

Mobility and Bike Share During the Pandemic: A Look Back at Bike Share Usage in 2020



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*The opinions expressed in this research report are those of the authors only and do not represent the opinions and views of either CUR or Ryerson University.

Report Prepared by:

Diana Petramala
Senior Economist

and

Daniel Bailey, M.Pl.
Research Assistant

Contact

Centre for Urban Research and Land Development,
Ryerson University
350 Victoria Street, Toronto, ON M5B 2K3
E-mail: cur@ryerson.ca

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Introduction

The pandemic has changed the way individuals and households live, work and play in the city of Toronto. These shifts were evident in the way the city of Toronto's bike sharing program ("Bike Share") was used in 2020.

For this report, we used daily Bike Share ridership data by location, available from the City of Toronto website, to track how ridership patterns changed between 2019 and 2020.

Findings imply that Bike Share was primarily used as a means for commuting to work prior to the COVID-19 pandemic and thus the shift to working from home had a negative impact on usage in 2020. However, this was likely offset by an increase in leisure usage. An increase in rides during the weekend and along Toronto's recreational trails imply a higher share of rides in 2020 were potentially tied to leisure.

After providing a short explanation of the Bike Share program, the report then provides the key takeaways from the data on how Bike Share usage changed during the pandemic.

A brief overview of Bike Share, data used, and definitions before we begin

Bike Share is the City of Toronto's bike sharing program. Launched in Toronto in 2011 under the "Bixie" brand, it was taken over by the Toronto Parking Authority (TPA) in 2014. The system has since expanded from just 80 stations (1,000 bikes) to 625 stations (6,850 bikes) with the help of investments from Metrolinx and other provincial and municipal programs.

The locations of the stations are widespread across the city, although there is a high concentration in the downtown Toronto area. Each station can house a range of bikes that rest in individual docks. For instance, at the time of writing, a station at Dundas and Crawford had 11 docks, four of which were occupied with bikes and seven of which were free for bike returns.

Bike Share memberships come in a variety of options for users, including:

- A single ride pass for \$3.25;
- A day pass for \$7, which includes 24 hours of unlimited rides;
- A three-day pass for \$15, which includes unlimited rides for 72 hours; and
- An annual membership for \$99, which includes unlimited rides for a year.

For the purposes of this report, we define riders on single-ride, day and three-day passes as "casual members" and individuals with an annual membership as "annual members".

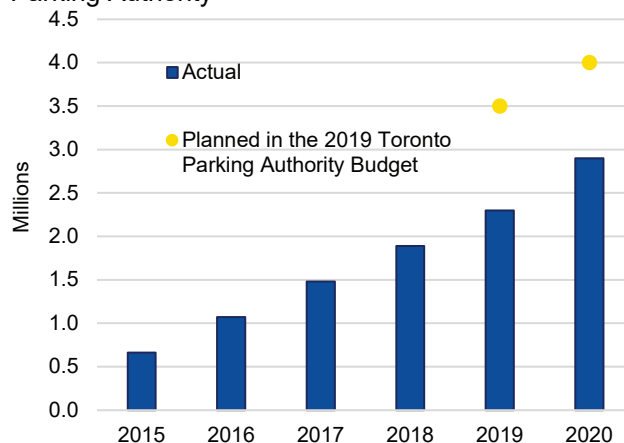
We used data from the City of Toronto open data webpage and cleaned it to ensure a reliable analysis. We removed outlier rides (those that were under 4 minutes, for example) and only included docks that existed in 2019, allowing for consistent for year-over-year comparisons.

Mobility Shift #1: The pandemic had a negative impact on Bike Share usage

Bike Share ridership was rising rapidly with every year of system expansion prior to the COVID-19 pandemic. The total number of rides topped 2.3 million in 2019, up from 663,000 in 2015 (Figure 1).

