APPENDIX B

TDC Bike Share Evaluation Report

2017 FREE-FLOATING BIKE SHARE
PILOT EVALUATION REPORT

Seattle
Department of
Transportation

City of Seattle

Bikeshare Pilot Evaluation

Revised April 25, 2018

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Contents

Notes on Data Used

In this report, almost all figures are a reflection of what the data available to us says, rather than extrapolations. The only exceptions include the regression model developed to consider the effect of rain and temperature on bikeshare utilization, and, for trips with missing information on the destination location, the location of the next trip start is used.

Reporting only on what the data states has implications for a several figures in this report. For example, a trip is considered to have traveled on a Greenway or Protected Bike Lane if one of the GPS pings (trip start, end, or in progress) were within a minimal distance from the Greenway or Protected Bike Lane. No attempt was made to create routes from the GPS points. It is possible that there are more trips that use these facilities than is reported here. However, while the trip number may be an undercount, the general magnitude and relationship among facilities should be accurate. That is, if one Greenway is reported to have higher percentage of trips than another, that relationship should be accurate.

The survey described in Part III of the report is similarly taken as-is and all figures described in the report are a reflection of the raw data that came in. There were roughly 2,500 distinct Rider IDs that responded to the survey. This figure may include people who chose to respond to the survey for more than one company and it is impossible to connect Rider IDs across different vendors. Some of the companies also offered compensation for responding to the survey so the sample may be biased.

All items related to the survey should be considered with some caution. For example, the survey results suggest that there are areas within the city where people own more helmets than bikes, which seems suspicious. Similarly, the number of people self reporting as children in the survey seems odd.

Multiple checks were conducted for the internal consistency of the data. The information received from each bikeshare vendor is collected and reported to us in slightly different formats. In general, we have information on trips starts, end, trips in progress, periodic pings when a bike is reporting its location back to a vendor, and a record for when vendors remove bikes from the street. From these figures we can, for example, count the total number of bikes present in a neighborhood on any given day, count the number of bikes moved by the companies from and to any neighborhood, or calculate the change in elevation from starting point to end point.

Field work would be necessary to verify that the numbers of bikes on the street are reflected in the data set used in this report. Again, only information available in the data is described. To the extent feasible without field work, checks were conducted to determine whether any data were obviously missing and any such issues were resolved. It is important to note that if there are missing bikes from the dataset, some reported figures will be more affected than others. For example, the trend of people generally riding down hill, riding less in the rain, riding near centers of activity, and the peak area being near the University of Washington campus would not likely be affected by more bicycles being added to the data. However, any calculation involving fleet size would represent an undercounte.g. trips per bike per day.

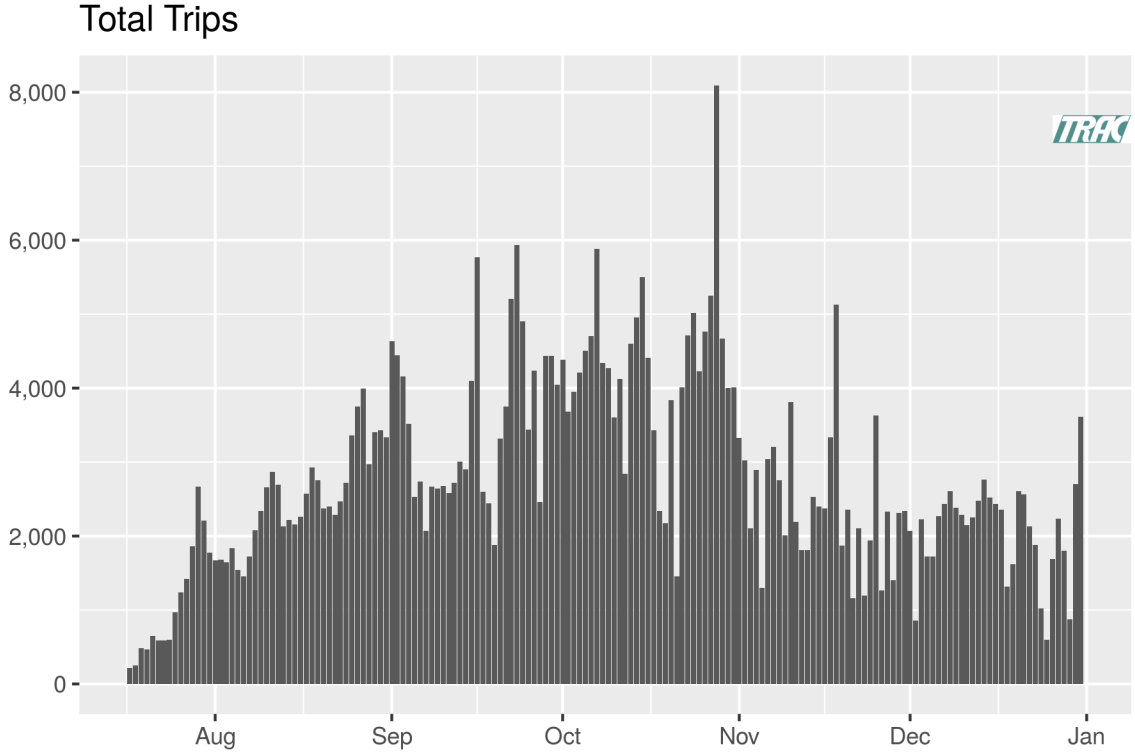
1 Compliance and Pilot Evaluation

1.1 General Statistics

1.1.1 How many trips have been taken in the system, daily and overall?

Total trips between July 17 and December 31, 2017 is 468,976

Date	Trips
2017-07-17	218
2017-07-18	247
2017-07-19	487
2017-07-20	468
	...
2017-12-28	1799
2017-12-29	874
2017-12-30	2699
2017-12-31	3612

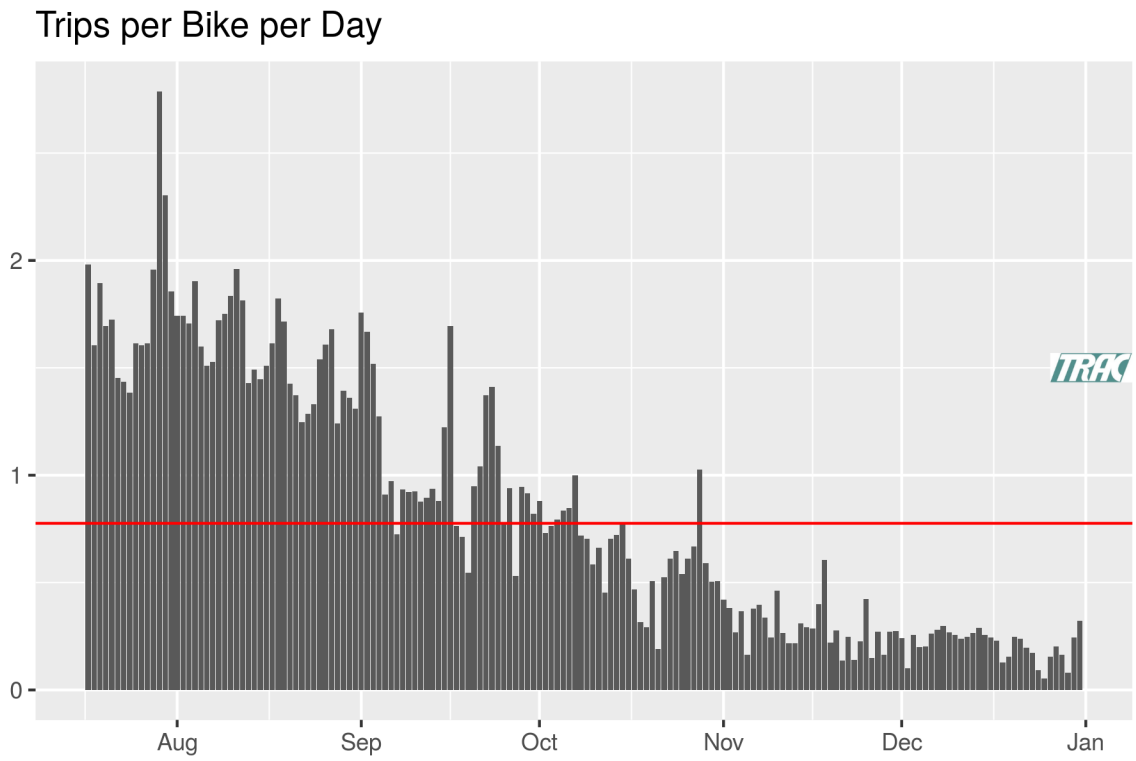


1.1.2 On average, how many trips are taken per available bike per day?

Average trips per bike per day: 0.84

Trips per Bike per Day:

Date	TBD
2017-07-17	1.98
2017-07-18	1.6
2017-07-19	1.89
2017-07-20	1.7
	...
2017-12-28	0.16
2017-12-29	0.08
2017-12-30	0.24
2017-12-31	0.32



1.1.3 What is the average daily trip count per 1,000 residents?

The Washington State Office of Financial Management population estimate for the City of Seattle for 2017 is 713,700[1]. Average daily trips are 2,792, so average daily trips per 1000 residents is **3.9**.

1.1.4 How many unique users have ridden bikeshare? (with understanding that one user may have an ID on multiple apps)

there are **137,214** unique rider IDs. Given the results of the user survey, it seems likely that this presents an overcount as many users have tried multiple companies but would appear as separate users here because there is no way to connect the individual bikeshare vendors databases.

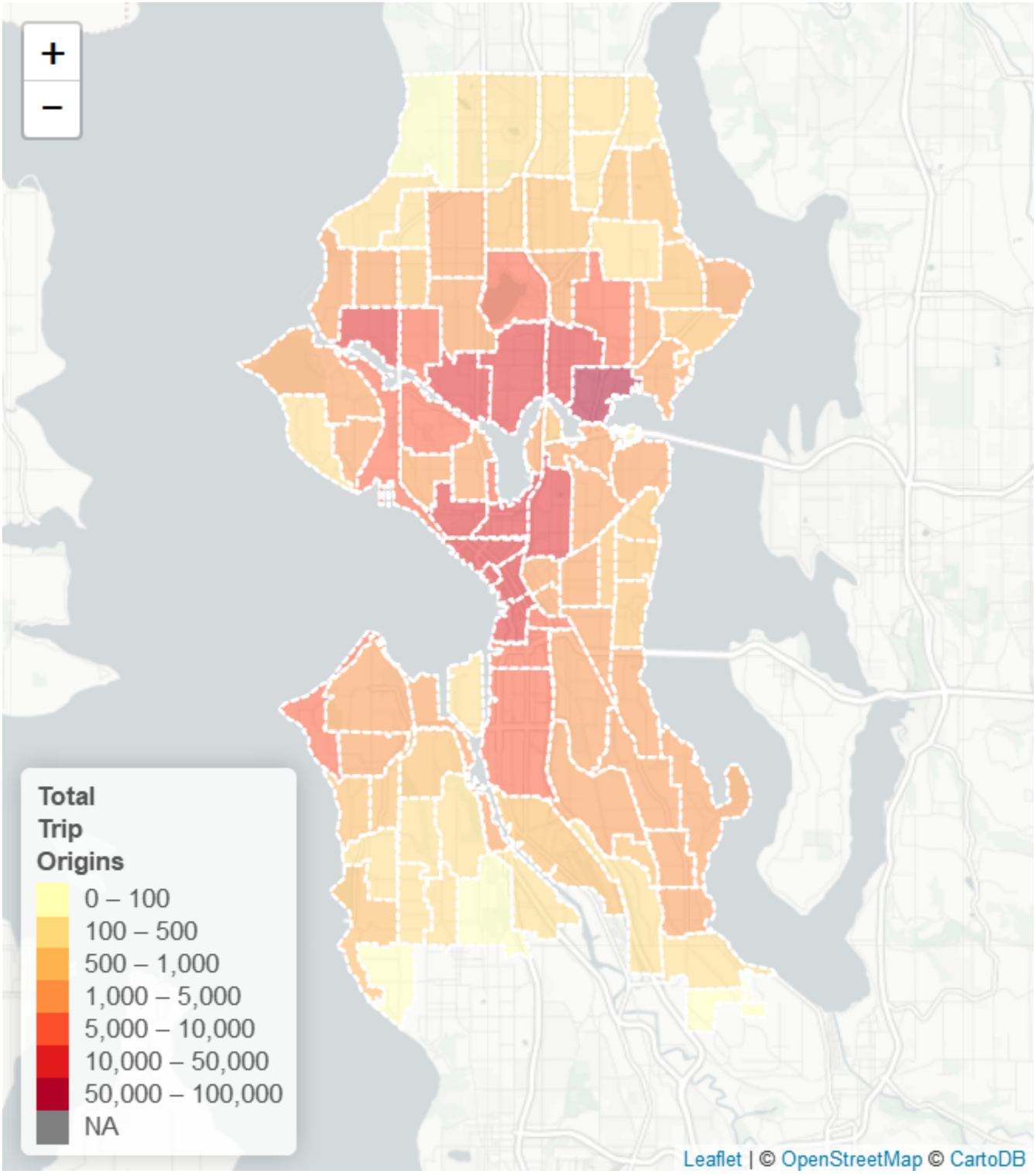
1.1.5 On average, how often does an individual user ride bikeshare?

Mean: 3.15
Standard deviation: 6.93
Min: 1
Max: 904

[1] https://www.ofm.wa.gov/washington-data-research/population-demographics/population-estimates/april-1-official-population-estimates

1.3 Neighborhood Origin/Destination Data

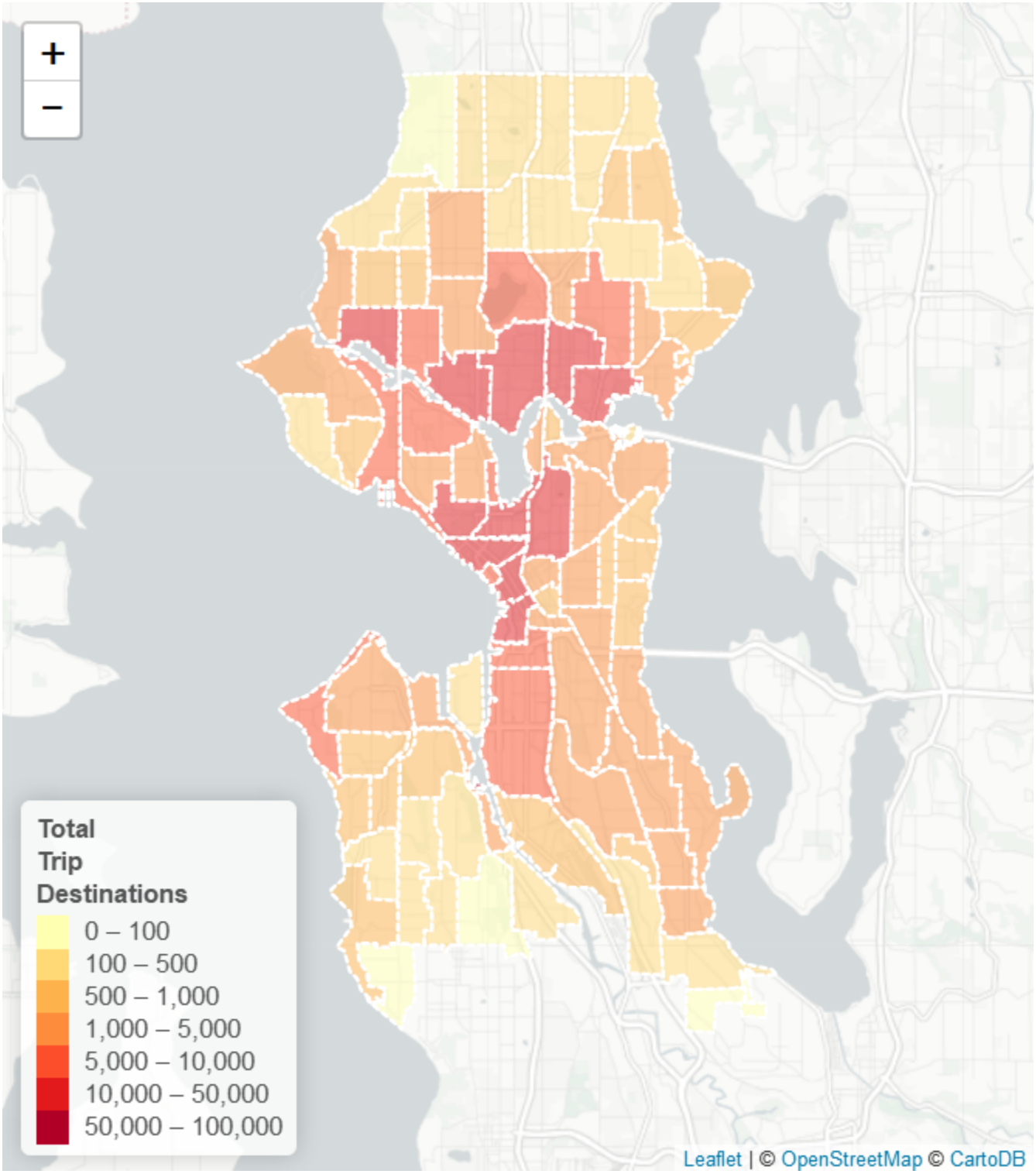
1.3.1 What is the distribution of trip starts across the 90 Seattle neighborhoods? How has this distribution changed over time?



Percent of trip origins by neighborhood (e.g. Adams as compared to city wide):

origin	date	percent
Adams	2017-07-18	1.62
Adams	2017-07-19	0.2
Adams	2017-07-20	1.71
Adams	2017-07-21	1.53
		...
Yesler Terrace	2017-12-29	0.8
Yesler Terrace	2017-12-30	0.93
Yesler Terrace	2017-12-31	0.58
Yesler Terrace		0.19

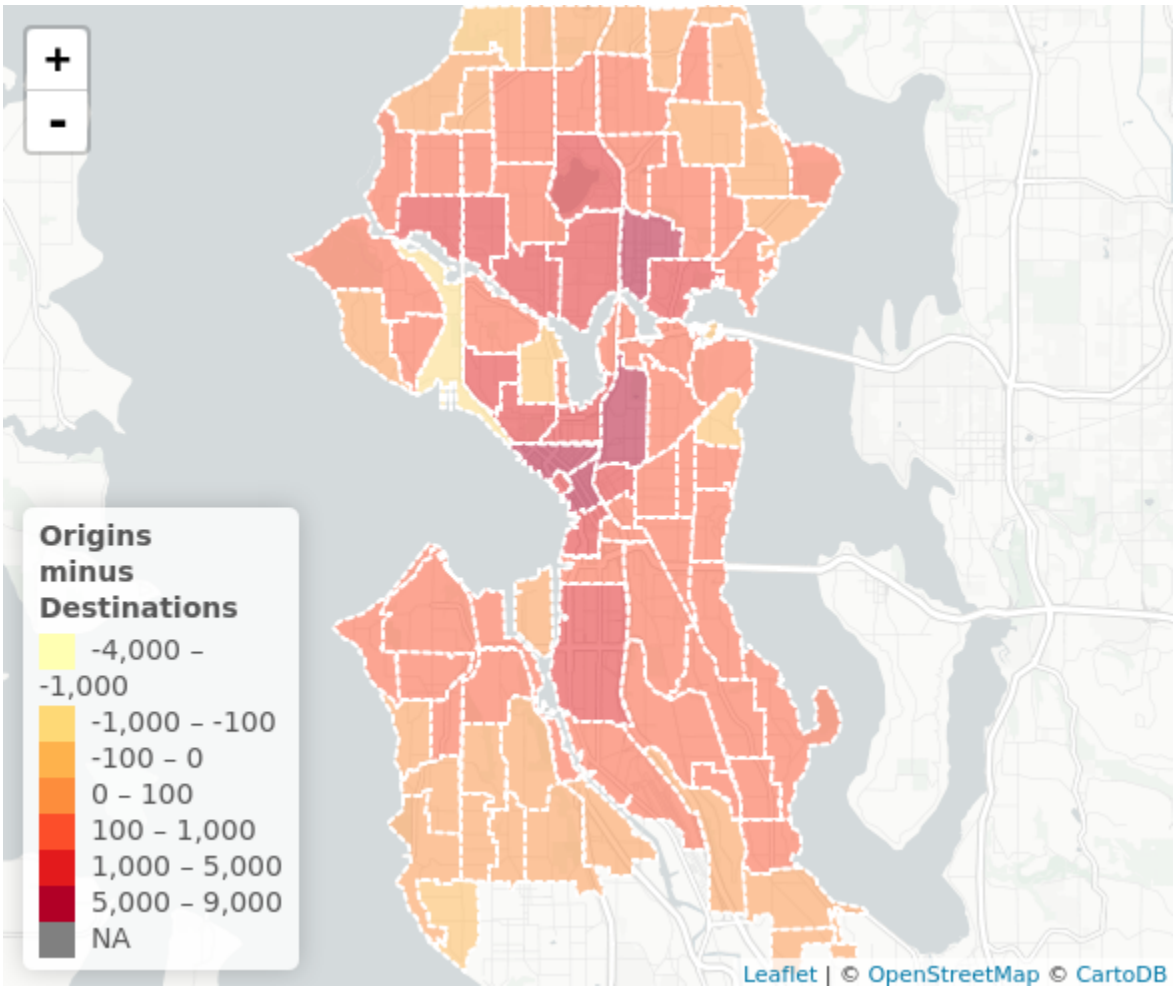
1.3.2 What is the distribution of trip ends across the 90 Seattle neighborhoods? How has this distribution changed over time?



Percent of trip destinations by neighborhood

destination	date	percent
Adams	2017-07-18	1.22
Adams	2017-07-19	0.62
Adams	2017-07-20	2.56
Adams	2017-07-21	1.99
		...

1.3.3 What neighborhoods have had significant differences between number of trip starts and trip ends?



Light color represents destination favored areas. Dark colors represent origin heavy locations.

