

Bikesharing Research and Programs

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PUBLIC BIKESHARING IN THE U.S., CANADA, & MEXICO: Industry Developments & User Understanding PROJECT HIGHLIGHTS



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Transportation Sustainability Research Center
University of California, Berkeley

FHWA Bikesharing Webinar

April 2, 2014

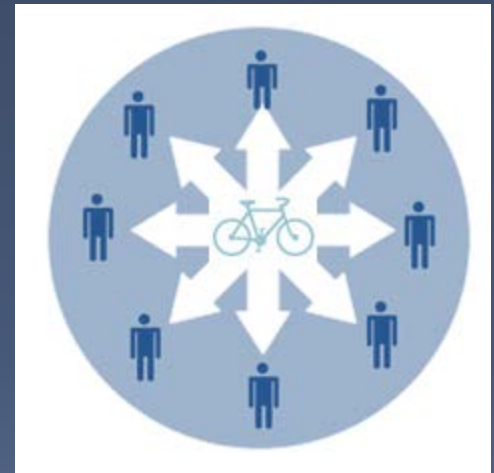
Overview

- Bikesharing defined
- Worldwide and US bikesharing numbers
- Study background
- Carsharing in North America by the numbers
- Operator understanding
- Impacts
- Acknowledgements



What is Public Bikesharing?

- Bikesharing organizations maintain fleets of bicycles in a network of locations
- Stations typically unattended, concentrated in urban settings and provide a variety of pickup and dropoff locations
- Allows individuals to access shared bicycles on an as-needed basis
- Subscriptions offered in short-term (1-7 Day) and long-term (30-365 Day) increments
- Most programs cover the cost of bicycle maintenance, storage, and parking



Worldwide & US Bikesharing: March 2014

- ◉ 714 cities with IT-based operating systems
- ◉ 740,000 bikes
- ◉ 35,000 stations
- ◉ 10 new city programs since January 2014
- ◉ US: 41 cities & 4 universities with IT-based systems
 - 19,600 bikes
 - 2,000 stations

Source: Russell Meddin, 2014



Research Methodology

- Ongoing literature review
- 23 operator interviews in the US, Canada, & Mexico
- IT-based bikesharing program growth tracking (including planned programs)
- Surveys with members of 5 public bikesharing systems in Spring/Summer 2013
- 2013 operational data analysis from Nice Ride MN



History & Growth of Bikesharing

- **1965.** Amsterdam launches first generation “White Bike” bikesharing program.
- **1991.** Coin-deposit systems are launched in Farsø and Grenå, Denmark bringing in bikesharing’s second generation.
- **1998.** Rennes, France launches first IT-based system for public access marking the third generation of equipment.
- **2005.** Lyon, France launches the first large-scale municipal third generation system called Vélo’v.
- **2007.** Paris launches Vélib’ ushering in the bikesharing boom.
- **2009.** Public Bike System Company (PBSC) is formed in Montreal and North America’s first major IT-based bikesharing program is launched.

Recent Developments in Bikesharing

○ Occasional Members

- › In 2012, PBSC introduced a new membership type known as the Occasional Member

○ Membership Reciprocity

- › B-cycle's B-connected campaign

○ Community Involvement & Crowd-Sourced Funding

- › Online "Suggest-a-Station" platforms enabling additional public input and crowd-funded system expansions

○ Equity Issues & Public Policy

- › Systems are increasingly looking at how to address social equity in bikesharing

Recent Developments in Bikesharing

- **Helmet Dispensing Options**

- › Helmet kiosks launched in Boston

- **Peer-to-Peer Bikesharing**

- › The sharing of private bicycles between individuals

- **Flexible Docking and Geo-fencing Technologies**

- › Allows for users to pick-up and drop-off bicycles anywhere within a geographic area

- **Self-Rebalancing and Dynamic Pricing**

- › Pricing mechanisms are used to encourage self-rebalancing of the bikesharing fleet (e.g., Vélib, CapBi, London's Barclay's Cycle Hire)

- **Public Bike System Company (PBSC) Bankruptcy**

- › Following concerns of PBSC's ability to repay its debts, the company filed for bankruptcy protection in January 2014

Timeline of North American Bikesharing Program Launches (2007-2013)

2007	2008	2009	2010	2011	2012	2013
Tulsa Townies	Bikla SmartBike D.C.	BIXI Montreal	Capital Bikeshare Chicago B-Cycle EcoBici Denver B-Cycle Des Moines B-Cycle Nice Ride MN	Bike Chattanooga Charlotte B-Cycle DecoBike Long Beach Houston B-Cycle Kansas City B-Cycle Nashville B-Cycle Spokies	BIXI Toronto	5B Bikeshare
				Boulder B-Cycle Broward B-Cycle Capital BIXI DecoBike Miami Golden Community Bike Share Hawaii B-Cycle Madison B-Cycle Hubway Omaha B-Cycle San Antonio B-Cycle Spartanburg B-Cycle	Bike Nation Anaheim Bay Area Bike Share Capital Community Bike Share Citi Bike CoGo Divvy Fort Worth B-Cycle GREENbike Greenville B-Cycle Midwest Bikeshare WE-cycle Austin B-cycle Smartbike Puebla	

Key:
 Currently Operational
 Suspended
 Defunct

Bikesharing in North America by the Numbers

	United States	Canada	Mexico	North American Total
Number of programs	22	4	2	28
Total Number of users	1,191,442	197,419*	71,611	1,460,472
Number of members	44,695	53,707	71,611	170,013
Number of casual users, 1-30 Day	1,146,747	143,312	0	1,290,059
Number of bicycles	7,549	6,115	3,680	17,344
Number of kiosks	800	492	307	1,599
Number of docks	12,955	10,506	7,487	30,948

* Note BIXI Montreal had an additional 400 occasional users. Occasional users maintain a key and are billed a 24 hour membership when the key is used.

The Business of Bikesharing

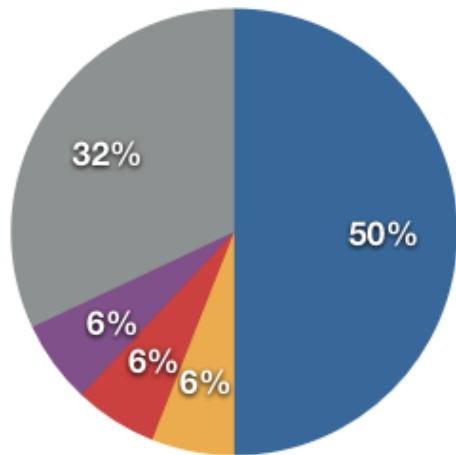
Revenue from Membership & User Fees

Program	Percent Revenue from Members	Percent Revenue from Casual Users	Other Sources (sponsorship, donations, etc)
Program 1 Publicly Owned, Contractor Operated	15%	44%	41%
Program 2 Publicly Owned, Contractor Operated	33%	67%	0%
Program 3 Non-profit	16.10%	48.40%	35.5%
Program 4 Non-profit	3.60%	54%	42.4%

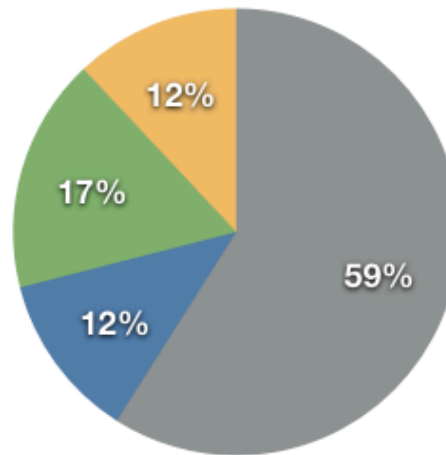
Shaheen et al., 2014

Station Location, Location, Location (n=15)

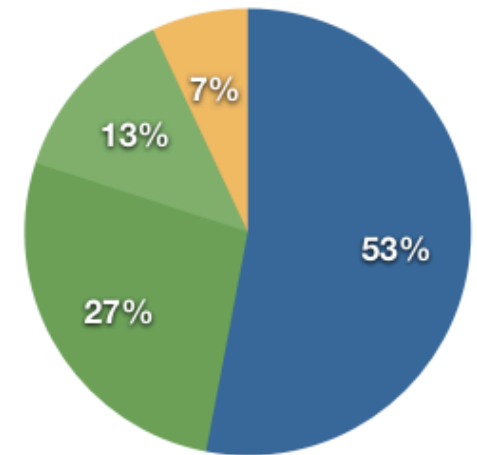
Greatest Membership



Greatest Ridership



Greatest Revenue



- Tourist Locations
- Program Sponsor Location
- Parking Available

- Transit Locations
- High-Density Mixed-Use Locations

- University Locations
- Felt Safe

- Residential Locations
- Recreational Parks/Trails

Lessons Learned from Operators

To improve public bikesharing, I would...

Marketing & Outreach	Operations & Equipment	System Planning & Scale
"Change public perception so that people view bikesharing as "sharing" and not a 'rental'."	"Develop ways to minimize and ease pre/re-balancing (e.g., pricing signals to users)."	"Have more docking points to lower the cost of bike redistribution."
"Get more people to use public bikesharing."	"Build awnings to protect kiosks from the elements."	"Expand the system with more stations and bicycles."
"Build stronger partnerships among users, sponsors, and local government."	"Encourage technological enhancements to further automate public bikesharing."	"Improve the balance of stations between downtown and residential neighborhoods."
"Build stronger relationships between bikesharing programs."	"Reduce the cost of bikesharing systems."	"Add wayfinding signs to show where stations are located and what direction to go in to return a bike."
		"Enhance accessibility into under-served communities."

Lessons Learned from Operators

One lesson our program has learned...

Marketing & Outreach	Operations & Equipment	System Planning & Scale
"Work with local partners first. "	"Do not under estimate the importance of the 'casual user' in terms of revenue."	"Stations placed at the right location will be successful."
"Funding from local sources enhances community partnerships."	"Remember that public bikesharing is a commuting option, and people depend on this mode. If we make mistakes, we can really mess up someone's day."	"Greater density of stations is needed at a program's launch."
"Work with municipal public works departments early on."	"Training our technicians locally to move stations is more cost effective than flying in technicians to do this."	"Place stations farther apart to enhance geographic coverage, particularly outside the urban core."
"Education and outreach among users is important, particularly with respect to user fees after the initial free usage timeframe."	"Determining the number of users and rides the system can support is important."	"If you provide a quality service, people will use it."
"Remembering that we're selling is a 'culture.'"		
"Friendly competition – sharing success stories with other programs can make bikesharing better."		

