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ASSESSMENT OF DATA-DRIVEN DEPLOYMENT

by the Memphis Police Department

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MESSAGE FROM THE EXECUTIVE DIRECTOR

The Public Safety Institute (PSI) at the University of Memphis is an interdisciplinary part of the University community committed to identifying and advancing best practices in the field of public safety.

Under an agreement between the University and the Memphis Shelby Crime Commission, the PSI is to assess the impact of various objectives in the local Safe Community Plan designed to prevent and reduce crime.

One of the key objectives of the Safe Community Plan is deployment of resources by local law enforcement in a data-driven manner.

Last year, the PSI conducted an assessment to determine whether, during calendar year 2017, the Memphis Police Department's commitment to data-driven deployment of resources by identifying crime hot spots in each precinct on a weekly basis had an impact on crime patterns. That assessment indicated a consistent short-term positive impact.

The PSI decided to conduct a similar assessment for calendar year 2018 to determine if there was a consistency in results from year to year. This assessment covers 2018 and seeks to determine the impact of the Memphis Police Department's continued commitment to weekly identification of crime hot spots at the precinct level.

I thank the PSI's lead research assistant, James "Max" Helms, for taking the lead on this assessment and the Memphis Police Department for its cooperation, without which this assessment would not be possible.

Bill Gibbons, Executive Director
Public Safety Institute

INTRODUCTION

Data-driven policing has been a priority for the Memphis Police Department (MPD) for over ten years. During the initial Safe Community Plan developed by major community stakeholders (2007–2011), MPD expanded its data-driven ability by updating the technology used and increasing its personnel. According to the Real Time Crime Center website, this technology allows MPD to "receive instant information on recent criminal activity in a radius around a crime, existing crime patterns in the neighborhood and a history of people with arrest records who may frequent the area." Successful policing should have good data and intelligence gathering abilities, such as hotspot analysis. Hotspots can help police identify areas of high crime to better prevent and solve crime. The objective of this assessment is to examine if MPD is deploying its resources to the best of its abilities through data-driven deployment.

LITERATURE REVIEW

The Evolution of Data-Driven Policing: Computers in Law Enforcement

Throughout the history of policing, electronic data use has increased as use of technology has become more common. Computer use by police departments was first implemented in the St. Louis Police Department in the mid-1960s (Colton, 1979). The beginnings of wide-spread technology use by law enforcement can be traced to the Omnibus Crime Control and Safe Streets Act of 1968 (Northrop, Kraemer, & King, 1995). This led to the creation of the Law Enforcement Assistance Administration (LEAA), which contributed approximately $50 million to law enforcement agencies to enable them to access police technology (Northrop et al., 1995). Surveys conducted in the early and mid-1970s showed that implementation of police technology was slower than anticipated (Colton, 1979).

Police use of technology became more common during a crime spike in the 1960s and 1970s when a "demand gap" emerged, and it was evident that traditional policing techniques were not getting the job done (Ratcliffe, 2016). In the 1970s, technology use within law enforcement agencies markedly improved,

most notably in data entry and management (Ratcliffe, 2016). Managing crime data more effectively allowed for the creation of a “strategic picture of crime” (Ratcliffe, 2016, p. 2). The demand gap led to “greater calls on the police for effectiveness and efficiency” (Ratcliffe, 2016, p. 2). The public wanted more professionalism from the police, with increased access to information. While the factors listed above helped increase data management technology within departments, rising levels of organized crime that ignored jurisdictional and state lines meant that police departments needed a better way to collaborate with each other.

Crime Mapping

Crime maps were noted as early as 1829 in France and were known as choropleth maps. Chamard (2016, p. 1) defined these as “maps that display quantities of things in areas. More specifically, in choropleth maps geographical areas are divided into multisided figures called polygons, which are then shaded depending on the value of the variable being displayed.” Election maps are a modern example of choropleth maps. During the 1900s, sociologists at the University of Chicago mapped the homes of delinquent children using another type of map called a point map. These maps used dots or points to mark geographical points of interest and were completed without the aid of computers, which took hours of work. Crime mapping in a true sense did not appear until the ability to run crime mapping programs on desktop computers.

Before mapping programs became widely available, police departments used a basic pushpins and paper technique. These maps allowed for elementary detection of clustered activity but lacked the ability for more advanced analyses that incorporated other factors, such as time of offense. Even with the availability of computers, digitizing crime maps was still a significant undertaking. Due to the labor involved, many police departments couldn't afford to computerize their maps. A study conducted in the late 1990s showed that larger departments were much more likely to have a computerized crime mapping system than their smaller counterparts (Charmard, 2016).

Crime mapping has advanced with the development of Geographical Information System technology (GIS), which began in planning for the 1970 census and improved from there. As satellite images of Earth became available

and the military was able to create a platform for these images to be viewed, GIS technology quickly came to be useful for gathering intelligence. The ease of attaining computer hardware that came with a reduction in price in the 1980s combined with improved computer systems and more advanced software has had a positive impact on the widespread use of GIS technology. However, early use of GIS crime mapping was met with several setbacks, such as organizational problems, information sharing issues, technical problems and geocoding problems. These problems have not entirely disappeared, and new problems have emerged over time (Chainey & Ratcliffe, 2013).

CompStat, short for "Compare Statistics," is a program introduced in New York City in 1994. The idea for CompStat stemmed from failures in traditional policing (Weisburd, Mastrofski, McNally, Greenspan, & Willis, 2002). To counter these failures, data-driven decision making was emphasized. CompStat was intended to be an organizational device that used crime information to target crime reduction. This organizational tool allowed agencies to more effectively use their data and its emergence was followed by an impressive decrease in crime.

Current Technology

Police use of technology has grown and changed over the years. Crime mapping has moved from merely describing where crimes have happened to be a predictive tool for preventive measures. Current technologies can gather data on police activity, indicate where crime reduction projects are in place, detail crime incidents and more (Chainey & Ratcliffe, 2013). Data are used in police briefings as indicators of where future crimes may occur and in targeting crime hotspots. Data gathered on crimes can also be applied to analysis of crime reduction projects in areas where those have been deployed (Chainey & Ratcliffe, 2013). Many other policing technologies employed today have not always been readily available, including "wiretapping, fingerprints, DNA research, database coupling, data mining and profiling, camera surveillance and network analyses" (Custers, 2012, p.62). Other less well known methods of computerized data collection are also in use now, such as 3D crime scene imaging and through-the-wall radar technology (Solar, 2015). Technology is

integrated into police officers' everyday lives via use of body-cameras. This video footage can be used in court as evidence (Solar, 2015).

According to Willis, Koper, & Lum (2018), 60% of all large police departments currently use license plate readers (LPRs), high-speed cameras that can read and instantly analyze license plates. The LPR stores pictures of the plates and compares them to a database of plates of interest to law enforcement. These could be the plates of stolen vehicles or plates connected to known criminals. Along with the plate information itself, data such as the date, time, description of the vehicle and the location of the vehicle are available to officers to aid in investigations.

Another technology currently being used by law enforcement is gunshot detection technology (GSD). GSD was developed in the mid-1990s and works by triangulating multiple sensors that can detect sound waves produced by a gunshot. Systems generally require three or more sensors to detect the sound wave for optimal accuracy. Data gathered from these sensors is then sent to law enforcement with the location and an identification of the noise (whether it was an actual gunshot or another sound, like vehicle backfire). Previously, gunshots were reported mainly through citizen reports, which can be inaccurate. With the innovation of GSD, law enforcement is hoping to "increase the perceived risk of firing a weapon," mainly through more rapid dispatch and response times and to reduce gun crime overall (Choi, Librett, & Collins, 2014, p.51).

