



Welcome to

Enchantment Under the Sea

P3S Signature Event

Photo Credit: "The new Pacific Vision wing at the Aquarium of the Pacific, Long Beach, CA © 2019 Tom Bonner"

Sustainability & Resilience

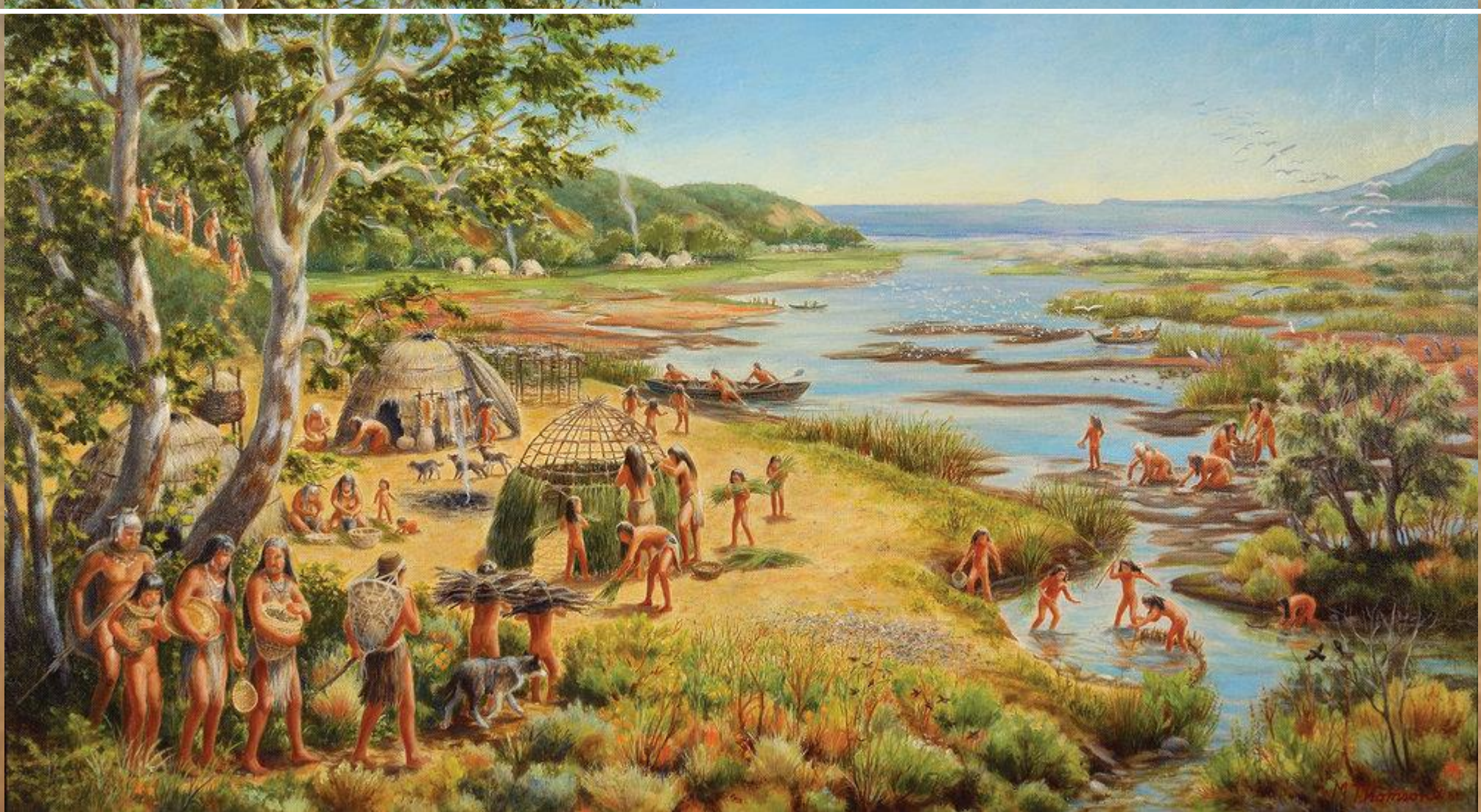
at the *Aquarium of the Pacific*



Jennifer Lentz, Ph.D.

LEED Green Associate, EcoDistricts AP

Living in Harmony **with** Nature



“Wiyot’s Children” by Mary Leighton Thomson, depicting life of the Tongva people before the Spanish arrived in the 1800s.

Photo courtesy of the Friends of Ballona Wetlands

Orange County Archives

Los Angeles

Pasadena

Downey

Compton

Signal Hill

Long Beach

Anaheim

Huntington Beach

Newport

San Pedro

Torrance

El Segundo

Riverside

1920s

Orange County Archives

1920s

Los Angeles

Pasadena

Downey

Compton

Signal Hill

Long Beach

Torrance

San Pedro

Huntington Beach

Newport

Anaheim

Riverside

Orange County Archives

1920s

Los Angeles

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Compton

Signal Hill

Long Beach

Torrance

San Pedro

Huntington Beach

Newport

Anaheim

Riverside

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Orange County Archives

San Francisco

San Jose

San Diego

Los Angeles

Pasadena

San Bernardino

Orange

San Pedro

Long Beach

Huntington Beach

Newport

1920s

Orange County Archives

San Francisco

San Jose

San Diego

Los Angeles

Pasadena

San Bernardino

Orange

San Pedro

Long Beach

Huntington Beach

Newport

1920s

Orange County Archives

1920s

Map of Southern California, 1920s, showing major cities and geographical features.

Key locations labeled on the map include:

- San Francisco
- San Diego
- Los Angeles
- Pasadena
- San Bernardino
- Orange
- Fullerton
- Anaheim
- Huntington Beach
- Newport Beach
- Long Beach
- Compton
- Downey
- Signal Hill
- Torrance
- El Segundo
- San Pedro
- Los Angeles Harbor
- Fish Harbor
- San Juan Capistrano
- San Gabriel
- San Jose
- San Luis Obispo
- San Marcos
- San Ramon
- San Rafael
- San Francisco
- San Jose
- San Luis Obispo
- San Marcos
- San Ramon
- San Rafael

[illegible]

This is a detailed historical map of Southern California, likely from the 1920s as indicated by the caption. The map shows the coastal region from San Diego in the south to San Francisco in the north. Major cities are prominently labeled in large, bold letters: Los Angeles, Pasadena, San Diego, Long Beach, and Anaheim. Other cities shown include San Bernardino, Fontana, Redlands, and Orange. The map also depicts the San Gabriel Mountains, the San Joaquin Hills, and the Pacific Ocean coastline. Numerous smaller towns and cities are labeled throughout the region, such as San Jose, Santa Clara, and Fresno. The map uses a color palette typical of early 20th-century cartography, with greens for land, blues for water, and browns for mountains. The overall style is that of a vintage educational or reference map.

