2015 Street Tree Census in New York

Course ALY6070: Communicate/Visual Data Analytics

Final Report

Submitted to: Trubskyy, Mykhaylo B.

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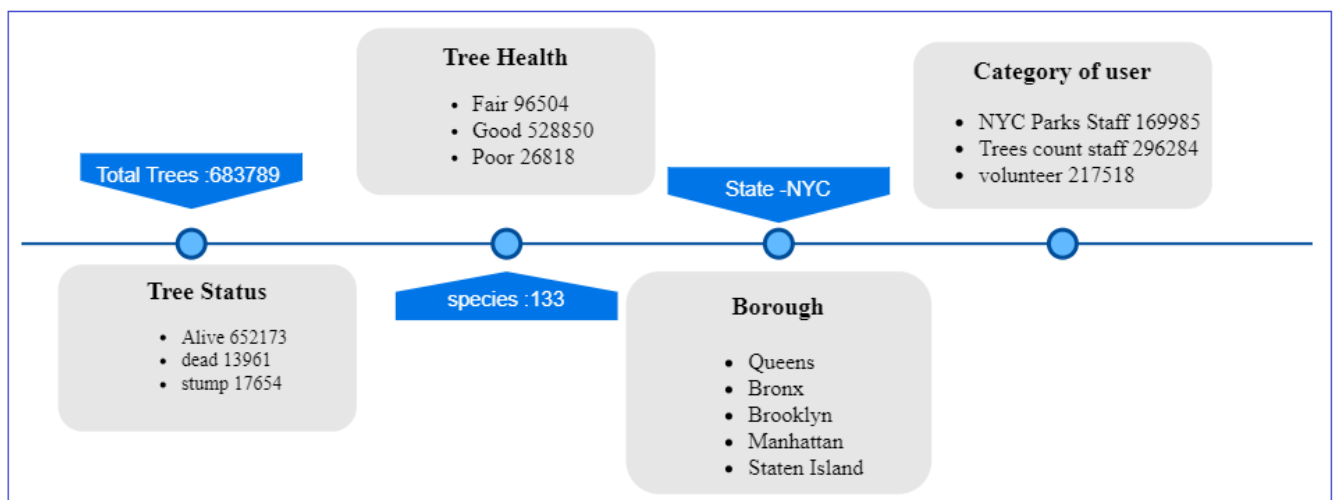**Date:** March 24, 2020

Content

Introduction

New York City, as one of the busiest City in the world, has surprisingly large amount of green space. The 2015 tree censuses were conducted by NYC Parks and Recreation staff, program staff, and hundreds of volunteers. This dataset includes a record for every tree in New York City and includes the tree's location by borough and latitude/longitude, species by Latin name and common names, size, health, and issues with the tree's roots, trunk, and branches.

This draws our attention to analyze the trees in NYC. Before looking at any data, the problems we are interested in including

- Which borough has the highest and the lowest number of trees?
- Which borough has the most good health trees and which borough has the poor condition trees?
- Why there are fewer trees in Manhattan? or what can be done to increase the trees count in this part?
- Which borough needs more attention?
- Which are the endangered species and when can we plant the seed again?

Desription of Data:

Tree Health
- Fair 96504
- Good 528850
- Poor 26818

Category of user
- NYC Parks Staff 169985
- Trees count staff 296284
- volunteer 217518

Total Trees :683789

State -NYC

Tree Status
- Alive 652173
- dead 13961
- stump 17654

species :133

Borough
- Queens
- Bronx
- Brooklyn
- Manhattan
- Staten Island

Initial Data Analysis

Table 1 represents the trees count and the density of the trees in each Borough. We can see that Queens have maximum number of trees. However, Manhattan have high density of trees. Table 2 represents the trees count for common species. This helps to understand the which species are precious and has maximum number.

Table 1: Trees Count and Density

Borough	Trees Count	Density of trees
Queens	237812	2451.670103
Brooklyn	169652	2430.544413
Staten Island	101443	1854.533821
Bronx	80585	2315.66092
Manhattan	61495	2860.232558

Table 2: Trees Count for Most Common species

Species	Trees Count	Species	Trees Count
London Planetree	86933	Japanese Pagoda Tree	19333
Honey Locust	64236	Red Maple	17246
Callery Pear	58916	Green Ash	16221
Pin Oak	52948	American Linden	13530
Norway Maple	34167	Silver Maple	12277
Little Leaf Linden	29692	Sweetgum	10653
Other Cherry	29272	Northern Red Oak	8388
Japanese Zelkova	29195	Sugar Maple	2840
Ginkgo	20879	Sycamore Maple	2727

Correlation patterns

In analysis, we have used using 35 out of 45 features provided in the dataset. The features that we are working with, have correlations that we found out to be important. Some of the correlations that we found out are listed below-

1. stump_diam, steward and guards are dependent on 'Status'. If status of the tree is stump/dead, then the features mentioned in the beginning would be valid.

