California Drought (and Flood) Update

For July 27, 2017

by Patrick Ruckert

Published weekly since July, 2014

http://www.californiadroughtupdate.org

https://www.facebook.com/CaliforniaDroughtUpdate

patruckert@hotmail.com

Since the Glass-Steagall Act began to be torn down 50 years ago, Wall Street's banks and funds — with their most dangerous operations always in London! — have been a succubus on the economy, which can't grow without financial crashes, and since the 2008 crash can't grow at all. The Glass-Steagall breakup must start now, to prevent the threatening new bank crash.

Then, credit must be issued from a national credit institution.... credit soon in the trillions, for 20-25-year periods at low interest rates.

The purpose is high-technology investments in new, more productive infrastructure to replace the crumbling sinews of the U.S. economy, raise productivity and create productive employment again. It cannot and will not be done by private investment. President Trump must learn this, and the Wall Streeters around him like the Treasury Secretary, have to go.

A great expansion of the United States space exploration program will drive this revival, as the President had stated in a television message to the American people in March.

What Must Be Done Before Another Bank Crash Hits
From LaRouche PAC, July 25, 2017

A Note To Readers

The quote above is from a LaRouche PAC statement of July 25, 2017, and represents what must be addressed if any specific problem is to be approached from the standpoint of solving it. The full statement is here: https://larouchepac.com/20170725/what-must-be-done-another-bank-crash-hits

And that goes double for California's water management system. Recall the early 1930s and the attempt by the state to build the Central Valley Project. The governor, the legislature and the

population approved the funds for the project, but there were no buyers for the $170 million revenue bonds. The nation was in the depths of the Great Depression. The state then asked the Roosevelt administration to take over the project, and in 1935 President Roosevelt transferred $20 million to begin the project. In 1937, the authorizing legislation, the Rivers and Harbors Act, placed the project under the Bureau of Reclamation and provided further funding. Actual construction of the dams, reservoirs and aqueducts began in 1937, and for the next 30 years the Congress passed thirteen separate bills authorizing further funding and construction.

Today, the existing system of Wall Street speculation and the ideology of anti-government thinking both have to be put in the trash. The minimal requirement for just repairing the nation's infrastructure as the American Society of Civil Engineers' report this year stresses, requires $4.6 trillion. No state, and definitely no so-called Private Public Partnership, can even make a dent in that, much less provide the trillions more required for the required new infrastructure platform of an expanded space program and an aggressive program for developing fusion power.

As for the California water management system, even a couple more dams and reservoirs like the proposed Sites Reservoir and the Temperance Flat dam have a price tag of an estimated $3-4 billion each, and can take as long as ten years to build. That will not do. Only setting the nation on a mission, like President Kennedy did with the Apollo Project, with funding at $2-3 trillion per year for a massive infrastructure building program for water, high-speed rail, fusion, space exploration and thousands of other projects should even be considered. Of course, instituting a Hamiltonian credit system to fund it is the only way that can be done.

China's Belt and Road Initiative, now building projects all over the world, is already a $2 trillion investment in the most massive building program in human history with more than 70 nations now participating. China's financial system, as I have reported on here over the past few weeks, is, ironically, a copy of that American System of Alexander Hamilton we used to have.

If China can do it, so can we.

In this week's report

The Oroville Dam report this week is This week's update on Oroville Dam is a smorgasbord of videos, announcements, action, what is next, an ominous warning, and more.

Wildfires this year have already burned more than triple last year's acreage for this time of year.