Orange County Archives

1920s

Los Angeles

Pasadena

Downey

Compton

Signal Hill

Long Beach

Anaheim

Huntington Beach

Newport

San Pedro

Torrance

El Segundo

Riverside

[illegible]

Orange County Archives

1920s

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1920s

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Riverside



1920s



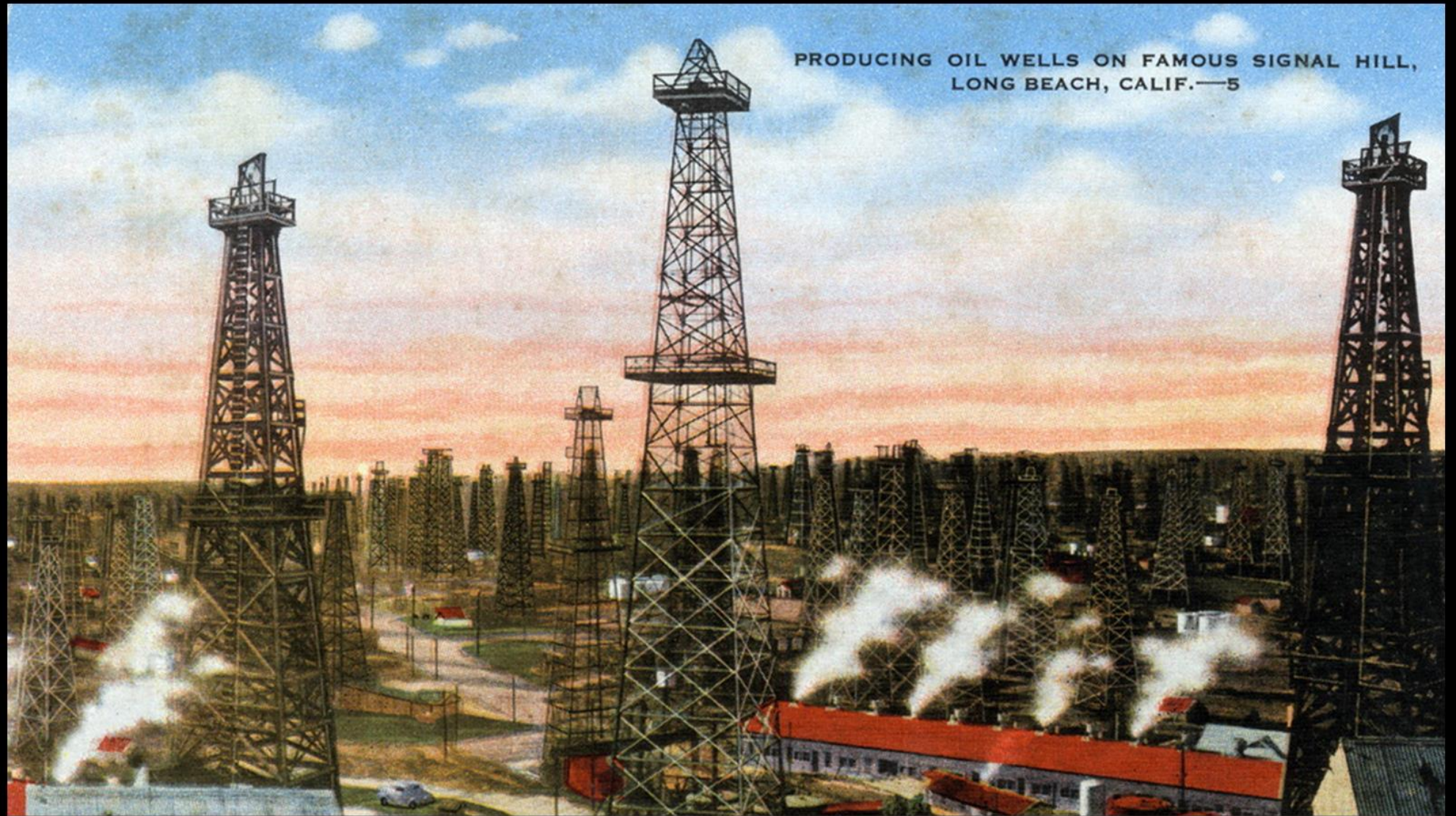
Santa
Monica

El Segundo

Torrance

San
Pedro

1920s



Circa 1926 postcard of Signal Hill. Courtesy of the Werner Von Boltensstern Postcard Collection, Department of Archives and Special Collections, Loyola Marymount University Library.



Santa Monica

Los Angeles

El Segundo

Torrance

San Pedro

Compton

Signal Long

Pasadena



Courtesy of Los Angeles Public Library Photo Collection

Orange County Archives

Santa
Monica

Los Angeles

El Segundo

Torrance

San
Pedro

Compton

Signal

Long

Pasadena



Google Earth 3D Rendering of Present Day.

Santa
Monica

Los Angeles

El Segundo

Torrance

San
Pedro

Pasadena

March 2, 1938

Flooding at West 43rd Place & 11th Avenue

Photo Courtesy of the Los Angeles Times

Riverside

Laguna
Beach

Santa
Monica

El Segundo

Torrance

San
Pedro

1948



**Edward Koehn, Chief of flood control design for the LA district,
explains the model to colleagues**

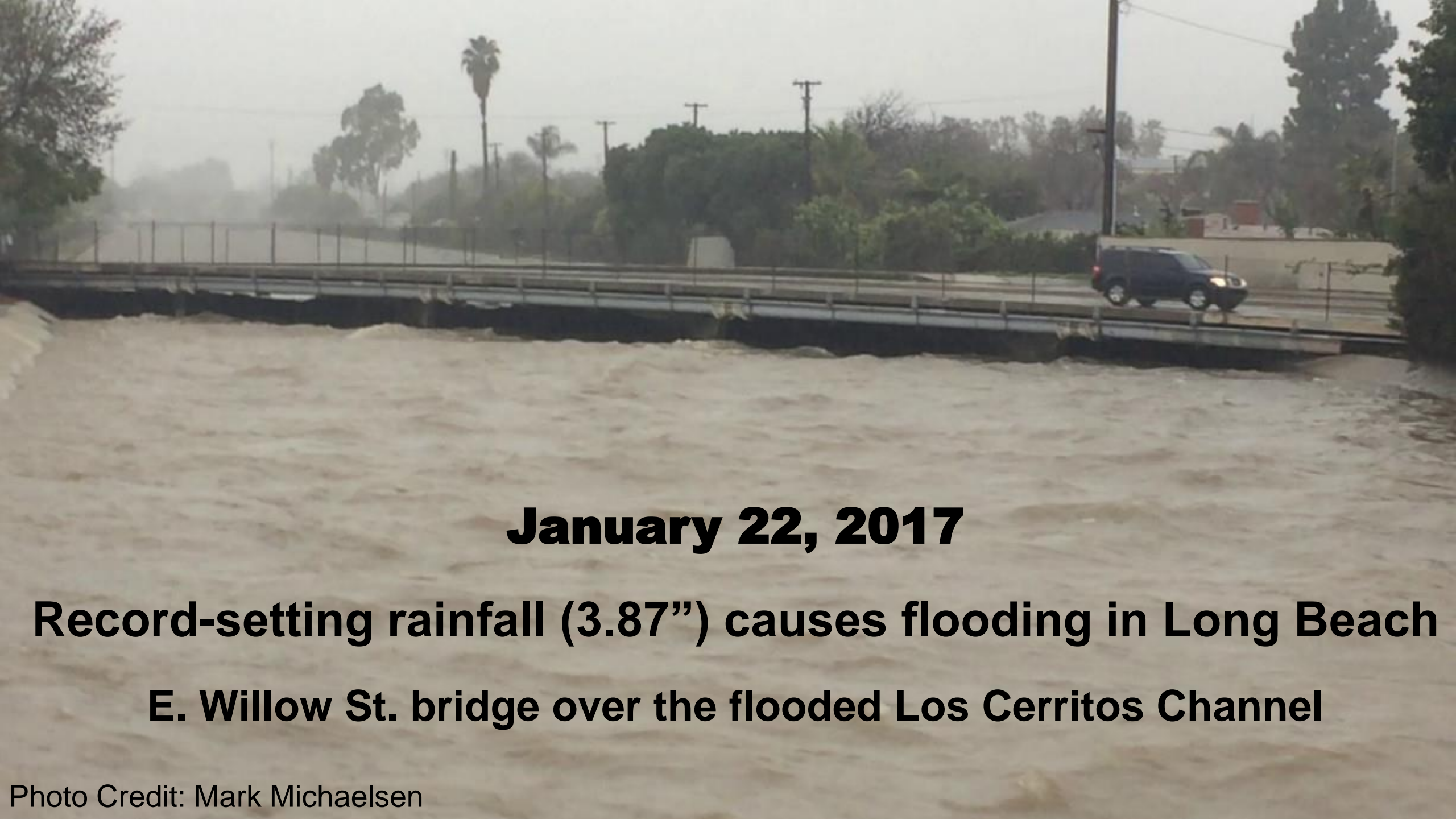
Photo Courtesy of the Los Angeles Public Library

