California Drought Update

For December 1, 2016

by Patrick Ruckert

Published weekly since July, 2014

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A Note To Readers

There is no feature report this week, just some drought news and announcements by the state that, as usual, just piss people off.

Yes, it rained a lot in October. In fact, so far this Fall, we have had more rain these first two months of the Water Year than we have had in last 30. But, as the reports below make clear, a month or two of rain tells us nothing about what the winter may bring.

Eighty percent of the state remains in “Severe,” “Extreme,” or “Exceptional” drought. Only 12 percent of the state, and that up in the northwest corner, is actually free of drought. The central and southern parts of the state, as you will see in the U.S. Drought Monitor below, are as dry as hell, and no improvement is expected. Once again I shall remind everyone that until 2014 not even one percent of the state had ever been in “Exceptional Drought.” In that year “Exceptional Drought” covered over 60 percent of the state, so the 21 percent measure of “Exceptional Drought” we have today is an improvement, yes.

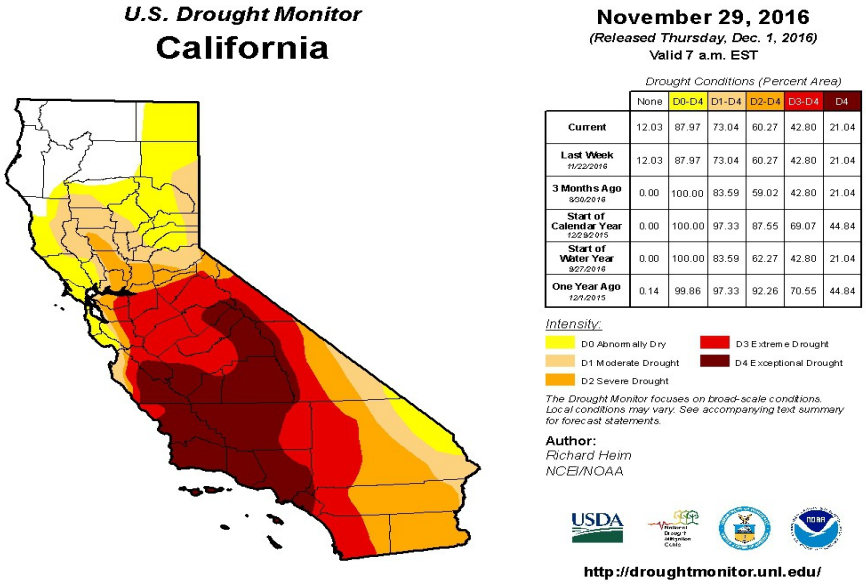
One of the items below highlights the conditions of the southern part of the state, underlining my point above.

The drought and weather news is followed by ***The Directives*** from Jerry and friends. The first tells us that our new way of life, whether you like it or not, is water scarcity. The second tells the State Water Project contractors that once again they are screwed. They will get only 20 percent of their requested allocation next year. Note that the last time they received a full 100 percent allocation was in 2006. A statement from the State Water Contractors association follows the report on the Water Boards announcement.

This week's report concludes with another chicken little story and how the California state government has once again made its weirdness the butt of humor for the nation. This time the new law regulating cow farts.