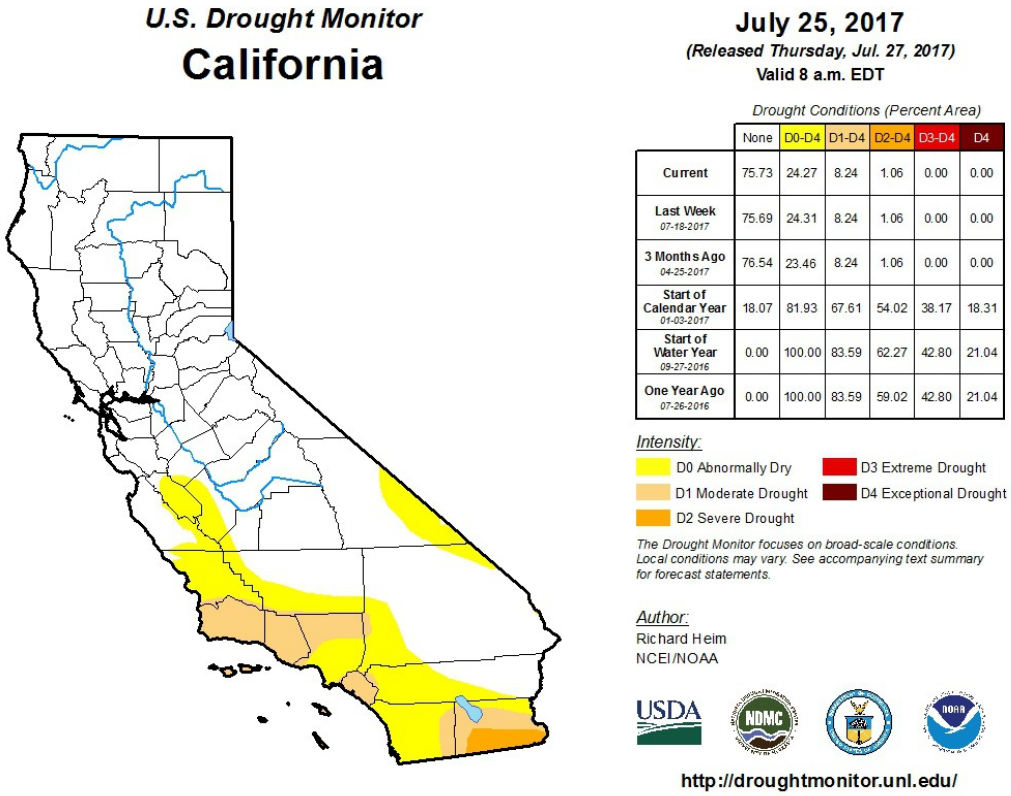
The Delta tunnels, or as Jerry likes to call it the Calfix, moved forward a little this past week with the announcement by the California Department of Water Resources that another permit milestone had been achieve.

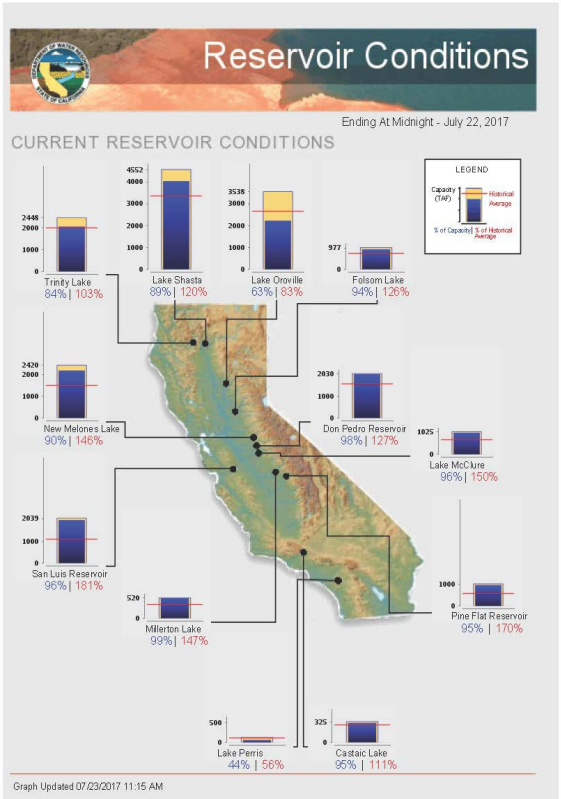
Other Political Developments On the Topic of Water covered this week include a bill passed by the state assembly that will fast-track infrastructure projects, a GOP push to shift state water policy away from conservation, and an update on The State Water Resources Control Board plan to return the San Joaquin River to 40 percent of its “unimpaired flow.”

Then there is a report on the ongoing and future damage from the drought in the subsidence of the land.

Finally, we conclude this week's report with an example of the insanity that demonstrates why our nation is so dysfunctional, but also why the a good part of the population acts like they are all on drugs-- they are.

U.S. Drought Monitor and Reservoir Graph





Oroville Dam Update

This week's update on Oroville Dam is full of videos, announcements, action, what is next, an ominous warning, and more. We begin it with video updates from the Department of Water Resources; three of them.

Videos

Oroville Spillway July 18, 2017

https://www.youtube.com/watch?v=0v9w761zuSc

Published on Jul 19, 2017
Recovery efforts continue on the Lake Oroville spillways project. Concrete is placed between the stay-forms on the lower chute of the main spillway with ongoing excavation and rock cleaning to prepare the spillway's foundation.

Oroville Spillways Update July 20, 2017

https://www.youtube.com/watch?v=megVDiL2kYc&list=PLeod6x87Tu6eVFnSyEtQeOVbxvSWywPlx&index=1

Published on Jul 21, 2017
Kiewit begins pouring concrete on the upper spillway and continues rock cleaning to prepare the spillway's foundation, part of the Lake Oroville spillways recovery project.

Oroville Spillway Update July 25, 2017

https://www.youtube.com/watch?v=IRxQ1_gg9uU&index=1&list=PLeod6x87Tu6eVFnSyEtQeOVbxvSWywPlx

Published on Jul 26, 2017
Electrical towers are removed for relocation and installation begins on drainage pipes for the lower spillway.

