BAY AREA WATER SUPPLY AND CONSERVATION AGENCY

BOARD OF DIRECTORS MEETING

November 16, 2017

Correspondence and media coverage of interest between September 11, 2017 and November 9, 2017

Correspondence

Date: November 8, 2017
From: Nicole Sandkulla, BAWSCA CEO/General Manager
To: Daniel L. Wade, SFPUC Director, Water Capital Projects and Programs
Subject: BAWSCA Comments on Black & Veatch / MJA Technical Memorandum Dated October 25, 2017 'Considerations for Downstream Flow Control of Mountain Tunnel' and Recommendations for Next Steps

Date: October 16, 2017
From: Tom Francis, BAWSCA Water Resources Manager
To: Dan Wade, SFPUC Director, Water Capital Projects and Programs Infrastructure Division
Subject: BAWSCA's Review of the SFPUC's FY 2016-17 Annual Report, Water System Improvement Program

Media Coverage

Water Supply:

Date: November 6, 2017
Source: Monterey Herald
Article: Pure Water Monterey, Marina Coast alternative water supply proposals get attention

Date: November 6, 2017
Source: Capital Press
Article: U.S. climate report forecasts shrinking snowpacks

Date: November 5, 2017
Source; Digital Journal
Article: Atmospheric rivers may increase flood risks by 80 percent

Water Management:

Date: November 8, 2017
Source: Water Deeply
Article: Two Ways Congress Can Create More Incentives for Water Savings

Date: November 5, 2017
Source: California Water Blog
Article: Moving Salmon over Dams with Two-Way Trap and Haul

Date: November 5, 2017
Source: The Mercury News
Article: Opinion: East Bay reservoir plan benefits Silicon Valley economy

Date: November 4, 2017
Source: Bakersfield.com
Article: Opinion: Water data is for fighting

Water Management, cont'd.:

Date: November 3, 2017
Source: Water Deeply
Article: Stanford Study Probes Psychological Resistance to Recycled Water

Date: November 2, 2017
Source: Maven's Notebook
Article: California Fisheries Groups Sue State for Failure to Protect Impaired Waterways

Date: October 25, 2017
Source: High Country News
Article: A flood of drought news can reduce water use

Date: October 6, 2017
Source: Water Deeply
Article: How California Is Learning to Love Drinking Recycled Water

Water Infrastructure:

Date: November 6, 2017
Source: Sacramento Bee
Article: If Jerry Brown can't sell California on two Delta tunnels, would just one fly?

Date: November 6, 2017
Source: Water Deeply
Article: Why Hydroelectric Utilities Are Endangered by Soaring Solar and Wind

Date: November 2, 2017
Source: The Almanac
Article: Creek authority works through options to bolster flood capacity

Date: October 24, 2017
Source: Capital Press
Article: California makes critical repairs in century-old levee system

Water Infrastructure, cont'd.:

Date: October 24, 2017
Source: CBS News
Article: Floods are bad, but droughts may be even worse

Date: October 24, 2017
Source: Sacramento Bee
Article: California Democrats seek new federal probe of water project

Date: October 24, 2017
Source: Red Green and Blue
Article: Congressmen want GAO investigation of federal money siphoned to Delta Tunnels

Date: October 19, 2017
Source: Los Angeles Times
Article: Proposed Huntington Beach desalination plant clears a hurdle with State Lands Commission vote

# # #

BAWSCA
Bay Area Water Supply & Conservation Agency

November 8, 2017

Daniel L. Wade, P.E., G.E.
Director, Water Capital Projects and Programs
Infrastructure Division
San Francisco Public Utilities Commission
525 Golden Gate Avenue, 6th Floor
San Francisco, CA 94102

SUBJECT: BAWSCA Comments on Black & Veatch / MJA Technical Memorandum Dated October 25, 2017 'Considerations for Downstream Flow Control of Mountain Tunnel' and Recommendations for Next Steps

Dear Mr. Wade:

On October 26, 2017, you provided the Bay Area Water Supply and Conservation Agency (BAWSCA) with an electronic copy of a Technical Memorandum (TM) prepared by the San Francisco Public Utilities Commission's (SFPUC) engineering consultant, Black & Veatch / McMillian Jacobs Associates titled "Considerations for Downstream Flow Control of Mountain Tunnel" dated October 25, 2017. It is understood that SFPUC will be presenting this TM to the Commission at its upcoming November 14, 2017 meeting. BAWSCA has prepared this letter to share our review comments and provide two specific recommendations for next steps as part of this discussion.

Review of TM and Proposal for Downstream Flow Control of Mountain Tunnel

The TM presented the engineering consultant's opinion that installation of downstream flow control on Mountain Tunnel would provide performance and operational benefits. Cost and schedule implications estimated by the consultant were included.

The benefits of downstream control as envisioned by the consultant are compelling, yet the construction cost impact is significant, with total project costs increasing by over 50%, from $147 million to $227 million. Annual tunnel maintenance costs are assumed by the engineer to be significantly reduced, yet the engineer neglects to consider that the control facility itself may generate its own list of maintenance concerns that factor into total lifecycle costs. The potential exists for excessive wear and tear on control valves from debris and suspended sediment.

The concept of installing downstream control was introduced to BAWSCA at an August 4, 2017 meeting of the Mountain Tunnel Technical Advisory Panel (TAP), which was initially assembled to review the proposed options for repair of the existing Mountain Tunnel, including consideration of a new tunnel. The potential need for downstream control was met with very little discussion by the TAP. TAP members, while experts on tunnel geotechnical topics, do not consider themselves experts on tunnel hydraulics and hence little time was spent on the matter.

BAWSCA staff present at the TAP meeting asked the SFPUC's environmental consultant if the incorporation of downstream control was factored into their work. In reply, they stated they did not consider downstream control and therefore more environmental review would be required.

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If the SFPUC moves toward this option, they should carefully consider how other pressurized tunnels in California operate. Will higher internal water pressures on the tunnel liner have a negative impact? Will the increased potential for outward seepage from the tunnel into the surrounding geological formations lead to ground saturation and erosion of nearby slopes?

Recommendations

BAWSCA offers the following two recommendations for immediate consideration as part of the next steps in this project.

1. **A more robust cost estimate of total lifecycle cost should be completed as part of the evaluation of this alternative.**

   The cost estimates provided in the TM are preliminary in nature with a high degree of uncertainty. In addition, the assumptions associated with long-term operational costs and cost savings are not clearly presented in a way that enable verification. Given the importance that overall cost plays into the recommendation for downstream flow control, a more robust cost estimate is warranted at this time.

2. **The TAP composition should be expanded to include an expert in large tunnel/pipeline hydraulics.**

   While BAWSCA is persuaded by the advantages of downstream flow control as identified by SFPUC's consultant, BAWSCA believes that an outside expert should review the TM and be asked to comment on (and concur with) the TM's findings and recommendations. The TAP composition, per our understanding, is somewhat fluid, and hence it would be possible for such a person or persons to be brought into this process. That expert should consider the concerns as raised by BAWSCA along with other issues that may factor into an installation decision.

That outside expert review coupled with a more developed cost estimate would give BAWSCA greater confidence in a recommendation to move forward with a downstream control option included as part of the repair design for Mountain Tunnel.

Sincerely,

Nicole Sandkulla
Chief Executive Officer/General Manager

cc: SFPUC Commissioners
Harlan L. Kelly, Jr., SFPUC General Manager
Kathy How, SFPUC Assistant General Manager, Infrastructure
Steve Ritchie, SFPUC Assistant General Manager, Water Enterprise
BAWSCA Board of Directors
BAWSCA Water Management Representatives
Allison Schutte, Hanson Bridgett

BAWSCA
Bay Area Water Supply & Conservation Agency

October 16, 2017

Daniel L. Wade, P.E., G.E.
Director, Water Capital Projects and Programs
Infrastructure Division
San Francisco Public Utilities Commission
525 Golden Gate Avenue, 6th Floor
San Francisco, CA 94102

RE: BAWSCA's Review of the SFPUC's Fiscal Year (FY) 2016-17 Annual Report, Water System Improvement Program

Dear Mr. Wade:

The San Francisco Public Utilities Commission (SFPUC) recently provided the Bay Area Water Supply and Conservation Agency (BAWSCA) a copy the Water Supply Improvement Program (WSIP) Annual Report for Fiscal Year 2016-17 dated September 1, 2017 (2016-17 Annual Report). We have prepared this letter to provide our comments on that document.

In 2016, BAWSCA requested that the SFPUC revise the format and content of the WSIP Annual Report for 2015-2016 (2015-16 Annual Report) to be more inclusive of issues BAWSCA thought were important. The SFPUC responded to BAWSCA's request and did a very good job addressing BAWSCA's concerns as part of the 2015-16 Annual Report. Those changes have been carried over into the 2016-17 Annual Report where again, overall the SFPUC has done a good job characterizing the main aspects of the WSIP performance during the last year. There are, however, a few recommendations that have yet to be incorporated in the report produced, and we ask that they be addressed when you draft next year's report. Also, we have two new requests of the SFPUC based on the information shared in the report.

Previous Recommendations Not Addressed in the 2016-17 Annual Report

BAWSCA's review of the 2015-16 Annual Report included three recommendations which were not implemented in the 2016-17 Annual Report. Our comments below reiterate those recommendations for the 2016-17 Annual Report:

- BAWSCA recommends that the SFPUC include a column in Table 4-1 of the current report (beginning on pg. 24) comparing forecast project schedules to the 2005 project schedules (WSIP baseline schedule) for reader context. This information would offer continuity with the information provided in Section 4– Program Schedule Summary, of the WSIP Quarterly Report (Appendix C).

- BAWSCA recommends that the SFPUC include a column in Table 5-1 (pg. 31) of the report comparing current project budgets to the 2005 project budgets for reader context. This information would offer continuity with the information provided in Section 3–Program Cost Summary, of the WSIP Quarterly Report (Appendix C).
- BAWSCA recommends that the SFPUC include information in the report showing in which years there have been budget and schedule rebaselinings. Again, this is for reader context. (Note: since 2005 there have been 8 years in which rebaselinings have occurred – 2007, 2009, 2011, 2013, 2014, 2015, 2016, and 2017) This information would offer continuity with the information provided in Section 1–Program Description, of the WSIP Quarterly Report (Appendix C).

The above recommendations will add to a reader's overall understanding of how the WSIP implementation has progressed over the years. While these issues are addressed in the WSIP Quarterly Reports, the Annual Report has a broader audience that cannot be expected to regularly follow the WSIP Quarterly Reports. Even though the WSIP is winding down, including this information would be helpful to ensure better understanding and documentation of the program in its final years of implementation.

Requests

In BAWSCA's review of the 2016-17 Annual Report, we identify two matters that we ask to be addressed moving forward:

- Pages ES 1, 10 and Appendix A of the report describe the WSIP Notice of Changes (NOC) Report that documents the February 14, 2017 adopted schedule revisions to three WSIP projects. There is no specific timeframe specified in the AB 1823 legislation for issuance of this report after the Commission adopts changes to the WSIP, only that it be "promptly furnished" to the requisite State agencies. Moving forward, BAWSCA requests that the NOC report be submitted to the state within 3 months following adoption.
- Pages ES4 and 51 of the report indicate that the program schedule is at risk due to possible delays in the Alameda Creek Recapture Project (ACRP), and the Regional Groundwater Storage and Recovery Project (RGSRP) and further indicate that the available funding is likely to cover only a 65% risk confidence level rather than an 80% risk confidence level. The report also indicates that about half of the remaining Directors Reserve fund is reserved for increasing soft costs, leaving much less funding to cover project risks. This information indicates that both a schedule rebaselining and a request for added funding will be coming soon. BAWSCA must be able to convey that risk to our Board, and further, must be able to do so by December 2017. BAWSCA requests that the SFPUC provide the details of the plan(s) for added funding and schedule changes to it as soon as possible so that these changes can be evaluated and the implications conveyed to the BAWSCA Board and member agencies.

BAWSCA would like to receive feedback regarding the willingness of SFPUC to address the above recommendations and requests. Please contact me at (650) 349-3000 if you need further clarification regarding the matters detailed herein.

Sincerely,

Tom Francis
Water Resources Manager

cc: BAWSCA Board Members
BAWSCA Water Management Representatives
SFPUC Commissioners
Harlan Kelly, SFPUC, General Manager
Steven Ritchie, SFPUC, Assistant General Manager, Water Enterprise
Stefan Cajina, No. Coastal Sect., SWRCB, Div. of Drinking Water, Chief Eng.
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Richard McCarthy, California Seismic Safety Commission, Exec. Director
Fred Turner, California Seismic Safety Commission, Structural Engineer,
Allison Schutte, Hanson Bridgett, LLP, Partner

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Pure Water Monterey, Marina Coast alternative water supply proposals get attention
Monterey Herald | November 6, 2017 | Jim Johnson

Monterey – A state Public Utilities Commission judge has left the door open for additional hearings next spring on potential expansion of the Pure Water Monterey recycled water project. That could lead to a smaller California American Water desalination plant or serve as a bridge if the desal project is delayed, even as Monterey Peninsula water officials ponder a Marina Coast Water District proposal to provide an additional temporary water supply.

During CPUC hearings last week to address a number of key desal project issues, Judge Gary Weatherford suggested the Pure Water Monterey expansion proposal could be addressed in more detail at subsequent hearings, perhaps in April, if a formal request is made. Planning and Conservation League representative Jonas Minton indicated he would make the request, according to Peninsula water activist George Riley, who is a formal participant in the CPUC's desal project proceeding.

