Walking Distance to Elementary Schools in Urban Prince George

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Abstract

The school district of Prince George, School District 57, made dramatic changes to school zones in 2004. Many schools were closed and many school zones were expanded - resulting in many parents who were concerened that their children now had to walk too far to go to school. But how far do the children really have to walk in each school zone?

Introduction

School District 57 currently has 15,716 students in 11 secondary schools and 37 elementary schools. Each school has a "catchment zone" that dictates which students should register with the school. So even if a student lives a short distance from an elementary school, they might have to register with a different school that is further from their home.

Although there are 37 elementary schools within the district, for this project we will only consider 15 schools in the Bowl and College Heights areas of Prince George. These schools are considered "urban" by most residents of Prince George. The schools are as follows: Carney Hill, Central Fort George, College Heights, Foothills, Harwin, Heritage, Malaspina, Peden Hill, Pinewood, Quinson, Ron Brent, Southridge, Spruceland, Van Bien, and Westwood.

Data Source

Data required for this project (and were provided for me) include a map of prince george, with roads, rivers and the city limits boundary. Data that was not available to me, but was necessary for this project included school zone polygons and elementary school points. This data had to entered manually into ArcMap, using the School District's website as a guide.

Data Manipulation

The first step in this project was to crop the roads layer and the rivers layer to the city limits of Prince George layer. From here, I had a blank canvas on which to draw the elementary schools and school zones by hand. I found the locations of each by visiting School District 57's website and viewing the sketch of each school zone, and then finding the correct location on my map and creating polygons and points. In order to properly analyze each school zone, I had to create each school zone in a separate layer, as well as each school in a separate layer - that's a lot of layers!

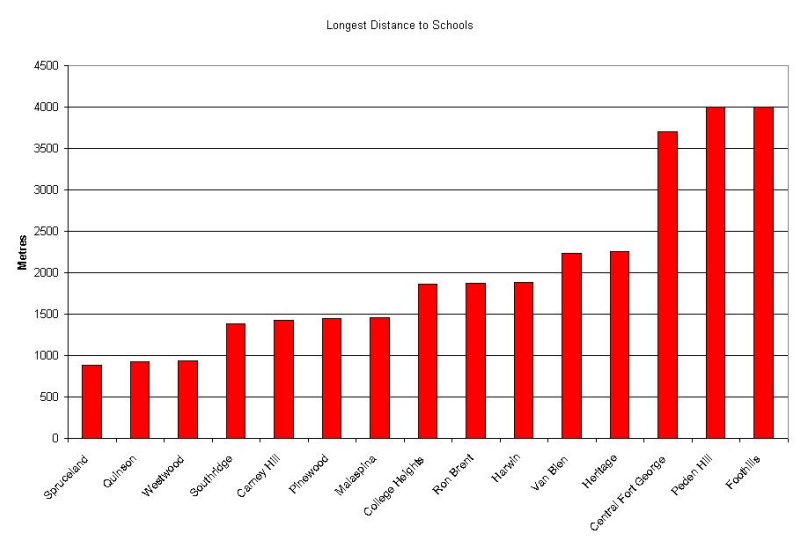
Spatial Analysis Methods

In order to find out how far families live from the elementary school in each school zone, I used the Spatial Analyst --> Distance --> Straight Line tool that produces a raster output showing distances to schools. In order to produce these rasters, I had to set the analysis mask and exent to the specific school zone I was working on, choose the school contained within that school zone as the "Distance To" point, and also set the Maximium Distance to 4000m, as children who live beyond 4km from a school are bussed to school by the district.