Neighborhood	Origins.minus.Destinations
Adams	1,000 to 5,000
Alki	100 to 1,000
Arbor Heights	-100 to 0
Westlake	100 to 1,000
Whittier Heights	100 to 1,000
Windermere	0 to 100
Yesler Terrace	100 to 1,000

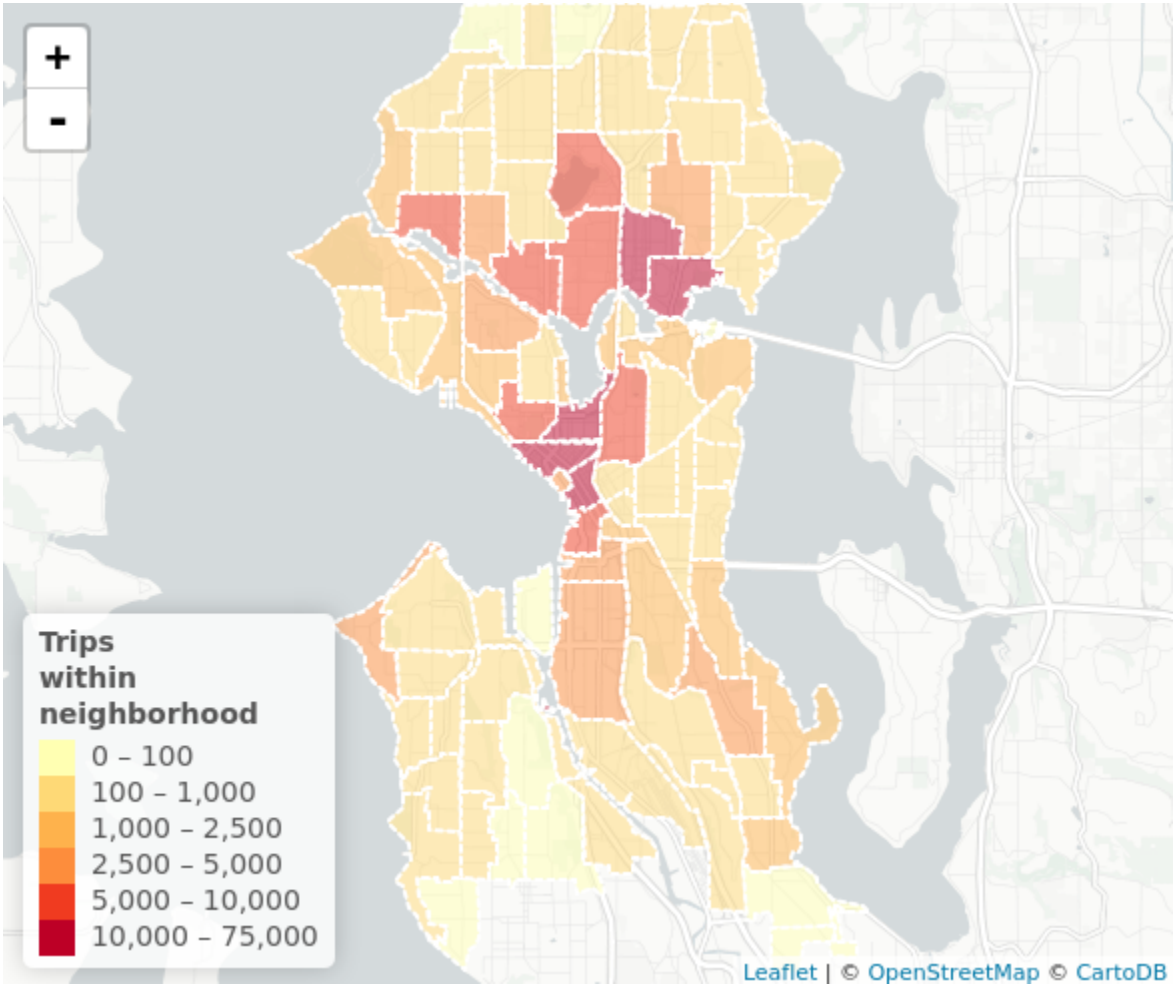
1.3.4 do origin-destination distributions vary by time of day, day of week, and user attributes?

Percentage of trip origins by neighborhood. percent of all trip origins in one neighborhood compared to all neighborhood, percent of weekday trips in one neighborhood compared to all weekday trips, and percent of peak period (AM 6:00 to 9:00; PM 15:00 to 18:00) trip origins in one neighborhood compared to the same time periods in all neighborhoods.

Neighborhood	All	Weekday	AM	PM
Adams	3.43	2.33	1.76	1.98
Alki	1.1	0.94	0.83	1.06
Arbor Heights	0.04	0.05	0	0.07
Atlantic	0.34	0.34	0.77	0.4
	...	...	...	...
Wallingford	3.79	3.4	3.67	3.15
Wedgwood	0.1	0.1	0.44	0.23
West Queen Anne	0.69	0.7	0.97	0.98
West Woodland	1.8	1.68	1.55	1.64

Neighborhood	All	Weekday	AM	PM
Adams	3.29	2.37	1.98	2.1
Alki	1.2	1.11	0.92	1.13
Arbor Heights	0.04	0.04	0.22	0.07
Atlantic	0.36	0.34	0.62	0.46
	...	...	...	...
West Queen Anne	0.47	0.46	0.7	0.68
West Woodland	1.83	1.67	1.6	1.82
Westlake	1.59	1.69	1.94	1.7
Whittier Heights	0.19	0.16	0.53	0.28

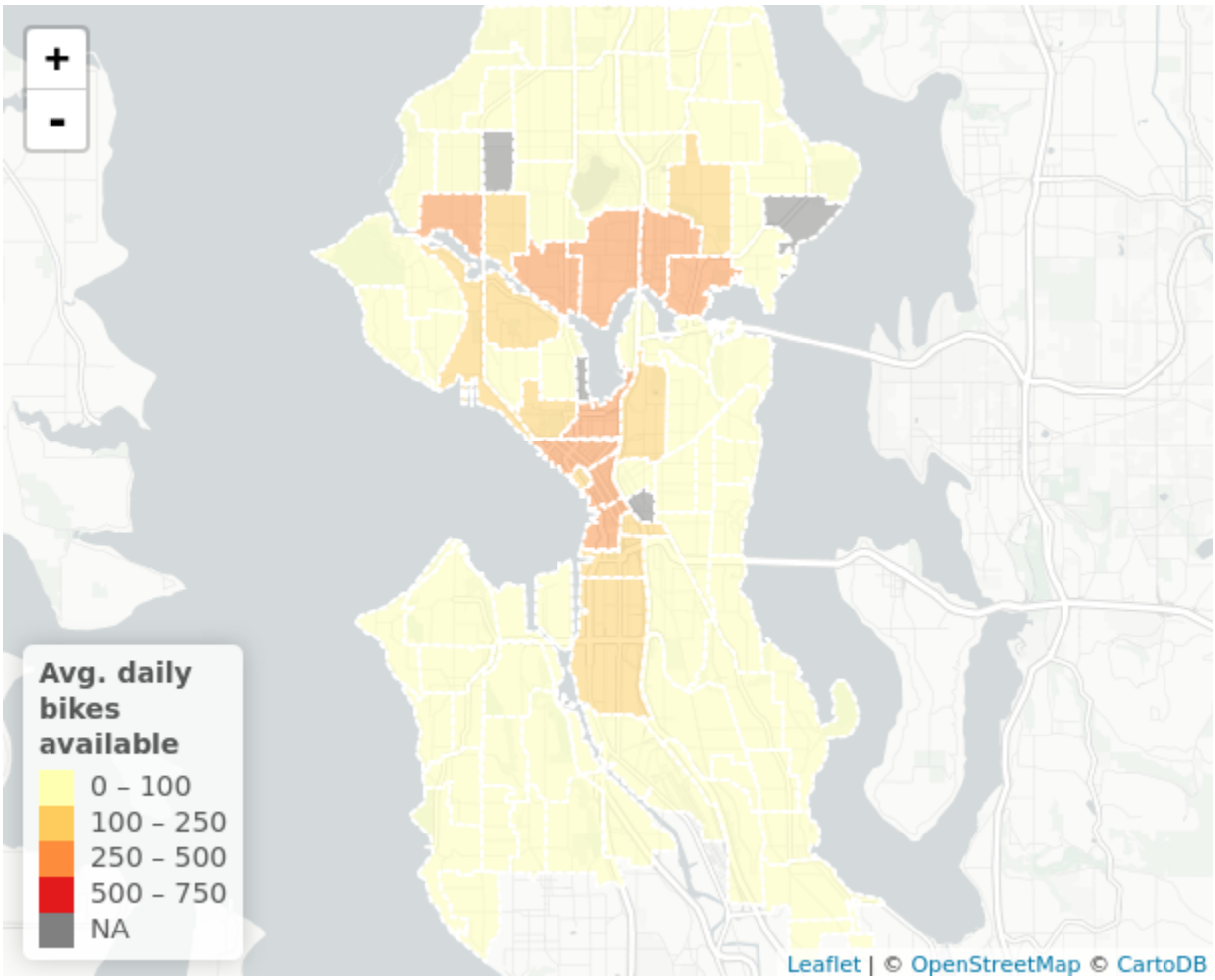
1.3.5 Internal trips



Neighborhood	InternalTrips
	2500-4999
Adams	5000-9999
Alki	2500-4999
Arbor Heights	0-99
Whittier Heights	100-999
Windermere	100-999
Yesler Terrace	100-999
	10000-75000

1.4 Bike Availability and Equity

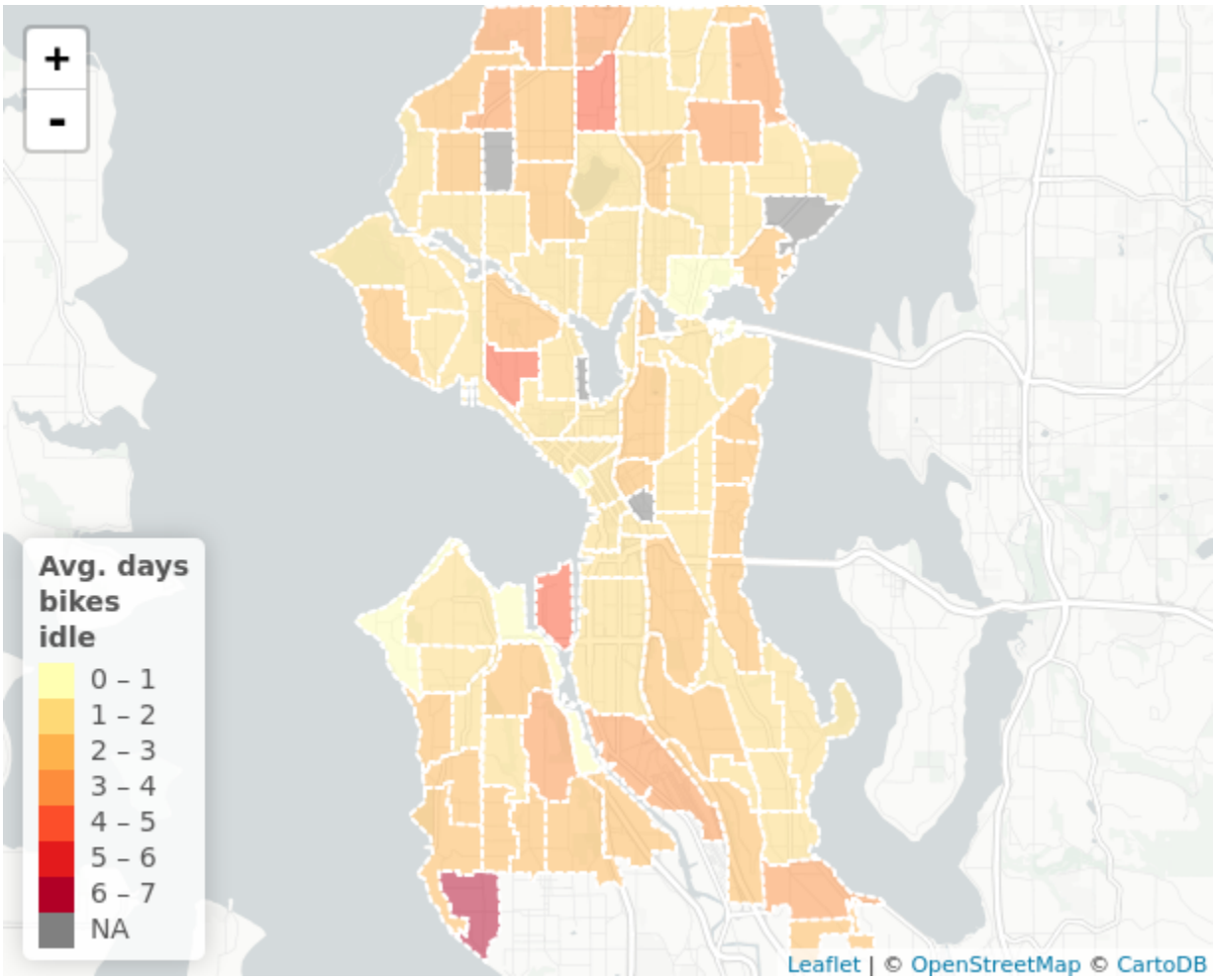
1.4.1 On an average day, how many bikes are available in each neighborhood? How has this changed over time?



Average daily available bikes by month and neighborhood:

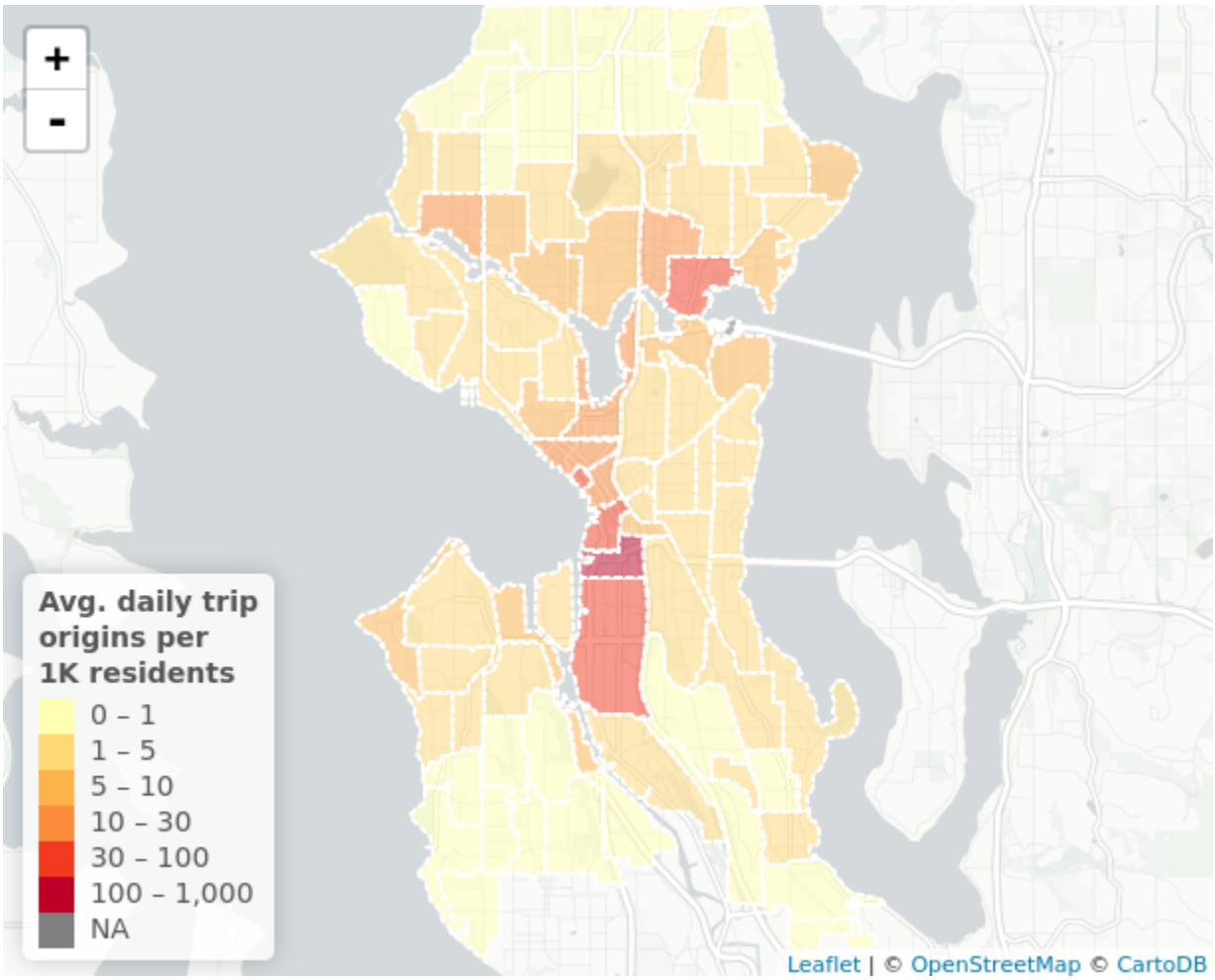
neighborhood	month	bikes
Adams	7	0-100
Adams	8	101-250
Adams	9	101-250
Adams	10	251-500
	...	
Yesler Terrace	9	0-100
Yesler Terrace	10	0-100
Yesler Terrace	11	0-100
Yesler Terrace	12	0-100

1.4.2 How does bike availability and length of bike idleness vary by neighborhood? Have bikes in certain areas been reused faster than bikes in other areas?



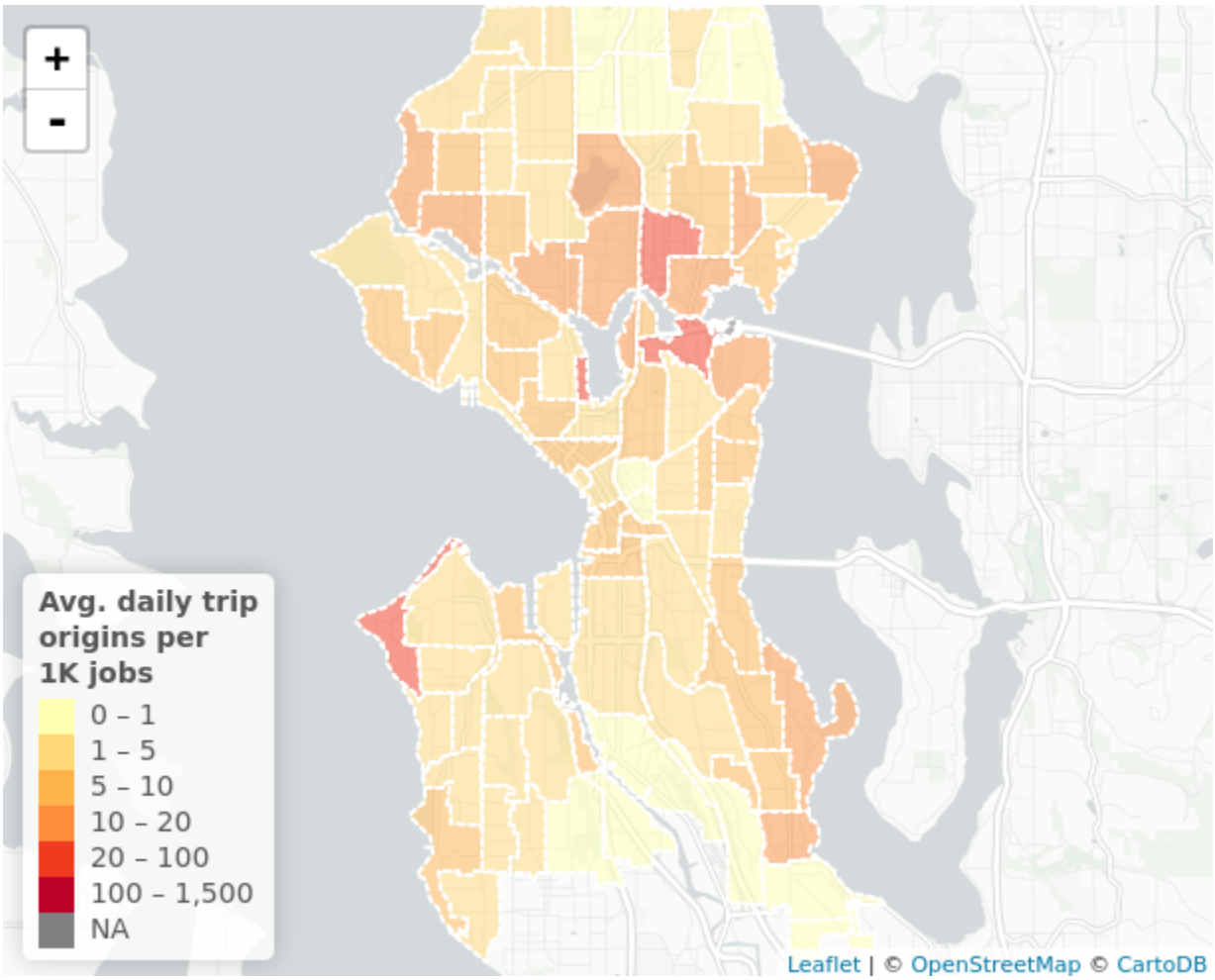
neighborhood	avg_days_idle
Adams	1.79
Alki	0.79
Arbor Heights	6.5
Atlantic	1.72
	...
Westlake	1.09
Whittier Heights	1.47
Windermere	2.75
Yesler Terrace	1.8

1.4.3 What is the average daily trip count per 1,000 residents in each neighborhood?

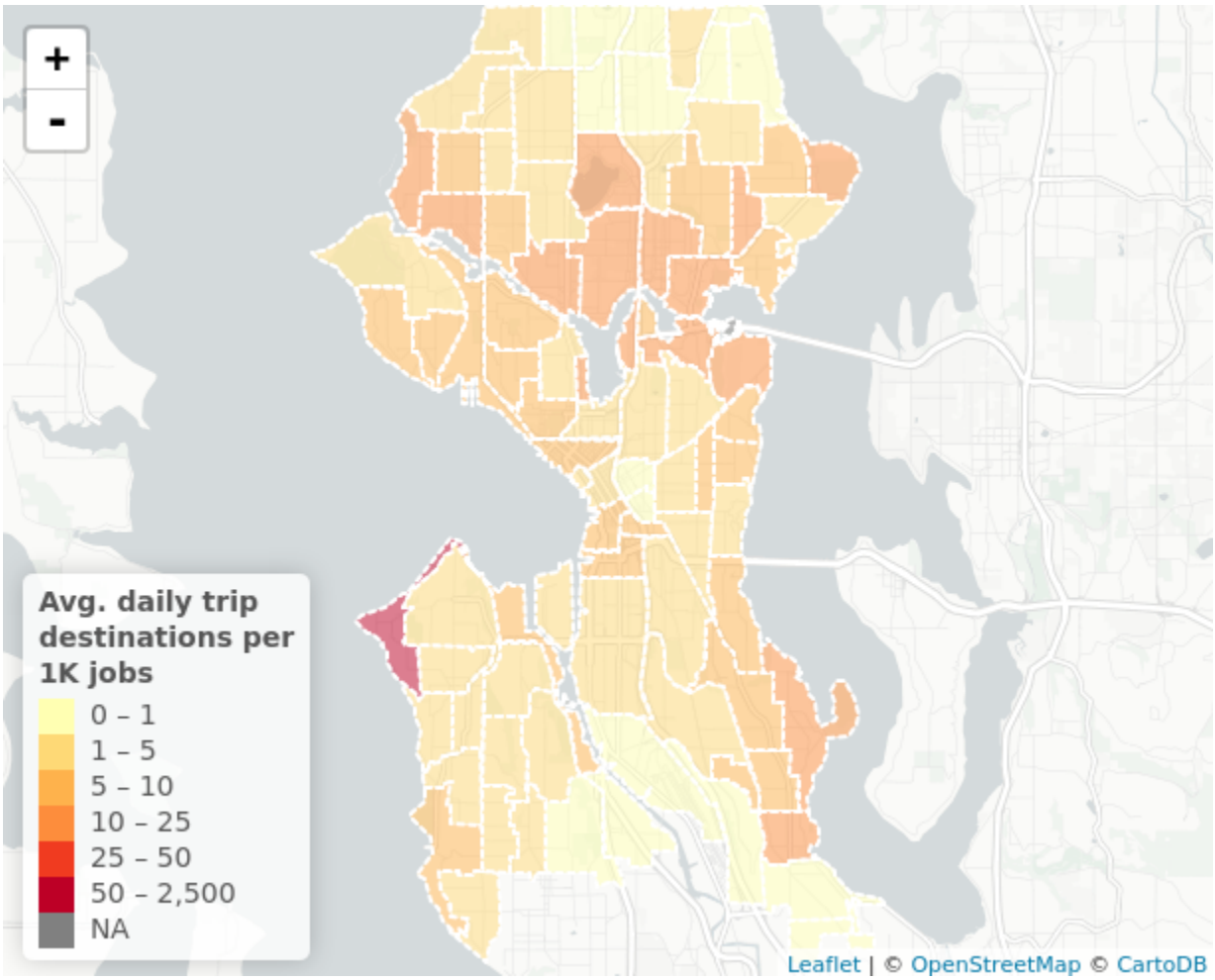


	Neighborhood	avg. origins 1K
	Adams	9.55
	Alki	4.65
	Arbor Heights	0.11
	Atlantic	1.27
...		...
	West Woodland	4.99
	Whittier Heights	0.88
	Windermere	0.87
	Yesler Terrace	1.29

1.4.4 What is the average daily trip count per 1,000 jobs in each neighborhood?



	Neighborhood	avg. origins 1K	avg. destinations 1K
	Adams	11.75	11.18
	Alki	30.07	31.32
	Arbor Heights	1.14	1.16
	Atlantic	1.46	1.45
...		...	...
	West Woodland	5.37	5.57
	Whittier Heights	4.86	4.48
	Windermere	1.24	1.33
	Yesler Terrace	0.6	0.57



1.4.5 How does bike availability in each neighborhood (and/or census block) vary based on residential population, population density, employment, and employment density?

