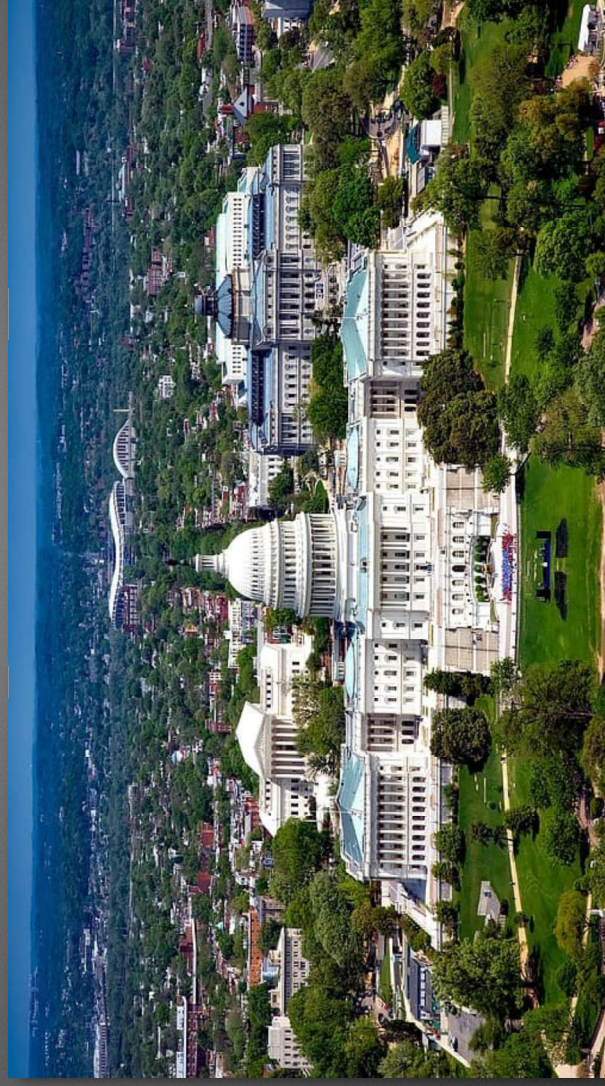


Spatial and Temporal Analysis of Violent Crime in Washington, DC, for the Years 2018 - 2022



Pallavi Roe

Advisor - Dr. Gregory Thomas
Masters of GIS Capstone Research project
Pennsylvania State University
Department of Geography

Background

Washington, DC and Crime

- Capital of the United States of America.
- Population
- Neighboring States - Virginia and Maryland
- What is Violent Crime?
- Safety concern
- Crime peaked in 1990's
- Factors contributing to the problem of violent crime

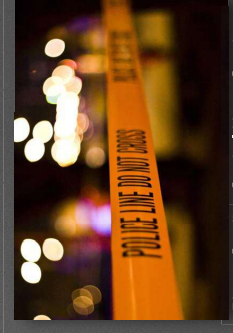
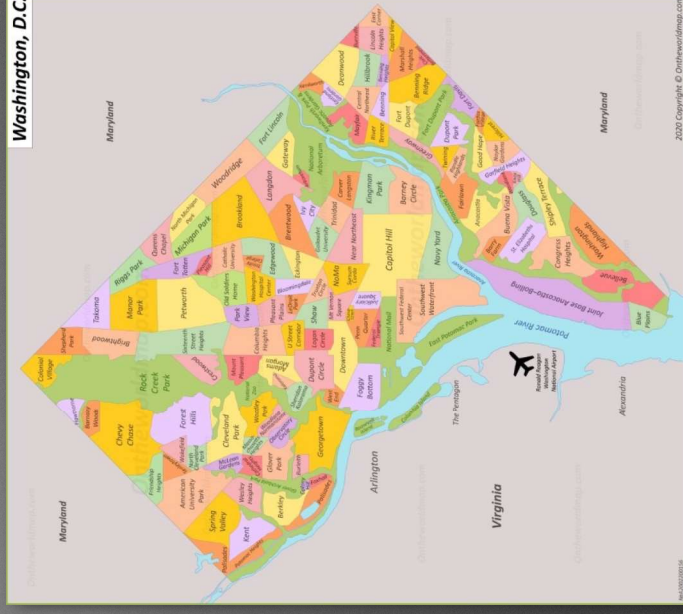


Photo Credit - Capital News Service

All Violent Crime



Homicide



Sex Abuse



Assault w/Dangerous Weapon

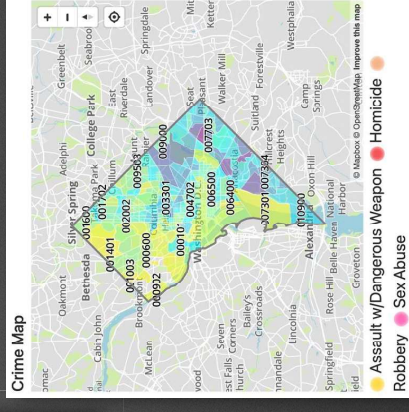
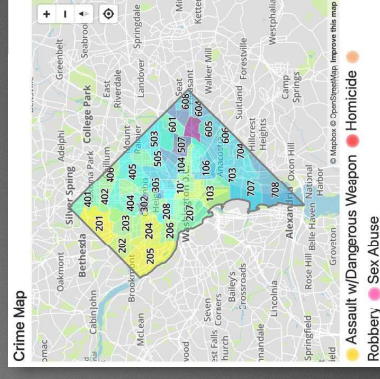


