Making **Beautiful Maps** for Education

using ArcGIS Pro and ArcGIS Online

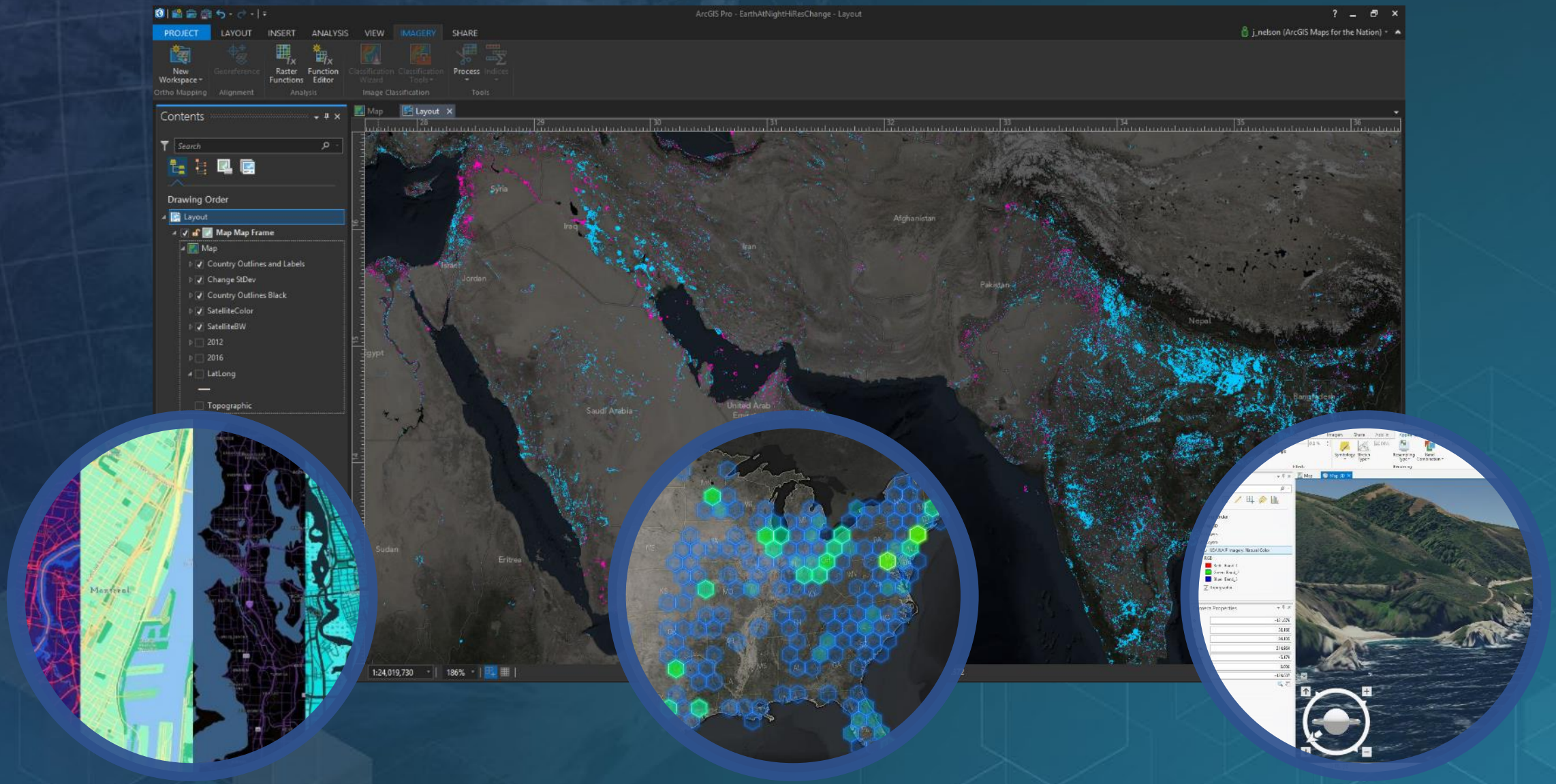
livingatlas.arcgis.com

Dan Pisut

dpisut@esri.com

esri

THE SCIENCE OF WHERE



Download the free 21-day trial software

https://www.esri.com/en-us/arcgis/products/arcgis-pro/trial

Creating a good map

1. What is the message?
2. How will it be seen? e.g., SOS, web map, print, etc.
3. Pick a good basemap
4. Pick a symbology that doesn't distort #1
5. Use good color choice
6. Label what needs to be labeled

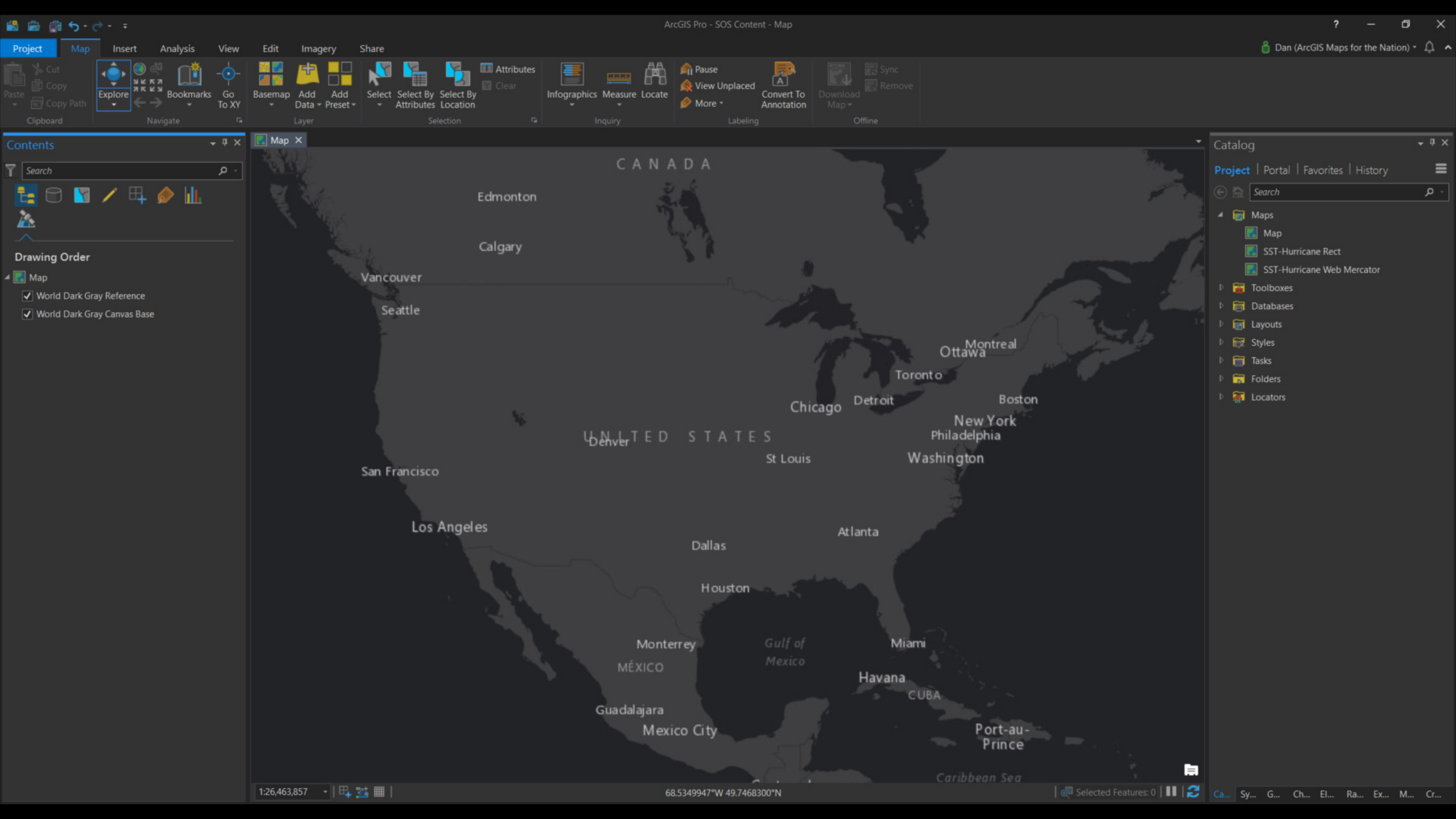
Making a Map is Easy

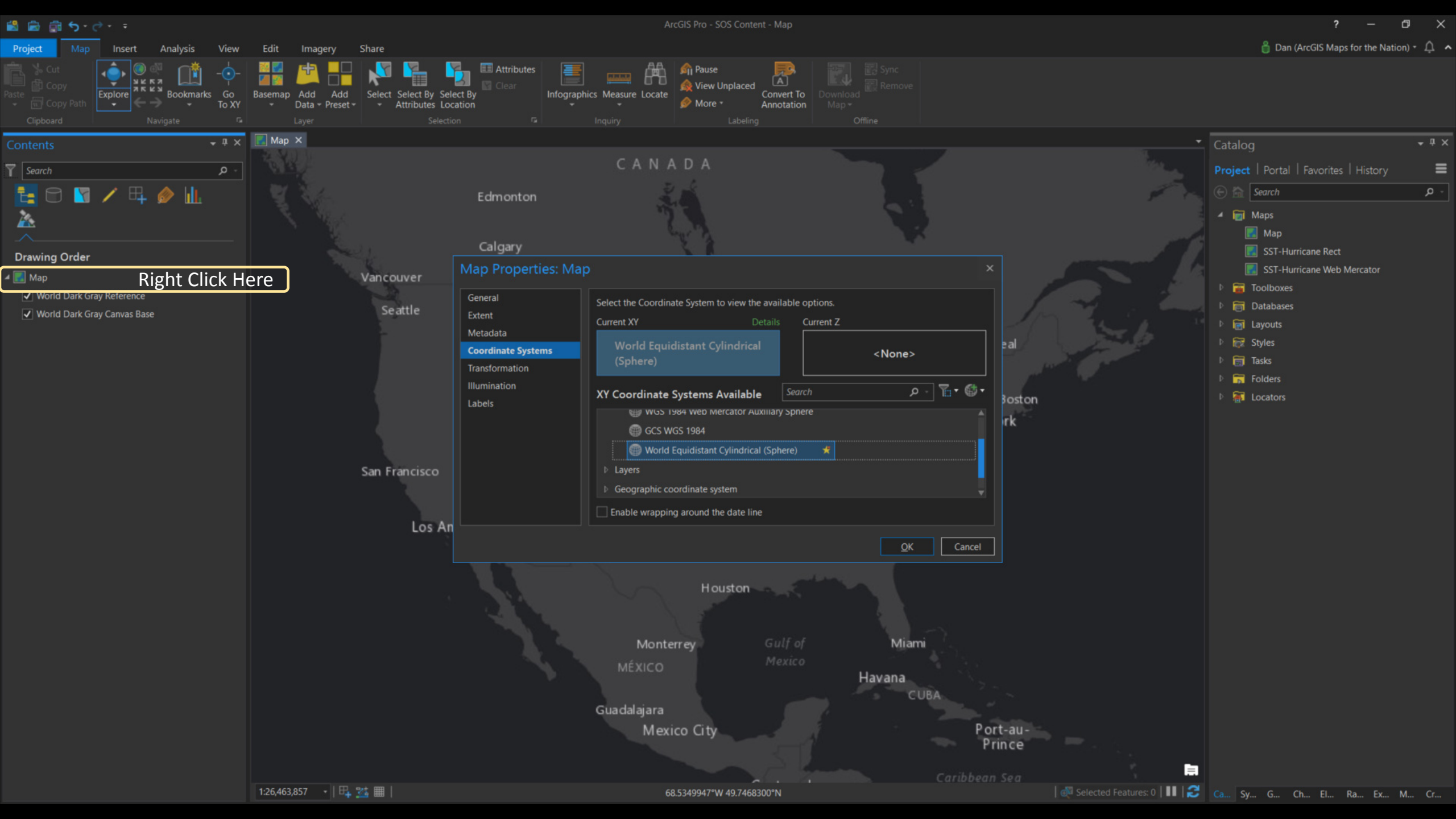
Download the PPT

https://tinyurl.com/y9qmk4vb

Download the Files

https://tinyurl.com/ybr83t85


ArcGIS Pro - SOS Content - Map
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Dan (ArcGIS Maps for the Nation)
Cut
Copy
Copy Path
Paste
Explore
Bookmarks
Go To XY
Clipboard
Navigate
Basemap
Add Data
Add Preset
Layer
Select
Select By Attributes
Select By Location
Attributes
Clear
Selection
Infographics
Measure
Locate
Inquiry
Pause
View Unplaced
More
Convert To Annotation
Labeling
Download Map
Sync
Remove
Offline
Contents
Search
Drawing Order
Map
World Dark Gray Reference
World Dark Gray Canvas Base
Map
CANADA
Edmonton
Calgary
Vancouver
Seattle
Ottawa
Montreal
Toronto
Chicago
Detroit
Boston
New York
Philadelphia
Washington
UNITED STATES
Denver
St Louis
San Francisco
Los Angeles
Atlanta
Dallas
Houston
Monterrey
Gulf of Mexico
Miami
MÉXICO
Havana
CUBA
Guadalajara
Mexico City
Port-au-Prince
Caribbean Sea
1:26,463,857
68.5349947°W 49.7468300°N
Selected Features: 0
Catalog
Project
Portal
Favorites
History
Search
Maps
Map
SST-Hurricane Rect
SST-Hurricane Web Mercator
Toolboxes
Databases
Layouts
Styles
Tasks
Folders
Locators