"I think it's exciting because there are low-cost options out there for ratepayers," Riley said.

Riley said Monday that Minton had been advocating for additional consideration of alternative water supplies for the Peninsula for more than a month. He added that there "seemed to be a lot of interest" in additional hearings on the issue during last week's hearings at CPUC headquarters in San Francisco. He acknowledged the additional hearings could end up delaying the CPUC's schedule for considering a permit for the Cal Am desal project, further underscoring the need for a fall-back position.

Monterey Peninsula Water Management District general manager Dave Stoldt told the Peninsula mayors water authority technical advisory committee during a meeting Monday that the district board and the Monterey One Water board would be asked this month to authorize spending $480,000 on additional analysis and preparatory work for the Pure Water Monterey expansion proposal in advance of possible hearings.

Last month, Monterey One Water submitted testimony to the CPUC outlining potential expansion options for the current Pure Water Monterey advanced water treatment plant. The plant is designed to produce 3,500 acre-feet of water per year as part of the effort to create a new Peninsula water supply in conjunction with Cal Am's proposed desal plant to offset the state-ordered cutback in pumping from the Carmel River.

The expansion options ranged from a $6.9 million, 650-acre-foot per year expansion to a $51.6 million, 2,250-acre-foot per year addition to a $132.9 million, 3,570-acre-foot per year doubling of the plant capacity.

Meanwhile, water authority executive director Jim Cullem asked the committee to weigh in on Marina Coast proposals to temporarily sell about 1,700 acre-feet per year in additional water to the Peninsula through the water management district and the Seaside basin watermaster to further meet the Peninsula's water demand over the next 6-10 years. The Marina Coast proposal emerged as a result of talks between the water district, which has opposed the desal project and claimed its slant feeder wells would negatively impact its underground water supply,

and the authority, water management district, Monterey One Water, city of Marina and Cal Am. The proposal is aimed at avoiding threatened litigation and the resulting cost and delay.

Combined, the recycled water and Marina Coast proposals with Cal Am's authorized Carmel River allocation would provide nearly 11,000 acre-feet of water supply per year for the Peninsula, which is already using less than that.

Cullem said the committee will recommend the water authority board continue talks with Marina Coast while also advocating for timely CPUC approval of the Cal Am desal plant. He said the authority needed to "hedge its bets" and continue talks with Marina Coast. He also expressed concern that new discussions around alternative water supplies could affect the overall CPUC schedule and the ability to meet the state water board's cutback order milestones.

But committee member and Coalition of Peninsula Businesses representative John Narigi blasted any suggestion the authority should support anything but the Cal Am desal project, especially given the time and effort already devoted to backing the proposal. Narigi said it's "crazy" the community isn't united on a water supply solution after so many years of shortages. He even suggested the community might only wake up if the cutback order went into effect and that perhaps the Peninsula should return to the defunct regional desal project.

Currently, Cal Am project manager Chris Cook said the schedule calls for CPUC approval by June 30 next year, just three months before the cutback order's Sept. 30 milestone deadline. The CPUC has said it expects to release a final combined environmental impact document by mid-March, and could certify the document by mid-April.

The increasing attention to alternative water supplies come amid increasing concerns Cal Am's proposed desal project could be delayed or even scuttled by litigation, and discussions about a downsized 4.2 million gallon per day desal plant even smaller than the currently proposed 6.4 mgd plant, which was reduced from 9.6 mgd as a result of the approval of the Pure Water Monterey project.

# # #

U.S. climate report forecasts shrinking snowpacks

The National Climate Assessment projects snowpacks in Oregon, Idaho, Washington and California will be much smaller by 2050

Capital Press | November 6, 2017 | Don Jenkins

Snowpacks in Oregon, Idaho, Washington and California and are expected be much smaller by mid-century if greenhouse gas emissions continue to rise, according to federal projections released Friday.

The Fourth National Climate Assessment, completed once every four years, asserts that the mild winter of 2014-15 may have foreshadowed the future.

“As a harbinger, the unusually low Western U.S. snowpack of 2015 may become the norm,” according to the report.

The highly anticipated assessment, written by government and university scientists, reports that average temperatures globally and in the U.S. have risen by 1.8 degrees since 1885. The report concludes that it’s “extremely likely” human-released greenhouse gases are the main cause.

In the Northwest — Oregon, Idaho and Washington — average temperatures are projected to rise by mid-century by 3.66 to 4.67 degrees, depending on different levels of carbon emissions. Temperatures in California and five other southwest states are projected to rise by 3.72 to 4.80 degrees.

The heating up is projected to continue in the latter half of the century, with average temperatures in the West expected to be about 8.5 degrees higher than current norms by 2100.

The low snowpack of 2015 preceded one of Washington’s most severe droughts. The warm winter was caused by natural forces, not human-caused climate change, but Washington State Climatologist Nick Bond said the odds of such winters occurring will increase as baseline temperatures rise.

“It wasn’t global warming, but it was a dress rehearsal for it,” he said. “We know the times they are a-changing, and they already have to a certain extent.”

As winter temperatures increase, the percentage of precipitation that falls as snow will decrease. The snow that does stick will melt earlier in the spring, potentially disrupting water-management practices, according to the assessment.

In a high-emissions scenario, the average winter snowpack in the Cascades will have 41 percent less water by 2050 and 90 percent by 2100. The Sierra Nevada, Klamath and Wasatch mountains are projected to have similar declines in snowpacks.

Precipitation is projected to increase in some places but decrease in other places. The northern U.S. is expected to have more precipitation in the winter and spring, according to the assessment.

“If we use our resources wisely, I could imagine for at least awhile, we’ll have enough water to get by,” Bond said.

Growing seasons may be extended, with the time between frosts increasing by a month or two, according to the assessment. The report warns, however, that new invasive weeds may thrive and that increased demand for irrigation could exceed the water supply.

Even in places that do get more rain, soils are expected to be drier because evaporation likely will outpace precipitation, according to the assessment.

The number of large forest fires has been increasing in the West since the 1980 and that trend is expected to continue. Fires may also be held back if drought and insect infestations stunt forests, according to the assessment.

# # #

Atmospheric rivers may increase flood risks by 80 percent
Digital Journal | November 5, 2017 | Karen Graham

In a first-of-its-kind study, the global effects and impact of atmospheric rivers on rainfall, flooding, and droughts have been estimated for the first time. The study reveals that in some regions, the risks can be increased by as much as 80 percent.

Many places around the globe depend on atmospheric rivers (ARs), narrow bands of water vapor in the atmosphere that are propelled by jets of air swirling high above the Earth, for access to water. ARs can carry water vapor across the planet's oceans, on to the continents and as far as the polar regions.

These "rivers" can change weather conditions instantly, causing flooding in one region and drought-like conditions in another. Oxford University, in collaboration with NASA's Jet Propulsion Laboratory and other researchers, attempted to look at the bigger picture by mapping the global network of these aerial rivers and the extent of their effect on the planet.

Persistently heavy rainfall across western and central Europe has swollen rivers and claimed victims from at least four countries

Atmospheric rivers can cause extreme weather events

As extreme weather events, ARs expose almost 300 million people annually to flooding and droughts. And while the overall numbers may seem small, the ARs still create an enormous impact. Think about this - A strong AR weather event can transport a volume of water vapor equal to 7.5–15 times the average flow of liquid water at the mouth of the Mississippi River.

Most readers will remember the "Pineapple Express" that battered California in February this year. The atmospheric river event produced evacuation orders, water rescues and dangerous flooding and mudslides, causing millions of dollars in damages and the lives of a number of people.

The AR event was dubbed the Pineapple Express because of its apparent ability to bring moisture from the tropics near Hawaii to the U.S. west coast. Actually, from 30 to 50 percent of the annual precipitation in the West Coast states in the U.S. occurs in just a few AR events, and this contributes to the region's water supply.

So while some regions of the globe depend on ARs to replenish needed water, these same events can also create sometimes devastating floods and other damages, including the destruction of critical infrastructure, loss of income or even death.

Findings from the study

Using a database of specialized satellite observations which represent only water vapor, and not winds, the researchers were able to create a picture of the volume of water generated, and the effect on stream flow, soil moisture and snow levels. In turn, they were then able to identify areas where ARs have a major impact on flooding or drought.

Homero Paltan, the study’s lead author and a researcher at Oxford’s School of Geography and the Environment, said: ‘By incorporating demographic data into our study, we have found that, globally, a large number of people are exposed to hazards that stem from atmospheric rivers. They have a considerable impact that we're only beginning to understand and measure.’

Precipitation from atmospheric rivers contributes to 22 percent of the Earth's total water flow. And in some regions, like the east and west coasts of North America, Southeast Asia, and New Zealand, ARs can contribute to as much as 50 percent of the water flow.

Globally, it was also found that ARs can increase the likelihood of flood or drought hazards. Flood hazards can be increased by up to 80 percent in areas where they are most common, and in areas where rivers have little influence, the chance of a drought can be increased by as much as 90 percent.

Duane Waliser, chief scientist of the Earth Science and Technology Directorate at NASA's Jet Propulsion Laboratory in Pasadena, California and the paper’s co-author, said: " The findings provide added impetus for considering improvements to our observing and modeling systems that are used for forecasting atmospheric rivers.’

The study, "Global Floods and Water Availability Driven by Atmospheric Rivers," was published in the journal, Geophysical Research Letters.

# # #

Two Ways Congress Can Create More Incentives for Water Savings

Western legislators can be leaders on two critical issues: water-saving tax reforms and funding the EPA's WaterSense conservation program, says Kerry Stackpole of Plumbing Manufacturers International.

Water Deeply | November 8, 2017 | Kerry Stackpole

Congress has a marvelous opportunity as members negotiate the various elements of tax reform and the federal budget. Our senators and representatives have the chance to revise tax rules to reward consumers who save water and to authorize the United States Environmental Protection Agency (EPA)'s WaterSense program, which has saved 2.1 trillion gallons of water over a little more than a decade. Authorization, or codification, would provide the WaterSense program with greater permanence by giving it a direct annual congressional appropriation rather than leaving its annual budget up to the EPA's discretion.

Members of Congress from California and other Western states can lead this advocacy, which can benefit the whole country. Federal tax reform related to water efficiency rebates and WaterSense authorization can create more incentives for water savings across the entire nation, saving the necessity for a state-by-state approach to this challenge.

Making rebates received for water conservation improvements exempt from federal income tax is "win-win" thinking. Right now, if you receive a $100 rebate for installing a water-efficient toilet you must pay federal taxes on it. That should change.

The bipartisan Water Conservation Rebate Tax Parity Act (H.R. 448/S. 1464) amends federal tax law to exclude homeowners from paying income tax on rebates from water utilities for water conservation improvements, including the purchase of manufactured products certified by the EPA's WaterSense program. This legislation is sponsored by Jared Huffman (D-California) and Dana Rohrabacher (R-California) in the House and Dianne Feinstein (D-California) and Dean Heller (R-Nevada) in the Senate.

WaterSense is a voluntary public-private sponsorship program that encourages the use of water-efficient toilets, showerheads, faucets and other plumbing products – most of which are manufactured by U.S. companies. More than 21,000 product models bear the WaterSense label. While saving 2.1 trillion gallons of water since 2006, WaterSense has enabled consumers to keep more than $46.3 billion in water and energy bill savings in their pockets. As a result, the program enjoys bipartisan support in Congress, as well as from plumbing manufacturers, retailers, water utilities, state and local governments and nongovernmental organizations.

The savings achieved by WaterSense, while impressive, would be even greater if more American homeowners and businesses installed water-efficient plumbing products. A 2017 research study released by Plumbing Manufacturers International (PMI) and the Alliance for Water Efficiency showed that water-efficient toilets could save up to 170 billion potable gallons of water per year across just five states – Arizona, California, Colorado, Georgia and Texas – all facing water scarcity due to drought, regional population growth and other factors.

Unfortunately, many homes in these states and elsewhere still do not have plumbing products that meet federal water-efficiency standards. And even more do not have WaterSense products, which are certified by an independent third-party laboratory to save 20 percent more water than

those meeting federal standards. A 2015 PMI-commissioned study conducted by GMP Research found that only 7 percent of toilets, 25.4 percent of faucets and 28.7 percent of showerheads installed nationwide were WaterSense models.

The plumbing manufacturing industry and its allies have been fighting hard recently, not only to create awareness of the underutilization of water-efficient plumbing in efforts to save water, but also to spare the WaterSense program from threatened budget cuts and gain much-needed authorization for the program.

The U.S. EPA Office of Inspector General agrees with us about the program's value, having recently deemed WaterSense "a sound model for voluntary programs" in an August 1 report that evaluated EPA controls assessing the accuracy of the program's annual accomplishments and the program's claims of water and energy savings.

Three bills have been introduced that include language providing WaterSense authorization: the Water Efficiency Improvement Act of 2017 (S. 1700), the Clean, Safe, Reliable Water Infrastructure Act (S. 1137) and the Water Advanced Technologies for Efficient Resource Use Act of 2017 (H.R. 3248).

WaterSense is a federal program that has achieved quantifiable water and energy savings, a rave review from the EPA inspector general and bipartisan support. Let's reward this strong track record with authorization and consumer relief on rebate taxes – and set an example of how to encourage all Americans to save water.

# # #

Moving Salmon over Dams with Two-Way Trap and Haul

California Water Blog | November 5, 2017 | Peter Moyle and Robert Lusardi, UC Davis Center for Watershed Sciences

Removing Shasta Dam is the single best action we can take to save California's wild salmon. Not possible, you say?

Then there are two alternatives.

