National Bicycle & Pedestrian Documentation Project

With the Institute of Transportation Engineers (ITE)

Transportation Research Board

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Outline

- Introduction
- Background
- Objectives
- Methods
- Data Access & Analysis
- Summary of Findings

Introduction

- Annual bicycle and pedestrian count and survey effort

- A cooperative effort between Alta Planning + Design and the ITE Pedestrian & Bicycle Council

- Initiated in 2002

- Not funded

- Applied v. academic research

- Free service available to all public agencies and organizations

Background

> *"Further development of modeling techniques and data sources are needed to better integrate bicycle and pedestrian travel into mainstream transportation model and planning activities."*
> -FHWA, Guidebook on Methods to Estimate Non-Motorized Travel, July 1999

- The lack of hard, empirical data on bicycling and walking limits the effectiveness of all existing analytical tools.

Background

- Automobile, transit, and other modes utilize consistent, widely-accepted methods of gauging demand, volumes, and impacts that allow for short and long range planning

- Examples: level of service, trip generation rates, parking generation rates, mode split assumptions

- Almost all policy and analysis flows from these sources, including decisions on improvements, funding, and impacts

Background

- Non-motorized modes have no such consistent, uniform data collection and analysis system

- Each agency conducts counts, surveys, and analysis its own way

- No or little national sharing of data

- Result = harder to justify funding, document benefits, understand what influences walking and bicycling

- One solution to this problem: National Bicycle and Pedestrian Documentation Project

Objectives of the National Documentation Project

- Establish a **consistent national methodology** for conducting bicycle and pedestrian count and surveys;

- Establish a **national database** of bicycle and pedestrian count information generated by these consistent methods and practices; and

- Use the count and survey information to **begin analysis** on the correlations bicycle and pedestrian activity and local characteristics

NBDP in Use Today

- Non-motorized Transportation Pilot Project (using NBPD methodology in 4 communities)

- Caltrans Seamless Travel Study (2+ years, 80 count locations, 4 automatic count machines, new findings on correlation between volumes and independent variables)

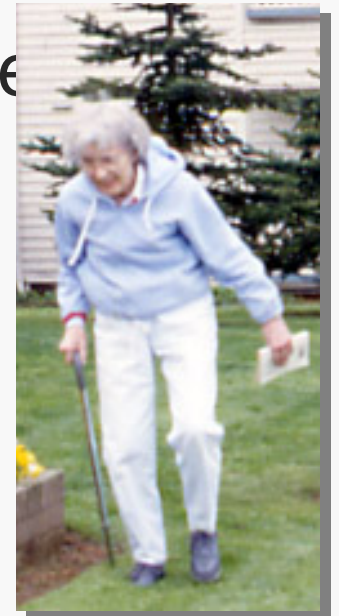- Over 60 agencies have sent in data/are using methodology

Methodology

- Consistent dates and times
  - 1 weekday and 1 weekend day
  - 2nd week of September (primary)
  - January, May, July supplemental date
  - Weekday, 7-9AM, 4-6PM (primary)
  - Saturday, 12-2PM (primary)

Criteria for Count Locations

- Historical count location
- Bicycle facility
- High crash area
- Smart growth
- Transit
- Planned project
- Mix of land uses
- Stakeholder recommendations

Pedestrian Survey

Nonmotorized Transportation Pilot Project: Pedestrian Survey

Location: _____   Date: _____   Time: _____

Surveyor: _____   Weather: _____
                                                  (sunny, cloudy, rainy, windy, hot, and/or cold)

Please complete this mail-back survey, fold in half with this survey on the inside, tape or staple the open end together, and return via prepaid U.S. Mail.

1. **What is your home zip code?**

    Home zip code: _____

2. **What best describes the purpose of this trip?**

    ☐ Exercising (a)   ☐ Work commute (b)   ☐ School (c)

    ☐ Recreation (d)   ☐ Shopping/doing errands (e)   ☐ Personal business (medical, visiting friends, etc.) (f)

3. **In the past month, about how often have you walked here?**

    ☐ First time (a)   ☐ 0 – 5 times (b)   ☐ 6 – 10 times (c)   ☐ 11 – 20 times (d)   ☐ Daily (e)

4. **Please check the seasons in which you walk.**

    ☐ All Year (a) ☐ Summer (b)   ☐ Fall (c)   ☐ Winter (d)   ☐ Spring (e)

5. **What is the total length of this trip (start to finish)?** *(complete one or more of the following)*

1. Distance:	and	2. Time:
_____ miles	/ or	_____ minutes

	3. Origin (zip code) _____	and	Destination (zip code) _____
and / or	Or location description other than zip code:* _____ * Address, intersection, landmark, etc.		Or location description other than zip code:* _____ * Address, intersection, landmark, etc.

6. **Will any part of this current trip be taken on public transit?**

    ☐ Yes (a)   ☐ No (b)

7. **If you were not walking for this trip, how would you be traveling?**

    ☐ Car (a)   ☐ Carpool (b)   ☐ Transit (c)   ☐ Bicycle (d)   ☐ I would not make this trip (e)

8. **Why are you using this route as opposed to walking somewhere else?** *(please check all that apply)*

    (This route is/has:)

    ☐ Accessible/close (a)   ☐ Direct (b)   ☐ Lower traffic volumes (c)   ☐ Heard about it through friends, media, etc.   (d)

    ☐ Scenic qualities (e)   ☐ Level (f)   ☐ Personal safety (g)   ☐ Connection to transit (h)

9. **What would you like to see improved along this route (mark with an 'X') and community in general (mark with an 'O')?** *(please check all that apply)*

    ☐ Wider sidewalks (a)   ☐ Better surface (b)   ☐ Better street crossings (c)

    ☐ More shade trees (e)   ☐ Benches (f)   ☐ Access to shops, etc. (g)   ☐ More sidewalks (h)

10. **What ethnic group do you belong to?** *(please check all that apply) (optional)*

    ☐ Hispanic/Latino (a)   ☐ African American (b)   ☐ Anglo/Caucasian (d)   ☐ Asian (c)

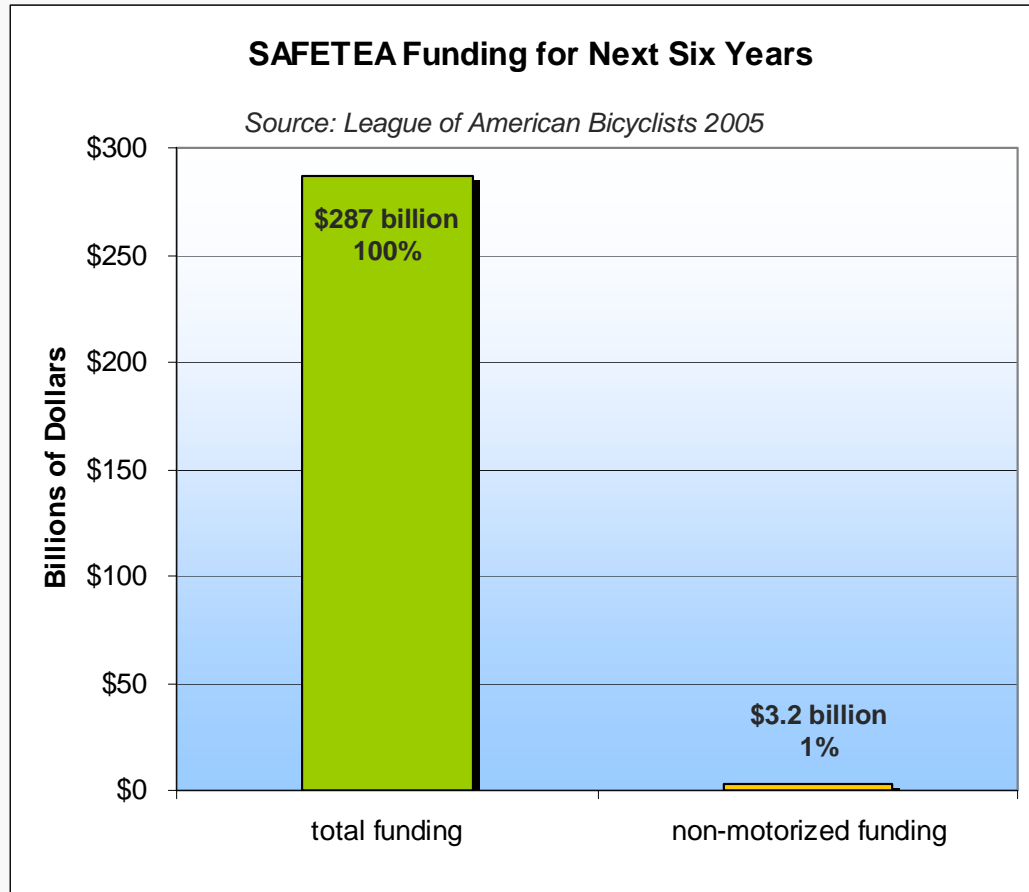*Thank you for your time!*

Data Access and Analysis

Data can be used for:

- Demand projections
- Exposure analysis
- Estimate of benefits
- Trip generation
- Overall trends in activity
- Facility operation and design
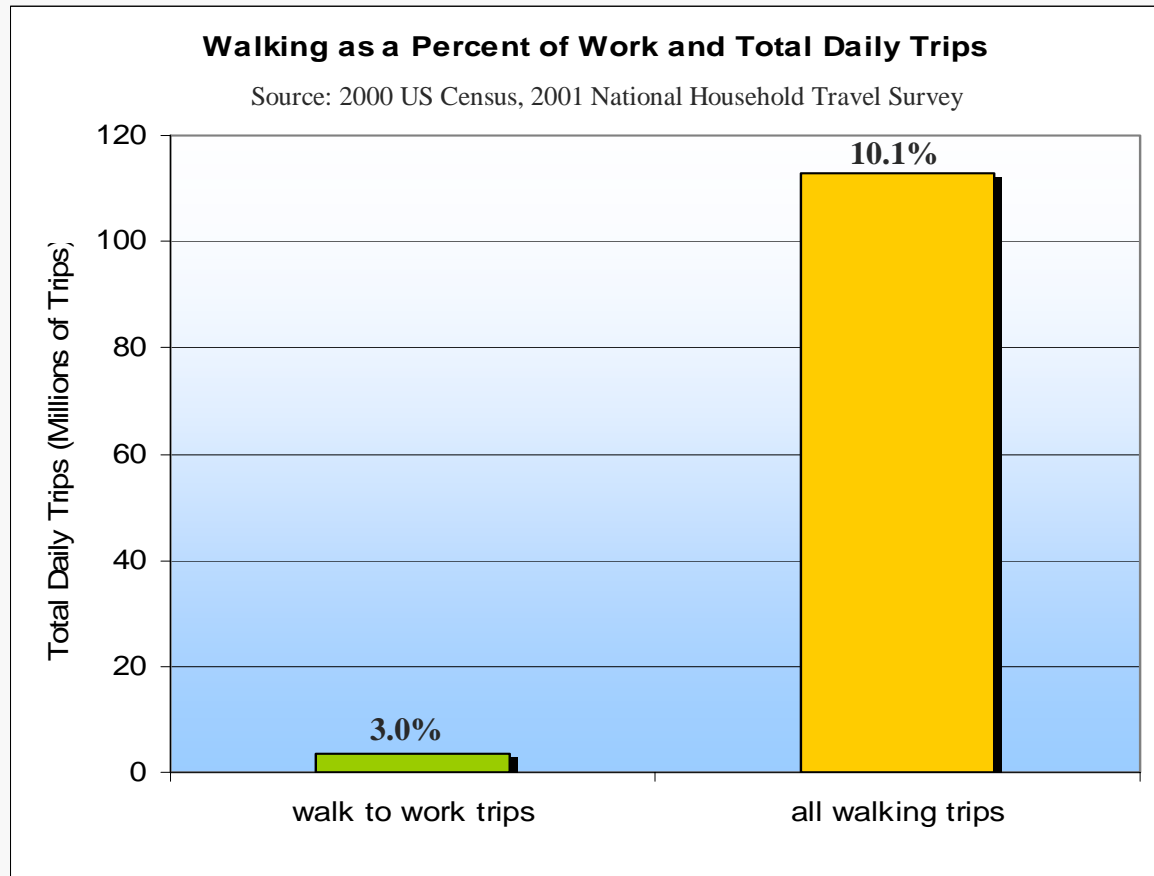- Land use and design

SAFETEA-LU Funding

SAFETEA Funding for Next Six Years

Source: League of American Bicyclists 2005

$287 billion
100%

$3.2 billion
1%

Billions of Dollars

$300
$250
$200
$150
$100
$50
$0

total funding   non-motorized funding

NHTS Household Trips

Walking as a Percent of Work and Total Daily Trips

Source: 2000 US Census, 2001 National Household Travel Survey

Major Findings & Issues

- Alta does not have resources to analyze or conduct QA/QC on incoming data

- Most data is from multi-use paths

- Seamless Travel project has funded NBPD for 2 years as case study in San Diego County

Multi-Use Paths: Monthly Variations in Use
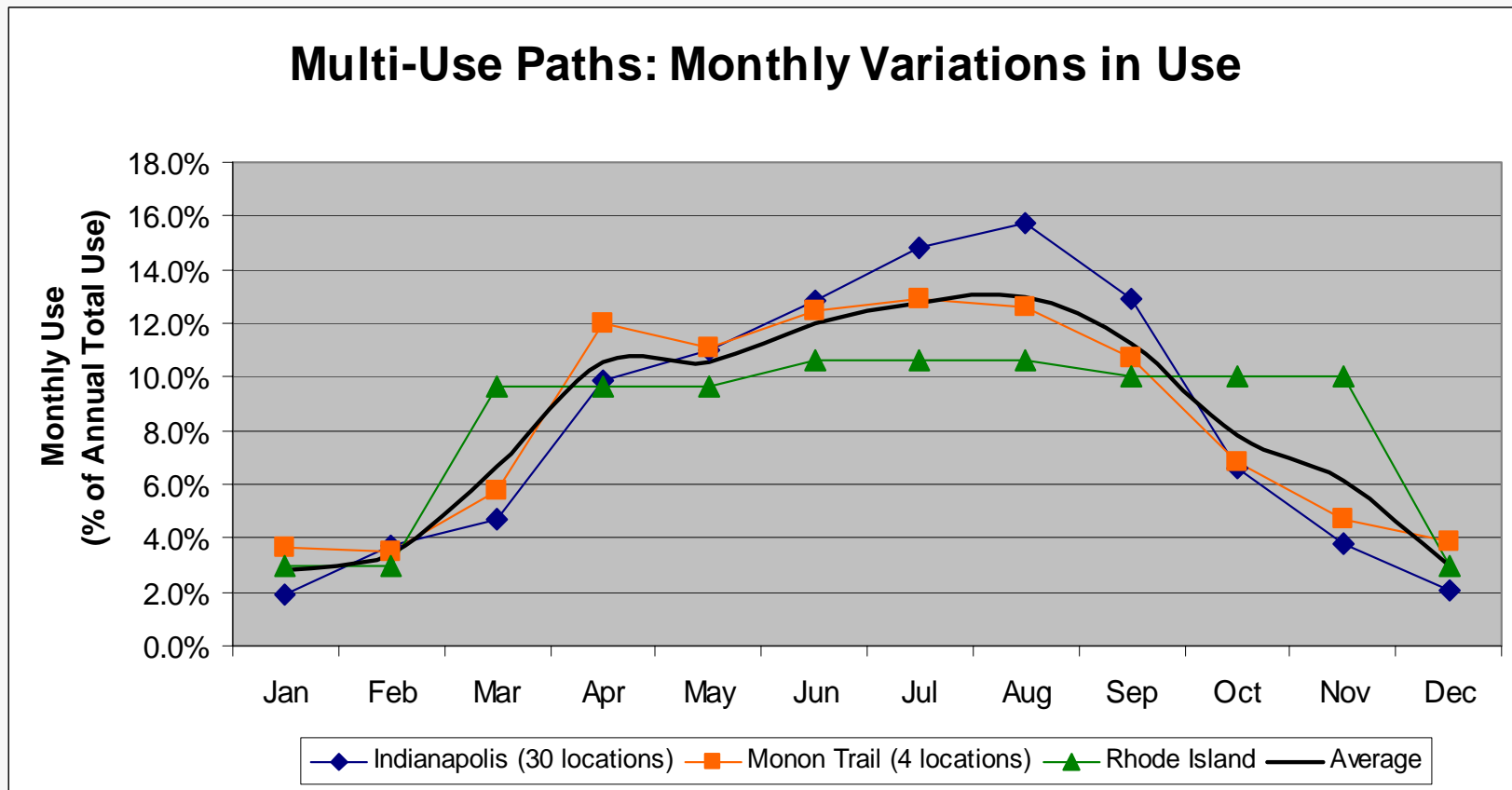
Monthly Variation: San Diego

