

California Drought Update



For September 15, 2016
by Patrick Ruckert

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A Note To Readers

Making up for the brevity of the last few reports, this week our cup runneth over.

First we must note that the 15th anniversary of the terrorist attack of September 11, 2001. Mr. LaRouche a couple of months ago called for the observance of a “living memorial” for all those who died that day and those who have died in the regime change wars carried out by the Bush and Obama administrations since.

To that end the Schiller Institute, founded in 1984 by Helga Zepp-LaRouche, organized and participated in four events in New York City and in Morristown, New Jersey this past weekend. Joined by the Foundation to Revive Classical Culture, the Schiller Institute Community Chorus of New York City performed the beautiful Requiem Mass of Mozart. Churches in the Bronx, Brooklyn, Manhattan and Morristown were the venues. More than 3,000 people participated in total, and the Catholic cathedral in Brooklyn, from which 21 firefighters died that day, incorporated Mozart's Requiem in the memorial Mass given each year to honor those brave men who died while attempting to save the lives of others.

Here is a link to a report on the performances, and I am sure there will be more links to come, including video.

Schiller Institute Leads "Living Memorial" to Victims of 9/11

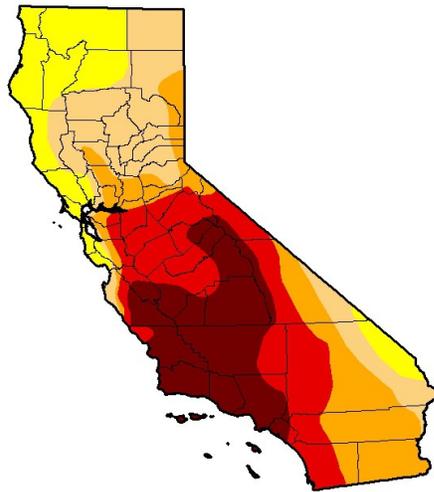
<https://larouchepac.com/20160911/schiller-institute-leads-living-memorial-victims-911>

Without going into any detail to summarize this week's report, I'll just let you peruse it after simply stating that what we report this week contrasts the environmentalist no growth anti-human outlook that so dominates the nation today to a very human idea that there are no limits to what we human beings can do except those that we impose on ourselves.

U.S. Drought Monitor for September 13, 2016

U.S. Drought Monitor California

September 13, 2016
(Released Thursday, Sep. 15, 2016)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	83.59	62.27	42.80	21.04
Last Week 8/6/2016	0.00	100.00	83.59	59.02	42.80	21.04
3 Months Ago 6/14/2016	0.00	100.00	83.59	59.02	42.80	21.04
Start of Calendar Year 1/23/2016	0.00	100.00	97.33	87.55	69.07	44.84
Start of Water Year 9/23/2015	0.14	99.86	97.33	92.36	71.08	46.00
One Year Ago 8/15/2015	0.14	99.86	97.33	92.36	71.08	46.00

Intensity:
■ D0 Abnormally Dry ■ D3 Extreme Drought
■ D1 Moderate Drought ■ D4 Exceptional Drought
■ D2 Severe Drought

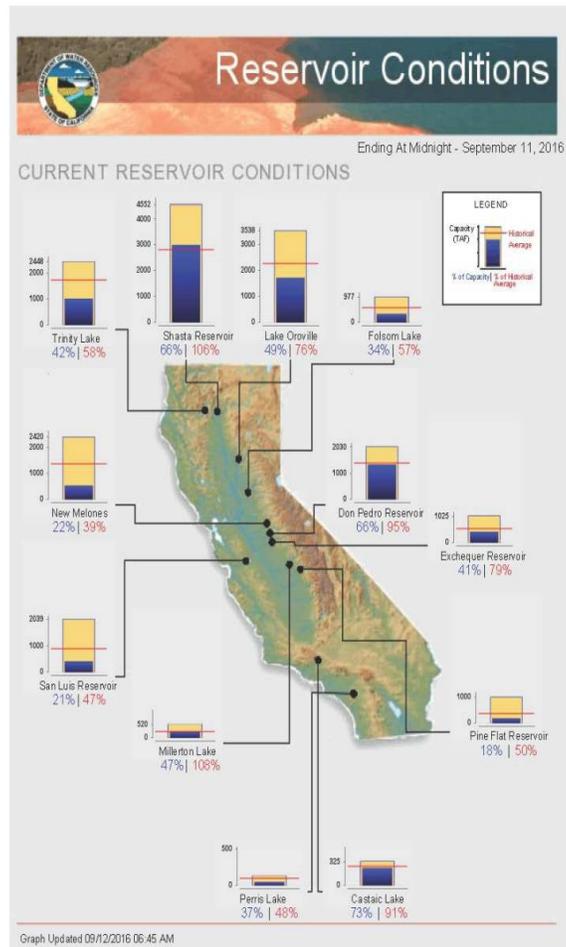
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Eric Luebbehusen
U.S. Department of Agriculture



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

California Reservoir Conditions for September 11, 2016



Remember the Water Bond Voters Passed in 2014?

