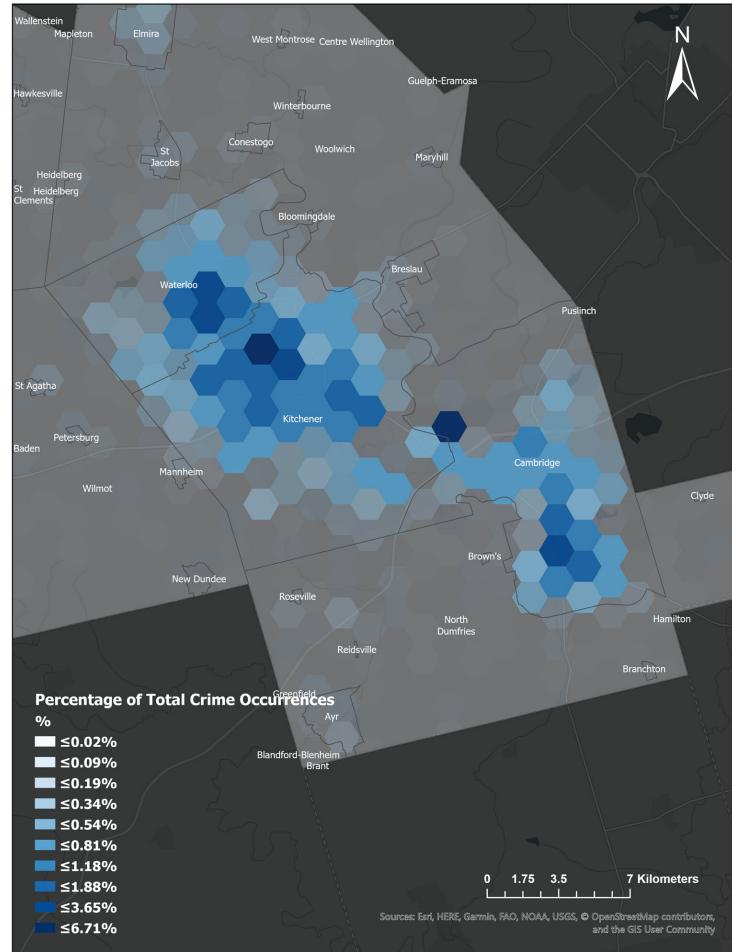


GEOG 381 ASSIGNMENT 1

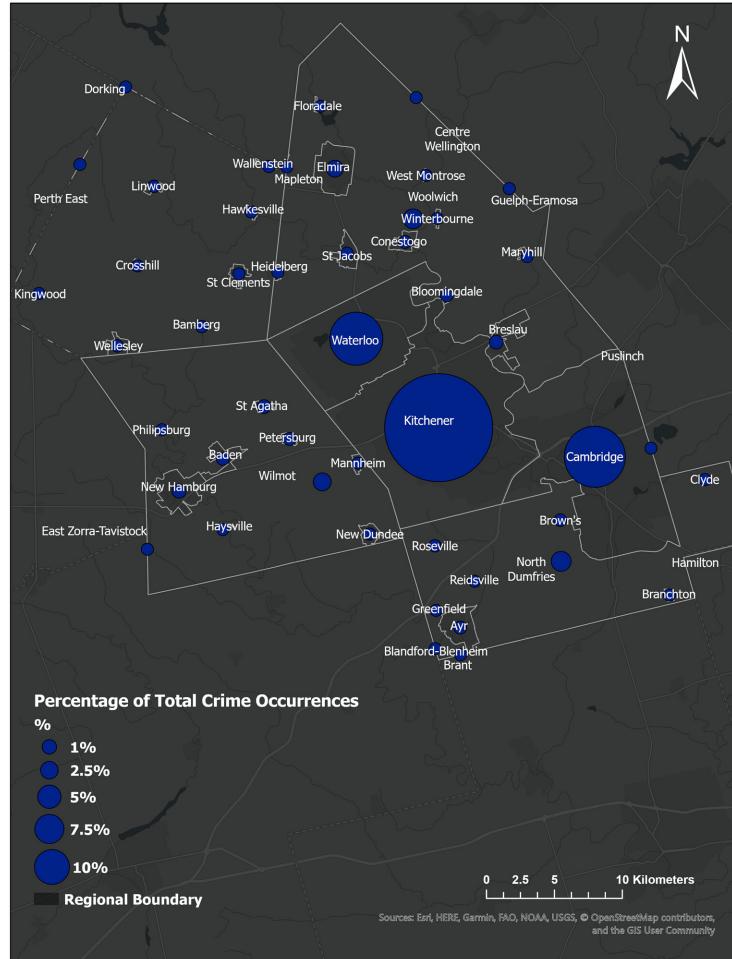
**2018 CRIME OCCURRENCES IN  
THE REGION OF WATERLOO**

