

A Geospatial Analysis of Surrey's low-income Districts
Crime, Social Services, Gentrification, and Flooding

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Abstract

Surrey is a notably fast growing municipality in British Columbia. The ethnocultural diversity, rapidly growing population, and ubiquitous urban development, amongst other factors, all contribute to Surrey's unique social geography. Surrey is also known to face a number of social issues including low income and high crime rates, and this is problematic. This report is concerned with notable social-geographical issues, exploring relationships and risks across the various districts of Surrey, BC as a means to provide a geographic framework to tackle the issues. The geographical approach allows for spatial related solutions to be implemented. Close relationships between crime, income, and social services were found through geospatial analysis, as well as zones of risk in low-income districts of Surrey, including flood plains and future areas of gentrification.

Introduction

This report will discuss the methodology, and findings of a geospatial data analysis on low-income districts within Surrey, British Columbia- relating to the attached map. The findings are indicative of the geographical issues that press the low-income districts in Surrey, pertaining to: crime, gentrification, flooding, and what is currently being done to solve such issues. This report will suggest other solutions to these issues, using conclusions from this analysis combined with outside research.

Data and Methods

Using ArcMap 10.5 and numerous datasets acquired from the City of Surrey's Open Catalogue, a geospatial analysis was conducted. Two datasets, namely the median household income, and criminal code offences per 1,000 residents, were provided as excel documents; then were divided based on the six townships within the City of Surrey (Table 1). The remaining datasets were in the form of geodatabase files (.gdb) and are listed in Table 2. The summarized data from Table 1 was imported into ArcMap and values were

joined to the Federal Electoral District database based on township name to get the desired output. The Census 2016 dataset had Fleetwood and Guildford as a single entity, so a geometric mean based on data from both towns was taken and used. It should be noted that the census and low cost & free resource geodatabases used are based on 2016 data, however data listed in Table 1 is from 2011 as it was most accessible at the time of our analysis. A brief summary of our project is shown below (Figure 1).

Table 1 - Summary of values based on the township.

Township	Median Household Income (\$)	Criminal code offences per 1,000 residents
Whalley/Surrey City Centre	49,470	163.5
Newton	61,210	90.5
Fleetwood + Guildford	64,845	67.8
South Surrey	67,866	58.3
Cloverdale	73,376	52.3

Table 2 - .gdb files used to create the project.

Geodatabase Files
Surrey geography (UTM) Census data from 2016
Low Cost & Free Resources available within township
Expected extent of 200 year Flood Plain

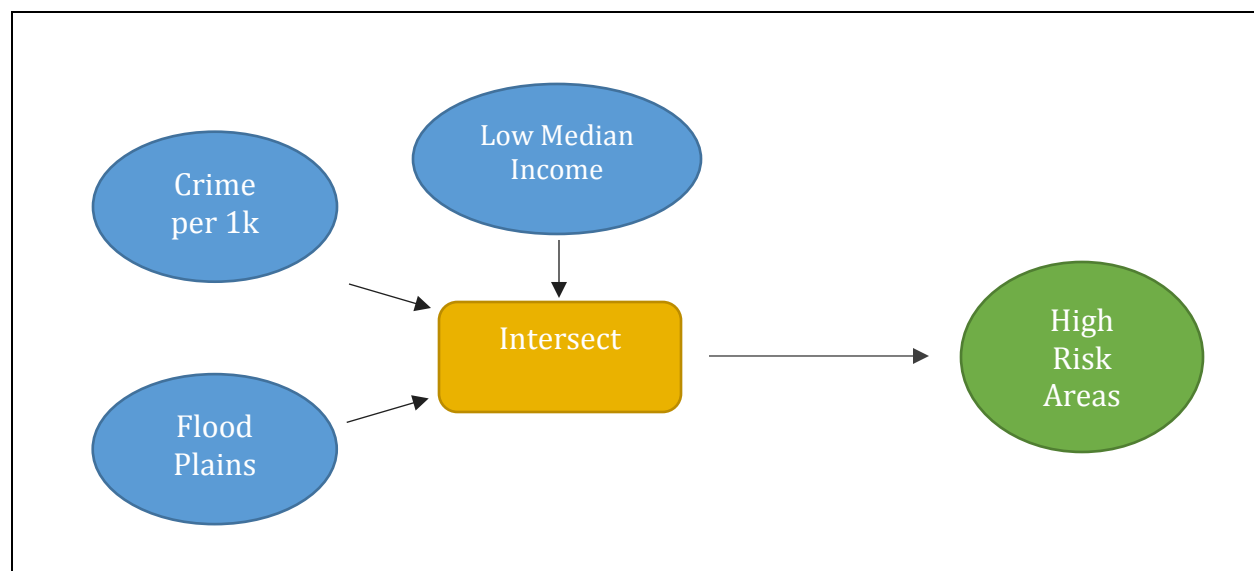


Figure 1: Data Model

Results and Discussion

Crime

Conducting a geospatial analysis on the geography of low income areas revealed that there is an inverse relationship between median household income and crime (Figure 3). This inverse relationship is indicative of the social issues that Surrey's low-income areas are facing.

