector Tile?
- 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

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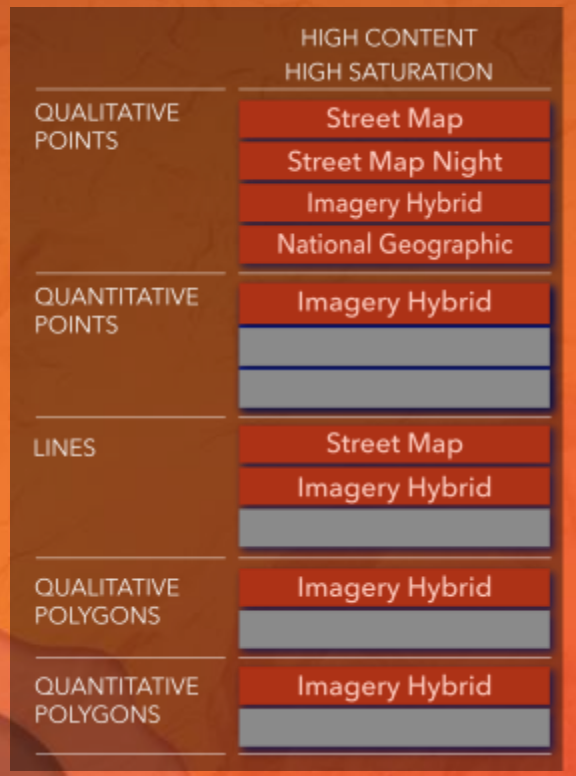
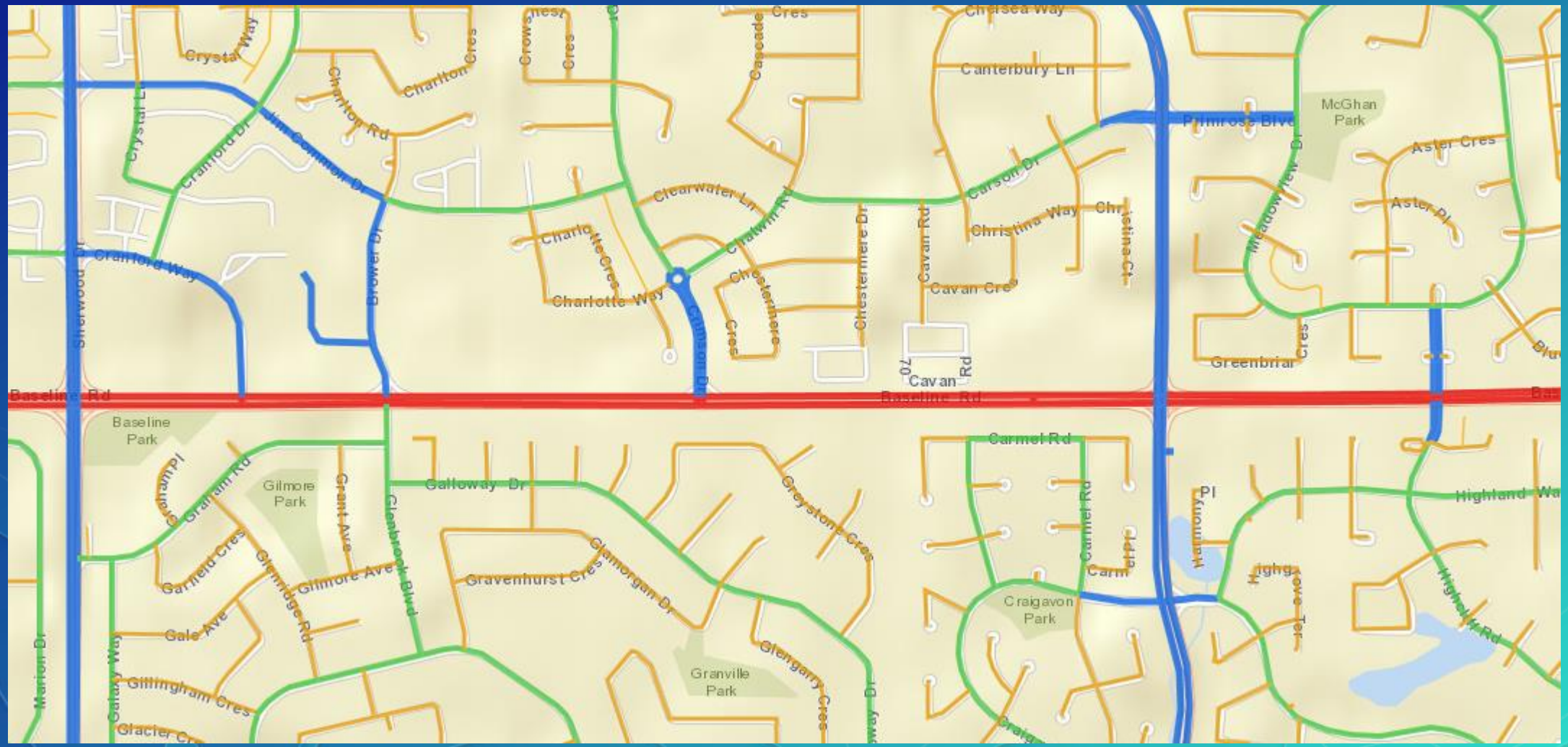


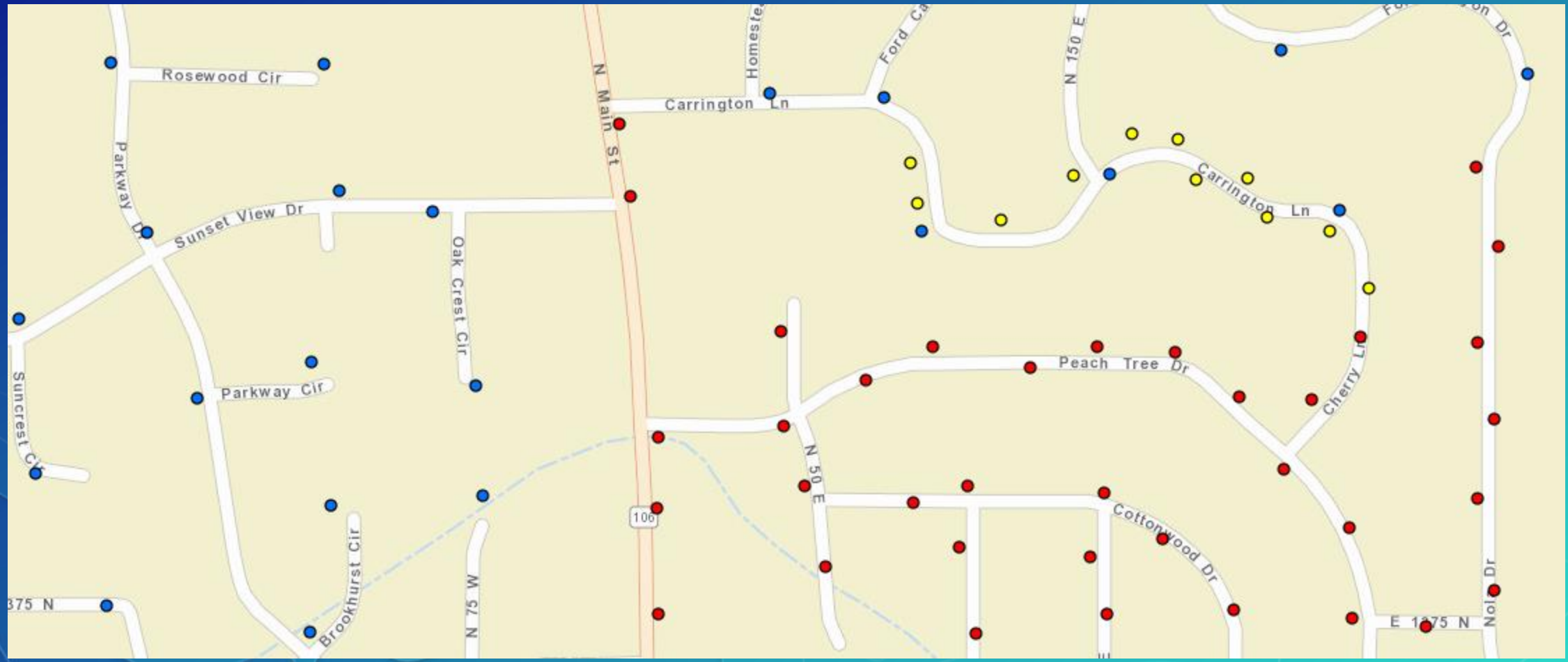
# World Street Map

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

# Strathcona County (Canada) Snow Removal web map



# Centerville City Street Lights web map

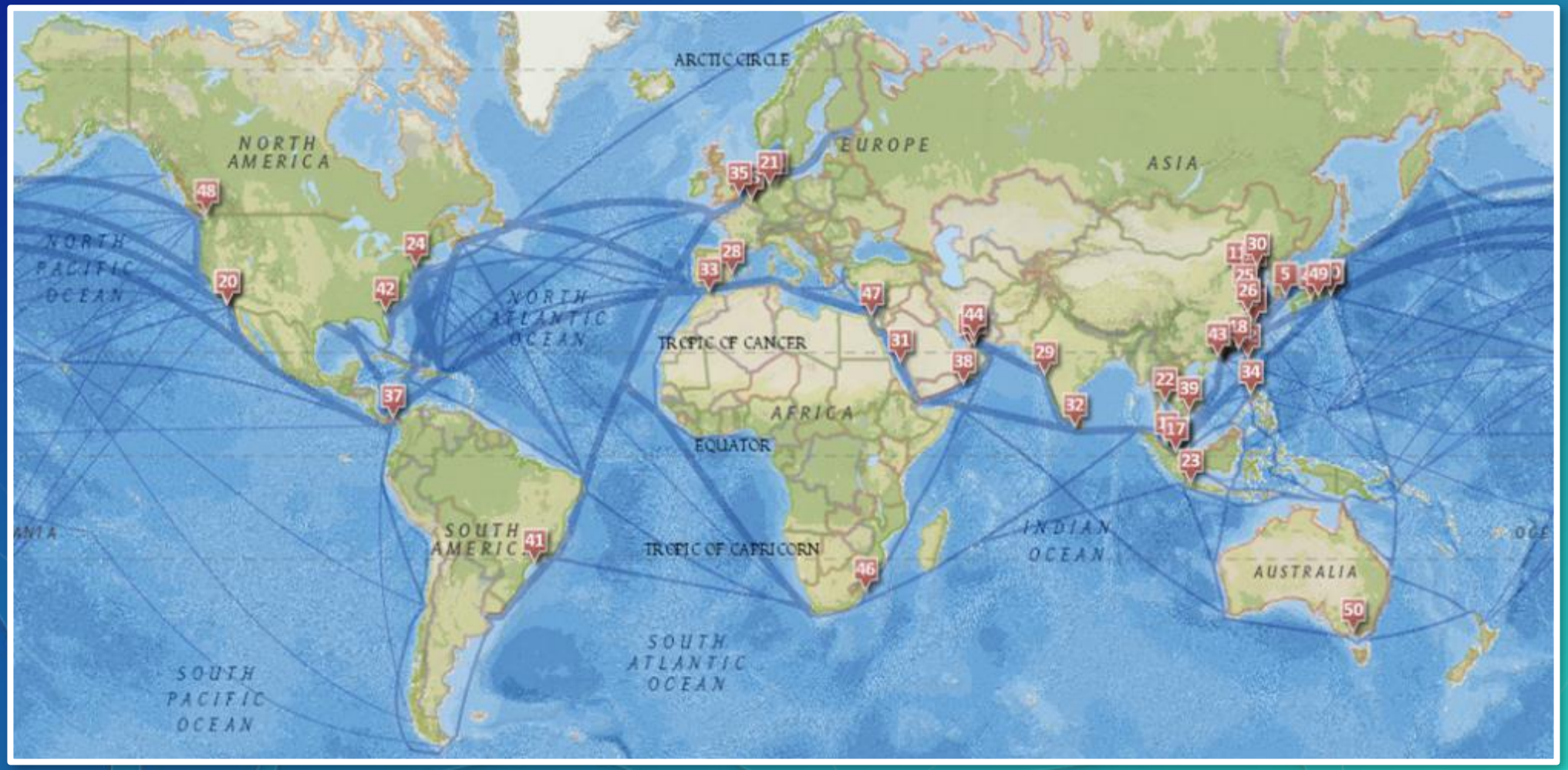


# Hennepin County Transportation web map

# 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

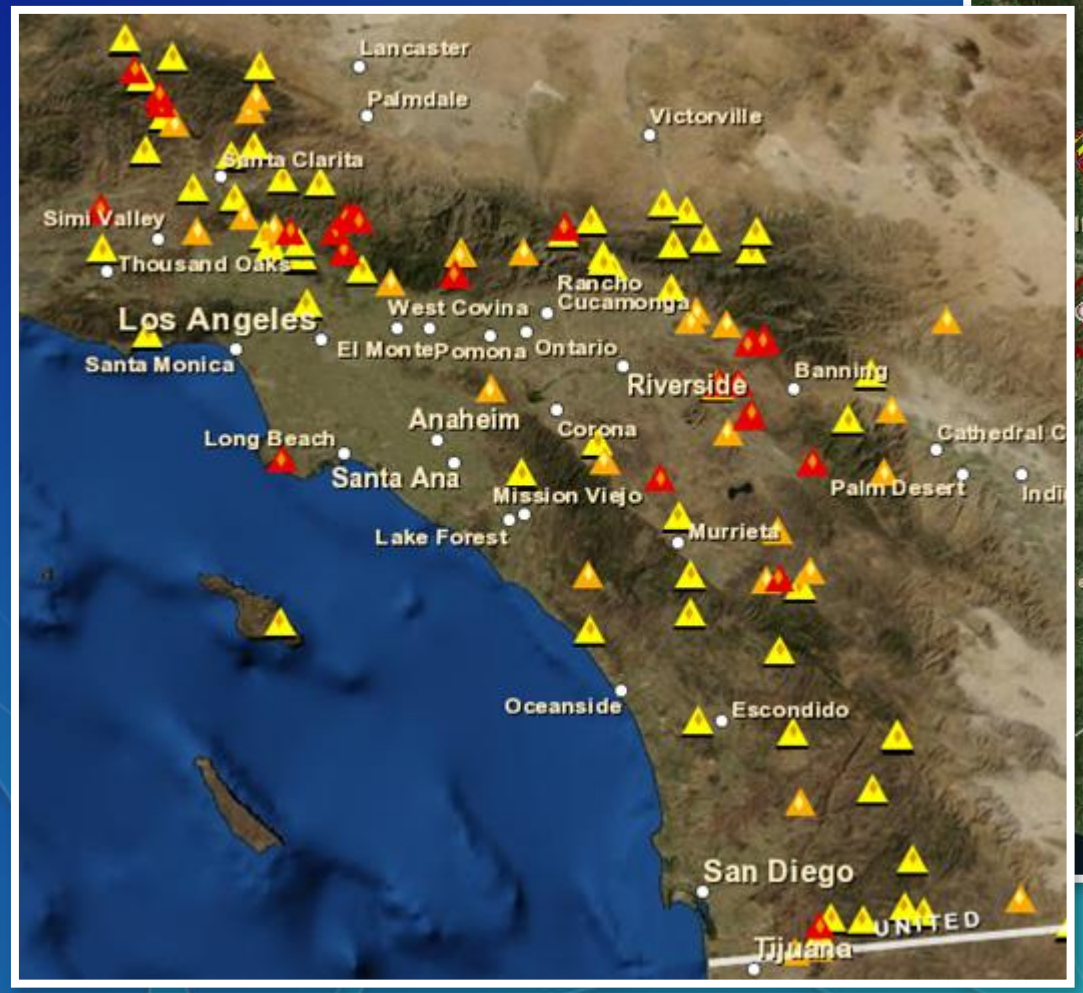


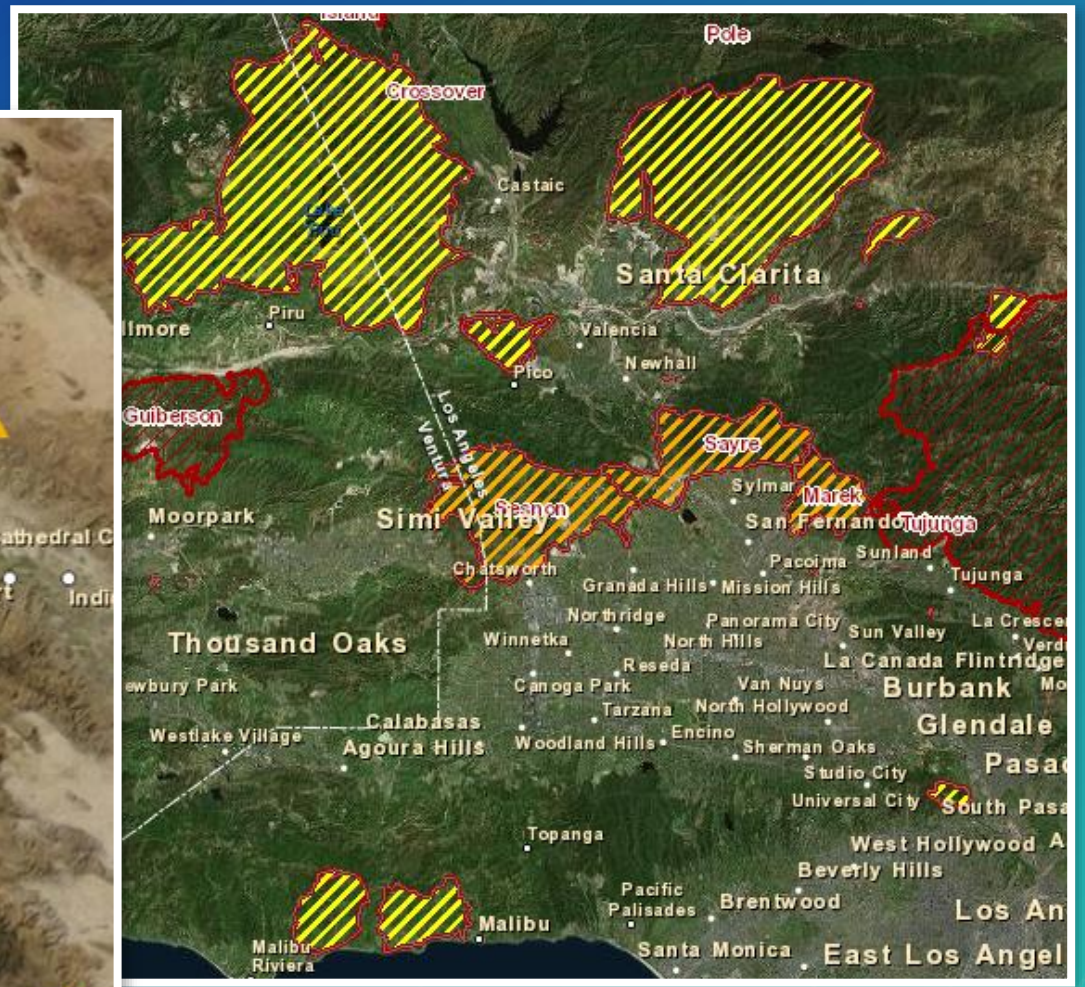
# Mexico's Historical Monuments Story Map

