

USF class projects

Geospatial Analysis using R

Fall 2021

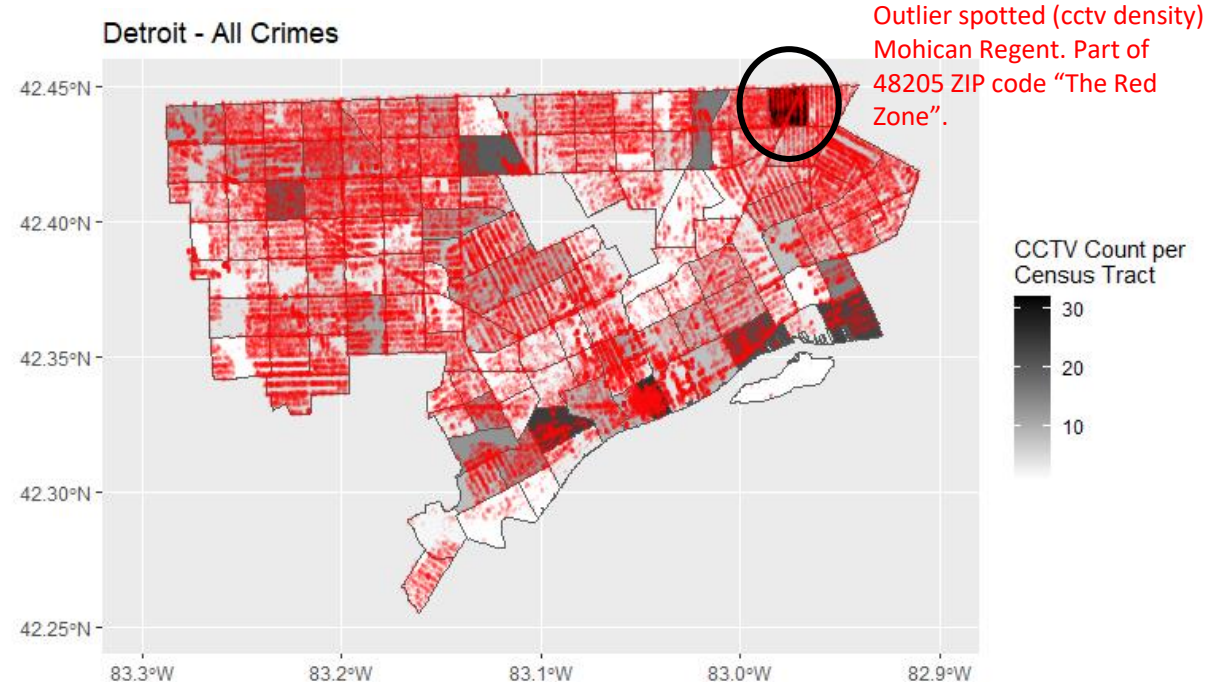
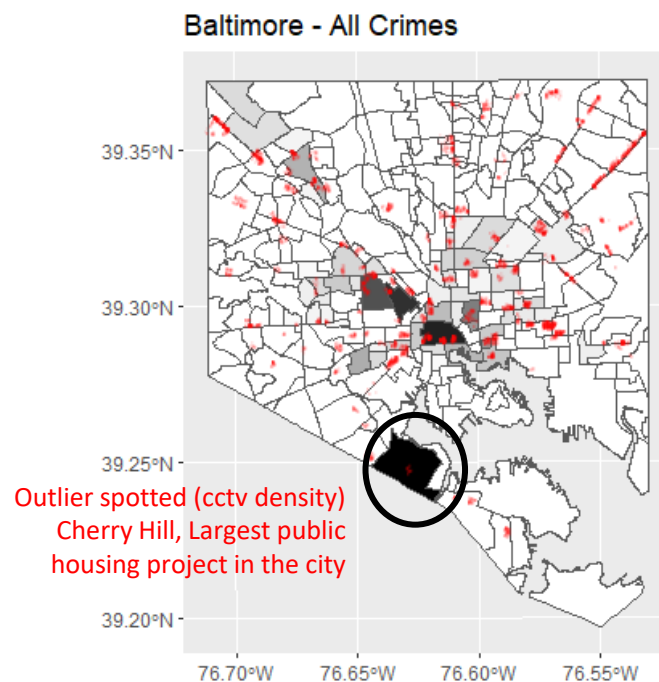
Student Projects

- Surveillance: Detroit and Baltimore
- BudgetFlow: San Francisco
- Policeprop: San Francisco
- Hashtag sweep: Continental US

- Pili comments in red.

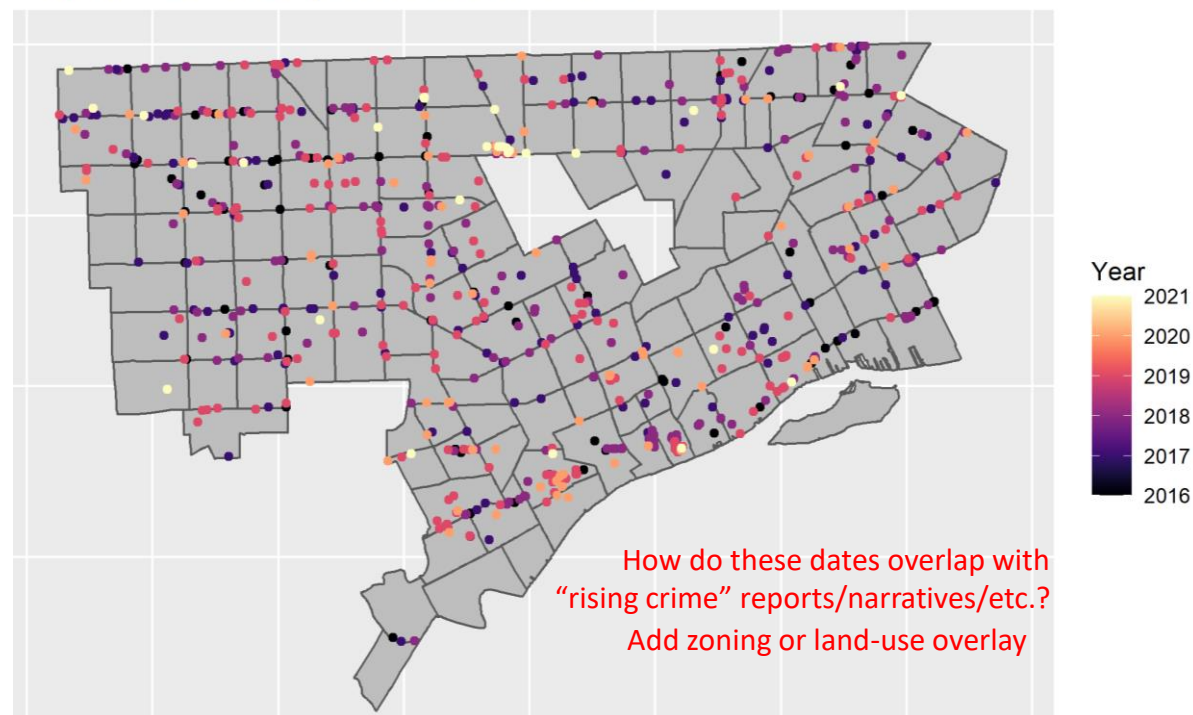
SURVEILLANCE (Arman, Aiyin, Claire)

- Interested in the correlation between surveillance and socioeconomic variables, such as local crime rate, income, and the composition of population.
- The analysis of surveillance across Detroit, MI, and Baltimore, MD are based on the distribution and relationships of cctv and crime, income, and minority population.
- Crime: Arson, Assault, Homicide, Larceny, Robbery, Stolen vehicles.

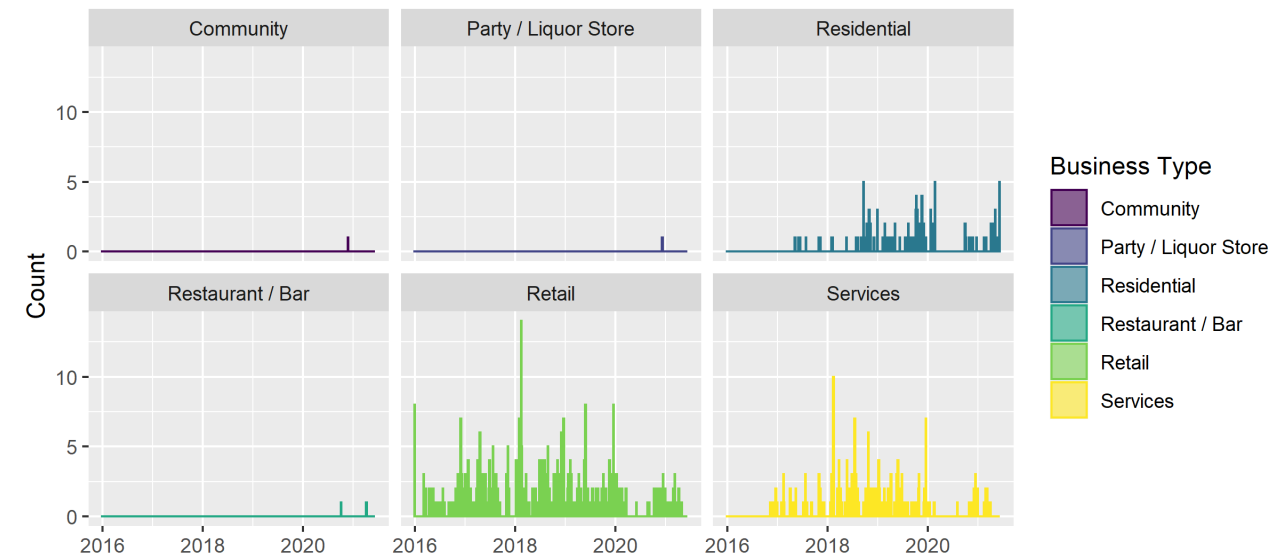


Future research question: What is happening in the other high-density (cctv) tracts?

Distribution of CCTV by activation date in Detroit

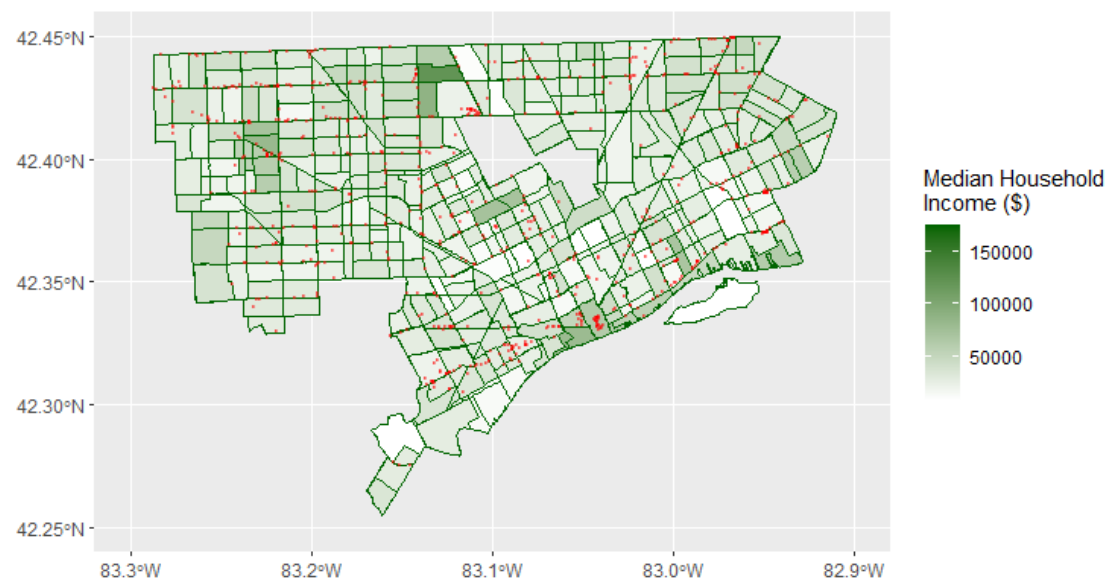


CCTV activation date in Detroit

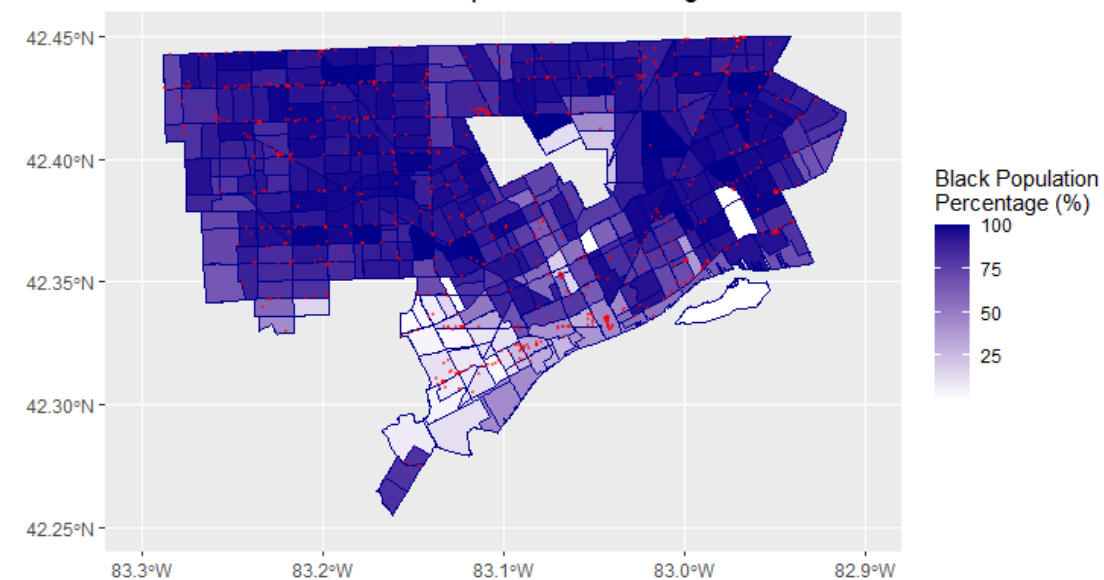


Perhaps map distribution/density of business type surveillance
by tract or income?

