California Emergency Management Agency

Statewide Extreme Event Planning Scenarios

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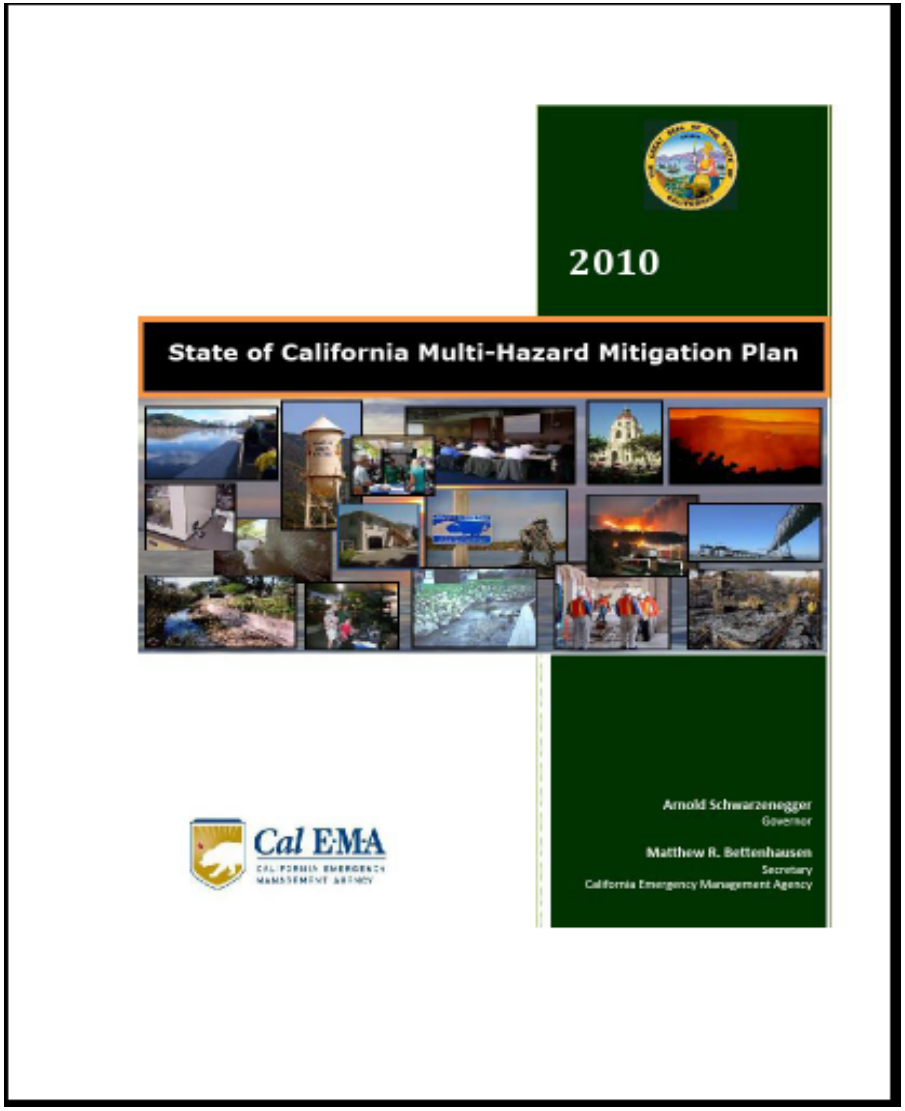
STATE HAZARD MITIGATION OFFICER

Nature of Extreme Events

- Natural hazards
  - Geological – earthquakes, tsunami, landslides
  - Flooding
  - Wildfires
- Human-caused hazards – chemical releases, nuclear accidents, bridge and dam failures
- Climate Change – heat, severe storms, earlier snow melt, flooding, wildfires, sea level rise

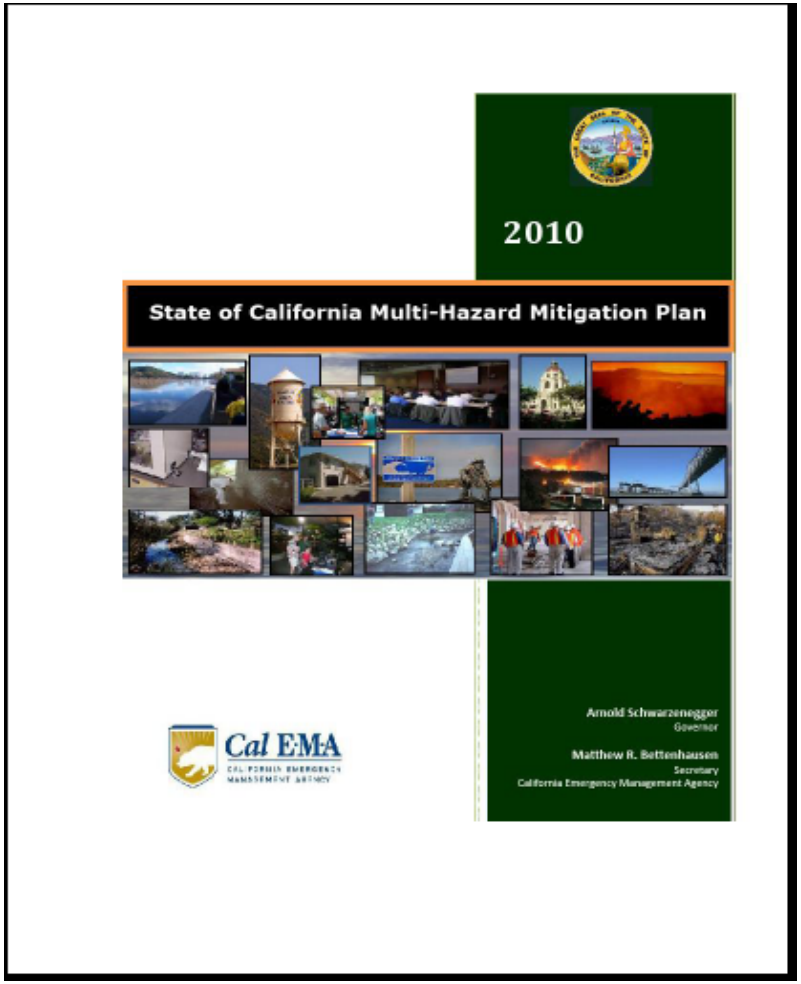
2010 California State Multi-Hazard Mitigation Plan (SHMP)