# 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

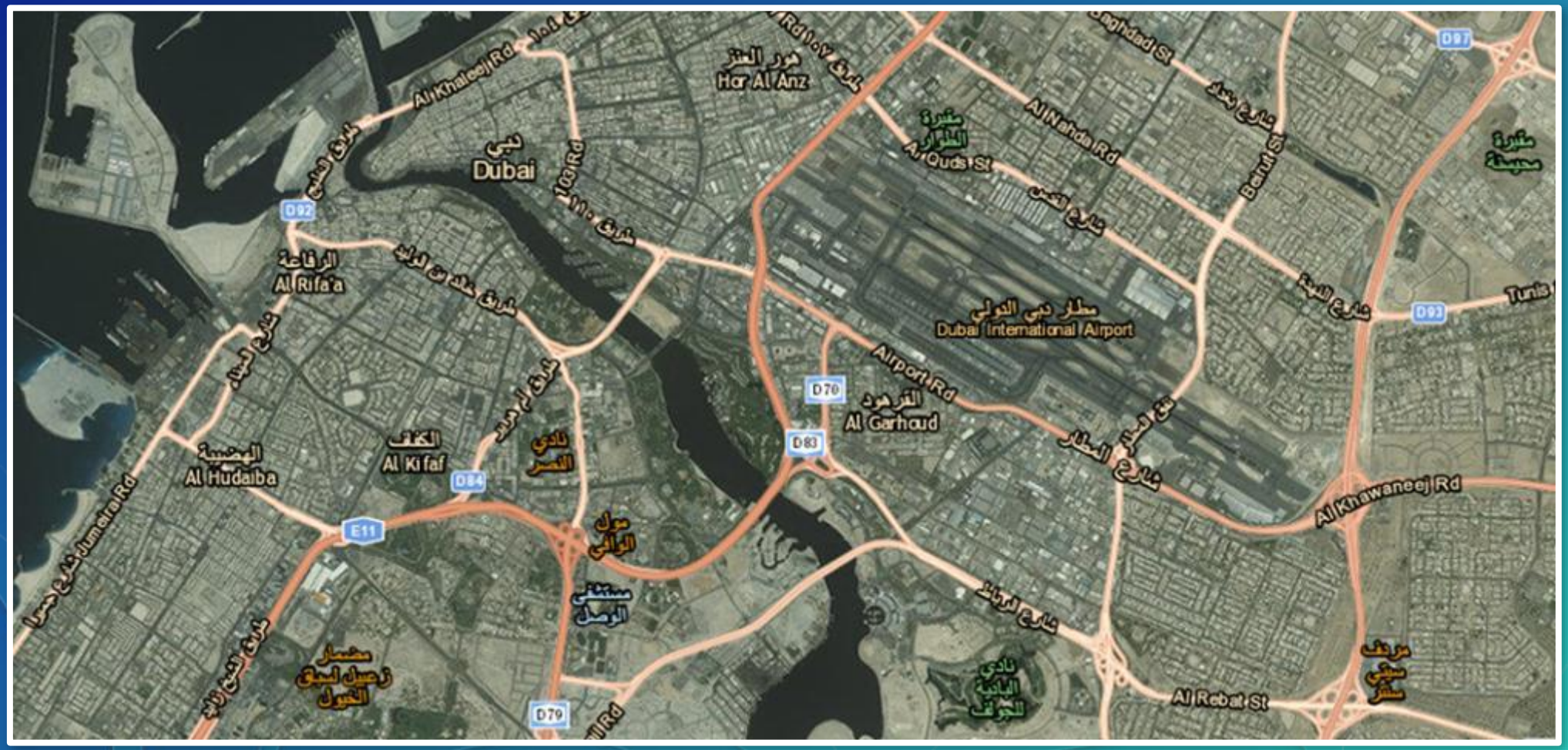
# California Fire History web map



# City of Naples, FL:  Zoning web map

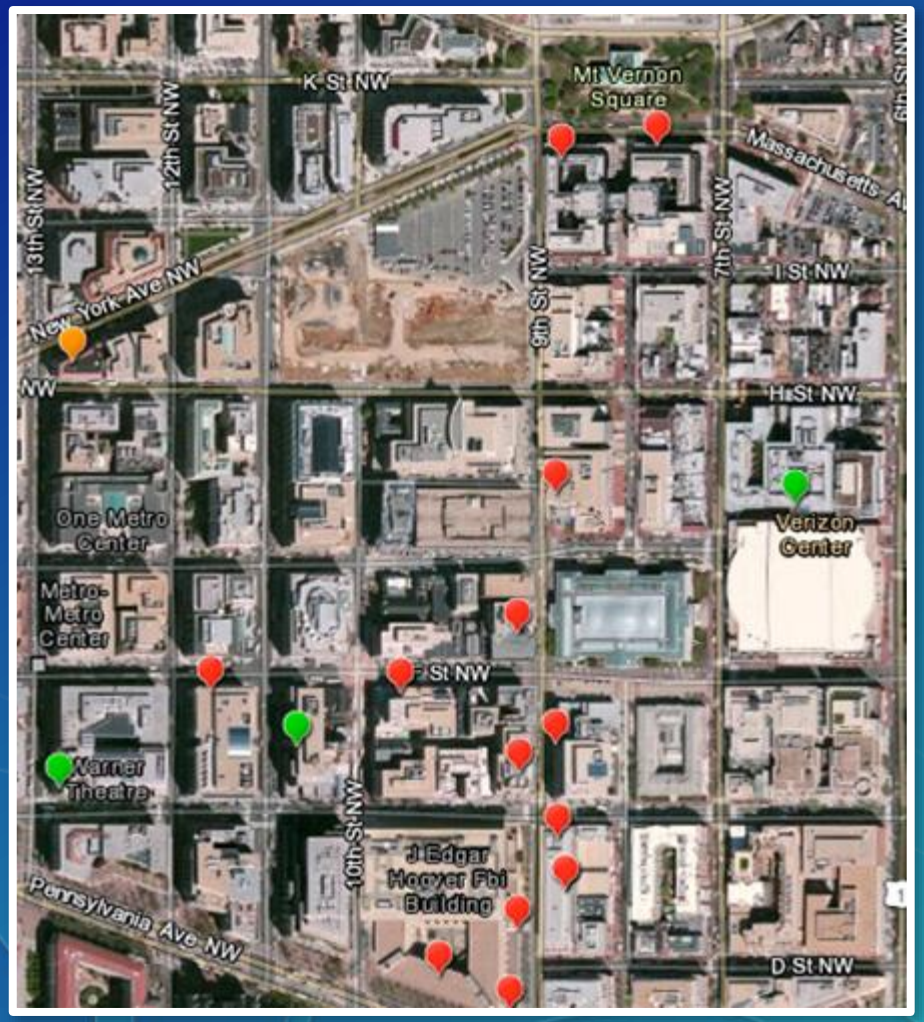
# Imagery with Labels + World Transportation together

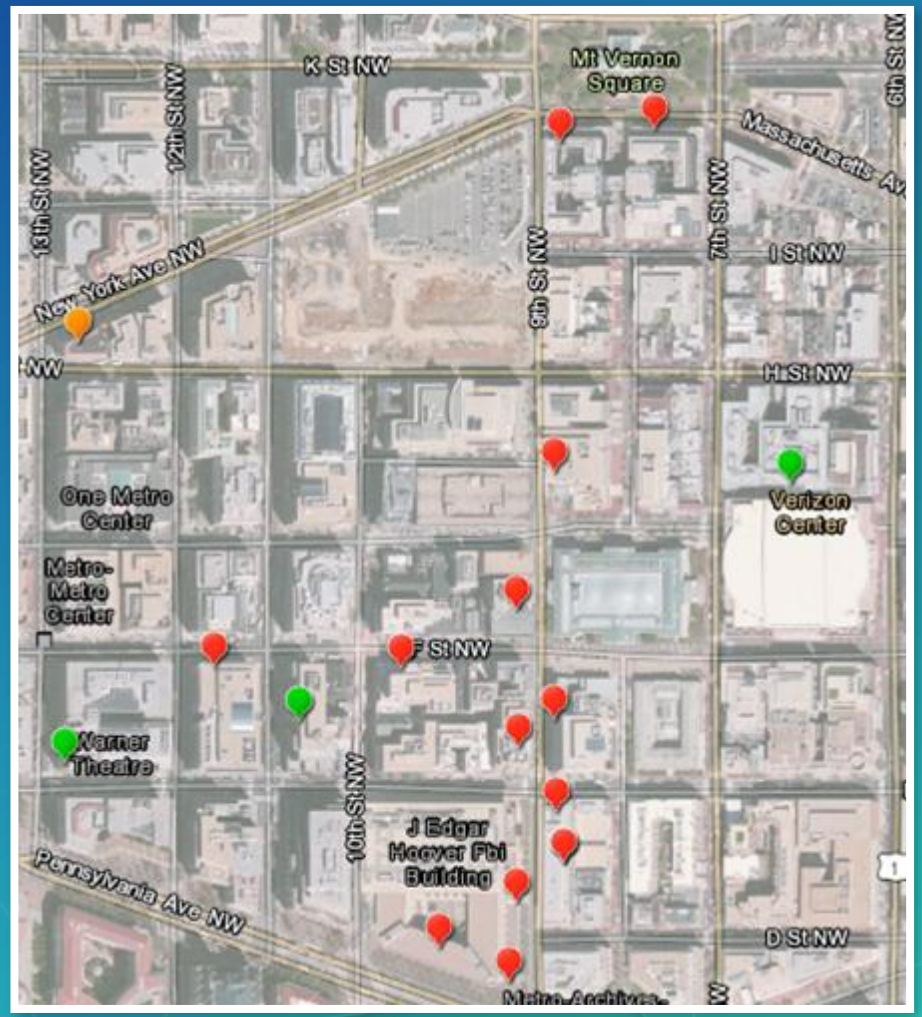


# Hybrid Map

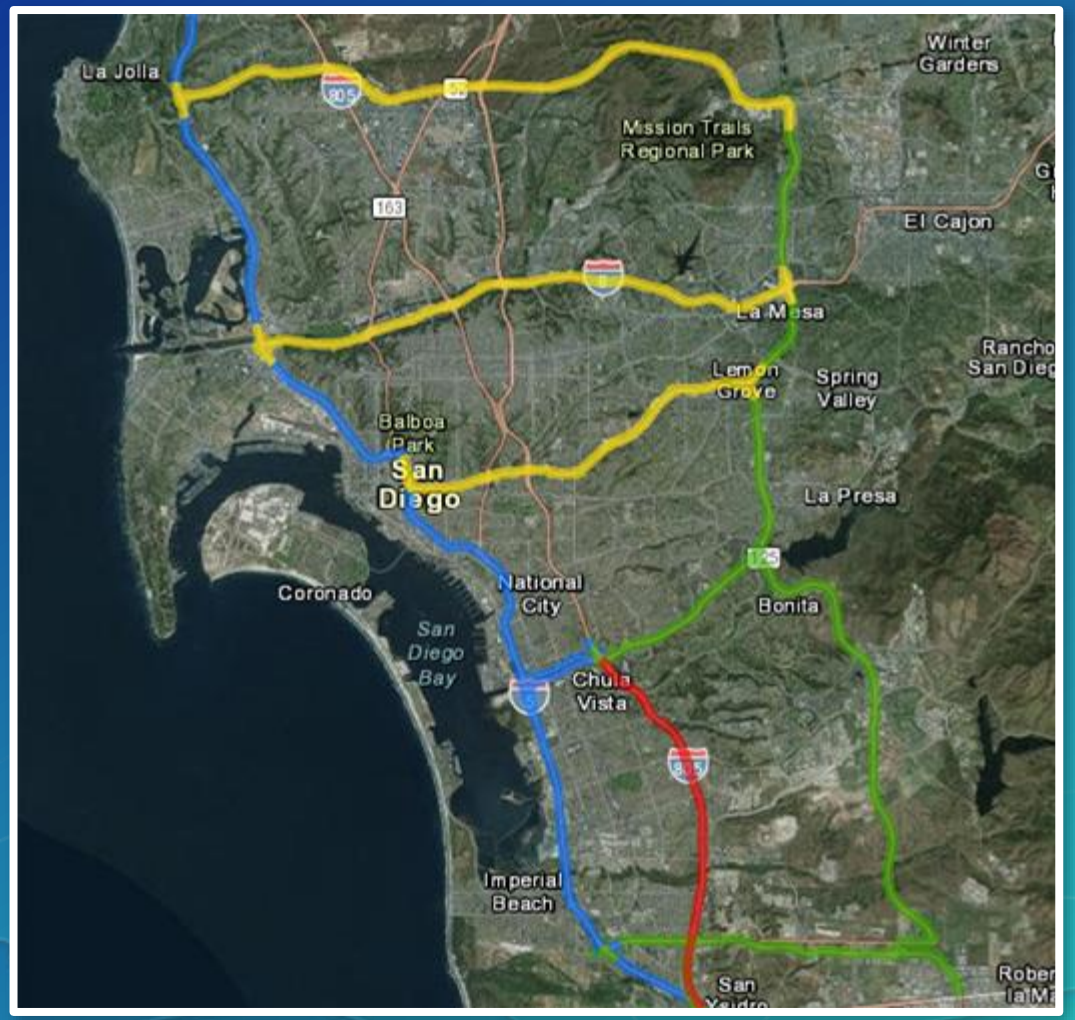
- World Imagery with Labels + World Transportation map services combined
- Updated cartographic design
- Works as a basemap and as a reference map
- Great for point, line, polygon data overlay

# DC Cinema and Theater web map



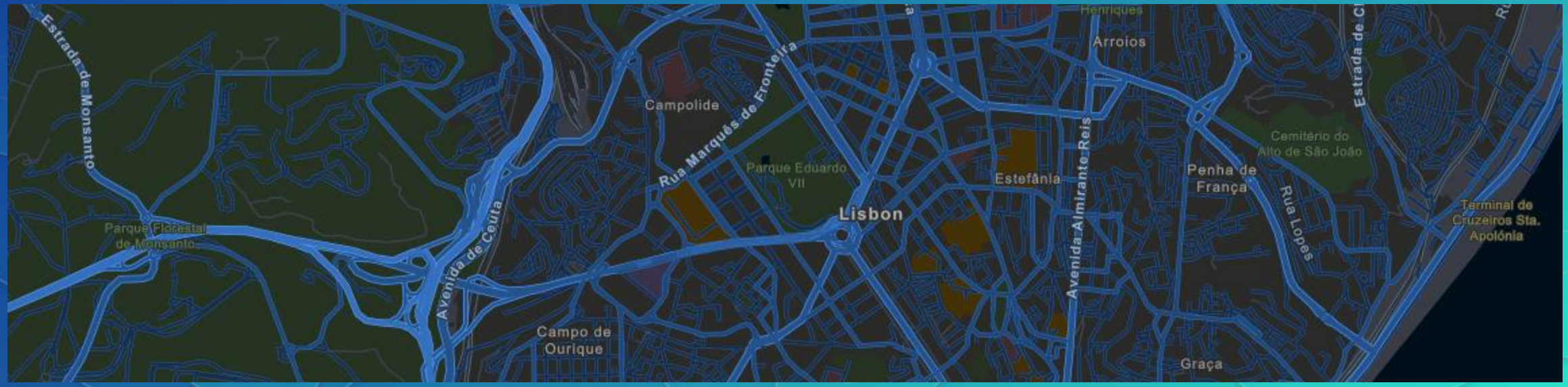



# Interstate 805 Closure, Detours & Alt Routes web map

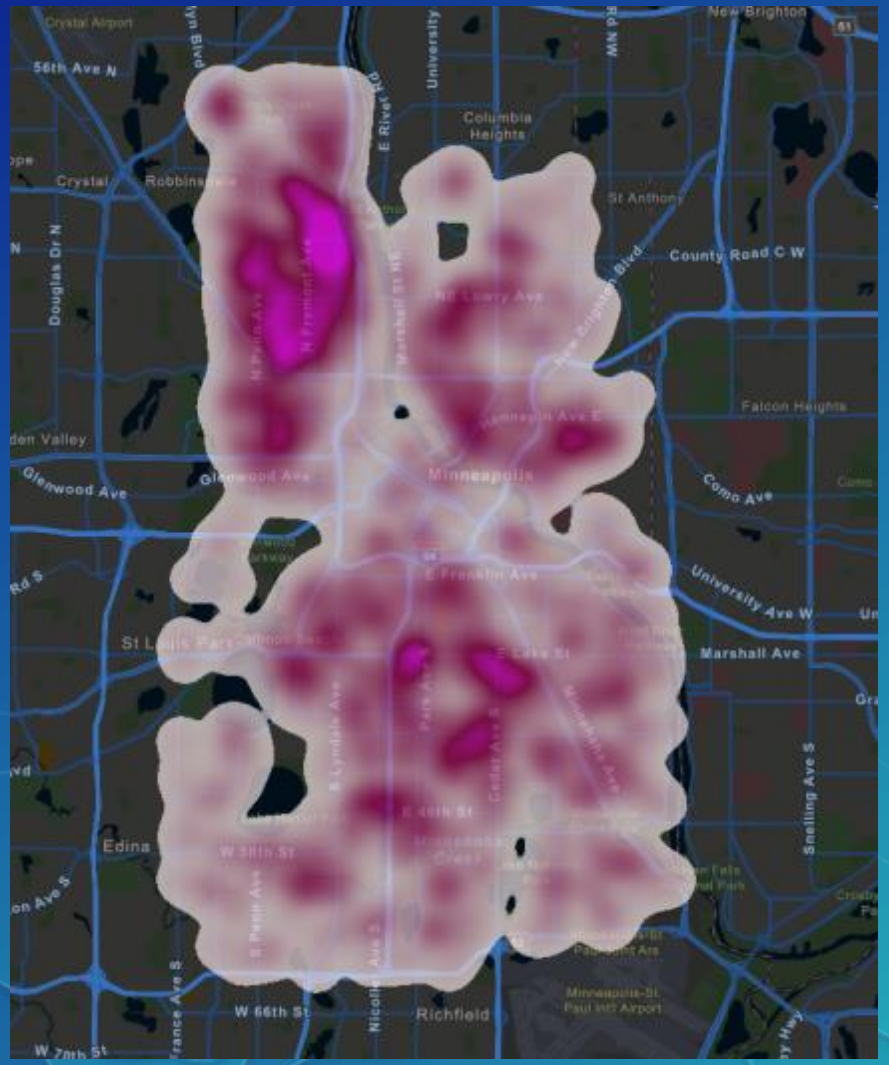


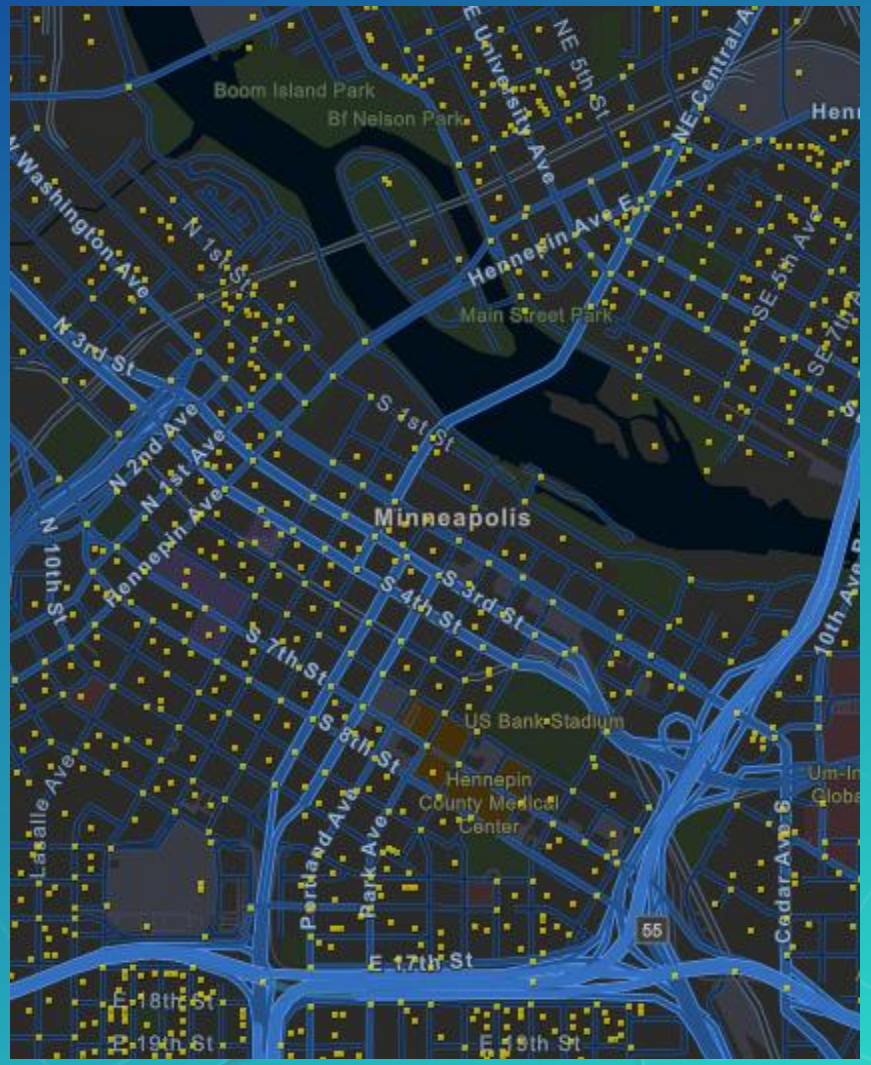
# Street Map Night

- Same content as the World Street Map
- Designed for use at night or low-light environments
- Vector Basemap – customizable; great for high-resolution display
- Works as a basemap and as a reference map