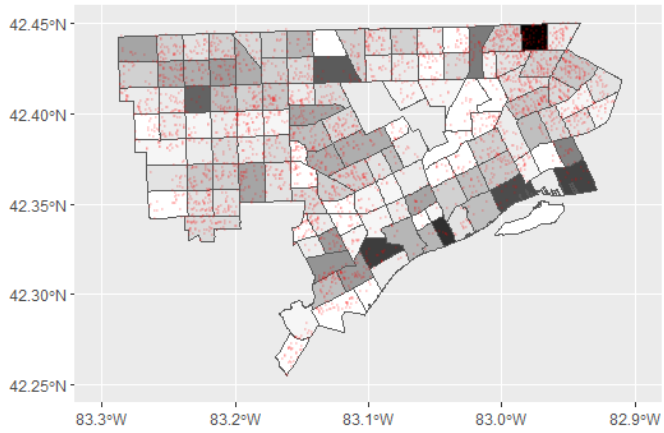
Detroit
CCTV locations over Median Household Income



Detroit
CCTV locations over Black Population Percentage

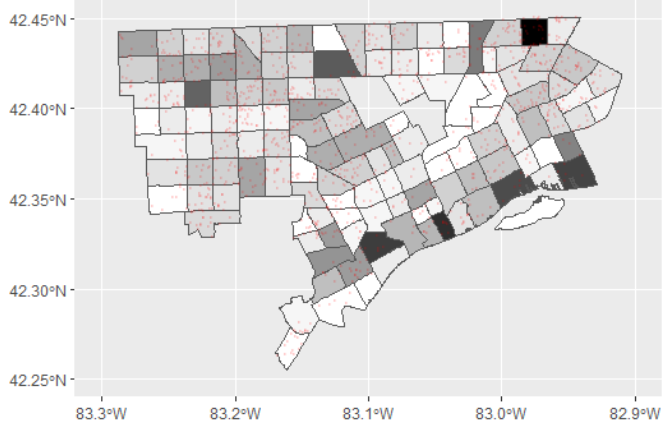


Arson

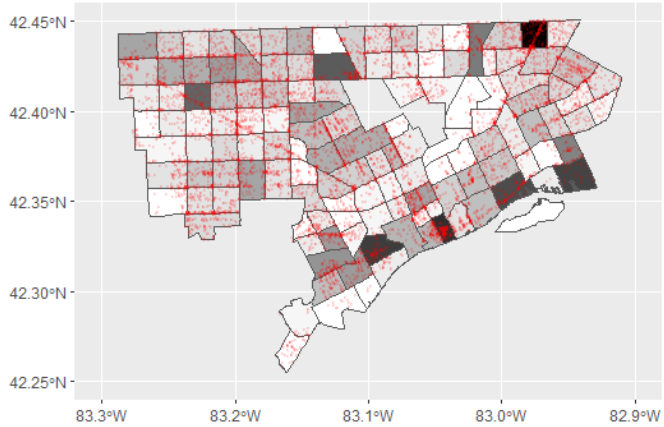


No clear pattern in terms of categories of crime, maybe something comes up if we add temporal factor.

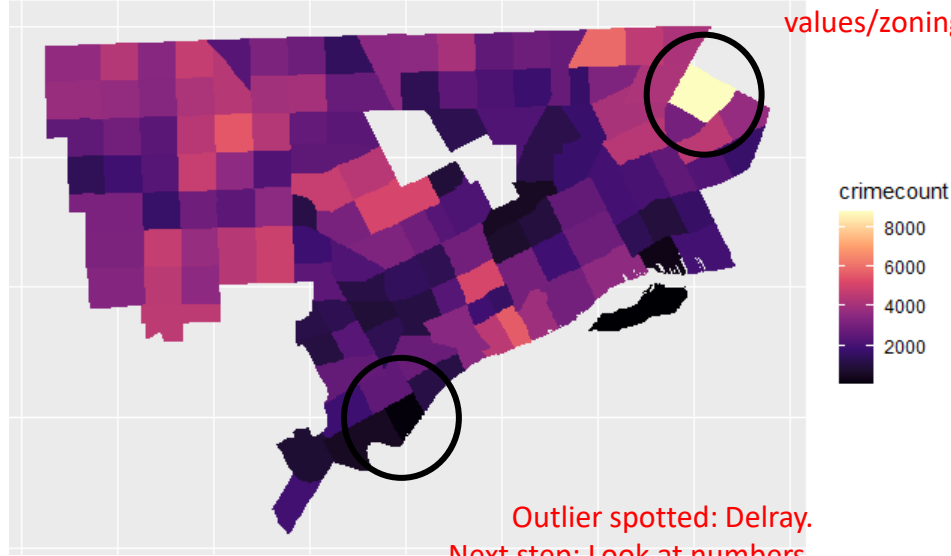
Homicide



Robbery



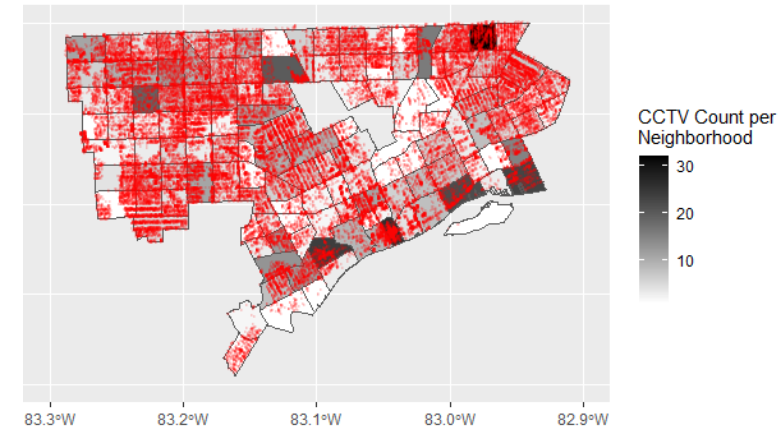
Detroit crime counts per neighborhood



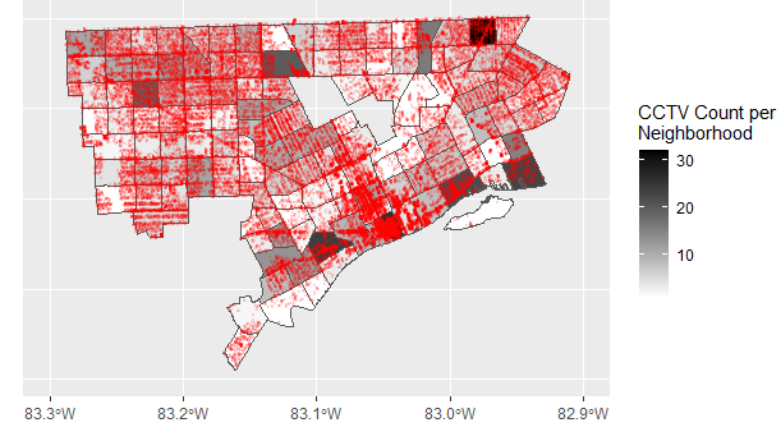
Outlier spotted: Delray.
Next step: Look at numbers, property values/zoning, policing.

Outlier spotted: Denby, Yorkshire Woods, Moross-Morang neighborhoods.
Next step: Look at property values/zoning.

