

California Drought (and Flood) Update



For February 23, 2017

by Patrick Ruckert

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<http://www.californiadroughtupdate.org>

<https://www.facebook.com/CaliforniaDroughtUpdate>

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As I move through the West, especially in this state and other states where water is short, I realize that nearly all of the standard of living which we enjoy in this part of the United States has been due partly to our own efforts, the generation which is now here, but really even more to the generation that went before-- the people who started in the early 1920's, for example, to organize the distribution of water along the basin.... So I think it is essential that we, in the 1960's, take steps to provide for the kind of country and state that we going to have 20 years from now, so that we do for our children the same thing that was done for us.

President John F. Kennedy

At the inauguration of Flaming Gorge Dam

September 27, 1963

Salt Lake City, Utah

A Note To Readers

I guess I'll maintain the new title for this report for at least a few more weeks. Floods, like droughts, come and go, but we scribes shall always be. Ours is not to do or die, but to, hopefully, enlighten a few minds and give some direction. And direction is what the nation requires. For as the noise and bedlam that inundates the airways and the social media provides the distraction from the reality that urgently needs to be understood, sorting out what is important is what I hope to do.

As the historic drought of the past five plus years slowly fades away, and now the record rainfall

replaces it, it may well be time to remind us all that mankind must never be subject to the whims of nature, but, through that great gift of human creativity, we must discover and master less imperfectly the fundamental laws of the universe, and then wield that knowledge to continuously improve life on Earth, and in the future the Cosmos.

That mankind has always altered nature to provide for his existence, for his well-being, there should be no argument to the contrary. That there is such an argument is a problem and demonstrates what more than 40 years of incessant propaganda promoting the idiotic “post-industrial society” and the idea that mankind is a plague on “nature,” can do. One would think that if those who have been sucked into such ideas would reflect a little, they would understand that mankind is not only a part of nature, and created by nature, but is the most perfect of nature's creations. For mankind is a species, unlike all other species, that, like all the processes of nature is creative. Humans bring into being by a deliberate intent that which had never existed, and thus mankind is self-evolving-- that is we deliberately change our behavior, we change our relationship to the rest of the universe by the creative power of our minds to create, build and use that which we create to adjust nature to our needs. No animal can do that.

This week's report will include the U.S. Drought Monitor, but will focus more on the flood and the attention it has given to the fragile state of the state's water infrastructure, which not just provides water, but also is the flood-control system.

Following the Drought Monitor is a summary report written three days ago, which shall serve as an overview. The remainder of this week's report will cover the flood, the weather and the status of the flood-control system.

Next week we shall turn to the broader question of infrastructure, or better conceptualized as productive platforms of scientific and technological progress that transform the entire economy. We must think about and bring into being those discoveries of science which eliminate less productive activity in our economy, and bring into being occupations and skills that do not exist today. That is what human progress has always done, and must continue to do so.

I suggest a look at the American Society of Civil Engineer's “Report Card for America's Infrastructure.” This report is issued every four years, with the new report due out on March 1. The 2013 report concludes that just in order to repair the nation's existing infrastructure by 2020 the cost would be \$3.7 trillion. The link below takes you to the entire report, at which you can explore the nation, all the states and all the areas of infrastructure.

<http://www.infrastructurereportcard.org/>

U.S. Drought Monitor

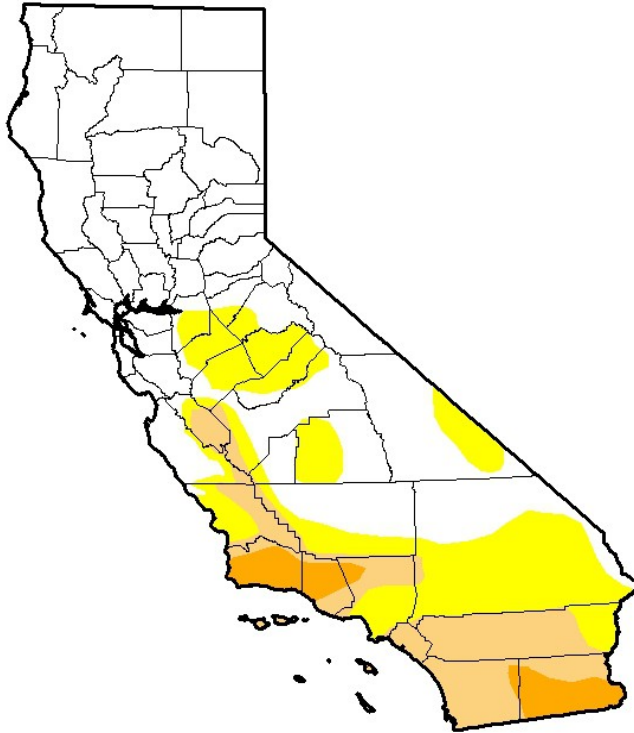
One year ago 5 percent of the state was not in drought. As of today, as can be seen in this week's U.S. Drought Monitor, 83 percent of the state is drought-free. Zero percent of the state is now in the two most intense drought categories-- “extreme” and “exceptional,” with only 4 percent of the state in the third most intense category- “severe.” Since most of the state is free of drought it is only the counties of Southern California that remain in it.