One is to provide plenty of cold water and diverse, highly managed habitat below dams. The other is to transport fish to now-inaccessible habitat above dams.

(A third option might be improved management of hatcheries; however, to avoid the pitfalls of domestication that come with hatchery production, our focus is on wild, naturally spawning fish.)

The focus of management today involves regulating dam releases to manage flow and temperature, as well as creating new habitat for spawning and rearing, such as floodplains. Central Valley salmon are so far not doing well under this option.

The second option is being proposed by fisheries agencies (mainly NMFS), moving fish above the dams. Seventy percent of all salmon habitat is now above impassible dams. Given that it is nearly impossible to construct fish ladders over California's large dams, current management proposals involve what we call "two-way trap and haul".

Basically, adult fish are trapped below dams, then trucked and released in rivers above dams. If the transported fish spawn successfully, juveniles are then trapped as they move downstream to lower sections of river or into a reservoir. After trapping, juveniles are trucked for release below dams, allowing them to migrate to sea.

Sound good? Well, there are some problems to overcome.

First, many adult fish die after being transported, due to stress and other factors. This issue has largely been resolved, however, and there are many success stories of transporting adult salmon over barriers.

Second, habitat conditions above dams are different from historical conditions. In California, most of these upstream rivers have been without salmon, and the influx of ocean nutrients they provide, for 60-70 years. Besides water quality, other changes to upstream habitat can include stream flow, temperature, channel morphology, and potentially competing resident fishes (including introduced species such as brown trout).

Third is the difficulty of capturing out-migrating juveniles before they reach the reservoir. Juvenile traps must work under a wide range of reservoir surface elevations and during sudden high flow events, when most juveniles move downstream. Juvenile capture is among the most difficult hurdles to overcome and capture rates are low. The current favored proposal for the McCloud River is a trap at the mouth of the McCloud River. To keep the water cool enough for salmon, a temperature curtain is proposed, based on modeling, which will prevent cool water from sinking until it is past the collector.

Fourth is the problem of releasing captured juvenile salmon after transport and expecting them to survive in the river after the stress of capture and transport. These fish also must face all the

below-dam problems that non-transported fish face during outmigration, including passage through the Delta, degraded water quality, and predation.

Overcoming these problems is essential to making two-way trap and haul work. NMFS proposes this technique to establish above-dam populations of Central Valley steelhead, spring-run Chinook salmon, and winter-run Chinook salmon, all listed under state and federal endangered species acts (ESAs).

Steelhead should not be included in this list because they do not need the protection of the ESAs for complex reasons. Also, most reservoirs support steelhead-like rainbow trout that live in the reservoirs and migrate up tributaries to spawn, likely making it more difficult for introduced steelhead to establish. Some reservoirs also have land-locked populations of Chinook salmon.

Spring-run and winter-run Chinook need additional protection at all life history stages, including the need to have multiple populations across the landscape. Thus, two-way trap and haul seems to have potential to aid that aspect of recovery. The requirements of the two runs are somewhat different, so we focus on winter-run Chinook salmon because it is also the main focus of NMFS efforts.

The urgency of developing new approaches for winter-run conservation increased during the 2012-2015 drought, when low flows, combined with mismanagement of the coldwater pool in Shasta Reservoir, resulted in the near-extirpation of naturally spawned fish in the Sacramento River. The run was saved mainly by a hatchery program at the Livingston Stone facility below Shasta Dam.

Of all the Chinook salmon runs in California, Sacramento winter-run is the most distinctive by genetics and habitat requirements. Here is a salmon that lives at the southern end of the range of the species, yet it incubates its eggs, the most temperature-sensitive life stage, during the hot days of summer. Originally, it accomplished this amazing feat by spawning in the McCloud River. Historically, the McCloud was a good-sized, cascading river, fed by giant cold-water (7-8°C) springs all year around. Winter-run spawned in the McCloud so their young would hatch during late summer when there would be little competition from the young from other salmon runs. Eventually they would migrate downstream to the productive Pit River, which in turn flowed into the Sacramento River. Small juveniles likely reached the Sacramento Valley in time to catch the annual flooding of riparian lands and forests, where food and cover were abundant so fish could grow fast and fat. As floods receded, winter-run moved off the floodplains, down the river, and out to sea.

Of course, winter-run Chinook were not alone. The McCloud River in the 19th Century was regarded as the most productive salmon stream in California and was the site of the first fish hatchery in the state. All four runs of Chinook salmon spawned there, as did steelhead. There was almost a continuous influx of spawners, with juveniles of many ages and sizes rearing and then moving out as conditions permitted. One indication of the unique nature of the McCloud is that it was the only river (as far as we know) to support bull trout, a cold-water loving trout that preyed upon abundant juvenile salmon. It is now extirpated from the river and the state.

But the historic McCloud River is no more. Over 80% of the cold spring water flowing into McCloud Reservoir is diverted for hydropower production, making the river below the dam smaller and the water somewhat warmer. Below-dam tributaries increase flows in the main river and create a more natural river flow regime, including flood events. Shasta Reservoir covers

the lowest and presumably once-most productive reaches. The Pit River is a staircase of hydropower dams. Winter-run Chinook have survived by establishing a population in non-historical habitat immediately below Shasta Dam, where cold water releases from the reservoir are managed for their continued existence.

Today, winter-run Chinook depend on these flows and on gravel dumped in the river below Keswick Dam and Red Bluff to improve spawning. As a backup, a few are reared through their entire life cycle at the Livingston Stone Hatchery at the base of the dam; the hatchery has chillers to keep the water cold.

Winter run Chinook are in a desperate situation; they are on the brink of extinction, especially as wild fish. Hence, they are NMFS' prime candidates for two-way trap and haul, between the Sacramento and McCloud rivers. Presumably, the operation will be conducted initially as an experiment, to see if a back-up population can be established that can persist through years of severe drought. This will not be easy.

Here are a few of the problems that must be dealt with in tandem:

The McCloud of today is a smaller, shorter river than the original river and it has not been fertilized by salmon for 70 years.

The McCloud River supports substantial populations of potentially competing rainbow and brown trout.

Capture of out-migrating juveniles will require a trap in or just above the reservoir that can work during rapid reservoir fluctuations and during all flows, including high flows.

The release program for captured juveniles must result in survival rates as high or higher than naturally spawned fish in the Sacramento River.

The trap and haul program should not take funds and effort away from improving habitats for rearing and migration in the Sacramento River corridor.

Despite these problems, it is likely that a two-way trap and haul program for winter-run Chinook salmon will be established soon. A pilot study is a top priority action for NMFS in California. We recommend that such a program not be tried on other runs of salmon until it can be demonstrated that the winter-run Chinook program works successfully. Success should be clearly defined and measured against objective and quantifiable pre-determined criteria. Ultimately, the recovery of winter run Chinook, and other fishes, will depend on improved/expanded riverine and floodplain habitats, such as proposed in the salmon resiliency strategy of the California Natural Resources Agency. The alternative is either extinction or maintaining winter-run Chinook salmon as a domesticated oddity.

Peter B. Moyle is a UC Davis Professor Emeritus of fish biology and an associate director of the Center for Watershed Sciences. Robert A. Lusardi is a researcher at the Center for Watershed Sciences and is the CaliforniaTrout-UC Davis Wild and Coldwater Fish Scientist.

# # #

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Opinion: East Bay reservoir plan benefits Silicon Valley economy
The Mercury News | November 5, 2017 | George Miller

With California's Mediterranean climate and frequent droughts, water storage has helped keep our economy strong and meet the public's need for water.

Unfortunately, in the past, some reservoir projects have included waste-inducing subsidies and caused severe environmental damage, especially to California's salmon, and to the communities and fishing jobs that depend on them.

Dam proponents have long promised environmental benefits. But those promises have often proven to be illusory, as illustrated by the harm dams have caused to the Trinity, San Joaquin and other rivers.
Today, however, new storage approaches can benefit the environment and the economy. That trend is exemplified by the Contra Costa Water District proposal to expand Los Vaqueros Reservoir, potentially in partnership with the Santa Clara Valley Water District, East Bay Municipal Utility District, the San Francisco PUC and other agencies.

Retired U.S. Rep. George Miller (Kristopher Skinner/Bay Area News Group)
The state should support this innovative project by awarding it funds to pay for the project's public benefits.
Federal law encourages projects like the Los Vaqueros expansion. To restore balance to federal water management in California, Congress 25 years ago passed and President George Bush signed the Central Valley Project Improvement Act (CVPIA).

The Act, which I co-authored with Sen. Bill Bradley, established fish and wildlife protection as a "project purpose" of the federal Central Valley Project, the nation's largest water project. CVP dams had prevented Sierra Nevada snowmelt from reaching Central Valley wetlands. To repair this damage, the CVPIA provided initial water supplies for wetland refuges and required the Bureau of Reclamation to purchase additional water for wetlands. For 25 years, the Bureau has struggled to meet this mandate.

The CVPIA also began to replace waste-inducing federal agricultural water subsidies with what is now called the "beneficiaries pay" approach to water financing.

Contra Costa Water District's proposal to expand the existing Los Vaqueros Reservoir reflects the CVPIA's balanced approach. The project would devote half of its new water to wetlands and refuges. This would represent, by far, the largest contribution of new water to meet the needs of Central Valley wetlands.

In contrast with the broken promises of the past, Contra Costa's project would provide important benefits for millions of migratory waterbirds and endangered species harmed by lost and degraded habitat.

The other half of Contra Costa's project is just as smart. During the recent drought, cities learned the value of dry-year water supplies, close at hand, to provide for local residents and

businesses. The Bay Area conserved aggressively during the drought. But we still need reliable supplies when winter rains don't arrive.

Devoting half the water from the Los Vaqueros expansion to local dry-year supplies can strengthen our region, from Silicon Valley to San Francisco, without changing the benefits the existing reservoir provides to the East Bay. As a result, Bay Area water agencies are willing to pay their fair share of the project's costs to reflect the benefits they would receive.

The result is a truly balanced project with economic benefits to be financed by water users and environmental benefits that should be paid by the public. These latter benefits should be financed from the $2.7 billion in state bond funds that will be awarded by the California Water Commission to storage projects with public benefits.

California's strong economy and support for the environment show that these values are not in conflict. Far from it. Twenty-five years ago, the CVPIA established balanced water policies to benefit both Central Valley wildlife and Silicon Valley workers. The Los Vaqueros project shows the real-world application of that approach.

# # #

George Miller, D-Martinez, represented Contra Costa County in the U.S. House of Representatives from 1975 to 2015. Along with then-Sen. Bill Bradley, D-N.J., he authored the Central Valley Project Improvement Act. He wrote this commentary for the Bay Area News Group.

Opinion: Water data is for fighting
Bakersfield.com | November 4, 2017 | Joe Mathews

If you thought California's water wars were bitter, just wait until you see our water data wars.

Digital tools have expanded the ability of governments, companies and nonprofits to measure the uses of California water, and thus build more water-efficient products, boost water conservation, and replace expensive and inefficient infrastructure.

But the abundance of water data effectively makes every piece of land and every drop of water in California the subject of measurement—and conflict. The data also exposes the fragmentation and deficiencies of California's system of water management.

The state's new conservation requirements add to the stakes of the arguments over data. As Californians struggled to save every drop of water during the recent five-year drought, the state for the first time imposed mandatory restrictions on water use—requiring that 400 local water agencies figure out how to reduce usage by 25 percent in 2015. That shift, following 2009 legislation setting a goal of reducing urban per capita water use by 20 percent by 2020, is changing the way Californians fight over water—away from historic battles over dams, and toward new battles over maximizing the water we already have.

Among the questions to which new data is being applied: What incentives will convince most people to remove their grass lawns and, if they do, how much water do those removals save? How much water do efficient toilets and appliances really save? Exactly how much water are we losing to leaks—and where can we make the most efficient investments to stop them?

Then there's a bigger-picture quandary: can data help integrate our water use with our electricity and gas use—making ourselves so efficient that we effectively mitigate the effects of climate change?

That promising thought is mixed with real questions about the accuracy of the data we do have. How precisely are we measuring, for example, evapotranspiration—the process by which water is transferred from the land to the atmosphere both by evaporation from soil and by transpiration from plants? And how accurately are we measuring our land—in terms of how much has landscaping on it—to determine how much could be replaced by more water-efficient plantings?

This is not easy work. When a state pilot project tried to measure landscape, it found that among 20 water agencies, there was no consensus on defining landscape areas or how to calculate them. Similar questions worm through other data, both at local and state level.

These issues are not petty—they are questions of justice. How much water savings can we demand from farmworker housing that draws on groundwater in the fields? Or how do you measure the right use of water on a large public park with multiple water meters?

In this context, the highly publicized controversy over the California Water Fix—Gov. Jerry's Brown proposal to build tunnels under the Delta to convey water to the San Joaquin Valley and Southern California—feels like an anachronistic repeat of decades-old dramas about dams and peripheral canals. The more important fight today is over who controls the data and what it justifies.

This newer fight has lately involved legislation—SB 606 and AB 1668—that seeks to establish a management regime to realize the governor's framework for "making water conservation a California way of life." Much of the energy of the fight is over bureaucratic control—what powers will the state have to set standards, and what powers will be left to regional or local agencies? But questions over data shadow every piece of the bills.

Younger, tech-savvy water players say that much of the data undergirding California water use is old or faulty. In an open letter to Governor Brown this summer, Patrick Atwater of the L.A.-based nonprofit ARGO wrote that state water agencies don't have accurate land use information, don't have landscape area definitions, and don't have accurate service area boundaries for local water retailers.

