Esri International User Conference

San Diego, California

**Technical Workshops** | July 24, 2012

# Making Beautiful Maps

Jaynya Richards

Aileen Buckley

Ken Field

***Please!***

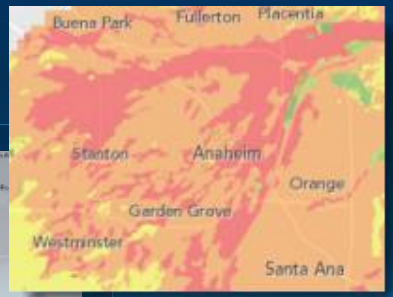
***Turn OFF cell phones and paging devices***

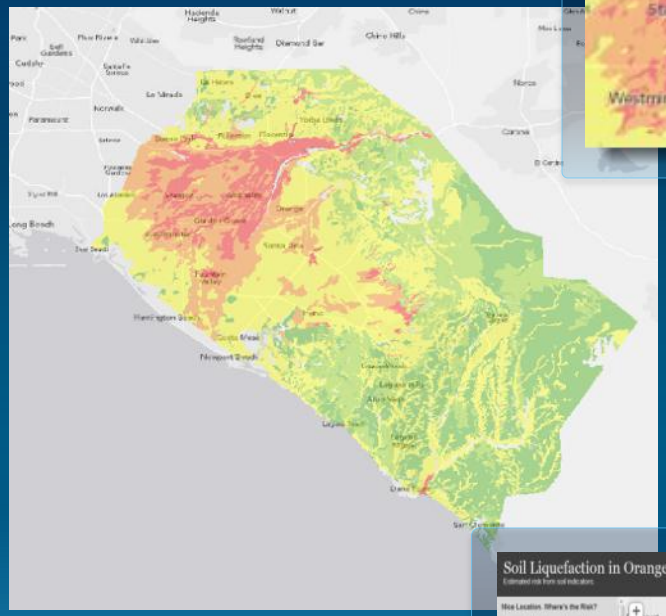
# Overall goal for this session

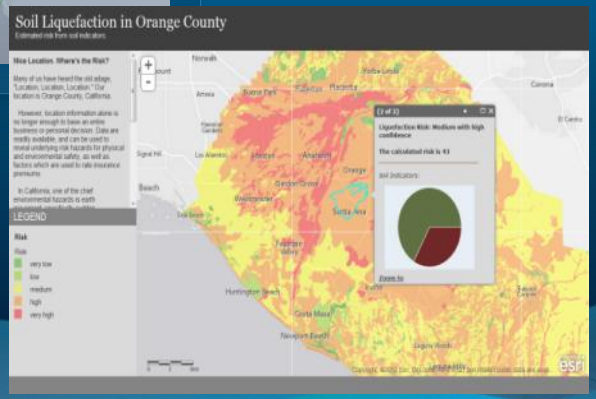
- Share many advanced cartographic techniques
- Show a variety of maps with an emphasis on web maps
- Cover a variety of themes
- Use examples to show techniques

# ArcGIS 10.1

- Online
- Desktop
- Server
- Mobile
- Developer
- Solutions



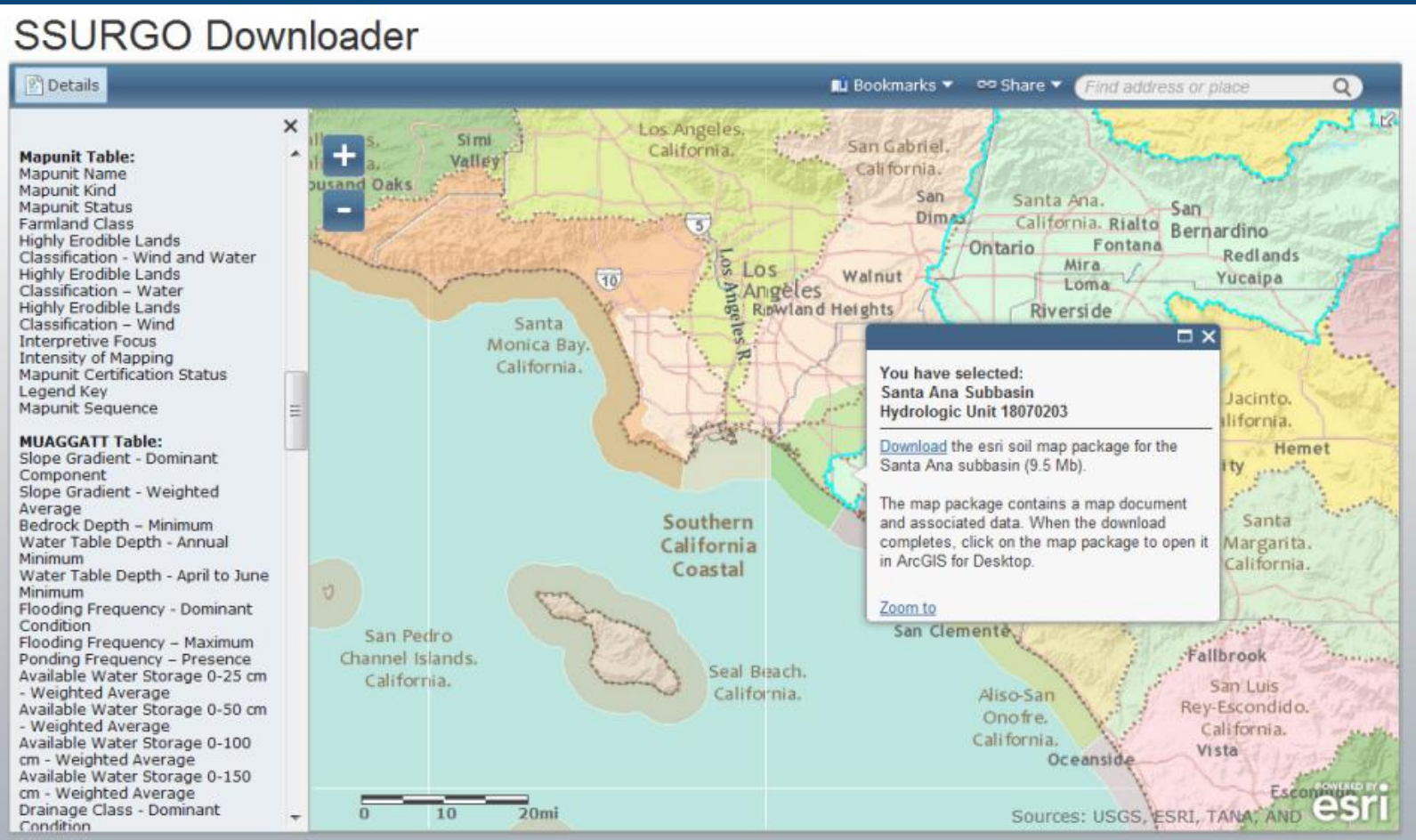





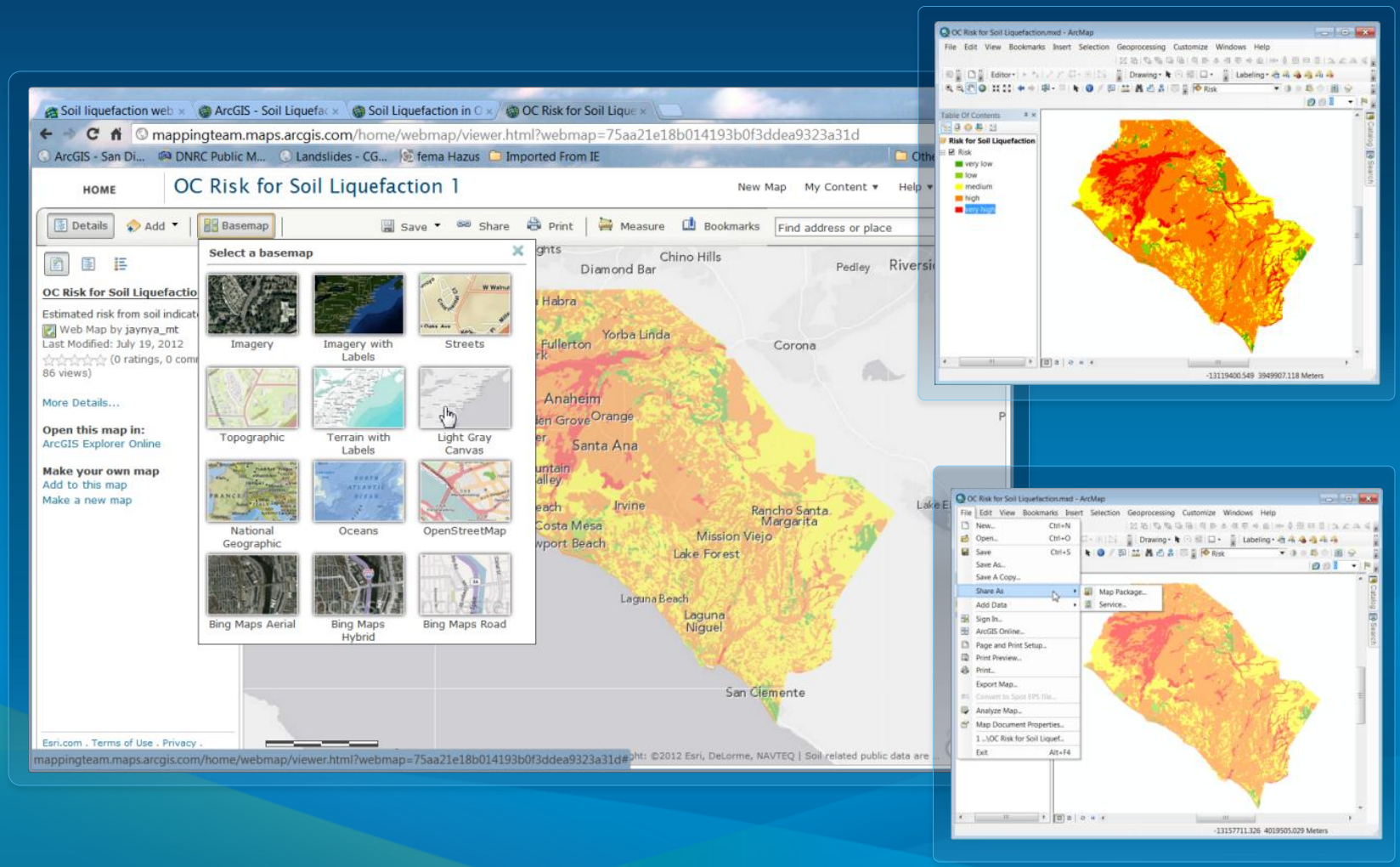

# Soil Liquefaction

Jaynya Richards

# *Data from watershed subbasins from the SSURGO Downloader*



# Original MXD



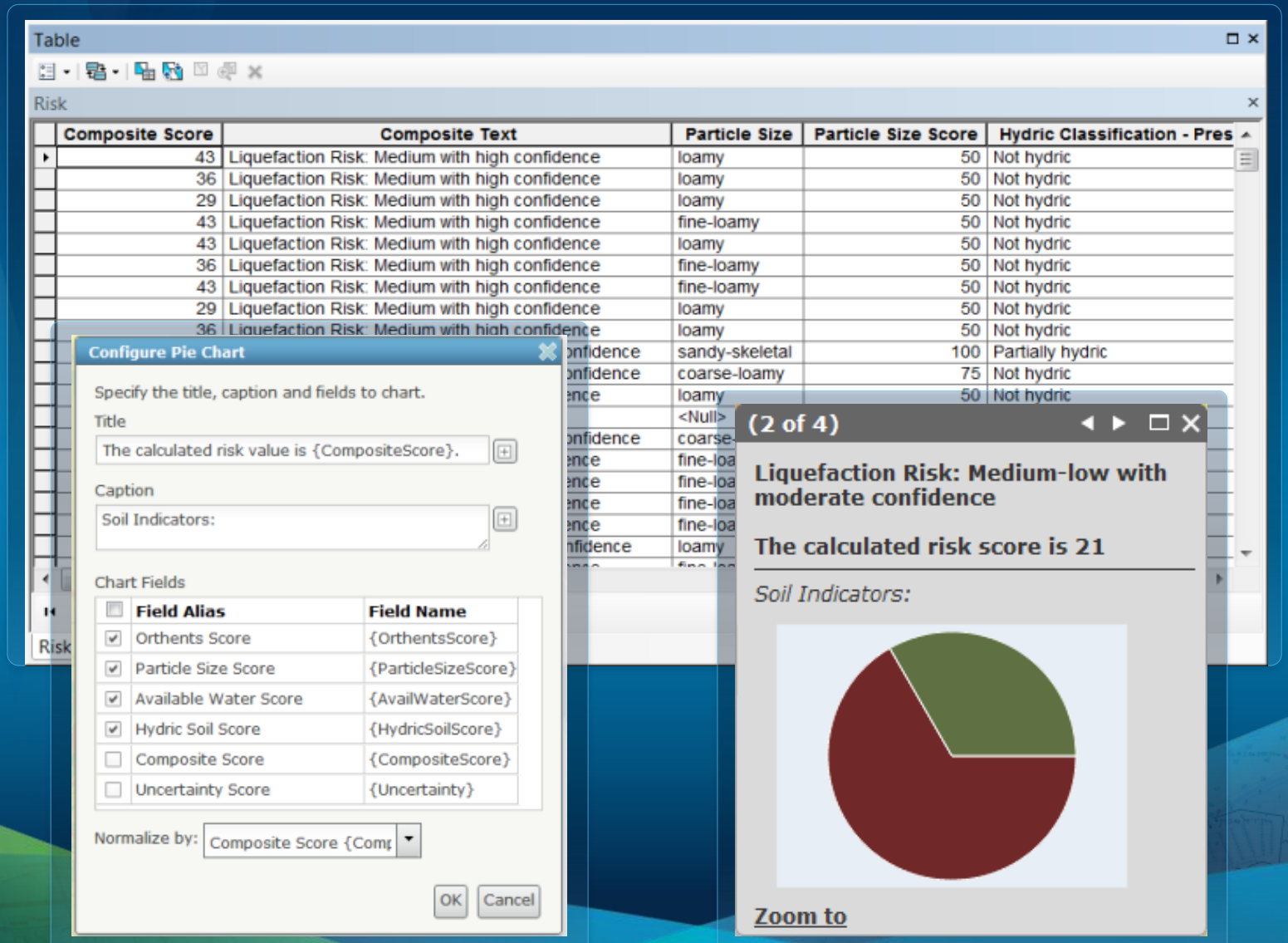
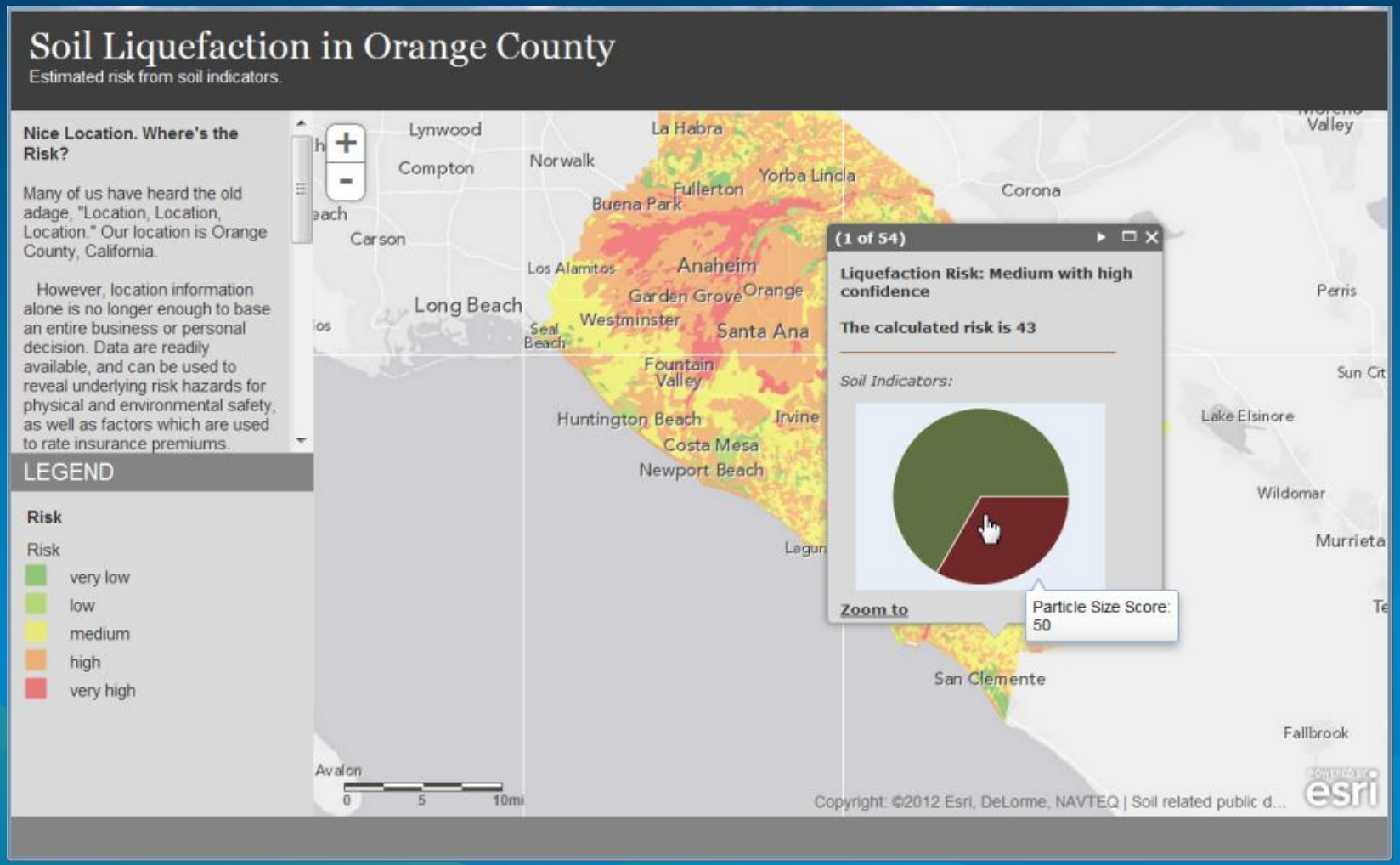
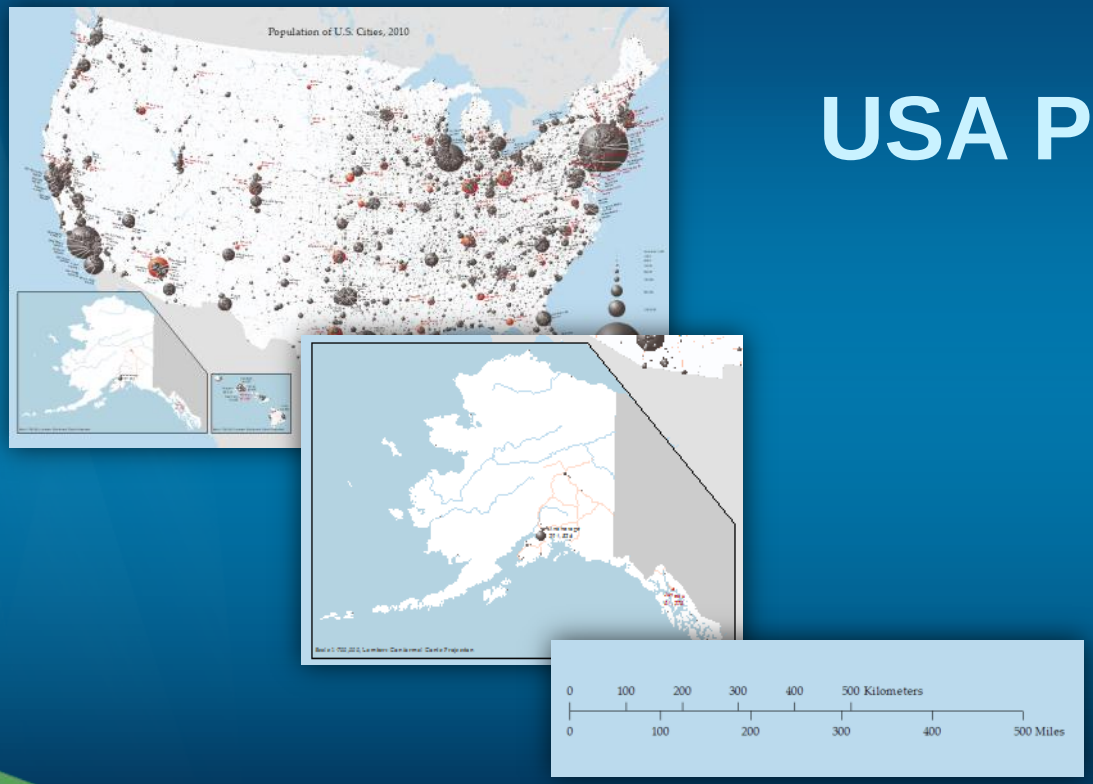


Table
Risk
Composite Score
Composite Text
Particle Size
Particle Size Score
Hydric Classification - Pres
43 Liquefaction Risk: Medium with high confidence loamy 50 Not hydric
36 Liquefaction Risk: Medium with high confidence loamy 50 Not hydric
29 Liquefaction Risk: Medium with high confidence loamy 50 Not hydric
43 Liquefaction Risk: Medium with high confidence fine-loamy 50 Not hydric
43 Liquefaction Risk: Medium with high confidence loamy 50 Not hydric
36 Liquefaction Risk: Medium with high confidence fine-loamy 50 Not hydric
43 Liquefaction Risk: Medium with high confidence fine-loamy 50 Not hydric
29 Liquefaction Risk: Medium with high confidence loamy 50 Not hydric
36 Liquefaction Risk: Medium with high confidence loamy 50 Not hydric
sandy-skeletal 100 Partially hydric
coarse-loamy 75 Not hydric
loamy 50 Not hydric
Configure Pie Chart
Specify the title, caption and fields to chart.
Title
The calculated risk value is {CompositeScore}.
Caption
Soil Indicators:
Chart Fields
Field Alias
Field Name
Orthents Score {OrthentsScore}
Particle Size Score {ParticleSizeScore}
Available Water Score {AvailWaterScore}
Hydric Soil Score {HydricSoilScore}
Composite Score {CompositeScore}
Uncertainty Score {Uncertainty}
Normalize by:
Composite Score {Com
OK
Cancel
(2 of 4)
Liquefaction Risk: Medium-low with moderate confidence
The calculated risk score is 21
Soil Indicators:
Zoom to

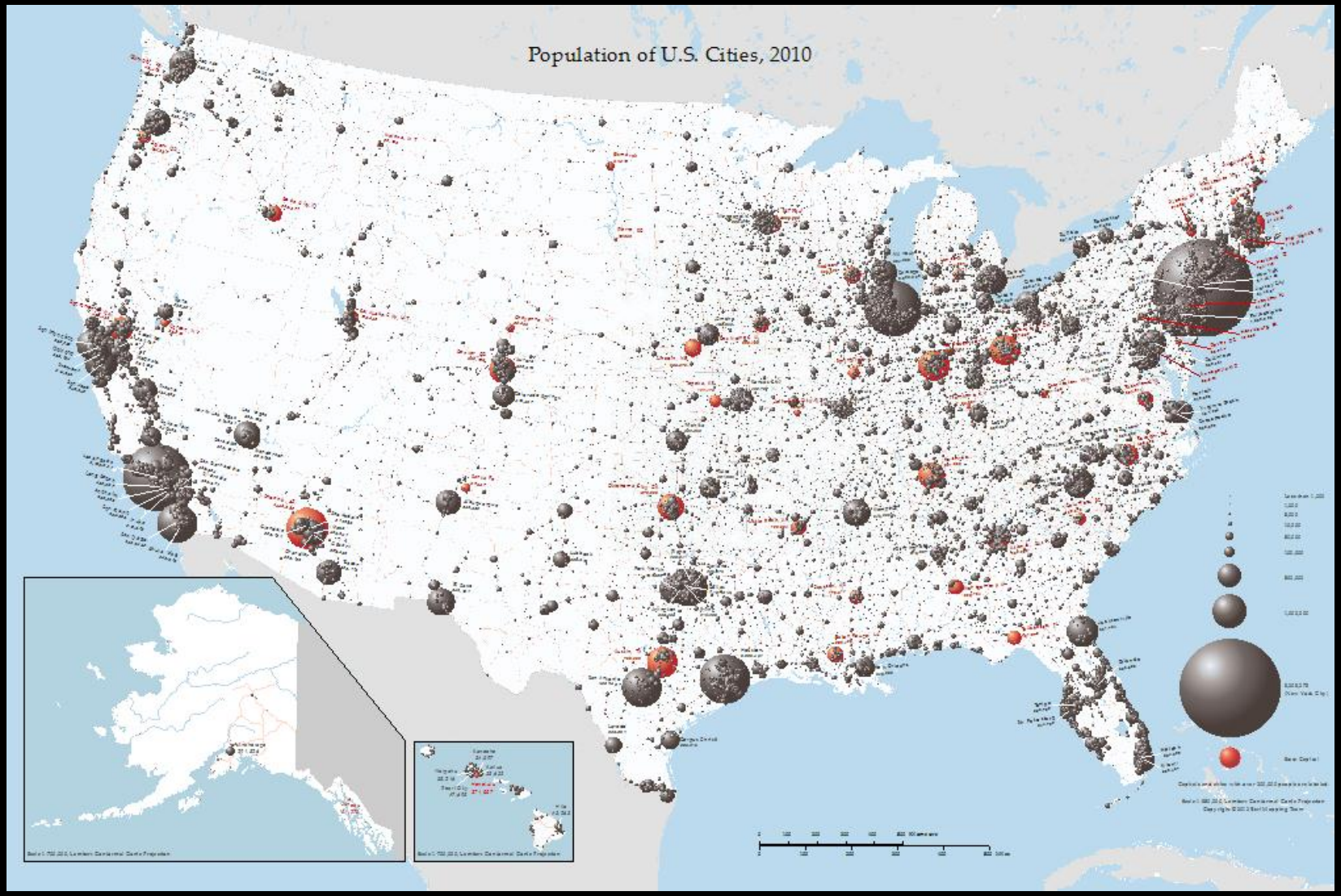
# Soil Liquefaction web map application



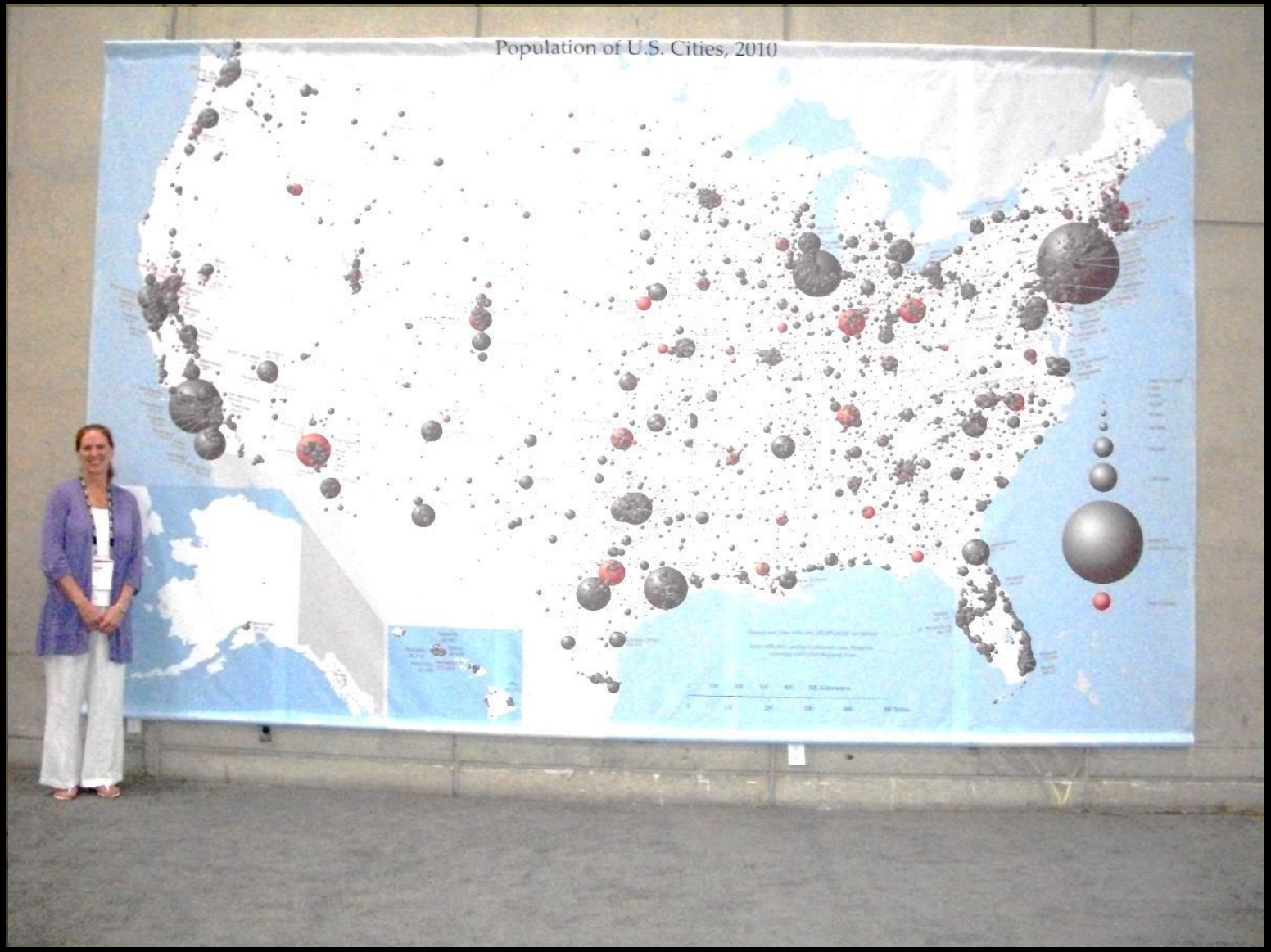



# USA Population, 2010

Aileen Buckley
(Andrew Norris)


Population of U.S. Cities, 2010

Population of U.S. Cities, 2010


Population of U.S. Cities, 2010

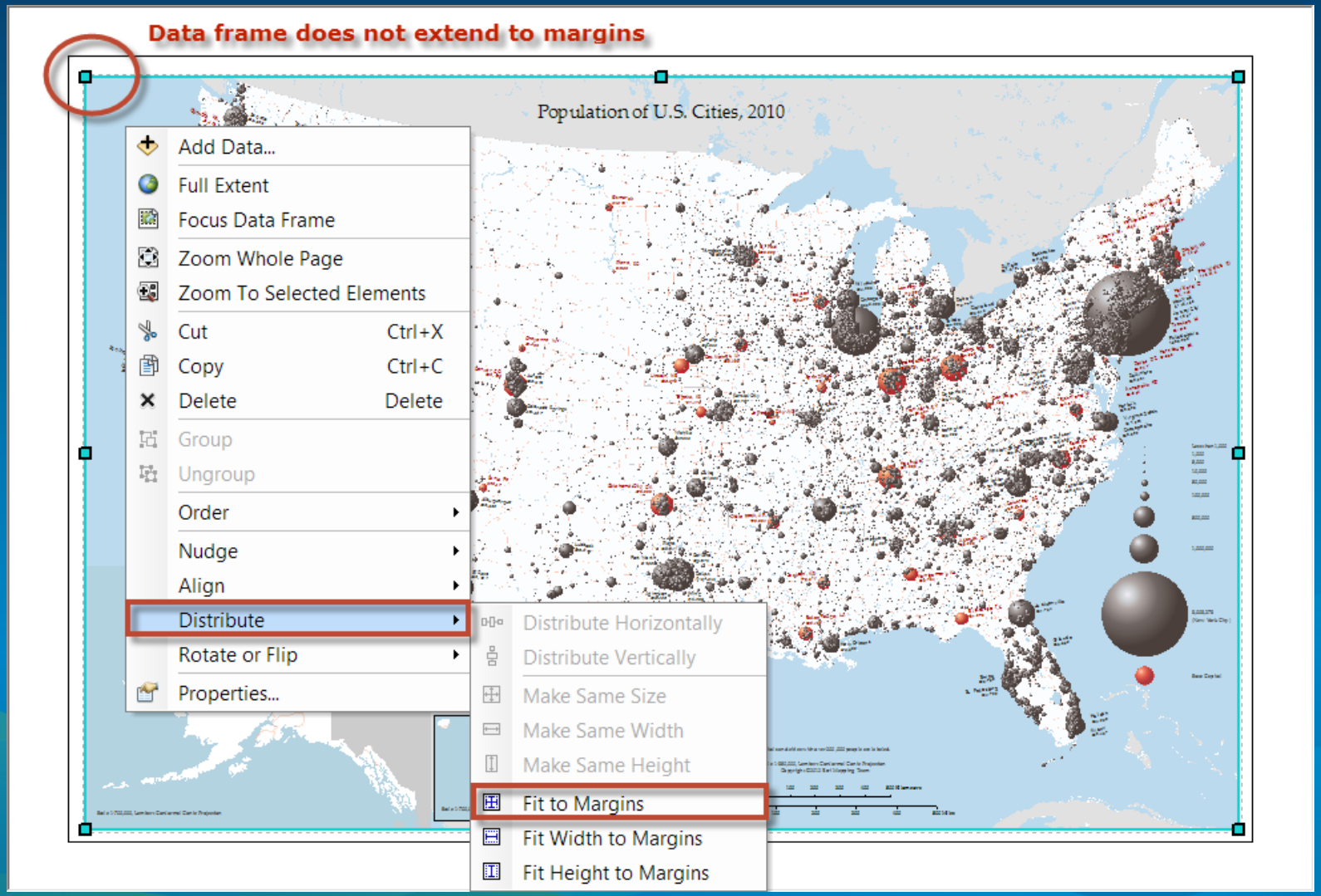
# Tips and tricks

- Setting up the page for full bleed printing
- Aligning scale bars
- Clipping the data frame
- Using PNG files in picture marker symbols
- Flattening layers into a single raster