2. We have also like to co-relate boroughs with steward, to see where more stewardship is required

Main Analysis

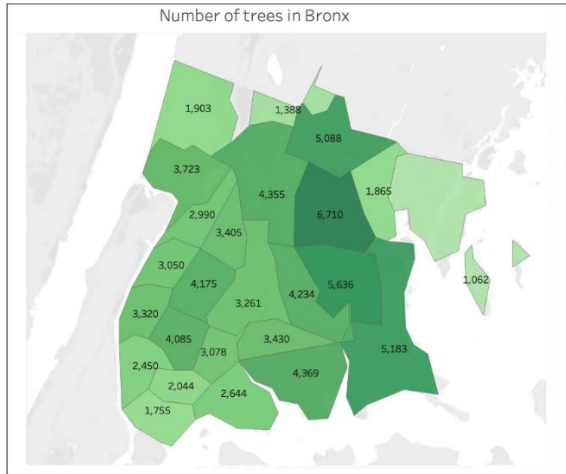## Which borough has the highest and the lowest number of trees?
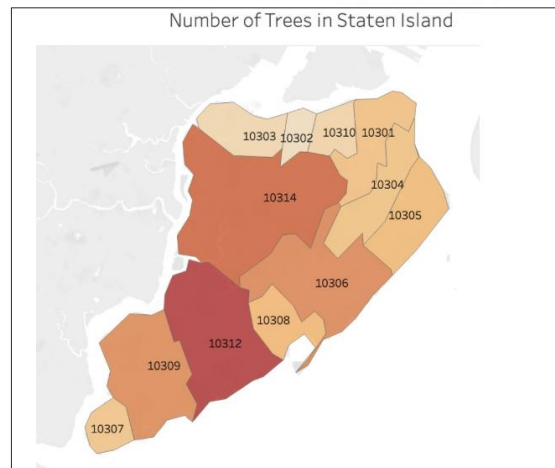

Fig 1. Number of trees in each area of Bronx

Fig 2.Number of trees in each area of Staten Island
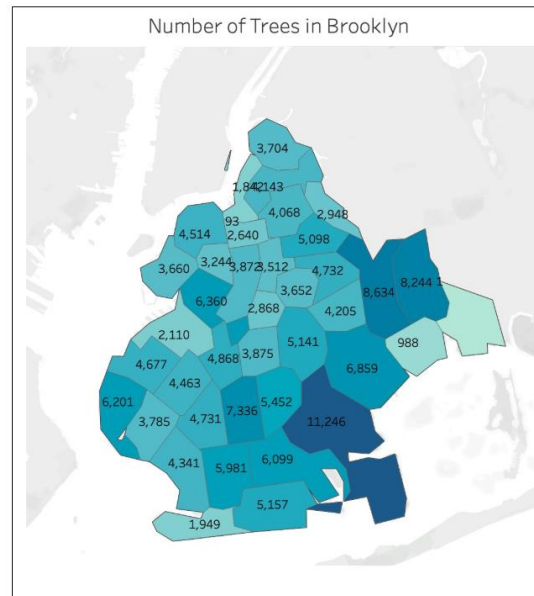

Fig 3 Number of trees in each area of Queens

Fig 4. Number of trees in each area of Brooklyn
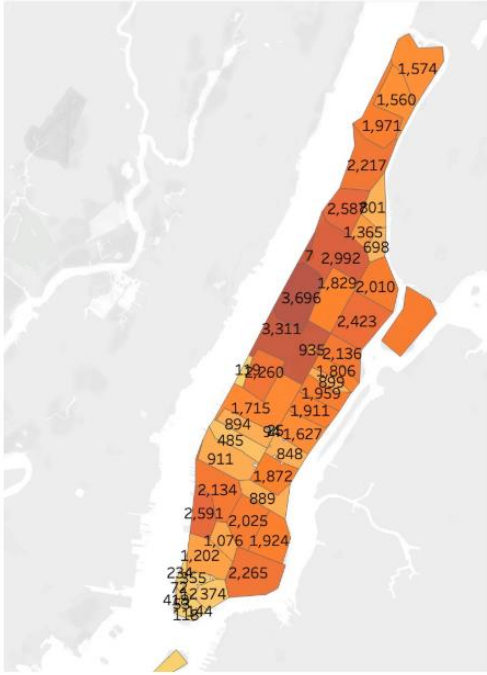
Number of Trees in Manhatten

Fig 5Number of trees in each area of Manhatten

Interpretation:

Figure above plots we can see that the tree cover rate is a lot and denser in the areas / postal codes towards the East of the **Bronx** borough. Post code: 10469 has the maximum number of unique tree points with 6,710 trees.

