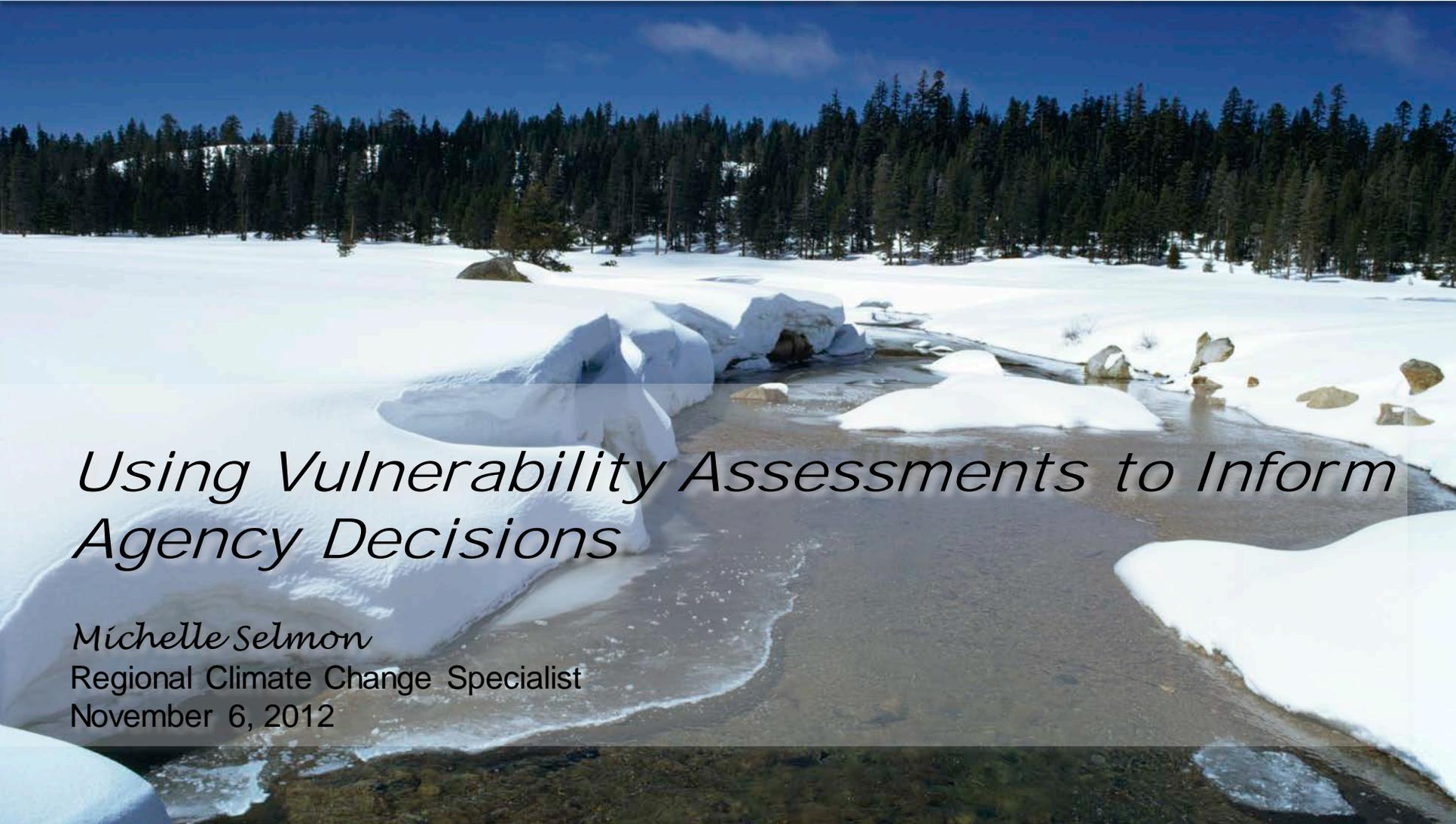




# CLIMATE CHANGE

AT THE DEPARTMENT OF WATER  
RESOURCES

A photograph of a snow-covered landscape with a stream flowing through it, surrounded by evergreen trees. The stream is partially frozen, with snow piled up on the banks and rocks. The background shows a dense forest of evergreen trees under a clear blue sky.