Announcements

From the California Department of Water Resources:
Here is the official statement from the department (excerpts):

Final 2017 Construction Plans for Lake Oroville Spillways Project Approved
Updates on other project-related activities
http://www.watereducation.org/sites/main/files/file-attachments/072617construction_1.pdf

SACRAMENTO
– Today, the Department of Water Resources (DWR) provided an update on construction work on the Lake Oroville Spillways Emergency Recovery Project.

DWR received authorization to proceed with its final 2017 construction plan
from the California Division of Safety of Dams (DSOD) and the Federal Energy Regulatory

Commission (FERC) on July 13 and 15 respectively.

The work to be completed this year now has all required approvals from federal, state, and independent oversight groups.

The independent Board of Consultants (BOC) also approved DWR's construction plans last month pending final approval from FERC.

Action

The following item is the best summary this week of the construction that has been done and what the remaining construction schedule looks like. Go to the link for the full article.

Lake Oroville spillway reconstruction still on schedule

By Steve Schoonover, Chico Enterprise-Record

Posted: 07/26/17, 4:53 PM PDT | Updated: 7 hrs ago

http://www.orovillemr.com/general-news/20170726/lake-oroville-spillway-reconstruction-still-on-schedule

Oroville >> Reconstruction of the lower part of Oroville Dam's spillway is on schedule, the state and its contractor said Wednesday.

The spillway will be able to handle releases of 100,000 cubic feet per second if needed on Nov. 1, according to representatives of the Department of Water Resources, the Natural Resources Department and Kiewit, the contractor doing the work.

About 2,270 feet of spillway has been demolished, and it will be rebuilt this year with a combination of structural concrete and roller compacted concrete. The latter doesn't have as much reinforcement but is "acceptable in spillway and dam construction," according to Erin Mellon of the National Resources Department, the communications manager for the project.

A topping of structural concrete will be placed over the roller compacted concrete next year. The top 730 feet of the spillway, which is just being patched this year, will be demolished and replaced as well in 2018.

What people looking at the webcams showing the construction are seeing now is the placement leveling concrete on the bottom 350 feet of the spillway. Structural concrete will be placed over that. The same construction technique will be used on the top 870 feet of the spillway to be reconstructed this year as well.

The space between — 1,050 feet — will be filled with roller compacted concrete. It is already being used to fill the deepest void that was gouged out from beneath the spillway, according to Jeff Petersen, Kiewit's project director, and use of that material should become visible on the webcams soon.

He said construction of the walls on the sides of the spillway should begin in the next couple of weeks.

And the warning

While some of the state's media has regularly covered the reports from Robert G. Bea, "one of the

country's foremost experts on catastrophic engineering failures," on the Oroville Dam spillway failure, most have not. The state's response to his reports and warnings have been a timid "we are looking into it" or "his reports will be forwarded to our official panel.

His most recent report is alarming and I include extended excerpts from one article below, and the actual summary of Brea's report.

Catastrophic engineering expert asks: Is Oroville Dam leaking?

By Ryan Sabalow

Sacramento Bee

July 20, 2017

http://www.sacbee.com/news/local/article162801773.html

One of the country's foremost experts on catastrophic engineering failures released a new report Thursday on the troubled Oroville Dam that asks a disturbing question: Is the country's tallest dam leaking?

State dam managers have insisted for months that there's no problem, and that persistent green wet spots near the top left abutment of the nearly 770-foot-tall earthen dam are nothing more than natural vegetation growth caused by rainfall.

adjusted for the proper clearance over the entire length of the seal."

Oroville Dam Persistent 'Wet Spots'

We have reviewed DWR – DOSD – FERC Oroville Dam inspection reports covering the period 2008 – 2016. These reports contain a series of photographs that show the continued development of 'Leaks' and 'Wet Spots near the dam abutments (Figures 3, 4, 5).

DWR - DSOD, and FERC should be required to focus high quality field investigations and detailed analyses of the results from these investigations to determine and confirm if important seepage is taking place in and around the Oroville Dam. If such threats are confirmed, then proven effective remediation measures should be implemented and validated to assure that the dam is 'Safe' and 'Reliable' for current and future use.

