

# Resilience Analysis and Planning Tool

User Guide

May 2025



FEMA

*This page intentionally left blank*

## Contents

<b>1. Introduction .....</b>	<b>1</b>
<b>2. Getting Started .....</b>	<b>2</b>
2.1. User Agreement.....	2
2.2. RAPT User Settings.....	2
2.3. Take a Tour of RAPT .....	2
<b>3. Navigating the Map .....</b>	<b>2</b>
3.1. Legend .....	3
3.2. Basemaps.....	3
3.3. Boundaries.....	3
<b>4. Data Layer List and Pop-Up Functionality .....</b>	<b>3</b>
4.1. Location and Resizing.....	4
4.2. Toggling Layers On/Off.....	4
4.3. Data Layer Legend .....	5
4.4. Options.....	6
4.5. Actions.....	6
4.6. Docking Pop-ups.....	7
4.7. Multiple Tabs in Pop-Ups .....	7
<b>5. Community Demographics and Resilience Challenges Indicators.....</b>	<b>8</b>
5.1. Community Resilience Challenges Indicators .....	8
5.2. Community Resilience Challenges Index (CRCI).....	9
5.3. CRCI Indicator Pop-Ups .....	10
5.4. Indicator Data Bins.....	10
5.5. County Indicators.....	11
5.6. Census Tract Indicators .....	11
5.7. Tribal Nation Boundary Indicators.....	12
<b>6. Infrastructure and Hazards Data.....</b>	<b>13</b>
6.1. Infrastructure.....	13
6.2. Hazards.....	13
<b>7. The Attribute Table .....</b>	<b>14</b>

7.1.	Attribute Table Data .....	14
7.2.	Filters in the Attribute Table .....	18
7.3.	Downloading Data from the Attribute Table .....	19
<b>8.</b>	<b>Add Data.....</b>	<b>19</b>
<b>9.</b>	<b>Analysis Tools .....</b>	<b>25</b>
9.1.	Draw, Measure and Find Coordinates .....	25
9.2.	Filter Data .....	30
9.3.	Incident Analysis.....	37
9.4.	Population Counter .....	40
9.5.	Incident Area From Shapefile .....	49
9.6.	Print.....	53
9.7.	Select .....	55
<b>10.</b>	<b>Contact Us .....</b>	<b>59</b>

# 1. Introduction

The Resilience Analysis and Planning Tool (RAPT) is a free, publicly available geographic information systems (GIS) analysis tool to help emergency managers, community partners and State agencies of all GIS skill levels:

- visualize and assess potential challenges to community resilience, and
- make strategic decisions for preparedness, mitigation, response, and recovery.

---

*Definition of Resilience- The Federal Emergency Management Agency (FEMA) defines resilience as the ability to prepare for threats and hazards, adapt to changing conditions and withstand and recover rapidly from disruptions.*

---

This User Guide provides step-by-step instructions on how to use the features and analysis tools in RAPT. Access links to RAPT and the Resource Center are on FEMA's website at: <https://www.fema.gov/RAPT>.

RAPT includes over 100 pre-loaded data layers and the tool's functionality allows users to visualize combinations of these data layers for a specific location. The categories of data layers are:

- **Infrastructure** information drawn from the Homeland Infrastructure Foundation-Level Data (HIFLD)<sup>1</sup> Subcommittee, such as fire station and hospital locations.
- **Hazards** such as real-time weather layers from the National Oceanic and Atmospheric Administration (NOAA), historic tornado paths and risk layers from the National Risk Index (NRI)
- **Community Demographics** for counties, census tracts, and Tribal Nations drawn primarily from the U.S. Census Bureau. RAPT includes 26 demographic layers, including 22 community resilience challenges indicators identified from peer-reviewed research, and FEMA's Community Resilience Challenges Index (CRCI) for counties and census tracts, a composite value of all 22 community resilience challenges indicators. The full list of community demographic data layers available in RAPT is provided in section 5.

---

<sup>1</sup> The HIFLD Open Data Portal contains national foundation-level geospatial critical infrastructure data in the public domain. You can access HIFLD Open at <https://hifld-geoplatform.opendata.arcgis.com/>.

## 2. Getting Started

### 2.1. User Agreement

The initial splash page shows a short user agreement and provides an opportunity to take a tour of RAPT. Click the box next to “I agree to the above terms and conditions” and then click the “OK” button each time you open RAPT to gain access.



### 2.2. RAPT User Settings

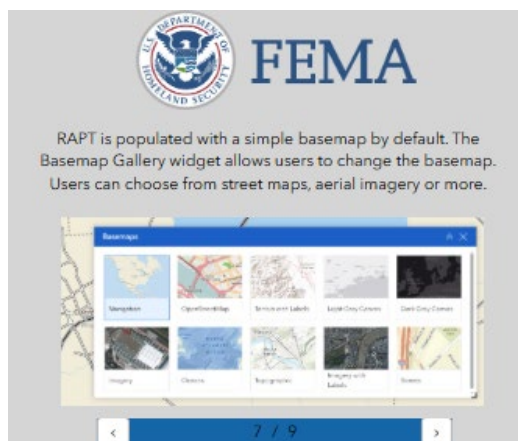
Due to unique browser, computer and display configurations for each user, some of the icons, graphics and map views in RAPT may look slightly different than what is shown in this user guide. The Resilience Analysis and Planning Tool is best viewed on a desktop or laptop, although it is also compatible with all mobile devices and tablets.

When viewing on a laptop or desktop, we recommend setting your webpage zoom between 70-80% to ensure all layer list and tool icons display properly on the map.

RAPT has been configured to be viewed in the Microsoft Edge or Mozilla Firefox browser, although it will work in any browser.

### 2.3. Take a Tour of RAPT

You can access the “Take a Tour” overview from the RAPT Header after clicking the splash page user agreement. Clicking on the “Take a Tour” button will open an information window in the middle of the screen. This virtual tour provides various tabs with information on the important functional and visual aspects of RAPT. Click the left or right arrows to cycle through the informational tabs. You can close this window by clicking anywhere on the map.



## 3. Navigating the Map

The initial map view shows the continental United States, but you can move to other areas, such as

Hawaii, Alaska, or Puerto Rico and you can zoom in to specific locations. Navigate with the following:



- **Mouse:** Use your mouse wheel to zoom in and out on the map. Left click the mouse and hold to move the whole map, or left click on a specific point.
- **Search:** Type the name of a specific address, county, city, or state in the search bar. The Search bar is located in the upper left corner.
- **Zoom:** Click the +/- boxes at the top left of the map to zoom in or out on a map location.
- **Home:** Use the home button to bring the map back to the initial view.
- **Previous Extent:** Use the arrows to zoom to a previous extent.
- **My Location:** Use the circular button to center the map on your current location.

The blue circular icons at the top of RAPT have drop-down menus for RAPT data layers and other useful information. You can see the title for each icon by hovering over the icon with your mouse.

### 3.1. Legend

Displays the legends for all the layers (hazard, infrastructure, indicators) you have toggled on in the map.



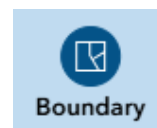
### 3.2. Basemaps

There are various basemap options in RAPT. The default map is the grey Navigation Map, and other options include satellite imagery, streets, topographic and terrain views. The Streets Map view is especially helpful to assess evacuation routes, and the terrain views are useful when looking at hazards such as flood or wildfire.



### 3.3. Boundaries

The Boundaries list provides various boundary layers for reference and analysis, including Tribal boundaries, county boundaries and municipal boundaries.



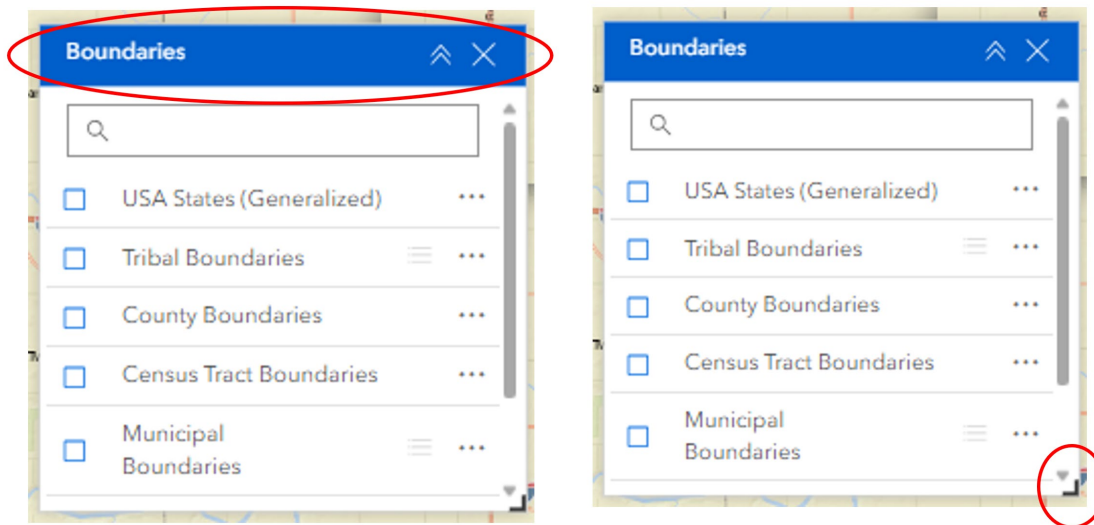
## 4. Data Layer List and Pop-Up Functionality

The data layer lists are grouped into blue icons at the top of the screen. Each blue icon contains a specific type of data layer (Infrastructure, Hazards, Community Resilience Indicators etc.). The layer list titles are below the icons and click on the icon to find and view layers in that group.



## 4.1. Location and Resizing

Data layer lists will open at the upper left of the screen and can be resized and moved anywhere on the map. This allows users to open multiple layer lists and tools at once, resize them and place them wherever they choose. Click and drag the blue header to move layer lists and tools. Click on the lower right corner and drag your mouse to resize layer lists and tools.



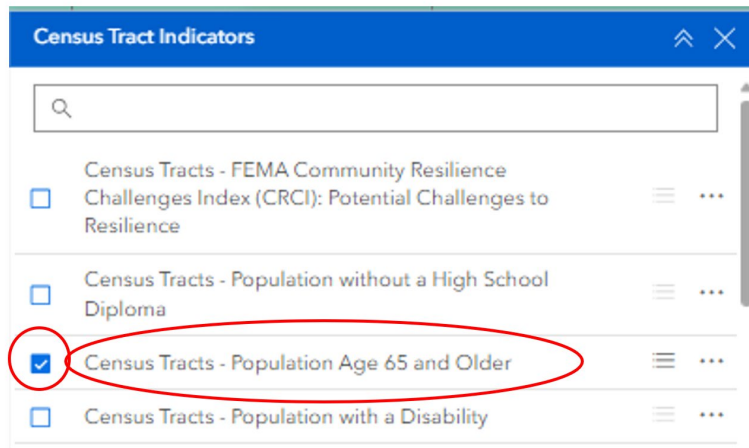
- NOTE: During a user session in RAPT, a re-sized layer list will re-open to the same size and location as they were when closed by the user.

## 4.2. Toggling Layers On/Off

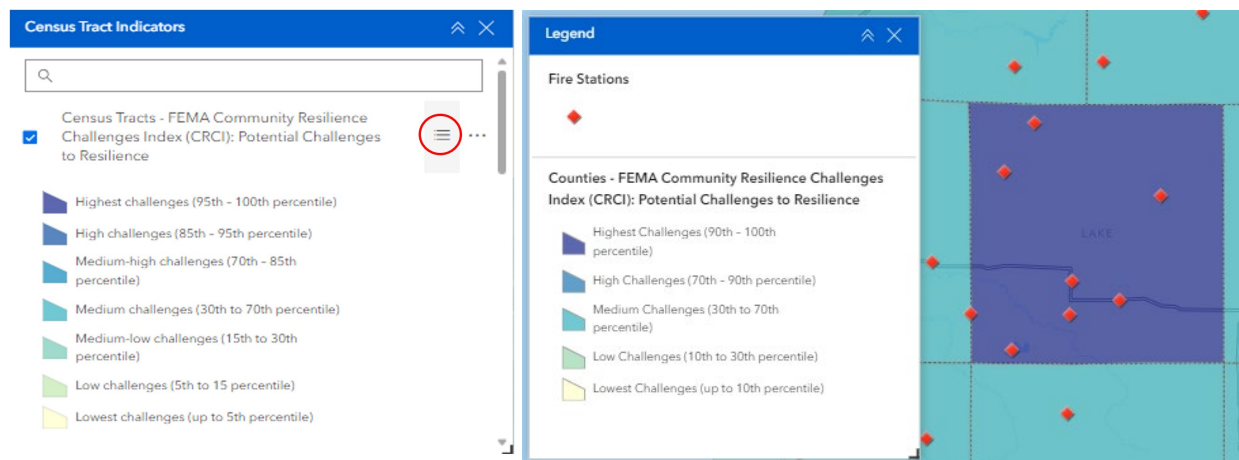
Users have two options for toggling on/off data layers. Clicking on the layer name will toggle the data layer on/off. Users can also click on the box next to the layer name. A checkmark will appear in the box and the data will display on the map.

- NOTE: If a data layer name appears grey, you will need to zoom in on the map before this layer is able to populate.



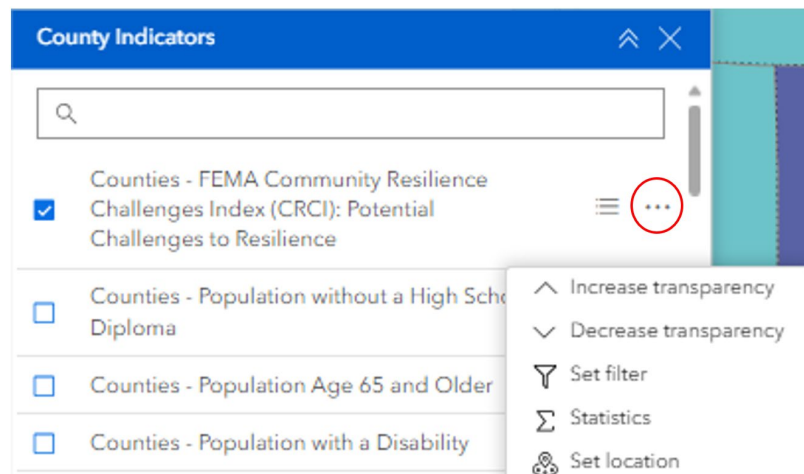


### 4.3. Data Layer Legend



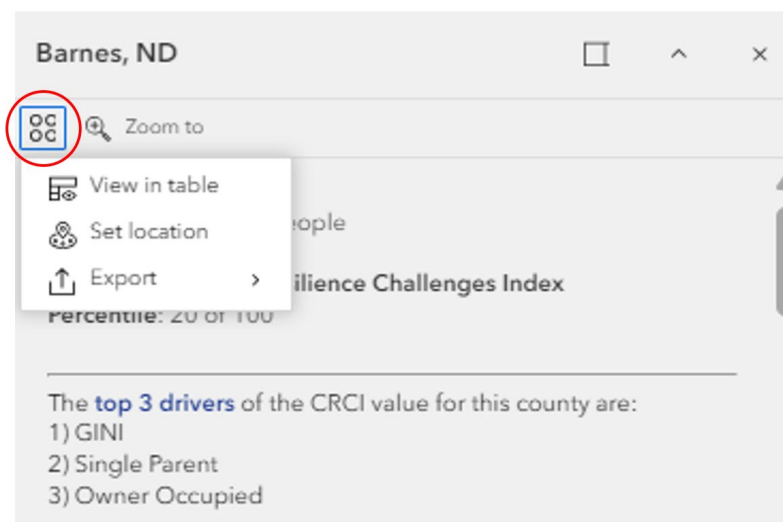
RAPT users can view the data layer legend in the data layer list or in the Legend icon. Clicking on the “Legend” symbol next to the layer name will open the layer legend below the layer title. Users can view layer legends for all layers that are toggled on by clicking the blue “Legend” icon.

## 4.4. Options



Each data layer has three dots to the right of the title. Clicking on the three dots gives you additional options for how the data layer can be displayed, including transparency. Adjusting the transparency of the visual display on the map can be useful when you have multiple data layers toggled on.

## 4.5. Actions

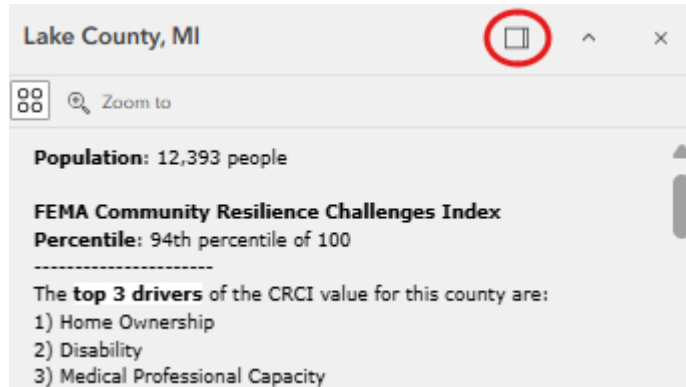


When viewing a pop-up for a data layer, users can click the “actions” button to see various options, including viewing the information in the attribute table, setting the location as input for various analysis tools and exporting the dataset information to an Excel file.

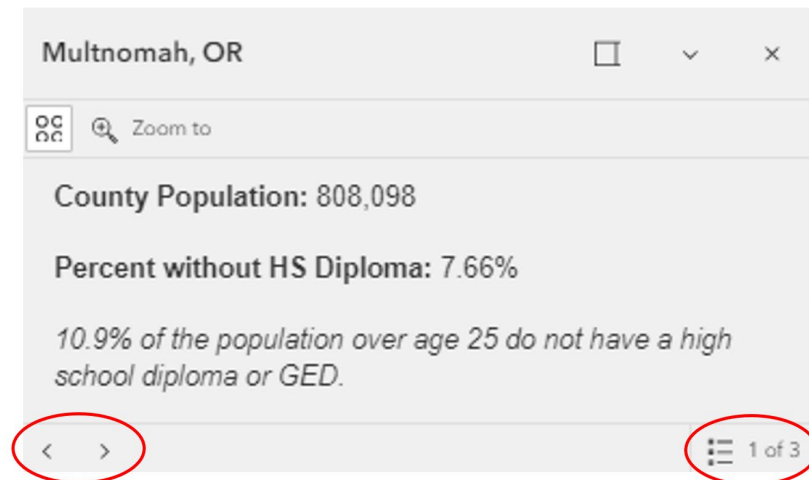
## 4.6. Docking Pop-ups

When viewing a pop-up for a data layer, the pop-up will appear on the map with a pointer to the location. Users can dock the pop-up on the right side of the map by clicking the “dock” button. This allows users to see more of the geographic area they are focused on.

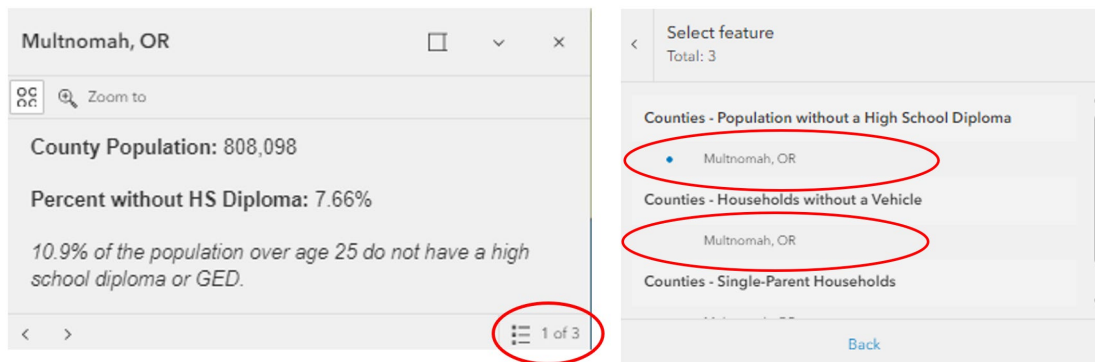
- NOTE: Pop-ups will re-open to the same location as they were when closed by the user. Users can re-locate the pop-up to the map location by clicking the “Undock” button.



## 4.7. Multiple Tabs in Pop-Ups



When viewing a pop-up with multiple data layers toggled on, the pop-up will have tabs that correspond to each data layer. The number of tabs will be displayed at the bottom right of the pop-up. Users can cycle through the tabs by clicking the “next” and “previous” arrows at the bottom of the pop-up.



Users can also see a list of all the data layers that are toggled on and go to the tab for a specific layer. Click the list icon in the pop-up to display the list of data layers. Select the layer you want to view in the pop-up and click the location below the layer name. The pop-up will now display the information for the data layer you selected.

## 5. Community Demographics and Resilience Challenges Indicators

### 5.1. Community Resilience Challenges Indicators

RAPT includes important demographic information about the people who live in the community.

These community demographic layers are available at the county, census tract and Tribal Nation boundary levels. RAPT includes 26 demographic layers, including 22 community resilience challenges indicators identified from peer-reviewed research and FEMA's Community Resilience Challenge Index (CRCI) for counties and census tracts.



Not all demographic data layers in RAPT are available at all three levels. Currently, 25 of the 26 layers are available for counties; 21 are available for census tracts; and 17 are available for Tribal Nation boundaries.

## RAPT Community Demographics Data Layers

The table below shows all 26 community demographic data layers available in RAPT, including the 22 community resilience challenges indicator layers.

