Automated Bicycle and Pedestrian Counting
Towards a Regional Active Transportation Monitoring Program

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COUNTY OF SAN DIEGO
HHSA
HEALTH AND HUMAN SERVICES AGENCY

healthy
WORKS
Paths to Healthy Living

Overview

- Purpose of HHSA Funded Research Project

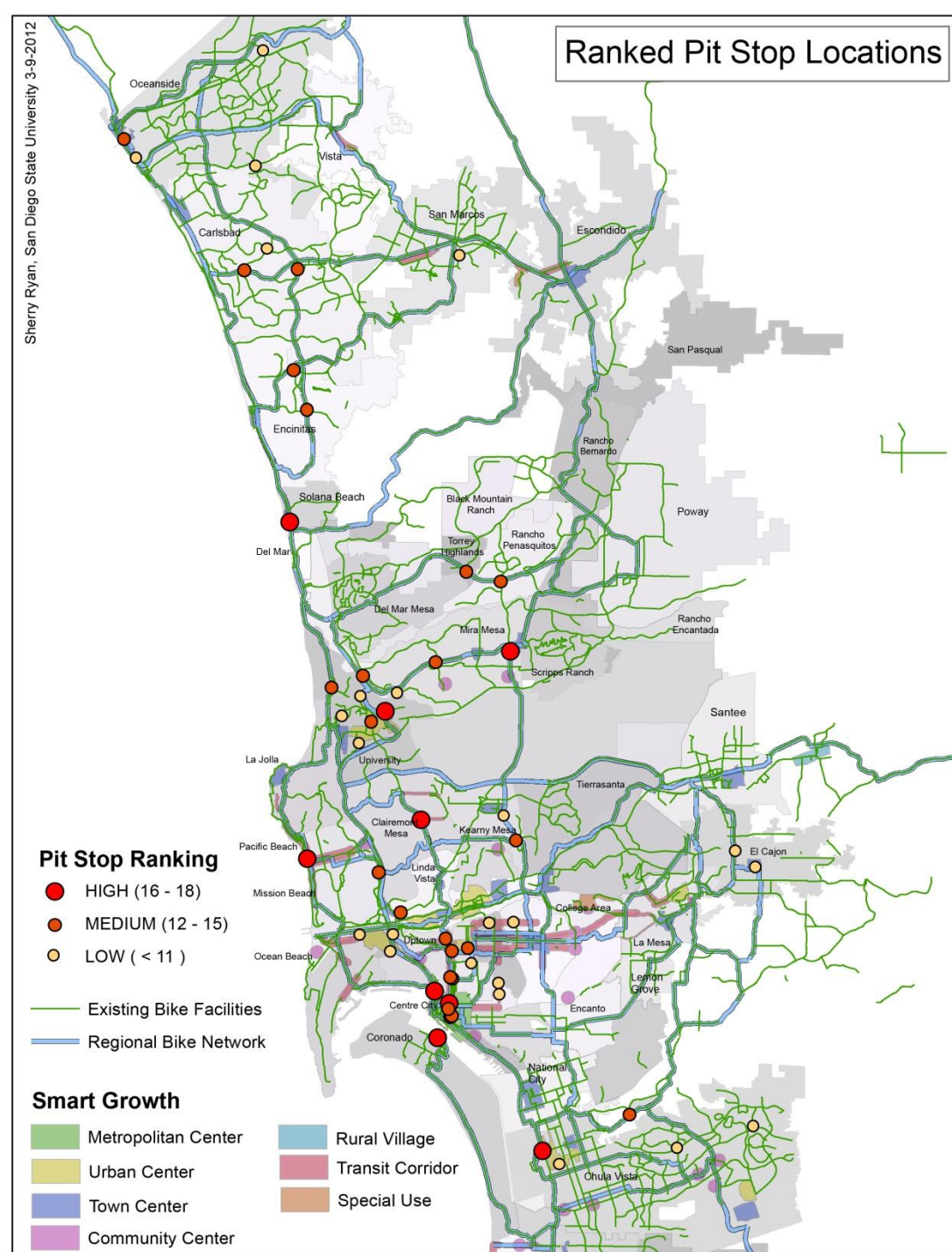- Manual Counting in San Diego

- Automated Counting

Purpose of the HHSA Funded Research

1. Evaluate SANDAG's Bike to Work Month promotions via longitudinal bicycle and pedestrian counting
   - *Manual counts at 75 locations during 3 points of time*

2. Establish automated counting program to support active transportation monitoring program
   - *58 units to be installed in 35 locations*

Manual Count Siting Process

- Previous "*Pit Stop"*

- Overlap with SANDAG's *Smart Growth Opportunity Area*

- Overlap with *Existing Bike Network*

- Overlap with San Diego *Regional Bicycle Network*

- *Historic Count Location*

Ranked Pit Stop Locations

Sherry Ryan, San Diego State University 3-9-2012

Pit Stop Ranking
- ● HIGH (16 - 18)
- ● MEDIUM (12 - 15)
- ○ LOW (< 11)

— Existing Bike Facilities
— Regional Bike Network

Smart Growth
- Metropolitan Center
- Urban Center
- Town Center
- Community Center
- Rural Village
- Transit Corridor
- Special Use

Manual Counting

- March, May 20th, and Sept 2011

- AM Peak Period (7AM-9AM)

- Location of Cyclist in ROW *(travel lane, bike lane or sidewalk)*

- With or Against Traffic Flow

- Gender

- Pedestrians in Crosswalks or within 50' of crosswalk

Manual Counts on Bike to Work Day

7AM-9AM Peak Period Bike Count
on Bike to Work Day

- •   0 - 48
- ●   49 - 102
- ●   103 - 272

Existing Bicycle Facilities

San Diego Regional Bicycle Network

7AM-9AM Peak Period Bike Count
on Bike to Work Day

- • 0 - 48
- ● 49 - 102
- ● 103 - 272

― Existing Bicycle Facilities

▬ San Diego Regional Bicycle Network
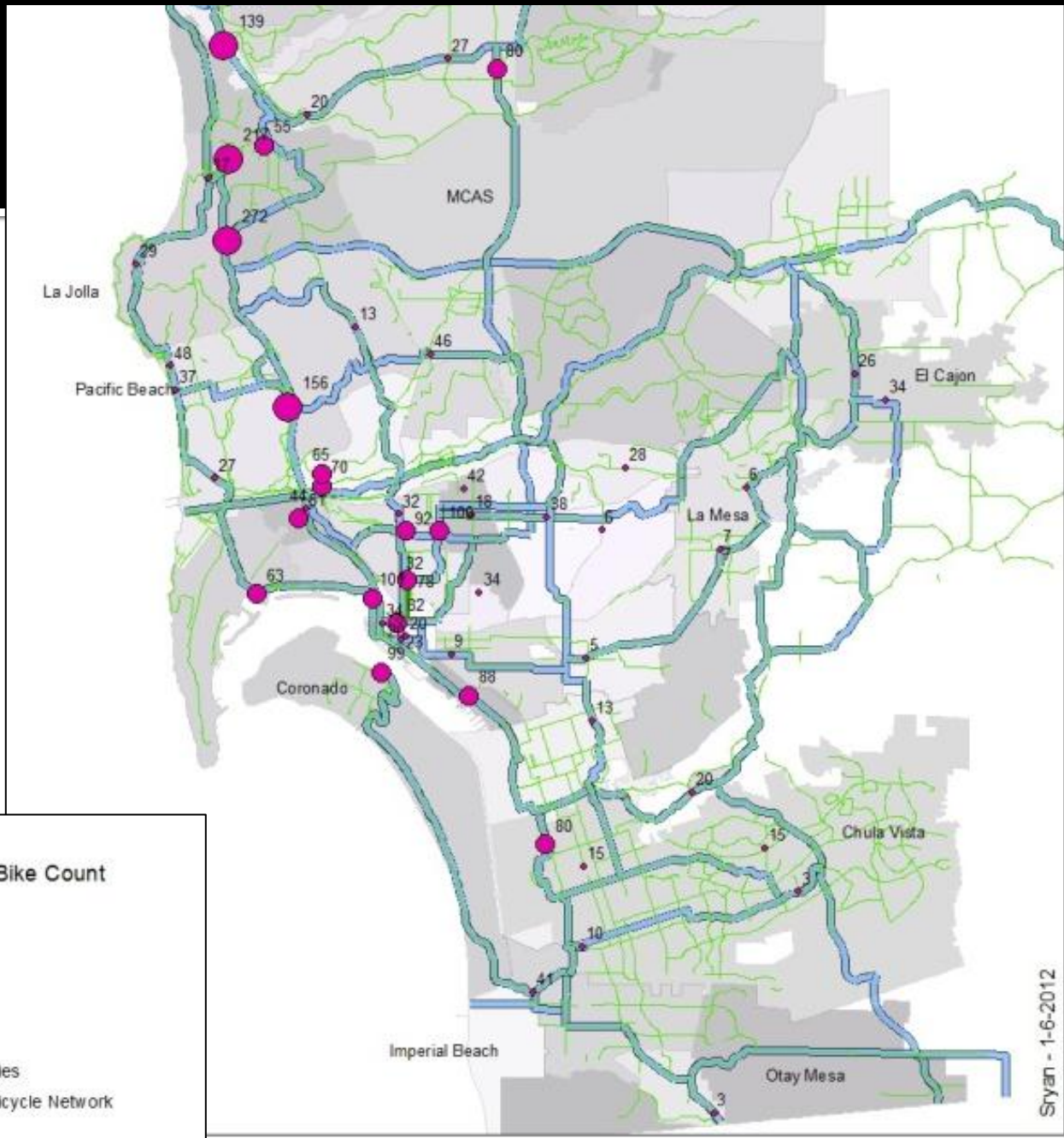
Sryan - 1-6-2012