ArcGIS Pro - SOS Content - Map
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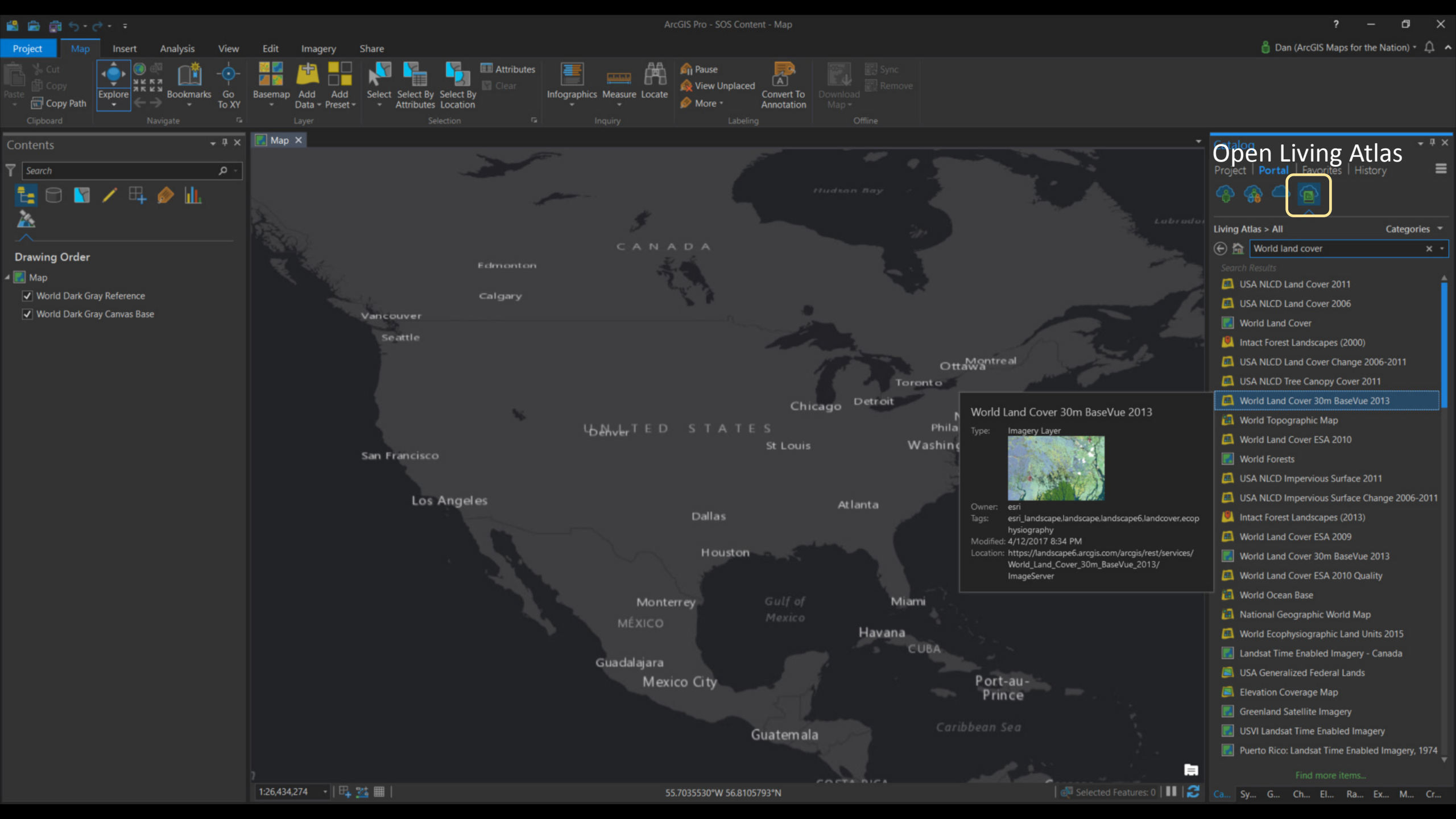
Houston
Monterrey
MÉXICO
Gulf of Mexico
Miami
Havana
CUBA
Guadalajara
Mexico City
Port-au-Prince
Caribbean Sea
Boston
Map Properties: Map
General
Extent
Metadata
Coordinate Systems
Transformation
Illumination
Labels
Select the Coordinate System to view the available options.
Current XY
Details
World Equidistant Cylindrical (Sphere)
Current Z
<None>
XY Coordinate Systems Available
Search
WGS 1984 Web Mercator Auxiliary Sphere
GCS WGS 1984
World Equidistant Cylindrical (Sphere)
Layers
Geographic coordinate system
Enable wrapping around the date line
OK
Cancel
Catalog
Project
Portal
Favorites
History
Search
Maps
Map
SST-Hurricane Rect
SST-Hurricane Web Mercator
Toolboxes
Databases
Layouts
Styles
Tasks
Folders
Locators
1:26,463,857
68.5349947°W 49.7468300°N
Selected Features: 0


ArcGIS Pro - SOS Content - Map
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Bookmarks
Go To XY
Basemap
Add Data
Add Preset
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Select By Attributes
Select By Location
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View Unplaced
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Search
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World Dark Gray Reference
World Dark Gray Canvas Base
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Calgary
Vancouver
Seattle
Ottawa
Montreal
Toronto
Chicago
Detroit
UNITED STATES
Denver
St Louis
San Francisco
Los Angeles
Dallas
Atlanta
Houston
Monterrey
MÉXICO
Gulf of Mexico
Miami
Havana
CUBA
Guadalajara
Mexico City
Port-au-Prince
Caribbean Sea
Guatemala
1:26,434,274
55.7035530°W 56.8105793°N
Selected Features: 0
Catalog
Project | Portal | Favorites | History
Open Living Atlas
Living Atlas > All
Categories
World land cover
Search Results
USA NLCD Land Cover 2011
USA NLCD Land Cover 2006
World Land Cover
Intact Forest Landscapes (2000)
USA NLCD Land Cover Change 2006-2011
USA NLCD Tree Canopy Cover 2011
World Land Cover 30m BaseVue 2013
World Topographic Map
World Land Cover ESA 2010
World Forests
USA NLCD Impervious Surface 2011
USA NLCD Impervious Surface Change 2006-2011
Intact Forest Landscapes (2013)
World Land Cover ESA 2009
World Land Cover 30m BaseVue 2013
World Land Cover ESA 2010 Quality
World Ocean Base
National Geographic World Map
World Ecophysiographic Land Units 2015
Landsat Time Enabled Imagery - Canada
USA Generalized Federal Lands
Elevation Coverage Map
Greenland Satellite Imagery
USVI Landsat Time Enabled Imagery
Puerto Rico: Landsat Time Enabled Imagery, 1974
Find more items...
World Land Cover 30m BaseVue 2013
Type: Imagery Layer
Owner: esri
Tags: esri_landscape,landscape,landscape6,landcover,ecophysiography
Modified: 4/12/2017 8:34 PM
Location: https://landscape6.arcgis.com/arcgis/rest/services/World_Land_Cover_30m_BaseVue_2013/ImageServer

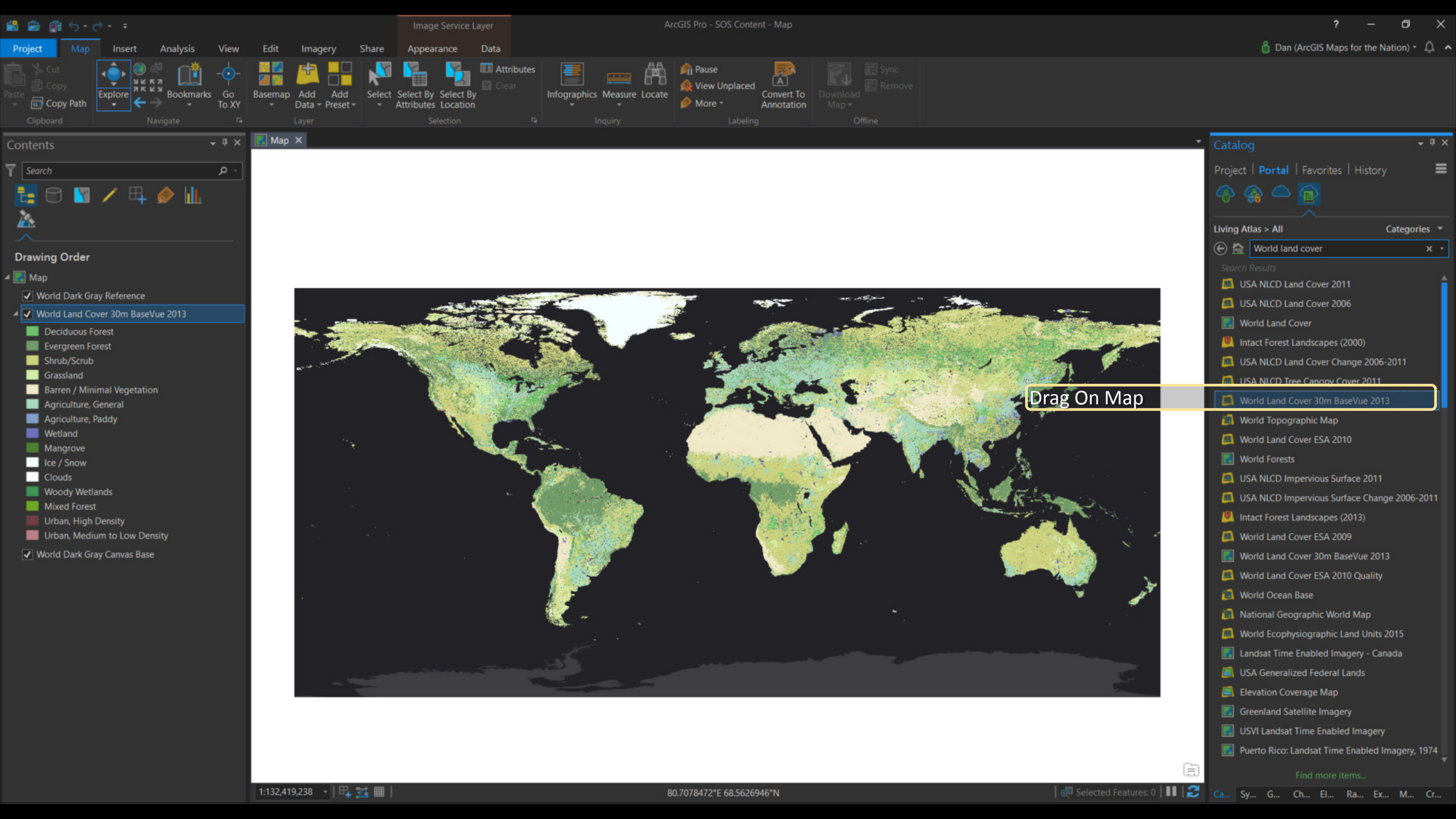
Image Service Layer
ArcGIS Pro - SOS Content - Map
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Appearance
Data
Dan (ArcGIS Maps for the Nation)
Cut
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Copy Path
Clipboard
Explore
Bookmarks
Go To XY
Navigate
Basemap
Add Data
Add Preset
Layer
Select
Select By Attributes
Select By Location
Attributes
Clear
Selection
Infographics
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Locate
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View Unplaced
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Sync
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Offline
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Search
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Map
World Dark Gray Reference
World Land Cover 30m BaseVue 2013
Deciduous Forest
Evergreen Forest
Shrub/Scrub
Grassland
Barren / Minimal Vegetation
Agriculture, General
Agriculture, Paddy
Wetland
Mangrove
Ice / Snow
Clouds
Woody Wetlands
Mixed Forest
Urban, High Density
Urban, Medium to Low Density
World Dark Gray Canvas Base
Map
Drag On Map
1:132,419,238
80.7078472°E 68.5626946°N
Selected Features: 0
Catalog
Project
Portal
Favorites
History
Living Atlas > All
Categories
World land cover
Search Results
USA NLCD Land Cover 2011
USA NLCD Land Cover 2006
World Land Cover
Intact Forest Landscapes (2000)
USA NLCD Land Cover Change 2006-2011
USA NLCD Tree Canopy Cover 2011
World Land Cover 30m BaseVue 2013
World Topographic Map
World Land Cover ESA 2010
World Forests
USA NLCD Impervious Surface 2011
USA NLCD Impervious Surface Change 2006-2011
Intact Forest Landscapes (2013)
World Land Cover ESA 2009
World Land Cover 30m BaseVue 2013
World Land Cover ESA 2010 Quality
World Ocean Base
National Geographic World Map
World Ecophysiographic Land Units 2015
Landsat Time Enabled Imagery - Canada
USA Generalized Federal Lands
Elevation Coverage Map
Greenland Satellite Imagery
USVI Landsat Time Enabled Imagery
Puerto Rico: Landsat Time Enabled Imagery, 1974
Find more items...

