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USGS Central Valley Hydrologic Model (CVHM) Report (http://ca.water.usgs.gov/projects/central-valley/central-valley-hydrologic-model.html)
CA DWR Bulletin 118: California's Groundwater (http://www.water.ca.gov/pubs/groundwater/bulletin_118/california%27s_groundwater__bulletin_118_-_update_2003_/bulletin118_entire.pdf)
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TYPES OF WATER RIGHTS IN CALIFORNIA

I. RIGHTS TO USE OF SURFACE WATER

A. Appropriative Water rights

1. Pre-1914 Appropriative right:

a. No permit required

b. Right acquired by diverting and applying water to beneficial use prior to December 19, 1914.

2. Post-1914 Appropriative right:

a. Permit (or license) from State Water Resources Control Board (SWRCB) or predecessor agency is required.

b. Permit is to be granted only if water is available for appropriation and if proposed use is in the public interest.

c. Diversion and use of water is subject to terms and conditions specified by SWRCB.

3. Common characteristics of appropriative rights

a. Priority is based on time of use or recording (pre-1914) or date of application (post-1914). "First in time, first in right." In times of scarcity, later (junior) appropriators are cut off before earlier (senior) appropriators. That is, early priority rights must be satisfied before later rights receive any water.

b. Right is quantified—a definite amount (although not necessarily available in every year).

c. Right is granted for particular use, and particular place of use, and point of diversion is specified. There will also be a specified season of diversion.

d. Right may be lost through 5 or more years of non-use ("Use it or lose it.")

B. Riparian Water Rights

1. For use on riparian property adjoining a watercourse.

2. Riparian rights are "correlative," that is, owners share the water in case of shortage, have equal rights among themselves (not based on time of first use).

3. Must be in watershed of the stream. No seasonal storage allowed.

4. Applies only to water available under natural conditions. No "foreign" water.

5. No permit from SWRCB required.

6. Generally have priority over appropriative rights (but not always). Priority vis-à-vis appropriators depends on date of patent (deed from U.S. Government), not date of first use.

7. Riparian rights are not lost by non-use, but can be given lower priority than presently exercised rights when the SWRCB determines all the rights to a stream (statutory adjudication).

II. RIGHTS TO USE OF GROUNDWATER

A. Owners of land overlying a groundwater basin have "overlying" rights to pump water from the basin for use on overlying land.

B. Among overlyers, the rights are correlative (like riparians)—they share in the "safe yield" of the basin.

C. If there is a surplus, it may be taken for use away from the basin. Such use is called "appropriative", but does not require a permit from SWRCB.

D. Among appropriators, the rights are first in time, first in right.

E. Between overlyers and appropriators, overlyers have priority.

F. Use by municipalities is considered appropriative, even if the city lies over the groundwater basin.

G. No permits are required for pumping of "percolating groundwater" (most groundwater is percolating). However, water flowing in "subterranean streams" is treated like surface water and requires an SWRCB permit.

H. Prescription (wrongful taking of another person's water) can occur when users pump more than the safe yield of a basin for more than five consecutive years

("overdraft"). The rules for prescription are complicated and based on a few California Supreme Court decisions.

I. Some groundwater basins have been adjudicated, that is, all the rights have been determined. In that case, the judgment defines the rights.

J. In four Southern California counties, those who pump over 25 acre-feet of water per year must report the pumping to the SWRCB (even though they don't need a permit).

III. OTHER TYPES OF WATER RIGHTS

A. Federal reserved rights (based on implicit Congressional intent to reserve water when it reserves land from the public domain for a particular purpose, e.g. national forest, national park). This is the only water right created by federal law.

B. Pueblo right. Right of a municipality that was a pueblo under Mexican law to the use of water within the municipality for its residents.

C. Contractual right to obtain water from someone having a water right.

CALIFORNIA WATER VIRTUAL TOUR

California droughts precipitate innovation

Jay Lund, draft 9 January 2014

"When the well is dry, we know the worth of water." Benjamin Franklin, 1746

2013 was the driest calendar year on record for much of California (over 160 years in Sacramento). There is almost no snow in the Sierra Nevada or Trinity mountains and the forecast for January is dry. We are currently in a drought, though with three months left of our normally wet season, it remains possible that 2014 will not become a drought year.