Average bike availability per day by population, population density (people per acre), employment, and employment per acre:

	Neighborhood	Population	Pop. dens.	Employment	Emp. dens.
	Adams	0.03	13.84	0.03	17.02
	Alki	0.01	5.64	0.06	36.47
	Arbor Heights	0	0.15	0	1.56
	Atlantic	0.01	2.88	0.01	3.29
...		...	...	...	...
	West Woodland	0.02	8.24	0.02	8.86
	Whittier Heights	0	0.61	0.01	3.37
	Windermere	0	1.84	0.01	2.62
	Yesler Terrace	0	0.43	0	0.2

1.4.6 What neighborhoods have been overserved and underserved on the basis of bike availability? What neighborhoods have been overserved or underserved relative to their population, population density, employment, and employment density?

Needs definition for over- and under- served. Purely as an impression, the University District appears to function differently from the rest of the city with a considerable volume of internal trips. It is conceivable that the neighborhood is under-served given the limitation of fleet concentration within the neighborhood and limits on bicycles being re-balanced to the University of Washington campus.

1.4.7 How has bike availability in each neighborhood changed as the bikeshare fleet expands?

Average daily available bikes by month and neighborhood:

neighborhood	month	bikes
Adams	7	0-100
Adams	8	101-250
Adams	9	101-250
Adams	10	251-500
	...	
Yesler Terrace	9	0-100
Yesler Terrace	10	0-100
Yesler Terrace	11	0-100
Yesler Terrace	12	0-100

1.4.8 What are the average available bike-minutes (sum of the lengths of time each available bike has been idle at time of measurement) in each neighborhood?

This question is answered in c1.4.2 as average idle time in days (see table and map). It is presented here as minutes, but is more readily understandable as days.

	Neighborhood	Avg minutes idle
	Adams	2579.33
	Alki	1133.12
	Arbor Heights	9359.52
	Atlantic	2475.42
...		...
	West Woodland	2326.97
	Whittier Heights	2120.56
	Windermere	3965.44
	Yesler Terrace	2590.07

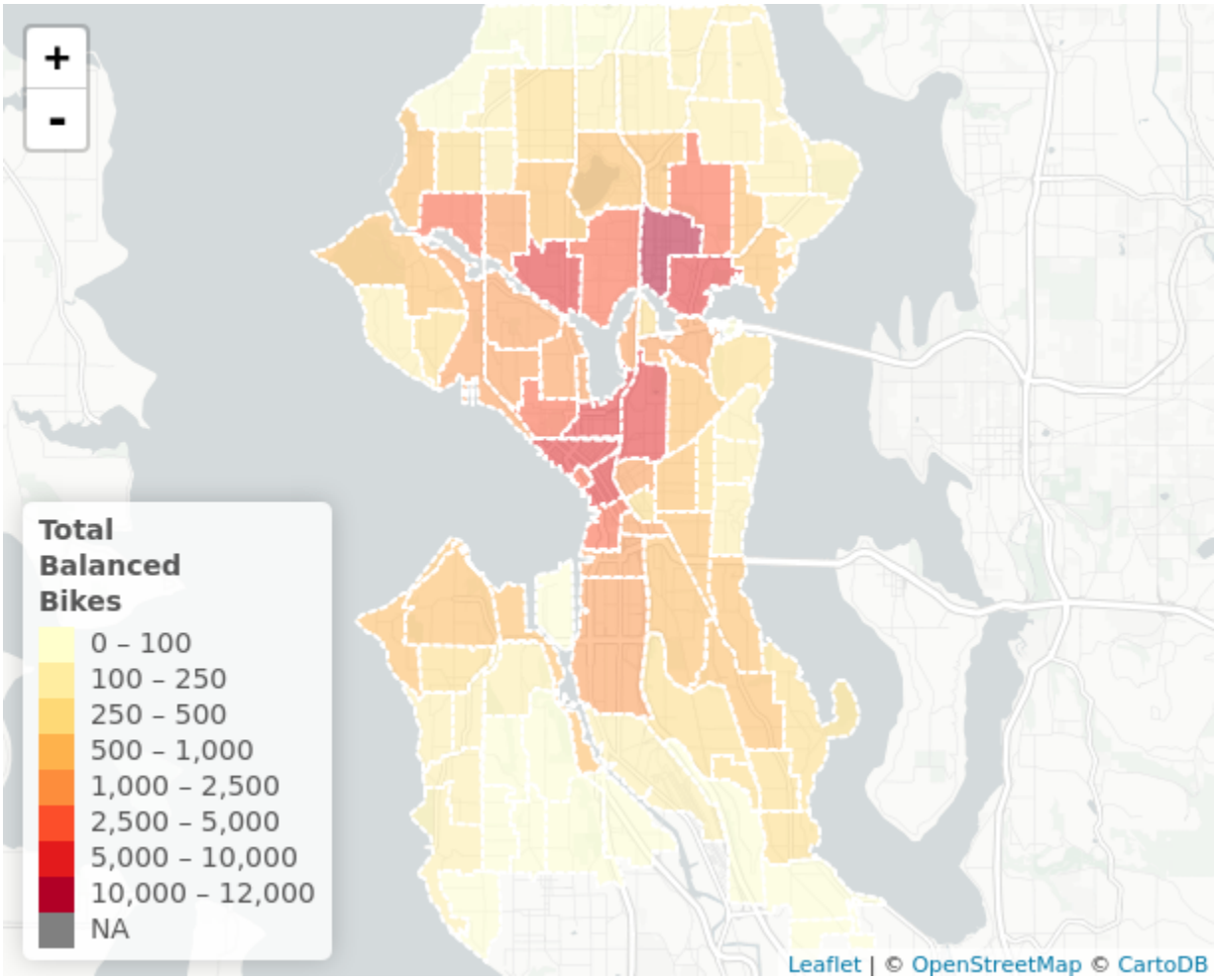
1.4.9 How do bike availability and available bike-minutes vary among neighborhoods or census blocks, based on race/ethnicity and on the factors identified as affecting Displacement Risk and Access to Opportunity, as defined in the Seattle 2035 Equity Analysis? [2]

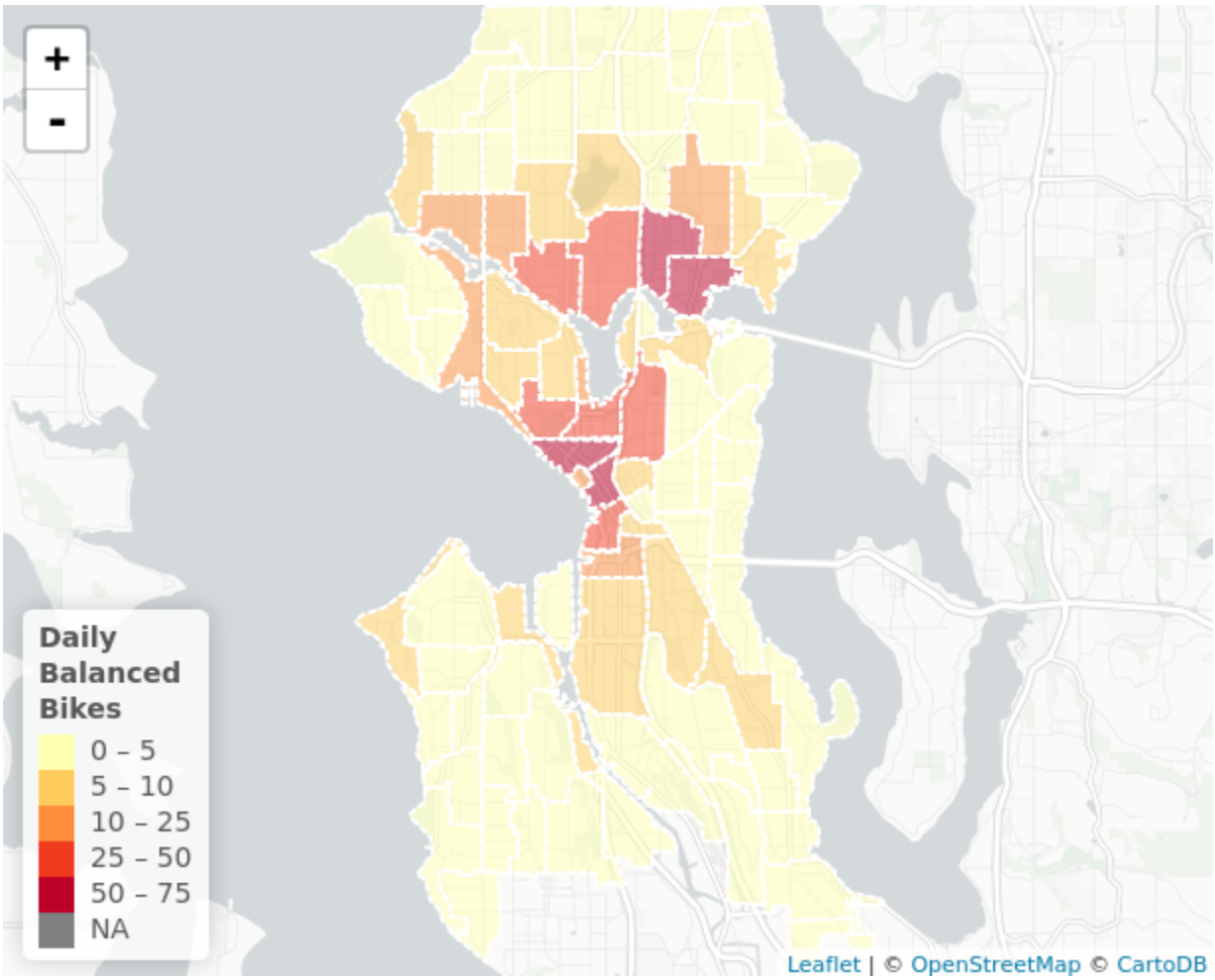
village	displacement	opportunity	avg. available	avg. days idle
12th Avenue	17.5	19.2	153.02	2.59
130th & I-5	14.1	13	4.39	2.39
23rd & Union-Jackson	17.6	21	14.27	1.61
Admiral	9.8	16.3	37.59	1.53
	...	...	...	...
Uptown	8.9	24.6	128.03	1.57
Wallingford	8.6	24	706.98	1.09
West Seattle Junction	7.8	9.9	23.69	2.83
Westwood-Highland Park	19.9	7.2	3.4	2.72

[2] https://www.seattle.gov/Documents/Departments/OPCD/OngoingInitiatives/SeattlesComprehensivePlan/2035EquityAnalysisSummary.pdf

1.4.10 Have bikes been uniformly redistributed across the city? On average how many bikes are rebalanced to each neighborhood each day? How many times have bikes been rebalanced to each neighborhood?

Neighborhood	Total	Daily
Adams	3338	20.7
Alki	962	7.1
Arbor Heights	10	1
Atlantic	568	4.1
	...	...
Westlake	2182	13.2
Whittier Heights	240	2.3
Windermere	246	2.6
Yesler Terrace	388	2.9




+
-
Daily Balanced Bikes
0 – 5
5 – 10
10 – 25
25 – 50
50 – 75
NA
Leaflet | © OpenStreetMap © CartoDB

2 System Performance and User Behavior Evaluation

2.1 Ridership

2.1.1 What is the distribution of trips per user?

Mean	3.1
SD	6.8
Min	1
Max	900

2.1.2 What is the average trips per user per day?

This calculation is based on the number of trips a rider took divided by the number of days the rider was active (date of end of last ride minus date of start of first ride). The mean number of active days is 15.7. The mean number of active days for people who took more than one trip is 31.6.

The mean number of trips per person per day is 1.02. Considering only people who took more than one trip, the mean value increases marginally to 1.05.

A different way to consider this issue is how many rides people took over the life of the evaluation period starting in July and ending on December 31, 2017. The distribution of number of rides is:

Frequency	Percent
1	52.5
2	17.5
3	8.9
4	5.4
5	3.5
6+	12.1

Please note that there is no way to connect Riders and Rider IDs across bikeshare vendors. Please see the survey responses in section III for a discussion of how many firms each Rider has used.

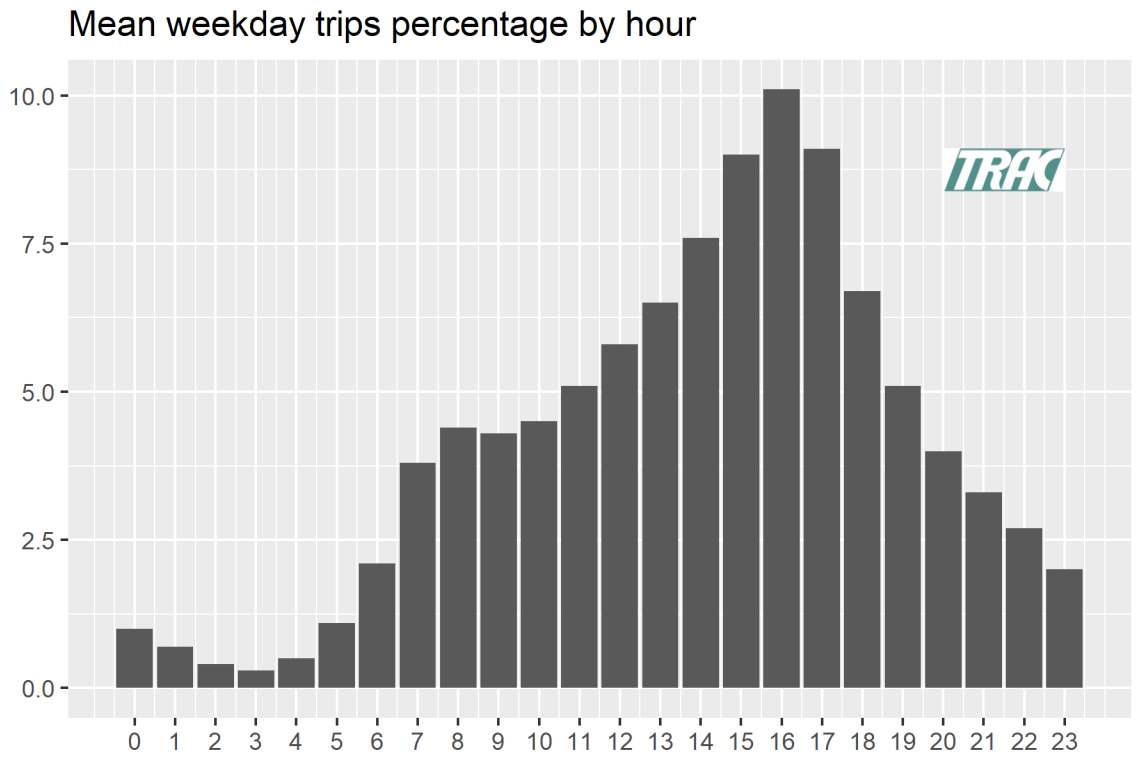
2.2 Trip Attributes

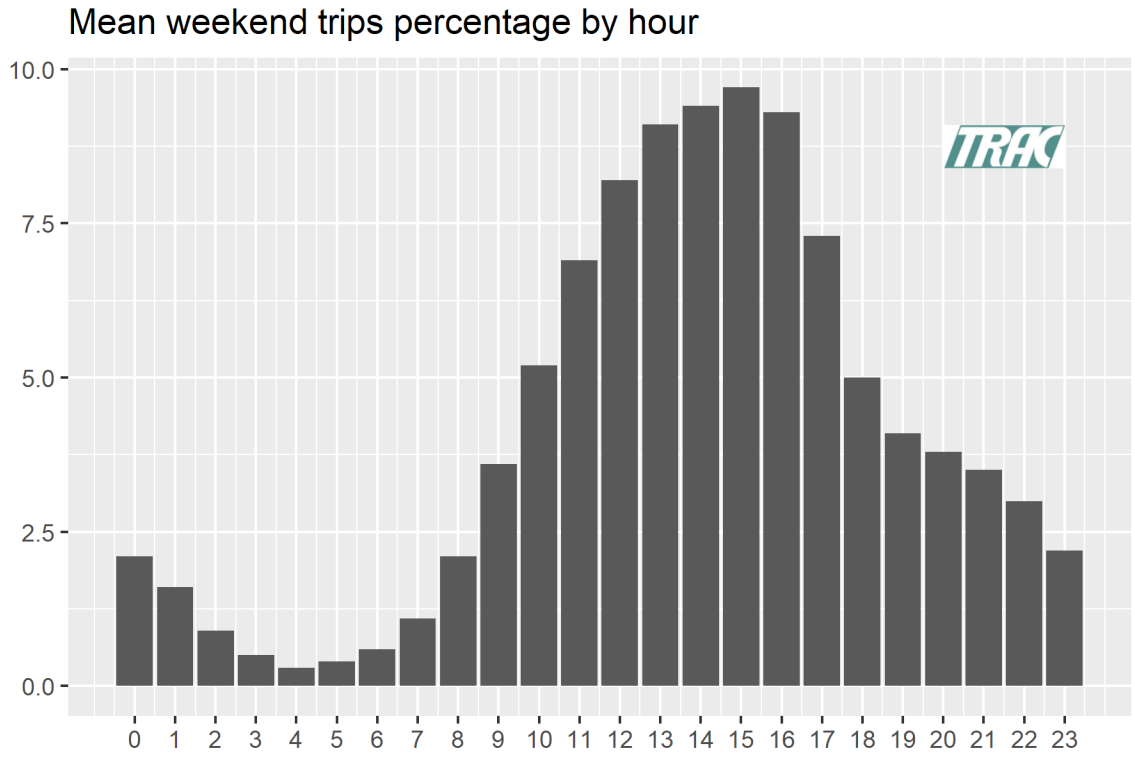
2.2.1 Timing

2.2.1.1 How do ridership and trip attributes vary over the course of a day? How do ridership and trip attributes differ on weekdays and on weekends?

Time-period	Trips	By hour
All	3,029.6	126.2
Weekday	2,899.3	120.8
AM	296.4	12.9
PM	818.6	272.9

2.2.2 Systemwide peaks: What are the peak times for bike share use? Do those peaks correspond with standard peak commute hours? Are there other peak times for bike share, such as lunchtime or bar break? Are there weekend peaks? How pronounced are ridership peaks?





2.2.2.1 Localized peaks: Are there notable localized peaks within particular neighborhoods or neighborhood groups? If so, when, where, and how pronounced are the peaks?

Only neighborhood with sufficient hourly rides are reported.