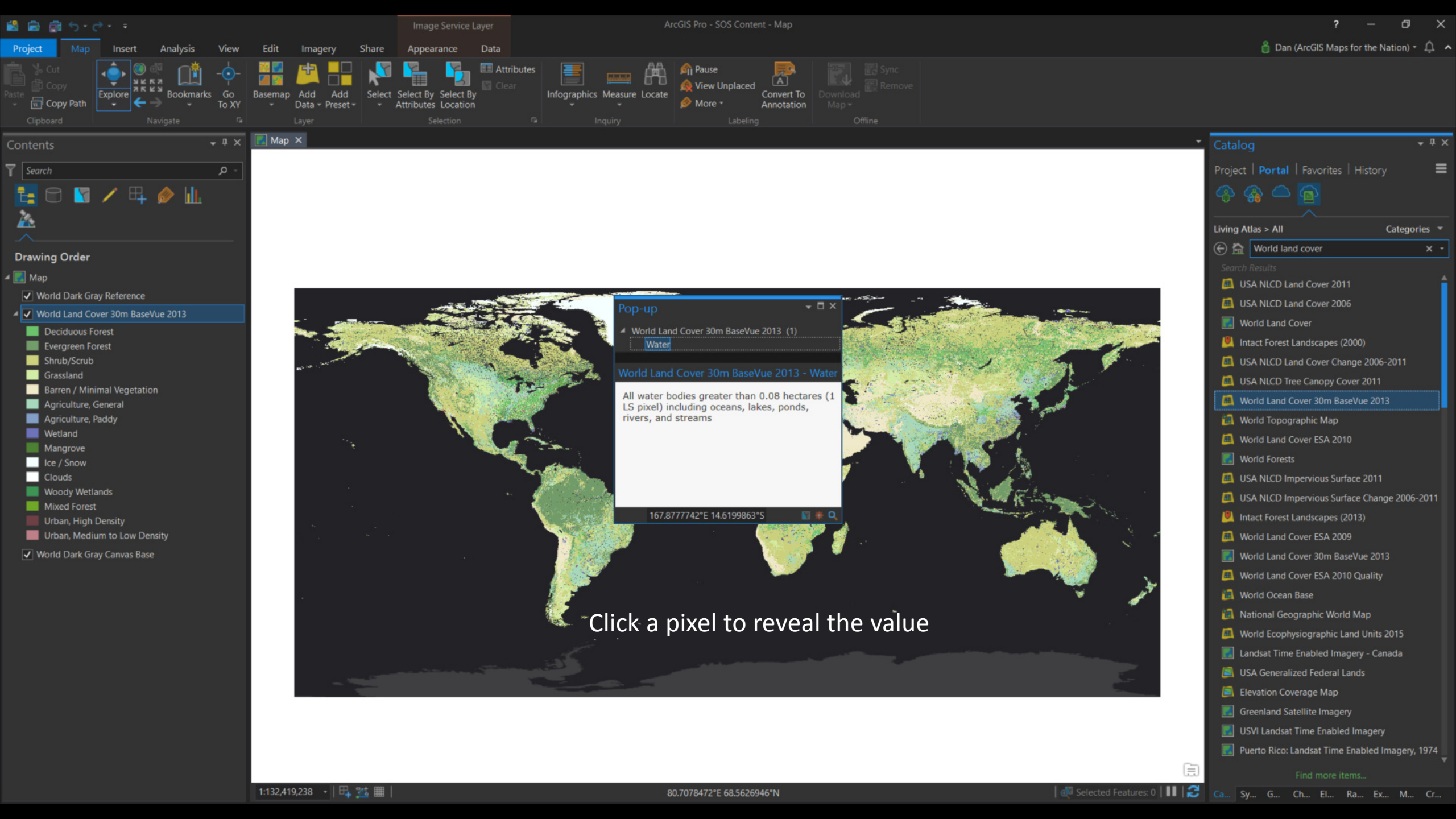
Image Service Layer
ArcGIS Pro - SOS Content - Map
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Dan (ArcGIS Maps for the Nation)
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Go To XY
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Add Data
Add Preset
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Select
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Attributes
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Grassland
Barren / Minimal Vegetation
Agriculture, General
Agriculture, Paddy
Wetland
Mangrove
Ice / Snow
Clouds
Woody Wetlands
Mixed Forest
Urban, High Density
Urban, Medium to Low Density
World Dark Gray Canvas Base
Map
Pop-up
World Land Cover 30m BaseVue 2013 (1)
Water
World Land Cover 30m BaseVue 2013 - Water
All water bodies greater than 0.08 hectares (1 LS pixel) including oceans, lakes, ponds, rivers, and streams
167.8777742°E 14.6199863°S
Click a pixel to reveal the value
1:132,419,238
80.7078472°E 68.5626946°N
Selected Features: 0
Catalog
Project
Portal
Favorites
History
Living Atlas > All
Categories
World land cover
Search Results
USA NLCD Land Cover 2011
USA NLCD Land Cover 2006
World Land Cover
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USA NLCD Tree Canopy Cover 2011
World Land Cover 30m BaseVue 2013
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USA Generalized Federal Lands
Elevation Coverage Map
Greenland Satellite Imagery
USVI Landsat Time Enabled Imagery
Puerto Rico: Landsat Time Enabled Imagery, 1974
Find more items...

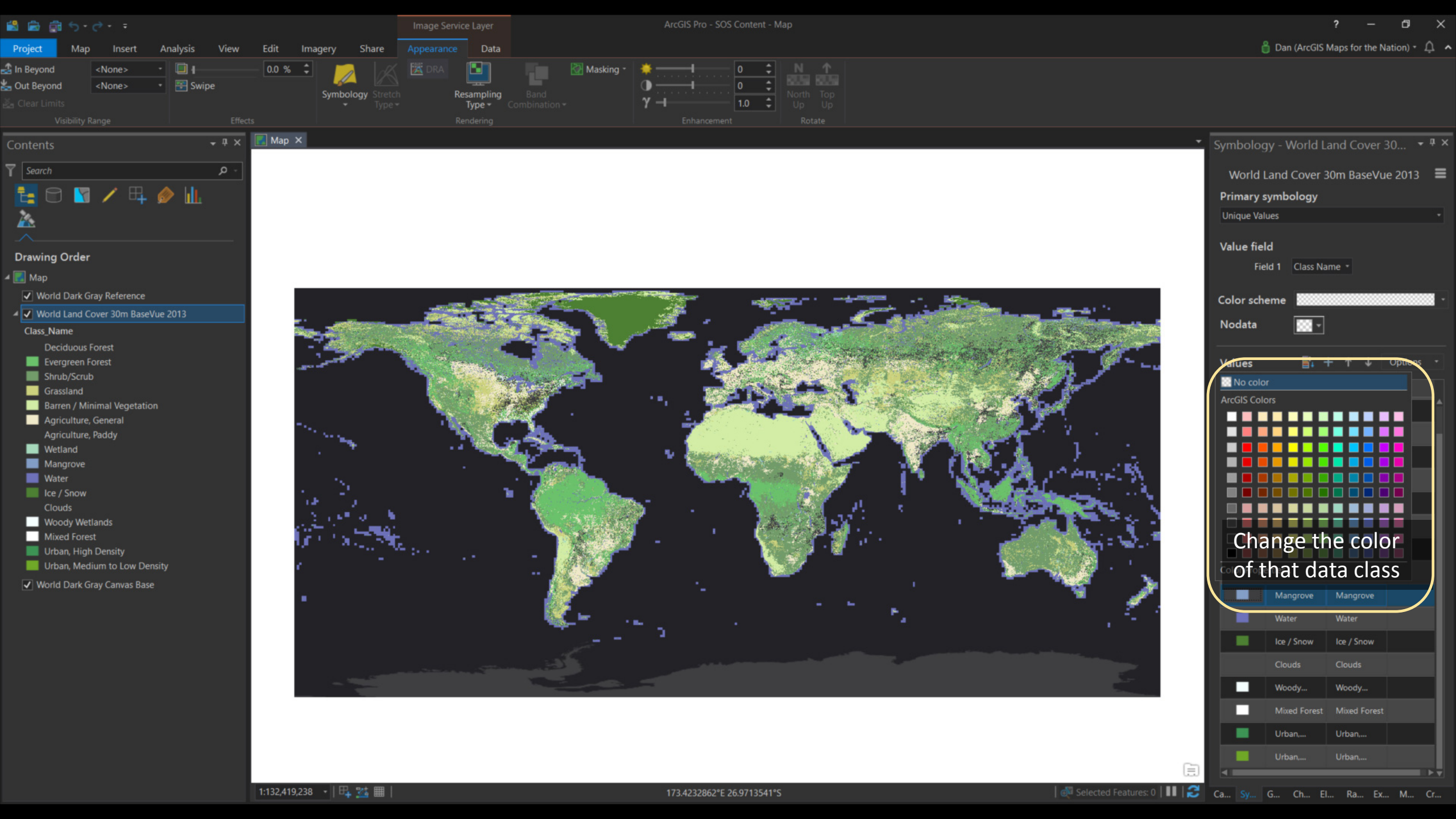
Image Service Layer
ArcGIS Pro - SOS Content - Map
Project
Map
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Edit
Imagery
Share
Appearance
Data
Dan (ArcGIS Maps for the Nation)
In Beyond
Out Beyond
Clear Limits
Visibility Range
Swipe
Effects
Symbology
Stretch Type
DRA
Resampling Type
Band Combination
Masking
Rendering
Enhancement
North Up
Top Up
Rotate
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World Land Cover 30m BaseVue 2013
Class_Name
Deciduous Forest
Evergreen Forest
Shrub/Scrub
Grassland
Barren / Minimal Vegetation
Agriculture, General
Agriculture, Paddy
Wetland
Mangrove
Water
Ice / Snow
Clouds
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Mixed Forest
Urban, High Density
Urban, Medium to Low Density
World Dark Gray Canvas Base
Map
Symbology - World Land Cover 30...
World Land Cover 30m BaseVue 2013
Primary symbology
Unique Values
Value field
Field 1
Class Name
Color scheme
Nodata
Values
Options
No color
ArcGIS Colors
Change the color of that data class
Mangrove
Water
Ice / Snow
Clouds
Woody...
Mixed Forest
Urban,...
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Selected Features: 0

