EBTJV Focal Areas Visualization User Guide

Eastern Brook Trout | Data Visualization

About

TU has built two linked tools to help identify conservation need and restoration opportunities for Eastern Brook Trout within the Connecticut, Delaware, Susquehanna, and Chesapeake Bay basins. The first tool is a Tableau data visualization for querying and filtering EBT patch-scale data summaries across the basins and the second is an ArcGIS Online map viewer for investigating the source data at the scale where projects occur. The purpose of this tutorial is to help potential users get oriented with the Tableau and ArcGIS Online web applications.

Contact

Sean McFall, Spatial Analyst (smcfall@tu.org or 208-345-9800)
Trout Unlimited - Boise, ID

Notes on Use

Links to all focal areas

Tableau resets on an automatic timer, so be aware your filters may reset if you discontinue use of the visualization for a time.

Part 1. Tableau Data Visualization

Select a tab by clicking on it

Eastern Brook Trout Joint Venture, Delaware Patches

This Eastern Brook Trout Delaware Basin visualization and mapping tool provides a means to query and display focal area results associated with Trout Unlimited's *Eastern Brook Trout Range-wide Conservation Portfolio and Focal Area Risk and Opportunity Analysis* towards identifying locations where specific restoration opportunities may be appropriate for securing and enhancing Eastern Brook Trout (EBT) populations. This project is funded by the National Fish and Wildlife Foundation.

The larger analysis is comprised of three components – an EBT Conservation Portfolio analysis, a range-wide habitat condition and threats assessment, and a focal area analysis. The EBT Conservation Portfolio component characterizes EBT population "patches" produced by the Eastern Brook Trout Joint Venture (EBTJV 2015) based on how each existing population contributes to the range-wide diversity of EBT through representation of genetic, life history, geographic diversity, resiliency to disturbances, and demographic persistence. The EBT range-wide assessment characterizes the EBT population patches and their adjacent subwatersheds (HUC12s) across the range of EBT in the eastern US based on the current pattern of habitat alteration and anticipated threats. The focal area assessments further evaluate habitat condition and future threats within EBT patches using local datasets. The focal area assessments identify existing products to help inform EBT patch characterization, map regional-specific stressors, and integrate additional factors, including ecosystem services, climate, and monitoring data into the range-wide assessment. Full documentation for the analyses is available on TU's website.

Tabs within this visualization tool correspond to the common suite of restoration activities used to improve Eastern Brook Trout populations and habitats. For each restoration activity, we provide filters and criteria related to portfolio, range-wide assessment, and focal area-specific factors we identified as relevant for evaluating restoration need and opportunity within EBT population patches. The tab labeled "Data Descriptions" provides a list of the sources used in each of the subsequent tabs.

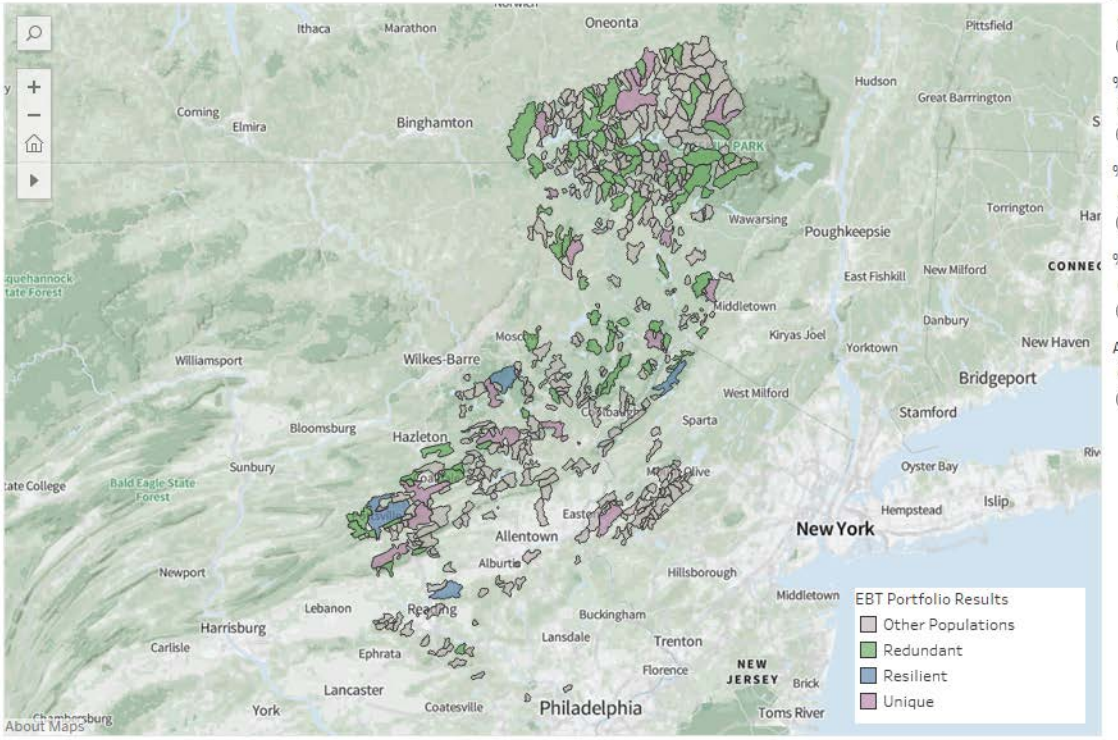
By adjusting the slider bars and check boxes associated with each filter, the map panel responds to show those patches meeting custom criteria. Hovering over a patch in the map reveals a pop-up box with additional information for the patch. Double clicking on a patch will highlight a single patch and add a hyperlink to the pop-up which links to an ArcGIS Online map application which provides access to a subset of mapped information within patches.

The visualization tool allows for the exploration of opportunities across EBT patches by highlighting portions of broad geographies that meet user-defined criteria. The map application allows for the exploration of the pattern of factors such as stream temperature and EBT occupancy models, riparian condition, and land use within patches. Taken together, the two tools serve as a "living"

Description | Data Sources | Secure Portfolio Elements | Climate Change and Ecosystem Services | AMD, Abandoned Mines, Acid Deposition | Riparian Restoration | Evaluate/Restore Fish Passage | Mitigate Sediment and Nutri

Go to a data source's webpage by clicking it

Conservation Action or Strategy	Relevant Criteria or Filters	Source (click for link)
All tabs	Ave. modeled EBT occupancy (DeWeber,Wagner)	DeWeber, Wagner/PSU, 2015
	Average modeled EBT occupancy (Letcher)	Ecosheds/Letcher, 2016
	Max. 30-day ave. stream temp C (DeWeber,Wagner)	DeWeber, Wagner/PSU, 2014
	Mi. Exceptional Waters	NY Water Quality Classifications, 2010
		PA Class A trout streams, 2016
		PA Existing Use Streams, 2016
	Redundancy & Resiliency	Derived from EBTJV, 2015
	Subatershed Name	Watershed Boundary Dataset, USGS, 2014
	Trout Community	EBTJV, 2015
	Unique Life History	Derived from AppLCC/TNC Steam Habitat Assessment, 2014
	Watershed Name	Watershed Boundary Dataset, USGS, 2014
AMD, abandoned mines, acid deposition	# existing AMD treatment sites	PA DEP, 2016
	% riparian zone forested	StreamCat, 2016
	acres abandoned mine lands	Abandoned Mine Lands Inventory, PA DEP, 2016
	acres Pottsville Sandstone	Geologic Map of Pennsylvania, PA DCNR, 2001
	Mean acid deposition (kg/ha)	EBTJV, 2015
	Miles 303(d)-listed for AMD	Integrated List Non Attaining, PA DEP, 2016
Climate Change and Ecosystem Services	Ave Drinking Water Importance Index	Forests to Faucets, USFS, 2011
	EBT occupancy under +2C	Ecosheds/Letcher, 2016
	Mean summer temp - Letcher	Ecosheds/Letcher, 2016
	Percent floodplain developed	Derived from TNC Active River Area, 2008
		Derived from USGS National Land Cover Dataset, 2011
	Percent stream network overlap with karst geology	Karst in the United States: A Digital Map Compilation and Database, USC
Data Gaps	Fish monitoring sites - Delaware River Watershed Initiative	DRWI, 2015
	Mean Brook trout abundance (fish per mile) - USGS	Landscape Models of Brook Trout Abundance and..
	Number stream temperature monitoring sites - ecosheds	Ecosheds, 2016
	Number stream temperature monitoring sites - RMRS	RMRS AWAE, 2016
	Other monitoring sites - Delaware River Watershed Initiative	DRWI, 2015
	Percent floodplain developed	Derived from TNC Active River Area, 2008
		Derived from USGS National Land Cover Dataset, 2011
	Trout monitoring sites - NY Dept Envir Cons Region 3	NY DEC, 2013
	Trout monitoring sites - NY Dept Envir Cons Region 4, Delaware County	NY DEC, 2012
Evaluate/Restore fish passage	Culvert inventory status	estimated from NAACC, NH DES sources
	Fragmentation Index - ratio largest patch size identified after new patch delineation using best available barriers data to EBTJV patch size	Derived from NAACC, 2016
		Derived from NABD, 2012
		Derived from NH DES, 2016



% Public Land
0.0 100.0

% Riparian Canopy Cover
0.02 100.00

% Agricultural Land
0.00 72.00

% Impervious Surface
0.00 74.00

Allopatric EBT Habitat Extent (km)
0.00 64.65

Trout Community
- [x] Allopatric EBT
- [x] Sympatric EBT & BNT
- [x] Sympatric EBT & RBT
- [x] Sympatric EBT, BNT, & RBT

Resiliency & Redundancy
- [x] Both
- [x] Neither
- [x] Redundant

Unique Life History
- [x] Missing Data
- [x] Resident Not Productive
- [x] Unique

Miles of Exceptional Waters
0.00 98.27

Max. Avg. 30-day Stream Temperature (C) - DeWeber & Wagner
0.00 24.83

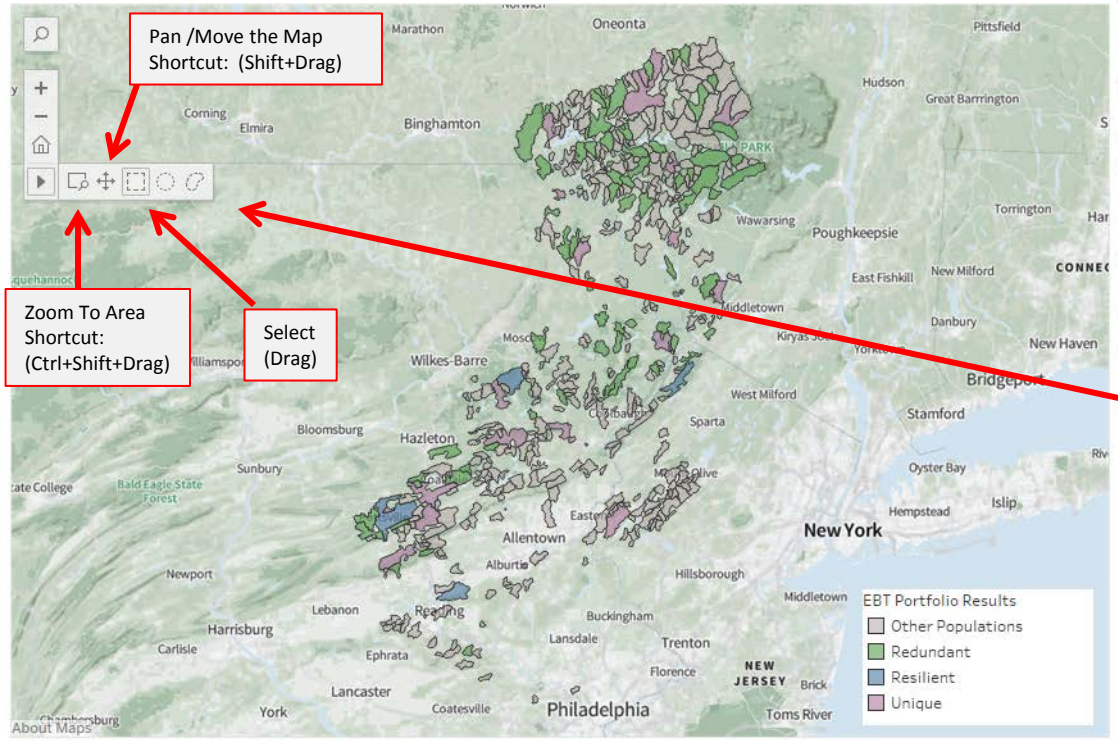
Ave. Modeled EBT Occupancy - Letcher
0.0500 1.0000

Ave. Modeled EBT Occupancy - DeWeber & Wagner
0.0000 0.7800

To filter, drag the half-circle shape located below the desired attribute.

