Background

There are more miles of pipeline than railroad in the world. Pipelines have an estimated 15-year lifespan, but are often used for much longer. As they are overused, they are prone to corrosion, spills, leaks, and fires. And these incidents often impact physical and mental human health poorly. On a global scale, and in the States, pipelines often disproportionately affect indigenous groups. "Oil pipelines have also caused disproportional impacts on low-income and minority communities in the United States." (O’Rourke).

This year, the indigenous resistance to the Dakota Access Pipeline brought to light these themes and how resource extraction, and the damage it creates, affects marginalized communities the most. I made maps to explore if pipeline incidents (property damage, injuries, and fatalities) are concentrated in areas with higher rates of people below the poverty line and people of color. The data on where exactly pipelines are located is censored from the public. The Pipeline and Hazardous Materials Safety Administration (PHMSA) is granted permission to not comply with the Freedom of Information Act. Due to this secrecy measure—which shuts out information or- ganizers, and community organizations could use—I look at the incidents related to pipelines, not related to the proximity to the pipelines. I looked at both the county and census tract level of race, and poverty status in the United States to see if these incidents are an example of environmental racism. I based my pipeline incident data from 1986 to 2016, and current (2015) racial and poverty demographics.

Methodology

The percent below poverty data for each census tract in the United States was joined by attribute to a detailed shapefile of all the census tracts. The field calculator was then used to divide the number of white people by the sum of all the races to calculate the percent white for each census tract. The percent of people in each tract below poverty was also calculated by the field calculator. Graduated colors in Symbology by Quantities were used to show percent white and percent below the poverty line. The graduated data of all the points of pipeline incidents from the PHMSA was joined spatially to census tract polygons. Graduated colors in Symbology by Quantities were used to show which census tracts had the most and least pipeline incidents. The same exact process was followed for the county level.

The shapefiles of the county and census tracts by factor were clipped to only include the Continental United States because the pipeline incidents data for Alaska, Hawaii, Puerto Rico, and other US territories was not complete or available. Local Moran’s I tests were run on these six maps to see how they were clustered. Due to the fact that lower percentage white and percentage of people below poverty are correlated in the United States, Ordinary Least Square (OLS) Regressions were used to test the correlation of the incidents to percent white, and incidents to percent people below the poverty line for both census tract and county data.

Results

It was hard to draw conclusions from the twelve maps about whether pipeline incidents affect people of color and low-income communities the most. The regressions, however, showed a strong correlation between incidents per county and percent white. It showed when one percent white population per county decreases, there are 3.29 more incidents likely to occur. The other regressions showed neither percent below poverty or percent white was correlated to pipeline incidents at the level of census tracts and there was no correlation between percent below poverty and pipeline incidents on the county level. The regression by percent below poverty and incidents per county has a borderline significance, and could be insignificant or need more investigation for an accurate conclusion.

Conclusions and Limitations

There are many factors that make up low-income communities, I only used percent below poverty to test whether or not pipeline incidents were more concentrated in low income communities. My results leave room for more investigation on the matter. Not all pipeline incidents are reported, that could cause errors in my calculations. The census tract level data did not give me very much information on very connected with the correlation. From my results, the county data does not appear to have any results that the tract might show. The results should be taken to heart by people and policy makers to reduce the number of pipeline incidents in communities of color and end this form of environmental racism.