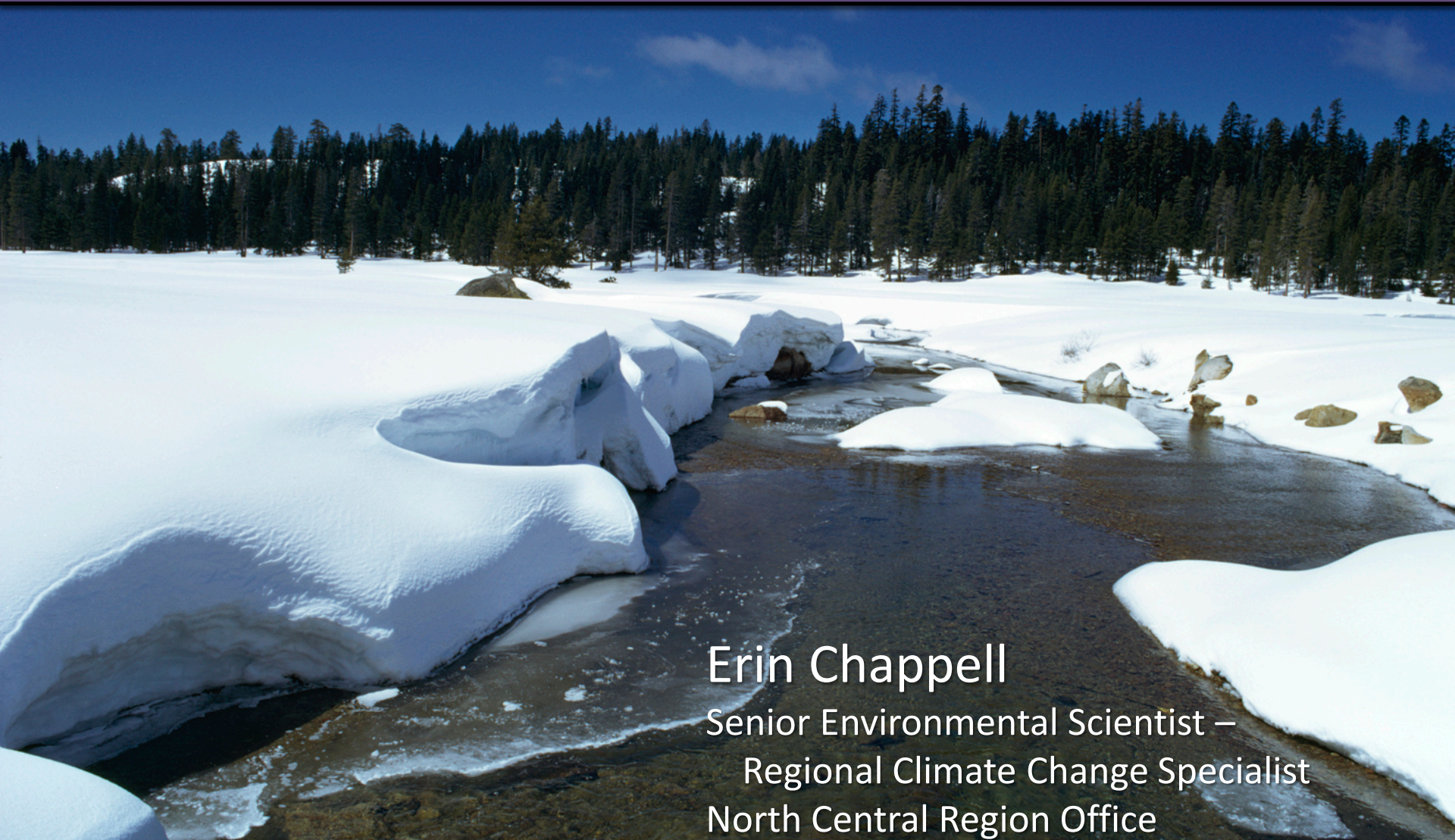
Climate Adaptation



Erin Chappell
Senior Environmental Scientist –
Regional Climate Change Specialist
North Central Region Office

