Using Social Media to Assess Urban Park Visitation and Recreation Services

ACES 2016 | Thursday, December 8, 2016

Marie Donahue | dona0212@umn.edu | @mlynndonahue
Natural Capital Project
University of Minnesota Institute on the Environment

Image: Hargreaves Associates

Recreation Services

InVEST

integrated valuation of environmental services and tradeoffs

flickr

Wood et al. (2013)

natural capital PROJECT

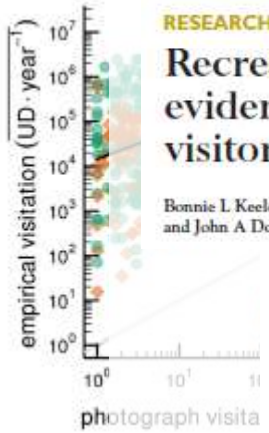
SCIENTIFIC REPORTS

OPEN

Using social media to quantify nature-based tourism and recreation

SUBJECT AREAS:
SOCIOECONOMIC SCENARIOS

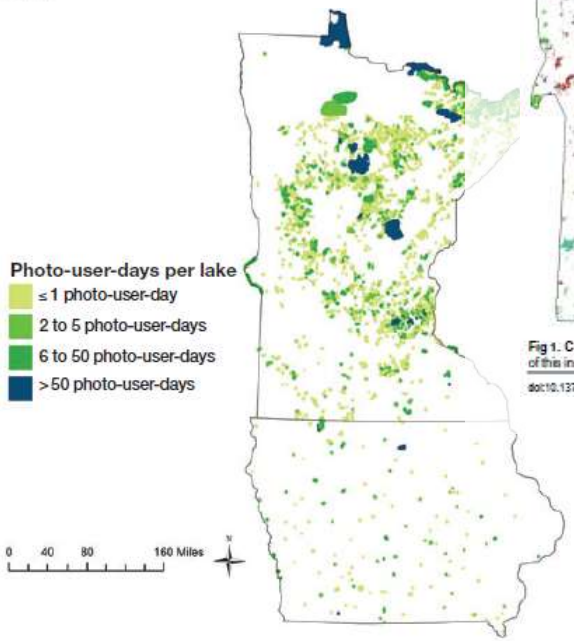
Spencer A. Wood[1,2], Anne D. Guerry[1,2], Jessica M. Silver[1,2] & Martin Lacayo[2]



RESEARCH COMMUNICATIONS RESEARCH COMMUNIC

Recreational demand for clean wa evidence from geotagged photogr visitors to lakes

Bonnie L Keeler[1*], Spencer A Wood[2,3], Stephen Polasky[4], Catherine Kling[5], Christoph and John A Downing[6]



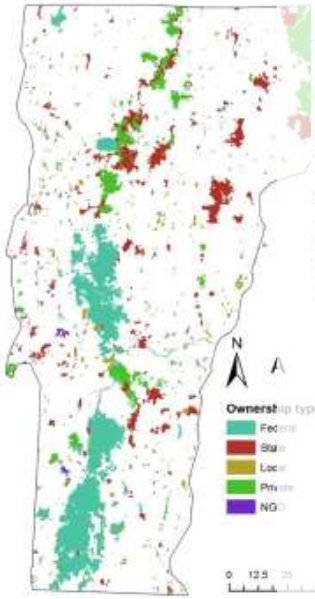


Fig 1. Conserved lands in Vermont. Spatial distribution of conserved lands by of this indicator in "Data Sources") between 2007 and 2014.

doi:10.1371/journal.pone.0162372.g001

PLOS ONE

RESEARCH ARTICLE

Spatial and Temporal Dynamics and Value of Nature-Based Recreation, Estimated via Social Media

Laura J. Sonter

Contents lists available at ScienceDirect

Journal of Environmental Management

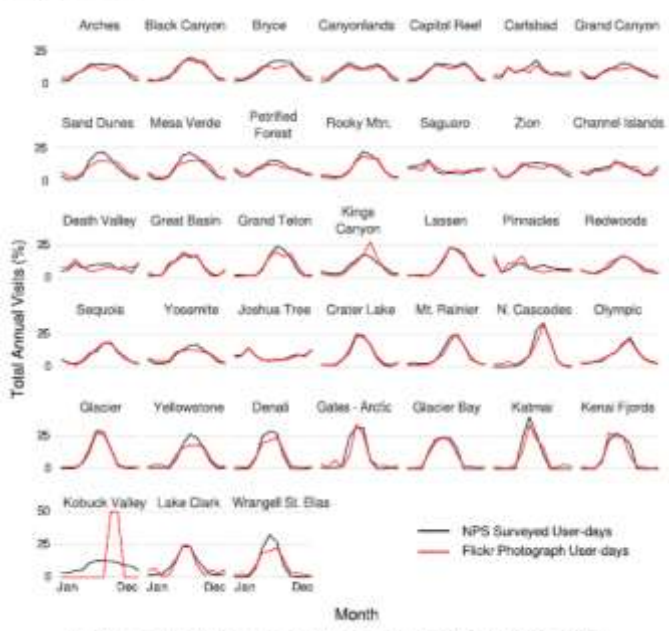
journal homepage: www.elsevier.com/locate/jenvman