# Minneapolis Public 311 Incidents web map



# High Content and Medium Saturation

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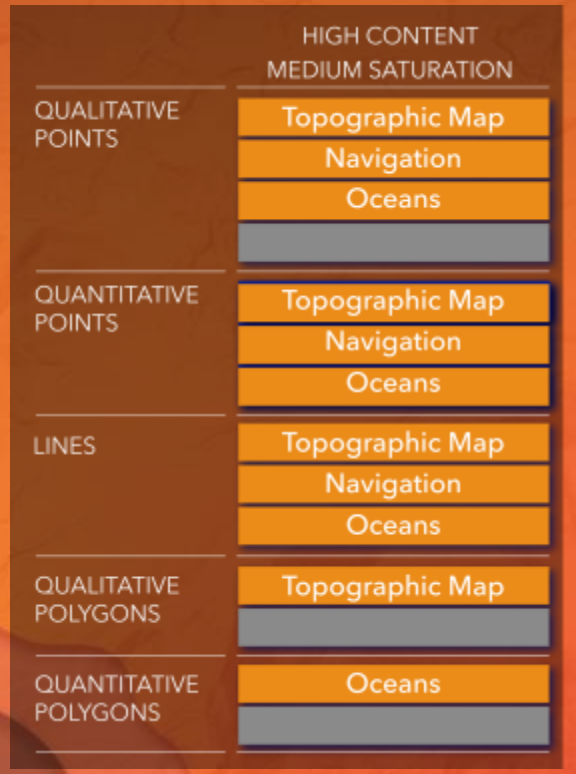
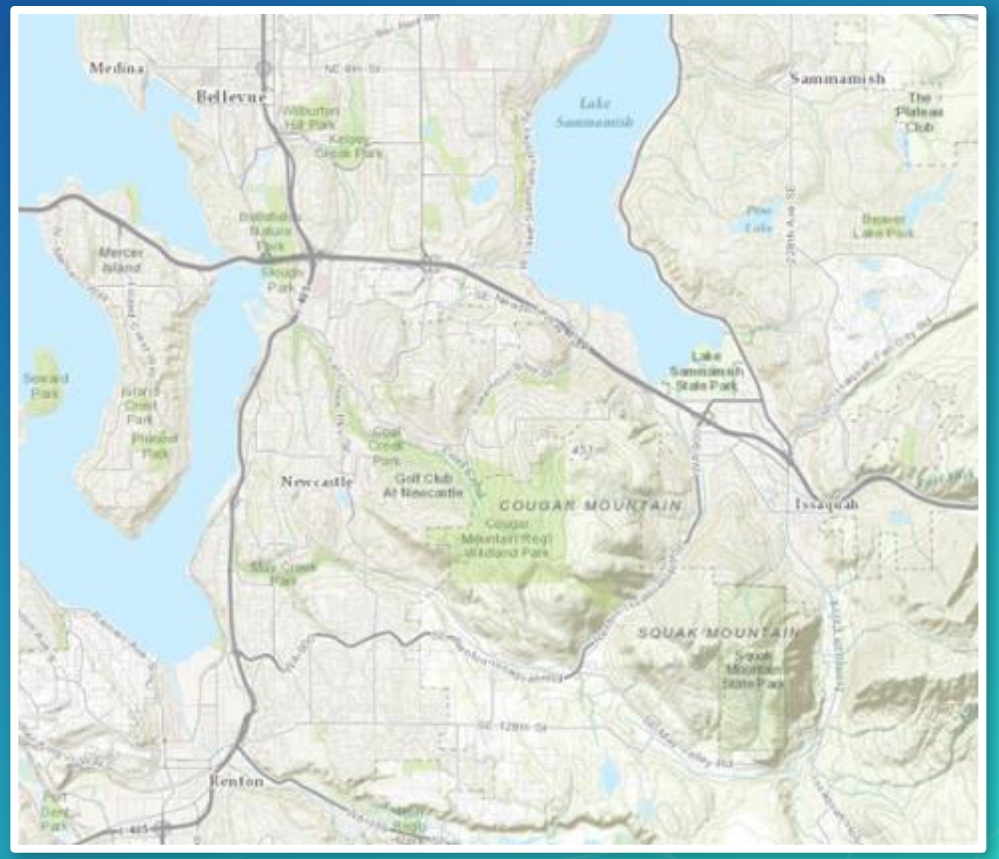


# Topographic Map

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



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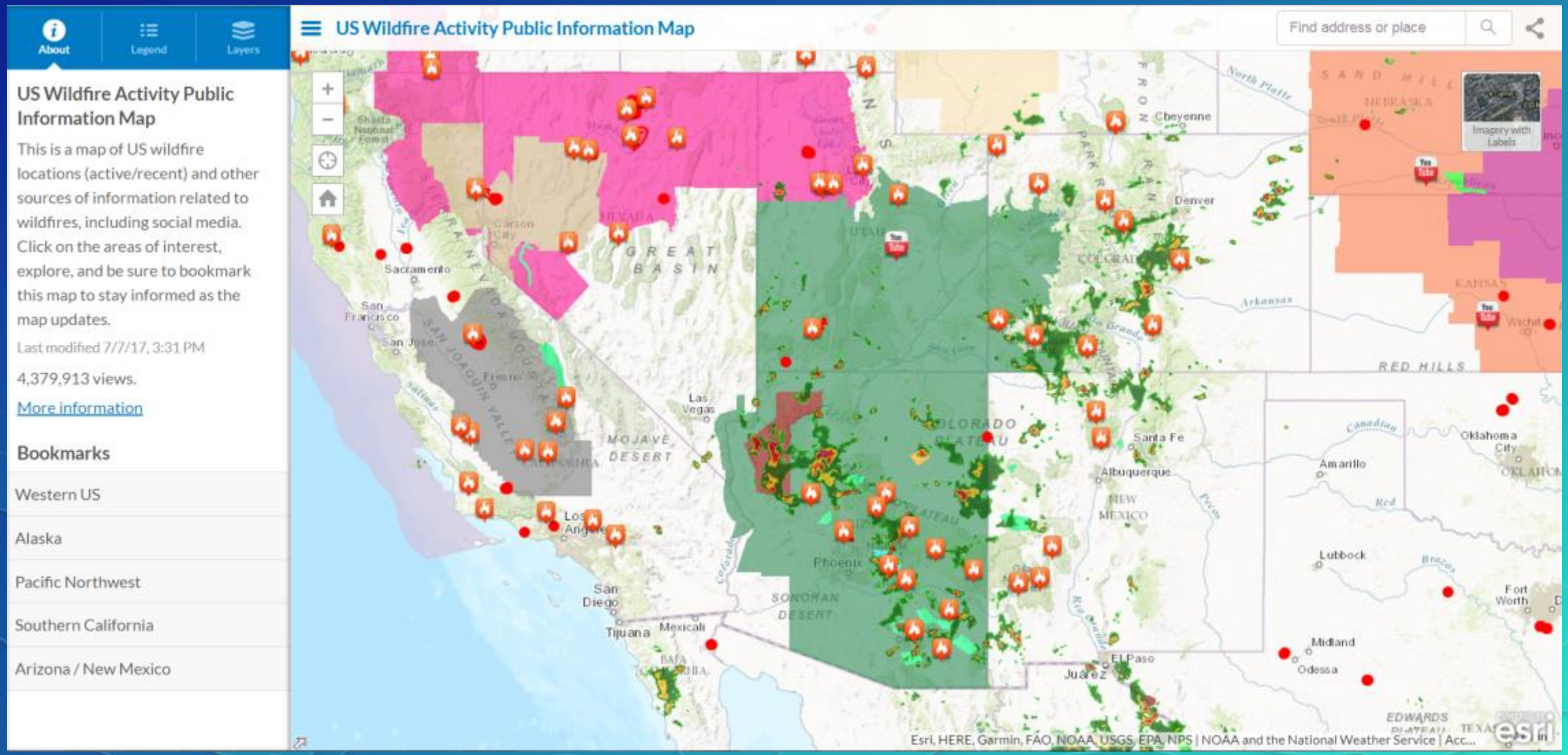
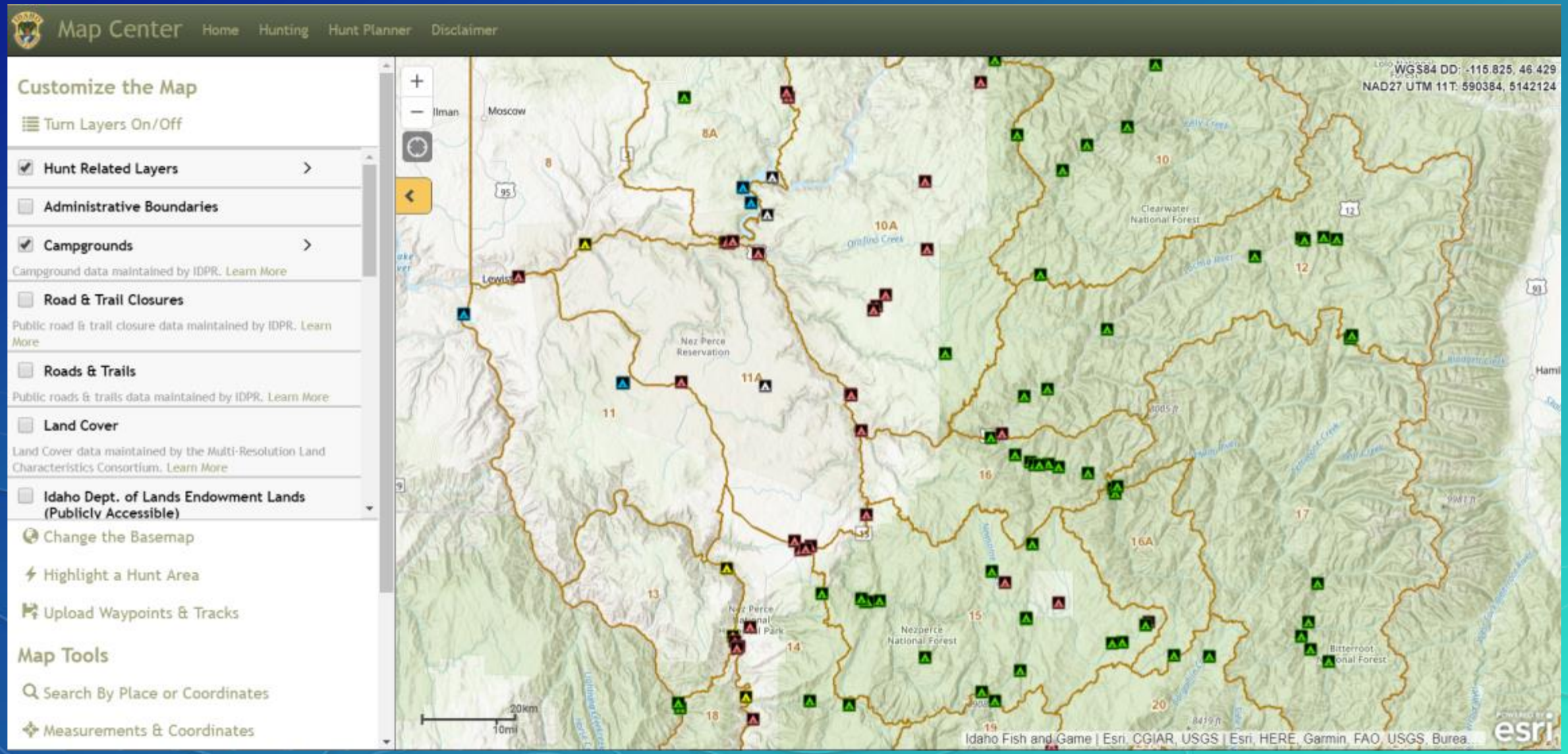


# Topographic Map



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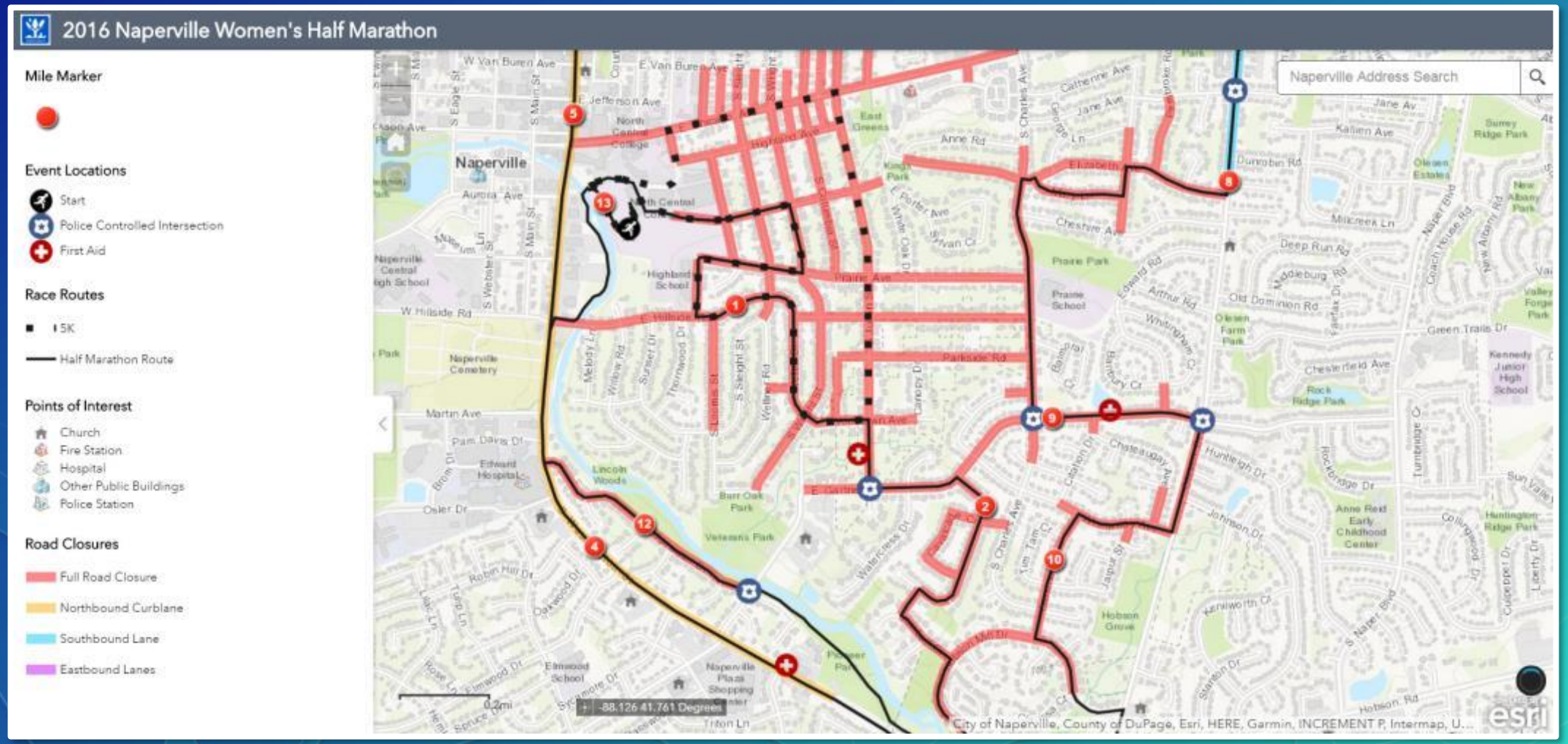

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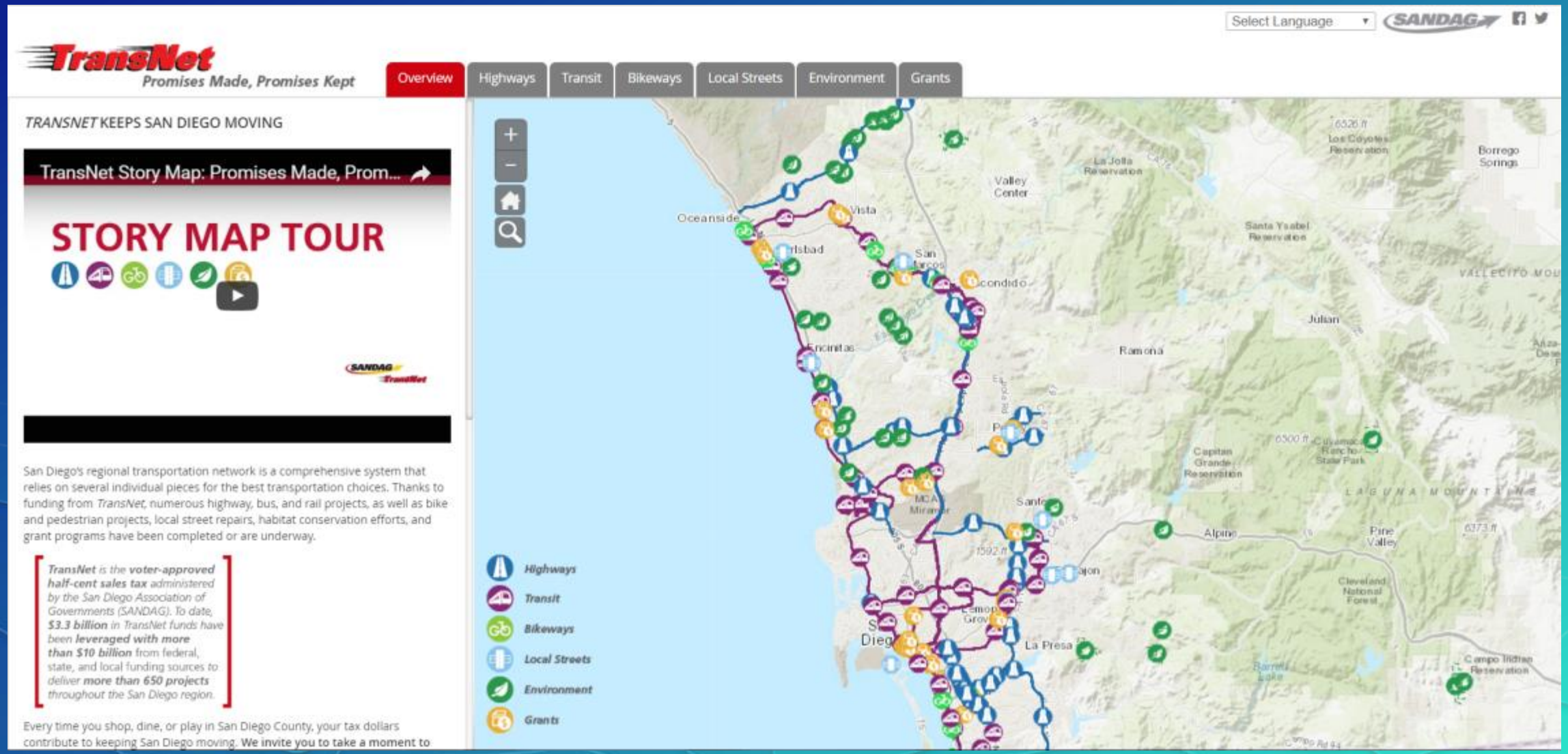