Weekdays:

Neighborhood	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Adams	2	1.1	0.7	0.6	0.2	0.7	1.5	2.6	2.9	3.2	3.3	5	5.5	5.6	6.9	8.4	8.7	8.1	7.4	6.1	4.9	5.3	4.3	4.9
Alki	0.5	0.3	0.2	0.5	0.2	0.5	0.7	1.3	1.9	2.9	4.6	5	8.5	8	10.4	10	11.6	9.6	5.2	6.3	3.8	4	2.4	1.5
Atlantic	1.2	0.5	0.8	0.8	1.8	2.4	2.7	4.9	4.3	4.4	3.5	5.8	5.2	6.4	7.6	10.4	8.5	8.2	5.3	5.5	4	1.8	2	2
Belltown	1	0.7	0.6	0.3	0.6	1	1.5	2.8	3.5	4.1	4.6	5.3	5.6	6.3	7.9	9.8	11.6	9.8	7	4.9	3.8	3.1	2.4	1.8
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Wallingford	1.1	0.9	0.4	0.2	0.2	0.8	1.8	4.3	5.3	4.5	4.7	5.3	5.3	6.5	7.5	9.6	10.1	9.3	6.9	4.3	3.3	2.5	2.6	2.4
West Woodland	0.8	0.3	0.2	0.2	0.3	0.5	1.6	3.5	3	4.9	4.2	5.9	6.5	5.4	7.2	9.9	8.8	9	7.7	7.1	3.7	4.8	2.8	1.8
Westlake	0.2	0.1	0.2	0.3	0.3	1.1	2.8	6.1	5.9	7	5.4	5.6	5.2	5.1	6.7	8.6	10.8	10.9	7.1	4	3.2	1.5	1	0.7
Yesler Terrace	1.3	1	0.3	1	0.3	1.8	2.3	4.6	8.9	4.8	6.3	4.1	5.8	4.3	4.3	9.4	11.4	9.1	3.8	4.3	3	2.3	3.8	1.8

Weekends:

Neighborhood	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Adams	5.7	3.9	1.6	0.3	0.2	0.2	0.3	1.1	1.4	2.8	4.7	7.2	9.5	10.1	10	8.3	9.2	5.9	4	3.6	2.8	2.4	2.6	2.4
Alki	0.9	1.2	0.6	0.4	0.1	0.2	0.1	0.8	1.1	3.5	3.9	6.3	7.8	10.5	9.2	11.4	13.2	10.2	4.1	3.3	3.4	1.9	2.5	3.5
Atlantic	0.3	0.6	0.3	1	0.3	1.9	1	1.9	3.2	5.5	7.7	6.8	7.7	12.5	5.1	11.3	6.8	7.1	4.2	5.5	3.5	1.6	2.3	1.9
Belltown	1.7	1.5	1.3	1	0.4	0.6	0.6	1.1	2.6	4.3	6.1	7.5	8.6	9.4	9.3	8.9	8.4	6.2	4.3	4.2	3.5	3.2	2.8	2.4
<NA>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
University District	2.3	1.4	0.8	0.4	0.2	0.3	0.7	1.2	1.7	3.1	4.4	5.7	6.8	7.7	8.7	8.3	8.8	7.3	5.7	4.9	5.6	6.1	4.7	3.2
Wallingford	2	1.4	1	0.4	0.1	0.3	0.7	1.7	2	3.9	6.3	7.7	9.6	10.3	8.8	10.7	9.8	7.2	5.3	2.5	2.7	2.6	2.1	1.2
West Woodland	1.4	1.5	0.2	0.7	0.3	0.3	0.7	1.6	2.6	4.8	5.4	6.4	9.8	6.6	8.9	9.2	9.8	7.4	5.8	5.2	4	2.9	3.6	1
Westlake	0.6	1.5	0.6	0.1	0.1	0.7	1.2	2	2.8	6.6	6.5	7.8	8.6	9.5	7.6	9.9	9	7	4.8	3.6	2.2	2.5	3	1.9

2.2.3 Distance

2.2.3.1 How far do users ride bike share bikes, on average? What is the distribution of trip distances?

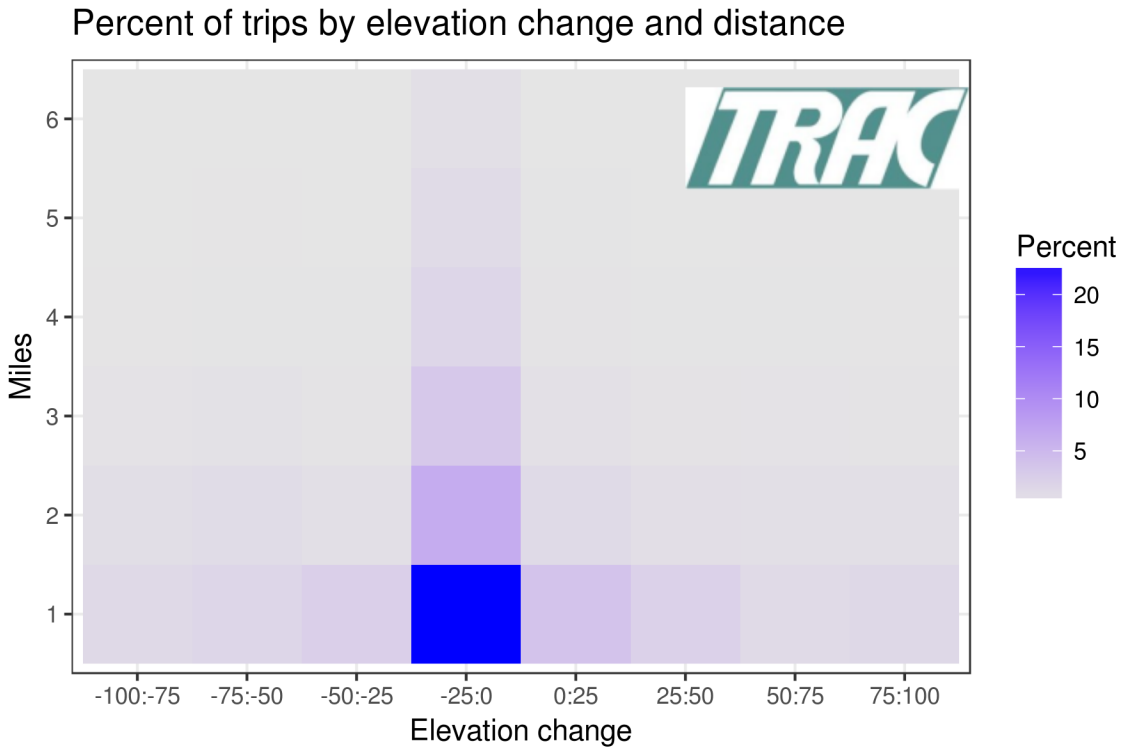
The mean trip distance is 1.5 miles with a standard deviation of 2 miles.

2.2.3.2 How do trip distances vary depending on time of day, day of week, and weather conditions?

Trip distances in miles:

	Weekdays	Weekends	AM	PM
mean	2.0	2.5	1.0	1.3
sd	6.2	6.0	1.4	1.8

2.2.3.3 How does trip elevation change affect trip distance?



2.2.4 Duration/Speed

2.2.4.1 How long do users ride bike share bikes, on average? What is the distribution of trip durations?

Mean trip lengths are reported in minutes for all reported trips with a duration of less than one day (24 hours) and less than 3 hours.

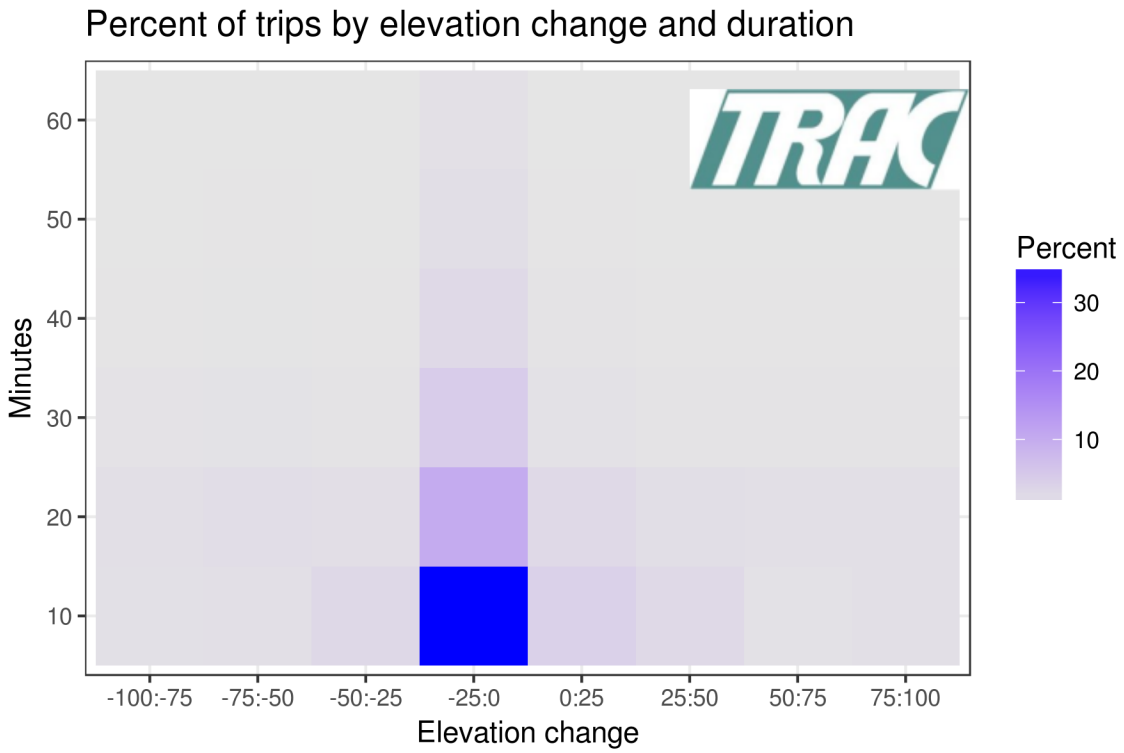
	<24 hours	<3 hours
mean	21.7	15.2
sd	59.5	20.1

2.2.4.2 How do trip durations vary depending on time of day, day of week, and weather conditions?

Mean trip duration in minutes by day of week and time of day:

	Weekdays	Weekends	AM	PM
mean	19.9	24.5	9.7	13.0
sd	62.2	59.8	13.5	17.7

2.2.4.3 How does trip elevation change affect trip duration?



2.2.4.4 How fast are riders riding bike share bikes? Does this vary significantly based on other trip or user attributes?

A speed of six miles per hour is currently assumed. Once routing analysis and research is further refined in a potential future stage of this work, it will be possible to provide metrics for this topic.

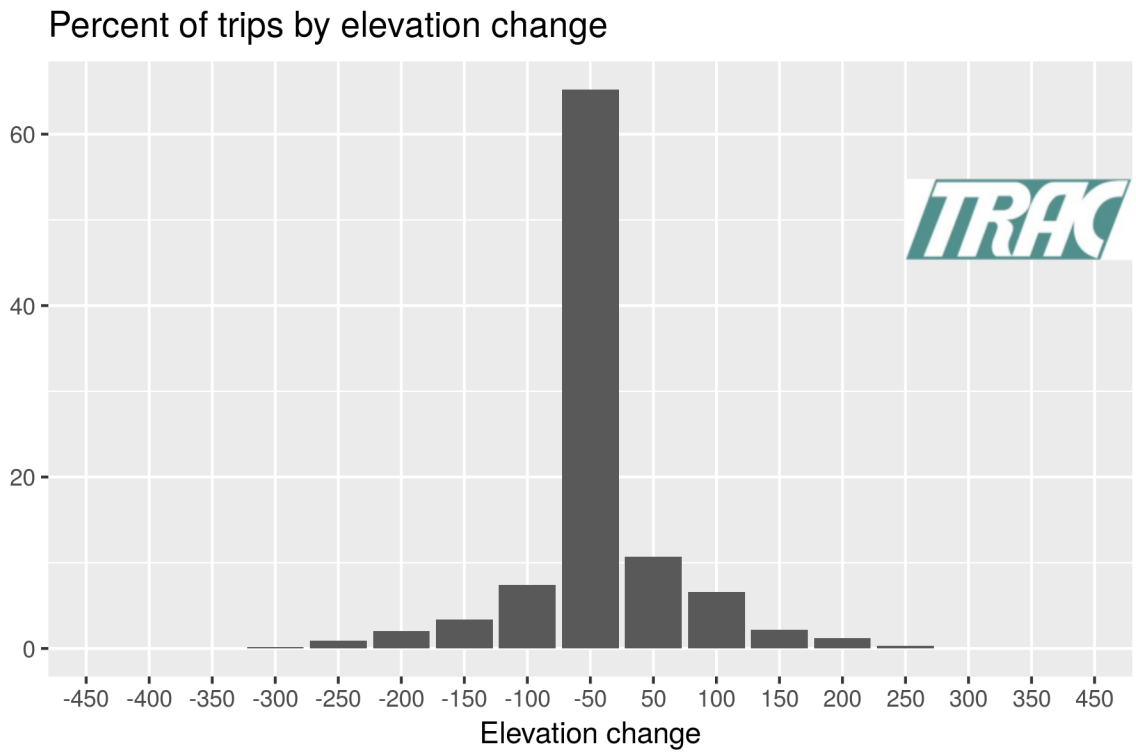
2.2.4.5 Can speed and duration data be used to create estimates of travel times by bike share along different routes between neighborhoods?

Once routing research is completed in a future stage of work, travel times can be developed on select corridors.

2.2.5 Elevation

2.2.5.1 What is the distribution of elevation changes on bike share trips?

The mean elevation gain is -4.7 feet with a standard deviation of 57.8 feet.



2.2.5.2 How does trip elevation change vary depending on time of day, day of week, and weather conditions?

	Weekdays	Weekends	AM	PM
mean	-4.9	-4.6	-12.7	-2.2
sd	55.1	58.4	57.7	54.4

2.3 Location and Corridor Data

2.3.1 Neighborhoods

2.3.1.1 What are common or predominant travel routes for each neighborhood origin-destination pair?

The most common routes for the top ten origin and destination pairs (note they are all internal trips) with the most trips are as follows:

1	University District:	NE CAMPUS EB PY
2	Industrial District:	S DEARBORN ST
3	Belltown:	DEXTER AVE N
4	South Lake Union:	DEXTER AVE N
5	Central Business District:	2ND AVE
6	Adams:	17TH AVE NW
7	Broadway:	BROADWAY
8	Fremont:	N 34TH ST
9	Pioneer Square:	2ND AVE
10	Lower Queen Anne:	MERCER ST

2.3.2 Trips Outside Seattle

2.3.2.1 How many trips have occurred partly or wholly outside of city limits? (begin, midtrip, and/or end) How many of these trips occur daily? Do these trips show trends in routing, clustering, trip attributes, or user attributes?

Trip origins outside of Seattle: 1,396
Trip destination outside of Seattle: 1,934
Trips completely outside of Seattle: 1,192

2.3.2.2 Where are bikes frequently clustered outside city limits (cities, corridors, stations)?

Cities outside of Seattle with more than 100 trips include Tukwila, Bainbridge Island, and Sea Tac.

2.3.2.3 How does frequency of travel outside of Seattle vary based on time of day and day of week?

	Mean	SD
Weekdays	7.5	7.1
Weekends	8.0	7.0
AM	1.4	0.8
PM	2.8	2.3

2.3.3 Protected Bike Lane Corridors

(See Existing and Planned Bike Network map file, proposed PBLs and existing routes with major separation from traffic)

2.3.3.1 How frequently do bike share riders use each corridor? How has use of each corridor changed over time?

Total trips for each PBL as well as monthly percentage of trips for each PBL.

PBL	Trips	7	8	9	10	11	12
WESTLAKE TRAIL	3972	10.6	19.2	19.5	18.5	12.5	19.7
NE CAMPUS EB PY	3281	1.6	4.6	14	38.1	30.4	11.3
2ND AVE	3275	11.6	14.4	17.4	18.8	12.4	25.3
NE 40TH ST	3000	1.6	3.9	15.8	41.4	26.6	10.7
<NA>	...	...	...	...	...	...	...
UNIVERSITY BR ON RP	231	-	3	11.3	41.6	26.4	17.7
UNIVERSITY WAY NE	201	8	12.9	12.4	36.3	14.9	15.4
NE 65TH ST	197	10.2	15.7	19.8	24.4	16.8	13.2
15TH AVE NE	120	5.8	12.5	15	39.2	9.2	18.3

2.3.3.2 What neighborhood origin-destination pairs have been common for each corridor?

PBL	Origin	Destination
15TH AVE NE	University District	University District
2ND AVE	Central Business District	Central Business District
2ND AV ET S	Pioneer Square	Pioneer Square
<NA>	<NA>	<NA>
UNIVERSITY WAY NE	University District	University District
WESTERN AVE	Central Business District	Central Business District
WESTLAKE TRAIL	South Lake Union	South Lake Union
YESLER WAY	Pioneer Square	Pioneer Square

2.3.3.3 How does corridor use vary based on time of day, day of week, and weather conditions?

Percent of PBL trips that occurred on the weekend versus weekday as well as percent of weekday trips that occurred during peak commute periods.

PBL	Weekdays	Weekends	AM	PM
WESTLAKE TRAIL	32.2	67.8	9.1	17.6
NE CAMPUS EB PY	29.4	70.6	21.1	7.9
2ND AVE	27.4	72.6	9.8	16.0
NE 40TH ST	28.0	72.0	22.6	7.6
N 34TH ST	38.7	61.3	9.7	13.2
BROADWAY	25.6	74.4	10.5	13.5

2.3.3.4 What are the most popular travel routes that lack protected bike lanes? When are they popular?

Note that 1) Origin and destination pairs include the opposite (as in destination to origin is included in the pair), 2) The list of pairs describes places without PBLs, while other facilities may be present–e.g from Adams to Fremont there is the Burke-Gilman Trail, and 3) this list includes pairs with more than 1,000 trips in any direction.

Origin	Destination
Adams	Fremont
Adams	Sunset Hill
Adams	West Woodland
Alki	Industrial District
Belltown	Broadway
Belltown	Central Business District
Belltown	Interbay
Belltown	Lower Queen Anne
Belltown	Pike-Market
Belltown	Pioneer Square
Belltown	South Lake Union
Broadway	Central Business District
Broadway	South Lake Union
Central Business District	Industrial District
Central Business District	Lower Queen Anne
Central Business District	Pike-Market
Central Business District	Pioneer Square
Central Business District	South Lake Union
Fremont	University District
Fremont	Wallingford
Fremont	West Woodland
Industrial District	Pioneer Square
Lower Queen Anne	South Lake Union
Montlake	University District
Ravenna	University District
South Lake Union	Westlake
University District	Wallingford

2.3.3.5 Do trips that use a PBL corridor vary from those that do not based on any trip attributes? Do certain PBL corridors show notable differences based on trip attributes?

Of trips under three hours, all trip mean duration is 15.3 minutes compared to a longer, 17.6 mean minute ride on PBLs.

2.3.4 Neighborhood Greenways

(See Existing and Planned Bike Network map file, existing and proposed neighborhood greenways)

2.3.4.1 How frequently do bike share riders use each corridor? How has use of each corridor changed over time?

Greenway	Trips	7	8	9	10	11	12
12TH AVE NE	2753	0.2	4.2	14.5	39.7	30	11.4
17TH AVE NW	1064	5.5	18.4	21.1	19.9	14.5	20.6
NW 58TH ST	993	5.5	16.4	18	22.8	16.4	20.8
NW DOCK PL	781	6.1	16.6	23.2	28.9	12.3	12.8
<NA>	...	...	...	...	...	...	...
FREMONT AVE N	153	5.9	19.6	11.8	25.5	8.5	28.8
25TH AVE	130	8.5	26.9	26.2	16.9	6.2	15.4
22ND AVE	103	3.9	15.5	6.8	17.5	17.5	38.8
25TH AVE S	101	10.9	29.7	24.8	11.9	10.9	11.9

2.3.4.2 What neighborhood origin-destination pairs have been most common for each corridor?

Greenway	Origins	Destinations
12TH AVE NE	University District	University District
12TH AVE S	Industrial District	Industrial District
13TH AVE S	Industrial District	Industrial District
15TH AVE SW	Riverview	Riverview
<NA>	<NA>	<NA>
SW ANDOVER ST	North Delridge	Industrial District
S WILLOW ST	Brighton	Brighton
SW MYRTLE ST	Riverview	Riverview
SW WEBSTER ST	Riverview	Riverview

2.3.4.3 How does corridor use vary based on time of day, day of week, and weather conditions?

Greenway	Weekdays	Weekends	AM	PM
12TH AVE NE	32.1	67.9	17.2	8.3
17TH AVE NW	35.0	65.0	–	–
NW 58TH ST	35.5	64.5	–	–
NW DOCK PL	42.3	57.7	–	–
E COLUMBIA ST	31.7	68.3	–	–
37TH PL NW	40.4	59.6	–	–

2.3.4.4 What have been the most popular travel routes between neighborhoods that lack either PBLs or greenway designation?

Origin	Destination
Adams	Fremont
Adams	Sunset Hill
Adams	West Woodland
Alki	Industrial District
Belltown	Broadway
Belltown	Central Business District
Belltown	Interbay
Belltown	Lower Queen Anne
Belltown	Pike-Market
Belltown	Pioneer Square
Belltown	South Lake Union
Broadway	Central Business District
Broadway	South Lake Union
Central Business District	Industrial District
Central Business District	Lower Queen Anne
Central Business District	Pike-Market
Central Business District	Pioneer Square
Central Business District	South Lake Union
Fremont	University District
Fremont	Wallingford
Fremont	West Woodland
Industrial District	Pioneer Square
Lower Queen Anne	South Lake Union
Montlake	University District
Ravenna	University District
South Lake Union	Westlake
University District	Wallingford

2.3.4.5 Do trips that use a greenway corridor only vary from those that use a PBL and those that use neither based on trip attributes? Do certain greenway corridors show notable differences based on trip attributes?

Of trips under three hours, all trip mean duration is 15.3 minutes compared to a longer, 16.7 mean minute ride on Greenways.

2.3.5 Transit and Mobility Hubs

(Includes all mobility hub candidate locations specified on pages 5-4 and 5-5 of Shared Mobility Hubs Siting Analysis Draft Memorandum, August 2017, AND Seacrest Dock ferry terminal)

2.3.5.1 How frequently have bike share rides begun or ended near each location (within 300 feet of station or station entrances)?

Hub	Origins	Destinations
15th Ave. E and E John St.	411	–
15th Ave. NW and NW Market St.	521	374
1st Ave. and Madison St.	871	816
1st Ave. N/Queen Anne Ave. N and Mercer St.	763	512
<NA>	<NA>	<NA>
Westlake Ave. N and Denny Way	2029	1546
Westlake Ave. N and Galer St./8th Ave. N	1586	1017
Westlake Ave. N and Mercer St.	852	857
Westlake Station	2156	1477

2.3.5.2 What origin-destination neighborhood pairs have been most common for trips to and from each location? Do these vary notably based on time of day, day of week, or weather conditions?

For each hub, the most common destination neighborhood starting from the hub and the most common origin neighborhood terminating at the hub are reported.

Hub	From Hub	To Hub
15th Ave. E and E John St.	Broadway	Broadway
15th Ave. NW and NW Market St.	Adams	Adams
1st Ave. and Madison St.	Central Business District	Central Business District
1st Ave. N/Queen Anne Ave. N and Mercer St.	Lower Queen Anne	Lower Queen Anne
<NA>	<NA>	<NA>
Westlake Station	Central Business District	Central Business District
West Seattle Bridge: SW Avalon Way and SW Yancy St.	North Delridge	North Delridge
Westwood Village: SW Barton St. and 26th Ave. SW	Roxhill	Roxhill
Yesler Terrace: Broadway and E Yesler Way	Yesler Terrace	Yesler Terrace

2.3.5.3 What are the busiest times for trips to and/or from each station?

The busiest hour for trips from and to transit hub with sufficient data to answer this question:

Hub	From	To
Campus Pkwy. and University Way/15th Ave. NE	16	15
Capitol Hill LINK Station (Broadway and E John St.)	16	–
Colman Ferry Dock	6	16
Husky Stadium/Montlake Blvd./SR 520	16	16
International District LINK Station/King Street Station	–	15
Safeco Field and CenturyLink Stadium	21	16
SODO Busway and S Spokane St.	4	–
SODO LINK Station (S Lander St. and SODO Busway)	6	–
Westlake Ave. N and Denny Way	16	16
Westlake Ave. N and Galer St./8th Ave. N	16	–
Westlake Station	17	17

2.3.5.4 Do rides to and from station locations differ significantly from other rides based on any trip attributes?

Of trips under three hours, all trip mean duration is 15.3 minutes compared to a shorter, 12.4 mean minute ride from mobility hubs, and 13 minutes to the mobility hubs.

2.3.6 Events

(see TDCEventsList Fall 2017 spreadsheet)

2.3.6.1 For each listed event, how many trips begin and end near the specified location during the event times, and 1-2 hours before and after the event times? How does ridership for events compare to ridership to and from the same location at days and times without an event? Do weather conditions have an effect on the use of bike share to get to and from events?

Place	Left from	Left from +2hr	Left not event	Came to	Came to +2hr	Came not event
1 Century Link Field	576	855	575	460	759	473
2 Columbia City Farmers Market	206	280	198	160	240	170
3 Macy's Holiday Parade	–	–	178	–	–	125
4 WaMu	356	560	1324	310	525	987
5 Washington State Convention Center	312	425	221	239	332	191

2.3.6.2 Are there common origin-destination pairs for trips to and from this location during the event? Are the common pairs different outside of event times?

There are not sufficient trips from these small locations to be able to answer these questions at this time. Should trips to and from these locations increase in the future, it will be possible to respond.

2.3.6.3 What other busy times exist for these event locations outside of event hours?

There are not sufficient trips from these small locations to be able to answer these questions at this time. Should trips to and from these locations increase in the future, it will be possible to respond.

