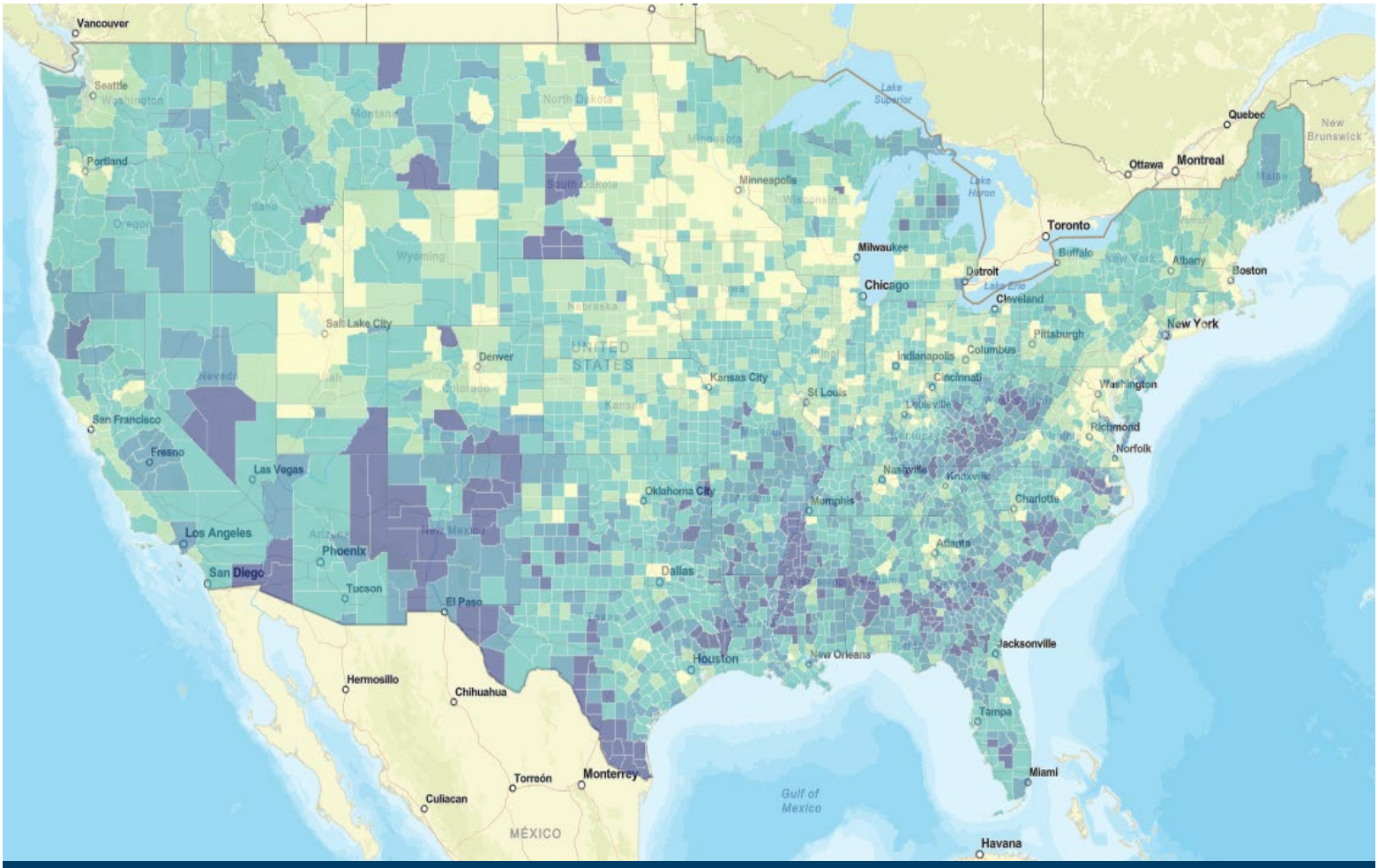

Resilience Analysis and Planning Tool

User Guide

May 2023

FEMA

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Contents

1. Introduction

The Resilience Analysis and Planning Tool (RAPT) is a free, publicly available geographic information systems (GIS) tool to help emergency managers and community partners of all GIS skill levels visualize and assess potential challenges to community resilience.

This User Guide provides step-by-step instructions on how to use the features and analysis tools in RAPT. There is also a RAPT Instructional Video on the RAPT Resource Center.

Access links to RAPT and the RAPT Resource Center 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)[1] 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 future forecast layers such as sea-level rise.
- **Community Demographics** for counties, census tracts, and tribes drawn primarily from the U.S. Census Bureau. RAPT includes 27 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 the graphic in the Community Resilience Challenges Indicators section on page 7.

[1] 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. 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. Left Information Window

Once you have accepted the user agreement, you will see the information window on the left side. This provides direct links to the following resources:

- **RAPT Resource Center** – Support website containing all supporting documents and resources.
- **RAPT Overview and Quick Start** – A high-level, storymap introduction to RAPT.
- **RAPT User Guide** – User guide providing step-by-step guidance on RAPT functionality.

You can close this window by clicking on the tab with the left facing arrow [<].

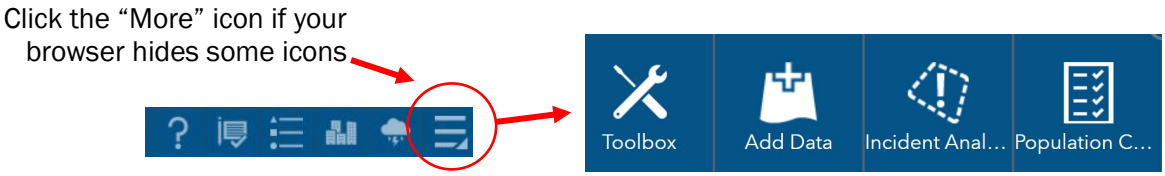
3. Navigating the Map

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.
- **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.
- **My Location:** Use the circular button to center the map on your current location.

3.1. Navigation Bar Icons

The icons in the blue bar at the top of RAPT have drop-down menus for RAPT data layers and functions. You can see the title for each icon by hovering over the icon with your mouse. Depending on your browser and your webpage's zoom level, some of the icons may be hidden – in that case, you will see a "More" icon to reveal the additional icons.



3.2. Frequently Asked Questions

Provides answers to frequently asked questions about RAPT and troubleshooting issues. Additional FAQs are available in the RAPT Resource Center.

3.3. Legend

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

3.4. Basemap Gallery

The Basemap Gallery allows you to change the display of the basemap. The default map is the Streets Map, other options include satellite imagery, grey canvas, 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.

4. Data Layers Navigation

Data Layers Navigation: Clicking on the **infrastructure**, **hazard**, **county**, **census tract**, or **Tribal boundary** icon will open a drop-down list of associated layers.

- To toggle on the layer, click on the box next to the layer name. A checkmark will appear in the box and the data will display. To toggle the data layer off, click the checkmark.
- To view the legend for the data layer, click on the layer name (census tract layers have a subtitle next to a yellow diamond tile; to see the legend you will also need to click on the subtitle name). You can also click on the “Legend” icon to see the legend for all the open layers on your map.
- If a data layer name appears grey, you will need to zoom in on the map before this layer is able to populate.
- Each data layer has 3 dots to the right of the title. Clicking on the 3 dots gives you additional options for the display, including transparency. Adjusting the transparency of the visual display on the map can be useful when you have multiple data layers toggled on.

5. Infrastructure and Hazards Data

5.1. 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.

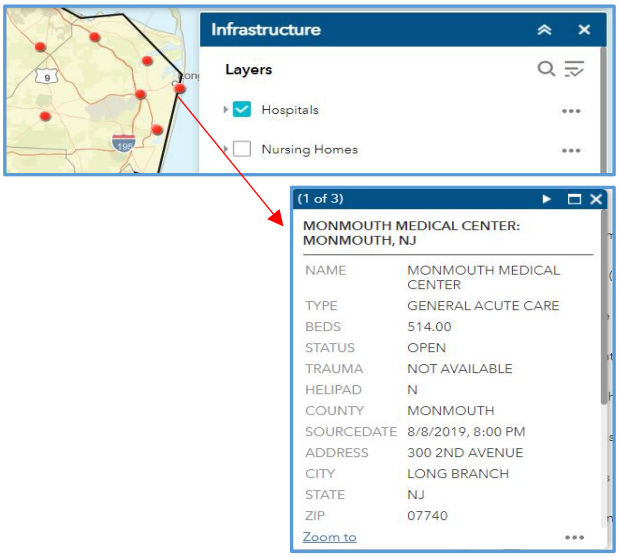
Pop-up Boxes: The RAPT includes a pop-up box function to display additional information for a data point or geographic area. The **infrastructure, hazard, county, census tract,** and **Tribal indicators** all have pop-up box information.

Click on the data point or geographic area to activate the pop-up box. You may need to scroll down within the pop-up to view all the information.

Pop-up Box Header: When multiple tabs are open in the pop-up, the number of tabs will be displayed at the upper left of the blue header. Click the white arrow on the right side of the header to advance through the tabs. Clicking the white file box will open the pop-up window in a larger screen. Click the “X” to close the pop-up.

Three dots: Clicking the 3 dots in the bottom right of the pop-up will provide additional options, to view the information in the Attribute Table, download the data and use the datapoint as input for analysis tools.

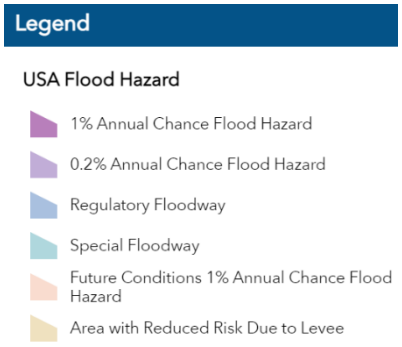
- Click on the name of the infrastructure layer in the drop-down list to see the legend for that layer (the shape and color of the datapoint). This is helpful when you have more than one infrastructure layer displayed. You can also click on the “Legend” icon to see the legends for all the data layers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



5.2. 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 and future forecast layers of 4–6-foot sea-level rise. Hazard layers have additional information about the hazard in pop-up boxes.

- NOTE: 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.



6. Community Demographics and Resilience Challenges Indicators

6.1. 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 boundary levels. RAPT includes 27 demographic layers, including 22 community resilience challenges indicators identified from peer-reviewed research and FEMA's CRCI for counties and census tracts.

Not all demographic data layers in RAPT are available at all three levels. Currently, 26 of the 27 layers are available for counties; 19 are available for census tracts; and 17 are available for Tribal boundaries.

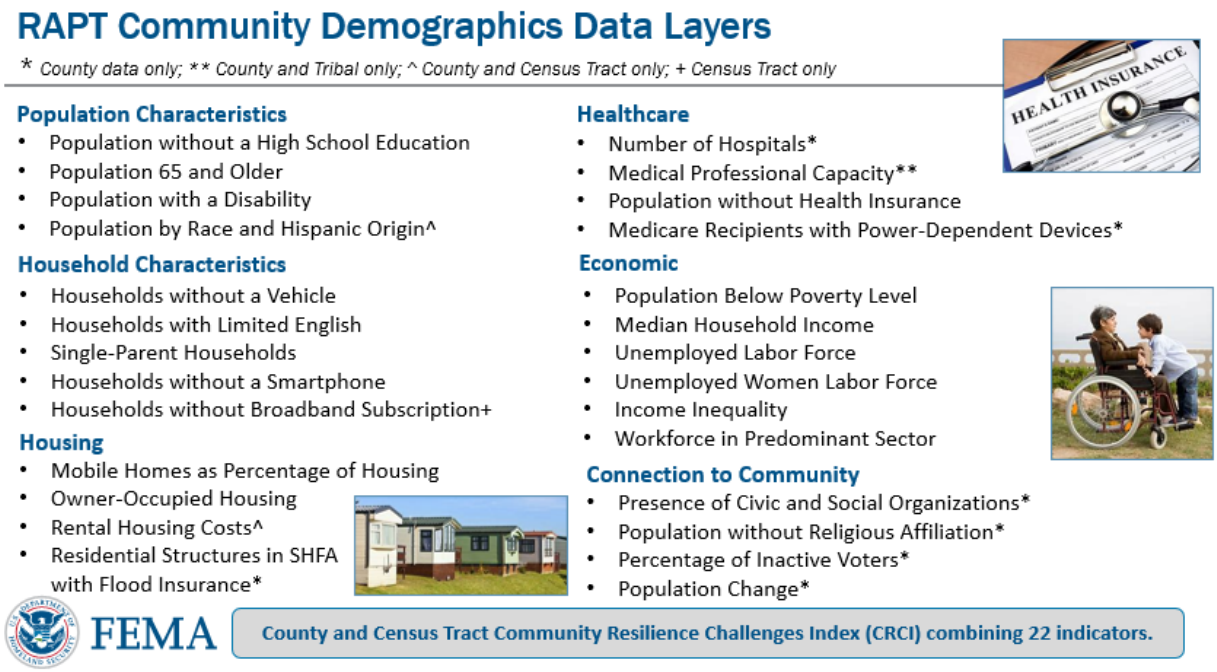
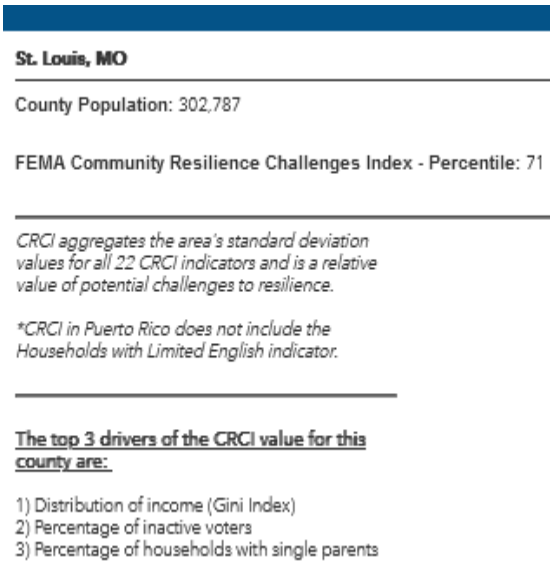


Image above shows all 27 community demographic data layers available in RAPT, including the 22 community resilience challenges indicator layers.

6.2. Community Resilience Challenges Index

The CRCI 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 an average of counts of standard deviations from the national mean for each indicator. The CRCI is available for counties and for census tracts.



- 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: Municipios in Puerto Rico do not include "speaks English less than well" as one of the indicators to calculate CRCI in Puerto Rico.

