



# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE





# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE



## State Resources for Local Governments



# State Resources Overview

Michael McCormick

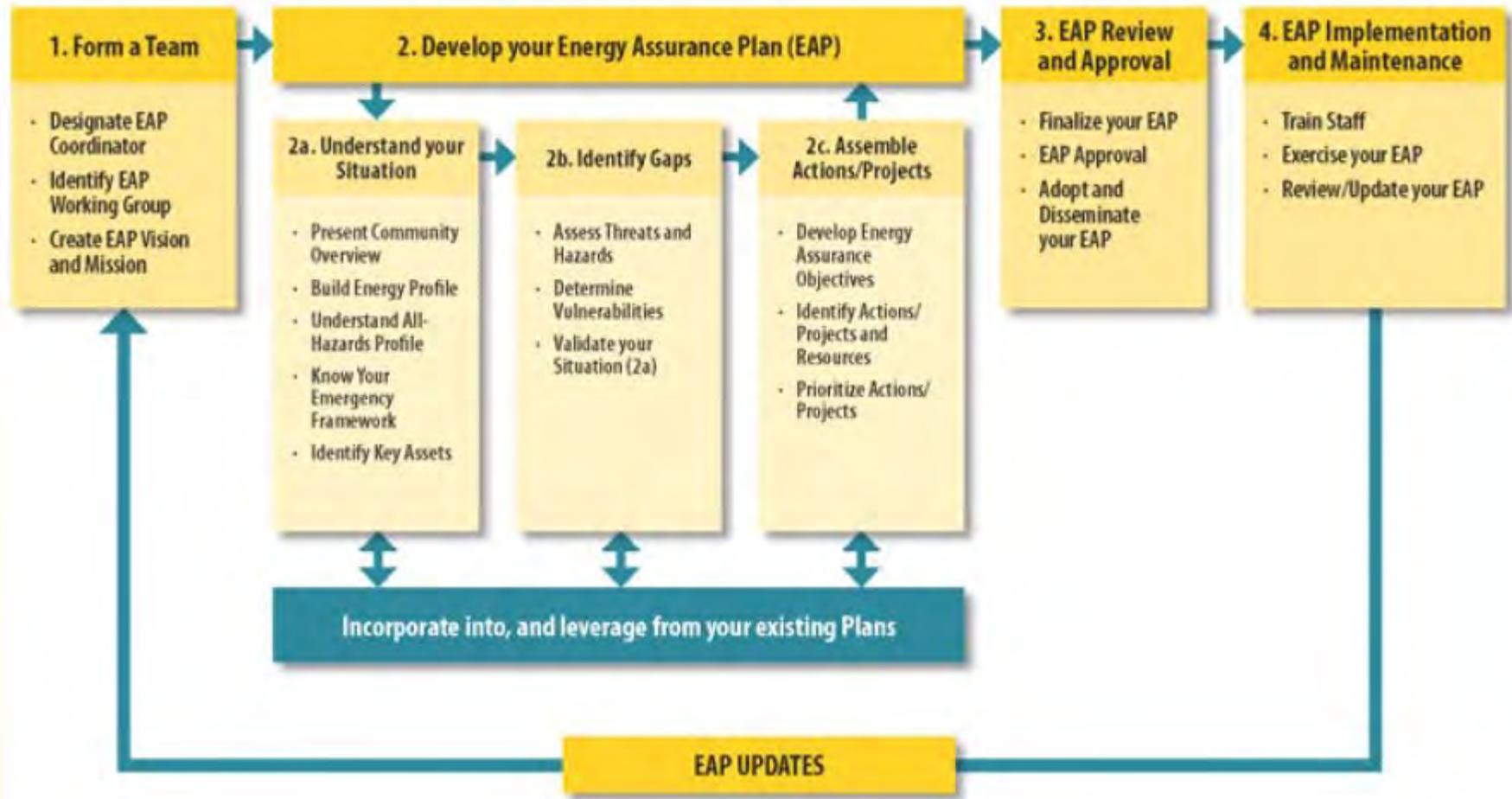
Governor's Office of Planning and Research

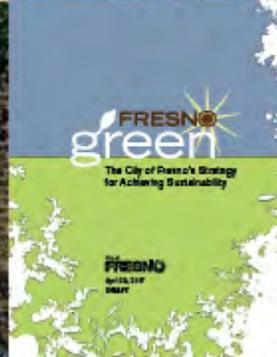
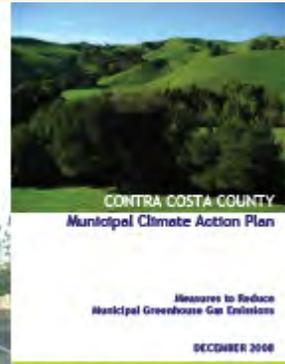
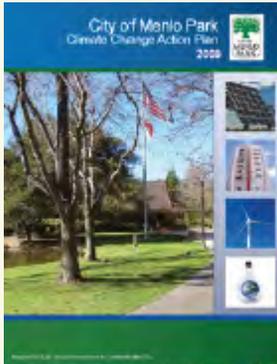
## Climate Change Resources:

Resources for Local Government Climate Change Planning, Policy and Mitigation  
**State Web-based Guidance for Local Governments**



- Local Government Access Points
- OPR Resources
- OPR CAP Technical Advisory
- General Plan Guidelines
- OPC Sea Level Rise Guidance
- CDPH Health and Climate
- CalEMA/CNRA – APG
- State Hazard Mitigation Plan
- DWR – Climate Change and Regional Water Planning
- CEC – Energy Assurance Planning
- SGC Grant Funding





# Climate Action for Health: Integrating Public Health into Climate Action Planning

[www.cdph.ca.gov/programs/CCDPPH/Pages/ClimateChange.aspx](http://www.cdph.ca.gov/programs/CCDPPH/Pages/ClimateChange.aspx)



EXTREME CLIMATE RISKS  
AND CALIFORNIA'S FUTURE





# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE

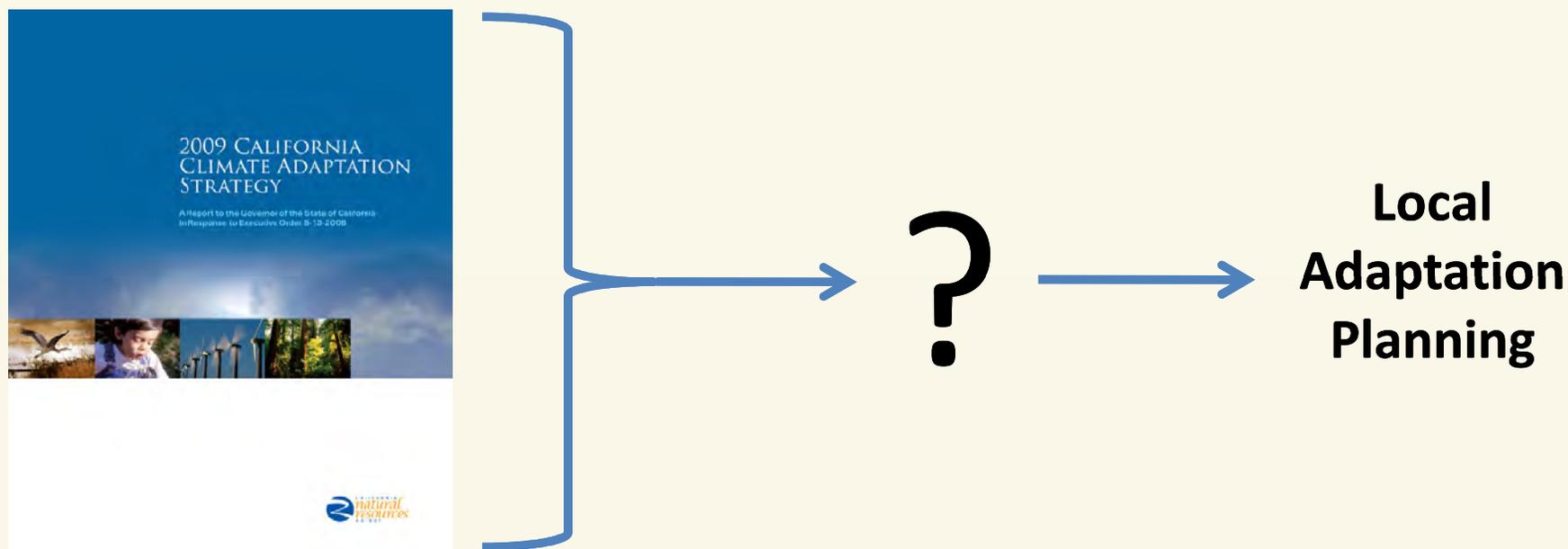




# Cal-Adapt: Climate Adaptation in California

Kurt Malchow  
Natural Resources Agency

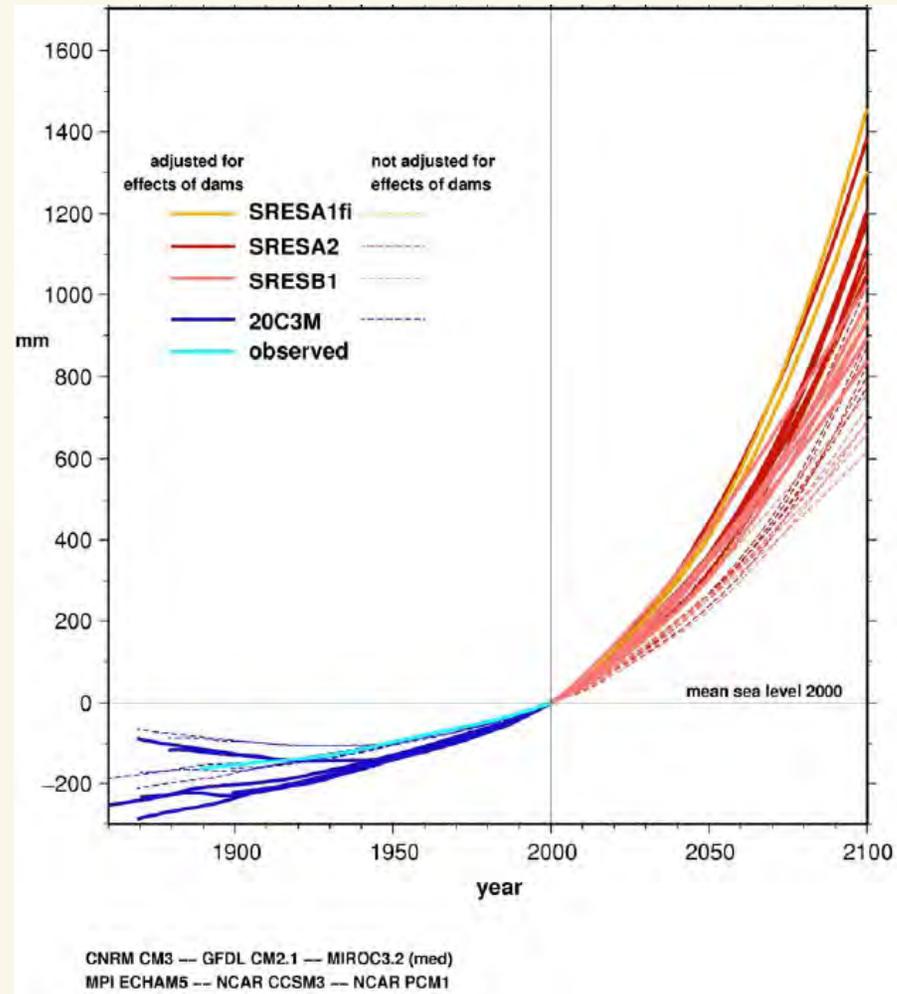
# Bridging the Gap Between State and Local Planning:



**First: make the research easier to understand**

# Example:

Rendering SLR projections from this:



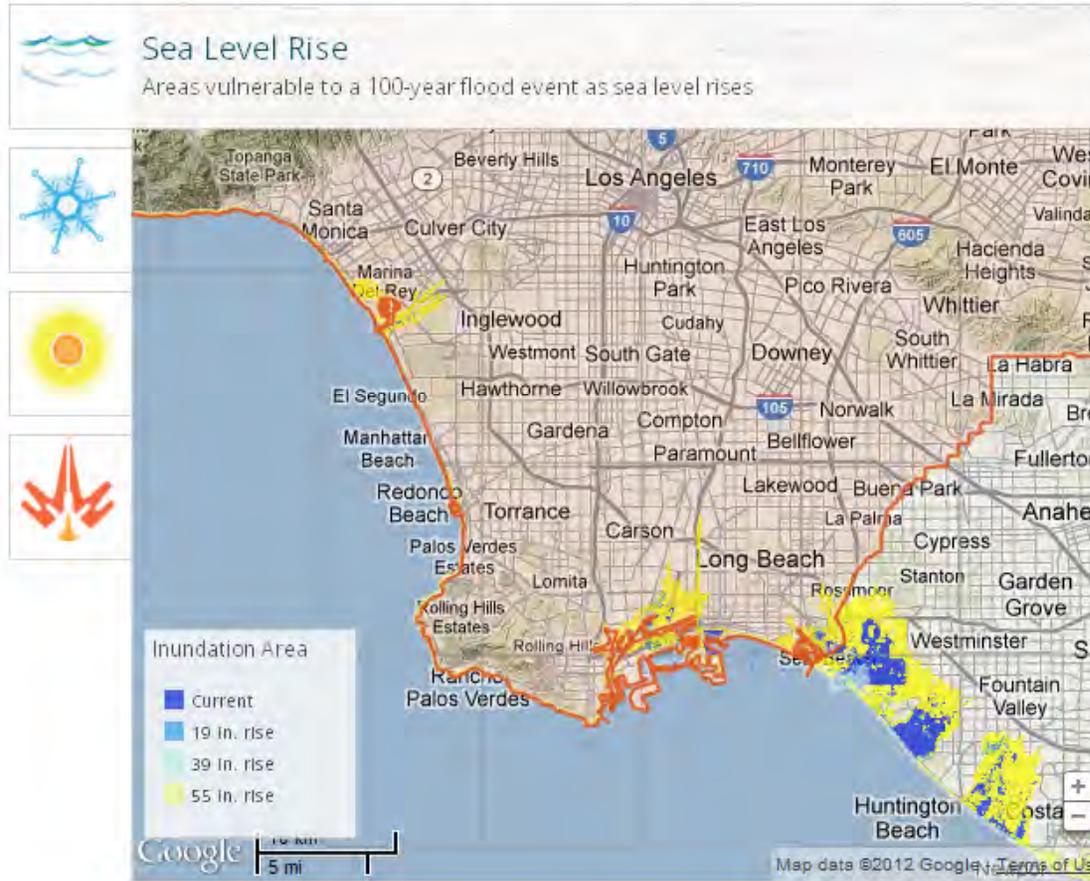
Source: Cayan et al., 2009. CEC-500-2009-014-F