- Designated an Enhanced State Mitigation Plan by FEMA, bringing extra post-disaster grants
- Prepared by Cal EMA in coordination with Cal Poly San Luis Obispo
-Addresses mitigation strategies to counteract natural and human-caused hazards, e.g., earthquakes, flooding, wildfires
- ***Recognizes climate change and the need to connect climate action and adaptation with hazard mitigation***

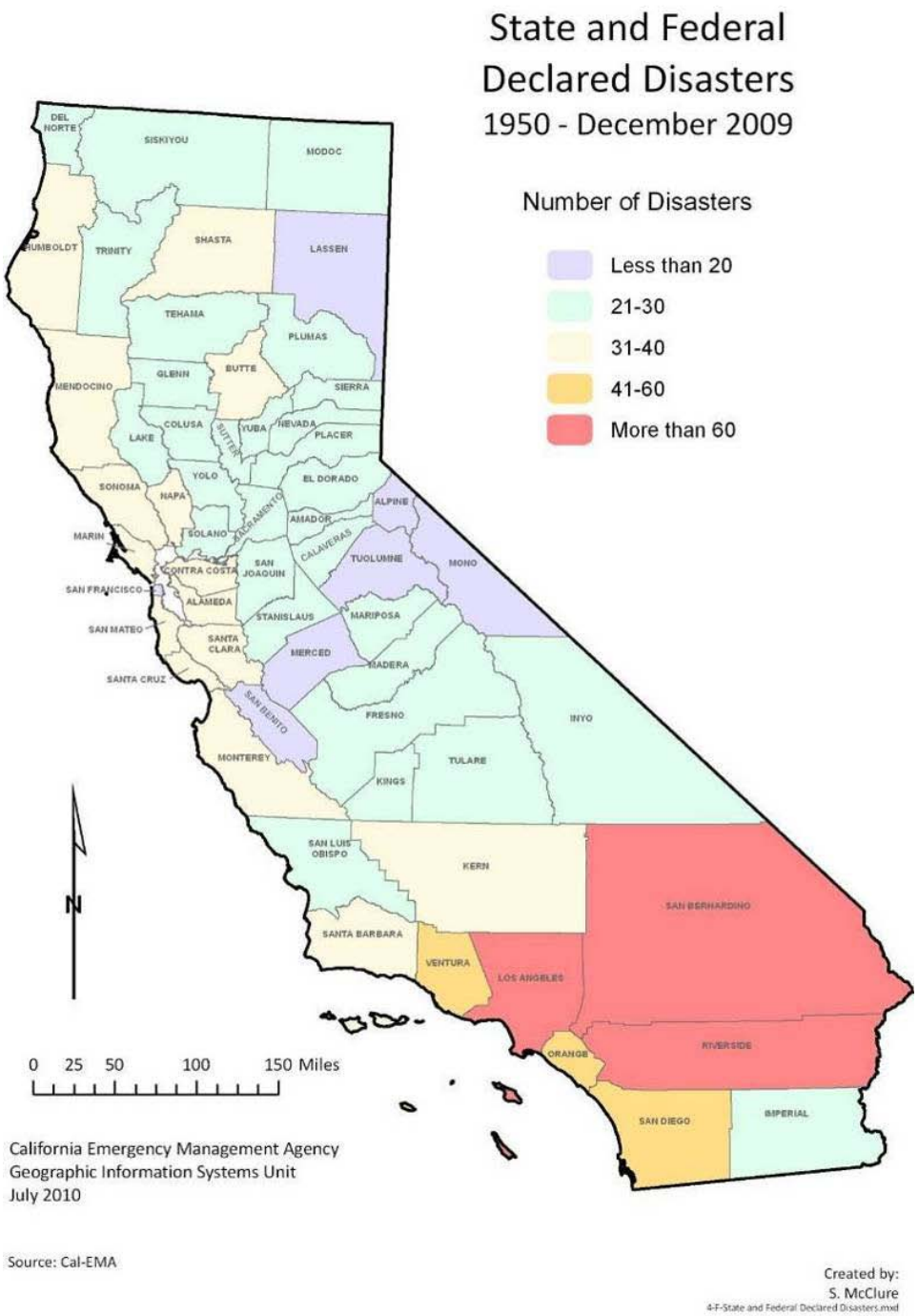
2010 State Hazard Mitigation Plan: Why This Plan is Important for Local Adaptation