If you wish to be more precise, you can click both the max and min, then input a number manually.

Note: To reset your filters, refresh the webpage.



% Public Land
0.0 — 100.0

% Riparian Canopy Cover
0.02 — 100.00

% Agricultural Land
0.00 — 72.00

% Impervious Surface
0.00 — 74.00

Allopatric EBT Habitat Extent (km)
0.00 — 64.65

To navigate and manipulate the map, click the black triangle button to open up a menu of options.

Trout Community
- [x] Allopatric EBT
- [x] Sympatric EBT & BNT
- [x] Sympatric EBT & RBT
- [x] Sympatric EBT, BNT, & RBT

Resiliency & Redundancy
- [x] Both
- [x] Neither
- [x] Redundant

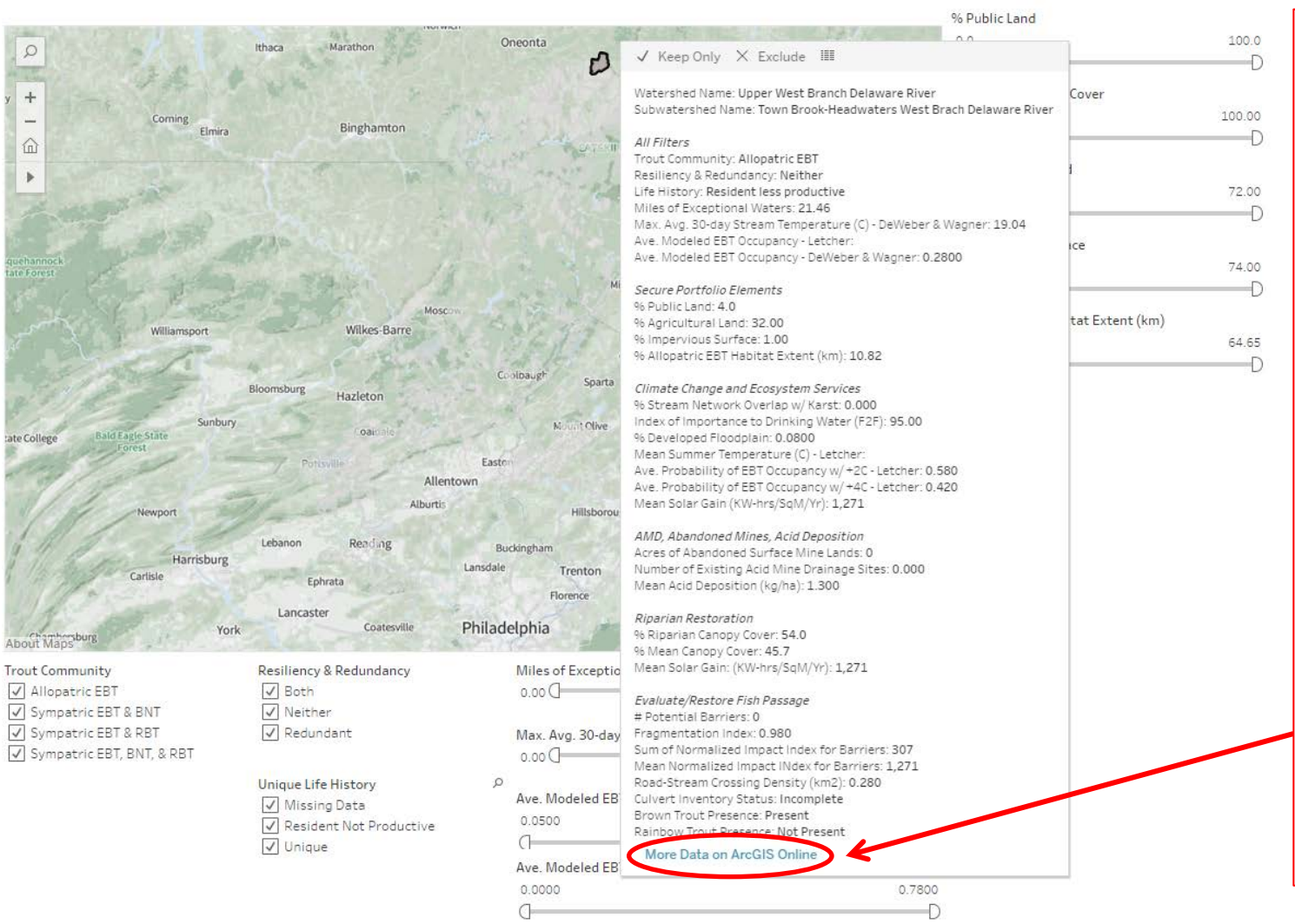
Unique Life History
- [x] Missing Data
- [x] Resident Not Productive
- [x] Unique

Miles of Exceptional Waters
0.00 — 98.27

Max. Avg. 30-day Stream Temperature (C) - DeWeber & Wagner
0.00 — 24.83

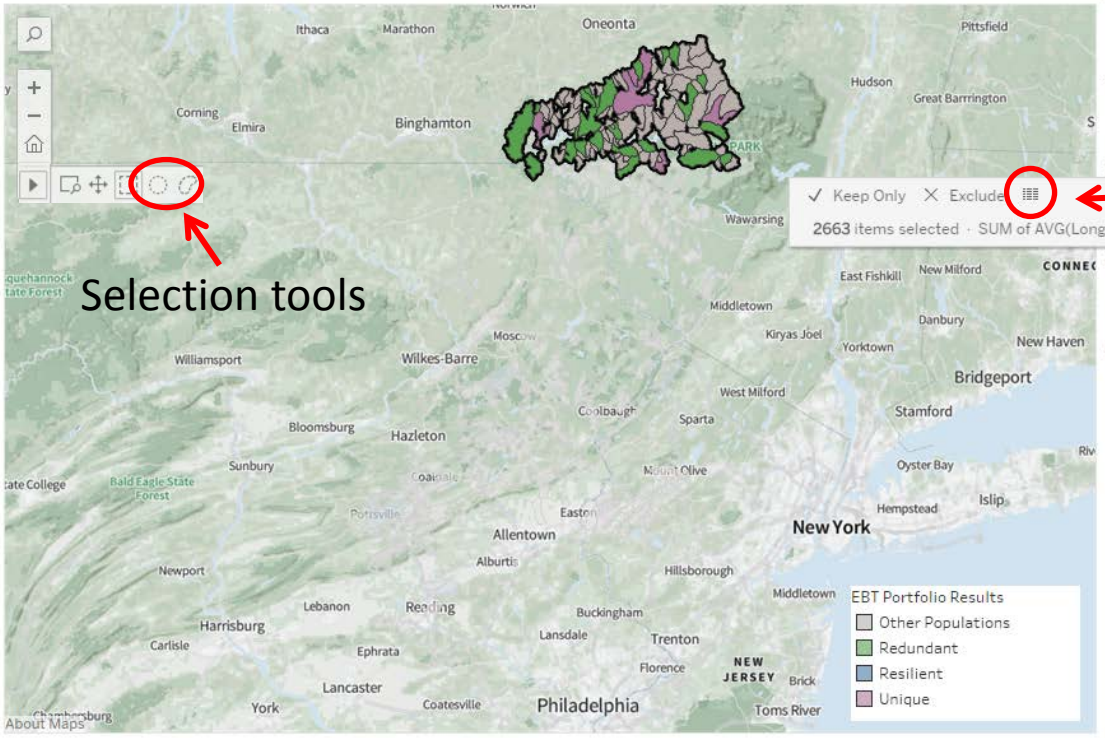
Ave. Modeled EBT Occupancy - Letcher
0.0500 — 1.0000

Ave. Modeled EBT Occupancy - DeWeber & Wagner
0.0000 — 0.7800



If you hover your mouse over a polygon, a tooltip with pertinent information for that polygon will appear.

If you **click** (not hover your cursor) on a polygon, a link, as seen below, will appear. This will take you to ArcGIS Online web application.



% Public Land
0.0 — 100.0

% Riparian Canopy Cover
0.02 — 100.00

% Agricultural Land
72.00

% Impervious Surface
0.00 — 74.00

Allopatric EBT Habitat Extent (km)
0.00 — 64.65

Trout Community
- [x] Allopatric EBT
- [x] Sympatric EBT & BNT
- [x] Sympatric EBT & RBT
- [x] Sympatric EBT, BNT, & RBT

Resiliency & Redundancy
- [x] Both
- [x] Neither
- [x] Redundant

Unique Life History
- [x] Missing Data
- [x] Resident Not Productive
- [x] Unique

