

**University of Southern California  
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**THE IMPACT OF METRO BIKE SHARE SYSTEM ON COMMUTING  
BEHAVIOR OF DOWNTOWN LOS ANGELES RESIDENTS**

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## **1. Introduction**

Nowadays large cities across the globe face almost similar problems regarding the improvement of transportation systems due to rapidly growing urban population. One of the ways to improve efficiency of city transportation system is the implementation of projects aimed to impact the commuting behavior of citizens and encourage and stimulate the usage of bicycles.

Bike sharing systems are becoming an efficient and necessary measure for major cities to deal with the challenges of mobility, accessibility and ecology. There are more than 80 cities in the United States which have their own bike share systems, and the number of trips taken is growing drastically every year. According to National Association of City Transportation Officials, the number of trips taken via bike share across the U.S. in 2017 was 35 million trips, 25% more than in 2016. The number of bike share bikes in the U.S. in 2017 more than doubled – from 42,500 bikes at the end of 2016 to about 100,000 bikes by the end of 2017. The types of bike share systems vary from dockless to station-based, and from those operated or administered by private companies to local governments and agencies. Bicycle share systems contribute to the number of people preferring bike to vehicle, which in general positively influences on transportation environment in cities.<sup>1</sup>

## **2. Background**

Despite comfortable and suitable climate conditions, wide boulevards and streets available for developing bike infrastructure Los Angeles City has yet a comparatively little share of people using bicycles. In 2017 cycling in Los Angeles accounted for 0,9% of all commuters. However, due to the city's large population the number of bike commuters is quite large (18171 bike commuters), which places Los Angeles among top 5 U.S. cities with the most bicyclists, along with New York City, Portland, Chicago and Washington DC.<sup>2</sup>

Compared to other U.S. cities, Los Angeles was relatively late in implementing a municipal bike sharing system. At one point, by 2013-2015 the city was the only one of the 10 largest U.S. cities to lack a bike sharing system. After an attempt to implement such system in 2013 and its failure due to cumbersome permitting process, in July 2016 Los Angeles County Metropolitan Transportation Authority launched brand new bike share system called Metro Bike Share

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<sup>1</sup> Bike Share in the U.s.: 2017  
<https://nacto.org/bike-share-statistics-2017>

<sup>2</sup> Where we ride. Analysis of bicycle commuting in American cities. (2017). *The league of American Bicyclists*. Retrieved from [https://bikeleague.org/sites/default/files/Where\\_We\\_Ride\\_2017\\_KM\\_0.pdf](https://bikeleague.org/sites/default/files/Where_We_Ride_2017_KM_0.pdf)

(hereinafter – MBS).<sup>3</sup> The project primarily operated in Downtown Los Angeles and was further expanded to Port of LA, Venice and Pasadena (the latter was cancelled in 2018 due to high operational costs and low ridership). Nowadays, MBS has 90 stations in Downtown LA, Port of LA and Venice with over 1,000 bikes available 24/7.<sup>4</sup>

What makes MBS unique is that it's the first bike share system in the U.S. which is operated by the county transit agency, Metro, and is integrated into the existing public transit system. The riders can use the service with the same TAP card that is used on Metro's buses and trains.

MBS is a comparatively new bike share project, and it's aimed to improve the transportation environment of Los Angeles and to make a contribution to transforming the city to a more bicycle-friendly place of living. Thus, this project is of particular interest to analyze and study.

### **3. Assumption**

In our work we want to check 2 assumptions using GIS-based analysis.

*1. Have the frequency of usage of MBS increased since its launching in 2016?*

We assume that after the launching of the system in 2016 the number of people using MBS and the number of trips made has grown. We are considering DTLA stations and we want to check whether the increase of using each station occurred or not. By using GIS mapping we want to observe which particular stations were used most and least frequently. We can make a conclusion about which of the DTLA stations are popular and which are not over these 3 years.

*2. Whether MBS has influenced commuting behavior of DTLA residents?*

We want to compare the number of people commuting to work by bicycle in DTLA in 2016, 2017 and 2018 with relation to the MBS station locations. We assume that the percentage of bike commuters in certain DTLA areas has changed because of the MBS station located near or in this area.

### **4. Data and Sources**

To conduct the analysis, we used available secondary data.

*Location of MBS stations<sup>5</sup>*

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<sup>3</sup> In L.a., Efforts Are Afoot To Make Bike Share a Genuine Part Of the Transit Network <https://www.thetransportpolitic.com/2015/08/03/in-l-a-efforts-are-afoot-to-make-bike-share-a-genuine-part-of-the-transit-network/>

<sup>4</sup> About The Metro Bike Share system. Retrieved from <https://bikeshare.metro.net/about/>

<sup>5</sup> Station Information. Retrieved from <https://bikeshare.metro.net/about/data/>

We took the data from the existing online map of all stations on Metro Bike Share official web-site. We also used the trip data available on this site to determine the latitude and longitude of each station in order to draw a map in ArcGIS.