## *Using Vulnerability Assessments to Inform Agency Decisions*

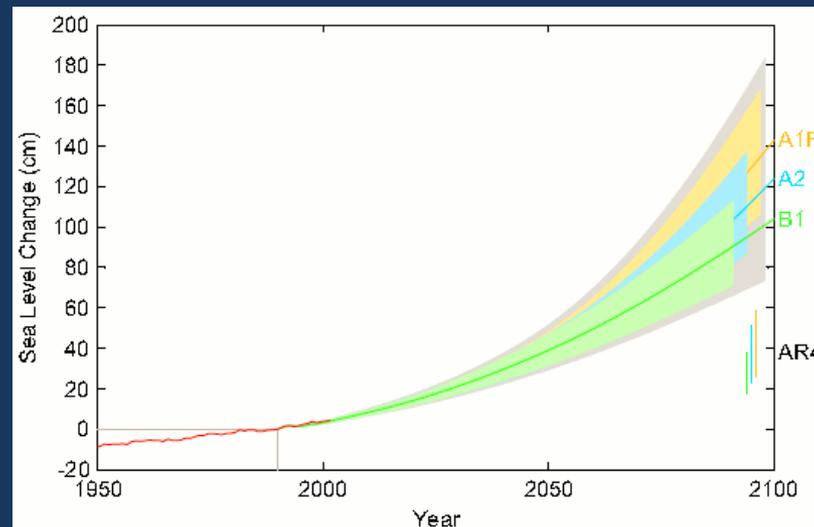
*Michelle Selmon*

Regional Climate Change Specialist

November 6, 2012

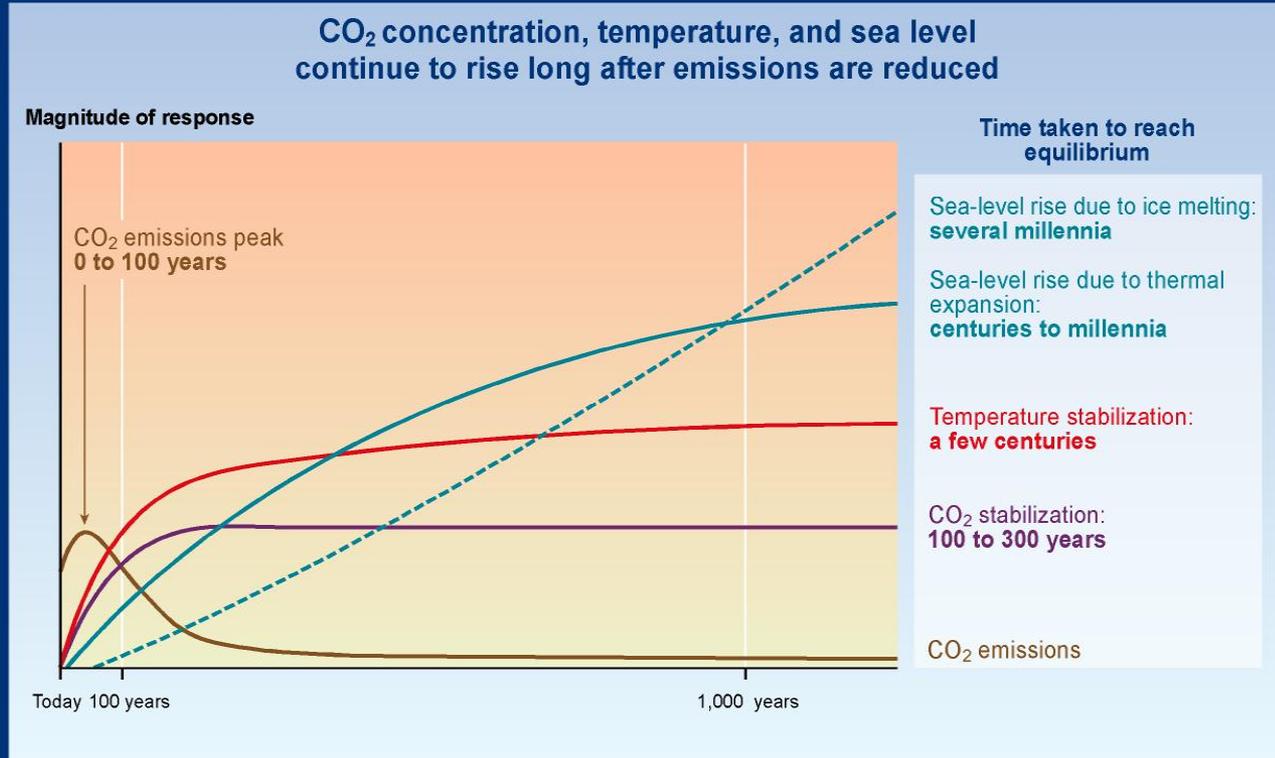
# In the Past 100 Years...

