




CLIMATE CHANGE RESOURCES

AT THE DEPARTMENT OF WATER RESOURCES

A photograph of a snow-covered landscape with a stream flowing through it, surrounded by evergreen trees under a clear blue sky. The stream is dark and contrasts with the white snow. Large snowdrifts are visible on the left and right sides of the stream. The background is a dense forest of evergreen trees.

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Senior Environmental Scientist
(Climate Change Specialist)
October 22, 2014
Inyo-Mono RWMG Meeting, Bishop, CA

DWR Activities

- ❖ State Water Project
- ❖ Bay-Delta Plan
- ❖ Water Plan
- ❖ Dams
- ❖ Floods
- ❖ Grants



Water Plan

- ❖ Protecting water uses
- ❖ Quantifying demand and supply
- ❖ Identifying ways to save and find more water



Other: Dams, Floods, Grants

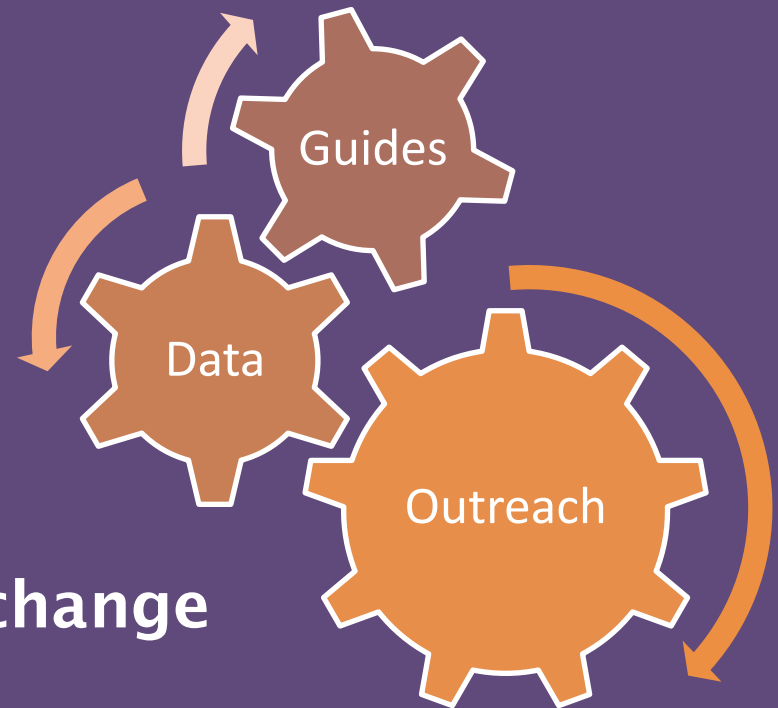
- ❖ Regulating dam safety, controlling floods, responding to emergencies
- ❖ Giving funds and assistance for managing water and watersheds
- ❖ Operating a drought water bank



DWR Climate Program

Team of managers, scientists, engineers, administrators, and interns from headquarters and the regional offices

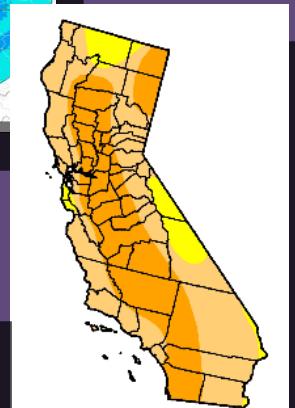
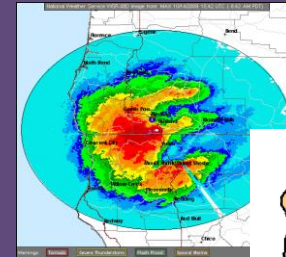
- ❖ *Develop guidance on addressing CC & GHGs*
- ❖ *Provide outreach & technical assistance*



www.water.ca.gov/climatechange

In the Next 40 years

- ❖ 0.9 – 3.6° F temp rise
- ❖ 25 - 40 % less snowpack
- ❖ More intense wet and dry periods
- ❖ Higher flood peaks
- ❖ Less summer runoff
- ❖ Sea level rise: 4-16” (7-55” by end of century)
- ❖ More frequent and intense wildfires