California's history is punctuated by droughts (Hanak et al 2011). Each drought reveals weaknesses and becomes an opportunity to focus on improving water management. For example:

1924 – Value of irrigation. For farmers who largely came from back east, drought years in the 1920's caused severe losses for herders and dryland farmers (mostly in the Sacramento Valley), firming ideas that California needed large water storage, conveyance, and irrigation systems to support the growth of agriculture and cities. (Pisani 1986)

1928-1934: Need for major water infrastructure systems. Irrigation systems existed in much of California by this time, but this 6-year drought accelerated design and construction of the Central Valley Project, and served as the design standard for most of California's water system, until 1976-77. (1930 California Water Plan)

1976-1977: Water conservation works and growth leads to shortages. By this drought, most of today's infrastructure had been built, but this driest 2-year period on record still had severe impacts. Cities, particularly in the Bay Area, found that substantial reductions in water use were possible, up to 40%, in times of drought. Drought and permanent water conservation became established for urban areas (Gilbert et al. 1990), only to be reinforced by later droughts. Long-term conservation plans for cities became widespread. (DWR 1978)

1988-1992: Water markets, conjunctive use, and more urban water conservation. This drought further motivated urban conservation, raised the importance of managing groundwater for droughts, and established water markets as a way to reduce the economic impacts of drought by allowing higher-valued water uses to buy water from willing lower-valued uses. (Brumbaugh et al. 1994; Lund 1991; Israel and Lund 1995)

2007-2009: Problems of the Delta. This mild three year drought cost was very deep for southern California, and had substantial impacts on river and Delta supplies. About 21,000 agricultural jobs were lost (16,000 due to the drought alone and another 5,000 due to Delta export restrictions) (Howitt et al. 2009). This drought brought attention to the problems of the Delta and groundwater in California. In 2009, major state legislation passed on managing and planning for the Delta and setting a rough 20% urban water conservation target, with relatively little movement on the state's role in groundwater. (DWR 2010)

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Possible results from the current drought?

Drought brings opportunities and urgency for change. What might a drought motivate this year? Six issues seem likely to be prominent in a coming drought year.

- **Streamlining state regulation of water market transfers.** Difficulties of Delta exports and less-than-dire water conditions have mired how the state regulates and manages water markets. A drought will bring attention to this important approach to increasing flexibility for drought and water management.
- **2014 Water Bond and overall financing the water sector activities.** Every interest has a wish list for state funding. But long-term efforts to manage water in California are disrupted by state bond funding. Better long-term financing would support more effective government actions. Perhaps one more water bond can help smooth this transition.
- **Strategic decisions on the Delta and BDCP.** Strategic decision-making is hard with thousands of stakeholders and interests. But this year seems promising for making strategic Delta decisions, as opposed to making changes in response to future failures. A drought will focus attention on big potential changes.
- **Advances in groundwater quantification, rights, and management.** California relies mostly on groundwater for surviving long droughts. Droughts make groundwater's importance more obvious and worsen groundwater declines. State action might become preferable to widespread litigation over groundwater.
- **Broadening flood protection.** Central Valley flood protection is becoming poised for implementation beyond the major cities. But credible financing for construction, ecosystem mitigations, and ongoing maintenance remains missing. A drought could lead to improvements in flood management, if this were added to a package of water management changes.
- **Organizing management of aquatic ecosystems.** Aquatic ecosystem management is perhaps California's least coordinated water management problem. Everyone has roles, but no one is in charge, and there is not substantial funding for it anyway. Droughts always make this problem more urgent and apparent.

These are all difficult issues, where the easy effective solutions have largely already been implemented. Real solutions will involve trade-offs and political will. In water policy, aridity often focuses attention.

Every drought springs innovations.

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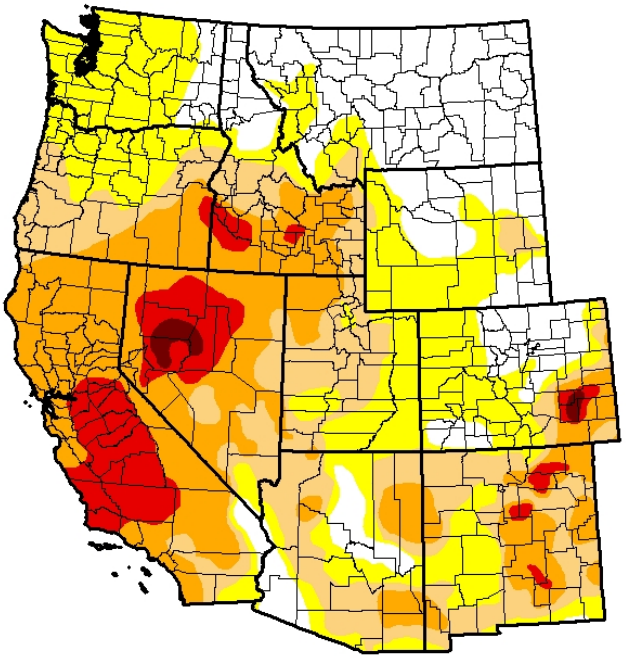
U.S. Drought Monitor
West



December 31, 2013
(Released Thursday, Jan. 2, 2014)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	22.20	77.80	51.44	31.11	7.75	0.63
Last Week 12/24/2013	22.20	77.80	51.15	30.75	7.62	0.63
3 Months Ago 10/1/2013	25.25	74.75	58.96	34.18	5.57	0.63
Start of Calendar Year 1/1/2013	24.39	75.61	69.31	45.04	18.01	2.15
Start of Water Year 10/1/2013	25.25	74.75	58.96	34.18	5.57	0.63
One Year Ago 1/1/2013	24.39	75.61	69.31	45.04	18.01	2.15