- **Changes in the timing of peak flood flows**
- **10 % overall loss of snowpack in the Sierra Nevada**
- **An average of 7 inches of sea level rise along the CA coast**



*Vermeer, M., Rahmstorf, S. Global sea level linked to global temperature. Proceedings of the National Academy of Sciences, December 2009*

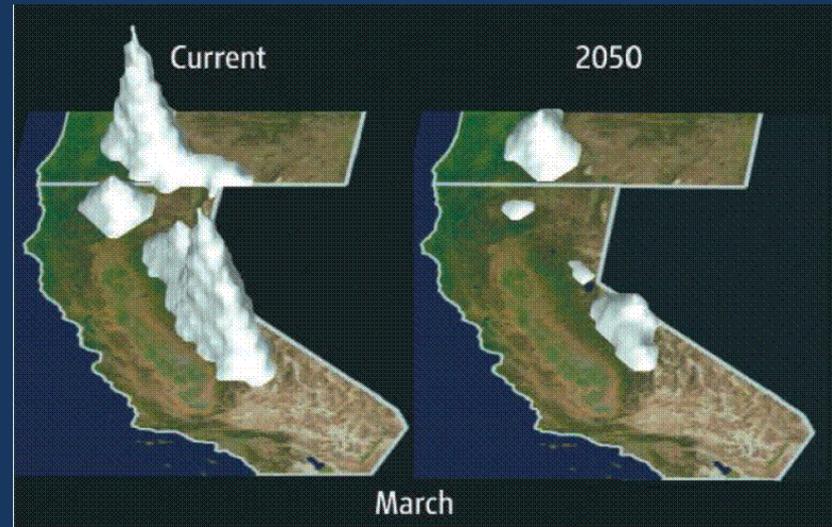
# Adaptation is a Necessity



SYR - FIGURE 5-2

# In the next 40 years...

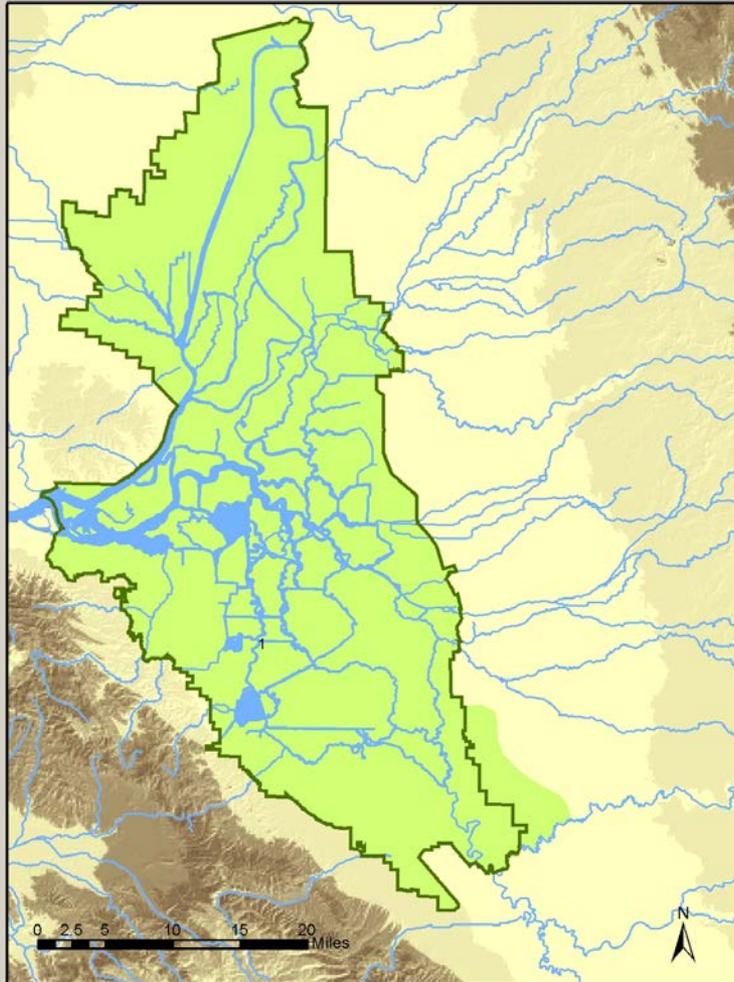
- **Sea level rise: 5-24" (17-66" by 2100)**
- **25-40% reduction in snowpack**
- **Less summer runoff**
- **More intense wet and dry periods**
- **Increased salinity in the Delta**
- **Less supply and predictability of water resources for urban, agricultural and environmental uses**



