

**A Study of COVID-19 and Hate Crime Hotspots in
Los Angeles County**

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Executive Summary

In this project, we looked at trends of crime cases in Los Angeles County during the COVID-19 pandemic. Our goal was to see the impact of the Coronavirus on criminal actions taken within Los Angeles County by pinpointing crime hotspots. In doing so, we aimed to highlight the rising cases of criminal activity that have been depicted in the media from the inception of the COVID-19 pandemic, and the resulting migration of people out of high risk COVID areas. To do the project, we collected various articles that discussed the correlation between assault cases and COVID cases in Los Angeles County. We found datasets that related to this data from publicly available online databases, such as datasets on Los Angeles Open Data and LA County Census Data as well. We had to clean the data for any null or irrelevant values and imported the information into ArcGis Pro. We conducted a series of analyses on our dataset. We primarily focused on proximity analysis, spatial patterns analysis and mapping clusters. The proximity analysis was used to see how physically close each crime was and compare the crime to the overall population data. With the spatial pattern analysis, we wished to see if there was a pattern to the attacks in Los Angeles County. Lastly, we looked at mapping clusters to see which counties and/or cities were more likely to face more crime cases. Our mapping indicated that there was an increasing amount of crimes committed against several races during the pandemic. We also found that racial crimes had a rapid spread into suburban and coastal neighborhoods across Los Angeles County.

Introduction and Spatial Inquiry

The frequency of criminal incidents in the United States in 2021, from public taunts of Asian-Americans to physical assaults of people of all races, have surpassed that of 2020. With killings “hitting a decade high after years of sustained reductions and shootings increasing nearly 40%”, there is no doubt that COVID-19 has had a crucial impact on criminal activity in Los Angeles and in the U.S. in general. We were interested in studying the surge of criminal activity during the Coronavirus pandemic in Los Angeles County because the issue impacts people of all communities. We found projects of similar interest, such as the one mentioned in the article Los Angeles Crime Change during 2020 Pandemic, which mentioned crime rates have been on a steady increase due to the high level of unemployment created by COVID-19. Spatial inquiry helped us scrutinize the issue of rising crimes during this time period by showing a correlation between places of high-level criminal activity and areas where COVID-19 is prevalent.

Data Source and Processing

City of Los Angeles Neighborhoods Population & Race

There were three datasets used in our analysis. Each added a separate component of our story relating to the hate crimes during the pandemic. The first

dataset is titled, "City of Los Angeles Neighborhoods Population & Race" This dataset gives the population by race with the percentage of the total population for that neighborhood. The data was collected in Los Angeles county and will be according to the demographic data from 2020. This dataset consisted of 356 rows and 10 columns. The column headers were for each type of race represented in the dataset and the rows were for each neighborhood. Our initial data is pictured below:

City / Community		Total Population, All Population of One Race Two or More Races			Hispanic or Latino (Overlaps with other race categories)				
American Indian & Alas:Asian		Black or African Amercian Native Hawaiian & Other Pacific Islander (Not Hispanic or Latino) Some Other Race							
Los Angeles County	10,014,009	163,464	1,499,984	794,364	24,522	2,563,609	2,784,180	1,488,068	4,804,763
	1.63%	14.98%	7.93%	0.24%	25.60%	27.80%	14.86%	47.98%	
Acton@Ei	7,431	72	158	80	16	4,736	956	1,027	2,076
	0.97%	2.13%	1.08%	0.22%	63.73%	12.87%	13.82%	27.94%	
Agoura Hills	20,299	66	1,776	262	17	14,744	732	2,167	2,319
	0.33%	8.75%	1.29%	0.08%	72.63%	3.61%	10.68%	11.42%	
Agua Dulce@Ei	3,451	31	61	48	2	2,291	325	550	868
	0.90%	1.77%	1.39%	0.06%	66.39%	9.42%	15.94%	25.15%	
City / Community		Total Population, All Population of One Race Two or More Races			Hispanic or Latino (Overlaps with other race categories)				
American Indian & Alas:Asian		Black or African Amercian Native Hawaiian & Other Pacific Islander (Not Hispanic or Latino) Some Other Race							
Alhambra	82,689	1,061	43,077	1,537	91	6,942	14,555	10,749	29,910
	1.20%	51.89%	1.83%	0.11%	8.38%	12.59%	12.97%	36.09%	
Alondra Park@Ei	8,549	191	1,436	971	29	1,572	2,538	1,216	4,204
	2.23%	16.76%	11.33%	0.24%	18.25%	29.62%	15.47%	49.06%	
Altadena@Ei	42,846	381	3,026	7,387	54	17,900	5,485	6,728	12,171
	0.89%	7.06%	17.24%	0.13%	41.78%	12.80%	15.70%	28.41%	
Arcadia	56,681	233	36,772	959	46	9,968	3,138	4,135	7,401
	0.41%	64.88%	1.69%	0.08%	17.59%	5.57%	7.30%	13.06%	
City / Community		Total Population, All Population of One Race Two or More Races			Hispanic or Latino (Overlaps with other race categories)				
American Indian & Alas:Asian		Black or African Amercian Native Hawaiian & Other Pacific Islander (Not Hispanic or Latino) Some Other Race							
Artesia	16,395	161	6,921	652	67	2,608	3,247	1,838	5,825
	0.98%	42.21%	3.98%	0.41%	15.91%	19.80%	11.21%	35.53%	
Avalon	3,460	46	33	30	11	1,366	1,133	508	1,903
	1.33%	0.95%	0.87%	0.32%	39.48%	32.75%	14.68%	55.00%	
Avocado Heights@Ei	13,317	340	1,654	98	11	771	5,075	3,769	10,638
	2.55%	12.42%	0.74%	0.08%	5.79%	38.11%	28.30%	79.88%	
Azusa	50,000	1,314	7,384	1,752	74	7,751	15,623	10,053	32,020
	2.63%	14.77%	3.50%	0.15%	15.50%	31.25%	20.11%	64.04%	
City / Community		Total Population, All Population of One Race Two or More Races			Hispanic or Latino (Overlaps with other race categories)				
American Indian & Alas:Asian		Black or African Amercian Native Hawaiian & Other Pacific Islander (Not Hispanic or Latino) Some Other Race							
Baldwin Park	72,179	1,474	14,770	745	57	3,291	30,277	13,524	55,683
	2.04%	20.46%	1.03%	0.03%	3.31%	41.95%	18.74%	74.39%	
Bell	33,559	896	270	192	17	1,484	18,469	7,515	31,392
	2.67%	8.08%	0.57%	0.05%	4.42%	55.03%	22.39%	93.54%	
Bell Gardens	39,501	1,283	266	281	23	740	24,446	7,682	37,994
	3.25%	6.67%	0.71%	0.06%	1.87%	61.89%	19.45%	96.18%	
Bellflower	79,190	1,380	10,104	10,552	582	10,815	25,393	13,189	45,250
	1.74%	12.76%	13.32%	0.73%	13.66%	33.33%	16.65%	57.14%	
City / Community		Total Population, All Population of One Race Two or More Races			Hispanic or Latino (Overlaps with other race categories)				
American Indian & Alas:Asian		Black or African Amercian Native Hawaiian & Other Pacific Islander (Not Hispanic or Latino) Some Other Race							
Beverly Hills	32,701	46	2,886	680	13	24,894	759	2,857	2,218
	0.14%	8.83%	2.08%	0.04%	76.13%	2.32%	8.74%	6.78%	
Bradbury	921	13	354	17	0	335	72	109	184
	1.41%	38.44%	1.85%	0.00%	36.37%	7.82%	11.83%	19.98%	
Burbank	107,337	808	12,568	3,078	116	60,350	10,806	14,624	25,961
	0.75%	11.71%	2.87%	0.11%	56.22%	10.07%	13.62%	24.19%	
Calabasas	23,241	69	2,213	537	12	17,175	543	2,151	1,954
	0.30%	9.34%	2.31%	0.05%	73.30%	2.34%	9.26%	8.41%	
City / Community		Total Population, All Population of One Race Two or More Races			Hispanic or Latino (Overlaps with other race categories)				
American Indian & Alas:Asian		Black or African Amercian Native Hawaiian & Other Pacific Islander (Not Hispanic or Latino) Some Other Race							
Carson	95,558	1,066	25,501	21,751	1,713	6,569	22,557	11,644	37,643
	1.12%	26.69%	22.76%	1.79%	6.87%	23.61%	12.19%	39.39%	
Castaic@Ei	18,937	207	2,127	633	33	9,208	2,330	3,155	5,886