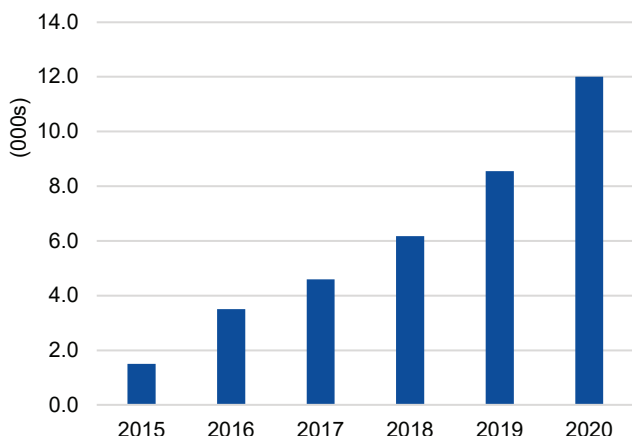
The biggest expansion in the number of stations occurred in 2020 (see Figure 2, page 5), and Bike Share had anticipated the expansion would lead to 4 million rides per year by 2020 and 2021. However, there were a total number of just 2.9

Figure 1: Total Number of Trips Taken on the Bike Share System, Total and Budgeted by Toronto Parking Authority



Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Figure 2: Total Number of Docks on the Bike Share System, as of Year End



Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

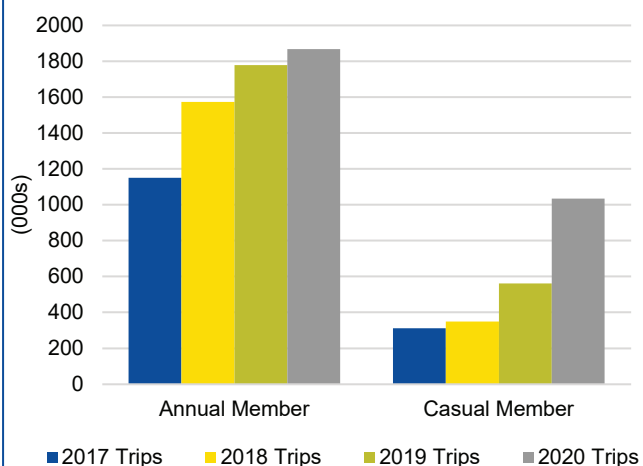
million rides in 2020 (see Figure 1). Rides were up from 2019, just not as much as Bike Share had expected, as the system was expanded at a much faster pace than ridership.

Mobility Shift #2: Casual members helped drive the increase in rides in 2020

Figure 3 looks at total trips per year by member type. The figure shows that the vast majority of rides taken on the Bike Share network in Toronto are taken by riders who had purchased an annual membership.

Prior to the pandemic, most of the growth in annual rides also occurred among annual members, while rides among casual members was more stable over time.

Figure 3: Yearly Trips by User Type, 2017 - 2020



Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

That dynamic was reversed during the pandemic as more casual members used Bike Share for leisure and fitness purposes. The share of casual riders increased substantially in 2020. Figure 3 shows that:

- Casual members accounted for 37% of all rides in 2020, up from 20% in 2019.
- Rides among casual members increased by just over 400,000 in 2020, accounting for two-thirds of the increase in rides in the year.
- Rides by annual members were relatively flat in 2020.

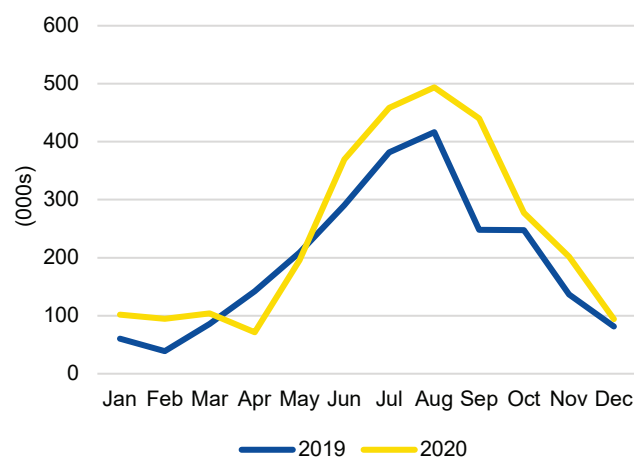
Mobility Shift #3: Seasonal patterns in ridership changed

Figure 4 shows bike share rides by month in 2019 versus 2020.