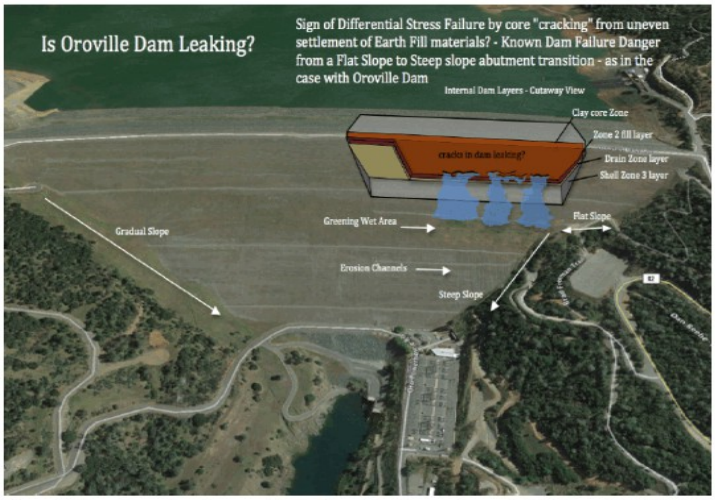


Figure 3: Does the water 'seepage' in the Oroville Dam endanger its Safety and Reliability?

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The report warns that the dam may be "facing a breach danger from a serious and a dangerous form

of a slow-motion failure mode" from persistent leaks in the main dam, perhaps caused by internal shifting of dam fill. The report notes that the sensors embedded in the dam to detect such problems quit working years ago.

"That's scary. But it pays to be afraid," Bea said in an interview. "That doesn't mean you tremble and quake and crawl in the closet and suck on your thumb, but you have to understand there's something here that's potentially very harmful." Bea is a retired engineer whose credentials include conducting an independent investigation into why the levees around New Orleans failed in 2005 during Hurricane Katrina.

Diagram of the "wet spot" area from Robert Bea's report (p. 15)

View the entire document with DocumentCloud

Closer view of the wet spots in the Bea report (p. 16)

View the entire document with DocumentCloud

Bea's report doesn't just sound alarms about potential leaks. It also points to possible problems with the dam's main spillway that may loom hundreds of feet above where a massive crater formed in the concrete chute in early February. The hole in the spillway set off of a chain of events that eventually led to the two-day evacuation of 188,000 people living below the dam.

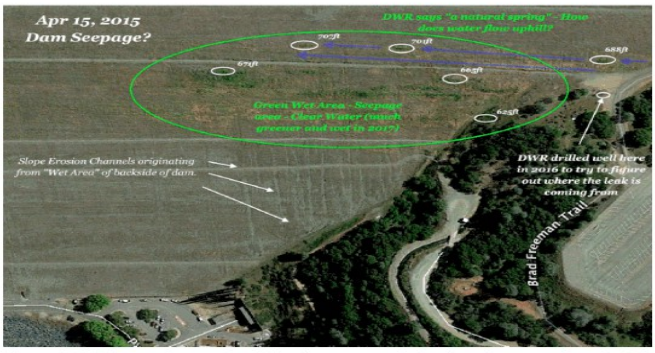

Figure 4: 2015 image of vegetation following an upward elevation slope away from the left abutment. Erosion channels, greenage locations, non-greenage above and below and up the embankment, uphill water flow, contradicts against a left abutment spring. Image courtesy of Google Earth.

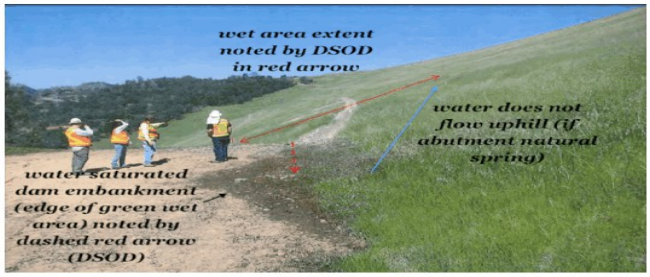

Figure 5: Water does not flow uphill if the dam abutment 'wet spot' is a "natural spring."

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The authors say they have evidence of broken and cracked "anchor tendons" that help support the structure that raises and lowers the spillway gates, allowing for water to gush down the chute. The

report says two 50-year-old steel anchor tendons have already failed and DWR has data showing that 28 more have "crack indicators" in the steel. There are 384 of the anchor tendons in total, the report says.

The report's authors also were troubled by a 14-foot crack growing in a massive five-foot-thick concrete pier attached to the spillway's headworks. The crack has been well-documented in state inspection reports, but the reports don't address whether or not it poses a safety risk.

"If the structural support and anchorages are inadequate to support the gate loadings, catastrophic failure of the gates could occur with catastrophic effects," Bea's report reads.

The report, meanwhile, restates many of the conclusions Bea made in April that shoddy design, construction work and maintenance caused the crater to form in the spillway.

