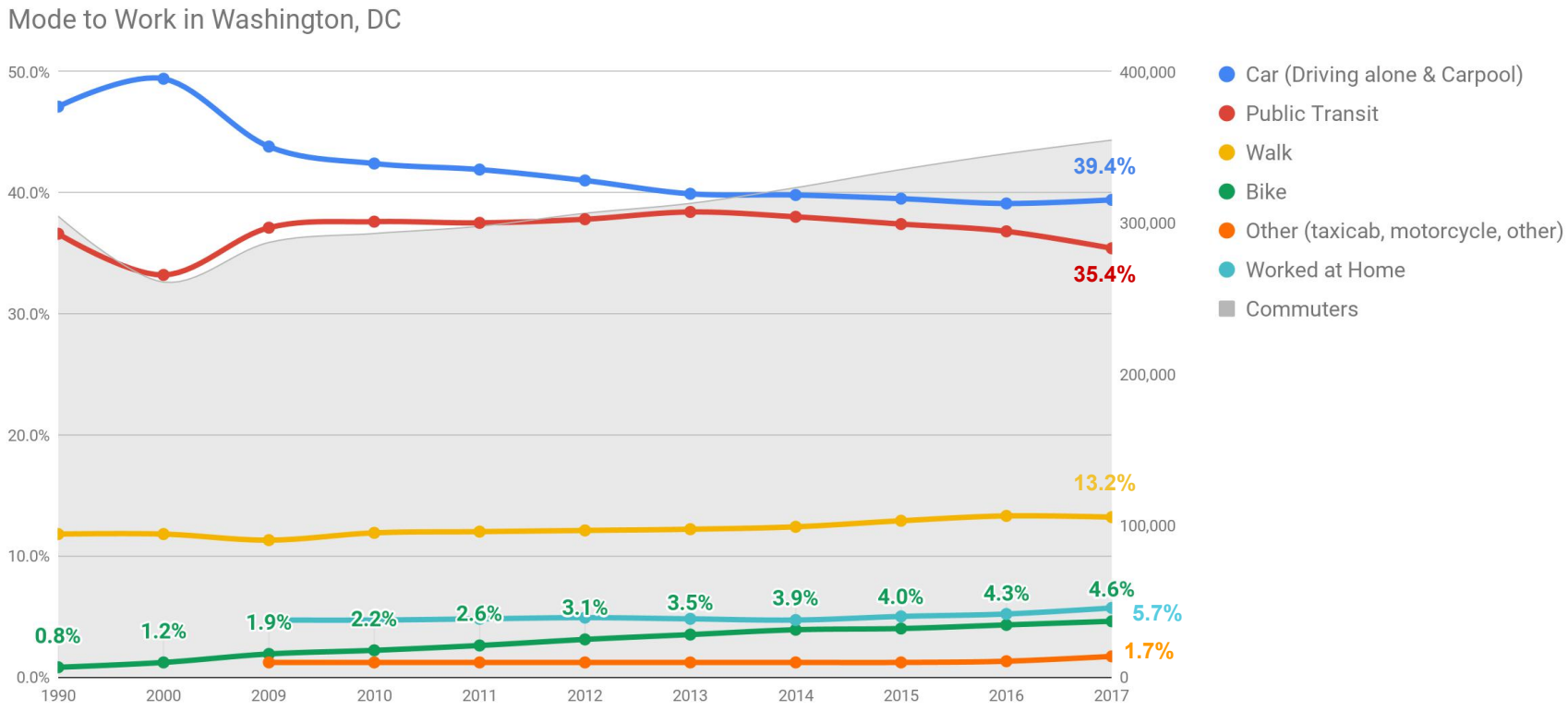
District Department of Transportation

Micromobility data for the city benefit
Case of Washington, DC

Iryna Bondarenko
District of Columbia
Department of Transportation
Active Transportation Fellow
Fulbright Scholar

November 28, 2019
Brussels, Belgium

Commuting in Washington, DC



Source: American Community Survey (US Census)

