

Bikeshare SF

the rise of shared transportation and
recommendations around expansion

By: Kathy Wannaviroj, Hector Perez,
Ricardo Rendon, Ksenia Chan, and
Jarely Martin



Agenda

- 1 What is Bike-sharing?
- 2 Goal: Expansion in SF
- 3 Background about Bay Wheels
- 4 Rise of Bike Share + Analysis
- 5 Expansion Recommendations
- 6 Sources

What is Bike-sharing?





Bike-sharing is public service where individuals can rent a bike for a short-term with a fee (\$)



Available across the major U.S. cities such as Washington D.C., New York, and San Francisco.



Number of public-use bicycles is only increasing, 45.5 million bike trips in the U.S. in 2018 in comparison to 28 million in 2016.

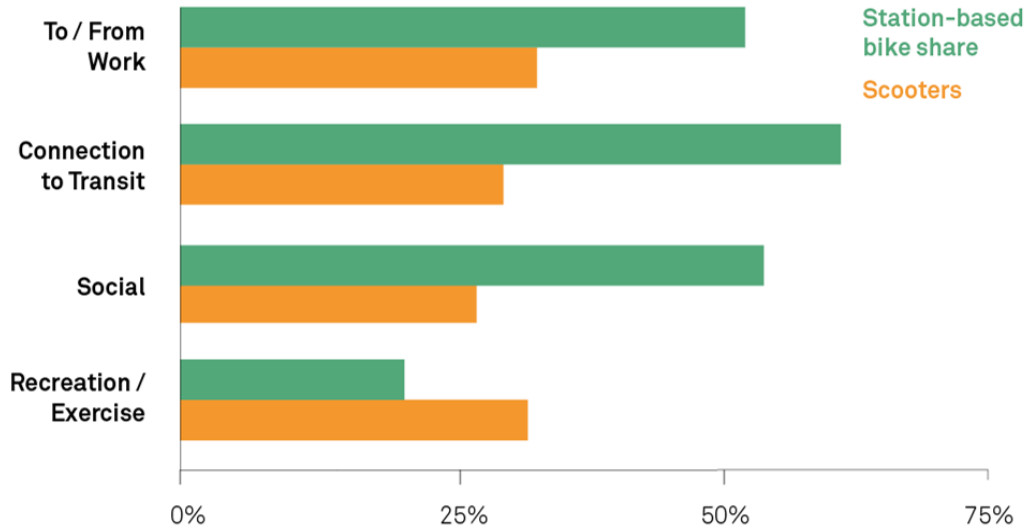
San Francisco named second most bike friendly city in the U.S.

According to the U.S. Census, the 2016 ranking shows that San Francisco has made bikes a priority.

1. Chicago
2. San Francisco
3. Portland
4. New York City
5. Seattle



Why do people ride?



The analysis shows evidence of big demand for e-bikes.

Classic bike share is mostly used for commuting or transit connections.

Bike share can help with the use of public space to increase active mobility.

Goal:
Expansion in SF





Goal: Provide the mayor's office with **recommendations** as to where to expand Bay Wheels stations in the city of San Francisco.



Main Priority: Ensure everyone has access to transportation.



Background about baywheels



San Francisco

Bike-sharing program started in 2013 through the San Francisco Municipal Transportation Agency (SFMTA). Also serves the East Bay and San Jose.

Bikes

Bay Wheels provides both electric and non-electric bikes that are either in docks or stationless.

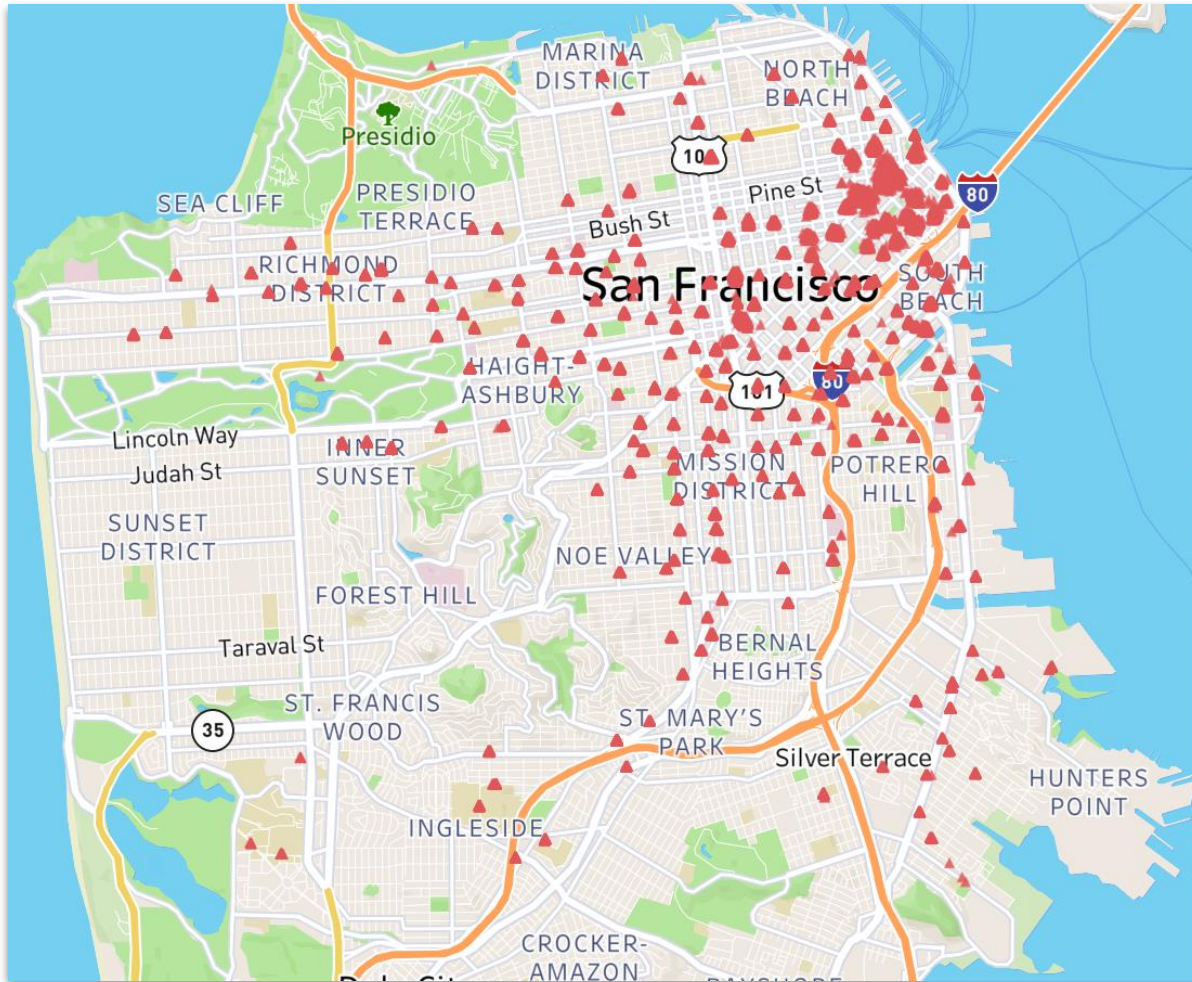
Lyft

Bay Wheels is available on the **Lyft app** for single trip usage or for those apart of the membership program.

Equity

20% of bike stations are located in low-income neighborhoods and the **Bike Share for All** program provides affordable membership prices for those that qualify.





There are a total of 280 stations.

Every ▲ represents a distinct **Bay Wheels** station in SF.



Vehicle Types, Usage & Pricing



What are ebikes v. classic bikes?



