BUILT ENVIRONMENT:
How urban design can affect health

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Seventh-Day Adventist Population (Adventist)

- Religious denomination
- Lower Mortality Rate
  - Cancer
  - Cardiovascular disease
- Diverse dietary habits
- Highest Concentration
  - Southern California

Loma Linda's Adventist

- San Bernardino County
- Centenarians Adventist
  - Highest Concentration

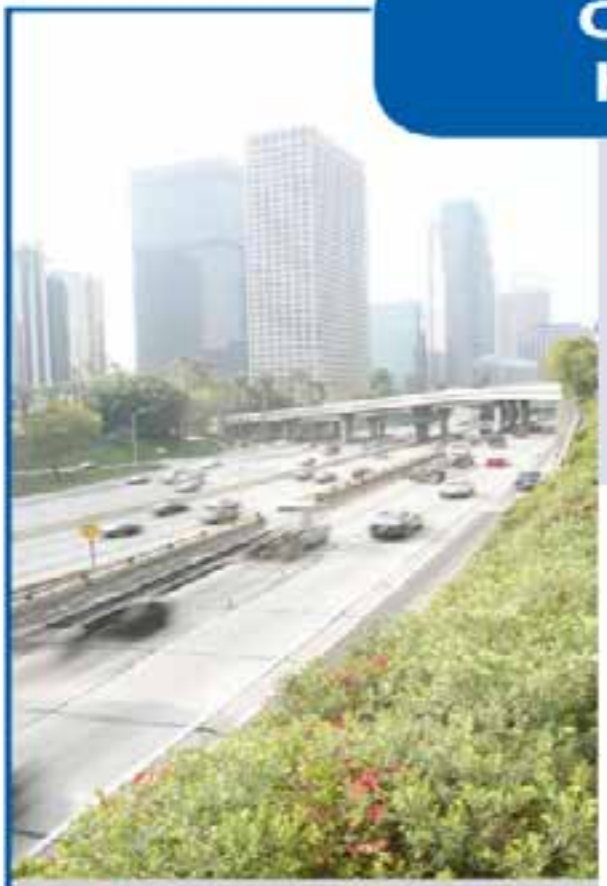
Loma Linda

Loma Linda Adventist

- Same Religious Lifestyle
- Greater Longevity in Loma Linda
- What is causing the differences in lifespan?

Built Environment?

CDC Recommendations for Improving Health through Transportation Policy



The U.S. transportation system has been shaped by multiple policy inputs and concrete actions which have arisen from transportation and community planners, funding agencies and others at Federal, state and local levels. Today, the system is designed to move people and goods efficiently; however, there is a growing awareness across communities of the impact that transportation systems have on quality of life and health. Government and non-government agencies are seeking innovative policies and programs that promote health while allowing for the efficient transportation of goods and people.

The Opportunity

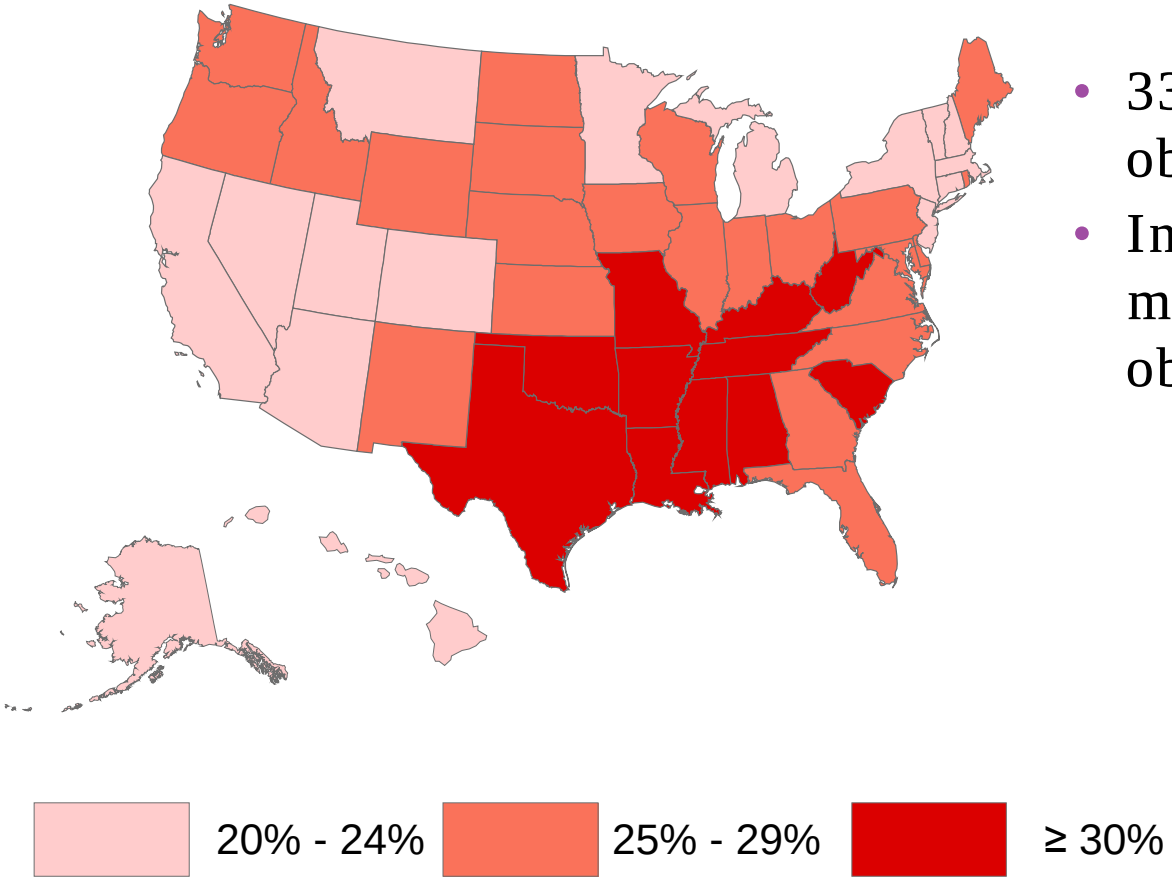
Expanding the availability of, safety for, and access to a variety of transportation options and integrating health-enhancing choices into transportation policy has the potential to save lives by preventing chronic diseases, reducing and preventing motor vehicle-related injury and deaths, improving environmental health, while stimulating economic development, and ensuring access for all people.