However, this dataset had to be cleaned to make sure numbers matched their expected format. This was followed by adding additional columns to the dataset to create data for the total demographic percentage in respect to Los Angeles. Additional columns were also added for latitude and longitude to be able to represent the data better in ArcGIS. Lastly, Zip codes had to be added in where they were missing to complete the dataset. The final dataset that was used to create our maps was 141 rows

and 22 columns. Thus, our finished dataset became much more manageable in ArcGIS and is pictured here:

Crime Data from 2020 to Present

The second dataset used in our mapping is titled “Crime Data from 2020 to Present.” This dataset shows crime incidents in Los Angeles county from the start of 2020. Overall, the initial dataset has 367,904 rows and 19 columns to depict the crime incidents with each row representing a separate crime incident in Los Angeles county.

This data is pictured below:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
367883	2.12E+08	#####	#####	530	16	Foothill	1685	1	220	ATTEMPTED	0913 1814	35 F	H	101 STREET	400	STRONG-A	I/C		
367884	2.11E+08	#####	#####	1140	11	Northeast	1126	2	956	LETTERS, LI	913	26 F	H	501	SINGLE FAMILY DWELLING		AA		
367885	2.10E+08	#####	#####	1730	2	Rampart	235	2	662	BUNCO, GF	1402	39 M	W	101 STREET			IC		
367886	1.12E+08	#####	#####	1	20	Olympic	2074	2	354	THEFT OF I	377	45 M	B	502	MULTI-UNIT DWELLING (APARTM	I/C			
367887	1.12E+08	#####	#####	830	18	Southeast	1831	1	510	VEHICLE - STOLEN	0			101 STREET			IC		
367888	1.12E+08	#####	#####	1500	17	Devonshire	1752	1	820	ORAL COPI	0512 0510	15 F	W	502	MULTI-UNI	500	UNKNOWN		
367889	2.11E+08	#####	#####	900	10	West Valley	1025	2	354	THEFT OF I	1822 0935	38 M	H	501	SINGLE FAMILY DWELLING		IC		
367890	2.10E+08	#####	#####	1200	2	Rampart	295	1	440	THEFT PLA	1822 0344	70 M	H	101 STREET			IC		
367891	2.12E+08	#####	#####	2153	18	Southeast	1802	1	110	CRIMINAL	1822 1300	31 M	H	101 STREET	102	HAND GUN	I/C		
367892	1.12E+08	#####	#####	2230	18	Southeast	1831	1	210	ROBBERY	0319 0336	28 F	B	501	SINGLE FA	400	STRONG-A	AA	
367893	2.11E+08	#####	#####	1930	14	Pacific	1453	1	310	BURGLARY	1609 0344	0 X	X	220	NAIL SALON			IC	
367894	2.12E+08	#####	#####	2200	15	N Hollywood	1526	2	626	INTIMATE	I2000 0400	36 F	H	502	MULTI-UNI	400	STRONG-A	I/C	
367895	2.11E+08	#####	#####	1710	10	West Valley	1007	2	956	LETTERS, LI	1822 1906	80 F	W	501	SINGLE FAMILY DWELLING		IC		
367896	2.10E+08	#####	#####	1600	4	Hollenbeck	497	1	510	VEHICLE - STOLEN	0			101 STREET			IC		
367897	1.12E+08	#####	#####	2255	21	Topanga	2128	1	230	ASSAULT	W0411 1402	33 M	H	101 STREET	200	KNIFE WITH	I/C		
367898	1.12E+08	#####	#####	1300	20	Olympic	2088	1	510	VEHICLE - STOLEN	0			101 STREET			IC		
367899	2.11E+08	#####	#####	1603	7	Wilshire	721	2	745	VANDALISM	329	0 M	O	108	PARKING LOT			IC	
367900	2.12E+08	#####	#####	1840	15	N Hollywood	1524	2	626	INTIMATE	I2000 0400	38 F	H	108	PARKING LI	400	STRONG-A	I/C	
367901	2.11E+08	#####	#####	1105	12	77th Street	1218	1	510	VEHICLE - STOLEN	0			108	PARKING LOT			IC	
367902	1.12E+08	#####	#####	430	19	Mission	1963	2	626	INTIMATE	10444 1813	21 F	H	502	MULTI-UNI	400	STRONG-A	AA	
367903	2.11E+08	#####	#####	2210	5	Harbor	564	2	434	FALSE IMPO	319 0334	41 F	B	502	MULTI-UNI	200	KNIFE WITH	AA	
367904	2.1E+08	#####	#####	1200	3	Southwest	363	1	350	THEFT, PER	1822 0344	15 F	H	101 STREET			IC		