#### *Frequency of usage of stations<sup>6</sup>*

Metro Bike Share web site also has data on number of trips made from each station throughout all the months from July 2016 to December 2018. Using this data will help us to create a map showing the frequency of using each station in 2016, 2017 and 2018.

#### *Number of bike commuters to work<sup>7</sup>*

SimplyAnalytics database contains information on commuting behavior of people in particular areas of the city (by census tracts or ZIP codes). We will export the data about the percentage of people in DTLA who commute to work by bike and will use 2016, 2017, 2018 data to determine the possible influence of MBS on DTLA residents' travel habits.

## **5. Analysis**

Metro Bike Share is one of LA Metro's multiple public transportation options. Currently MBS has 90 stations in DTLA, Port of LA and Venice with over 1 000 bikes available. The locations selected for each station are assessed for feasibility, including sufficient sun exposure, space availability, and visibility. Final station locations are identified through a community outreach process. This process includes recommendations from partner agencies, institutions, community groups and stakeholders. The MBS web site also provides an option for everyone to suggest a new station.

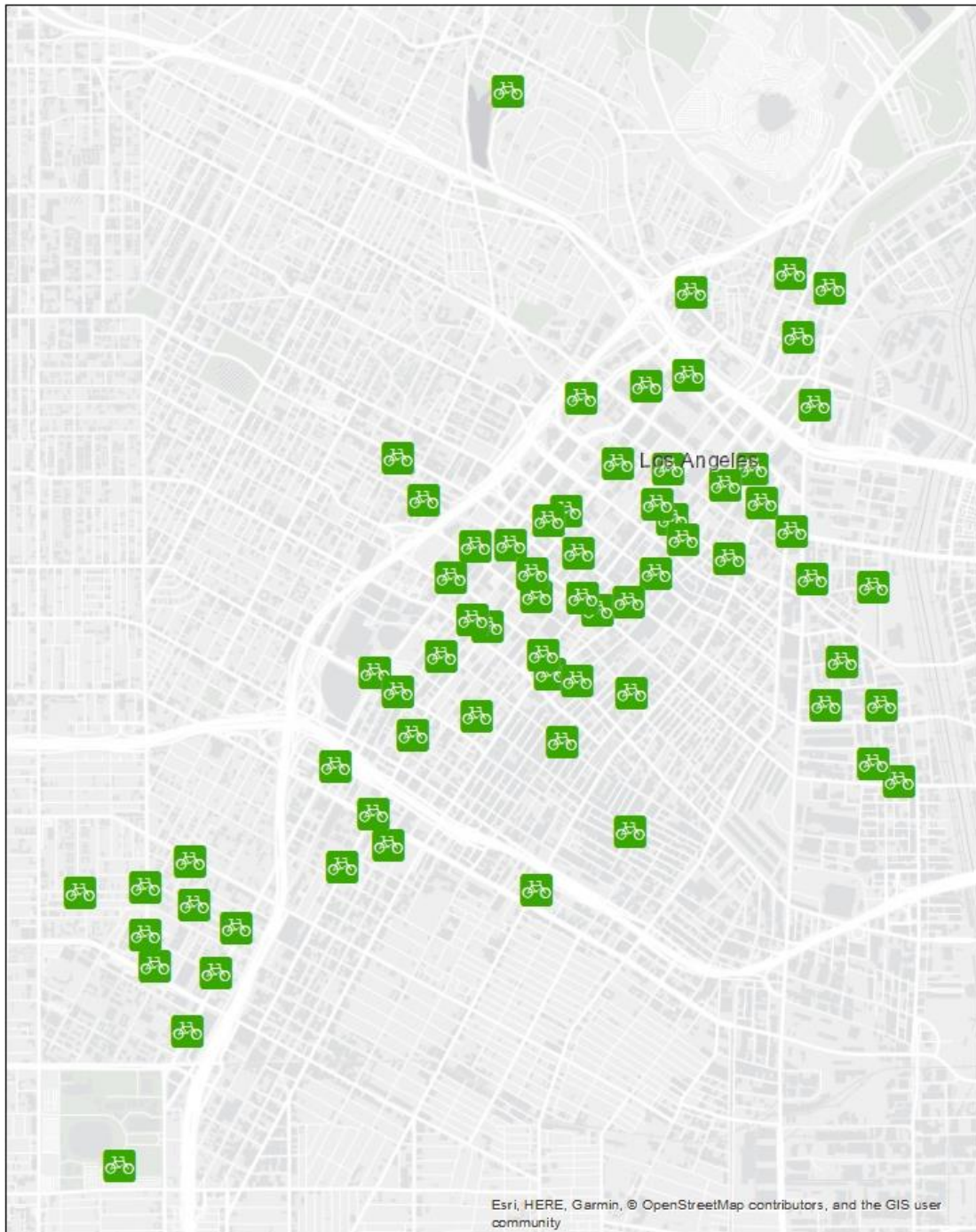
For our analysis we have taken 68 active stations in DTLA. These stations cover DTLA districts, University Park (USC) and Echo Park area. All these stations defined by MBS official data as DTLA located stations. 10 station are located near USC Campus, 1 in Echo Park and the majority in the densest parts of DTLA.

