

# UMD DATA CHALLENGE 2020

## Recycling Diversion Rate

Dataset Provider: Booz Allen Hamilton

TEAM - DC20069

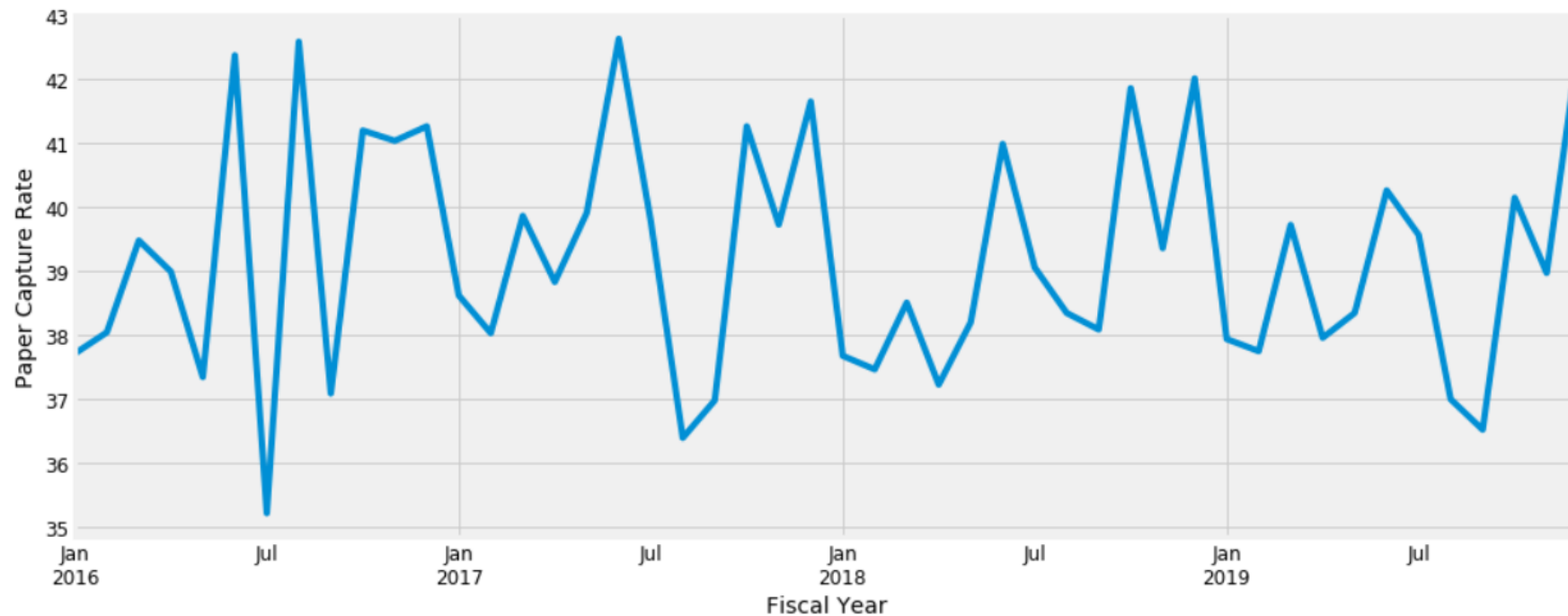
MENTOR: JILL ROBBINS

02/28/2020

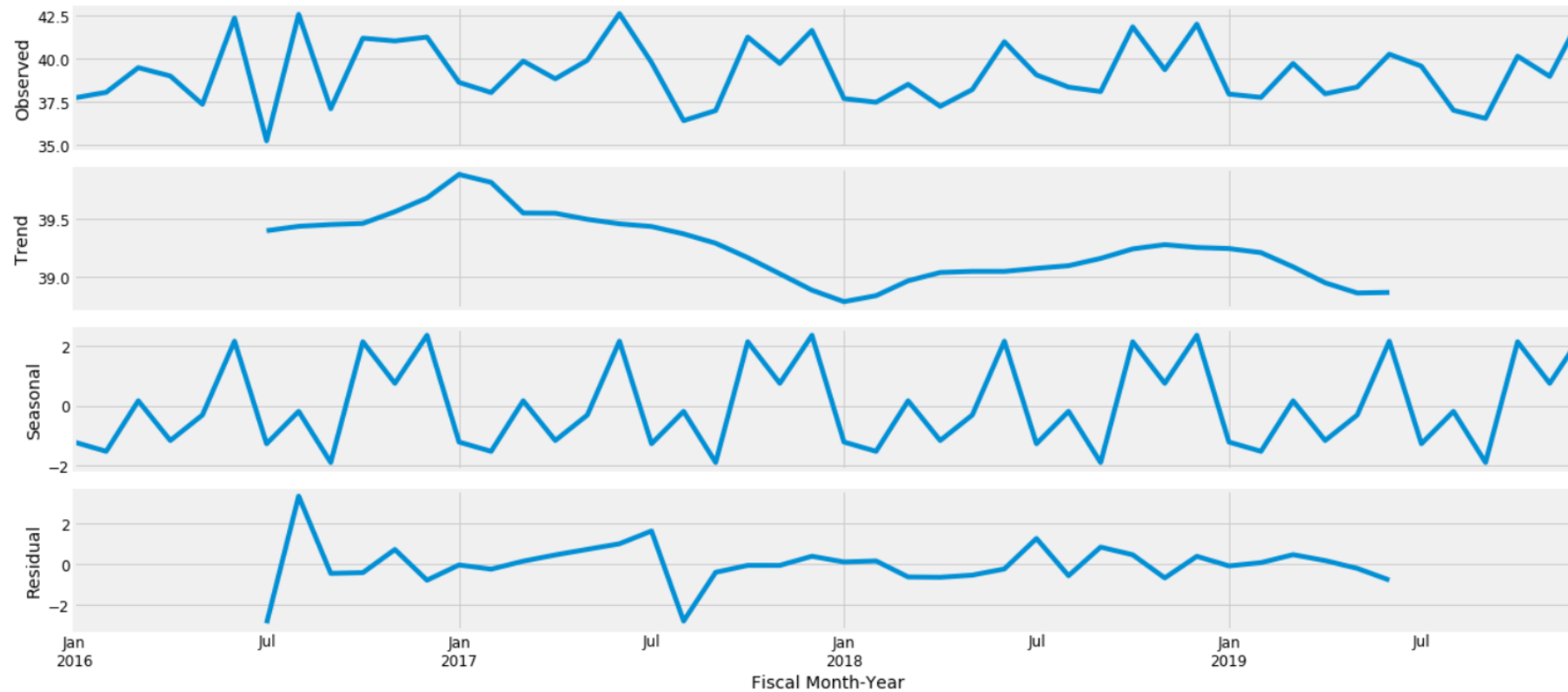