Ebikes: electric-assist bicycles, pedal assist for the hills, dockless mode in which riders can lock the bike to any bike rack with a built in lock

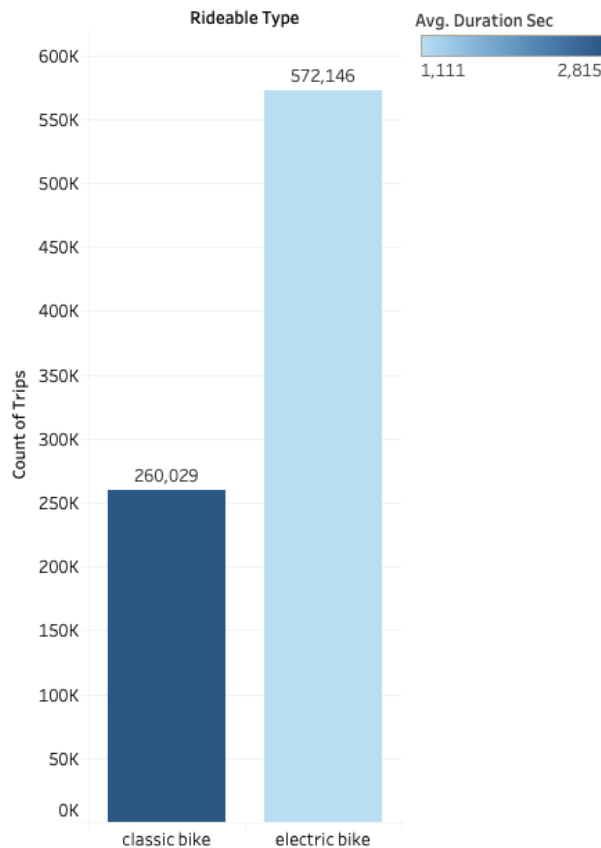


Classic Bikes: Classic pedal bike, non-electric, available only at docks

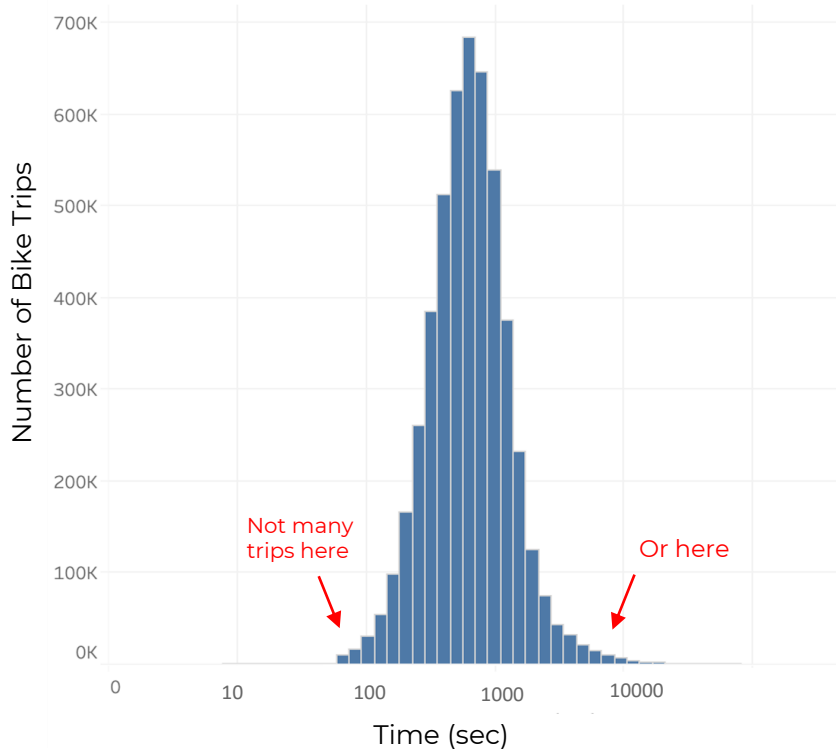
How does usage differ by vehicle type?

Based on this graph it shows more riders **prefer** electric bikes over classic

The average duration in seconds (lighter the color the shorter the trip v. the darker the color the longer the trip)



Bike Trip Duration



Majority of bike trips are relatively **short** where they fall closer to 1,000 sec = ~16 min


Users are taking shorter trips
→ using bike-sharing to get to/from work and accessing other public transportation




Bike Share Price

× Access Passes


Single Ride
Good for one, 30 minute trip
\$2




Access Pass
Unlimited, 30 minute trips
\$10



Monthly Membership
Take unlimited, 45 minute trips
\$15



Annual Membership
Take unlimited, 45 minute trips
\$149



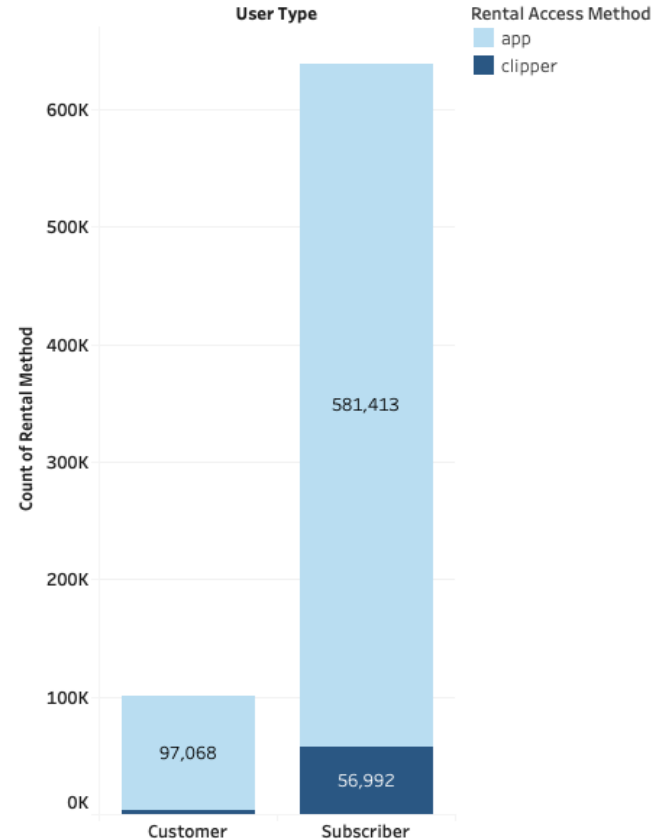
A reduced pricing option, **Bike Share for All**, exists for users who qualify for government assistance programs. The reduced price is \$5/year for the first year and \$5/month in subsequent years.

As of January 2018, around **15%** of members used the **Bike Share for All** option.

User Type & Rental Method

This graph shows the amount of users on bike share and the rental method they used (Lyft app v. Clipper card)

It also shows whether the user is a customer (one time user) or subscriber



Competing Markets



Bike Sharing Market in San Francisco

Prominent Players



Adopting Strategies

To combat competition companies are adopting strategies collaborations & partnerships or merger & acquisitions to expand their business operations.

New Acquisitions

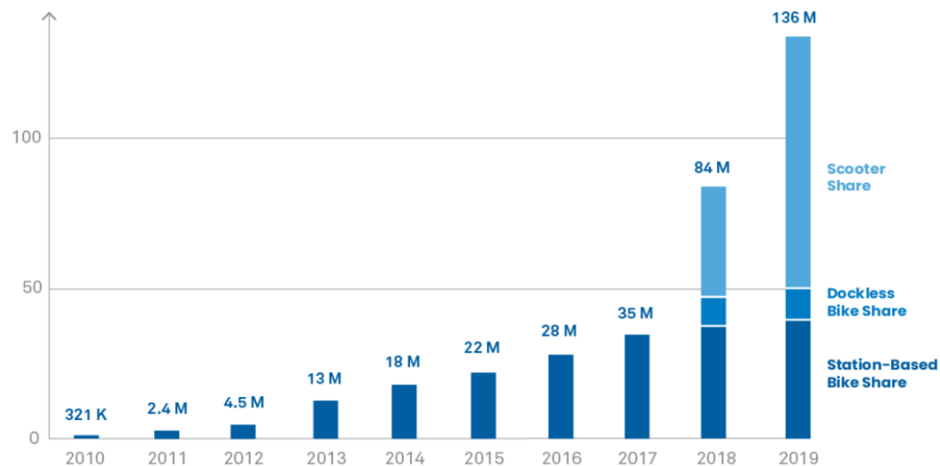
In July 2018, Lyft acquired, Motivate, a San Francisco based company.



Shared Micro-Mobility Growth

SHARED MICROMOBILITY RIDERSHIP GROWTH FROM 2010–2019,
IN MILLIONS OF TRIPS

Source: NACTO



In 2019, people took over 40 million trips on station-based bike share systems, pedal and e-bikes.

