Parking Search Caused Congestion: Where's all the fuss?

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TRANSPORTATION RESEARCH INSTITUTE

UNIVERSITY OF CALIFORNIA SANTA CRUZ

The New York Times

Gone Parkin'

By DONALD SHOUP MARCH 29, 2007

Los Angeles

MOST people view traffic with a mixture of rage and resignation: rage because congestion wastes valuable time, resignation because, well, what can anyone do about it? People have places to go, after all; congestion seems inevitable.

Observations

•A large percentage of traffic in business districts is due to drivers searching for curb parking. In a *15-block area of Westwood CA*, cruising for parking generates
•950,000 excess vehicle-miles of travel per year,
•wastes 47,0000 gallons of gas, and produces per year
•730 tons of greenhouse gas carbon dioxide per year*

* Donald Shoup, The High Cost of Free Parking, American Planning Association Press, 2004.

Year	City	Share of traffic cruising (percent)	Average search time (minutes)
1927	Detroit (1)	19%	
1927	Detroit (2)	34%	
1933	Washington		8.0
1960	New Haven	17%	
1965	London (1)		6.1
1965	London (2)		3.5
1965	London (3)		3.6
1977	Freiburg	74%	6.0
1984	Jerusalem		9.0
1985	Cambridge	30%	11.5
1993	Cape Town		12.2
1993	New York (1)	8%	7.9
1993	New York (2)		10.2
1993	New York (3)		13.9
1997	San Francisco		6.5
2001	Sydney		6.5
2005	Los Angeles	68%	3.3
2007	New York	28%	
2007	New York	45%	
2008	New York		3.8
2011	Barcelona	18%	
Average		**34%**	**7.5**

Source: Shoup, *The High Cost of Free Parking*, 2011

Research Question: What fraction of drivers are *really* cruising for parking?

Data-Driven Models of Parking Search

GPS Datasets:

- University of Michigan Transportation Research Institute
  - 11,148 trips over 5 years in Ann Arbor
- Commercially obtained dataset
  - 173,782 trips in San Francisco over a month period
- California Household Travel Survey
  - 270 trips terminating in San Francisco

What is cruising for parking?

Trip length is at least 200 meters longer than the shortest legal path and 50% of identified excess occurs within the 400m of destination.