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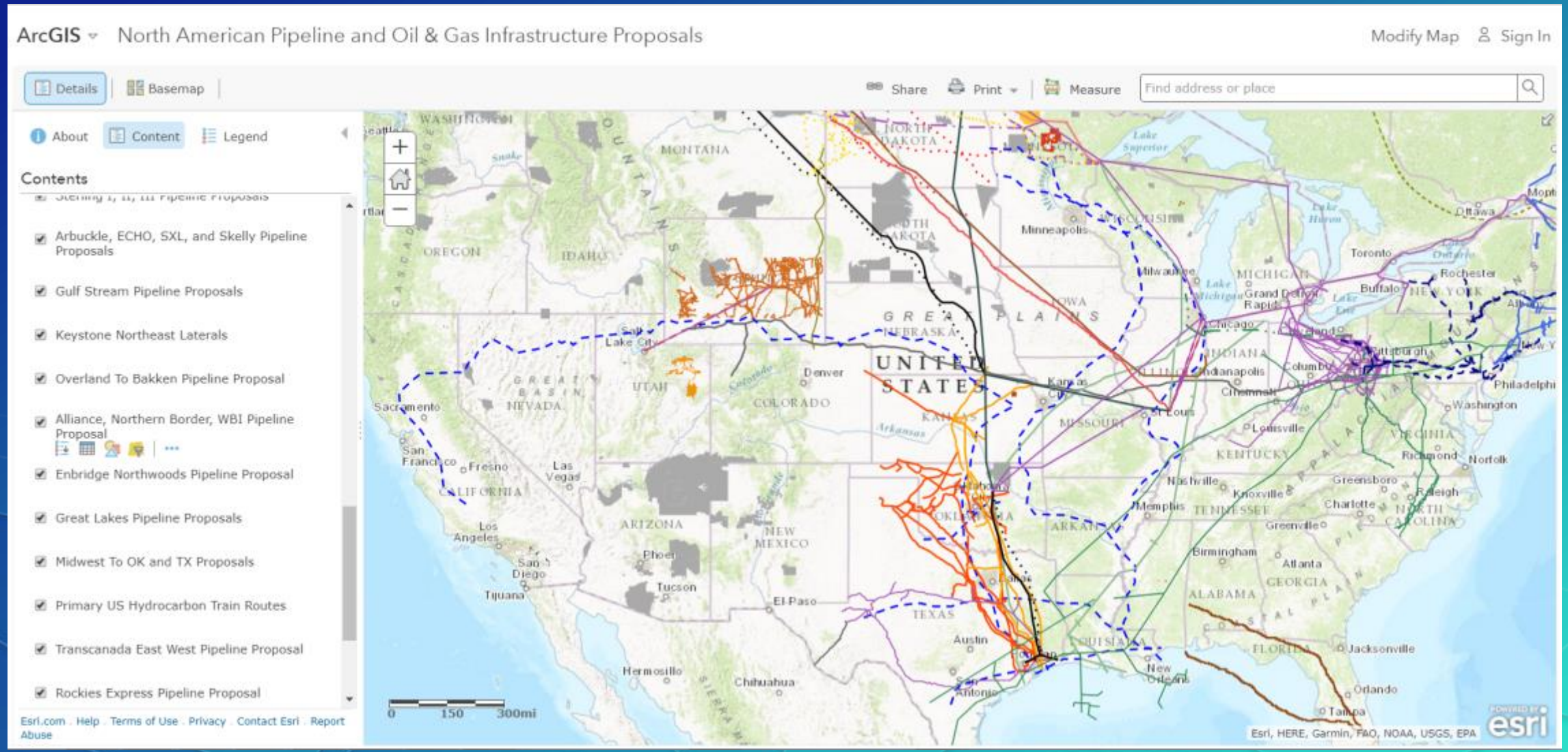

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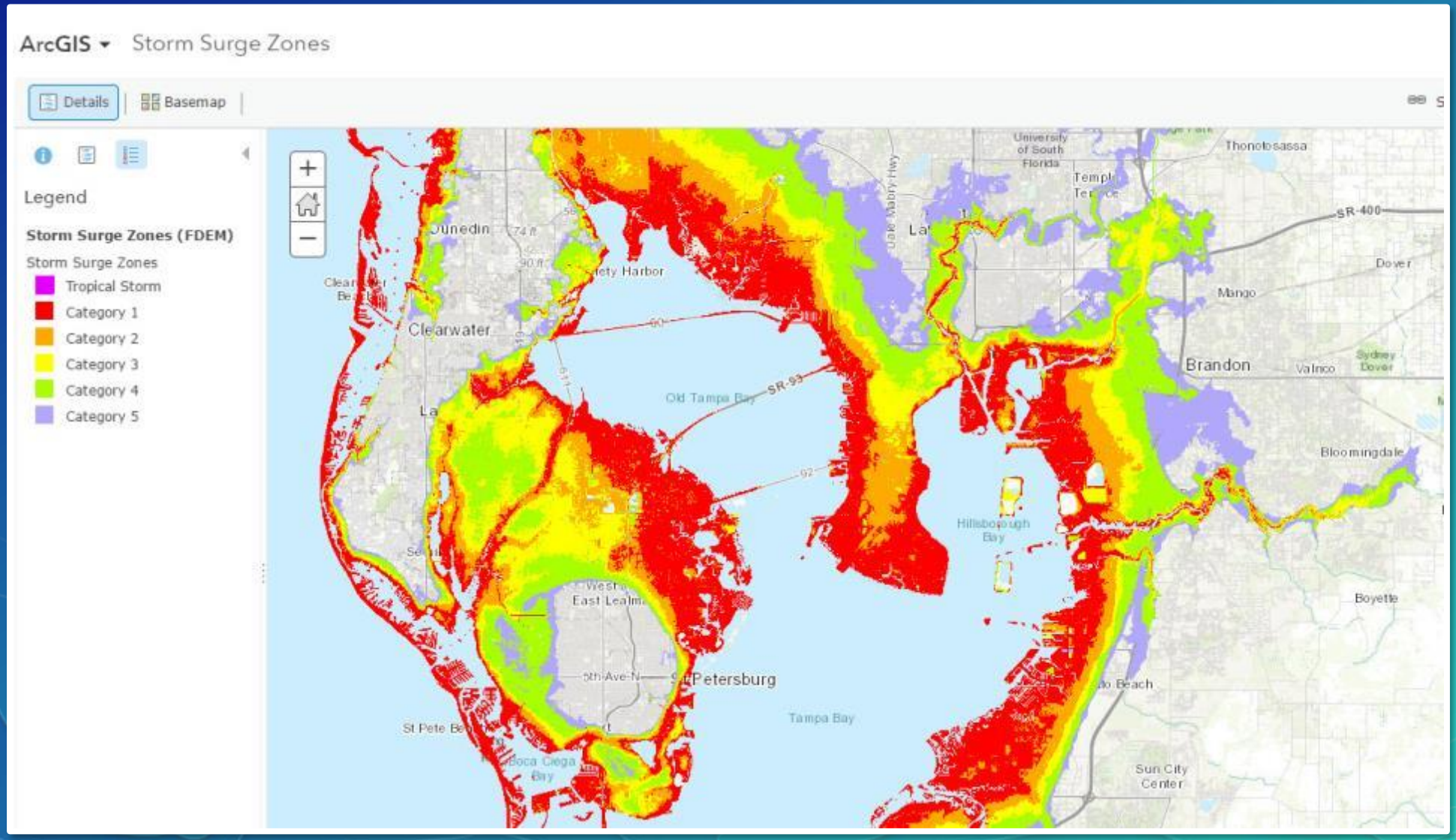

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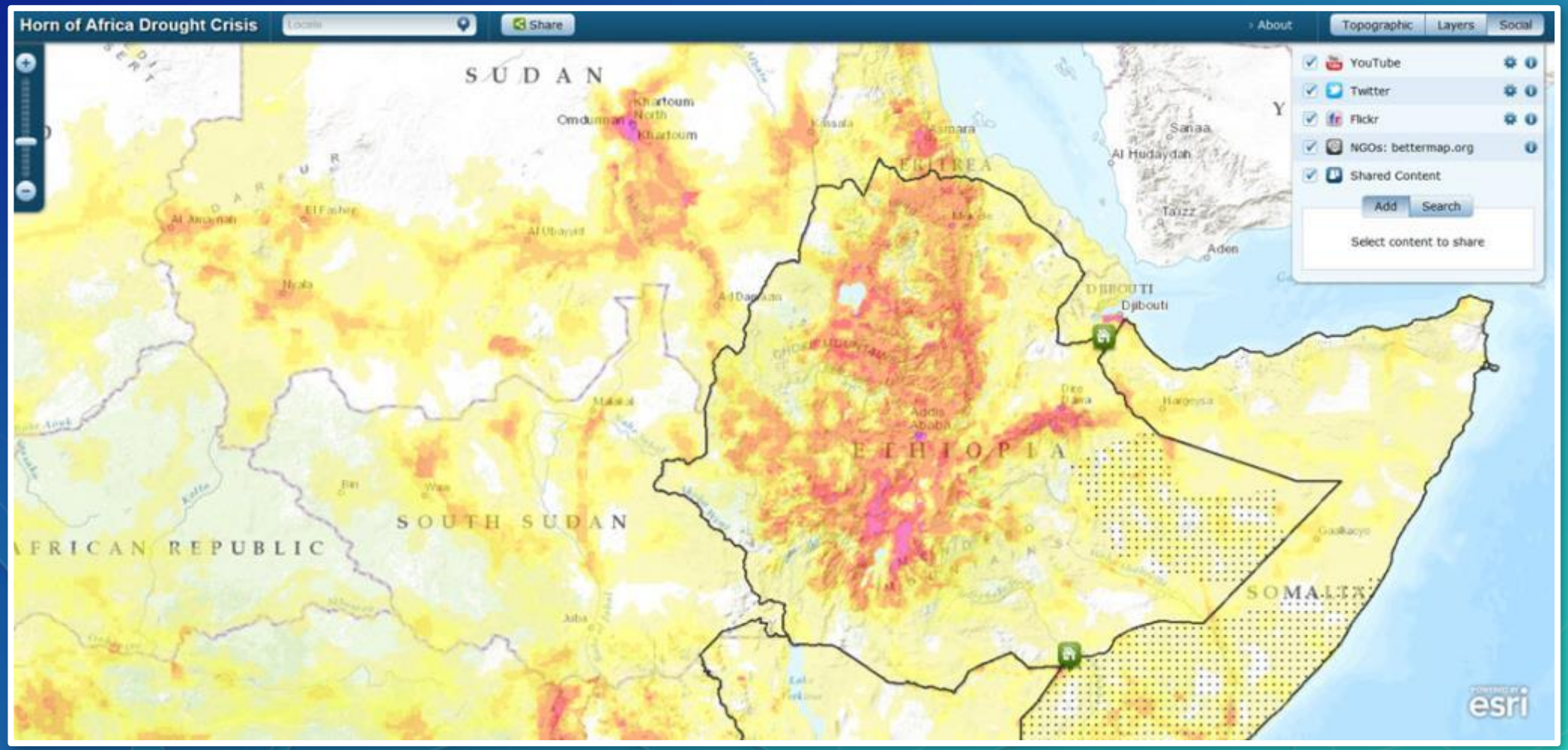
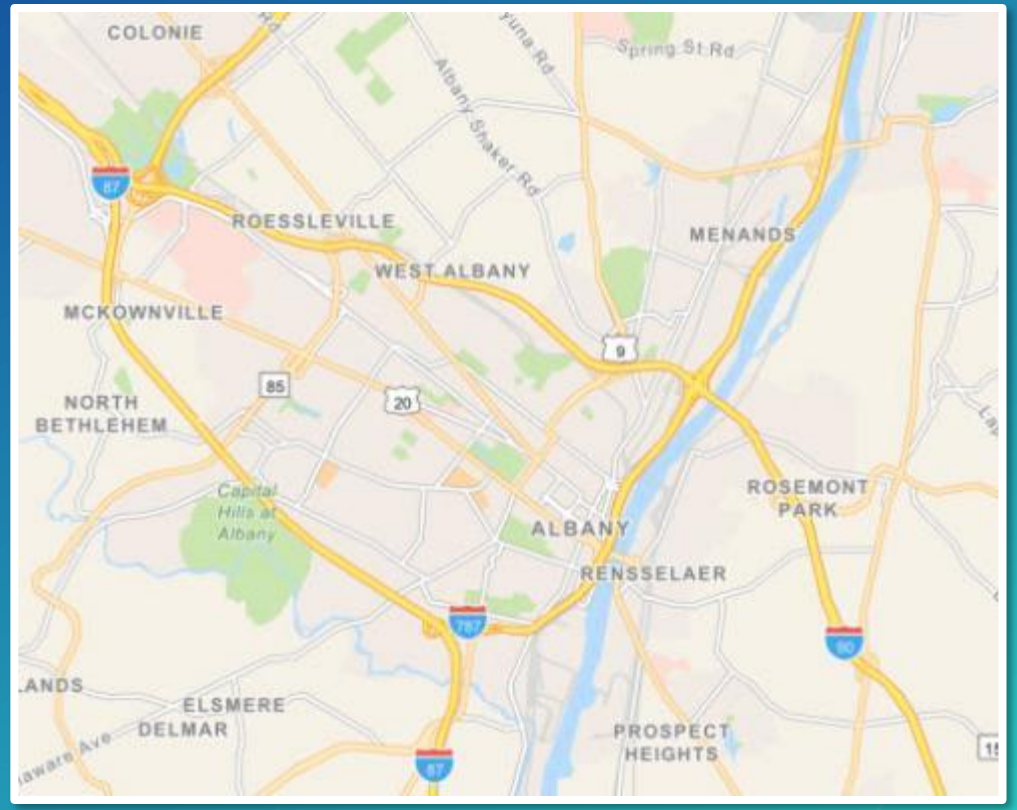


# Navigation Map

- Vector map style only
- Reference map and a basemap
- Emphasis on road network, places
- Diverse, but not overpowering color palette
- Great for overlaying all data
- …but palette limits some color choices



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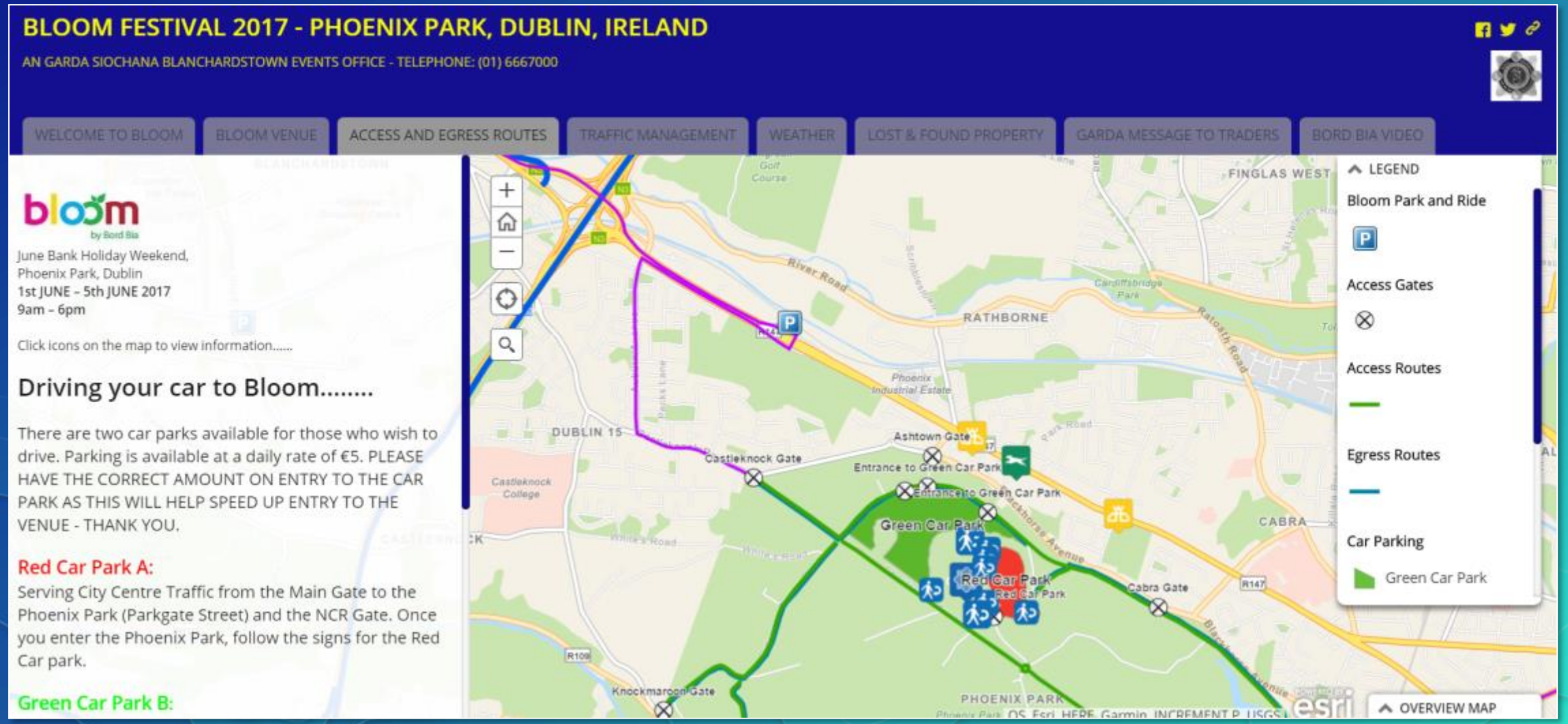