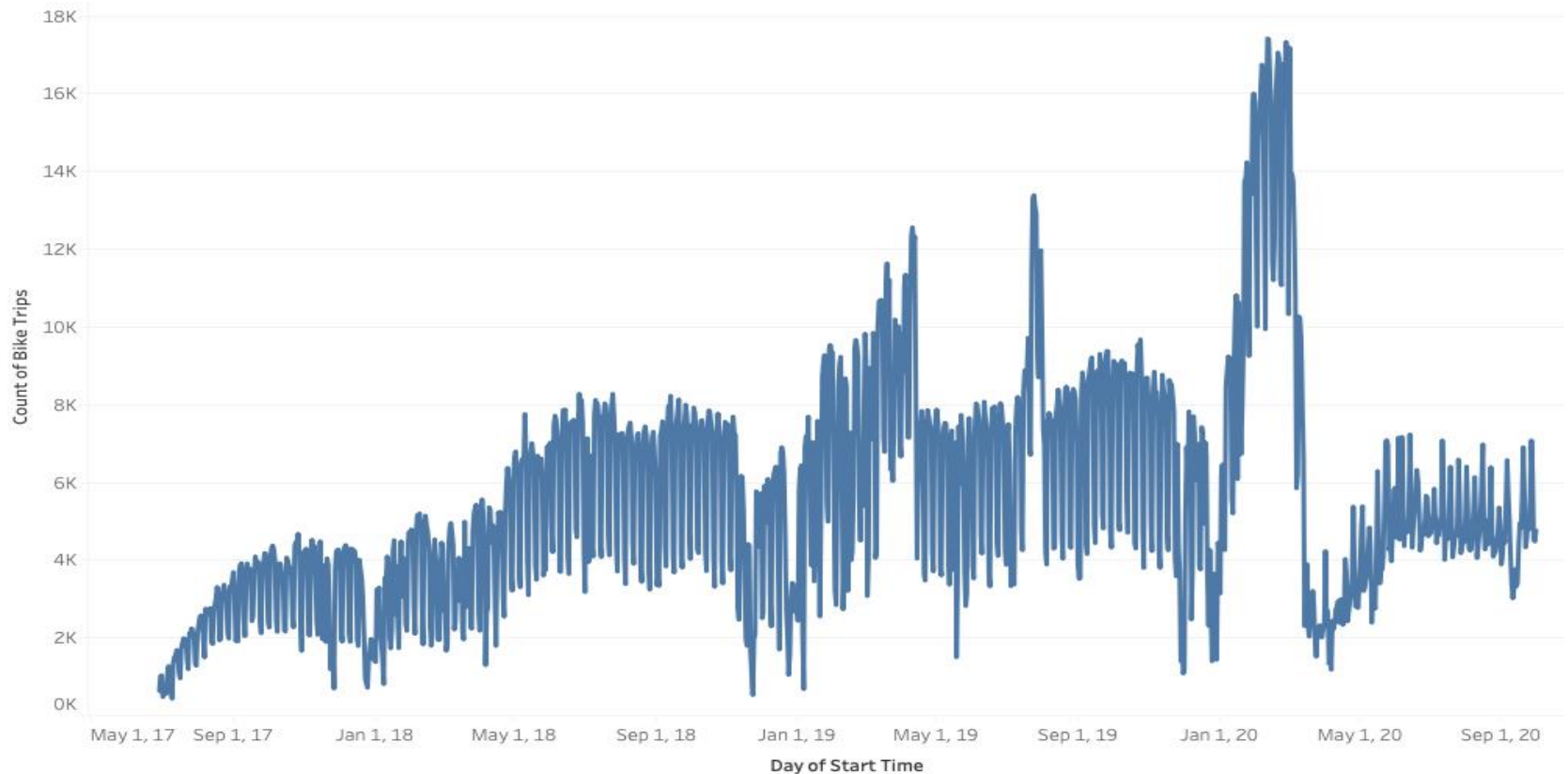
Between 2018 and 2019 bike share grew roughly 10%.

Scooter trips, more than doubled over the same period of time.