Miles of Exceptional Waters
0.00 — 98.27

Max. Avg. 30-day Stream Temperature (C) - DeWeber & Wagner
0.00 — 24.83

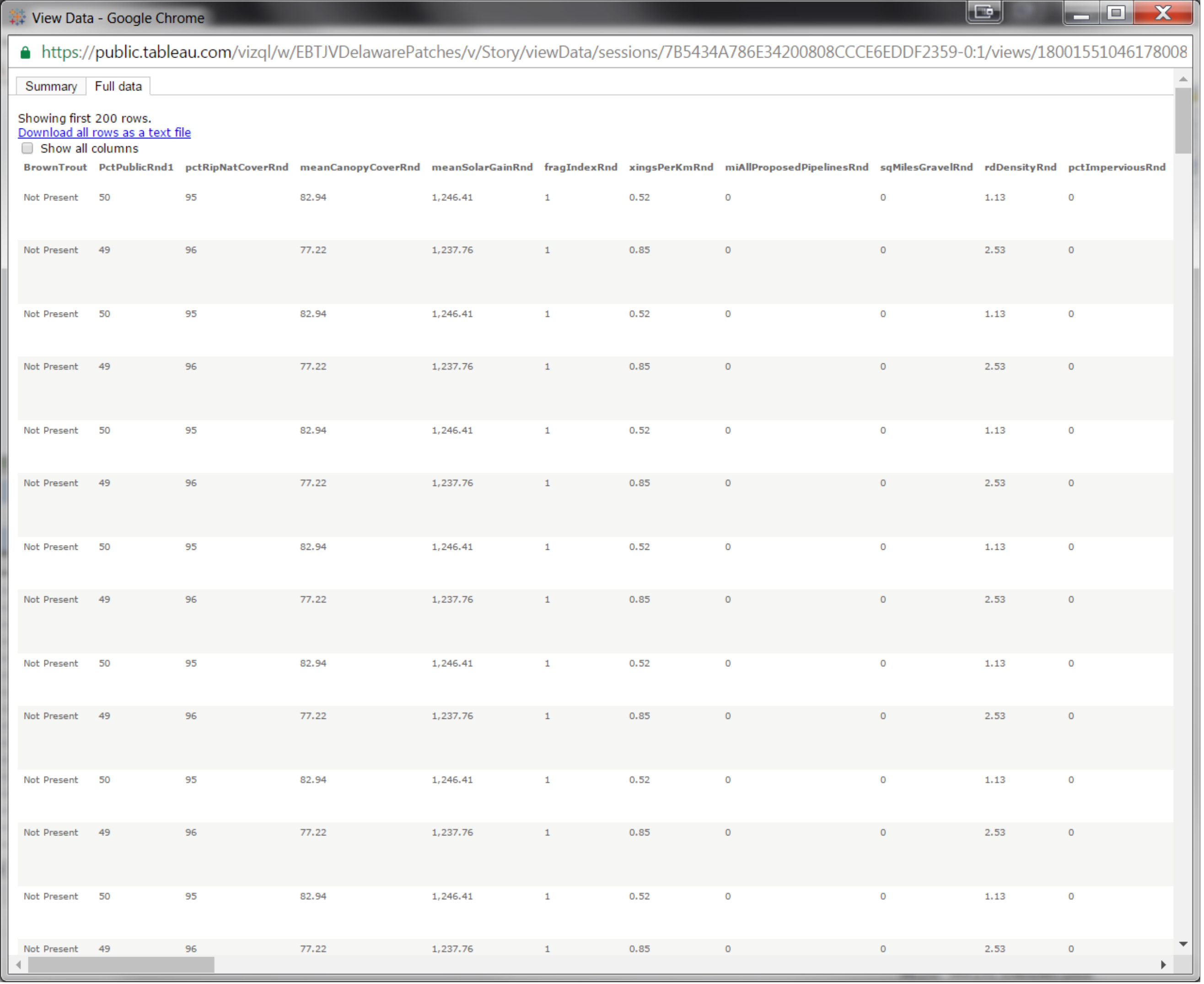
Ave. Modeled EBT Occupancy - Letcher
0.0500 — 1.0000

Ave. Modeled EBT Occupancy - DeWeber & Wagner
0.0000 — 0.7800

If you **select** a set of polygons, this window will pop-up.

The tabular data export window is launched by the button surrounded by the red circle.

To de-select a set of polygons, click anywhere on the basemap.



View Data - Google Chrome

https://public.tableau.com/vizql/w/EBTJVDelawarePatches/v/Story/viewData/sessions/7B5434A786E34200808CCCE6EDDF2359-0:1/views/18001551046178008

Summary | Full data

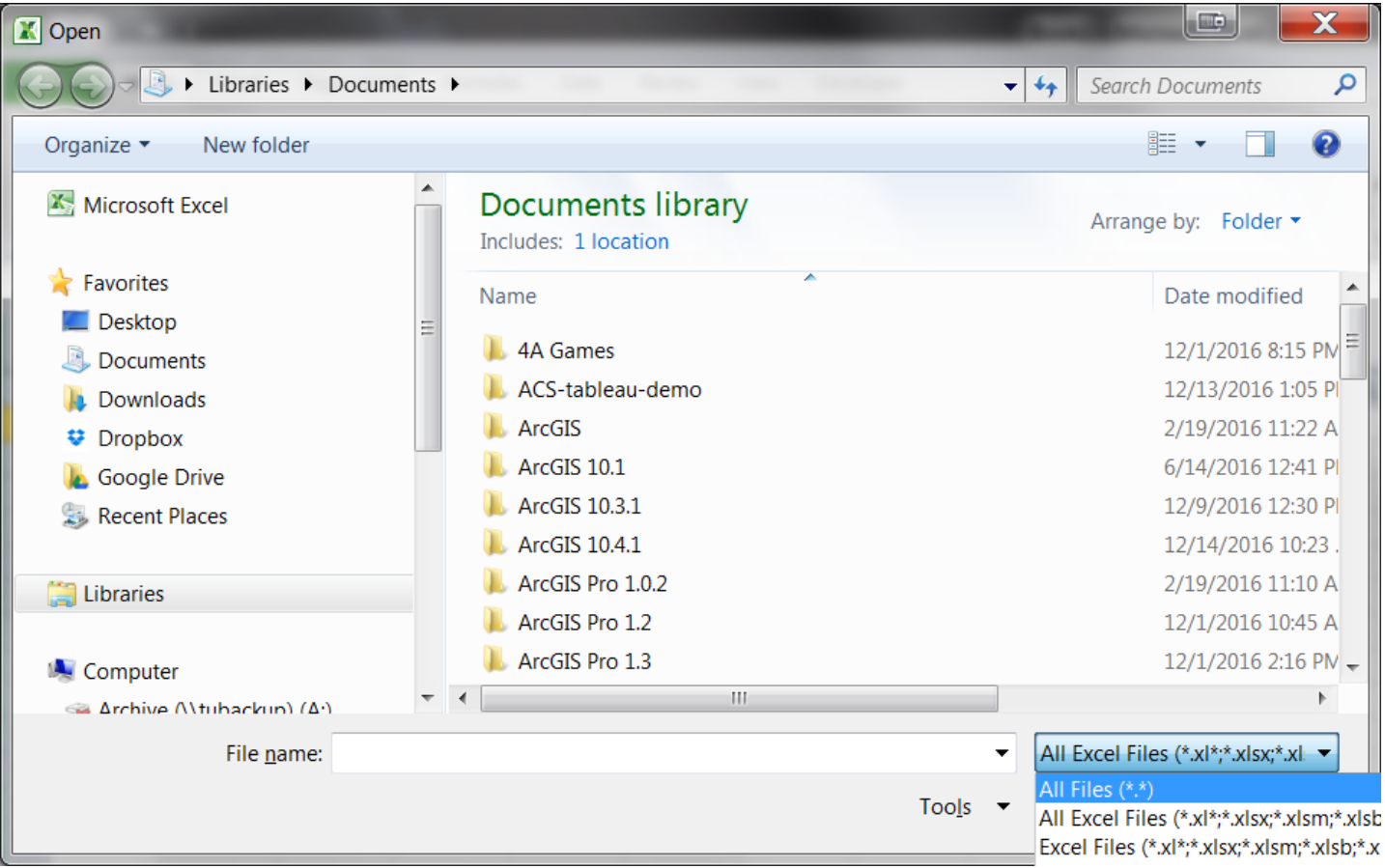
Showing first 200 rows.
Download all rows as a text file
Show all columns

BrownTrout	PctPublicRnd1	pctRipNatCoverRnd	meanCanopyCoverRnd	meanSolarGainRnd	fragIndexRnd	xingsPerKmRnd	miAllProposedPipelinesRnd	sqMilesGravelRnd	rdDensityRnd	pctImperviousRnd
Not Present	50	95	82.94	1,246.41	1	0.52	0	0	1.13	0
Not Present	49	96	77.22	1,237.76	1	0.85	0	0	2.53	0
Not Present	50	95	82.94	1,246.41	1	0.52	0	0	1.13	0
Not Present	49	96	77.22	1,237.76	1	0.85	0	0	2.53	0
Not Present	50	95	82.94	1,246.41	1	0.52	0	0	1.13	0
Not Present	49	96	77.22	1,237.76	1	0.85	0	0	2.53	0
Not Present	50	95	82.94	1,246.41	1	0.52	0	0	1.13	0
Not Present	49	96	77.22	1,237.76	1	0.85	0	0	2.53	0
Not Present	50	95	82.94	1,246.41	1	0.52	0	0	1.13	0
Not Present	49	96	77.22	1,237.76	1	0.85	0	0	2.53	0
Not Present	50	95	82.94	1,246.41	1	0.52	0	0	1.13	0
Not Present	49	96	77.22	1,237.76	1	0.85	0	0	2.53	0
Not Present	50	95	82.94	1,246.41	1	0.52	0	0	1.13	0
Not Present	49	96	77.22	1,237.76	1	0.85	0	0	2.53	0

If you click on the button mentioned in the previous step, a separate window will appear that will display tabular data for the patches you have selected.

Note you are given an option to download the selected data in tabular form.

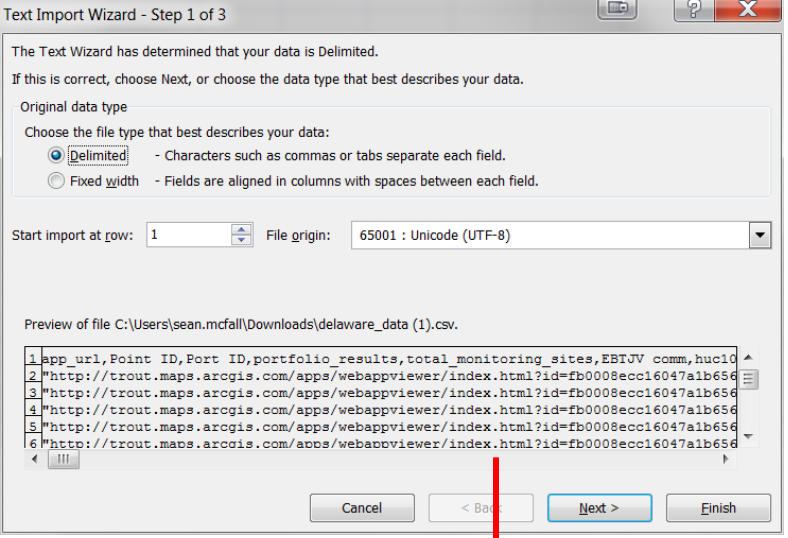
If you want to import this tabular data or use it elsewhere please go to the next page. If not skip to Part 2 of this guide.