With most of the state having already received more than 100 percent of its normal annual rainfall with six months remaining in the water year, reservoirs are full and the snowpack is at 188 percent of its historic average for this date, and 154 percent of the April 1 average. More storms are coming, so we must join with all those who have been saying the drought is over, at least for the time being. But, the reminder must be stated: The damage from this drought will remain with us for years to come. The subsidence, especially in the Central Valley is and will cost tens of millions. One hundred million dead

trees shall provide ample fuel for the forest fires to come. And the depleted aquifers mean wells will forever have to be dug deeper.

**U.S. Drought Monitor
California**

February 21, 2017
(Released Thursday, Feb. 23, 2017)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|-------------------------------------------|-------|--------|-------|-------|-------|-------|
| Current | 61.66 | 38.34 | 16.87 | 4.19 | 0.00 | 0.00 |
| Last Week 2/14/2017 | 43.94 | 56.06 | 24.19 | 7.41 | 0.73 | 0.00 |
| 3 Months Ago 11/22/2016 | 12.03 | 87.97 | 73.04 | 60.27 | 42.80 | 21.04 |
| Start of Calendar Year 1/3/2017 | 18.07 | 81.93 | 67.61 | 54.02 | 38.17 | 18.31 |
| Start of Water Year 9/27/2016 | 0.00 | 100.00 | 83.59 | 62.27 | 42.80 | 21.04 |
| One Year Ago 2/23/2016 | 0.43 | 99.57 | 94.38 | 81.82 | 60.86 | 38.48 |

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:
Richard Heim
NCEI/NOAA



<http://droughtmonitor.unl.edu/>

California Drought and Flood Update
A Summary for February 20, 2017
By Patrick Ruckert

Here is a headline from February 20: “Atmospheric River Brings Historic Flood Risk to California.” As of last week, the drought in its sixth year, and the worst drought the state has experienced since records have been kept, still covers 25 percent of the state. That is sharply down from the 100 percent of just a few months ago.

Now, record precipitation is the norm, with more rainfall in the northern part of the state already this water year (began on October 1) than has been recorded in 100 years. Looking back to 1862, the last mega-flood in the state, Sacramento was under ten feet of water for months. All of the reservoirs are now full, with two, as of today, being forced to release more water, creating flood conditions along the San Joaquin River. Warnings to the populations of several cities have been issued to be ready to evacuate with a 15 minute notice.

As I wrote in the weekly “California Drought Update” several weeks ago, perhaps we are returning to the “normal” climate the region has experienced for most of the past 2,000 years-- alternating mega-droughts and mega-floods. Mega-droughts are those that last more than ten years, with some lasting a century.

The very unusual, and not experienced by anyone alive, picture today is that the state is being hit by one atmospheric river after another, with each one being stronger and dropping more precipitation than the previous one. In addition to the record level of rain is the record or near-record snowfall, which at this moment is near 200 percent of normal for this time of the year and more than the average entire winter as measured on April 1. With six weeks remaining in this rainy season, the forecasts generally are that all records will be broken by then. And given what we have seen this winter, who is to say that April 1 will be the end of the rainy season?

As for Oroville Dam, which nine days ago threatened a collapse of the emergency spillway, forcing a no warning evacuation of near 200,000 people for three days, the continued release of water over the damaged spillway has lowered the reservoir level to 50 feet below the top of the dam. Water department personnel are now confident that even with 10 inches of new rain expected in the Oroville area Monday night from a new atmospheric river, there will be no danger of the reservoir level getting even close to the top once again.

Much noise has been generated about the warnings on the Oroville Dam emergency spillway being voiced a dozen years ago, which is true, and blame is being solely put on the Brown administration by conservatives, but they seem to forget that back in 2005, both the President and Governor were Republicans. So, partisan bullshit is being thrown around quite freely. Of course, Brown and his brown-shirts deserve no quarter for blocking the building of more water management infrastructure for decades. But, never forget, the partner of the environmentalists has been Wall Street and London who turned our economy into a gambling casino, wrecking the real physical economy of industry, science, infrastructure and the space program.