Recommendations

The document **CDC Recommendations for Improving Health through Transportation Policy** (http://www.cdc.gov/transportation) gives specific recommendations for including the consideration of public health within transportation issues. Key high-level areas include:

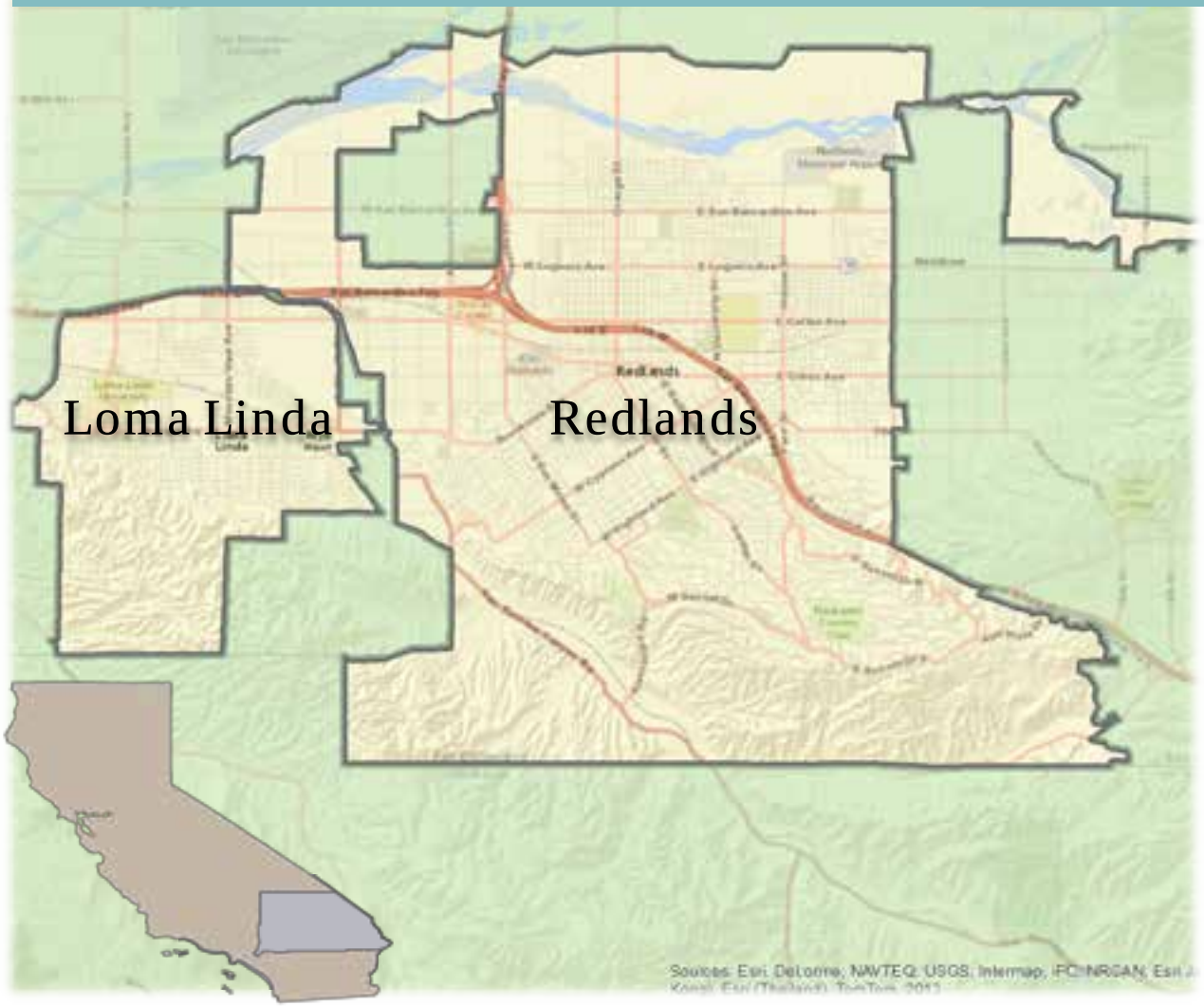
- Reduce injuries associated with motor vehicle crashes. Examples of interventions include:
  - Restraint laws; alcohol-impaired driving laws;
  - Comprehensive graduated driver licensing systems;
  - Community designs that promote reduced traffic speeds in neighborhoods; and
  - Addressing roadway safety issues through community design, and policies which improve driver behavior.
- Promote active transportation. Examples of interventions include:
  - Well-lit sidewalks, shared-use paths, and safe roadway crossings;
  - Bicycle-supporting infrastructure such as shared-use paths, protected bikeways, cycletracks and programs that reduce motor vehicle traffic and vehicle speed on neighborhood streets (e.g. bicycle boulevards);

