

UC ANR: Response to the Drought



California Institute for Water Resources

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U.S. Drought Monitor

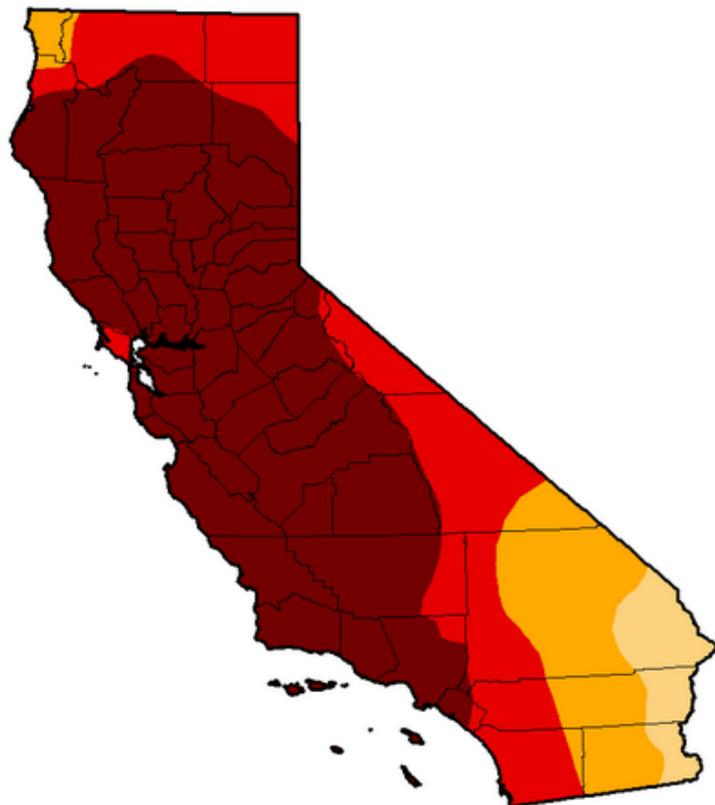
California

September 23, 2014
 (Released Thursday September 25, 2014)
 Valid 8 a.m. EDT

Statistics type: Traditional (D0-D4, D1-D4, etc.) Categorical (D0, D1, etc.)

Drought Condition (Percent Area):

Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	2014-09-23	0.00	100.00	100.00	95.34	81.92	58.41
Last Week	2014-09-16	0.00	100.00	100.00	95.42	81.92	58.41
3 Months Ago	2014-06-24	0.00	100.00	100.00	100.00	76.69	32.98
Start of Calendar Year	2013-12-31	2.61	97.39	94.25	87.53	27.59	0.00
Start of Water Year	2013-10-01	2.63	97.37	95.95	84.12	11.36	0.00
One Year Ago	2013-09-24	2.63	97.37	96.04	89.84	11.36	0.00



Population Affected by Drought: **37,253,959**

[View More Statistics](#)

Intensity:

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

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

Author(s):