2.3.7 Parks

(See theCity of Seattle Parks shapefile at http://www.seattle.gov/gis)

2.3.7.1 What city parks have been common origins and destinations for riders?

The list below includes the mean daily trips that start and end in parks with sufficient trips to report on.

Park	Origins	Destinations
Alaskan Way Boulevard	21.6	–
Alki Beach Park	27.3	21.7
Burke-Gilman Trail	40.8	56.5
Gas Works Park	55.5	41.3
Golden Garden Park	26.3	–
Green Lake Park	83.5	78.1
Seward Park	26.1	21.1

2.3.7.2 What city parks are travel corridors (i.e. what parks have riders been traveling through often?)

Alaskan Way Boulevard, Burke-Gilman Trail, and Green Lake are common pass through parks.

2.3.7.3 Do trip starts, ends, and transits in parks change depending on time or day, day of week, or weather conditions?

Percent of trips on weekends versus weekdays and percent of trips in the commute peak periods compared to weekdays for origins (o) and destinations (d).

Park	(o) Week-end	(o) Week-day	(o) AM	(o) PM	(d) Week-end	(d) Week-day	(d) AM	(d) PM
Alaskan Way Boulevard	42.1	57.9	–	–	42	58	–	–
Alki Beach Park	49.2	50.8	–	15.4	47.1	52.9	–	18.6
Burke-Gilman Trail	41.2	58.8	9.2	17.2	38.5	61.5	5.2	19
Commodore Park	51.2	48.8	–	–	–	–	–	–
<NA>	...	...	<NA>	<NA>	<NA>	<NA>	<NA>	<NA>
Washington Park and Arboretum	51.8	48.2	–	–	51.8	48.2	–	–
Waterfront Park	43.3	56.7	–	–	42.7	57.3	–	–
Westlake Park	26.3	73.7	–	–	–	–	–	–
Woodland Park	48.4	51.6	–	–	46.1	53.9	–	–

2.3.8 College Campuses

(See HigherEd Campuses for TDC spreadsheet)

2.3.8.1 How many trips have begun and ended at the listed college campuses? How does trip volume change by time of day and day of week? What peaks are there?

Information is provided by school only when there are sufficient trips to do so.

School	Origins	Destinations
Central	1,874	979
Cornish	374	280
North	1,30	–
South	–	–
SPU	662	590
SU	966	691
UW main	18,307	19,491
UW west	17,504	13,828
Vocational	–	–

School	(o) Week-end	(o) Week-day	(o) AM	(o) PM	(d) Week-end	(d) Week-day	(d) AM	(d) PM
Central	25.3	74.7	–	23.5	29.3	70.7	–	24.7
SPU	33.7	66.3	–	–	34.0	66.0	–	–
SU	27.6	72.4	–	22.9	29.9	70.1	–	22.8
UW main	21.6	78.4	4.5	24.5	22.1	77.9	8.3	20.4
UW west	26.0	74.0	6.7	20.27	26.4	73.6	6.4	18.3

Origins (percent)

School	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
UW main	1.0	0.7	0.4	0.2	0.1	0.4	0.5	1.6	2.7	4.4	5.7	6.3	7.9	8.6	9.9	9.4	9.0	8.0	6.3	4.9	4.1	3.3	2.4	1.9
UW west	2.1	1.1	0.5	0.2	0.3	0.7	1.1	2.1	4.5	5.3	5.0	5.5	5.6	7.2	7.3	7.6	7.5	8.0	6.9	6.4	5.2	3.8	3.5	2.7

Destinations (percent)

School	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
UW main	1.0	0.5	0.3	0.2	0.2	0.5	1.0	3.0	5.2	6.9	7.3	7.3	7.7	7.9	8.4	7.6	7.7	7.0	6.0	4.5	3.6	2.9	1.8	1.5
UW west	2.0	1.4	0.7	0.3	0.3	0.6	0.7	2.4	4.4	5.1	5.1	5.3	5.7	6.7	7.0	6.9	6.8	7.4	7.1	6.4	5.3	4.8	4.3	3.1

2.3.8.2 What have been the most common origin-destination pairs for travel to and from listed college campuses? Do they vary by time of day, day of week, or weather conditions?

Most common neighborhoods that riders leave from to go to school:

School	Neighborhood
Central	Broadway
Cornish	Belltown
SPU	North Queen Anne
SU	Broadway
SU	First Hill
UW main	Fremont
UW main	Montlake
UW main	Ravenna
UW main	University District
UW main	Wallingford
UW west	Fremont
UW west	Ravenna
UW west	University District
UW west	Wallingford

Most common neighborhoods that riders go to after leaving from a school:

School	Neighborhood
Central	Broadway
Central	Central Business District
Central	First Hill
Cornish	Belltown
SPU	North Queen Anne
SU	Broadway
SU	First Hill
UW main	Fremont
UW main	Montlake
UW main	Ravenna
UW main	University District
UW main	Wallingford
UW west	Eastlake
UW west	Fremont
UW west	Ravenna
UW west	South Lake Union
UW west	University District
UW west	Wallingford

2.3.8.3 Are there clusters on these campuses that tend to have large numbers of available bikes?

For campuses where there are sufficient origins and destinations to report on, there are no discernible patterns of clusters of available bikes; bikes are dispersed across campuses.

2.3.9 Designated Bike Share Parking Areas

(See High Use Area Shapefiles)

2.3.9.1 How many trips have begun and ended at each location? How does trip volume to and from these locations change by time of day and day of week? What peaks are there?

Parking	Origins	Destinations
Alki Beach 14	1,777	1,454
Ballard Locks 20	908	826
Belltown Business District 9	4,674	3,557
Fremont Business District 4	3,477	2,056
Gasworks Park 6	7,713	6,307
International District 16	3,380	2,812
Old Ballard	5,872	4,923
Pioneer Square 12	3,406	2,943
Safeco 8 / Century Link 5	6,342	5,301
Seacrest Park 13	1,300	1,042
Seattle Center 10	7,011	5,970
South Lake Union 15	10,103	8,298
University Village Shopping Center 11	5,442	5,414
UW Campus North Entrance 2	1,259	705
UW LinkLight Rail Station 7	8,153	5,613
UW Medical Center 22	5,462	4,822
UW West Campus	20,093	16,615
WA State Ferry Terminal 3	3,519	3,177

Parking	(o) Weekend	(o) Weekday	(o) AM	(o) PM	(d) Weekend	(d) Weekday	(d) AM	(d) PM
Alki Beach 14	49.4	50.6	–	–	47.4	52.6	–	13.1
Ballard Locks 20	53.1	46.9	–	–	52.2	47.8	–	–
Belltown Business District 9	29.7	70.3	6.1	19.3	30.8	69.2	7.8	18.1
Fremont Business District 4	46.8	53.2	–	14.7	44.0	56.0	–	17.7
Gasworks Park 6	43.2	56.8	3.7	20.7	40.6	59.4	6.5	18.3
International District 16	27.0	73.0	11	15.9	24.9	75.1	6.5	21.5
Old Ballard	47.3	52.7	–	12.7	44.3	55.7	–	15.1
Pioneer Square 12	33.3	66.7	6.9	17	33.1	66.9	7	18.1
Safeco 8 / Century Link 5	34.6	65.4	12.6	15.9	30.8	69.2	12	21.6
Seacrest Park 13	47.7	52.3	–	8.3	46.7	53.3	–	9.8
Seattle Center 10	38.0	62.0	4.4	18.2	38.3	61.7	5.7	18.2
South Lake Union 15	19.2	80.8	2.7	20.3	18.8	81.2	9.8	13.6
University Village Shopping Center 11	41.7	58.3	–	23.8	38.8	61.2	4.4	25.6
UW Campus North Entrance 2	18.8	81.2	–	26.7	17.2	82.8	–	18.9
UW LinkLight Rail Station 7	30.5	69.5	9.2	25.6	30.0	70.0	10	24.2
UW Medical Center 22	17.2	82.8	4.2	26.7	18.9	81.1	11.8	18.8
UW West Campus	27.0	73.0	7.1	20.2	27.0	73.0	6.5	18.8
WA State Ferry Terminal 3	29.3	70.7	20.9	12.6	25.4	74.6	6.2	31

Origins:

Parking	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Belltown Business District 9	0.4	0.6	0.7	0.1	0.4	1.3	1.8	4.4	3.8	4.5	5	5.1	5	6.2	7.6	9.8	11.5	10.3	5.6	5.1	2.8	3.1	2.4	2.3
Fremont Business District 4	2.3	0.8	0.1	0.2	0.2	0.3	1.5	1.6	2.7	2.9	2.8	7.3	6.8	6.2	6.8	9.6	7.8	9.7	6.3	7.1	4.4	5.3	4.2	2.9
Gasworks Park 6	1.2	1.4	0.5	0.1	0	0.3	0.7	2.6	2.9	2.1	4.1	5	5.4	8.8	8.8	10.5	12.6	11.5	7.6	3.8	3	2.2	2	2.8
International District 16	1	0.9	0.3	0.2	2.1	3.1	6.1	6.8	5	3.3	2.7	4.4	5.6	6.4	6.5	10.6	7.8	7.4	5	3.9	2.3	3.1	2.9	2.3
<NA>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
South Lake Union 15	0.5	0.3	0	0.4	0.2	0.5	1.3	1.5	2.2	3.1	3.2	4.7	6.2	5.8	7.1	9.4	13.6	14.2	9.1	5.6	4.4	3	2.4	1.2
UW Campus North Entrance 2	0.9	1.5	0.5	0.8	0.1	0.2	0.3	1.9	2.3	5.9	7.1	8.4	8.6	7	10.8	8.8	10.9	7.4	4.4	4.1	3.2	2	1	1.8
UW Medical Center 22	0.3	0.3	0.1	0	0	0.4	0.9	1.3	2.9	3.5	6.5	7.5	7.2	8.1	11.1	10.6	11.4	10.3	7.1	3.8	2.8	1.6	1.3	0.9
UW West Campus	2	1.1	0.5	0.2	0.4	1	1.4	2.3	4.6	5.5	5.1	5.5	5.4	7.1	7.2	7.6	7.9	7.9	6.8	6.1	5	3.7	3.3	2.6

Destinations:

Parking	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Belltown Business District 9	0.9	0.4	0.5	0.2	0.3	0.9	2.6	4.3	5.1	3.4	4.2	4.7	4.9	6.4	6.1	8.4	9.5	9.4	9.1	5.1	4	3.8	3.6	2.1
Fremont Business District 4	2.7	0.4	0.4	0.1	0.3	0.6	2.1	2.1	2	4	4.5	5.6	6.8	6.6	6.5	7.8	8.6	12.7	5.9	5.5	5.6	2.4	3.4	3.2
Gasworks Park 6	0.8	0.7	0.4	0	0.1	0.6	1.1	3.9	6.1	3.8	4	4.9	5.7	7.8	9.1	10.5	11.3	8.9	6.2	3.5	3.2	2.6	2.3	2.5
International District 16	0.9	0.5	0.2	0.1	1.1	1	2.8	3.8	3.7	2.4	3.3	4.6	6.5	7.4	9.5	13.5	11.8	9.3	5.7	3.2	2.3	2	2.7	1.5
<NA>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
UW LinkLight Rail Station 7	0.3	0.2	0	0.2	0.5	1.3	2.3	4.6	5.5	4.3	3.7	4.5	4.8	6.1	6.6	9.6	10	10.3	7.9	5.4	4.4	3.3	2.8	1.4
UW Medical Center 22	0.2	0.2	0.2	0.1	0.9	1.9	2.9	4.8	6.6	6.8	7	7.1	7.4	9.1	9.3	8	7.2	7.1	4.3	2.8	2.5	1.6	1.5	0.6
UW West Campus	1.8	1.3	0.6	0.3	0.3	0.7	0.9	2.4	4.3	5.1	5	5.4	5.8	6.8	7	7.1	7.3	7.5	7.1	6.1	5.2	4.5	4.3	3.1
WA State Ferry Terminal 3	0.4	0.1	0.2	0.1	0.9	2	2.3	3.4	2.8	1.9	2.8	3.9	4	7.2	8.6	13.4	18.6	10.8	5.3	3.5	2.7	2.3	1.3	1.6

2.3.9.2 What have been the most common origin-destination pairs for travel to and from each location?

Origins:

Parking	Neighborhood
Alki Beach 14	Alki
Alki Beach 14	Industrial District
Ballard Locks 20	Adams
<NA>	<NA>
WA State Ferry Terminal 3	Industrial District
WA State Ferry Terminal 3	Lower Queen Anne
WA State Ferry Terminal 3	Pike-Market
WA State Ferry Terminal 3	Pioneer Square

Destinations:

Parking	Neighborhood
Alki Beach 14	Alki
Alki Beach 14	Industrial District
<NA>	<NA>
Fremont Business District 4	North Queen Anne
Fremont Business District 4	South Lake Union
Fremont Business District 4	University District
Fremont Business District 4	Wallingford

2.3.10 Do users tend to choose different routes for uphill and downhill trips between neighborhoods?

Users predominantly ride in flat areas or have a slight elevation loss. There are not sufficient trips from origin destination pairs with notable elevation gain and loss to answer this question. Once more data is collected it may be feasible to respond.

2.3.11 At what notable locations and/or times have riders frequently left their bikes idle midtrip? (Separate regular-duration trips (trip-chaining) from extremely long-duration rentals)

There is no evidence that a significant number of riders leave their bikes idle during their trip. There are however a significant number of unreasonably long trips where it appears that riders did not lock the bicycle.

2.4 Bike Availability

These questions supplement the Bike Availability and Equity section above. These questions request aggregated systemwide data. All of the questions posed in this section have been answered in the first part of this document and are not replicated here.

2.5 Weather and lighting

Posed questions:

2.5.1 How does ridership vary based on reported temperature, precipitation, cloud cover/UV index, and wind speed? How do changes in weather correlate with changes in trip attributes?

2.5.2 How do ridership, trip attributes, and user attributes vary based on sunrise, sunset, civil twilight, and nautical twilight times?

2.5.3 How do weather and light conditions affect riders, based on user attributes?

All of the questions posed here are responded to with a single simple simple set of linear models. Future research could and should expand and refine these models. Future models can and will consider hourly weather instead of daily weather conditions and socio-economic demographics.

The first set of models only consider information available from the survey (section 3 of this report). A separate set of models is also run for trips, duration, and elevation across the full trip data set.

Data is aggregated to mean daily values for the 168 days that bikeshare operated in Seattle during 2017. Dependent variables include average temperature per day in Fahrenheit (temp), Daily total rainfall in inches (rain), miles of visibility (vis), average wind speed in miles (wind), total minutes of light–i.e. time between sunrise and sunset in minutes (light), gas price in Seattle in dollars (gas), and the number of days since the bikeshare program began (maturation).

Dependant variables for the various models include the total daily trips of survey respondents (trips), the percent of riders per day who reported their gender as female (female), multiple age categories as a percentage of riders per day with the age group of 25-34 being used for analysis, a binary for student status (student), the mean daily trip duration in minutes (duration), and mean daily elevation change (elevation). Summary statistics for all of these variables is available in Table 1. Model results are available in Table 2.

Table 1: Summary statistics for data used in models

Statistic	N	Mean	St. Dev.	Min	Max
temp	168	56.137	12.259	32	80
rain	168	0.081	0.220	0.000	1.370
vis	168	9.173	1.520	2	10
wind	168	4.714	2.756	1	18
light	168	686.030	141.819	505	931
gas	168	2.946	0.083	2.798	3.067
maturation	168	84.500	48.642	1	168
trips	168	114.744	65.897	10	299
female	165	28.841	7.982	2.400	45.500
under13	168	0.184	0.574	0.000	4.700
age13_17	168	3.635	2.975	0.000	14.800
age18_24	168	19.978	8.332	0.000	40.600
age25_34	168	39.423	9.796	14.300	79.100
age35_44	168	20.038	8.673	0.000	64.300
age45_54	168	10.115	5.013	0.000	28.600
age55_64	168	3.933	3.662	0.000	22.200
age65plus	168	1.469	1.787	0.000	14.300
student	162	26.858	9.545	2.400	52.800
duration	168	14.823	4.965	6.874	40.210
elevation	141	−6.886	10.552	−49.130	17.390

Table 2: Regression Results

	Dependent variable:					
	trips	female	age25_34	student	duration	elevation
	(1)	(2)	(3)	(4)	(5)	(6)
temp	4.002***	0.453***	−0.374**	0.574***	0.174**	−0.022
	(0.798)	(0.124)	(0.161)	(0.142)	(0.082)	(0.188)
rain	−84.666***	−2.285	3.001	−9.862***	−1.021	2.323
	(19.167)	(2.897)	(3.872)	(3.379)	(1.980)	(4.648)
vis	4.517	−0.039	0.920*	−0.598	0.254	0.147
	(2.732)	(0.416)	(0.552)	(0.486)	(0.282)	(0.689)
wind	−0.575	0.319	0.105	−0.152	−0.264*	−0.203
	(1.433)	(0.217)	(0.290)	(0.257)	(0.148)	(0.330)
light	−2.202***	−0.064*	0.065	−0.207***	0.003	−0.179***
	(0.229)	(0.035)	(0.046)	(0.041)	(0.024)	(0.055)
gas	−224.642***	−50.380***	−25.228**	−33.071***	−10.978*	−24.528*
	(61.523)	(9.686)	(12.429)	(11.798)	(6.355)	(14.623)
maturation	−4.552***	0.020	0.118	−0.355***	0.048	−0.503***
	(0.626)	(0.095)	(0.126)	(0.111)	(0.065)	(0.148)
Constant	2,415.148***	192.983***	70.956	271.080***	29.964	231.400***
	(309.033)	(47.805)	(62.432)	(57.105)	(31.921)	(72.466)
Observations	168	165	168	162	168	141
Log Likelihood	-881.236	-552.266	-612.540	-568.323	-499.847	-526.013
Akaike Inf. Crit.	1,778.471	1,120.532	1,241.081	1,152.647	1,015.693	1,068.026
Note:						*p<0.1; **p<0.05; ***p<0.01

The first set of model results provides predictable findings. As temperature increase the number of trips goes up, a higher share of rider is women, more people outside the age group of 25-34 ride, more students ride, trips are longer, and people go down hill more. In other words, nice weather in terms of temperature gets people to ride more. Rain has a substantial negative effect on trip and also a negative effect on students. Visibility and wind don't seem to have an effect on any of the variables of interest. Hours of daylight has a negative relationship with trips and student status. Gas price has a negative relationship with all of the variables. Program maturation (the amount of time since bikeshare began in Seattle), has a negative relationship with trips, student status, and elevation. Table 3 provides results for the non-survey models include the independent variables of trips, duration, and elevation change.

Table 3: Regression Results

	Dependent variable:		
	trips	duration	elevation
	(1)	(2)	(3)
temp	61.988***	−0.052	0.428
	(23.446)	(0.089)	
rain	−1,594.633***	−1.442	−1.707
	(415.887)	(1.587)	
vis	74.576	−0.187	0.717
	(68.309)	(0.261)	
wind	−69.146**	−0.029	−0.147
	(31.393)	(0.120)	
light	5.875	0.009	−1.353
	(6.053)	(0.023)	
gas	−6,127.614**	−21.381**	−87.134
	(2,696.594)	(10.291)	
maturation	−2.886	−0.065	−3.193
	(14.396)	(0.055)	
Constant	15,368.000	91.465**	1,378.068
	(9,334.540)	(35.623)	
Observations	100	100	8
Log Likelihood	-822.242	-265.394	216.522
Akaike Inf. Crit.	1,660.484	546.788	-417.045
Note:		*p<0.1; **p<0.05; ***p<0.01	

Using the full trips data set, rain still has a strong negative relationship with trips. It is worth noting that wind, which did not appear to have a relationship with trips in the survey models now has a negative relationship with trips.

3 Users–survey

3.1 System performance

3.1.1 Origin-Destination

3.1.1.1 do origin-destination distributions vary by time of day, day of week, and user attributes? See: 1.3.4

Top-ten origin and destination for females:

Origin	Destination
UW Campus	UW Campus
Stadiums	Stadiums
University District	University District
Lower Queen Anne	Belltown
Belltown	South Lake Union
Central Business District	Lower Queen Anne
South Lake Union	Pioneer Square
Fremont	Fremont
Pioneer Square	Central Business District
Wallingford	Wallingford

Top-ten origin and destinations for males:

Origin	Destination
UW Campus	UW Campus
University District	University District
Belltown	Belltown
Central Business District	South Lake Union
South Lake Union	Pioneer Square
Pioneer Square	Central Business District
Lower Queen Anne	Stadiums
Stadiums	Industrial District
Fremont	Fremont
Broadway	Adams

3.1.2 Duration and Speed

3.1.2.1 How fast are riders riding bike share bikes? See: 2.2.4.4

Mean trip duration for females is 14.3 minutes versus 14.5 minutes for males.

3.1.3 Schools

3.1.3.1 How do user attributes of trips beginning and ending at colleges vary from those that do not?

The University of Washington is the only school with sufficient survey respondents to answer this question. For trip by gender, females comprise 27% of trips as compared to 33% of trips made by females across all locations. 38% of trips to the University of Washington were made by students as compared to 30% of trips being made by students overall.

3.2 Age and Gender

3.2.1 How does ridership compare among respondents based on age and gender?

Gender	Percent
Female	32.1
Male	65.6
Other/Prefer not to answer	2.3

Age	Percent
Under 13	0.3
13-17	4.7
18-24	20.6
25-34	37.7
35-44	19.0
45-54	10.9
55-64	5.3
65 and over	1.6

3.2.2 How do trip distance, duration, speed, and elevation-change vary based on a users age and gender?

For the most part, distance is imputed based on duration and assumed speed and are not addressed further here. Elevation change is reported in feet gained or lost.