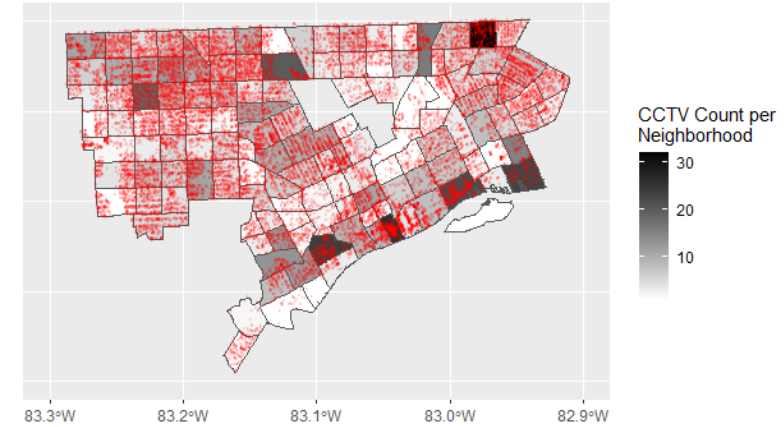
Assault



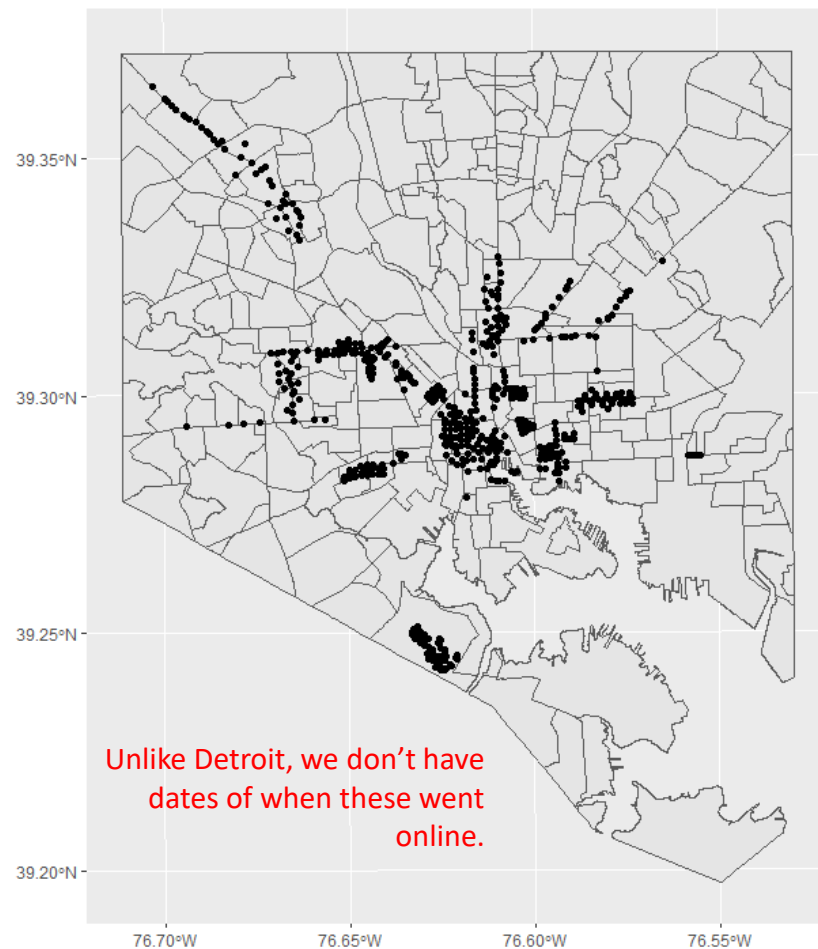
Larceny



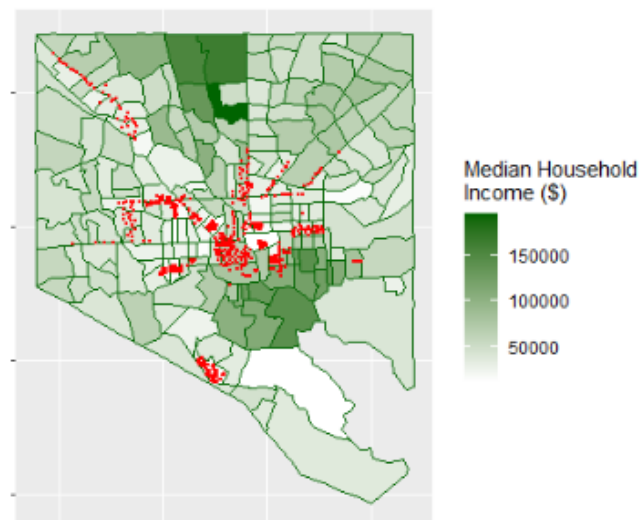
Stolen Vehicle



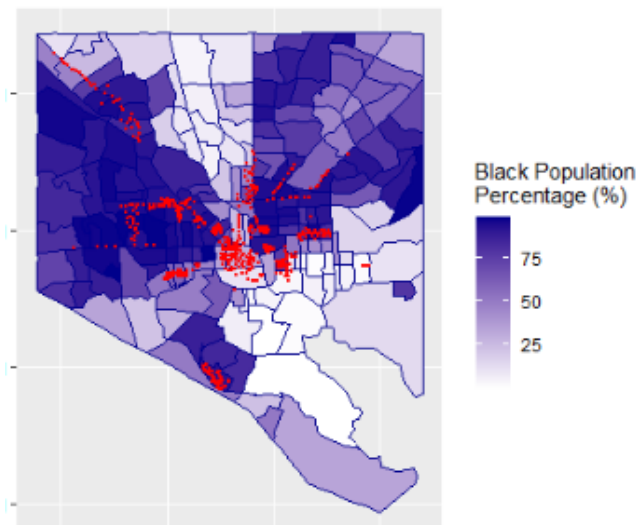
CCTV Distribution in Baltimore



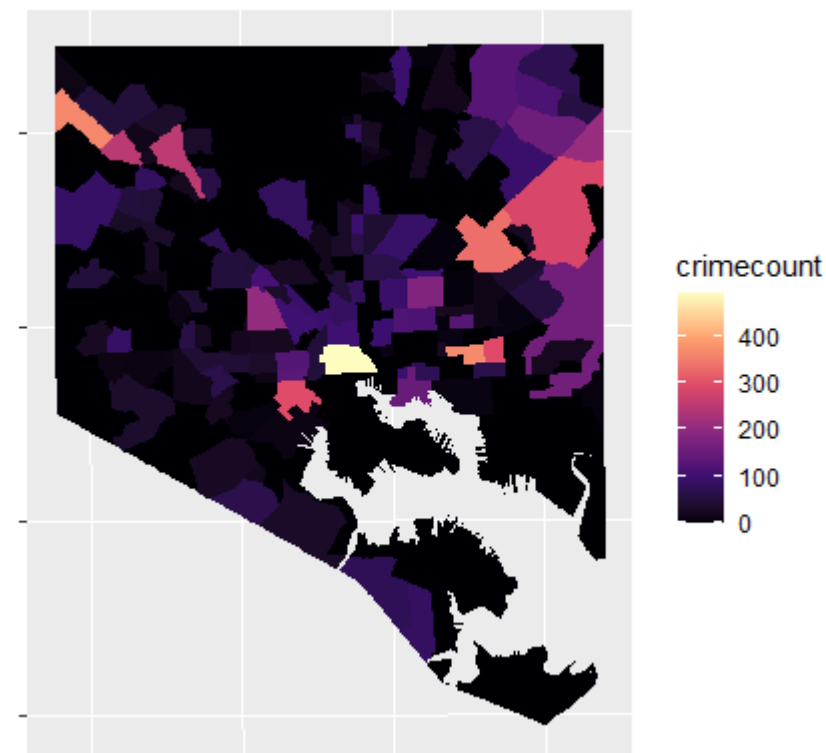
Baltimore
CCTV locations over Median Household Income



Baltimore
CCTV locations over Black Population Percentage



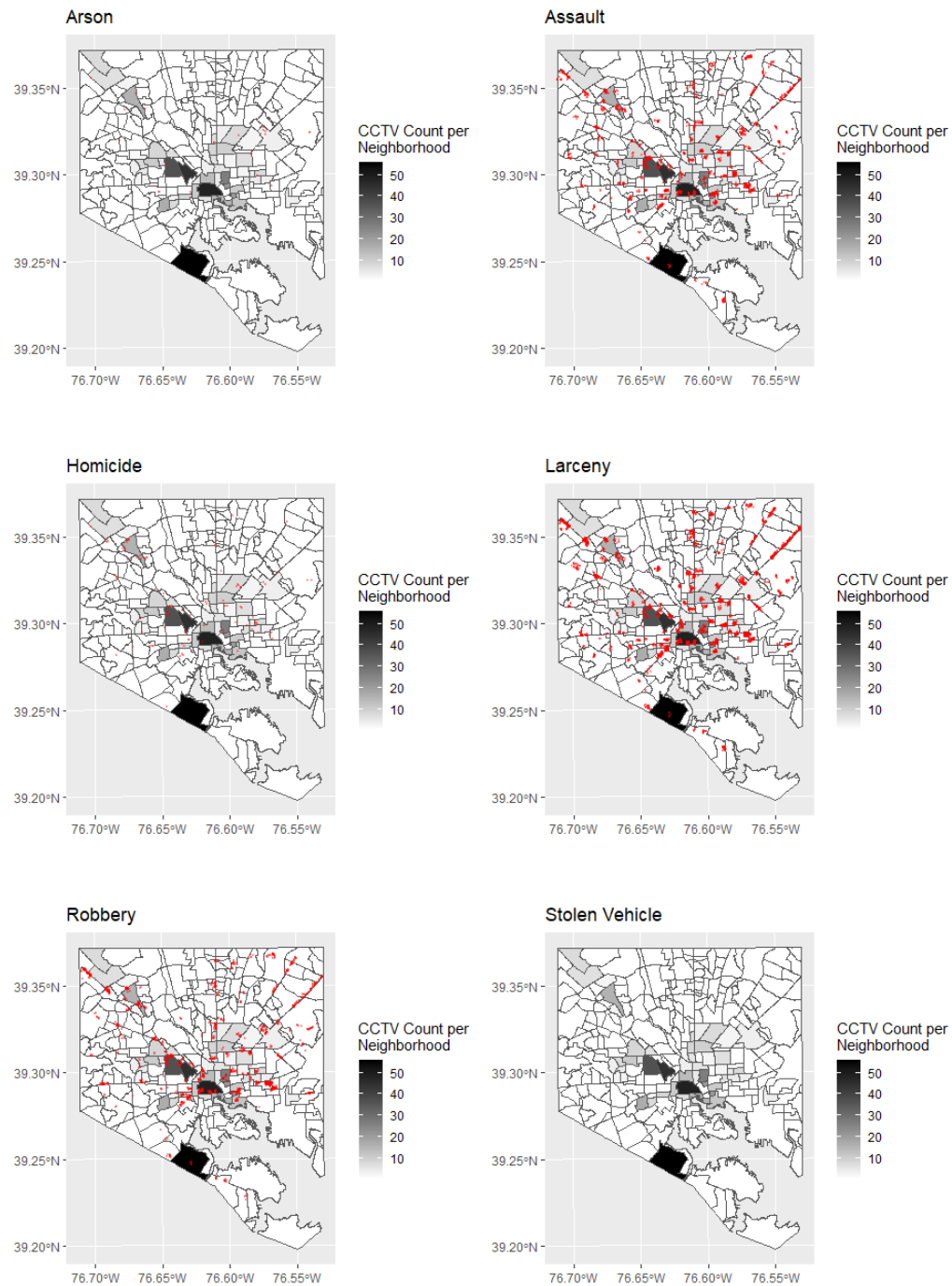
Baltimore crime counts per neighborhood



The contrast between some neighborhoods and others is striking. Is it underreporting? Overreporting? Police presence? Next step: Overlay with strategic policing areas.

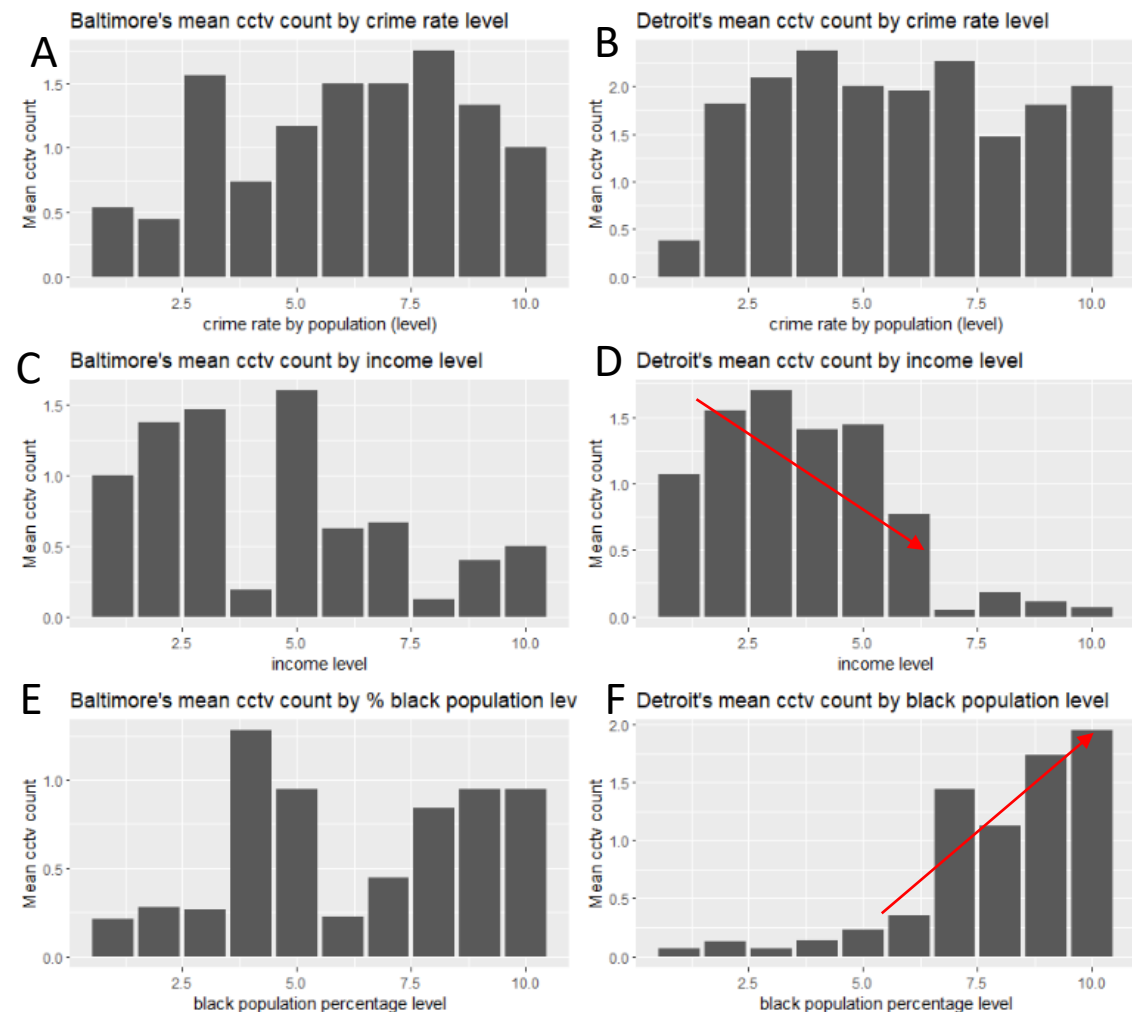
These maps confirm what we already know. I would add more information, zoning, parcel values, another explanatory variable. Except, Baltimore city doesn't share information. We could purchase it if needed or reach out to the city for data.

Same as Detroit, no clear pattern in terms of categories of crime, maybe something comes up if we add temporal factor.