we can see that the tree cover rate is denser in the areas towards the South of the **Queens** borough. Post code: 11385 has the maximum number of unique tree points with 10,937 trees.

we get the exact count of trees present in each postal code of the **Manhattan** borough Post code: 10025 on the western side of the map has the maximum number of unique tree points with 3696

we can conclude that postal code: 10312 has the maximum number of tree points despite having a comparatively smaller area as compared with some other post codes in the **Staten Island** borough. F

we can see that the tree cover rate is a lot denser in the areas / postal codes towards the south-east of the **Brooklyn** borough. Post code: 11234 has the maximum number of unique tree points with 11,246

Critical Thinking

We select Queens and Manhattan boroughs for the sake our analyses as these two boroughs denote the highest and the lowest number of tree points. These two boroughs help us in addressing our business objectives i.e. which borough has the highest and the lowest number of trees as well as which borough needs the most attention.

Based on our analysis, we can conclude that Manhattan not only has the lowest number of trees but also has the lowest number of alive trees, therefore we say that it is necessary to increase the stewardship in Manhattan and also conclude that it's necessary to plant more trees in the Manhattan

Which borough has the most good health trees and which borough has the poor condition trees?

Fig 6 Bar graph representing the Status of Trees in each Borough
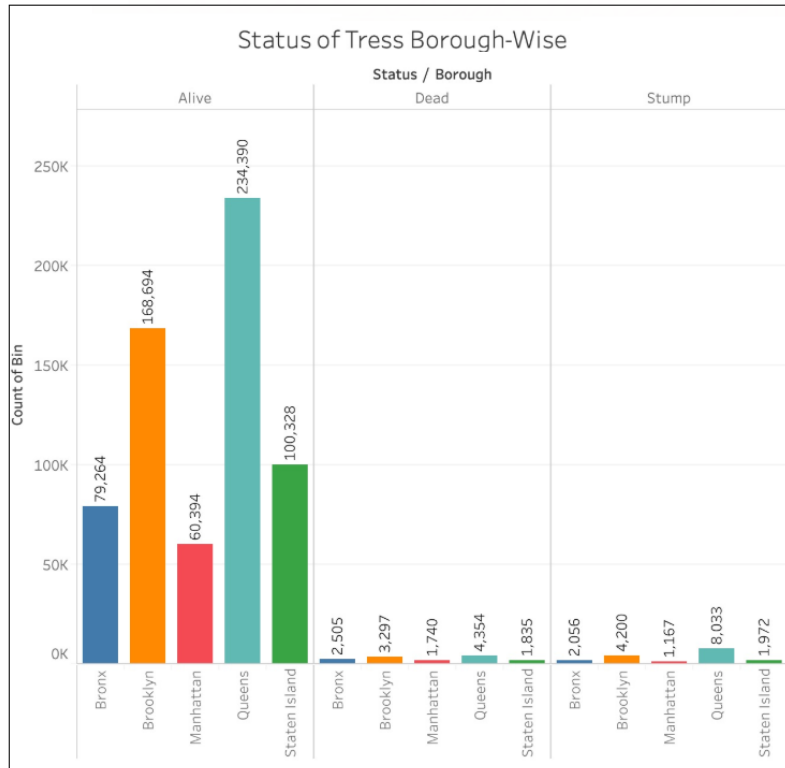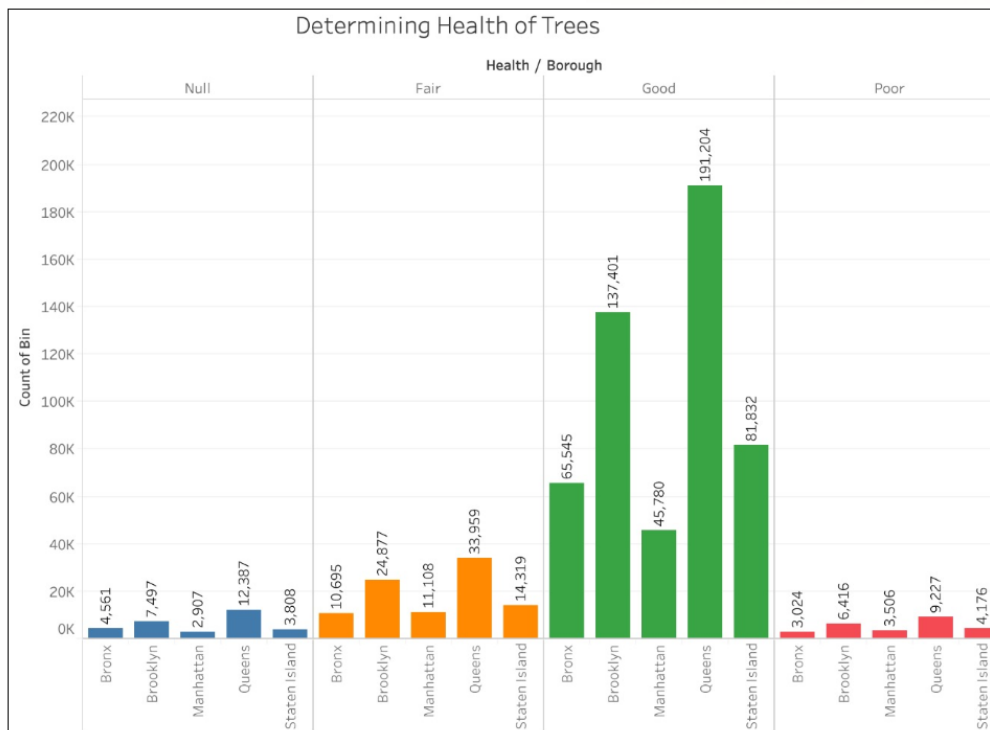
Interpretation:

we have checked the status of the trees in each borough. **Queens** has the highest alive trees and **Manhattan** has the lowest Alive trees. Similarly, Manhattan has the lowest number of dead trees and stump trees. Queens has more Stump trees than any other Borough

Critical Thinking:

Manhatten is the industrial area that's why we have less number of alive trees in that borough. Queens is has more grographical area and space which leads to maximum number of Trees.

We need to plant more trees in manhatten however there is space limitation we can plant more trees in Bronx

Fig 7Bar graph representing the Health of Trees in each Borough

Interpretation:

From fig 7 we can see that The highest number of good trees are on Queens which is 191,204 and the lowest count of good trees in Manhattan 45,780. Bronx has the lowest tree count on the poor health status. The highest number of poor trees is on Queens which is 9,227.

Why there are fewer trees in Manhattan? or what can be done to increase the trees count in this part?
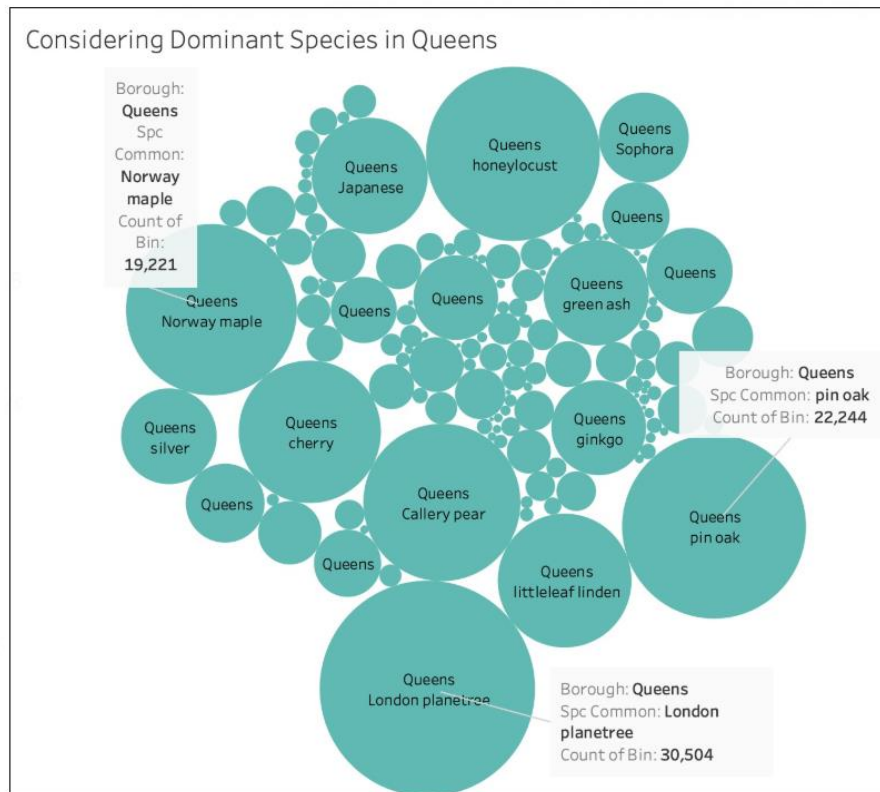

Fig 8 Bubble graph representing the Dominant species in Queens

Interpretation:

We can see different species of tree on the Queens Borough where London Plant ree has the highest count of 30,504. The second highest is the pin oak with the count of 22,244.