Figure 3 Definition of Cruising

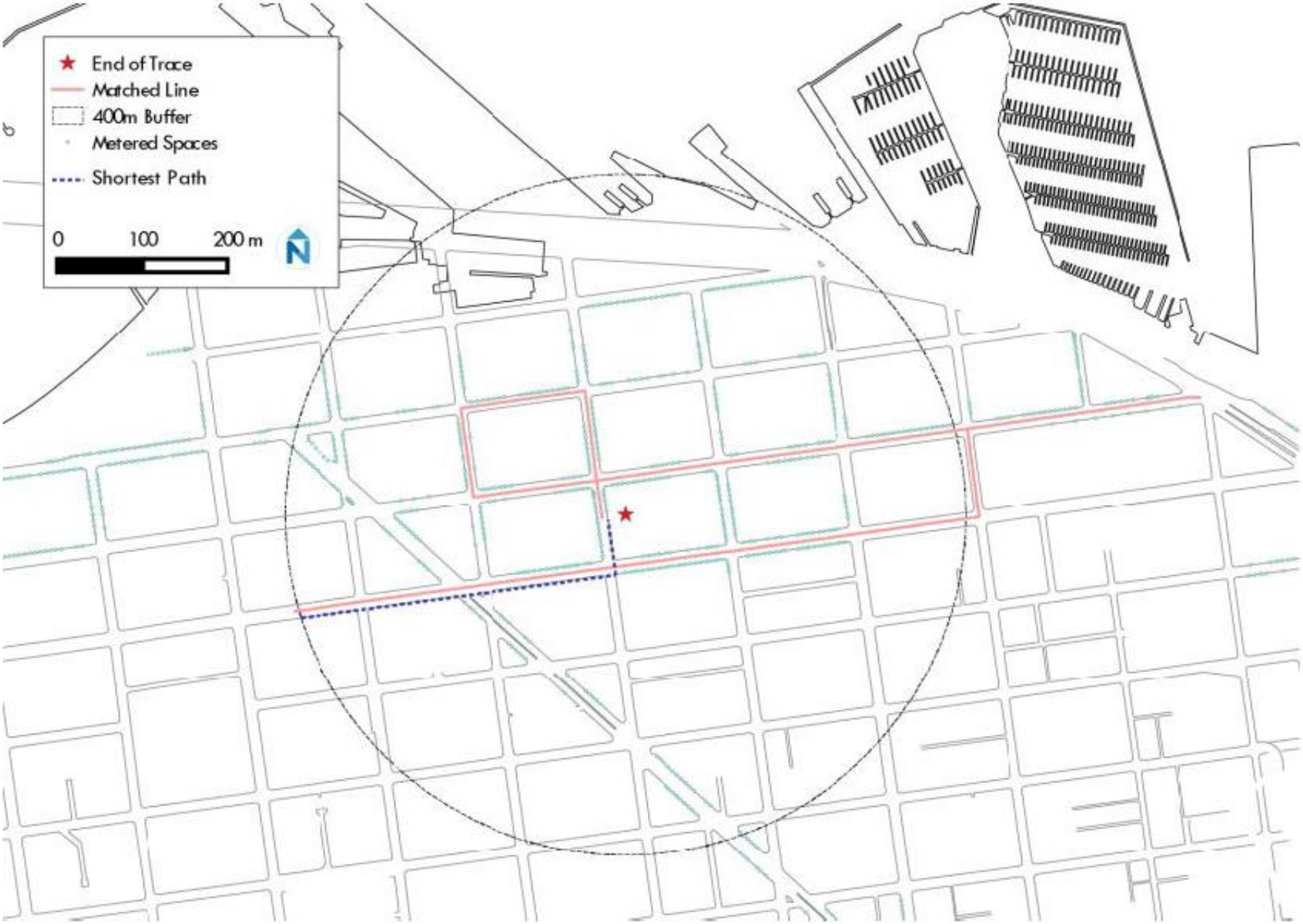

Figure 2 **Trip Trace with Driving and Walking**

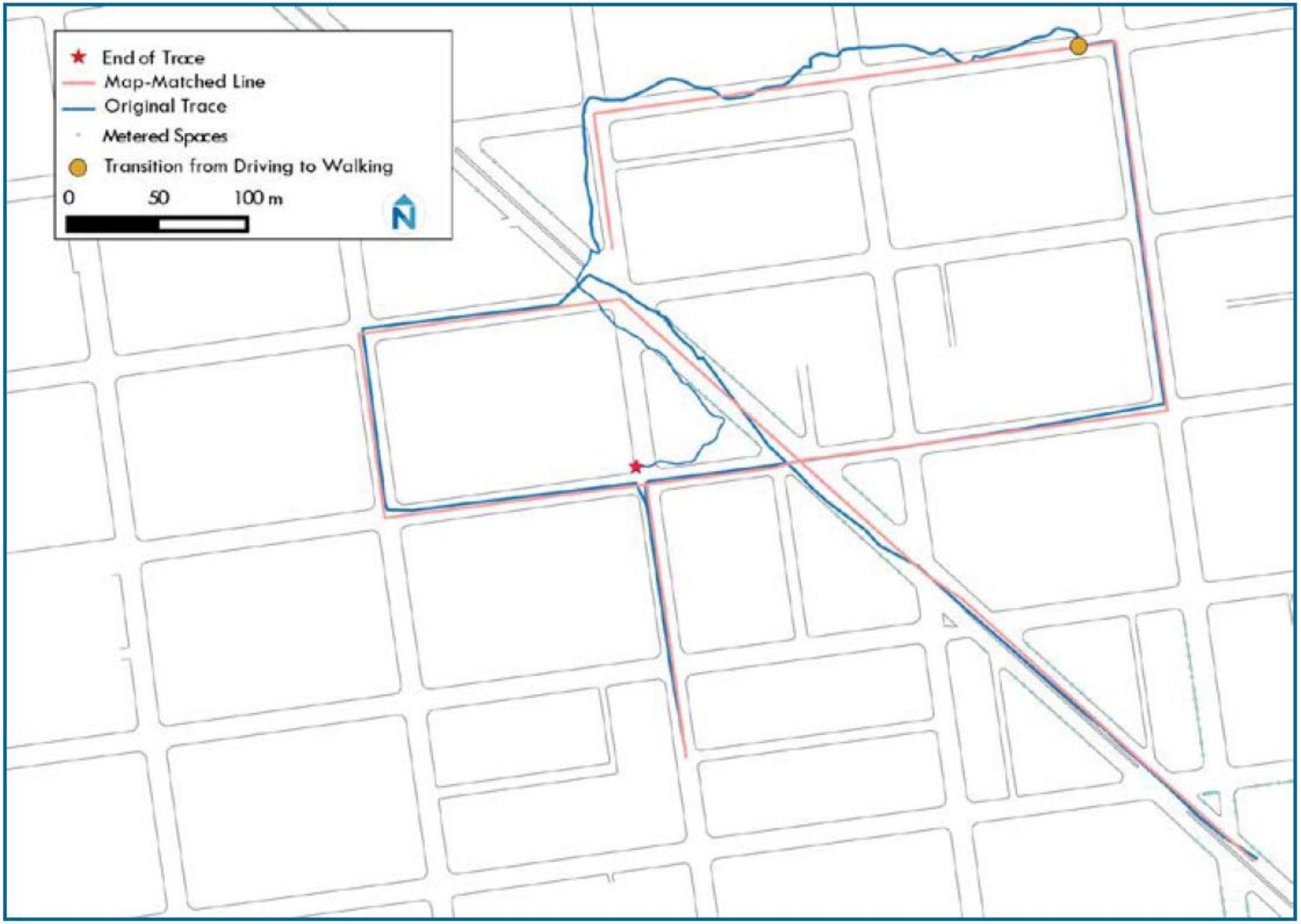

Figure 2a Following the street in Lieu of "Shortest" Path

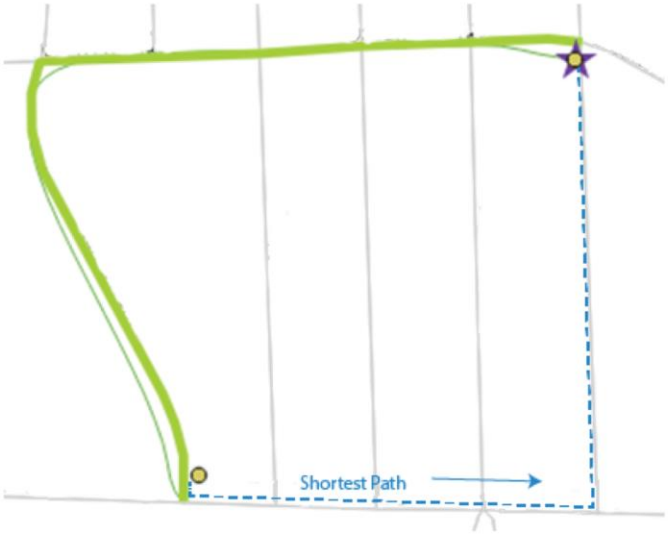

Figure 2b Probable Errand Appearing as Parking Search

Cruising is much lower than 34% !

		UMTRI	Commercial
1	Relevant GPS traces	13,503	556,908
2	Low-resolution traces*	469	444,219
3	Traces ending on freeway	59	4,475
4	Traces where map-matching fails**	3,145	10,769
5	Usable GPS traces (row 1 – row 2 – row 3 – row 4)	9,830	97,445
6	Cruise (actual trip is at least 200 meters longer than shortest legal path and 50% of identified excess occurs within the search area)	570	4,747
7	Percent Cruising (row 6/row 5)	5.8%[1]	4.9%
8	Average excess distance for cruising trips	548m	660m
9	Average distance cruised for all trips (row 7 * row 8)	32m	32m

Average Cruising Distance is the same in San Francisco and Ann Arbor!

