



The citi bike[®] Project

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16:137:553 Business Intelligence with Visual Analytics

December 2021



Introduction

- **Background**
 - Planning and Implementation
- **Citi Bike in Operation**
 - How is the Citi Bike system used?
 - What are the most popular locations?
 - What does daily usage look like?
 - How does usage vary throughout the day?
 - A day in the life of a Citi Bike
 - The problem of Pools and Drains
- **Effects of the COVID-19 Pandemic**
 - How has ridership compared year over year before and during the pandemic?
 - How does usage compare to Subway ridership?
 - How has monthly usage varied year over year?
 - How has the subscriber base changed?

Data Sources

- **Main Source: Citi Bike System Data**
(<https://ride.citibikenyc.com/system-data>)
Downloadable monthly (CSV) files of every trip on the Citi Bike system over 60 seconds including:
 - Trip Duration
 - Start Time and Date
 - Stop Time and Date
 - Start Station Name
 - End Station Name
 - Station ID
 - Station Latitude and Longitude
 - Bike ID
 - User Type (Customer = Customer = 24-hour pass or 3-day pass user; Subscriber = Annual Member)
 - Gender and Year of Birth (if known)
- **Other: NYC Transit Data**
 - Aggregated at QRI.cloud (<https://qri.cloud/nyc-transit-data>)





BIKE-SHARE

OPPORTUNITIES IN NEW YORK CITY

Background

- **Bike sharing first proposed in 2009**
- **Designed from the start to be large scale**
- **Conditions perfect for implementing bike share**
 - Bicycling in New York at all time high in 2007
 - Current and proposed bike lane infrastructure conducive to successful bike share program
 - Despite dramatic increase in bicycling, injuries have declined and fatalities have remained flat



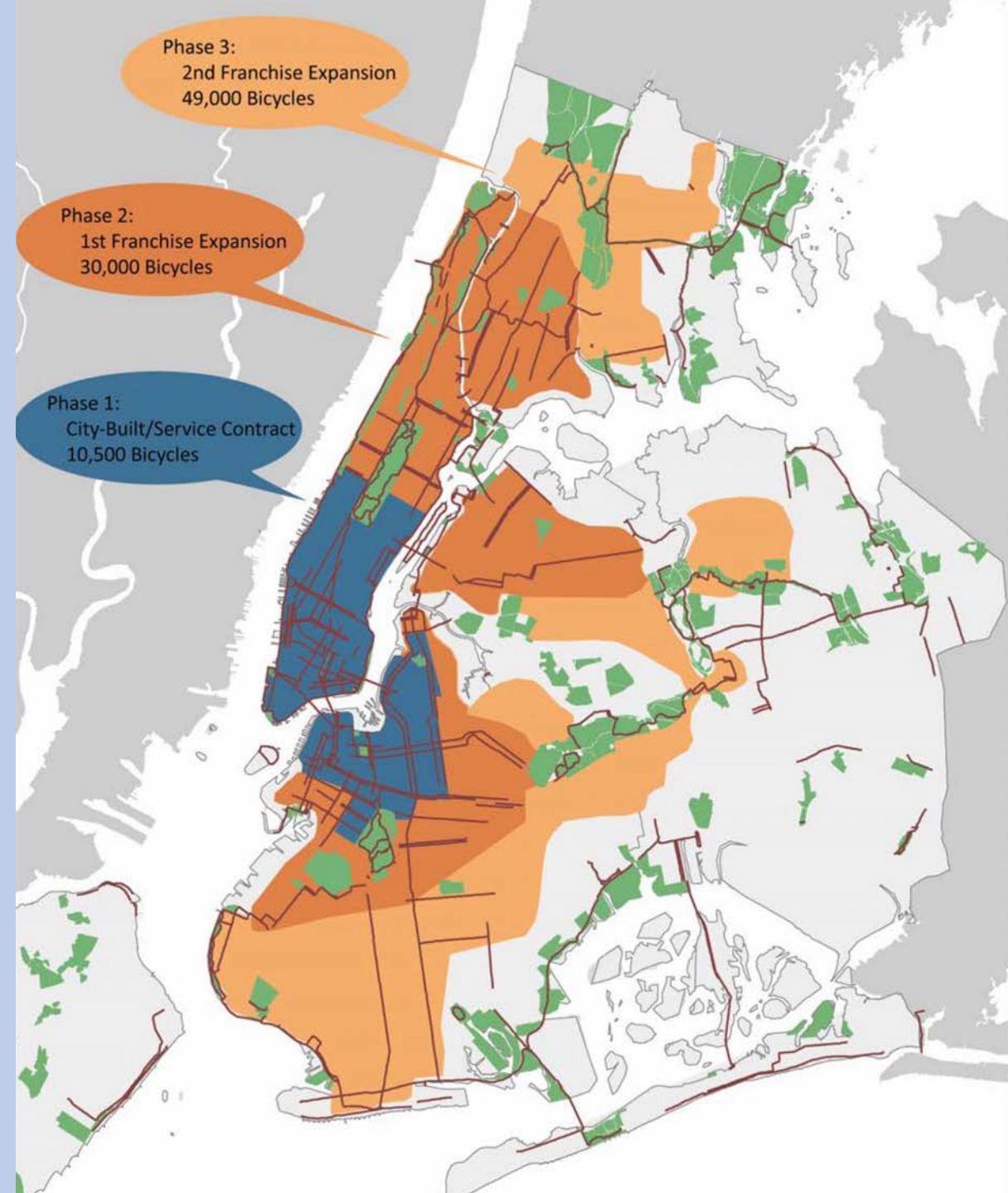
Planning

■ Proposed initial phases

- 10,000 bicycles
- Service area would be Manhattan south of 81st Street and parts of northwestern Brooklyn