Climate Change Adaptation

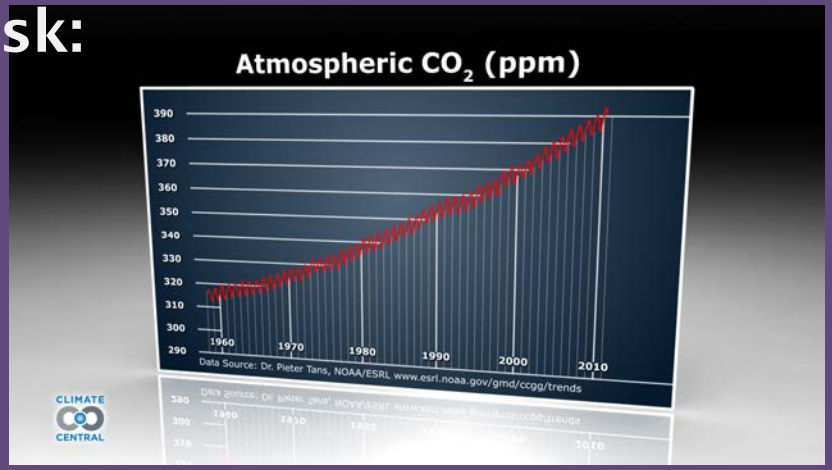
'Climate adaptation' refers to efforts by society or ecosystems to prepare for or adjust to changes in the climate

- **Protective** – guarding against negative impacts of climate change
- **Opportunistic** – taking advantage of any beneficial effects of climate change

Atmospheric CO_2

- Carbon dioxide levels are measured in parts per million (ppm)
- Pre-industrial level was about 270 ppm
- Scientists consider 350 ppm to be the 'upper limit' of CO_2 concentration that ecosystems and human society can tolerate or we risk:

  - loss of major ice sheets
  - accelerated sea level rise
  - abrupt shifts in forest and agricultural systems



