UMD DATA CHALLENGE 2020

Recycling Diversion Rate

Dataset Provider: Booz Allen Hamilton

TEAM - DC20069

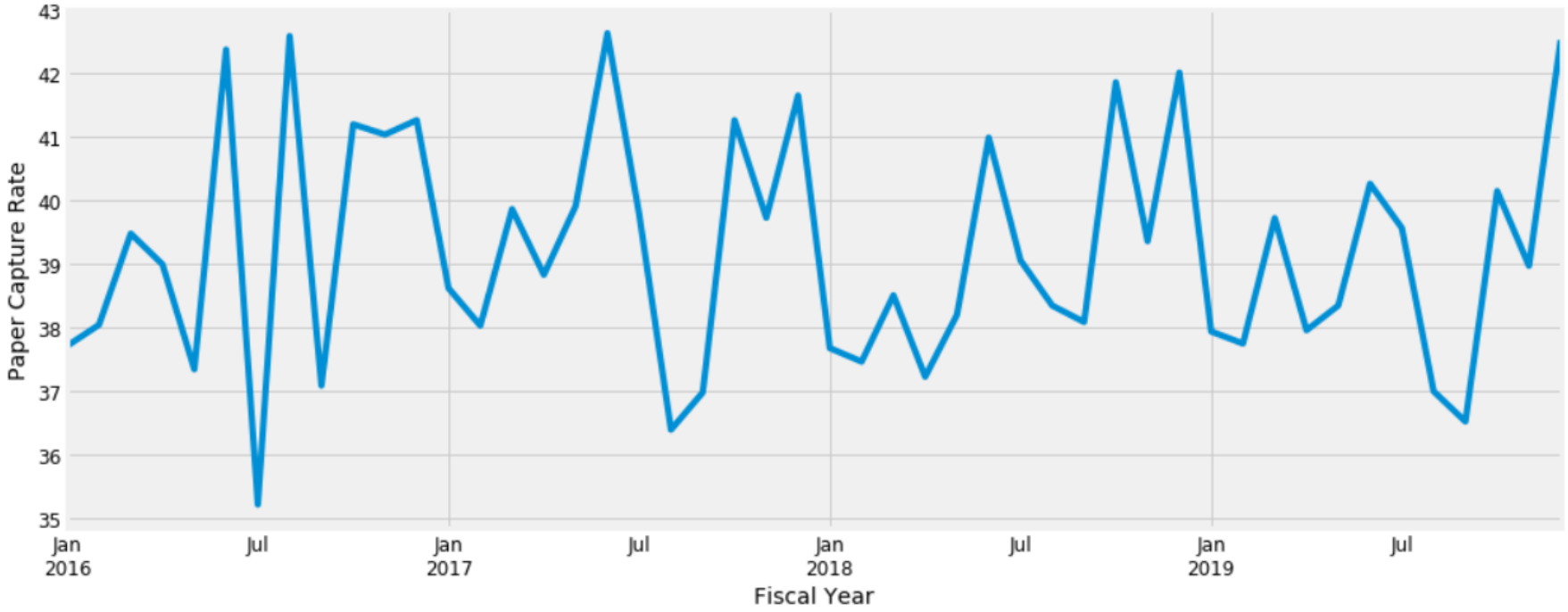
MENTOR: JILL ROBBINS

02/29/2020

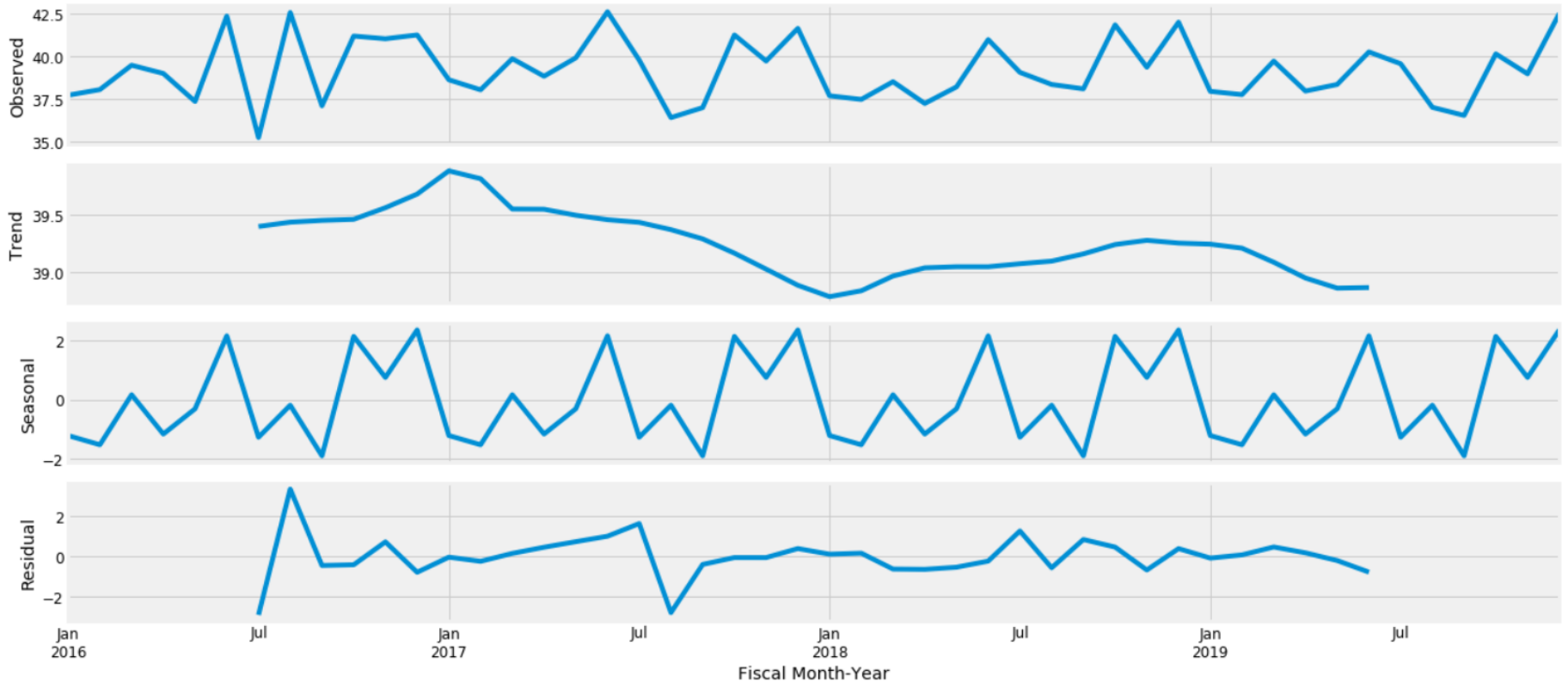
ARTI SINGH

AIONA CRASTA

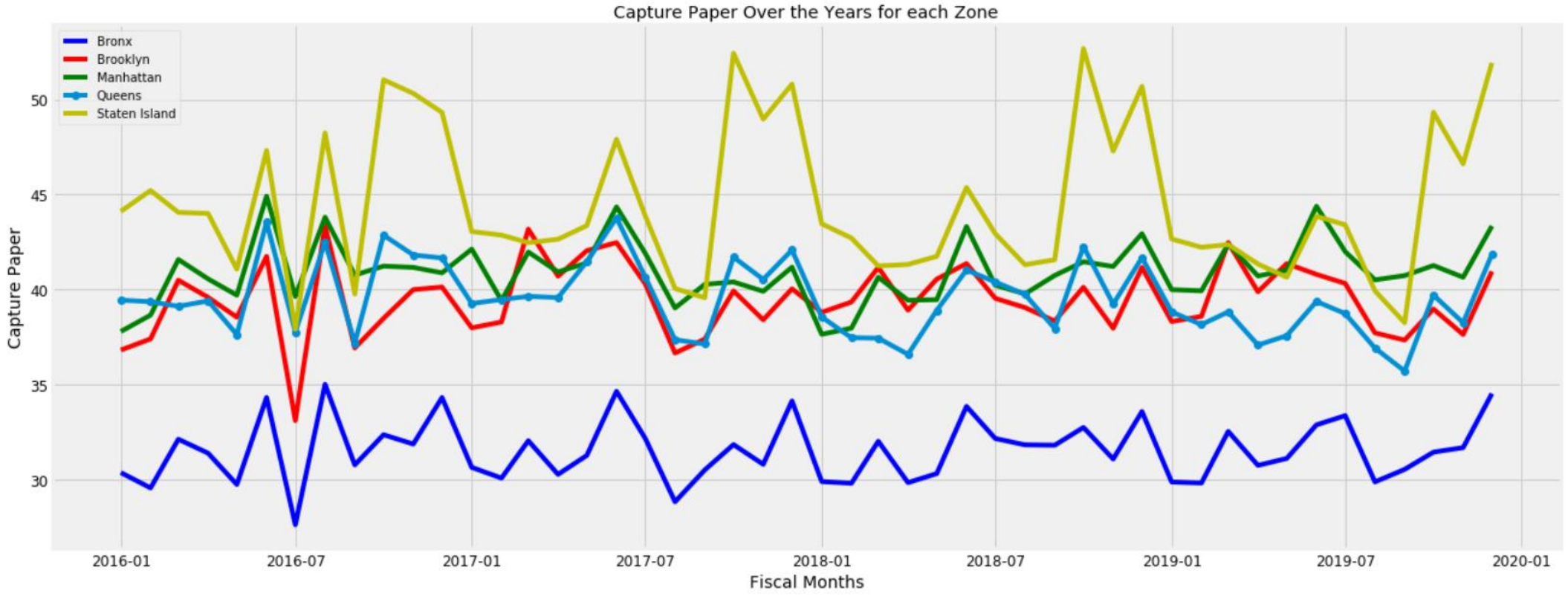