The Use of Data in Policing

According to Lum, Koper and Willis (2016, p.135), "technology has become a major source of expenditure and innovation in law enforcement and is assumed to hold great potential for enhancing police work." Police departments use data from this technology in many ways. For example, crime mapping data is used to "locate crime and traffic crash hotspots, thus enabling law enforcement officials to target these areas with highly visible traffic enforcement" (Hardy, 2010, p.1). Data not only are collected but are also analyzed. Analyses are used to inform decisions on "local partnerships; strategic operations; information sharing and outreach; monitoring, evaluating and adjusting operations; and measuring outcomes" (Hardy, 2010, p.2). All the data gathered by police can then be used to increase proactive measures. In Chicago, for example, the police department

currently focuses on a “heat list” of offenders that risk analysis programs have shown to be possible future risks (Joh, 2014). Even Homeland Security is employing computer systems into their preventive measures, with their systems filtering out potentially threatening words (Joh, 2014).

In New York, the NYPD has developed a “Domain Awareness System” that links data gathered from several computerized systems such as CCTV footage and LPR technology (Joh, 2014). New York has been active in data-driven policing beginning with CompStat in the 1990s, the system that allowed them to use pinpointed crime maps to target specific areas and more efficiently allocate resources based on the maps. This system led to significant decreases in crime rates (Hyunseok, Hoover, & Joo, 2010).

“Real-Time Crime Centers” (RTCCs), such as the one within MPD, are a great example of how high-end police technology interacts with data-driven policies. The software employed at the Memphis RTCC can receive instant updates on criminal activity, identify crime patterns and monitor high-risk offenders. The RTCC uses Blue C.R.U.S.H. (Crime Reduction Using Statistical History) data gathered on hotspot crimes, including time of day, day of the week and location to better allocate resources to those hotspots. Additionally, a wall of LCD monitors that display live feeds from areas of interest (such as the locations of GSD and LPR technologies) aids in providing real-time responses.

Research with the Mesa Police Department in Arizona showed how data-gathering technology like LPRs can influence police efficiency and resource allocation and illustrated the effectiveness of those technologies on reducing hotspot crimes. Specifically, Mesa police were interested in whether these technologies could reduce auto theft and increase the recovery of stolen vehicles and the apprehension of thieves. The department deployed an auto theft unit of four patrolmen in various types of cars all outfitted with LPRs. Each camera was linked to state-level data on stolen vehicles and other vehicles of interest, with a small amount of warrant information being linked as well. After methodically sweeping hotspots for 30 weeks, results of the study showed that the LPR patrol unit was more likely than other patrol units to recover stolen vehicles and to apprehend auto thieves. However, the LPR unit was only nominally more likely to make arrests for auto theft. Only four auto theft or stolen plates arrests were made, with the remainder being for unrelated crimes, either observed or based on warrants. The patrols saw a two-week time frame

during which auto thefts and reports of drug activity were reduced. However, a sustained reduction in actual auto theft was not realized. Based on these results, Mesa concluded that, while LPR cameras may not be cost effective for hotspot crime patrols, a specialized unit may be able to impact a targeted offense, at least in the short-term. In addition, while increasing scanned license plates may lead to more matches with the database of auto theft information, it is best to deploy a manual patrol unit as well (Koper, Taylor, & Woods, 2013).

Conclusion

Technology use by police departments began in the 1960s with computers cautiously being integrated into stations that could afford them, with many tasks still being done by hand. Crime maps did not consist of the advanced information we have access to today, but pushpins on a map on the wall. As computer technology became more advanced and more affordable, many cities saw the positives of becoming more computerized, starting with their data management systems. This eventually led to data analysis being done to meet growing demands for police professionalism and accountability. New York City set the standard in the 1990s by implementing CompStat and using its data to more efficiently and effectively allocate its resources to higher crime areas and focus on high risk offenders. This standard led to other cities implementing similar programs that helped bring their crime statistics down. In time, law enforcement has implemented increasingly advanced systems that allow them to analyze even more detailed aspects of crime, such as the Blue C.R.U.S.H. data that can focus on the time of day and day of the week crimes are occurring. These data often are used in RTCCs that monitor these hotspot areas to inform management decisions on more effective and efficient allocation of resources.

TRAC Meetings

Weekly TRAC Meeting Process

The Memphis Police Department holds weekly Tracking for Responsibility, Accountability and Credibility (TRAC) meetings. These meetings usually include the presence of MPD command staff, precinct colonels and members of

different agencies (such as the District Attorney's Office, the MPD Academy, etc.). Prior to January 2018, these meetings were in a format referred to now as "TRAC 1." After the MPD command staff gave updates on the previous week, each precinct commander would give a report on his or her precinct through a PowerPoint presentation.

Starting in January 2018 under the direction of Chief Don Crowe, MPD made a change that was referred to as "TRAC 2, Round 1." During this transition, a precinct was notified before the meeting that it would be giving a presentation. After the command staff members gave their updates, the chosen precinct would give its PowerPoint presentation and answer any questions from the command staff. In March 2018, "TRAC 2, Round 2" began. On Monday prior to the week's TRAC meeting, all MPD chiefs review all nine precincts crime reports and one precinct is chosen to undergo the full review. After the precinct gives its update, precinct representatives are questioned about designated Blue C.R.U.S.H. crimes. Blue C.R.U.S.H. crimes include robbery (business and individual), aggravated assault, burglary (residential, business and non-residential), auto theft and theft from a motor vehicle. Several factors are taken into consideration during the review. The command staff evaluates and notes how the precinct representatives meet expectations in the categories of preparation, engagement, knowledge of crime and receptiveness. The command staff notes any other comments it may have in response to questions posed. Other questions that may be asked include:

- How many lieutenants do you have on each shift?
- How many sergeants are in your General Investigation Bureau (GIB)?
- How many total investigators are in GIB?
- How many PIIs, or officers, are assigned to your precinct?
- How many officers are on task forces? What hours do they work?
- How many details did you run last week? Areas? Focus?
- How many outside units assisted last week (Tactical Apprehension and Containment Team [TACT], Organized Crime Unit [OCU], Traffic, etc.)?

Task forces are made up of officers who are assigned to specific tasks. For example, the OCU uses multi-jurisdictional task forces to help target attacks on

illegal drug trafficking operations and the TACT Unit assists with various emergencies. Precinct colonels will also assign details within their precinct. These details place officers within the hotspots of their precinct to help reduce the crime in these areas. Precinct leaders may also use outside units to help assist with specific crimes.

The precinct colonel and officers of his or her choice answer these questions from the command staff to the best of their abilities. Chief Don Crowe then collects and keeps the evaluation sheets submitted by each member of the command staff in order to keep a record of the precinct's responses.

TRAC Meeting PowerPoints

These PowerPoints cover a wide arrange of data that would be helpful for any precinct commander to know. Besides the Blue C.R.U.S.H. offenses, larcenies are also a major focus of these PowerPoints. Larcenies make up a major part of the total crime within Memphis. These PowerPoints include:

- The number of guns reported stolen/recovered
- The Trend of Blue C.R.U.S.H. offenses by week and four-week comparisons
- Budgeting
- Hotspots
- General Investigation Bureau arrests and clearances
- Officer weekly productivity
- Larceny reports and offenses
- Larceny hot times and hot days

TRAC Meeting Accountability

"TRAC 2, Round 2" meetings usually last over three hours. In an effort to hold precinct colonels and their staffs accountable, the questioning by the MPD command staff can be intense and very specific as to cases, incidents and patterns. Sometimes, possible solutions to particular matters are discussed,

considered and decided. Precinct colonels and their staffs are expected to be prepared and to follow up where weaknesses are identified.