This dataset also had to go through an initial cleaning process in order for it to be ready for mapping. This first involved filtering out dates that were not useful to the timeline we were trying to picture, removing missing crime entries, and removing entries with missing coordinates. The original dataset had about 20 different ethnicities in it so a new column had to be made for race and all races stemming from Asia were put into a larger category titled, “Asian.” The

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
22850	2E+08	##### Southwest	210 ROBBERY	21 M	H	Hispanic	PARKING	L OTHER KNI	34.0282	-118.276								
22851	2.11E+08	##### West LA	740 VANDALISM	41 F	B	Black	VEHICLE, PASSENGER/		34.0489	-118.537								
22852	2.11E+08	##### West Vall	210 ROBBERY	30 M	H	Hispanic	RIVER BED	FOLDING K	34.1866	-118.554								
22853	2.11E+08	##### Newton	624 BATTERY -	65 M	H	Hispanic	YARD (RES)STRONG-AI		34.0002	-118.272								
22854	2E+08	3/5/2020 Southwest	230 ASSAULT W	25 M	H	Hispanic	STREET	HAND GUN	34.0109	-118.301								
22855	2E+08	3/6/2020 Hollenbeck	920 KIDNAPPIN	11 M	H	Hispanic	SIDEWALK	STRONG-AI	34.0319	-118.21								
22856	2.11E+08	8/1/2021 Van Nuys	230 ASSAULT W	42 M	H	Hispanic	STREET	OTHER KNI	34.1867	-118.423								
22857	2E+08	##### Central	330 BURGLARY	31 M	W	White	PARKING	LOT	34.0496	-118.246								
22858	2.11E+08	9/6/2021 Northeast	624 BATTERY -	29 F	H	Hispanic	DODGER S	STRONG-AI	34.0724	-118.247								
22859	2E+08	1/1/2020 Rampart	230 ASSAULT W	26 M	H	Hispanic	SIDEWALK	UNKNOWN	34.059	-118.274								
22860	2.12E+08	6/2/2021 Mission	624 BATTERY -	54 F	H	Hispanic	STREET	STRONG-AI	34.323	-118.456								
22861	2.12E+08	##### Mission	626 INTIMATE I	26 F	H	Hispanic	STREET	STRONG-AI	34.2283	-118.472								
22862	2.01E+08	##### Harbor	662 BUNCO, GF	87 F	W	White	SINGLE FAMILY	DWELL	33.7449	-118.311								
22863	2.11E+08	##### 77th Street	230 ASSAULT W	34 F	B	Black	STREET	VEHICLE	33.796	-118.318								
22864	1.52E+08	9/9/2015 N Hollywood	354 THEFT OF I	56 F	B	Black	MULTI-UNIT	DWELLIN	34.163	-118.371								
22865	2E+08	2/3/2020 Hollenbeck	230 ASSAULT W	44 F	H	Hispanic	STREET	VEHICLE	34.0146	-118.201								
22866	2.11E+08	3/9/2021 Newton	625 OTHER ASS	43 F	H	Hispanic	SINGLE FA	STRONG-AI	33.9998	-118.277								
22867	2.11E+08	##### Wilshire	310 BURGLARY	28 M	W	White	SINGLE FAMILY	DWELL	34.0493	-118.373								
22868	2.1E+08	##### Rampart	331 THEFT FRO	27 F	H	Hispanic	CAR WASH		34.0695	-118.277								
22869	2E+08	##### Central	624 BATTERY -	35 M	H	Hispanic	SIDEWALK	STRONG-AI	34.0424	-118.249								
22870	2E+08	2/2/2020 Rampart	210 ROBBERY	26 M	H	Hispanic	SIDEWALK	SEMI-AUT	34.0394	-118.274								
22871	2.12E+08	##### Devonshire	626 INTIMATE I	29 F	H	Hispanic	SINGLE FA	STRONG-AI	34.2391	-118.355								
22872	2.11E+08	##### West Valle	230 ASSAULT W	35 M	W	White	STREET	FIXED OBE	34.1938	-118.534								
22873																		
22874																		

data was then divided into pre pandemic data and post pandemic data and columns were deleted if they had no value to the project. Lastly, a simple random sample was made of the data to select a smaller portion of the data because there were far too many crime cases to include. This resulted in a dataset with 22,872 rows and 13 columns which is pictured above.