Critical Thinking

Dominant species analysis helps to understand which species are more likely to survive in the particular borough. We can consider this analysis to plant more and more trees which survives in Queens
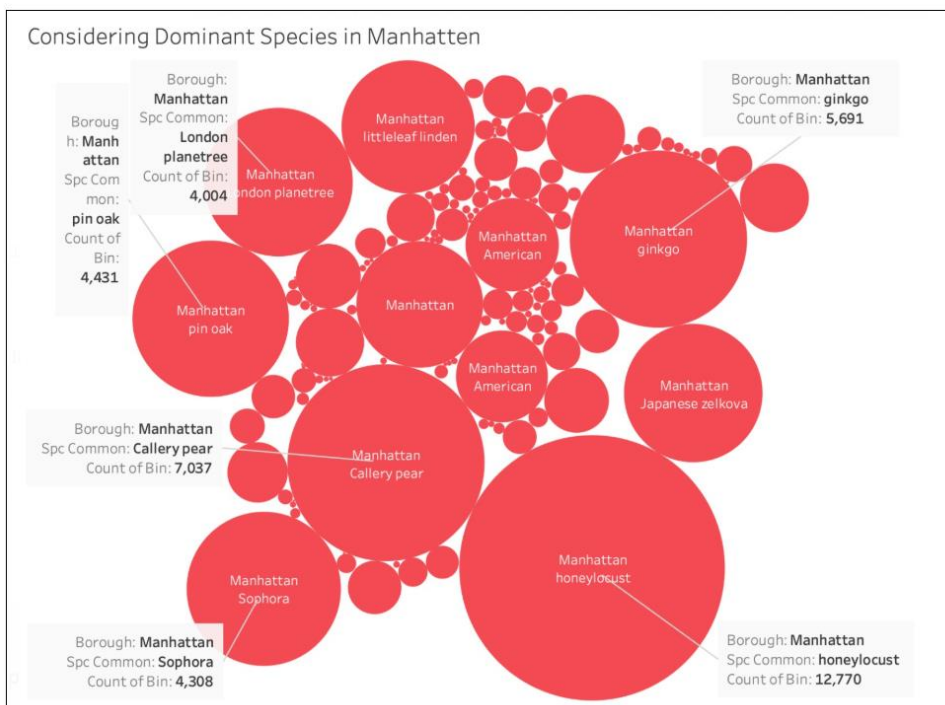

Fig 9 Bubble graph representing the Dominant species in Manhattan

Interpretation :

The above chart shows the different species of trees in Manhattan borough. Among all of them we have highlighted top 5 species and Honey locust has the highest count of 12,770 .

Critical Thinking:

As Manhattan has less number of Trees , this analysis helps us to understand which species are more likely to survive and can be planed in order to increate the number of count
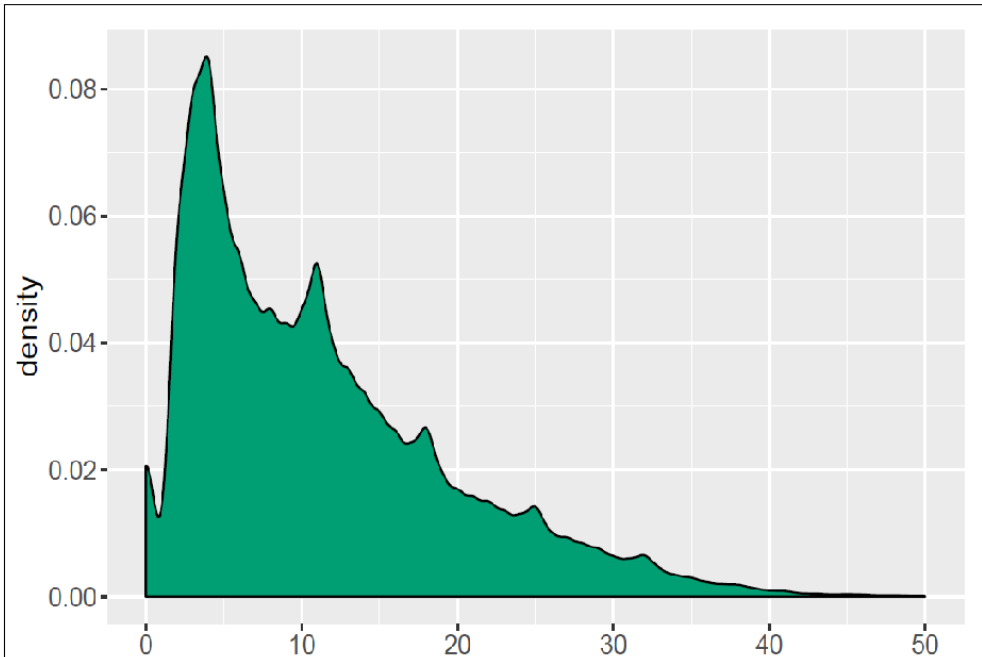
Tree breast height Diameter Grpahs