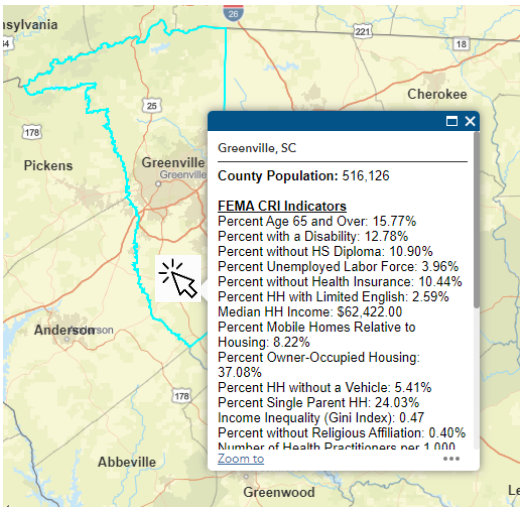
For each county CRCI, the pop-up box will also include the top 3 drivers of the CRCI value for the county. This gives emergency managers and community leaders a quick way to see the top 3 challenges to resilience within the county, based on research-based commonly-used community resilience challenges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

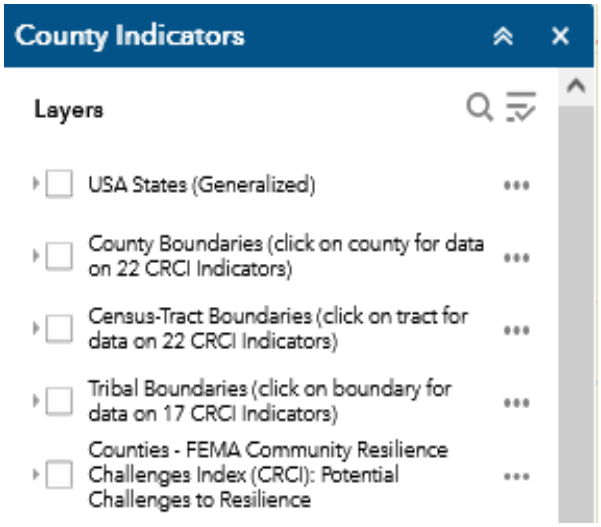
6.3. Boundaries and CRCI Indicator Pop-Ups

The indicator drop-down lists start with boundary layers for states, counties, census tracts, and Tribal boundaries. When a boundary layer is toggled on, the outline for that geographic area will populate on the map. In addition, the list of available community resilience challenges indicators from peer reviewed research will be available as a pop-up box.

To view the pop-up box and list of indicators and data for the geographic area, click on the map inside the boundary area. Scroll down inside the pop-up box to see the full list of indicators with values for each. Click on the "File" icon in the upper right of the pop-up box to open the pop-up in a larger screen.

- NOTE: The “County Boundaries” and “Census Tracts Boundaries” layers MUST be toggled on for some tools (e.g., Attributes in Selected Area, Filter tool) to function correctly.





6.4. Indicator Data Bins

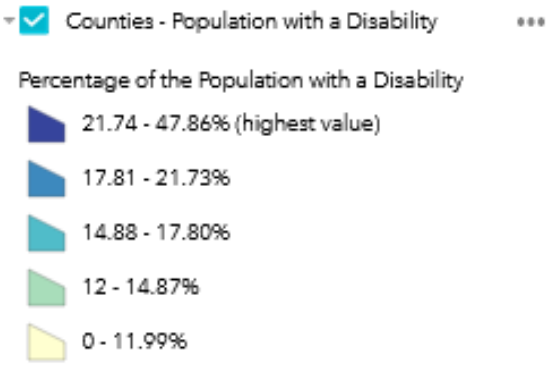
Because the indicator datasets are so large, FEMA binned the datasets and assigned consistent color ramps for the bins to provide a visual cue for users to quickly identify ranges for the data. These bins and associated colors provide a more immediate high-level understanding of a geographic area’s characteristics. 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.

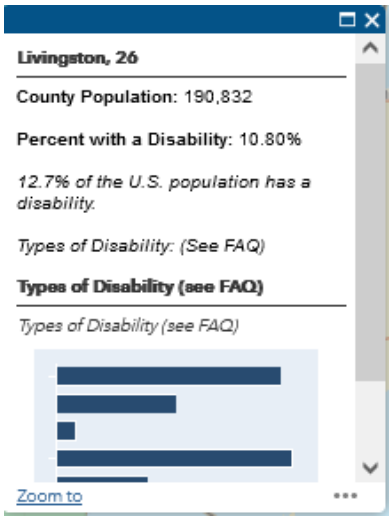
- If multiple indicators have been selected, each indicator will have a separate tab in the pop-up, with the data point for the geographic area and the national average.
- If multiple layers are toggled on, the map will only display the colored bins for the indicator that is highest on the drop-down list.
- If multiple boundary layers are toggled on, you will also see pop-up tabs with the available datapoints for counties, census tracts, and Tribal boundaries for the area of the map on which you click.

6.5. 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. If the “County Boundaries” layer is toggled on, there will be a tab in the pop-up that lists all available community resilience challenges indicators and their values.

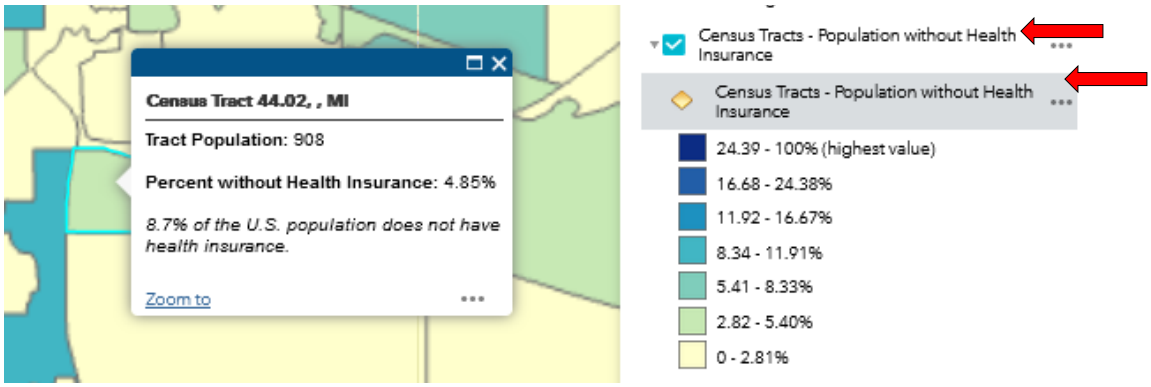
- Click on the title of the desired layer, and a legend will appear below the layer name. The county indicators are organized into five bins, with the darker colors indicating potential greater challenges to resilience.
    - NOTE: While the color bins are the same, the legend or data range associated with each color is different for each indicator.
- Click on a county for a pop-up box of that county's data and the national average for that indicator.
- If individual indicators have also been selected, that datapoint will have a separate tab in the pop-up, along with the national average.
    - There will be a tab in the pop-up box for every indicator layer you have toggled on.
- There are 5 county-level indicators that have additional information in the pop-up box. These are Households with Limited English, Rental Housing Costs, Population by Race & Hispanic Origin, Population with a Disability, and Population Age 65 and Older.





6.6. Census Tract Indicators

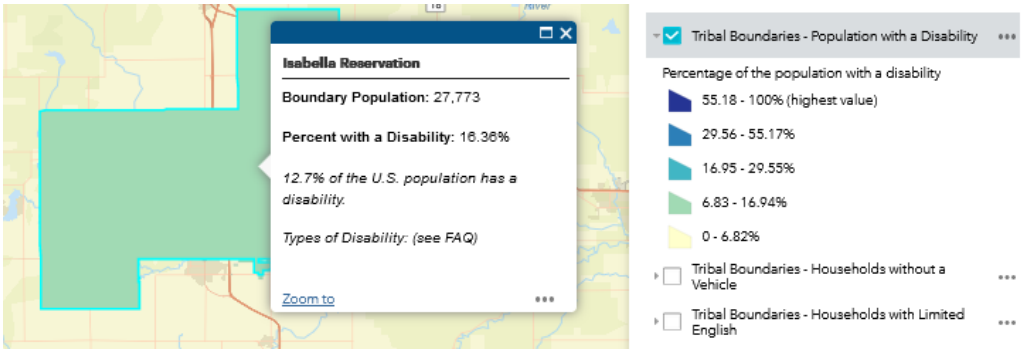
- Click the name of the indicator, and then the detailed name of the indicator to see the legend showing the data bins. Darker colors denote greater challenges to resilience. Census tract data is grouped into 7 bins to allow greater differentiation across this much larger dataset.
- Click on a census tract for a pop-up box with total population for the census tract, information on the selected indicator data, and the national average.



6.7. Tribal Boundary Indicators

Both the Tribal boundaries and the Tribal indicator data are drawn from the U.S. Census Bureau data table DP02.

- Similar to the county indicators tab, click the name of the indicator to see the legend showing its data bins. Darker colors denote greater challenges to resilience. Tribal boundary indicator data is grouped into 5 bins.
- Click on a Tribal area for a pop-up box with information on the selected indicator data.



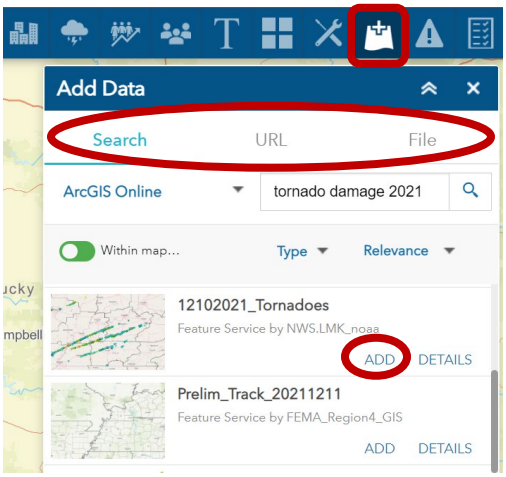
6.8. Add Data

The Add Data tool allows you to add data to the map by searching for layers hosted on ArcGIS Online or on a Portal for ArcGIS, entering URLs to data sources, or uploading local files (appropriate data types include a zipped shapefile, KML, CSV, GPX, or GeoJSON). Not all ArcGIS layers are available for free; some require a subscription to Esri. Click on the details link of the layer to see if that layer requires a subscription (a shield will appear). If you would like access to the subscriber data layers, please contact your organization's lead GIS analyst to obtain the requisite login information. You can also upload your own GIS layers by zipping a shapefile and dragging and dropping the zipped folder into the Add Data tool.

While you can upload additional layers for analysis, **you will not be able to save these layers into**

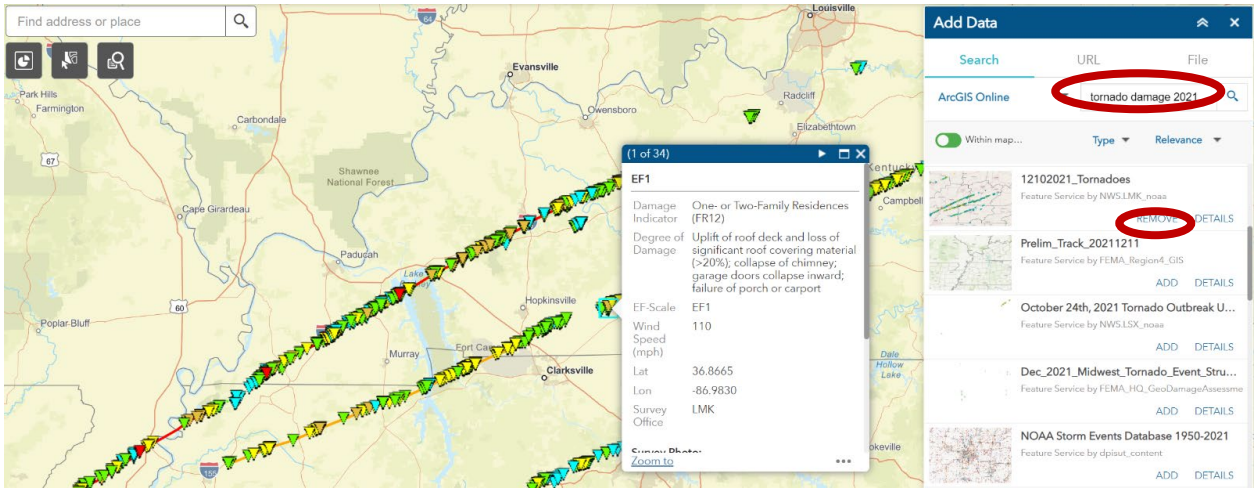
RAPT. As a publicly available tool that does not require a username or password, local layers cannot be permanently saved or embedded. Added layers will remain until you close or refresh your browser.

- Click on the “Add Data” icon.
- You can add data using the search function, pasting a URL, or uploading local files.
- To search, 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 “ADD.”

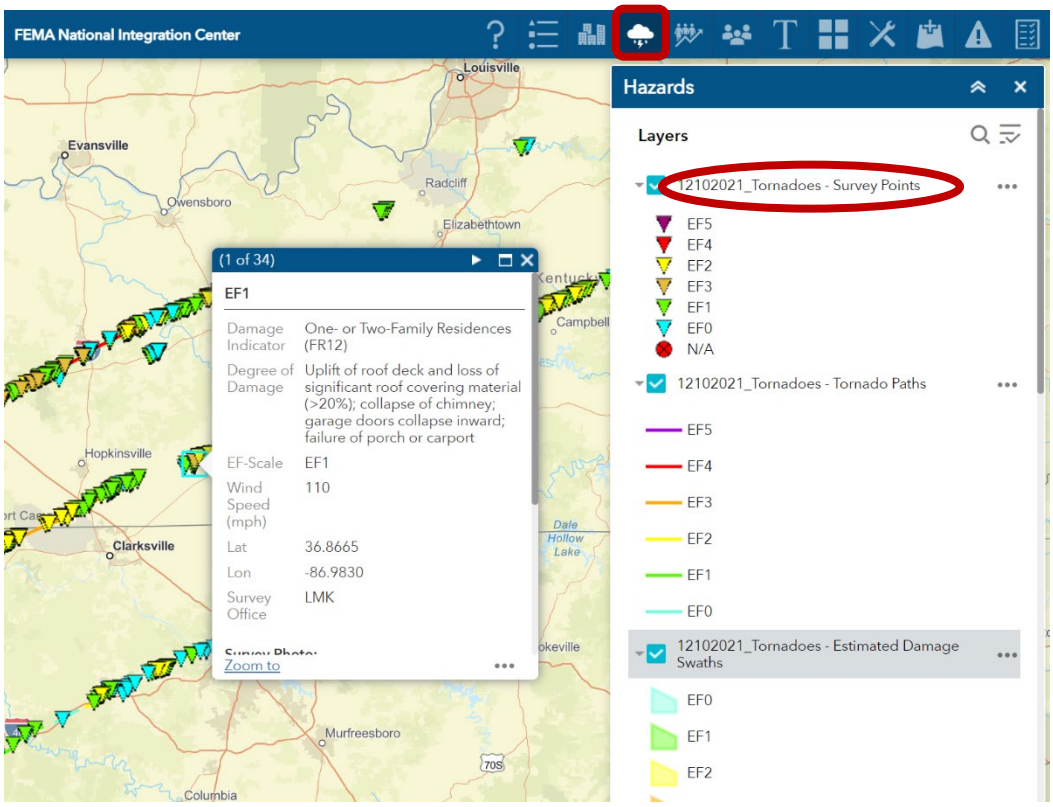


For this example, the user zoomed into the Kentucky/Tennessee region, searched “tornado damage 2021” and added a layer that is provided by NOAA. The added data layer displays on the map and includes information about the hazard in the pop-up.

- To remove the added layer once it is on the map, click “remove.”



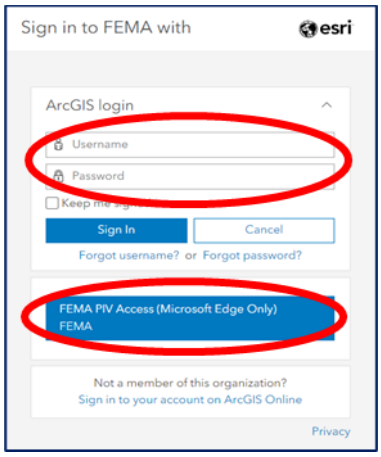
Once a layer has been added, you can see the legend by going to the Hazards tab (or Infrastructure tab) and clicking on the layer name.



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.