U.S. Drought Monitor West

October 14, 2014

(Released Thursday, Oct. 16, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|--|-------|-------|-------|-------|-------|------|
| Current | 31.95 | 68.05 | 55.56 | 35.07 | 19.75 | 8.90 |
| Last Week <i>10/7/2014</i> | 31.51 | 68.49 | 55.52 | 35.65 | 19.95 | 8.90 |
| 3 Months Ago <i>7/15/2014</i> | 31.51 | 68.49 | 60.35 | 46.65 | 23.56 | 6.02 |
| Start of Calendar Year <i>12/31/2013</i> | 22.20 | 77.80 | 51.44 | 31.11 | 7.75 | 0.63 |
| Start of Water Year <i>9/30/2014</i> | 31.48 | 68.52 | 55.57 | 35.65 | 19.95 | 8.90 |
| One Year Ago <i>10/15/2013</i> | 27.53 | 72.47 | 56.15 | 32.44 | 5.34 | 0.63 |

Intensity:

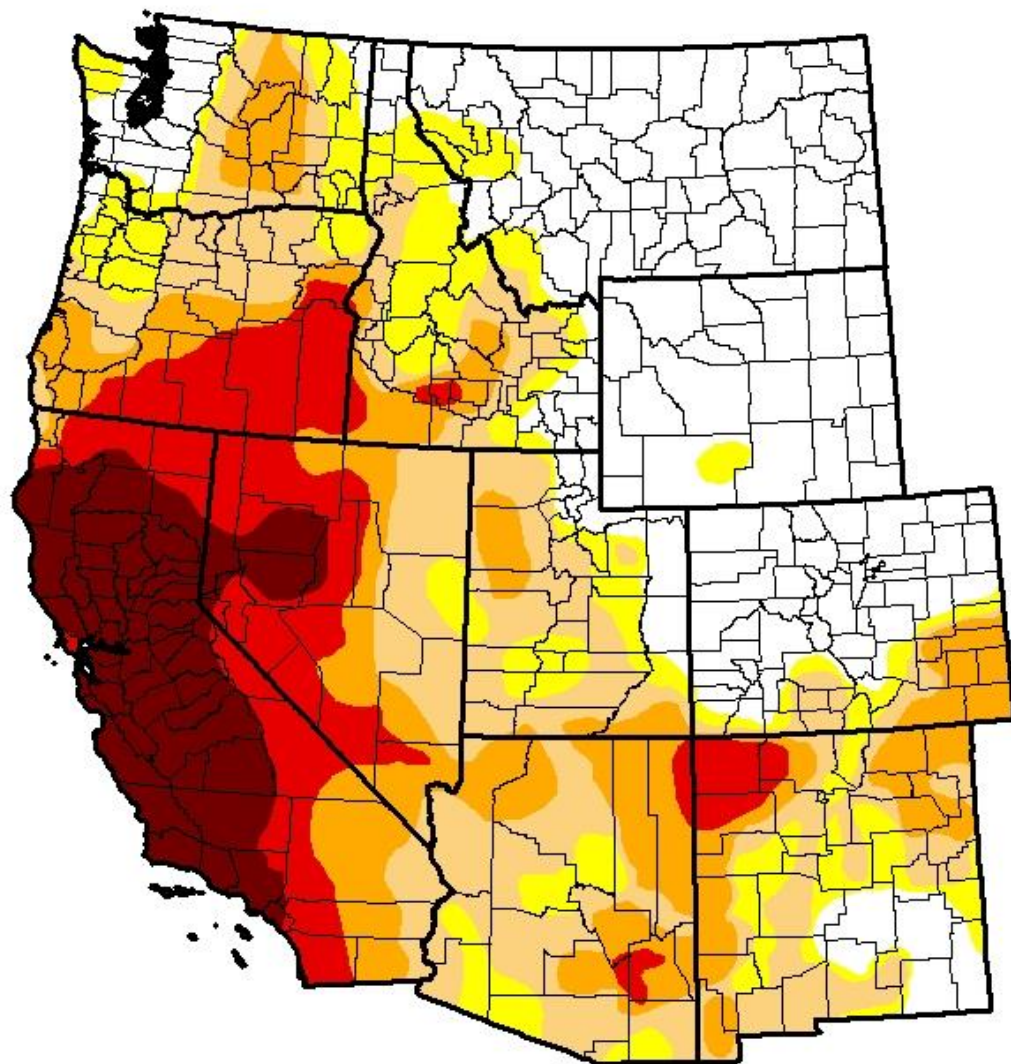
| | |
|---|--|
|  D0 Abnormally Dry |  D3 Extreme Drought |
|  D1 Moderate Drought |  D4 Exceptional Drought |
|  D2 Severe Drought | |