The process appears to be an effective, intensive tool of accountability. Precincts are being held to a higher standard under the new process compared to the previous process under "TRAC 1." Each reporting precinct is expected to explain what it did or did not do and the reasoning behind its actions, in response to specific challenges.

METHODS

MPD provided The Public Safety Institute (PSI) with data of Blue C.R.U.S.H. offenses within all nine precincts for the 2018 calendar year. Blue C.R.U.S.H. offenses include robbery (business and individual), aggravated assault, burglary (residential, business and non-residential), auto theft and theft from a vehicle. The data were then separated into each precinct for a more thorough examination of each precinct. MPD also provided the PSI with the Tracking for Responsibility, Accountability and Credibility (TRAC) PowerPoints for all precincts for each week that they met in 2018. Using the provided PowerPoints allowed the PSI to see where each precinct was labeling a hotspot and the number of Blue C.R.U.S.H. offenses that occurred in those areas and, by using the offense data provided, to get an accurate count of Blue C.R.U.S.H. offenses the week after an area was labeled a hotspot. Data were also pulled from the previous year assessment in order to compare how each precinct and MPD as a whole had either improved or declined.

Hotspot Evaluation

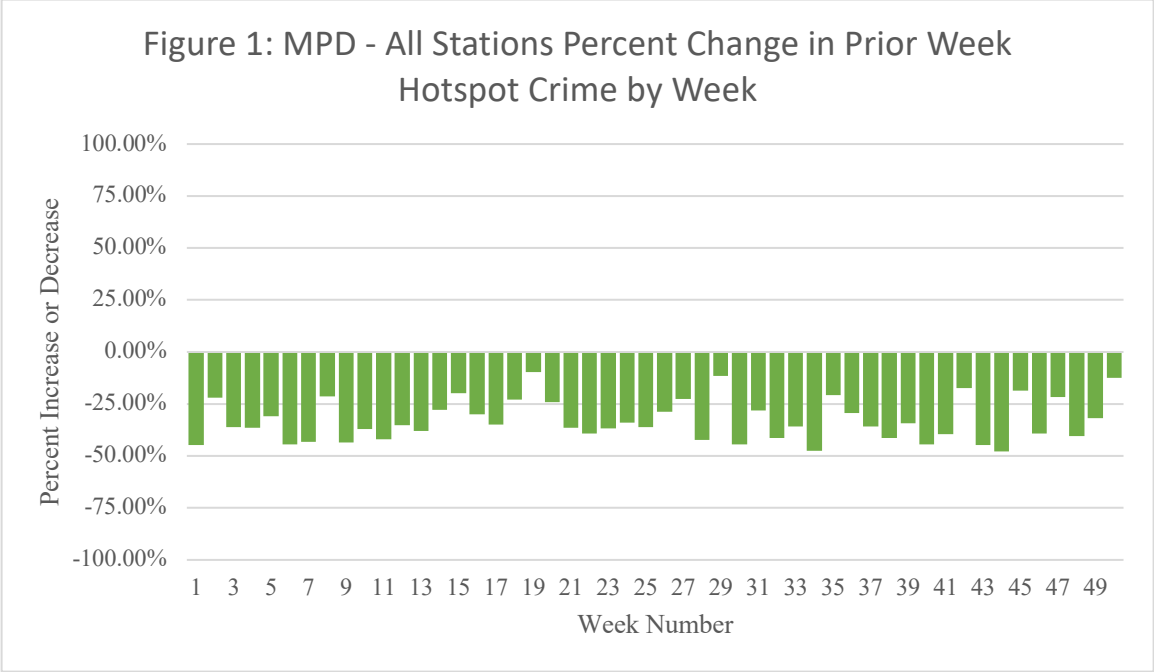
To determine whether MPD is being data driven when using its resources, the PSI examined changes in crime within chosen hotspots in each precinct. MPD crime analysts provide each precinct colonel a general map of his or her precinct that maps reported crimes within that precinct during the prior four weeks. The precinct colonel and his or her staff then determine which areas are considered hotspots. When a colonel identifies hotspots within his or her

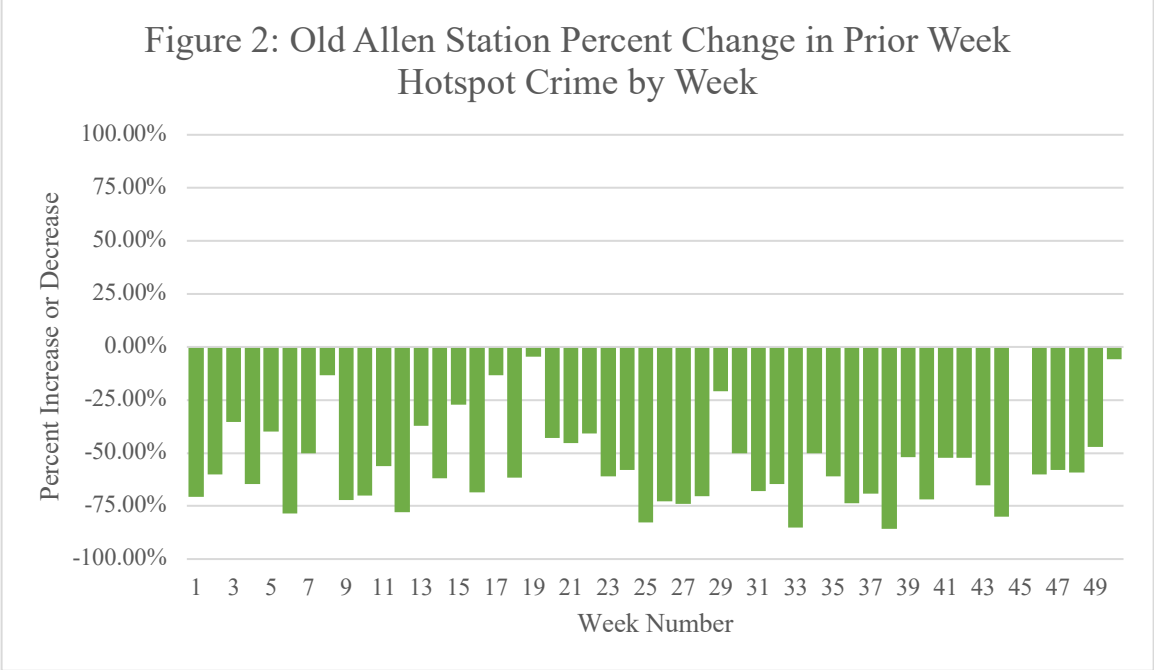
precinct, the plan is to shift more resources into those areas to help combat the crime numbers. This could mean placing Sky Cop cameras, adding additional officers on the ground, or placing specialized task forces in those areas.

For the aim of this assessment, when hotspots were determined, data were collected on how many Blue C.R.U.S.H. crimes were committed in all the hotspot areas for that precinct. The next week, whether some of the same areas were hotspots or not, Blue C.R.U.S.H. offenses were counted to measure the total change of offenses in the hotspots. A percentage was then determined to identify how much of a change had occurred. While each precinct commander has the choice of using four weeks' worth of Blue C.R.U.S.H. offenses in his or her precinct, the numbers for the prior week were used to determine the change in these offenses in the selected hotspots. Due to not having an assured way to measure displacement, we are not able to determine if any decrease in crimes was caused by displacement of crimes. Displacement of crimes would refer to offenders who move locations to commit offenses due to a number of reasons; heavier police presence and installation of cameras for example.

