Deliverable 2

Analysis

1. The analysis of neighborhoods' complaints

We collected the neighborhoods' complaint status. These complaints can be divided into two types. The first situation is the complaints solved on time, while the other is the neighborhood complaints which are overdue. As seen in Figure 1, the proportion of complaints resolved on time and overdue varies. Brighton is the area with the least number of on-time resolved complaints, while Fenway, Kenmore, Audubon Circle, and Longwood have the most on-time resolved neighborhood complaints.

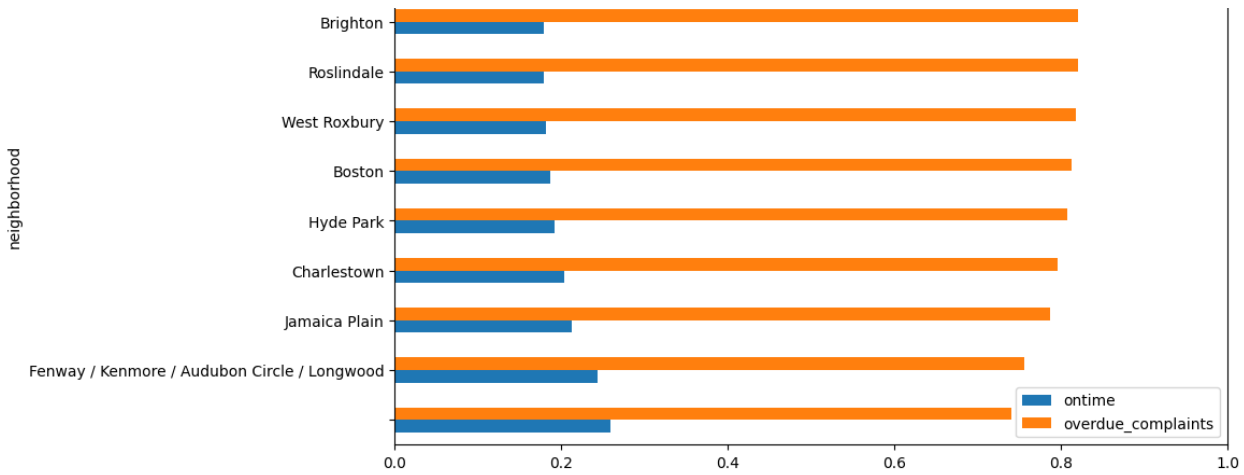

Figure 1: different neighborhoods' complaints status

To explore the neighborhoods' complaints status further, we added another analysis aspect: whether the neighborhoods' complaints are open cases or closed cases. For open cases, these complaints are pending resolution or being resolved. For closed cases, the complaints have been resolved. From Figure 2, we can see the proportion

of open or closed complaints. West Roxbury has the highest proportion of open cases.