Research article

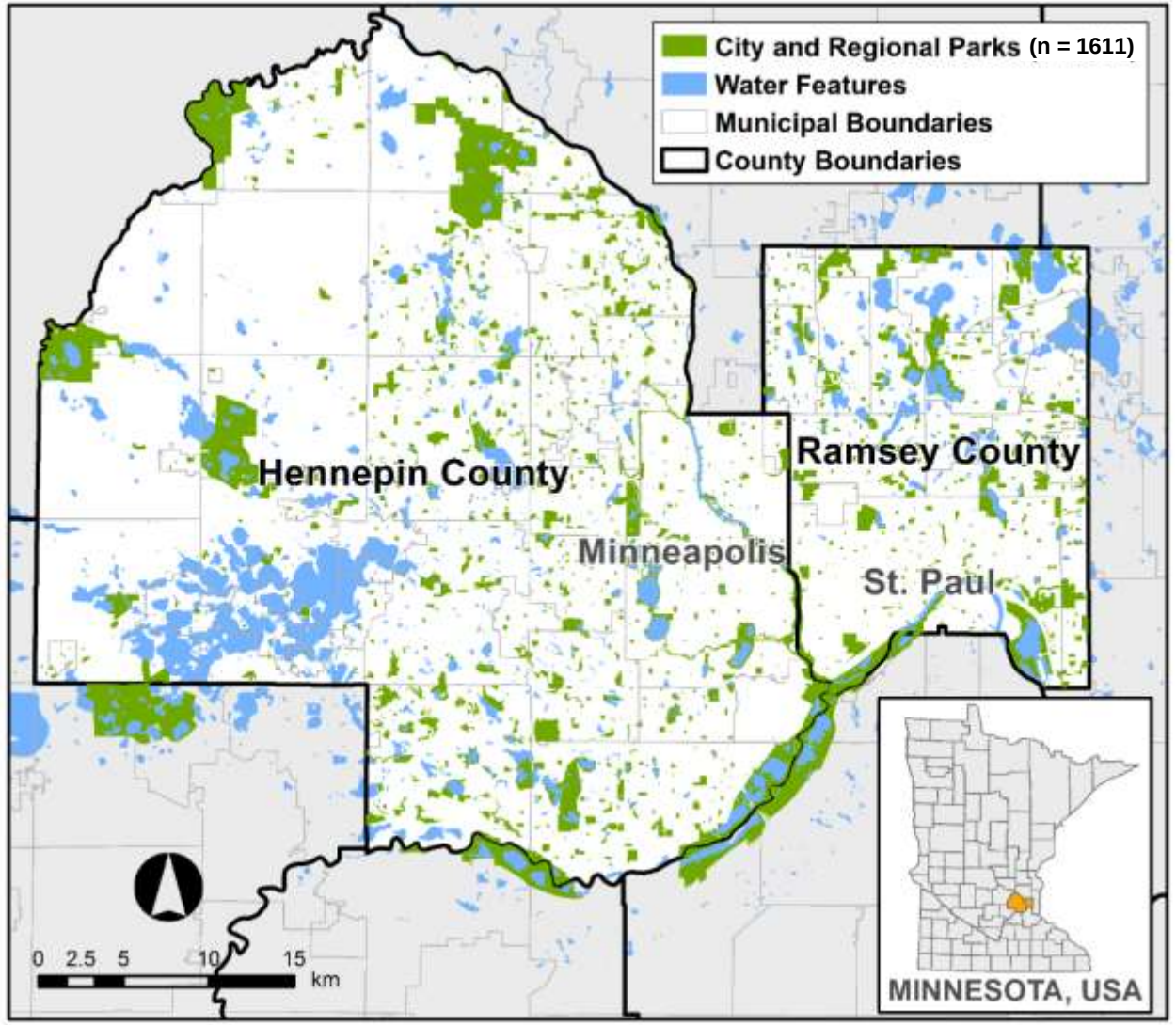
Measuring recreational visitation at U.S. National Parks with crowd-sourced photographs

Carrie Sessions [a,b,c,*], Spencer A. Wood [b,c], Sergey Rabotyagov [b], David M. Fisher [b,c]

[a] Evans School of Public Policy and Governance, University of Washington, 4300 15th Ave NE, Seattle, WA 98195, USA
[b] School of Environmental and Forest Sciences, University of Washington, Box 352100, Seattle, WA 98195, USA
[c] Natural Capital Project, Stanford University, USA