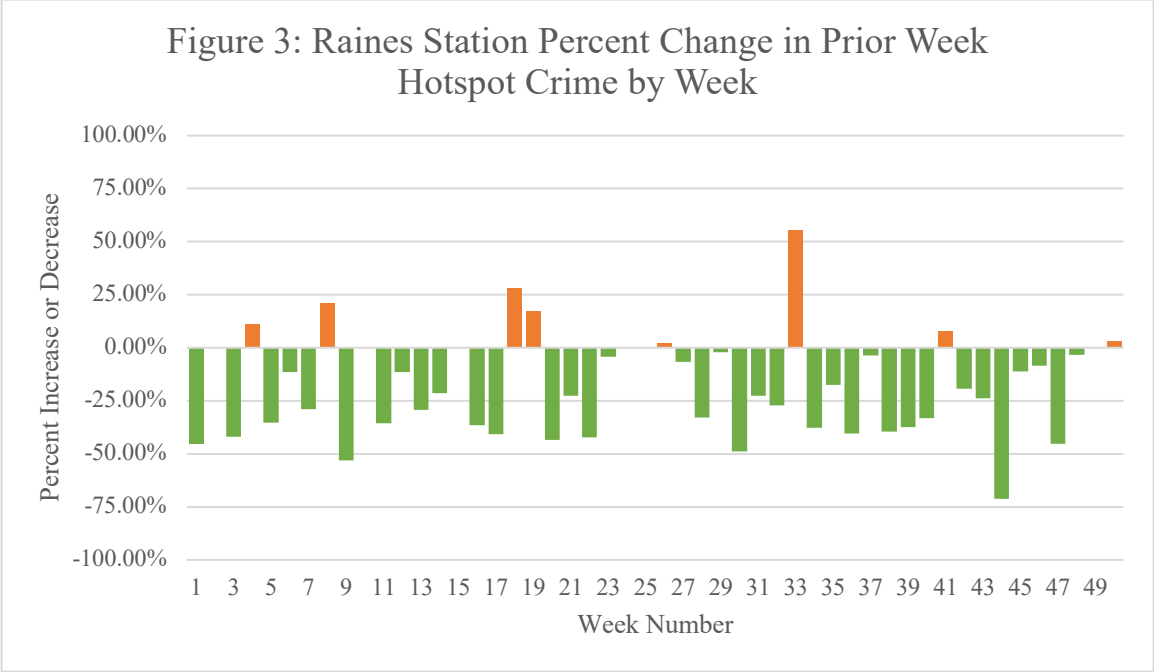
ANALYSIS AND RESULTS

An analysis was conducted for calendar year 2018 to determine whether identifying an area as a hotspot appeared to have any short-term impact on the number of reported Blue C.R.U.S.H. crimes the week after that area was identified. Figures 2-10 below show the increase or decrease within each precinct's hotspots the week after those spots were selected. Figure 1, titled 'MPD – All Stations,' represents the average increase or decrease within all hotspots across all nine precincts. On each of these charts, the numbers from 1 to 50 on the bottom axis represent the weeks of the year. This is due to the fact that they only had 50 meetings in 2018. For example, Week 1 is Jan. 1, 2018 through Jan. 7, 2018. The percentages represent the decrease (negative/green) or increase (positive/orange) of Blue C.R.U.S.H. crimes within the chosen hotspots one week after they were considered hotspots.

