

Community Impact

A look at the effects of 2020 on the city of Nashville

Brought to you by:

Data Analytics Cohort 3
Nashville Software School



Questions Answered

By gaining insight into how the storms and the onset of Covid-19 have affected our community geographically and socioeconomically, Nashville's Metro Emergency Communications Center can...

1. Prioritize dispatch to specific high-need areas hit hardest during a catastrophe
2. Revise and increase on-call staffing during storm season
3. Provide insight into areas of focus for future budgeting and planning of emergency funds

Event

Location

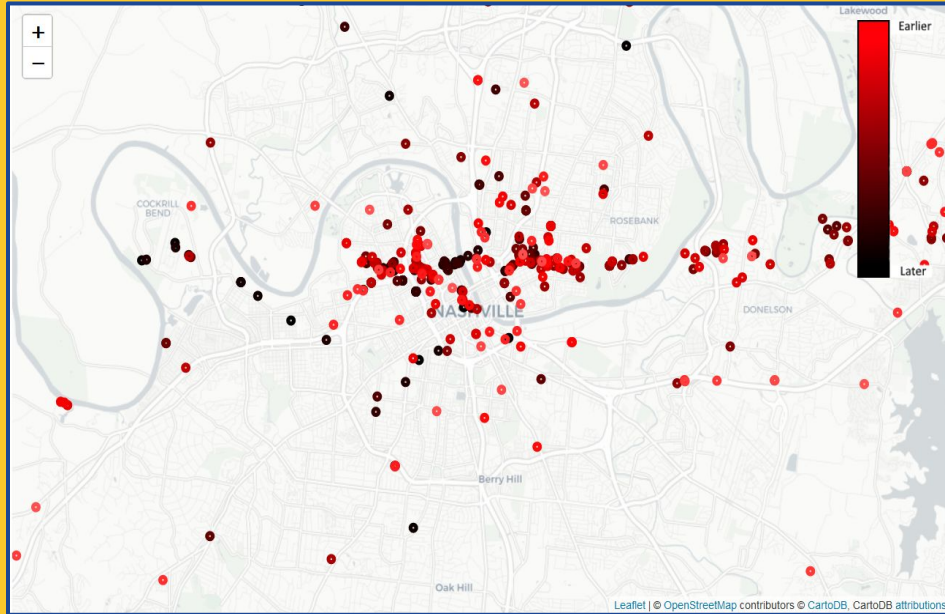
Community

-
- | | | |
|---|---|---|
| <ul style="list-style-type: none">● A timeline of each storm: from beginning to the end of the event and times of stronger storm impacts, based on call volumes● The geographic path of the storm generating reports of damage or impact | <ul style="list-style-type: none">● Locations less impacted or not impacted, based on call volume (or lack thereof)● Locations of heaviest storm impact based on call volume | <ul style="list-style-type: none">● Drill down to demographic and economic status of specific neighborhoods hit hardest by each event by looking at property values, types of structures affected, and correlation with covid impact. |
|---|---|---|



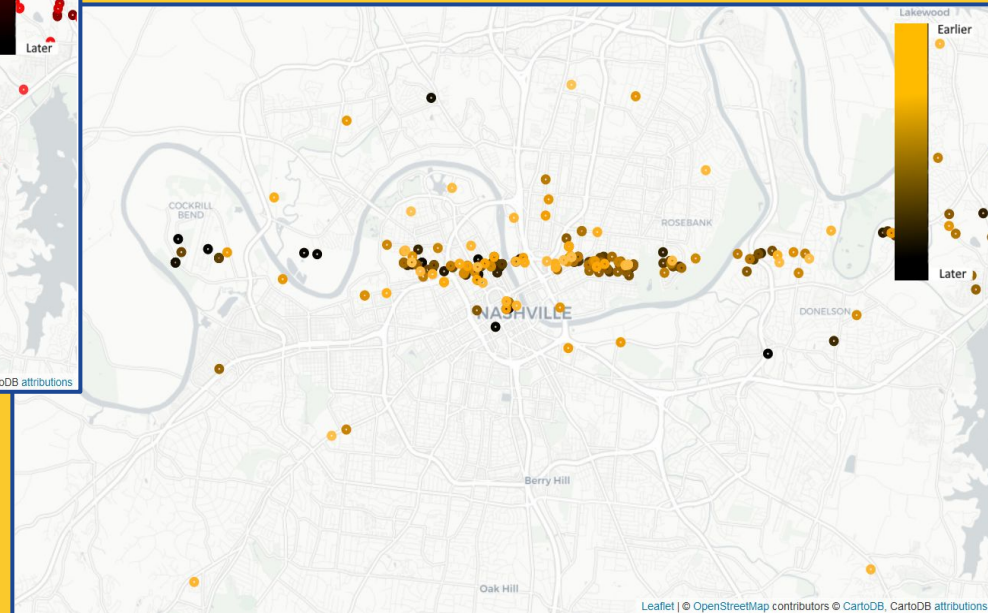
The Events

Tornado 911 calls based on time



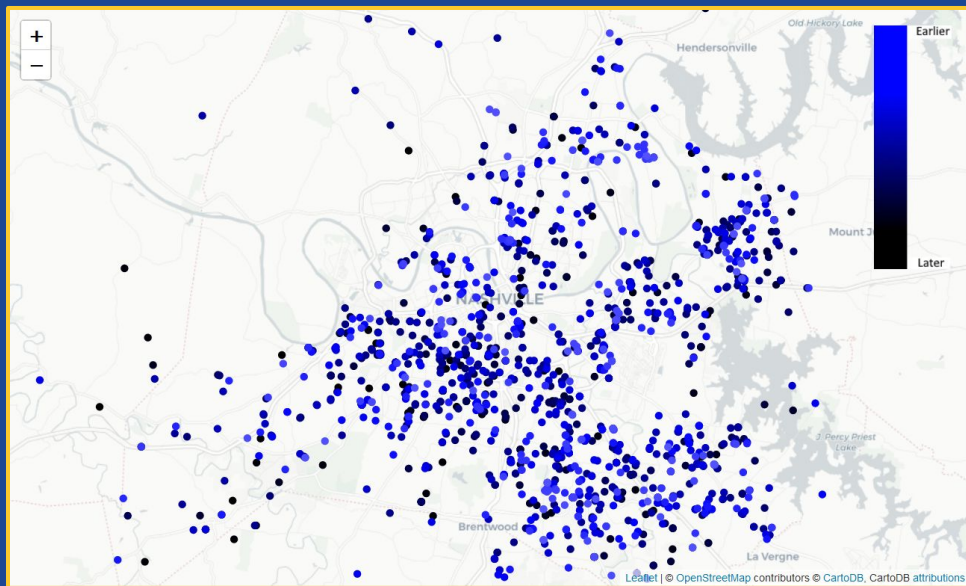
While we see the path of the storm, the pattern of calls does not create a clear timeline.

Tornado dispatch based on time

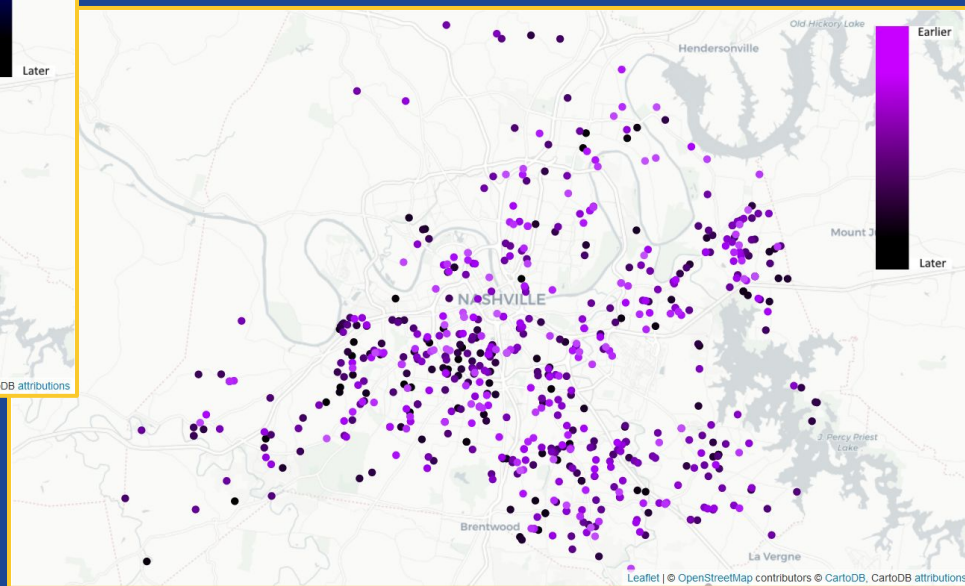


Click graph for interactivity

Derecho calls based on time



Derecho dispatch based on time

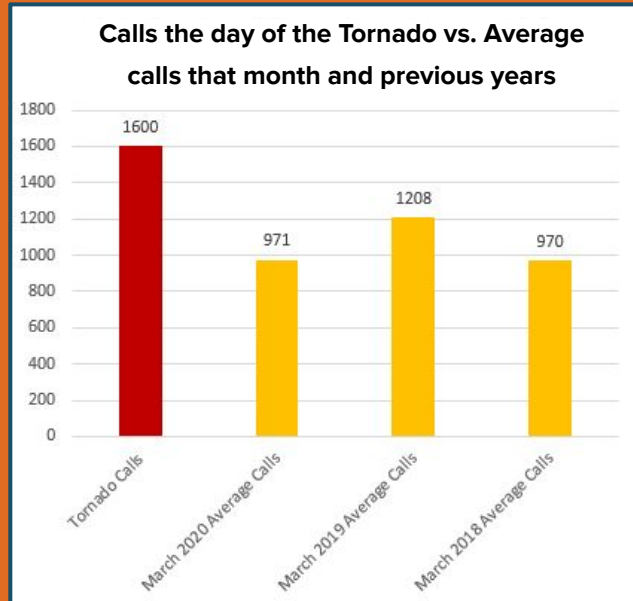


Derecho was much more widespread without any clear path.