- Provides frame of reference for state and local risk reduction and hazard mitigation decisions
- ***Provides implementation tools such as MyPlan and the APG***
- Helps create more resilient and sustainable urban and rural communities
- Protects California's economy and environment from preventable losses
- Creates benchmarks for future action



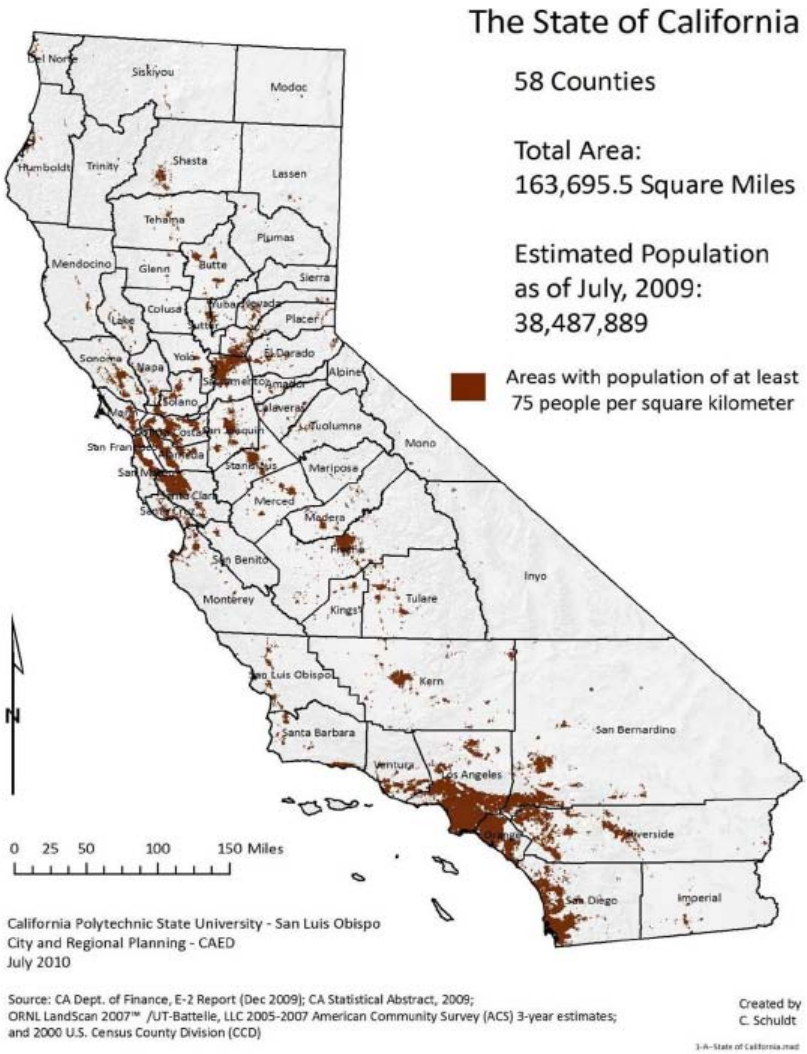
State and Federal Declared Disasters

Most counties have had from 20 to 40 state and federal declared disasters since 1950.



California: Assets at Risk

- Stakes are high – assets include:
  - 38 million people – largest state population
  - 3rd largest land area in nation
  - 8th largest economy in world
  - ***Highest agricultural production in U.S.***
- Plan highlights 2007-2010 progress, emphasizes collaborative action:
  - State-local
  - Public-private