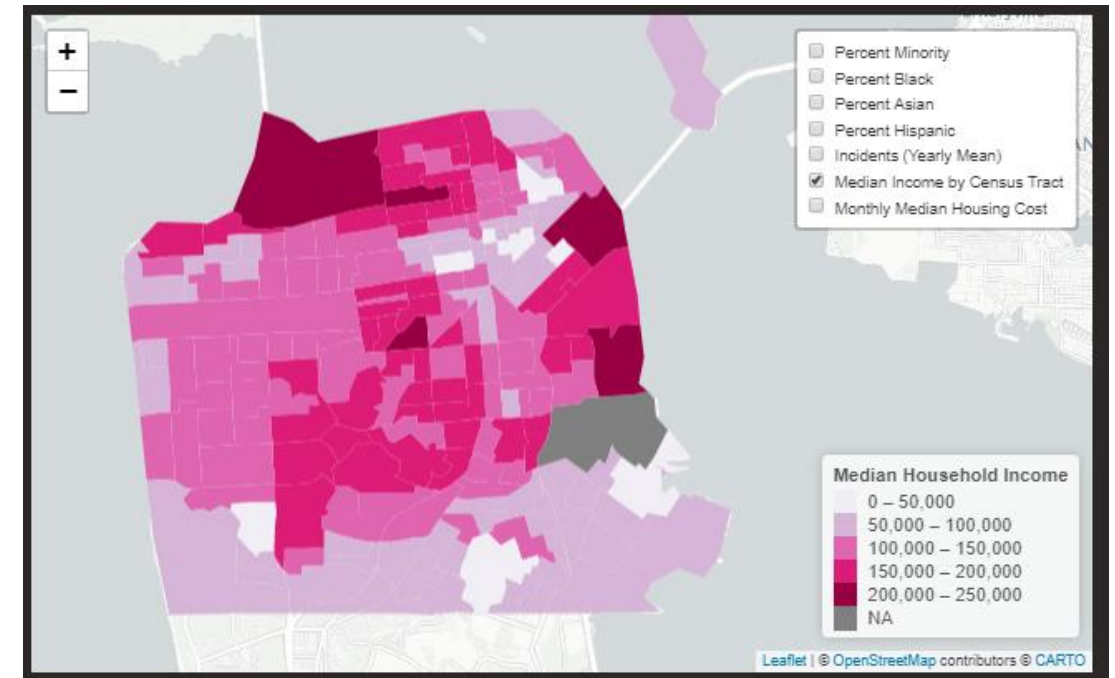
Correlations confirm intuition, more money = smaller crime rates. Black population density = higher crime rate. But the relationship is not statistically significant.



Each X-axis variable is divided in 10 categories in density (unsure how the team produced that number) but for instance, graph D shows that there is a higher presence of cctv in areas with a lower income (less 50% metric). Baltimore's cctv relation to population and income variables don't show clear tendencies.

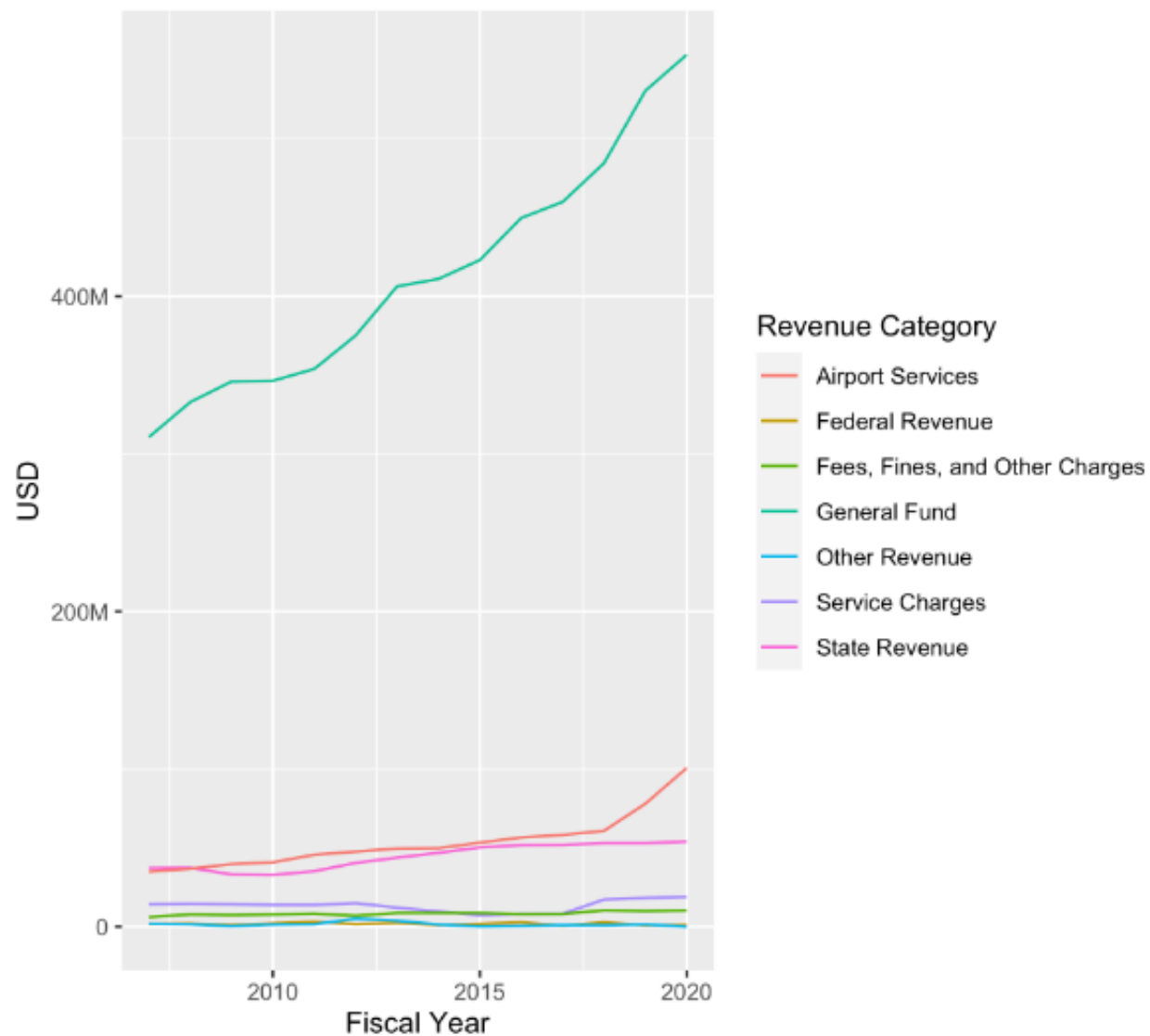
BUDGETFLOW (Anna, Robert, Ryan)

- Interested in how and where there is demand for and distribution of policing resources and the urban landscape being policed. Incident data serves as a proxy for police activity, as it includes not only crime reports but other policing activities such as serving arrest warrants and other non-crime related police activity.
- Where is the most police activity in relation to socio-demographics and land-use in different areas of the city. Where is police staffing proportionate with police activity?

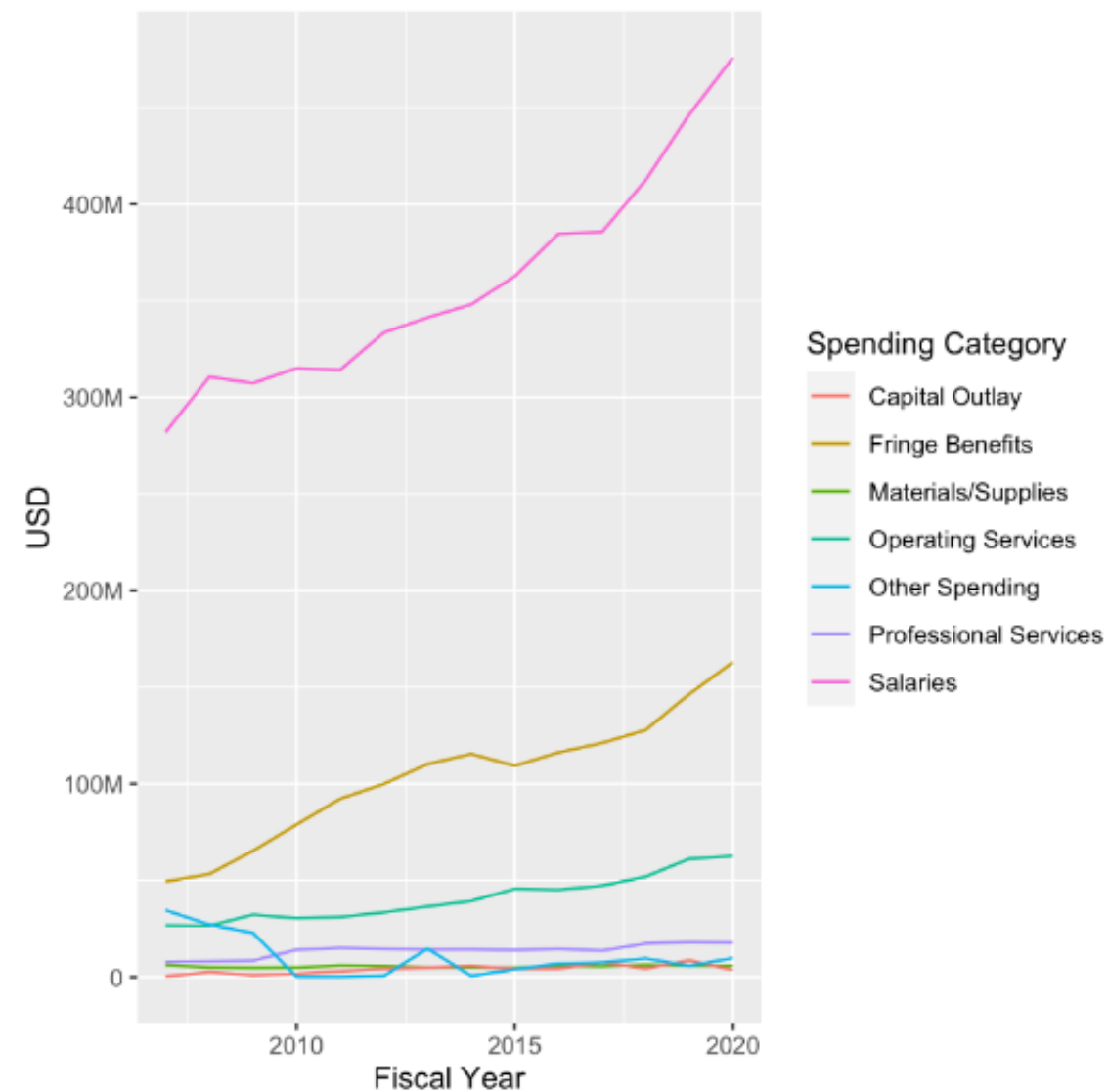


Interactive map (can't export, will show on Weds)