The figure shows that there is a clear seasonal pattern to bike share ridership, despite the program running all year long. The system gets very little use during the winter months. Ridership starts to increase gradually in March, peaking in August. Then ridership starts to drop off after August as the weather gets cooler.

During the pandemic, total ridership was lower in March and April in comparison to the previous year, which is expected given that was the period of the most stringent pandemic lockdowns in Ontario. However, rides ramped up more than usual through late spring (May-June) and remained unusually elevated during the fall (September-October).

Figure 4: Total Trips by Month, 2019 and 2020



Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Figures 5 a and b break down total rides by month per membership type and show that seasonal patterns remained relatively constant during the pandemic for annual members. However, they changed significantly for casual members, who also accounted for much of the increase in rides taken between May and October.

Mobility Shift #4: Annual members riding more on weekends

Figures 6 a and b show the distribution of rides across days of the week by annual and casual members.

In 2019, the majority of rides taken by annual members (roughly 80%) occurred during the work week. Bike Share usage for this group would then

taper off on the weekends.

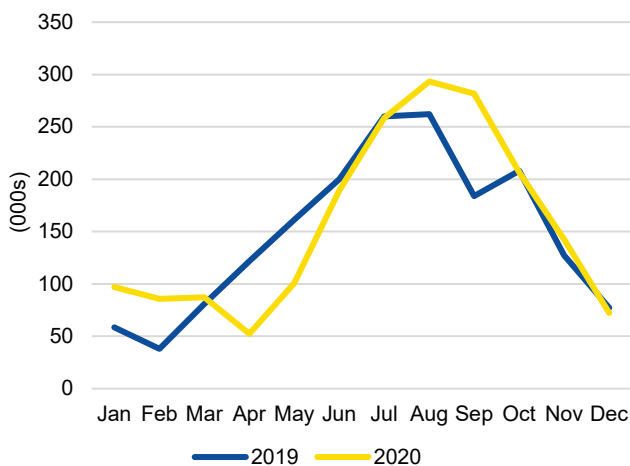
This was still the case for annual members in 2020, but they were also riding more on weekends. In 2020, almost 30% of rides among annual users were taken on weekends.

Figure 6a shows that casual ridership was up across every day of the week during 2020 when compared to 2019! But, weekend trips were definitely more popular. The share of rides taken on the weekend increased to 46% last year, from 42% the year before.

Mobility Shift #5: No more early mornings for riders

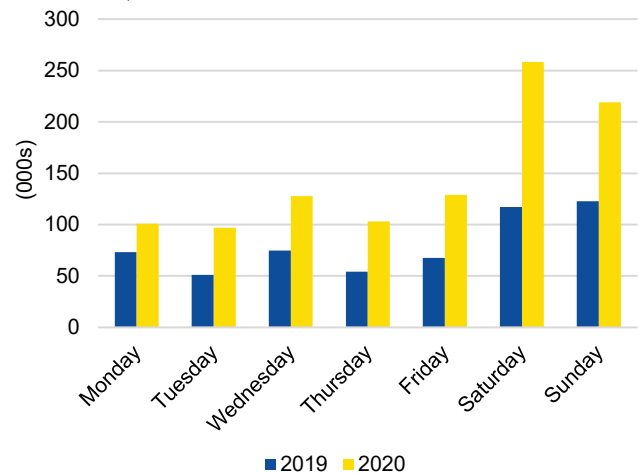
Figures 7 a and b shows the distribution of rides by time of day for annual and casual members.