"There is an urgent need to modernize how California's water agencies manage data," he wrote, adding, "Achieving the broader urban water efficiencies will require creativity and finesse, not simply command and control regulation." ARGO called for a one-year task force to focus on developing better-quality data and designing a 21st-century system of water governance, with more local control and management.

Such a transformation would be welcome. But it may be a long way off. For now, more data means more water wars.

# # #

Stanford Study Probes Psychological Resistance to Recycled Water

While most Californians are in favor of using recycled water for nonpotable purposes, research has found that only 11 percent would drink it. A Stanford study examines the reasons why and the policy implications.

Water Deeply | November 3, 2017 | Mitch Tobin

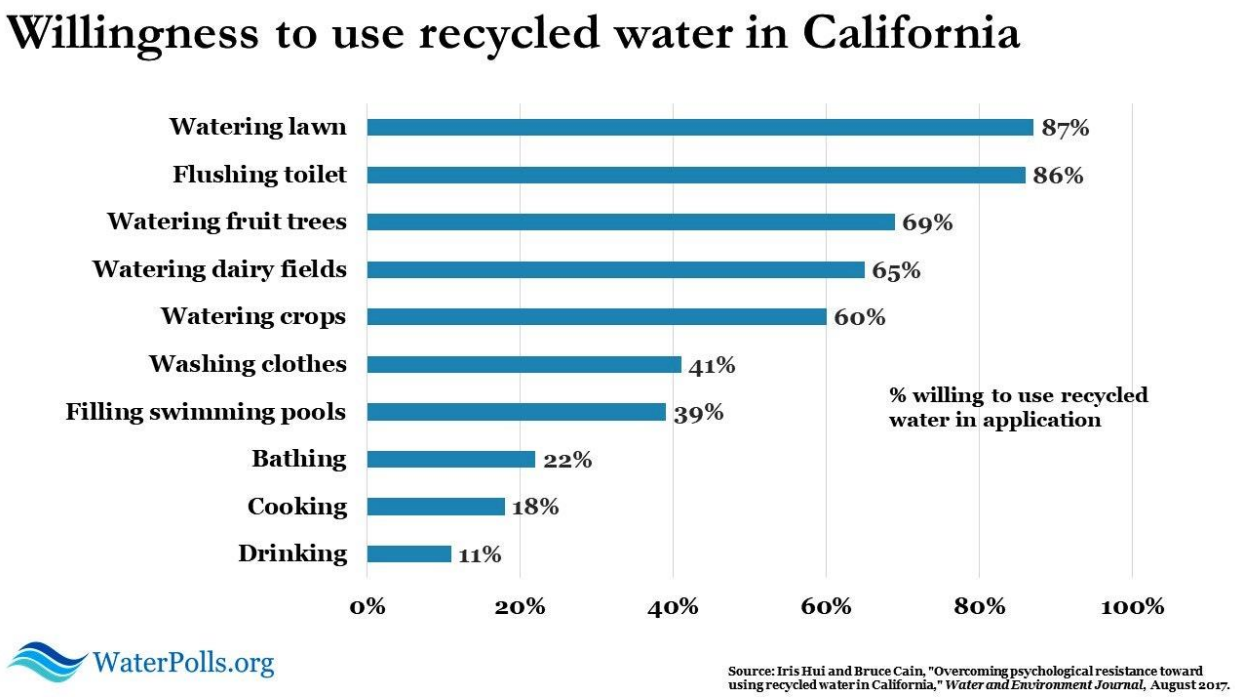
Stanford researchers have found that Californians' views on recycled water depend heavily on how that water is eventually used.

The study, which appeared in the August 2017 issue of Water and Environment Journal, revealed that psychological resistance to using treated effluent can be reduced, to some extent, by explaining the treatment process to people and informing them of an existing program in Orange County.

"In short, adding positive claims boosts support for using recycled water to some degree," according to the study, "but the public remains resistant to using water that involves ingestion or personal contact."

The paper, based on a 2015 internet survey of 1,500 Californians, was authored by political scientists Iris Hui and Bruce Cain, who are affiliated with Stanford's Bill Lane Center for the American West.

The graphic below, which I created based on the study's data, shows that nearly nine in 10 Californians are willing to use recycled water for watering lawns and flushing toilets. It's a different story when it comes to skin contact or consumption. Only about one in five Californians approve of bathing in recycled water or cooking with it. Just 11 percent say they're willing to drink recycled water.



Demographic Differences

Analyzing social and demographic factors, Hui and Cain concluded that males are generally more willing to use recycled water than women. Self-identified Democrats are less resistant to using recycled water than Republicans or Independents. Republicans appear less willing to embrace the technology because GOP voters are three times less likely to see climate change as a serious threat, and they're more skeptical of government attempts to regulate the water supply. "Given the psychological stigma that recycled water has for many people," Hui and Cain write, "the willingness to

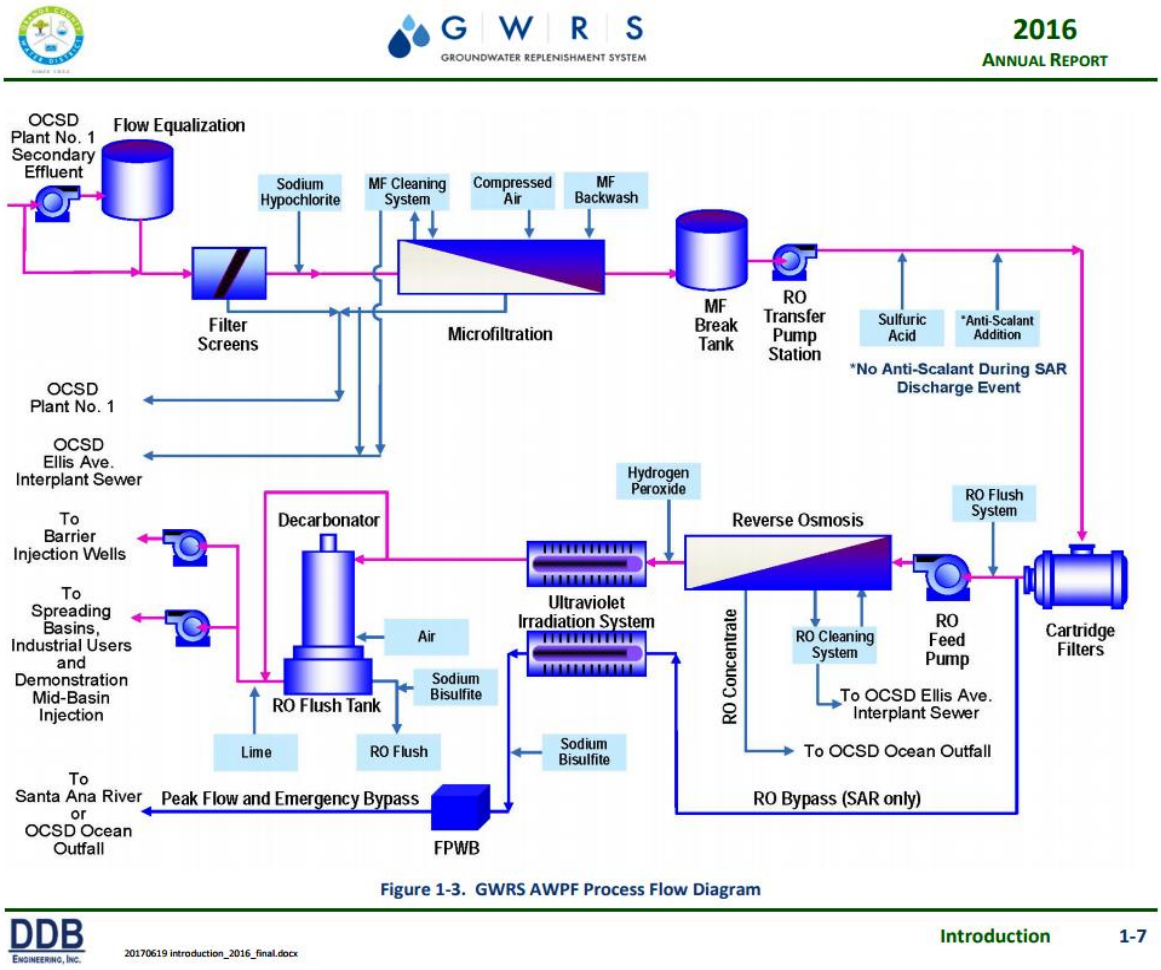
overcome that inherent aversion should increase if a person believes that using recycled would serve some larger purpose such as climate change and drought adaptation."

Looking across the state, the researchers found that support for recycled water was especially high in the Central Valley, a farming region hit hard by drought and groundwater depletion, though residents in the Central Valley also balked at drinking and cooking with recycled water.

Contrary to some previous research, Hui and Cain's paper discovered that respondents' educational level didn't affect their views of recycled water. The researchers conjecture that one reason for the lack of an educational effect was the salience of California's epic drought, which heightened awareness of the need to find new water sources. "We did the poll during the drought, so it was on the news every day," Hui said in an interview. "Everyone was totally getting the message and understood the urgency of the problem."

Experiment Tests Impact of Messaging

As part of the study, the researchers conducted a randomized experiment in which some people were educated about Orange County's Groundwater Replenishment System, which the utility describes as "the world's largest water purification system for indirect potable reuse." The process involves taking treated wastewater that would otherwise be discharged into the Pacific Ocean and purifying it further with a three-step process before injecting the water into local groundwater aquifers.



Orange County's Groundwater Replenishment System. (Orange County Water District)

"When we give people more information about the recycled water system and how it gets purified and injected into local groundwater before being taken out for use, those details make people feel more

comfortable using it in certain applications," Hui said. "The public information on this particular topic is very shallow. When you frame it differently, people react differently."

Although positive messages and explanations of the process made Californians more comfortable with using recycled water, there was still significant resistance to using treated wastewater for drinking and cooking. For example, willingness to drink recycled water increased from 11 percent to 17 percent after people were informed that Orange County has a "toilet to tap wastewater recycling program for outdoor and indoor water use, including drinking and bathing," and that this system provides 70 percent of the county's water. When the "toilet to tap" moniker was dropped and additional positive information was provided about the treatment process, support for using recycled water increased further, but the share of Californians willing to drink it was still only 21 percent.

The graphic below from the paper summarizes the impact of the educational messages. "T1" is the group that learned about Orange County's "toilet to tap" system and "T2" is the group that received messages that dropped the "toilet to tap" phrase and included more information about the treatment technology.

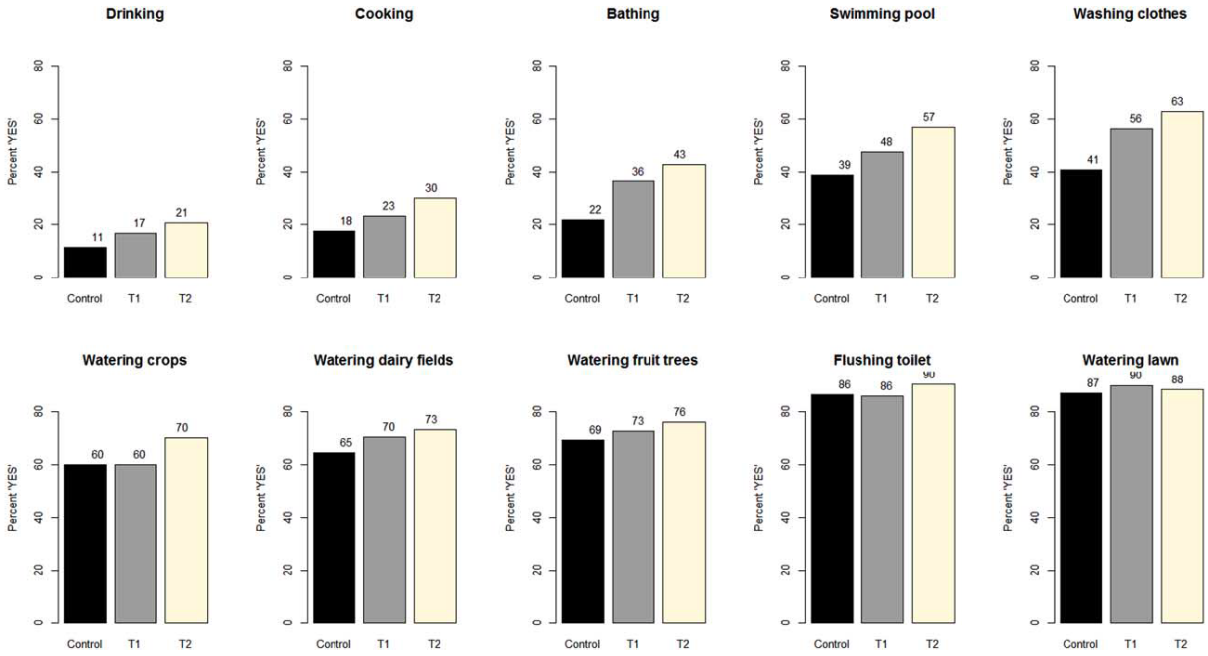


Fig. 4. Group means of control, Treatment Group 1 (T1) and Treatment Group 2 (T2). Note: Average treatment effects computed from Model 1 (Fig. 2). The first bar represents support for an application among the control group, the second and third bar displays support in the Treatment 1 and 2. Treatment 2 has the strongest impact in applications that are the most resisted. [Colour figure can be viewed at wileyonlinelibrary.com]

Implications for Water Policy

The researchers argue that their findings have important implications for water policy, not only in California but also in other areas that are struggling to find new water sources:

The existence of successful recycling programs appears to reassure people about the technology. "As more communities adopt recycled water without harmful effects, the resistance to recycled water in other communities may break down over time," Hui and Cain write.