If you see the following window after you click to add the layer, you will need an ArcGIS account to be able to add this layer into RAPT.

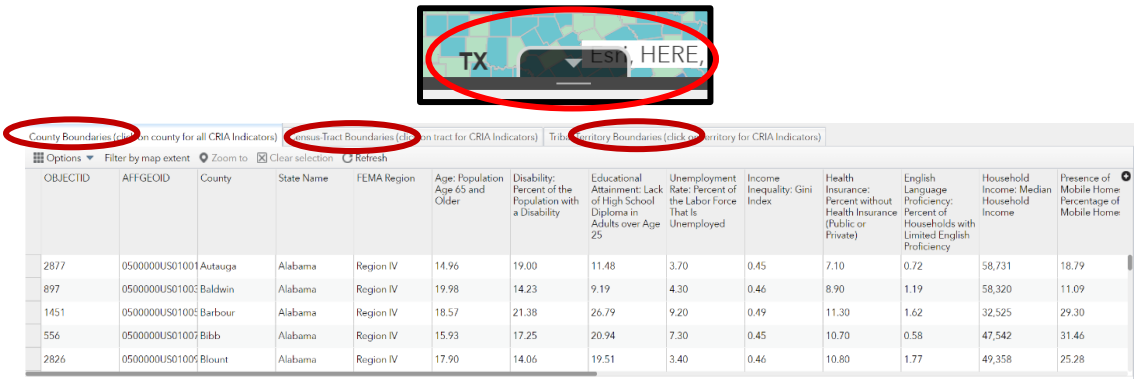
- If you are a FEMA employee, enter your login credentials in the Username and Password boxes.
- If you are not a FEMA employee, please click on “Sign into your account on ArcGIS Online.”



7. The Attribute Table

All of the infrastructure, hazard, and indicator information in RAPT can be viewed in tabular form in the Attribute Table. The Attribute Table has 3 default tabs that divide information into county, census tract and Tribal levels.

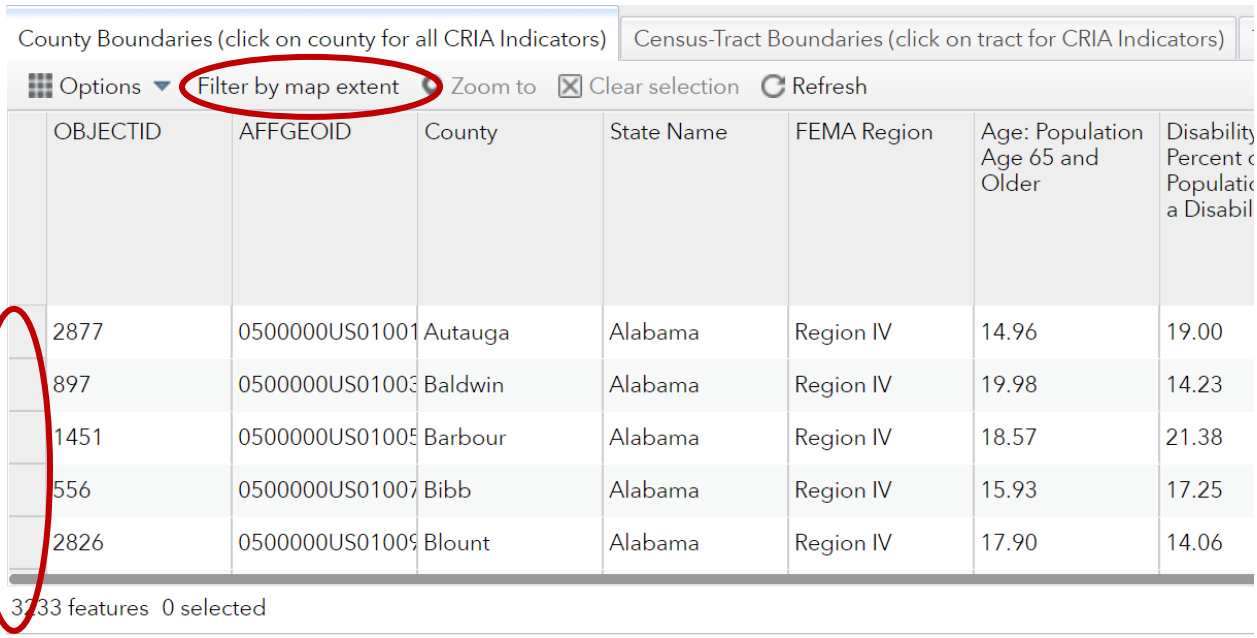
- Click the dark grey tab at the bottom of the web page to open the Attribute Table. A window will pop up showing data in a tabular form.
    - The Attribute Table can also be opened by clicking the 3 dots in the lower right corner of a pop-up box and selecting “View in Attribute Table.”



- Initially, the table will include only the counties and census tracts displayed on the screen (within the extent of the map on the screen). To include all counties, census tracts and Tribal boundaries in the database, deselect “Filter by Map Extent.”

- Select one or more counties or census tracts of interest by clicking on the grey “Selection Handle” box to the left of the row.

- Use CTRL-click to select additional entities.

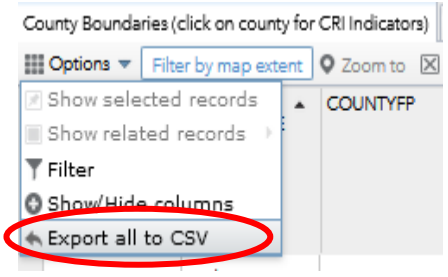


The table has columns for each of the CRCI resilience challenges indicators that are available at that level, as well as the CRCI value for that county or census tract (CRCI is not available at the Tribal level at this time). The bar at the bottom of the screen shows how many counties or census tracts (labeled as features) are included in the dataset on the screen.

7.1. Downloading Data

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

- Click on the “Options” tab to export the data to a .csv file, which can be easily saved as an Excel file. The Options tab also allows you to filter the data by specific properties (by state or county, for example) and show or hide specific columns.

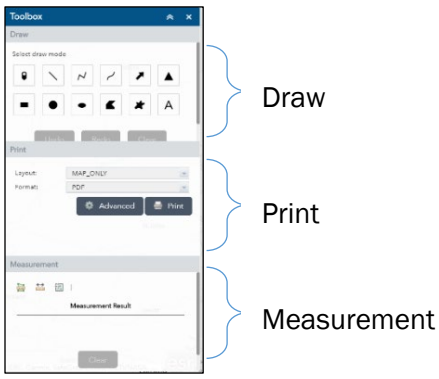


- Sort by state or county to make it easier to look at specific areas within the map.

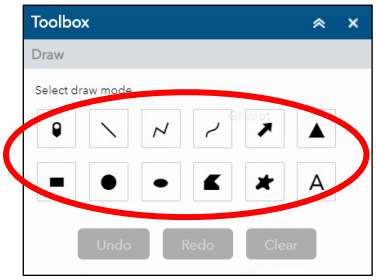
8. Analysis Tools

8.1. Toolbox

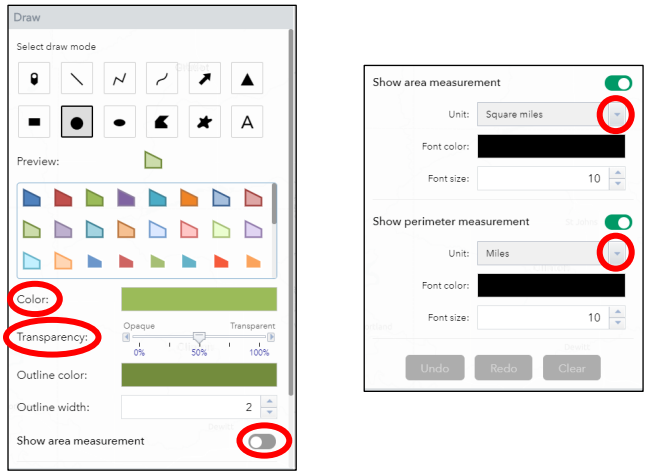
The Toolbox opens in the upper-right corner of the screen. It contains 3 tools to help visualize areas on the map: Draw, Print, and Measurement.



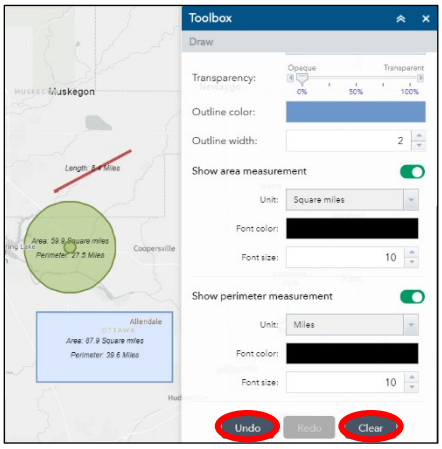
- **Draw**: The Draw tool lets you create graphics that display on the map (single points, lines, polygons, etc.). It can also display measurements for drawn features, such as length, area, and perimeter.
    - To draw an object, select the shape of the object you wish to draw.



    - Once you select the shape you want, formatting options will appear below that allow you to adjust the color and transparency of the figure and include measurements (depending on the type of image).
    - Use the drop-down for “Show area/length measurement” to select the unit of measurement.
    - Change the font size depending on preference.



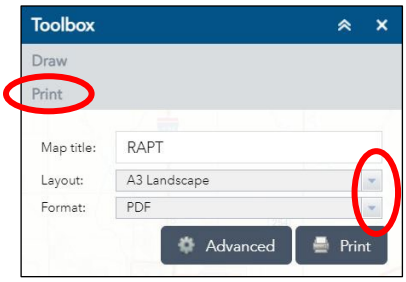
- After you select the shape and choose the formatting, move your cursor to the map. A pop-up box will appear with instructions on how to draw the shape.
- You can have multiple shapes on the map. To draw additional shapes after your first, go back to the Select Draw Mode, select your next shape, and follow the previous steps.
- You can undo the most recent drawing and clear all drawings by clicking the “Undo” or “Clear” buttons at the bottom of the formatting box.



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

- **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.
  - Click the “Print” bar in the Toolbox, enter your map title and use the drop-down to select layout and format preferences.

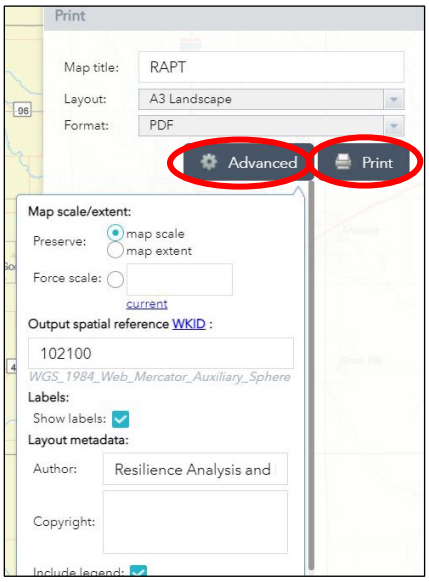
- NOTE: The PDF will only show the extent of the map that is visible on your display.



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

  - NOTE: In the Advanced Options, the “include attributes” box needs to remain toggled off for the map to print.

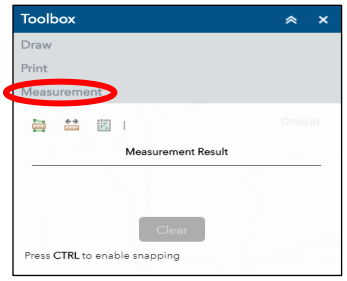
- Click “Print” and your map will save as a PDF.



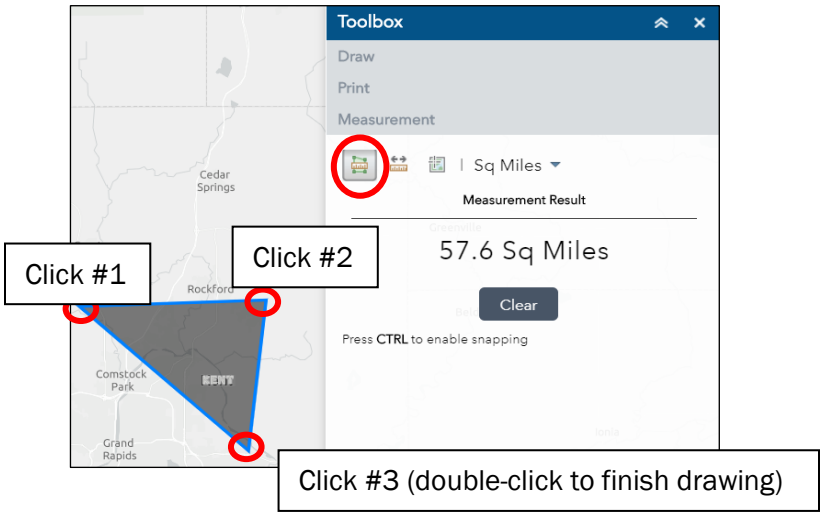
- **Measurement:** The Measurement tool lets you create polygonal shapes and straight lines while providing the square miles or distance as you draw your shapes. It can also provide latitude and longitude values for a specific point on the map.

  - Click on the “Measurement” bar located below the “Print” option in the Toolbox.

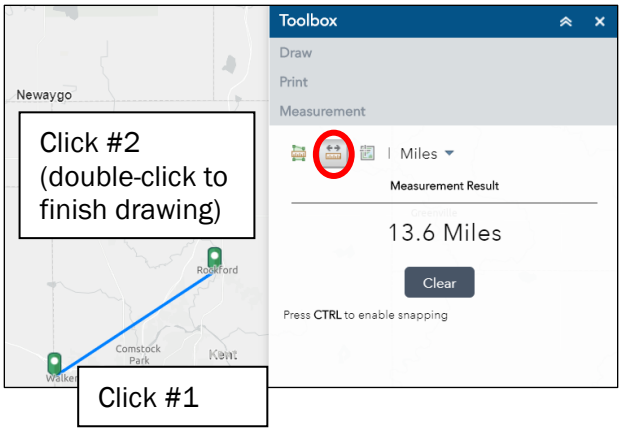
    - NOTE: The Measurement tool differs from the Draw tool in that it allows you to see the area of a polygon or the length of a line you are drawing while you are using the tool. This is useful for potentially determining the distance between events and infrastructure, geographical landmarks, or the affected radius of an event.



- To draw a polygon and measure the area within the polygon, click the “Area” icon.
- Click on points on the map to determine the corners of your polygon.
- Double-click the final corner of your polygon and the shape and area will appear.



- To draw a line and measure the distance of the line as you draw, click on the “Distance” icon.
- Click a point on the map as the start point of your line. As you move your mouse from that point, the distance will display under the “Measurement Result” section.
- Double-click the final point of your line and the total distance will appear.

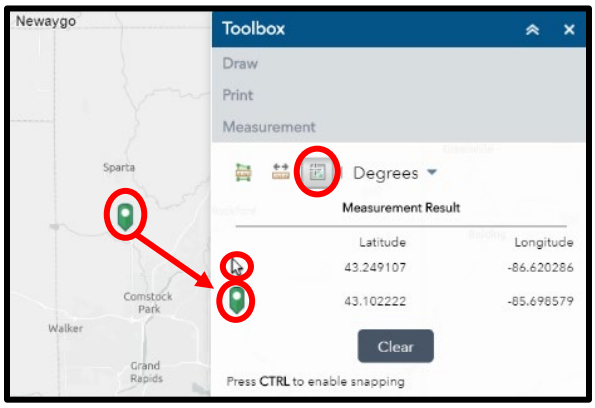


- To see the latitude and longitude values of a specific point on the map, click on the "Location" icon.

