

# **ESTIMATING TOTAL MILES WALKED AND BIKED BY CENSUS TRACT IN CALIFORNIA**

**ATLC Advisory Group Meeting**

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**Analysis by Deborah Salon**

**Presentation by Susan Handy**

**Institute of Transportation Studies**

**University of California, Davis**

# MOTIVATION

- Vehicle activity is an output of travel models, but **detailed estimates of bicycle and pedestrian activity are often not available.**
- Good estimates of the total amount of cyclist and pedestrian activity on our roads are useful for:
  - **Informing demand-based investments** in bicycle and pedestrian infrastructure
  - **Identifying dangerous locations** for potential safety investments

## RESEARCH OBJECTIVE

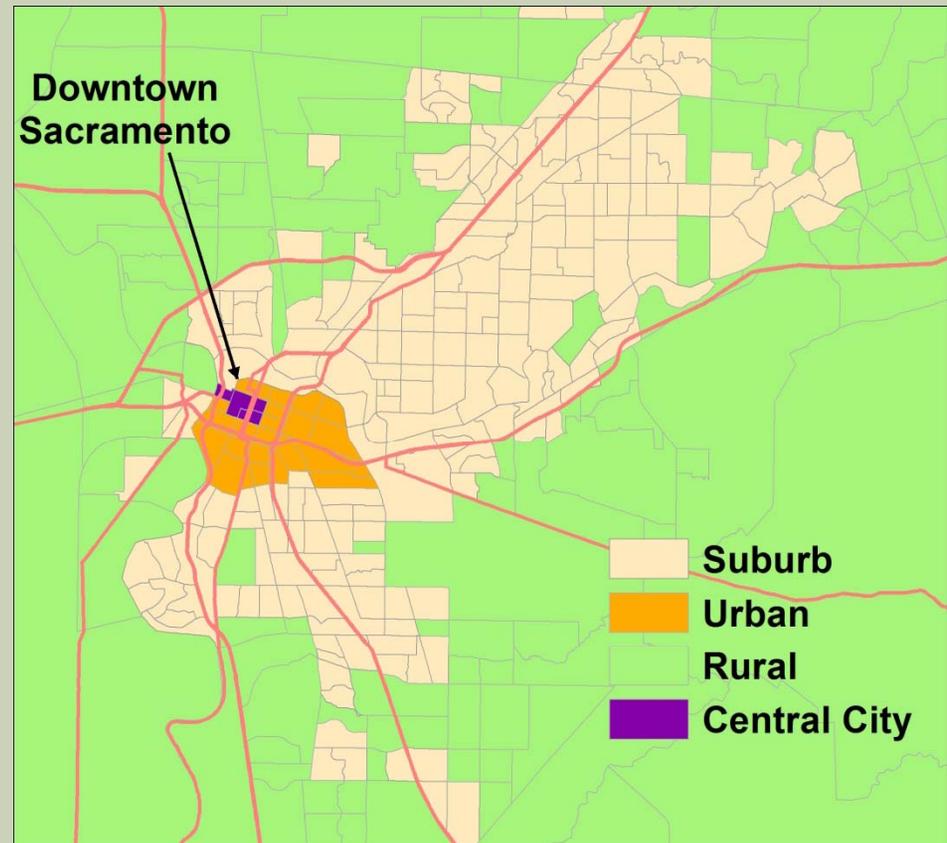
- Estimate the total miles walked by pedestrians and total miles biked by cyclists living in each census tract in California
- *Important Note: The estimates presented here are not of miles walked and biked within the geographic area of each tract, but we expect them to be highly correlated with these values.*