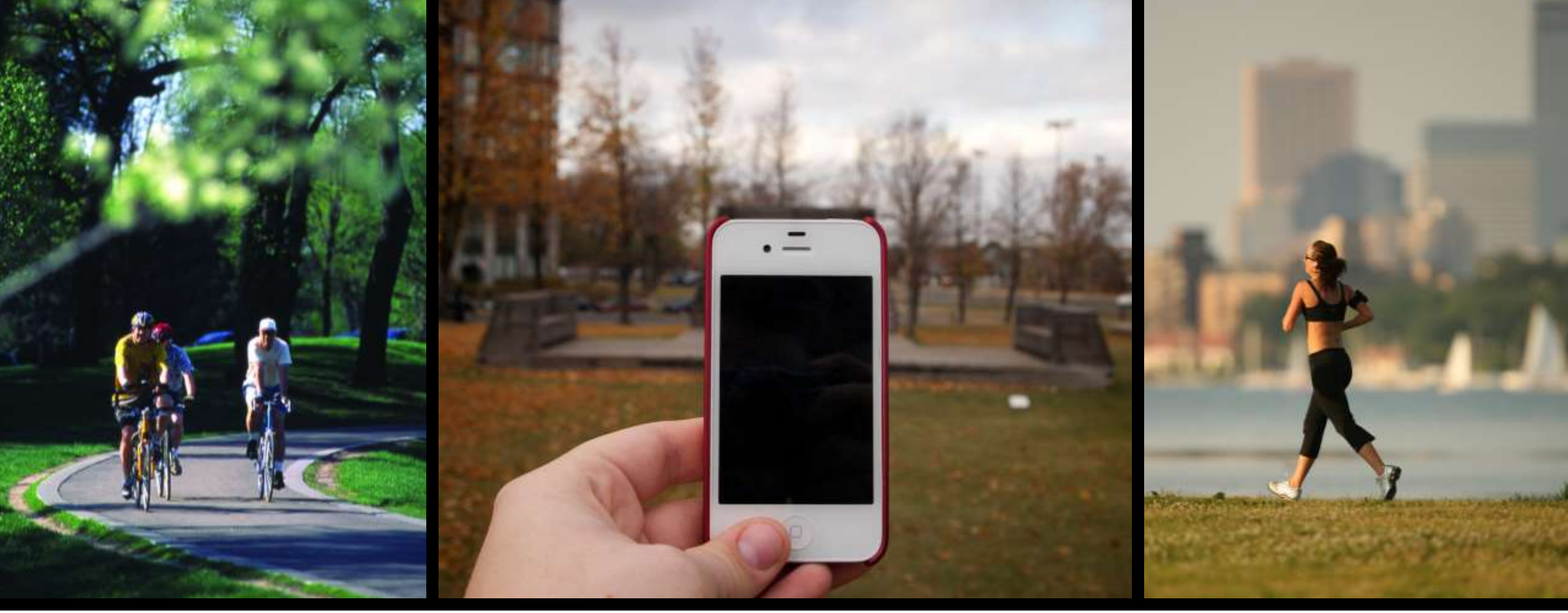
Study Area



Donahue et al. *In prep*

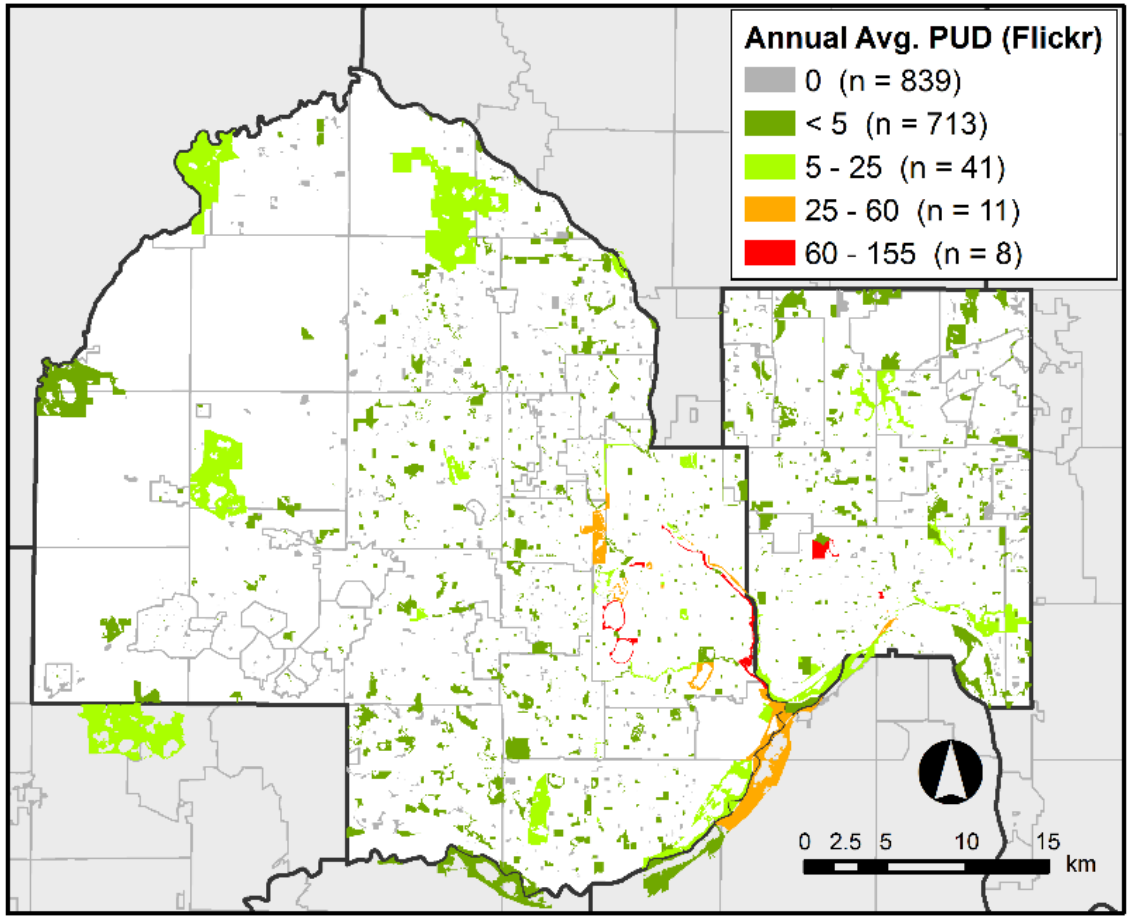
Research Questions

1. Can social media data (SMD) be used to measure urban park use? Which urban parks are used most?
2. How well do SMD compare to traditional survey methods of estimating urban park users?
3. What characteristics affect variation in visitation across urban parks?