		UMTRI	Commercial
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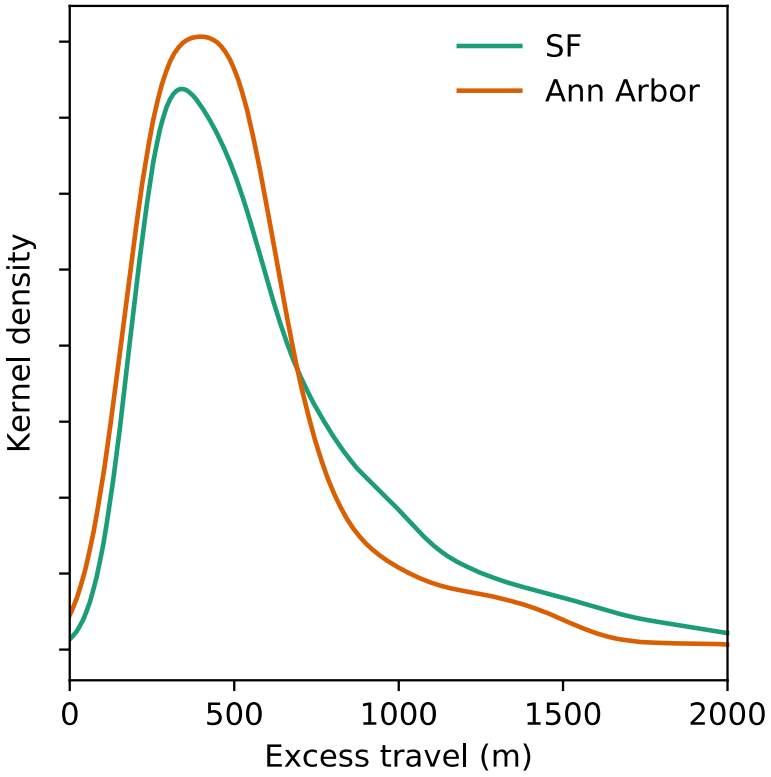
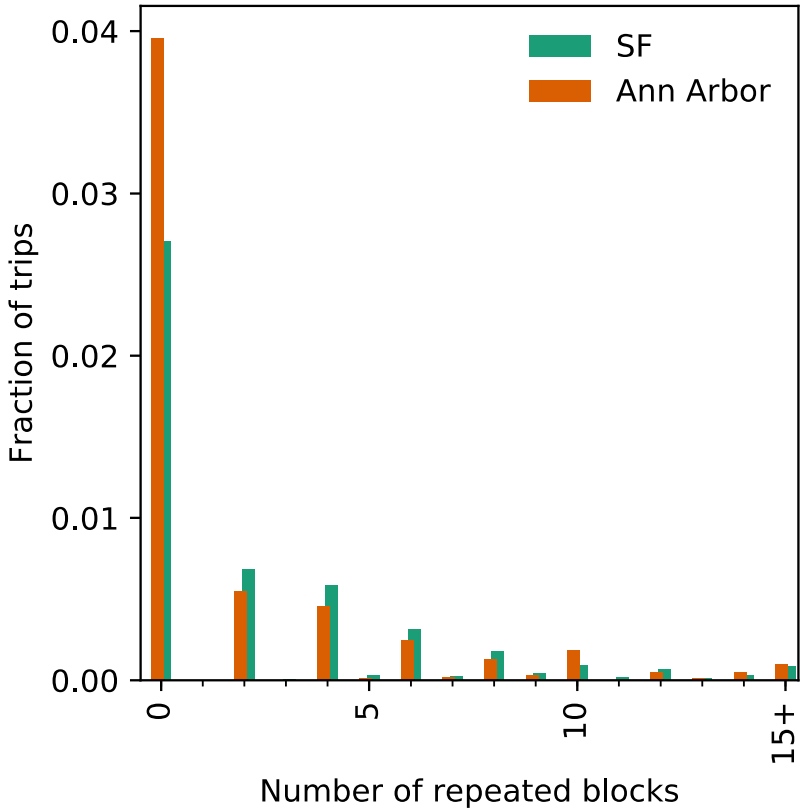