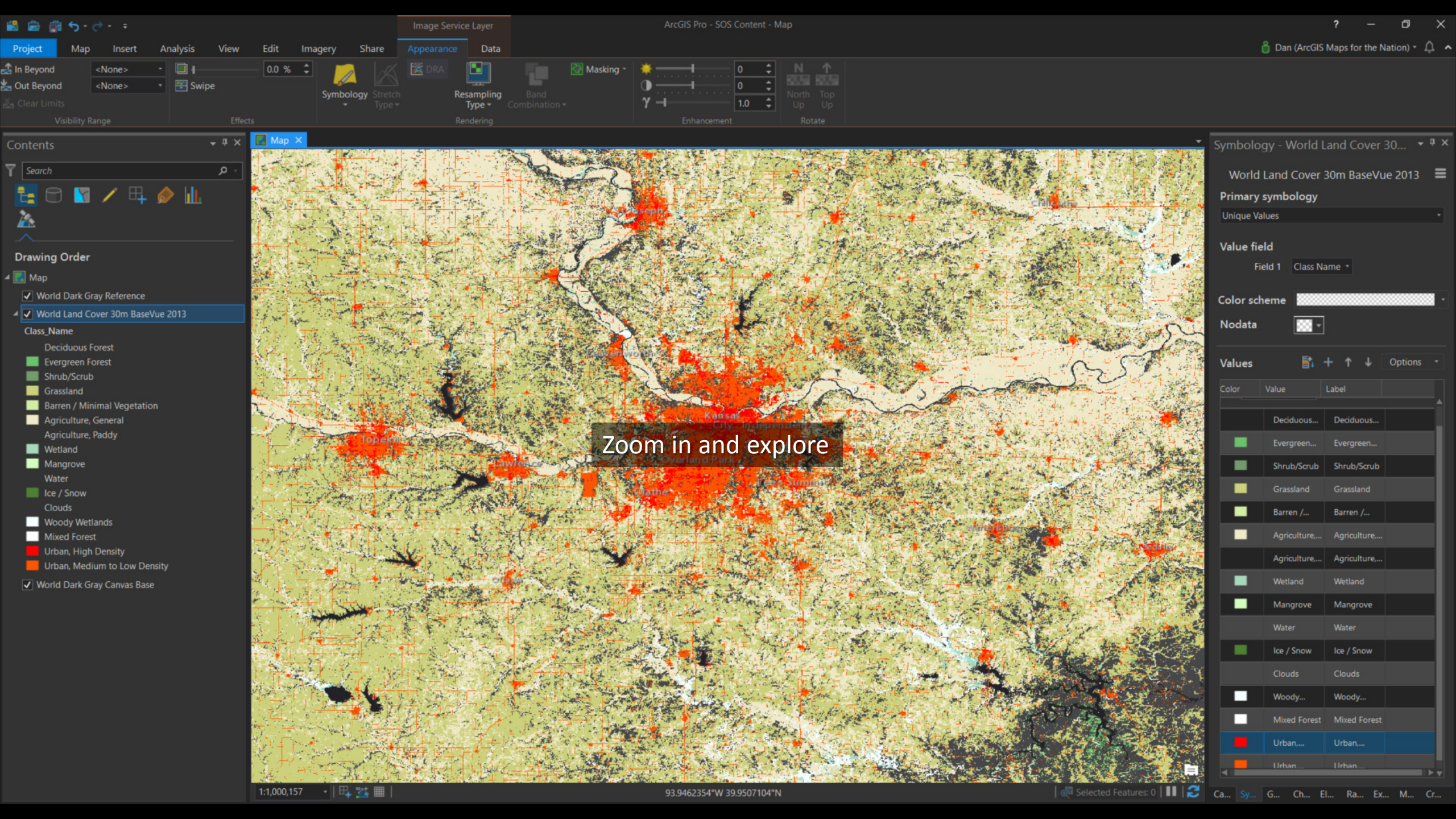
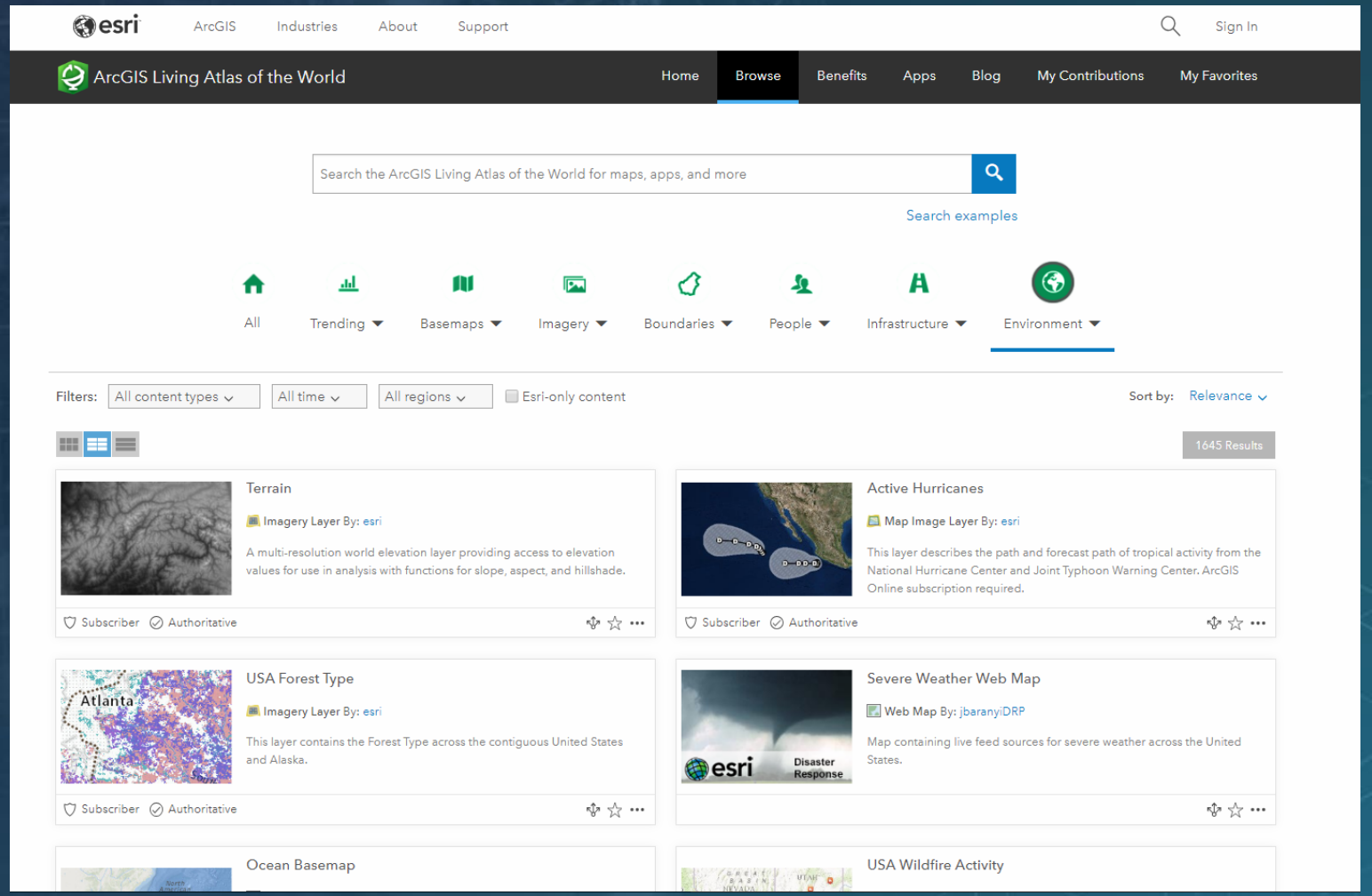


Image Service Layer
ArcGIS Pro - SOS Content - Map
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Appearance
Data
Dan (ArcGIS Maps for the Nation)
In Beyond
Out Beyond
Clear Limits
Visibility Range
Swipe
Effects
Symbology
Stretch Type
DRA
Resampling Type
Band Combination
Masking
Rendering
North Up
Top Up
Rotate
Contents
Search
Drawing Order
Map
World Dark Gray Reference
World Land Cover 30m BaseVue 2013
Class_Name
Deciduous Forest
Evergreen Forest
Shrub/Scrub
Grassland
Barren / Minimal Vegetation
Agriculture, General
Agriculture, Paddy
Wetland
Mangrove
Water
Ice / Snow
Clouds
Woody Wetlands
Mixed Forest
Urban, High Density
Urban, Medium to Low Density
World Dark Gray Canvas Base
Map
Zoom in and explore
Symbology - World Land Cover 30...
World Land Cover 30m BaseVue 2013
Primary symbology
Unique Values
Value field
Field 1
Class Name
Color scheme
Nodata
Values
Options
Color
Value
Label
1:1,000,157
93.9462354°W 39.9507104°N
Selected Features: 0

