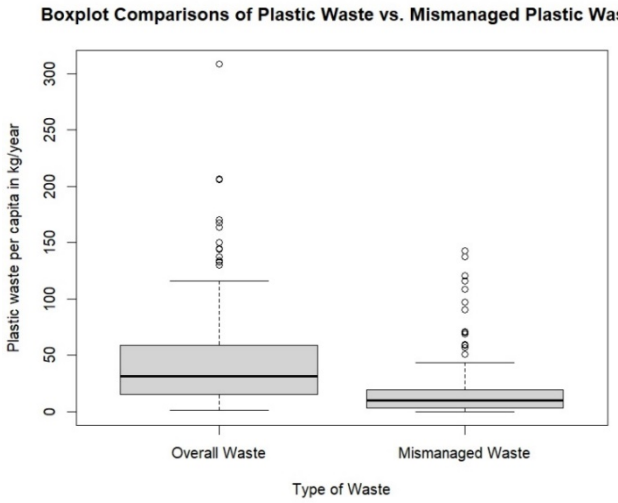
Introduction: Plastic pollution is a major and growing problem, negatively affecting oceans and wildlife health. There is plenty of data to be found online on this topic, and we will take a global look at the situation across different countries in the world.

The general goal of the analysis is to explore what factors may affect the levels of the two types of plastic waste, and what potentially useful relationships may exist among the variables, in order to inform a future modelling strategy for plastic waste.

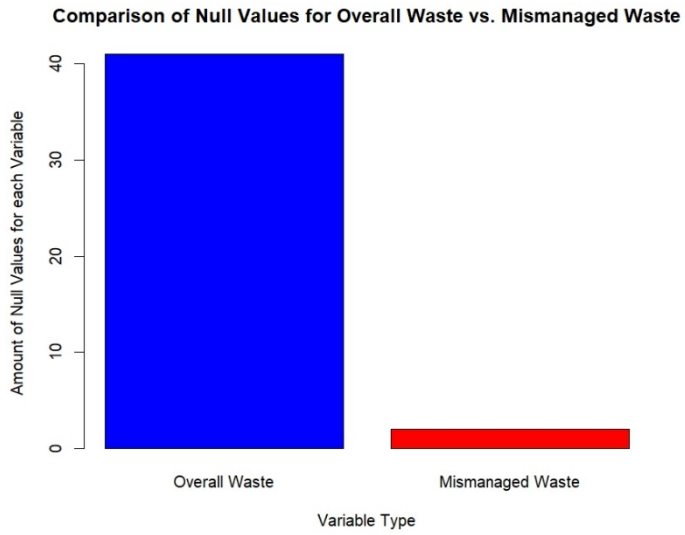
Part 1: The distributions of the two types of plastic waste. Identify and explore any potential outliers, unusual values, and missing values.



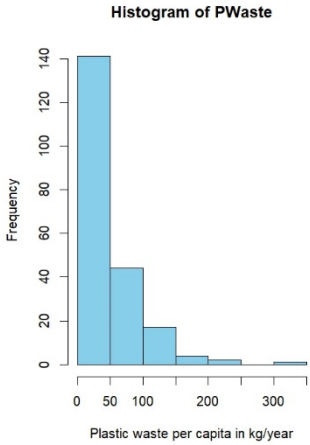
*The mismanaged waste group has a lower median

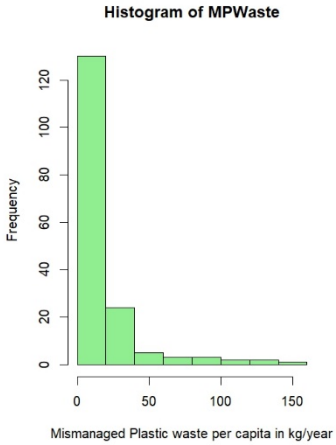
*Mismanaged waste group's outliers do not have as high of values as the overall waste group.

*Overall waste also has a higher variance while mismanaged waste's values are more condensed.



*The number of missing values is far higher in the PWaste column compared to the MPWaste.



