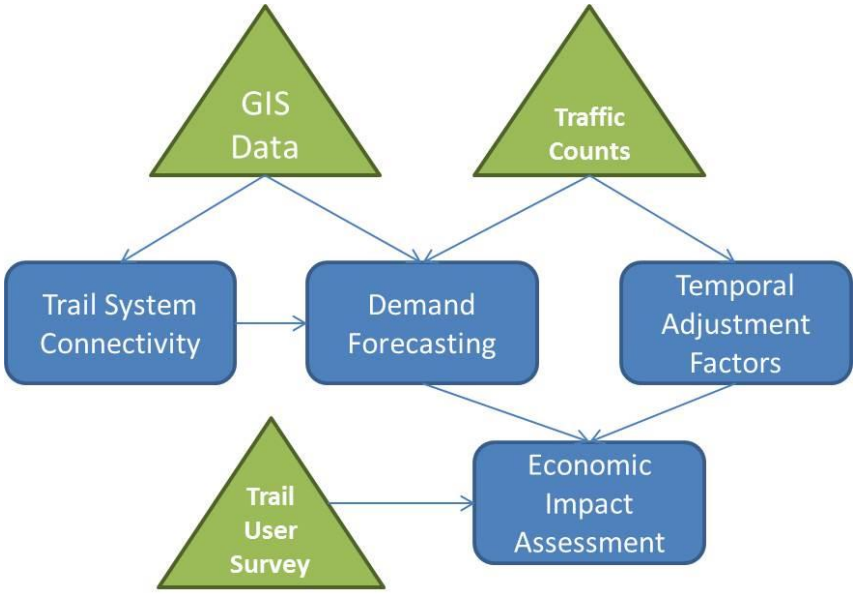
Creating the Next Generation of Trail Planning Tools

Tracy Hadden Loh, PhD

Carl Knoch

International Trails Symposium * May 19,2015 * Portland, OR

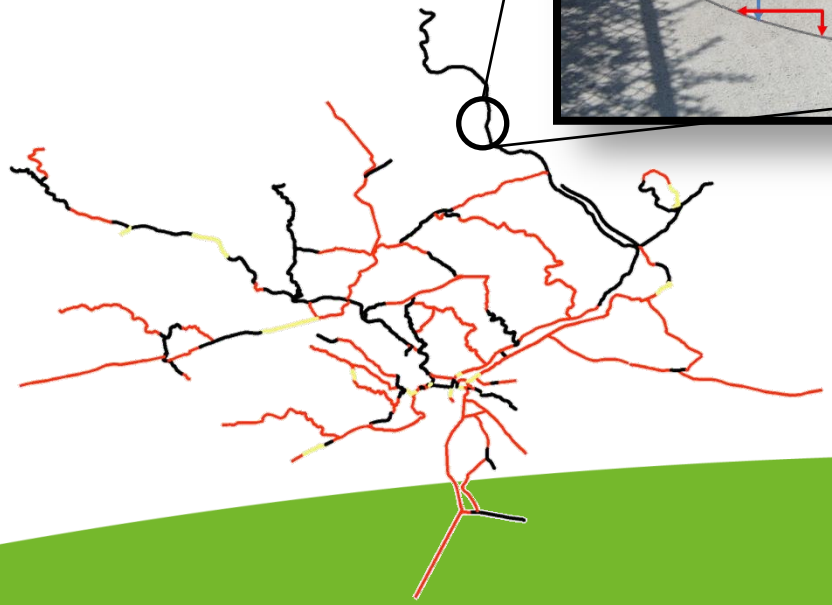
The Trail Modeling and Assessment Platform (T-MAP)



To the Field: Collecting and Using Trail User Data in Practice

The Trail Modeling and Assessment Platform (T-MAP)

A Practitioner-Rooted Research Project



RTC 101

- Founded in 1986
- 150,000 Members and supporters
- HQ in DC with 4 Regional Offices
- 40+ Staff

rails-to-trails conservancy

Our Mission

"To create a nationwide network of trails from former rail lines and connecting corridors…

…to build healthier places for healthier people."

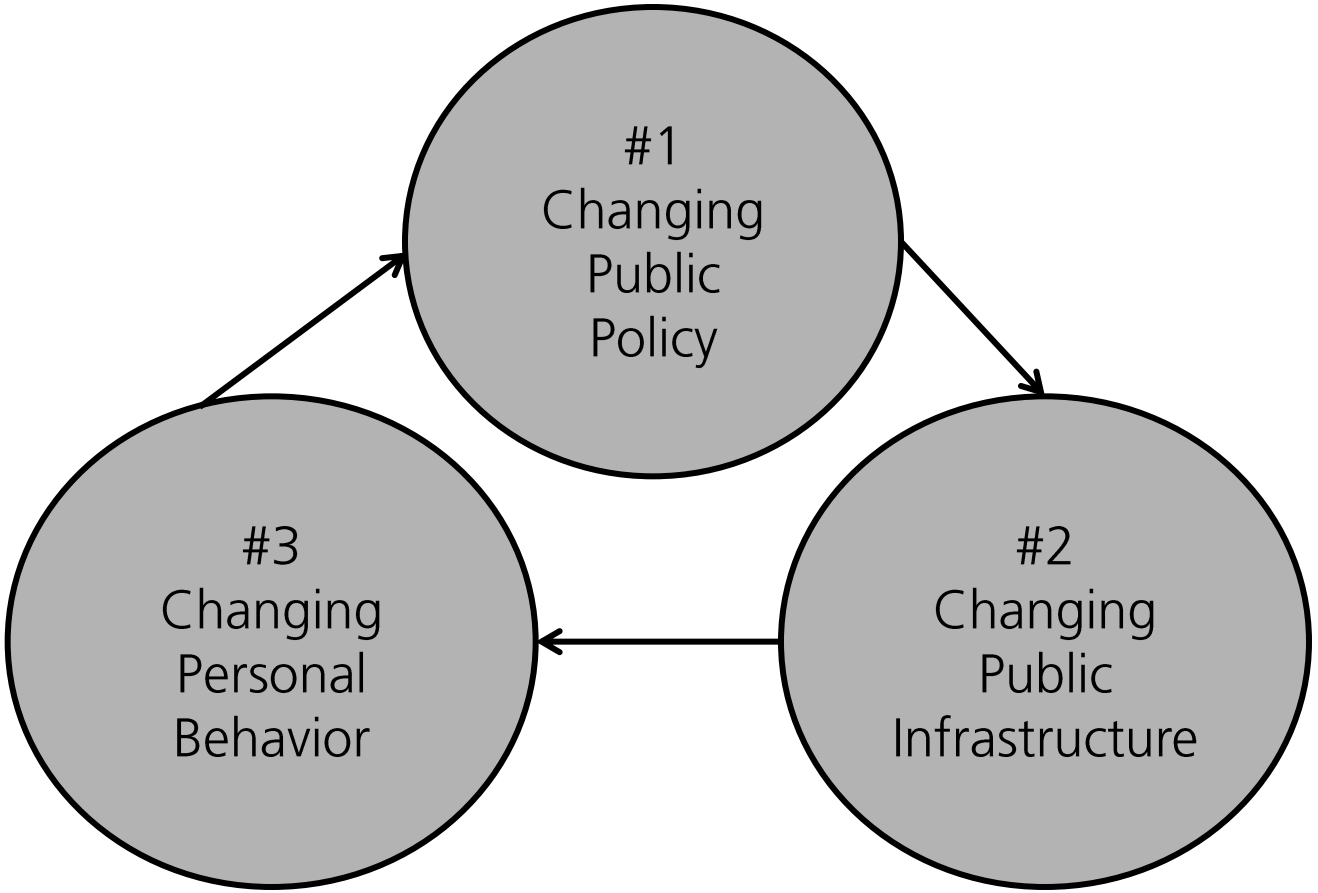
- Adopted Oct 2004

"Health" in Multiple Dimensions

Improving the…

- …***economic and environmental health*** of a place
- …***personal health*** of its people
- …***social health*** of a community

Our Methods:
Catalyzing Change in 3 Spheres



Our Methods:
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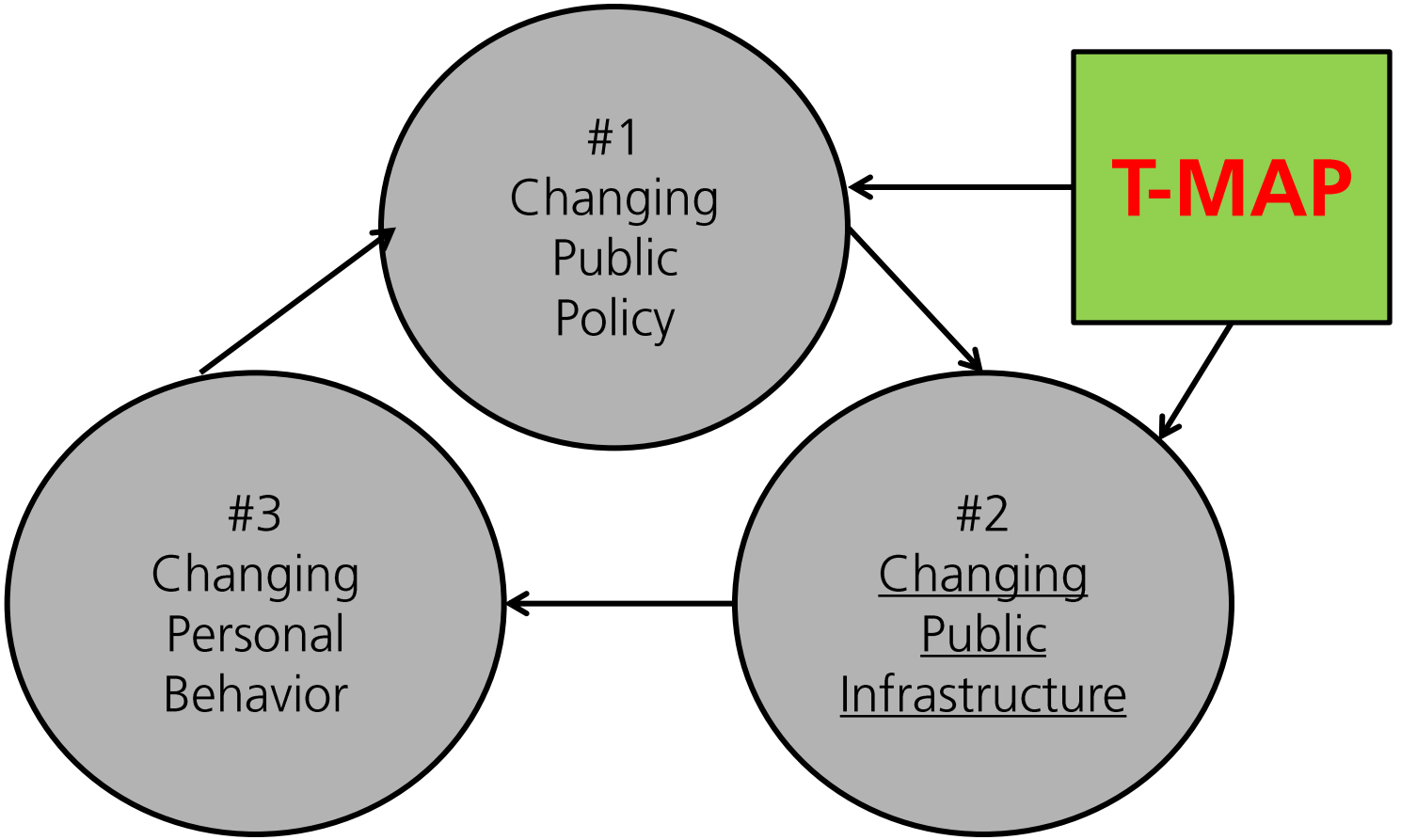


Looking Back

<u>Past success:</u>

- 1986: 250 miles
- 2014: >21,000 miles

Looking Ahead: Our BHAG

Our Big, Hairy, Audacious Goal:

By 2020, 90 percent of Americans will live within three miles of a local trail system.