Bike to Work Day Results

- Double the Number of Cyclists on Bike to Work Day

  (Mean = 55 cyclists vs. 23 cyclists)

- More Men than Women on Bike to Work Day

  (Mean = 43 male cyclists vs. 10 female cyclists)

- More Cyclists Seen in …
    - Low Density Neighborhoods (Mean = 60 vs. 39),
    - High Income Neighborhoods (Mean = 72 vs. 38),
    - High Education Neighborhoods (Mean = 76 vs. 34),
   - Low Percent Hispanics (Mean = 78 vs. 31)

Change March to May 2011

- Greater *increases* in cycling rates in...

  - Low Density Neighborhoods (Mean = 42 vs. 20),

  - High Income Neighborhoods (Mean = 46 vs. 16),

  - High Education Neighborhoods (Mean = 46 vs. 16) and

  - Low Percent Hispanic (Mean = 48 vs. 14)
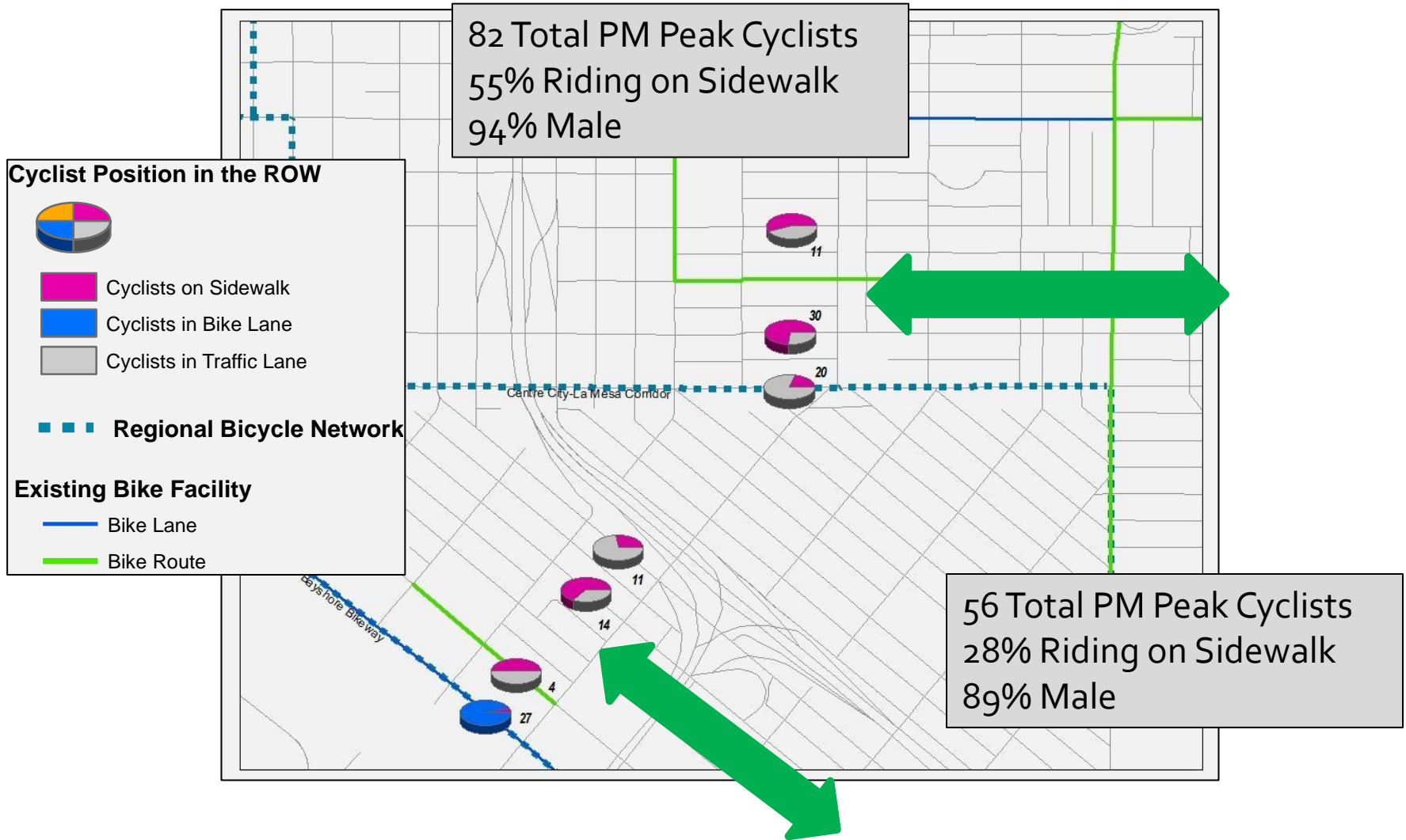
Preliminary Findings

- SANDAG's promotional efforts were effective in increasing cycling on Bike to Work Day

- Increased cycling rates were not maintained after Bike to Work Day

- Cycling *rates* and *increases* in bicycling on Bike to Work Day were significantly lower in underserved areas, suggesting that targeted promotion may be needed in these difficult to reach areas