# METHOD

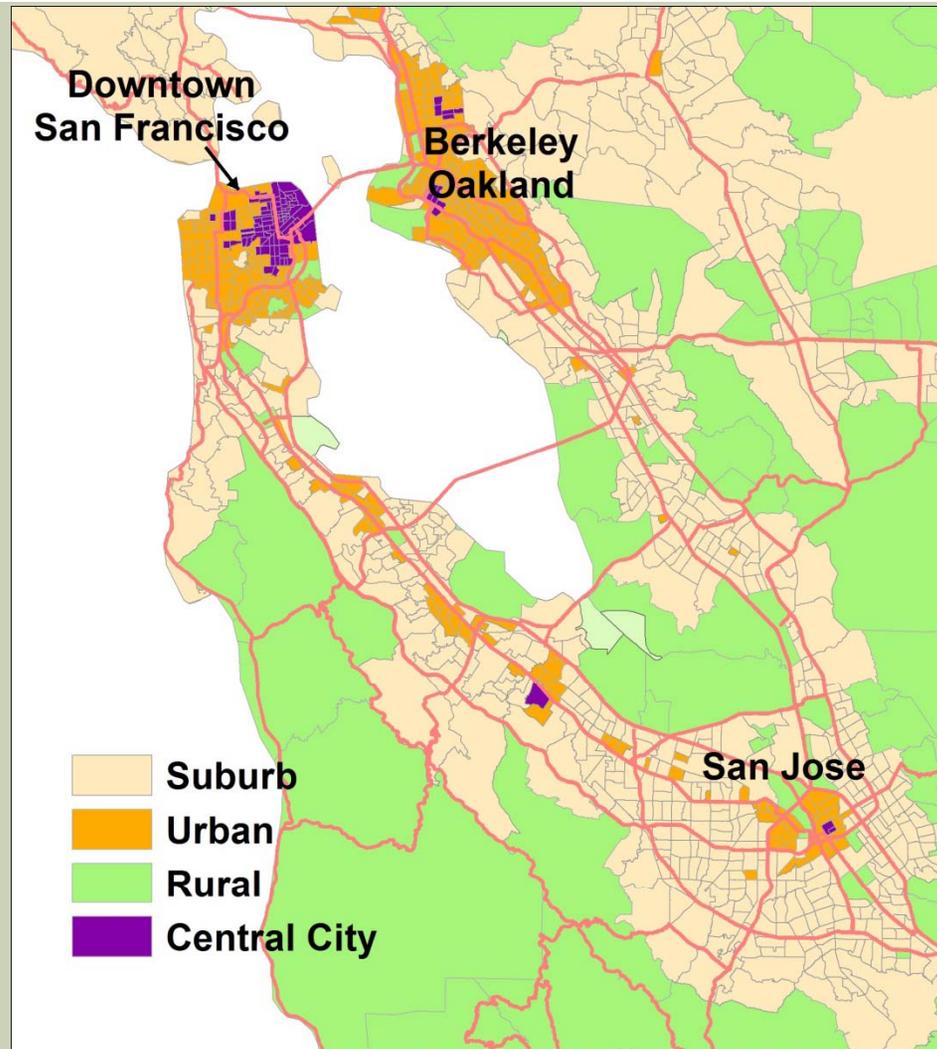
- 1.** Assign census tracts to neighborhood types based on built environment characteristics
- 2.** Assign each survey respondent to their age-gender-home neighborhood category
- 3.** Calculate average miles biked and miles walked for each age-gender-home neighborhood category
- 4.** Use these averages with census data to expand travel survey data to population totals