Measuring the BHAG: Creating Geospatial Data Base

- Since 2006 we have mapped 25,500 miles of multi-purpose trail in the US
- Overlay with Census data to measure proximity

National Progress on BHAG

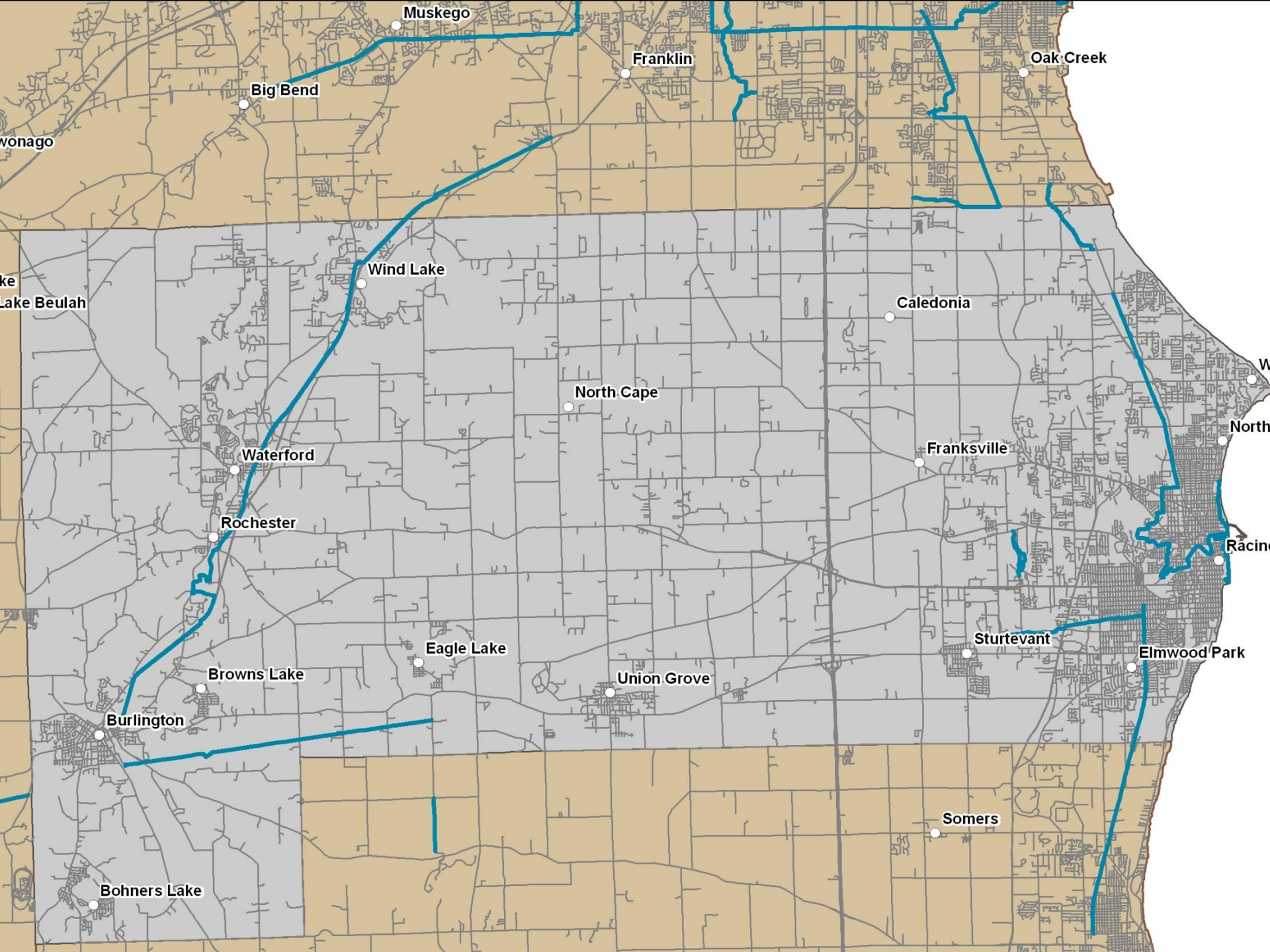
- Dec. 2009: 25.5%
  - 14,700 miles of trail
- Dec. 2010: 32.5%
  - 17,500 miles of trail
- Dec. 2011: 39.8%
  - 21,700 miles of trail
- Dec. 2012: 42.2%
  - 23,500 miles of trail
- Dec. 2013: 44.0%
  - 25,200 miles of trail

State-Level Analysis: 2013

1. District of Columbia (100%)
2. Rhode Island (75%)
3. Colorado (70%)
4. Washington (68%)
5. Illinois (66%)
6. California (62%)
7. New York (58%)
8. Nebraska (58%)
9. Oregon (58%)
10. Wisconsin (56%)

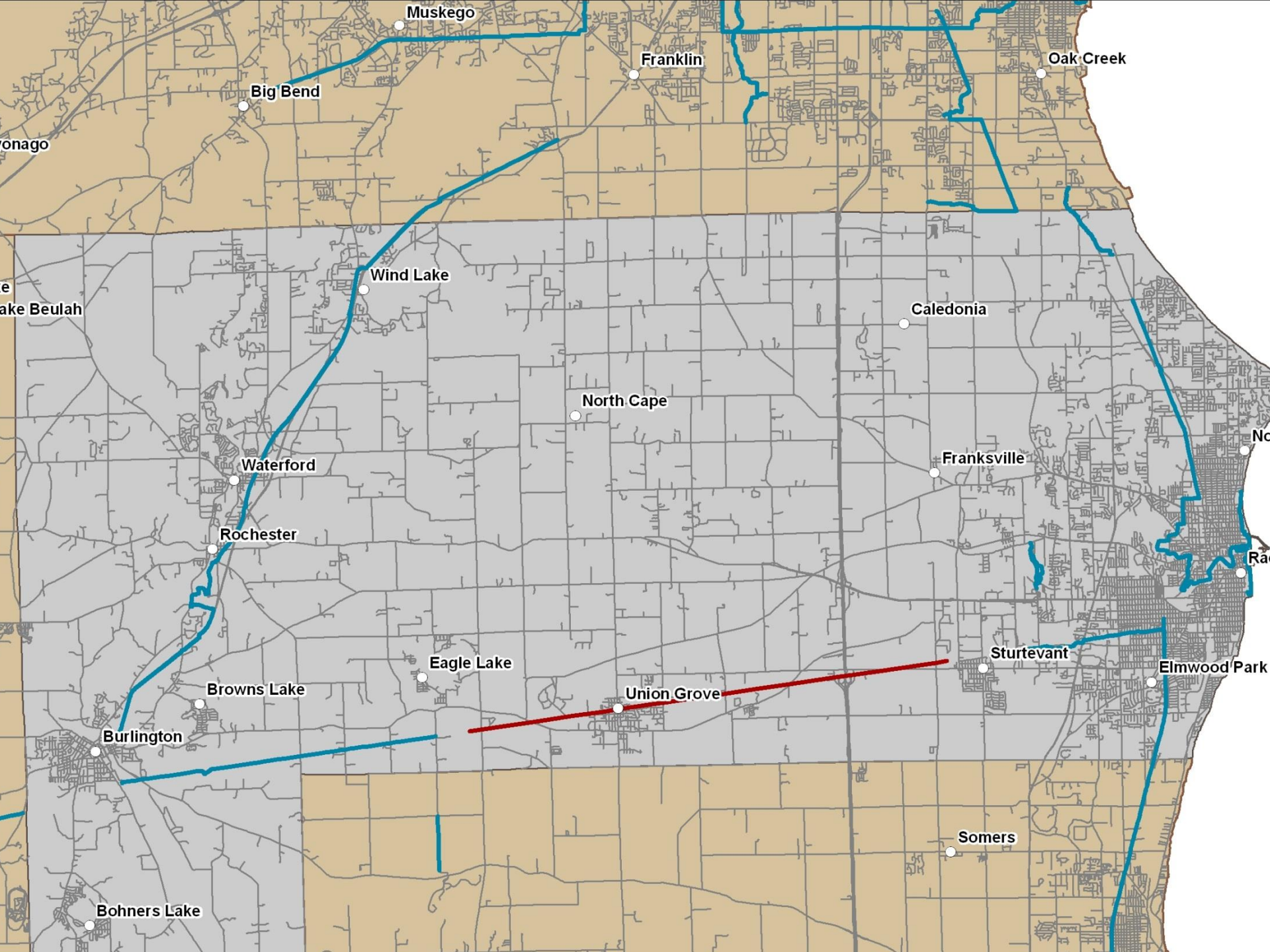
MSA-Level Analysis

1. Rockford, IL (93%)
2. San Francisco-Oakland-Fremont, CA (92%)
3. San Jose-Sunnyvale-Santa Clara, CA (92%)
4. Boulder, CO (91%)
5. Lincoln, NE (90%)
6. **Racine, WI (90%)**
7. **Milwaukee-Waukesha-West Allis, WI (90%)**
8. Denver-Aurora-Broomfield, CO (88%)
9. Des Moines-West Des Moines, IA (85%)
10. Fort Collins-Loveland, CO (85%)


Muskego
Franklin
Oak Creek
Big Bend
wonago
Wind Lake
ke
Lake Beulah
Caledonia
North Cape
Waterford
Franksville
Rochester
Racine
Eagle Lake
Sturtevant
Elmwood Park
Browns Lake
Union Grove
Burlington
Somers
Bohners Lake

RTC's Early Warning System

- On January 28, 2014, the Soo Line filed a notice to abandon 10.6 miles of active line between Sturtevant and Kansasville, WI.
- We notified all potentially interested parties in Wisconsin
- Wisconsin state DNR intends to rail bank this segment
- The map now looks like this…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Inescapable Conclusion

- Measuring proximity is useful, but limited
- It does not address equity
- It does not ensure usage
- Accessibility and connectivity are crucial factors in determining if infrastructure change supports behavior change
- **Key Question:** Does infrastructure effectively connect people and places?

