Data Analytics & Visualization

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Tree Census In New York City

This analysis aims to know about the street tree survey conducted from 2015 to 2016. The dataset gives us insights about the health of the trees, species that are being impacted and find a solution to protect and improve it. In this dataset, we have data about species, the width of the trees and stumps, status of the trees, issues, wellbeing of the trees, in case they are situated on-curb/off-curb and substantially more. Profound analysis of the details mentioned above will give us valuable information based on which the concerned audience can work on maintaining and improving the street trees. In this chosen dataset we have analysed the health status of the trees, the factors that are affecting tree's growth and health and is there a need to change the protection plan and use more guards around the street trees.

The variables of Interest are as follows:

Field	Field name as it appears in dataset	Type	Description
Unique Tree ID No.	tree_id	Integer	Unique identification number for each tree point
Date trees were mapped	created_at	Date	The data tree points were collected in the software
Diameter at height of tree	tree_dbh	Integer	Diameter of the tree, measured at approximately 54"/137cm above ground
Tree Status	status	Text	Indicates whether tree is alive, dead or stump
Tree Health	health	Text	Indicates user's perception of tree health (good, fair, poor)
Common name of Species	spc_common	Text	Common name for species, eg "Red Maple"
No of signs of stewardship observed	steward	Text	Indicates no of unique signs of stewardship observed for alive tree
Presence and type of Tree Guards	guards	Text	Indicates whether guard is present and if the user felt it was harmful or helpful guard
Zipcode	zipcode	Integer	5-digit zip code in which the tree is located
Borough name	boron	Geographic	Name of borough in which tree is located
Latitude of Tree point	latitude	Double	Latitude of point
Longitude of Tree point	longitude	Double	Longitude of point
Problems	Problems	Text	Indicates problems faced by tree for poor health

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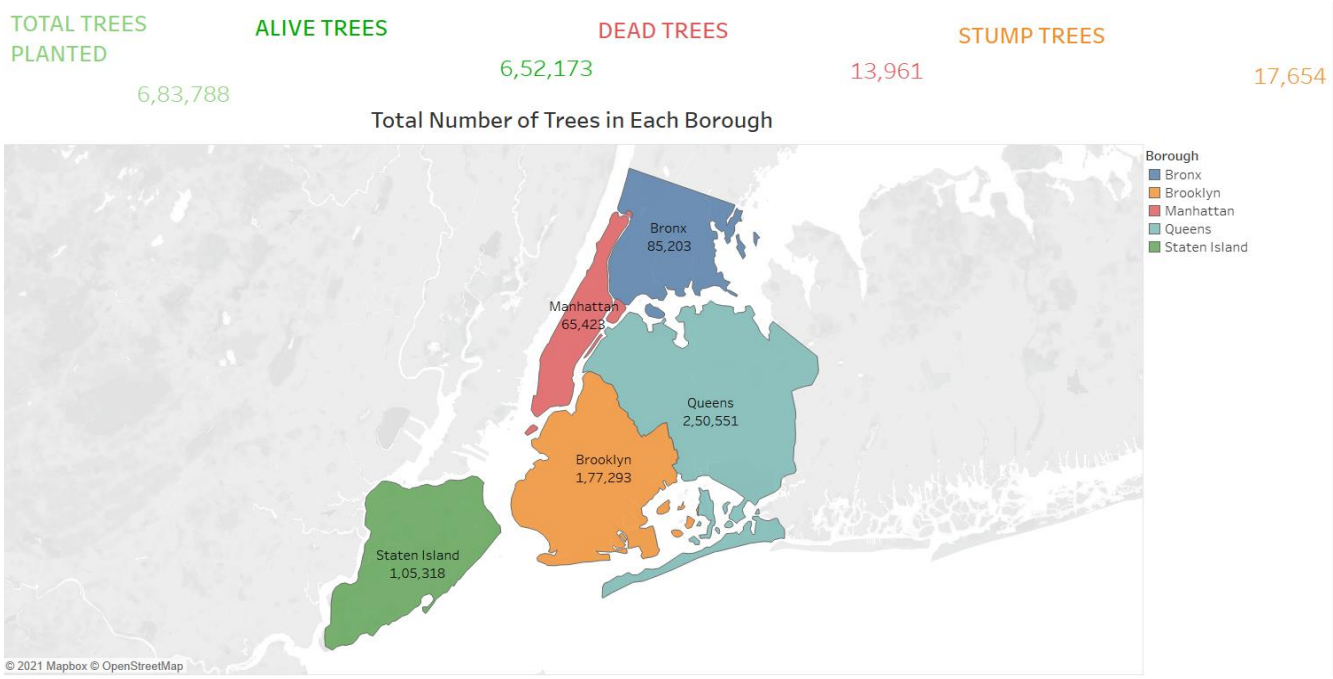
Analysis:

Fig 1: Total Number of Trees in Each Borough

According to the dataset, there are records of about 683,788 trees from New York. Where the maximum number of trees are planted in Queens and Brooklyn with tree count of 250,551 and 177,293. Whereas Manhattan has least count of Trees 65,423.

The street view also assists us with understanding our tree status in an expansive range wherein we can get insights about the exact location of trees and their health status



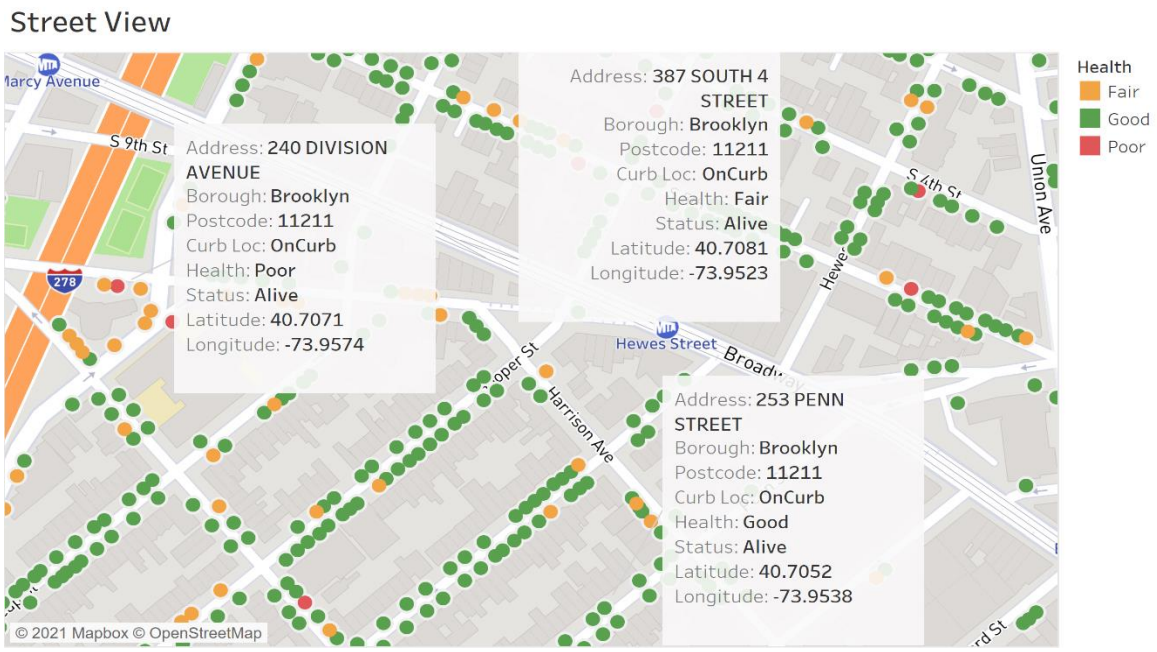


Fig 2: Health status wrt Borough

According to the underlying diagram we saw maximum number of Trees are mapped in Queens and Brooklyn area whose health seems to be good. Queens shows 29.75% trees with good health and 5.30% trees with poor health as for Brooklyn poor health observed is almost 1% and good health is approximately 21.19%. Now that we know that these are two areas which have maximum trees with poor health, we will check common problems leading to poor health.

