



Motorist-Cyclist Crash Data Needs For Safety Analysis

Krista Nordback, Ph.D., P.E



Geoff Gibson and
Sirisha Kothuri, PhD,
Portland State University



www.hsrc.unc.edu

May 22, 2017



Nick Ferenchak and
Wesley Marshall, PhD, PE,
University of Colorado Denver

Agenda

- Introduction
- Communities Studied
- Recommendations
- Next Steps

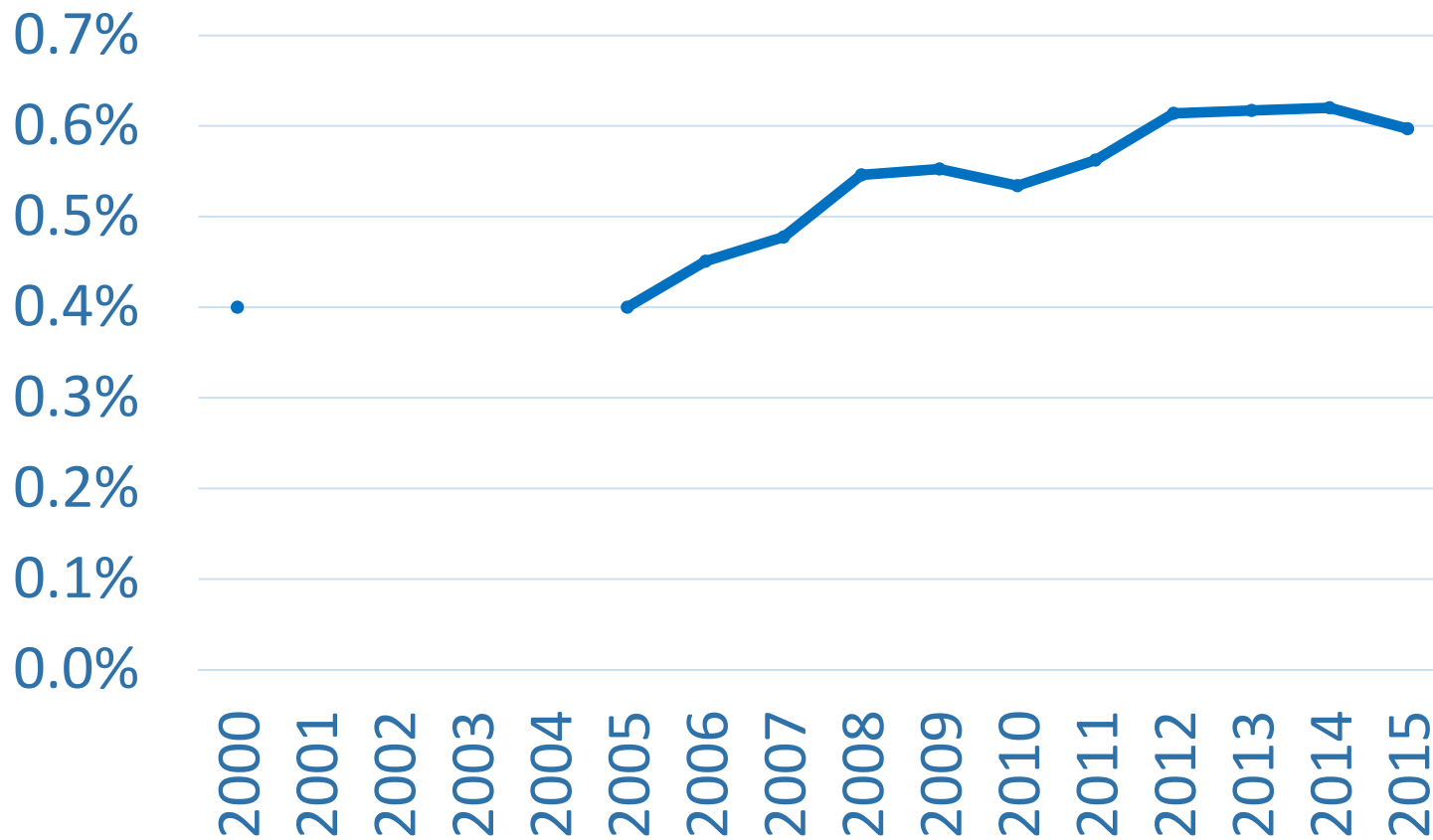


Introduction

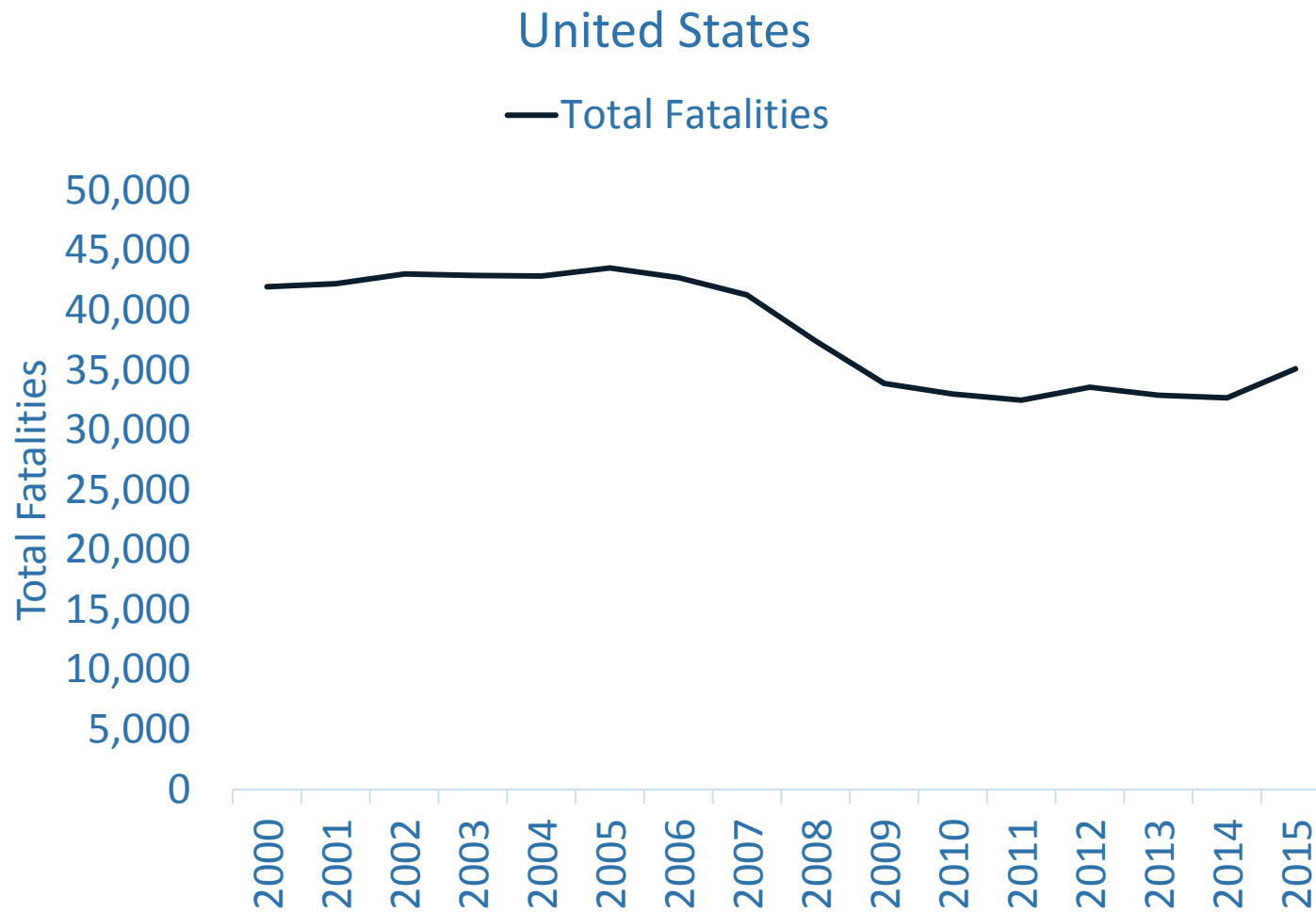


United States

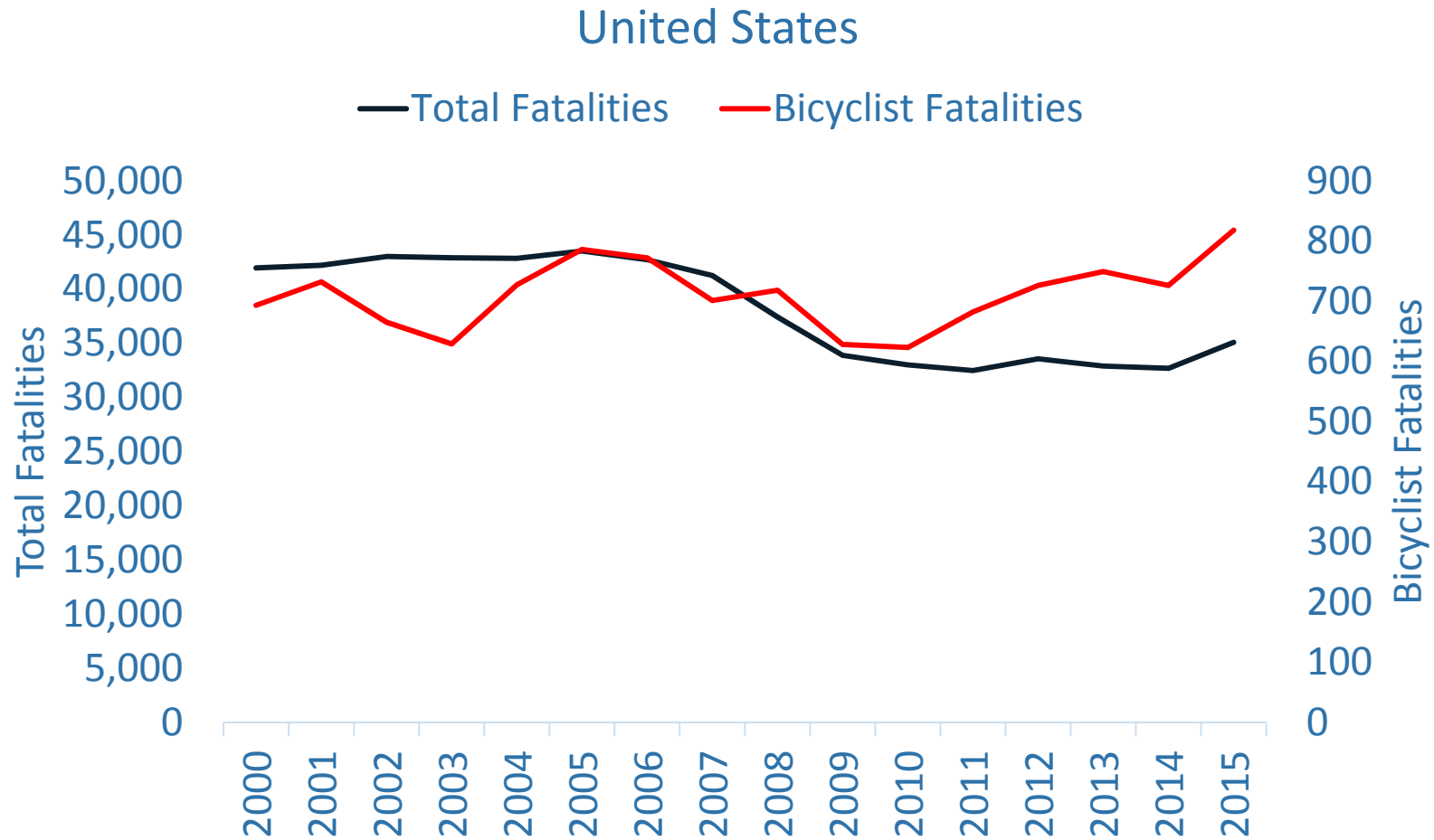
— Cyclist Commute Mode Share



Fatalities