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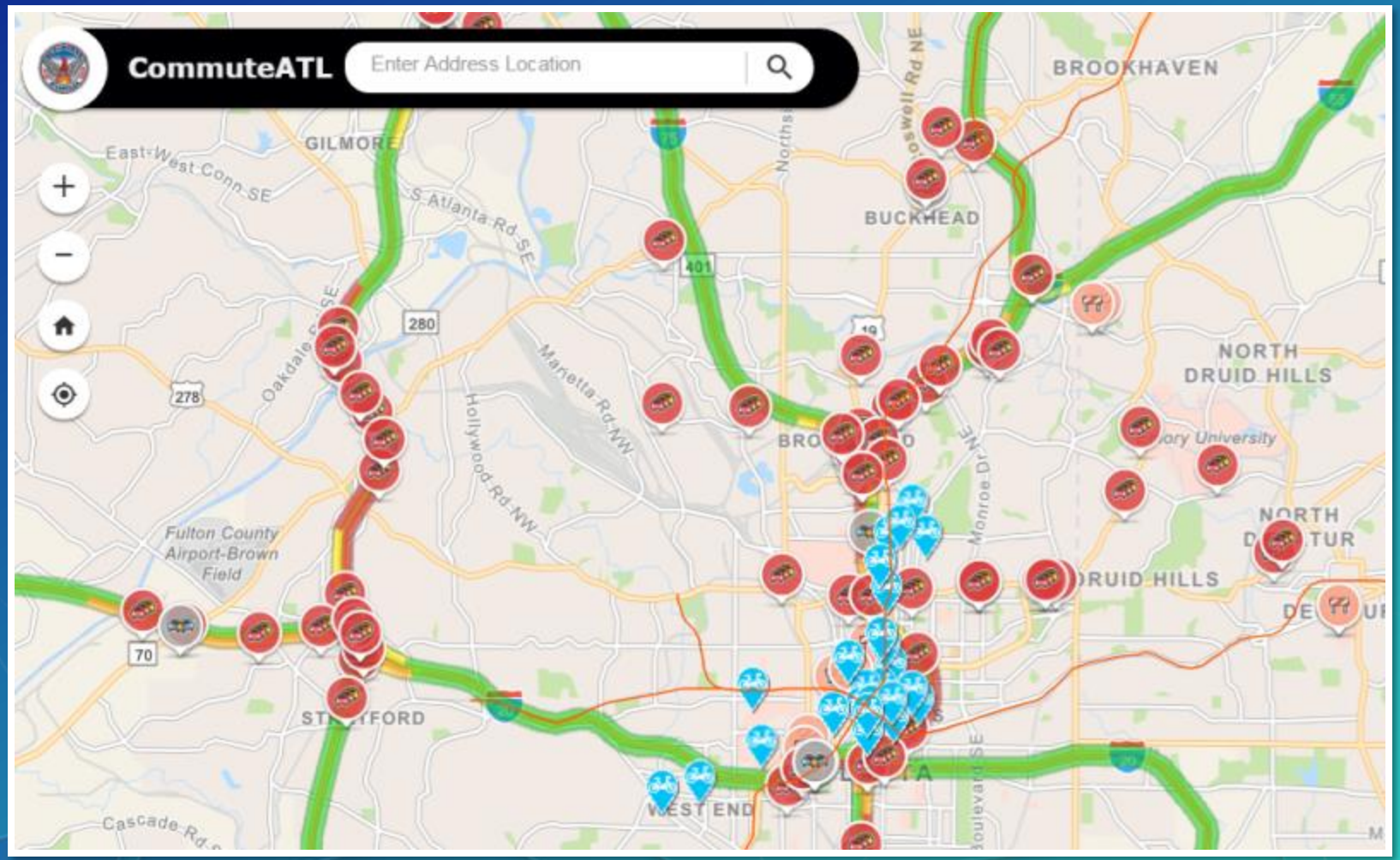


# Oceans Map

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

# Oceans Map

## Understanding Ocean Wind Energy

Download Data MarineCadastre.gov BOEM

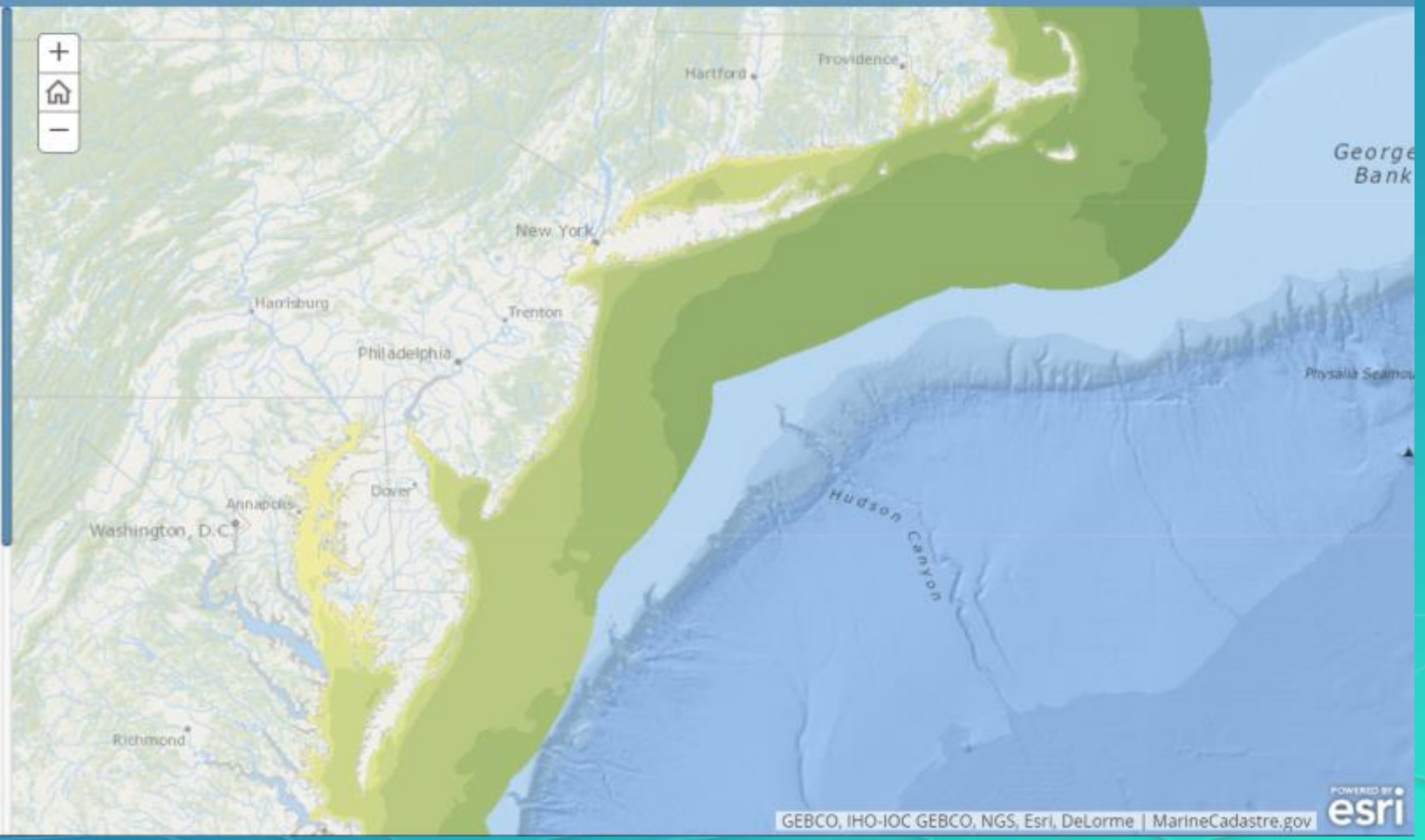
Energy Potential | Planning | Development

Optimal wind power begins at 7.5 meters per second and can be found within 50 nautical miles of the shore. While the Gulf of Mexico and Great Lakes are included as viable options, models show the strongest winds reside in the Pacific and Atlantic Oceans.

The Northeast and Mid-Atlantic regions of the US are ideal for offshore wind development. These regions possess high potential wind resources and the shallow water depths allow for more cost effective construction with currently available wind turbine platform technology.

Credit: energy.gov

The data shown depicts estimates of the annual average wind resource (speed) for the United States. Annual average wind speeds are closely related to the available energy at a particular location and are categorized by their value at a height of 90 meters above the surface, the approximate hub height for



# Oceans Map

## Understanding Ocean Wind Energy

Download Data MarineCadastre.gov BOEM

Energy Potential | Planning | Development

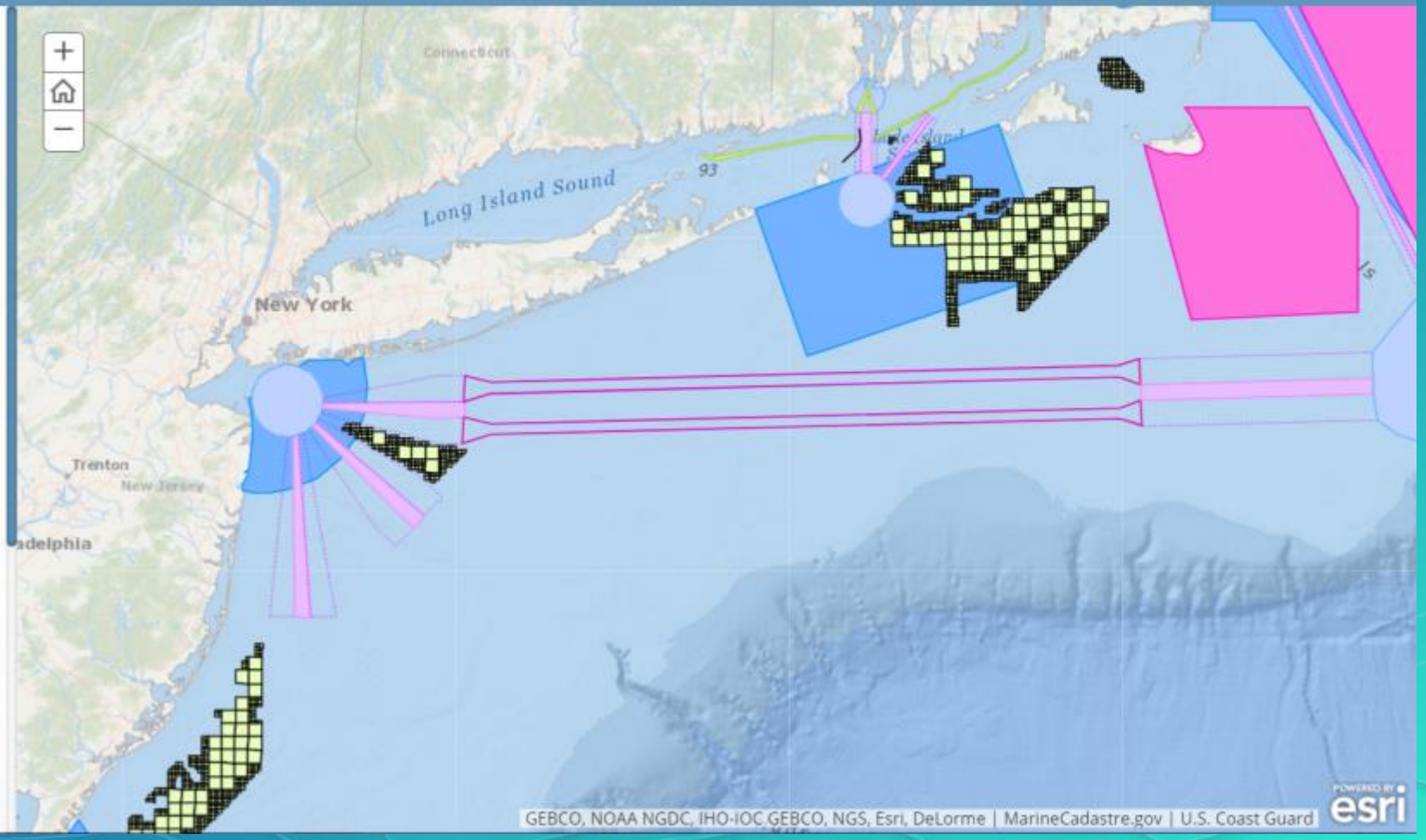
While there are currently no developed wind energy facilities off the coast of the U.S., progress is being made in several state waters as well as leases in federal waters. Active Renewable Energy Leases off Delaware, Massachusetts, and New Jersey illustrate where companies have leased areas of the ocean with the intent to build wind energy facilities. Permits may be issued for development provided further site assessment for each leased area.

Credit: energy.gov

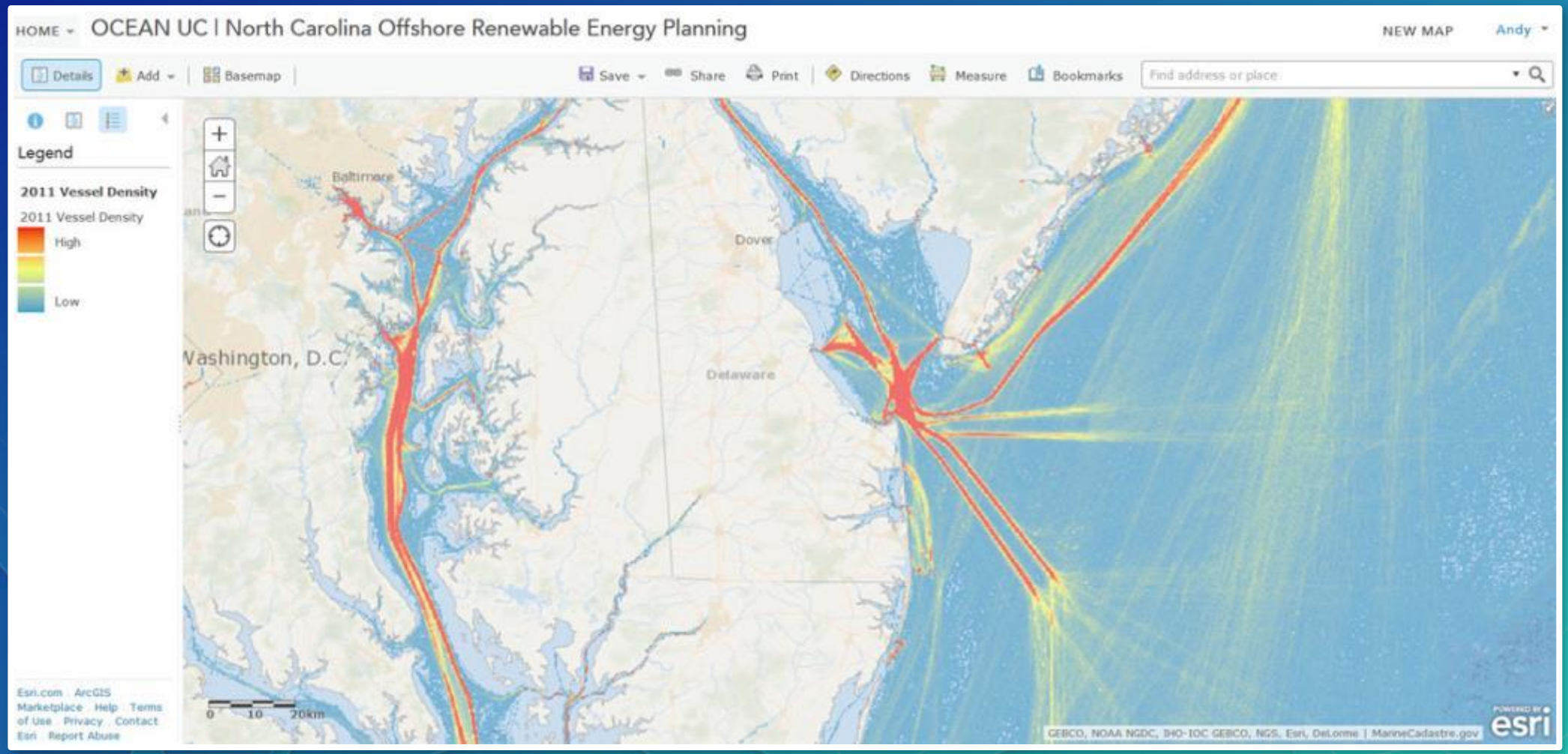
To download data in these maps, please visit our Data Registry.

Active Renewable Energy Leases

Wind Energy Lease



# Oceans Map


HOME
OCEAN UC | North Carolina Offshore Renewable Energy Planning
NEW MAP
Andy
Details
Add
Basemap
Save
Share
Print
Directions
Measure
Bookmarks
Find address or place
Legend
2011 Vessel Density
2011 Vessel Density
High
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Baltimore
Dover
Washington, D.C.
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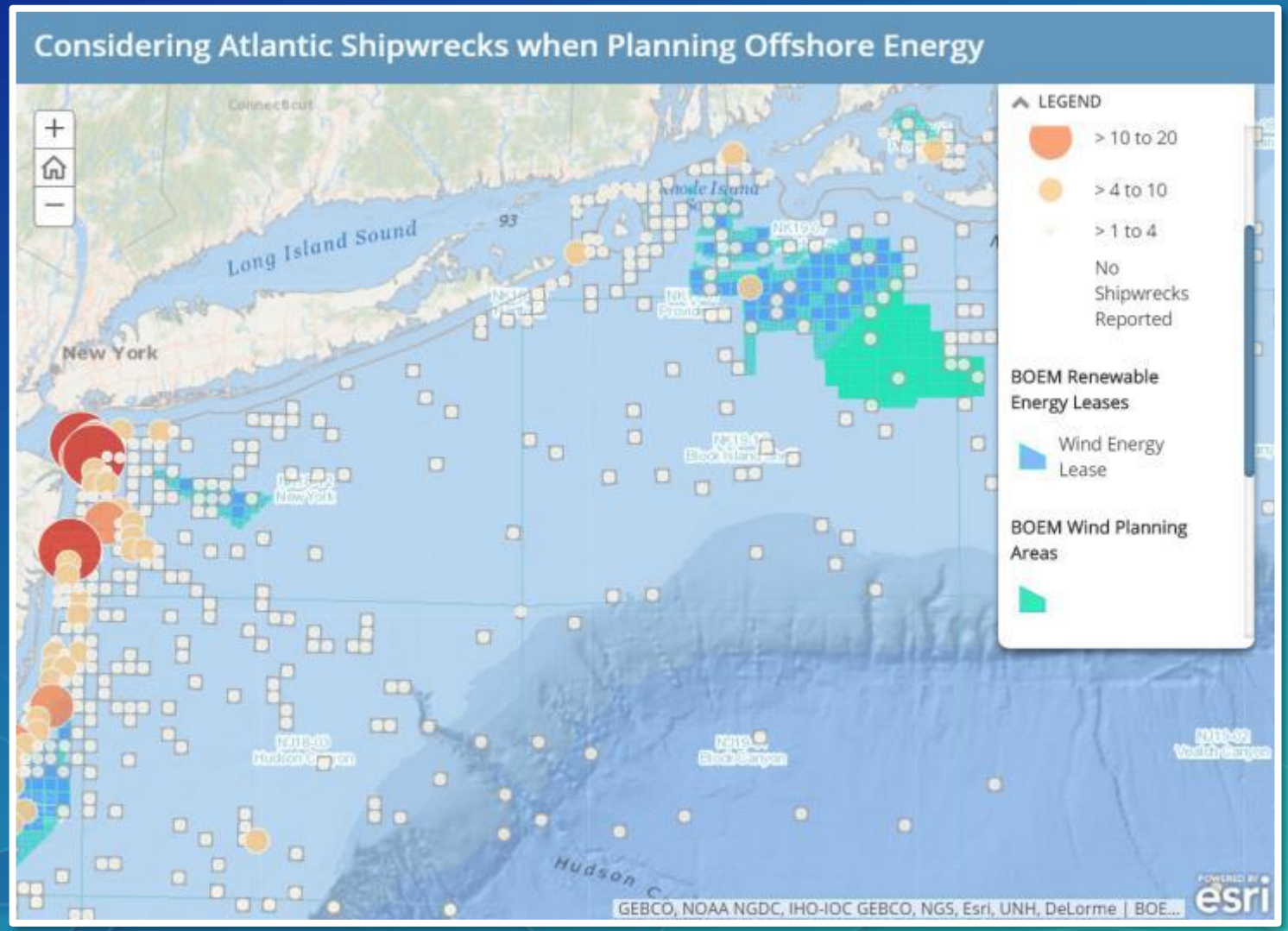
Esri.com ArcGIS Marketplace Help Terms of Use Privacy Contact Esri Report Abuse
GEBCO, NOAA NGDC, IHO-IOC GEBCO, NGS, Esri, DeLorme | MarineCadastre.gov
esri

# Oceans Map


Considering Atlantic Shipwrecks when Planning Offshore Energy
LEGEND
> 10 to 20
> 4 to 10
> 1 to 4
No Shipwrecks Reported
BOEM Renewable Energy Leases
Wind Energy Lease
BOEM Wind Planning Areas
Long Island Sound
New York
GEBCO, NOAA NGDC, IHO-IOC GEBCO, NGS, Esri, UNH, DeLorme | BOE...
esri

