Reducing Violent Crime in Minneapolis

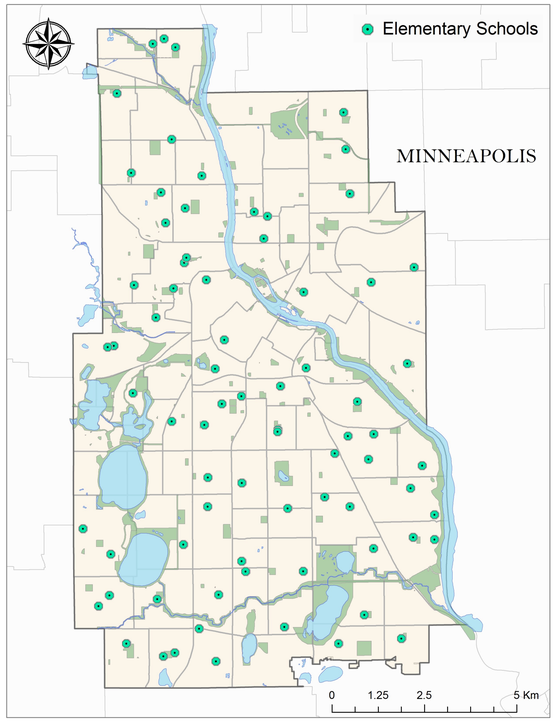
Identifying Elementary Schools for Violence Prevention Program Implementation

Background

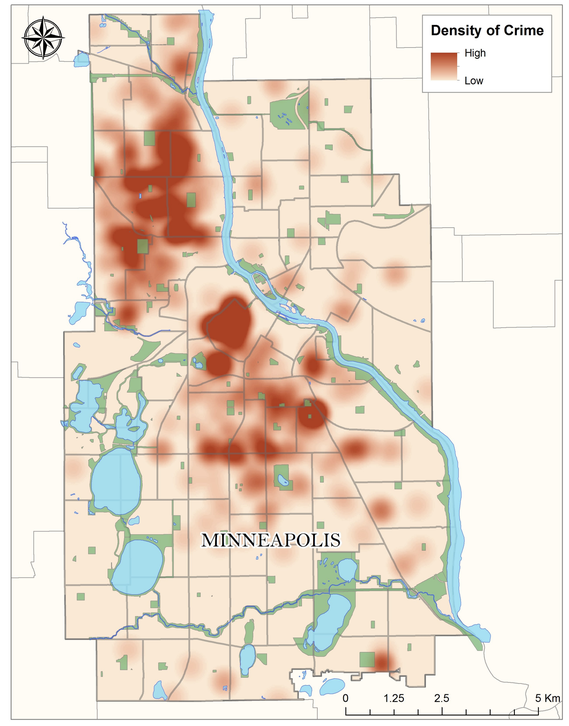
The incidence of violent crime in Minneapolis has continued to rise over the years, particularly among youth. The city considers this a serious threat to public safety and public health and is actively calling for more initiatives that focus on violence prevention while simultaneously building leadership skills among the city's youth. One means of accomplishing this is through school-based violence prevention programs.[1] School environments provide an easy way to reach a large number of at-risk youth and serve as a safe place for teaching strategies to reduce aggressive behavior. Furthermore, exposure to trauma early in life has been shown to be a predictor of chronic disease later in life. The Centers for Disease Control and Prevention reports that participation in such programs can result in decreased rates of arrest, reduction in aggressive behavior, and improved social skills.[2] These programs are an opportunity for changing societal behavior and should be therefore be implemented in schools located in areas of high crime intensity. The goal of this project is to identify the elementary schools which fall within these parameters .

Methods

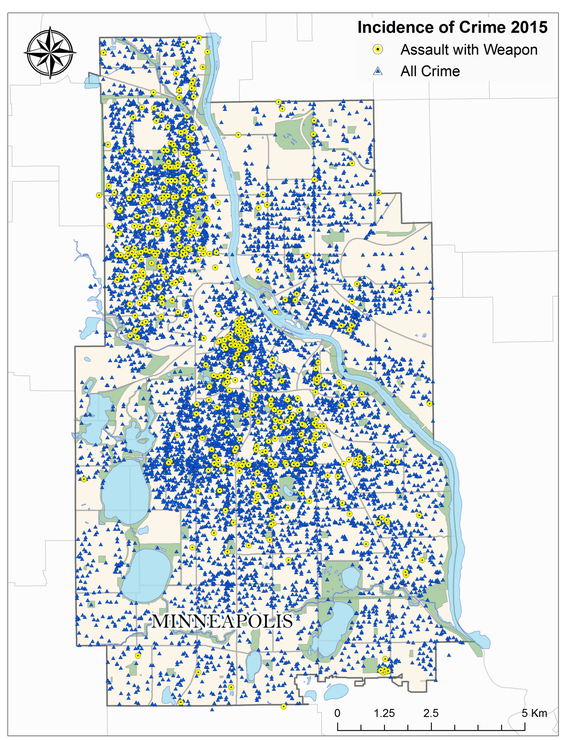
To begin, two feature layers were mapped within the city limits of Minneapolis, Minnesota: "Police Incidents 2015" and "Elementary Schools". As the police incidents dataset includes crimes of all offenses, those classified as "Assault with a dangerous weapon" needed to be distinguished from all incidents. The Select by Attribute tool was used to identify crimes according to offense and a new data layer was created from selected items; afterwards, a kernel density analysis was performed using a 500 meter radius and a cell size of 30 to display the distribution of these new data across the city using a stretched symbology. Finally, the reclassify tool was used to redefine the raster data layer, and a maximum of five ranges was chosen to represent the intensities of crime via zones. Using natural breaks and retaining the original calculated raster statistics, a red to green color scheme was applied to easily distinguish areas of most intense crime (red), dispersing into areas of lower crime intensity (green).