### Population Characteristics

- Population without a High School Diploma
- Population Age 65 and Older
- Population with a Disability

### Household Characteristics

- Households without a Vehicle
- Households with Limited English
- Single-Parent Households
- Households without a Smartphone

### Housing

- Mobile Homes as Percentage of Housing Units
- Housing Units that are Owner-Occupied

### Healthcare

- Number of Hospitals
- Medical Professional Capacity
- Population without Health Insurance

### Economic

- Population Below Poverty Level
- Median Household Income
- Unemployed Labor Force
- Unemployed Women in the Labor Force
- Income Inequality
- Workforce Employed in Predominant Sector
- Connection to Community
- Presence of Social/Civic Organizations
- Population without Religious Affiliation
- Percent of Inactive Voters
- Population Change



### Additional pre-Loaded Demographic Layers

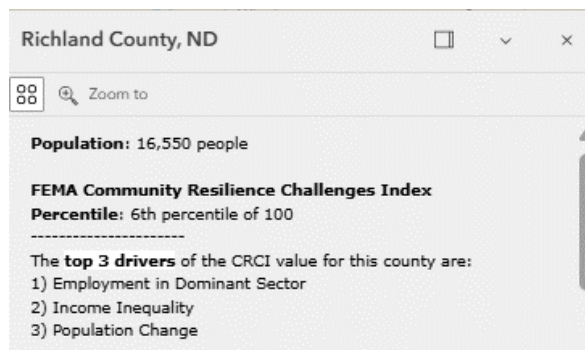
- Percent of Population without Broadband Subscription
- Housing Costs as a Percentage of Household Income
- Residential Structures in SHFA with Flood Insurance
- Medicare Recipients with Power-Dependent Devices

## 5.2. Community Resilience Challenges Index (CRCI)

The Community Resilience Challenges Index is a composite index comprised of the 22 commonly used indicators identified through an analysis of peer-reviewed research. This index provides a relative composite value by county and by census tract, measured as a percentile relative to all other counties and census tracts, respectively.

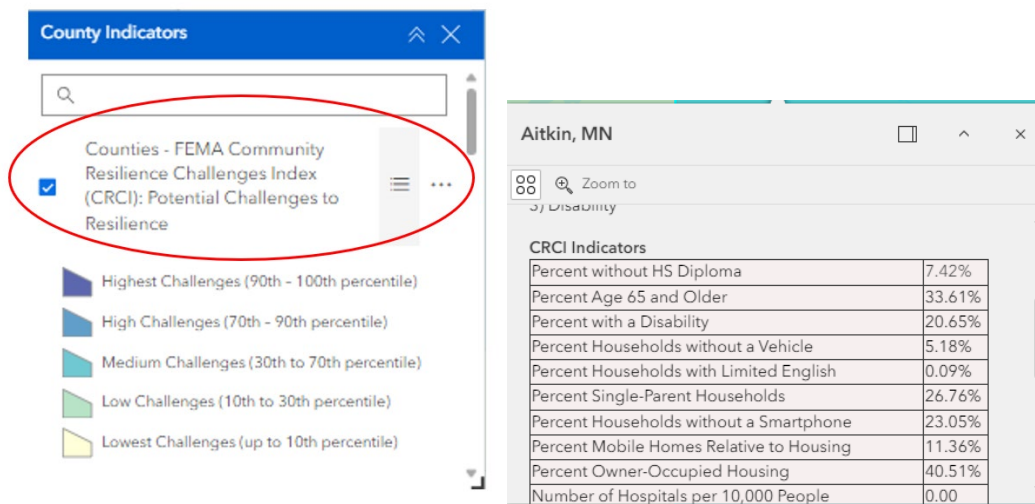
- NOTE: When data for an indicator was not available at the census tract level, the research team imputed the county data for the census tract calculation.
- NOTE: The CRCI values for municipios in Puerto Rico do not include “Households with Limited English” as one of the indicators in the calculation.

For each county CRCI, the pop-up box will also include the top 3 drivers of the CRCI value for the county. This gives emergency managers and community leaders a quick way to see the top 3 challenges to resilience within the county, based on research-based commonly-used community resilience challenges indicators.



### 5.3. CRCI Indicator Pop-Ups

The FEMA Community Resilience Challenges Index layer is available for both counties and census tracts. To view the pop-up box that contains the list of indicators and data for the geographic area, toggle the FEMA Community Resilience Challenges Index layer on and click on the county. Scroll down inside the pop-up box to see the full list of indicators with values for each.



### 5.4. Indicator Data Bins

The datasets are binned and assigned consistent color ramps for the bins to provide a visual cue for users to quickly identify ranges for the data. These bins and associated colors provide a more immediate high-level understanding of a geographic area's characteristics. While the color ramp is consistent, the legend of the specific data range represented by the color is specific to each indicator. In addition to the data range color, the specific data point is available in the pop-up box, along with the national average for the indicator.

- If multiple indicators have been selected, each indicator will have a separate tab in the pop-up, with the data point for the geographic area and the national average.

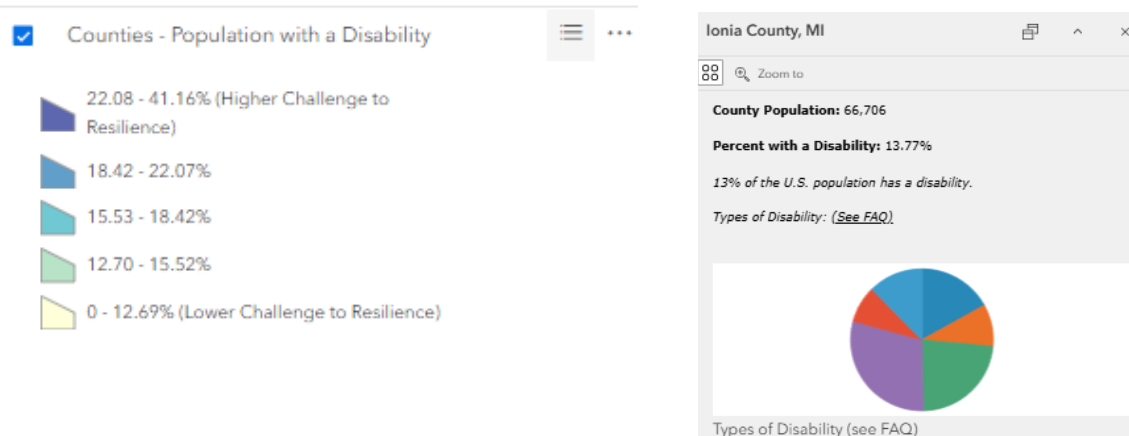
- If multiple layers are toggled on, the map will only display the colored bins for the indicator that is highest on the drop-down list.

## 5.5. County Indicators

Click on the “County Indicators” icon to see the list of all the layers available with county-level data. Toggle on/off layers to see the different community resilience indicator values for each county.

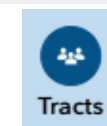


- With a layer toggled on, click on the “Legend” symbol next to the layer name and a legend will appear below the layer name. The county indicators are organized into five bins, with the darker colors indicating greater potential challenges to resilience.
- Click on a county for a pop-up box of that county’s data and the national average for that indicator.
  - NOTE: There will be a tab in the pop-up box for every indicator layer you have toggled on.
- There are four county-level indicators that have additional information in the pop-up box. These are Population Age 65 and Older, Population with a Disability, Households with Limited English and Housing Costs as a Percentage of Household Income. When there is a bar or pie chart in the pop-up box, use your mouse to hover over each bar to see the data value for that bar.



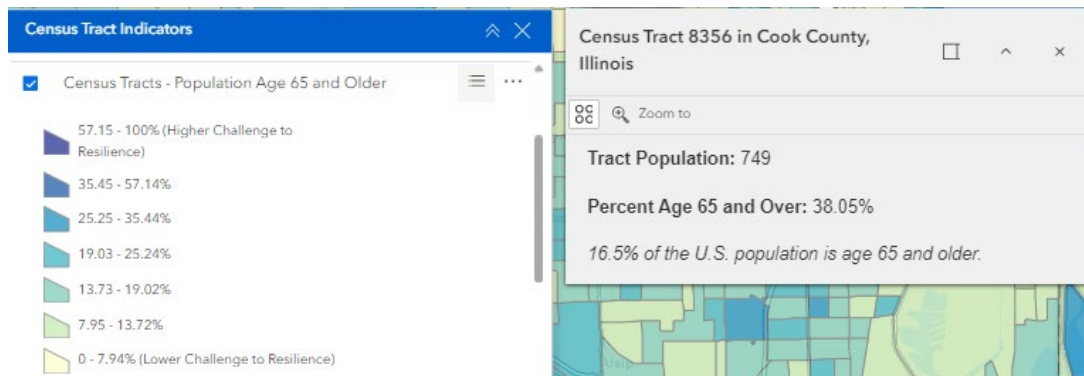
## 5.6. Census Tract Indicators

Click on the “Census Tract Indicators” icon to see the list of all the layers available with census tract-level data. Toggle on/off layers to see the different community resilience indicator values for each census tract.



- With a layer toggled on, click on the “Legend” symbol next to the layer name and a legend will appear below the layer name. Darker colors denote greater challenges to resilience. Census tract data is grouped into 7 bins to allow greater differentiation across this much larger dataset.

- Click on a census tract for a pop-up box with total population for the census tract, information on the selected indicator data, and the national average.

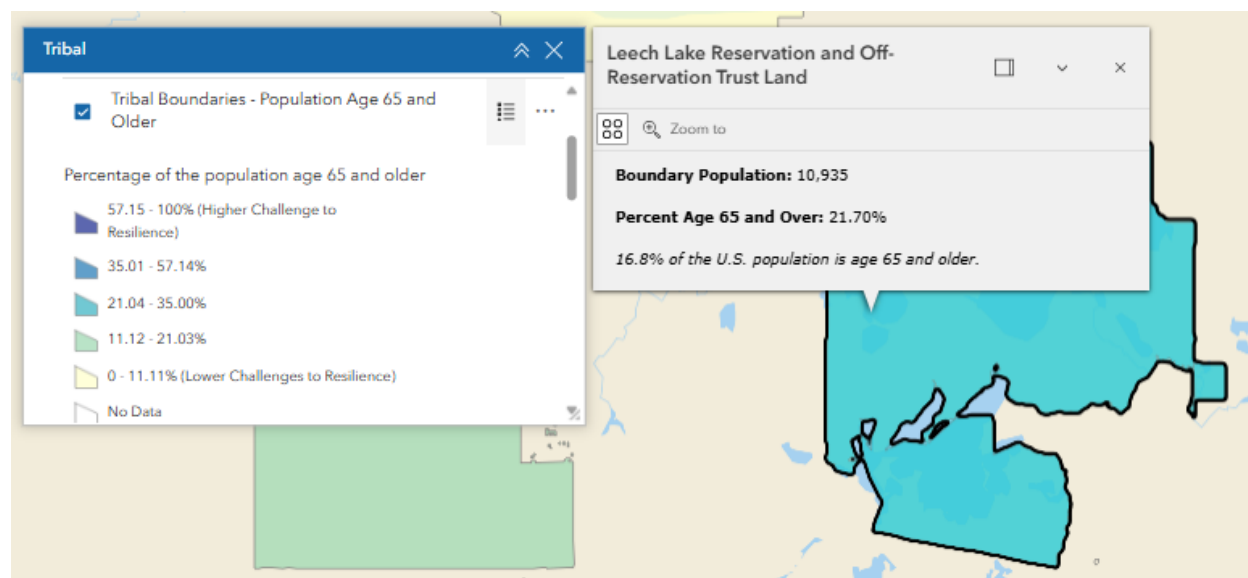


## 5.7. Tribal Nation Boundary Indicators



Both the Tribal Nation boundaries and the Tribal Nation indicator data are drawn from the U.S. Census Bureau data table DP02. Click on the “Tribal” icon to see the list of all the layers available with Tribal Nation Boundary-level data. Toggle on/off layers to see the different community resilience indicator values for each Tribal Nation Boundary.

- Similar to the county indicators tab, click on the “Legend” symbol next to the layer name to see the legend. Darker colors denote greater challenges to resilience. Tribal Nation boundary indicator data is grouped into five bins.
- Click on a Tribal Nation area for a pop-up box with information on the selected indicator data.





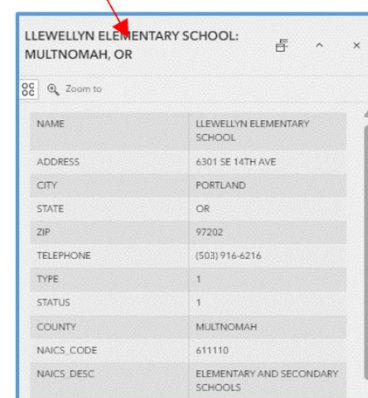
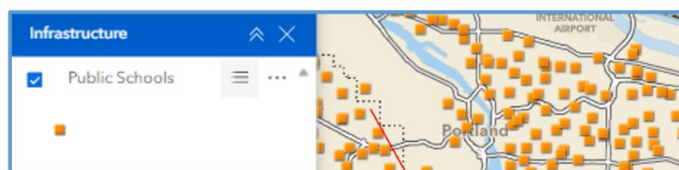
## 6. Infrastructure and Hazards Data

### 6.1. Infrastructure

Click on the “Infrastructure” icon to see a drop-down list of all the infrastructure data layers available in RAPT. Most of the infrastructure data in RAPT is pulled from the HIFLD Open online database.

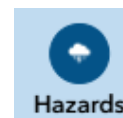


- Click on the name of the infrastructure layer in the drop-down list to toggle the layer on. Click on the “Legend” symbol next to the layer name to see the legend (the shape and color of the datapoint). This is helpful when you have more than one infrastructure layer displayed. You can also click on the “Legend” icon to see the legends for all the data layers you have toggled on.
- Click on a datapoint and a pop-up box will appear with the information HIFLD Open has available.

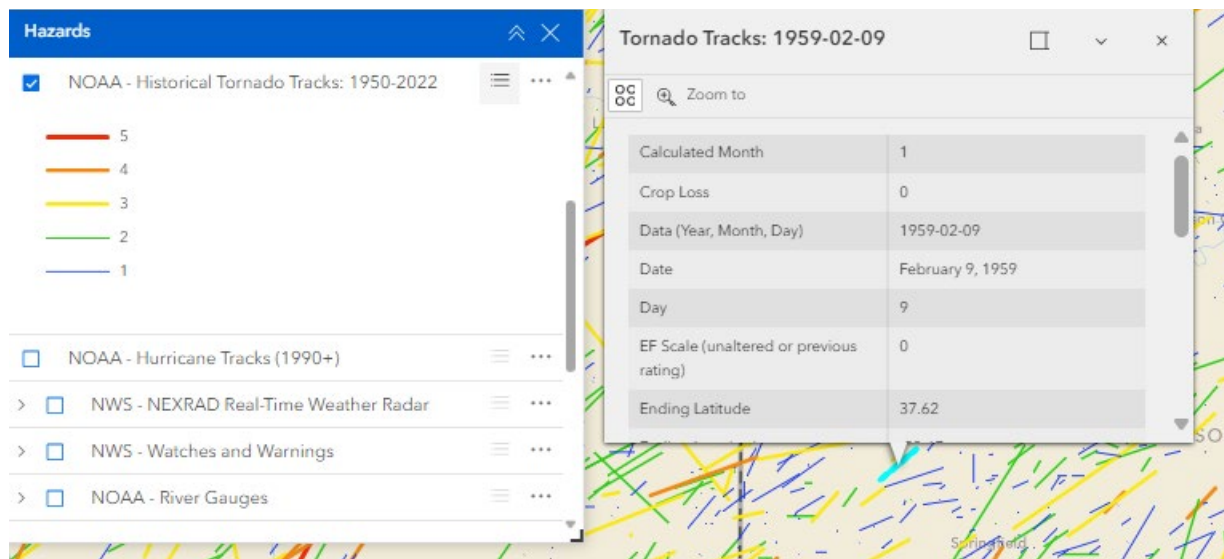


### 6.2. Hazards

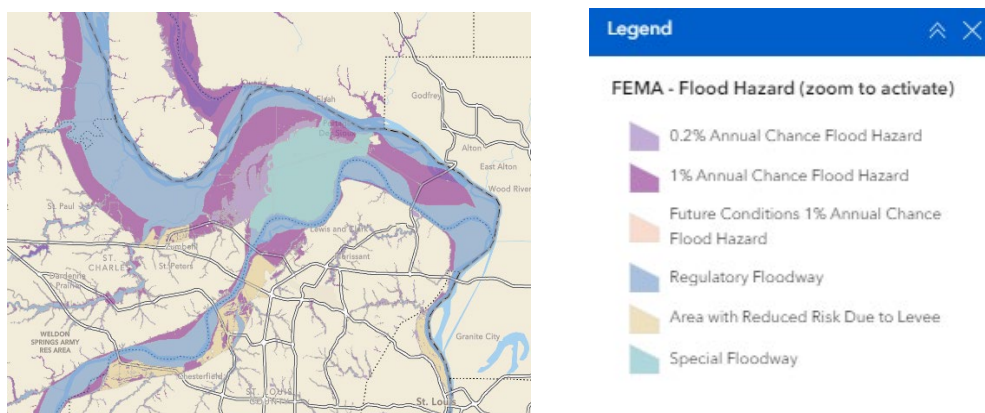
Hazard data in RAPT includes data layers of real-time radar and watch and warning notifications from the National Weather Service (NWS) (severe weather, excessive rainfall, fire weather outlooks, etc.), live stream gauges, current wildfires, historical hazard data for tornadoes and hurricanes, and flood and seismic risk from the U.S. Geological Survey and the National Oceanic and Atmospheric Administration. The Hazard layer list also includes FEMA's National Risk Index, which includes Expected Annual Losses and hazard-specific risk information. Additional information about specific hazard layers is available in the hazard pop-up.



- Click on the name of the hazard layer in the drop-down list to toggle the layer on. Click on the “Legend” symbol next to the layer name to see the legend. You can also click on the “Legend” icon to see the legends for all the data layers you have toggled on.
- If the hazard includes datapoints, click on a datapoint to view the pop-up with information.



- Because the dataset is so large, FEMA's National Flood Hazard Layer will only populate on the map when the area shown on the screen corresponds to an altitude of 10,000 feet or lower. Flood maps are not available for all areas.



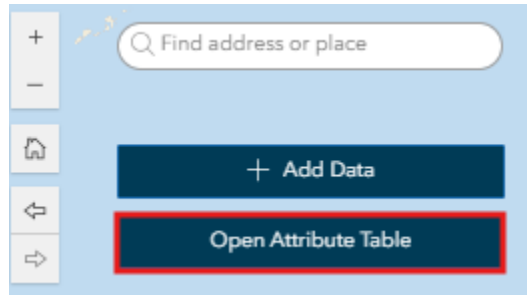
## 7. The Attribute Table

The Attribute Table gives users the ability to view and download all the data in RAPT in a tabular or spreadsheet format. All of the infrastructure, hazard, and indicator population data in RAPT can be viewed in the Attribute Table.

### 7.1. Attribute Table Data

The Attribute Table contains 3 default data layers that provide information for counties, census tracts and Tribal boundaries, including the GEOID, population, the Community Resilience Challenges Index and community resilience indicator values. These default layers will always be available in the Attribute Table.

- The Attribute Table can be opened multiple ways. Click the “Open Attribute Table” action button in the upper left corner of the map and the Attribute Table will open at the bottom of the screen.



- Users can also click the blue expand tab at the bottom of the web page to open the Attribute Table. A window will pop up showing data in a tabular form. The bar at the bottom of the screen shows the total number of counties, census tracts or Tribal Nation boundaries that are included in the dataset.

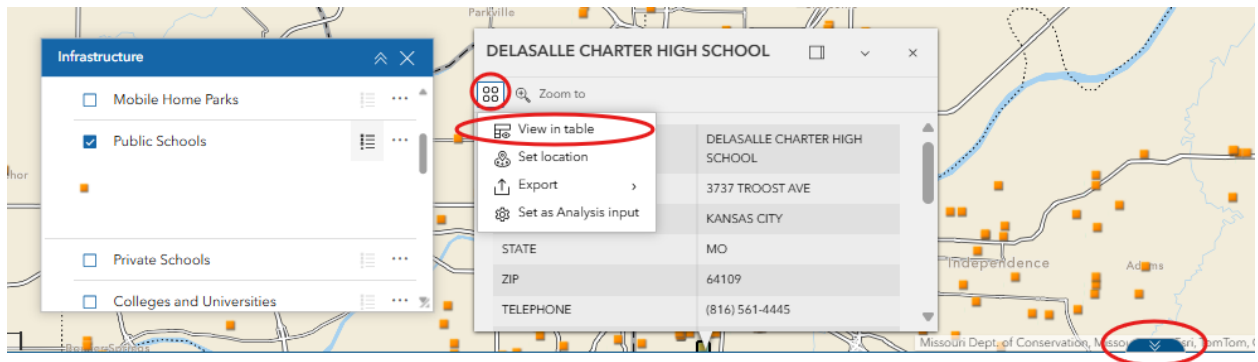


- Three data layers will appear in the drop-down menu by default: County, census tract and Tribal Boundaries. Click the drop-down arrow and select the dataset you want to view.