The near-universal, instinctive aversion to recycled water "has the redeeming feature that lessons learned in one setting have a good chance of applying to other settings as well," according to the study.

While public outreach campaigns are essential for increasing public acceptance of recycled water in a variety of uses, the aversion to drinking recycled water remains strong even after people are educated about an existing program such as Orange County's. "Our findings suggest that in arid communities

that want to enhance their water supply with recycled water might have to deploy separate piping systems for potable and nonpotable uses," Hui and Cain write.

# # #

This story first appeared on WaterPolls.org.

The views expressed in this article belong to the author and do not necessarily reflect the editorial policy of Water Deeply.

California Fisheries Groups Sue State for Failure to Protect Impaired Waterways
Maven's Notebook | November 2, 2017 | Institute for Fisheries Resources:

Today four commercial fisheries organizations filed a lawsuit accusing the California State Water Resources Control Board (the Water Board) of failing to fulfill their responsibility to protect clean water and public trust resources in the Bay Delta and Central Valley. At issue is the state's failure to list long-suffering Delta waterways as impaired on its 303(d) list, a regulatory process that is required by the Clean Water Act.

The Pacific Coast Federation of Fishermen's Associations, the Institute for Fisheries Resources, the North Coast Rivers Alliance, and the San Francisco Crab Boat Owners Association each work on behalf of commercial fishermen and women to protect their jobs and the living marine resources on which they depend. Without healthy salmon populations and functional river habitat free of toxic pesticides, the fishing way of life and thousands of coastal jobs are fundamentally threatened.

Fishermen say the Water Board consistently refuses to protect water quality from dangerously warm temperatures and toxic pesticide pollution. In this case, the Water Board wilfully ignored readily available data and instructions from the Environmental Protection Agency that would have lead to targeted protections. They compare the administratively delayed and legally mandated 303(d) listing process, which has lasted seven years despite a two year deadline, with the speed at which exemptions to water protection rules have been issued. These exemptions allowed massive water diversions and violations of water quality standards during California's five year drought, the effects of which are still reverberating in coastal towns from Morro Bay to Crescent City. Fishermen say decisions like these are pushing salmon, and thus their industry and way of life, towards extinction.

"By failing to adequately protect critical salmon habitat, the State Board is failing to implement its fundamental responsibilities at a time when California's salmon fishery is withering on the vine," stated Noah Oppenheim, executive director of the Pacific Coast Federation of Fishermen's Associations. "Two years ago nearly all endangered winter run king salmon in the Sacramento died because the river was allowed to overheat. Meanwhile, our fishery is facing a second year of disaster in a multi-decade period of decline. Inadequate environmental protection destroys fisheries and coastal communities, yet the Water Board is again us to sit back and wait for them to take action. Salmon fishing families cannot abide by these delays and derelictions of duty any longer."

The fishing groups' lawsuit claims that the Water Board refused to use readily available data that unequivocally show waterways such as the Sacramento River above the Delta are too warm to support anadromous fishes, including endangered winter run and the commercially important fall run king salmon. Further, the groups claim that toxic pyrethroid pesticides, which are known to harm fish and public health, were not adequately considered during the 303(d) listing process.

Regina Chichizola, watershed policy consultant for the Institute for Fisheries Resources, says that this is not a surprising outcome in a state that in some years over-allocates its water by a factor of five. She says the state often violates the public trust by letting regulated industries and

polluters drive the processes that regulate them, but when fishermen or other clean water advocates engage, their concerns are largely ignored.

“The state of California is forcing its salmon into extinction and polluting its drinking water by failing to protect water quality and flows. We have watched year after year as the state ignored its own science and pushed for more diversions, misguided storage and conveyance projects, and poorly crafted regulations. It is time for the Water Board to do it’s job and use the tools they are required to use to protect our water quality and public trust fisheries before it’s too late.”

# # #

A flood of drought news can reduce water use

Drought-stricken California conserved more when media coverage spiked.

High Country News | October 25, 2017 | Emily Benson

You're probably familiar with the recent 5-year drought in California. That's likely due in part to the intense media attention it attracted. At the peak of the coverage, there were nearly 30 times more drought-focused newspaper stories written per month than during an earlier Golden State drought that lasted from 2007 to 2009.

During the latest drought, even before California Gov. Jerry Brown mandated a 25 percent reduction in urban water use statewide in 2015, residents of the San Francisco Bay Area were consuming less water than they had a few years earlier. "The question was, what was driving them to reduce their water use?" asked Nicole Sandkulla, the CEO and general manager of the Bay Area Water Supply and Conservation Agency, a consortium of 26 cities and water districts.

New research suggests that newspapers were, in fact, part of the answer. Media attention — and the public awareness and engagement that follows — is one way to get people to use less water.

Researchers suspected that spikes in media coverage could be driving the drops in water consumption Sandkulla and others were seeing. To find out, Kimberly Quesnel and Newsha Ajami of Stanford University studied a decade's worth of water use data, from 2005 to 2015, from 20 of the water agencies that belong to the Bay Area Water Supply and Conservation Agency. (The agency helped fund the study.)

The scientists also counted the number of articles related to drought that nine national and regional newspapers ran during the same period. There was less drought-centered coverage during the earlier drought, perhaps as a result of news coverage focused on the economic recession and the 2008 presidential election. The more recent dry spell, however, captured statewide and even national attention: The number of drought-focused articles published every month rose precipitously starting in 2014. "Drought in California was interesting, and it was the news of the day," says Ajami, the director of urban water policy at Stanford's Water in the West program.

To elucidate the link between news stories and turning off the tap, the researchers estimated how much water households used based on combinations of factors including climate and weather parameters, demographic elements, water price and number of drought-focused newspaper articles. Then they compared the results to average rates of actual consumption. Simulations that included the media measure more closely matched reality than those that didn't include it, suggesting that newspaper coverage was a contributor to domestic water conservation. An increase of about 100 drought stories over two months was associated with a drop of 11 to 18 percent in typical household water use.

But were people actually reading the news stories? When the scientists conducted an analysis of Google search data over the same years, they found a connection between media reports and public interest in drought. Searches for the term "California drought" surged in the San Francisco Bay Area during the same time period that the number of newspaper stories on drought went up.

“For future droughts, there’s no question that we learned that there is a role for media to play,” Sandkulla says. During the recent drought, her agency and others bought ads, wrote press releases and met with community groups and reporters to alert the public to the dire need to conserve water — and to let them know how they could help, by doing things like turning off sprinklers and shortening showers.

And those efforts were successful: Between June 2014 and April 2017, Bay Area water agencies reduced their water use by 10 to 35 percent. The role that public awareness likely played in those reductions is encouraging, Ajami says. “People do care if you give them the right set of information — they react, they respond, they change their behavior.”

# # #

How California Is Learning to Love Drinking Recycled Water
Water Deeply | October 6, 2017 | Tara Lohan

Would you rather drink a cup of recycled wastewater or advanced purified water?

Actually, that's a trick question – both terms are often used to talk about the same thing. But when it comes to public acceptance of the practice, the language you use makes a big difference. And so does education about how the process works.

Those are some of the things that have helped shift attitudes in California around potable reuse (drinking wastewater that has been purified for drinking). But it's been a long road to get there and a few bumps remain.

Decades ago, the idea of treating wastewater to drinking water standards was met with resistance and it earned the unfortunate moniker of "toilet to tap" in 1995, which became widely touted in defeating proposals to purify recycled water for drinking in Southern California in the 1990s.

But Orange County paved a different way forward for California by using indirect potable reuse – treating wastewater to drinking water standards and then putting it back underground to mingle with water in the aquifer before being pumped back out for drinking.

Add to the equation another multi-year drought (just entering year six) and increased pressure on water sources from climate change and competing interests, and many Californians now seem ready to welcome recycled water into their homes. San Diego and Silicon Valley are both on their way.

Just Don't Call It Wastewater

In January, the water technology company Xylem conducted a survey of 3,000 Californians to gauge their support of water recycling. Water recycling can mean water treated for non-potable purposes, such as industrial uses and irrigation, but in this survey it was defined to mean wastewater that had been treated and purified for drinking.

Of those surveyed, 42 percent were very willing to use recycled water in their everyday lives and 41 percent were somewhat willing. The numbers increase with more information. The survey found that 89 percent of people were willing to use recycled water after receiving information about how the treatment process works.

The findings are similar to what Santa Clara Valley Water District has found as they have tested their customers on the concept as well. The water district has a facility, the Silicon Valley Advanced Water Purification Center, that can treat wastewater to drinking water standards, but currently the water is only used to supplement recycled water for non-potable uses such as irrigation. In the near future (likely the next two to three years), the agency may be using the water for indirect potable reuse to supplement groundwater for drinking.

A survey the agency conducted in Santa Clara County in 2010 found that initially, people were pretty opposed to the idea of one day drinking recycled water – only 31 percent were in favor of it. But after being read information about how the treatment and purification process works, 53 percent were supportive. And then after being given additional information about why it's good for the environment and helps support groundwater supplies, support rose to 69 percent.

“What we learned from that is with enough information and education you can change people’s understanding and perception,” said Marta Lugo, a public information representative of Santa Clara Valley Water District. Since education is key, in 2014 when the water district opened their water purification center, they immediately kicked off a public tour program.

Tasting is Believing

If seeing is believing, then tasting usually seals the deal. Lugo said an open-house event last October drew 900 people from the community, and more than 90 percent took a taste test. “Many were surprised when they saw, smelled and tasted it,” said Lugo. “If people see their neighbors taking a taste, or their friends and peers, they get over a psychological barrier – it becomes normalized.”

She says that acceptance has also grown during California’s drought, and being in Silicon Valley, they are aided by having many tech-minded residents. But a 2014 survey found that the biggest factor driving public acceptance of drinking recycled water is actually concern for the environment — the fact that recycled water is good for rivers, streams, fish, plants and wildlife, she said.

The language is also important, said Lugo. People are more accepting when it is referred to as “highly” or “advanced purified water.” It’s not just semantics but an important distinction. Many Californians are already familiar with recycled water that is transported in purple pipes for irrigation and industrial uses.

They are also repeatedly cautioned not to drink purple pipe water. “We had to find a way to disassociate from that, because even though we are recycling water, it is not the same water in the purple pipes. It’s a step ahead of that recycled water.”

Water from the Silicon Valley Advanced Water Purification Center goes through three main processes – microfiltration, reverse osmosis and ultraviolet light. If it was to be used for drinking water, it would also receive advanced oxidation.

Next year, the California legislature is likely to begin addressing regulations for direct potable reuse, which will give another boost to the idea of wastewater as part of the water supply. But it will likely be many more years before direct potable use is widespread.

Water agencies like Santa Clara Valley Water District are moving slowly. “It’s not an overnight process, it’s taken years of education,” said Lugo. “It has only been in the last year and a half that we have moved to aggressively talking about recycled water for drinking water supplies – either for groundwater replenishment or for direct use. It’s a process, but for the most part, the community has been very supportive.”

# # #

This article originally appeared on Water Deeply, and you can find it here. For important news about the California drought, you can sign up to the Water Deeply email list.

If Jerry Brown can't sell California on two Delta tunnels, would just one fly?
Sacramento Bee | November 6, 2017 | Dale Kasler

It sounds like a nice, elegant compromise for a California water project swamped in uncertainty: If there isn't enough money to build two Delta tunnels, why not build just one?
Drastically downsizing Gov. Jerry Brown's tunnels wouldn't merely save money. It would also reduce the project's footprint and make it more palatable to some of its critics. A coalition of environmental groups has endorsed a lone-tunnel approach.

Nothing is ever simple in California water, however, and scaling back the $17.1 billion twin tunnels plan is no exception. Reducing the size and scope of California WaterFix, as the project is officially known, would create complications of its own – and might not win over most of the opposition.

Advocates of the twin tunnels say a smaller project would translate into less protection for the endangered fish that live in the Delta and supposedly would be helped by the twin-tunnel setup. Proponents also say a single tunnel, while less expensive as a whole, would likely cost more on a per-gallon basis than a twin-tunnel plan.

Most Delta residents, environmentalists and other foes aren't sold on a smaller project, either. They say WaterFix in any form would harm the estuary's diminishing fish population and degrade the quality of the water used to irrigate the Delta's vineyards and orchards. In their view, one tunnel is probably just as bad as two.

"I don't think it's clear sailing for either path," said Dante Nomellini, a Stockton lawyer who represents Delta farmers who are fighting the project in court.

The one-tunnel alternative has been floated for years but didn't start to become a serious option until Westlands Water District, which serves farmers in a major swath of the San Joaquin Valley, rejected Brown's project in September. That erased at least $3 billion in funding for WaterFix, which is supposed to be paid for by south state water agencies that pull water out of the Delta. Many other agricultural agencies have refused to back the project as well, leaving a funding gap of $6 billion or more.

With the project struggling, influential elected officials such as U.S. Sen. Dianne Feinstein began pushing the idea of one tunnel. Then in mid-October the concept gained considerably more momentum. That's when Santa Clara Valley Water District rejected the twin tunnels and voted instead to offer "conditional support" for a less expensive single tunnel.

State officials promptly agreed to consider a "smaller, more affordable project," as Department of Water Resources Director Grant Davis put it.

The Brown administration and its allies say they haven't abandoned the twin-tunnels plan, which is designed to keep Delta fish from getting killed in the powerful pumps that ship water south while improving the reliability of those shipments.