# NEIGHBORHOOD TYPE CLASSIFICATION

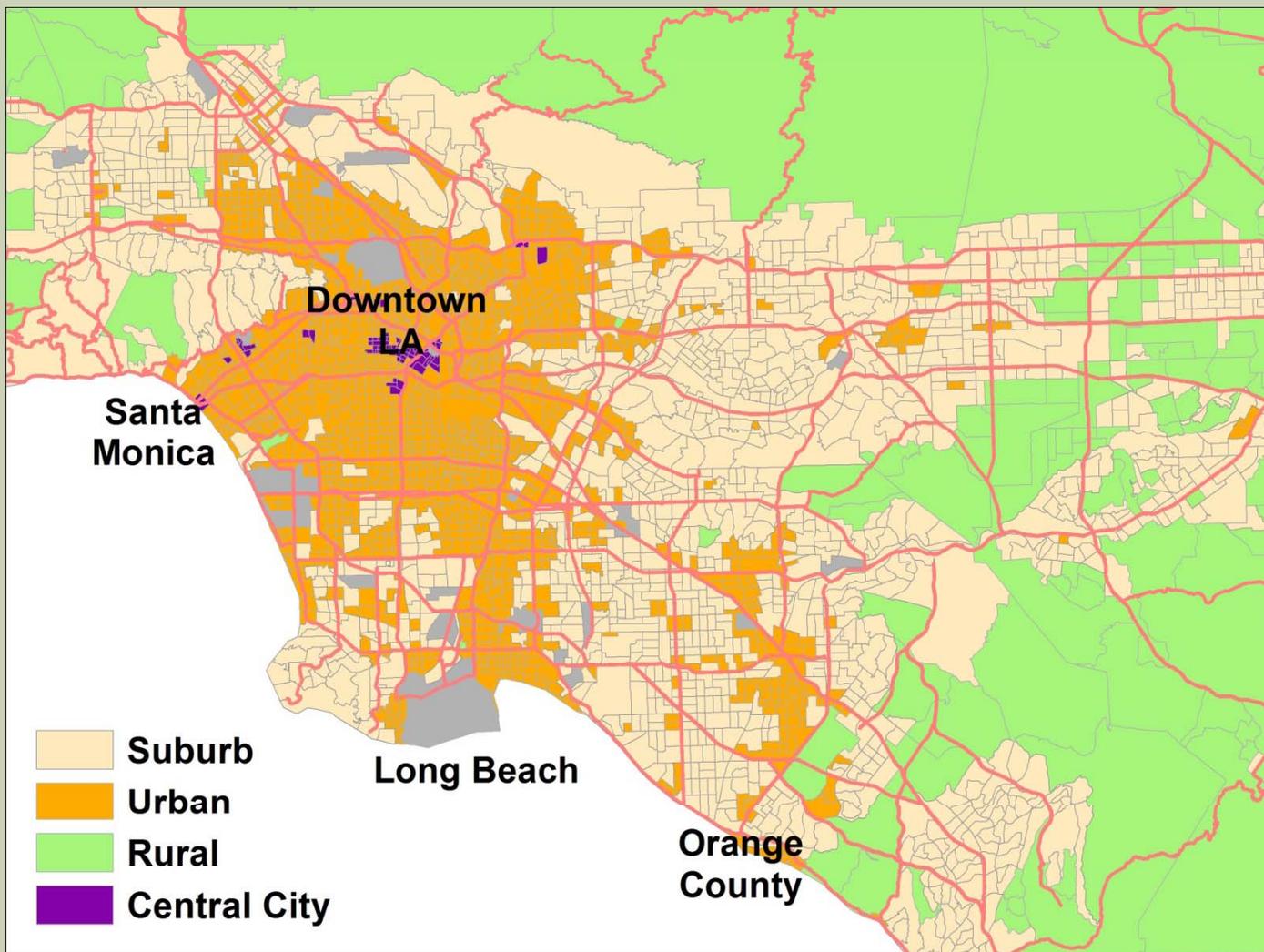
- Cluster analysis of 10 variables yielded 4 neighborhood types:
  - Population Density
  - Road Density
  - Local Job Access
  - Regional Job Access
  - Restaurants Within 10 Minute Walk
  - Pct. Walk/Bike Commuters
  - Pct. Single Family Detached
  - Pct. Old Housing
  - Pct. New Housing
  - Median House Value