Public Bikesharing User Survey Analysis

Member & On-Street Survey Findings



Member Survey: Overview



- Programs surveyed:
 - › Bixi Montreal – Montreal, Canada
 - › Bixi Toronto – Toronto, Canada
 - › Nice Ride MN – Minneapolis/St. Paul, MN
 - › GreenBike SLC – Salt Lake City, Utah
 - › EcoBici – Mexico City, Mexico
- Goal of survey:
 - › Better understanding of travel behavior, shopping behavior, modal shift, helmet use and safety, and user demographics

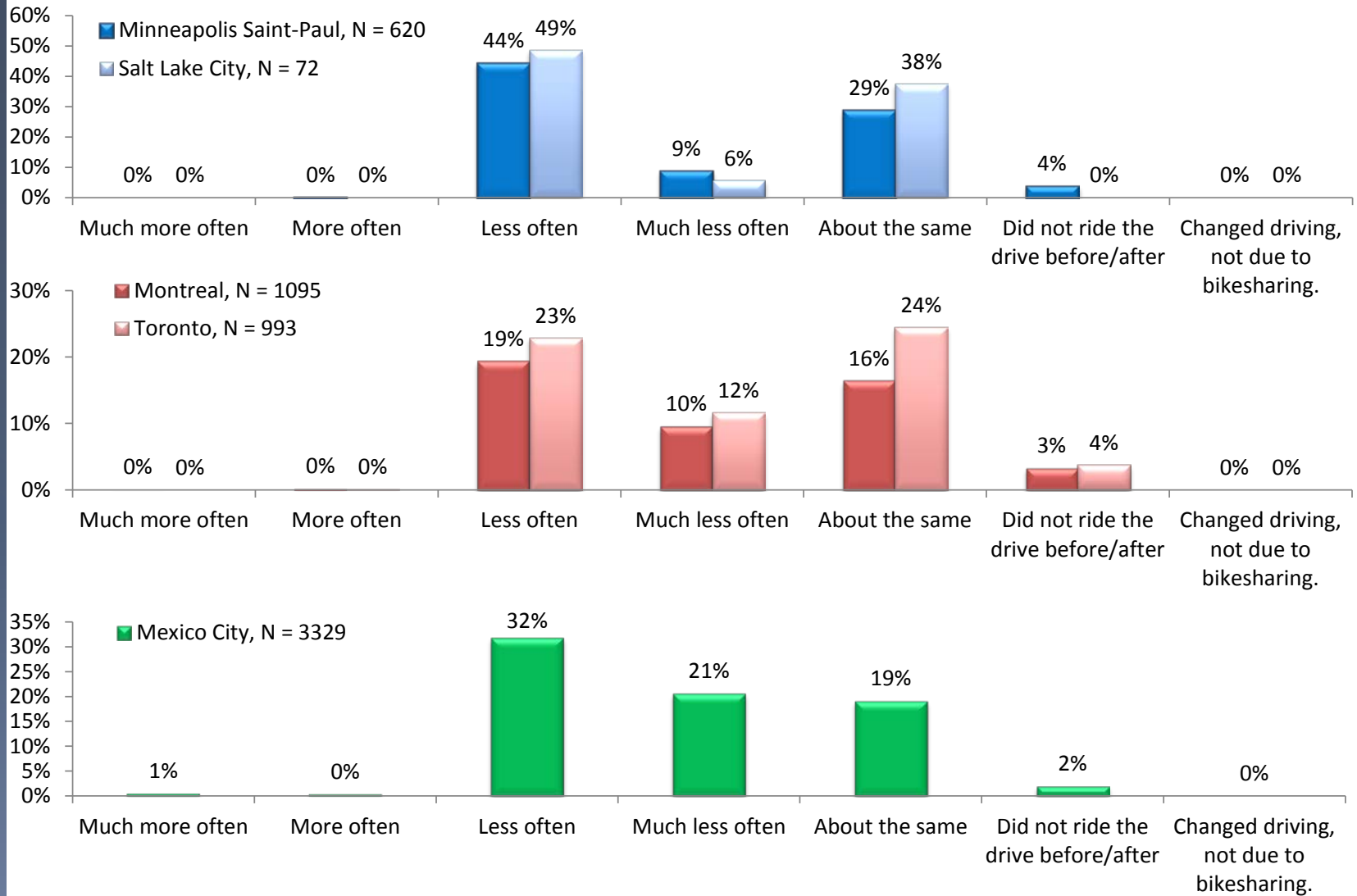
Member Survey: Findings

- Compared to general population bikesharing users tend to be...
 - > Wealthier
 - > More educated
 - > Younger
 - > Caucasian
 - > Male



Member Survey: Key Findings

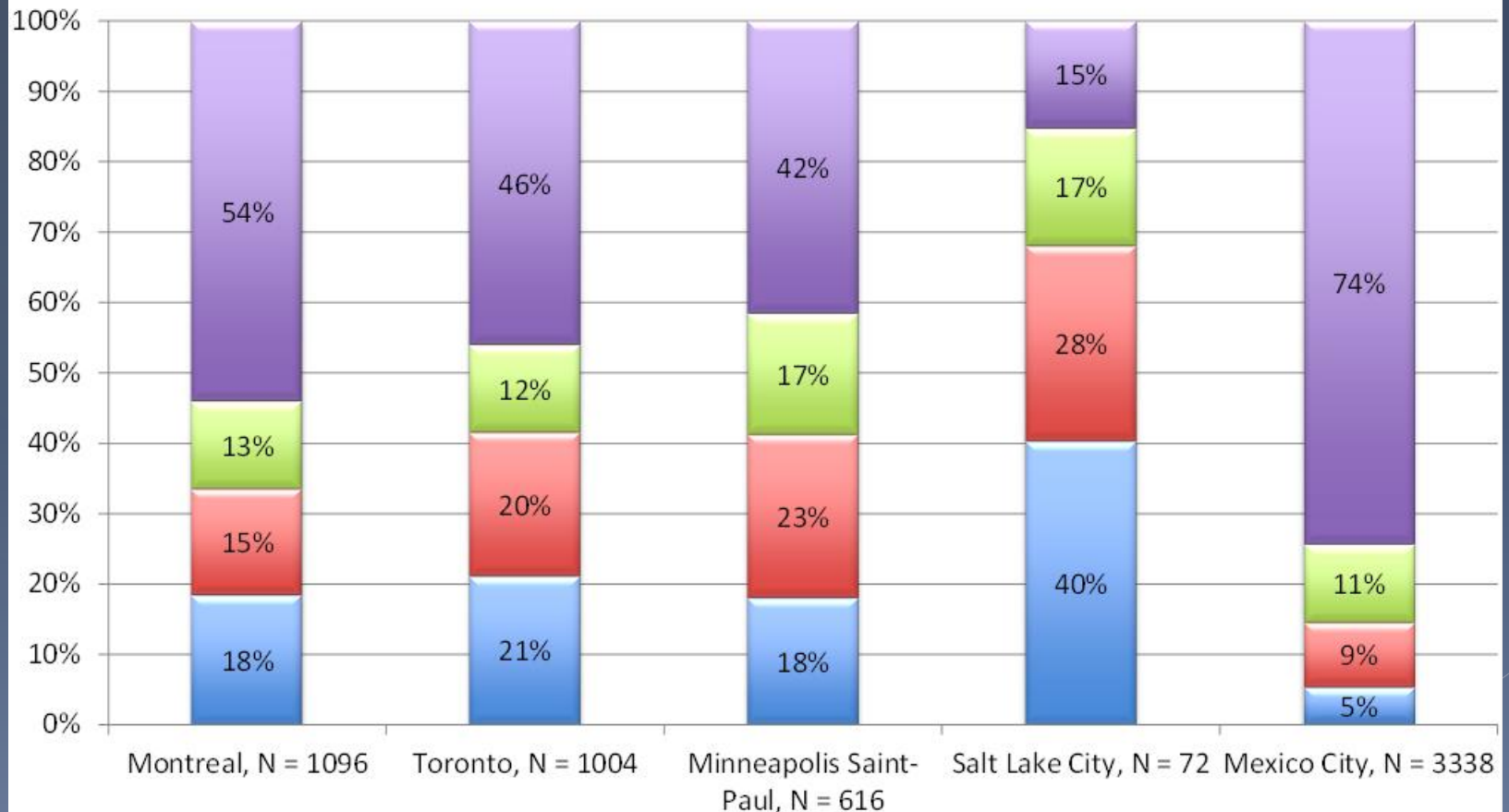
As a result of my use of bikesharing, I drive a personal vehicle (e.g., car, SUV, etc.) ...



Member Survey: Key Findings

How often do you wear a helmet while using bikesharing?

Never Rarely Sometimes Always



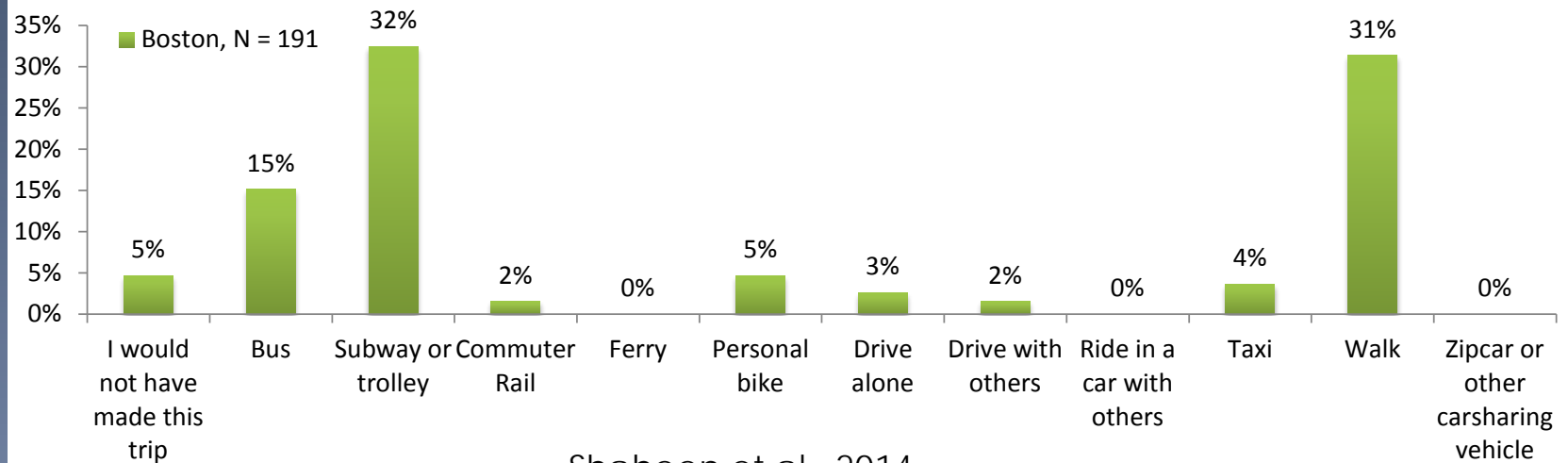
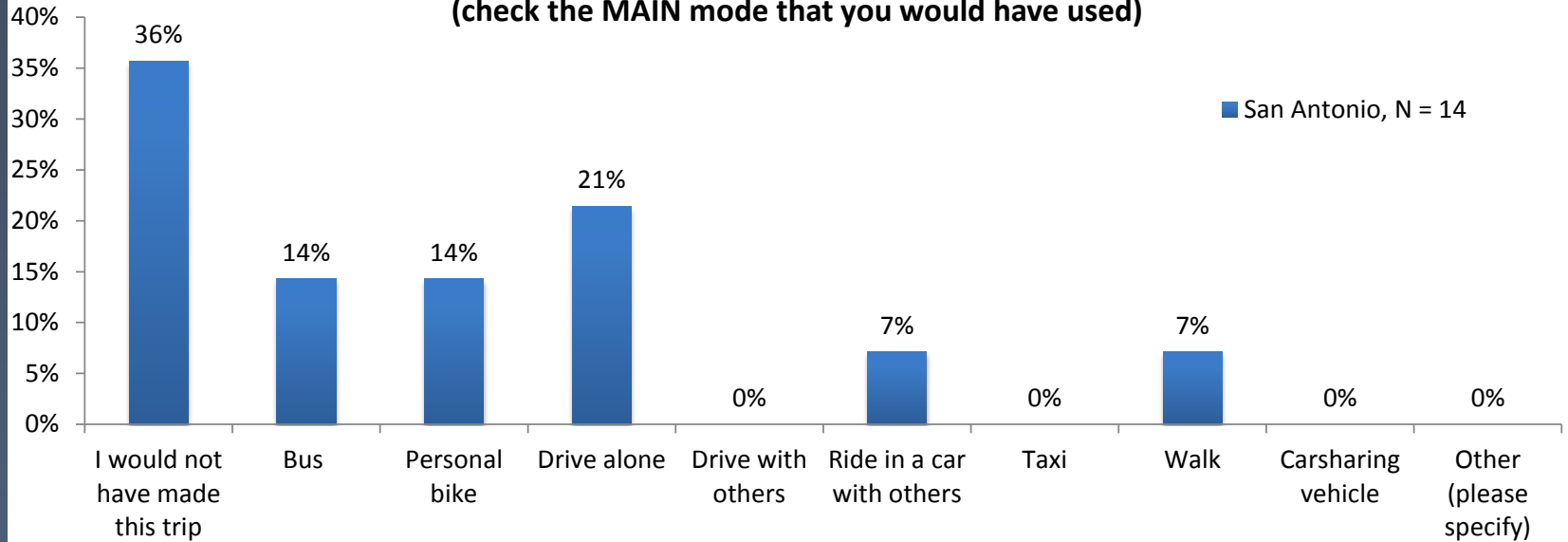
On-Street Survey: Overview



- Programs surveyed:
 - › San Antonio B-cycle – San Antonio, TX
 - › Hubway – Boston, MA
 - › GreenBike SLC – Salt Lake City, Utah
- Goal of survey:
 - › To better understand the behavior of members and casual users based on data collected immediately after the trip.