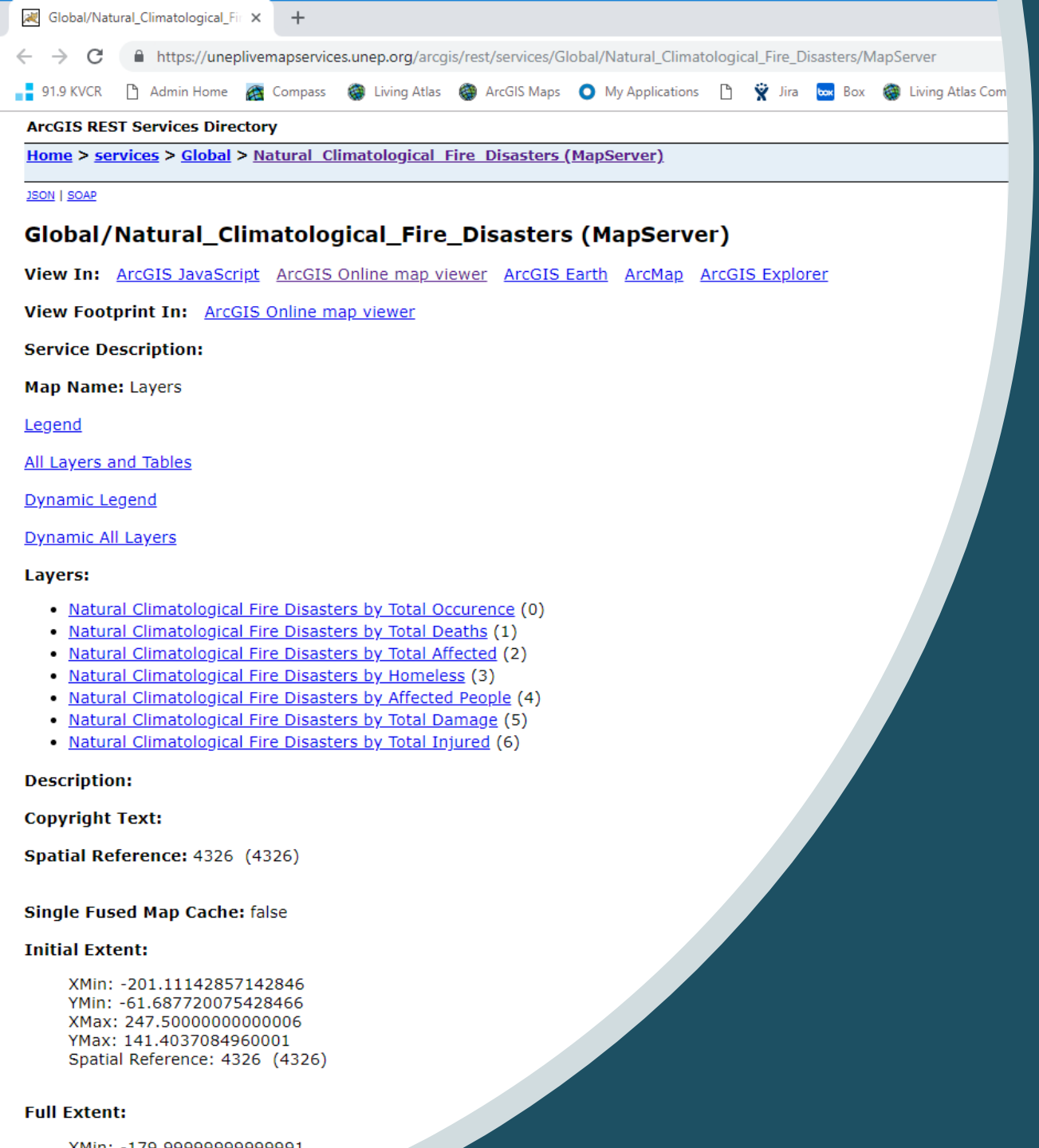
Add Data to Your Map



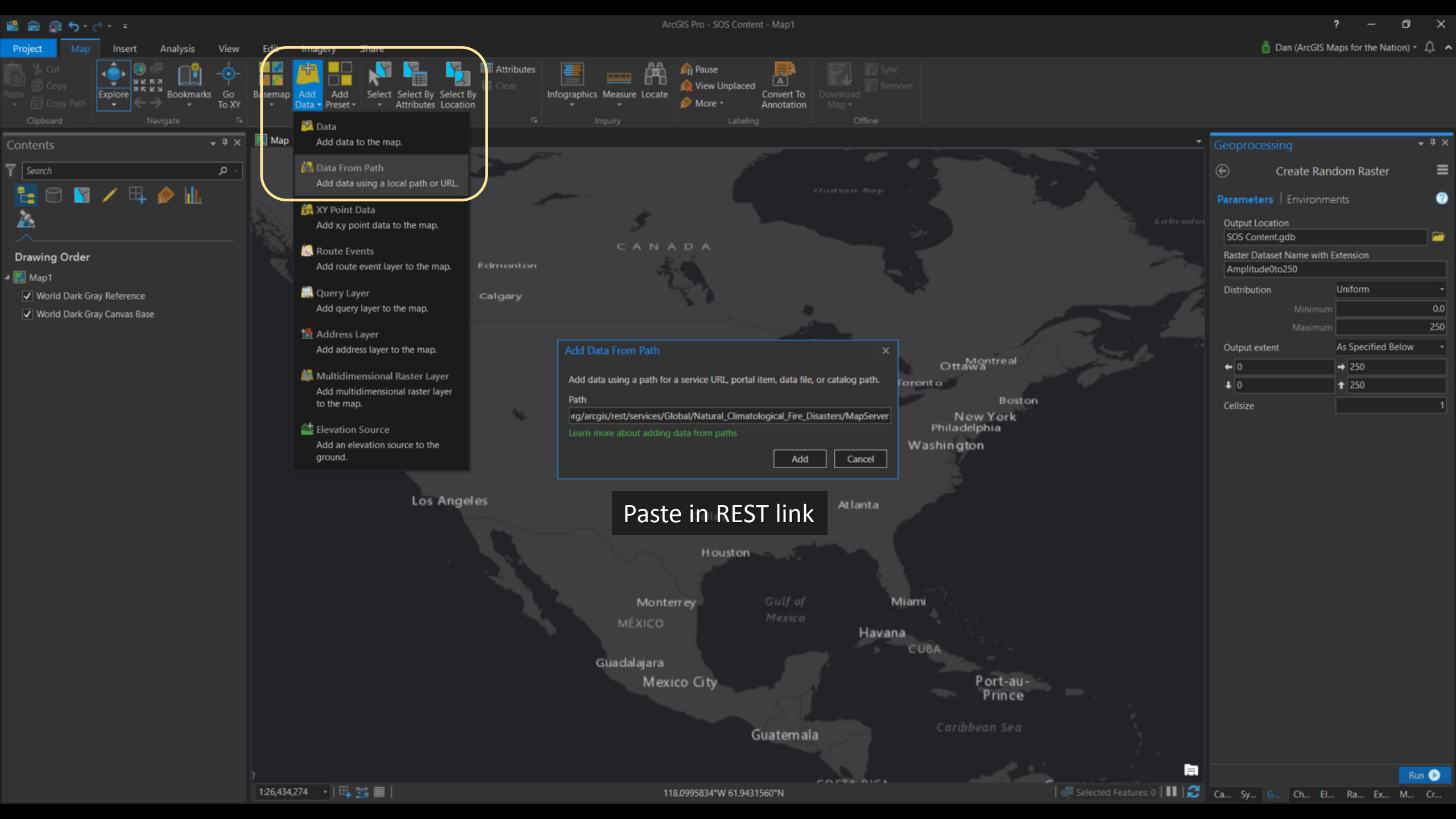
Living Atlas of the World

livingatlas.arcgis.com

a trusted source of ready-to-use data from all over the world



Use a WMS or REST URL to load data to the map


ArcGIS Pro - SOS Content - Map1
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Dan (ArcGIS Maps for the Nation)
Cut
Copy
Copy Path
Paste
Explore
Bookmarks
Go To XY
Clipboard
Navigate
Basemap
Add Data
Add Preset
Select
Select By Attributes
Select By Location
Attributes
Clear
Infographics
Measure
Locate
Inquiry
Pause
View Unplaced
More
Convert To Annotation
Labeling
Download Map
Sync
Remove
Offline
Data
Add data to the map.
Data From Path
Add data using a local path or URL.
XY Point Data
Add x,y point data to the map.
Route Events
Add route event layer to the map.
Query Layer
Add query layer to the map.
Address Layer
Add address layer to the map.
Multidimensional Raster Layer
Add multidimensional raster layer to the map.
Elevation Source
Add an elevation source to the ground.
Contents
Search
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Map1
World Dark Gray Reference
World Dark Gray Canvas Base
Map
CANADA
Edmonton
Calgary
Ottawa
Montreal
Toronto
Boston
New York
Philadelphia
Washington
Los Angeles
Atlanta
Houston
Monterrey
MÉXICO
Gulf of Mexico
Miami
Havana
CUBA
Guadalajara
Mexico City
Port-au-Prince
Caribbean Sea
Guatemala
Add Data From Path
Add data using a path for a service URL, portal item, data file, or catalog path.
Path
rg/arcgis/rest/services/Global/Natural_Climatological_Fire_Disasters/MapServer
Learn more about adding data from paths
Add
Cancel
Paste in REST link
Geoprocessing
Create Random Raster
Parameters
Environments
Output Location
SOS Content.gdb
Raster Dataset Name with Extension
Amplitude0to250
Distribution
Uniform
Minimum
0.0
Maximum
250
Output extent
As Specified Below
0
250
0
250
Cellsize
1
Run
1:26,434,274
118.0995834°W 61.9431560°N
Selected Features: 0

ArcGIS Pro - SOS Content - Map1

Layer

Project | Map | Insert | Analysis | View | Edit | Imagery | Share | Appearance

Dan (ArcGIS Maps for the Nation)

Paste | Cut | Copy | Copy Path — Clipboard

Explore | Bookmarks | Go To XY — Navigate

Basemap | Add Data | Add Preset — Layer

Select | Select By Attributes | Select By Location | Attributes | Clear — Selection

Infographics | Measure | Locate — Inquiry

Pause | View Unplaced | More | Convert To Annotation — Labeling

Download Map | Sync | Remove — Offline

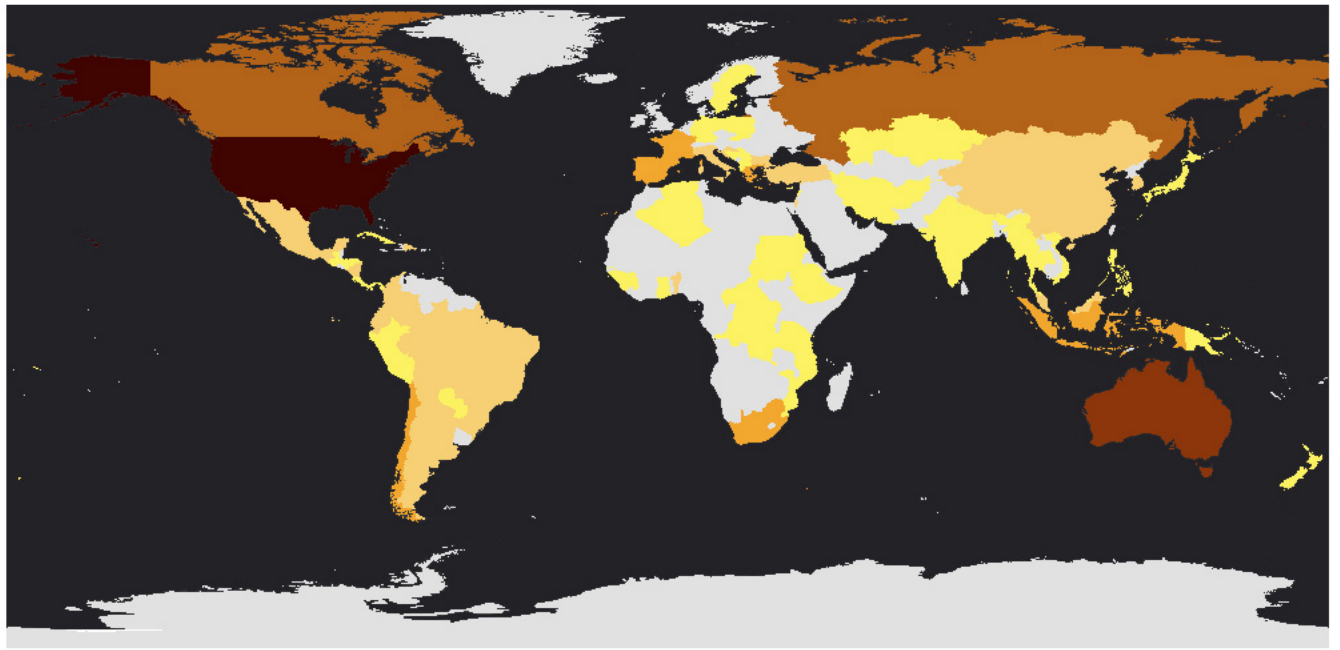
Contents

Search

Drawing Order

- Map1
  - World Dark Gray Reference
  - Global/Natural_Climatological_Fire_Disasters
  - World Dark Gray Canvas Base

Map | Map1



1:190,678,848 | 57.7121870°W 26.4967902°N | Selected Features: 0

Geoprocessing

Create Random Raster

Parameters | Environments

Output Location: SOS Content.gdb

Raster Dataset Name with Extension: Amplitude0to250

Distribution: Uniform

Minimum: 0.0

Maximum: 250

Output extent: As Specified Below

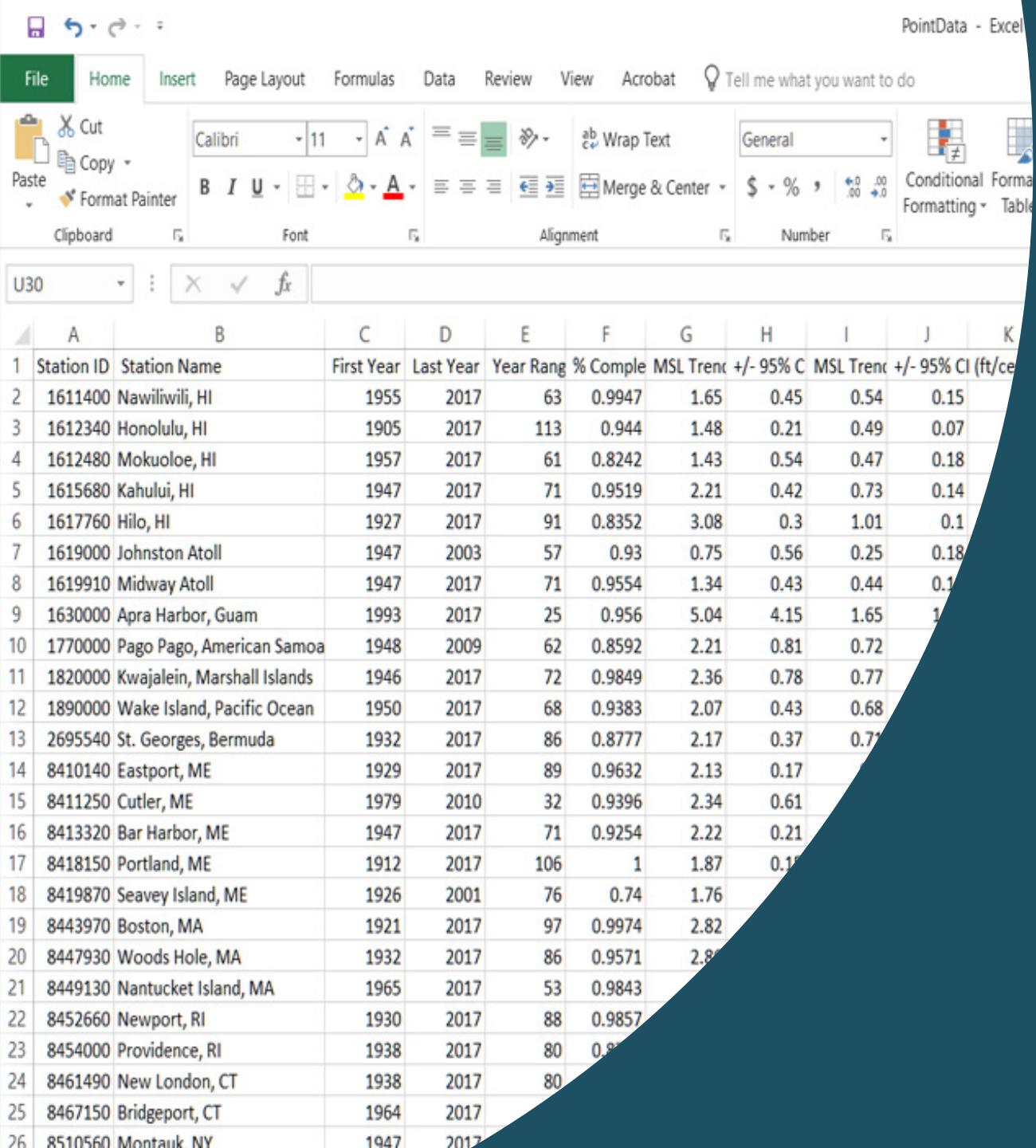
0 | 250

0 | 250

Cellsize: 1

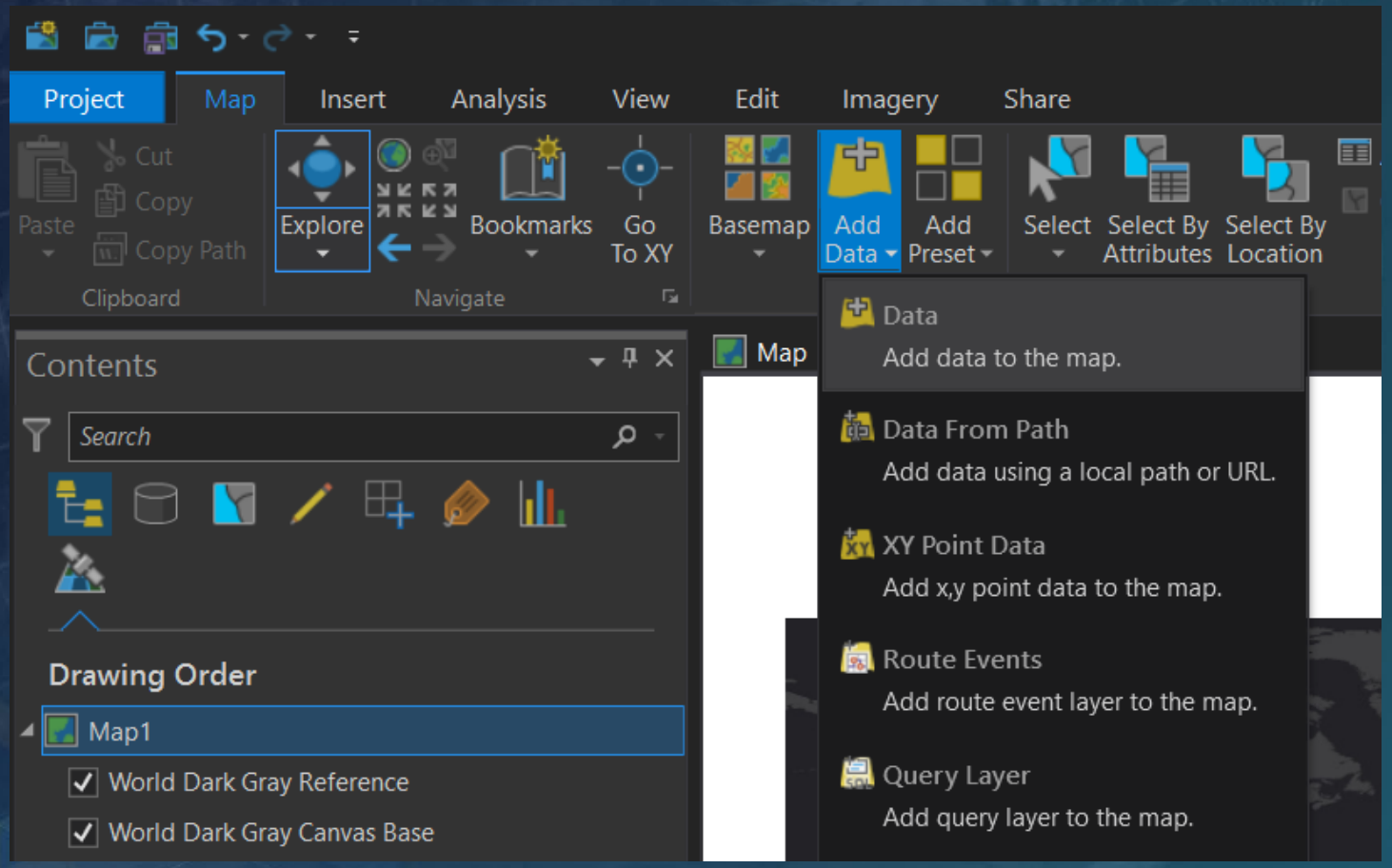
Run

Ca... Sy... G... Ch... El... Ra... Ex... M... Cr...