Percent of obese adults (BMI ≥ 30) in U.S., CDC 2010



- 33.8% of adults are obese
- In 2010 no state met obesity control objectives

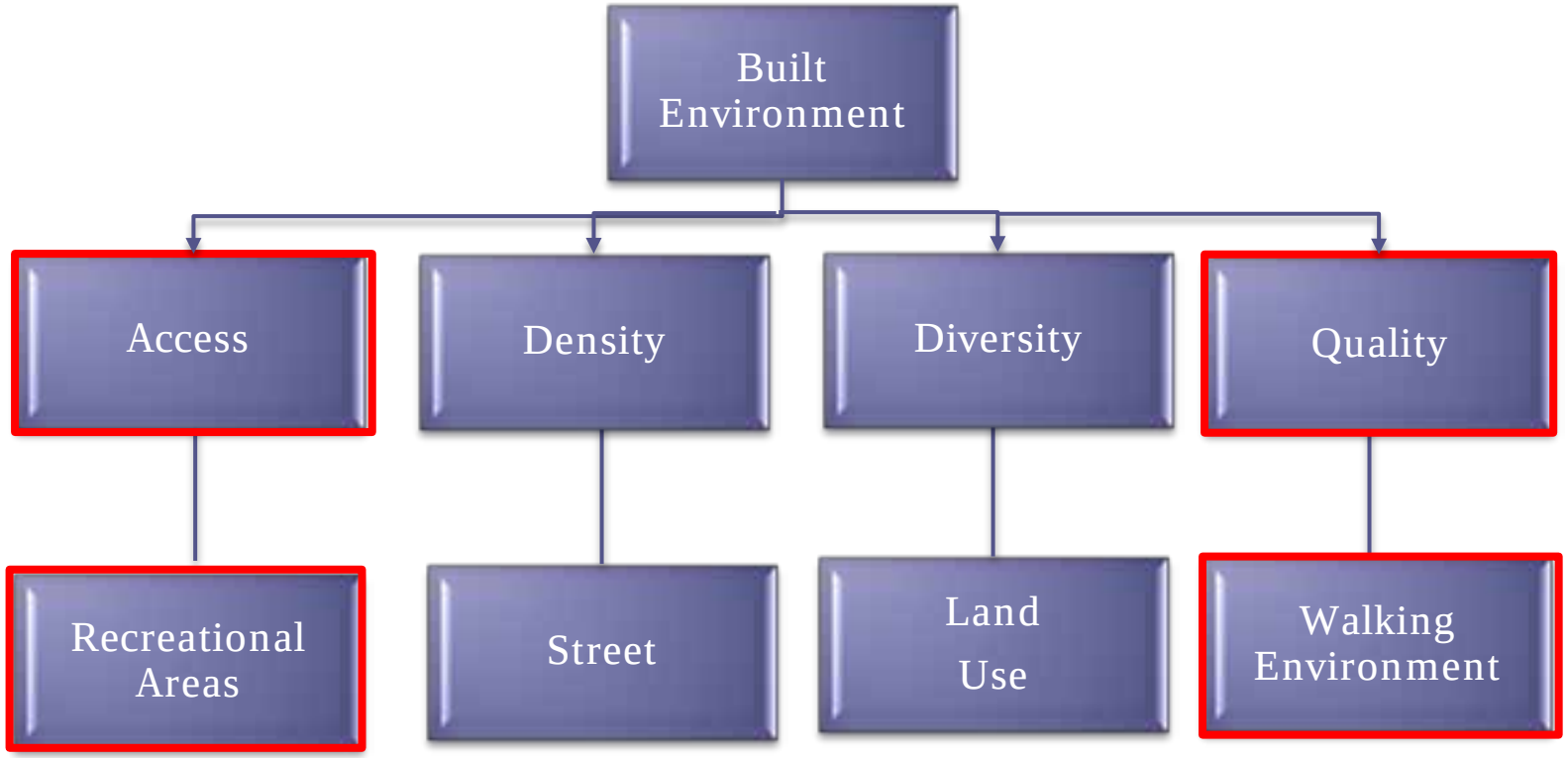