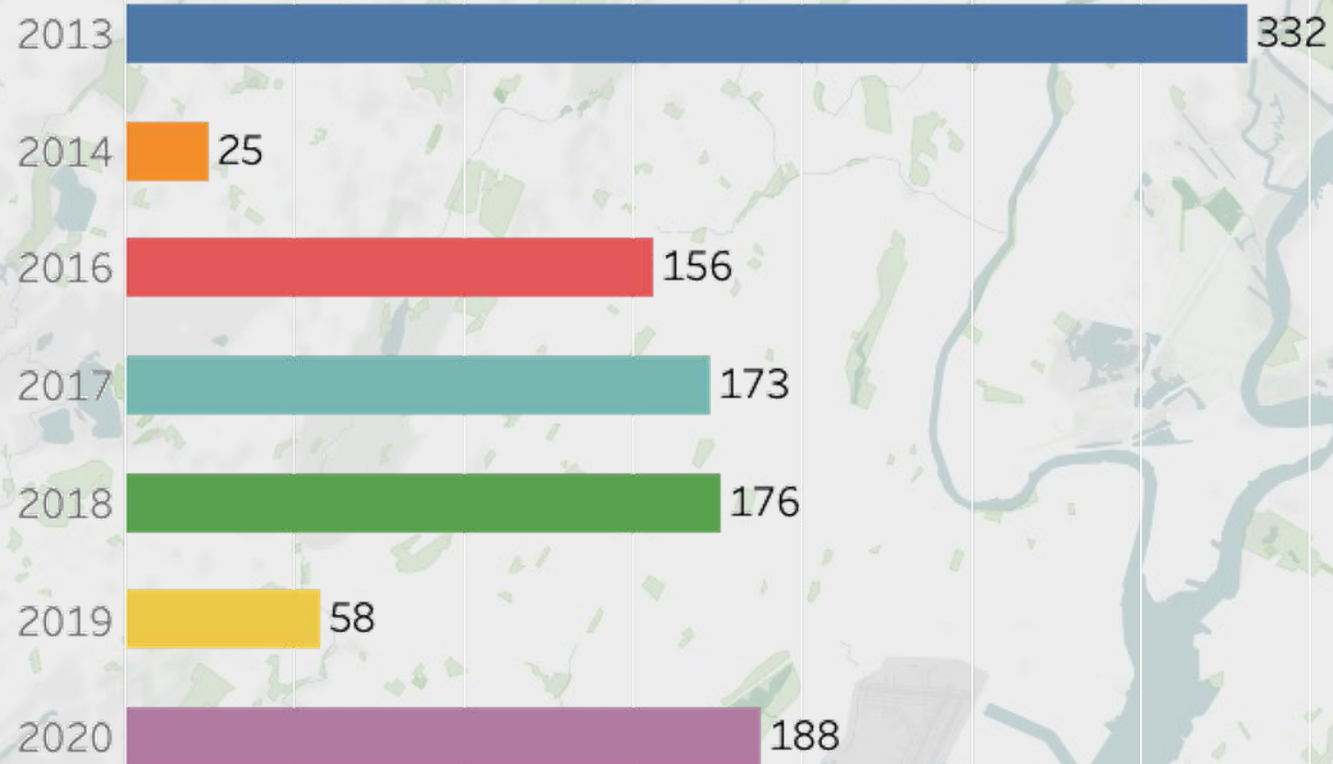
■ Subsequent phases

- Goal of 49,000 bicycles
- Service area to cover significant parts of four of the five boroughs
- Would serve two thirds of the city's population