# What Could Happen to Bay-Delta Estuary?

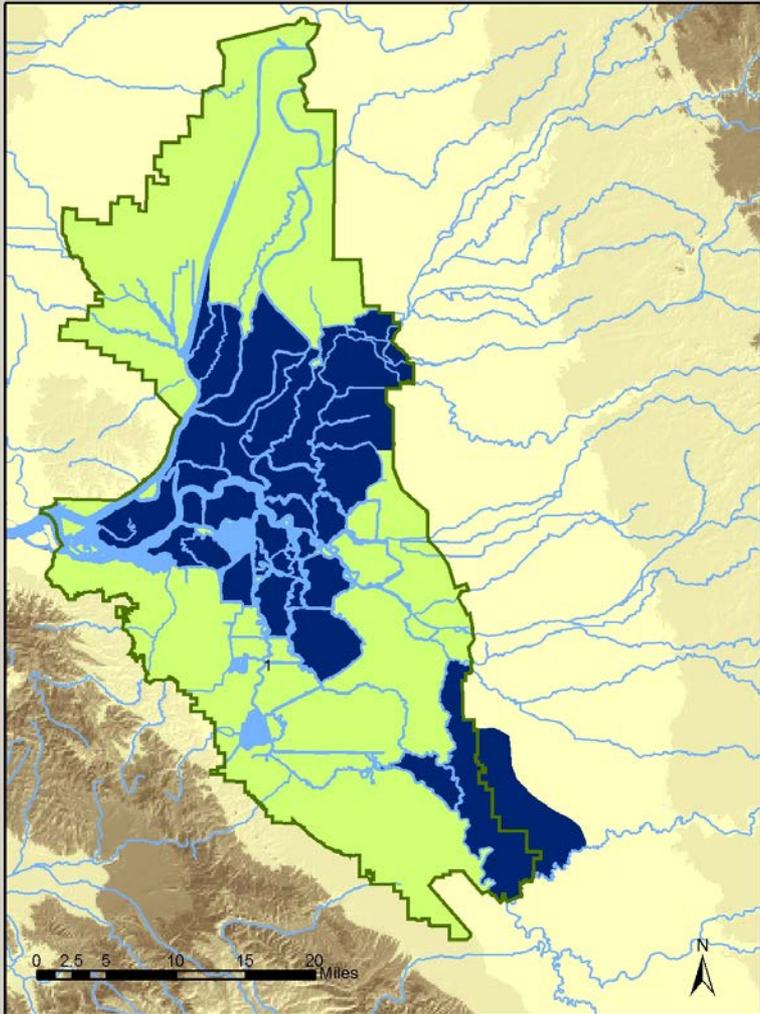


# Projected Sea Level Rise



The Delta today.