A major issue in Surrey is crime, which is reducing the overall livability. Importantly, the primary offence in Surrey is property crime¹. The motives of property crime are usually theft; thieves are stealing because they lack the resources to survive in their current position. This positive feedback loop is creating a larger problem for Surrey today. A geographical analysis is vital here, see Figure 2. This crime rate map can be used to help pinpoint the areas that require direct support.

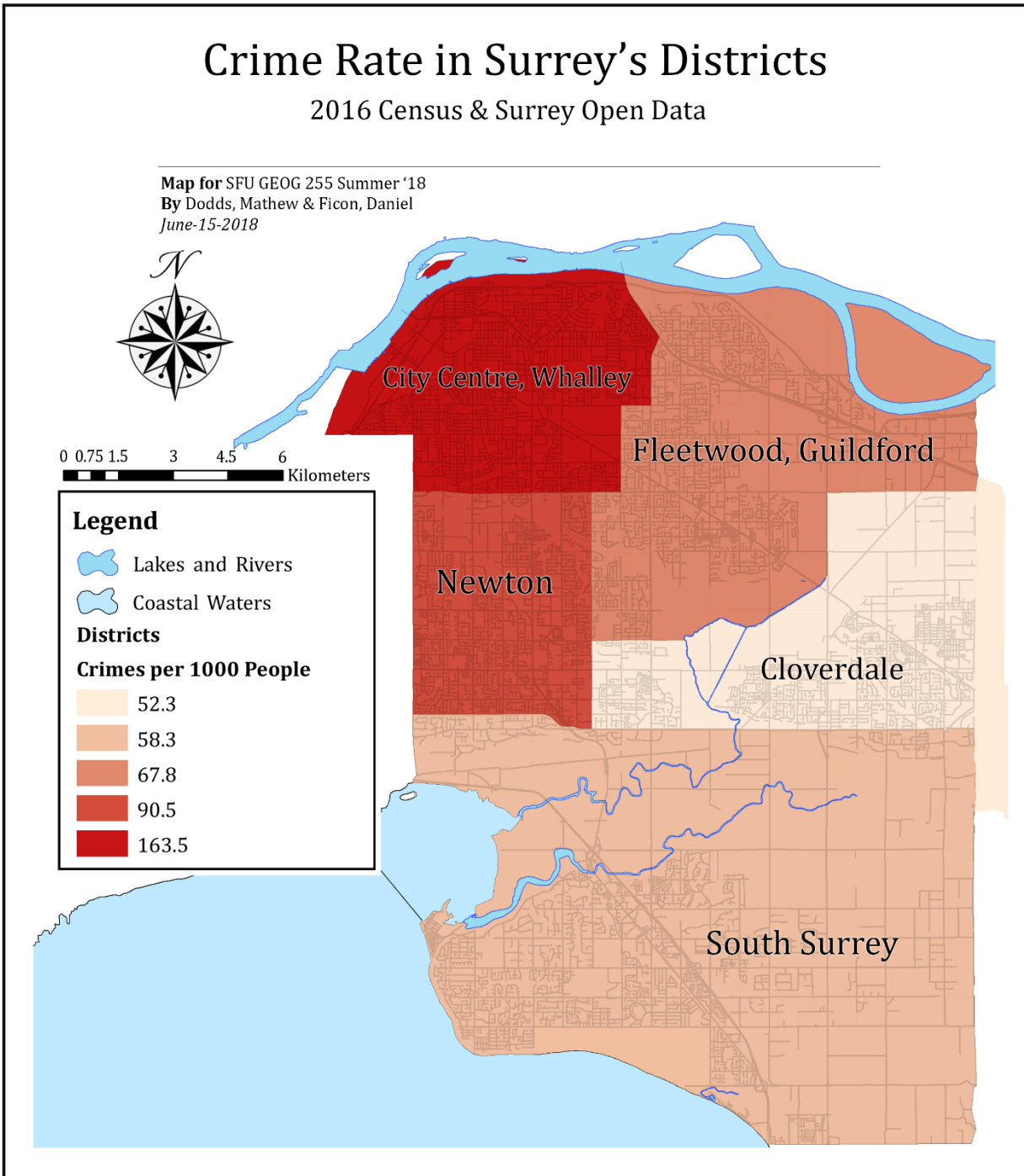


Figure 2

Social Services

The city of Surrey appears to be committed to providing services. Referring to the attached map, you can see this in effect. Implementations of early childhood counselling, family social services, debt counselling and more, should be on the rise in the lower income areas. There is a positive relationship between low cost and free resources which are available to the community, and income (Figure 3).

