Urban Forestry for People in a Hurry

CANOPY

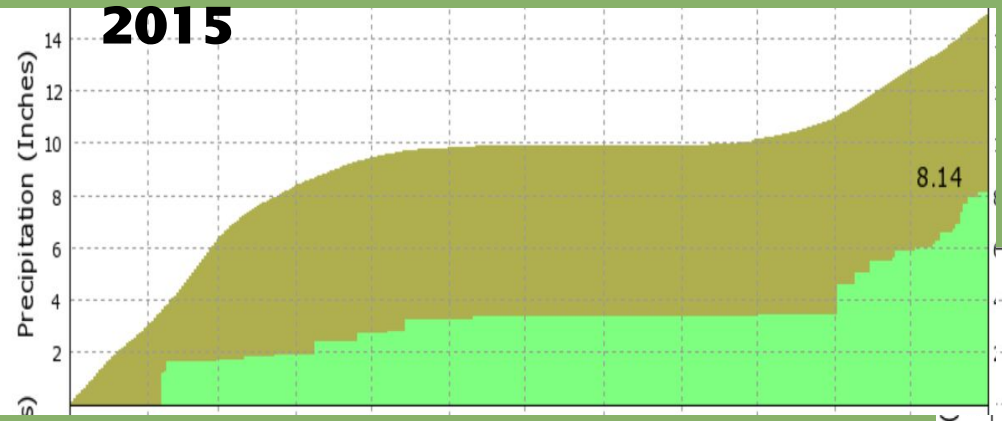
THE COUNTY OF SANTA CLARA 1850

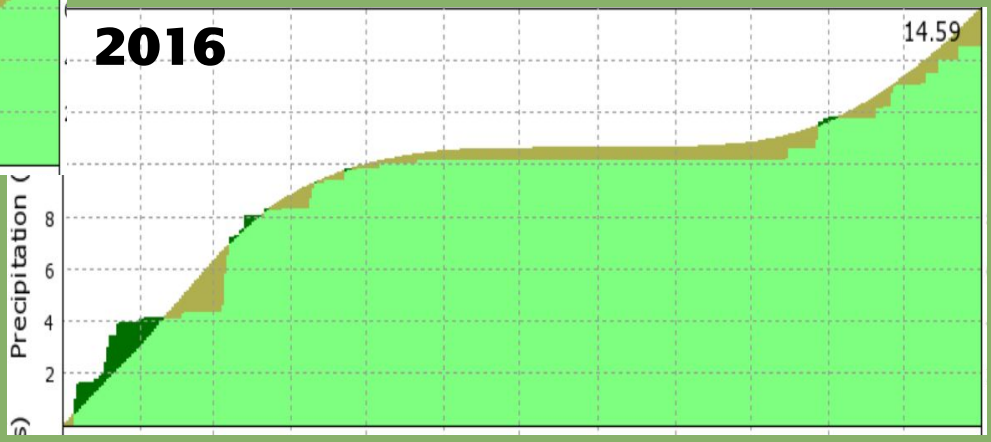
OUR CITY FORES

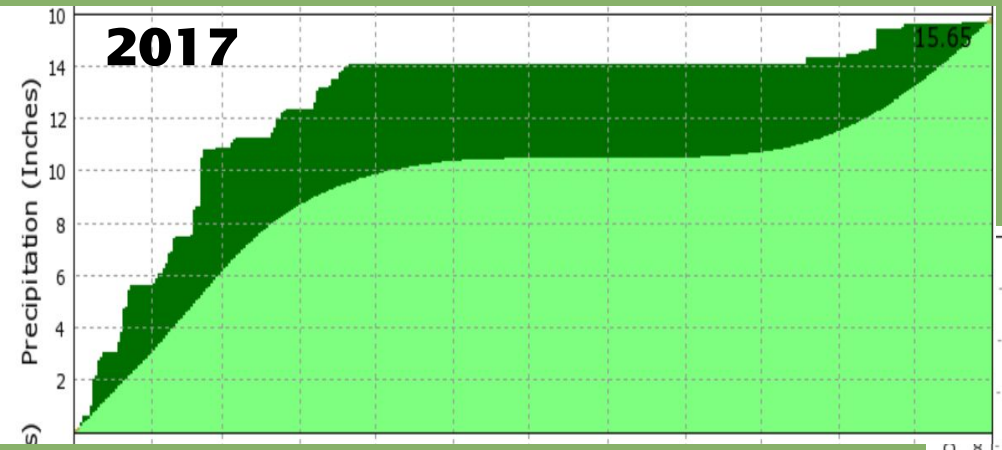
bay area urban forest ecosystem council

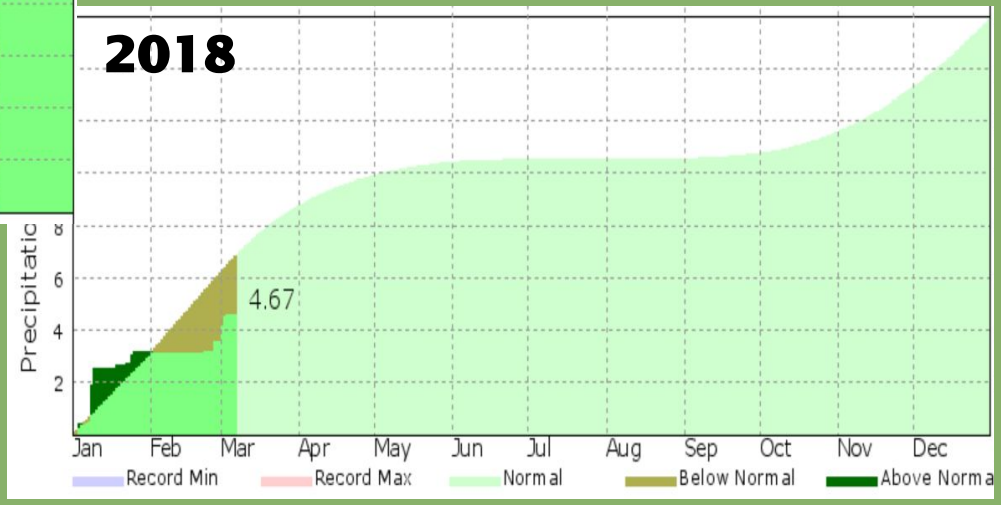
bay area urban forest ecosystem council

“Drought” is common in San Jose









Program Overview

9:30am - **Welcome with Dr. Igor Lacan**

9:40am - **Why Urban Forests? Why in A Hurry?**

9:50am - **Urban Forest Benefits and Threats**

10:20am - **The Components of a Robust Urban Forestry Program**

10:27am - **Municipal Arborist Panel**

10:55am - **Break**

11:15am - **Lightning Round:**
Surveying Trees with Volunteers
Replenishing the Urban Forest
Funding the Urban Forest
Re-Oaking and Resilient Landscapes

11:50am - **Urban Tree Canopy and Human Health**

12:20pm - **Call To Action and Closing with Supervisor Joe Simitian**

Why Urban Forestry? Why in a hurry?

bay area urban forest ecosystem council

Elizabeth Lanham
Contract Arborist, City of Palo Alto

Michael Hawkins
Program Director, Canopy

Rob Castaneda
Planting Manager, Our City Forest

Urban Forest Benefits and Threats

Dr. Natalie van Doorn

Urban Forest Benefits and Threats

Natalie S. van Doorn

USDA Forest Service

Pacific Southwest Research Station

Urban Forestry for People in a Hurry
San Jose; March 9, 2018

Today

- Value of urban trees from a research perspective
- The state of our urban forest
  - Community forests
  - Street trees
    - Palo Alto
- Threats and opportunities
- What you can do

Benefit-Based Approach

- Species
- Size
- Abundance

- Energy
- Carbon dioxide
- Air pollution mitigation
- Storm water retention
- Property values

Conserving Energy

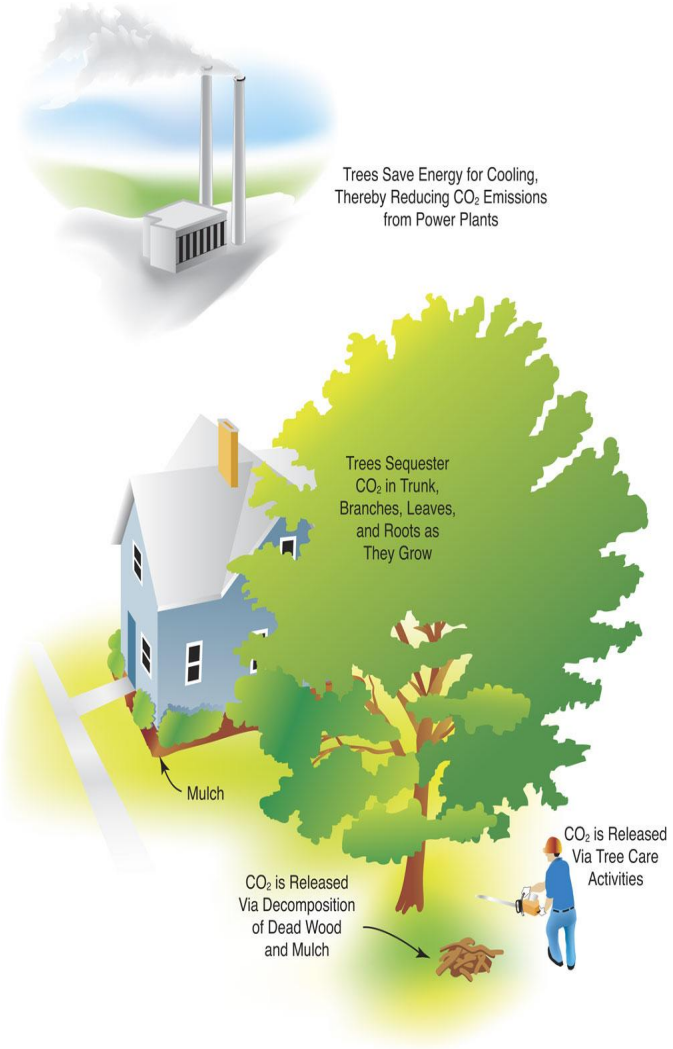
Plant Strategically: Summer Shade

- West is the best
- Closer is better
- Large, dense crown

Plant Strategically: Solar Friendly to South

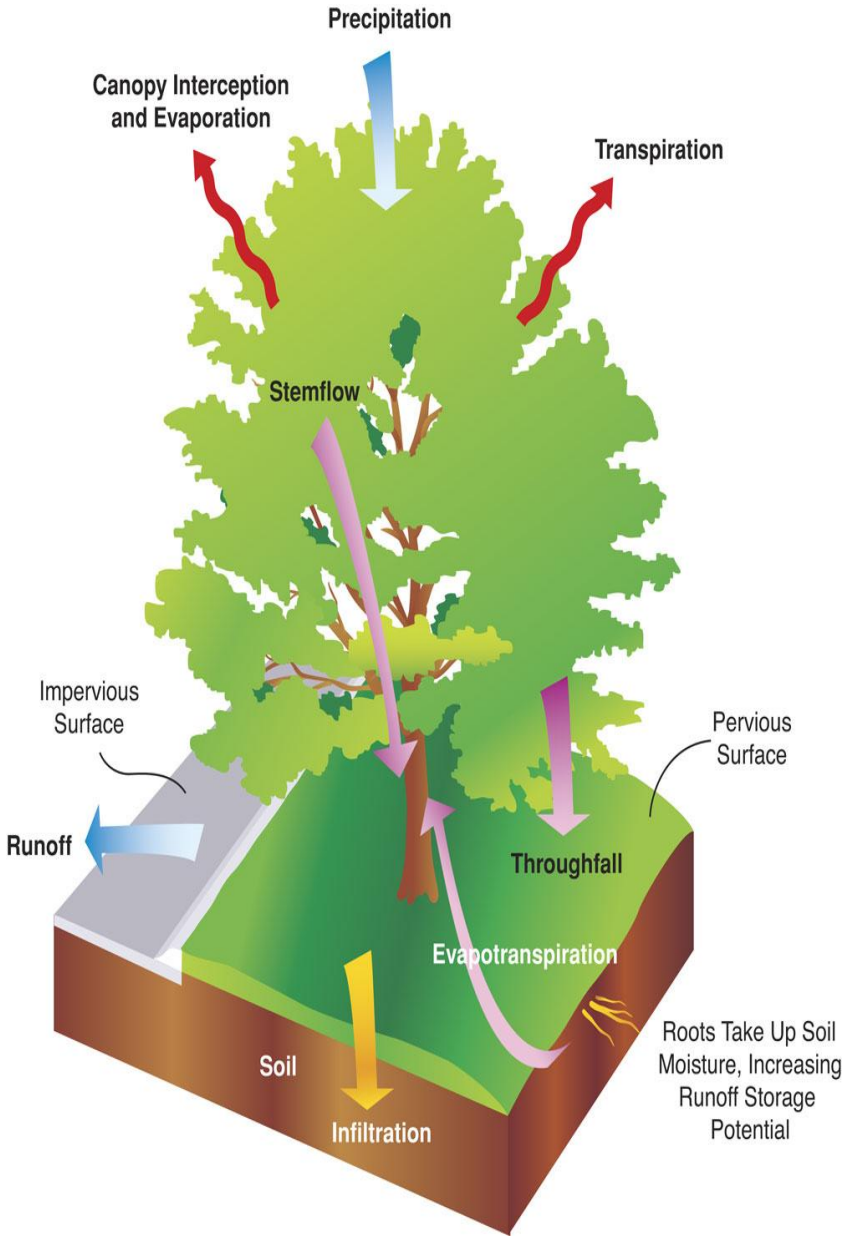
- Avoid trees to south
- Open winter crown, dense summer shade