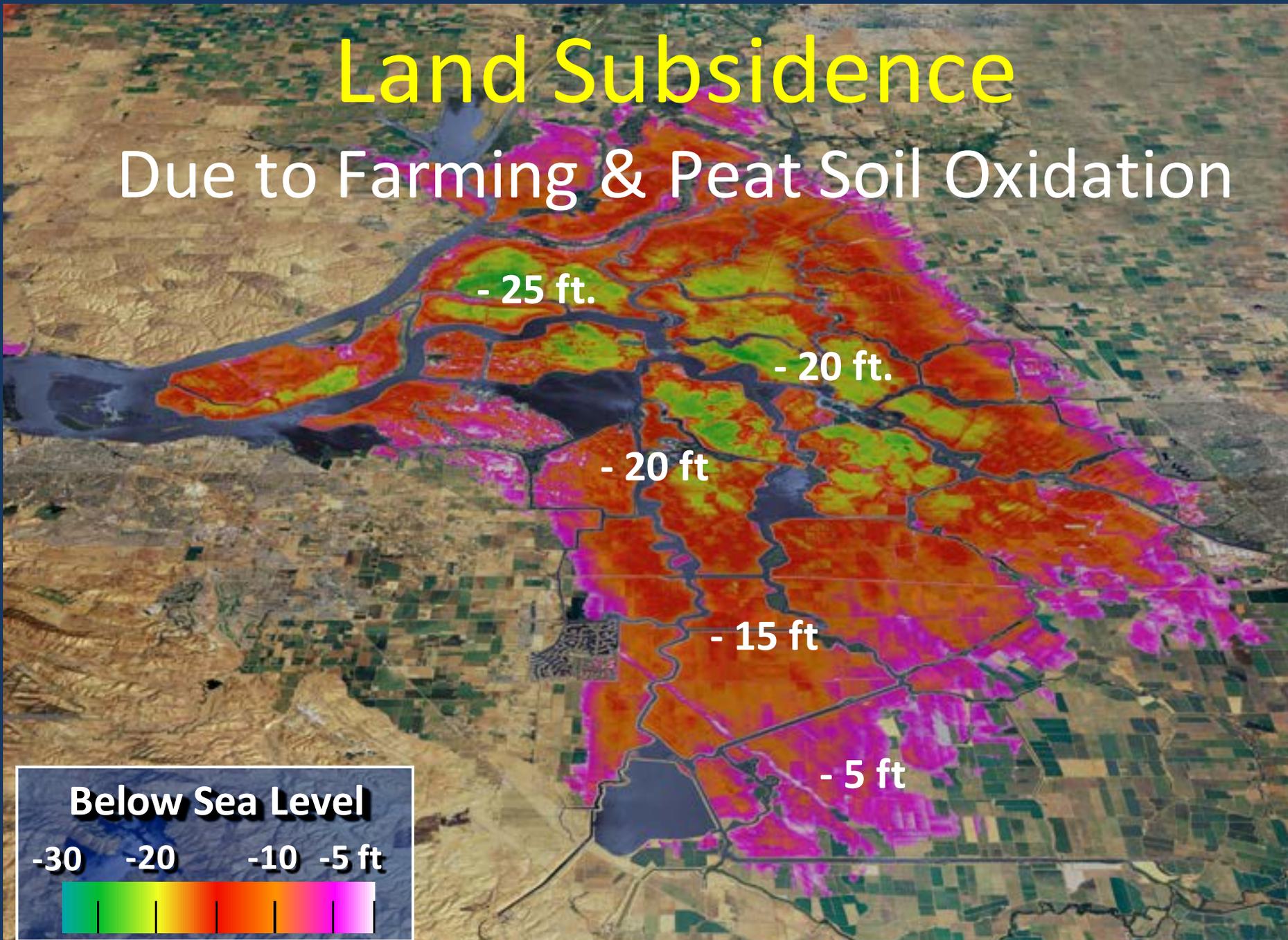
# Projected Sea Level Rise



Areas most at risk in the  
Delta with 2-foot sea  
level rise.

# Land Subsidence

Due to Farming & Peat Soil Oxidation



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# DWR's Climate Adaptation Strategy

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<http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf>

EXECUTIVE SUMMARY  
2009 CALIFORNIA  
CLIMATE ADAPTATION  
STRATEGY  
DISCUSSION DRAFT

A Report to the Governor of the State of California  
in Response to Executive Order S-13-2008



**Public Review Draft**



California **Water Plan**  
Highlights

INTEGRATED WATER MANAGEMENT



Update 2009 • Department of Water Resources

**Public Review Draft**

January 14, 2009

[www.climatechange.gov/adaptation](http://www.climatechange.gov/adaptation)

[www.waterplan.water.ca.gov](http://www.waterplan.water.ca.gov)

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# Statewide Strategies

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- Practice and promote integrated flood management
- Enhance and sustain ecosystems
- Expand water storage and conjunctive management of surface and groundwater resources
- Fix Delta water supply, quality and ecosystem conditions