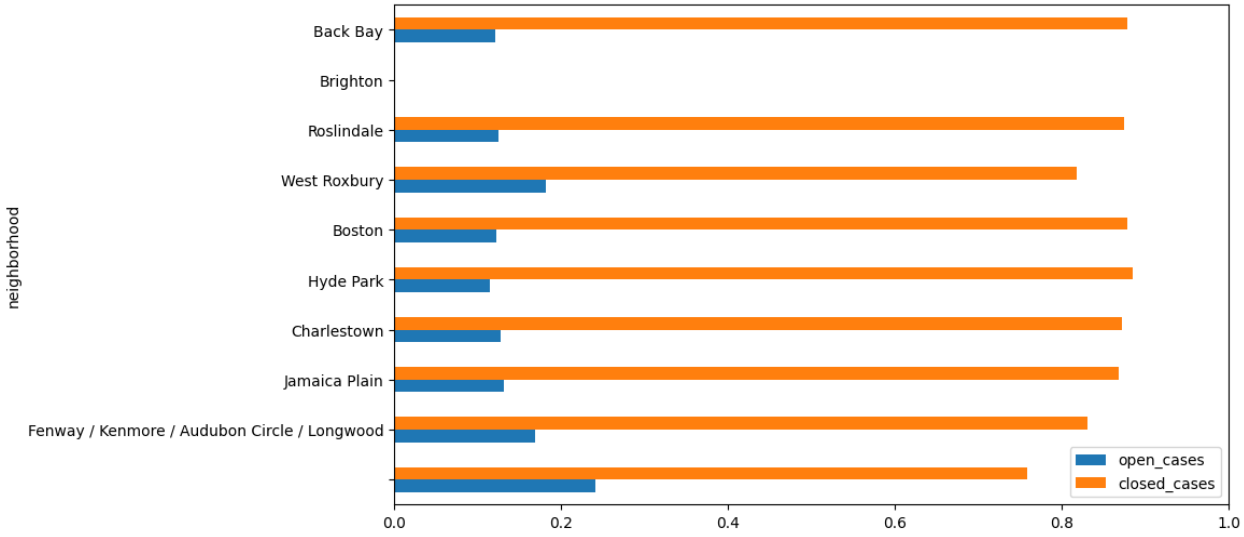

Figure 2: different neighborhoods' case status

2. The visualization of neighborhoods' complaints

We collected the latitude and longitude data of each neighborhood and added it to the df_prop dataframe, then plotted the map.

As seen in the map below, the larger the marker, the more complaints there are in that area. The size of the markers is proportional to the number of open complaints. The red marker indicates complaints still in progress, while the green marker means the complaints are overdue. The red markers and the green markers normally come up in pairs, indicating that this area has many tenants' complaints, whether in the past or just recently.