Here is Brea's Summary and Conclusions from his report:

Root Causes Analyses of the Oroville Dam Gated Spillway Failures and Other Developments

Robert G. Beaa
Emeritus Professor, Department of Civil & Environmental Engineering
Advisor, Center for Catastrophic Risk Management Oroville Dam Advisory Group
University of California Berkeley

Tony Johnsonb
Center for Catastrophic Risk Management Oroville Dam Advisory Group
University of California Berkeley

July 20, 2017

http://www.documentcloud.org/documents/3898599-Bea-and-Johnson-ROOT-CAUSES-REPORT.html#document/p15/a363860

Summary of Conclusions

The flaws and defects incorporated into the Oroville Dam Gated Spillway represent accumulated results from the Gated Spillway's Life-Cycle Phases (1965 to February 2017). The Life-Cycle defects include those developed during Design, Construction, Operations and Maintenance (O&M) Phases. Of particular importance in this Root Causes investigations were the Standards, Guidelines, procedures and processes used by the California Department of Water Resources (DWR) and the associated Division of Safety of Dams (DSOD) during the life-cycle phases of the Gated Spillway.

The California Code of Regulations and The California Water Code charge DWR and DSOD with primary responsibilities and accountabilities for specified State Water Supply dams and reservoirs during their lives: "…as to the Safety of design, construction, maintenance, and operation of any dam or reservoir." t

In the April 17th Preliminary Root Causes Analysis reportu and the May 11th Legislative Oversight Testimony reportv, specific defects and flaws in the Gated Spillway were cited and described that could be identified and corroborated based on the photographic evidence and documentation referenced in those reports' references. A summary of the analyses of the

physical causes of the initial failure in the Gated Spillway was provided.

Our Root Causes Analyses investigations have concluded the physical effects of the life-cycle flaws and defects incorporated into the Gated Spillway were highly interactive and cumulative. The interactions resulted in progressive deterioration of the performance abilities of the Gated Spillway and resulted in reduction of its Safety and increases in its Risk of failure. This process continued until the Gated Spillway failed during the early February 2017 Oroville Dam reservoir discharges.

Our Root Causes Analyses investigations have concluded that 'inappropriate'w standards and guidelines, procedures and processes were used by the Department of Water Resources (DWR) and the associated Division of Safety of Dams (DSOD) to evaluate and manage the Riskx of failure characteristics of the Gated Spillway. These standards and guidelines, procedures and processes failed to adequately and properly address Aging, Technological Obsolescence, and Increased Risk of failure characteristics of the Orville Dam Gated Spillway.

Due to the multi-decade 'Loss of Core Competencies', the management of DWR and DSOD failed to provide adequate Management (planning, organizing, leading, controlling), Engineering, Operations, and Maintenance personnel 'skills, knowledge and performance capabilities' and other important 'resources' required to effectively prevent and mitigate the failures of the Gated Spillway.m The Gated Spillway was 'managed to failure' by DWR and DSOD.

In addition, the available evidence indicates validation and approval of the long-term continued use of these 'inappropriate' standards, guidelines, procedures and processes was provided by the Federal Energy Regulatory Commission (FERC). The Gated Spillway was 'regulated to failure' by FERC.

We have received 'redacted' reports released by the DWR Board of Consultants (BOC)y and the DWR Forensic Engineering Team (FET),z and by the U.S. Army Corps of Engineers (USACE) Institute for Water Resources Risk Management Center.aa Also, we have received a report written by Bernard Goguel that provides a summary of his analyses of the initial failure in the Gated Spillway.

Our reviews of the physical causes related to design, construction, operation and maintenance of the Gated Spillway identified in these reports leads us to conclude these findings substantially corroborate those identified in the April 17th Preliminary Root Causes investigation report, summarized in the May 11th Summary and Recommendations report and in this report. These additional reports have provided important additional details and background on the life-cycle Physical Root Causes of the Gated Spillway failures.

The link to one more article on the topic is included here because of the graphic it includes is much more clear:

Speculation about Oroville Dam's 'green spot' grows

Bill Husa — Enterprise-Record file

July 25, 2017

http://www.chicoer.com/general-news/20170725/speculation-about-oroville-dams-green-spot-grows

Robert Bea and his team at UC Berkeley are far from convinced. Bea is a professor emeritus at UC Berkeley and a risk management expert who has been recognized by the U.S. Senate for his review of

disaster management following the BP oil spill and Hurricane Katrina.

He said a lot of thought went into deciding when to publish the findings, if at all. He understands the unrest residents are likely to feel from reading about the report, but in his opinion, the DWR's explanation for the spot warrants posing the question publicly.

"The consequences of not getting the right answer are very high," Bea said. "I don't think anyone should encourage a casual approach."

DWR officials have addressed the spot of vegetation before, chalking it up to the rainy season or calling it a natural spring. Bea said those claims are both problematic.

The much-discussed green spot on the south side of the dam is see in this photo from May 2.

Wildfires

As forecast, wildfires this year is a more than serious, and it will probably get much worse. Already the acreage burned is more than triple that of last year at this time.