Robbery

Photo Credit - DC Crime Cards

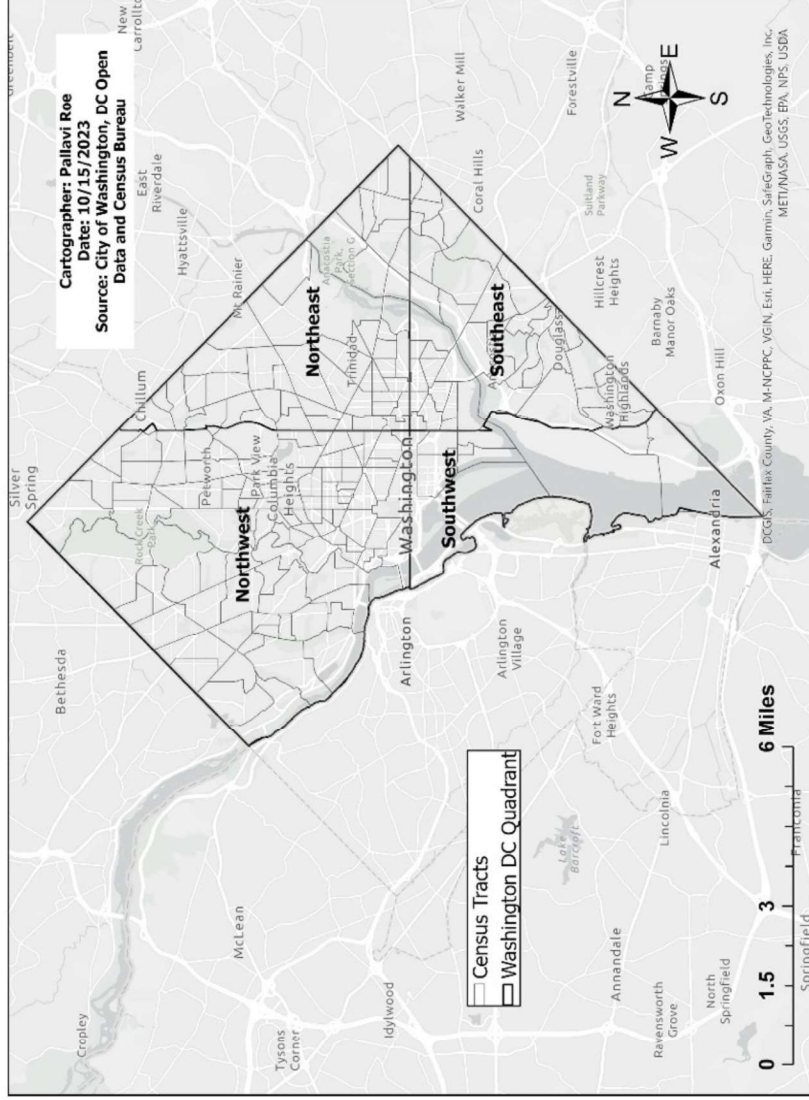
Goals and Objectives

- 1. What types of violent incidents occur most frequently?
- 2. Where are the crimes occurring?
- 3. When do the violent incidents occur?
- 4. What are the socioeconomic factors that influences these crimes?



Study Area

Washington DC Quadrant Map



Data and Software

➤ Violent Crime Data

➤ Socioeconomic Data
(Year 2020 from Census
Bureau)

➤ Boundary Data



Data Sources

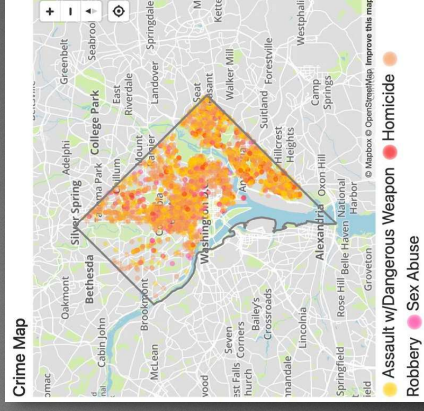
DATA SET	SOURCE	YEAR
VIOLENT CRIME INCIDENT DATA (POINT DATA)	opendata.dc.gov	2018 - 2022
WASHINGTON DC BOUNDARY SHAPEFILE (POLYGON)	opendata.dc.gov	2023
CENSUS TRACTS TIGER/LINE SHAPEFILE	opendata.dc.gov	2020
WASHINGTON DC QUADRANTS SHAPEFILE (POLYGON)	opendata.dc.gov	2022
SOCIO-DEMOGRAPHIC DATA	https://data.census.gov/	2020

Methodology

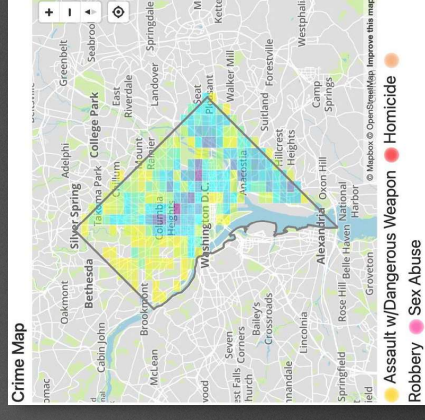
➤ Spatial and Temporal analysis on violent crime