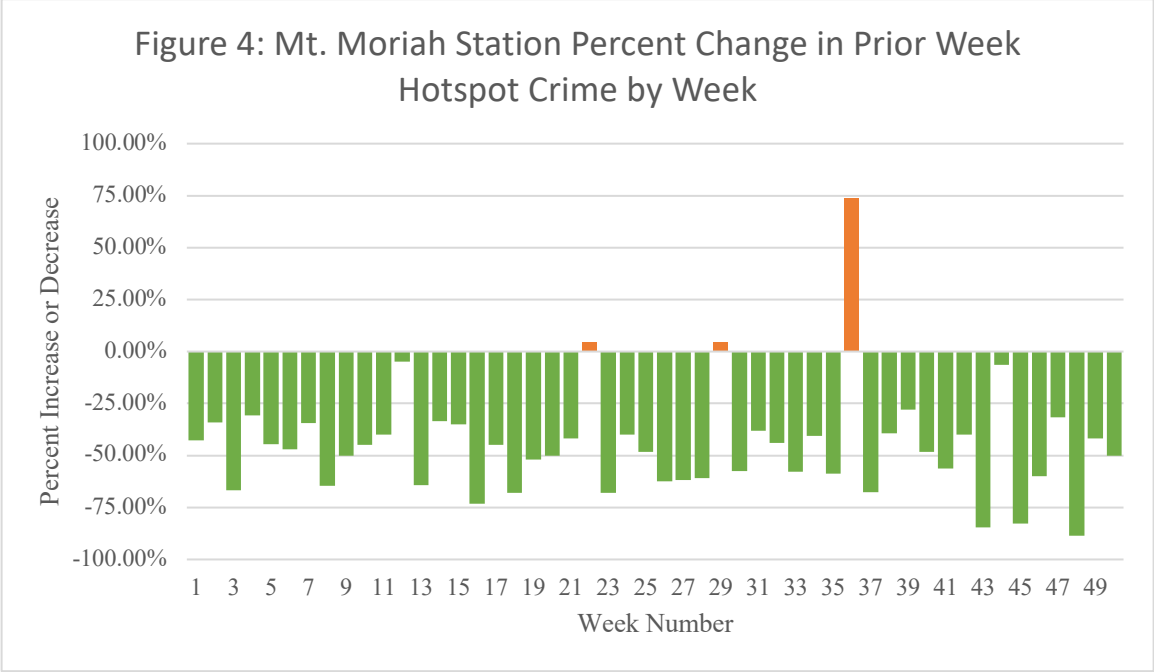


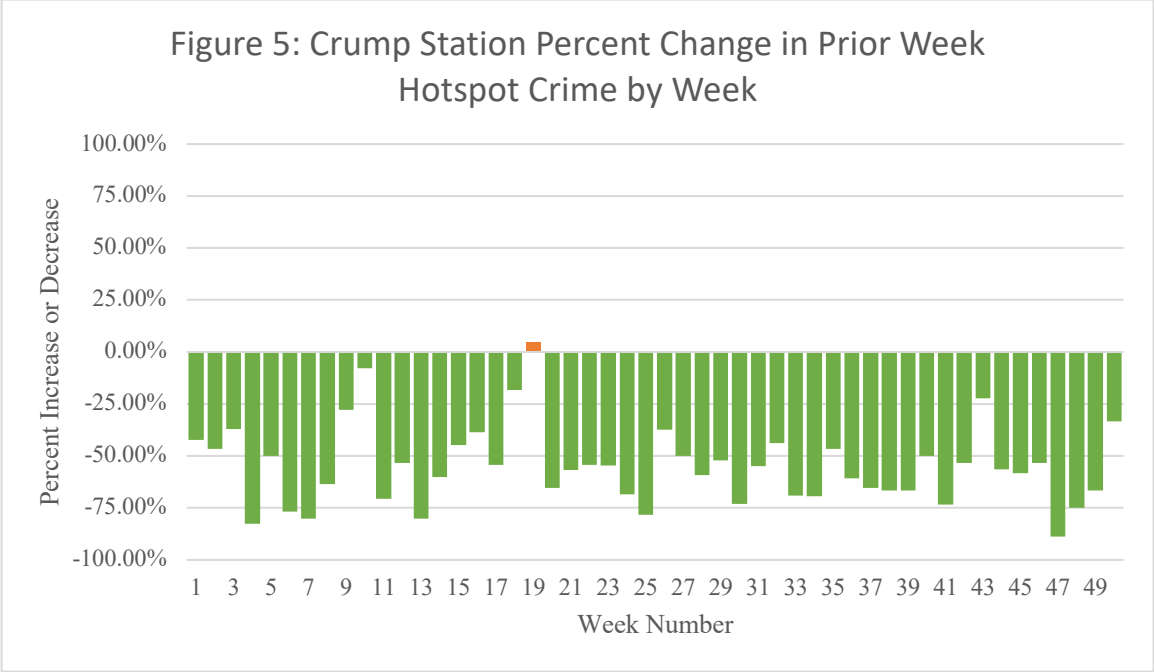


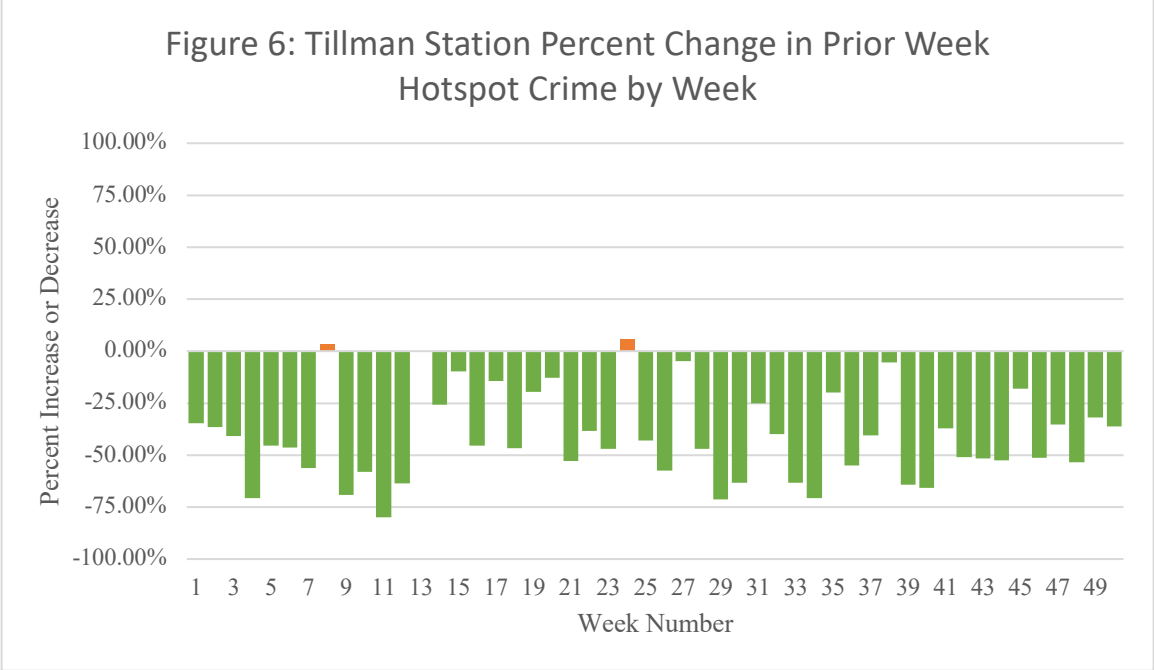
**Week 45 had a 0% change.*



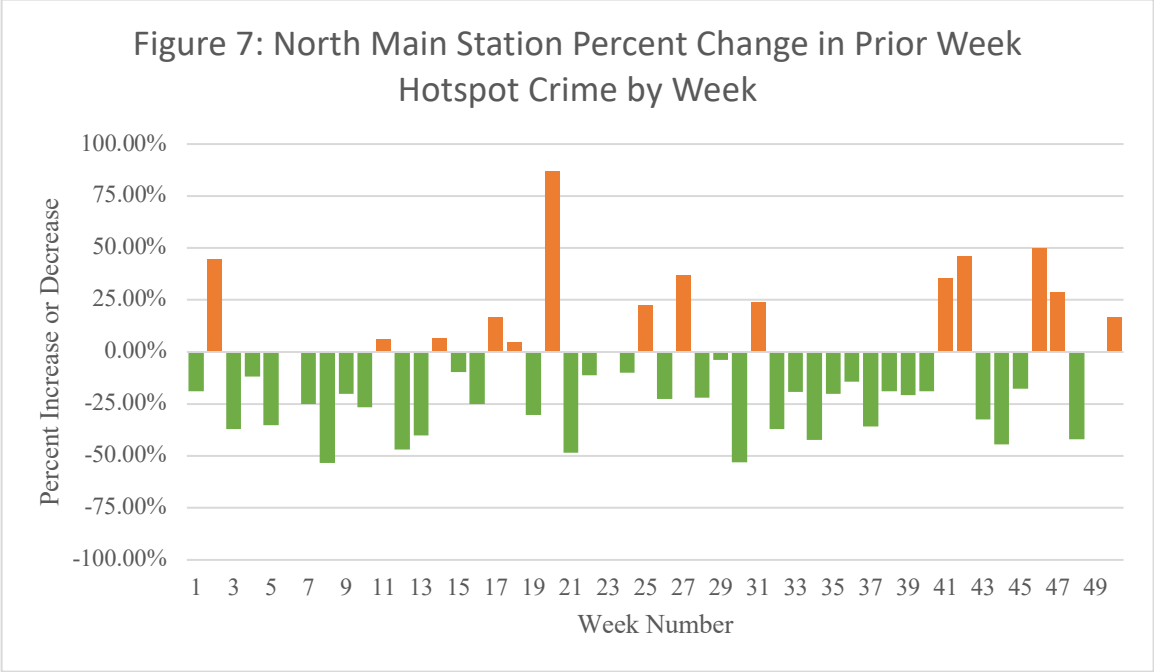
**Week 2, 10, 15, 24, 25 and 49 had a 0% change.*