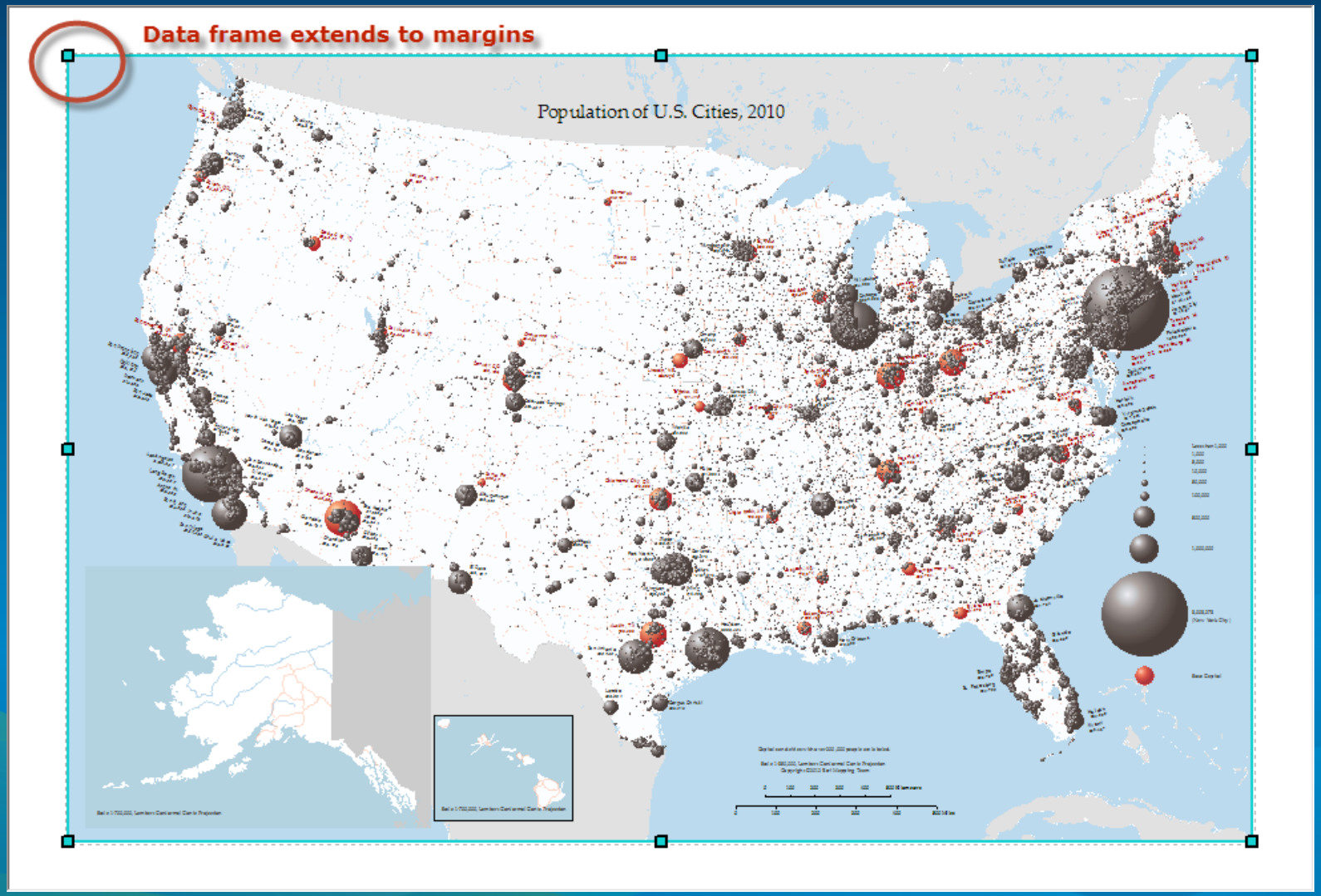
# Demo

USA Population, 2010

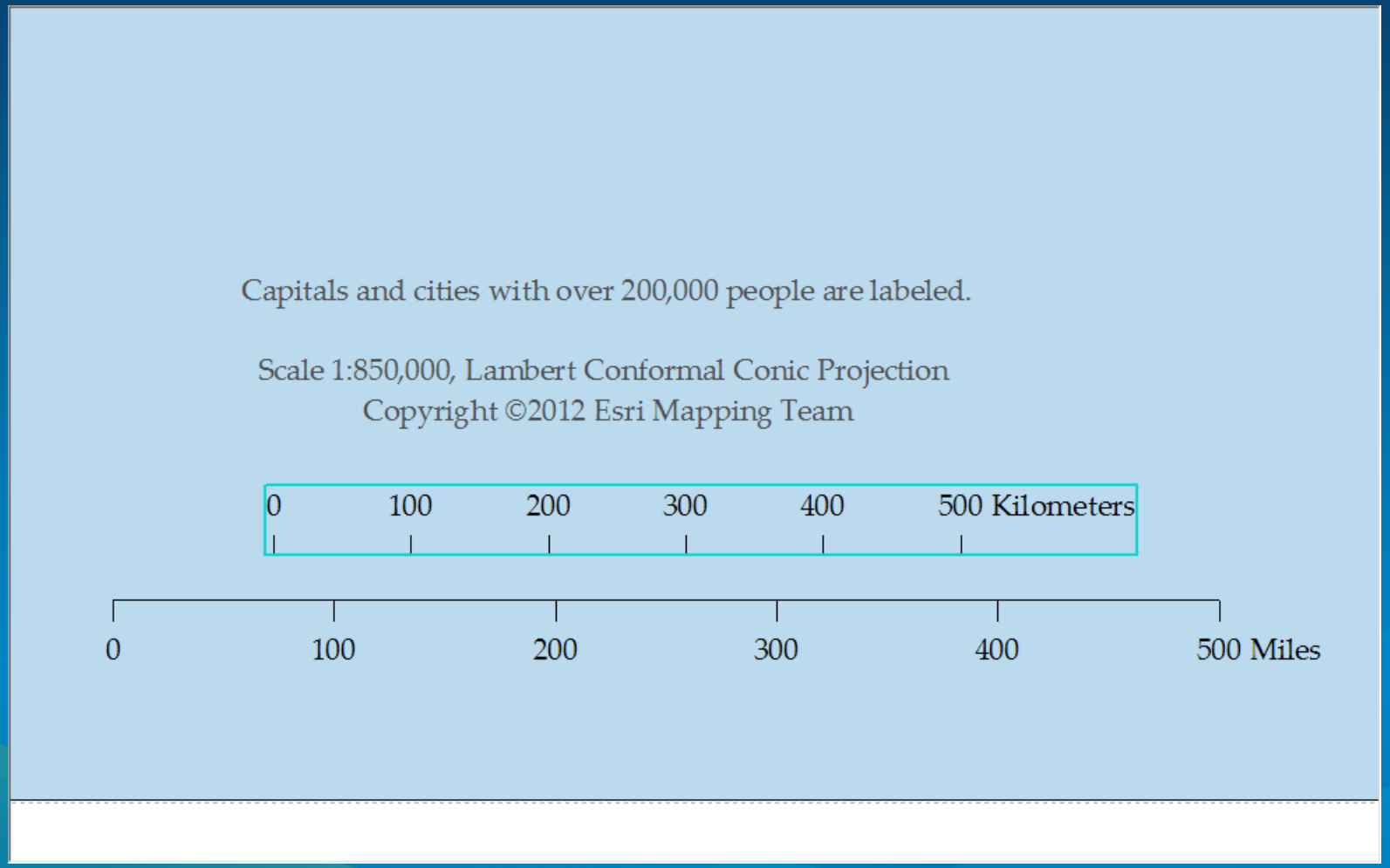
# Setting up the page for full bleed printing - 1



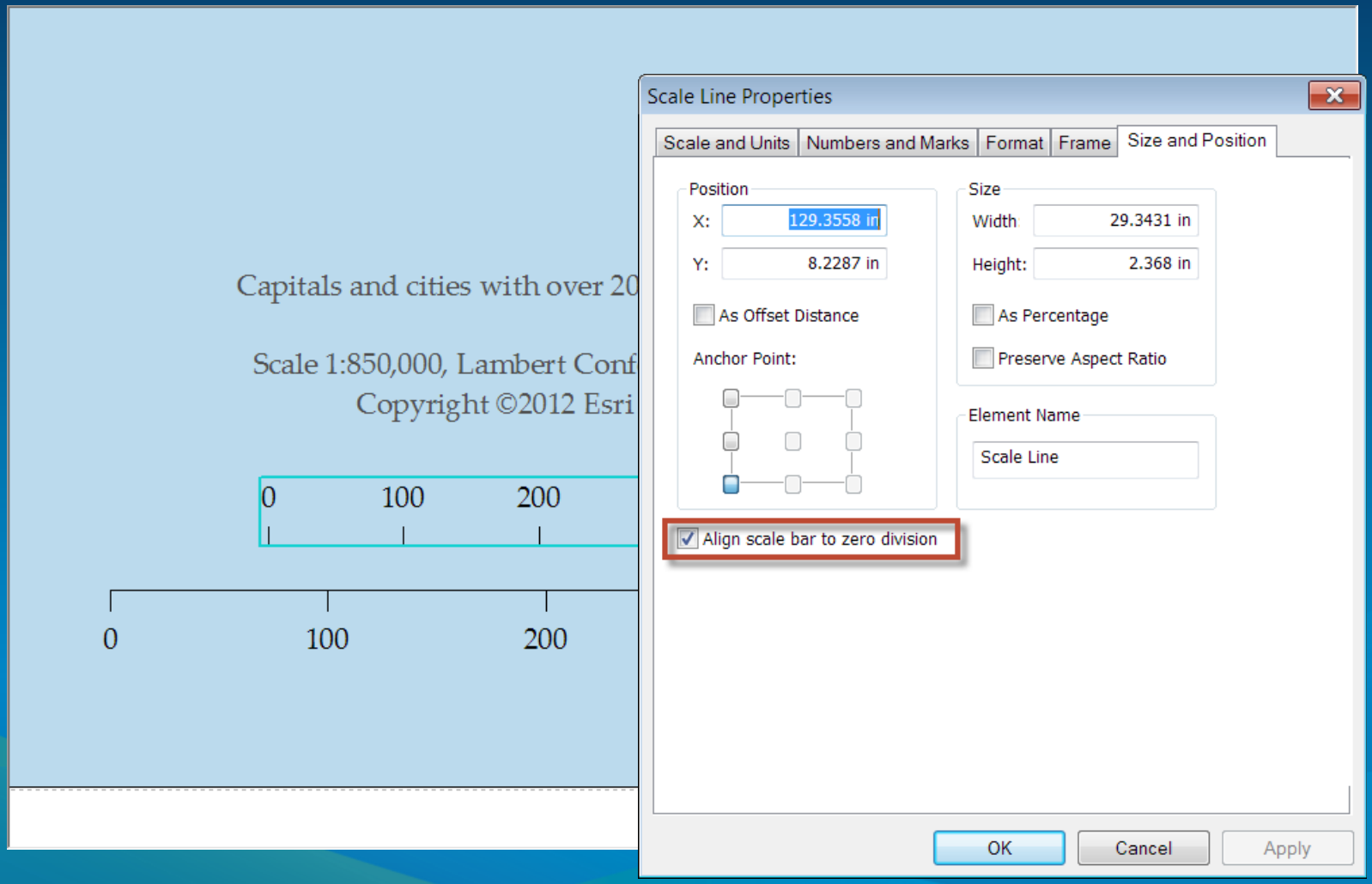
# Setting up the page for full bleed printing - 2



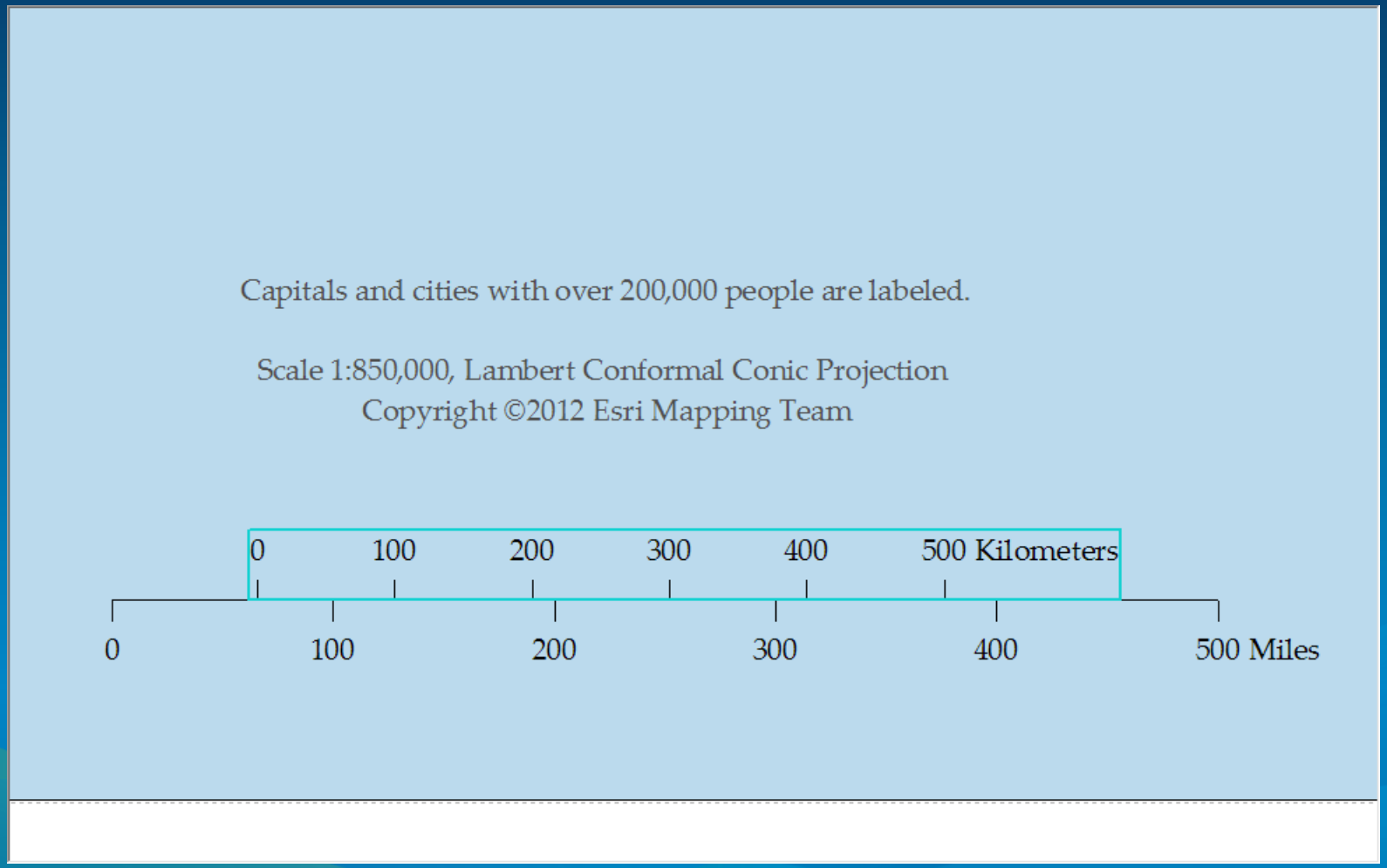
# Aligning scale bars – Check properties of scale bars



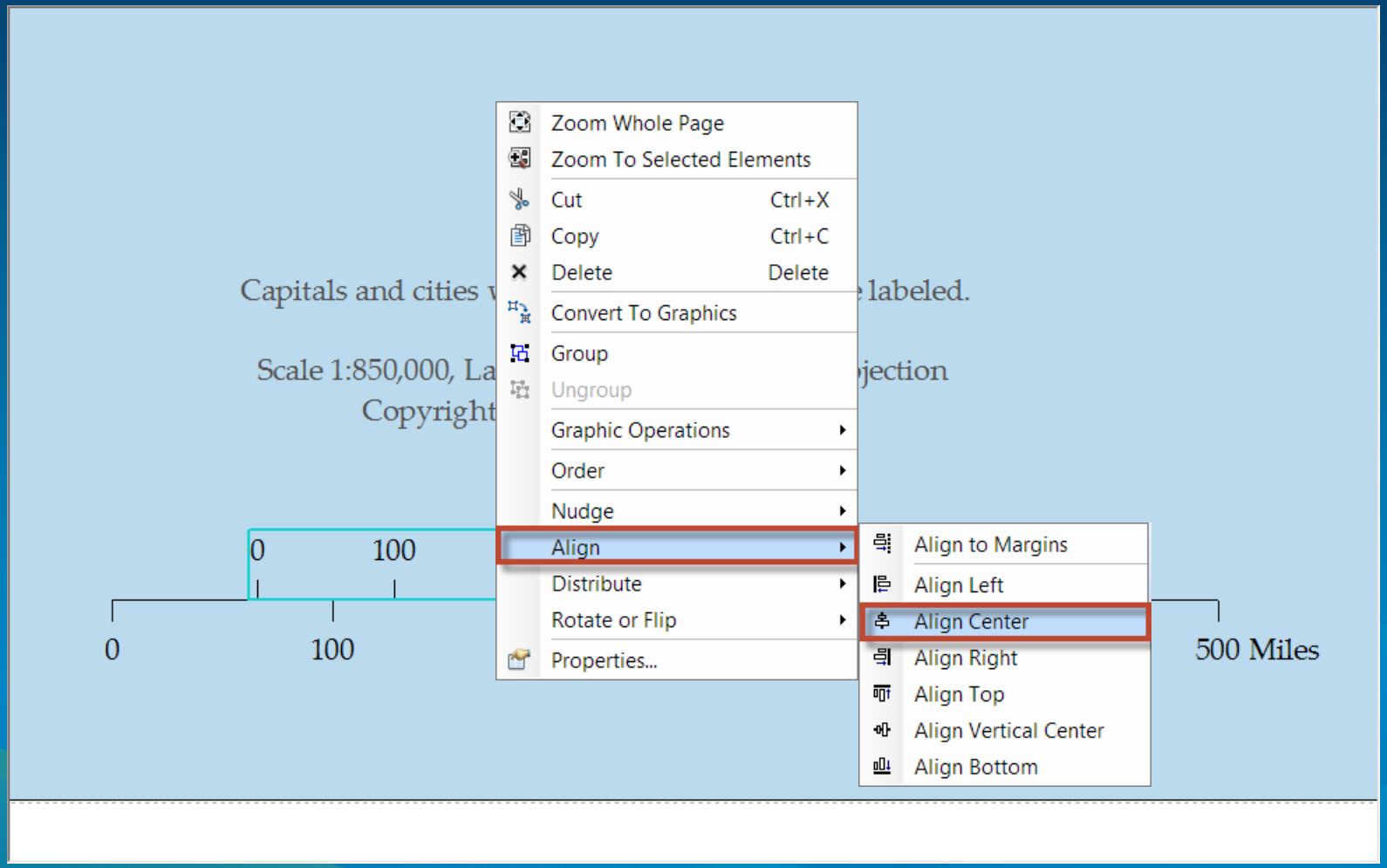
# Aligning scale bars – Set option to align to zero



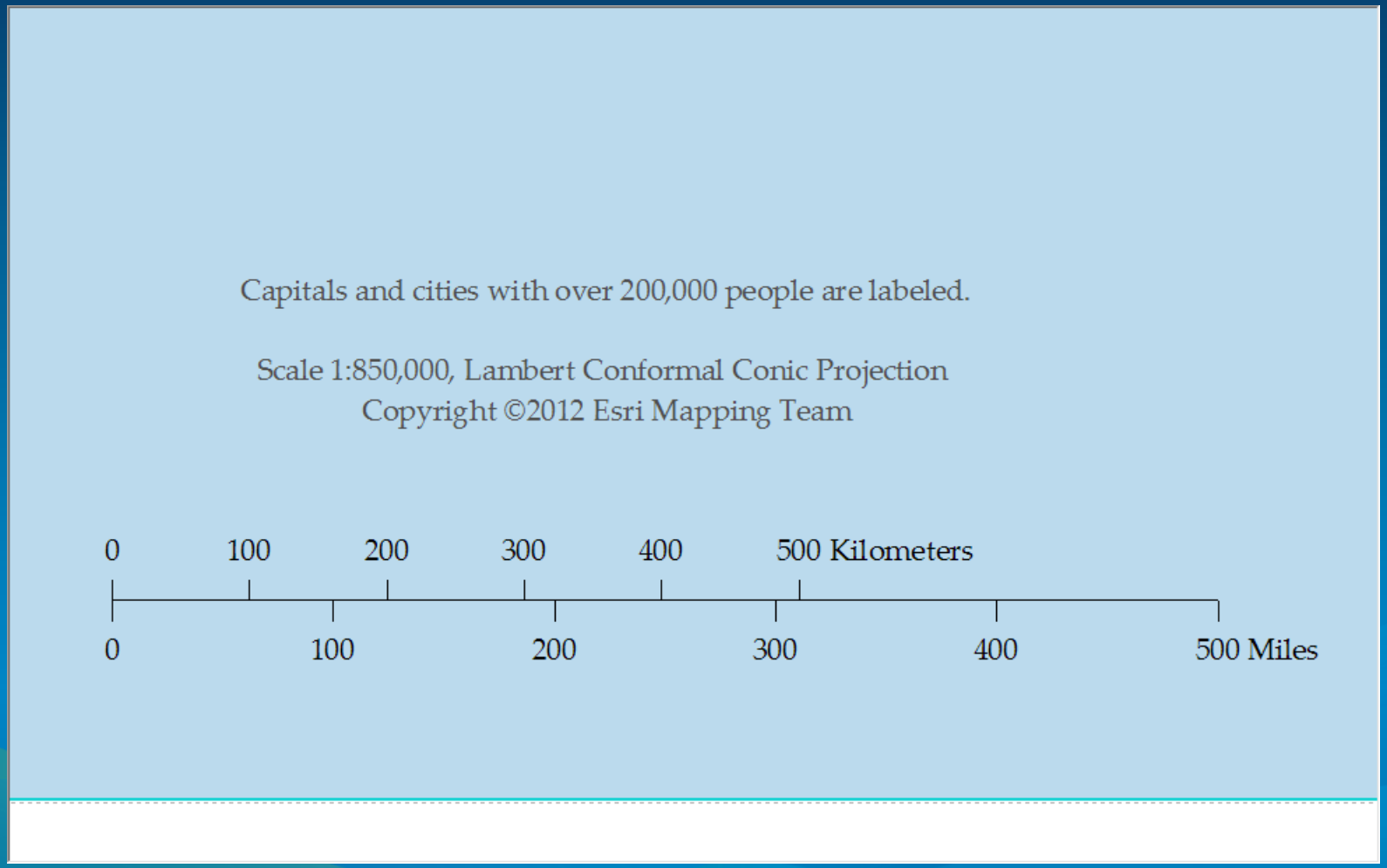
# Align scale bars – Align them vertically



# Align scale bars – Select both and align to center



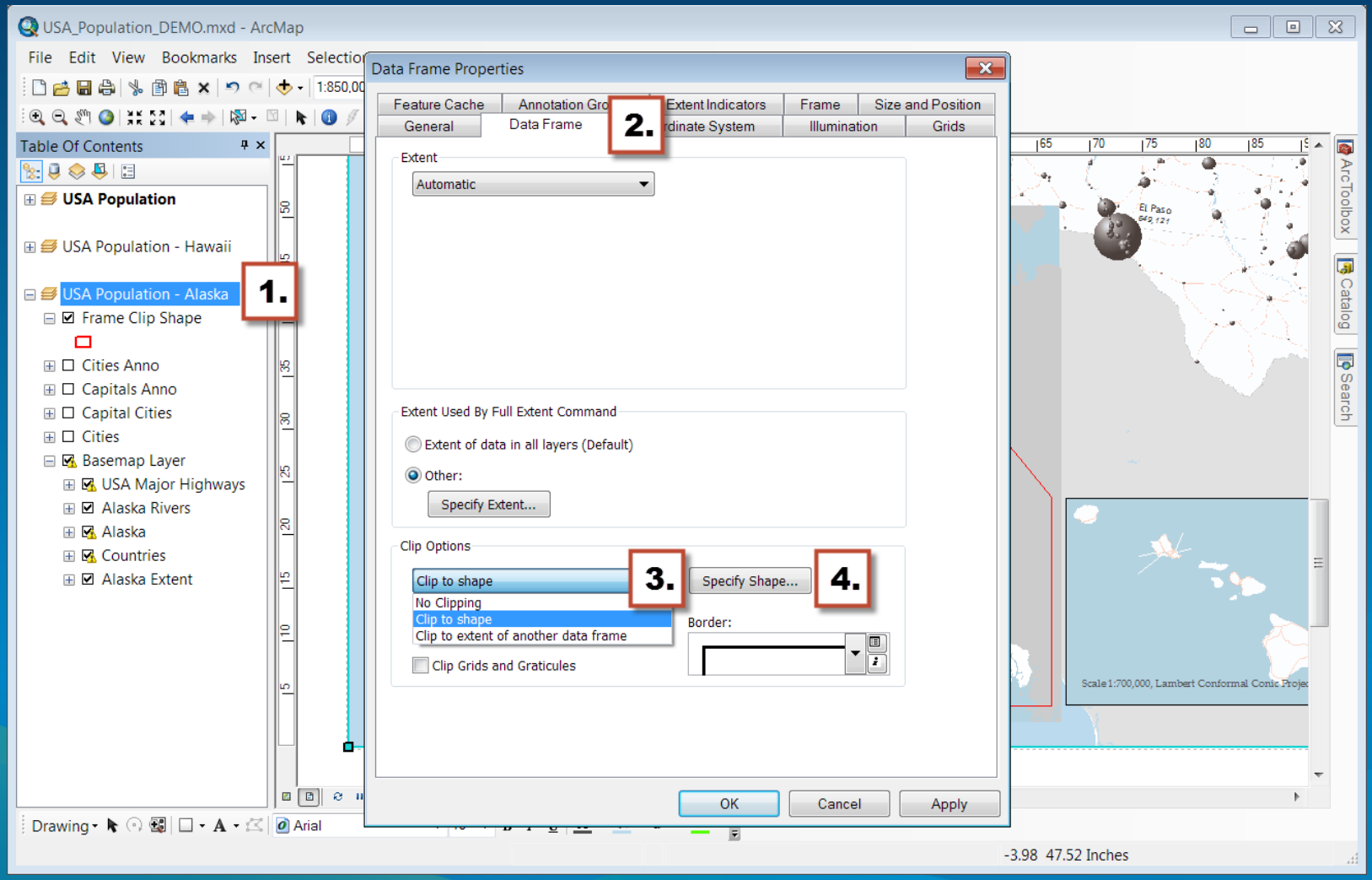
# Align scale bars – Scale bars will align to zero



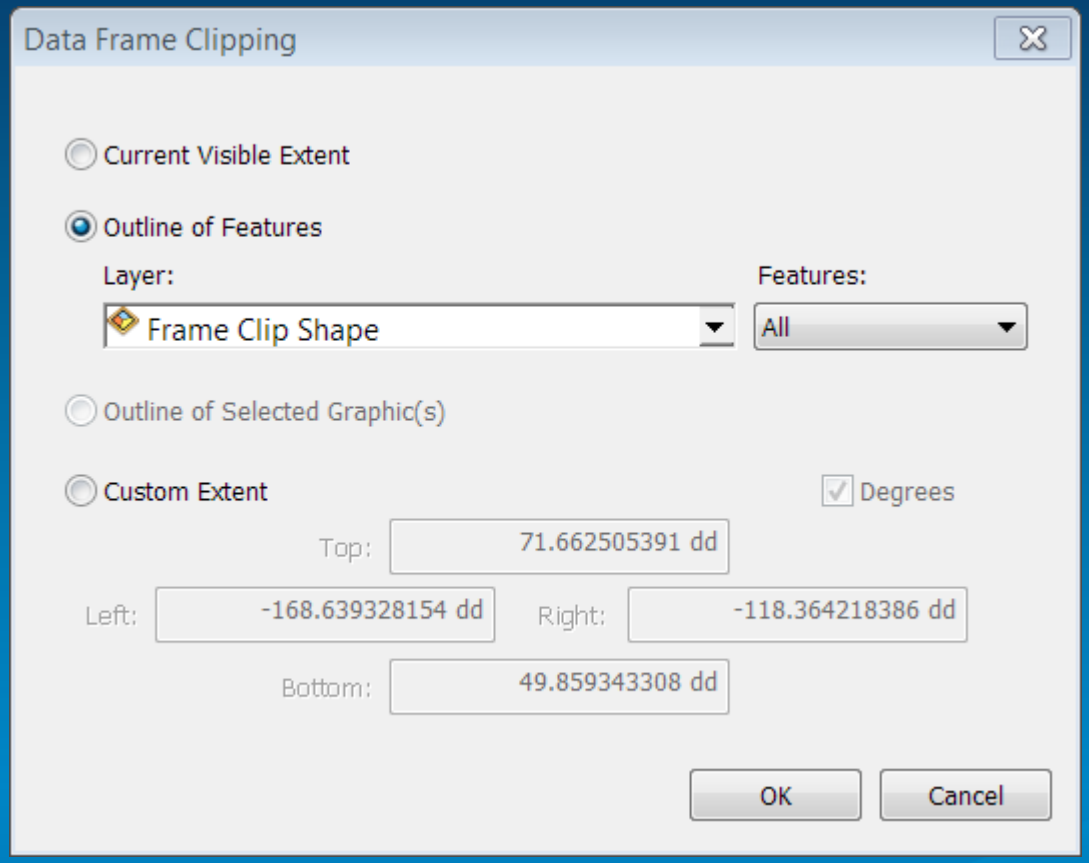
# Clipping the data frame

- Right-click data frame name in table of contents
- Properties > Data Fame > Clipping
- Clip to Shape
- Specify Shape
  - Outline of Features
  - Outline of Selected Graphics