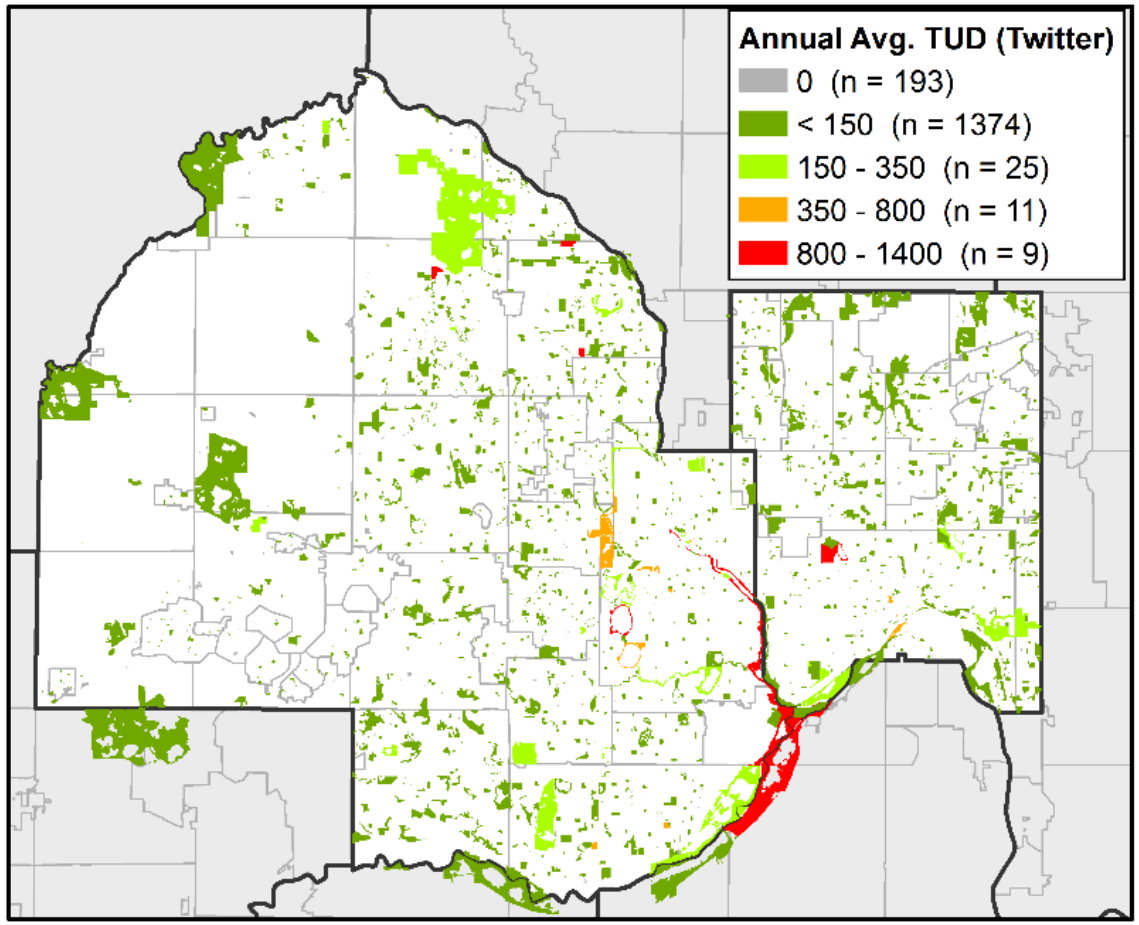


RQ1: Can SMD be used to measure urban park use? Which urban parks are used most?

annual average Flickr Photo User Days (PUD) 2005-2014



annual average Twitter User Days (TUD) 2012-2014



Donahue et al. *In prep*

Most “Visited” Parks

	PUD (rank)	TUD (rank)
Como Regional Park	154 (1)	967 (4)
Minnehaha Park	94 (2)	866 (5)
Parade Park	89 (3)	787 (10)
West River Parkway	91 (4)	843 (9)
Lake Harriet	70 (5)	443 (17)
Lake Calhoun Park	68 (6)	1023 (2)
Fort Snelling Park	58 (9)	1063 (1)
East River Parkway	48 (11)	1015 (3)

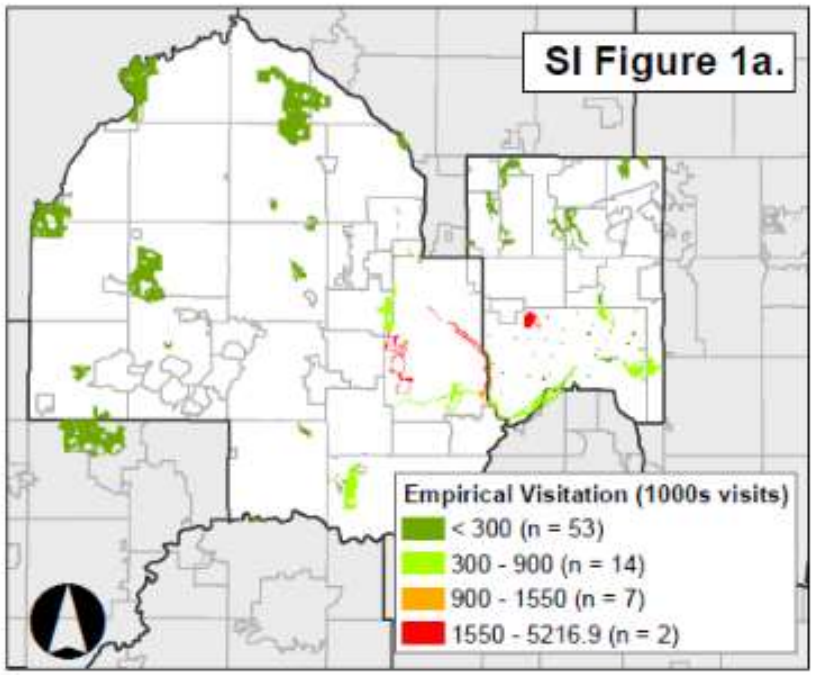
Donahue et al. *In prep*

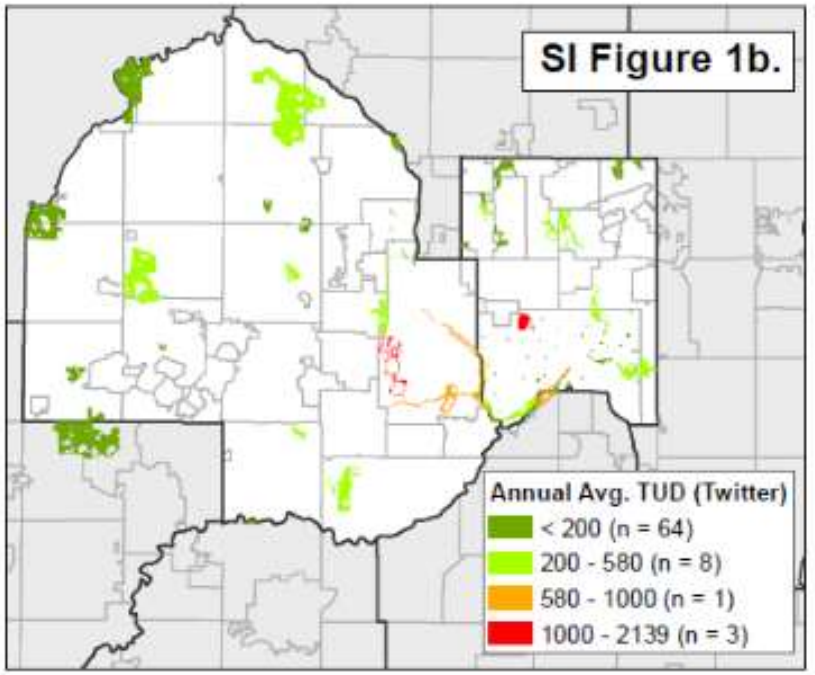
RQ2: How well do SMD compare to traditional survey methods of estimating urban park users?