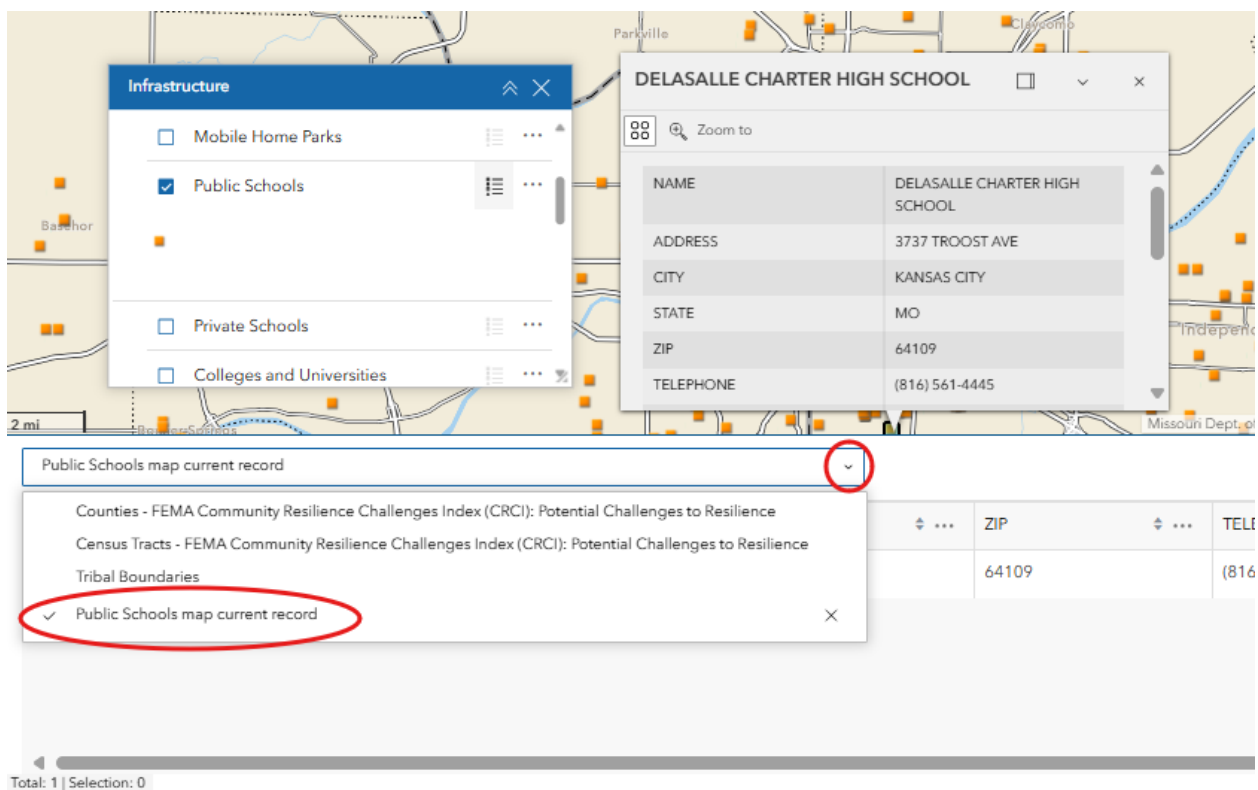
Counties - FEMA Community Resilience Challenges Index (CRCI): Potential Challenges to Resilience				NAMELSAD	STUSPS
<div> <input checked="" type="checkbox"/> Counties - FEMA Community Resilience Challenges Index (CRCI): Potential Challenges to Resilience             <input type="checkbox"/> Census Tracts - FEMA Community Resilience Challenges Index (CRCI): Potential Challenges to Resilience             <input type="checkbox"/> Tribal Boundaries         </div>				Baldwin County	AL
01	069	00161560	0500000U01069	Houston County	AL
01	005	00161528	0500000U01005	Barbour County	AL
01	119	00161585	0500000U01119	Sumter County	AL

Total: 3,222 | Selection: 0

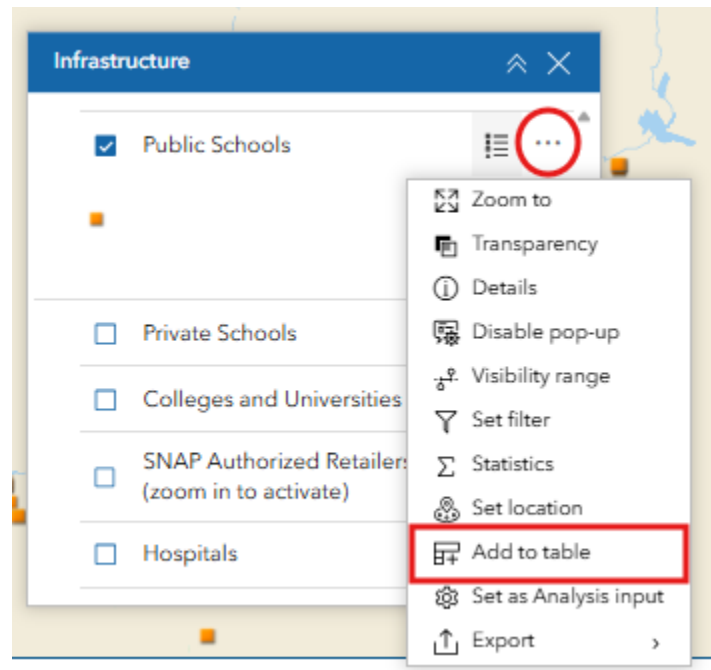
- The Attribute Table can also be opened from pop-ups and layer lists to view specific datapoints or lists of datapoints. To view a specific datapoint in the Attribute Table, click the “Actions” button in the upper left corner of the pop-up and select “View in Table.” Click on the Attribute Table arrow at the bottom of the page.



- The Attribute Table layer list will now contain an option to view the information from the data layer in the pop-up.



- To view all datapoints from a layer list in the Attribute Table, click on the “Options” icon next to the layer name in the layer list. Select “Add to Table”.

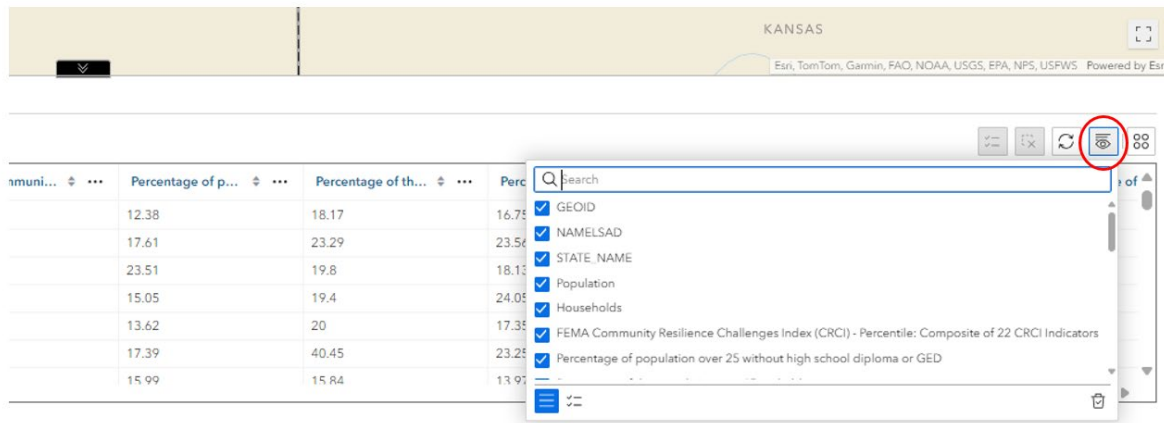


- Open the Attribute Table at the bottom of the page. The Attribute Table will now contain an option with all of the datapoints from that data layer.

NAME	ADDRESS	CITY	STATE	ZIP	TELEPHONE	TYPE	ST
ALBERTVILLE MIDDLE SC...	600 E ALABAMA AVE	ALBERTVILLE	AL	35950	(256) 878-2341	1	1
ALBERTVILLE HIGH SCHO...	402 E MCCORD AVE	ALBERTVILLE	AL	35950	(256) 894-5000	1	1
ALBERTVILLE INTERMEDI...	901 W MCKINNEY AVE	ALBERTVILLE	AL	35950	(256) 878-7698	1	1
ALBERTVILLE ELEMENTA...	145 WEST END DRIVE	ALBERTVILLE	AL	35950	(256) 894-4822	1	1

Total: 102,268 | Selection: 0

- Users can select which columns of data they wish to view in the Attribute Table. Click on "Show/hide columns" to adjust which columns are displayed for your data layers.

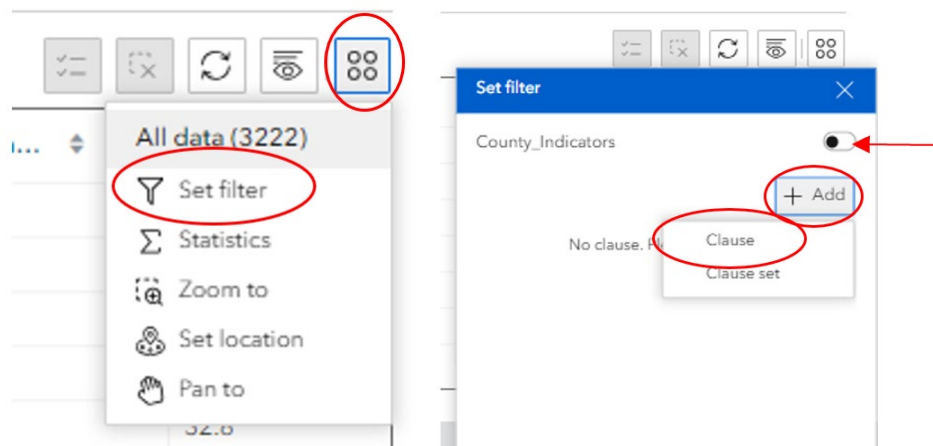


Indicator	Value	Value	Value
Percentage of p...	12.38	18.17	16.75
Percentage of th...	17.61	23.29	23.56
	23.51	19.8	18.13
	15.05	19.4	24.05
	13.62	20	17.35
	17.39	40.45	23.25
	15.99	15.84	13.95

## 7.2. Filters in the Attribute Table

Users can set filters in the Attribute Table to view specific indicator, infrastructure and hazard datasets that fall within desired parameters.

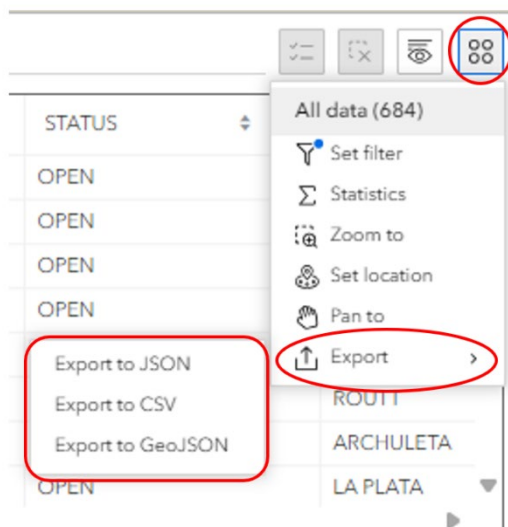
- Click on “Actions” to see various options for filtering and summarizing data in the Attribute Table. Select “Set Filter”, then “Add” and then “Clause” to set parameters and only view datasets within those parameters. You must toggle on the Filter for the Attribute Table to reflect the filtered datasets.



### 7.3. Downloading Data from the Attribute Table

From the Attribute Table, you can download data into an Excel document, sort by name/title and filter by state, county or other attribute.

- Open your indicator, infrastructure or hazard data in the Attribute Table and set any filters.
- Click “Actions”, select “Export” and choose which file type you want to export.

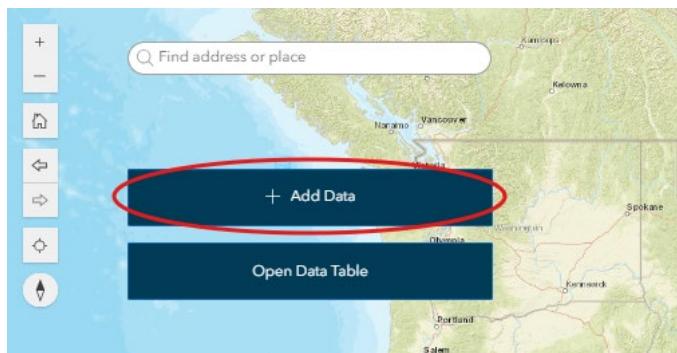


## 8. Add Data

The Add Data tool allows you to add data to the map by searching for layers from online libraries of GIS data layers, pasting URLs of REST Services, and uploading shapefiles or GeoJSONs. Supported file types include zipped shapefile, KML, CSV, GPX, or GeoJSON.

There are three libraries of GIS data in RAPT: ArcGIS Online, the Esri Living Atlas, and a curated list of RAPT Suggested Layers. Note: While all of the RAPT Suggested Layers are available for free, not all data layers from ArcGIS Online or Esri Living Atlas are free. Some of these data layers require a subscription to Esri.

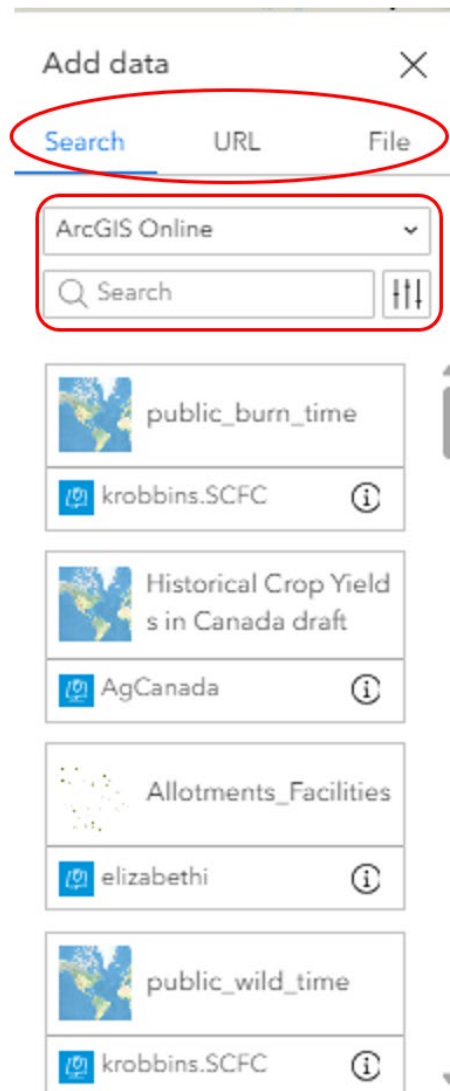
- NOTE: While you can upload additional layers for analysis, **you will not be able to permanently add these layers into RAPT**. As a publicly available tool that does not require a username or password, local layers cannot be permanently saved or embedded. However, added data layers will remain in your Add Data window list until you completely close out your browser.
- Click the “Add Data” action button in the upper left corner of the map and the Add Data window will open.



- Click “Click to add data” in the window.



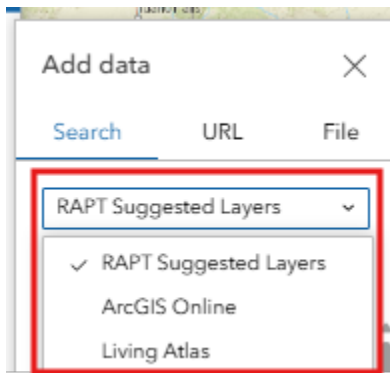
- The Add Data search window will open, and you will see multiple options for searching for and adding data layers to the map. You can add data using the search function, pasting a URL or uploading local files.



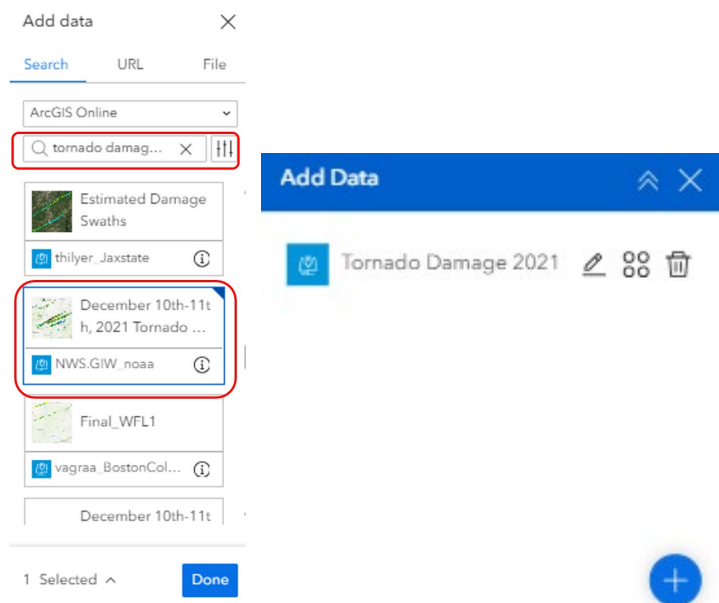
There are various directories to search for data layers, including ArcGIS Online, the Esri Living Atlas and the curated RAPT Suggested Layers list. Click the drop-down and select which directory you would like to search.

- We suggest reviewing the layers available in the RAPT Suggested Layers list first and then searching ArcGIS Online and Living Atlas if you cannot find the layer you are looking for.





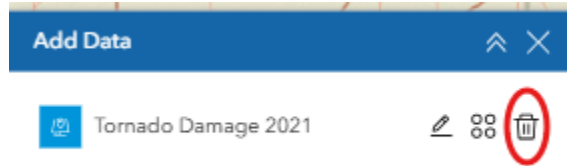
- To search for additional layers, select “ArcGIS Online” from the drop-down, zoom to the geographic area you want to focus on and type in the data layer you are looking for.
- Once you determine the layer to add, click on the layer title. A blue triangle will appear in the upper right corner of the layer title and the layer will be outlined in blue.
- Click “Done” and the search window will disappear. You will see the added layer displayed in the Add Data window and the layer will appear on the map.



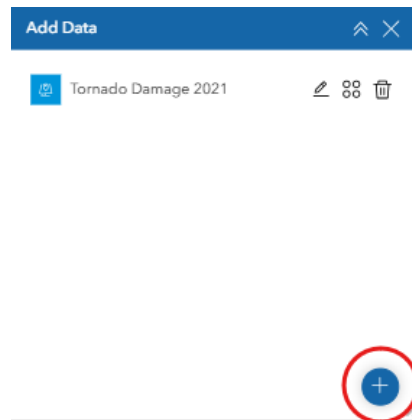
Once the layer has been added to the map, users can rename the added data layer by clicking on the “Rename” button.



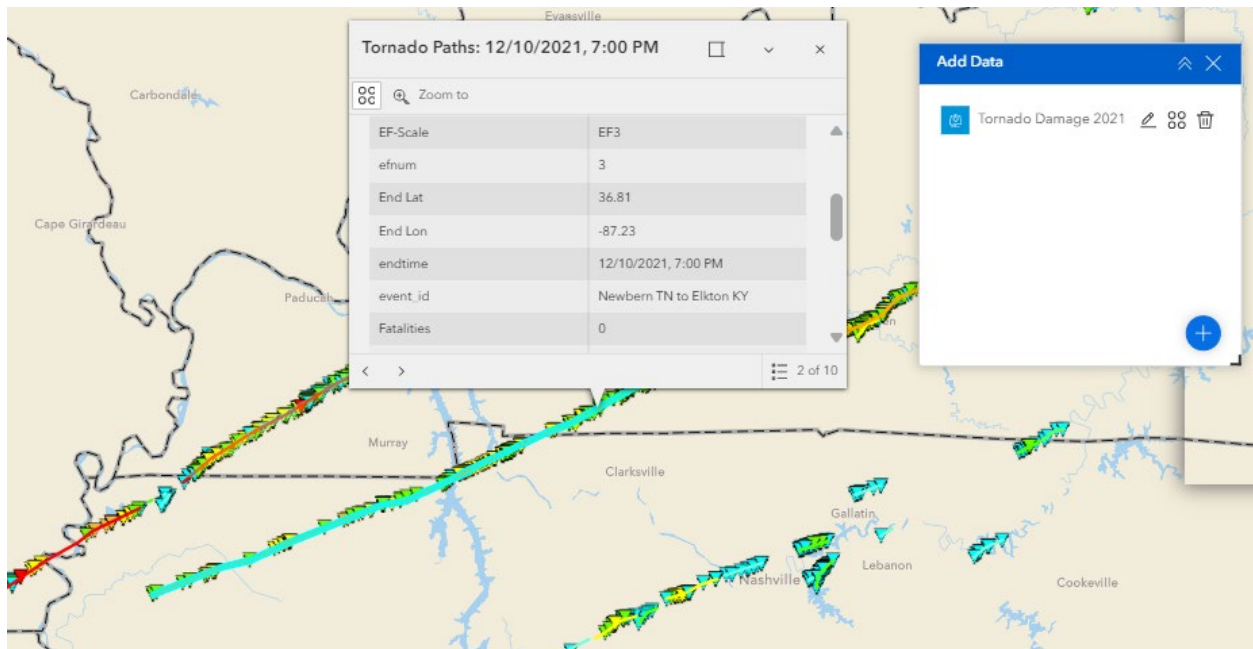
- NOTE: Refreshing your browser will remove the added data layer from the map, but the added data layer will remain in the Add Data window. Simply click the “Actions” button and select “Add to map”. The layer will now appear on the map again.
- To remove an added data layer from the map, click the “Remove” button in the Add Data window.