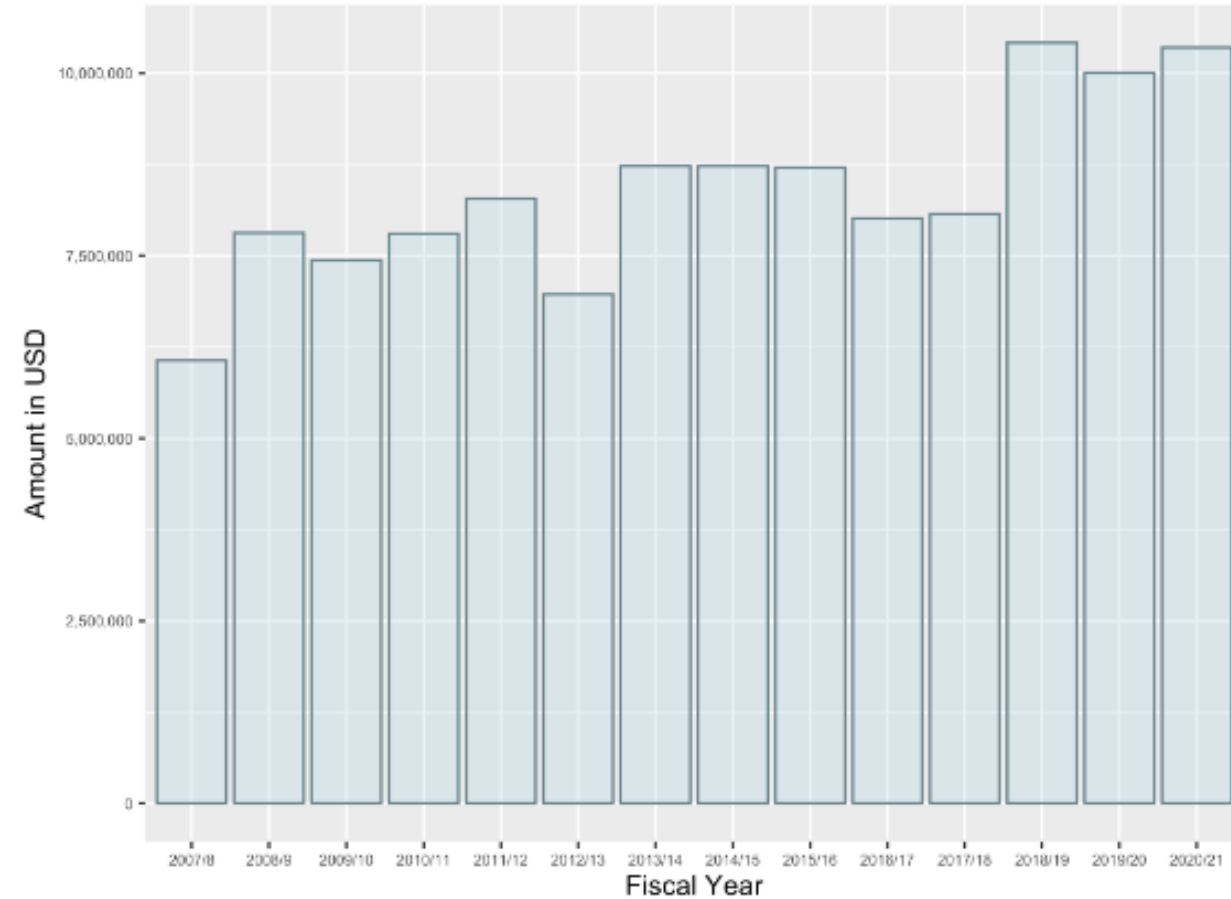
San Francisco Police Department Revenue



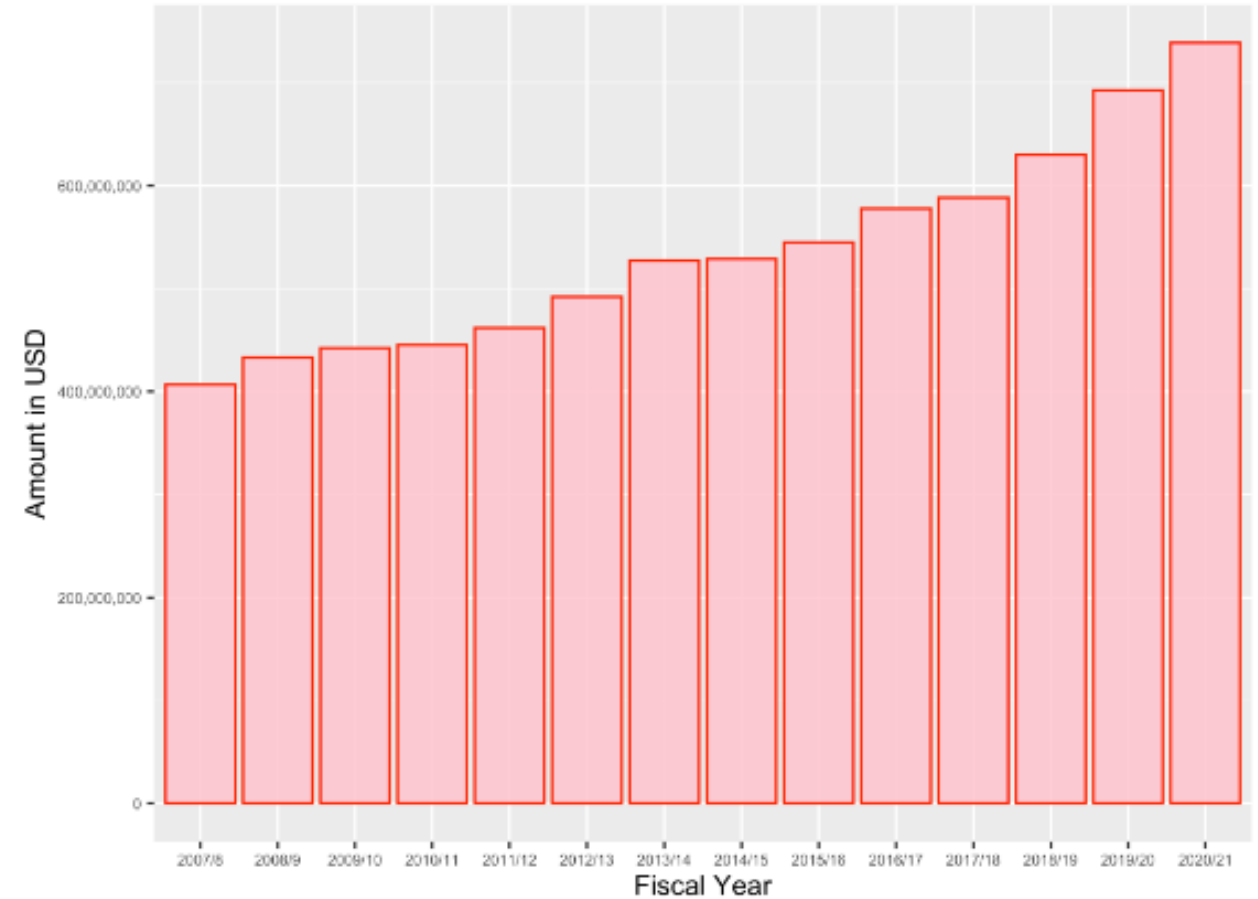
San Francisco Police Department Spending



SFPD Budget Obtained Through Fees, Fines, and Other Charges

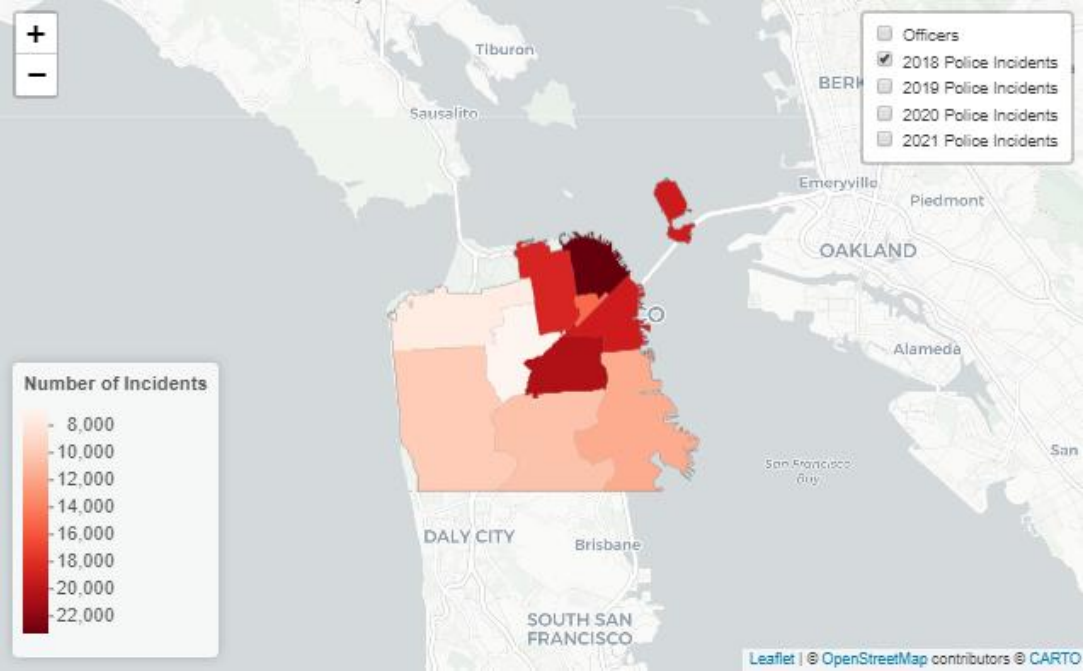
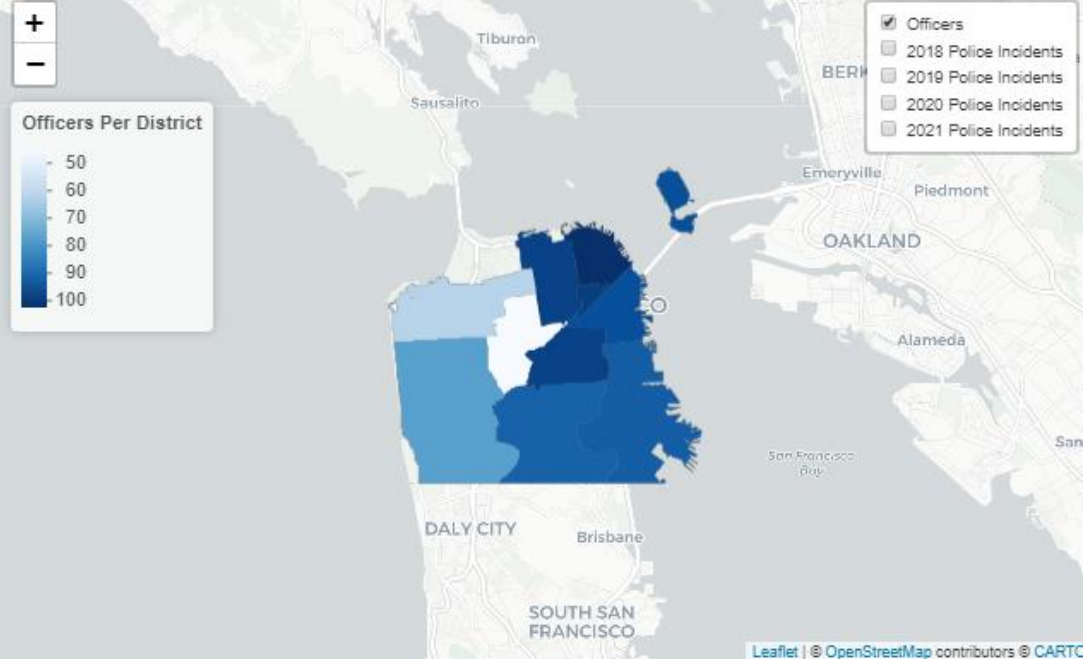
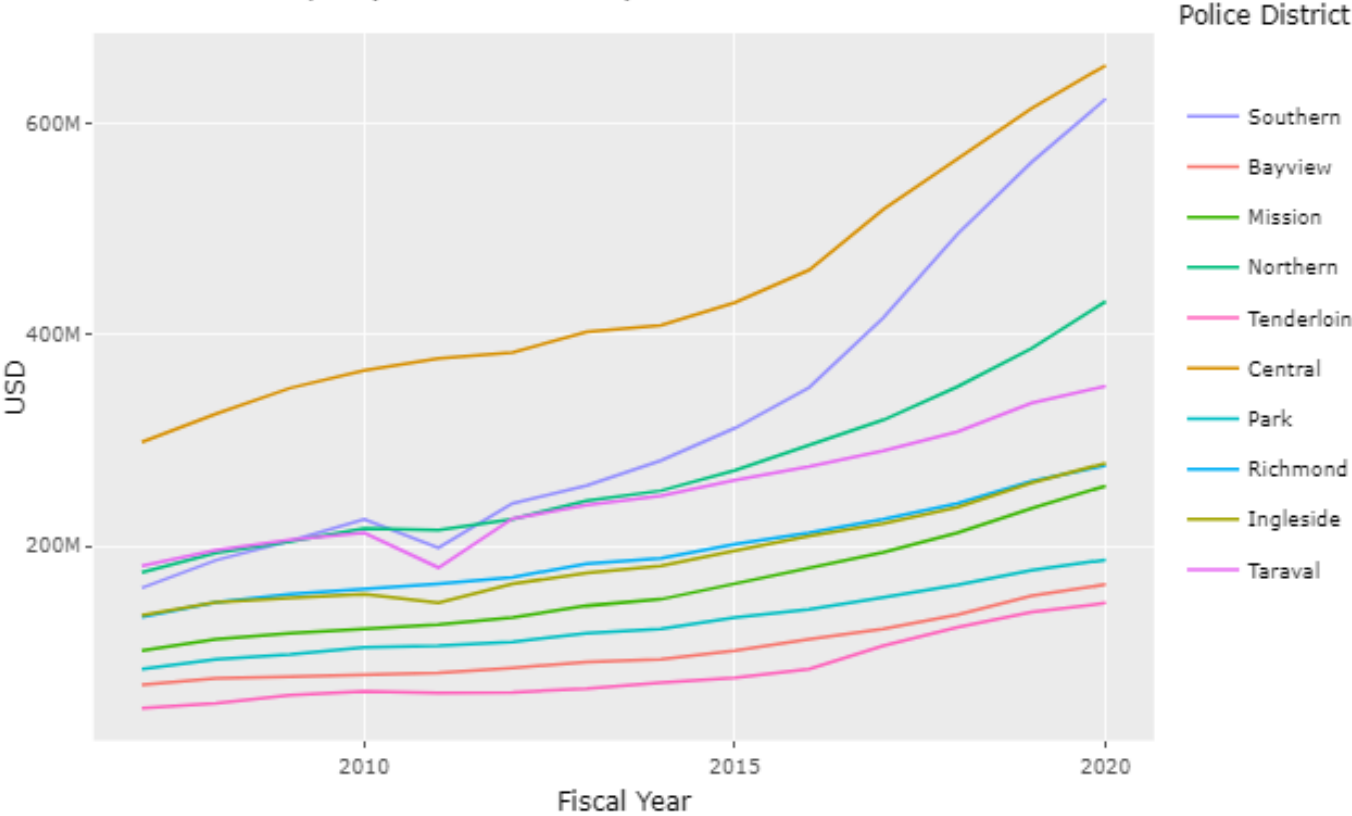