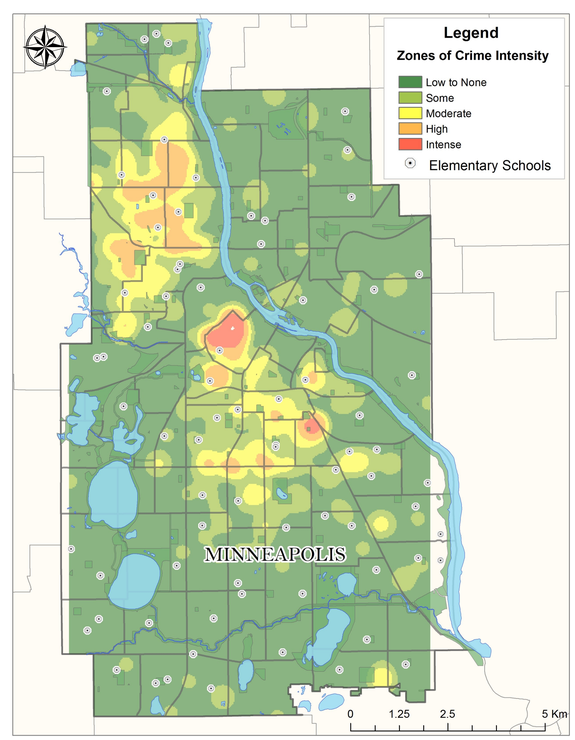
All Elementary Schools in Minneapolis, Minnesota (2015)



Density of Violent Crime in Minneapolis, Minnesota (2015)



Proportion of Violent Crime to All Crime in Minneapolis, Minnesota (2015)



Heat Map of Violent Crimes in Minneapolis, Minnesota (2015)

Discussion

Using a kernel density model was a good choice to demonstrate the varying degrees of intensity of violent crime and their locations across the city of Minneapolis. Reclassifying this density surface into a readable scale also helps the reader more easily understand the situation being presented. Mapping the elementary school data layer on top of these heat zones presents a clear picture of which schools are in closest proximity to areas of high crime, and may therefore be good candidates for having a violence prevention program implemented into their schools. One limitation of this model to consider is that these crimes were mapped only within the city boundaries of Minneapolis, which could potentially pose a problem of omission. Clipping the raster layer to within city limits may omit incidents of crime that took place on or over the border of adjacent cities. This may cause certain parts of Minneapolis to appear more or less safe than they are in reality. Another potential issue to take into account is that students who go to schools in zones with higher crime rates may not walk to school or live nearby these hot spots of crime; therefore, the students' actual exposure to crime is unclear. The data suggest that no schools fall directly into areas of "Intense" crime, but several fall into the category of "High" crime. Overall, depending on available funding, it is reasonable to conclude that elementary schools that fall in "high" and "moderate" crime zones should be considered to receive funding for violence prevention programming.

Sources

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Map Projection: Minnesota State Plane Projection

Data Sources: Water, September 2015, Minneapolis Open Data; Parks, September 2015, Minneapolis Open Data; City Boundary, October 2015, Minneapolis Open Data; Neighborhood, September 2015, Minneapolis Open Data

Citations:

Police Incidents 2015, September 2015, City of Minneapolis, published by Minneapolis Open Data; Accessed November 16, 2015

Elementary Schools, U.S. Businesses, September 2015, ReferenceUSA; published by InfoGroup; Accessed November 16, 2015

References:

1. UNITY: Urban Networks to Increase Thriving Youth 2011, Fact Sheet - Public Health Contributions to Preventing Violence, Oakland, CA. Accessible at www.nola.gov
1. Hahn et al., 2007. The effectiveness of universal school-based programs for the prevention of violent and aggressive behavior. Recommendations and Reports. The Center For Disease Control and Prevention. 56(rr07);1-12

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