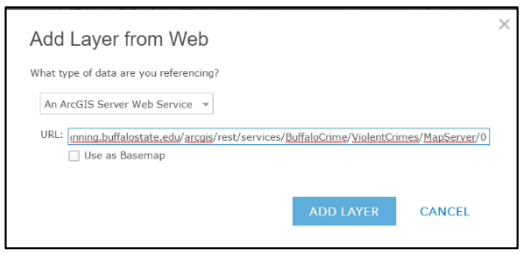
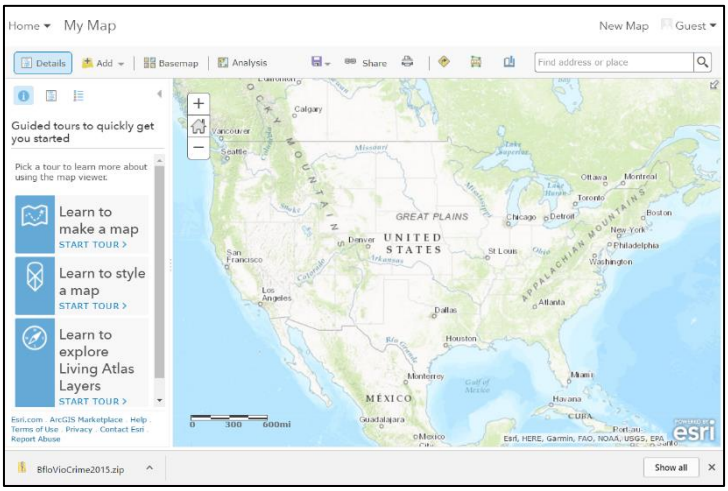
Crime Study Using ArcGIS Online

This module demonstrates how to use an ArcGIS Online Account to conduct analysis of crimes. A guest account is being used to demonstrate this application instead of the author's administrative account.

1. Log in to your ArcGIS Online account.
2. Click on MAP from the top menu bar to open a new map
3. Click the down arrow next to the +Add button and select "Add Layer from Web".

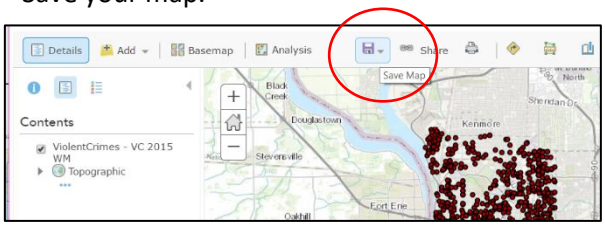


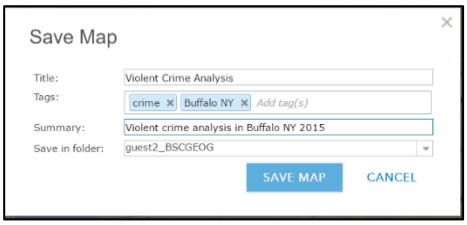


Enter the URL: https://geographyplanning.buffalostate.edu/arcgis/rest/services/BuffaloCrime/ViolentCrimes/MapServer/0

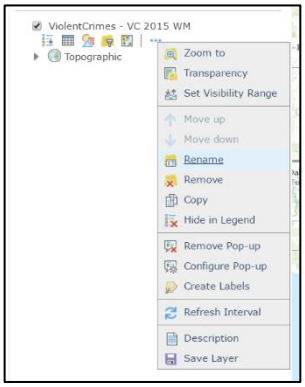
Click on ADD LAYER. You will get a warning about too many features to draw. All 3,405 of the crime locations are used in the analysis.

