

RECLAMATION

Managing Water in the West

Climate Change Assessments And Adaptation Planning in Mid Pacific Region

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MP Region Climate Change Coordinator
August 2011**



U.S. Department of the Interior
Bureau of Reclamation

Climate Assessment & Adaptation Planning Drivers

Federal mandates, policies and programs are consistent with and speak to the need climate change assessments

Secure Water Act (2009)

- Public Law 111-11, Title 9, Subtitle F

DOI Secretarial Order 3297 & 3289 (2009)

Basin Study Program (2009)

- WWCRA , BSPs

P&Gs & NEPA

- Executive Order 11747 (EO11747)

BDCP, CALFED & CVP IRP

- Public Law 102-575, Section 3408(j)

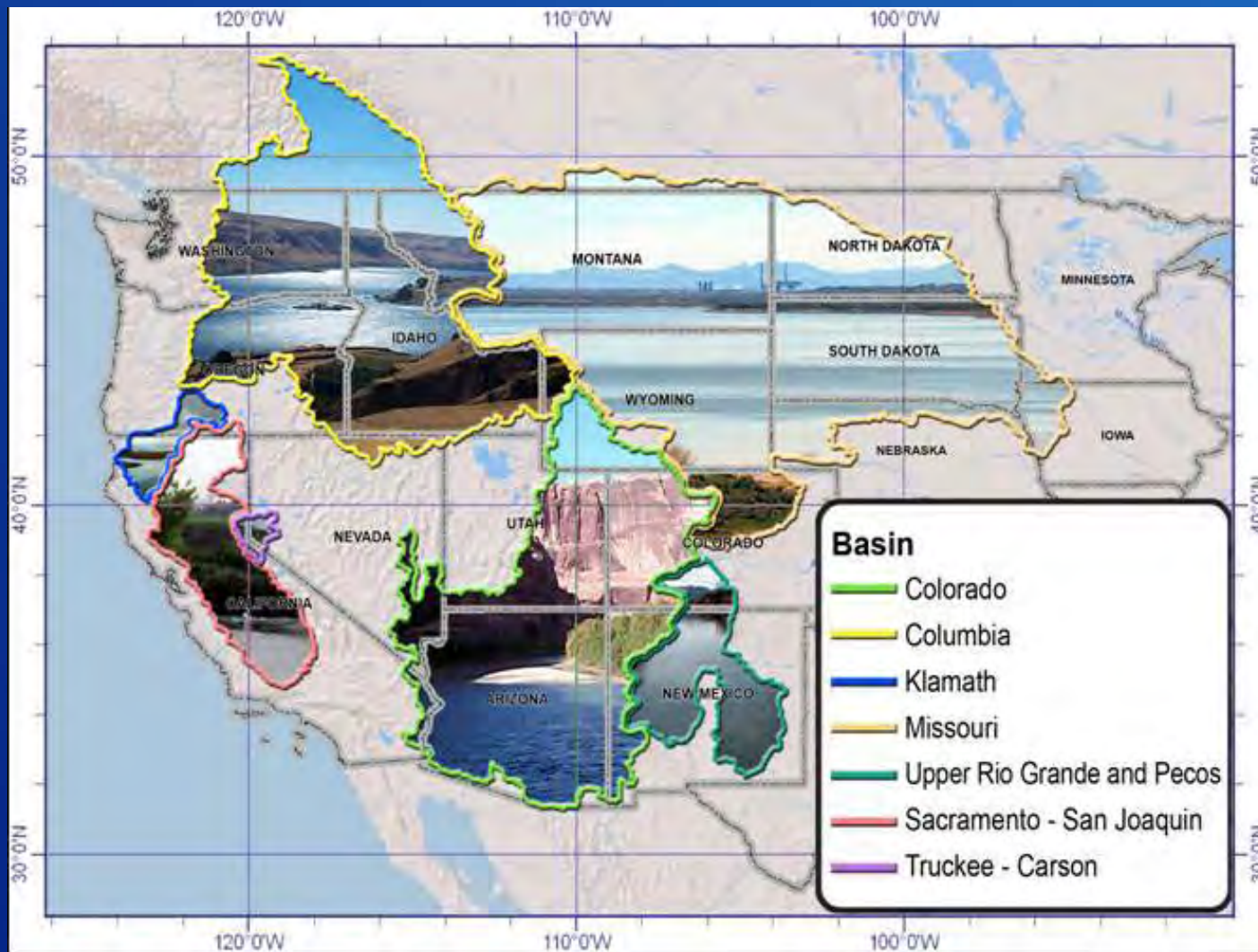
- Public Law 108-361, Title 1

Maintain 21st Century
Project Sustainability

Long-term
Planning
Studies



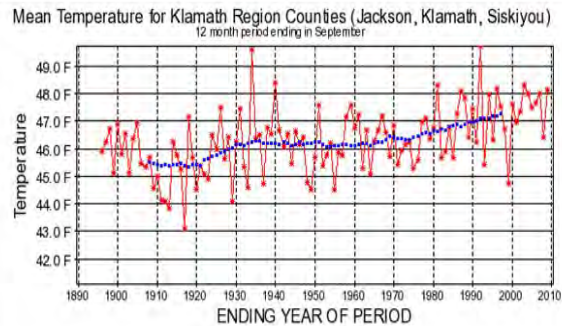
SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water – April 2011