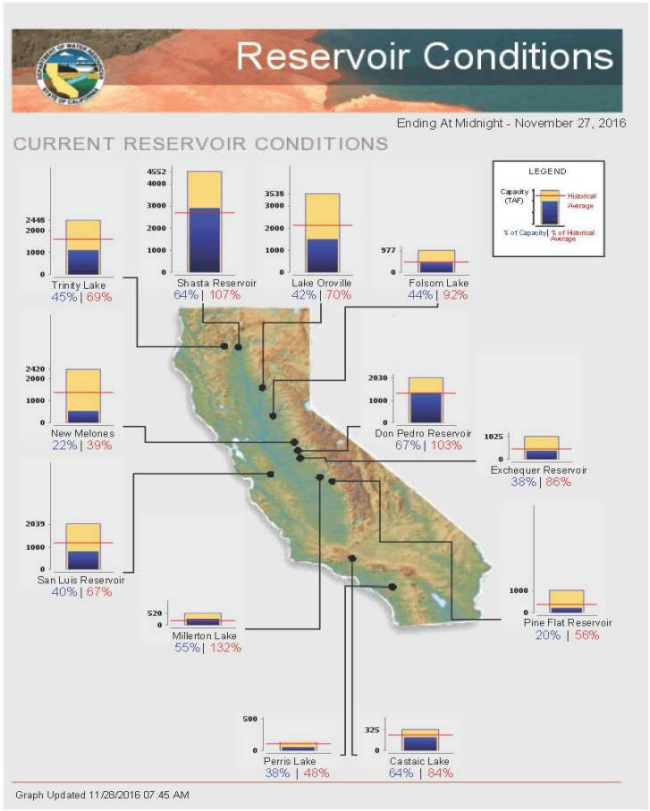
U.S. Drought Monitor

Note the continuing intensity of the drought in Central and Southern California. Twenty-one percent of the state remains in "Exceptional Drought," the most extreme category. As you will see in the report below, this is very unlikely to go away anytime soon.



Reservoir Conditions

Despite a rainy October, most of the reservoirs remain well below their historical average for this time of the year.



The Rain: It Came, and Then.....

The best summary of where we stand is in the following article excerpted below from the *San Jose Mercury News* on November 28. The official "Water Year" begins on October 1, and, so-far, at least the northern part of the state has had more rainfall than any year in the last 30.

Rain season off to fast start, but drought worries linger

http://www.mercurynews.com/2016/11/28/rain-season-off-to-fast-start-but-drought-worries-linger/

By Denis Cuff

November 28, 2016

But while water managers are pleased with the abundant early rains, they caution that it's too early to predict whether this is going to end up as a wet or dry year by the time spring rolls around.

And in a move that reinforces that cautionary outlook, state officials announced Monday there is a chance of sharp cuts next spring in water distributed to local water agencies.

In a preliminary outlook, the state Department of Water Resources said it can count on allocating as little as 20 percent of requested water supplies to start, hinting drought fears are far from over in California. In most years, the initial state water allocations increase as more storms produce more rain and snow later in the season.

"October's storms and subsequent rainfall have brightened the picture, but we could still end up in a sixth year of drought," said Mark Cowin, the state Department of Water Resources.

Much of the rainfall in October and November was soaked up by the state's dry soil, although later storms will increase runoff into streams and reservoirs.

"We are off to a fast start, but rain in October and November is not a good indicator for what falls the entire year," said Stephen Nemeth, a state water resources engineer. "We have had two very wet months followed by very dry ones before."

"One year with nearly average rainfall only makes a dent in a drought lasting for five years," said Nemeth, the state water engineer.