Tornado 911 Call Volume Comparison

Day of Tornado

1600 Calls



When looking at staffing for future catastrophic events, 911 calls increased more than 1.5x the day of the tornado versus the average number of calls that same month. There is a similar result when looking at previous year call averages in March as well.

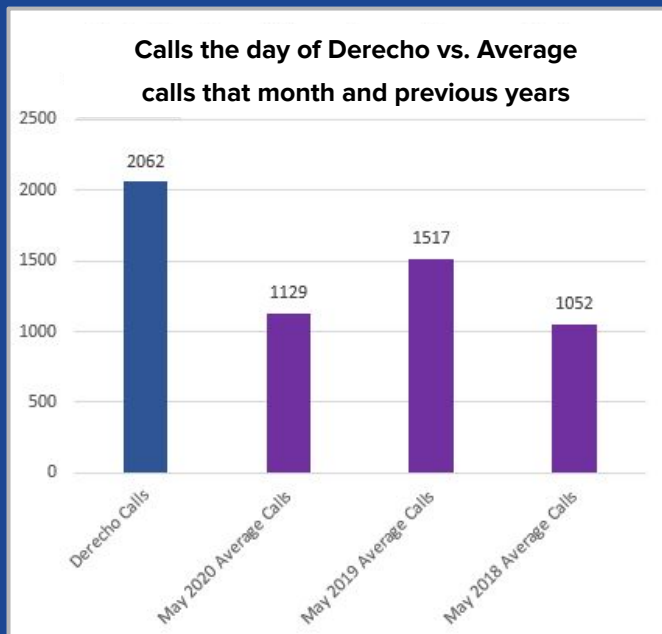
Percent Over Avg the Day of Tornado

March 2020	165%
March 2019	132%
March 2018	165%

Derecho 911 Call Volume Comparison

Day of Derecho

2062 Calls



Even more significant, 911 calls increased by almost double the day of the derecho versus the average number of calls that same month.

Percent Over Avg the Day of Derecho

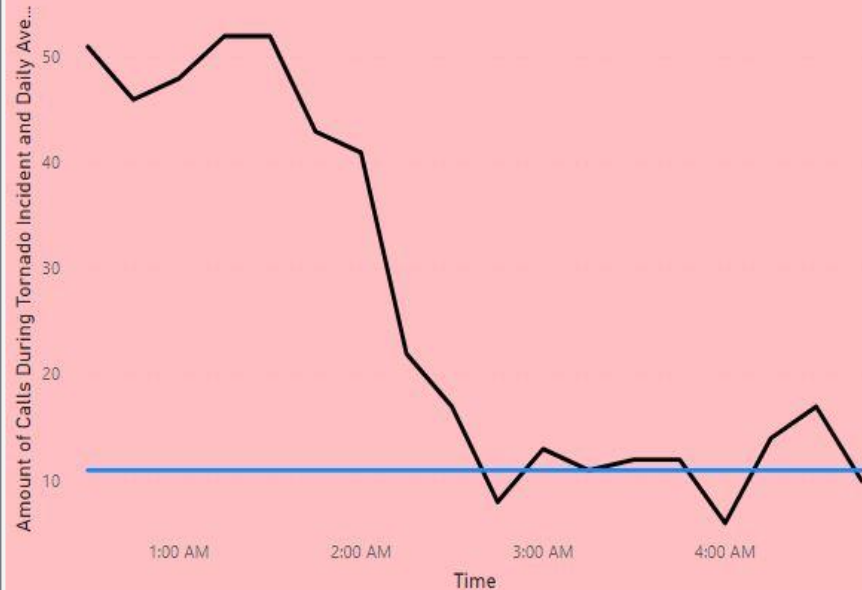
May 2020	196%
May 2019	136%
May 2018	183%

Call volume during storms compared to daily average

TORNADO INCIDENT: 911 CALLS

Amount of Calls During Tornado Incident and Daily Average: Calls per 15 minutes by Time

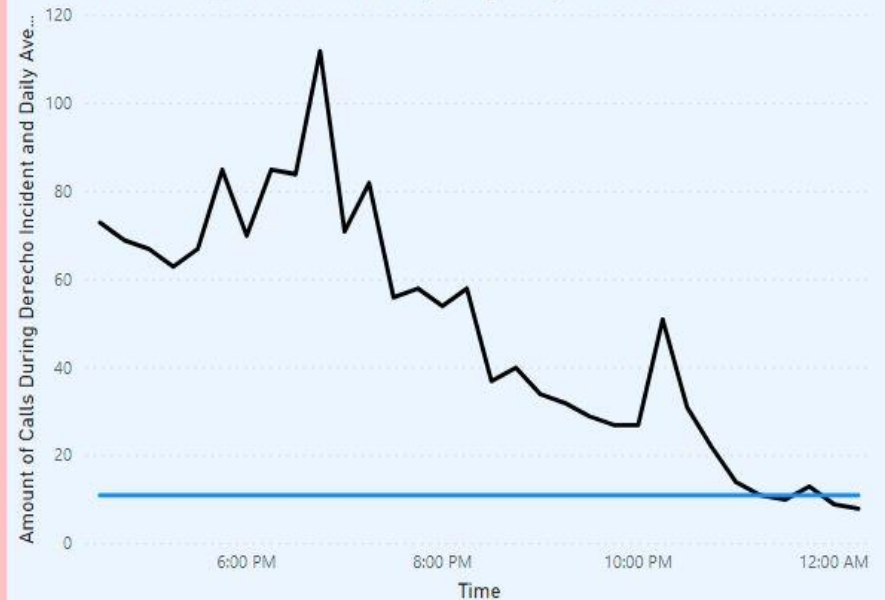
● Amount of Calls During Tornado Incident ● Daily Average: Calls per 15 minutes



DERECHO INCIDENT: 911 CALLS

Amount of Calls During Derecho Incident and Daily Average: Calls per 15 minutes by Time

