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The Current Drought Exposes Long-Standing Water Problems, Not Create Them: Can Policymakers and Scientists Learn From This?

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"You never oughta drink water when it ain't runnin'."
—John Steinbeck, *Of Mice and Men*, 1937

California is in the midst of its third year in a row with "below normal" water supplies. We call that a drought. However, much of our public debate is not about how to solve the problems exposed by the drought. Instead, we demand 'more water' as the answer to 'not enough water.' If it was only that easy! The drought amplifies—but is not the cause of—our long-standing water problems. For example:

- The current drought did not force cities like Folsom, Roseville, or Sacramento to use significantly more water per capita than the state average, as they have done for decades.
- The current drought did not force farmers in the Sacramento and Central valleys to substitute water-needy permanent tree and vine crops for more traditional annual crops, which often use less water.
- The current drought did not force almost 100 years of overuse of groundwater in the Tulare Basin of the Central Valley.
- The current drought did not cause the decline of important fish species in the Sacramento–San Joaquin Delta—often called the Pelagic Organism Decline—which started long before water exports from the Delta.
- The current drought did not force Delta property owners to convert almost 700,000 acres of seasonally flooded wetlands into productive agriculture, which eliminated valuable habitat for fish and wildlife.
- The current drought did not force communities in rural California to rely solely on wells or the hope of adequate rain or snow for their water supply.

Instead, our historic population and economic growth—and the social and individual choices we have made—explain the water and environmental problems we face today. Unless we acknowledge that water supplies are limited, and act to temper our water use, we will limp toward the next drought, and act surprised when it happens. Matching human expectations to the limits of nature is essential, but generally not politically popular.

When the Delta Stewardship Council adopted the Delta Plan in late 2013, we described the situation this way:

> "Achieving the co-equal goal of providing a more reliable water supply for California means better matching the state's demands for reasonable and beneficial uses of water *to the available water supply*." (DSC 2013) [emphasis added]

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Historically, we have acted as if nature will supply whatever water humans' demand.[1] The Delta Plan mirrors what the California Department of Water Resources (CDWR) has been saying for many years: rely more on local sources of water, including efficiencies and conservation. CDWR calls this 'regional self-reliance,' or 'integrated regional water management.'

Equally important, Governor Jerry Brown's Administration has broadened the steps needed to resolve water and environment issues. It directed the State Water Resources Control Board to complete its Bay Delta Water Quality Control Plan, which is vital to both water quality and environmental protection. The Administration's California Water Action Plan is notable for urging water conservation "as a way of life," and for urging immediate groundwater management at the local level—with the ability of CDWR to step in the breach if locals are unwilling or unable to act (CNRA 2014).

This journal publishes the research of scientists and engineers focused on environmental and water quality problems in the San Francisco Bay and Sacramento–San Joaquin Delta. In a recent issue[2] the journal linked public policy questions to traditional scientific research. This is a good idea, but we must overcome the suspicions both professions have of the other. The scientific community seems deeply suspicious of politics in general, and frustrated with demands that scientific recommendations should carry a guarantee of success. Policymakers have their own frustrations with politics and science.

After 50 years in and around public policymaking, and listening to a lot of scientists tell me what I should know and do about ocean policy, water, and the Delta, it seems to me that both sides need to step back and think a bit differently.

First, a confession: Most policymakers, even lesser ones like me, want to find popular solutions to complicated problems. That's why we spend so much time talking about "win–win" solutions; the dream world where everyone gets whatever they want, and there is no need for taxes or fees to pay for the result! Sure, this is completely unrealistic. We know that.

However, we also know that public expectations—unrealistic or not—permit or block good policy changes. The calls for political 'leadership' are too often cries for policymakers to ignore public opinion and 'do the right thing.' In spite of this conflict, policymakers are inching toward water management solutions.

POLICYMAKERS HAVE INVITED SCIENCE INTO THE WATER BATTLES

California policymakers have explicitly invited scientists to join the effort to improve the reliability of our water supply, and to protect and improve our environment.[3] In 2012, Governor Brown, U.S.