On-Street Survey: Key Findings

If bikesharing was not available, how would you have made this trip?
(check the MAIN mode that you would have used)



Shaheen et al., 2014

Conclusion

- Bikesharing is *still* growing rapidly in North America
- Rebalancing remains a difficult and expensive issue for operators
- Causal users generate the majority of revenue
- Partnerships are key to program success
- Members drive less as a result of bikesharing
- Bikesharing functions as public transit for many commuters



Acknowledgements



- ◉ Mineta Transportation Institute (MTI), Caltrans, and US DOT
- ◉ Bikesharing operators in North America
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- ◉ Nelson D. Chan (co-author)
- ◉ Adam P. Cohen (co-author)
- ◉ Matthew Christensen, TSRC
- ◉ Russell Meddin, Philadelphia Bike Share



www.tsrc.berkeley.edu



A Snapshot of Capital Bikeshare Travel



Darren Buck

Capital Bikeshare Planning,
District Department of
Transportation
Washington, DC



Join.



Take.



Ride.



Return.





What is Capital Bikeshare?

- A regional bike transit system.
- 3000 bikes at 300+ solar-powered docking stations.
- Launched on September 20th, 2010.
- Designed for relatively short, one-way trips.
- Complements other transport modes.



Join.



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Ride.

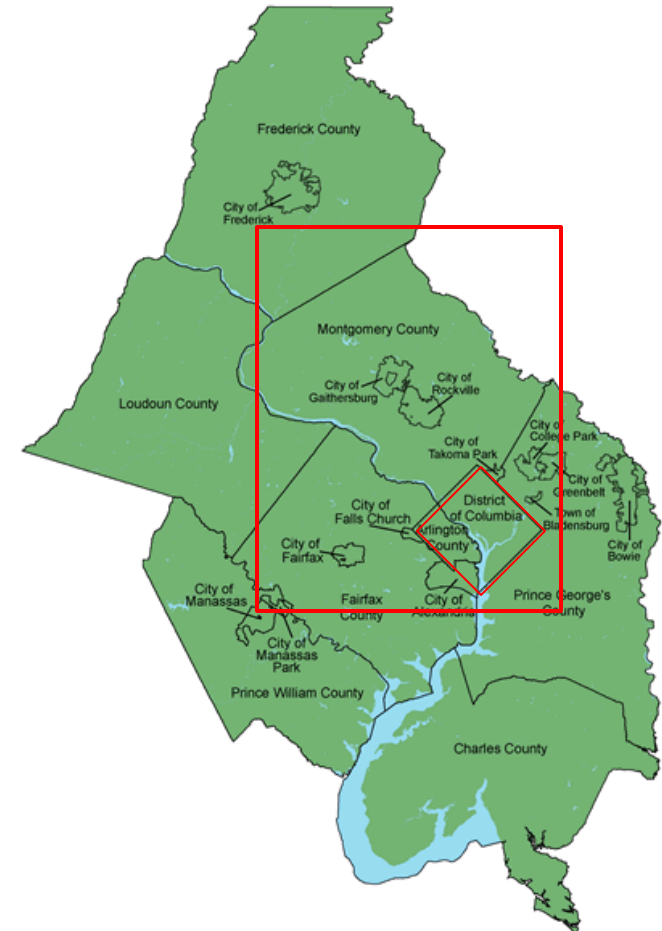


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Who is Capital Bikeshare?

- Started with Arlington County, VA RFP/contract
- DC utilized a rider clause within the MPO to replicate contract
- City of Alexandria, VA joined September 2012
- Montgomery County, MD joined September 2013
- Municipal partnership owns and manages Capital Bikeshare
- All partners use the same contractor: Alta Bicycle Share



Join.



Take.

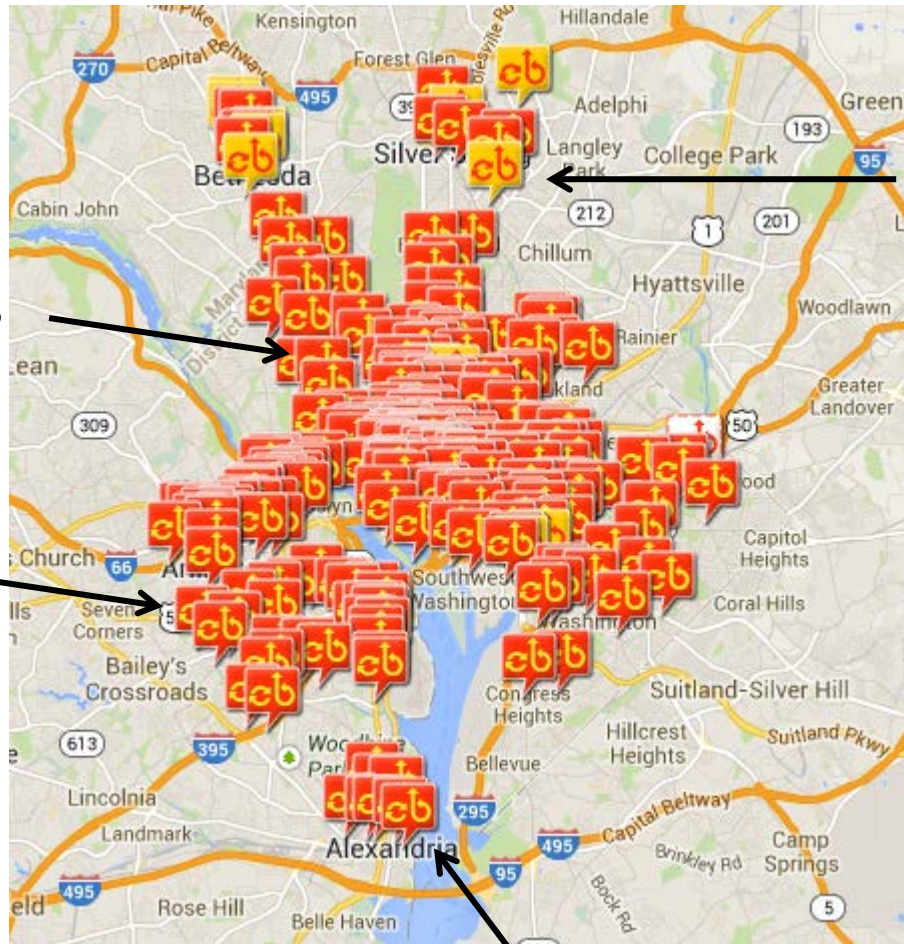


Ride.



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Capital Bikeshare™



Montgomery County – 41 Stations

DC – 194 Stations

Arlington – 70 Stations

Alexandria – 8 Stations



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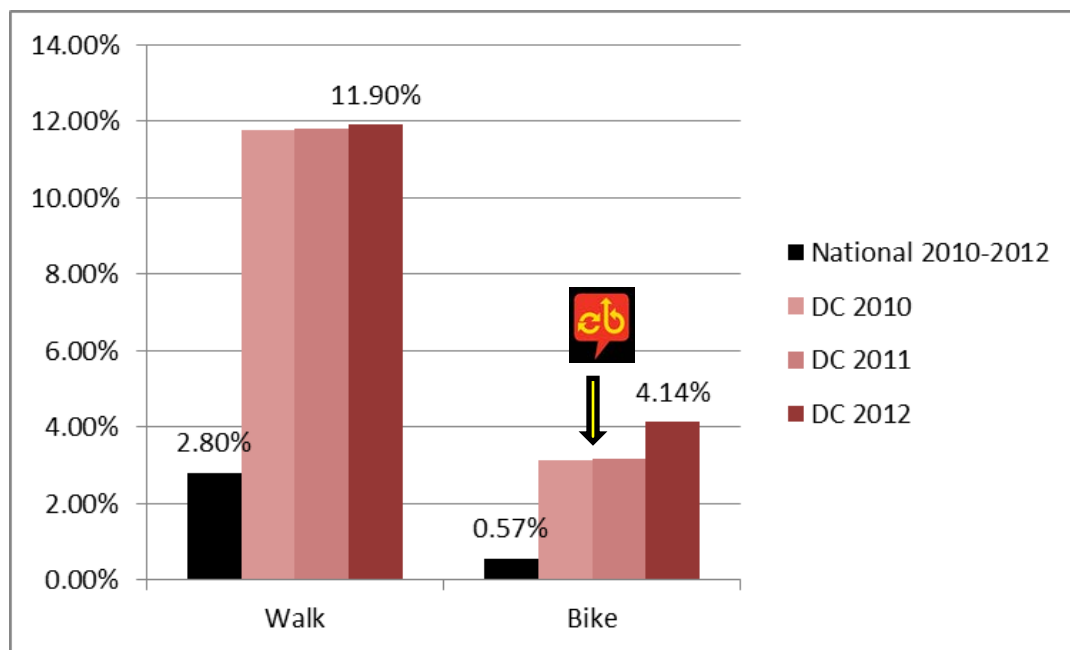


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DC Walks and Bikes to Work



- DC bikes to work at over 7 times the national share

- DC bike modeshare rising at over twice national rate from '10 – '12 (32% vs 15%)



Capital Bikeshare introduced

Census ACS Means of Transportation to Work, 2010 – 2012. 3-Year National data, individual years for Washington, DC.



Join.



Take.



Ride.



Return.





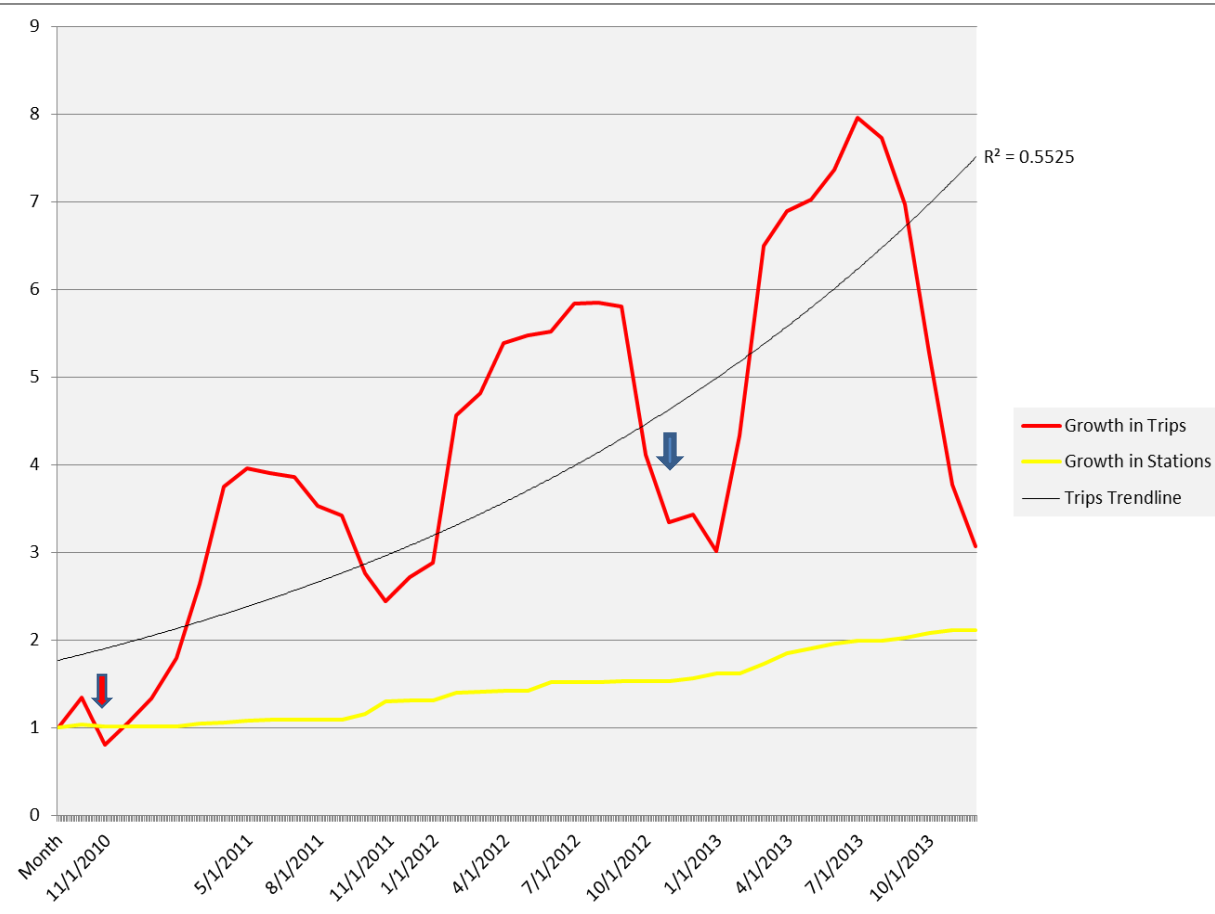
Trips (DC only)