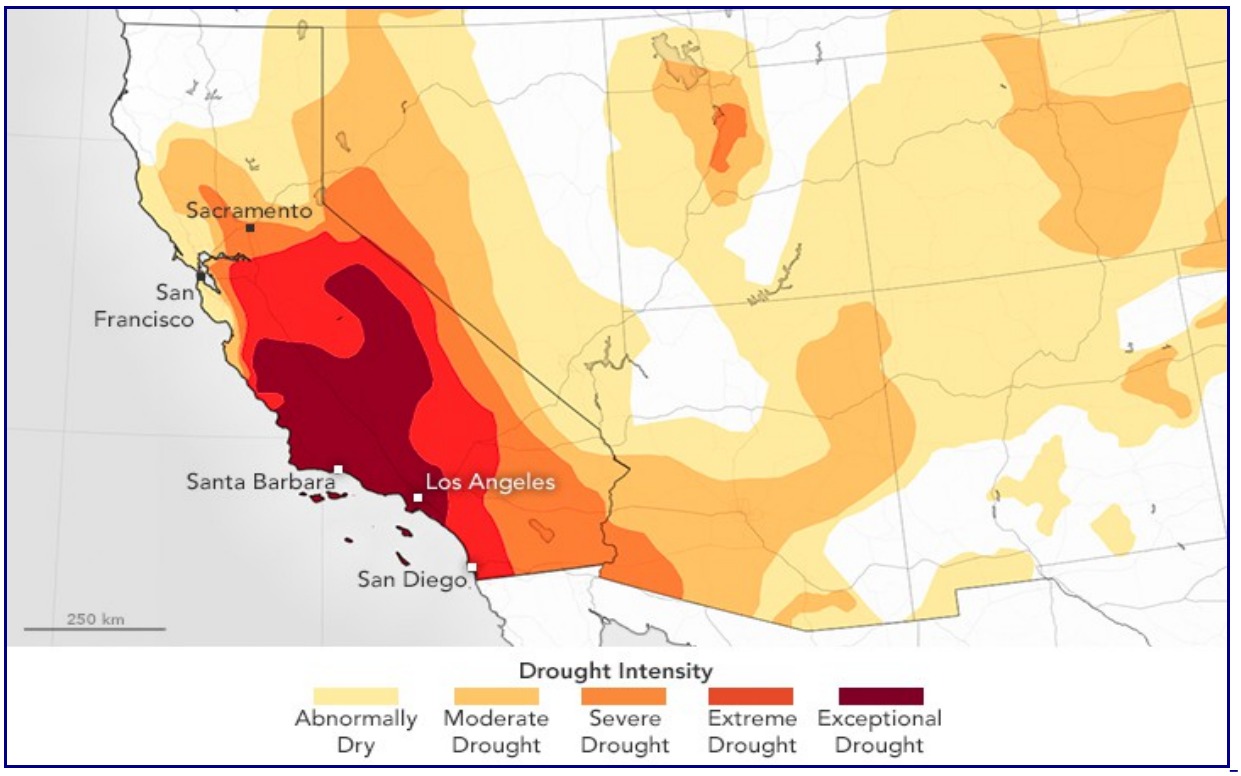
The water level in Shasta Lake, the largest reservoir in California, is at 107 percent of normal for Nov. 27. But Oroville in Butte County has only 70 percent of normal for the date, and San Luis near Los Banos has 67 percent of normal.

But, as for the central and southern parts of the state, as the below article headline states, "Drought continues to plague Southern California." This is an item from *NASA*, dated November 16:

http://earthobservatory.nasa.gov/IOTD/view.php?id=89110

While late summer and autumn rains offered some relief to Northern California, drought continues to torment the southern part of the state. New data from the U.S. Drought Monitor show exceptional drought in California's Central Valley, Central Coast, and South Coast.

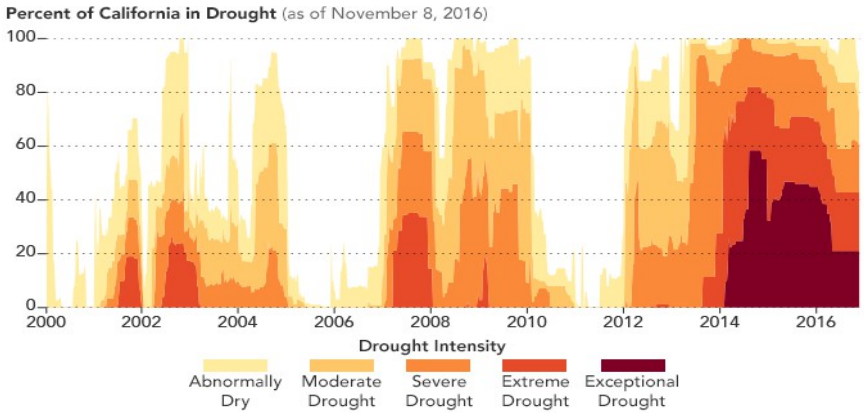
The map at the top of this page (actually below--PR) *depicts drought conditions as of November 8, 2016. Areas facing exceptional drought (the highest on the scale) are shown in maroon and extreme drought is red. According to the Drought Monitor classification system, exceptional drought can bring widespread crop and pasture losses, as well as water emergencies due to low reservoirs, streams, and wells. The map is based on measurements of soil, water, and climate conditions collected by federal, state, and local observers. (NASA also provides experimental measurements and models to the drought monitoring effort.)*



While the extent and severity of drought has fluctuated over the months and years, the large zone of exceptional drought in Southern California has persisted since January 2014.