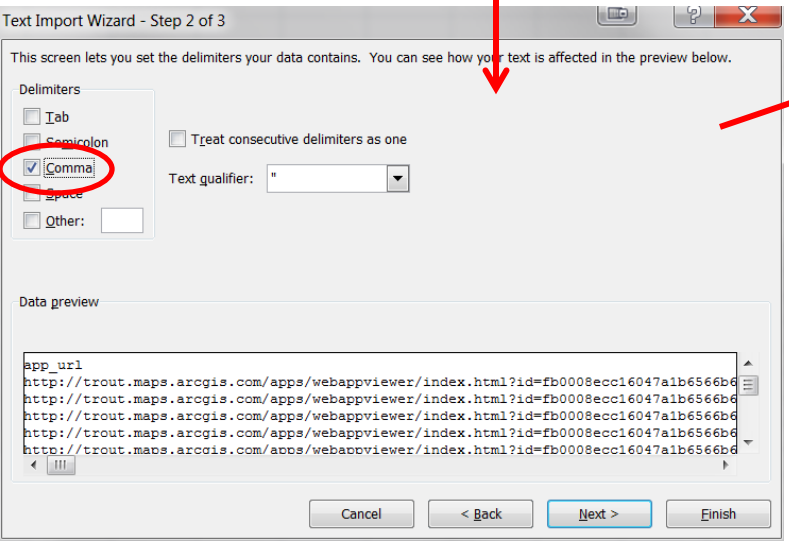


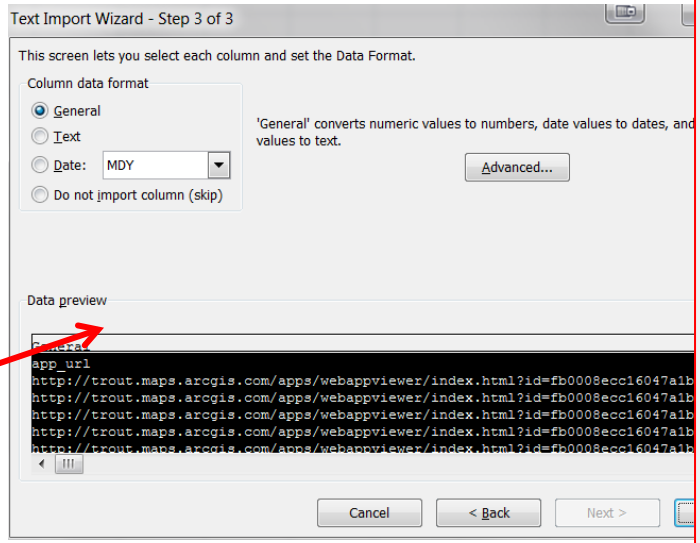
Once you have downloaded the selected data from the previous step, open an instance of Excel.

Open a file, and make sure to select ‘All Files’ as shown here else your selected data will not show.

Select your file.

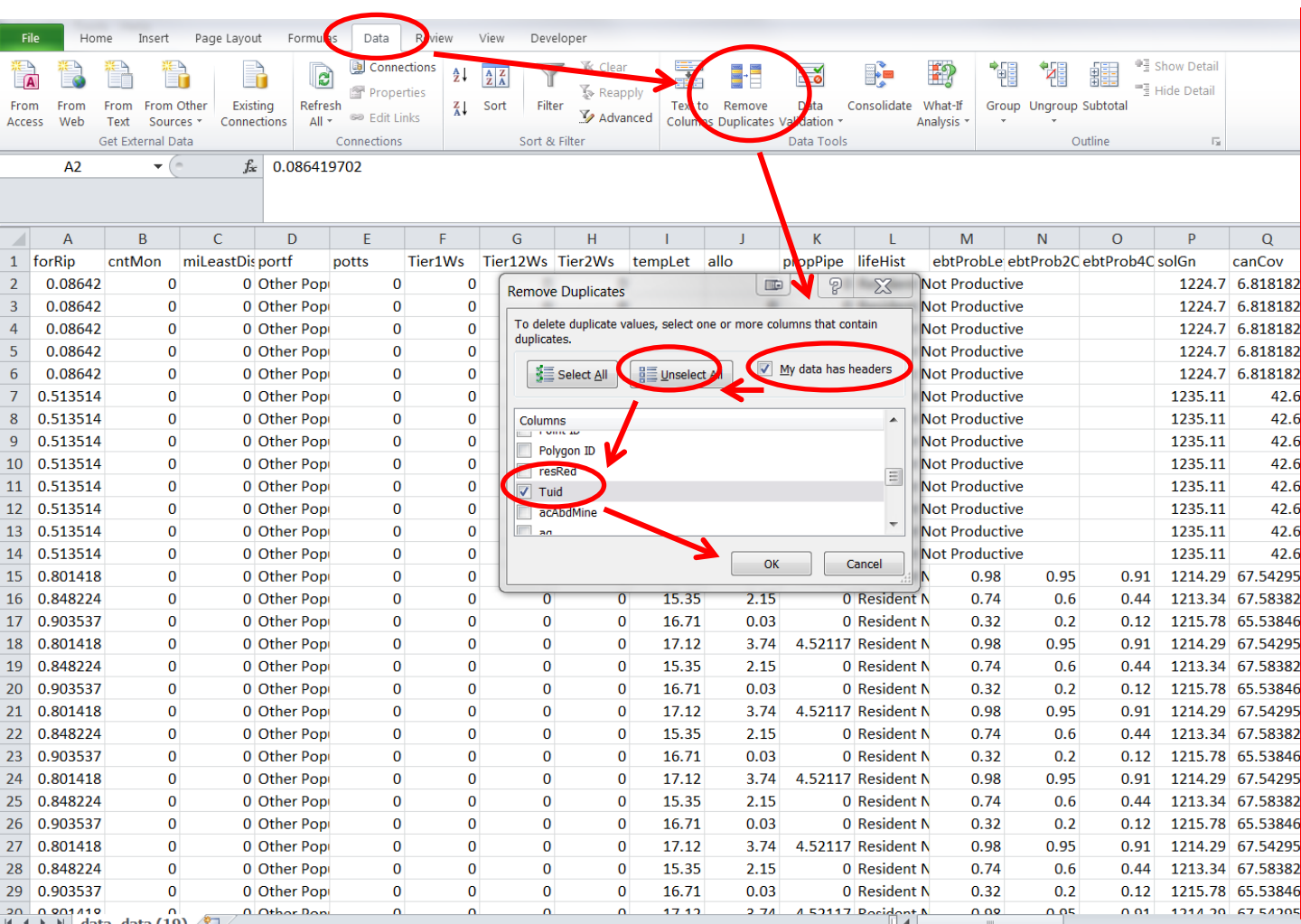






Next you will be prompted to import your selected data, as it is a .csv file not an excel file.

The only thing you need to change in the following three menus is the 'Delimiter' from Tab to Comma, as shown here.