Figure 5a: Total Trips by Month, Annual Members, 2019 and 2020



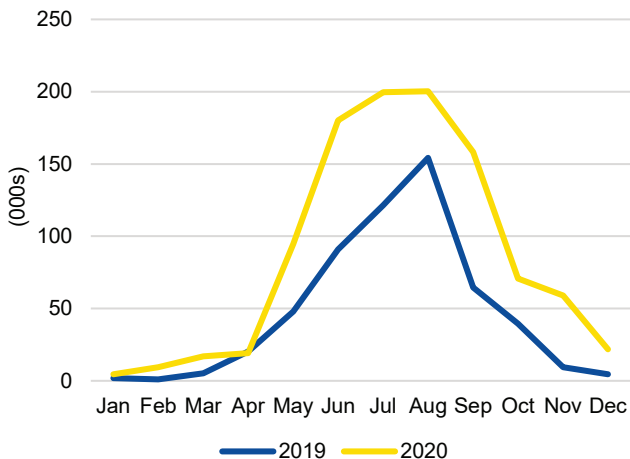
Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Figure 6a: Trips by Day of the Week, Casual Members, 2019 and 2020



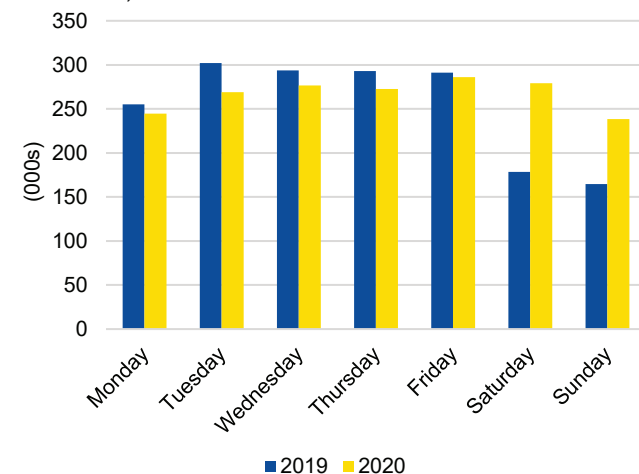
Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Figure 5b: Total Trips by Month, Casual Members, 2019 and 2020



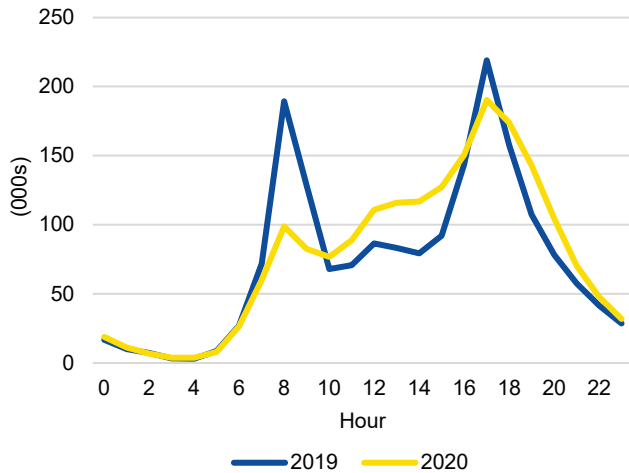
Source: CURm based on Toronto Parking Authority and City of Toronto Open Source data

Figure 6b: Trips by Day of the Week, Annual Members, 2019 and 2020



Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Figure 7a: Trips by Hour, Annual Members, 2019 and 2020

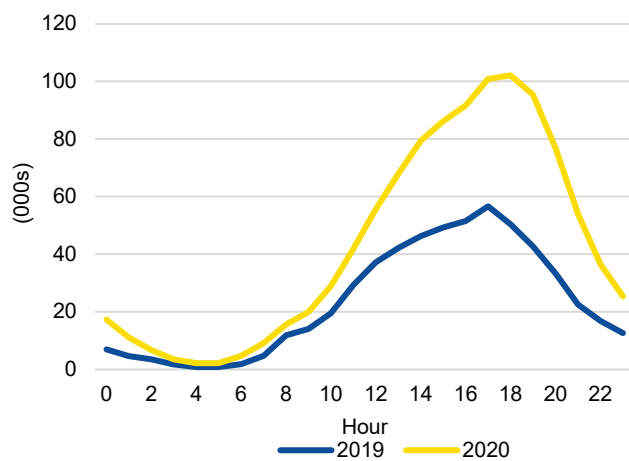


Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Prior to the pandemic, annual members had a clear pattern of peak ridership during the morning commute hours and in the evening. During 2020, there were almost 100,000 fewer daily trips during the morning commute than in 2019. Annual members increased the number of their afternoon rides, while the total daily rides during the evening peak remained constant.