4. Save your map.

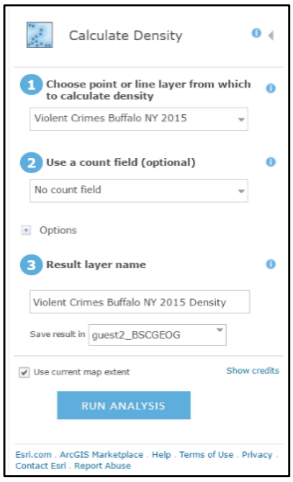


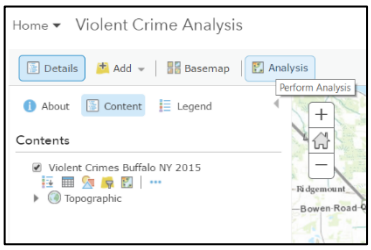


5. Click on the map layer name, then the . . . to rename the layer.



Density and Hot Spots Analysis

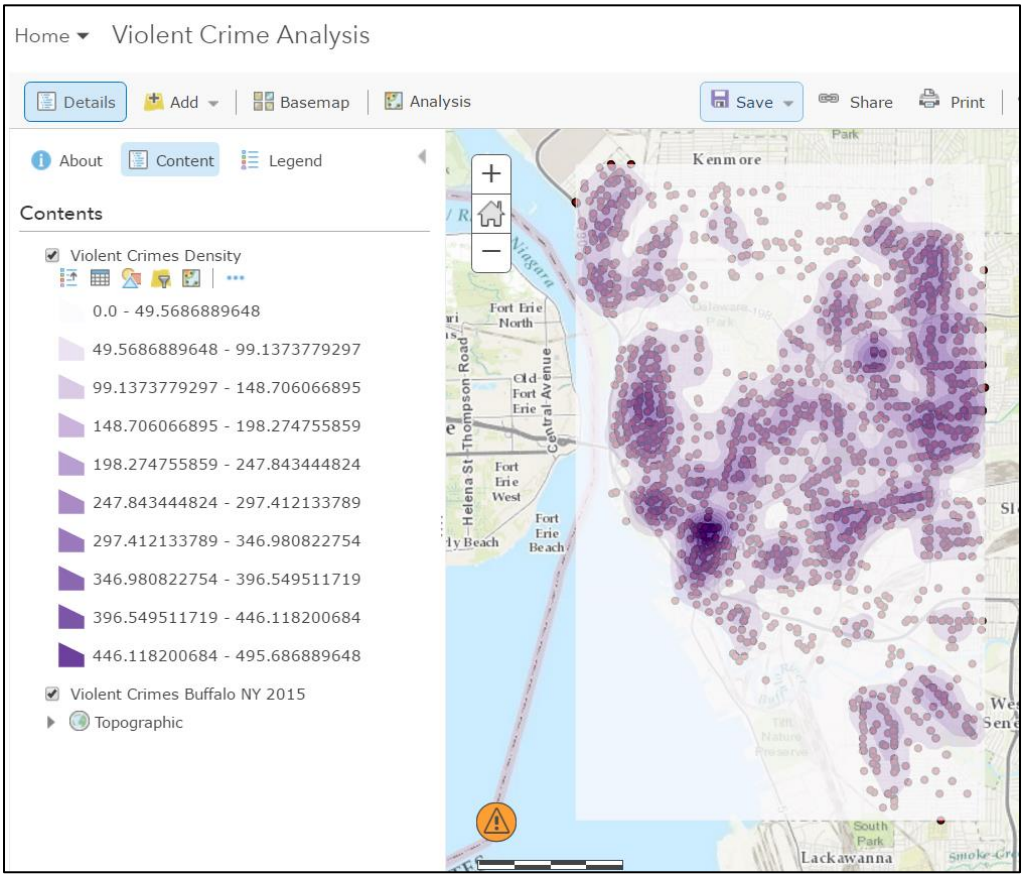


6. Click on Analysis in the 

menu bar.

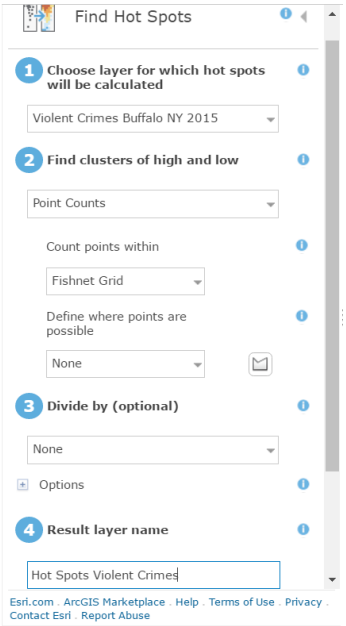
7. Click on **Analyze Patterns**, then **Calculate Density**. Leave all the options as is and click on RUN ANALYSIS. *Note: I changed the result layer name to Violent Crimes Density.*

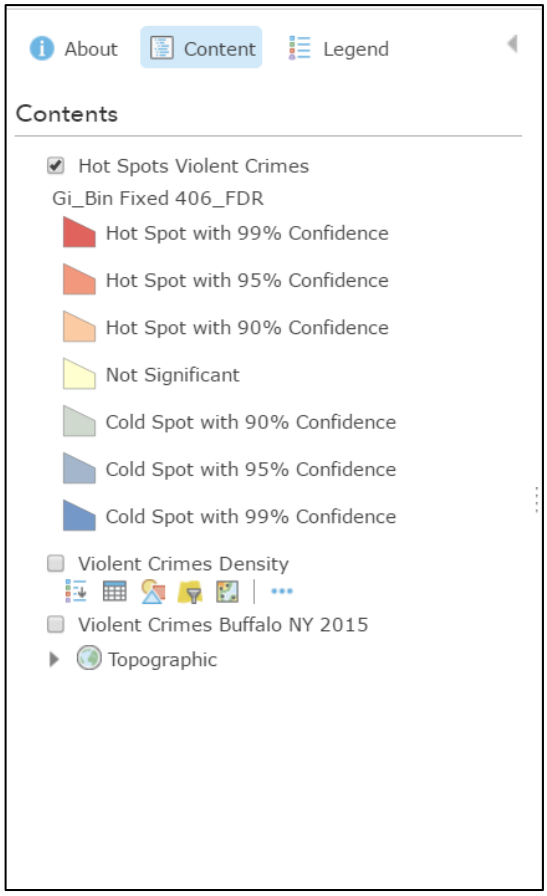
A new analysis layer is added showing the number of violent crimes per square mile. You can make the point layer invisible and change the symbology of or set filters on the density layer.