ARTI SINGH

AIONA CRASTA

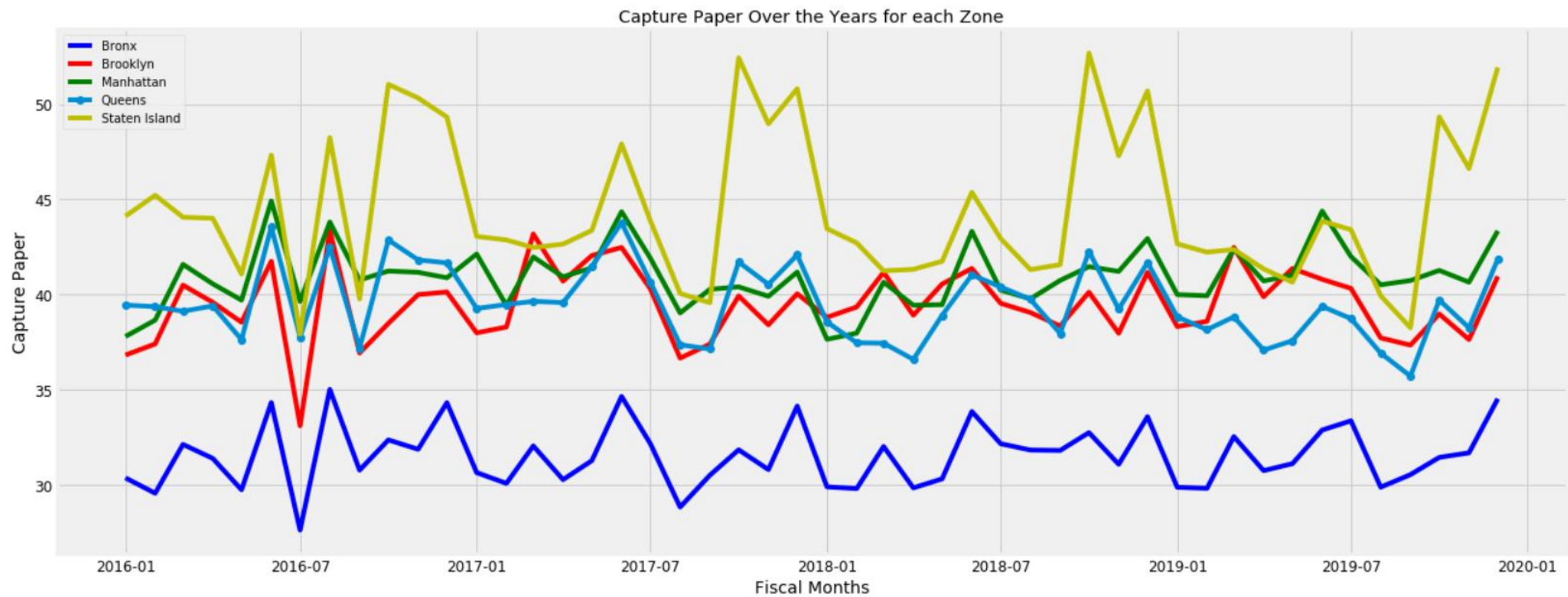
# Paper Recycle Capture Rate Over 4 Years



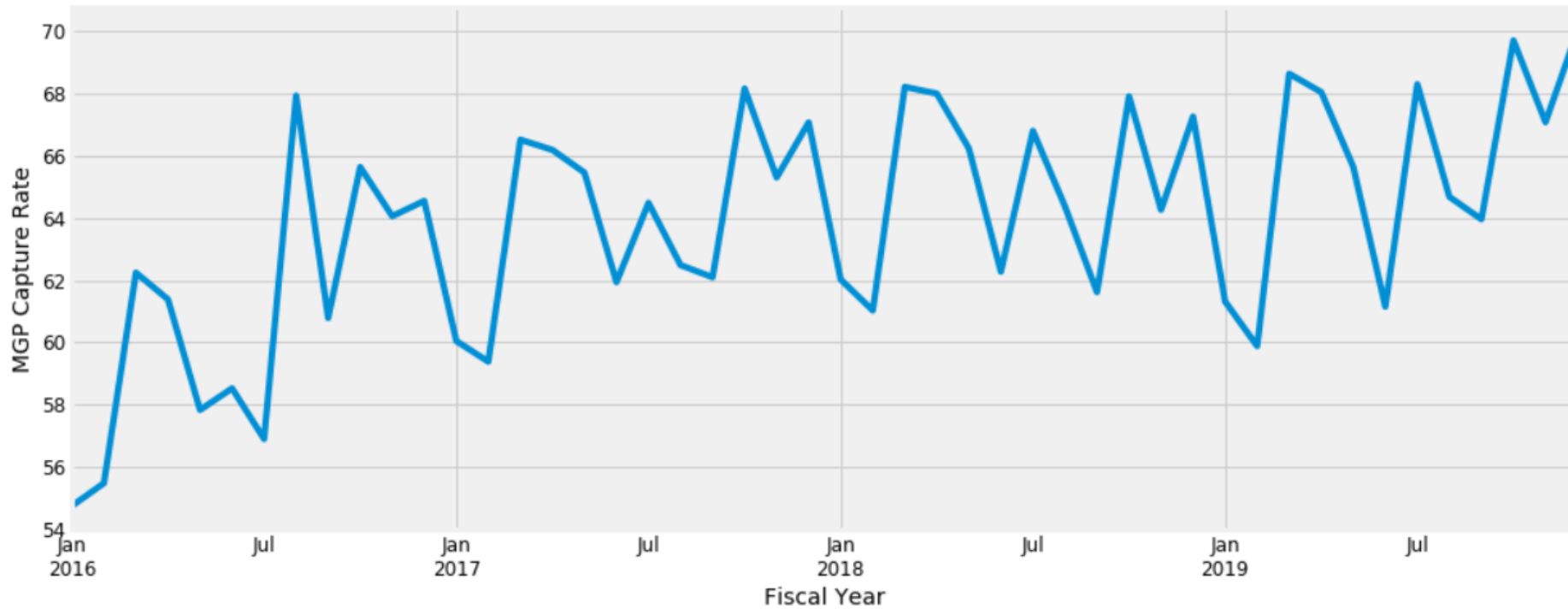
# Continued... Detailed Time-Series Analysis