Gender	Minutes (mean)	Elevation change
Female	14.3	-5
Male	14.5	-6
Other/Prefer not to answer	18.4	-5

Age	Minutes (mean)	Elevation change
Under 13	7.6	-3
13-17	14.9	-3
18-24	15.7	-7
25-34	13.9	-4
35-44	13.9	-7
45-54	14.6	-7
55-64	16.0	-7
65 and over	15.3	-4

3.2.3 How do distributions of rider age and gender vary over time of day, day of week, and weather conditions?

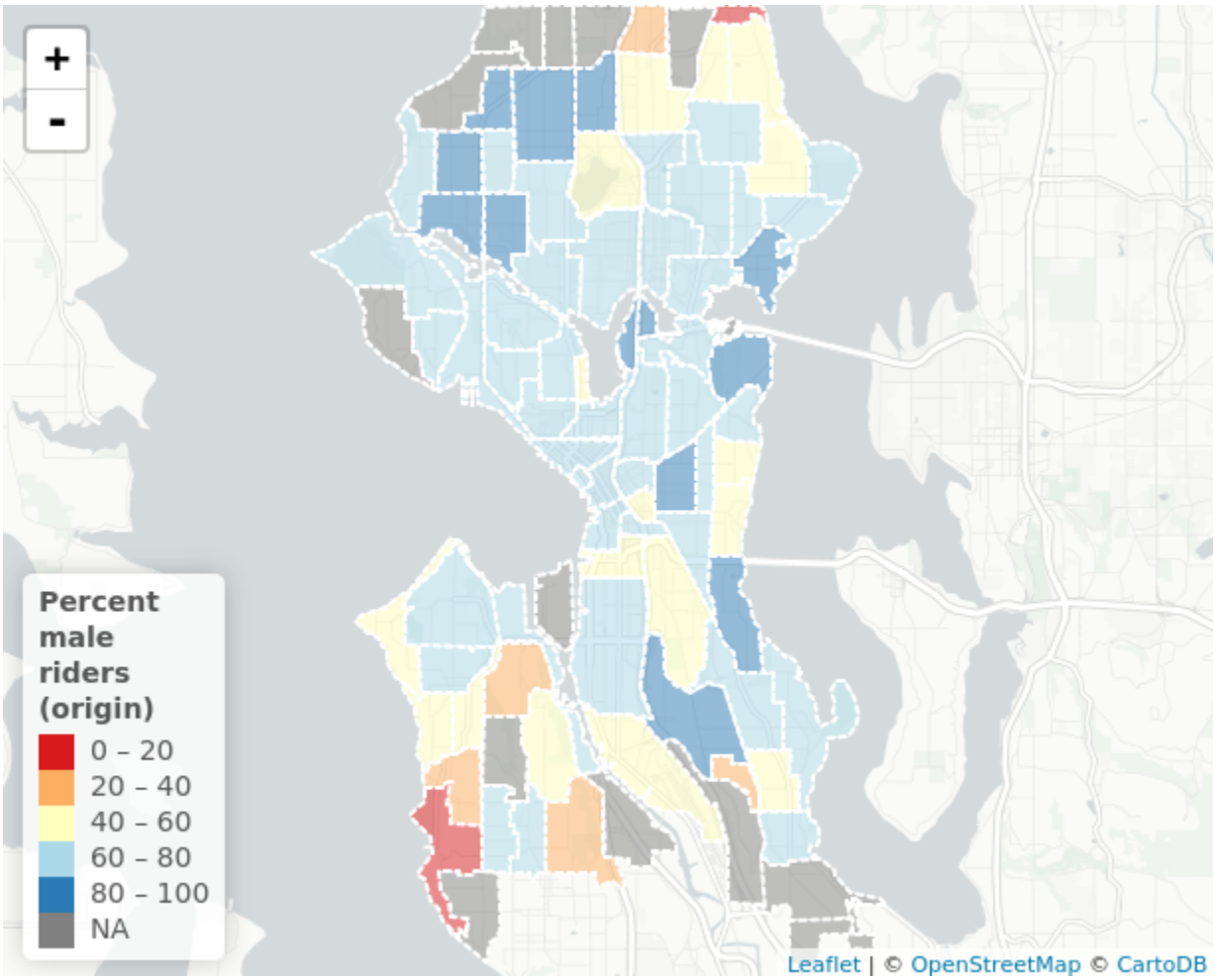
Gender	All	Weekday	AM	PM
Female	29.9	29.5	26.3	27.0
Male	68.2	68.6	72.6	71.1
Other/Prefer not to answer	1.9	1.9	1.1	1.9

Age	All	Weekday	AM	PM
Under 13	0.2	0.2	-	0.3
13-17	4.2	4.3	4.9	5.8
18-24	22.4	21.7	24.3	22.5
25-34	39.6	39.6	49.9	39.0
35-44	18.7	18.6	20.8	17.8
45-54	9.9	10.1	-	10.6
55-64	3.5	3.7	-	2.4
65 and over	1.6	1.7	-	1.5

3.2.4 How do rider age and gender distributions vary across origin and destination neighborhoods?

Percent males by neighborhood origin and destination:

Neighborhood	Origin	Destination
Adams	81.2	82
Alki	45.3	49
Atlantic	72.5	64.1
	...	...
Whittier Heights	68.4	96
Windermere	66.7	70
Yesler Terrace	51.1	60.9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Percent male riders (origin)
0 – 20
20 – 40
40 – 60
60 – 80
80 – 100
NA
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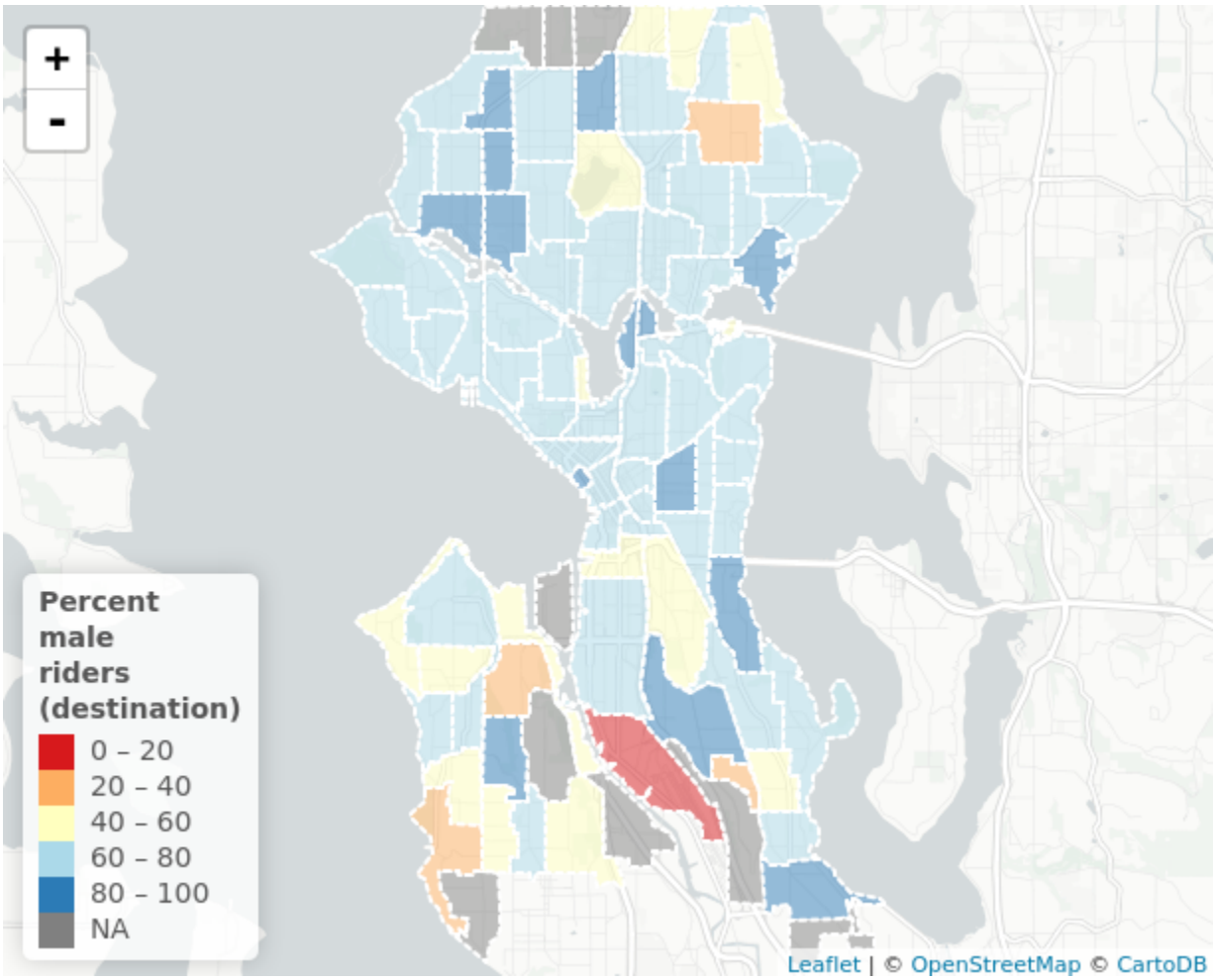


Predominant age group by neighborhood:

Neighborhood	Origin	Destination
Adams	25-34	25-34
Alki	25-34	25-34
Atlantic	25-34	25-34
Westlake	18-24	18-24
Whittier Heights	25-34	35-44
Windermere	18-24	25-34
Yesler Terrace	25-34	18-24

3.3 Language

3.3.1 What is the percentage breakdown of survey respondents by language preferred?

English is the preferred language of 98% of the respondents. The following languages (reported as written) comprise the remaining 2%:

Bahasa, Brazilian Portuguese, Chinese, Danish, Dutch, Farsi, French, German, Indonesia, Japanese, Korean, Lao, Mandarin, Persian, Polish, Portuguese, Romanian, Russian, Spanish, Tamil, Thai, Turkish, Vietnam

3.4 Helmet use

3.4.1 How does ridership compare among respondents based on reported helmet use?

Use helmets 24%
Do not use helmets 76%

3.4.2 Are users who reported wearing helmets riding more often or more regularly than non-helmet users?

Average number of trips:

Use helmets: 7.7
Do not use helmets 7.8

3.4.3 Do trip distance, duration, and elevation-change vary based on a user's reported helmet use? If so, how?

Trip duration, minutes:

Use helmets: 20
Do not use helmets: 17

Elevation change, gain (+) or loss (-) in feet:

Use helmets: -5
Do not use helmets: -5.7

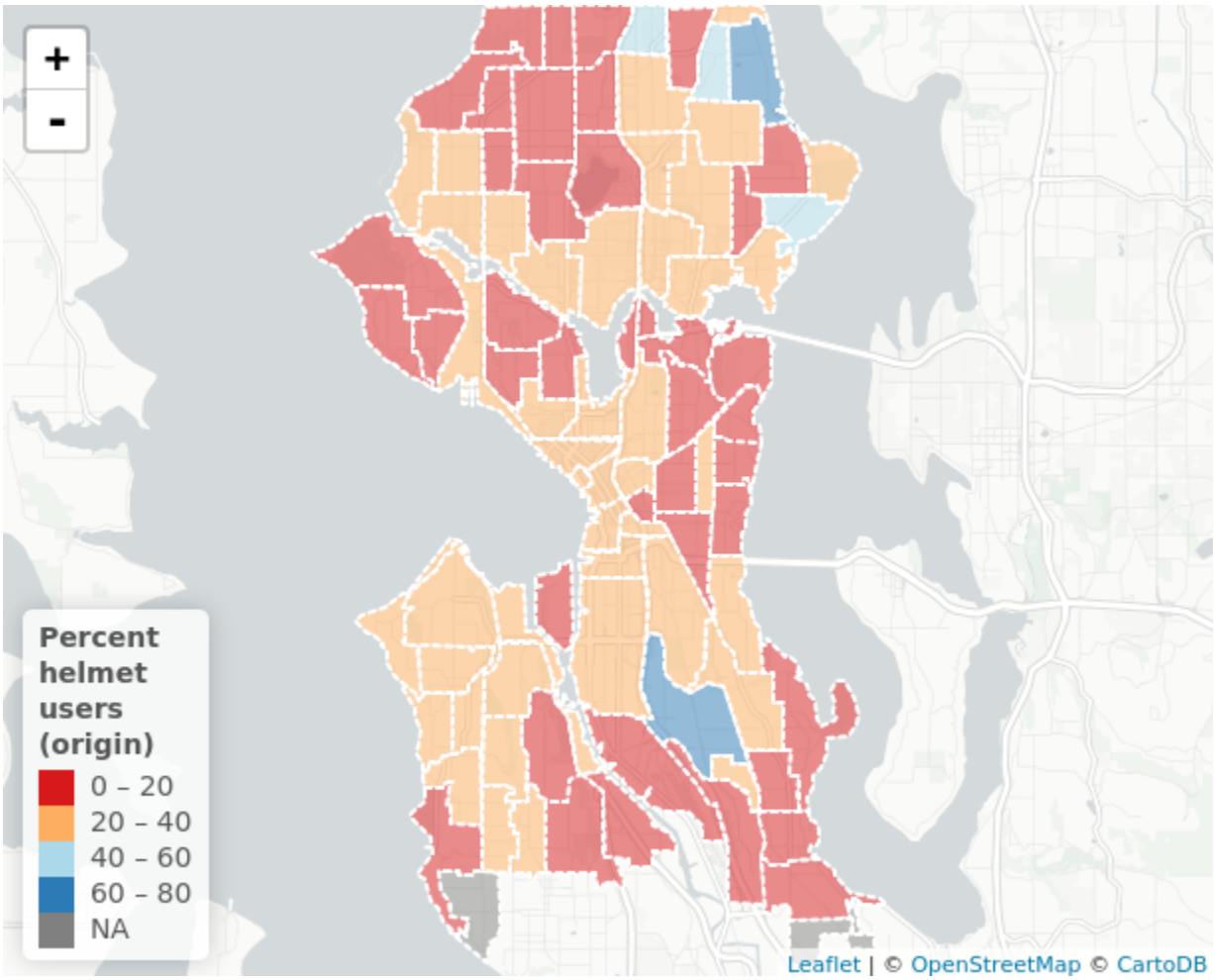
3.4.4 Does ride time of day, day of week, and weather conditions vary based on user's reported helmet use? If so, how?

Use helmet?	No	Yes
all female	80.5	19.5
all male	75	25
weekday female	80.8	19.2
weekday male	74.6	25.4
AM female	80.3	19.7
AM male	70.3	29.7
PM female	76.8	23.2
PM male	74.5	25.5

3.4.5 How does reported helmet use compare across origin and destination neighborhoods? Are users in some neighborhoods using helmets more frequently than users in other neighborhoods?

Percent of trip origin and destinations by neighborhood where the rider reported using a helmet:

Neighborhood	Origin	Destination
Adams	22.8	23.2
Alki	26.4	29.8
	...	...
Westlake	34	30.2
Whittier Heights	15.8	25
Windermere	50	25
Yesler Terrace	16.3	8.7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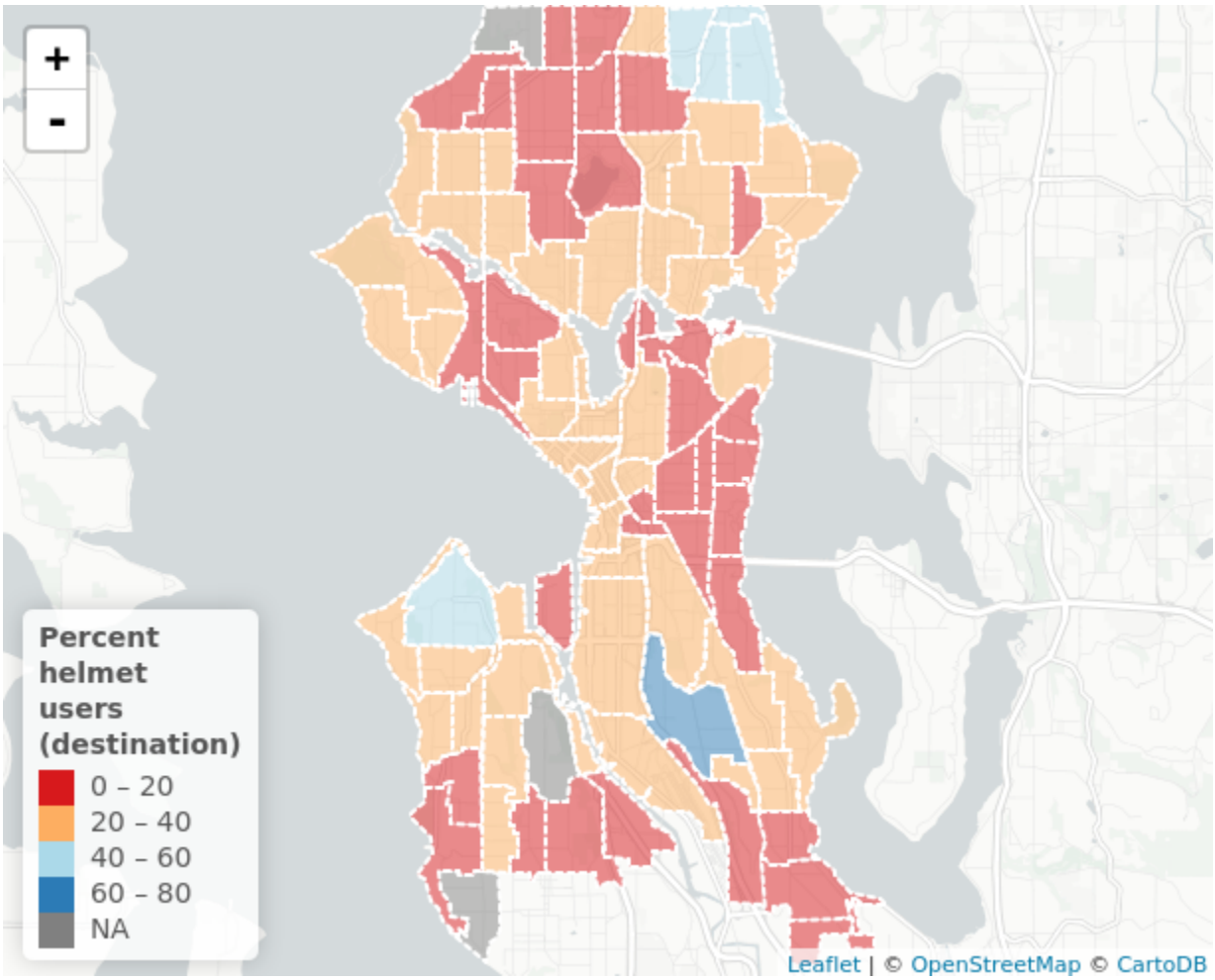
Percent helmet users (origin)
0 – 20
20 – 40
40 – 60
60 – 80
NA
Leaflet | © OpenStreetMap © CartoDB



3.4.6 Does reported helmet use vary based on age and gender? If so, how?

Use helmet?	Female	Male
no	80.5	75
yes	19.5	25

Use helmet?	No	Yes
Under 13	28.9	71.1
13-17	49.4	50.6
18-24	76.8	23.2
25-34	77.7	22.3
35-44	80.7	19.3
45-54	70.5	29.5
55-64	78.5	21.5
65 and over	100	0

3.5 Car, bike, and helmet ownership status

3.5.1 How does ridership vary among respondents based on reported ownership status of these items? Are users who reported owning each of these items riding more often or more regularly?

Mean number of rider for respondents based on car, bike, and helmet ownership:

Own	Car	Bike	Helmet
No	8.0	8.0	8.3
Yes	7.6	7.5	7.5

3.5.2 How do trip distance, duration, and elevation-change vary based on a user's reported ownership of these items? Are riders using bike share to fill different niches in their travel patterns depending on their ownership status?

Mean minutes per ride by ownership status:

Own	Car	Bike	Helmet
No	15.0	14.6	14.8
Yes	14.3	14.5	14.3

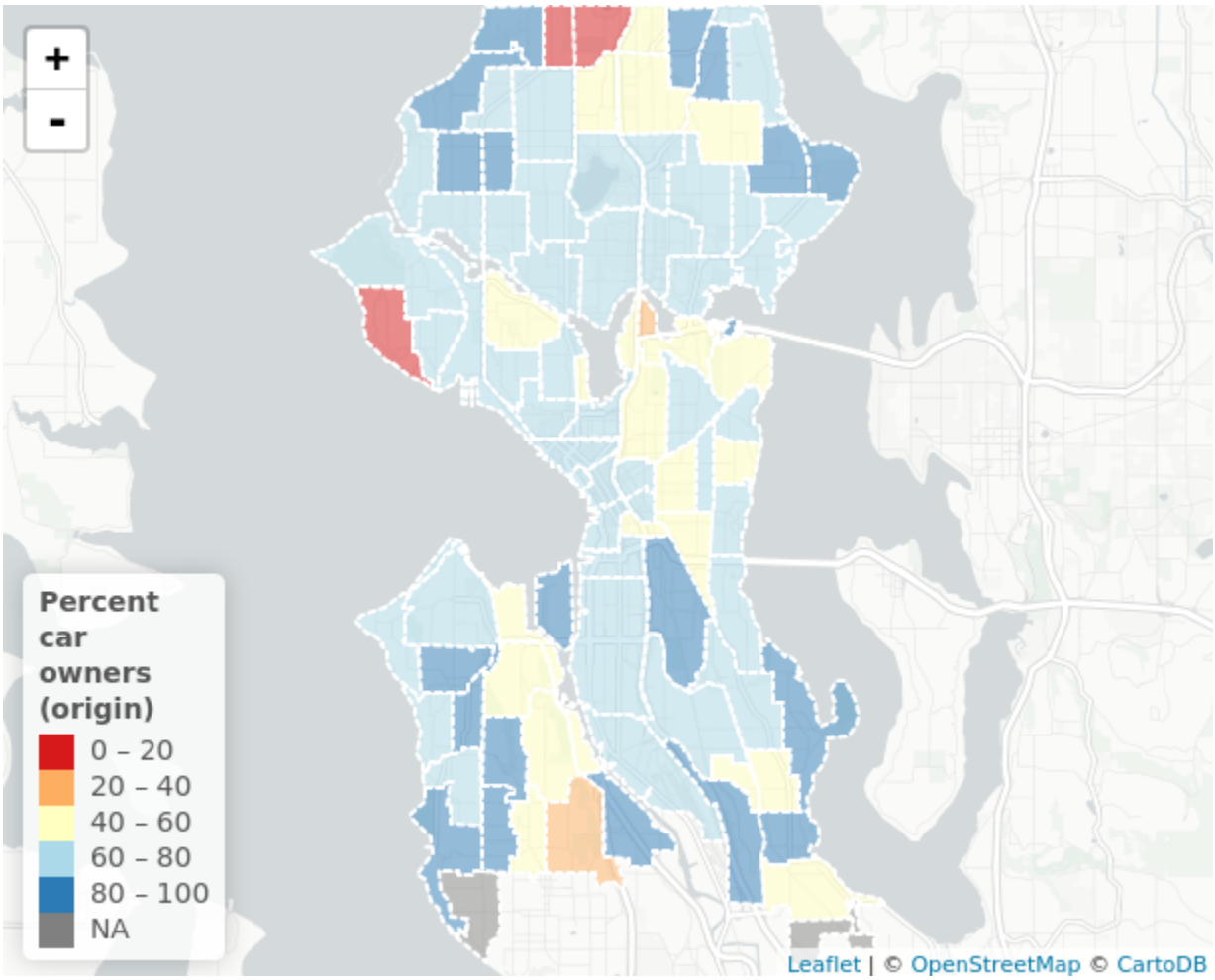
Mean feet of elevation gain or loss by ownership:

Own	Car	Bike	Helmet
No	-9.1	-7.8	-8.4
Yes	-3.8	-3.8	-4.0

3.5.3 How does ownership status compare across origin and destination neighborhoods? Are users starting or ending trips in some neighborhoods more likely to own a car, bike, and/or helmet than users starting or ending trips in other neighborhoods?