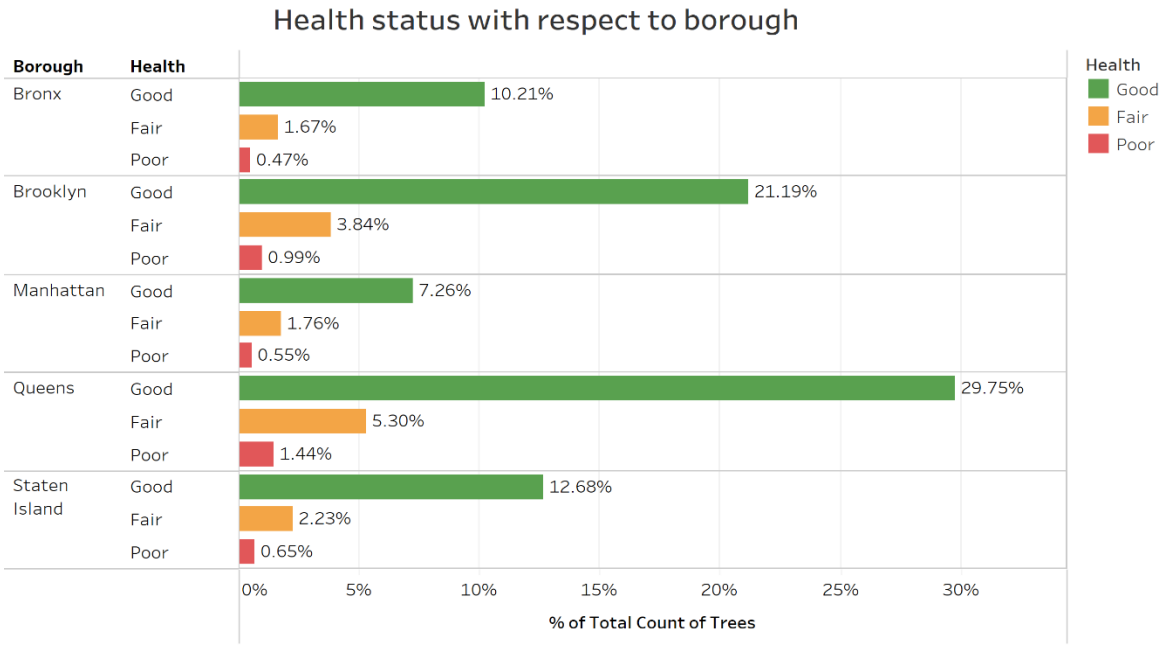


Fig 3.1 : Common problems leading poor health wrt Borough

The given visualization conveys information about top 6 problems leading to poor health of the tress spread across 5 Boroughs. The colour shows us details about these top 6 problems. From the visualization we can conclude that maximum of the trees has poor heath due to Stones *(root problems caused by paving stones in the tree bed)* followed by Branch lights *(Branch problems caused by lights or wires)*. Along with this let us also check if the size of the tree diameter has any impact on the survival rate.