- Click the map at the desired location and the latitude and longitude values will display under the Measurement Result section.

As you move your mouse, the latitude and longitude values for your mouse location will display next to the mouse icon.

- If you click on a new location in the map, the latitude and longitude values will change to display the new location.

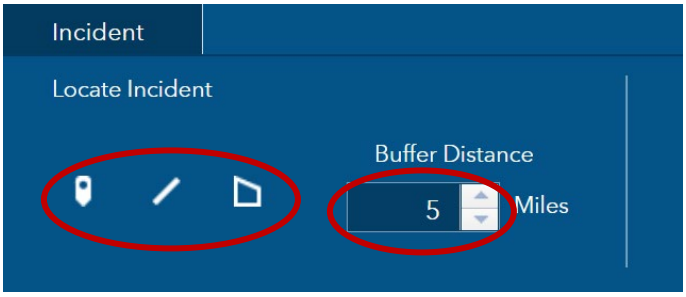


8.2. Incident Analysis

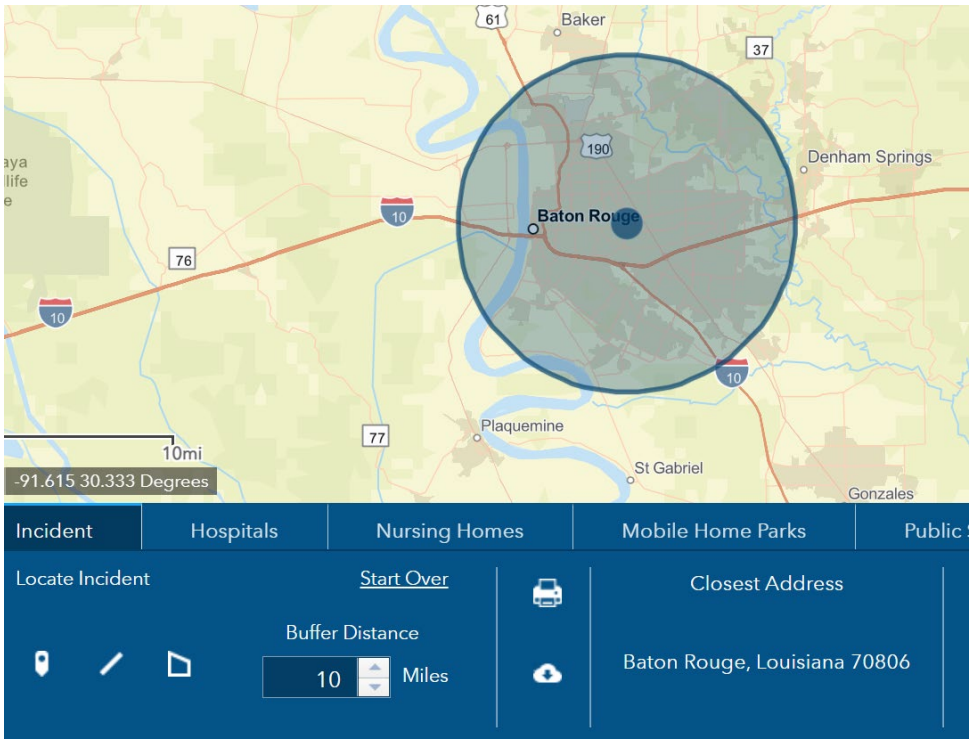
The Incident Analysis tool allows you to create a shape (single point, linear, and polygonal) and a buffer zone around that shape that represents an incident area or area of interest, and identify and visualize infrastructure entities within this incident area. This tool can provide a comprehensive list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

- Click on the "Incident Analysis tool" icon and the tool will open at the bottom of the page.

- Set the buffer distance 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 buffer zone. The map will zoom to the incident area.

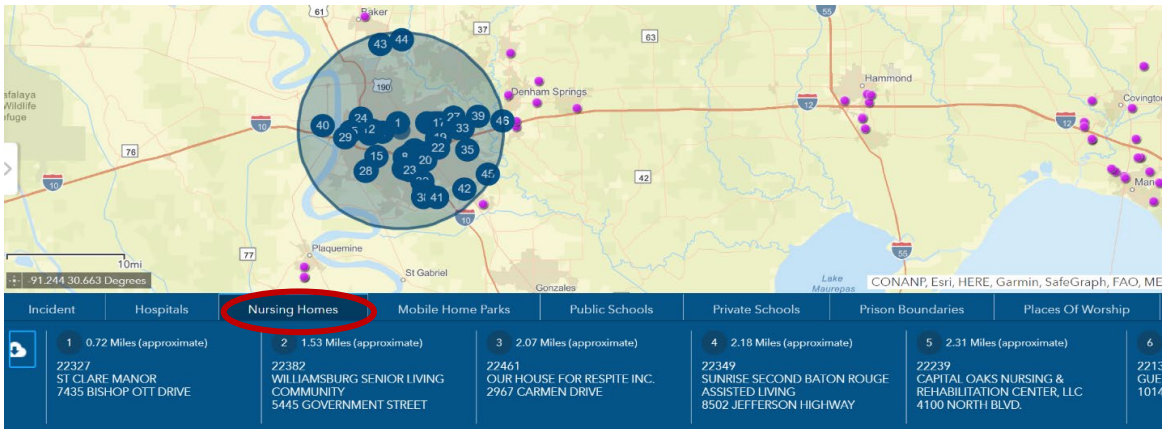


- Once the buffer zone is drawn, select infrastructure entities by clicking on the infrastructure name.
    - Infrastructure entities are listed in order of closest to furthest from the center of the buffer zone. Only the infrastructure entities in the buffer zone will be listed and displayed on the map.

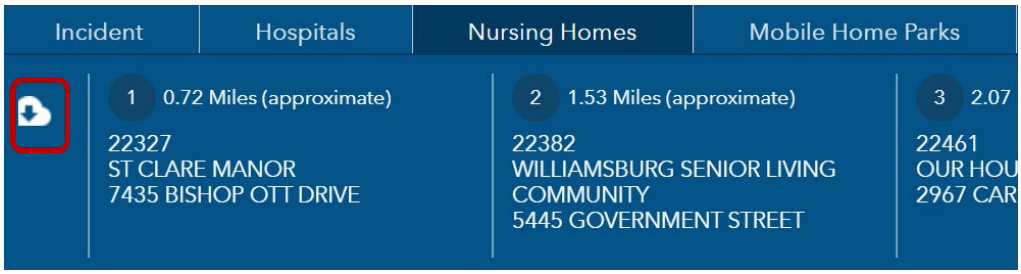
  - NOTE: To also see infrastructure entities outside the incident area, you must toggle on that infrastructure layer before opening the Incident Analysis tool.

- 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.



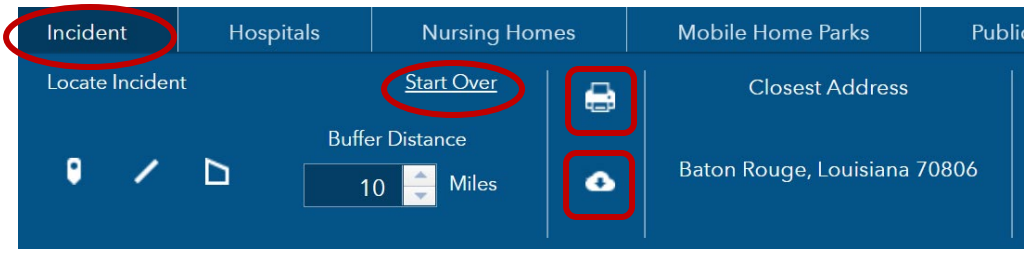
- To export the list of selected entities, click the “Cloud” icon and the list will open in Excel.



- To create a PDF report that provides a list of all infrastructure entities located within the incident area as well as their individual characteristics, go to the “Incident” tab in the tool and click on the “Printer” icon.

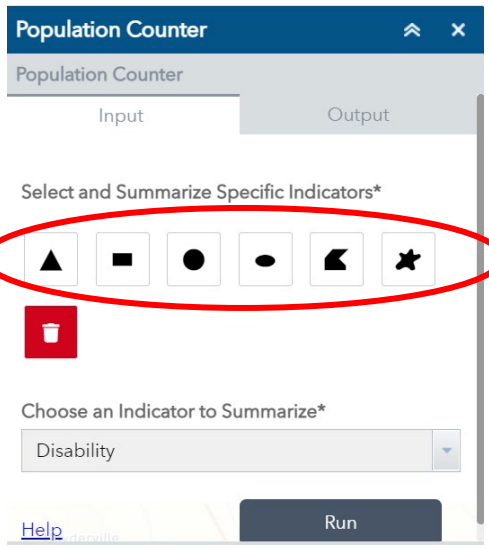
- To download and export an Excel file of all infrastructure entities located within the incident area, click on the “Cloud” icon.

- To erase the current buffer zone and create a new one, go to the “Incident” tab and click “Start Over.”



- Once you erase a buffer zone, the highlighted entities on the map and the list will disappear.

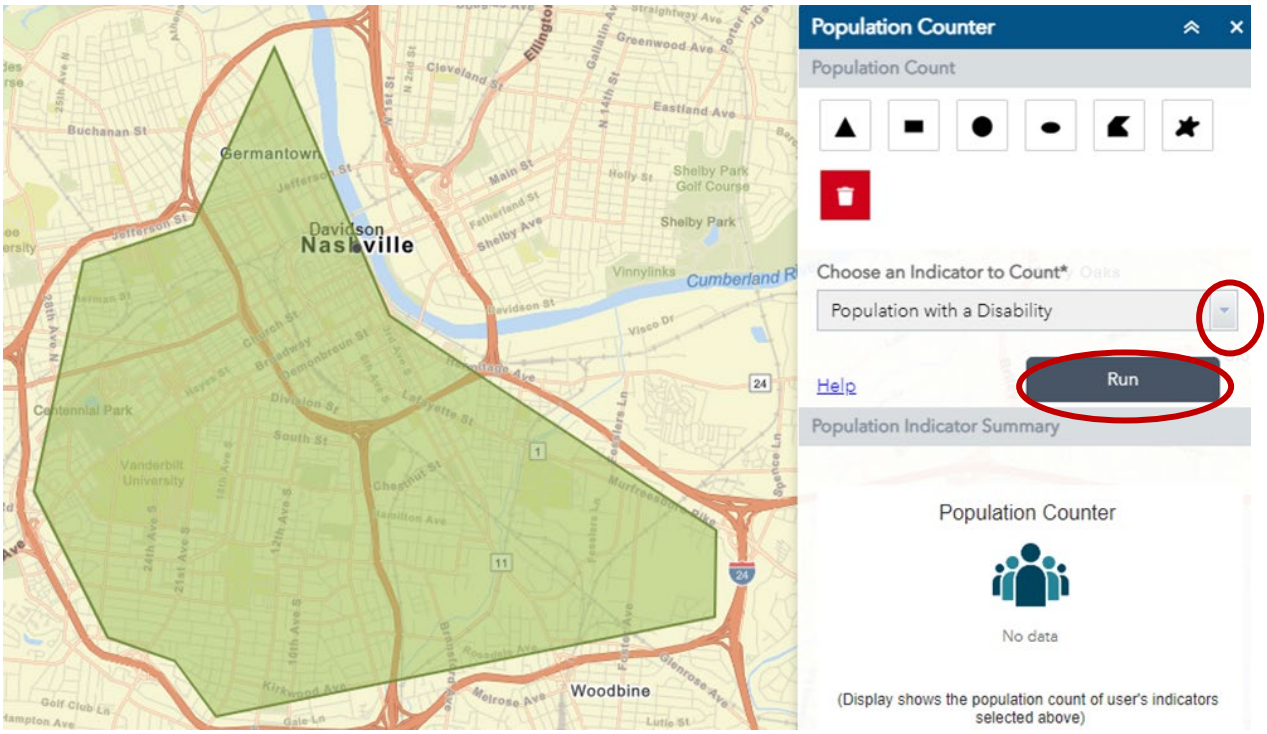
8.3. Population Counter



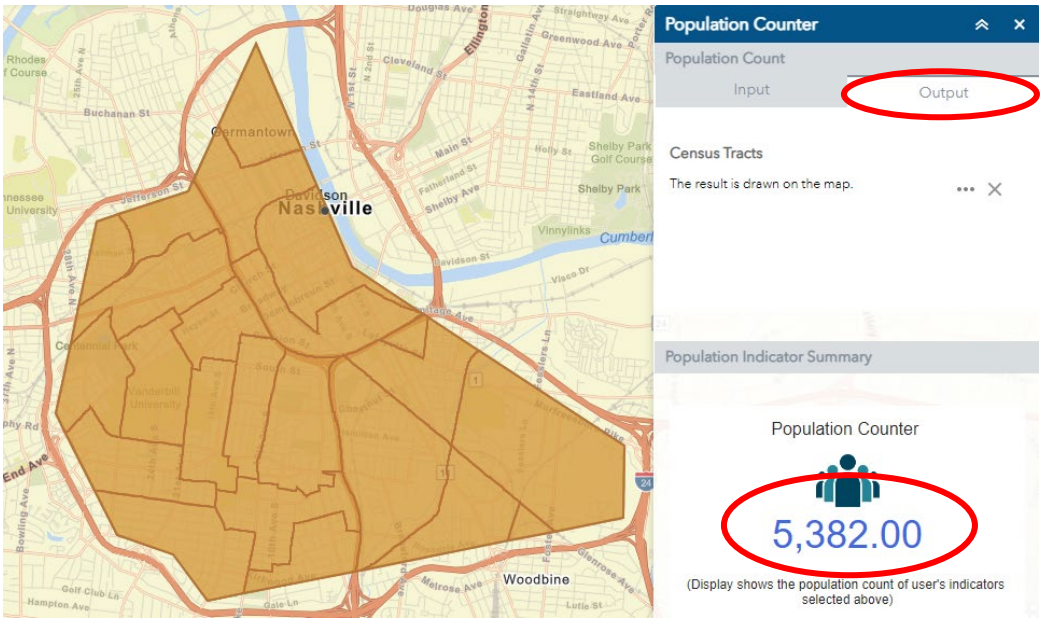
The Population Counter tool allows you to draw a specific incident area on the map (circle, rectangle, polygon, etc.), select all whole or partial census tracts within the incident area, and calculate the estimated population of individuals with specific resilience indicator characteristics (age over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

- Click on the “Population Counter” icon in the upper-right corner.
- The Population Counter opens on the right side of the screen. Click the desired shape you want to draw on the map (triangle, rectangle, circle, etc.).
- Place your mouse over the map after selecting the shape, and a box appears with instructions on how to draw the incident area.
- After drawing the incident area, select the indicator characteristic you wish to summarize from the drop-down list and click “Run.”

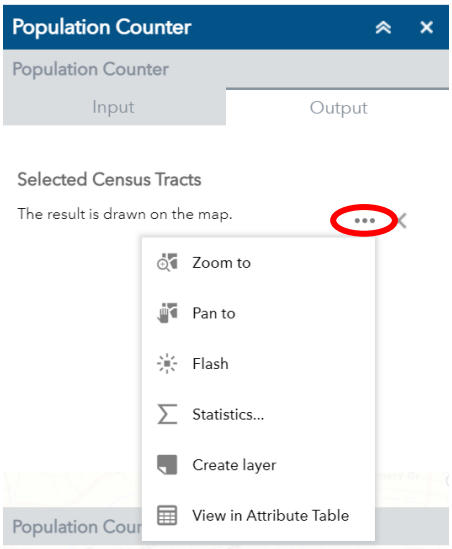
- NOTE: You may have to scroll down slightly to see the “Run” button, depending on your browser display settings.