● Amount of Calls During Derecho Incident ● Daily Average: Calls per 15 minutes



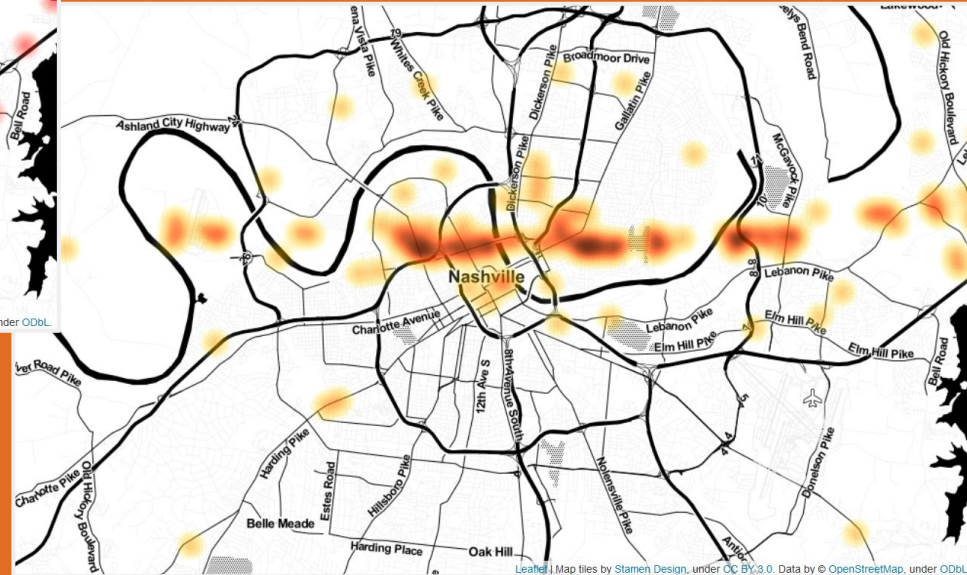


Location

Tornado call areas

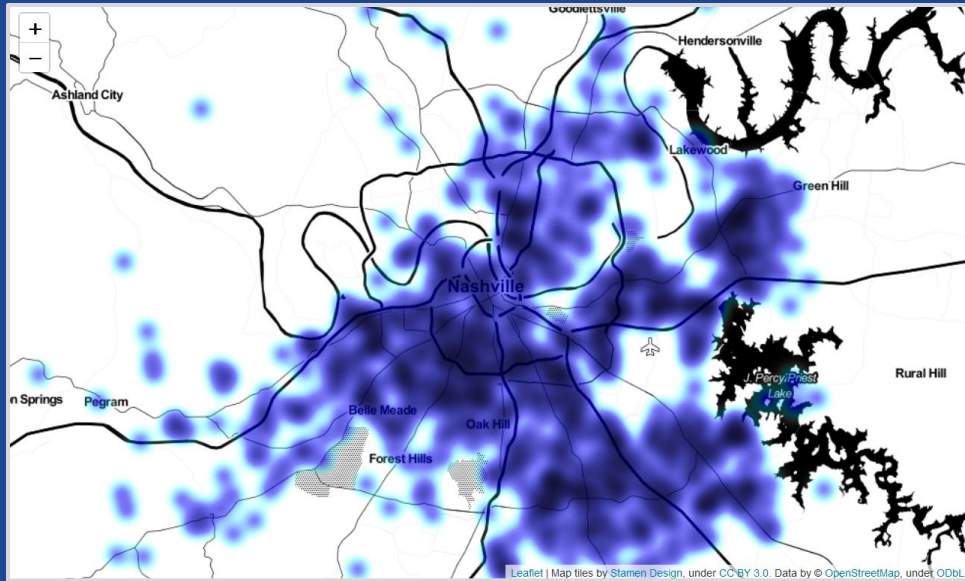


Tornado dispatch areas

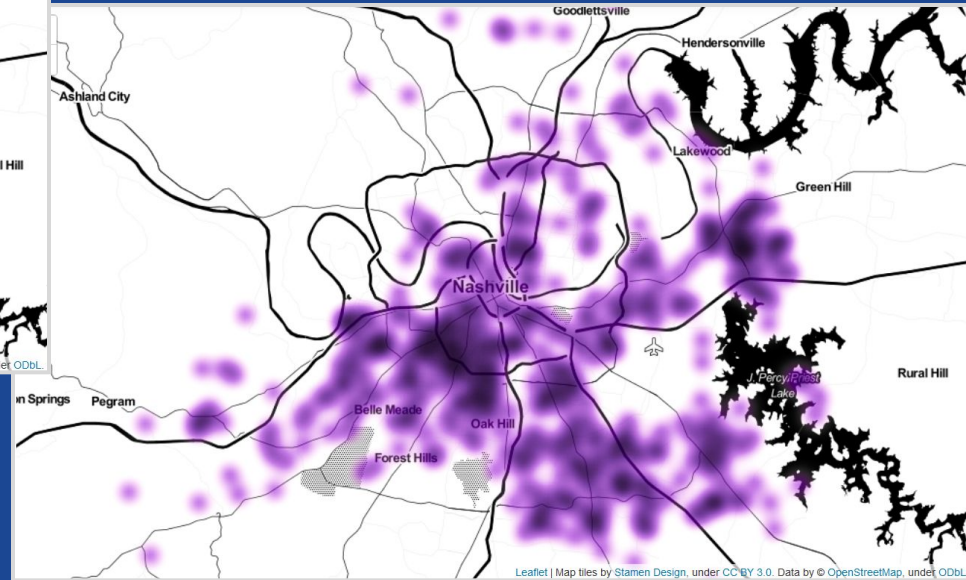


While 911 calls were spread around Nashville during the Tornado, the dispatches clearly shows it's path.

[Derecho call areas]



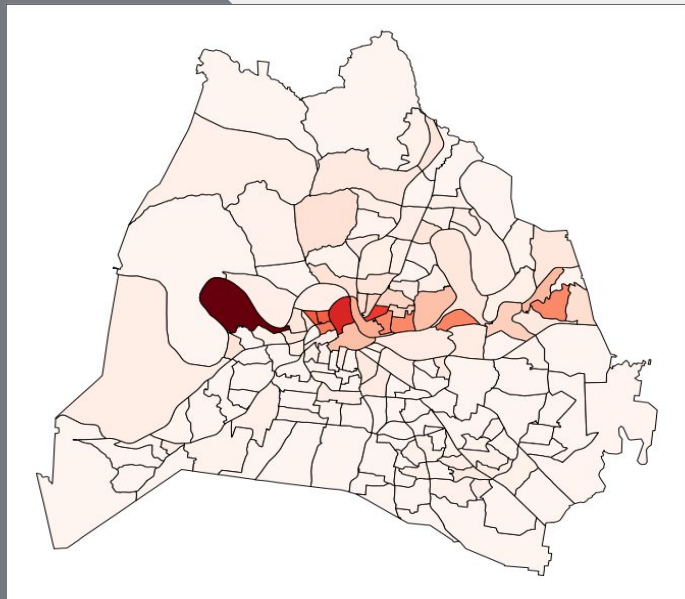
[Derecho dispatch areas]



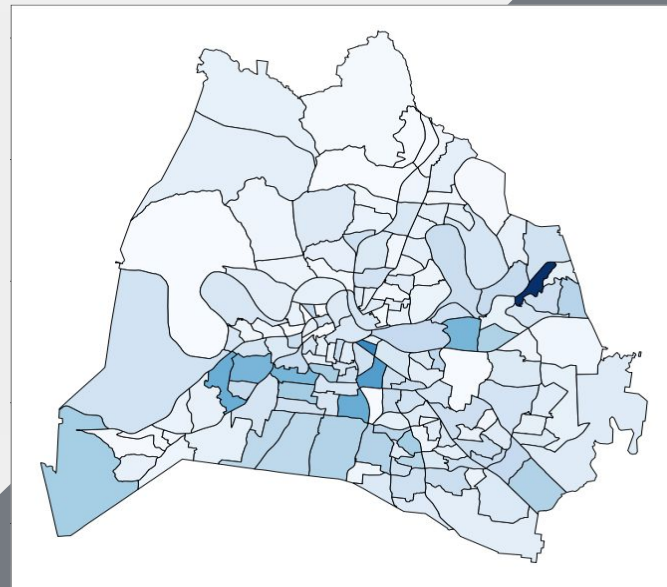
Dispatch locations match call locations with
no clear pattern of variance