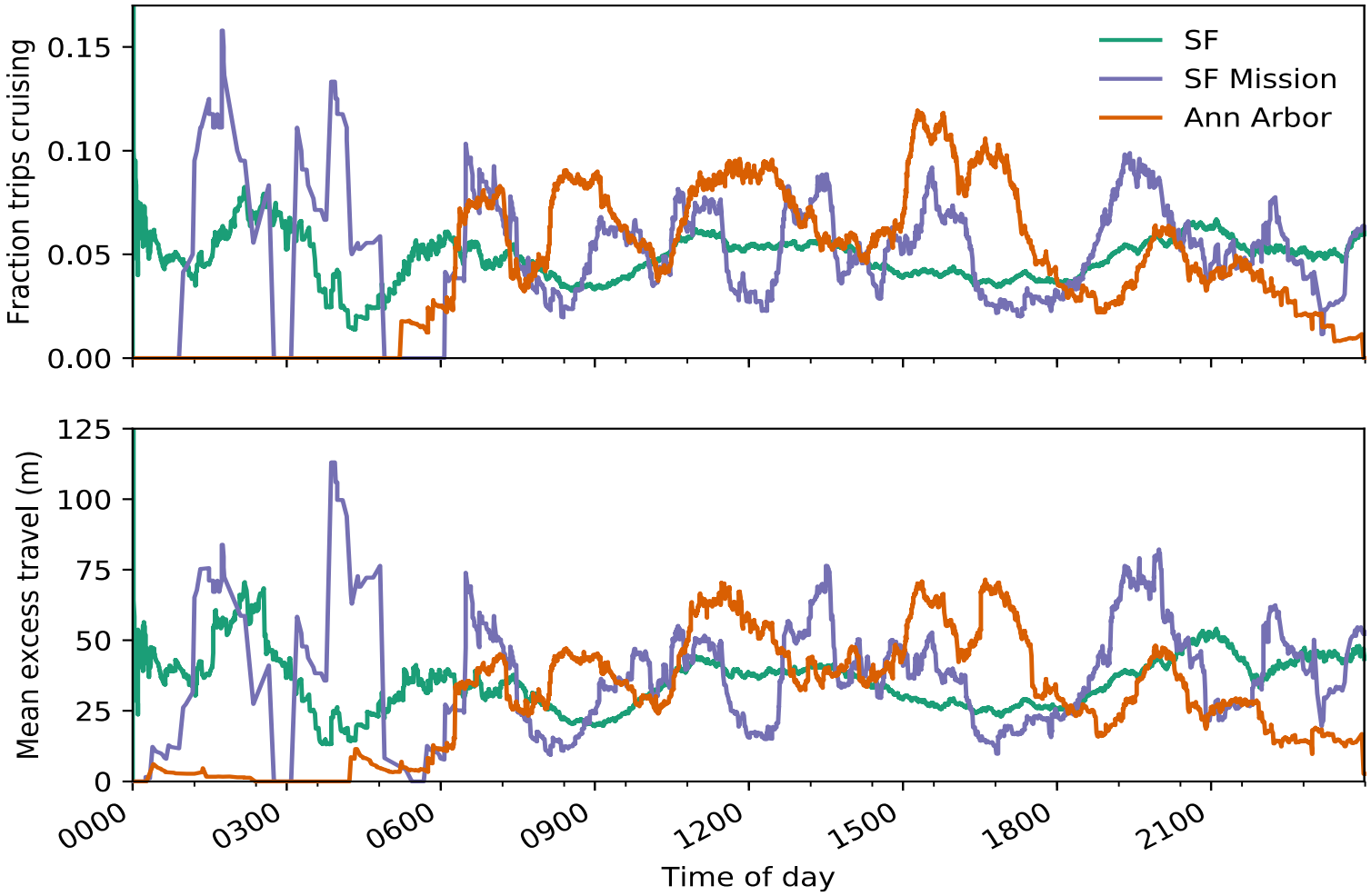
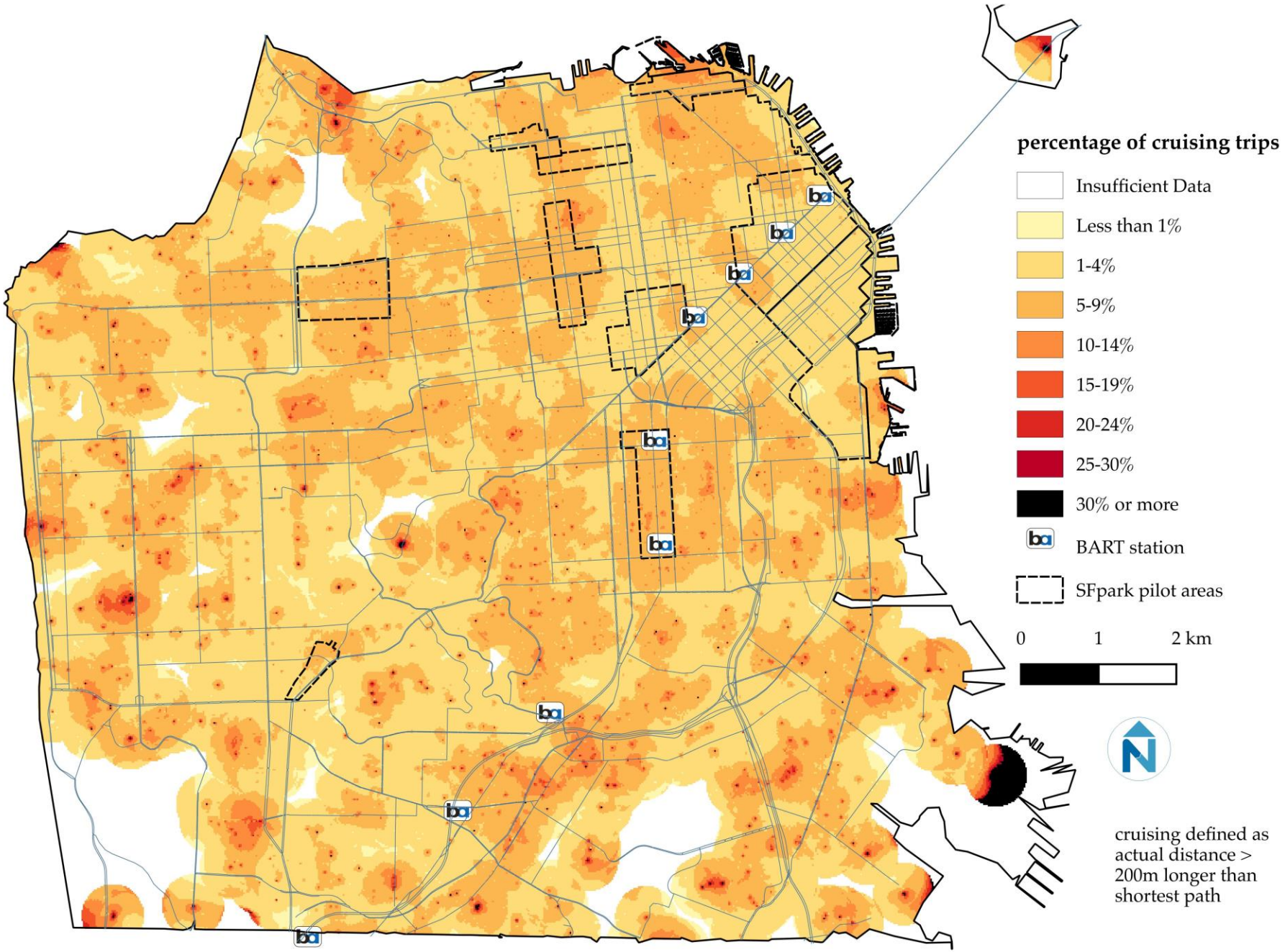
Distributions of Excess Travel and Repeated Blocks (cruising trips only)