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<sup>6</sup> Trip data. Retrieved from <https://bikeshare.metro.net/about/data/>

<sup>7</sup> % of bike users to work. Retrieved from <https://app.simplyanalytics.com/index.html>

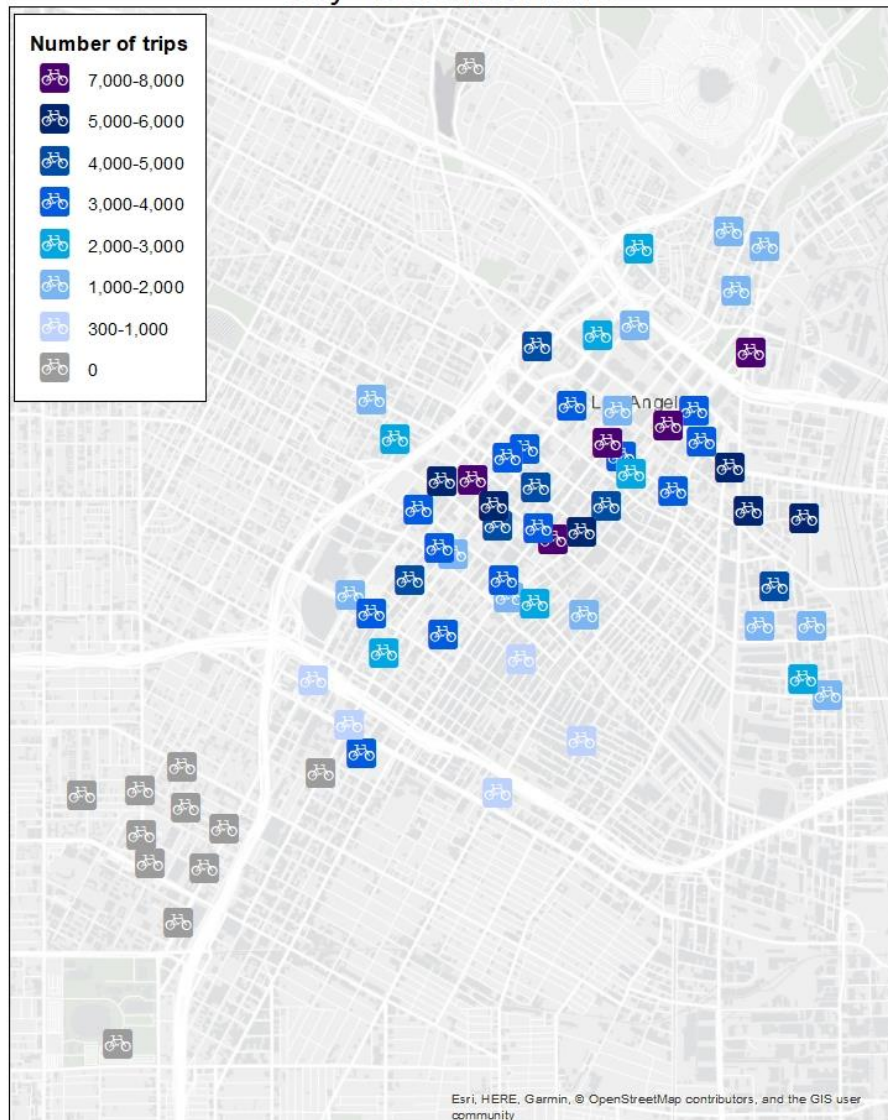
# Metro Bike Share Station Map, DTLA



In order to prove our first assumption, we used data available on the MBS web site. We counted the number of trips made to and from a particular station.

MBS was launched on July 2016, and the web site provides data on the number of uses of each station from July to December 2016. Primarily, the project had 56 stations in DTLA. The stations in the University Park area and Echo Park didn't exist at that time. On the map below these stations are marked grey. We can observe that the maximum frequency of trip was up to 8,000 in 2016. From the very beginning of MBS 5 stations had become the most popular and frequently used: 1<sup>st</sup> & Central St., 7<sup>th</sup> & Flower St., Main & 1<sup>st</sup> St., 7th & Spring St., and Union Station West Portal.