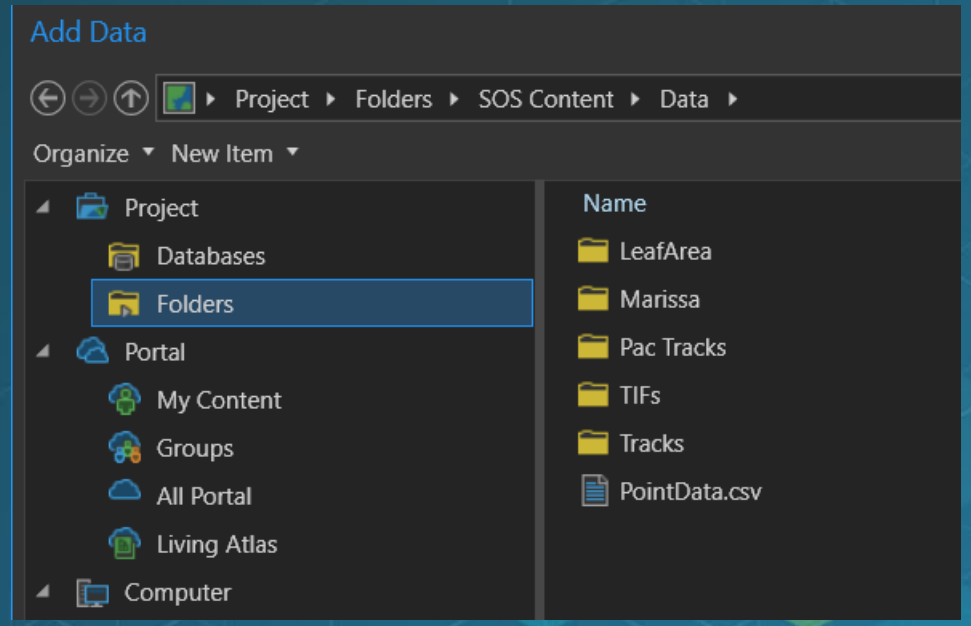


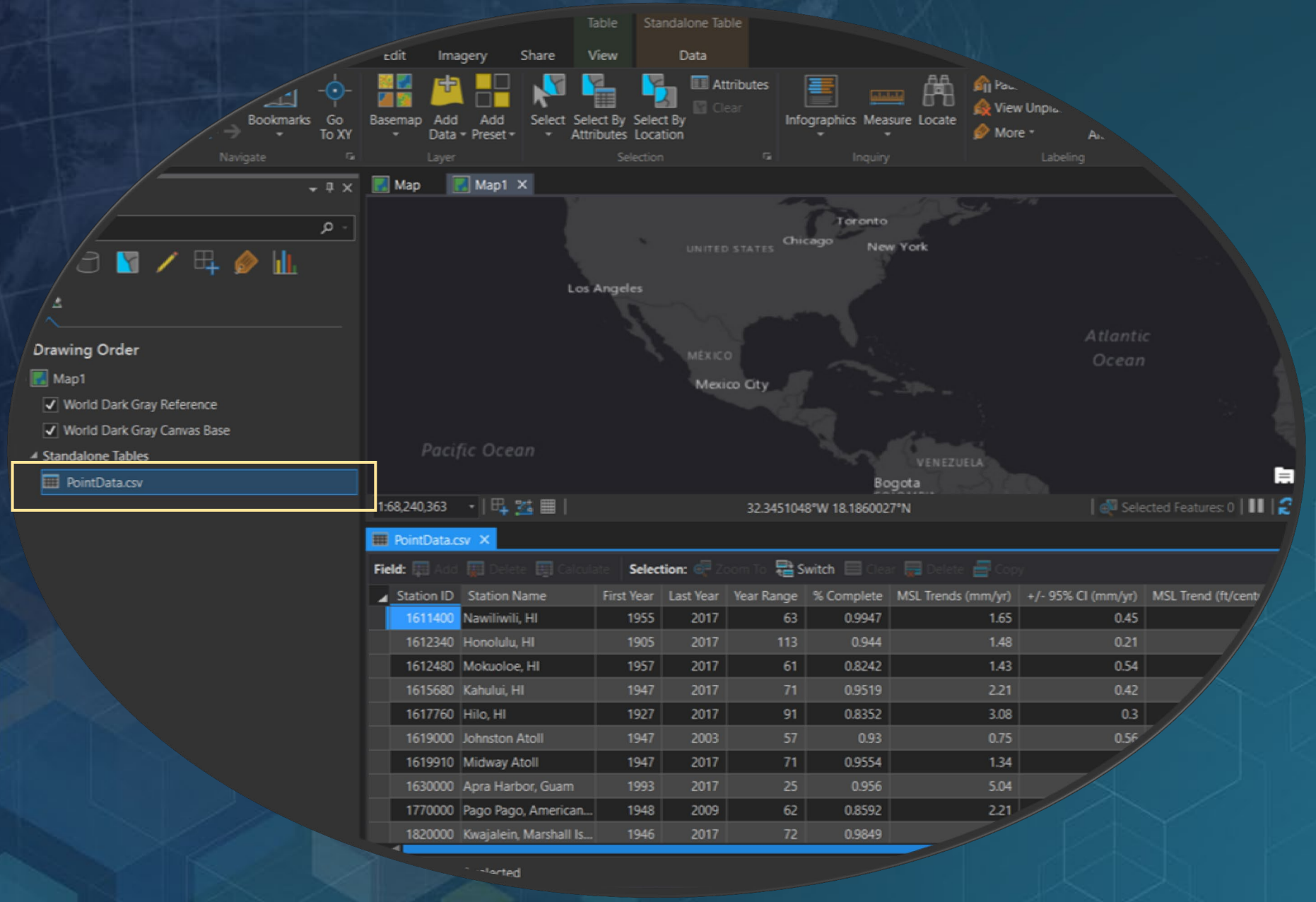
	A	B	C	D	E	F	G	H	I	J	K
1	Station ID	Station Name	First Year	Last Year	Year Rang	% Comple	MSL Trenc	+/- 95% C	MSL Trenc	+/- 95% CI	(ft/ce
2	1611400	Nawiliwili, HI	1955	2017	63	0.9947	1.65	0.45	0.54	0.15	
3	1612340	Honolulu, HI	1905	2017	113	0.944	1.48	0.21	0.49	0.07	
4	1612480	Mokuoloe, HI	1957	2017	61	0.8242	1.43	0.54	0.47	0.18	
5	1615680	Kahului, HI	1947	2017	71	0.9519	2.21	0.42	0.73	0.14	
6	1617760	Hilo, HI	1927	2017	91	0.8352	3.08	0.3	1.01	0.1	
7	1619000	Johnston Atoll	1947	2003	57	0.93	0.75	0.56	0.25	0.18	
8	1619910	Midway Atoll	1947	2017	71	0.9554	1.34	0.43	0.44	0.1	
9	1630000	Apra Harbor, Guam	1993	2017	25	0.956	5.04	4.15	1.65	1	
10	1770000	Pago Pago, American Samoa	1948	2009	62	0.8592	2.21	0.81	0.72		
11	1820000	Kwajalein, Marshall Islands	1946	2017	72	0.9849	2.36	0.78	0.77		
12	1890000	Wake Island, Pacific Ocean	1950	2017	68	0.9383	2.07	0.43	0.68		
13	2695540	St. Georges, Bermuda	1932	2017	86	0.8777	2.17	0.37	0.7		
14	8410140	Eastport, ME	1929	2017	89	0.9632	2.13	0.17			
15	8411250	Cutler, ME	1979	2010	32	0.9396	2.34	0.61			
16	8413320	Bar Harbor, ME	1947	2017	71	0.9254	2.22	0.21			
17	8418150	Portland, ME	1912	2017	106	1	1.87	0.1			
18	8419870	Seavey Island, ME	1926	2001	76	0.74	1.76				
19	8443970	Boston, MA	1921	2017	97	0.9974	2.82				
20	8447930	Woods Hole, MA	1932	2017	86	0.9571	2.8				
21	8449130	Nantucket Island, MA	1965	2017	53	0.9843					
22	8452660	Newport, RI	1930	2017	88	0.9857					
23	8454000	Providence, RI	1938	2017	80	0.9					
24	8461490	New London, CT	1938	2017	80						
25	8467150	Bridgeport, CT	1964	2017							
26	8510560	Montauk, NY	1947	2017							

Use a CSV file of locations and values to create a dot map



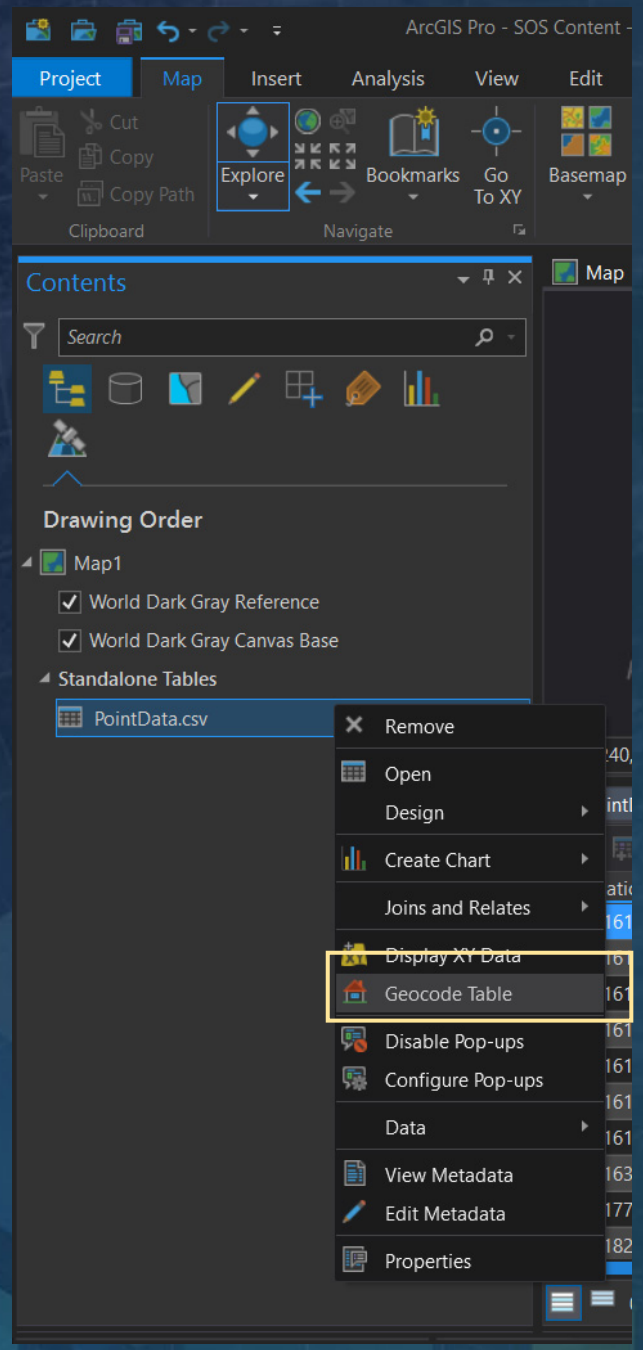
Use the Add Data tab to load your CSV file into the map