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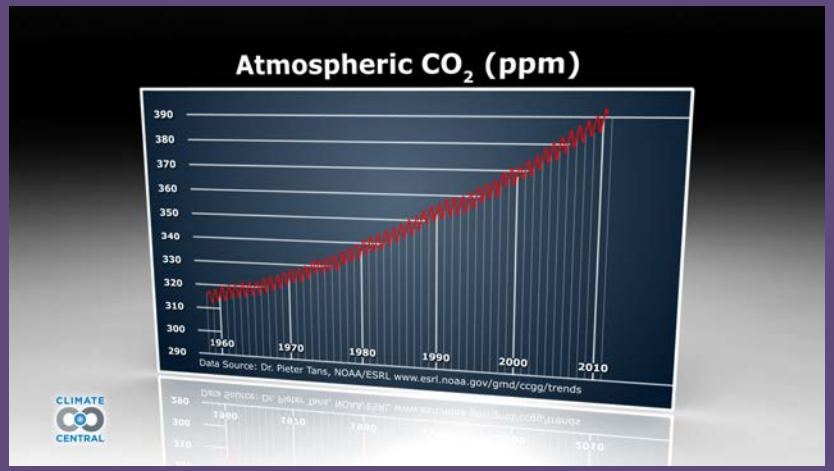
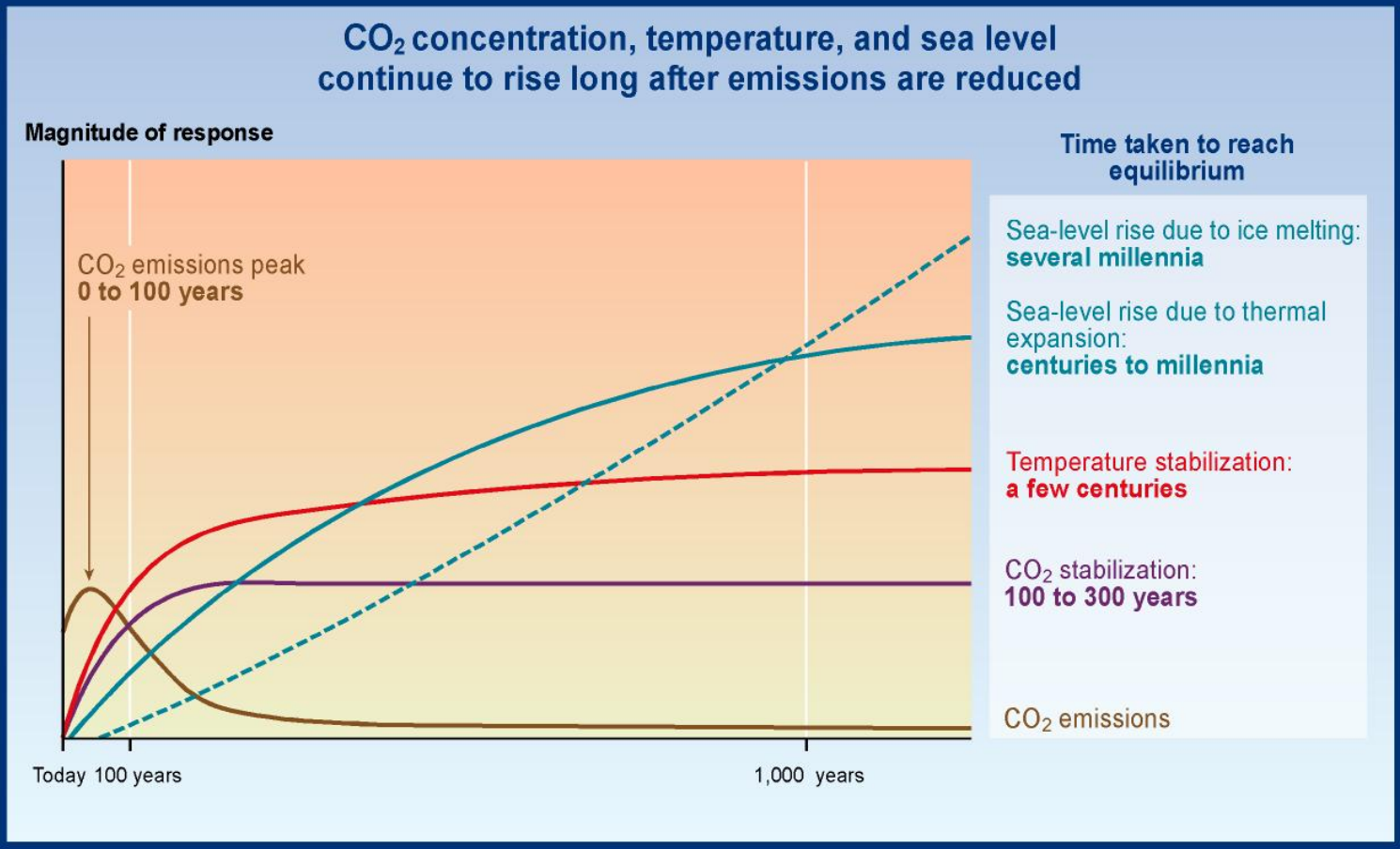


- ***We recently passed 400 ppm!!!***

☹

Adaptation is a Necessity!