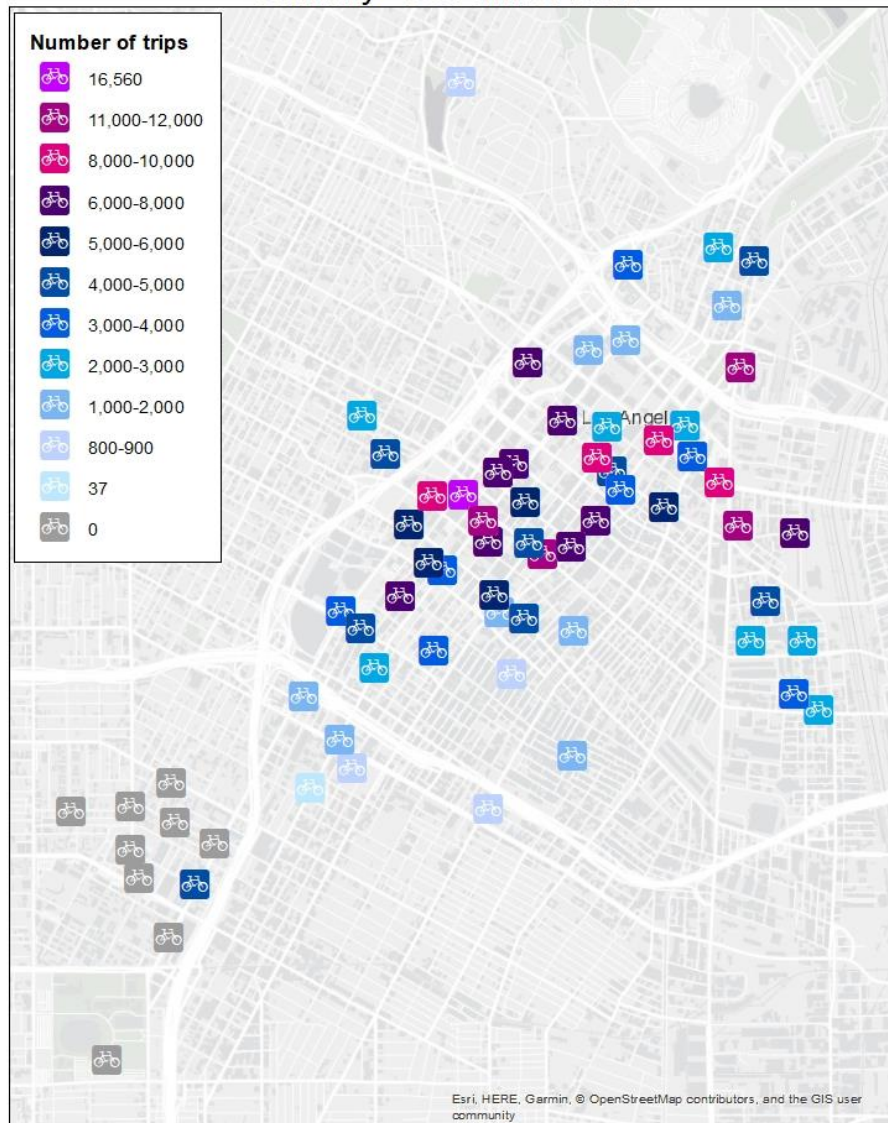
Frequency of Use of Metro Bike Share DTLA Stations  
July - December 2016