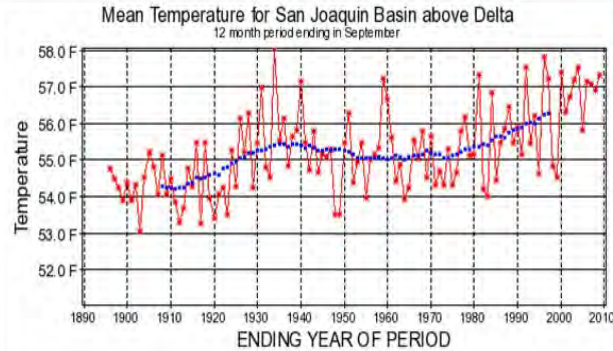
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SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water – April 2011

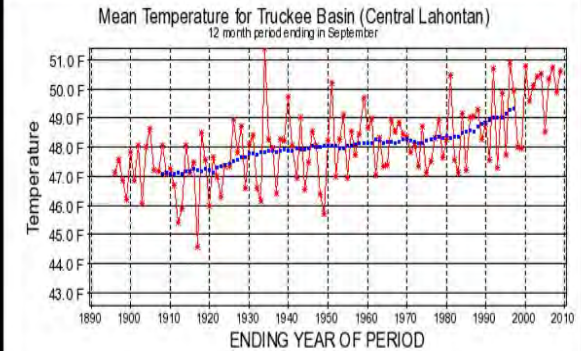
Klamath Basin



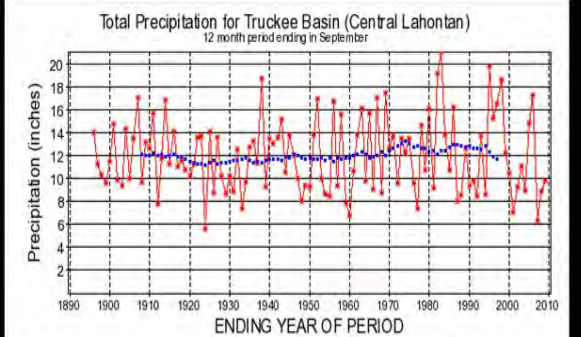
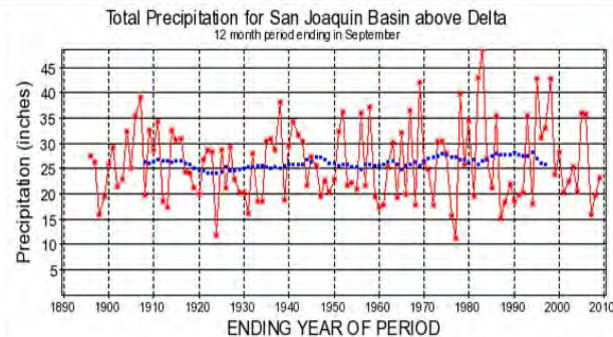
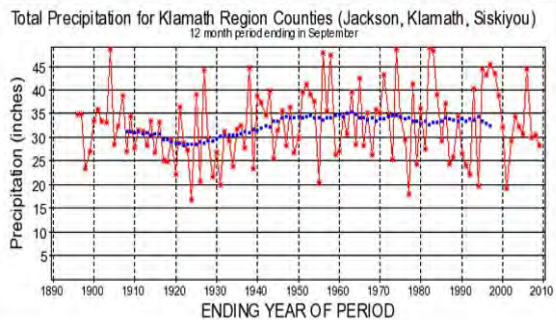
Sacramento-San Joaquin Basins



Truckee-Carson Basins



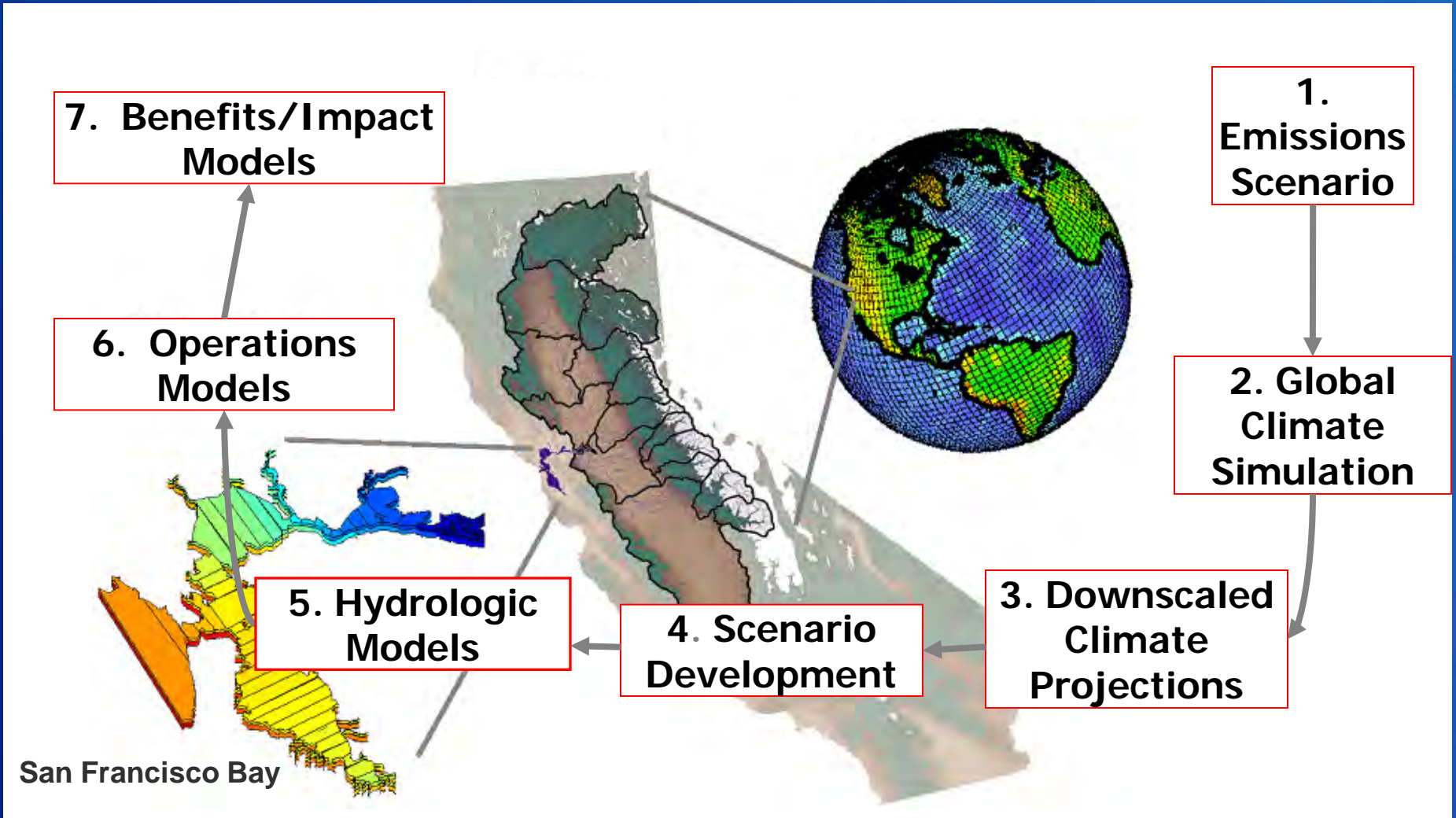
Observed Historic Mean Annual Temperature (°F) and 25 year moving average