911 Call Volumes by Census Tract Population

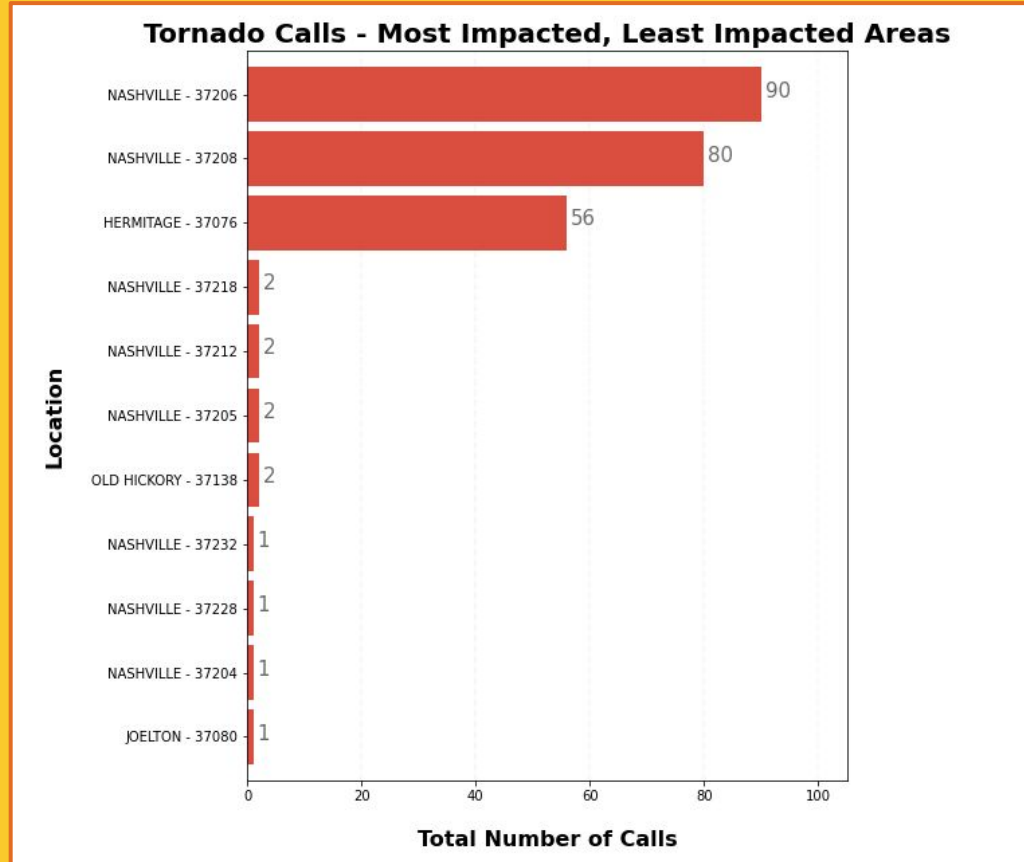
Tornado 911 Calls



Derecho 911 Calls

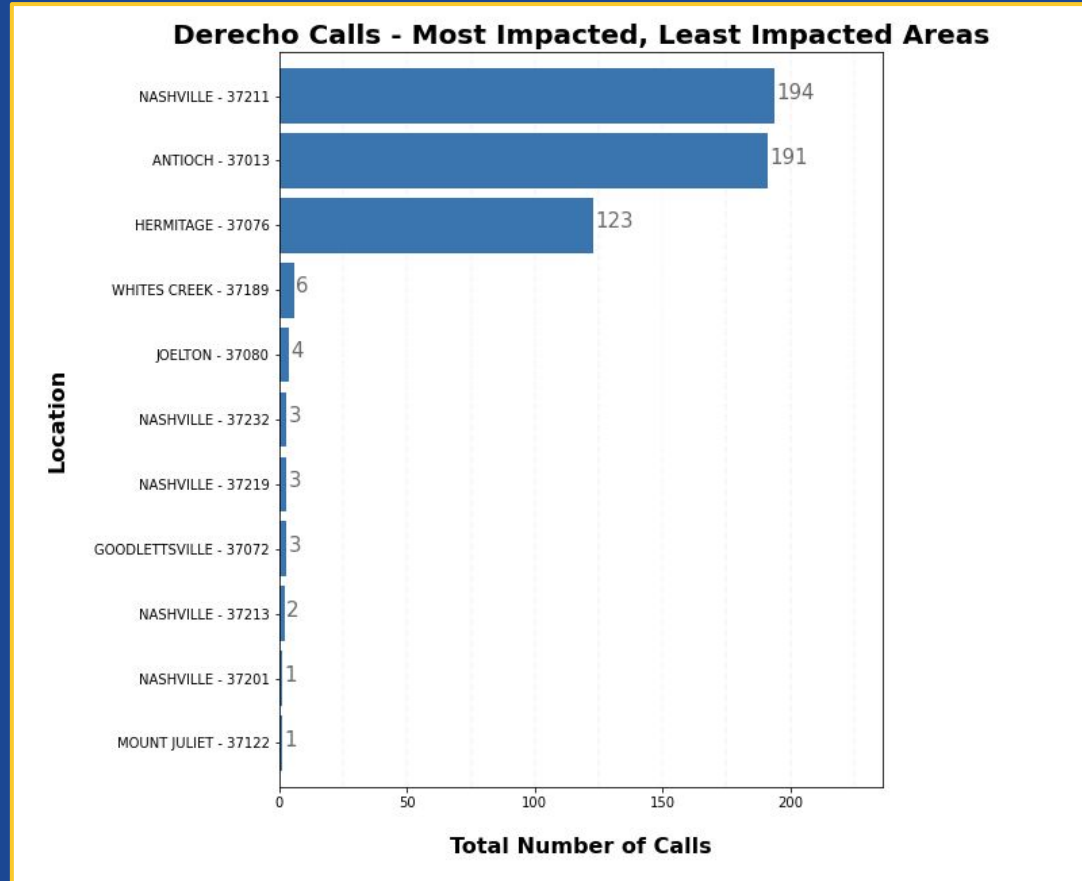


Tornado Calls - Total Number of Calls, Top 90th and Bottom 25th Percentile Areas



Click graph for interactivity

Derecho Calls - Total Number of Calls, Top 90th and Bottom 25th Percentile Areas

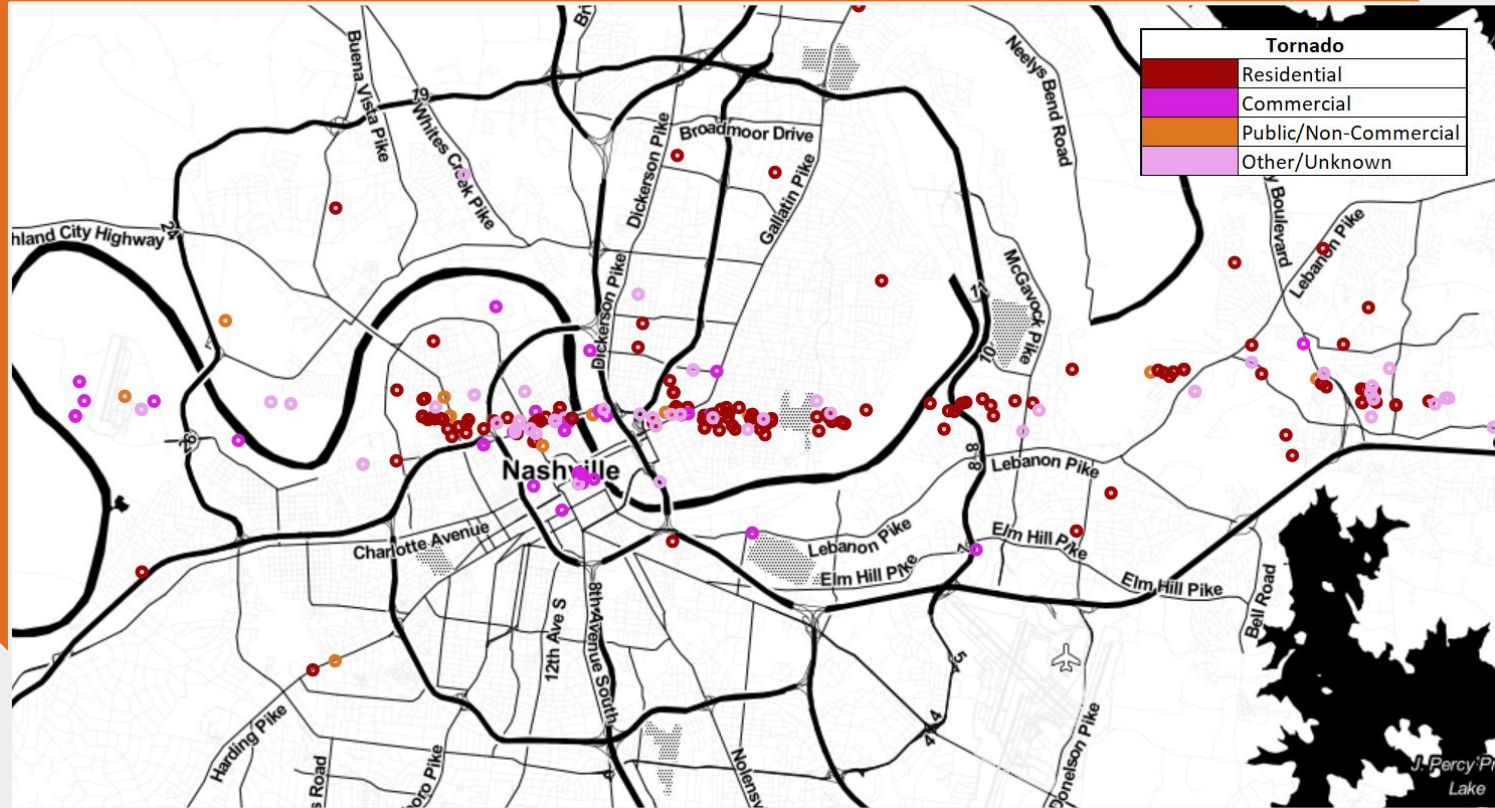


