Conflagration Index Metadata

Introduction

This Excel spreadsheet contains the all calculations of the conflagration weighted sum index created by CenTex 360. This index was designed to measure the relative likelihood a fire would spread in a given area. This analysis project was completed by CenTex 360 at the request of the City of San Marcos as part of the class requirements for GEO 4427.

Data

All data for this index was provided to our group by the City of San Marcos GIS Office. The following shapefiles were used for this analysis:

* Buildings
* City Grid
* Parcels

Spatial Analysis Extent

In this table, the field GRID ID corresponds to a grid cell system of San Marcos, TX. This grid can be found in the ‘City Grid’ shapefile and was created by the City of San Marcos to delineate 16 separate study areas. These grids were used by CenTex 360 to compare different areas of the city based on the output of the conflagration index.

Weights

For this index we used a weight of .4 for Conflagration Area Acreage and for the Number of Buildings Affected by Conflagration. The Wildland-Urban Interface factor was given a weight of .2. These weights were subjective assignments based on my interpretation of the literature and can be altered for future analysis.

Factors

For this index we had three factors:

1. Conflagration Area Acreage

We derived this value from creating a 20’ buffer around the ‘buildings’ layer. We then intersected the output of this process to determine where the buffer overlapped. This overlap calculated the relative proximity of two structures to each other. This overlap is represented in the table in total acres.

Our rationale for this factor was thatThe closer the structures, the larger the overlap, and so the more likely a fire was to spread from structure A to B.

1. Buildings Affected by Conflagration

In addition to area between buildings, the second factor took into quantity of buildings vulnerable to a fire spreading. This is the quantity of buildings that had their buffer intersect another building's buffer during the Conflagration Area Acreage calculation. We found this value using the ‘select by location’ tool all buildings within 20’ of the intersect output created during the first factor’s calculation. Since the buildings layer had multiple entries for the same building if it was more than one story, this factor also proportionally took into account the vertical contribution of a building during the event of a fire.

1. Wildland-Urban Interface  
   The third factor, wildlife-urban interface was the total length of developed parcels that were adjacent or within 10' of an undeveloped parcel. We clipped the parcel layer for each grid cell and then coded all parcel as either developed (1) or undeveloped (2). From here, we selected parcels by attribute and created independent layers for both factors. We took both layers, which were originally polygons, and converted them to polylines. From this output, I ran multipart to singlepart to convert the polylines into line segments. I recalculated the geometry of the length and selected by location to determine the total length in a grid.

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