Richard Heim, NOAA/NCDC

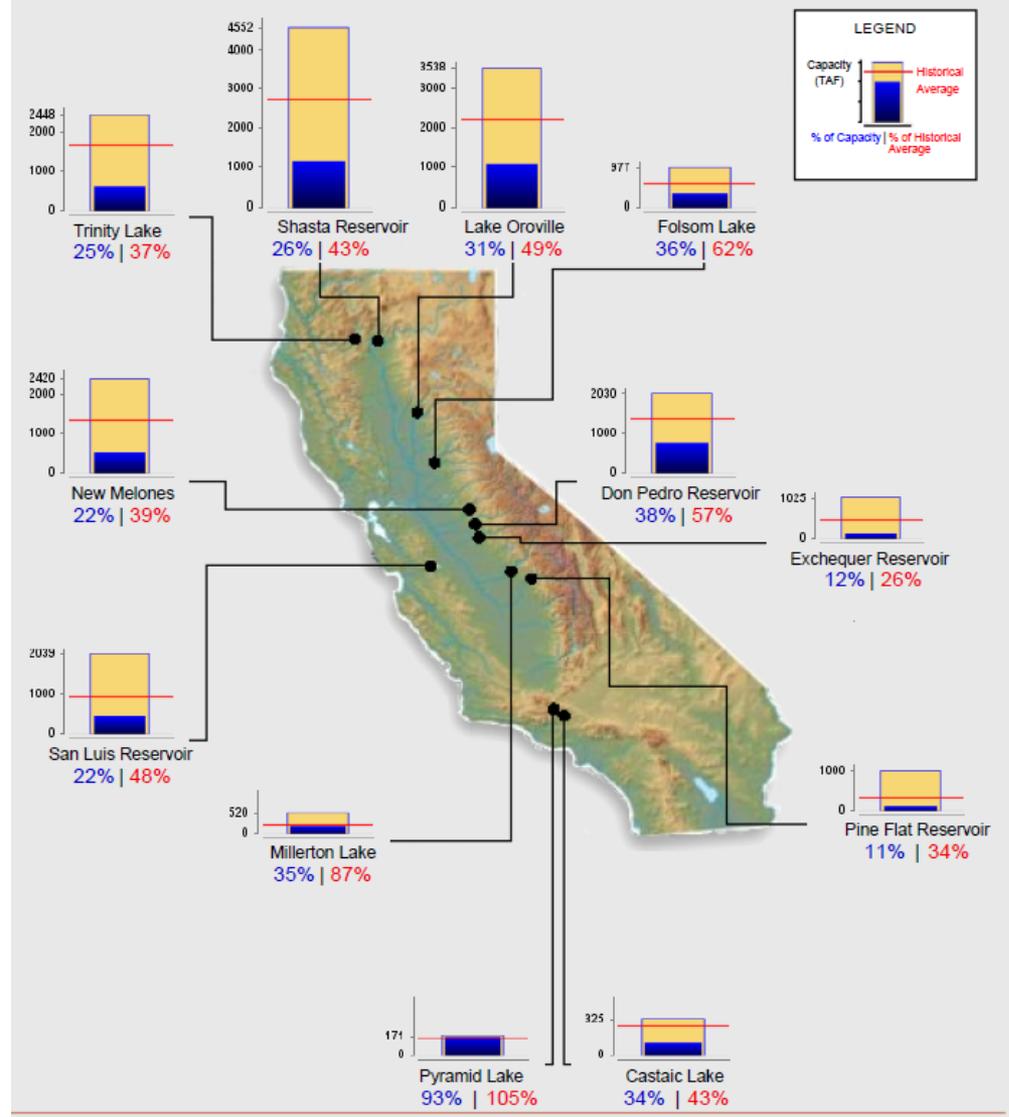
load:



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CURRENT RESERVOIR CONDITIONS