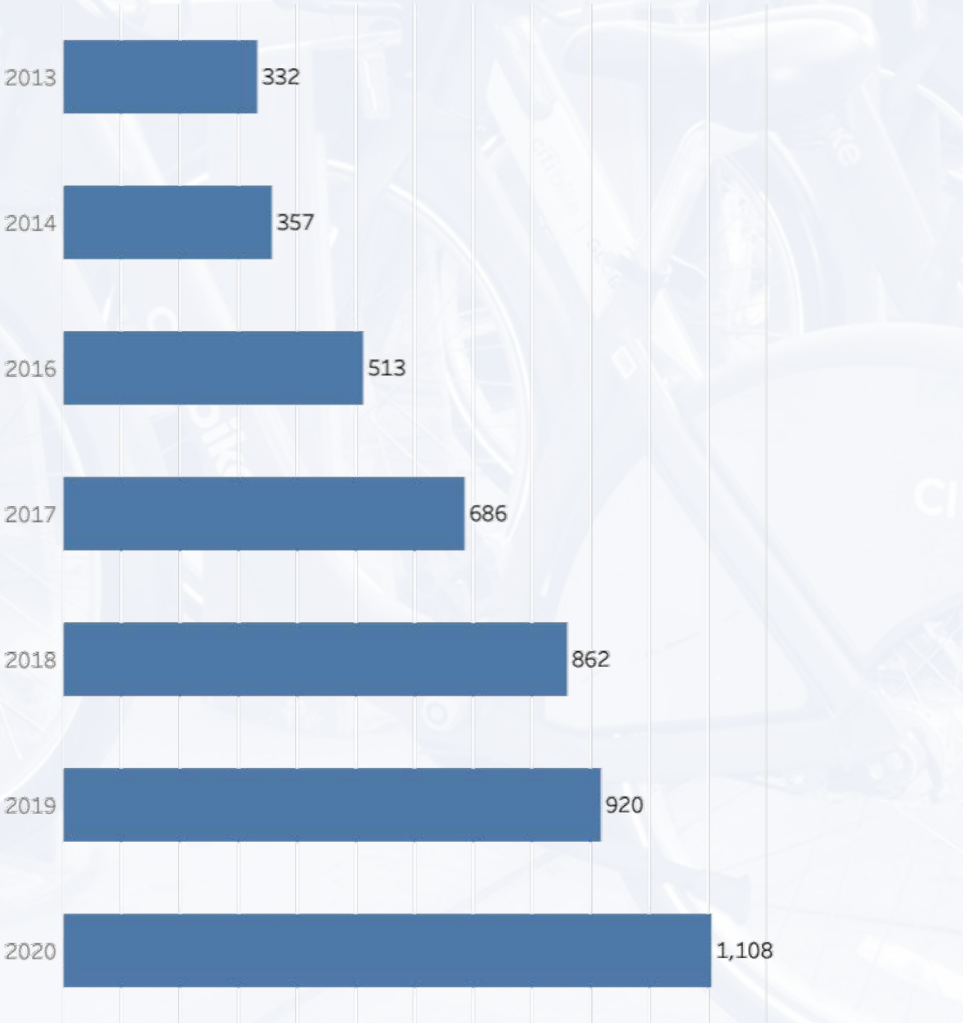
Building the infrastructure

Citi Bike Station Installations by Year

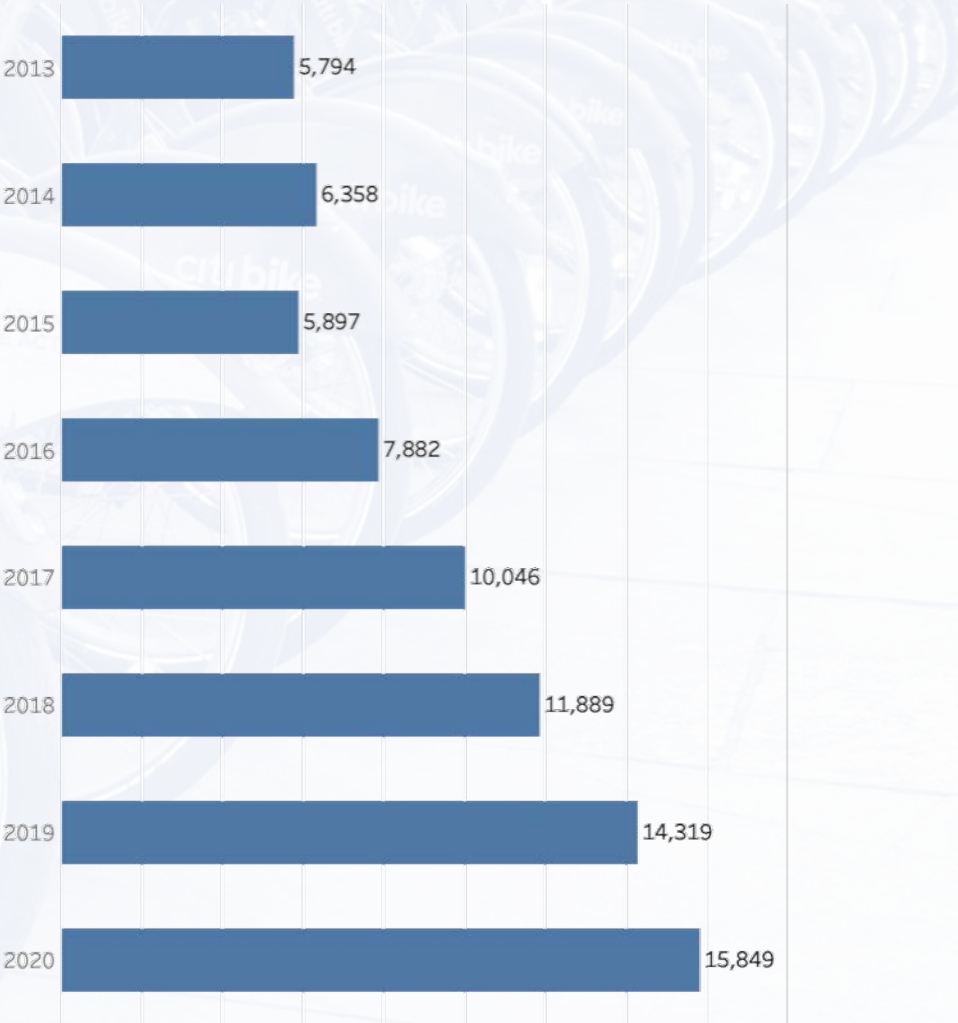


Growth of the Citi Bike system

Citi Bike Station Count by Year*



Bicycles in Use by Year*



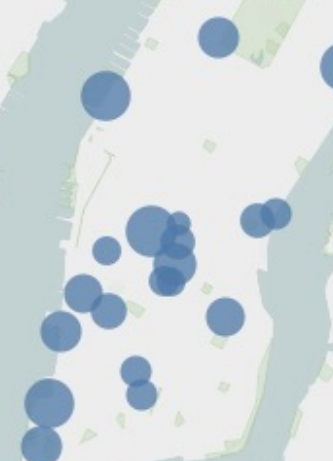
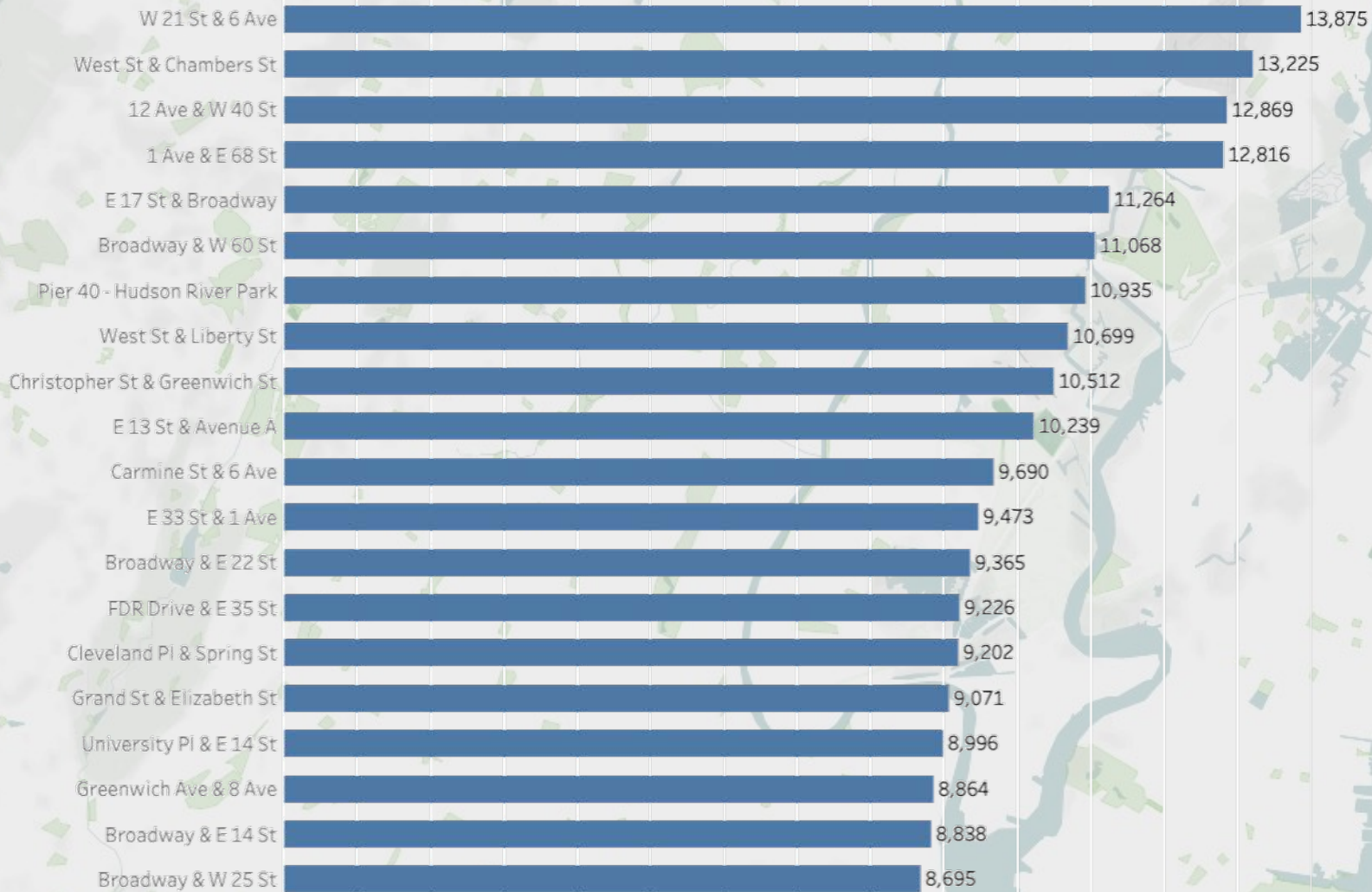
* Station and bicycle counts based on usage data from June of each year from 2013-2020. Bicycle counts reflect the number of individual bikes checked out during the month, not the total number available.