Reducing Atmospheric Carbon Dioxide



Choose Species Wisely

Reducing Stormwater Runoff



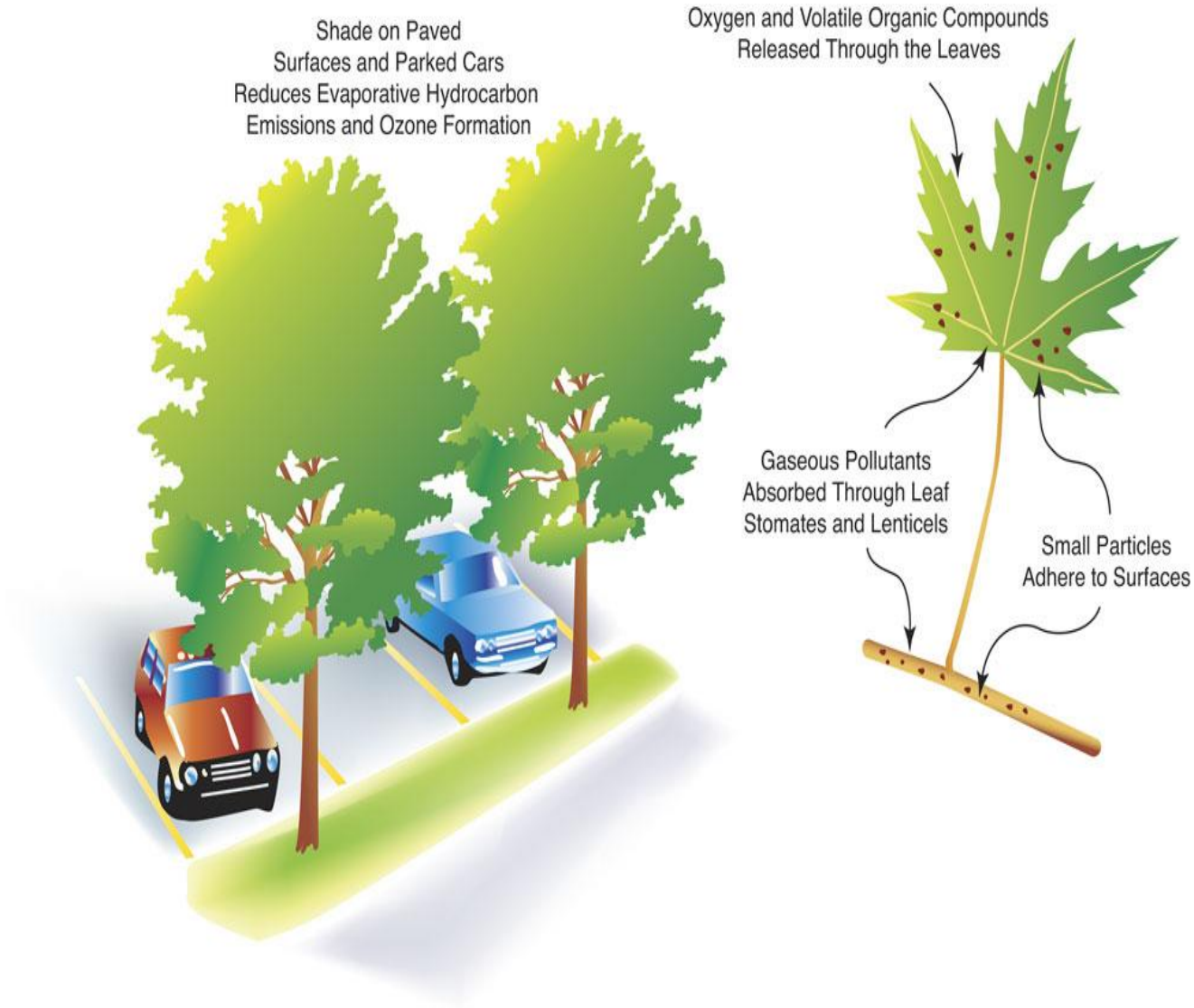
Choose Species Wisely

Little leaf & stem surface

Lots of surface area, wide crown


Chris Madden

Improving Air Quality



Choose Species Wisely

Large and tolerant to pollutants

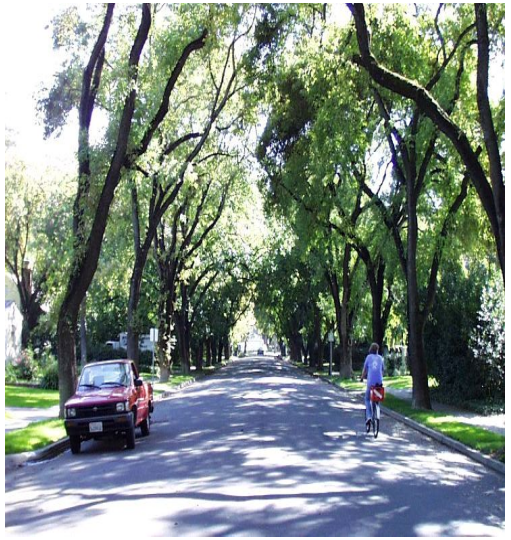
Evergreens for particulates

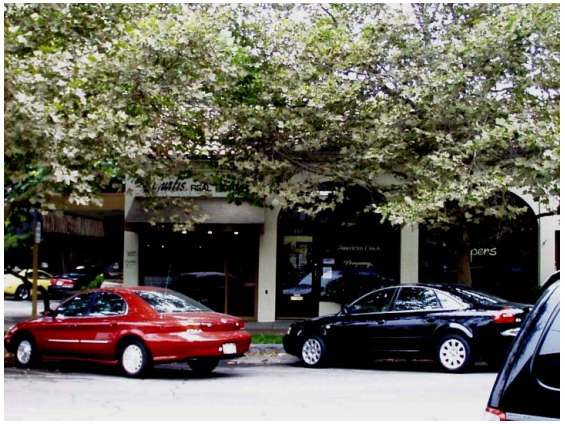
Property values

- Each large front yard tree adds 1% to sales price
- Large specimen trees can add 10%, or more, to property values.

Other benefits

- Wildlife habitat
- Increased spending in retail districts
- Shade improves road surface condition
- Beautification
- Social and psychological





We love benefits! But what about costs…

- tree and planting
- pruning
- removal and disposal
- pest and disease control
- infrastructure (sewer line, sidewalk upheaval)
- irrigation
- clean-up
- liability and legal
- administration

We love benefits! But what about costs…

Estimate	Source
$10-$20 per tree annually	survey of Bay Area foresters, 2010
$19 per tree annually, on average	CA-wide survey, 2003
$11.22 per tree for sidewalk repair	survey of 18 CA cities, 2000

McPherson et al. 2010; Thompson 2006; McPherson 2000

Today

- Value of urban trees from a research perspective
- The state of our urban forest
  - Community forests
  - Street trees
    - Palo Alto
- Threats and opportunities
- What you can do

California statewide assessments - key points

Entire urban forest

- 173.2 million city trees
- $8.3 billion annual value
- Tree canopy cover per capita is lowest in the U.S.
- 236 million vacant tree sites
- Tree diversity could be higher
- $1 invested = $2.52 in benefits

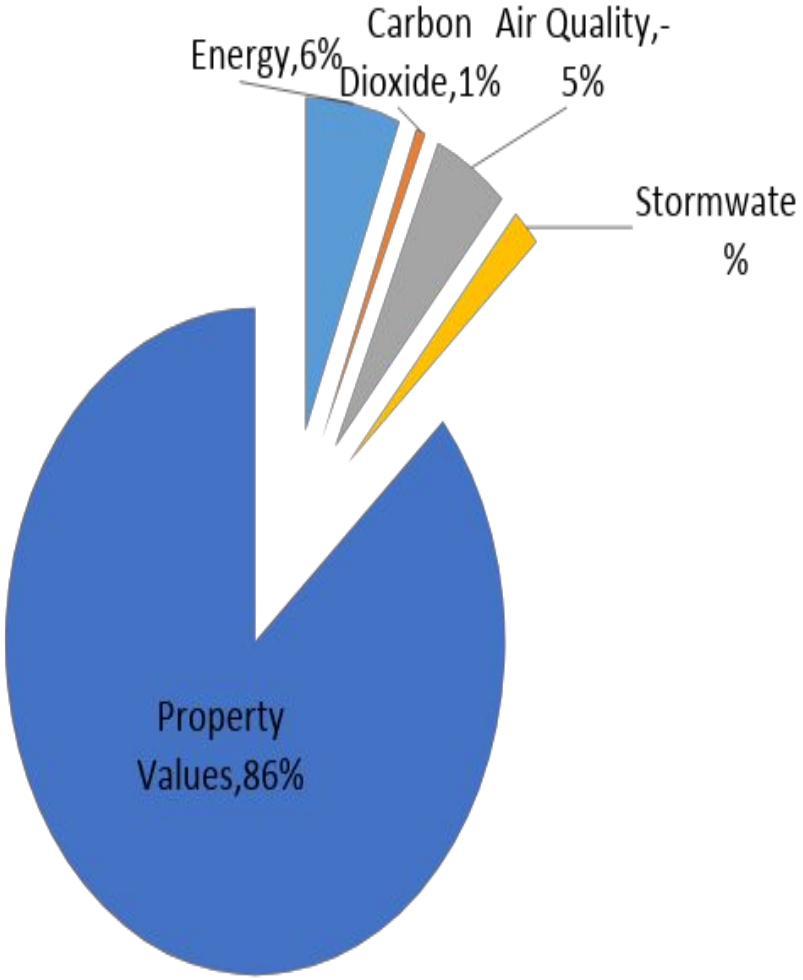
McPherson et al. 2017

Street trees

- 9.1 million street trees
- $1 billion annual value
- Tree density has fallen by 30% since 1988.
- 16 million vacant tree sites
- Tree diversity could be higher
- $1 invested = $5.82 in benefits

McPherson et al. 2016

A local example: street trees in Palo Alto, CA



Category	Total ($)	$/capita	$/tree
Energy	$681,887	$10.59	$19.72
Carbon Dioxide	$68,751	$1.07	$1.99
Air Quality	-$542,636	-$8.43	-$15.69
Stormwater	$209,436	$3.25	$6.06
Property Values	$9,596,381	$149.01	$277.47
Grand Total	$10,013,819	$155.49	$289.54

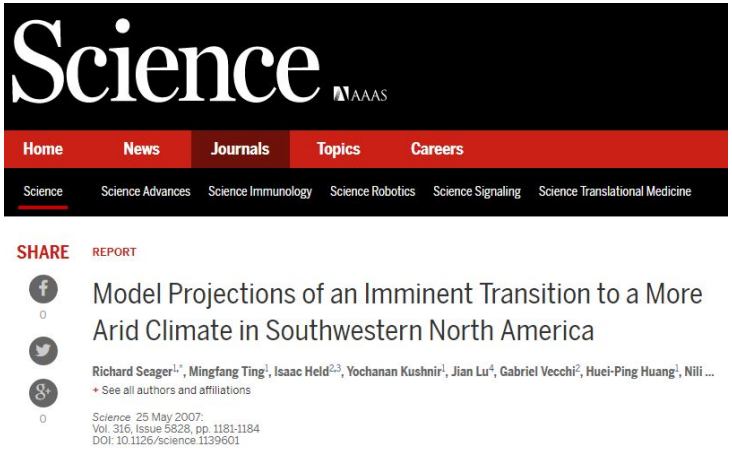
McPherson et al. 2016

Today

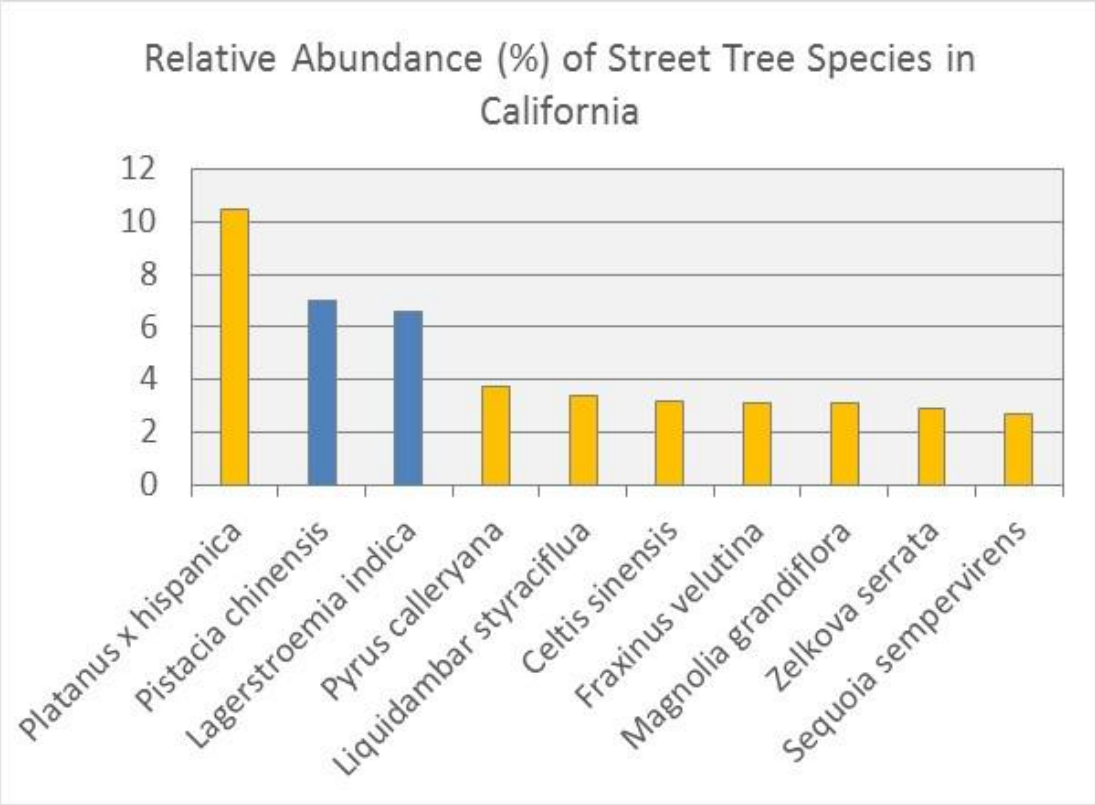
- Value of urban trees from a research perspective
- The state of our urban forest
  - Community forests
  - Street trees
    - Palo Alto
- Threats and opportunities
- What you can do

California's Drought

- Broad consensus that recent drought will be new climatology of SW



Vulnerability to Drought?