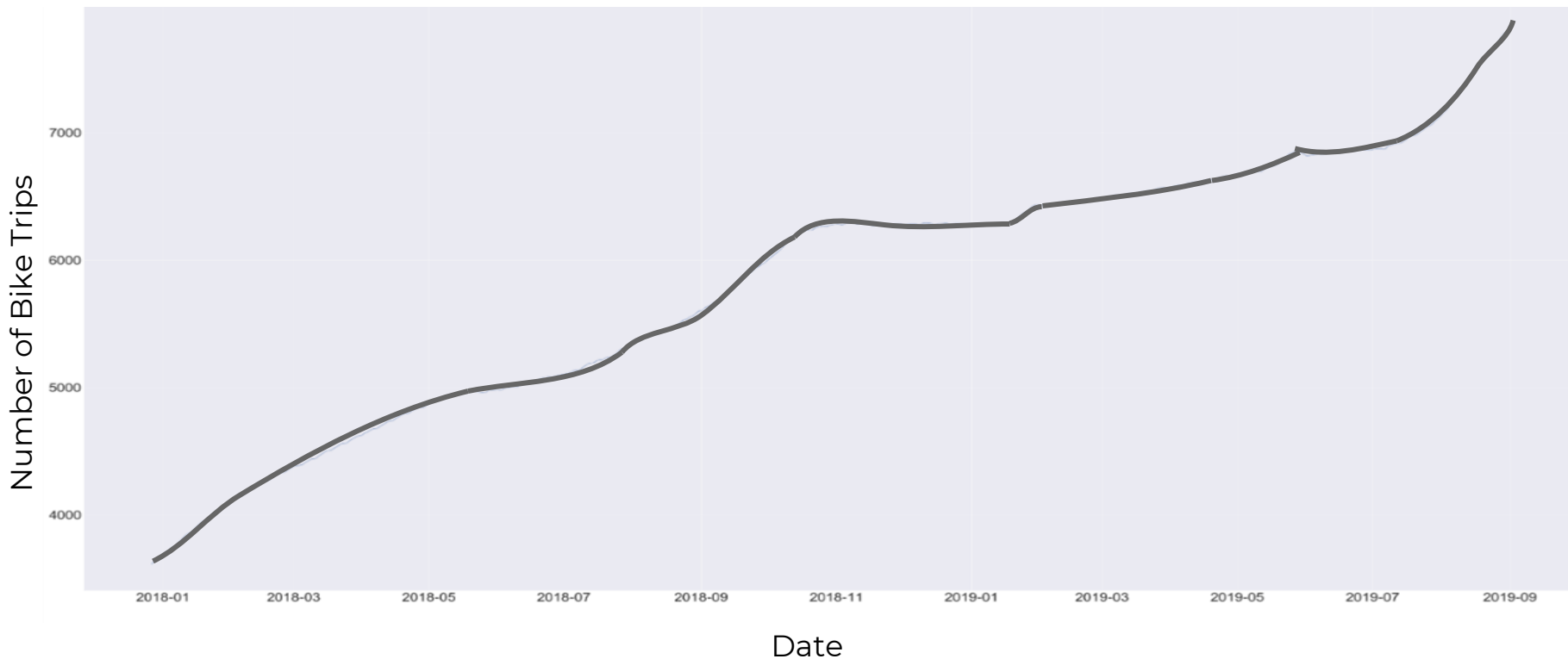
Rise of Bike-sharing + Analysis



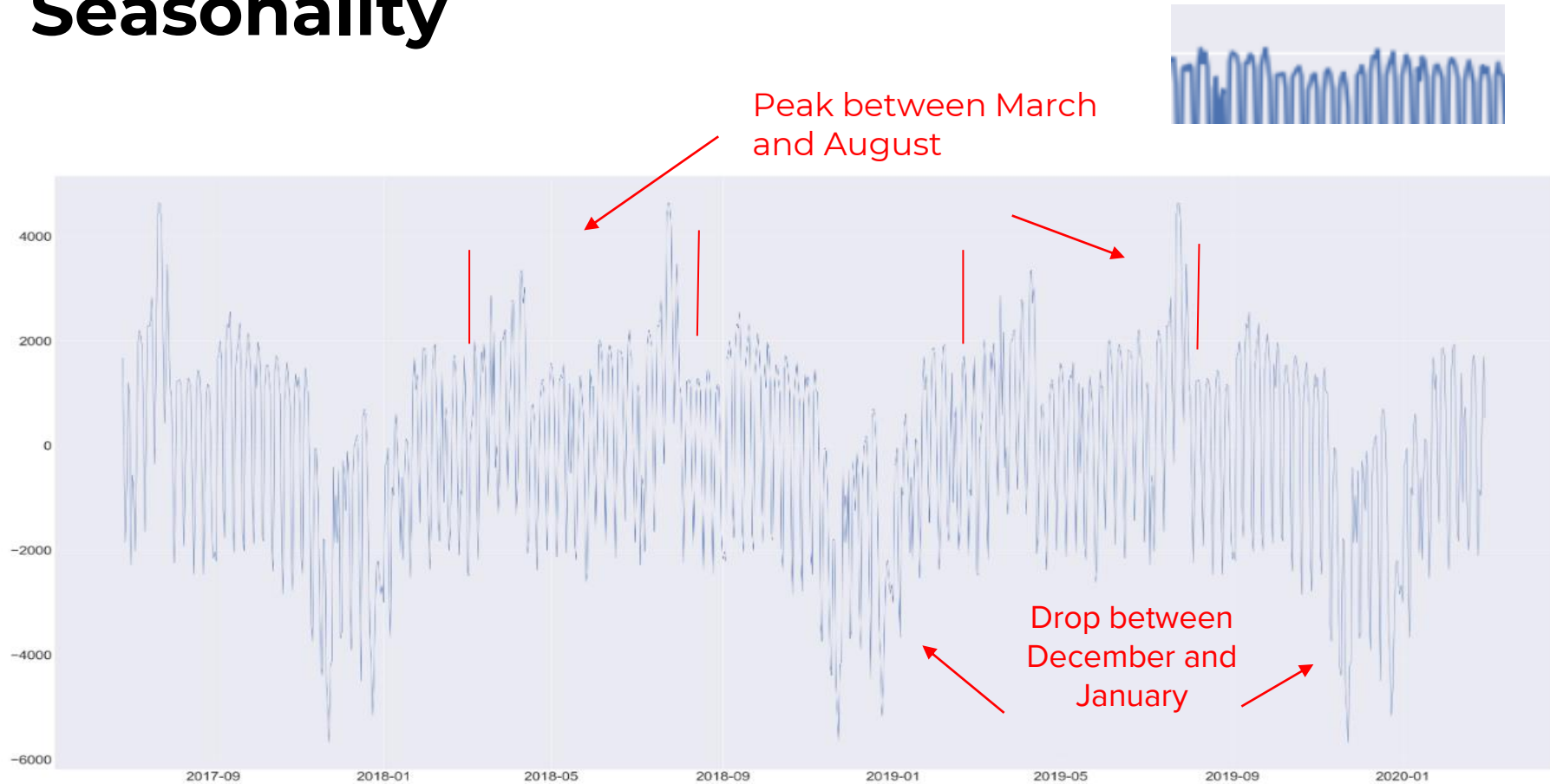
Bike-sharing in SF



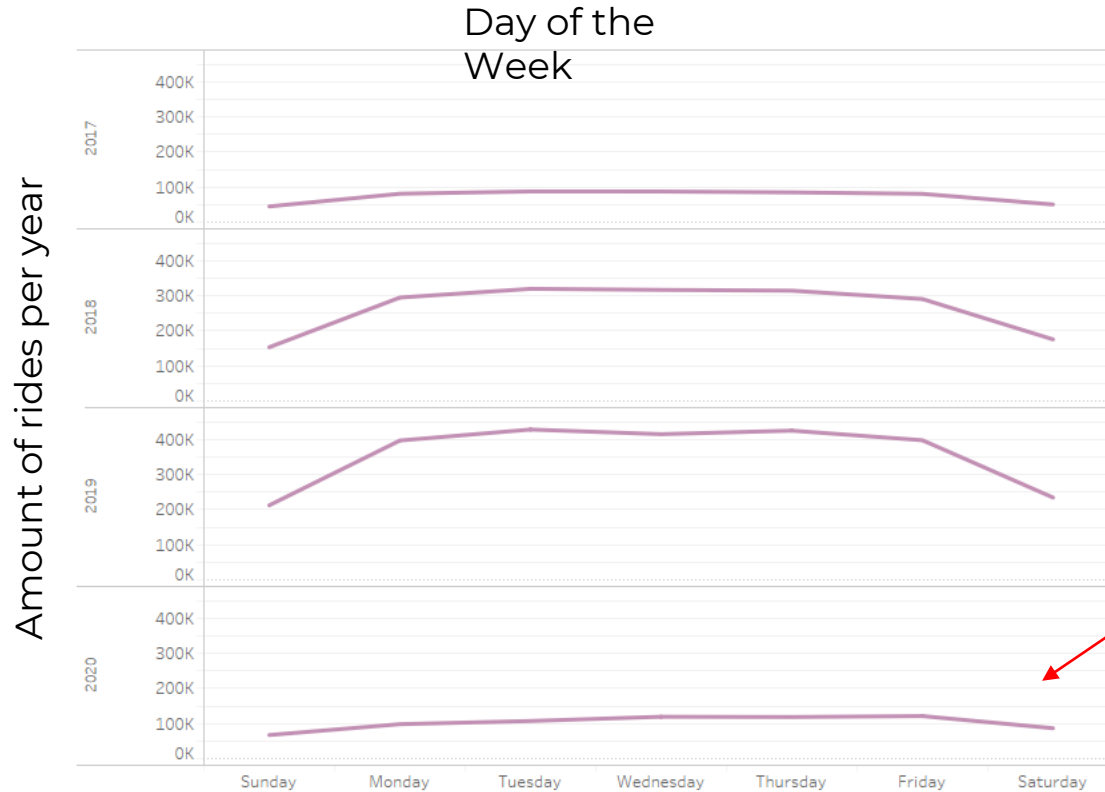
Increase in Bike-sharing



Seasonality



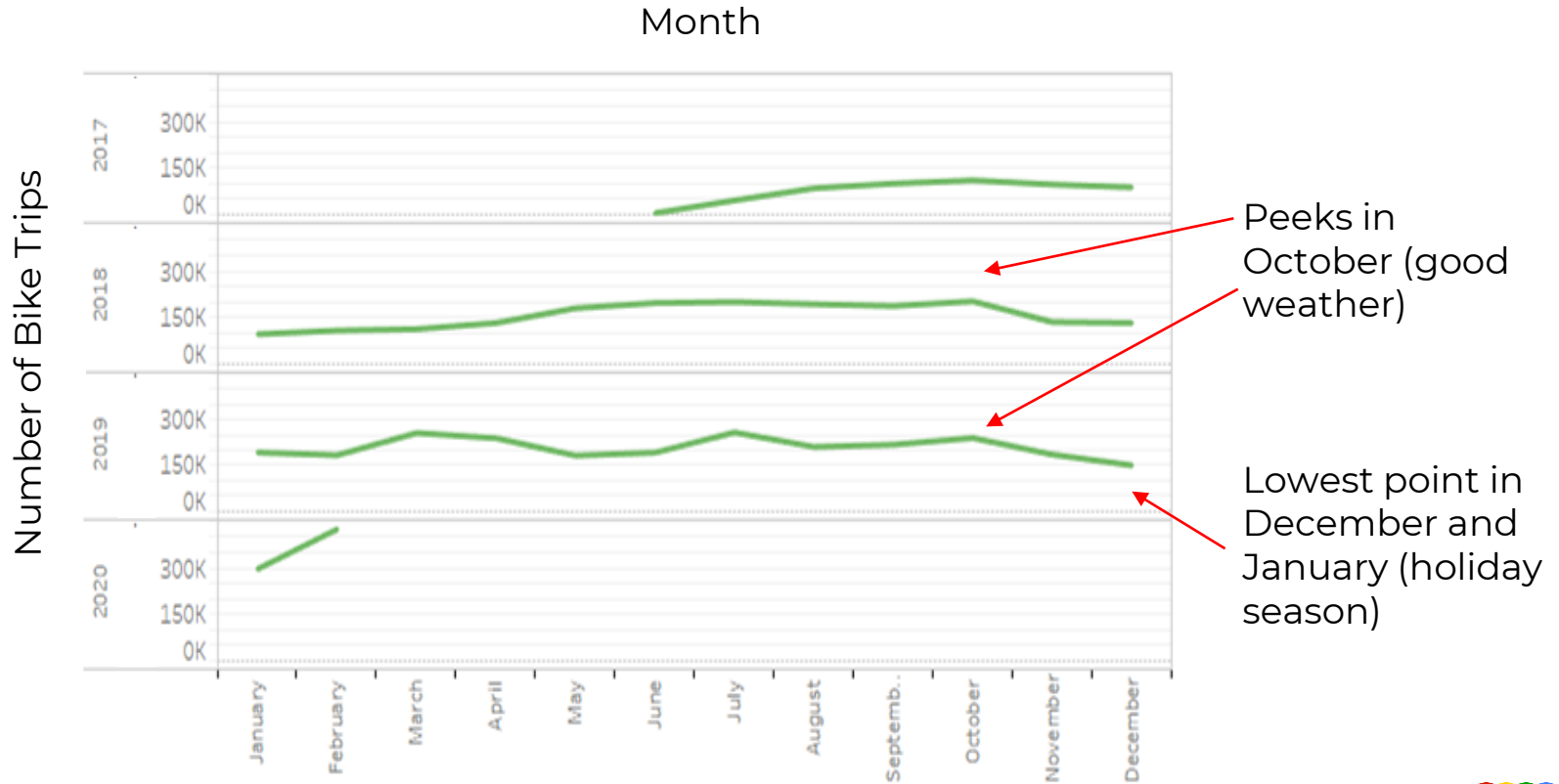
Amount of Rides per Weekday



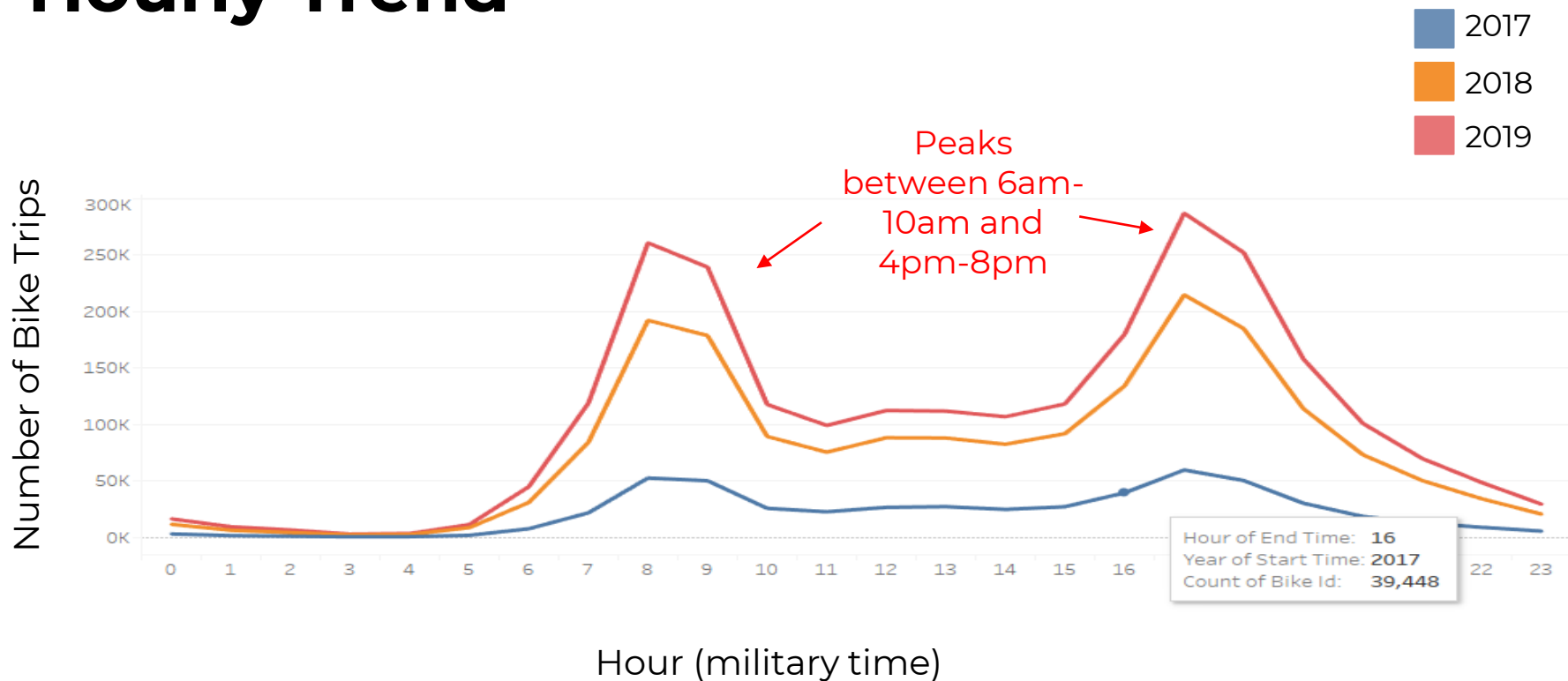
LOW due to lack of information in year 2020 (Jan-Mar)



Amount of Rides per Month



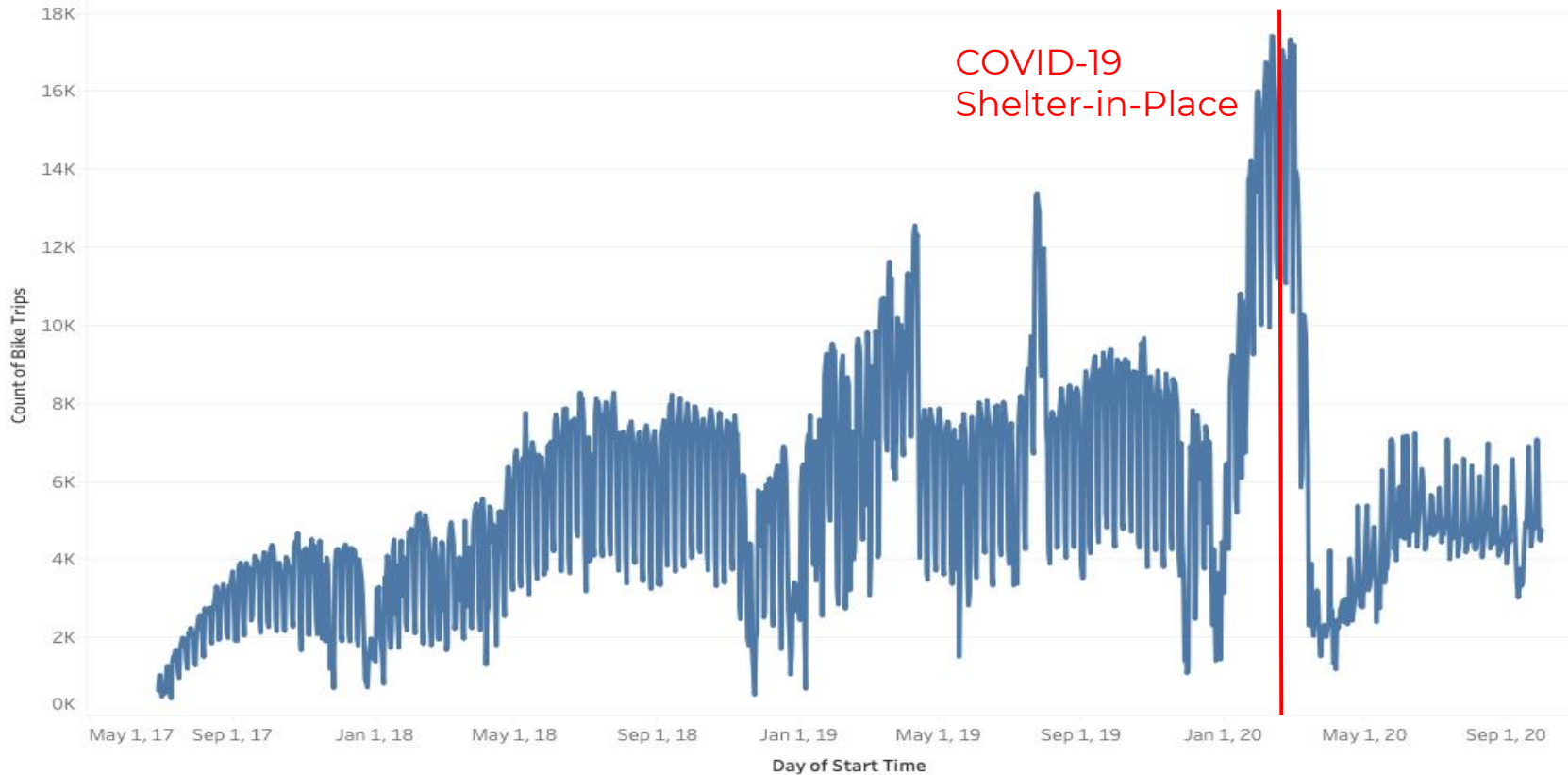
Hourly Trend



COVID-19: Impact on Bike-sharing



Bikesharing in SF after COVID-19



COVID-19 Impact on Ridership

Bay Wheels trips during 2020 and 2019

Bay Wheels services the California cities of Oakland, San Jose, San Francisco, Berkeley, and Emeryville



Source: Bay Wheels system data

March 17th - Bay Area announced shelter-in-place order

March 27th - Bay Wheels announced a one-month free-rides program for healthcare workers