Paper Recycle Capture Rate Over 4 Years



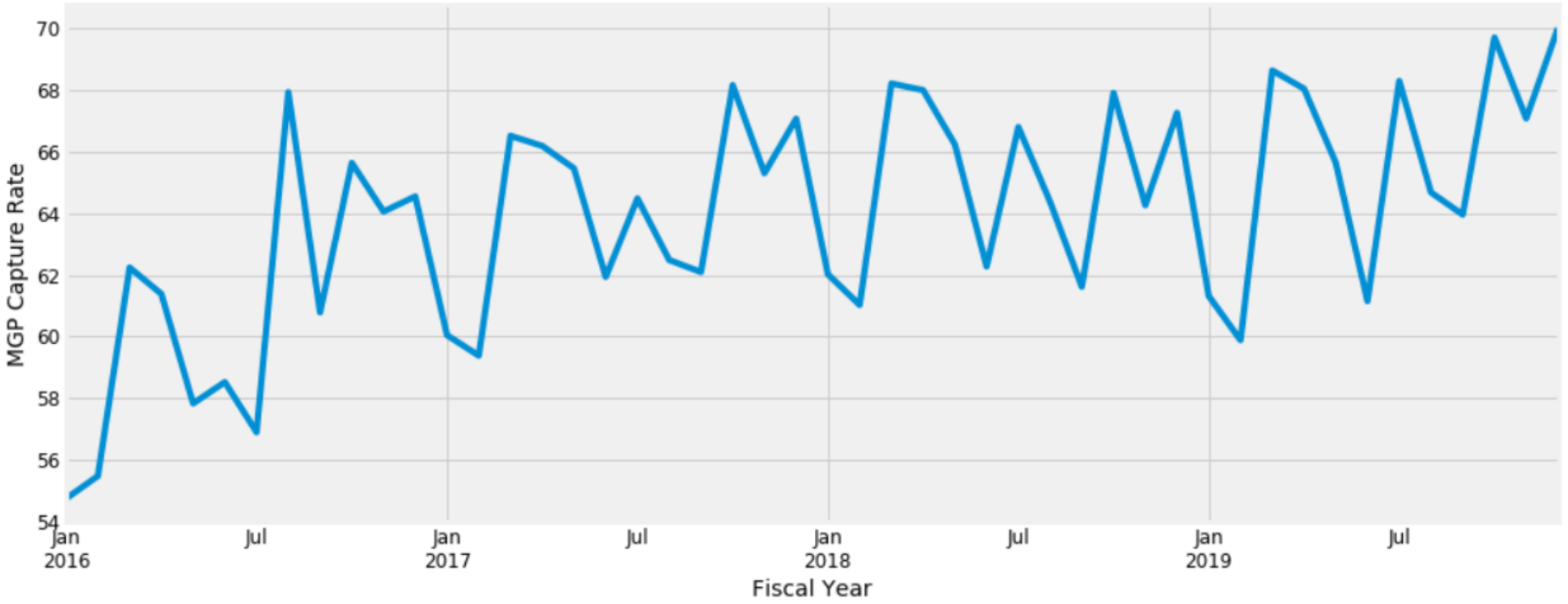
Continued… Detailed Time-Series Analysis



Continued… Categorized by Zone



Metal-Glass-Plastic Recycle Capture Rate Over 4 Years



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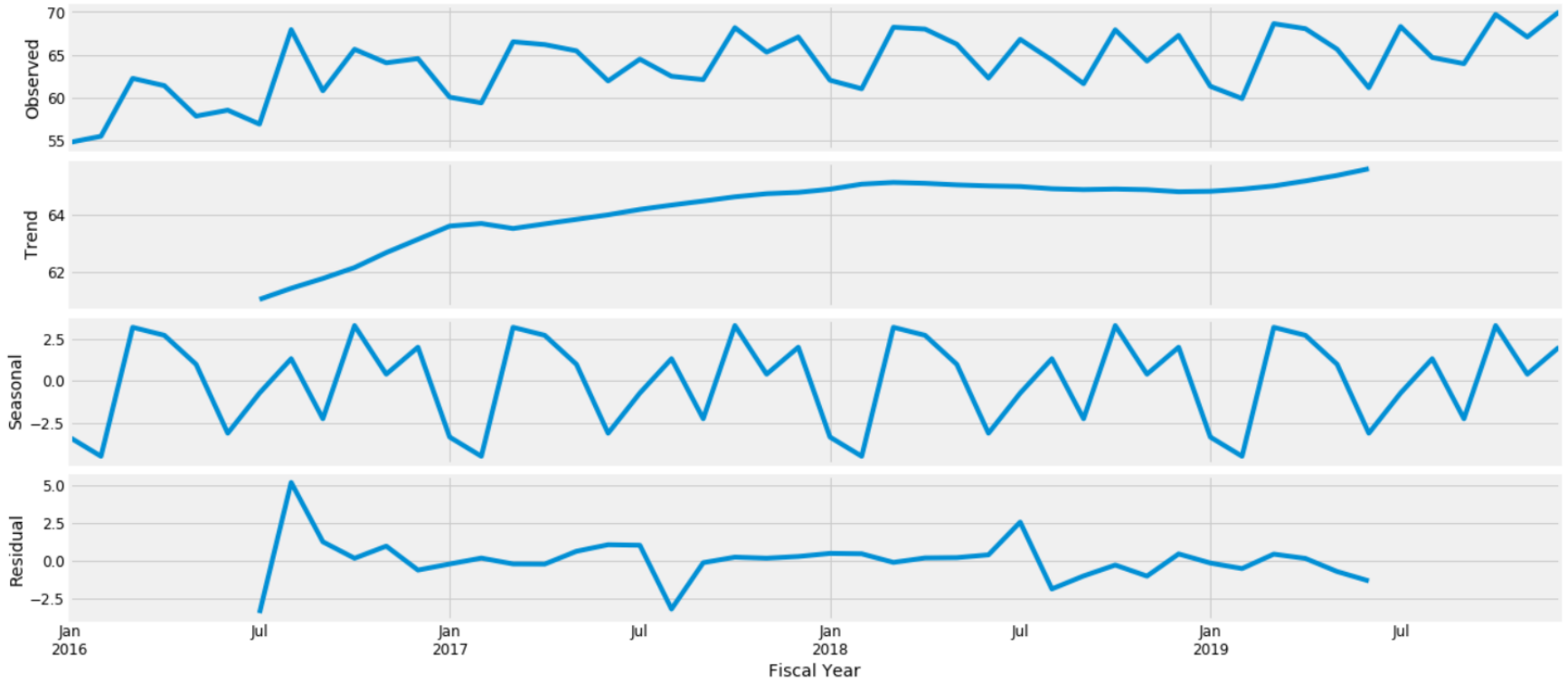