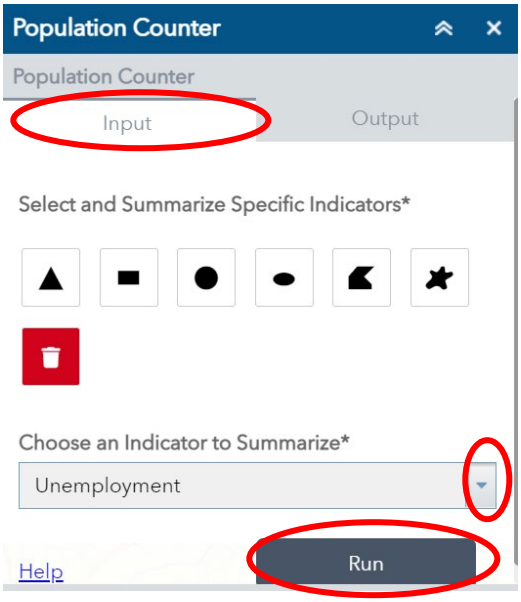
- The tool will take you to the “Output” tab, produce a visualization of the whole or partial census tracts within the incident area, and provide an estimate of the number of individuals with the selected resilience indicator characteristic in the Population Indicator Summary section.
- In the example below, the estimated number of individuals with a disability within the selected census tracts is 5,382, displayed in the Population Indicator Summary section.



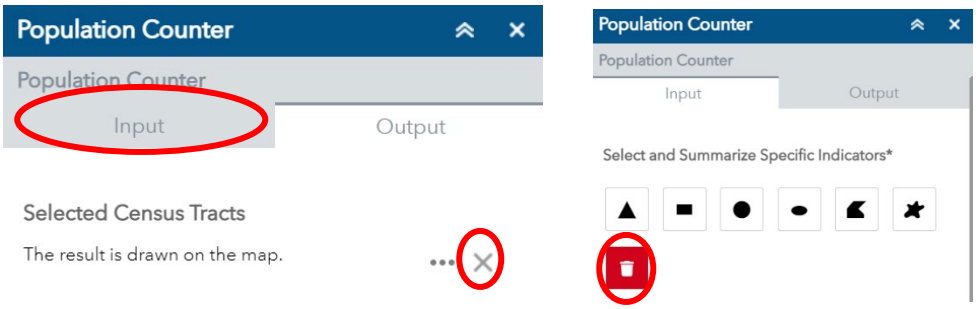
- To export, save, or view this information in the Attribute Table, click the 3 dots under “Selected Census Tracts” and select the desired action.



- To maintain the same incident area but summarize a different indicator characteristic, click on the “Input” tab in the tool, select the new indicator characteristic from the drop-down list, and click “Run.”



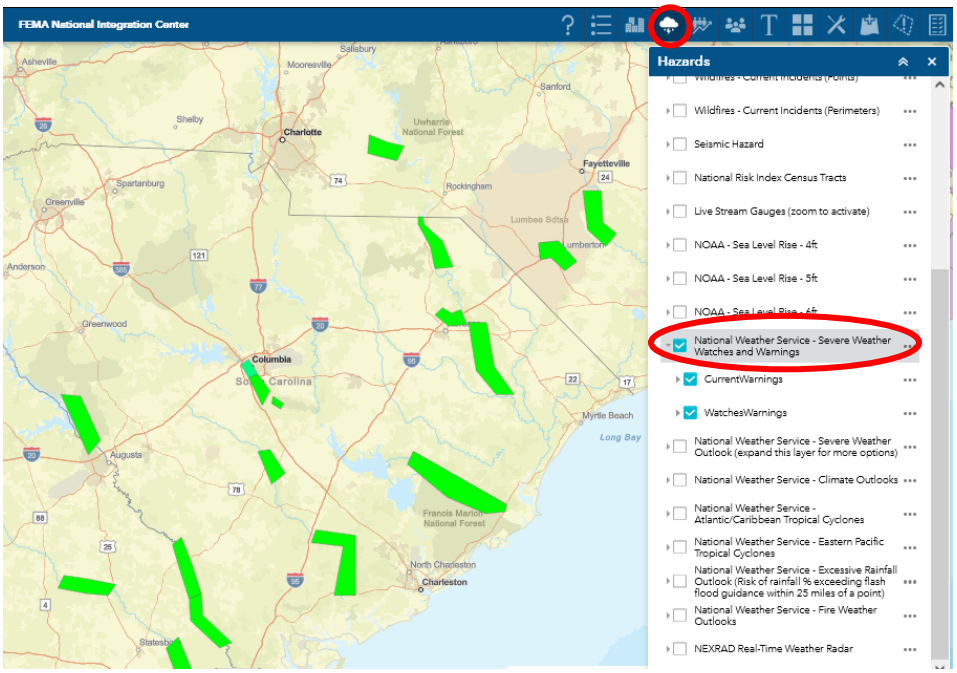
- To create a different incident area, click on the “X” to clear the results in the “Output” tab. Then, go to the “Input” tab, and click on the red box to use the tool and select a different area.



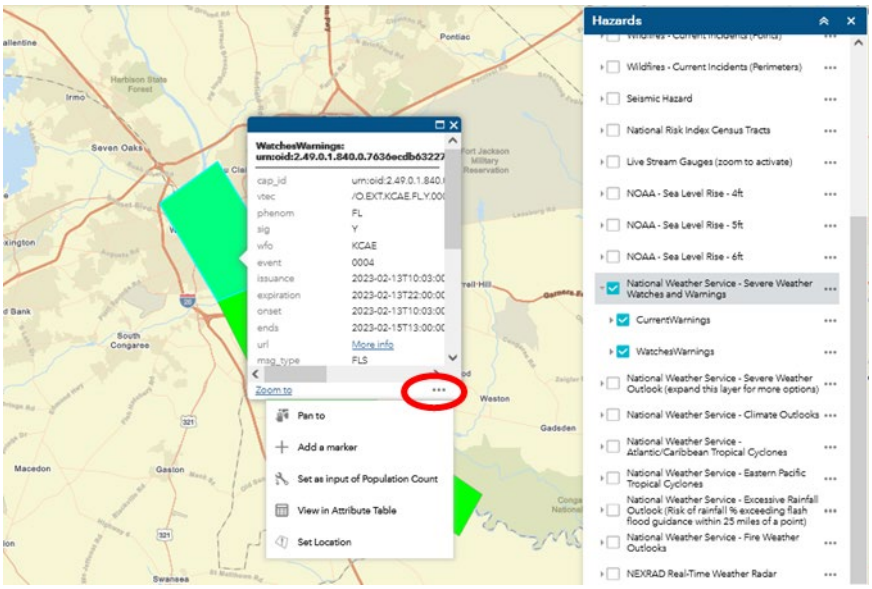
8.4. Incident Area From Shapefile

Users can use shapefiles to set the incident area for both the Incident Analysis tool and the Population Counter tool. 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 Severe Weather Watches and Warnings layer.



- Click on the Severe Weather Watch or Warning you want to use as your shape.
- In the pop-up box, click on the 3 dots at the bottom right to display a list of options.



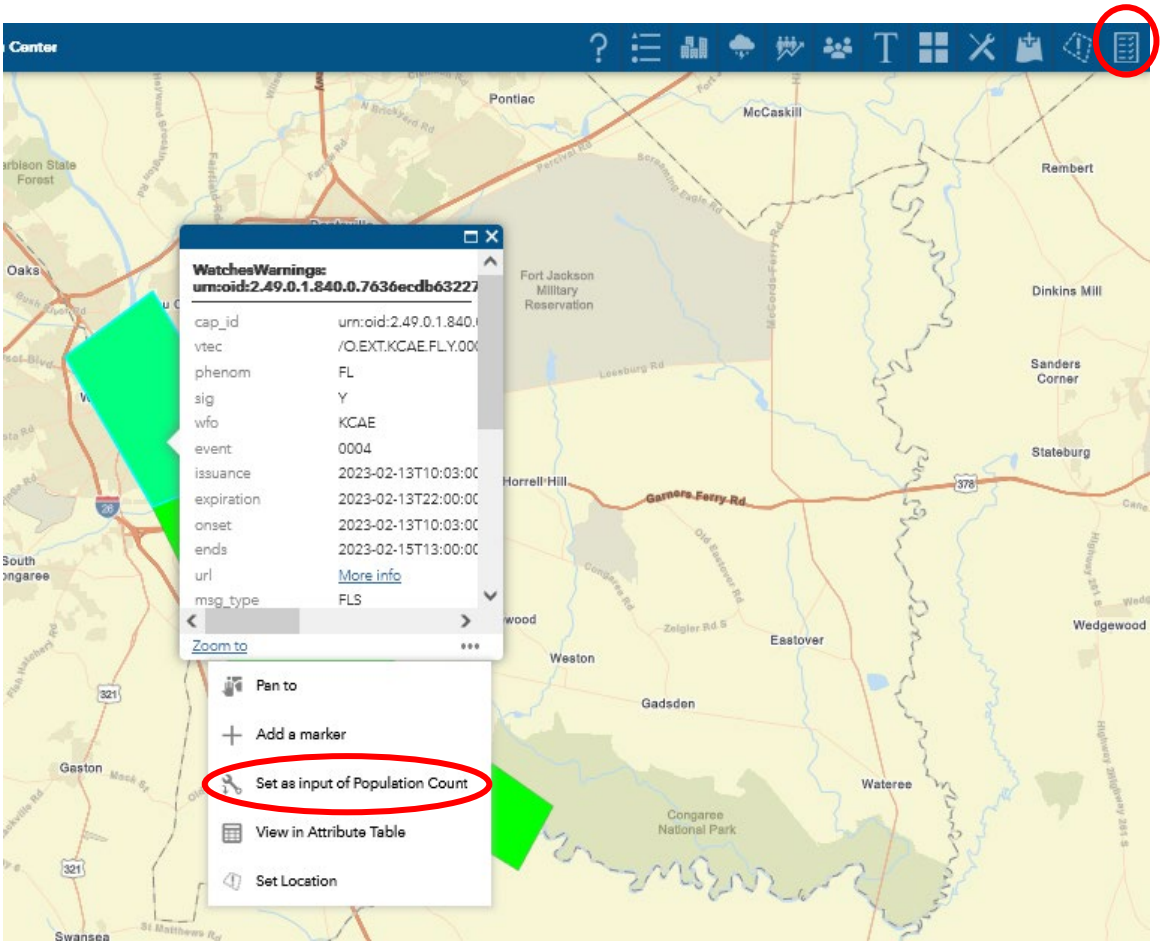
To set a unique incident area for the Incident Analysis tool, please see the Incident Analysis section on page 20.

To set a unique incident area for the Population Counter tool, see below.

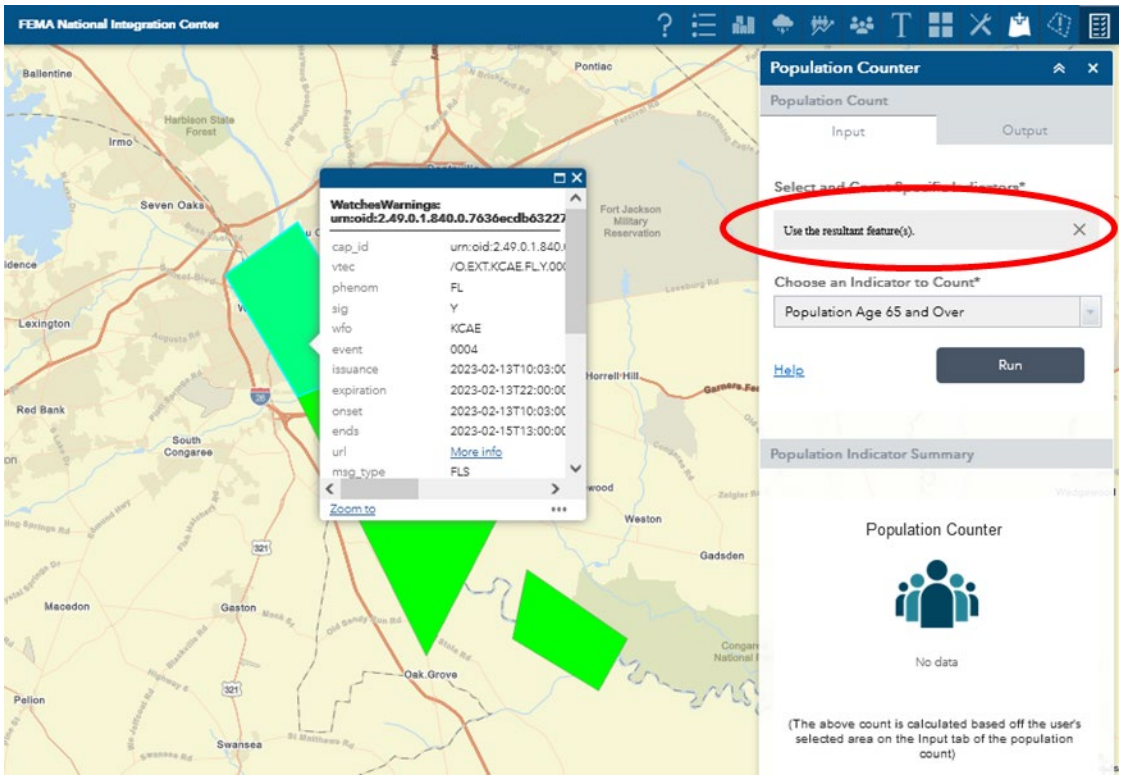
8.4.1. POPULATION COUNTER

- Select “Set as input of Population Count.”

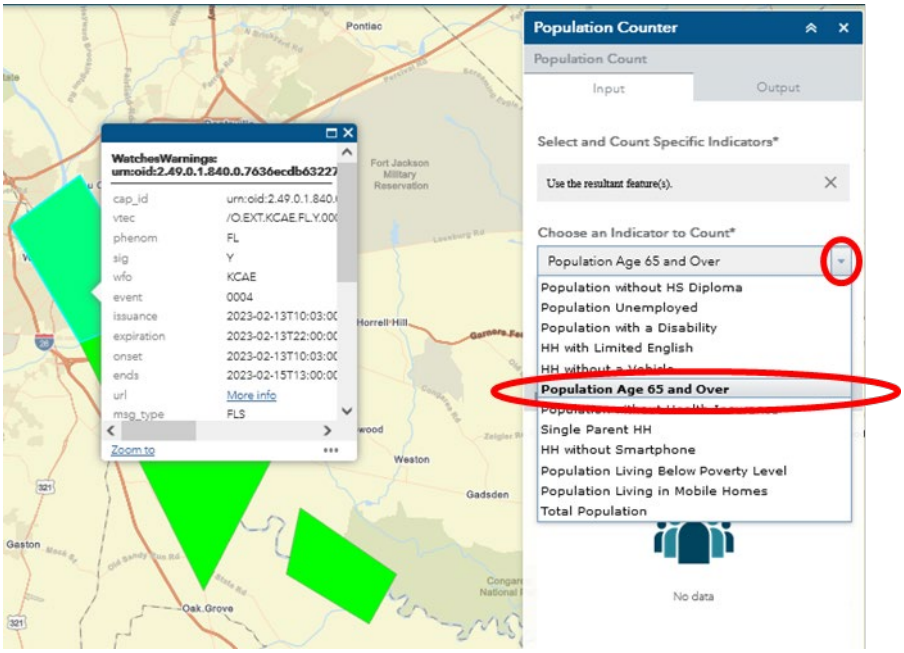
- Click on the “Population Counter” tab in the upper-right.