- Over 6.2 million total trips systemwide (5.8M DC)
- Aug 2013 – 273,045 trips in DC (8x opening month)
- Estimated 6.2% of all bike trips in DC are by CaBi

Stations (DC only)

- From 90 up to 194 stations (2.2x opening month)

- ↓ 2-way 15th Street Cycletrack installed
- ↓ 1-way L Street Cycletrack installed



Source: CaBi Dashboard trip data, Sep 2010 – Jan 2014, internal DDOT records of station deployment



Join.



Take.



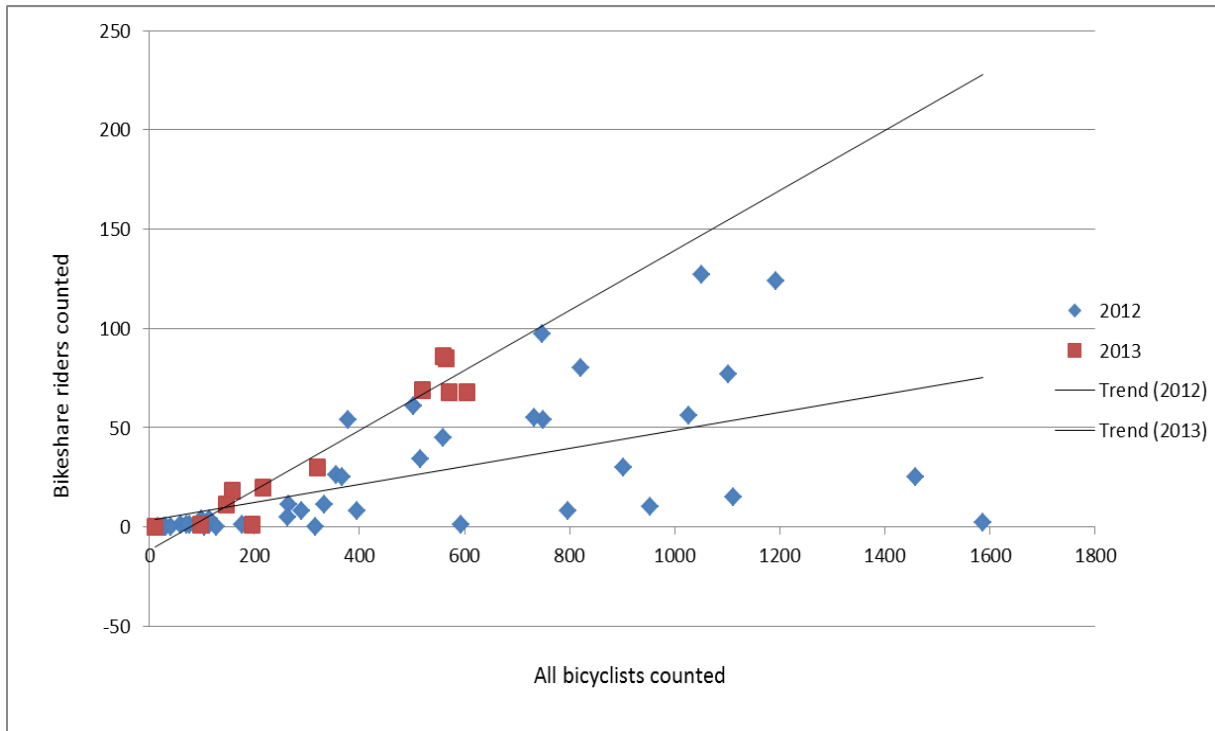
Ride.



Return.



CaBi Share of DC Bicycling



- **2012: 5.2% of observed riders appeared to be riding CaBi bikes**
- **2013: 11.5% (didn't count at higher volume bridge/trail points)**
- **Bikeshare played big role in 2012 ACS bicycling rise (perhaps 50%?)**

Source: DDOT June 2012 and June 2013 peak period screenline bicyclist counts



Join.



Take.



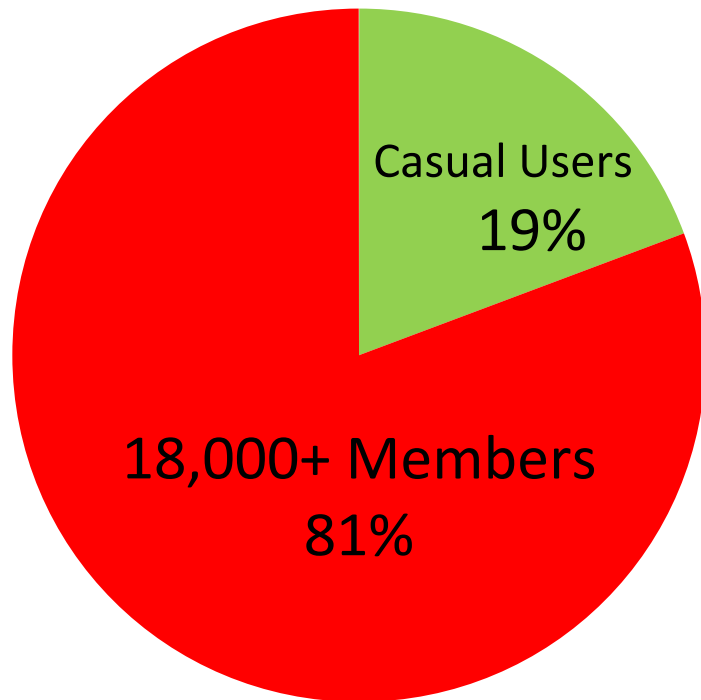
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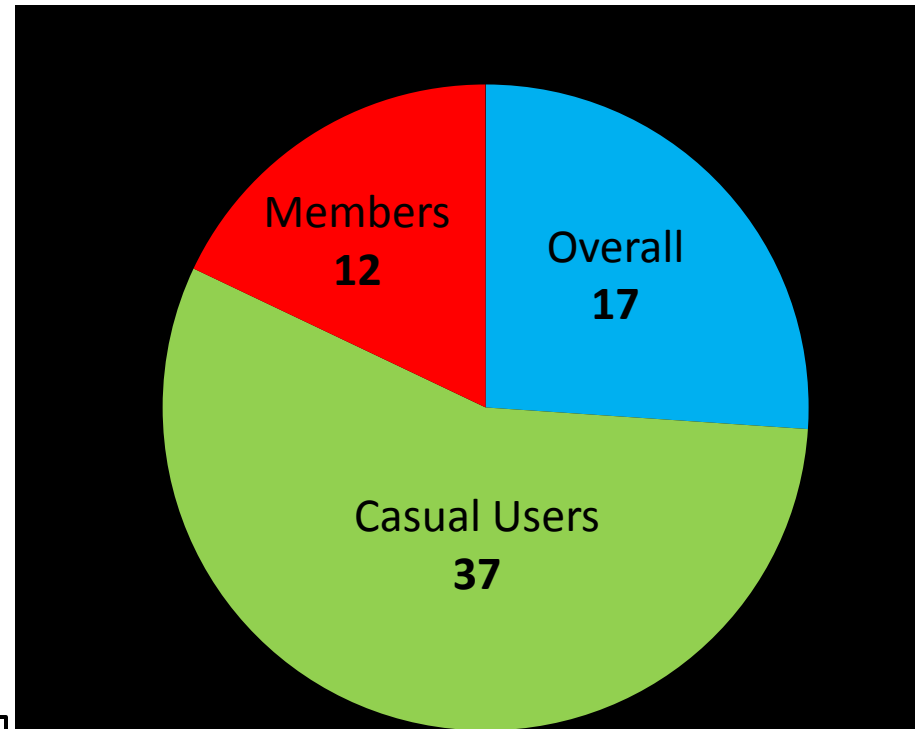


Most Rides by Annual Members



Percent of Total Trips Taken by Membership Type

Source: CaBi Dashboard trip data, Sep 2010 – Jan 2014



Average Trip Duration (Minutes)
Estimated Avg Trip Distance: ~1.5 mi



Join.



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Ride.

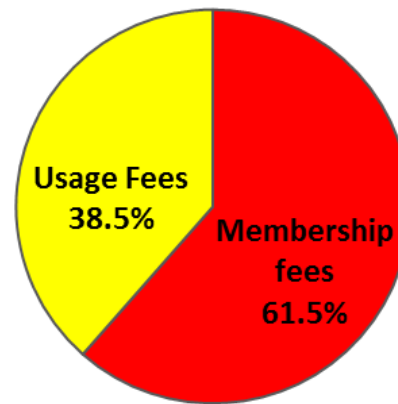


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DC Bikeshare Revenue Breakdown



CY 2013 Gross Revenue



- Majority of DC's revenue from membership fees of all types
- High proportion of usage fees come from casual users

Source: Internal DDOT financial reports



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Ride.



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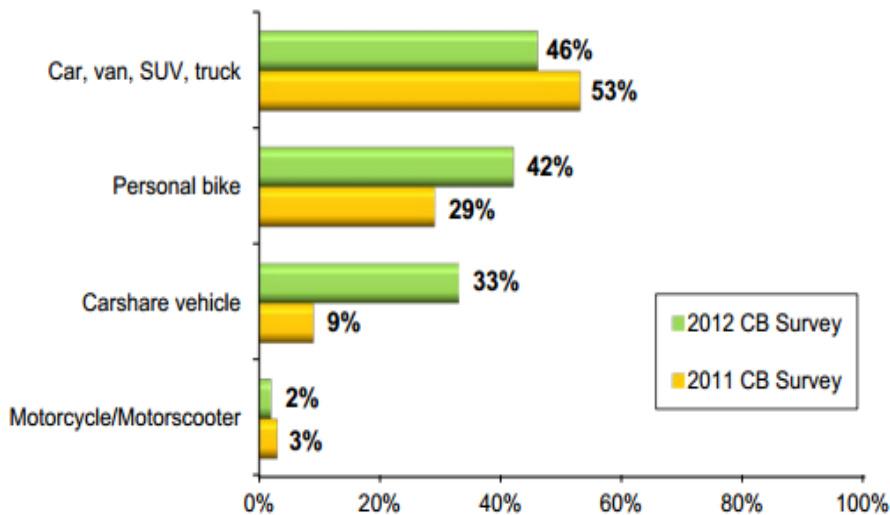


Supplementing Car-Lite Travel

Vehicles and Other Personal Transportation Options Regularly Available for Travel

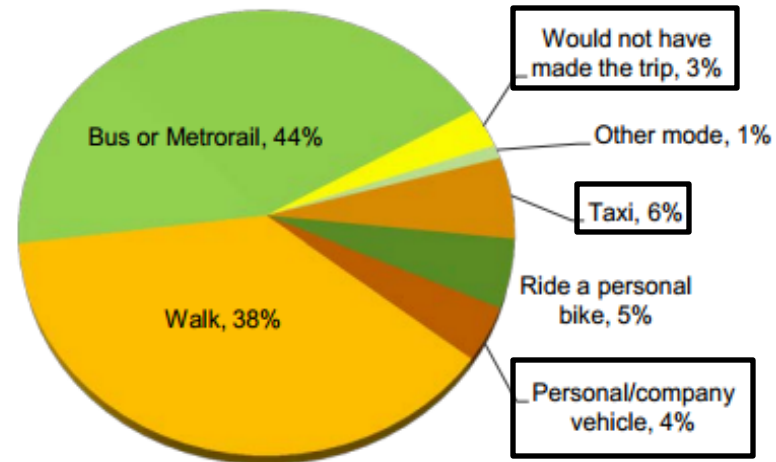
2012 and 2011 CB Survey

(2012 n = 3,731; 2011 n = 5,464)



Travel Options for Most Recent Trip if Bikeshare Not Available

(n = 2,814)



Source: 2013 Capital Bikeshare Member Survey Report



Join.