Casual members have different travel patterns than do annual members, tending to ride more between mid-afternoons to early evening. This pattern didn't change much in 2020, however, there were substantially more casual riders during the peak hours of 2 p.m. and 8 p.m.

Figure 7b: Trips by Hour, Casual Members, 2019 and 2020



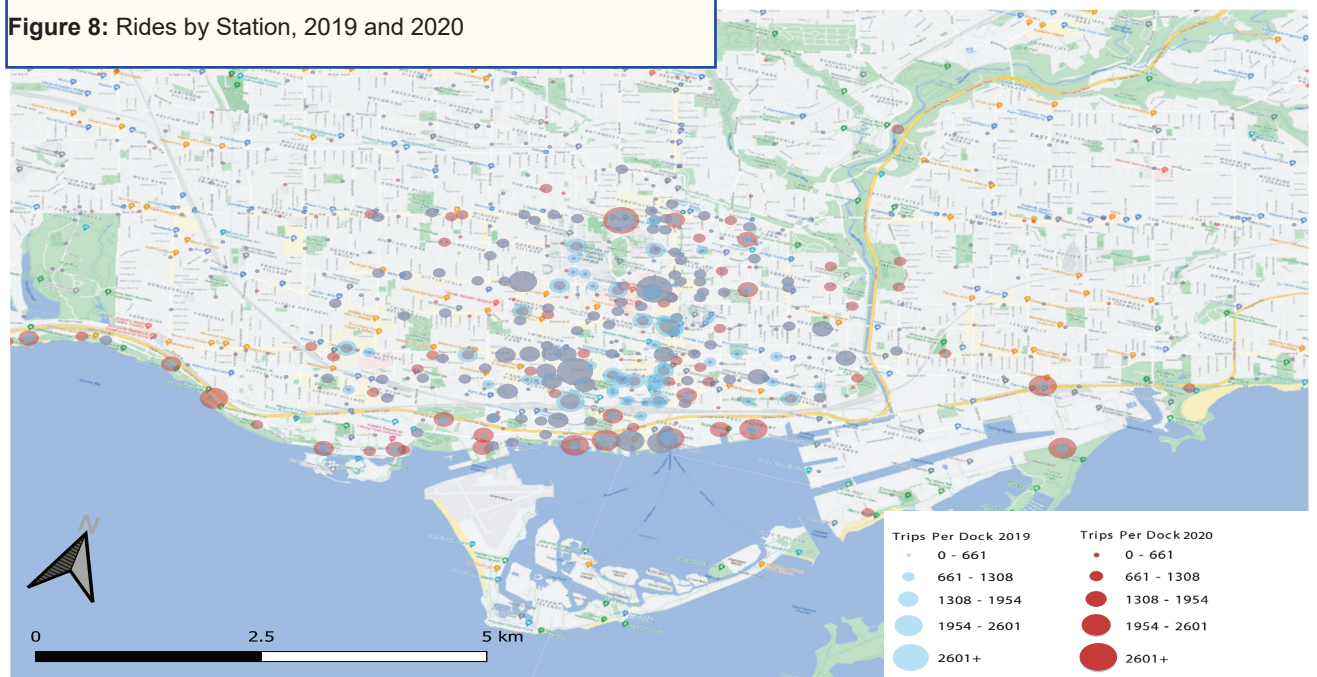
Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Mobility Shift #6: Stations near recreational trails had the most significant use

The stations that had the greatest increase in ridership in 2020 were along recreational trails, such as the Don Valley Bike Trail, Tommy Thompson Park and along the waterfront trail (Figure 8).