Kristi Diener has an excellent report on myjobdependsonag.com, dated September 14, detailing what has and has not been done with the \$7.5 billion authorized by voters for water projects in 2014. I include just an excerpt, and urge you to read the entire piece.

Frankly My Dear, Prop. 1 Won't Give a Dam

<http://www.myjobdependsonag.com/prop-1-wont-give-a-dam/>

Kristi Diener is the founder of the California Water For Food and People Movement.

After 68% of the voters passed the \$7.5 billion Water Quality, Supply, and Infrastructure Improvement Act of 2014, you may be wondering, when is that dam construction going to start? After all, Chapter 8 of the bond approved \$2.7 billion for water storage, dams, and reservoirs, right?

Not exactly.

Fast forward to January 2019 when the CWC is scheduled to begin its conditional funding commitments – more than four years after Prop. 1 was approved. If an anomaly were to have occurred, and dam-ground broke in early 2019, the soonest Temperance Flat could be completed would be the year 2026, and Sites in the year 2029.

A Double Offensive Against A Productive Economy

Both environmentalist organizations and the California Water Board are demanding even less water be sent to cities and farms. On August 28, this article by Chris Clarke was run on *KCET*, “Last Chance to Save the Delta Smelt?” It should be noted that the chair of the California Water Board Felicia Marcus was the long-time attorney for the *Natural Resources Defense Council*. The lengthy article is blunt: If you want to save the fish, stop pumping water from the Delta. A short excerpt follows.

<https://www.kcet.org/define/last-chance-to-save-the-delta-smelt>.

Earlier this month, the Natural Resources Defense Council (NRDC), Defenders of Wildlife, and the Bay Institute sent a [letter to SWRCB](#) urging the agency to enact emergency regulations requiring the federal Bureau of Reclamation (BuRec) and the California Department of Water Resources (DWR) to cut summer pumping of Sacramento River water into the aqueducts of the Central Valley Project and the State Water Project in order to protect the smelt.

As if on cue, the Water Board on September 15, issued its recommendation proposing that hundreds of thousands of additional acre-feet of water be allowed to flow unused in the San Joaquin system.

The statement from the Water Board can be found here: <https://mavensnotebook.com/2016/09/15/this-just-in-state-water-board-releases-draft-flow-objectives-for-san-joaquin-river-salinity-objectives-for-the-southern-delta/>

The very destructive impact of such a policy was highlighted in a *Sacramento Bee* article on September 15, written by Ryan Sabalow and Dale Kasler. The article, “California proposes steering more river water to fish – less to farms, cities,” is excerpted below.

<http://www.sacbee.com/news/state/california/water-and-drought/article101983402.html#storylink=cpy>

The article is updated, here:

<http://www.sacbee.com/news/local/article101983402.html>

In a move that foreshadows sweeping statewide reductions in river water use for human needs, state water regulators on Thursday presented a stark new reality to some California cities and farms that receive water from the San Joaquin River and its tributaries.

In order to protect endangered fish at critical parts of their life cycle, state regulators proposed leaving hundreds of thousands of additional acre-feet of water flowing in the San Joaquin system. While as little as 20 percent of the river now flows unimpeded to the Sacramento-San Joaquin Delta, regulators said they want the “natural” flow raised to 30 to 50 percent, “with a starting point of 40 percent.”

The proposal by the State Water Resources Control Board’s staff is sure to add new drama to the ever present conflicts over California’s precious water supply, a situation whose complications have multiplied since the [onset of the drought](#) five years ago. The five-person board will eventually vote on the staff’s plan.

With more water devoted to fish and other environmental needs, the proposal could lead to substantial cuts in water deliveries to San Francisco, Modesto, Merced, Turlock as well as for San Joaquin Valley farmers who also pull from the rivers to water their crops. That could lead to significant legal and political fights, as many of those cities and farm groups hold senior water rights.

The proposal would leave anywhere between 288,000 and 485,000 acre-feet of additional water in the river system, according to a staff analysis. Farm groups, already struggling with [dropoffs in water deliveries](#) during five years of drought, said the proposal could bring more harm to California’s agricultural economy. Mike Wade of the California Farm Water Coalition said the proposal could take hundreds of thousands of acres of land out of production, and force hundreds of farms out of business.