SDSU Bike Count Project
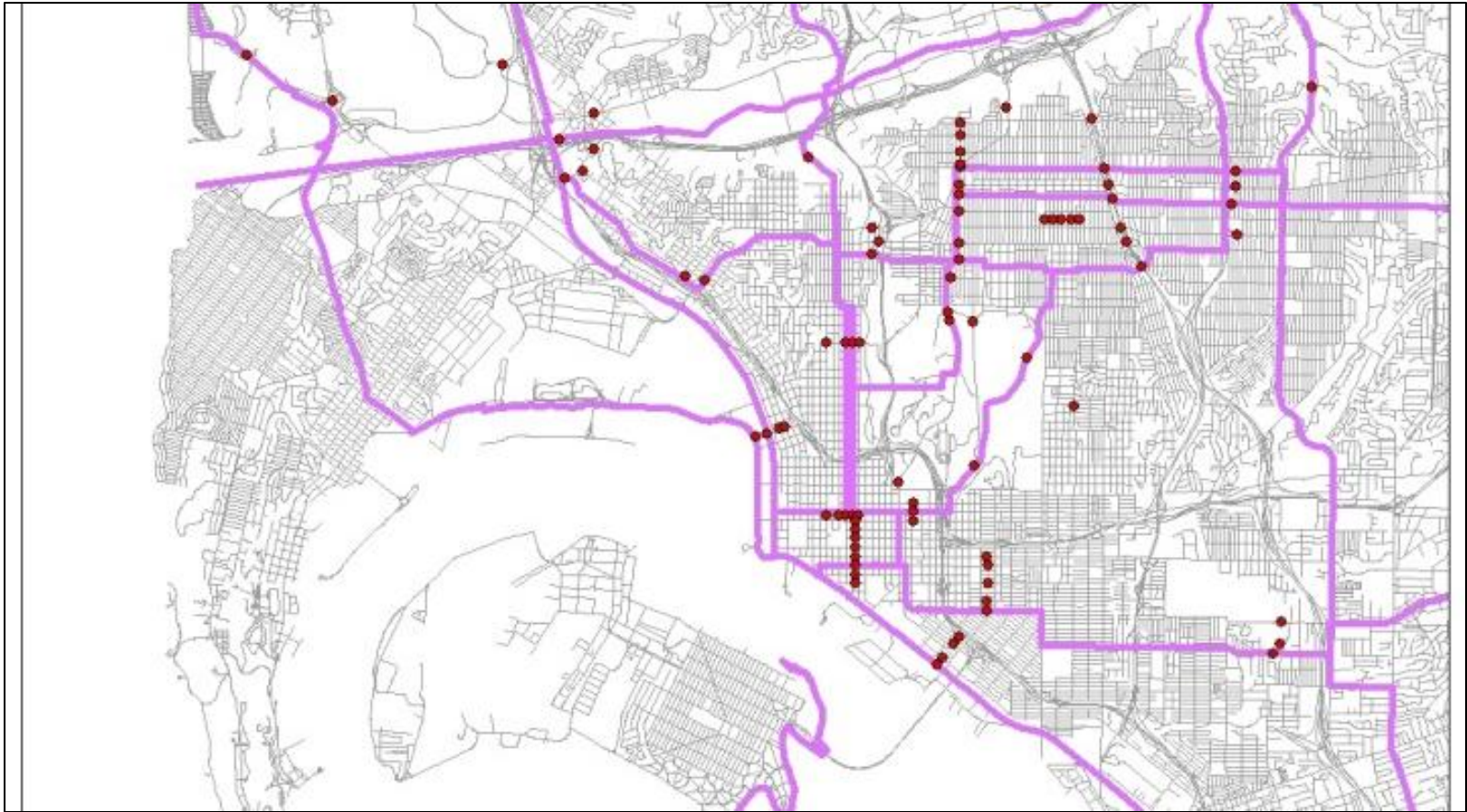
Simultaneous Parallel Bike Counts Centered on Regional Bike Network