Temporal Patterns of Cruising




percentage of cruising trips
Insufficient Data
Less than 1%
1-4%
5-9%
10-14%
15-19%
20-24%
25-30%
30% or more
BART station
SFpark pilot areas
0
1
2 km
cruising defined as actual distance > 200m longer than shortest path

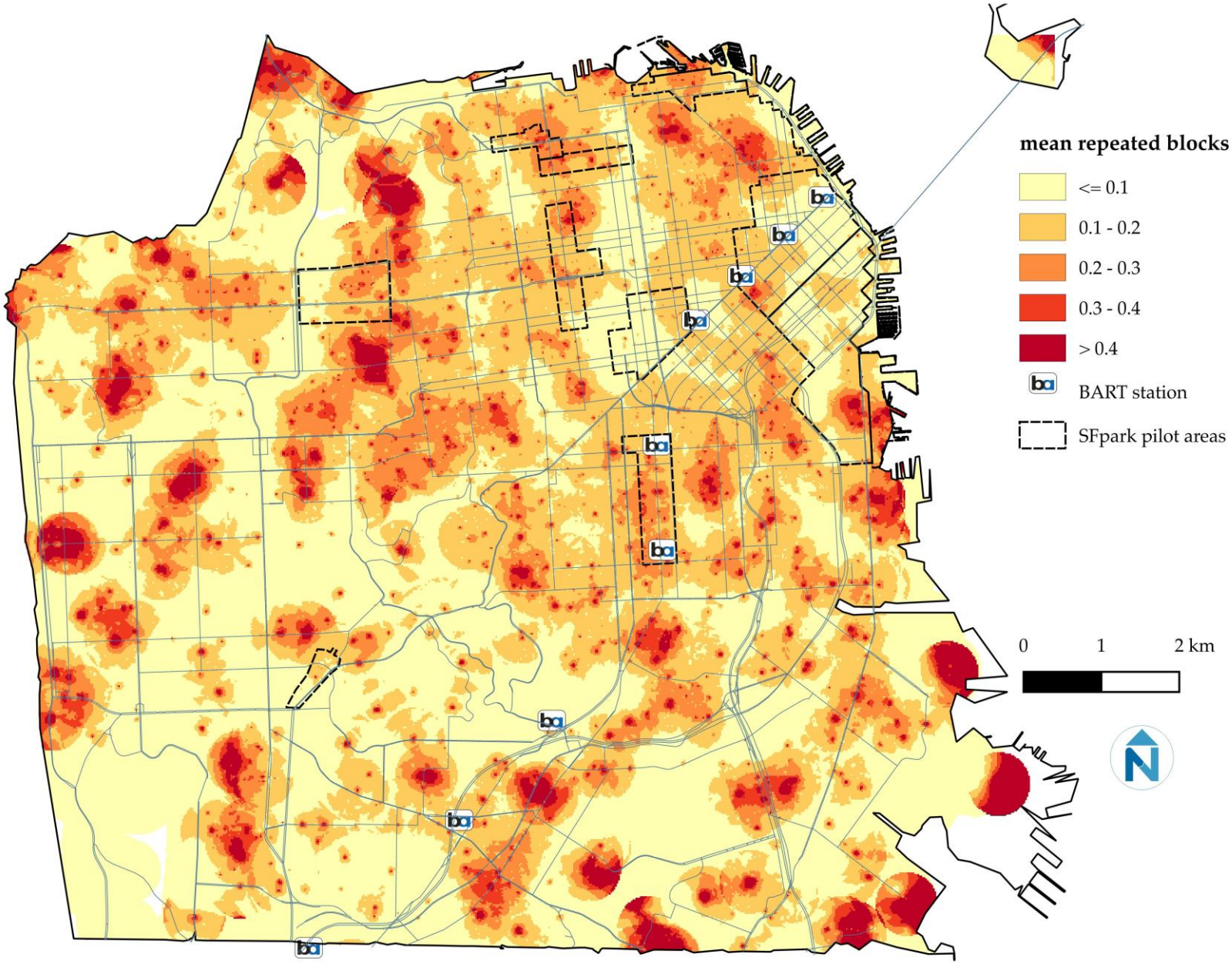

mean repeated blocks
<= 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
> 0.4
BART station
SFpark pilot areas
0
1
2 km