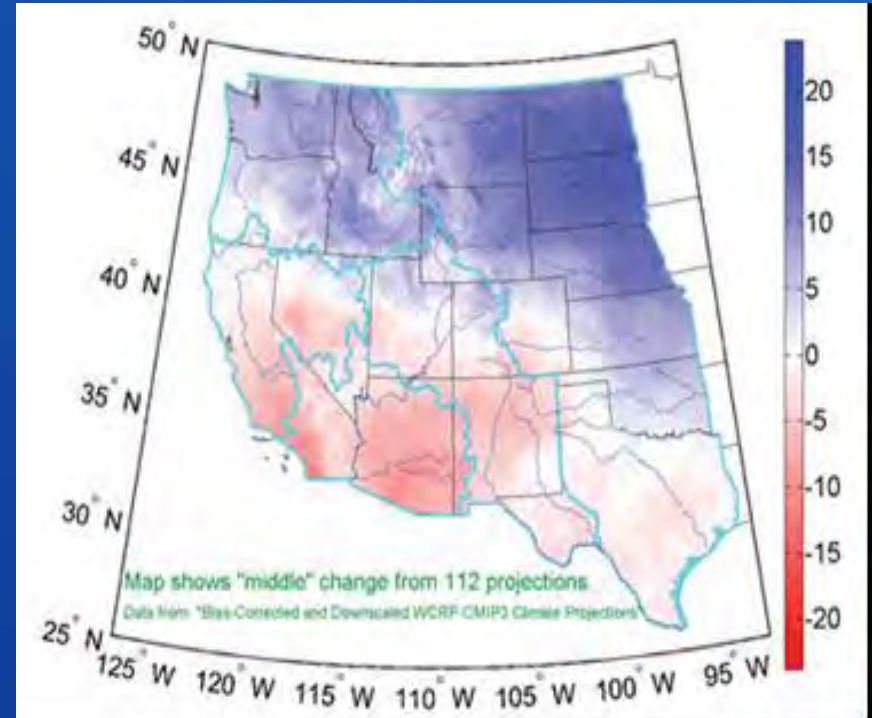
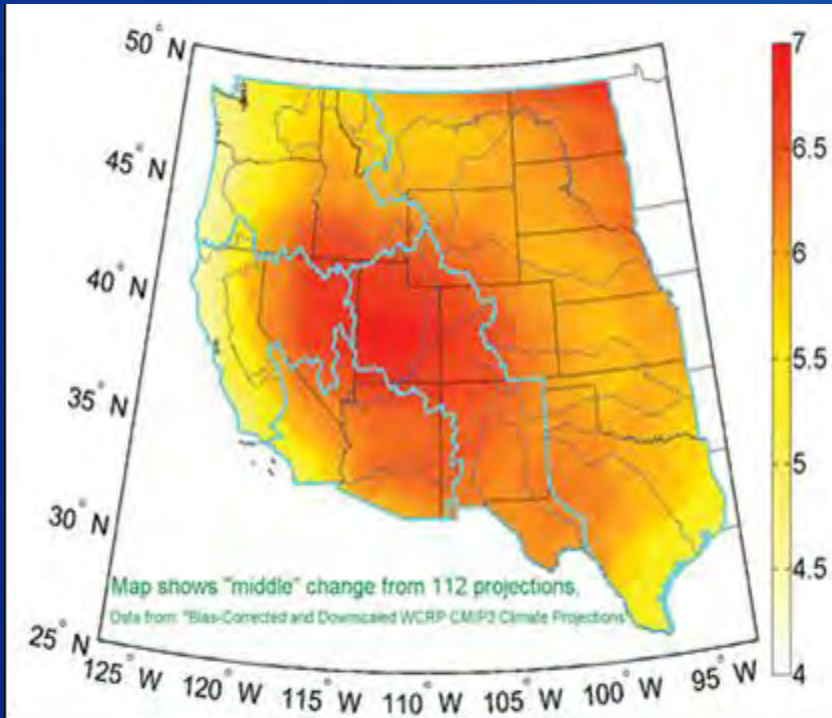
Observed Historic Mean Annual Precipitation (in) and 25 year moving average