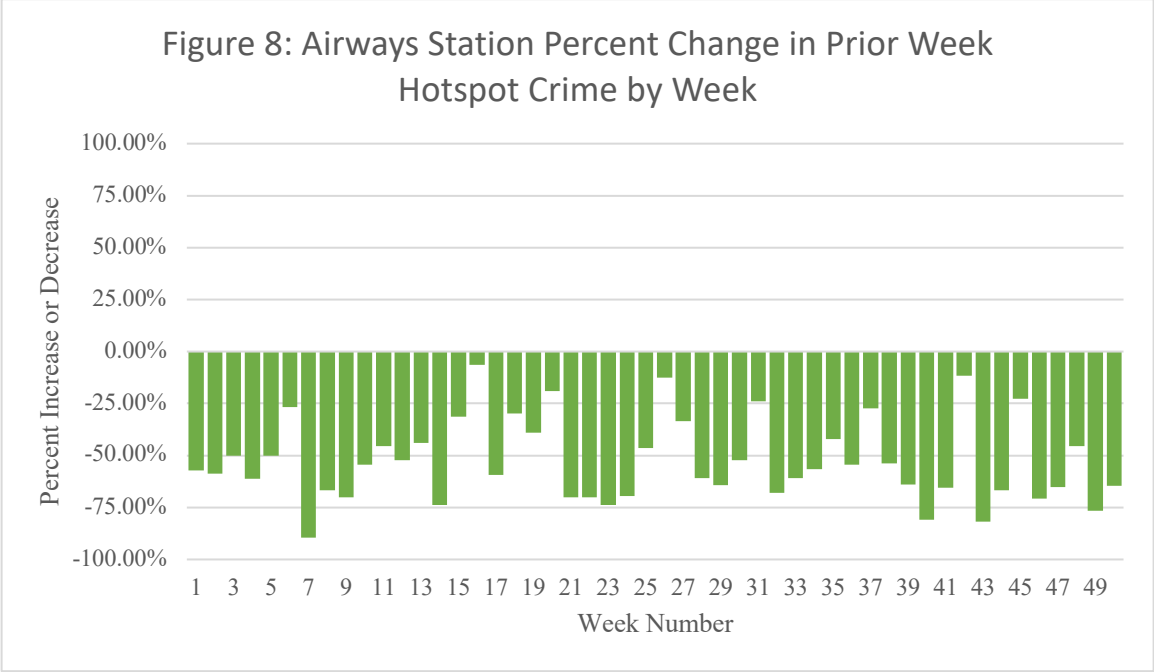


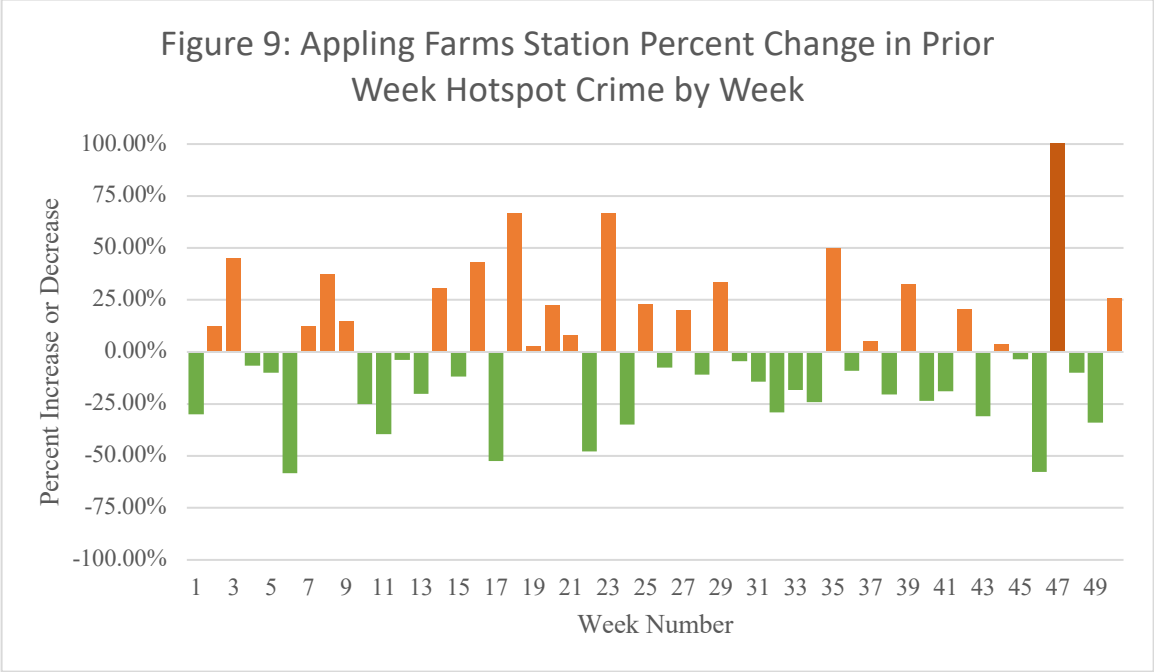


**Week 12 had a 0% change.*



**Week 6, 23 and 49 had a 0% change.*





**Note* – Week 47 has a darker line due the increase being higher than 100%.

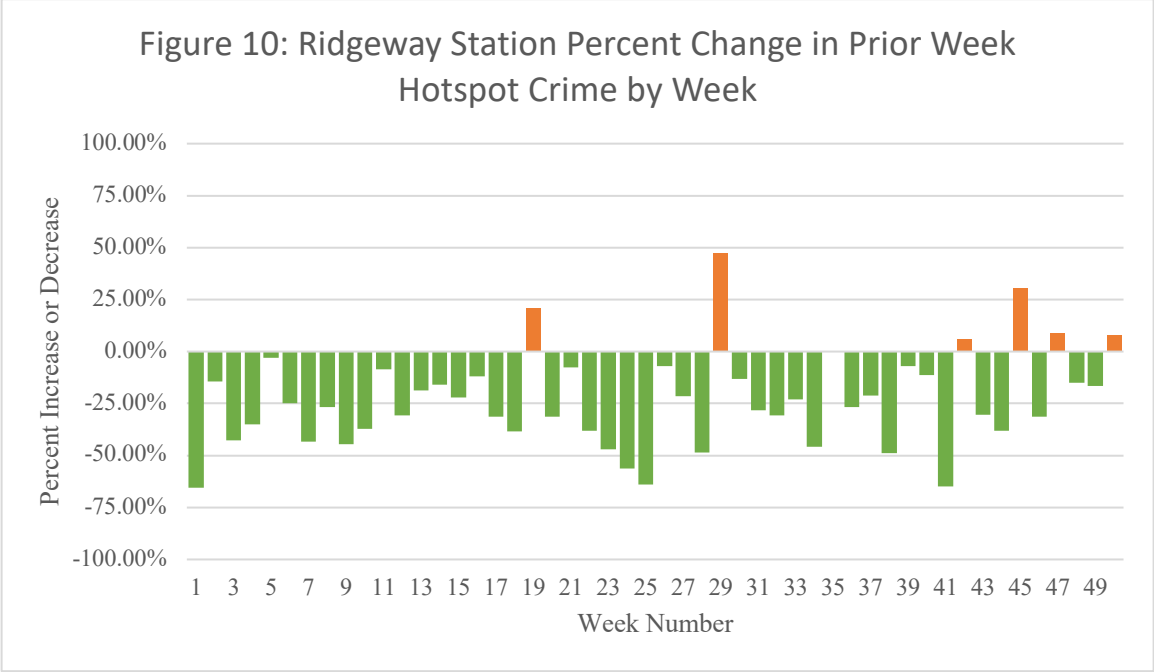


Table 1 shows the average number of weekly Blue C.R.U.S.H. offenses within hotspots the week that they are labeled hotspots, the average number of offenses the week after and the average of the change from week to week. *Citywide, MPD saw an average decrease of 84.78 crimes the week after labeling areas as hotspots*. The three precincts that had the highest decrease of crimes the week after were Tillman (-16.34), Crump (-12.80) and Old Allen (-12.38).

Table 1: Average Number of Weekly Blue C.R.U.S.H. Crimes in Hotspots & Weekly Change for 2018

Precinct	Week of Avg.	Week After Avg.	Weekly Change Avg.
Old Allen	21.98	9.6	-12.38
Raines	34.98	27.96	-7.02
Mt. Moriah	25.70	13.64	-12.06
Crump	23.02	10.22	-12.80
Tillman	38.14	21.80	-16.34
North Main	20.40	17.68	-2.72
Airways	20.88	9.74	-11.14
Appling Farms	35.44	33.92	-1.52
Ridgeway	32.70	23.90	-8.80
MPD	253.24	168.46	-84.78

Table 2 examines each precinct individually. The first two columns show the percent of weeks that had a decrease or increase in Blue C.R.U.S.H. offenses within hotspots and the last column shows the weekly average change of these offenses. Only one precinct [Airways] had a decrease in crimes every week within chosen hotspots. Four precincts [Old Allen, Mt. Moriah, Crump, & Tillman] had a decrease in crimes in over 90% of the weeks within their chosen hotspots. One precinct [Ridgeway] had a decrease in crimes in over 80% of the weeks. On average, the three highest percentage decreases in Blue C.R.U.S.H. offenses weekly were in Crump (-55.06%), Old Allen (-54.84%) and Airways (-52.80%). However, on a weekly average, Appling Farms saw a 3.64% increase. This can be

explained since, in Week 47, Appling Farms had a 263.64% increase (11 offenses to 40). (As noted above, Appling Farms had an average decrease of offenses weekly by 1.52 offenses.) *Citywide, MPD had a decrease in crime every week in hotspots and on average reduced Blue C.R.U.S.H. offenses in these hotspots by -32.99% weekly.*