To this:

LOCAL CLIMATE SNAPSHOTS

Los Angeles County, CA

INSTRUCTIONS ▶ DATA SOURCES ▶ SHARE ▶

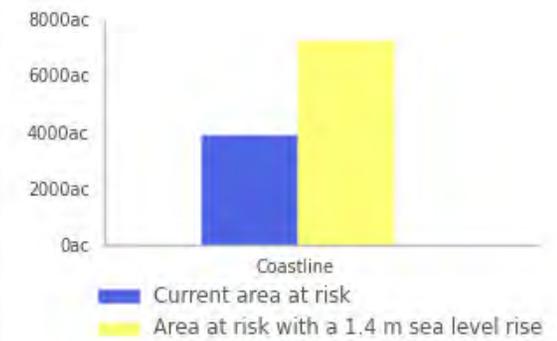


Use Metric Units

LOS ANGELES COUNTY

Land Vulnerable to a 100-Year Flood Event

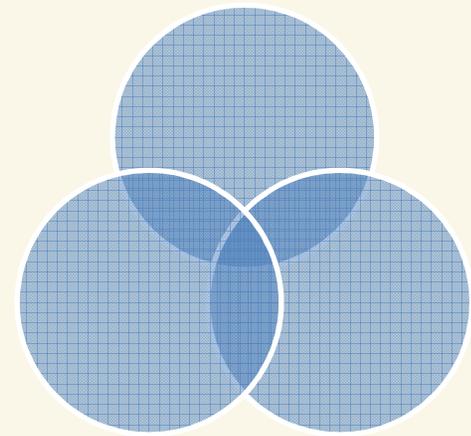
	Estimated Acreage in 2000	Estimated Acreage in 2100	Percent Change
Coast:	3,950	7,290	+46%



disclaimer

# Integrating Adaptation Tools:

- Cal-adapt
- Climate Adaptation Policy Guide
- Strategic Growth Council – Sustainable Communities Planning Grants
- OPR – General Plan Guidelines Update
- State Hazard Mitigation Plan
- Upcoming resources





New #Gov20 platform - Cal-Adapt - to help local governments fight climate change. Can #sf lead the way? Read more <http://bit.ly/jgWj7T>



Interactive maps showing climate change scenarios for the San Francisco Bay Area. Says more than any essay. <http://cal-adapt.org/>



Used the new @cal\_adapt mapping tool to see #climatechange impacts on my favorite #california spots [bit.ly/kfhLSG](http://bit.ly/kfhLSG)



Cal-Adapt: a window into California's climate change research. [cal-adapt.org](http://cal-adapt.org) Terrific resource, needs translating to Oz. 20 Jun



Cal-Adapt: fun with maps, climate change, and California. It's like they put all of my favorite things together - [cal-adapt.org](http://cal-adapt.org)



We need more of this. Cal-adapt: online tool to explore climate change impacts and adaptation in California <http://bit.ly/mUkwDB> #climate



Very cool - new website <http://cal-adapt.org> shares California's climate change science with the world: <http://ht.ly/5ezr9>

# Social Networking Comments:



California establishes a website where Californians can see how climate change will impact them personally. <http://cal-adapt.org/>



Cal-adapt – new tool from Berkeley helps researchers, policymakers & the general public better understand climate change <http://j.mp/inObwe>



Un buen recurso para mirar en clase: Cal-Adapt utiliza Google Maps x mostrar los efectos del cambio climático (en inglés) <http://is.gd/jM5hoF> 7 days ago retweet



Website Californië visualiseert effecten climat change vr elke gemeente. [cal-adapt.org](http://cal-adapt.org). Knap en vooral begrijpbaar.Ook nodig in België 20 Jun



Check out CalAdapt for Climate Stories, resources & ask an expert. Localized maps, predictions. <http://bit.ly/m6J70f> 2 hours ago



Share this information with your friends and family! Important news we all should know: <http://cal-adapt.org/> #climatechange #green 6 hours ago



Overwhelmed by your California climate data? Useful visualization tools now online at <http://cal-adapt.org/>

via TweetDeck



Cal-Adapt -- Exploring #California's #ClimateChange Research: [cal-adapt.org](http://cal-adapt.org) - Critical information & we know Knowledge=Power=Change



カリフォルニア気候変動まとめサイト。おそろしいできれば。 <http://cal-adapt.org/>



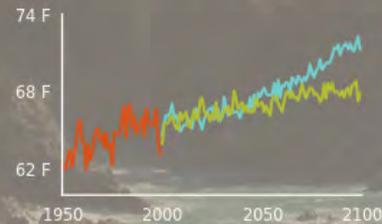
# cal-adapt

EXPLORING CALIFORNIA'S  
CLIMATE CHANGE RESEARCH



## View Local Profiles

QUICKLY EXPLORE CLIMATE  
PROJECTIONS FOR YOUR LOCAL AREA



## Explore Climate Tools

INTERACTIVE MAPS & CHARTS



## About Cal-Adapt

**NEW** EXTREME HEAT TOOL



**?** FAQs

## Access Data

ACCESS THE RAW DATA USED IN CAL-  
ADAPT



Select and download data in a variety of  
tabular and GIS formats

## Resources

INFORMATION, ARTICLES & LINKS



Find out more about how climate change in  
California is relevant to your community

## Community

PARTICIPATE IN COMMUNITY BASED  
TOOLS AND ACTIVITIES



Find out how you can share your thoughts  
and findings, communicate with experts,  
and help to collect new data

Tweet 0

Like 382

cal-adapt.org

## TEMPERATURE: EXTREME HEAT TOOL

Burbank, CA



Emissions Scenario: **LOWHIGH**

ABOUT THE TOOL

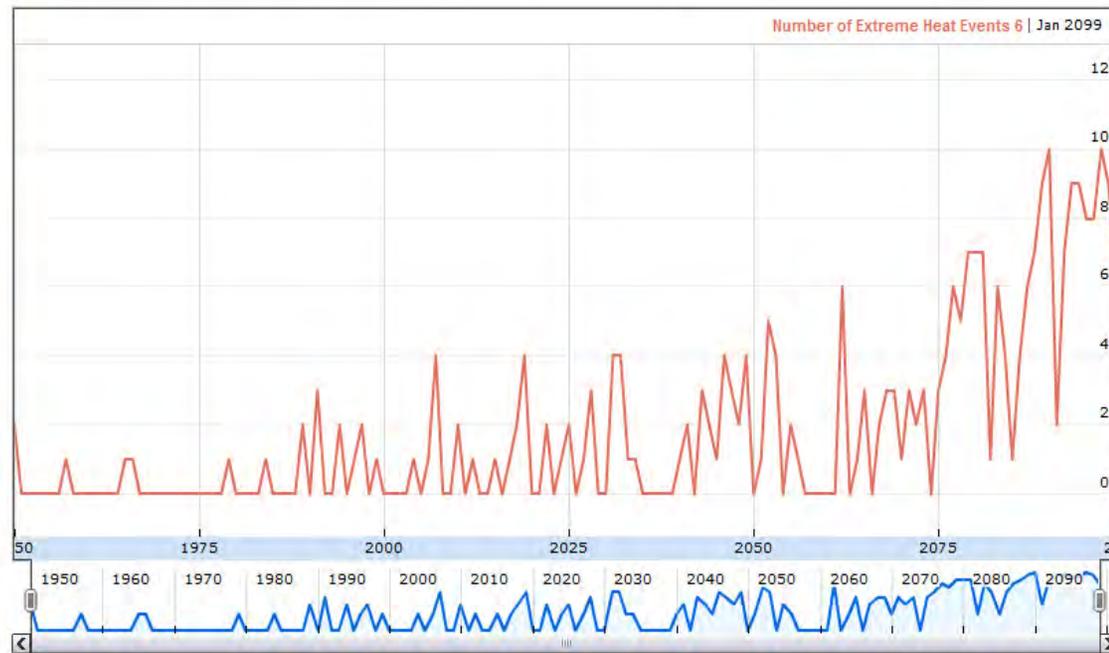
GRAPH IT!

DISCLAIMER



Timing of Extreme Heat Days by Year

OPTIONS



Historical Avg. # Extreme Heat Days: 4

Extreme Heat Day Threshold: 105°F

All values based on modeled data

Updates:

# Cal-adapt:

- Data
- Funding
- Feedback



# Thank you

Kurt Malchow  
Climate Adaptation Coordinator  
Natural Resources Agency

[http://resources.ca.gov/climate\\_adaptation/](http://resources.ca.gov/climate_adaptation/)

[www.cal-adapt.org](http://www.cal-adapt.org)





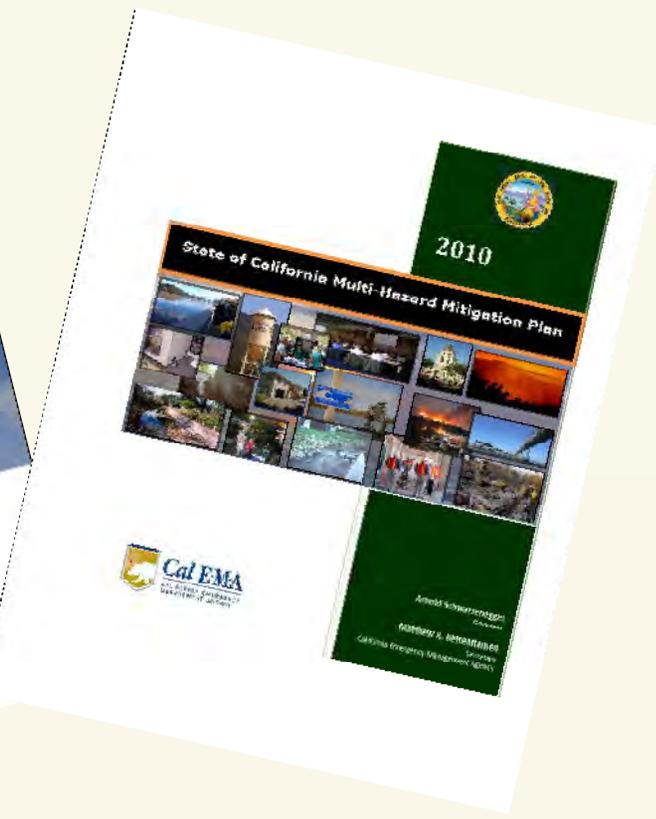
# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE





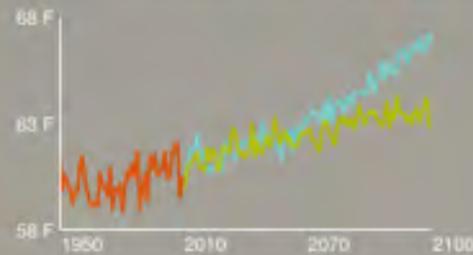
# Climate Adaptation Policy Guide

Adrienne Grieve  
Cal Poly San Luis Obispo



### View Local Profiles

QUICKLY EXPLORE CLIMATE PROJECTIONS FOR YOUR LOCAL AREA



### Explore Climate Tools

INTERACTIVE MAPS & CHARTS



SEA LEVEL RISE

### About Cal-Adapt

- WHAT'S NEW?
- WHAT'S TO COME?
- FAQS

### Access Data

ACCESS THE RAW DATA USED IN CAL-ADAPT



Select and download data in a variety of tabular and GIS formats

### Resources

INFORMATION, ARTICLES & LINKS



Find out more about how climate change in California is relevant to your community

### Community

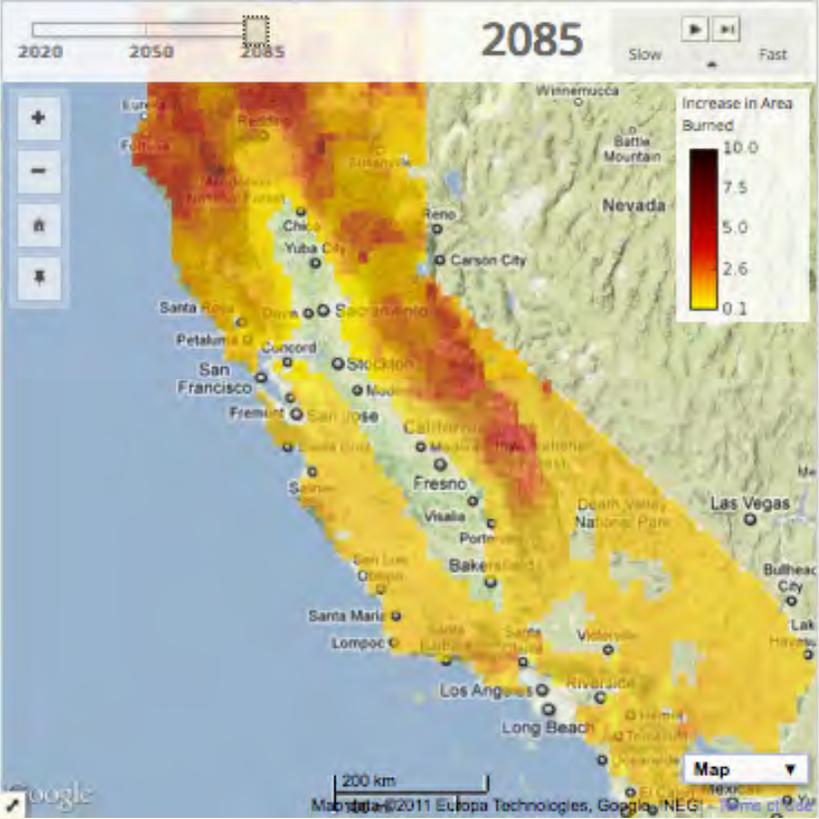
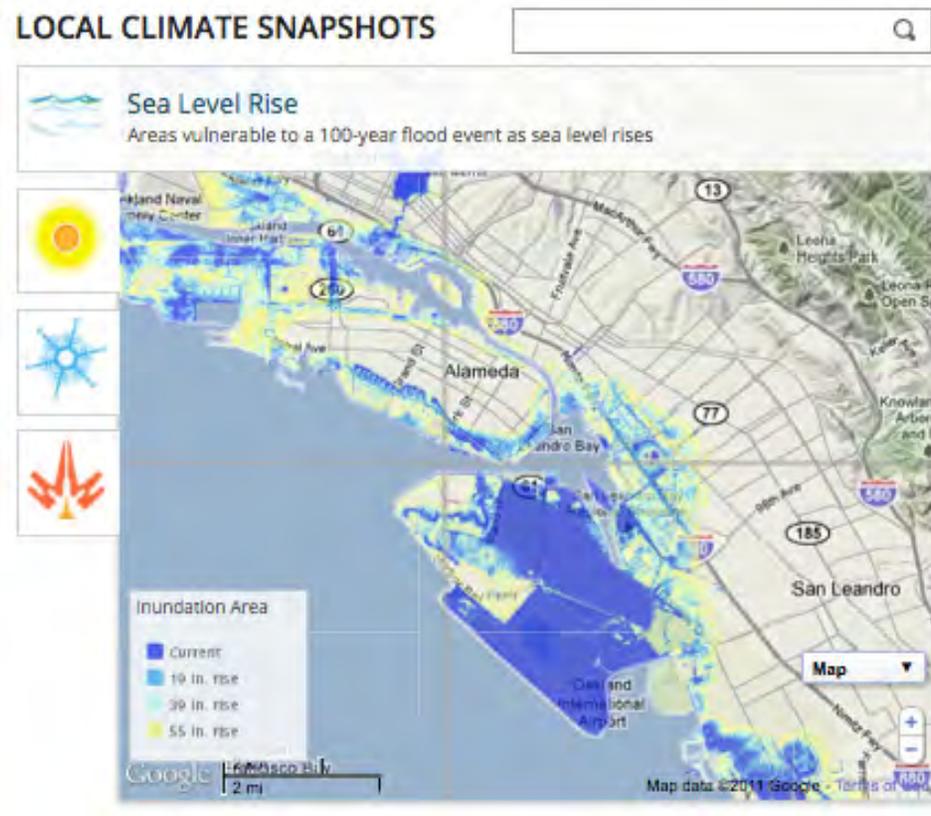
PARTICIPATE IN COMMUNITY BASED TOOLS AND ACTIVITIES