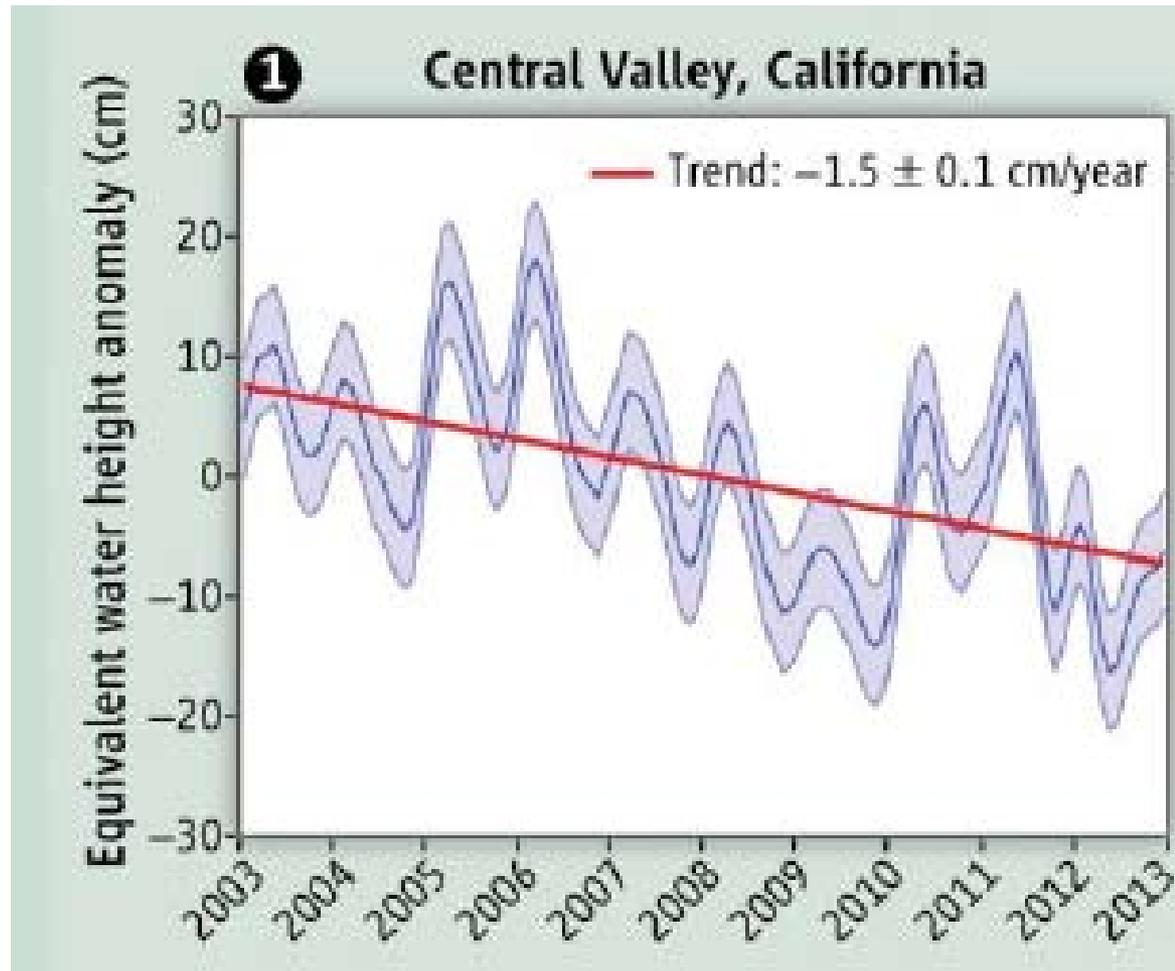
<http://www.water.ca.gov/waterconditions/droughtinfo.cfm>



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Groundwater Levels



Famiglietti and Rodell, 2013

Impacts to California

- Fallow Crop Land
- Import Feed for Livestock and Dairy
- Cull Herds
- Impact Ecosystem Health
- Increase Wildfire
- Impact Ecosystem Restoration Efforts
- Residential and Urban Water Demand