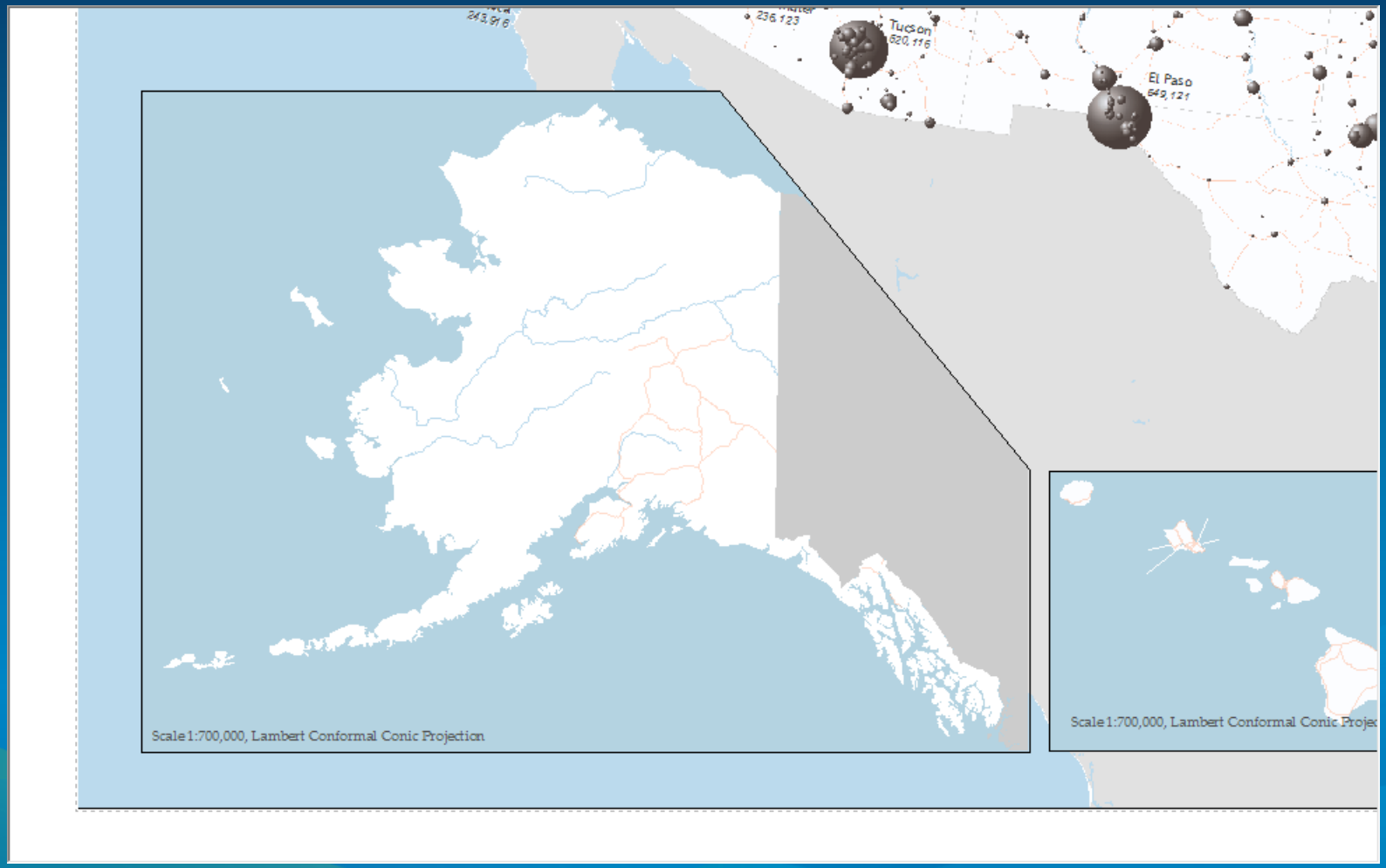
# Clipping the data frame



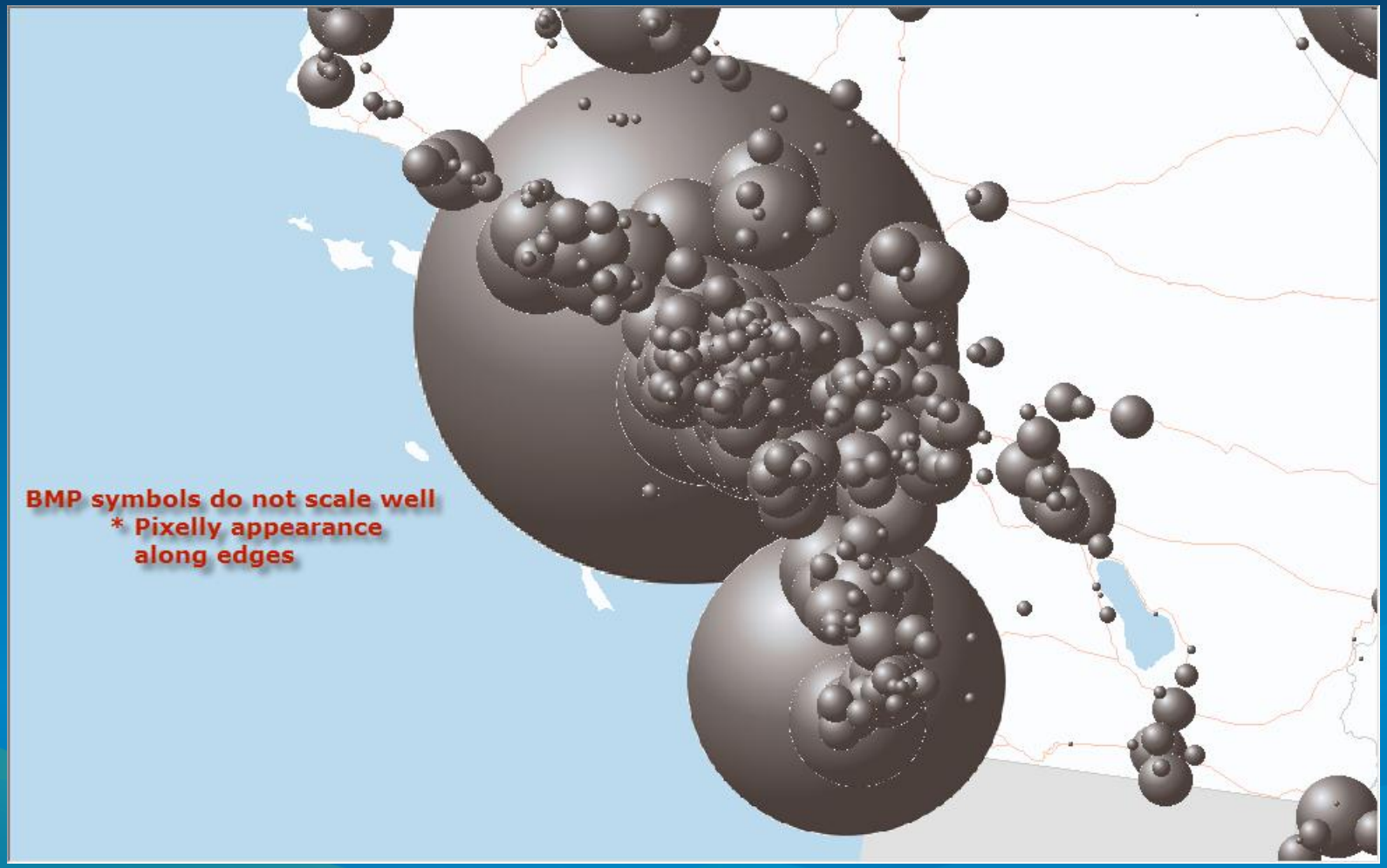
# Clipping the data frame



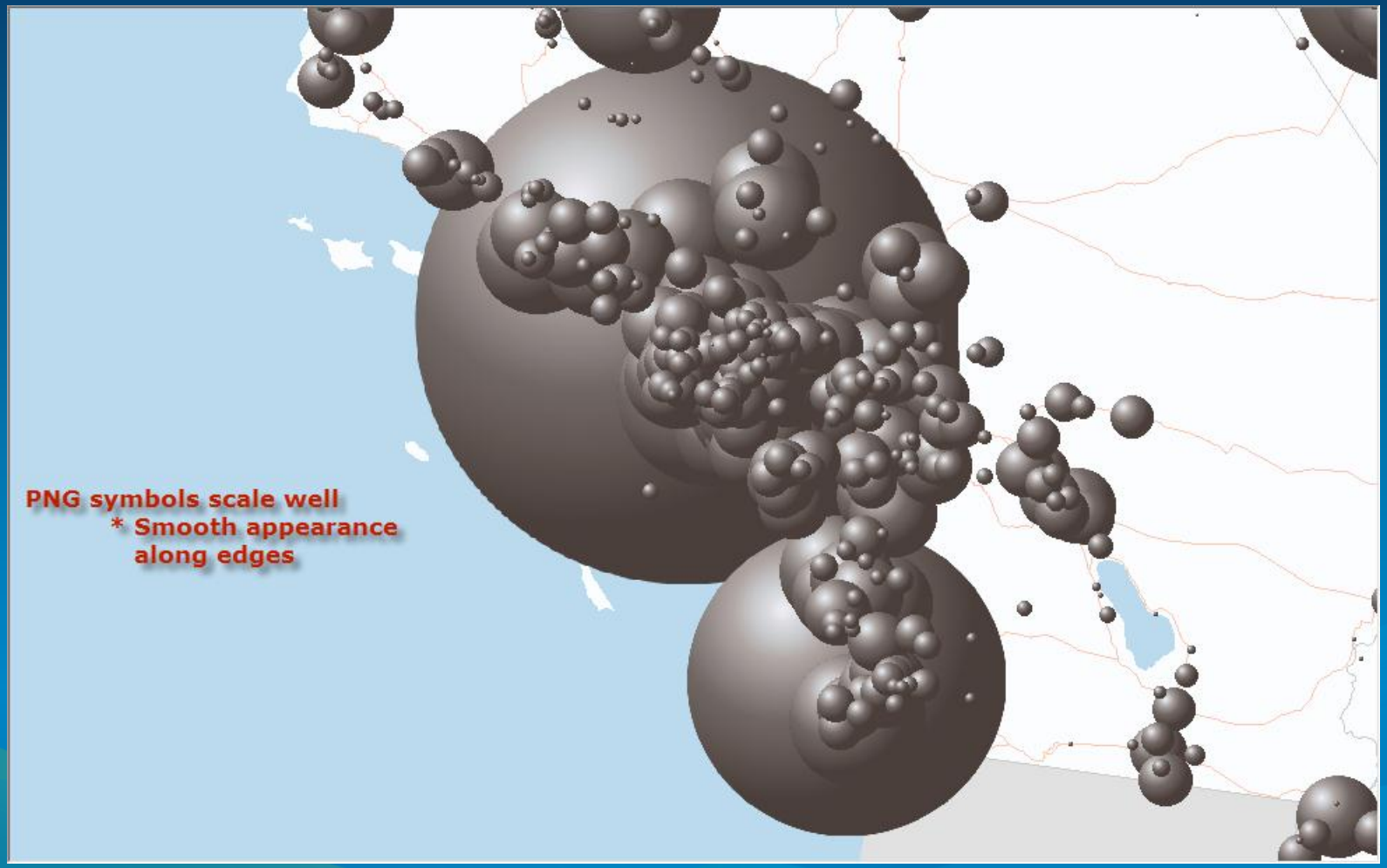
# Clipping the data frame



# Using PNG files in picture marker symbols

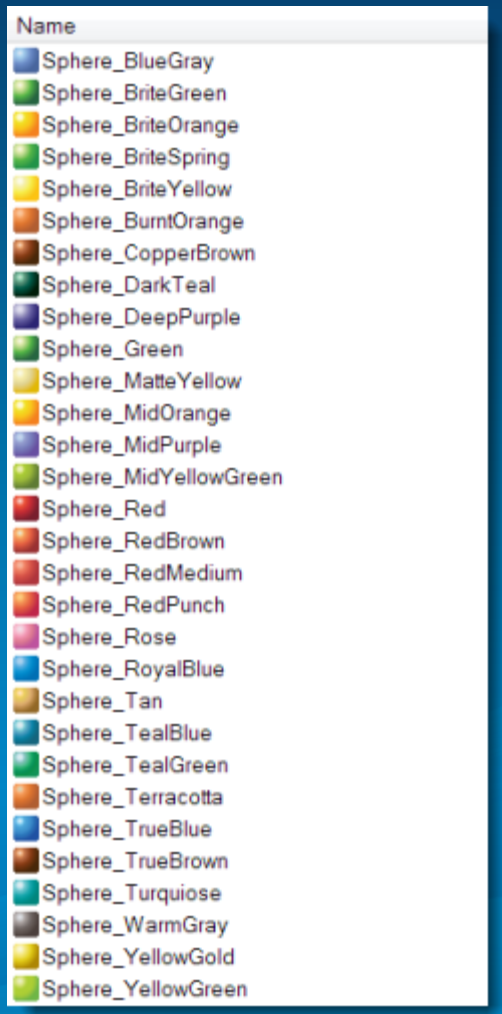


# Using PNG files in picture marker symbols

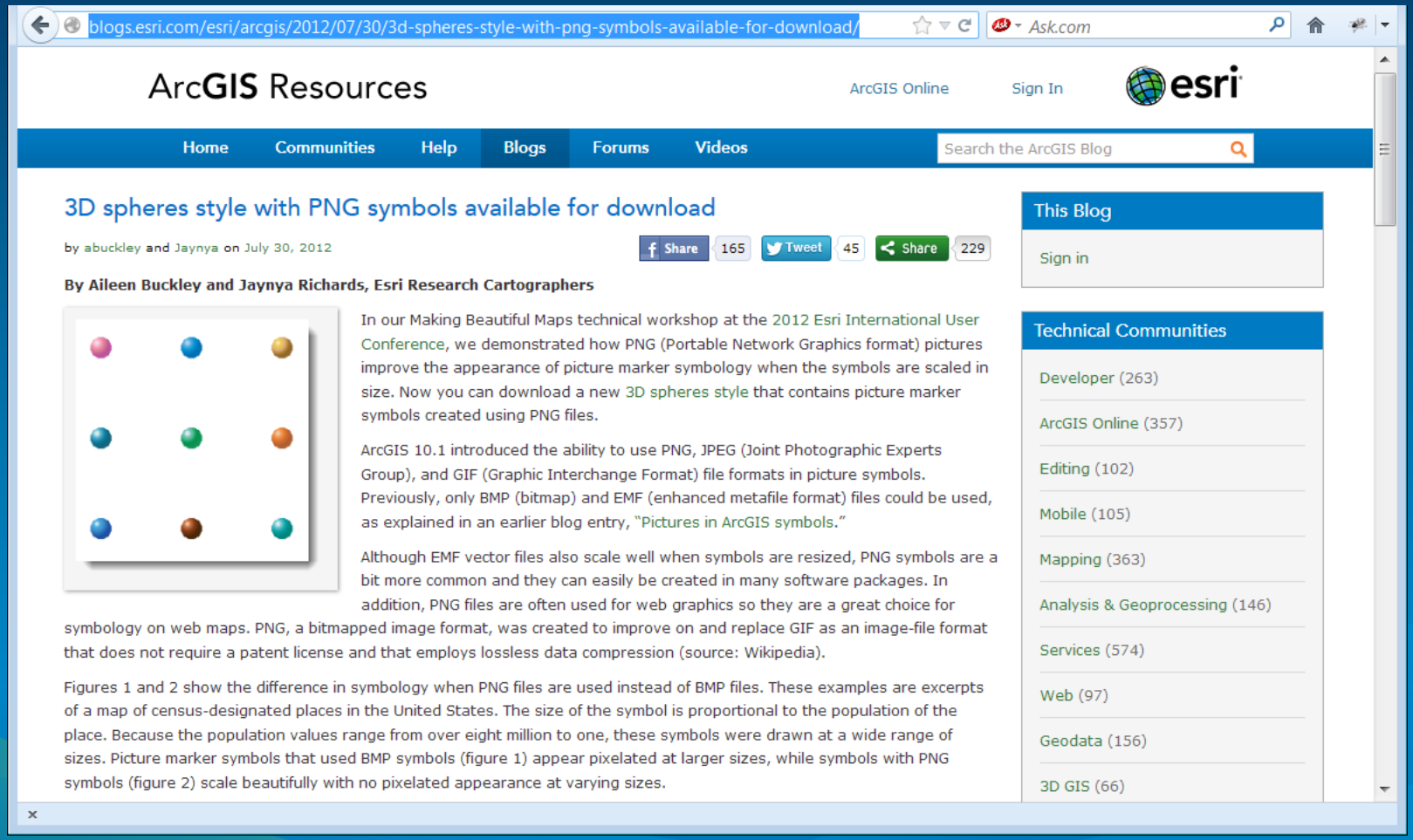


# Using PNG files in picture marker symbols

- **Ability to use PNG, JPEG, and GIF file formats Is new in ArcGIS 10.1 !**
- **A new style containing PNG symbols for spheres of different colors is now available for download**
  - **blogs.esri.com > Search “3D spheres style”**



# 3D spheres style



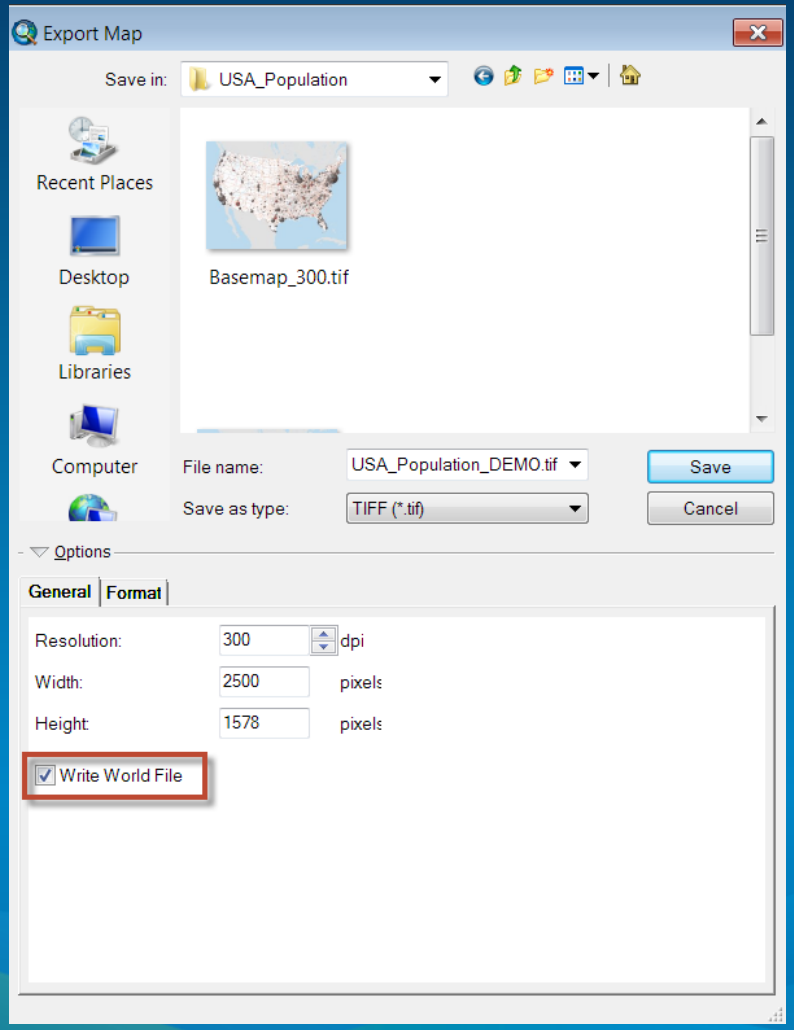
# Flattening layers into a single raster

- When it takes a LONG time for the map to draw each time
  - E.g., when editing annotation

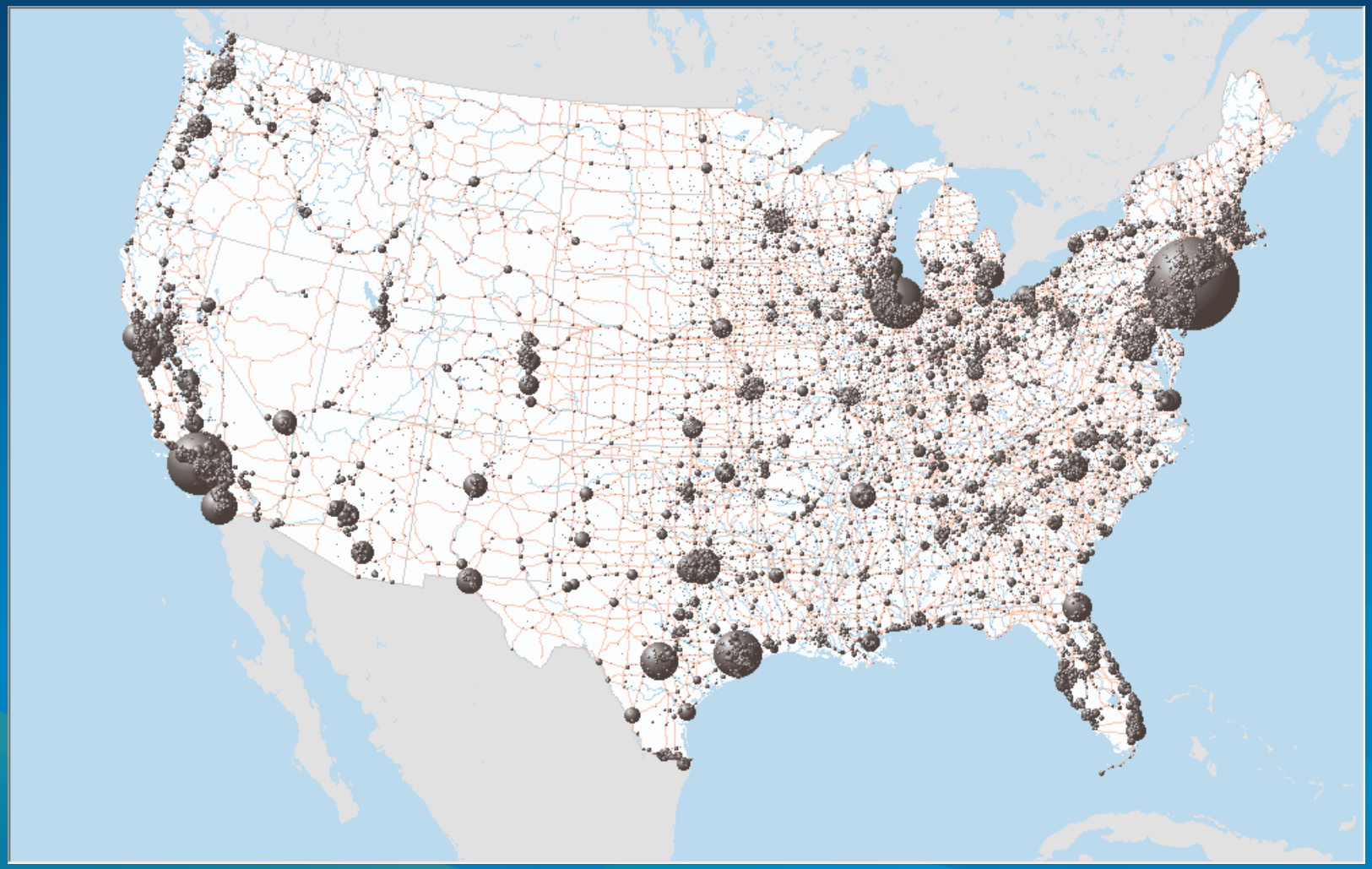
1. Turn on all layers that you want to display in the raster
2. In DATA VIEW > Zoom to the extent that you want the raster to cover
3. Export Map
4. Use a format that has the option to write a World File
   - BMP, JPEG, PNG, TIF, GIG300
5. Set Stretch to None

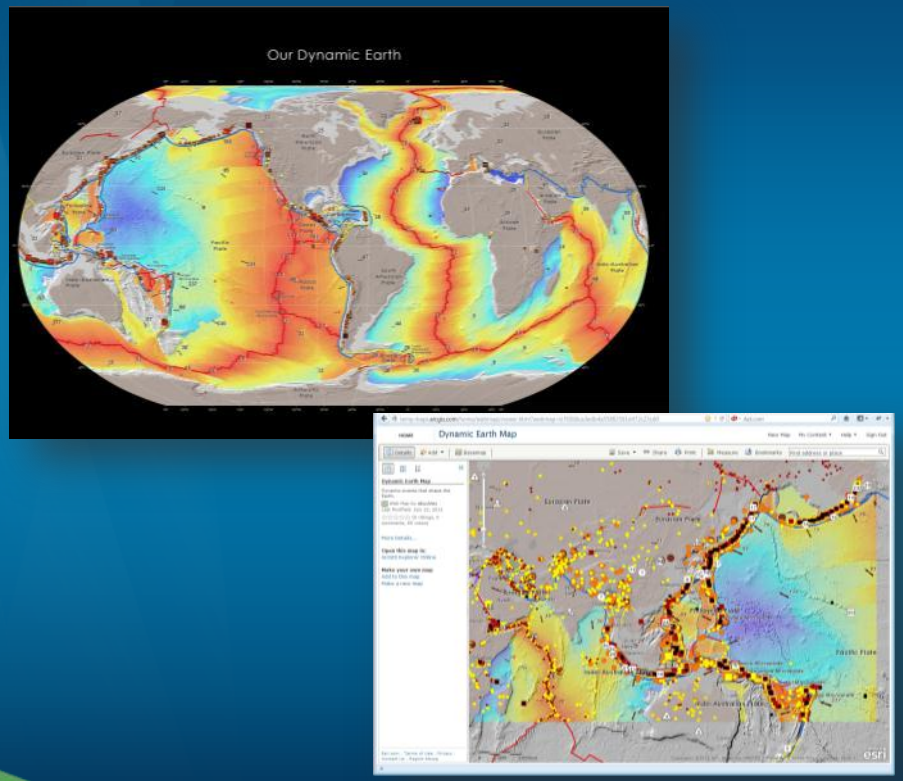
- TIP: For higher resolution in the final exported map, use the original layers, not the flattened raster

# Flattening layers into a single raster



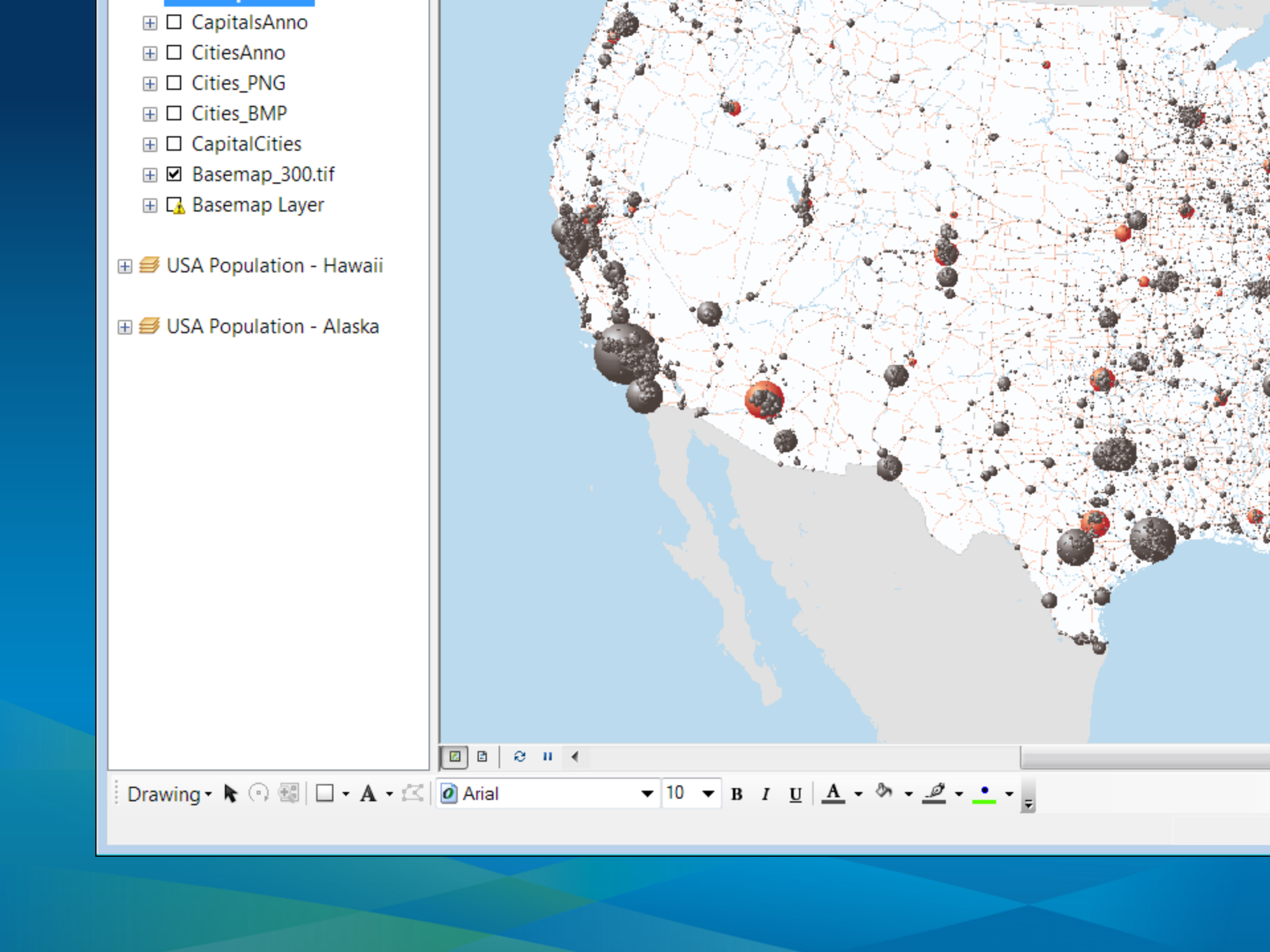
# Flattening layers into a single raster






# Our Dynamic Earth

Aileen Buckley
(Andrew Norris)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CitiesAnno
Cities_PNG
Cities_BMP
CapitalCities
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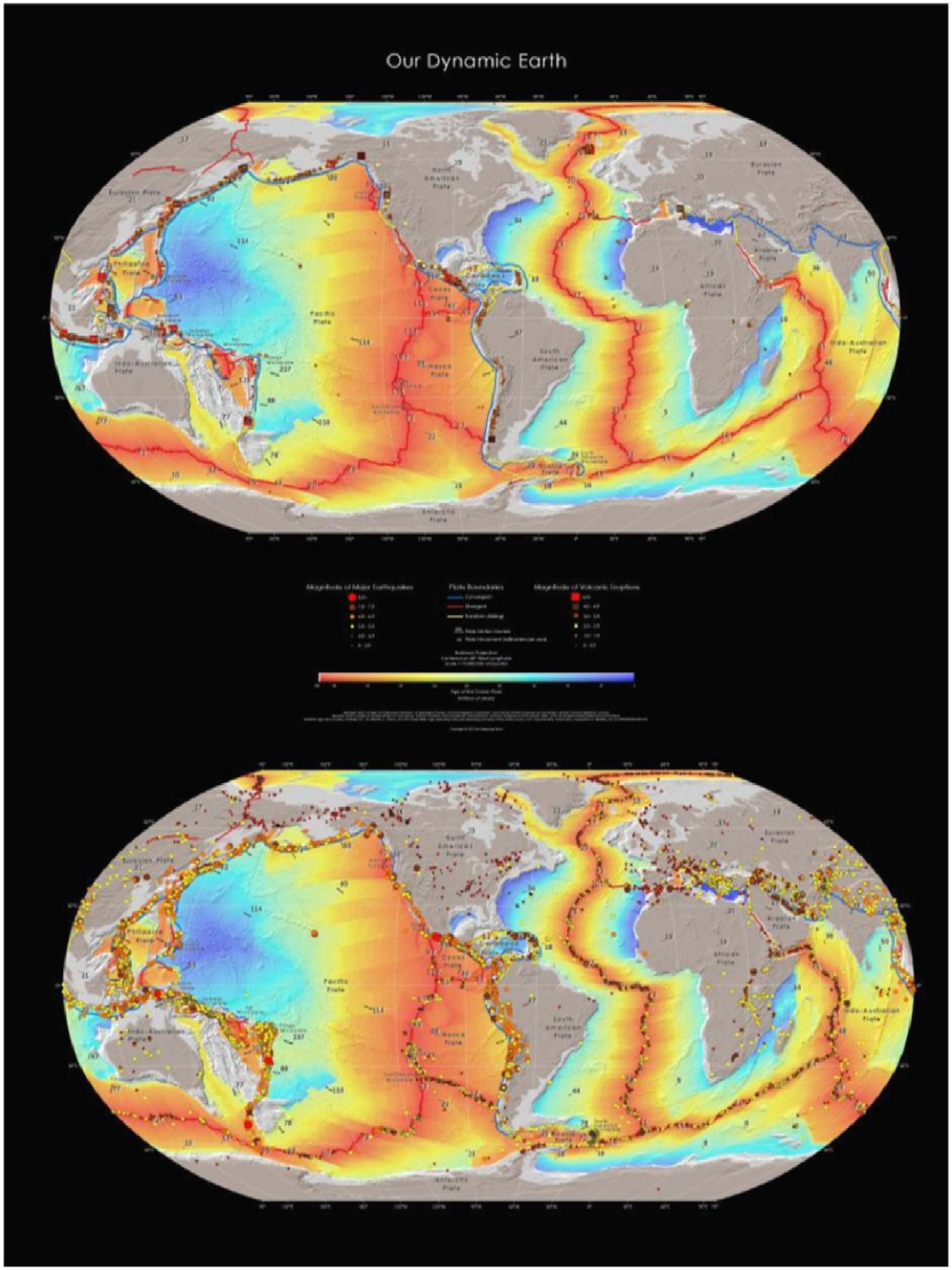
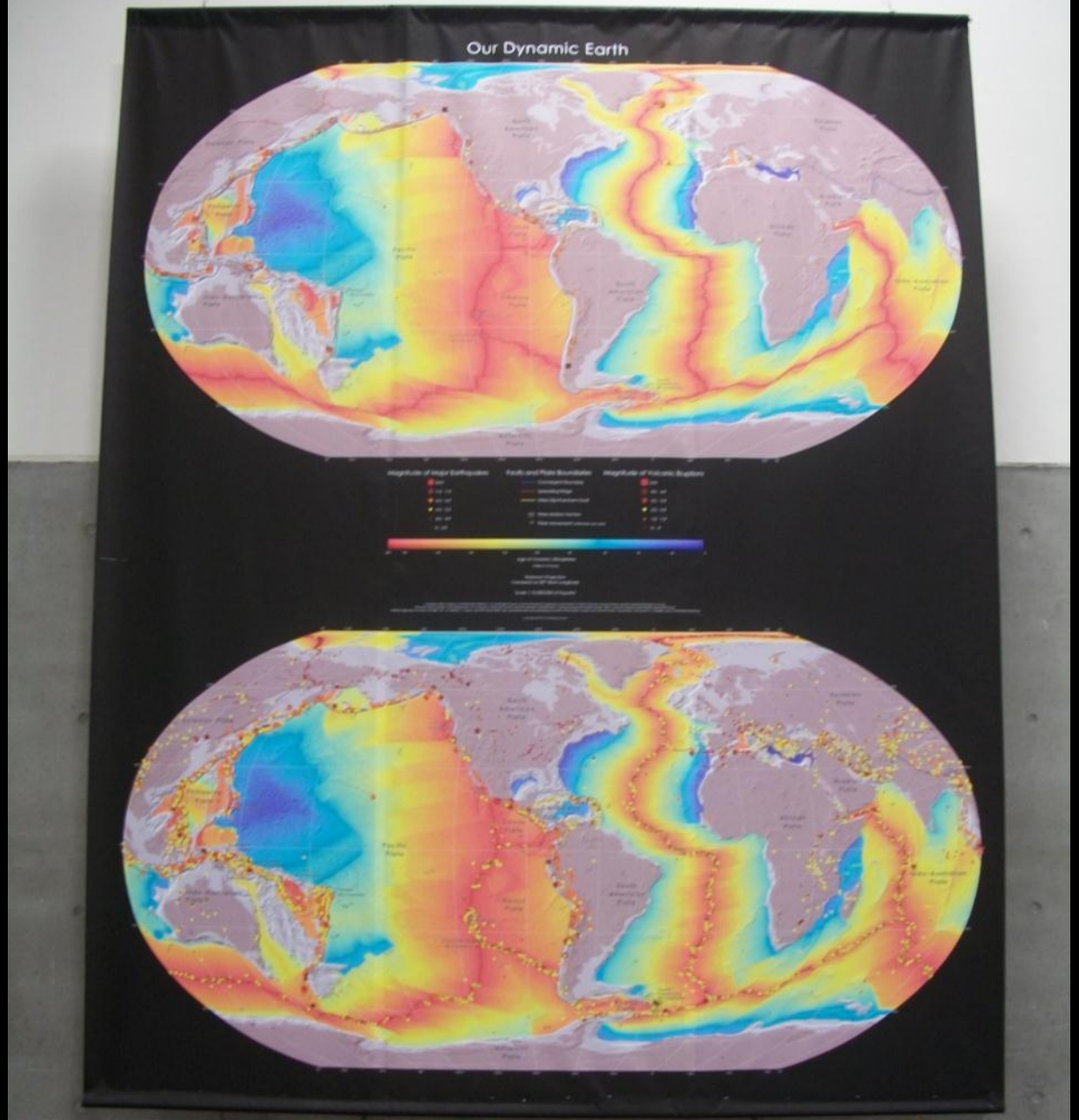
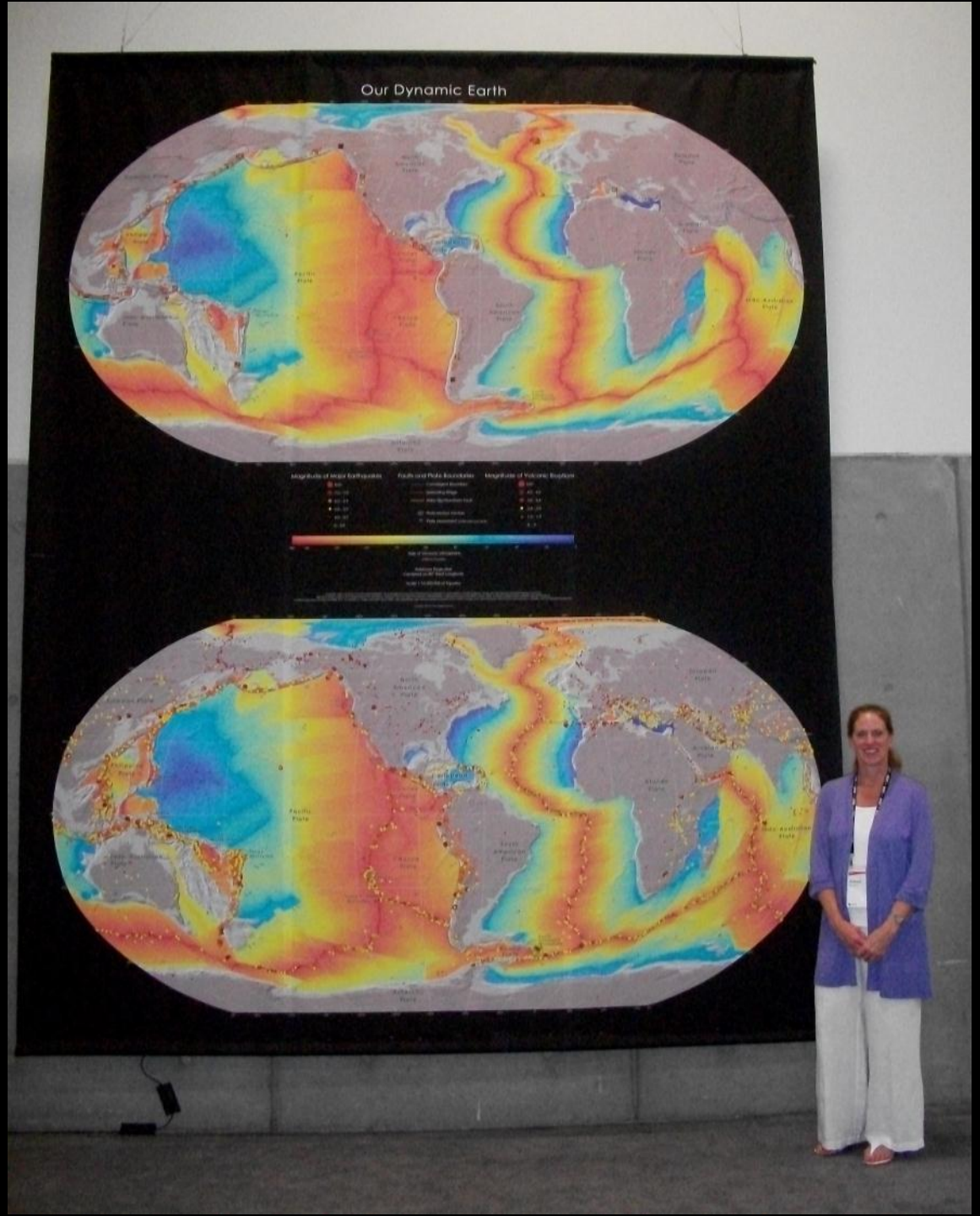
Basemap Layer
USA Population - Hawaii
USA Population - Alaska
Drawing
Arial
10