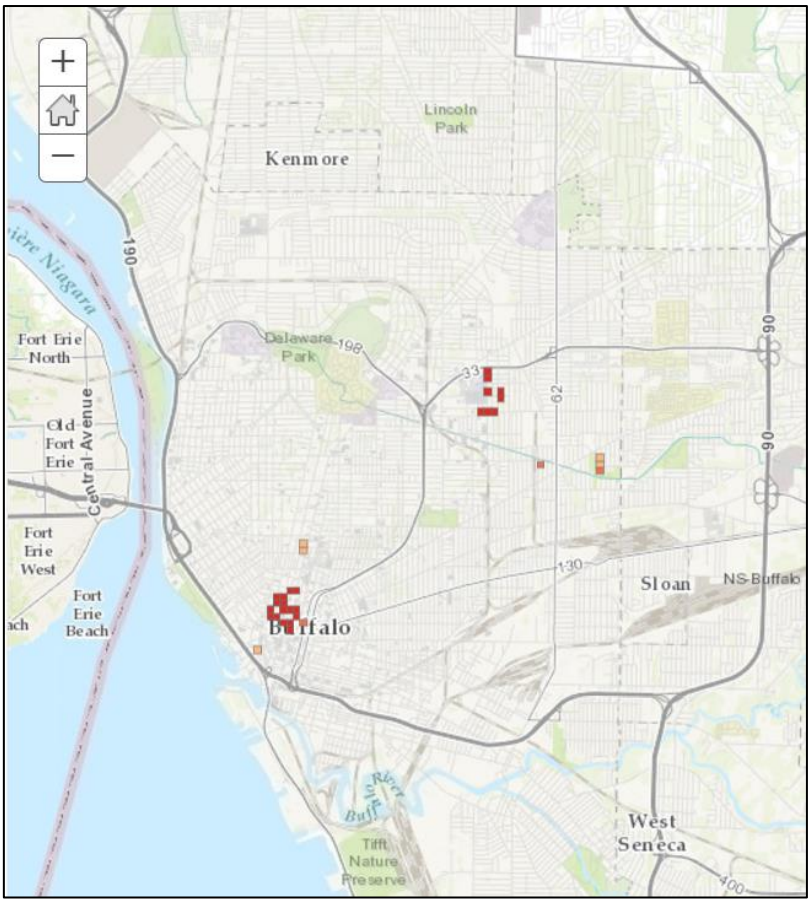


8. Another analysis tool is to identify hot spots. Click on Analysis in the menu bar. Click on **Analyze Patterns**, then **Find Hot Spots**. Leave the default values and click on RUN ANALYSIS. *Note: I changed the result layer name to Hot Spot Violent Crimes.*

The tool creates a grid (fishnet) using the optimal cell size based on the study area size. Since there is no layer that defines where crimes occur (only within Buffalo city limits) the results will differ from those shown in the Portal exercise. The study area border was used to generate hot spots in that application.

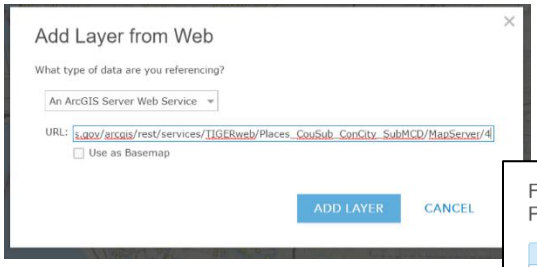


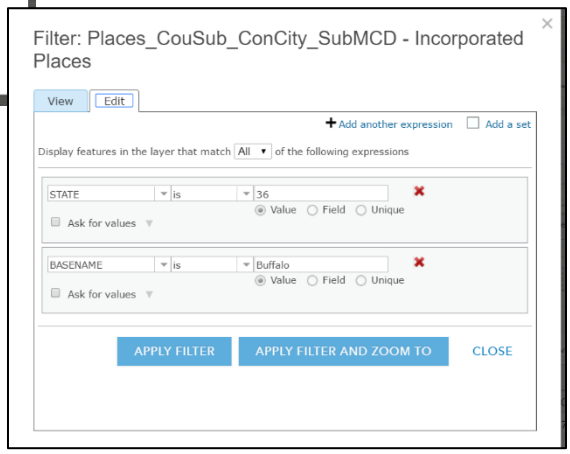




9. You can add a border for Buffalo, NY using the Census TIGERweb Rest services for Incorporated places. Use the same steps as in (3) except the URL is:

https://tigerweb.geo.census.gov/arcgis/rest/services/TIGERweb/Places_CouSub_ConCity_SubMCD/MapServer/4



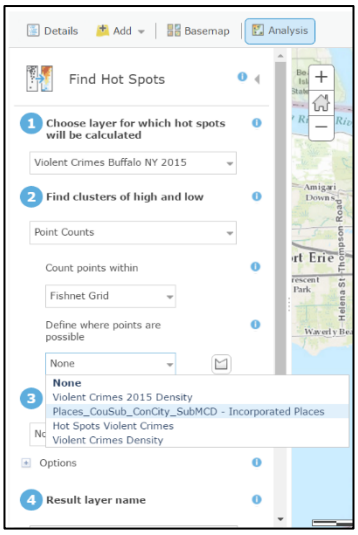


Unfortunately, the place boundary for Buffalo will include part of Lake Erie. Nevertheless, create a filter to show only Buffalo.