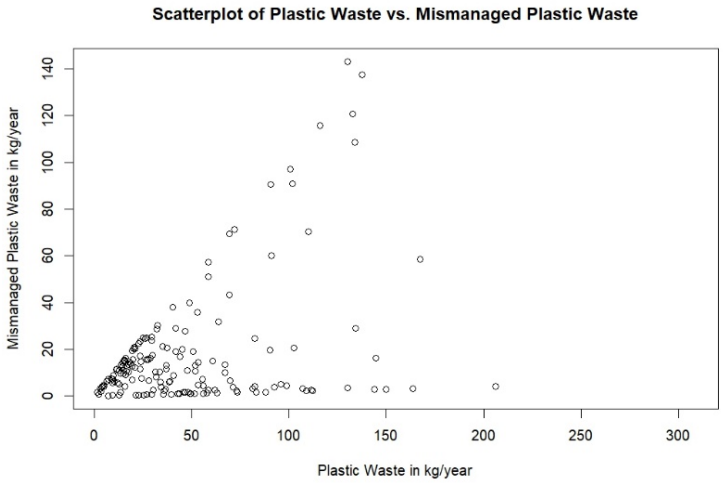


*These two plots show us that both plastic waste and mismanaged waste are heavily concentrated in the smaller levels (< 50 kg/year)

*We see very few observations of high levels (>150kg/year).

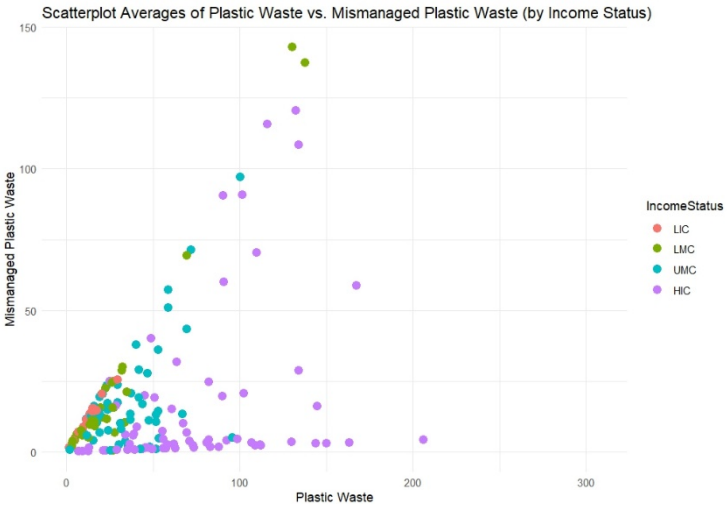
Summary: There is, on average, less mismanaged waste that total plastic waste. There is also a large amount of missing values in the overall plastic waste subset. Lastly. Most of the mismanaged and regular plastic waste is concentrated in lower levels. Further analysis of which countries don't have values for plastic waste would be interesting, especially if they are high GDP.

Part 2: The relationship between plastic waste and mismanaged plastic waste, and any potential impact of region and income status.



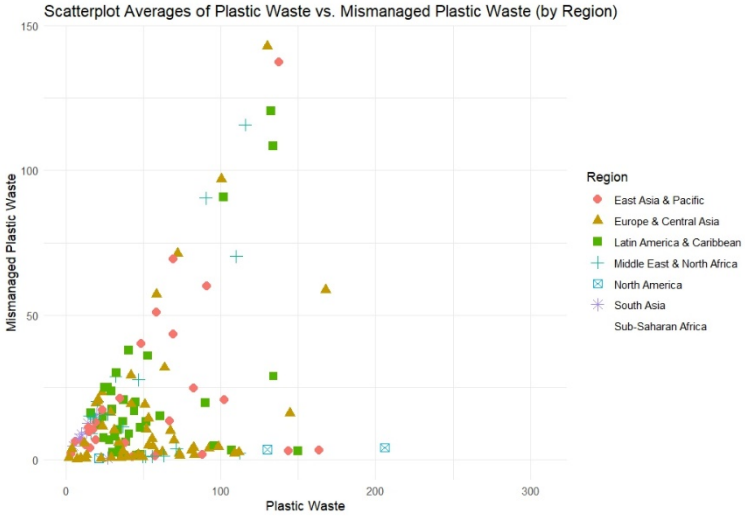
*As plastic waste increases, so does mismanage plastic waste.