# Our Dynamic Earth




Our Dynamic Earth

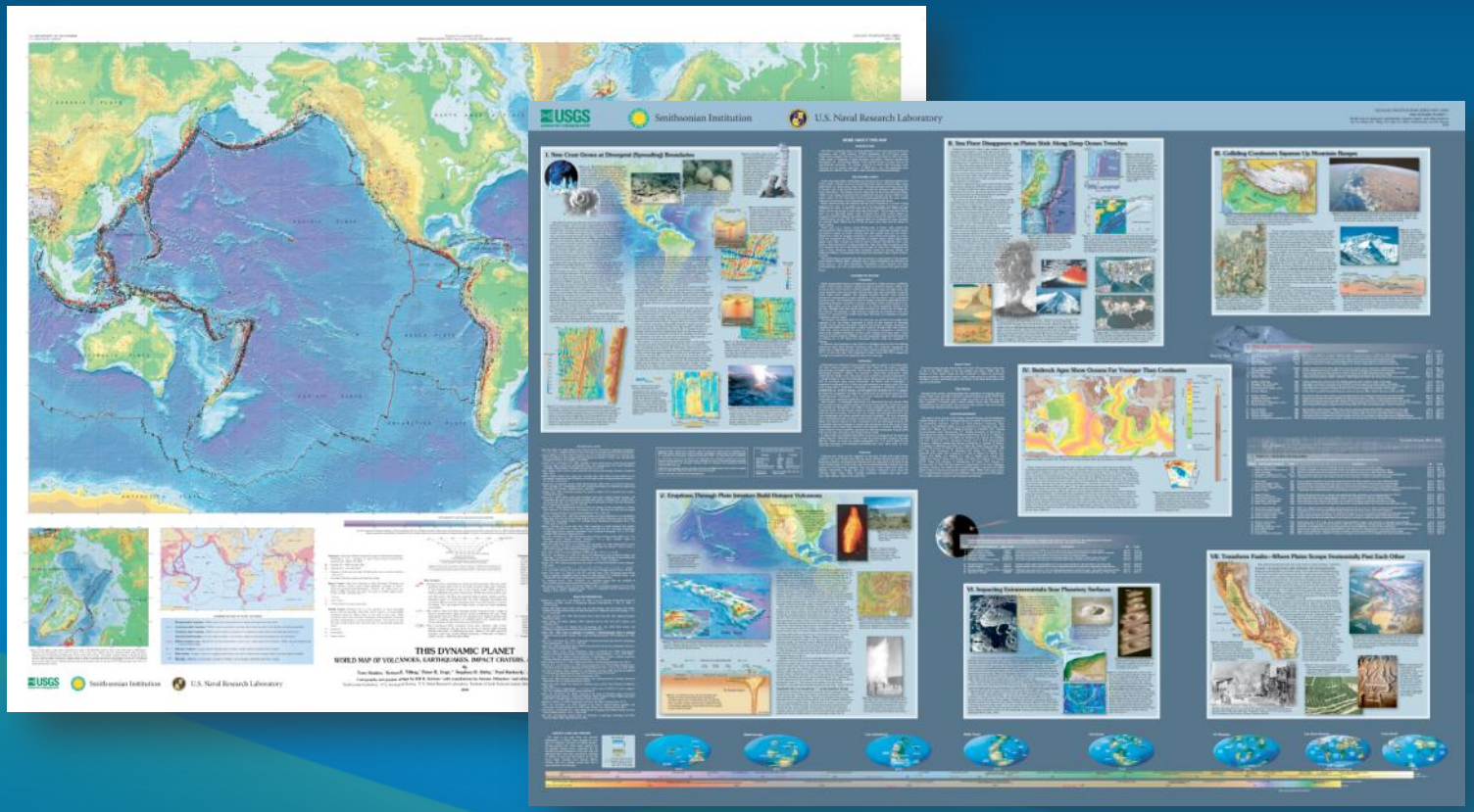

Our Dynamic Earth

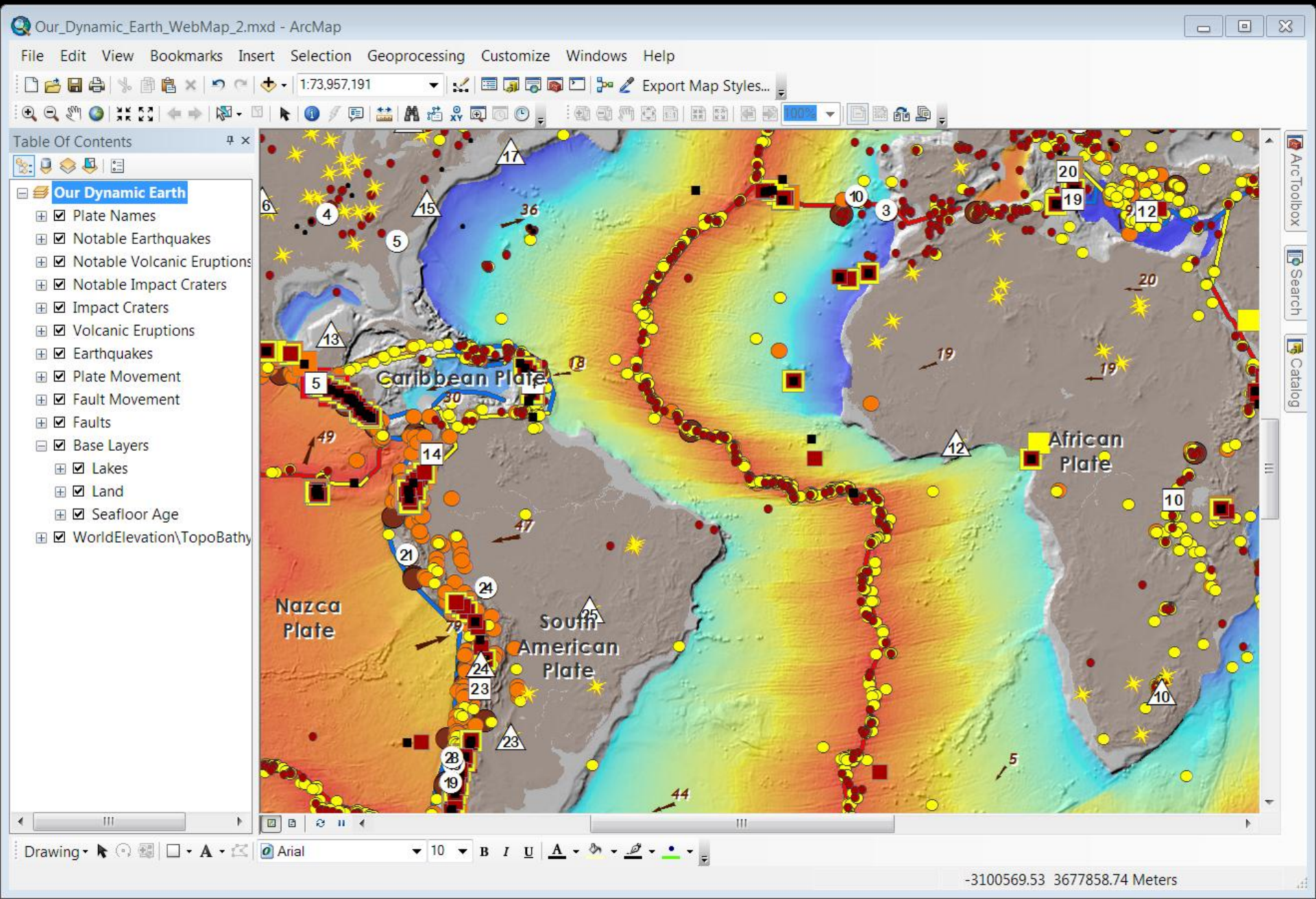
# Credits for this map

USGS science for a changing world

Smithsonian Institution

U.S. Naval Research Laboratory

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File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
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Export Map Styles...
Table Of Contents
Our Dynamic Earth
Plate Names
Notable Earthquakes
Notable Volcanic Eruptions
Notable Impact Craters
Impact Craters
Volcanic Eruptions
Earthquakes
Plate Movement
Fault Movement
Faults
Base Layers
Lakes
Land
Seafloor Age
WorldElevation\TopoBathy
Caribbean Plate
African Plate
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South American Plate
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Search
Catalog
Drawing
Arial
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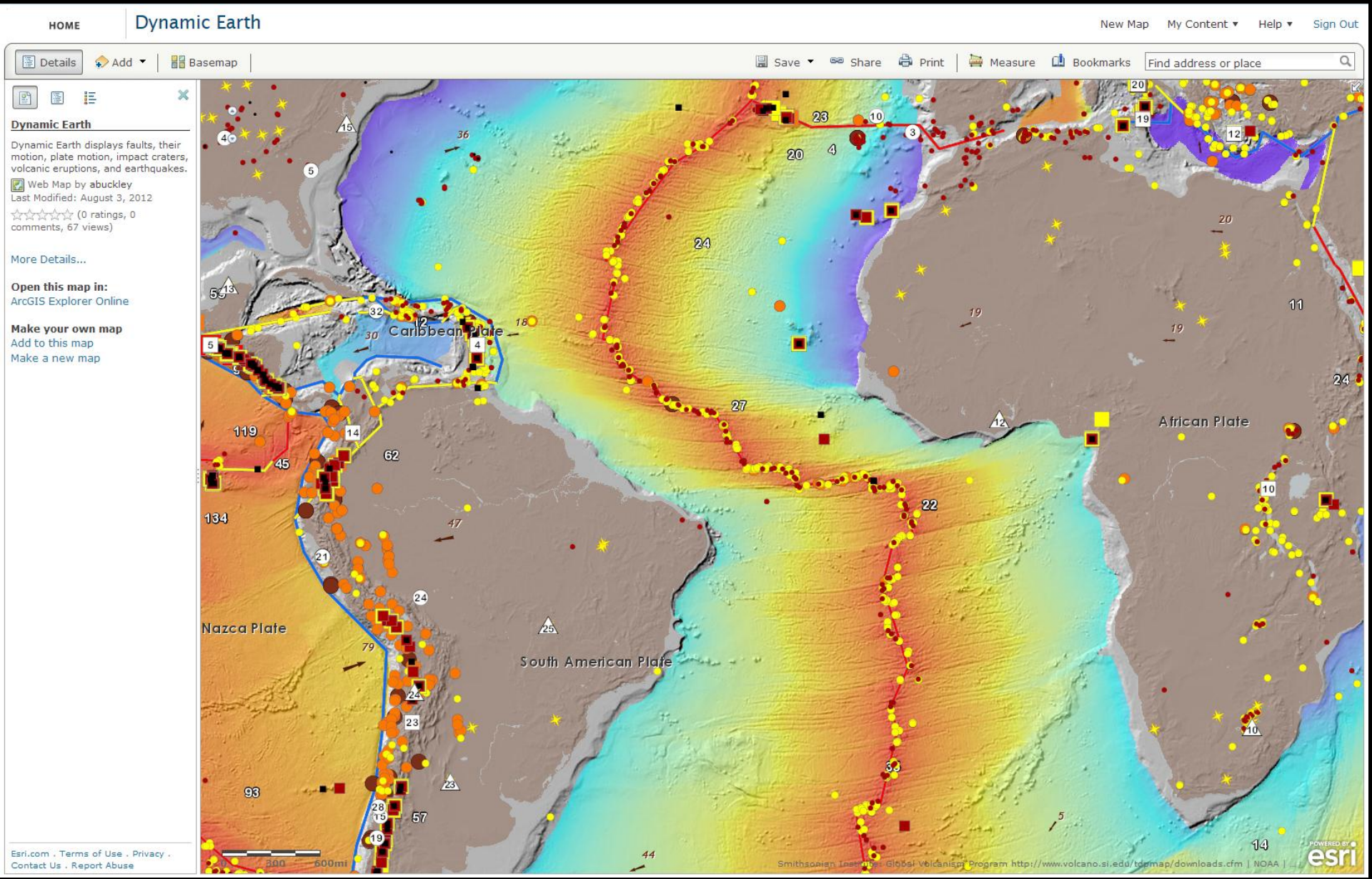
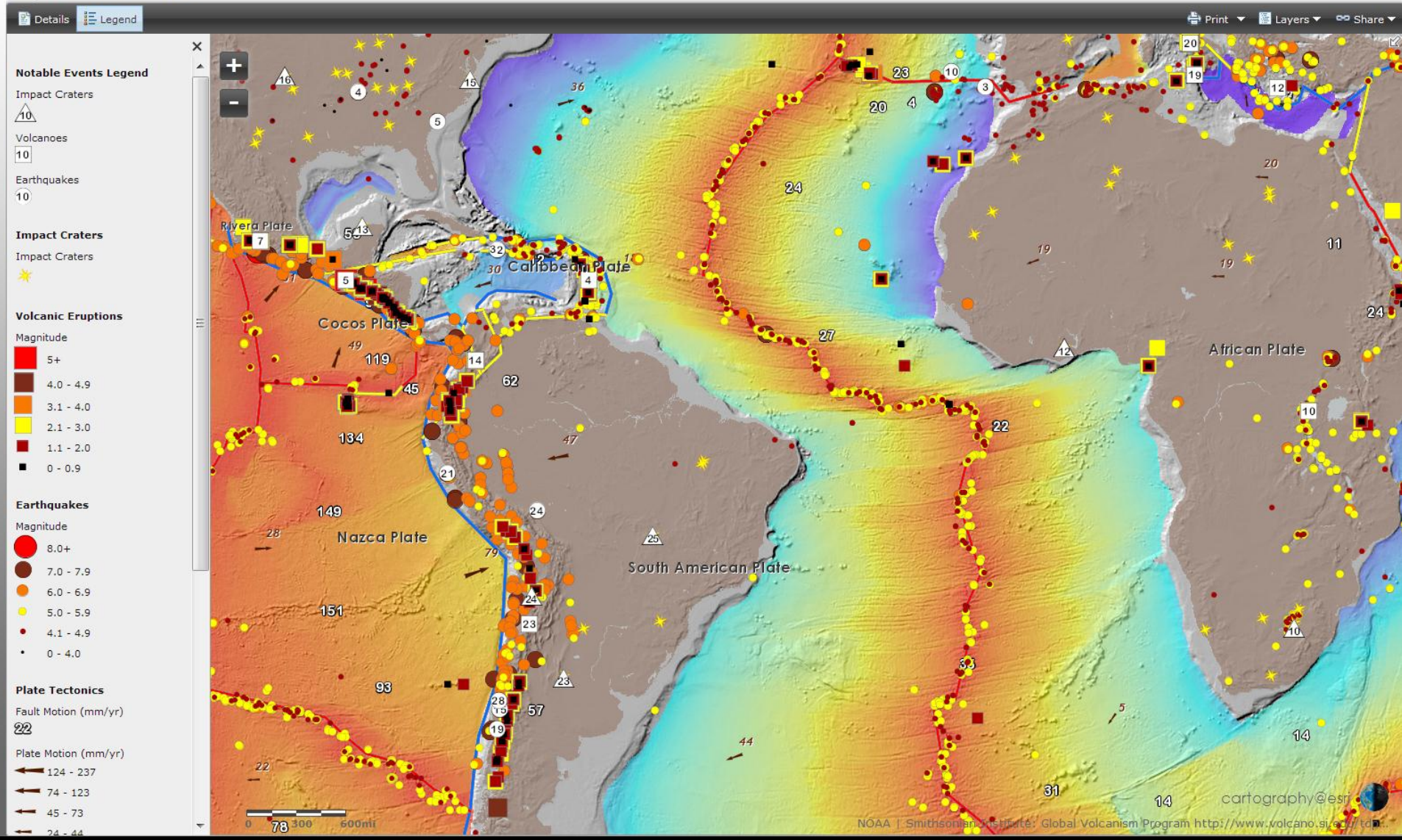

HOME
Dynamic Earth
New Map
My Content
Help
Sign Out
Details
Add
Basemap
Save
Share
Print
Measure
Bookmarks
Find address or place
Dynamic Earth
Dynamic Earth displays faults, their motion, plate motion, impact craters, volcanic eruptions, and earthquakes.
Web Map by abuckley
Last Modified: August 3, 2012
(0 ratings, 0 comments, 67 views)
More Details...
Open this map in:
ArcGIS Explorer Online
Make your own map
Add to this map
Make a new map
Caribbean Plate
African Plate
Nazca Plate
South American Plate
Esri.com . Terms of Use . Privacy . Contact Us . Report Abuse
Smithsonian Institution Global Volcanism Program http://www.volcano.si.edu/tdmap/downloads.cfm | NOAA |
esri

# Dynamic Earth



# Tips and tricks

- Using the Esri World Elevation Services
- Using complex point and line symbols
- Documenting the AGO content items
- Configuring the web map app

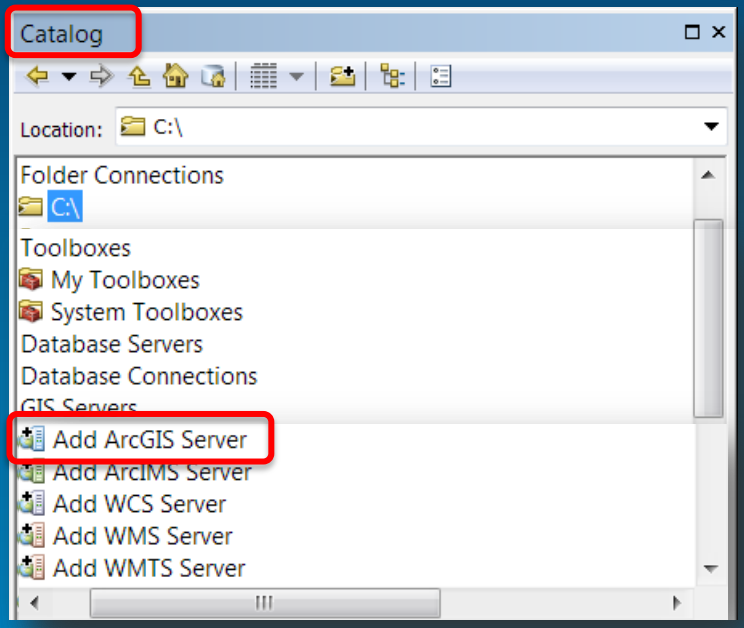
# Using the Esri World Elevation Services

- Multiscale – global to ~1:1,000, where there is data
- Multiple themes
- Optimized for speed of display
- Use a basemap layer
- Accessing the services
  - ArcMap or ArcGlobe
  - ArcGIS Online