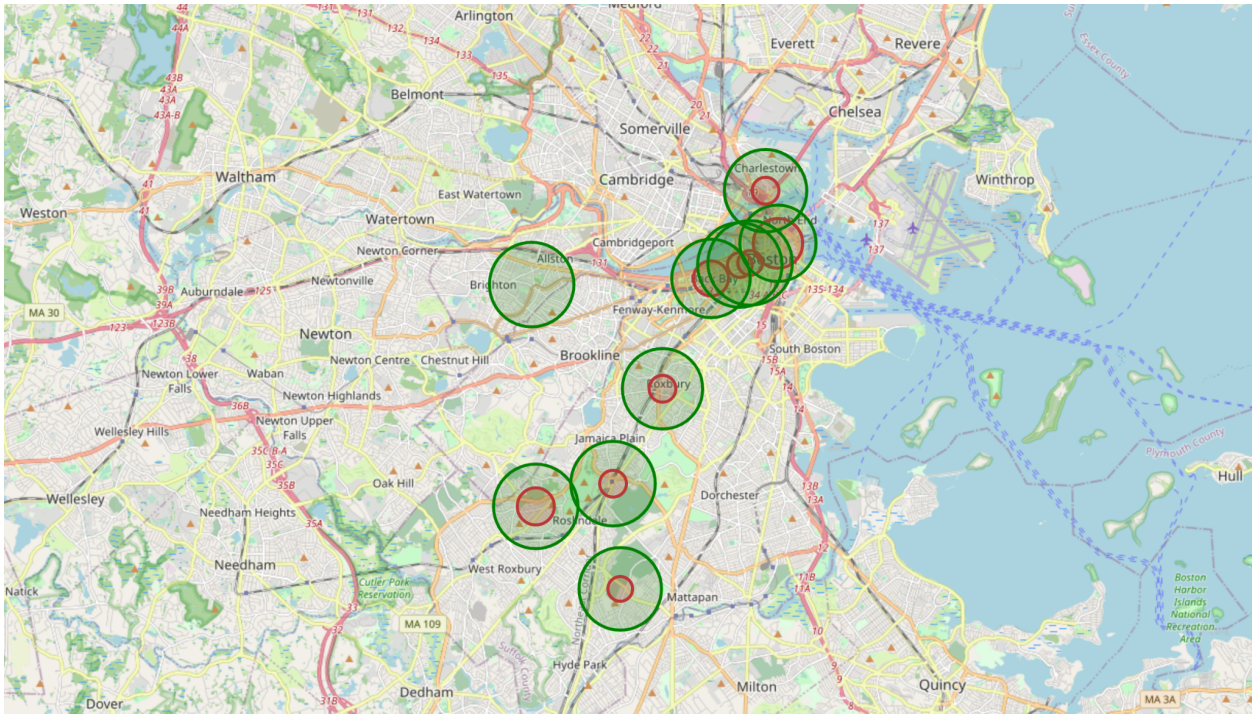

Figure 3.1: the red markers represent the volume of complaints in the area

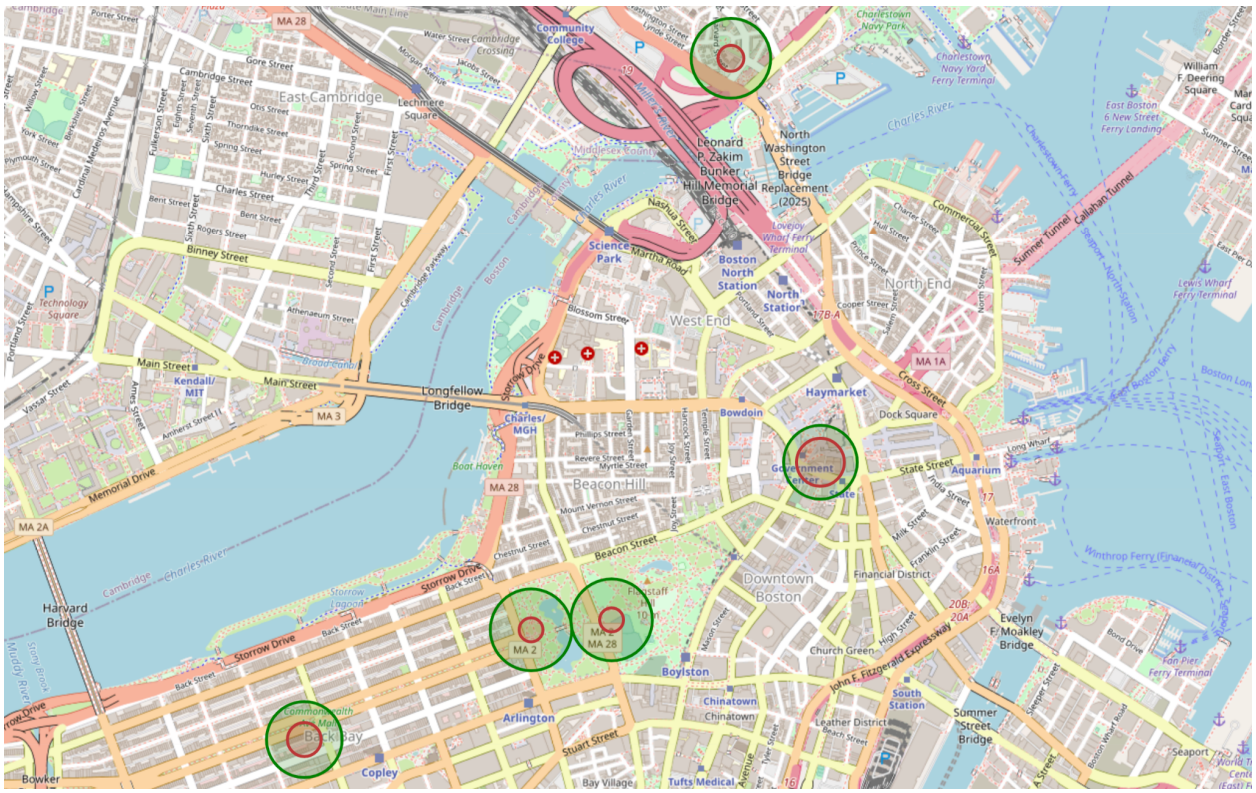

Figure 3.2: more detailed map

3. The analysis of violations

We analyzed the behavior of violations, and the top 10 most common violations are in Table 1. The top three violation behaviors are Failure to Obtain Permit, Unsafe and Dangerous, and Owners' Responsibility to Maintain Structural Elements - Structural elements shall be maintained free from holes, cracks, loose plaster, or other defects.