Fatalities



Data for Safety Analysis

- Data needed for crash based safety studies
 - Crash
 - Exposure
 - Data about the environment
- Fatal crash data are standardized (FARS)
- Non-fatal crash data are inconsistent

- Lack of 4 or 5 star CMFs
- Lack of SPFs in HSM



Communities Studied

Community	2010 Population	Years (Non-Fatal)	Non-fatal Bicycle Related Crashes			Bicycle-Crash Index	FARS
			Total Non-Fatal Crashes	Ave Crashes per Year	Crashes per Year per 100,000 population		Bicyclist Fatalities per Year
Arlington	207,627	2010-2015	239	40	19	24	0.2
Bellingham	80,867	2001-2015	499	33	41	20	0.2
Boulder	97,468	2004-2012	893	99	101	10	0.6
Denver	600,025	2003-2009	1480	211	35	15	1.3
Minneapolis/ St. Paul	667,646	2005-2014	3784	378	57	14	1.1
Philadelphia	1,526,006	2010-2014	2675	535	35	18	3.3
Portland	583,789	2009-2012	1271	318	54	9	2.2
San Diego County	3,095,313	2001-2014	6493	464	15	50	3.8

$$\text{Bicycle Crash Index} = \frac{1,000 * (\text{Non} - \text{fatal motorist} - \text{cyclist crashes})/\text{year}}{\text{Population} * \% \text{Bicycle Commute Mode Share}}$$