SHMP Implementation – MyPlan: New Local Planning Tool

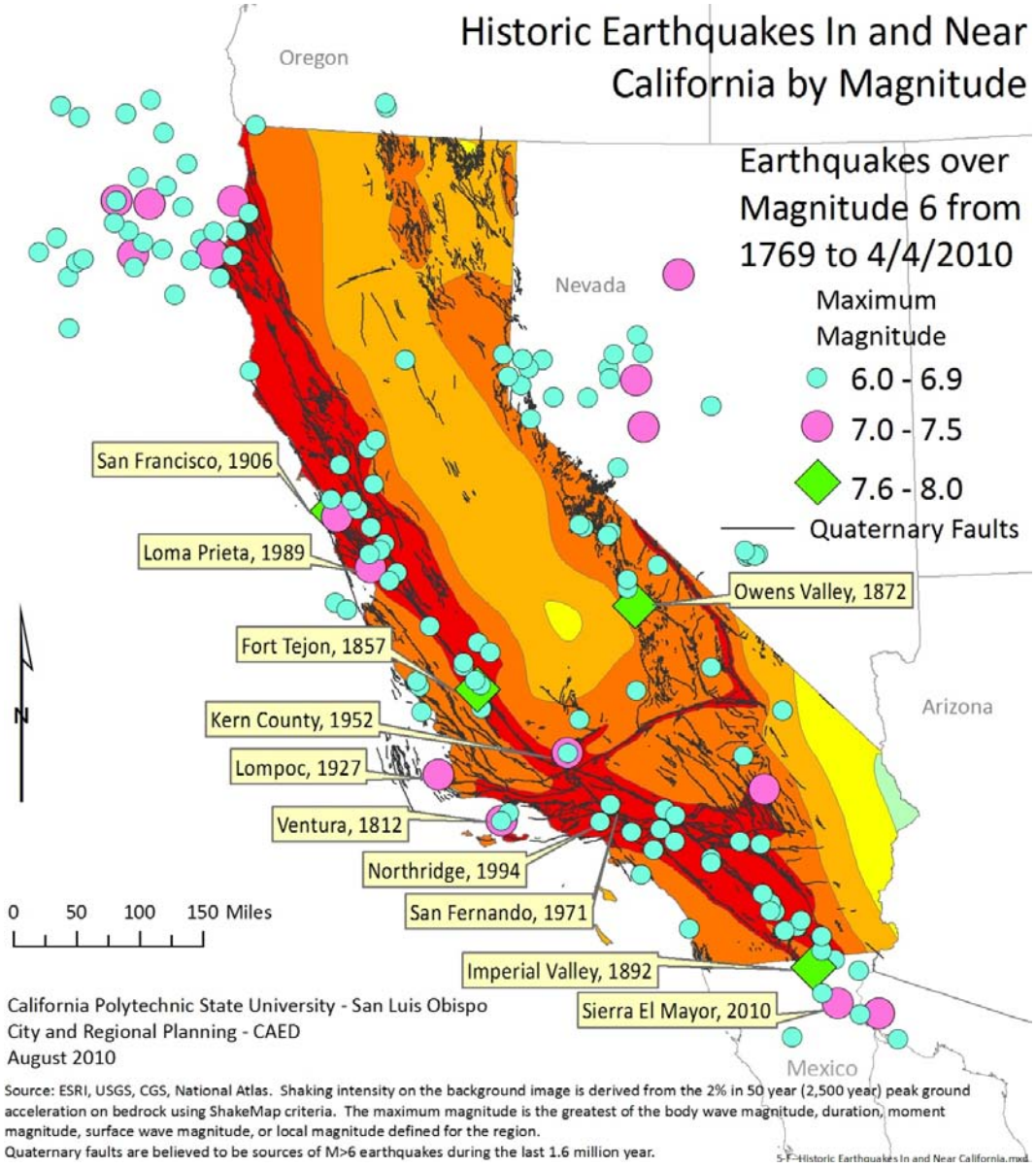
Cal EMA-CNRA sponsored online single source GIS map server for existing multi-source hazards mapping

Web Page:
myplan.calema.ca.gov

Earthquakes In and Near California

M6.0 – M8.0

Earthquakes – a common hazard in California

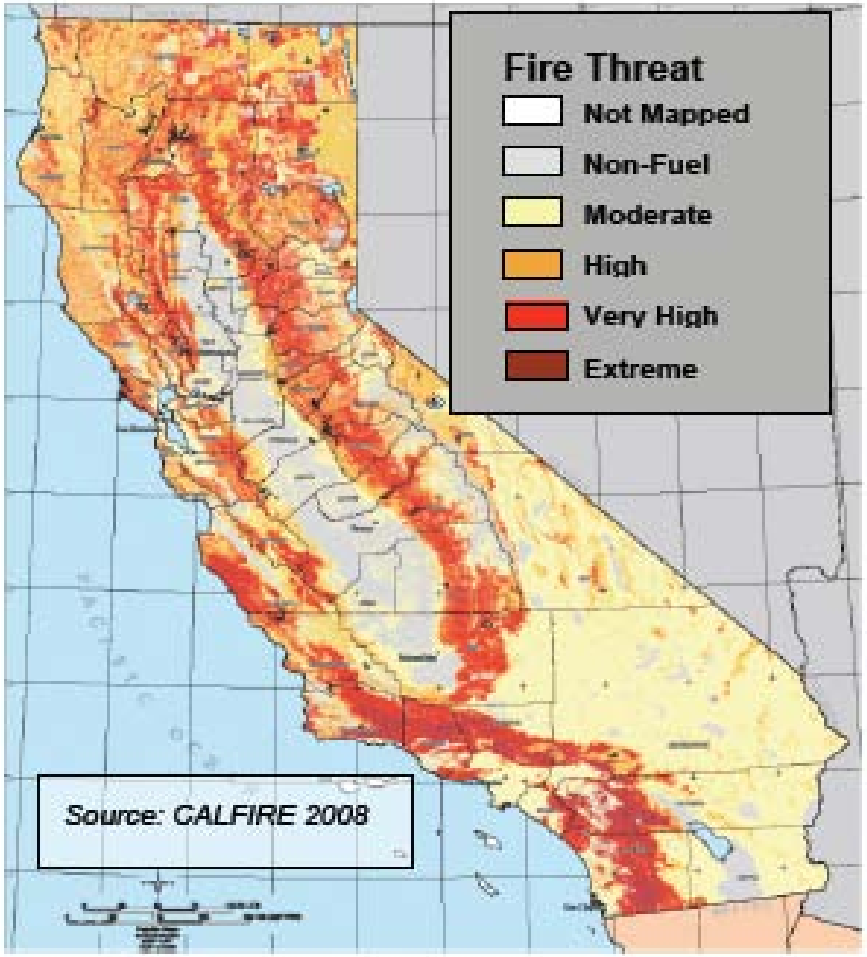


Wildfire Risk

"The California Department of Forestry and Fire Protection (CAL FIRE) spent over $500 million on fire suppression during fiscal year 2007/2008."