Capital Bikeshare **100 stations**

300 stations

400 stations

500 stations

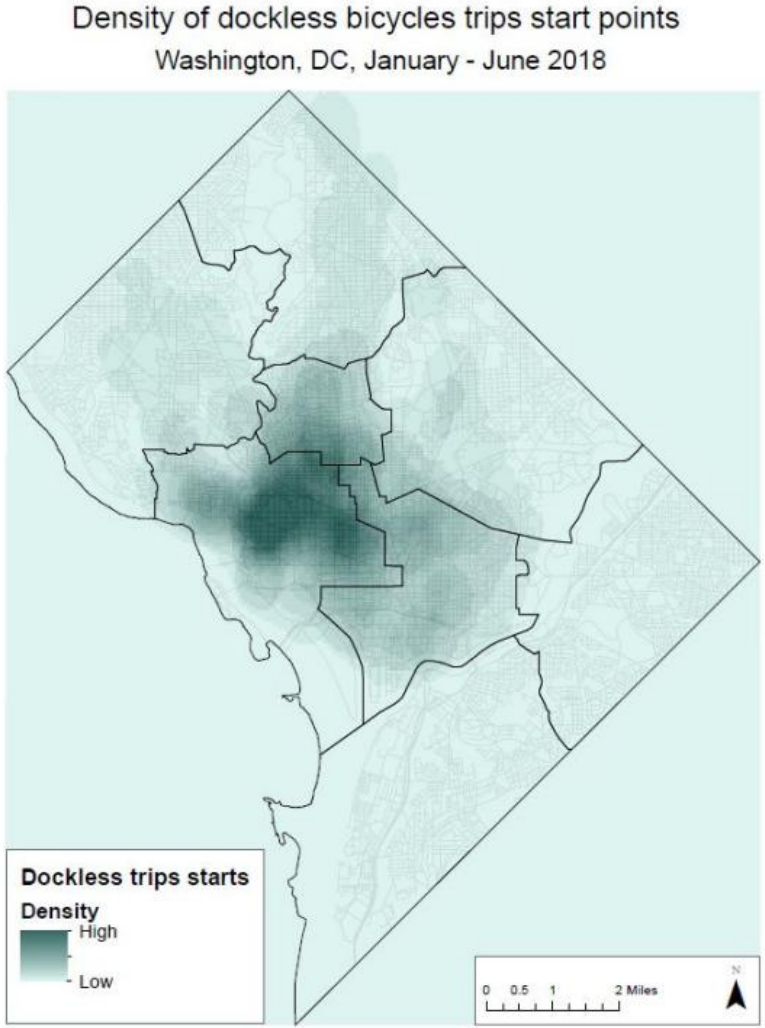
2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019

Dock-less bikes pilot **4b+1e**

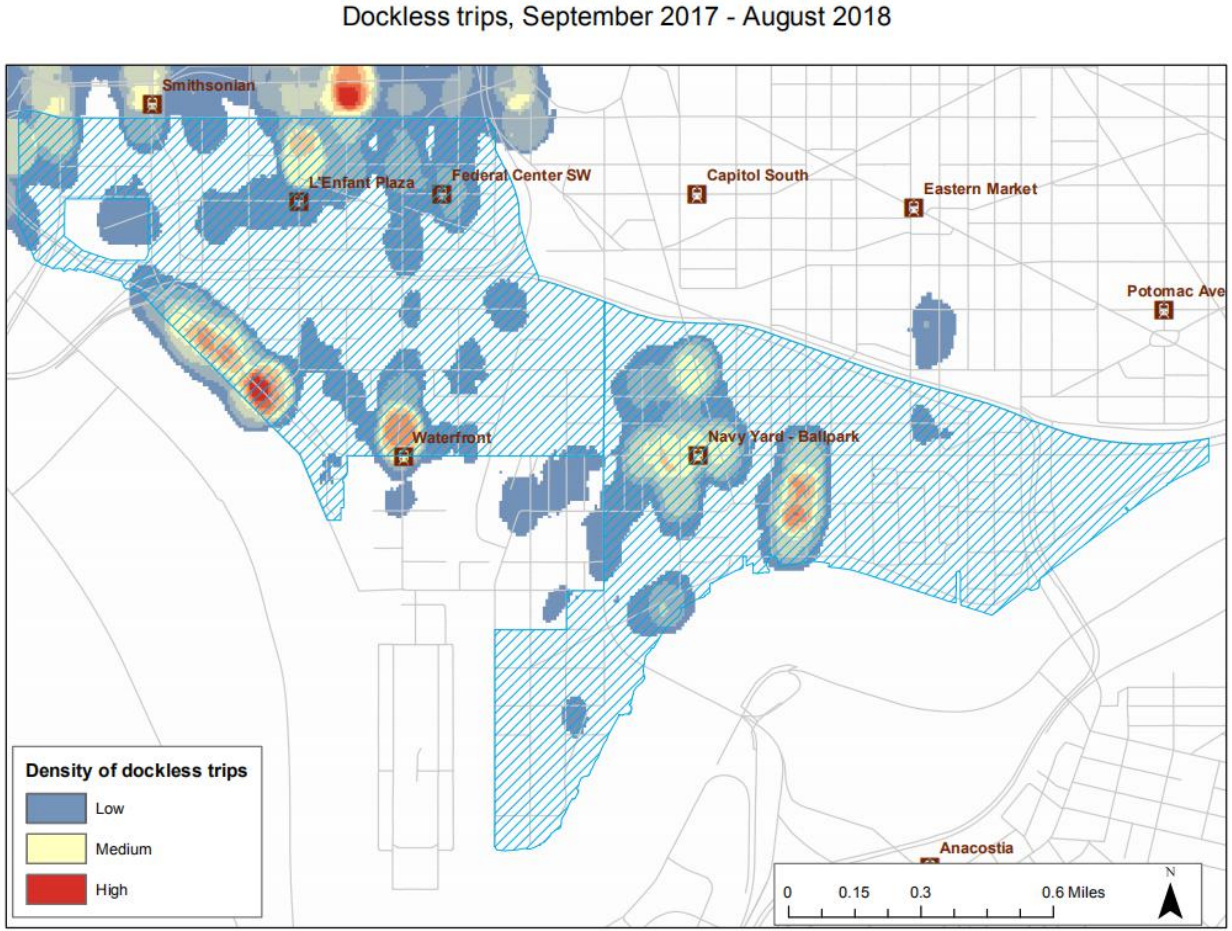
E-scooters pilot **3s**

Phase II **6s+1e**


Density of dockless bicycles trips start points
Washington, DC, January - June 2018
Start of DL trips
0 0.5 1 2 Miles
N