Riverside

Laguna
Beach



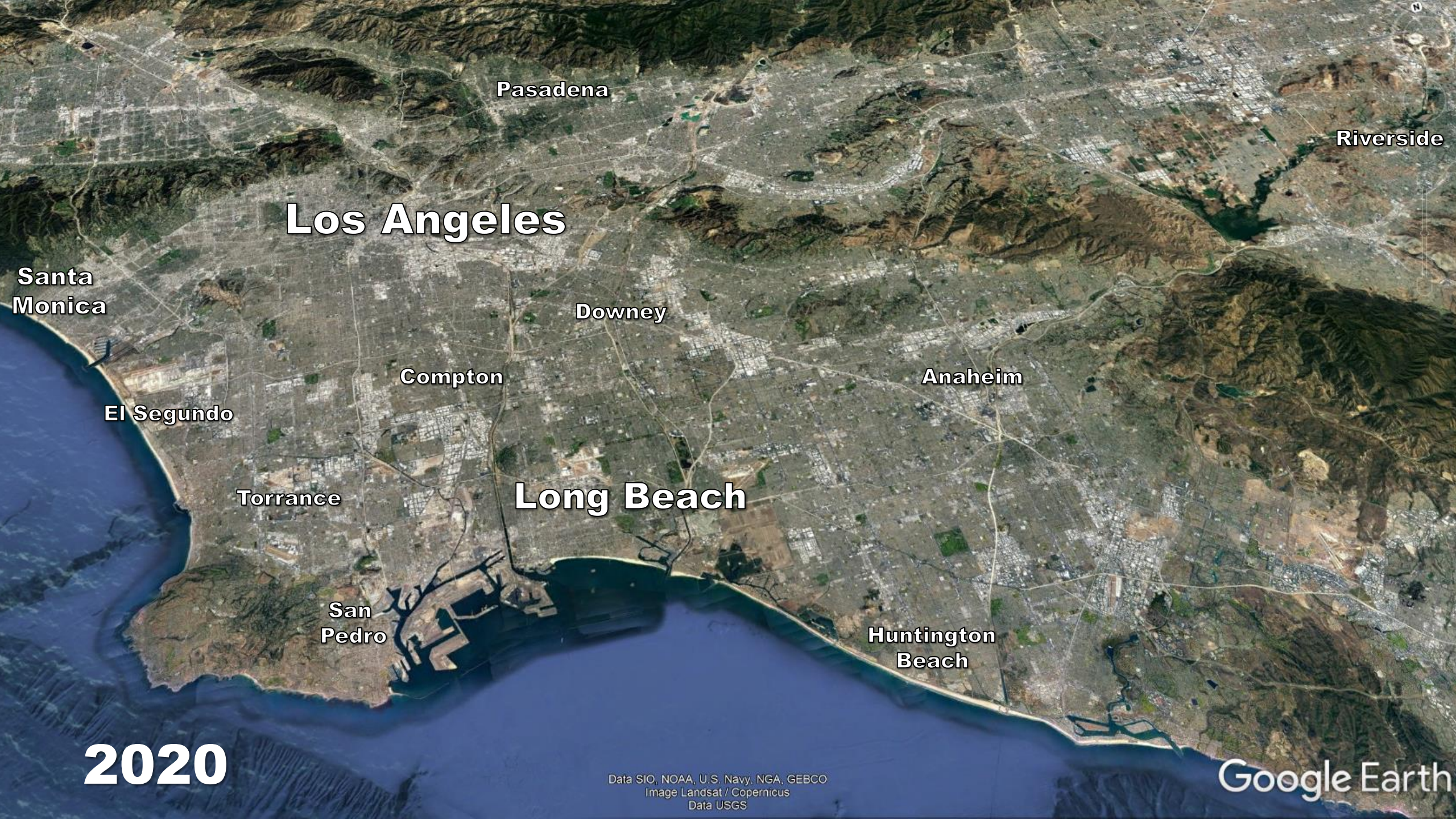
Los Cerritos Channel



January 22, 2017

Record-setting rainfall (3.87") causes flooding in Long Beach

E. Willow St. bridge over the flooded Los Cerritos Channel



Pasadena

Riverside

Los Angeles

Santa
Monica

Downey

Compton

Anaheim

El Segundo

Torrance

Long Beach

San
Pedro

Huntington
Beach

2020


Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
Data USGS

Google Earth


Primary **Climate Change Impacts** for Long Beach



**Extreme
Heat**



**Drought
& Water Scarcity**

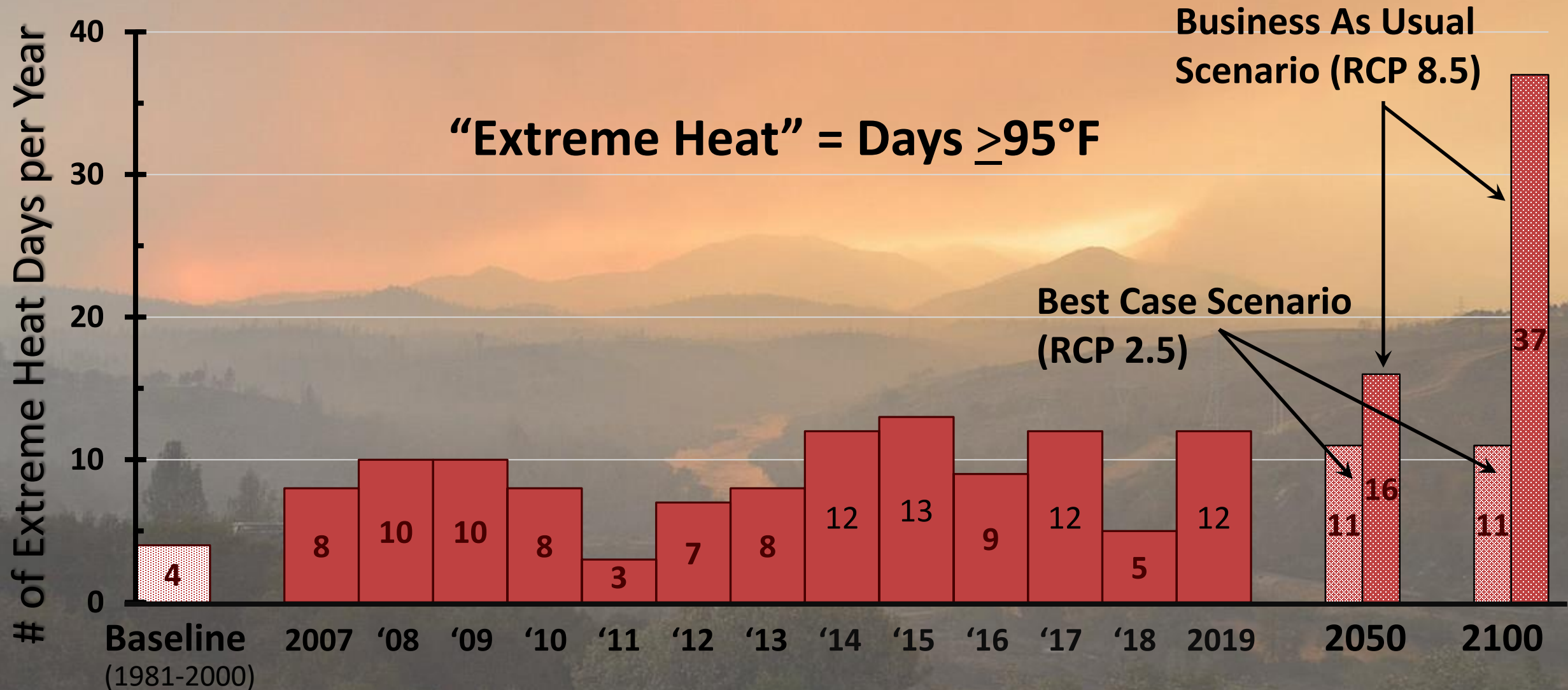


**Worsening
Air Quality**



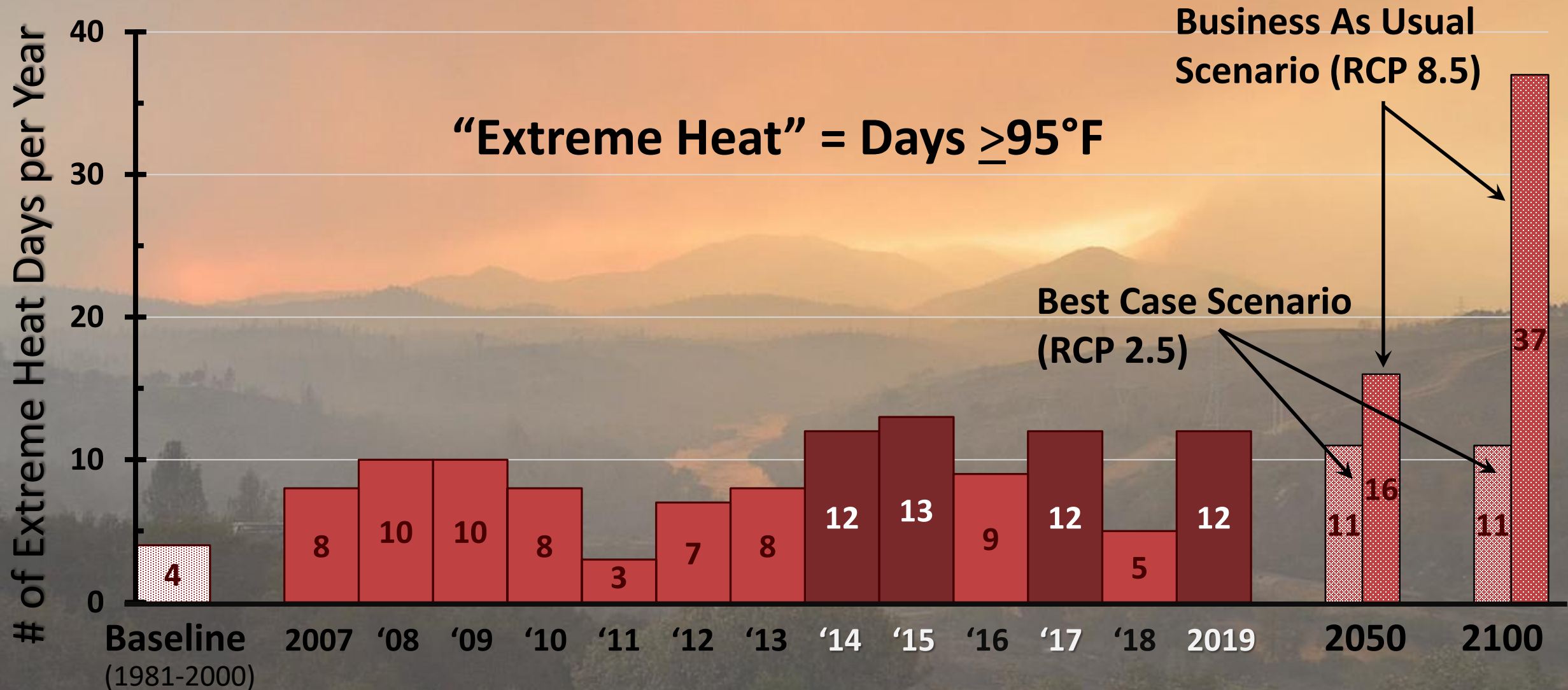
**Sea Level Rise
& Flooding**

Number of **Extreme Heat** Days in Long Beach



Baseline Annual Average & Future Projections are based on Sun et al. 2015

Number of **Extreme Heat** Days in Long Beach



Baseline Annual Average & Future Projections are based on Sun et al. 2015

Extreme Heat events are ↑ in Southern California

Capital Weather Gang

All-time high temperature records set throughout Southern California, including Los Angeles

Record Highs Today (7/6/2018)			
