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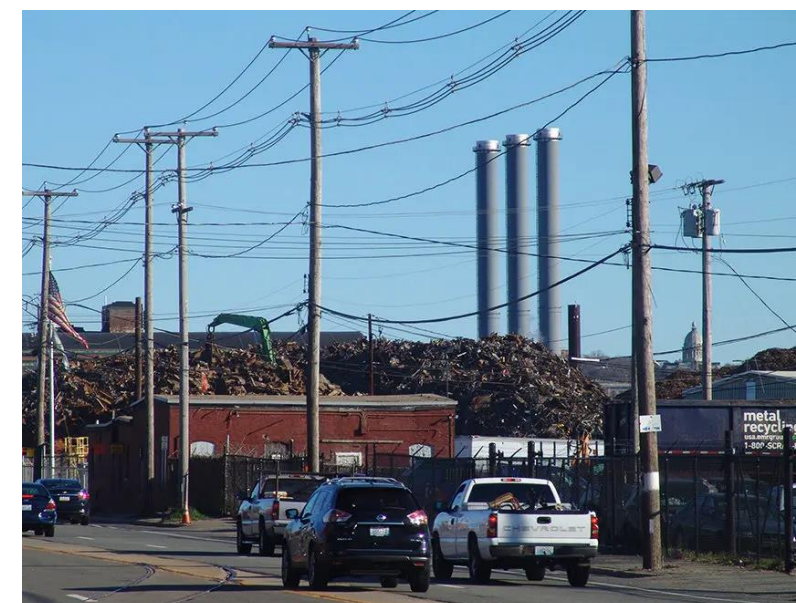
Environmental toxins disproportionately effect low income and minority communities along the Providence River

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Introduction

The effects of environmental toxins emitted from the various industrial businesses along the Providence River and Allen's Ave have been reported by residents to cause an incline in respiratory diseases and other illnesses in children and adults in nearby neighborhoods (1). Operations along Allen's Ave consist of heavy toxin emitting practices such as hot asphalt mixing, fuels emissions, toxic runoff, gas leaks and piles of scrap metal. Many local news articles and blog posts have reported on the fact that this industrial waterfront has adversely impacted neighboring communities. However, there is little research explicitly comparing the socioeconomic differences between the east and west sides of the river, and how there may be a larger environmental justice issue at hand.

This study evaluates the differences in marginalized populations, cancer risk and proximity to hazardous waste, between the east and west side of the river. **I predict individuals on the west side of the river are disproportionately exposed to environmental toxins based on the vulnerability that their class and race brings them.**



Allen's Ave, Providence, RI (West side of Providence River)



East Bay Bike Path Providence, RI (East side of the Providence River)

Methods

Data was collected using EJScreen national data set on environmental risk factors(2). Areas within a ~3 mile radius from the shore of both the east and west side of the river were organized by FIPS codes and chosen from the larger EJScreen dataset to evaluate the specific areas relative to Allen's Avenue. R studio was used to run linear models to compare percent minority, percent low income, proximity to hazardous waste, and cancer risk relative to the location of the river (east or west).