Study Area



- Population
  - Redlands
    - 70,000
  - Loma Linda
    - 23,704

Source: U.S. Census Bureau

Built Environment Factors

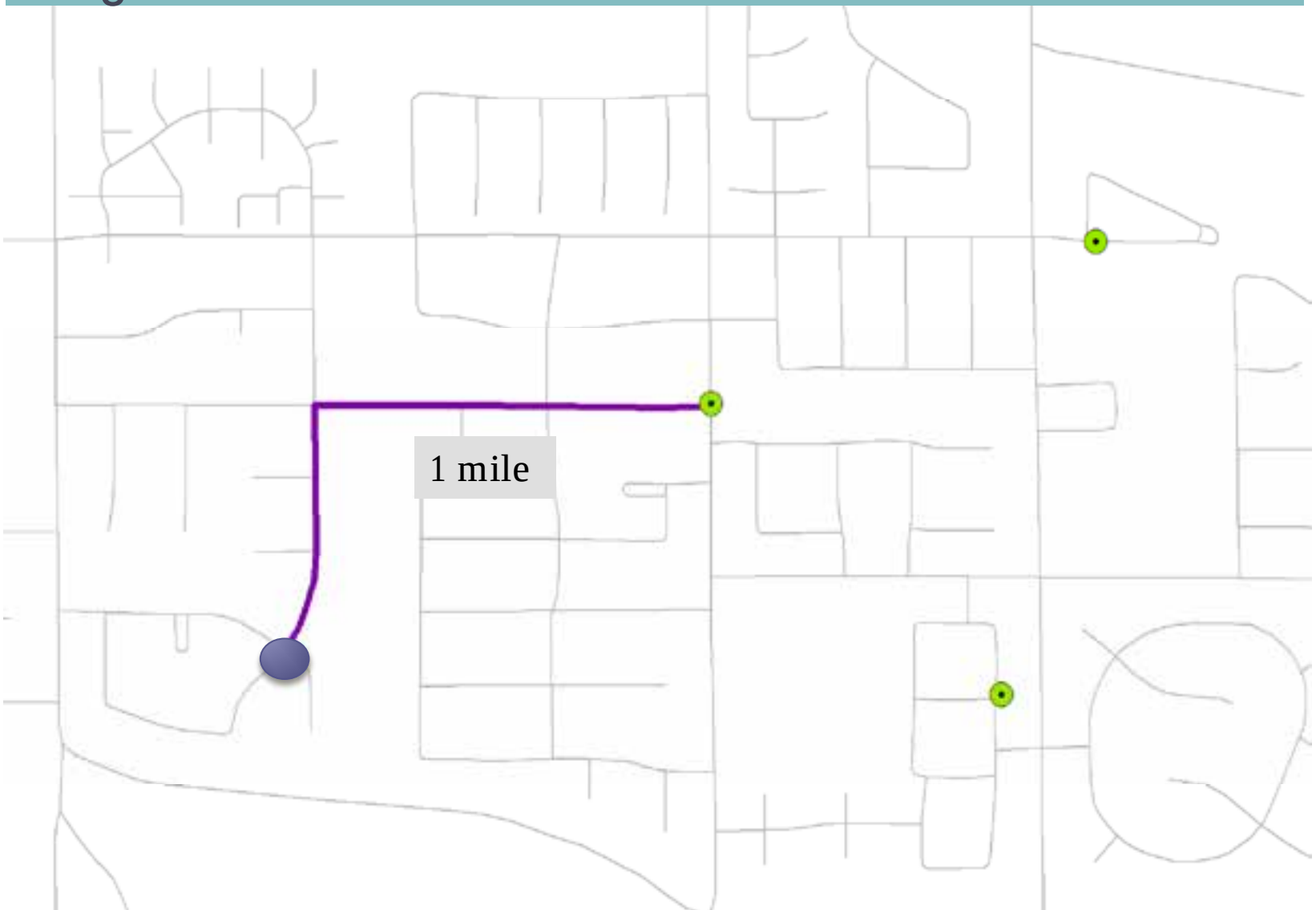