➤ Kernel Density Analysis

➤ Spatial and Temporal analysis on the use of guns in violent crimes

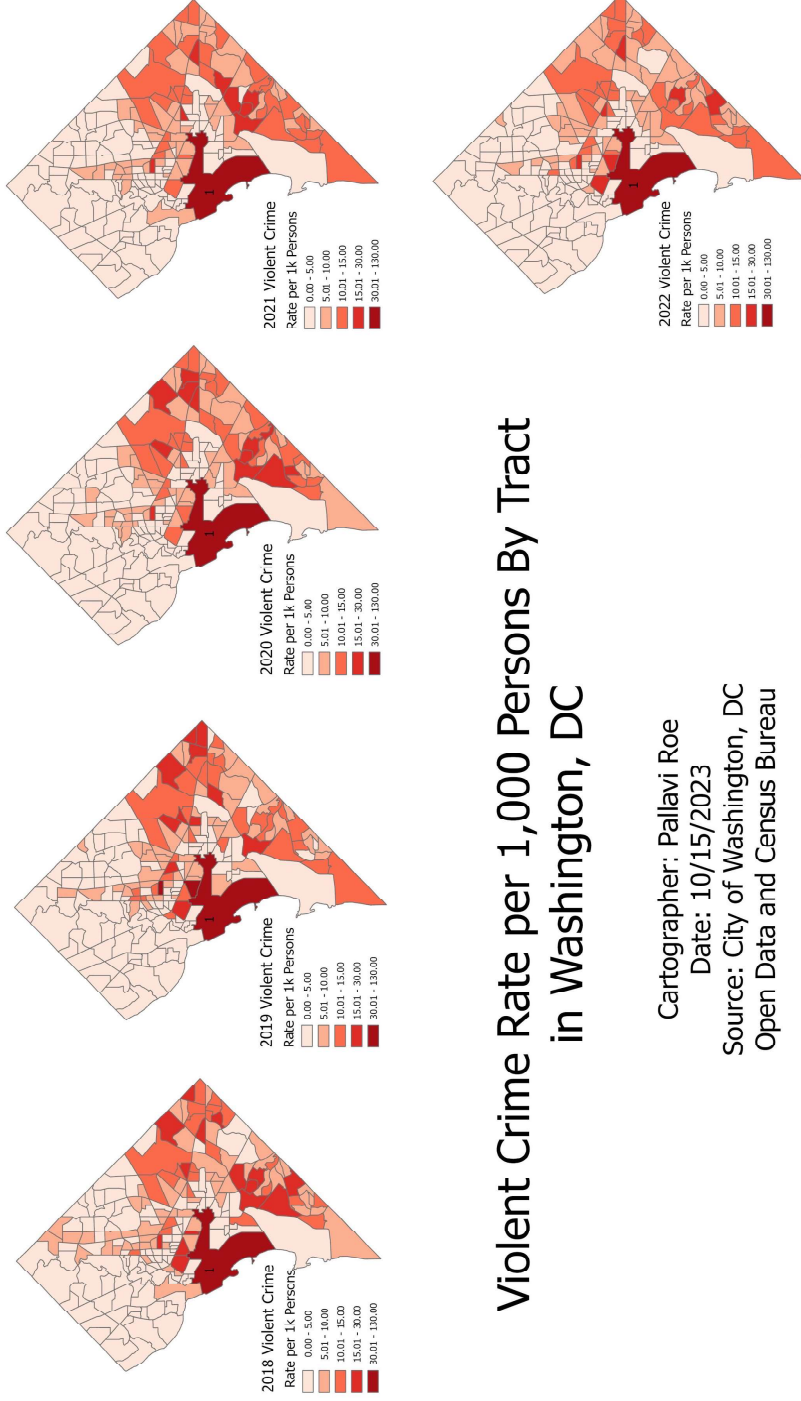


Point Map of Violent Crimes in DC Year 2021



Heat Map of Violent Crimes in DC Year 2021

Spatial Analysis

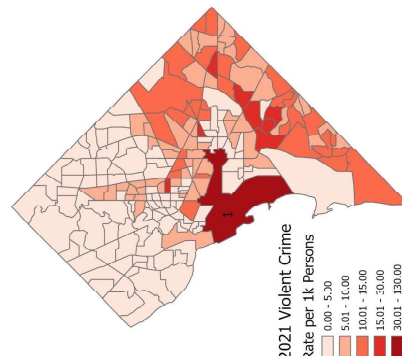
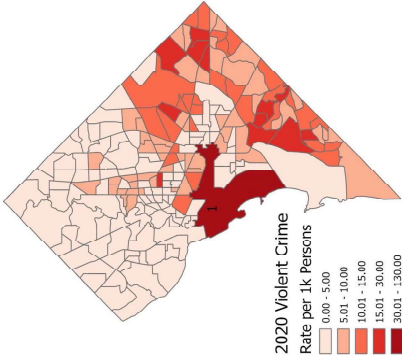
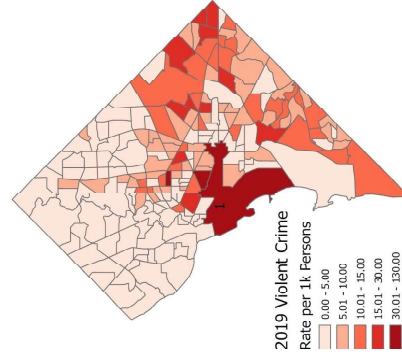
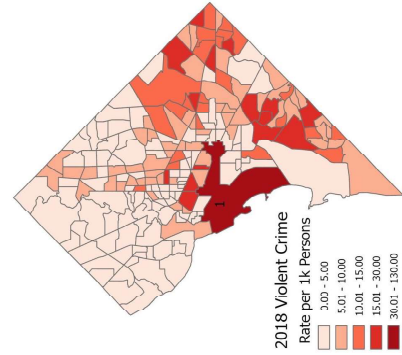