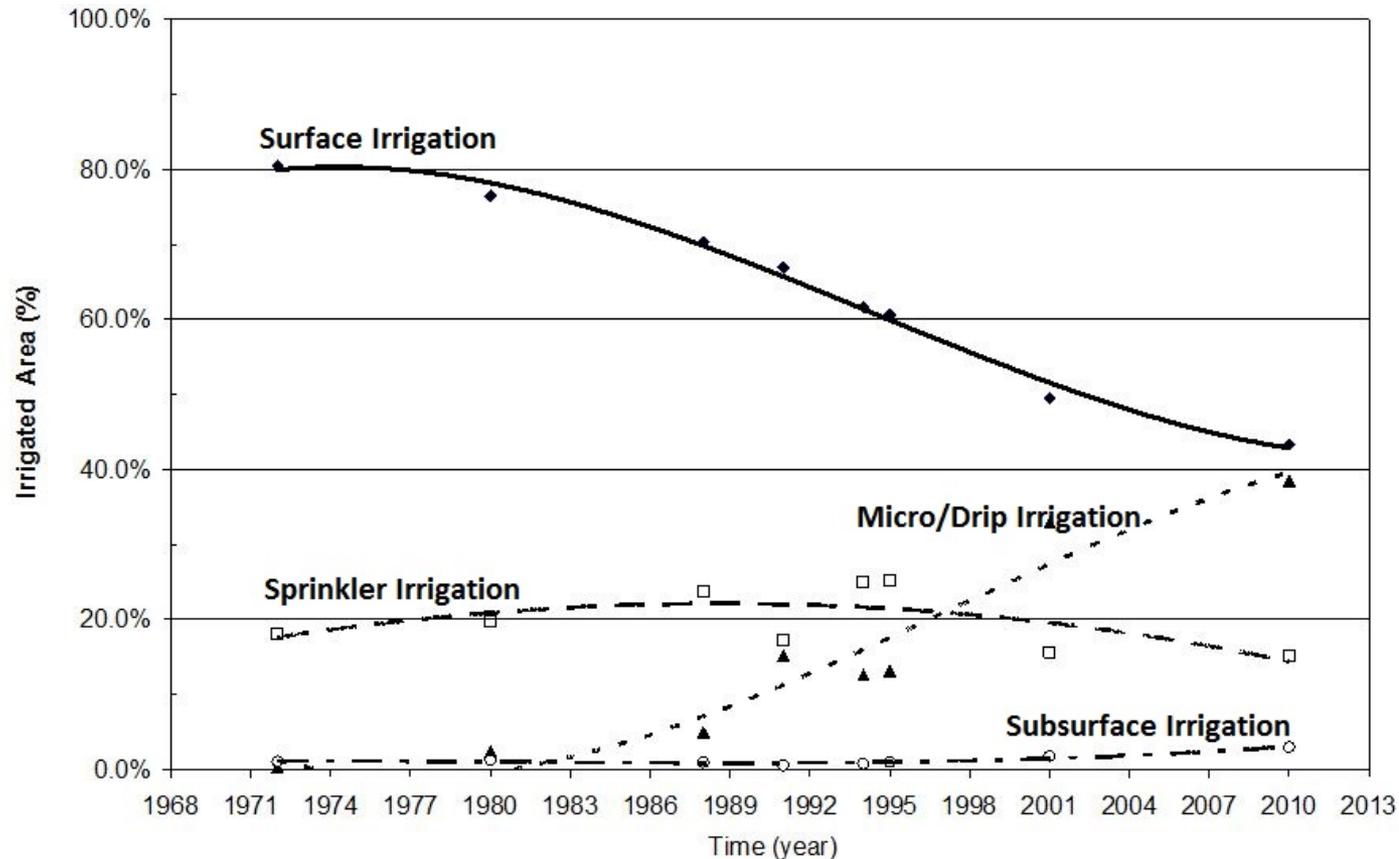


UC ANR Response to Drought: Long-term

- Drought Not New To California
- 150+ Years of Research and outreach
 - Irrigation Efficiency
 - Irrigation Management
 - Rangeland Management
 - Fire Management
 - Managed Aquifer Recharge
 - Recycling/Reuse
 - Landscape Management
 - Stormwater Capture and Recharge
 - Real-time Monitoring Stream and Snowpack