Percent of Annual Total Volume by Month
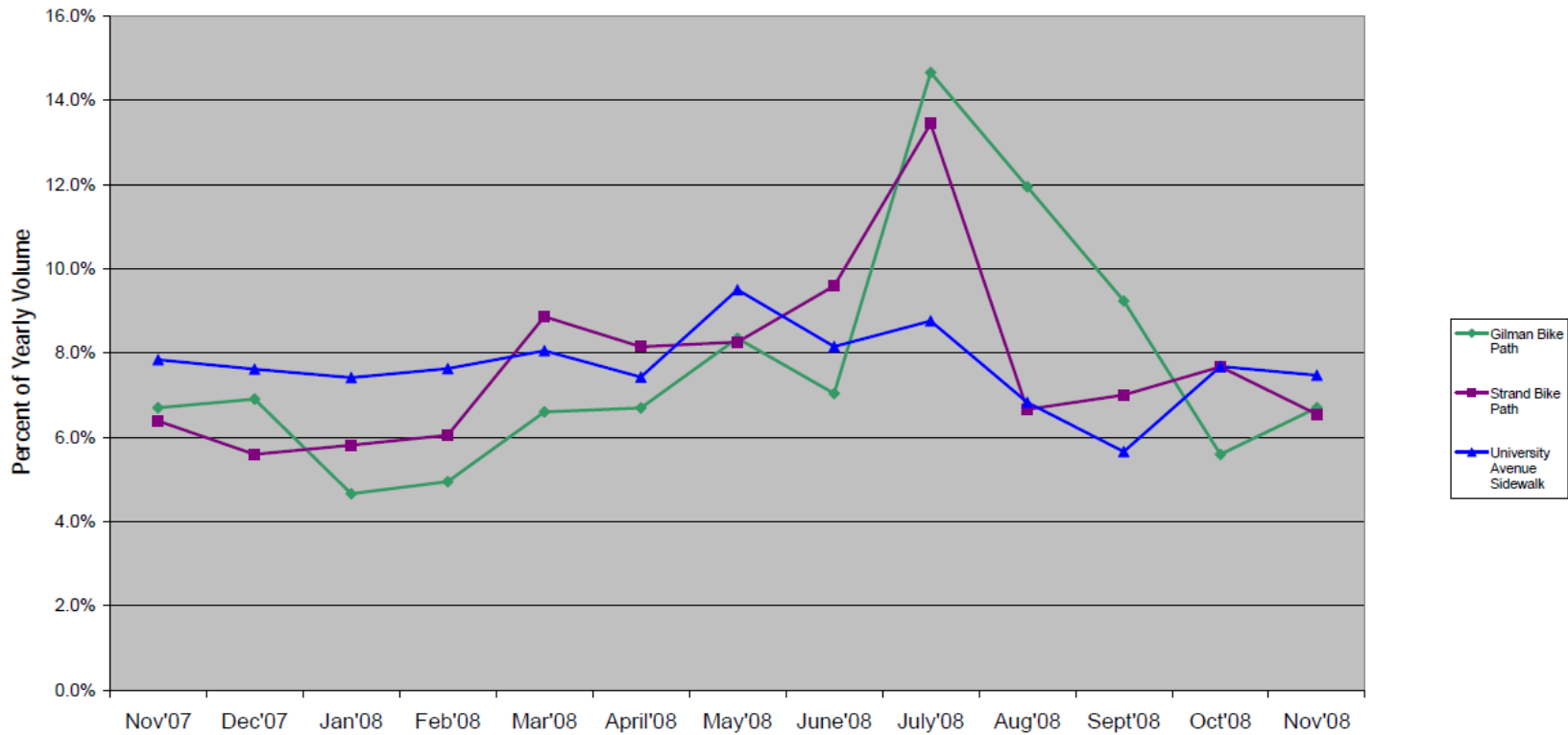
Summary of Findings: 2005

Multi-Use Paths Monthly Variations in Use on Monon Trail (Ind.) vs. Temperature
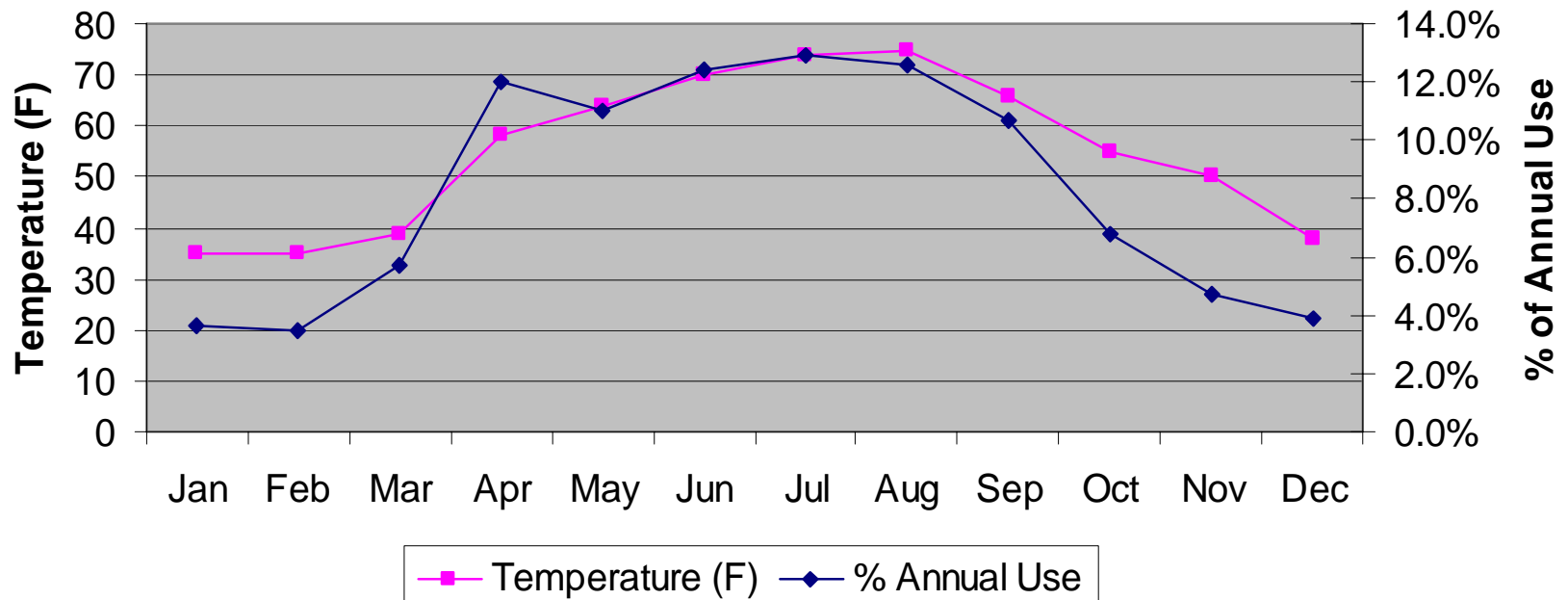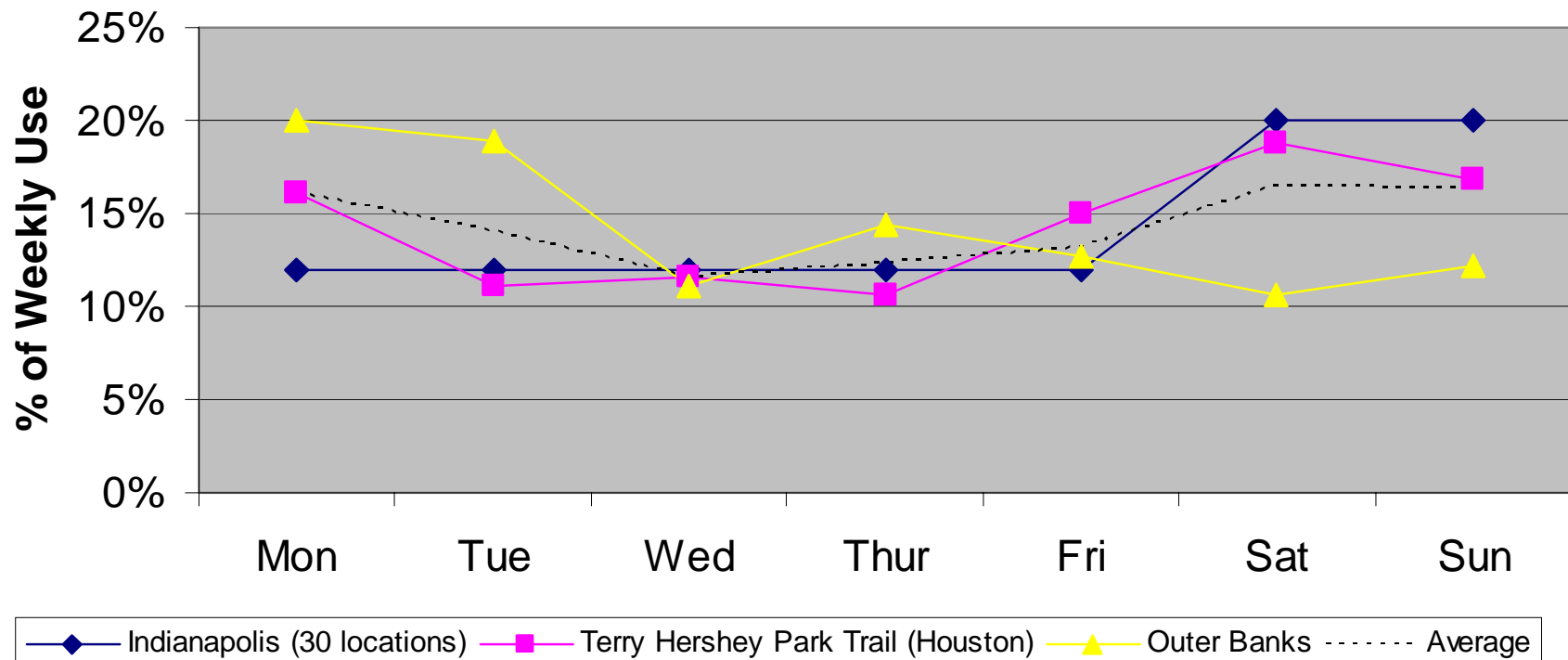
Conclusion

- Unlike vehicle use patterns, there appears to be significant regional differences in seasonal patterns