Simultaneous Parallel Counting

82 Total PM Peak Cyclists
55% Riding on Sidewalk
94% Male

Cyclist Position in the ROW

Cyclists on Sidewalk
Cyclists in Bike Lane
Cyclists in Traffic Lane

Regional Bicycle Network

Existing Bike Facility
Bike Lane
Bike Route

56 Total PM Peak Cyclists
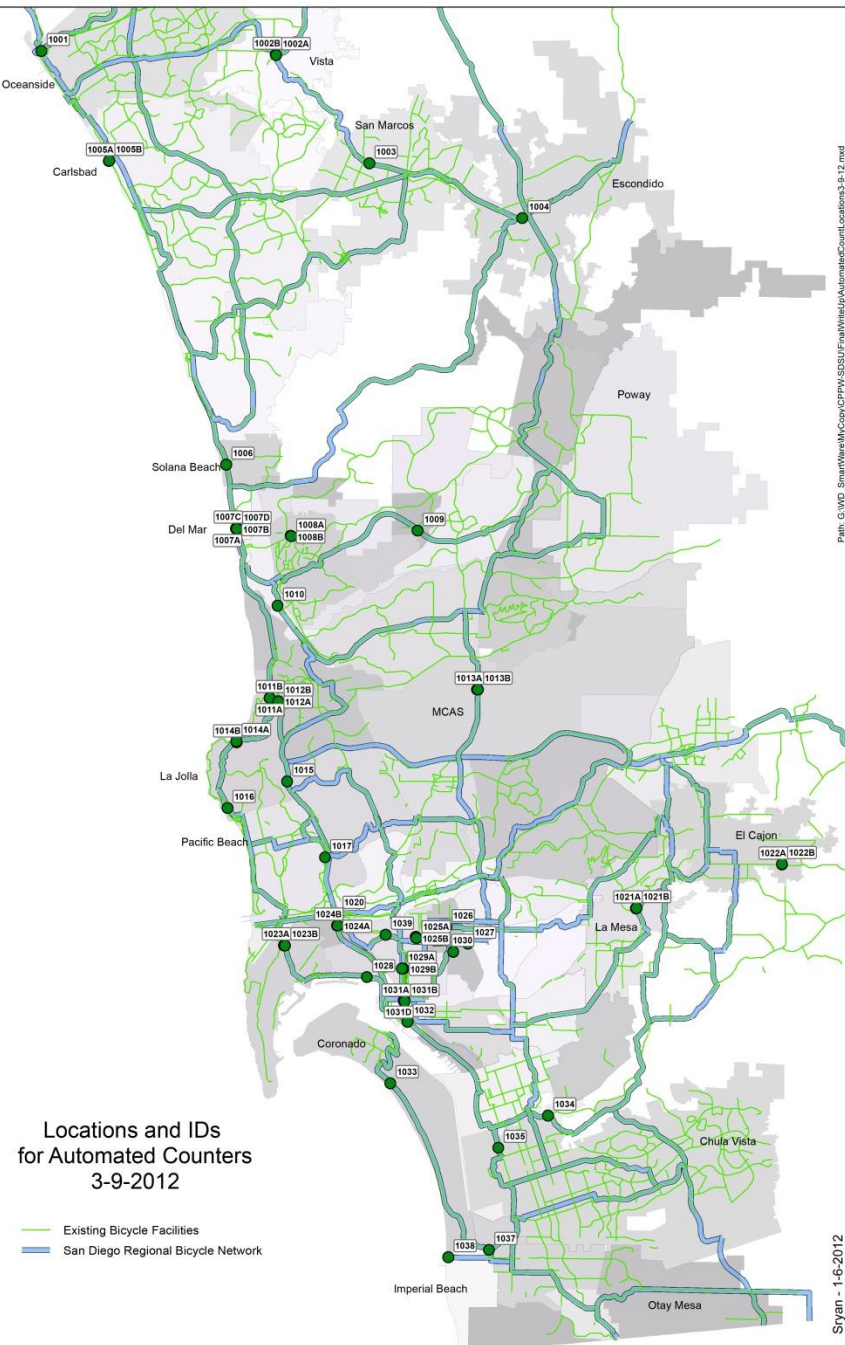28% Riding on Sidewalk
89% Male

Comprehensive Network of Bike Count Stations

- 75 Manual Locations

- *At least one location per segment of Regional Bike Network*

- *Along the Regional Bike Network*

- *Overlapping with SGOAs*
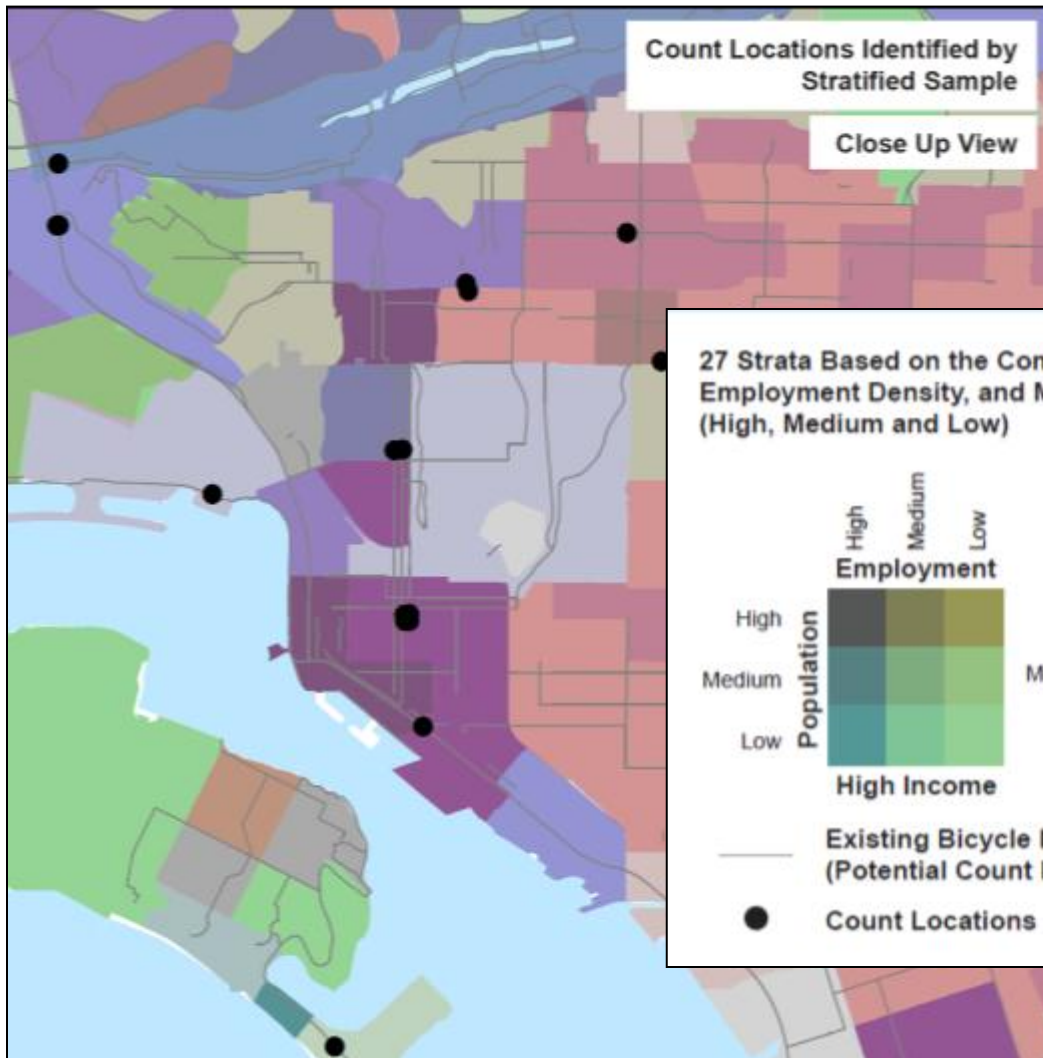
- *Resulted in Approximately 170 locations*
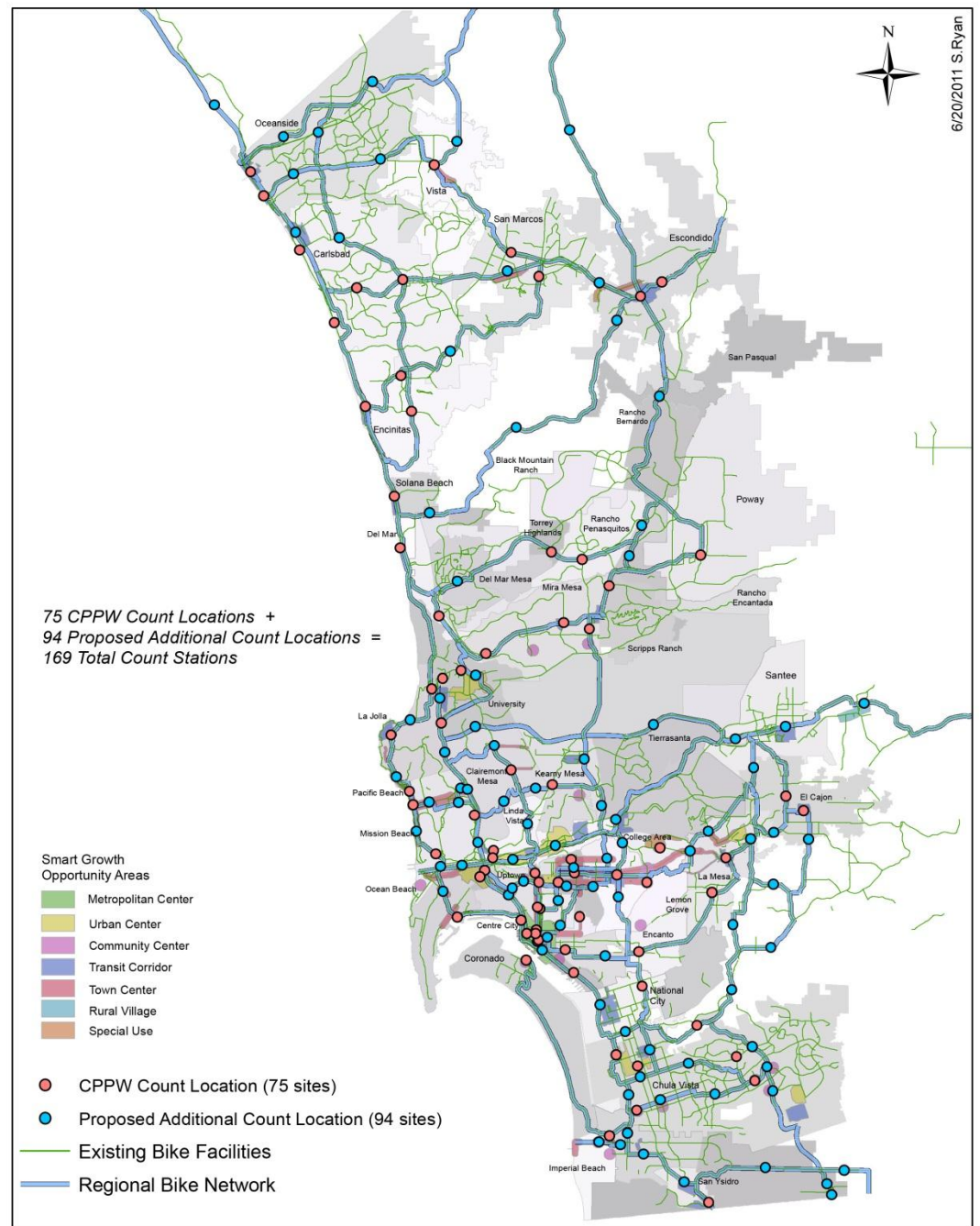
Proposed Network of Bicycle and Pedestrian Count Stations