"The current project was chosen as the preferred alternative because it most effectively met the need and addressed the conflict between (water delivery) operations and species," said Lisa Lien-Mager, a spokeswoman for the state Natural Resources Agency.

Project backers still hope “there’s a way to crack that nut on the financing and stick with the original project,” said Jeff Kightlinger, general manager of the Metropolitan Water District of Southern California, a leading advocate for the twin tunnels.

But if the $6 billion funding gap can’t be bridged, “then I think you pivot and look at, OK, something smaller,” Kightlinger said. “We are starting the technical work to look at what a smaller project would look like.” Metropolitan, which serves 19 million urban residents, has pledged $4 billion toward the tunnels, more than any other agency.

As envisioned by Brown’s administration, WaterFix would remedy two giant, interconnected problems facing the Sacramento-San Joaquin Delta, the estuary that serves as the hub of California’s elaborate water-delivery system.

Decades of pumping by the State Water Project and its federal counterpart, the Central Valley Project, have wrecked the Delta’s ecosystem and left some fish species in danger of extinction, including the smelt and winter-run Chinook salmon.

Perhaps the biggest issue is that the state and federal pumping stations, located at the south end of the Delta, are so powerful that they can reverse the flow of some crucial river channels inside the estuary, drawing fish toward predators and the pumps themselves. To comply with the Endangered Species Act, the pumps sometimes have to be shut off or throttled back, which allows water to bypass the pumps and flow to the ocean.

The problem figures to get worse as the federal and state agencies that oversee the estuary’s ecosystem contemplate stricter regulations. That will mean less water reaching the pumps in the coming years, to the growing dismay of the south-of-Delta water agencies.

WaterFix would reroute how water reaches the pumps in order to make them less hazardous to fish. By easing the fish problem, WaterFix would enable the pumps to operate more reliably, improving water deliveries to the southern half of the state.

Brown’s current plan is to divert a portion of the Sacramento River – no more than 9,000 cubic feet per second – at a spot near Courtland. That water would be piped through a pair of underground tunnels, 40 feet in diameter, approximately 40 miles south to the pumping stations outside of Tracy. By having this water delivered directly to their doorstep, the pumps wouldn’t have to work as hard, according to Brown’s administration. The “reverse flow” or “cross-Delta” problem would be improved dramatically, and the pumps could operate more reliably without harming fish.

So how would one tunnel work? Four years ago a coalition of environmental groups proposed building a single underground tunnel, with one-third the carrying capacity. It would cost half as much as the twin tunnels.

The Natural Resources Defense Council, one of the leaders of the coalition, says the proposal represents a sensible compromise: One tunnel would help shore up deliveries to the south state water districts, especially in wet winters when there’s plenty of water sloshing through the Delta. At the same time, by restricting the amount of water being moved through the tunnels, the project would force the south-of-Delta districts to make do with less water from the estuary than they’d get with two tunnels, said Doug Obegi, a lawyer in the NRDC’s San Francisco office.

The smaller plan would free up billions of dollars that the south state agencies could spend on recycling, conservation and other programs to improve their water supplies, Obegi said.

By diverting less water from the Sacramento River, the one-tunnel approach could make WaterFix seem less frightening to Delta landowners who've come to rely on the relatively pristine waters of the Sacramento.

"You have a physical constraint on how much you can take out of the Sacramento," said Jeffrey Mount of the Public Policy Institute of California, which has advocated for one tunnel. "It achieves multiple political objectives. It is less expensive."

Others believe the one-tunnel idea has serious flaws, however. The less water that flows through the tunnels, the harder the pumping stations would have to work to bring water to the south state. That could undermine the efforts to ease the "reverse flow" problem that's had such harmful effects on fish populations.

"The idea of a single tunnel … doesn't really resolve the issue of cross-Delta flows," said Peter Moyle, a biologist at UC Davis' Center for Watershed Sciences. "From a fish perspective, it doesn't help them much."

Kightlinger, the Metropolitan official, said the cost savings from scaling back to one tunnel might not be as generous as some advocates believe. And the south-of-Delta agencies paying for the project might wind up spending more for each gallon of water than they would with twin tunnels.

"Your cost of purchasing tunnel bore machines, getting into the ground – those things are the same regardless of what size you build it," Kightlinger said. "Procurement, permitting, land issues – the per-unit cost is likely going to be a little more."

Hardcore WaterFix opponents remain unconvinced of the virtues of a smaller project.

They argue that diverting a portion of the Sacramento River's flows – even a comparatively tiny amount – would deprive fish of desperately needed water at crucial points in the Delta and leave much of the estuary mired in saltier, lower-quality water from the San Joaquin River.

"The Delta water quality … is going to turn into a toxic pool," said Nomellini, the lawyer for Delta landowners. "The Delta survival depends to a great extent on Sacramento River water going through it."

# # #

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Why Hydroelectric Utilities Are Endangered by Soaring Solar and Wind

A California phenomenon called the 'duck curve' successfully predicted an electricity surplus as solar and wind energy flooded the grid. This may be bad news for Western hydroelectric dams that are unable to adapt.

Water Deeply | November 6, 2017 | Matt Weiser

A wet winter led operators of Shasta Dam on the Sacramento River, shown here in January, to release water from river outlet gates in the face of the dam for the first time in six years. This sort of operation may become more common as an oversupply of energy creates negative pricing conditions, forcing dam operators to bypass hydroelectric turbines or lose money on the power they produce.Photo Courtesy Sacramento Bee

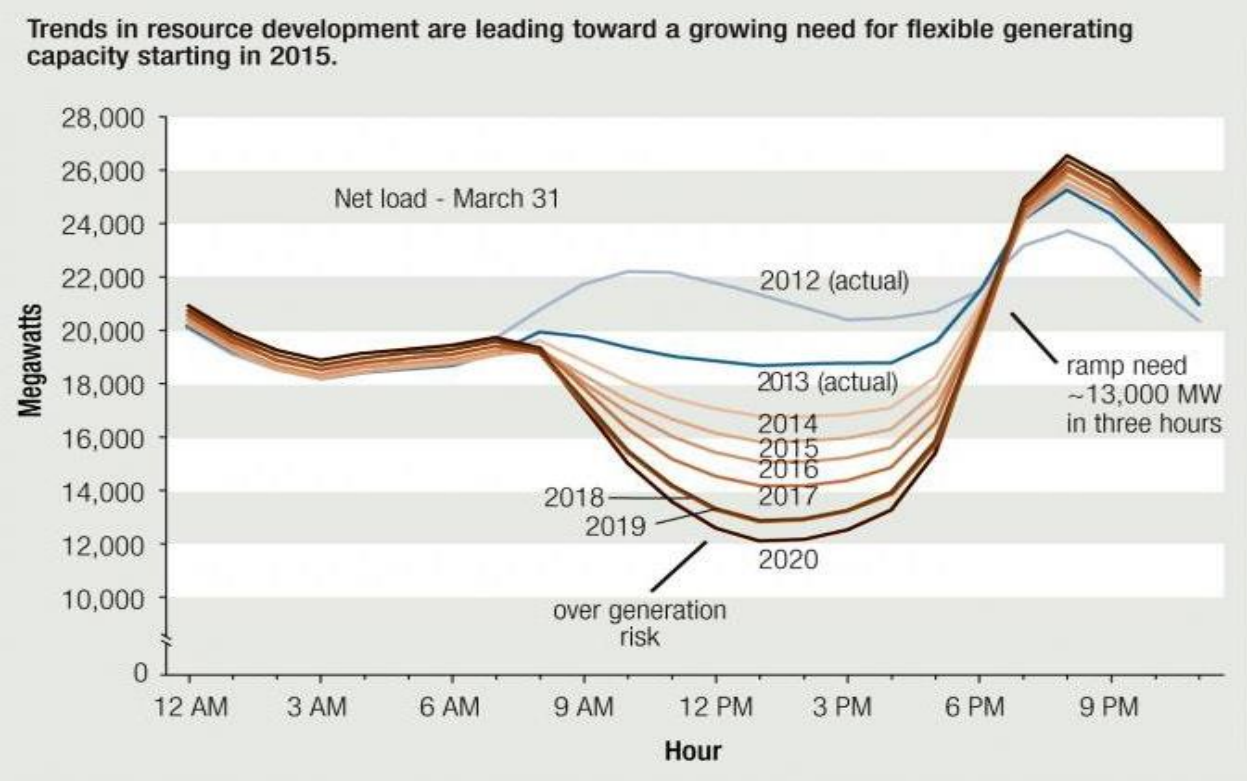
The success of solar and wind energy in California is having a surprising side effect: It may be undercutting revenue for hydroelectric dams, the longtime stalwart of "green" energy in the West.

Four years ago, officials at the California Independent System Operator (ISO), which manages electricity demand across the state, identified a phenomenon called the "duck curve." The curve – shaped like the profile of a duck – predicted that within a few years growing wind and solar generation would create a surplus of electricity during midday.

That surplus, in turn, would create a condition in which traditional power producers, including hydro, might have to be idled.

The prediction not only proved to be true, but the power imbalance has grown even faster than expected. As a result, there were long periods this year in which market pricing for electricity in California actually turned negative. That means producers had to pay the market to take their energy.

The situation is good for energy consumers, who benefit from lower prices. It's also good for the planet, because it means solar and wind energy have at last become major contributors to the grid.



The "duck curve," shown here, illustrates how the rise of solar and wind energy create a growing surplus of power during midday, a phenomenon that is putting economic strain on traditional energy sources including hydropower. (Image Courtesy California ISO)

But it's a different story for the hydropower industry, especially during springtime. That's when reservoirs are full with storm runoff and dam operators must release water as snowmelt builds. Normally, they would do so through hydroelectric turbines to generate electricity. But negative pricing could force some to release water by other means, without producing revenue from electricity generation.

The hydro industry may eventually find that some generating units no longer pencil out. And the effects aren't limited to California: The duck curve influences utilities all over the West, which contribute energy to the grid, in part, to help satisfy California's huge energy demand.

"If there is a lack of demand during the daylight hours, then there is going to be a direct influence on the ability to sell hydropower, which is in a must-run scenario during springtime," said Gregg Carrington, managing director of energy resources at the Chelan County Public Utility District, a hydropower producer in Washington State. "If energy costs are lower than the cost of production, then it's going to cause the business model they were developed for to be in question."

Carrington was on a panel that discussed the issue at this year's conference of the Northwest Hydroelectric Association. In a PowerPoint presentation, he illustrated how electricity pricing has declined by a dramatic 55 percent over the past six years in the mid-Columbia energy market in central Washington, a region dominated by hydropower.

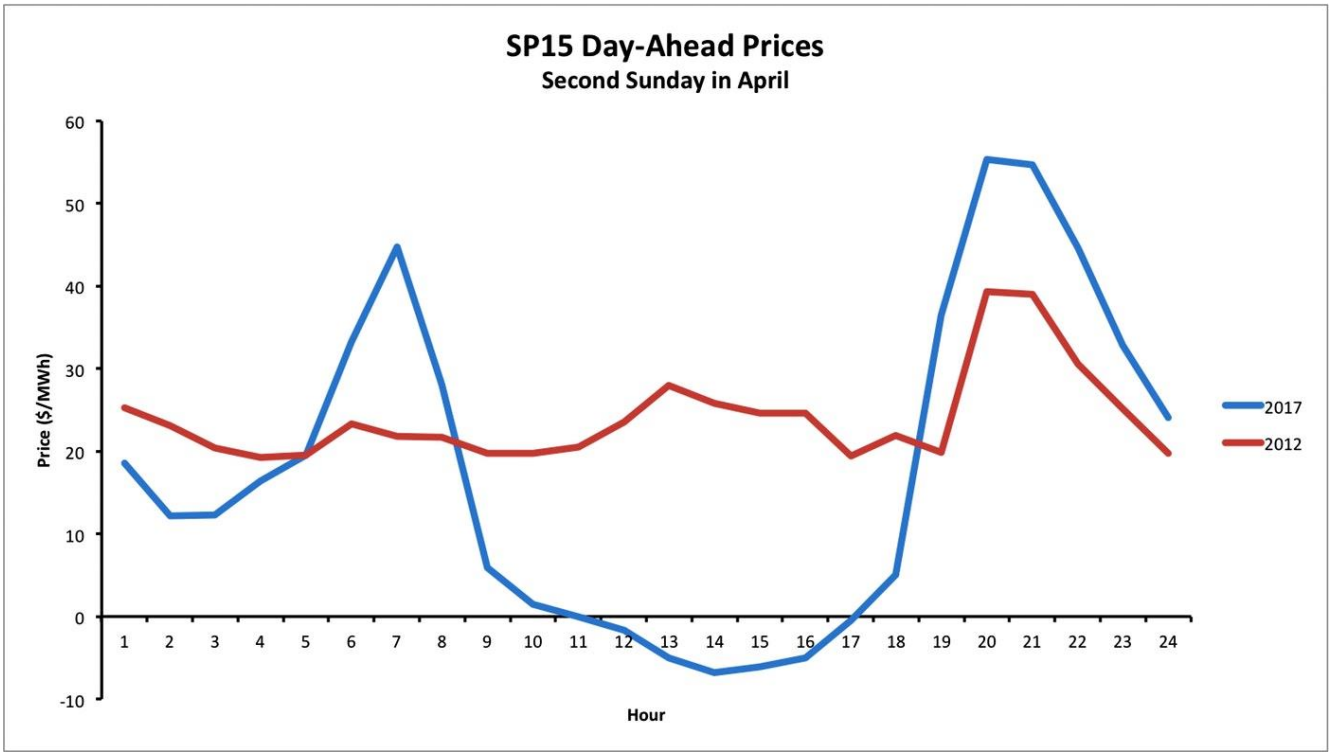
In an earlier report, the Northwest Power and Conservation Council essentially blamed the duck curve, citing growth of wind and solar power and government incentives to reduce greenhouse gas emissions. It warned the results could "discourage future power generation development in the region."