More importantly, as I noted in my update last week, what is at risk is the entire water management system of the state. The flooding is threatening the hundreds of miles of levees on the Sacramento and San Joaquin rivers; with some of them already being breached. It is possible, especially if the atmospheric rivers just keep coming, that the levee system could collapse which could shut down both the Central Valley Project and the State Water Project system which provides the water for more than 20 million people.

In this overall context, the debate on infrastructure, and its negligence for decades, is getting some coverage in the media, including some articles bluntly stating that Trump's “plan” cannot fix the California dams, since there can be no “tolls” on fixing dams, and new reservoirs will take a decade to build. What is missing from the public debate is a real solution. That is provided in this publication by the LaRouche PAC: “The United States Joins the New Silk Road.”

<https://larouchepac.com/20151229/us-joins-new-silk-road>

The Flood and the Flood-control System

What follows are links to and some excerpts from just some of the hundreds of articles reporting on

California's present mess that has ended the drought.

Powerful storms continue to batter Northern California amid concern about levees
<http://www.latimes.com/local/lanow/la-me-california-storm-20170221-story.html>

Presidents' Day deluge caused rain records to tumble in Bay Area

By Filipa A. Ioannou

February 21, 2017

<http://www.sfgate.com/aboutsfgate/article/Presidents-Day-deluge-caused-rain-records-to-10948531.php>

14,000 households remain under flood evacuation order in San Jose

By [Jenna Lyons](#), [Sarah Ravani](#), and [Evan Sernoffsky](#), San Francisco Chronicle

Updated 6:29 am, Thursday, February 23, 2017

<http://www.sfgate.com/news/article/Thousands-remain-evacuated-as-flood-ravages-San-10950769.php>



Central Valley urged to be ready to 'evacuate quickly' as another storm approaches

By Ryan Sabalow and Adam Ashton

February 19, 2017

<http://www.sacbee.com/news/weather/article133714379.html>

Forecasters with the National Weather Service offered a stark warning Sunday for just about everyone living in the soggy, soaked Central Valley.

“Pretty much anybody needs to be prepared for the possibility that they may have to evacuate quickly,” said Sacramento meteorologist Brooke Bingaman.

Is California on-pace for the wettest year ever? We have to wait and see, says one expert

Kristin Hanes

February 22, 2017

<http://www.sfgate.com/bayarea/article/Is-California-on-pace-for-a-record-rainfall-year-10951020.php>

Some areas in California are blowing records right out of the water when it comes to rainfall this year.

Santa Rosa is 200 percent of normal, which means it's had twice the rainfall it normally has this time of years, with 52 inches. Blue Canyon, along the American River, has had 95 inches, where it normally would have 42.5.

But Jan Null, meteorologist with Golden Gate Weather Services, said it's really hard to say if we're going to see a "wettest water year ever."

This article is useful for the detail it provides about the integrated water management system of the state. Excerpts:

It's not just Oroville: Record rain is straining California's whole flood control network

By Rong-Gong Lin II, Paige St. John, Matt Stevens and Corina Knoll

Los Angeles Times

February 16, 2017

<http://www.latimes.com/local/california/la-me-oroville-floods-norcal-20170216-story.html>

The frantic effort over the last few days to lower water levels at [Oroville Dam](#) after the structure's two spillways became damaged is part of a larger drama playing out as California rapidly shifts from extreme drought to intense deluges.

Large swaths of the region are on track to experience their wettest winter on record, with many areas having already surpassed their average precipitation for an entire year.

And all that water is putting new strains on the network of dams, rivers, levees and other waterways that are essential to preventing massive flooding during wet years like this one.

The biggest danger zone lies in the Central Valley at the base of the Sierra Nevada, whose tall peaks can wring the skies of huge amounts of rain and snow. The area is essentially one giant floodplain that would be easily transformed into an inland sea without man-made flood control. At 400 miles long and 40 miles wide, it has only a tiny bottleneck from which to drain — a one-mile opening at the Carquinez

Strait at San Pablo Bay — before water heads into the San Francisco Bay.

Hoping to avoid the situation faced by Lake Oroville, officials are planning large releases of water from reservoirs. But that could further strain the hundreds of miles of levees that line the Central Valley's vast river networks, built to protect homes, businesses and farms from floods. The series of storms that slammed the area in December 1996 and lasted for a week caused numerous levees to collapse. Widespread flooding that inundated 300 square miles led to extensive damage and evacuations of 120,000 people, as well as nine deaths.

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While the state's reservoirs are built to release water slowly, officials are forced to quicken the pace of releases when they are at capacity. Water from brimming reservoirs is guided into nearby rivers. If those rivers are full, water can seep over and under levees, or through hidden cracks, leading to erosion.

More expected storms this season and a massive snowpack likely to run off into the summer has officials grappling with their options.