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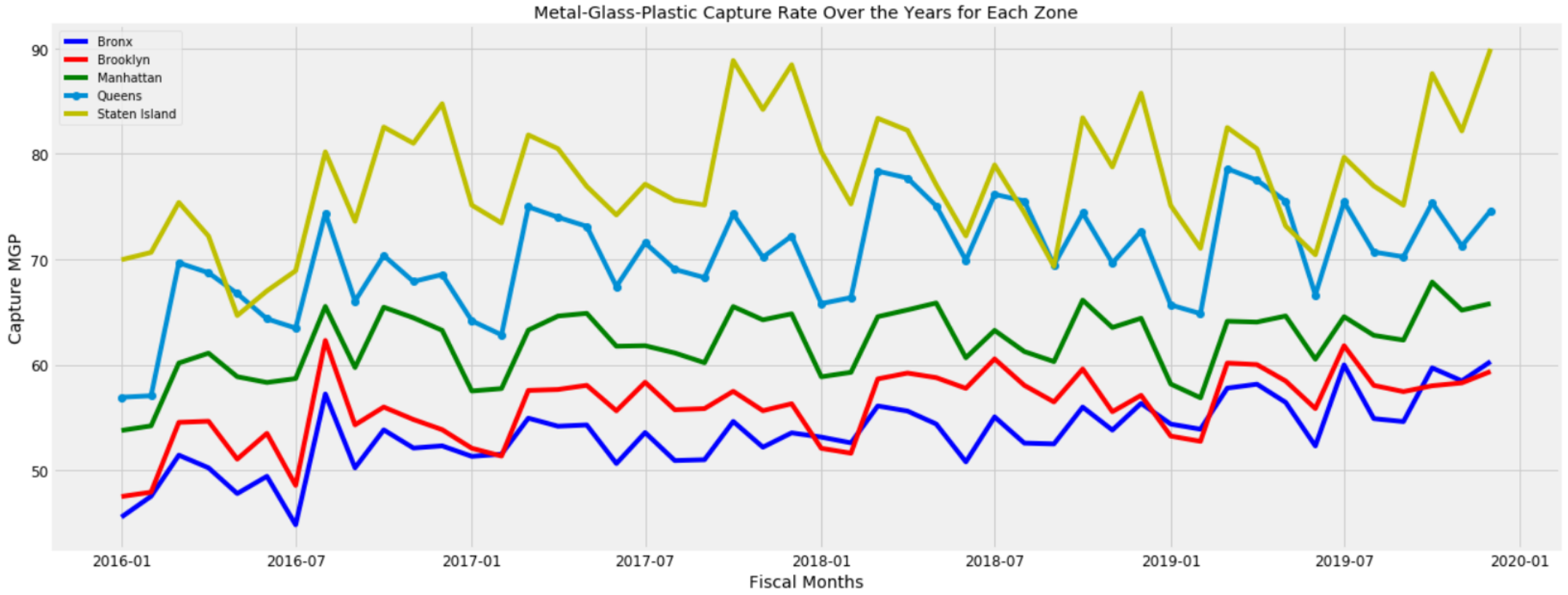
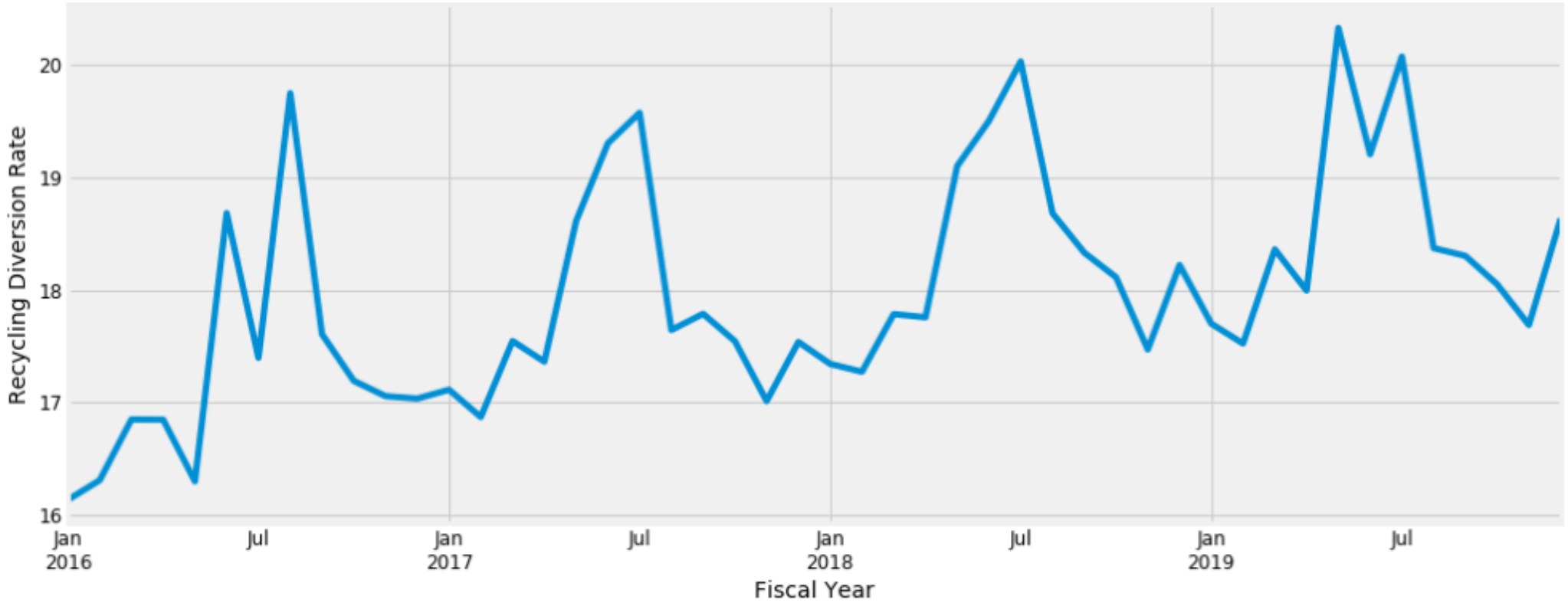
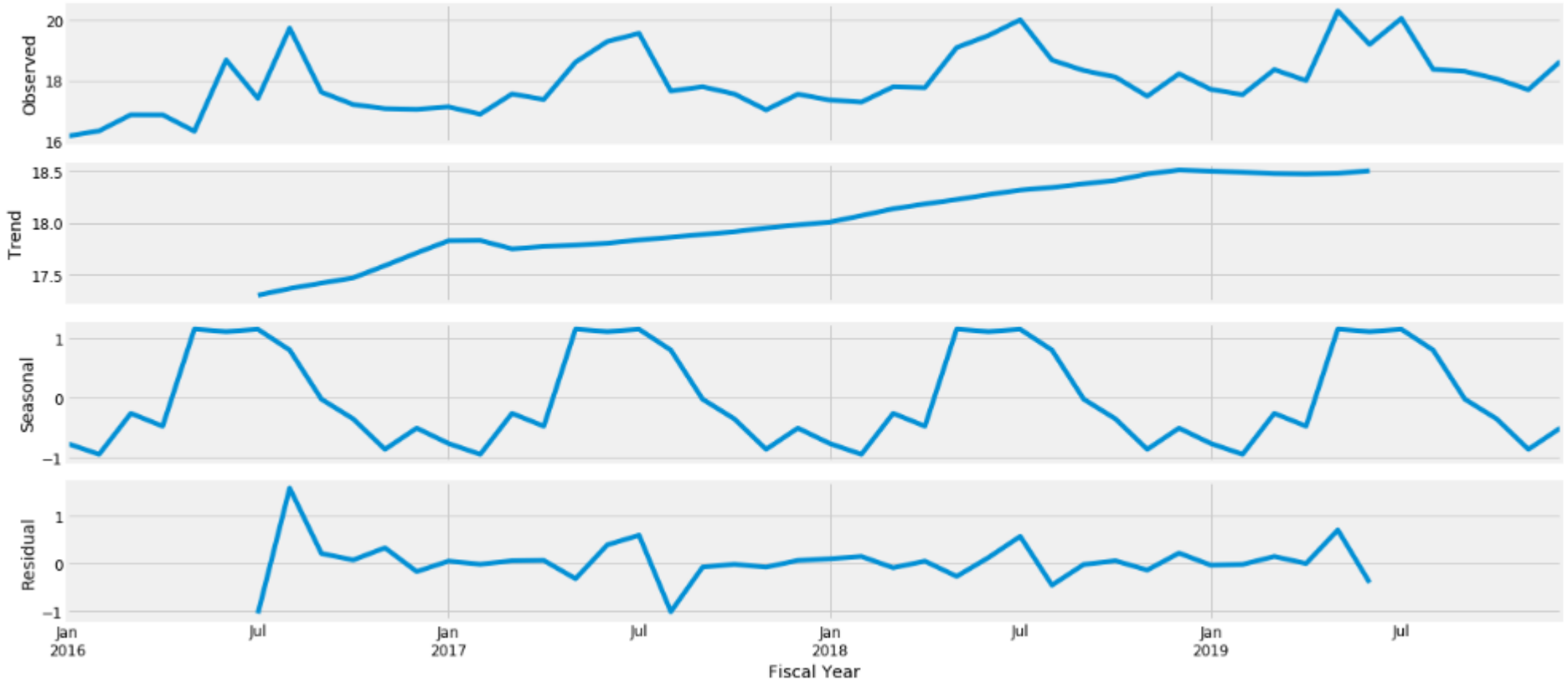