Click graph for interactivity



Community

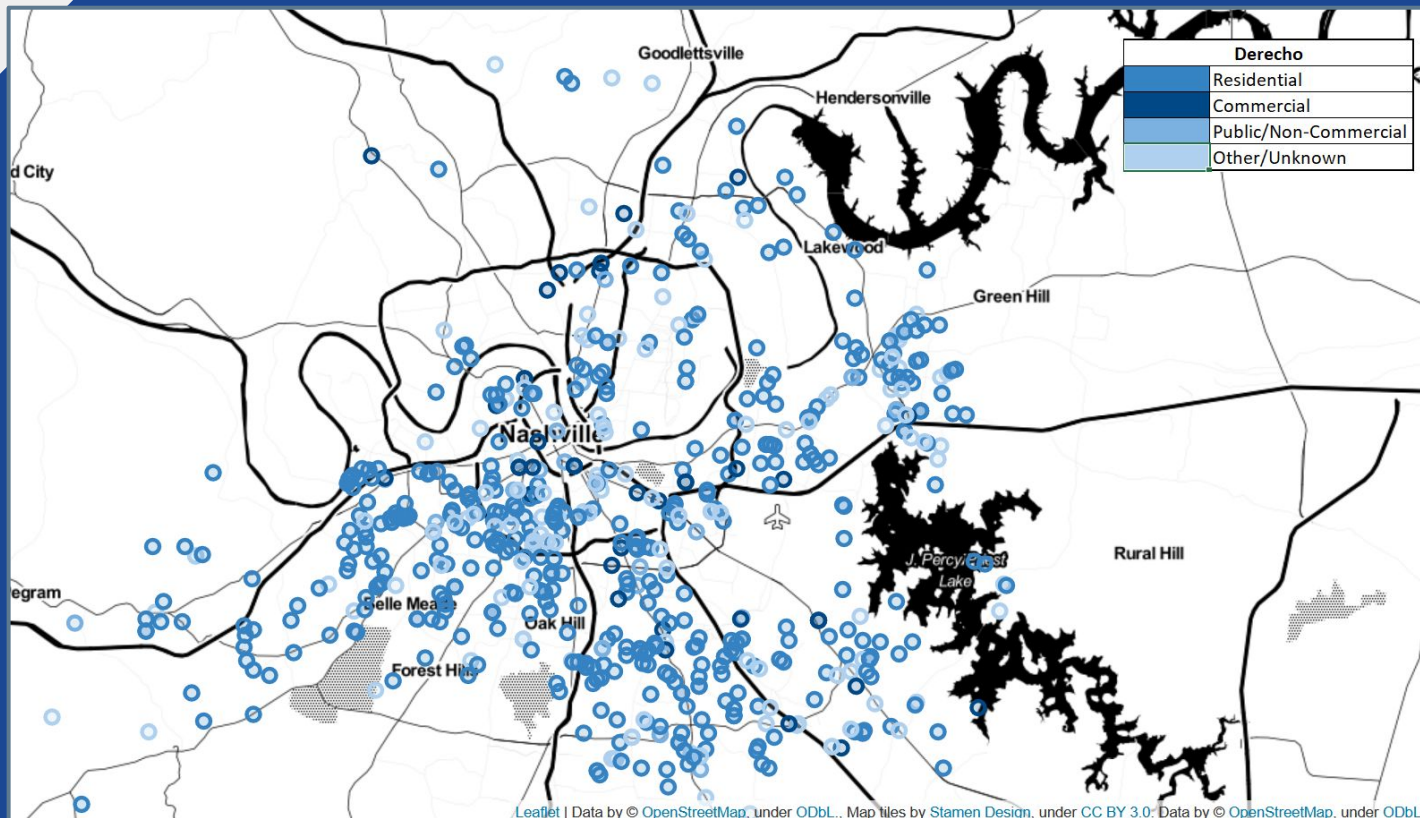
Structural Impact from Tornado



*Source: Nashville Planning Department

Click graph for interactivity

Structural Impact - May 2020 Derecho

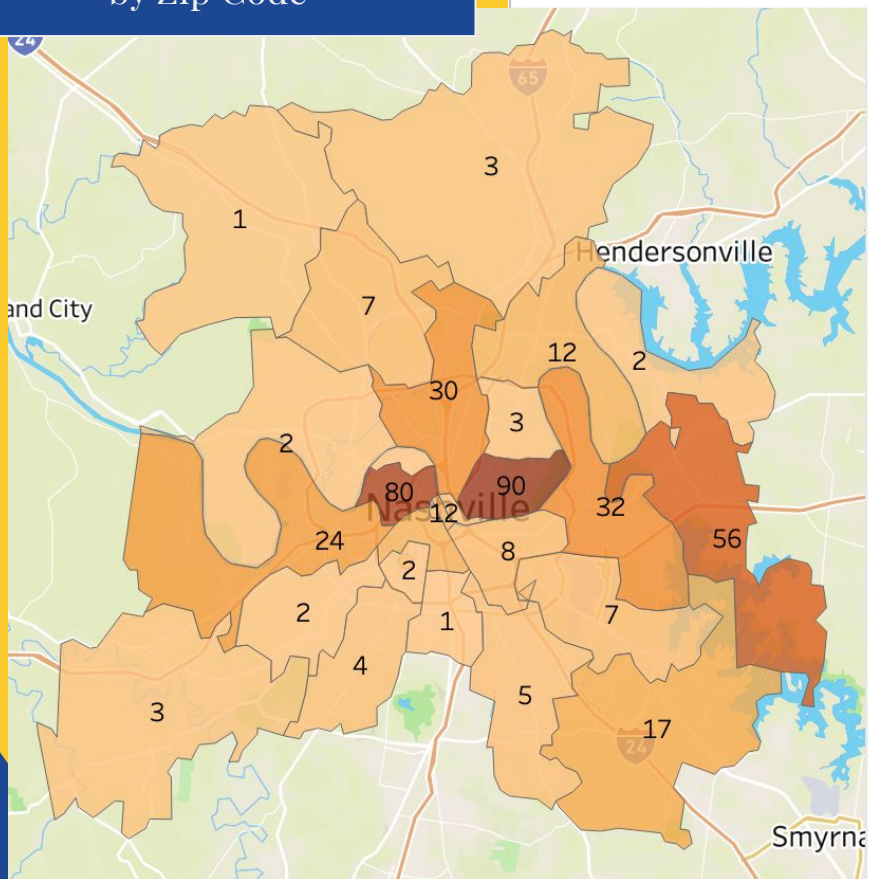


*Source: Nashville Planning Department

Click graph for interactivity

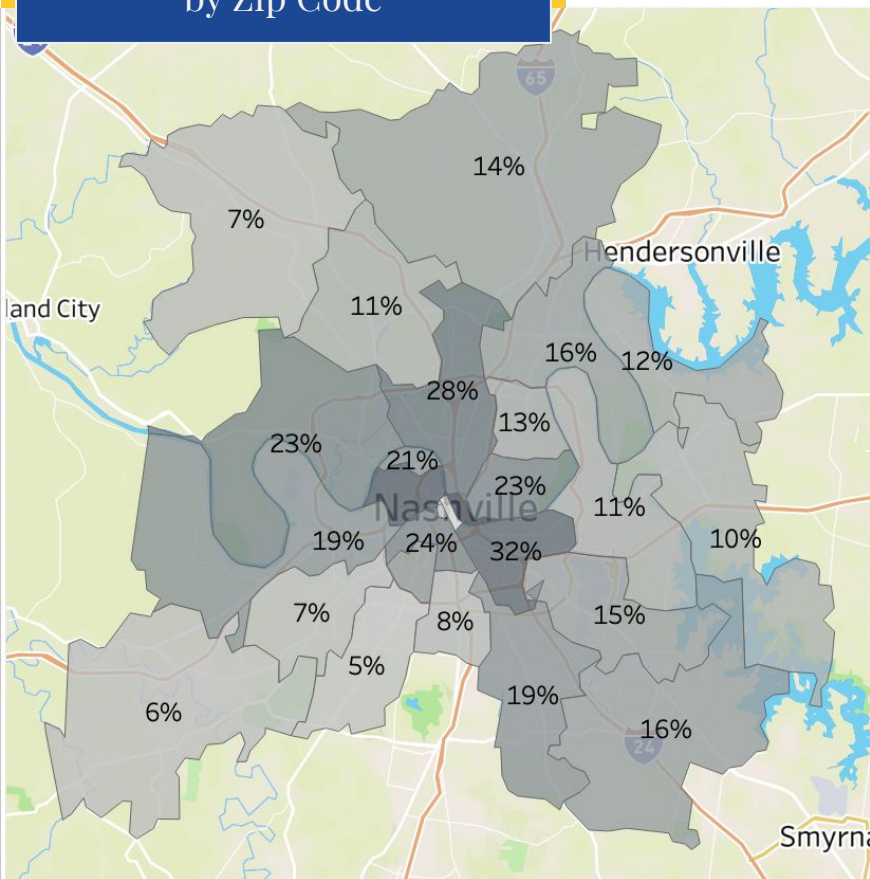
Tornado 911 Call by Zip Code