Source: California Climate Adaptation Strategy, CNRA, 2009

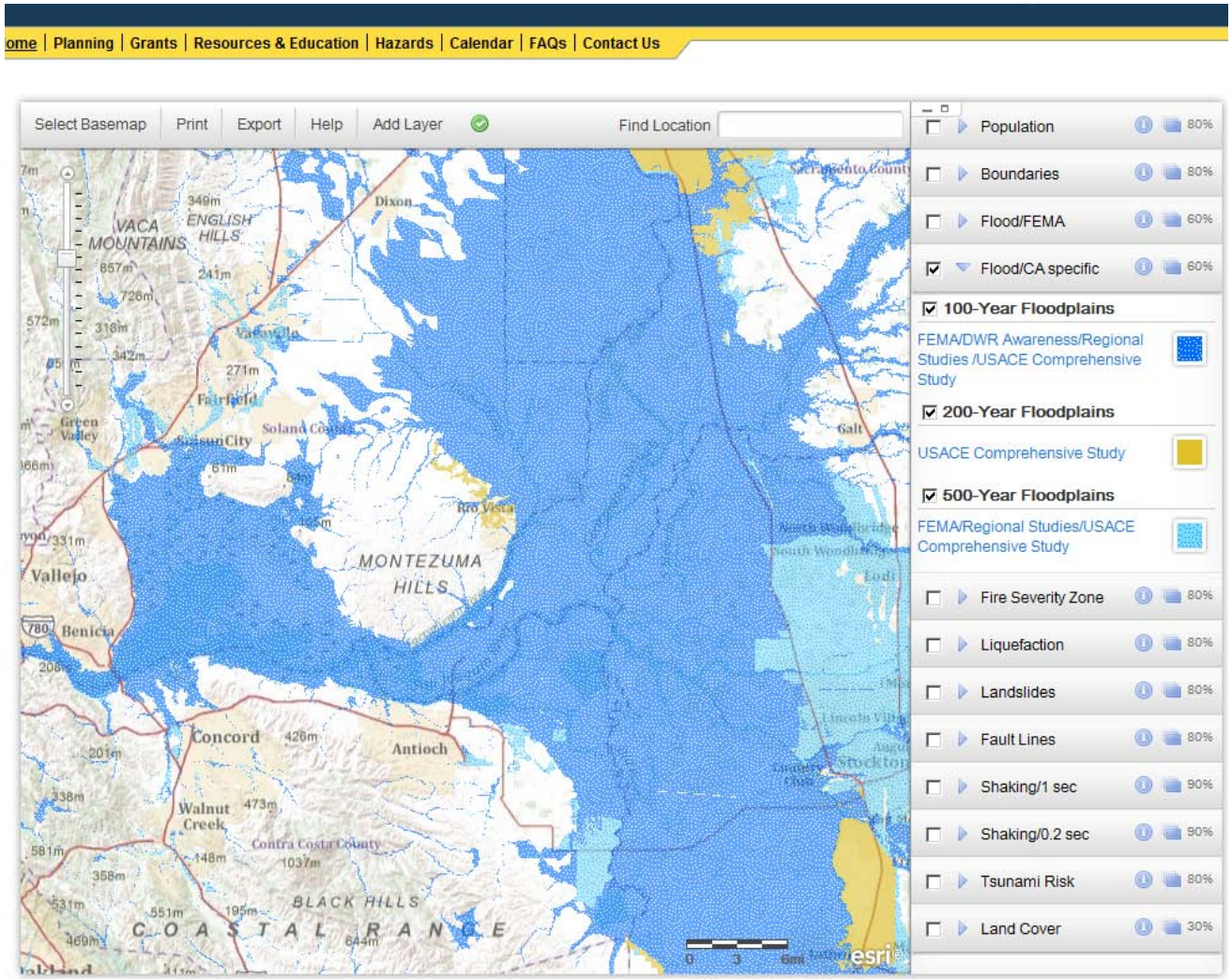
Figure 11: Increasing Wildfire Risk



MyPlan GIS Map Server– Flood Hazards, Sacramento–San Joaquin Delta

Now online:

- *select area,*
- *select layers,*
- *zoom in*
- *print*

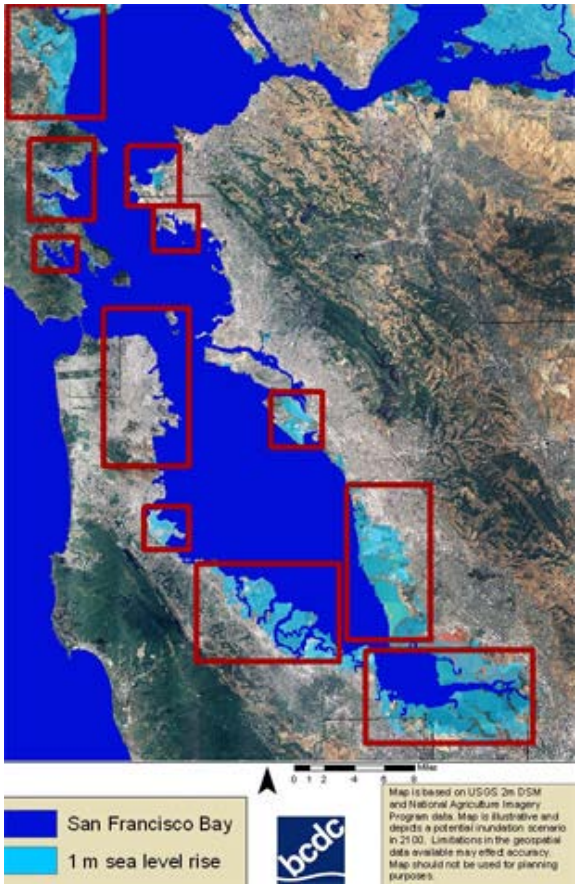


MyPlan website: myplan.calema.ca.gov

New Orleans? – No, Sacramento-San Joaquin Delta Levee Break, 2004

Climate Change Impacts: More and Bigger Natural Disasters

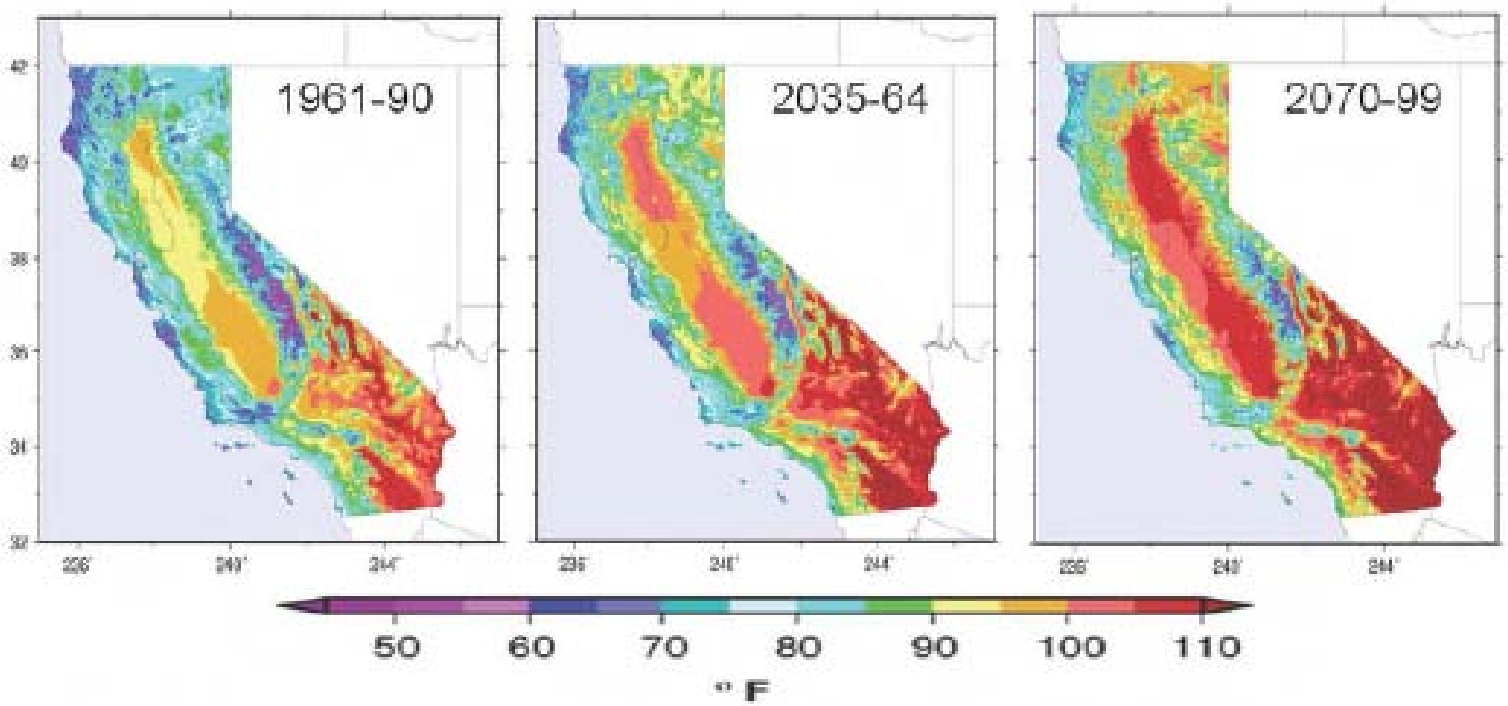
- Severe storms, flooding, landslides
- Sea level rise, coastal inundation
- Sacramento-San Joaquin Delta levee impacts
- Prolonged droughts → long-term depletion of water supplies
- ***Agricultural disruption***
- Wildfires
- Urban heat zones
- Species changes



Source: Bay Conservation and Development Commission

Geographic Distribution of Temperature Increases, 1961–2099

Figure 1. California Historical & Projected July Temperature Increase 1961-2099



Source: Dan Cayan et al. 2009.