Why California's Wildfires Have Burned So Much Area So Early This Season

By Sally Schilling

July 21, 2017

http://www.capradio.org/articles/2017/07/21/why-californias-wildfires-have-burned-so-much-area-so-early-this-season/

California's wildfires have burned more than three times the acreage compared to this time last year.

The intense start is thanks to the thick grasslands left behind after this year's heavy rainfall.

While the rains may be the cause of bigger grass fires this year, they may help prevent the state's alpine forests from burning as badly.

One concern, though, is the more than 100 million trees in the Sierra that have died recently due to the drought and bark beetle epidemic.

The Detwiler Fire is active at night, and a scientist says that's relatively new

By Lewis Griswold

Fresno Bee

July 22, 2017

http://www.fresnobee.com/news/local/article163109348.html

A prolonged drought, tall grasses, steep terrain and erratic winds are making the Detwiler Fire in Mariposa County difficult to get under control, the California Department of Forestry and Fire Protection said.

But something else seems to be at play – high temperatures and low humidity at night are keeping the fire going.

It's unclear if global climate change is to blame, but a professor of fire science at the University of California Center for Fire Research and Outreach said firefighters have been reporting in recent years that wildfires in California aren't slowing down at night like they used to.

The Detwiler Fire, which started July 16, had destroyed 60 homes and burned 75,200 acres as of Saturday morning and was 30 percent contained. Full containment is not expected until Aug. 5.

An air tanker drops fire retardant on a hilltop next to Lake McClure to battle the Detwiler Fire near Coulterville. ANDREW KUHN Merced Sun-Star

Last week, Cal Fire noted that a lack of higher humidity at night was allowing the Detwiler Fire to keep growing. For example, from the evening of July 18 to the next morning, the fire nearly doubled, expanding from 25,000 acres to 45,724.

Temperature drops at night are important to wildfire managers, said UC Berkeley fire science professor Scott Stephens.

People keep saying the fire isn't going down at night. That's something we've been hearing from firefighters since 2008.

Scott Stephens, professsor of fire science at UC Berkeley

"Fires 'lay down' in the night, really subside," he said. "Those night periods are critically important. It's used in a major way in operations."

But based on what firefighters have been telling him in recent years, something seems to have changed, Stephens said.

"People keep saying the fire isn't going down at night," he said. "That's something we've been hearing

from firefighters since 2008."

To date, the pattern has not been the subject of academic study and no research links it directly to climate change, Stephens said.

However, climate research has shown that "worldwide, low temperatures at night are going up," he said. "Night temperatures are warmer than they used to be. That's attributed to climate change."

79 wildfires in Northern California in last 24 hours, most likely sparked by lightning

By Amy Graff, SFGATE

July 25, 2017

http://www.sfgate.com/bayarea/article/lightning-Northern-California-wildfires-Lassen-11383570.php#photo-13211474

Firefighting efforts in the far reaches of Northern California are in lightning mode.

As hundreds of lightning bolts strike the region, CAL FIRE is staffing its lookout towers and sending planes into the air to scour the region for plumes of smoke signaling fires.

"We're out there scanning the area and any smokes that develop we have our resources that can address it," says Cal Fire spokesperson Scott McLean.

From Monday morning through Tuesday morning, 79 fires were counted in Lassen, Modoc and Siskyou counties by CAL FIRE and the U.S. Forest Service, and lightning was likely the cause of most of them, says McLean.

While the conditions are extreme, it could be a lot worse. "This a combination of dry and wet lightning so we have some moisture follow through," McLean says. "In 2008, there were a lot more fires started by lightning."

In 2008, thousands of lightning strikes resulted in 191,294 acres burning.

Jerry Is Happy. But Will It Last?

Here is an excerpt from the California Department of Water Resources on the decision they made on the twin tunnels under the Delta:

California WaterFix Reaches Key Milestone as State Environmental Review Is Certified

July 21, 2017

http://www.water.ca.gov/news/newsreleases/2017/072117waterfix.pdf

> *Clearing another major milestone toward the modernization of the state's water delivery system, the California Department of Water Resources (DWR) today certified the environmental analysis of the California WaterFix. Today's announcement follows recent federal biological opinions that confirm the project is consistent with environmental and wildlife protection standards.*

And the reaction to that announcement by both the proponents and opponents has been gathered by Maven. I do not include here the statements, but only the link to them. Followed by one of the many

editorials that are appearing.

Water agencies and stakeholder groups react to certification of the California Water Fix environmental documents

July 21, 2017 Maven Other News Item

https://mavensnotebook.com/2017/07/21/reactions-water-agencies-and-stakeholder-groups-react-to-certification-of-the-california-water-fix-environmental-documents/

Editorial: Twin tunnel plan ignores delta reality

July 27, 2017

http://www.chicoer.com/opinion/20170726/editorial-twin-tunnel-plan-ignores-delta-reality

Gov. Jerry Brown's cheerleading squad was in high-spirited form Friday with the latest news that his twin tunnels project in the delta inched a step closer to reality.