Los Angeles County COVID Data

Our last dataset is dealing with the COVID data in Los Angeles and is titled, “Los Angeles County COVID data.” This dataset shows COVID data based on location in Los Angeles county and is the final portion we needed for our mapping. Our initial dataset

started with 287 rows and 5 columns and is pictured below:

CITY/COMMUNITY**	Cases	Case Rate ¹	Deaths	Death Rate ²
City of Agoura Hills	1543	7389	20	96
City of Alhambra	8487	9786	221	255
City of Arcadia	3538	6126	149	258
City of Artesia	2495	14856	82	488
City of Avalon	33	853	0	0
City of Azusa	7664	15316	133	266
City of Baldwin Park	14926	19443	342	445
City of Bell	7730	21276	128	352
City of Bell Gardens	9191	21339	122	283
City of Bellflower	13348	17171	218	280

This dataset also went through a cleaning process and even had to be merged with two datasets in order to get a complete picture that was ready for ArcGIS. Our initial dataset was merged with a dataset that had zip code data for cities in Los Angeles. This zip code data was then put into tableau to generate latitude and longitude numbers for our zip codes. This was then merged with our initial dataset in order to get latitude and longitude coordinates for each of our rows with COVID data. This dataset was then merged with a dataset which had a population based on zip codes to create our final dataset. This final product has 173 rows and 7 columns and is pictured below:

Zip	Total Cases	Total Deaths	Latitude (generated)	Longitude (generated)
90002	8874	114	33.949	-118.2468
90004	8095	144	34.0762	-118.3108
90005	8195	162	34.0597	-118.3124
90006	10814	320	34.0481	-118.2938
90007	5678	80	34.0284	-118.2846
90008	7649	134	34.0094	-118.3473
90011	8468	139	34.0072	-118.2586
90012	12944	197	34.0664	-118.2385
90013	615386	10617	34.0443	-118.2401
90016	6586	175	34.0286	-118.3538
90018	1372	16	34.028	-118.3178
90019	10104	279	34.0486	-118.3389
90022	28105	465	34.0241	-118.1565
90024	3866	30	34.0655	-118.4352
90025	3610	71	34.0452	-118.4463
90026	8771	236	34.0788	-118.2633
90027	11968	218	34.1246	-118.2913
90029	3854	130	34.0897	-118.2951
90032	7566	118	34.0792	-118.1793

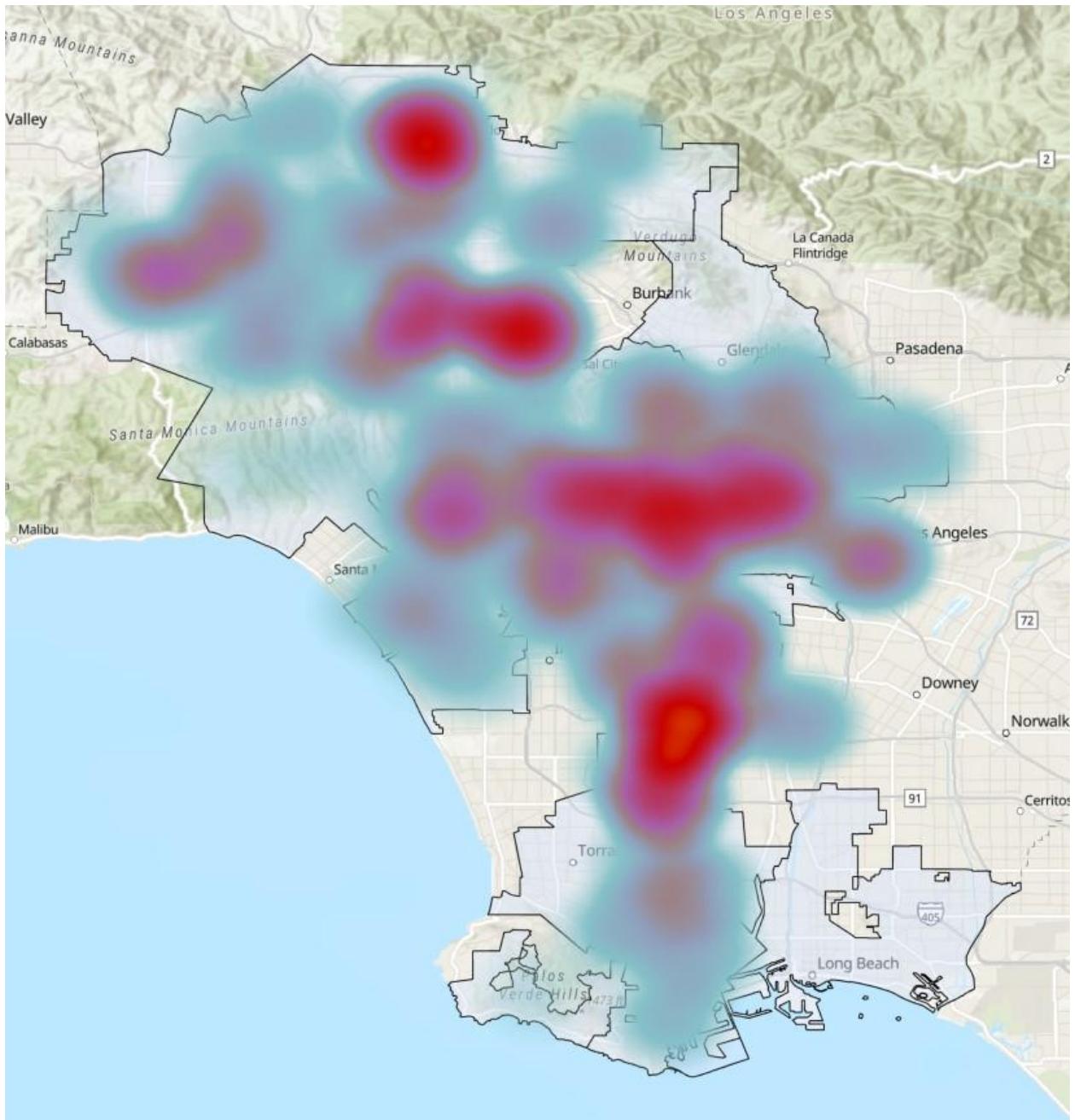
Analysis and Results

We began our analysis by playing around with the dataset in question. We had no clear idea on what exactly we wanted to convey. All we knew was that covid was rising and so were crimes across LA. This combination of events puzzled us, almost as though it were a code we needed to decipher. The dataset we collected was like an empty canvas one in which we wanted to paint with a story that needed to be told. Thus, we set forth and began applying various features and functions to the dataset all in an effort to get better acquainted with our data and figure out the story we wanted to tell.