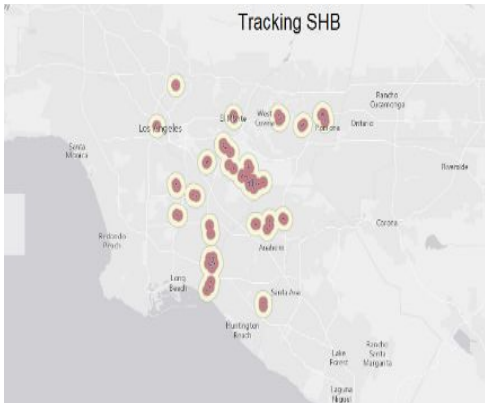
Invasive Shot Hole Borer-Fusarium Disease complex

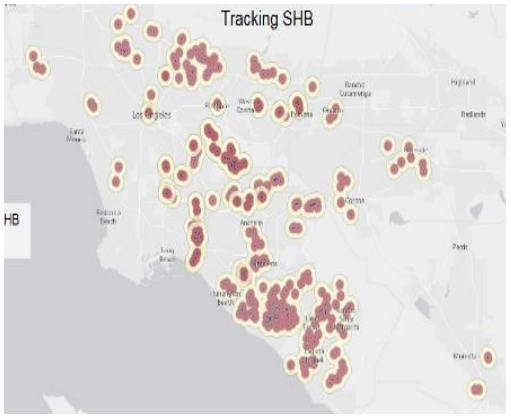
Newly discovered beetle decimates trees in Tijuana River Valley

September 1, 2016 by Nancy Aziz

Newly discovered beetle decimates trees in Tijuana River Valley

September 1, 2016 by Nancy Aziz





Opportunities

- AB32
  - Greenhouse Gas Reduction Fund
    - Env. justice
    - Plantings in low treed areas
    - Required monitoring

Today

- Value of urban trees from a research perspective
- The state of our urban forest
  - Community forests
  - Street trees
    - Palo Alto
- Threats and opportunities
- What you can do

Plant and Maintain More Trees

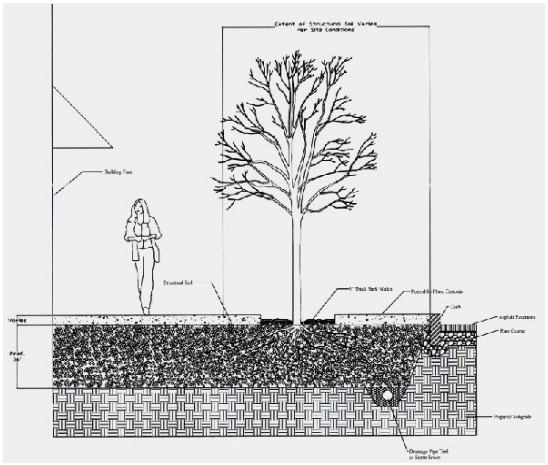
Plant Larger Growing Trees…. where space allows!

…Or several medium stature trees

…. Or many small stature trees

Create Diversity

Adopt Smarter Urban Design



The Bottom Line...

- Quality of life depends on tree benefits
- Benefits depend on healthy trees
- Healthy trees require quality care

What You Can Do…

- Establish long-term goals for the community forest
- Fund programs for monitoring and maintenance
- Design cities to accommodate trees
- Support volunteer organizations
- Champion community trees

Plant Trees. Create a Legacy.

Thank you!

Questions? Comments?

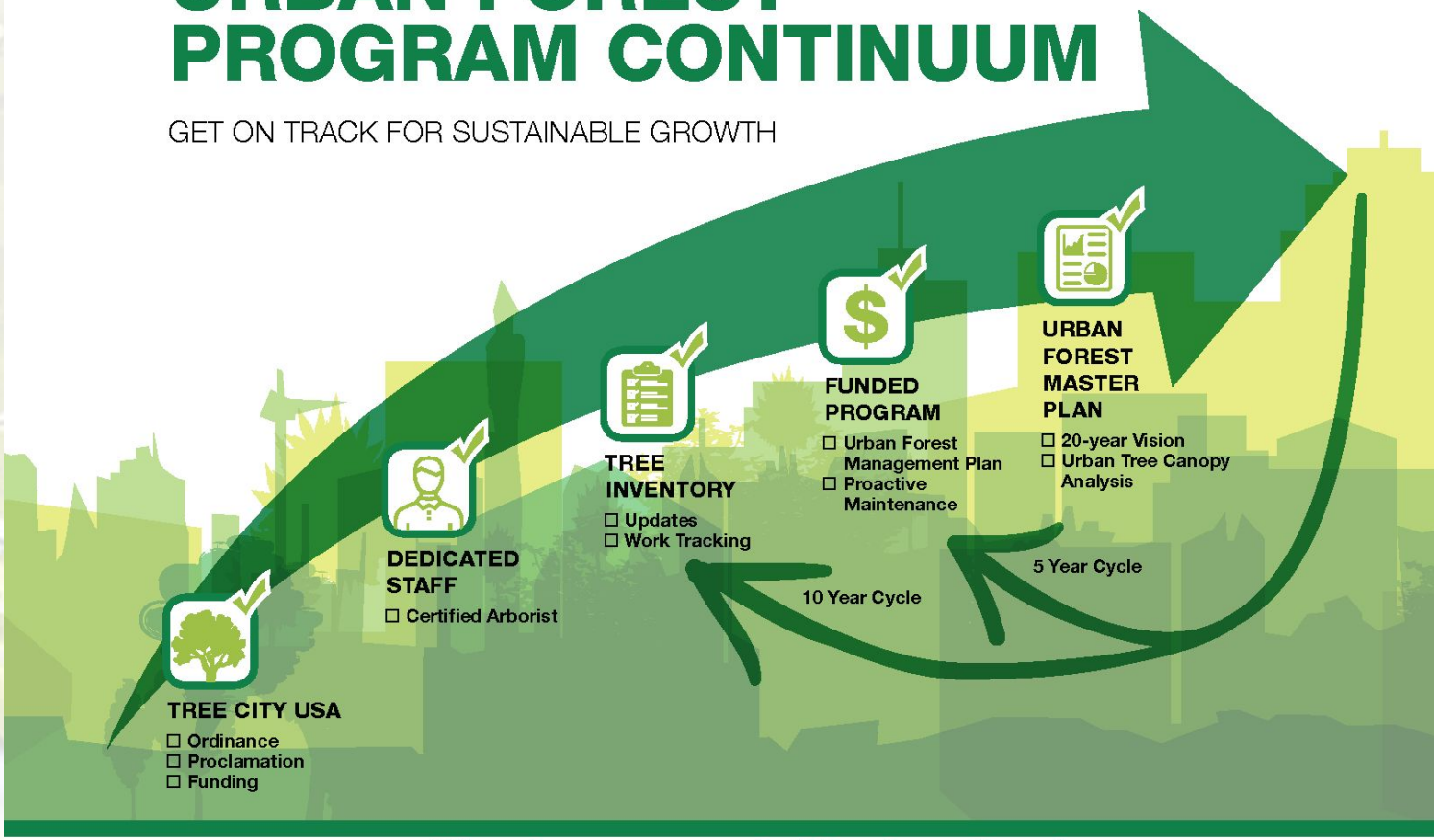
nvandoorn@fs.fed.us

The Components of a Robust Urban Forestry Program

Dorothy Abeyta

URBAN FOREST PROGRAM CONTINUUM

GET ON TRACK FOR SUSTAINABLE GROWTH



Where does your community fall on the continuum?

Connect with your team of urban forestry experts to get to the next step.

DAVEY Resource Group

Dorothy Abeyta | Project Developer / Co-chair BAUFEC

(925) 391-5969 | dorothy.abeyta@davey.com

bay area urban forest ecosystem council

Arborist Panel

Moderated by Elizabeth Lanham
Arborist, City of Palo Alto

Bruce Hurlbert
Parks and Open Space Manager, City of Mountain View

Diane Milowicki
Interim Deputy Director , City of San Jose Department of Transportation

Christina Fusco
Arborist, City of Saratoga

Urban Forestry for People in a Hurry

CANOPY

THE COUNTY OF SANTA CLARA 1850

OUR CITY FORES

bay area urban forest ecosystem council

Lightning Round

Surveying Trees with Volunteers
Elise Willis, Community Urban Forestry Manager, Canopy

Replenishing the Urban Forest
Rob Casteñeda, Planting Manager, Our City Forest

Funding the Urban Forest
Michael Hawkins, Program Director, Canopy

Re-Oaking and Resilient Landscapes
Erica Spotswood, Applied Ecologist, San Francisco Estuary Institute

SURVEYING TREES WITH VOLUNTEERS

Tree Plotter

https://pg-cloud.com/Canopy/

Young Tree Care Survey

The Great Oak Count

Replenishing the Urban Forest

Rob Casteñeda

Cal Fire Grants

Avg grant size: **$150k to 1.5mil**

Total funding: $26 million

Next RFPs: Likely next winter/spring

- Greenhouse Gas Reduction Fund GGRF
- Planting, management, and urban wood reuse options
- Must be in a Disadvantaged Community (DAC)

Coastal Conservancy

Avg grant size: ?

Total funding: $3.8 million+

Next RFPs: Guidelines almost ready

- Climate adaptation

Coastal Conservancy

Urban Greening - California Natural Resources Agency

Avg grant size: $100K to $5M ; Total funding: $26M

Next RFPs: Proposals due April 11

- Parks, trees, bike paths, walkability
- Also Greenhouse Gas Reduction Fund GGRF

Environmental Enhancement and Mitigation Program

Avg grant size: $100K to $1M ; Total funding: $7M

Next RFPs: Couple months

- Multiple benefits, trees, water, climate adaptation, land conservation
- Mitigation for transportation projects

Active Transportation Program

Avg grant size: ? ; Total funding: $446M

Next RFPs: Next couple months

- Walkability, bikeability
- Parks, trails, safe-routes-to schools

Affordable Housing and Sustainable Communities

CALIFORNIA STRATEGIC GROWTH COUNCIL

Avg grant size: $1M+ ; Total funding: $255M

Next RFPs: Probably next fall

- Multiple urban greening elements are a "threshold requirement"

Other Resources and Ideas:

- City needs to invest
- Partner with a nonprofit
- Identify local allies
- Trees are green infrastructure
- City Forest Credits
- CA ReLeaf
- CAUFC
- Vibrant Cities Lab
- Prop 68

CALIFORNIA ReLEAF

Ca ufc 50 YEARS

#YesOn68 Yes on Prop 68 An investment in California's critical water supplies & natural resources.

VIBRANT CITIES LAB

RE-OAKING SILICON VALLEY

Building vibrant cities (and urban forests) with nature




Erica Spotswood, Robin Grossinger, Erin Beller, Steve Hagerty
April Robinson, Letitia Grenier, Ruth Askevold

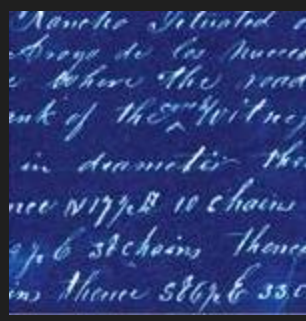
SFEI | AQUATIC SCIENCE CENTER
SAN FRANCISCO ESTUARY INSTITUTE & THE AQUATIC SCIENCE CENTER

Urban Forestry for People in a Hurry
March 9, 2018

SFEI Resilient Landscapes Program

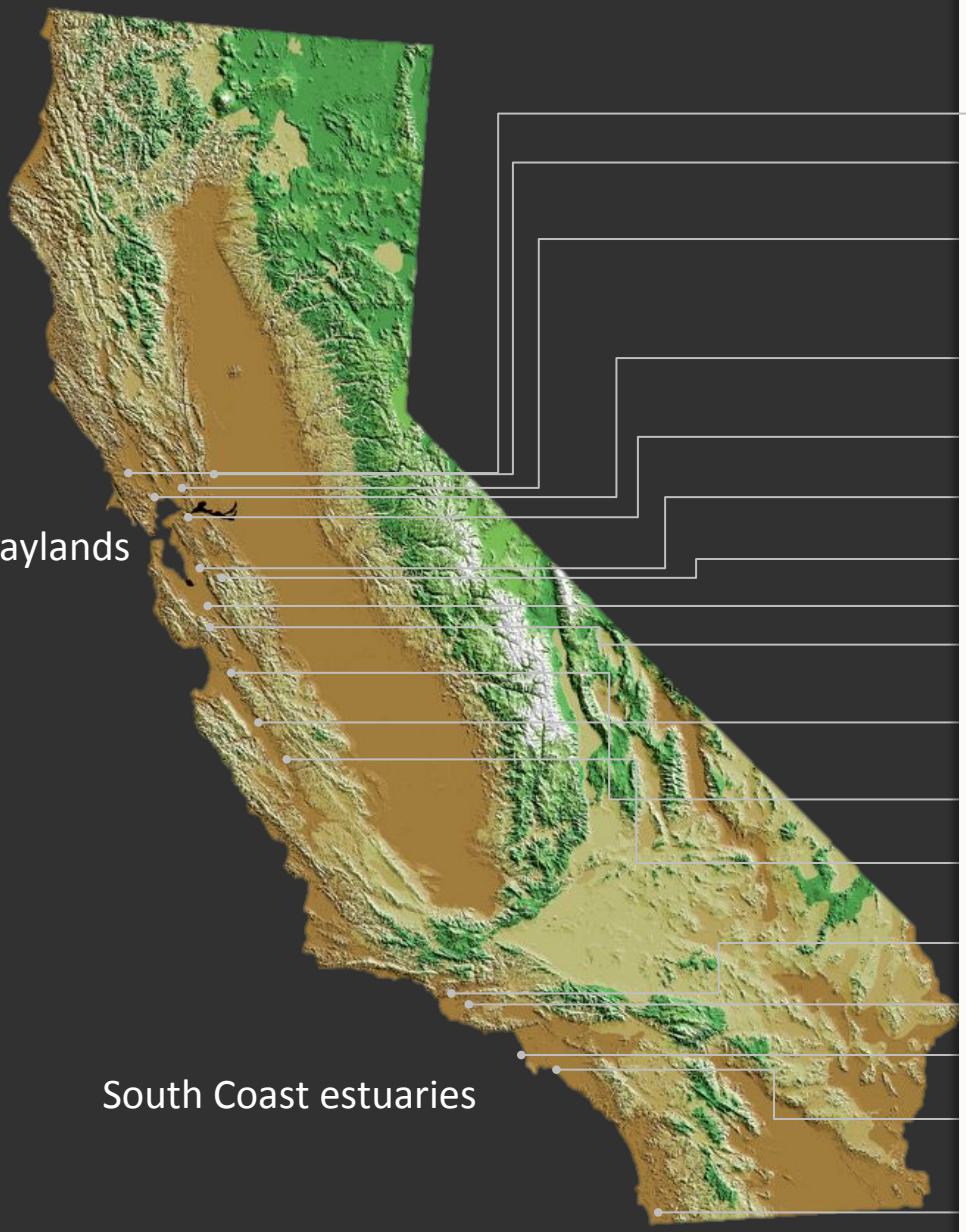
Use understanding of landscape history & change to guide forward-looking ecosystem management