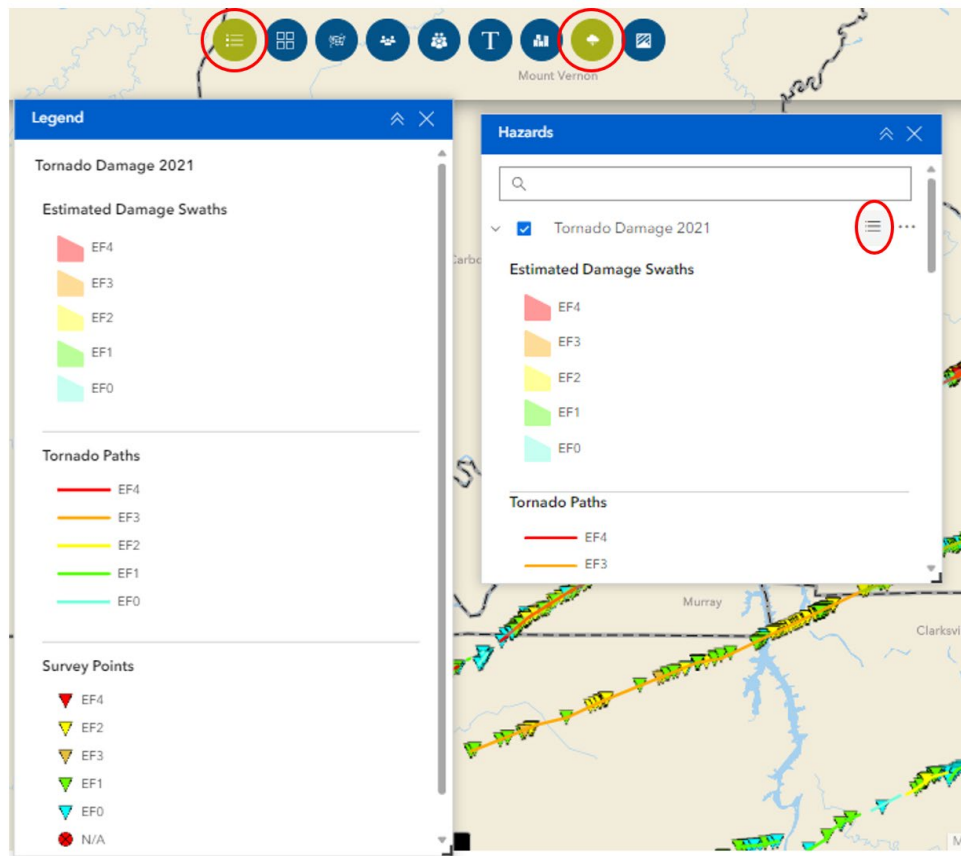
- To add additional data layers, click the blue “+” icon in the Add Data window.



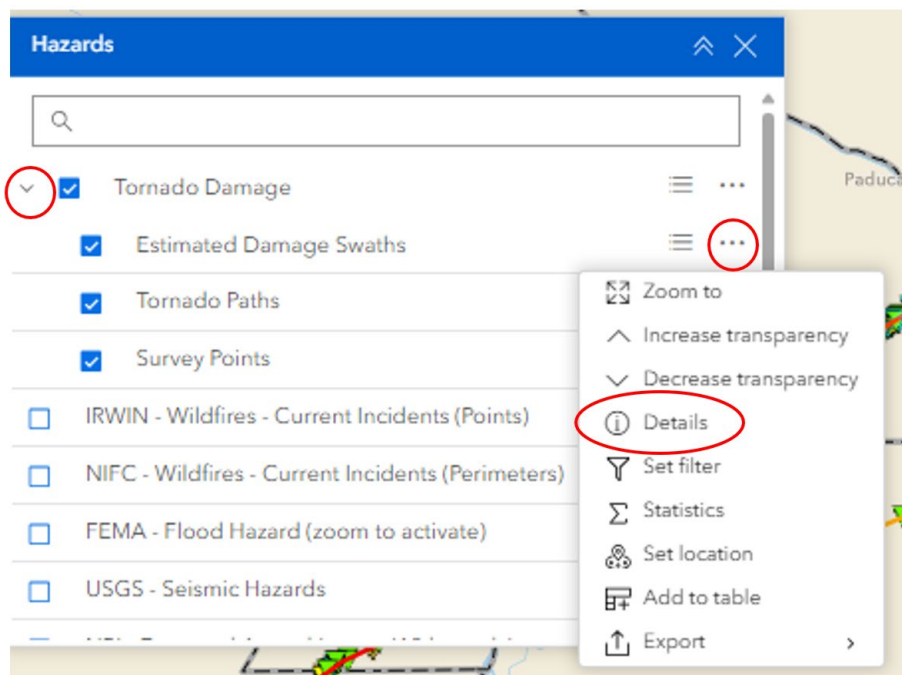
For this example, the user zoomed into the Kentucky/Tennessee region, searched “tornado damage 2021” and added a layer that is provided by NOAA. The added data layer displays on the map and includes information about the hazard in the pop-up.



Once a layer has been added, you can see the legend by going to the Hazards tab (or Infrastructure tab) and clicking on the “Legend” button. You can also click on the “Legend” icon to see the added layer legend if it is toggled on.



Users can see additional information about the added data layer, adjust transparency, set filters and export information. Once a layer is added, it will display in all of the Data Layer lists (Census Tract, Hazards, Infrastructure etc.). If there are sub-categories available, click the “Expand” button. Click “Options” under one of the sub-categories and you will see a list of options available for that layer. Select the option you need, like viewing the details page for the added layer. Not all options will be available for all added data layers.



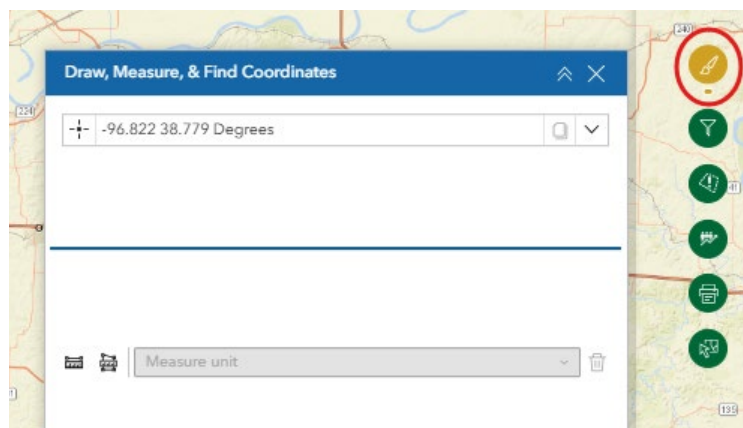
Some of the data layers in the ArcGIS Online database are publicly available and will load automatically when you select them, while other data layers require an ArcGIS login. To check if a subscription is needed for a specific layer, click “Details” and see if the layer is labeled as a “Subscriber” layer.

## 9. Analysis Tools

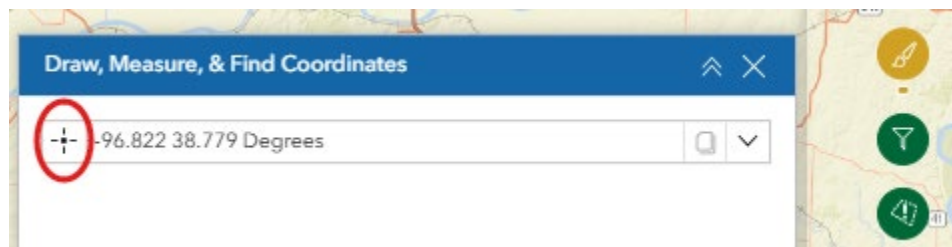
The analysis tools are grouped into green icons at the right of the screen. Each green icon contains a specific type of analysis tool (Incident Analysis, Filter, Print etc.). Hover over an icon to see the title and click on the icon to open the tool.

### 9.1. Draw, Measure and Find Coordinates

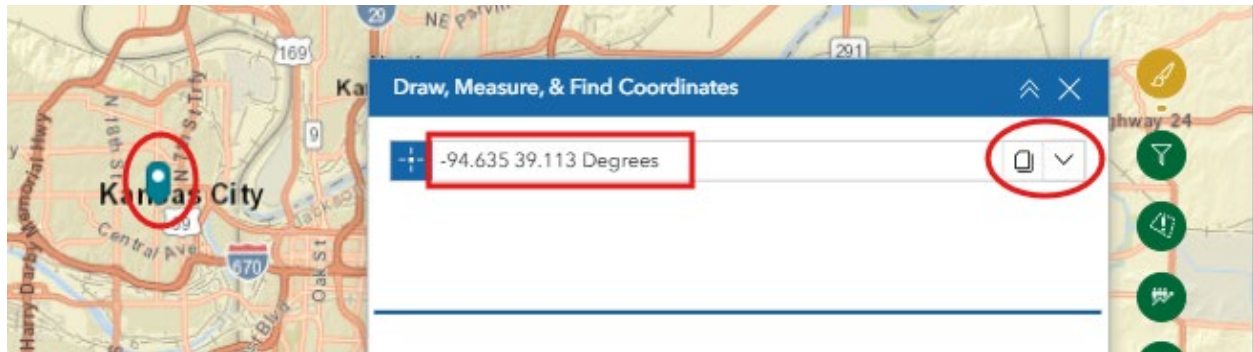
The Draw, Measure & Find Coordinates tool (referred to as the “Draw” tool) contains options to help draw and measure customized visualizations that display on the map (single points, lines, polygons, etc.). It can also display measurements for drawn features, such as length, area, and perimeter and show the coordinates of any single point selected on the map. Click on the “Draw” icon to open the tool.



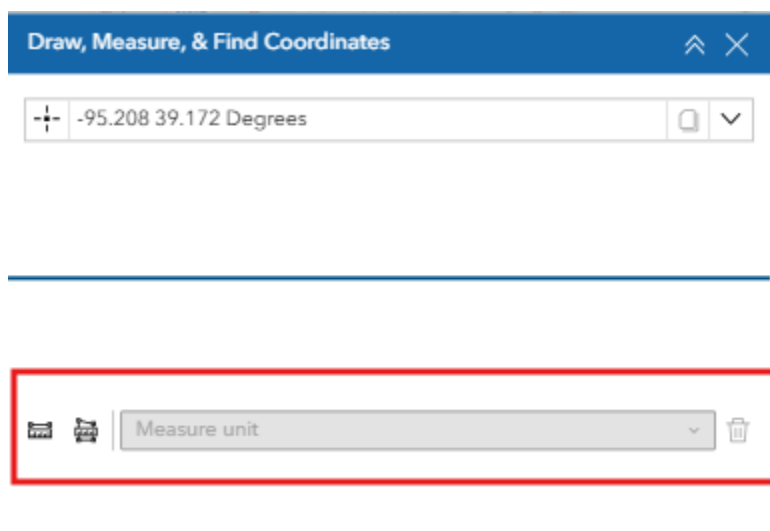
- Once open, you will notice the coordinates update according to where your pointer is located on the map. Click the Coordinate icon to enable clicking the map to get coordinates for a specific location.
- NOTE: You must deselect the Coordinate icon to return to normal RAPT function and stop selecting locations.



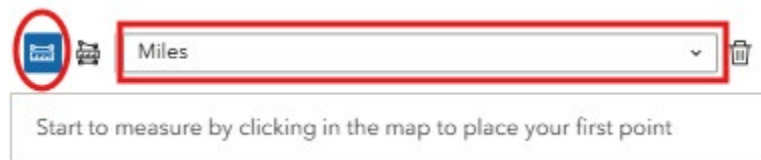
- Click the map and the coordinates for that location will appear. You can copy the location coordinates by clicking the “Copy” button. You can also select the output coordinate system by clicking the drop-down.



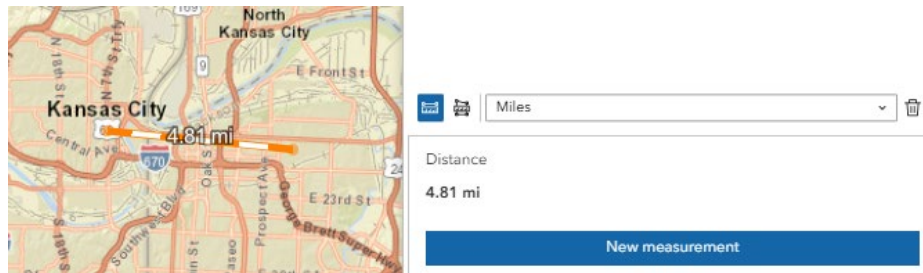
The next tool available in this widget is the Measure tool. The Measure tool allows you to see real-time measurement details for line segments or polygonal shapes.



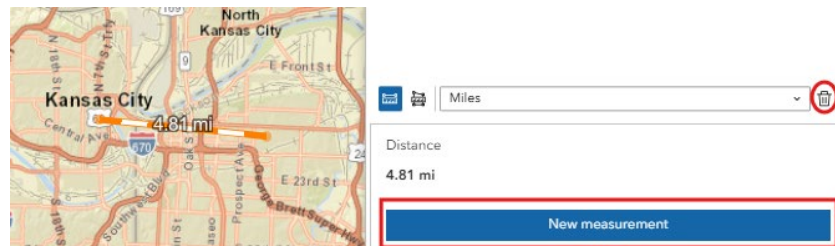
- Select the shape (line or polygon) you'd like to draw. The icon will turn blue and instructions will appear under the unit of measurement drop-down. Select the desired unit of measurement.



- Click on the starting point for your shape. The measurement information will update in real-time both on the map and in the widget. Single-click to continue making your shape. Double-click to finish drawing your shape and see the final measurement values.



- Click the “Remove” icon to delete the shape. Select “New Measurement” to erase your previous shape and draw another shape on the map.



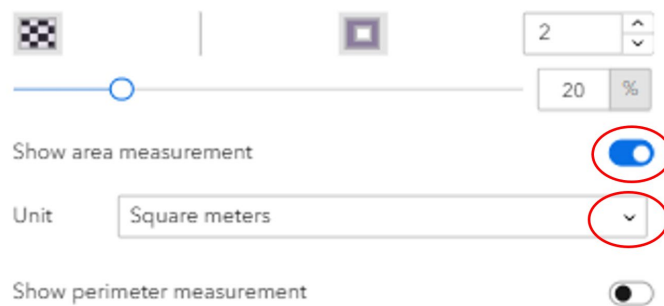
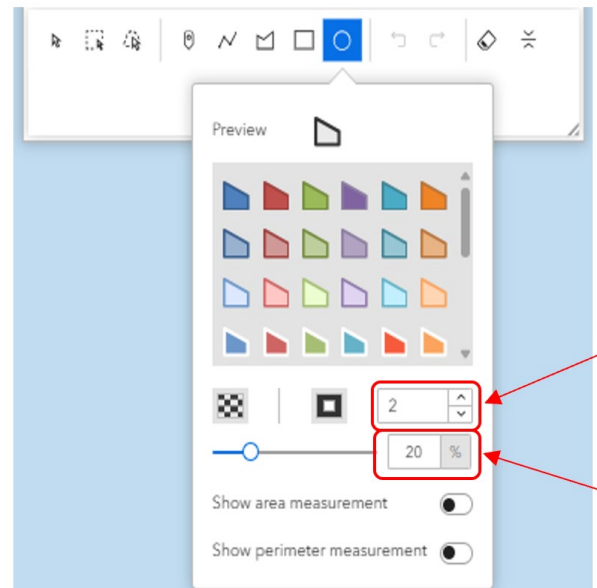
- NOTE: You must deselect the shape icon in order to return to normal RAPT function.

Another tool in this widget is the Draw tool. The Draw tool is located at the bottom of the widget and allows you to place various shapes and text boxes onto the map.

- To draw an object, select the shape of the object you wish to draw from the options in the tool.



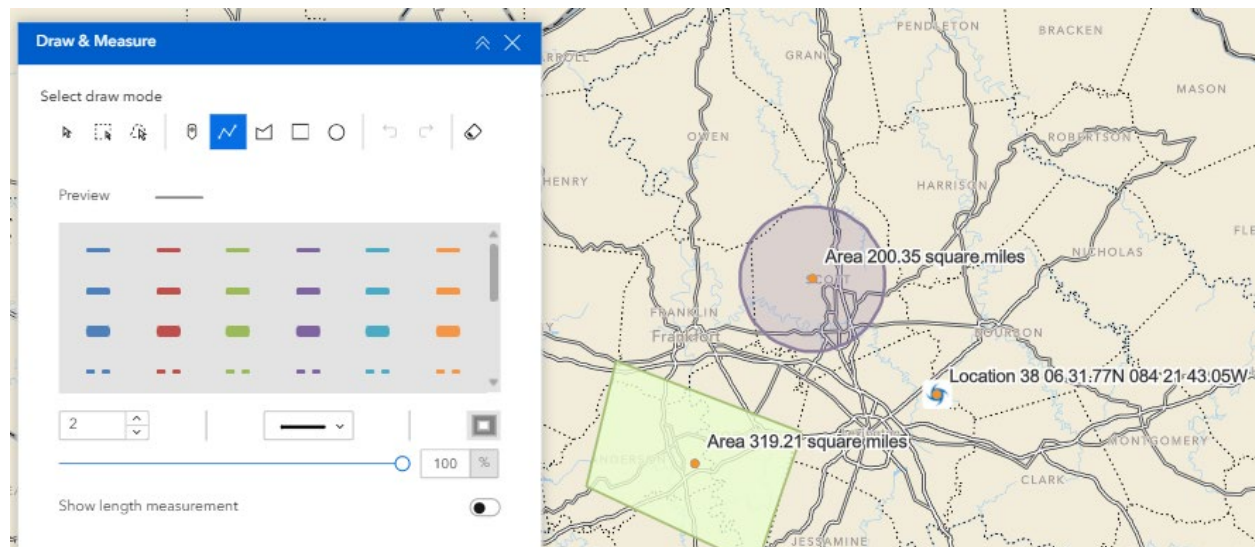
- Once you select the shape you want, formatting options will appear that allow you to adjust the border, color and transparency of the figure.
- Users can also include measurements for drawn shapes, depending on the type of shape. Use the drop-down for “Show area measurement” to select the unit of measurement.



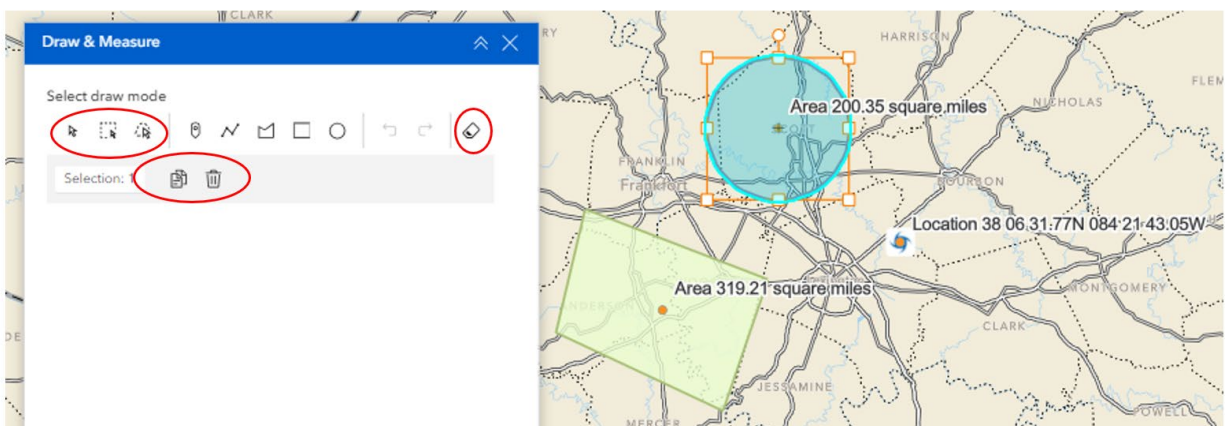
- After you select the shape and choose the formatting, move your cursor to the map. Depending on the type of shape you've selected, you will see it on the map. For points, click on the location you want to place your shape. For Polylines and Polygons, click on the corners of your shape and double-click to finish drawing. For Squares and Circles, click and drag your mouse to draw your shape on the map.



- You can have multiple shapes on the map. To draw additional shapes, go back to the tool, select your next shape and follow the previous steps.



- Once you have shapes drawn on the map, use the “Select” options to duplicate or delete each option.
- You can clear all drawings by clicking the “Clear all” button in the tool.



- NOTE:** Drawings are not saved when you exit RAPT. They remain on the map until you click “Clear all” or refresh your browser.

## 9.2. Filter Data

The Filter function in the Resilience Analysis and Planning Tool allows you to set parameters and filter certain indicators, infrastructure and hazards by specific characteristics, such as location (state, county, etc.), value (over 50% or between 25-45, etc.) or characteristic (type of hospital, for example).

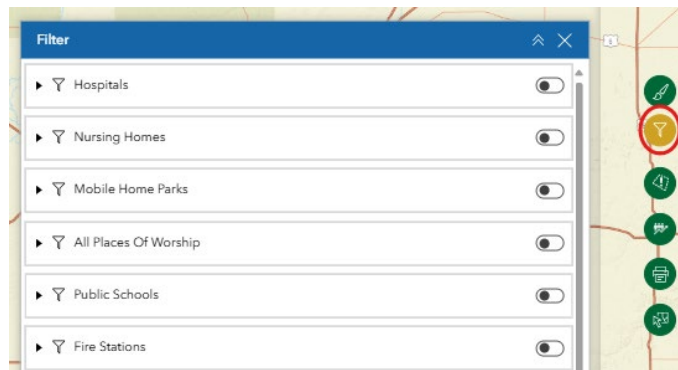
- You can use the Filter function and set parameters three different ways: through the layer list, in the Attribute Table and via the Filter tool.
- Before setting filters in RAPT, turn on the indicator, infrastructure or hazard layers you want to filter. This will allow you to see the changes in display once the filters have been set and applied.