Calls
1 90

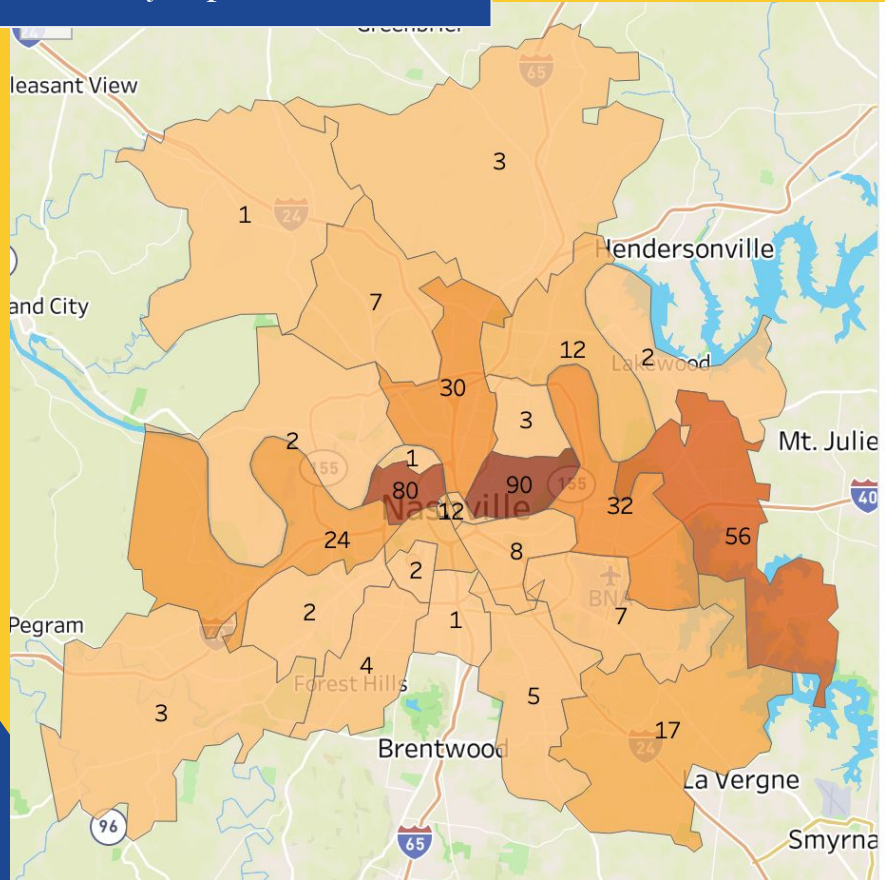


Percent Poverty Level by Zip Code

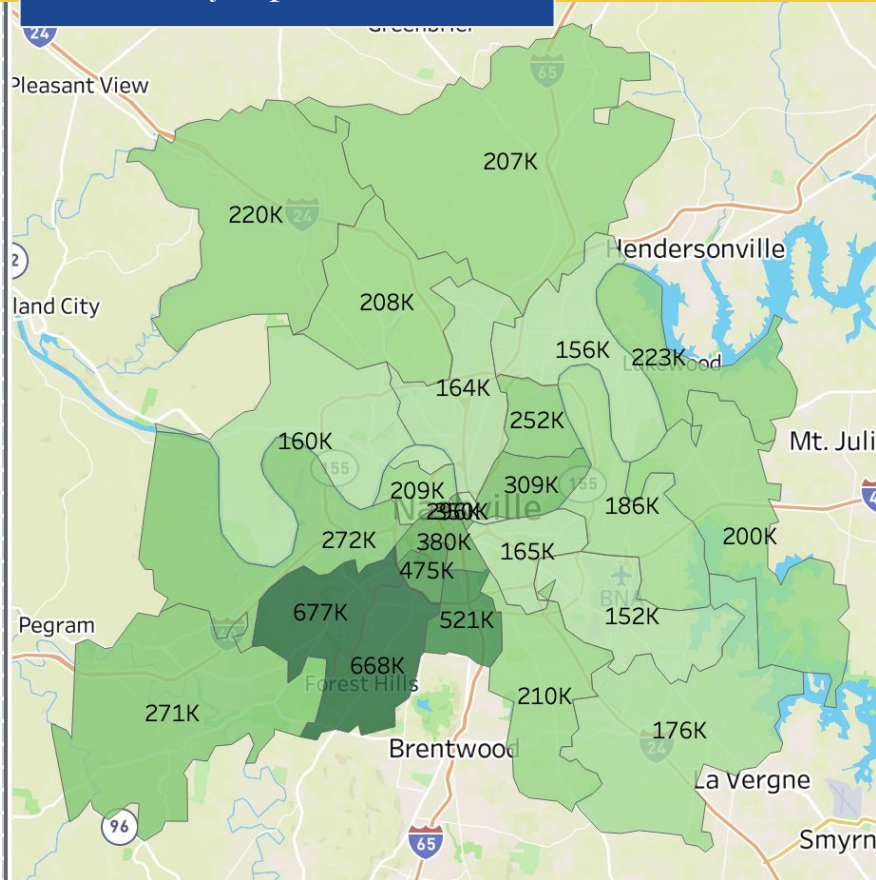
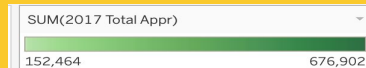
Population for whom poverty status is determined
0.00 0.41



Tornado 911 Call by Zip Code



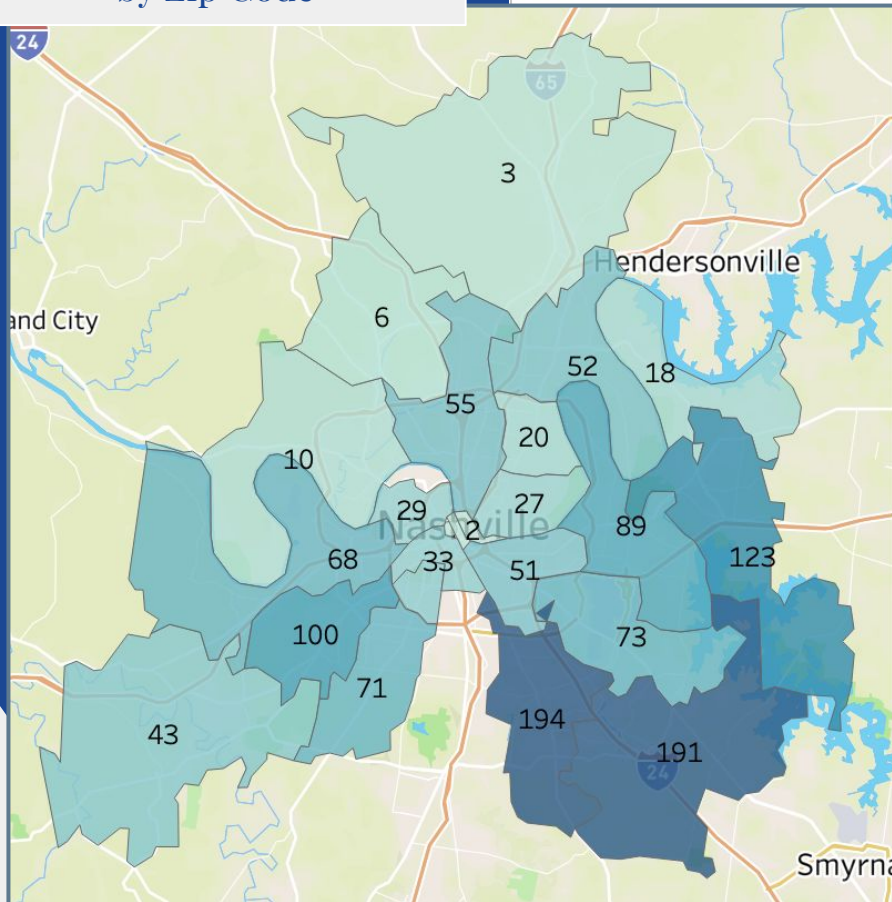
Average Property Values by Zip Code



Derecho 911 Call by Zip Code

Calls (count_derecho_calls.csv)