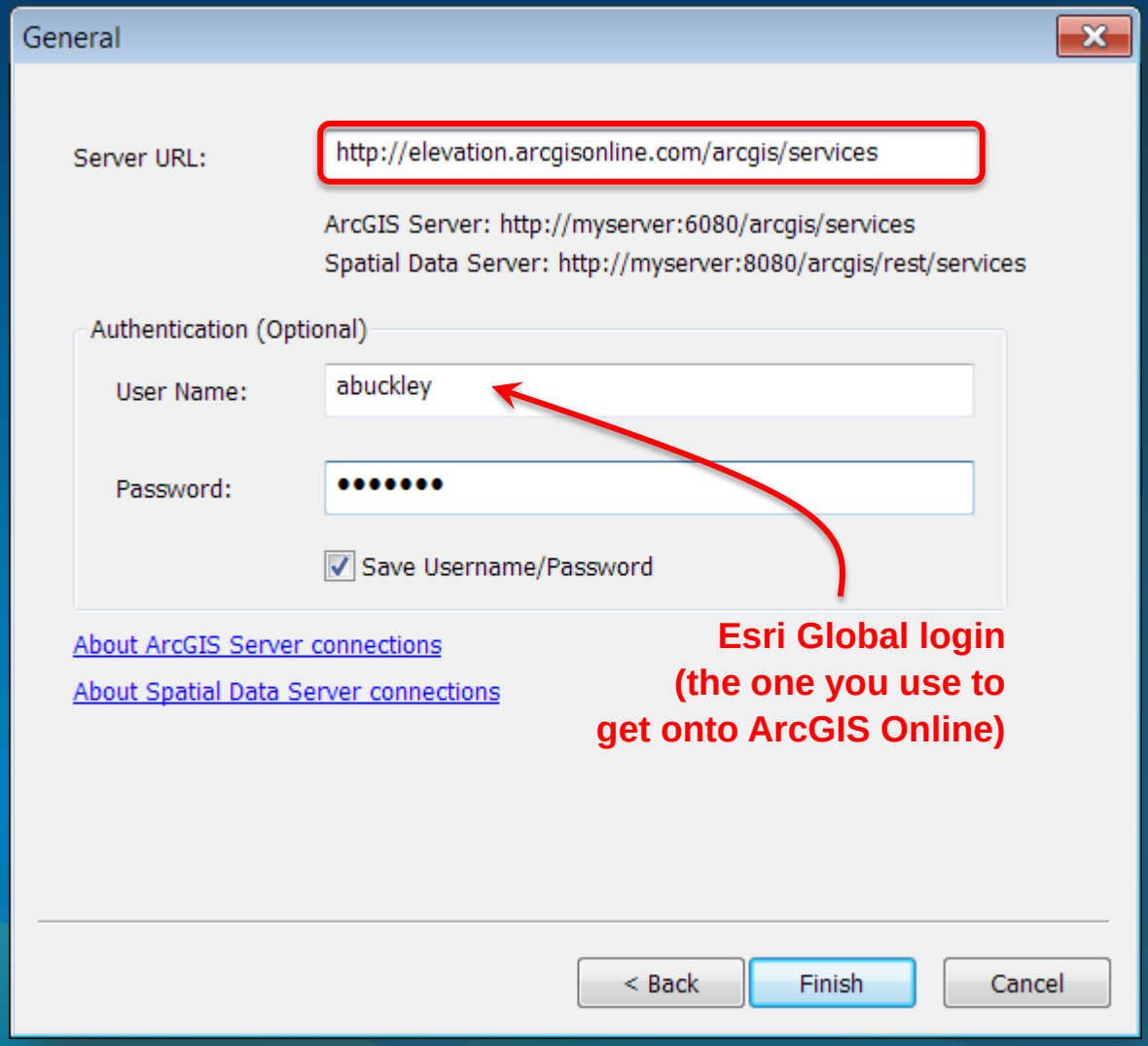
# Demo

Esri Elevation Services

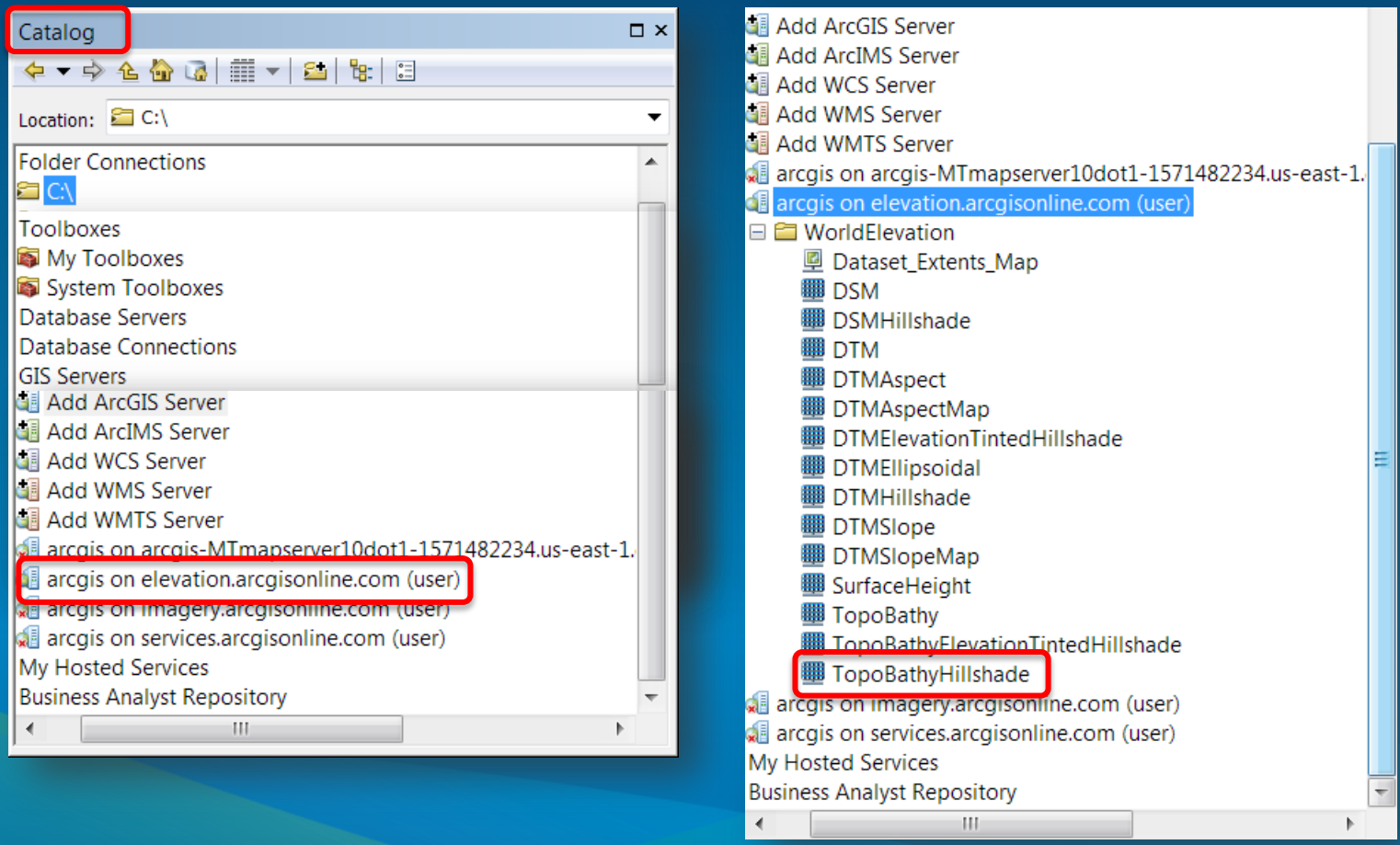
# Accessing the services in ArcMap



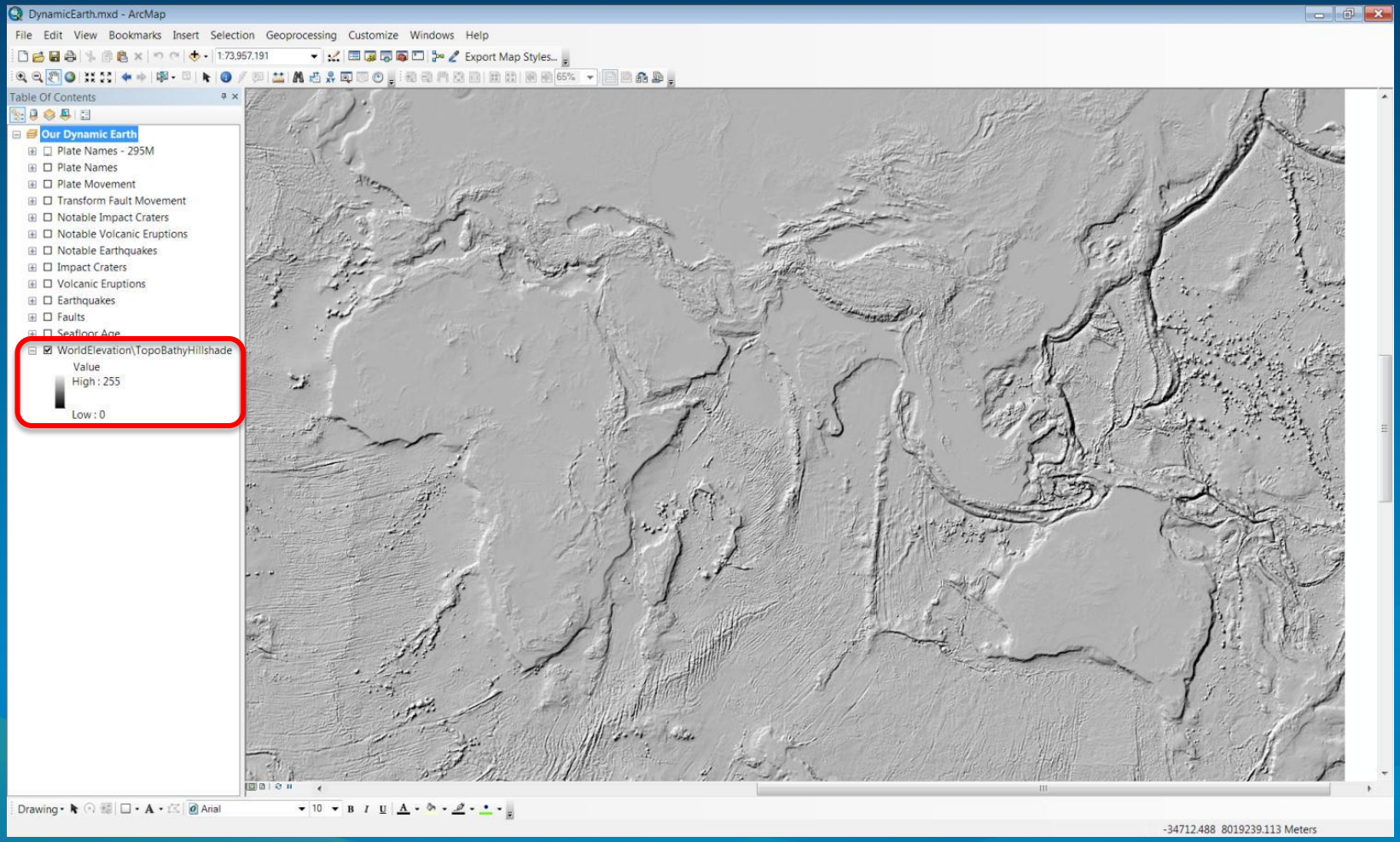
# Accessing the services in ArcMap



# Multiple services include data and maps

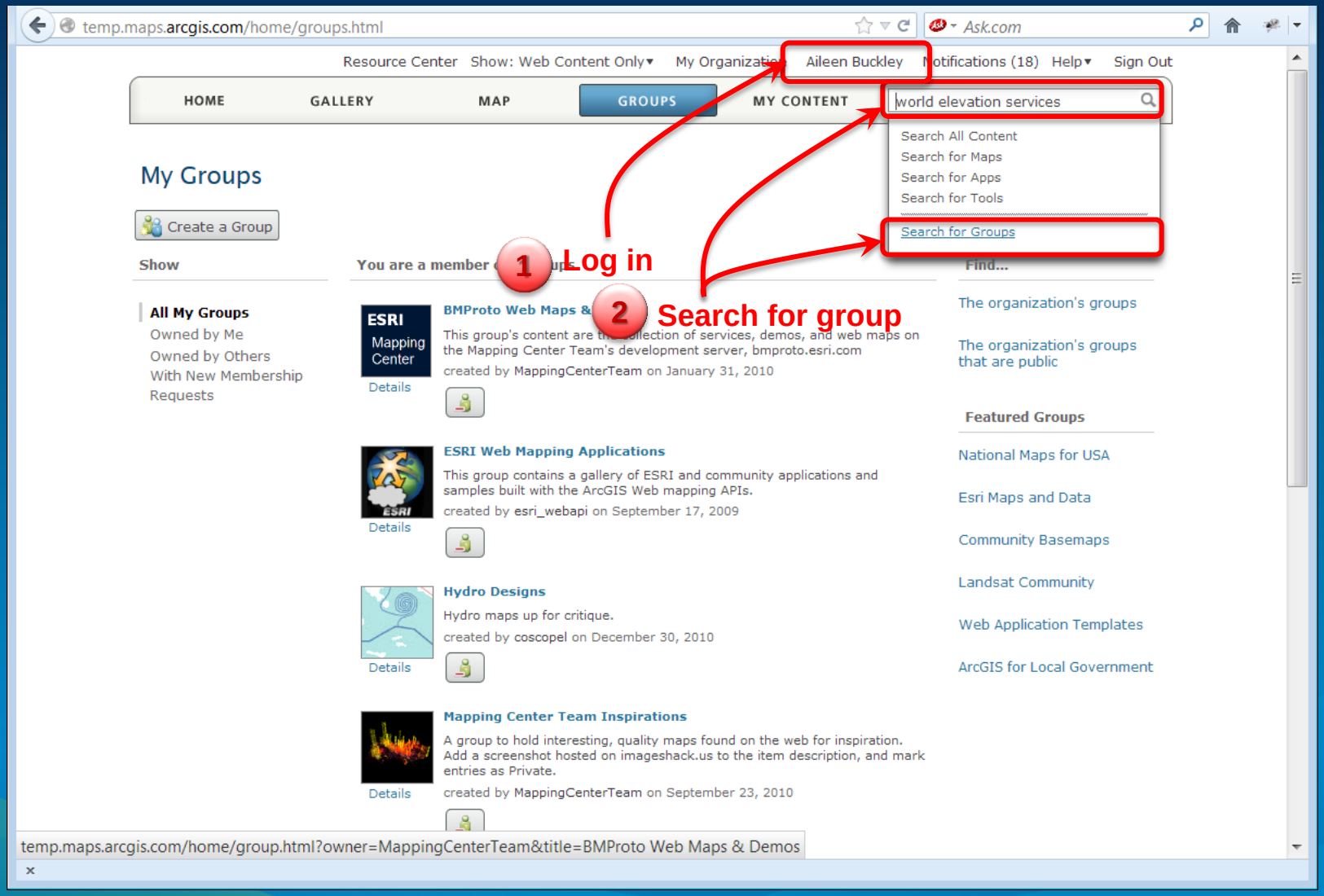


# Drag the service into the table of contents



# Accessing the services on ArcGIS Online

1. Log in
2. Search Groups for World Elevation Services
3. Join the Group
4. Add the service to a web map
5. Add the service as a basemap
    1. Copy the URL
    2. Add from Web
    3. Add as basemap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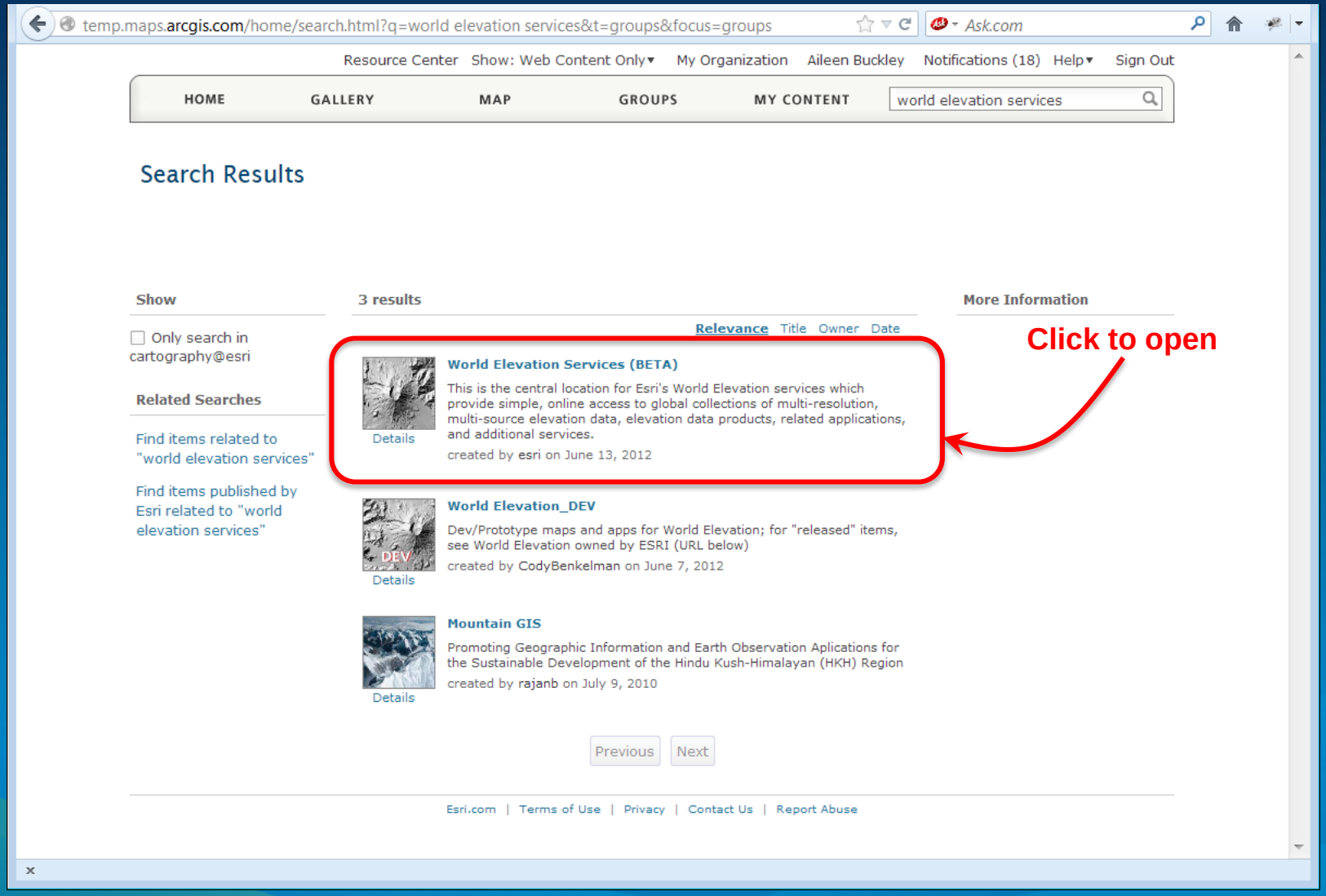
Ask.com
Resource Center
Show: Web Content Only
My Organization
Aileen Buckley
Notifications (18)
Help
Sign Out
HOME
GALLERY
MAP
GROUPS
MY CONTENT
world elevation services
Search All Content
Search for Maps
Search for Apps
Search for Tools
Search for Groups
My Groups
Create a Group
Show
All My Groups
Owned by Me
Owned by Others
With New Membership Requests
You are a member
1
Log in
2
Search for group
ESRI Mapping Center
BMProto Web Maps &
This group's content are th collection of services, demos, and web maps on the Mapping Center Team's development server, bmproto.esri.com
created by MappingCenterTeam on January 31, 2010
Details
ESRI Web Mapping Applications
This group contains a gallery of ESRI and community applications and samples built with the ArcGIS Web mapping APIs.
created by esri_webapi on September 17, 2009
Details
Hydro Designs
Hydro maps up for critique.
created by coscopel on December 30, 2010
Details
Mapping Center Team Inspirations
A group to hold interesting, quality maps found on the web for inspiration. Add a screenshot hosted on imageshack.us to the item description, and mark entries as Private.
created by MappingCenterTeam on September 23, 2010
Details
Find...
The organization's groups
The organization's groups that are public
Featured Groups
National Maps for USA
Esri Maps and Data
Community Basemaps
Landsat Community
Web Application Templates
ArcGIS for Local Government
temp.maps.arcgis.com/home/group.html?owner=MappingCenterTeam&title=BMProto Web Maps & Demos


temp.maps.arcgis.com/home/search.html?q=world elevation services&t=groups&focus=groups
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Dev/Prototype maps and apps for World Elevation; for "released" items, see World Elevation owned by ESRI (URL below)
created by CodyBenkelman on June 7, 2012
Details
Mountain GIS
Promoting Geographic Information and Earth Observation Aplications for the Sustainable Development of the Hindu Kush-Himalayan (HKH) Region
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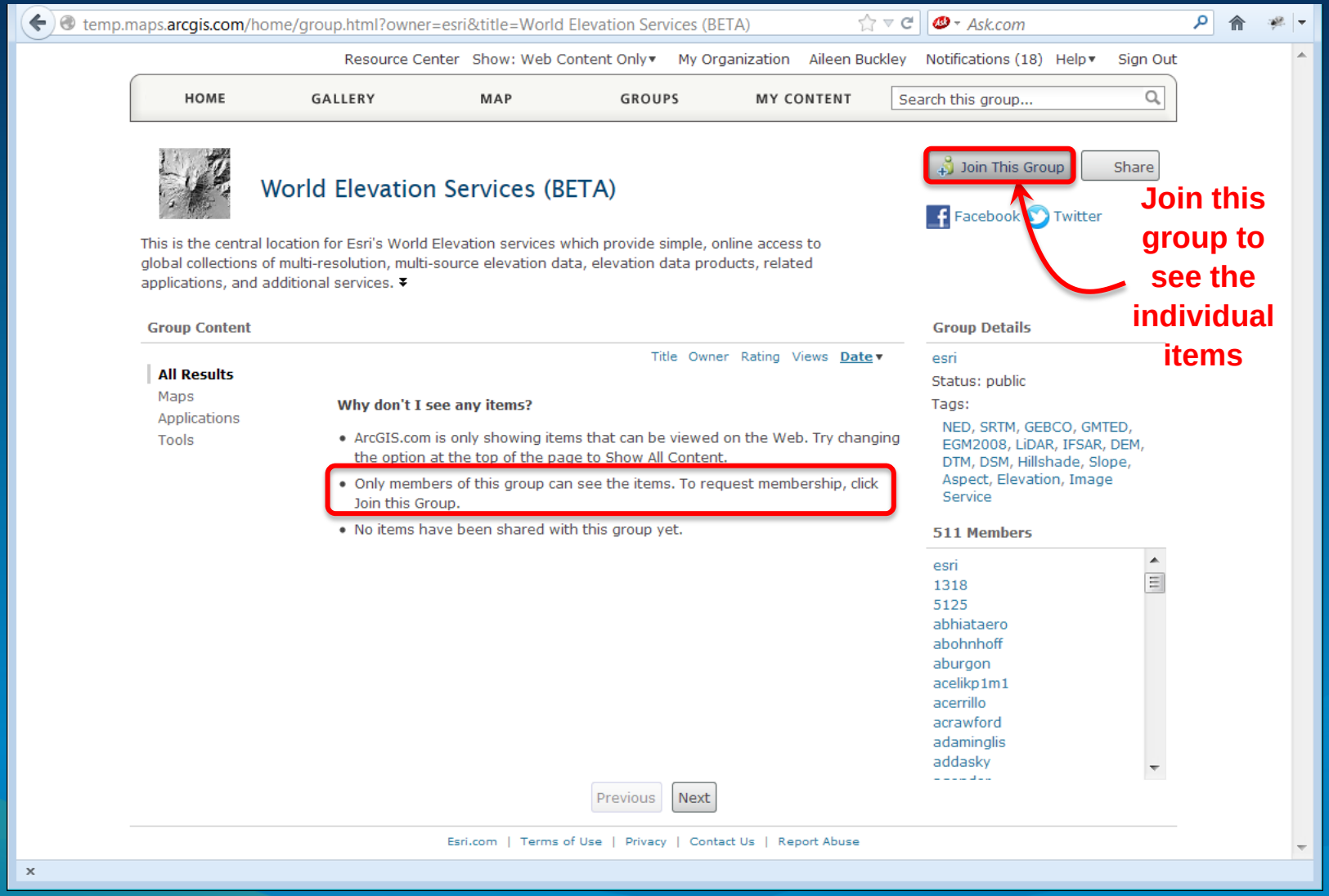
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511 Members
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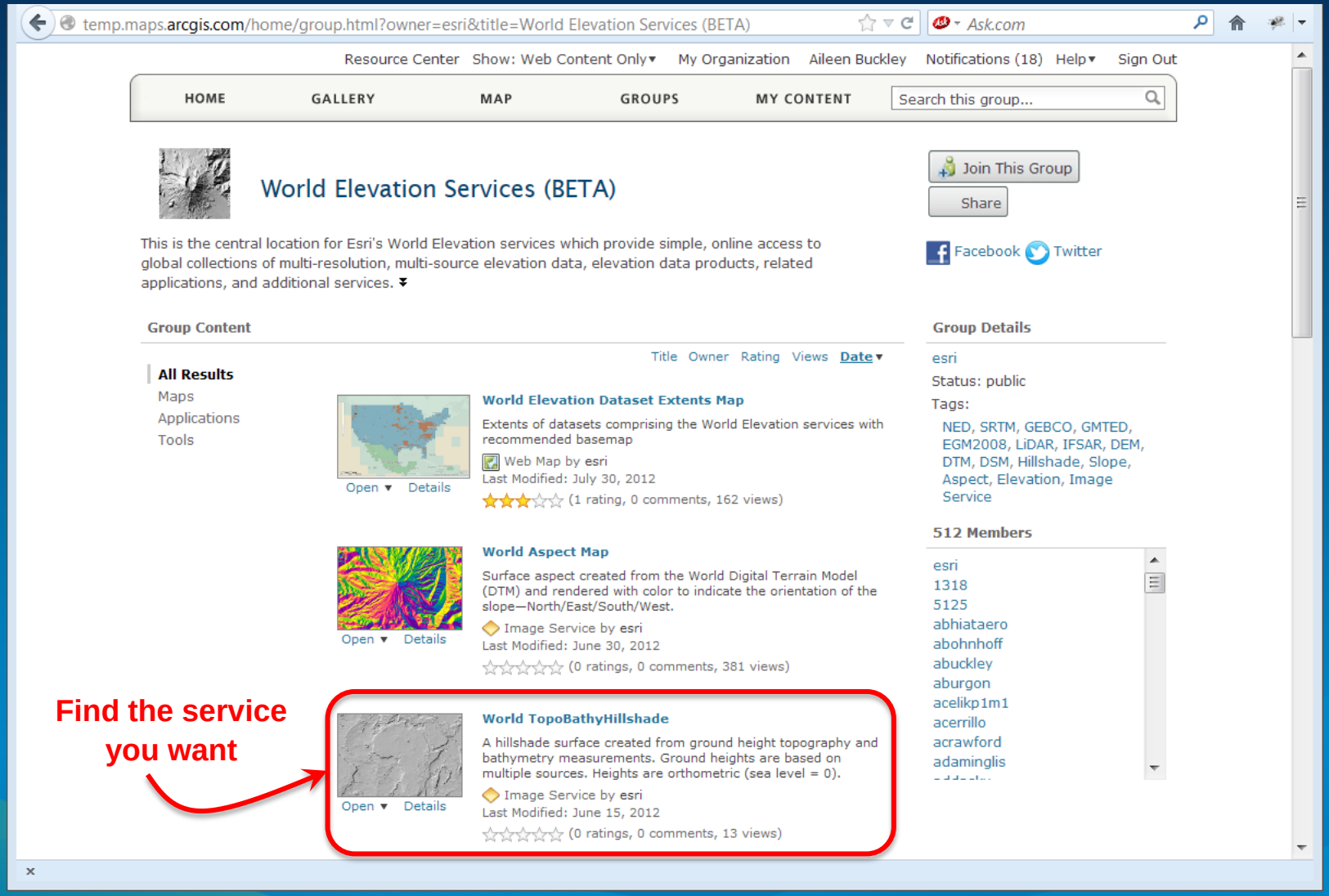
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World Elevation Dataset Extents Map
Extents of datasets comprising the World Elevation services with recommended basemap
Web Map by esri
Last Modified: July 30, 2012
(1 rating, 0 comments, 162 views)
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Details
World Aspect Map
Surface aspect created from the World Digital Terrain Model (DTM) and rendered with color to indicate the orientation of the slope—North/East/South/West.
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A hillshade surface created from ground height topography and bathymetry measurements. Ground heights are based on multiple sources. Heights are orthometric (sea level = 0).
Image Service by esri
Last Modified: June 15, 2012
(0 ratings, 0 comments, 13 views)
Open
Details
Group Details
esri
Status: public
Tags:
NED, SRTM, GEBCO, GMTED, EGM2008, LiDAR, IFSAR, DEM, DTM, DSM, Hillshade, Slope, Aspect, Elevation, Image Service
512 Members
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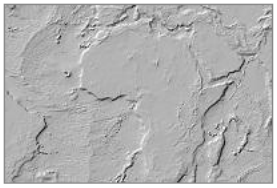
# World TopoBathyHillshade



A hillshade surface created from ground height topography and bathymetry measurements. Ground heights are based on multiple sources. Heights are orthometric (sea level = 0).

Image Service by esri

Last Modified: June 15, 2012

(0 ratings, 122 views)

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**If you do not want the service to be the basemap, click Open**

## Description

This service provides a hillshade (shaded relief) surface created from a combination of ground height topography and bathymetry measurements. Ground heights are based on multiple sources. Heights are orthometric (sea level = 0). When possible, the water areas are represented by the best available bathymetry. In the cu View item details athymetry data is defined by the GEBCO 08 dataset.

**Beta Version:** These services are currently being provided in Beta form, primarily for testing and feedback. Please provide feedback via Esri's Beta program, beginning at **this link**.

**Data Type Returned by Default:** 8 bit unsigned integer, with jpeg compression.

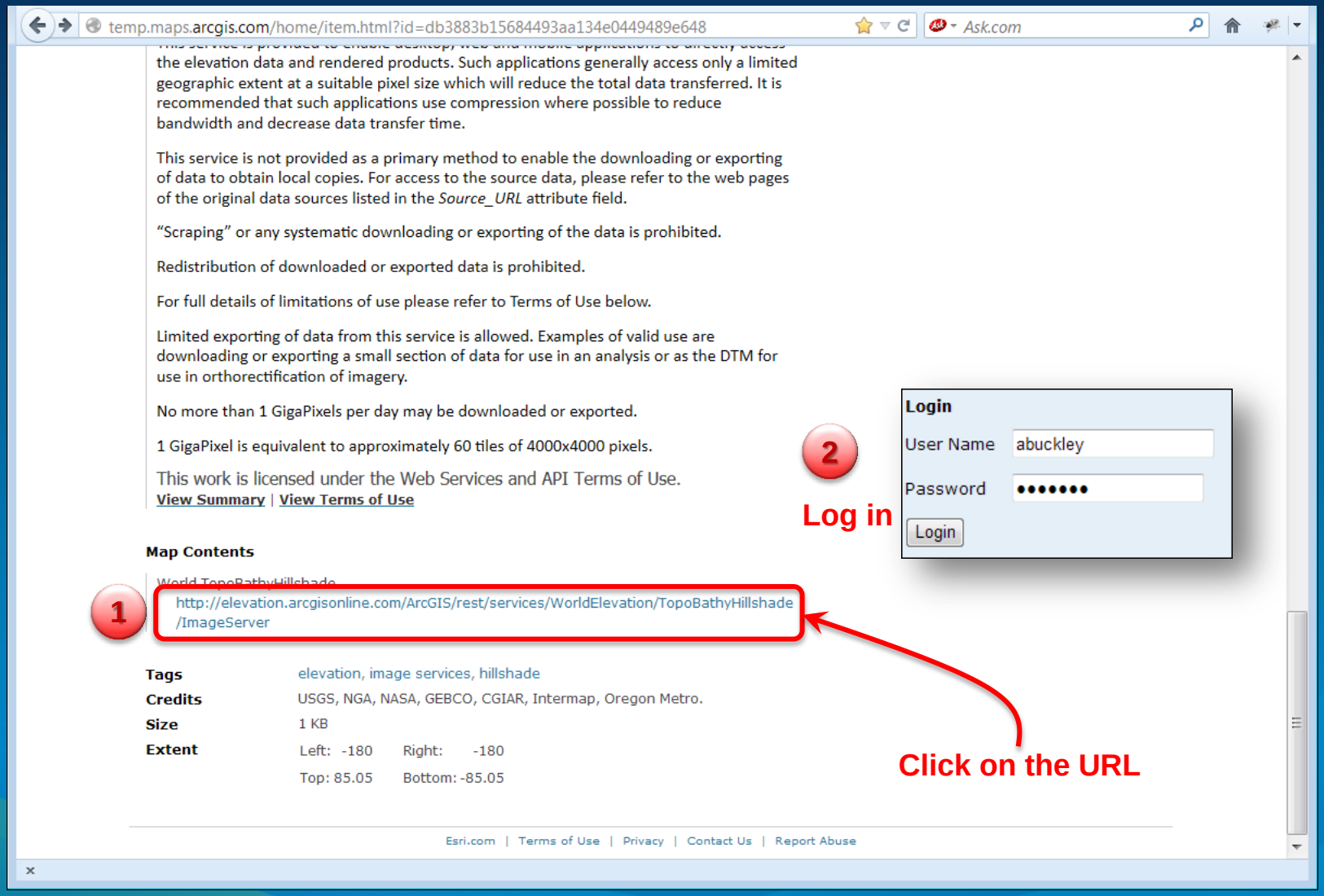
**Use for Visualization:** Yes. This is appropriate for visualizing the shape and height of the surface at a range of map scales. The image service can be added to applications or maps to enhance a users' contextual understanding.

**Use for Analysis:** No. The values returned by this service represent a graphic visualization, not measurable values.

## Comments (0)

**To add the service as the basemap, scroll down**

### Add a Comment


temp.maps.arcgis.com/home/item.html?id=db3883b15684493aa134e0449489e648
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the elevation data and rendered products. Such applications generally access only a limited geographic extent at a suitable pixel size which will reduce the total data transferred. It is recommended that such applications use compression where possible to reduce bandwidth and decrease data transfer time.
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Map Contents
1
http://elevation.arcgisonline.com/ArcGIS/rest/services/WorldElevation/TopoBathyHillshade/ImageServer
Tags elevation, image services, hillshade
Credits USGS, NGA, NASA, GEBCO, CGIAR, Intermap, Oregon Metro.
Size 1 KB
Extent Left: -180 Right: -180
Top: 85.05 Bottom: -85.05
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2
Log in
Login
User Name abuckley
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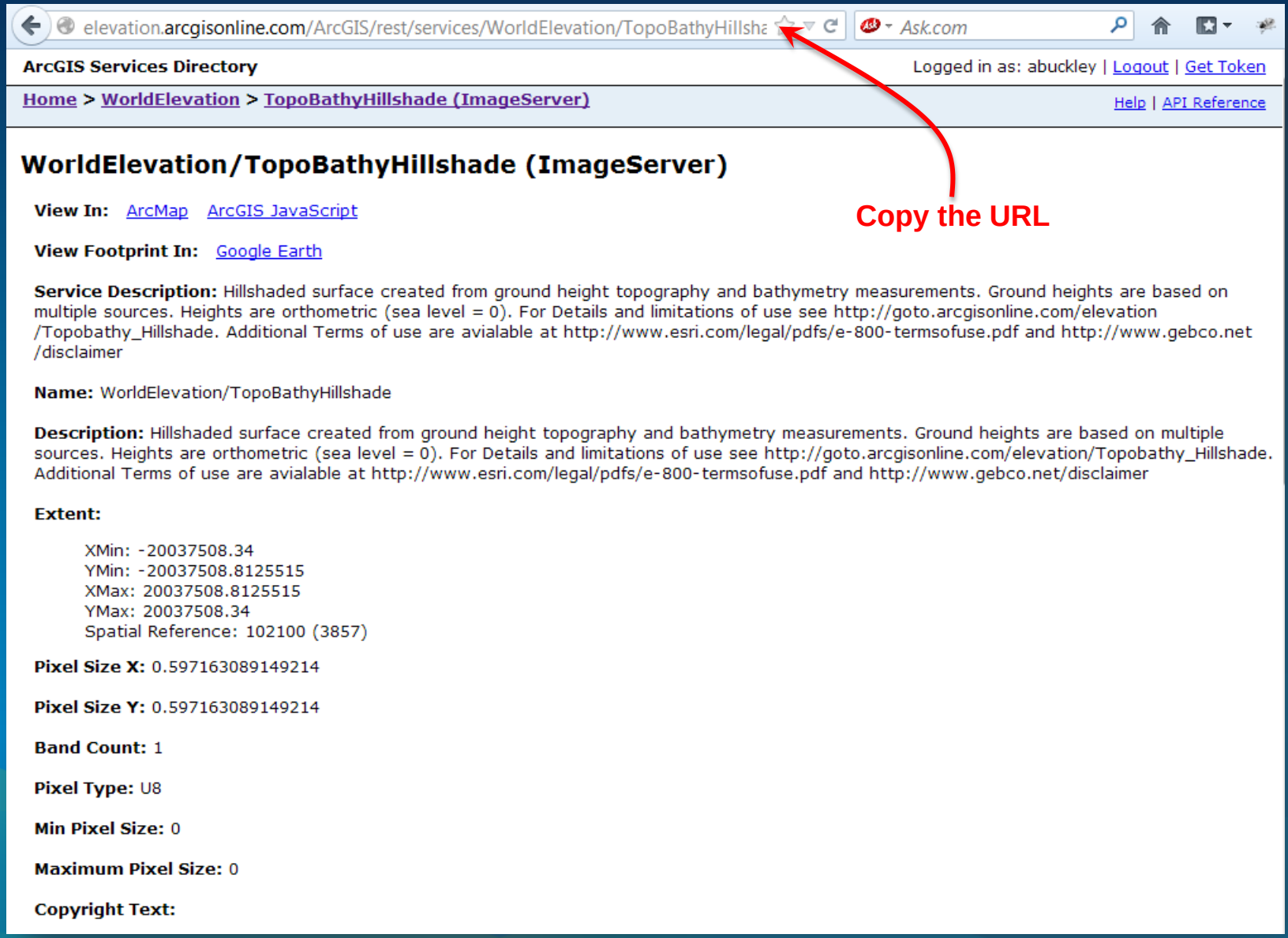
Click on the URL