Available Data

	Time Fields				Crash Fields		Environment Fields				
Community	Year	Month	Day	Hour	Crash Severity	Collision Type	Lighting	Weather	Speed Limit	Traffic Control	Intersection
Arlington	X	X	X	X		X			X		
Bellingham	X	X		X	X	X	X				X
Boulder	X	X		X	X		X	X			X
Denver	X	X	X	X	X			X	X		X
Minneapolis St. Paul	X	X	X		X	X	X		X	X	X
Philadelphia	X	X	X	X	X	X	X	X	X	X	X
Portland	X	X	X	X	X	X	X	X		X	X
San Diego	X	X	X	X	X	X	X	X			X

Differences between datasets

- Differences in data fields between communities
- Differences in data coding within communities
- Diverse file formats

Other Issues

- Under reporting
- Motor-vehicle-specific reporting formats (no bicycle specific fields)

STATE OF WASHINGTON
POLICE TRAFFIC
COLLISION REPORT

1591971

1

2

3

4

4a

5

6

7

8

9

10

INTERSTATE CITY STREET

STATE ROUTE OTHER

COUNTY RD PRIVATE WAY

FIRE RESULTED

STOLEN VEHICLE

HIT & RUN INVOLVED

TRIBAL RESERVATION

DATE OF COLLISION

ON (PRIMARY TRAFFIC WAY) INTERSECTION NON-INTERSECTION

DISTANCE OF (REFERENCE OR CROSS ST)

UNIT 01 MOTOR VEHICLE PEDAL-CYCLE

LAST NAME FIRST NAME

STREET NEW ADDRESS

CITY

CDL ENDORSEMENTS

DRIVER'S LICENSE # STATE

ON DUTY STATUS AIRBAG RESTR. EJECT HELMET USE

LICENSE

CASE #

LOCAL AGENCY CODING

TOTAL # OF UNITS

TIME (2400)

COUNTY #

M M D D Y Y Y Y

MILES N E

FEET S W

Non-Fatal Crash Data



Crash Report



Data Processing



Online Database



Safety Researchers

	Crash Reporting	Data Processing	Database	Researchers
Issues	Are bicycle-specific fields recorded? (sidewalk riding, dooring, etc?)	Are bicycle-specific data fields included? (crash type, severity, etc) Is exact crash location recorded?	Are data from other sources added to crash data? (facility type, weather, exposure, etc.) Which data fields, if any, are accessible online?	Can researchers readily locate data? Are data comparable across jurisdictions?

Slide Credit: K. Nordback

Other Related Research

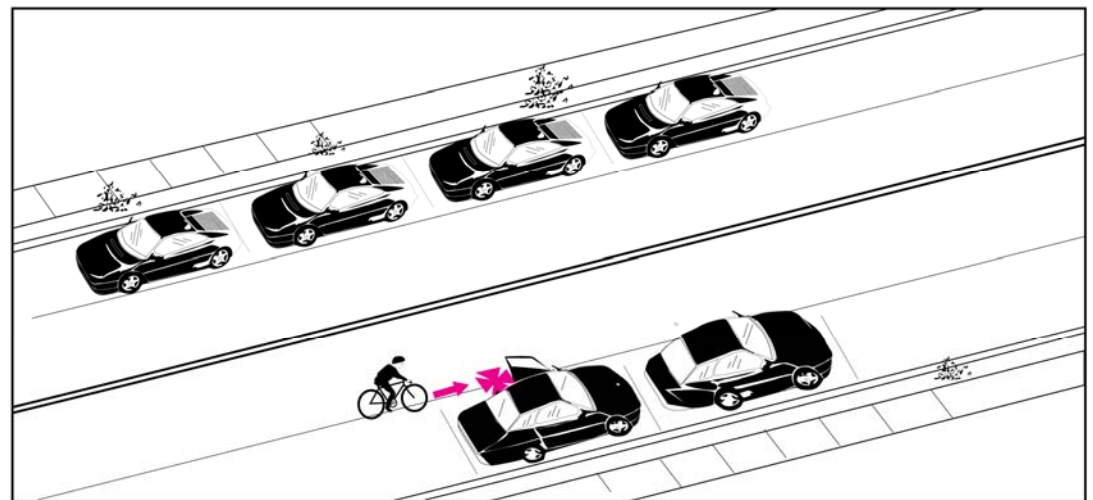
- Berkow et al. 2017
 - Cyclist location relative to roadway missing in many databases
 - Make collision reports compatible with MMUCC
 - Include type of facility