For-seeing the Water Board's decision, Mike Dunbar wrote an article on September 10 in the *Modesto Bee*, highlighting the anger of the water officials and farmers in the Valley. Here are excerpts from the article, “Day of reckoning for our rivers.” <http://www.modbee.com/opinion/opn-columns-blogs/mike-dunbar/article100963342.html>

Thursday is the “day of reckoning” on our rivers. The State Water Resources Control Board is set to release a revised document justifying sending twice as much Tuolumne River water down the San Joaquin and into the Delta.

“We know it’s going to be bad,” said Stanislaus County Supervisor Vito Chiesa. “We’re going to be left with nothing to do but fight.”

“We’re Custer right now,” said Supervisor Terry Withrow, while vacationing at the Little Bighorn Battlefield in Montana.

For more than a year, Withrow had been meeting with irrigation district and state officials, water users and environmentalists to work out a reasonable settlement. After reaching what one state official called the most comprehensive and thorough proposal he’d ever seen, the deal went up the official ladder.

What happened next? Silence.

“The leaders in our community have attempted to provide them with substantial evidence of how we have historically put the water to beneficial use and the importance of the water to our region – both for farmers and municipal water users in cities,” said Turlock Irrigation District board member Michael Frantz, who attended nearly every meeting. But those efforts have been ignored.

The original [Substitute Environmental Draft](#) statement was released in 2012. It demanded 40 percent unimpaired flows. That’s an additional [380,000 acre-feet of water off the Tuolumne](#), or double what currently flows to the Sacramento-San Joaquin Delta – the same figure most expect to see Thursday. The state’s report said that would cost our region \$40 million, tops.

That dollar figure doesn't even qualify as laughable.

In 2014, an average acre of irrigated land generated roughly \$8,150. Since the Farm Bureau believes such reduced flows would mean 100,000 fallowed acres, losses would start at \$815 million. The economic multiplier puts it closer to \$1 billion.

Having flunked their math assignment once, you'd think the state would talk to the people who live here this time.

County officials, representing 525,000 people? "We haven't been part of the discussion," said Chiesa.

Irrigation districts, who have rights to the water? "Not that I'm aware," said Frantz.

Farm Bureau, representing 1,700 farmers? "Hell no," said Tom Orvis.

How to Lie With Statistics

A book by that title was published in 1954, and apparently the good professors at UC Davis are at least familiar with it. In August the *Center for Watershed Sciences* released a UC Davis drought report titled "[Economic Analysis of the 2016 California Drought on Agriculture](#)." The report states that just 77,000 acres of farm land were fallowed this year due to the drought, leaving the reader with the distinct impression that the drought's impact was dramatically less destructive than any of the first four years of this drought.

Following protests by farm leaders, the Center issued an update that states that 370,000 acres have been fallowed this year in total. The 77,000 acres, they claim, is just that land directly shut down due to the drought and did not include the other hundreds of thousands of acres shut down due to the actions of state and federal regulators cutting off agricultural areas from receiving water.

Here is a report from farmwater.org:

Amount of Idled Farm Land Five Times Greater than Report States

<http://farmwater.org/farm-water-news/uc-davis-drought-report/>

On August 15 the Center for Watershed Sciences released a UC Davis drought report titled "[Economic Analysis of the 2016 California Drought on Agriculture](#)." The report was a follow-on to reports commissioned by the California Department of Food and Agriculture (CDFA) and released previously in 2014 and 2015.

Of note in the 2016 report was a statement that approximately 77,000 acres were fallowed this year, which raised questions among many agricultural industry leaders who were aware of fallowing estimates in the range of several hundred thousand acres. CFWC checked with CDFA as well as with researchers at UC Davis to express concerns over the seemingly low fallowing estimates. That communication resulted in the production of an update clarifying the numbers reported in the August 15 report.

Drought accounts for just 21% of expected fallowing

By September 30 according to the update, Central Valley land fallowing is expected to be approximately 370,000 acres, of which 77,000 acres can be attributed to the drought. The remaining 293,000 would be from other factors, including the regulatory restrictions that have delivered a 5 percent water supply to South of Delta CVP contractors and put tremendous pressure on other CVP and State Water Project contractors.

It went on to say, "Pumping restrictions in the Delta to prevent reverse flows and operations of the San Luis Reservoir have also affected quantity and timing of water to agricultural users south of the Delta. The

combination of these effects contributed to the additional following on top of drought related following. Thus a number of regulatory issues, not directly related to the drought of 2016, have contributed to idled land observed in the Central Valley in 2016.”