Citi Bike in Operation – September 2020

Most popular locations

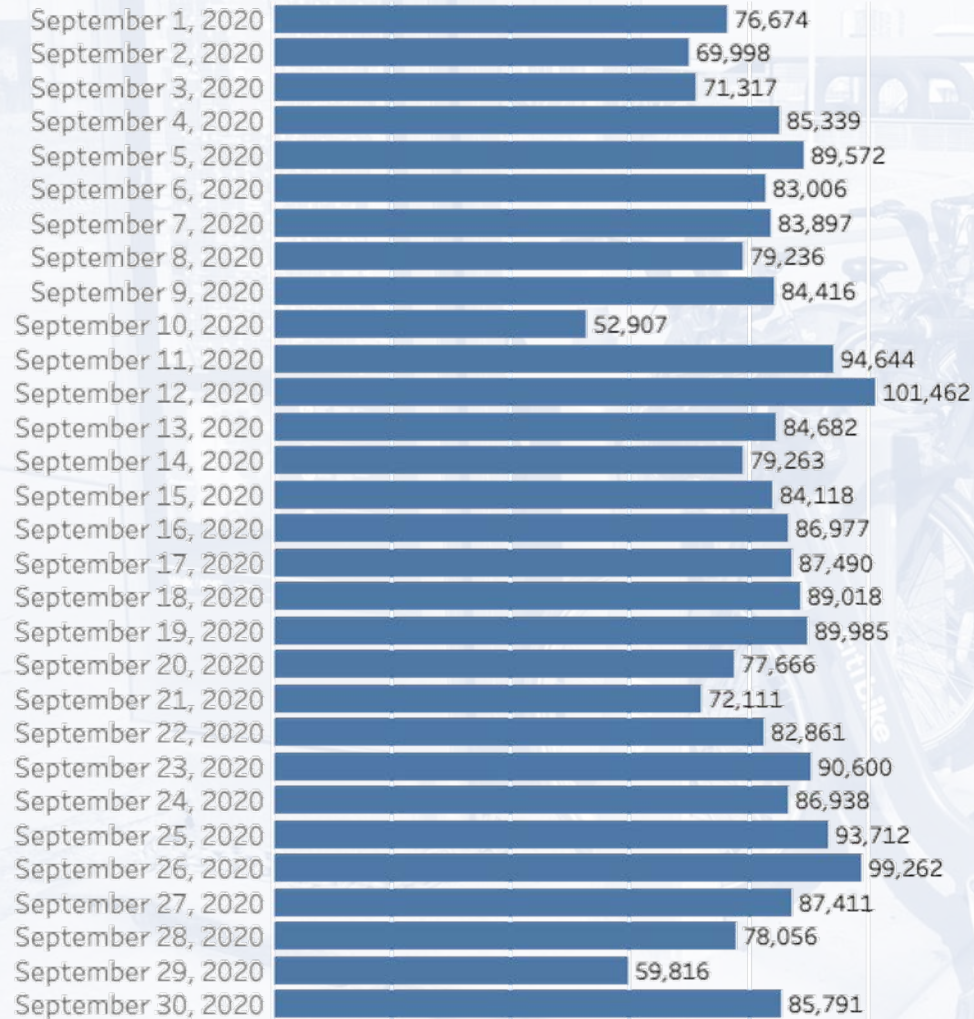
Top 20 Checkout Locations - September 2020