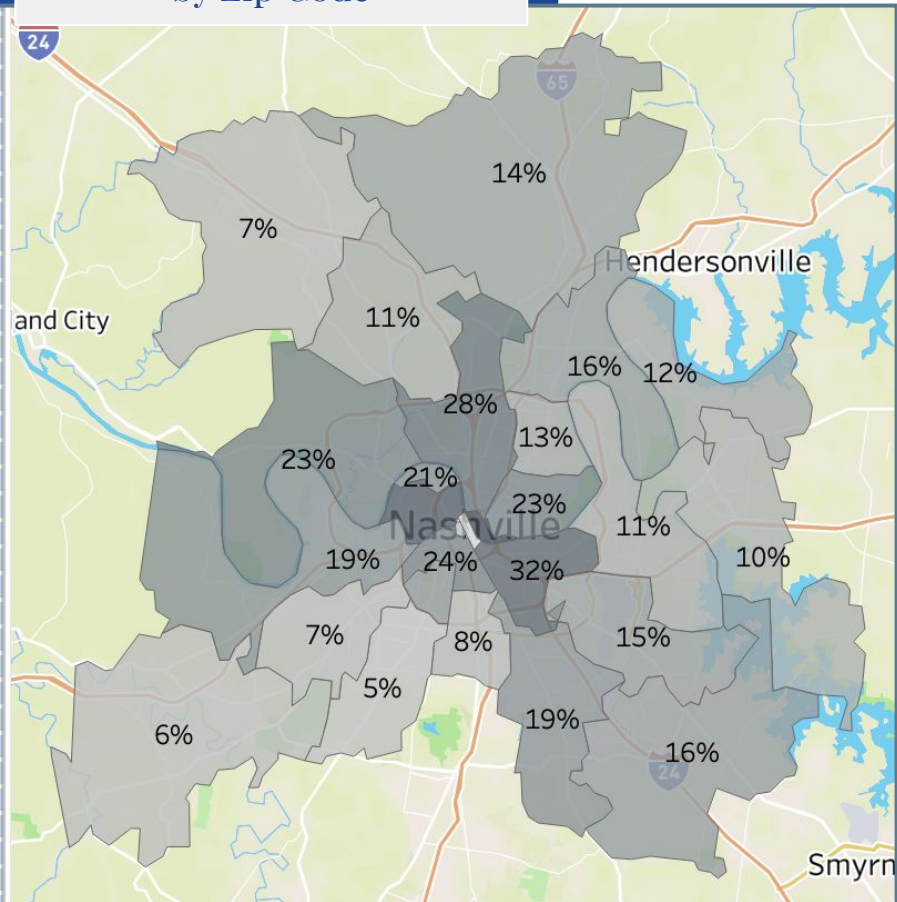
1 194



Percent Poverty Level by Zip Code

Population for whom poverty status is determined

0.00 0.41

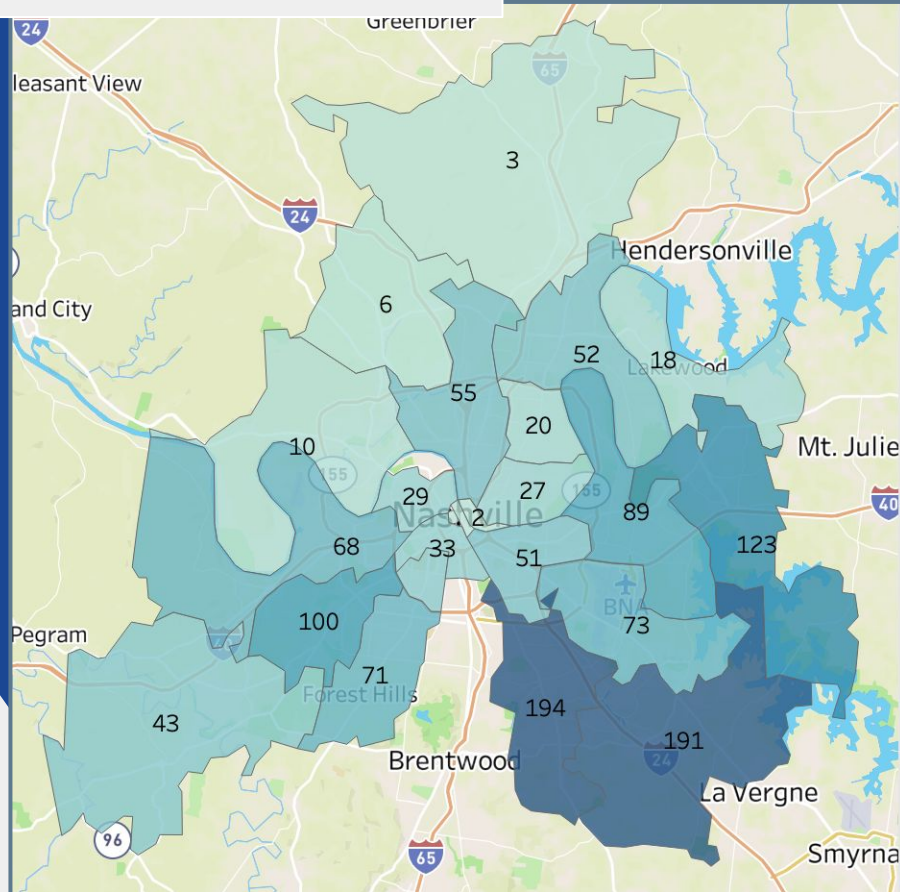


Click graph for interactivity

Derecho 911 Call by Zip Code

Calls (count_derecho_calls.csv)