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

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National Drought Mitigation Center



<http://droughtmonitor.unl.edu/>

Longer, More Frequent Droughts

- ❖ Water Management
- ❖ Agriculture
- ❖ Forests
- ❖ Ecosystems
- ❖ Public Health & Safety
- ❖ Infrastructure
- ❖ Coastal Resources

Longer, More Frequent Droughts

❖ Water Management

- Less supply, higher water demands
- Poor WQ, less GW recharge
- Reduced recreational opportunities

❖ Agriculture

- Less supply, higher water demands
- Increase in pests/diseases/invasive species
- Reduced productivity, shifts in crop types

❖ Infrastructure

- Higher energy demand, increased outages
- Reduced water supply

Climate Change in CWP 2013

❖ **Regional Reports**

- *Regionally appropriate adaptation strategies*
- *Scientifically sound approach to address CC*

❖ **Future Climate Scenarios**

- *Climate Change Technical Advisory Group*

❖ **Resource Management Strategies**

- *Climate Change Adaptation*
- *Greenhouse Gas Mitigation*

❖ **Statewide Strategies**

- *Highlights & key recommendations*

South Lahontan Hydrologic Region

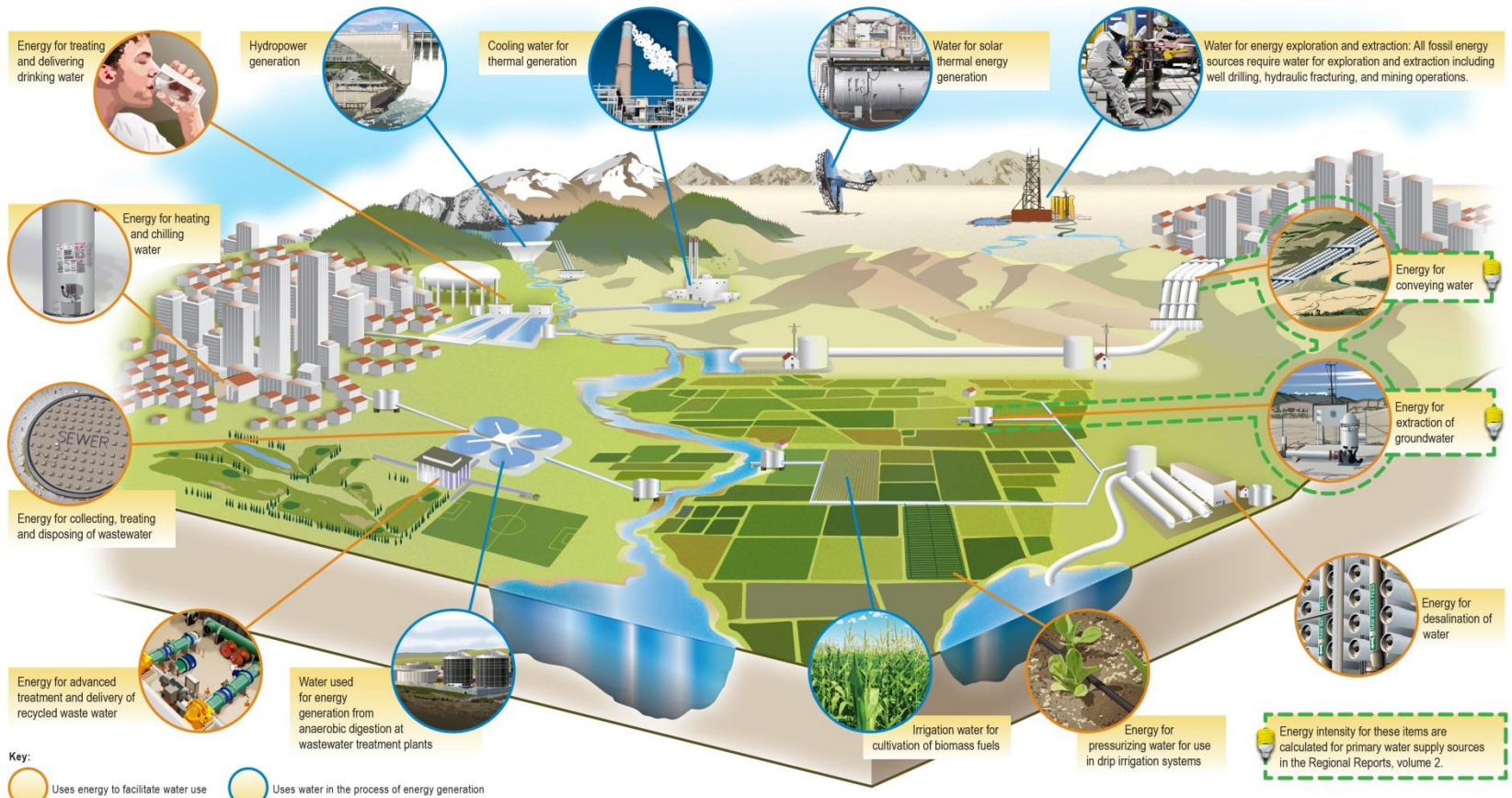
Temperature Increases During Past Century

| Climate Regions | Average Temp Changes (Fahrenheit) | Minimum Temp Changes (Fahrenheit) | Maximum Temp Changes (Fahrenheit) |
|-----------------|--------------------------------------|-----------------------------------|-----------------------------------|
| Statewide | 1 degree | -- | -- |
| Mojave Desert | 1.3 to 2.5 degrees (projection: 4.9) | 1.6 to 2.7 degrees | 1.0 to 2.4 degrees |
| Northeast | 0.8 to 2.0 degrees (projection: 4.6) | 0.9 to 2.2 degrees | 0.5 to 2.1 degrees |