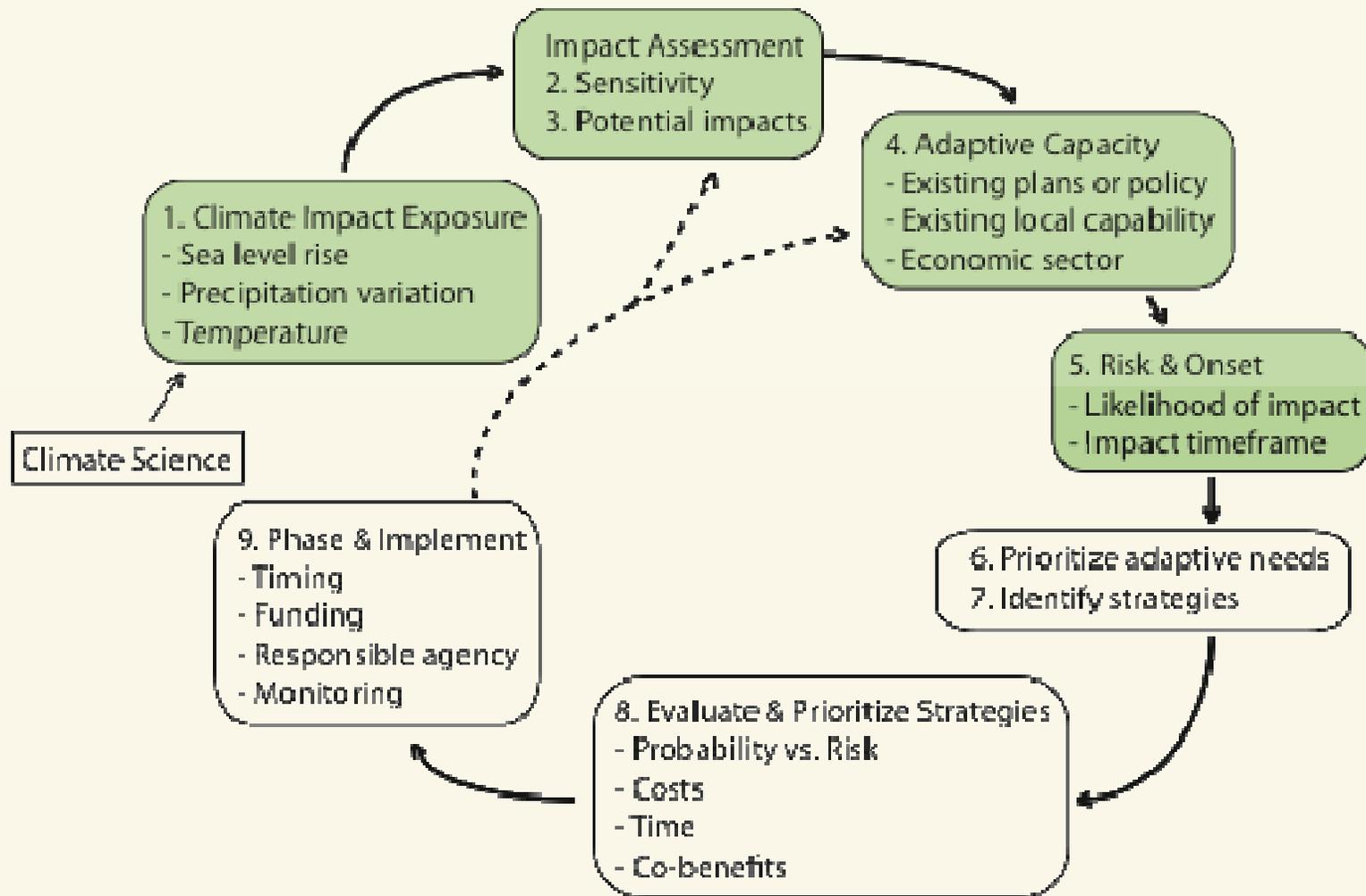
Find out how you can share your thoughts and findings, communicate with experts, and help to collect new data

[Tweet](#) 201 [Like](#) 349

# Cal-adapt

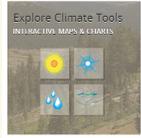


# Adaptation Policy Guide



Adapted from Boswell, Greve, & Seale, 2012

# APG Organization



## Part 1 - Introduction

- Introduction
- Adaptation Process
- Vulnerability
- Policy Development
- Sector Introduction
- Regions Introduction



## Part 2 - Regions



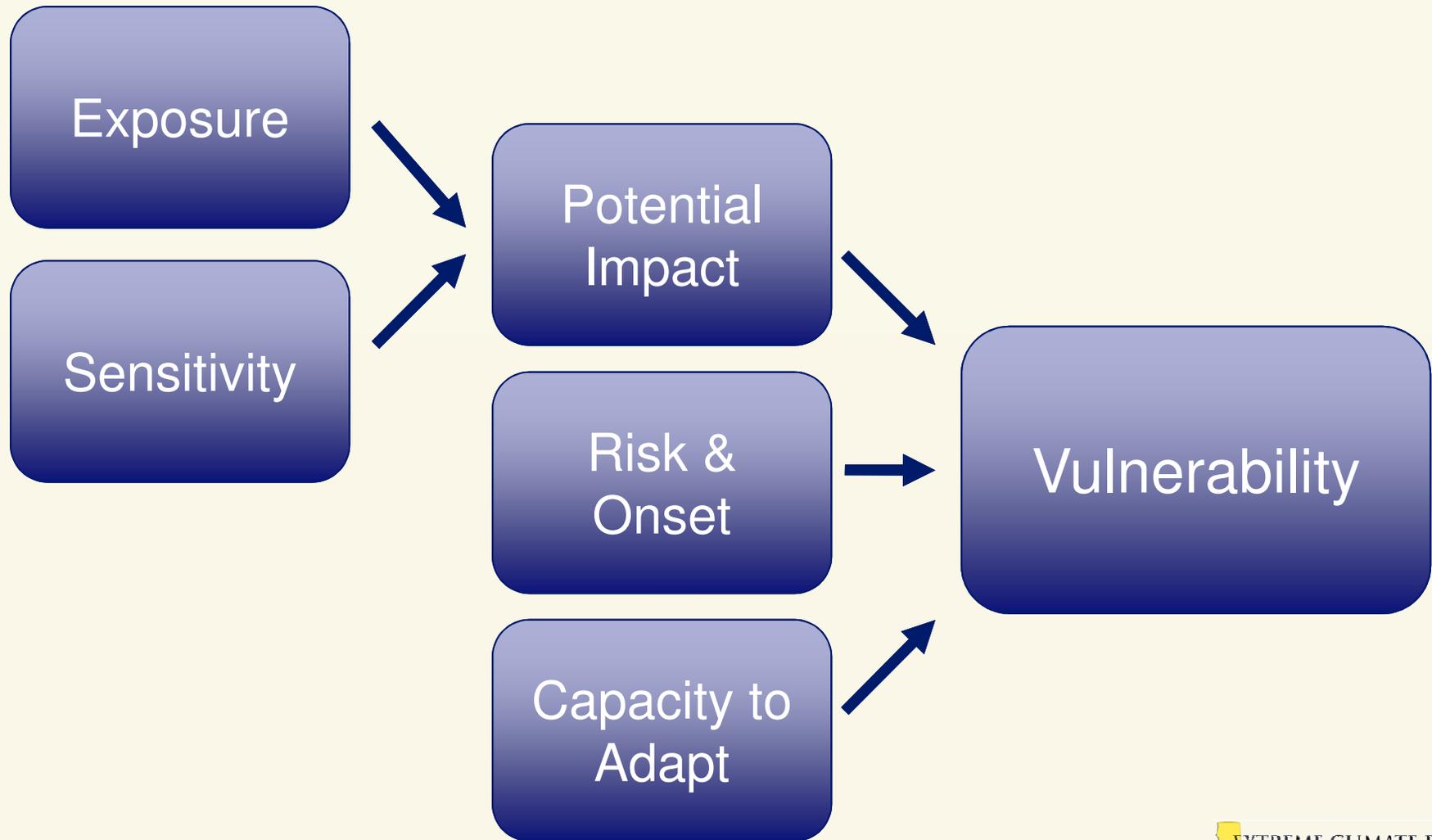
- 10 Adaptation Regions



## Part 3 - Strategies

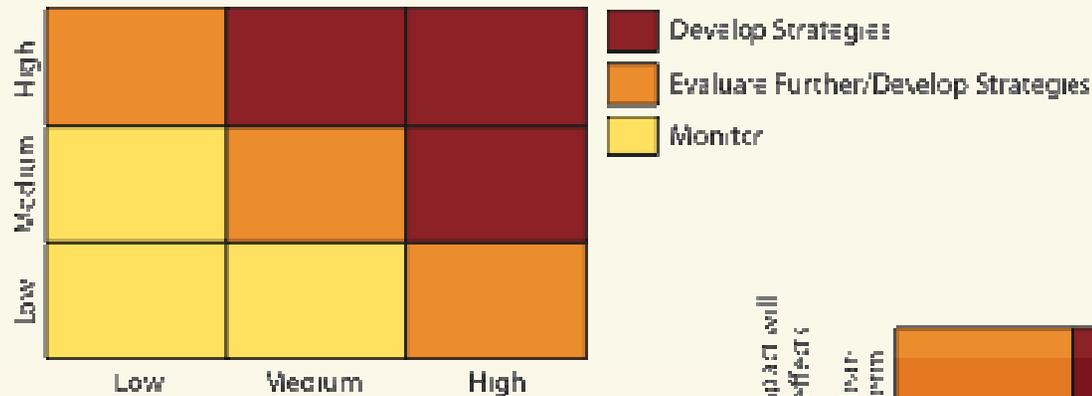
- Public Health
- Coastal
- Water Management
- Forest & Range
- Biodiversity
- Agriculture
- Infrastructure

# Vulnerability



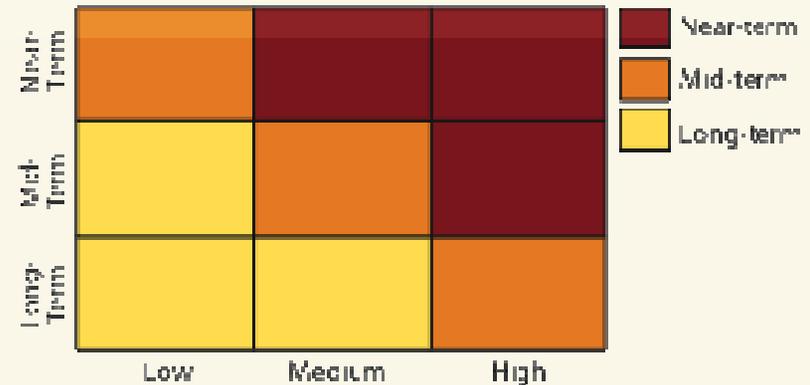
# Policy in the Face of Uncertainty

**Impact** - A combination of potential impact and community capacity to adapt



**Risk/Uncertainty** - For an individual impact based on the scientific certainty and certainty of impact sensitivity

**Impact Onset** - When the impact will begin to have detrimental effects



**Cost** - Ease of obtaining funding

**Co-benefits** - Benefit to the community beyond adaptation

**Duration** - Ease of implementation (from the perspective of time)

**Social** - Level of community &/or political support

# Feedback

Public Review Draft the  
**California Climate Change  
Adaptation Policy Guide**

[http://resources.ca.gov/climate\\_adaptation/local\\_government/](http://resources.ca.gov/climate_adaptation/local_government/)



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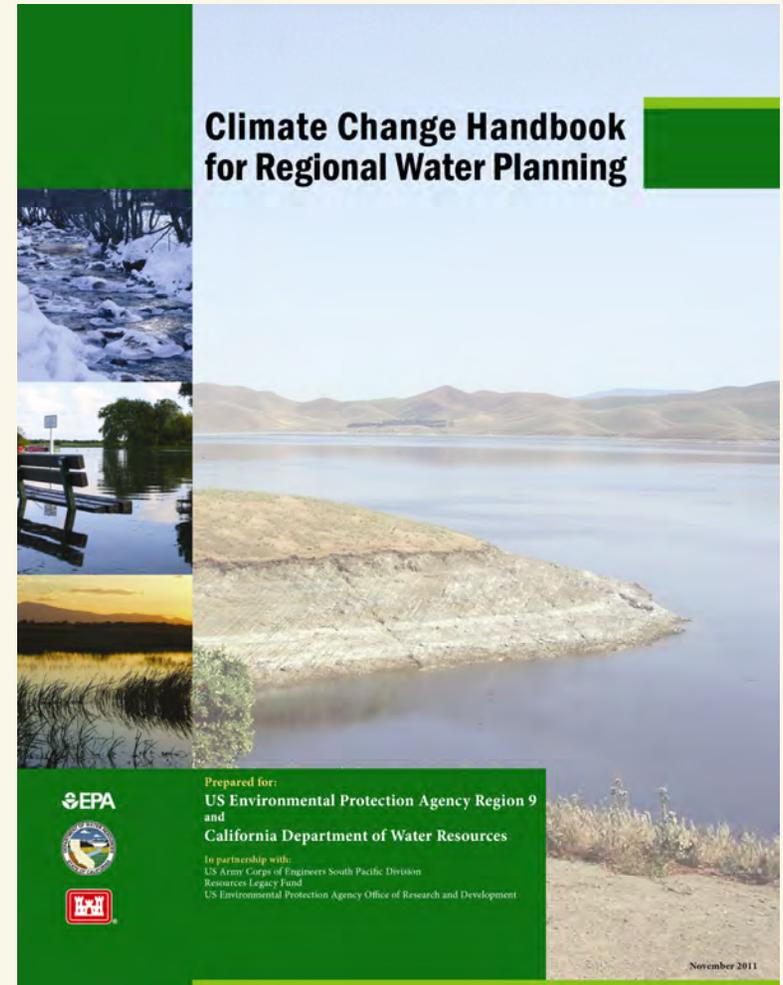
# Climate Change Handbook For Regional Water Planning