Density of dockless bicycles trips start points
Washington, DC, January - June 2018
Dockless trips starts
Density
High
Low
0 0.5 1 2 Miles
N

Density of the destination points



Micromobility data helps to

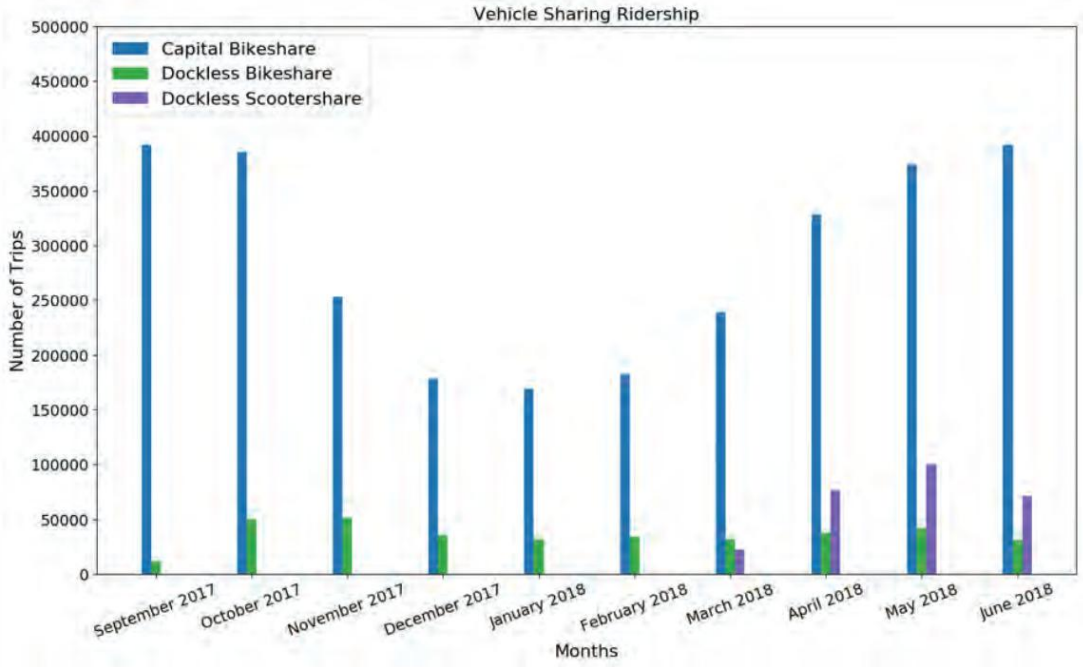
- Analyse and predict transportation demand
  - Bike and scooter parking
  - Bike lanes and trails
  - Promote sustainable transportation
  - Identify “hot spots” that require planners’ attention
- Analyse and control usage of sidewalks and pedestrian areas
  - Remove inappropriately parked scooters
  - Geofence areas to control access and speed
- Analyse and improve social and economical situation
  - Utilization rate and competition with other modes
  - Safety of the vehicles
  - Equity

