Area Growth of Fort Worth, Texas in Zip Codes 76131, 76177, 76137, and 76244

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Background

From 1996 to 2016 the area of Far North Fort Worth has had tremendous growth. This area is defined by the zip codes 76131, 76137, 76177, and 76244. I left this are for military service and visited infrequently over this time span. In 1996, my sister lived in the 76137 zip code. My wife's parents moved to the 76131 zip code in 2006, and my sister in law moved to the same area in 2014. We moved to the 76131 area in 2016 after retiring from the military. The area I currently live in was grassy ranch land and was not easily accessible. Now there are several large neighborhoods which are easily accessible. This growth has had an impact on open green space and I wanted to quantify that impact.

Methodology

- Select satellite images.
  - o Satellite images contain multi-spectral bands which will help determine green space.
- Use the Normalized Difference Vegetation Index (NDVI) tool on the images.
  - o This allows us to emphasize greenness using near infrared and red bands from the image.
- Select 5 points from different areas of the new image to determine the highest level of known non-vegetation.
  - o Areas selected were Alliance Airport, Texas Motor Speedway, sections of I-35W corridor, and US Highway287.
- Use the Reclassification tool on the image.
  - o Set values that were less than or equal to the highest value found to zero. Zero indicates non-vegetation areas. Set all other values to one. One indicates areas of vegetation.
- Use the Raster to Polygon tool to generate polygons to be able to extract data for area.
- Use the Clip tool on the polygons to see only data in the four zip codes.
- Repeat process for second image.
- After both images have been reclassified, use the Minus tool to subtract the reclassified 1996 image from the 2016 reclassified image. The result will indicate area of loss, area of no change, and area of regrowth.
- Convert raster to polygons.
- Use clip tool to get only data for the four zip codes

1996

2016

Observations

- In 1996, Texas Motor Speedway and Alliance Airport were already built.
- The 1996 image is from Landsat 5 and has a coarser resolution.
- Zip code 76137 appears to have had a lot of development in the 1996 image.
- Zip code 76244 did not exist in 1996. The area marked as this zip code was actually 76248. 76244 was established in 2009 to ease mail flow through the Keller post office.
- The 2016 image is from Landsat 8 and has a much higher resolution.
- 76131, the southern portion of 76177, and 76244 appear to have had a lot of development in the 2016 image.

$$NDVI = \frac{NIR - RED}{NIR + RED}$$

Conclusion

By using the NDVI tool and converting the images, we revealed that from 1996 to 2016 there was a loss of 40,000 kilometers of green space. This is a 22% loss. However, there were areas of vegetative growth that make up approximately 11% of the area. The growth can be attributed to the areas where development was prevalent in 1996. As the developed areas matured, vegetation was able to grow to a more significant level. The population density of this area from the 2010 census reflects the amount of growth that has been happening. The zip codes with the highest population density are the ones that have lost the most green space. As the population grows in areas, the loss of green space will occur. As the population matures, the vegetation will also mature and some green space will be returned.