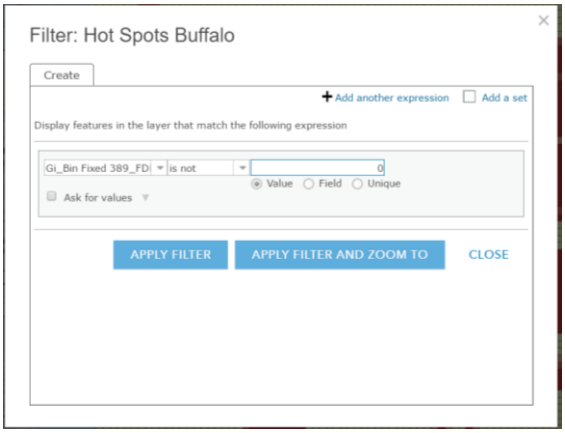
STATE is 36

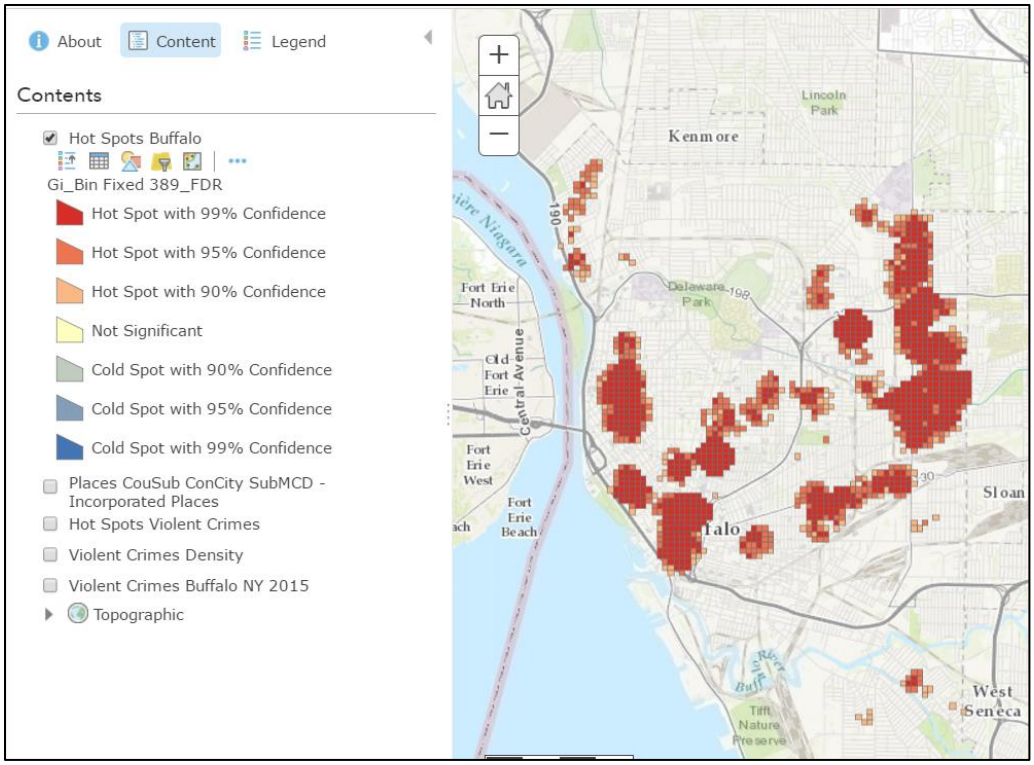
BASENAME is Buffalo

10. Re-run the find hot spots analysis except this time under **Define where points are possible** select the incorporated places layer. Before you run the analysis, uncheck Use current extent. (*Note: you can draw a study area boundary, too.)*



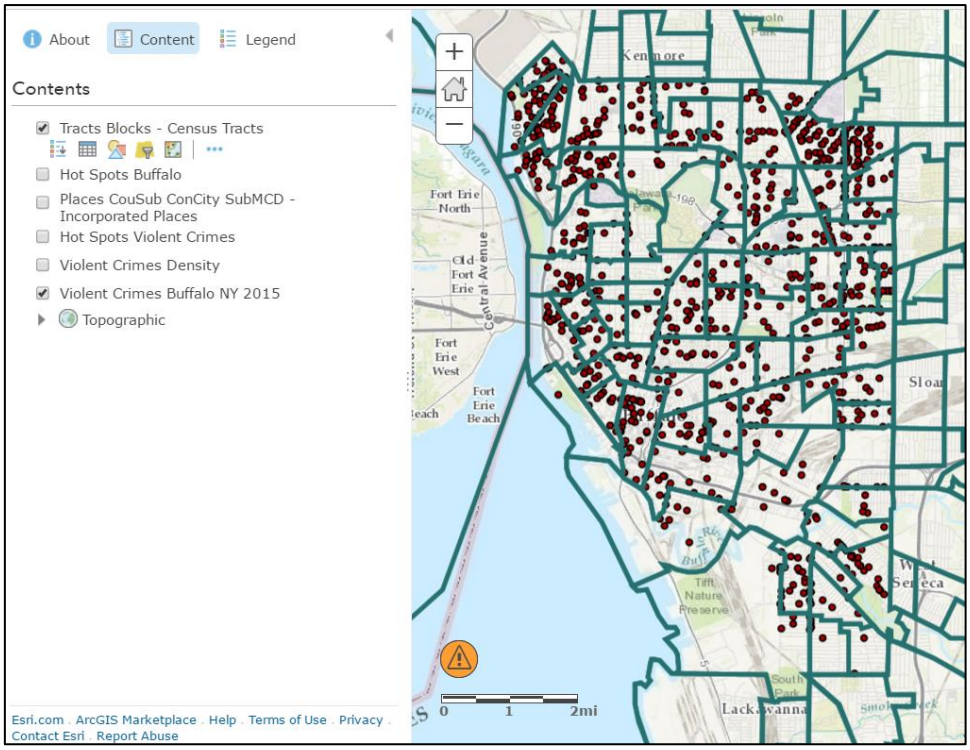
Set a filter on the new Hot Spots layer to show only those cells with significant z-scores. Gi_Bin Fixed 389_FDR is not 0. Incorporating a study area boundary results in significant changes in the Hot Spot analysis.