- Bridge research to implementation – partnerships with academia, agencies, NGOs, industry
- Data synthesis, tool development, science translation

Many places & partnerships



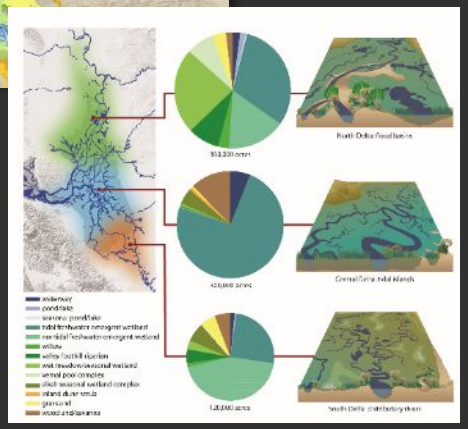
Funders

California Department of Fish and Wildlife
California Native Plant Society
City of San Jose
Committee for Green Foothills
Contra Costa County Flood Control District
Delta Conservancy
Delta Science Program
Department of Water Resources
East Bay Dischargers Authority
Exploratorium
Friends of the Napa River
Google Ecology Program
Marin County Flood Control District
Metropolitan Water District
Napa County Flood Control District
Napa County Resource Conservation District
Napa Valley Vintners
National Park Service
San Francisco Estuary Partnership
San Francisco Public Utilities Commission
Santa Clara Valley Open Space Authority
Santa Clara Valley Water District
Seed Fund
SF Bay Regional Water Quality Control Board
Sierra Club
State Coastal Conservancy
State Water Resources Control Board
The Nature Conservancy
U.S. Environmental Protection Agency

How do we get from history to resilience?

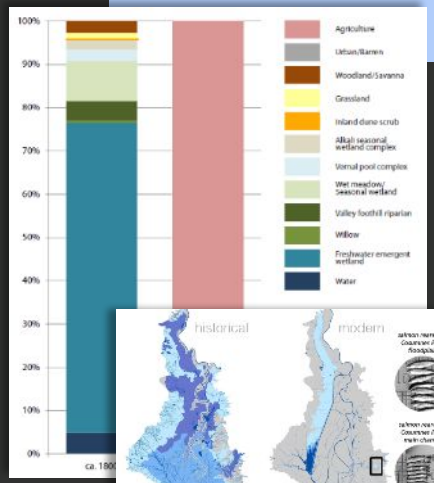
How things worked

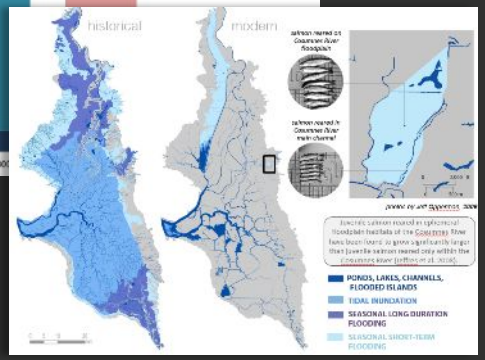
Reconstruct History



How things work now

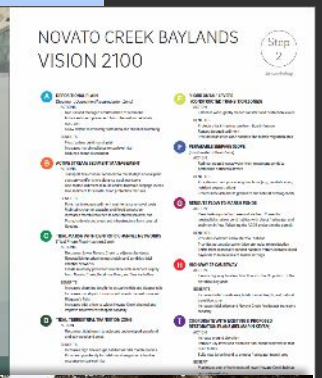
Assess Change





What's needed for resilience

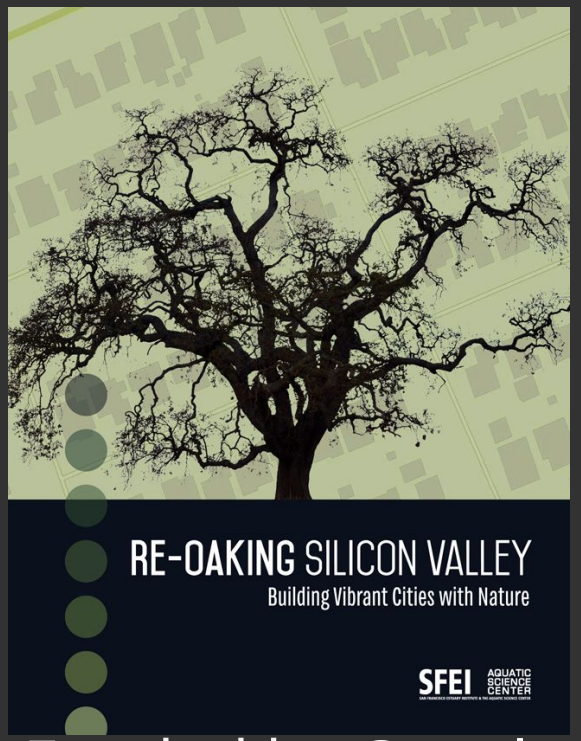
Envision Future Landscapes



Re-oaking Silicon Valley

Technical Advisory Committee

Alex Felson – Yale
Becky Chaplin Kramer – The Natural Capital Project
Blair McLaughlin – University of Idaho
Diane Pataki – University of Utah
Frank Davis – UC Santa Barbara
Janis Dickinson – Cornell University
Justin Brashares – UC Berkeley
Laurence Costello – UC Extension
Mark Shorett – ABAG
Peter Groffmann – Cary Institute/CUNY
Rick Standiford – UC Extension
Rosey Jencks –
Walt Koenig – Cornell University
Willett Moss – CMG

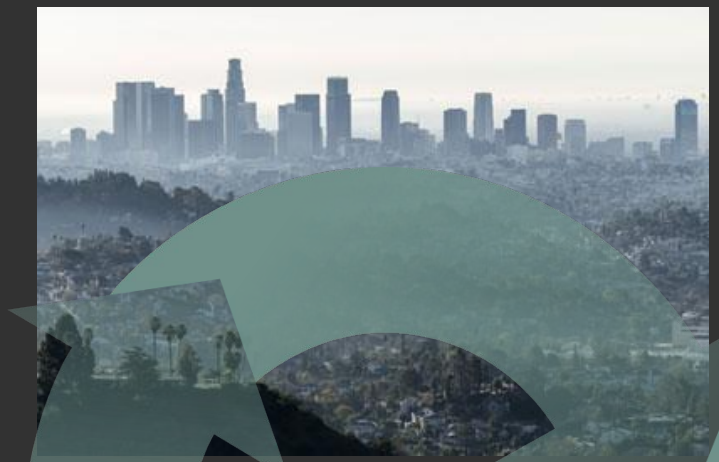


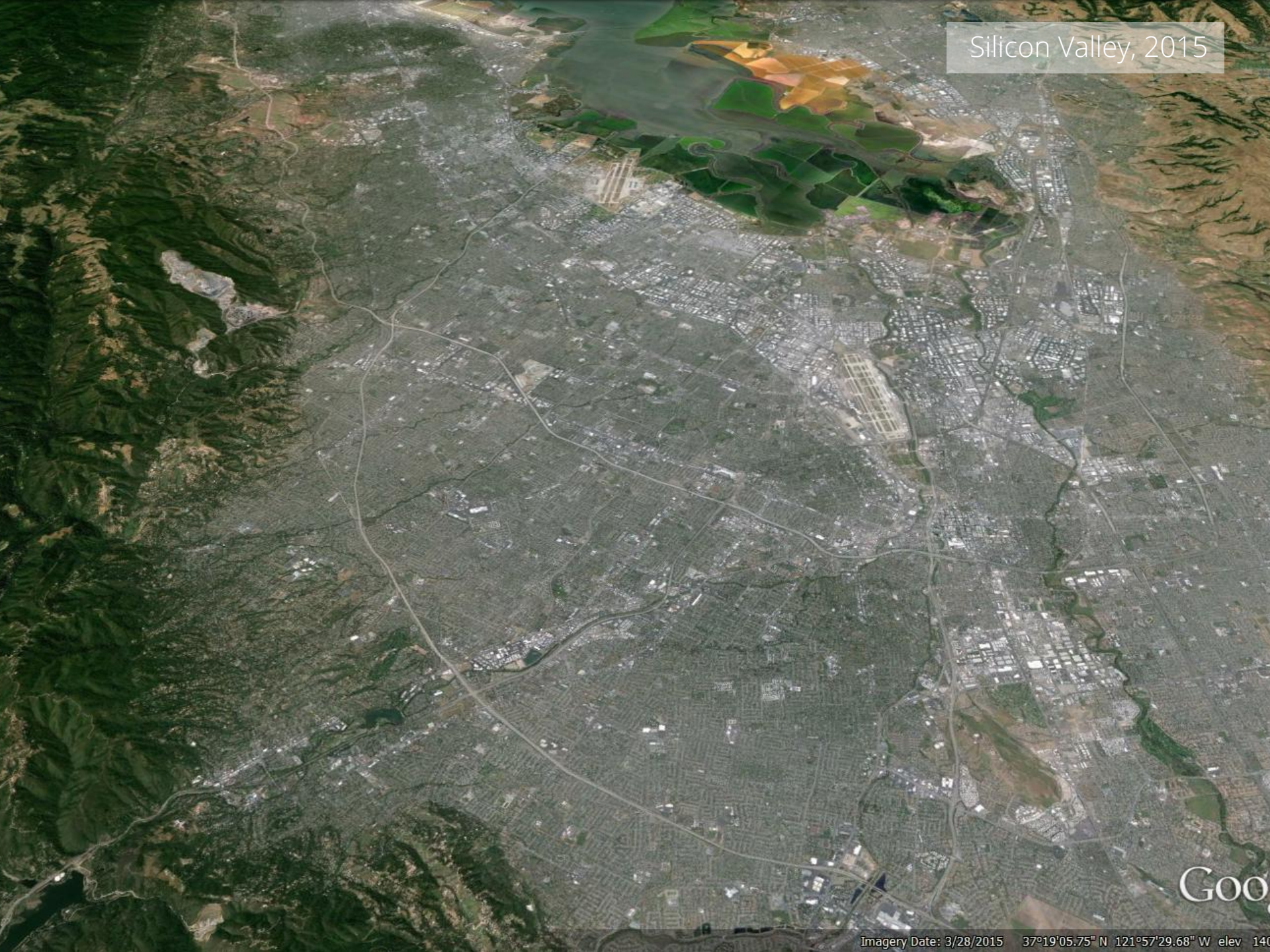
Funded by Google

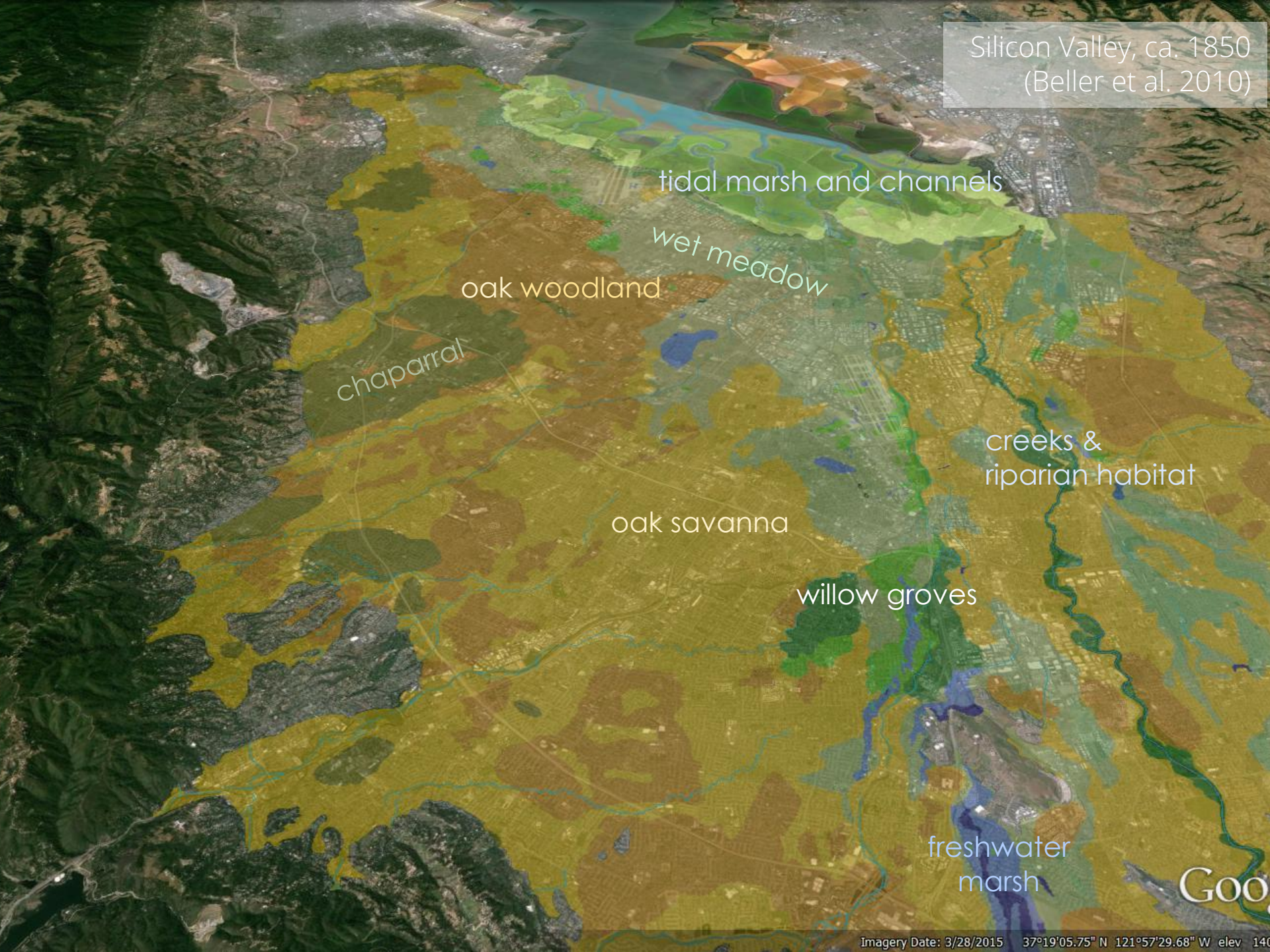
resilientsv.sfei.org

Urban forests are valuable, yet vulnerable...