Climate Change in CWP 2013

❖ Water-Energy Nexus *CA Water Today Water-Energy Paper*

Figure 3-23 The Water and Energy Connection

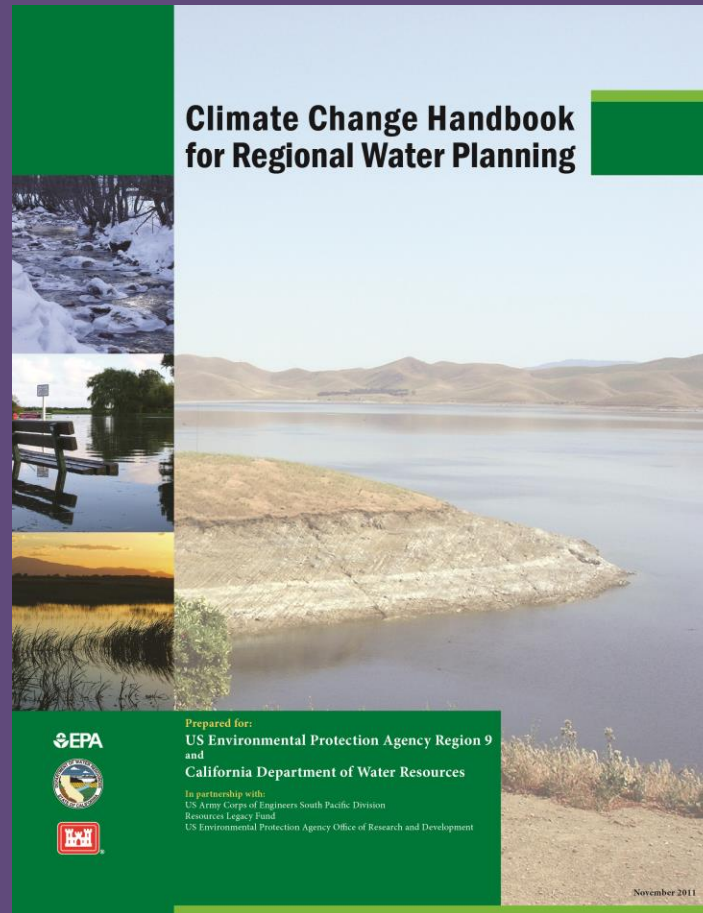


Regional Strategies for Adaptation

- ❖ Aggressively increase water use efficiency
- ❖ Fully implement Integrated Regional Water Management (IRWM), e.g., Inyo-Mono Region