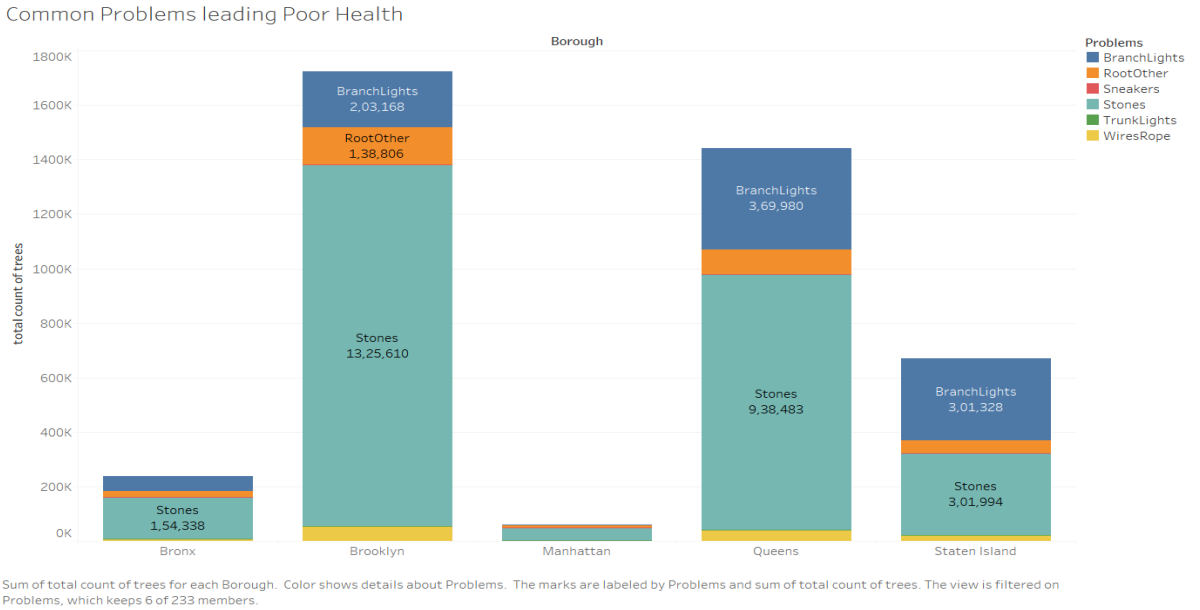


Fig 3.2 : Problems leading poor health wrt Diameter

The below boxplot depicts the average tree diameter in each borough and how the size of the diameter is affecting the health status. According to the below figure it is clearly understood that the lesser the diameter of the tree, poor is the condition of the tree. Hence, we can conclude that smaller trees have less chance of survival than larger trees.

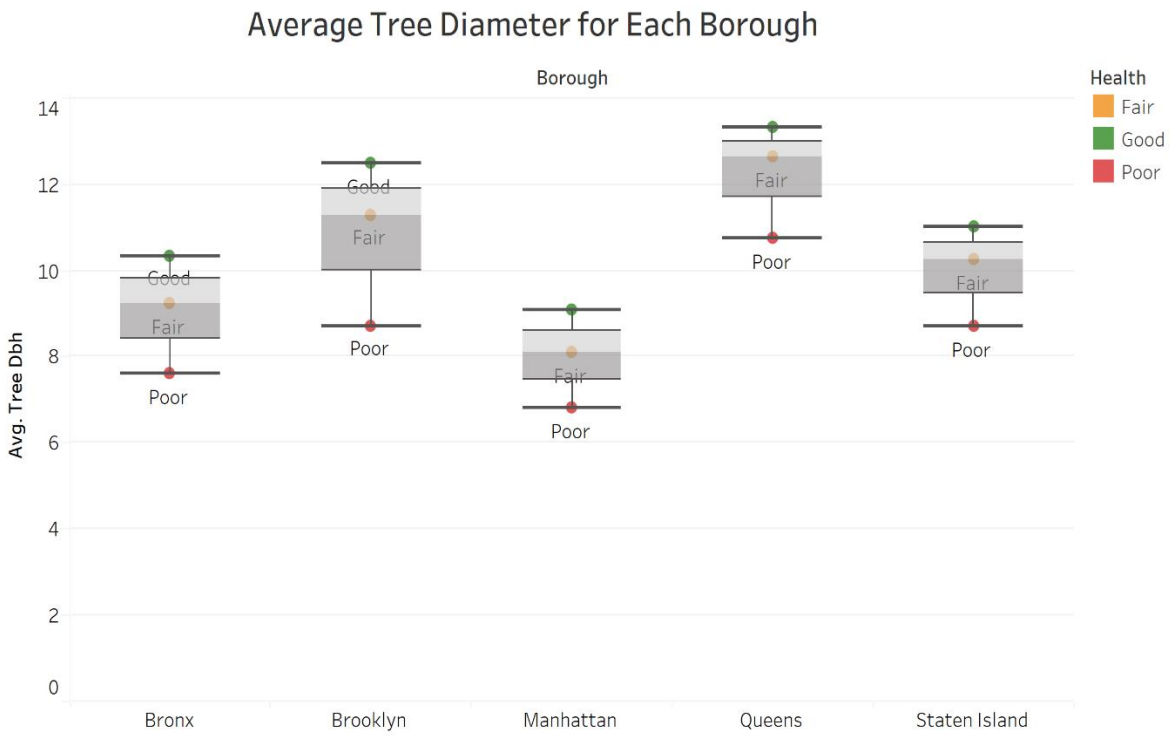


Fig 4 : Protective Measures

We can say the majority of the good trees have no guards but if they are not taken care of henceforth, they are most likely to be affected by various issues which we saw in figure 3.