1 In 1962 prominent water attorney James H. Krieger and Harvey O. Banks—the famous CDWR Director for Governor Pat Brown when the State Water Project was authorized by California voters—made a very similar point. Although focused on groundwater overuse, the article followed an 18-year dry period in southern California and sounds exactly like today's water debate. Of course, some progress on water conservation has been made, but not enough. Krieger and Banks state that the problem of water supplies not meeting human demands

> *"... can be met in two ways: increase the supply or limit the demand. Both are necessary. Methods of increasing the supply range from experiments in saline water conversion, rain making and bizarre flirtations with 'juvenile water,' to bold and expensive projects to transport water great distances over the mountains from watersheds with surplus to areas of deficiency. Great aqueducts are not new in California, but the $1,750,000,000 California Water Resources Development Bond Act to conserve and transport water from Northern California to Southern California is the most ambitious project of its kind in America. In limiting the demand for water California has been less imaginative. Americans are less prone to curb their appetites than they are to invent new ways to satisfy them; hence, there have been few attempts to stretch the available water supply. Conservation and reclamation are viewed as a last resort. While this philosophy is responsible in part for the people of California voting a multi-billion dollar project to import water into thirsty areas, it is equally accountable for squandering the local supply.* (Krieger and Banks 1962)

2 For essays on science and policy in the Bay–Delta, see Volume 11, Issue 3 in *San Francisco Estuary and Watershed Science* (*http://escholarship.org/uc/search?entity=jmie_sfews;volume=11;issue=3*); see also Medellín–Azuara et al. 2014 (*http://escholarship.org/uc/item/4b7295m9*).

3 Legislation adopted in 2009 mandates use of "the best available science," and "adaptive management" in the Delta Stewardship Council's Delta Plan, Water Code Sec. 85302. These requirements are also part

Secretary of Interior Ken Salazar, and NOAA Deputy Administrator Eric Schwaab made a major announcement on the Bay Delta Conservation Plan (BDCP), shrinking its size and reducing the number of intakes for the proposed tunnel, and also by speaking directly about the role of science in the water future of California:

> "Science will now guide how to best restore the ecosystem and how much water can be exported." (CNRA 2012)

More and more, words like 'best available science' and 'adaptive management' appear in legislation. Sure, statutory mandates don't enforce themselves, and they don't protect scientists from criticism for what they say. And there is no endless supply of free money for science. But the invitation to science is there and it is real.

Policymakers have heard scientists on water and environmental problems. We know the present water supply system is not working as it should. We know the supply of water is limited; most of California is arid and water is a scare commodity. We know the Delta ecosystem has to be dramatically improved if we want a more reliable water system. And we know it will take a very long time to work this out.

MANAGING MESS

'Managing mess' is an excellent way to describe how we deal with our water problems in California, where a relatively fixed supply is tied to growing human demands, slow progress in water conservation or water efficiencies, and the moral and legal obligation to protect and improve the environment. Emery Roe[4] coined this phrase in *Making the Most of Mess: Reliability and Policy in Today's Management Challenges* (Roe 2013).

Roe suggests there are practical limits to our ability to 'control nature,' and those limits butt up against unrealistic human expectations. Thus, he ultimately concludes that managing a 'mess' is inevitable.

Ironically, 'managing mess' sounds like a place where the scientific method—hypothesis, test, test, and test again... and redo the whole thing as new evidence is found—ought to be comfortable. Roe suggests further that preventing a mess from turning into a disaster is what we should be about.

In the middle of a drought, most folks just want more water for their farms or towns or the environment. Science has no immediate solution for that preference, but a drought does focus the attention of the public and policymakers, if only for a brief period of time (Lubell 2014). Which is why connecting science and government is vital, with all the benefits, and possible dangers that follow.[5]

DROUGHT LESSONS LEARNED: CDWR LOOKS BACK

The California Department of Water Resources (CDWR) is the operational and planning water agency for the State of California. It gets little credit for

of the Bay Delta Conservation Plan, as explained in the Governor's California Water Action Plan and other BDCP documents.

4 Roe is currently a policy analyst at the University of California, Berkeley's Center for Catastrophic Risk Management.

5 A sobering discussion of applied science and government comes from the British chemist, novelist, and social commentator C. P. Snow. In his 1960 Godkin Lecture at Harvard, Snow, one of the smart young scientist recruited for the World War II effort, talked about the uses and abuses of scientific opinion. He powerfully described the science-recommended decision to carpet bomb the homes of German workers to damage the industrial capacity of that country. The morality of targeting civilians was horrible enough, but post-war surveys showed that the estimate of scientists who predicted a dramatic drop in German production capacity was wrong.