General performance indicators

Summary Table of Performance for Dockless Demonstration Period

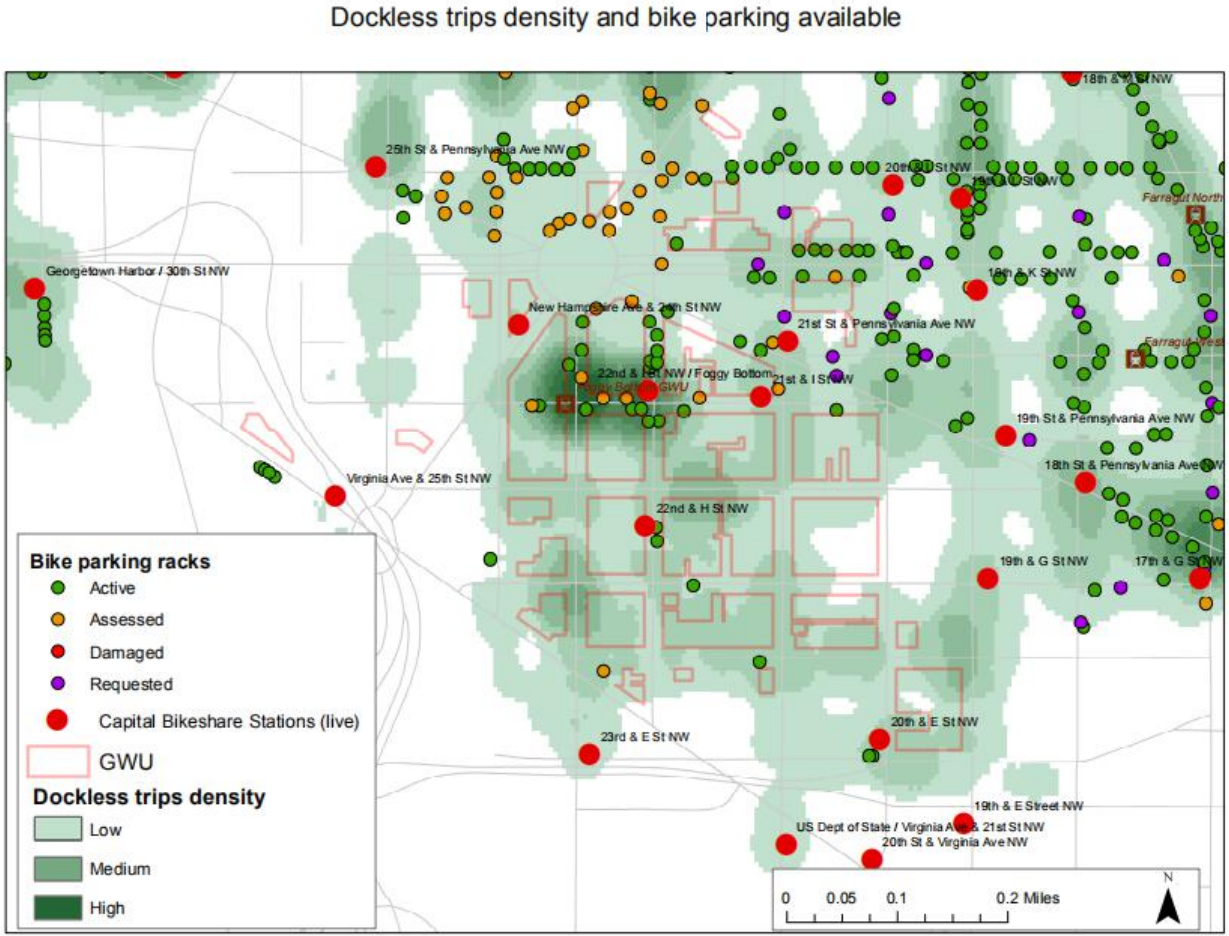
	Trip Count		Average Trips per Vehicle Per Day	
	Dockless	CaBi	Dockless	CaBi
2017 September	11,817	392,041	2.33	4.52
2017 October	49,974	385,389	2.36	4.43
2017 November	51,347	252,825	1.81	3.06
2017 December	35,104	178,084	1.35	2.21
2018 January	31,402	168,791	1.37	2.18
2018 February	33,795	182,555	1.49	2.42
2018 March	54,087	239,130	2.27	2.71
2018 April	113,571	328,550	2.87	3.52
2018 May	142,189	373,805	2.94	3.89
2018 June	102,675*	391,740	3.14*	4.21

* Missing data from one or more operators



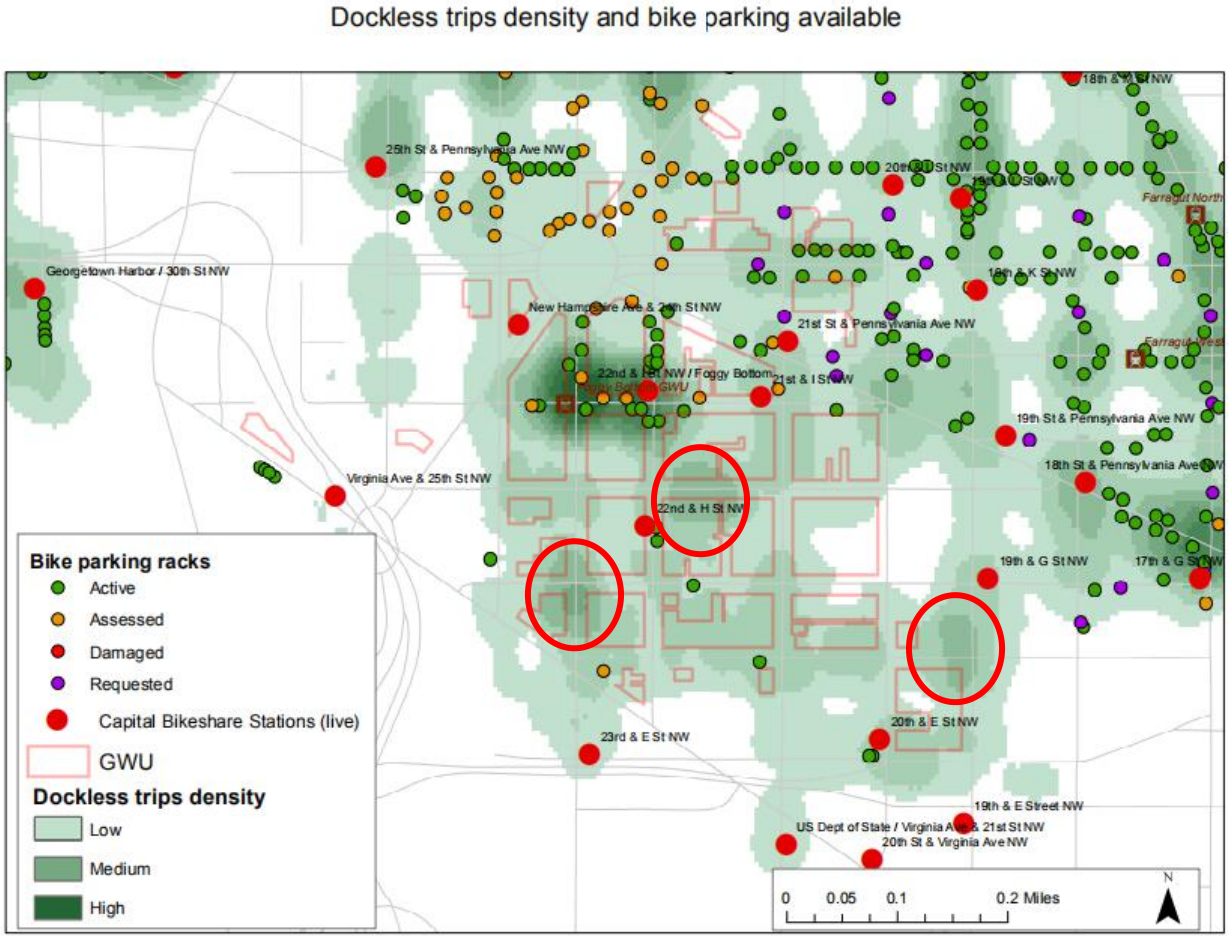
Source: Dockless Vehicle Sharing Demonstration | Phase I Evaluation | December 2018