Intensity:

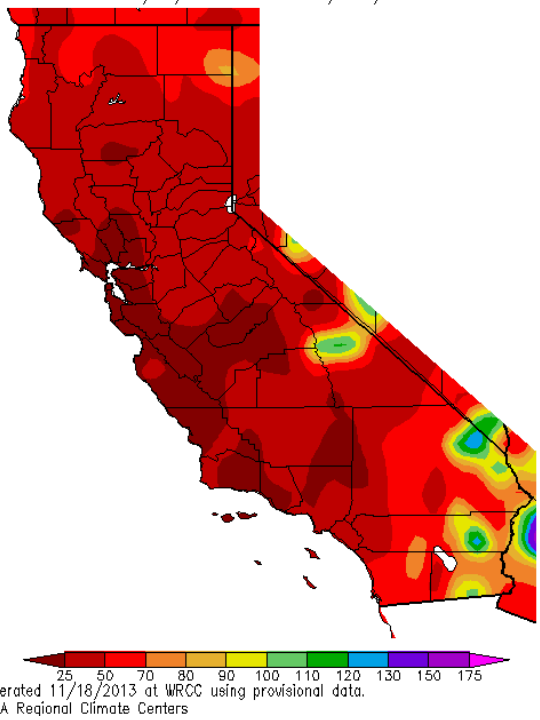
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

Author:
Matthew Rosencrans
CPC/NCEP/NWS/NOAA

http://droughtmonitor.unl.edu/

Percent of Average Precipitation (%)
1/1/2013 – 11/17/2013



Generated 11/18/2013 at WRCC using provisional data.
NOAA Regional Climate Centers

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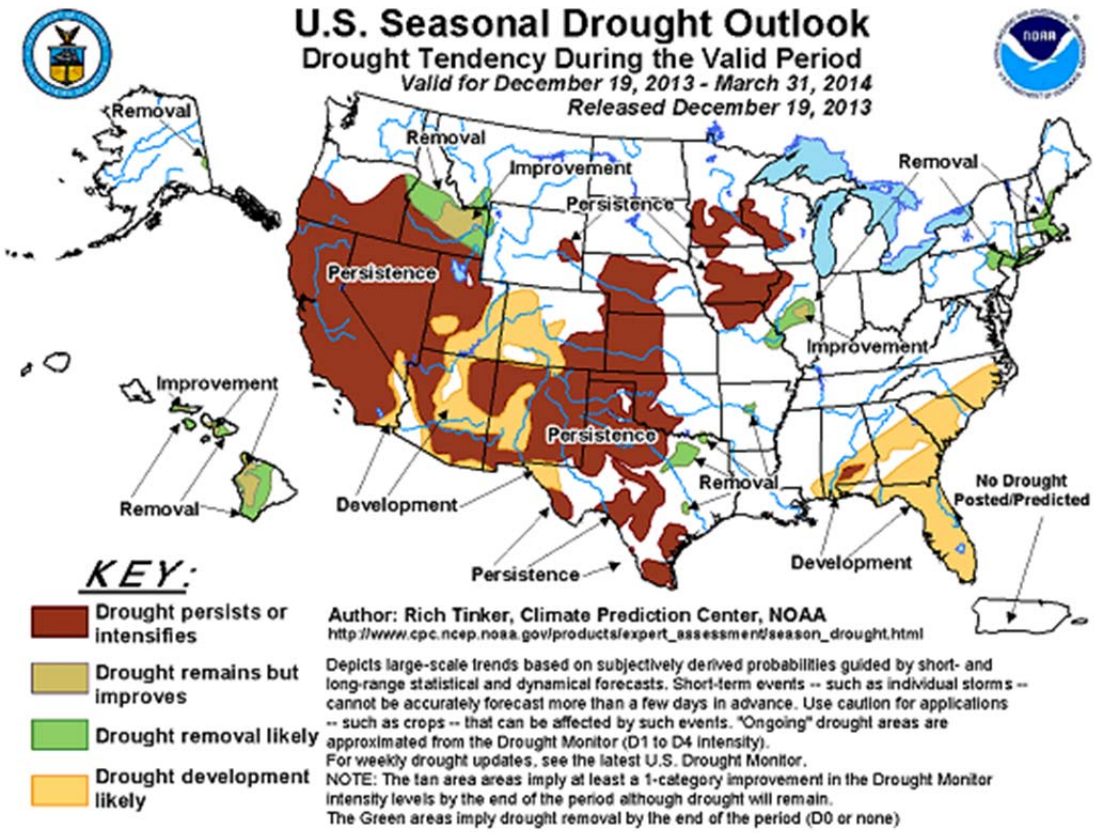

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