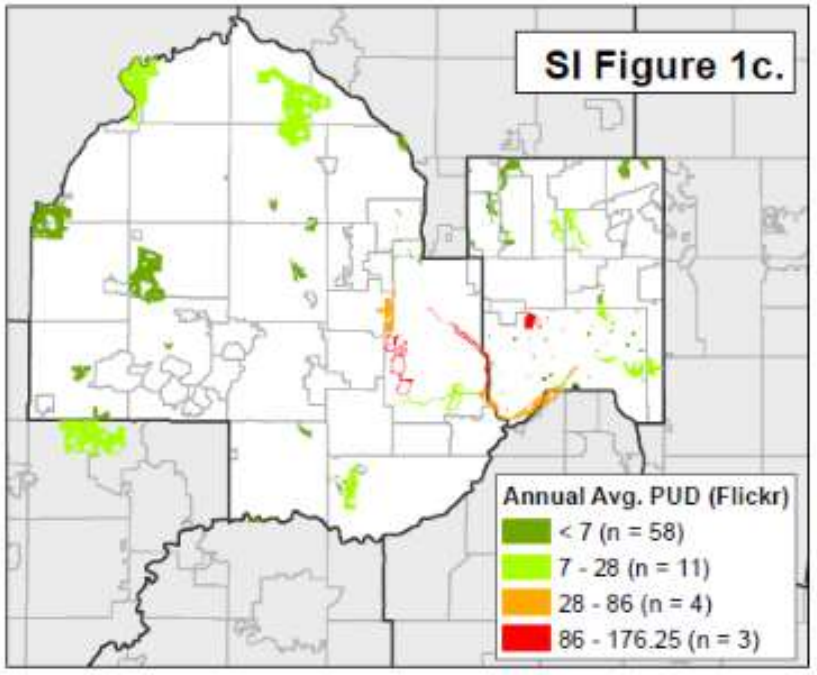
empirical visitation from agency survey data

annual average TUD

annual average PUD



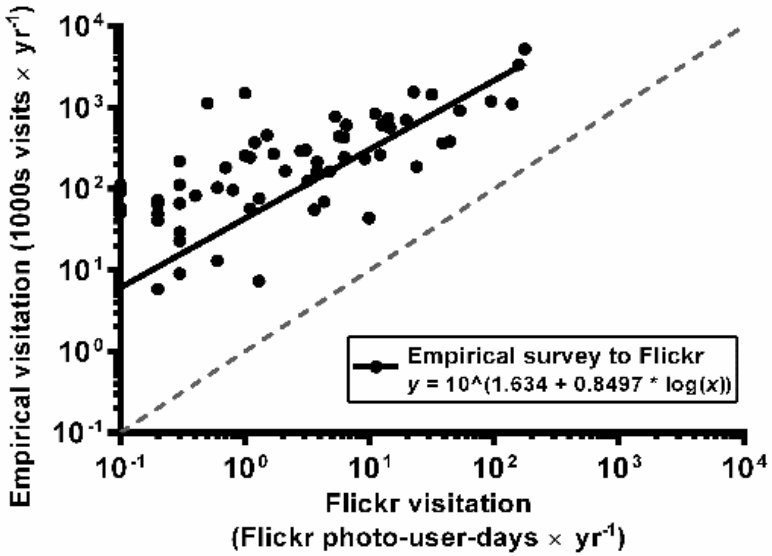




SMD validation uses subset of park features (n = 76 parks)

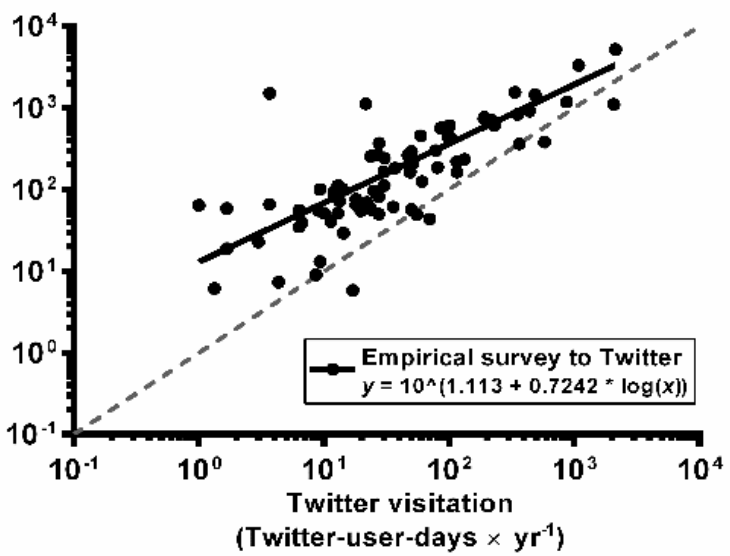
Donahue et al. *In prep*

survey : PUD



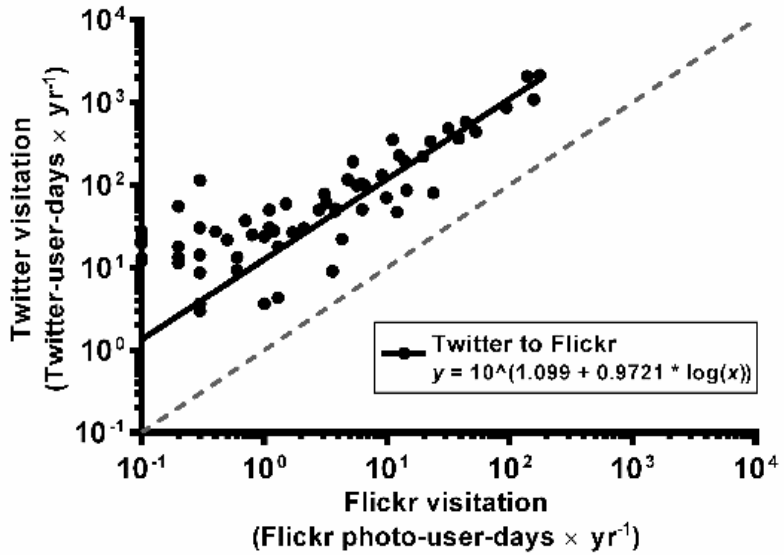
R2 = 0.67

survey : TUD



R2 = 0.64

PUD : TUD



R2 = 0.90

n = 76 parks for all regressions

Donahue et al. *In prep*

RQ3: What characteristics affect variation in visitation across urban parks?