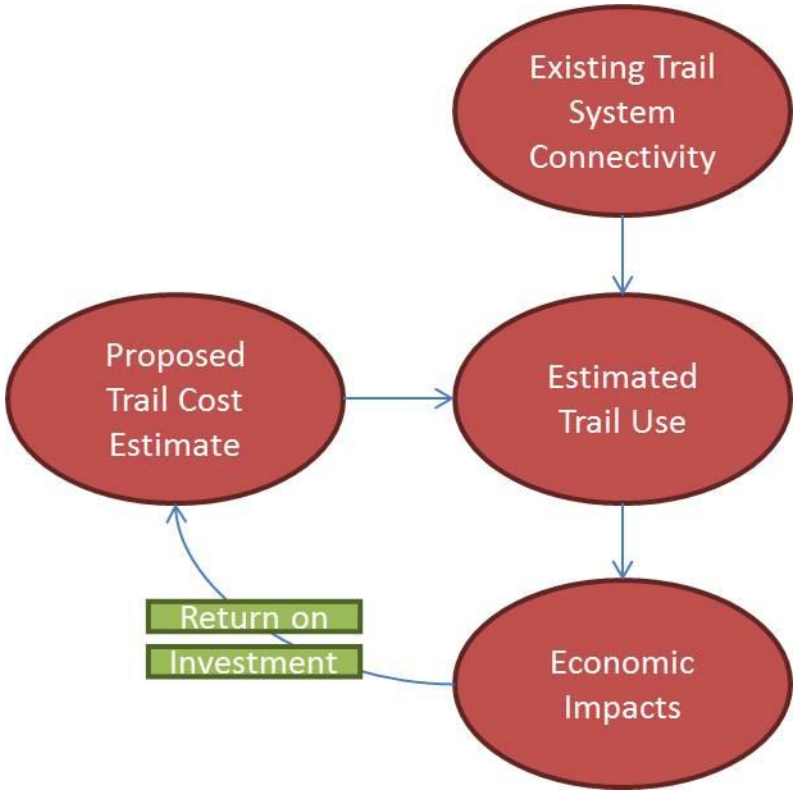
The Genesis of T-MAP

- Was NOT created to develop "evidence"
- Emerged last summer from an internal staff dialogue about creating "TrailScore" to measure trail system connectivity
- We want practical tools to change the world – and there are research professionals out there who feel the same way

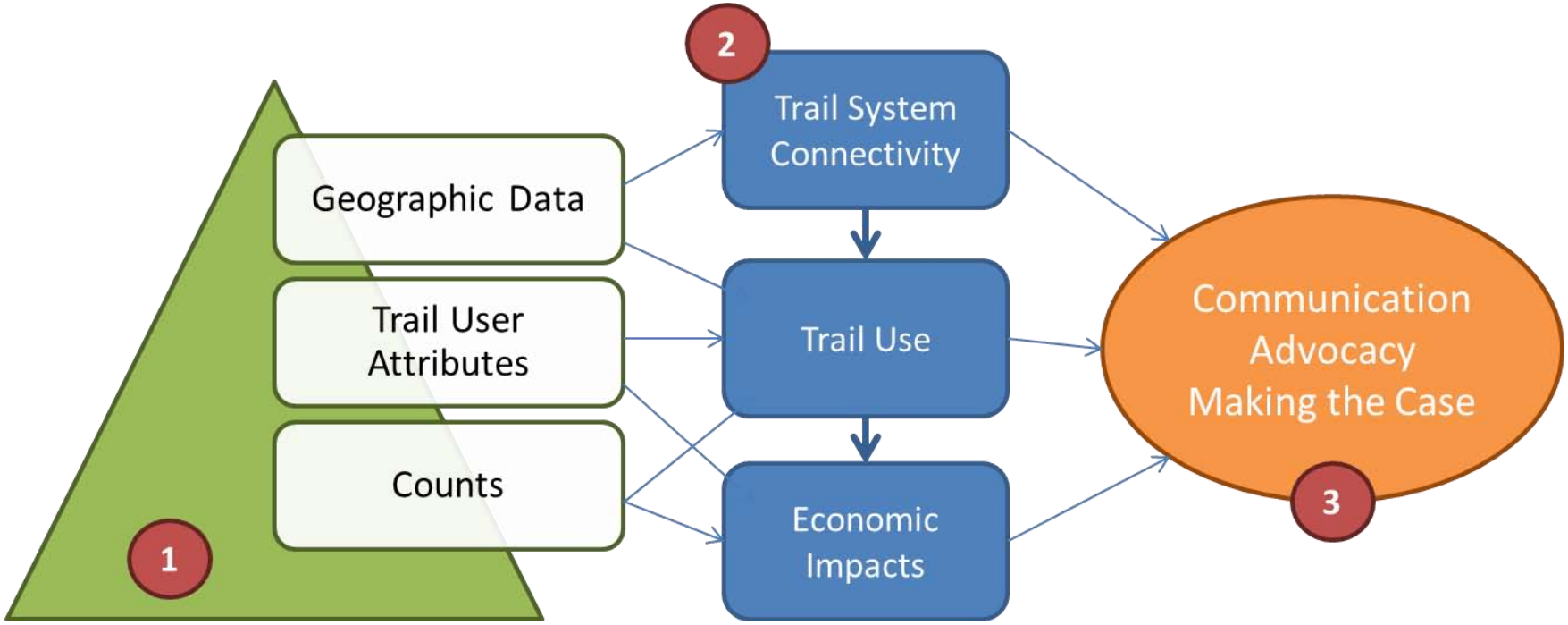
Conclusion: The Opportunity

- $7 billion in federal investment since 1991 has built 25,000 miles of multi-purpose trails across the American landscape
- Approaching a tipping point: relatively small investments to make connections to create networks will cause usage to soar
- T-MAP will ensure and demonstrate that future investment delivers a high ROI

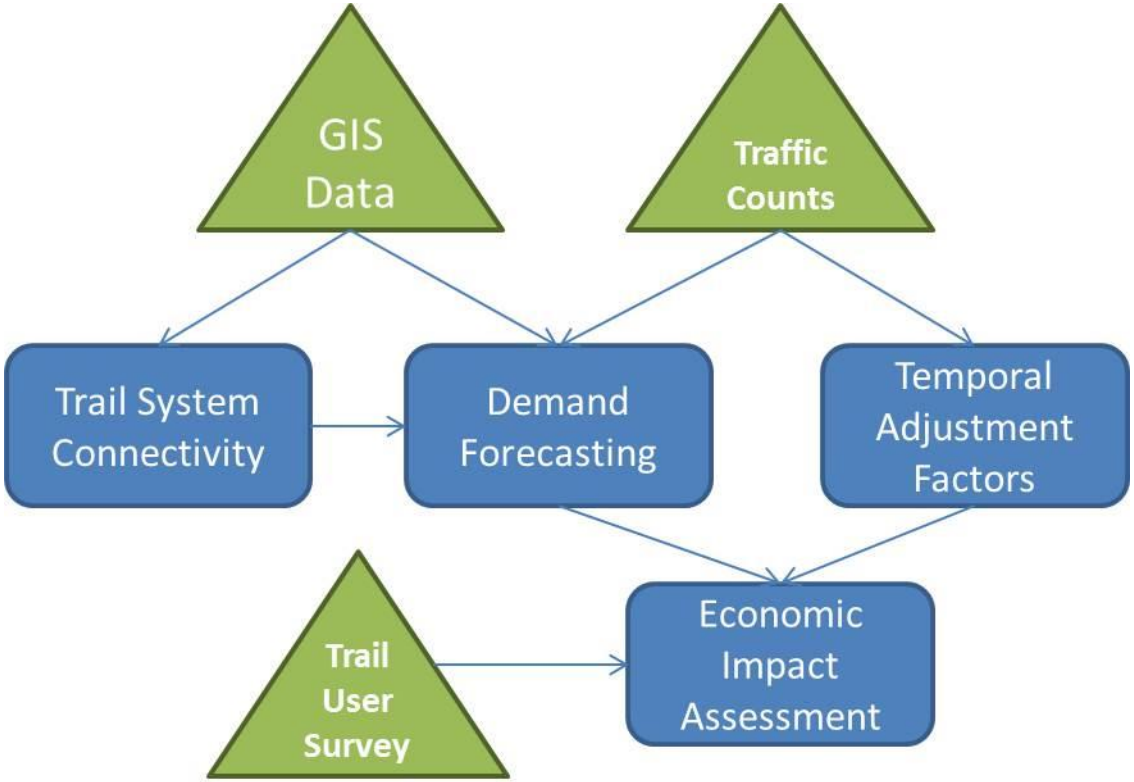
Logic Model


Existing Trail System Connectivity
Proposed Trail Cost Estimate
Estimated Trail Use
Return on Investment
Economic Impacts