Climate Change Handbook for Water Planning



www.water.ca.gov/climatechange/CCHandbook.cfm

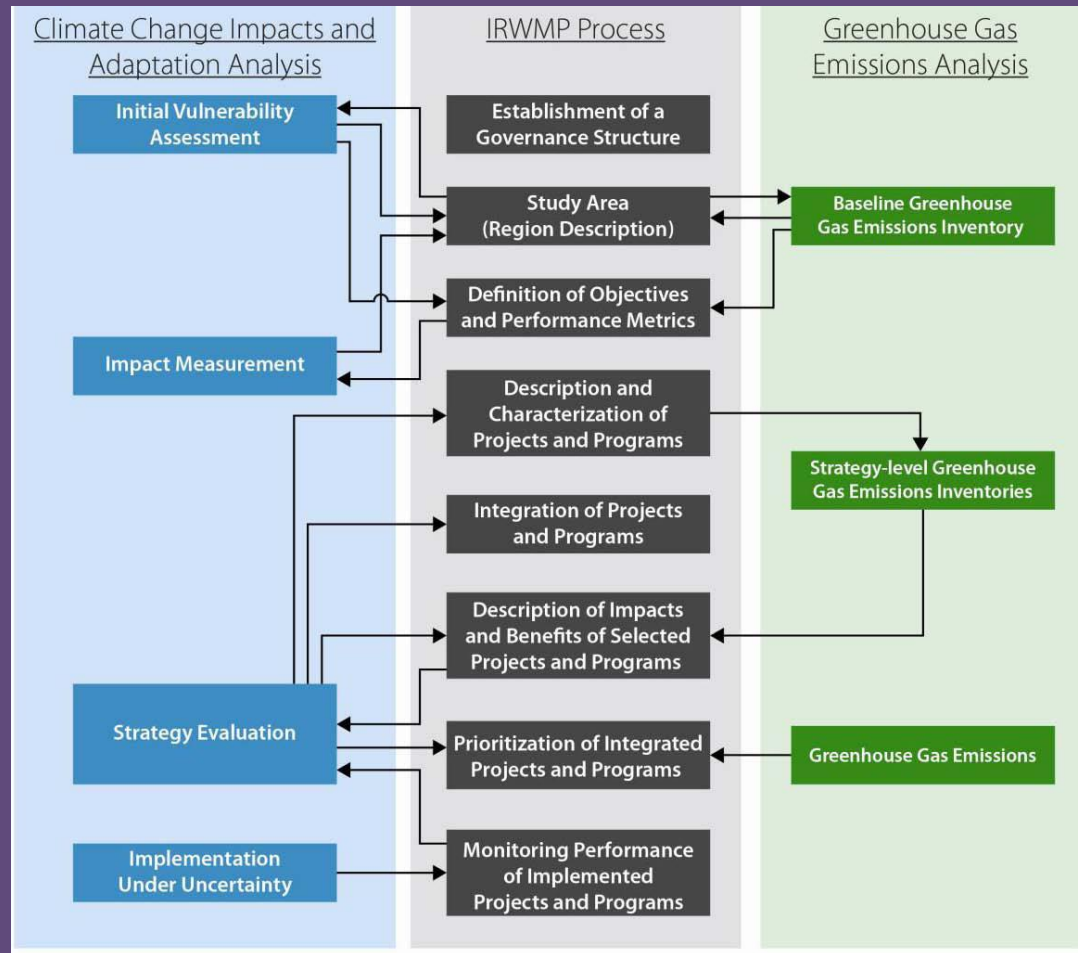
Purpose of the Handbook

- ❖ *Outline the general process for accounting for climate change in water planning*
- ❖ *Synthesize available literature in a way that is useful for regional water planning*
- ❖ *Support IRWM planning in California*