Fig 10 Density graph representing the Tree breast height diameter

Interpretation:

From Fig 10 We can clearly see the serval peaks. The highest peak is around 4cm, with a density of more than 0.08. In addition, we can see the diameter is distributed normally around the peak of 4cm, even though the plot does not look like a bell, since the lower bound of the diameter is 0 and do not have a upper bound.
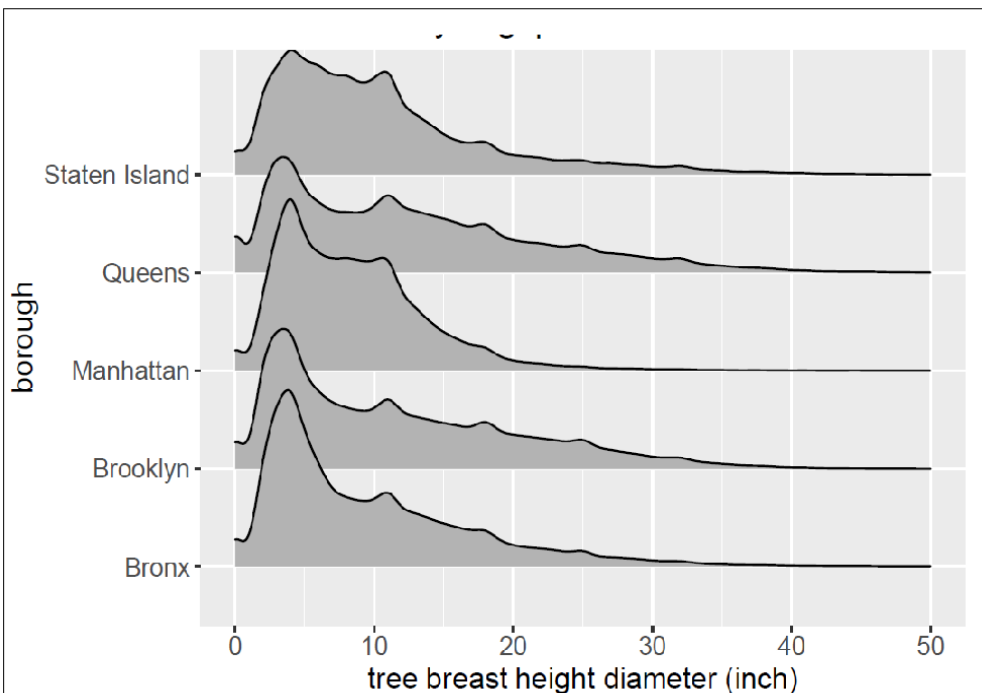

Fig 11 Density graph representing the Tree breast height diameter in each Borough

Interpretation:
From fig 11 we can see that Queens has more trees with diameter from 25-50 than Manhattan, which have very few trees with diameter in that range.

Critical Thinking:

This analysis helps to understand size of the trees in each borough. We can see that though Manhattan has a smaller number of trees it has trees which are larger in size. The sizes of trees are helps to understand the age of trees and maintenance. Bronx also has trees which are larger in size.

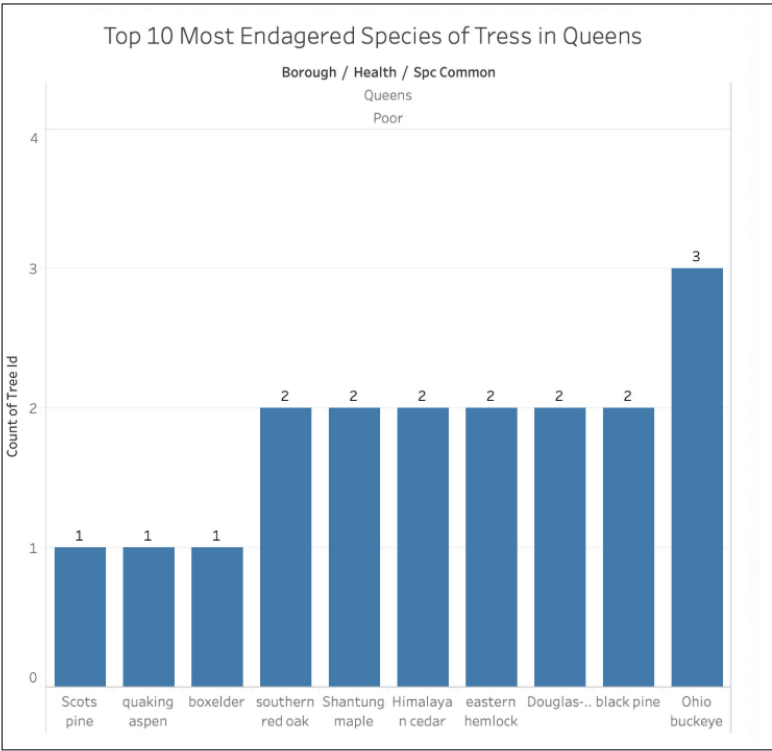# Top 10 Most Endagered Species of trees in Queens and Manhatten