...and will not easily weather coming changes.




Silicon Valley, 2015
Goo
Imagery Date: 3/28/2015 37°19'05.75" N 121°57'29.68" W elev 140


Silicon Valley, ca. 1850
(Beller et al. 2010)
tidal marsh and channels
wet meadow
oak woodland
chaparral
creeks &
riparian habitat
oak savanna
willow groves
freshwater
marsh
Imagery Date: 3/28/2015 37°19'05.75" N 121°57'29.68" W elev

Valley oaks

Largest, longest lived oaks in North America

Deciduous

Thrive in fertile alluvial soils

California oak woodlands

8.5 million ha (8% of the state)

Foundation species

- High wildlife diversity → 5,000 insects, 300 vertebrates
- Insects → 800 specialists

Dee Shea Himes

Oak trees

Many large trees

Dead limbs

Dead trees

Leaf litter

Downed logs

Miguel Vieira

Steve Zamek

Dee Shea Himes

Greg Schechter

Re-oaking Silicon Valley

How has this landscape changed over time?

What does urban landscape provide?

What actions could restore elements of this lost ecosystem?

Dee Shea Himes

Evaluating change over time

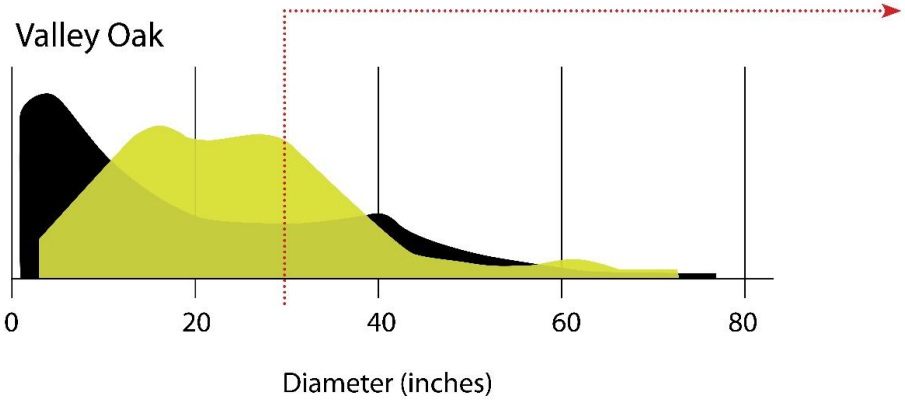
Three datasets:

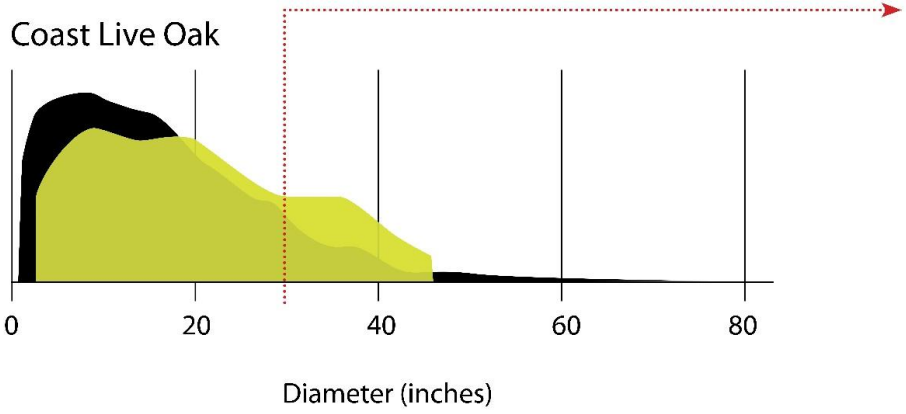
1850s - General Land Office Public Land Survey (n= 135)

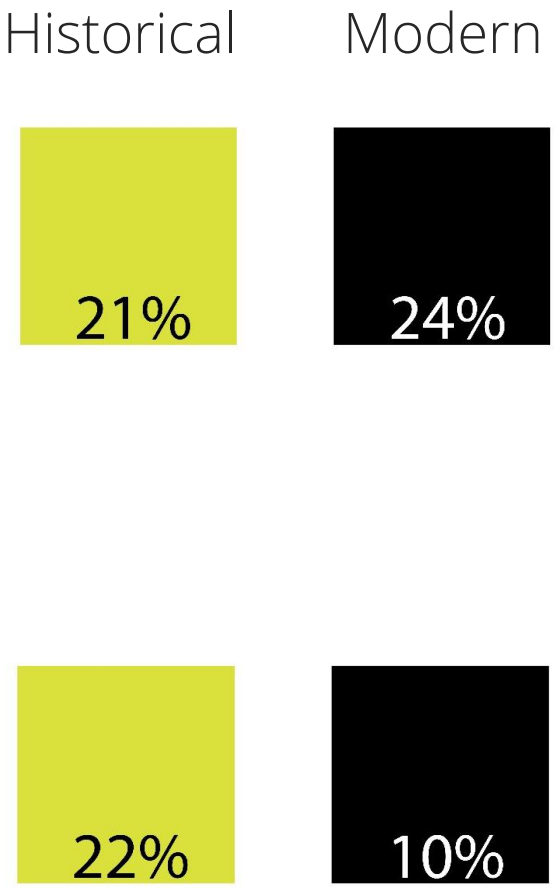
2001 - Palo Alto Oak Survey (n=8,911)

2010 - Street trees Palo Alto, Mountain View, Cupertino (82,342)