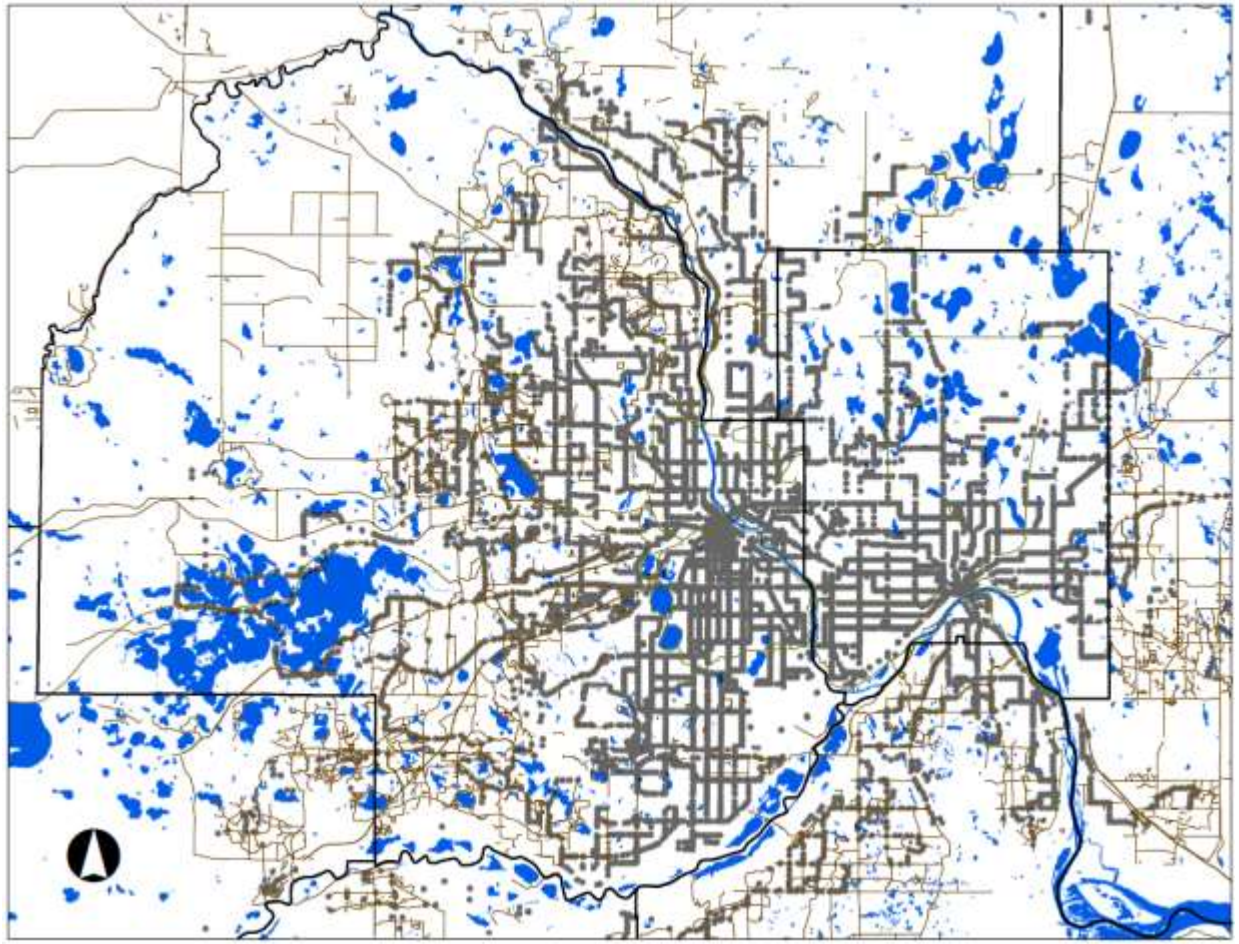
Proposed Regression Model

SMD Visitation Rates (PUD or TUD) =

Function (Park Characteristics, Park Facilities, Accessibility, Neighborhood Characteristics)

Predictors of Visitation

MetCouncil: waterbodies, bikeways, regional trails, bus stops



Predictors of Visitation

MetCouncil: waterbodies, bikeways, regional trails, bus stops

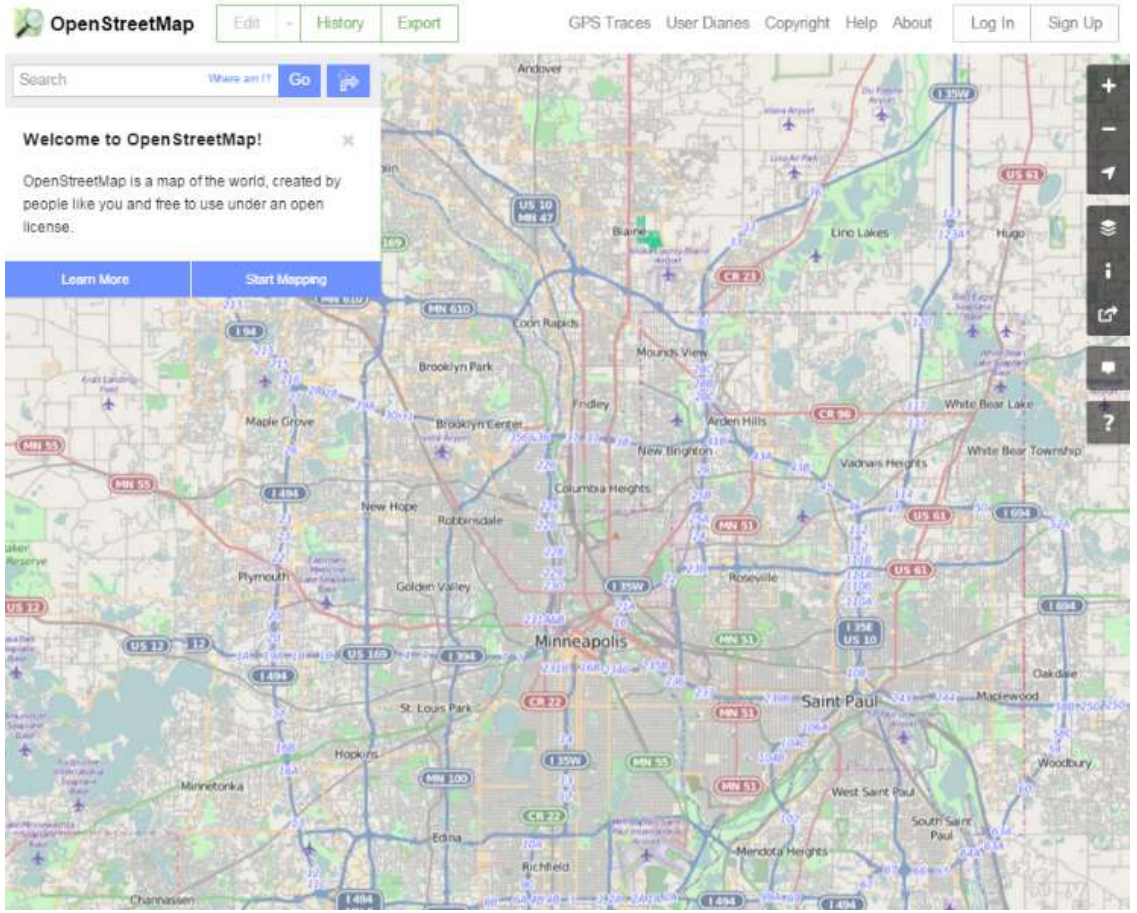
UMN USpatial & Remote Sensing Lab: 1m land cover (e.g., turf grass, imperviousness)