SYR - FIGURE 5-2

Adaptation as a Necessity

Adaptation as a Necessity

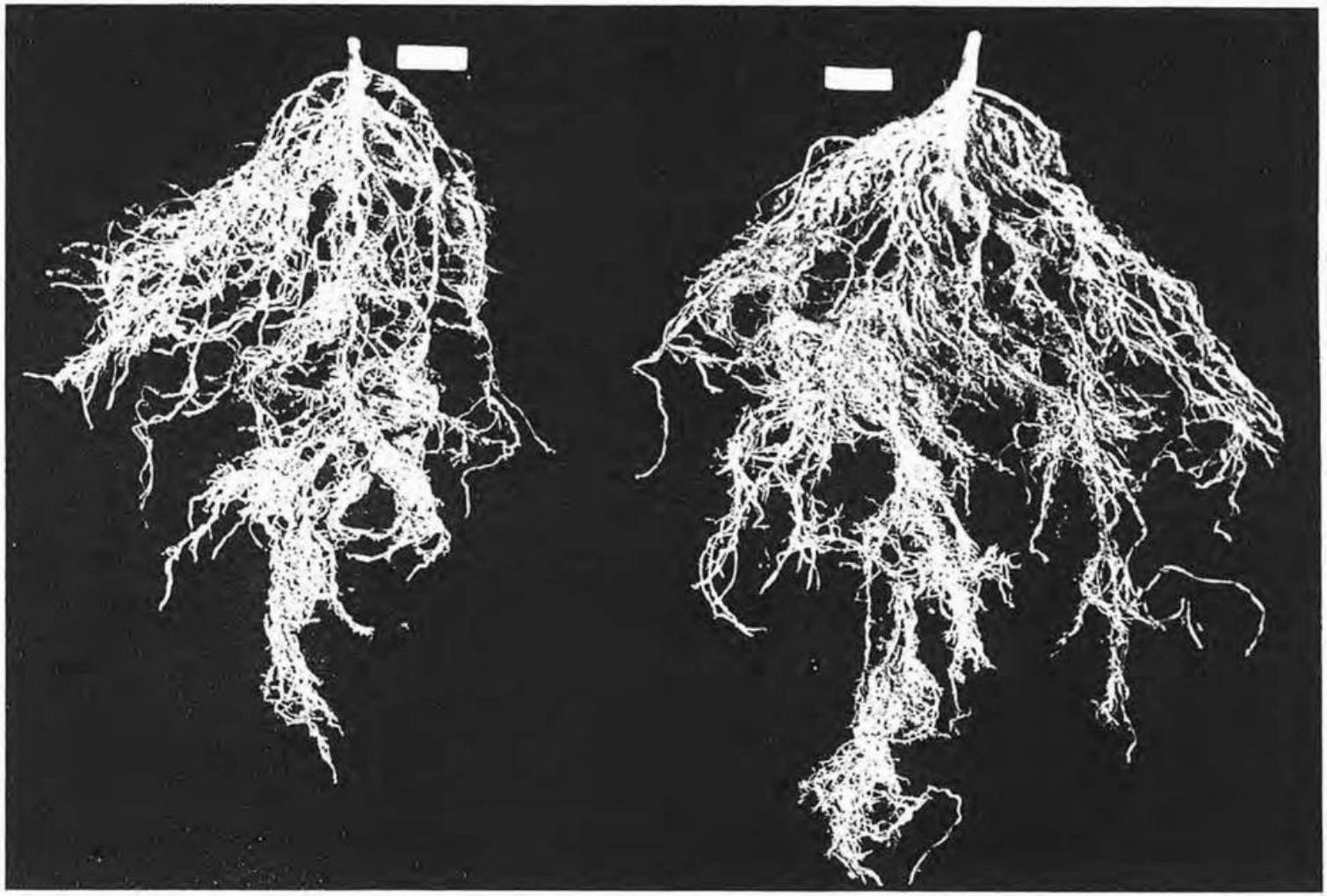