The chart below shows how extreme the current drought has been in comparison to past dry spells. While the state has experienced several dry periods since 2000, none pushed any portion of the state into exceptional drought. About 20 percent of California remains in exceptional drought now.

Exceptional drought now: January 4, 2000 - November 8, 2016



Two more articles, excerpted, on what happened, and stating bluntly that it could all mean nothing, follow. The first is excerpted from the *Sacramento Bee* on November 28:

Wettest start in 30 years to rainy season in Northern California, but don't forget the drought

November 28, 2016

http://www.sacbee.com/news/state/california/water-and-drought/article117579188.html#storylink=cpy

The National Weather Service said Monday that the rainy season in the northern Sierra Nevada is off to its wettest start in 30 years. Mountain conditions are critically important to monitoring the drought because a major share of the state's water supply is stored for months as snow.

Citing state data from a string of eight gauges scattered around the northern Sierra, the service said precipitation has come in at about twice the average for this time of year, making for the wettest kickoff to the water year in 30 years. The water year, as defined by climatologists and others, begins Oct. 1.

However, the strong start doesn't guarantee an end to the drought, or even meaningful relief.

As it is, the rainy beginning is largely the result of one of the wettest Octobers ever, which dumped four times as much rain on the Sacramento region as normal, said weather service forecaster Travis Wilson. Already, there are signs of a slowdown: Despite the wet Thanksgiving weekend, November has been relatively dry, with the Sacramento area getting only about half the normal rainfall.

The two-month wet spell "doesn't guarantee you anything," Wilson said.

Overall, the major reservoirs are holding twice as much water as they did last year at this time, said spokesman Shane Hunt of the U.S. Bureau of Reclamation, which operates the federal government's reservoirs and dams in California.

That leaves reservoir managers "cautiously optimistic," Hunt said. But he noted that January is usually the wettest and therefore the most crucial month in the entire season.

And this one is from *Jay Lund, Director of the UC Davis Center for Watershed Sciences and Professor of Civil and Environmental Engineering at UC Davis*. Lund provides a useful discussion of reservoir levels, groundwater, soil moisture and snowpack.

The Coming Droughts of California in 2017

November 27, 2016

By Jay Lund

https://californiawaterblog.com/2016/11/27/the-coming-droughts-of-california-in-2017-november-27-2016/

The first two months of this new water year have been wetter than average in the north and much drier than average in the south. But it is still early days.

Reservoir and Groundwater Storage Conditions

Reservoir storage in California is now about 2.5 million acre-feet below historical averages for this time of year. (This is 0.8 maf better than 2 months ago.) Some major reservoirs are below average, particularly Oroville, Trinity, San Luis, New Melones, and the Tulare Basin reservoirs. Cachuma Reservoir near Santa Barbara is in the worst shape at 7% of capacity or 10% of average storage for this time of year.

Groundwater will be recovering in northern parts of California, with less recovery in large parts of the southern Central Valley. (Can anyone suggest a set of online well elevation records in different parts of the Central Valley to create a groundwater storage index?)

October was a nice wet month, so soil moisture in much of the Sierras and Central California is improving, but remains in drought conditions (worsened by unusually high temperatures). Conditions for forests and native fishes remain depressed and will see drought impacts for years after hydrologic conditions improve.

This seemingly bad situation is substantially better than in this time a year ago. Something to be thankful for. (My comment: Jay, never end a sentence with a preposition).

North of the Delta, so far we have above average precipitation and improving storage in most Sacramento Valley reservoirs. In the San Joaquin Valley, this water year's precipitation is about average so far. But further south, the Tulare Basin has less than 50% of average precipitation so far this water year. And temperatures remain higher than average. So far, no snowpack – it is still a bit early.