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West-Wide Climate Risk Assessments: Bias-Corrected and Spatially Downscaled Surface Water Projections



SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water – April 2011



Projected median temperature (°F) and precipitation (%) changes at the end of 21st century (2070–2099) relative to historic conditions (1950–1979)

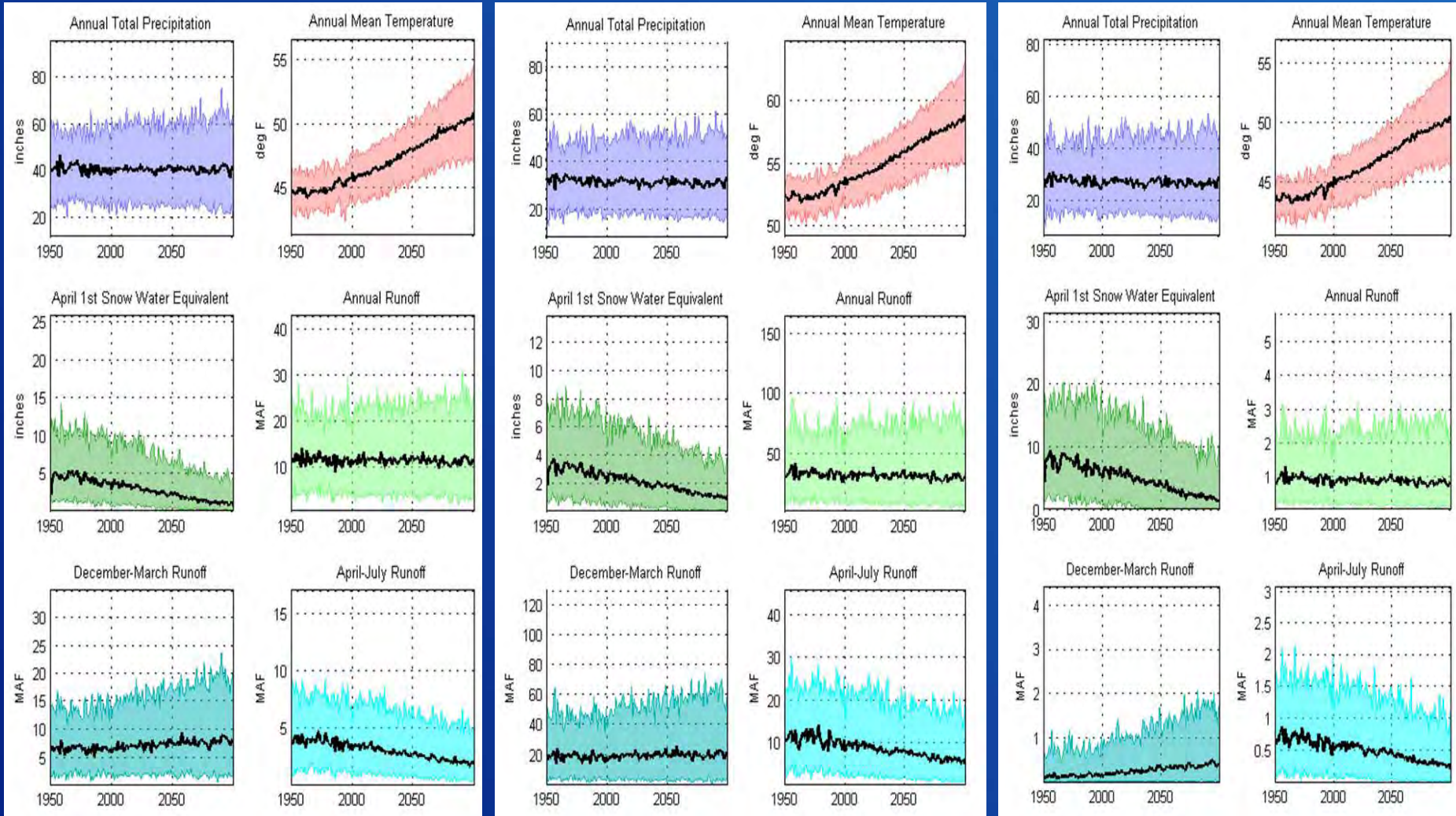
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Mid Pacific Region Hydro-Climate Projections