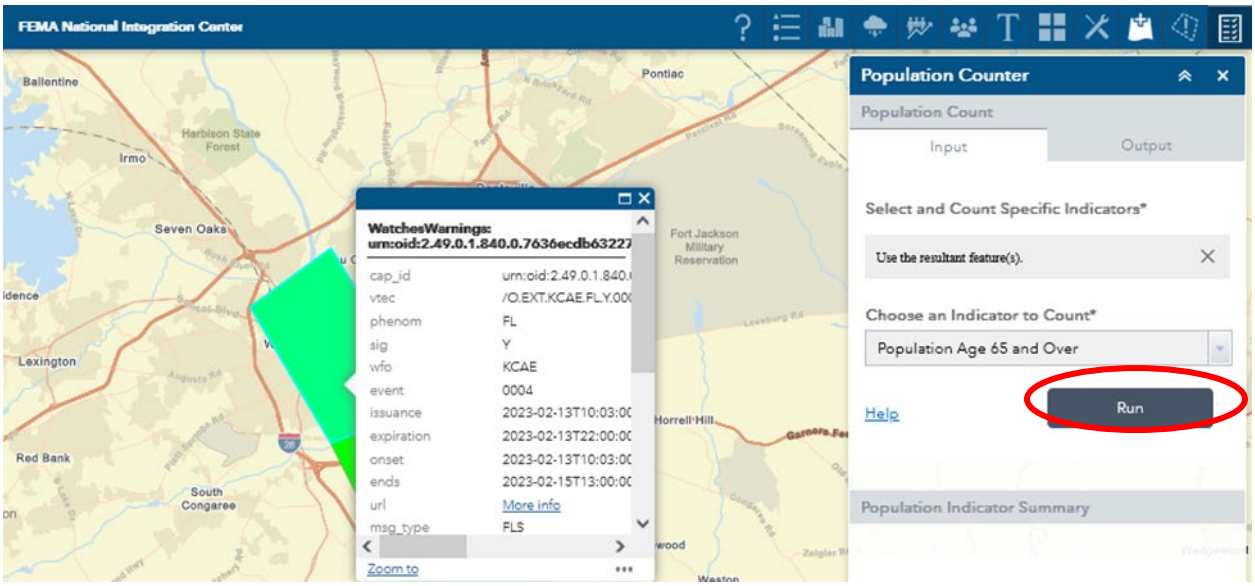
Once you click on the Population Counter tab, the tool will open on the right side of the page. You will notice that instead of the various options to draw an incident area on the map, the Input tab will display “Use the resultant feature(s).”



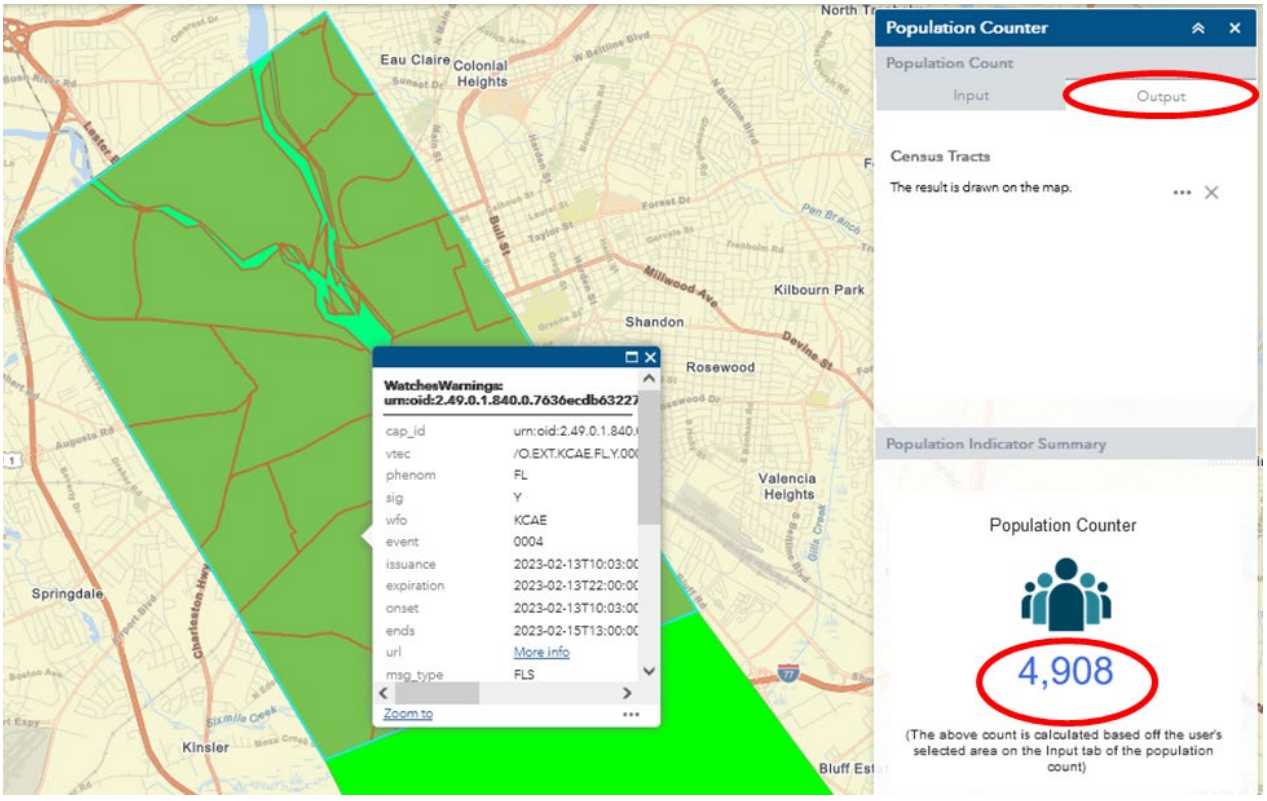
- Click on the drop-down arrow to see a list of available indicators.
- Select the indicator you wish to estimate for the incident area.



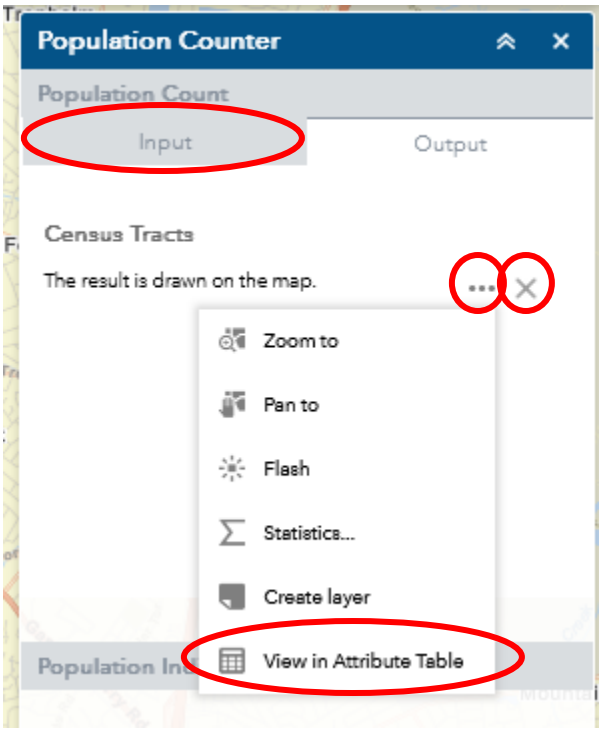
- Click “Run” and the tool will run the calculation for the unique incident area and indicator selected.



Once the tool has completed the calculation, you will see the Output tab displayed and the total estimated number of individuals with the selected indicator will be shown at the bottom. The unique incident area will be highlighted on the map.



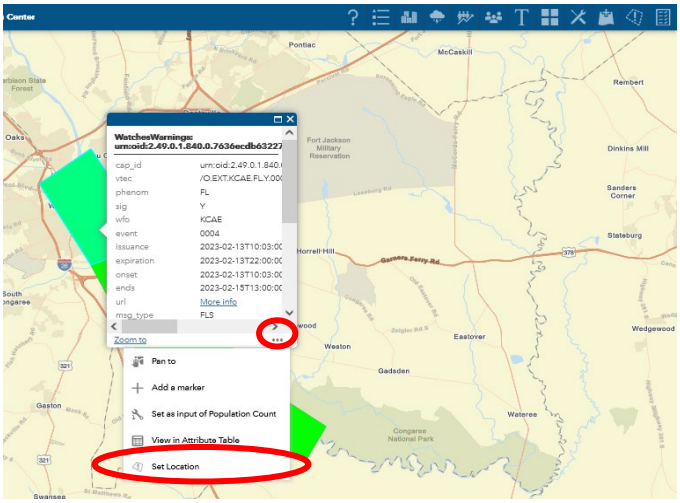
Once the results are displayed, the functionality is the same as using the Population Counter with the default shapes provided. You can view the information in the Attribute Table, clear the selection or return to the Input tab and select a different indicator to calculate.



8.4.2. INCIDENT ANALYSIS

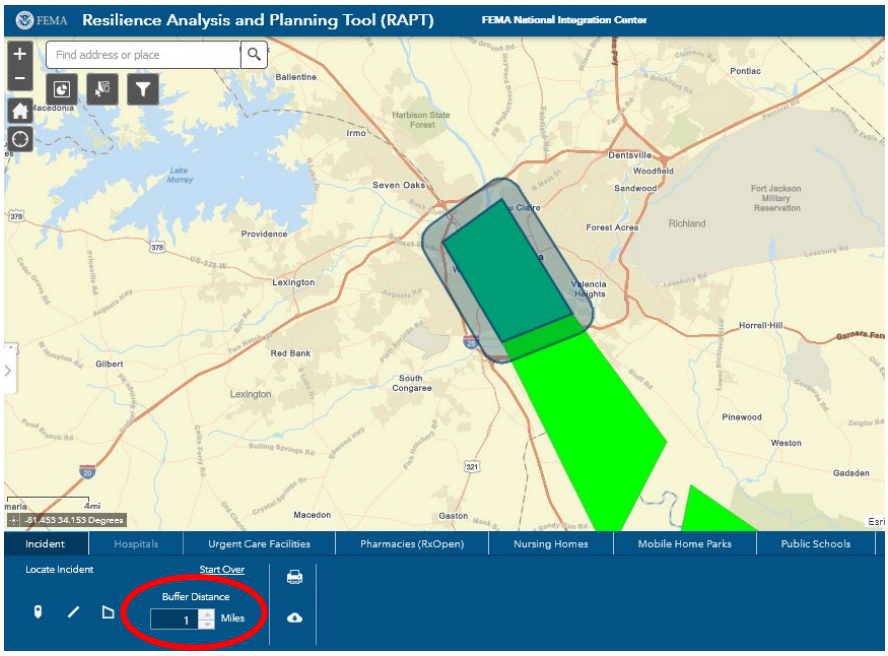
You can also set unique incident areas for the Incident Analysis tool.

- Use the same steps listed previously on page 26 to select your unique shape and open the pop-up.
- Click on the 3 dots.
- With the pop-up open and the options listed, click on “Set Location.”



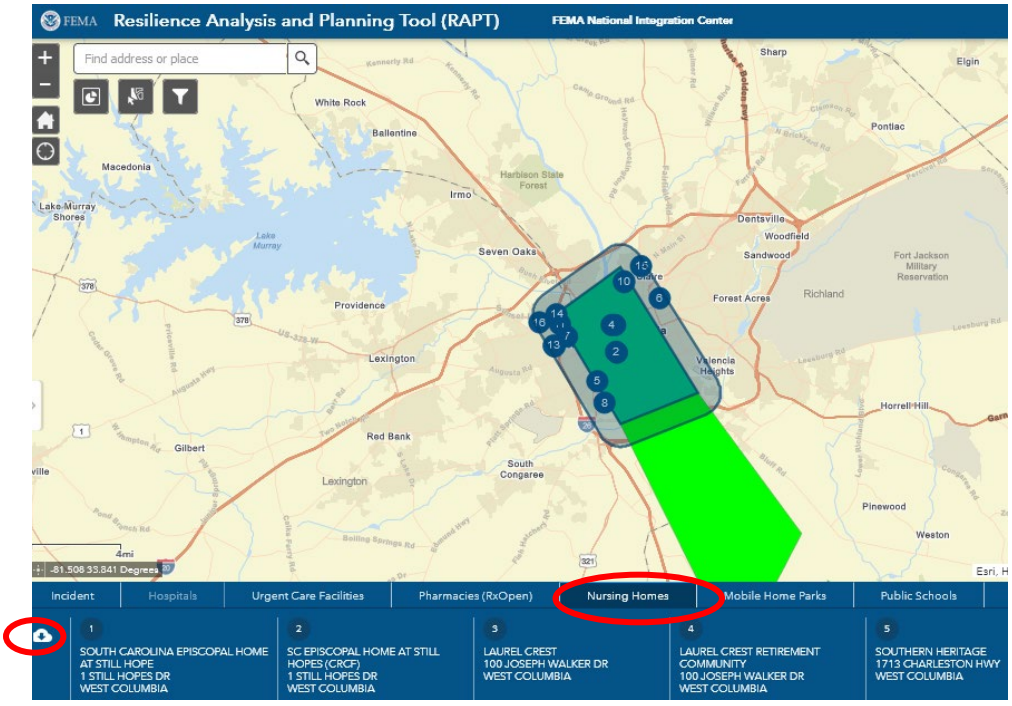
The Incident Analysis tool will open automatically at the bottom of the screen and the unique incident area will be selected.

- Set your buffer distance by entering the value in the “Buffer Distance” box as a unit of miles.
    - You can also use the arrows to increase or decrease the buffer distance.



- Click on any of the infrastructure titles to see the infrastructure entities within the unique incident area.

- Download the list of infrastructure entities by clicking the “Cloud” icon.

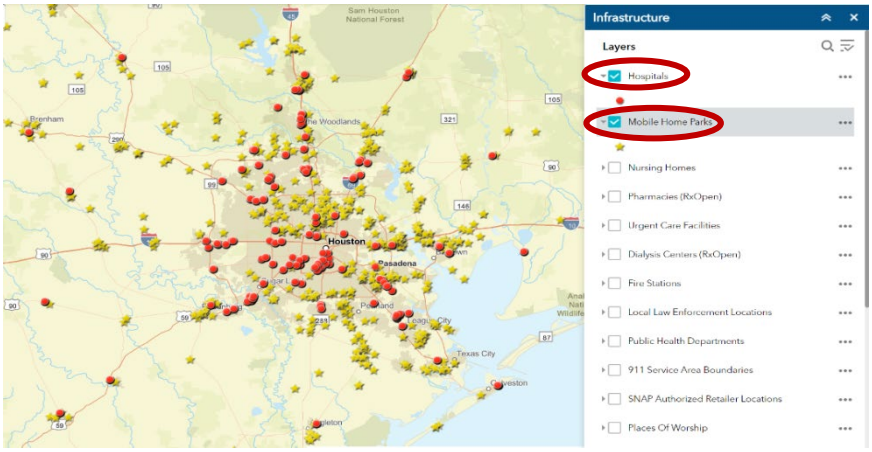


8.5. Filter

The Filter tool is found in the upper left of the map and allows you to set parameters and filter certain indicators, infrastructure, and hazards by specific characteristics, such as location (state,

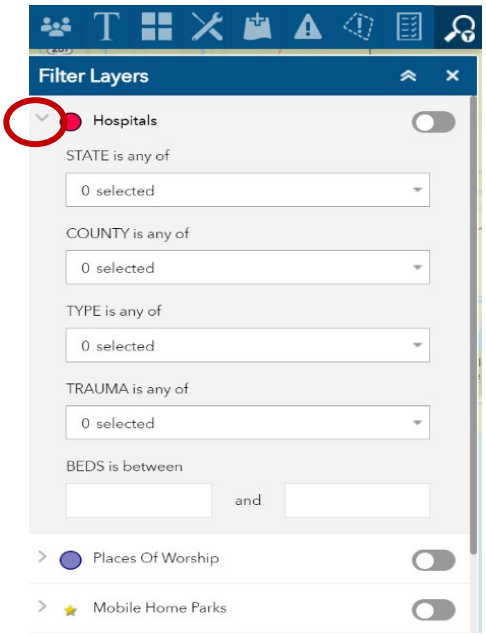
county, etc.), value (over 50% or between 25-45, etc.) or characteristic (type of hospital, for example).