Predictors of Visitation

MetCouncil: waterbodies, bikeways, regional trails, bus stops

UMN USpatial & Remote Sensing Lab: 1m land cover (e.g., turf grass, imperviousness)

Openstreetmap.org: sport facilities, park infrastructure (e.g. beaches, playgrounds, toilets)



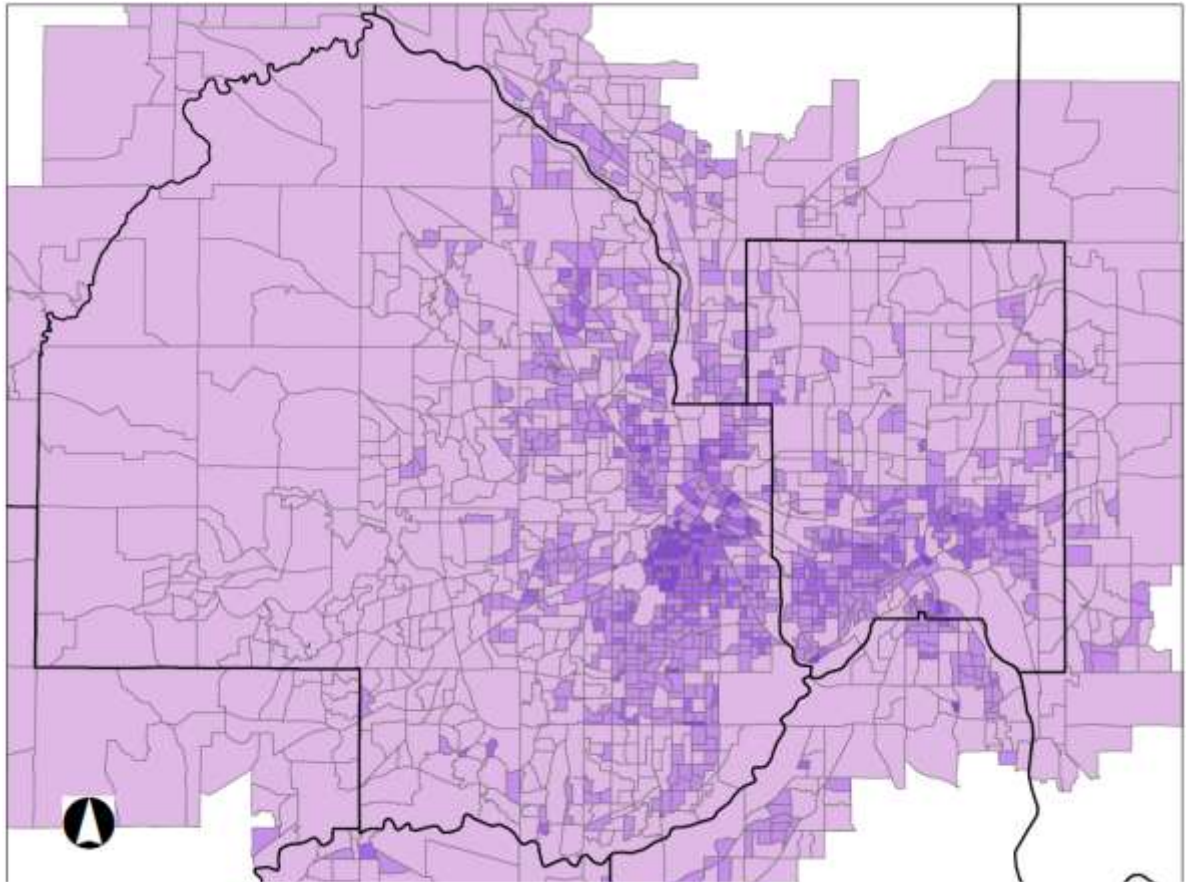
Predictors of Visitation

MetCouncil: waterbodies, bikeways, regional trails, bus stops

UMN USpatial & Remote Sensing Lab: 1m land cover (e.g., turf grass, imperviousness)

Openstreetmap.org: sport facilities, park infrastructure (e.g. beaches, playgrounds, toilets)