Locations and IDs
for Automated Counters
3-9-2012

— Existing Bicycle Facilities
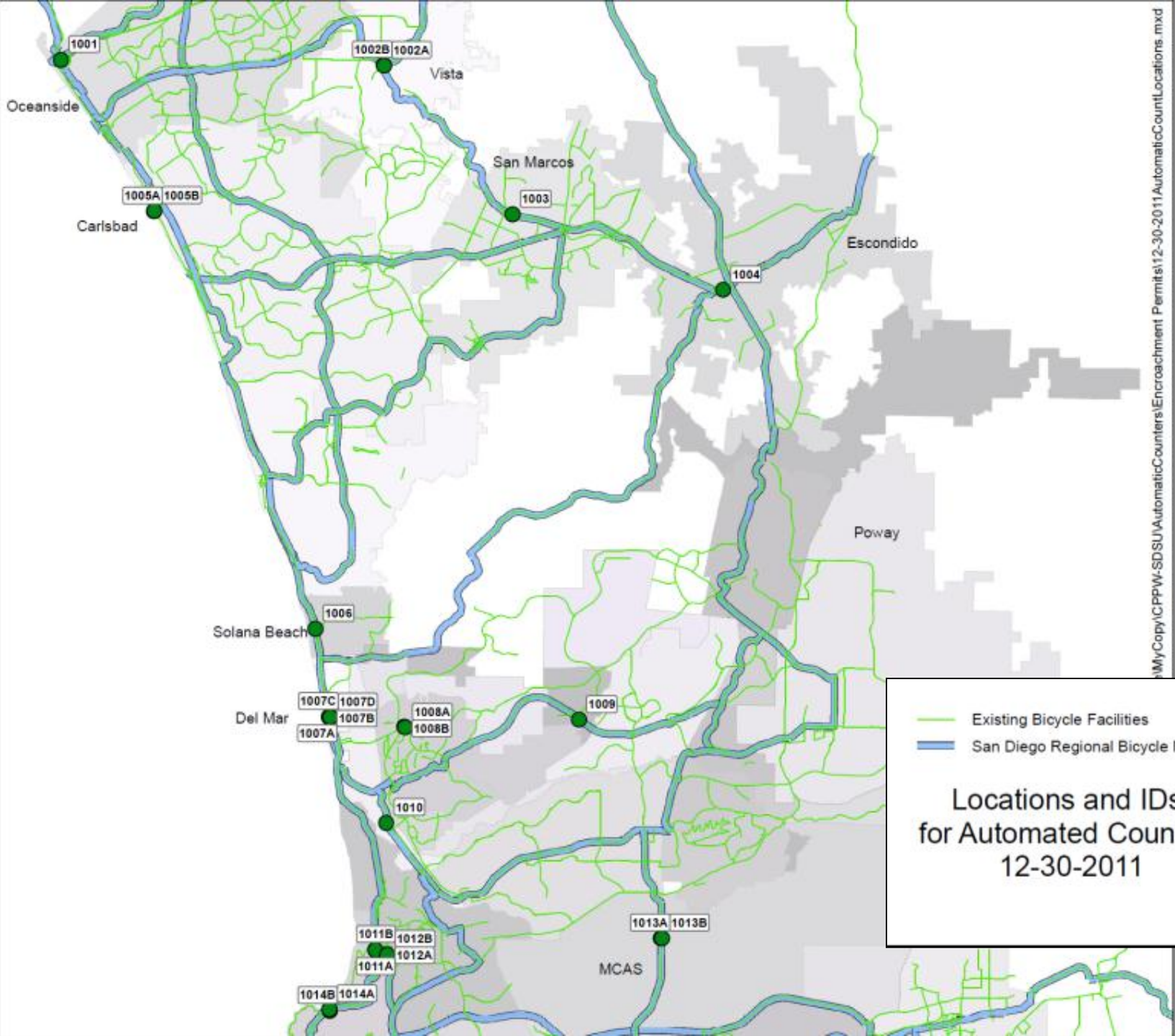— San Diego Regional Bicycle Network

Core Network of Automated Count Stations

- 58 units in 35 locations

- Inductive Loops for In-Street Counts along Class II & III

- Combo Infrared *and* Inductive along Class I Multi-Use Paths

- Infrared along Urban Sidewalk

# Proportional Sampling from 27 Strata

Count Locations Identified by Stratified Sample

Close Up View

27 Strata Based on the Combinations of Three Indicators (Population Density, Employment Density, and Median Household Income) and Three Ranges (High, Medium and Low)

High Income

Medium Income

Low Income

Existing Bicycle Network and Proposed Regional Bicycle Network (Potential Count Locations)

● Count Locations

Locations and IDs for Automated Counters 12-30-2011

Legend:
- Existing Bicycle Facilities
- San Diego Regional Bicycle Network

Map labels:
- 1001
- 1002B 1002A
- Vista
- Oceanside
- San Marcos
- 1005A 1005B
- Carlsbad
- 1003
- Escondido
- 1004
- Poway
- 1006
- Solana Beach
- 1007C 1007D
- 1007B
- 1007A
- Del Mar
- 1008A
- 1008B
- 1009
- 1010
- 1013A 1013B
- 1011B 1012B
- 1011A 1012A
- 1014B 1014A
- MCAS

Vertical text (right margin): MyCopy\CPPW-SDSU\AutomaticCounters\Encroachment Permits\12-30-2011AutomaticCountLocations.mxd

La Jolla

1015

1016

Pacific Beach

1017

El Cajon

1022A 1022B

1018A 1018B

1020

1019   1024B   1026

1021A 1021B

1024A   1025B 1025A

1023A 1023B   1027

La Mesa

1030

1028   1029A

1029B

1031A 1031B

1031D 1032

Coronado

1033

1034

Chula Vista

1035   1036

Existing Bicycle Facilities

San Diego Regional Bicycle Network

Locations and IDs
for Automated Counters
12-30-2011

1038   1037

Imperial Beach

Otay Mesa

1039

Sryan - 12/30/2011
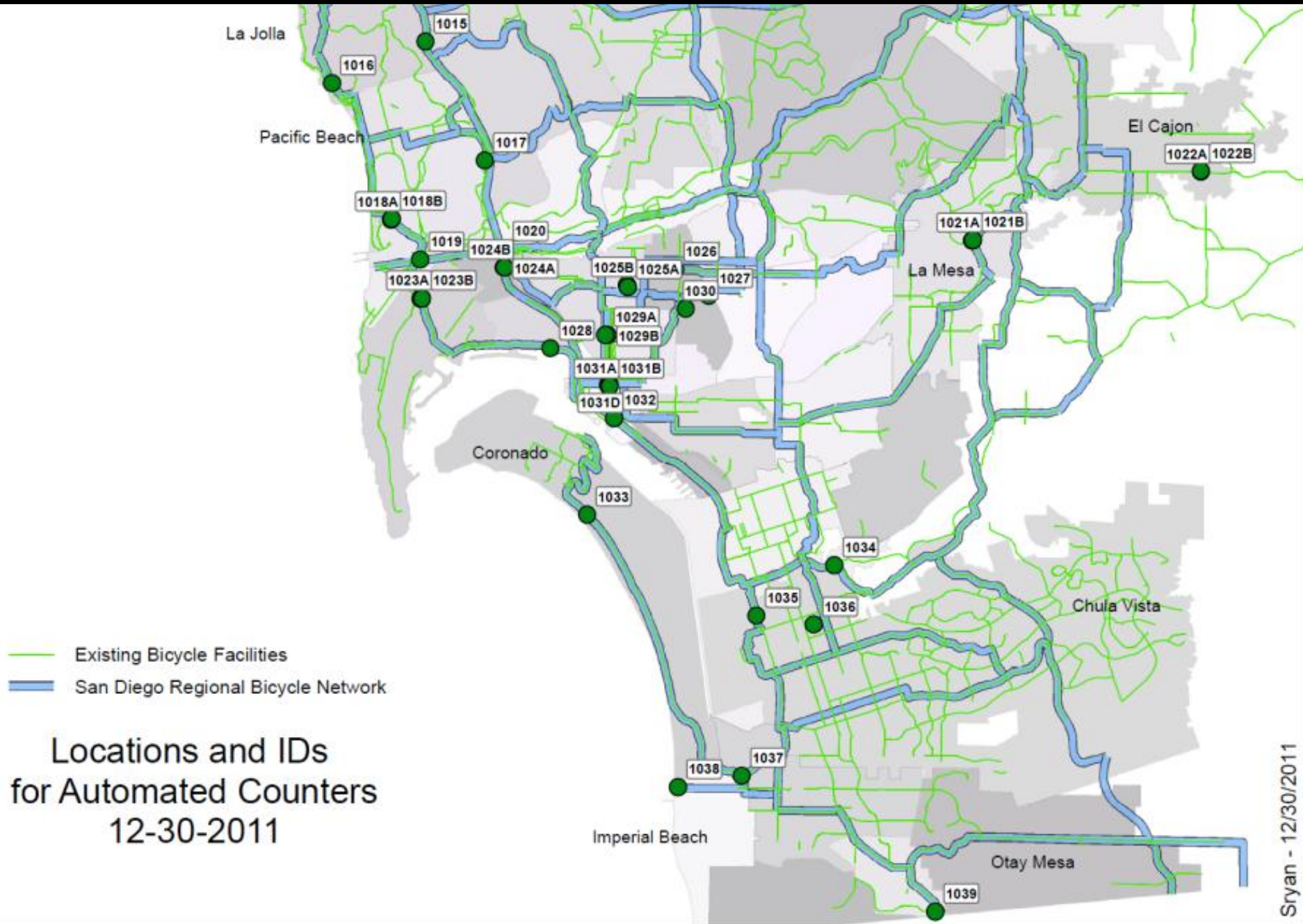
Eco-Counter ZELT Inductive Loop

Designed to ignore all motorized traffic.