Top 10	Violations
1st	Failure to Obtain Permit
2nd	Unsafe and Dangerous
3rd	Owners Responsibility to Maintain Structural Elements - Structural elements shall be maintained free from holes, cracks, loose plaster, or other defects
4th	Owners Installation/Maintenance Responsibility - All facilities and equipment which are required by the owner including but not limited to water, gas, electrical and heating, shall be installed in accordance with all accepted codes
5th	Maintenance
6th	Extermination of Insects, Rodents and Skunks - The owner of a dwelling containing two or more dwelling units shall maintain it and its premises free from all rodents, cockroaches and insect infestation and shall be responsible for exterminating them
7th	Extermination of Insects, Rodents and Skunks - Extermination shall be accomplished by eliminating the harborage places of insects and rodents. All use of pesticides shall be in accordance with applicable laws and regulations of the Department of Food and Agricultures Pesticide Board
8th	Smoke Detectors & Carbon Monoxide Alarms - Owner shall provide, install and maintain in operable condition smoke detectors and carbon monoxide alarms
9th	Extermination of Insects, Rodents and Skunks - The owner of a rooming house shall maintain it and its premises free from all rodent, cockroaches, and insect infestation and shall be responsible for exterminating them
10th	Testing & Certification

Table 1: the top 10 most common violations

Figure 4 shows the proportion of top 10 most common descriptions of violations.

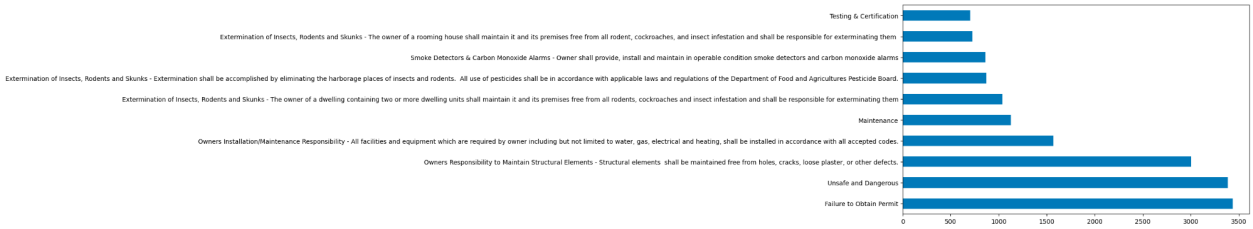

Figure 4: the top 10 most common violations

4. The visualization of violations

We collected the latitude and longitude data of each neighborhood's violations and added it to the df_prop dataframe, then plotted the map.

From Figure 5, we can observe the condition of violations and how they are distributed in the area of Boston. In the areas of Dorchester, Roxbury, South End, and Beacon Hill, there seem to be more violations, and the heatmap gets denser.