On April 28th it extended the program for another month



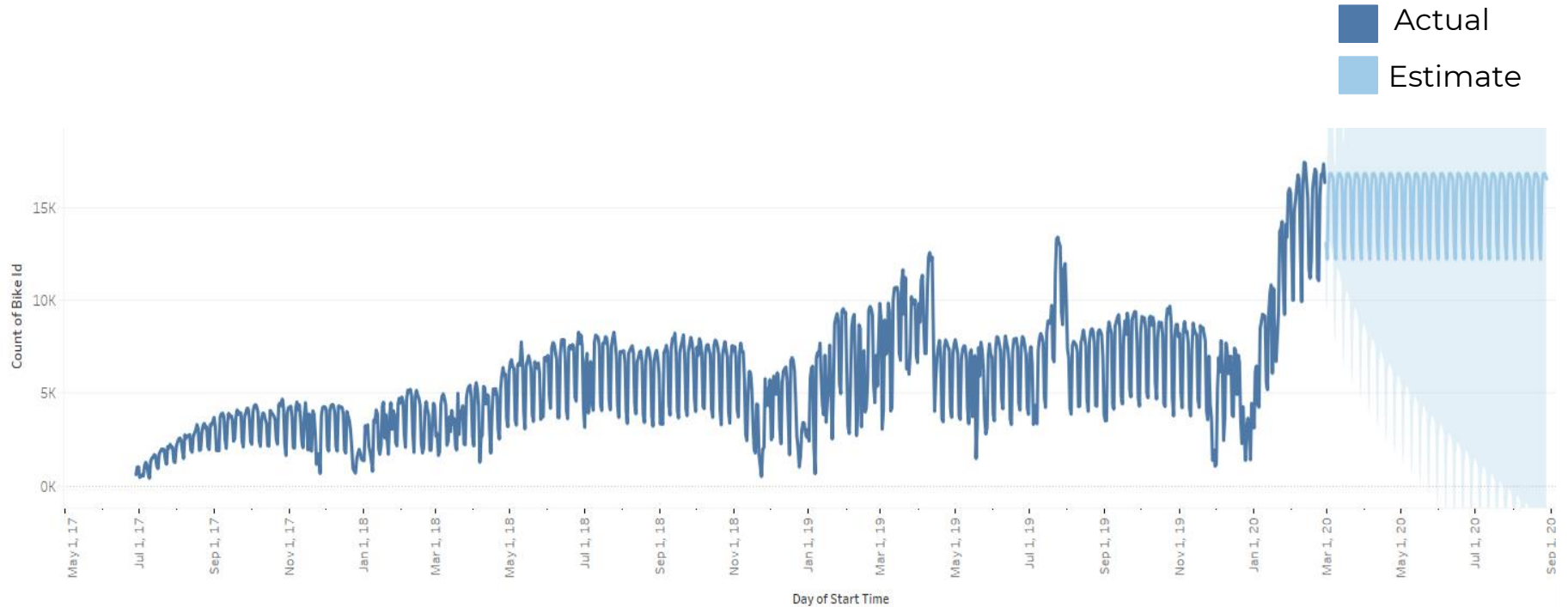
So, How Much \$\$ did Bay Wheels Lose due to COVID-19?

Let's predict the amount of rides from March (when covid started) to the present based on only pre-COVID data.

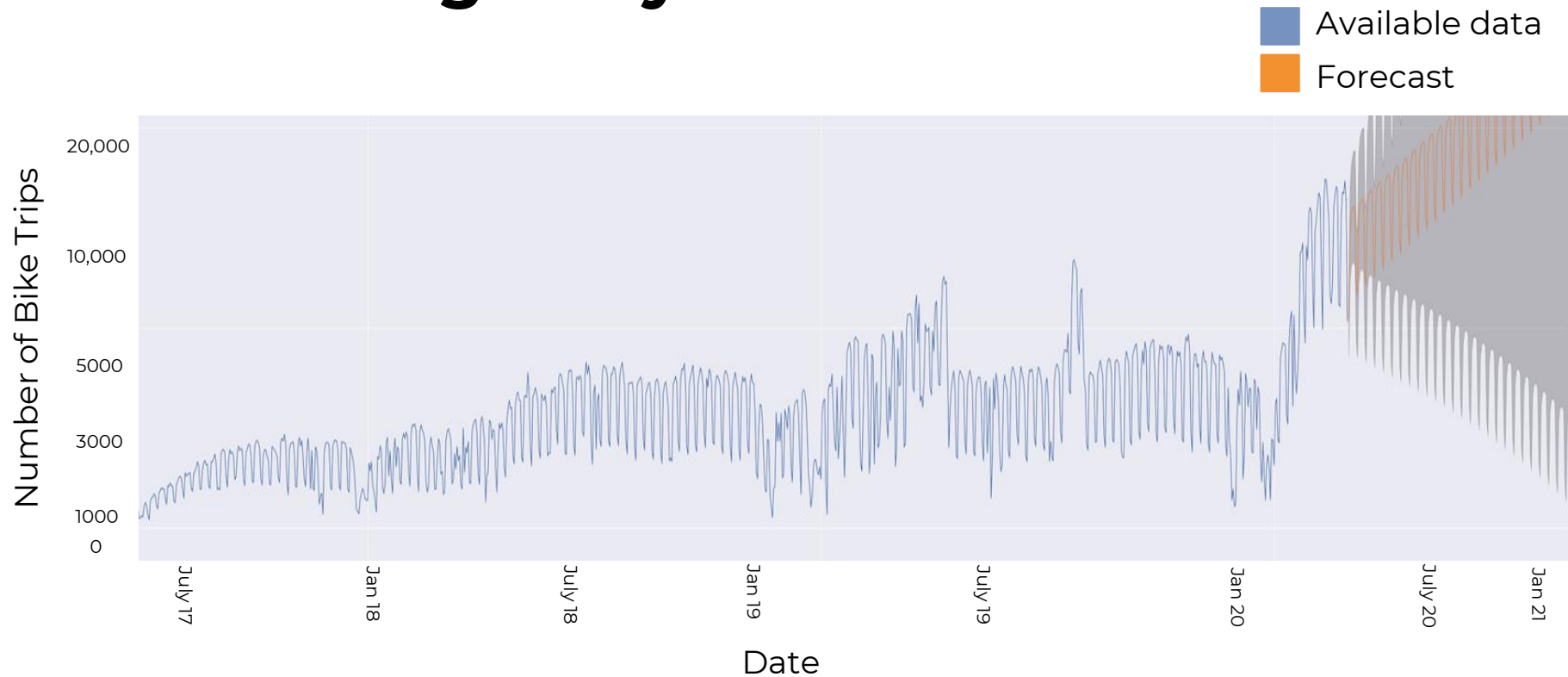
This will help us understand the number of rides lost once we subtract the predicted data with the actual data, what happened after COVID-19.



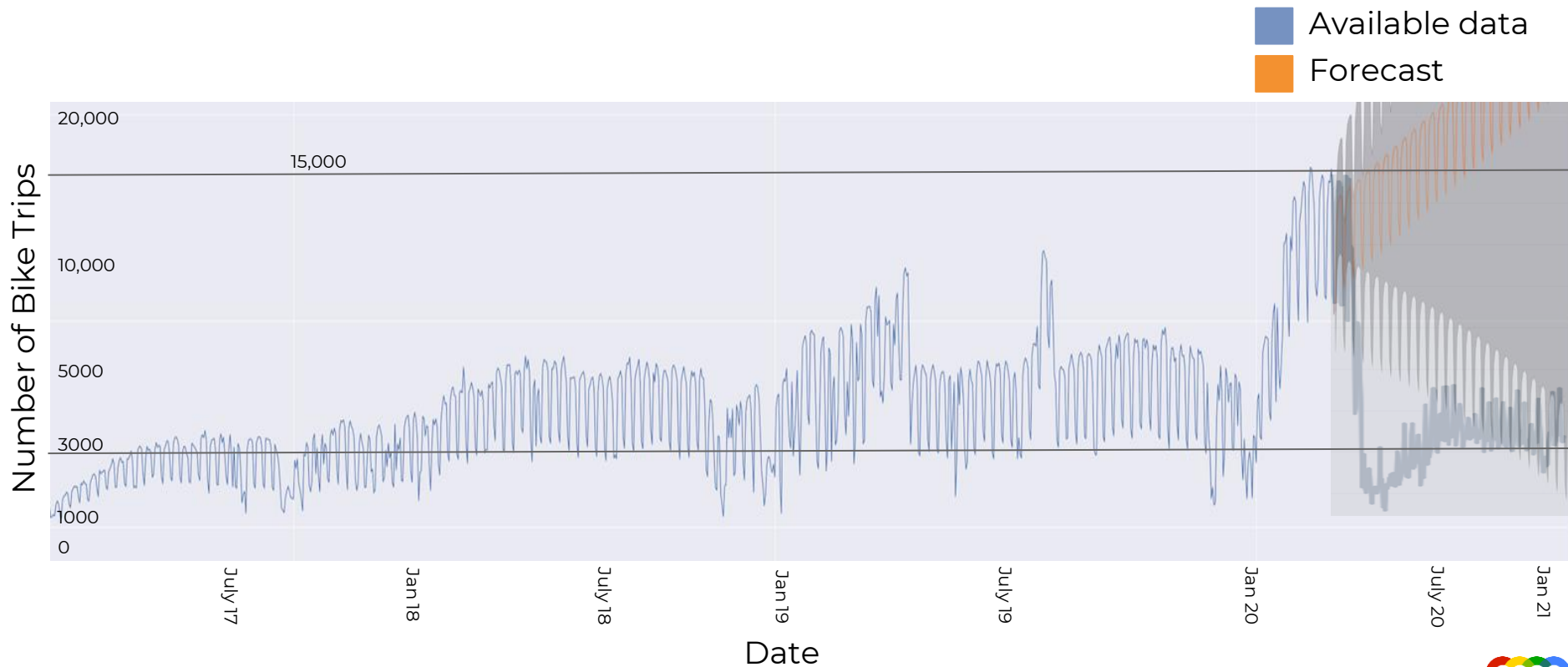
Forecasting in Tableau



Forecasting in Python



Loss due to COVID: 12k Rides per day



Let's break it down:

There are **12k rides** per day* with \$3.70 avg. revenue per ride=\$45k per day.

