



## **Bare Mountaintops and Thirsty Cities: On California and its Snowpack** **Sayd Randle**

*Figuring how to represent the oncoming effects of climate change is a common challenge faced by whistleblowers and policymakers attempting to alert populations. Sayd Randle shows how the state of California is trying to mobilize the monitoring of snow in the Sierra Nevada as a harbinger of a durable state of drought in the coastal cities.*

“You’re at the Phillips snow course for the April 1, 2015, measurement,” Frank Gehrke, chief of the California Cooperative Snow Survey program, told the crowd of reporters assembled in a barren field high in the Sierra Nevada Mountains. “And as you can clearly see, there is no snow at this location.”

Gehrke held a tall metal measuring pole in his right hand. Twisted around that post at the level of his mouth, a green band marked a height of 56.7 inches (144 cm), the average snow depth for this spot on this day of the year during the previous seven decades of recordkeeping. “This is the first year in its measurements, going back to 1942, that this snow course has been bare, no snow at all,” he explained.

Minutes later, California governor Jerry Brown took to the microphone. Building on Gehrke’s commentary, Brown outlined the grave implications of the barren field for a state water provision system built around the slow summer melt of the Sierra snowpack (currently the source of roughly 60% of the state’s water). No mountain snow in April meant minimal stream flow in the state’s rivers and aqueducts come May and June, which meant a paltry supply of water to allocate among cities and farms across the state that summer. In the speech’s most-quoted line, he brought a sense of rupture all the way home, right into his constituents’ front yards:

“People should realize we’re in a new era. The idea of your nice little green grass getting lots of water every day, that’s going to be a thing of the past... It’s a different world. We have to act differently.”

In these lines, urban and suburban Californians are presented with the notion that they should interpret the mountain field not as simple evidence of an individual dry year, but as an indicator of unprecedentedly bad years to come. And in the high-altitude staging of the speech, they are all invited to understand their fates as tied to this remote mountain field—while feeling some unease about that arrangement’s future prospects.

**Figure 1. Frank Gehrke, chief of the California Cooperative Snow Survey program demonstrating the absence of snow next to governor Jerry Brown, April 2015**



© Florence Low, California Department of Water Resources, 2015.

Few would question the assertion that cities rely on their hinterlands for critical resources. Aqueducts, power lines, and faraway clusters of farms and forests all provide urban centers with the raw materials they require to thrive. A robust body of scholarship has explored the process of producing, sustaining, and sometimes obscuring such enduring material links between the city and the countryside (e.g. Cronon 1991; Piper 2006; Needham 2016; Powell 2018). But these ties are not unchanging. Just as political and institutional shifts hold the potential to rework the nature and meaning of these urban provisioning networks, so too does environmental change.

Here, I reflect on how the anticipated effects of climate change are reworking both urban–rural material ties and popular understandings of such links in California. I draw on 18 months of ethnographic fieldwork and archival research conducted in 2014 and 2015 to recount scenes from the state’s recent drought crisis alongside representations of its longer history of snowpack monitoring (and reliance). Through these accounts, I sketch the new forms of environmental temporality emerging through public discourse around the remote landscapes on which California’s urbanites rely for their water. Figuring the snowpack as an indicator of not only short-term scarcity, but also of medium- to long-term water stresses across the region, contemporary policy actors seek to rescale fears of (and investments in preventing) metropolitan water crises. The snowless mountaintop, then, signals a potentially parched future far beyond the year it’s measured.

## **Then: snowpack as the familiar near-future**

The state of California first sponsored a coordinated Sierra snowpack survey in the winter of 1929–1930. Over the years, the surveyors established standardized “snow courses” to which they returned repeatedly to gather data on snow depth and water content. Taking three sets of measurements per year became standard: one in late January, one around March 1, and one at the beginning of April. As the surveys proceeded over the course of the 20<sup>th</sup> century, the Sierra snowpack entered the public eye primarily through newspaper reports detailing the snow surveyors’ results and exploits.

Reviewing snow survey coverage from the *Los Angeles Times* gives the reader an appreciation of the climatic variability that has long characterized California. In an April 1931 article titled “State’s Water Outlook Dark,” a byline-less reporter notes that the snow survey revealed moisture levels between 10% and 50% of “normal” in the fields of the Sierras. An April 1933 article—“State Shy on Water this Year”—tells a similar story, warning that the paltry snow levels would lead to reduced streamflow after July 1. In contrast, 1937 articles trumpeted the recovered snowpack: “Seven Feet of Snow Disclosed in Tule Watershed Survey” reported one account, reassuring readers that the year would unfold with ample water for all. These articles emphasize the connections between the snowy landscapes measured by the surveyors and the livelihoods of lowland Californians. “That glass of water you drank at yesterday’s dinner table was probably part of a deep snowfall which drifted against the majestic Sierra Nevada Mountains last winter,” begins one such article, which goes on to detail the measuring mechanics and eventual flow path of the melting snow (“Sierra Snow Survey Forecasts Water Here,” 1937).

Snowpack coverage during California’s last big drought of the 20<sup>th</sup> century, which stretched from 1987 through 1992, conforms with the patterns described above. Notably, it also presents the practice of measuring and the experience of drought as relatively quotidian for Californians, situating both within decades sprinkled with low-snow periods. In this drought, discouraging measurements were reported shortly after the surveys, analyzed in comparison to the readings from previous bad years, and discussed in terms of possible water-policy implications:

“DWP [the Los Angeles Department of Water and Power] hasn’t raised the issue of restrictions, and probably won’t, officials say—at least this year. But in a winter that has provoked more than a few comparisons to the drought year of 1976/77, the precise water content of the Sierra snowpack has emerged in the last few weeks as an issue of concern” (Parachini 1987).