Klamath Basin

Sacramento-San Joaquin Basins

Truckee-Carson Basins



Note: Runoff Scales Vary By Basin

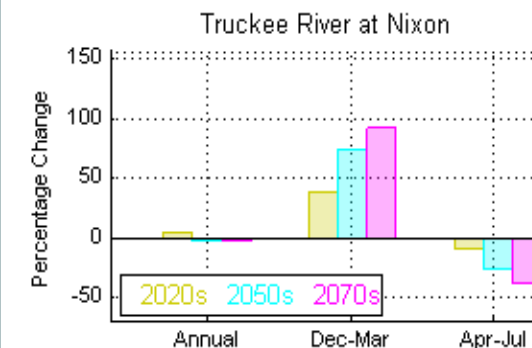
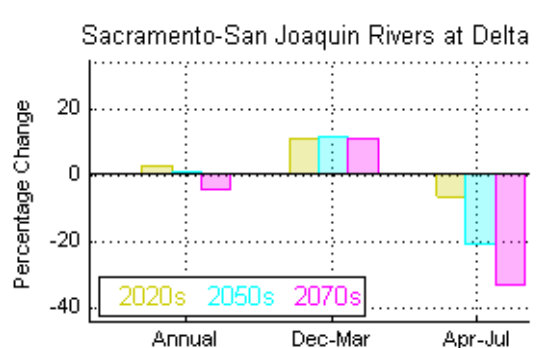
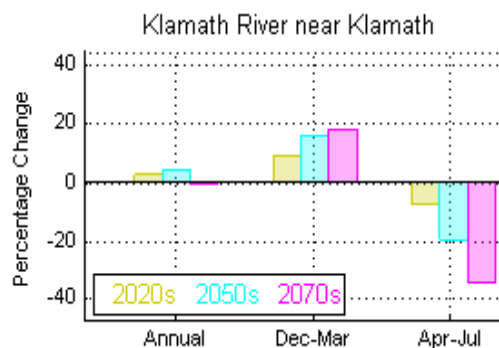
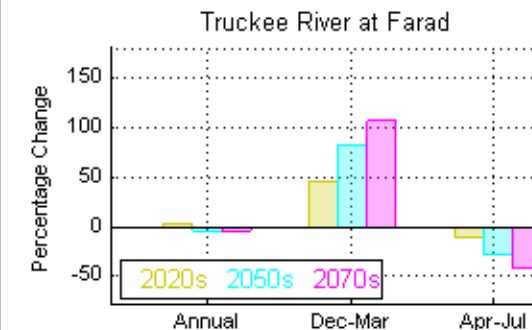
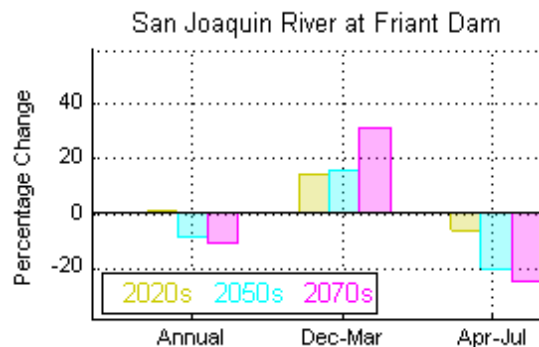
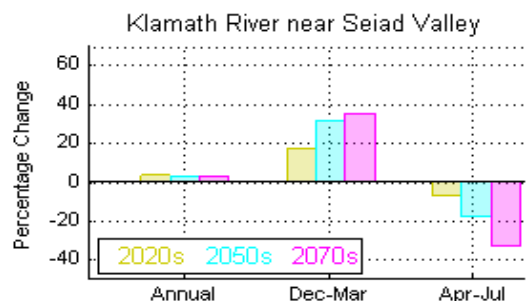
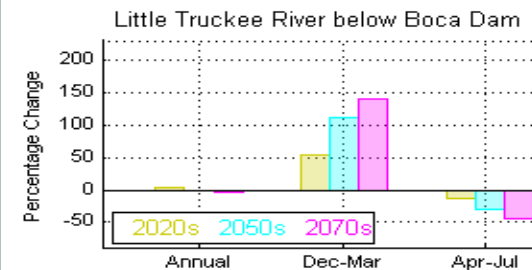
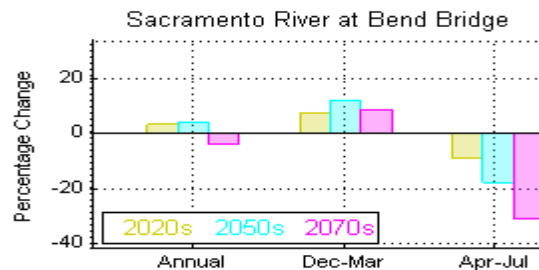
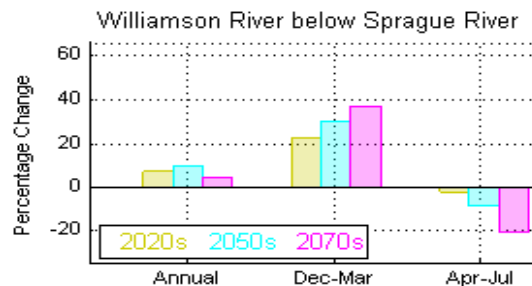
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Mid Pacific Region Hydro-Climate Projections