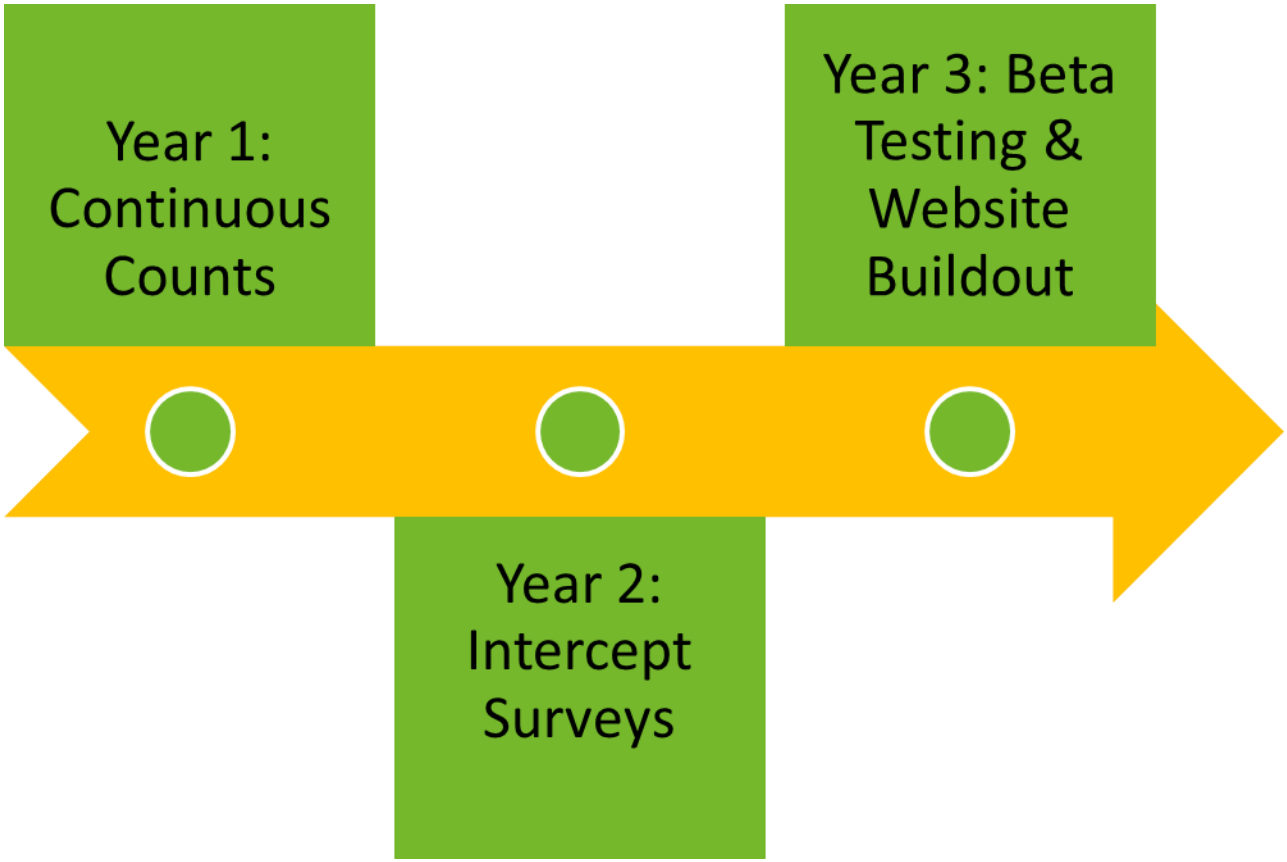
T-MAP by Component



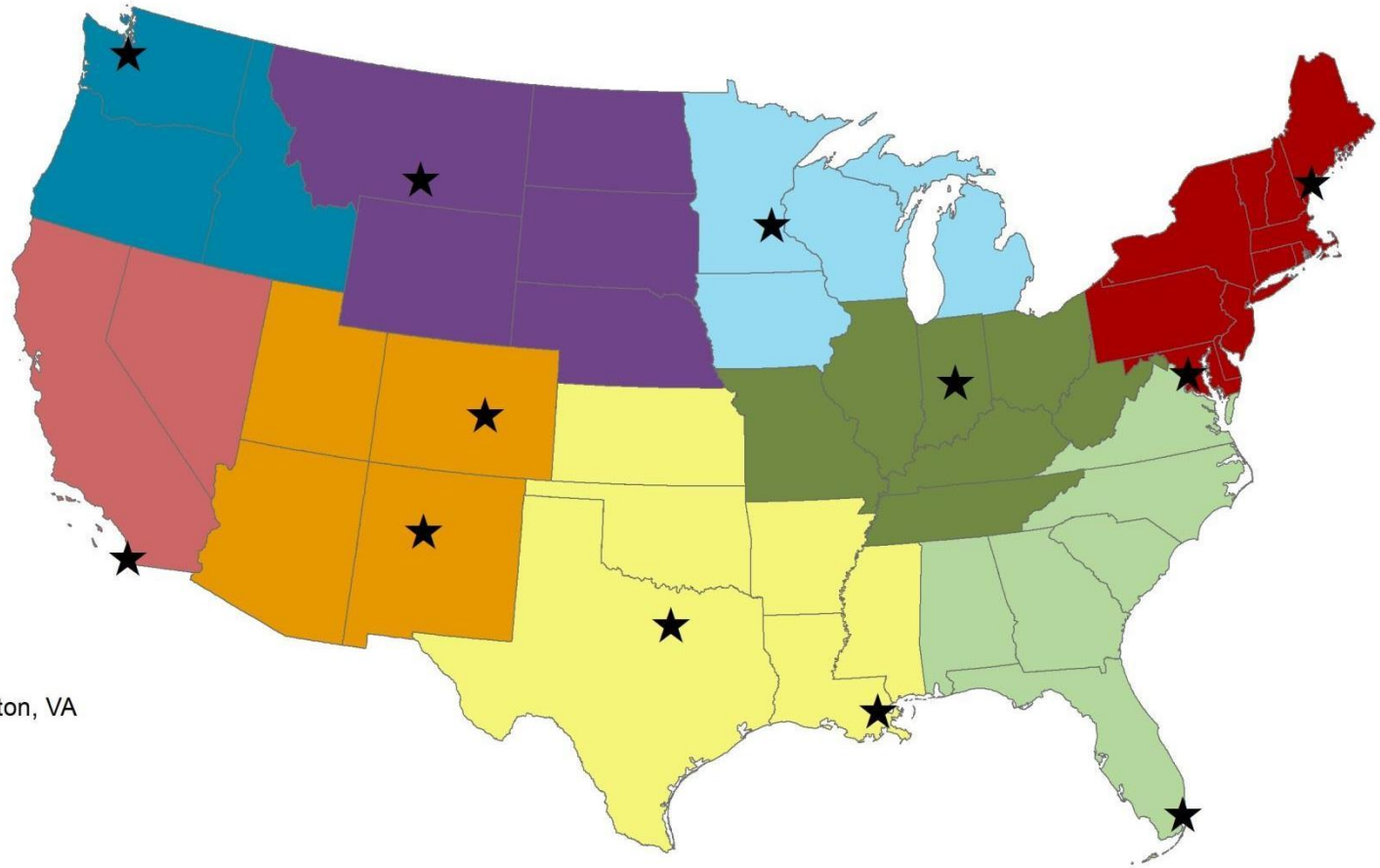
Inputs & Outputs



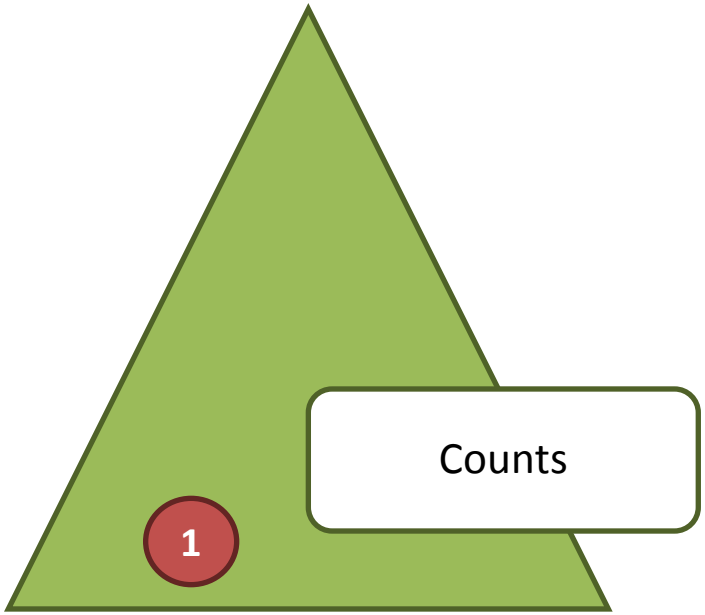
Timeline


Year 1: Continuous Counts
Year 2: Intercept Surveys
Year 3: Beta Testing & Website Buildout

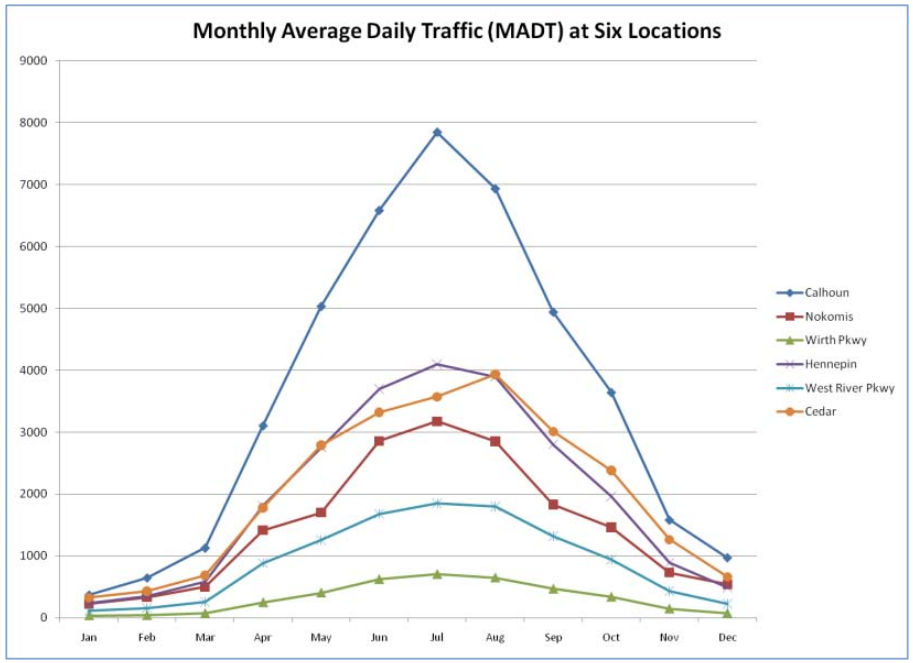
- Albuquerque, NM
- Billings, MT
- Colorado Springs, CO
- Fort Worth, TX
- Indianapolis, IN
- Miami, FL
- Minneapolis, MN
- New Orleans, LA
- Portland, ME
- San Diego, CA
- Seattle, WA
- Washington, DC & Arlington, VA



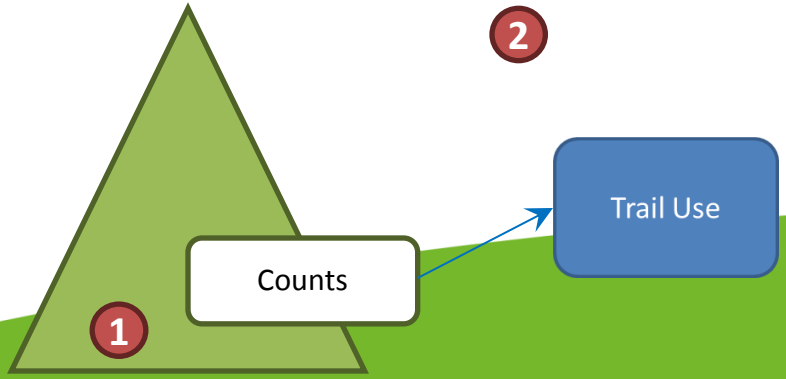
Year One Data Collection: Counts



Trail Use Research Questions

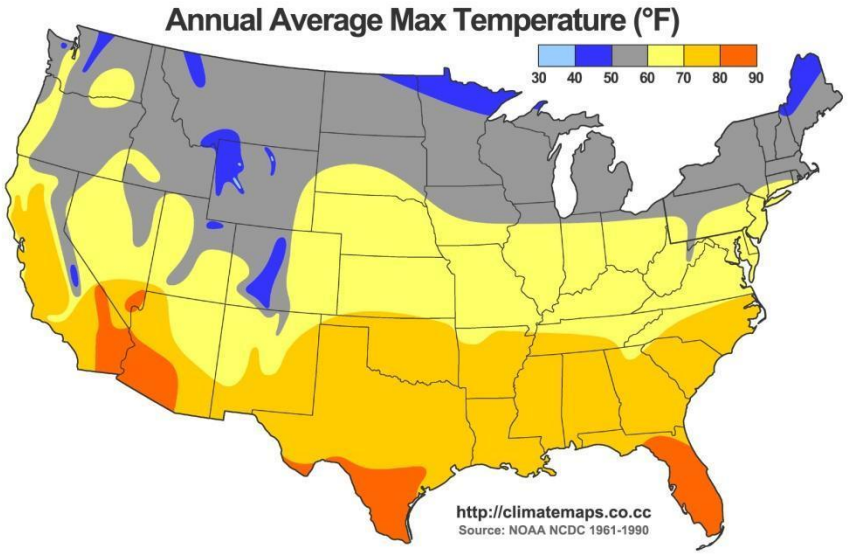


- How many visits does my trail get per year?
- What is the peak trail use on my facility?
- What is the modal distribution of my users?