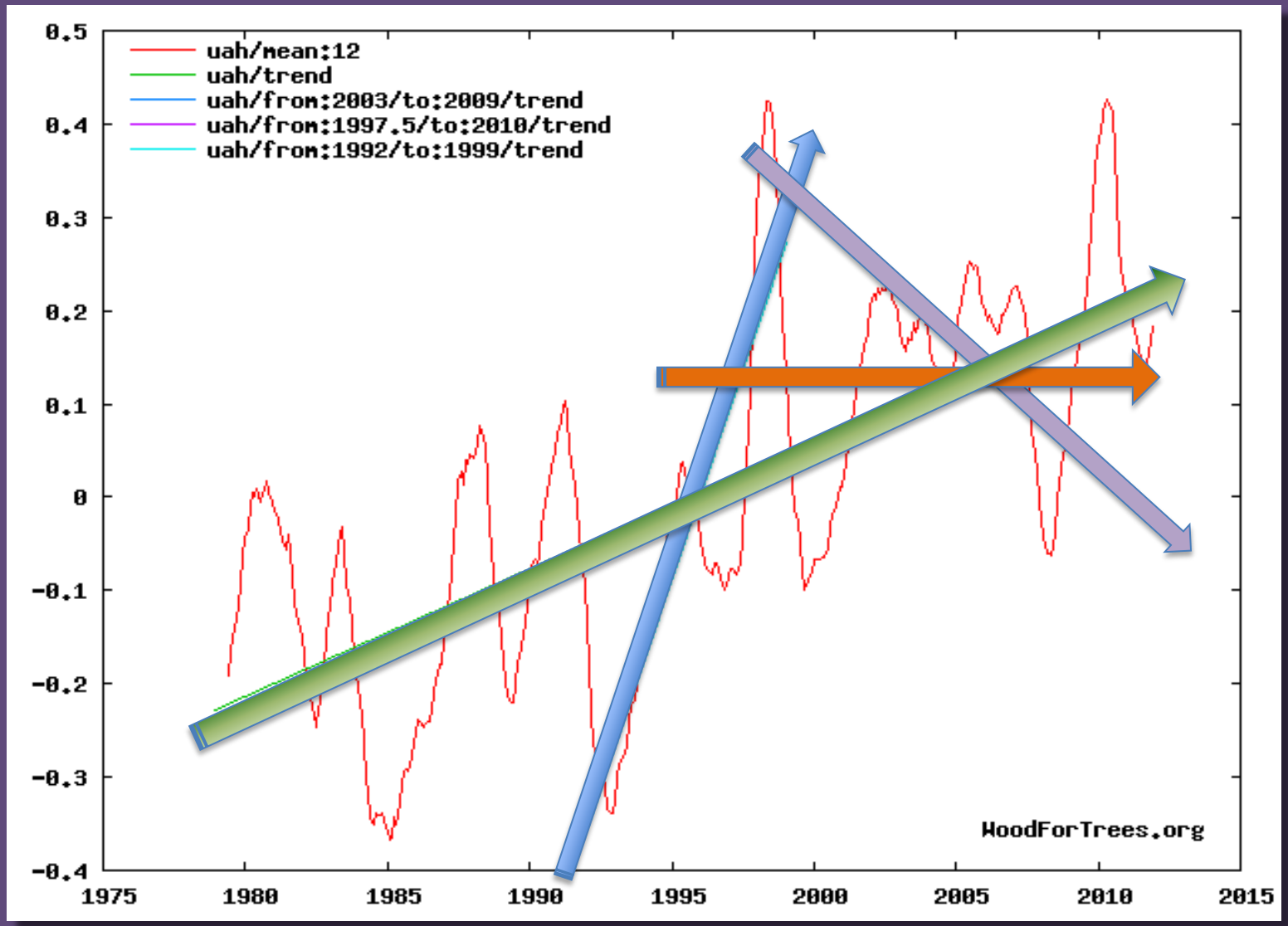
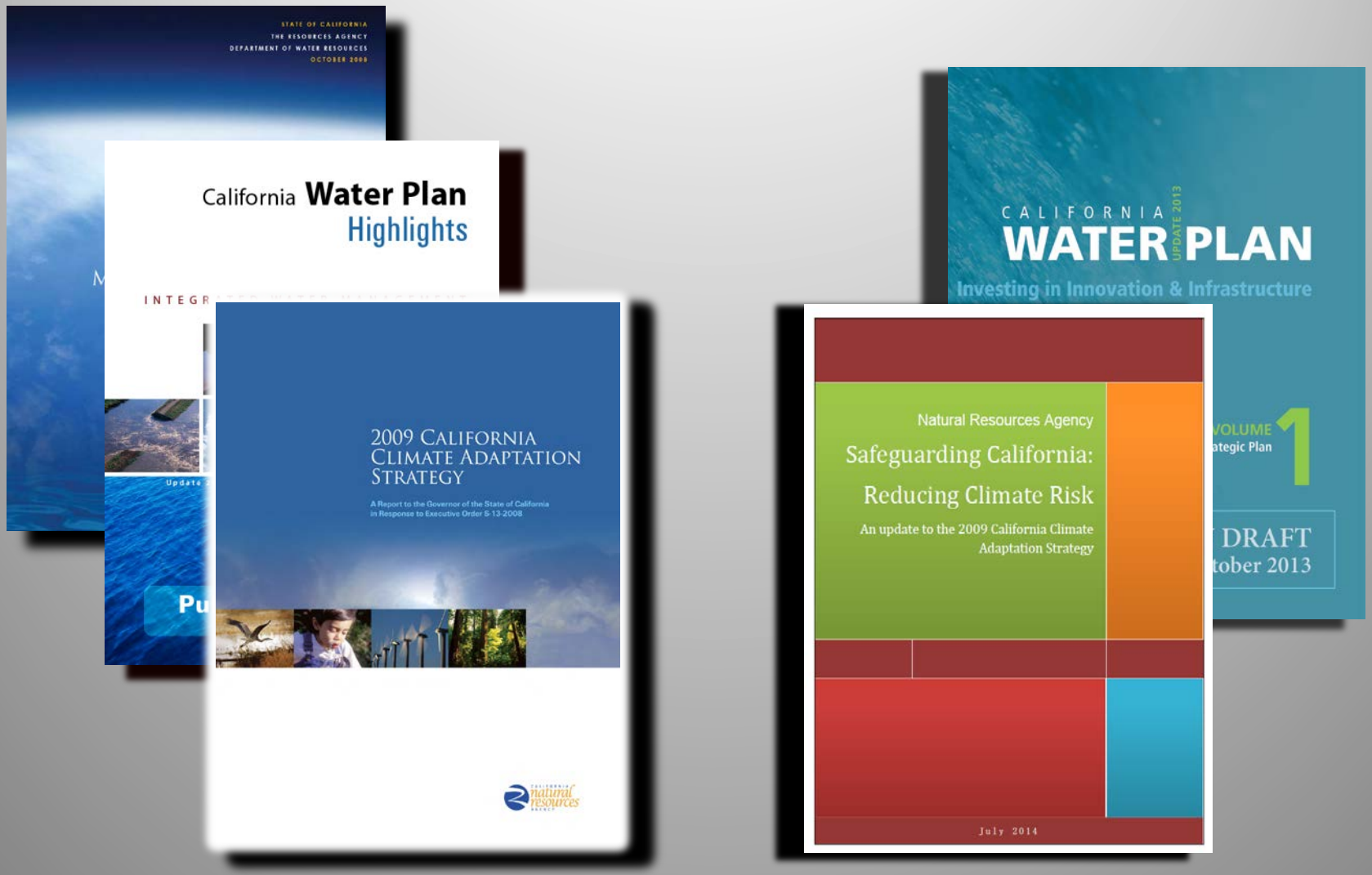