Take.



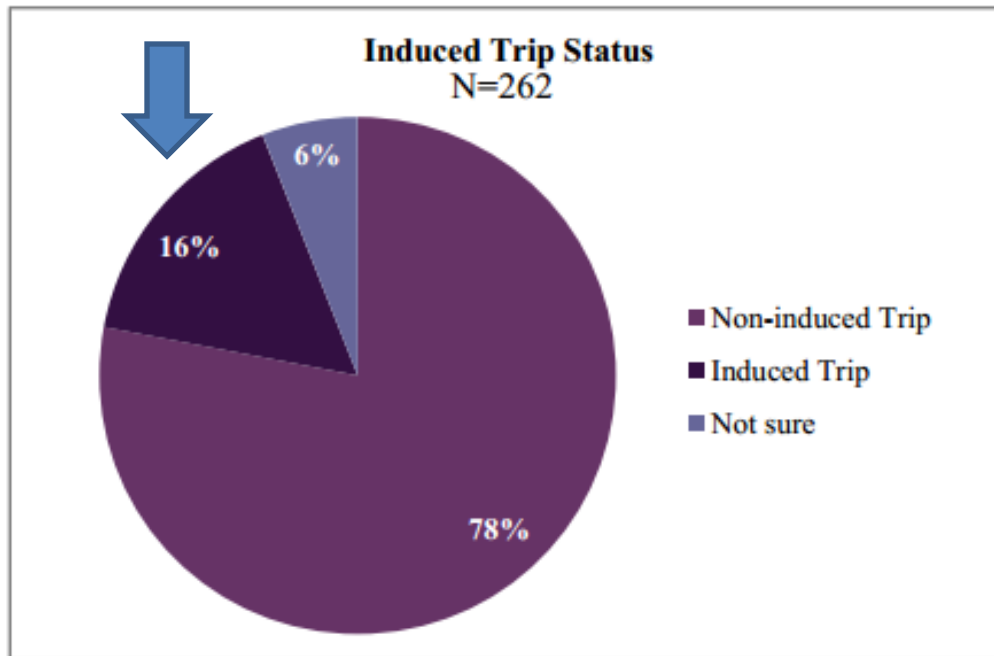
Ride.



Return.



Bikeshare Helps Grow Retail



- Intercept survey of CaBi riders arriving at retail destinations
- Without a CaBi station, 16% report that they would not have taken the trip
- Induced CaBi trip-takers spent an estimated \$75-127K at the 5 surveyed stations in 2Q 2013

Source: Virginia Tech report, "Economic Impacts and Operational Efficiency for Bikeshare Systems," Dec 2013.



Join.



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Ride.

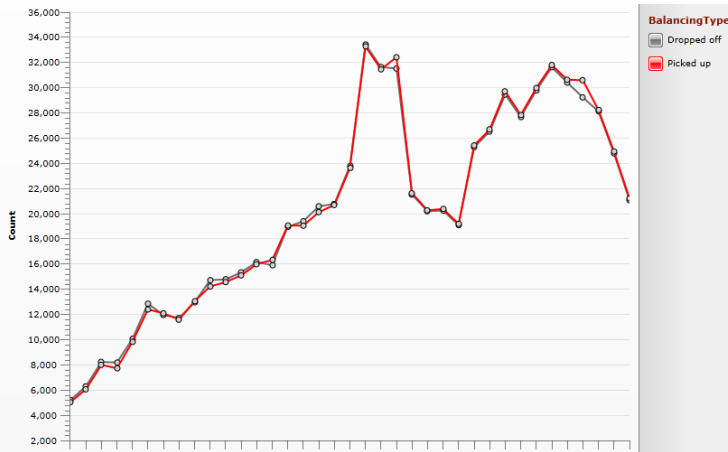


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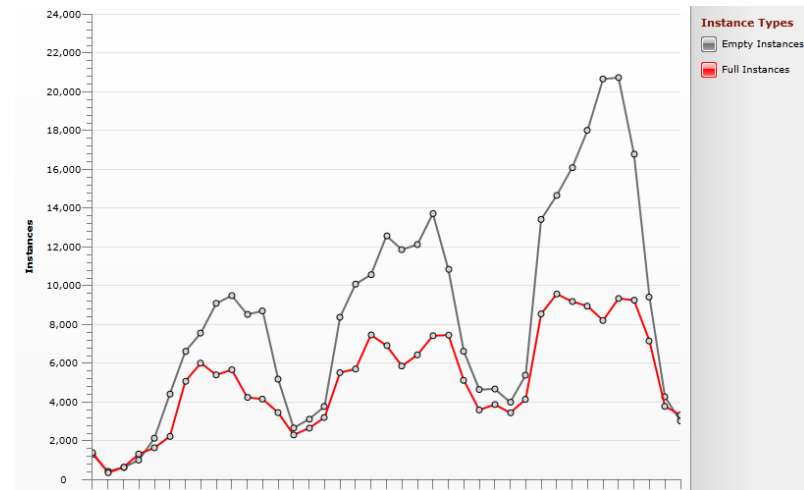


Demand > Supply

- Alta (system contractor) redistributes 15-30K (or more!) bikes per month
- 8 trucks, 2 locations



- Demand still outpacing both capital and operations growth
 - Morning commute inflow demand cannot be met 100%



Source: CaBi Dashboard operations data, Sep 2010 – Jan 2014



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To start, choose a membership.
(How long do you want access to the bikes?)

JOIN AT STATIONS

24-Hour
\$7

3-Day
\$15

JOIN ONLINE
(get your own key & save 25% on usage fees)

Daily Key
\$10

\$10 one-time key fee includes one 24-hour membership. Additional \$7 each day you ride

Month
\$25

— OR —

Annual
\$75

Annual
\$7 per month
with monthly installments

⚠ YOUR COST = Membership fee + Usage fee per trip

The first 30 minutes of EVERY trip are FREE throughout your membership period.
Trips beyond 30 minutes will incur usage fees.

 0 - 30 minutes FREE	 31 - 60 minutes \$2	61 - 90 minutes \$6	Each additional 30 min +\$8
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Members save 25% on usage fees. You must use a credit card to join Capital Bikeshare.

For station locations, visit capitalbikeshare.com

Carrots and Sticks?

- Charge a “cordon” congestion charge?
- Boost reverse-peak rides?
- Make more costs variable with a per-trip “fare” model?
- Encourage users to “graduate” to personal bikes?
- New contractual incentives/penalties?
- Or just “build our way out?”
- *What would the impact on ridership be?*



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Planning for Continued Performance

- Long term sustainability plan
- Achieve long-term transpo plan bikeshare targets
- Goals for ridership, equity, accessibility, environment, & efficiency
- 26 draft measures of success
- Guide future stations, investments, promotions, pricing, and other tactical decisions



Join.



Take.



Ride.



Return.

capital bikeshare™



Capital Bikeshare surveys, data dashboard, and trip record archives

capitalbikeshare.com/system-data

CaBiTracker

<http://cabitracker.com/>

Virginia Tech report, “Economic Impacts and Operational Efficiency for Bikeshare Systems”

<http://ralphbu.files.wordpress.com/2014/01/virginia-tech-capital-bikeshare-studio-report-2013-final.pdf>

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@bikepedantic



Join.



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Ride.



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Denver B-cycle

B

Understanding Denver B-cycle Use

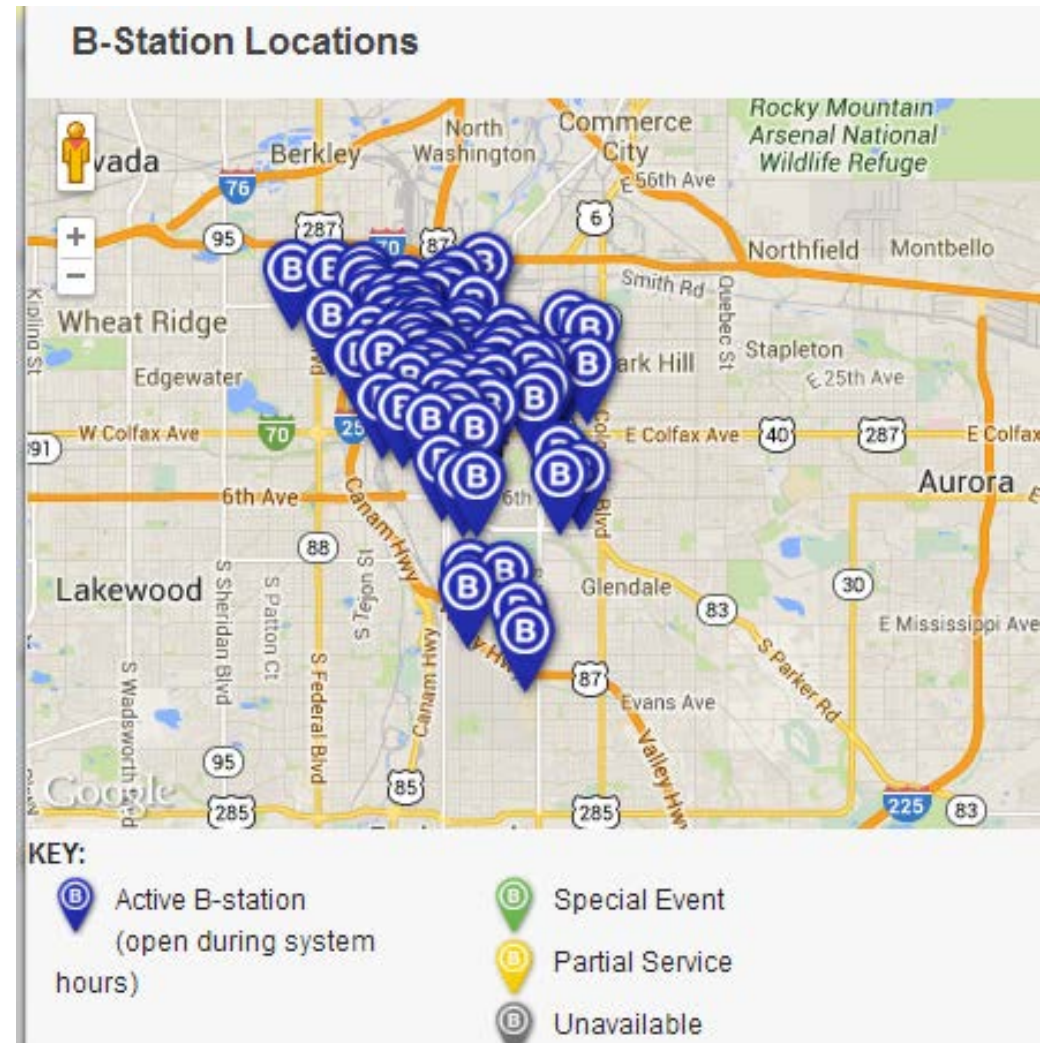
Nick Bohnenkamp
Executive Director
Denver B-cycle