Real Impacts for California



Tindula et al. (2013). Survey of Irrigation methods in California in 2010

Real Impacts for California

Processing Tomatoes 1990 - Present

- Decreased Water Use
- Increased Yield
- Reduced Acreage
- Increased Production



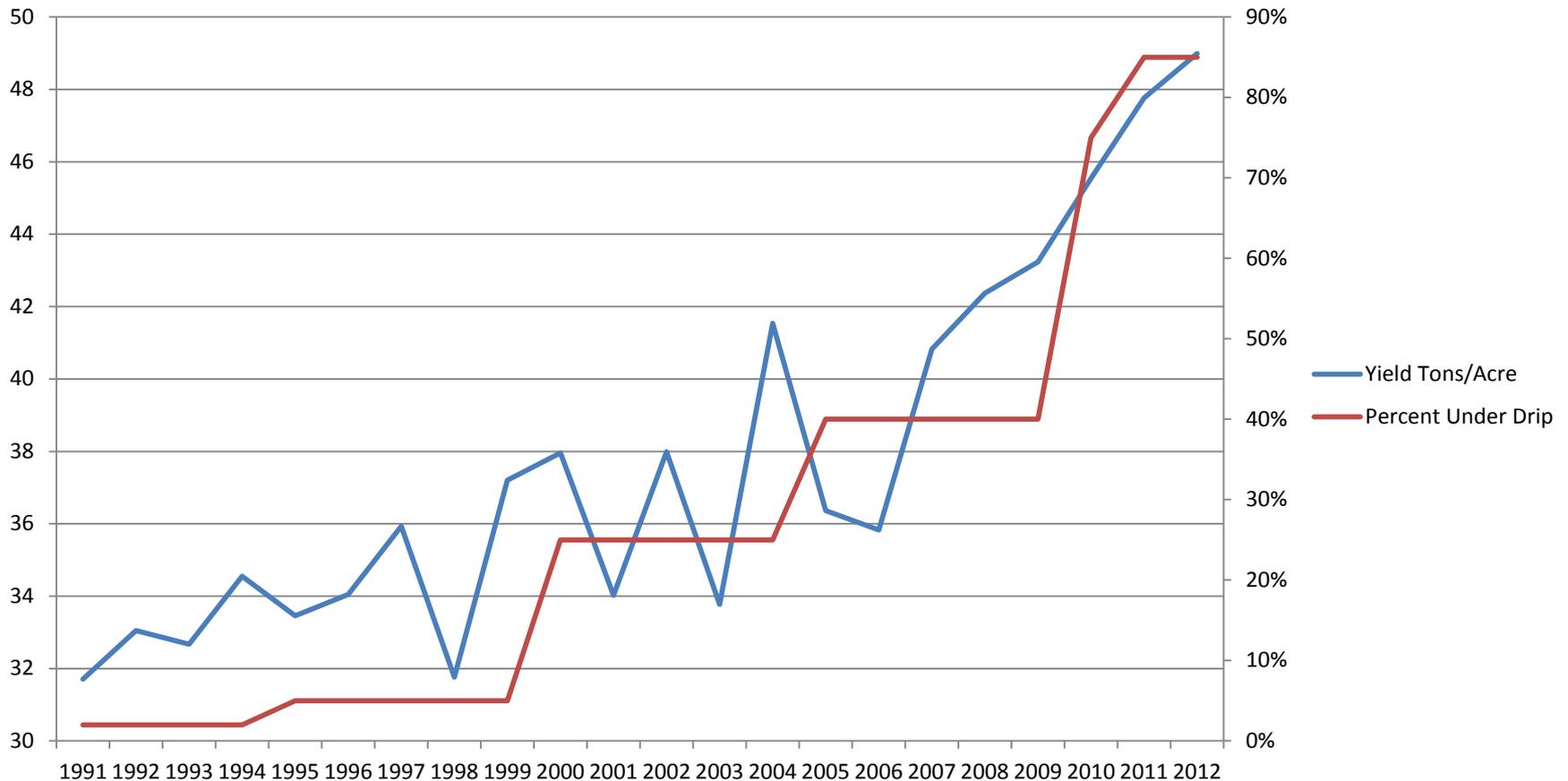
Real Impacts for California

Nearly 85% of Crop now on Drip

- Initial Quality Concerns
- UCCE Research on Water Management Saved Water and Increased Product Quality
- Integrated Research with Variety Development and Other On-Farm Management Changes



Real Impacts for California



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Real Impacts for California

54% Increase in Water Use Efficiency

- Not Necessarily Water Savings
 - Return Flows and Percolation
 - Changes in Acreage



Real Impacts for California

Years of Irrigation Efficiency Research and Outreach on:

- Nut Crops
- Tree Fruits
- Citrus
- Strawberries
- Vegetables...