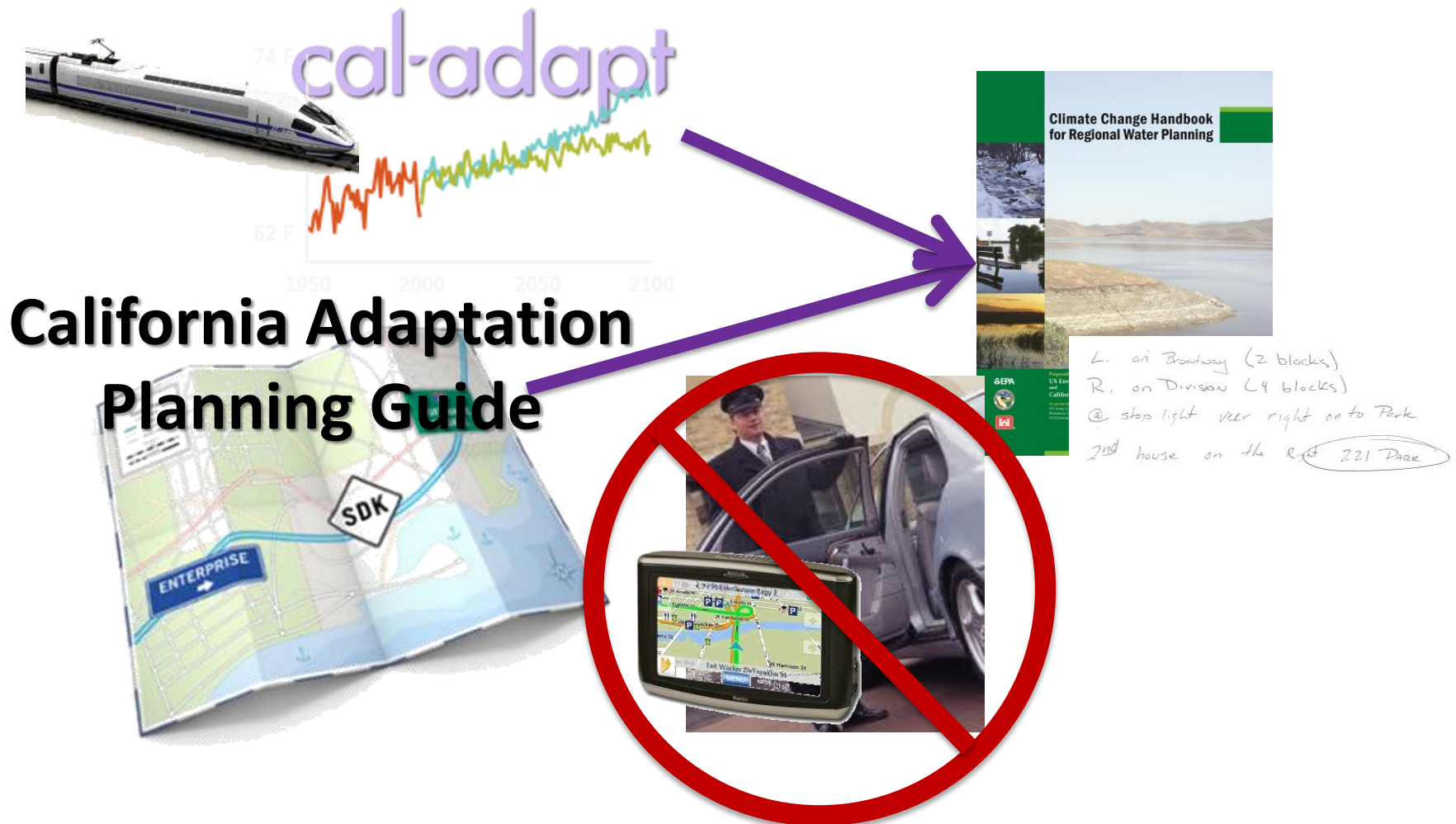
What the Handbook is NOT

- ❖ *A cookbook*
- ❖ *A one-size-fits-all methodology or approach*
- ❖ *An extension of or an addition to the IRWM Guidelines*
- ❖ *A requirement*

Climate Change Analysis



Linking Up With Other Efforts



DWR GGERP

- ❖ California Department of Water Resources
Climate Action Plan Phase I: Greenhouse Gas Emissions
Reduction Plan
<http://www.water.ca.gov/climatechange/CAP.cfm>



<http://www.water.ca.gov/climatechange/>

Climate Change



Climate change is having a profound impact on California water resources, as evidenced by changes in snowpack, sea level, and river flows. These changes are expected to continue in the future and more of our precipitation will likely fall as rain instead of snow. This potential change in weather patterns will exacerbate flood risks and add additional challenges for water supply reliability.

The mountain snowpack provides as much as a third of California's water supply by accumulating snow during our wet winters and releasing it slowly when we need it during our dry springs and summers. Warmer temperatures will cause what snow we do get to melt faster and earlier, making it more difficult to store and use. By 2050, scientists project a loss of at least 25 percent of the Sierra snowpack. This loss of snowpack means less water will be available for Californians to use.

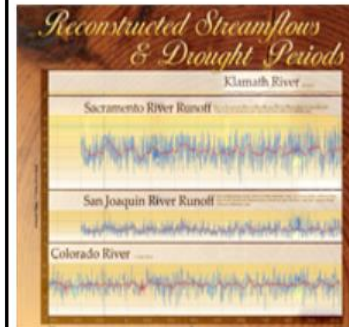