Snow was on the losing end of the British government's argument on carpeting bombing, but after the war thought long and hard about what to do with atomic and nuclear weapons, another intersection of science and government. Although nuclear war, to be sure, is far more threatening than California's water battles, the problems of policymakers who have little background in science remains. Snow described the dilemma this way:

> *"One of the most bizarre features of any advanced industrial society in our time is that the cardinal choices have to be made by a handful of men: in secret: and, at least in legal form, by men who cannot have a firsthand knowledge of what those choices depend upon or what their results may be."* (Snow 1961)

Which leads to a related subject of communication between science and government, the subject of The Alan Alda Center for Communicating Science at Stony Brook University, *http://www.centerforcommunicatingscience.org/*

doing a good job, but is sure to be blamed when water problems crop up. Why haven't policymakers paid attention to CDWR, when it has reported for decades that dry water years are common in the state? CDWR's post-mortem reports on the droughts of 1976–77, 1987–92, and 2007–09 are worth a look.

The 1976–77 drought prompted the temporary pipe carrying fresh water across the Richmond–San Rafael Bridge to Marin County. CDWR strongly recommended the 1986 update of the Coordinated Operations Agreement of the Central Valley Project and the State Water Project, which has made federal and state water operations more efficient, and which ultimately committed the federal government to state standards of water quality and environmental protection (CDWR 1978).

The 1987–92 drought confirmed improvements in the federal/state Coordinated Operations Agreement, and began our experiment with a State Drought Water Bank, premised on legislation that encouraged the use of water marketing (CDWR 1993).

The 2007–09 drought accelerated the pace of water banking and prompted regional water storage projects in Southern California and Contra Costa County (CDWR 2010). Actions at the local level are very important, since about 84% of all annual spending on water supplies and delivery, water and wastewater treatment, and flood control is done by local agencies (Hanak et al. 2014).

Add to this list CDWR's long and successful advocacy of regional self-reliance and integrated regional water management and it is clear that progress is being made (CDWR 2005, 2009, 2013). Water Code Section 85021[6], adopted in 2009, legally set as state policy 'reduced reliance' on the Delta for water in the future, following the CDWR emphasis on local and regional self-reliance. Yes, droughts lead to change.

AND SOME FAILURES

California's failure to stop the long-standing overuse of groundwater, and our erratic record of statewide water conservation by urban, rural, and business/industrial interests is clear.

Fortunately, the governor's Water Action Plan calls for groundwater regulation, first at the local level, and then by state agencies if local action does not occur. It also articulates that "conservation has to be a way of life" for Californians, not just an option. Historians will note similar language appearing in the 1976–77 CDWR report (CDWR 1978). The renewed effort from the current administration is impressive.

WILL SCIENCE RESOLVE THE DROUGHT AND ALL OUR OTHER WATER PROBLEMS?

I doubt the lack of scientific research lies at the heart of all our problems. Instead, matching our demands for water to the available supply is the practical dilemma we face. The National Research Council of the Academies of Science, Medicine, and Engineering (NRC) has managed to put the science and policy of water and the Delta into clear language (see NRC 2012) that points the way forward:

- There is not enough water in California to meet all desired uses everywhere and at all times. (p. 32)
- California is not running out of water, but we should stop over-promising what can be delivered. (p. 38)
- Massive water conveyance and storage projects are being replaced with supply and demand-management tools, particularly the use of conservation. (p. 31-32)
- The Delta that existed before extensive human uses were applied cannot be recovered. (p. 152)
- Elimination of one stressor to the Delta ecosystem is unlikely to reverse the decline of any listed species. Equally important, a species-by-

6 Full text of California Water Code Section 85021 is available here: *http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=85021*

species recovery program is not likely to work. (pp. 6, 8)

This short list illustrates how first-rate science could become public policy. It also echoes Governor Brown's generic call for us to "live within our means," which applies as well to water supply and the ecosystem as it does to state budgets and spending.