# Oceans Map


The Real Pirates of the Caribbean
A story map
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.
esri
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)
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
Havana
Veracruz / San Juan de Ulloa
Zacatecas
Cartagena
Nombre de Dios / Portobelo
The Spanish Main
Caribbean Sea
Mexico
Cuba
Honduras
Nicaragua
Guatemala
Albatross Plateau
Middle America Trench
Hatteras Plain
Bahamas
Esri | GEBCO, IHO-IOC GEBCO, NGS, Esri, DeLorme
esri

# Low Content and Low Saturation

ANDY SKINNER

# The ‘Map Sandwich’ concept

Using the Light Gray Canvas Map as an example

# The ‘Map Sandwich’ concept with Feature Services

Using the Light Gray Canvas Map as an example


Reference Layer

Cached Service

Base Layer


Feature Service

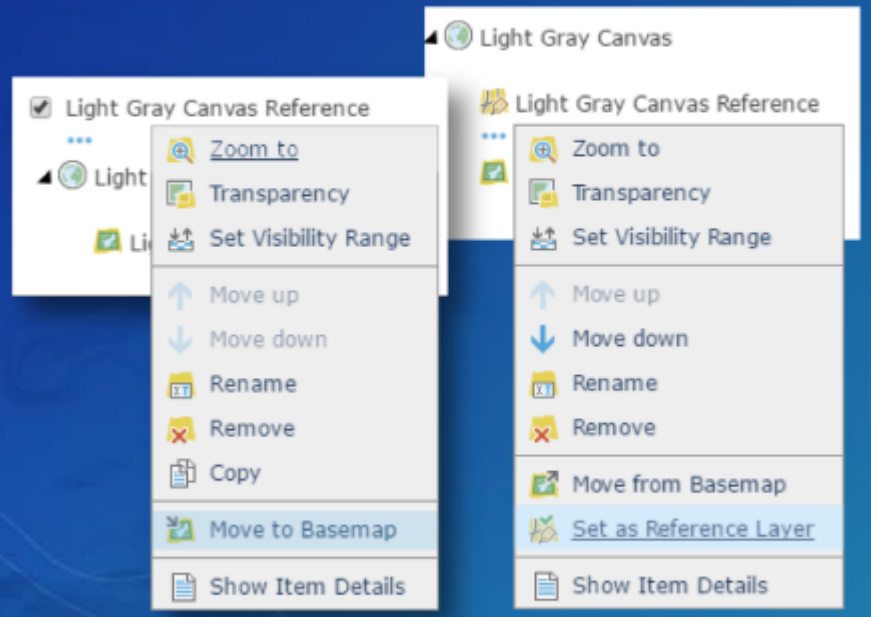
Reference Layer

Base Layer

# The ‘Map Sandwich’ concept: Update

Using the Light Gray Canvas Map as an example

*Move reference layer(s) to the ‘Basemap’ layer

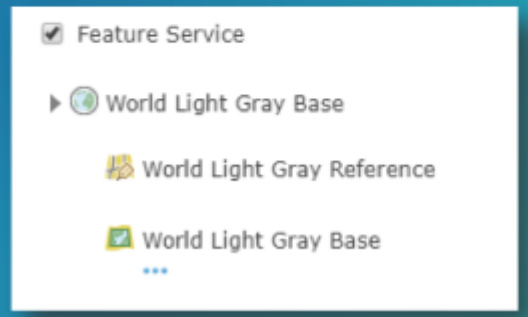




Reference Layer

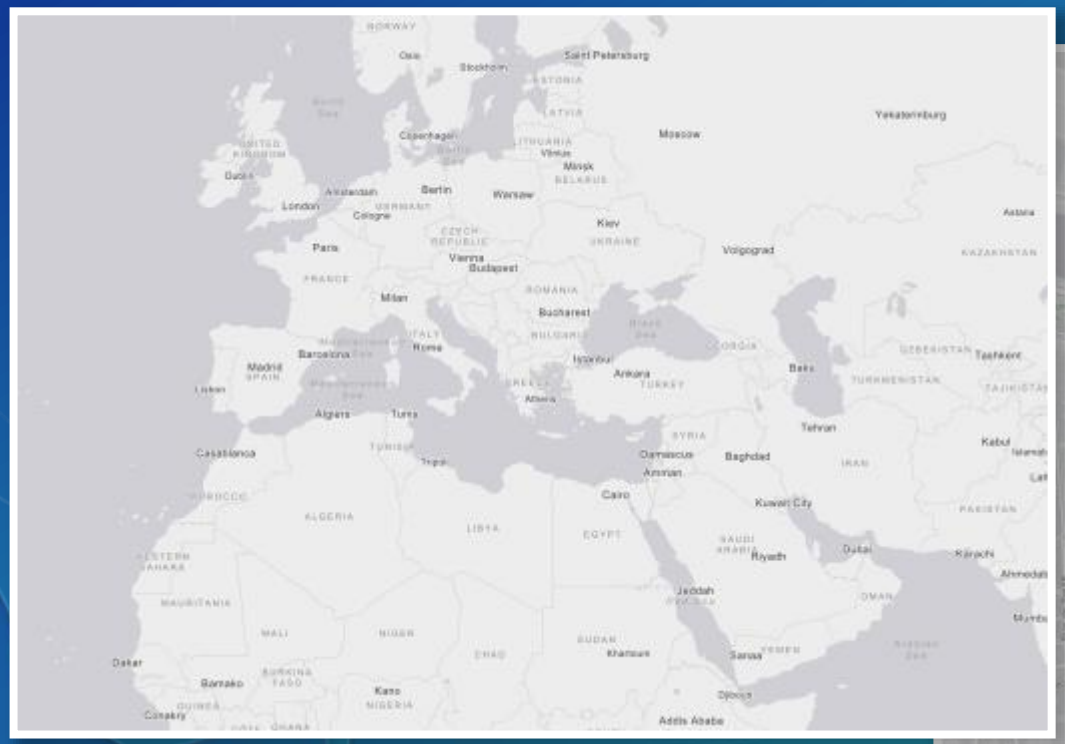
Feature Service

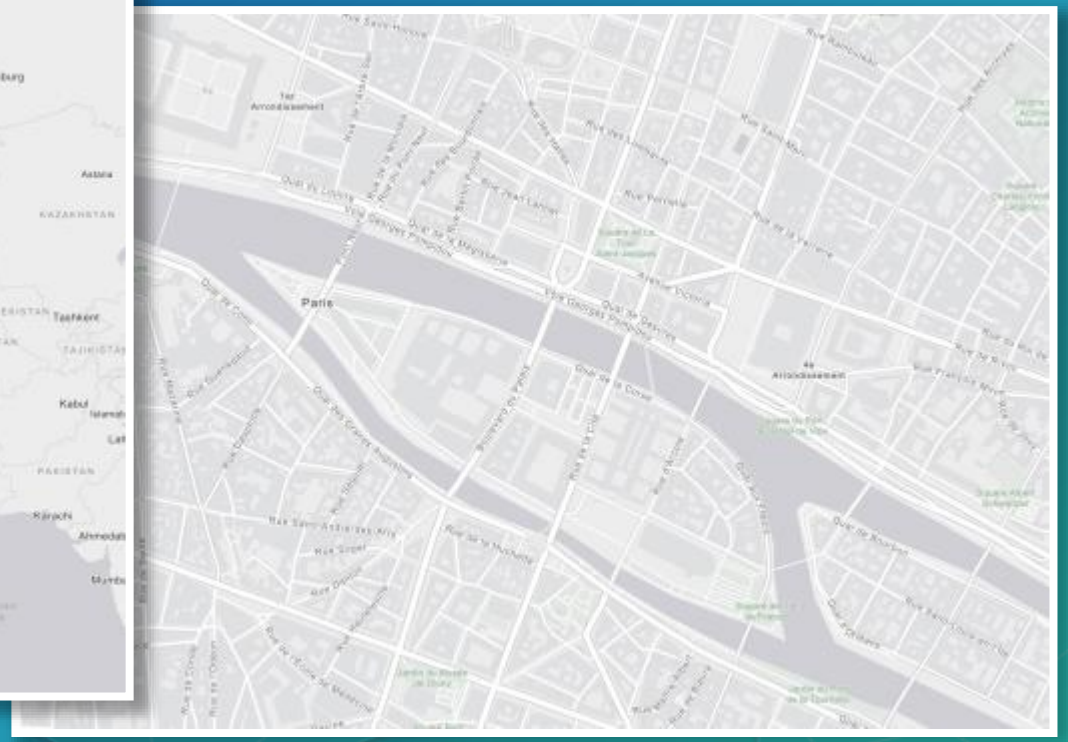
Base Layer



# Light Gray Canvas Map

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



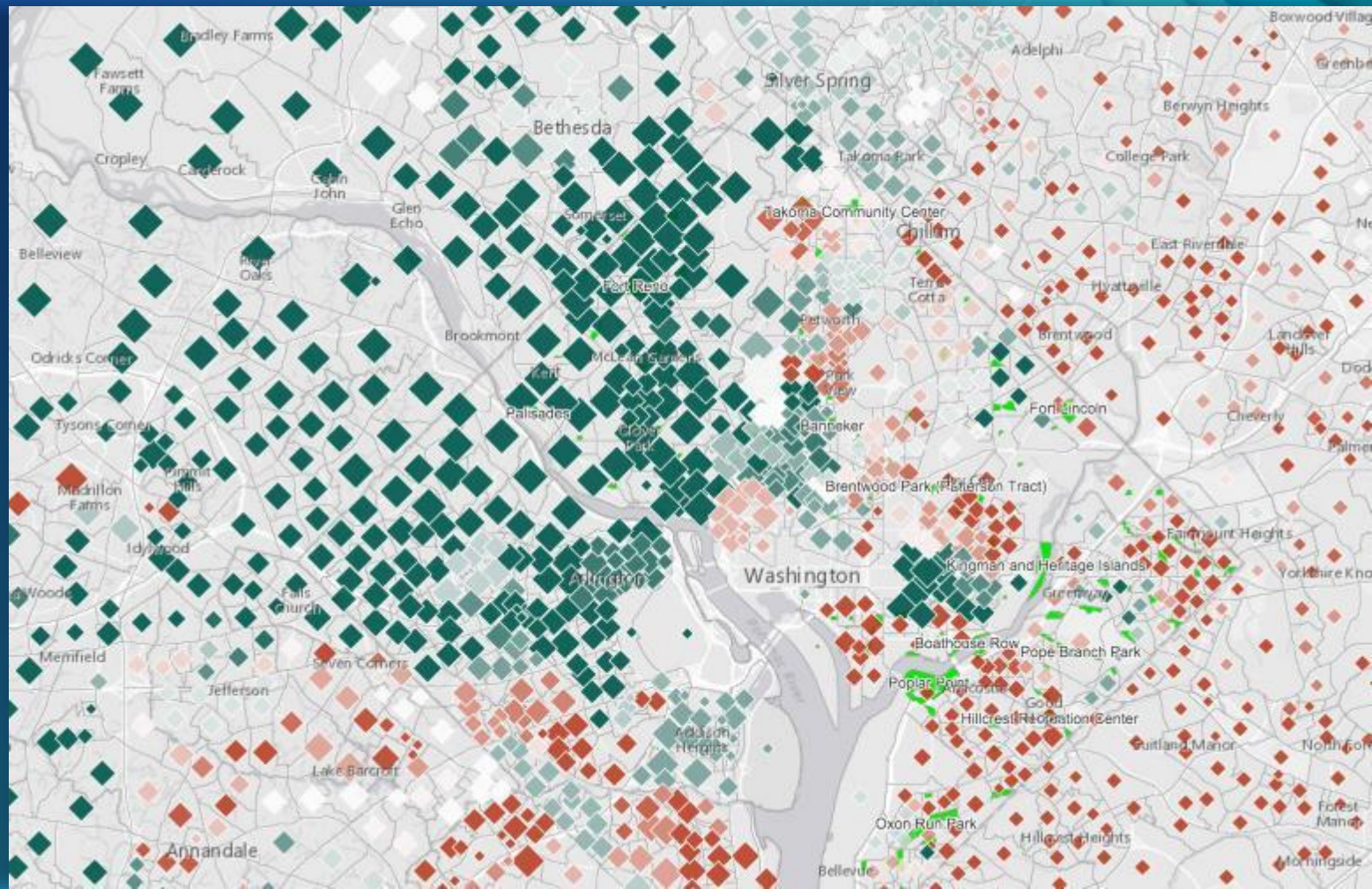



# Using the Basemap with Point Information

## Light Gray Canvas Map

Open Opportunity Data

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



# Using the Basemap with Point Information

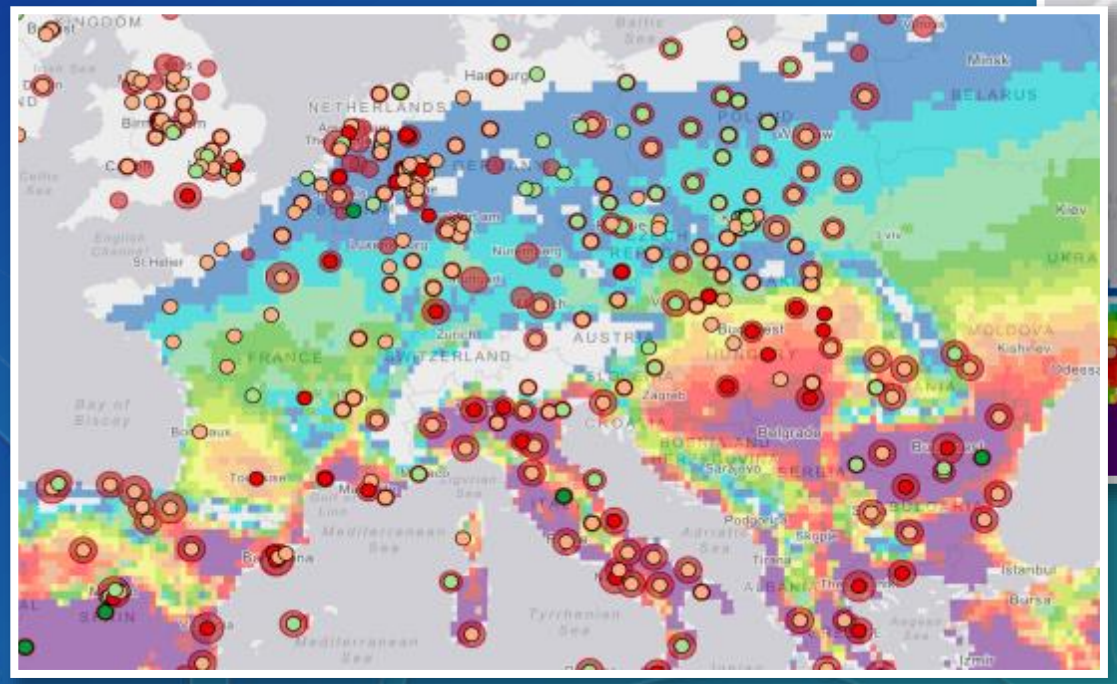
## Light Gray Canvas Map

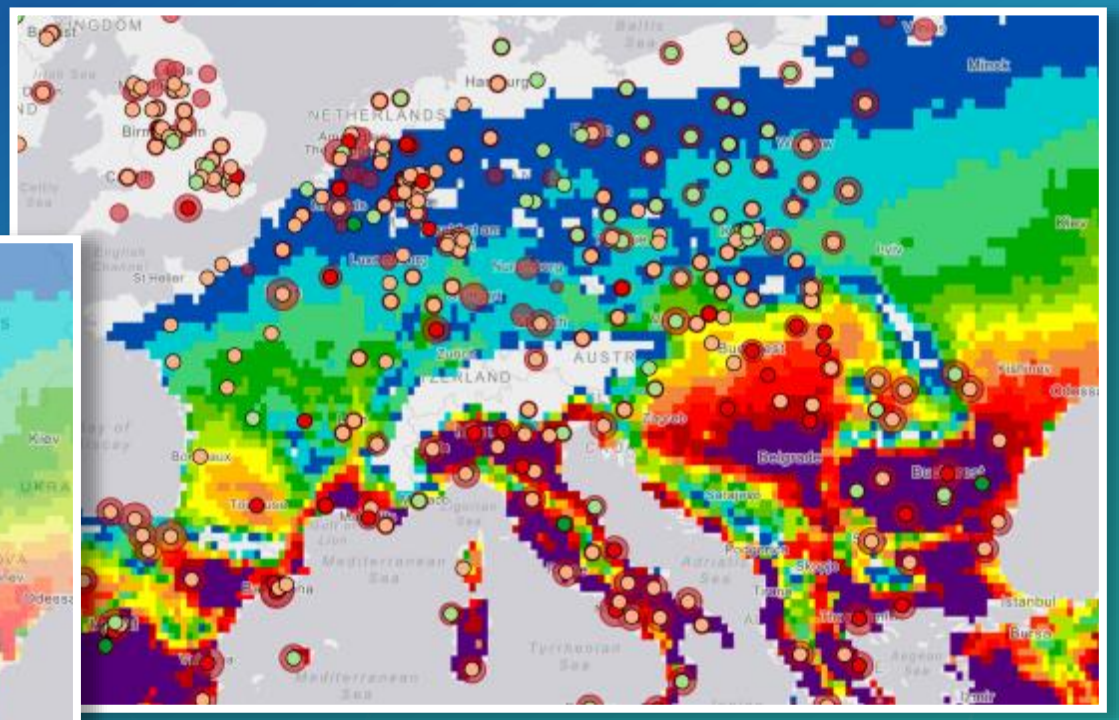
Portland Traffic Fatalities & Serious Injuries, 2005-2014

- Base and reference are available as separate layers
- … and can be used separately