U.S. Census: Large Roads, 2008-2012 ACS block group population and demographics



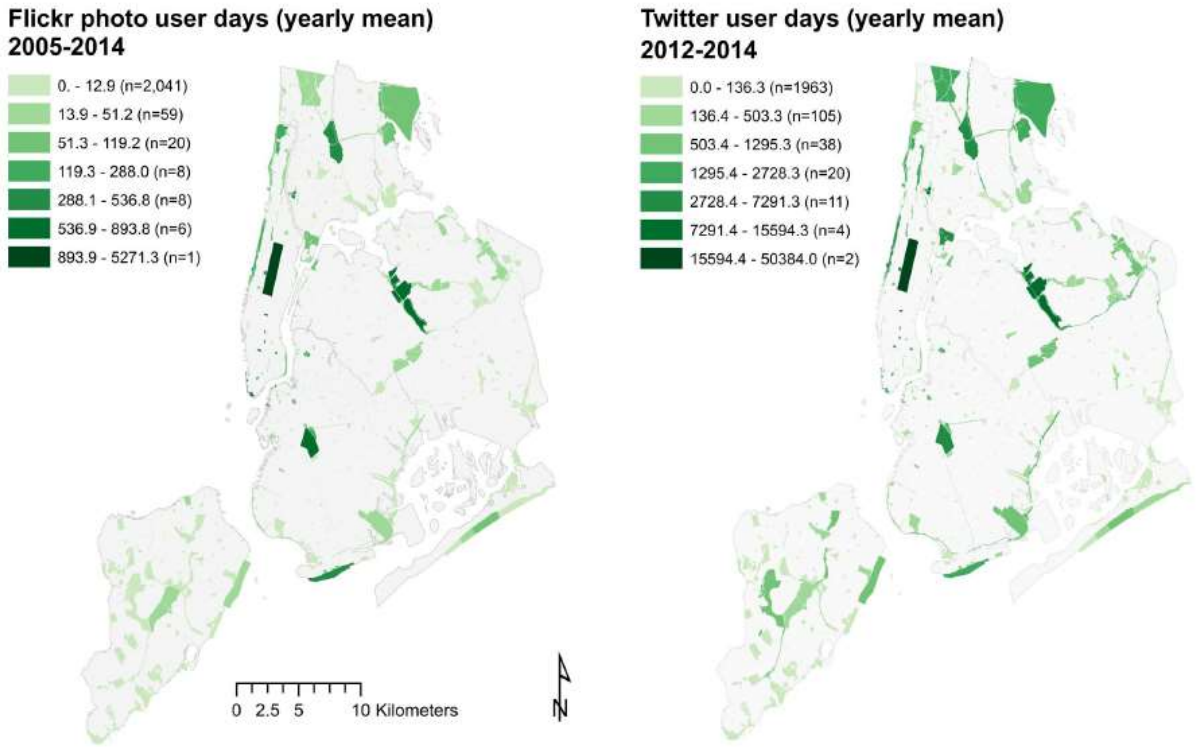
Preliminary Results

Neg. Binomial Regressions for Count Data

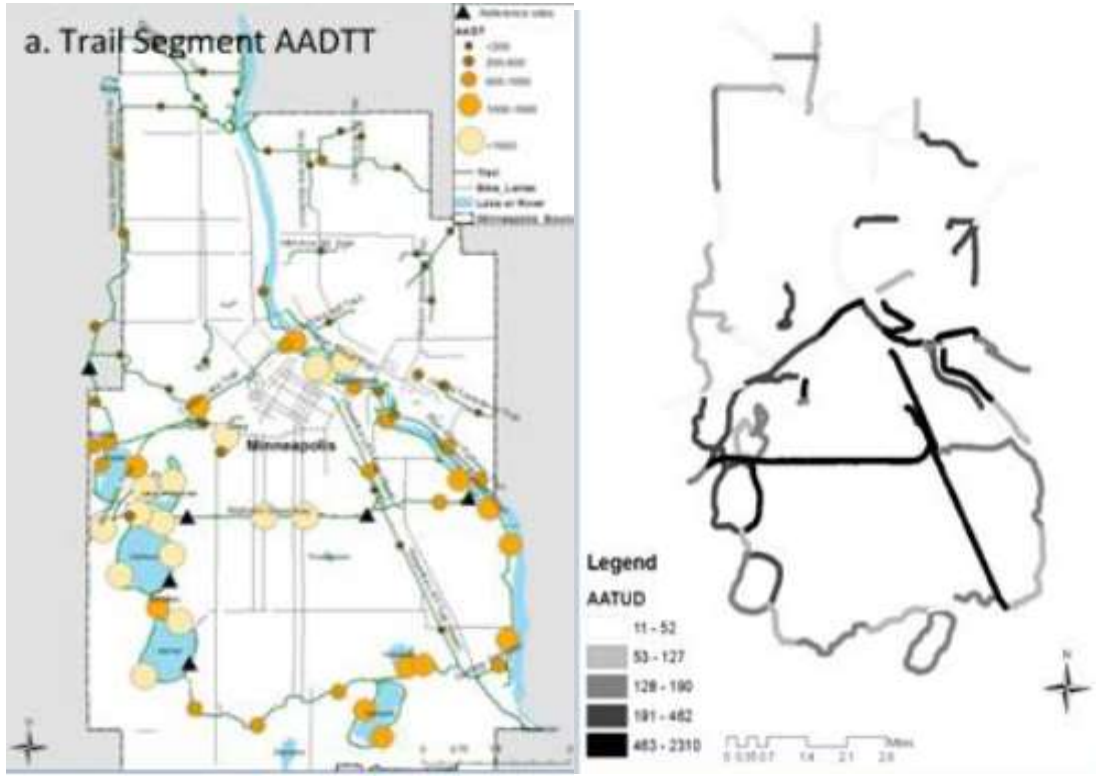
	PUDnonzero (n = 772 parks)			TUDnonzero (n = 1418 parks)		
	Est.	P	Sign	Est.	P	Sign
Park size (100m^2)	0.000024	***	+	0.00012	***	+
Water feature (presence)	1.27	***	+	0.44	***	+
% Park LC in Managed Turf Grass	2.80			15.2	***	+
Sport Fields and Courts (presence)	-0.05			0.82	***	+
Non-sport Facilities[1] (presence)	0.42	***	+	-0.12		
Regional trail length (100m)	0.02	***	+	0.025	***	+
Large roads (count)	0.08	***	+	0.08	***	+
Pop density (people/100m^2)	5.36	***	+	2.50	***	+

[1]*Includes beaches, boat launches, dog parks, playgrounds, shelters, toilets, etc.*

Donahue et al. *In prep*



Z.A. Hamstead, T. McPhearson, S. Wood, D. Fisher, R. Ilieva, P. Kremer & M. Donahue. Using social media data to understand determinants of urban park use in New York City. In prep.



Wu, Xinyi, Spencer A. Wood, David Fisher, Greg Lindsey. Photos, Tweets, and Trails: Are Social Media Proxies for Urban Trail Use? (working title)

Next Steps and Future Research

Next Steps and Future Research

Acknowledgements

Funding Support from the Institute on the Environment Sustainable Cities Discovery Grant

-

Thanks to **coauthors and project collaborators**: Bonnie Keeler, Spencer Wood, David Fisher, Zoé Hamstead and Timon McPhearson

-

And many other partners in our NatCap Urban InVEST and IonE Sustainable Cities efforts.

Marie Donahue | dona0212@umn.edu
environment.umn.edu
naturalcapitalproject.org

natural capital PROJECT

INSTITUTE ON THE ENVIRONMENT
UNIVERSITY OF MINNESOTA
Driven to Discover℠

Questions?

Marie Donahue | dona0212@umn.edu
environment.umn.edu
naturalcapitalproject.org

natural capital PROJECT

INSTITUTE ON THE ENVIRONMENT
UNIVERSITY OF MINNESOTA
Driven to Discover℠