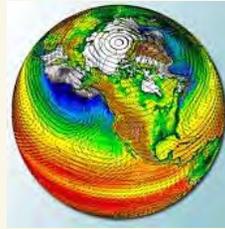
Andrew Schwarz  
Department of Water Resources

# State-Federal-Nonprofit Collaboration



RESOURCES LEGACY FUND





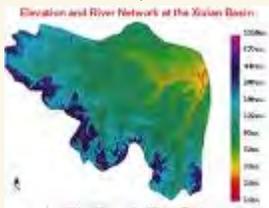
Science



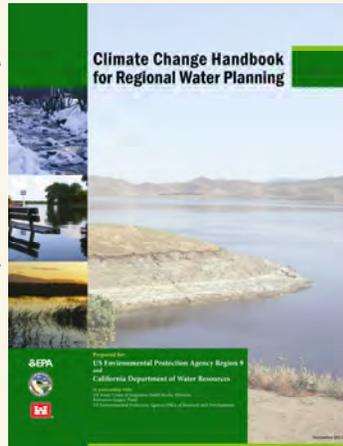
Policy



Practical



Technical



Planners

Engineers

Decision Makers

The Public

# Regional Water Planning and Management are the Frontlines for Responding to Climate Change

- Land use , energy, flood protection, water supply/demand, and wildlife and landscape conservation decisions are made at the local and regional level
- Climate change impacts and vulnerabilities vary by region
- Lots of adaptive capacity at the regional level

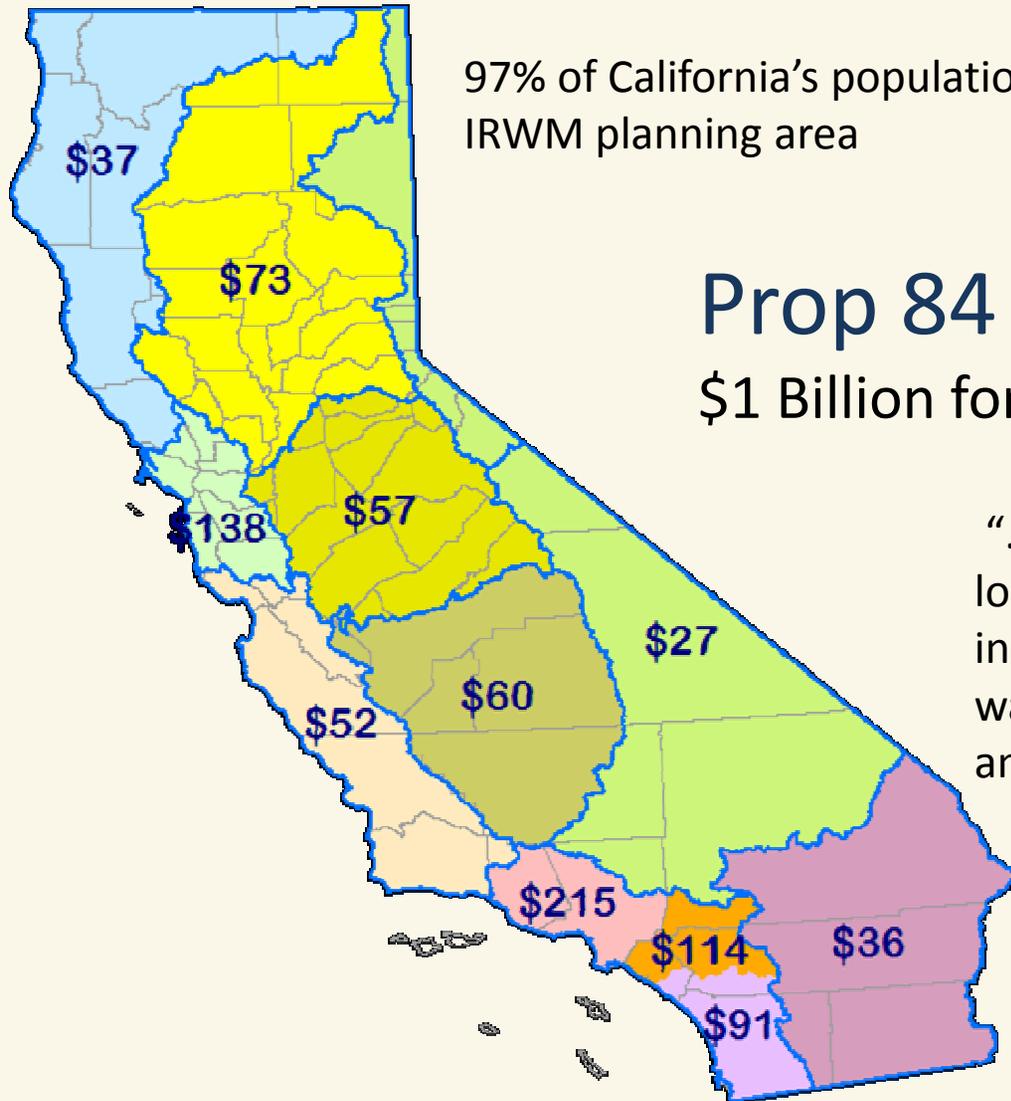
# Integrated Regional Water Management

97% of California's population lives within an IRWM planning area

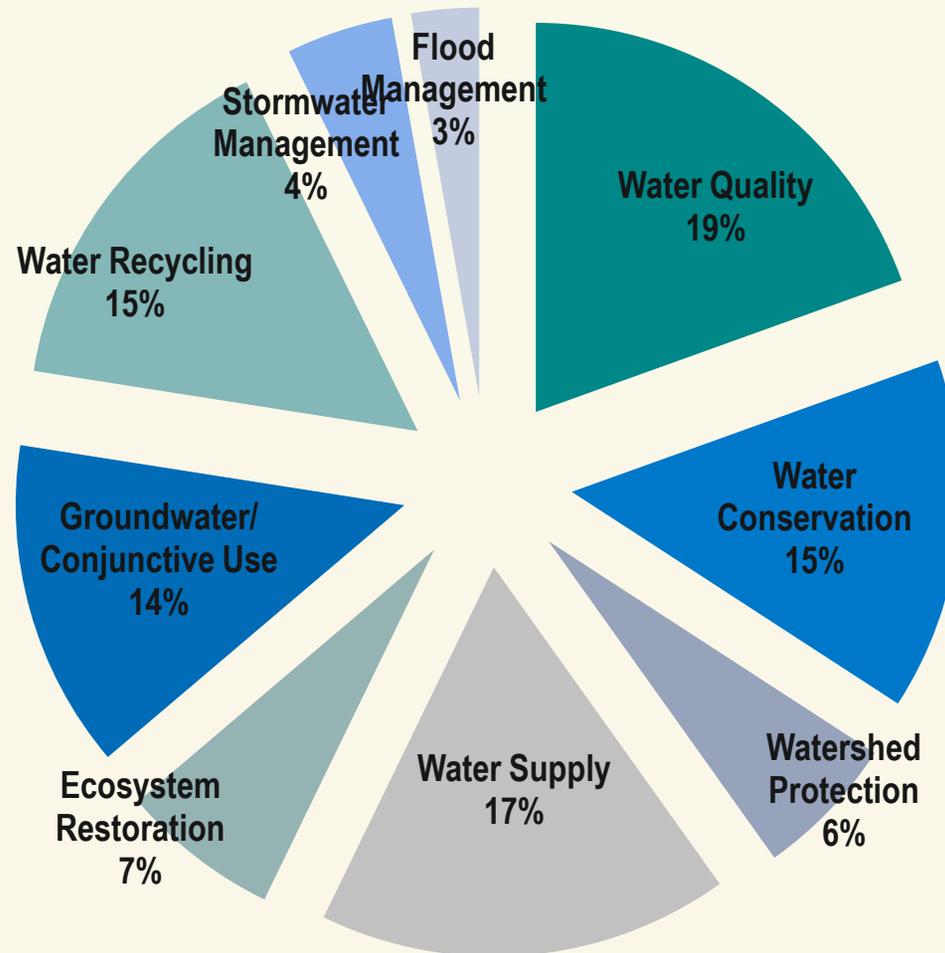
## Prop 84

\$1 Billion for IRWM

"...assists local public agencies to meet long term water needs of the state including the delivery of safe drinking water and the protection of water quality and the environment."



# Prop 84 IRWM Implementation Round 1 Primary Benefit



# Climate Change Analysis

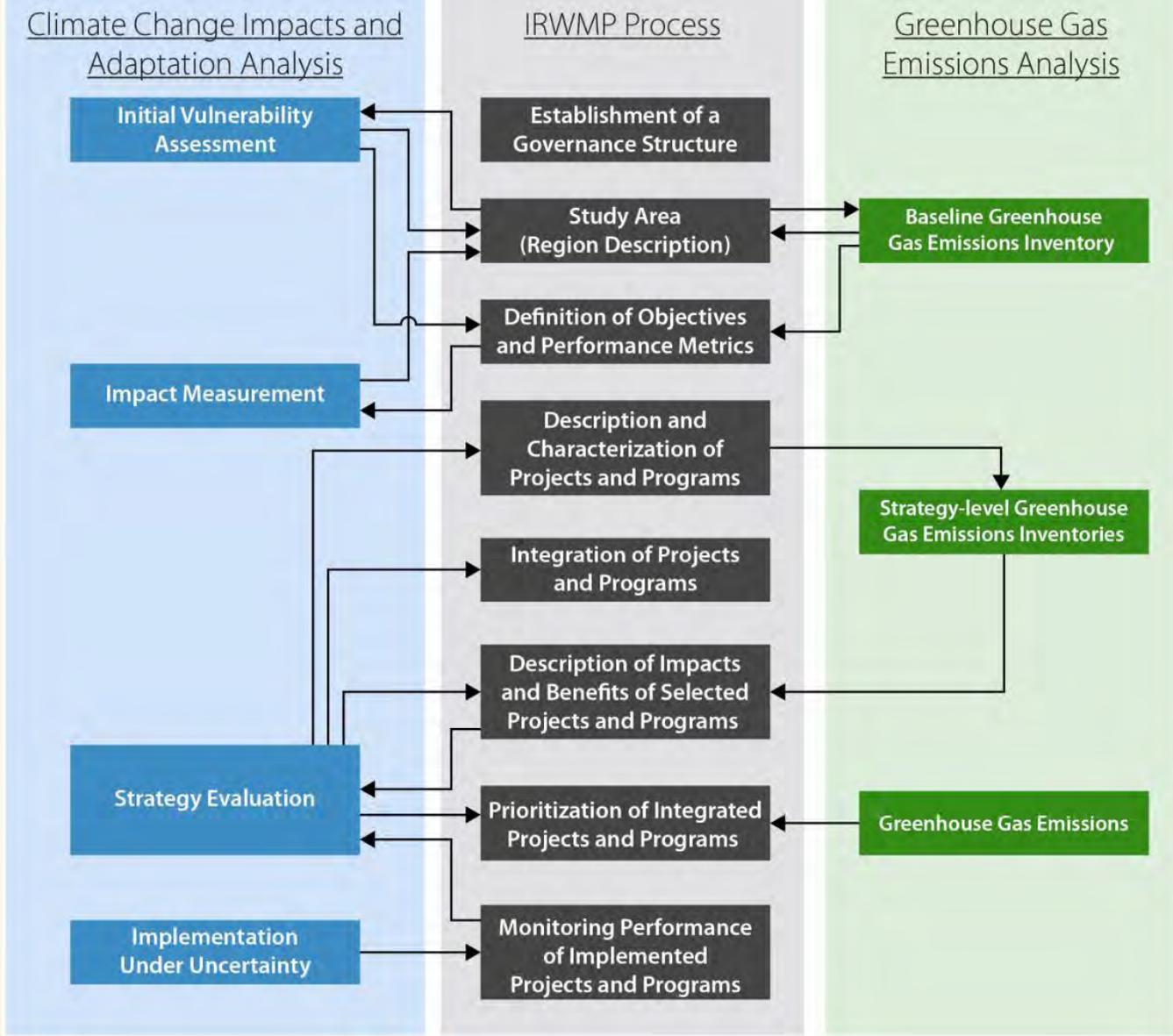
## Climate Change Analysis

Assess Vulnerability

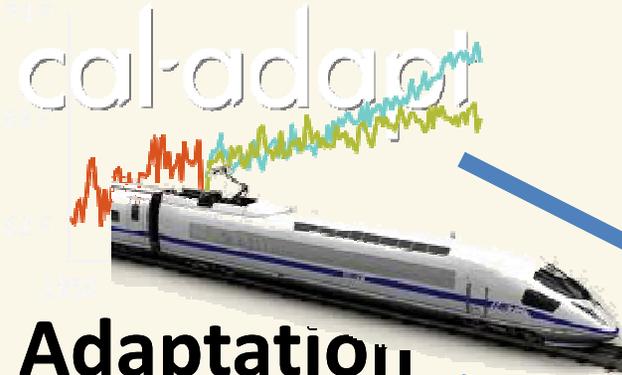
Measure Impacts

Evaluate Strategies  
(including adaptation and mitigation)

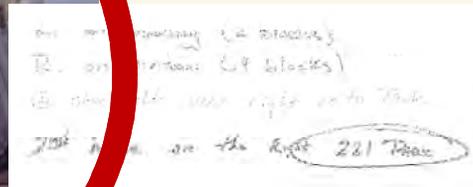
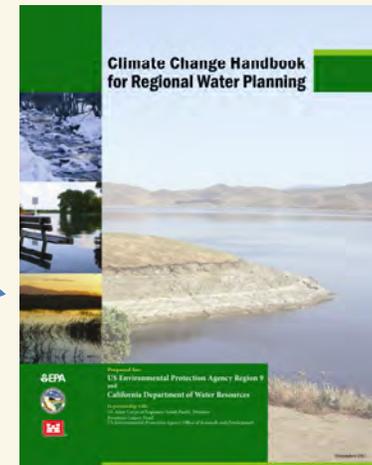
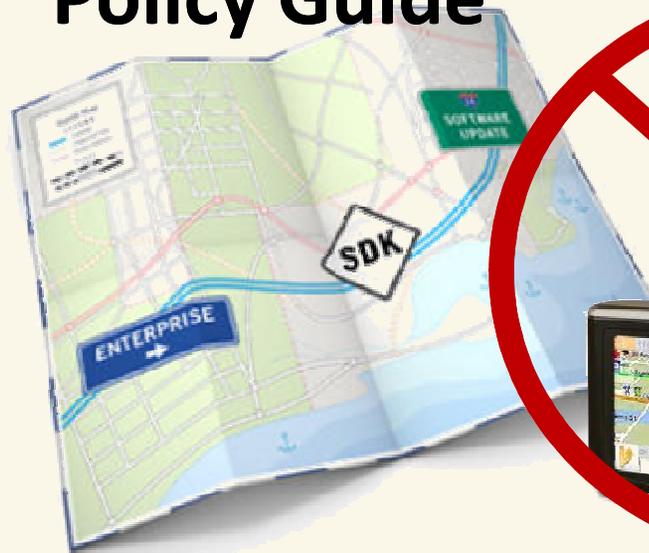
Implement Under Uncertainty