Bike and scooter parking



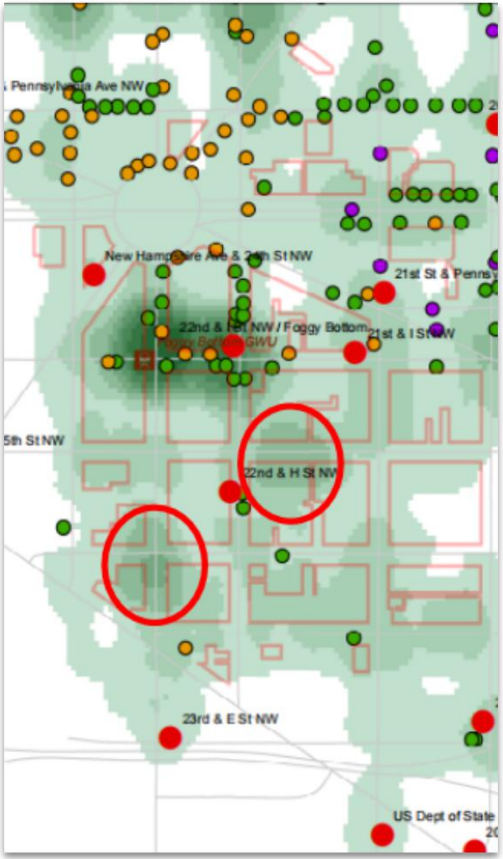
George Washington University, Washington, DC, 2018

Bike and scooter parking



George Washington University, Washington, DC, 2018

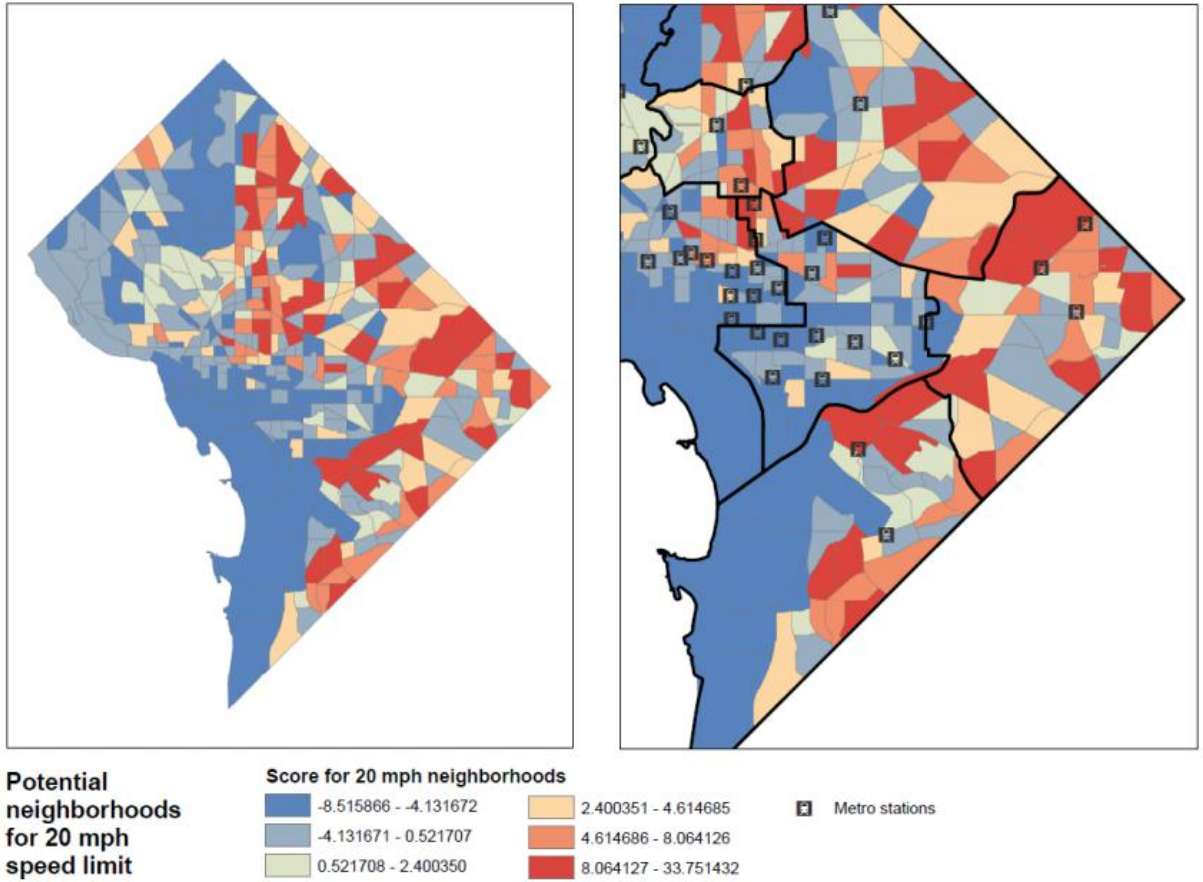
Planning for “hot spots”: parking, special zones