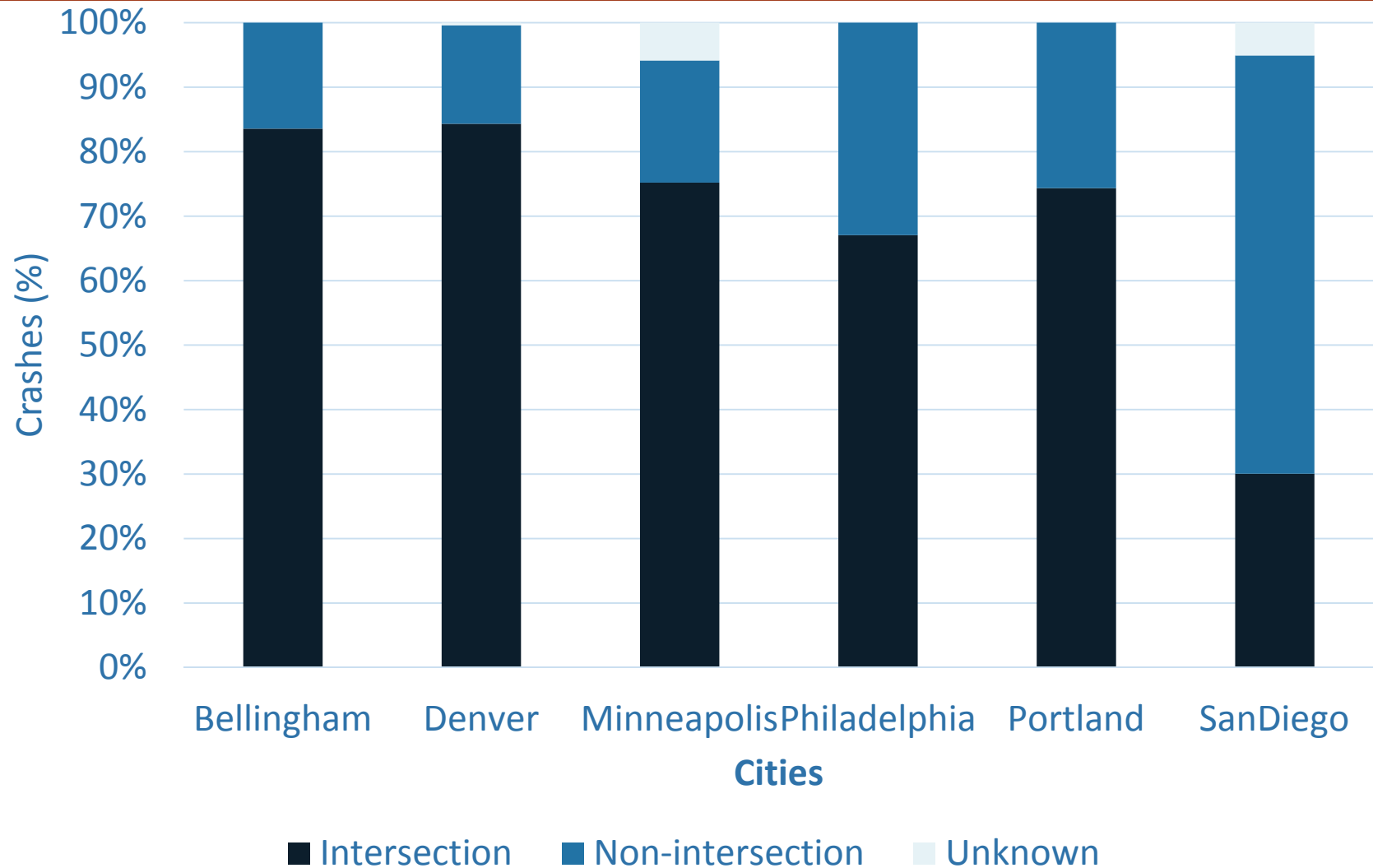
Recommendations

- Data standards need for non-fatal crashes. Should include
 - Intersection type
 - Crash type
 - Crash severity
 - Cyclist location
 - Type of facility
- PBCAT already has crash typing