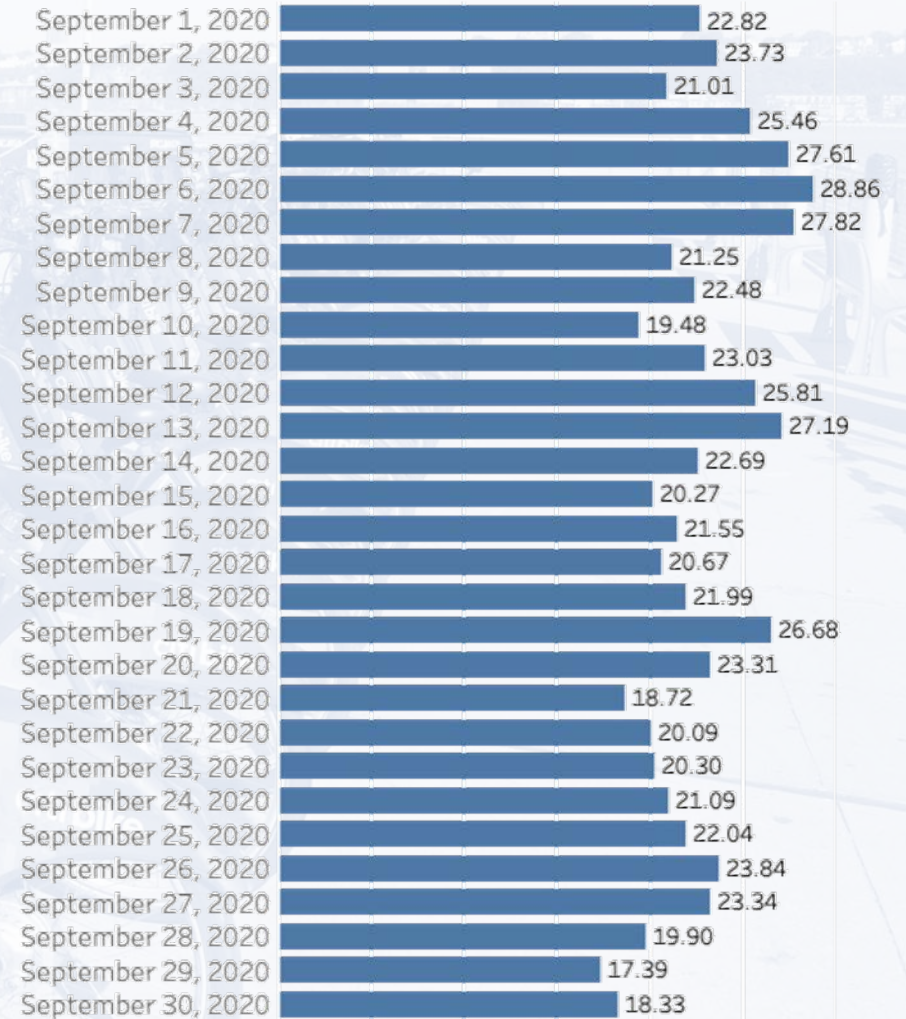
Daily trips

12 Avenue & W 40 Street
Pier 79 Ferry Terminal
citi bike

Total Trip Count

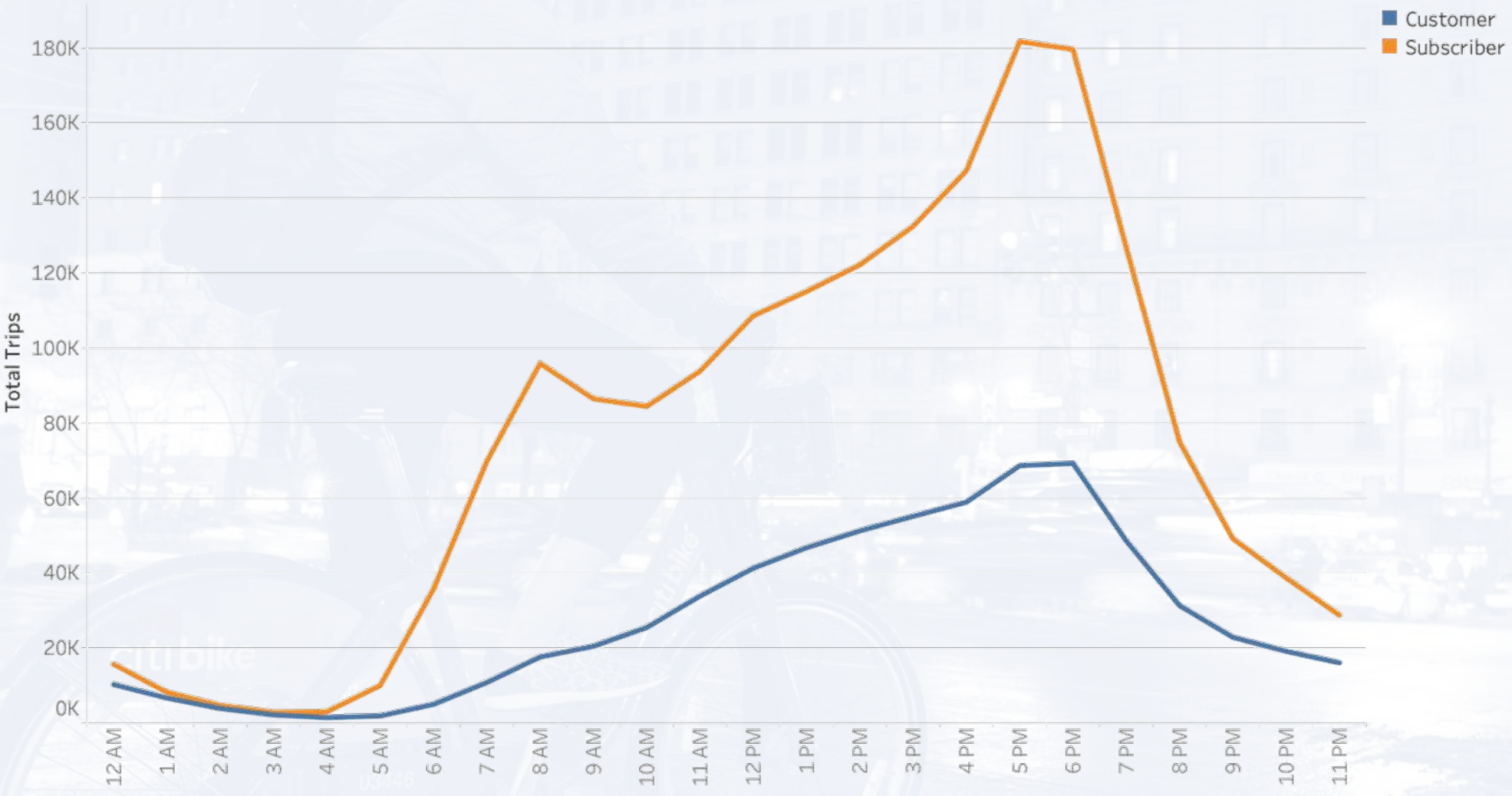


Average Trip Duration



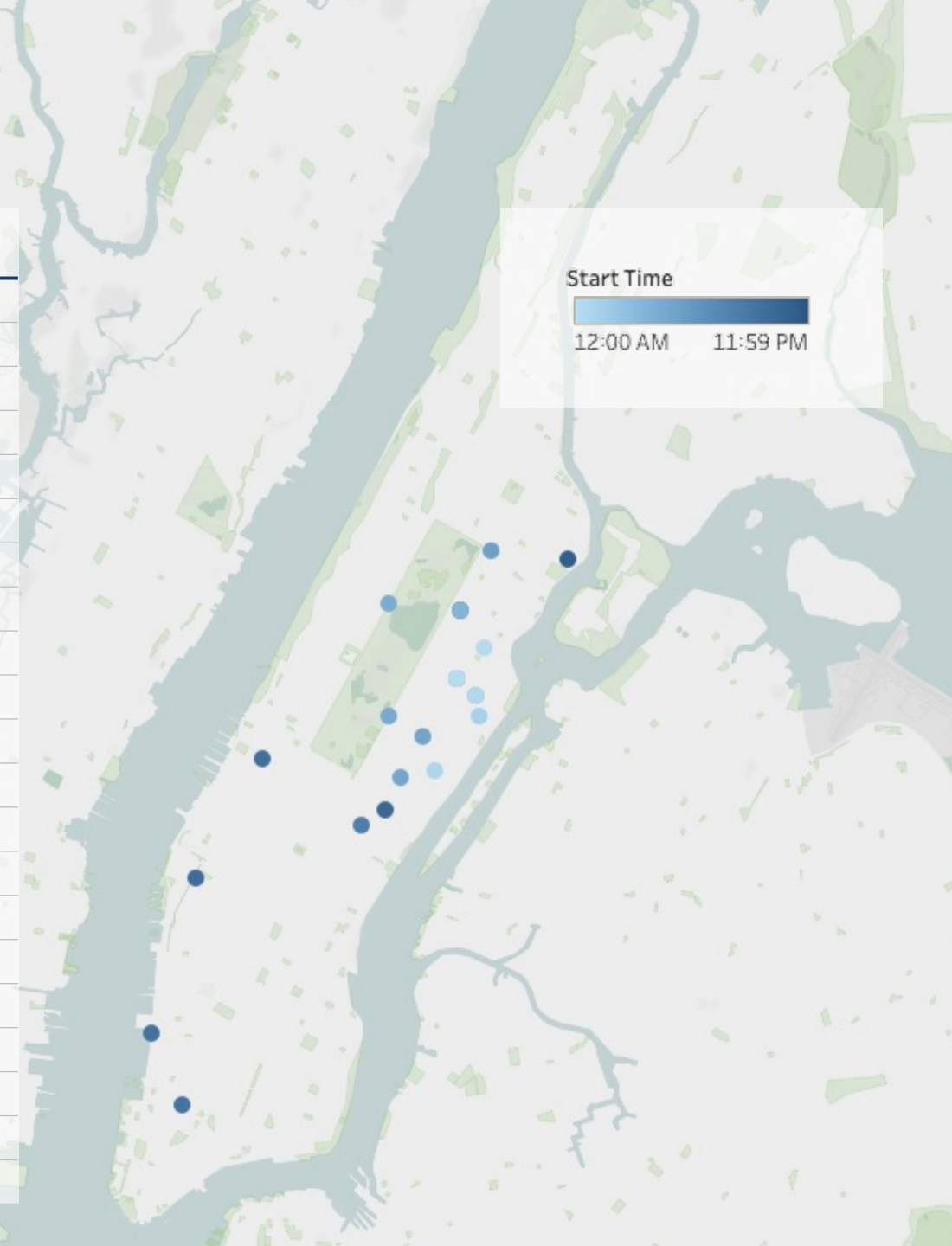
Who is using Citi Bike and when?

Total Trips by Hour of Day



A day in the life of a Citi Bike

Start Station Name	End Station Name	Starttime	Stoptime	Trip Duration (Minutes)
E 85 St & 3 Ave	E 93 St & 2 Ave	12:11 AM	12:27 AM	16.88
E 93 St & 2 Ave	E 84 St & 1 Ave	12:28 AM	12:44 AM	15.93
E 84 St & 1 Ave	1 Ave & E 68 St	12:45 AM	1:25 AM	40.52
1 Ave & E 68 St	E 81 St & York Ave	1:26 AM	2:13 AM	46.72
E 81 St & York Ave	E 85 St & 3 Ave	2:15 AM	2:54 AM	38.98
E 85 St & 3 Ave	E 97 St & Madison Ave	6:36 AM	6:42 AM	6.42
E 97 St & Madison Ave	Central Park W & W 91 St	7:08 AM	7:52 AM	43.73
Central Park W & W 91 St	5 Ave & E 73 St	8:35 AM	8:49 AM	14.23
5 Ave & E 73 St	E 84 St & 1 Ave	8:54 AM	9:05 AM	10.37
E 84 St & 1 Ave	E 63 St & 3 Ave	9:21 AM	9:31 AM	10.75
E 63 St & 3 Ave	3 Ave & E 72 St	9:43 AM	9:47 AM	3.70
3 Ave & E 72 St	E 110 St & Madison Ave	9:49 AM	10:04 AM	14.45
E 110 St & Madison Ave	E 51 St & Lexington Ave	10:38 AM	11:07 AM	28.73
E 51 St & Lexington Ave	Leonard St & Church St	4:22 PM	4:42 PM	19.33
Leonard St & Church St	Pier 40 - Hudson River Park	6:39 PM	6:50 PM	10.82
Pier 40 - Hudson River Park	W 53 St & 10 Ave	6:54 PM	7:13 PM	19.80
W 53 St & 10 Ave	W 26 St & 10 Ave	7:15 PM	7:31 PM	16.70
W 26 St & 10 Ave	E 56 St & 3 Ave	8:00 PM	8:56 PM	55.93
E 56 St & 3 Ave	E 97 St & Madison Ave	9:08 PM	9:31 PM	23.15
E 97 St & Madison Ave	Pleasant Ave & E 116 St	9:47 PM	9:59 PM	12.27
Pleasant Ave & E 116 St	Frederick Douglass Blvd & W 115 St	10:34 PM	10:44 PM	10.60