- Estimating models will need regional factors

- Climate

- Visitors

Daily Variation
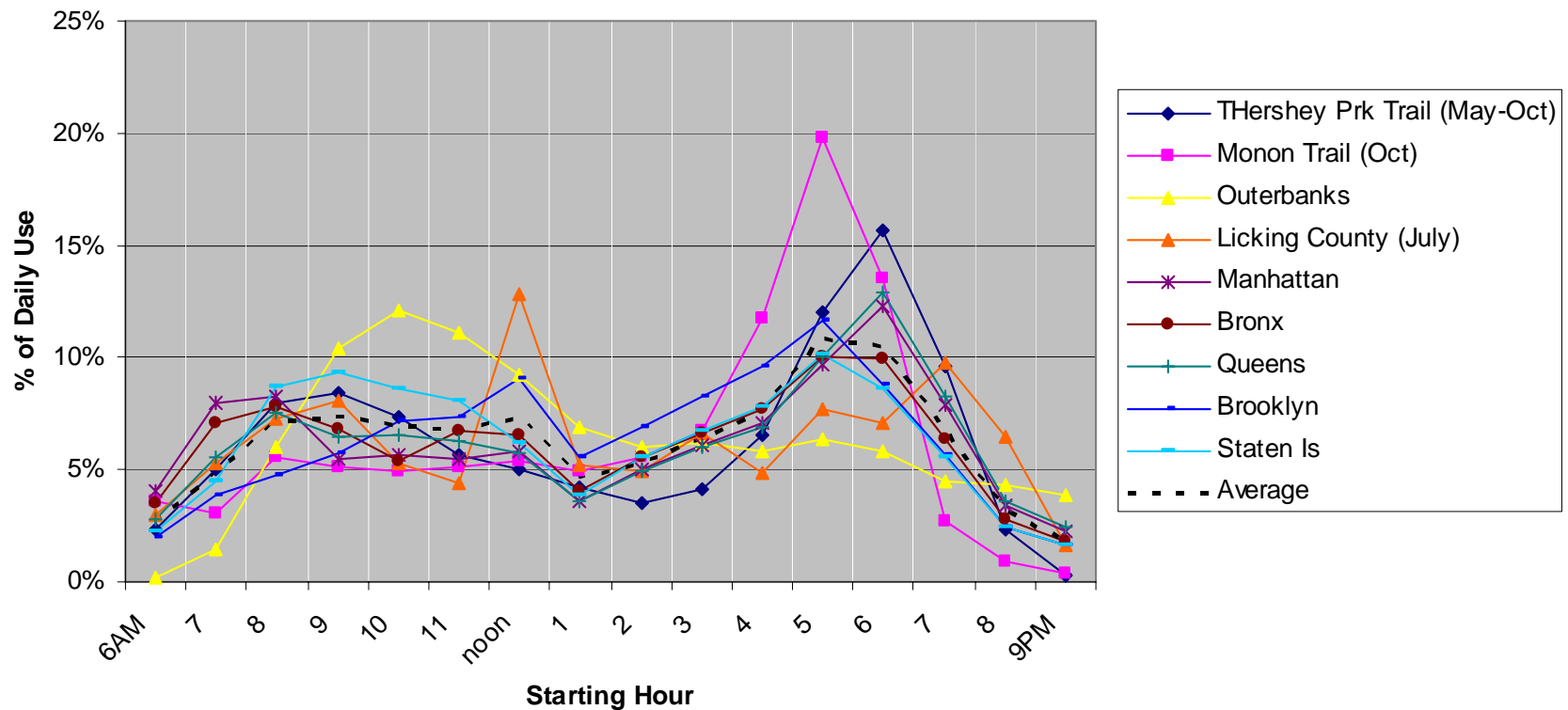
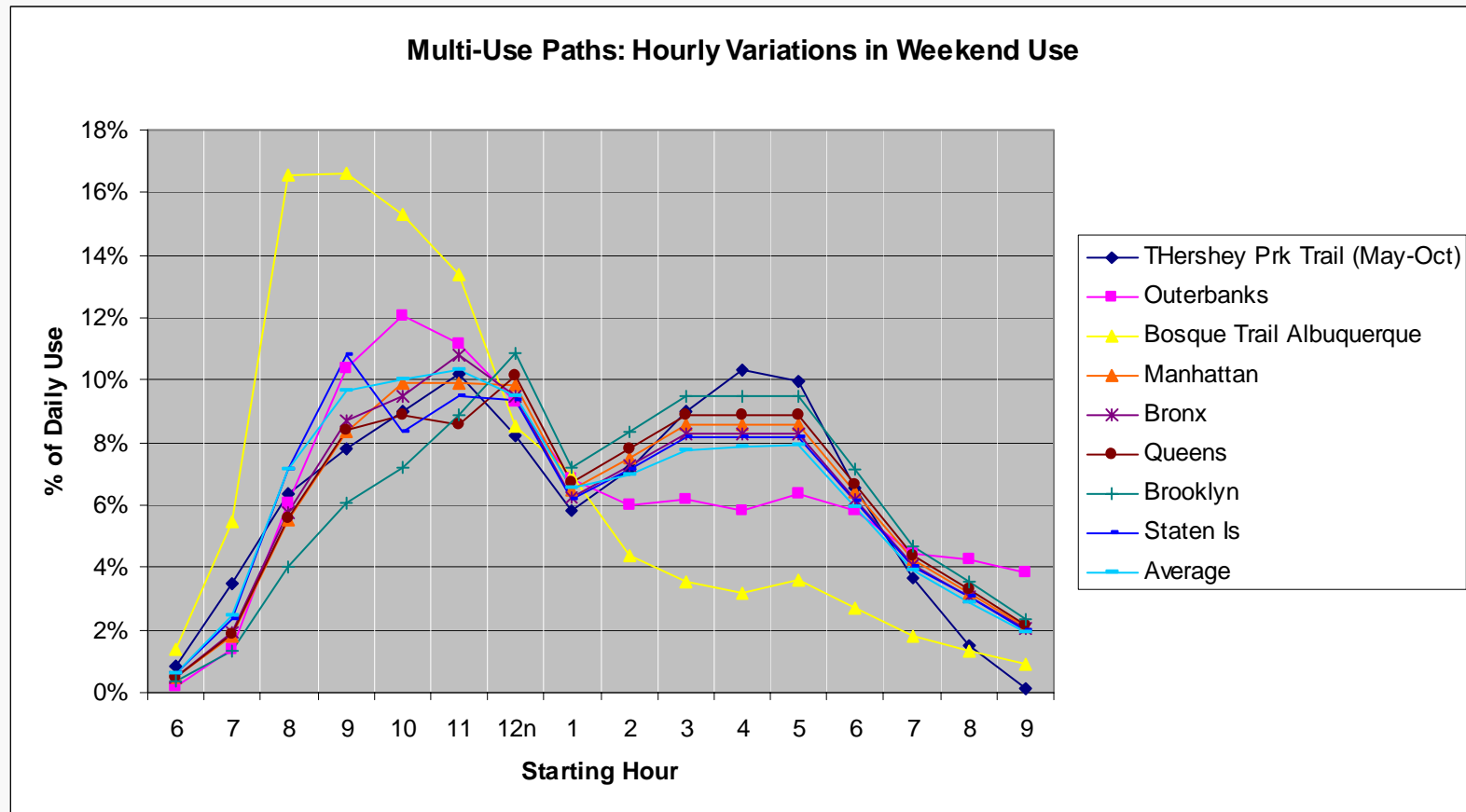## Multi-Use Paths: Daily Variations in Use

Legend:
- Indianapolis (30 locations)
- Terry Hershey Park Trail (Houston)
- Outer Banks
- Average

Weekday Hourly Variation

Multi-Use Paths: Hourly Variations in Weekday Use

Weekend Hourly Variation

Multi-Use Paths: Hourly Variations in Weekend Use

Conclusions

- Significant weekday variation and weekday variation

- Significant hourly variation

- No generalized 'peak' period

- Accept variation as part of normal estimating process

NBPD Aggregate Model

Work Commute
Employed adults riding bicycles/walking (US Census)

School Commute
School children riding bicycles/walking (US Census and available sources)

College Commute
College students riding bicycles/walking (UC Census)

Utilitarian Trips
Non-work or school trips by bicycle/walking (surveys, other)

Recreational/Discretionary
Recreational/discretionary trips by bicycle/walking (surveys, studies)

Total daily estimated bicycle and walking trips

Average trip length, trip purpose

Replaced vehicle miles, health, transportation, other benefits

Results: Bicycling on the Rise

- +103% 1999-2008 on weekdays, +48% weekends

- +17% 2007-2008 on weekdays, +21% on weekends

- 72% male, 13% children

- 29% not wearing helmets

- 11 days/month average

- 10 miles average round trip

Results: Aggregate for Marin

- Pedestrians

- 115,680 daily pedestrian trips
- 81,288 saved vehicle trips
- 27,442 saved vehicle miles

- Bicyclists

- 18,428 daily bicycle trips
- 24,965 saved vehicle trips
- 37,525 saved vehicle trips

Results: Validation

Table C
Average Daily Bicycle/Pedestrian Trips: Comparing Model Outputs
Marin County

|	**Bicyclists**	**Pedestrians**
Alta Model	18,428	115,680
NHTS	14,128	141,283
Report to Congress	17,909	117,406
Average	16,821	124,789