- Bike lanes

- Bike boulevards

- Bike/bus lane

ZELT Inductive Loop

Eco-Counter PYRO Box
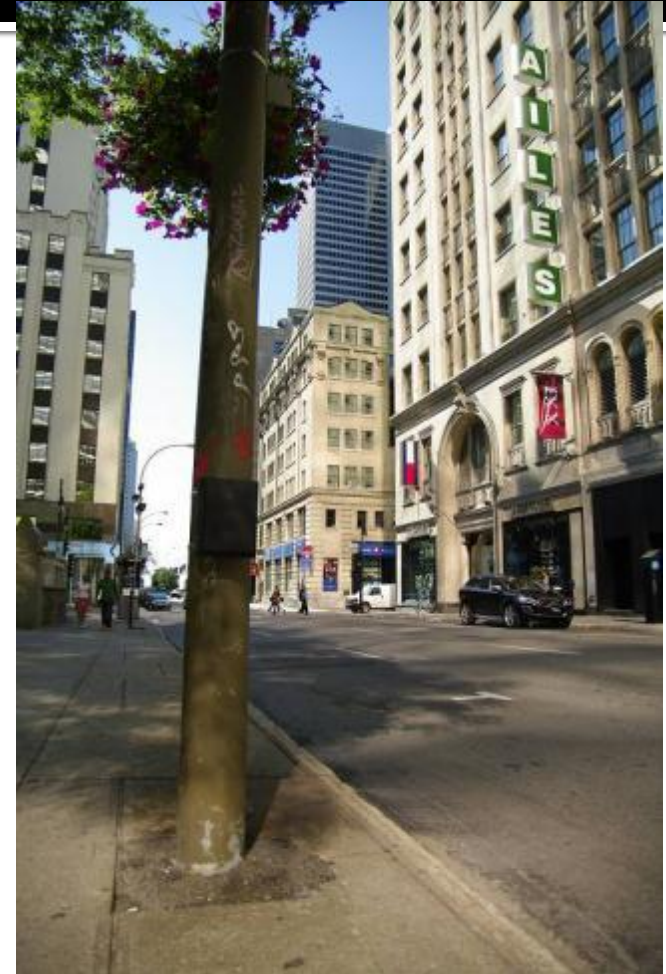
- Pyro Box Compact to count pedestrians

- Portable or permanent solution

- Uses body heat to register counts

PYRO-Box

Combining the ZELT Greenway and the PYRO to count both pedestrians and cyclists

Eco-Multi
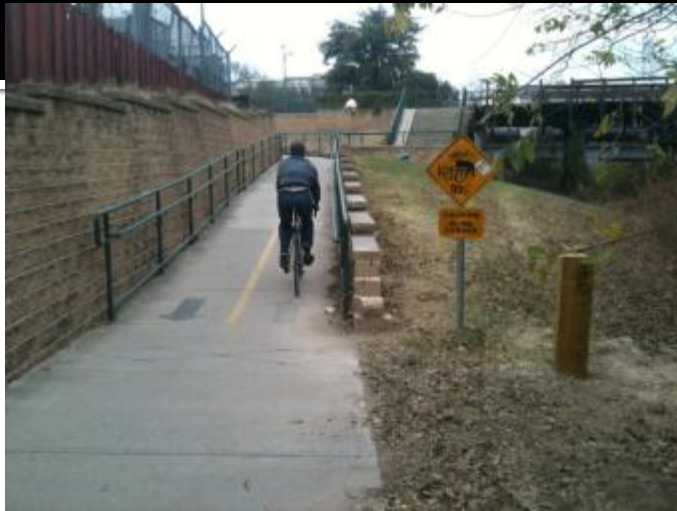
Camino Del Mar, SB at south leg of 14th Street – ID 1007A & 1007B

⬤ Zelt Logger installed in valve box underground

━━ Inductive loop installed in asphalt   ⬤ Pyro Sensor installed on city pole

1007B

1007A

STOP

© 2011 Google   Report a problem

Camino Del Mar NB at 14th Street - ID 1007C & 1007D

Zelt Logger installed in valve box underground
Inductive loop installed in asphalt

Pyro Sensor installed on city pole

1007D

1007C

Coast Highway, south of Lomas Santa Fe – ID 1006

🔴 Zelt Logger installed in valve box underground

— Inductive loop installed in asphalt

1006

East Washington Avenue (EB), west of Jamacha Rd – 1022A

● Zelt Logger installed in valve box underground

— Inductive loop installed in asphalt

ID 1022A

East Washington Avenue (WB), east of Jamacha Rd – 1022B

⬤ Zelt Logger installed in valve box underground

— Inductive loop installed in asphalt

ID 1022B

Bayshore Bikeway, north of E Street – ID 1035

Multi Wooden Post

Inductive loop installed in asphalt and connected to logger in Multi Urban Post

ID 1035
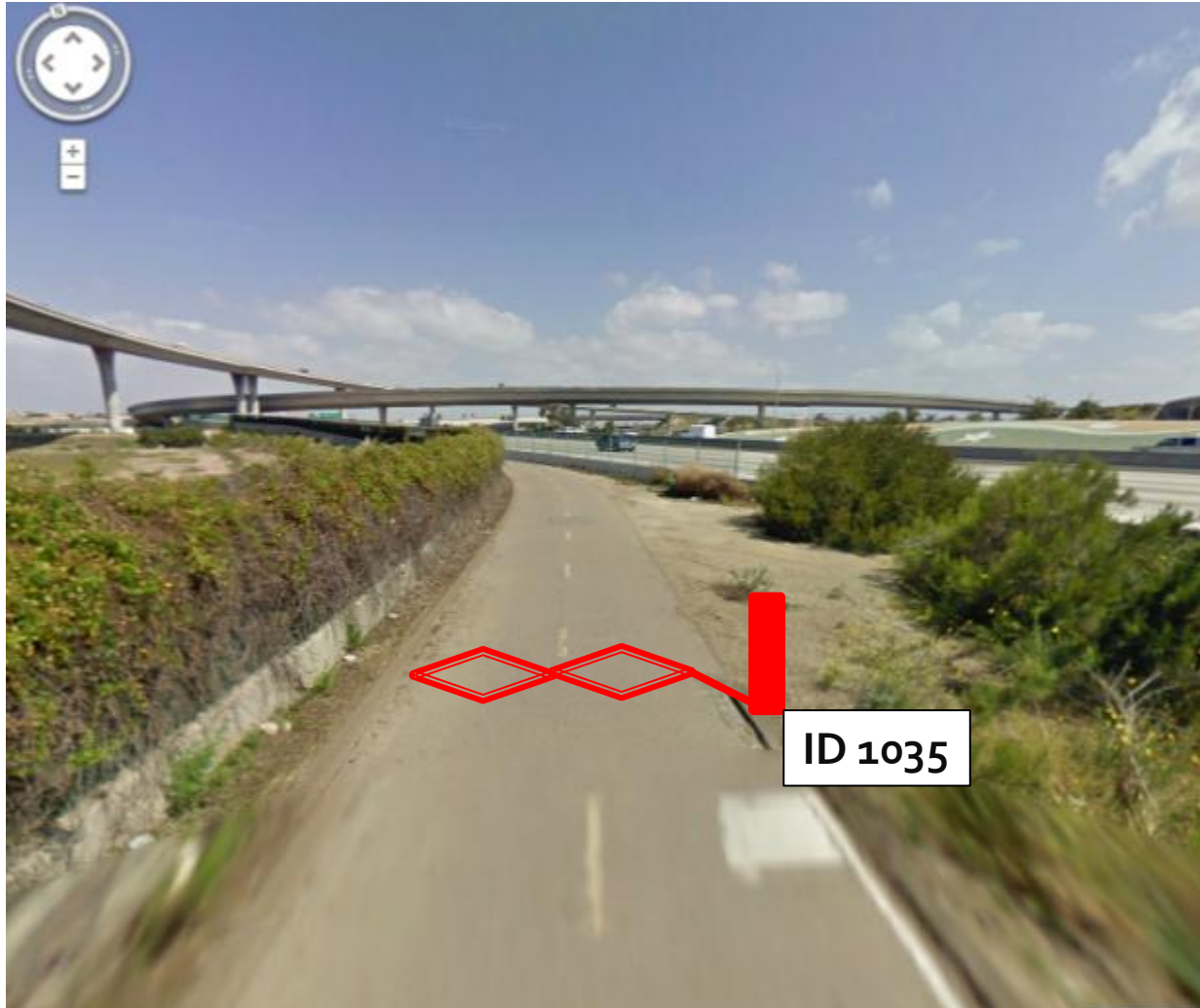
SR-56 Bike Path, west of Camino Del Sur – ID 1009