### 9.2.1. FILTER TOOL

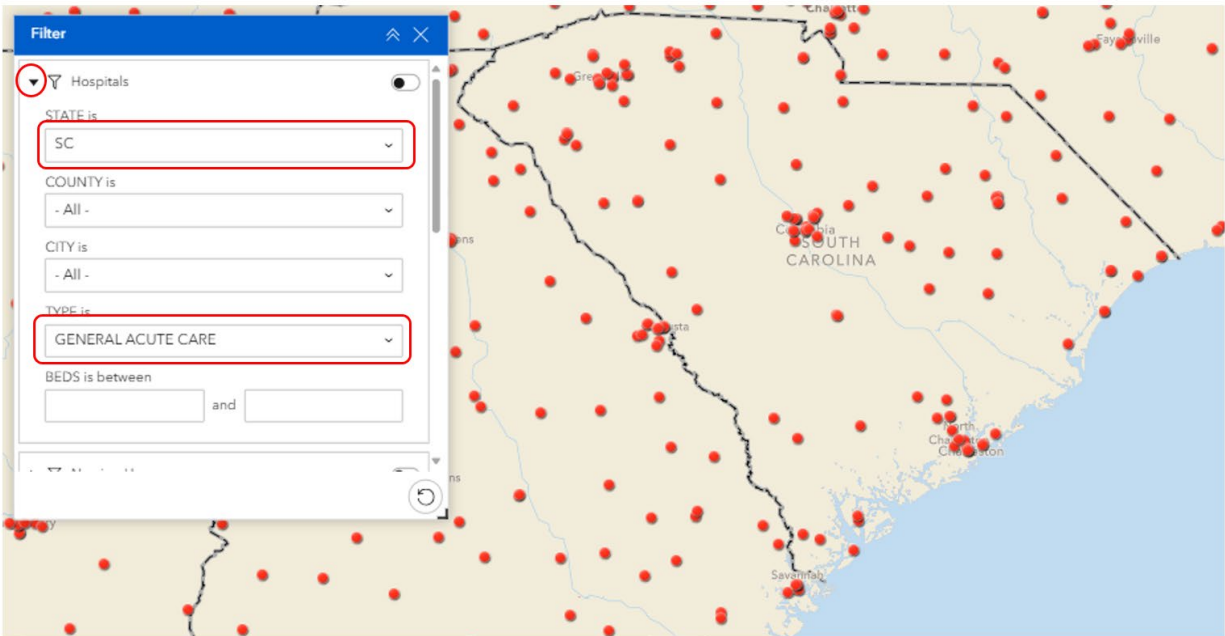
The Filter tool is located in the Analysis Tools group and provides pre-selected parameters for various data layers, including hospitals, public schools, tornado tracks and county-level indicators.



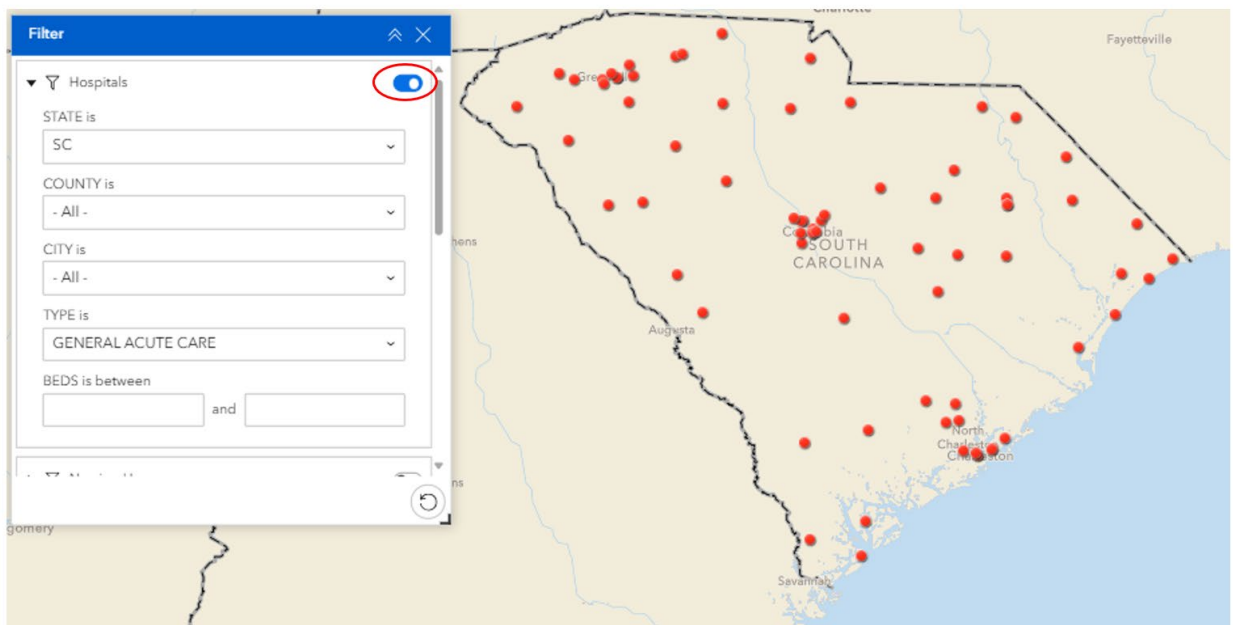
- Click on the Filter icon. You will see a list of pre-selected layers available for filtering.



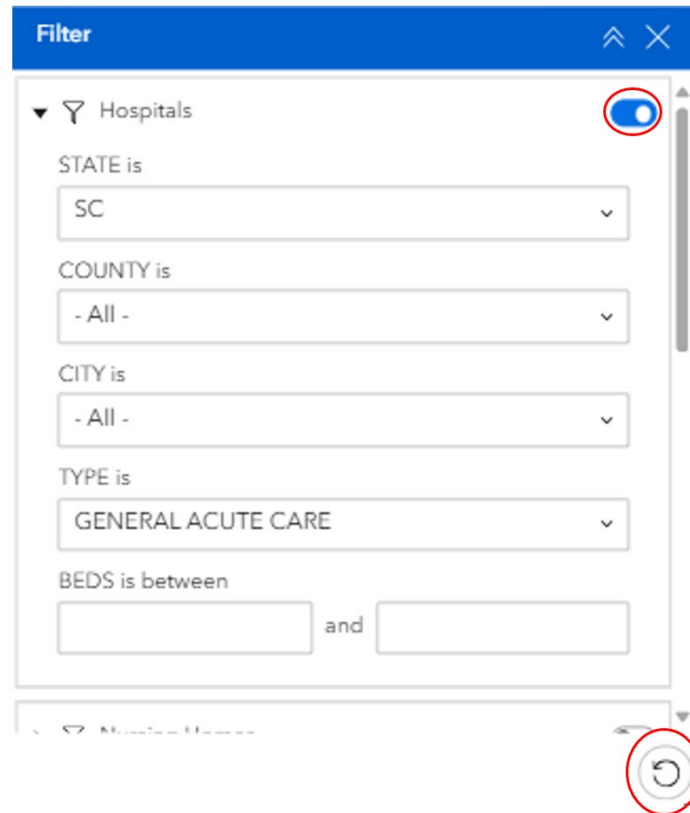
- For this example, we will set a filter for hospitals. After toggling on the Hospital infrastructure layer, click the “expand” arrow next to the layer name in the Filter tool. A list of parameters will appear. Set the desired parameters, such as State, County or Type.
  - Note: The parameter options will vary depending on the data layer you select.



- Toggle on the Filter by clicking the “toggle” button in the upper right. The map will now display only those datapoints that fall within the parameters you have set.



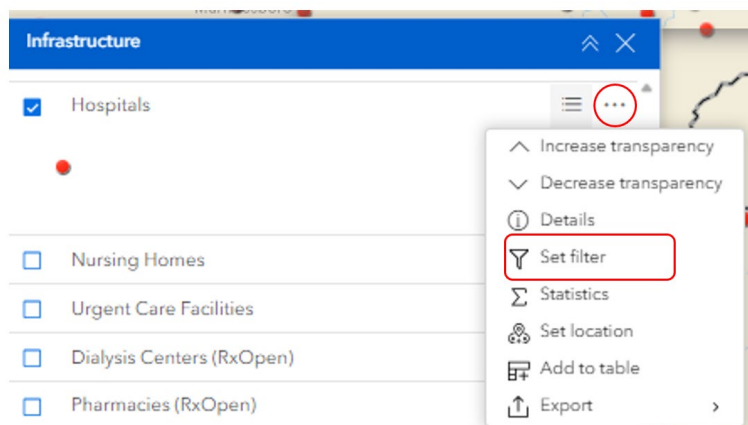
- You can toggle off the Filter by clicking the “toggle” button. You can also clear all Filters by clicking the “Reset all Filters” button in the bottom right of the Filter tool.



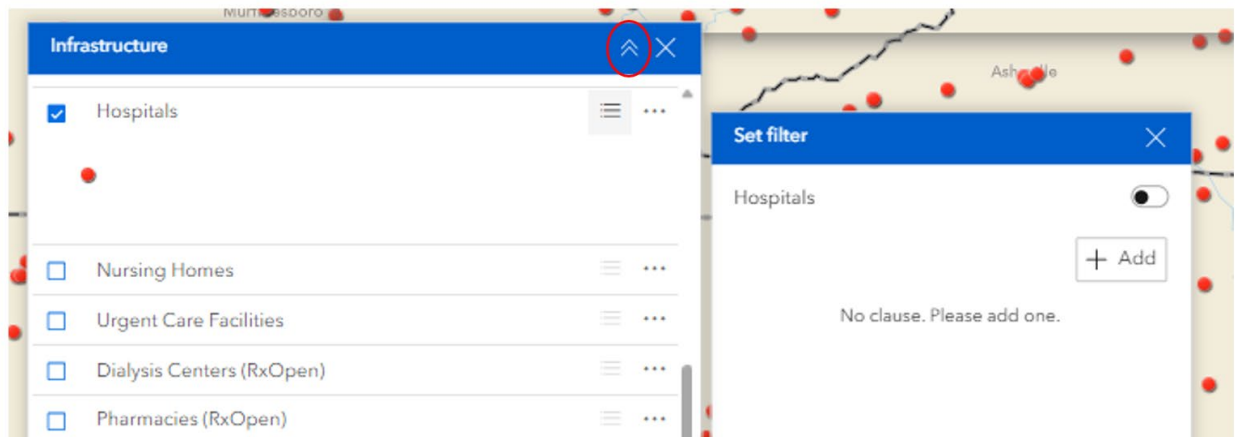
### 9.2.2. FILTER VIA LAYER LIST

In addition to using the pre-selected parameters in the Filter tool, users can also filter data layers through the data layer lists.

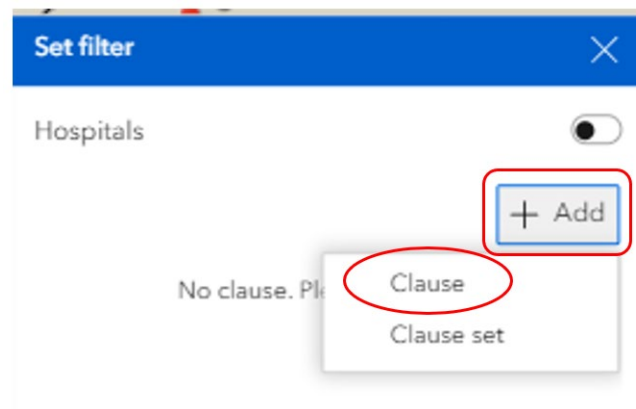
- Open the layer list for the layer you want to Filter. For this example, we will toggle on hospitals in the Infrastructure layer list.
- Click on “Options” and select “Set Filter”.



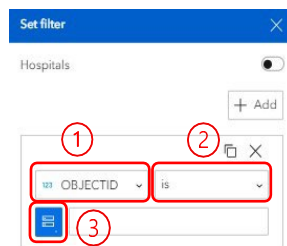
- The “Set Filter” window will open that will allow you to set parameters, or “Clauses”, to filter this layer.
- NOTE: The Set Filter window might open behind the layer list. If this happens, either minimize the layer list by clicking the “Collapse” arrows or drag and move the Set Filter window so you can see it.



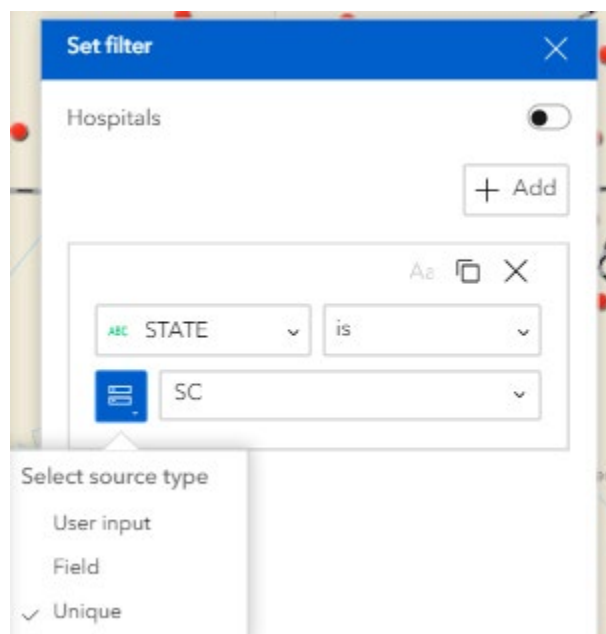
- Click “Add” and then “Clause” to set parameters for the layer.



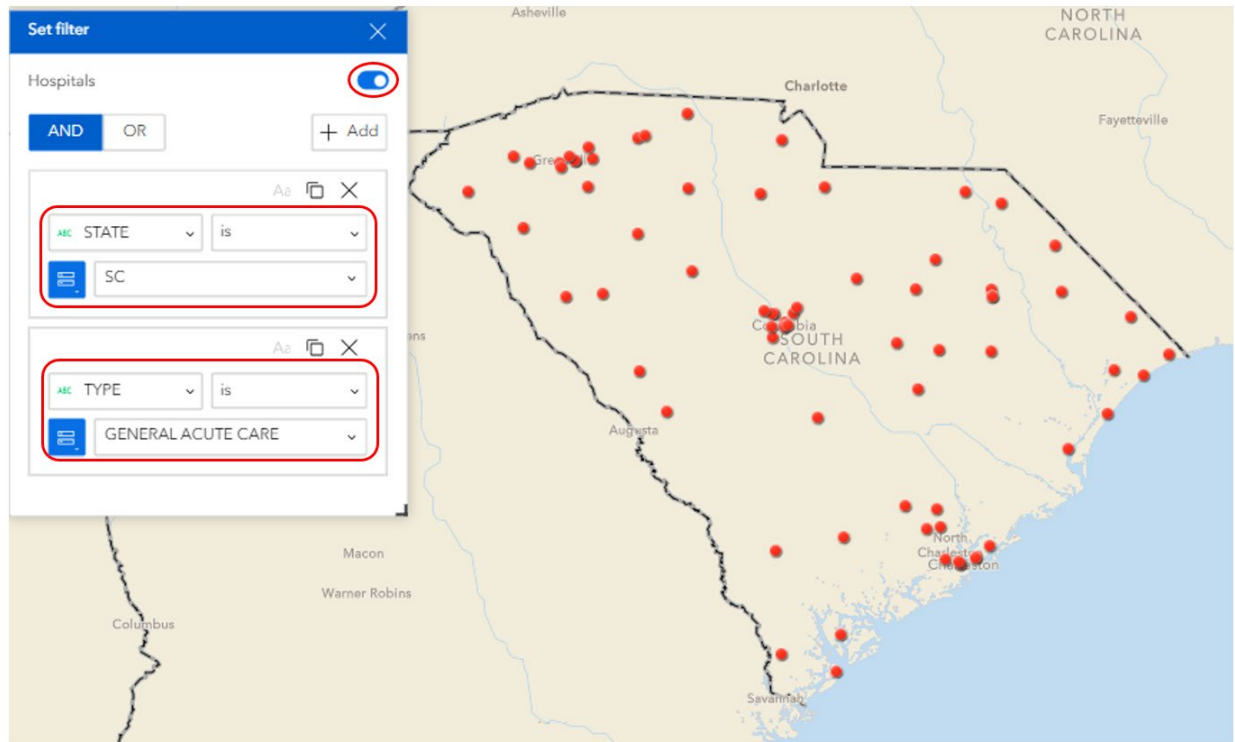
- Next, select the data field which you will use to filter your datasets by clicking the drop-down arrow on box 1. Set your conditions/qualifiers by selecting from options in box 2. Lastly, you will need to specify your input values in box 3.



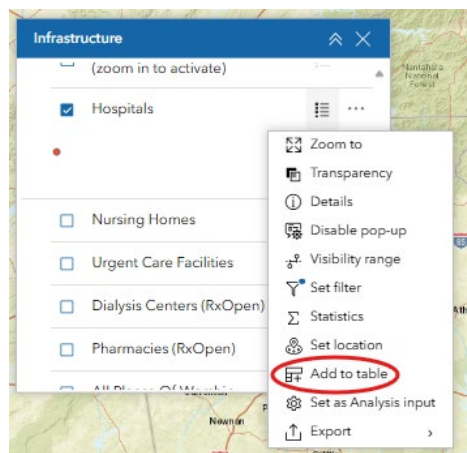
- There are three different ways to input values for your filter parameters. Click on the “Select Source Type” icon to set your input type for each parameter.
  - **Value:** The user must type the input for the parameter, and the input value must match the datapoint information *exactly* for it to work correctly.
    - For example, the state parameter value must be entered as a capitalized two-letter abbreviation, not the full state name (AL, AZ, AK, etc.).
  - **Field:** The user is given a shortened list of information fields pertaining to the datapoint that is selected based on comparing the value in one field to the value in another field.
  - **Unique (Recommended Input Type):** The user is given a list of the unique values that exist for the data field selected and selects which values will be the parameters for the filter. This is the best option for filters, because it automatically uses the correct formatting for the input type.
    - In this example, using the Unique input type creates a drop-down list of all the state abbreviations that exist for hospitals.



- You can set multiple parameters for a filter by clicking the “Add” button and adding as many “clauses” as you want.
- Once all parameters, or “clauses” have been set, toggle on the filter by clicking the “toggle” button. The map will now reflect only those datapoints that fall within the established parameters. For this example, filters are: state is South Carolina (SC), and the type is General Acute Care.

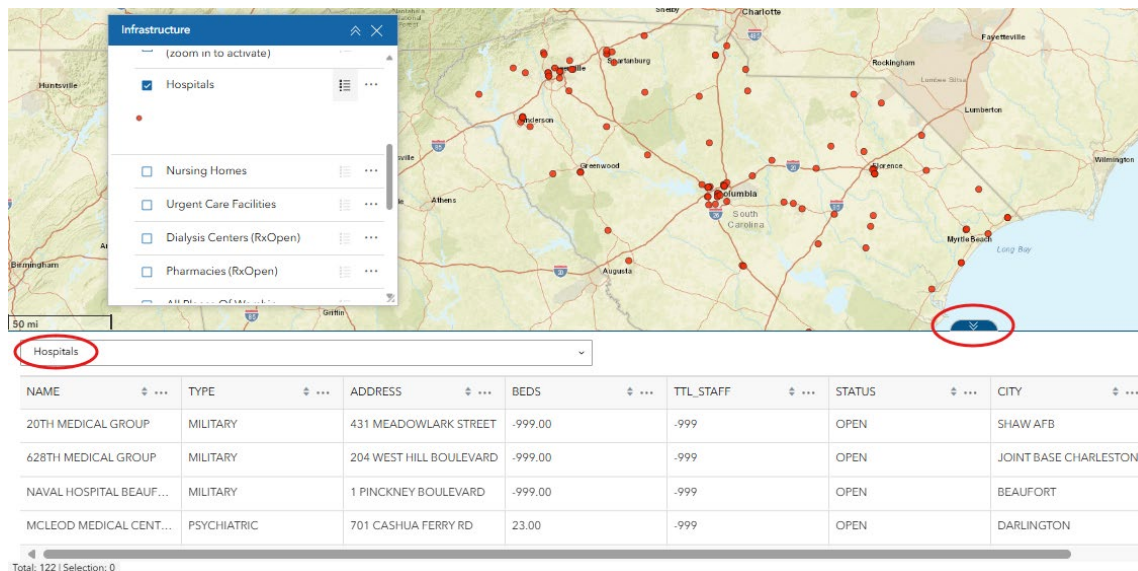


- When setting multiple clauses, at the top of the Set Filter window there will be an option to connect clauses via the “AND” condition or the “OR” condition. The “AND” condition will only include datapoints that fit all of the parameters established. The “OR” condition will include any datapoints that fit at least 1 of the established parameters. The default setting for filters is the “AND” condition.
- To view this filtered information in the Attribute Table, go to the data layer list, click on the “Options” icon next to the layer name and click “Add to Table.”