Rides along the waterfront trail doubled between 2019 and 2020 and accounted for a quarter of the increase in ridership last year. More than 530,000 rides were taken along the waterfront trail.

Figure 8: Rides by Station, 2019 and 2020



In contrast, the Bike Share station near Union Station, a commuter hub and one of the most used stations in 2019, saw a significant decline in rides in 2020. Rides fell by almost 50% in this station on both an absolute and per dock basis.

Other highly used Bike Share stations (such as those in James Town and Regent Park) in 2019 also saw a decline in ridership in 2020.

Mobility Shift #7: Mega users increase

There are a small number of users that TPA calls “mega users”, members who use bike share more frequently during the day than average, and within a short time window. Mega users usually account for both a small number of riders and a large number of rides.

High frequency users may have various reasons for using Bike Share. They may be leisure riders who are choosing to dock and pick up a bike every half hour. But they could also be couriers relying on Bike Share for their main mode of transpiration to make their deliveries.

There were a total of 50 mega users in 2019 who took a total of 27,000 trips that year. There were some 370 mega users in 2020, who took a total of 153,000 trips – accounting for 21% of the increase in ridership in 2020.

Conclusion

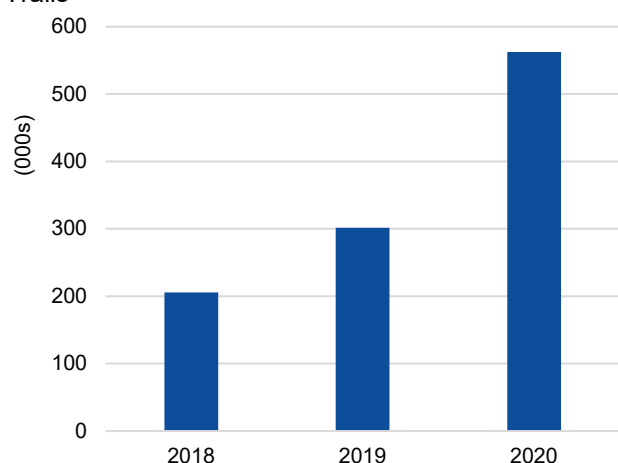
The City of Toronto Bike Share program was largely a means for commuting to work prior to the pandemic. However, work-from-home orders during the pandemic have curbed Bike Share usage.

The predominant use for Bike Share was leisure and recreation in 2020 as Torontonians turned to outdoor adventures and exercise to fill their time.

However, leisure use in 2020 could be a gateway into more Torontonians using Bike Share as a main mode of commuting, even when the pandemic is over. While the data is not available to us, the TPA’s financial update earlier this year noted that annual membership revenue was stronger than expected in the first half of 2021, suggesting that the threat of COVID may actually encourage more Bike Share usage relative to transit as the economy starts to re-open.

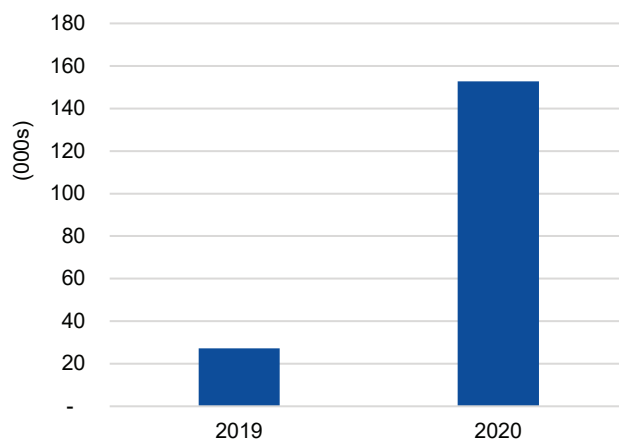
We anticipate that as the return-to-work begins, the use of Bike Share for leisure may wane, but there could be an increase in use as a means for the daily commute.

Figure 9: Total Number of Trips Taken on Waterfront Trails



Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data

Figure 10: Trips by Mega Users, 2019 and 2020



Source: CUR, based on Toronto Parking Authority and City of Toronto Open Source data