The significant water and environmental documents of California including the Delta Plan, the governor's Water Action Plan, and the CDWR Water Management Plan Update, all move in the directions the NRC suggests. The lesson is simple, but difficult to achieve: we must all be far more prudent in our use of water than we are now.

For obvious reasons, I hesitate to say to scientists, "Come on in; the water's fine." That is, however, exactly what I mean. We can achieve better results with a joint effort than by staying in our professional silos and yelling.

To make this work, scientists and policymakers both need a sense of history, considerable patience, and the willingness to say publicly what we all say privately. That's not easy, but it *is* possible.

REFERENCES

[CDWR] California Department of Water Resources. 1978. The 1976-1977 California drought: a review. [cited 05 June 2014]. Available from: *http://www.water.ca.gov/watertransfers/docs/9_drought-1976-77.pdf*

[CDWR] California Department of Water Resources. 1993. California's 1987-92 drought: a summary of six years of drought. Sacramento (CA): CDWR. [cited 05 June 2014]. Available from: *http://www.water.ca.gov/waterconditions/docs/2_drought-1987-92.pdf*

[CDWR] California Department of Water Resources. 2005. California water plan update. Sacramento (CA): CDWR. [cited 05 June 2014]. Available from: *http://www.waterplan.water.ca.gov/*

[CDWR] California Department of Water Resources. 2009. California water plan update. [cited 05 June 2014]. Available from: *http://www.waterplan.water.ca.gov/*

[CDWR] California Department of Water Resources. 2010. California's drought of 2007-2009: an overview. [cited 05 June 2014]. Available from: *http://www.water.ca.gov/waterconditions/drought/docs/DroughtReport2010.pdf*

[CDWR] California Department of Water Resources. 2013. Draft California water plan update. California water plan update. [cited 05 June 2014] .Available from: *http://www.waterplan.water.ca.gov/*

[CNRA] State of California Natural Resources Agency. 2012. Governor Brown and Obama Administration outline path forward for Bay Delta Conservation Plan. Press release dated 25 July 2012. [cited 28 May 2014]. Available from: *http://baydeltaconservationplan.com/Libraries/Dynamic_Document_Library/Joint_Announcement_Press_Release-7-25-12.sflb.ashx*

[CNRA] State of California Natural Resources Agency. 2014. Final state water action plan released: outlines California's near-and long-term water priorities. Press release dated 27 January 2014 [cited 28 May 2014]. Available from: *http://resources.ca.gov/docs/Final_Water_Action_Plan_Press_Release_1-27-14.pdf*

[DSC] Delta Stewardship Council. 2013. Chapter 3: A more reliable water supply for California. In: Delta plan. [cited 28 May 2014]. Available from: *http://deltacouncil.ca.gov/sites/default/files/documents/files/CH_03_2013.pdf*

Krieger JH, Banks HO. 1962. Ground water basin management. 50 Cal. L. Rev. 56. Available from: *http://scholarship.law.berkeley.edu/californialawreview/vol50/iss1/3*.

Lubell M. 2014. The California drought is a political time machine. Center for Environmental Policy and Behavior [Internet]. Blog entry dated 05 March 2014. [cited 28 May 2014]. Available from: *http://environmentalpolicy.ucdavis.edu/blog/2014/03/333*

Medellín-Azuara J, Howitt RE, Hanak E, Lund JR, Fleenor W. 2014. Agricultural losses from salinity in California's Sacramento-San Joaquin Delta. San Fran Est Water Sci [Internet]. [cited May 19 2014]; 12(1). Available from: *http://escholarship.org/uc/item/4b7295m9*

[NRC] National Research Council of the National Academies, Sustainable Water and Environmental Management in the California Bay-Delta. 2012. [cited 29 March 2012]. Available from: *http://www.nap.edu/openbook.php?record_id=13394*.

Hanak E and 10 others. 2014. Paying for water in California. [cited 12 March 2014]. San Francisco (CA): Public Policy Institute of California Available from: *http://www.ppic.org/main/publication.asp?i=1086*

Roe E. 2013. Making the most of mess: reliability and policy in today's management challenges. Durham (NC): Duke University Press. 224 p.

Snow CP. 1961. Science and government. Cambridge (MA): Harvard University Press. Published in Great Britain by Oxford University Press, London. 152 p.