Seamless Travel

- Caltrans/TSC
- 2.5 year study
- 40 historic locations
- 40 new locations
- 80 total count locations
  - AM weekday peak (all)
  - Midday weekend peak (all)
 - PM weekday peak (20 selected)

Peak Hour Count Locations

80 Peak Hour
Bike & Ped Count Locations
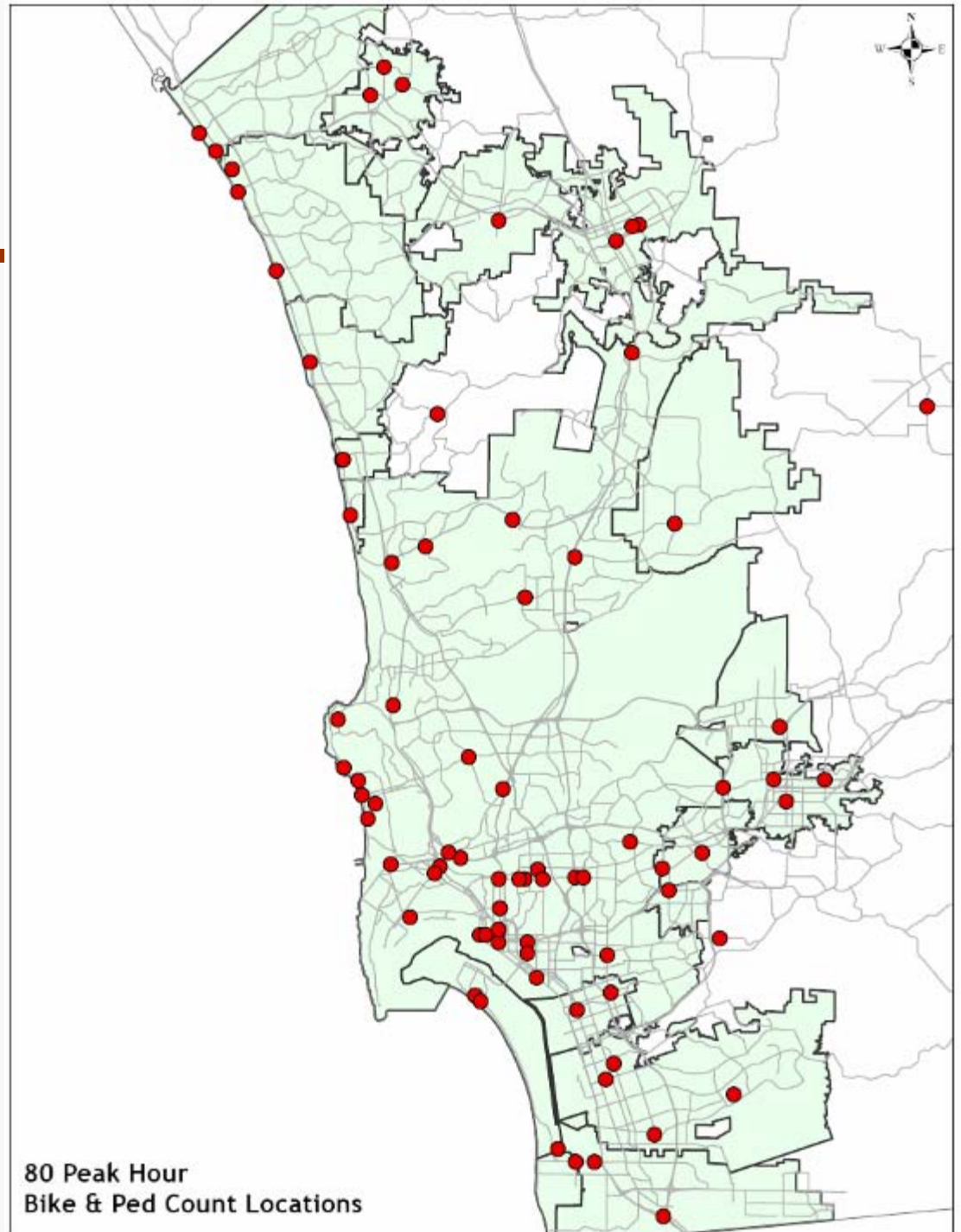
Count Technology

- **Active Infrared Detection (6 sets)**
  - Classification of bikes and peds
  - At locations that support installation of 2 units

- **Passive Infrared Detection (2 sets)**
  - No classification possible
  - At locations that do not support 2 units

- **Time stamped**

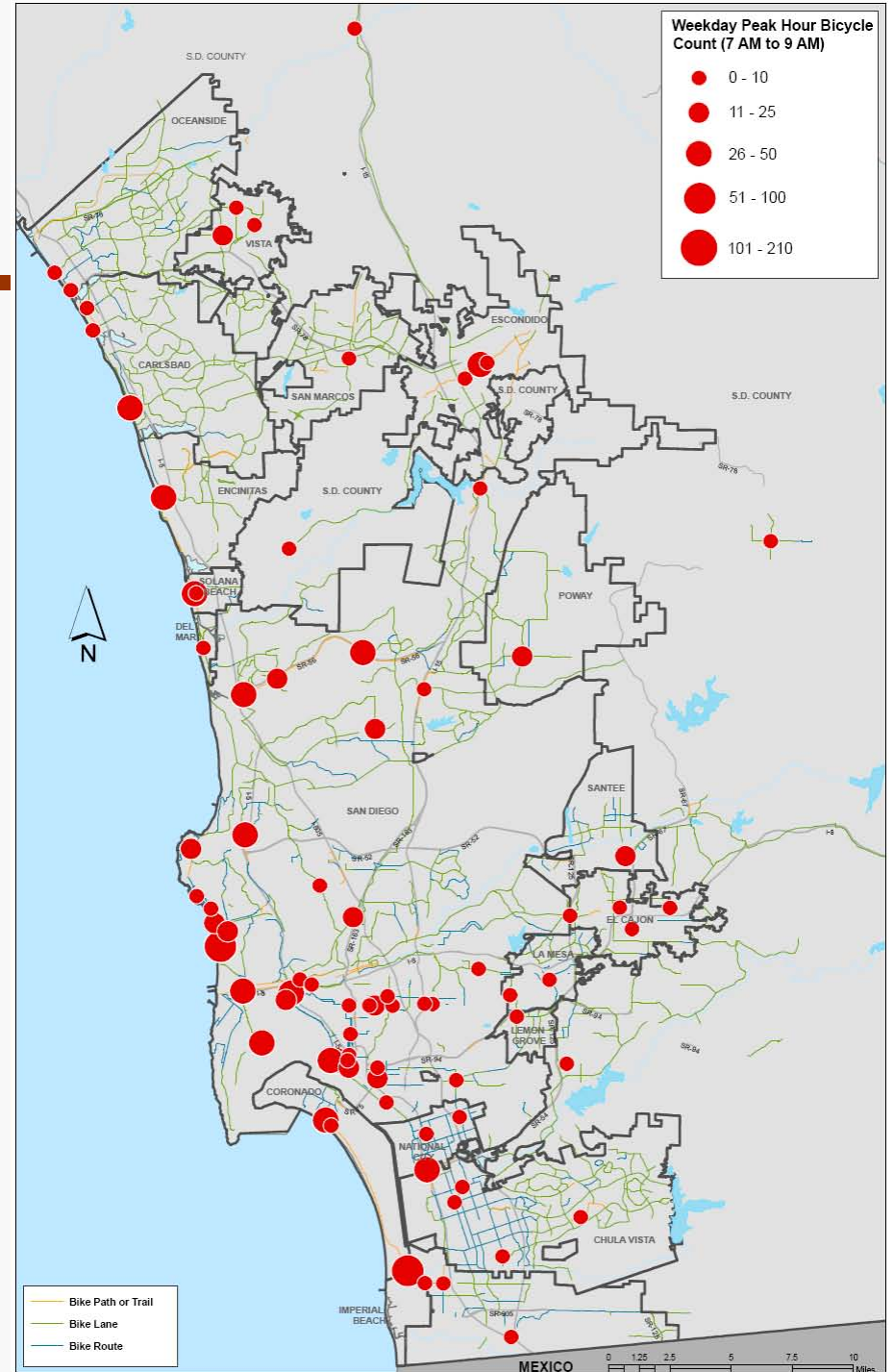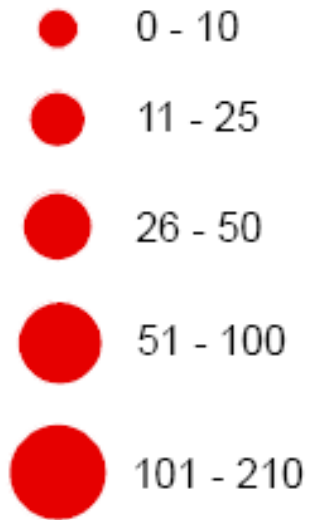- **Downloadable data**