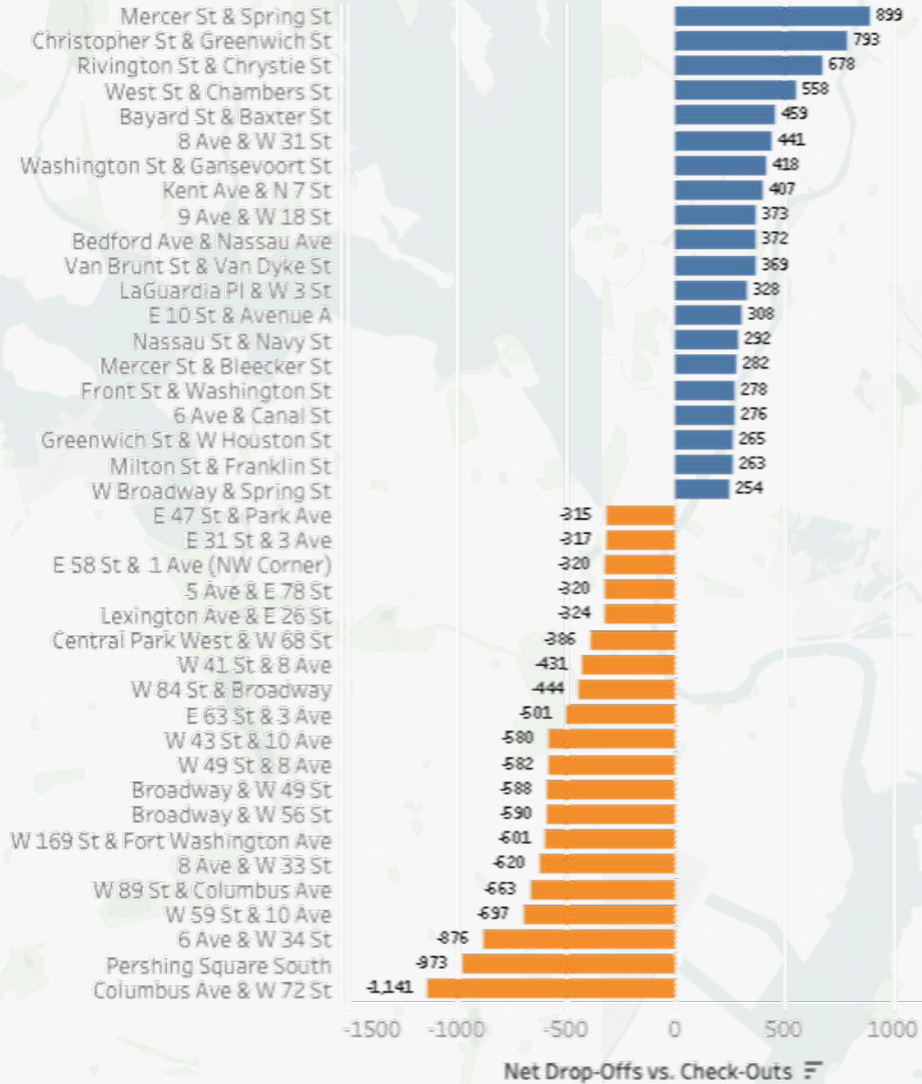
Pools and Drains

Some geographies are very unbalanced in terms of their ridership patterns — for example, hundreds of bikes “drain” from the Upper West Side (riders unlock bikes but don’t return them) every day, while bikes “pool” (riders return bikes, but don’t unlock them) in South Brooklyn neighborhoods like Red Hook and Cobble Hill.

“How We’re Rebalancing the Citi Bike System,”
<https://ride.citibikenyc.com/blog/rebalancing-the-citi-bike-system>

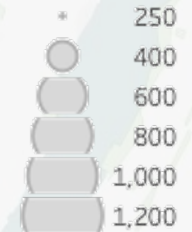
Where are the largest pools and drains?