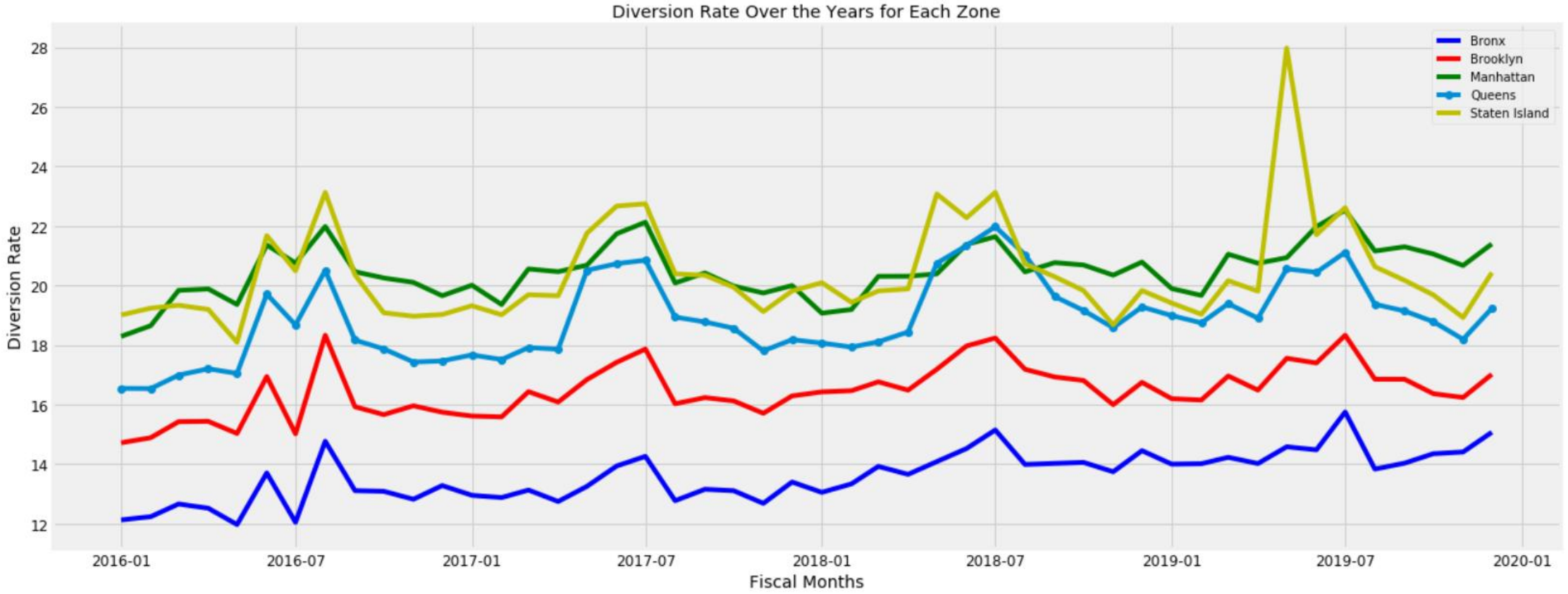
Total Recycling Diversion Capture Rate over 4 Years



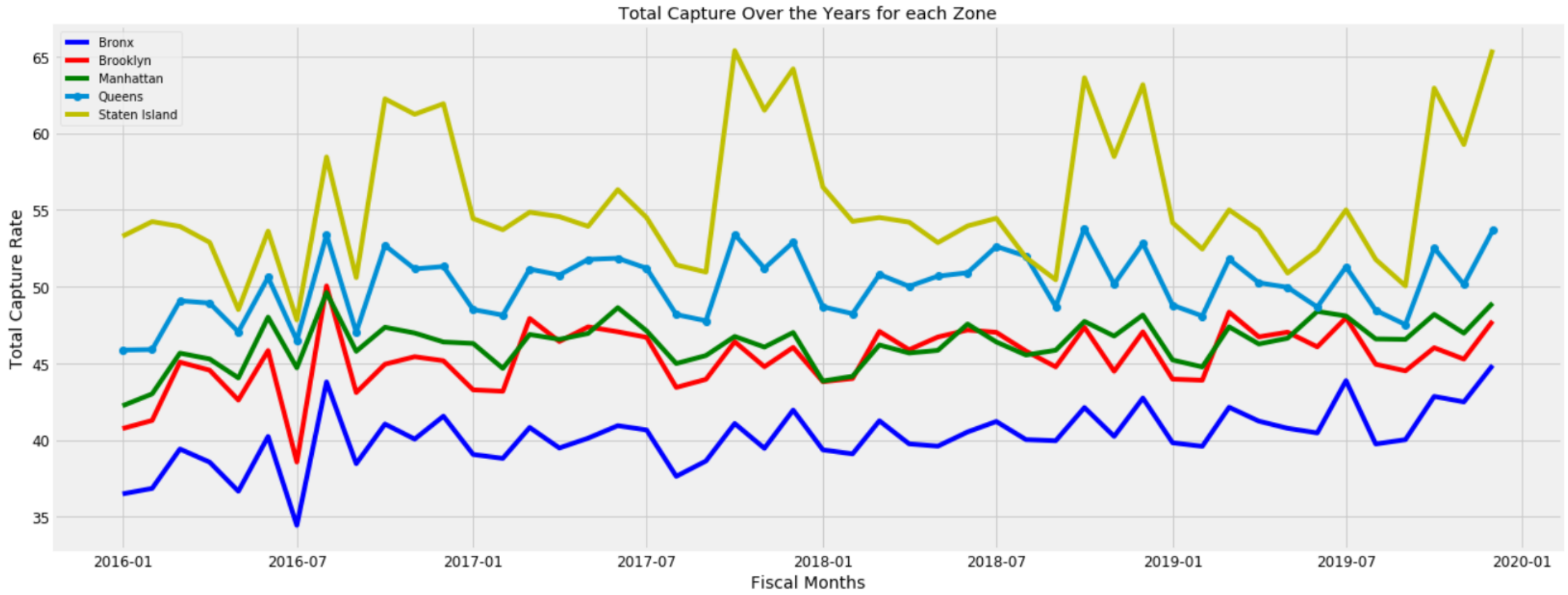
Continued… Detailed Time-Series Analysis