Figure 42 Geography of Cruising in Downtown Ann Arbor

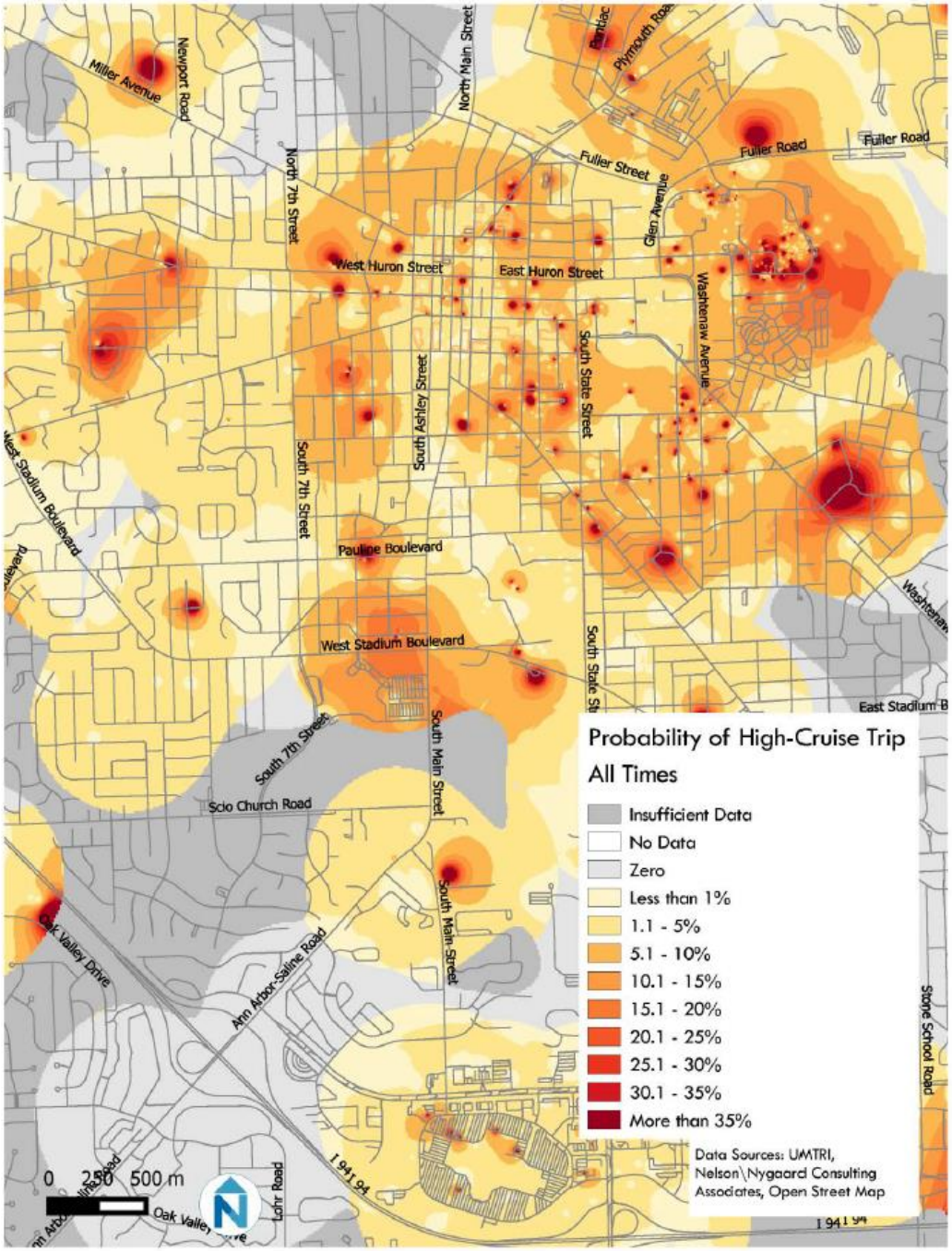