**JUNE 3 2020, ANUGRA SHAH 20583386**

Crime Occurrence 2018 in Region of Waterloo



# Crime Occurrence 2018 in Region of Waterloo



In this choropleth map of total crime occurrences, expectedly, Kitchener, Waterloo and Cambridge, being the most populated municipalities in the region, had the highest number of crime occurrences in the Region of Waterloo. In Kitchener, the darkest hexagon, indicating highest number of occurrences, are in Downtown Kitchener. Uptown Waterloo is another area that has the highest concentration of occurrences. It is evident that the pattern of occurrences, start with highest in the urban core of the cities, and gradually decrease as we get farther into the peripherals, and suburbs. This map shows the percentage of occurrences of the total occurrences, for each hexagon, and municipalities.

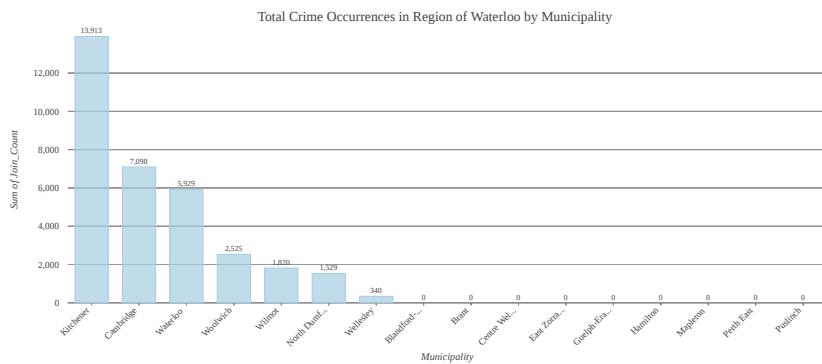
# Process

1. I generated a hexagonal tessellation layer, within the extent of the region of Waterloo, with the size of 700 squared meters for each hexagon.
  2. Spatially Join the Occurrences points layer with the hexagonal tessellation layer, counting the number of occurrences within each hexagon
  3. Symbolize using Natural Jenks. Normalized with the percentage of total, which makes it easier to compare the different municipalities

In this graduated symbol map of total crime occurrences, shows similar findings, where Kitchener, Waterloo and Cambridge have the highest percent of total crimes in the region of Waterloo. Below is a histogram breaking down the same data

## Process

1. I downloaded Cities and Towns dataset from open data and conducted a spatial join with the occurrences points
  2. Symbolized the resulting layer, with the percentage of total occurrences for each city/town as graduated symbols. Used Natural Jenks
  3. Generated a histogram to further show the distribution of all the occurrences in Waterloo Region.



This is a map of Downtown Kitchener, which had an unusually high concentration of unwanted persons occurrences. As evident, the core of downtown Kitchener had a very significant concentration of such occurrences. This maybe due to the higher rate of homelessness in downtown Kitchener, and the general unacceptance of residents in the area. (The Record, 2020).