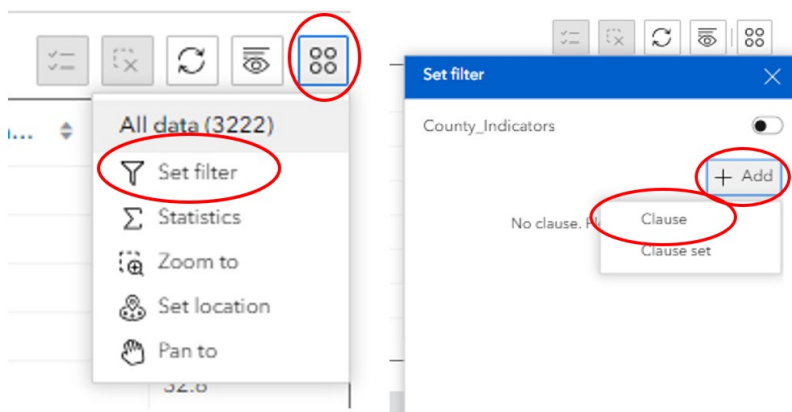
- Open the Attribute Table and it will now contain an option with only the filtered datapoints from that data layer.



### 9.2.3. FILTER VIA ATTRIBUTE TABLE

Users can set filters in the Attribute Table to view specific indicator, infrastructure and hazard datasets that fall within desired parameters.

- Refer to section 7 on how to view information in the Attribute Table.
- Once viewing information in the Attribute Table, click on “Actions”. Select “Set Filter”, then “Add” and then “Clause” to set parameters and only view datapoints within those parameters.
- Follow the steps in Section 9.2.2 above to add clauses to the Filter and view datapoints on the map. Toggle on the Filter for the Attribute Table to reflect the filtered datapoints.



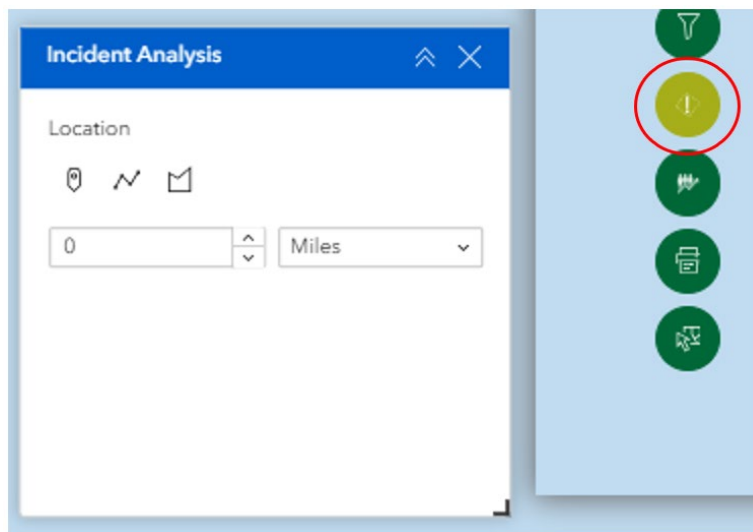


### 9.3. Incident Analysis

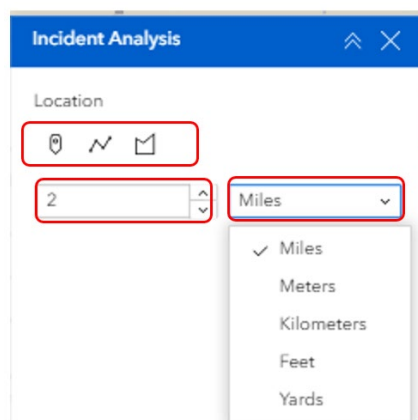


The Incident Analysis tool allows you to create a shape (single point, linear, and polygonal) and a buffer zone around that shape that represents an incident area and identify and visualize infrastructure datapoints within this incident area. This tool provides a comprehensive list of infrastructure datapoints within the incident area. You can also create and export a report of the infrastructure datapoints located within the incident area that provides a list of datapoints as well as their individual characteristics (# of beds, # of students, etc.).

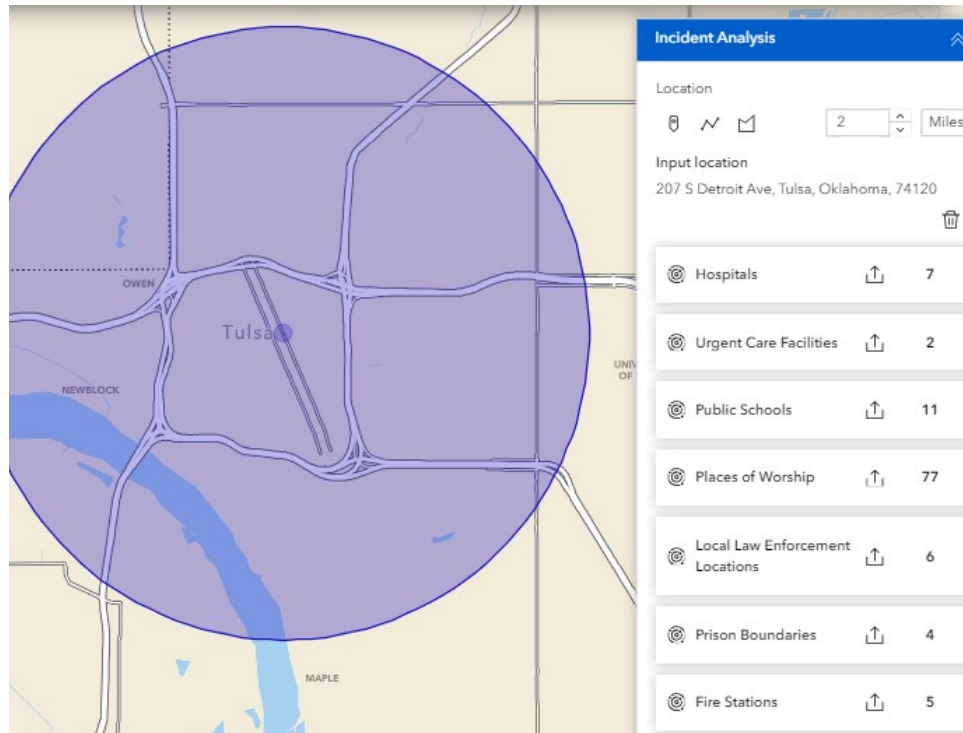
- Click on the “Incident Analysis” icon and the tool will open on the right side of the page.



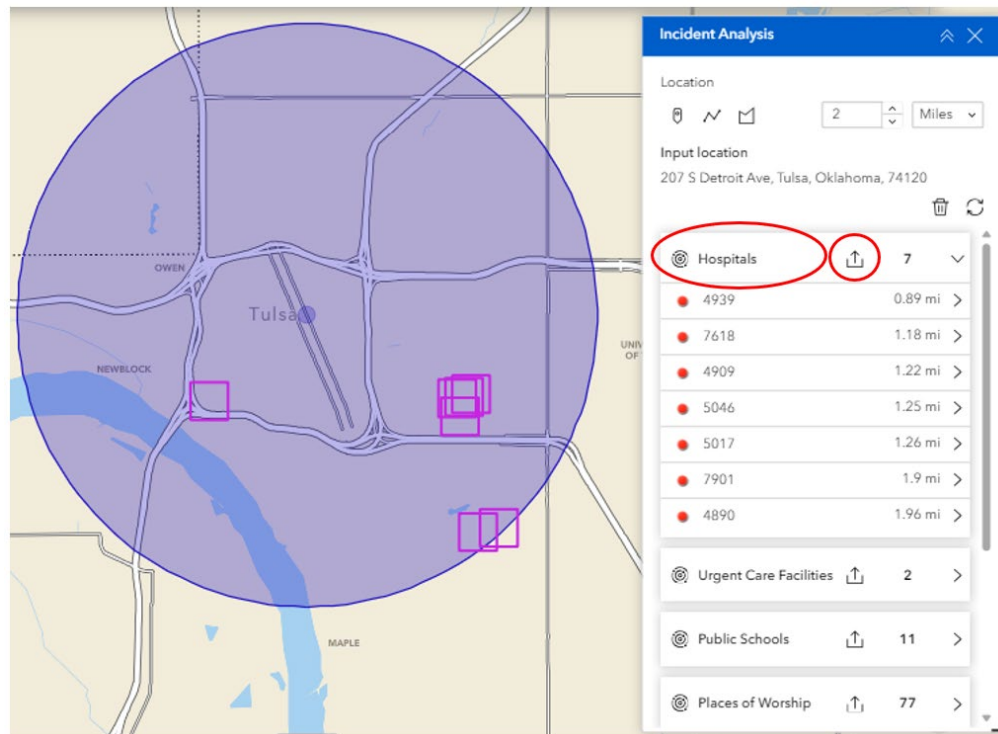
- Set the buffer distance and unit of measurement by using the arrows or clicking inside the box, typing the desired value, and hitting “Enter.”
- Select the desired type of buffer (single point, linear, or polygonal). In this example, a single point is used.



- Click on the map to draw the incident area. The map will zoom to the incident area and a list of infrastructure datasets within the area will appear in the Incident Analysis tool.





- Click on an infrastructure title in the tool to see a list of those datapoints that fall within the incident area. Each datapoint will be represented on the map by a square around that datapoint. Infrastructure datapoints are listed in order of closest to furthest from the center of the buffer zone.
  - NOTE: If you want to see the pop-up information for a datapoint, click on the infrastructure symbol and the pop-up information will appear in the Incident Analysis tool layer list.
- To export the list of selected datapoints, click the “Export” icon and the list will open in Excel.









A few things to note about the Incident Analysis tool:

- You can only select one infrastructure layer at a time, but the buffer zone will not disappear as you toggle between layers.
- You can only create one buffer zone at a time.
- Infrastructure icons will not appear on the map unless you have the infrastructure layer toggled on.
- To erase the current buffer zone and create a new one, click “Clear.” To adjust the buffer zone and unit of measurement, enter a different buffer zone value and select a unit of measurement. Click “Refresh” to get an updated list.



**Incident Analysis**  




Location

      Miles 

Input location

207 S Detroit Ave, Tulsa, Oklahoma, 74120

 Hospitals  7 

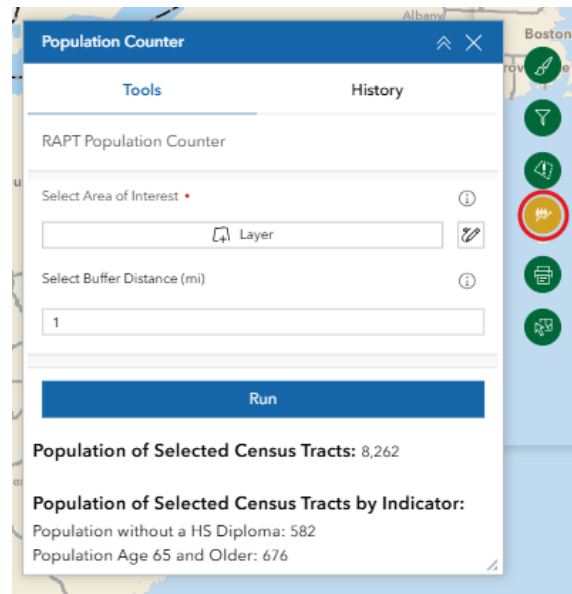
## 9.4. Population Counter



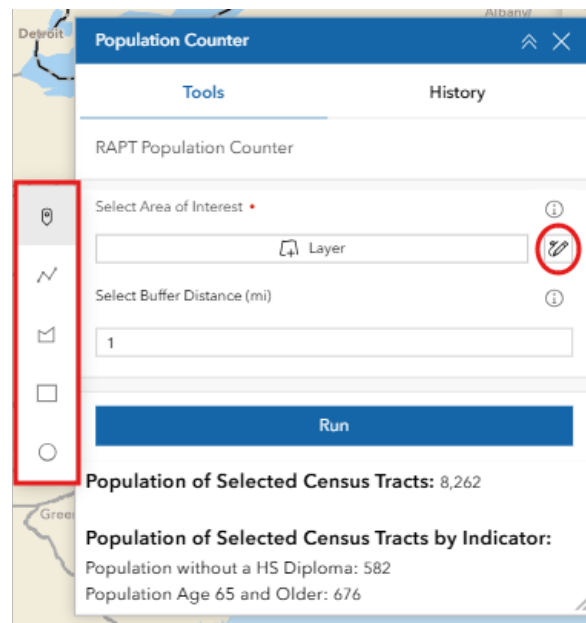
The Population Counter tool allows you to draw a specific area of interest on the map (circle, rectangle, polygon, etc.), select all whole or partial census tracts within the area, and calculate the estimated population of individuals with specific resilience indicator characteristics (age over 65, disability, unemployment, etc.) in the area. This tool can provide a visual and comprehensive list of census tracts located in the area or interest, as well as the estimated total number of individuals for each indicator.

Population Counter – Select area of interest on the map and calculate the estimated population of individuals with specific resilience indicator characteristics.

- Click on the “Population Counter” icon and the tool will open on the right side of the map.

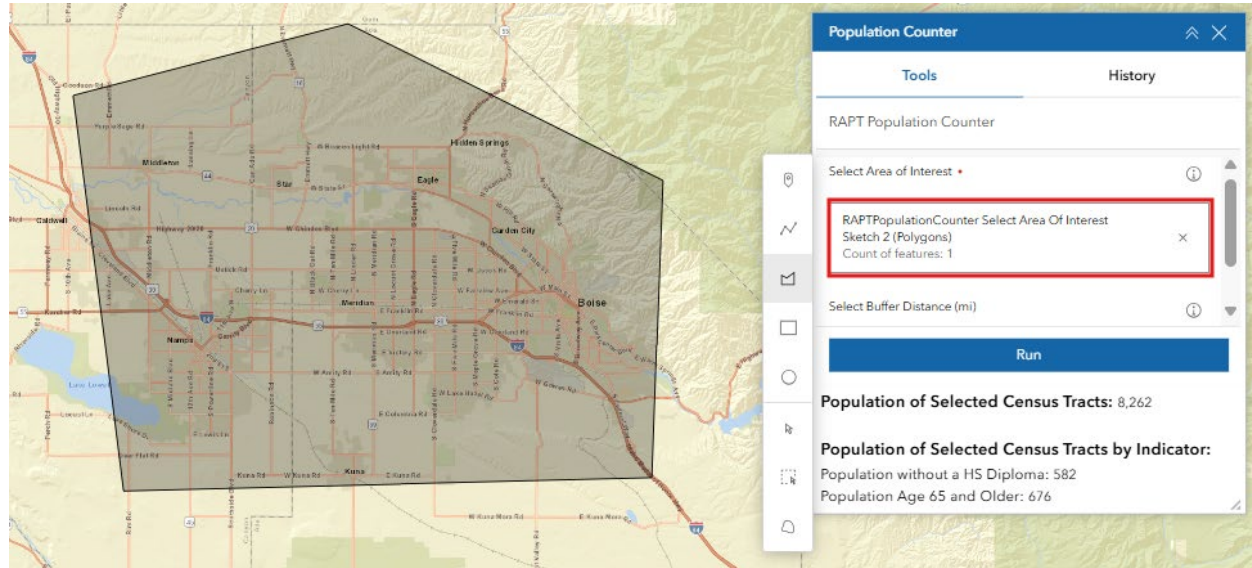


- NOTE: When initially opened, the Population Counter will show the values from the previous run. These numbers will update to reflect new values once the tool is run again.
- Click the “Draw input features” button to show the list of options for shapes to use as the area of interest. Users can select from shapes with buffer zones (single points and lines), user-drawn unique polygons and established shapes (circles and rectangles).

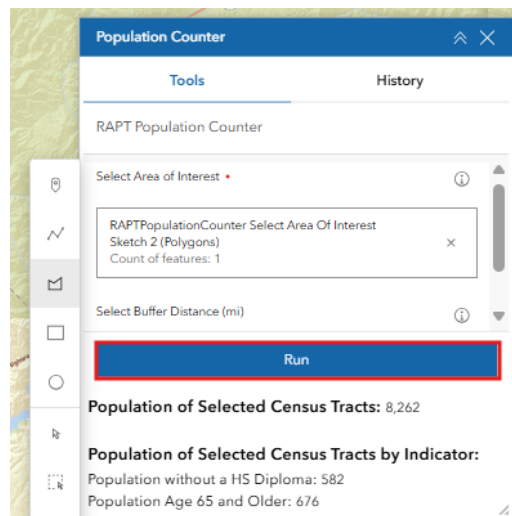


- Select the shape you want for your area of interest. In this example, we use the “Polygon” shape.

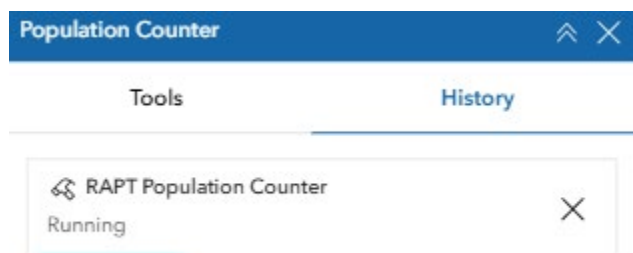
- Click the corners of your polygon to set the area of interest. As you click on the map, your shape will update to reflect the new boundaries. Double-click when you have finished drawing your area. The “Select Area of Interest” will now reflect your area, labeled a “Sketch”, as the input for the tool.



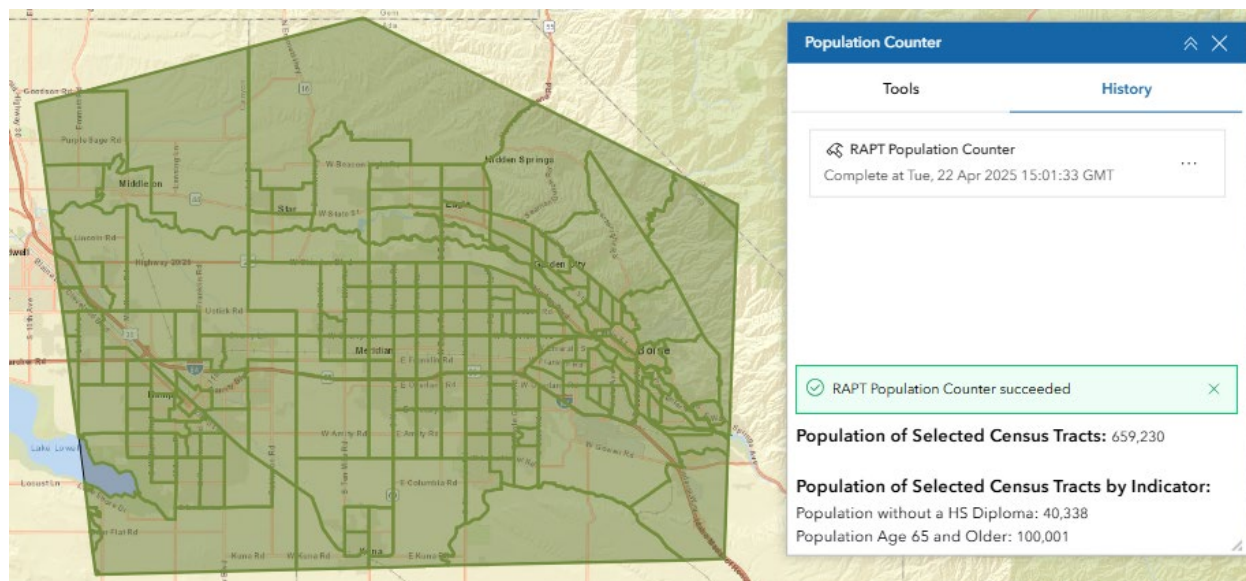
- Once your area of interest is set, click “Run”.
- NOTE:** If you are using a polygonal shape as your input, ignore the “Select Buffer Distance” input. This is only for non-polygonal inputs, such as lines and points.
- NOTE:** If you are using a single point, line or established shape (circle or rectangle), you can adjust the buffer distance. The buffer distance is always expressed in miles and the default value is “1”.



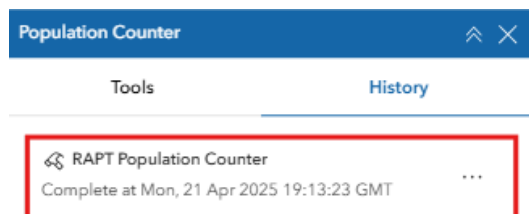
- The Population Counter will begin calculating the estimated population in the selected area of interest. You will be taken to the “History” tab in the tool and will see “Running” below the RAPT Population Counter title.



