Comparing Hotspots of Residential Theft to SIUC Student Perceptions in Carbondale, Illinois

Andrew Sirota & Gavin Gordon Southern Illinois University Carbondale Department of Geography and Environmental Resources

Abstract

The purpose of this study is to find how crime, specifically theft and burglary, is spatially distributed in the city of Carbondale, Illinois. In addition, we wanted to understand students' spatial perceptions of crime in Carbondale. We used point densities to determine areas that are at high risk of residential theft. Surveys of Carbondale residents revealed their perceptions of crime patterns. By analyzing the areas of high risk and perceived crime, we were able to make a comparison. This comparison of actual crime patterns to students' perceptions allowed us to identify any common misconceptions of spatial patterns of crime in Carbondale, Illinois.

Introduction

Theft is one of the most significant crimes in Carbondale, Illinois. Theft can occur anywhere, it is difficult to track, and it is difficult to prevent. By using Geographic Information Systems (GIS) to map the incidents with greater accuracy, more crime data can be obtained and analyzed which can aid prevention of crime. Geographic crime research includes many different mapping and analysis methods. Criminal analysts using GIS technology have been able to map crime and understand the who, what, where, when, why, and how of crime. This project seeks to answer some of those questions about burglary. Our aim in the project was to locate where the hotspots of residential theft in Carbondale occurred, and compare these locations to areas where people perceive residential theft to be the most prevalent. This comparison will be accomplished through the use of point data and surveys.

Methodology

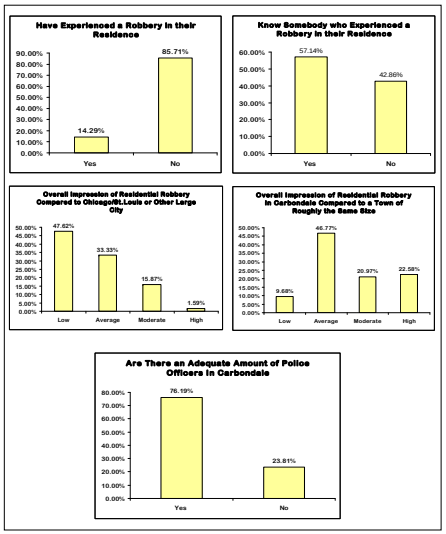
The crime data used in this project were received from the Carbondale Police Department in Excel spreadsheet format. The data set contained 2,900 records describing general theft crimes from the years 2004 through 2006. A data set this large was not conducive to our analytical approach, so the data set was narrowed to contain only points from the year 2006 and did not include occurrences of theft from motor vehicles. This Excel file was converted to a database format and was geocoded using ArcMap 9.2.

The final data set that was used contained 654 points and a census block of Carbondale was used as the base map. We interpreted the distribution of these points using tools in ArcMap 9.2. Using the spatial analyst tool, a density interpretation (Figure 1) was performed producing a raster representation of the different point densities. We then performed a geostatistical method of Kriging. By using this method we were able to produce a general prediction map of crime hotspots (Figure 2). The hotspots allow us to understand where the areas of highest risk of residential crime in Carbondale are located.

The second part of this study was to examine people's preconceived notions of crime and crime location in Carbondale to compare to our analysis. This was accomplished with the use of a pilot survey. We surveyed 63 SIUC students. The survey consisted of five questions and a map of Carbondale for the students to mark the locations where they perceived crime to occur.

We divided the map of Carbondale into 35 one inch by one inch numbered sections. These sections were then used to record where the students perceived crime locations. On some surveys student markings crossed multiple cells and some only used one cell. Based on the illustrated grid data we were then able to digitize these cells in ArcMap 9.2 (Figure 3). Point density was then compared to these digitized cells (Figure 4).

Results



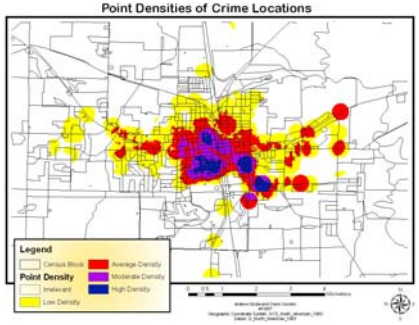


Figure #1- Point density of reported residential theft in Carbondale, IL.

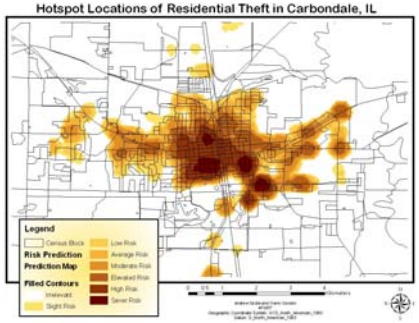


Figure #2- Hotspot location of reported residential theft in Carbondale, IL.

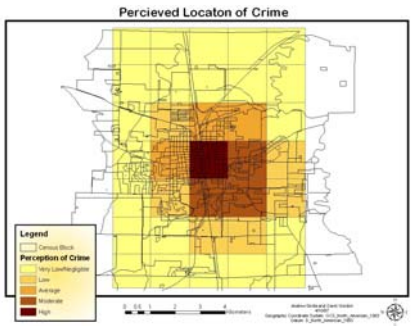


Figure #3- Areas perceived as having high crime in Carbondale, IL.

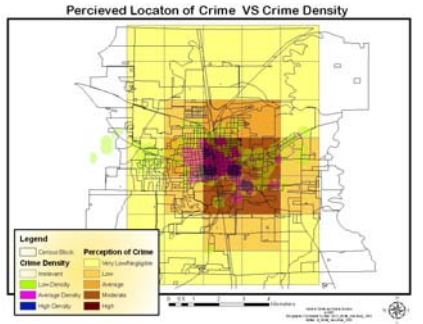


Figure #4- Point density of reported residential theft compared to areas perceived as having high crime in Carbondale, IL.

Conclusion

Results indicate that reported residential theft is most likely to occur towards the center of Carbondale. The areas of crime that are the highest risk occur in close proximity to West College Street, East College Street, and Grand Avenue.

Both East and West College Street fell in the area that students perceived to have the highest amount of crime and Grand Avenue fell in an area that was perceived to have the second highest amount of crime. The survey indicated that the students had an accurate perception of location of crime in Carbondale. A majority of students knew someone who had experienced a residential theft, but had not experienced one themselves. The students perceived that Carbondale has an average amount of theft compared to a town of the same size and a low amount of theft compared to a town of larger size. Students believe that there is an adequate amount of police officers in Carbondale.

Some of the limitations in this study include the pilot survey and the data. The survey could have encompassed more students and non-student residents. A second round of surveys could have included more specific questions. Quantitative data at the ratio/interval scale would have made it possible to perform more rigorous methods of spatial analysis.

Acknowledgments

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