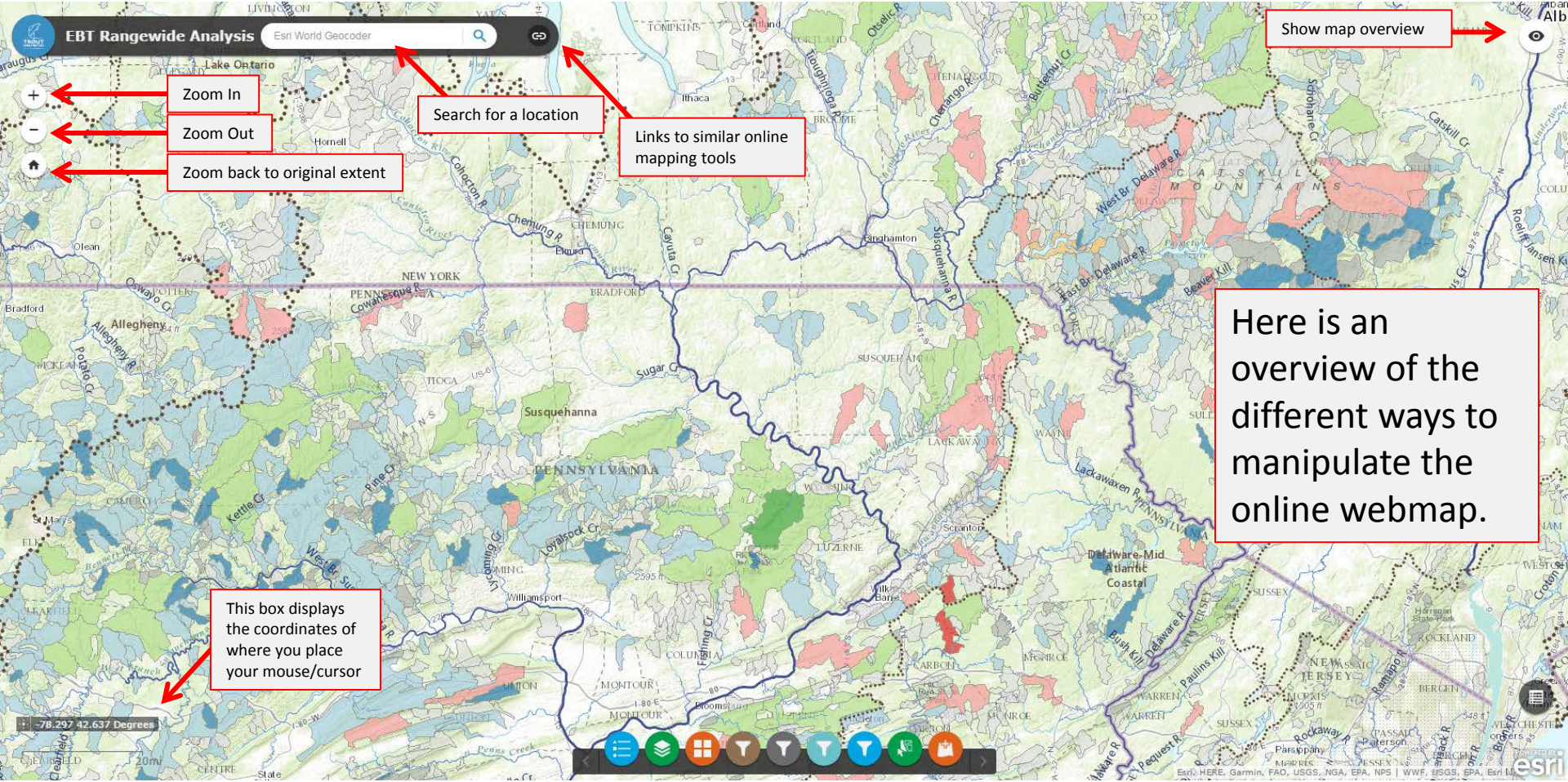


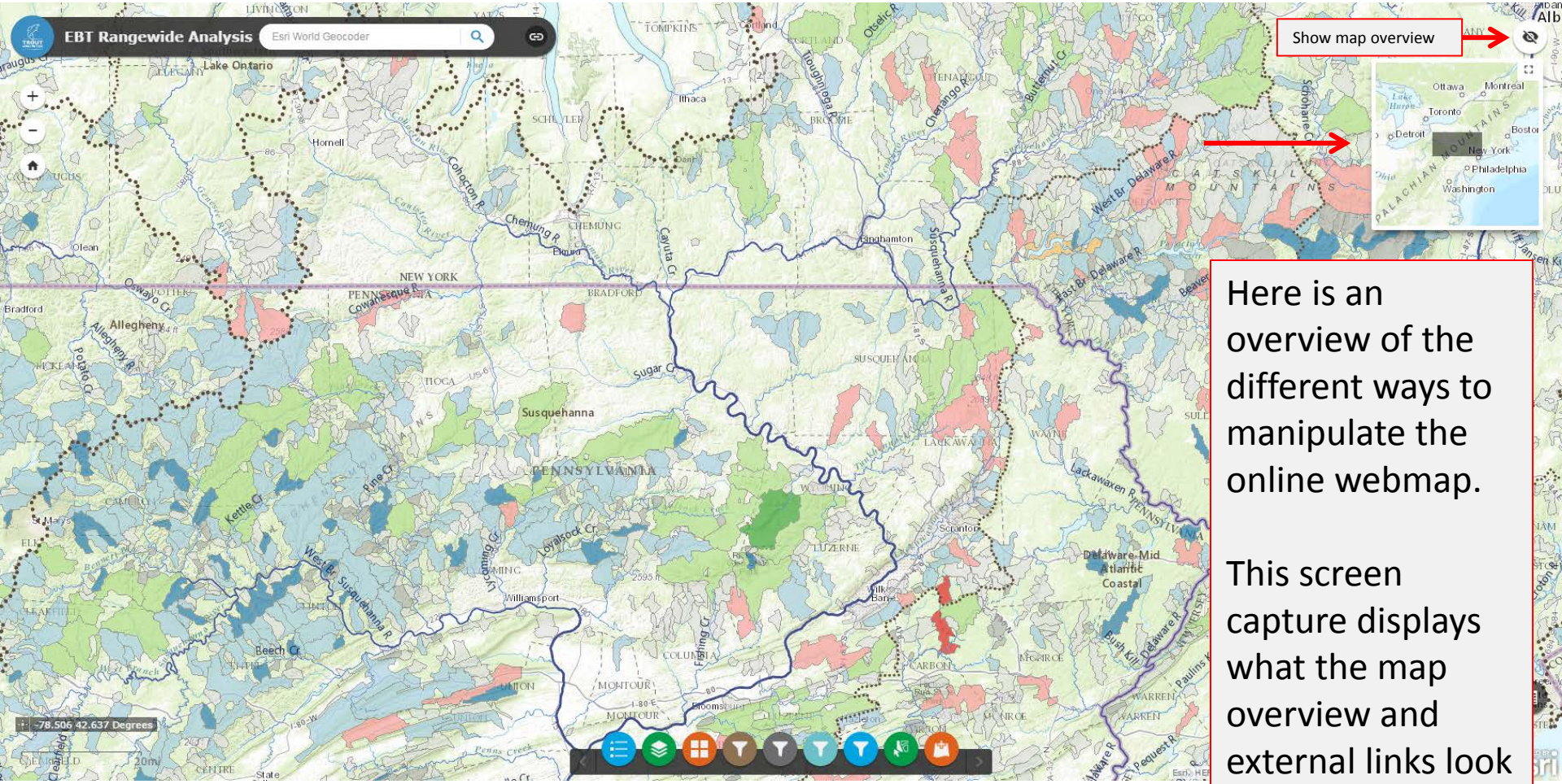
Finally, click on the ‘Data’ section then the ‘Remove Duplicates’ tool as shown here.

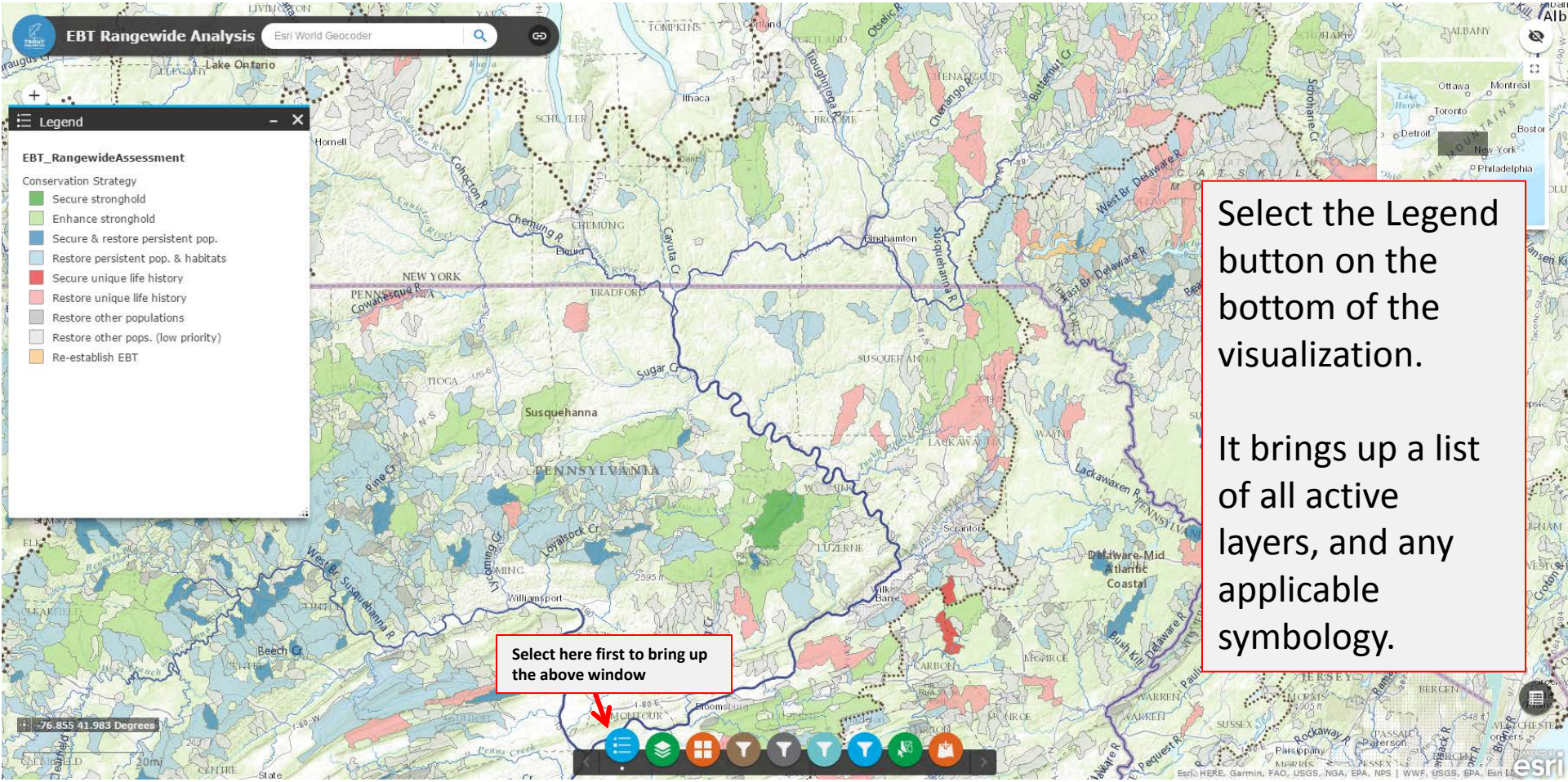
Make sure ‘My data has headers’ is checked, then hit ok.

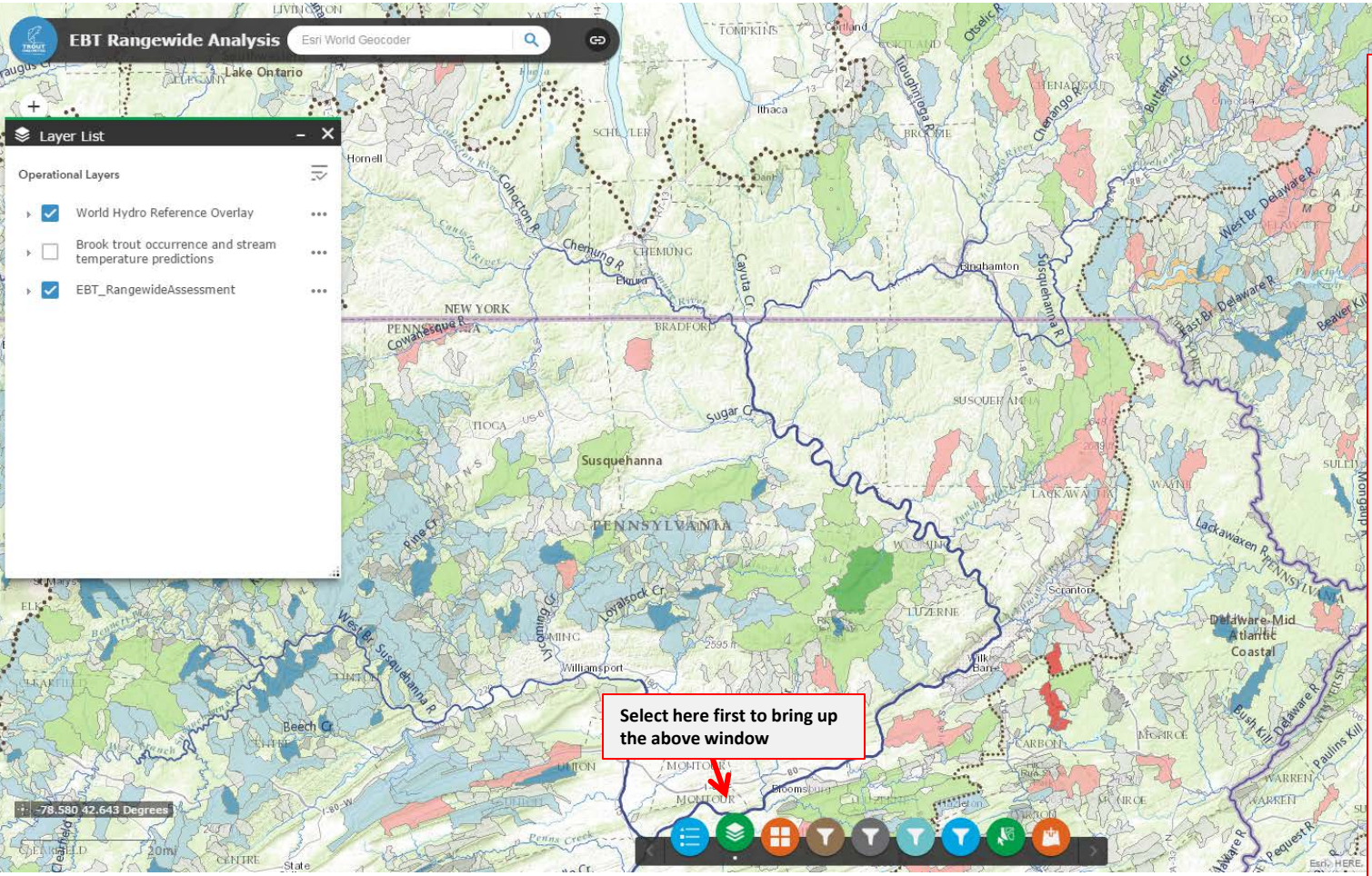
Click the ‘Unselect All’ Button, then only select ‘Tuid’. Finally click ‘OK’. You’re done!

Part 2. ArcGIS Online Map Visualization


EBT Rangewide Analysis
Esri World Geocoder
Zoom In
Zoom Out
Zoom back to original extent
Search for a location
Links to similar online mapping tools
Show map overview
Here is an overview of the different ways to manipulate the online webmap.
This box displays the coordinates of where you place your mouse/cursor
-78.297 42.637 Degrees


EBT Rangewide Analysis
Esri World Geocoder
Show map overview
Ottawa
Montreal
Toronto
Detroit
Boston
New York
Philadelphia
Washington
Here is an overview of the different ways to manipulate the online webmap.
This screen capture displays what the map overview and external links look like when clicked.