Data available: until September 2020

Projected loss (from March to September): \$7,380,000



Facebook Prophet Algorithm:

At its core, the Prophet procedure is an additive regression model with four main components:

- A piecewise linear or logistic growth curve trend. Prophet automatically detects changes in trends by selecting changepoints from the data.

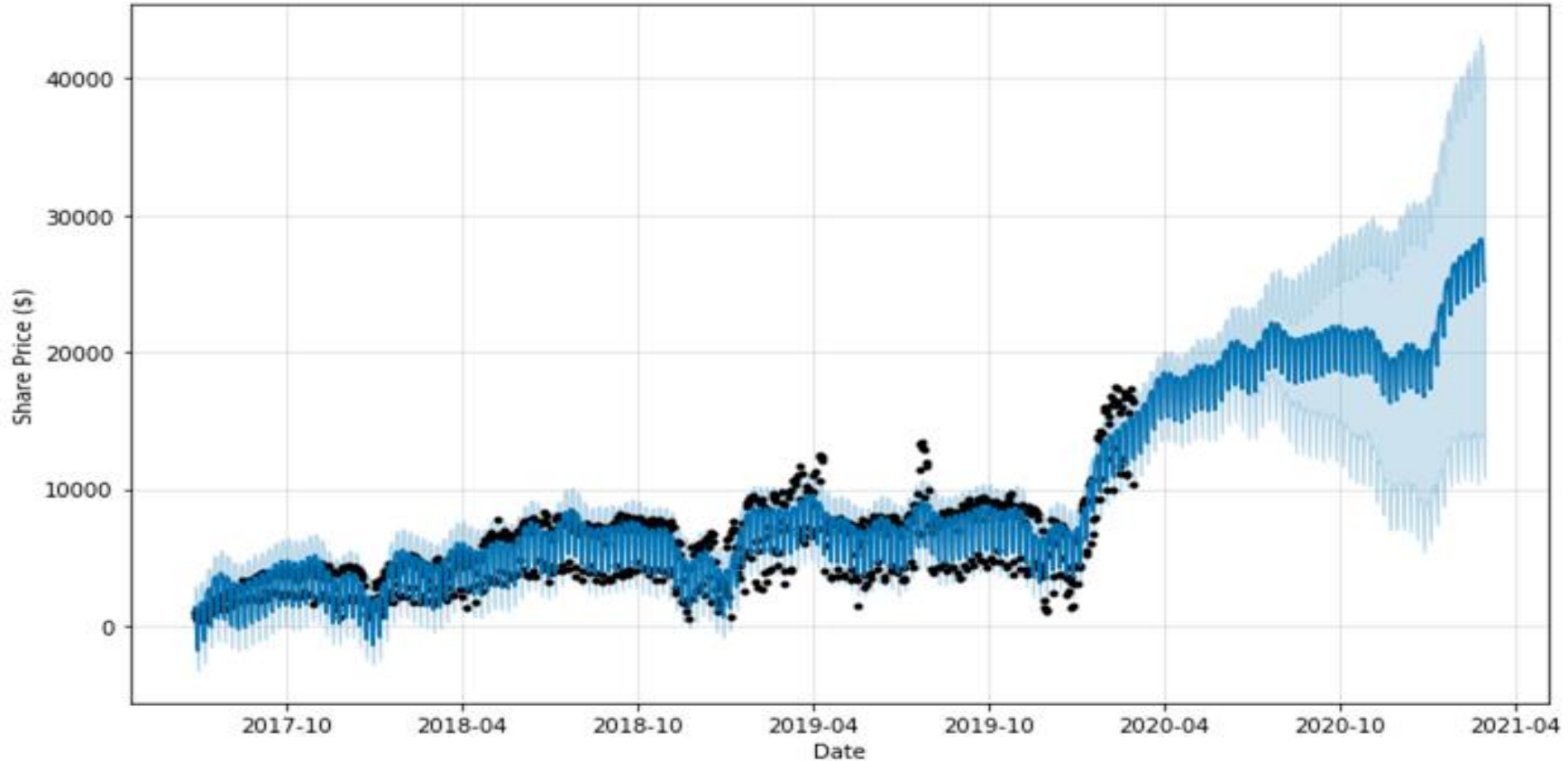
- A yearly seasonal component modeled using Fourier series.

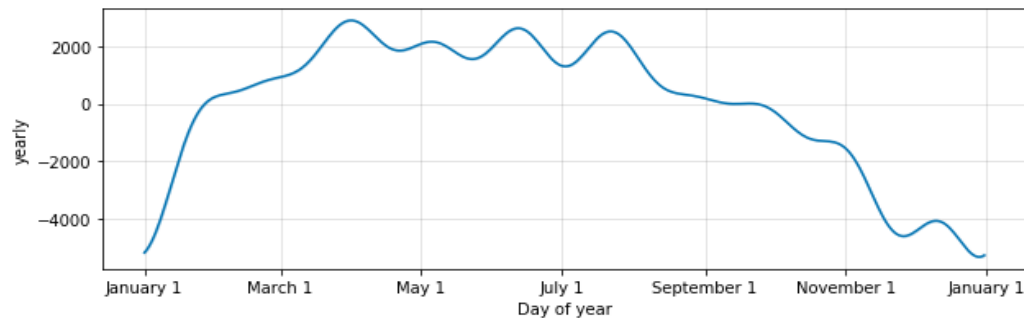
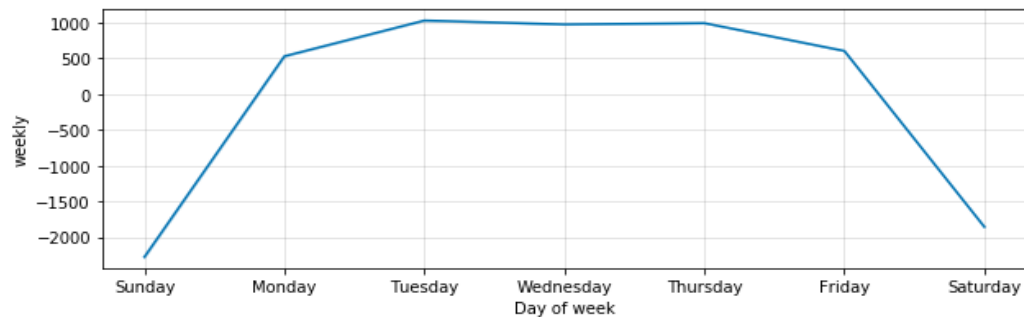
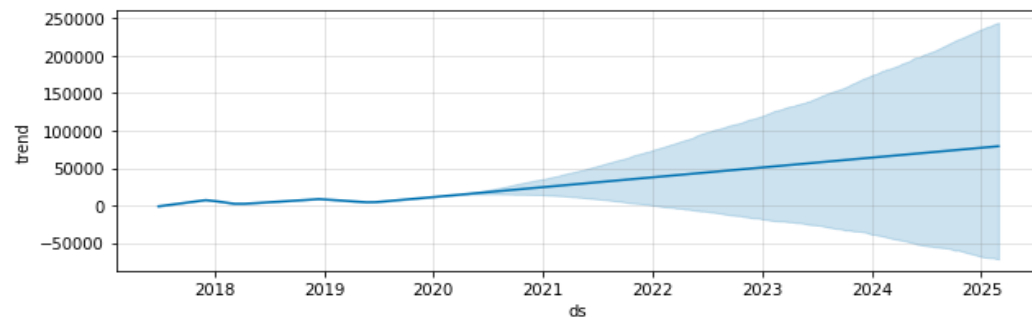
- A weekly seasonal component using dummy variables.

- A user-provided list of important holidays.