Fig. 10. Photographs of 35 day old soybean plants and their root systems grown at 350 ppm (left) and 700 ppm CO_2 (right) in growth rooms of the Duke University Phytotron.

Collecting and Understanding Data to Facilitate Adaptation



Planning for Adaptation



Comprehensive Strategy for Adaptation in the Water Sector

Regional Strategies

- Fully implement Integrated Regional Water Management (IRWM)

- Aggressively increase water use efficiency

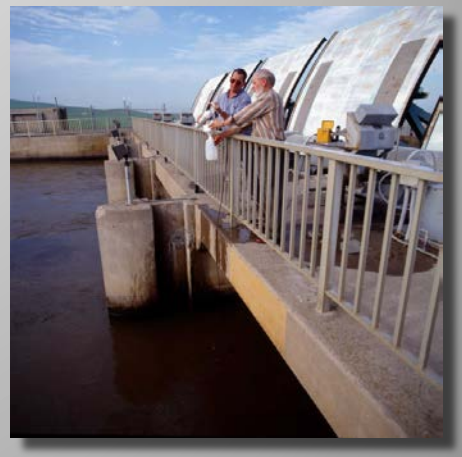
Comprehensive Strategy for Adaptation in the Water Sector

Statewide Strategies

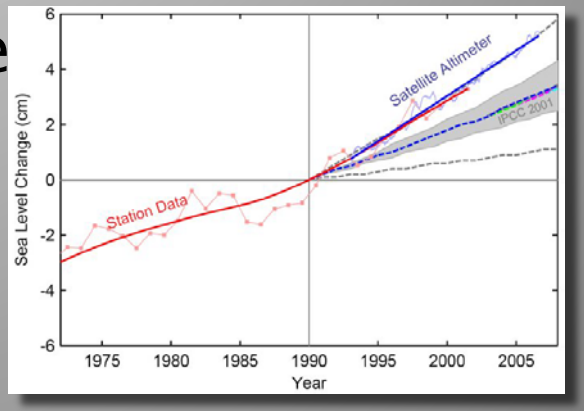
- Practice and promote integrated flood management
- Enhance and sustain ecosystems
- Fix the Delta
- Advance and expand conjunctive management of surface and groundwater resources

Comprehensive Strategy for Adaptation in the Water Sector

Improving Management and Decision-Making Capacity



- Preserve, upgrade, and increase monitoring and data analysis & management
- Plan for and adapt to sea level rise
- Identify and fund focused climate change impacts and adaptation research and analysis



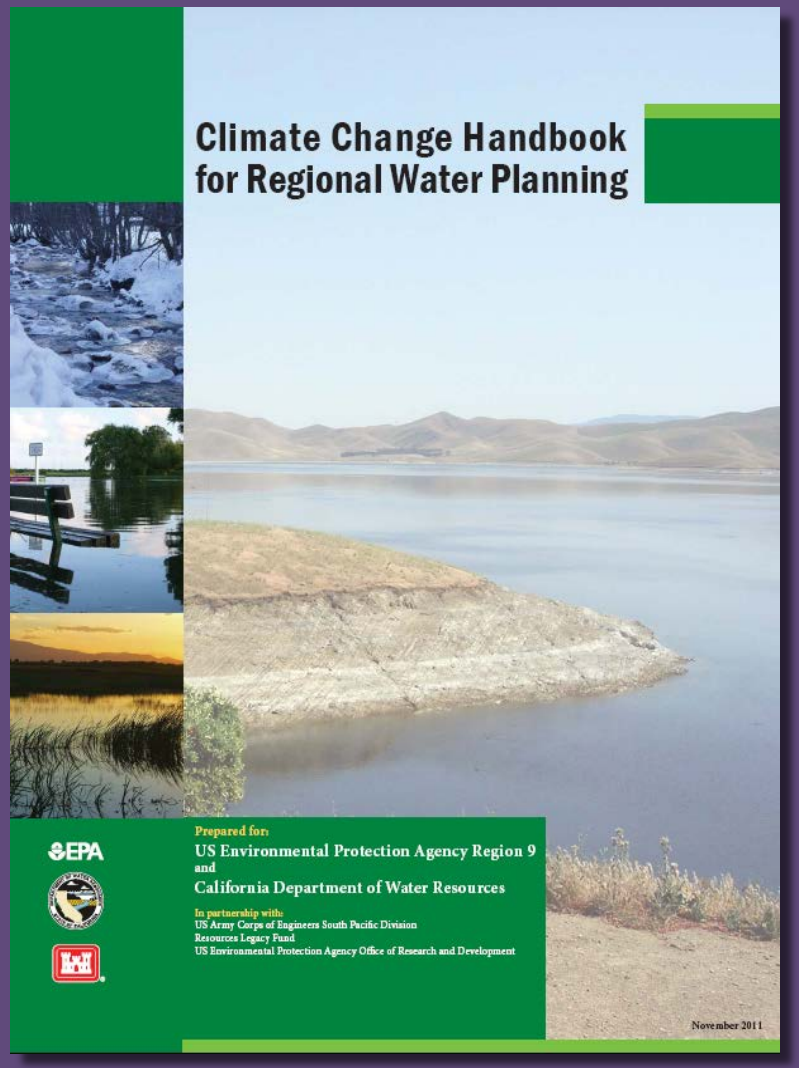
Comprehensive Strategy for Adaptation in the Water Sector

