

Hydrology in a Brave New World

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The Effect of Climate Change on Water Resources

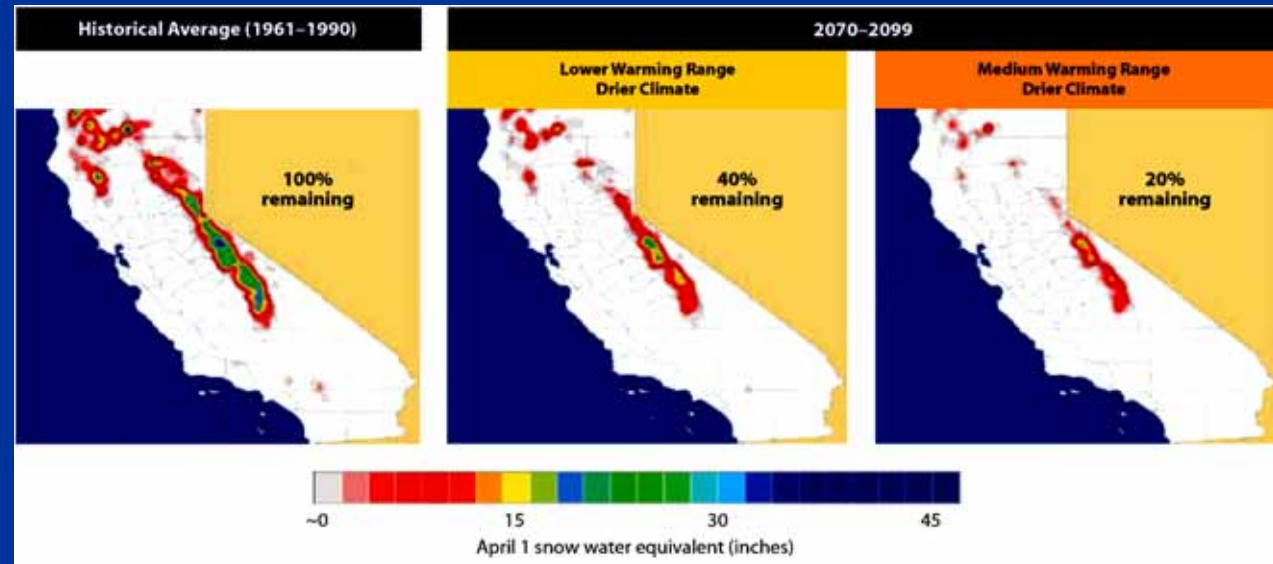


- Water resources in the West will be affected significantly by climate change.
- They also will be affected by forecasted population growth, which will put more stress on shrinking water supplies.
- Future is not the same as the past – old assumptions need to be modified.

The Effect of Climate Change on Water Resources



- Loss of snow pack
- More precipitation as rain than snow
- Earlier runoff from snow melt
- Sea level rise
- More extreme weather
- Reduced summer hydropower generation
- Changes in river flows
- Substantial reductions in water for agriculture



South Bay: South Palo Alto



Source: “Projecting Vulnerability to Inundation Due to Sea Level Rise in the San Francisco Bay,” Noah Knowles, USGS Menlo Park (September 2008).

California Acts to Reduce GHG Emissions

- Executive Order S-03-05 (June 1, 2005)
- AB 32, Global Warming Solutions Act of 2006, H&S Code §§ 38500, et seq. (Sept. 27, 2006)
- State must reduce total emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050.
- Very aggressive reduction targets in light of expected economic, population growth.

California Environmental Quality Act (CEQA)

- Requires environmental impact report (EIR) for state or local agency action that may significantly affect the environment.
- Unlike NEPA, “CEQA establishes a duty to avoid or minimize environmental damage where feasible.” (Guidelines, § 15021(a).)

SB 97

- SB 97 requires Governor's Office of Planning & Research (OPR) to adopt mitigation measures for greenhouse gas emissions by 2010
 - (Cal. Pub. Res Code § 21083.05, adopted Aug, 2007)
- Removes any doubt that analysis and mitigation of greenhouse gases is required under CEQA

The Water-Energy Relationship

Water-related energy use (CEC, PEIR)

- In CA, water-related energy use consumes **19+%** of electricity, **30+%** of natural gas, and **88+ billion gallons** of diesel fuel annually.
- State Water Project is largest single user of electricity in State – 2-3% percent.
- Acre-foot of water (serves a family of five for a year) = **1,400 tons**.

Water-Related Energy Use in California

	Northern California (kWh/MG)	Southern California (kWh/MG)
Supply & Conveyance	150	8,900
Water Treatment	100	100
Distribution	1,200	1,200
Wastewater Treatment	<u>2,500</u>	<u>2,500</u>
Regional Total:	3,950	12,700

Source: CEC (November 2007)

CEQA and Water

- Agencies should estimate emissions, assess impact, mitigate where feasible, and support conclusions with substantial evidence.
- Some mitigation measures related to water include:
 - Retrofitting municipal water and wastewater systems with energy-efficient equipment, and recovering wastewater treatment methane for energy production.
 - Water recycling and water reuse.
 - Requiring construction of buildings with energy- and water-efficient features and recycled materials.
- Reduction in future water supplies highlights the need to conserve water – which in turn will serve as mitigation.