Special analysis functions/operations

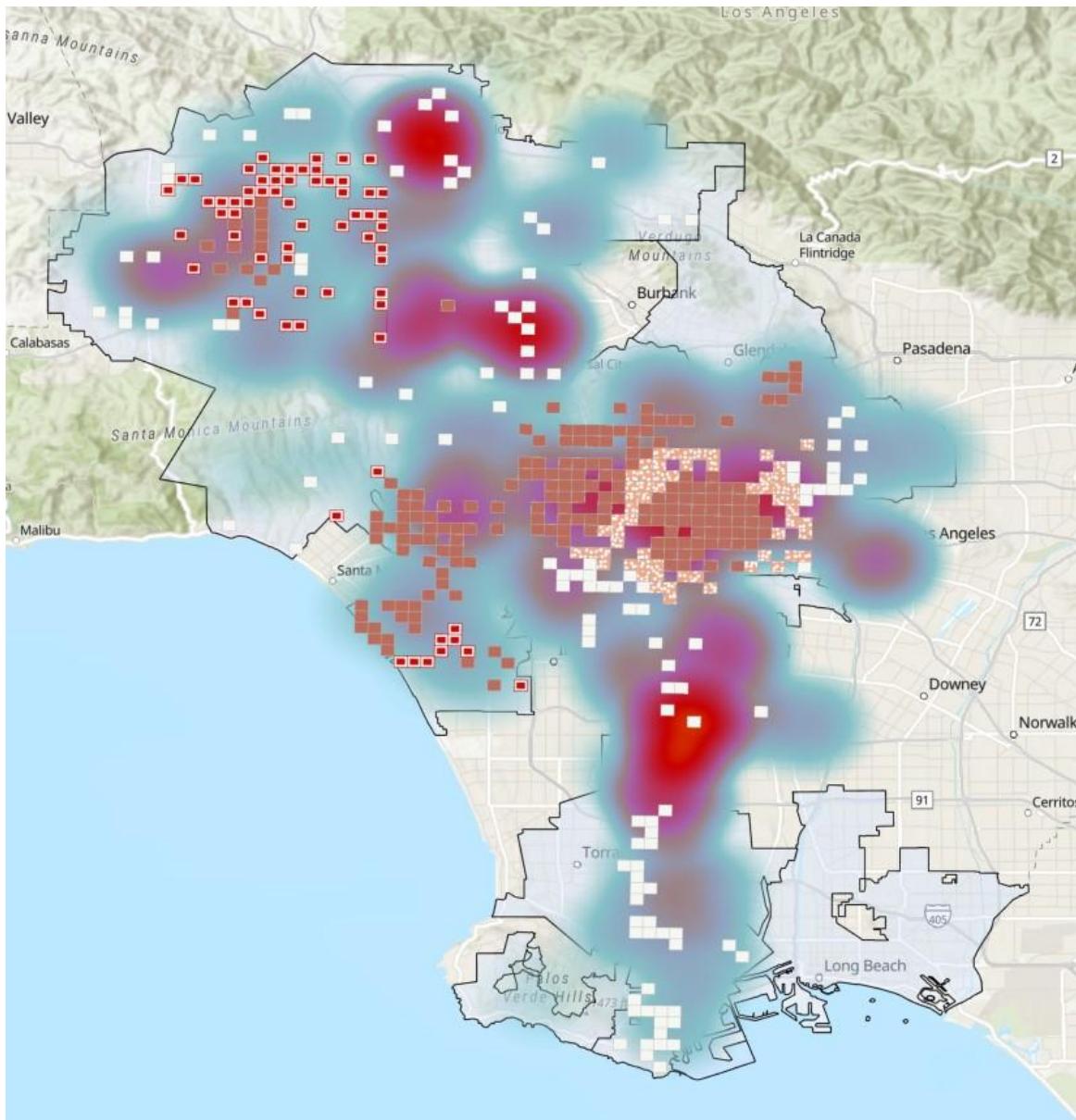
- We applied the X/Y to point feature
- We utilized the Symbology
- Performed a Select Layer by attribute
- Enacted a Feature Class to Feature Class
- Optimize hotspot analysis
- Buffer
- Spatial Join
- Create space time cube
- Project
- Emerging hotspot analysis

The first visual we obtained in our findings was a heatmap of the spread of Covid-19 across LA County. We can see just how rampant the spread is going from inland to coastal neighborhoods. We were initially laying the groundwork for more discoveries as we took note of the spread of the virus.