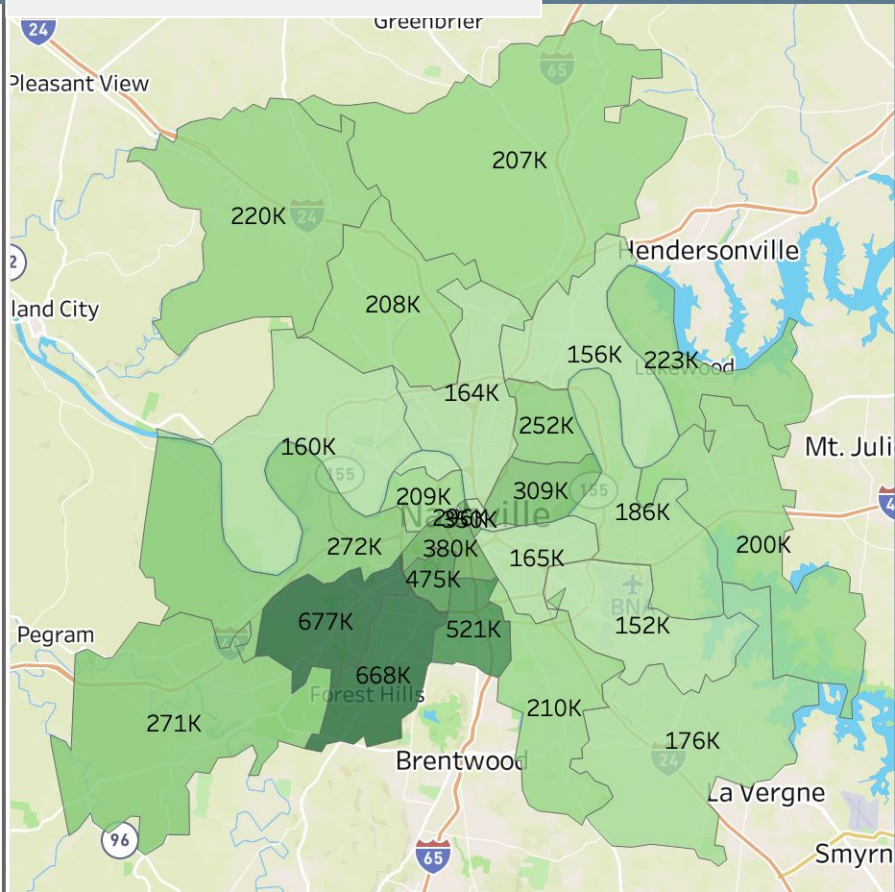
1 194



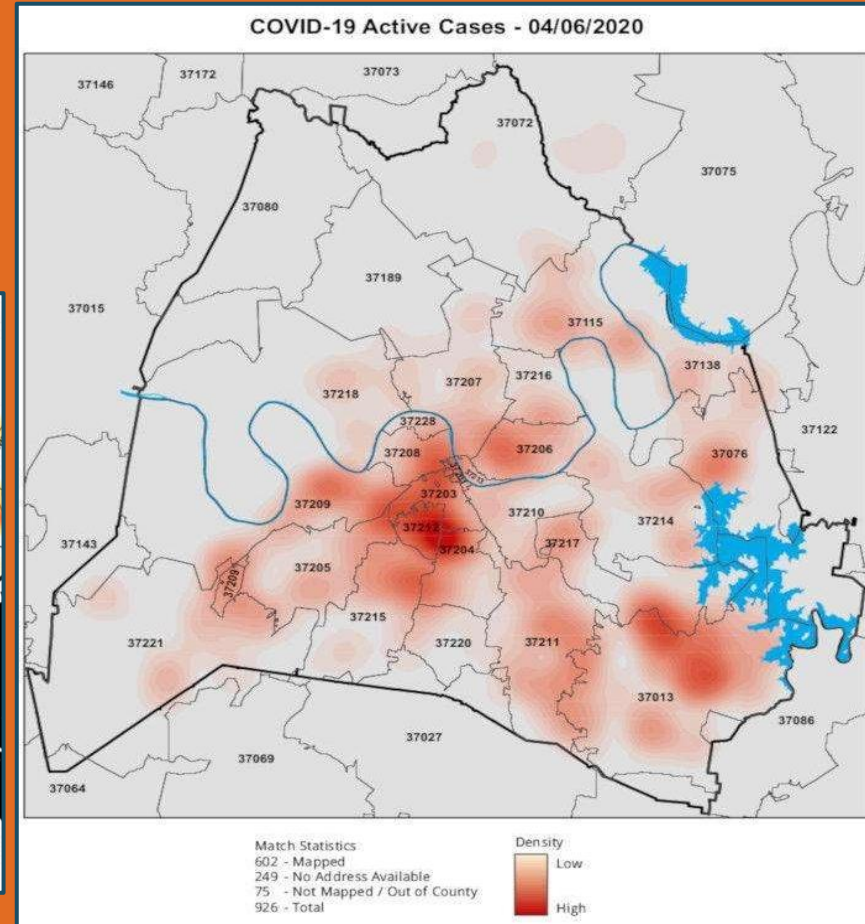
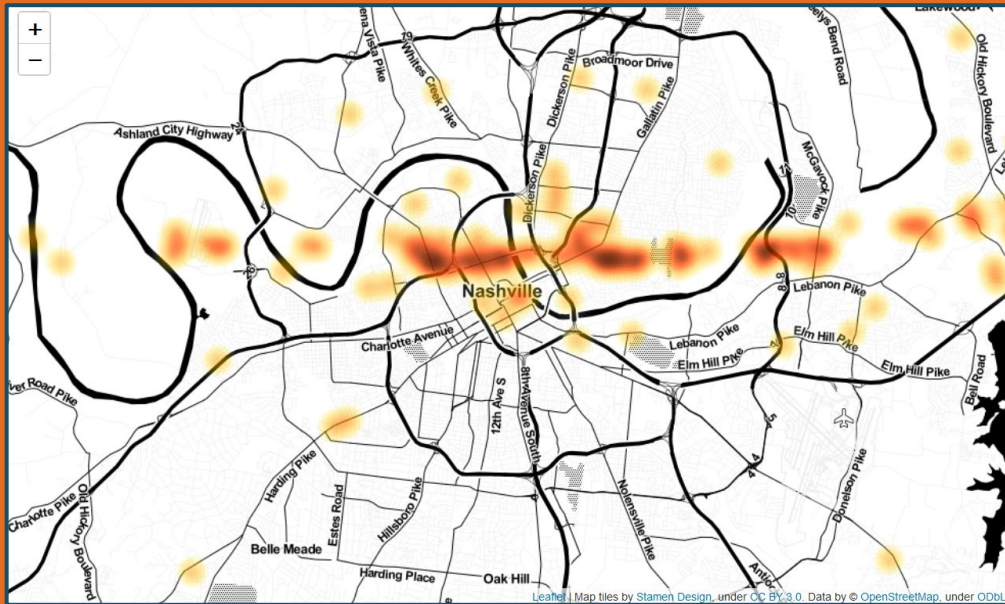
Average Property Values by Zip Code

SUM(2017 Total Appr)

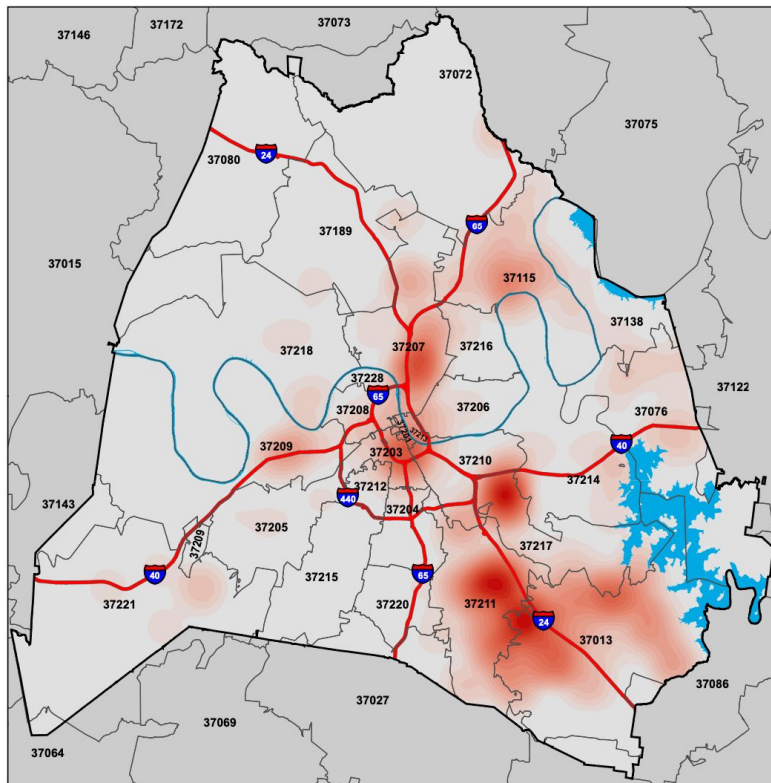
152,464 676,902



Impact of the Tornado on COVID-19 Hotspots



COVID-19 New Cases, for Week Ending 05/02/2020



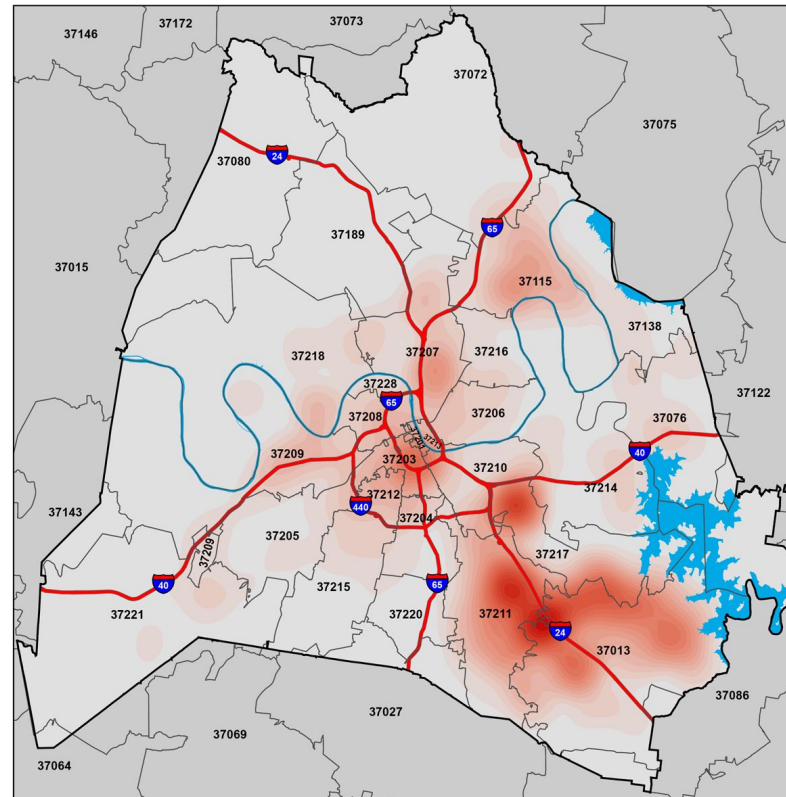
490 New Cases Mapped (Excludes Previous Weeks)



Density layer created from kernel density estimation using the following guidelines: 1.5 mile search radius, equal interval classification (20 classes).

Source: Data provided by Metro Public Health Department. Based on reported home locations, not locations of tests. For informational and planning purposes only. Nashville Metro Government is not responsible for the misuse or misrepresentation of the data.

Known COVID-19 Cases: Cumulative Through 05/18/2020



Density layer created from kernel density estimation using the following guidelines: 1.5 mile search radius, equal interval classification (20 classes).

Source: Data provided by Metro Public Health Department. Based on reported home locations, not locations of tests. For informational and planning purposes only. Nashville Metro Government is not responsible for the misuse or misrepresentation of the data.



Events Conclusions

- The call volume almost doubled for each storm event.
- The increased call volume supports increasing staffing during storm season.
- Storm path cannot be determined solely by the time of call.

Location Conclusions

- Studying storm patterns could help the department know what to expect when a storm strikes.
 - In the case of the tornado, the pattern of dispatch records shows the response to calls and location of the storm pathway.
- Based on call volume, the following locations were the hardest hit:
 - North and East Nashville during the tornado
 - South Nashville during the derecho



Community Conclusions

- Residential structures generated the highest number of calls for the tornado and derecho.
- The storms affected all economic groups.
- There were some parallels between both the derecho and COVID, but one could not say that there was a correlation between the two.

Further Analysis

- Were some communities lesser represented in the call data actually some of the hardest hit?
 - Possible lack of calls due to lack of electricity or cell towers being down.
 - Could look at targeting areas known to have cell towers down first.
- What data is needed to consider alternative methods of notification?
- If dropped calls are able to be tracked to their origin, does the rate of dropped calls vary by location in an extreme weather scenario?
- Can we assess response times of initial calls by neighborhoods or zip codes to observe equity?

References

Poverty Level Statistics and Population Source:

U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates

Property Values:

Davidson County Assessor's Office '2017 single family_final_with_sqft.txt'

COVID-19 Maps:

Metro Public Health Department, Nashville and Davidson County

Residential/Commercial Building Designation:

Nashville Planning Department: https://maps.nashville.gov/ParcelViewer_TextOnly/