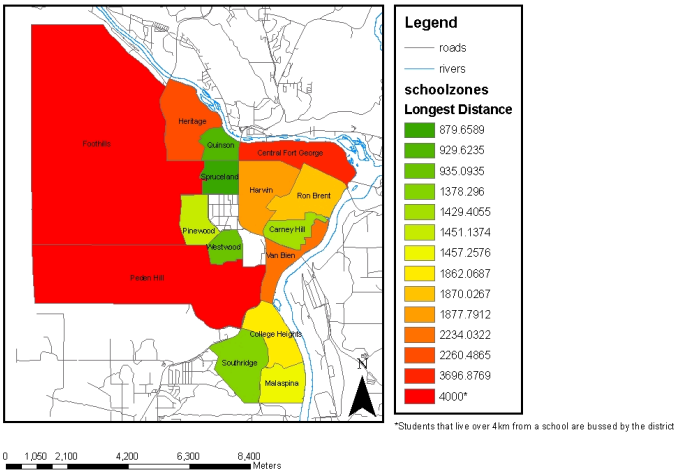
After I had performed all of the Straight Line operations on each school in the district, I was able to create a layer that contained all of the school zones in the district, as well as a layer that contained all of the elementary school zones in the district. This significantly cut down on the number of layers contained in my project.

Once I had the distance to the schools from within the school districts, I recorded the longest distance a child would have to walk in that district in the attribute table for the school zones. I also recorded the average distance a child in the school zone would have to walk to school in the same attribute table.

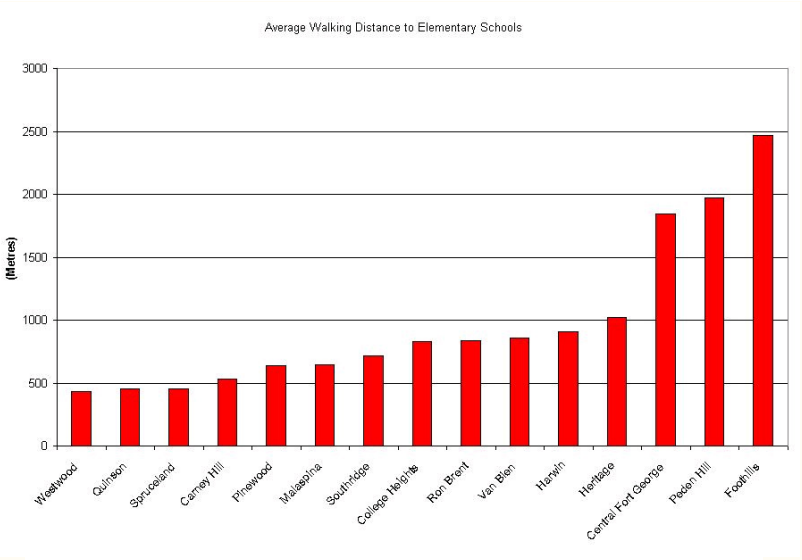
Analysis Results



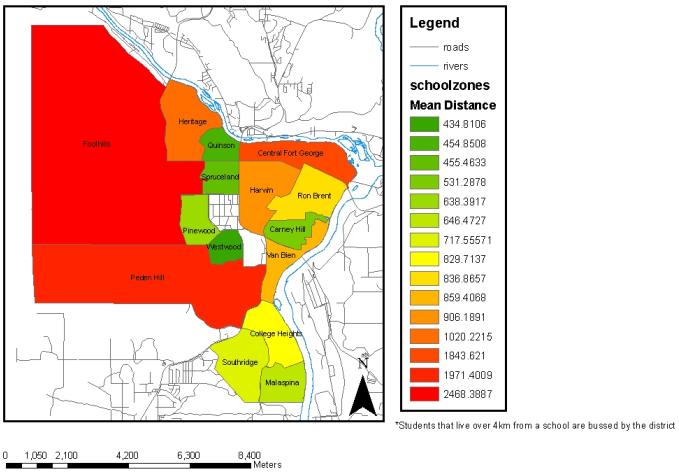
Longest Walking Distance to Urban Elementary Schools in Prince George