# Using the Basemap with Polygon Information

- Use transparency to allow the basemap to contribute …



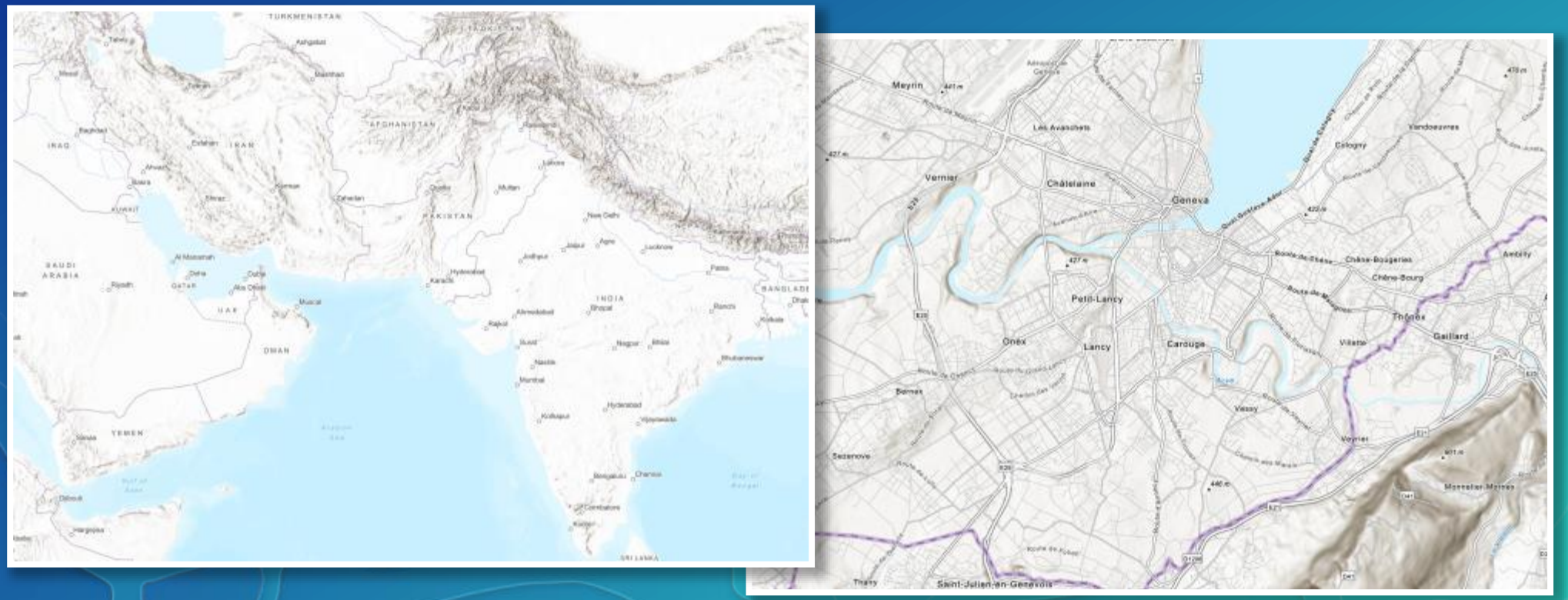

- But build with strong colors to compensate for the transparency

# Terrain with Labels Basemap (cached)

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

# Terrain with Labels Basemap (vector tile)

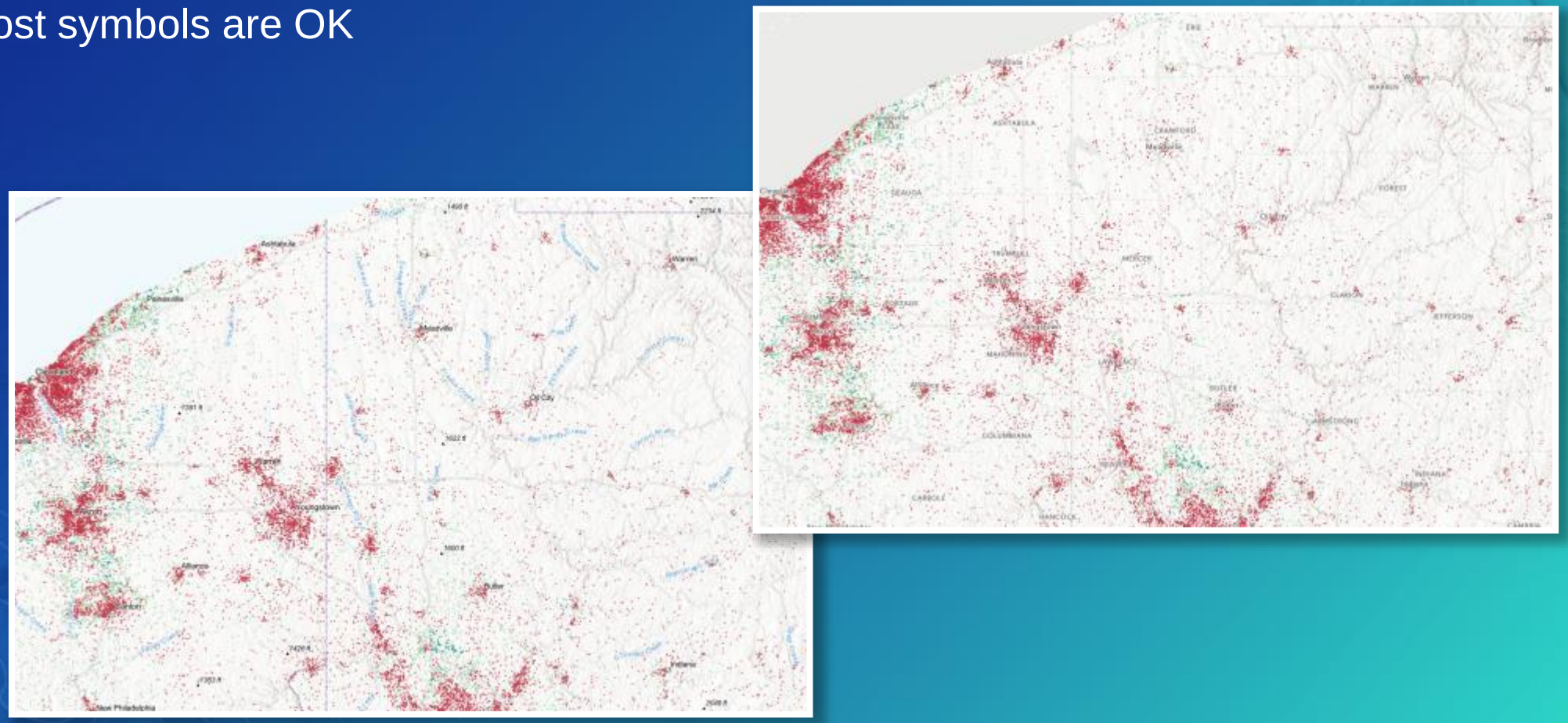
- Redesigned with a more neutral palette
- Uses the more sophisticated multi-directional hillshade



# Using the Basemap with Point and Line Information

## Terrain with Labels map: Population Growth and Decline

- Most symbols are OK

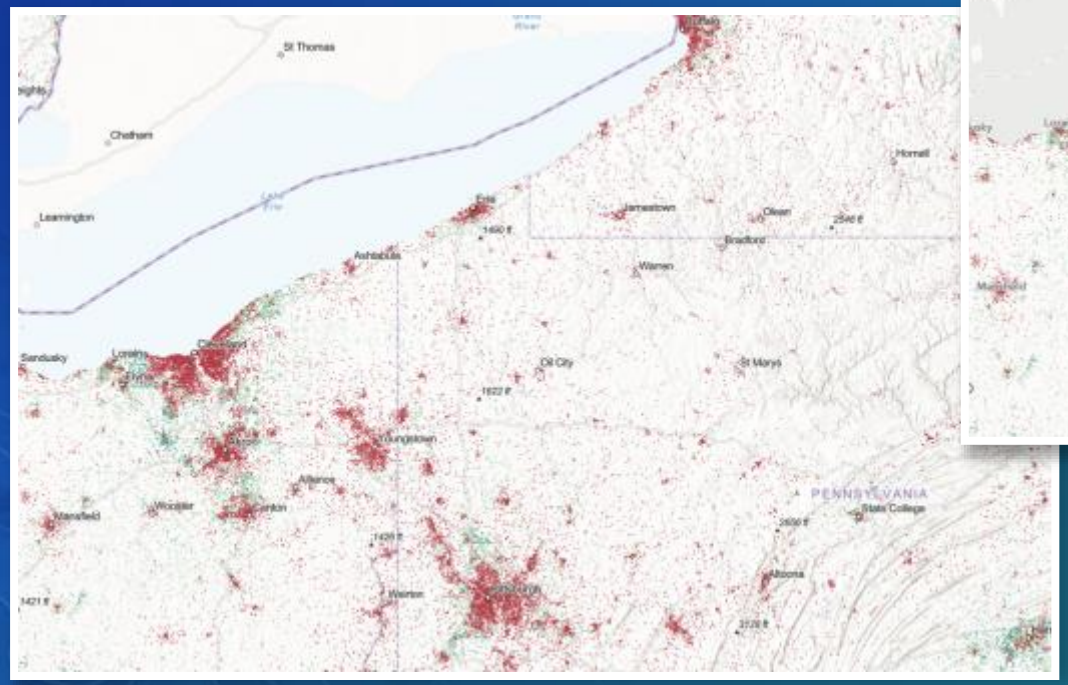


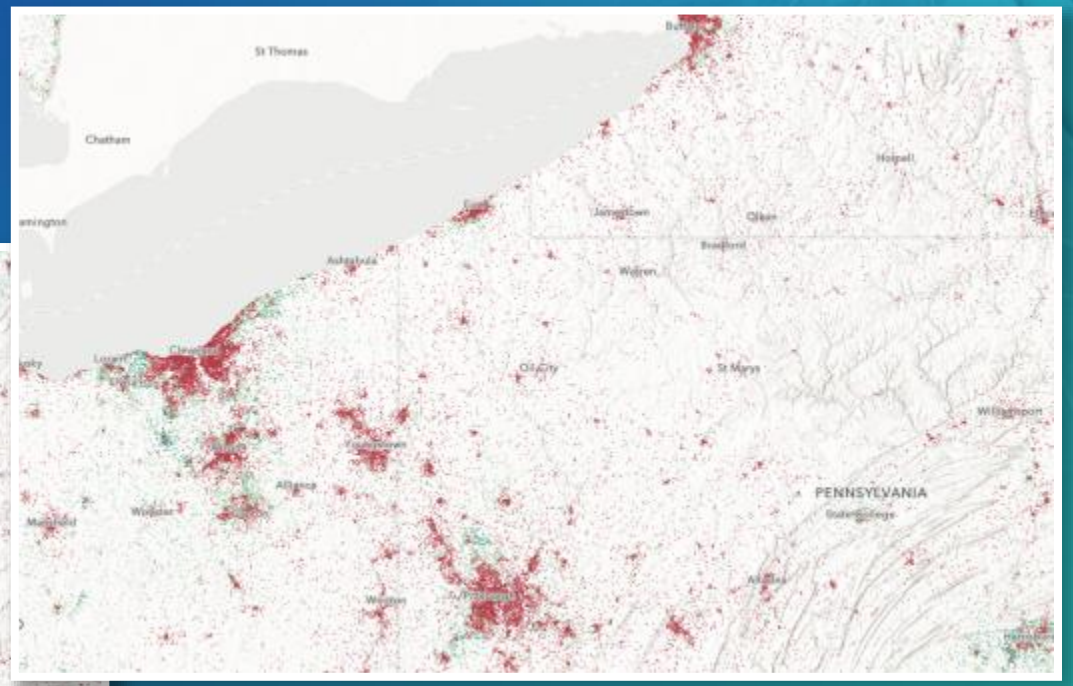
# Using the Basemap with Point and Line Information

## Terrain with Labels map: Population Growth and Decline

- Mix and Match

Terrain with Labels Basemap



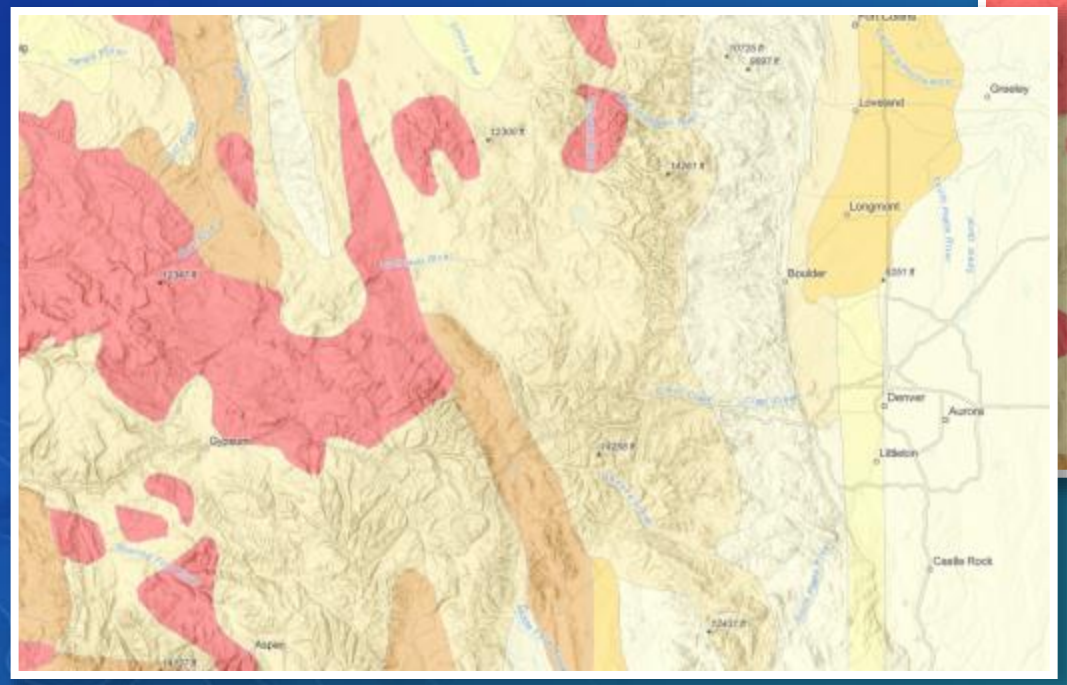



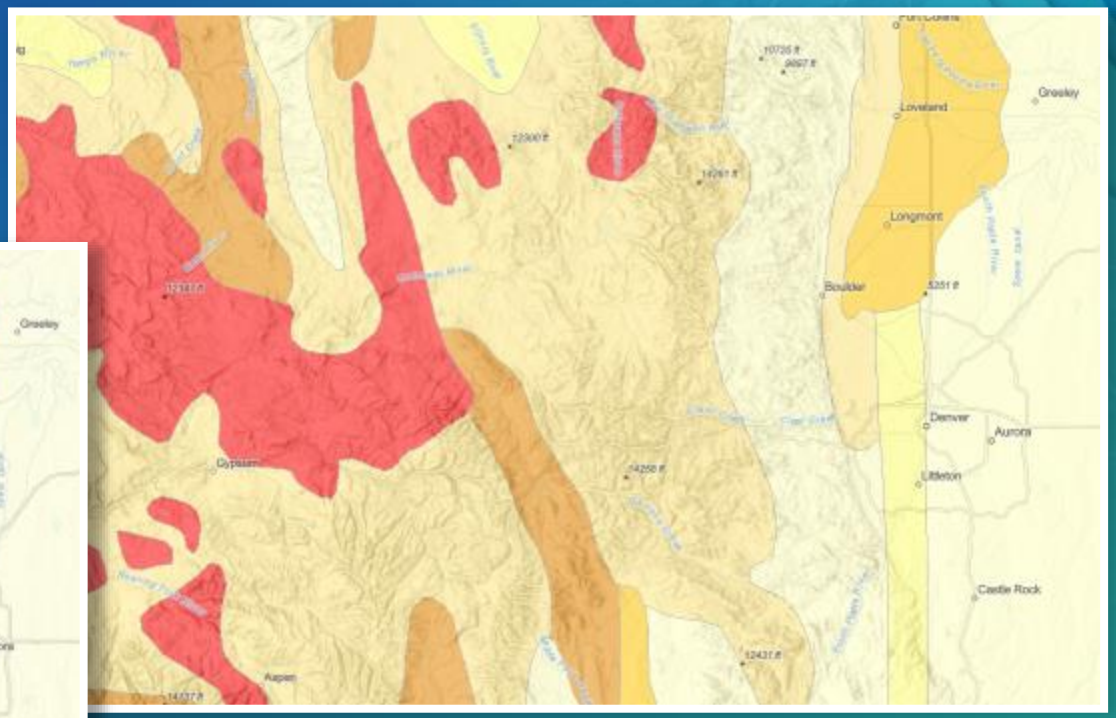

Hillshade + Human Geography Basemap

# Using the Basemap with Polygon Information

## Terrain with Labels map: Landslide Susceptibility

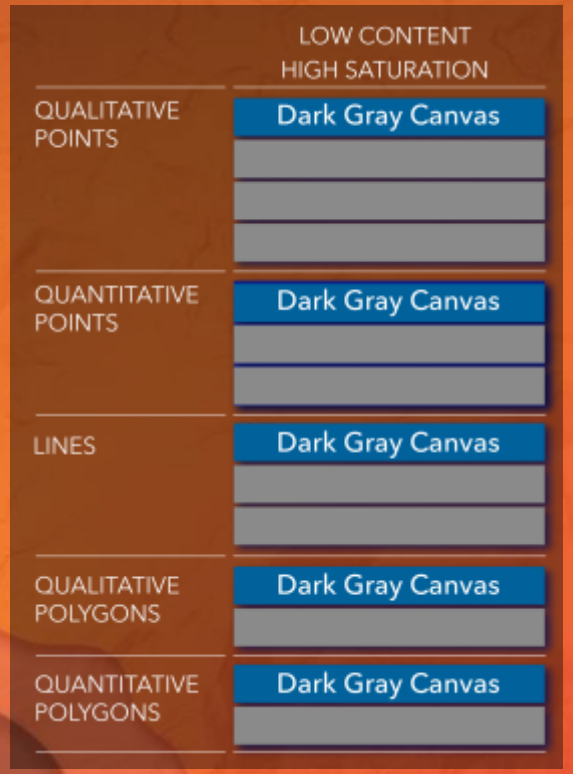
- Try to use bright colors, and don't create too many categories