Net Returns vs. Checkouts



■ Top 20 Pools
■ Top 20 Drains

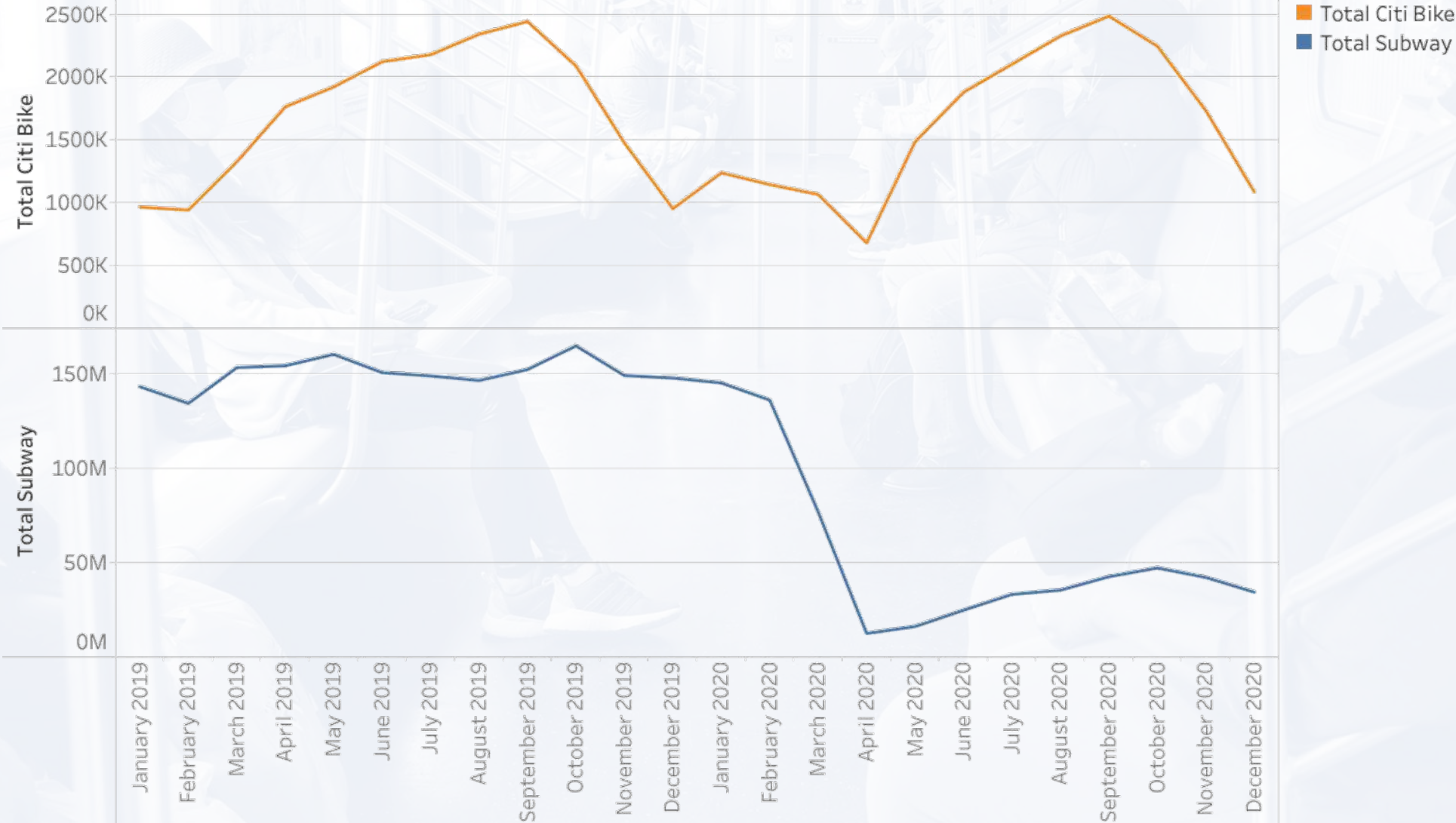
Net Returns vs. Checkouts





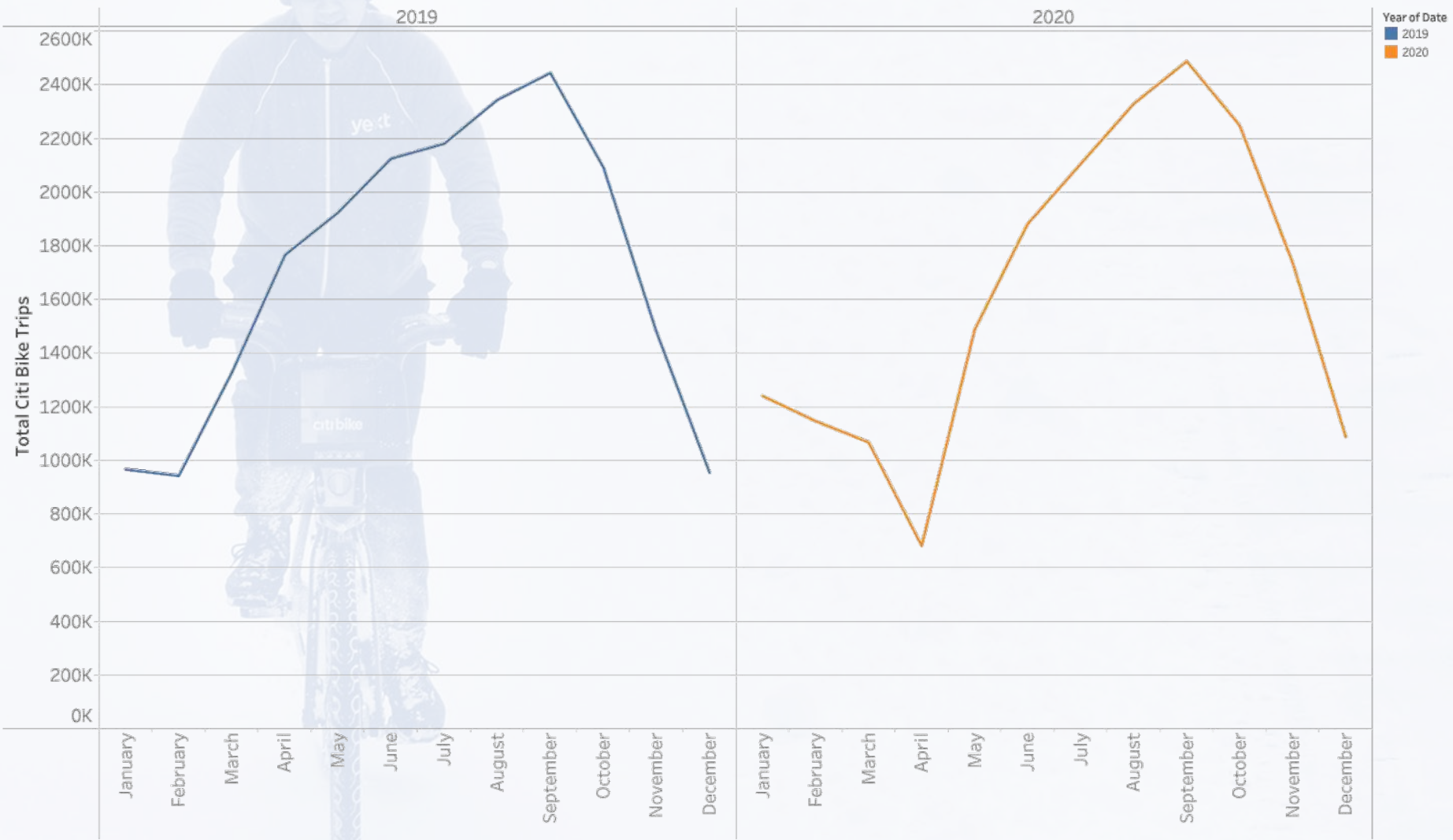
Effects of the COVID-19 Pandemic

Citi Bike Usage vs. Subway Ridership – 2019-2020



NYC Subway data source: NYC Transit data aggregated at QRI.cloud (<https://qri.cloud/nyc-transit-data>)