Klamath Basin

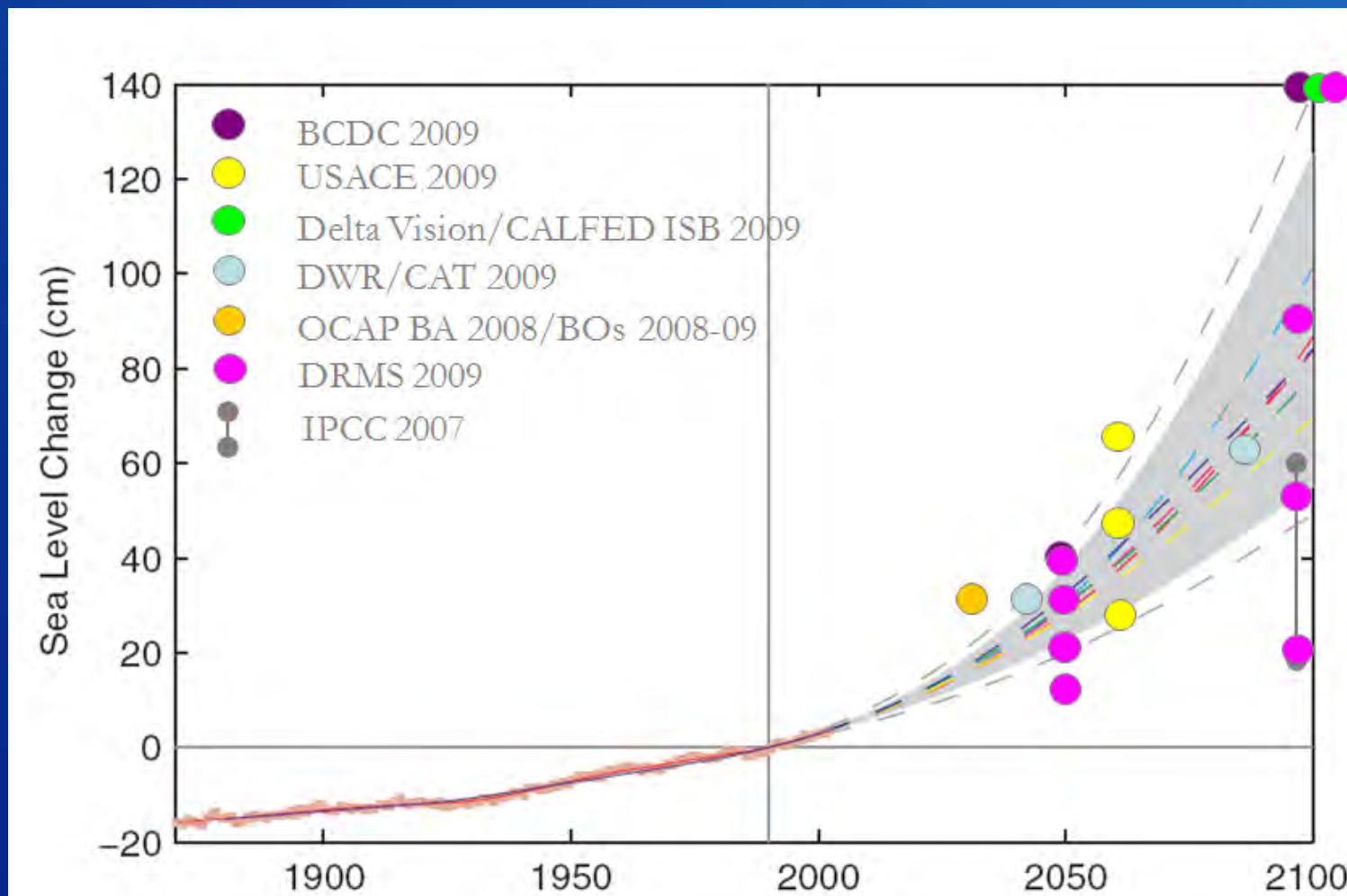
Sacramento-San Joaquin Basins

Truckee-Carson Basins



Mid Pacific Region Hydro-Climate Projections

SEA LEVEL CHANGE



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Mid Pacific Region Hydro-Climate Projections

ATMOSPHERIC RIVERS

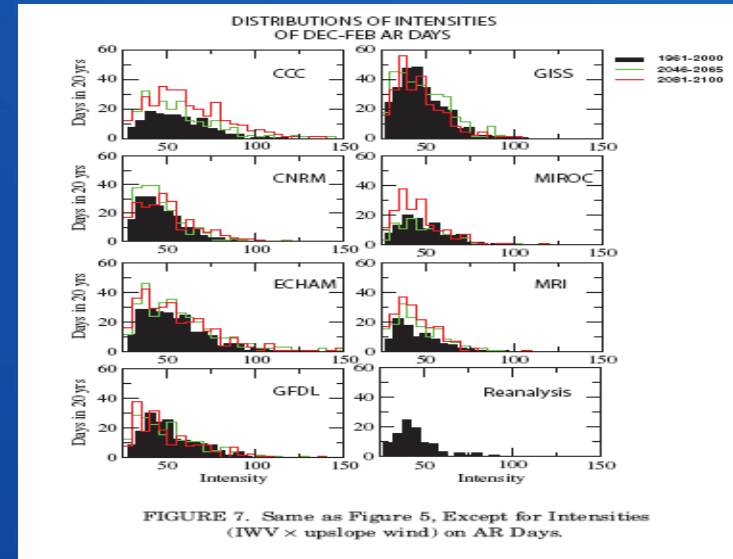
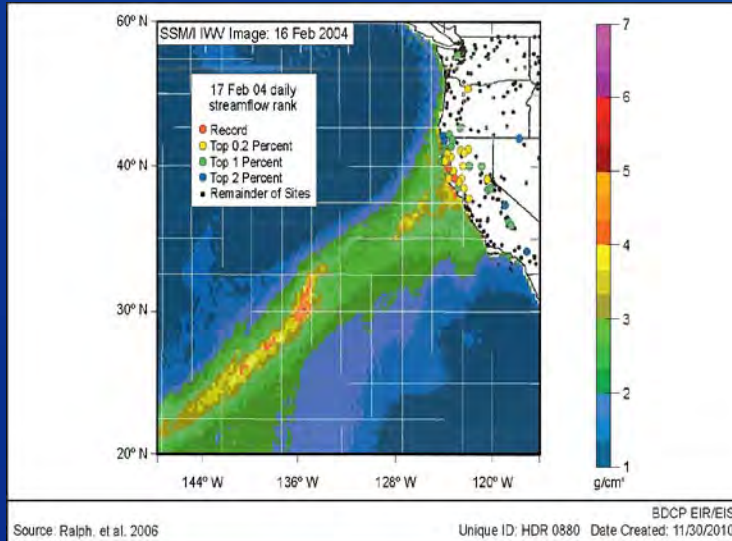
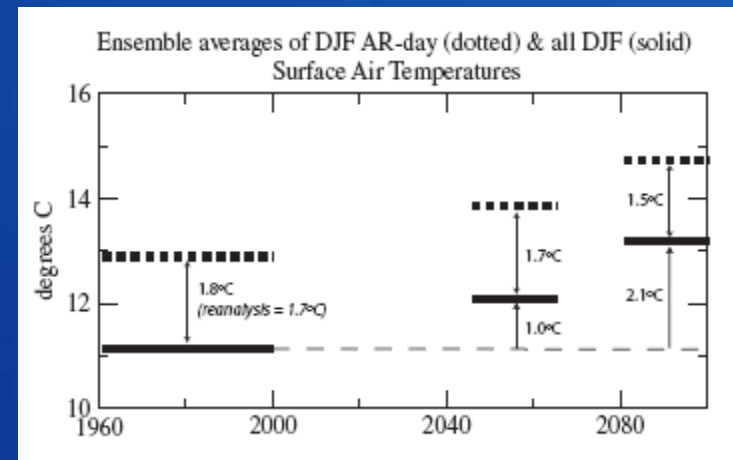