Real Impacts for California

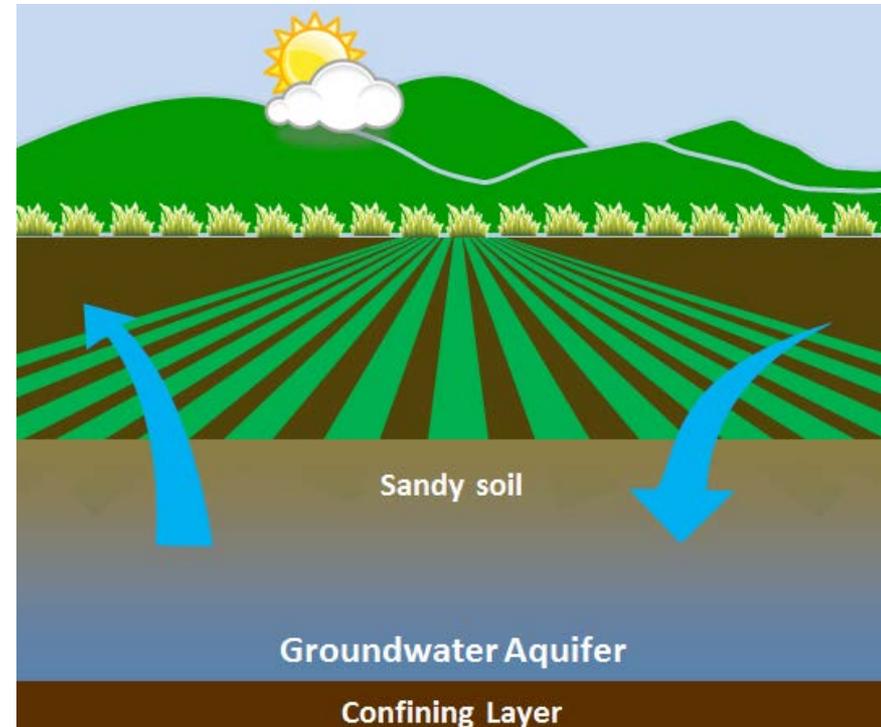
- Increase in Value of Water with No Increase in Cost Increases Demand
- Demonstrates need for Conjunctive Management of Surface Water and Groundwater Supplies



Real Impacts for California

Managed Aquifer Recharge

- Use Agricultural Lands to Recharge Groundwater in Wet Events
- Bank Water for Drought Years
- Potential for Use on Many Crops
- Concerns for Groundwater Quality

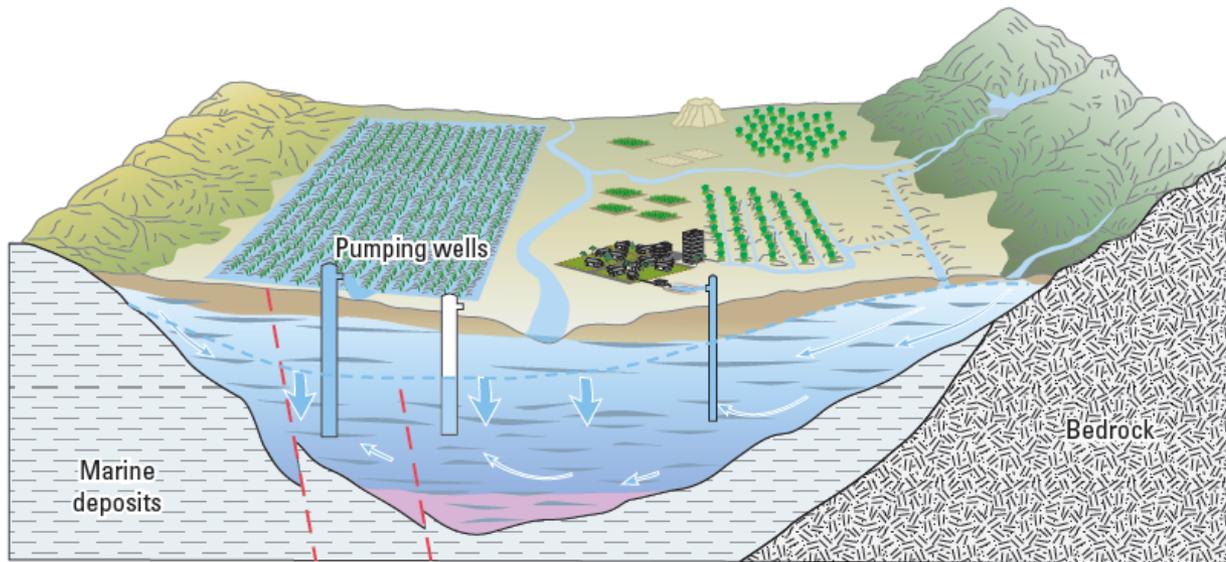


Dahlke, et. al., 2014

Real Impacts for California

If 1% of entire alfalfa and irrigated pasture acreage (15,000 acres) would recharge 6 in/day of surplus surface water
= 225,000 acre-feet (3,800 cfs) could be recharged in 30 days

Dahlke, et. al., 2014



Faunte, 2009, USGS



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UC Response to Drought: Short-term



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Developing research-based solutions to water-related challenges

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QUICK LINKS

- New! Drought resources
- Nitrogen Hazard Index
- Rosenberg Forum
- Follow us on Twitter
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New! Drought resources

As we enter 2014 in the midst of historic drought, California's academic institutions serve as a tremendous resource.