Carrington went a little further, cautioning that energy oversupply could force utilities to mothball some generating units, whether they be coal, natural gas or hydro. Coal plants are the natural first victims, because they are the most polluting. Already, three coal-fired plants in the Northwest have announced plans to close in coming years.

"In the end, what's going to happen is you're going to have stranded assets," Carrington said. "People will turn off baseload assets, and in the long run it could affect [grid] reliability."

The first victim of this trend in the hydroelectric sector may be the Pacific Gas & Electric (PG&E) Company's DeSabla-Centerville facility, a small hydroelectric system on Butte Creek in California. In February, the utility told the Federal Energy Regulatory Commission (FERC) it planned to withdraw its application for a new operating license for the project. FERC declined, instead directing PG&E to find another entity to buy the hydro system, a process that is still under way.

PG&E spokesman Paul Moreno said he could not blame the duck curve for the utility's decision to part with DeSabla-Centerville. But he did cite weak energy prices.



The oversupply of energy exemplified by the duck curve has led to negative pricing in Western energy markets – a condition in which power producers may have to pay utilities to take their energy. This graph shows an example from April 9, 2017, in which energy prices turned negative during the middle of the day. (Image Courtesy California ISO)

“Markets have changed,” he said. “The cost to operate it and declining prices for power mean it’s simply no longer good value for our electric customers.”

The repercussions of hydropower closures can be complicated. In most cases, decommissioning and removing hydropower dams is good for rivers, reviving natural river flows and restoring upstream access to spawning fish.

But that may not be the case if PG&E’s DeSabla-Centerville project is shut down. The system, more than a century old, diverts cold high-elevation water from the West Branch of the Feather River into a canal that feeds into Butte Creek. There, the cold water has become essential to sustaining the only wild-spawning population of spring-run Chinook salmon that still survives in California.

So if DeSabla-Centerville was shut down, or if its flows were significantly altered by a new owner, it could threaten this rare strain of native salmon.

As a result, environmental groups don’t want big changes at DeSabla-Centerville.

But they have started looking closely at other hydroelectric dams that may be vulnerable to the new economics.

Dave Steindorf, special projects director at American Whitewater, a river advocacy nonprofit, believes conditions in the energy market have created a new incentive to remove some hydroelectric dams.

“In the middle of the day, if you subtract out wind and solar, the generation need for other resources goes to near zero,” said Steindorf, also chairman of the Hydro Reform Coalition, a collection of environmental groups. “That’s what we want to see. We need to see solar replacing other energy sources.”

Steindorf has been working with an analyst at Lawrence Berkeley Laboratory for more than a year to identify Western hydro projects that might soon be on the chopping block due to economic

pressures. This, he said, could create new opportunities to reopen rivers for spawning fish and for recreation.

Steindorf said he isn't prepared yet to identify any vulnerable hydro systems. But he said smaller systems and those that are "run of the river" – meaning they don't have a lot of water storage – could be the most vulnerable.

"We believe there's some opportunity here for river restoration, as well as to have the hydropower fleet be more efficient in meeting the changes that are required as part of more renewable energy coming online," he said. "If we're going to do anything about climate change, these are the kinds of problems that we need to solve."

Clyde Loutan, a principal for renewable energy integration at the California ISO, is considered the "father" of the duck curve. He first identified the oversupply problem and developed the forecasts that led to the duck curve. Today, he and others at the ISO are working on a number of solutions to address the problem.

These include energy storage, such as massive batteries to store power at homes and businesses when there's a surplus on the grid; proliferation of electric vehicles, which are essentially rolling batteries; and even encouraging consumers to use more power during midday when there's an oversupply.

Hydropower is also in the mix of solutions, Loutan said, because it can generally respond instantly to changing energy demand simply by releasing water through turbines.

The opposite challenge posed by the duck curve is the upright neck of the duck. It represents a steep ramp-up in power demand at dusk – a time when solar energy production tapers off but energy demand spikes as people return home from work.

Hydropower can respond to these ramps faster than almost any other energy producer. But not all hydro plants have this capability.

Loutan noted that many hydroelectric dams are required to meet strict cold-water flow requirements at certain times of the day to protect endangered fish. Others don't have adequate storage capacity to meet the new energy grid's ramping demands.

Those that can ramp up swiftly, however, will remain in high demand. What's needed, Loutan said, is pricing incentives that encourage these hydropower plants to run full-bore during the steep new ramping periods.

"In the spring months, when the snow starts melting, there's only so much you can do because we have a lot of run-of-the-river hydro. Either you harvest that energy or you lose it," Loutan said. "The bigger hydros, eventually we're going to want them to operate a little differently. They're going to have to align with the challenges we see."

Drought presents another challenge, Loutan said. Even big reservoirs can't help meet energy demand if they have no water to move through their turbines.

Another threat is climate change. Some predictions show that in the decades to come, more of California's mountain precipitation will fall as rain and less as snow. This means more runoff in spring, when hydroelectric dams are already less able to respond to the duck curve; and less runoff in summer, when energy demand is highest.

"There is a pretty big shift going on out there in power generation," Steindorf said. "These utilities are going to have to look hard at how much they want to spend maintaining a hydroelectric project they know is really not economically viable.

# # #

Creek authority works through options to bolster flood capacity
The Almanac | November 2, 2017 | Kate Bradshaw

In 1998, a major storm flooded the San Francisquito Creek and caused untold damage to the surrounding area, especially in the creek's downstream portions. Almost 20 years later, that flood is still the high-water mark against which local jurisdictions are working to protect themselves.

The San Franciscquito Creek Joint Powers Authority, headed by Executive Director Len Materman and made up of representatives from the cities of Menlo Park, East Palo Alto and Palo Alto, San Mateo County and the Santa Clara Valley Water District, is working on developing a plan to reduce flooding in upstream areas of the creek by containing excess water and diverting it to the Bay.

The goal is for the creek and possible related infrastructure to be able to handle a water flow of 7,500 cubic feet per second, according to Mr. Materman.

Along the creek, there are a number of flood-prone choke points. Among those are the Pope Street-Chaucer Street Bridge in Menlo Park, the Newell Road/Woodland Avenue Bridge in Palo Alto, and the University Avenue/Woodland Avenue creek crossing.

The project

In January, the joint powers authority (JPA) launched its environmental impact study on a number of alternatives that could be pursued to protect the communities the creek borders from flooding.

There are three ways to expand the creek's capacity, Mr. Materman said, in addition to modifying bridges and widening bottleneck points along the creek, where water backs up and could spill over during a flood.

The first is to detain water in detention basins. That could mean building a new detention basin or using existing sites such as Searsville Lake, Felt Lake and Lake Lagunita, or land upstream from I-280, according to scoping documents laying out the environmental study's parameters.

The second is to contain water in the creek through excavation or building flood walls along the creek between U.S. 101 and El Camino Real. One proposal to do that is to expand flood walls from U.S. 101 to about the Pope-Chaucer Streets bridge.

Third, the authority could create a bypass route for excess water. There are three areas being considered for such a bypass. One option under consideration is to build a culvert from University Avenue beneath Woodland Avenue for about three-quarters of a mile before it would connect back with the creek. Other routes under consideration are to install a bypass culvert beneath Willow Road between Middlefield Road and the Bay or along University Avenue between Woodland Avenue and U.S. 101. All of those options would be very expensive and disruptive, Mr. Materman said. Because of that, there's some likelihood those options will be screened out, he said.

In addition to those alternatives, ideas from the community that are being studied include:

• Building an underground channel or culvert around the Pope-Chaucer bridge and raising the capacity of the creek downstream.

• Replacing the Pope-Chaucer bridge with a bike or pedestrian bridge, or not replacing it at all.

• Building multiple small-scale water-detention facilities, a new pump station or a new Ladera Dam.

• Increasing incentives for low-impact development; using overland floodways; and deepening the creek channel.

The draft environmental impact report is expected to be released in another four to five months.

Any projects the JPA decides to move forward with would be restricted to construction between June 15 and Oct. 15 because the creek is a habitat for protected steelhead trout, Mr. Materman said.

Moving fast

One of the goals of the project is to move faster than other agencies' lengthy processes for flood-protection projects.

Currently, there is a parallel process by the federal Army Corps of Engineers to study the options for flood control in terms of cost-effectiveness.

The results of that study are expected to be released any day and likely by the end of the year, Mr. Materman said. It's not yet known how many of the recommendations from the Army Corps of Engineers will overlap with the JPA's analysis of best options. Areas of overlap may be eligible for federal funding, Mr. Materman said.

The JPA hosted several public meetings to gather feedback in advance of the draft environmental Impact report's release.

"If a federal project has elements that are a local match, they build something. It sometimes pays off, sometimes not," he said.

While the Army Corps of Engineers' project is focused on the best flood protection for the lowest cost, the JPA has laid out other considerations to guide its alternative selection process: to reduce flooding, improve recreation and support environmental sustainability.

According to Mr. Materman, it's not yet known how much the project alternatives will cost. "I think we'll probably have a better sense of numbers when the EIR comes out," he said. "That's when we can really dive into a detailed comparison."

According to local environmentalist Jerry Hearn, who sits on the board of local environmental nonprofit Acterra, one priority the JPA should focus on is restoring native plants, which can provide some natural flood protection, he said. He noted that expanding the creek's capacity while considering the needs of people and the environment is a "balancing act."

"You can't take the creek back to prehistory, but you can make sure the ecosystem is vibrant," he said.

Another complicating factor for the project is Stanford's as-yet-unclear plans for the Searsville Dam.

"They've been looking at their Searsville project for many years to come up with their preferred alternatives," Mr. Materman said. "We have to assume Stanford may or may not do anything, and that the dam may fill up and spill over."

# # #

California makes critical repairs in century-old levee system

The state spent $80 million this summer repairing 30 of the state's 40 most critically impaired levees, but the century-old levee system is in need of many more upgrades.

Capital Press | October 24, 2017 | Tim Hearden

SACRAMENTO — Water agencies in California spent $80 million this summer to repair 30 of the most critically impaired levees after last winter's rains, but there were 10 others that they couldn't get to, officials said.

Many of them were in the San Joaquin Valley, where reservoir releases to accommodate late-season snowmelt kept rivers swelling well into June. Officials had to wait for the water to recede to assess impact on the levees, said Jon Ericson, acting chief of the Department of Water Resources' Division of Flood Management.

"There are still sites that we haven't repaired, and we're going to have contingency plans for those," Ericson said during a news conference Oct. 23 on a levee overlooking the Sacramento Weir, which is undergoing repairs.

The state has prepared designs for those 10 future sites and worked with local water districts and others to prepare contingency plans for 100 other compromised levee sites in preparation for this year's rainy season.

A sense of urgency prevailed this summer after high river levels during a historically wet winter exposed weak spots in roughly 1,600 miles of levees in the Central Valley. Among the most troubled areas is the Feather River below the Oroville Dam, whose spillways nearly failed in February.

Crews spent more than $40 million in mostly state funds to shore up those levees, including a $12 million project to refurbish a one-mile stretch of levee protecting agricultural land near Yuba City that needed emergency repairs last winter.

Officials gathered on Oct. 23 to urge flood preparedness among residents and to highlight the monstrous task ahead in refurbishing a century-old levee system that was ostensibly built for agriculture but now protects many urban areas as well.

"The Central Valley is one of the highest flood risk areas in the nation," said Bill Edgar, president of the Central Valley Flood Protection Board. "The levees have been successful in protecting agriculture, but over time people began building homes ... and high-value permanent crops (in the floodplain)."

California has spent more than $4 billion on repairs since 2007 under a flood control plan passed by the Legislature in 2007, Edgar said. The effort in the Central Valley could cost as much as $21 billion over a 30-year period, he said.

Funding has come from various sources, including money from Proposition 1E, a $900 million flood protection bond passed in 2006. And the Legislature approved a bill by state Senate Leader Kevin de Leon, D-Los Angeles, to place a $3.5 billion bond measure for flood protection, water supply reliability and new parks and open space before voters in June 2018.

But officials said more contributions from local water agencies and more federal funding will be needed to pick up the slack. For instance, the state spends about $30 million a year on basic levee maintenance when engineers say it should be spending about $130 million, Edgar said.

“That’s the kind of increase we’re looking at,” he said, adding that such a boost would require commitments from local assessment districts, the state’s general fund and state bond funds as well as federal sources.

“The thing to understand is that this is a partnership,” Edgar said. “Everyone is going to have to pay. They’re all paying now, but they’re going to have to pay a little more.”

State efforts barely scratch the surface in terms of needs for the levee system as a whole, said Greg Farley, the Division of Flood Management’s communications branch chief.

California has about 14,000 miles of levees, including those that protect urban areas, those that protect coastal areas from flooding because of storm surges and others, Farley said.

Of the 5,000 miles of levees in the Central Valley, the state has a financial interest in about 1,600 miles of them, he said. Most of the rest are owned by local districts or the U.S. Army Corps of Engineers, he said.

But among its levees, the state will make a push over the next five years to repair those in agricultural areas, he said. The state had a program this summer in rural areas to replace corroded pipes in levees and take erosion-control measures, Edgar said.