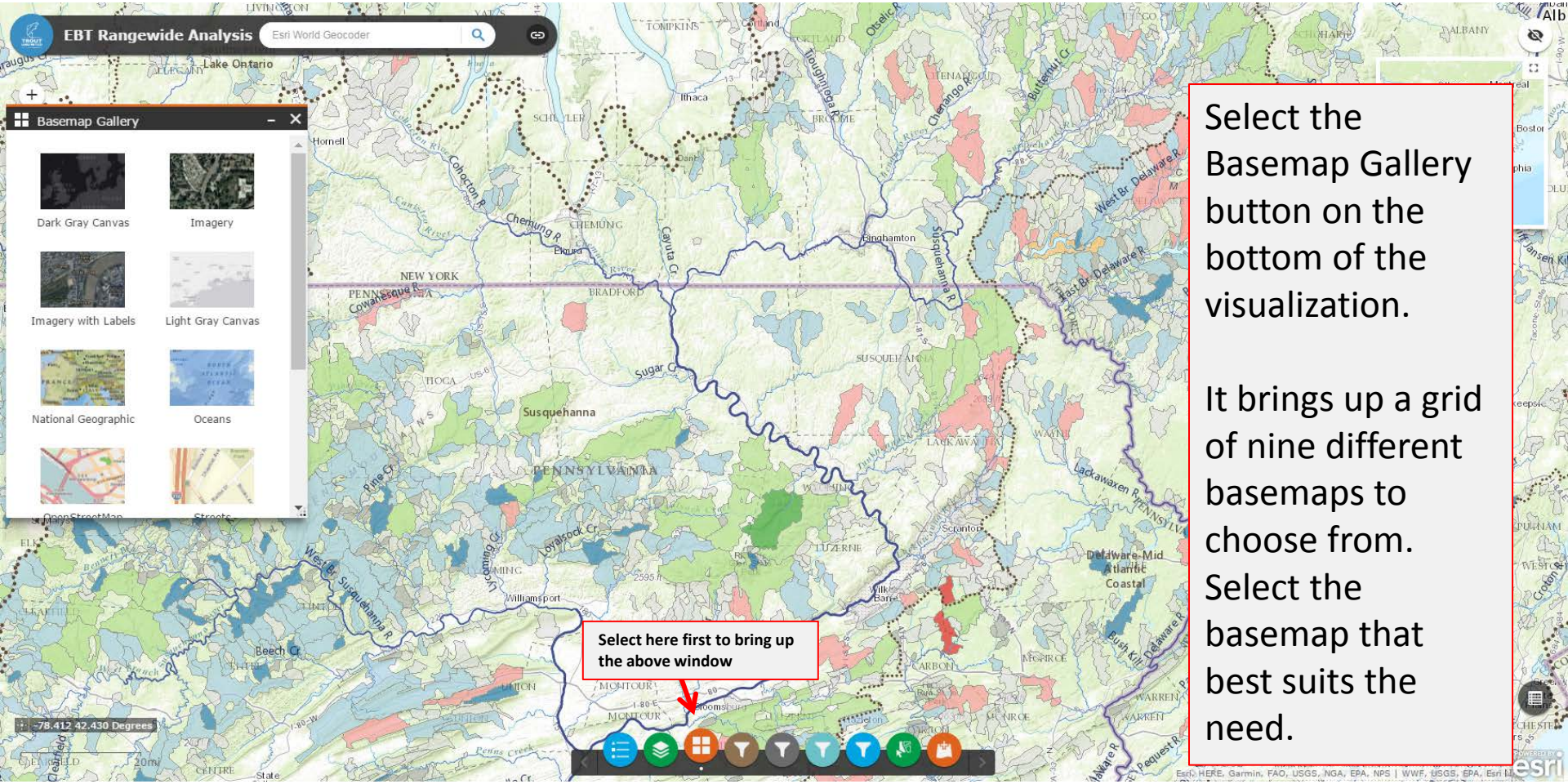

EBT Rangewide Analysis
Esri World Geocoder
Legend
EBT_RangewideAssessment
Conservation Strategy
Secure stronghold
Enhance stronghold
Secure & restore persistent pop.
Restore persistent pop. & habitats
Secure unique life history
Restore unique life history
Restore other populations
Restore other pops. (low priority)
Re-establish EBT
Select here first to bring up the above window
Select the Legend button on the bottom of the visualization.
It brings up a list of all active layers, and any applicable symbology.

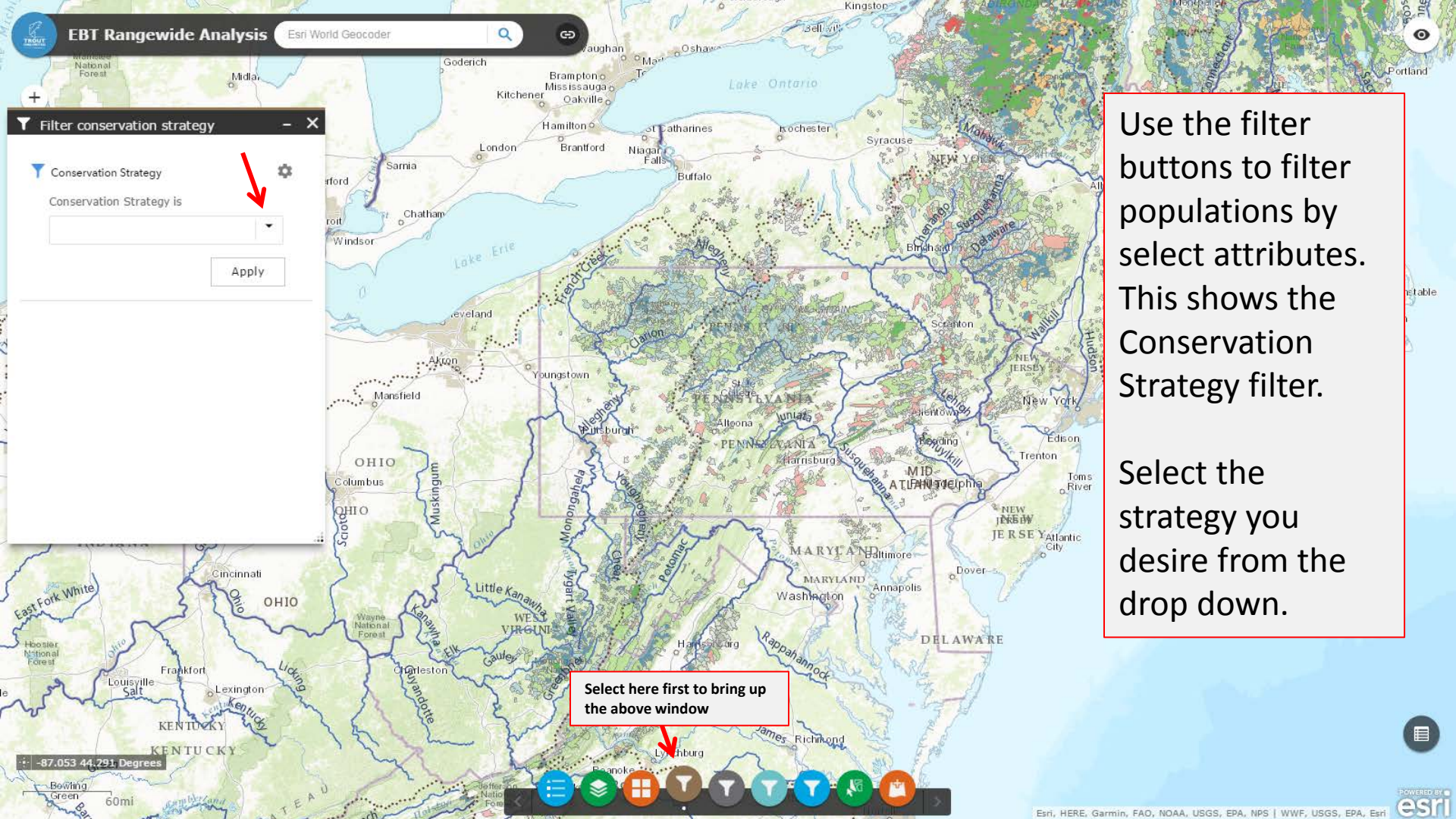


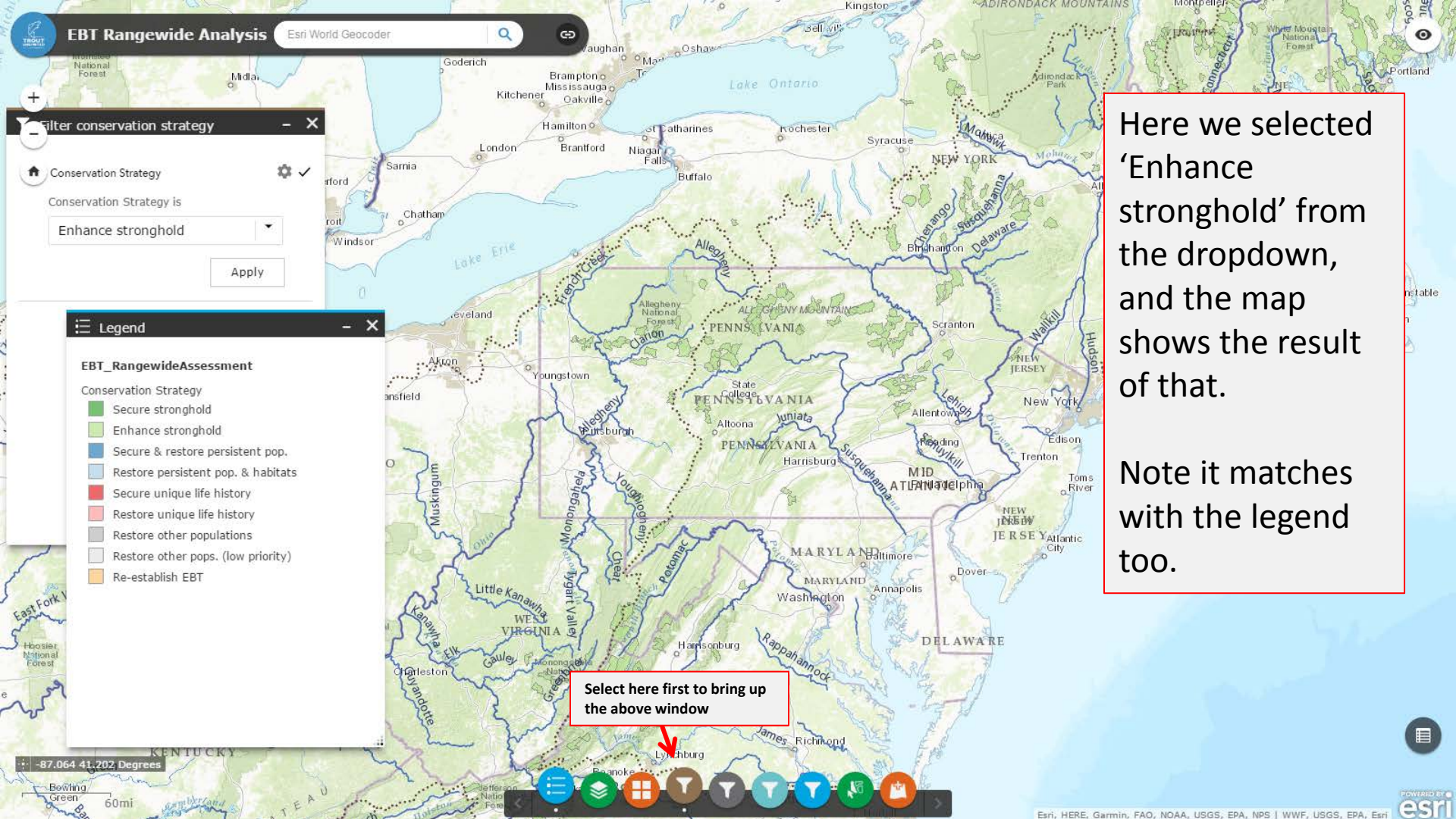
Select the Layers button on the bottom of the visualization.