Change Your Life, If You Have Not Done So Already-- Says Jerry and Friends

On November 30, the state issued a draft plan for conserving water, portrayed as the final solution. So, get in line. Here is just the first paragraph of the announcement as reported by *Maven*

THIS JUST IN … State Plan Seeks To Make Water Conservation A Way of Life

November 30, 2016 Maven Breaking News

https://mavensnotebook.com/2016/11/30/this-just-in-state-plan-seeks-to-make-water-conservation-a-way-of-life/

From the Department of Water Resources, State Water Board, and other state agencies:

> *Working to make water conservation a way of life, State agencies today released a draft plan for achieving long-term efficient water use and meeting drought preparedness goals that reflect California's diverse climate, landscape, and demographic conditions.*

The State Jumped the Gun

Two days before releasing the plan above, the *Department of Water Resources (DWR)* announced, that once again, water contractors for the State Water Project will get just a few drops delivered next year. To be specific: Just 20% of what they need and requested. The link to the DWR announcement is from *Maven* (excerpts only). Note at the bottom of the statement is a list of how much water was delivered each year since 2007. Why they left off 2006, which was the last time the State Water Project was able to deliver 100 percent of requested water was in 2006, I leave to your imagination.

THIS JUST IN … Initial State Water Project allocation set at 20%

November 28, 2016 Maven Breaking News

https://mavensnotebook.com/2016/11/28/this-just-in-initial-state-water-project-allocation-set-at-20/

Drought Continues Despite Early-Season Rainfall

Still early in California's rainy season, the Department of Water Resources (DWR) today announced its initial water allocation for 2017 of 20 percent of the requests by the 29 public agencies served by the State Water Project (SWP).

Winter storms in coming months may boost today's initial 2017allocation, but California's deep drought lingers.

"October's storms and subsequent rainfall have brightened the picture, but we could still end up in a sixth year of drought," said DWR Director Mark Cowin. "Our unpredictable weather means that we must make conservation a California lifestyle."

Much of October's heavy rainfall was soaked up by the state's drought-dried soil, although water from subsequent storms will increase runoff into streams and reservoirs.

Initial allocations frequently change. For example, the initial allocation for this year (2016) was 10 percent, with a final allocation of 60 percent. DWR typically issues a final allocation in May, after the state's wettest months have passed.

Lake Oroville in Butte County, the SWP's principal reservoir, early this morning was holding 1,492,136 acre-feet, 42 percent of its 3.5 million acre-foot capacity and 70 percent of its historical average for the date. Shasta Lake north of Redding, California's and the federal Central Valley Project's (CVP) largest reservoir, was holding 2,896,484 acre-feet, 64 percent of its 4.5 million acre-foot capacity and 107 percent of its historical average. San Luis Reservoir, a critical south-of-Delta pool for both the SWP and CVP, was holding 814,972 acre feet, 40 percent of its 2 million acre-foot capacity and 67 percent of its historical average for the date.

The 29 public water agencies that receive SWP water collectively requested 4,172,786 acre-feet of water for 2017. Under today's initial allocation, they would receive 839,376 AF. For most agencies, that amounts to 20 percent of the supplies for which they contract with DWR.

Nearly all areas served by the SWP have sources of water other than the DWR allocation, among them streams, groundwater and local reservoirs. DWR is hopeful that today's SWP allocation, made before the wettest months, will increase as storms bring additional rain and snow to the state.

The last 100 percent SWP allocation – difficult to achieve even in wet years because of Delta pumping restrictions to protect threatened and endangered fish species – was in 2006. SWP allocations in recent years:

2016 – 60 percent
2015 – 20 percent
2014 – 5 percent
2013 – 35 percent
2012 – 65 percent
2011 – 80 percent
2010 – 50 percent
2009 – 40 percent
2008 – 35 percent
2007 – 60 percent

In response, the state water contractors demonstrate that they are not very happy. Here is their statement:

From the State Water Contractors:

The California Department of Water Resources (DWR) today announced its initial 2017 water delivery projection, forecasting that 20 percent of contracted water supplies will be available to the water agencies that purchase water from the State Water Project (SWP). DWR's initial allocation is estimated based on current storage levels, regulatory restrictions and anticipated streamflows. The percentage may go up or down depending on actual conditions this winter and spring.

