**MEMO (Geoprocessed maps)**

**LU Change Map:**

To make an LU Change map between 2002 and 2012, LU maps were first made for both years. To do that, NJDEP Bureau of GIS was used to retrieve datasets for ‘Land Use’ in Middlesex County specifically.

These datasets were clipped using the Edison County shape file that was also a result of a clip of the original county’s shape file of NJ. This clipped version of LU in 2002 and 2012 was used to form a choropleth map. Thereafter, another LU file was downloaded for the year 2007 for the purposes of making a map of changes between 2002 and 2012. The file for the year 2012 had a field called Change12 which was a dummy variable for whether the land underwent a change from 2007 to 2012 or not. Similarly, the file for 2007 had a field called Change07 which had a flag for whether the land underwent a change from 2002 to 2007 or not. Using these two clipped versions of shape files, a **union** was performed to have a consolidated file with both Change12 and Change07.

Map

Description automatically generatedAfter doing a union, two or more unique values choropleth map was made to give all permutations possible of changing or not changing between 2002, 2007, and 2012, sequentially.

**Results:**

For this data, which was of Edison Township, there were only three possible values; the fourth value denoting that there was a change from 2002 to 2007 and a subsequent change from 2007 to 2012 did not occur in this dataset. Thus, the map showed which areas in Edison went through what permutation of change in the span of 10 years.

After analyzing the map, more than 80 percent of the land in Edison remained unchanged in Land Use. There was only 1 tract that did not undergo any change from 2002 to 2007 but did undergo a change from 2007 to 2012. Of the areas that did undergo a change, their changes happened after 2002 and remained the same way till 2012. Some of these areas were previously forests (in the north west portion of Edison) which changed into urban and residential buildings. Industries near the center of Edison were changed into commercial buildings. And lastly, the military installations in Edison, in 2002, were all changed into a variety of land uses such as commercial, residential, and even as forests (Deciduous Brush Land).

**Edison Parcel Map:**

Building upon the work done for LU 2002 and 2012 maps of Edison, NJGIN Open data was used to find parcel data for Middlesex which was then clipped for Edison. This shape file was brought in the workspace and on the change map, it was assessed which areas were worthy of consideration. It was seen that there was a distinct land use type called Military Installations in Edison which after 2002 was removed. The 2002 LU dataset was used to select all features with such LU. This was made a separate layer. This layer was used to clip parcels data to get parcels for only the military installation land. This new layer was then geoprocessed using **intersect** feature involving the LU 2012 shape file to denote the new labels of ex-military installations. Then, like before, a choropleth map was made to show what changes came into these areas.

A picture containing timeline

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**Middlesex’s Public Facility’s Solar PV count map:**

To get a shape file for all the public facilities installed with solar photovoltaics, NJDEP Bureau of GIS was used. It provided a file that had points for all the facilities including Government Facilities, Public Schools, Public Colleges/Universities, and other public-school facilities, in entire New Jersey. To aggregate the number of such facilities falling inside each municipality in a specific state, a shape file called ‘stmun’ was brought in which represented polygons of all municipalities in New Jersey.

Then, a **spatial join** was performed to sum the points falling inside each polygon. This function processed a new shape file having new statistical attributes, including a count for the number of points in each municipality. To circumscribe the analysis to just one county, Middlesex, a ‘select by attribute’ function was performed to select Middlesex and clip the shape file that came out from spatial join. This new clipped was then used to draw a choropleth map of counts normalized by the respective area of the municipality to give a sense of where a particular municipality stands with respect to others in the same county. A population density map for the same county was also made at municipality level to better analyze the position of Edison in Middlesex with respect to solar panel installations, in terms of its relative size and population density.

**Results:**

Map

Description automatically generatedIt turned out Edison given its large covered area is quite behind in the number of public facilities that have solar panels installed. Majority of the other municipalities in Middlesex fare well and it goes on to show how much does Edison needs to do to curtail its carbon footprint by incorporating renewable energy. Upon analyzing the population density map, it was found that the population density of Edison is not substantially larger than other states thereby allowing some leeway regarding its position in the field of public installed solar panels.