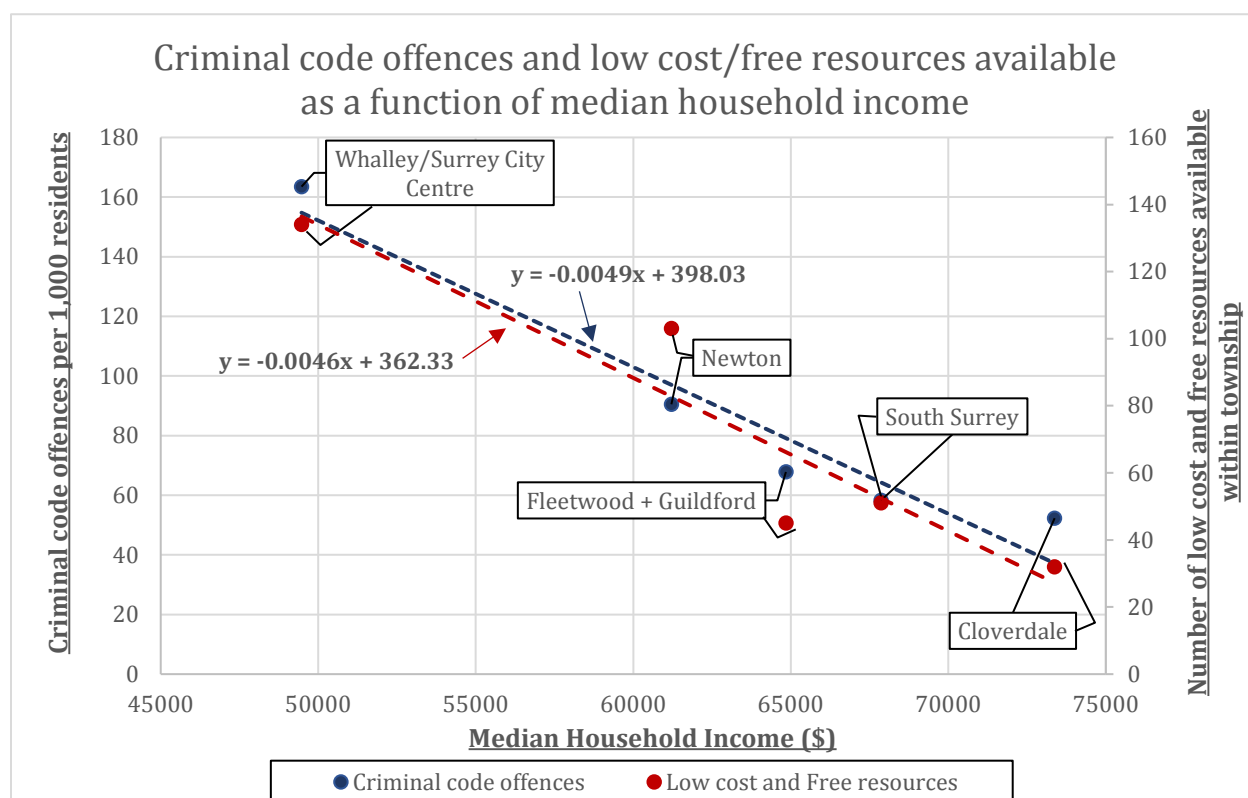


Figure 3

Performing a union operation between the low cost and free resource geodatabase and the districts allowed us to create a useful summary table (Table 3). This table is important, because it demonstrates the work that Surrey is already doing to improve these areas.

Table 3 - Summary of resources available within each town.

Township	Number of low cost and free resources available
Whalley/Surrey City Centre	134
Newton	103
Fleetwood + Guildford	45
South Surrey	51
Cloverdale	32

Gentrification

In the attached map, planned development zones are shown. These areas are designated, as per city by-laws, to be developed with the help of direct tax allocation. This means there will be direct funding from the City of Surrey, in cooperation with businesses, to develop these areas to a high standard of aesthetic and livability.¹ This is a notion of gentrification, which will likely be troubling for low-income families. The main focus area for the city is in the low-income neighbourhood of Surrey City Centre/ Whalley², which increases the inimical effect of gentrification.

Flood Plains

Included in the attached map are 200 year flood plains. Low income areas are at greater risk to the adversities of a flood – due to the constituents' inability to move, or afford safe measures to protect their homes. In the North West of City Centre/Whalley, there is a flood plain that will effect many residential areas. This is a problem pressing the

¹ Downtown Surrey Business Improvement Association. 2018. Downtown Surrey: City of the 21st Century. <http://downtownsurreybia.com/>.

² Ibid.

low-income areas of Surrey. This analysis can help planners develop a prioritized migration plan for the flood-risk zone in the City (with priority for low-income districts).

Conclusion

This analysis acts as an excellent tool for city planners and NGO's locating high-risk zones in the low-income districts of Surrey, to provide support for the constituents affected. In finding the propinquity of services/support, high-risk zones, intersectional areas of vulnerability, and migration plans for flooding, planners absolutely require their geolocations and a related geospatial analysis for further extrapolation. This report and the attached map, thus serve as vital tools in this process. Using arcMap, Excel, and Open Data catalogues, we were able to provide an extensive geospatial analysis of Surrey's low-income districts.

Works Cited

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