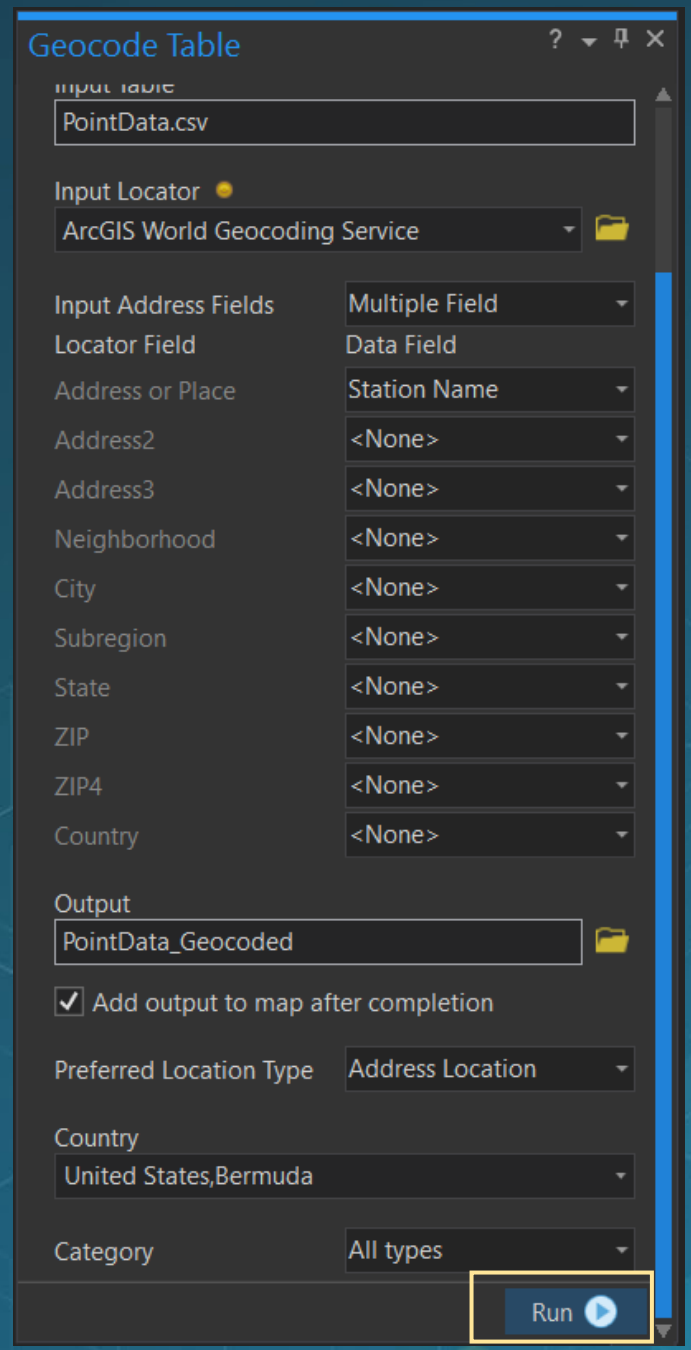


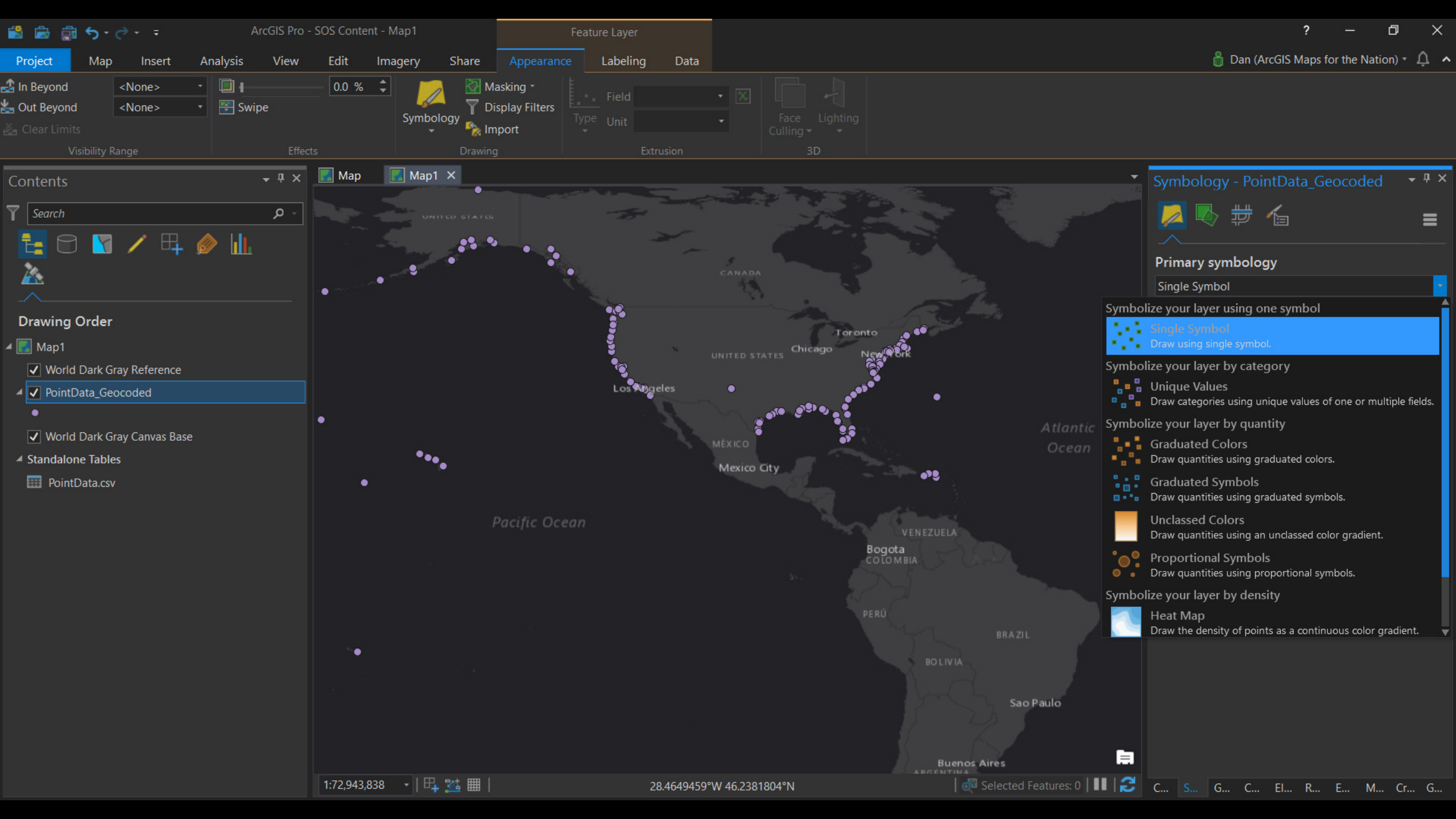
Station ID	Station Name	First Year	Last Year	Year Range	% Complete	MSL Trends (mm/yr)	+/- 95% CI (mm/yr)	MSL Trend (ft/cent
1611400	Nawiliwili, HI	1955	2017	63	0.9947	1.65	0.45	
1612340	Honolulu, HI	1905	2017	113	0.944	1.48	0.21	
1612480	Mokuoloe, HI	1957	2017	61	0.8242	1.43	0.54	
1615680	Kahului, HI	1947	2017	71	0.9519	2.21	0.42	
1617760	Hilo, HI	1927	2017	91	0.8352	3.08	0.3	
1619000	Johnston Atoll	1947	2003	57	0.93	0.75	0.56	
1619910	Midway Atoll	1947	2017	71	0.9554	1.34		
1630000	Apra Harbor, Guam	1993	2017	25	0.956	5.04		
1770000	Pago Pago, American...	1948	2009	62	0.8592	2.21		
1820000	Kwajalein, Marshall Is...	1946	2017	72	0.9849			

The CSV is added as Standalone Table. Right click and Open to show the imported table features



Next we'll geocode the addresses so they have a lat/lon field in the attribute table.



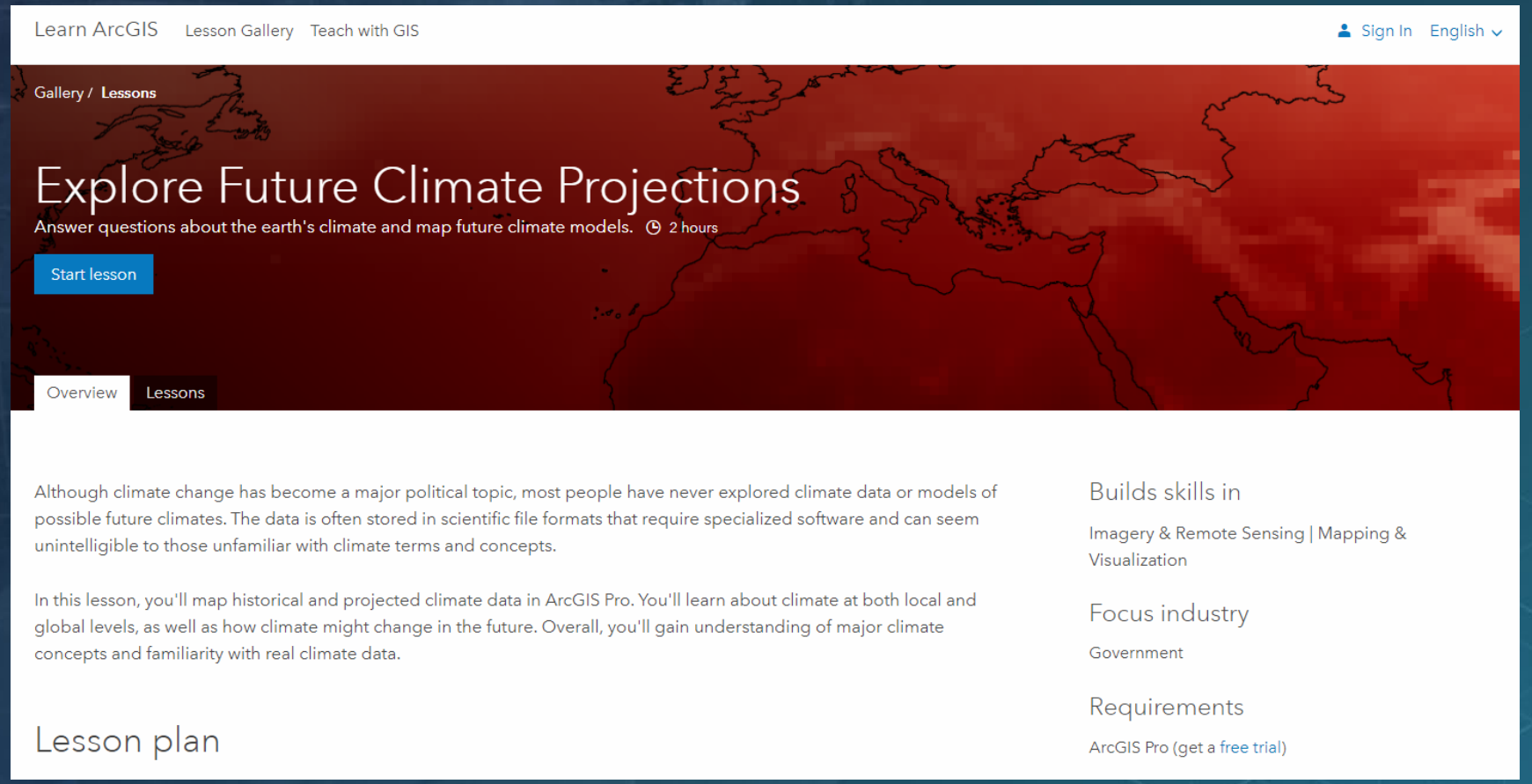

ArcGIS Pro - SOS Content - Map1
Feature Layer
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Appearance
Labeling
Data
Dan (ArcGIS Maps for the Nation)
In Beyond
Out Beyond
Clear Limits
<None>
<None>
Visibility Range
Swipe
0.0 %
Effects
Symbology
Masking
Display Filters
Import
Drawing
Field
Type
Unit
Extrusion
Face Culling
Lighting
3D
Contents
Search
Drawing Order
Map1
World Dark Gray Reference
PointData_Geocoded
World Dark Gray Canvas Base
Standalone Tables
PointData.csv
Map
Map1
UNITED STATES
CANADA
Toronto
Chicago
New York
Los Angeles
MÉXICO
Mexico City
Atlantic Ocean
Pacific Ocean
VENEZUELA
Bogota
COLOMBIA
PERÚ
BRAZIL
BOLIVIA
Sao Paulo
Buenos Aires
1:72,943,838
28.4649459°W 46.2381804°N
Selected Features: 0
Symbology - PointData_Geocoded
Primary symbology
Single Symbol
Symbolize your layer using one symbol
Single Symbol
Draw using single symbol.
Symbolize your layer by category
Unique Values
Draw categories using unique values of one or multiple fields.
Symbolize your layer by quantity
Graduated Colors
Draw quantities using graduated colors.
Graduated Symbols
Draw quantities using graduated symbols.
Unclassed Colors
Draw quantities using an unclassed color gradient.
Proportional Symbols
Draw quantities using proportional symbols.
Symbolize your layer by density
Heat Map
Draw the density of points as a continuous color gradient.