Rose Canyon

Mission Beach

University Avenue
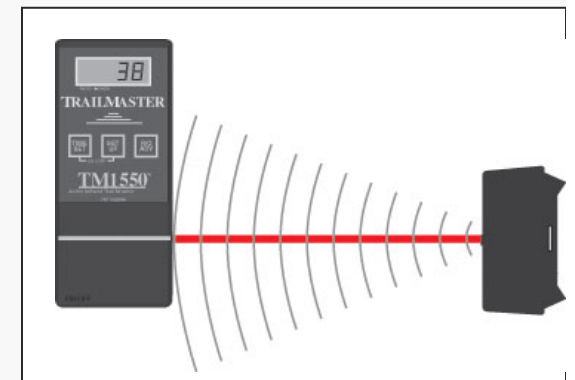
The Strand

Weekday Bikes

Weekday Peak Hour Bicycle Count (7 AM to 9 AM)

- 0 - 10
- 11 - 25
- 26 - 50
- 51 - 100
- 101 - 210

Weekday Pedestrian
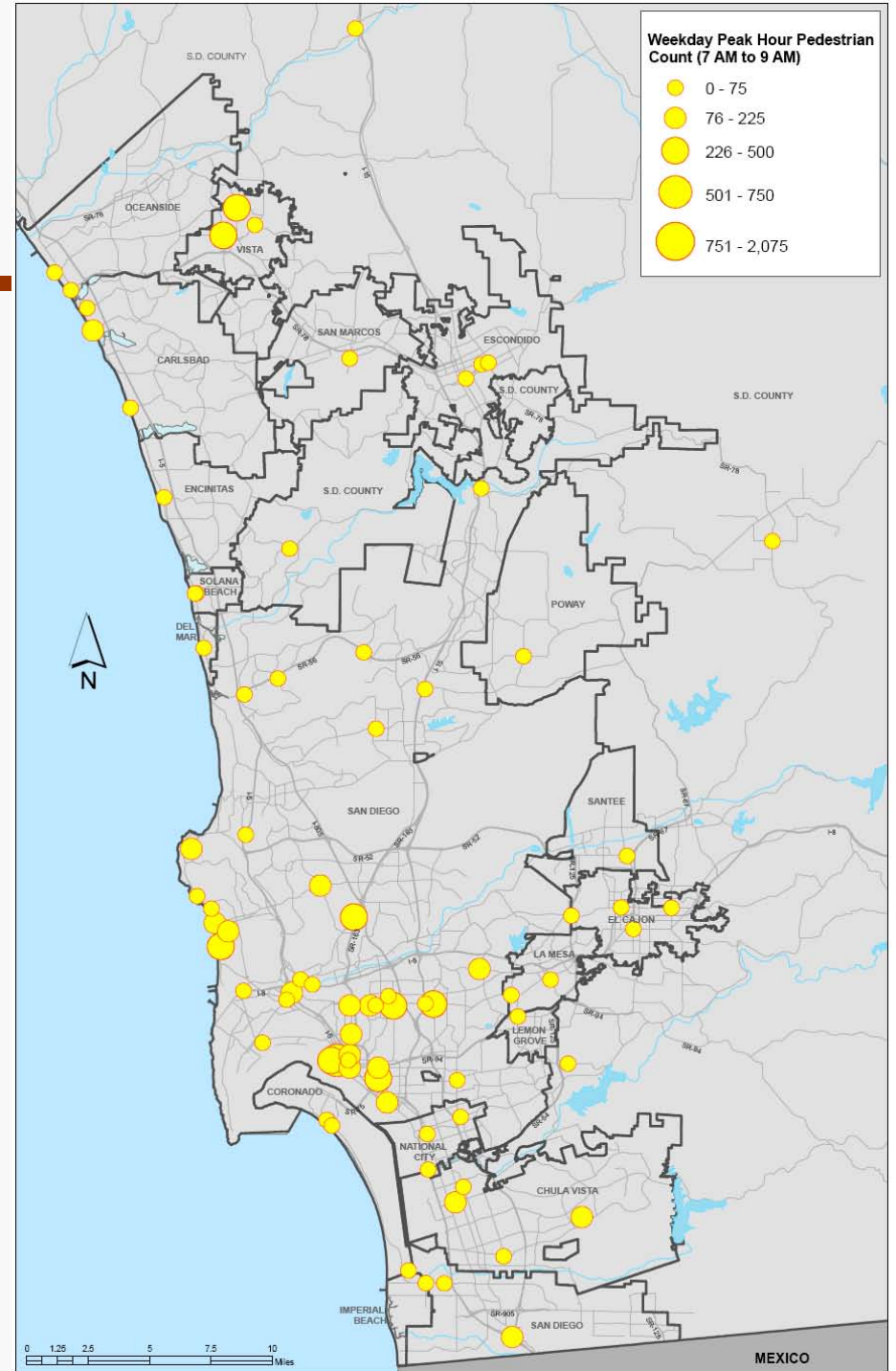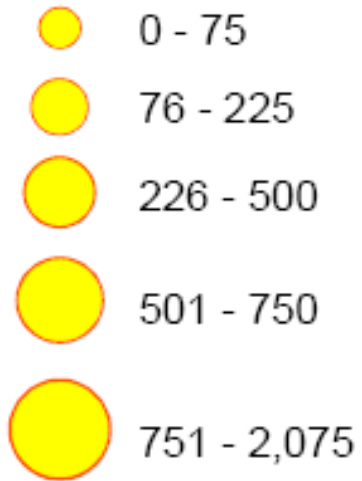
The Strand - Daily Pedestrian and Bicyclist Volume Fluctuation

