This research assesses the relationship between income per capita, how long roads across Texas. Relevant datasets and analysis techniques such as demographic (census data), population density (distribution), road network, maintenance records, etc. will be carried out using ArcGIS Pro software. A series of maps highlighting analysis results derived based on the various parameters will be produced to provide a comprehensive overview of the relationship between the variables, if any, that would be useful for future decision-making.

Background

This topic became a point of interest when the road quality and upkeep in low-income areas were observed to be disproportionate to the timeframe of maintenance and quality of roads in higher-income areas; after the observation, we needed to see if there was any correlation in the data. We were interested in analyzing the population, per capita median income, and road quality. Assessing the relationship of those timeframes for maintenance, we determined there were less frequent maintenance and improvement projects completed in low-income areas, even when the population was higher, equating to higher road use.

Objective

Assess and analyze the relationship between per capita income, the priority of road maintenance, and road quality across the state of Texas

Data

| Data Set/Source | Purpose/Goal |
|----------------------|--|
| The US Census Bureau | - Find the median household in- |
| demographic and eco- | come by county. |
| nomic records data | - Normalize Impoverished |
| | households by county popula- |
| | tion for comparison |
| | |
| Texas Department of | Gave us detailed shapefiles |
| Transportation | and data concerning: |
| | current road quality |
| | Jean Contension - |
| | Jean Sector Sect |
| | |

Income and Road Quality Correlation in Texas

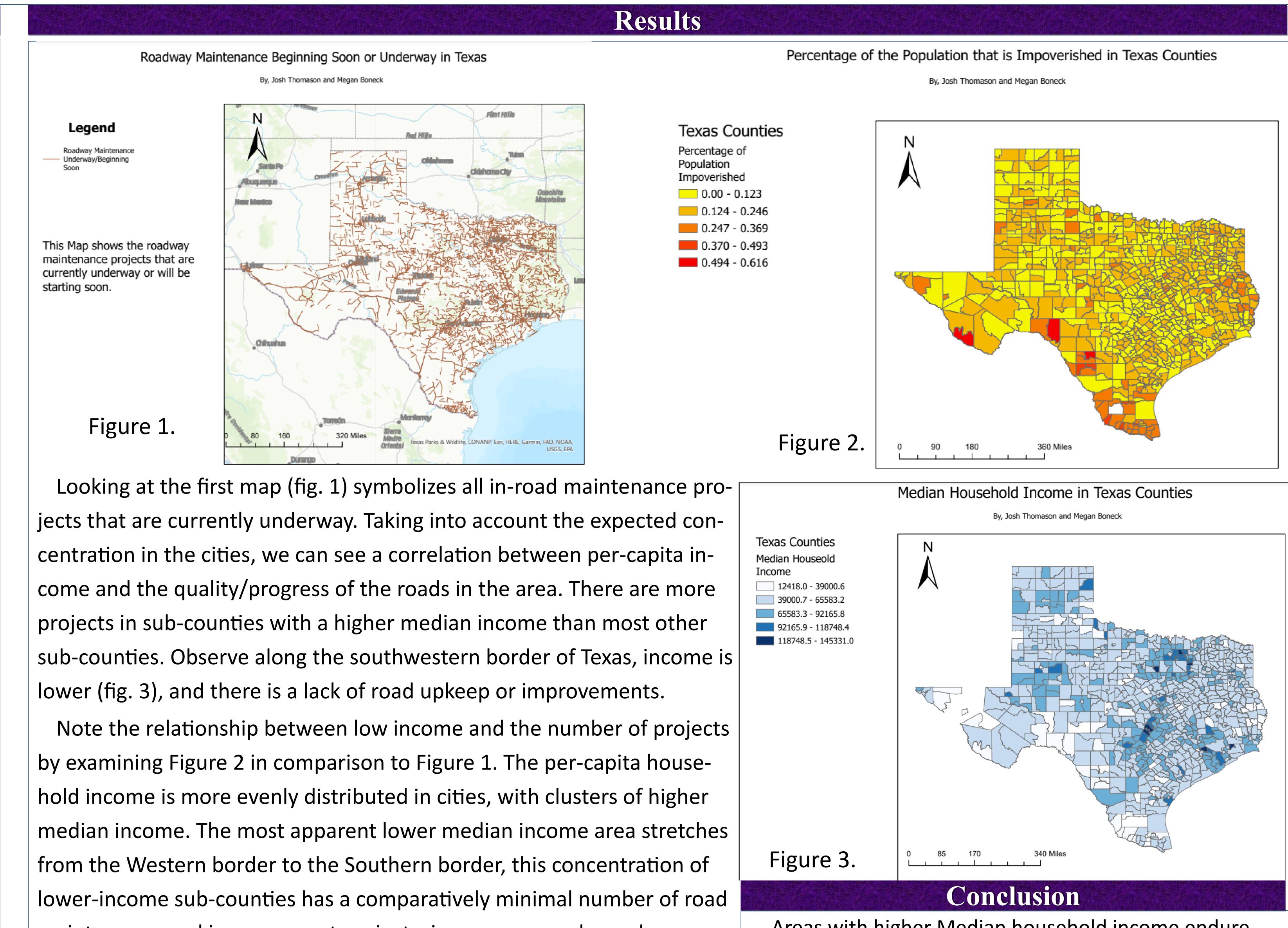
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Methods

The first thing we had to do was import the data into ArcGIS. We started by adding the data set with all of the road maintenance projects that were underway or were in the planning process. Initially, the map was crowded and difficult to analyze. So, to clear it up and maintain the data's integrity, we chose only to represent projects that were already underway or were beginning soon. While the data was still a little crowded this was the furthest we could cut down the data to still have a map that represented what we were trying to find. For the second map, we wanted to focus on the income aspect of the project. To do this, we added the 2020 census data for Texas at the county subdivision level, to easily determine meaningful analysis from, as opposed to full county data. To assess the relationship between household income statistics we added the income table from the census metadata to the project via the join function. This allowed us to represent the income levels on the map, then edit the symbology to a gradient to accurately represent the income by population da-

In the last map, added for a more integrated analysis, we included the poverty levels of each county. Using the same method as the second map, we joined the poverty table with the counties' shapefile data. With that data joined, we changed the symbology to represent the total number of people impoverished in each county. After editing the symbology, we realized the data needed to be normalized by the population. Going through the metadata again, there was a field for the population within the counties. Using this allowed us to normalize the total impoverished by population, and represent this data with proper symbology that showed the percentage of people that were living in poverty for each county, using an equal interval and graduated color scheme to represent.

Abstract



maintenance and improvement projects, in progress or planned.

If you look at Figure 2 you can see a similar discrepancy along the borjects total. der with poverty statistics, less impoverished people have access to qual-- higher income areas have more improvement projects ity roads that are regularly maintained. This shows that income and road planned for five and ten years out, while only urgent ismaintenance have a positive relationship. With higher income areas receiving more road projects and consistent upkeep for overall better quali- sues receive planning in low-income areas. ty roads. Displaying the negative relationship between poverty and road - Low income areas have a longer wait time for upkeep quality and maintenance. and improvement projects.

- Areas with higher Median household income endure less wait time for upkeep, and more improvement pro-