San Francisco street

Prioritizing safety for neighborhoods

Density of bike and scooter shared trips is one of the variables used for identification of neighborhoods with the highest potential for road safety measures.



People complain

- Blocking passage for pedestrians (sidewalks, pedestrian areas)
- Collisions with pedestrians on sidewalks (riding on sidewalks on high speed)
- “Cluttering” the city (scooters in rivers, on lawns, in private yards)

Figure 17 Word cloud from textual analysis of public comments related to parking sent to dockless.bikeshare@dc.gov through April 1, 2018

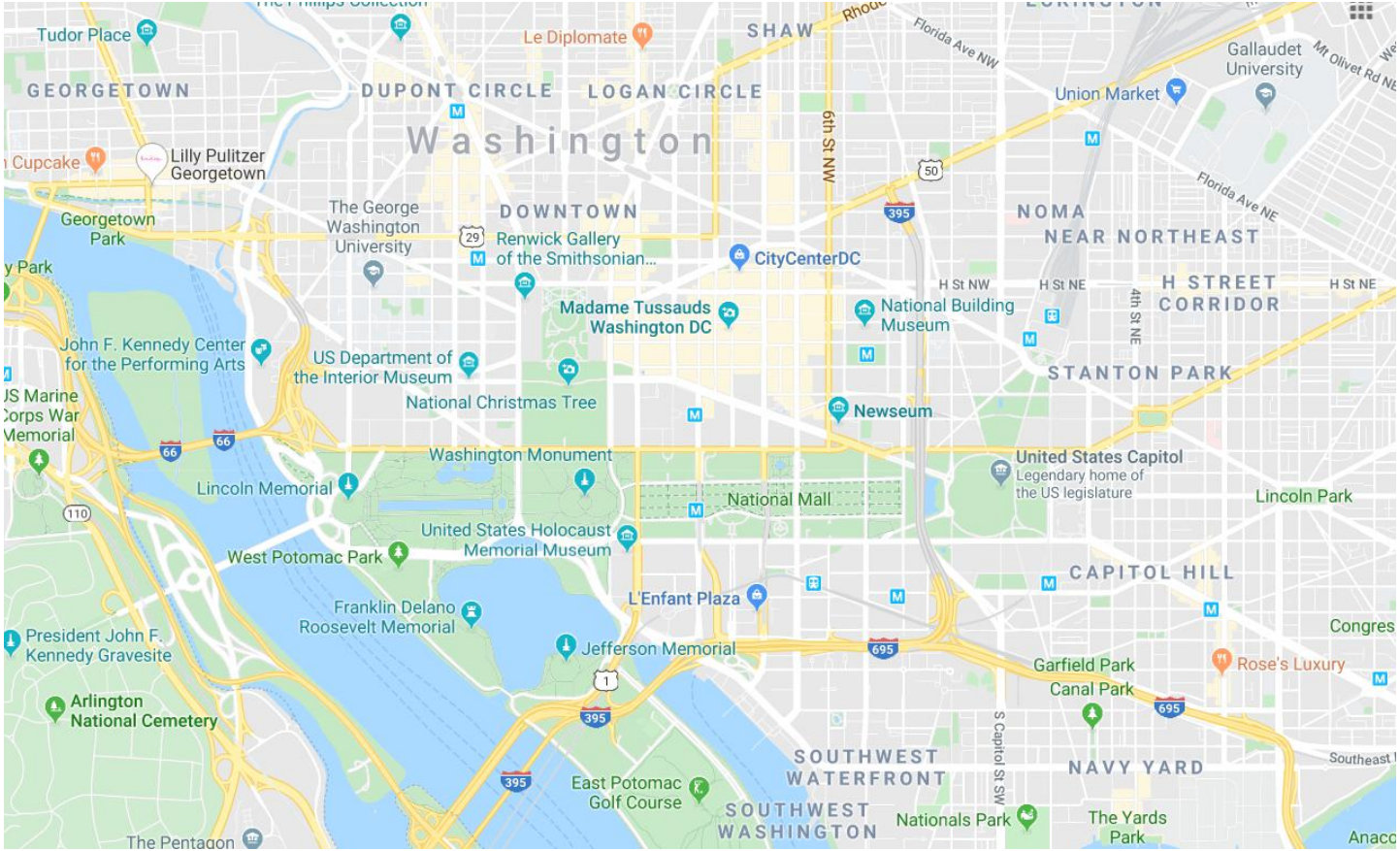
Source: Dockless Vehicle Sharing Demonstration | Phase I Evaluation | December 2018

Geofencing: Restricted access and Speed limits

Pedestrian areas of high tourists interest:

- Parking is not allowed

- Speed limit is 10 mph (16 kmh)



Making sure the vehicles are safe for users

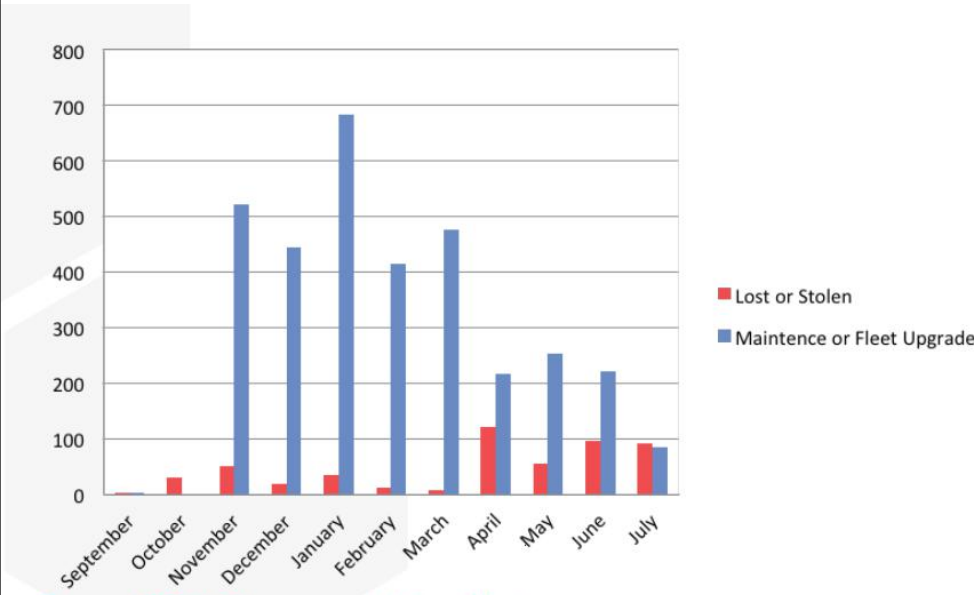


Figure 12 Vehicles removed from fleet

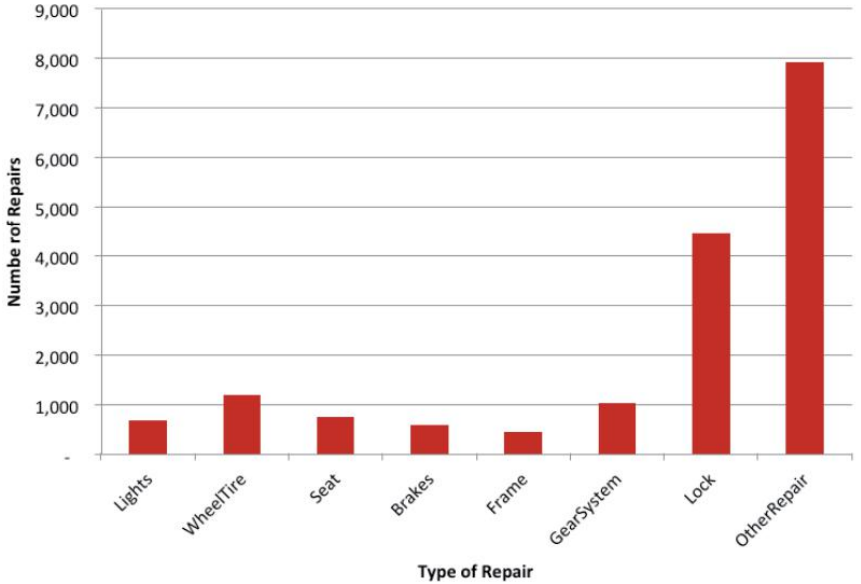


Figure 13 Number of repairs conducted by companies over the demonstration period by type

Source: Dockless Vehicle Sharing Demonstration | Phase I Evaluation | December 2018

Equity

- Availability in all neighborhoods in the morning
- Possible to pay by cash
- Possibilities for low-income members

Example: Capital Bikeshare Community Partners Program:

- $5 annually (normal price $85)
- 60 min ride included (normally, 30 min included)

Source: Analysis of Community Partners Program, DDOT, 2017

Office Hours
Monday to Friday, 8:15 am to 4:45 pm

Connect With Us
55 M Street, SE, Suite 400,
Washington, DC 20003
Phone: (202) 673-6813
Fax: (202) 671-0650
TTY: (202) 673-6813
Email: ddot@dc.gov

Ask the Director
Agency Performance

Jeff Marootian
Director

Shared Dockless Vehicle Program - 2020 Permit Application

DDOT released the 2020 permit application for the 2020 Shared Dockless Vehicle Program. Here are the links to the 2020 Permit Information:

1. Application
2. FAQs
3. Scooter Terms and Conditions
4. Bike Terms and Conditions
5. Addendum to the Terms and Conditions

Please submit the application by 9 am on Thursday, November 21, 2019, through email submission to dockless.mobility@dc.gov. Please direct any questions regarding this application to dockless.mobility@dc.gov.

Shared Dockless Vehicle Program - 2020 Terms and Conditions for Public Comment

DDOT released the 2020 proposed Terms and Conditions for the Shared Dockless Vehicle Program for comment on September 25, 2019. The comment period closed on October 30, 2019. Comments on the proposed Shared Dockless Vehicle Program 2020 Terms and Conditions along with DDOT's response is available here.