- Before using the Filter tool, 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.
    - NOTE: Refer to the Infrastructure and Hazards sections on how to toggle on/off these layers.



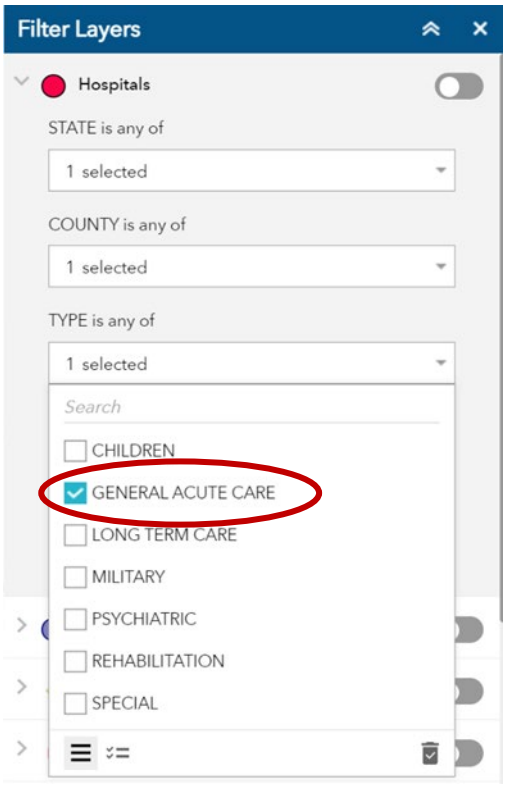
8.5.1. PRE-LOADED FILTERS

- Once the desired layers are toggled on, Click on the “Filter” tool.
- Click the arrow to expand the filter options for each entity you want to set a filter for.

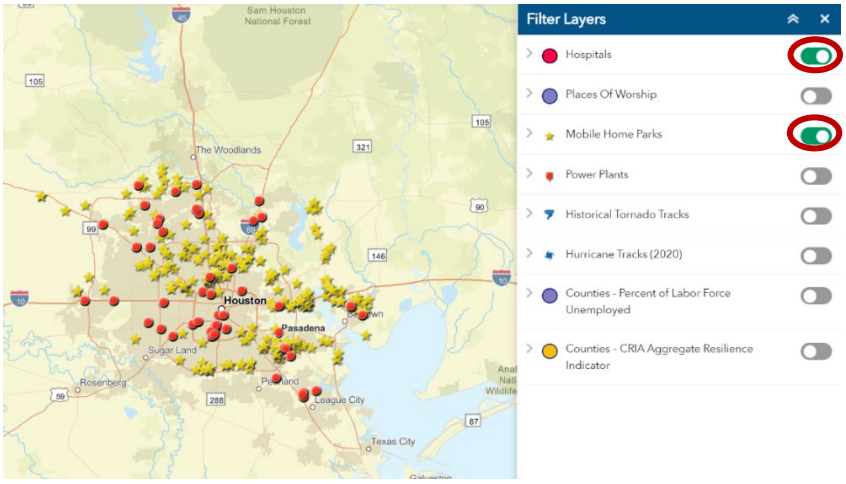


- Set the parameters of your filter for each of the entities you are examining. For this example:

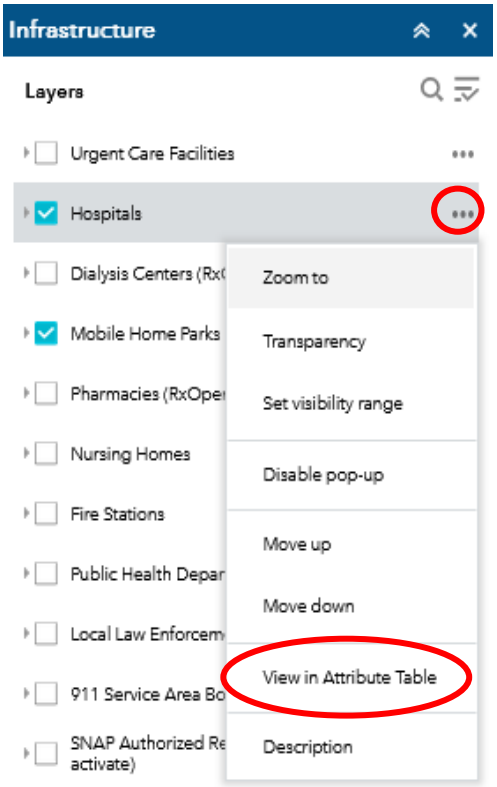
- The Hospital filters are: state is Texas, the county is Harris, and the type is General Acute Care.
- The Mobile Home Park filters are: state is Texas, the county is Harris, and the status is Open.



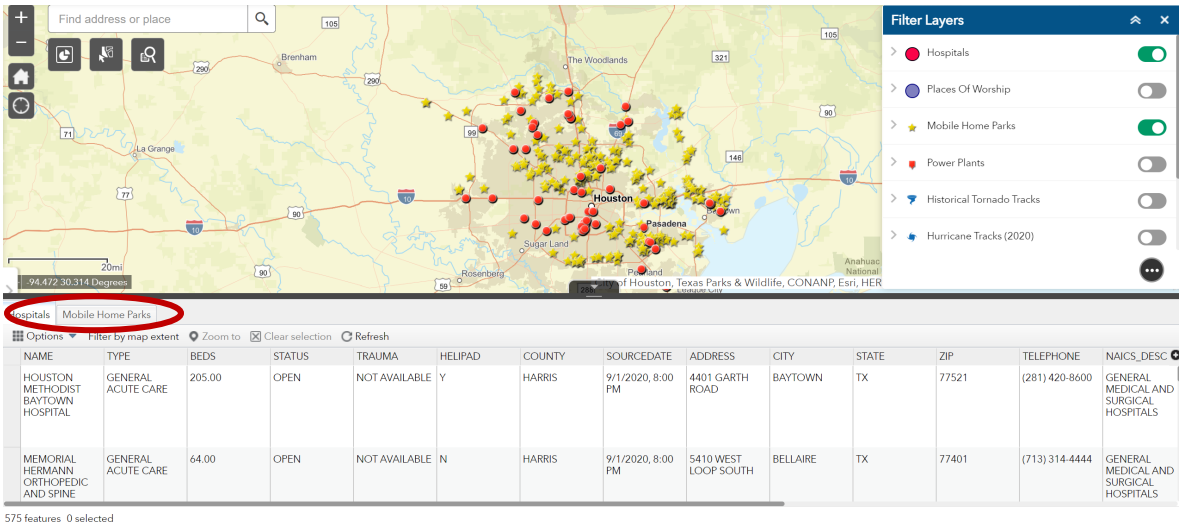
- Toggle the filter on by clicking the button to the right of the entity name. It will turn green and your map will display only those entities that fit the parameters of the filters you have set.



- To view this information in tabular form, go to the infrastructure tab, click on the 3 dots next to the infrastructure name and click “View in Attribute Table.”



- To export this information, click on “Options” and select “Export all to CSV.”

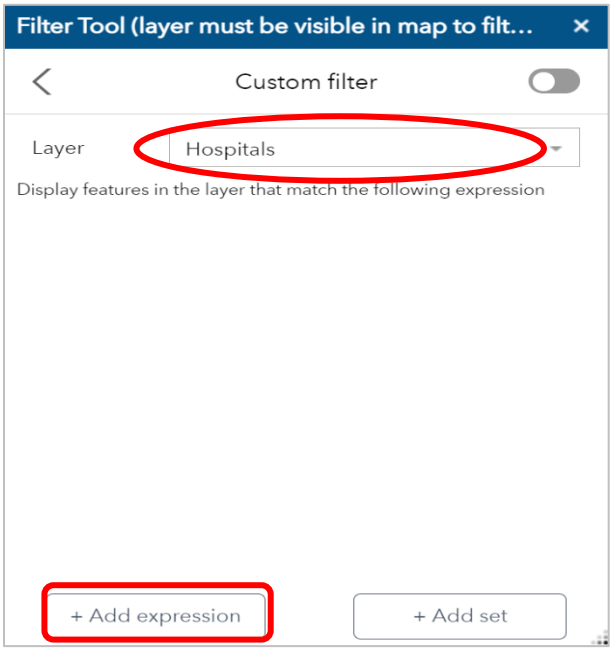


NAME	TYPE	BEDS	STATUS	TRAUMA	HELIPAD	COUNTY	SOURCEDATE	ADDRESS	CITY	STATE	ZIP	TELEPHONE	NAICS_DESC
HOUSTON METHODIST BAYTOWN HOSPITAL	GENERAL ACUTE CARE	205.00	OPEN	NOT AVAILABLE	Y	HARRIS	9/1/2020, 8:00 PM	4401 GARTH ROAD	BAYTOWN	TX	77521	(281) 420-8600	GENERAL MEDICAL AND SURGICAL HOSPITALS
MEMORIAL HERMANN ORTHOPEDIC AND SPINE	GENERAL ACUTE CARE	64.00	OPEN	NOT AVAILABLE	N	HARRIS	9/1/2020, 8:00 PM	5410 WEST LOOP SOUTH	BELLAIRE	TX	77401	(713) 314-4444	GENERAL MEDICAL AND SURGICAL HOSPITALS

8.5.2. CUSTOM FILTERS

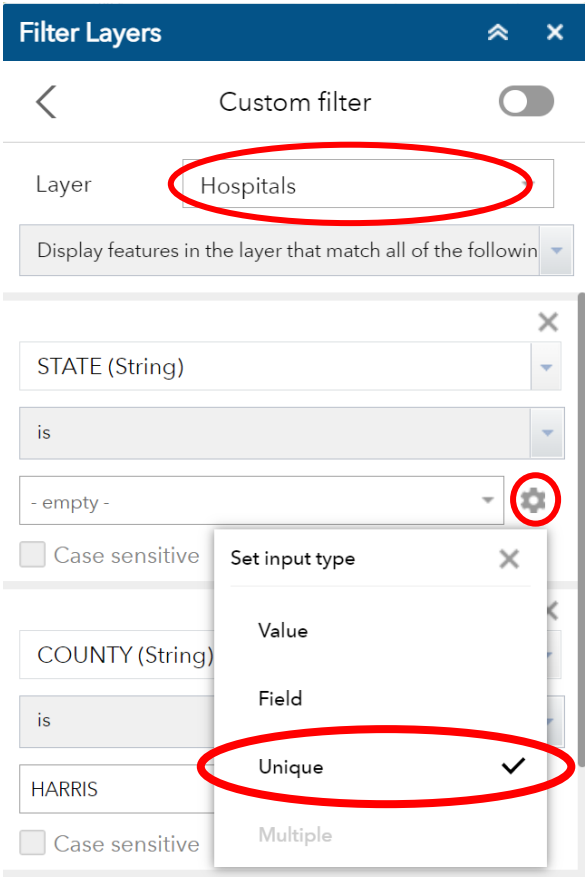
In addition to the pre-loaded filters that are available, you can create a custom filter with additional or different parameters for each entity. To create a custom filter, click on the “Create a Custom Filter” icon located at the bottom of the Filter tool layer.

- Select the layer you want to set a filter for, such as Hospitals.
- Click “Add Expression” to add an expression to your filter.

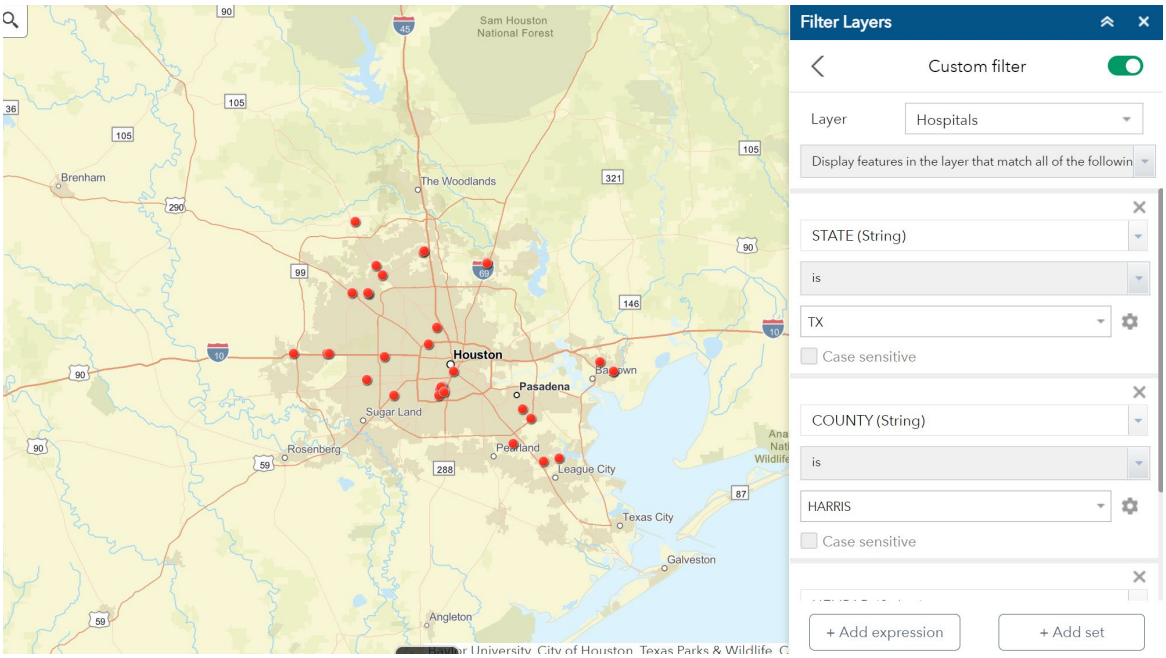


- NOTE: There are 3 different ways to input values for your filter parameters. Click on the “Gear” icon to set your input type for each parameter.
    - **Value**: The user must type the input for the parameter, and the input value must match the entity information *exactly* for it to work correctly.
        - For example, the state parameter value must be entered as a capitalized 2-letter abbreviation, not the full state name.
    - **Field**: The user is given a shortened list of information fields pertaining to the entity 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 entity and selects which values will be the parameters for the filter. This is the best option for location filters, because it automatically uses the correct formatting for the input type.