# Linking Up With Other Efforts



## California Adaptation Policy Guide





# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE





# State and Federal Resources for Local Government

Tina Curry  
California Emergency Management Agency

# California's Standardized System

## State

*State* – Statewide resource coordination integrated with federal agencies

## Regional

*Regional* – Coordinates among operational areas

## Operational Area

*Operational Area* – Coordinates all local governments within the geographic boundary of a county

## Local

*Local* – County, city or special district

## Field

*Field* – On-scene responders



# My Hazards: Interactive Website



California Emergency Management Agency | Hazard Mitigation Portal

## MyHazards

Helping reduce your risks from natural disasters



Cal EMA  
CALIFORNIA EMERGENCY  
MANAGEMENT AGENCY

Enter address to search for hazards (California only)

Map Search

Clear Search

Instructions

Earthquake

Flood

Fire

Tsunami

click on tabs above to change from earthquake, flood and fire

### Wildfire Hazards

California wildfires typically burn hundreds of thousands of acres each year. California law requires CAL FIRE (California Department of Forestry and Fire Protection), to identify areas based on the severity of fire hazard that is expected to prevail there. These areas, or "zones," are based on factors such as fuel (material that can burn), slope and the expected chance of burning. There are three zones, based on increasing fire hazard... Moderate (M), High (H) and Very High (VH).

See FEMA's information about [how to protect yourself from wildfire](#).

### Wildfire Hazard Preparedness

For those living with wildfire hazards start protecting your property by creating 100 feet of "defensible space" around your structures. This includes removing all flammable vegetation and debris within 30 feet immediately surrounding your home, and, creating a "reduced fuel zone" that extends 70 feet beyond that.

Next, you can use "ignition resistant" materials in your construction, and make sure you have well marked access to your property and an emergency water supply.

For many more tips on keeping your property fire safe see the [Fire Safety](#) web page from Cal Fire.

Contact Us Link E

Showing: Fire Hazard Map



Very high fire hazard

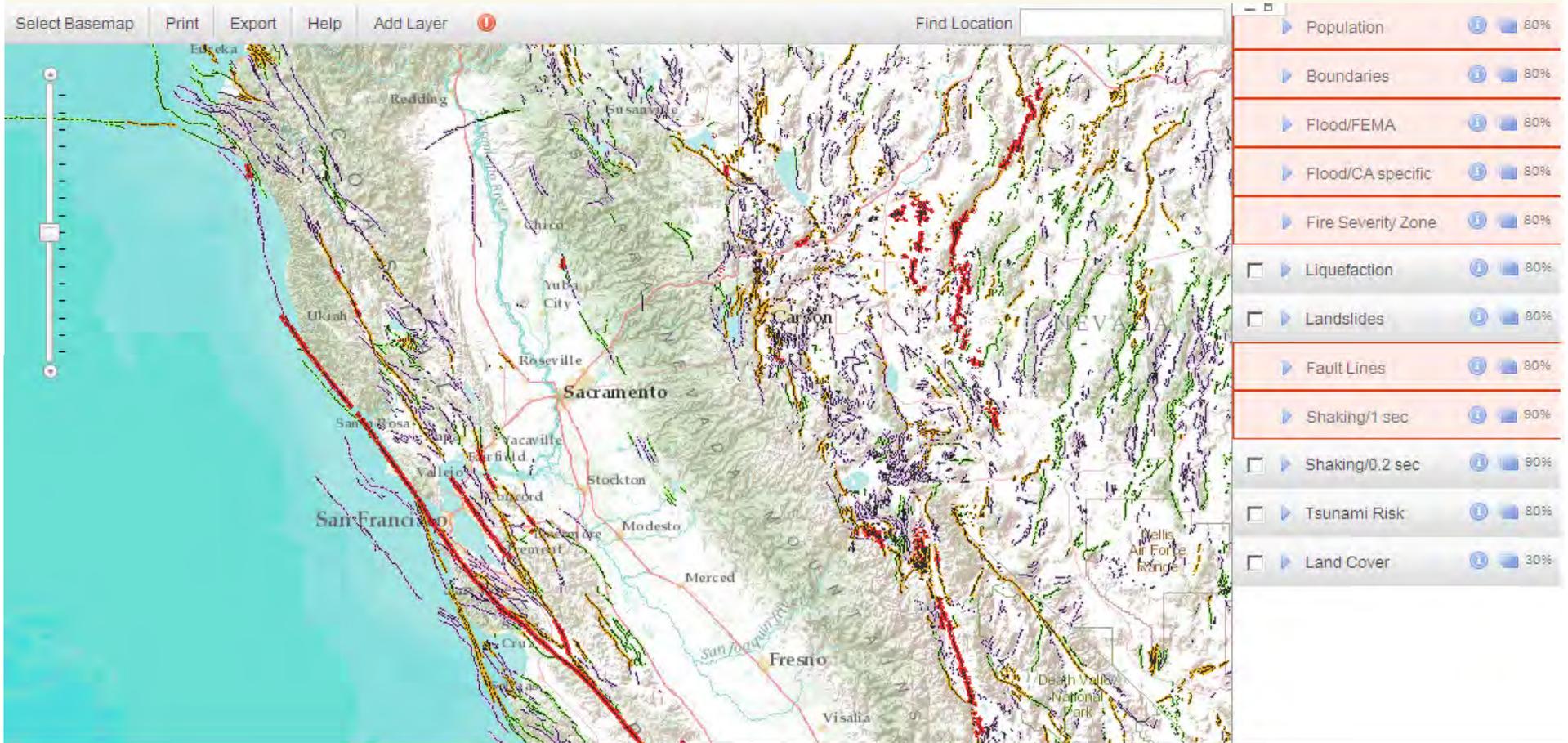


Cal EMA  
CALIFORNIA EMERGENCY  
MANAGEMENT AGENCY

<http://myhazards.calema.ca.gov>



# My Plan: Hazard Maps for Mitigation Planning



# Hazard Mitigation Assistance

- Local Mitigation Plans
- State Mitigation Plan
  - Adaptation Policy Guide
- Hazard Mitigation Grant Program
- Federal and State Disaster Assistance
- [www.calema.ca.gov](http://www.calema.ca.gov)



# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE





# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE



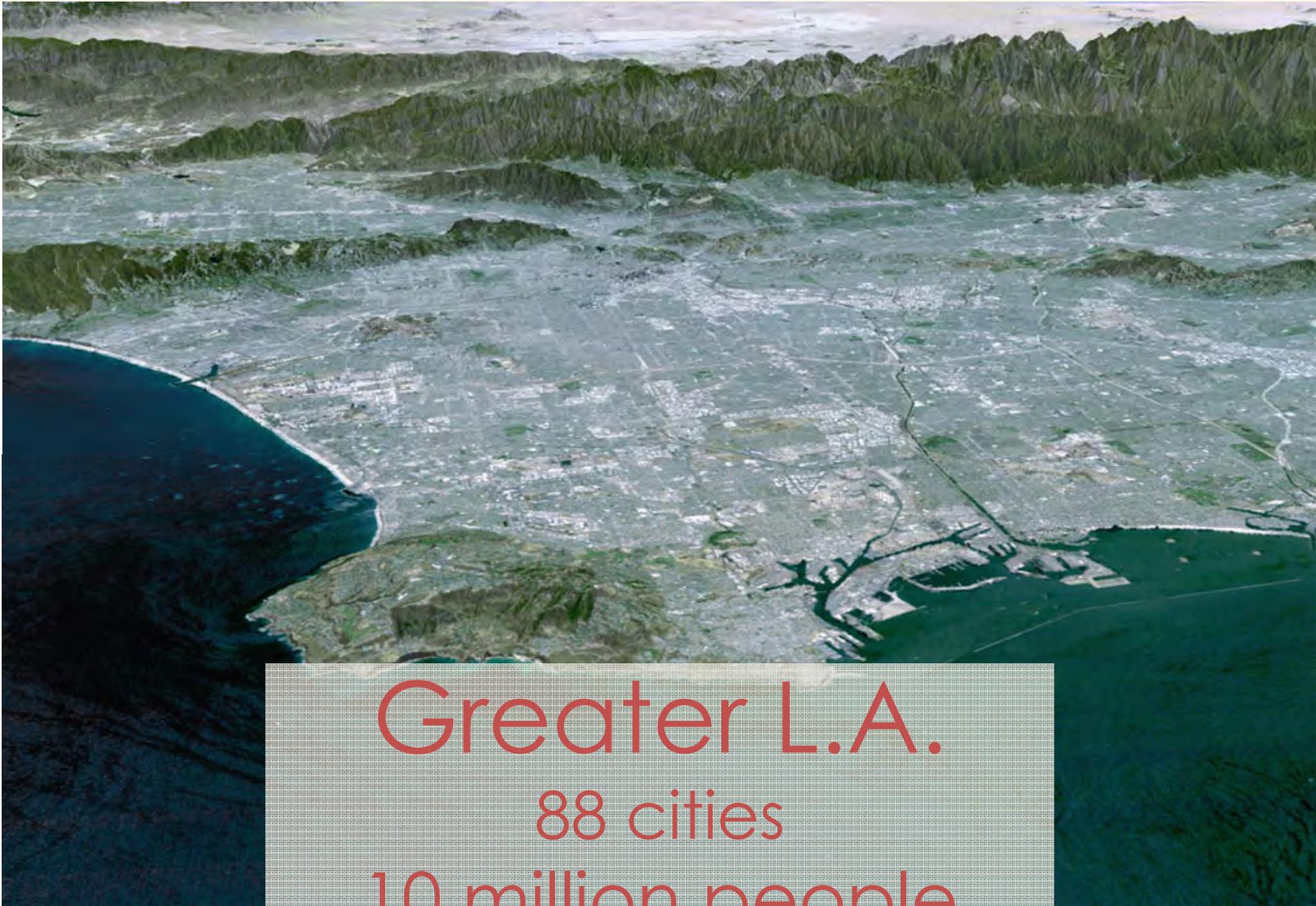
## Successful Regional Coordination



# Working together for a Sustainable Region

Paul Bunje

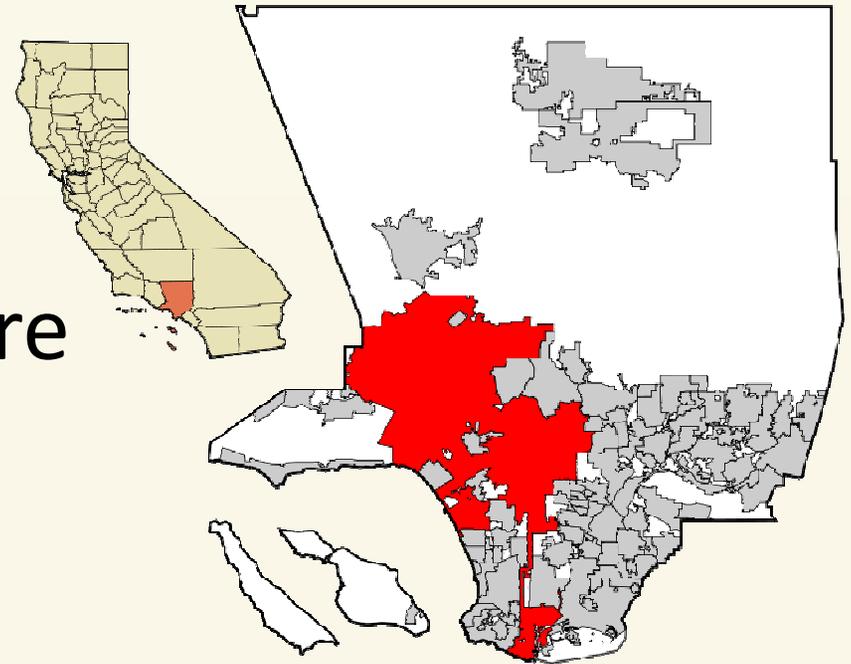
Los Angeles Regional Collaborative  
for Climate Action and Sustainability



Greater L.A.  
88 cities  
10 million people

# Global Climate Change is a Profoundly Local Challenge

- ADAPTATION: Impacts are unique to each place
- MITIGATION: GHGs are emitted because of local economies





LA Collaborative Vision Team, January 2009

The Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) came together in 2008 to coordinate regional climate action.

- [laregionalcollaborative.org](http://laregionalcollaborative.org)

The purpose of LARC is to share information, foster partnerships, and develop system-wide strategies to address climate change and promote a green economy through sustainable communities.