TABLE 2. Trends in Intensity (IWW × upslope wind speed) of AR Days/100 Years From Seven Climate Models, With Highlighting as in Table 1.

Climate Model	Change/100 Years	% Change/100 Years	R ² (in %)
CCC	+5.7 cm H ₂ O m/s	+11%	12
CNRM	+4.0	+9%	8
ECHAM	+3.8	+7%	6
GFDL	+0.1	0	0
GISS	+1.6	+4	3
MIROC	-0.3	-1	0
MRI	+2.1	+5	3*



Mid Pacific Region Hydro-Climate Projections

DROUGHTS

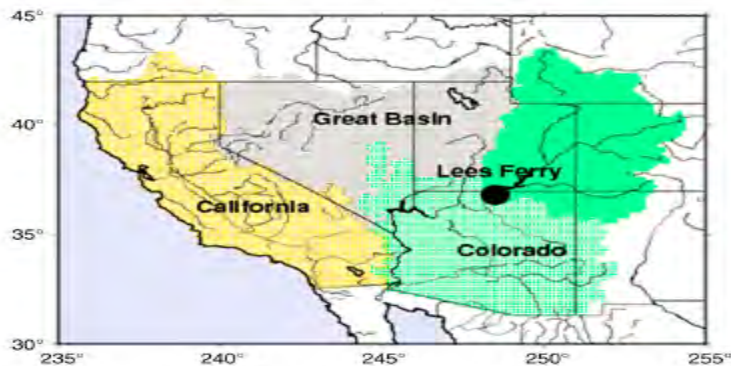
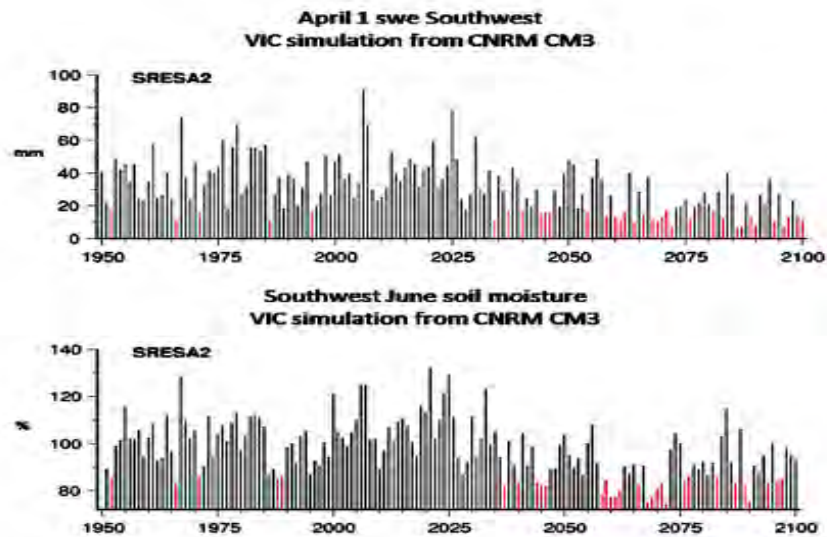
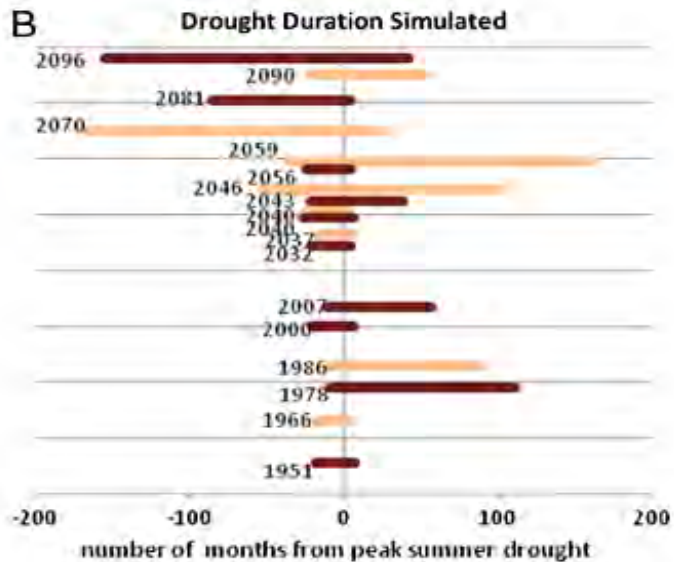
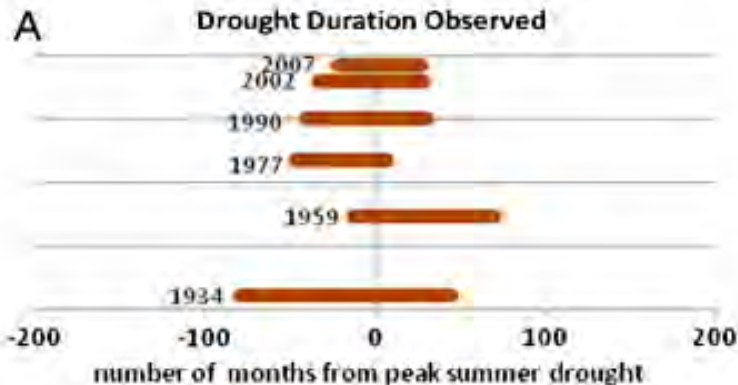