🔴   Zelt Logger installed in valve box underground

──   Inductive loop installed in path and connected to Zelt Logger

ID 1009

Sweetwater Bike Path at the eastern terminus near Plaza Bonita

Multi Wooden Post

Inductive loop installed in asphalt and connected to logger in Multi Wooden Post

Summary of Installation to Date

17 Units Installed in 11 Cities

- El Cajon (2)
- Del Mar (4)
- Solana Beach (1)
- Chula Vista (1)
- National City (1)
- Imperial Beach (1)
- Oceanside (1)
- Escondido (1)
- San Marcos (1)
- La Mesa (2)
- Vista (2)

41 Units to be Installed

- Carlsbad (2)
- San Diego (38)
- Coronado (1)

Automated Web-Based Data Upload

Eco-Visio Web-based Software

Data at Your Fingertips!!

450-550 Cyclists

Total Daily Cyclists on Bayshore Bikeway (Chula Vista) February 2012
01/02/2012 - 29/02/2012

1035 Bike Totals Chula Vista
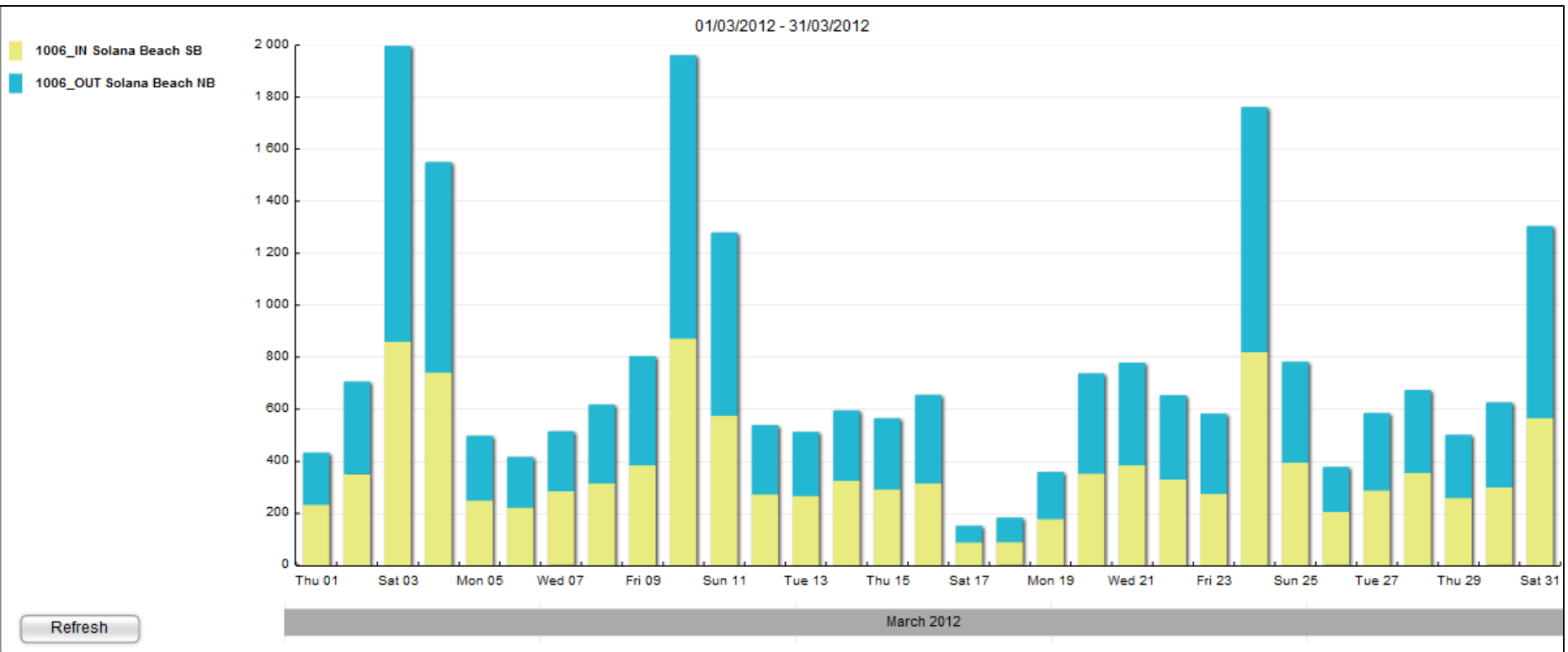
250-300 Cyclists
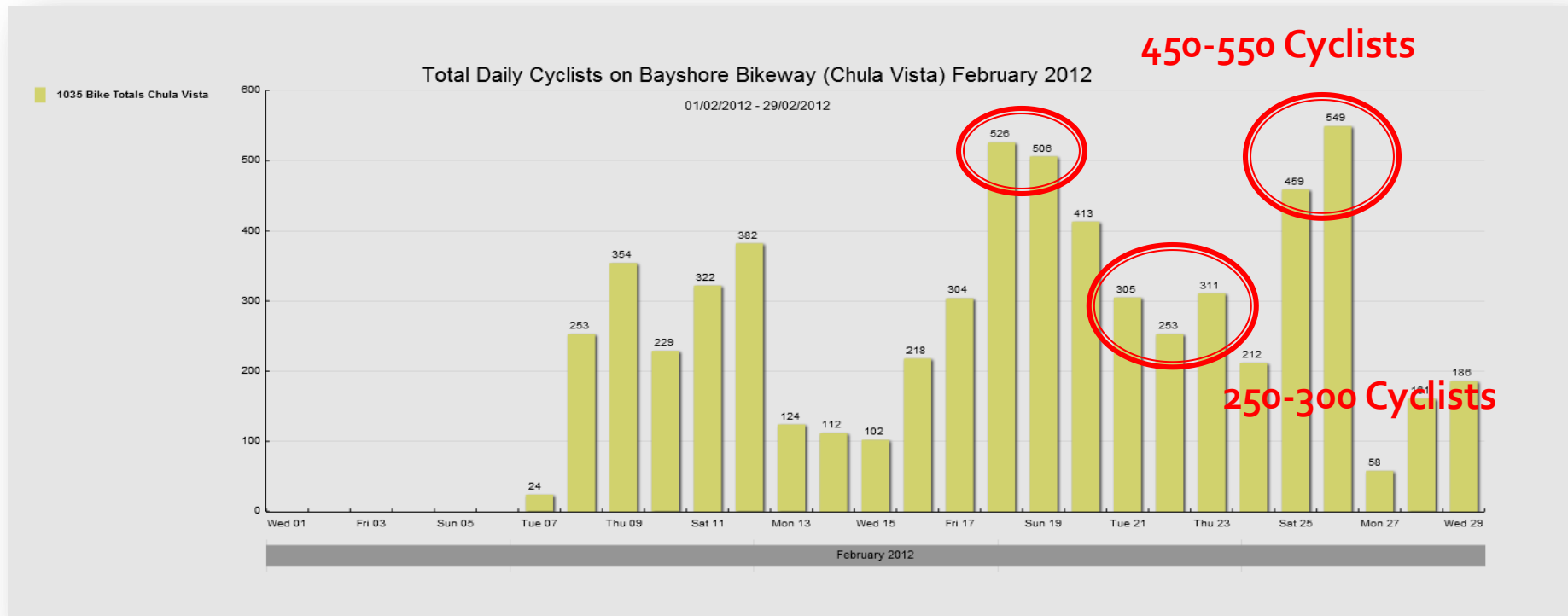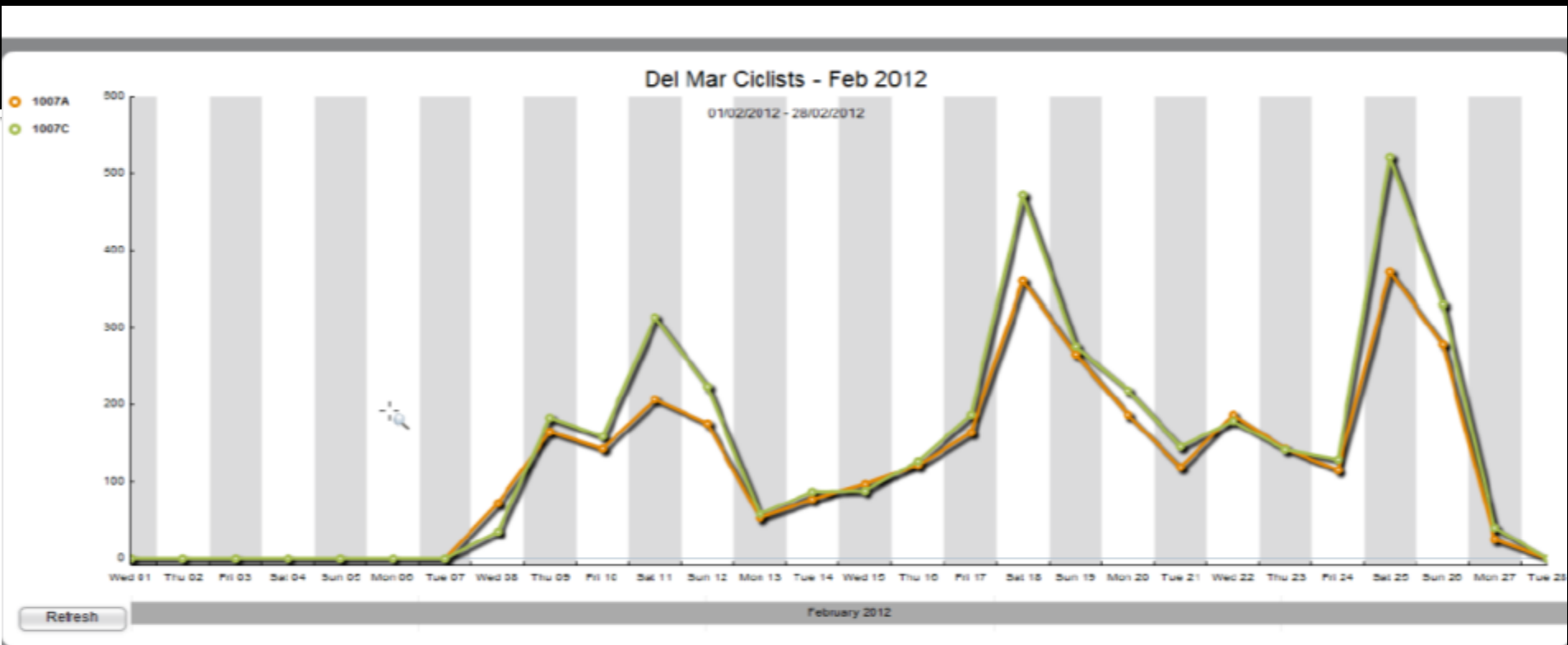
February 2012