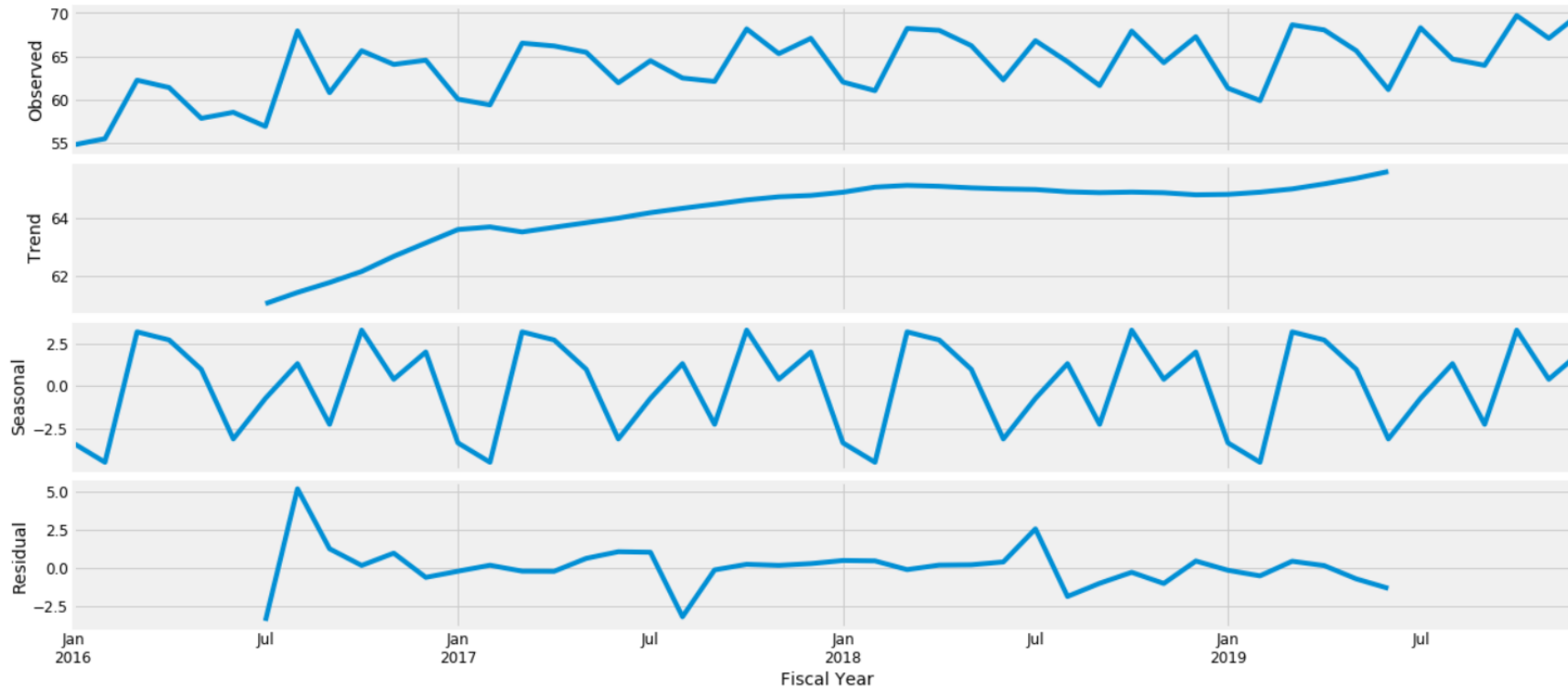
# Continued... Categorized by Zone



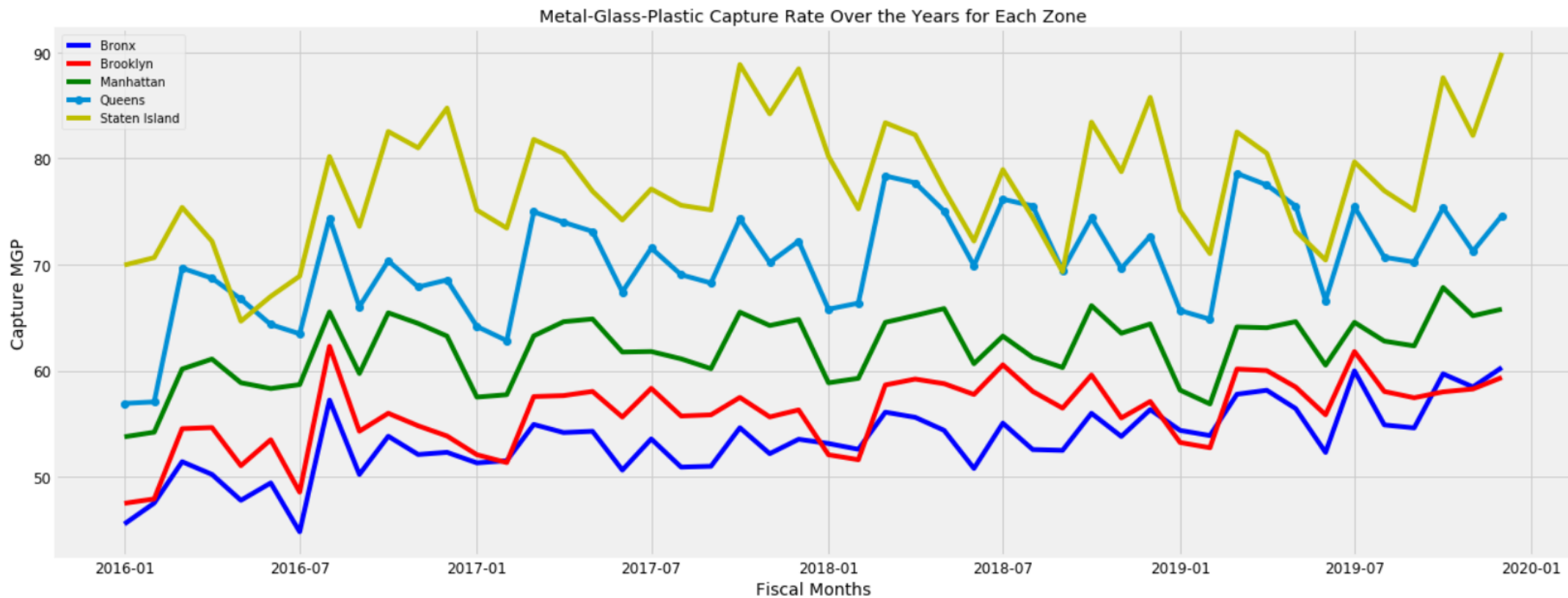
# Metal-Glass-Plastic Recycle Capture Rate Over 4 Years



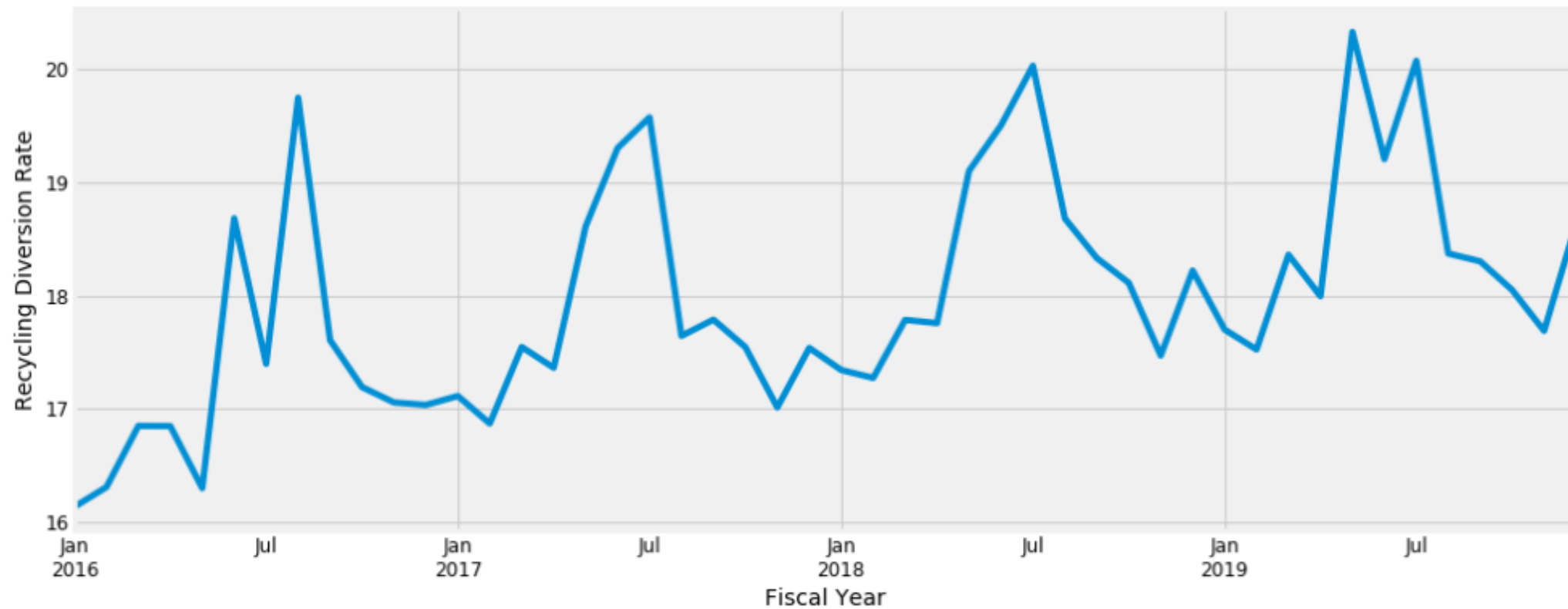
# Continued... Detailed Time-Series Analysis