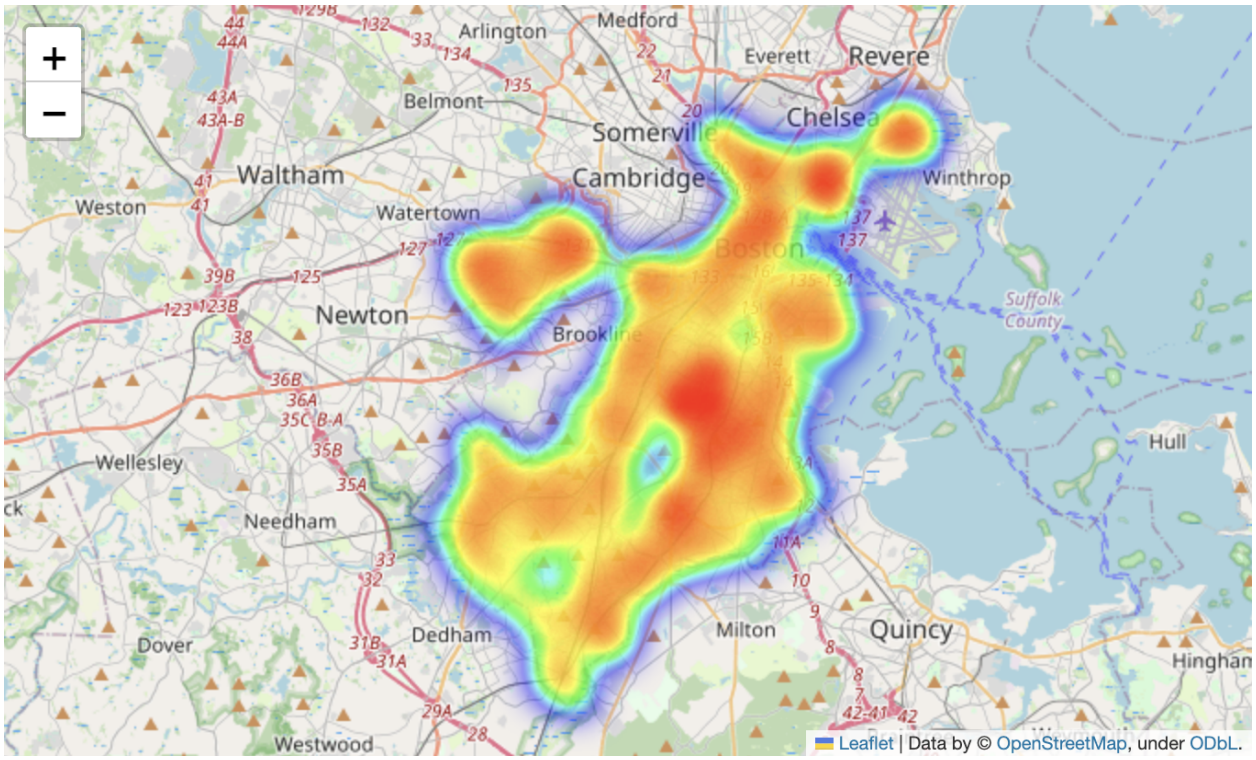

Figure 5: heatmap of violations

5. The analysis of complaints and eviction rate

We collected data from the income-restricted inventory and Eviction Filings Boston Neighborhood, summed all the units in each neighborhood, found out the number of complaints in each neighborhood, and named the column as 'complaints.' We used regex to find the number of evictions in each neighborhood (merged columns with greater than 30% match in the name) and added the number of open complaints to the dataframe.

	neighborhood	complaints	eviction_rate	open_complaints
0	Dorchester	39209	2.1	0.090515
1	Roxbury	23541	6.7	0.092265
2	South Boston / South Boston Waterfront	23264	1.2	0.083176
3	East Boston	19151	2.9	0.065688
4	Allston / Brighton	19090	2.9	0.084180
5	South End	18860	1.2	0.094327
6	Downtown / Financial District	16496	NaN	0.110572
7	Jamaica Plain	16051	1.9	0.132079
8	Back Bay	13850	0.9	0.121733
9	Greater Mattapan	10873	1.3	0.114688
10	Hyde Park	10554	3.8	0.115406
11	Roslindale	9910	2.9	0.125227
12	Boston	9720	2.9	0.121914
13	Charlestown	9419	1.0	0.127933
14	West Roxbury	8963	1.3	0.182082
15	Beacon Hill	8854	0.9	0.104247
16	Fenway / Kenmore / Audubon Circle / Longwood	5463	NaN	0.169504
17	Mission Hill	5426	2.9	0.105971
18	South Boston	2481	2.9	0.097138
19		2433	NaN	0.240855
20	Brighton	1484	1.0	0.084232
21	Allston	782	2.9	0.113811
22	Mattapan	543	1.3	0.084715
23	Chestnut Hill	33	2.1	0.030303

Table 2: the neighborhoods' eviction rate and complaints number

We can clearly see each neighborhood's complaints and eviction rate. We ranked this data via the neighborhood's number of complaints, and the eviction rate is not proportional to the number of complaints. It depends on the actual situation of each area, which varies from what we have imagined.