# SAN FRANCISCO BAY AREA



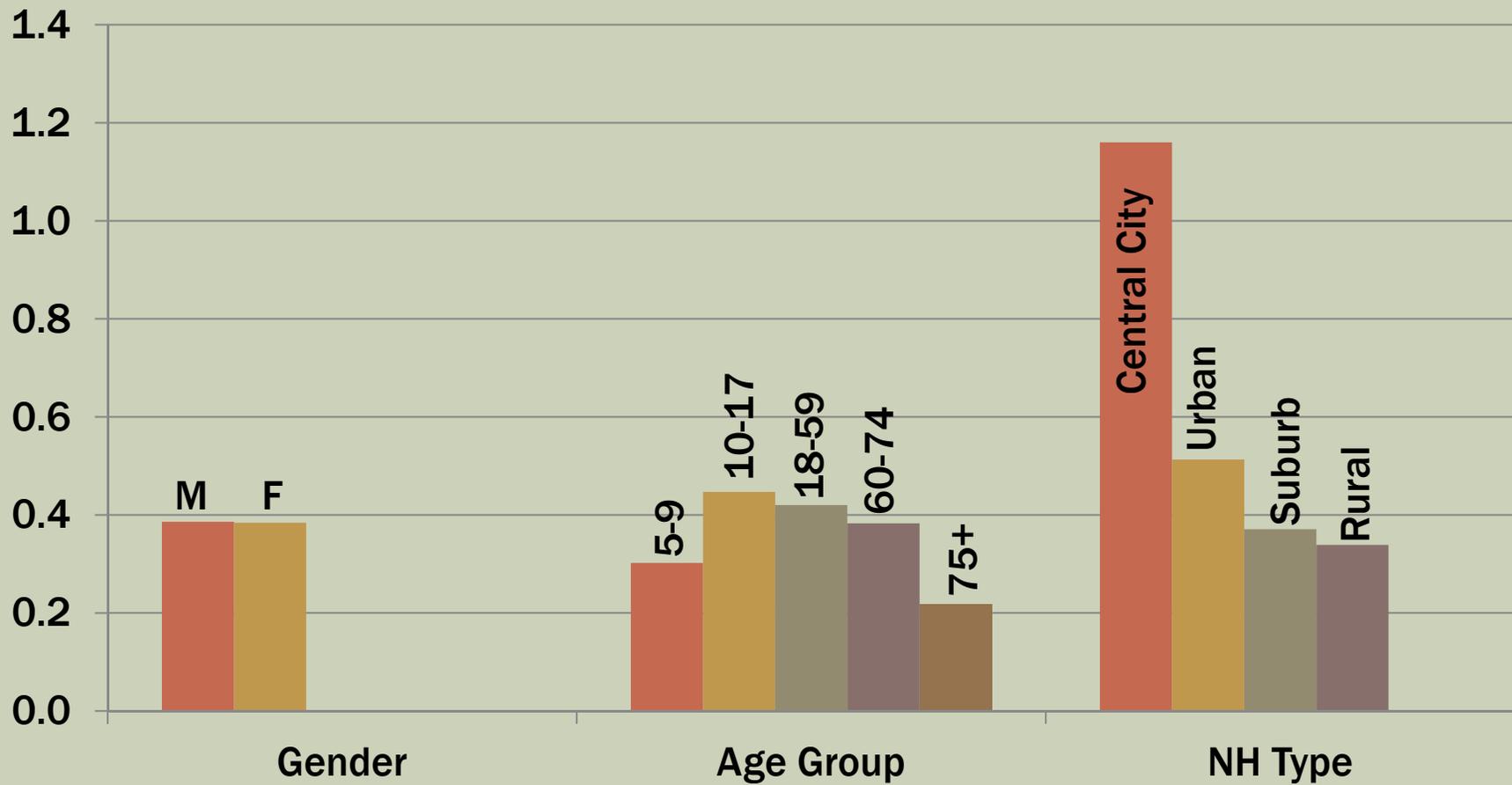
# LOS ANGELES AREA



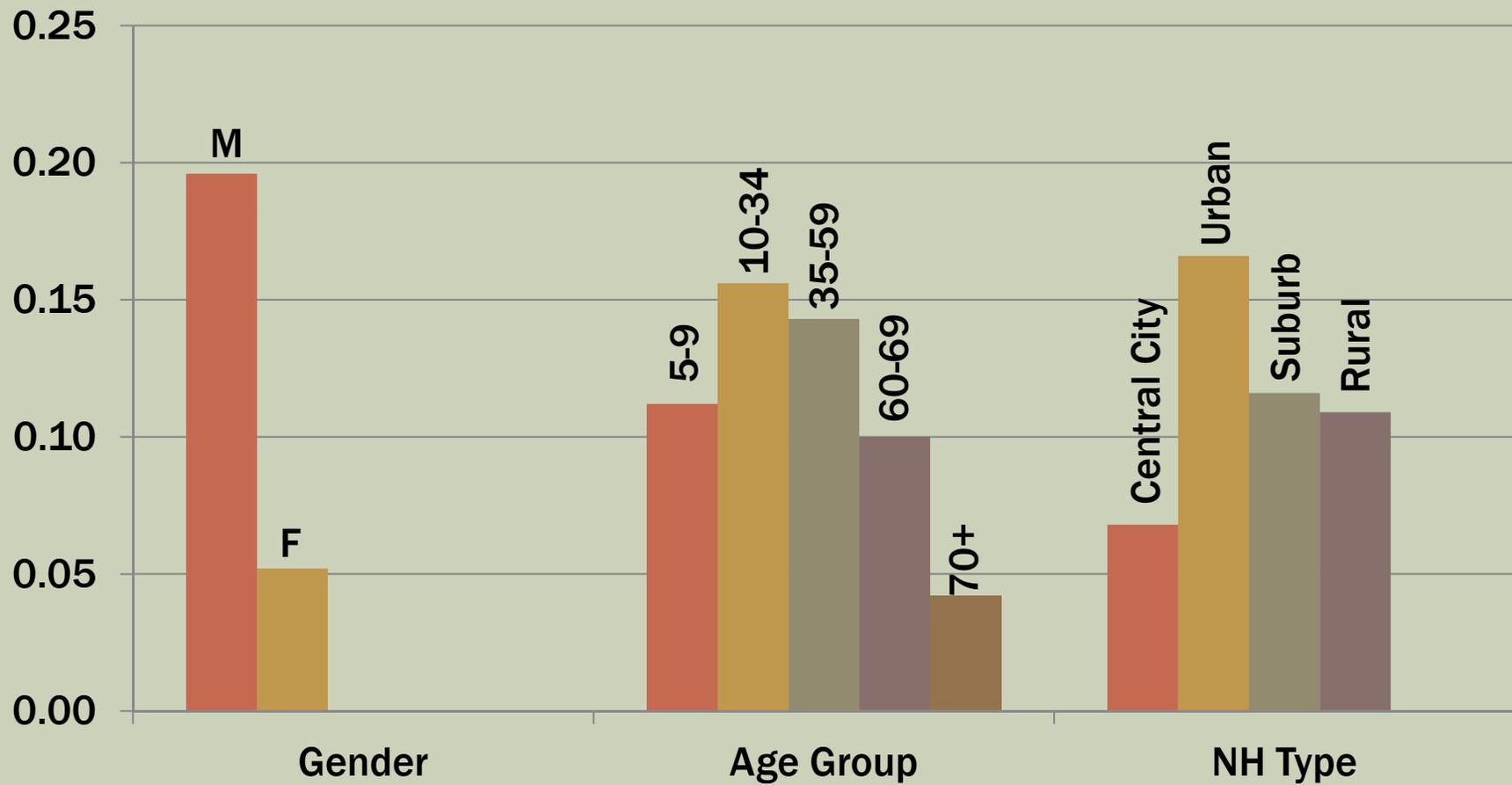
# SURVEY RESPONDENT CATEGORIES

- **Categories based on:**