Framework: Brownson et al. 2009

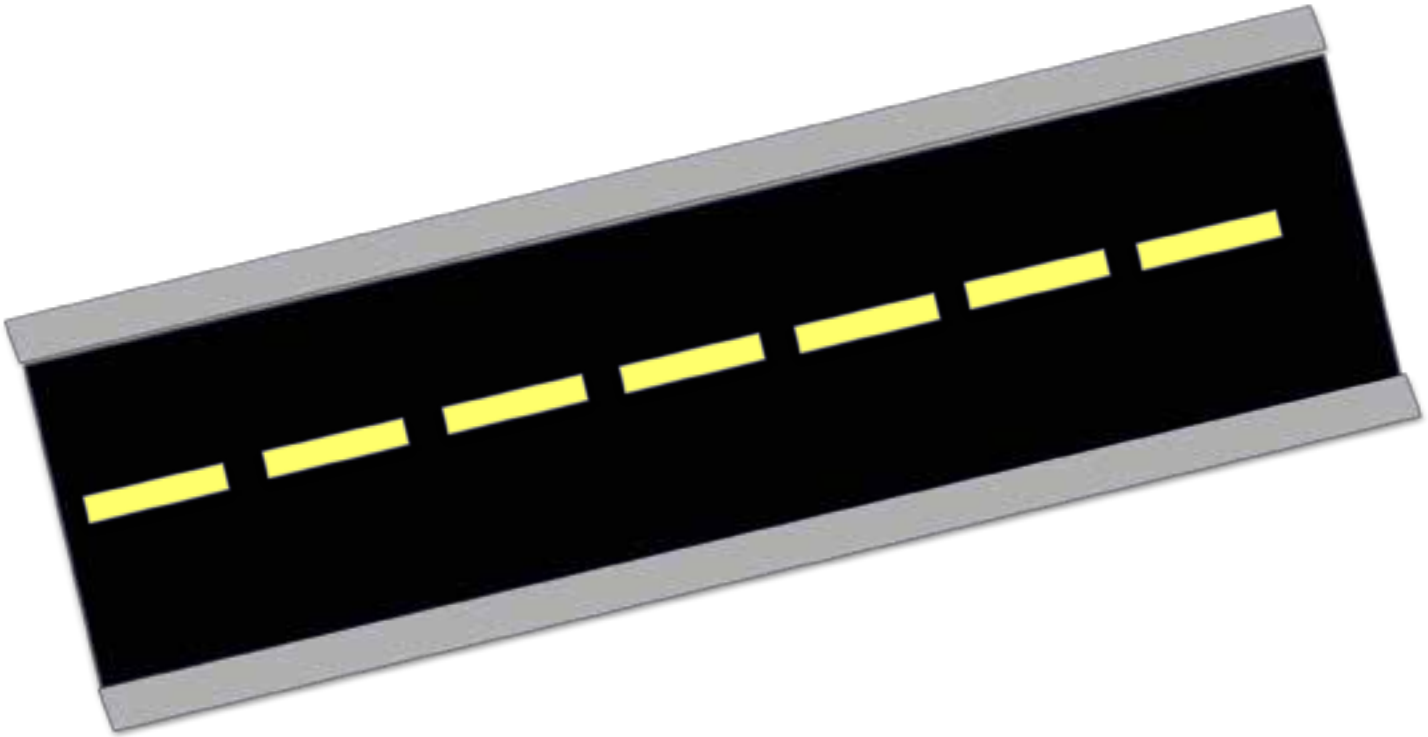
Built Environment Toolbox

- Replicable
- Preserve Identifiers
  - join health data
- Standardized indicators