Crime Rate Analysis

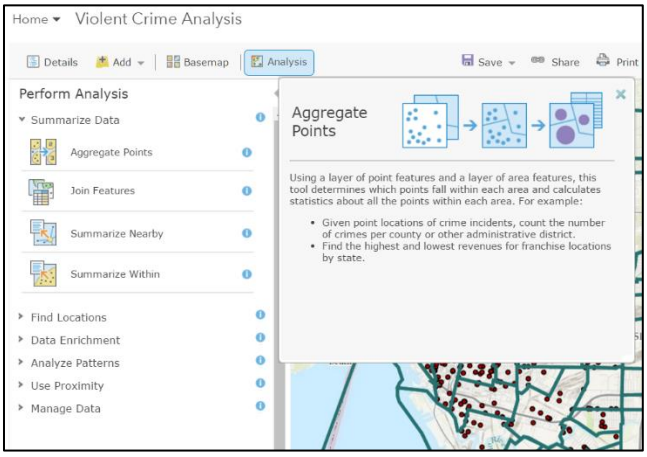
11. Add the Census TIGER layer for census tracts using the URL:

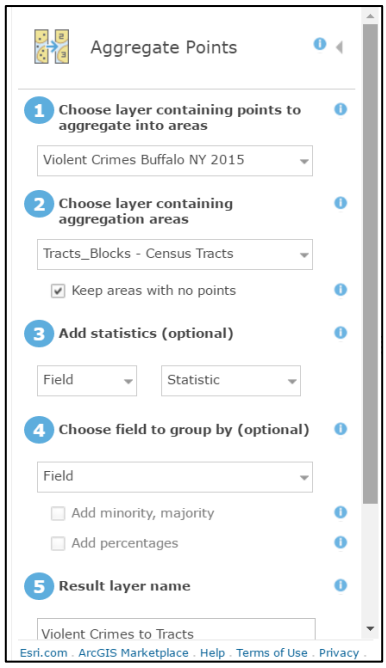


https://tigerweb.geo.census.gov/arcgis/rest/services/TIGERweb/Tracts_Blocks/MapServer/0

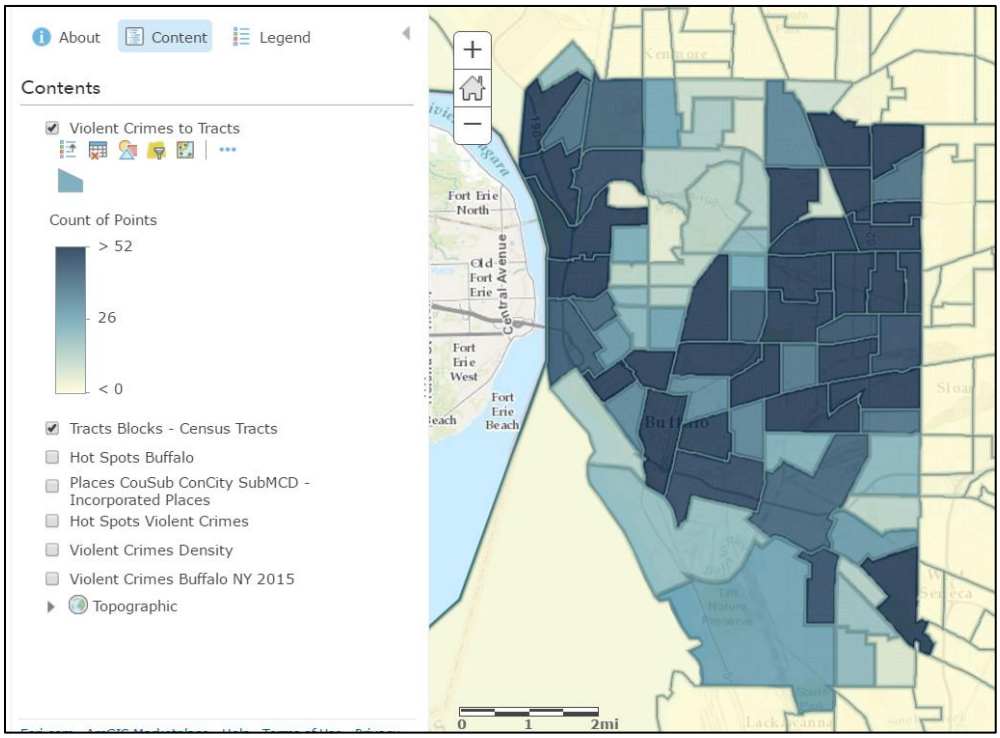
Click on Analysis in the menu bar. Click on **Summarize Data**, then **Aggregate Points**.