Here is the link to the updated supplement from the *Center for Watershed Sciences*:

file:///C:/Users/patru/Desktop/Drought%20articles/20160906_Estimates%20of%20Idle%20Land%20due%20to%20the%202016%20California%20Drought.pdf

Desalination

Both technical developments and a political offensive appear to be underway to promote desalination. First, *wateronline.com* published an article on September 5, arguing that the Carlsbad plant now represents a test case for the political fight on desalination. An excerpt follows.

<http://www.wateronline.com/doc/carlsbad-a-test-case-for-desalination-policy-0001>

Carlsbad A Test Case For Desalination Policy

By [Sara Jerome](#)

Nearly a year after the San Diego County’s desalination plant began operating, the debate continues around what role this controversial treatment method should play in ensuring the water supply during California’s record-breaking drought.

Experts say policy decisions linked to the plant in Carlsbad, CA — the nation’s largest desalination facility — could reverberate around the country as policymakers decide on how to approach desalination projects.

“There’s a reason why arguments over the merits of the Carlsbad Desalination Project are ongoing. At least three new desalination projects are in the works in the region. The perceived success or failure of the Carlsbad plant could tip the scales for those projects, which will face regulatory hurdles and legal challenges of their own,” Voice of San Diego recently [reported](#).

The *voiceofsandiego.org* joins in this discussion with an article on September 2, “Wastewater Recycling and Conservation Aren’t Enough — That’s Where Desal Comes in.” Excerpts follow.

http://www.voiceofsandiego.org/topics/opinion/wastewater-recycling-conservation-arent-enough-thats-desal-comes/?goal=0_c2357fd0a3-2063ccd9d5-84049417

Wastewater recycling and conservation are obviously necessary to do. By themselves, however, they cannot possibly overcome drought, dependence on imported water and expected population growth for the region.

The [same old arguments](#) against desalination keep getting resurrected: It’s too expensive, too energy intensive, plus wastewater recycling and conservation by themselves can solve the drought problem. When put in the context of climate change, imported water and perpetual drought, none of these arguments make sense.

Opponents of desalinated water always refer to energy use without putting it in the context of importing water and other daily electrical uses. It takes approximately 14,000 kilowatt hours per million gallons to import water to Southern California, and approximately 15,000 kilowatt hours to produce the same million gallons from desalination, so it’s essentially a wash.

Wastewater recycling and conservation are obviously necessary to do. By themselves, however, they cannot possibly overcome drought, dependence on imported water and expected population growth for the region. As drought and conservation take hold, there is less wastewater to recycle.

Two articles point to new technical developments with desalination that lower the costs of the process.

The first, from *globalvoices.org* on August 16, highlights how Israel now gets 55 percent of its water from desalination and is a model for not only other nations of the region but for the world. Excerpts follow.

Israel, One of the World's Driest Countries, Is Now Overflowing With Water

<https://globalvoices.org/2016/08/16/israel-one-of-the-worlds-driest-countries-is-now-overflowing-with-water/>

This post by [Rowan Jacobsen](#) was originally published on [Ensia.com](#)

We are standing above the new Sorek desalination plant, the largest reverse-osmosis desal facility in the world, and we are staring at Israel's salvation.

Bar-Zeev, who recently joined Israel's Zuckerberg Institute for Water Research after completing his postdoc work at Yale University, is an expert on biofouling, which has always been an Achilles' heel of desalination and one of the reasons it has been considered a last resort. Desal works by pushing saltwater into membranes containing microscopic pores. The water gets through, while the larger salt molecules are left behind. But microorganisms in seawater quickly colonize the membranes and block the pores, and controlling them requires periodic costly and chemical-intensive cleaning. But Bar-Zeev and colleagues [developed a chemical-free system](#) using porous lava stone to capture the microorganisms before they reach the membranes. It's just one of many breakthroughs in membrane technology that have made desalination much more efficient. Israel now gets 55 percent of its domestic water from desalination, and that has helped to turn one of the world's driest countries into the unlikeliest of water giants.

Enter desalination. The Ashkelon plant, in 2005, provided 127 million cubic meters (166 million cubic yards) of water. Hadera, in 2009, put out another 140 million cubic meters (183 million cubic yards). And now Sorek, 150 million cubic meters (196 million cubic yards). All told, desal plants can provide some 600 million cubic meters (785 million cubic yards) of water a year, and more are on the way.

Inside Sorek, 50,000 membranes enclosed in vertical white cylinders, each 4 feet high and 16 inches wide, are whirring like jet engines. The whole thing feels like a throbbing spaceship about to blast off. The cylinders contain sheets of plastic membranes wrapped around a central pipe, and the membranes are stippled with pores less than a hundredth the diameter of a human hair. Water shoots into the cylinders at a pressure of 70 atmospheres and is pushed through the membranes, while the remaining brine is returned to the sea.