Location	Today's High	Old Daily Record	Record Type
Downtown Los Angeles	108	94 (1992)	Daily
Los Angeles Int'l Airport	92	88 (1957)	Daily
Long Beach Airport	109	93 (1998)	Monthly
UCLA	106	89 (1942)	Monthly
Burbank Airport	114	103 (1976)	Monthly & All Time
Van Nuys Airport	117	99 (2017)	Monthly & All time
Woodland Hills	117	106 (1976)	Daily
Oxnard NWS	95	85 (1981)	Daily
Camarillo Airport	101	87 (2011)	Monthly
San Luis Obispo	102	86 (2011)	Daily

109°F
@ LB Airport

Record Winter Highs

Record Highs Today (1/29/2018)			
Location	County	Today's High	Old Record
Long Beach Airport	Los Angeles	91	83 (1992)
LAX	Los Angeles	89	83 (1962)
UCLA	Los Angeles	89	85 (1971)
NWS Oxnard	Ventura	87	85 (1971)
Camarillo Airport	Ventura	89	85 (1971)
Santa Maria	Santa Barbara	85	83 (1931)
Paso Robles	San Luis Obispo	79	77 (1976)

91°F
@ LB Airport

Deteriorating Air Quality Negatively Impacts Health in Long Beach



Long Beach, L.A. Area Ranked Among Worst Cities for Air Quality by American Lung Association

Despite continued improvement in air quality across the nation, the American Lung Association found that the Los Angeles-Long Beach area still experiences “dangerous”...