Levees were not designed to be stressed for extended periods of time and they require constant supervision, said Joseph Countryman, a member of the Central Valley Flood Protection Board and former head of reservoir operations for the U.S. Army Corps of Engineers for Northern California, Nevada, Utah and Colorado. Even without major rainstorms, the magnitude of the volume of water flowing through the system will still create "tremendous seepage" in the levees, potentially weakening them. And significant flows are to be expected through June, he said.

"The longer the water is on levees, the more potential they have to become saturated and develop problems they have never before exhibited," he said.



Oroville Emergency a Warning for U.S. Dam Safety

February 15, 2017

By Brett Walton, Circle of Blue

<http://www.circleofblue.org/2017/water-management/oroville-emergency-warning-u-s-dam-safety/>

The Oroville emergency is unfolding in a state with a dam safety program widely regarded as the nation's strongest. McCann agreed that California's efforts to prevent a partial collapse of Oroville's auxiliary spillway should be a wakeup call for other states with less vigilant dam regulation. Alabama, for instance, has [no state dam oversight at all](#).

Already the top spending state for dam safety, both in total dollars and inspectors per dam, California increased its program budget by six percent between 2014 and 2016, to \$US 13.3 million. The Department of Water Resources' Division of Safety of Dams has roughly one employee per 20 state-regulated dams. That is far greater than the national average of one employee per 200 dams, according to data from the Association of State Dam Safety Officials.

"California has had a strong dam safety program for many decades," McCann said. "It's well-funded, well-staffed, and they inspect regularly."

Two-thirds of U.S. dams are privately owned and often owners do not have funds for maintenance or repair, according to Lori Spragens, executive director of the Association of State Dam Safety Officials. Most U.S. dams are more than 50 years old and an unknown number are not built to current safety standards. The association estimates that [\\$US 18.7 billion](#) is needed to repair high-hazard, state-regulated dams. High-hazard dams could kill people if they failed.

"We're living off the investments of two to three generations ago," Eric Halpin, deputy dam safety officer for the U.S. Army Corps of Engineers, told Circle of Blue. "Those dams have the science and engineering of their times embedded in them. The pace of change today doesn't get easier. It gets harder in the future: back to back wettest years followed by five years of drought. All this has an impact on dams."

Despite Oroville Crisis, California Has The "Cadillac" Of State Dam Safety Programs

By Ben Adler

February 21, 2017

http://www.capradio.org/90632?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+CapitalPublicRadioLatestNewsRSS+%28Capital+Public+Radio%3A+Latest+News+RSS%29

The state of California missed one of its two annual Oroville Dam inspections last year. It has one field engineer for every 57 dams it must inspect. And there's a potential conflict of interest in how the state inspects dams.

Yet despite those concerns, California's dam safety inspection program – which is drawing increased scrutiny after last weekend's Oroville Dam crisis – is considered the best in the nation.

"Everybody is understaffed and underfunded," says Lori Spragens, who runs the Association of State Dam Safety Officials. "Every other state is more understaffed and underfunded."

She says other states look to California.

“They are actually what we consider the Cadillac version of a state dam safety program.”

A very interesting technical article on the problems that develop with dams generally and some of the problems already seen at Oroville is in this article from the *Los Angeles Times*. I just include a very small excerpt here.

Damage to Oroville's main spillway 'was an accident waiting to happen'

By Ralph Vartabedian

Los Angeles Time

February 20, 2017

<http://www.latimes.com/local/california/la-me-ln-oroville-spillway-damage-20170220-story.html>

David Rogers, a dam expert at Missouri University of Science and Technology who has written books on past dam failures, said long spillways such as the one at Oroville create difficult engineering problems. A 3,000-foot stretch of concrete can shrink 15 feet as it cures, creating gaps between panels. Thermal expansion and contraction over the years reopens gaps, allowing cavitation to expand the holes.

Oroville's spillway was also fighting gravity, having a tendency to slide downhill, opening more gaps on its surface over the years, Rogers said. Meanwhile, the long drought probably caused the underlying soil to shrink, creating underground fissures that the drenching rains this year would have easily filled in the foundation, he said.

“You have to grout these things in perpetuity, and that is what we are doing a poor job on as nation and a state,” Rogers said.

CA: The Physical Collapse Of A Social State

[*Thomas Del Beccaro*](#)

<http://www.forbes.com/sites/thomasdelbeccaro/2017/02/22/ca-the-physical-collapse-of-a-social-state/#6ed351d72f53>

It is said that California has over \$77 billion in deferred road, highway and bridge maintenance. Of course, there is the whole issue of the lack of water infrastructure in California. There is not

enough of it to store and supply the water needed for its industry and residents. Indeed, the system was designed for half those living in California today. Keep in mind that, three years ago, even the EPA said California needs \$44.5 billion to fix the infrastructure that it has.