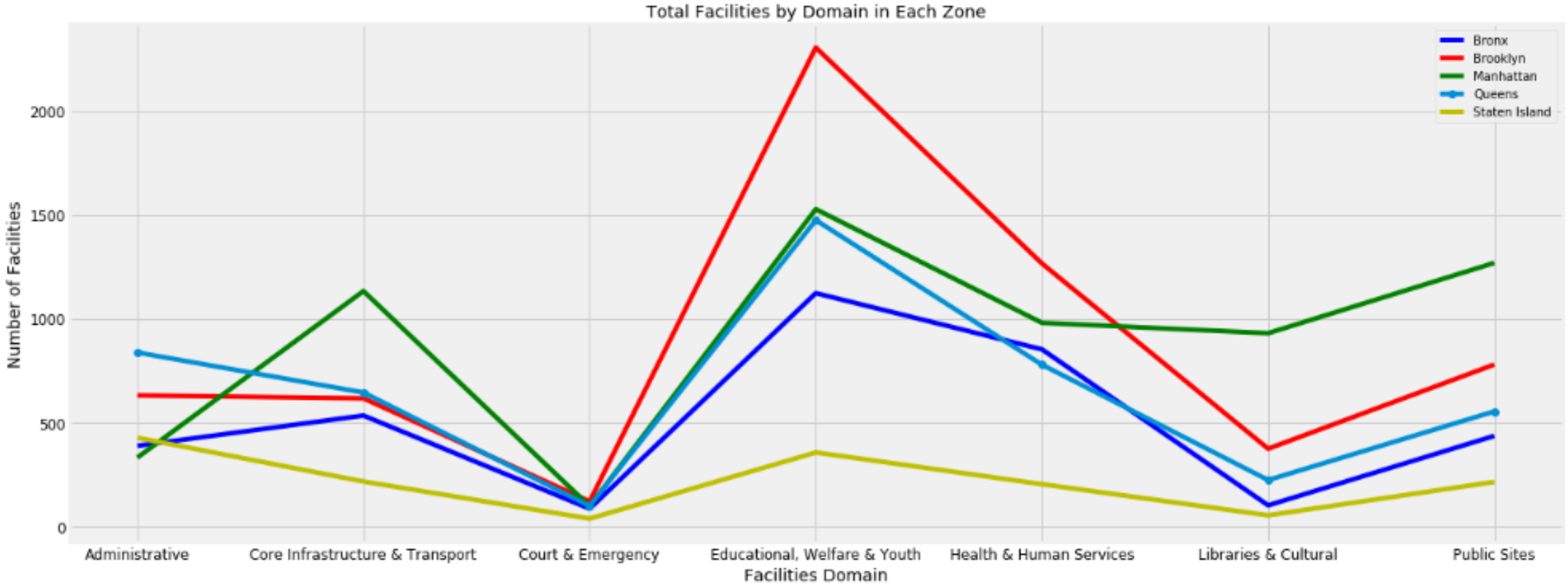
Continued… Categorized by Zone



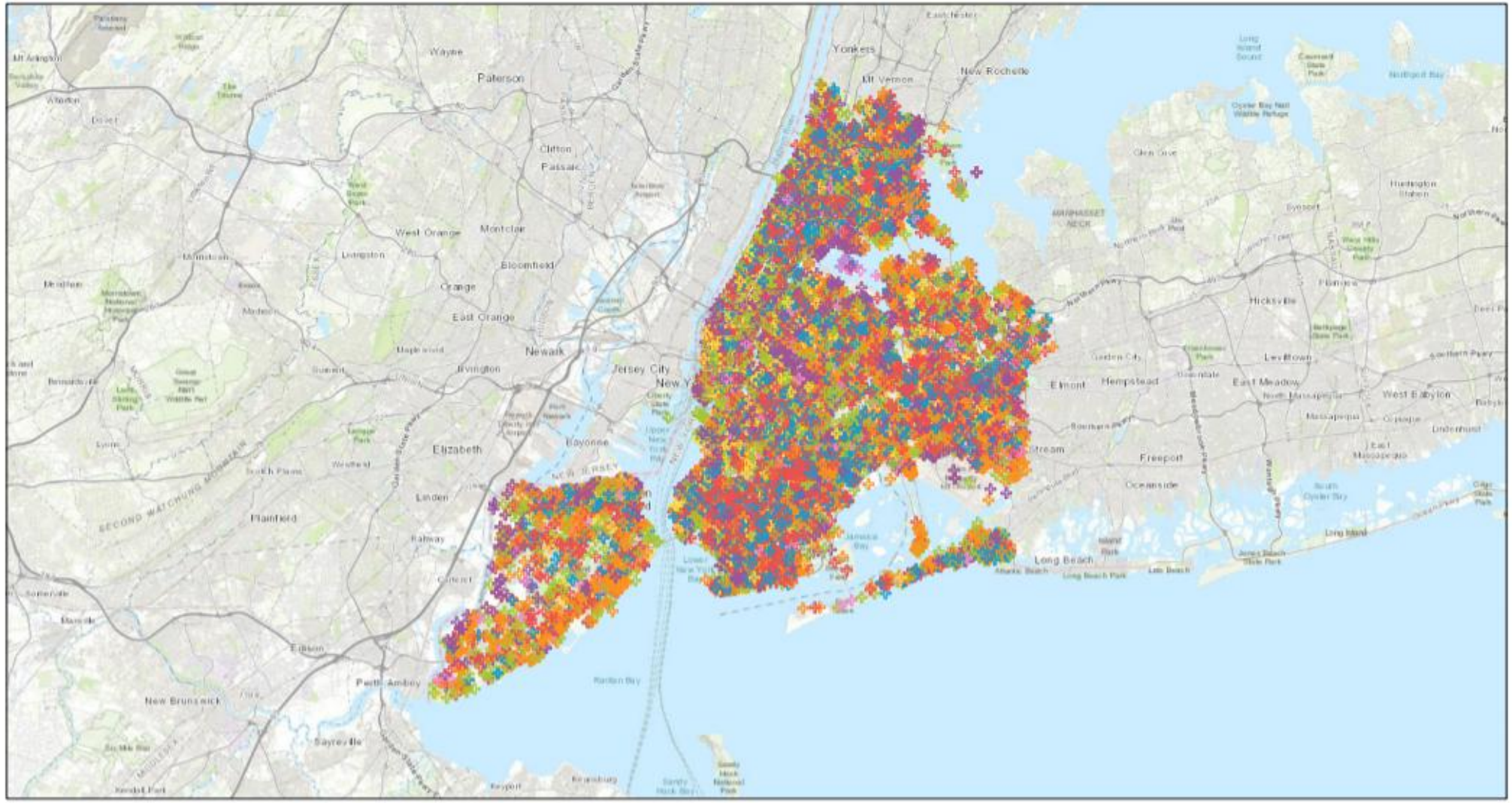
Total Capture Rate Categorized by Zone



Zone-wise Types of Facilities/Service Building



Facilities Map



2/28/2020

New York City Facilities

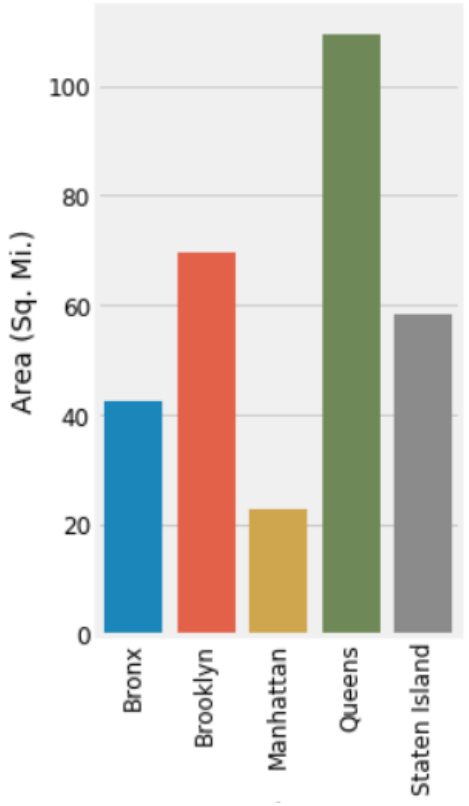
- EDUCATION, CHILD WELFARE, AND YOUTH
- HEALTH AND HUMAN SERVICES
- PARKS, GARDENS, AND HISTORICAL SITES
- CORE INFRASTRUCTURE AND TRANSPORTATION
- ADMINISTRATION OF GOVERNMENT
- LIBRARIES AND CULTURAL PROGRAMS
- PUBLIC SAFETY, EMERGENCY SERVICES, AND ADMINISTRATION OF JUSTICE
- 0.93
- 1.13
- 1.33