*There appears to be different groups of high plastic waste; one that contains low mismanaged waste and another group with high mismanaged waste. To see if cofounding variables are influencing this, we can look to how region and income influence this relationship.



*The main culprit for high mismanaged waste levels as plastic waste increases is Low-Median Income earners, who also are the second highest contributors of plastic waste.

*We can also see that High income earners have the highest plastic waste levels, but do a better job of controlling the mismanaged plastic waste levels.



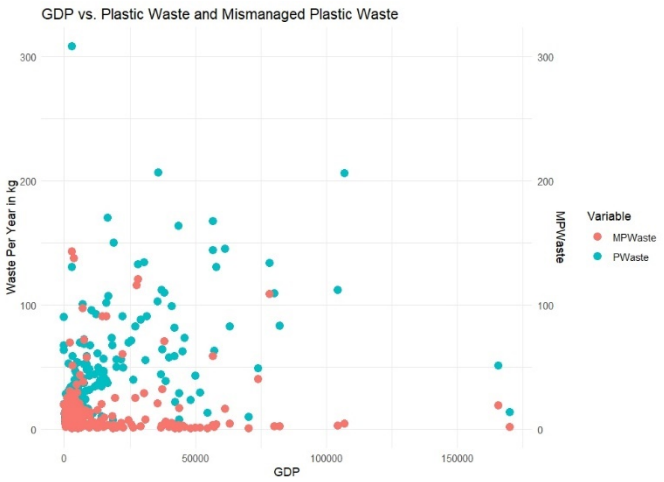
*North America is the leader of plastic waste but does a good job of managing it's mismanaged waste.

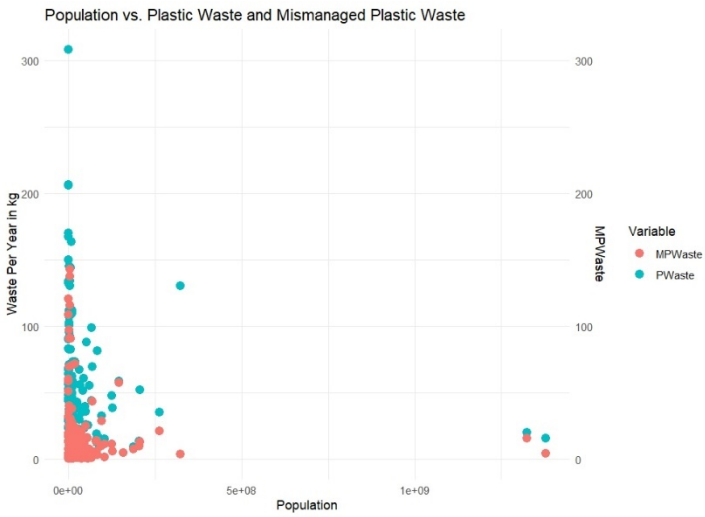
*All other regions besides North America and South Asia are pretty similar. They all have relatively high plastic waste and mismanaged plastic waste.

*South Asia is the anomaly with very low plastic waste and mismanaged waste.

Summary: Low-Median Income earners, who also are the second highest contributors of plastic waste, are the highest contributors of mismanaged plastic waste. High earners produce more plastic waste, but are good at minimizing mismanaged plastic waste. A time series analysis would be interesting on how plastic waste type changes as people move between income types.

Part 3: The relationship between both types of plastic waste and the other quantitative variables.