LBPOST.COM

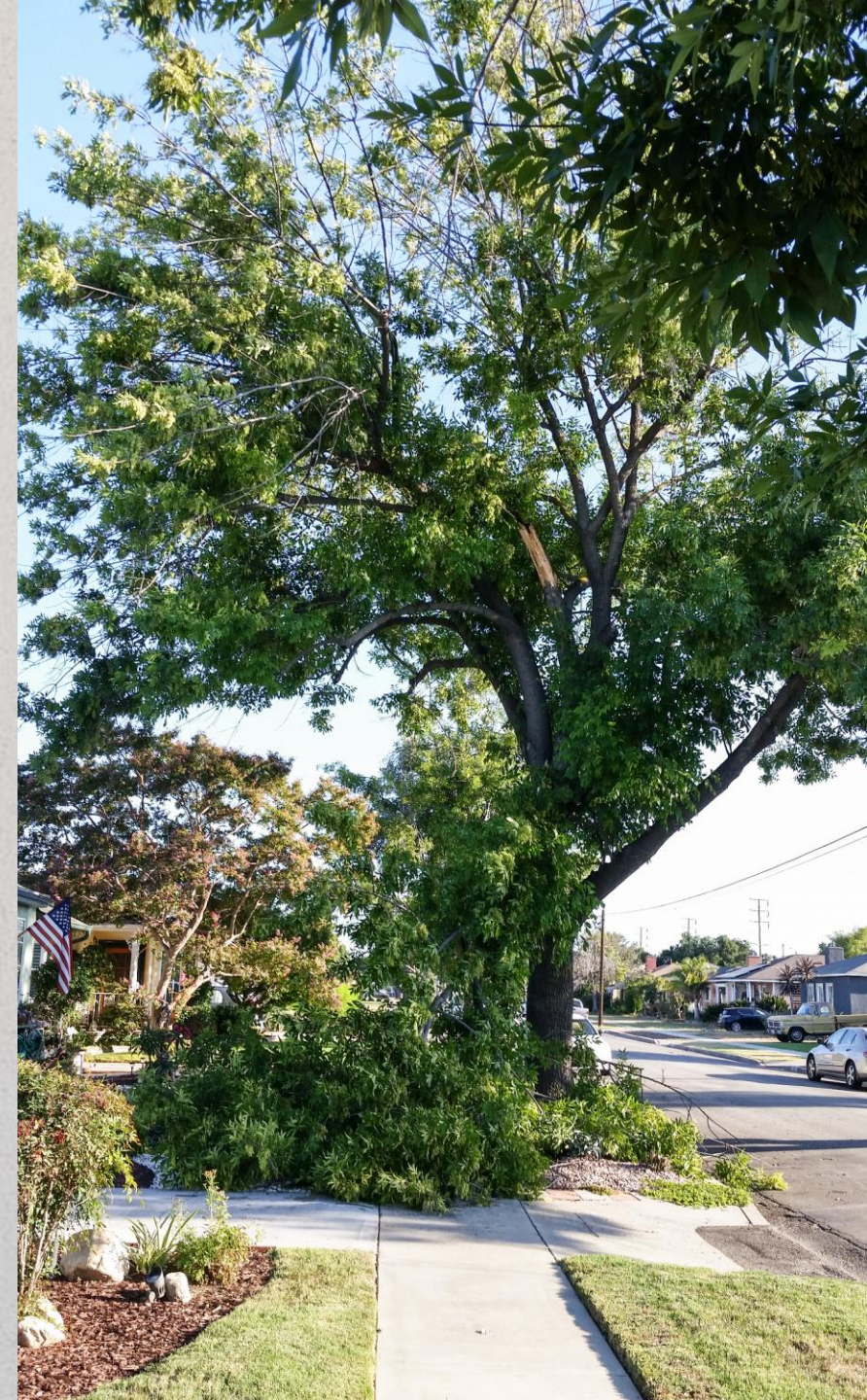
April 21, 2017

Prolonged Droughts punctuated by Heavy Precipitation puts Trees at Risk



Gust of wind topples tree into Long Beach home; five people escape through window

PRESSTELEGRAM.COM





Prolonged Droughts ↑ Urban Flooding during Extreme Rain events
January 22, 2017, Corner of Caspian Ave & PCH in Long Beach

3.87"

Photo by Stephen Carr, Long Beach Press Telegram

Long Beach residents are already experiencing flooding without Sea Level Rise



January 19, 2017

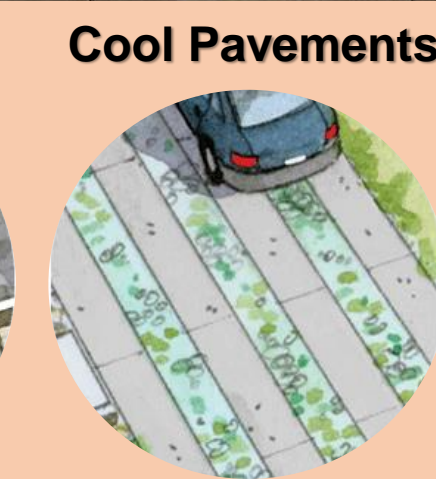
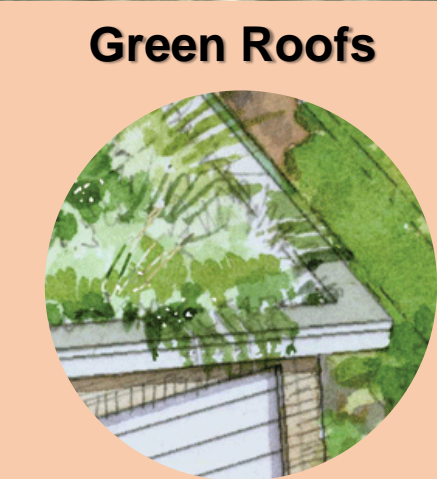
Flooding near Belmont Shore caused by rain and high tides

- Photo by Holly Rindge (featured in *the Gazette*)

Becoming **RESILIENT**



Extreme Heat – Actions



Weatherizing Buildings & ↑ Energy Efficiency

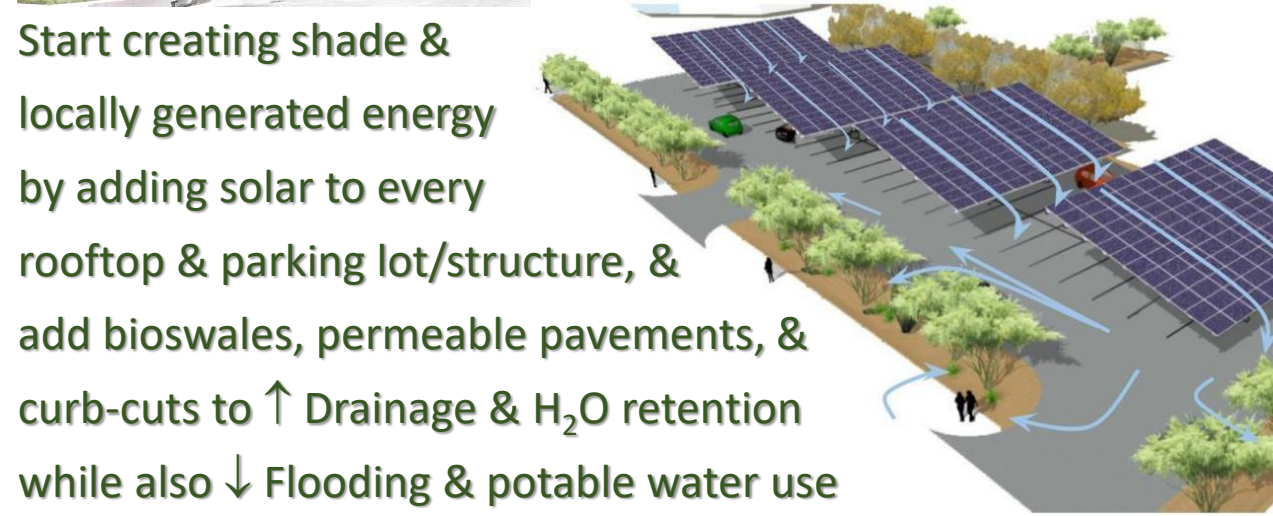
Stop Decapitating Trees to Protect Powerlines