Desalination used to be an expensive energy hog, but the kind of advanced technologies being employed at Sorek have been a game changer. Water produced by desalination costs just a third of what it did in the 1990s. Sorek can produce a thousand liters of drinking water for 58 cents. Israeli households pay about US\$30 a month for their water — similar to households in most US cities, and far less than Las Vegas (US\$47) or Los Angeles (US\$58).

The International Desalination Association claims that [300 million people get water from desalination](#), and that number is quickly rising. IDE, the Israeli company that built Ashkelon, Hadera and Sorek, recently finished the Carlsbad desalination plant in Southern California, a close cousin of its Israel plants, and it has many more in the works. Worldwide, the equivalent of six additional Sorek plants are coming online every year. The desalination era is here.

The second article, "Shocking new way to get the salt out," from the *MIT News Office* late last year, reports on what is so often ignored by most-- that new technological developments can completely change all the parameters of all that we do. Excerpts follow.

MIT team invents efficient shockwave-based process for desalination of water.

David L. Chandler | MIT News Office

November 12, 2015

<http://news.mit.edu/2015/shockwave-process-desalination-water-1112>

It is also reported on here:

<http://www.engineering.com/DesignerEdge/DesignerEdgeArticles/ArticleID/10967/Shockwave-Desalination-Removes-Salts-from-Flowing-Water.aspx>

As the availability of clean, potable water becomes an increasingly urgent issue in many parts of the world, researchers are searching for new ways to treat salty, brackish or contaminated water to make it usable. Now a team at MIT has come up with an innovative approach that, unlike most traditional desalination systems, does not separate ions or water molecules with filters, which can become clogged, or boiling, which consumes great amounts of energy.

*Instead, the system uses an electrically driven shockwave within a stream of flowing water, which pushes salty water to one side of the flow and fresh water to the other, allowing easy separation of the two streams. The new approach is described in the journal *Environmental Science and Technology Letters*, in a paper by professor of chemical engineering and mathematics Martin Bazant, graduate student Sven Schlumpberger, undergraduate Nancy Lu, and former postdoc Matthew Suss.*

This approach is “a fundamentally new and different separation system,” Bazant says. And unlike most other approaches to desalination or water purification, he adds, this one performs a “membraneless separation” of ions and particles.

Initially at least, this process would not be competitive with methods such as reverse osmosis for large-scale seawater desalination. But it could find other uses in the cleanup of contaminated water, Schlumpberger says.

Unlike some other approaches to desalination, he adds, this one requires little infrastructure, so it might be useful for portable systems for use in remote locations, or for emergencies where water supplies are disrupted by storms or earthquakes.

Climate Change, the Drought and Real Science

Over the last few weeks there has been a virtual flood of articles attempting to link the drought, and the droughts to come, to climate change. As one may suspect, most of these articles at least pay lip service to the discredited idea that climate change is caused by mankind's activities.

Following the real science presented immediately below are some of these articles.

Disregarding Donald Trump's ignorant statement that there is no drought in California, and Hillary Clinton's blathering about the potential horrors of climate change, we human beings, with our creative mental powers, have the capability to deal with anything nature, or stupid politicians, throw at us. Very simply, the climate has always changed, is changing now, and will always change in the future eons to come.

As I wrote in my review of the book, “The West Without Water: What Past Floods, Droughts, and Other Climatic Clues Tell Us About Tomorrow,” published in *Executive Intelligence Review* on May 9, 2014:

As the great Ukrainian-Russian scientist Vladimir Vernadsky demonstrated, rather than man merely

adjusting to “nature,” man is not only created by nature, but is nature’s most perfect creation, in that, unlike the rest of nature, man is a willfully creative force in the universe. That creative power has given the human species the power to adjust nature to accord with mankind’s needs and well-being; to reshape nature’s processes by increasing man’s understanding of the principles of the universe, which are really only known to man by the effects of his action on that universe. That is how mankind knows the future—because he creates it from his imagination, an imagination that brings into being that which never before existed.

Here is the link to my review: “Are We Controlled by the Whims of Nature, or Will We Create Our Future?”

http://larouchepub.com/eiw/public/2014/eirv41n19-20140509/48-52_4119.pdf

Last week I provided a link to the *LaRouche PAC Science Team* dialogue which featured a newly published study by *Henrik Svensmark* on the affects of galactic radiation and the activity of our Sun on cloud formation and precipitation. <https://larouchepac.com/20160905/your-life-our-solar-galactic-climate>

Here is a short excerpt from that dialogue.

Your Life in Our Solar-Galactic Climate

BEN DENISTON: Yeah. We'll get into this issue of what is mankind's real position in the Galaxy and the Universe, and have some fun with this. This is a theme that we've presented for some years on the LaRouche PAC website with our work in the Science Team. But there was a new paper that was released on the subject of the relationship between Galactic cosmic radiation and the effects of our Galaxy; the effects of solar activity and how that creates the conditions of climate, the activity of water, the water cycle back here on Earth.