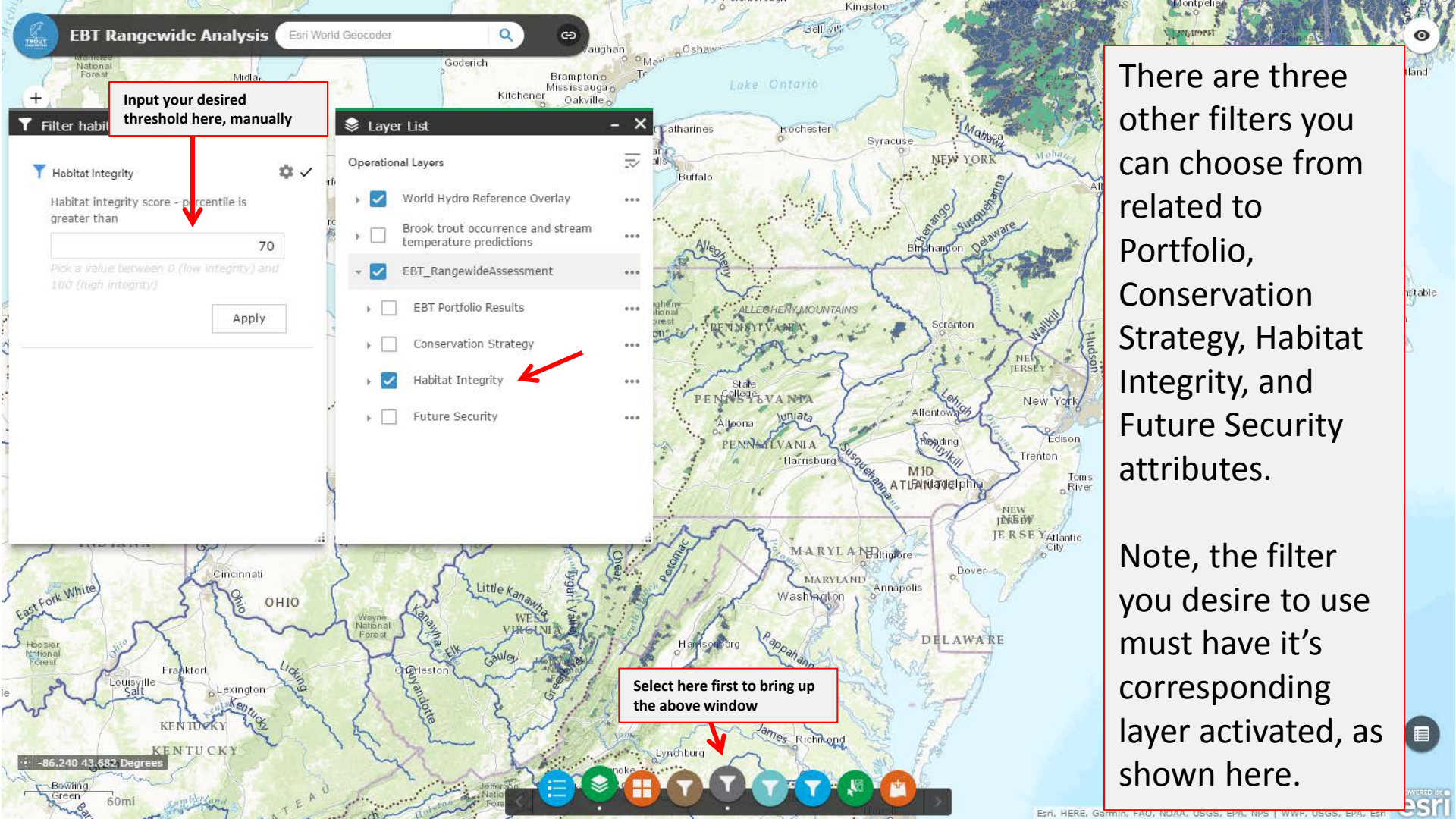
It brings up a list of all layers available for viewing.

Note: some layers require the user to zoom in or out to a certain extent in order to view them.


EBT Rangewide Analysis
Esri World Geocoder
Basemap Gallery
Dark Gray Canvas
Imagery
Imagery with Labels
Light Gray Canvas
National Geographic
Oceans
Select here first to bring up the above window
Select the Basemap Gallery button on the bottom of the visualization.
It brings up a grid of nine different basemaps to choose from. Select the basemap that best suits the need.

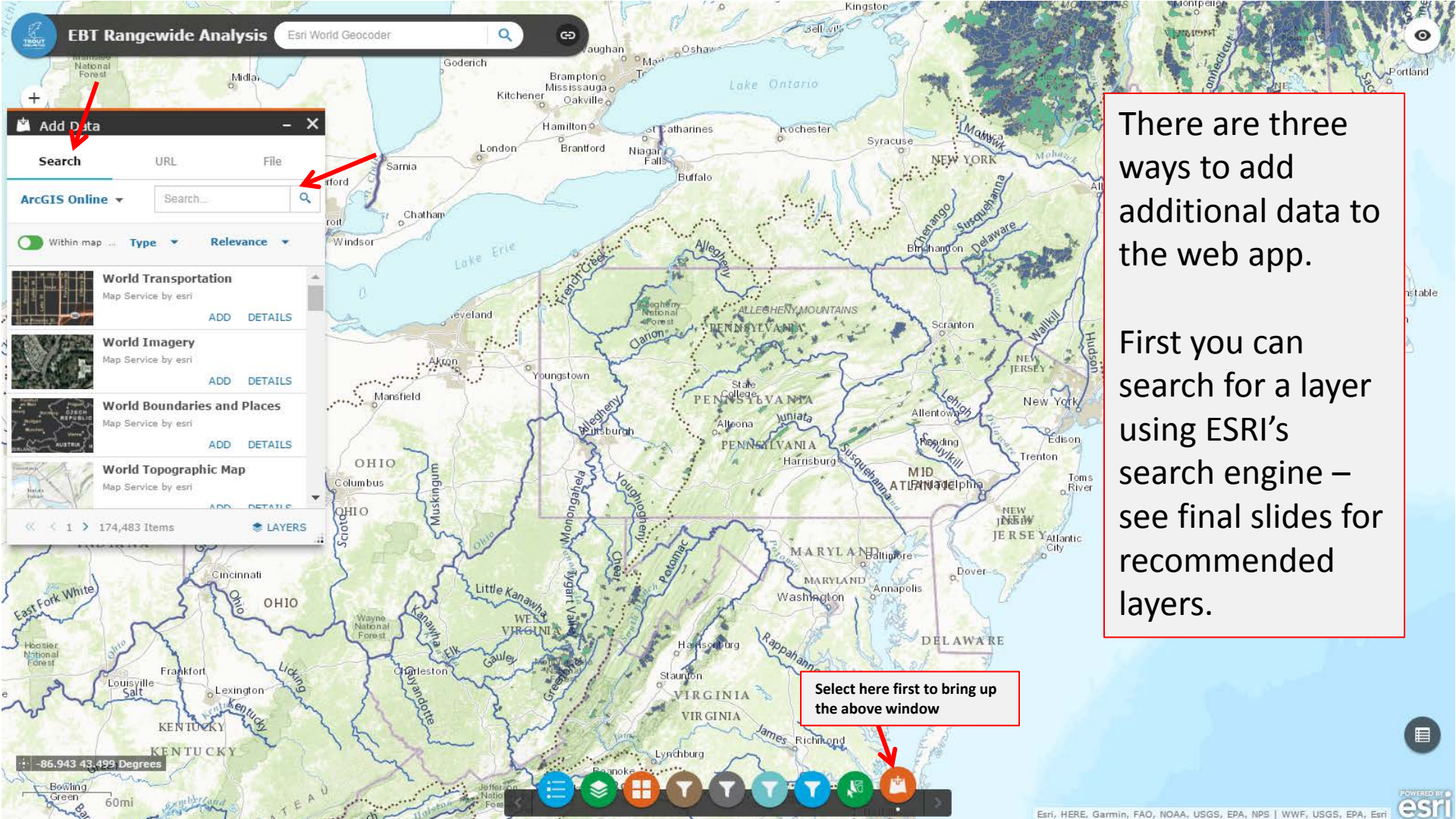

EBT Rangewide Analysis
Esri World Geocoder
Filter conservation strategy
Conservation Strategy
Conservation Strategy is
Apply
Use the filter buttons to filter populations by select attributes. This shows the Conservation Strategy filter.
Select the strategy you desire from the drop down.
Select here first to bring up the above window
-87.053 44.291 Degrees
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | WWF, USGS, EPA, Esri

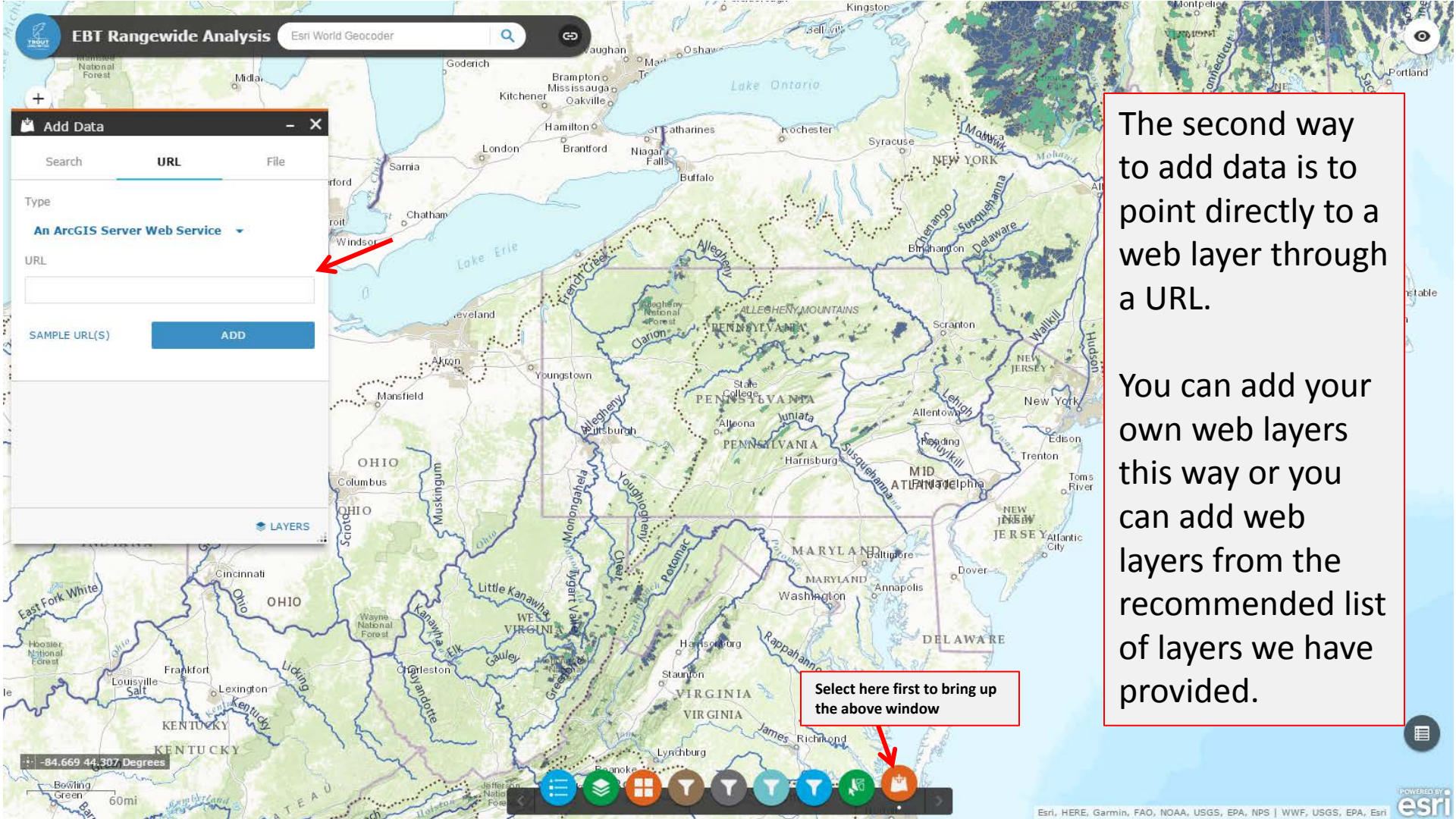

EBT Rangewide Analysis
Esri World Geocoder
Filter conservation strategy
Conservation Strategy
Conservation Strategy is
Enhance stronghold
Apply
Legend
EBT_RangewideAssessment
Conservation Strategy
Secure stronghold
Enhance stronghold
Secure & restore persistent pop.
Restore persistent pop. & habitats
Secure unique life history
Restore unique life history
Restore other populations
Restore other pops. (low priority)
Re-establish EBT
Select here first to bring up the above window
-87.064 41.202 Degrees
60mi
Here we selected 'Enhance stronghold' from the dropdown, and the map shows the result of that.
Note it matches with the legend too.