Prioritize Trees & ↑ Energy Resiliency



Trees can ↓ Urban Heat by up to 10°F



Drought – Actions

Long Beach... Beautiful California Friendly Landscapes Made Here

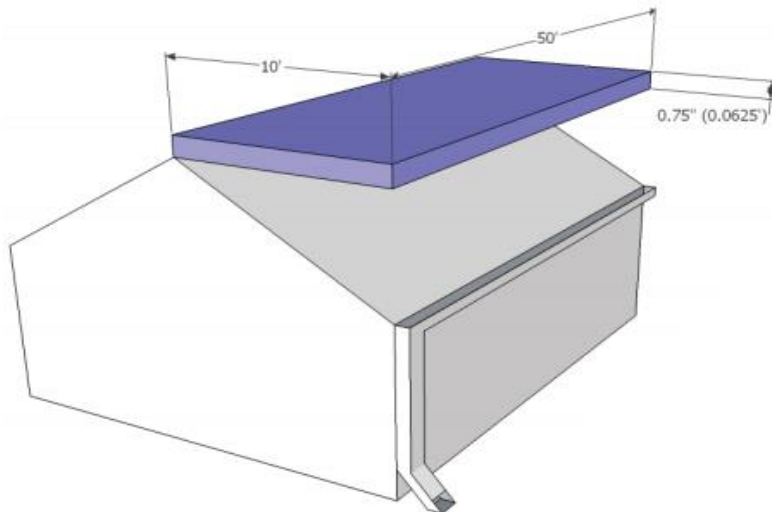


Recycled Water

**How To Determine
The Number of
Rain Barrels to Install**

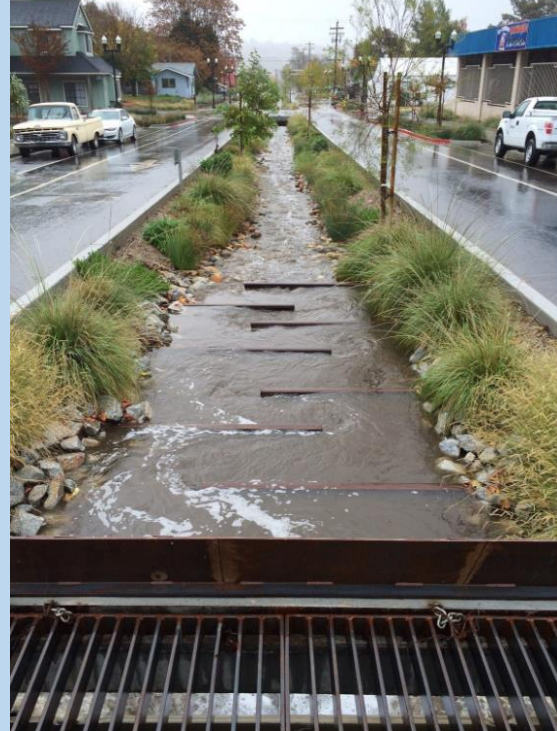


**Rain Barrel
Storm-Water
Catchment
System**



**3 min
shower timer**

**Shower
Bucket**



Stormwater + Complete Street Solutions



21st St. Improvements in Paso Robles, CA

By CannonCorp Engineering Consultants

**Fig. 2.1 3D View of Stormwater Planter
Philadelphia Green Streets Design Manual**

Air Quality – Actions

Vegetated Barriers Clean & Cool the Air & ↓ Noise

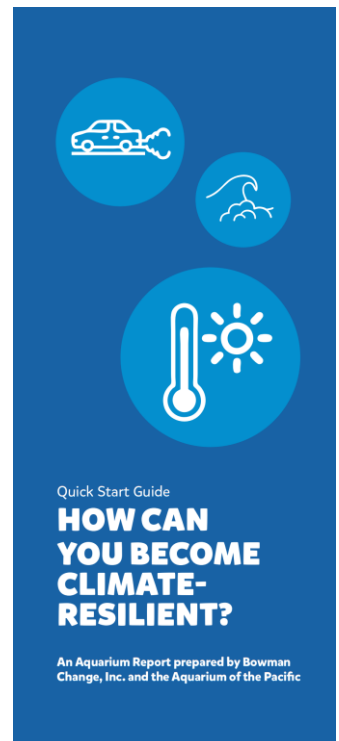
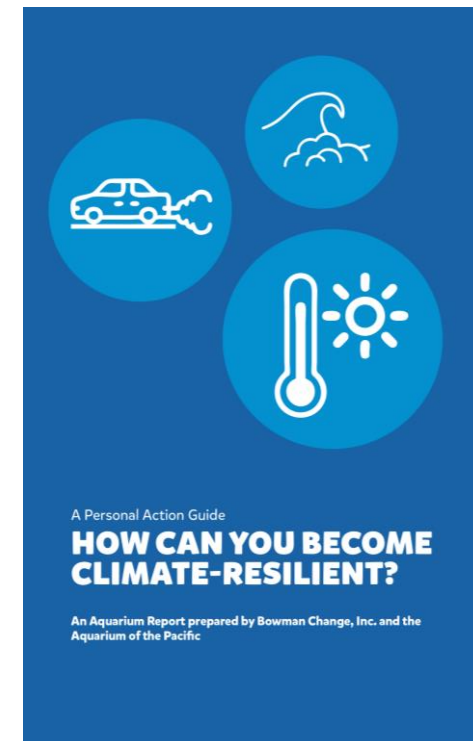
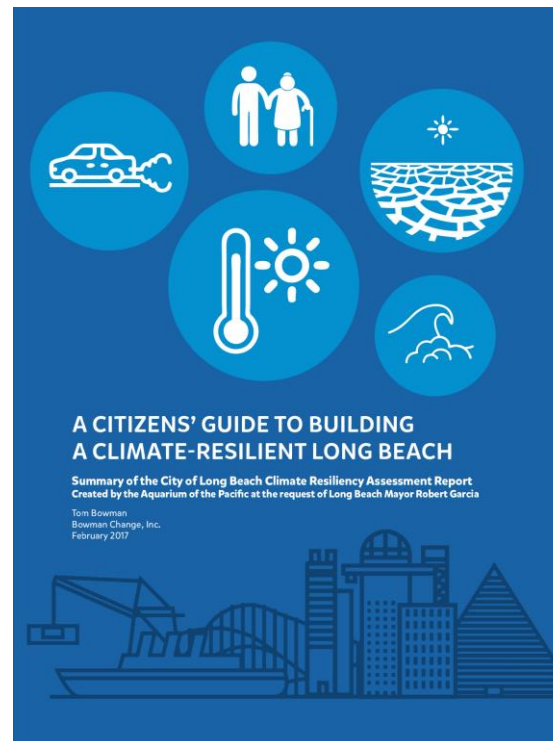


Sustainability & Resilience at the Aquarium of the Pacific



City of Long Beach Climate Resiliency Assessment Report

*Prepared by
Aquarium of the Pacific
December 2015*



Freely Available at: <http://pacific.to/resilientLBaop>

AQUARIUM OF THE PACIFIC

AQUARIUM OF THE PACIFIC
helping to build a
Climate Resilient Long Beach

What do you
love about
Long Beach?

What would
you do to
protect it?

 **#ResilientLB**

 @resilientLbaop



#ResilientLB

AQUARIUM OF THE PACIFIC



AWAY
**BOYEE
G ONLY**
Home
Prices, Inc.
ITEMS WILL BE
CHARGED AT
\$0.25 PER POUND
302.579.7017

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What do you **LOVE** most about Long Beach?

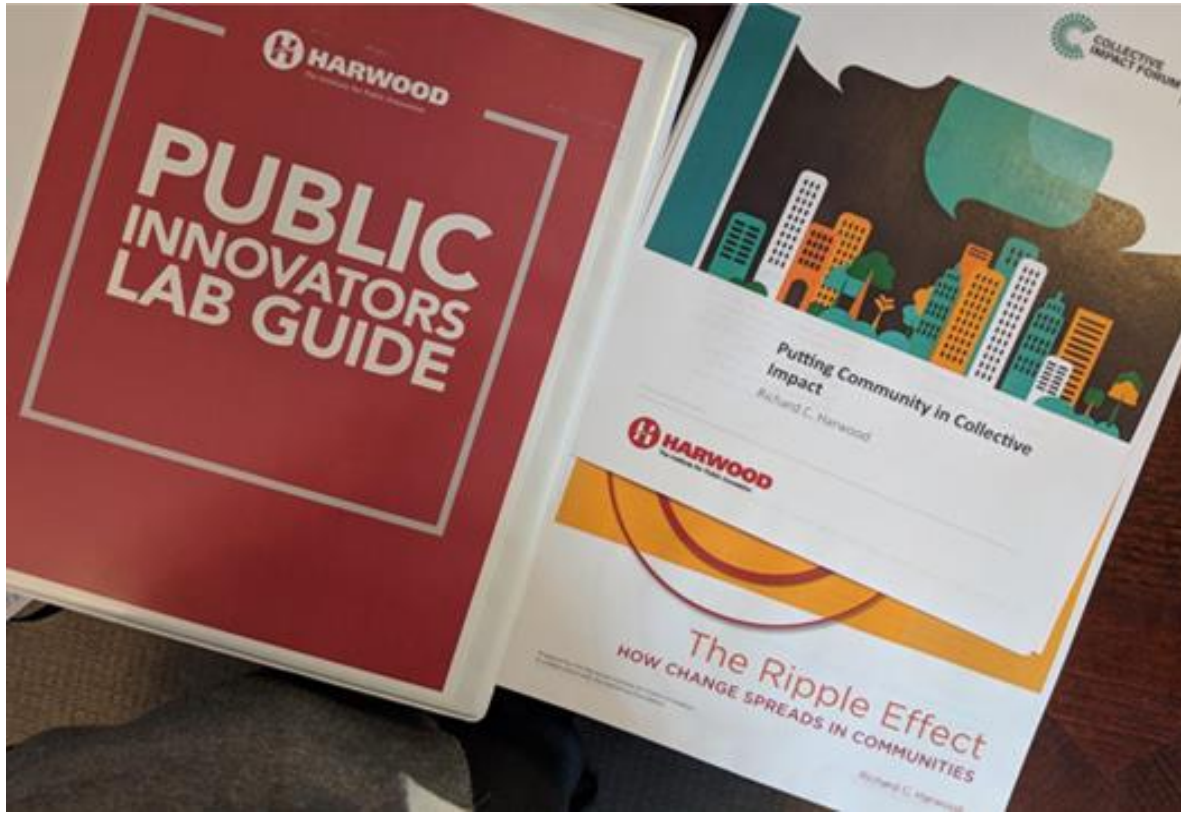


What can **WE** do to **PROTECT** what we love?