Also considering the stewardship (signs related to care of the tree) we can see that most of the Boroughs show no stewardship, if this is been taken care by the NYC Park then there is a high possibility of tree being in a good shape.

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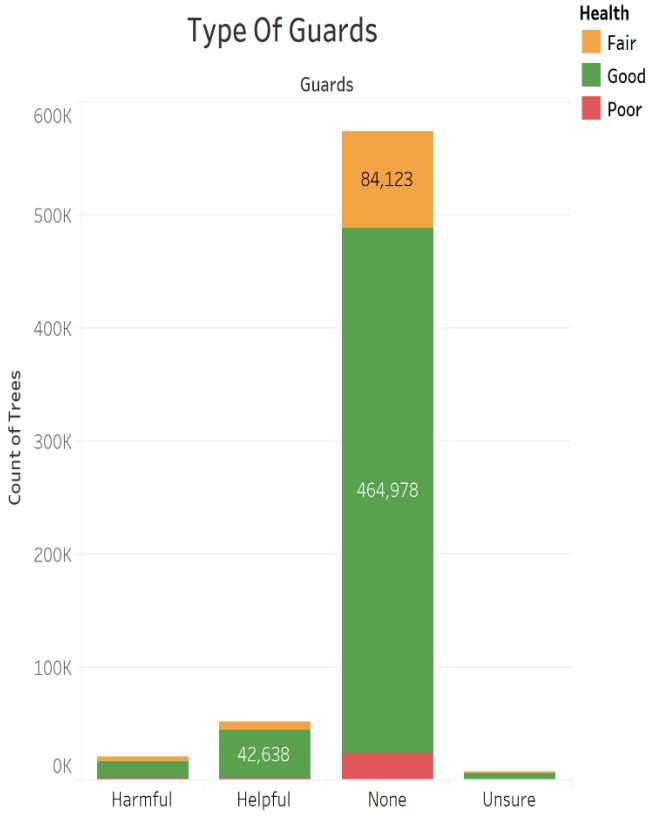

Stewardship wrt health

Health	Borough	Steward 1or2	3or4	4orMore	None
Fair	Bronx	2,118	124	6	8,507
	Brooklyn	6,460	757	59	17,708
	Manhattan	4,363	1,374	76	5,352
	Queens	6,057	398	43	27,655
	Staten Island	2,648	129	11	11,625
Good	Bronx	11,947	683	61	53,200
	Brooklyn	35,667	5,130	464	96,593
	Manhattan	17,739	5,803	448	22,013
	Queens	33,544	2,539	278	155,698
	Staten Island	15,368	1,240	98	65,513
Poor	Bronx	633	41	2	2,363
	Brooklyn	1,629	143	10	4,651
	Manhattan	1,425	418	16	1,663
	Queens	1,825	112	15	7,325
	Staten Island	696	23	2	3,478

Count of total count of ..
2 155,698

Conclusion:

We can infer that the diameter of trees significantly affects the durability of trees, the trees with smaller diameters are less likely to survive than the trees with larger diameters also most of the problems observed by the trees are side to stones on the pavement and branch lights which is leading to poor health of trees. Besides, guards and protection cover are playing an important role in protecting trees but it was observed that the trees with no guards are in good condition but are likely to deteriorate due to difficulties we saw. According to the analysis most of the trees are in good shape and are healthy focus needs to be only on the trees with poor health which are comparatively very less.

Recommendations:

The NYC Park staff needs to foster a particular assurance intend to tackle the above noticed issues, such as providing more maintenance and creating protection covers for all the trees in the neighbourhood. Trees with poor health are mostly because of the branch and stone problems which need to be taken care of and more guards need to be installed for better survival rate. More attention needs to be given to the trees with smaller diameters as they are at the risk of depletion. If the above points are taken into consideration, there is a better chance of the trees surviving which can lead to a healthy environment.

Reference:

https://www.kaggle.com/nycparks/tree-census?select=new_york_tree_census_2015.csv