Prophet Algorithm Forecast

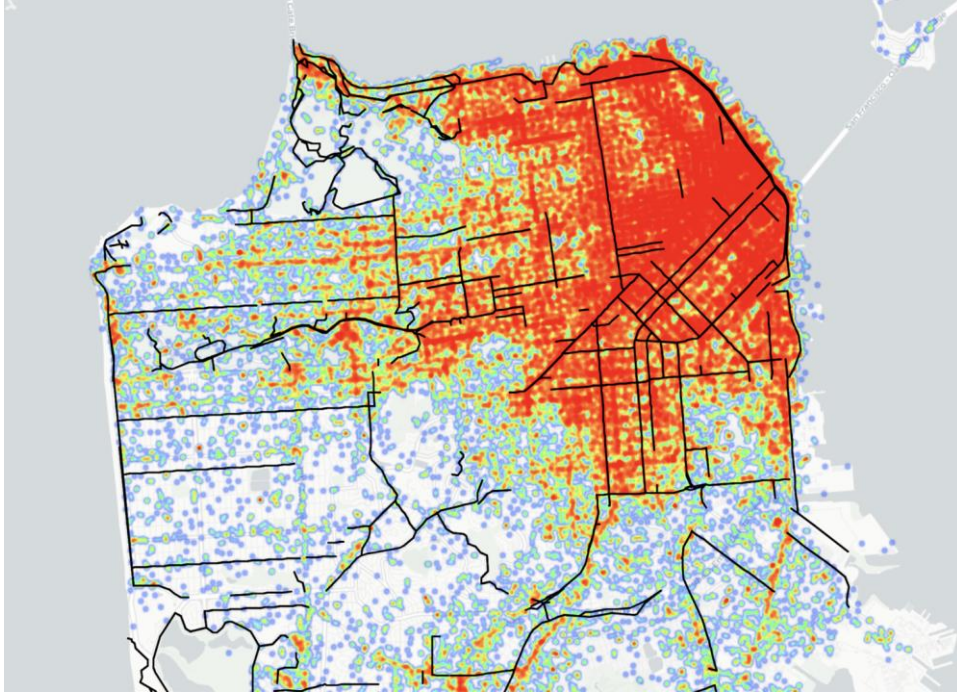




Expansion Recommendations



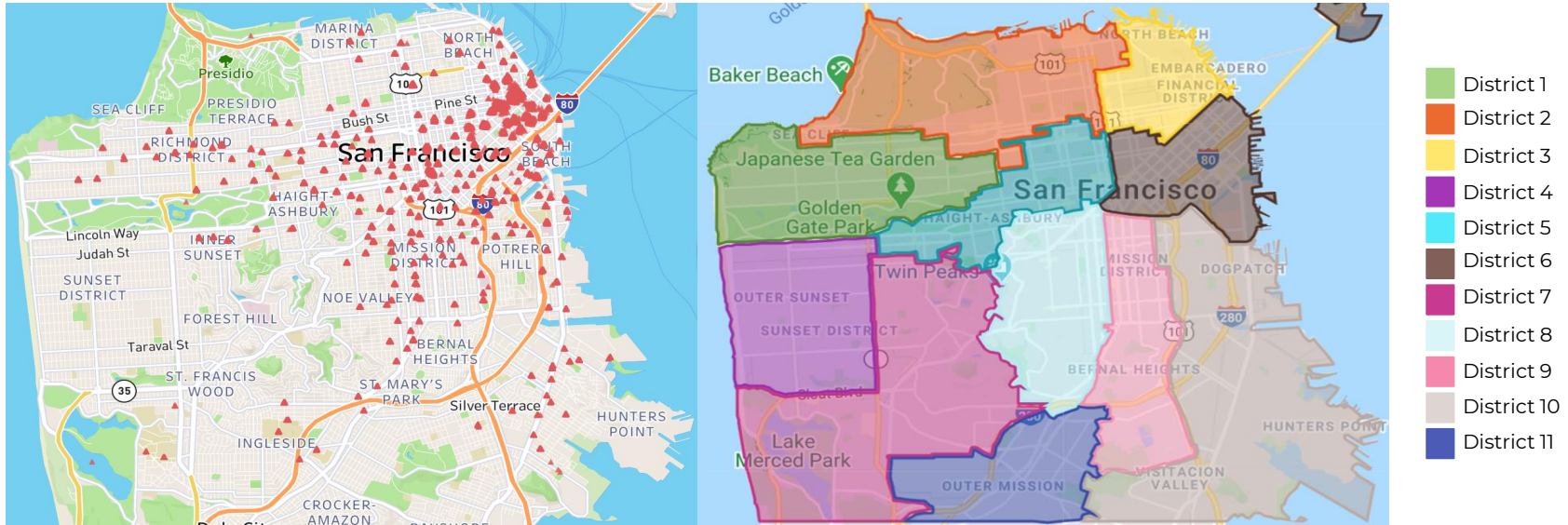
Bike Share v. Scooter Share



Bike share is in **red**, while scooter share is in **green** and bike lanes are in **black**

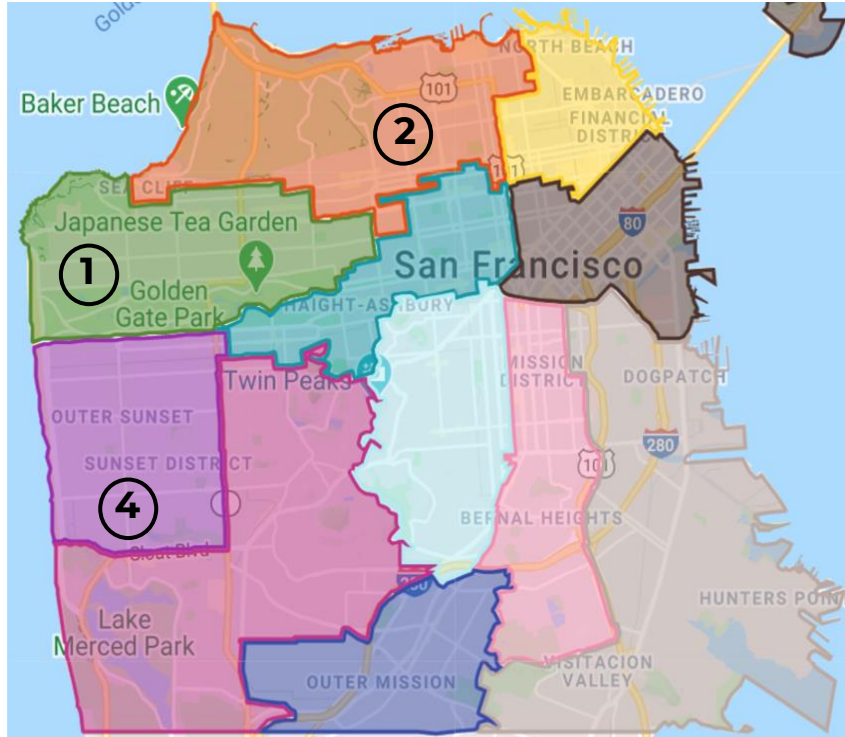
This map further supports our goal of expansion in Districts 1, 2, and 4

Bike Stations by District



Less bike-sharing stations are available in Districts 1, 2, and 4 which are residential areas and home to very popular tourist locations.

Recommendations



District 1: Add stations near prominent tourist attractions in this area (Lands End, Legion of Honor, Golden Gate Park)

District 2: Add stations in Presidio area and neighborhoods (ride to Golden Gate Bridge, Fort Mason, Crissy Fields, etc.)

District 4: Add stations in residential area (ride the great highway, SF Zoo, commuting to work/rest of the city)

Sources

- <https://nacto.org/shared-micromobility-2018/>
- <https://sf.streetsblog.org/2019/04/17/scooter-trips-surpass-bike-share-for-the-first-time/>
- <https://www.gminsights.com/industry-analysis/bike-sharing-market>
- <https://www.sfexaminer.com/news/lyft-corners-temporary-bikeshare-monopoly-in-san-francisco/>
- <https://usa.streetsblog.org/2020/08/31/micromobility-trips-explode-60-percent-in-one-year-but-bikeshares-lag/>
- <https://medium.com/@skipscooters/skip-survey-insights-how-san-francisco-rides-9049ce34f28c>
- <https://sf.curbed.com/2016/9/19/12982284/sf-bike-friendly-city-cycling>
- <https://www.sfmta.com/getting-around/bike/bike-share#Overview>
- <https://www.lyft.com/bikes/bay-wheels/meet-our-bikes>
- <https://www.lyft.com/bikes/bay-wheels/pricing>
- <https://citymonitor.ai/transport/the-decisions-cities-made-about-coronavirus-had-a-big-impact-on-bike-share-ridership>
- <https://www.cfodive.com/news/dockless-scooters-profitability-forecast-lime-bird/568041/#:~:text=3.49%20rides%20per%20scooter%20per,charged%20in%20Louisville%20last%20year.>
- <https://www.theverge.com/2020/5/13/21257307/electric-scooter-bikeshare-covid-19-bird-lime-uber-subsidies>
- https://en.wikipedia.org/wiki/San_Francisco_Municipal_Transportation_Agency



Questions?