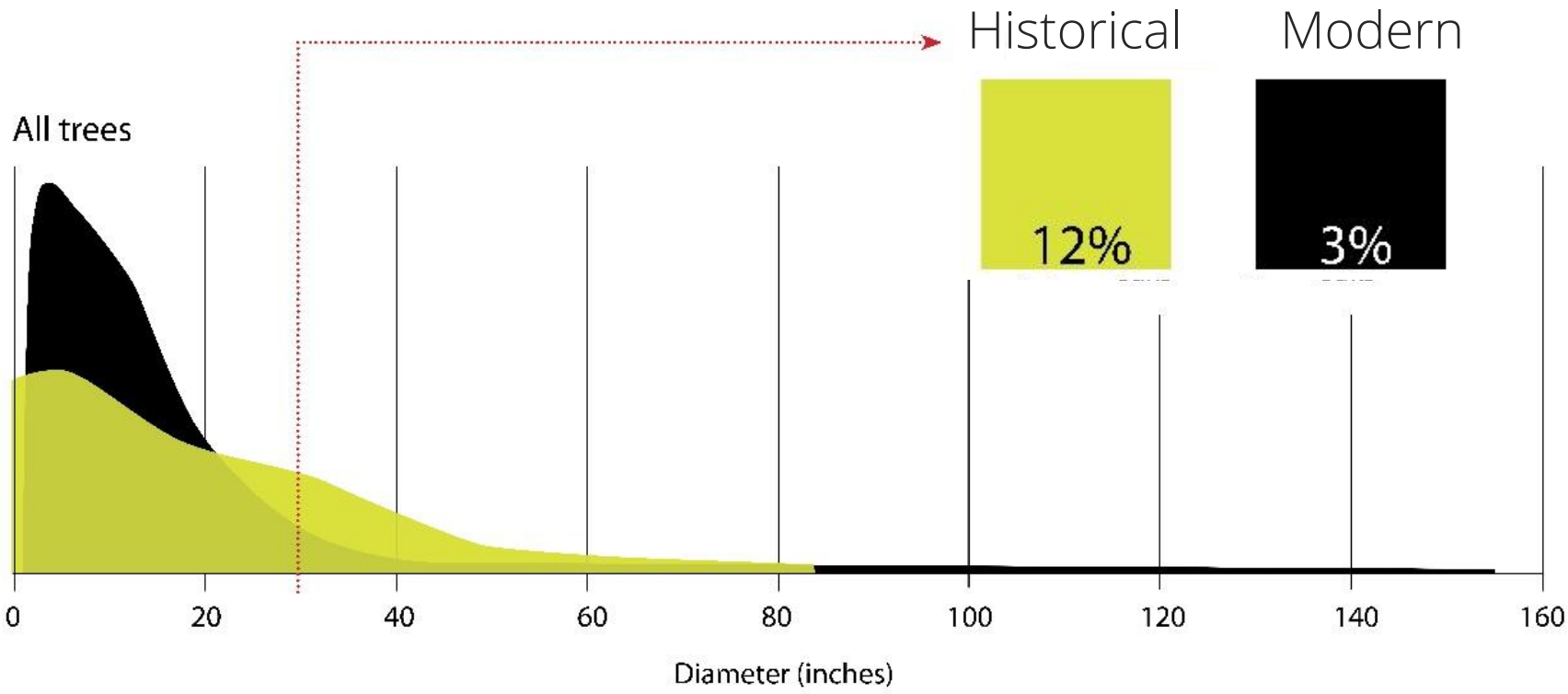
Change over time





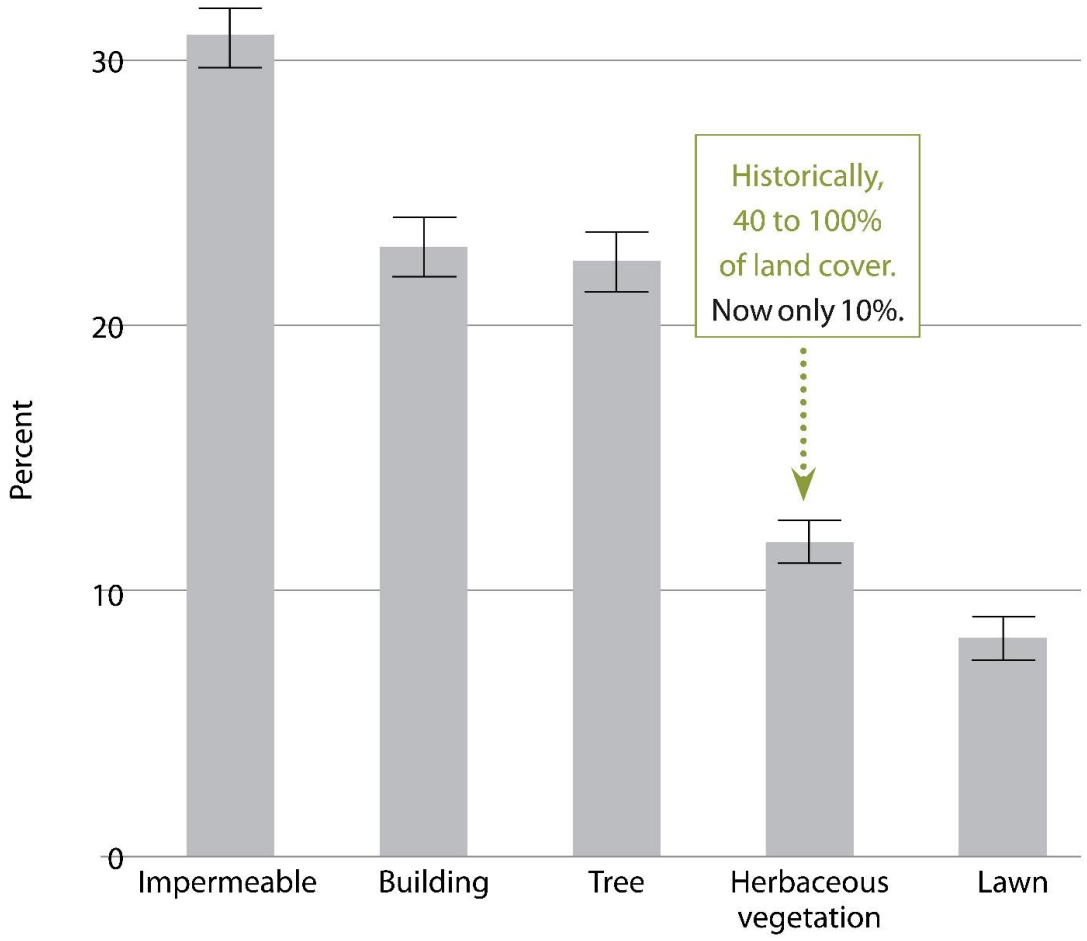


Change over time



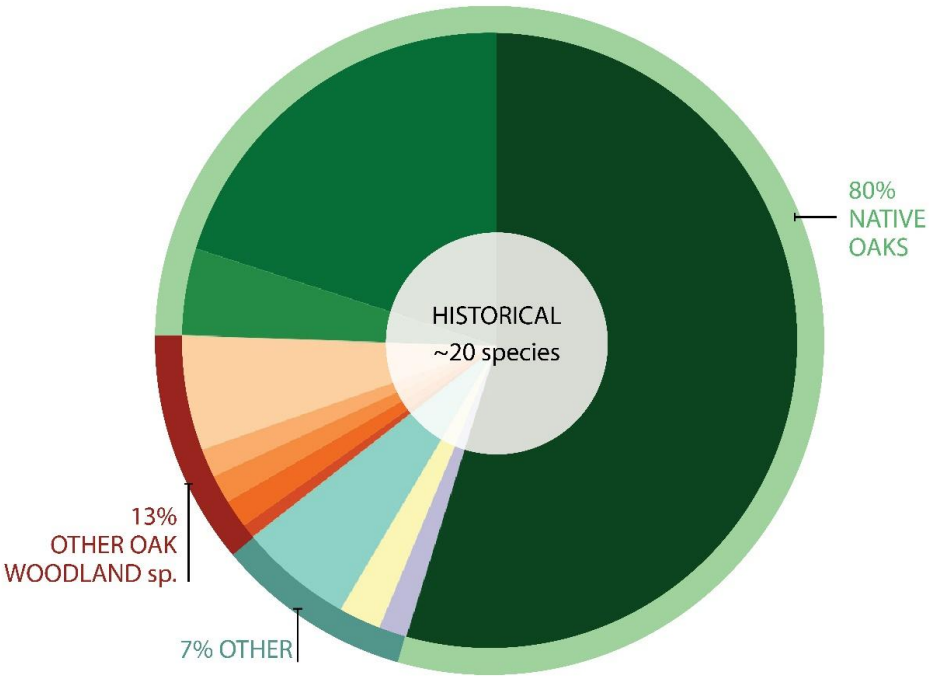
Trees over 32 inches

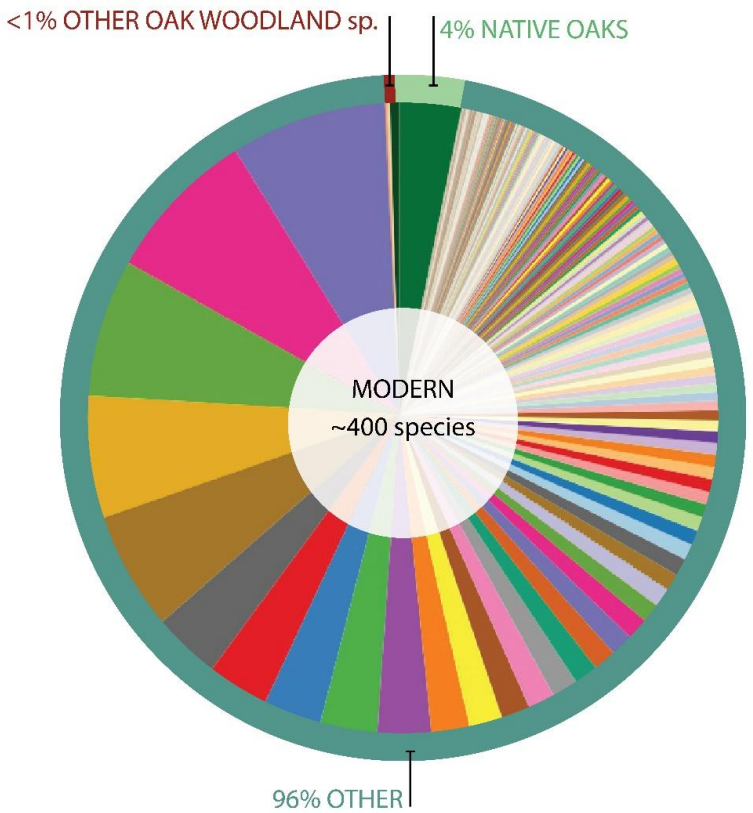
Change over time



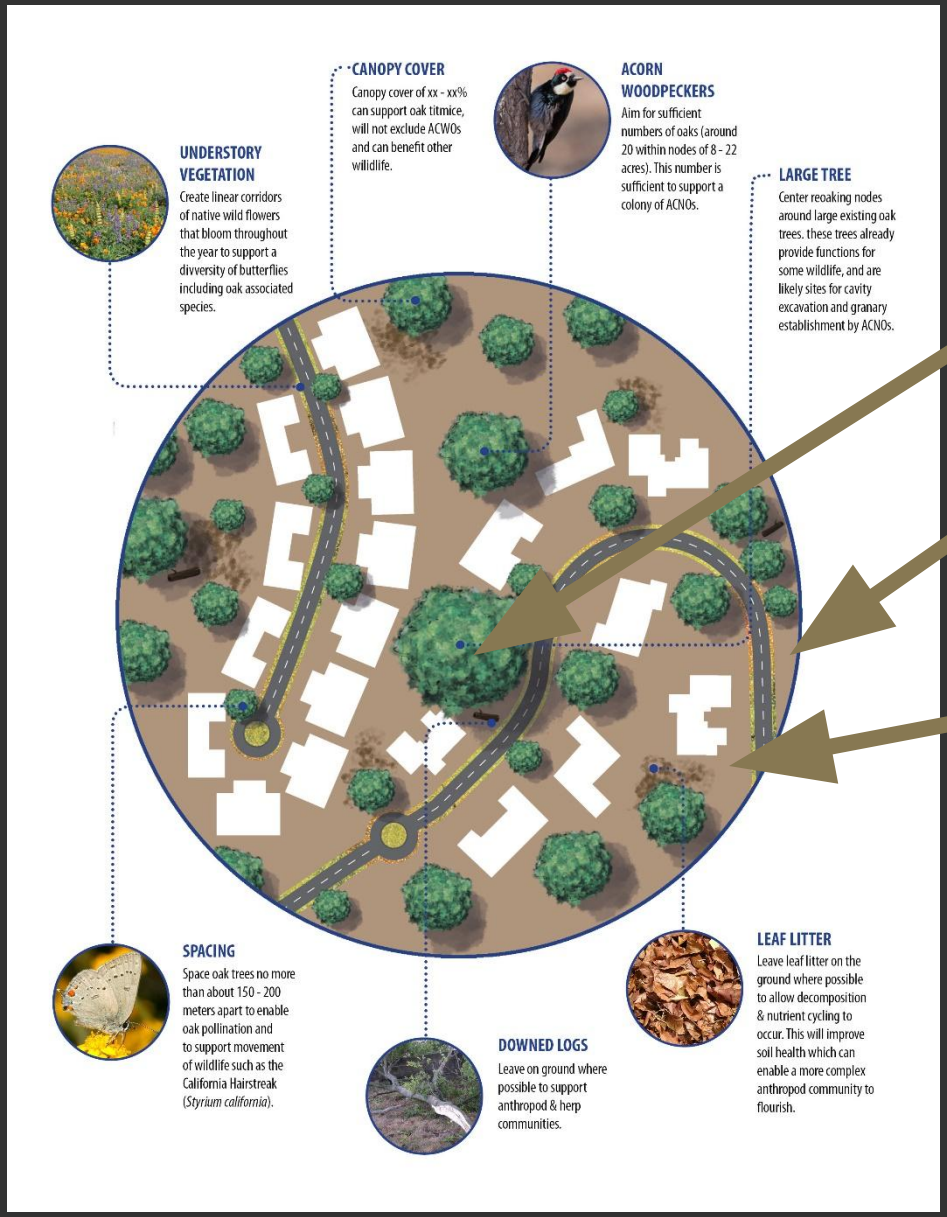
iTree Canopy

Change over time





How to Re-oak?



Center nodes around large trees

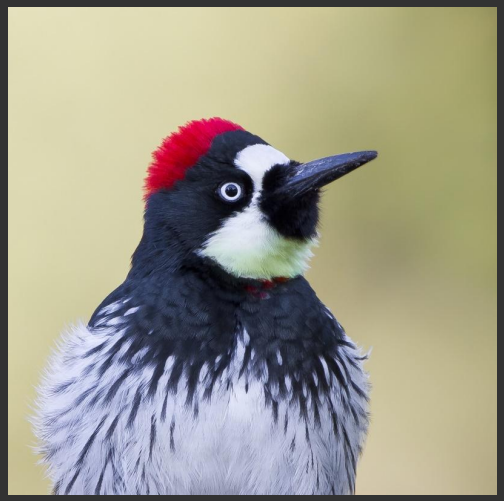
Create linear strips of herbaceous vegetation

Place trees < 500 feet apart

Aim for 20 trees within nodes

Plant multiple species of oak and other associated native trees

Benefits to biodiversity…



Acorn Woodpecker

Oak titmouse

Mournful duskywing

California sister

Crab spider

.... and people

Drought tolerant

Rainfall interception

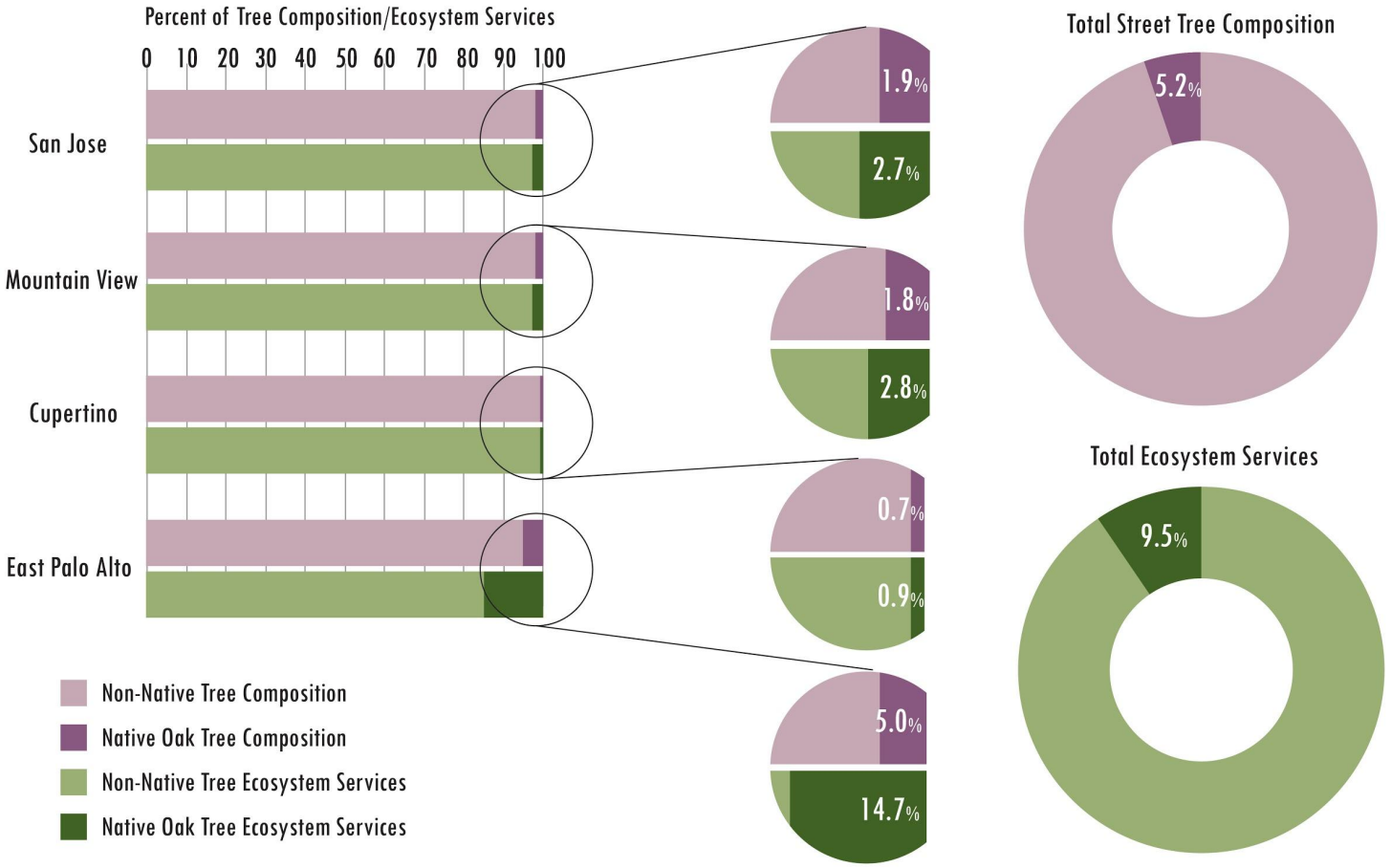
(Coast live oak)

Shade

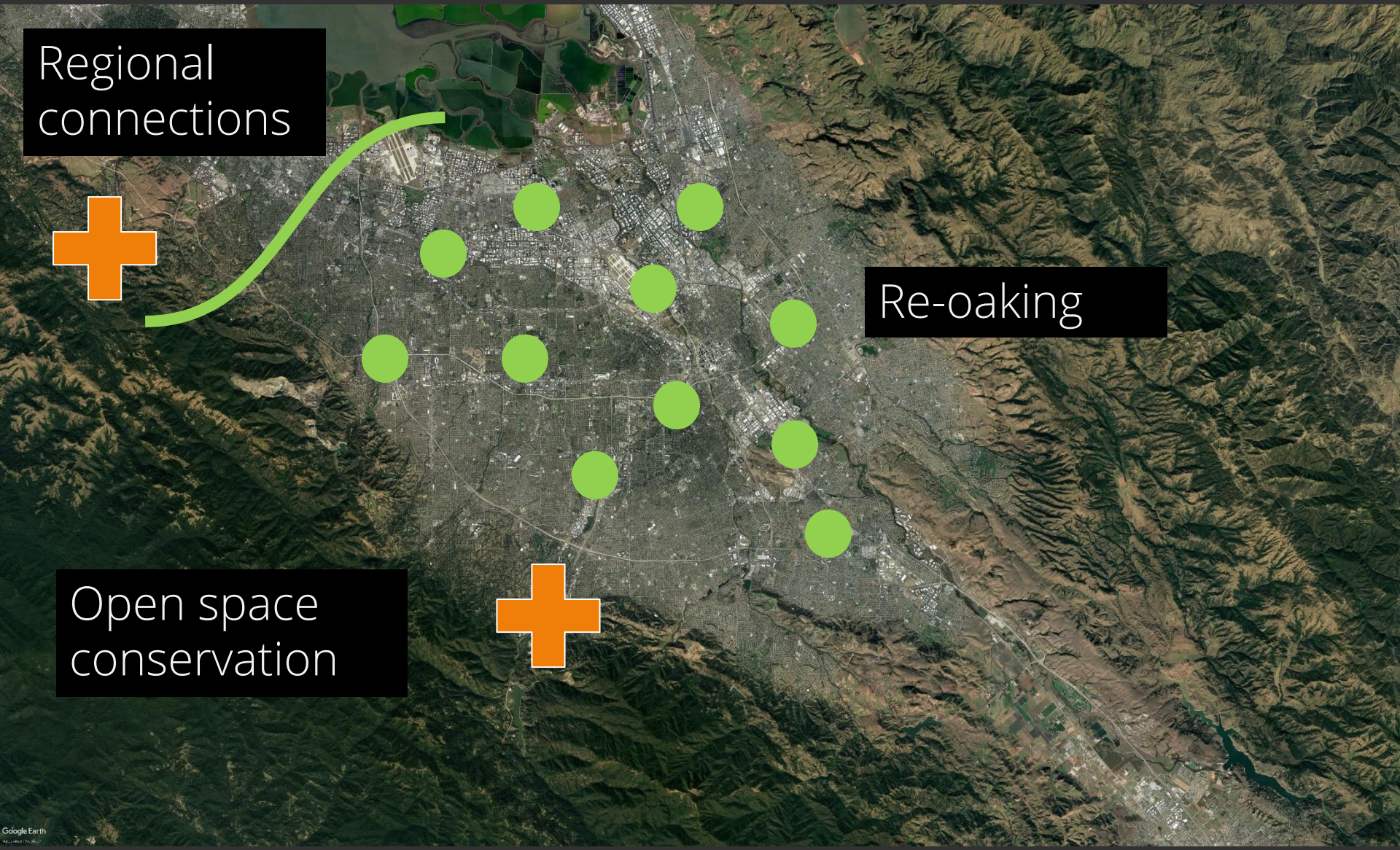
Carbon storage

Natural heritage

Ecosystem Services Provided by Native Oaks



Regional opportunities?