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# Regional Strategies

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- Aggressively increase water use efficiency
- Fully implement Integrated Regional Water Management (IRWM)



**IRWM provides *a critical framework* for actions to address the uncertainties presented by climate change as well as other risks to California's water future.**

*-Water Plan Update 2009*

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# Helping Local Water Agencies

## IRWMP Regions

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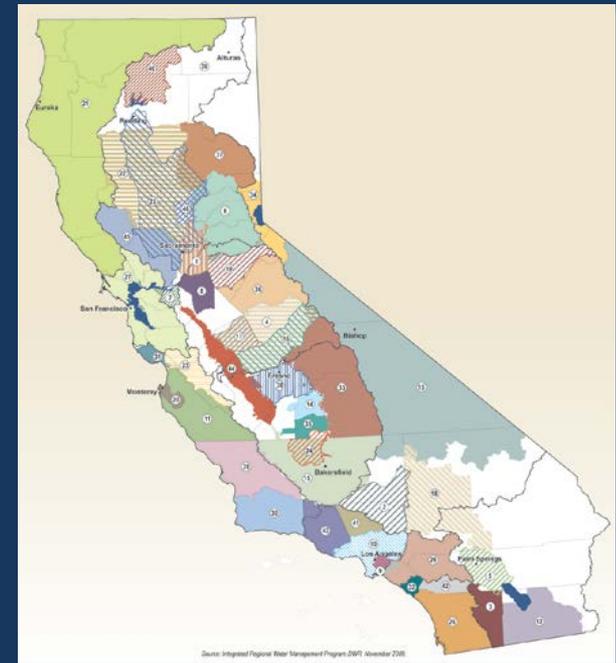
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### IRWM planning regions

- Approximately 87% of the area of the State
- Approximately 99% of the population

### Benefits of IRWM Planning

- IRWM efforts are long term
- IRWM efforts yield coordination and cooperation
- Relationships between diverse stakeholders



# All IRWM plans should include the following elements to help their region adapt to a changing climate:

- *An assessment of the region's vulnerability to the long-term risk and associated uncertainty associated with climate change*
- water conservation
- conjunctive management
- integrated flood management
- drought contingency

*-Water Plan Update 2009*

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# Helping Local Water Agencies

## IRWMP Program Objectives

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### Direct Objectives

- Improve water supply reliability
- Protect and improve water quality
- Ensure sustainability through environmental stewardship

### Higher-Level Objectives

- Promote regional planning
- Financial incentives to promote integration and regional cooperation and collaboration

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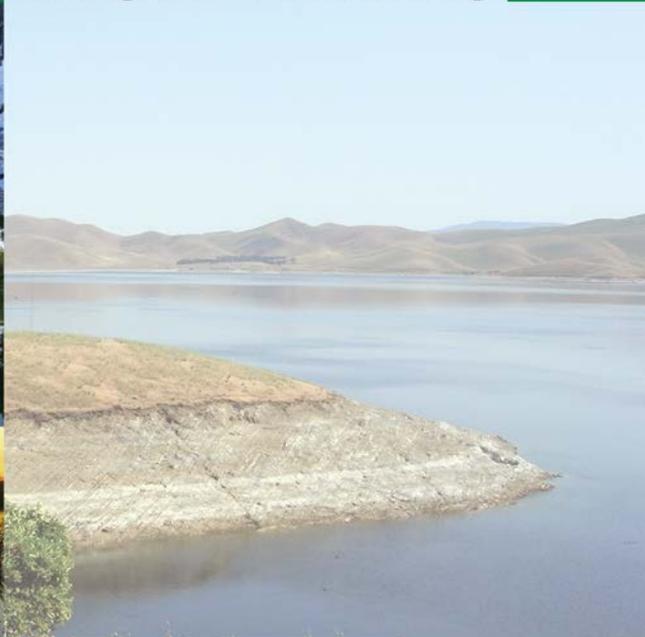
# Helping Local Water Agencies

## IRWM Regional Strategies

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- Advance and expand conjunctive management of multiple water supply sources
- Use and reuse water more efficiently
- System modifications that address rising sea-level and other anticipated impacts of climate change
- Proposals that contain projects that reduce GHG emissions

# Climate Change Handbook for Regional Water Planning



Prepared for:  
**US Environmental Protection Agency Region 9**  
and  
**California Department of Water Resources**