This is a good opportunity to highlight this new study and put this in context of some of the picture that we've been development in recent years about mankind's real, emerging relationship with our Galactic System as a whole, and elevating mankind conceptually, mentally which is really what defines how mankind acts, what mankind is, to this higher Galactic level.

People are probably familiar, or I would expect a good chunk of our audience is familiar with the work of this Danish group of researchers around Henrik Svensmark, his son is rather active with them, and a few other collaborators, as well as an Israeli collaborator Nir Shaviv on the role of Galactic cosmic radiation effects on the Earth's climate.

And here are a couple of links to articles on the Svensmark study:

Svensmark publishes: Solar activity has a direct impact on Earth’s cloud cover

[Anthony Watts](#)

[August 25, 2016](#)

<https://wattsupwiththat.com/2016/08/25/svensmark-publishes-solar-activity-has-a-direct-impact-on-earths-cloud-cover/>

Solar activity has a direct impact on Earth's cloud cover

August 25, 2016 by Morten Garly Andersen

<http://phys.org/news/2016-08-solar-impact-earth-cloud.html>

Now for the articles on climate change and the drought.

The first one is quite alarming, or at least the headline attempts to be so. It is from *newsroom.ucla.edu* and posted on September 15. I include below more than an excerpt because the report on the study does include some interesting ideas.

Pacific Ocean's response to greenhouse gases could extend California drought for centuries

Warming forces have caused millennia of dryness in California's prehistory, and greenhouses gases could do the same

Alison Hewitt

September 15, 2016

<http://newsroom.ucla.edu/releases/pacific-oceans-response-to-greenhouse-gases-could-extend-california-drought-for-centuries>

Clues from prehistoric droughts and arid periods in California show that today's increasing greenhouse gas levels could lock the state into drought for centuries, according to a study led by UCLA professor Glen MacDonald.

The [study](#), published today in the Nature.com journal Scientific Reports, looked at how natural climatic forces contributed to centuries-long and even millennia-long periods of dryness in California during the past 10,000 years. These phenomena — sun spots, a slightly different earth orbit, a decrease in volcanic activity — intermittently warmed the region through a process called radiative forcing, and recently have been joined by a new force: greenhouse gases.

As long as warming forces like greenhouse gases are present, the resulting radiative forcing can extend drought-like conditions more or less indefinitely, said MacDonald, a distinguished professor of geography and of ecology and evolutionary biology.

“Radiative forcing in the past appears to have had catastrophic effects in extending droughts,” said MacDonald, an international authority on drought and climate change. “When you have arid periods that persist for 60 years, as we did in the 12th century, or for millennia, as we did from 6,000 to 1,000 B.C., that's not really a ‘drought.’ That aridity is the new normal.”

What they found was not only that periods of increased radiative forcing could produce drought-like conditions that extended indefinitely, but that these conditions were closely tied to prolonged changes in Pacific Ocean surface temperatures.

Changes in ocean temperatures are linked to El Niño and La Niña conditions, which increase and decrease precipitation in California. Until now, no one had the long, detailed record of California's dry periods needed to show that that aridity went hand-in-hand with changes in the prehistoric climate records of the Pacific Ocean, MacDonald said.

From 6,000 to 1,000 B.C., during a time geologists refer to as the mid-Holocene, the core sample captures a 5,000-year dry period in California that has been seen in less detail through other paleoenvironmental records. This arid period is linked to a slight variation in Earth's orbit that increased the amount of solar energy received by the Northern Hemisphere in the summer months. California was warm and dry, while marine sediment records show the Pacific was in a La Niña-like state, likely reducing precipitation.

A similar dry period was seen from about 950 to 1250 A.D., a time known as the medieval climate anomaly. Increased radiative forcing and warming at this time is connected to decreased volcanic activity and increased sunspots. Again, La Niña appears to have reigned in the Pacific Ocean.

“In a century or so, we might see a retreat of forest lands, and an expansion of sagebrush, grasslands and

deserts,” MacDonald said. “We would expect temperatures to get higher, and rainfall and snowfall would decrease. Fire activity could increase, and lakes would get shallower, with some becoming marshy or drying up.”

California might remain an agricultural state, thanks to irrigation and engineering, though productivity might decrease and crops might change, said MacDonald, who emphasized that while the past is no guarantee of the future, in this case it does provide cause for concern.