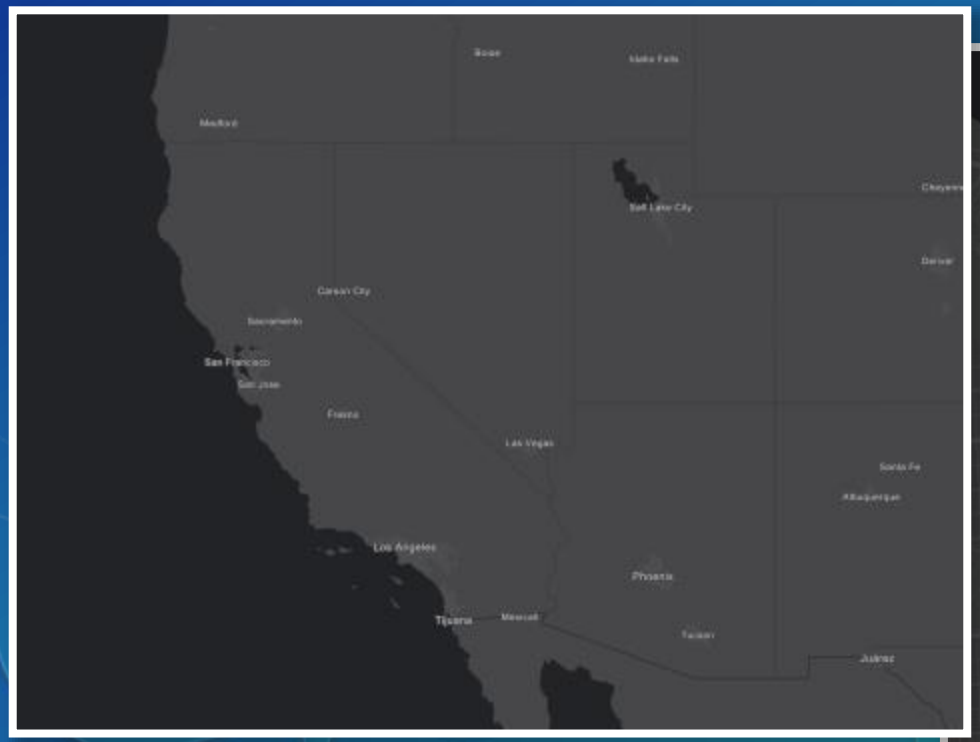
# Low Content and High Saturation

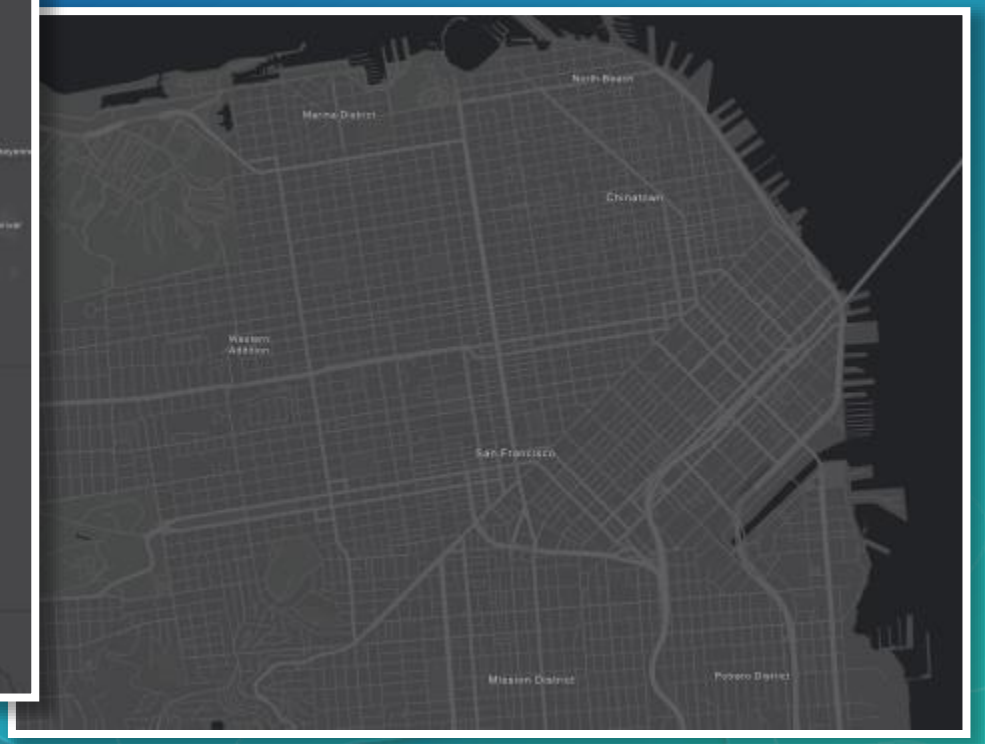
ANDY SKINNER



# 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

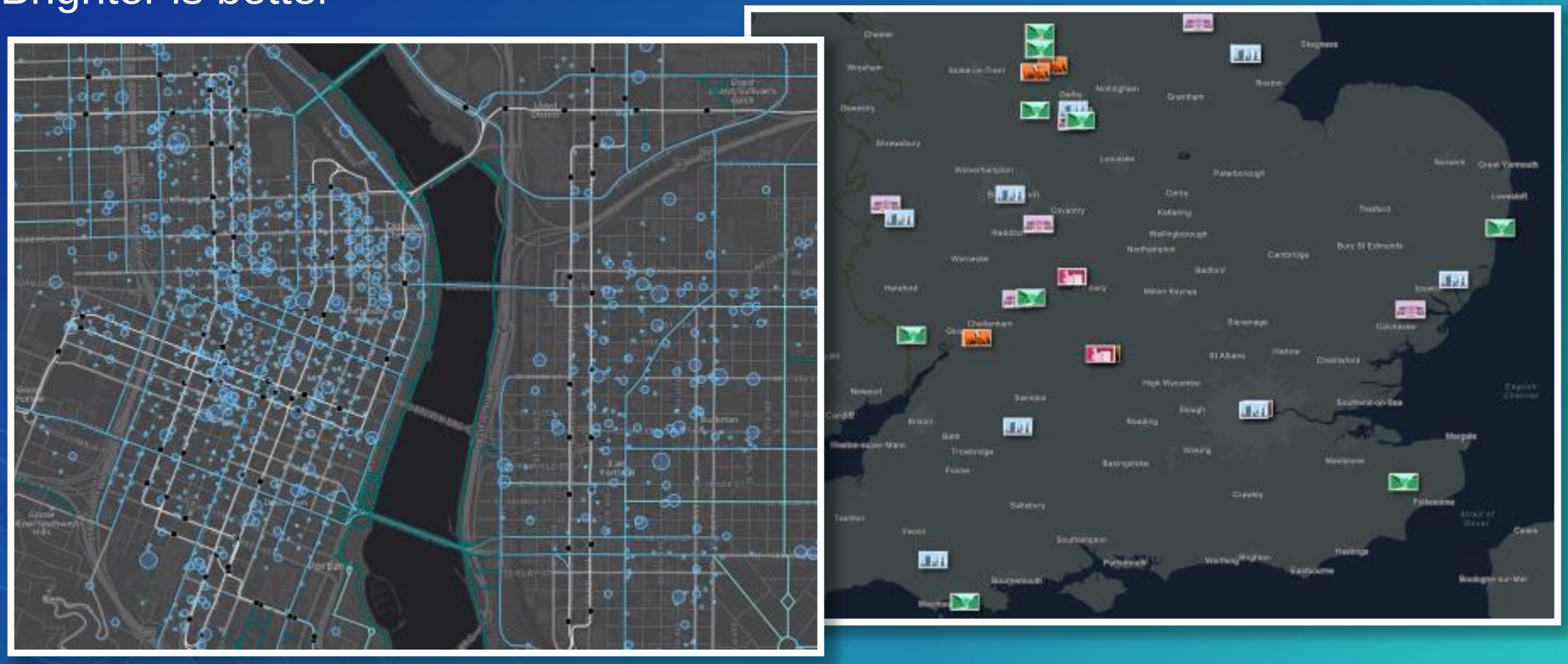


# Using the Basemap with Point and Line Information

Dark Gray Canvas map:

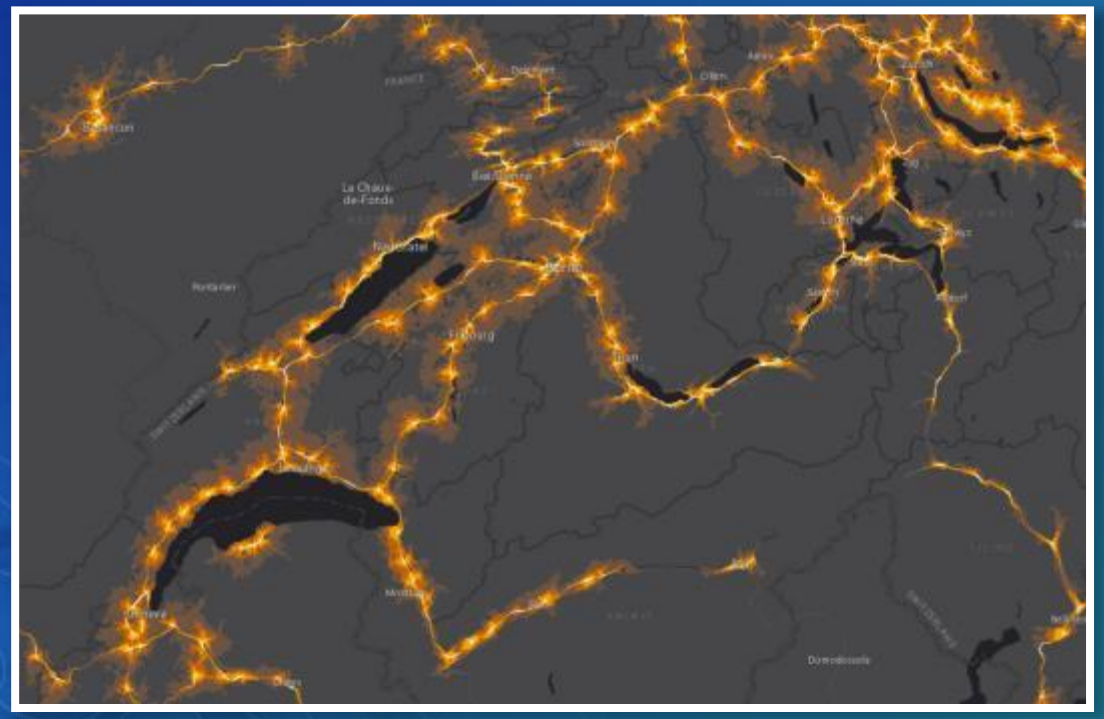
- No color problems (unless you want to use a dark gray or black!)
- Brighter is better



# Using the Basemap with Line Information

## Dark Gray Canvas Map: Highway Access map

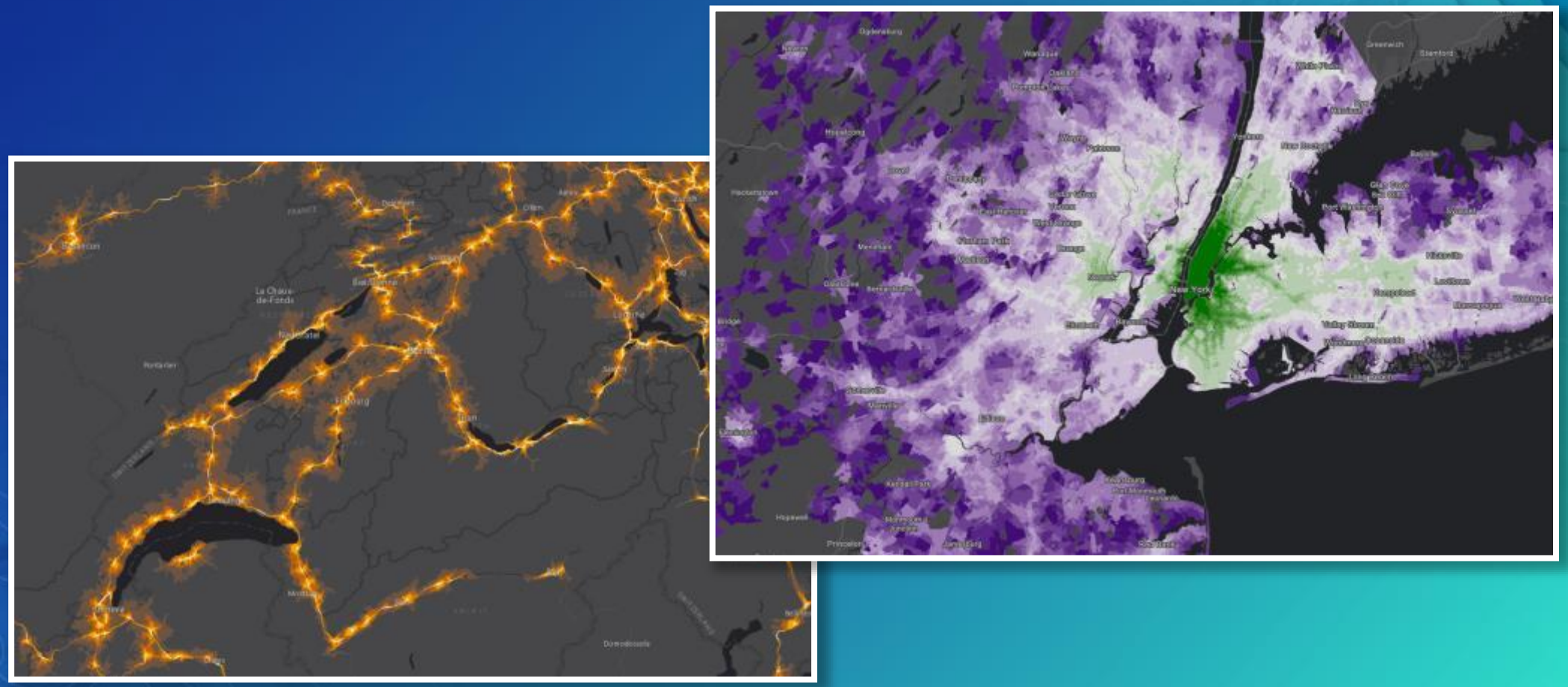
- No color issues, but use bright colors…



- … and use a gradient from dark for weak to bright for strong values

# Dark Gray Canvas Map

Urban Observatory Highway Access map: Most Job Accessible Cities



# Dark Gray Canvas Map

## Most Job Accessible Cities (detail)

# 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

# Creation of your own basemap

- Create your own vector tile basemap in ArcGIS Pro
  - Clean, generalized data
  - Symbolize your map with simple symbols
  - Adjust label properties
  - Set up scale ranges for symbol/label classes and for visibility of the layers
- … OR re-style one of our esri vector basemaps!
  - Copy tile layer
  - Download style file
  - Re-style it using one of our style editors

# Conclusion

## Selecting the Perfect Basemap

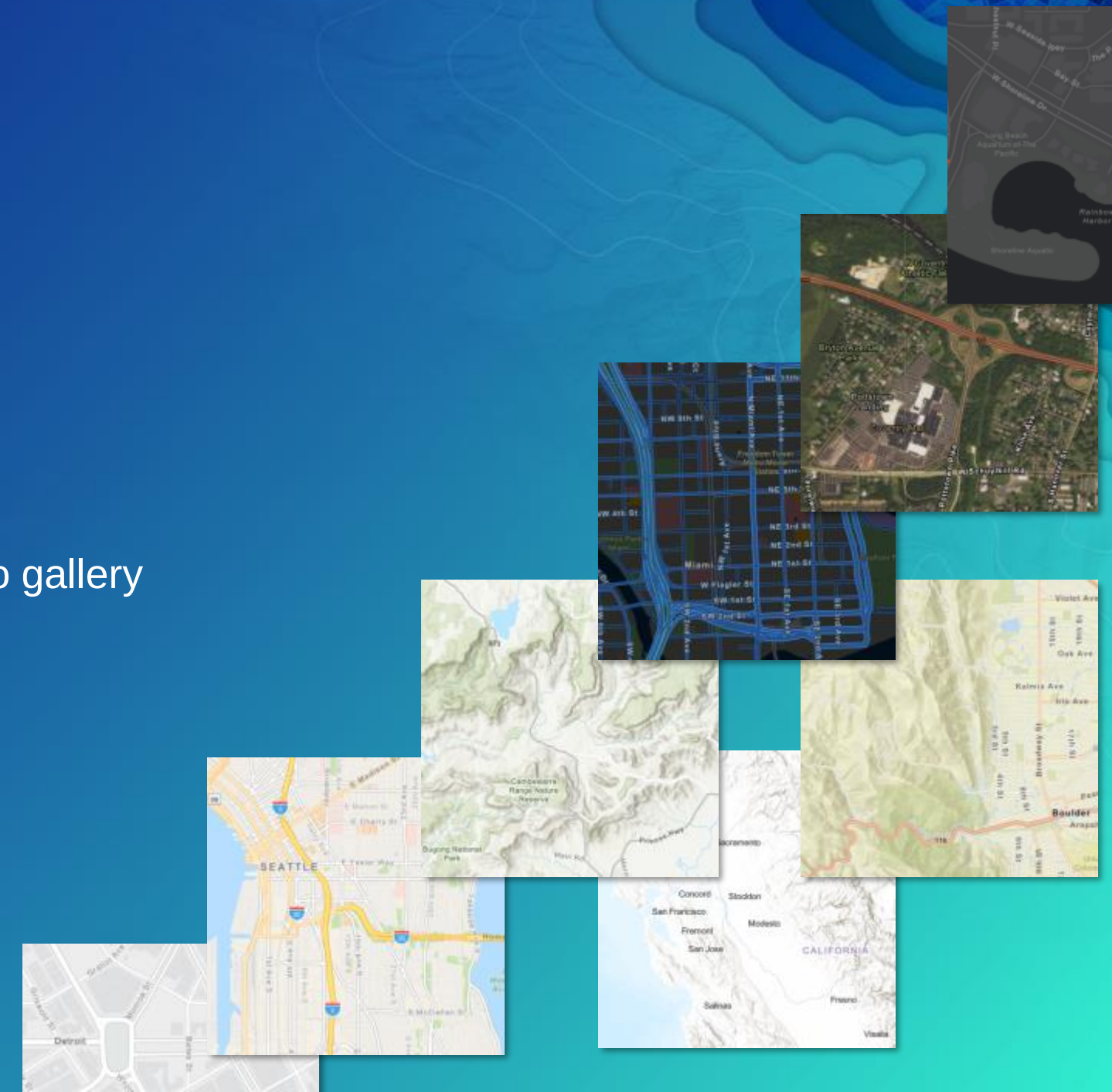
- Know the type of data you are mapping
- Know your subject, geographic area and scales of your data

- Decide on the geography and scales of the basemaps
- Decide on the content to support the purpose of your map

# Basemap Road Ahead

What to expect from ArcGIS.com

- Continued basemap data updates
- Basemaps in GCS/WGS84
- Integration of Vector Basemaps into gallery
- More basemap styles
- Customization tools to improve your maps' functionality



# Additional Resources

## Related Technical Workshops and U.C. sessions

- Amazing and Inspiring Maps in ArcGIS
- Authoring Great Web Maps
- Corporate Brand Your Vector Basemap
- Creative Vector Basemaps
- Designing Esri's Vector Tile Basemaps
- Styling Vector Basemaps
- Styling Vector Tiles
- Tips and Tricks for Vector Basemap Customization

## ArcGIS.com

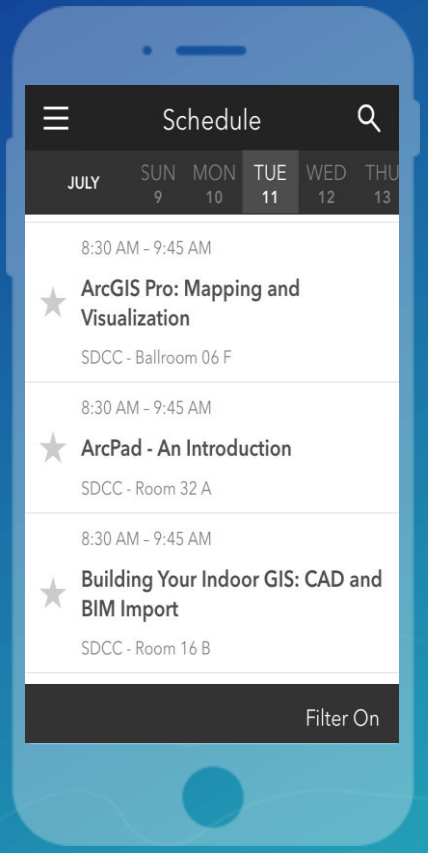
- Living Atlas of the World
- blogs.esri.com/esri/arcgis/tag/vectorbasemap

# Please Take Our Survey on the **Esri Events App!**

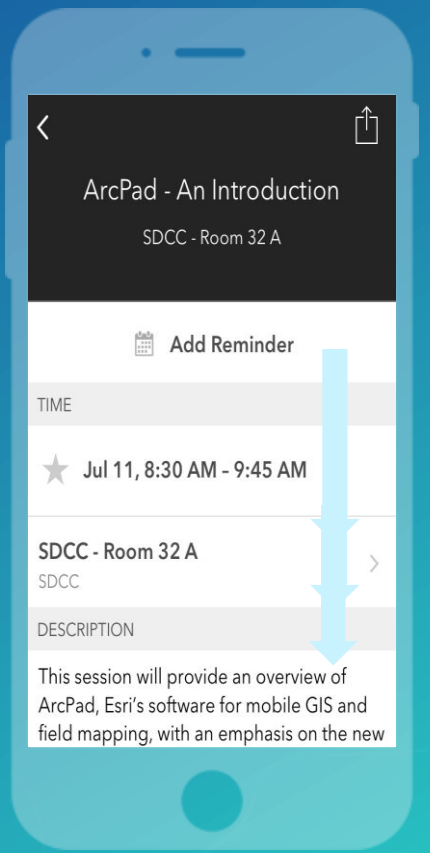
## Selecting the Perfect Basemap

### Download the Esri Events app and find your event

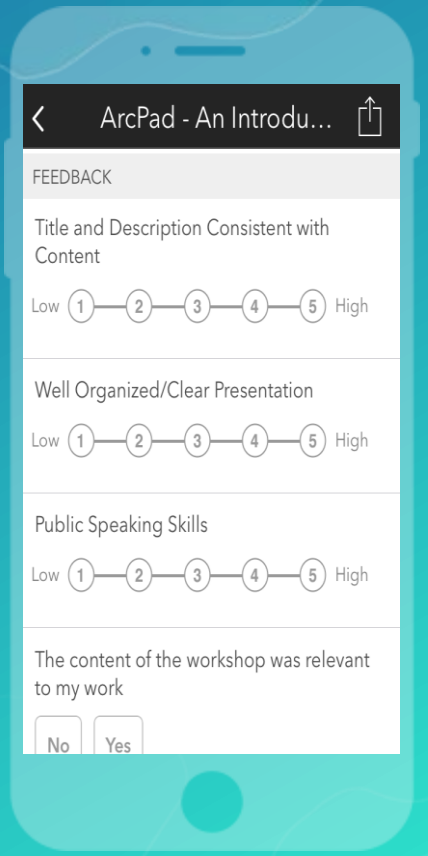

### Select the session you attended




### Scroll down to find the survey




### Complete Answers and Select "Submit"

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