Percent of respondents that own cars by neighborhood:

Neighborhood	Origin	Destination
Adams	75.6	72.5
Alki	68.9	67.3
	...	...
Westlake	53	55.6
Whittier Heights	84.2	91.7
Windermere	66.7	60
Yesler Terrace	76.7	65.2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Percent car owners (origin)
0 – 20
20 – 40
40 – 60
60 – 80
80 – 100
NA
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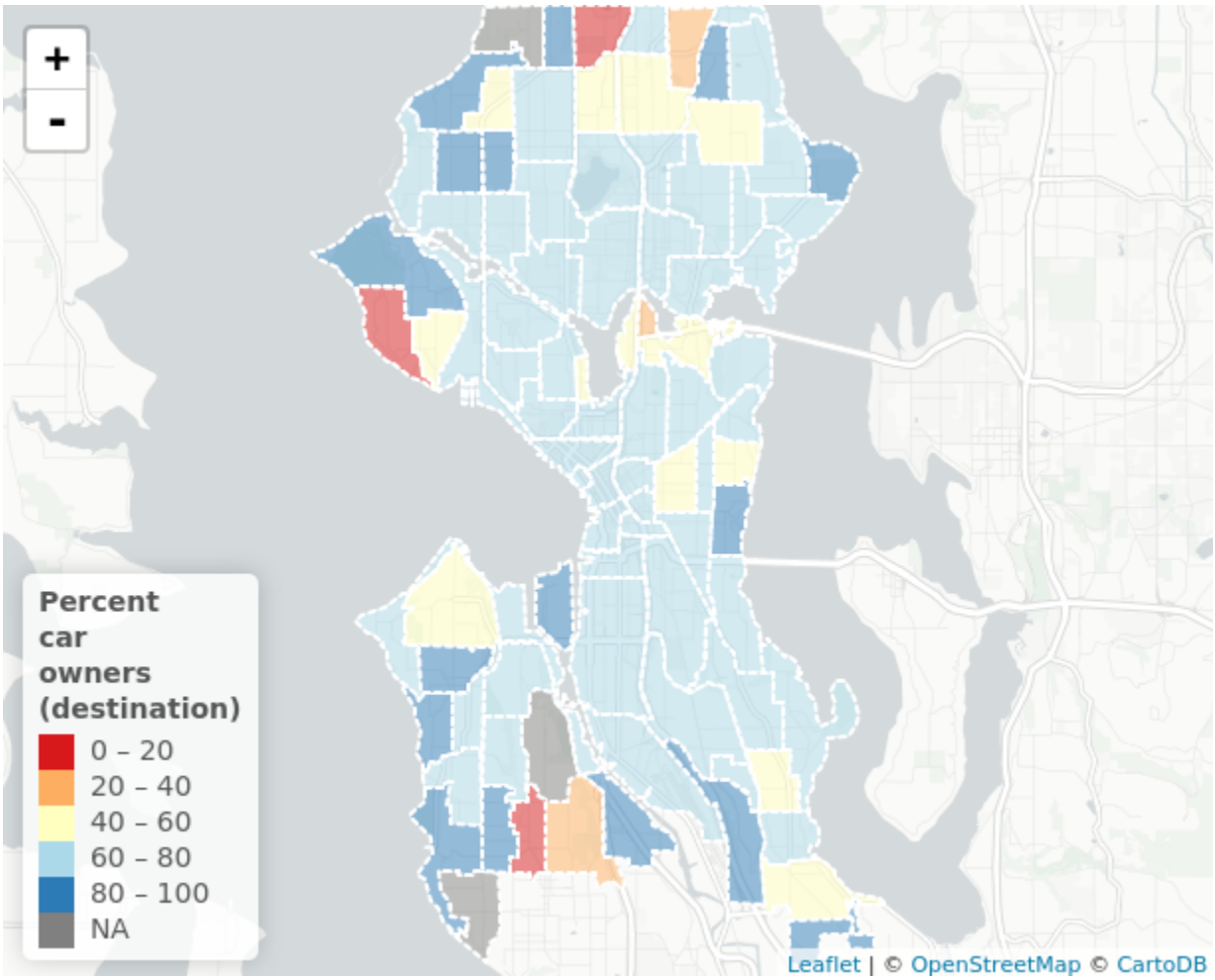
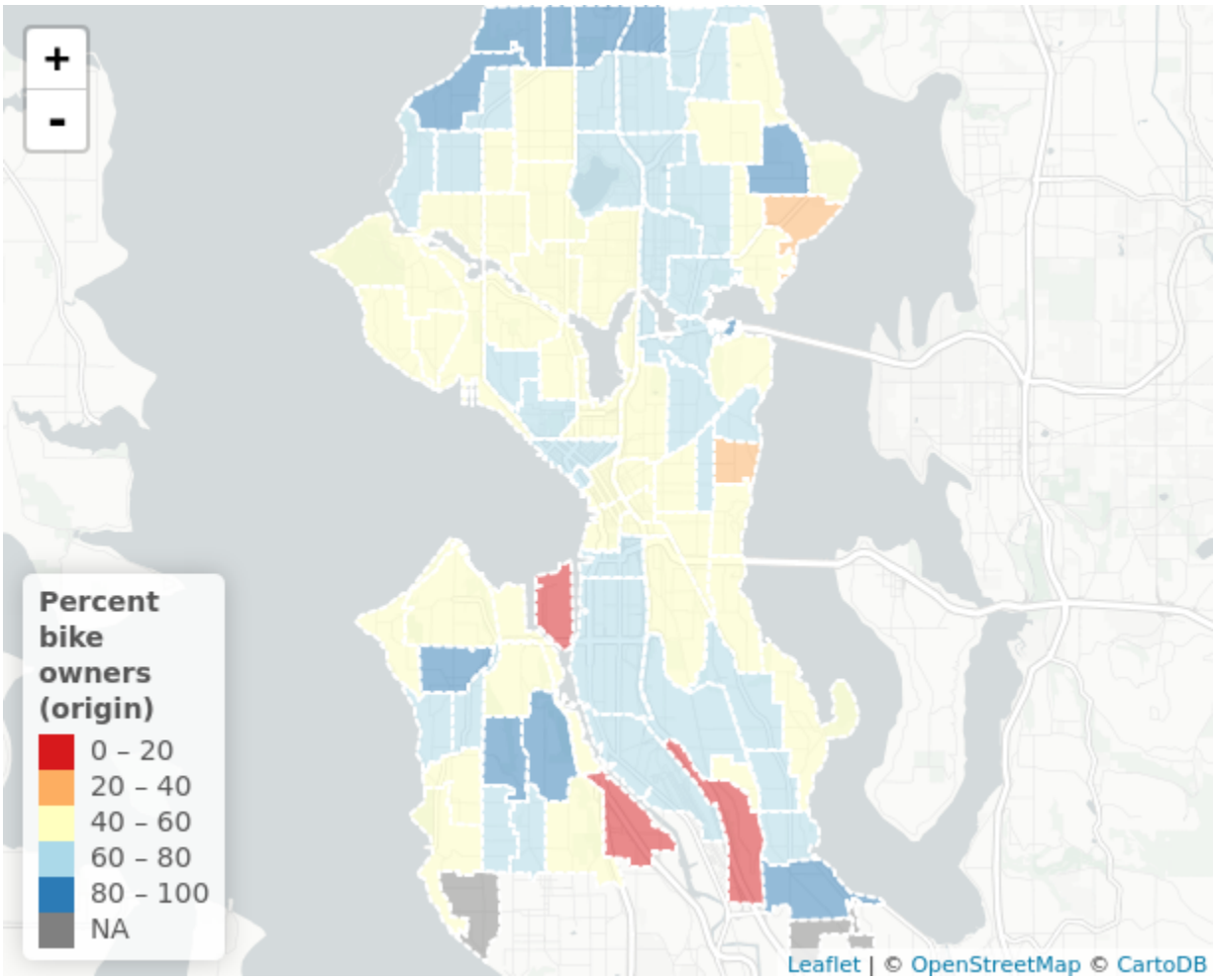


Percent of respondents that own bikes by neighborhood:

neighborhood	origin	destination
Adams	59.3	55.8
Alki	59.4	57.7
	...	...
Westlake	45.3	43.9
Whittier Heights	57.9	83.3
Windermere	33.3	40
Yesler Terrace	51.2	52.2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Percent bike owners (origin)
0 – 20
20 – 40
40 – 60
60 – 80
80 – 100
NA
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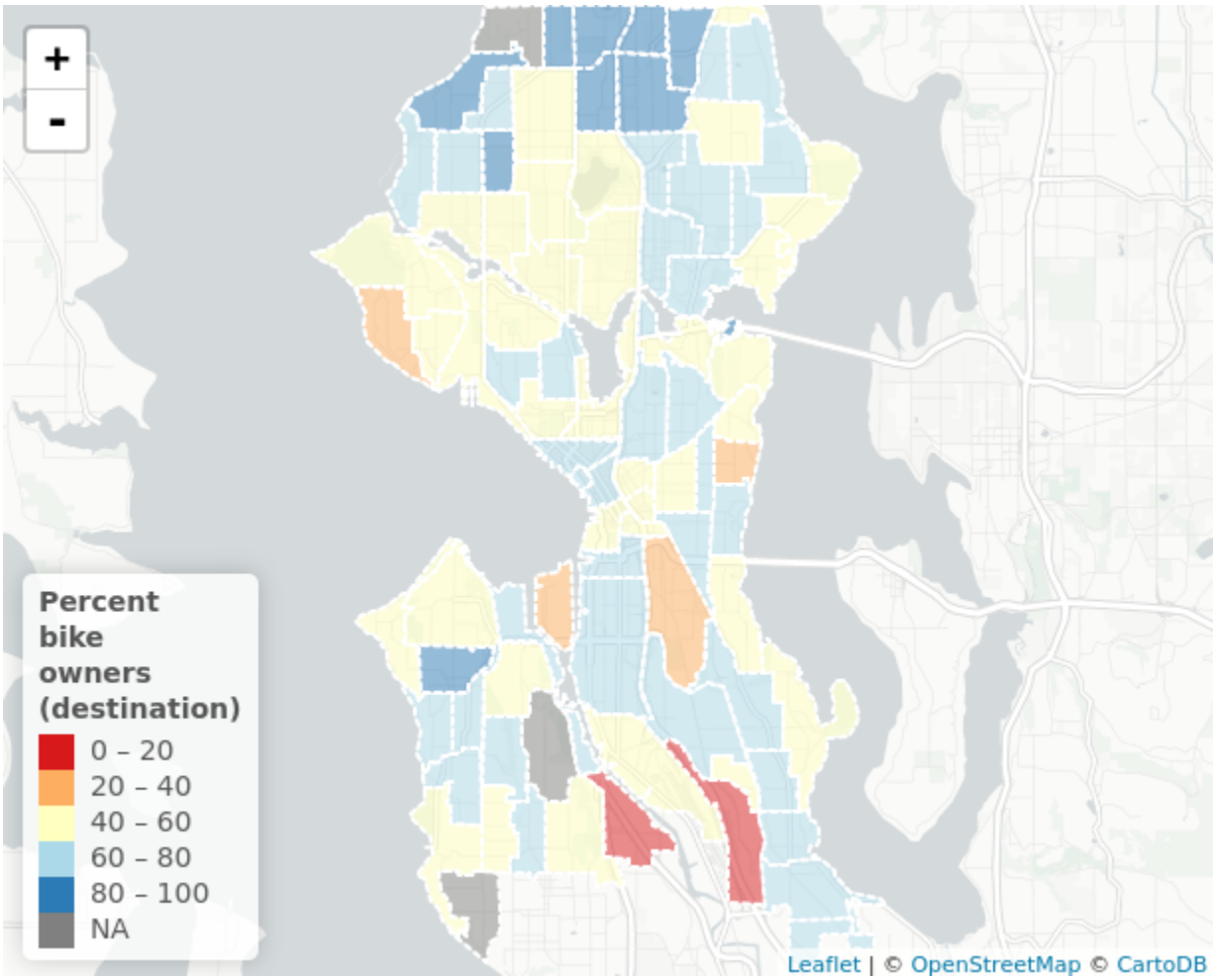
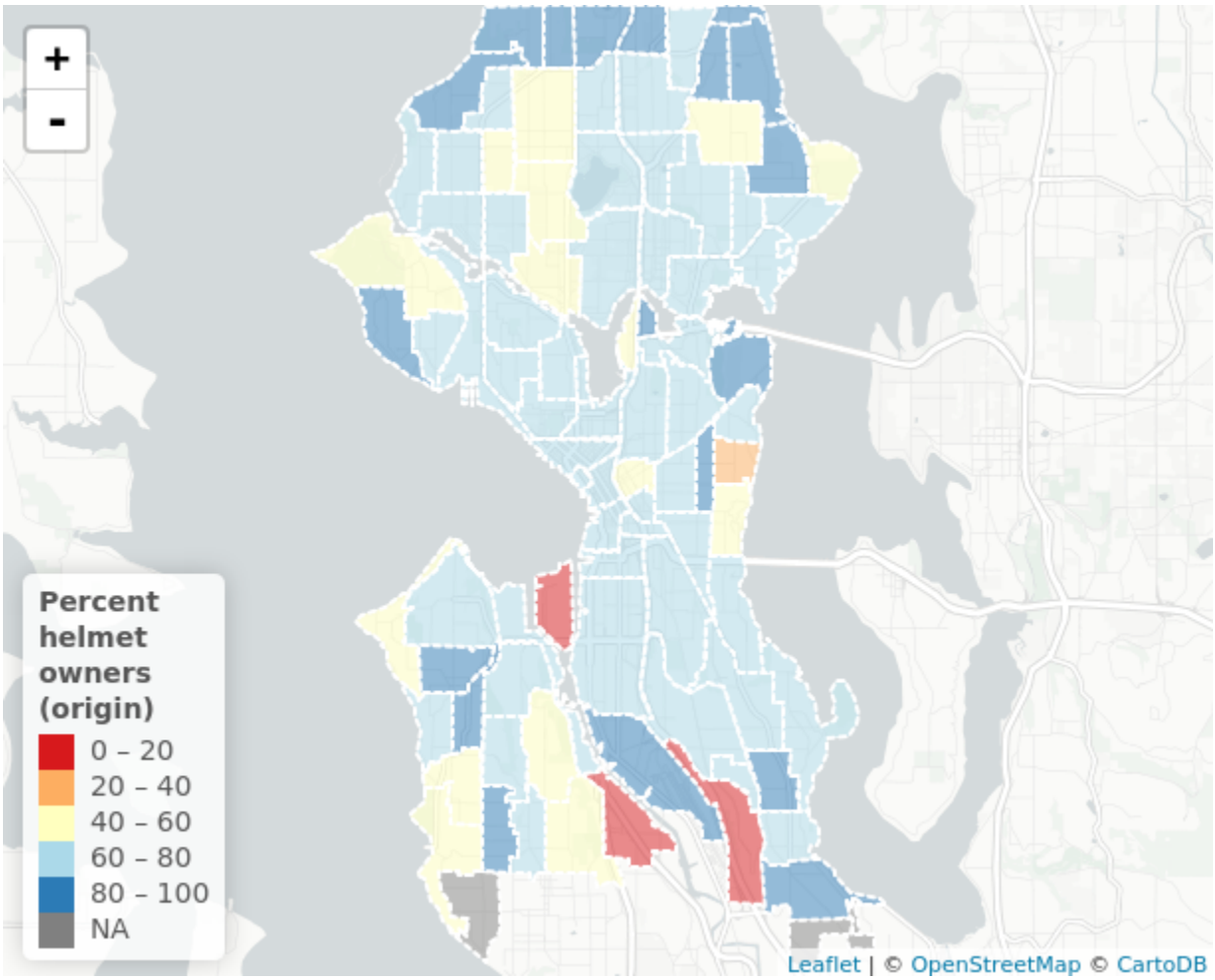
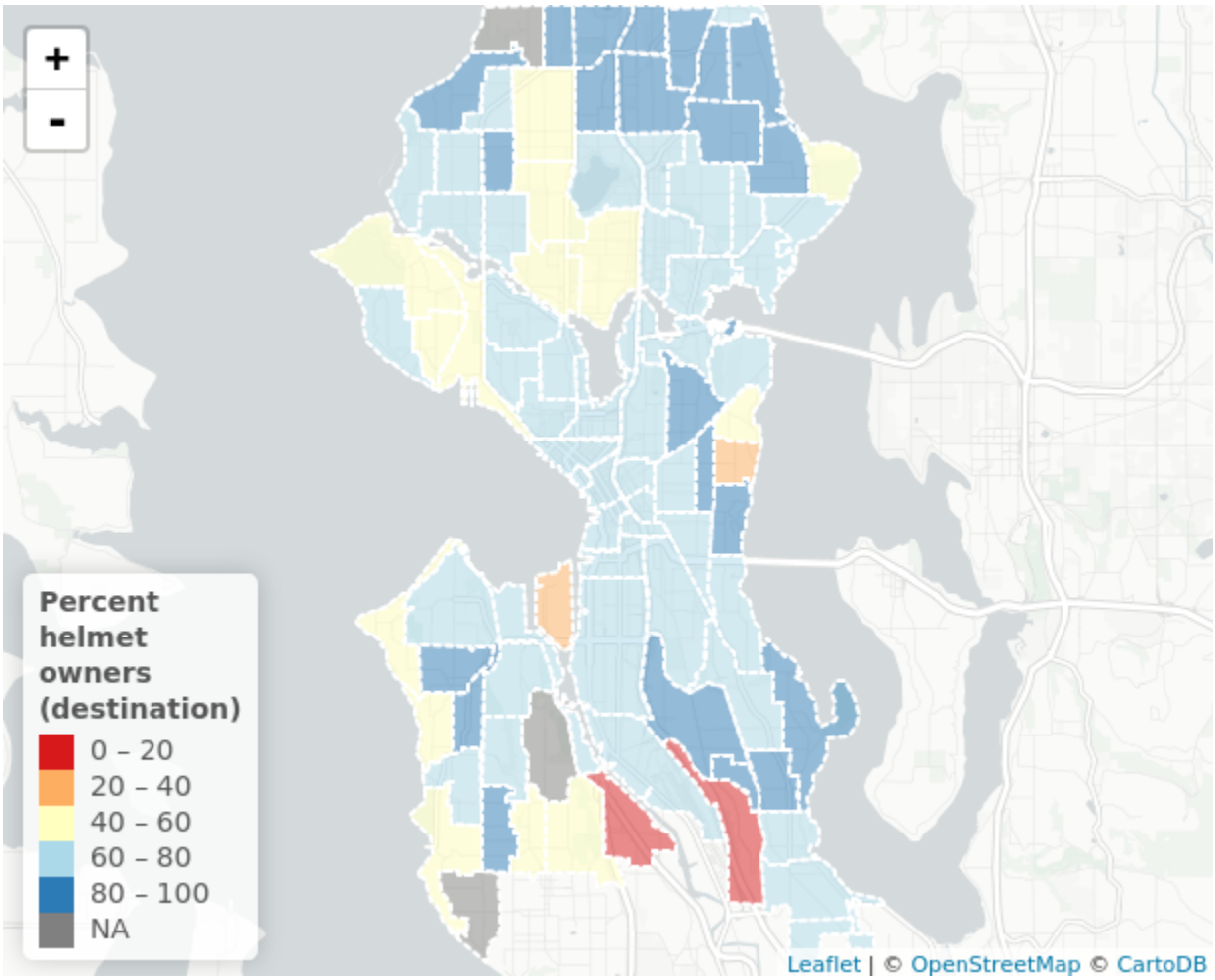


Percent of respondents that own helmets by neighborhood:

Neighborhood	Origin	Destination
Adams	71.9	69.6
Alki	57.5	58.7
	...	...
Westlake	66.8	69.1
Whittier Heights	57.9	87.5
Windermere	66.7	60
Yesler Terrace	72.1	65.2


+
-
Percent helmet owners (origin)
0 – 20
20 – 40
40 – 60
60 – 80
80 – 100
NA
Leaflet | © OpenStreetMap © CartoDB



3.5.4 What are the most common neighborhood origin-destination pairs for riders based on ownership status?

Top ten origin-destination pairs for people who **do not own cars**. Note the internal trips.

	Origin and Destination
1	UW Campus ; UW Campus
2	Stadiums ; Stadiums
3	University District ; University District
4	South Lake Union ; South Lake Union
5	Belltown ; Belltown
6	Fremont ; Fremont
7	Industrial District ; Industrial District
8	Broadway ; Broadway
9	UW Campus ; University District
10	Pioneer Square ; Pioneer Square

Top ten origin destination pairs for people who **own cars**. Note the internal trips.

	Origin and Destination
1	UW Campus ; UW Campus
2	University District ; University District
3	Stadiums ; Stadiums
4	Industrial District ; Industrial District
5	University District ; UW Campus
6	Belltown ; Belltown
7	South Lake Union ; South Lake Union
8	Pioneer Square ; Pioneer Square
9	Central Business District ; Central Business District
10	Lower Queen Anne ; Lower Queen Anne

Top ten origin-destination pairs for people who **do not own bikes**. Note the internal trips.

	Origin and Destination
1	UW Campus ; UW Campus
2	University District ; University District
3	Stadiums ; Stadiums
4	Fremont ; Fremont
5	Belltown ; Belltown
6	South Lake Union ; South Lake Union
7	Pioneer Square ; Pioneer Square
8	University District ; UW Campus
9	Industrial District ; Industrial District
10	Adams ; Adams

Top ten origin destination pairs for people who **own bikes**. Note the internal trips.

	Origin and Destination
1	UW Campus ; UW Campus
2	University District ; University District
3	Stadiums ; Stadiums
4	Industrial District ; Industrial District
5	Belltown ; Belltown
6	University District ; UW Campus
7	South Lake Union ; South Lake Union
8	UW Campus ; University District
9	Lower Queen Anne ; Lower Queen Anne
10	Broadway ; Broadway

Top ten origin-destination pairs for people who **do not own helmets**. Note the internal trips.

	Origin and Destination
1	UW Campus ; UW Campus
2	University District ; University District
3	Stadiums ; Stadiums
4	Fremont ; Fremont
5	Industrial District ; Industrial District
6	Pioneer Square ; Pioneer Square
7	University District ; UW Campus
8	Belltown ; Belltown
9	UW Campus ; University District
10	South Lake Union ; South Lake Union

Top ten origin destination pairs for people who **own helmets**. Note the internal trips.

	Origin and Destination
1	UW Campus ; UW Campus
2	University District ; University District
3	Stadiums ; Stadiums
4	Belltown ; Belltown
5	Industrial District ; Industrial District
6	South Lake Union ; South Lake Union
7	University District ; UW Campus
8	Lower Queen Anne ; Lower Queen Anne
9	Central Business District ; Central Business District
10	Broadway ; Broadway

3.5.5 How does reported ownership status vary based on age, gender, and student status?

Percent car, bike, and helmet ownership by gender, student status, and age:

Own	Gender	Car	Bike	Helmet
No	Female	33.7	37.0	36.6
No	Male	66.3	63.0	63.4
Yes	Female	32.7	30.2	31.5
Yes	Male	67.3	69.8	68.5

Own	Student	Car	Bike	Helmet
No	No	52.3	63.9	65.8
No	Yes	47.7	36.1	34.2
Yes	No	80.7	78.3	75.7
Yes	Yes	19.3	21.7	24.3

It seems unlikely that someone under the age of 13 owns a vehicle as reported in the data. The record was left unchanged, but caution in interpreting results is advised.