Rose Canyon Bike Path/ Gilman
Daily Pedestrian and Bicyclist Volume July 2007
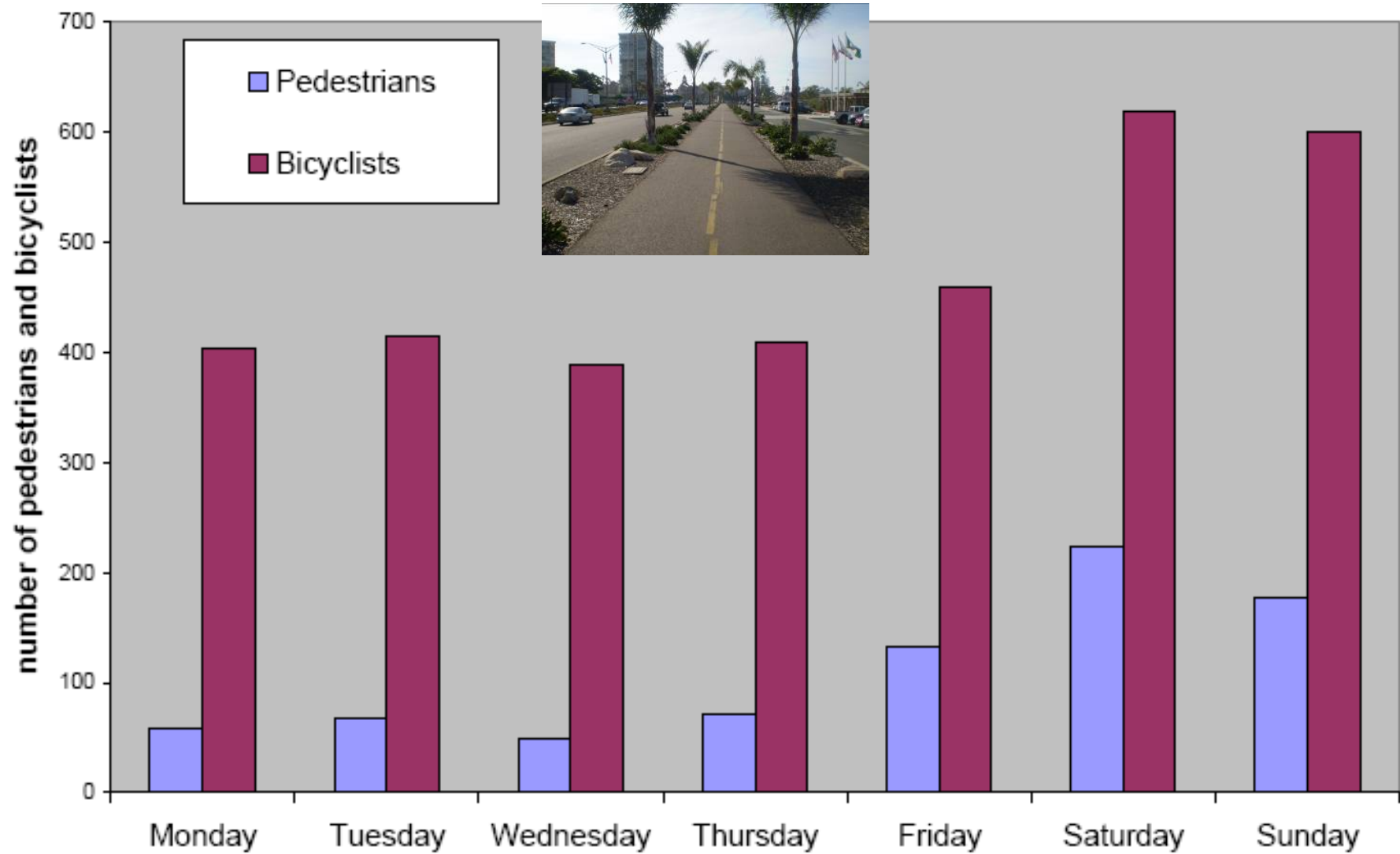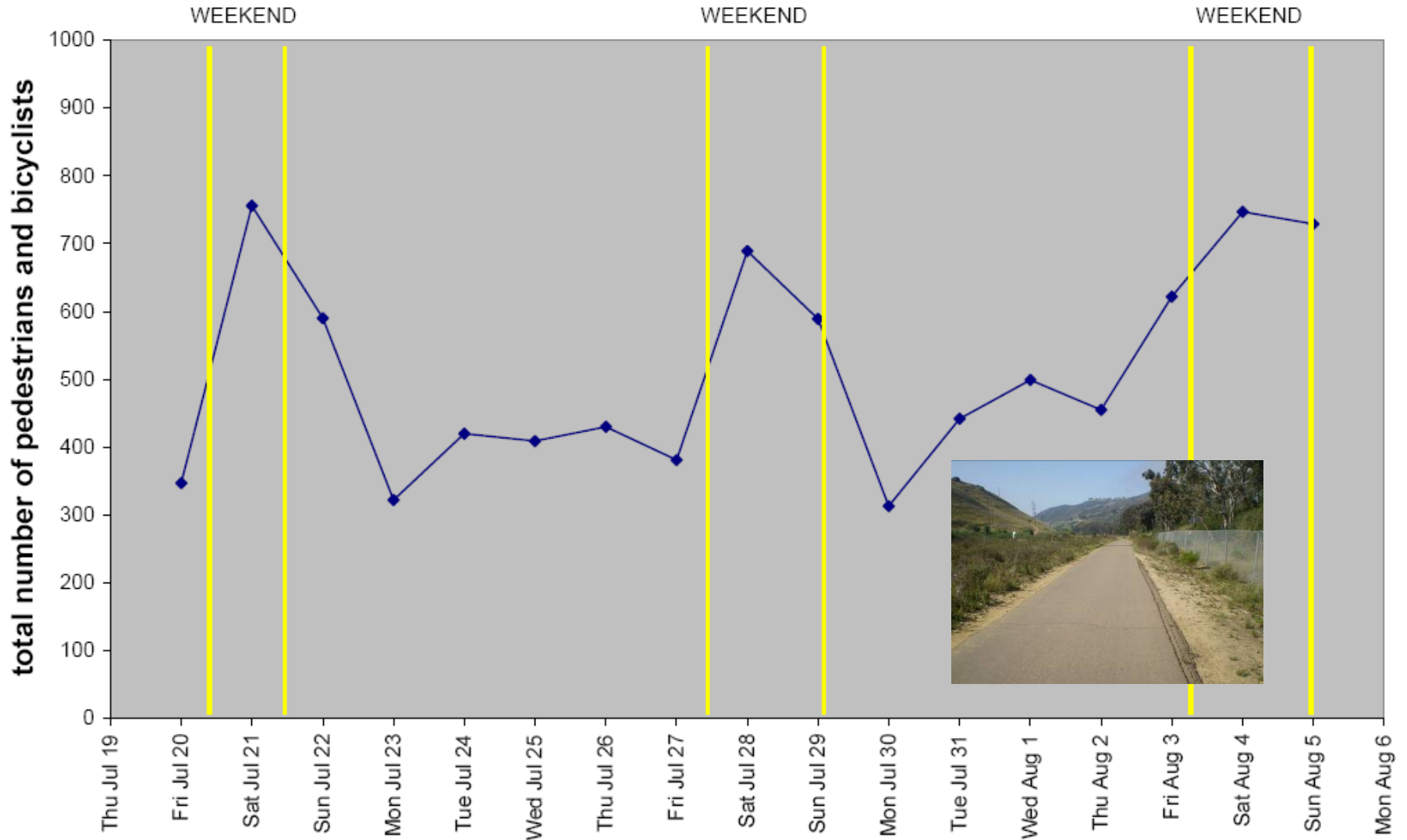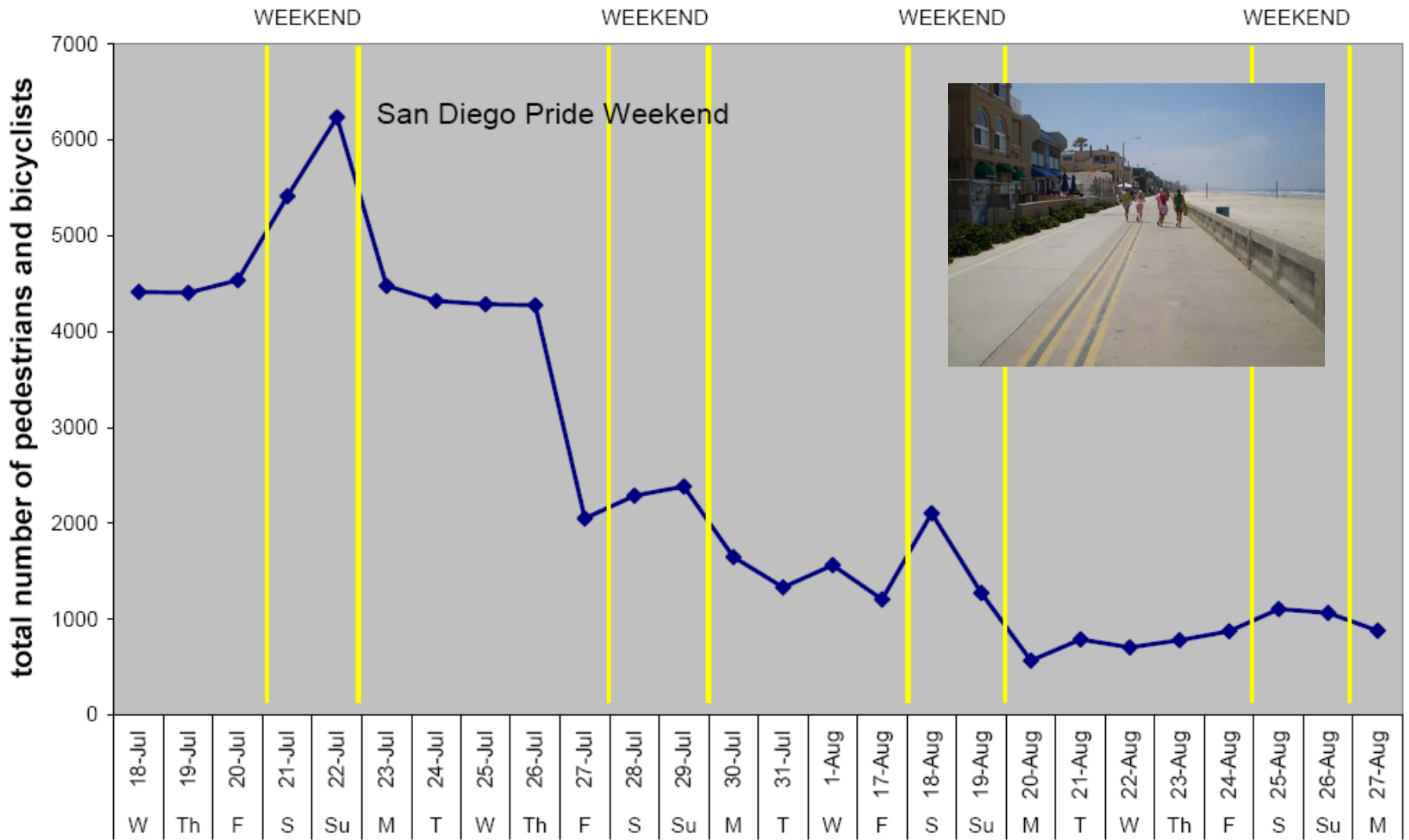
Mission Beach Boardwalk - Daily Pedestrian and Bicyclist Volume
July - August 2007

San Diego Pride Weekend

WEEKEND   WEEKEND   WEEKEND   WEEKEND

total number of pedestrians and bicyclists

7000
6000
5000
4000
3000
2000
1000
0

| 18-Jul | 19-Jul | 20-Jul | 21-Jul | 22-Jul | 23-Jul | 24-Jul | 25-Jul | 26-Jul | 27-Jul | 28-Jul | 29-Jul | 30-Jul | 31-Jul | 1-Aug | 17-Aug | 18-Aug | 19-Aug | 20-Aug | 21-Aug | 22-Aug | 23-Aug | 24-Aug | 25-Aug | 26-Aug | 27-Aug |
| W | Th | F | S | Su | M | T | W | Th | F | S | Su | M | T | W | F | S | Su | M | T | W | Th | F | S | Su | M |