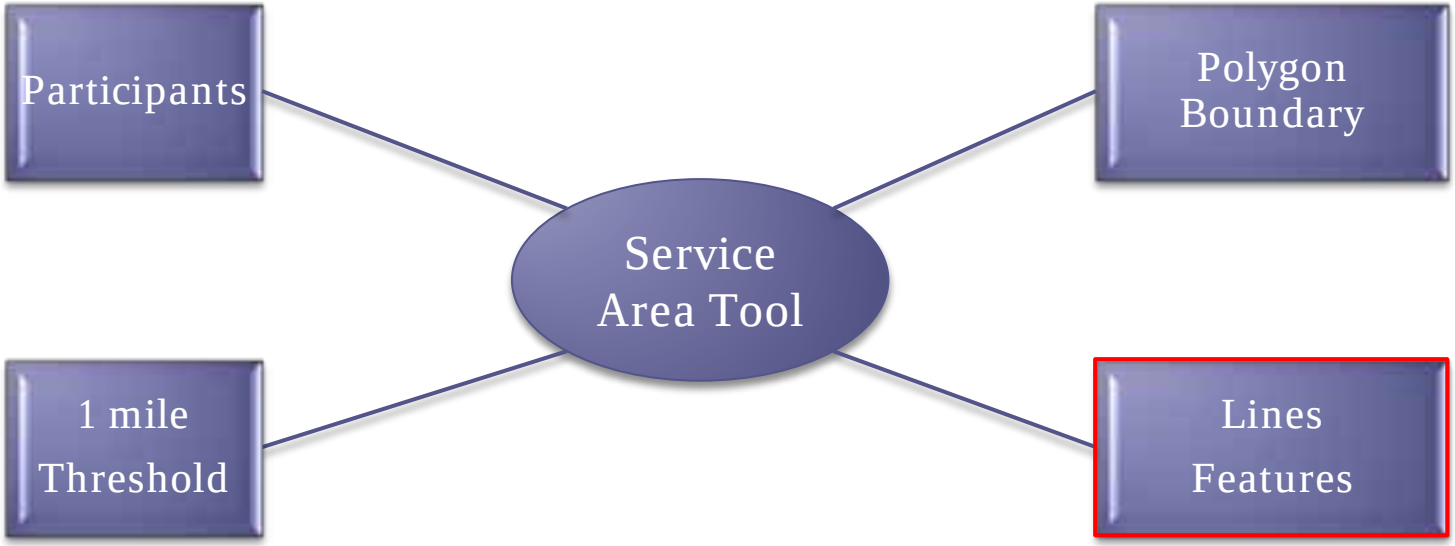
Access
Origin-Destination Matrix tool



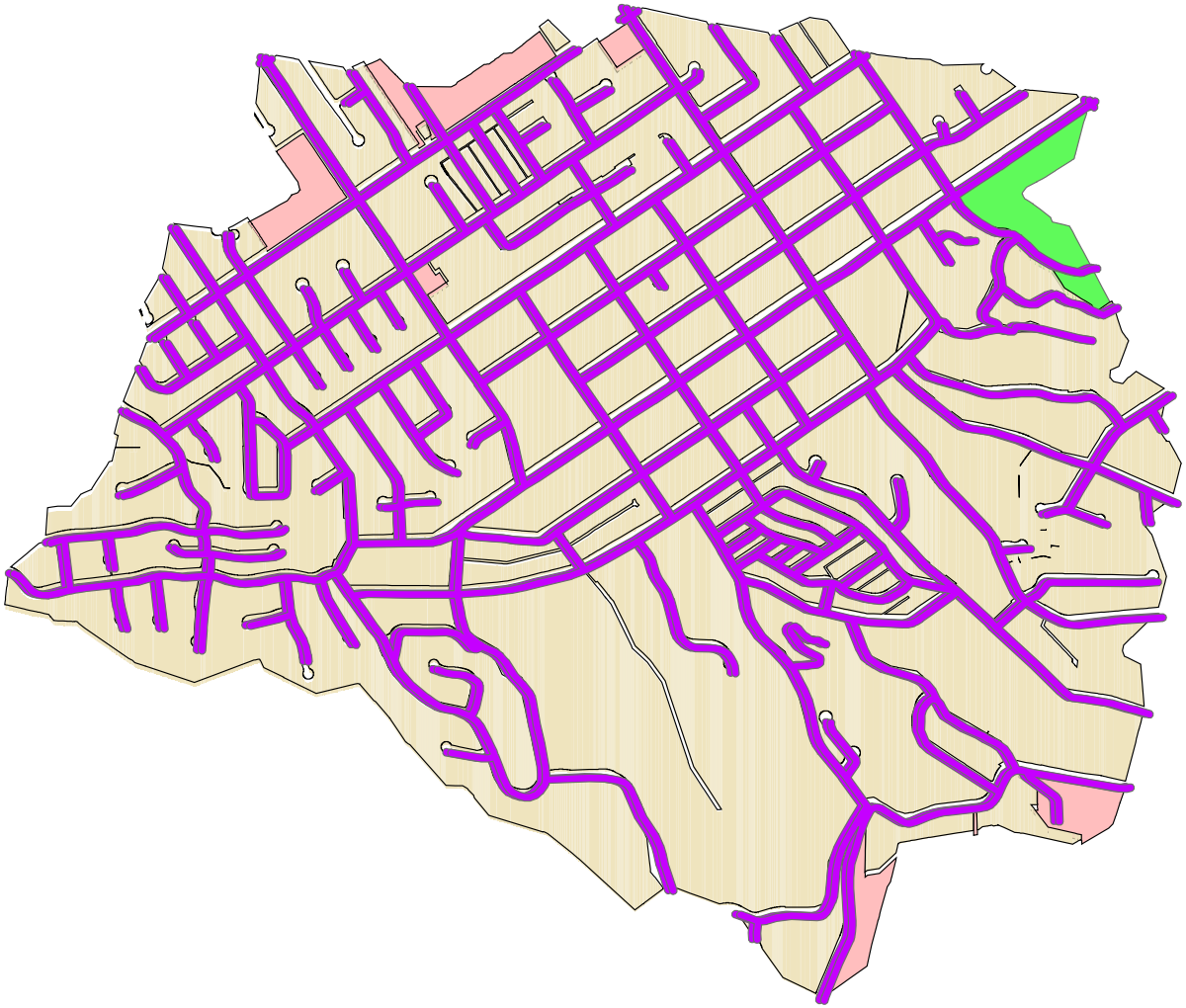