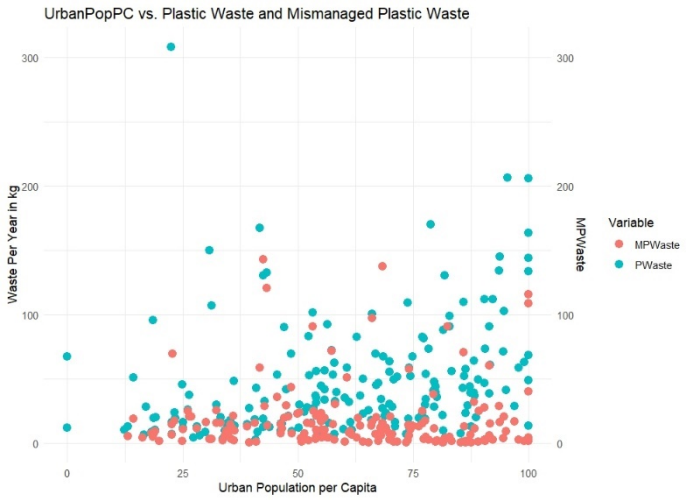


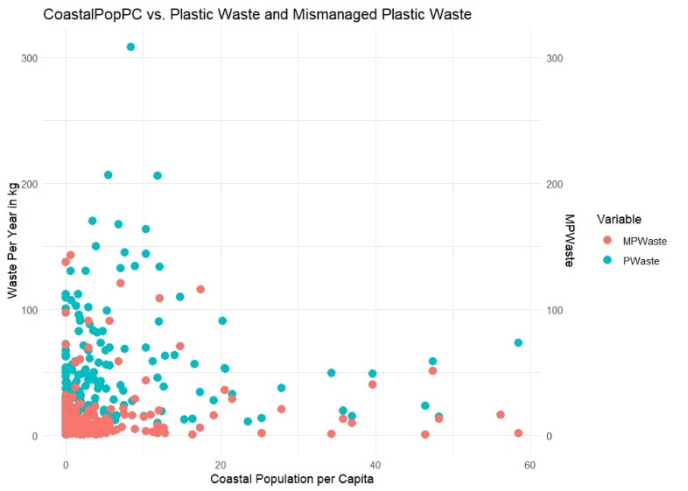


* There is one country with a low population with an extremely large production of plastic waste

* An increase in GDP is showing more prevalence of high plastic waste

* The more the GDP increases, the less mismanaged waste there is



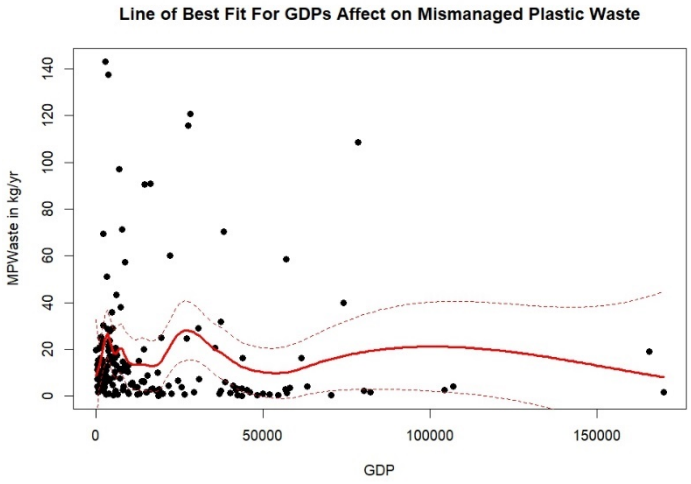


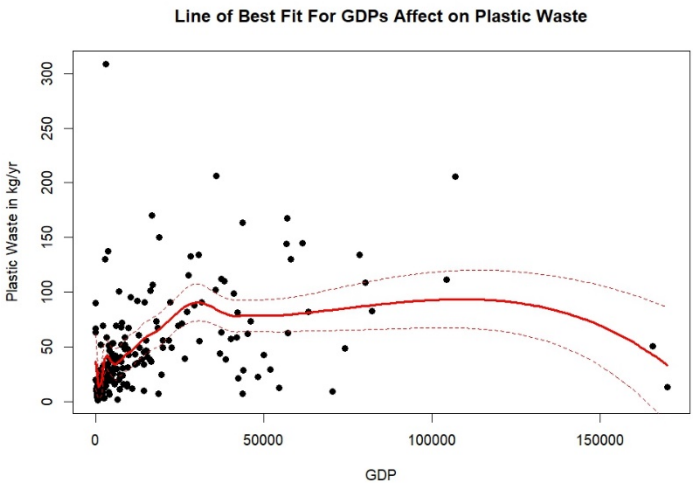
* The greater the urban population, the greater the plastic waste, but mismanaged waste remains relatively unchanged.