  - Gender (2)
  - Age Group (5 groups)
  - Home Neighborhood Type (4 Types)
- **Yields 40 Categories**

# AVERAGE MILES WALKED BY SURVEY RESPONDENT CATEGORY



# AVERAGE MILES BIKED BY SURVEY RESPONDENT CATEGORY



# SURVEY-TO-POPULATION ESTIMATION METHOD

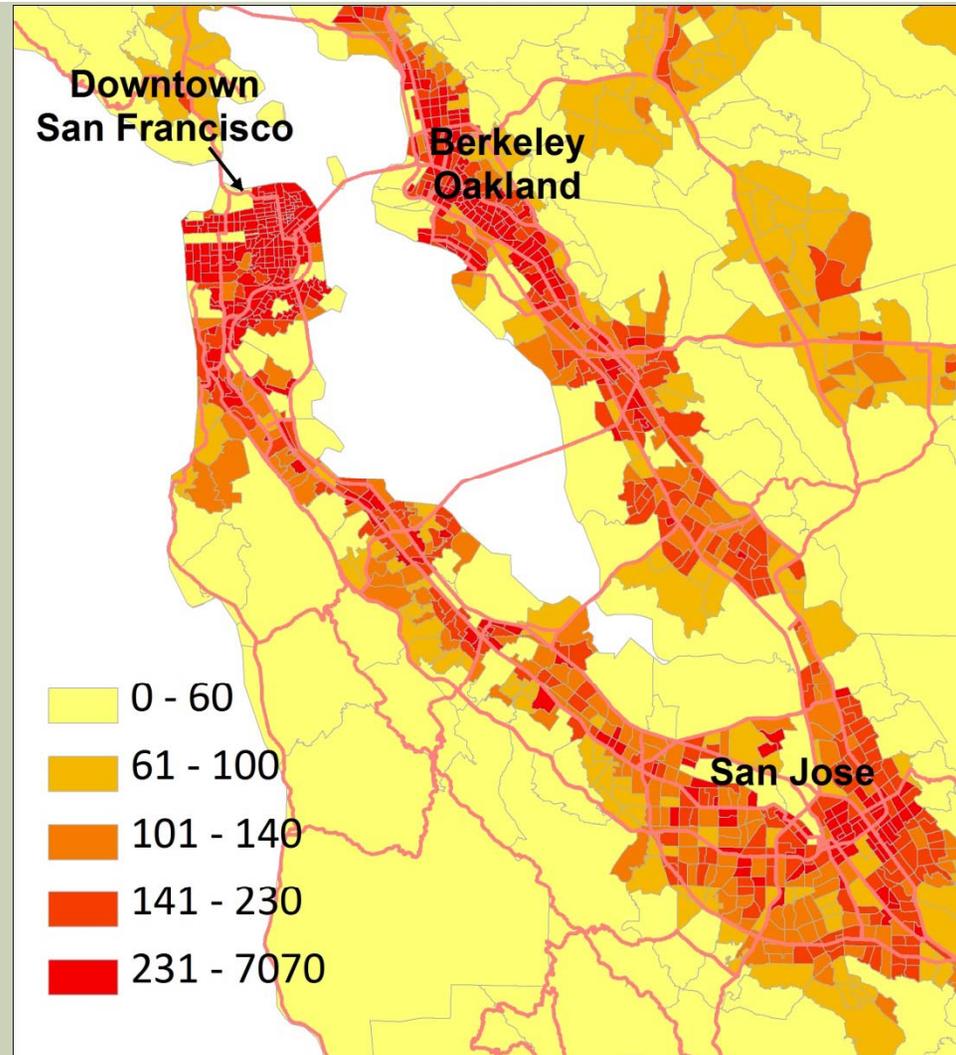
## ■ Simple Expansion Formula:

$$TotalMilesTract = \sum_{i=1}^{10} SurveyAvgMiles_{ti} * TractPopulation_i$$

where  $i$  is the gender-age group category  
and  $t$  is the neighborhood type category

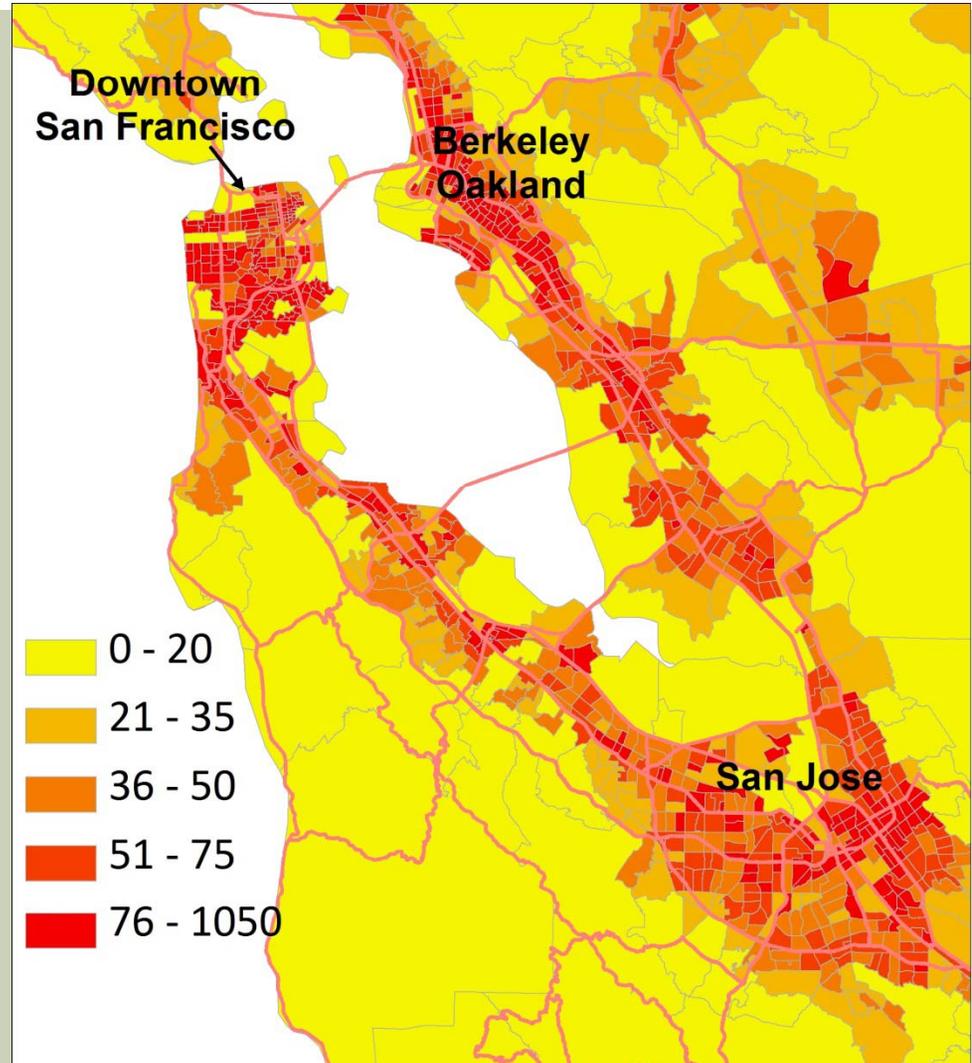
# INFRASTRUCTURE ANALYSIS: TRACT-LEVEL WALKING ESTIMATES

**Weekday Miles  
Walked Per  
Non-Highway  
Road Mile**



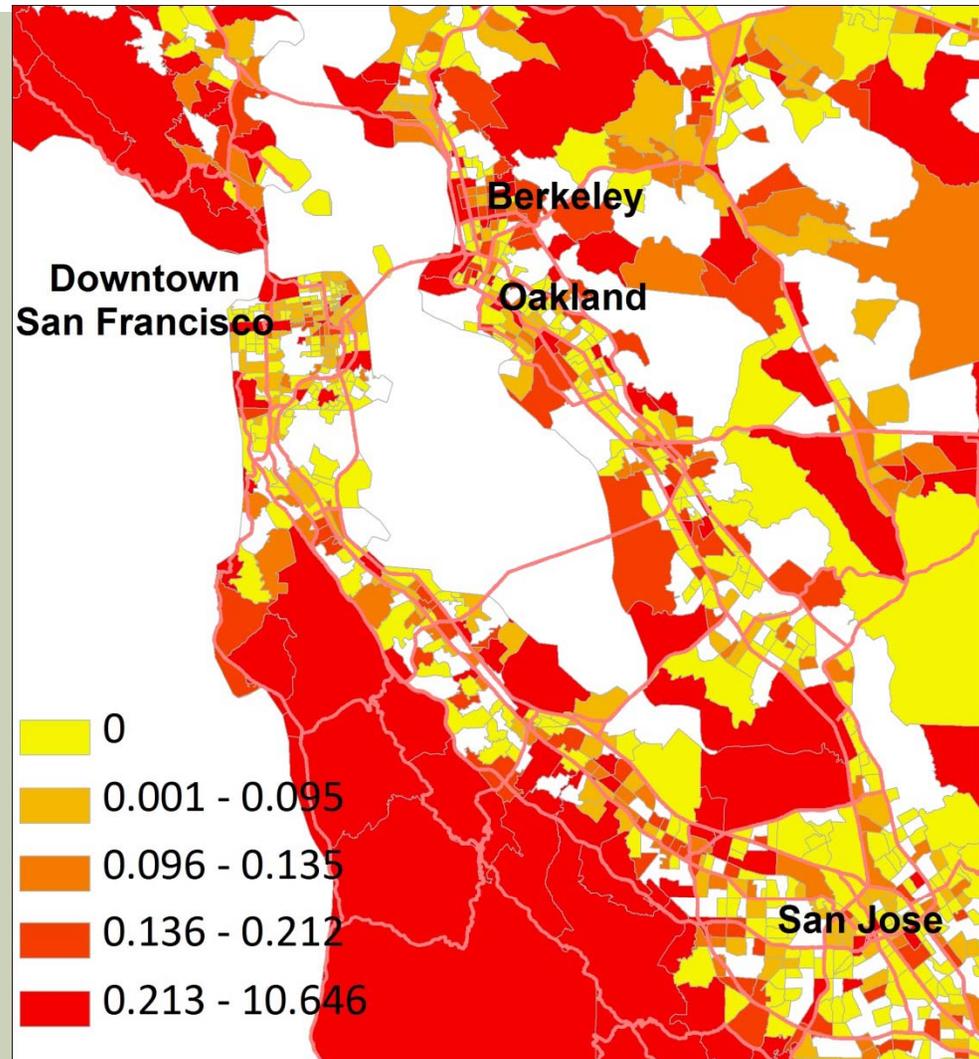
# INFRASTRUCTURE ANALYSIS: TRACT-LEVEL BIKING ESTIMATES