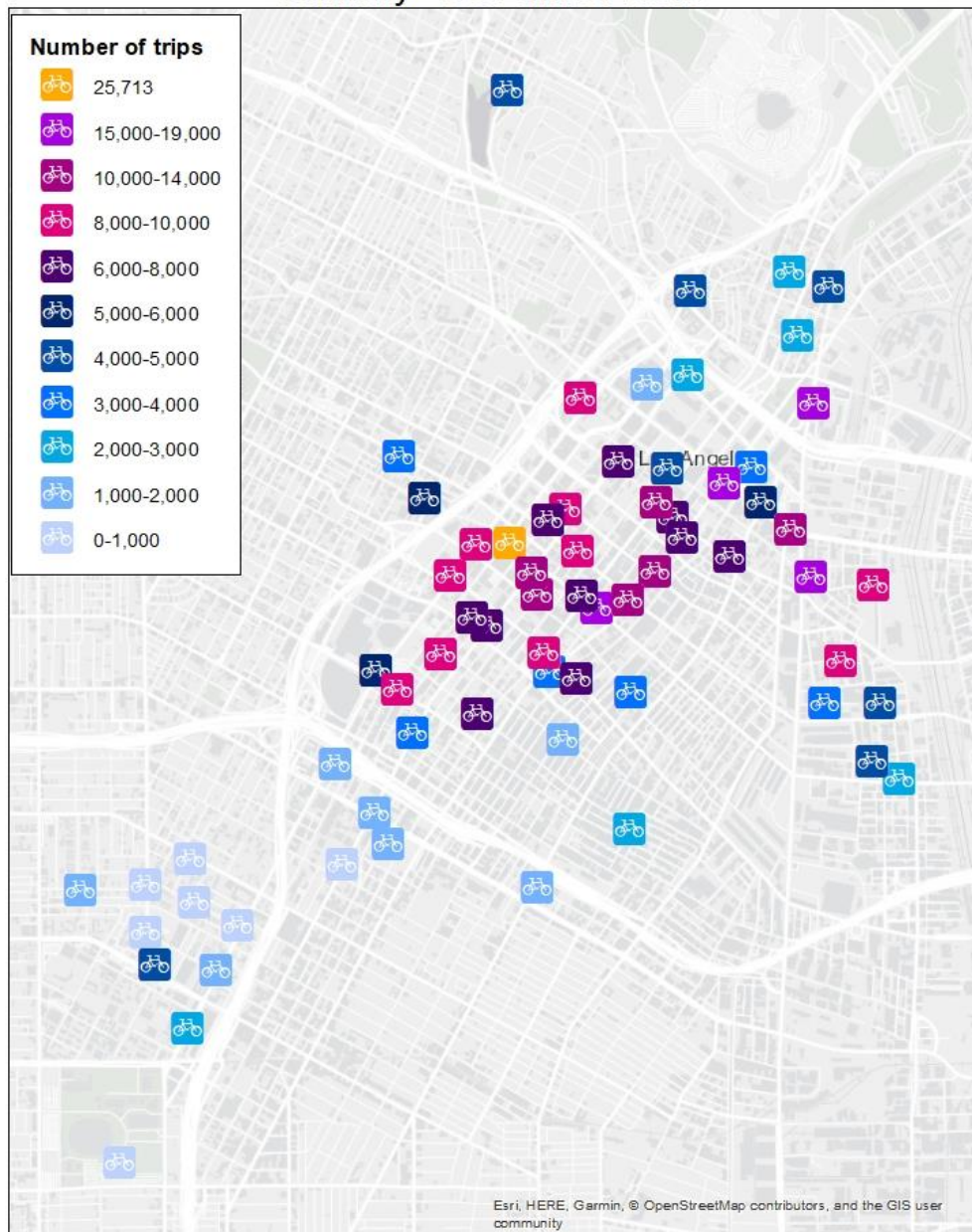
In 2017 the number of stations increased, as we can see from the map below. Three new stations started to operate in the University Park, DTLA and Echo Park areas. We can observe that the usage of all stations almost doubled. For instance, the number of trips from/to 7<sup>th</sup> & Flower St. station was doubled compared to the previous year (8,263 in 2016, 16,560 in 2017). 18 stations were used more than 6,000 times, whereas in 2016 there were only 5 stations with that number of trips.

Frequency of Use of Metro Bike Share DTLA Stations  
January - December 2017



In 2018 significant changes occurred with MBS in DTLA, compared to previous years. The rest 9 stations in USC area started to operate and the number of stations with the total trips of more than 6,000 increased to 31 stations. The most popular station remained the same - 7<sup>th</sup> & Flower St. and it was used 25,713 times now. We can also notice that the usage of the bikes along Alameda Street increased and one of the stations located there had more than 6,000 trips.

Frequency of Use of Metro Bike Share DTLA Stations  
January - December 2018





After visualizing the frequency of the trips for the given years, we can conclude that MBS has become more popular and the number of city residents and the usage frequency has increased since 2016. One of the major observations we made was that the bikes located right near Metro stations have the highest number of trips over the given period of time. On the contrary, bike stations in the USC area, for instance, weren't used so often compared to other stations. We also noticed that the most popular bike station in DTLA is located on 7<sup>th</sup> & Flower St. and it had been used about 50,000 times since 2016. The bike station with the least number of usage (only 46 times) is the station located near Expo Park (EXPO/LAFC). The reason why this station had only 46 trips is that it was installed on December 18, 2018.<sup>8</sup>