Community Conversations

1. What kind of community do you want to live in?
2. Why is this important to you?
3. How is that different than what you see now?
4. What are some of the things that need to happen to create the kind of community you want?



Partnering with **Artists & Designers** to create **Innovative & Inspiring** **Solutions**



Native Vegetation
blocks strong wind



Grey Sand
slows down erosion



Coastal plants fortify shores



NATURAL ROCKS



WILD GRASS
FOUNTAIN GRASSES



NATIVE SUCCULENTS

Partnering with **Artists & Designers** to create **Innovative & Inspiring Solutions**



LIGHT PROJECTION

Using natural surfaces for projection.



NATURAL ROCKS

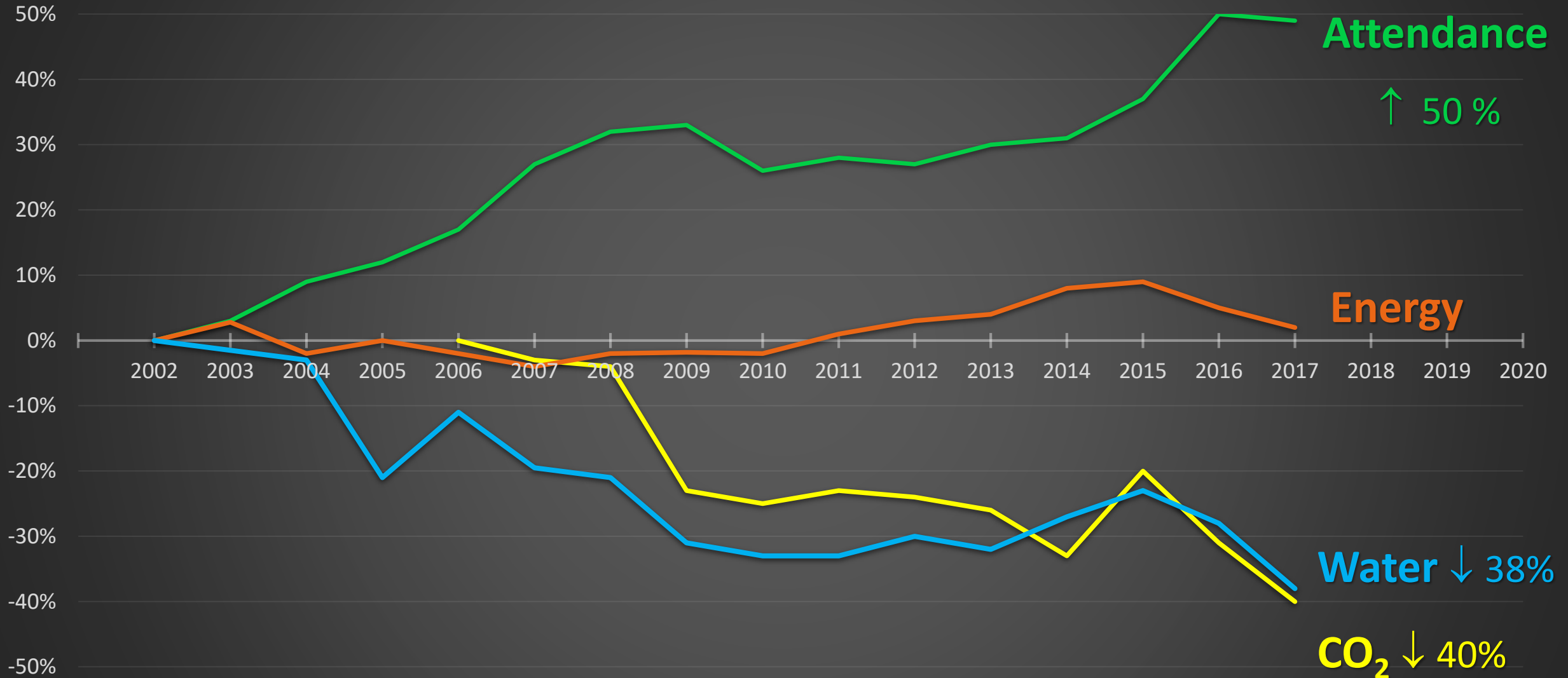


**WILD GRASS
FOUNTAIN GRASSES**



NATIVE SUCCULENTS

Our Environmental Footprint



Energy

Founding Member of The Climate Registry
Reported GHG Emissions from 2006 - Present



The Climate Registry

Achieved Climate Registered **Gold Status**
for our 2017 GHG emissions Inventory



Energy

Renewable Energy installations (Solar & Wind)
LED bulbs, Occupancy Sensors, Insulation, Shade



Energy

Siemen's Demand Flow technology
Energy ↓ 50%, & saves 800,000 kWh/year



**Fuel cell installation takes us
87% off the grid**



Potable
WATER

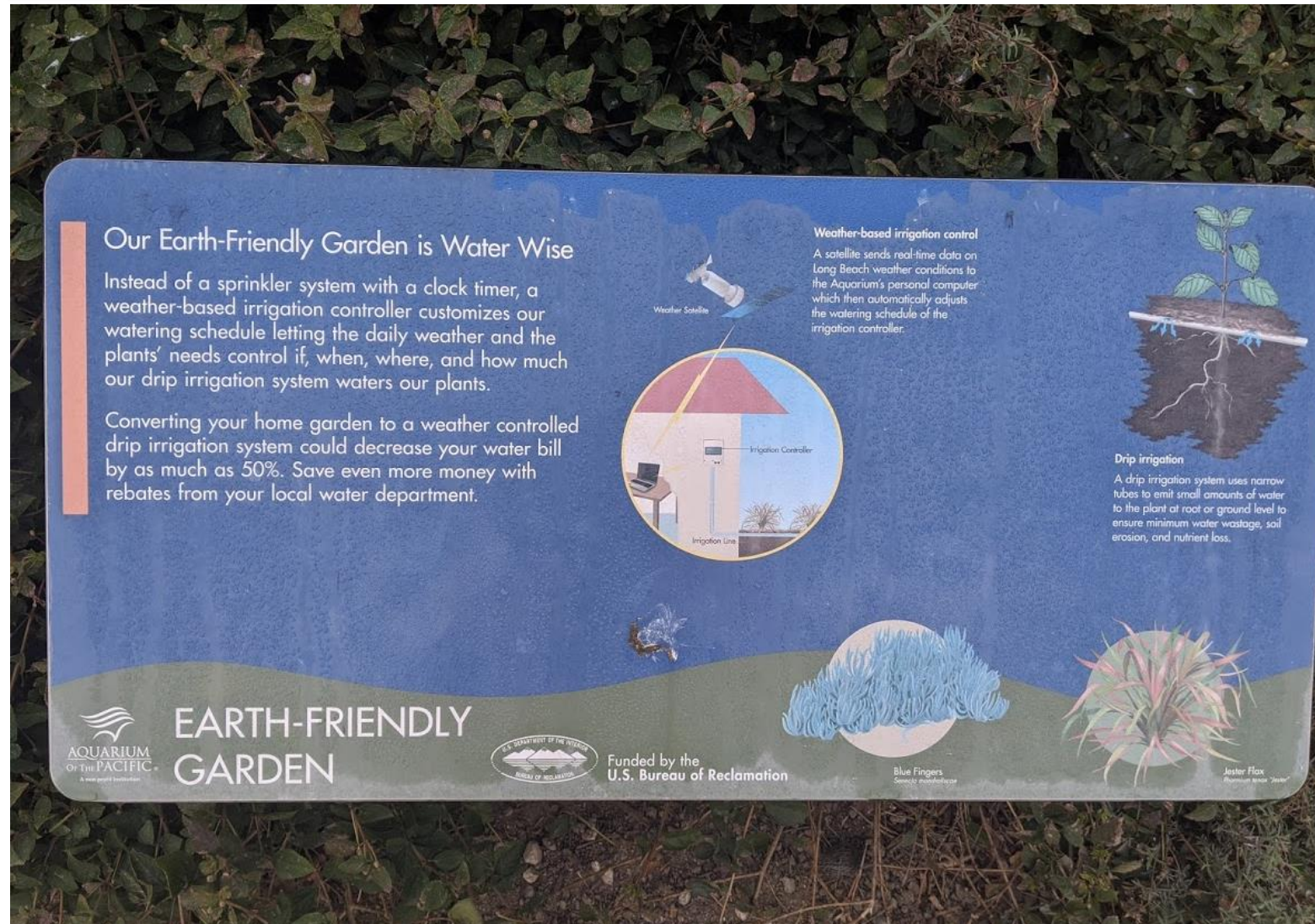
Waterless urinals & dual-flush toilets
saves 960,000 gallons/year