Denver B-cycle system at a glance

B

- 700 bikes at 82 stations
- Launched April 22nd, 2010
- 12.5 square mile service area
- Tie to Boulder B-cycle
- 2 truck balancing fleet

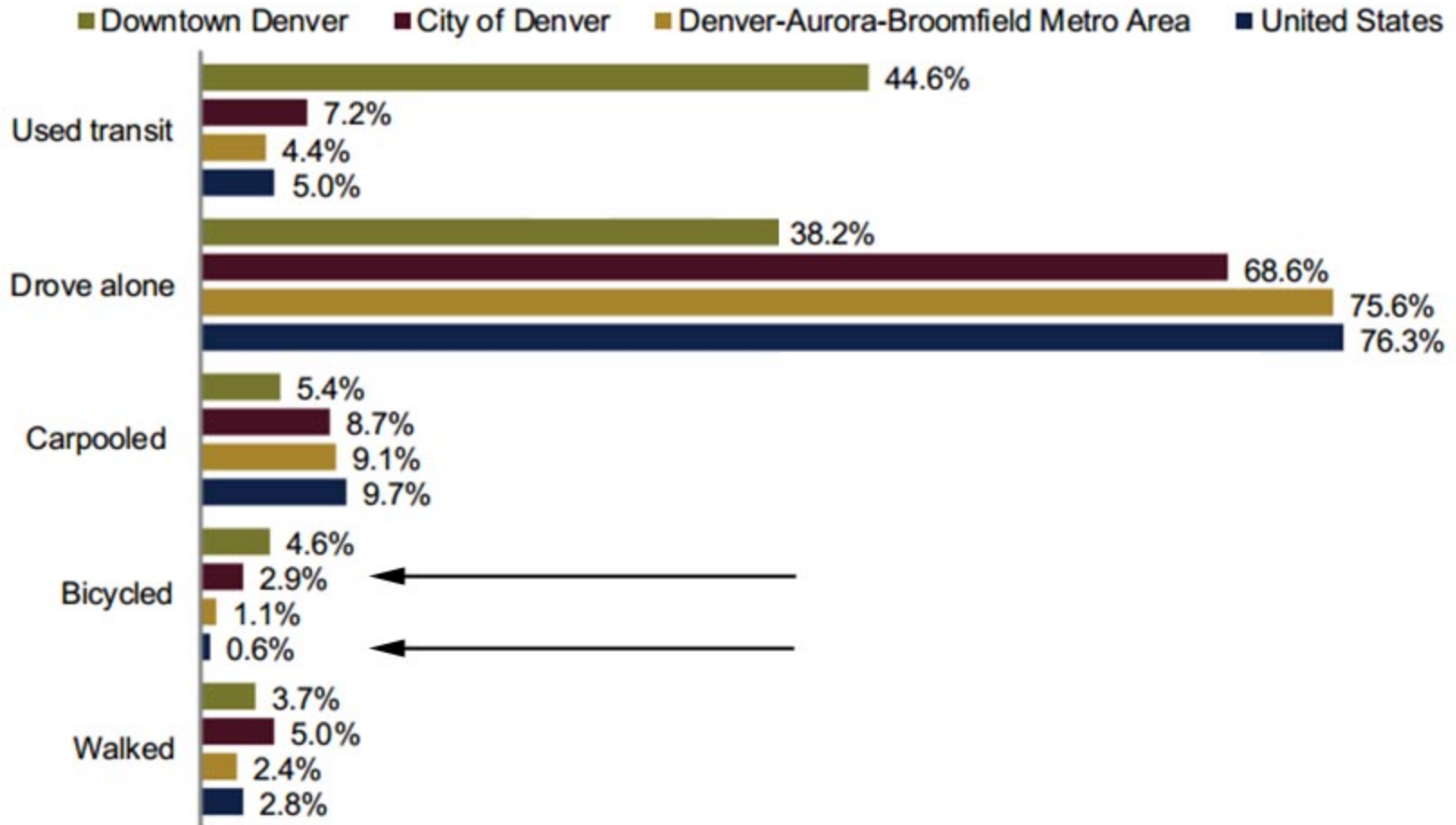


Denver mode share



Geographic mode split comparison

Sources: 2013 Downtown Commuter Survey and
2012 U.S. Census Bureau American Community Survey 1-Year Estimates

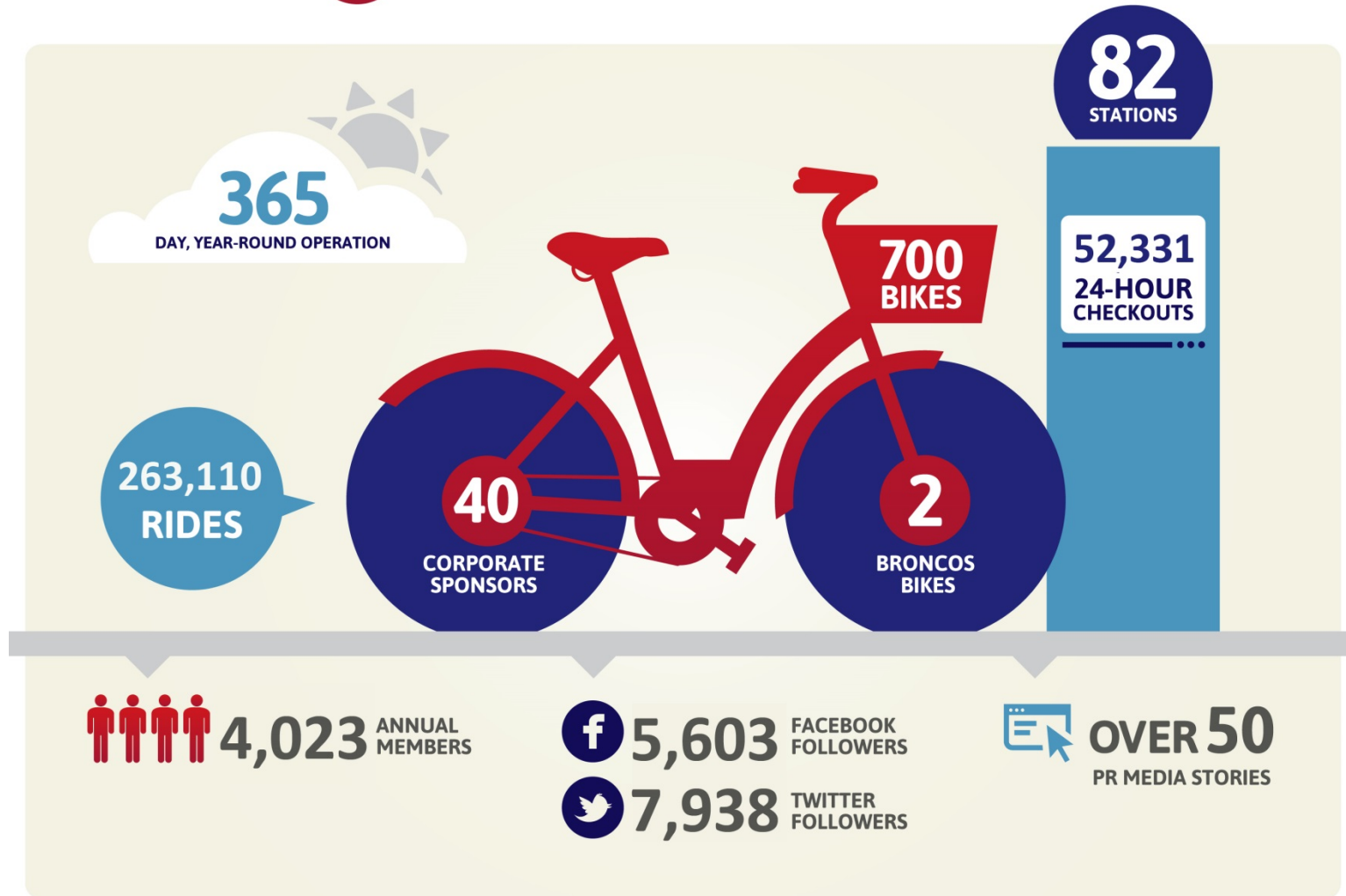


2013 season results



DENVER **B** *cycle*

2013 BY THE NUMBERS

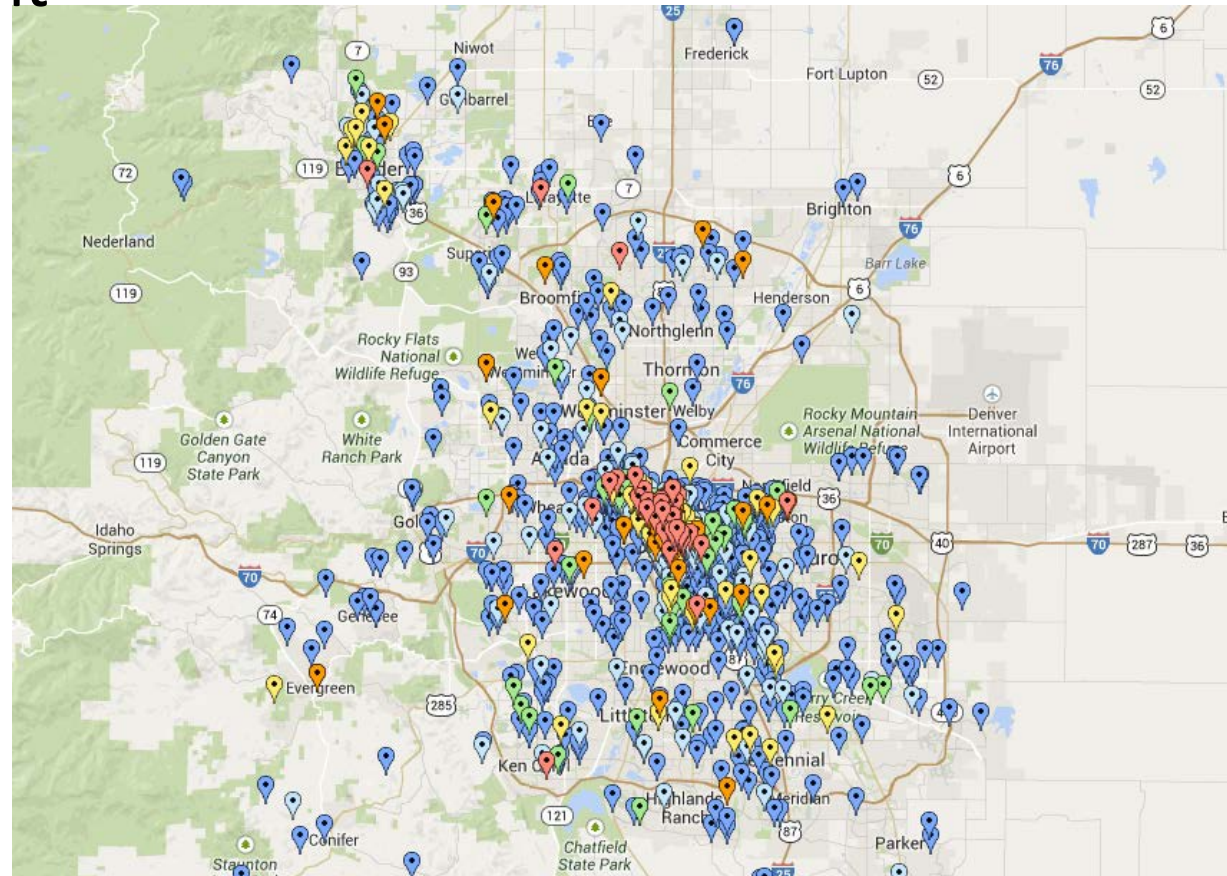


RELIABILITY // INCLUSIVITY // SAFETY // HEALTH

Where do our members live?