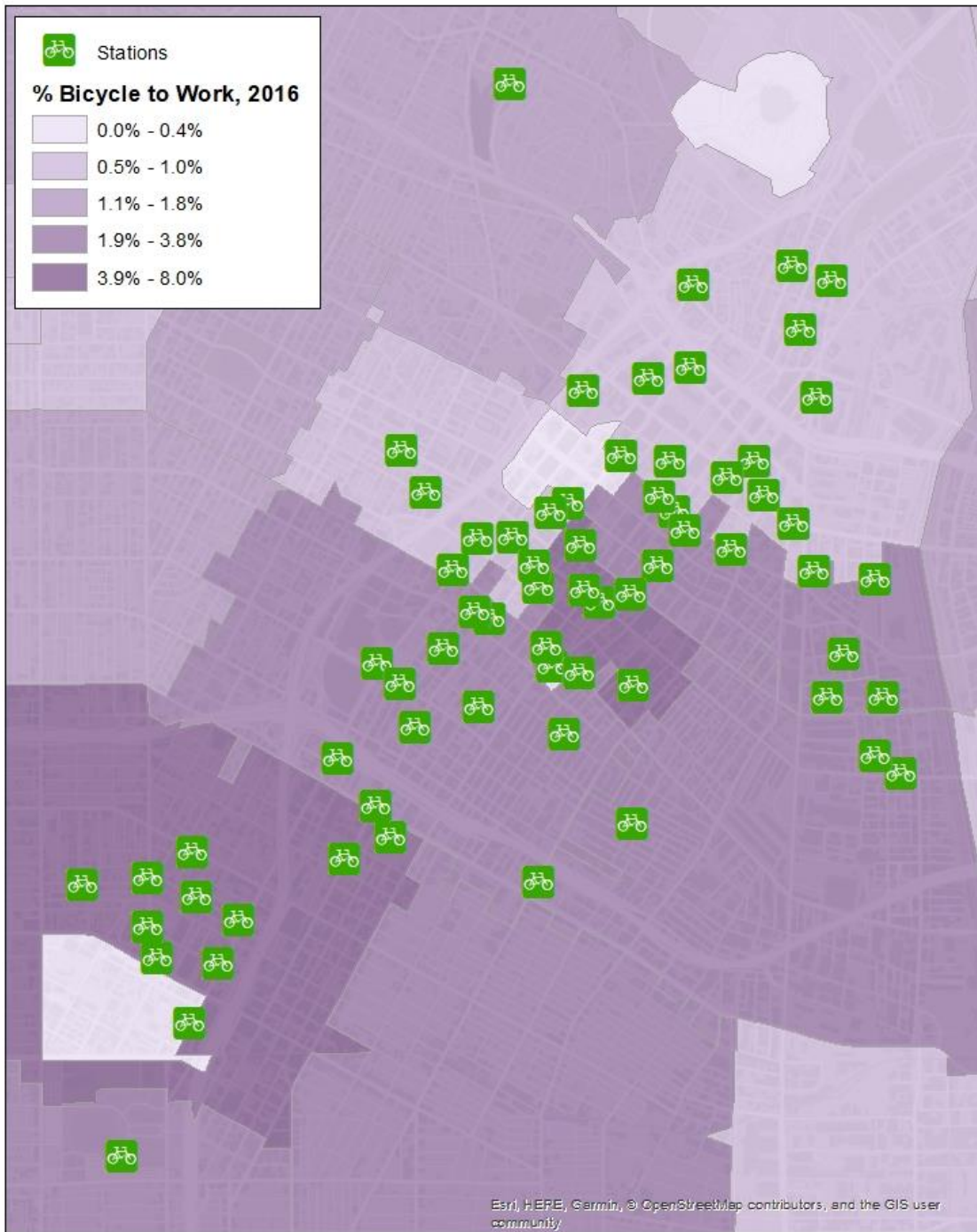
Our second assumption implies the relation between the MBS emerged in the city in 2016 and the growth of the number of bike commuters in DTLA areas in the following years. We suppose that after launching bike sharing system in DTLA the residents have changed their travel habits and began to prefer bicycles to commute to work. We do take into consideration that this bike share project is not the only influence on the commuting behavior of people. Other determinants or a combination of factors can cause change in citizens' preferences, such as geographic location of a particular district or area, income level, population characteristics and others. However, using the data we can assume that MBS affects the people's choice of transportation mean in some way, even if not significantly.

In 2016 the share of Los Angeles residents preferring to commute to work by bicycle was 1.15%. Using SimplyAnalytics data we created a map showing the station locations and the percentage of people using bikes to go to work by ZIP Codes. We can observe that the bicycle usage varies from 0% to 8% out of the total population. Most of the Downtown area has about 1.1-3.8% of bicyclists except 2 ZIP Code areas with up to 8% of bike commuters. These two areas refer to ZIP Code 90007, University Park, and a small area of 90014.