# Continued... Categorized by Zone

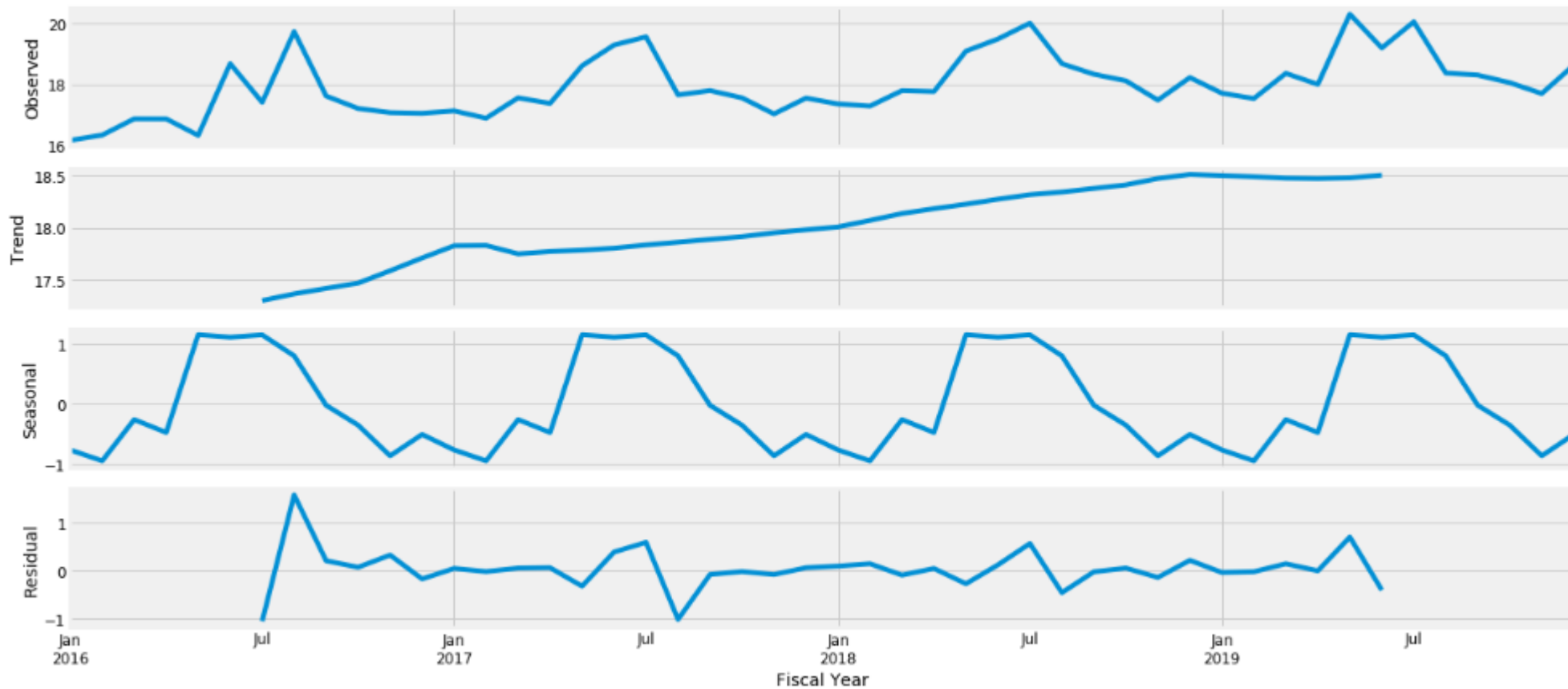


# Total Recycling Diversion Capture Rate over 4 Years

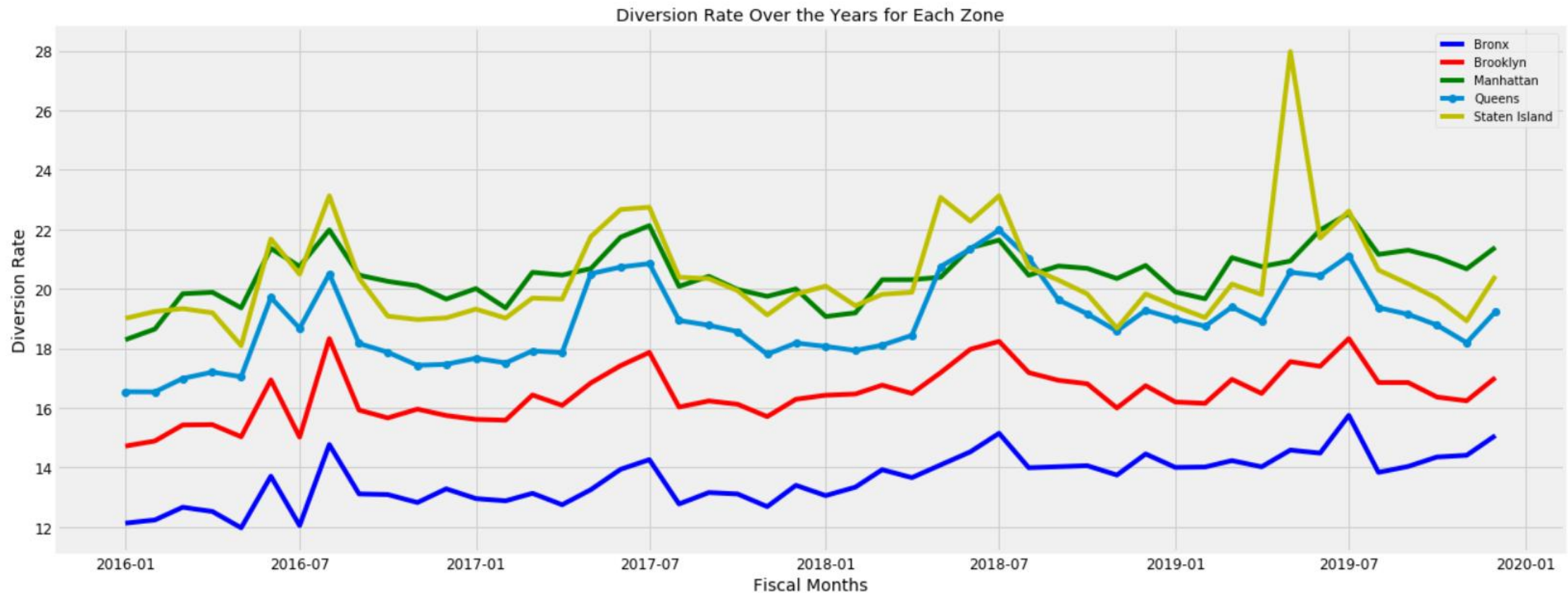




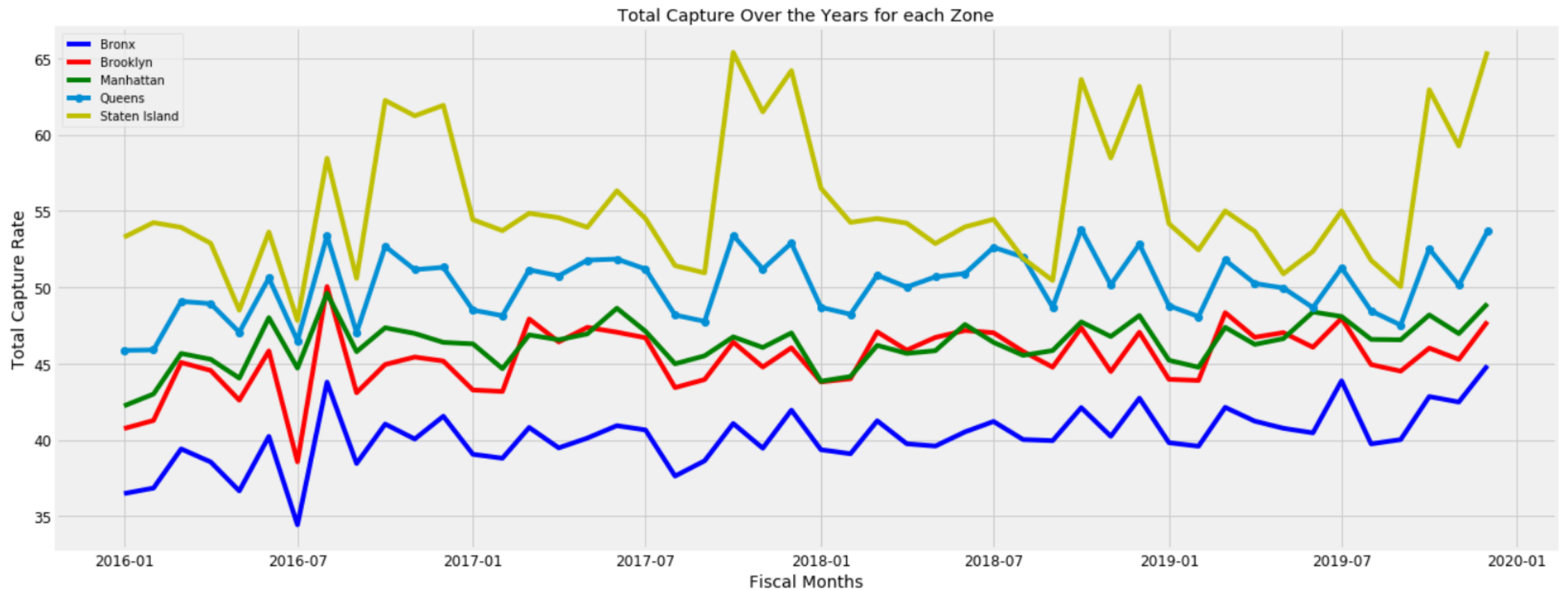
# Continued... Detailed Time-Series Analysis