1007A – Southbound

1007C - Northbound

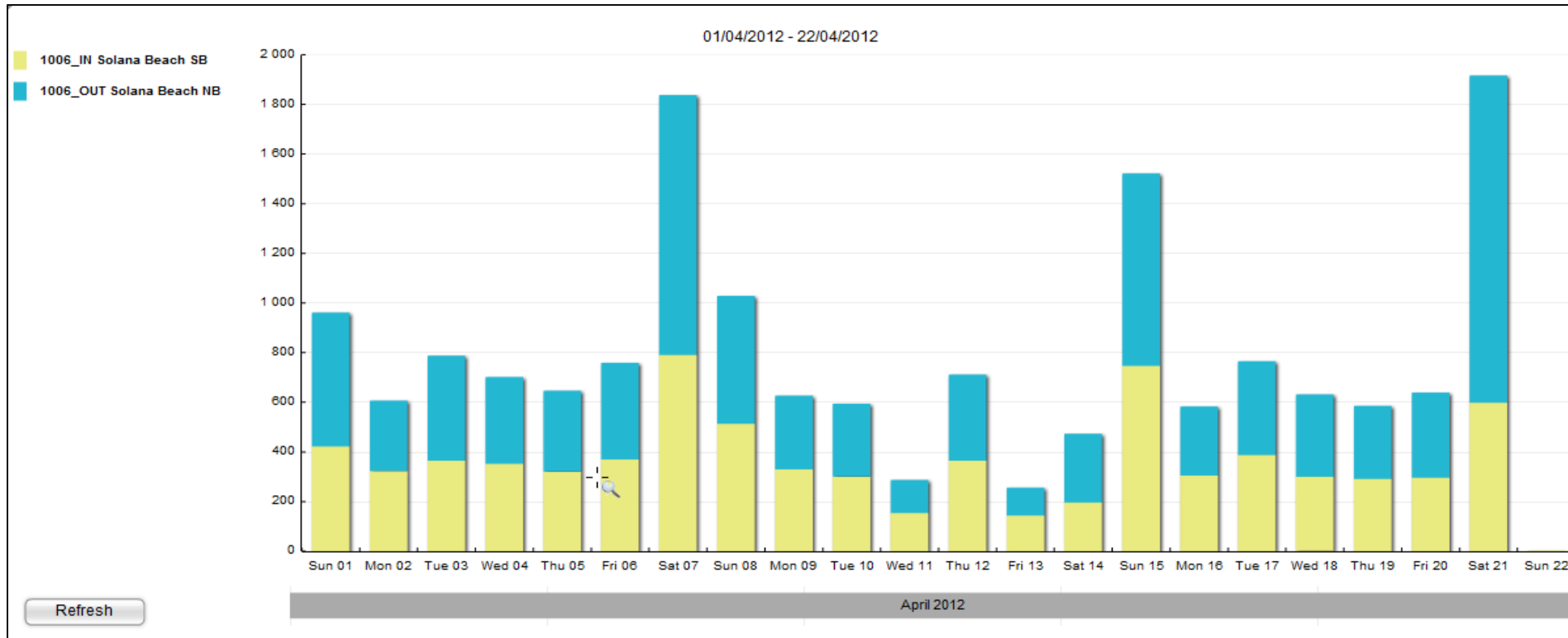Installation – February 8, 2012

County of San Diego Healthy Works and San Diego State University

Solana Beach – March 2012

- 1200-2000 weekend cyclists
- 400-800 weekday cyclists

Solana Beach – April 1ˢᵗ - 21ˢᵗ

- 1000-1900 weekend cyclists
- 400-700 weekday cyclists

Data Applications

- Use *daily data* to extrapolate peak period manual counts to daily counts at other locations

- Build justifications for bicycle facilities & treatments

- Track activity over time to understand effectiveness of efforts to shift mode of travel

- Use daily counts with intercept surveys to calculate Bicycle Miles traveled, frequency of bike trips by purpose, etc.

Questions?

Thanks!

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