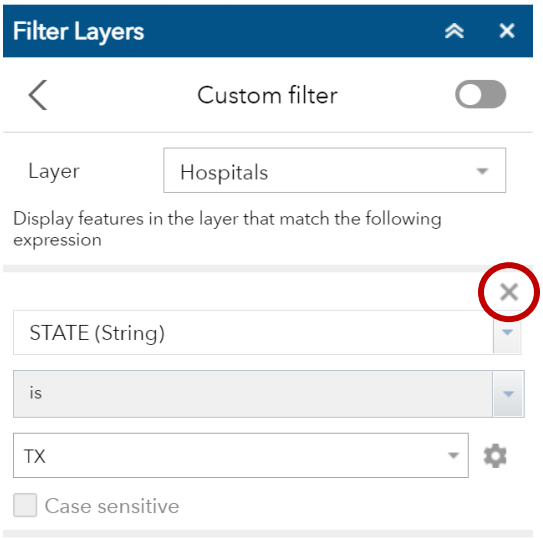
– In this example, using the Unique input type creates a drop-down list of all the states, counties and options for helipad that exist for hospitals.



- Set the parameters of your custom filter. In this example, the custom filter is: state is TX, county is HARRIS, and Helipad is Y.
- Toggle the filter on by clicking the button to the right of “Custom filter.” It will turn green and your map will display only those entities that fit the parameters of the custom filter you have set.



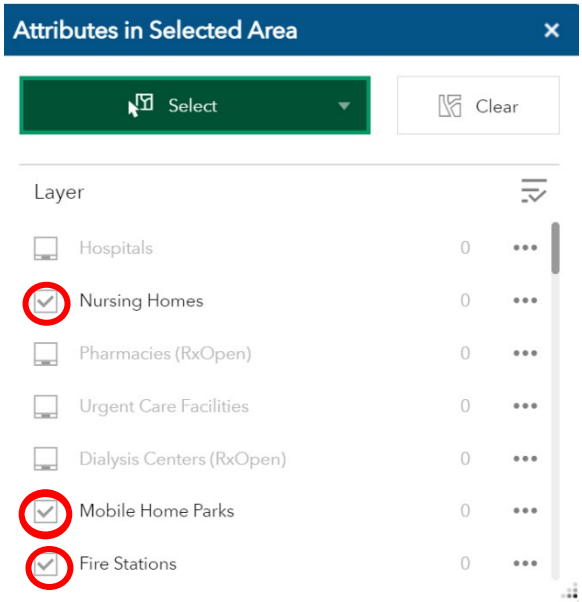
- To reset the custom filters you have made, click the "X" for each expression you have added.
  - NOTE: You can only create one custom filter at a time.



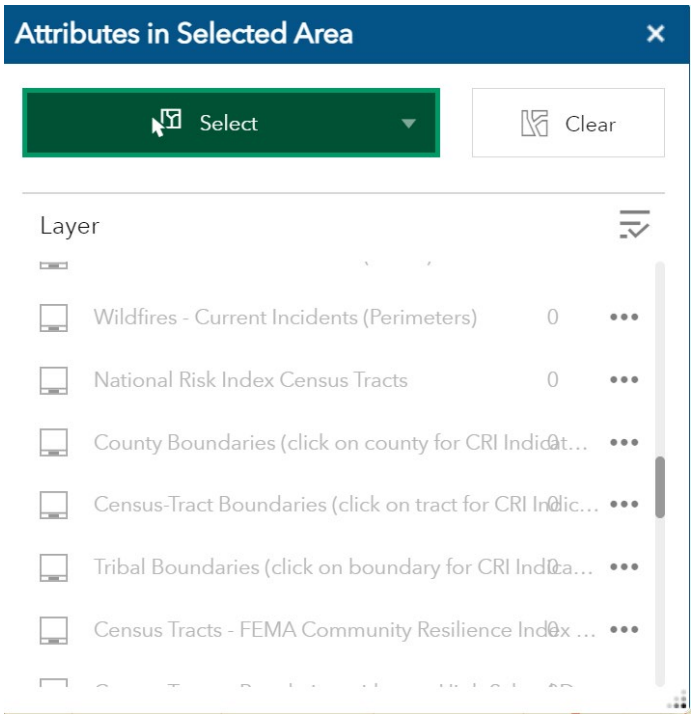
8.6. Attributes in Selected Area

The Attributes in Selected Area tool can be found in the upper left of the map 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.

- Before using the tool, turn on the infrastructure and hazard layers to be included in the output.
  - NOTE**:** Refer to the Infrastructure and Hazards sections on how to toggle on/off these layers.
- Click the "Selection" icon and the tool pop-up box appears. Select the infrastructure layers you wish to analyze by clicking on the boxes next to their names.
  - NOTE: Only the infrastructure layers you have turned on before opening the tool can be selected and summarized. All other layers will be greyed out as shown below and will not be included in the summary of entities.

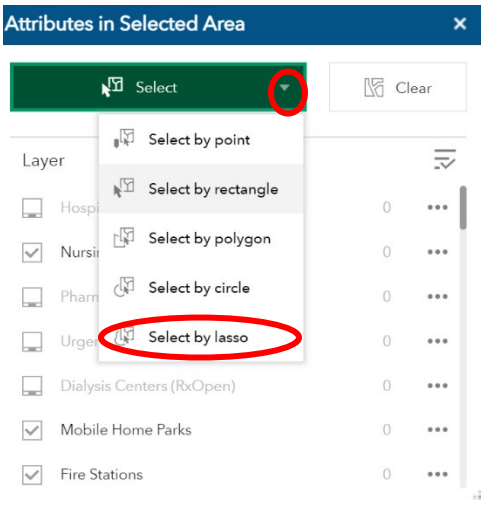


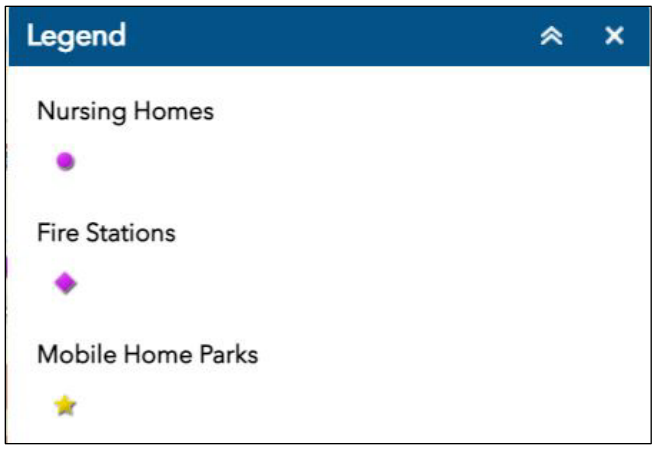
- If you have the "County Boundaries" or "Census Tracts Boundaries" layers toggled on, they will also appear in the results of the Selection tool. If you do not want to look at the counties or census tracts, and instead want to focus on infrastructure or hazard layers, turn off the "County Boundaries" and "Census Tracts Boundaries" layers listed in the layer list. Sometimes it is easier to see individual infrastructure entities with the county or census tract layers turned off.



- Click the arrow in the green "Select" box and select your desired shape from the drop-down list.
  - NOTE: When you place your mouse over the map after selecting the shape, a box will appear with instructions on how to draw the shape.

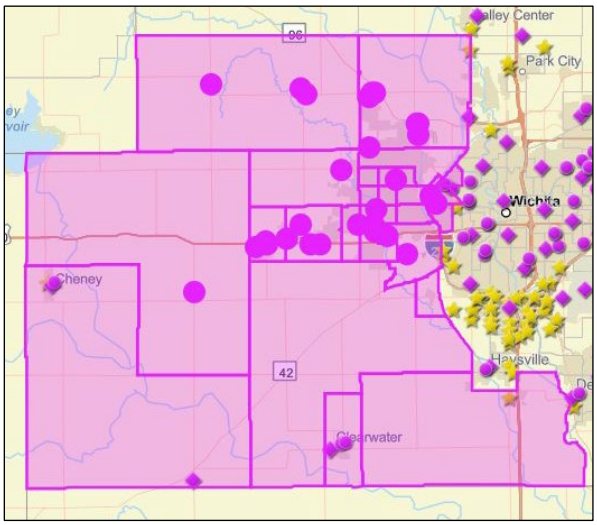
- The Legend includes information about which infrastructure layers are turned on; the legend for this example is below.

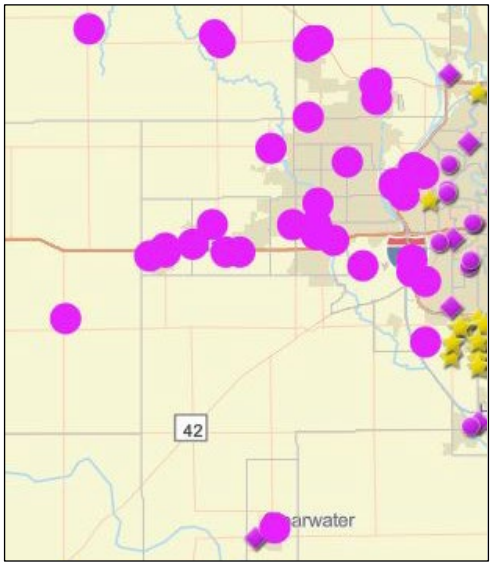




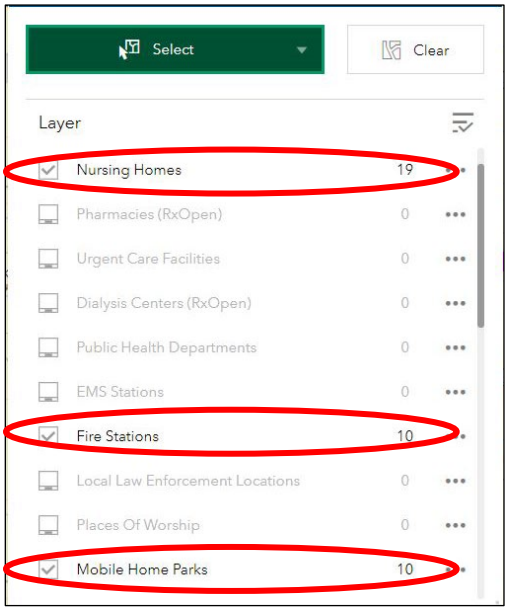
- After drawing the shape, you will see the infrastructure, hazard, county, and census tract entities selected within the shape.

- The image on the left shows the results of a rectangular drawing when census tracts are on. The image on the right shows the same drawing results when census tracts are off. The purple circles identify the various infrastructure entities within the selected area.

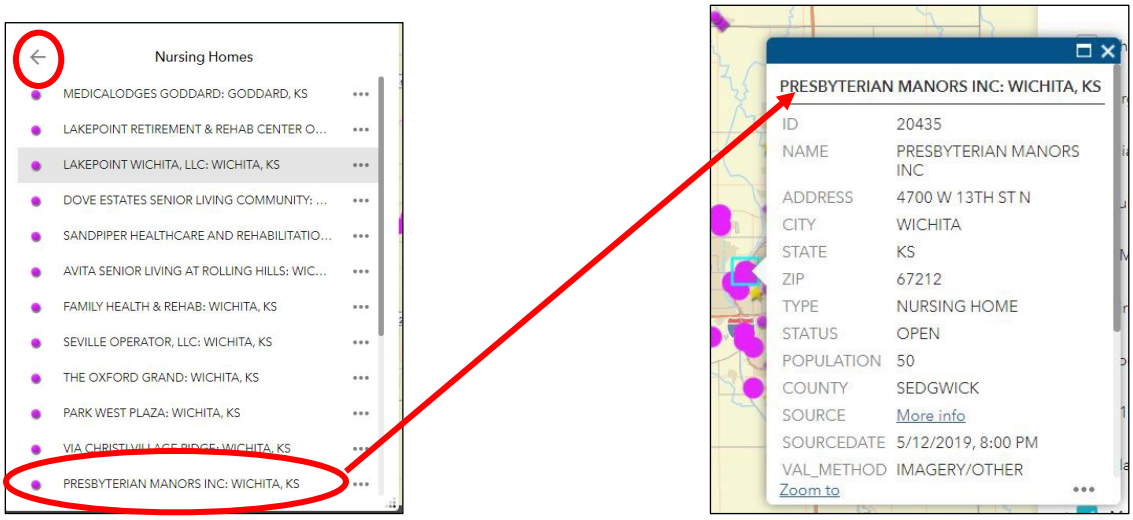




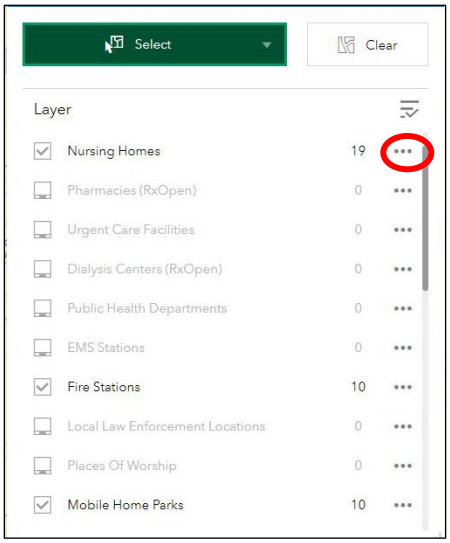
- The layer list displays the number of infrastructure entities and the number of counties and census tracts in the selected area.
  - In the example below, the area has 19 nursing homes, 10 fire stations, and 10 mobile home parks.

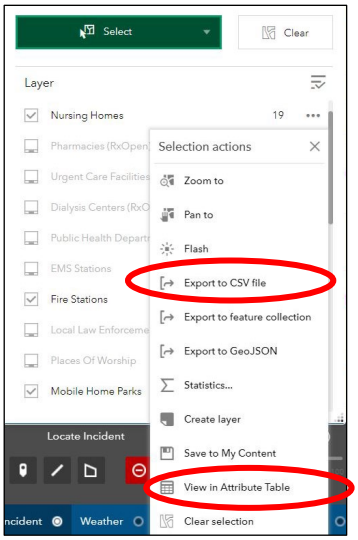


- Click on a specific layer to see a list of those entities within the area.
    - The image below shows the 19 nursing homes from the example above.
- Click on one of the nursing homes in the list to display a pop-up on the map with that nursing home's information.
- To go back to the layer list and view other infrastructure entities, click on the arrow in the top left of the tool.



- To export, save, or view this information in the Attribute Table, click the 3 dots to the right of the specific layer you want to focus on and select the desired action.





- To clear the results and select different entities or a different area, click the “Clear” button at the top of the tool.

- NOTE: If you wish to use the Population Counter tool to calculate the total population within the selected census tracts as described below, do not click the “Clear” button.

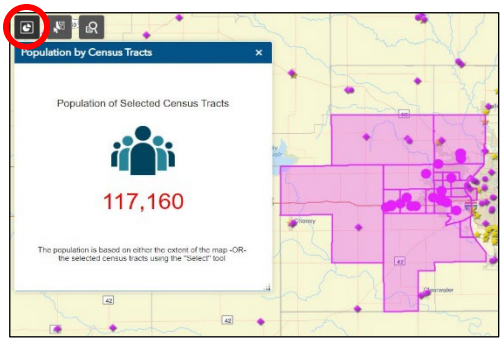
8.7. Population by Census Tracts

The Population by Census Tracts tool is located at the top left of the map and calculates the total population of the census tracts that are selected by the Attributes in Selected Area tool.

- NOTE: For this tool to work, you must have turned on the “Census Tract Boundaries” layer within the Census Tract Indicators list when using the Attributes in Selected Area tool. If this layer was turned off, you will need to clear your results in the Attributes in Selected Area tool, turn on the “All Census Tracts” layer, and re-select the census tracts.

- After selecting several census tracts with the Attributes in Selected Area tool, click the “Population by Census Tracts” icon.

- The total population of the selected census tracts appears.



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