In partnership with:  
US Army Corps of Engineers South Pacific Division  
Resources Legacy Fund  
US Environmental Protection Agency Office of Research and Development

November 2011

# CC Handbook for Regional Water Planning

## *Vulnerability Assessment Checklist*

- Water Demand
- Water Supply
- Water Quality
- Sea Level Rise
- Flooding
- Ecosystem and Habitat Vulnerability
- Hydropower

# CC Handbook for Regional Water Planning

## *Vulnerability Assessment Checklist*

- Launches key discussions about climate change
- Allows early identification of vulnerabilities to inform planning and project selection
- Brings issues such as species and habitat protection to the table
- Informs all IRWM "interested parties" of implications of climate change in their region
- Potentially spurs additional research and action on the issue

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# Climate Change and Water Management

## A Cross-sector Approach to Addressing Vulnerabilities

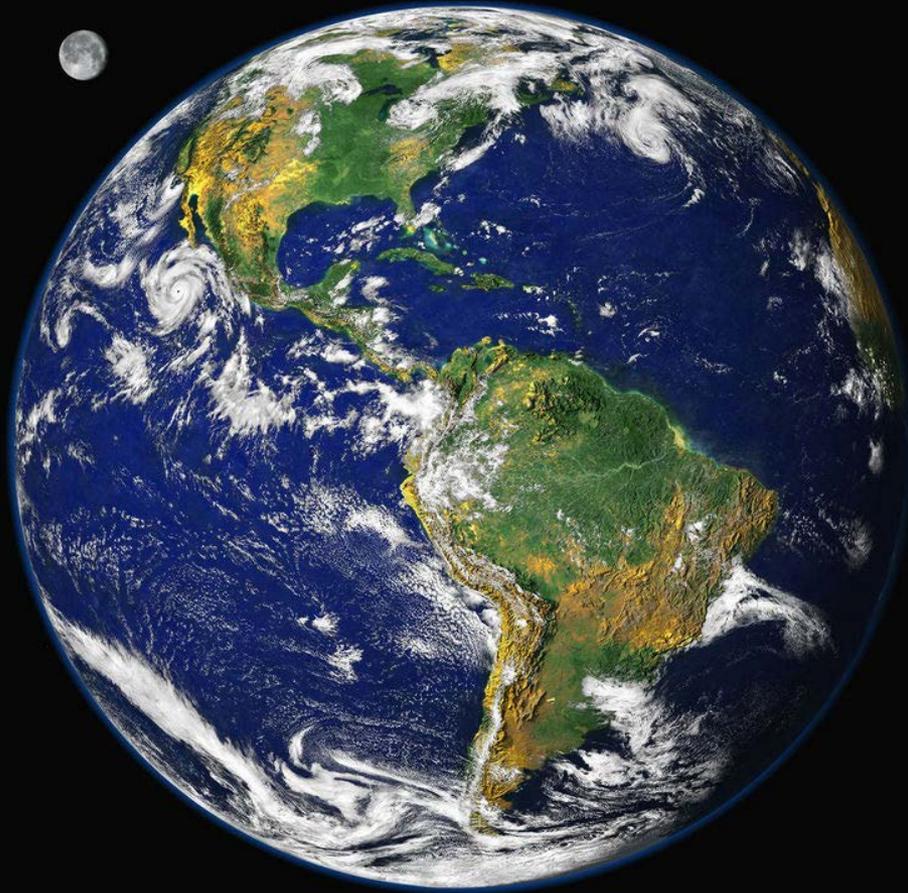
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- We must embrace an entirely new way of thinking about water resources planning and management – “stationarity is dead!”
- Regional water planning needs to include considerations of vulnerabilities to climate change
- We need to focus on mitigation as well as adaptation *in all sectors*
- Climate change response actions must be integrated with water supply reliability, environmental protection, public safety, and public health actions

# Climate Adaptation for Local Governments

- Strive to be a *climate resilient* community
- Assess regional vulnerabilities to climate change
- Prioritize risks from vulnerabilities based on current level of resilience and flexibility to make changes
- Identify ways risks can be addressed through existing planning processes
- Integrate climate resilience into overarching goals and policies
- Include the community in the planning process
- Commit to action in the face of uncertainty



*Questions?*  
mselmon@water.ca.gov