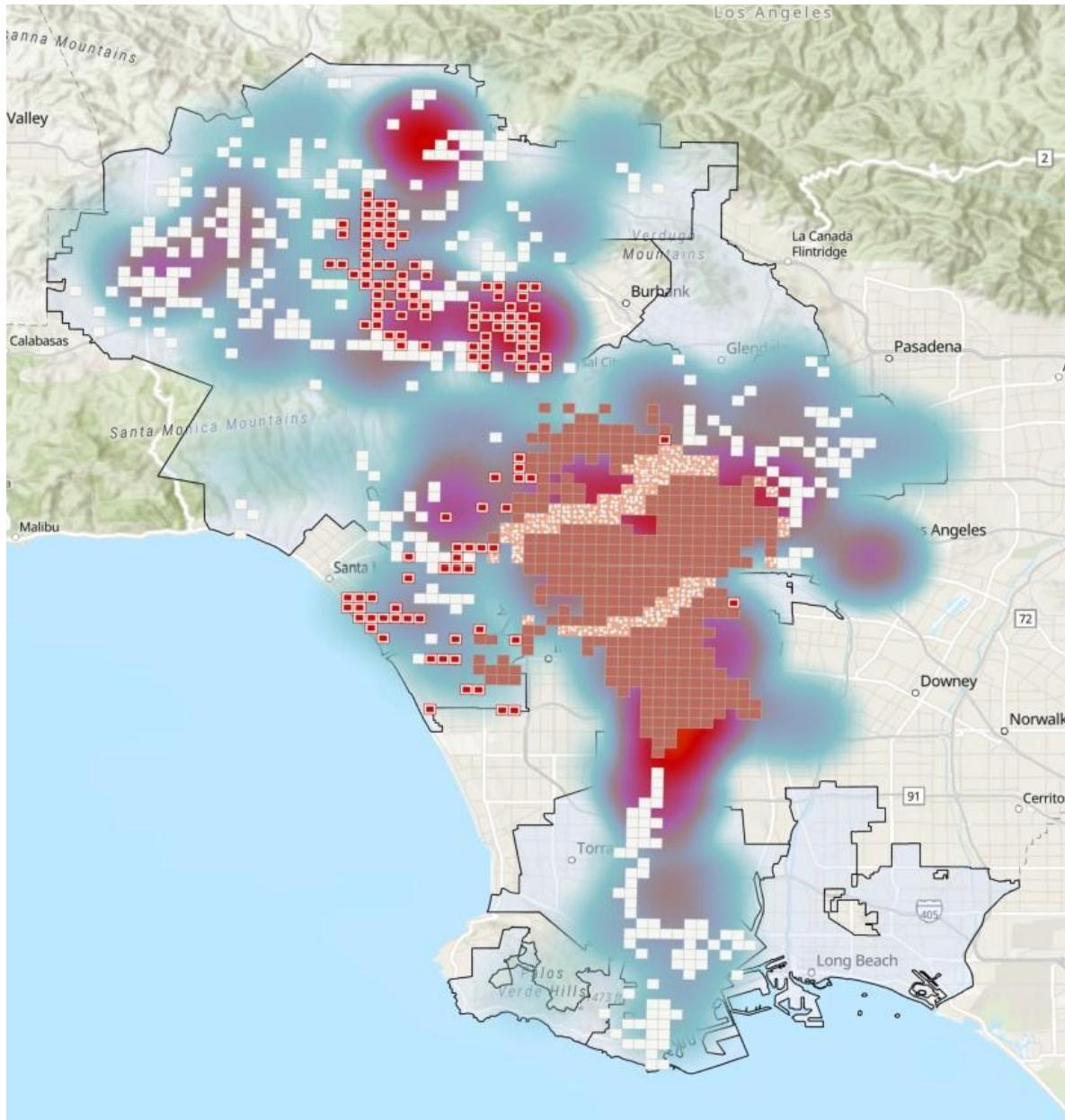
Next, we generated a visualization mapping Asian hate crimes across the greater LA County region. This was essentially an initial investigation relating a specific crime with the onset and spread of Covid-19. Here we can see that the spread of these crimes are moving from the inland to the coastal neighborhoods- similar to the trajectory of the spread of the virus. Additionally, we can see that the crimes further south were slowly

dying down. Although we found a correlation with the spread of Covid-19 and the rise of Asian hate crimes, we felt there was still more investigating to be done. Realizing that in real time there were news reports of racial crimes in general growing across the country, we felt it was important to cover multiple races across Los Angeles County.