Since October 1, the Northern Sierra Nevada Mountains have seen two times the amount of snow and rainfall compared to average, rivaling the region's wettest year in decades. But this record precipitation has not translated into a significant increase in stored water – runoff has largely skipped storage reservoirs, flowing into rivers and streams that go out to the San Francisco Bay. If California is to recover from record drought, it is imperative that regulators and water managers capture available supplies this winter to replenish the state's reservoirs and prepare for another potential dry year.

"We are cautiously optimistic, but California can only pull itself out of drought if we are able to capture water during peak storm periods," said Terry Erlewine, General Manager. "How we fare in 2017 will depend on how water is managed, operated and regulated in the Delta. Last winter's storms yielded little water for Californians – a painful missed opportunity for a state reeling from drought. With key reservoirs still depleted, and a potential sixth year of drought ahead, we can't afford another season of lost water and missed opportunities."

Harvey O Banks Pumping Plant near Tracy, part of the State Water Project. Photo / Curtis Jerome Haynes

The Snow Is Not Falling!, the Snow Is Not Falling!

These reports about what the snowpack will be 85 years from now because of climate change are really beginning to irritate me. Just so you can join me in being irritated, here is another one:

Sierra snowpack could drop 50% by the end of the century due to climate change

By Sanden Totten

November 28, 11:06 AM

http://www.scpr.org/news/2016/11/28/66446/sierra-snowpack-could-drop-50-by-the-end-of-the-ce/

The all-important Sierra Nevada snowpack could be cut in half by the end of the century if greenhouse gas emissions aren't reduced, according to a new analysis from UCLA.

Researcher Alex Hall used a complex computer model to look at what would happen to the Sierra Nevada mountains if these pollutants kept entering our atmosphere at the current rate.

He found that by the end of the century, average temperatures could climb by 7 to 10 degrees Fahrenheit and average snowpack levels could fall by 50 percent.

Even worse, this reduction in snow would likely fuel more warmth, since as snow melts it exposes land. Since land isn't as reflective as snow, it absorbs more heat and adds more warmth to the area around it.

Hall said it's a feedback loop that spells trouble for the snowpack.

Finally, Only in California

Only in California would the Legislature and the Governor make it a law to regulate cow farts to stop global warming. As one farmer in the article below makes clear, the new law will probably only drive ranchers and dairymen out of the state. These are excerpts from the *U.S. News and World Report* for November 29:

Moo! Cows Targeted in Global Warming Battle

California is taking its fight against global warming to the farm.

Nov. 29, 2016

http://www.usnews.com/news/business/articles/2016-11-29/california-targets-dairy-cows-to-combat-global-warming

By TERENCE CHEA, Associated Press

GALT, Calif. (AP) — California is taking its fight against global warming to the farm. The nation's leading agricultural state is now targeting greenhouse gases produced by dairy cows and other livestock.

Despite strong opposition from farmers, Gov. Jerry Brown signed legislation in September that for the first time regulates heat-trapping gases from livestock operations and landfills.

Cattle and other farm animals are major sources of methane, a greenhouse gas many times more potent than carbon dioxide as a heat-trapping gas. Methane is released when they belch, pass gas and make manure.

"If we can reduce emissions of methane, we can really help to slow global warming," said Ryan McCarthy, a science advisor for the California Air Resources Board, which is drawing up rules to implement the new law.

In the nation's largest milk-producing state, the new law requires dairies and other livestock operations to reduce methane emissions 40 percent below 2013 levels by 2030. State officials are developing the regulations, which take effect in 2024.

"We expect that this package ... and everything we're doing on climate, does show an effective model forward for others," McCarthy said.

"It just makes it more challenging. We're continuing to lose dairies. Dairies are moving out of state to places where these costs don't exist," said Paul Sousa, director of environmental services for Western United Dairymen.

The dairy industry could be forced to move production to states and countries with fewer regulations, leading to higher emissions globally, Sousa said.

"You've Got to Be Kidding! You'll Never Get Me to Put One of Those On!"