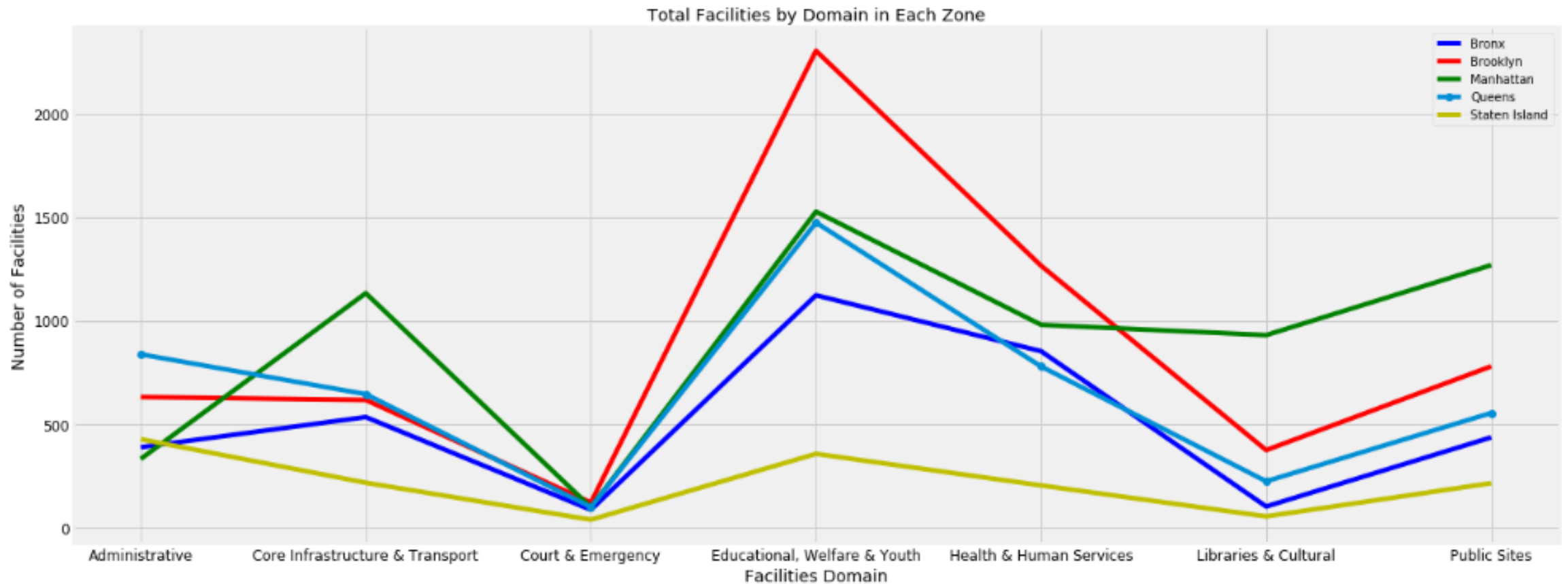
# Continued... Categorized by Zone



# Total Capture Rate Categorized by Zone

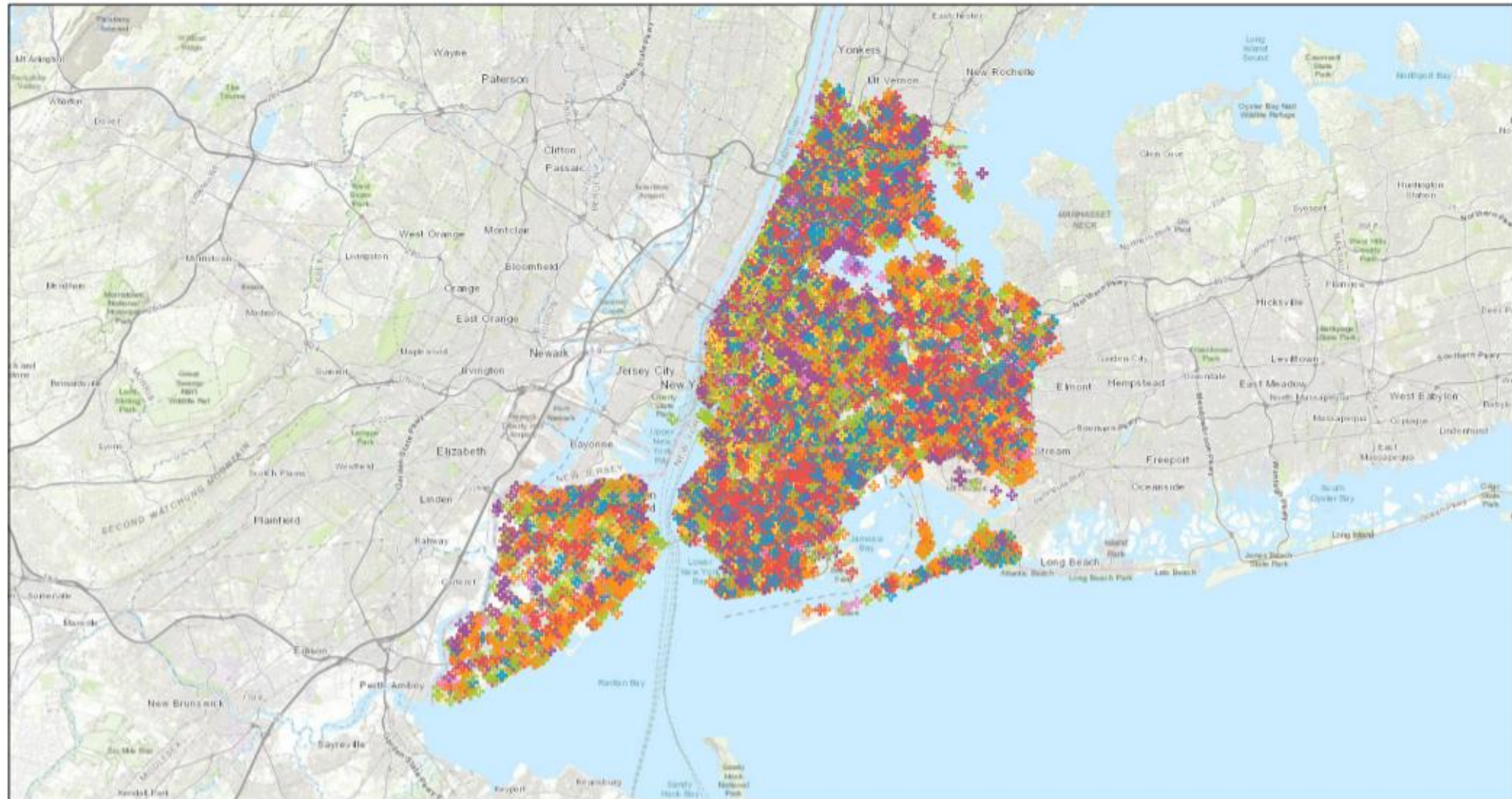


# Zone-wise Types of Facilities/Service Building





# 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

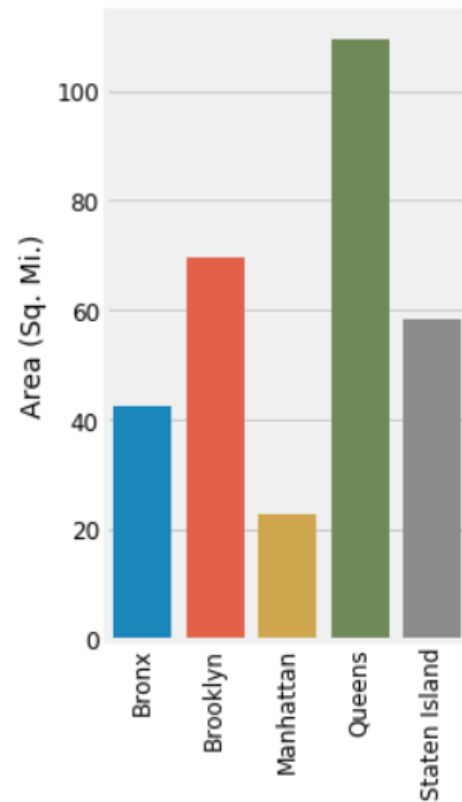
- ✚ LIBRARIES AND CULTURAL PROGRAMS
- ✚ PUBLIC SAFETY, EMERGENCY SERVICES, AND ADMINISTRATION OF JUSTICE
- ✚ 0.93
- ✚ 1.13
- ✚ 1.33

1:372,040



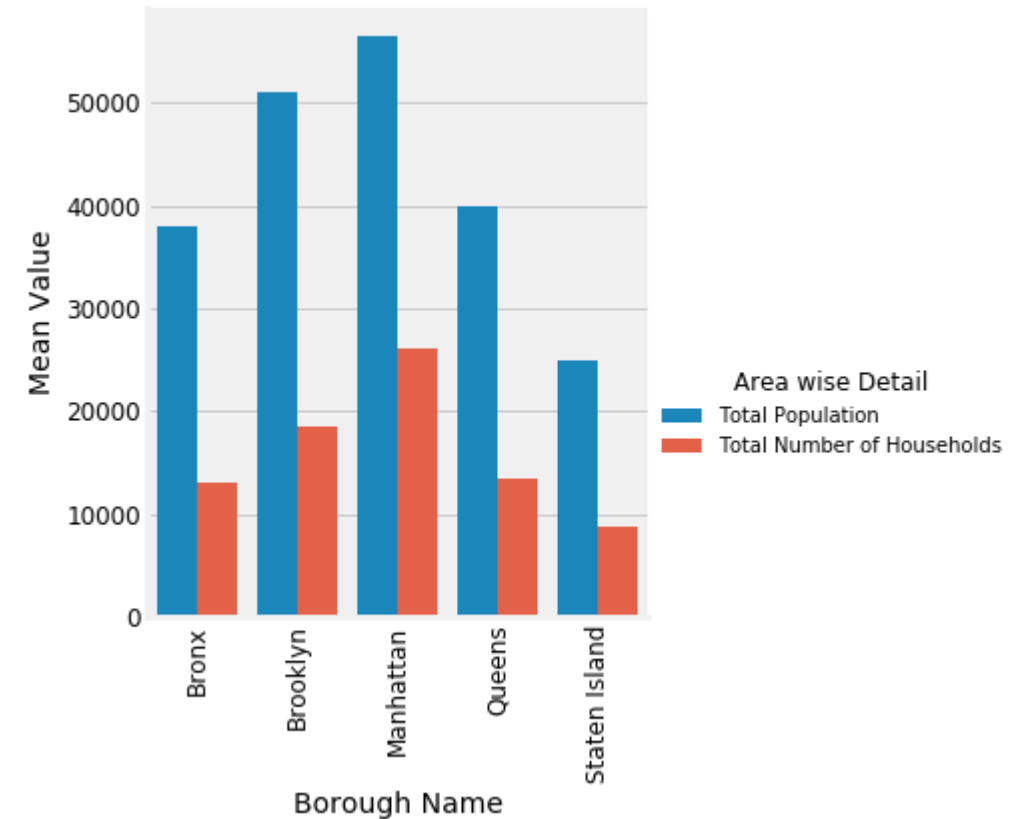