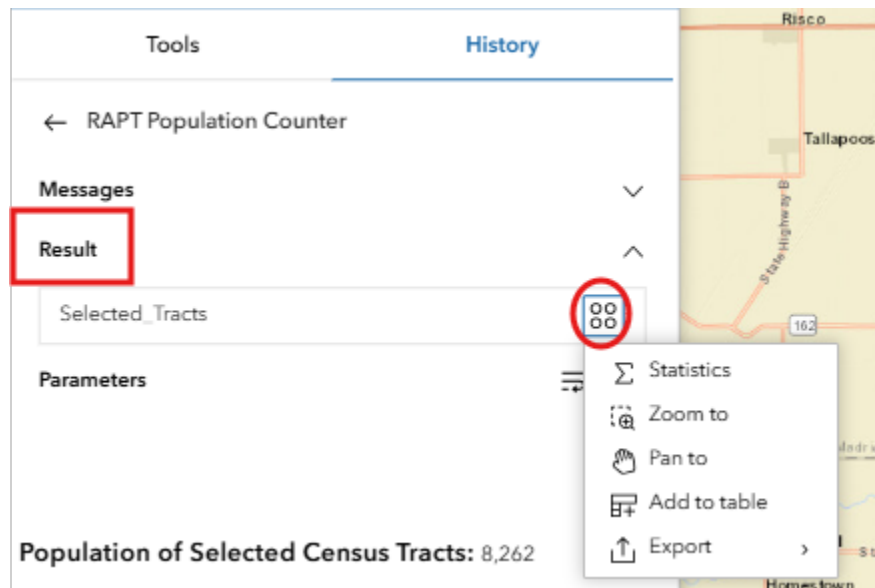
- Once the Population Counter has calculated population estimates for all indicators in the selected area of interest, including total population, the values will be listed at the bottom of the “History” tab. You should also see the green “RAPT Population Counter succeeded” message and information for when the tool was most recently run. The map will display all of the census tracts that are included in your area of interest.



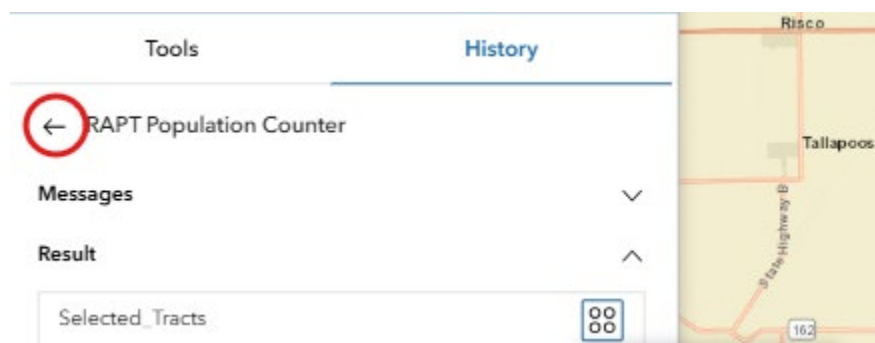
- Click on “RAPT Population Counter” to see a summary of the messages, results and parameters of the most recent run.



- In the Results section, click the “Actions” button to see various options, such as add the data to the Attribute Table, Export the data to a CSV file, etc.
- The census tracts included in the area of interest, displayed in green on the map, will be the only census tracts with data included in the exported file.

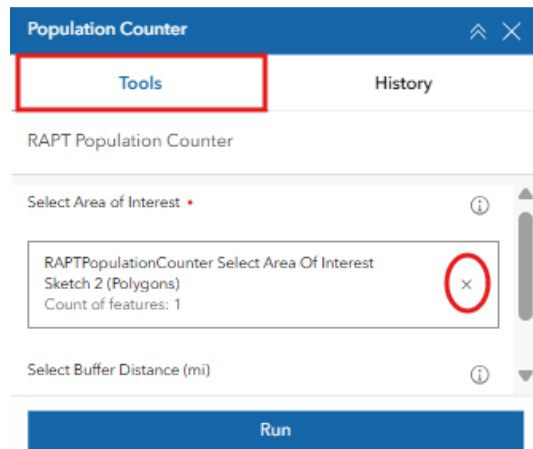


- Click the arrow to return to the History tab.



- To draw a new area of interest, go to the “Tools” tab. Click the “X” next to the Sketch input and you will see the default options to draw another area of interest.

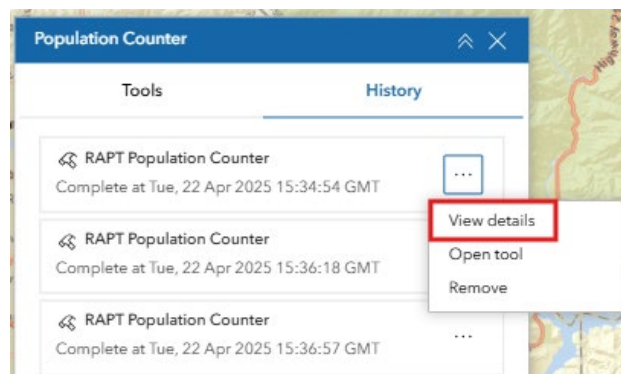




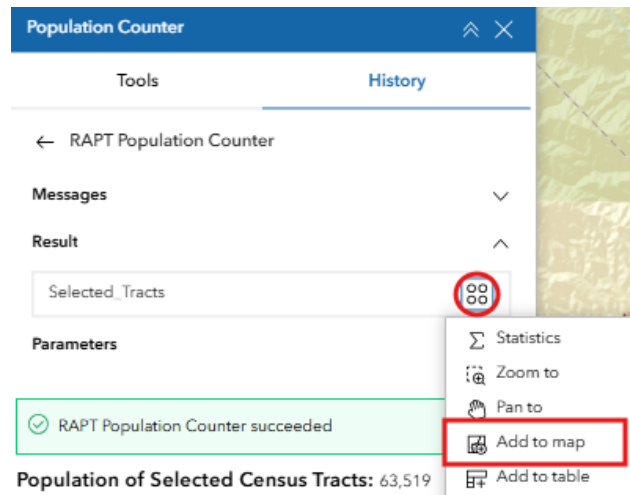
#### 9.4.1. PREVIOUSLY SELECTED CENSUS TRACTS

In this updated version of the RAPT Population Counter, both current and previous runs that have been completed are listed in the “History” tab. This allows users to use previous selected areas of interest as the input for the tool again without having to reselect or re-draw those areas.

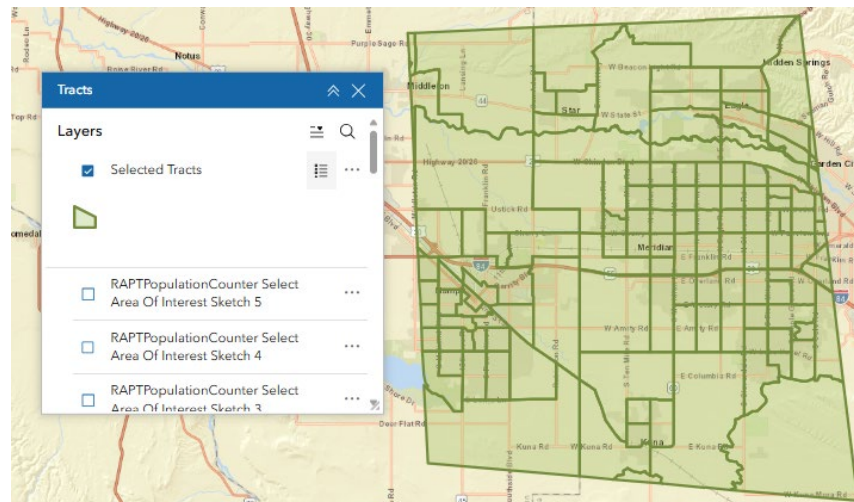
- To use a previous input for the area of interest, click the “Options” button for the layer you want to use as the input. Select “View Details”.



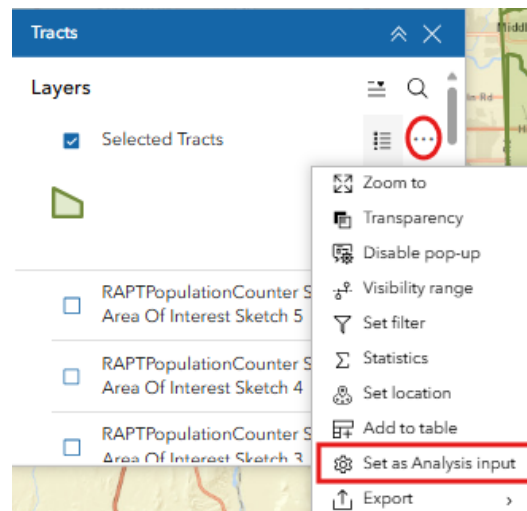
- Under the Results section, click “Actions”, and “Add to map”.



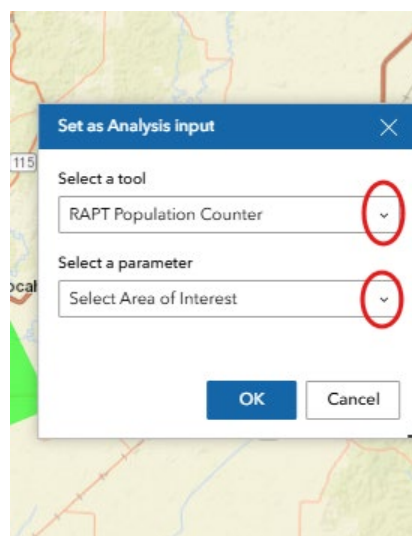
- The selected census tracts from that run will be added to the map and to the layer lists.



- Click “Options” and select “Set as Analysis Input”.

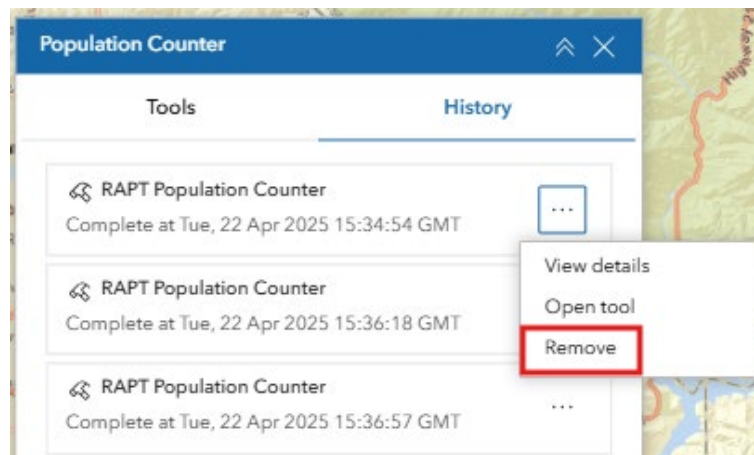


- A Population Counter input window will open and you will need to select “RAPT Population Counter” as the tool and “Select Area of Interest” as your parameter. Click “OK”.

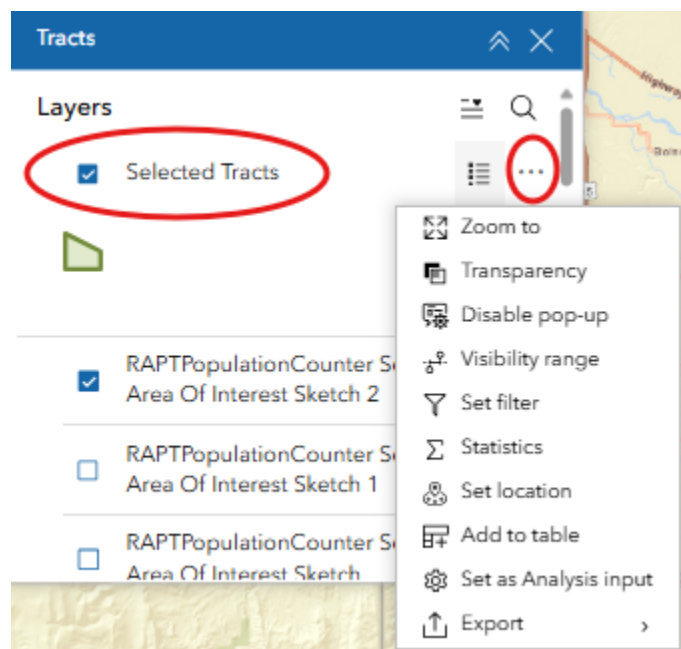


- The Population Counter tool will show your “Selected Tracts” as the input for the Select Area of Interest. Click “Run” to run the tool.

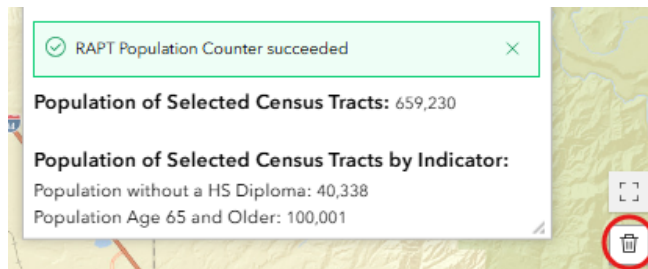
These completed runs will remain in the “History” tab until they are removed. Previous inputs can be removed from the list by refreshing your browser or clicking the “Options” button next to the layer in the History tab, then click “Remove”.



- Open any layer list to see 2 new layers that have been created. One layer will be titled “Selected Tracts”, is green and reflects the census tracts that are included in the current output of the Population Counter.
- Click the “Options” button for this layer to toggle the layer on/off, set Filters, Export etc.



- This layer can be deleted and removed from the map by clicking the “Clear Results” trash can icon in the bottom right of the map and select “Selected Tracts”.

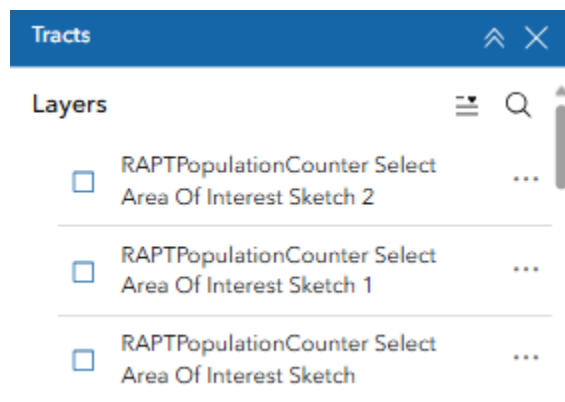


- Once removed from the map, the “Selected Tracts” layer will no longer appear in the layer lists. However, the “Sketch” layer will remain in the layer list.

### 9.4.2. PREVIOUS INPUT SHAPES

The Population Counter also allows users to see current and previously drawn shape inputs in any of the layer lists. This allows users to see which unique polygonal, line or single point inputs have been run in the Population Counter tool. These layers are titled “RAPT Population Counter Select Area of Interest Sketch #”.

- NOTE: These layers provide visuals of previous Population Counter shape inputs only. They are not able to be used as the input for future Population Counter calculations. Only layers listed in the “History” tab can be used as inputs for the Select Area of Interest.
- NOTE: These previously drawn shape inputs will remain in the layer lists until the browser is refreshed or you click the “Reset RAPT” button in the upper right corner of the map.

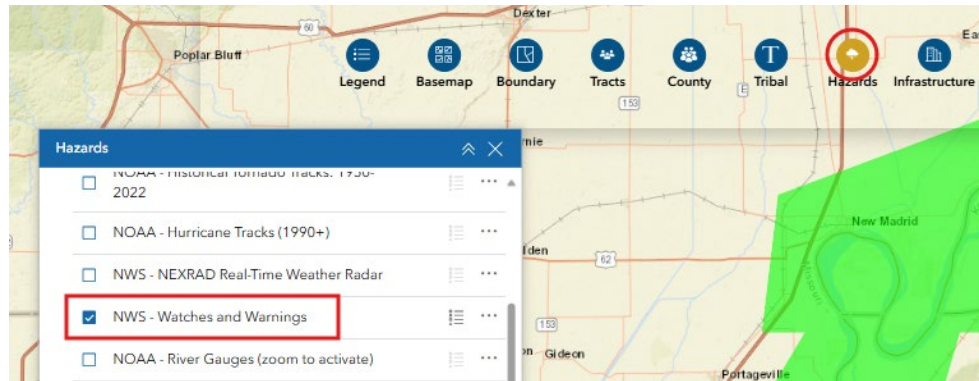


## 9.5. Incident Area From Shapefile

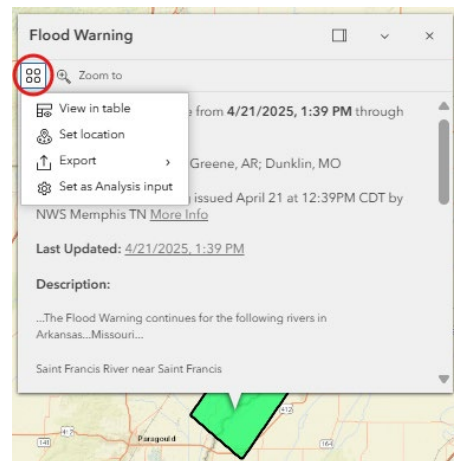
Users can use shapefiles to set the incident area for the Incident Analysis and Population Counter tools. These can be data layers that are already available in RAPT (Current Weather Watches and Warnings, Tribal Boundaries, etc.) or data layers that are added to RAPT (Census Boundary and Annexation Survey (BAS) Community layer, local land use plans, etc.).

- Toggle on the layer you wish to use to set the unique incident area.

- For this example, we will use the NWS - Watches and Warnings layer.

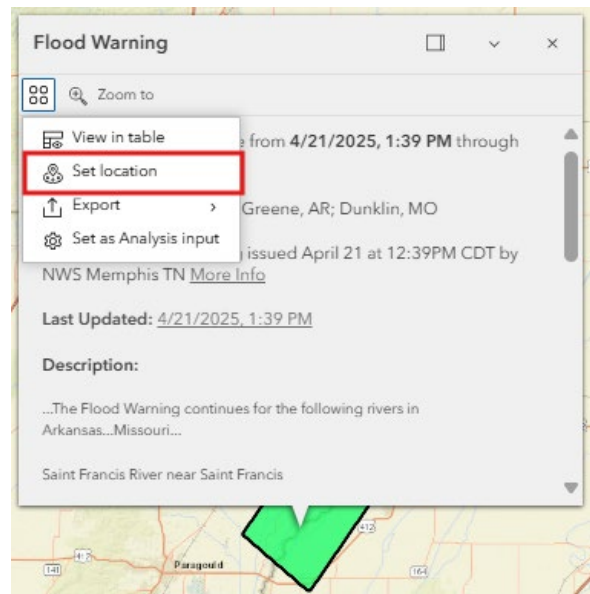


- Click on the NWS Watch or Warning you want to use as your shape.
- In the pop-up box, click the “Actions” button at the top left to display a list of options.

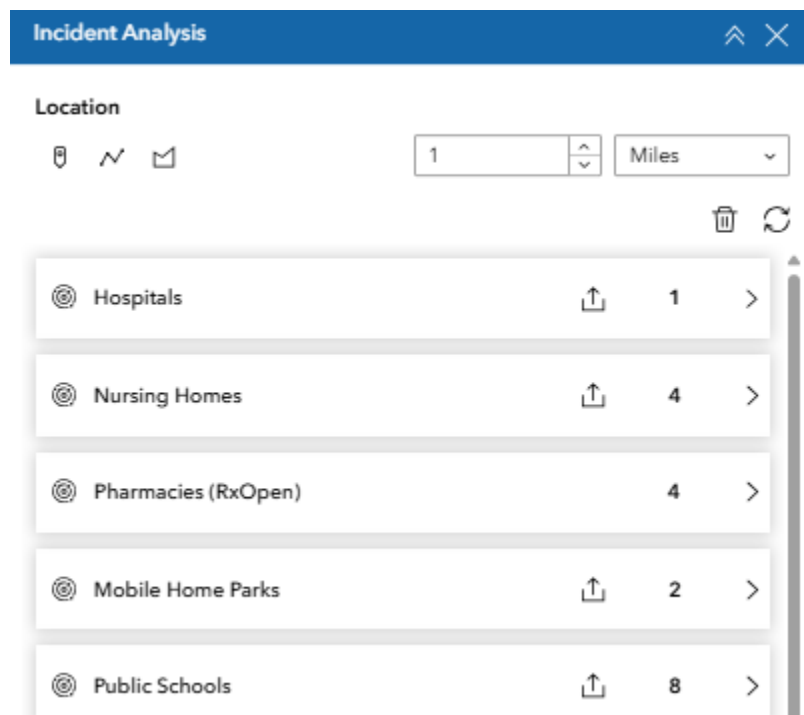


### 9.5.1. INCIDENT ANALYSIS

- With the pop-up open and the actions listed, click on “Set Location.”

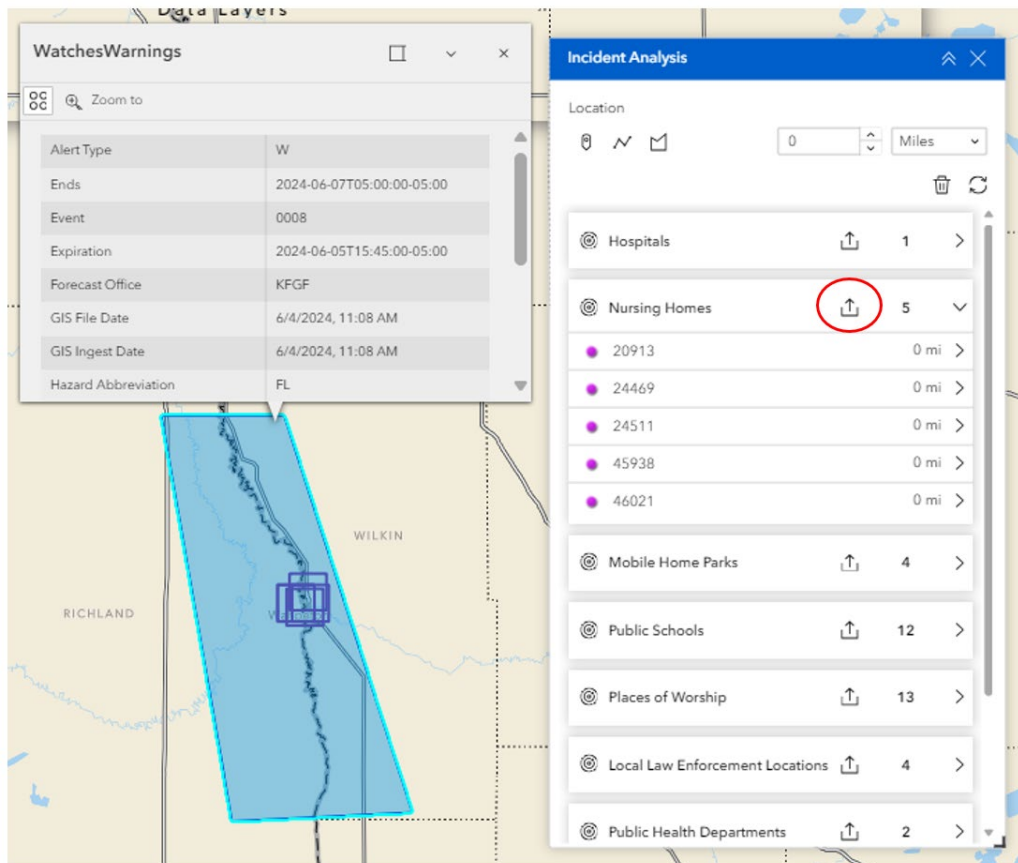


The Incident Analysis tool will open automatically at the right of the screen and the unique incident area will be selected. The tool will have calculated the infrastructure datapoints within the incident area.