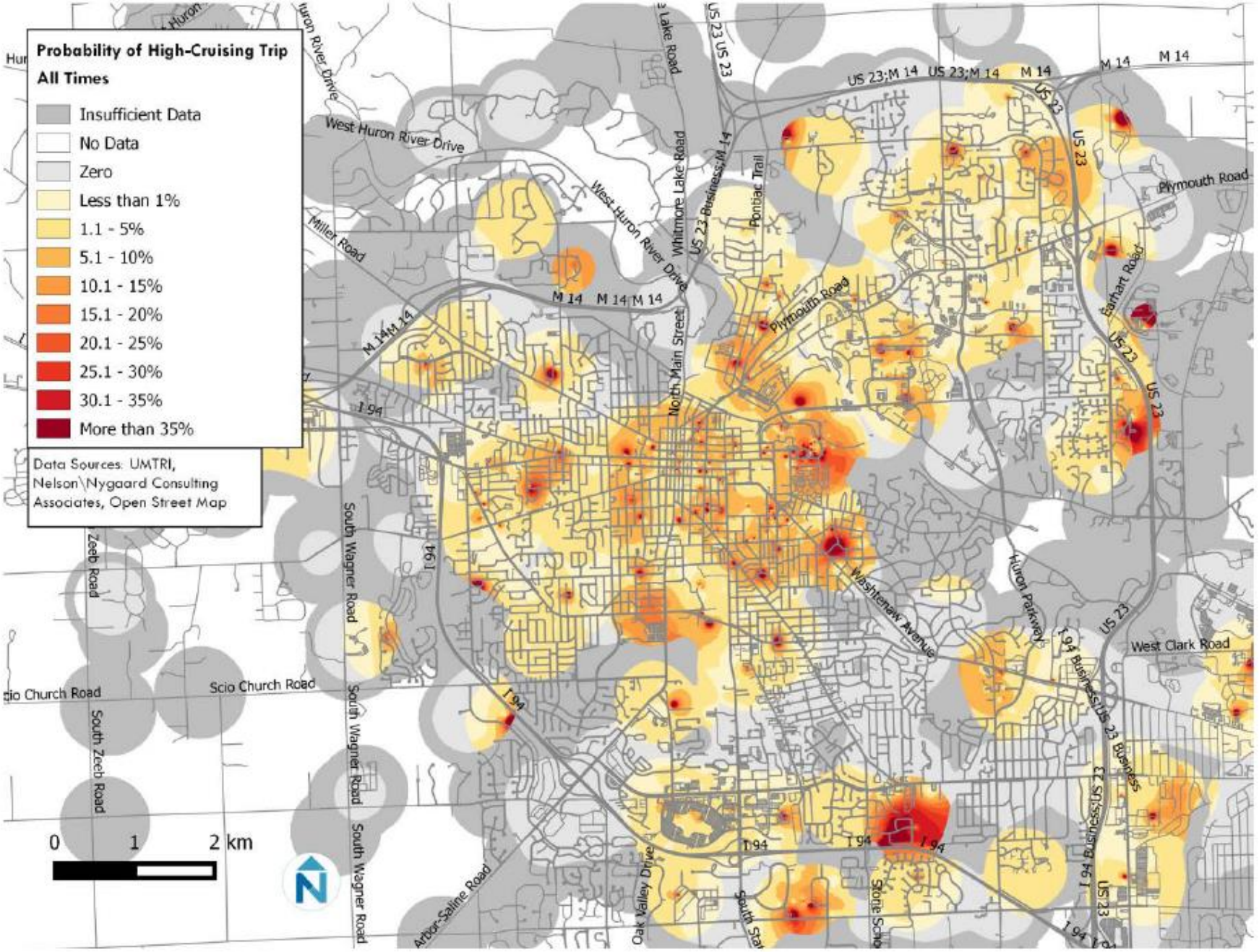
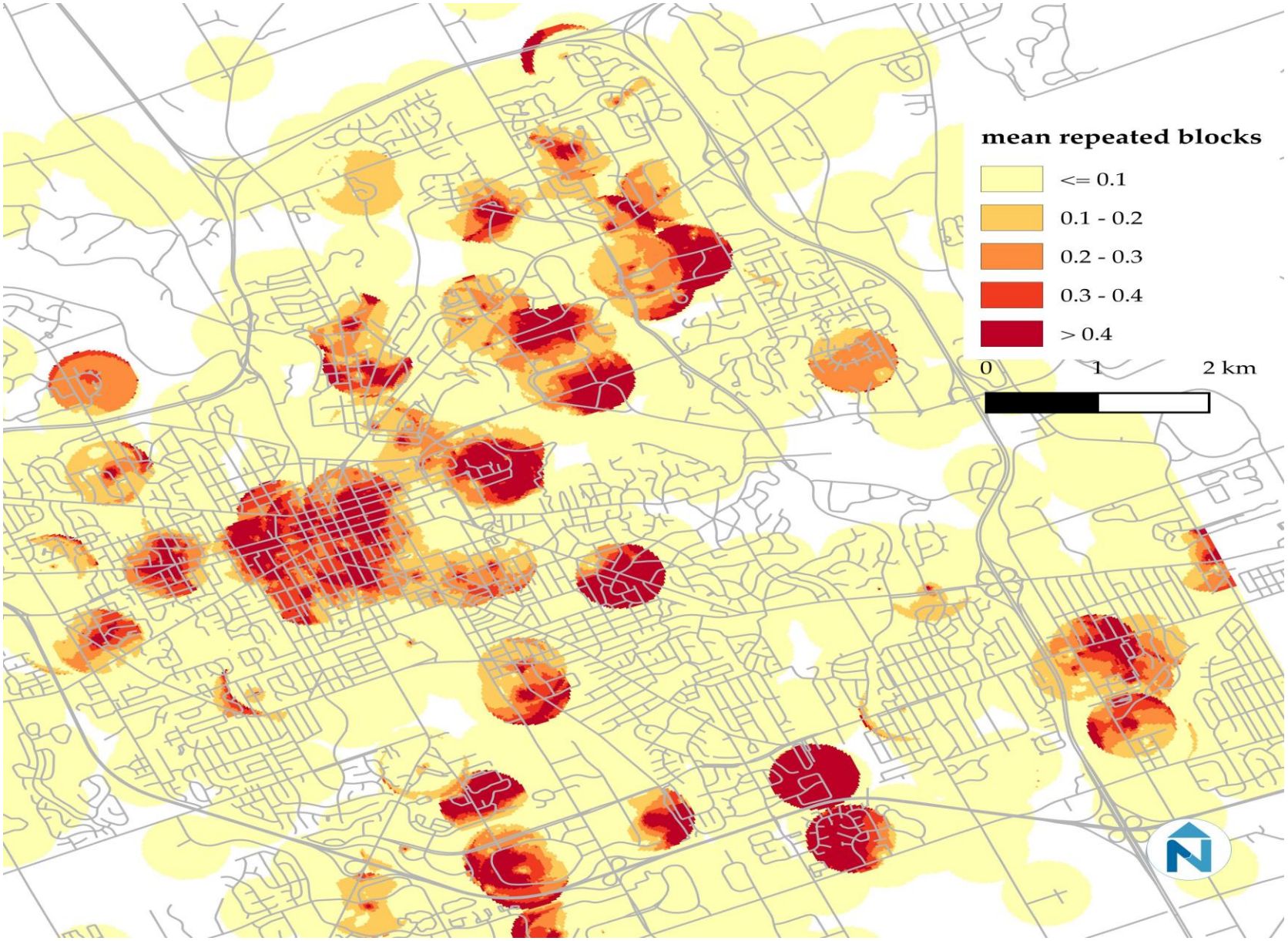
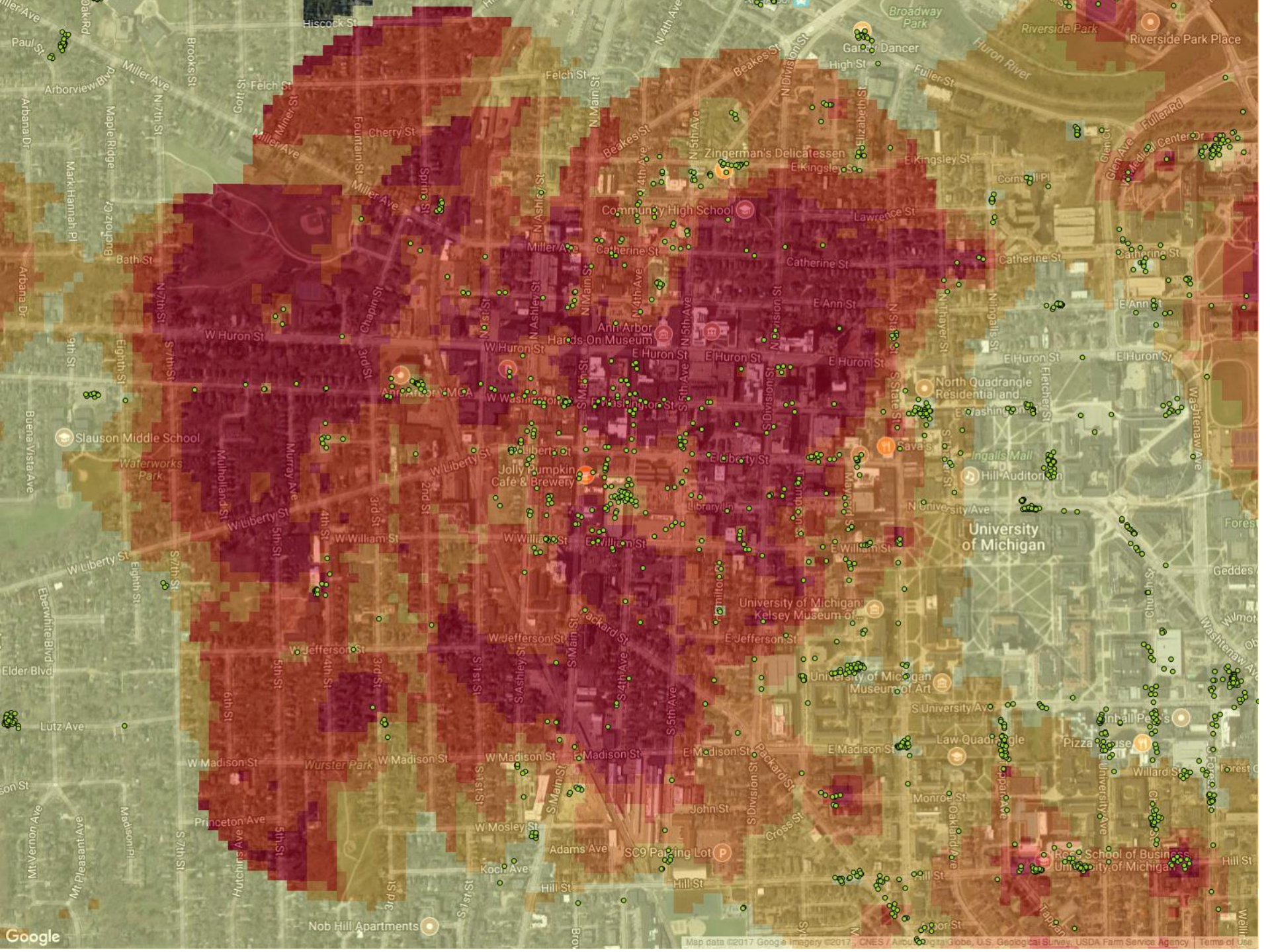