The state Department of Water Resources gave its approval to the tunnels by certifying the environmental reviews for the project. And really, what did you expect? The DWR answers to Brown, and Brown wants to build those four-story tunnels to funnel north state water from the Sacramento River, under the Sacramento-San Joaquin Delta, to farmers and cities in the south.

Other Political Developments On the Topic of Water

Oroville, other flood-safety projects would be fast-tracked under new bill

By Jim Miller

Sacramento Bee

July 27, 2017

http://www.sacbee.com/news/politics-government/capitol-alert/article163856538.html#storylink=cpy

Work to strengthen Oroville Dam, shore up downstream levees and other types of flood-prevention projects would be eligible for fast-tracked state approval under new California legislation lawmakers will consider when they return from summer recess next month.

The measure by state Sen. Jim Beall, D-San Jose, whose district suffered heavy flood damage in February, would require state agencies to speed up permit processing and approval for certain types of flood-control projects.

Current law already allows authorities to exempt or delay permit requirements during emergencies. Yet other high-priority projects still have to go through the normal permitting process. That leads to delays.

Beall's bill would make several categories of projects "to maintain human life safety" eligible for expedited permitting and approval.

GOP push to shift state water policy away from conservation

By Carolyn Lochhead

July 19, 2017

http://www.sfchronicle.com/science/article/GOP-push-to-shift-state-water-policy-away-from-11298025.php

WASHINGTON — With a friend in the White House and their party in control of both chambers of Congress, House Republicans have embarked on their most ambitious effort yet to change the way water flows in California.

Legislation that the House sent to the Senate last week outlines a bold effort to build big new dams and shift water from fish, birds and other wildlife to farms in the San Joaquin Valley.

The legislation would dry up long stretches of the state's second-longest river, the San Joaquin, and end efforts to restore its obliterated salmon runs. It would downgrade the water rights of the wildlife refuges that make up the last patches of California's interior wetlands.

The bill would speed reviews of five big dam projects in the state, long stalled because of their enormous cost and low water yields. It would drain more water out of the Sacramento-San Joaquin River Delta, override the Endangered Species Act and shift California's control over its water to the federal government by preempting the state's authority to protect fish.

Battle Looms as California Moves to Dedicate More Water to Fish

By Matt Weiser

July 17, 2017

https://www.newsdeeply.com/water/articles/2017/07/17/battle-looms-as-california-moves-to-dedicate-more-water-to-fish

On the heels of the worst drought in California history, state officials are telling water users in the San Joaquin River basin to give up a major share of their water supplies – permanently.

The timing, in some ways, couldn't be worse for farmers who struggled through the drought. On the other hand, the time is right for imperiled salmon that live in the river and its tributaries. This iconic species may not survive the next drought without more water.

The State Water Resources Control Board announced in September that it plans to return the San Joaquin River to 40 percent of its "unimpaired flow." This means the amount of water that would naturally flow through the river without existing dams and diversions.

The goal, according to the water board, is to rebalance water demand on the state's second-largest river. Policy and practice have long favored human water consumption over water quality and wildlife like Chinook salmon, a species in a steep decline for decades.

The board plans a similar process for the Sacramento River, the state's largest river.

To reach the 40 percent goal on the San Joaquin River, hundreds of companies and individuals will have to give up a portion of their right to divert water from the river and three of its tributaries: the Tuolumne, Stanislaus and Merced rivers. The biggest water users are farms and irrigation districts, who use the water to grow crops like almonds, cherries, peaches, apples and tomatoes.

The water board has received more than 20,000 comment letters from supporters and opponents of the flow increase measure. While many of these are form letters generated by interest groups, Grober said

"thousands" are unique letters sent by individuals.

The water board staff is in the process of reviewing all these comments, and will then prepare a revised proposal for the board to vote on by the end of this year.

Modesto and Turlock irrigation districts estimate the streamflow revisions could cost their region $1.6 billion in economic output. They launched a website, WorthYourFight.org, to rally support for their cause.

Subsidence

The record drought, as we have reported often, will leave damage that will cost billions more far into the future. Subsidence, or the sinking of the land is just one area of damage. The following excerpted article provides both some background and a very real example of the damage caused. That is followed by a graphic from the U.S. Geological Survey.

Friant-Kern Canal sinking raising concerns

By RICK ELKINS

July 22, 2017

http://www.recorderonline.com/news/friant-kern-canal-sinking-raising-concerns/article_e6a64238-6e8c-11e7-a789-13522266756d.html

Because of subsidence, water in the Friant-Kern Canal now touches the bottom of the bridge at Avenue 88. Officials are studying how the canal can be fixed.