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

# 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 2<sup>nd</sup> best Population by Area ratio
  - ▶ Reason for high Recycle Diversion Rate and Capture Rate
- ▶ **Brooklyn** has 2<sup>nd</sup> best statistic in Population by Area ratio
- ▶ Also, highest number of facilities and 2<sup>nd</sup> last Capture Rate
  - ▶ So, targeting Educational, Welfare & Youth -> can increase Capture Rate

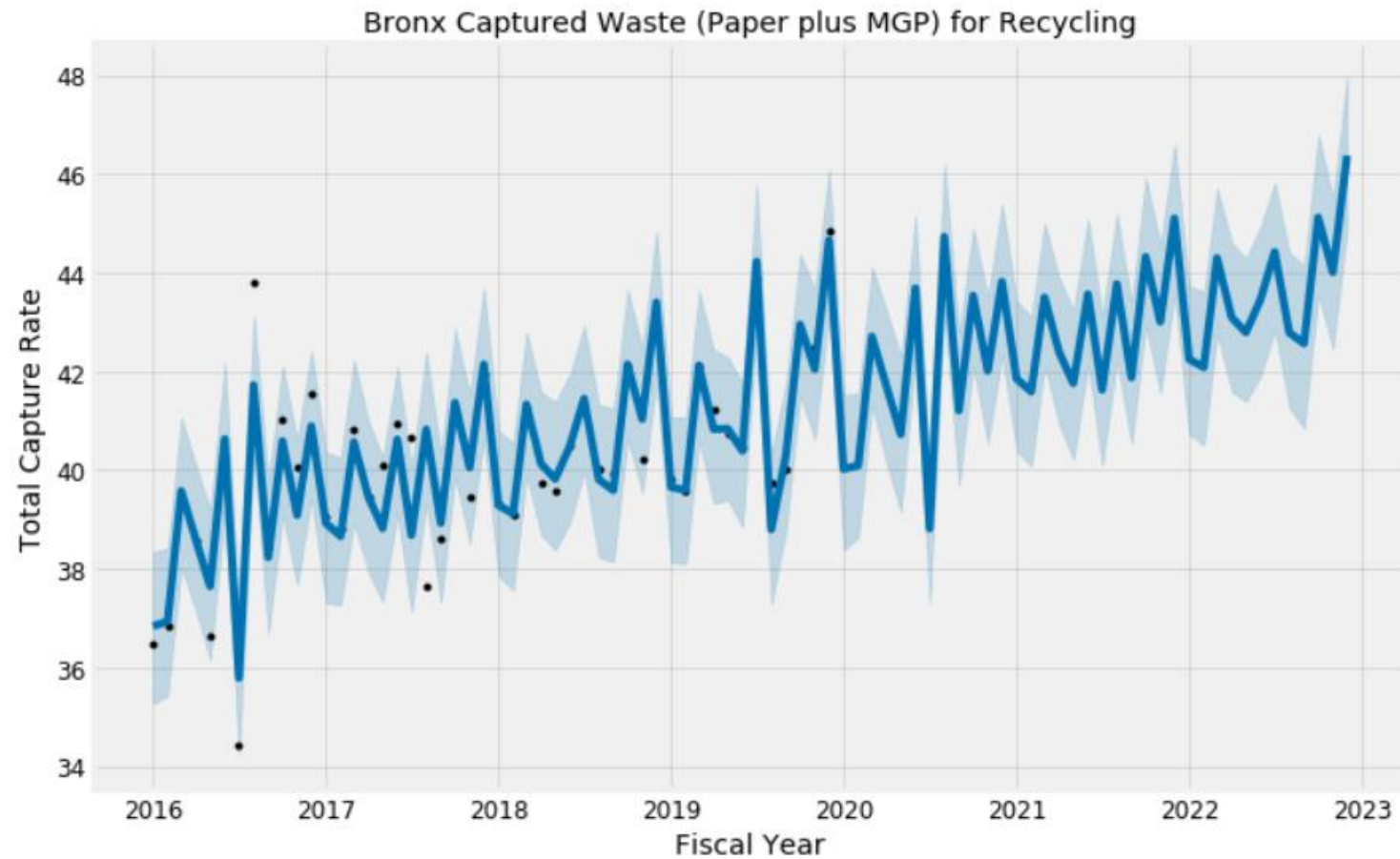
# Continued...