[Visit our drought pages](#) for events, experts, and informational resources.

Follow us on Twitter

 **UC Water Institute:**
Combo of [#climatechange](#), growth & groundwater a train wreck says [@JayFamiglietti](#) <http://t.co/1d4LbqTong>
[#drought](#) <http://t.co/VTMRJiffqa>
Posted less than a minute ago

 **UC Water Institute:**
The politics of allocating water between ag, residents, environment in CA, with Ellen Hanak of [@PPIcnotes](#) <http://t.co/BMnWFz2nJK>
[#drought](#)
Posted less than a minute ago

Fulfilling our mission

"As California faces its worst drought in decades, water supply and quality for agricultural, urban, and environmental systems has become one of our biggest challenges. UC's California Institute for Water Resources is vital to integrating California's research, extension, and education programs to help mitigate the current problem and develop practical long-term solutions."

Secretary Karen Ross, California Department of Food and Agriculture



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Current Drought Resources

The screenshot shows the website header with the University of California logo and the text 'University of California Agriculture and Natural Resources | California Institute for Water Resources'. Below the header is a navigation menu with links like 'Home', 'About the Institute', and 'Programs'. The main content area is titled 'California Drought Resources' and contains a paragraph about the drought in 2014, a list of links for drought-related events, information, experts, media coverage, and story highlights, and a social media link to follow @ucanrwater on Twitter. There are also satellite images of California from January 2013 and January 2014.

Web: ucanr.edu/drought

Twitter: [@ucanrwater](https://twitter.com/ucanrwater)

for up-to-date resources

for daily updates



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UC Drought Education and Events



Veterinarian Dr. Nancy Martin talks with ranchers about how to help their herds survive drought at a UC ANR workshop in Browns Valley in January.

- Almost 150 events this year. About 10,000 attendees.
- Many events with video capture now on the web.
- Over 15 more events planned with more to come

UC Drought Education and Events

Insights: Water and Drought Online Seminar Series

[Events](#) | [Information](#) | [Experts](#) | [Media Coverage](#) | [Story Highlights](#)

This online seminar series from the University of California, Agriculture and Natural Resources, with support from the California Department of Water Resources, brings timely, relevant expertise on water and drought from around the UC system and beyond directly to interested communities.

Drought impacts on natural resources, man-made environment, and water supply	
	<p>Droughts, climate change and dams: Reconciling a future for California's native inland fishes</p> <p>Peter Moyle, UC Davis</p>
	<p>Drought - an insidious stress on wildlife</p> <p>Greg Giusti, UC Cooperative Extension County Director and Advisor</p>
	<p>Wildfire and droughts in Sierra Nevada forests</p> <p>Susie Kocher, UC Cooperative Extension Advisor</p>
	<p>Agricultural water management practices under limited water supply: Lessons from recent droughts</p> <p>Jim Ayars, Agricultural Engineer, USDA ARS</p>
	<p>Land subsidence along the Delta-Mendota Canal and neighboring areas</p> <p>Michelle Sneed, California Water Science Center, US Geological Survey</p>

- Insights: Water and Drought Online Seminar Series
 - Drought Impact on Natural Resources and Environment
 - Drought Preparedness
 - Water Management for Urban Landscapes
 - Crop Management
 - Annual Crops
 - Permanent Crops

UC Drought Information



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Drought information

[Events](#) | [Information](#) | [Experts](#) | [Media Coverage](#) | [Story Highlights](#)

UC drought information resources:

- Recent recommendations for:
 - Agriculture:
 - [Pistachios](#)
 - [Walnuts](#)
 - [Almonds - The Almond Doctor](#)
 - [Rational Early Season Drought Planning for Almond Growers](#)
 - [UC Irrigation Management](#)
 - [UC Drought Management](#) - irrigation scheduling and deficit irrigation strategies for variety of crops
 - Rangeland:
 - [Updated ranch/rangeland management information](#)
 - [Livestock and range](#) in Sonoma County/north coast
 - Residential/urban:
 - [Drip irrigation for gardens](#)
 - [Water-wise gardening tips for Marin County](#)
 - [Landscape water management](#)
 - [Water Conservation Tips for Home Lawn and Garden](#)