B

- Annual Member footprint much larger than system footprint
- Casual users:
 - 50% out of state
 - 33% Denver
 - 17% in state (non Denver)

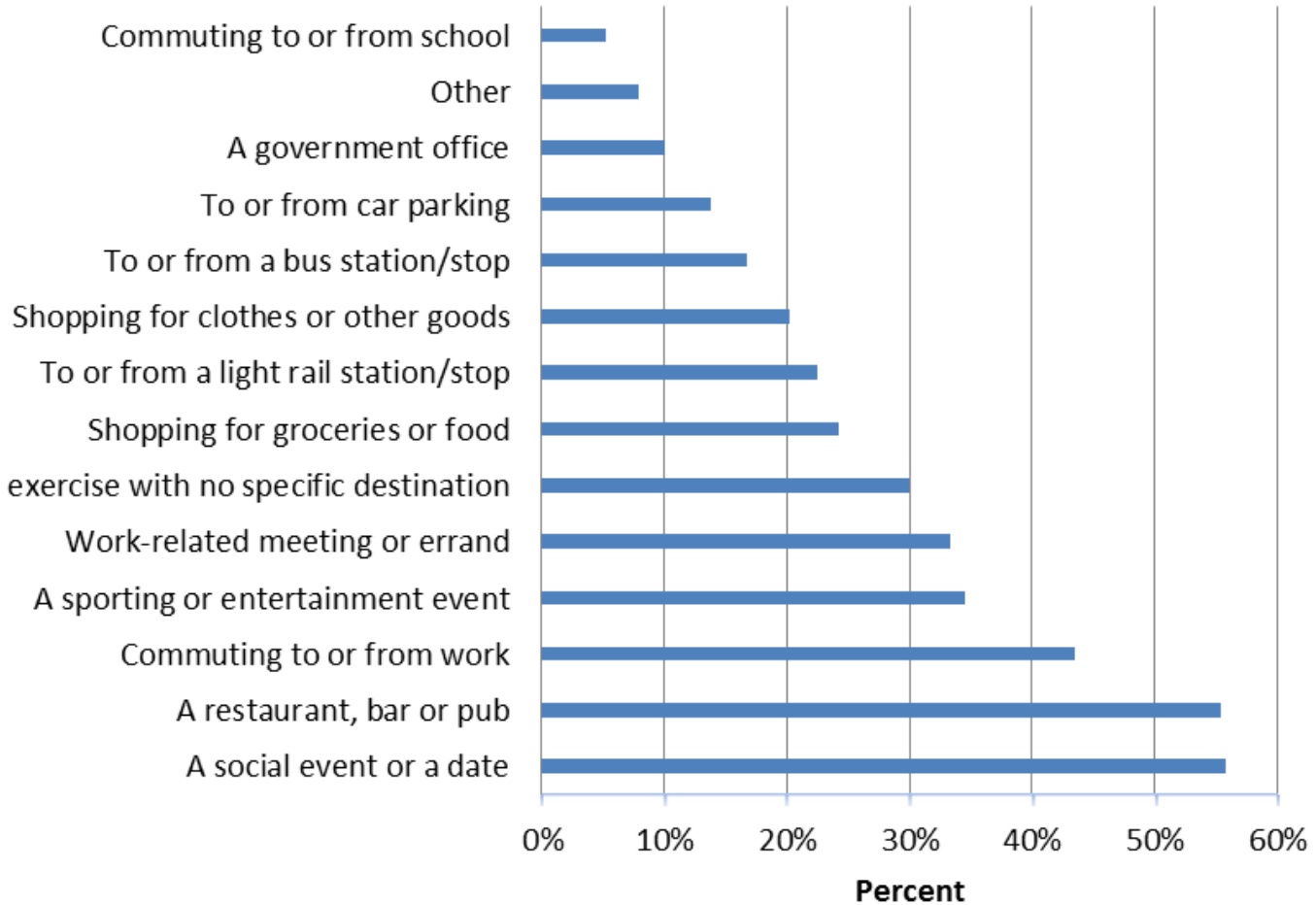


Annual Members by Home Address

Why do our members use B-cycle?

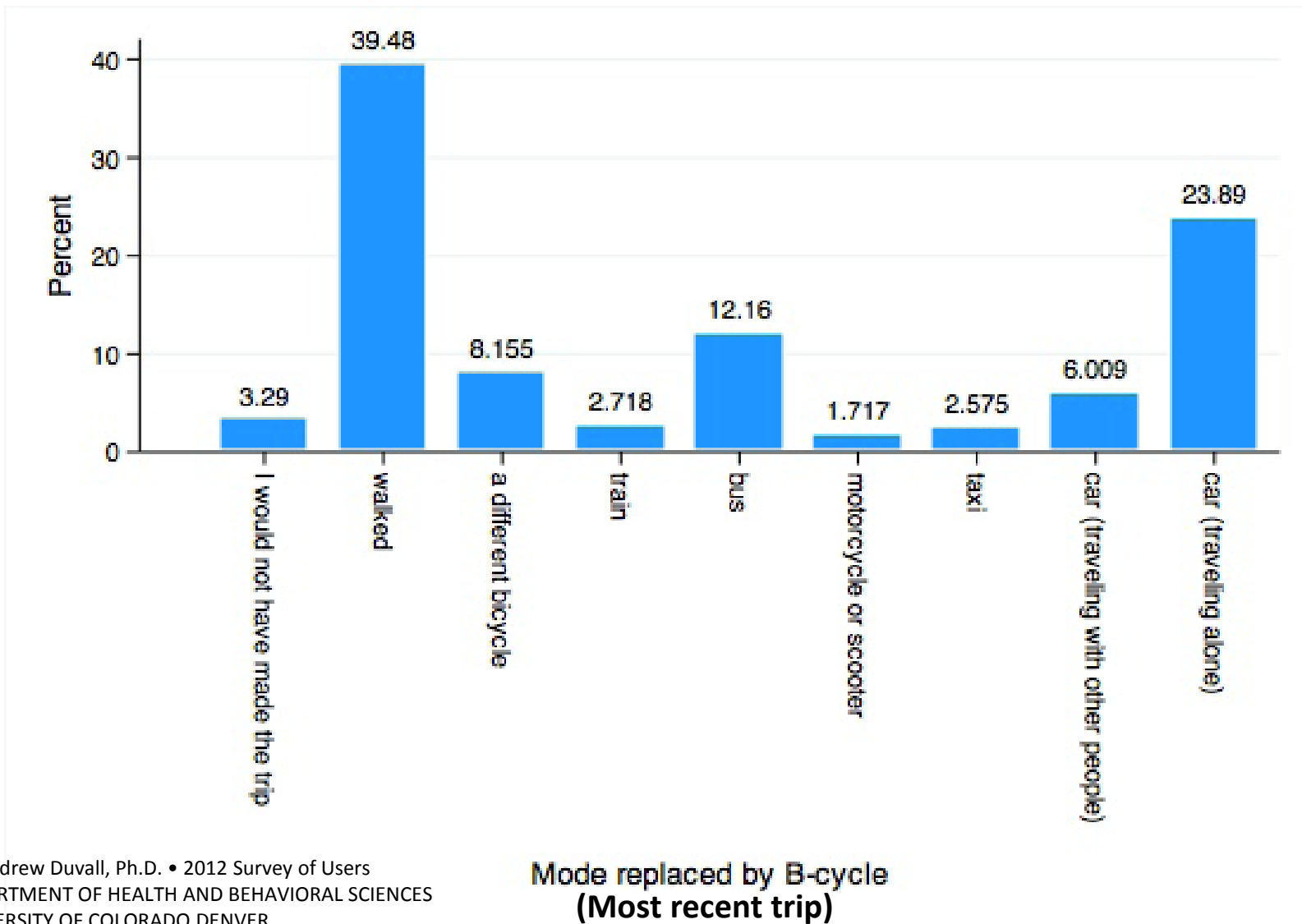
B

Reasons for Using B-cycle



By Andrew Duvall, Ph.D. • 2012 Survey of Users
DEPARTMENT OF HEALTH AND BEHAVIORAL SCIENCES
UNIVERSITY OF COLORADO DENVER

Modes replaced by B-cycle



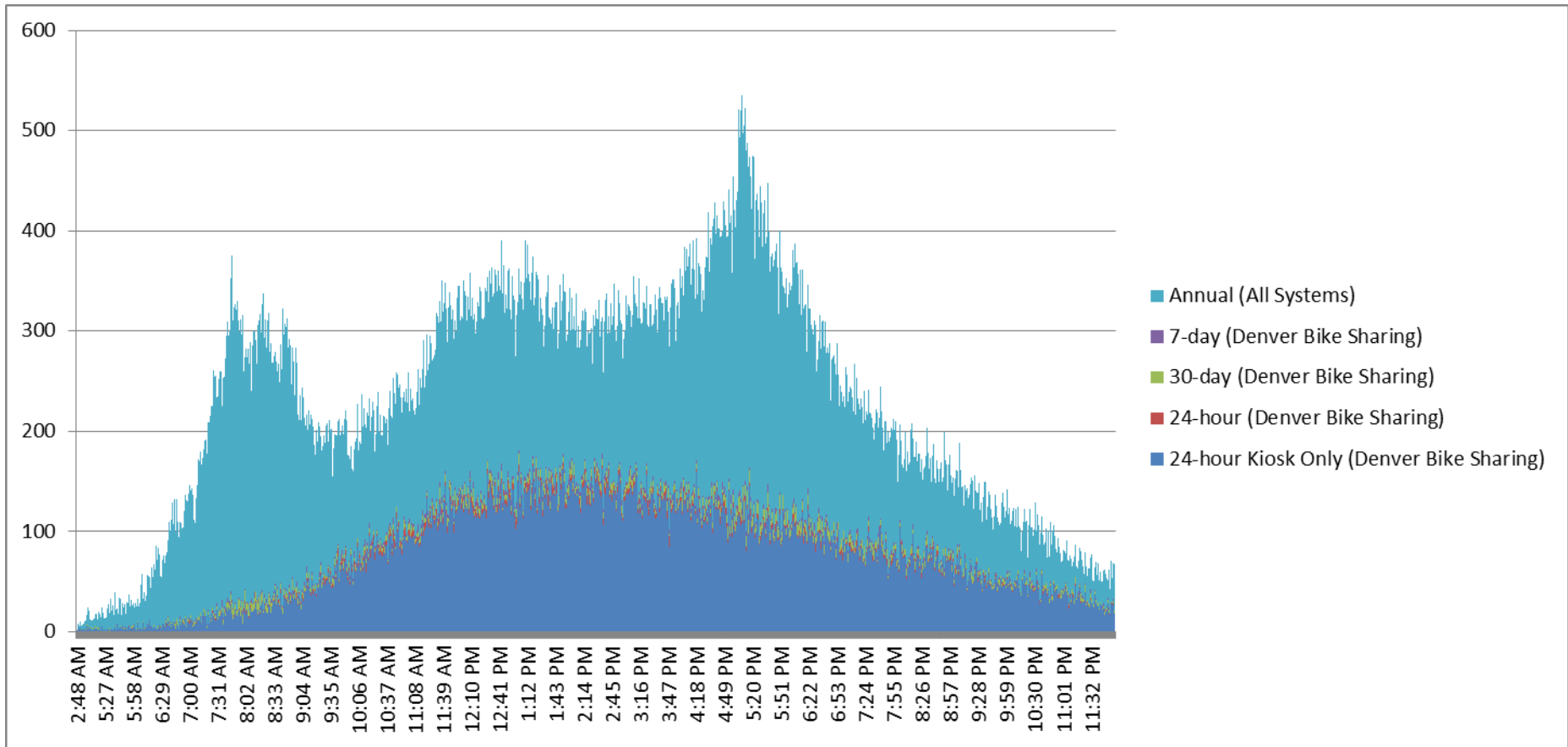
By Andrew Duvall, Ph.D. • 2012 Survey of Users
DEPARTMENT OF HEALTH AND BEHAVIORAL SCIENCES
UNIVERSITY OF COLORADO DENVER