*The greater the coastal population, a decrease is seen in both plastic and mismanaged waste.

Summary: An increased GDP has a higher relationship with high plastic waste as well as mismanaged waste. Furthermore, larger urban cities have a strong relationship with high plastic waste while their larger coastal cities see a reduction in both plastic and mismanaged waste. I'd be very interested to see coastal pollution since some of the plastics may be going into the ocean.

Part 4: The smoothed trends between (i) both types of plastic waste and GDP (the wealth of the country), and (ii) both types of plastic waste and the size of urban population.

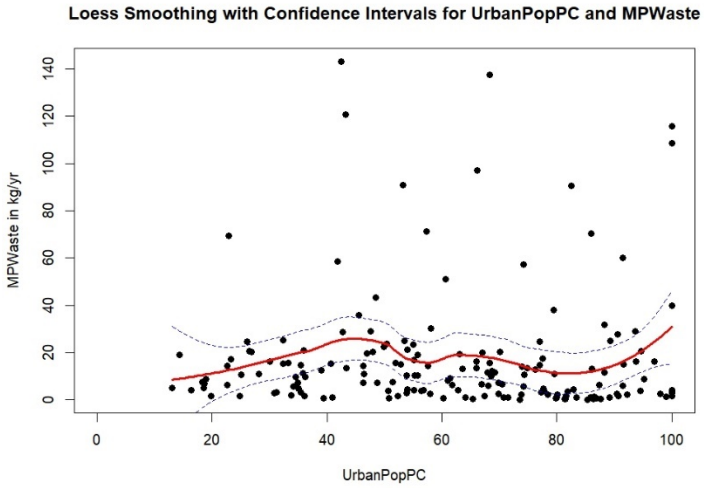


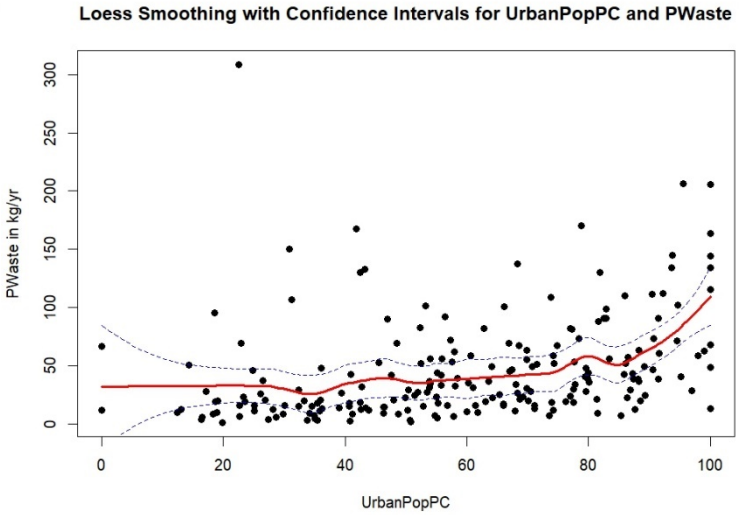


* GDP's affect on Mismanaged Waster Per Year is relatively even, with a slow decline as GDP increases

* Most of the high wasteful countries are low in GDP

* GDP's Affect on Plastic Waste Per Year is that it quickly rises and hits a plateau





* An increase in urban population shows no strong increase in mismanaged waste until a slow uptick at the upper bound

* As Urban Population increases, plastic waste increases slowly and then rapidly towards the upper limit of urban population

Summary: The strongest relationship between living environment and plastic waste is an increase urban population. Plastic waste is also higher in low GDP countries, so a multivariate exploration of large cities with low GDP would be interesting to see how much they contribute compared to their high GDP counterparts.