Leave the default values and Run the Analysis.

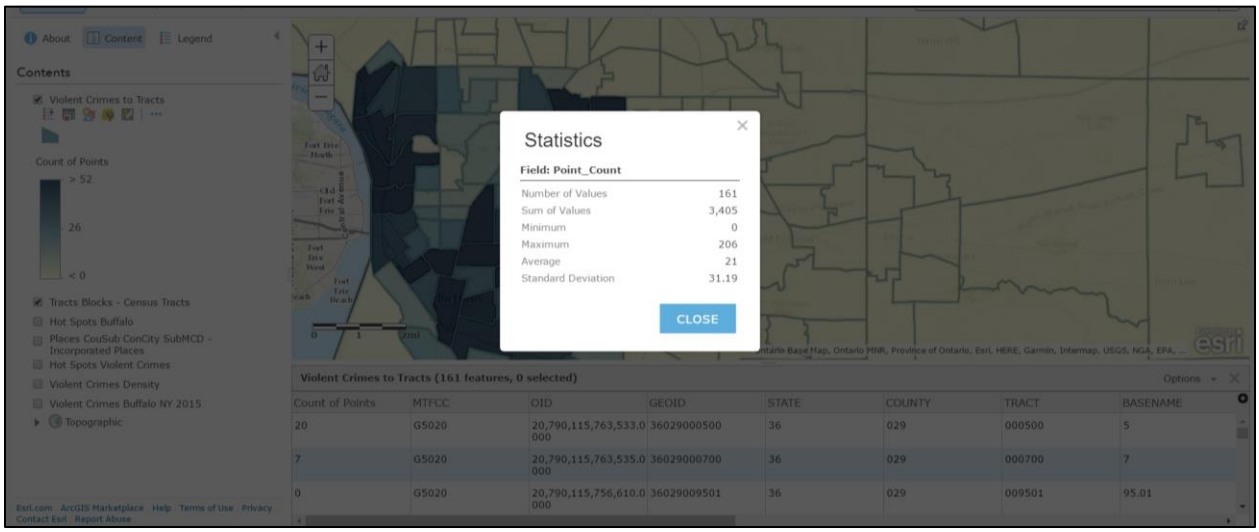




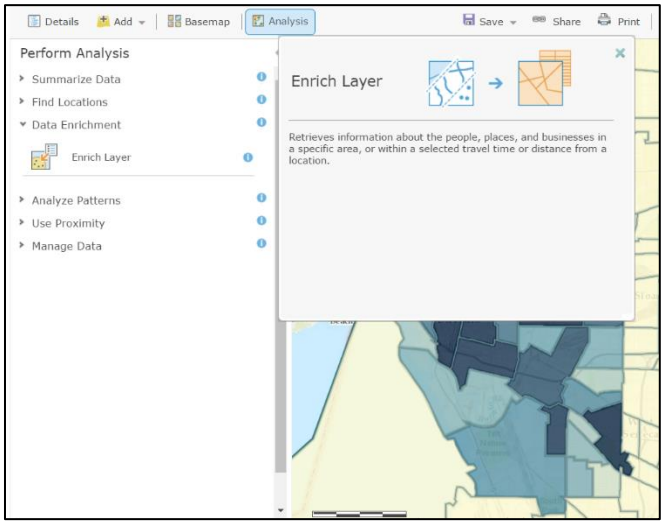
The symbology of the new layer shown below was changed from Counts and Amounts (size) to Counts and Amounts (color).



To verify that all crimes have been aggregated to the tracts, open the table for the new layer, click on the field "Count of points" and choose Statistics. The Sum of Values is 3,405.