## Goals

- ▶ Climate action
- ▶ Promote a green economy
- ▶ Build sustainable communities

## Methods

- ▶ Coordination
- ▶ Planning
- ▶ Resources
- ▶ Engagement

- [laregionalcollaborative.org](http://laregionalcollaborative.org)

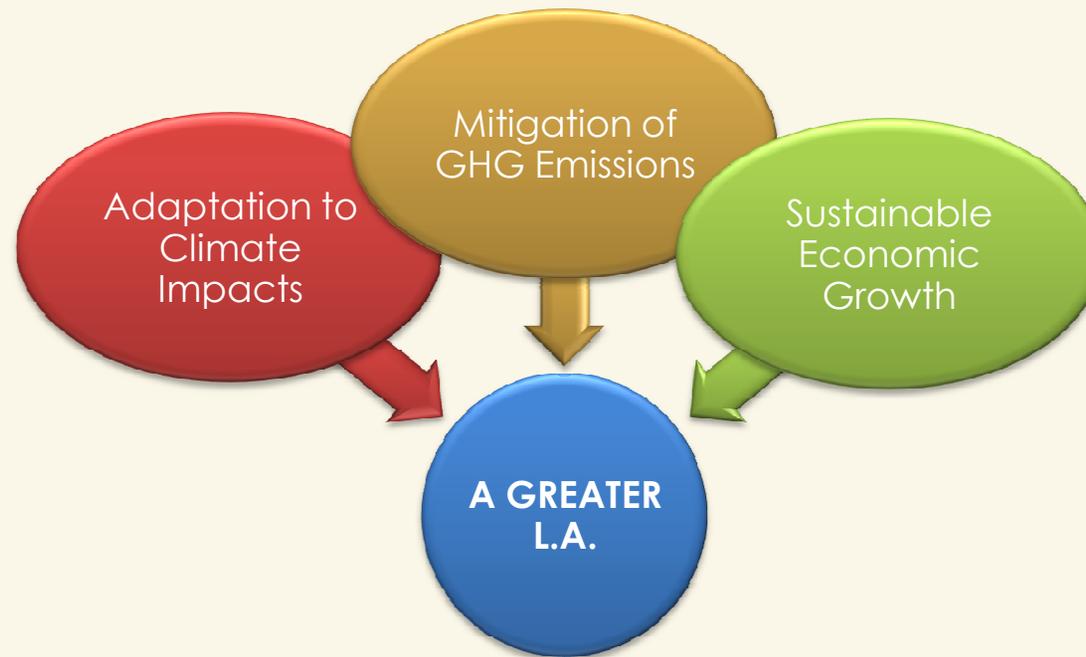
# Coordination

- Cross-jurisdictional and public-private partnerships
- Leverage local, state and federal resources to implement the Framework
- Coordinate local planning efforts
- Coordinate grant writing
- Topical working groups



# A Greater L.A.: The Framework for Regional Climate Action and Sustainability

- Successful climate action actually requires a comprehensive sustainability plan



- [laregionalcollaborative.org](http://laregionalcollaborative.org)

# Resources

- Information Sharing
- Promote Best-Practices
- Catalogue Successful Strategies
- Access to Research
  - USC Sea Grant – Sea Level Rise vulnerability assessment
  - UCLA Institute of the Environment and Sustainability – California Center for Sustainable Communities Research
  - UCLA Luskin Center for Innovation – Program on Local Government Climate Action Policies (Southern California Climate Action Database)
  - Antioch University – Masters in Sustainability
  - Electricore Inc. – Coordinated federal research projects
- [laregionalcollaborative.org](http://laregionalcollaborative.org)

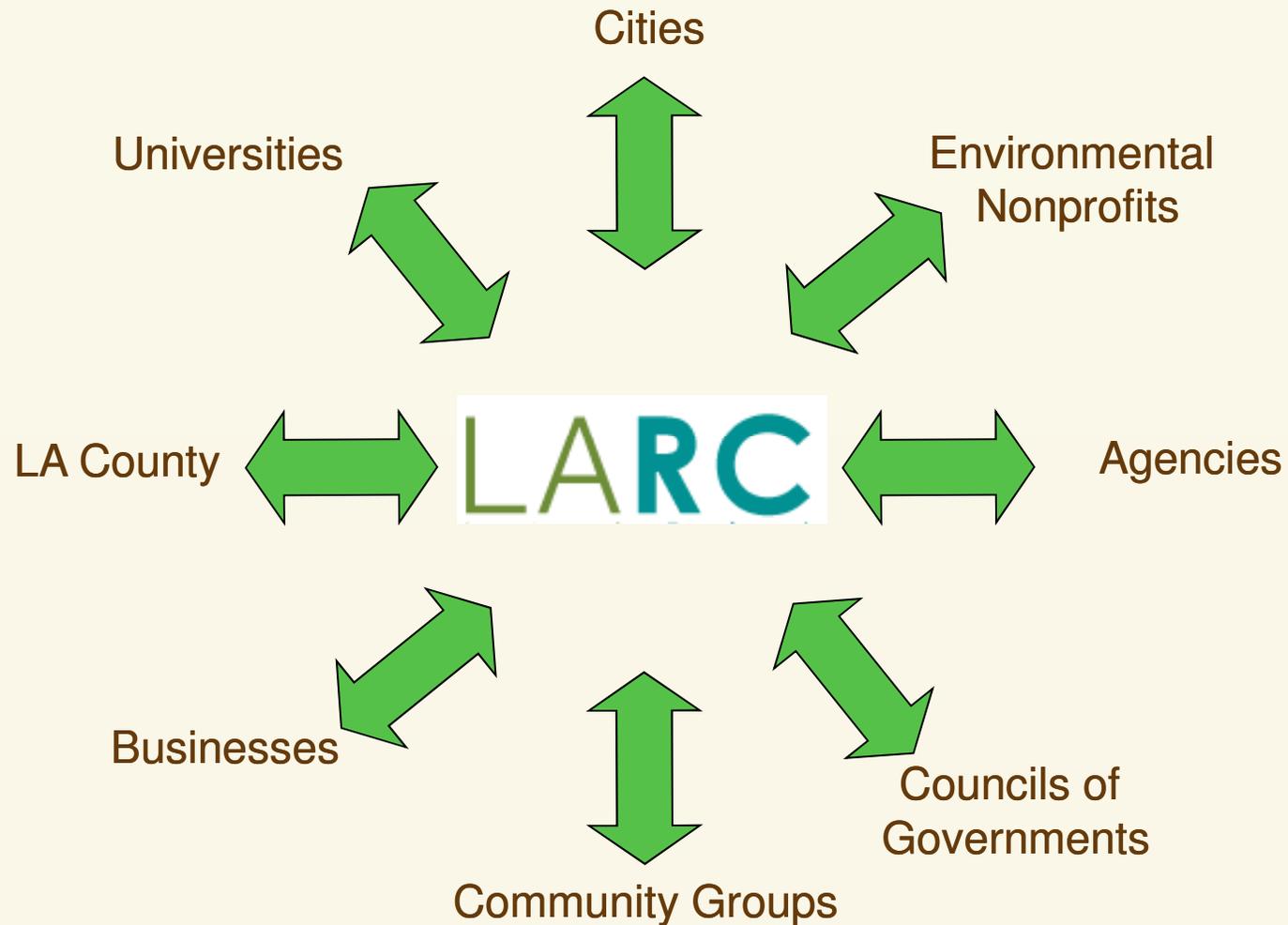
# Engagement

- Steering Committee: Building strong relationships
- Public Outreach: Website, talks, media
- Quarterly Meetings: Workshops on sustainability topics
- Southern California Sustainability Forum: the annual event for stakeholders to engage on local government and regional strategies. August 13-14, 2012



- [laregionalcollaborative.org](http://laregionalcollaborative.org)

# Integration and Collaboration



- [laregionalcollaborative.org](http://laregionalcollaborative.org)



# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE





# The San Diego Foundation Climate Initiative

Nicola Hedge  
San Diego Foundation

# Successful Regional Coordination



# Climate Action – 5 Years Ago

**US Mayors /  
Climate Registry**

- Chula Vista, Del Mar and San Diego

**Greenhouse Gas  
Inventories**

- Chula Vista and San Diego

**Local Climate Action  
Plans**

- Chula Vista and San Diego

**Other Regional Plans  
/Public Agencies**

# Climate Action - TODAY

US Mayors/  
Climate Registry

- **13 of 19** Local Governments committed to climate action

Greenhouse Gas  
Inventories

- **All 19** Local Governments performed GHG emissions inventories

Local Climate Action  
Plans

- **9 of 19** Local Governments working on or adopted climate action plans

Other Regional Plans  
/Public Agencies

**Port of San Diego:** *Mitigation & Adaptation Plan*

**SANDAG:** *SB375; Regional Climate Action Strategy*

**San Diego County Water Authority:** *Mitigation & Adaptation Plan*

**Regional Airport Authority:** *Mitigation & Adaptation*

**US Navy Region Southwest:** *Mitigation & Adaptation*

# Why a Climate Initiative?

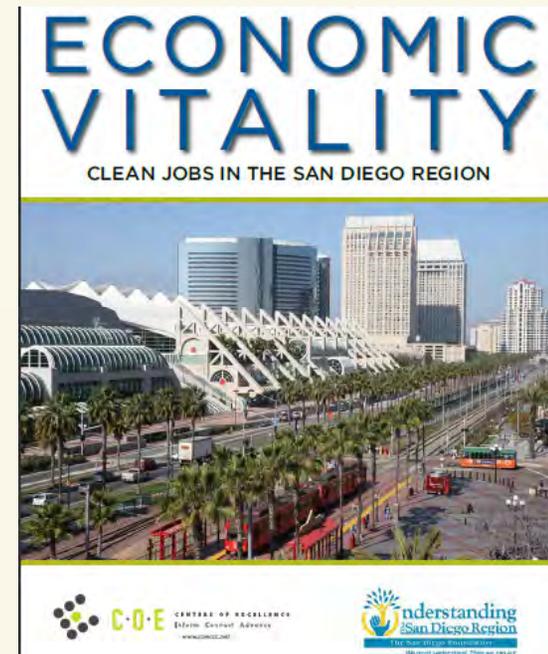
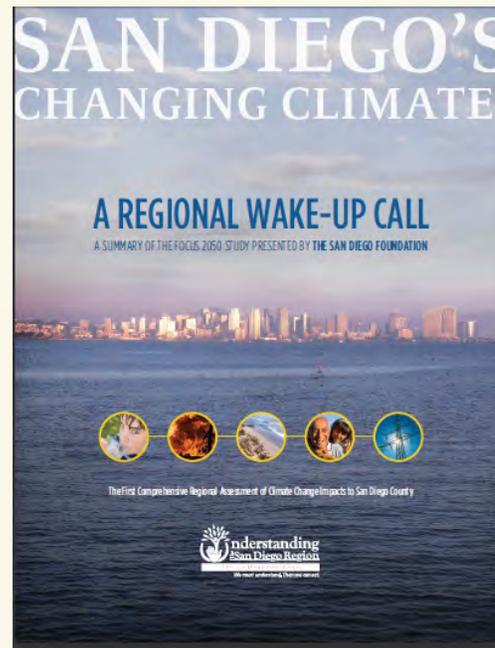
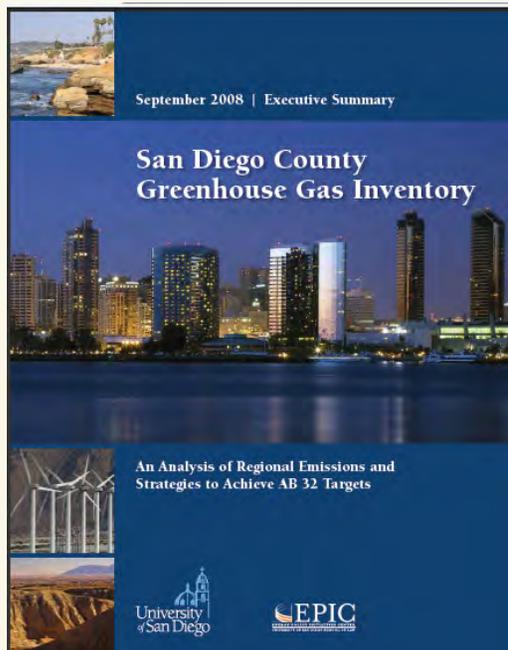


- Successful Regional Coordination

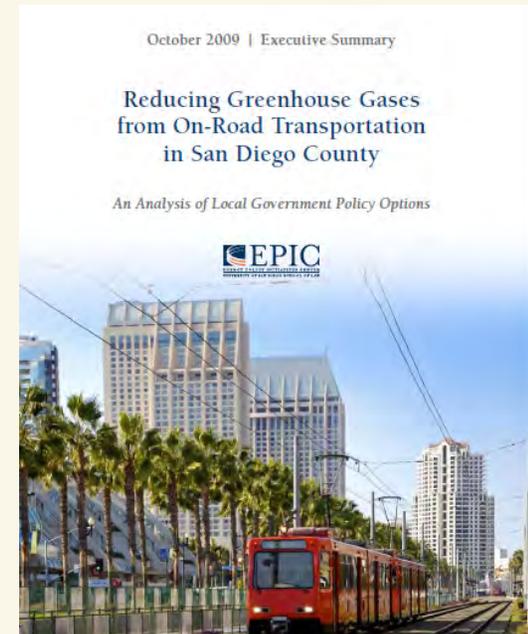
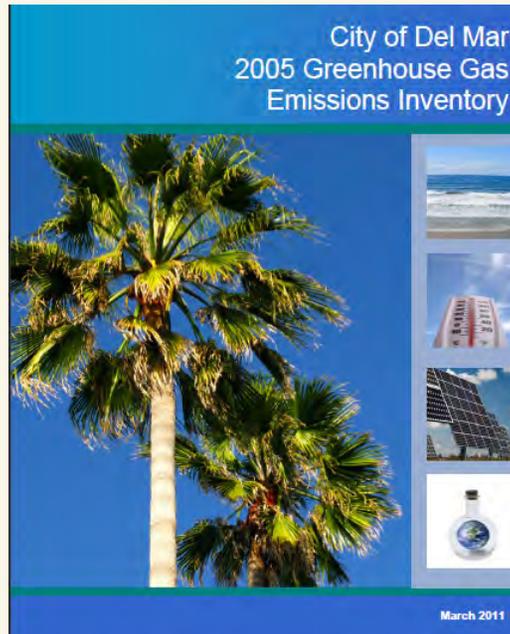
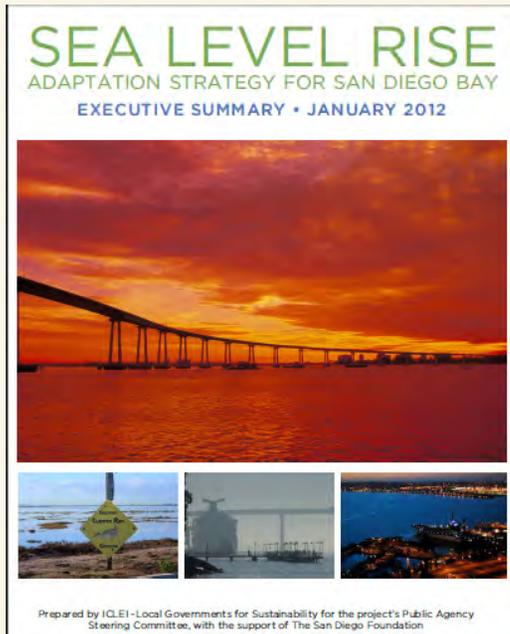


- Successful Regional Coordination

# Local Science and Research



# Technical Expertise



- Successful Regional Coordination



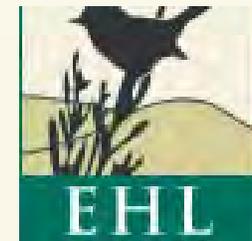
# Collaboration

- Regional Climate Protection Network
- Regional Collaborative on Climate Change
- San Diego Bay Sea Level Rise Strategy
- Co-fund partnership with Scripps Institution of Oceanography and County Water Authority



- Successful Regional Coordination

# Community Engagement



- Successful Regional Coordination

# Public Awareness

*8 in 10 San Diegans are concerned about the impacts of climate change on future generations*