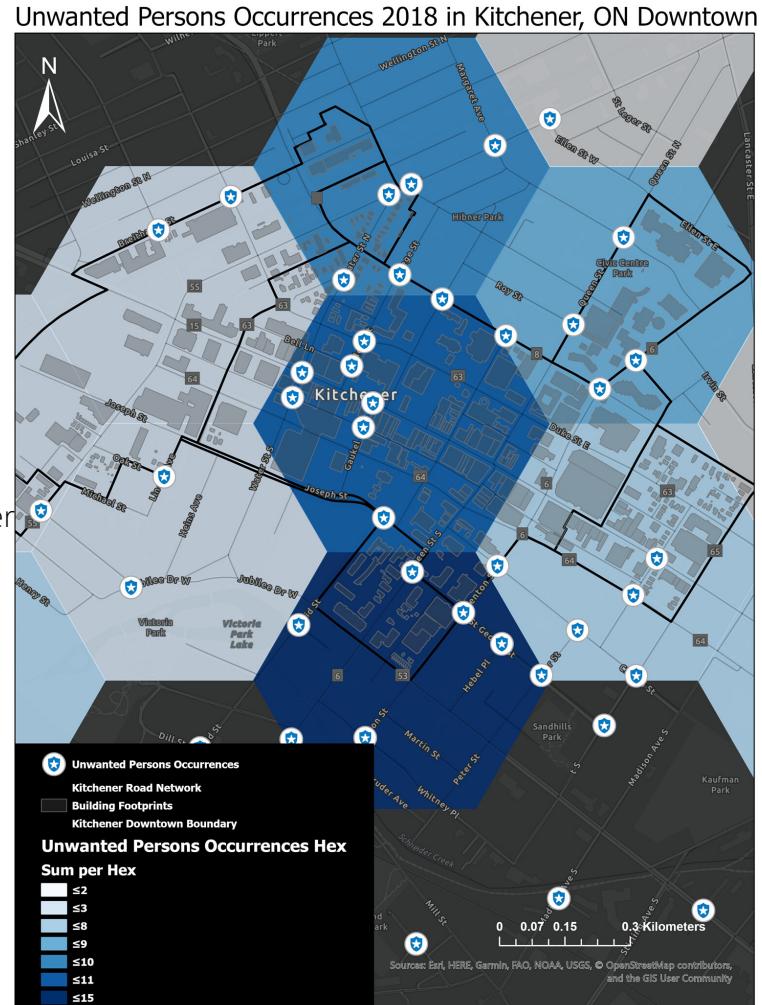
## Process

- 1.I generated a hexagonal tessellation layer, within the extent of the downtown Kitchener, with the size of 700 squared meters for each hexagon.
- 2.Spatially Join the unwanted persons occurrences points layer with the hexagonal tessellation layer, counting the number of occurrences within each hexagon.
- 3.Symbolize using Natural Jenks. Did not normalize this data, as the number of data points we're looking at are relatively small, since we're focusing on downtown Kitchener.

This is a map of Central Region of Waterloo, which shows vehicle stop occurrences along with the speed zones of roads in the region. Most vehicle stops occurred in 50km/h speed zones, represented by the orange lines. It may be the case that this correlation has no inherent causation, since majority of the roads are 50km/h. However, police cruisers can use this as a data product to plan, or schedule their monitoring for the future.