6. The visualization of complaints and eviction rate

We collect the neighborhoods' open complaints and the eviction rate, then draw a visual comparison chart. From Figure 6, we can see that Roxbury has the highest eviction rate up to 6.7 with an open complaints rate of about 0.09. Hyde Park has the second highest eviction rate at about 4 with an open complaints rate around 0.115.

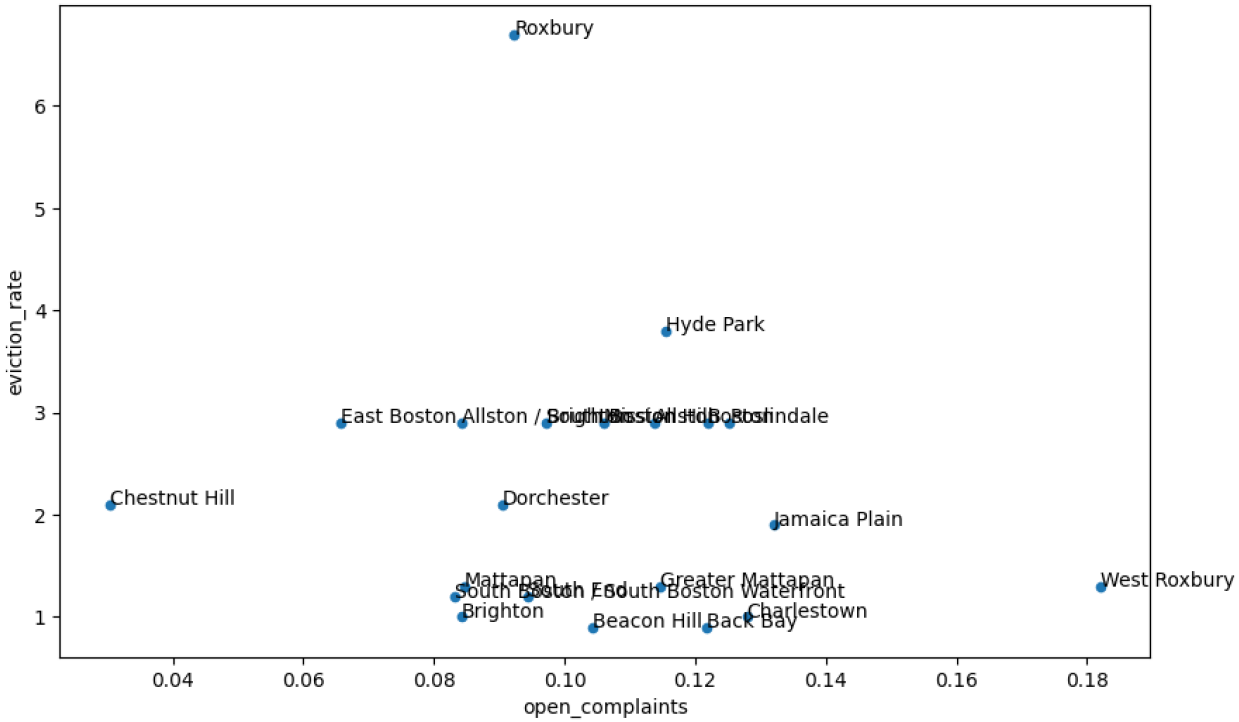

Figure 6: the open complaints vs eviction rate

Key Question

Q1. What is the spectrum of violations and severity in regards to worst landlords Classifications?

Figure 7: the spectrum of violations for all boston neighborhoods

Answer:

The above plot shows the spectrum of violations for all boston neighborhoods. The most common violations relate to Unsafe and dangerous conditions. Other common violation types are failure by owners to maintain structural integrity of the house and failure to obtain permits. Units in Mattapan have a higher number of complaints associated with them.