1:372,040

0 3.5 7 14 mi

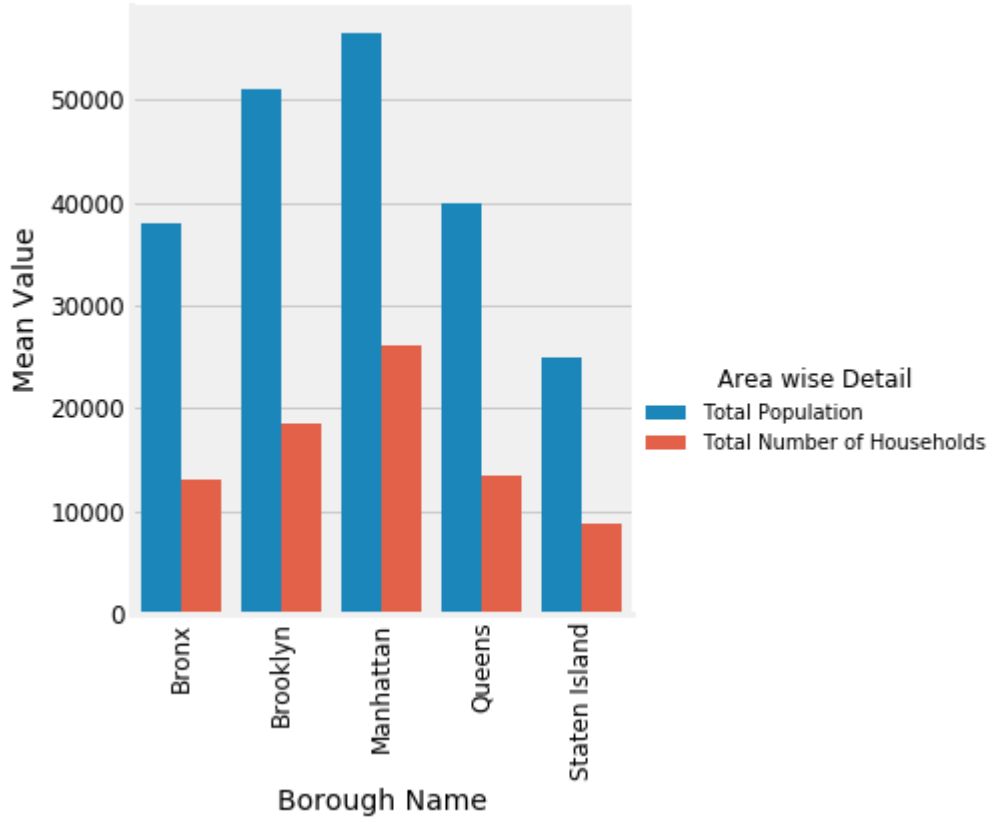
0 5 10 20 km

Zone-wise Household and Population



Borough Name	Population by Household Ratio
Queens	2.971356
Bronx	2.908666
Staten Island	2.848817
Brooklyn	2.759297
Manhattan	2.155860

Borough Name	Population by Area Ratio
Manhattan	2468.274050
Bronx	891.103346
Brooklyn	735.701968
Staten Island	427.676530
Queens	364.847033



Interesting Facts Observed

- **Staten Island** has less Population by Area ratio
- Also, least number of facilities in all domain
- Staten Island has 2nd best Population by Area ratio
  - Reason for high Recycle Diversion Rate and Capture Rate

- **Brooklyn** has 2nd best statistic in Population by Area ratio
- Also, highest number of facilities and 2nd last Capture Rate
  - So, targeting Educational, Welfare & Youth -> can increase Capture Rate

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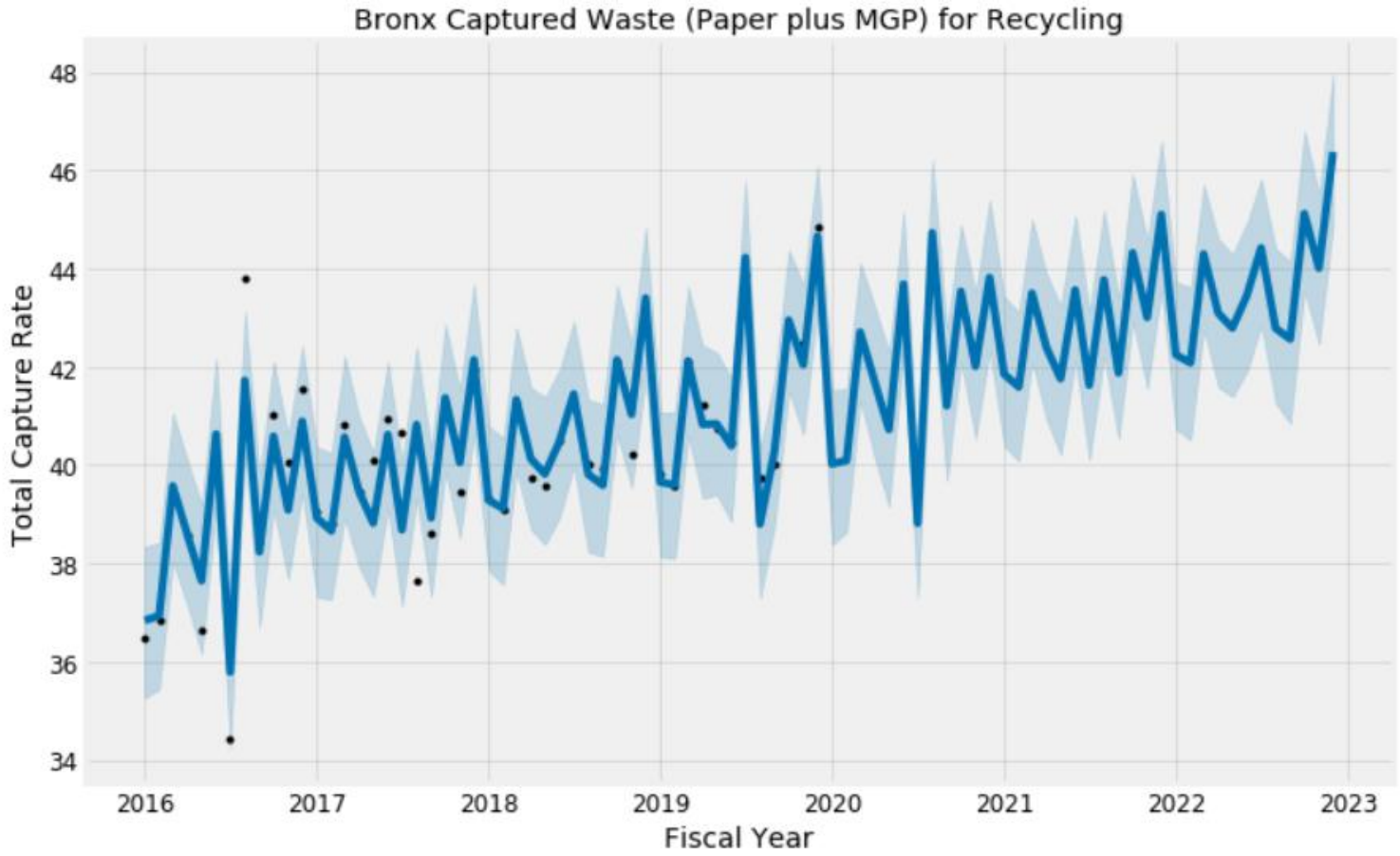
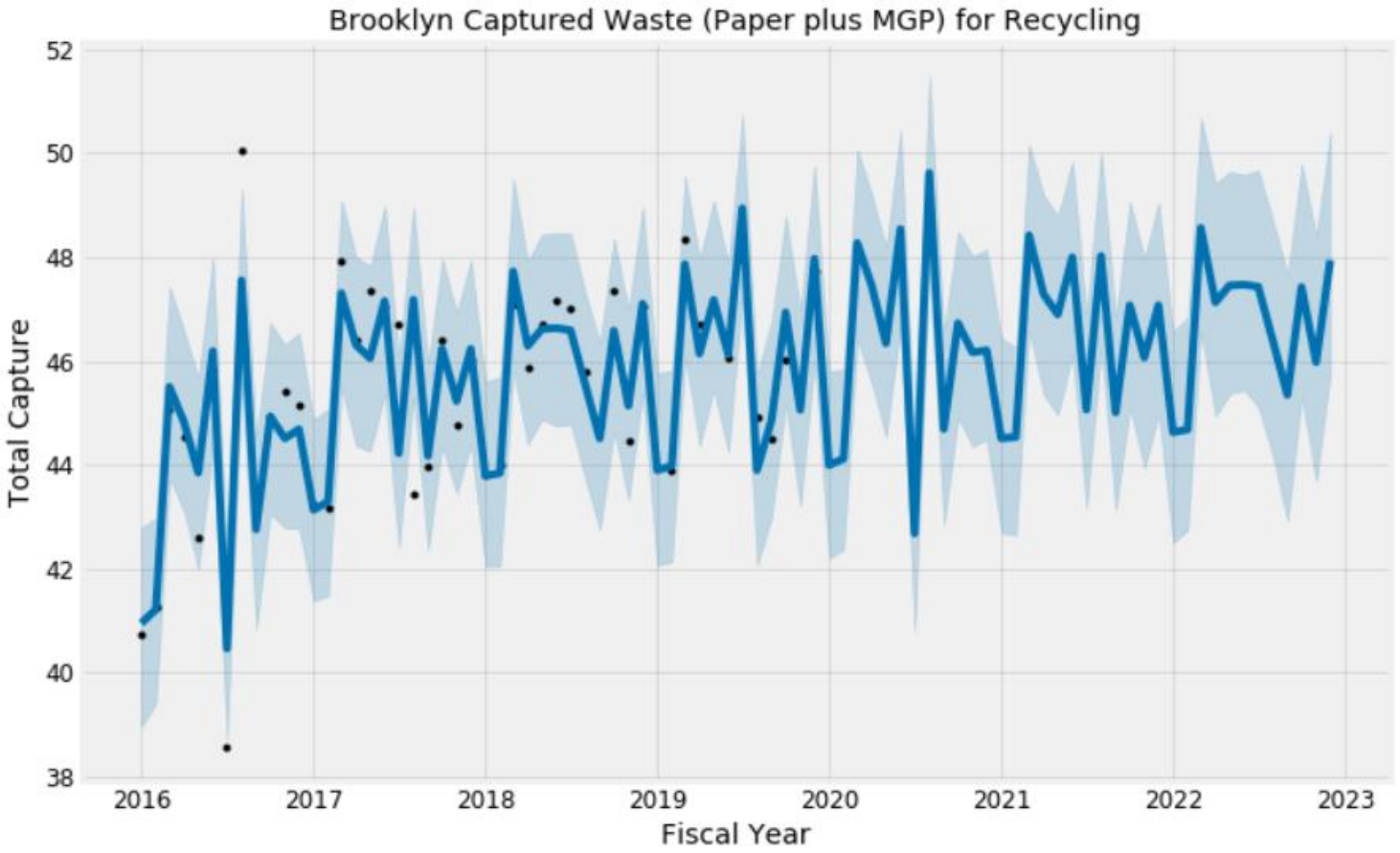
- **Queens** on top with Population by Area Ratio
- Least in Population by Household Ratio, concludes bigger household size
- 2nd best in Diversion and Capture Rate
  - Targeting at least 1 person is effective here.