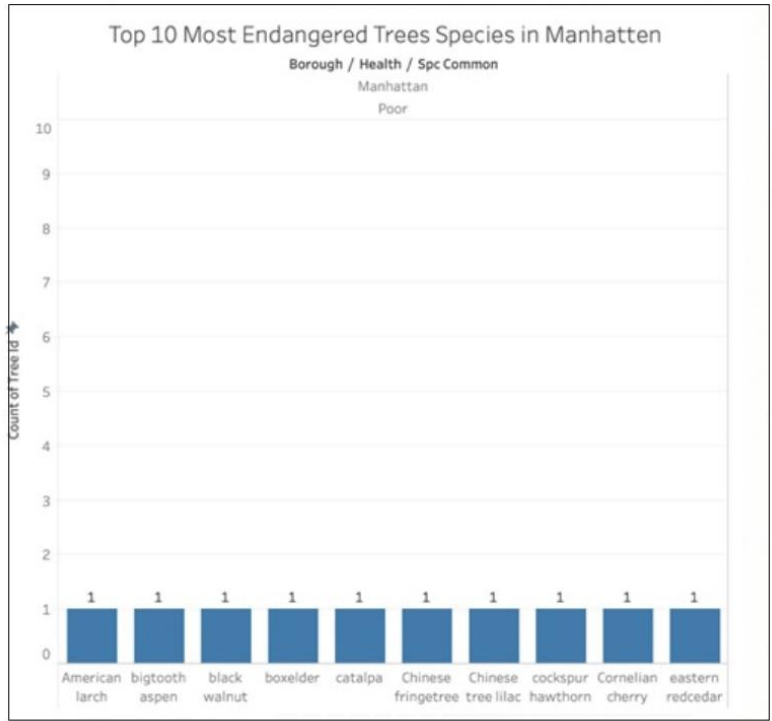Fig 12 Representation of 10 most endangered Species in Queens

Fig 13 Representation of 10 most endangered Species in Manhatten
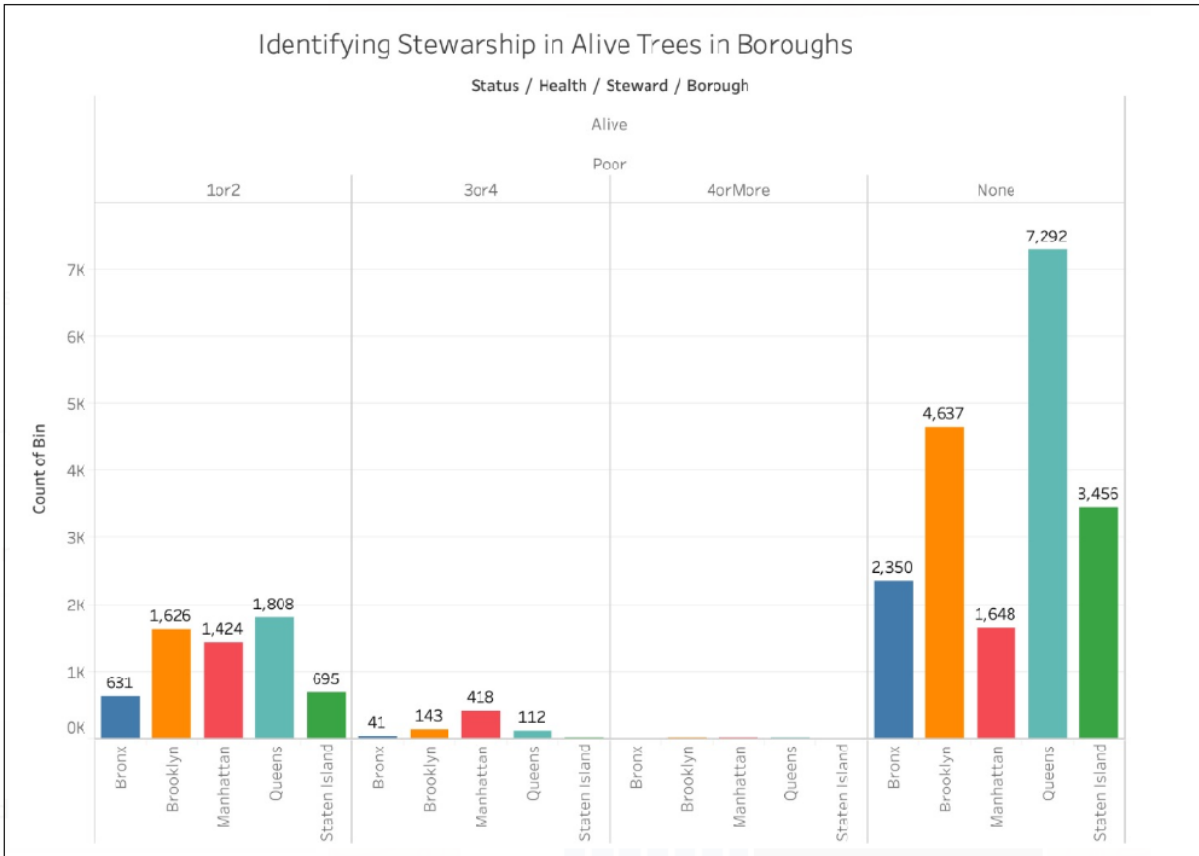
Which borough needs more attention?