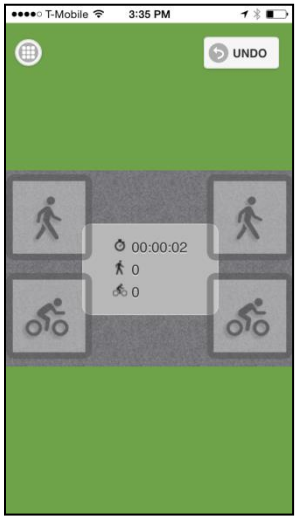


Year One Deliverables: Factors

- Separate for bicyclists and pedestrians
- For all weather zones of the US
- Large sample



Year One Deliverables: Calculator



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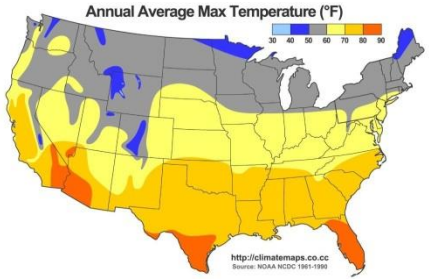

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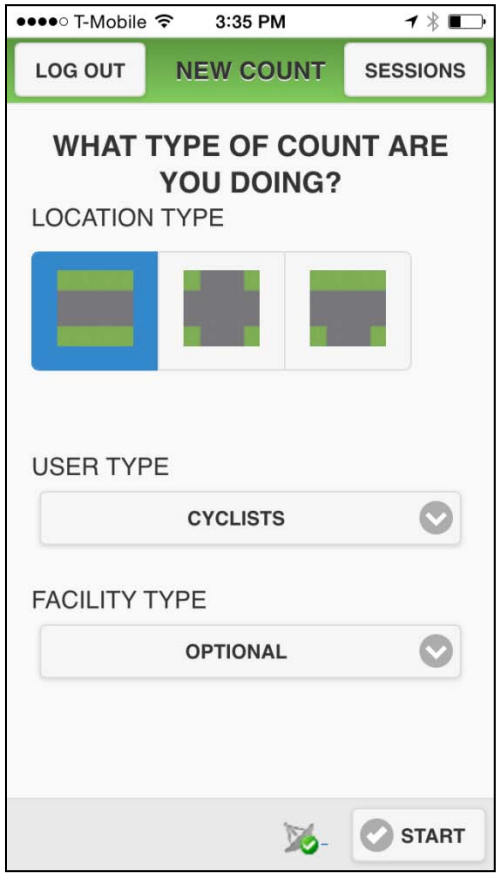
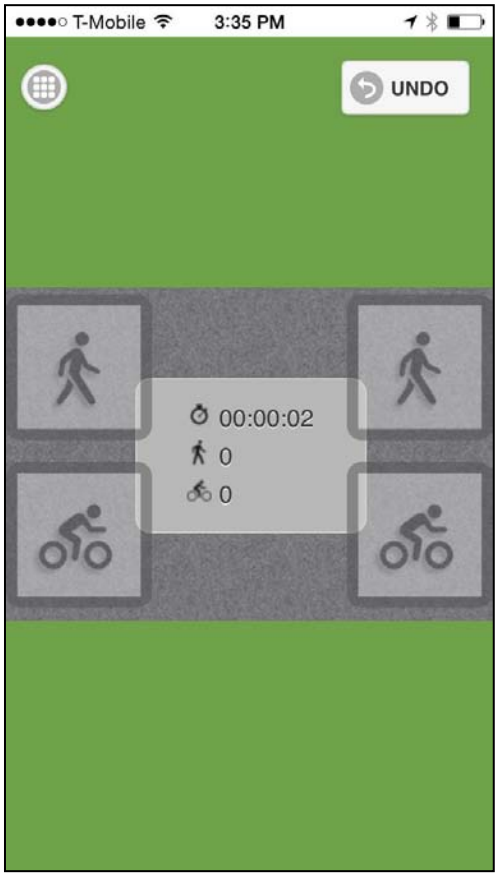
YOUR ANNUAL ESTIMATE!

Year One Deliverables: GO Counter!





More T-MAP to come…

- Forecasted trail use
- Impact assessment
- Bicycle facility network connectivity score

Dr. Greg Lindsey

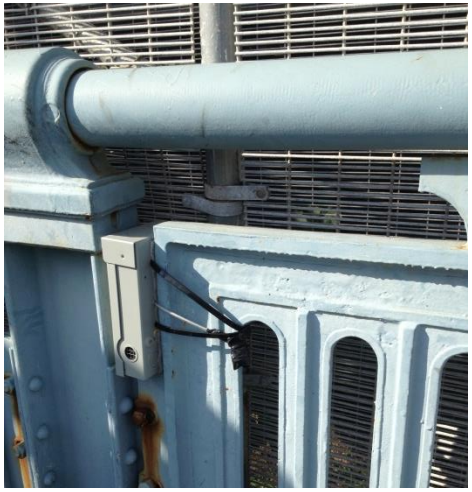
Dr. Thomas Gotschi

Dr. Mike Lowry

University of Minnesota
Driven to Discover℠

University of Zurich[UZH]

University of Idaho



TRAIL USER COUNTS

BEYOND THE NUMBERS

Carl Knoch

Manager of Trail Development

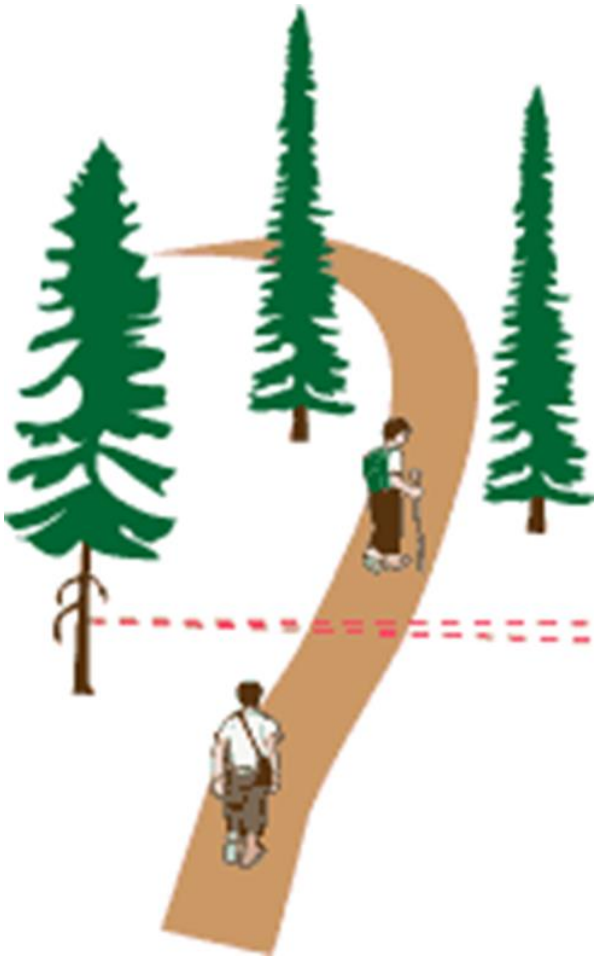
Northeast Regional Office

rails-to-trails

conservancy

HOW RTC COUNTS

- Passive Infrared
  - Uses an infrared beam of light
  - There is no reflector unit
  - Beam detects and counts warm moving objects



Infrared Counters

- TrafX
  - Passive infrared
  - Counters
  - Docking Module
  - Software – DataNet
  - Starter package $2,500
    - 3 counters, docking module and 3 year DataNet subscription
- You provide “protection” for counter
  - Standard off the shelf electrical box
  - DYI assembly
  - Don’t use big locks that can be used as leverage to break into box

Challenges

- Placement
  - Car and truck engines throw off a big heat signature

Challenges

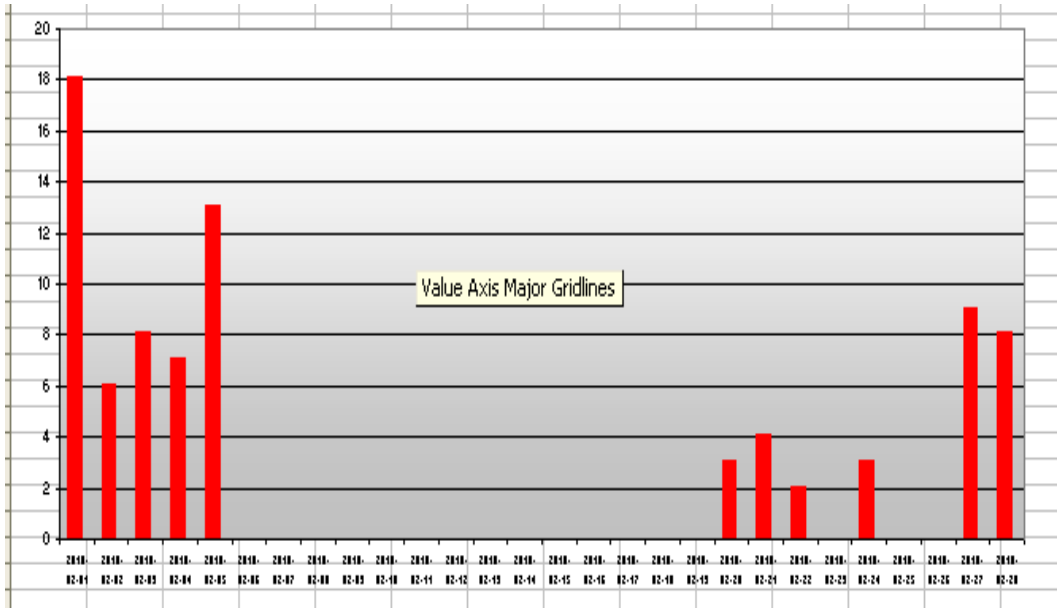
- Vandalism
  - Rural areas are just as susceptible as urban areas
    - Counter on Pine Creek Rail Trail stolen
    - Counter of Ghost Town Trail was vandalized
    - 3 Counters on Pittsburgh's Three Rivers Heritage Trail stolen