**Weekday Miles  
Biked Per  
Non-Highway  
Road Mile**

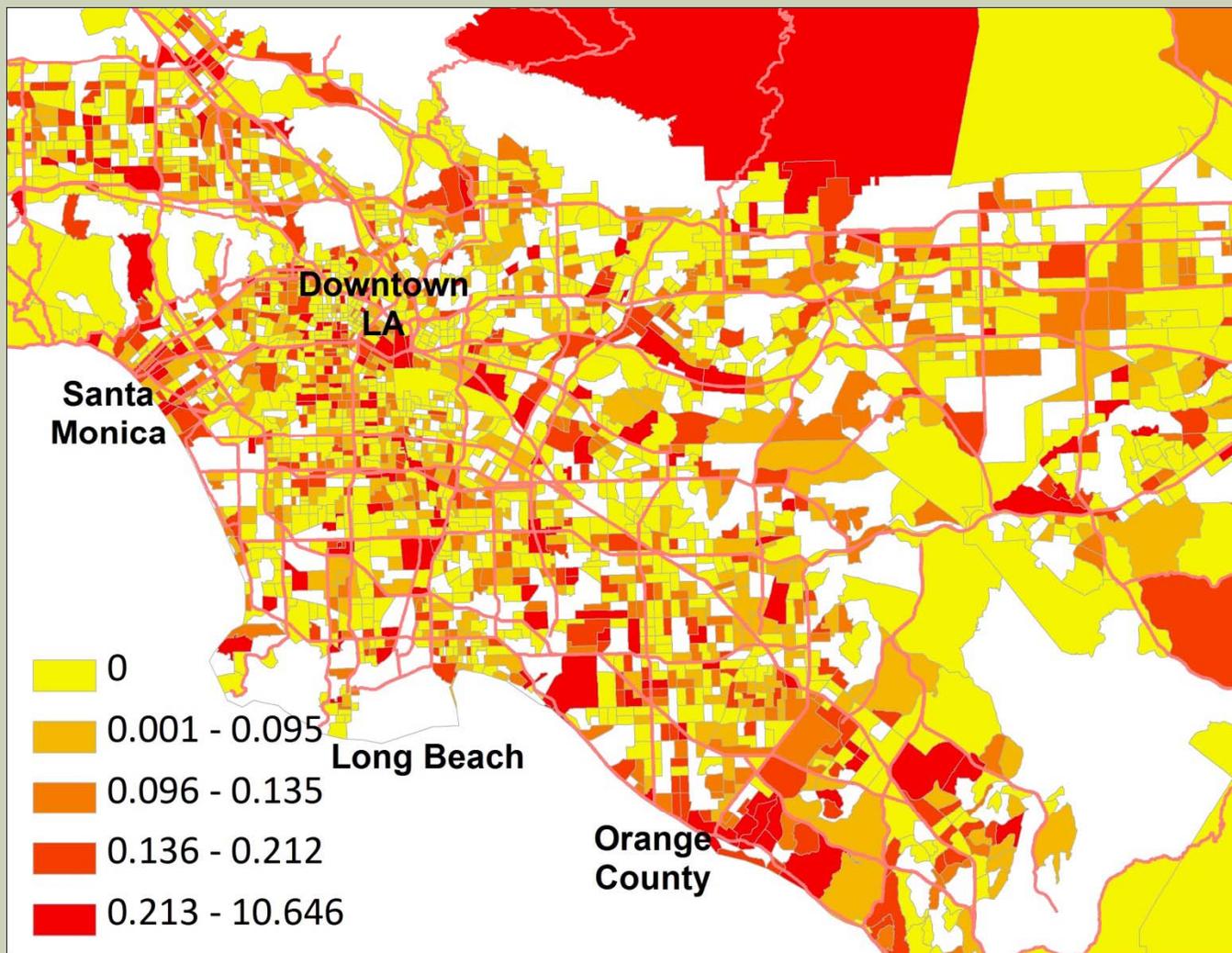


# SAFETY ANALYSIS: ACCIDENTS PER DISTANCE WALKED

Annual Severe  
Pedestrian  
Accidents Per  
1000 Weekday  
Miles Walked



# SAFETY ANALYSIS: ACCIDENTS PER DISTANCE WALKED



# CONCLUSIONS

- Method can provide estimates of cyclist and pedestrian activity based on travel survey and census data, without a full travel model
- Estimates of miles of activity per road mile are highly correlated with tract population density
- CHTS data produce somewhat lower estimates of bike/walk activity than NHTS data (results not shown)
- Compare these results with those from a full travel model, if available

Report available next week

Census tract estimates to be posted

Contact: [ddsalon@ucdavis.edu](mailto:ddsalon@ucdavis.edu)