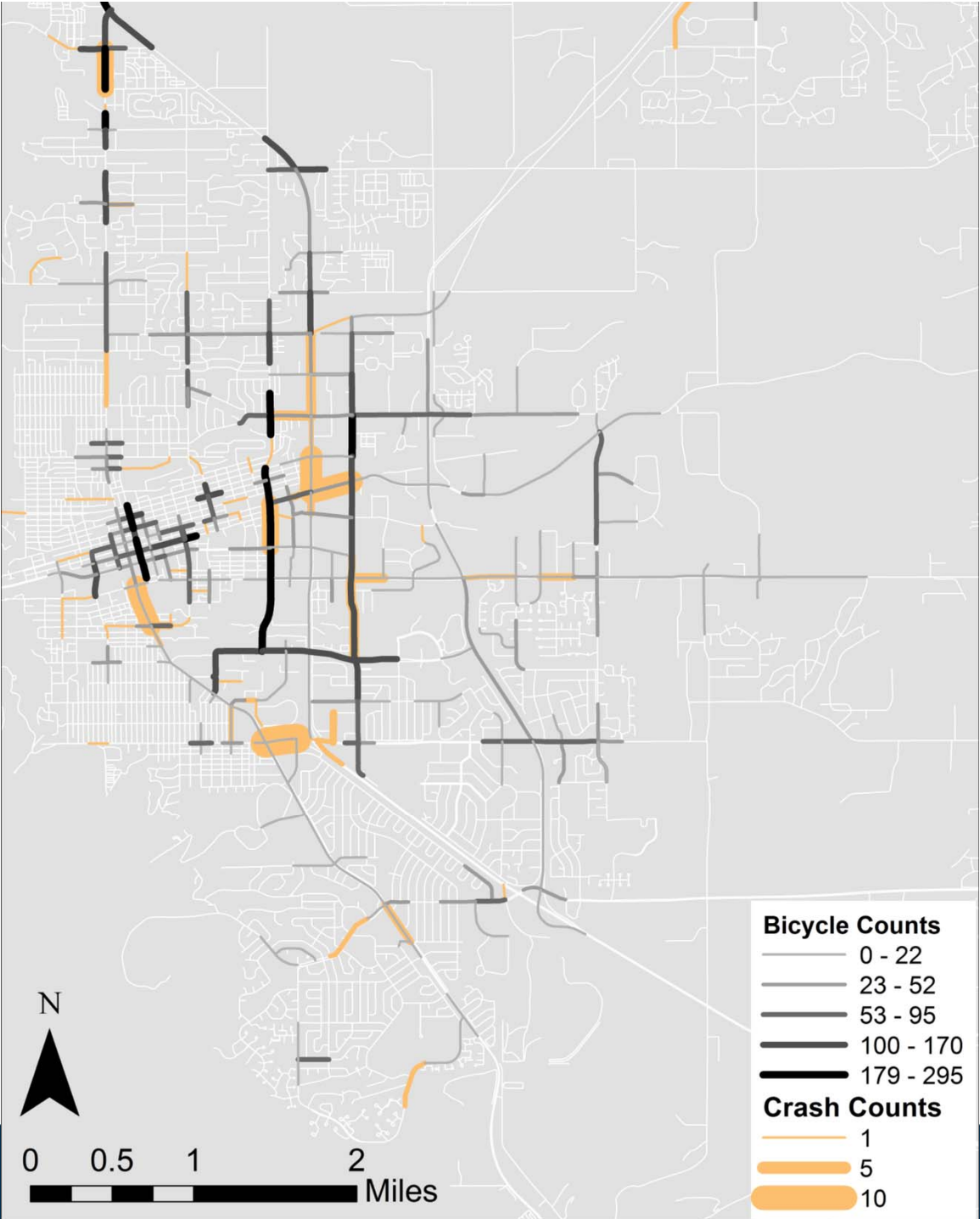
For Example: Bicyclist
Overtaking—Extended Door



Next Steps: Where do crashes occur?



Where do crashes occur?



Next Steps

- Safety Performance Function development
 - Boulder
 - Road segments
 - Variables:
 - Bicycle volume
 - Motor vehicle volume
 - Facility type
 - Land use
 - Demographics
- Expected results Summer 2017



Questions?

Krista Nordback

University of North Carolina
Highway Safety Research Center

Nordback@hsrc.unc.edu

919-962-3493



Portland State
UNIVERSITY



University of Colorado
Denver