Challenges

- Accuracy
  - Counters should be "calibrated" by comparing IR counter data with manual count.
  - Under counting
    - 13.7% + or – on average (National Cooperative Highway Research Program Project 07-19)

Challenges

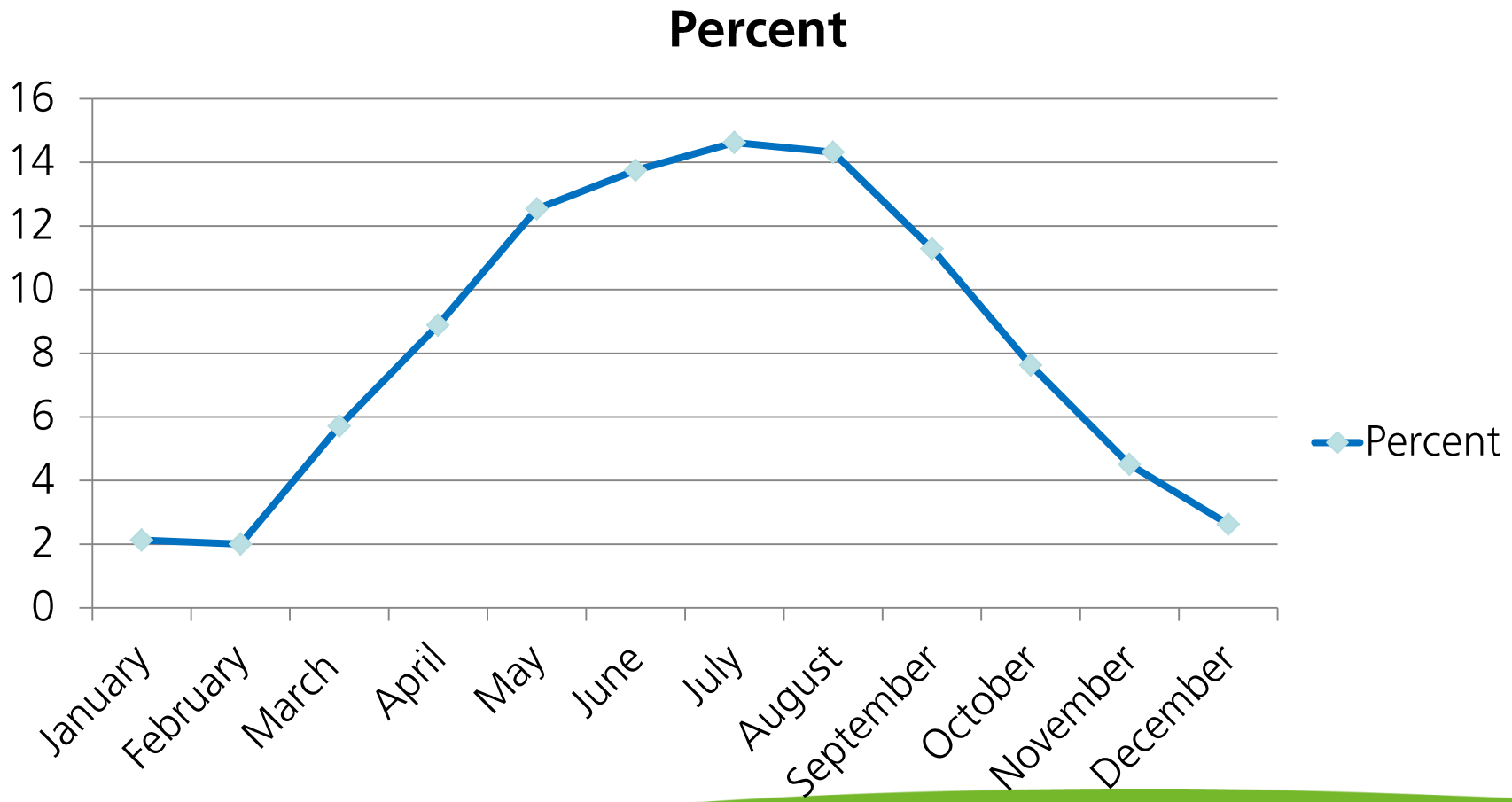
- Weather
  - Between Feb. 6 and Feb. 9, 2010 area received 42" of snow



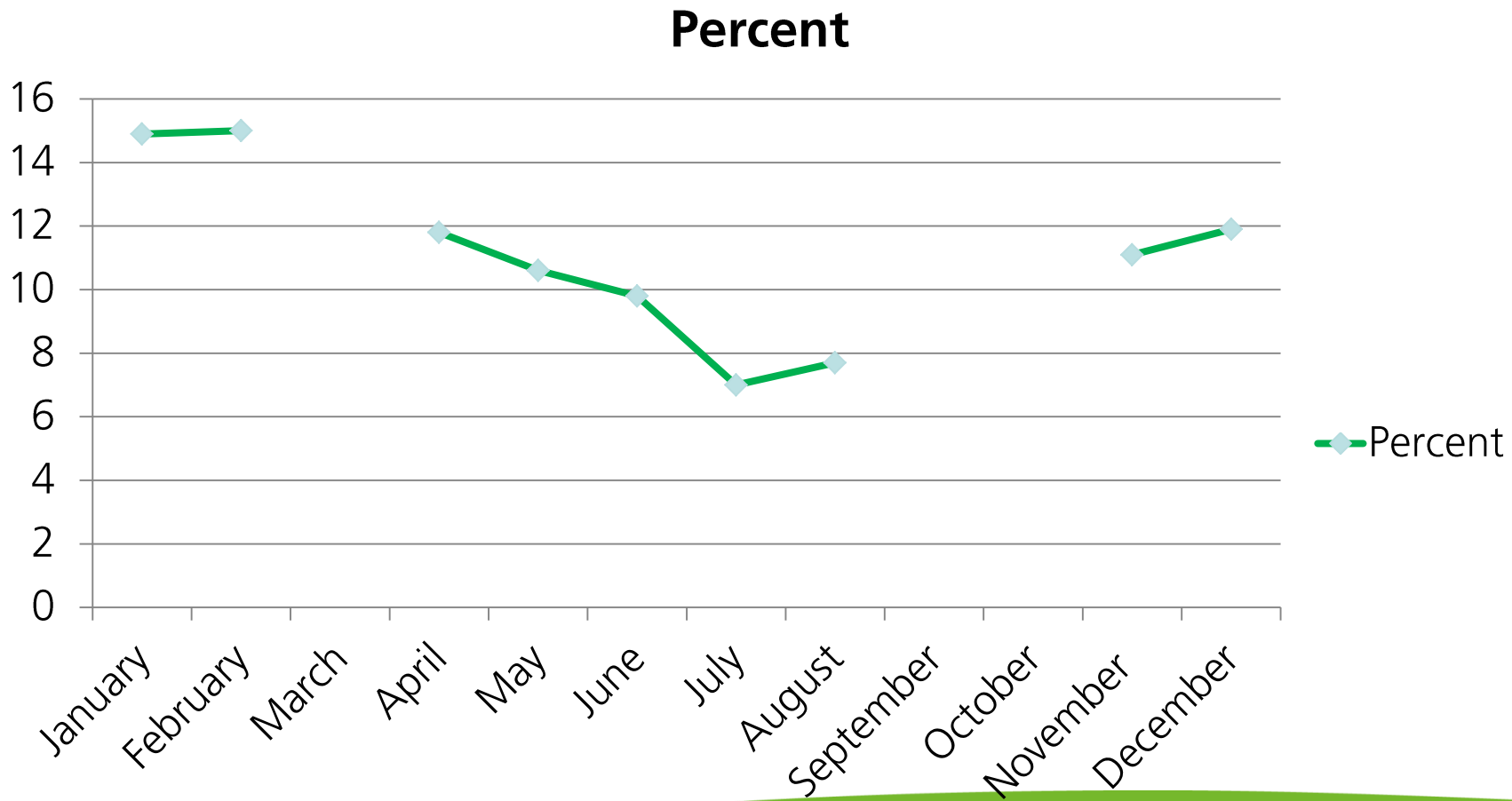
Typical Trail Counter Data Set

Greene County, Ohio: Multiple Sites - monthly % of annual counts															
	CST-Factory								CST-Grange Hall						
Month	2007	2008	2009	2010	2011	2012	2013	2014	2007	2008	2009	2010	2011	2013	2014
Jan	*1,576*	1,660	964	1,339	964	2,519	2,120	1,002	*1,410*	762	2,514	1,060	884	2,138	792
Feb	426	1,216	1,687	616	1,992	3,535	2,358	982	785	580	2,438	430	1,468	1,741	827
Mar	5,976	3,553	6,853	7,201	4,620	8,614	*4,256*	5,119	5,272	1,126	4,899	5,282	3,837	*3,263*	3,838
Apr	7,608	9,391	*7,831*	11,056	*7,287*	8,813	8,916	*8,510*	6,344	1,688	*5,311*	*8,544*	*5,718*	7,030	*7,082*
May	*11,863*	10,974	13,814	11,335	7,377	13,825	11,470	10,903	9,784	2,180	9,070	8,135	7,722	9,209	8,373
Jun	13,108	13,747	13,650	12,328	10,843	*13,763*	15,122	13,030	9,875	1,869	9,224	9,270	10,098	10,422	9,136
Jul	15,143	15,109	16,230	*12,457*	9,273	11,903	15,673	12,453	11,954	1,498	10,269	10,210	9,155	10,641	10,908
Aug	11,797	17,148	16,028	14,436	14,653	13,426	16,821	10,127	7,263	1,398	10,074	10,236	11,205	10,939	9,906
Sep	12,513	11,791	12,407	13,173	9,936	11,616	13,494	9,455	2,477	900	8,368	9,143	7,253	9,132	9,284
Oct	7,704	*8,157*	7,021	8,672	8,211	6,563	7,742	4,521	1,243	2,406	5,012	6,183	5,956	5,929	4,818
Nov	3,445	3,470	5,412	4,358	4,032	4,736	3,211	2,380	1,315	5,184	3,986	3,347	3,330	2,755	2,561
Dec	1,942	1,463	1,815	981	2,723	2,912	1,839	2,098	751	6,468	*1,435*	868	2,092	1,414	2,071