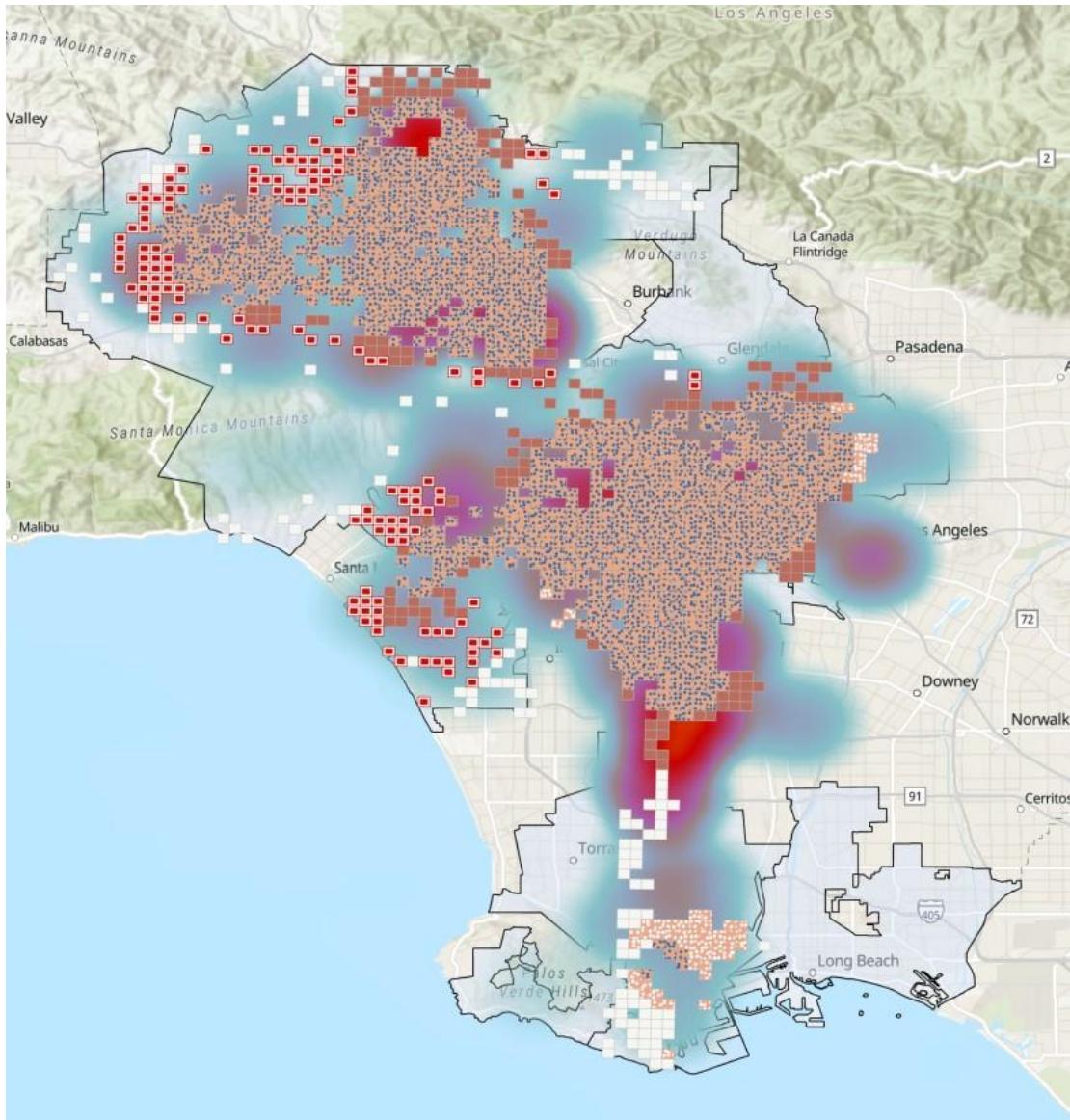


The third visual we created was a mapping of the crimes against African Americans in Los Angeles County. The image is intriguing; as we can see in the inland areas, there

are more oscillating white colors, indicating that crime rates are decreasing. However, as we move down the map we can see pink areas indicating recurring crimes. We can also see that the crimes are spreading to coastal areas such as Santa Monica.

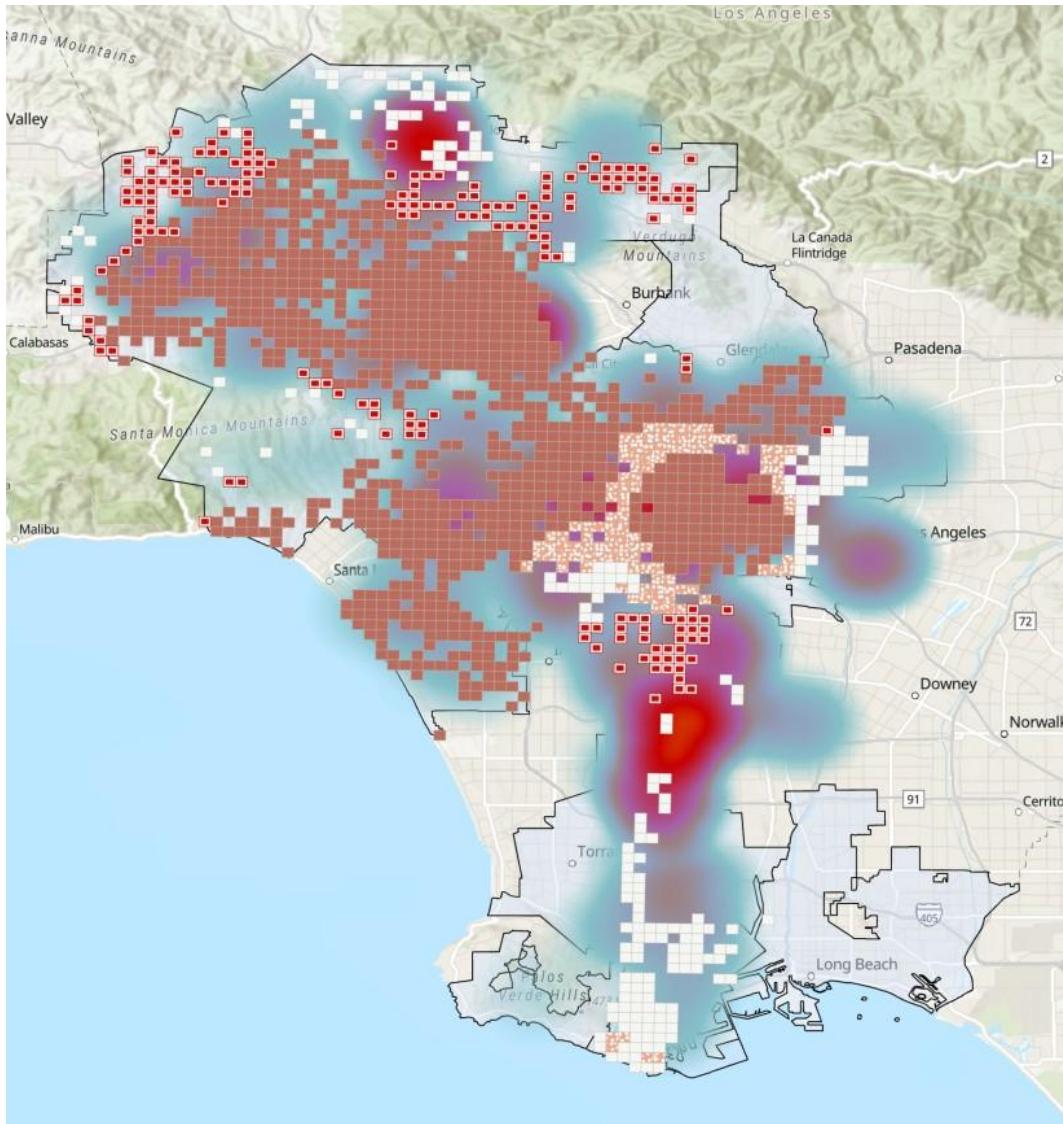


The fourth visual we created was a mapping of crimes against Hispanic-Americans. As previously seen, coastal areas of Los Angeles County are seeing increasing crime rates.