Recent Drought and Water Shortages

Figure 15: *View of Lake Oroville in 2005 (left) and November 2008 (right)*

Source: California Climate Adaptation Strategy, CNRA, 2009

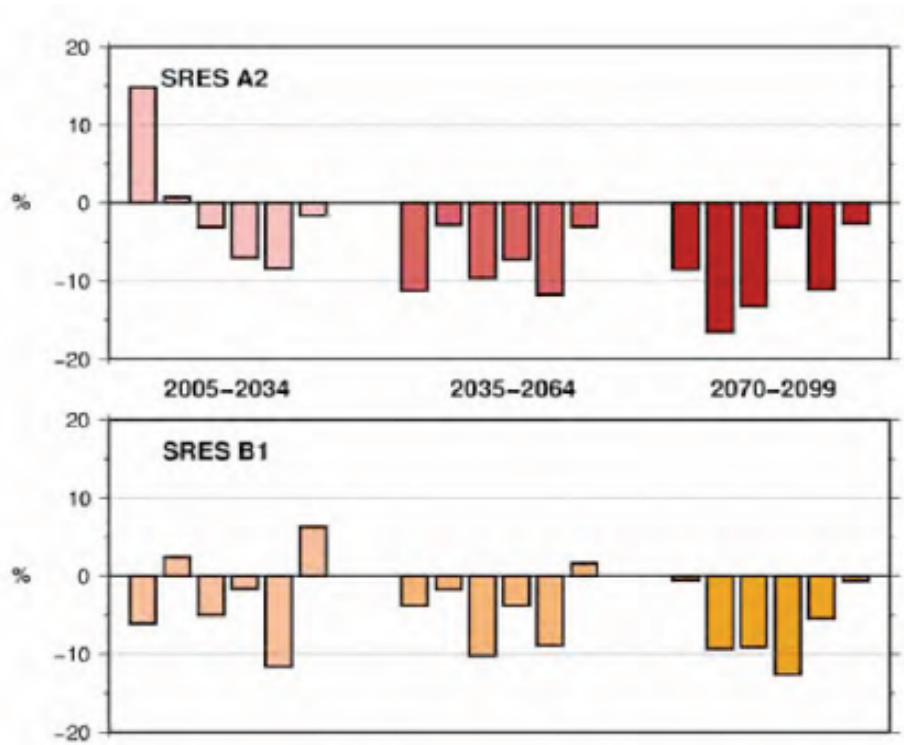
Factors Determining Severity of Heat Stress on Dairies

- The actual temperature and humidity
- The length of the heat stress period
- The degree of night cooling that occurs
- Ventilation and air flow
- The size of the cow
- The level of milk production and dry matter intake prior to the heat stress (higher producing animals will experience greater effects of heat stress).
- Housing – type, ventilation, overcrowding, etc.
- Water availability
- Coat color (lighter color coats absorb less sunlight)

Source: Chase 2006

Rainfall Scenarios

Figure 6: Predicted changes in Northern California precipitation levels show a generally drier future.



Models used:
1: CNRM CM3 – 2: GFDL CM2.1 – 3: MIROC3.2 (med)
4: MPI ECHAMS – 5: NCAR CCSM3 – 6: NCAR PCM1Source:
Cayan, et al. 2009.

Less rainfall for Northern California means…

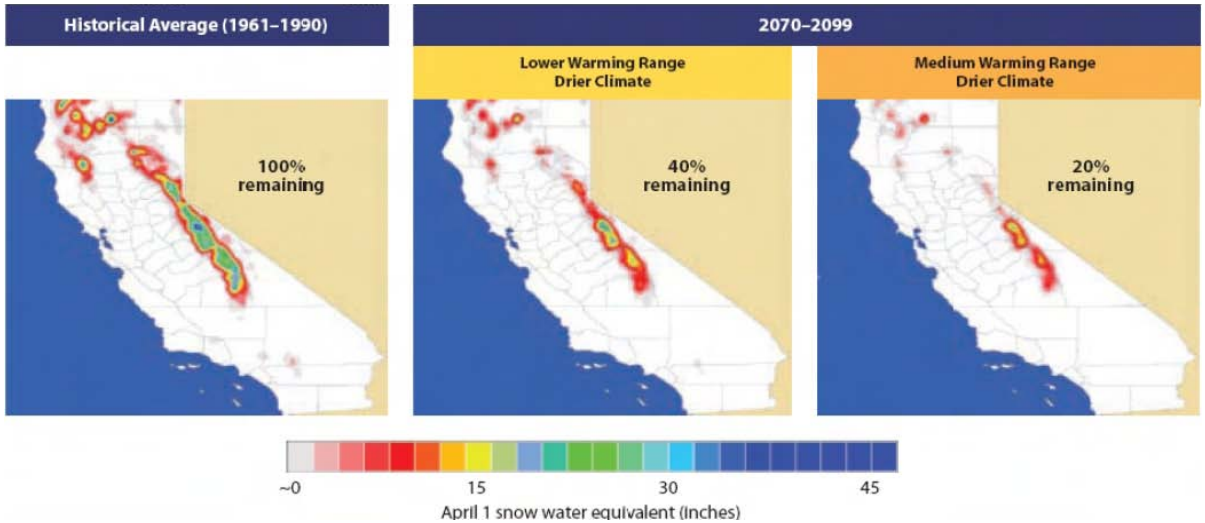
…lower long-term water supply for both Central Valley and So Cal

Rainfall Changes: Impacts on Agriculture

- Loss of water supply and reliability
- Loss of irrigated lands, crop production, food security
- Lack of water for agriculture and livestock
- Drier conditions may affect crop yields
- Increased fire risk to rangeland
- Dry steep terrain - increased soil erosion, sedimentation
- Changes in pests, diseases and invasive species
- Changes in ozone and air quality - adverse affects on crop production

Source: California Climate Adaptation Strategy, CNRA 2009

Historical and Projected Decrease in April Snowpack, 1961-2099



Source: California Adaptation Strategy, 2009

- Two-thirds of water originates in northern part of state
- Two-thirds of people live in southern part
- Reduced snowpack long-term means less water for everyone

