

## Record Snowpacks Could Threaten Western States



National Park Service, via Associated Press

In Rocky Mountain National Park in Colorado, plow operators are dealing with some of the deepest snow seen in years. Above, 23 feet of snow on Trail Ridge Road.

By [KIRK JOHNSON](#) and [JESSE MCKINLEY](#)

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**STEAMBOAT SPRINGS, Colo.** — For all the attention on epic flooding in the Mississippi Valley, a quiet threat has been growing here in the West where winter snows have piled up on mountain ranges throughout the region.

Thanks to a blizzard-filled winter and an unusually cold and wet spring, more than 90 measuring sites from Montana to New Mexico and California to Colorado have record snowpack totals on the ground for late May, according to a federal report released last week.

Those giant and spectacularly beautiful snowpacks will now melt under the hotter, sunnier skies of June — mildly if weather conditions are just right, wildly and perhaps catastrophically if they are not.

Fear of a sudden thaw, releasing millions of gallons of water through river channels and narrow canyons, has disaster experts on edge.

“All we can do is watch and wait,” said Bob Struble, the director of emergency management for Routt County in north-central Colorado. The county’s largest community, Steamboat Springs, sits about 30 miles from the headwaters of the Yampa River, a major tributary of the Colorado River that has 17 feet of snow or more in parts of its watershed.



Annie Tritt for The New York Times

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“This could be a year to remember,” Mr. Struble added in a recent interview in his office as snow fell again on the high country.

No matter what happens, the snows of 2011, especially their persistence into late spring, have already made the [record books](#).

But the West has also changed significantly since 1983, when super-snows last produced widespread flooding. From the foothills west of Denver to the scenic, narrow canyons of northern Utah, flood plains that were once wide-open spaces have been built up.

Many communities have improved their defenses, for example, by fortifying riverbanks to keep streams in place, but those antiflood bulwarks have for the most part not been tested by nature’s worst hits.

And in sharp contrast to the floods on the Mississippi River — one mighty waterway, going where it will — the Western story is fragmented, with anxiety dispersed across dozens, perhaps even hundreds, of large and small waterways that could surge individually, collectively or not at all.

**In California, officials staged three days of flood training last week, running disaster scenarios and practicing the grunt work of filling sandbags and draping and tying down tarp.** The state’s aging [levee](#) system has long been a source of concern, with fears of large-scale failures that could leave Sacramento, the state capital, vulnerable to a [Hurricane Katrina](#)-scale flood. The anxieties are amplified this year by the deep snows in the Sierra Nevada, where some ski spots around Lake Tahoe saw more than 60 feet this season.

At Flaming Gorge Reservoir on the Green River in Utah, federal managers have begun spilling water downstream in preparation for the rising waters; the reservoir has 700,000 acre-feet of available space, but will have an expected inflow of 1.4 million acre-feet more through July, federal officials said.

In the Wasatch Mountains outside Salt Lake City, where Alta Ski Resort still has about 200 inches of snow, cool temperatures have kept snowpacks from crossing what hydrologists call the isothermal barrier — 32 degrees Fahrenheit throughout the snowmass — which allows gradual melting from the bottom. Three more feet of snow piled on just last week.

In sparsely populated Wyoming, emergency officials are worried about tiny communities that in many cases are far from help if rivers surge; almost every county is in a potential snow-melt flood zone, and relatively few residents have flood insurance.

Here in Routt County, the terrain itself has changed, with thousands of acres of dead lodgepole pine trees on high mountain slopes. The trees were killed by an infestation of beetles in recent years and no longer hold the soil as they once did, raising erosion concerns.

Hydrologists, meanwhile, are cheering what they say will be a huge increase in water reservoir storage for tens of millions of people across the West. Lake Mead and Lake Powell, two huge dammed reservoirs on the Colorado River battered in recent years by drought, are projected to get 1.5 trillion gallons of new water between them from the mammoth melt.

But from Sacramento to Baggs, Wyo., a town of about 600 people on the Little Snake River, 150 miles west of Cheyenne, looking upslope in May and seeing lots of white is scary.

Late spring is a volatile time in the mountains, when freezing temperatures can turn overnight to heat waves and thunderstorms. And every day that the snows do not go gently down the stream raises the possibility of melting into late June and even July, when sudden mountain downpours can set off flash floods, dangerous even without a freight of snow behind them.

Floods kill more Americans than lightning, tornados or [hurricanes](#) in an average year, according to [federal figures](#). And [flash floods](#), usually associated with summer downpours, like the one that killed more than 140 people in Big Thompson Canyon in Colorado in 1976, can come as if from nowhere.

“It just takes one really sunny hot spell to get things running,” said Arthur Hinojosa, the chief of the Hydrology and Flood Operations Office with the California Department of Water Resources. “And that’s where our concern lies.”

Mr. Hinojosa added that the state had ample storage and diversion facilities to the north of Sacramento, where the city’s namesake river runs, but that that is less true of the San

Joaquin River, which wends through the state's agriculturally rich Central Valley to the south.

Several major tributaries, including the Merced and Tuolumne Rivers, spill into the San Joaquin, which runs north into the Sacramento-San Joaquin Delta, a collection of low-lying islands and waterways that serve as farmland, a recreation zone and the pumping location for water-hungry farms and residents to the south.

On Wednesday, as part of the California flood training, several dozen disaster officials and workers descended on Twitchell Island, a 3,500-acre delta depression, where land can sit up to 20 feet below sea level. Scores of homes also sit below levees, which hold back water and create marinas, adding the surreal scene of sailboats bobbing above the roofs of houses and farmland.

Some disaster officials say it is the clock that is driving them crazy — every day of postponed melt being cause for a sigh of relief and heightened anxiety from the looming June warmth.

But lingering snows are proving a bonus for others. Arapahoe Basin and [Aspen](#) ski areas in Colorado, for example, plan to keep their chairlifts running on some weekends, in Arapahoe's case, through at least June 19.

*Kirk Johnson reported from Steamboat Springs, Colo., and Jesse McKinley from Twitchell Island, Calif.*