Mode replaced by B-cycle
(Most recent trip)

Trip Data: Annual vs Casual Users

B

Checkouts by Time of Day



Trip Data: Annual vs Casual Users



Checkouts by Day of Week

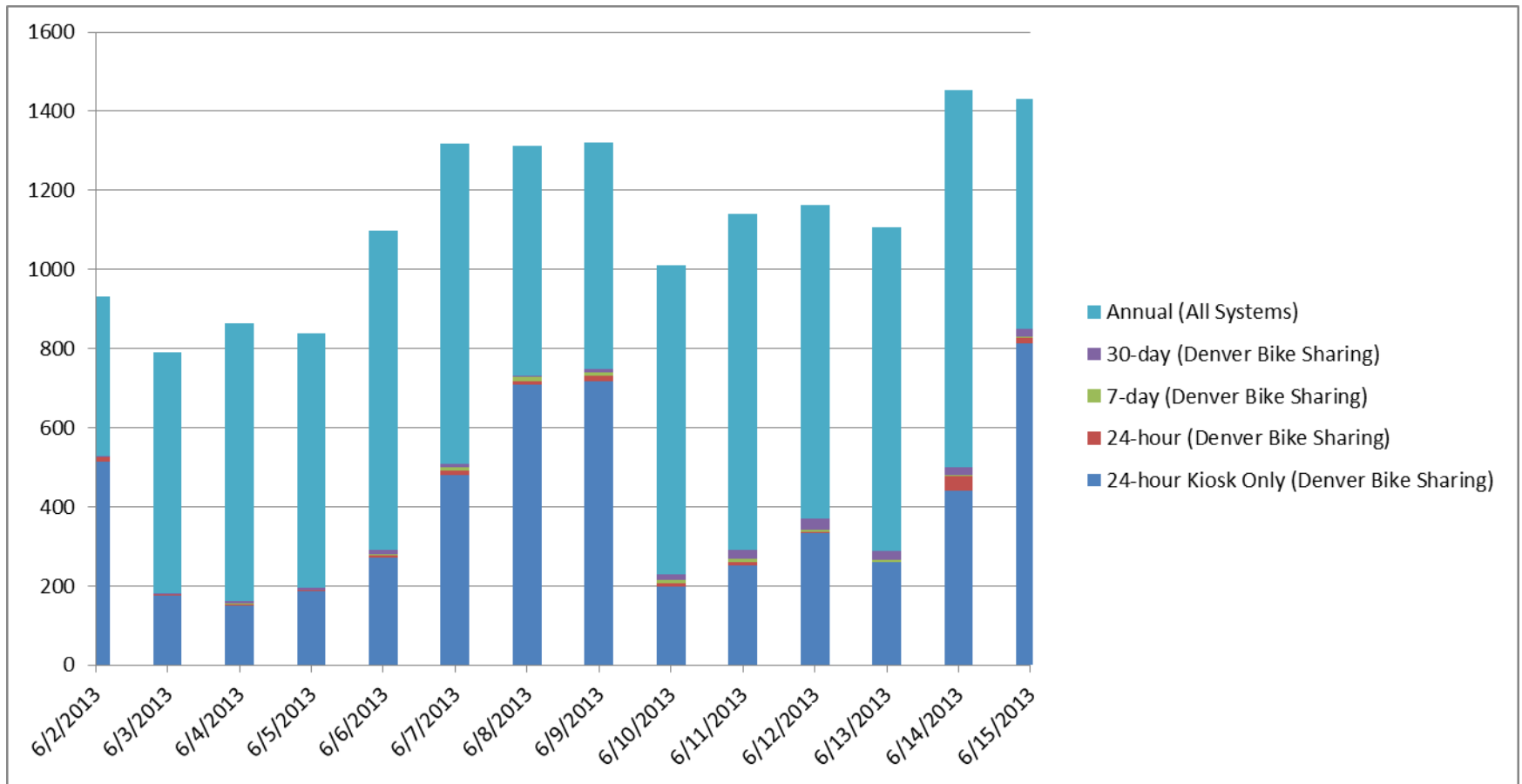
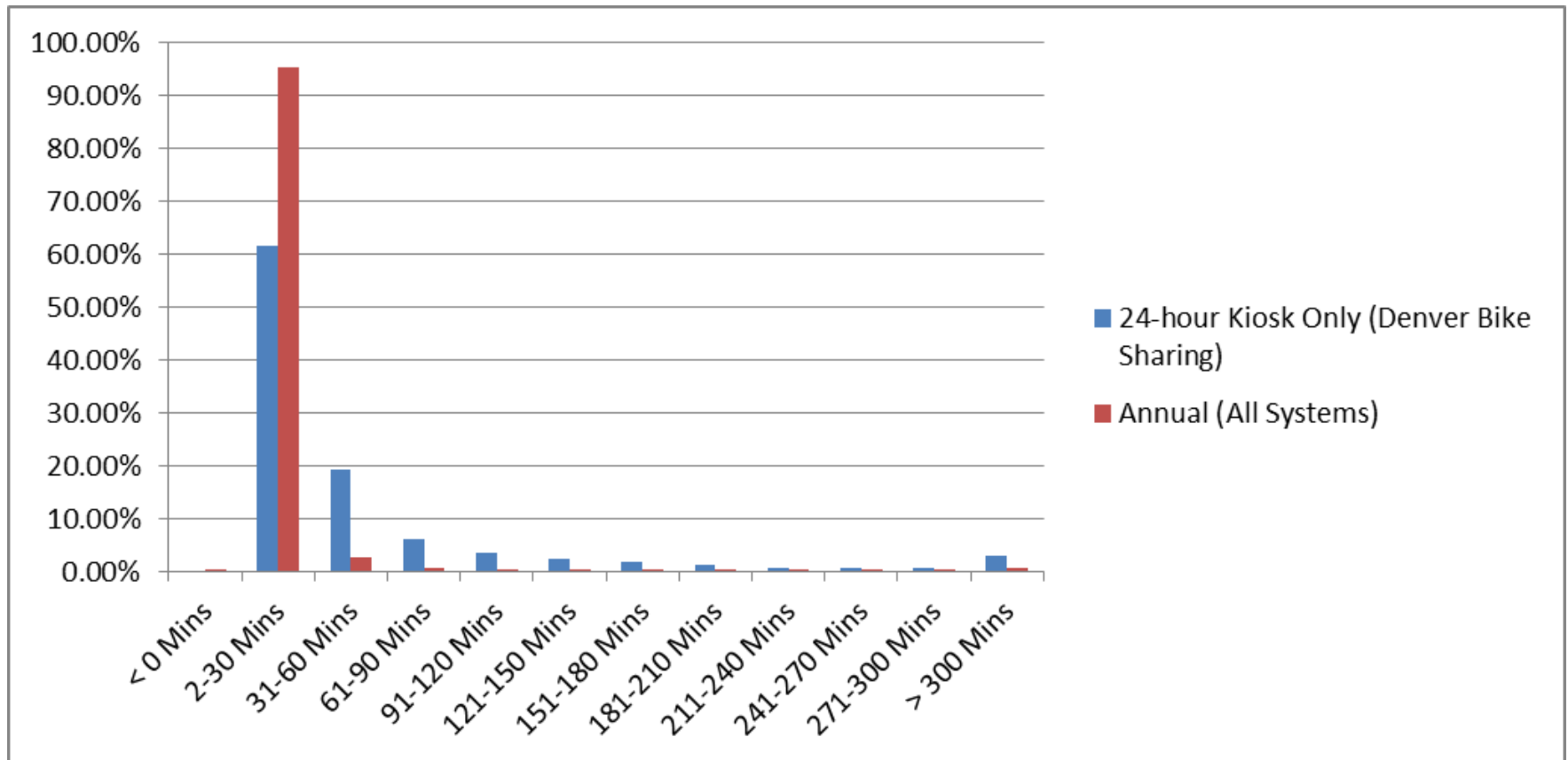


Chart represents Sunday through Saturday, two-week period

Trip Data: Annual vs Casual Users



Trip Durations by Member Type

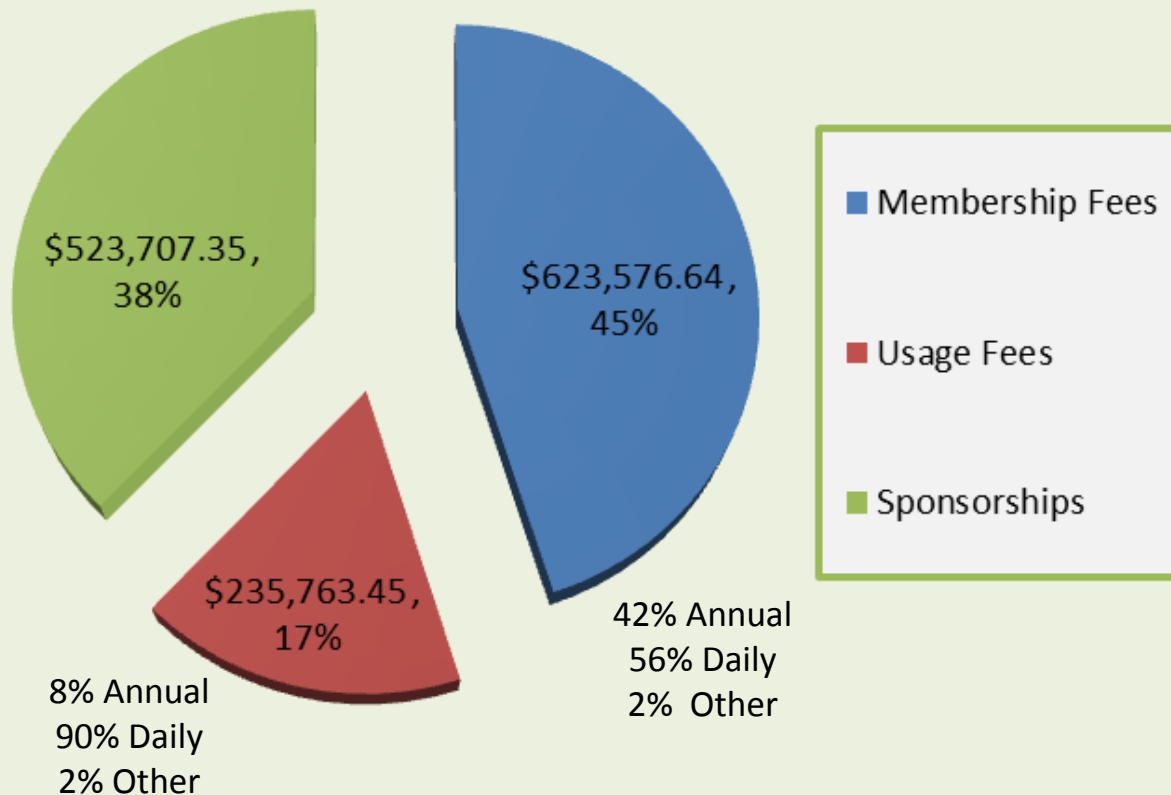


Operational Impacts

- Weekends, Weekdays, Events
 - Demand, pre-balancing, & balancing for “an area”
 - Full/empty station status
 - Event pricing
- 50% System Expansion in 2013 lead to:
 - ~30% increase in trips
 - 47% increase in annual membership
 - 29% increase in casual memberships
- Customer Service and brand building.

Financial Impacts

2013 Select Operating Resources



Planning for the Future

B

- Defining Expansion Plan Priorities
- Service Reliability Standards
- Membership Growth and Equity
 - Pricing schedules and membership types
- Sponsorship Revenue Streams

Denver B-cycle

B

Nick Bohnenkamp
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denverbikesharing.org



RELIABILITY // INCLUSIVITY // SAFETY // HEALTH