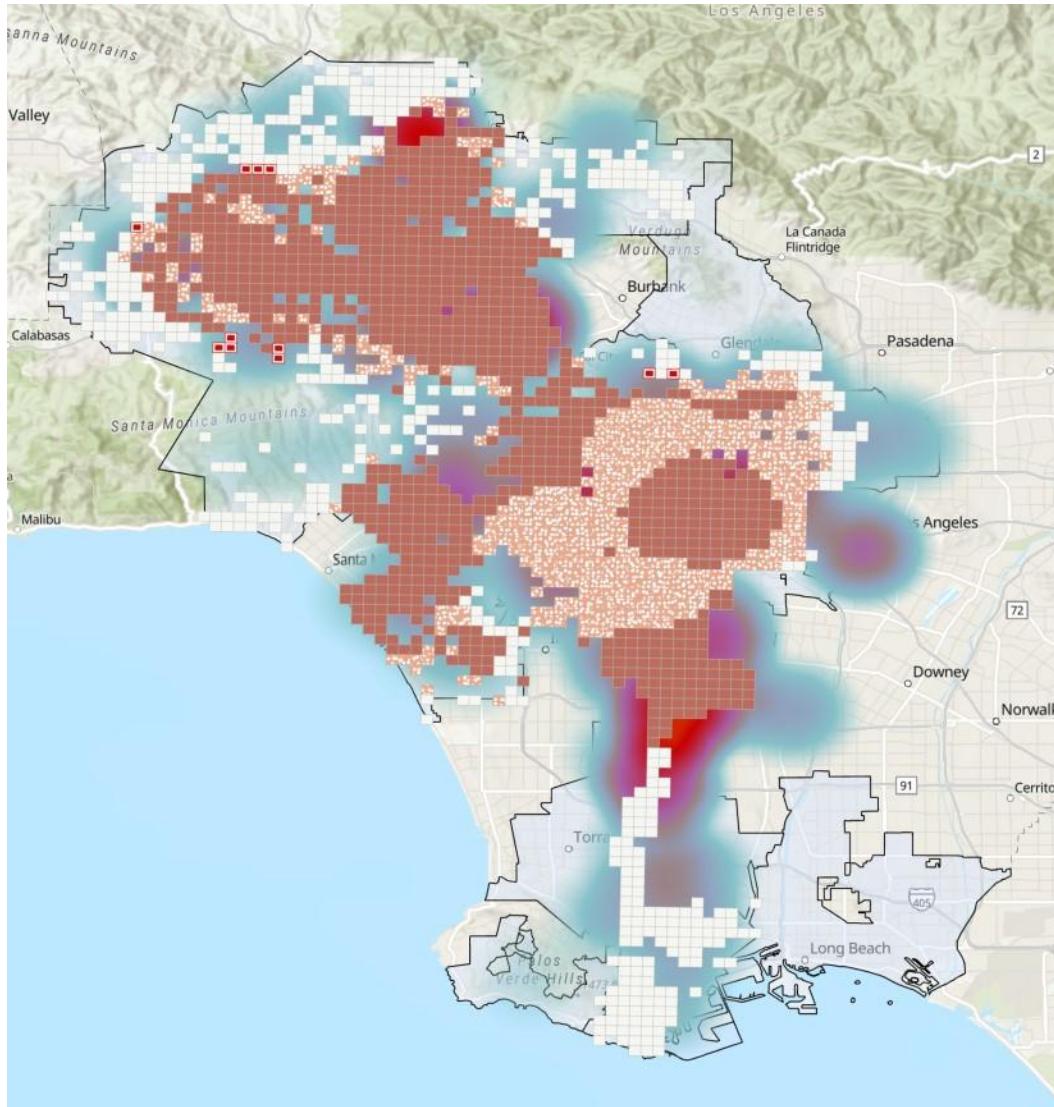
The fifth visual we created was eye opening as it was a mapping of crimes against white individuals. We can see that there is a large spread of crimes spreading across Los

Angeles County into suburban and coastal neighborhoods. This visual made us consider the implications that the spread of Covid could be contributing to the spread of all sorts of crimes across Los Angeles County.



Now, the last visual we created is a mapping of crimes perpetrated against all races. This was meant to answer our question of whether crimes in general are rising and whether they are correlated with the spread of Covid. We can clearly see that similar to

the Covid heatmap, the spread of crimes are coming from high density inland areas and reaching out further into coastal and suburban neighborhoods.



These results help us understand the bigger picture in our datasets that we gathered. The spread of Covid-19 can be mapped and correlated with the rise and spread of all sorts of crimes happening across LA County.

Recommended Actions

Based upon our findings, we recommend Los Angeles County allocate funds for neighborhood watch programs in highly impacted areas of racially motivated crimes. In addition, we recommend creating an allotted budget specifically for police to patrol suburban neighborhoods in order to stop potential crimes from occurring in these high impact areas. Lastly, we encourage utilizing social media to spread awareness of crimes happening in smaller, local areas. Websites that are often overseen by agencies such as neighborhood patrol programs may be updated to show local residents the latest crimes that have taken place in their area. With these three recommendations, we hope to reduce the levels of race-related crimes in Los Angeles County.

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 - a. “LA County COVID Data”
4. http://www.laalmanac.com/communications/cm02_communities.php
 - a. “LA City Zip Code Data”
5. <http://www.laalmanac.com/population/po03z.php#>
 - a. General Population by Zip Code in Los Angeles County, California
6. <https://storymaps.arcgis.com/stories/16f17d5c4bdc4ebb97d8d22504dc9c31>