Investment Strategies

- Provide sustainable funding for statewide and integrated regional water management

Climate Change and IRWM

- Outlines the general process for accounting for climate change in water planning
- Synthesizes available literature in a way that is useful for regional water planning
- Supports IRWM planning in California



Climate Change and CWP 2013

- Regional Reports
  - Regionally-appropriate adaptation strategies; energy intensity of extraction and conveyance
- Resource Management Strategies
  - Climate adaptation potential; impact on GHG emissions
- Statewide Strategies
  - Highlights and key recommendations for adaptation and mitigation
- Companion Plans
  - Technical and policy climate change references

CAP Phase 3: Vulnerability Assessment and Adaptation Plan

Purpose:

- To identify the vulnerabilities to climate change that could affect DWR's staff, facilities, and operations
- Assess the level of exposure and risk associated with each
- Develop climate change adaptation goals and objectives
- Layout a plan that will help achieve those objectives

CAP Phase 3: Vulnerability Assessment

- Describe all physical assets (facilities, land, other resources)
- Describe activities that take place at each facility
- Classify risk to assets and activities (L-M-H)
  - Risk = Exposure X Sensitivity
- Analyze potential impacts on highly and moderately vulnerable activities and assets
  - Vulnerability = Risk X 1/Adaptive Capacity

Potential Vulnerabilities

Infrastructure and Staff Vulnerabilities

- Extreme Heat
- Wildfire
- Sea Level Rise
- Flooding

For each category, facilities will be pre-screened to eliminate those with little or no vulnerability

Operational Vulnerabilities

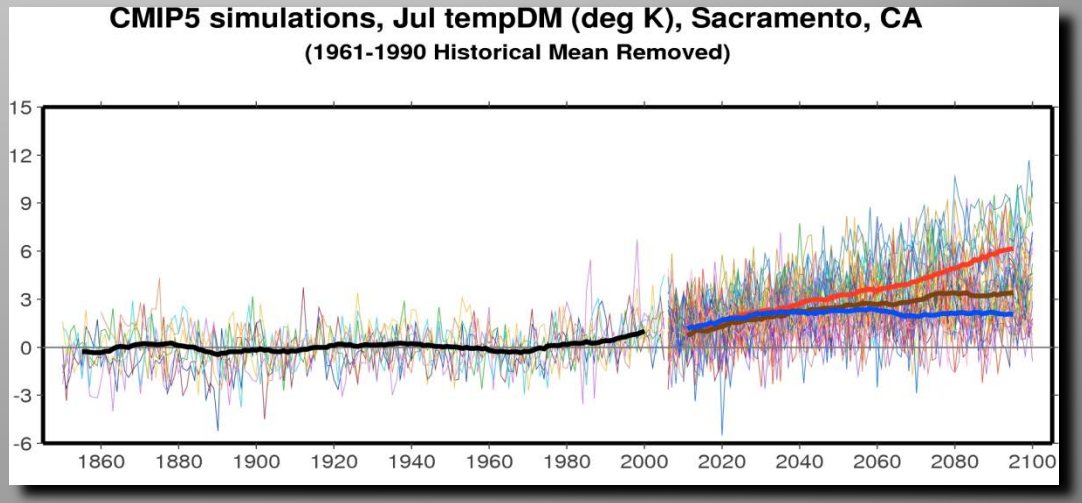
- Drought
- Declining Snowpack
- Changing Streamflows

Climate Team will use climate modeling, literature searches, and previous studies to identify and describe vulnerabilities to the extent possible

CAP Phase 3: Adaptation Plan

- Outline specific measures to reduce the vulnerability of those assets/operations most at risk
- Provide recommendations for improving DWR's resiliency in the face of a changing climate

Timeline – mid-2015



Take Home Messages

- Atmospheric CO_2 is currently higher than the 'safe limit' of 350 ppm
- Both adaptation and mitigation are necessary
- DWR is taking the lead to help water managers understand the risks and develop adaptation options

- To tackle this problem, we must think outside of the box