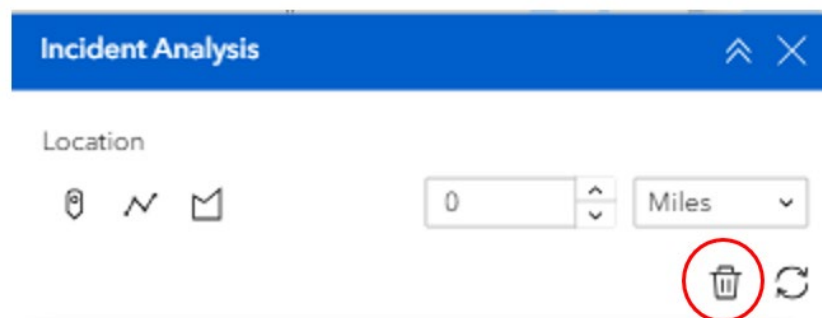


- The default buffer zone will be “1” and default unit of measurement will be “Miles”. You can adjust the buffer zone and unit of measurement, then click “Refresh” to get an updated list.
- Click on any of the infrastructure titles to see the infrastructure datapoints within the unique incident area.

- Download the list of infrastructure datapoints by clicking the “Export” icon.



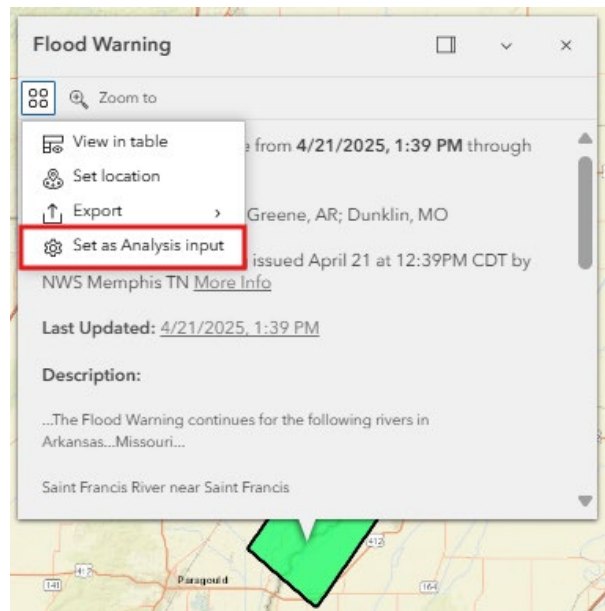
- Be sure to click the “Clear” button when finished using the incident analysis tool.



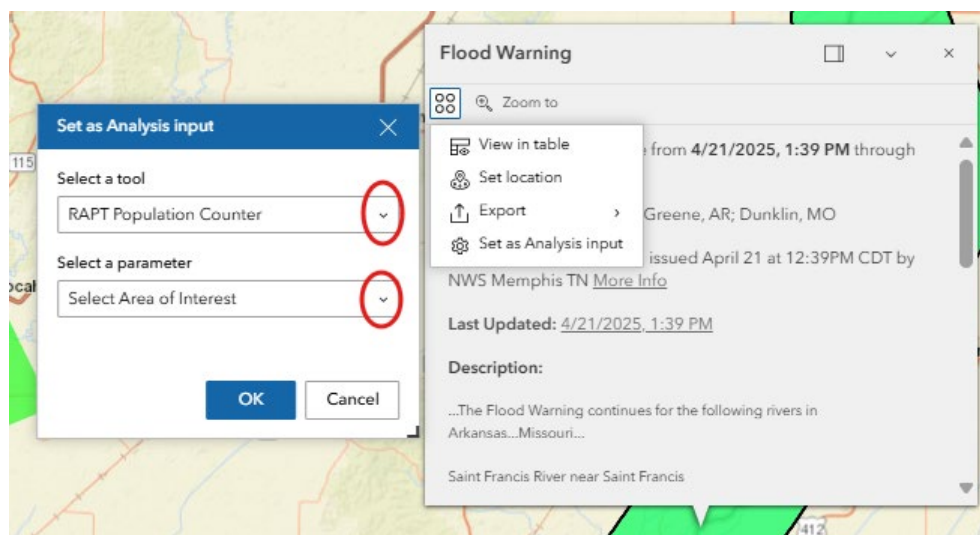
### 9.5.2. POPULATION COUNTER

- With the pop-up open and the actions listed, click on “Set as Analysis Input”.





- A Population Counter input window will open and you will need to select “RAPT Population Counter” as the tool and “Select Area of Interest” as your parameter. Click “OK”.



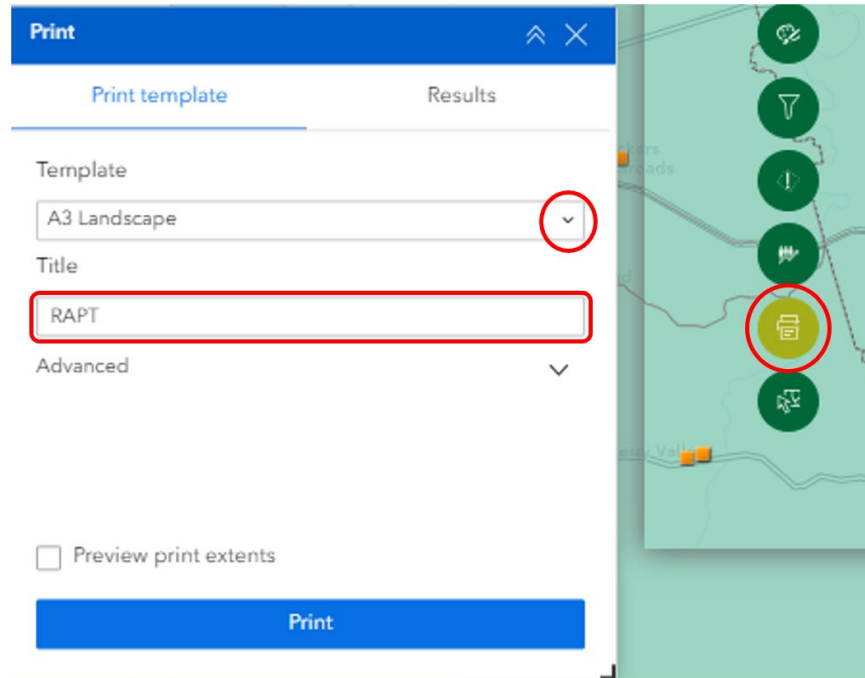
- The Population Counter tool will open and you will see the Selected area of interest as your input. Click “Run”.

## 9.6. Print

The Print function lets you save a PDF of the map on your screen. This will include any layers that are showing on the map when you print, and their respective legends.



- Click the “Print” icon. Enter your map title and use the drop-down to select template preferences.



- Click the “Advanced” button to modify various aspects of your map, including labels, map size and extent, legend and print quality.

**Print**

Print template Results (1)

RAPT

Advanced

Map printing extents

☒ Current map extent

☐ Current map scale

☐ Set map scale

Layout options

Author

Copyright

☒ Include legend

☐ Include north arrow

Scalebar unit Miles

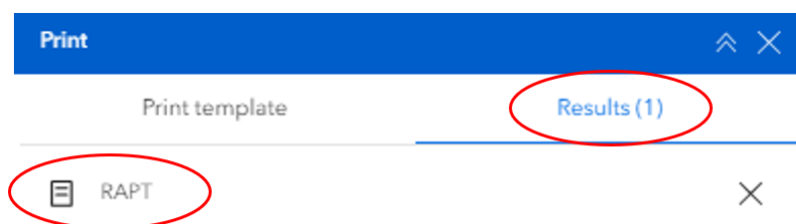
Print quality 96 DPI

☐ Include attributes

☐ Preview print extents

**Print**

- Click “Print” and your map will be created and appear in the “Results” tab. Click on the map name and it will open in your web browser.

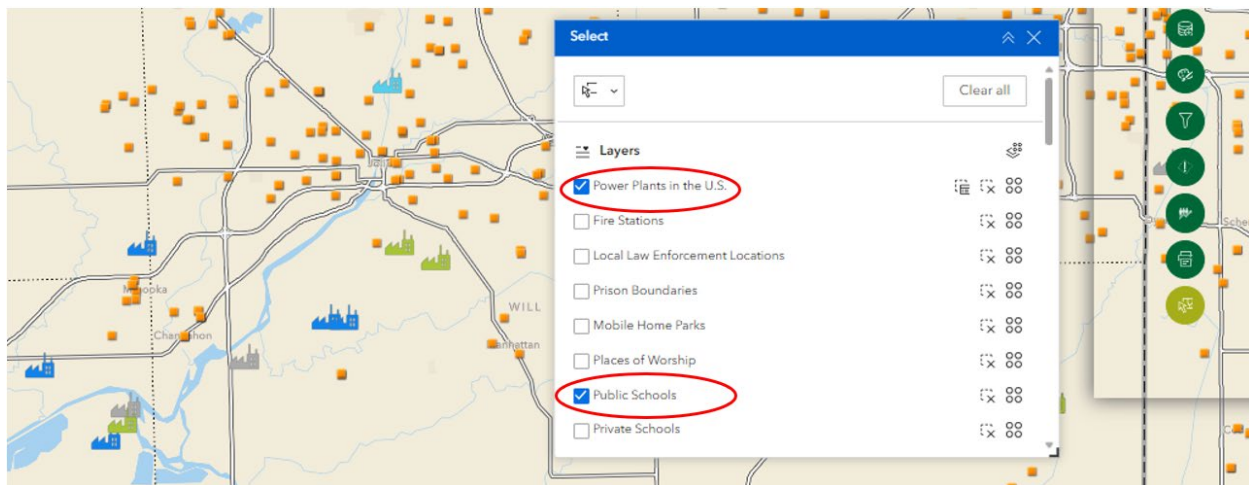


## 9.7. Select

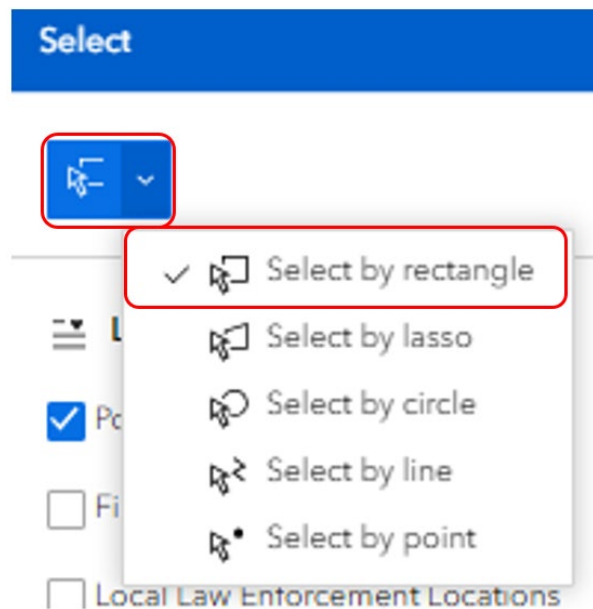
The Select tool can be found in the Analysis Tools section and allows you to select multiple infrastructure, hazard, county, or census tract datasets in a specified region (rectangle, polygon, circle, etc.). The output provides a number, visual, and comprehensive list of those multiple datasets. You may export, save, or view these datasets in the Attribute Table.



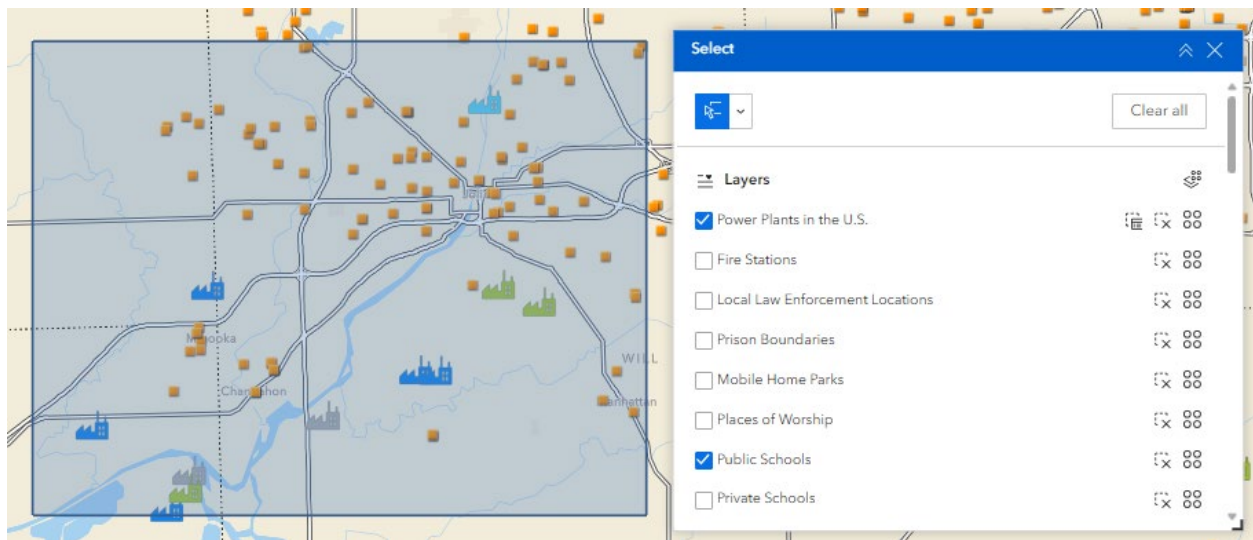
- NOTE: The Select tool differs from the Incident Analysis tool in that it will include any data layers you have added to RAPT.
- NOTE: Before using the tool, turn on the infrastructure, hazard and indicator layers to be included in the output.
- Click the “Select” icon and the tool will open on the right of the page. Select the data layers you want to summarize.
- In this example, we will focus on public schools and the added data layer of “Power Plants in the U.S.”.



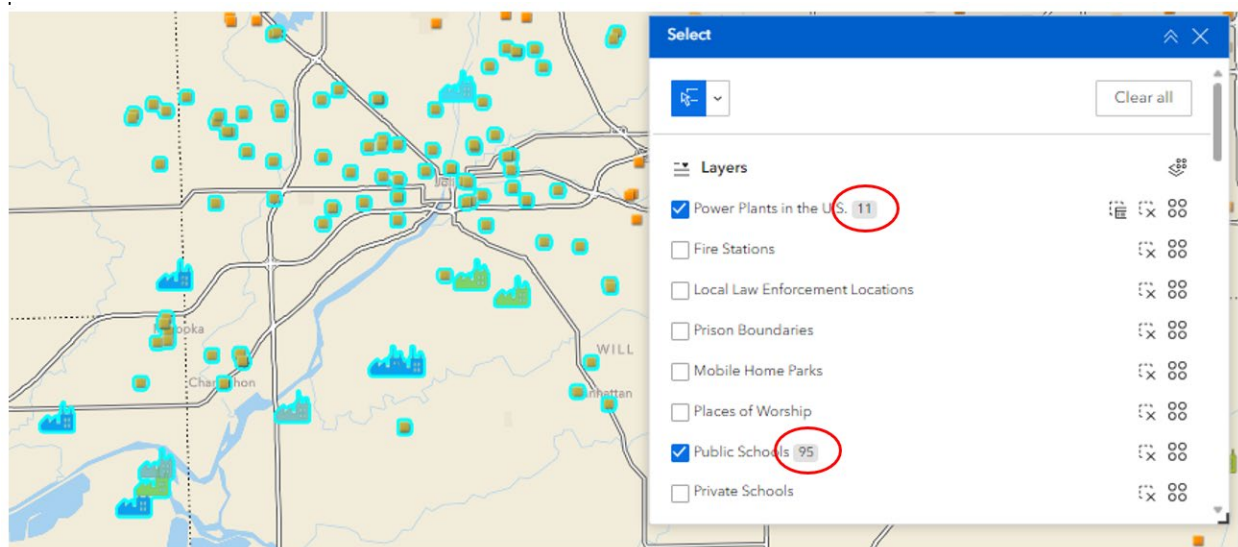
- You will next choose how you are going to draw your selection area on the map. Click the drop-down at the top of the tool to see a list of options.
- Once you have selected your shape, click on the mouse icon at the top of the tool. The mouse icon will turn blue, and you are ready to draw your selection area on the map.



- Draw your selection area on the map. You will be able to see your selection area while drawing it, but it will disappear once you are finished.



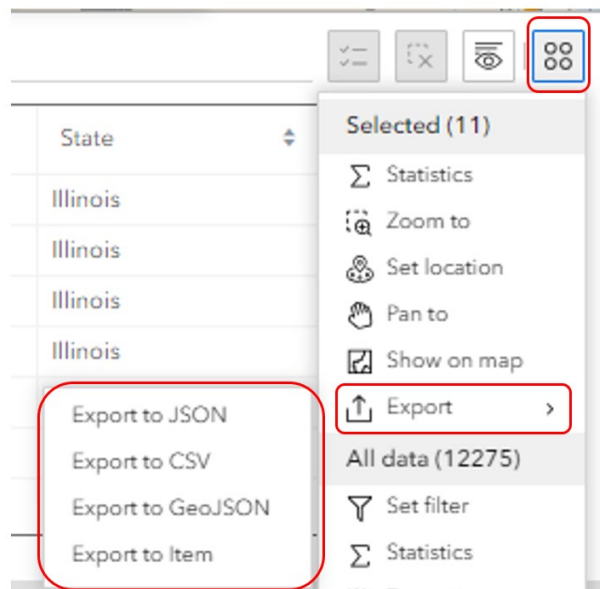
- Once your selection area is drawn on the map, the datapoints within the selection area will be highlighted and the layer list in the tool will update to reflect the # of datapoints within the selection area.
  - In the example below, the area has 11 Power Plants and 95 Public Schools.



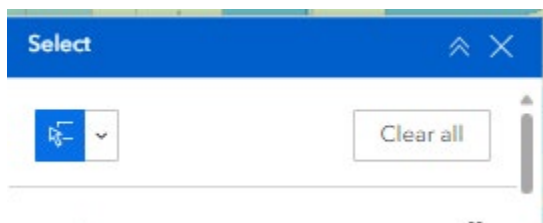
- The information for these datapoints can be viewed in the Attribute Table by clicking “Actions” and “View in Table”. Then open the Attribute Table to view the information.

NAME	ADDRESS	CITY	STATE	ZIP	TELEPHONE	TYPE
LOUISIANA SCHOOL FOR...	2888 BRIGHTSIDE LANE	BATON ROUGE	LA	70820	(225) 757-3482	2
LOUISIANA SCHOOL FOR...	2888 BRIGHTSIDE LANE	BATON ROUGE	LA	70820	(225) 769-8160	2
LSU LABORATORY SCHOOL	45 DALRYMPLE DRIVE	BATON ROUGE	LA	70803	(225) 578-3221	1
SOUTHERN UNIVERSITY L...	129 SWAN STREET	BATON ROUGE	LA	70813	(225) 771-3490	1

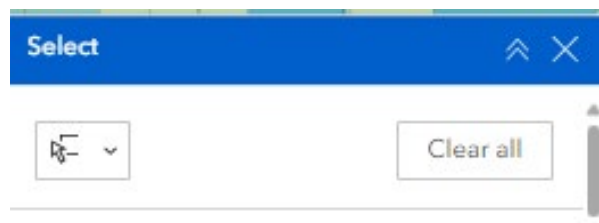
- Users can export this information from the Attribute Table. While viewing the tab in the Attribute Table, click “Actions”, then “Export” and select the type of file you wish to export.



- To clear the results and select different datapoints or a different area, click the “Clear all” button at the top of the tool.
- NOTE: Before closing the Select tool, be sure to click the mouse icon to disable selection mode. The Select tool will continue to run as long as the mouse icon is blue.



Select tool is on, in Select Mode.



Select tool is off.

## 10. Contact Us

If you have questions or would like additional support in using the Resilience Analysis and Planning Tool, please email [FEMA-TARequest@fema.dhs.gov](mailto:FEMA-TARequest@fema.dhs.gov).

*Please send us examples of how you are using RAPT, as well as recommendations for future improvements!*