Q2. What landlords are non-compliant? Overall volume, severe violations

Answer:

Landlords in Areas of Mattapan, Roxbury, Boston, and Dorchester have the highest number of complaints against them. Most frequent violation was failure by owners to maintain structural integrity of the house, unsafe and dangerous conditions were commonly reported.

Q3. Which landlords are impacting vulnerable communities the most (based on social vulnerability index/ climate resilience and college students); Also API for extension project

Answer:

1) The social vulnerability index

Communities of color are disproportionately affected by eviction filings in both subsidized and market-rate rental housing. From the Evictions in Boston: The Disproportionate Effects of Forced Moves on Communities of Color Report, we get Figure 8. The data reveals that Roxbury has the highest eviction rate, and this is correlated with having the highest proportion of Black renters in the area.

Our analysis in part 6 indicates that Roxbury has the highest eviction rate, and the figure below also shows the same area having the highest eviction rate. This suggests that the findings from both sources are consistent, reinforcing the idea that Roxbury is more susceptible to eviction filings and housing instability.

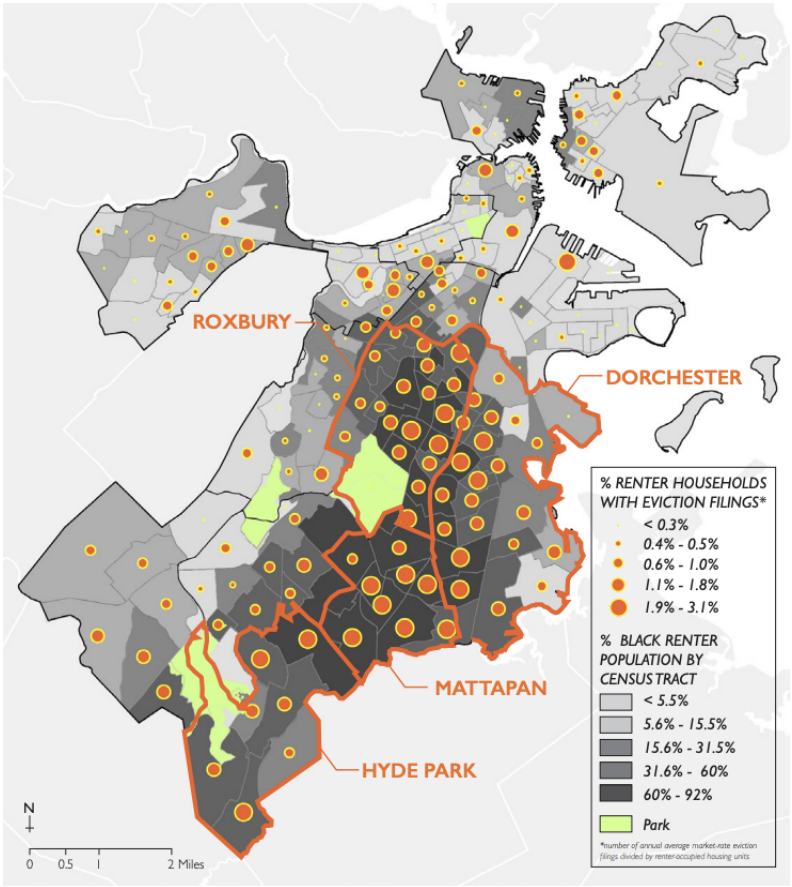

Figure 8: Annual Market-Rate Housing Eviction Filing Rate Underlaid with Black Renter Population, 2014-2016

2) Climate resilience

Climate resilience refers to the ability of communities to resist and recover from the impacts of climate change, such as extreme weather events, flooding and sea level rise. These impacts can lead to property loss and displacement, leading to evictions. In Boston, if a tenant's apartment is damaged by some extreme weather events, they may need to vacate the property while repairs are being made. If the landlord is unwilling or unable to make the necessary repairs in a timely manner, the tenant may be forced to seek other housing options, which can be difficult and expensive. This can ultimately lead to eviction if the tenant is unable to pay rent or find suitable alternative housing.