Thank you

Shira Bezalel

www.sfei.org/projects/resilient-silicon-valley

www.sfei.org/projects/re-oaking

Team

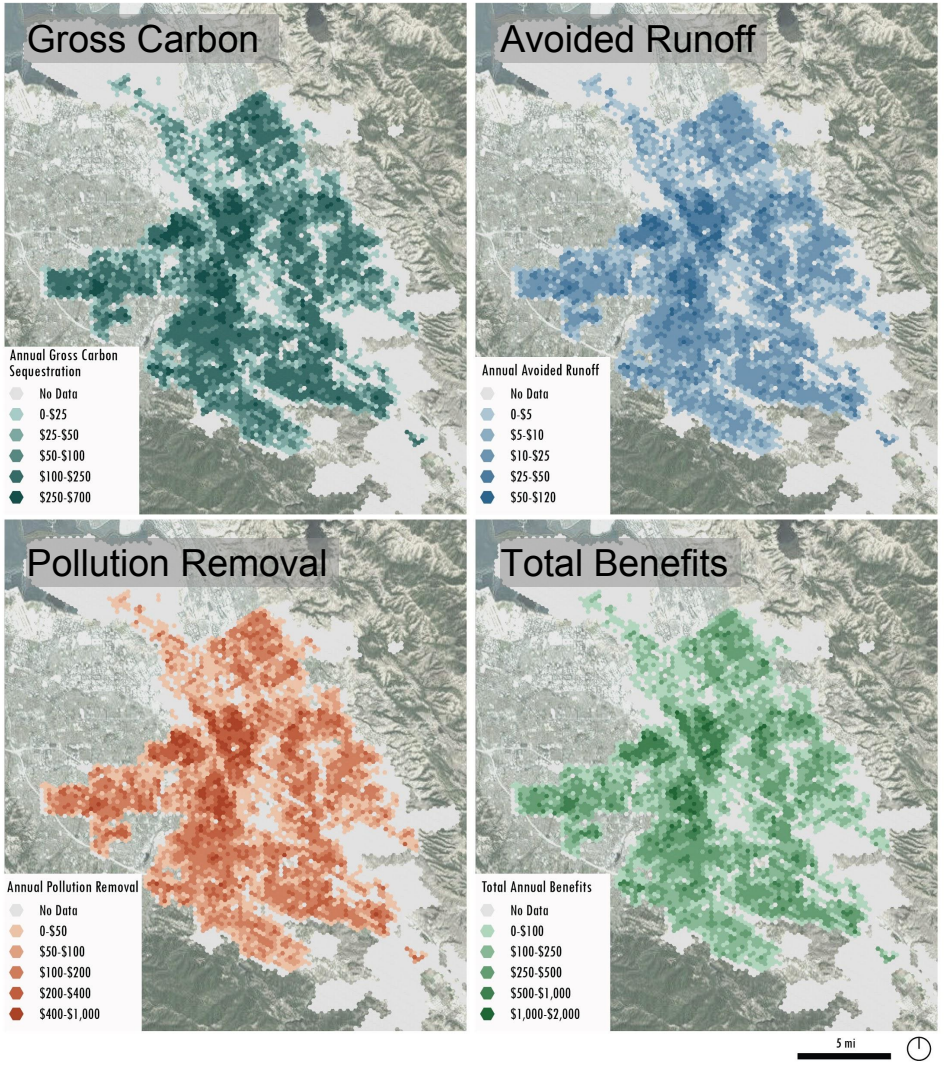
Erica Spotswood
Steve Hagerty
Robin Grossinger
Erin Beller
April Robinson
Letitia Grenier

Funder

Audrey Davenport
Google Ecology Program
Nicole Heller
Peninsula Open Space Trust

Distribution of Ecosystem Services

- The spatial distribution of ecosystem services is consistent across services provided.
- Hot spots of total annual benefits: central San Jose residential areas, some riparian corridors
- Cold spots of total annual benefits: undeveloped areas, hillsides, tidal marsh, and San Jose airport.



"Exposure to and connection with nature is increasingly recognized as providing significant well-being benefits for adults and children."

Hand et al. PNAS 2017

PNAS

The importance of urban gardens in supporting children's biophilia

Kathryn L. Hand[a,1], Claire Freeman[b], Philip J. Seddon[a], Mariano R. Recio[a], Aviva Stein[b], and Yolanda van Heezik[a]

[a]Department of Zoology, University of Otago, Dunedin 9016, New Zealand; and [b]Department of Geography, University of Otago, Dunedin 9016, New Zealand

Edited by Susan Hanson, Clark University, Worcester, MA, and approved November 23, 2016 (received for review June 24, 2016)

Exposure to and connection with nature is increasingly recognized as providing significant well-being benefits for adults and children. Increasing numbers of children growing up in urban areas need access to nature to experience these benefits and develop a nature connection. Under the biophilia hypothesis, children should innately

Second, lack of early connection to nature might result in loss of motivation to protect nature (17). Children's early experiences are crucial in establishing a lifelong connection to nature (18). Reports of children expressing fear of nature (19), and their inability to name common wildlife species (20), are indicators of a growing

Next steps – Urban Ecology at SFEI

- Framework for coordinated urban greening for biodiversity in cities
- Linking cities to their surrounding landscapes

Urban Tree Canopy and Human Health

Cindy Blain

Rx:
Urban Tree Canopy & Human Health

Urban Forestry for People in a Hurry
March 9, 2018

Cindy Blain
Executive Director

CALIFORNIA ReLEAF

Rx: 3 Take-Aways

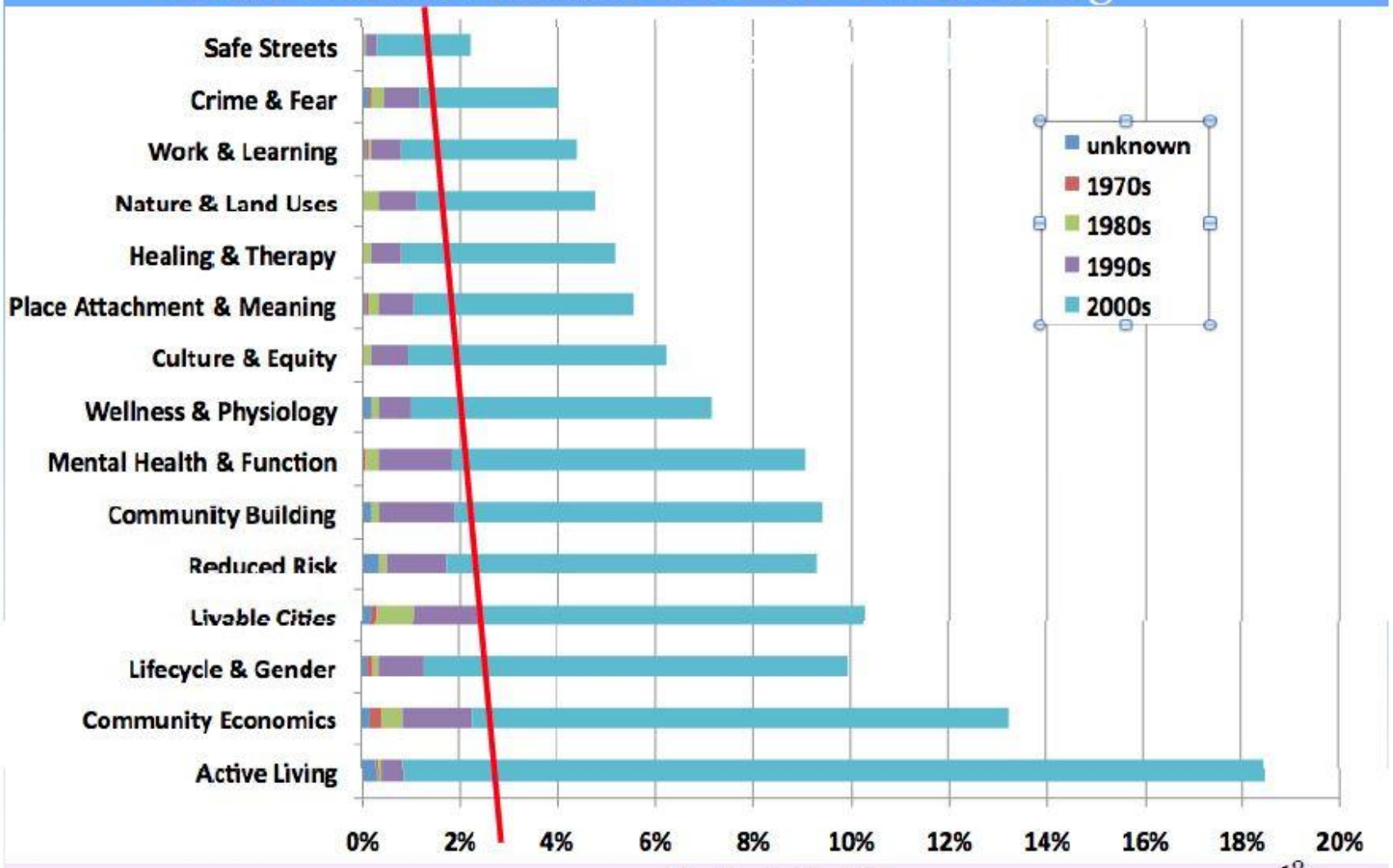
1. Urban Trees = Critical to Health: **95%**
2. Climate Change → Extreme Heat
3. Green City Design is Imperative


iCredit

Rx: Health Inequities

Dr. Kathy Wolf

Urban Green :: Human Health & Well Being



Rx: Two Research Projects

GreenRx

SACRAMENTO TREE FOUNDATION

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION CAL FIRE SINCE 1885

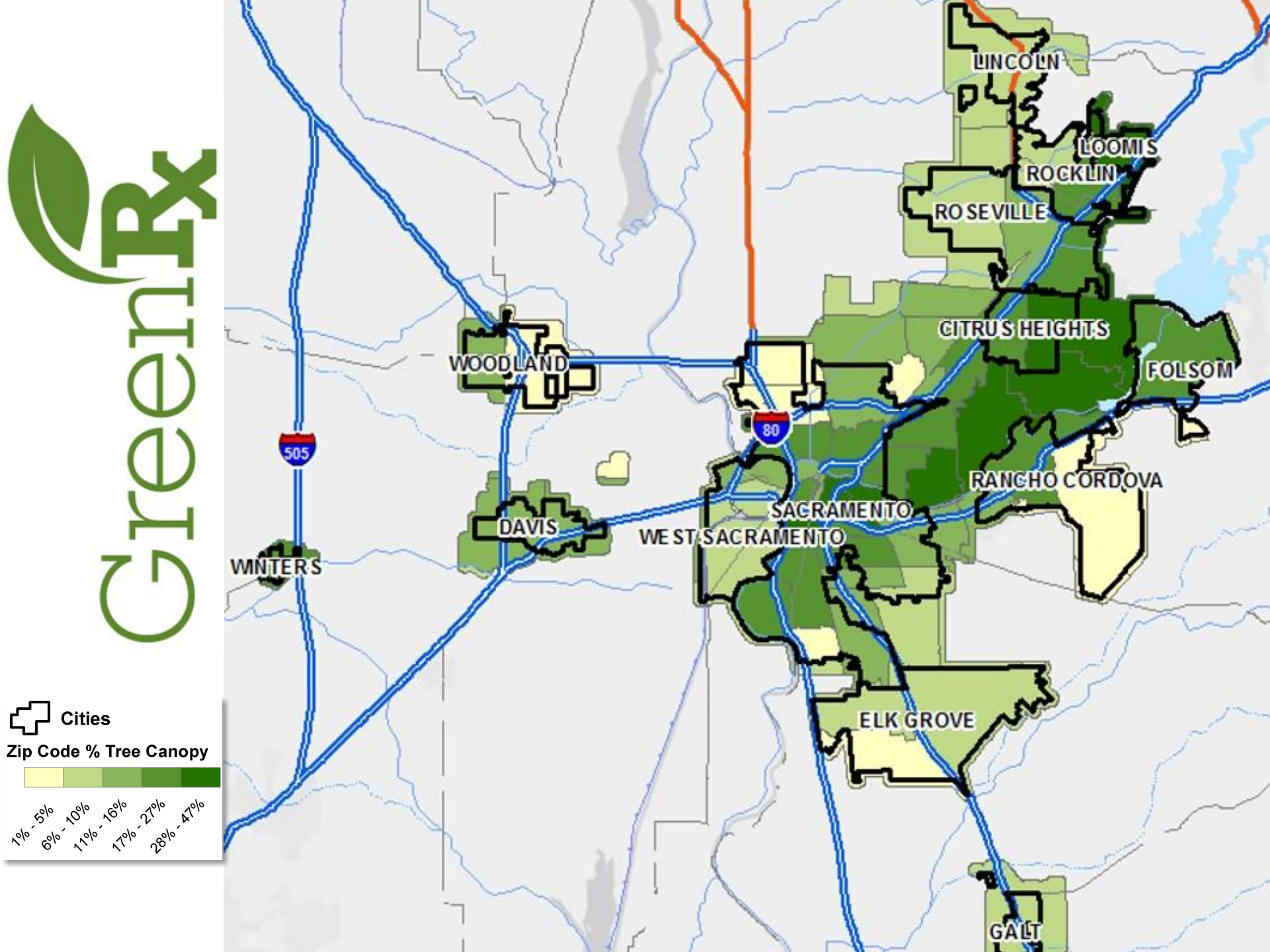
UD4H URBAN DESIGN 4 HEALTH

Tree$ ROI

ILLINOIS UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

KAISER PERMANENTE® DIVISION OF RESEARCH | Northern California

FOREST SERVICE US DEPARTMENT OF AGRICULTURE


GreenRx
LINCOLN
LOOMIS
ROCKLIN
ROSEVILLE
CITRUS HEIGHTS
FOLSOM
WOODLAND
80
505
RANCHO CORDOVA
SACRAMENTO
DAVIS
WEST SACRAMENTO
WINTERS
ELK GROVE
GALT
Cities
Zip Code % Tree Canopy
1% - 5%
6% - 10%
11% - 16%
17% - 27%
28% - 47%