Here, and across these documents, low snowpack in the Sierras is presented as a worrying indicator of a possible short-term crisis—albeit a remarkably common sort of threat for the state and the waterscape. In short, when the public encountered variability within this distant area of the waterscape, it was presented by water managers and newspaper reporters alike as a condition with clear historical precedent.

## **Now: snowpack as a signal of long-term crises to come**

In contrast, accounts of and predictions for these high-altitude environments are now used to structure understandings of the state’s future environment at a different temporal scale. Record low snowpack in a given year is framed not only as an intensification of familiar scarcity, but as

a “preview” of more dangerous conditions to come. During the state’s 2012–2016 drought, images of the Sierras were used by water-policy actors and closely associated experts to index the urgent need to rework urban water supply networks to assure future water reliability.

This orientation was on full display one night in December 2015, when I sat in a darkened auditorium at the University of California Los Angeles’s Hammer Museum of Art staring at a PowerPoint projection of the previous year’s Sierra snowpack. Along with a few dozen other Angelenos, I was attending a free public panel discussion on the future of water in California. Dr Alex Hall, the event’s first speaker, was in the midst of a presentation about the future of snow in California. A widely cited climate modeler, Hall became a media staple and something of a local celebrity over the course of the drought. The *Los Angeles Times* frequently covered his newest findings upon their publication in online journals, fleshing out the articles with comments on the research’s hydrological implications from local water-policy experts. A number of my NGO interlocutors read not only the Hall-focused *Times* articles, but also the UCLA press releases on the research and the scientific papers themselves. Many people in the LA water world treated his findings as expected environmental knowledge throughout my time in the field.

At the December event, Hall was presenting results from recent simulations of the future of California’s snowpack. The news was grim: his models suggested that under “business-as-usual” emissions conditions, the average end-of-century snowpack would be about half of the 20<sup>th</sup> century’s average depth and water content. And even with reduced emissions, he told the crowd, “a significant loss of Sierra snowpack is inevitable.” As temperatures rise, more snow will fall as rain. And further, even when snow falls, warmer winter weather will change the snow’s melt rates, complicating the temporality of water storage and distribution across the network.

Bringing the discussion back to LA, Hall explained that average precipitation totals within the city were unlikely to change much under conditions of climate change, but that storms would probably become flashier and more intense. He also suggested that LA’s best course forward would be to build more infrastructure to direct local rainfall into the city’s groundwater basins for storage. He put a hopeful spin on this assessment, noting that everything he has outlined “bodes well for an enhanced reliance on local resources.” He concluded by telling the crowd that it is unclear whether LA can continue to rely on the Sierras for its water—but that the city needs to start considering the implications of an inability to do so.

We might read Hall’s comments as a more fleshed-out, scientifically rich articulation of Governor Brown’s message from the Phillips snow course. Both present a narrative of rupture: Californians are now living with a new climate, and the Sierras are among the places where these changes are most visible and measurable. And given residents’ reliance on these mountain environments for vital resources, new strategies for withstanding the shocks—such as the unprecedentedly low snowpack revealed at the April 1, 2015, survey—are necessary.

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Following anthropologist Jerome Whittington, it seems appropriate to refer to the Sierra snowpack as a “bellwether” landscape in this context, one of the “harbingers of ecological

change across particularly delicate threshold ecologies” (2013, p. 416)—but with a key twist: the mountain landscape acquires its resonance not only through reference to past and anticipated local environmental baselines, but also in terms of its expected impact on faraway communities that rely on its resources. Though far removed from the daily lives of most Californians, the public staging of a “different world” embodied by the dwindling snowpack inserts this remote space directly into efforts to manage and provision urban landscapes.

As outlined above, when it comes to these particular mountaintops, reading the future in their snowbanks isn’t anything new. As essential resource-providing terrain for populous cities, these landscapes have long been mobilized to justify policy actions and infrastructural investment to buffer the distant communities built on the melting snow. But the key shift at play here—toward figuring the snowpack as an indicator of a medium- to long-term ecological threat, rather than just an acute one—is suggestive of how these bellwethers can slowly rearrange the material ties between cities and hinterlands. Folding every low snowpack reading into a narrative of future mountaintop scarcity bolsters efforts to develop new water sources closer to home, slowly establishing a buffer supply for the highly anticipated (but vaguely placed) lean years to come.

This is very much LA’s current path, signaled through recent large-scale investments in advanced wastewater recycling and stormwater capture, much as Hall called for in that 2015 presentation at the Hammer. And as someone who’s seen more than a few city agency presentations about such projects, I can attest: those capital expenditures are always justified with reference to a shrunken future snow supply. In effect, such narrations of the Sierra Nevadas have helped make the localized impacts of climate change legible before California’s urban centers are forced to address a true water supply crisis. It does seem worth noting, however, that all of this discussion and investment is oriented towards sustaining the lowland population centers, not the mountain environments themselves. These bellwether landscapes, it seems, are read only as places that signal coming danger elsewhere, not as endangered places in need of human protection or concern.

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### **Further reading**

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