Annual Distribution of Green County, OH Data Set

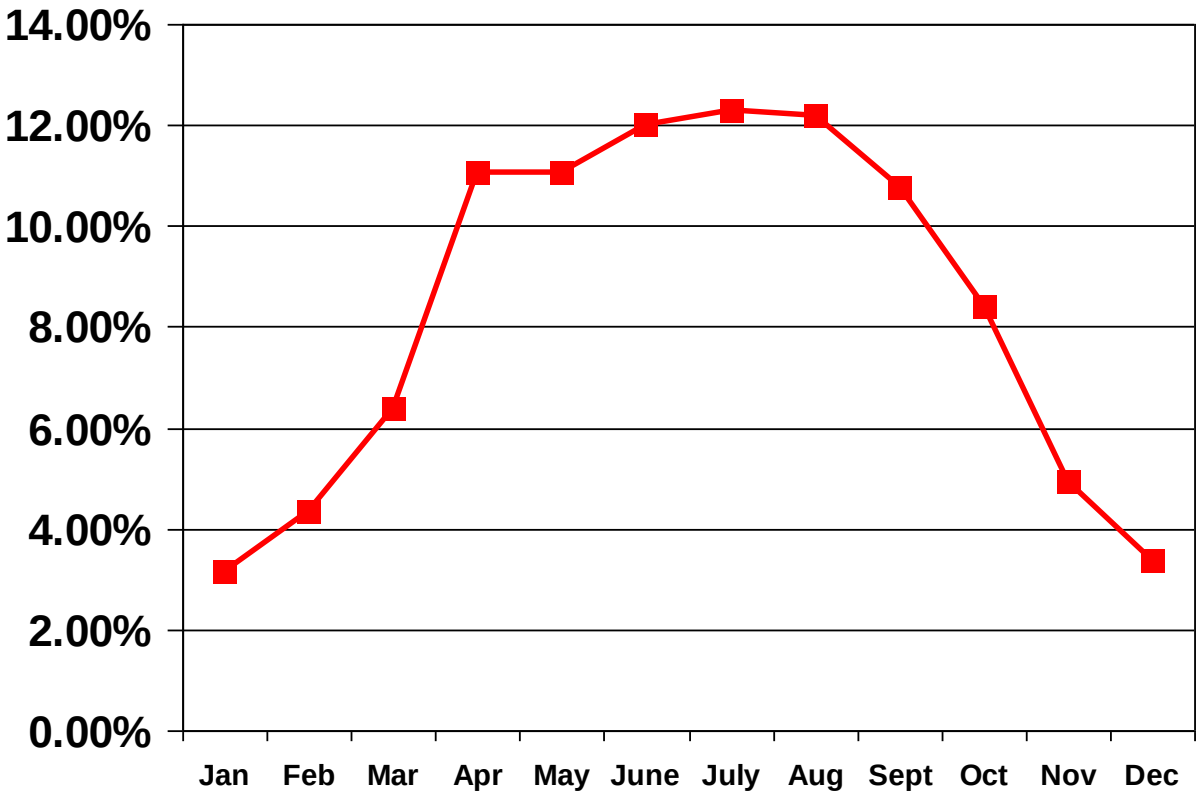


Annual Distribution of M-Path Data Set, Miami, FL



Annual Distribution of Trail User Visits

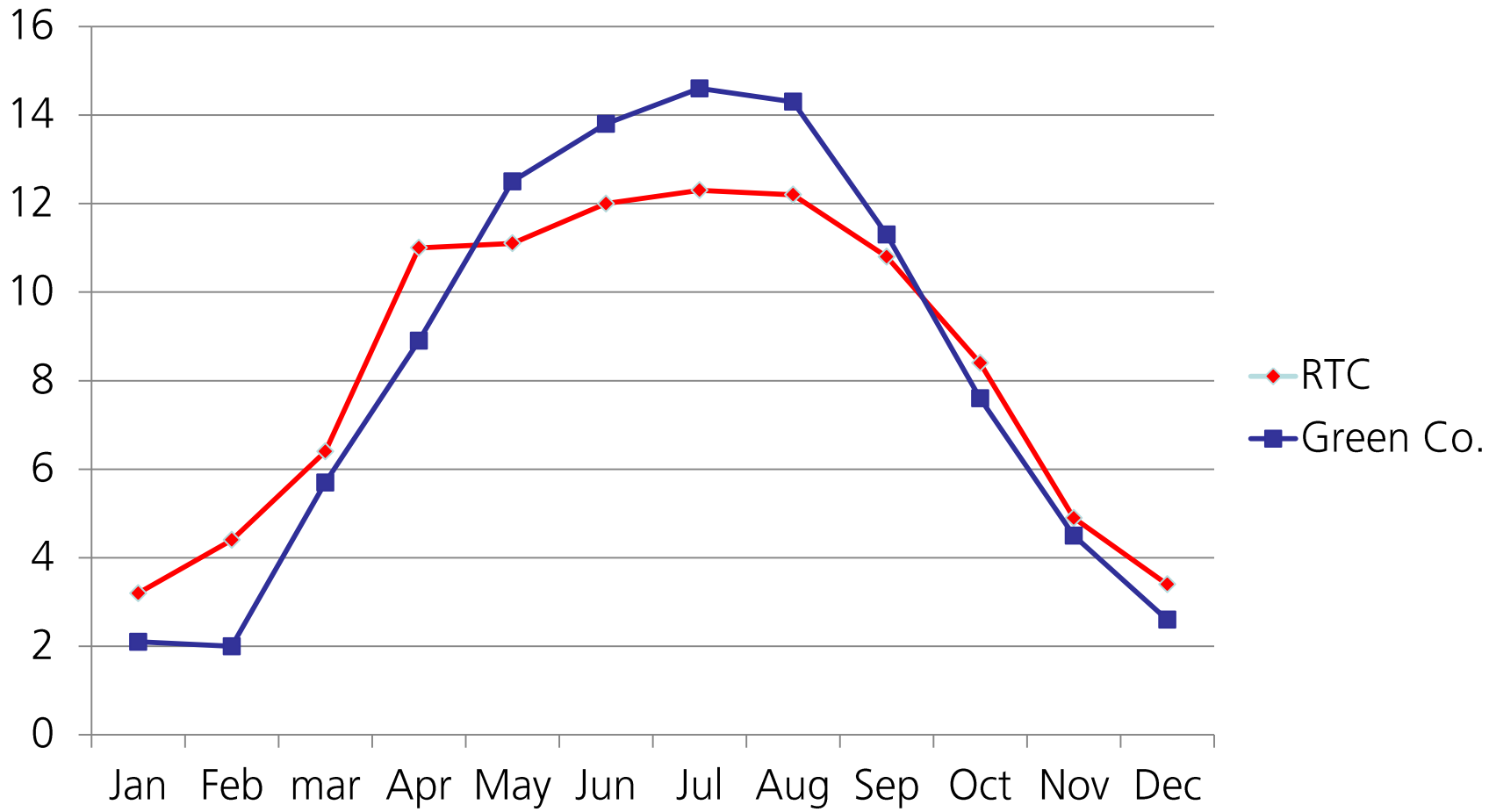
Based on 62 different counters and 5 million user visits across U.S.*



*No counts represented in US Climate Zones 1, 2 or 3

Developed by Rails-to-Trails Conservancy

RTC and Green County, OH

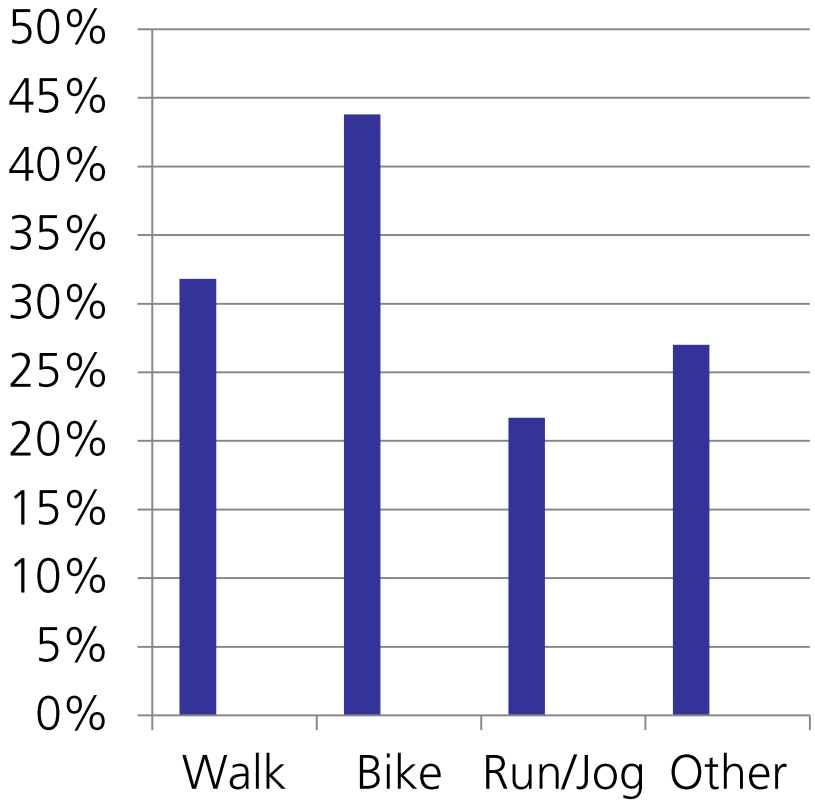


Trail User Surveys

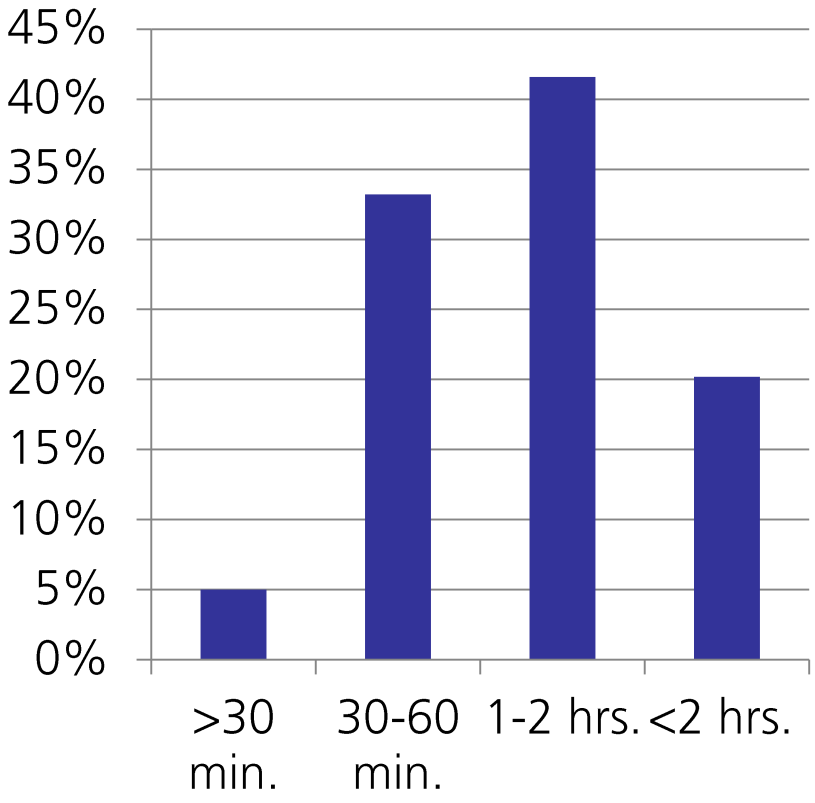
- All counts are conducted during the course of a trail user survey
- Survey provides information on trail user characteristics
  - Trailheads used
  - Time on the trail
  - Type of activity
- Surveys provide data on trail user spending
  - Amount spent on durable goods
  - Amount spent of consumables
  - Amount spent on accommodations
- Survey data enables development on annual user estimate and trail related spending – Economic Impact