Results

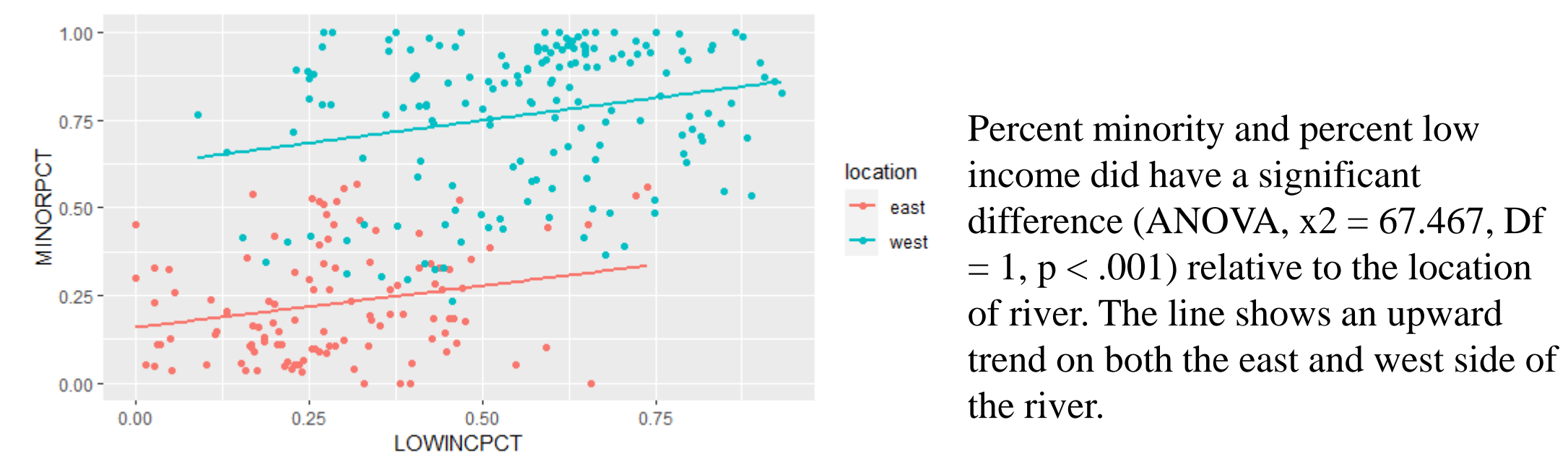


Fig.1 Percent people of color v. percent low-income relative to location on river

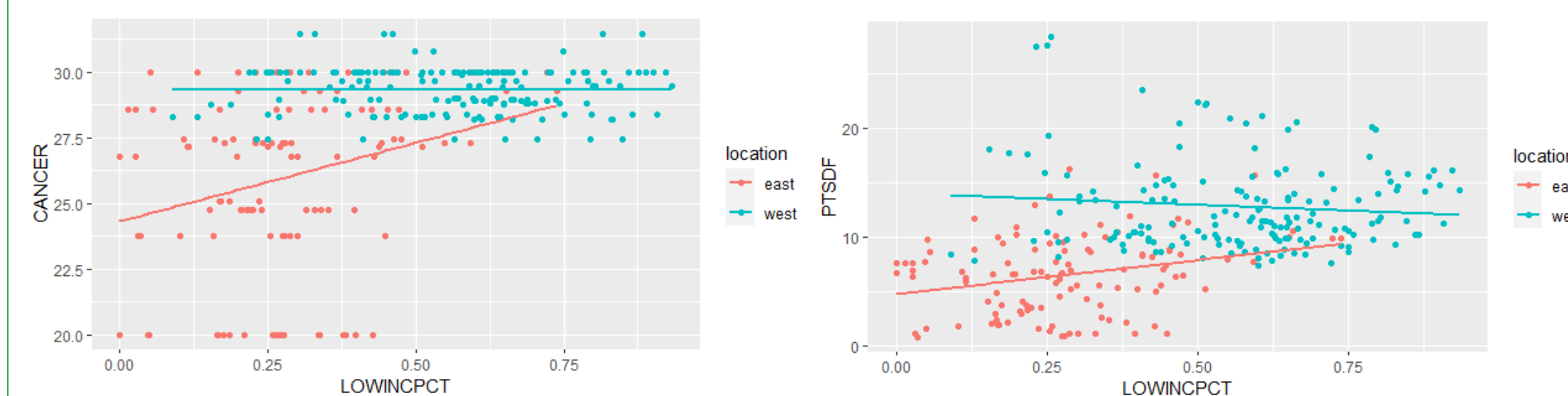


Fig. 2 Percent low-income v. cancer rate relative to location on river

Fig. 3 Percent low-income v. proximity to hazardous waste relative to location on river

Percent low income had a significant effect on cancer rate (ANOVA, $x^2=3.2893$, $Df=1$, $p<.05$). Percent low income did not have a significant effect on proximity to hazardous waste (ANOVA, $x^2=1.9568$, $Df=1$, $p>0.1$), however there was a significant interaction between percent low income and location relative to the river (ANOVA, $x^2=12.1705$, $Df=1$, $p<0.001$). In Fig. 2 and Fig. 3 there is a positive slope for the east side of the river, and a negative slope for the west.