Violent Crime Rate per 1,000 Persons By Tract in Washington, DC

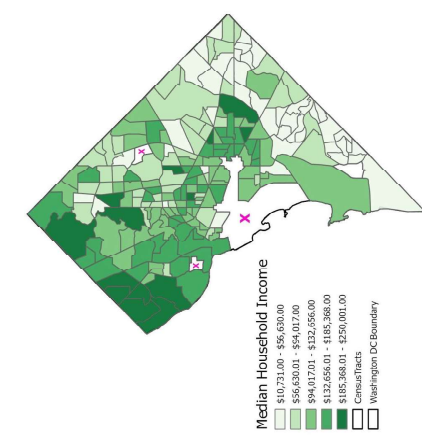
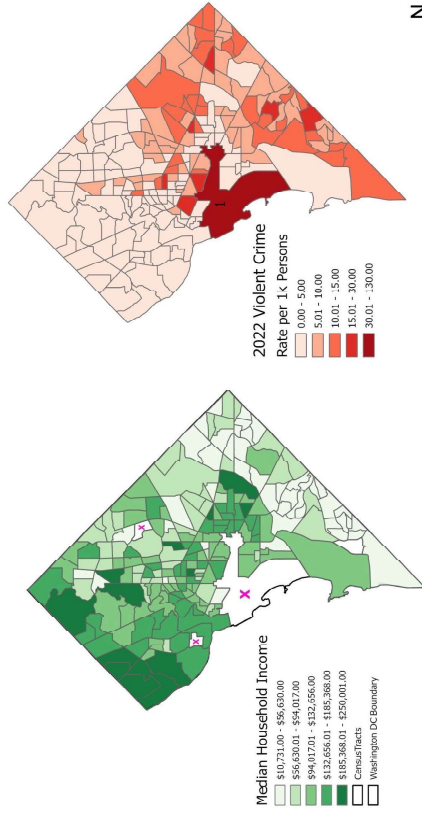
Cartographer: Pallavi Roe
Date: 10/15/2023
Source: City of Washington, DC
Open Data and Census Bureau



Spatial Analysis Continued



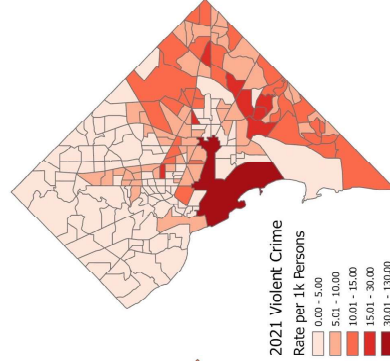
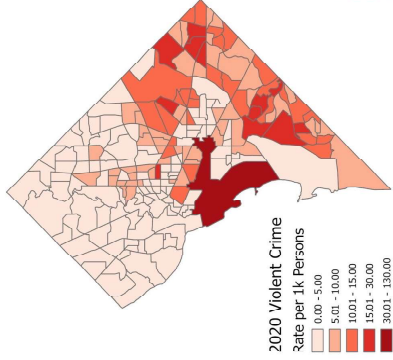
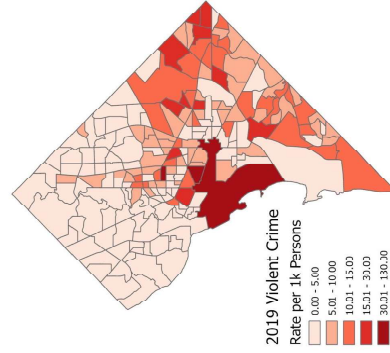
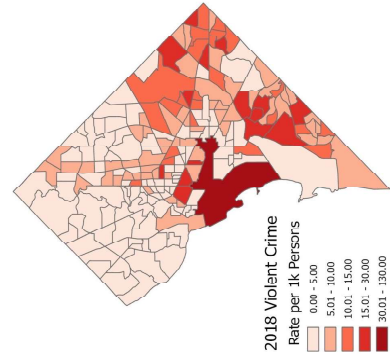
Violent Crime Rate per 1,000 Persons By Tract in Washington, DC in Relation to Median Household Income



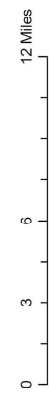
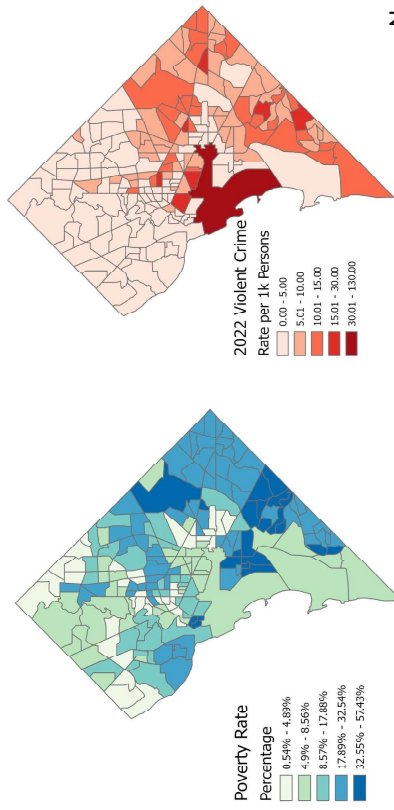
Cartographer: Pallavi Roe
 Date: 10/15/2023
 Source: City of Washington, DC Open Data and Census Bureau