AG's Actions Under CEQA: Comment Letters

- First AG CEQA letter raising GHG issue in 2006 – Orange County Transportation Plan (pre-AB 32)
- Now, have sent about 40 comment letters
- Regional transportation plans, general plans, specific plans, ethanol plants, dairies, refinery expansions, a few very large residential developments, airport master plan, cement plant, and a water bottling plant.
- Some of our comment letters have noted the need to address the effects of climate change on water supplies.

AG's Actions Under CEQA: Litigation

- Only one AG lawsuit filed - San Bernardino County General Plan
- Large county on LA border
 - 30-year General Plan
 - Lots of traffic, growth, heat
 - EIR: no discussion of GHG, GW
 - AG letter, followed by suit

AG's Actions Under CEQA: Settlements

- **San Bernardino** (General Plan) - County agreed to adopt GHG emissions reduction plan, inventory emissions, set a target for reductions, and take mitigation measures to meet target.
- **City of Stockton** – City agreed to adopt Climate Action Plan within two years
- **ConocoPhillips** (refinery expansion) – audits, \$10 million to Bay Area air district mitigation fund & to conservation projects
- **Port of LA** (terminal expansion) – GHG inventory extending beyond Port's borders
- **Great Valley Energy** (ethanol plant) – \$ 1 million to San Joaquin Valley air district mitigation fund
- **San Diego Airport Master Plan**– greening of onsite airport operations
- **Cilion** (ethanol plant)– payment to San Joaquin Valley air district mitigation fund

Recent GW CEQA Cases

- ***Center for Biological Diversity v. City of Desert Hot Springs***, No. RIC464585 (August 6, 2008) – finding EIR inadequate in part for failure to analyze the project’s impact on global warming.
- ***Natural Resources Defense Council v. South Coast Air Quality Management District***, No. BS 110792 (July 28, 2008) – Program Environmental Assessment failed adequately to identify, analyze, or quantify global warming effects of project, and thus failed to consider mitigation measures, in violation of CEQA.
- ***Environmental Council of Sacramento v. California Department of Transportation***, No. 07CS00967 (July 15, 2008) – finding EIR inadequate for failure to adequately disclose and analyze a project’s potential impacts on GHG emissions and climate change.

Recent GW NEPA Litigation

- NEPA requires environmental impact statement (EIS) for major federal action that may significantly affect environment.
- Unlike CEQA, NEPA requires that mitigation measures be discussed, but not that they be formulated and adopted.
- *Center for Biological Diversity v. National Highway Transportation Admin., as amended*, 538 F.3d 1172 (9th Cir. 2008).
 - Challenge to fuel efficiency standards.
 - Impacts on climate change are “precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct..”
 - Found NHTSA had failed to demonstrate that the effects of the new standards on climate change would be insignificant.

Recent GW ESA Litigation: Salmon and Delta Smelt

- ***Pacific Coast Federation of Fishermen's Associations v. Gutierrez***, No. 1:06-cv-00245-OWW-G, *as amended*, 2008 WL 2223070 (E.D. Cal. May 20, 2008).
- Plaintiffs argued the 2004 “no jeopardy” BiOp failed to consider that global climate change would significantly change the hydrology of Northern California river systems over the foreseeable future.
- Court found the NMFS had totally failed to “address, adequately explain, and analyze the effects of global climate change on the species,” and granted plaintiffs’ motion for summary judgment on this issue.
- ***Natural Resources Defense Council v. Kempthorne***, No. 1:05-CV-01207 OWW (TAG), 506 F.Supp.2d 322 (E.D. Cal. 2007).

A Sea Change

- Governor's Office of Planning & Research list of environmental documents addressing climate change
 - In 2006, 2 documents included GHG discussion
 - From March 07 to August 2008, ~ 470 documents
 - See OPR, CEQA Guidelines and Greenhouse Gases, <http://opr.ca.gov/index.php?a=ceqa/index.html>
- Based on an informal count, approximately 30 of these relate to hydrology projects.
- Issue is no longer “whether,” but “how.” More resources, examples, every day.

2020, 2050 and Beyond

“We have it in our power to begin the world over again.”

– Thomas Paine,
Common Sense (1776)



Resources

Executive Order S-3-05, available at <http://gov.ca.gov/executive-order/1861/>

Assembly Bill No. 32, available at http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.pdf

Senate Bill No. 97, available at http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0051-0100/sb_97_bill_20070824_chaptered.pdf

California Climate Change Portal (contains links to climate change-related proceedings at various state agencies): <http://www.climatechange.ca.gov/>

Governor's Office of Planning and Research, CEQA Guidelines and Greenhouse Gases: <http://opr.ca.gov/index.php?a=ceqa/index.html>

California Attorney General's Office, global warming website (includes links to CEQA, comment letters, settlement agreements, mitigation measures, and modeling tools): <http://ag.ca.gov/globalwarming/>

California Air Pollution Control Officers' Association, "CEQA and Climate Change" (Jan. 2008): <http://www.capcoa.org/>

California Energy Commission, 5th Annual Climate Change Conference (September 2008) (contains links to presentations):

http://www.climatechange.ca.gov/events/2008_conference/presentations/

California Energy Commission, "California's Water-Energy Relationship" (Nov. 2005): <http://www.energy.ca.gov/2005publications/CEC-700-2005-011/>