Climate change is also expected to result in more variable weather patterns throughout California. More variability can lead to longer and more severe droughts. In addition, the sea level will continue to rise threatening the sustainability of the Sacramento-San Joaquin Delta, the heart of the California water supply system and the source of water for 25 million Californians and millions of acres of prime farmland.

The Department of Water Resources (DWR) is addressing these impacts through mitigation and adaptation measures to ensure that Californians have an adequate water supply, reliable flood control, and healthy ecosystems now and in the future. Below are some of DWR's climate change activities.

- In 2013, DWR completed its ownership divestment of a coal-fired power plant in Nevada and ceased taking electricity from it. By replacing this electricity with electricity generated by high-efficiency gas-fired power plants and renewables, DWR reduced its GHG emissions by over 800,000 metric tons per year (equivalent to removing 170,000 cars from the road).
- In 2012, DWR adopted phase 1 of its Climate Action Plan, a Department-wide [Greenhouse Gas Emissions Reduction Plan](#)
- In 2011, DWR in cooperation with the U.S. Environmental Protection Agency, U.S. Army Corps of Engineers, and Resources Legacy Fund completed the [Climate Change Handbook for Regional Water Planning](#)

Featured Link

[Paleoclimate \(Tree-Ring\) Study Released](#)



New Hydroclimate Reconstructions have been released, using updated tree-ring chronologies for these California river basins; Klamath, San Joaquin and Sacramento. The report, prepared by the University of Arizona, allows assessment of hydrologic variability over centuries to millennia, gives historic context for assessing



The Climate Registry

CALIFORNIA