Survey Questions that Inform Counts

What is your primary activity on the trail

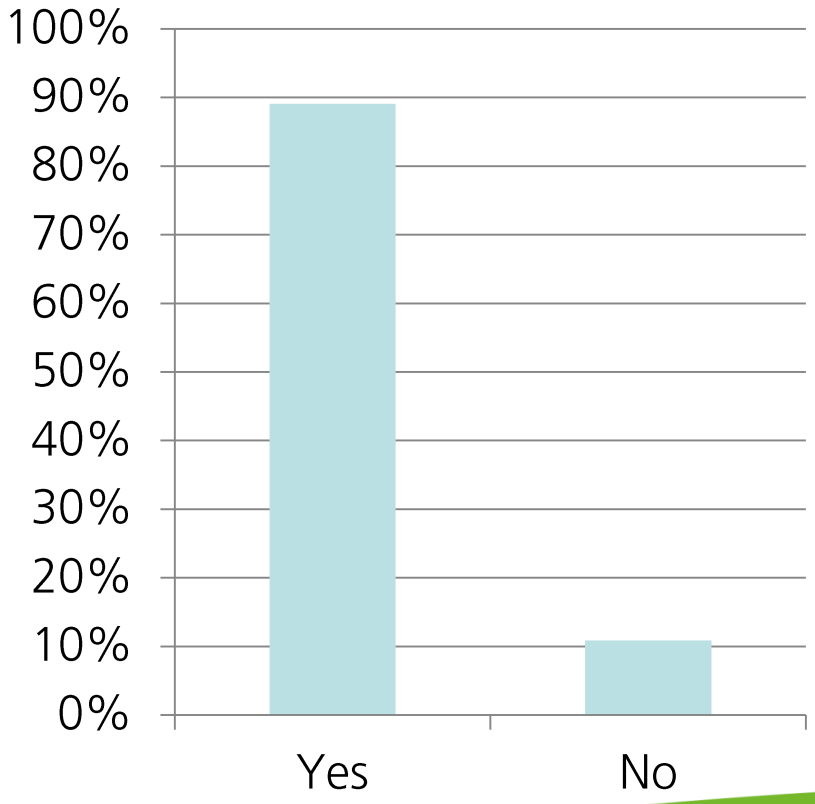


How much time do you spend on each trail visit

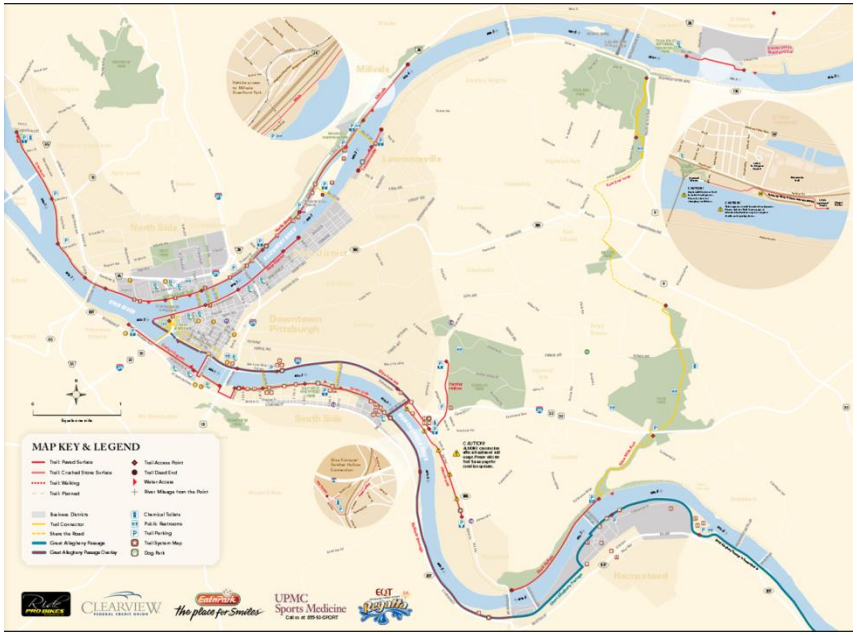


Survey Questions that Inform Counts

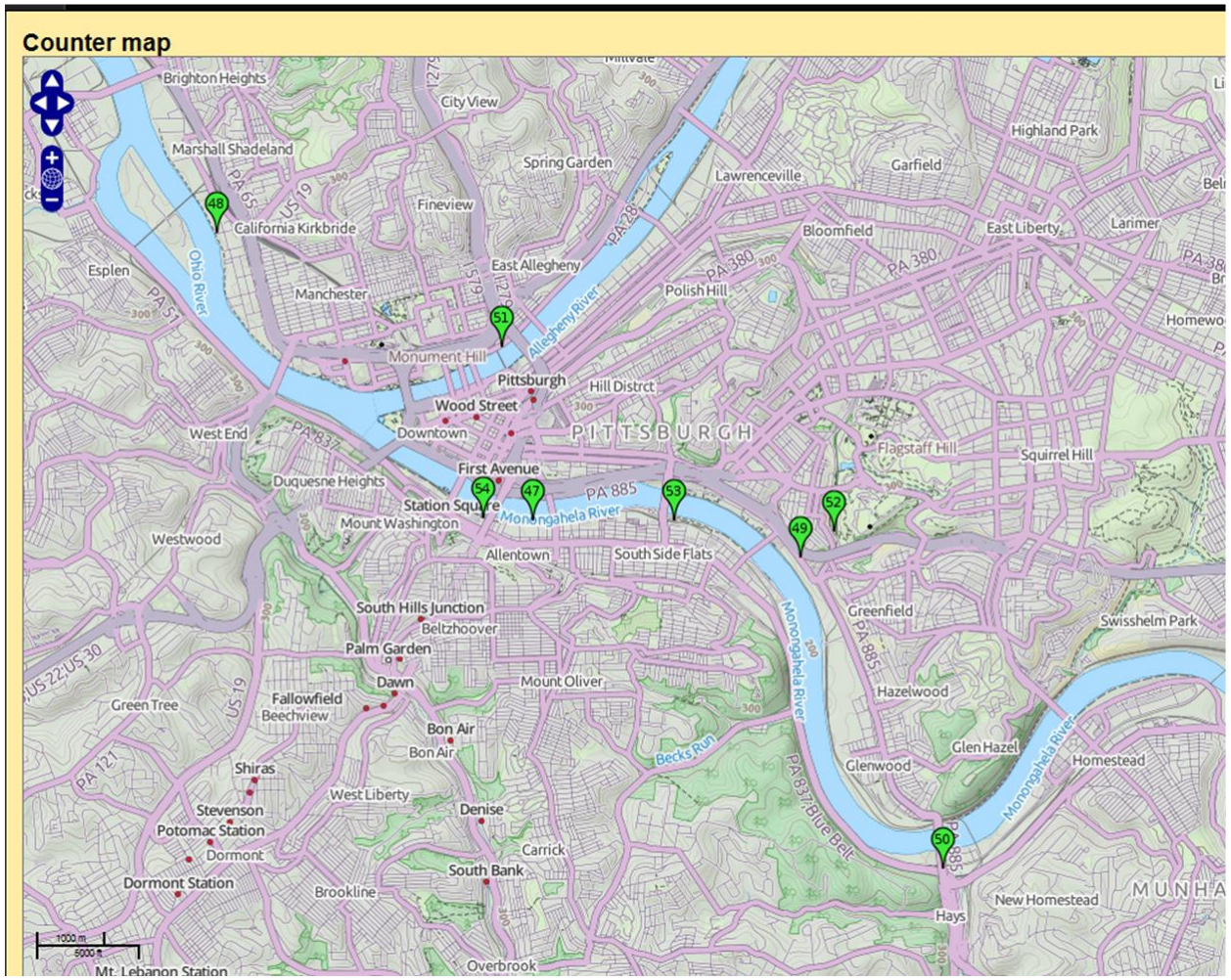
Did your trail experience today begin and end at the same location



Three Rivers Heritage Trail, Pittsburgh PA



Counter Locations



Trail Counter Location	Actual Count	Estimated 12-Month Count*	Adjusted for Passing Multiple Counters	Adjusted for Missing Counts	Adjusted for Out and Back Trips
Keystone	13,545	122,600	122,600	139,396	78,480
South Side Riverfront Park	17,751	160,700	125,547	142,747	80,366
South 4th Street	18,054	167,400	130,843	148,768	83,757
Chateau	10,349	94,000	69,130	78,601	44,252
North Shore	41,510	376,000	277,280	315,267	177,496
Panther Hollow	6,473	59,000	43,239	49,162	27,678
Eliza Furnace	17,007	154,000	113,604	129,168	72,721
Station Square	12,838	116,200	90,798	103,238	58,123
Total Estimated Annual User Visits					622,873**

Economic Impact Analysis

- Hard good purchases
  - Durable goods
- Soft goods purchases
  - Non-durable goods
  - Consumables
- Overnight Accommodations
  - Type
  - Number of nights
  - Average overnight rate

Economic Impact Analysis

	% Using	Average $	Average Life	Average # of Trips	Average # Nights	Estimate of $
Durable Goods	52.6%	$444.77	6 years	17.1		$1,842,288
Consumable Goods	57.5%	$16.53				$5,866,660
Accommodations	0.3%	$114.38				$ 577,078
Total $ Impact						$8,286,026

How Count Data is Used

- Supports grant requests
  - San Jose, CA - Trail Count 2008 data supported efforts to secure $1,377,000 in grant funding.
- Fosters new business formations
  - Trail Town Initiative uses trail counts to attract new businesses to towns along the Great Allegheny Passage
- Encourages community investment
  - Portion of hotel tax revenue goes to trail organization
- Helps in developing strategies for trail facility development
  - Parking lots, benches, picnic facilities…

New Freedom, PA
Population 4,464

Photo taken standing on the rail trail looking down Franklin Street