Quality: Attractive Walking Environment



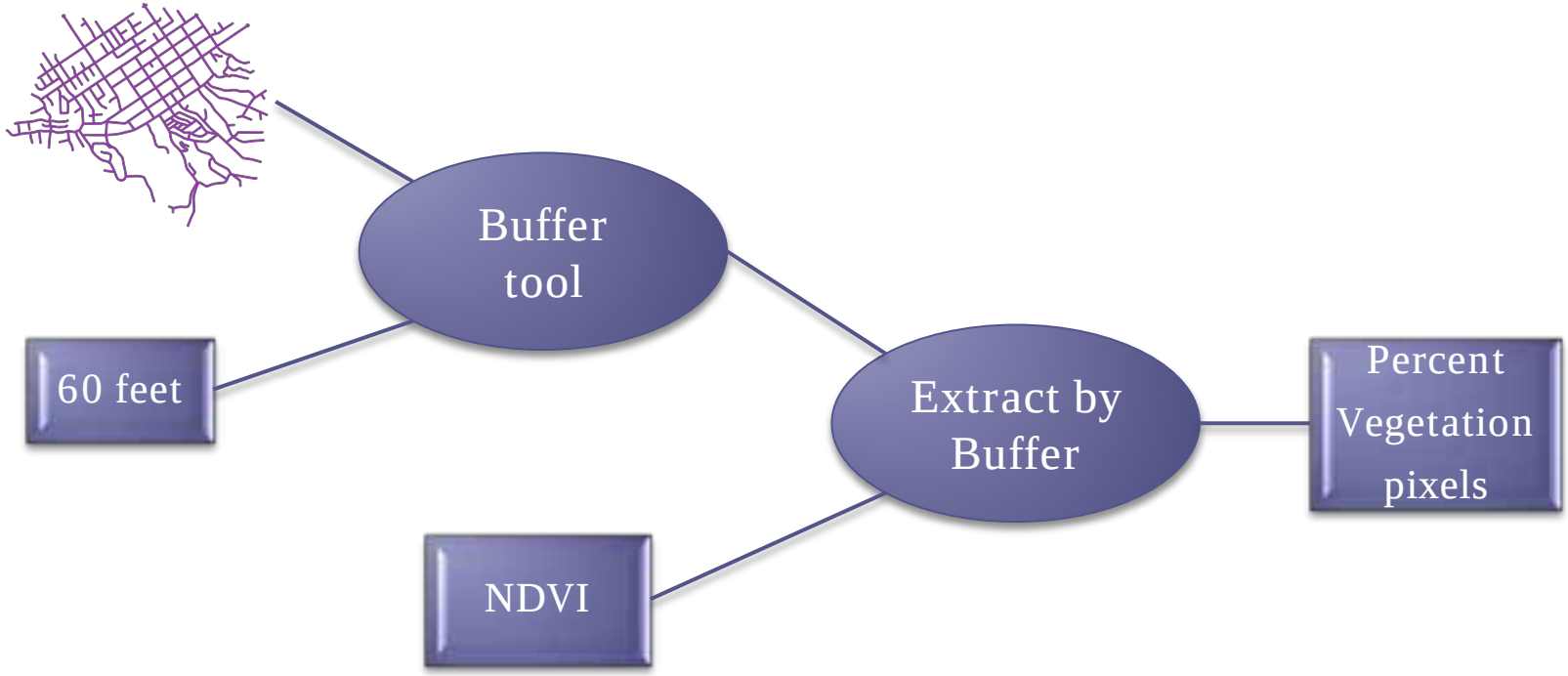
Walking Boundary Area Tool (1 mile network boundary)