## Process

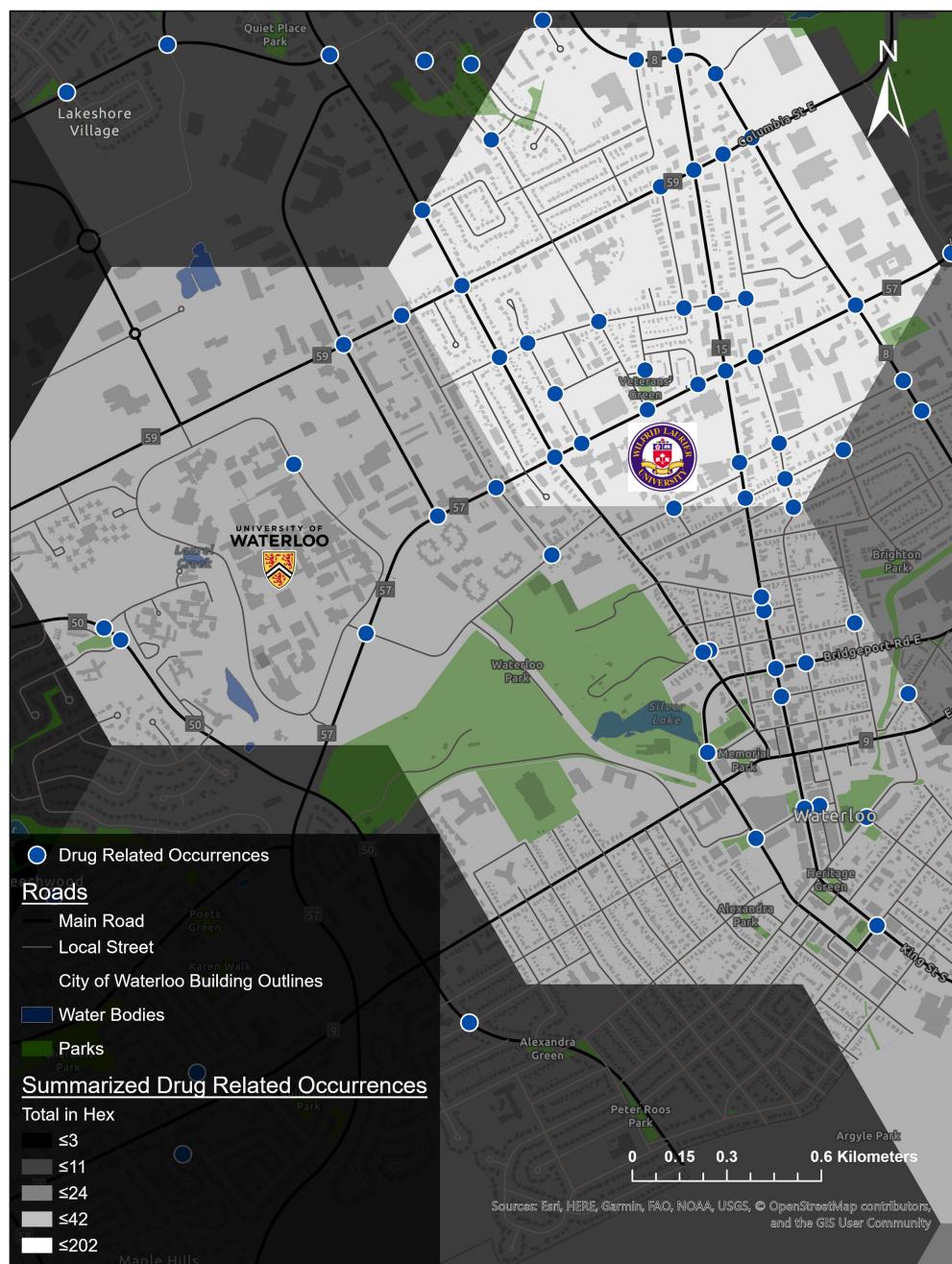
- 1.I generated a hexagonal tessellation layer, within the extent of the region boundaries, with the size of 700 squared meters for each hexagon.
- 2.Spatially Join the vehicle stop occurrences points layer with the hexagonal tessellation layer, counting the number of occurrences within each hexagon.
- 3.Download roads shapefile from open data, spatially joined the occurrences points, within 15m of the roads. Then generated the chart below.



Vehicle Stop Occurrences vs Speed Zones in Waterloo, ON



## Drug Related Occurrences in Student Dominant Areas of Waterloo, ON



The map above shows drug related occurrences in the student dominant areas of Waterloo. This shows student housing areas around Waterloo, Laurier and Conestoga campuses. As evident, these regions have a significantly higher concentration of drug related crime occurrences in the City of Waterloo. One can take away from this that the students in Waterloo, are on average involved in higher number of drug related crime activities. However, it can be disputed that its not simply the case that students are more involved with drugs than other residents of Waterloo, but they are ones who may be irresponsible and unsafe in their activites, hence getting caught at a higher rate than others.

## Process

- I generated a hexagonal tessellation layer, within the extent of the region boundaries, with the size of 700 squared meters for each hexagon, and I clipped this layer to the region shown above.
- Spatially Join the drug occurrences points layer with the hexagonal tessellation layer, counting the number of occurrences within each hexagon.
- Download building footprints layer to show the campuses and student housing in the region from open data, as well as roads, parks and water bodies datasets.
- Download roads shapefile from open data, spatially joined the occurrences points, within 15m of the roads. Then generated the chart below.

## **References**

Thompson, C. (2020, January 10). Homelessness growing, becoming more complex, Kitchener survey reveals. Retrieved from <https://www.therecord.com/news/waterloo-region/2020/01/10/homelessness-growing-becoming-more-complex-kitchener-survey-reveals.html>