Dockless Vehicle Permits and Operators

Eight private dockless companies currently operate in the District:

- One company operates bicycles-- Jump
- Eight companies operate electric scooters-- Bird, Bolt, Jump, Lime, Lyft, Razor, Skip, and Spin.

goDCgo
powered by d.

Your #1 resource for transportation information and options to make getting to, and around the District easier than ever.

DC Streetcar

DC Streetcar will facilitate travel for District residents, workers and visitors by complementing existing transit options, and by creating neighborhood connections where they currently do not exist.

Summary Table

Data Category	Field Names	Field Description	Field Explanation
Identification	Operator	Operator submitting report	The information in the summary table provides aggregated monthly totals of the number of trips, vehicles, crashes, and incidences of parking and maintenance.
Date	Month	Date of report submission	
Trips	TotalTrips	Total number of trips	
Bicycles	TotalBikes	Total number of bicycles	
Reports	TotalCrashes	Total number of safety reports on any crashes	
	TotalInjuries	Total number of injury/fatality reports	
	Parking	Total number of illegal parking complaints	
	NonOperationalLS	Total number of bicycles removed from service because of theft or property loss	
Maintenance	Lights	Total instances of repair	
	WheelTire	Total instances of repair	
	Seat	Total instances of repair	
	Brakes	Total instances of repair	
	Frame	Total instances of repair	
	GearSystem	Total instances of repair	
	Lock	Total instances of repair	
	OtherRepair	Total instances of repair	
	NonOperationalM	Total number of bicycles removed from service because of maintenance	

Source: DDOT web-site, https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/Data%20Attributes.pdf

Trip Table

Data Category	Field Names	Field Description	Field Explanation
Identification	Operator	Operator submitting report	The identification information allows DDOT to associate data from across the report tables. For example, DDOT can link a string of trips taken on the same bike to see how bikes travel across the city.
	TripID	Trip Identifier	
	BikeID	Bicycle Identifier	
	UserID	Traveler identifier	
Date	StartTime	Trip Start Date and Time	The date information allows DDOT to place the trip in time. For example, DDOT can see how long bikes are left idle or what time of day most trips are taken.
	EndTime	Trip End Date and Time	
Location	StartLatitude	The latitude coordinates of the trip's start point in decimal degrees (6 minimum)	The location information allows DDOT to place each trip geographically in the District. With this information, DDOT can see where trips are ending to improve bike parking or if bikes are being used to get to and from metro stations.
	StartLongitude	The longitude coordinates of the trip's start point in decimal degrees (6 minimum)	
	EndLatitude	The latitude coordinates of the trip's end point in decimal degrees (6 minimum)	
	EndLongitude	The decimal degree longitude coordinates of the trip's end point in decimal degree (6 minimum)	
	TripDistance	The distance traveled during trip (miles)	The distance information provides the actual (estimated) distance traveled based on the route the bike took. This allows DDOT to understand how far vehicles are being ridden. For example, if many trips are long, maybe they are replacing car trips but if they are short, vehicles may have been used instead of walking.

Event Table

Data Category	Field Names	Field Description	Field Explanation
Identification	BikeID	Bicycle Identifier	The identification information allows DDOT to associate data from across the report tables. In this table, it also allows us to link the breadcrumbs (waypoints) across a single trip or bike.
	TripID	Trip Identifier	
Date	CaptureTime	The capture date and time of event	The date information allows DDOT to place the trip in time. This data shows when the waypoint was collected so the data can be ordered chronologically.
Location	Latitude	The decimal degree latitude coordinates of event (6 minimum)	The location information gives DDOT the coordinates of each waypoint. By combining the waypoints on a single trip, DDOT can begin to identify routes that are often traveled. This may show streets that people feel safest riding or identify streets that could have bicycle infrastructure improvements.
	Longitude	The decimal degree longitude coordinates of event (6 minimum)	

Source: DDOT web-site, https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/Data%20Attributes.pdf

Challenges of micromobility data collection

- Clear rules for data format, followed by all participants
  - Different time zone
  - Changing vehicles' IDs
  - Not perfect GPS data (cannot identify and prevent sidewalk riding)
- Privacy concerns
  - Can city protect private data properly?
  - Do we need a "middleman" - a company that gets data from operators, protects private information, and provides only the aggregated data to the city?

Lessons learned

- Having data access to micromobility trips APIs, the city can use it for transportation planning, prevention of risk for pedestrians and users, and equity.

- Without access to the data, city is restricted and may need to spend more money to fulfill its functions.

- GPS data of micromobility operators is not perfect.

- Operators may not want to share the data with cities, particularly because of data privacy concerns.

- Third-party analytical companies may benefit from privacy concerns.

- The future of new micromobility vehicles is yet unclear and questionable (road safety concerns, cluttering public space). We need to talk about it.

Thank you!

Iryna Bondarenko

isbondarenko@gmail.com
ib@ecoact.org.ua
+38 (068) 386 1954

District of Columbia (USA)
Department of Transportation
Active Transportation Fellow

Kyiv (Ukraine)
Ecoaction
Head of Climate and Transportation Department

Fulbright Scholar