“Many areas remain vulnerable,” said Dan Tibbetts, the Sacramento Area Flood Control Agency’s principal engineer. For instance, some levees along the Sacramento River that sustained damage last winter will have to make it through another flood season, Tibbetts said.

# # #

Floods are bad, but droughts may be even worse
CBS News | October 24, 2017 | Rachel Layne

It is by now a familiar story: The storm hits, the cities flood, dramatic rescues ensue to save people from the rising waters, followed by the arduous and expensive cleanup.

But chances are you've thought less about the deadly and economically destructive consequences of a slower-moving culprit: drought.

Repeated droughts around the world are destroying enough farm produce to feed 81 million people for a year and are four times more costly for economies than floods, the World Bank found in a new study. Beyond hindering food production, erratic rainfall patterns and longer droughts as the climate changes are causing a host of problems for cities, including businesses.

"We are already seeing more extreme rainfall events -- more dry episodes and more wet episodes," said Richard Damania, the report's lead author and lead economist for the World Bank's water global practice, in an interview.

For instance, what experts classify as an unusually severe drought is now appearing much more frequently worldwide. "There are many, many parts of the globe where the one-in-50 year 'dry shock' appears in six out of the last 10 years for which we have data," he said. "There are other parts of the world where these dry shocks have emerged for seven or eight of the last 10 years. This is not a problem for the future -- it's a problem for the here and now."

In cities, a single water outage can cut a company's revenue by more than 8 percent, the study, called "Uncharted Waters: The New Economics of Water Scarcity and Variability," found. For smaller firms, like a single business operator selling their own wares or services, the cost is more than fourfold at 35 percent.

One in four cities around the globe, amounting to combined economic activity of $4.2 trillion, is classified as water-stressed, according to the World Bank. And more than 80 percent of the world's gross domestic product, a common measure of the size of an economy, comes from cities.

Meanwhile, water needs are rising. As urban populations swell, demand for water may rise as much as 70 percent, the report concludes. By 2050, nearly 1 billion people will live in cities with an inadequate water supply.

The systems in those cities can be inefficient. In the developed world, urban areas tend to charge far less than cost for water that flows freely into your tap, the World Bank notes. When you pay for water, you pay for the infrastructure to deliver it, not the water itself.

That's the case in the U.S., where a recent report from the American Civil Society of Engineers gave drinking water infrastructure a grade of D. It noted that many of the 1 million miles of pipes across the U.S. were laid in the mid-20th century and are coming to the end of their 75-to-100 year useful life.

While water quality is still high in the U.S., the country wastes an estimated 2 trillion gallons of treated drinking water through 240,000 water main breaks a year, that report said.

The American Water Works Association estimates $1 trillion is needed to maintain and expand service to meet U.S. demands alone in the next 25 years. That can mean higher costs for consumers, but better access to water in the long run.

For example, a Seattle Times analysis of that city's water rates in 2015 found that people in some of California's drought-stricken cities paid less for water than Seattle, where heavy rainfall makes it plentiful. That's because Seattle has poured more money into infrastructure to keep water safe from contaminants and more renewable. And some Seattle taxes are included in the water rate, which isn't the case in other places.

That inefficiency can hit small business owners hardest in cities. Take a local restaurant owner. A water shortage or closure because of broken pipes can stifle business and even cause power outages. That can quickly force a small business to close.

Another consequence: Dwindling supply makes it more likely that water becomes stagnant or contaminated. People may wash their hands less if they are conserving, leading to disease. And children may fail to grow normally, stunting development and raising health costs, Damania said.

On farms, the consequences are also grim for the food supply and the planet, the study found. Below-average rainfall over years hurts crop yields and pushes farmers into forests, cutting down a natural "climate stabilizer." That leads to more drought, exacerbating the problem.

Other research predicts food shortages and price increases may triple by 2040 because of extreme and erratic weather brought on by climate change.

Among other potential remedies, the World Bank recommends new water storage and management infrastructure and better policies to go with them; improved water utility regulation that rewards more efficient performance; and better safety nets for poor families.

# # #

California Democrats seek new federal probe of water project
Sacramento Bee | October 24, 2017 | Associated Press

SAN FRANCISCO – Five California Democrats in Congress asked Tuesday for a new federal review of funding for Gov. Jerry Brown's proposed tunnel project.

Their request follows a federal audit of Brown's $16 billion proposal to re-engineer California's complex north-south water system by building two giant water tunnels. The audit, released by the U.S. Interior Department's inspector-general in September, found that the Interior Department improperly used federal taxpayer money to help fund planning for the tunnels.

Congressional Democrats are now asking the U.S. General Accounting Office to determine whether that funding was legal. Five California Democrats and one Arizona Democrat made the request.

In an email, Interior Department spokesman Russell Newell said the alleged misuse of $84 million in federal funds for the tunnels occurred during the previous administration, and that the Interior Department welcomed the request for a review of the legality.

"The $84 million spent in taxpayers' money without disclosure to Congress and kept hidden from the public were decisions driven and executed by the Obama Administration and that team," Newell said.

Brown's administration is currently trying to line up support for the project among California water districts.

# # #

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Congressmen want GAO investigation of federal money siphoned to Delta Tunnels
Red Green and Blue | October 24, 2017 | Dan Bacher

Six House Democrats today asked the GAO, the federal watchdog agency that conducts investigations and audits on behalf of Congress, to issue a legal opinion about the Bureau of Reclamation's scheme to funnel money to expenses for California's Delta Tunnels/ WaterFix project. The penalty for this type of misuse of public money can include removal from office.

Here is the news release just in from Congressman Jared Huffman's office:

Led by Reps. Jared Huffman (D-CA) and Raul Grijalva (D-AZ), the Natural Resources Committee's Ranking Member, six House Democrats are calling on the Government Accountability Office (GAO) to open a new investigation into the misuse of taxpayer funds by the Interior Department's Bureau of Reclamation, following last month's revelations that tens of millions of dollars were secretly spent by the federal agency to subsidize private interests and help develop plans for a massive new California water project.

In its September audit, the Interior Department's Inspector General found that the Bureau of Reclamation improperly subsidized the planning process for the California WaterFix project, also known as the "Delta Tunnels." The audit identified at least $84 million in taypayer funds spent without disclosure to Congress as required by law, and kept hidden from other water users, stakeholders, and the public.

According to the Inspector General, at least $50 million of this total should have been paid by the local water agencies that sought to benefit from the massive infrastructure project, such as the powerful Westlands Water District. Instead, those costs were secretly reassigned by the Bureau of Reclamation so that taxpayers would pay most of the water districts' share.

With today's letter, the lawmakers are asking the GAO, the federal watchdog agency that conducts investigations and audits on behalf of Congress, to issue a legal opinion about the Bureau of Reclamation's funding scheme. The penalty for this type of misuse of public money can include removal from office.

The Inspector General's audit found that the controversial funding plan was first launched in 2008, during the period when David Bernhardt was the department's top lawyer. Upon leaving the department, Bernhardt became one of the top lobbyists for the Westlands Water District, the major beneficiary of this funding plan. He has now returned to the Interior Department as Deputy Secretary. In responses to the Inspector General, Interior Department staff have indicated that there are no plans to recoup these millions of dollars in taxpayer funds that were spent without authorization or rationale.

In addition to Rep. Huffman and Rep. Grijalva, the letter was also signed by Mike Thompson (D-CA), Jerry McNerney (D-CA), Mark DeSaulnier (D-CA), and Anna G. Eshoo (D-CA).

The full text of the letter is below.

The Honorable Gene L. Dodaro
Comptroller General of the United States
U.S. Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Comptroller General Dodaro,

The Department of the Interior's Office of Inspector General, (DOI OIG), recently issued a report regarding the Bureau of Reclamation's (USBR) spending on the Bay Delta Conservation Plan (BDCP) – a state-led effort involving the construction of new water diversion facilities benefitting select water contractors in the state of California. See DOI OIG, Report No. 2016-WR-040, The Bureau of Reclamation Was Not Transparent in its Financial Participation in the Bay Delta Conservation Plan (Sept. 7, 2017) (DOI OIG Report). In its report, the DOI OIG found that USBR "did not fully disclose to Congress and other stakeholders the $84.8 million cost of its participation in the BDCP efforts." DOI OIG Report, at 1. The DOI OIG report (at 1) states further that:

[USBR] did not report [to Congress] $50 million derived from an appropriation, available for other general purposes, that it also used for the BDCP. USBR obtained this $50 million over a 7-year span by using a complex, obscure process that was not disclosed in the annual congressional budget justifications, Office of Management and Budget Calfed Bay-Delta certified annual financial reports, or numerous briefing documents on BDCP issues and status prepared by USBR for senior management officials.

The complex, obscure process cited by DOI OIG report involved USBR altering its standard funding process for operation and maintenance activities which, according to the DOI OIG report, "obscured the source of its funding and the total cost of [USBR's] participation in the BDCP." DOI OIG Report, at 8. The DOI OIG report states that "USBR supplemented its BDCP activities with $50 million derived from funds appropriated for 'water and related resources' and authorized for application to reimbursable Federal [Central Valley Project Operation and Maintenance] activities and other purposes." DOI OIG Report, at 8. That is, USBR may have "written off" reimbursable expenses and converted them to expenses borne by the taxpayer.

Given these troubling findings, we respectfully request a GAO legal opinion as to whether USBR's actions with regard to the $50 million referenced above were consistent with, among other things, the rule against augmentation and the Miscellaneous Receipts Statute, 31 U.S.C. § 3302 (b). For your convenience, please find the full OIG report enclosed.

# # #

Attached:

Background: Delta Tunnels: Bureau of Reclamation is "Beyond reclamation."

Proposed Huntington Beach desalination plant clears a hurdle with State Lands Commission vote

Los Angeles Times | October 19, 2017 | Bradley Zint

A proposed Huntington Beach seawater desalination plant passed a major regulatory hurdle Thursday when a marathon session at City Hall concluded with an endorsement from the California State Lands Commission.

After more than four hours of public comment, the three-member panel unanimously approved amendments to a 2010 environmental impact report on Poseidon Water's $1-billion project.

The additions, recommended by commission staff, are expected to make the proposed plant at Pacific Coast Highway and Newland Street less harmful to ocean life and ensure its compliance with the California Ocean Plan, passed in 2015.

Among the changes are installing 1-millimeter wedgewire screens on an existing 14-foot-diameter offshore pipeline. The stainless-steel screens, about as thick as a credit card, are designed to prevent larger sea creatures from getting sucked into the intake pipe.

Poseidon also wants to install diffuser technology on another offshore pipeline that would lessen the salt concentration of the plant's discharge, according to commission staff.

Both pipelines have been in use since 1957.

"We are grateful for the thoughtful deliberations by the members of the California State Lands Commission and for approving our proposed environmental enhancements to the Huntington Beach desalination project," Scott Maloni, Poseidon Water's vice president, said in a statement. "Today's action is an important step toward addressing California's need for a reliable source of clean water that can withstand the very real threat of climate change. Once built, Huntington Beach will be the most technologically advanced, energy-efficient and environmentally sound seawater desalination plant in the world."

Poseidon says the plant would produce 50 million gallons of drinkable water a day, enough for 400,000 people.

Commissioner Betty Yee, California's state controller, said she wanted to see the facility be a model by being carbon-neutral.

Proponents of the project wore blue T-shirts that read "Water for the people" in English and Spanish and contained the hashtag "#VivaDesalination."

Representatives of organized labor also expressed their support, arguing that the project would create thousands of jobs. Several Orange County politicians and water agencies commended the project as well, saying it would create a much-needed local water supply.

Some advocates of the Bolsa Chica Ecological Reserve applauded Poseidon's recent pledge to give $300,000 annually to a state fund that could apply the money toward restoring the wetlands.

Opponents, many from Huntington Beach and regional environmental groups, said the project would harm sea life and is an expensive, inefficient method to obtain water that isn't necessarily needed.

Among the group in Poseidon's corner was former U.S. Sen. Barbara Boxer. The retired California Democrat said she has always been an environmentalist but can't understand why there is so much opposition to this project.

She noted how desalination has been a solution locally and worldwide.

"We've seen it in Carlsbad," Boxer said, referring to another Poseidon plant. "We've seen in Israel. We've seen it around the world."

Ray Hiemstra, associate director of programs for Costa Mesa-based Orange County Coastkeeper, said screens like the one Poseidon wants to install have been faulty and known to clog.

He warned how the plant's discharge could kill marine life and urged conservation measures to handle Orange County's water demand.

"We're wasting more water every day than this plant would produce. … Conservation still has a long way to go," Hiemstra said.

James Fisler, a director of the Mesa Water District in Costa Mesa, which has long supported Poseidon, accused environmentalists of fear-mongering.

"The answer to the drought is more water," Fisler said.

Former Huntington Beach Mayor Debbie Cook said the community, not Poseidon, should determine how much water is needed, how much should be produced and what technology is used.

"Poseidon has turned this process on its head," she said.

Victor Valladares and Oscar Rodriguez, members of Oak View Comunidad, a Latino advocacy group in Huntington Beach, argued that the plant would not provide an affordable water supply for their community, where many of whom residents live paycheck to paycheck.

Jennifer Savage, California policy manager with the San Clemente-based Surfrider Foundation, pointed to Poseidon's desalination plant in Carlsbad. She accused the company of being "terrible when it comes to environmental stewardship" and cited media reports this year saying the San Diego County plant is not delivering the amount of water promised.

Poseidon's project next faces consideration by the Santa Ana Regional Water Quality Control Board, which could hear the matter in the spring.

After that, the proposal will go before the California Coastal Commission.

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