

# Historically small Sierra snowpack, seen up close, another bad sign in California drought

By Mark Grossi

JOHN MUIR WILDERNESS — Worst of the worst

- *California's record-setting small snowpack looks as bad as it sounds.*
- *There is no snowpack below 9,000 feet.*
- *Utilities, farmers, cities and industry will suffer this year.*

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In a 9,700-foot-high meadow surrounded by wind-blasted Jeffrey pine trees, the helicopter finally landed on snow — a truly terrible thrill.

The haunting peaks, robust subalpine ecosystem and March chill are a heart-pounding experience. Unfortunately, so is this ghost of snowpack, which will rank as the smallest ever in the Sierra Nevada.

The water frozen in snow throughout the Sierra Nevada is 8% of average — less than [a third the size of the smallest on record](#). On Wednesday when this disappointing wet season ends, the headlines will be the next alarm bell in the state's damaging, four-year drought.

Up close in California's biggest mountain range, this crisis looks as bad as it sounds.

Flying with [Pacific Gas & Electric Co.](#) on a hydrologic inspection, the first four snow courses above 8,000 feet last week had only small, icy patches. In a normal year, they would be buried on snow drifts. PG&E hydrographer Matt Meadows held up the list of zeroes.

"Think I need a calculator to average these?" he asked. "This is supposed to be the biggest that the snowpack will get all year. I think people need to know how bad this is."

Meadows is among dozens of snow surveyors out in late March on the 400-mile-long range. They work for many different agencies and interests — among them the state Department of Water Resources, U.S. Forest Service and irrigation districts.

Farmers, cities, industries and government agencies are all interested in the snowpack, which annually provides a third of the state's water.

What's PG&E's interest? The utility has an innovative hydroelectric facility called the [Helms Project](#), buried out of sight deep in the granite east of Fresno.

When it's in full swing, Helms can light the cities of Fresno and Oakland, using water and gravity to turn electricity-generating units. The water comes from the snowpack around Courtright and Wishon reservoirs.

When the snowpack is small, utilities often cannot run their hydro operations all the way through summer. PG&E is trying to stretch the water supply, officials said.

"We're saving as much water as we can right now so we can have it available for electricity and environmental uses later this year," Meadows said.

Other snow-measurement locations have been tracked for decades in national parks, such as Lodgepole at 6,700 feet in Sequoia National Park. Over more than a half-century, Lodgepole has not seen a drier four years than the current drought, according to the National Weather Service in Hanford.

Lodgepole is a good place to see how the last wet season went so wrong for the Sierra. Normally, it would get 200 inches of snow a year. This year, with mostly warm storms, Lodgepole's total is 63 inches.

"It has been a very dry time," said meteorologist Paul Iniguez of the [Weather Service in Hanford](#). "When you look back just a few years to 2010-2011, Lodgepole got 430 inches of snow. This is quite a different year from that."

How different? [State climatologist](#) Michael Anderson says the previous record for low snowpack was 25% on April 1, 1977. It dropped from 9% to 8% in just a few days over the last week.

"And, no significant precipitation in sight," Anderson said. "As for temperature, we recorded our second straight warm winter for the Sierra region."

Which means the little snow in the Sierra is melting, said private meteorologist Steve Johnson of Fresno. He said the snowpack has been in melting mode since February.

"I don't think I would count on a lot more precipitation," he said. "I think we're done. I see heat and more heat in the coming months."

The warm winter already has taken its toll on the snowpack. On the PG&E survey, it was apparent there was not much snow below 9,000 feet in the Sierra east of Fresno.

At [Dodson's Meadow](#), elevation 8,050 feet, a few dozen feet of a snow patch covered a small part of the meadow where PG&E draws its samples. But it wasn't at a spot where hydrographers have historically sampled, so it couldn't be used in the data collection. Precision is important up here.

Helicopter pilot Brett Hendricks, who was helping to locate exact sampling spots, said the meadow looked a lot like the one they had visited only minutes earlier. At the next site, Long Meadow, elevation 8,500 feet, there was only matted mountain grass, trees, a trickling spring and very little snow.

Finally, at 9,700-foot Upper Burnt Corral Meadow, a broad snow field came into view, and Hendricks gently landed the helicopter on the snow. Everyone donned snowshoes for the crunchy walk to push a long, hollow pole into the snowpack, pull out a snow core and weigh it.

"You get the weight of the tube, plus the snow, minus the weight of the tube," said Meadows, as he ran through the math to determine water content in the snow. "It's 8.2 inches. The average here is about 36 inches."

A little later, Hendricks set the helicopter down in picturesque Blackcap Basin Meadow at 10,300 feet. It's a broad meadow with jagged, ancient peaks jutting into the deep blue sky. White puffy clouds drift on light afternoon breezes.

The sound of water came from many places underneath the snowpack. Clearly, this place is already off and running with snowmelt.

Meadows confirmed it: "You can feel it when you push down the pole. It moves easily. There's not a lot of density. It's melting. With a lot of warmth, this snowpack could come off pretty fast."

PG&E was surveying the north fork of the Kings River. Just south on the middle and south forks, the situation looked much the same, said Steve Haugen, water master for the [Kings River Water Association](#). Many of the association's snow measurement meadows were dry also.

Haugen said the state estimates of Kings runoff from the snowpack in his area would set a new record as the lowest

ever. He compared it to the small runoff in the dry year of 2014, which was only 32% of average. This year, the runoff will probably only be a third of last year's puny runoff.

"Most people are bracing for the worst," Haugen said. "For us, the numbers are hard to grasp."

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