Table 2: Reported Blue C.R.U.S.H. Crimes - Percentage of Weeks Reporting Decrease/Increase in Hotspot Areas and Average Percent Change for Year 2018

Precinct	% Decrease	% Increase	Weekly Change Avg.
Old Allen	98.00%	0.00%	-54.84%
Raines	72.00%	16.00%	-17.79%
Mt. Moriah	94.00%	6.00%	-44.92%
Crump	98.00%	2.00%	-55.06%
Tillman	94.00%	4.00%	-41.20%
North Main	66.00%	28.00%	-9.81%
Airways	100.00%	0.00%	-52.80%
Appling Farms	56.00%	44.00%	3.64%
Ridgeway	86.00%	12.00%	-23.35%
MPD	100.00%	0.00%	-32.99%

**Note - Some precincts do not equal 100% due to weeks having 0% change.*

As shown in Table 3, compared to 2017, three stations had fewer weeks where crime decreased in their chosen hotspots by a considerable amount, Raines (84.62% to 72.00%), North Main (73.09% to 66.00%) and Appling Farms (76.92% to 56.00%). Two precincts had a considerable increase in the percentage of weeks that crime in their chosen hotspots had decreased, Mt. Moriah (80.77% to 94.00%) and Ridgeway (76.92% to 86.00%).

Table 3: Reported Blue C.R.U.S.H. Crimes - Percentage of Weeks Reporting a Decrease in Hotspot Areas Comparison 2017 & 2018

Precinct	2017 % Decrease	2018 % Decrease
Old Allen	100.00%	98.00%
Raines	84.62%	72.00%
Mt. Moriah	80.77%	94.00%
Crump	96.15%	98.00%

Tillman	98.08%	94.00%
North Main	73.08%	66.00%
Airways	98.08%	100.00%
Appling Farms	76.92%	56.00%
Ridgeway	76.92%	86.00%
MPD	100.00%	100.00%

**Note - Some precincts do not equal 100% due to weeks having 0% change.*

As shown in Table 4, when comparing the average weekly percentage changes in Blue C.R.U.S.H. offenses compared to 2017, several precincts saw substantial changes. Regarding the percentage decrease of crimes in hotspots, the three highest improvements were Mt. Moriah (21.05%), Airways (11.34%) and Crump (10.95%). The three with the least improvement were Appling Farms (-20.67%), Raines (-13.80%) and North Main (-5.05%).

Table 4: Reported Blue C.R.U.S.H. Crimes - Average Weekly Percent Change of Blue C.R.U.S.H. Crimes in Hotspot Areas Comparison 2017 & 2018

Precinct	2017 Weekly Change Avg.	2018 Weekly Change Avg.
Old Allen	-55.74%	-54.84%
Raines	-31.59%	-17.79%
Mt. Moriah	-23.87%	-44.92%
Crump	-44.11%	-55.06%
Tillman	-43.73%	-41.20%
North Main	-14.86%	-9.81%
Airways	-41.46%	-52.80%
Appling Farms	-17.03%	3.64%
Ridgeway	-18.56%	-23.35%
MPD	-33.34%	-32.99%

Finally, in Table 5 we examine the difference between the yearly average decreases in the number of Blue C.R.U.S.H. offenses in hotspots, meaning the average change per week for the entire year. The only precinct that had a considerable change was Appling Farms (-8.17 in 2017 to -1.52 in 2018). *However, MPD as a whole saw a substantial change. In 2017 all nine precincts on*

average decreased Blue C.R.U.S.H. offenses by -10.09 in hotspots the week after. In 2018 that number jumps to decreasing these offenses by -84.78.

Table 5: Average Weekly Change of Blue C.R.U.S.H. Offenses Comparison for 2017 & 2018

Precinct	2017 Weekly Change Avg.	2018 Weekly Change Avg.
Old Allen	-13.13	-12.38
Raines	-10.12	-7.02
Mt. Moriah	-10.10	-12.06
Crump	-13.67	-12.8
Tillman	-14.85	-16.34
North Main	-4.10	-2.72
Airways	-9.79	-11.14
Applying Farms	-8.17	-1.52
Ridgeway	-6.92	-8.80
MPD	-10.09	-84.78

Hotspot Placement

A new addition to this analysis was the examination of hotspot placement by precinct leaders. As mentioned earlier in the assessment, precinct colonels are given the ability to decide which areas are hotspots based on information given to them by the data analysts. For this assessment two precincts were chosen to compare: Airways and Appling Farms. These two were chosen since Airways saw a decrease in Blue C.R.U.S.H. offenses every week after labeling an area a hotspot. Appling Farms was chosen because they were the precinct with the lowest percentage of weeks that had a decrease in Blue C.R.U.S.H. offenses (56.00%) in 2018.

Figures 11 and 12 show an overlay map of Airways precinct [Figure 11] and Appling Farms [Figure 12] hotspot locations for the 2018 calendar year. As shown from Figure 11, Airways would adjust their hotspots throughout the year, meaning, that while there are certain areas in which it focused, it was also adding and changing locations around its concentrated hotspots. Appling Farms on the other hand, focused primarily on four locations and would rarely make

any adjustments to its hotspot locations. In that Airways was able to decrease Blue C.R.U.S.H. offenses every week and Appling Farms was only able to decrease these offenses slightly over half of the year, it would appear that migrating hotspots throughout the year is more effective to combating these offenses.