Figure 43 Probability of High-Cruising Trips in Ann Arbor Citywide




mean repeated blocks
<= 0.1
0.1 - 0.2
0.2 - 0.3
0.3 - 0.4
> 0.4
0
1
2 km


Hiscock St
Broadway Park
Riverside Park
Riverside Park Place
Paul St
Arborview Blvd
Miller Ave
Brooks St
Felch St
Gott St
Maple Ridge
Mark Hannah Pl
Arbana Dr
Buena Vista Ave
Bath St
Cherry St
Fountain St
Miner St
Springs St
N Main St
Beakes St
N 4th Ave
N 5th Ave
N Division St
Fuller St
High St
Huron River
Fuller Rd
Glen Ave
Medical Center Dr
Elizabeth St
E Kingsley St
Zingerman's Delicatessen
Community High School
Lawrence St
Catherine St
N Ashley St
N 1st St
N 7th St
Chapin St
Ann Arbor Hands On Museum
W Huron St
E Huron St
E Ann St
N Thayer St
Ninigalls St
Fletcher St
Washtenaw Ave
North Quadrangle Residential and
Ann Arbor YMCA
W Washington St
E Washington St
S Main St
S 5th Ave
S State St
Slauson Middle School
Waterworks Park
Mulholland St
Murray Ave
W Liberty St
E Liberty St
Jolly Pumpkin Cafe & Brewery
Ingalls Mall
Hill Auditorium
2nd St
3rd St
4th St
5th St
Library Ln
N University Ave
University of Michigan
W William St
E William St
Eighth St
S 7th St
Eberwhite Blvd
Elder Blvd
Geddes
Church St
Willmot
University of Michigan Kelsey Museum of
W Jefferson St
E Jefferson St
Packard St
S Ashley St
S 1st St
S 4th Ave
S 5th Ave
University of Michigan Museum of Art
S University Ave
Lutz Ave
6th St
W Madison St
E Madison St
Wurster Park
Law Quadrangle
Pizza House
Willard St
Monroe St
John St
Cross St
S Division St
Oakland Ave
Princeton Ave
W Mosley St
Adams Ave
SC9 Parking Lot
Koch Ave
Hill St
Mt Pleasant Ave
Mt Vernon Ave
Madison Pl
Hutchins Ave
Nob Hill Apartments
Google
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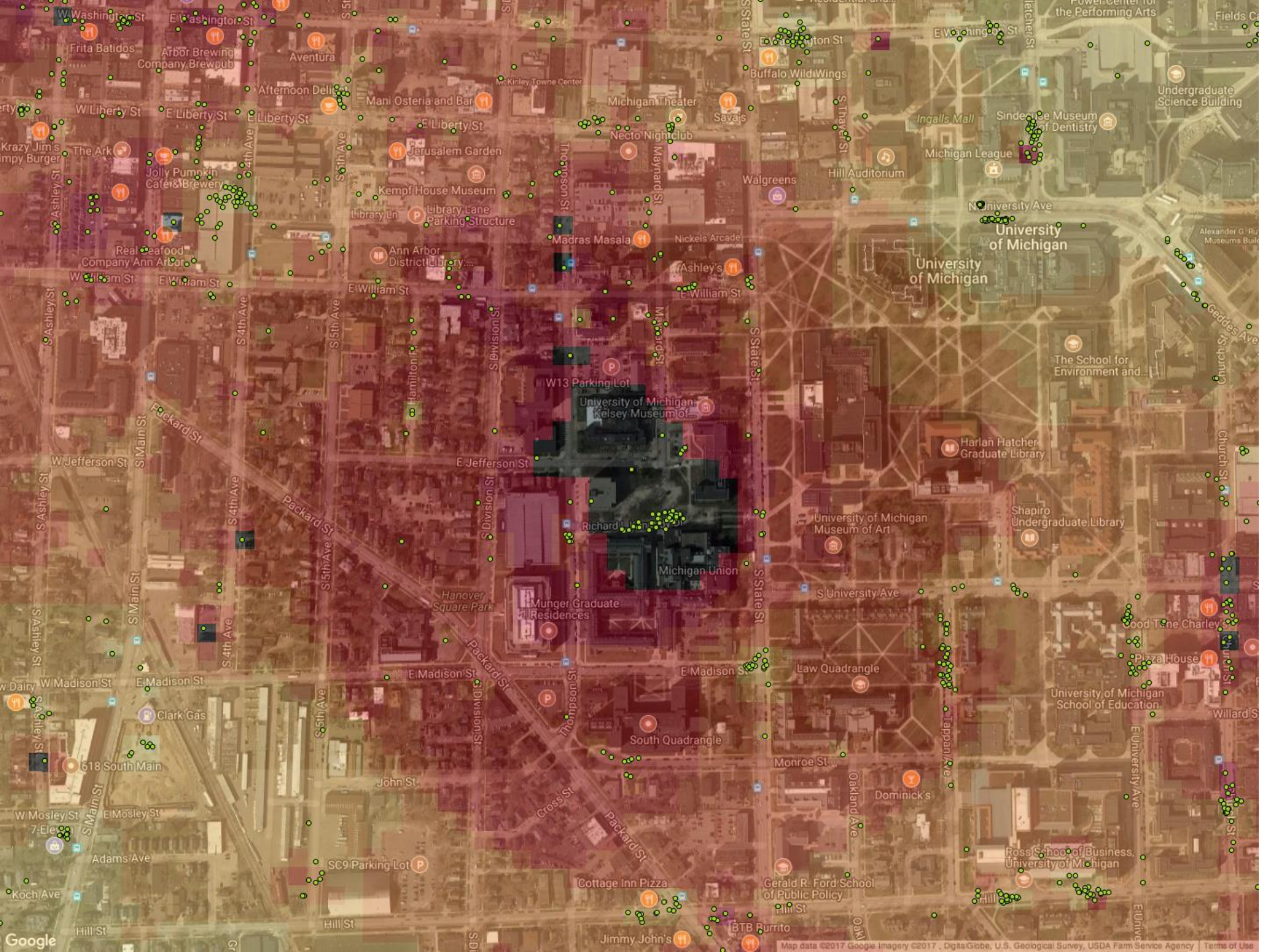
W Washington St
E Washington St
Frita Batidos
Arbor Brewing Company Brewpub
Aventura
Afternoon Delight
McKinley Towne Center
Mani Osteria and Bar
Michigan Theater
Savas
Buffalo Wild Wings
E Washington St
S State St
S Thayer St
Undergraduate Science Building
Ingalls Mall
Sindecuse Museum of Dentistry
W Liberty St
E Liberty St
Krazy Jim's Gimpy Burger
The Ark
Jolly Pumpkin Cafe & Brewery
Jerusalem Garden
Necto Nightclub
Michigan League
Hill Auditorium
Walgreens
Kempf House Museum
Library Lane Parking Structure
Library Ln
Thompson St
Maynard St
N University Ave
University of Michigan
Madras Masala
Nickels Arcade
Ann Arbor District Library
Real Seafood Company Ann Arbor
Ashley's
W William St
E William St
S Ashley St
S 4th Ave
S 5th Ave
S Division St
The School for Environment and...
W13 Parking Lot
University of Michigan Kelsey Museum of...
Packard St
S Main St
W Jefferson St
E Jefferson St
Harlan Hatcher Graduate Library
Geddes Ave
Church St
University of Michigan Museum of Art
Shapiro Undergraduate Library
Michigan Union
Hanover Square Park
Munger Graduate Residences
S University Ave
Pizza House
W Madison St
E Madison St
Law Quadrangle
University of Michigan School of Education
Willard St
Clark Gas
South Quadrangle
618 South Main
John St
Monroe St
Dominick's
Tappan Ave
Oakland Ave
E University Ave
W Mosley St
E Mosley St
Cross St
Adams Ave
SC9 Parking Lot
Ross School of Business, University of Michigan
Cottage Inn Pizza
Gerald R. Ford School of Public Policy
Koch Ave
Hill St
BTB Burrito
Jimmy John's
Google
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Playground
Green Rd
Burbank Dr
Burbank Dr
Burbank Dr
Bluett Rd
Chapel Hill Condominium
Burbank Dr
Carl Ct
Bolgos Cir
Bluett Rd
Burbank Dr
Connections Community Church
Burbank Dr
Green Rd
Bolgos Cir
Bolgos Cir
Alton Ct
Bluett Rd
Yellowstone Dr
Bluett Rd
Green Rd
United States Postal Service
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ATM
Bluett Rd
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-R. Weinberger, A. Millard-Ball and R.C. Hampshire, “Parking Search Caused Congestion: Where’s all the fuss?”, *Transportation Research Board Annual Meeting, 2016.*

-R. Weinberger, A. Millard-Ball, R.C. Hampshire, T. Dykstra J.Karlin-Resnick and D. Perlmutter, “Parking-Cruising Caused Congestion,” U.S. Department of Transportation, SBIR 14-2, Technical Report, 2016.

-Adam Millard-Ball, R. Weinberger and R.C. Hampshire, “Solving Cruising for Parking: Lessons from San Francisco,” *Access Magazine*, 2016.

-A. Millard-Ball, R.R. Weinberger and R.C Hampshire, ``Is the curb 80% full or 20% empty? A Dynamic Parking Pricing Experiment in San Francisco,” *Transportation Research Part A: Policy and Practice* 63 76-92, 2014

-A. Millard-Ball, R.R. Weinberger and R.C Hampshire,`` On the Analysis of Parking Elasticities," *Journal of the American Planning Association*, 79.4 330-336, 2014.

Supported By

1. CAREER Award, National Science Foundation

1. Parking-Cruising Caused Congestion & Targeting Public Mitigation Investments, U.S. Department Of Transportation (USDOT) Small Business Innovative Research (SBIR) Phase I.

1. Risk Management and Modeling for Healthcare Services and Sustainable Transportation, National Science Foundation.