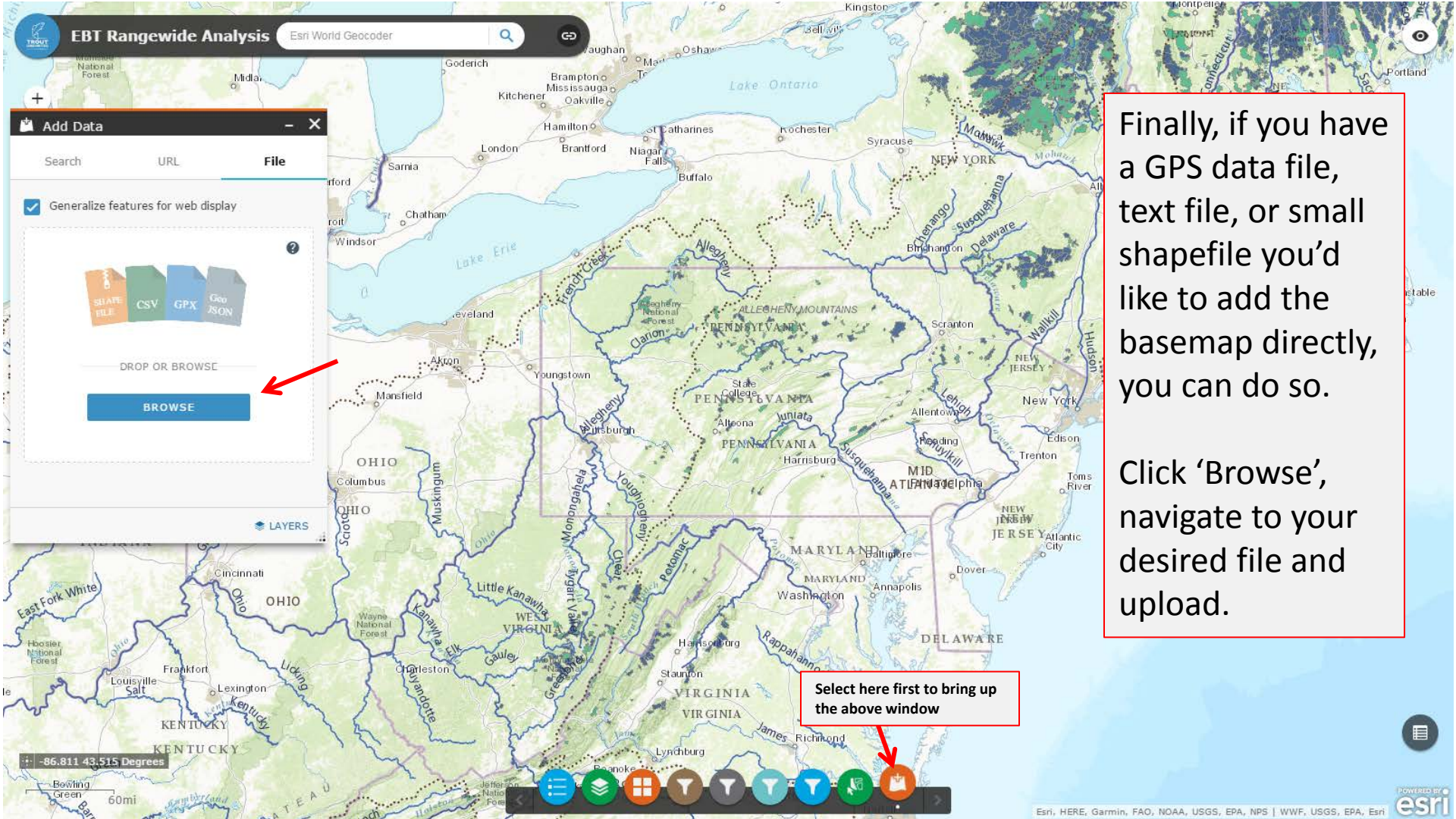


There are three other filters you can choose from related to Portfolio, Conservation Strategy, Habitat Integrity, and Future Security attributes.

Note, the filter you desire to use must have it's corresponding layer activated, as shown here.


EBT Rangewide Analysis
Esri World Geocoder
Add Data
Search
URL
File
ArcGIS Online
Search...
Within map ...
Type
Relevance
World Transportation
Map Service by esri
ADD
DETAILS
World Imagery
Map Service by esri
ADD
DETAILS
World Boundaries and Places
Map Service by esri
ADD
DETAILS
World Topographic Map
Map Service by esri
1
174,483 Items
LAYERS
There are three ways to add additional data to the web app.
First you can search for a layer using ESRI's search engine – see final slides for recommended layers.
Select here first to bring up the above window
-86.943 43.499 Degrees
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | WWF, USGS, EPA, Esri


EBT Rangewide Analysis
Esri World Geocoder
Add Data
Search
URL
File
Type
An ArcGIS Server Web Service
URL
SAMPLE URL(S)
ADD
LAYERS
Select here first to bring up the above window
The second way to add data is to point directly to a web layer through a URL.
You can add your own web layers this way or you can add web layers from the recommended list of layers we have provided.
-84.669 44.307 Degrees
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | WWF, USGS, EPA, Esri


EBT Rangewide Analysis
Esri World Geocoder
Add Data
Search
URL
File
Generalize features for web display
SHAPE FILE
CSV
GPX
GeoJSON
DROP OR BROWSE
BROWSE
LAYERS
Finally, if you have a GPS data file, text file, or small shapefile you'd like to add the basemap directly, you can do so.
Click 'Browse', navigate to your desired file and upload.
Select here first to bring up the above window
-86.811 43.515 Degrees
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | WWF, USGS, EPA, Esri

ArcGIS online layers that can be useful reference and readily overlaid on webmaps – all regions

Surface Drinking Water Importance - Forests on the Edge (Forests to Faucets)	
This web map provides a watershed index of surface drinking water importance, a watershed index of forest importance to surface drinking water, and a watershed index to highlight the extent to which development, fire, and insects and disease threaten forests important for surface drinking water.	More Information Direct Webmap Link

NAACC Road-Stream Crossings	
NAACC HUC12 subwatersheds prioritized for road stream crossing surveys. Based on the following project team-consensus objectives: diadromous fish, brook trout, risk of failure, and impact of failure.	More Information Direct Webmap Link

Potential Pipelines, Fractracker	
Covers entirety of North America, these are potential gas and oil pipelines	More Information Direct Webmap Link

Current Natural Gas Pipelines	
This is a polyline dataset representing the major natural gas transmission pipelines in the U.S. including interstate, intrastate, and gathering pipelines. These data were obtained by the U.S. Energy Information Administration from various sources including FERC Form 567—Annual Report Of System Flow Diagrams and Capacity, and other external sources such as company web pages and industry press.	More Information Direct Webmap Link

USA Karst	
These data are digital facsimiles of the original 1984 Engineering Aspects of Karst map by Davies and others.	More Information Direct Webmap Link

Protected Areas Database of the United States – By Owner	
This web layer illustrates and describes public land ownership represented in the Protected Areas Database of the United States (PAD-US). The database is published by the United States Geologic Survey, Core Science Systems, Core Science Analytics and Synthesis, National GAP Analysis Program.	More Information Direct Webmap Link

ArcGIS online layers that can be useful reference and readily overlaid on webmaps – CT basin

Presence of Coldwater Fisheries Resources Stream Surveys – MA	
The Massachusetts Division of Fisheries and Wildlife (MADFW) has mapped Coldwater Fisheries Resources (CFRs) at a scale of 1:25,000, based on NHD data. CFRs are important habitat for a number of cold water species, including trout. Identification of CFRs is based on fish samples collected annually by staff biologists and technicians. New streams are sampled and evaluated yearly.	More Information Direct Webmap Link

Vermont Stream Crossings	
Physical measurements and attributes of stream crossing structures and adjacent stream reaches which are used to provide a relative rating of aquatic organism passage and geomorphic compatibility. Additional screening tools have been developed to identify the amount of habitat available above and below individual structures and the potential for retrofitting an existing structure for improved aquatic organism passage.	More Information Direct Webmap Link

Lotic and Lentic Cores	
Core areas for rivers and streams in the watershed. These aquatic core areas include streams of relatively high ecological integrity, headwater streams of relatively high current habitat value for brook trout, and large and medium rivers that provide habitat for anadromous fish (specifically, American shad, blueback herring, shortnose sturgeon, alewife, and sea lamprey).	More Information Direct Webmap Link

Vermont Existing Hydroelectric Sites	
The existing hydroelectric dam data portrayed in this layer was extracted from the VTDam Inventory for dams with currently operating hydroelectric facilities. Potential hydroelectric sites were derived from a study) for the VT Department of Public Service entitled The Undeveloped Hydroelectric Potential of VT.	More Information Direct Webmap Link

Miles of High Risk Roads, Vermont	
The Hydrologically Connected Roads Segments layer was developed to help identify priority roads segments for completing inventories specifically where erosion (sediments and nutrients) could impact waters of the State.	More Information Direct Webmap Link

ArcGIS online layers that can be useful reference and readily overlaid on webmaps – DE basin and PA

DRWI Monitoring Sites - 2014	
Delaware River Watershed Initiative's monitoring sites dataset from 2014 that monitors macroinvertebrates, water chemistry, riparian habitat and fish.	More Information Direct Webmap Link

PA DEP – Streams CH93 Existing Use - 2016	
An "existing use" is defined in 25 Pa. Code 93.1 as "Those uses actually attained in the water body on or after Nov. 28, 1975, whether or not they are included in the water quality standards."	More Information Direct Webmap Link

PA DEP – 303(d) Listed Streams	
Pennsylvania Department of Environmental Protection list of all streams that do not meet minimum requirements of the Clean Water Act.	More Information Direct Webmap Link

Class A Streams 2016 – PA Fish & Boat	
Streams that support a population of naturally produced trout of sufficient size and abundance to support a long-term and rewarding sport fishery.	More Information Direct Webmap Link