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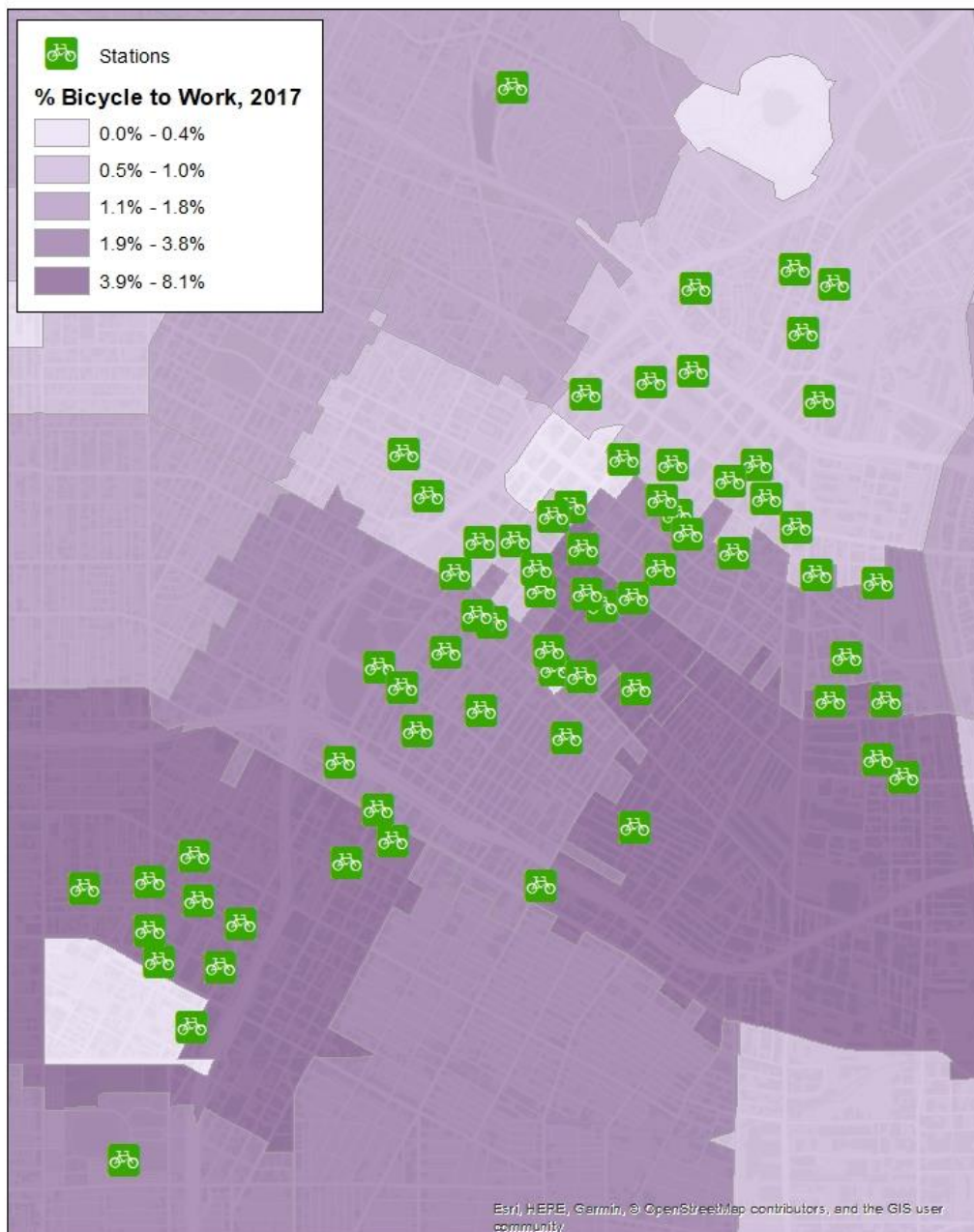
<sup>8</sup> Dale Zapata , personal communication, April 23, 2019.