Potable **WATER**



Drought Resistant Landscaping saves 550,000 gallons/year



Stormwater

Permeable Pavements, Grey Water Capture, & a Green Roof decrease stormwater runoff



Sustainable Construction

Watershed Classroom & Exhibit



- LEED® Platinum certified (2008)
- Carbon-neutral (solar, operable windows)
- 95% stormwater retained on site; several porous paving materials used; fly ash as concrete substitute
- Graywater for green roof
- native landscaping

Sustainable Construction



Designed to **LEED Platinum** Standards



Designed to **LEED Gold** Standards



 **3 Globes® Certified**

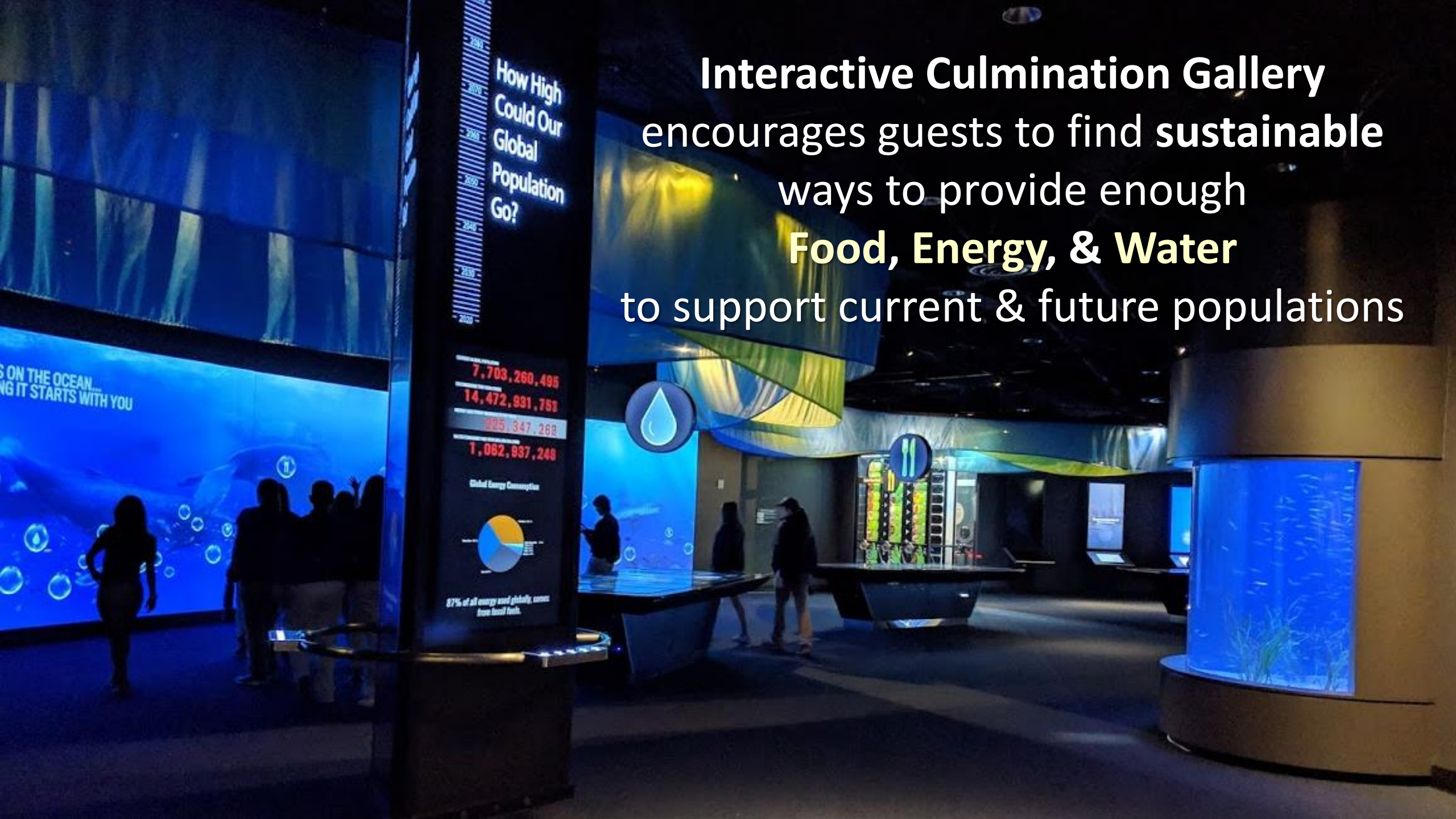
Sustainable Construction

Pacific Visions Expansion



- Bird-friendly glass & site lighting
- 25% more energy efficient than required by code
- Drought-tolerant landscaping

Interactive Culmination Gallery
encourages guests to find sustainable
ways to provide enough
Food, Energy, & Water
to support current & future populations



In the face of a changing environment,
communities must be **engaged** & at the **core of planning** for the future





The LA River Master Plan is using
Nature & Community-Based Solutions
to Restore Ecologic Function to the LA River.
→ an Inviting, healthier, more resilient system



Source: KCET.org

Urban Farms & Community Crop Swaps

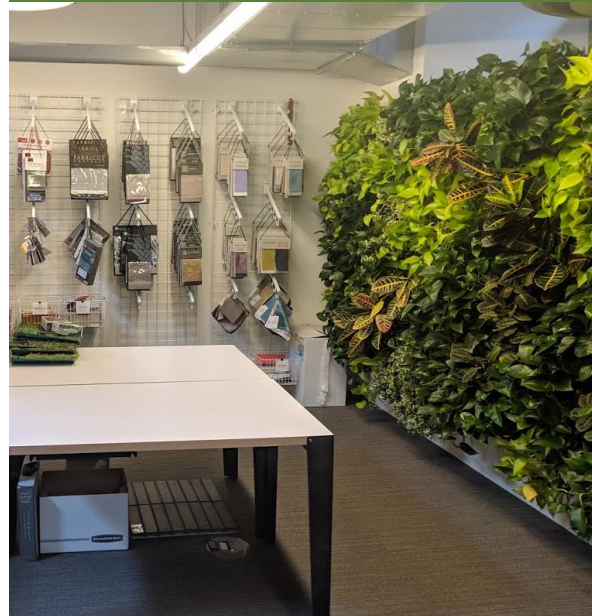
(↑ Food Security, Equity, Health & ↓ Foot-print)



Source: BCV arch

Living Walls & Vegetated Shade

(Cleans & Cools the Air, ↑ Health, ↓ Energy, ↓ Floods & Cleans H₂O, etc.)



We **CAN** Design the Future **We WANT**
Our Challenge is to **IMAGINE** It, **CREATE** It, & **SHARE** it



Illustration: "Imagining a Healthy, Sustainable Future for the LA River" by Perkins & Will

Thank You

Large-Scale Revitalization of the LA River, by AECOM