12. Use the Data Enrichment tool to add population of each tract.

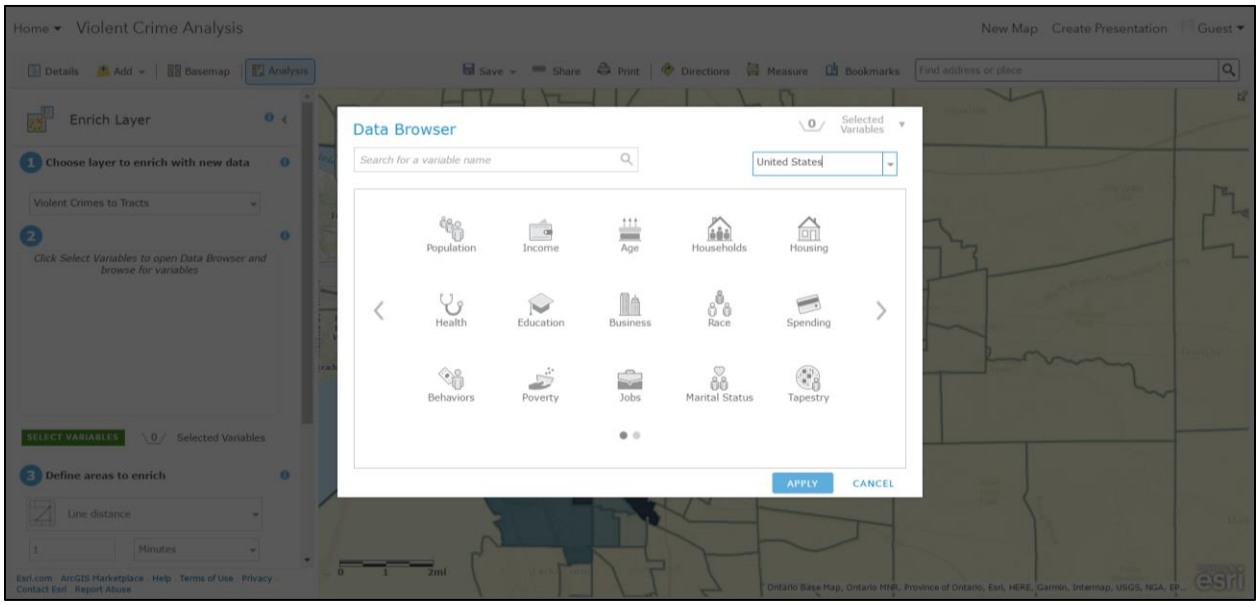


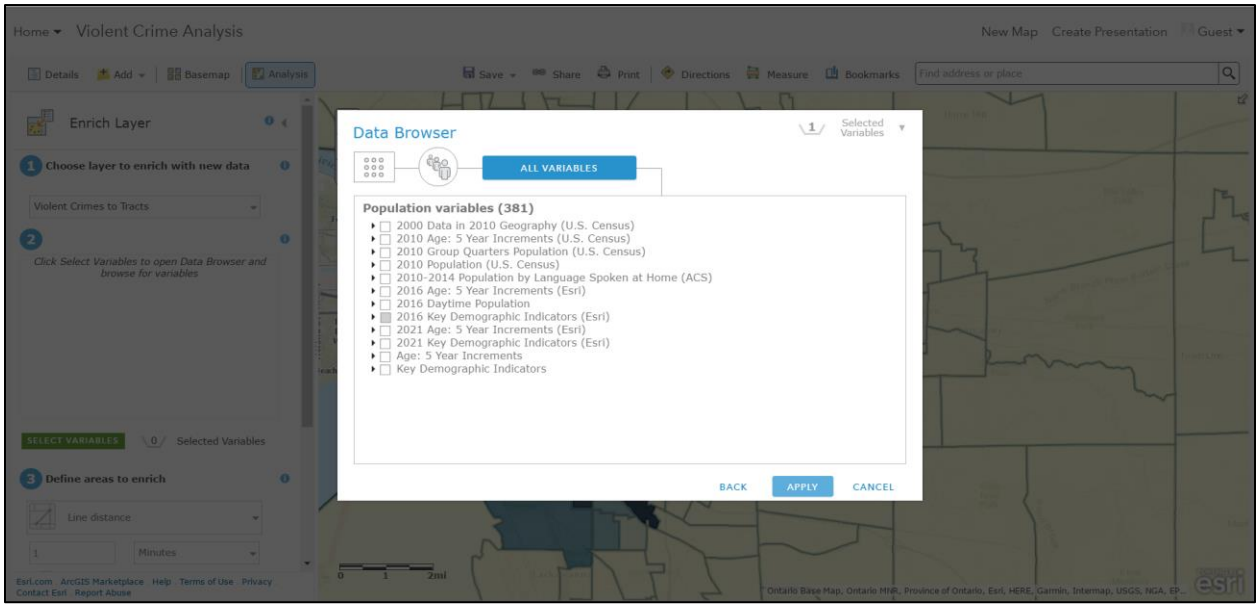
Make sure the layer to enrich is the Census tract layer. Click on Select Variables. You can add a wide variety of information to this layer. At this time we will only add population to determine crime rate.

Click on the population icon, then Show all population variables. Select the 2016 total population ESRI. The 2015 population data are not available through the data enrichment tool.

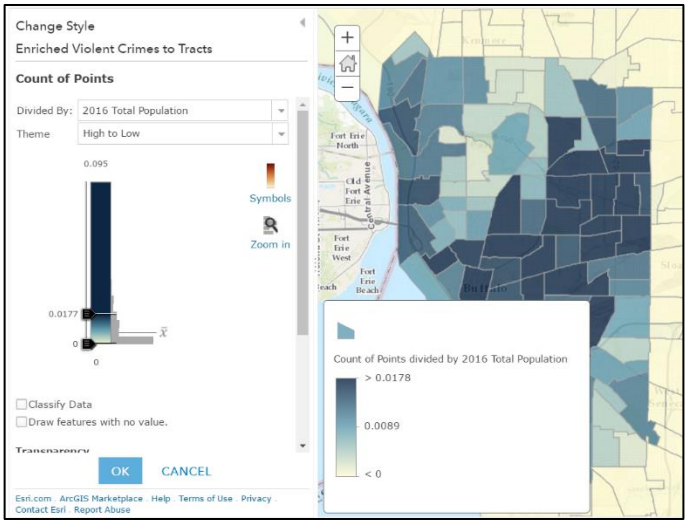
Click APPLY then RUN ANALYSIS.