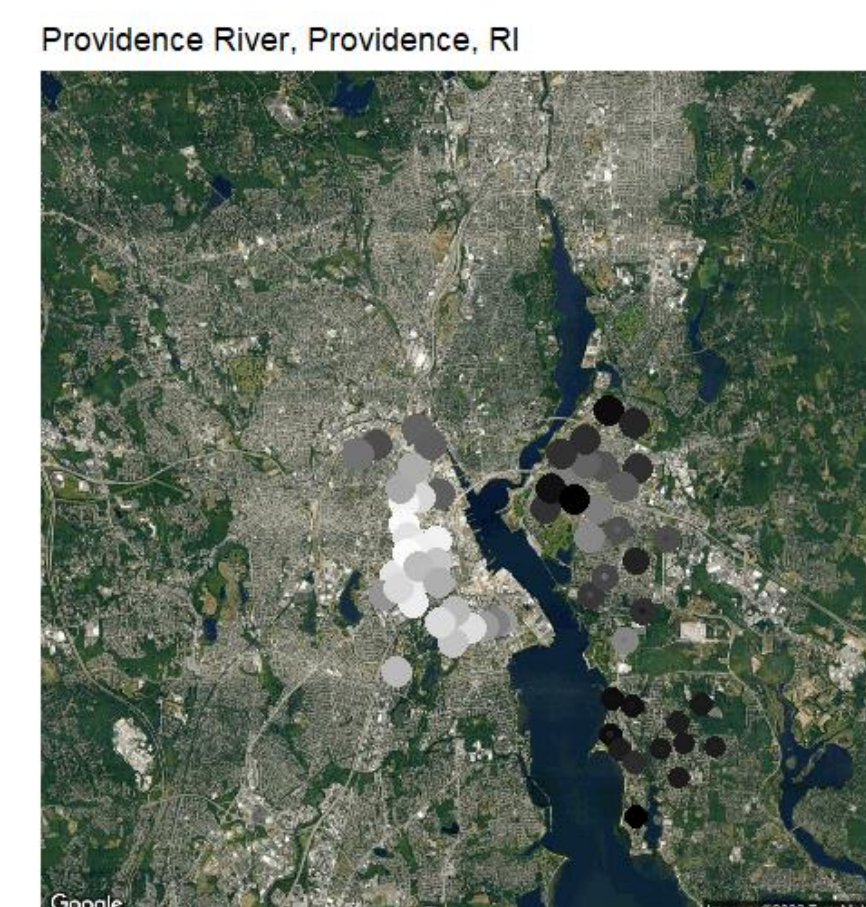


Fig. 4 Percent people of color v. cancer rate relative to location on river

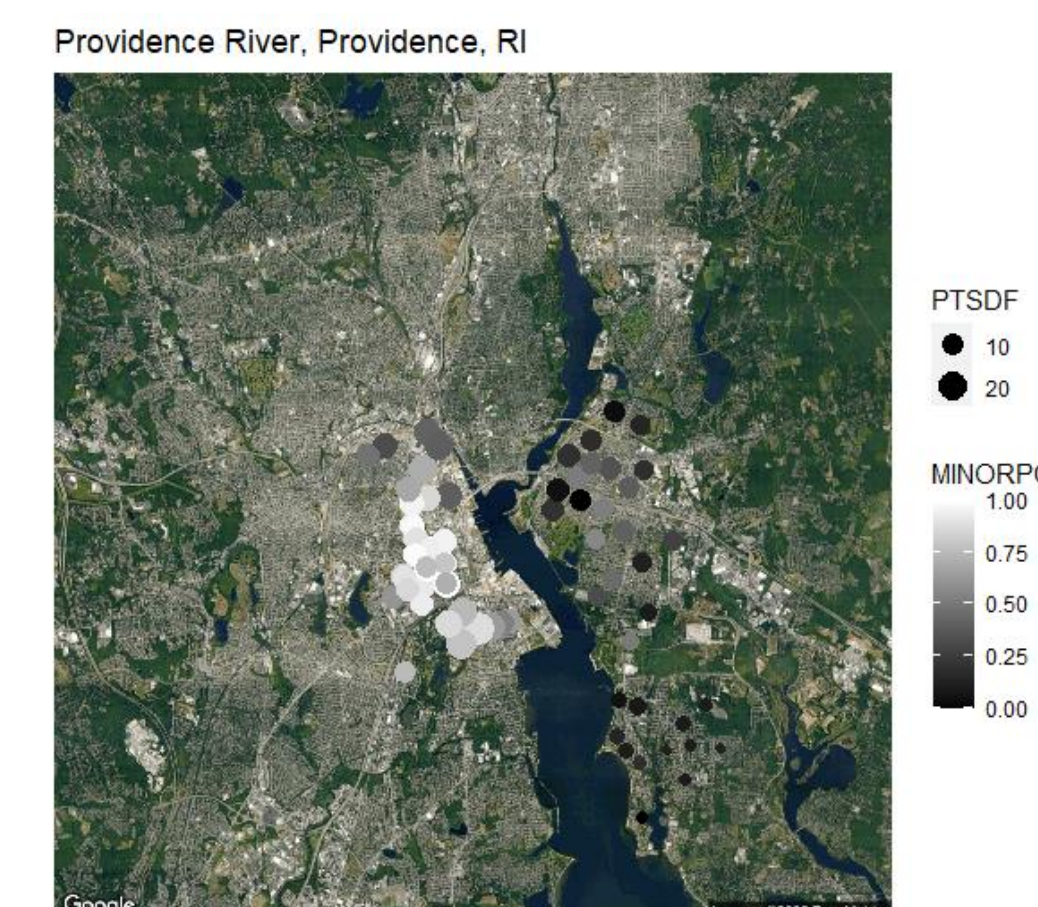


Fig. 5 Percent people of color v. proximity to hazardous waste relative to location on river

Location had a significant effect on cancer risk (ANOVA, $x^2=19.0526$, $Df=1$, $p<0.001$). There was not a significant relationship between percent people of color and cancer risk (ANOVA, $x^2=3.7446$, $Df=1$, $p>0.05$). Location also had a significant effect on proximity to hazardous waste (ANOVA, $x^2=4.2411$, $Df=1$, $p<0.05$). Both maps show higher percent people of color and higher cancer risk on the west side of the river.

Conclusion(s)

Both percent low-income and percent people of color were significantly higher on the west side of the river, closest to industrial Allen's Ave. The data shows that on the west side of the river, these higher percent people of color and low-income communities are at a higher risk for cancer and in closer proximity to hazardous waste than the communities located on the east side of the river. Some of the data did not show significant effects of percent low-income and percent people of color on cancer risk or proximity to hazardous waste, however, there was still a significant interaction between location relative to the river and these environmental risk factors.

Future research into more environmental risk factors and current practices along Allen's Ave may help community members build their case that they are being disproportionality effected on the west side of the river as marginalized individuals. Future research may also look more in depth to the possible relationships between percent low income, percent people of color, and environmental risk factors Push for legislature to stop these harmful business that include new fossil fuel and dump developments, has been brought upon by the effected communities(3) and having sound data to support their claims may help them show the city of Providence that there are vast differences in quality of life between the east and west side of the Providence River that may be affecting people's rights to clean air and water.

Acknowledgments

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References

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2. EJScreen. 2019, 2021, 2021. <https://www.epa.gov/ejscreen>
3. PVD Streets et al. 2022 <https://pvdstreets.org/action-alert-tell-ridot-we-need-a-safer-healthier-cleaner-allens-ave/>