elevation.arcgisonline.com/ArcGIS/rest/services/WorldElevation/TopoBathyHillsha
Ask.com
ArcGIS Services Directory
Logged in as: abuckley | Logout | Get Token
Home > WorldElevation > TopoBathyHillshade (ImageServer)
Help | API Reference
WorldElevation/TopoBathyHillshade (ImageServer)
View In: ArcMap ArcGIS JavaScript
View Footprint In: Google Earth
Service Description: Hillshaded surface created from ground height topography and bathymetry measurements. Ground heights are based on multiple sources. Heights are orthometric (sea level = 0). For Details and limitations of use see http://goto.arcgisonline.com/elevation/Topobathy_Hillshade. Additional Terms of use are avialable at http://www.esri.com/legal/pdfs/e-800-termsofuse.pdf and http://www.gebco.net/disclaimer
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Description: Hillshaded surface created from ground height topography and bathymetry measurements. Ground heights are based on multiple sources. Heights are orthometric (sea level = 0). For Details and limitations of use see http://goto.arcgisonline.com/elevation/Topobathy_Hillshade. Additional Terms of use are avialable at http://www.esri.com/legal/pdfs/e-800-termsofuse.pdf and http://www.gebco.net/disclaimer
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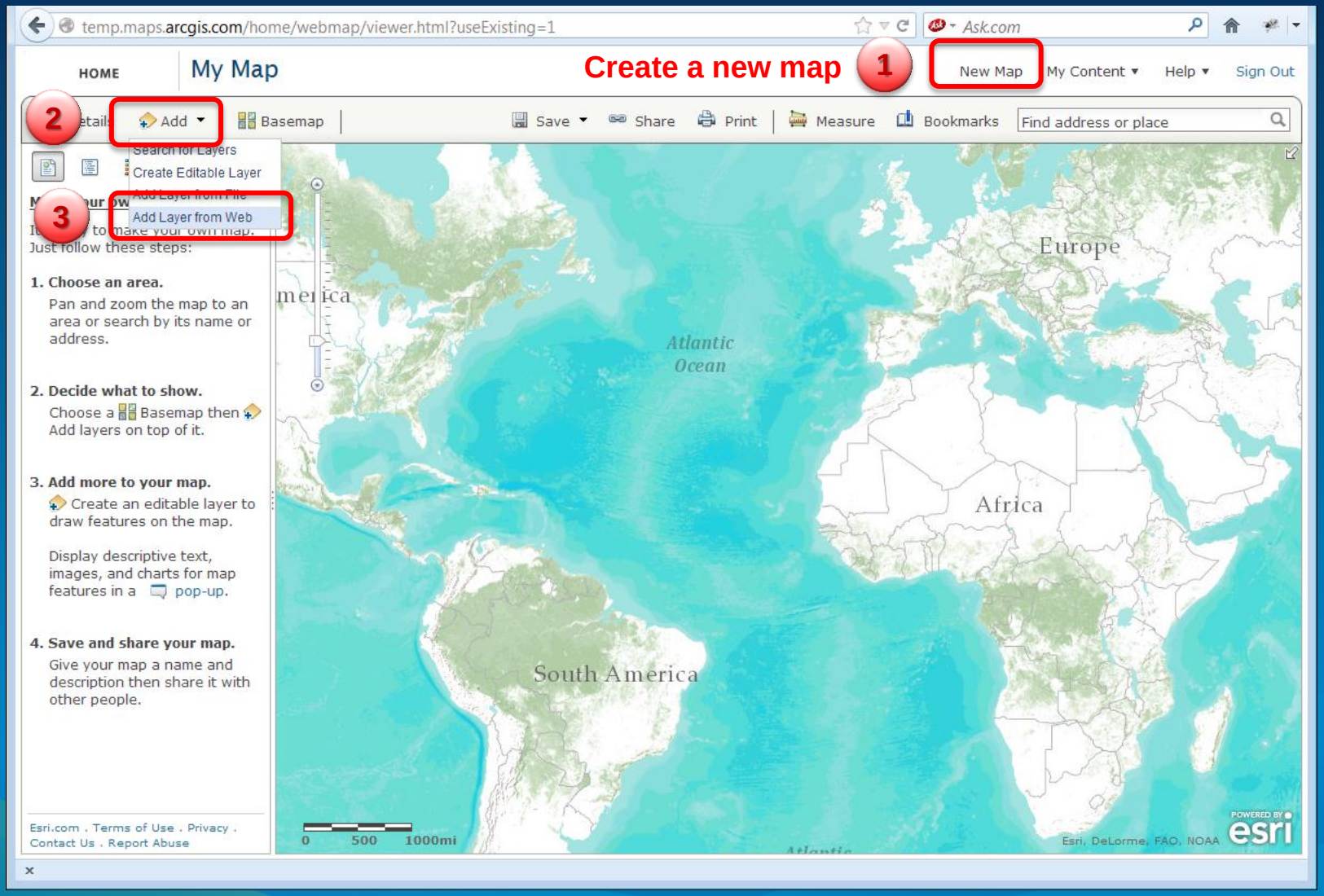
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New Map
My Content
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Sign Out
2
Add
Basemap
Save
Share
Print
Measure
Bookmarks
Find address or place
Search for Layers
Create Editable Layer
Add Layer from File
3
Add Layer from Web
Just follow these steps:
1. Choose an area.
Pan and zoom the map to an area or search by its name or address.
2. Decide what to show.
Choose a Basemap then Add layers on top of it.
3. Add more to your map.
Create an editable layer to draw features on the map.
Display descriptive text, images, and charts for map features in a pop-up.
4. Save and share your map.
Give your map a name and description then share it with other people.
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Atlantic Ocean
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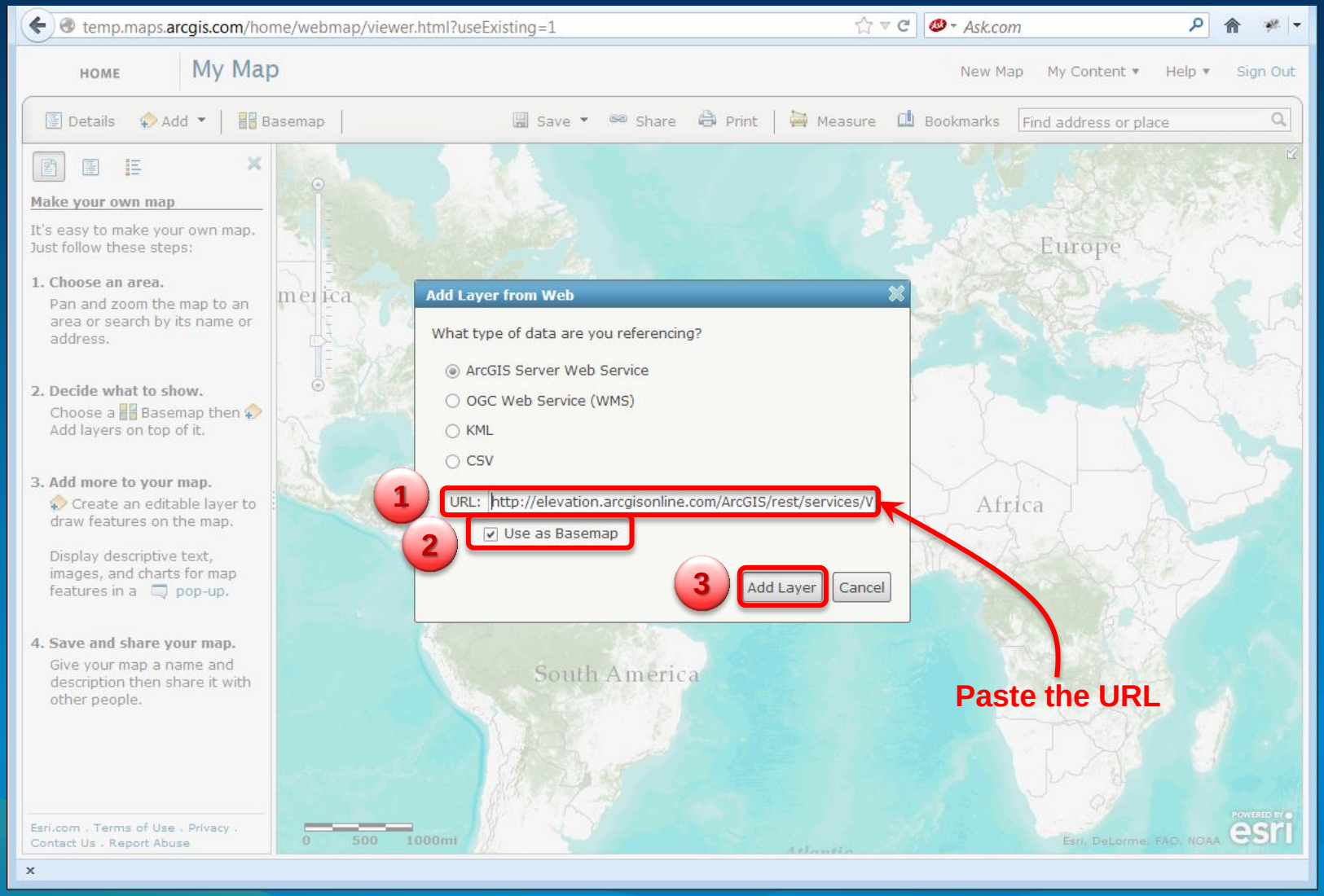
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My Content
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Basemap
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Share
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Find address or place
Make your own map
It's easy to make your own map. Just follow these steps:
1. Choose an area.
Pan and zoom the map to an area or search by its name or address.
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Choose a Basemap then Add layers on top of it.
3. Add more to your map.
Create an editable layer to draw features on the map.
Display descriptive text, images, and charts for map features in a pop-up.
4. Save and share your map.
Give your map a name and description then share it with other people.
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Add Layer from Web
What type of data are you referencing?
ArcGIS Server Web Service
OGC Web Service (WMS)
KML
CSV
1
URL: http://elevation.arcgisonline.com/ArcGIS/rest/services/V
2
Use as Basemap
3
Add Layer
Cancel
Paste the URL
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Esri, DeLorme, FAO, NOAA
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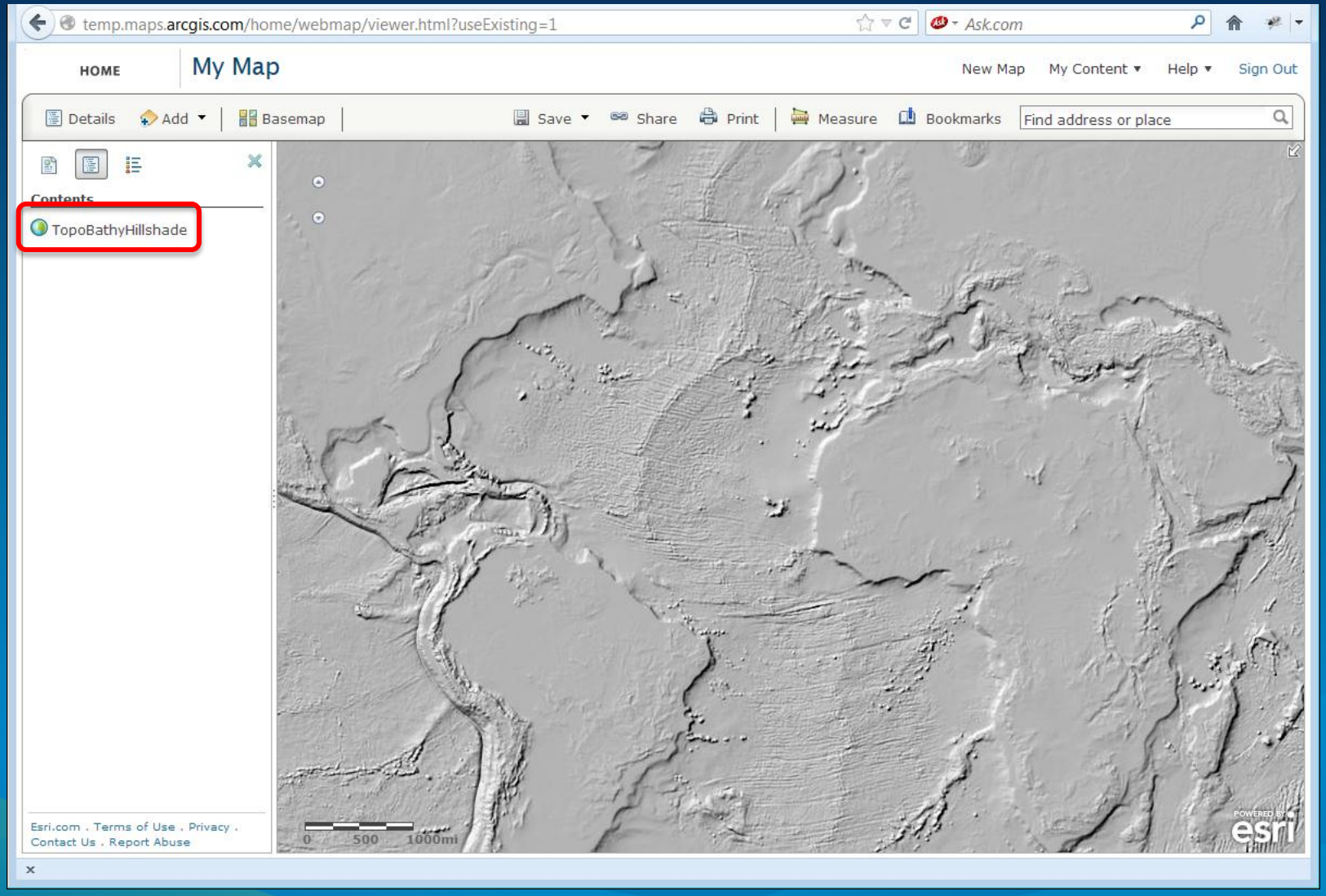
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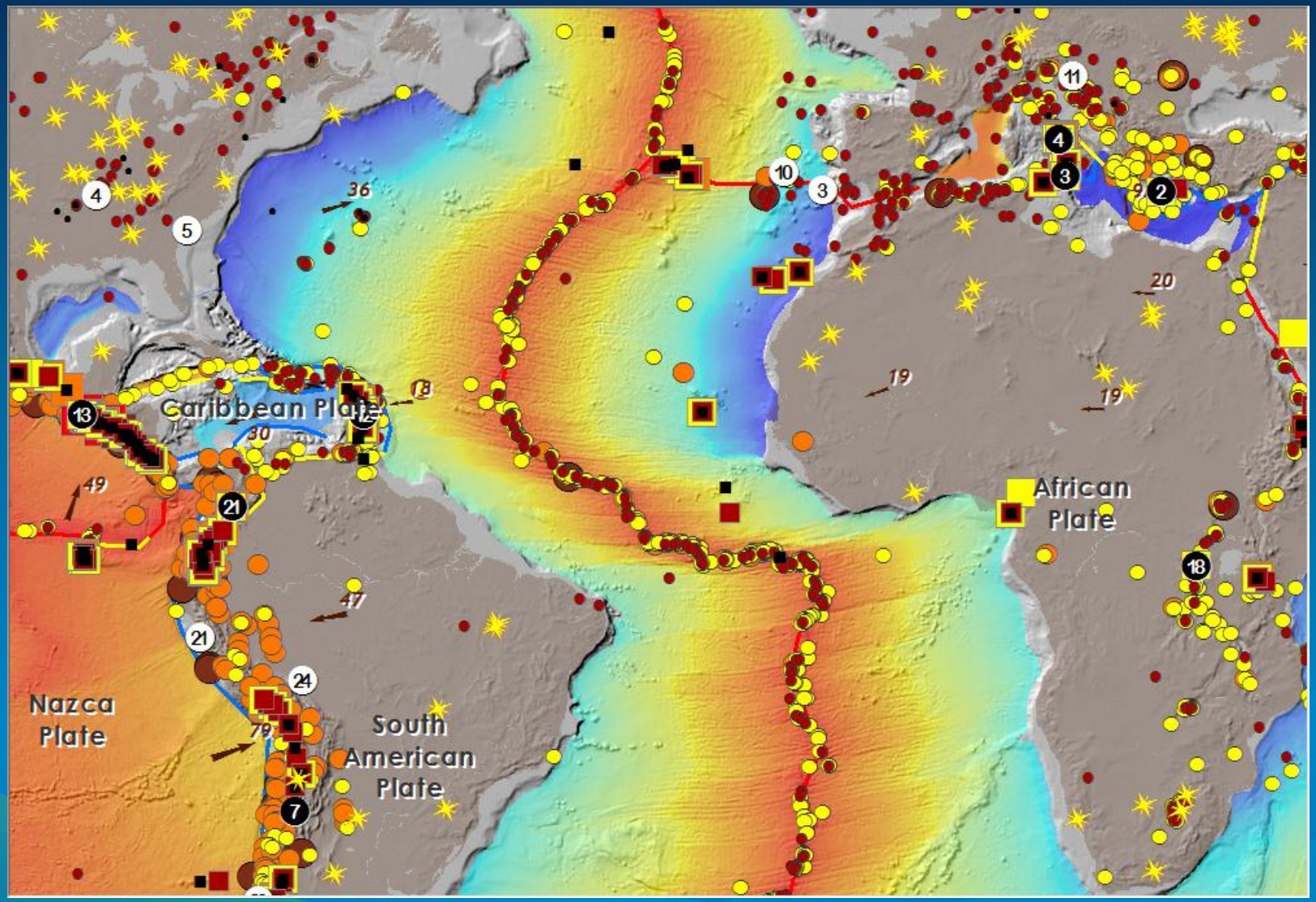
# Tips and tricks

- Using the Esri World Elevation Services
- Complex point and line symbols
- Text
- Documenting the AGO content item
- Configuring the web map app

# Demo

Dynamic Earth

Notable Impact Craters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Nazca Plate
South American Plate
African Plate
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30
49
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18

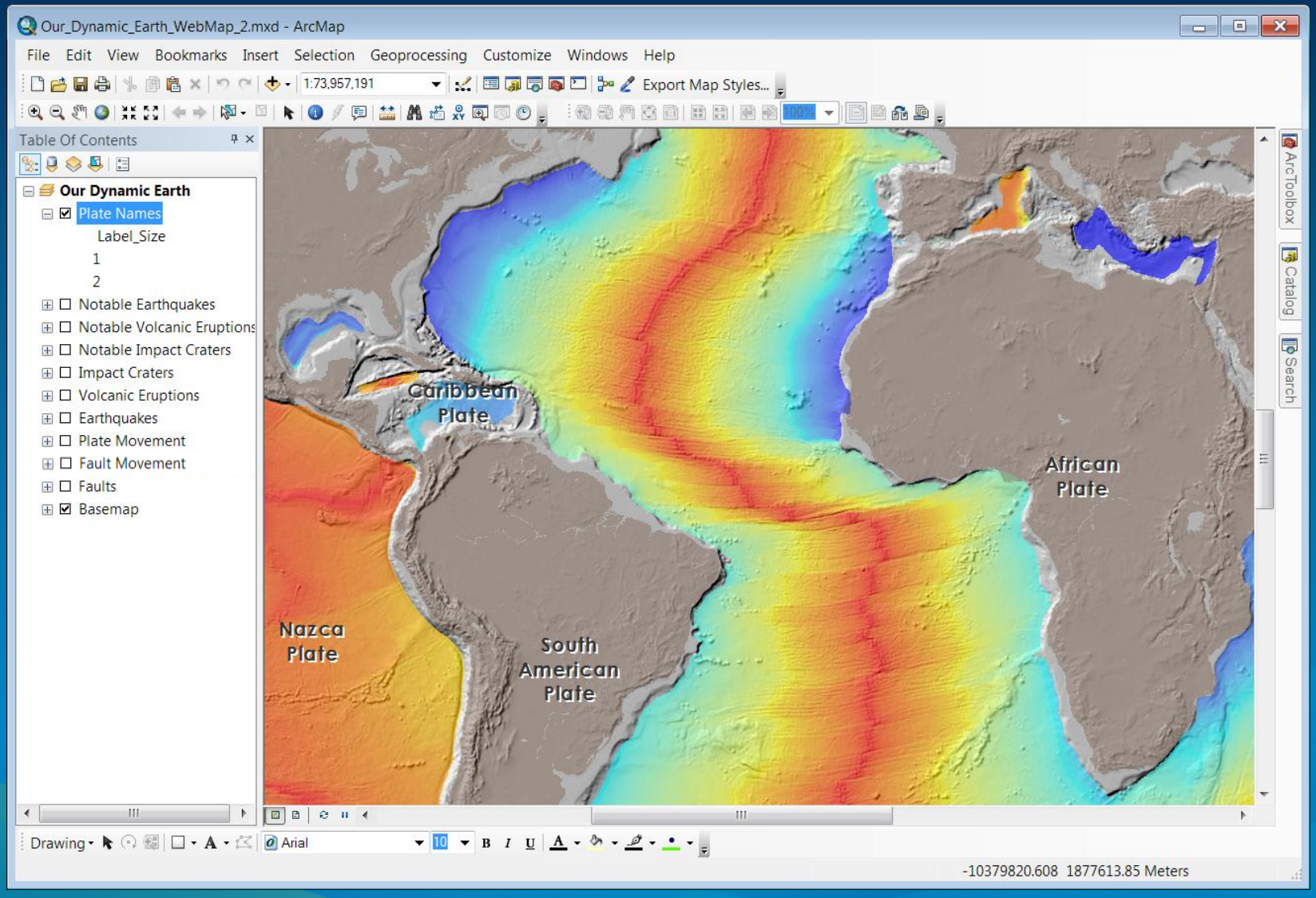
Our_Dynamic_Earth_WebMap_2.mxd - ArcMap
File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help
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Plate Names
Label_Size
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Notable Earthquakes
Notable Volcanic Eruptions
Notable Impact Craters
Impact Craters
Volcanic Eruptions
Earthquakes
Plate Movement
Fault Movement
Faults
Basemap
Caribbean Plate
African Plate
Nazca Plate
South American Plate
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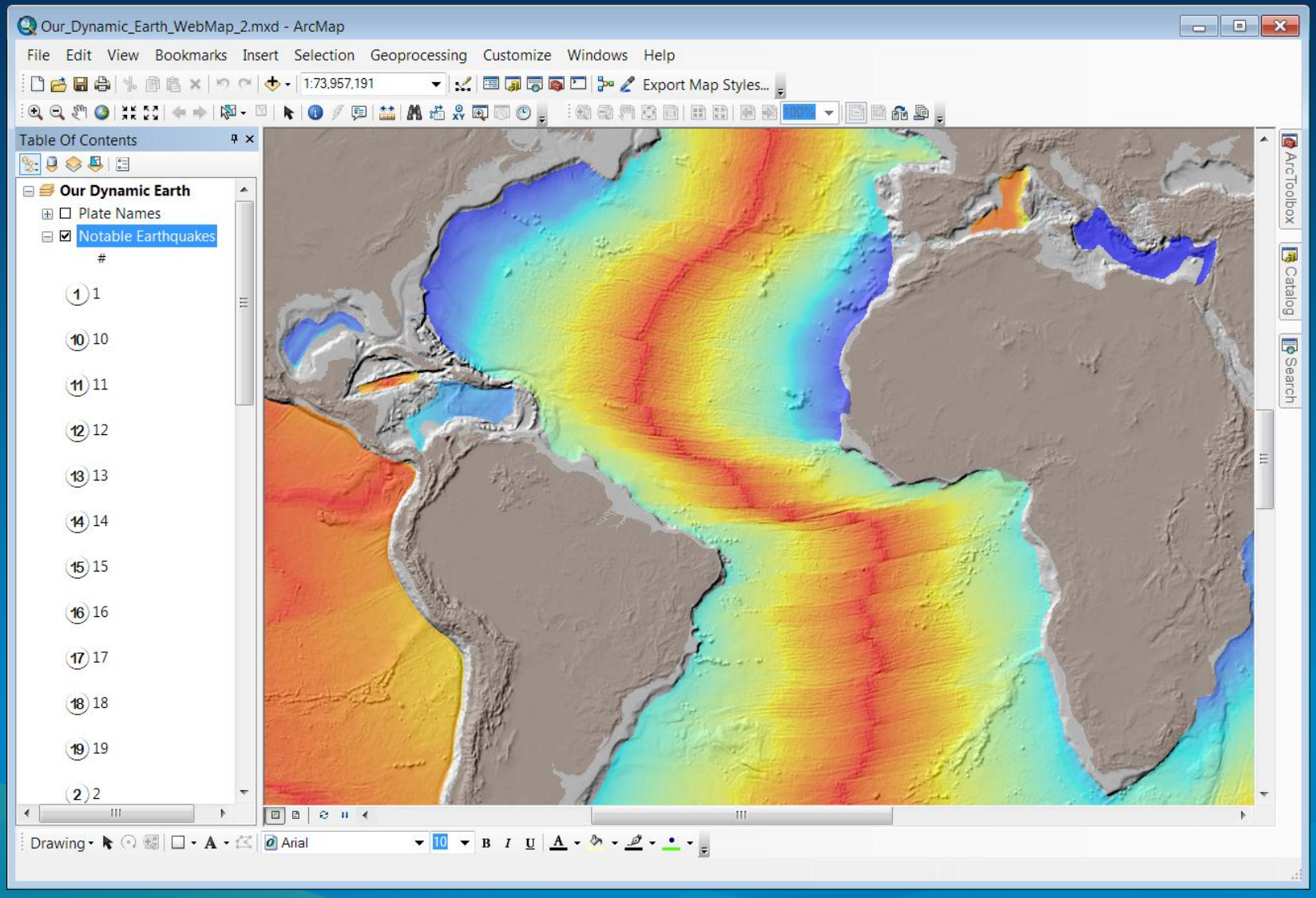
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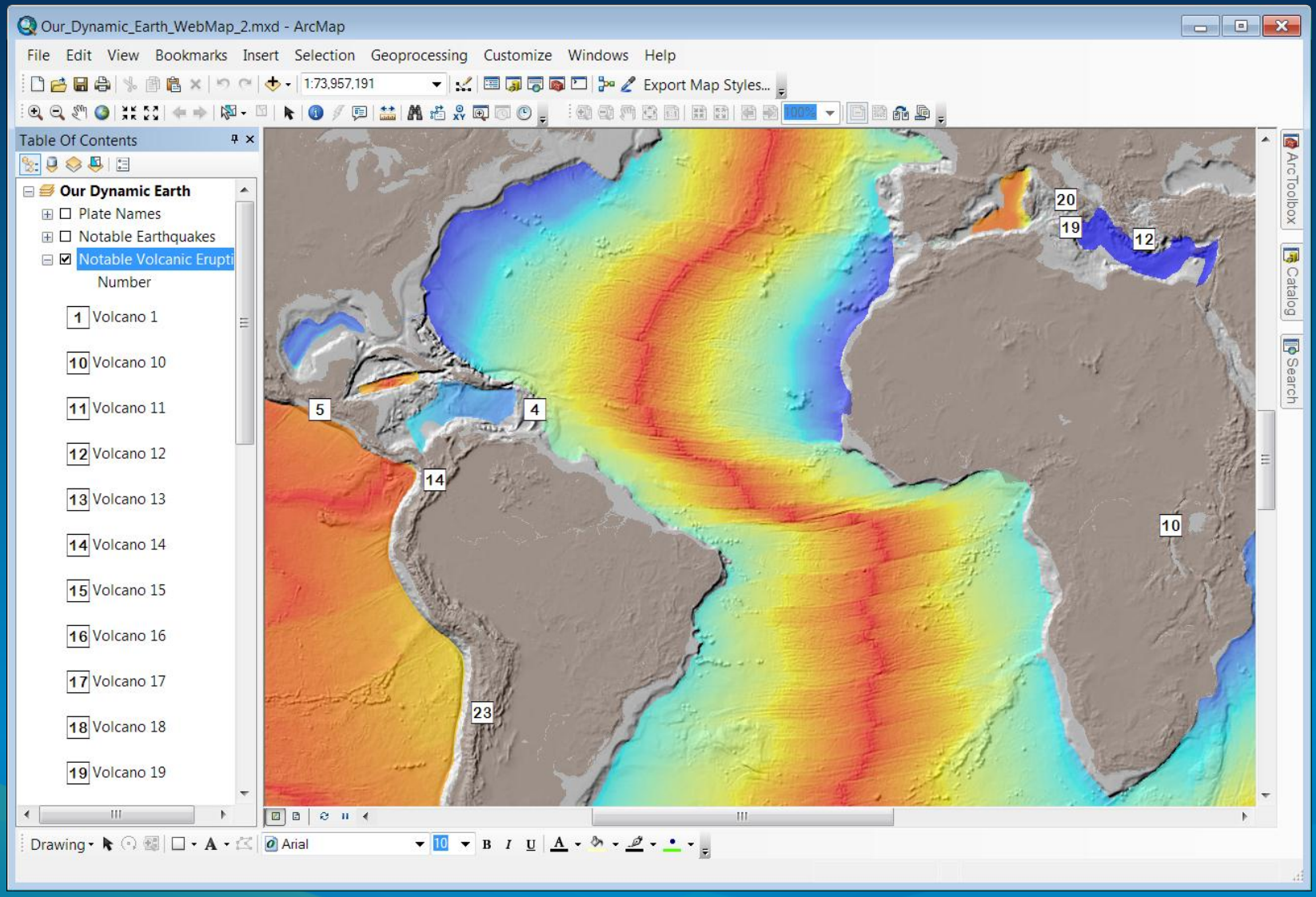
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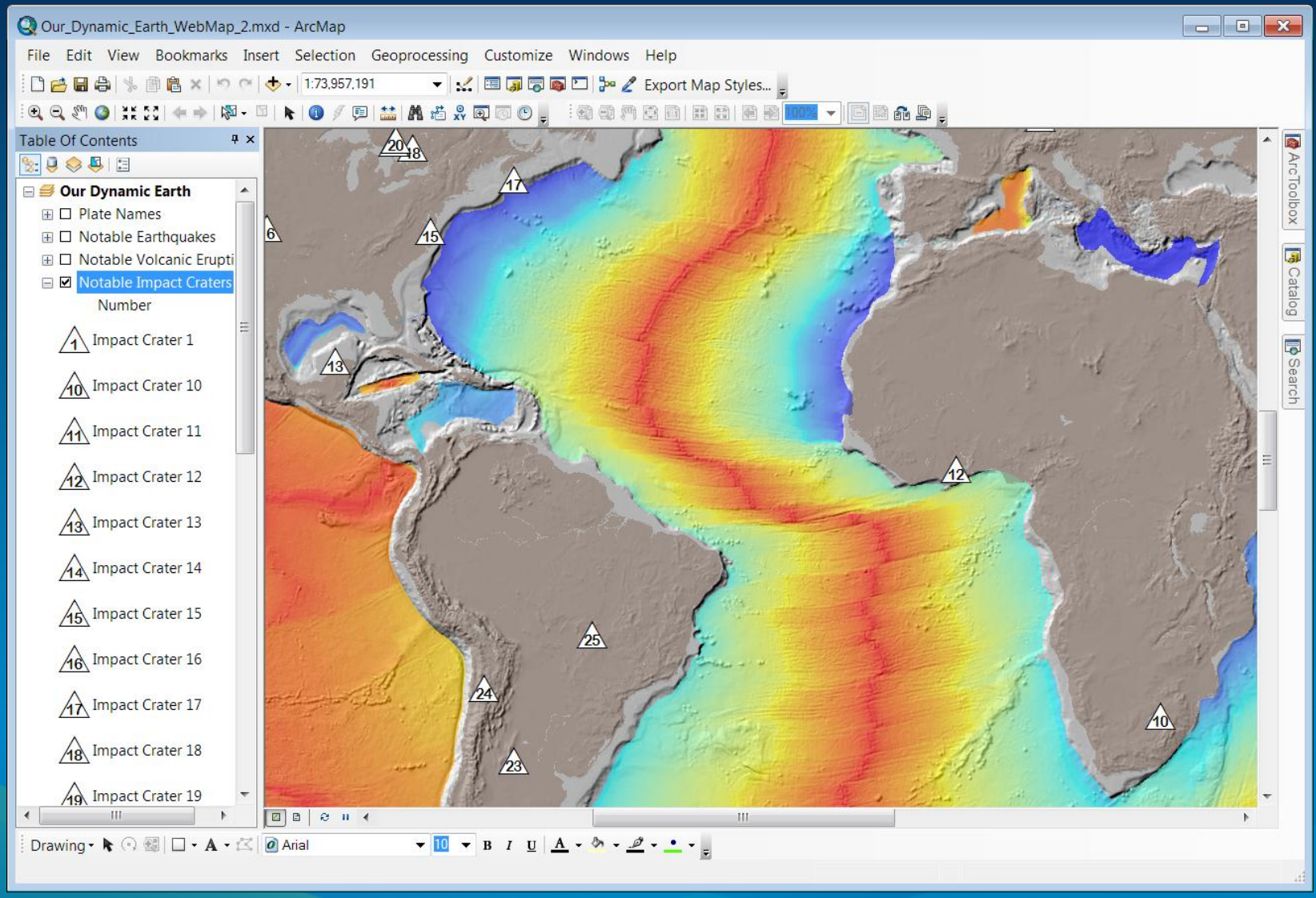
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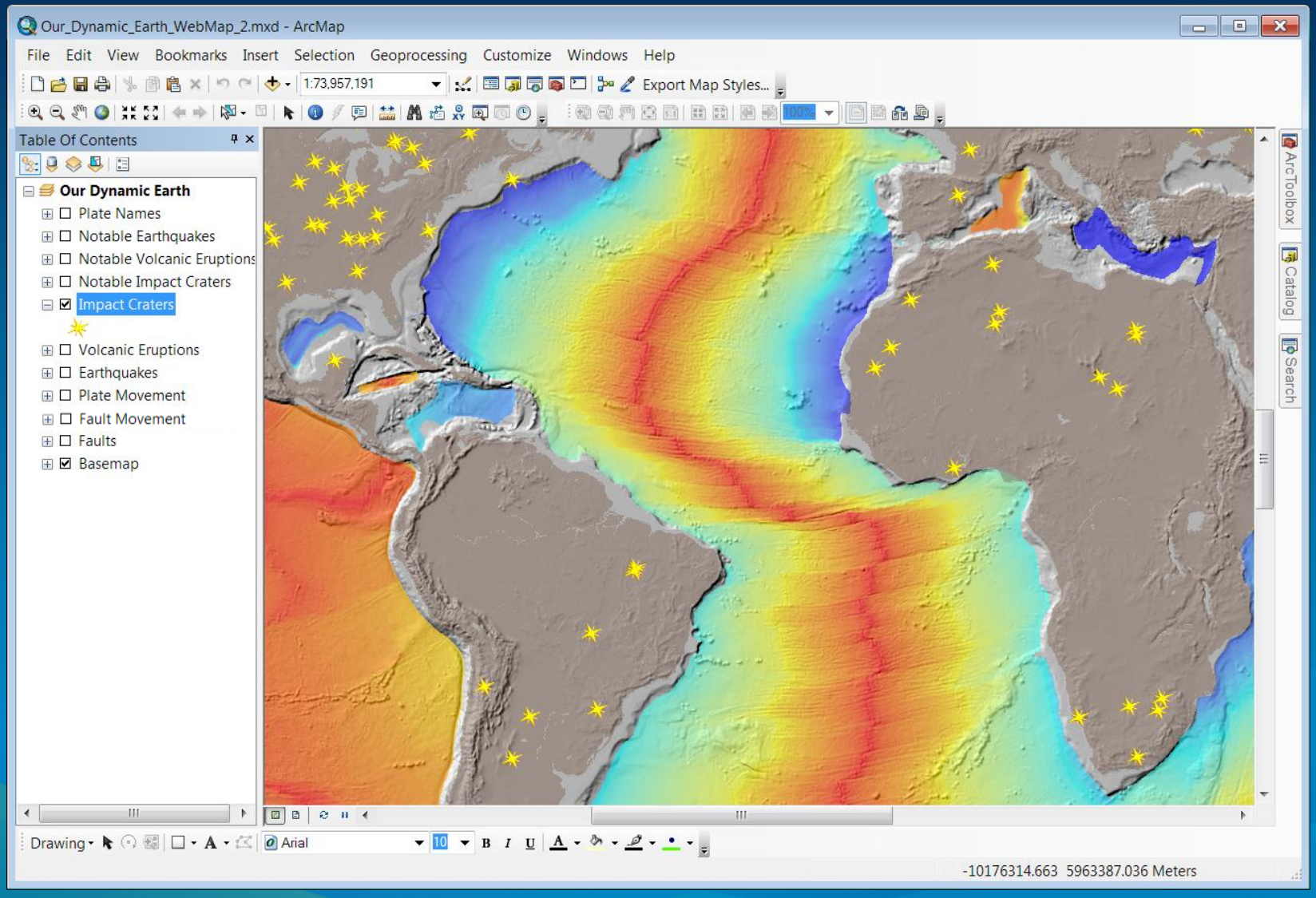
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Plate Names
Notable Earthquakes
Notable Volcanic Eruptions
Notable Impact Craters
Impact Craters
Volcanic Eruptions
Earthquakes
Plate Movement
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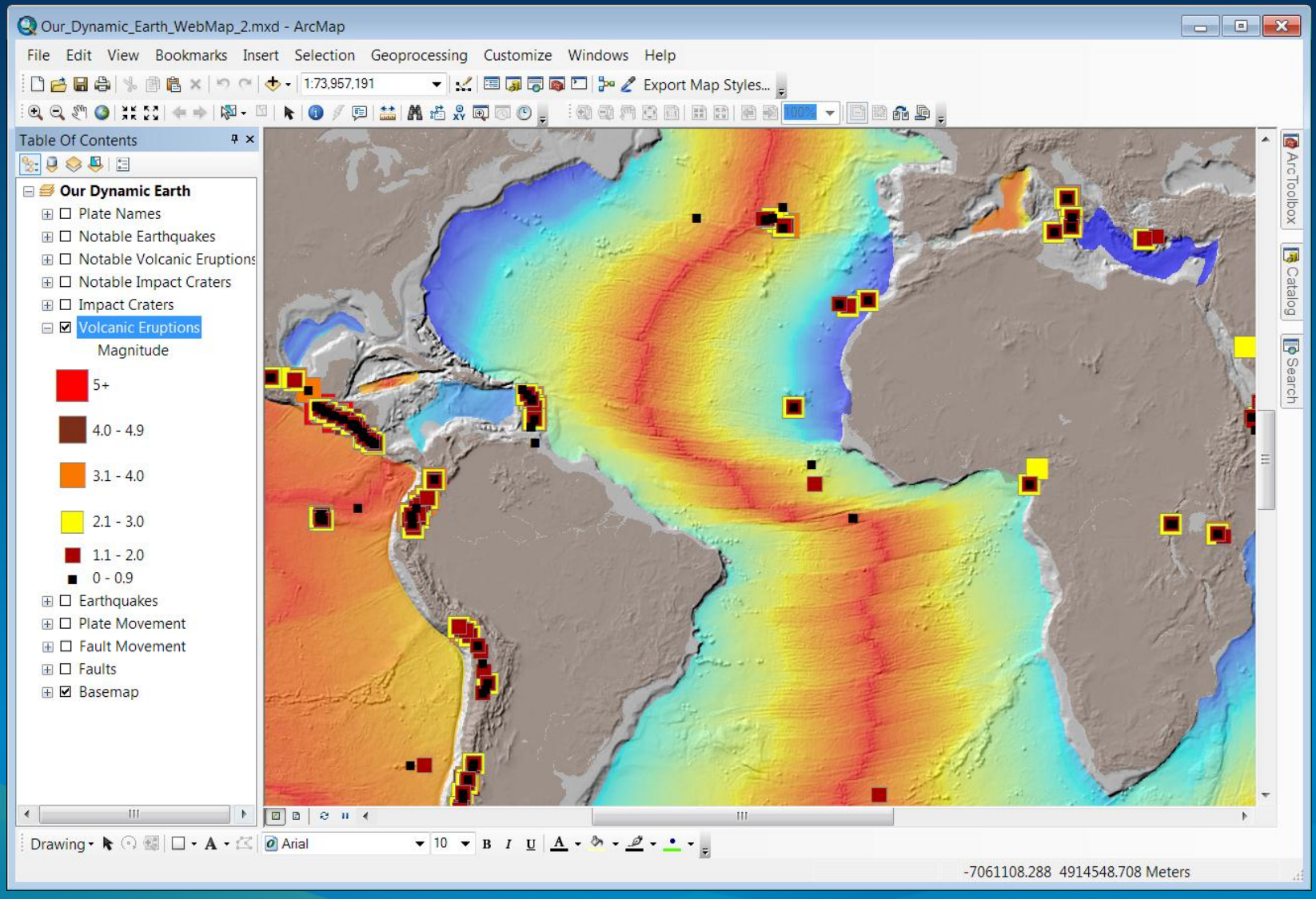
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Plate Names
Notable Earthquakes
Notable Volcanic Eruptions
Notable Impact Craters
Impact Craters
Volcanic Eruptions
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3.1 - 4.0
2.1 - 3.0
1.1 - 2.0
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Earthquakes
Plate Movement
Fault Movement
Faults
Basemap
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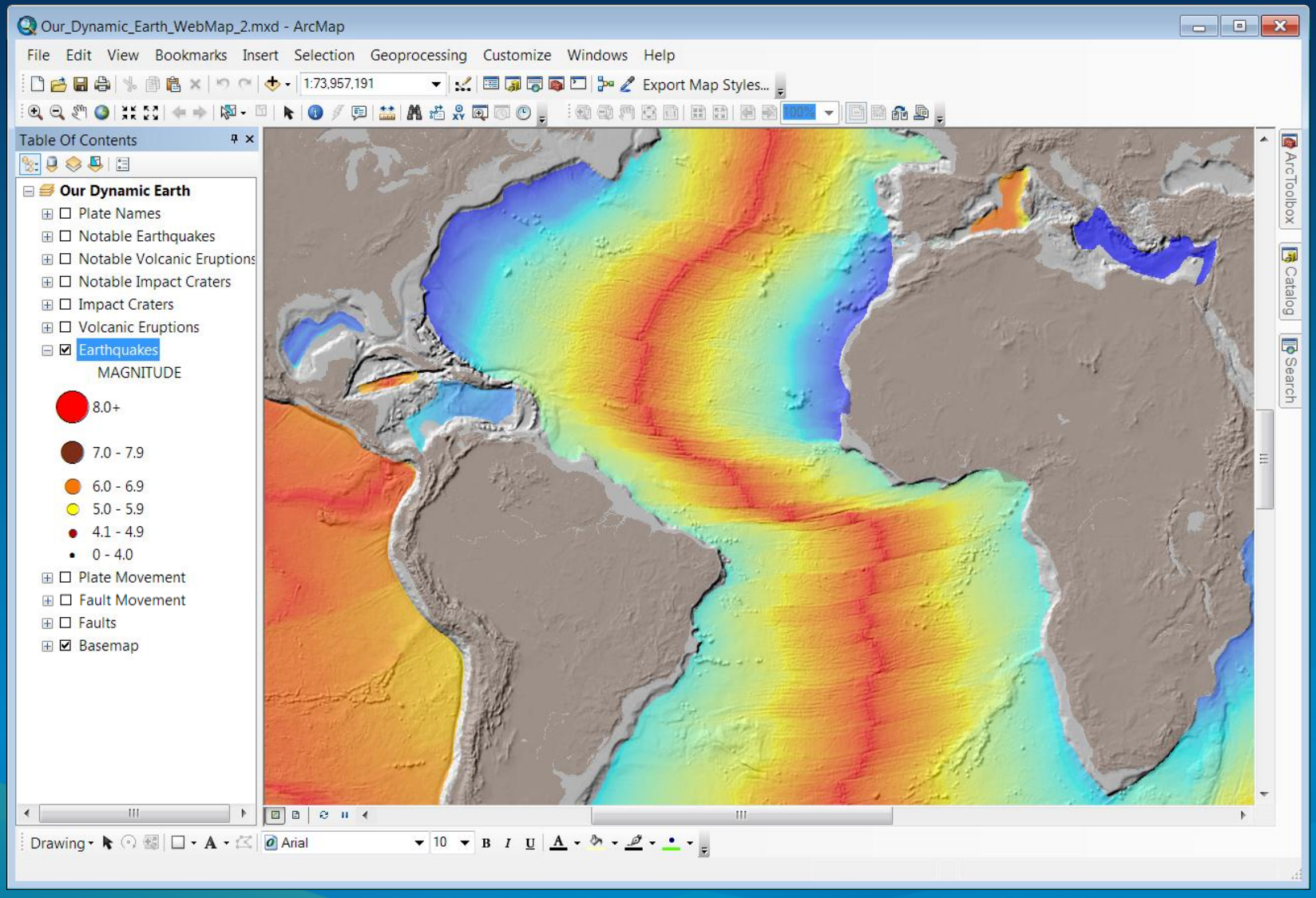
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Notable Volcanic Eruptions
Notable Impact Craters
Impact Craters
Volcanic Eruptions
Earthquakes
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7.0 - 7.9
6.0 - 6.9
5.0 - 5.9
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Plate Movement
Fault Movement
Faults
Basemap
ArcToolbox
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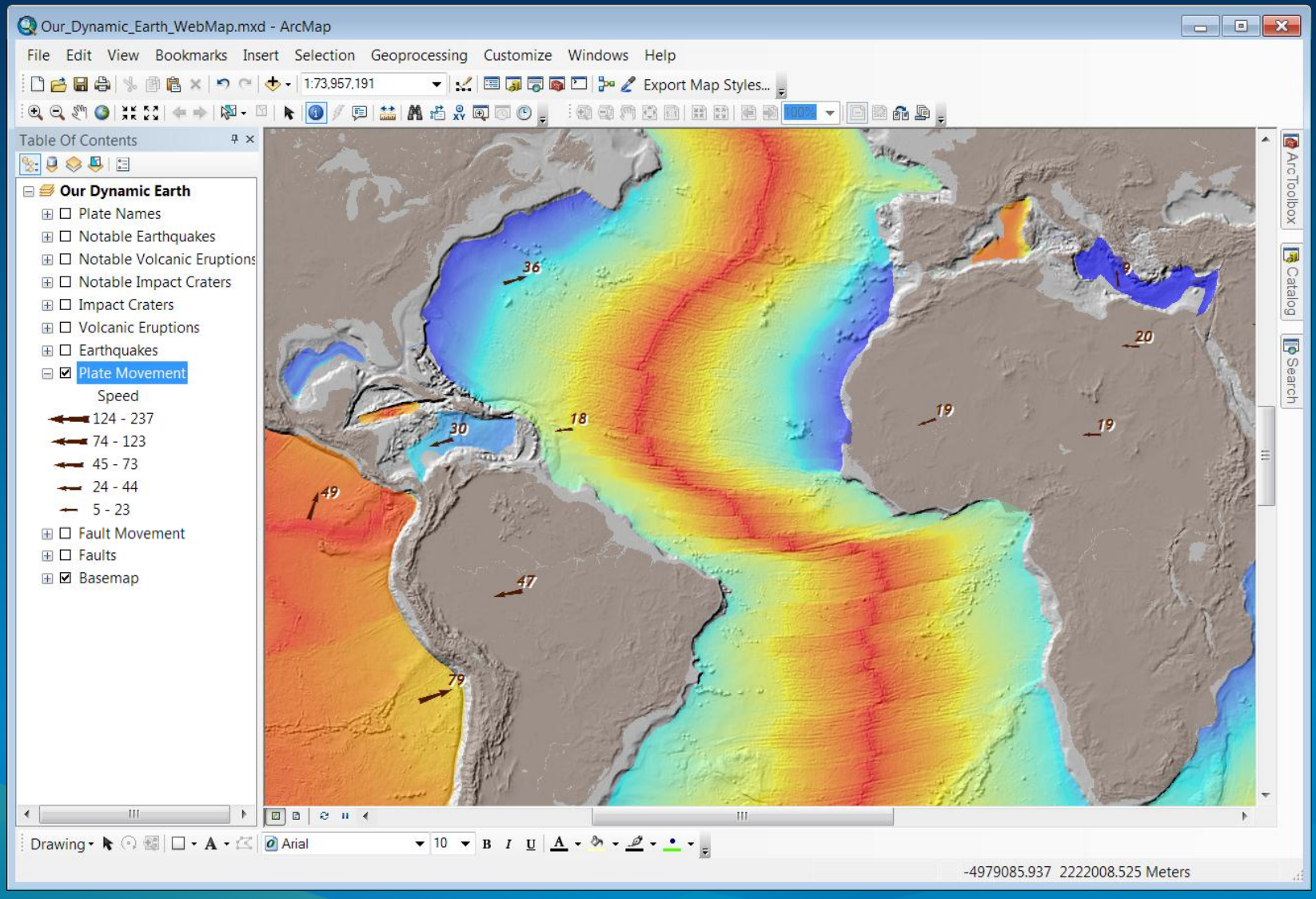
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Notable Impact Craters
Impact Craters
Volcanic Eruptions
Earthquakes
Plate Movement
Speed
124 - 237
74 - 123
45 - 73
24 - 44
5 - 23
Fault Movement
Faults
Basemap
36
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ArcToolbox
Catalog
Search
Drawing
Arial
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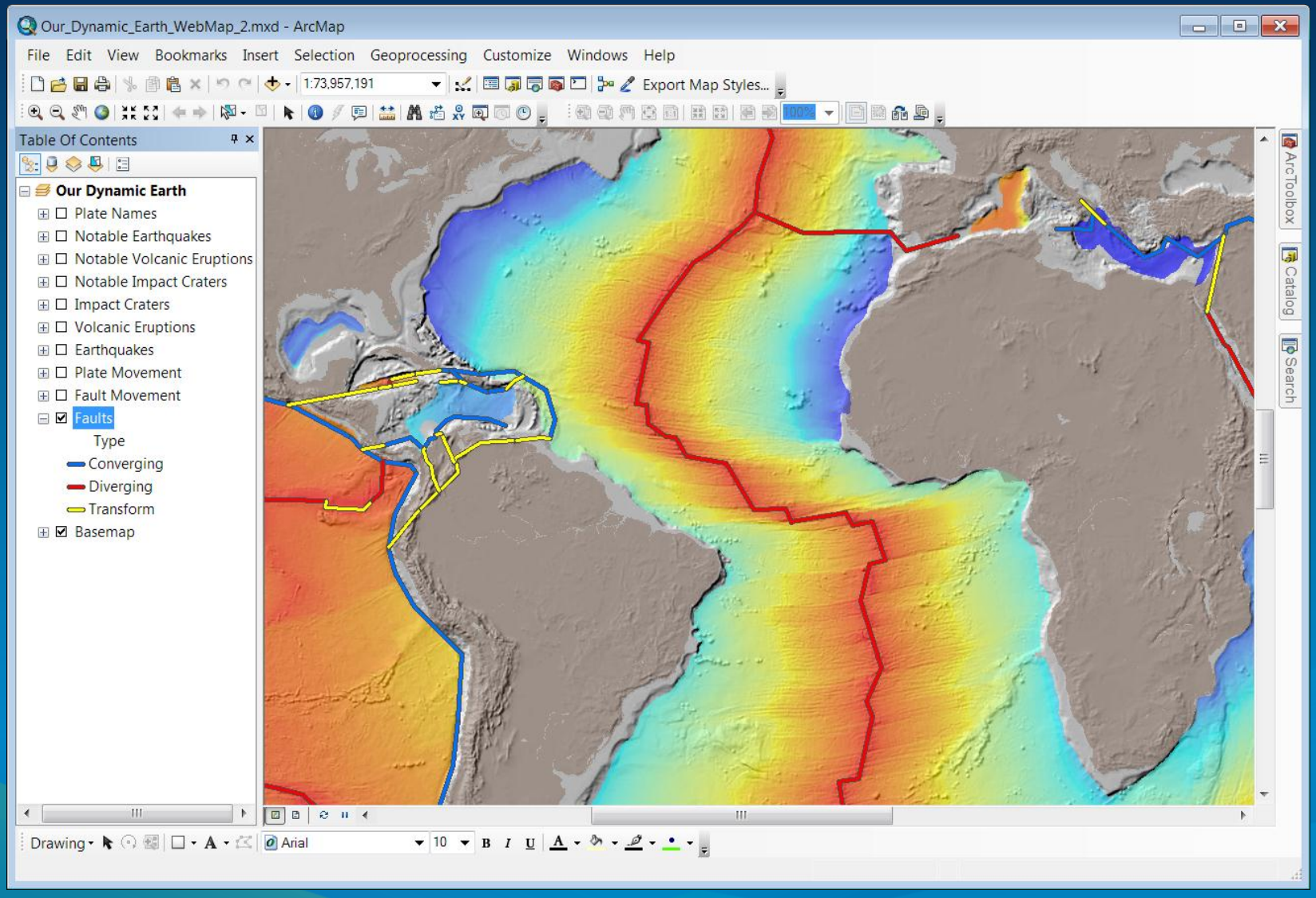
-4979085.937 2222008.525 Meters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Notable Volcanic Eruptions
Notable Impact Craters
Impact Craters
Volcanic Eruptions
Earthquakes
Plate Movement
Fault Movement
Faults
Type
Converging
Diverging
Transform
Basemap
ArcToolbox
Catalog
Search
Drawing
Arial
10