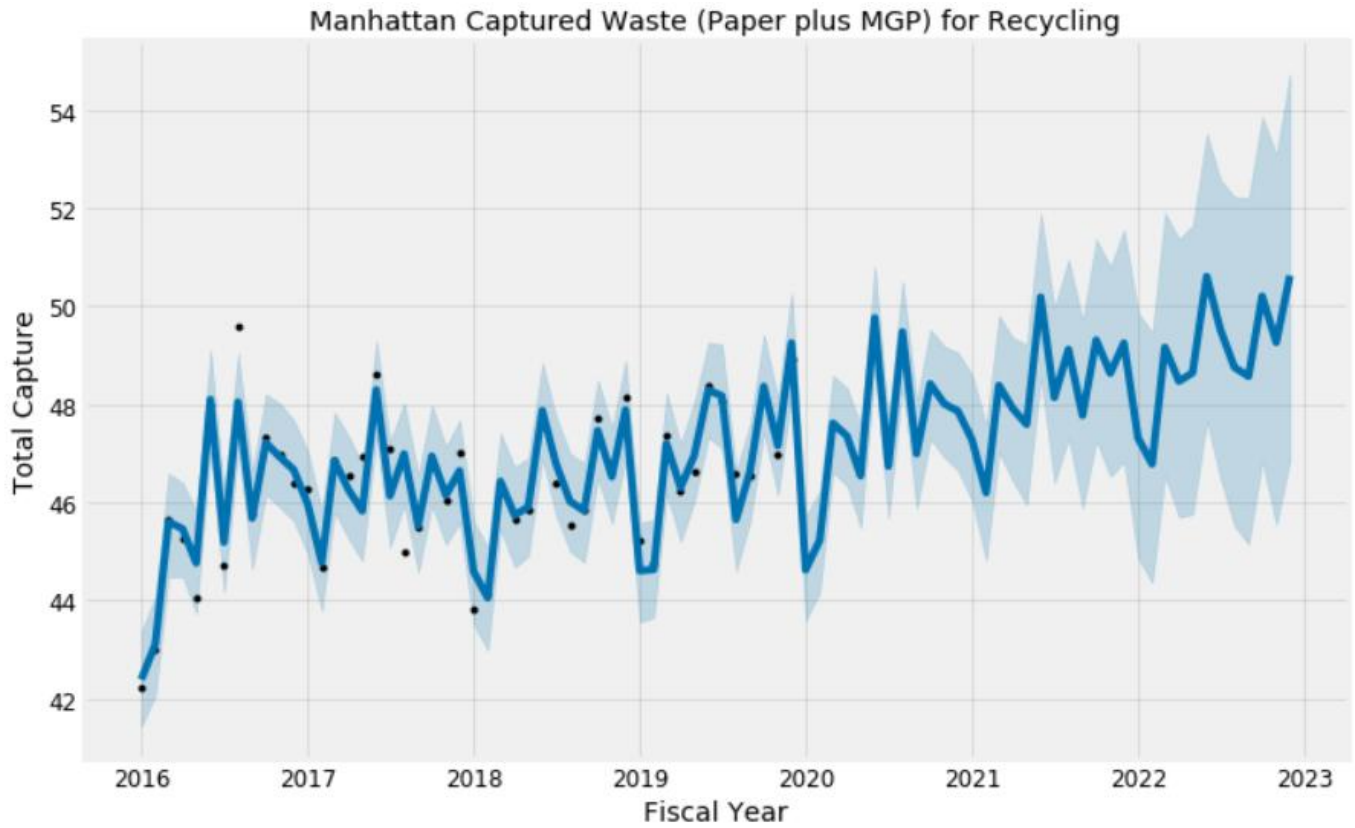
Forecast over Next 3 Years
Bronx



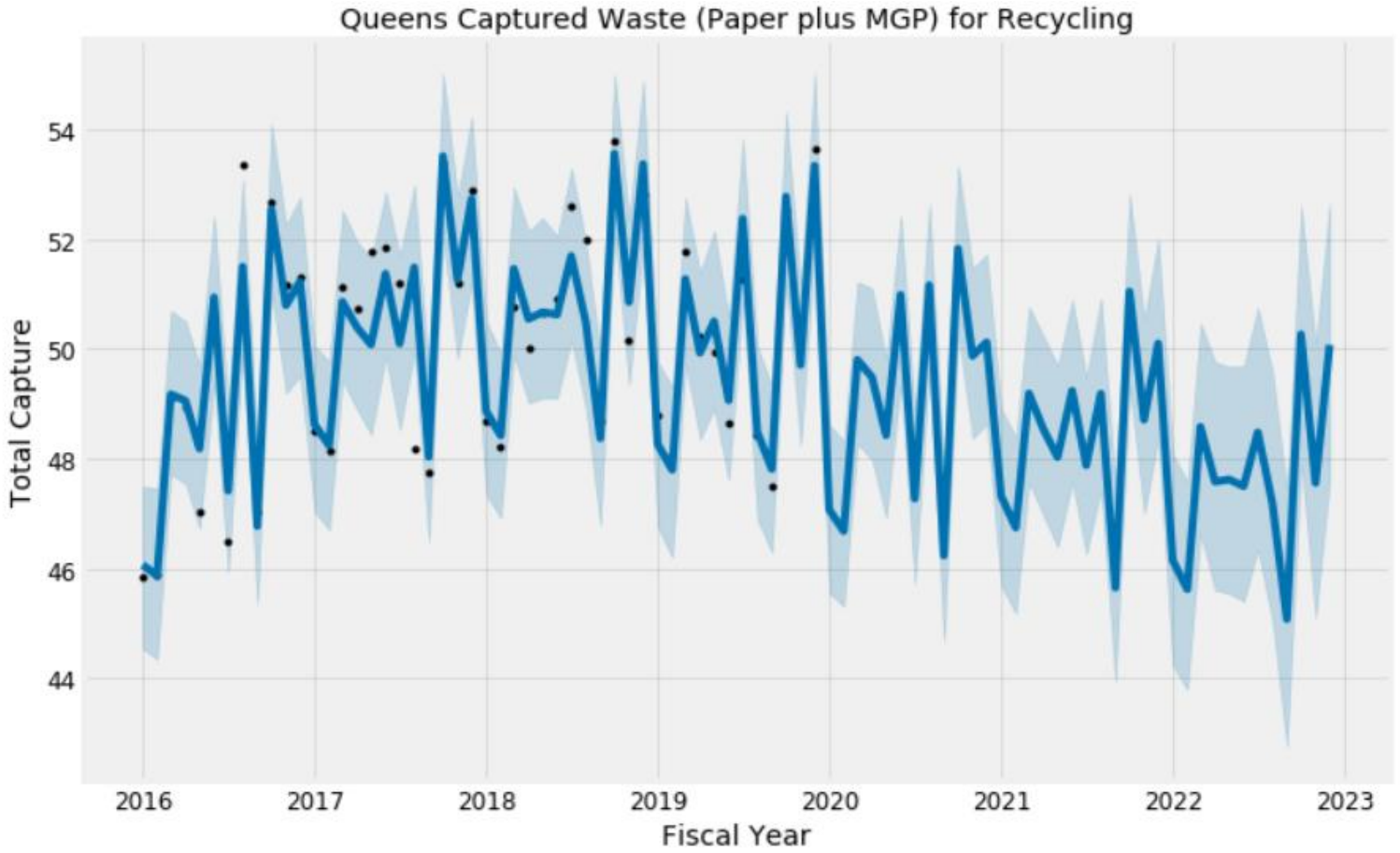
Brooklyn


Brooklyn Captured Waste (Paper plus MGP) for Recycling
Total Capture
52
50
48
46
44
42
40
38
2016
2017
2018
2019
2020
2021
2022
2023
Fiscal Year

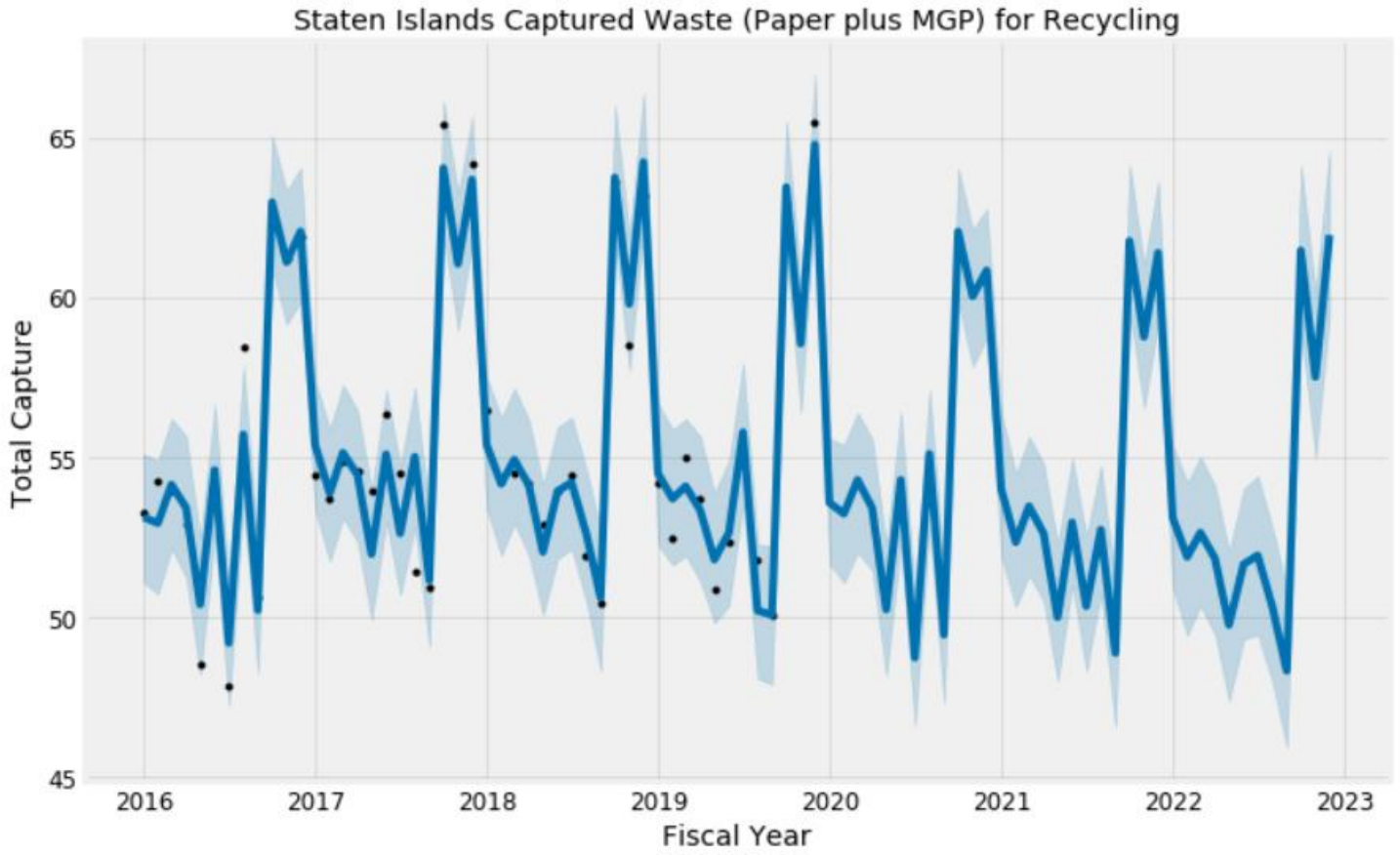
Manhattan


Manhattan Captured Waste (Paper plus MGP) for Recycling
Total Capture
54
52
50
48
46
44
42
2016
2017
2018
2019
2020
2021
2022
2023
Fiscal Year

Queens


Queens Captured Waste (Paper plus MGP) for Recycling
Total Capture
54
52
50
48
46
44
2016
2017
2018
2019
2020
2021
2022
2023
Fiscal Year

Staten Island



Observation from Forecast for Next 3 Years

- Bronx diversion rate and capture rate is increasing with few Dips
- Brooklyn is increasing but at a slow rate.
- Manhattan is increasing at average rate, need attention
- Queens has decreasing trend, high attention
- Staten Island, is constant with dips in between, can perform better.

Future Work

- Exist a correlation between Number of facilities, Population by Household and Capture and Diversion Rate
- Along with implemented Forecast model,
- Use these features to build machine learning model
- Machine Learning model to predict area for high attention considering other factors.

Recycling Facts and Sustainable Benefits

- 1 ton can save 7000 gallons of water
- 1 ton can save 4100kw-hour in energy
- 1 ton can avoid 3 cubic yard of landfill and 17 trees

- 1 ton of glass saves 10 gallons of oils
- 1 ton of aluminum saves 2350 gallons of gasoline.

References:

1) https://www.shutterstock.com/image-vector/sorting-garbage-into-containers-plastic-glass-1657930012
2) ArcGIS

THANK YOU