SFPD Department Budget by Fiscal Year

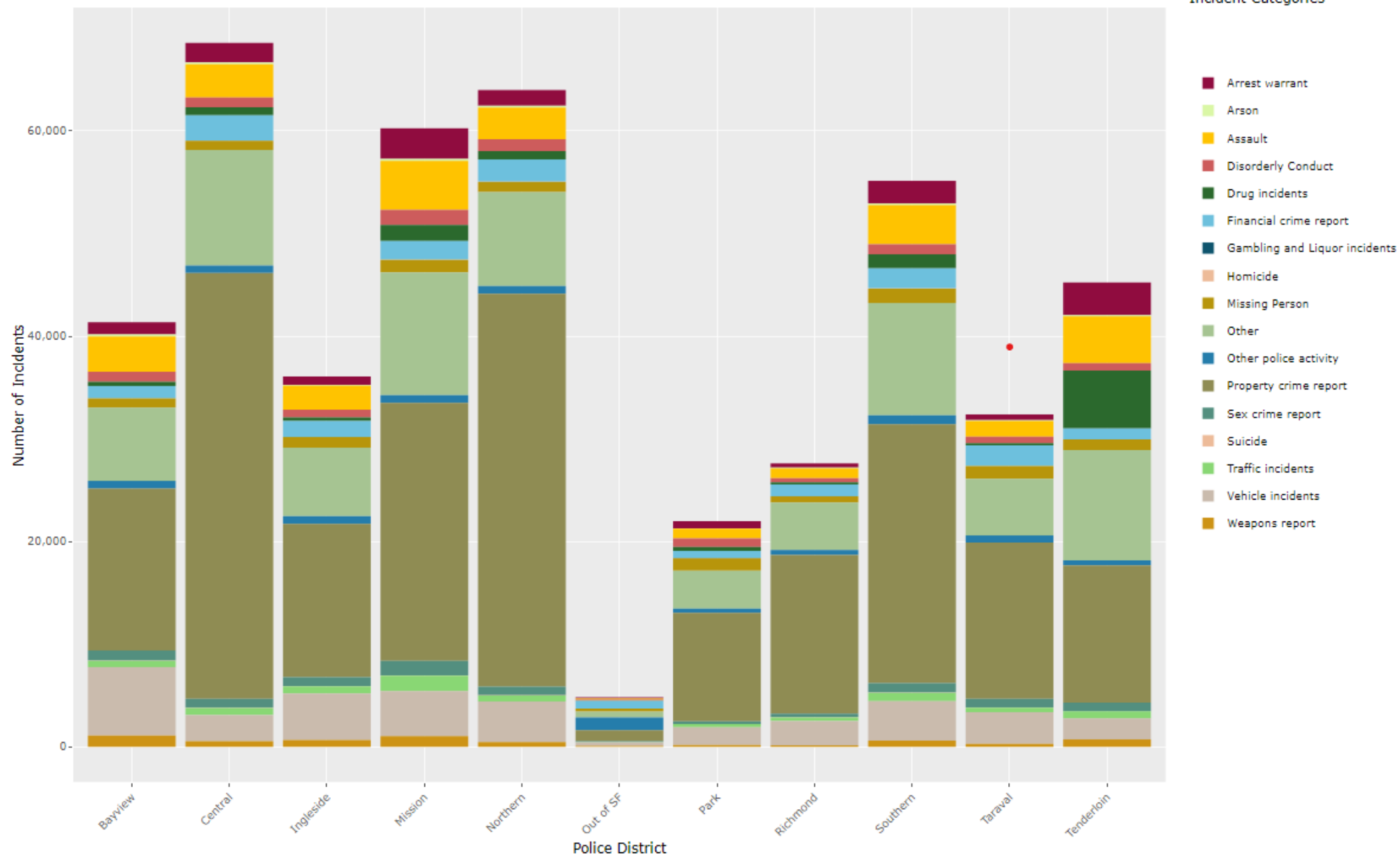


Would be easier to draw a proportional graph that show % of department budget made up by Fees, Fines, and Other charges.

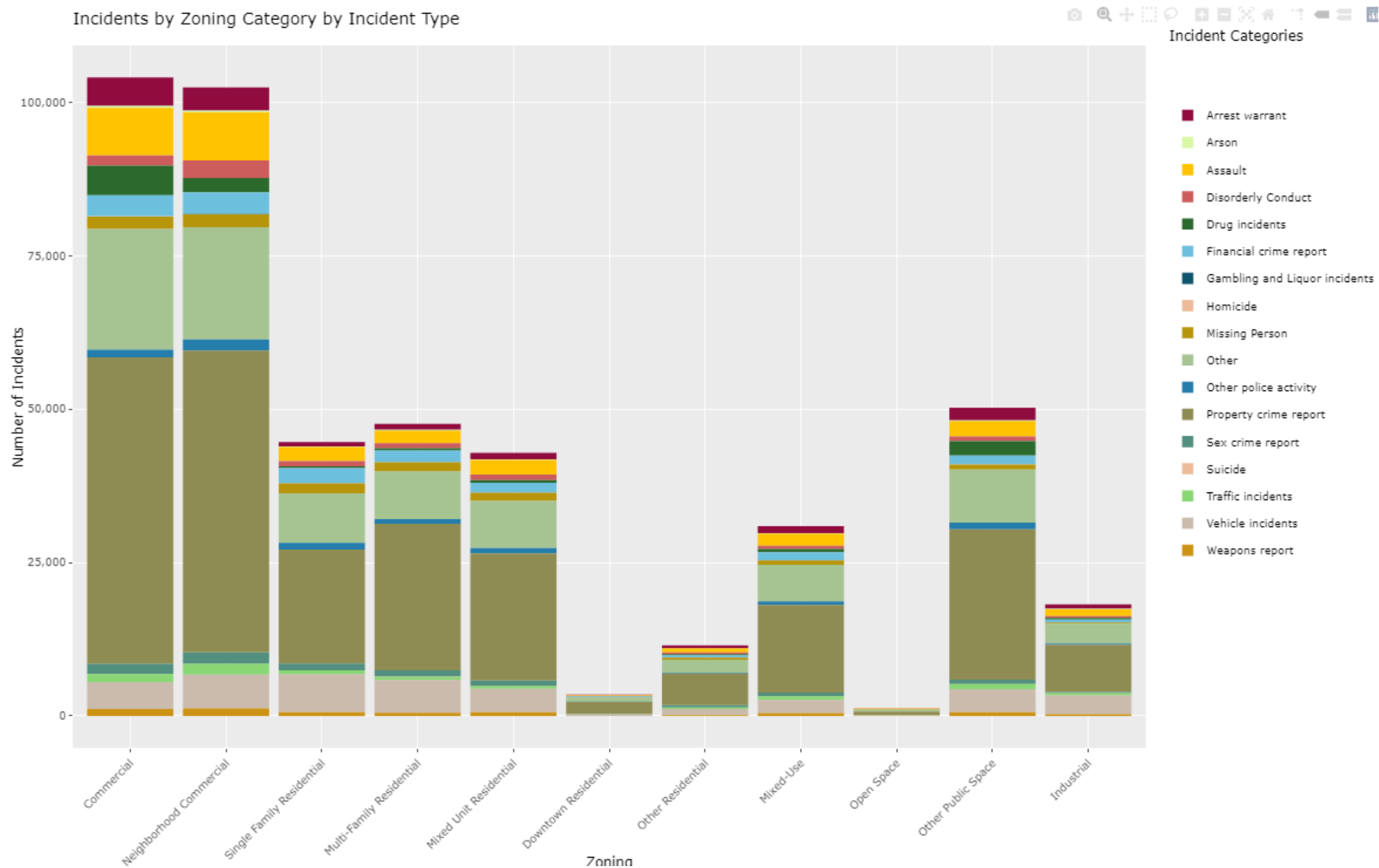
Estimated Property Tax Revenue by Police District



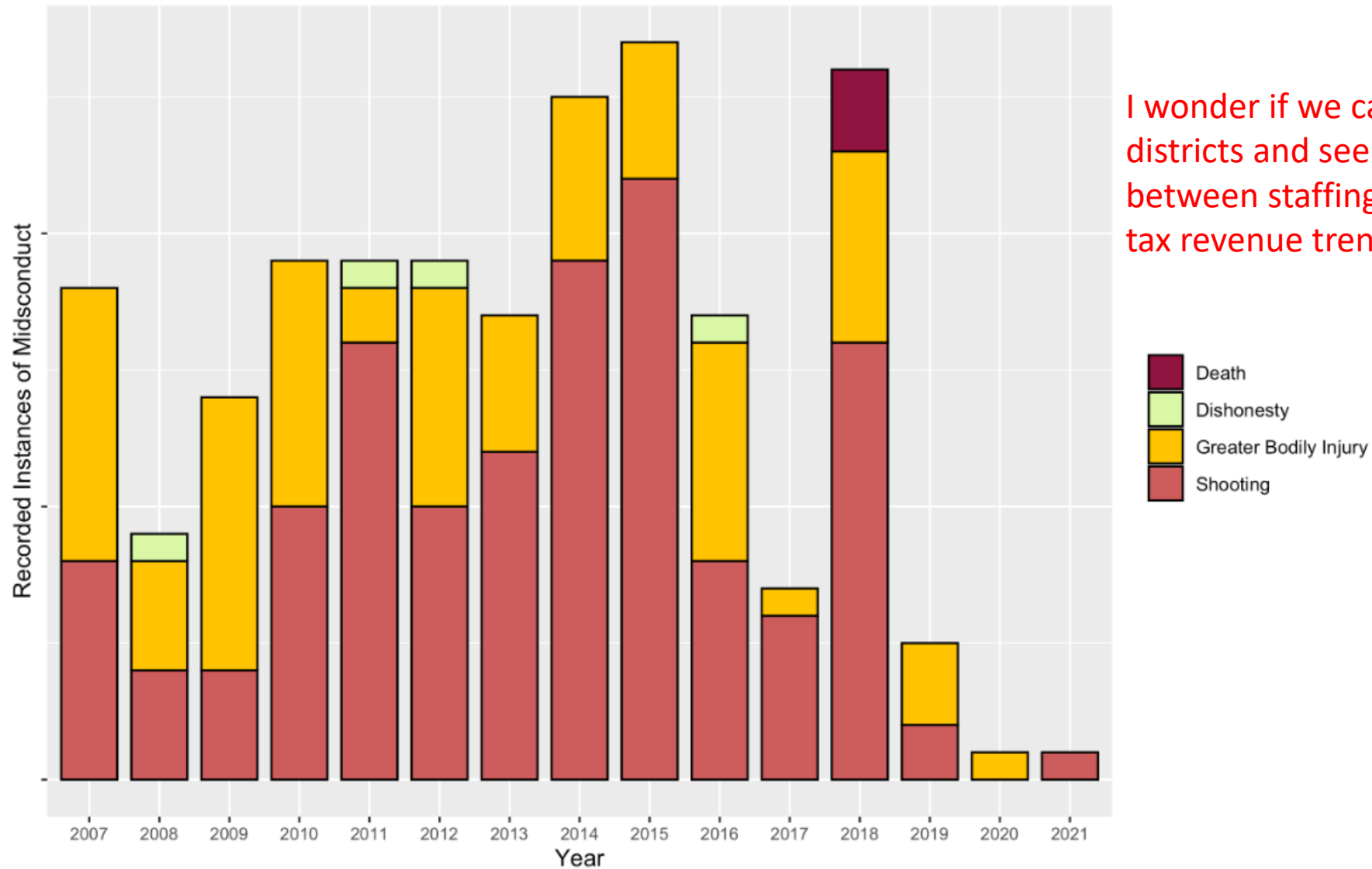
Incidents by Police District by Incident Type