Fig 14: Bar graphs representation stewardship in Alive trees in each Borough

Interpretation:

Based on the species count and the health status of the trees, each borough requires stewardship. We want to increase the tree count in each borough and the quality of trees. We have focused on Manhattan as it has the lowest trees count among all the borough. So, if we give more attention on the better condition of those trees in Manhattan, we can keep those trees in good condition and can last longer. Similarly, we need to plan more seeds in Manhattan to increase the tree count. Queens has the highest number of trees but also has the highest amount of poor trees. So Queens will require more stewardship as well. As a result, all the borough requires stewardship based on their current status as well as increase the seeding on the lower region where the count is less.

When can we plant new trees?

Created At
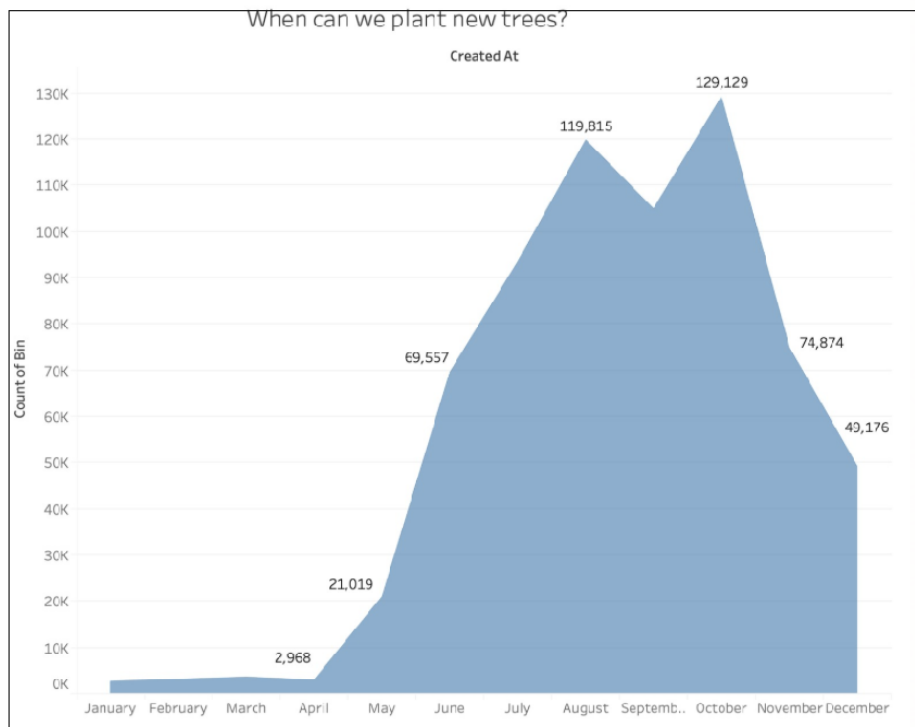
Interpretation :

Based on the above timeline, we can see that there is more plantation of trees from June to October. During this time, we can plant the endangered species of tree and increase the count of the trees on the borough where there is less count of trees.

Figure 15: Monthly distribution of trees count

Conclusion

Based on the analysis of through Tableau and R shiny graphs, we come to know that Queens has the highest number of trees and Manhattan has the lowest count in all boroughs. Similarly, Queens has the highest number of good health trees but also has the highest count of poor trees. So, Queens requires more attention and stewardship. It will help the poor trees to be in better condition and will increase the count of trees in that region

Similarly, since there are fewer trees in Manhattan, we are trying to increase the tree count in this borough. Since, Manhattan has 1,740 dead trees and 1,167 stump trees, with the proper stewardship, we can plant new seed during the peak time and increase the count of trees in Manhattan region. Likewise, we can increase the count of endangered species in Manhattan region during the seeding season. This will help to increase the number of species that are on the brink of extinction. We will implement similar approach in other boroughs as well.