Earlier Snowmelt Means More Spring Flooding Along Coast and Inland

- Increase in coastal flooding from winter storms
- Increase in pressure on Bay-Delta levee system

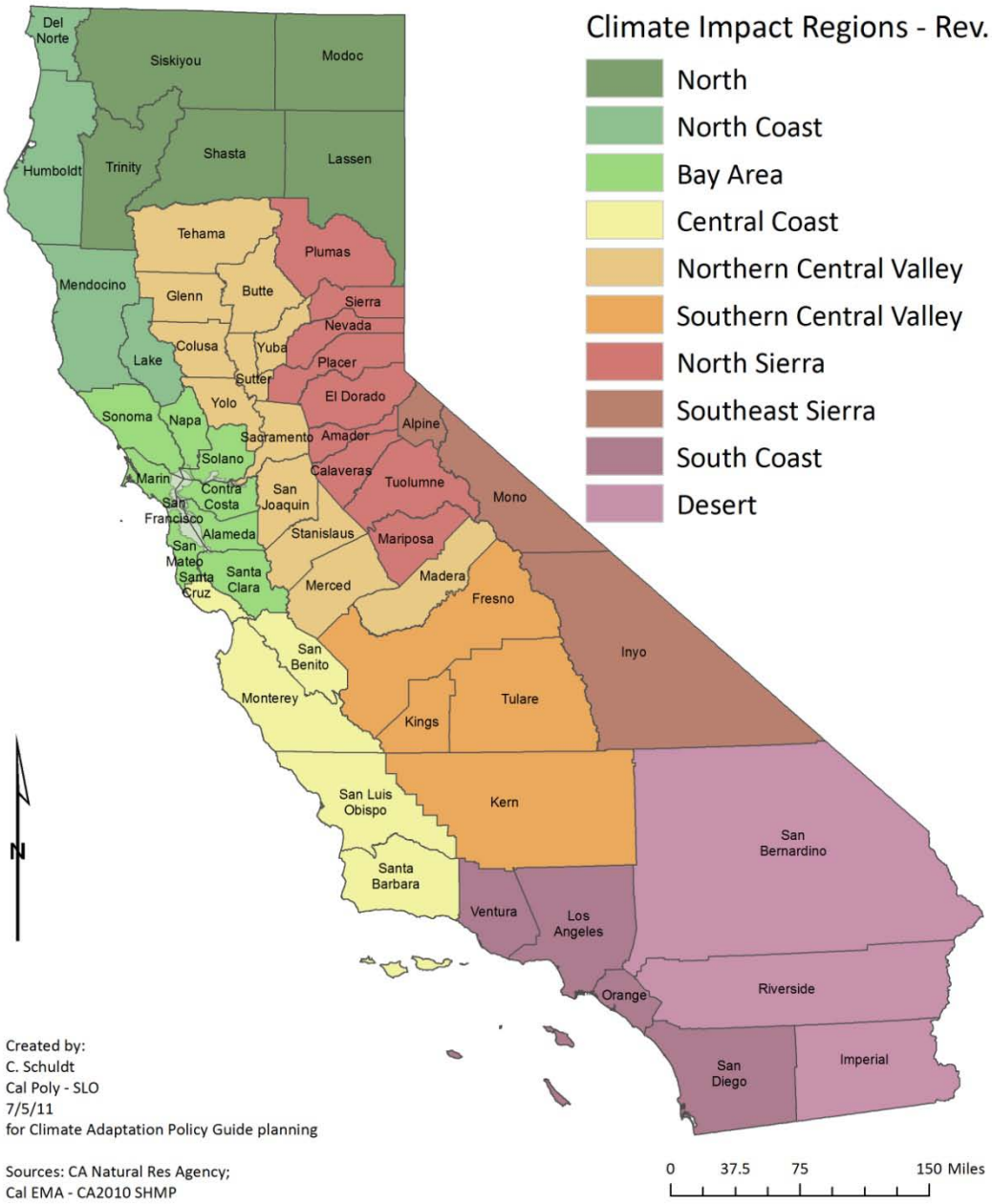
Source: California Climate Change Center

SHMP Implementation – Climate Adaptation Policy Guide (AGP)

- Joint project: Cal EMA-CNRA, assisted by Cal Poly-SLO
- Started February 2011, completion due in June 2012
- Not prescriptive – will provide framework to assist local and regional stakeholders to
  - Interpret climate change impacts for their areas
  - Develop locally suitable approaches for reducing risks aggravated by climate change
- Will identify potential impacts by region and sector
- Will provide adaptation tools for selective local use

Climate Adaptation Policy Guide Regions

Regional climate adaptation example: Central Valley – largest fruit and vegetable producer in the nation



Potential Agricultural Adaptation Strategies

- Irrigation and water conveyance retrofit (e.g. drip irrigation)
- Watershed management (incl. groundwater recharge)
- Change in crop mix
- Soil carbon management
- Drought tolerant crops
- Use of cover crops
- Farmscaping
- Shade provision
- Economic diversification
- Sequestration, GHG reduction, renewable energy, carbon offset (income source)
- Research, education, and information sharing

Thank You!

Additional Resources

Cal EMA Website

- www.calema.ca.gov

California Hazard Mitigation Web Portal

- http://hazardmitigation.calema.ca.gov/

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