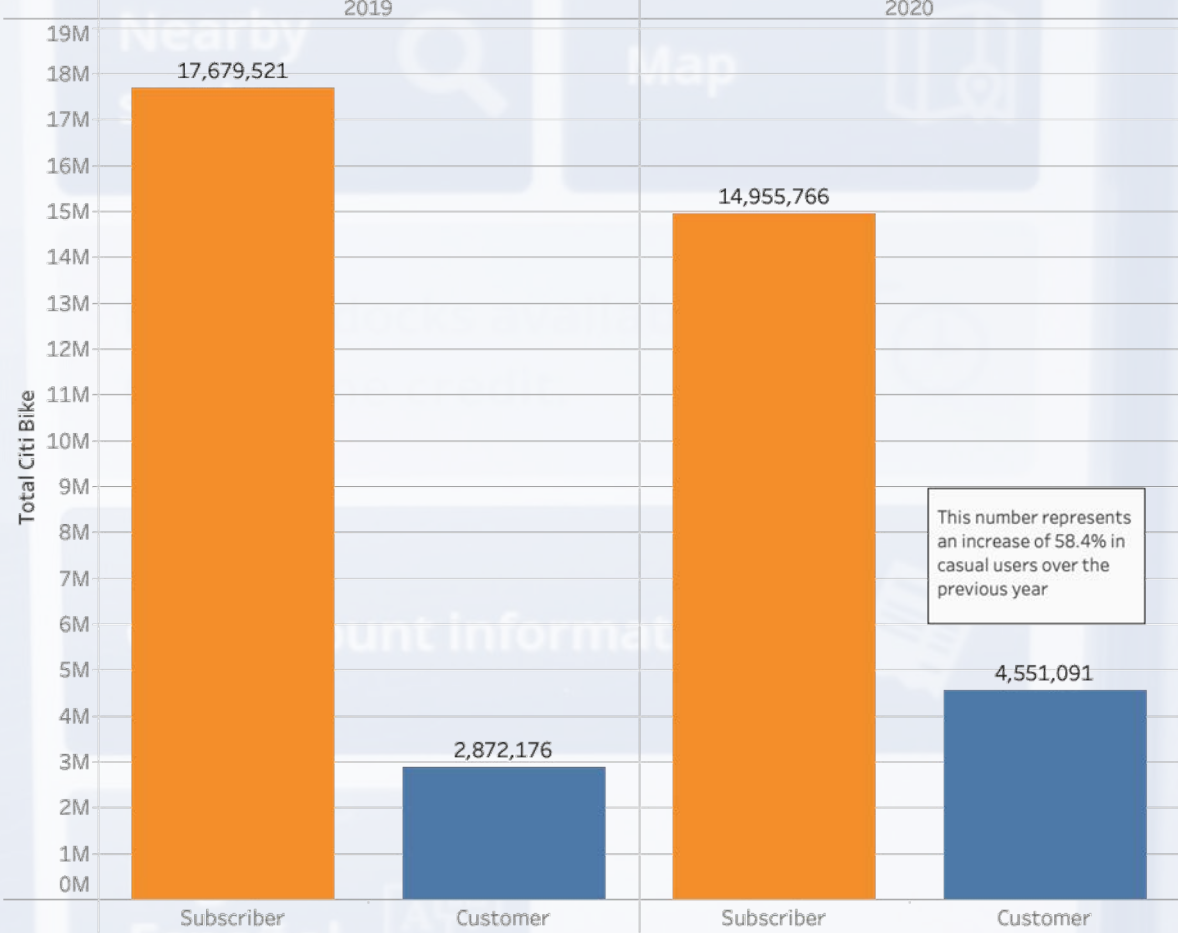
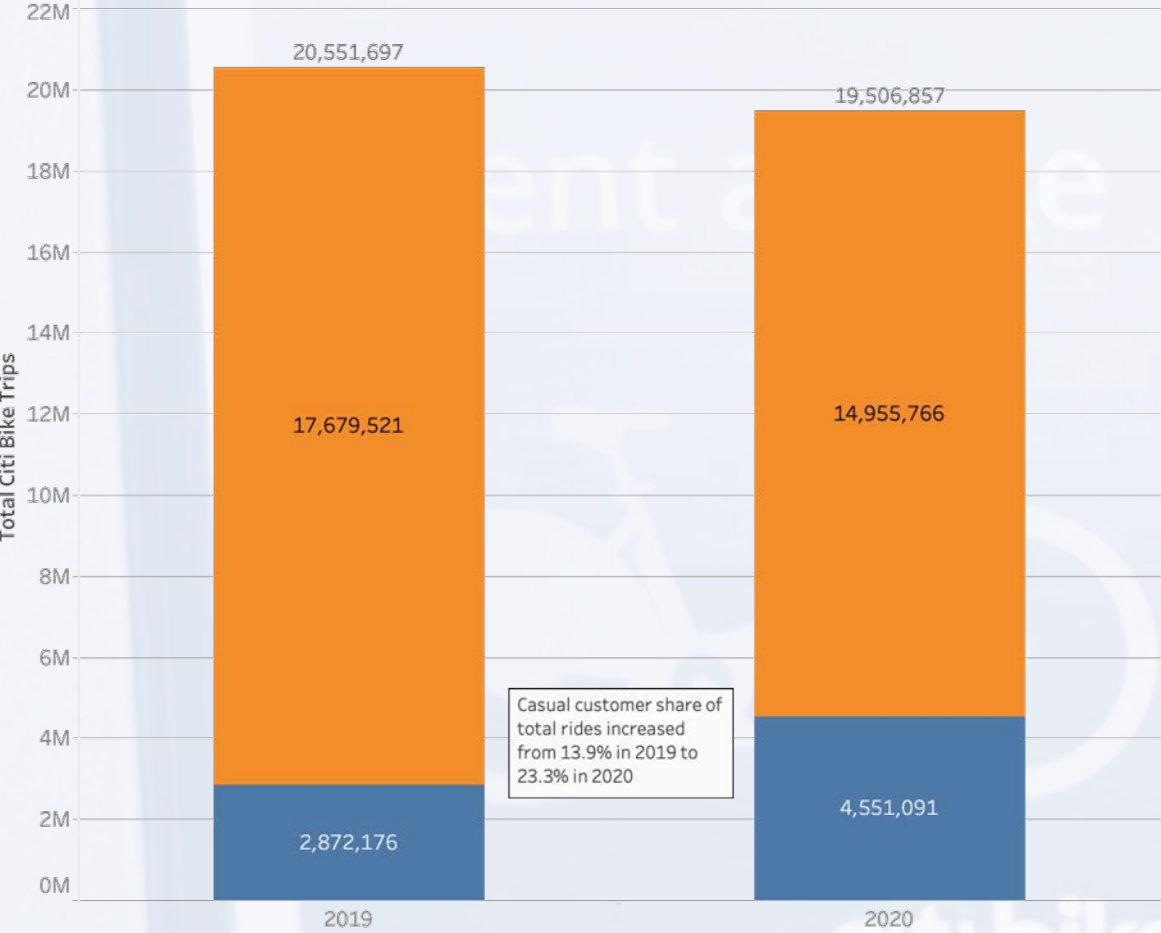
After an initial drop, Citi Bike usage returned to its seasonal pattern



In September 2020, monthly ridership overtook 2019 and continued to do so for the remainder of the year



Share of Casual Users Grew from 2019-2020



■ Customer ■ Subscriber

The future of Citi Bike

- **Phase 3 expansion continues**
 - Coverage to grow to 70 square miles
 - Bike totals to reach 40,000
 - 50% of New Yorkers will live within a five-minute walk of a station
- **Accessibility program for people with disabilities**
 - In 2019 Citi Bike oversaw a pilot program to add handcycles to the Citi Bike fleet. Citi Bike and NYC DOT are working with NYU to expand this accessibility initiative⁽¹⁾
- **E-Bikes**
 - After a false start in 2019, Citi Bike re-introduced several hundred “pedal-assist” bikes to its fleet and plans to increase that number to several thousand⁽²⁾

(1) Source: *NYC Streets Plan*, NYC Department of Transportation, December 2021 p.70
<https://www1.nyc.gov/html/dot/downloads/pdf/nyc-streets-plan.pdf>

(2) “Citi Bike’s E-Bikes Are Back On The Street After Long Absence Due To Safety Issue,” Jake Offenhartz, *Gothamist*
<https://gothamist.com/news/citi-bikes-e-bikes-pedal-assist-back>