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UC Drought Media Coverage



SCIENCE

Hundred Years of Dry: How California's Drought Could Get Much, Much Worse

Bryan Walsh @bryanwalsh Jan 23, 2014

Scientists fear California's long-ago era of mega-droughts could be back

As he gave his State of the State speech yesterday, California Gov. Jerry Brown had reason to feel pretty good. The 75-year-old governor has helped rescue the state from fiscal insolvency and presided over the addition of 1 million new jobs since 2010. But as he spoke, Brown hit a darker note. Last week, amid the driest year for the state since record-keeping began in the 1840s, Brown declared a



California is the driest it has been in record, but its perhaps history indicates the drought could get far worse

Photo: Michael J. Sells/Imagoe

The New York Times

Severe Drought Has U.S. West Fearing Worst

By ADAM RAGGOURNEY and IAN LOVETT FEB. 1, 2014

LOS ANGELES — The punishing drought that has swept California is now threatening the state's drinking water supply.

With no sign of rain, 17 rural communities providing water to 40,000 people are in danger of running out within 60 to 120 days. State officials said that the number was likely to rise in the months ahead after the State Water Project, the main municipal water distribution system, announced on Friday that it did not have enough water to supplement the dwindling supplies of local agencies that provide water to an additional 25 million people. It is first time the project has turned off its spigot in its 54-year history.

State officials said they were moving to put emergency plans in place. In the worst case, they said drinking water would have to be brought by truck into parched communities and additional wells would have to be drilled to draw on groundwater. The deteriorating situation would likely mean imposing mandatory water conservation measures on homeowners and businesses, who have already been asked to voluntarily reduce their water use by 20 percent.

"Every day this drought goes on we are going to have to tighten the screws on what people are doing" said Gov. Jerry Brown, who was governor during the last major drought here, in 1976-77.



VIEW SLIDE SHOW 13 Photos
A Deepening Drought in the West

Photo: Wikimedia for The New York Times

It's gone. [Links](#)

- ⓘ Inappropriate
- ⓘ Repetitive
- ⓘ Insecure

Mother Jones

It Takes HOW Much Water to Make Greek Yogurt?!

Dairy products require a whole lot of water—and many of them come from drought-ridden California.

by [Julie Lurie](#) and [Alice Park](#) | Photo: Matt. 10, 2014 2:00 AM PDT

How Thirsty Is Your Milk?

The water footprint, in gallons, of raw ingredients in our favorite creamy foods



Over 300 articles in a variety of media outlets including the *New York Times*, *Washington Post*, *Los Angeles Times*, *Time*, *Businessweek* and *Mother Jones*.

Media Experts from UC ANR and each UC Campus.



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Upcoming Resources

- Creation of Drought Tips Fact Sheets
 - Sponsored by DWR
 - Up to 50 Fact Sheets
 - More Video
 - Tip Website



Citrus irrigation scheduling during a drought
Managing rootzone salinity in a drought year
Managing irrigation in nut trees during drought
Managing irrigation in fruit trees during drought
Rational early season drought planning for Almonds
The use of treated waste water
Field use of tensiometers
Managing turfgrasses during drought
Furrow irrigation
Scheduling of surface-irrigated crops during a drought
Drought strategies for wine grapes
Crop salinity tolerance
Water quality guidelines for vegetables
Water quality guidelines for trees and vines
Drought tips for vegetable and field crop production
Drought strategies for feeding beef cattle and sheep
Coping with declining groundwater levels
Cost comparisons between electric motors and engines for irrigation pumping
Comparing the costs of electric motors and engines for irrigation pumping: in-depth analysis
Using shallow groundwater for crop production
Maintaining water quality for irrigated agriculture under drought conditions
Reclaiming sodic and saline/sodic soils
Irrigation scheduling for permanent set sprinklers
Deciding how much to plant during a drought
Irrigation water management made simple
How much water are you applying with your low volume irrigation system?
Irrigation scheduling for low-volume (drip or micro-

Thank You



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