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

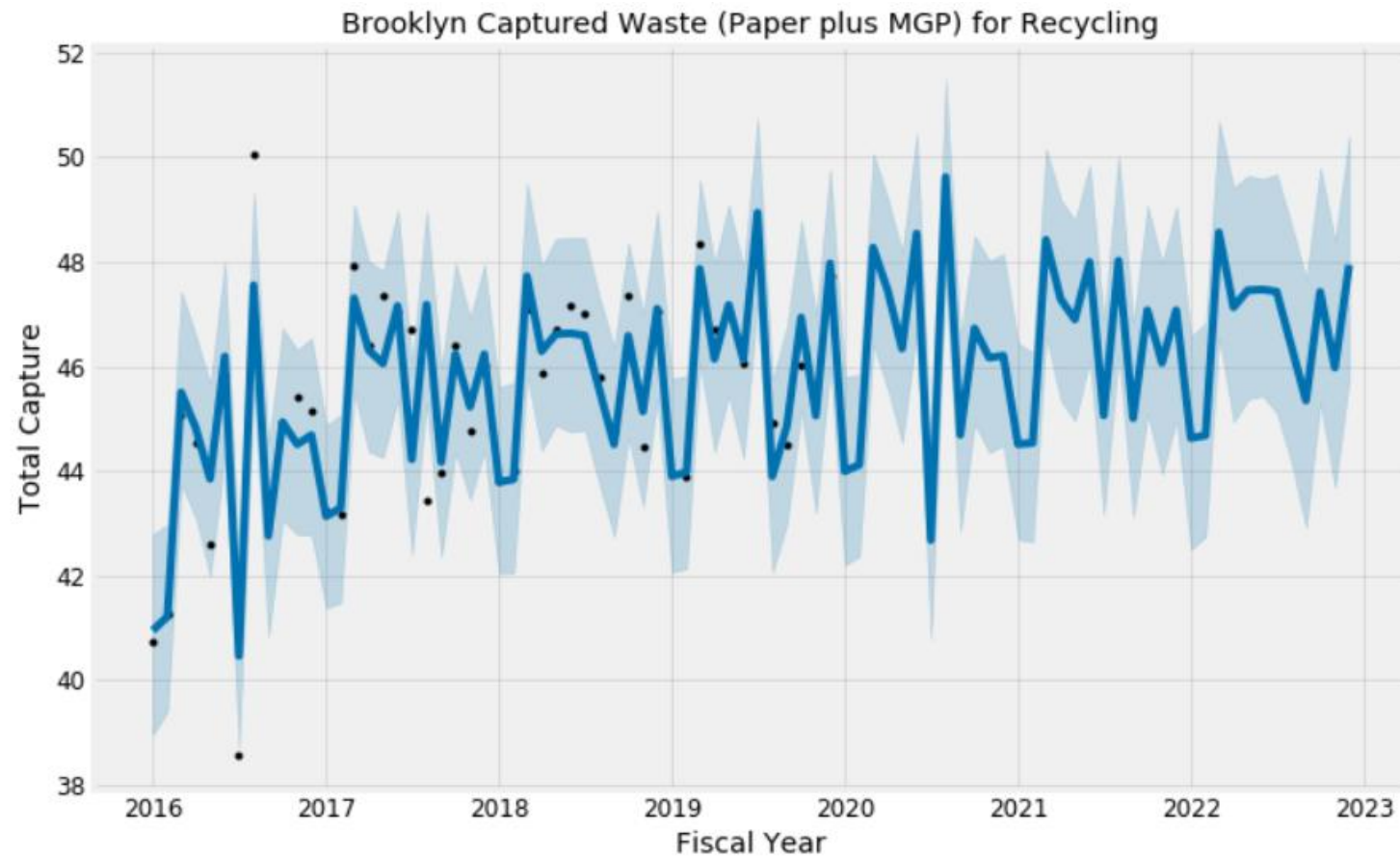


# Forecast over Next 3 Years

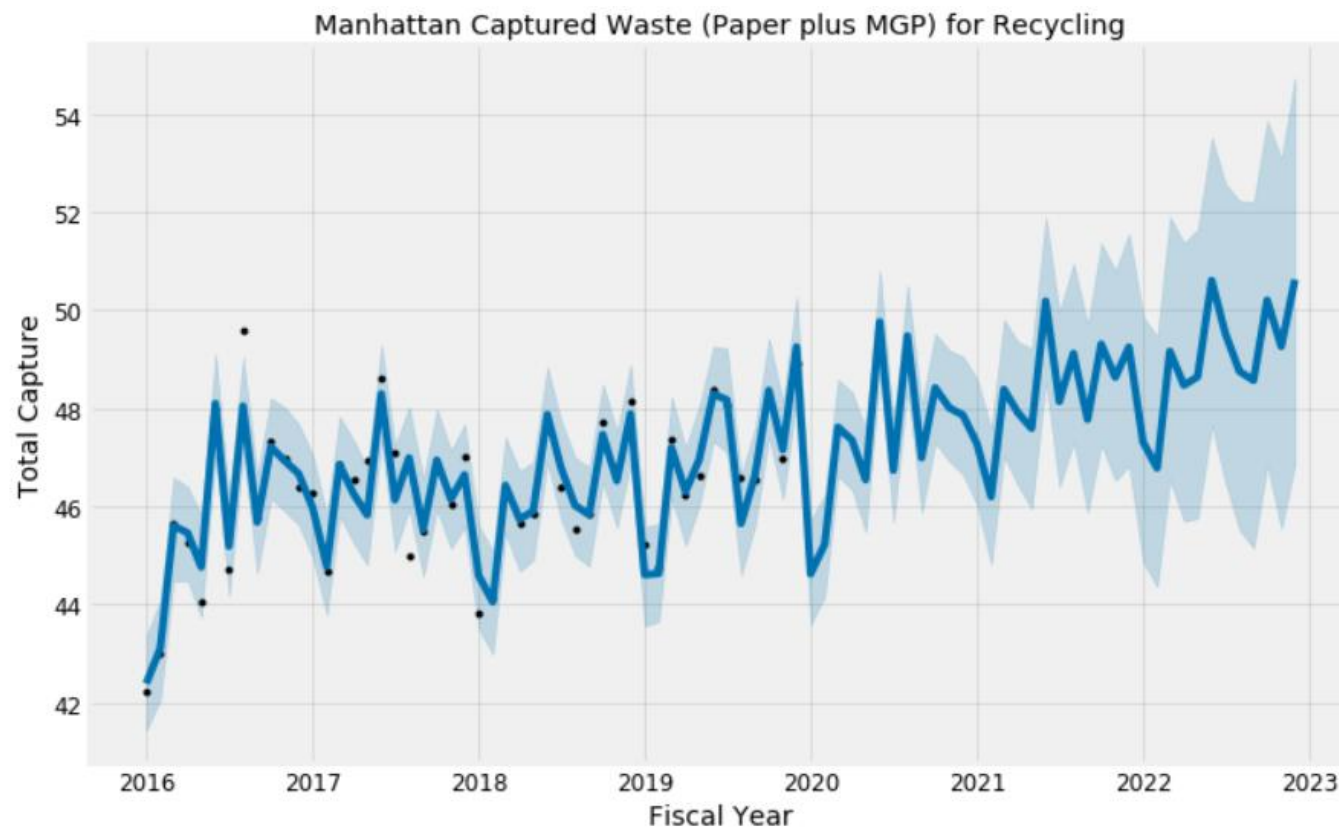
## Bronx



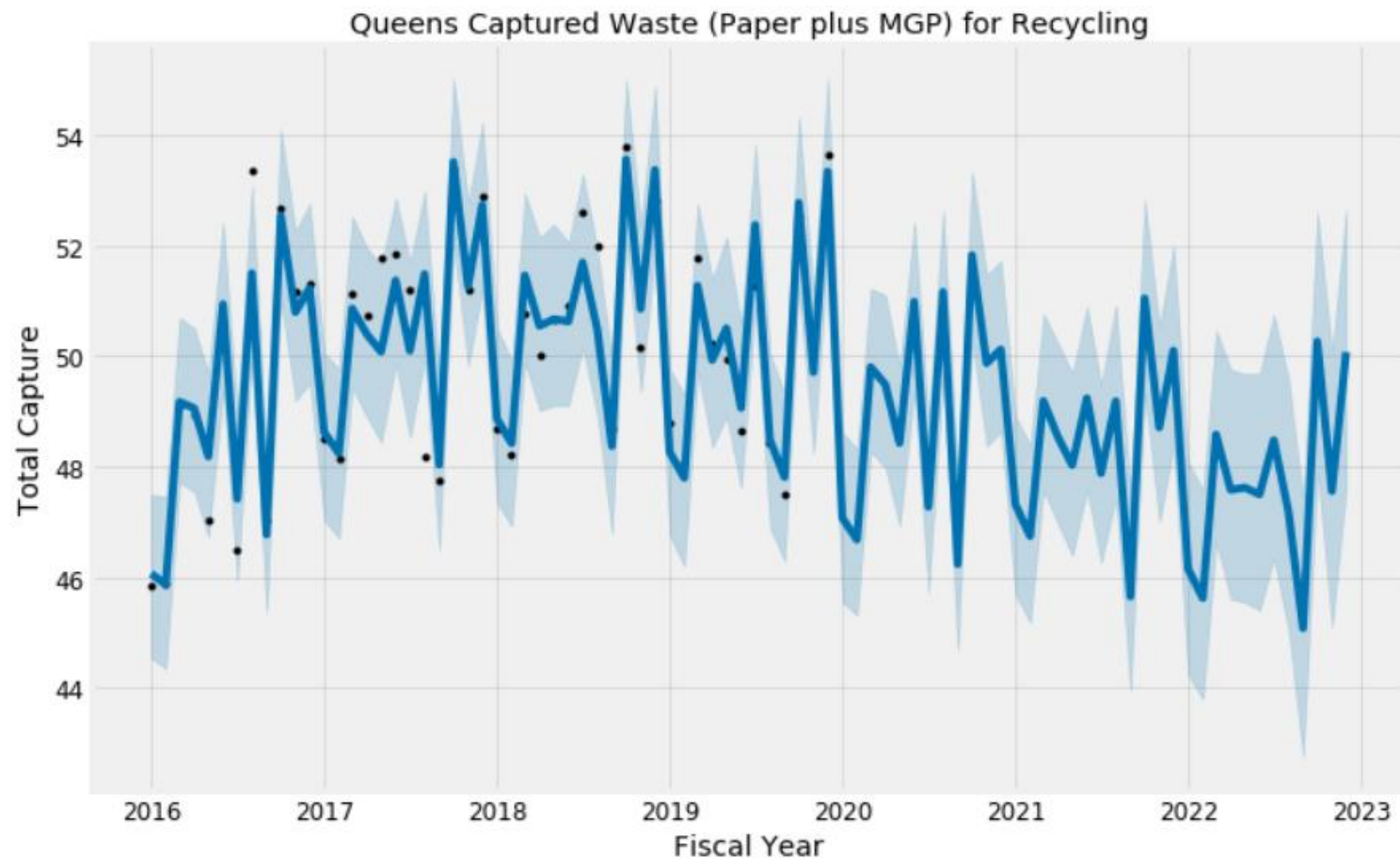