Spatial Analysis Continued

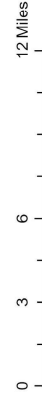
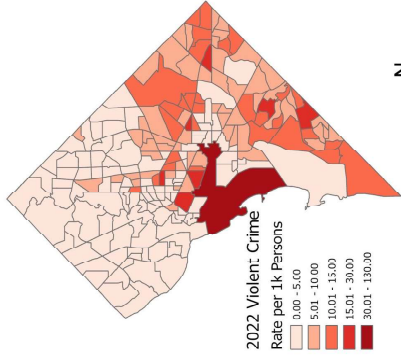
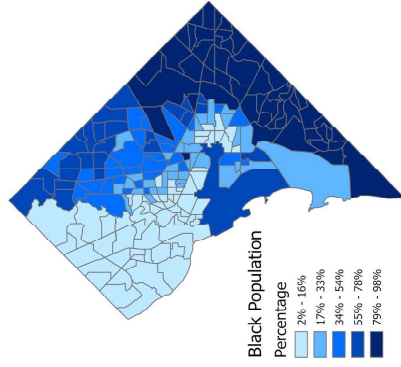
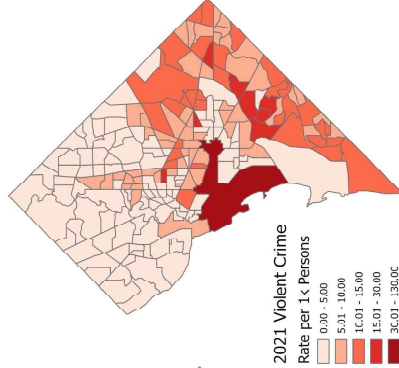
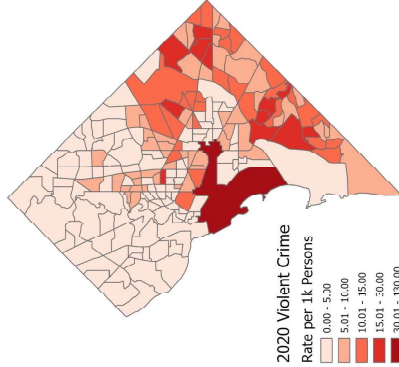
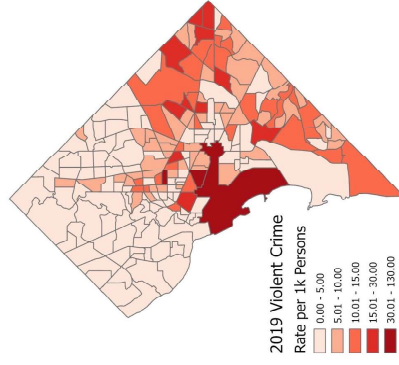
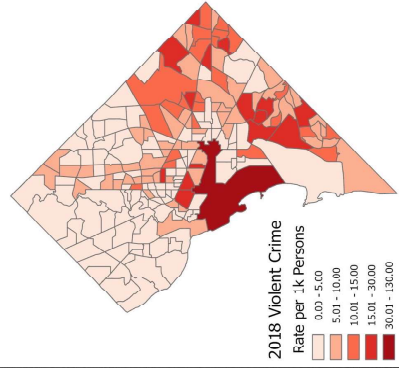


Violent Crime Rate per 1,000 Persons By Tract in Washington, DC in Relation to Poverty Rate based on 2020 Census Data



Cartographer: Pallavi Roe
 Date: 10/15/2023
 Source: City of Washington, DC Open Data and
 Census Bureau

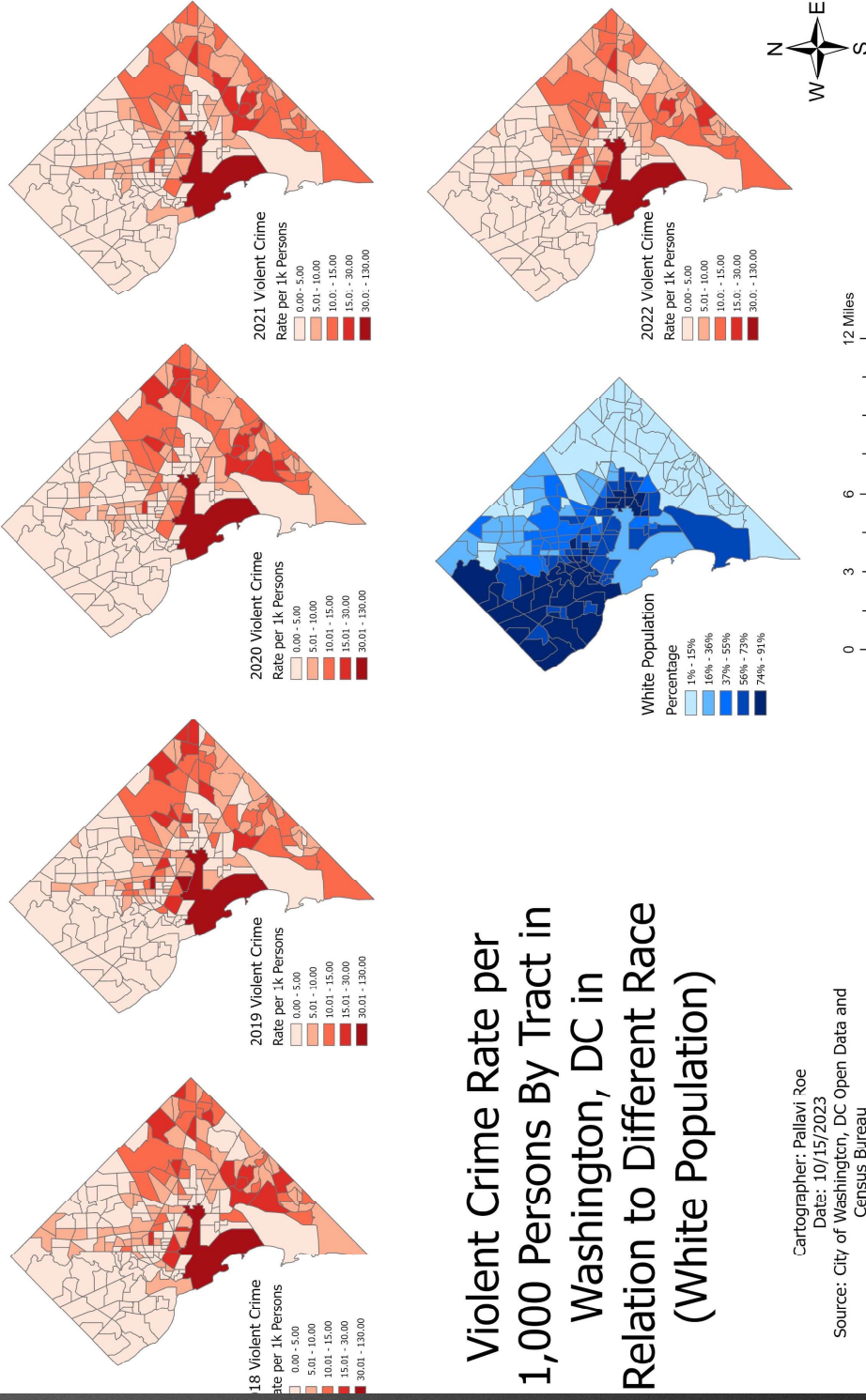
Spatial Analysis Continued



Violent Crime Rate per 1,000 Persons By Tract in Washington, DC in Relation to Different Race (Black Population)