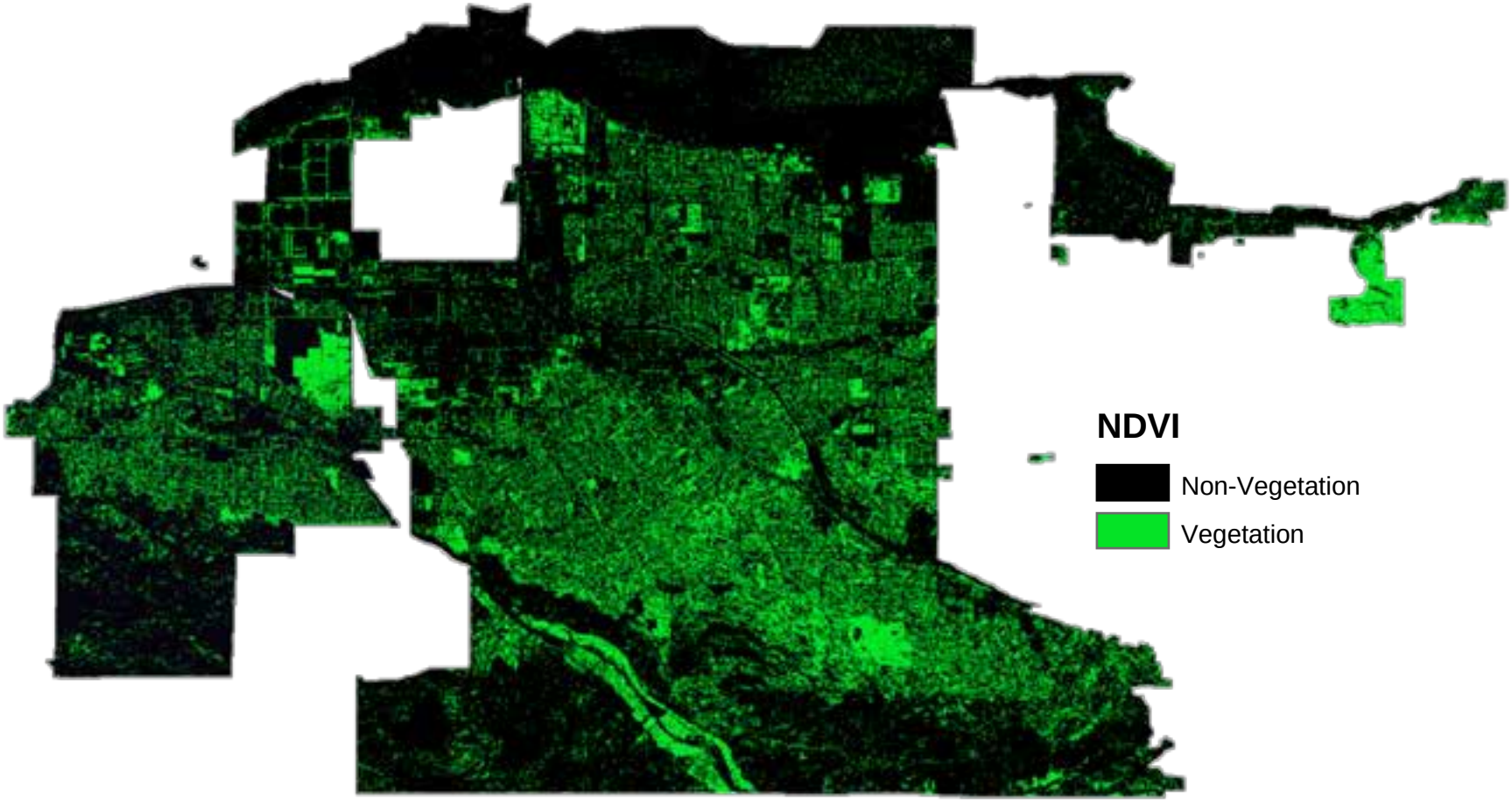
Walking Boundary Area Tool
(1 mile network boundary)



Extract Vegetation tool



Normalized Difference Vegetation Index (NDVI)



Extract Vegetation Tool

Data

- Adventist Health Study-2
  - Sample size: 1,985
    - Loma Linda- 72.6%
    - Redlands- 27.4%

- Imagery Data
  - California Department of Fish and Wildlife

Adventist sample distribution

Average Distance to Recreational Areas

Independent Sample T-test

Average distance to Recreational areas in miles	
Redlands	Loma Linda
3.0	1.6

- p-value < 0.001

Access to Recreational Areas (1 mile network distance)

Difference proportion test

At least one Recreational Area 1 mile distance	
Redlands	**Loma Linda**
32.9%	67.1%

- p-value < 0.05

Percent of vegetation pixels
1 mile network boundary

Difference proportion test

At least one Recreational Area 1 mile distance	
Redlands	**Loma Linda**
20.2%	19.8%

- p-value =0.857

Summary

- Built Environment Toolbox
  - 4 factors
- Significant difference
  - Access to recreational areas
- No significant difference
  - Extract Vegetation tool

Thank you

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