Multiple Measures

- Asthma
- Attention Deficit Disorder
- Cardiovascular disease
- General health
- Mental / Emotional health
- Overweight / Obesity
- Physical activity
- Social cohesion
- Type 2 diabetes

The Findings

More neighborhood tree canopy cover was **significantly associated** with:

- **Better General Health Score**
- **Less Overweight / Obesity**
- **Higher Social Cohesion**

Contents lists available at ScienceDirect

Health & Place

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

Multiple health benefits of urban tree canopy: The mounting evidence for a green prescription

Jared M. Ulmer [a,*], Kathleen L. Wolf [b], Desiree R. Backman [c], Raymond L. Tretheway [d], Cynthia JA Blain [e,1], Jarlath PM O'Neil-Dunne [f], Lawrence D. Frank [g]

[a] Urban Design 4 Health, 353 Rockingham St., Rochester, NY 14620, USA
[b] University of Washington, College of the Environment, Box 352100, Seattle, WA 98195-2100, USA
[c] California Department of Health Care Services, P.O. Box 997413, MS 0000, Sacramento, CA 95899-7413, USA
[d] Sacramento Tree Foundation, 191 Lathrop Way Suite D, Sacramento, CA 95815, USA
[e] California ReLeaf, 2112 Tenth Street, Sacramento, CA 95818, USA
[f] University of Vermont, 81 Carrigan Drive, Aiken Center, Room 205E, Burlington, VT 05405, USA
[g] Urban Design 4 Health & University of British Columbia, 235-1933 West Mall, Vancouver, BC, Canada V6T 1Z2

ARTICLE INFO

Article history:
Received 26 April 2015

ABSTRACT

The purpose of this study was to enhance the understanding of the health-promoting potential of trees in

GreenRx 10% More Tree Cover

What health differences do we see?

Adult Health Measure	Improvement
Overweight/obese	-19%
Type 2 diabetes	-19%
Current asthma	-10%
High blood pressure	-7%
General Health	+3%
Social Cohesion	+1%

Source:J Ulmer et al, Multiple health benefits of urban tree canopy, Health & Place

More Info on GreenRx: http://www.sactree.com/greenrx

Thinking outside the….

Dr. Backman connects CHIS to Canopy data

Big picture: Multiple Health Measures

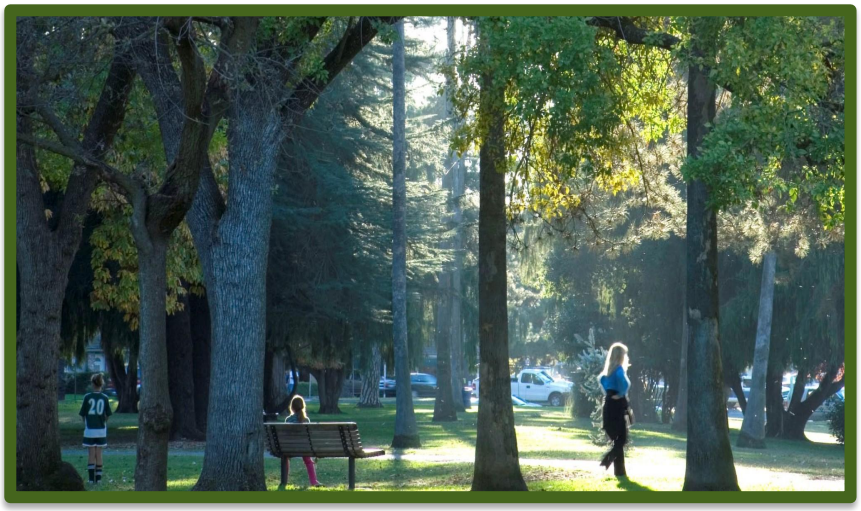
Big picture: Advisory Committee

Hi Res Data: CHIS & LIDAR

Not just p-values: Predictive Modeling

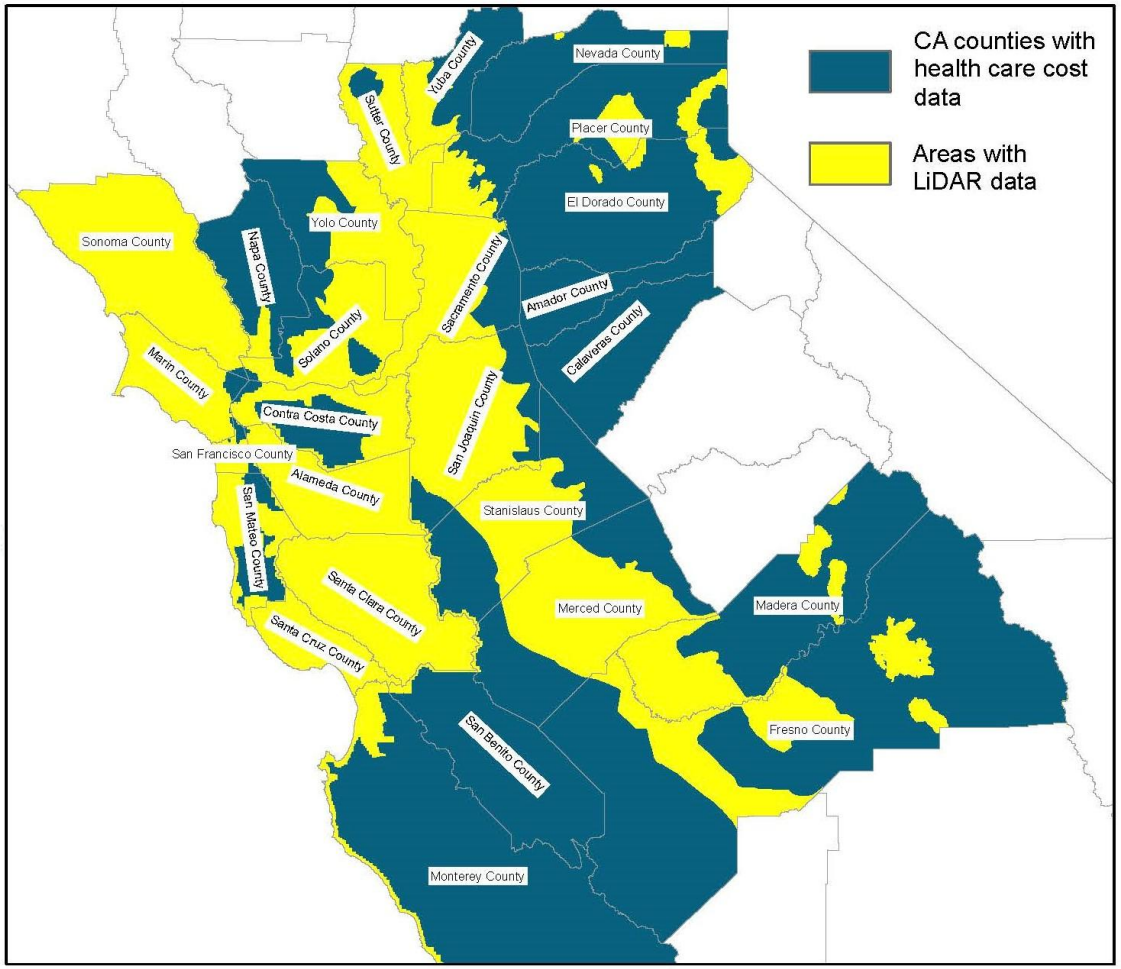
TBD: Health Economics Analysis

Ray Tretheway hires DrPH



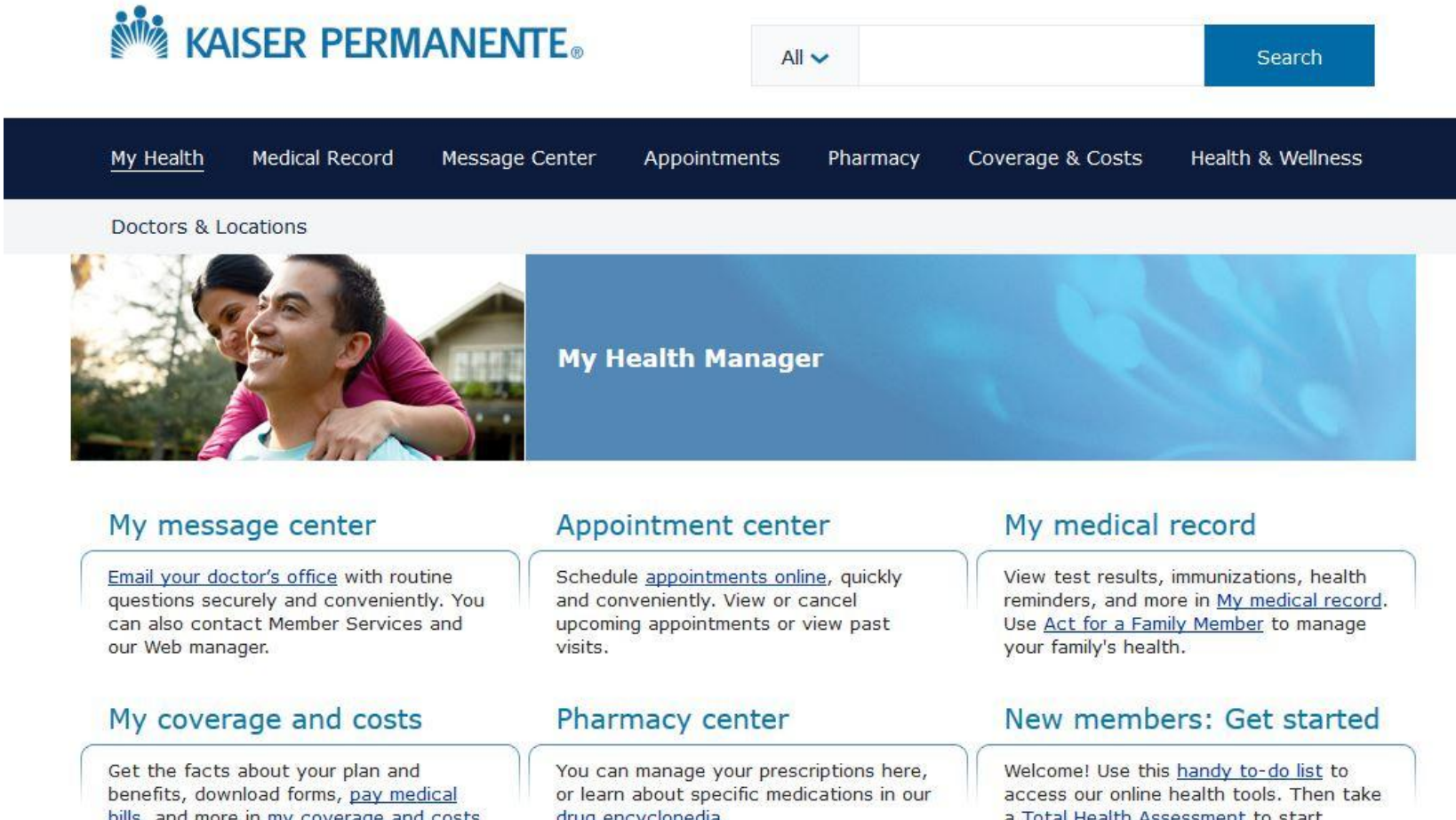
Tree$ ROI: The Next Steps

Larger Region



Tree$ ROI: The Next Steps

Actual Health Care Costs



Tree$ ROI: The Next Steps

Health Care vs $ Tree Care $

Photo credit: West Coast Arborists, Inc.

Rx: Climate Change

California Heat Wave of 2006: LA County

- 16,166 excess Emergency Room visits
- 1,182 excess hospitalizations
- acute kidney failure, cardiovascular diseases, diabetes, electrolyte imbalance

Rx: Climate Change

A “public health focus was the most likely to elicit emotional reactions consistent with support for climate change mitigation and adaptation”

Source: Myers, T.A., Nisbet, M.C., Maibach, E.W., Leiserowitz, A.A. (2012). A public health frame arouses hopeful emotions about climate change. Climatic Change 113: 1105-1112. (http://link.springer.com/article/10.1007%2Fs10584-012-0513-6)

Rx: Resources

- **Green Cities: Good Health**
  http://depts.washington.edu/hhwb/
- **Vibrant Cities Lab**
  https://www.vibrantcitieslab.com/
- **Why Trees?**
  http://californiareleaf.org/whytrees/

Rx: …Beyond the Box again

Thank you!
Questions?

Cindy Blain
cblain@CaliforniaReLeaf.org
916.497.0034

CALIFORNIA ReLEAF

Supervisor Joe Simitian

County of Santa Clara

Thank You!

Questions? Email Michael Hawkins, michael@canopy.org