“I think we would find a way to keep our cities going through prolonged drought, but we’re not going to engineer a way to conserve or preserve the ecosystems of the state,” MacDonald said. “We can’t save our huge expanses of oak woodlands, or our pine and fir forests, or high-elevation alpine ecosystems with irrigation projects like we might our orchards and gardens. I worry that we will see very different wildlands by the end of this century.”

The following article on September 8 by Juliet Christian-Smith, posted on *newsdeeply.com*, stresses that the state's water future will be determined by “climate change,” and ignores the truth of human civilization that only failed cultures are controlled by the whims of Nature, while successful ones create their future through scientific discovery and technological progress. Technically, the article does provide some decent reporting on the relationship of temperature to the snowpack. Excerpts follow.

Climate Change Is at the Heart of California’s Water Future

We should spend less time worrying about El Niño or La Niña weather patterns and more time dealing with the fact that climate change will be the biggest force in the state’s water future, writes scientist Juliet Christian-Smith.

<https://www.newsdeeply.com/water/op-eds/2016/09/08/climate-change-is-at-the-heart-of-californias-water-future>

But here’s the real story: come El Niño or La Niña, climate change is La Madre (the Mother) of weather systems and she will be playing the lead role in California’s water supply drama in the years ahead. Climate change is truly a game changer when it comes to our water supply, and dealing with it will require a seismic shift in how we manage this precious resource. It’s a shift we are only beginning to understand. Our current approach to water management doesn’t adequately integrate climate change projections into estimates of future water supply or designs for new water infrastructure, yet climate change will have a bigger impact on water availability than any single El Niño or La Niña cycle.

Climate change is such a destabilizing force because of the way our water system is engineered. For more than a century, Californians have relied on snowmelt-fed reservoirs, rivers and streams for much of our freshwater. Drought and climate change are depleting those traditional supplies. Global warming means hotter temperatures, which lead to less snow and more evaporation. In fact, the statewide average temperature during the winter of 2014–15 was the warmest ever recorded, at 50.5 degrees Fahrenheit (10.3 Celsius) – more than 5 degrees warmer than the average for the 20th century. And, even more disturbing, warming has been most severe in the Sierra Nevada, where much of our state’s water supply originates. In 2015, average minimum winter temperatures were above freezing for the first time, and the snowpack was the lowest ever recorded.

Snowpack decline is projected to continue as more winter precipitation falls as rain rather than snow.

The next article, “How does the ocean drive weather and climate extremes?,” from *phys.org* on August 31, provides some interesting material on the relationship of ocean temperatures and currents to climate and climate events. Some excerpts:

by Rebecca Fowler, Earth Institute, Columbia University

<http://phys.org/news/2016-08-ocean-weather-climate-extremes.html>

There's been a change in the weather. Across the globe, extreme weather events—severe heat waves, heavy precipitation, lengthy droughts and deadly wildfires—appear to be on the rise. December 2015 was the wettest month in the United Kingdom since record keeping began in 1910. More than 5,000 miles west, California recently entered its fifth year of drought.

The ocean plays a vital role in Earth's climate system, shaping weather and climate on land. The ocean takes up vast amount of heat from the sun in summer and releases it in winter; ameliorating summer and winter climate extremes downwind. Ocean currents can also move this heat, impacting local weather and climate conditions.

When ocean currents change, they modify the sea surface temperature that the atmosphere sees, which drives anomalies in winds, weather and climate across the planet. Such departures from average conditions sometimes occur in predictable ways. For example, every three to seven years, the sea surface temperature along the equator in the Pacific Ocean warms by as much as 2 to 3 degrees Celsius. A warm El Niño climate pattern results, which changes rainfall and weather, from flooding in California to drought in Australia.

El Niño, and its opposite, La Niña, have long been recognized and can be predicted up to a year in advance. But there are other processes in the ocean that create variations in sea surface temperature and impact global weather and climate, and these are not well understood."

We know that [sea-surface](#) temperature changes can drive weather extremes, but we don't know nearly enough about what drives these changes," Abernathey said. "That is a fundamental question about ocean physics, which we can explore with simulations and data analysis."

Abernathey and Seager are also investigating whether the changes in [sea surface temperature](#) are natural, man-made or a combination of the two, and how the probability of extreme weather is changing.

The theme continues with a couple articles on wild fires and climate change. The first is from KPCC radio on August 30, by Sanden Totten. A few excerpts follow.

Climate change will likely lead to more explosive fires in Southern California

<http://www.scpr.org/news/2016/08/30/63290/climate-change-will-likely-lead-to-more-explosive/>

Southern California is home to some of the most diverse plant communities in the world, from coastal sage scrub and oak woodlands to conifer forests and inland chaparral.

But where biologists see ecological niches, fire officials see fuel sources for wildfire.