Own	Age	Car	Bike	Helmet
No	Under 13	0.5	0.1	0.2
No	13-17	12.3	4.9	3.6
No	18-24	37.2	32.6	33.5
No	25-34	33.7	40.9	41.9
No	35-44	10.2	13.1	13.4
No	45-54	3.5	4.5	4.5
No	55-64	1.6	2.6	2.1
No	65 and over	0.9	1.2	0.7
Yes	Under 13	0.1	0.3	0.3
Yes	13-17	1.7	4.6	5.3
Yes	18-24	13.9	12.6	14.7
Yes	25-34	39.1	35.3	35.8
Yes	35-44	22.8	23.2	21.8
Yes	45-54	13.7	14.9	13.4
Yes	55-64	6.9	7.3	6.9
Yes	65 and over	1.8	1.8	1.9

3.5.6 How does users' ownership status affect rates of reported helmet use?

Own	Use helmet?	Car	Bike	Helmet
No	no	67.8	74.4	88.5
No	yes	32.2	25.6	11.5
Yes	no	79.1	76.8	70.2
Yes	yes	20.9	23.2	29.8

3.6 Student status

3.6.1 How does ridership compare among respondents based on reported student status? Are student users riding more often or more regularly?

Mean number of trips for respondent that are students is 8.6 compared to 7.4 for those who are not students.

3.6.2 How do trip distance, duration, and elevation-change vary based on a user's reported student status?

Mean minutes per ride and mean elevation gain or loss by student status:

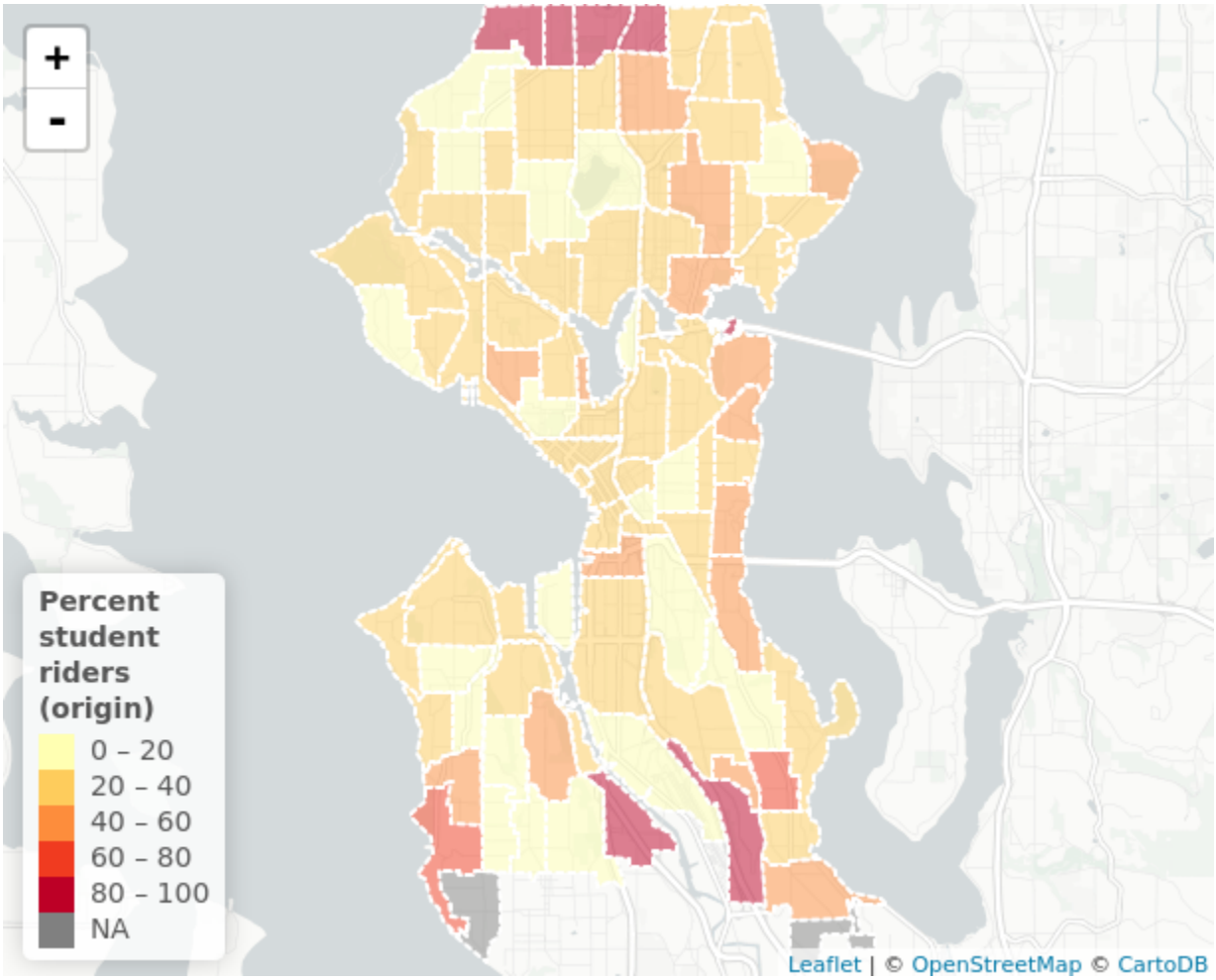
Student	Minutes	Elevation
No	14.3	-6.7
Yes	14.9	-2.3

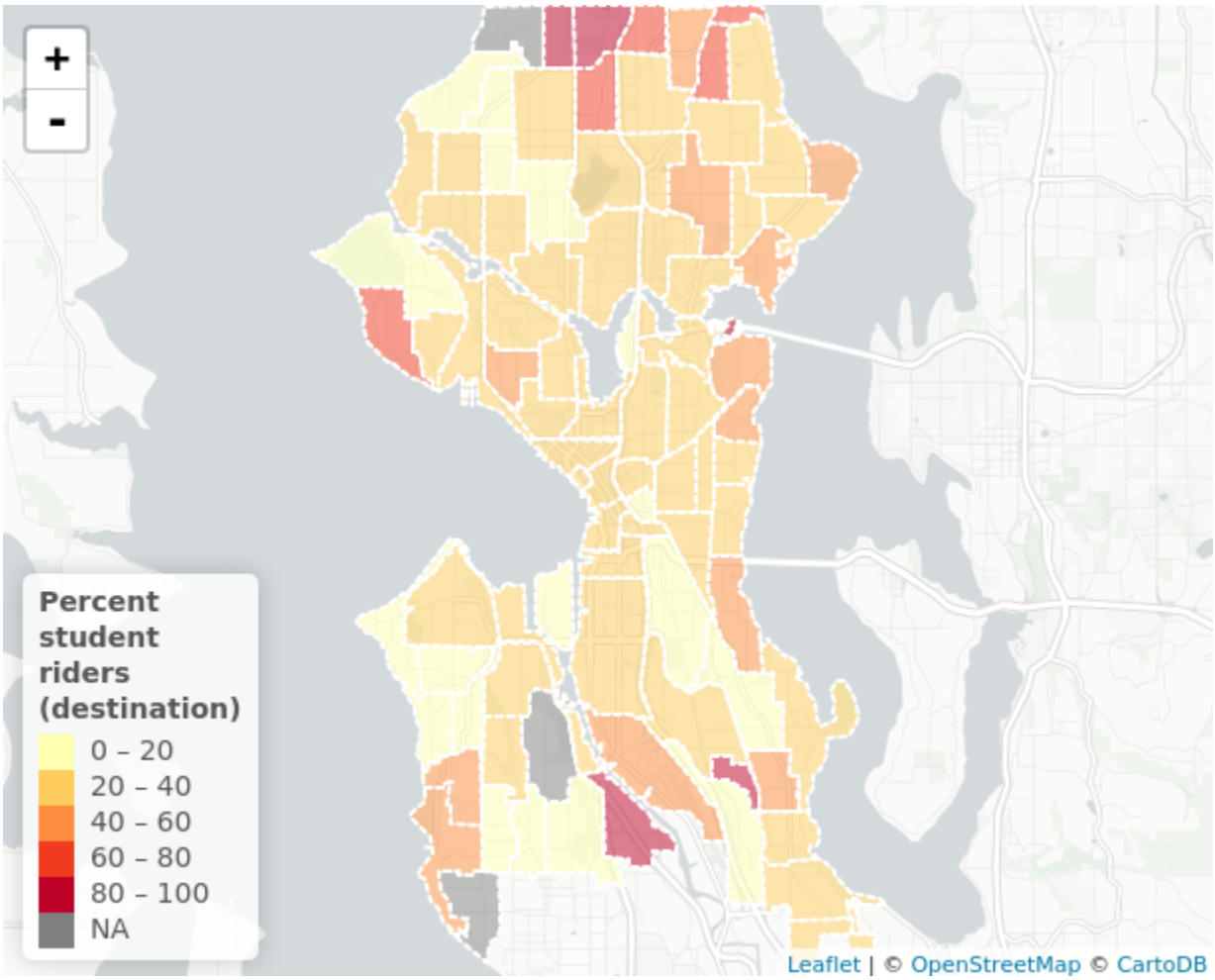
3.6.3 How do student and non-student ridership levels change depending on time of day, day of week, and weather conditions?

Student	All	Weekday	AM	PM
No	70.4	71.2	76.5	69.4
Yes	29.6	28.8	23.5	30.6

3.6.4 How does the frequency of student users compare across origin and destination neighborhoods? Are users in some neighborhoods more likely to be students than users in other neighborhoods?

Percent of trip origins and destinations whose riders reported being a student:





	Neighborhood	Origin	Destination
	Adams	24.5	22.1
	Alki	22.6	19.2
...		...	...
	Westlake	44.1	34.6
	Whittier Heights	21.1	8.3
	Windermere	33.3	35
	Yesler Terrace	9.3	19.6

3.6.5 What is the age, gender, and helmet use distribution of student and non-student riders?

Student	Gender	Percent
No	Female	32.6
No	Male	67.4
Yes	Female	33.9
Yes	Male	66.1

Student	Use helmet?	Percent
No	no	78.9
No	yes	21.1
Yes	no	67.6
Yes	yes	32.4

Age	No	Yes
Under 13	0.0	0.8
13-17	0.1	17.1
18-24	8.6	52.2
25-34	42.7	24.0
35-44	24.9	3.8
45-54	14.4	1.0
55-64	7.3	0.5
65 and over	2.0	0.5

3.7 Zip Code

3.7.1 How does ridership compare among respondents based on reported home neighborhood?

Neighborhood	Avg. rides
Adams	6 to 10
Atlantic	6 to 10
Belltown	6 to 10
Brighton	6 to 10
University District	6 to 10
UW Campus	6 to 10
Victory Heights	11 to 15
Wedgwood	6 to 10

3.7.2 How do trip distance, duration, speed, and elevation change vary based on a user's reported home neighborhood?

Neighborhood	Minutes	Elevation
Adams	13.6	-2.8
Atlantic	17.1	-3.9
Belltown	17.4	-4.4
Brighton	13.3	-5.1
	...	...
University District	13.5	0.1
UW Campus	24.5	-10.4
Victory Heights	16	-4.3
Wedgwood	12.3	-4.3

3.7.3 How does reported home neighborhood location ridership vary based on time of day, day of week, and weather conditions?

Share of trips made by respondents residing in a neighborhood by day of week and time of day:

Neighborhood	All	Weekday	AM	PM
Adams	5.8	5.8	5.3	5.5
Atlantic	2.9	2.5	1.7	3.3
Belltown	6.7	6.2	7.5	6.5
Brighton	3.4	3	2.5	3.2
	...	...	...	...
University District	16.6	15.9	14.1	14.1
UW Campus	0.6	1	0.7	1
Victory Heights	4	4.1	8	5
Wedgwood	6.3	6.1	7.5	7.2

3.7.4 What is the age, gender, student status, and helmet use distribution vary among reported zip codes?

Predominant age group, percentage male riders, percentage riders with student status, and percentage riders who state using helmets by reported home neighborhood:

Neighborhood	Age	Male%	Student%	Helmet%
Adams	25-34	78.3	19.6	25.8
Atlantic	35-44	66.2	14.7	18.3
Belltown	25-34	82.6	12	26.6
Brighton	18-24	66.8	48.4	36.9
		...	...	...
University District	18-24	56	75.6	17.6
UW Campus	18-24	52.1	96.3	17.9
Victory Heights	45-54	46.8	9	33.4
Wedgwood	25-34	52.3	28	24

3.7.5 How does the frequency of nonresident (from zip code outside of Seattle) riders compare across origin and destination neighborhoods? Are certain neighborhoods more likely to see non-resident ridership?

Neighborhoods with concentration of visitors for origins and destinations include:

	Neighborhood
1	Belltown
2	Broadway
3	Central Business District
4	Fremont
5	Industrial District
6	Lower Queen Anne
7	Pioneer Square
8	South Lake Union
9	Stadiums
10	University District
11	UW Campus
12	Wallingford

3.8 Company use

3.8.1 What is the distribution of user responses based on the number of companies they report using? On average, how many companies does a user rent from?

Mean number of vendors reported being used by respondents is 1.8

Vendors	Percent
0	4.6
1	35.5
2	33.8
3	26.2

3.9 Frequent Trip Types

3.9.1 In percent and rank, how did respondents travel before bike share implementation?

Seven choices were offered in the survey for *before* mode. There are 123 unique combinations for before mode in the responses, most of which have less that 1% of the total. It is impossible to tell which of the responses would have been a respondent's top choice(s) and limit the combinations. In this report, only combinations of responses with 5% or more of the total responses are included.

Before mode	Percent
Transit, Walking	9.9
Personal car, Taxi/Ridehail, Transit, Walking	7.5
Personal bike, Personal car, Transit, Walking	6.2
Taxi/Ridehail, Transit, Walking	5.1

3.9.2 In percent and rank, how did respondents travel after bike share implementation?

With seven options offered for *after mode*, there were 164 unique combinations and no way to discern which mode(s) would be the primary choices.

The only combination of after modes with more than 5% of responses is:

```
Transit, Walking (7.3%)
```

3.9.3 Which three trip types saw the largest growth and smallest growth after implementation vs before? What was the percent change?

There were 80 combinations of trip modes that were present in both report of before and after modes. For those combinations, the percent change is presented in this report:

Mode	Change (%)
Bike share, Personal bike, Personal car, Transit	250
Bike share, Personal bike, Transit, Walking	240
Bike share, Car-sharing, Transit, Walking	200
Bike share, Personal car, Taxi/Ridehail, Walking	200
<NA>	...
Car-sharing, Personal bike, Taxi/Ridehail, Walking	-83
Car-sharing, Taxi/Ridehail, Transit	-83
Personal bike, Taxi/Ridehail, Walking	-86
Personal bike, Personal car, Taxi/Ridehail, Transit, Walking	-92

3.9.4 Trip types

There are 342 distinct trip types based on combinations of five options and an open comment box. The most common purposes are reported here. The remaining trip purposes are available as a text file.

Trip type	Percent
Going to and from social or leisure activities	13.3
Taking care of errands and appointments;Going to and from social or leisure activities	10.8
Going to and/or from work	10.6
Going to and from social or leisure activities;Riding for exercise and recreation	8.1
Taking care of errands and appointments	7.1
Riding for exercise and recreation	6.8

3.10 Access to Transit

3.10.1 How often did respondents report using bike share to access transit?

Response	Percent
Always	4.9
Often	28.3
Rarely	41.5
Never	25.4

3.10.2 Provide breakdown to above question by respondent zip code, origin / destination neighborhood, age, gender, student status, car/bike/helmet ownership, and helmet use.

Origin	Always	Often	Rarely	Never
Adams	3.9	25.7	45.2	25.2
Alki	3	21	37	39
Belltown	6.7	34.5	34.2	24.6
	...	...	...	...
West Woodland	3.6	21.7	57.4	17.3
Westlake	5.2	26.4	47.2	21.2
Whittier Heights	5.9	11.8	52.9	29.4
Windermere	16.7	33.3	16.7	33.3

Destination	Always	Often	Rarely	Never
Adams	4.1	24.5	44	27.4
Alki	2.9	12.7	40.2	44.1
Belltown	6.7	33.2	33.2	26.9
	...	...	...	...
Wedgwood	28.6	28.6	14.3	28.6
West Queen Anne	8.1	37.4	40.4	14.1
West Woodland	3.4	22.3	57.6	16.7
Westlake	3.7	31	40.6	24.6

Age	Always	Often	Rarely	Never
Under 13	-	-	84.6	15.4
13-17	7.1	38.5	38.8	15.6
18-24	3.0	28.7	45.8	22.5
25-34	5.0	27.5	42.2	25.2
35-44	7.2	24.8	40.6	27.4
45-54	3.4	27.7	38.2	30.7
55-64	0.9	49.0	29.5	20.6
65 and over	12.6	12.6	29.1	45.7

Gender	Always	Often	Rarely	Never
Female	2.2	22.2	47.9	27.7
Male	6.2	30.7	38.4	24.7
Other/Prefer not to answer	1.1	35.9	51.3	11.7

Student	Always	Often	Rarely	Never
No	5.0	27.5	39.2	28.2
Yes	4.5	29.9	47.1	18.5

Own car?	Always	Often	Rarely	Never
No	5.8	32.8	41.2	20.3
Yes	4.5	26.3	41.7	27.5

Own bike?	Always	Often	Rarely	Never
No	4.1	22.0	40.4	33.5
Yes	5.4	32.3	42.3	20.0

Own helmet?	Always	Often	Rarely	Never
No	3.3	18.7	42.4	35.6
Yes	5.6	32.3	41.3	20.8

Use helmet?	Always	Often	Rarely	Never
no	3.5	26.8	43.8	25.9
yes	9.1	32.9	34.4	23.6

3.11 Positive Impacts

3.11.1 Overall answer percentage breakdown

There were seven options offered for this question along with an open-ended response option yielding 205 unique combinations. Only responses with more than 5% of the total are presented here. The remaining responses are available as text file.

```
It's easier or faster for me to get to where I need to go;There's a bike near me when I need to go (15.1%)

There's a bike near me when I need to go somewhere;It's easy to rent a bike on the app (8.4%)

It's more fun to move around Seattle now;It's easier or faster for me to get to where I need to go (7.9%)

It's easier or faster for me to get to where I need to go;It's easy to rent a bike on the app (6.2%)
```

3.12 Negative Impacts

3.12.1 Overall answer percentage breakdown

There were 12 options offered for this question along with an open-ended response option yielding 621 unique combinations. The only response with more than 5% was 'There are too few bikes near me when I need one' (8.3%). The remaining responses are available as text file.

3.13 Adaptive Bikes

3.13.1 Overall answer percentage breakdown

There were seven options offered for this question along with an open-ended response option yielding 142 unique combinations. The only notable response with more than 5% was 'Electric-assist bicycle' (28%). The remaining responses are available as a text file.

3.14 Collision

3.14.1 Overall answer count and percentage breakdown

Response	Respondents	Percent
No	2215	97.5
Yes, but there was no damage or injury	36	1.6
Yes, and there was damage or injury	20	0.9

3.14.2 Based on reported collisions, what is the bike share system's estimated citywide collision rate? (see SDOTs 2016 Traffic Report, p. 21-27)

Assuming that the people who participated in the survey are representative of all the people who have tried bike share, and assuming that the population of bike share users is similar to the population of all bike riders in Seattle, and further assuming that people who reported a collision through the survey only had one collision, then below is one potential way to consider collision rates:

Reported collisions (56) divided by trips made by survey respondents who answered the question (18,101) is 3/10 of one percent.

The rate would be lower if only considering collisions where there was damage or injury. There is no way to discern if and how many of these collisions constituted a 'serious injury'. There is also no way to discern whether a collision occurred during a 'commute' trip, whether the rider is a regular commuter, and as such no direct comparison to the reported figures in the city's traffic report can readily be made.

3.15 Comments

We do not have data queries for the open-ended comments respondents may provide. We ask that these comments be submitted to SDOT for coding in our in-house feedback records.

There are two sets of comments reported here, 1) reasons for or against using a helmet, and 2) general comments.

3.15.1 Helmet use

The complete set of responses to this question (1,898) are available as a text file.

```
A helmet requires thinking ahead (and carrying around the rest of the day/night).
Not convenient at all.  Would stop me from using bikeshare if required.

Already answered I have no helmet

annoying to bring my helmet

Annoying to carry a helmet around
...
You did not provide one

You did not supply me with one

"your". and because there wasn't one available. and because they usually look stupid.

You're fucking kidding me!!!!
```

3.15.2 General comments

The complete set of responses to this question (1,471) are available as a text file.

```
$1/hr to stay competitive

1. I would use these bicycles a LOT more if our city had more dedicated bicycle lanes.
I'm fearful of riding in traffic. 2. If the apps were accurate, like -
there's always going to be a bicycle where they say there's a bicycle-
then I would plan to use the bicycles, and I would bring my helmet.
I've been pretty annoyed when I bring my helmet from home, with the intention of using a bicycle,
and then I can't find one. As it is, I just use the bicycles spontaneously.
When I'm on a walk somewhere, and I see a bicycle, and I think, well, if I use that bicycle,
I could get there faster, so I rent the bicycle, but I never have my helmet with me. To be fair,
there are a lot more bicycles around the city now than when the bike-share started,
so even if the app is wrong, I'm more likely to find a bike when I want one.

1) Make renting bikes easier for non smartphone users
```

2) Free bikeshare accounts for teens to ride to school, like orca card
3) More bikes in south end.
4) Reporting damaged bikes should be easier on app

1. Please spread the bikes. I stay at a top of a hill once I use my bike to come down next day
I find no bikes and have to walk little more to get the bike. Next day more than that.
If I find bikes spread around the top of the hils that would be great. In the bottom of the hill
I find lots of these bikes stacked up. I would like to take a bike from top of the hill
and walk in the valleys.
2. My seats are too wet to sit. One day I took the bike wearing a dry pant and the seats
just wetted my pants. I would like a rain cover on the bike seat atleast! to motivate me take them
on rainy days. Remember It rains a lot in Seattle.
3. Big companies and corporates could be roped in to provide free bike ride service for employees.
That would be great!
4. I want to know how many rides I have for free.
If these are great suggestions you can send me a email at [REMOVED EMAIL ADDRESS] I have several more. ;)

(1) The regular damage to bikes is considerable and should be publically prosecuted.
I regularly ride bikes that have been vandalized. SPD should be more attentive to property damage.
(2) The privatization of the public space is not good.
(3) It'd be nice to use Orca on bikeshare instead of an app.
(4) Bikeshare should be available in *all* neighborhoods, not just downtown.
(5) I use Limebike about 8x per week right now to get around downtown.

...

you're doing a great job :)

Your survey is missing "skateboard", "scooter" or "electric skateboard" as transportation options.
I use those things quite often to get around and I encounter many others.
Small personal electric vehicles such as e-boards have exploded in popularity over the last six months
and their expanded use align well with Seattle's traffic and 2050 carbon goals.

You should be able to lock on app

You should have ways to reserve bikes on the app

Zones in the app of where to park bike could be useful (ex if bike is parked in the road,
dont allow user to lock bike). Or checklist the first time using the app to ensure it is parked properly.
I like the thumbs up and down function on spin where you can rate how the previous user did
in terms of parking.