# Complex point and line symbols

- Cased line symbols for faults
- Character marker symbols for plate motion vectors
- Character marker symbols for notable events

- Variation in methods
  - When sharing to ArcGIS subscription account
  - When sharing to a server

# Text

- Top layers on the print map, but bottom layers on the web map
  - Tiled map services are placed under feature services
- Share the feature services to a server

# Documenting the AGO web map

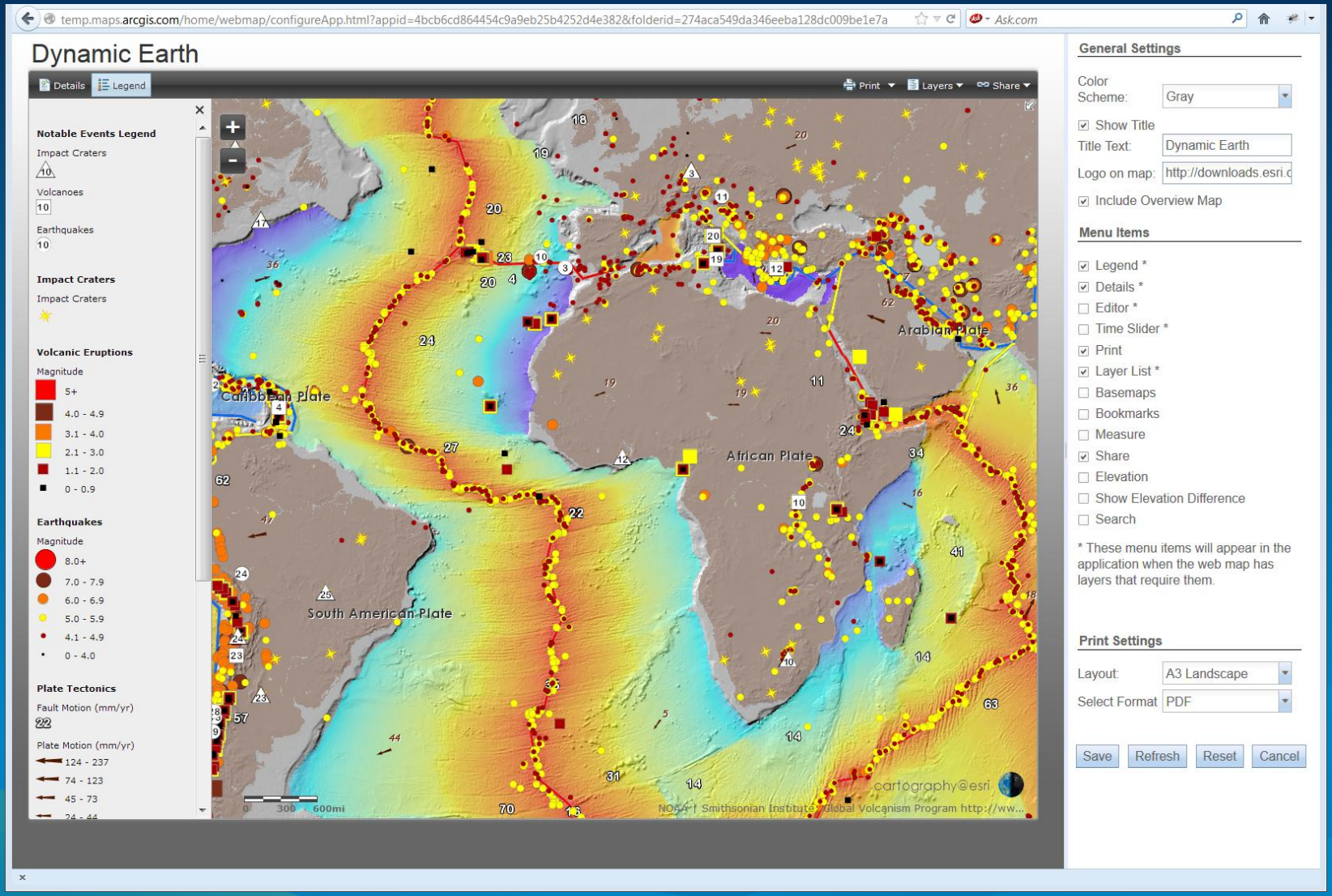
- The AGO content item helps populate the web map
  - Name
  - Summary
- Update the thumbnail
- Use Word doc to copy and paste content
  - Keeps hyperlinks
- Picture images must be on a server

# Compiling the web map

- Summary comes from the AGO content item
- Names in legend come from AGO content items
- Legend and layers are added
- Popups are configured
- Sometimes need to add layers just for the legend
- No ability to change
  - Order of tiled versus feature services

# Compiling the web map app

- Details come from the AGO content item
- Legend and layers come from the web map
- Configure app
  - Add title
  - Add logo
    - Saved on a server
  - Select desired application functions
  - No ability to change
    - Legend items and legend item names
    - Layers and layer names


temp.maps.arcgis.com/home/webmap/configureApp.html?appid=4bcb6cd864454c9a9eb25b4252d4e382&folderid=274aca549da346eeba128dc009be1e7a
Ask.com
Dynamic Earth
Details
Legend
Print
Layers
Share
Notable Events Legend
Impact Craters
Volcanoes
Earthquakes
Impact Craters
Volcanic Eruptions
Magnitude
5+
4.0 - 4.9
3.1 - 4.0
2.1 - 3.0
1.1 - 2.0
0 - 0.9
Earthquakes
Magnitude
8.0+
7.0 - 7.9
6.0 - 6.9
5.0 - 5.9
4.1 - 4.9
0 - 4.0
Plate Tectonics
Fault Motion (mm/yr)
Plate Motion (mm/yr)
124 - 237
74 - 123
45 - 73
Caribbean Plate
South American Plate
African Plate
Arabian Plate
0 300 600mi
cartography@esri
NOAA | Smithsonian Institute, Global Volcanism Program http://ww...
General Settings
Color Scheme: Gray
Show Title
Title Text: Dynamic Earth
Logo on map: http://downloads.esri.c
Include Overview Map
Menu Items
Legend *
Details *
Editor *
Time Slider *
Print
Layer List *
Basemaps
Bookmarks
Measure
Share
Elevation
Show Elevation Difference
Search
* These menu items will appear in the application when the web map has layers that require them.
Print Settings
Layout: A3 Landscape
Select Format PDF
Save
Refresh
Reset
Cancel

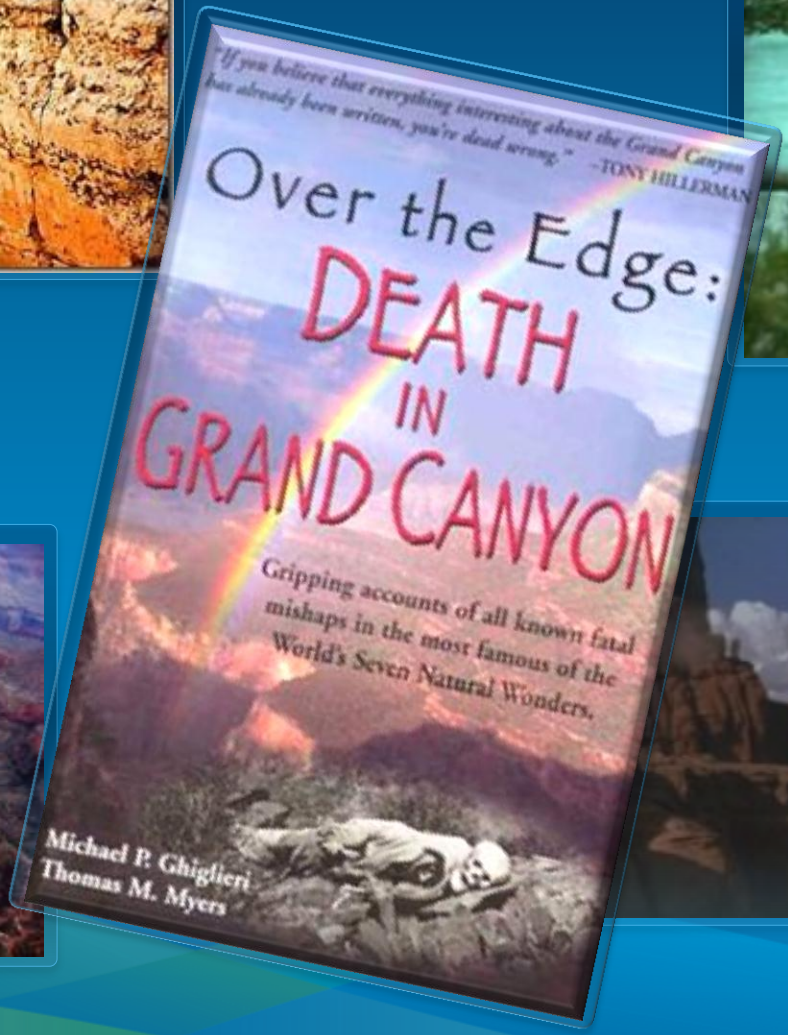
# Over the Edge 3D

## Death in Grand Canyon

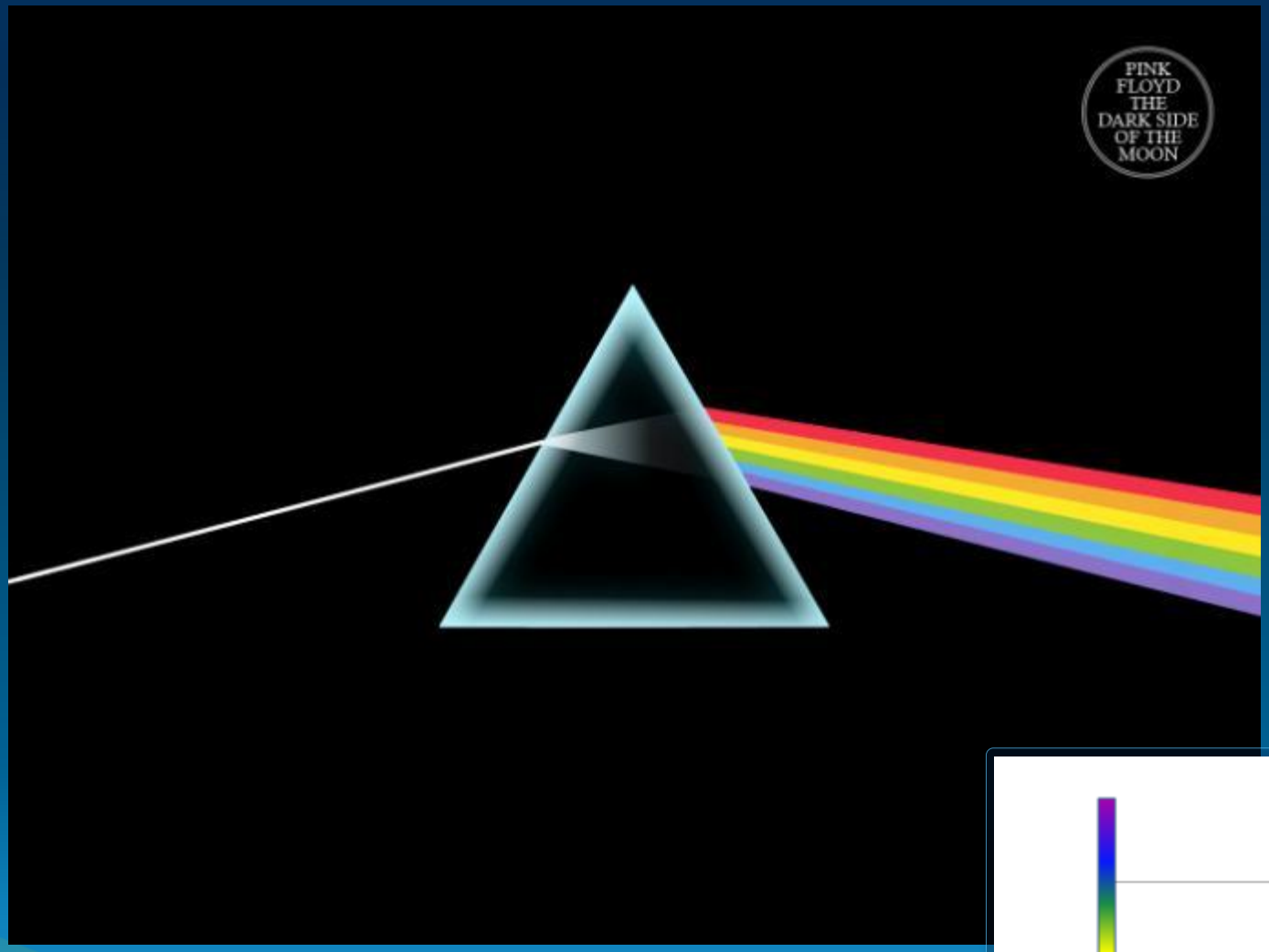
Kenneth Field
(@kennethfield)

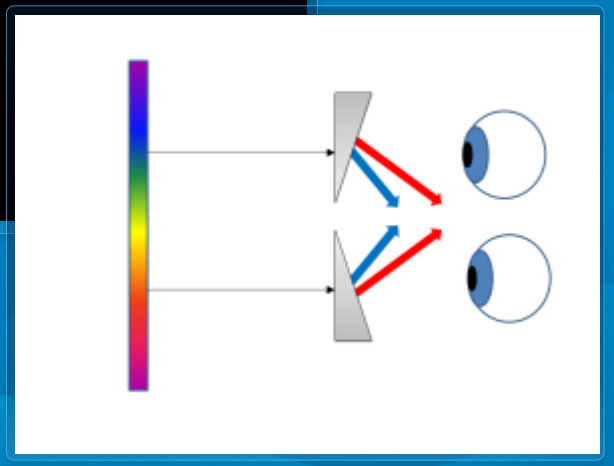
DEATH IN
3D
GRAND CANYON

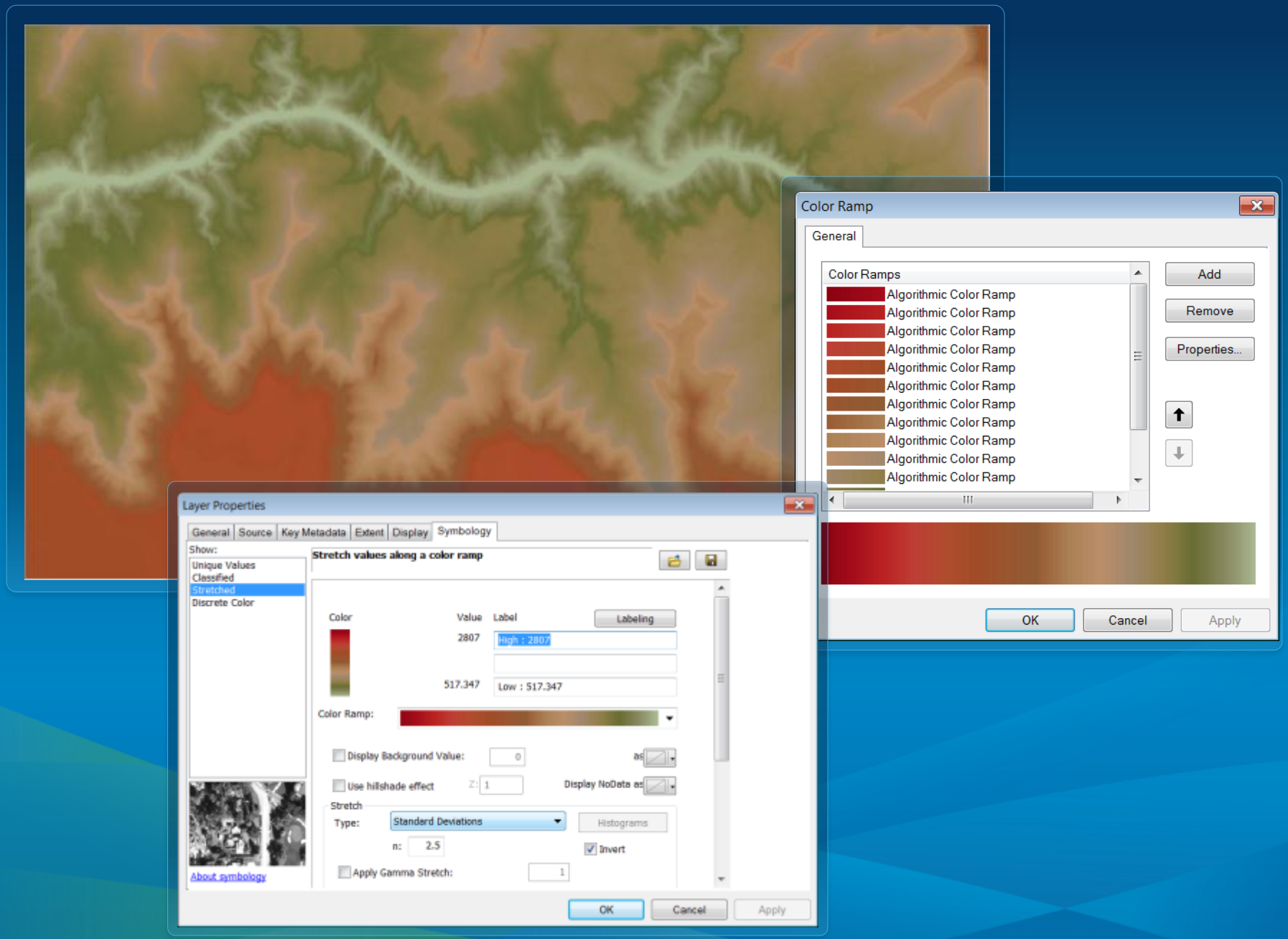
| | | | |
|---|---|---|---|
| Tom Gregory Standish, 32 | July 21, 1990 | Havasu Campground | *Standish of Boulder City, Nevada was camping with his fiancé in a small tent by a ledge in the campground downstream of Havasu Falls to escape heavy monsoon rains. A boulder peeled off the cliff above and struck Standish in the head, killing him instantly. His fiancé emerged unscathed physically.* Arizona Republic, *July 23, 1990.* |