Figure 11: Airways Precinct Overlay Map of Hotspot Locations in 2018

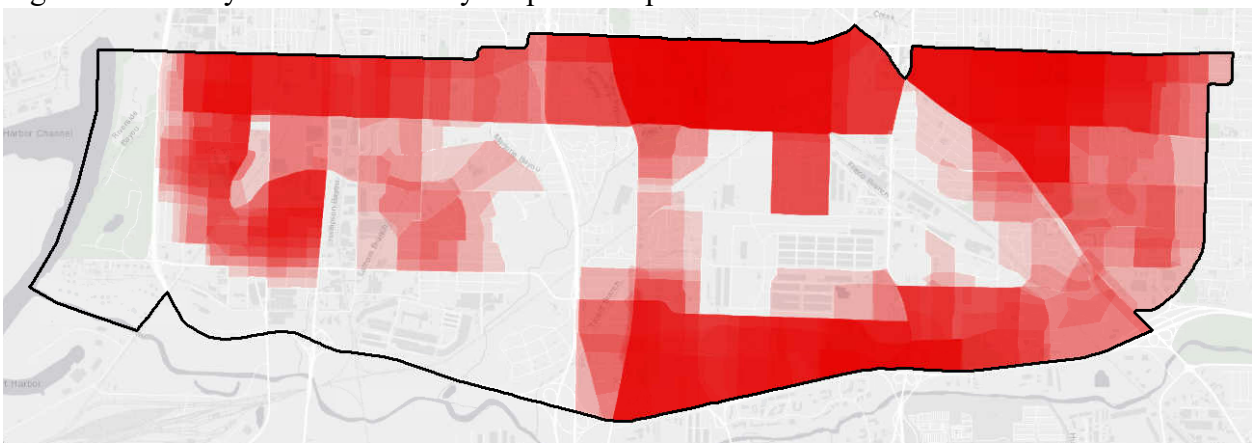
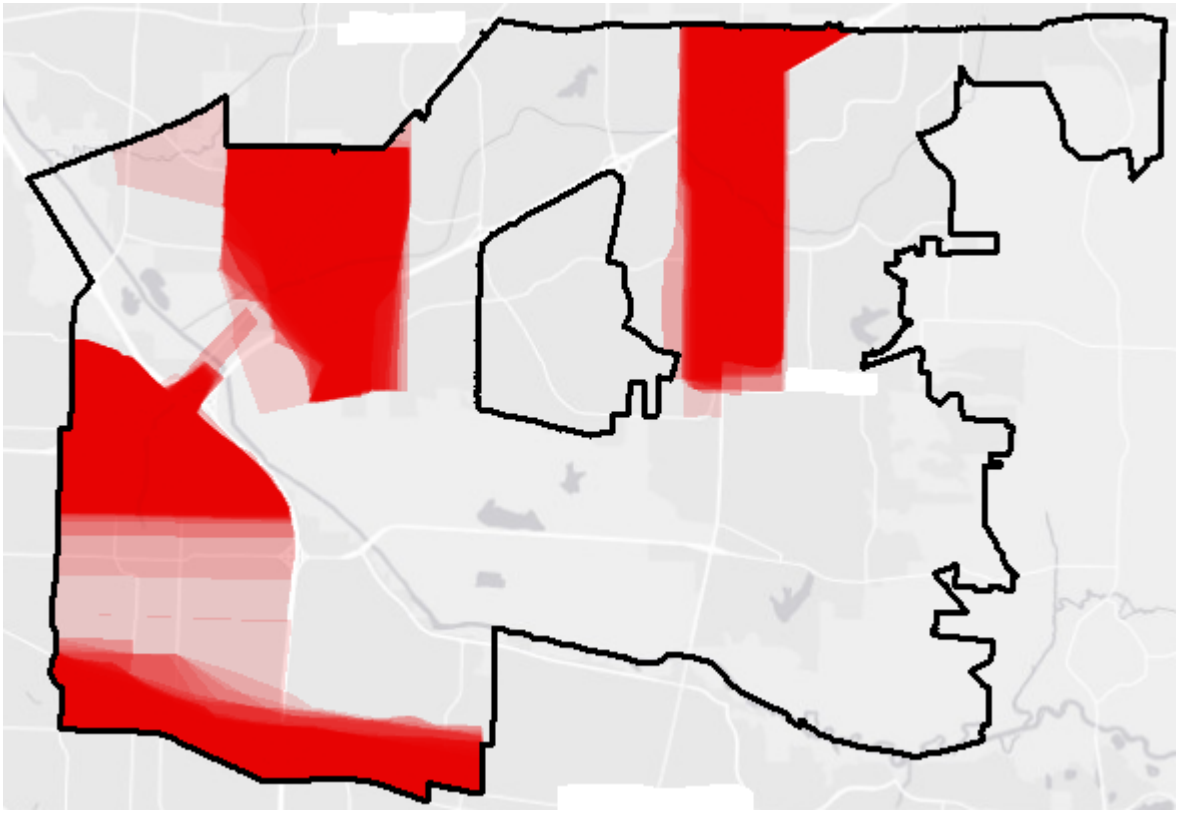


Figure 12: Appling Farms Precinct Overlay Map of Hotspot Locations in 2018



CONCLUSIONS AND RECOMMENDATIONS

Based on data analysis, reviewing the TRAC process and numerous interviews with MPD officials, the PSI provides the following conclusions:

1) MPD command staff and the precinct colonels and their staff appear to be data-driven in their hotspot area selections. The use of this data-driven approach seems to be beneficial to the precincts with an immediate, short-term impact on the level of crime within identified precinct hotspots. However, we cannot confirm what specific additional resources or officer precinct leaders were deployed to those hotspots.

2) During 2018, reported Blue C.R.U.S.H. crimes decreased weekly within precinct hotspots consistently, with the exception of one precinct (Appling Farms). Most precincts saw a consistent decrease of Blue C.R.U.S.H. offenses the immediate week after labeling an area as a hotspot. One precinct [Airways] had

a decrease every week, four precincts [Old Allen, Mt. Moriah, Crump and Tillman had decreases in over 90% of the weeks and one [Ridgeway] had decreases in over 80% of the weeks. Citywide, crime decreased within MPD hotspots every single week over 50 weeks in 2018.

3) Weekly averages in the number of reported Blue C.R.U.S.H. crimes in designated hotspots decreased in every precinct the following week. Tillman had the highest average decrease at -16.34 crimes. Old Allen, Mt. Moriah and Crump all had decreases of more than 12 crimes (-12.38, -12.06 and -12.80 respectively). Airways had a decrease of more than 11 crimes (-11.14) citywide, and the average number of crimes decreased by more than 84 during the weeks after the hotspots were identified.

The PSI has the following four recommendations:

1) Predictive Models

Allocation of resources based on identification of a hotspot is a reactive model to combat crime numbers. The precinct commanders examine all crimes that have happened within a four-week period. It could be beneficial if MPD used more of a predictive model in an attempt to determine where crime may happen next. Such a predictive analytics model would be a massive undertaking for MPD and the RTCC, but it could have a more significant impact on crime.

2) Hotspot Boundaries

Currently, crime analysts create the maps for each precinct that show where crimes are occurring, and the precinct commanders determine the hotspot boundaries. Crime analysts could convert these crimes into a weighted sample and develop a heat map. This heat map could be used as a tool for precinct commanders to narrow down their hotspot boundaries. Several of the weeks during which precincts experienced increases in hotspot crimes could have been the result of the hotspot being too broad. Providing more narrow hotspots would give officers a more precise area on which to focus.

3) Further Training for Crime Analysts

MPD should focus on giving additional training for their crime analysts. Currently, it appears that these analysts do not perform any in-depth analysis of the crimes for the precincts they are assigned. Currently, they provide each precinct colonel with a map and raw numbers of reported Blue C.R.U.S.H. crimes within his or her precinct. It would be beneficial for not only the RTCC but MPD as a whole if their crime analysts were given further training in order to perform a deeper analysis of these crimes, for example, being able to account for area population and per capita rates rather than just the use of raw numbers.

4) There should be a higher accountability for colonels and their precinct leaders regarding reducing crime. While most precincts did decrease significantly the number of crimes the next week, several precincts did not match or surpass the decrease they had in 2017. Overall, while there may be times that crimes surge, there should be a decrease in crimes in those precincts each week in their selected hotspots.

LIMITATIONS

Data analyses may have been impacted by the change of PowerPoint layouts later in the 2018 year. Some precincts did not include the "Last Week Hotspots" section that states how many crimes happened in those areas. In some weeks, some precincts did not include the previous week's hotspots. To address these omissions, data were provided by MPD and manually counted to determine the percentage change in reported Blue C.R.U.S.H. crimes within those impacted hotspots. This assessment did not analyze the data to determine the degree to which crime reductions in hotspot areas were sustainable over time given MPD's current resources. In addition, the assessment focused only on calendar year 2018.

Another limitation is long term effectiveness of hotspots was not measured. A precinct may see a decrease in a hotspot location causing the precinct to move the hotspot to another location, only to see Blue C.R.U.S.H. offenses increase in the original hotspot location. There is also the fact that precinct colonels select

the areas and each colonel may have a different way of determining the size of their hotspots. For example, one colonel may take the approach of choosing smaller areas where they can easily increase their resources while another may choose a larger area to encompass more crime.

The weekly average decline for precincts does not account for factors such as crime displacement (crime decreases in one area because it moves to another area). However, this inquiry does seem to indicate that MPD's approach to target certain crimes in specific areas is having an impact on those crimes, at least for one week. It is possible that in the absence of factors such as personnel shortages and major events (such as protests) pulling resources within a precinct, these weekly changes could even have been greater.

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