# Bike Commuters in DTLA by ZIP Codes, 2016



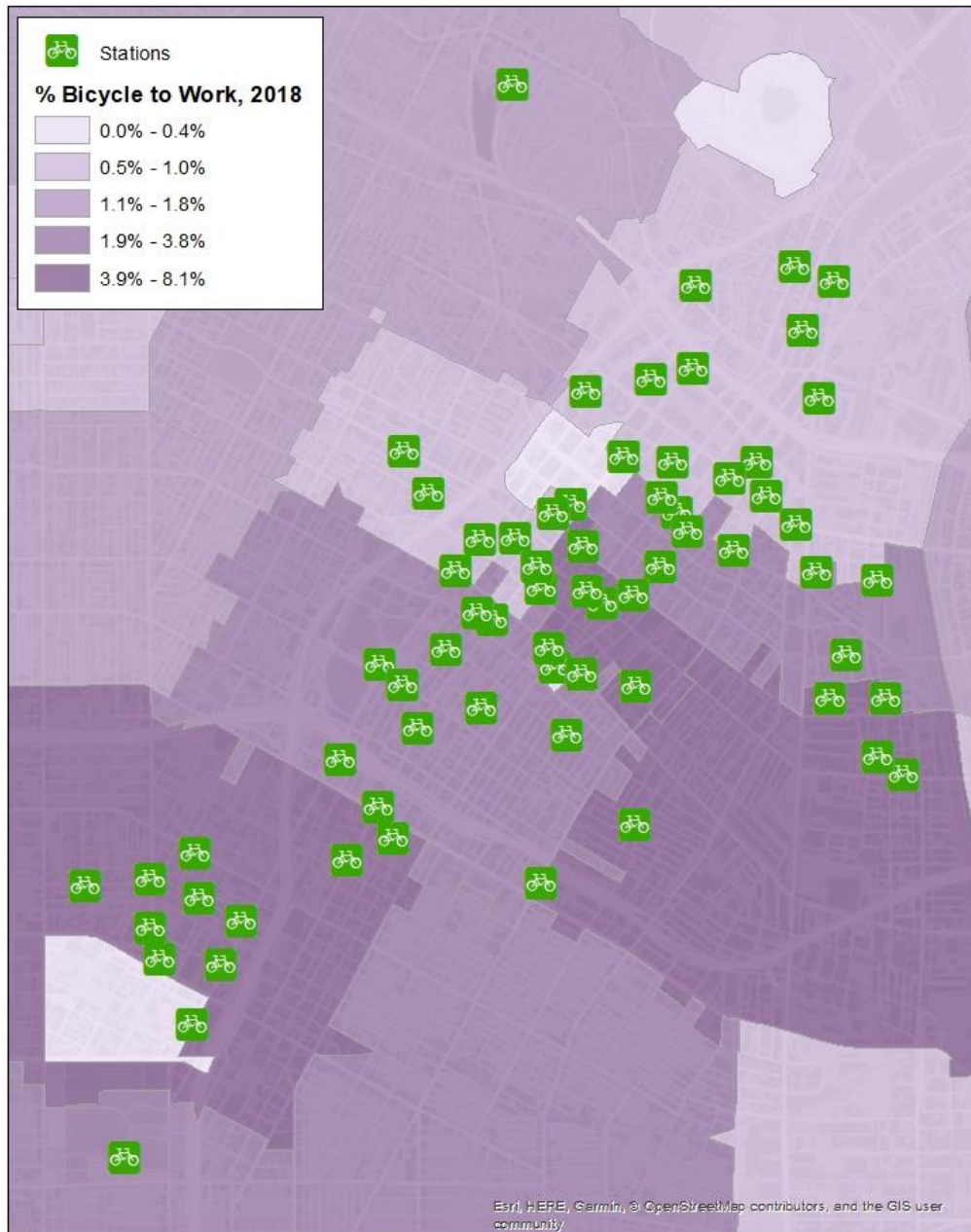
In 2017 we observe a slight change comparing to 2016 map. The area of 90021 that had up to 3.8% of bicyclists in 2016 has turned into the one with more than 3.8% of bike commuters. Overall, the percentage of people riding a bike when travelling to work in 2017 in Los Angeles has slightly increased as well to 1.19%. There are 6 MBS stations located in the 90021 area. From the previous maps of frequency of use of MBS stations, we can remember that almost all stations, including these 6 stations have become used more frequently.

## Bike Commuters in DTLA by ZIP Codes, 2017



We observe the same picture on the 2018 map where the same ZIP Code area 90021 remains having more bicyclists than in 2016.

## Bike Commuters in DTLA by ZIP Codes, 2018



## **6. Conclusion**

Based on the information we have and the analysis we conducted by using GIS we can make a conclusion that the implementation of Metro Bike Share project in Los Angeles City has met its primary goal to improve the commuting behavior of residents. It can be explained by the main observation we've got from this analysis:

- the frequency of use of MBS stations has increased since the launch in 2016. Therefore, we can state that the number of people using MBS has grown as well;
- the most popular bike stations are located near DTLA Metro stations and along the main train and bus routes;
- there is a possible impact of MBS on the increase of the percentage of bicyclists in the certain DTLA areas.

However, in order to make more an accurate and trustworthy conclusion about the influence of MBS on residents' transportation preferences more consistent and valid research should be conducted. It should consider all the factors that might possibly affect the assumption we defined.

## **7. Limitations**

During the work we faced several data limitations such as the data about the number of bike users in the DTLA areas. It would be more useful for this research to see the overall number of people who prefer bikes as a transportation mean and not be limited only with data about bike commuters to work which we got from SimplyAnalytics.

There is another limitation and concern related with this data about the percentage of people commuting to work by bike. It is important to know whether this data include those people who ride the MBS bikes too. This information also could provide significant evidence, which would prove our assumption of MBS influence on bike users.



## References

1. Ink, S. (n.d.). Bike Share in the U.S.: 2017. Retrieved from <https://nacto.org/bike-share-statistics-2017/2>
2. Where we ride. Analysis of bicycle commuting in American cities. (2017). The league of American Bicyclists. Retrieved from [https://bikeleague.org/sites/default/files/Where We Ride 2017 KM 0.pdf](https://bikeleague.org/sites/default/files/Where_We_Ride_2017_KM_0.pdf)
3. In L.A., Efforts Are Afoot To Make Bike Share a Genuine Part Of the Transit Network. Retrieved from <https://www.thetransportpolitic.com/2015/08/03/in-l-a-efforts-are-afoot-to-make-bike-share-a-genuine-part-of-the-transit-network/>
4. About The Metro Bike Share system. Retrieved from <https://bikeshare.metro.net/about/>
5. Station Information. Retrieved from <https://bikeshare.metro.net/about/data/>
6. Trip data. Retrieved from <https://bikeshare.metro.net/about/data/>
7. Percentage of bike users to work. Retrieved from <https://app.simplyanalytics.com/index.html>
8. Dale Zapata, personal communication, April 23, 2019.