Cartographer: Pallavi Roe
Date: 10/15/2023
Source: City of Washington, DC Open Data and Census Bureau

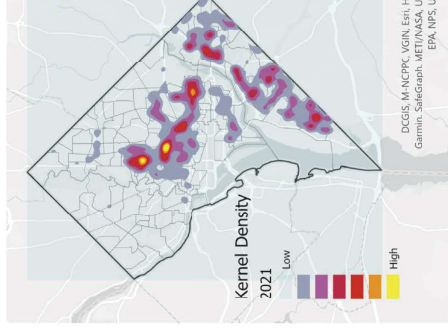
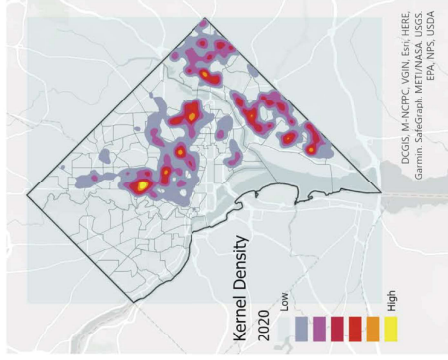
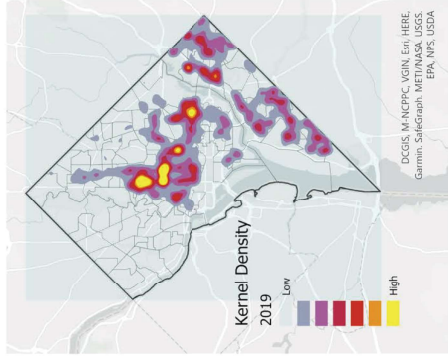
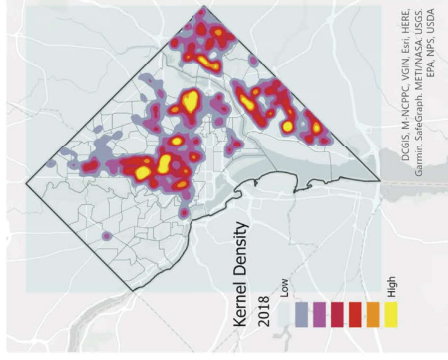
Spatial Analysis Continued



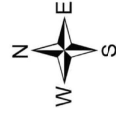
Violent Crime Rate per 1,000 Persons By Tract in Washington, DC in Relation to Different Race (White Population)

Cartographer: Pallavi Roe
 Date: 10/15/2023
 Source: City of Washington, DC Open Data and Census Bureau

Kernel Density Estimation



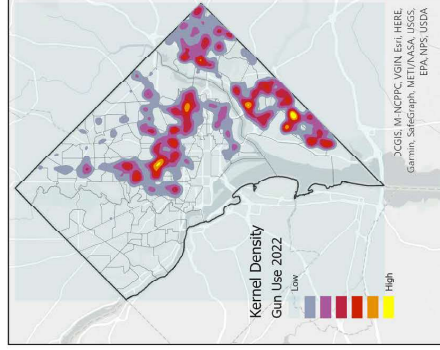
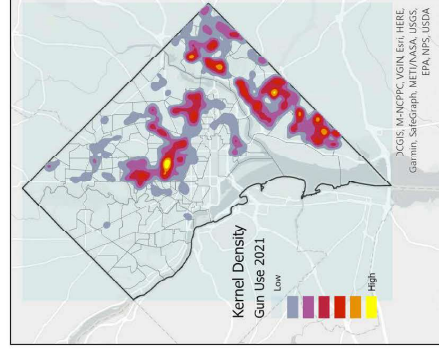
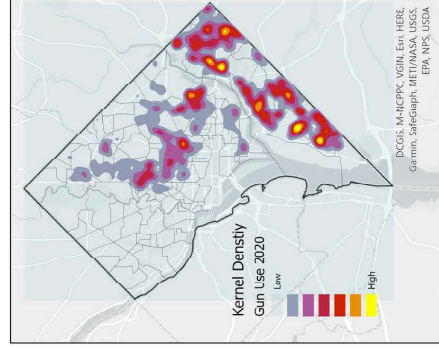
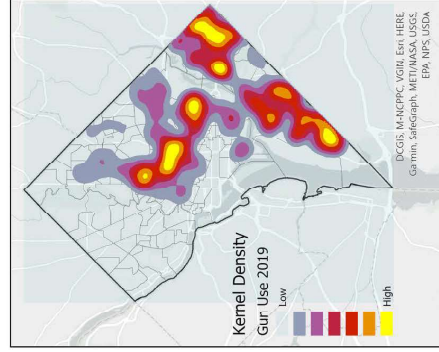
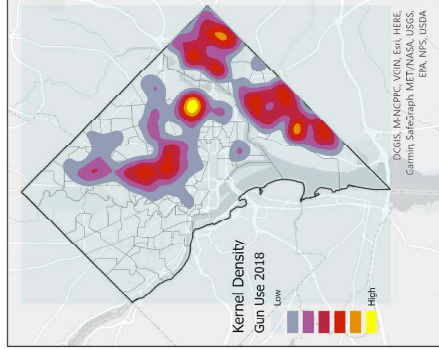
Kernel Density Estimation for the Violent Crimes in Washington, DC (Years 2018 - 2022)



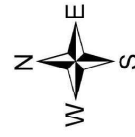
Cartographer: Pallavi Roe
Date: 10/17/2023
Source: City of Washington, DC Open Data



Kernel Density Estimation Continued



Kernel Density Estimation for the Violent Crimes Involving Guns in Washington, DC (Years 2018 - 2022)



