

Climate change could overwhelm California, Obama adviser says

By Carolyn
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Science

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Photo: Justin Sullivan, Getty Images

Image 1 of 2

Cracks in the earth at Shasta Lake in Northern California.

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WASHINGTON — Climate change is moving faster than anticipated and is intensifying California's drought, and unless greenhouse gas emissions are slowed, the state's efforts to adapt will ultimately be overwhelmed, President Obama's science adviser says.

California can do many things to adapt to the challenge of a drier environment, from pricing water more realistically to increasing conservation and efficiency and building more dams, White House science adviser John Holdren said in an interview with The Chronicle. But if greenhouse gas emissions continue on their current course, he said, such efforts are “ultimately going to be swamped by the changes in climate.”

“If you don’t also start to address the driving force,” Holdren said, making the state more drought-resilient will become “more expensive, less effective and more difficult.”

Holdren is monitoring California’s drought with the intimate interest of a nearly native Californian who grew up in San Mateo, earned his doctorate in physics from Stanford University and taught at UC Berkeley for more than two decades.

He knows the gallon capacity and energy input of a new desalination plant in San Diego County, and the share of fresh water flowing through the San Joaquin-Sacramento River Delta that it takes to prevent salt water from getting into supplies for people and crops.

Has Obama’s trust

“I lived in California for 30 years as an adult, and I grew up in Northern California,” said Holdren, 71. “So I’m somewhat familiar with the situation.”

By many accounts, Holdren is the most influential science adviser to a president since the job was created in 1976. From his office in the Eisenhower Executive Office Building next door to the White House, Holdren has been a key architect of Obama’s second-term agenda on climate change. The president often says that like Republicans, he’s not a scientist, “but I’ve got this guy. John Holdren. He’s a scientist.”

As one of the nation’s most influential ones, Holdren combines intellectual energy with an approachable demeanor and a frankness unusual in Washington.

Holdren is careful not to say climate change is the sole explanation for the drought. But the evidence of a connection to the warming climate, he said, is “enough to say very firmly that while you can’t assert that climate change is entirely responsible for the drought, you sure can assert that climate change has made it worse.”

He lists four links as firmly established:

- As the state warms — last year was the hottest on record — water evaporates faster from soil, reservoirs and rivers. Even if precipitation stays at normal levels, the environment will become drier.
- A larger fraction of precipitation occurs in extreme events. Rather than recharging the soil or underground aquifers, more precipitation is lost as runoff from big storms.
- More precipitation falls as rain and less as snow. The Sierra snowpack is California’s biggest reservoir, carrying the state through its summer dry season. This year the Sierra snowpack all but vanished.
- The spring melt occurs earlier and faster, reducing the amount of runoff later in the year.

Change at poles

A fifth link remains controversial, but Holdren sees “quite powerful evidence” for it:

- Changes in the temperature gradient between the poles and the midlatitudes are causing a “wavier” jet stream that has brought colder winters to the East and the “Ridiculously Resilient Ridge” of high pressure to California, shunting winter storms to the north.

With a smaller snowpack, a faster spring melt and more precipitation occurring in big storms, many in California say

the obvious solution is to build more dams and raise existing ones.

Holdren said the argument makes some sense in theory, but noted that the state already has many dams — roughly 1,400 — and that their reservoirs are shrunken. “The principal problem is that not enough has been flowing down the rivers,” Holdren said, “not that there aren’t enough dams.”

Desalination costly

Desalination plants may help some coastal cities, he said, but the cost is high — about \$2,500 an acre-foot. Urban users now pay between \$1,000 and \$3,000 an acre-foot, he said.

If the San Diego County plant produces its maximum projection of 50 million gallons a day, “you would need some 60 of those to meet half of the urban water needs of the state of California,” Holdren said. “It could be done.”

Conservation remains cheap by comparison, he said. Holdren, a longtime expert in energy policy, sees huge potential efficiency gains in water use. Still, he said, “you can’t conserve everything. You’ve got to supply something.”

He said one of the many things that worries him is what the drought is saying about the pace and momentum of climate change.

“It’s happening faster than we thought, not more slowly,” Holdren said, “and that means we have less time than we thought to respond to it.”

Energy system’s inertia

The huge inertia built into the energy system — a \$25 trillion worldwide investment in a mainly fossil-fuel infrastructure — is colliding with enormous momentum in the climate, which responds slowly to the buildup in greenhouse gases. The world is not even yet fully experiencing the results of emissions put into the atmosphere years ago, he said. It will take decades to turn both systems around.

“If we stopped emitting today, the temperature would still coast up for decades to come,” Holdren said.

He recalled sitting on a presidential science advisory panel during the Clinton administration.

“Quite a lot of folks were saying the impacts of climate change are uncertain and far away, the costs of dealing with it are large and close — therefore, we should wait and see what happens,” Holdren said.

“Well, like it or not, that’s pretty much what we did.”

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