Incidents by Zoning Category by Incident Type



Instances of SFPD Misconduct by Type

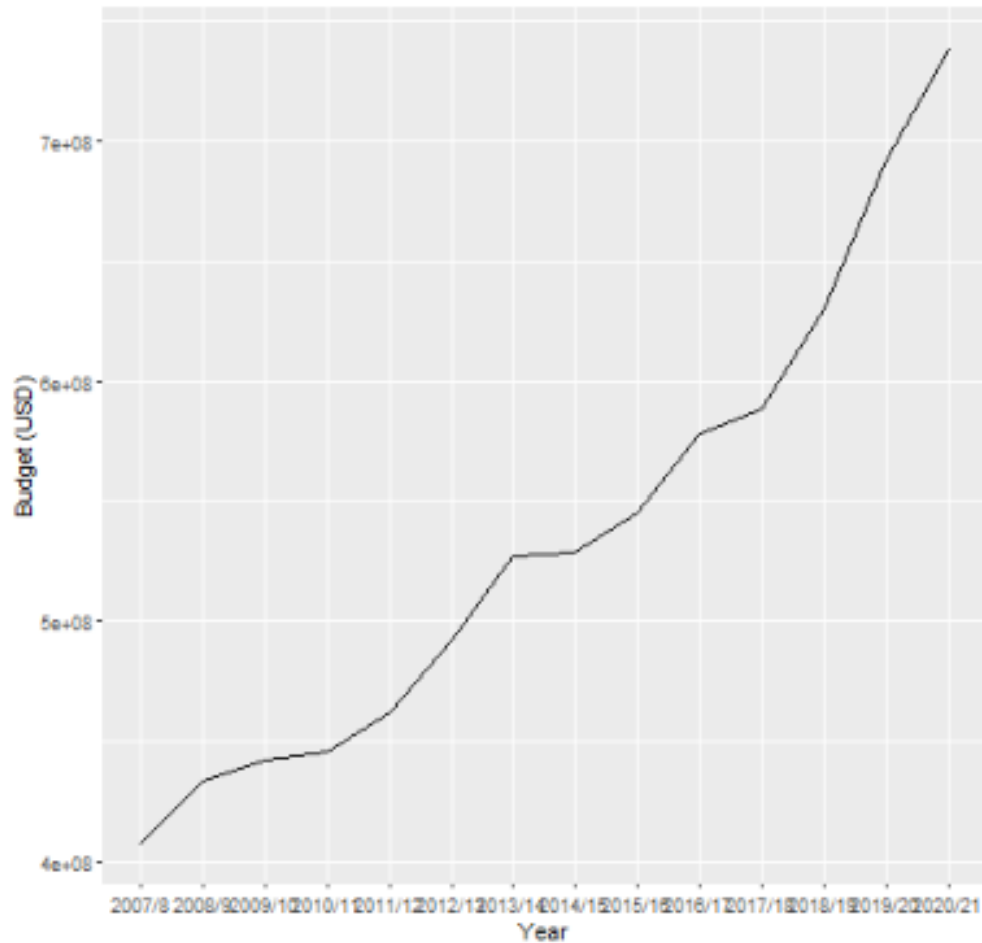


I wonder if we can plot these over police districts and see if there is a relationship between staffing, incidents, and property tax revenue trends.

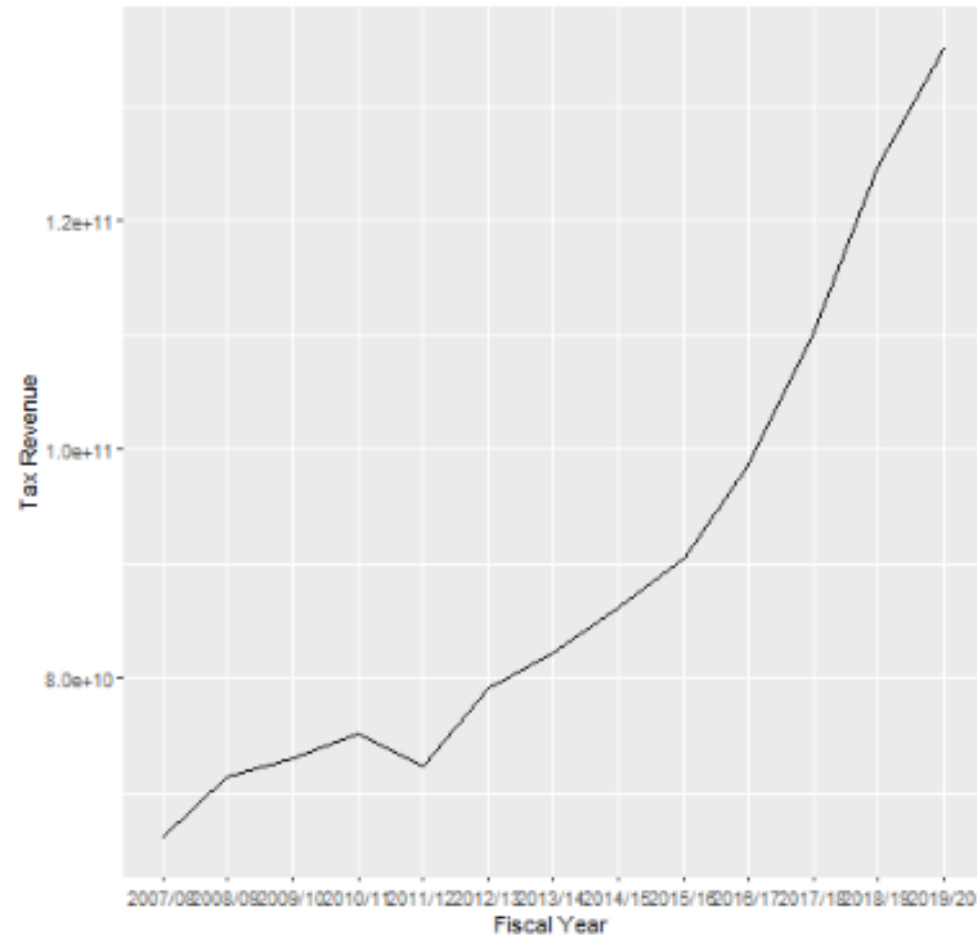
Policeprop (Julia, Atlas)

- Interested in analyzing changes in property valuation and policing in San Francisco from 2007 to 2021. It compares spatial and temporal changes in property values with police budget changes.

San Francisco Police Department Budget FY08-FY20

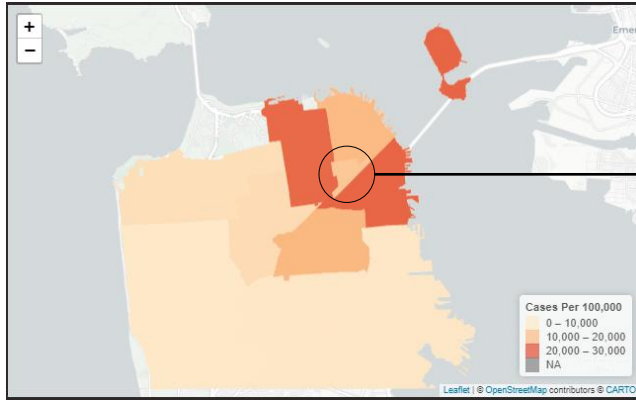


San Francisco Annual Tax Revenue from Real Property

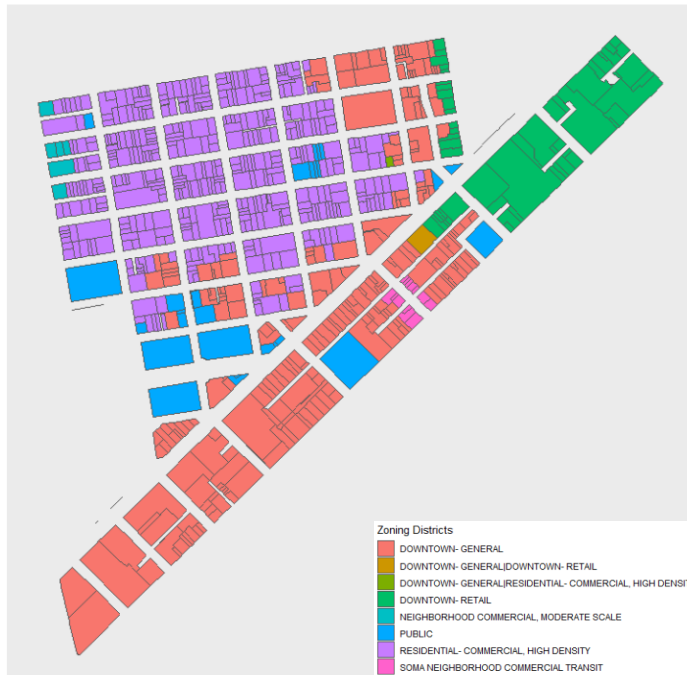


Neighborhood level analysis:

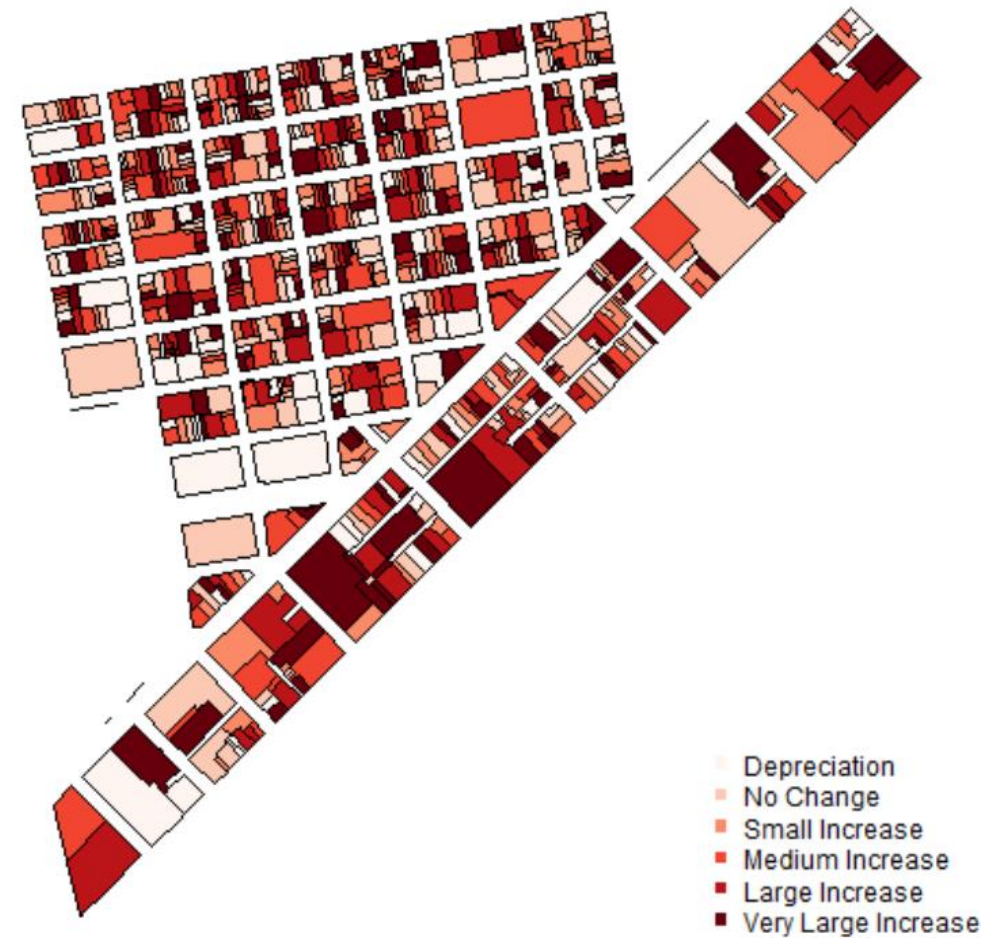
Tenderloin district selected in this example because the Urban Displacement Project identifies the area as at a stage of "early or ongoing" gentrification - so example may show some dynamism. More info about the project on the website (<https://www.urbandisplacement.org/maps/sf-bay-area-gentrification-and-displacement/>)