Rose Canyon Bicycle Path – Wednesday June 13th

Commuter, low density, few destinations
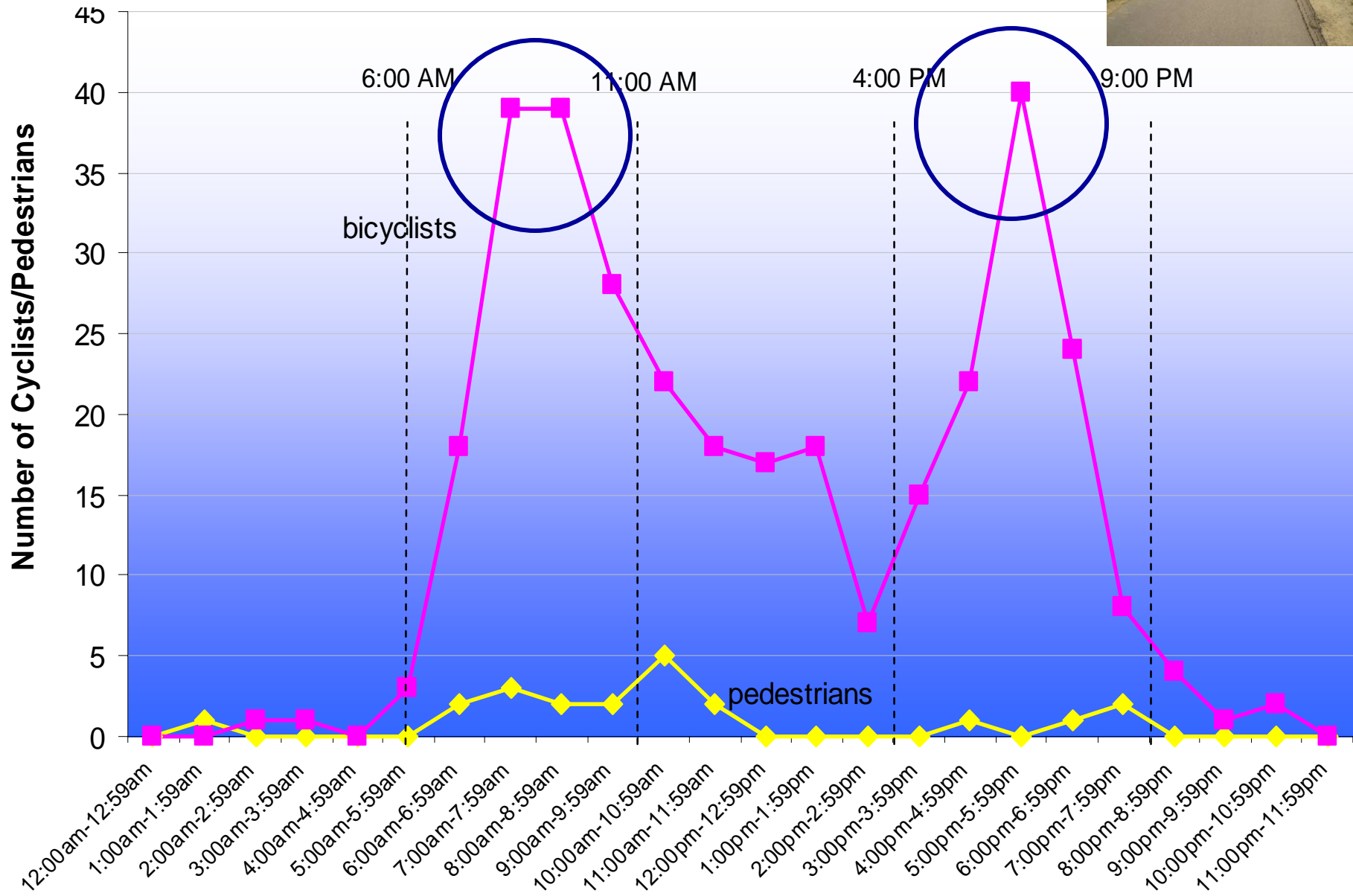
Mission Beach Bicycle Path – Wednesday June 13th

Recreational, many destinations

Number of Cyclists/Pedestrians

6:00 AM 11:00 AM 4:00 PM 9:00 PM

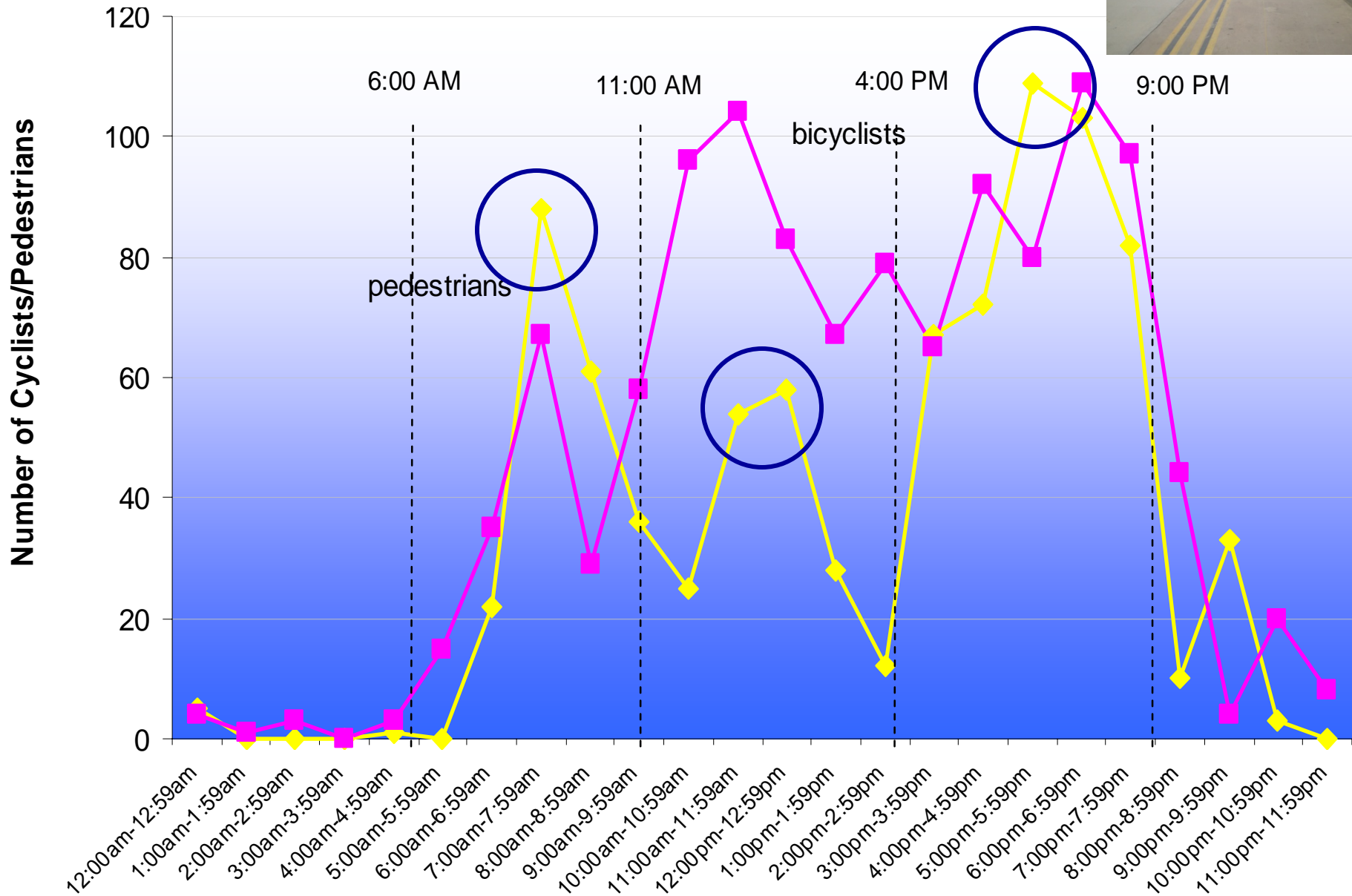pedestrians

bicyclists

120
100
80
60
40
20
0

12:00am-12:59am
1:00am-1:59am
2:00am-2:59am
3:00am-3:59am
4:00am-4:59am
5:00am-5:59am
6:00am-6:59am
7:00am-7:59am
8:00am-8:59am
9:00am-9:59am
10:00am-10:59am
11:00am-11:59am
12:00pm-12:59pm
1:00pm-1:59pm
2:00pm-2:59pm
3:00pm-3:59pm
4:00pm-4:59pm
5:00pm-5:59pm
6:00pm-6:59pm
7:00pm-7:59pm
8:00pm-8:59pm
9:00pm-9:59pm
10:00pm-10:59pm
11:00pm-11:59pm

Conclusions: Corridor Demand

- Limitations of automatic counters
- Errors at very high volumes
- Difficulty counting on-street bicycles
- Impact of special events and 'pulsing'
- Variability based on facility location
- Visitors/aesthetics
- Recreation v. commuter

Background Factors

Socio-economic	Population under 18
	Population over 65
	# households with no vehicle
Built Environment	Single family unit density
	Multi-family unit density
	Population density
	Street network length
	# transit stops
Travel Characteristics	# transit commuters
	# walking commuters
	Transit ridership

Analysis: Key Variables

- Employment Density R = .976

- Class I bike path within ¼ mile R = .879

Analysis: Estimating Wild Cards

- Topography
- Climate
- Security
- Traffic/crossings
- Facility quality
- Aesthetics
- Special events, 'pulsing'
- Land use/urban design

Summary: National Documentation Project

- A low cost, effective method of documenting the levels, trends, and factors influencing walking and bicycling

- More data is needed

- Funding being sought

Recommended Next Steps

- Assemble a Working Group of interested researchers to collaborate on and produce applied research

- Fund and develop a Bicycle/Pedestrian Traffic Monitoring Guide and research to develop an area wide and location specific estimating tool

- Work towards an accepted convention

- Promote research results that show the role of walking/bicycling in transportation

Summary

More information or to participate:
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http://www.ite.org/councils/Ped_Bike/trips.asp