Fig. 1. The study area consists of three regions: California, Great Basin, and Colorado River Basin. Together these are called the "Southwest."



SECURE Water Act Section 9503(c) – Reclamation Climate Change and Water – April 2011

- 1) **Water Supply, Reservoir Operations and Flood Management** - Reduced supply under current flood control constraints due to changes in seasonal runoff timing and increased reservoir evaporation.
- 2) **Water demands** – Increased demands due warming climate and increasing population. May be moderated by CO2 and technology changes.
- 3) **Groundwater** – Increased watershed ET could reduce recharge but changes in seasonal runoff timing could offset recharge reductions. Demands for groundwater likely to increase due reduced surface water supplies.
- 4) **Surface Water Quality** – Decreasing water quality due increasing water temperature, DO and eutrophication. Sea Level Rise and reduced surface water supply will cause increased difficulty in meeting Delta salinity standards.
- 5) **Fish and Wildlife** - Increased stress on fisheries that are sensitive to a warming aquatic habitat. Trigger synergistic effects in ecosystems and exacerbate invasive species problems.
- 6) **Hydropower** - Hydroelectric generation sensitive to climate changes that affect basin precipitation, river discharge (amount and timing), and reservoir water levels. Increased demands from climate warming.

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Mid-Pacific Climate Change - Basin Studies

KLAMATH BASIN STUDY PROPOSAL

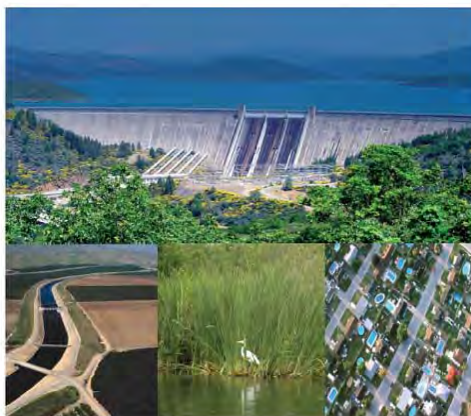
A COOPERATIVE PROPOSAL SUBMITTED BY

STATE OF OREGON - WATER RESOURCES DEPARTMENT

STATE OF CALIFORNIA - DEPARTMENT OF WATER RESOURCES



SACRAMENTO-SAN JOAQUIN BASINS STUDY Letter Proposal



A Collaborative Proposal From

State of California - Department of Water Resources
Stockton East Water District
California Partnership for the San Joaquin Valley



Truckee River Basin Study

Climate Change and Water Resources Assessment

Plan of Study



With Cost-Share Participation by these Major Study Partners:



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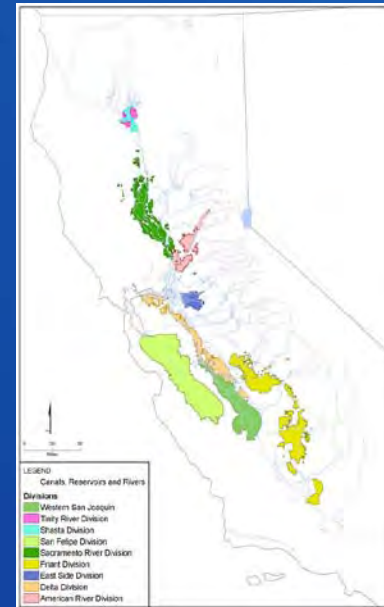
Mid-Pacific Climate Change - Other Studies

CALFED Storage Project Feasibility Investigations



- Shasta Lake Water Resources Investigation
- North of Delta Off-stream Storage Investigation
- Upper San Joaquin Storage Investigation
- Los Vaqueros Storage Investigation

Central Valley Project Integrated Resource Plan (CVP IRP)



CVP Division Specific Climate Change Assessments & Adaptation Strategies

Provide tools for Basin Study, CALFED, BDCP and other future stakeholder IRP & feasibility studies

Integrated Climate Impacted Supply/Demand Assessments

Transient 21st climate simulations capturing observed historic variability

Integrated water quality, economic, hydropower & GHG emissions

Scenario based planning & decision support tools

That's All Folks

Questions?

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