Zoning



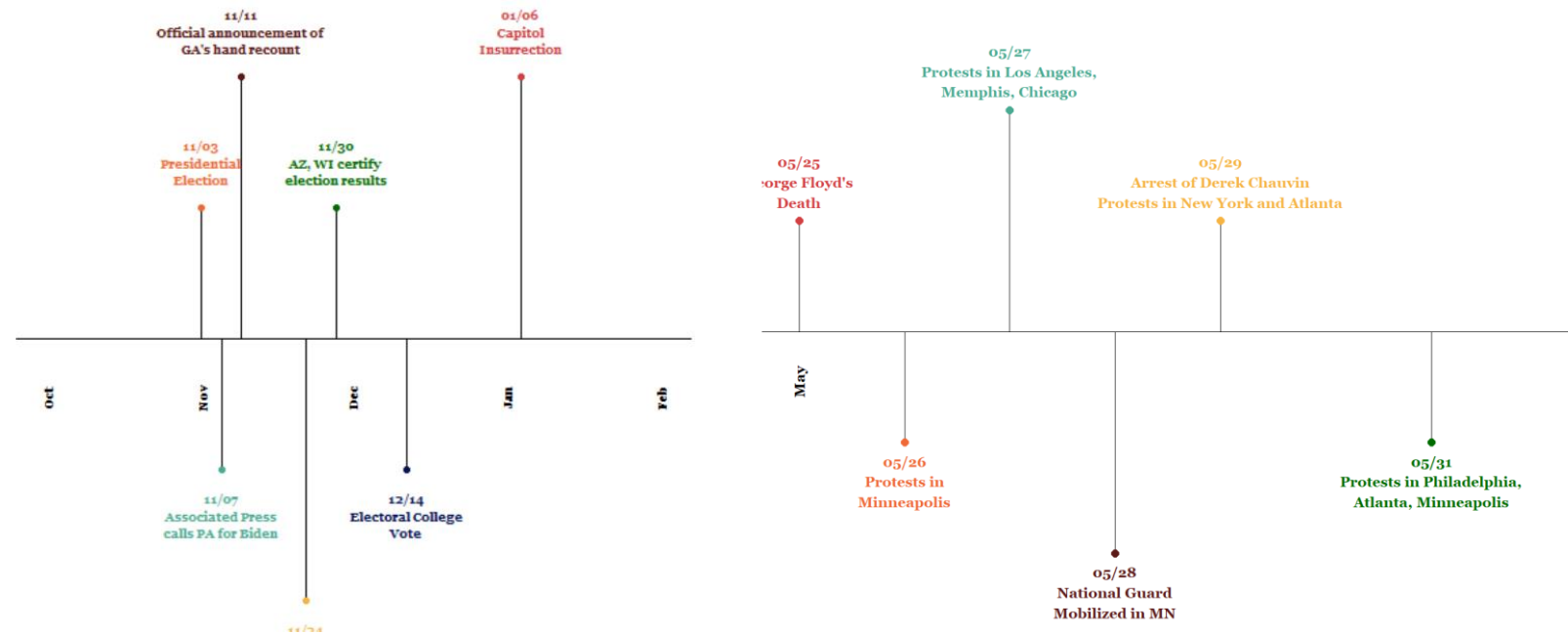
Tenderloin Land Value Tax Revenue Change FY0708-FY1718



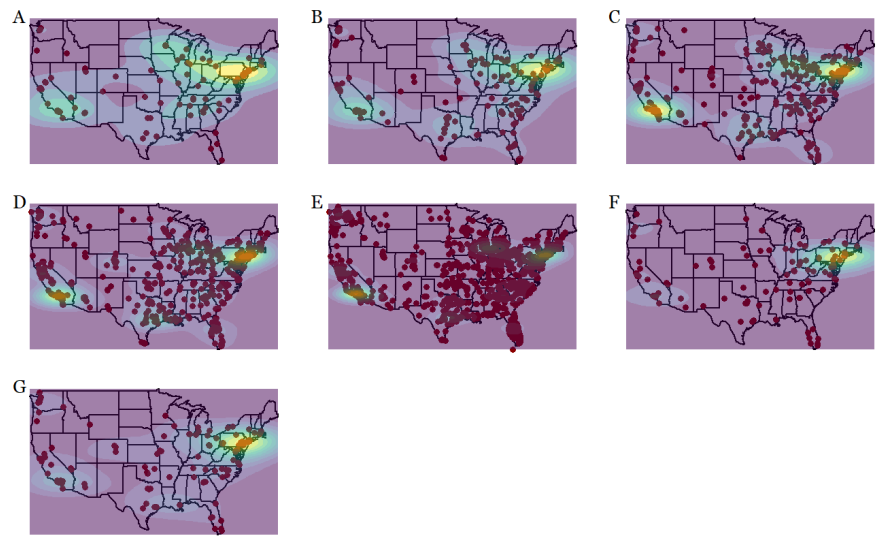
It would be interesting to see this in an interactive map to get the actual numerical change. Further work, add socio-economic information. Add Land Use.

Hashtag sweep (Sadie, Valeria)

- Examine the spatial dimensions of the role that Twitter played in the Black Lives Matter protests as well as the Capitol Insurrection.
- Mapped the spatial distribution of the three most common hashtags for capitol insurrection (#stopthesteal, #voterfraud, #electionfraud) in key dates after the 2020 Presidential Election (November 3rd, 7th, 11th, 24th and 30th, December 14th, and January 6th)
- Mapped the spatial distribution of the Black Lives matter hashtags (using #blacklivesmatter, #blm, #icantbreathe, #georgefloyd) in key dates of the summer of 2020 (May 26th - 31st) and spring of 2021 (March 8th and 28th).



Spatial Distribution of Tweets that included #blm



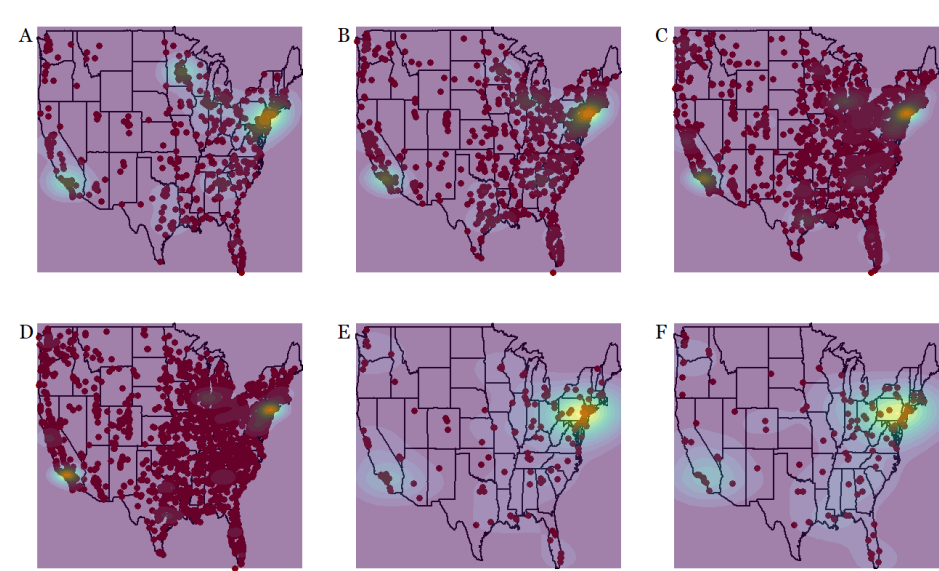
(A) May 26th, 2020. (B) May 27th, 2020. (C) May 28th, 2020. (D) May 29th, 2020. (E) May 31st, 2020. (F) March 8th, 2021. (G) March 28th, 2021.

Spatial Distribution of Tweets that included #icantbreathe



(A) May 26th, 2020. (B) May 27th, 2020. (C) May 28th, 2020. (D) May 29th, 2020. (E) May 31st, 2020. (F) March 28th, 2021

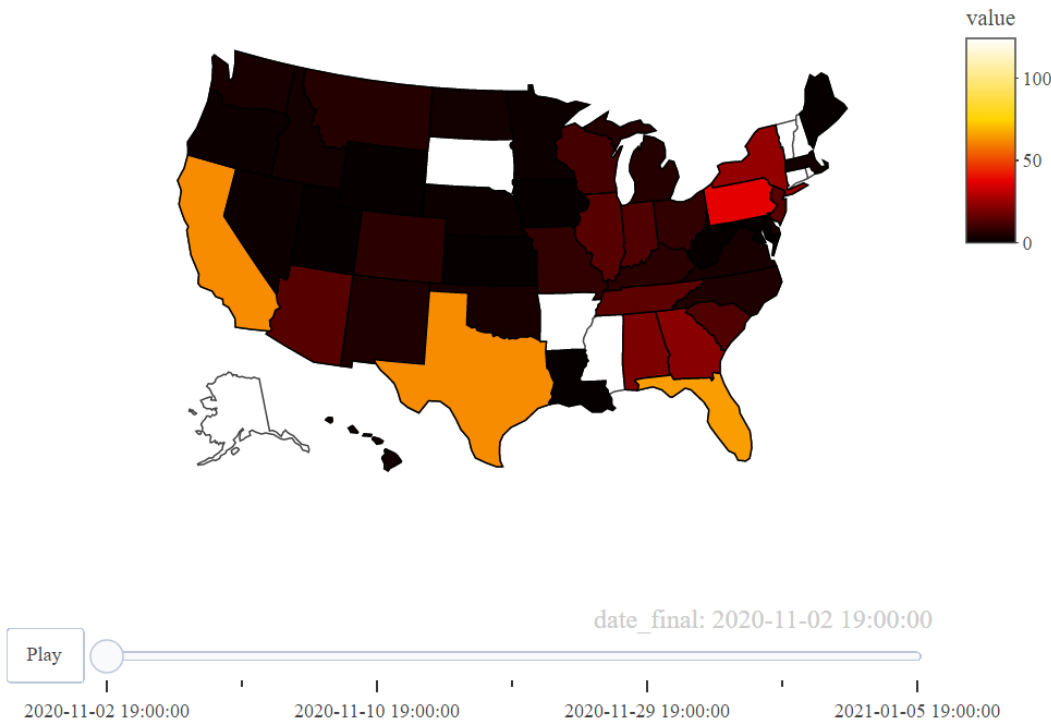
Spatial Distribution of Tweets that included #blacklivesmatter



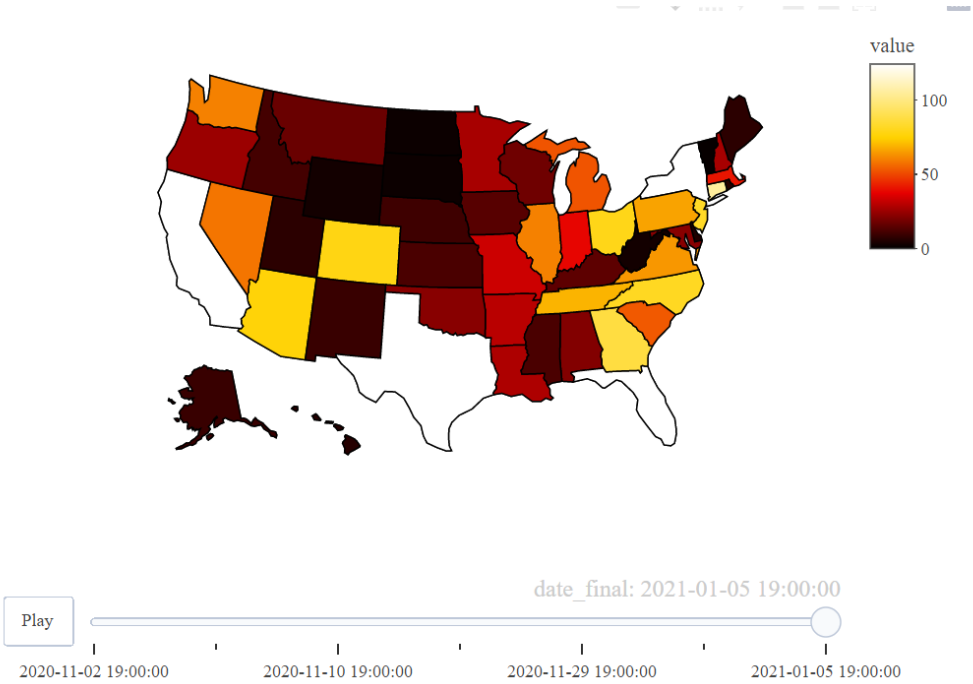
(A) May 26th, 2020. (B) May 27th, 2020. (C) May 29th, 2020. (D) May 31st, 2020. (E) March 8th, 2021. (F) March 28th, 2021.

Limitations: this plots not where the tweet is from but where the user is from. Which is rather neat, explains the cluster/heatmaps of larger tweet density. Although California's heatmap or lack thereof is interesting.

#stopthesteal



Day 1



Day 7