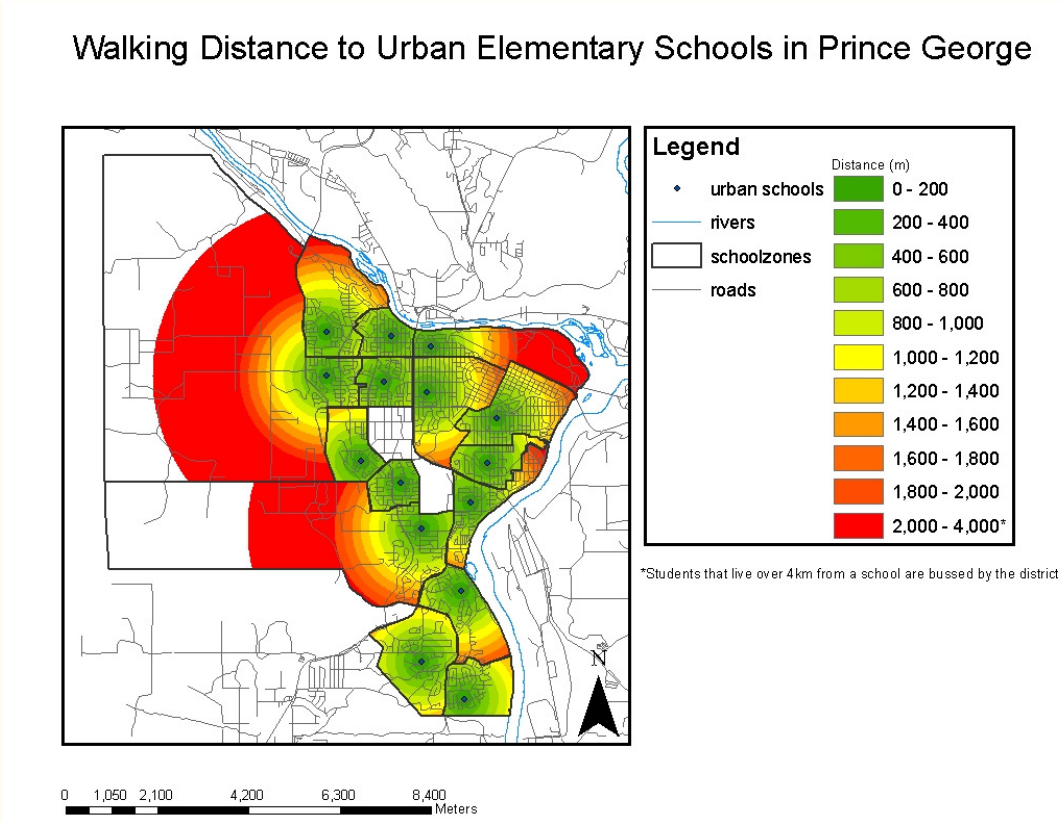
Longest Walking Distance by School Zone (click to enlarge)



Average Walking Distance to Urban Elementary Schools in Prince George



Average Walking Distance by School Zone (click to enlarge)



Final Output Map (click to enlarge)

Conclusions

The final output map should help parents in Prince George note the areas of the city that have a long walking distance to the school in their school zone. Although many of the red areas on the map are not residential areas, there are some that are. The schools along the edges of the bowl (Foothills and Peden Hill) have a harsher rating than they should, because they encompass hilly areas that have no students living there - and the students on the other side of the hill can be considered rural. Also note that any students that live further than 4km from a school are bussed to school by the school district.

From my output data, it seems that Quinson, Westwood, and Spruceland are the best school zones to live in if you don't want your child to walk very far. The worst school zones for walking distance seem to be Foothills, Peden Hill, and Central Fort George.

Future Developments / works

Originally, this project was to include data on the average property values in each school zone, and I was going to compare the wealth of each school zone with how far the children in that zone had to walk to school. However, this data was not readily available and I would have had to look up about 10 property values per school zone (10 x 15 = 150 different property values!). While this research would have been interesting, I did not have the time to perform it, as I already had to manually input almost all of the data I was using. It would make an interesting future project, however.

References

School District 57

Ping Bai

Acknowledgment

Chunhua Zhang

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