Symbols are colored based on expected Mean Sea Level Trend

Layer is duplicated and symbolized with Confidence Interval with no fill and a stroke of increasing diameter

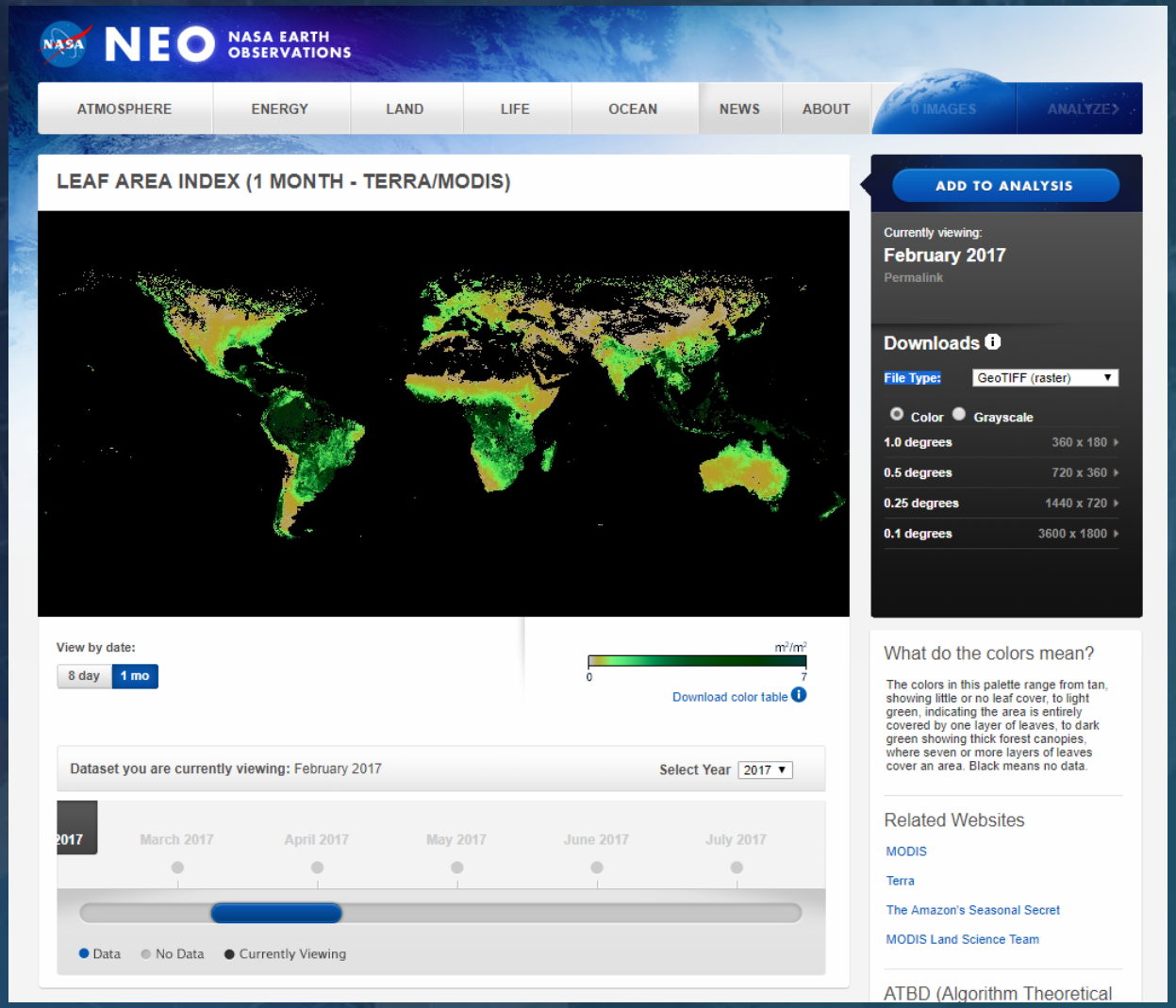
Symbols are semi-transparent so overlaps can be seen

Add a shapefile and change the symbols



Learn to use raster data (GeoTIFF and NetCDF) in the analysis of climate change scenarios

https://learn.arcgis.com/en/projects/explore-future-climate-projections/

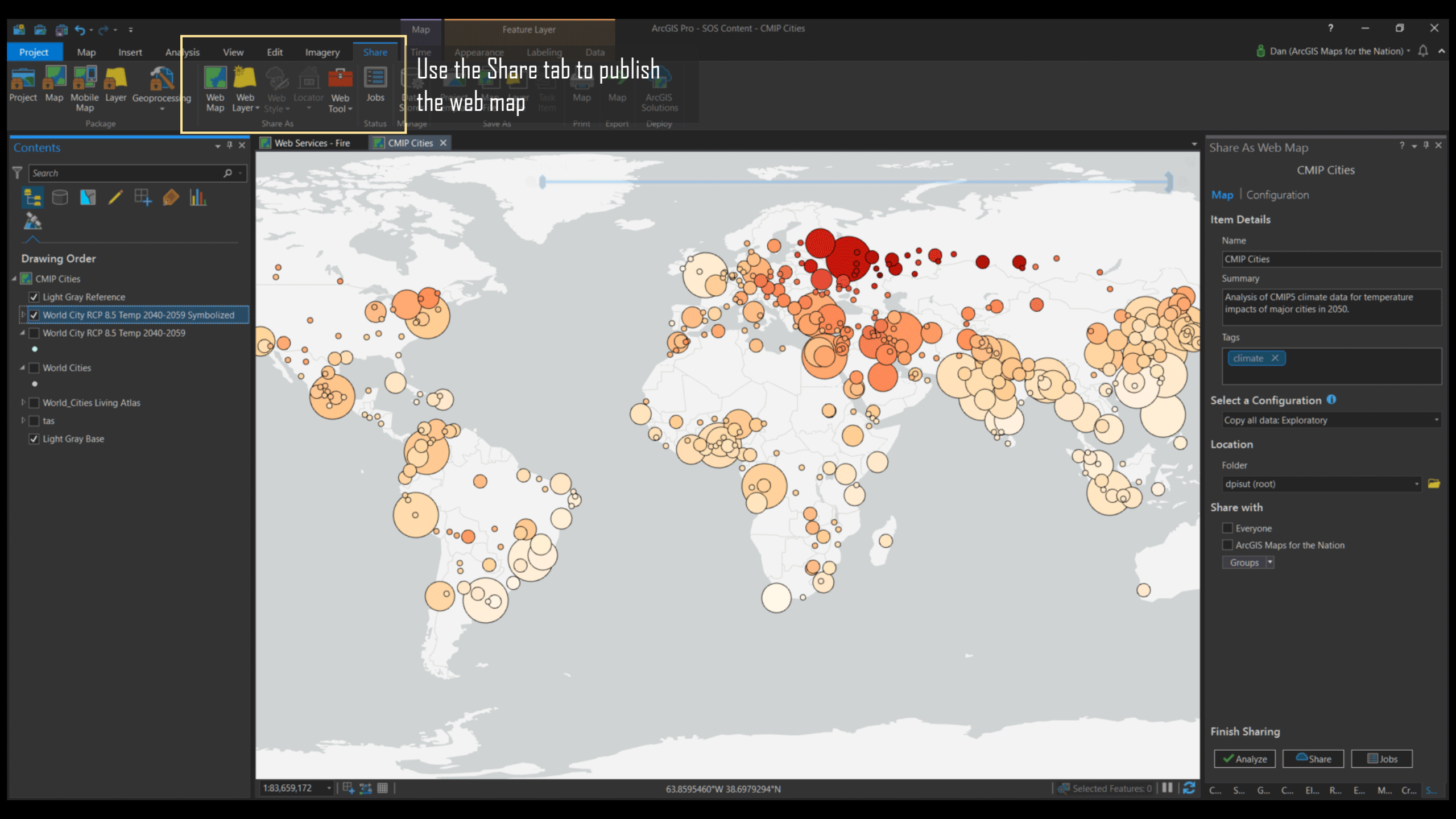


Provides GeoTIFFs in two flavors:

- 0-255 RGB value "Rasters"
- "Floating point" actual data values

Analyze the GeoTIFF (mean, difference, etc) in ArcGIS Pro

Share Your Maps with the World


Use the Share tab to publish the web map
ArcGIS Pro - SOS Content - CMIP Cities
Project
Map
Insert
Analysis
View
Edit
Imagery
Share
Feature Layer
Time
Appearance
Labeling
Data
Dan (ArcGIS Maps for the Nation)
Project
Map
Mobile Map
Layer
Geoprocessing
Package
Web Map
Web Layer
Web Style
Locator
Web Tool
Share As
Jobs
Status
Manage
Save As
Map
Print
Map
Export
ArcGIS Solutions
Deploy
Contents
Search
Drawing Order
CMIP Cities
Light Gray Reference
World City RCP 8.5 Temp 2040-2059 Symbolized
World City RCP 8.5 Temp 2040-2059
World Cities
World_Cities Living Atlas
tas
Light Gray Base
Web Services - Fire
CMIP Cities
Share As Web Map
CMIP Cities
Map
Configuration
Item Details
Name
CMIP Cities
Summary
Analysis of CMIP5 climate data for temperature impacts of major cities in 2050.
Tags
climate
Select a Configuration
Copy all data: Exploratory
Location
Folder
dpisut (root)
Share with
Everyone
ArcGIS Maps for the Nation
Groups
Finish Sharing
Analyze
Share
Jobs
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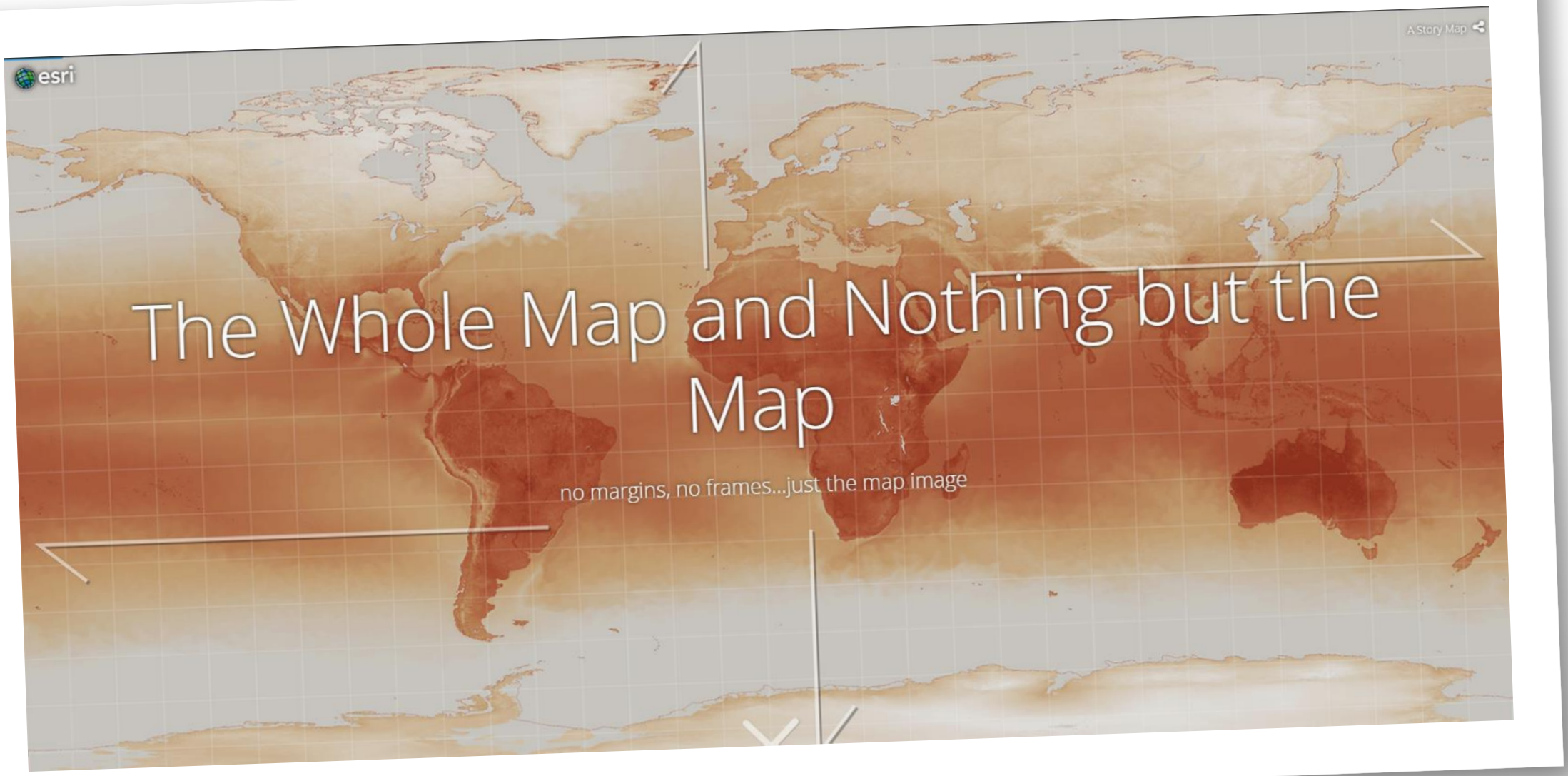
63.8595460°W 38.6979294°N
Selected Features: 0



Learn to output your map for the Science On a Sphere

[Esri Story Map]