Many climate models predict that greenhouse gasses will create a hotter, drier future for California over the next century. And that will likely amp up the potential for big blazes on these varying landscapes, creating new challenges for firefighters.

And the second, "Here's why Southern California brush has turned region into a tinderbox," is by David Danelki in the *Press-Enterprise* of August 29.

<http://www.dailybulletin.com/general-news/20160829/heres-why-southern-california-brush-has-turned-region-into-a-tinderbox>

Experts blame today's parched chaparral on five years of drought exacerbated by a warming planet. The sun-loving manazitas and other shrubs normally soak up the cool-season rains and spring snow melts, and thrive with new growth until the hot and dry days of summer arrive.

The Salton Sea

The Salton Sea, the Colorado River, farming in the Imperial Valley and more have created a complex and very difficult and expensive problem to solve. As the article, “California Is Running Out of Time to Save the Salton Sea,” from *Water Deeply* on September 2 explains. Some excerpts follow.

https://www.newsdeeply.com/water/articles/2016/08/31/california-is-running-out-of-time-to-save-the-salton-sea?utm_source=Water+Deeply&utm_campaign=391db29d36-Water_Deeply_Weekly_Update_09_029_1_2016&utm_medium=email&utm_term=0_2947becb78-391db29d36-117422765&mc_cid=391db29d36&mc_eid=ded6410b11

An agreement by California to draw less water from the Colorado River to help boost water levels at Lake Mead could accelerate the shrinkage of the already precarious Salton Sea, endangering air quality and wildlife habitat.

In this aerial photo, taken May 1, 2015, the exposed lakebed of the Salton Sea dries out near Niland, Calif. San Diego and other Southern California water agencies will stop replenishing the lake at the end of 2017, raising concerns that dust from the exposed lakebed will exacerbate asthma and other respiratory illness in a region whose air quality already fails federal standards. Gregory Bull, AP

Located in Riverside and Imperial counties, about 150 miles (240km) southeast of Los Angeles in the desert, the Salton Sea is a 360-square-mile (930-square-km) lake, the largest by area in California. But that status is under threat, as the lake has been shrinking for years, exposing the dry lakebed and creating dust that has hurt the air quality for local residents, while taking away critical wetland habitat for thousands of birds.

Now conditions are expected to deteriorate at a rapid clip when it stops receiving Colorado River water as part of an earlier agreement. California made plans to compensate for the impacts with major mitigation measures, but aside from a couple of small projects that finally got funding approval this June, little progress has been made.

Nuclear Power

China once again has picked-up what the U.S. has dropped. This time nuclear power. In fact, China is going beyond what we have ever done in the field. There remains very few voices within our nation that recognize the future does and will belong to those who will fully utilize the atoms potential. An opinion column in the *Orange County Register*, while giving lip service to global warming does make the case for a future which includes nuclear power in California.

First, here is the article on China's policy from *technologyreview.com*, dated August 2 and written by Richard Martin. The article includes a fairly extensive history of atomic energy in addition to a detailed report on China's nuclear program.

Fail-Safe Nuclear Power

Cheaper and cleaner nuclear plants could finally become reality—but not in the United States, where the technology was invented more than 50 years ago. <https://www.technologyreview.com/s/602051/fail-safe-nuclear-power/>

In February I flew through the interior of a machine that could represent the future of nuclear power. I was on a virtual-reality tour at the Shanghai Institute of Applied Physics in China, which plans in the next few years to build an experimental reactor whose design makes a meltdown far less likely. Inside the core—a superhot, intensely radioactive place where no human will ever go—the layers of the power plant peeled back before me: the outer vessel of stainless steel, the inner layer of a high-tech alloy, and finally the

nuclear fuel itself, tens of thousands of billiard-ball-size spheres containing particles of radioactive material.

Given unprecedented access to the inner workings of China's advanced nuclear R&D program, I was witnessing a new nuclear technology being born.

Over the next two decades China hopes to build the [world's largest nuclear power industry](#). Plans include as many as 30 new conventional nuclear plants (in addition to the 34 reactors operating today) as well as a variety of next-generation reactors, including thorium molten-salt reactors, high-temperature gas-cooled reactors (which, like molten-salt reactors, are both highly efficient and inherently safe), and sodium-cooled fast reactors (which can consume spent fuel from conventional reactors to make electricity). Chinese planners want not only to dramatically expand the country's domestic nuclear capacity but also to become the world's leading supplier of nuclear reactors and components, a prospect that many Western observers find alarming.

The *Orange County Register* opinion column is here, and includes a bit more than just a swipe at Brown and the environmentalists.

California's faux environmentalism

Sept. 15, 2016

By CARSON BRUNO / Contributing writer

<http://www.ocregister.com/articles/california-729047-nuclear-percent.html>