OUR  
GREATER  
SAN DIEGO  
VISION

... SAN DIEGO REGIONAL  
Climate Education Partnership  
:

- Successful Regional Coordination

# Climate Initiative Partners

**Bank of America**



**QUALCOMM**

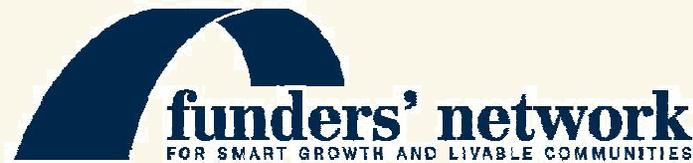
TSX Green  
Foundation

**THE KRESGE FOUNDATION**

Zell Family



Beyster Family, Blasker-Miah Rose, Engel, Hattie Ettinger Conservation, Hervey Family and Orca Funds, as well as the Zell Family Foundation





# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE

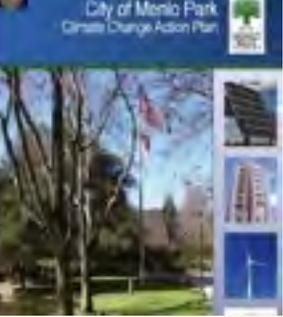
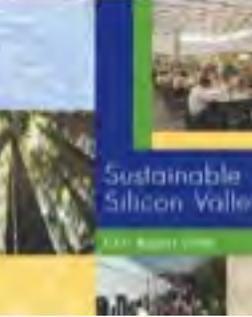
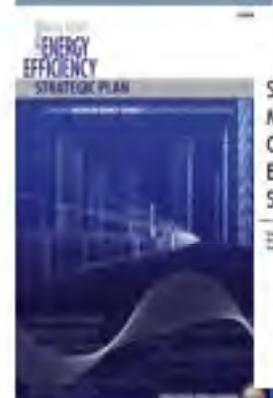
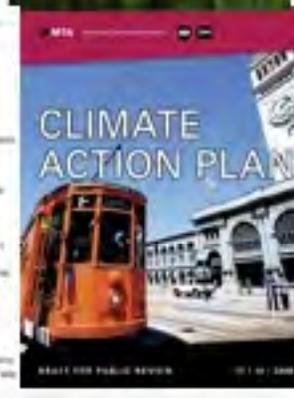
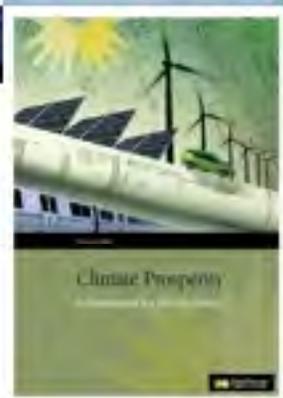
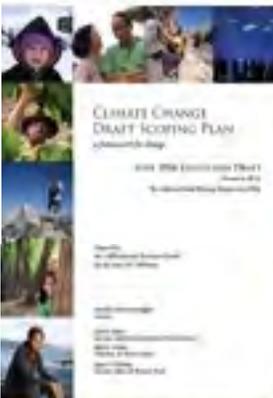
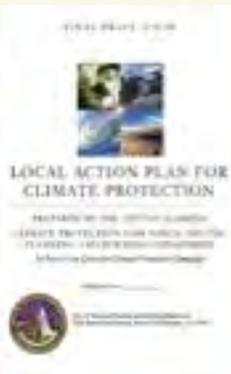
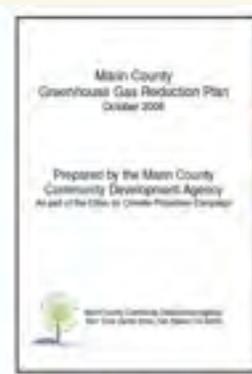
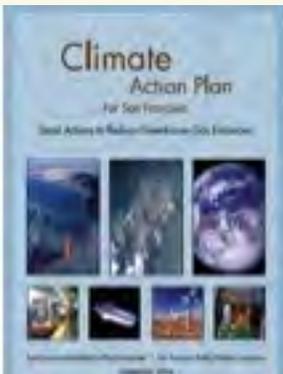
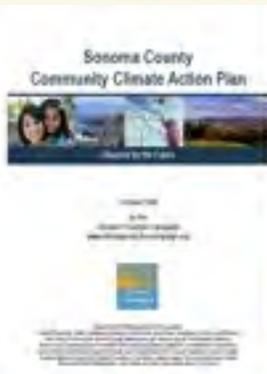




# Bay Area Climate & Energy Resilience Project

Bruce Riordan

Bay Area Joint Policy Committee





*Cooperative Research & Development between Pacific Gas & Electric Company and  
the U.S. Geological Survey on Earthquake Hazards in the San Francisco Bay Area*

**Collective Impact**  
By John Kania & Mark Kramer

Stanford Social Innovation Review  
Winter 2011

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**Economies of Scale & Scope in River Basin Management**

Gary Wolff, P.E., Ph.D.

Principal Economist and Engineer

The Pacific Institute, Oakland California

[gwolff@pacinst.org](mailto:gwolff@pacinst.org) and 510 251 1600

**Introductory Remarks**

Water management in most parts of the world has long followed a pattern of functional specialization (FS). Water agencies, companies, or departments of government supply water. Other agencies, companies, or departments supply wastewater services. Yet a third group is charged with flood control and storm runoff management. Of course some water utilities supply both water and wastewater services, and some government departments include all three branches of the water sector. These may appear to be exceptions, but the internal organization of these departments is usually along functional boundaries with planning documents and capital improvement budgets separated by function.

In contrast, many view River Basin Management (RBM) and its close cousins, Integrated Water Resources Management (IWRM) and Watershed Management (WM), as the emerging and better paradigm for water management. The World Bank (1993) has long urged the adoption of a comprehensive, cross-sectoral approach to water management. Saragoldin (1995) labeled the French system of stakeholder-governed water institutions organized into six hydrologic basins, created in 1964, as a "model" to be emulated by

15 November 2004  
FINAL PAPER FOR IDE

1/24

Gary Wolff, P.E., Ph.D.  
[gwolff@pacinst.org](mailto:gwolff@pacinst.org)



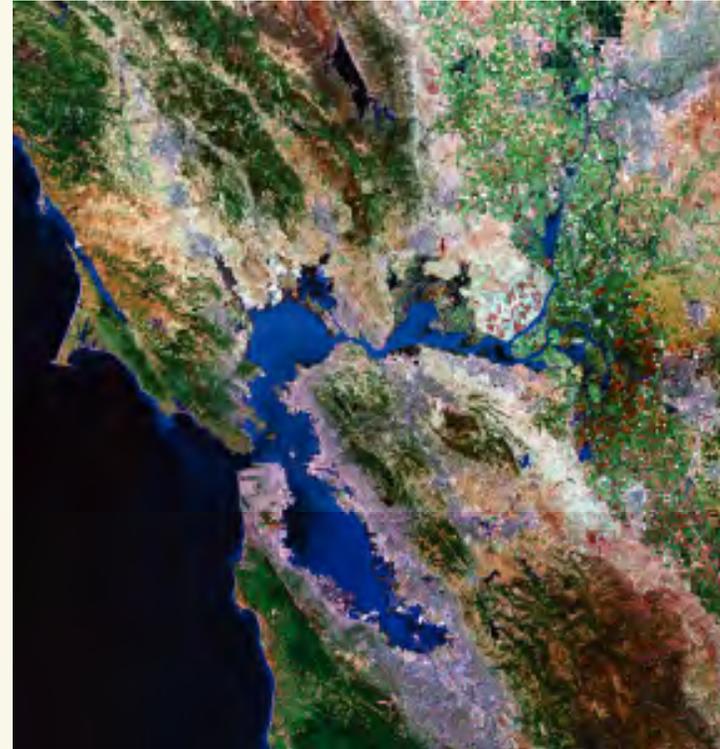
**YES**



**NO**

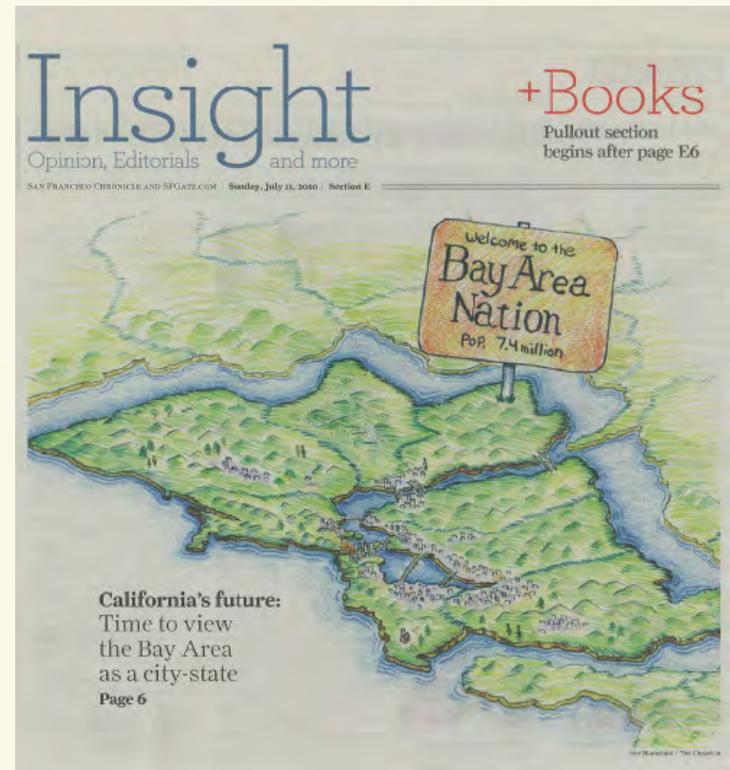
# April-May-June

- Report
- Event
- Briefings
- Commitments



# Our Vision:

- Researchers + Practitioners
- Forum for Tough Discussions
- Support Center





# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE





# Regional Coordination in the Sierra Nevada

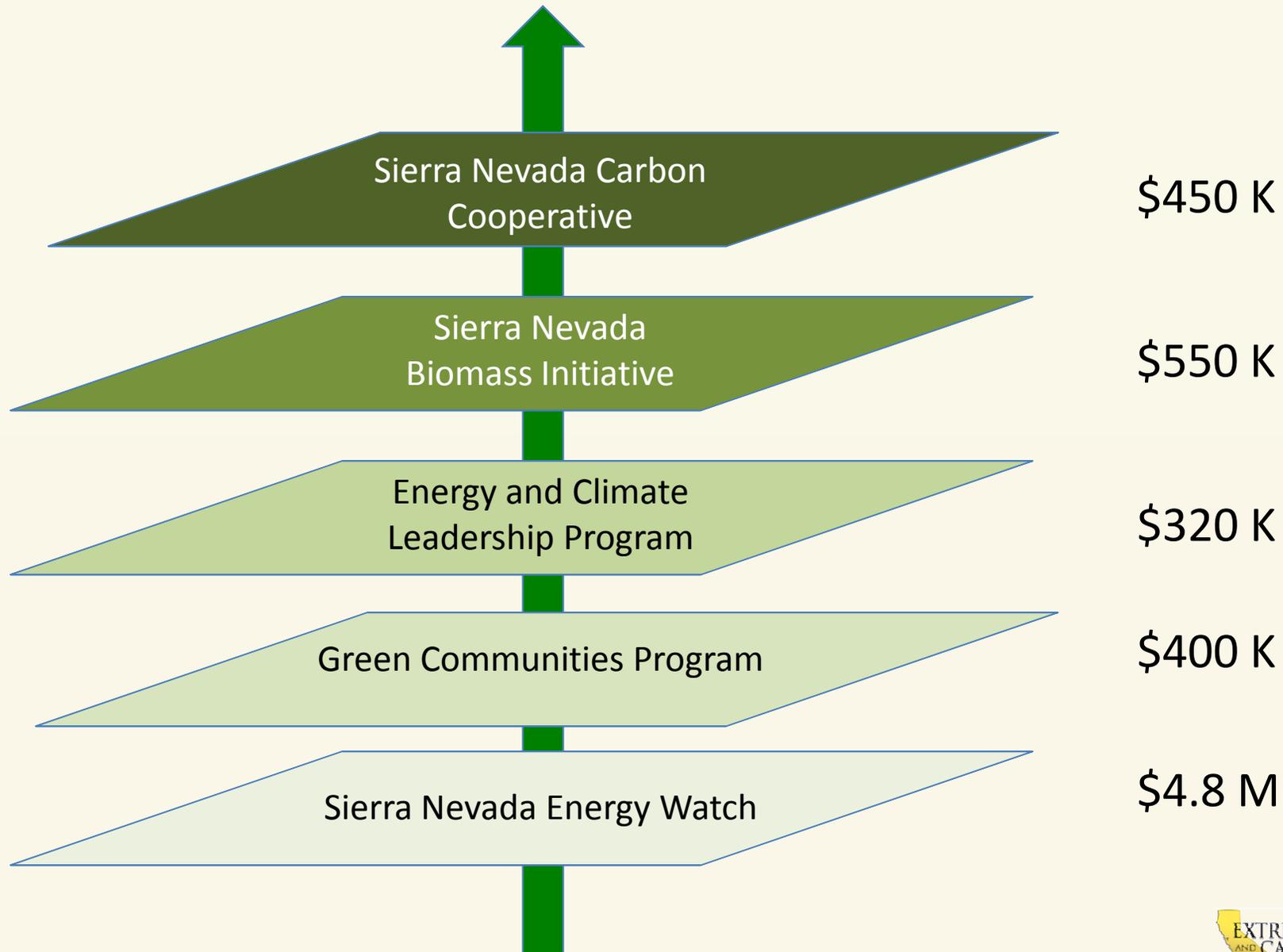
Steve Frisch  
Sierra Business Council

- Founded in 1994
- Works throughout the Sierra Nevada (20 Counties)
- Staff in San Francisco, Truckee, Bishop & Sonora
- Member-based Organization with about 750 members (business, government, non-profits, and individuals)
- Partnership Network reach of 12,000 active participants
- Promote public/private partnerships and private investment
- Strategic Plan Objective: Climate Change Adaptation and Mitigation