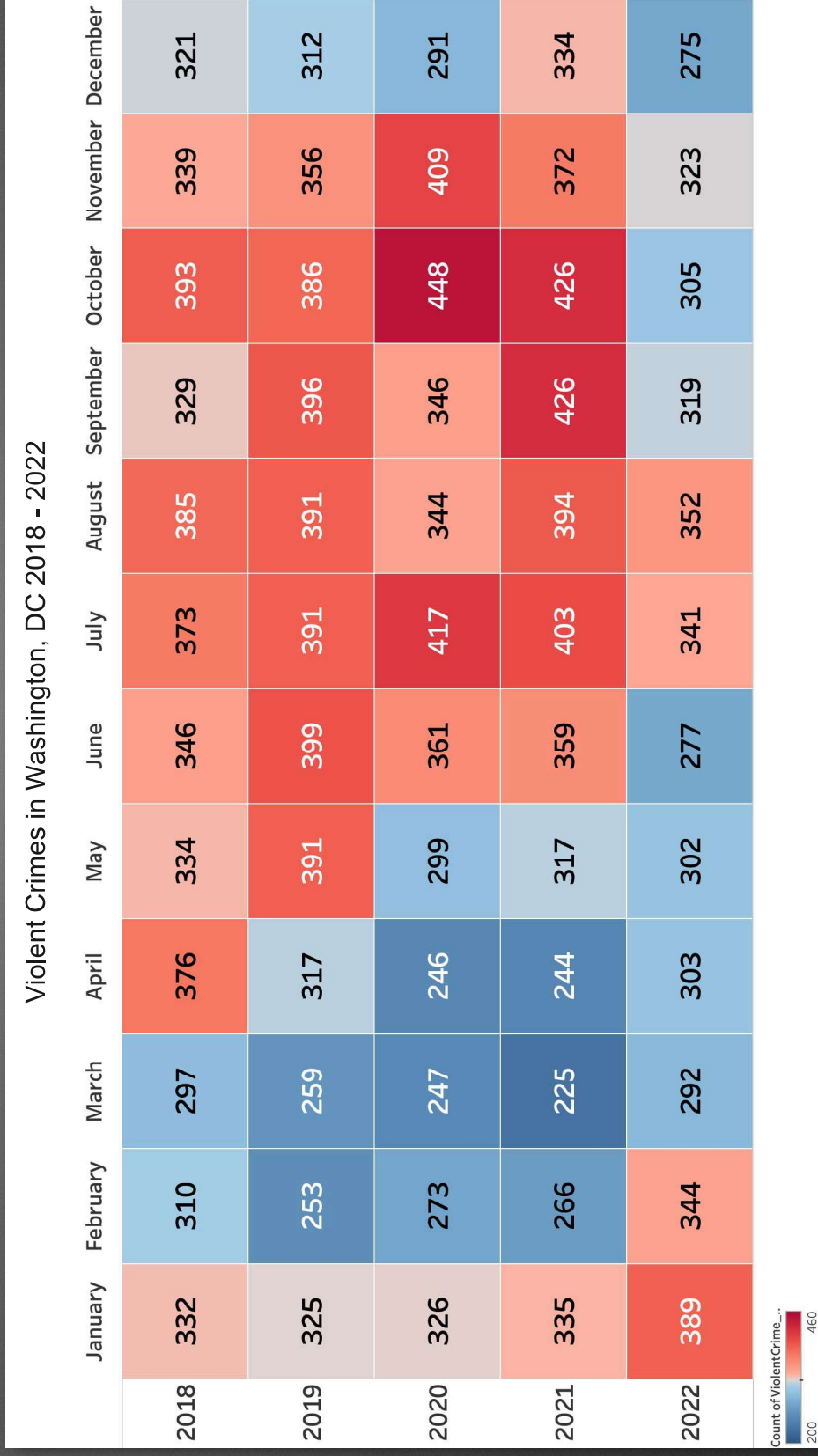
Cartographer: Pallavi Roe

Date: 10/17/2023

Source: City of Washington, DC Open Data and
Census Bureau

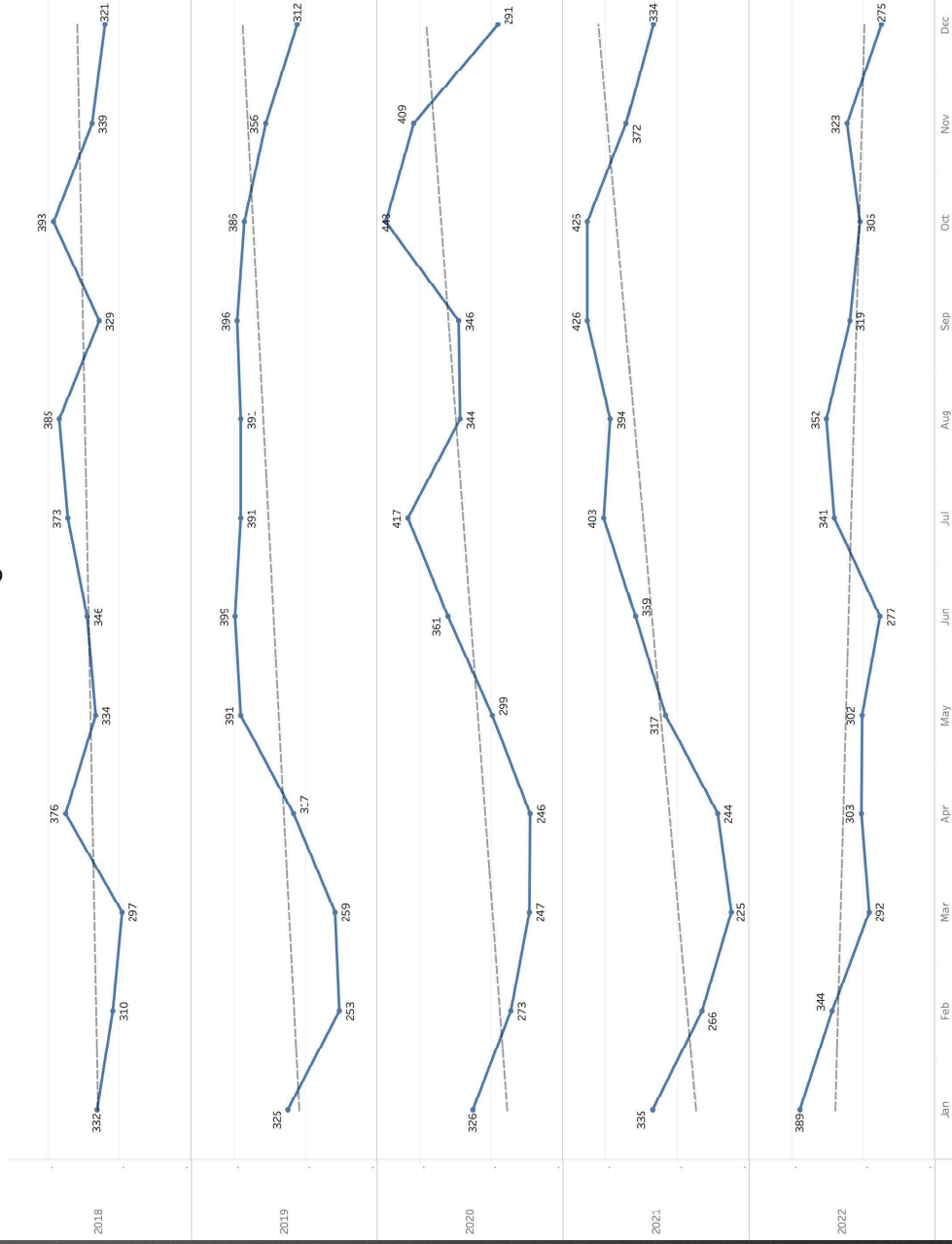


Temporal Analysis



Temporal Analysis Continued

Violent Crimes in Washington, DC 2018 - 2022



Temporal Analysis Continued

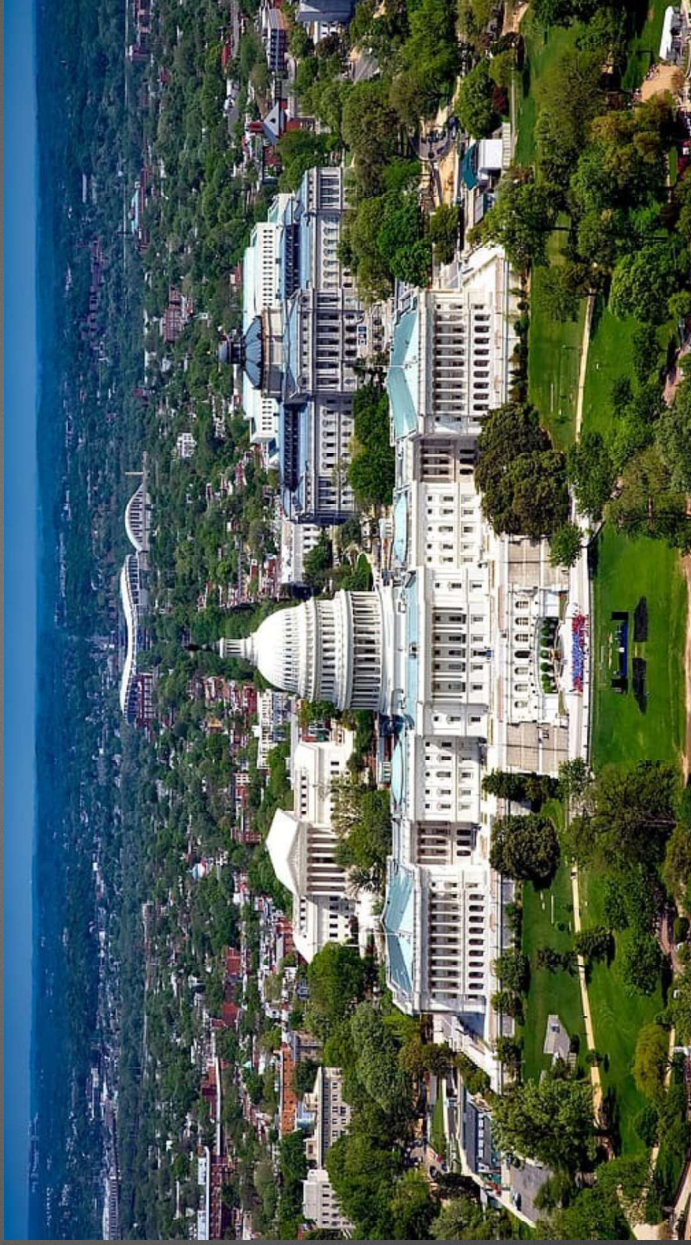
Violent Crimes in Washington, DC 2018 - 2022

	January	February	March	April	May	June	July	August	September	October	November	December
BLACK DAY	130	117	86	99	114	119	144	110	141	153	170	148
BLACK EVENING	386	270	210	223	242	229	240	256	273	334	371	335
BLACK MIDNIGHT	357	276	271	325	388	454	542	495	445	465	402	343
WHITE DAY	53	60	57	57	61	56	57	51	65	62	50	51
WHITE EVENING	79	94	94	106	108	96	106	104	99	106	86	85
WHITE MIDNIGHT	93	101	79	102	118	113	108	122	132	112	94	77
OTHERS DAY	150	110	112	125	127	156	173	180	142	145	131	110
OTHERS EVENING	286	253	245	244	246	243	254	268	284	330	284	224
OTHERS MIDNIGHT	173	165	166	205	239	276	301	280	235	251	211	160

Count of Violent Crime
20 500

Conclusion

- Robbery
- Northeast and Southeast quadrants
- Warmer Months and evening and night hours
- Income, Poverty and Race



Thank You !!

Questions?