Effect of Cities on Normalized Differences of Land

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Urban development is associated with negative effects on the environment, but these consequences are difficult to measure quantitatively. Thus, effective legislation cannot easily be created due to the lack of quantifiable evidence for the decrease in vegetation fitness. Using Landsat-8 Remote Sensing Data and indices based on the analysis of this information, we are able to analyze quantitative effects on the health of local vegetation for many cities. First, the algorithm for determining the outline shape of a city and the NDVI (Normalized Difference Vegetation Index, which describes the health of vegetation) of each distance away was created and run for each data file for the same city on different days. In this data, we captured the outline of the city using NBAEI (Normalized Built-up Area Extraction Index, which allows the extraction of developed areas). The NDVI was then measured for each data file, giving the average NDVI for each distance and date.These NDVI values were compared over time and between distances. After calculating errors and accounting for seasonal and city variation, we show that for closer distances, (a characteristic size of 1 mile and below), there was a definite decrease in NDVI over time. The linear regression line for each city's median average NDVI for each year showed a marked decreasing trend for shorter distances. Due to the decrease in average NDVI for shorter (1 mile and below) distances, it is apparent that proximity to city is a determining factor in the values of NDVI and vegetation. Areas closer to the city had significantly lowered NDVI values, while distant areas were relatively unchanged in vegetation health, thus reflecting the detrimental effects of the city on nearby vegetation.

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