# 5 Inter-connected Programs

\$7 M over 3 years



# SNEW Service Area

- 14 Counties
- 3 Implementers

Municipal, Special District,  
and Non-Profit Customers

Sierra Business Council

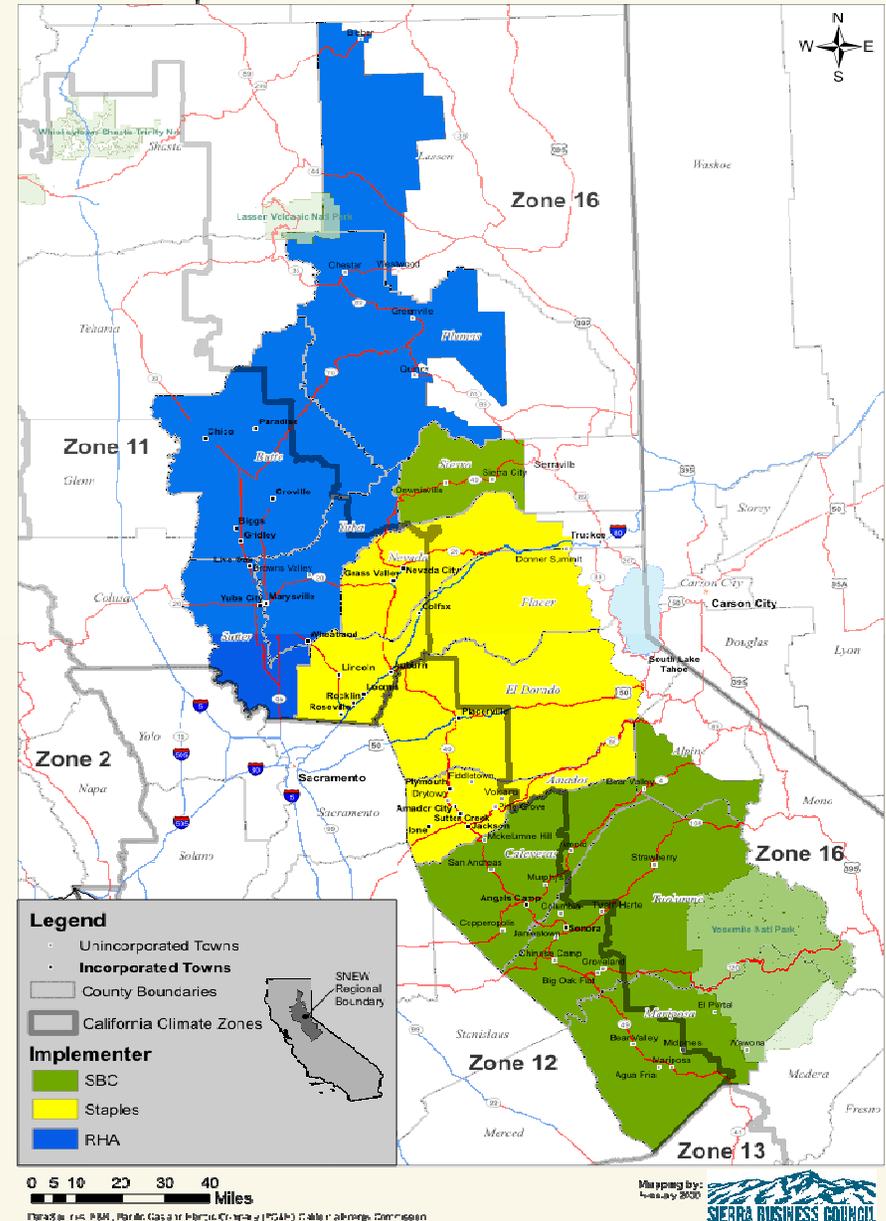
Small Business Customers

Sierra Business Council

Staples

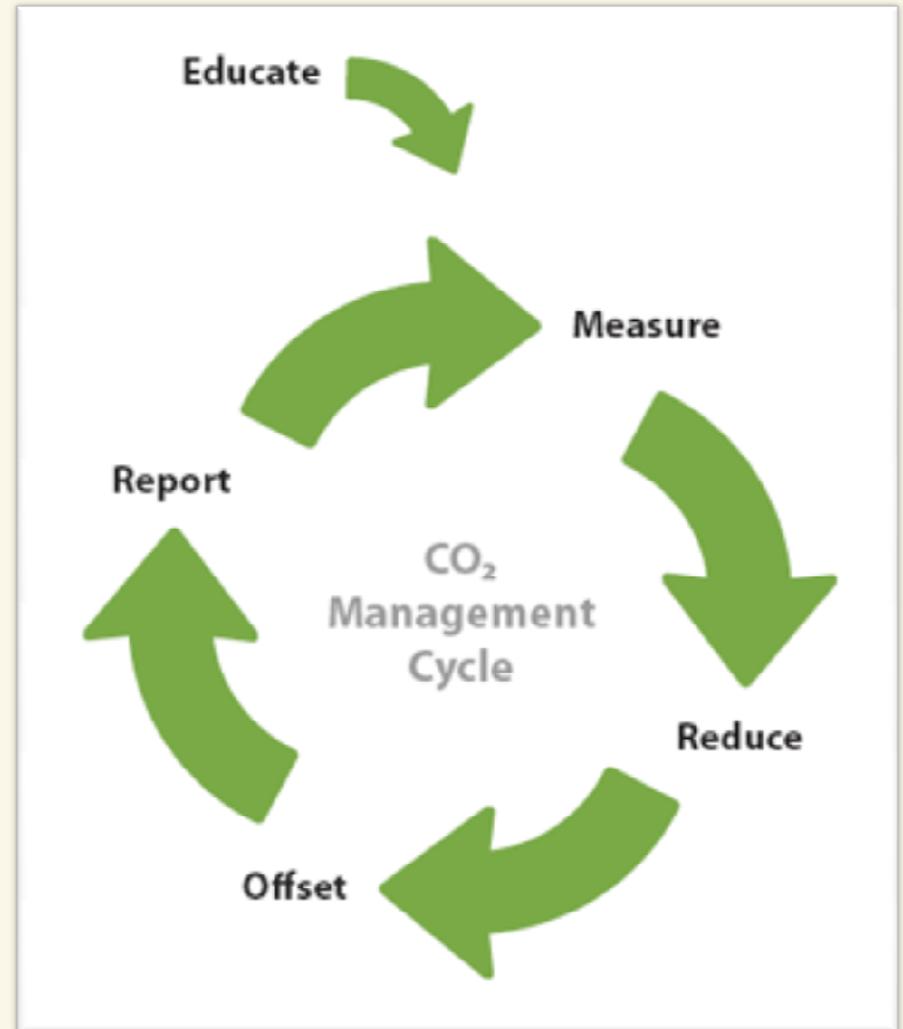
RHA

Sierra Nevada Energy Watch Region  
Implementation - Small and Medium Businesses

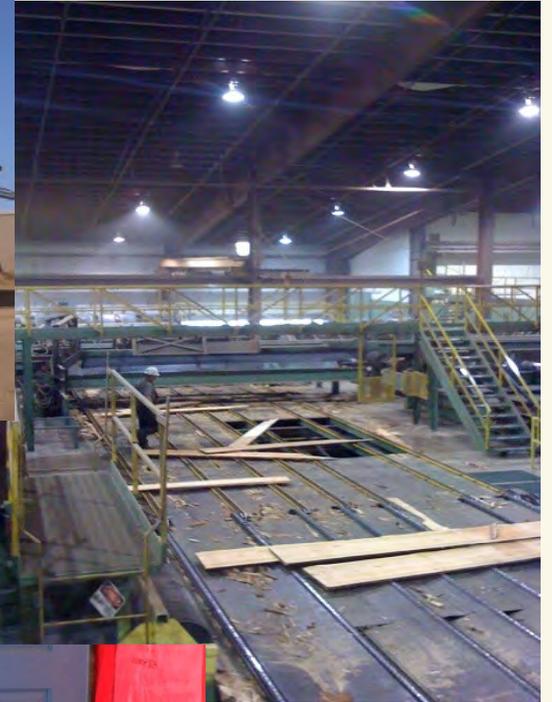


# Green Communities

- Local Government GHG Inventories
- Community Inventories
- Climate Action Plans
- 19 Local Government Inventories
- 17 Community Wide Inventories
- 3 Climate Action Plans



# Sierra Energy and Climate Leadership Program

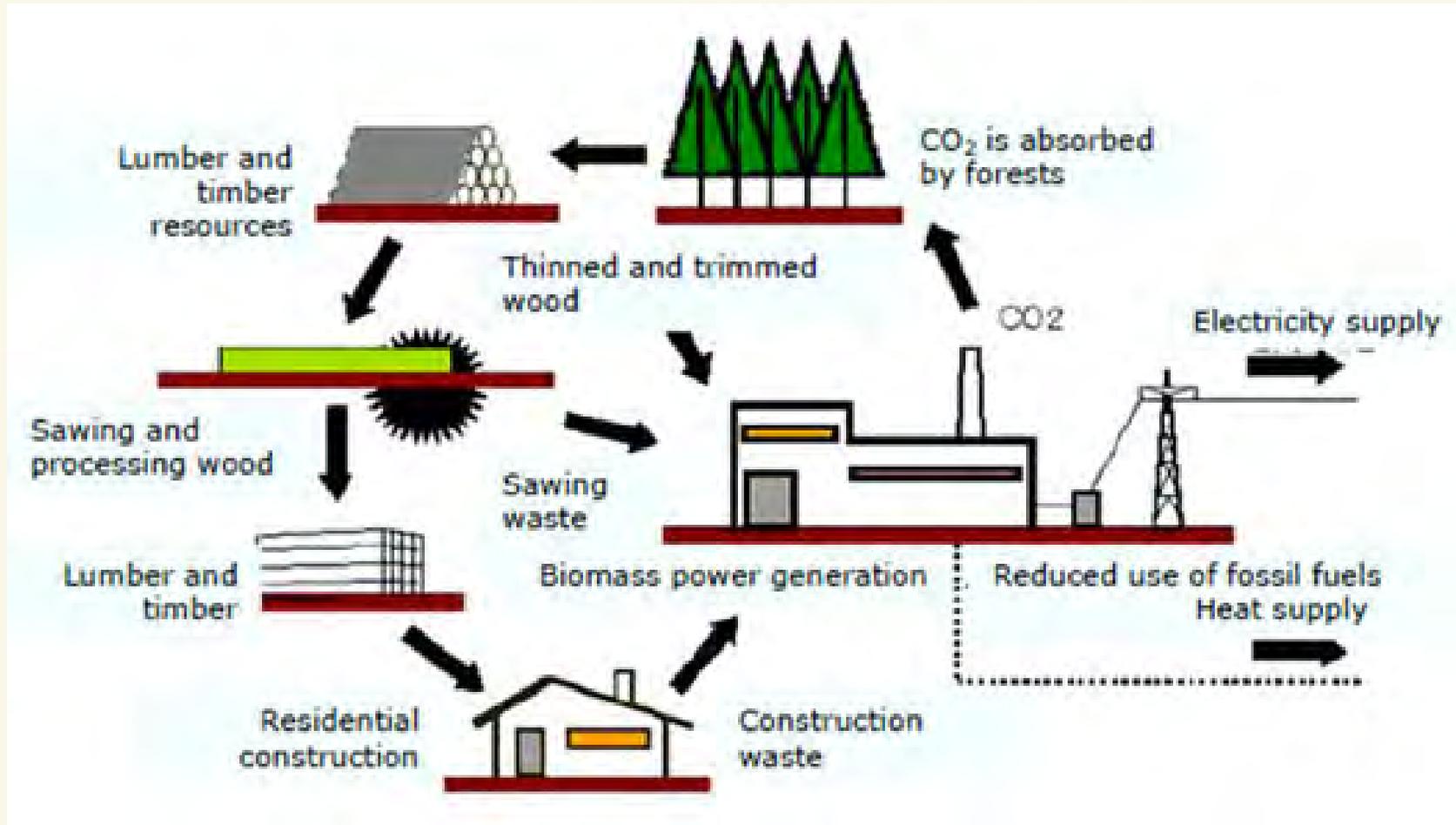


**SMEasure**  
Savings by Monitoring Energy

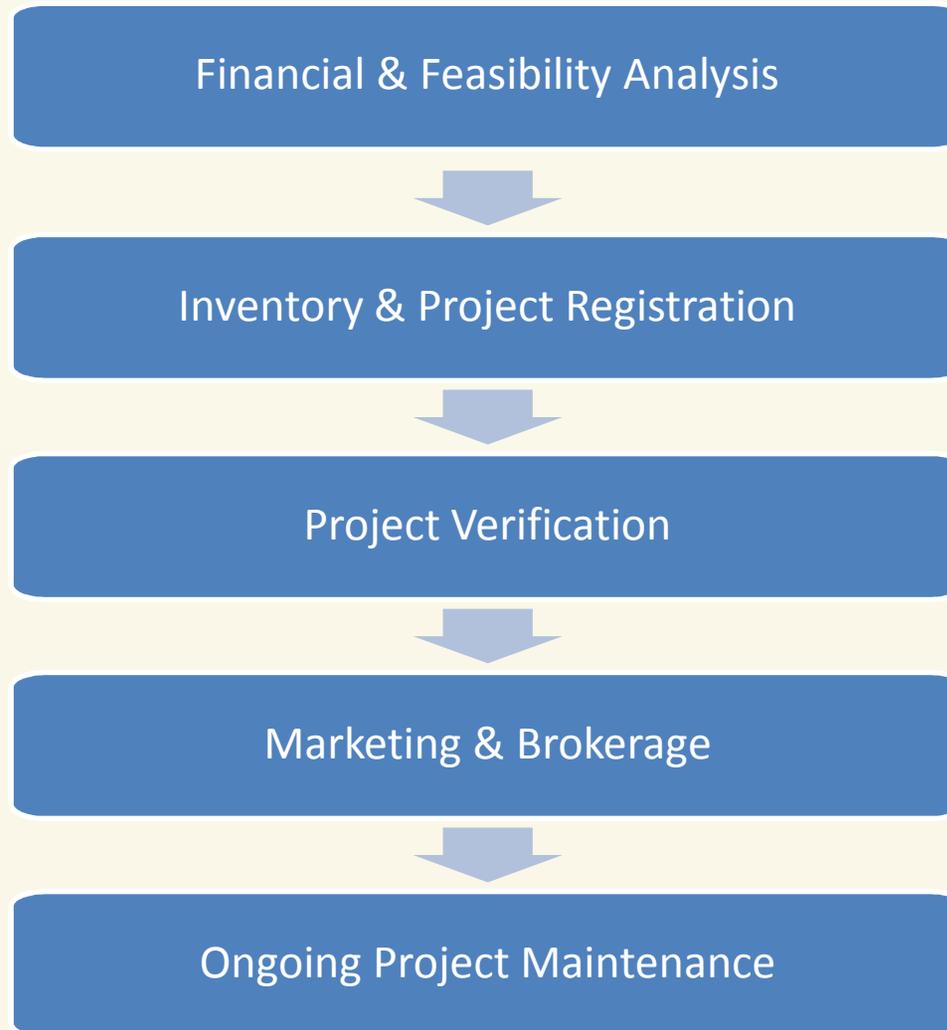


**Energy Efficiency Training Program**

# Sierra Nevada Biomass Initiative



# Sierra Nevada Carbon Cooperative





# EXTREME CLIMATE RISKS AND CALIFORNIA'S FUTURE