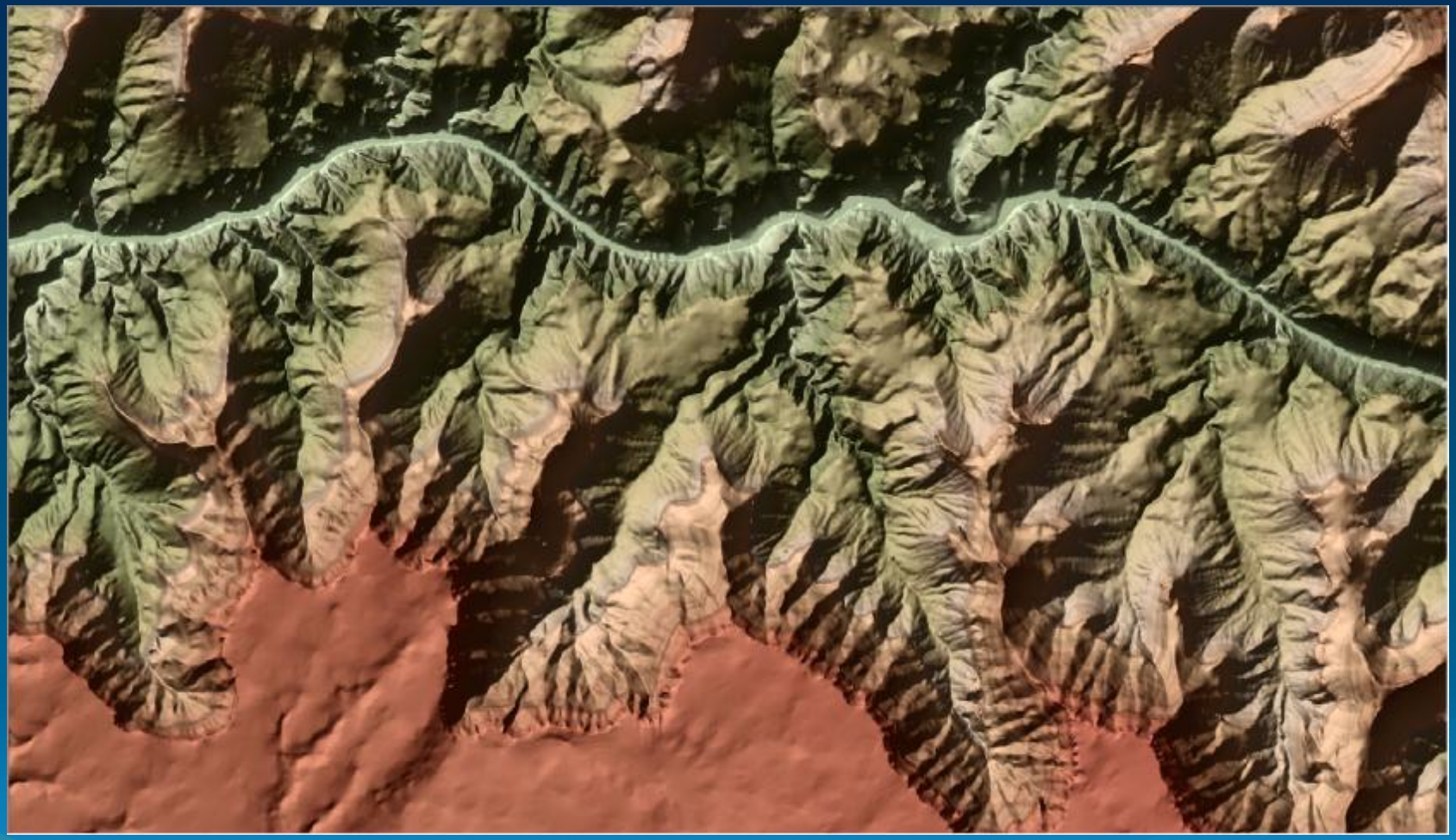


Jacob Lake
GRAND CANYON NATIONAL PARK
67
North Rim
Grand Canyon
Coconino
Tusayan

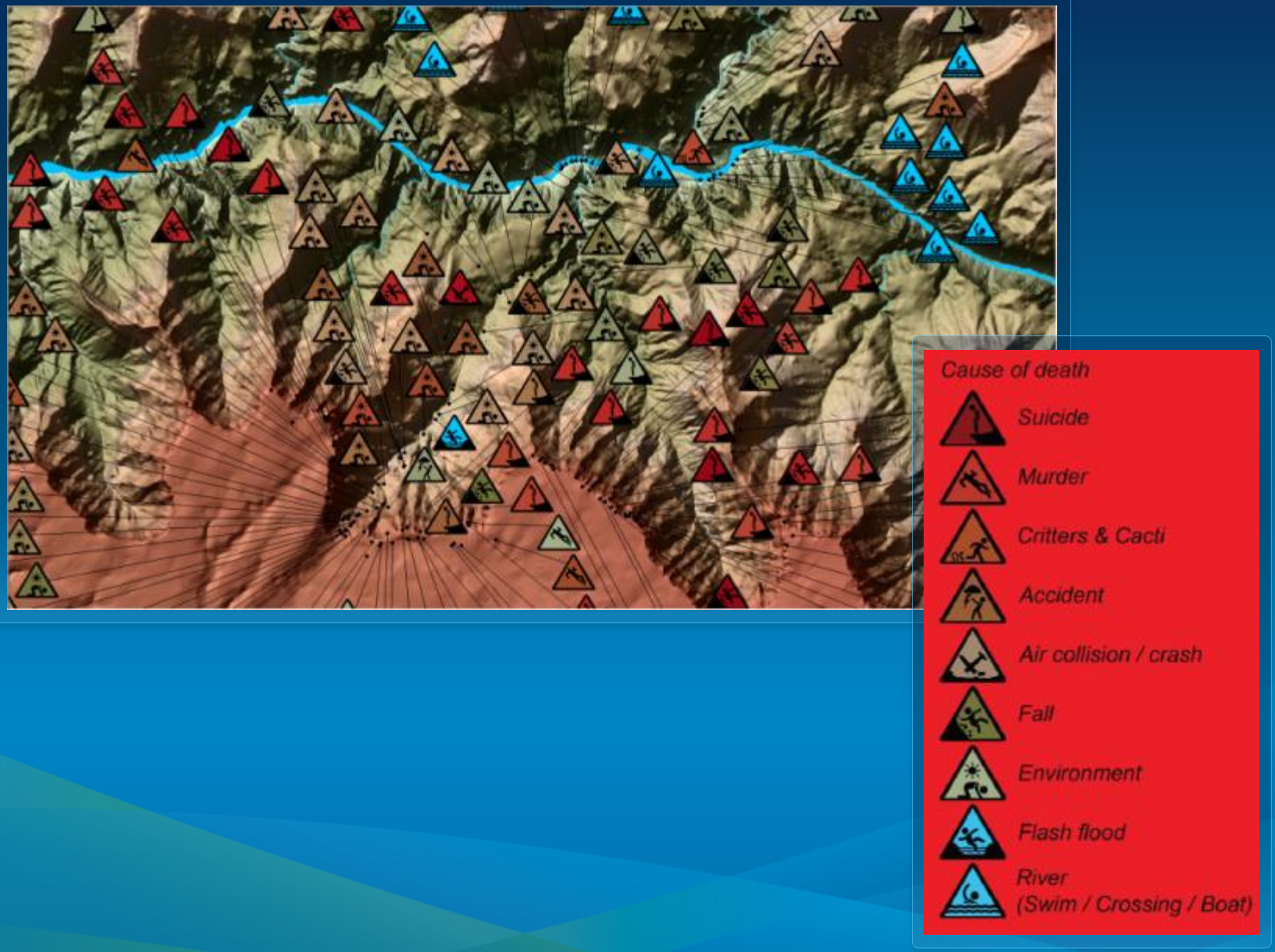

PINK
FLOYD
THE
DARK SIDE
OF THE
MOON

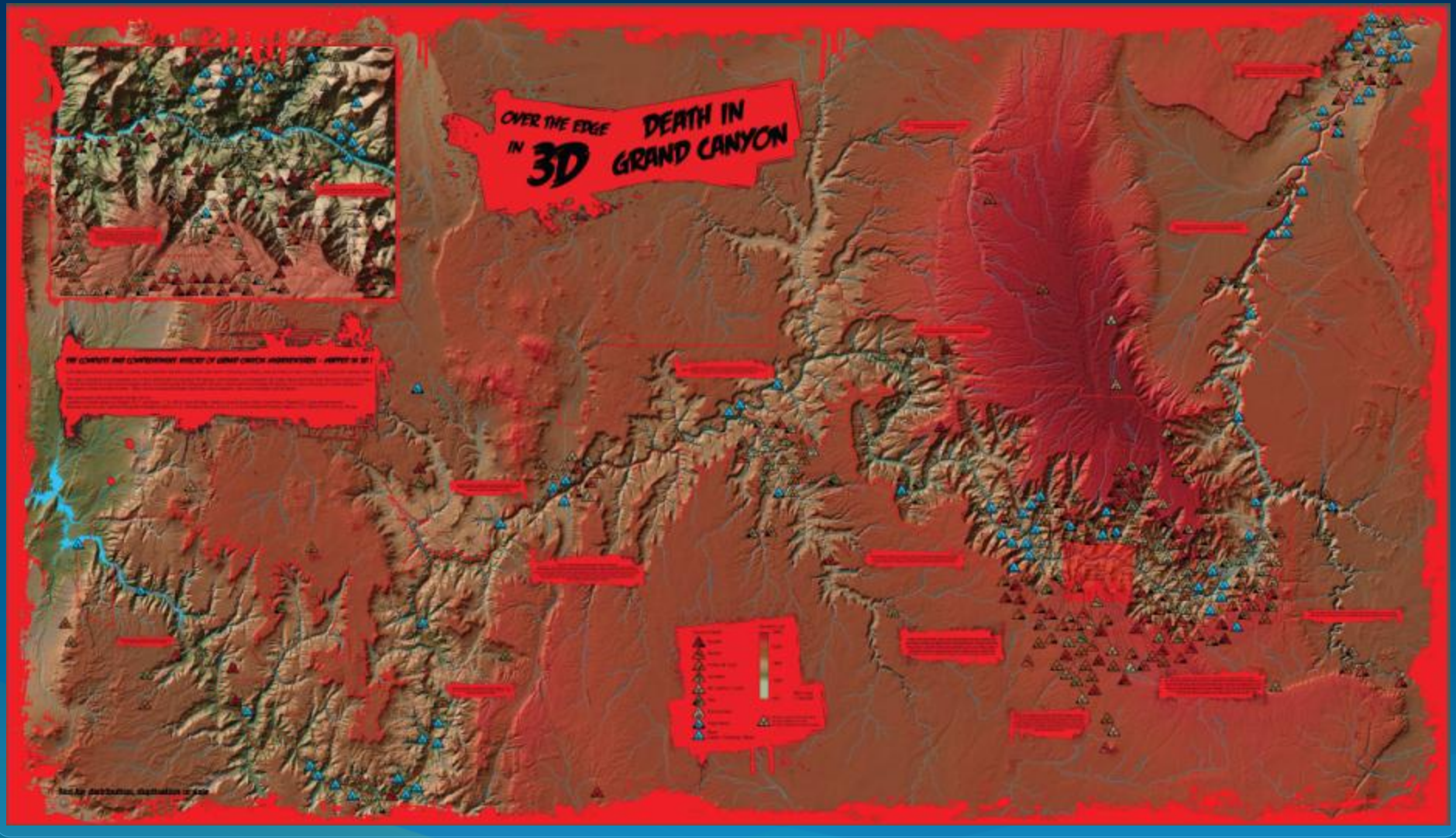



Color Ramp
General
Color Ramps
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Algorithmic Color Ramp
Add
Remove
Properties...
OK
Cancel
Apply
Layer Properties
General
Source
Key Metadata
Extent
Display
Symbology
Show:
Unique Values
Classified
Stretched
Discrete Color
Stretch values along a color ramp
Color
Value
Label
Labeling
2807
High : 2807
517.347
Low : 517.347
Color Ramp:
Display Background Value:
Use hillshade effect
Display NoData as
Stretch
Type:
Standard Deviations
Histograms
n:
2.5
Invert
Apply Gamma Stretch:
About symbology
OK
Cancel
Apply

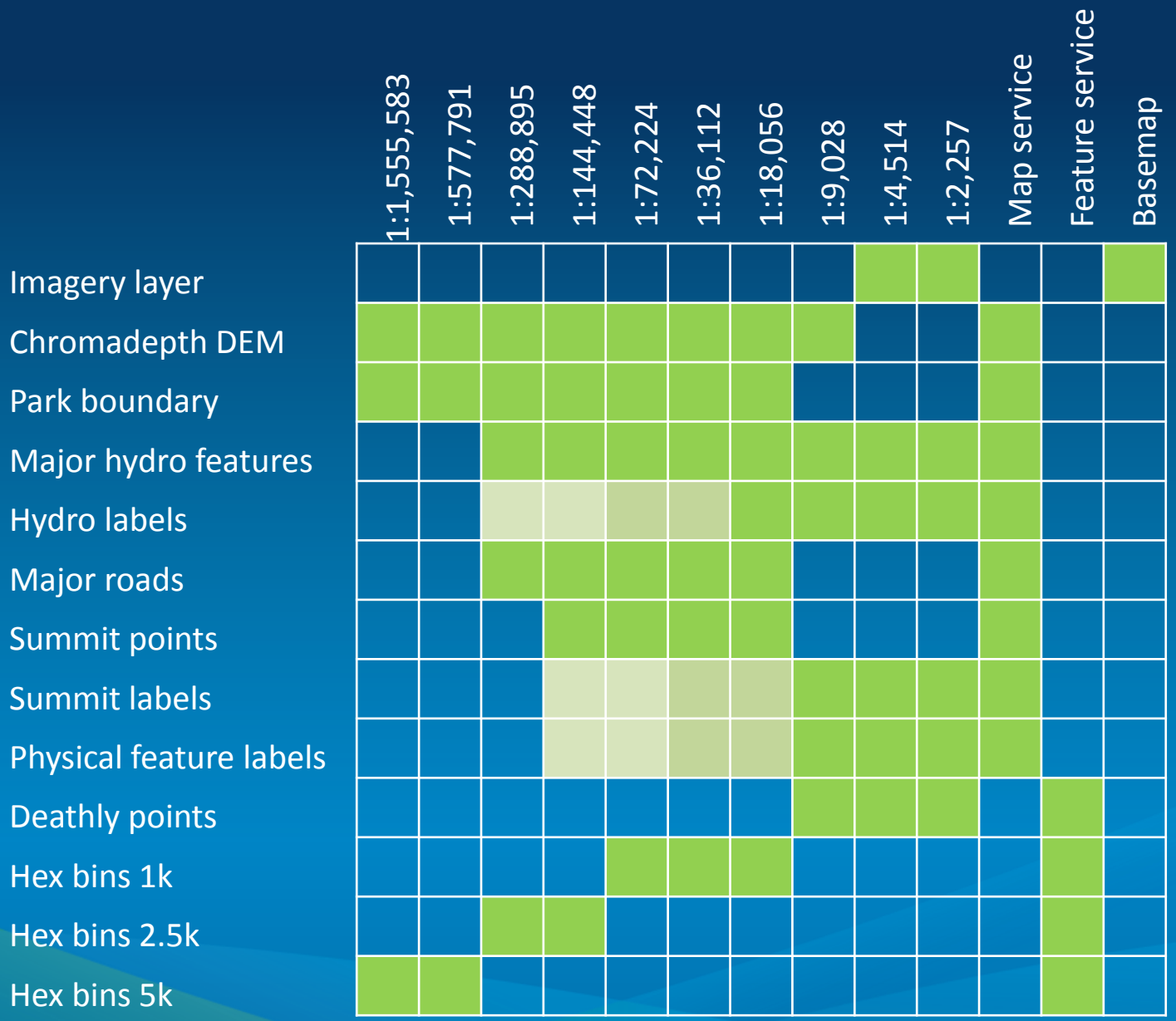


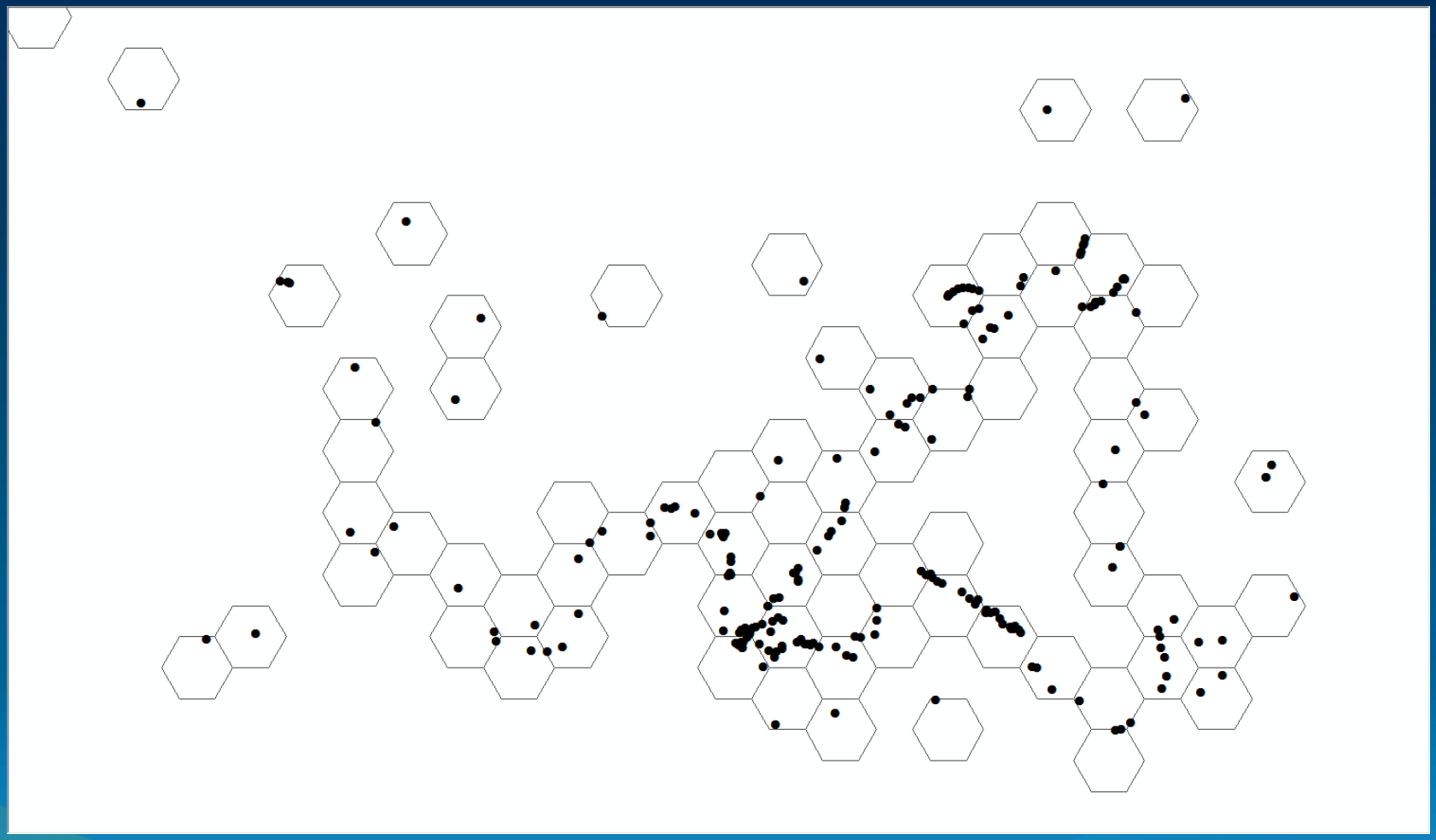
**ArcGIS Resources 10.1 Blog (http://blogs.esri.com/arcgis/)**
**Combining colored and grayshade rasters with high fidelity**

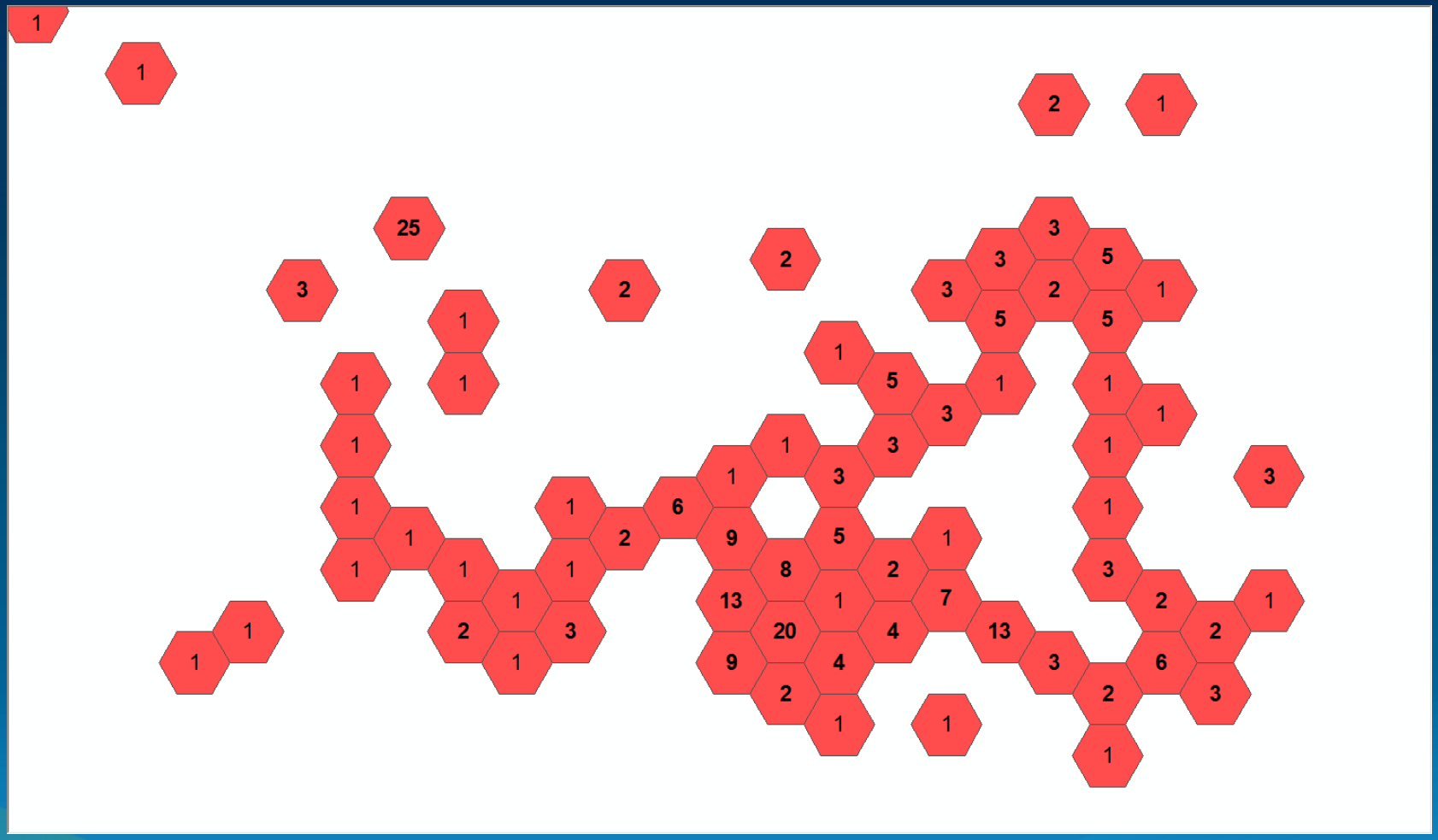

Cause of death
Suicide
Murder
Critters & Cacti
Accident
Air collision / crash
Fall
Environment
Flash flood
River
(Swim / Crossing / Boat)


OVER THE EDGE
IN
3D
DEATH IN
GRAND CANYON

# The web map

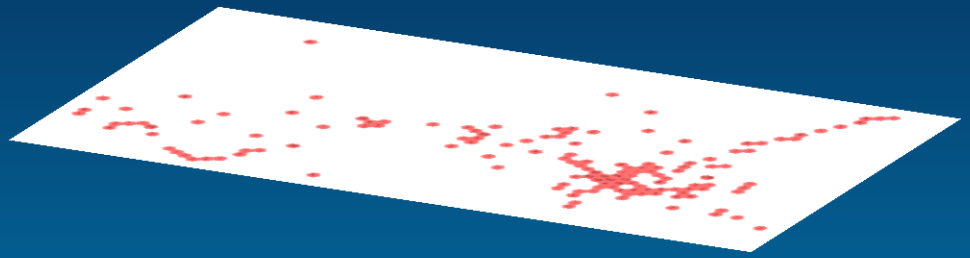

1:1,555,583
1:577,791
1:288,895
1:144,448
1:72,224
1:36,112
1:18,056
1:9,028
1:4,514
1:2,257
Map service
Feature service
Basemap
Imagery layer
Chromadepth DEM
Park boundary
Major hydro features
Hydro labels
Major roads
Summit points
Summit labels
Physical feature labels
Deathly points
Hex bins 1k
Hex bins 2.5k
Hex bins 5k



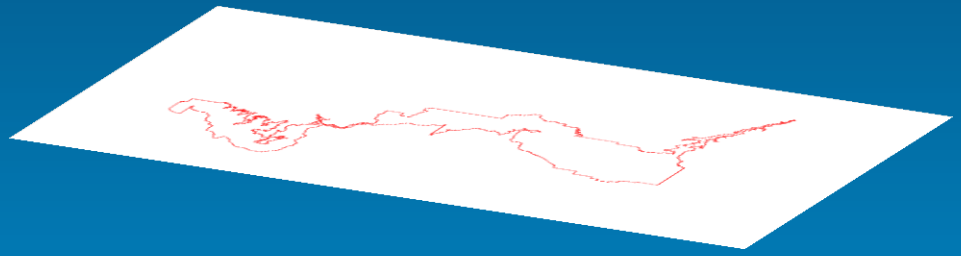



ArcGIS Resources 10.1 Blog (http://blogs.esri.com/arcgis/)

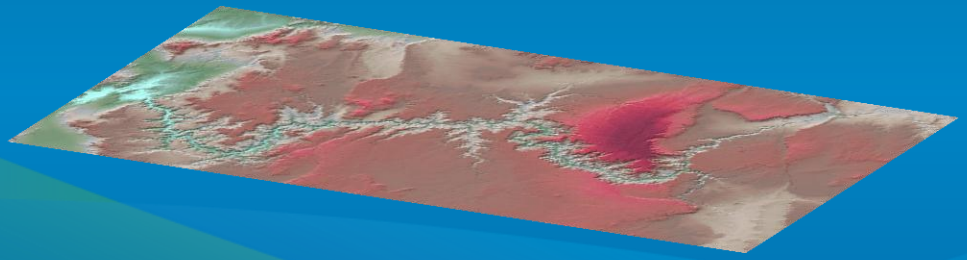
Using a binning technique for point-based multiscale web maps



**Feature service**
Hex bins
Individual incident points



**Cached map service**
Background contextual



**Cached map service**
Pansharpened DEM

# Over the Edge 3D: Death in Grand Canyon

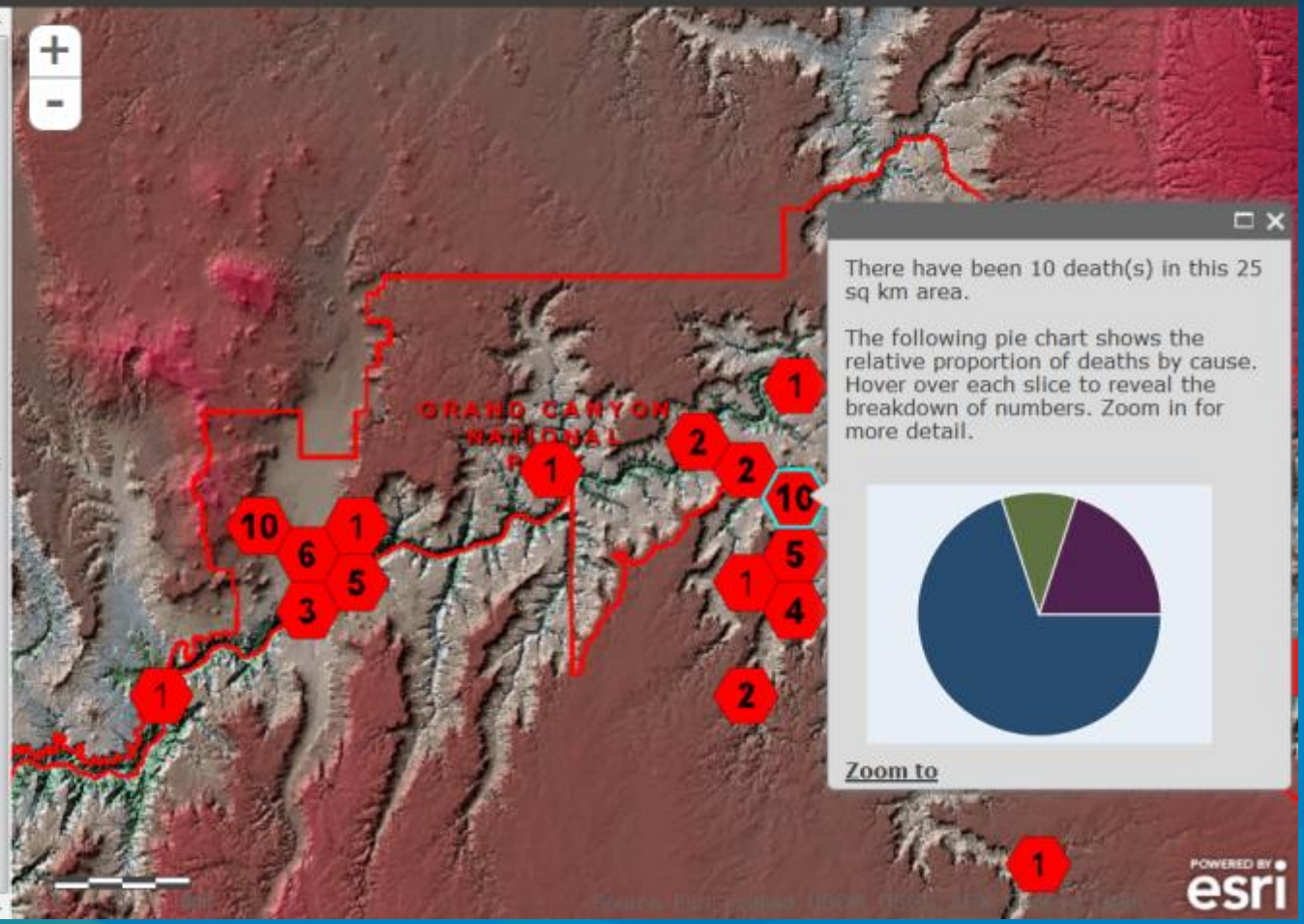
The complete and comprehensive history of grand canyon misadventures - mapped in 3D!

Over 770 deaths have occurred in Grand Canyon from the first river exploration by John Wesley Powell and his crew of 1869 to tourists falling off the rim today.

Inspired, and based on the book, by Ghiglieri, M. P. and Myers, T. M. (2012) Over the Edge: Death in Grand Canyon, this map is presented in Chromadepth and is best

LEGEND

**Click to reveal details. Zoom for more detail**



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LEGEND

**Death by cause**

Accident

Air

Search for
**Over the Edge**
in ArcGIS Online

Print your own copy

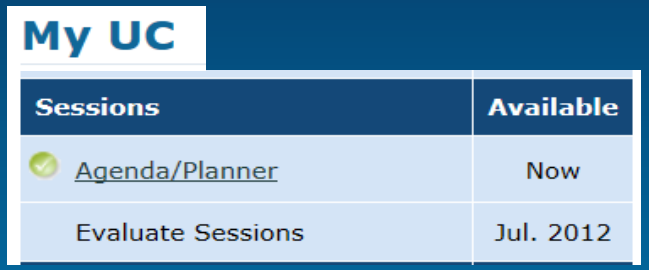
# In review

- Share many advanced cartographic techniques
- Show a variety of maps with an emphasis on web maps
- Cover a variety of themes
- Use examples to show techniques

# Please complete an online session evaluation

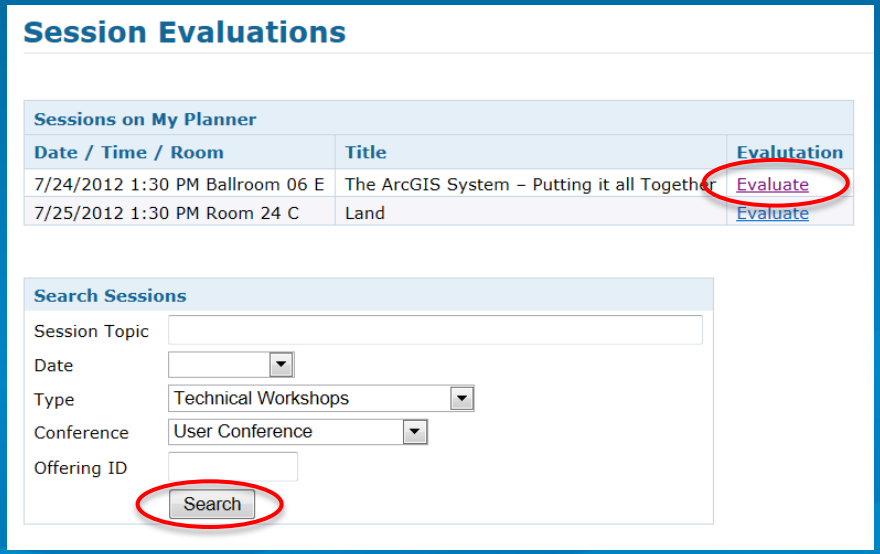
*www.esri.com/ucsessionsurveys*

1. **My UC Homepage > "Evaluate Sessions"**




2. **Choose session from planner or search for session**

**ID for this session:**
**Offering #1 ID: 636**
**Offering #2 ID: 2526**



# Questions?

Online session evaluation:
*www.esri.com/ucsessionsurveys*

**Offering #1 ID: 636**

**Offering #2 ID: 2526**

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