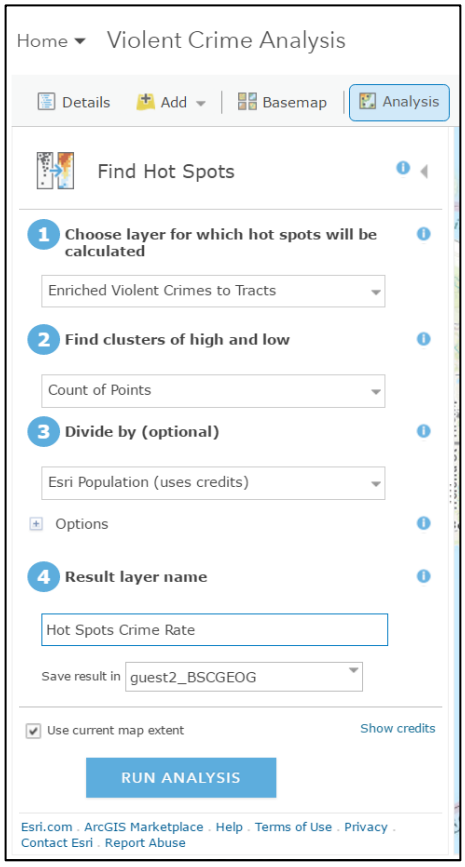
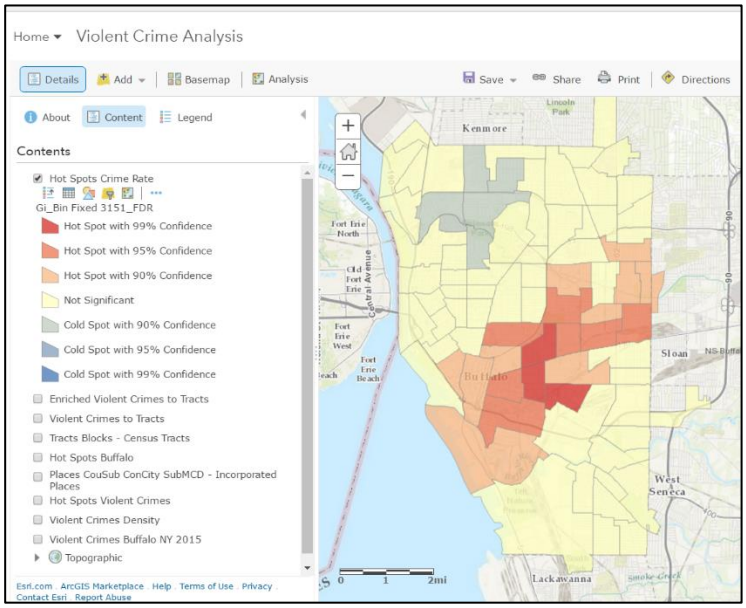
Adjust the symbology of the enriched layer to show the crime rate: Count of Points divided by 2016 Total Population.


Home
Violent Crime Analysis
New Map
Create Presentation
Guest
Details
Add
Basemap
Analysis
Save
Share
Print
Directions
Measure
Bookmarks
Find address or place
Enrich Layer
1 Choose layer to enrich with new data
Violent Crimes to Tracts
2
Click Select Variables to open Data Browser and browse for variables
SELECT VARIABLES
0 Selected Variables
3 Define areas to enrich
Line distance
1
Minutes
Esri.com ArcGIS Marketplace Help Terms of Use Privacy
Contact Esri Report Abuse
Data Browser
0 Selected Variables
Search for a variable name
United States
Population
Income
Age
Households
Housing
Health
Education
Business
Race
Spending
Behaviors
Poverty
Jobs
Marital Status
Tapestry
APPLY
CANCEL
0 1 2mi
Ontario Base Map, Ontario MNR, Province of Ontario, Esri, HERE, Garmin, Intermap, USGS, NGA, EP...
esri


Home
Violent Crime Analysis
New Map
Create Presentation
Guest
Details
Add
Basemap
Analysis
Save
Share
Print
Directions
Measure
Bookmarks
Find address or place
Enrich Layer
1 Choose layer to enrich with new data
Violent Crimes to Tracts
2
Click Select Variables to open Data Browser and browse for variables
SELECT VARIABLES
0 Selected Variables
3 Define areas to enrich
Line distance
1
Minutes
Esri.com ArcGIS Marketplace Help Terms of Use Privacy
Contact Esri Report Abuse
Data Browser
1 Selected Variables
ALL VARIABLES
Population variables (381)
2000 Data in 2010 Geography (U.S. Census)
2010 Age: 5 Year Increments (U.S. Census)
2010 Group Quarters Population (U.S. Census)
2010 Population (U.S. Census)
2010-2014 Population by Language Spoken at Home (ACS)
2016 Age: 5 Year Increments (Esri)
2016 Daytime Population
2016 Key Demographic Indicators (Esri)
2021 Age: 5 Year Increments (Esri)
2021 Key Demographic Indicators (Esri)
Age: 5 Year Increments
Key Demographic Indicators
BACK
APPLY
CANCEL
0 1 2mi
Ontario Base Map, Ontario MNR, Province of Ontario, Esri, HERE, Garmin, Intermap, USGS, NGA, EP...
esri

Before we calculate Hot Spots, set a filter on the enriched layer to show only tracts with Count of points greater than 0. You will see that during the aggregation process 2 tracts outside of Buffalo have crimes. This is because the location fell on the tract edge and was arbitrarily assigned to one of the bordering tracts.





13. Use the Find hot spots analysis tool to determine hot spots for the crime rate. Make sure to divide the count of points by the ESRI population.