When water flowing down the Friant-Kern Canal this winter began to hit the bottom of some bridges, officials took serious notice. The canal — between Deer Creek and White River — has dropped as much as two feet in some places because of subsidence.

The 152-mile canal from Millerton Lake above Fresno to just inside Kern County, serves approximately a million acres of farm land delivering much-needed water for irrigation. It also provides drinking water to the cities of Orange Cove and Lindsay, as well as to Terra Bella.

The canal relies on gravity to deliver the water and the subsidence is affecting that gravity flow to where the flow south of Deer Creek is only about 60 percent of the flow north of that.

Subsidence is a dropping of the ground level. It has increased in some areas the last few years because of the drought and groundwater pumping. DeFlitch said it is tied to the Corcoran area where in some areas the drop is more than 15 feet.

DeFlitch said pumping has played a role, but so has geology. He said what is causing the problem is the clay barrier under the surface of much of the Valley has dried and because of that, the clay contracts, causing subsidence.

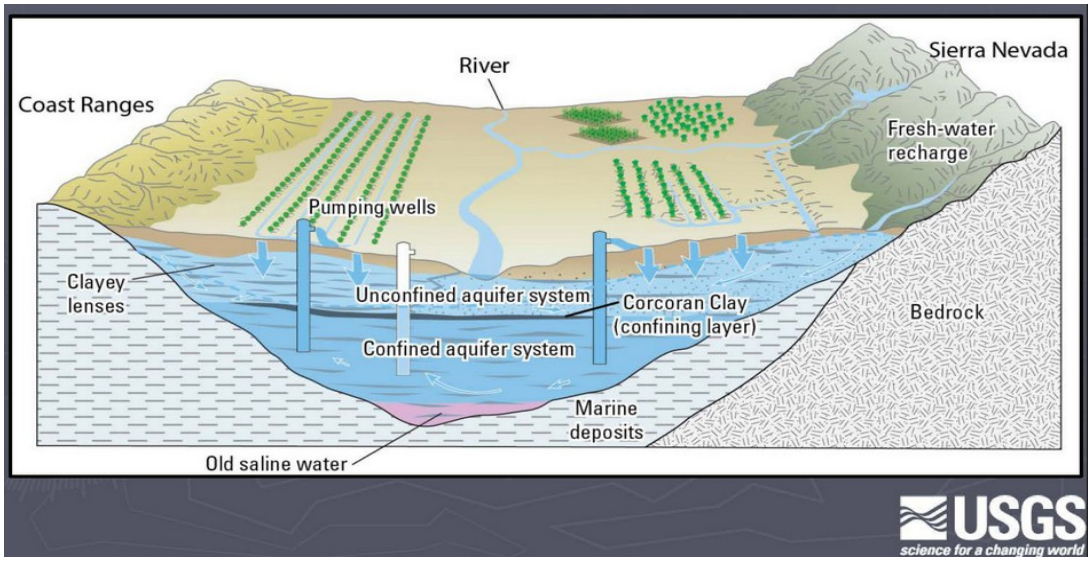
He said the pumping is a direct cause of a lack of water deliveries. The 2014 and 2015 water years, at the height of the drought, saw no water delivered from the canal. That not only hurt recharge efforts, but forced farmers to pump more water from the underground. Now, the slowing flow is reducing the amount of excess water this year from being used for underground recharge efforts in Kern County.

Fixing a major, cement canal that carries water at least nine months out of the year, is no easy undertaking.

"We haven't done any engineering design work," said DeFlitch of the problem which they are just

getting into.

The trick, is not shutting down the canal while there is work, although that is very possible in the area of Deer Creek.



They Are Not Kidding, Unfortunately

California Working to Avoid Recreational Marijuana Shortage

The state's drug czar wants to ensure dispensaries don't run out of legal marijuana once recreational sales begin in California.

Friday 07/21/2017

by Mike Adams

https://merryjane.com/news/california-working-to-avoid-recreational-marijuana-shortage

In an effort to prevent California from experiencing the same kind of shortage of recreational marijuana as Nevada, the state's marijuana czar is working to issue early cultivation licenses to ensure the state's dispensaries are fully stocked when the fully legal sector finally gets underway sometime next year.

The Los Angeles Times reports that Lori Ajax, chief of the Bureau of Medical Cannabis Regulation, told the state legislature earlier this week that it was necessary for the state to issue "temporary, four month licenses" to cannabis farmers in order to prevent "a break in the supply chain."

The majority of production licenses are expected to be granted at the beginning of 2018, but the goal now is to "make sure" that some of the cultivators are able to grow before that time.

Some of the latest reports predict that California's cannabis industry could be worth between $4 billion and $7 billion.