# Brooklyn



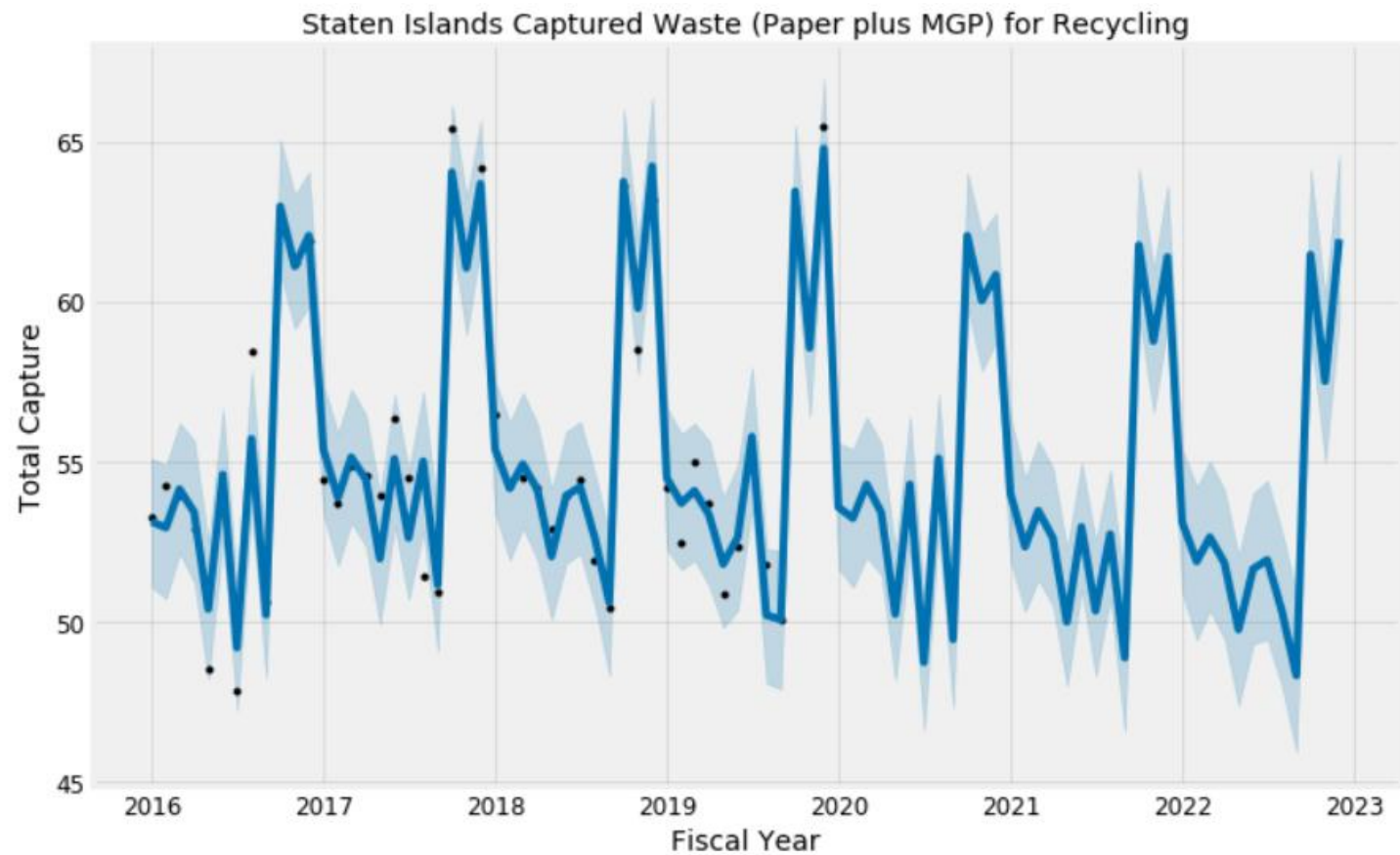
# Manhattan



# Queens



# Staten Island



# Observation from Forecast for Next 3 Year

- ▶ 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