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# Colorado rolls with climate shift, grappling with low river flows and complicated debate over reservoirs

Latest science finds heat — rather than rain and snow — may be driving Colorado's dry-out

By **BRUCE FINLEY** | bfinley@denverpost.com | The Denver Post  
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Colorado's ongoing climate shift toward lower flows in river headwaters is spurring [countless quick adaptations](#), most recently a gubernatorial intervention to allow taller stacks of hay on trucks rolling into the state.

But this shift since the start of the century toward greater aridity also is forcing, out of public view in government meetings and science labs, an unprecedented scramble to determine how much climbing temperatures — compared with Colorado's near-record low rain and mountain snowpack — are driving that change.

Quantifying the impact of rising heat is crucial to anticipate future water supplies, state planners and utility officials say. And it may help resolve an intensifying conflict in which some water users [embrace reservoirs](#) as necessary, though destructive, to enable more population growth and [irrigation agriculture](#) — even as water conservation makes huge gains in Colorado.

Environmental groups reject the idea of creating new reservoirs and are fighting multiple Front Range projects. Colorado already has more than 2,000 reservoirs. And, they note, draining rivers kills already-stressed Western ecosystems.

“The reservoirs really pay off,” state water czar John Stulp said last week after the latest multi-agency Water Availability Task Force meeting. Yet rather than expand storage beyond current projects, Stulp and Gov. John Hickenlooper continue to emphasize a conservation approach of using existing supplies more efficiently.

“We all need to have a strong water ethic,” Stulp said. “We can all do our part at our own water meters.”

As usual around the end of summer, Colorado farmers, ranchers, industries and city dwellers last week were drawing down the state’s existing reservoirs, such as Denver Water’s Lake Dillon, where siphoning through a 23-mile mountain tunnel to slake city thirsts and controlled releases to meet legal obligations downriver dropped the water level to 85 percent full, compared with the 91 percent norm in September.

The reservoir drawdowns are bigger in other parts of western Colorado, with the massive Blue Mesa Reservoir west of Gunnison only 39 percent full, reflecting [the low stream flows and demands of 40 million people across the Colorado River Basin](#). The latest data show combined water storage in Colorado River reservoirs at 47 percent of capacity.

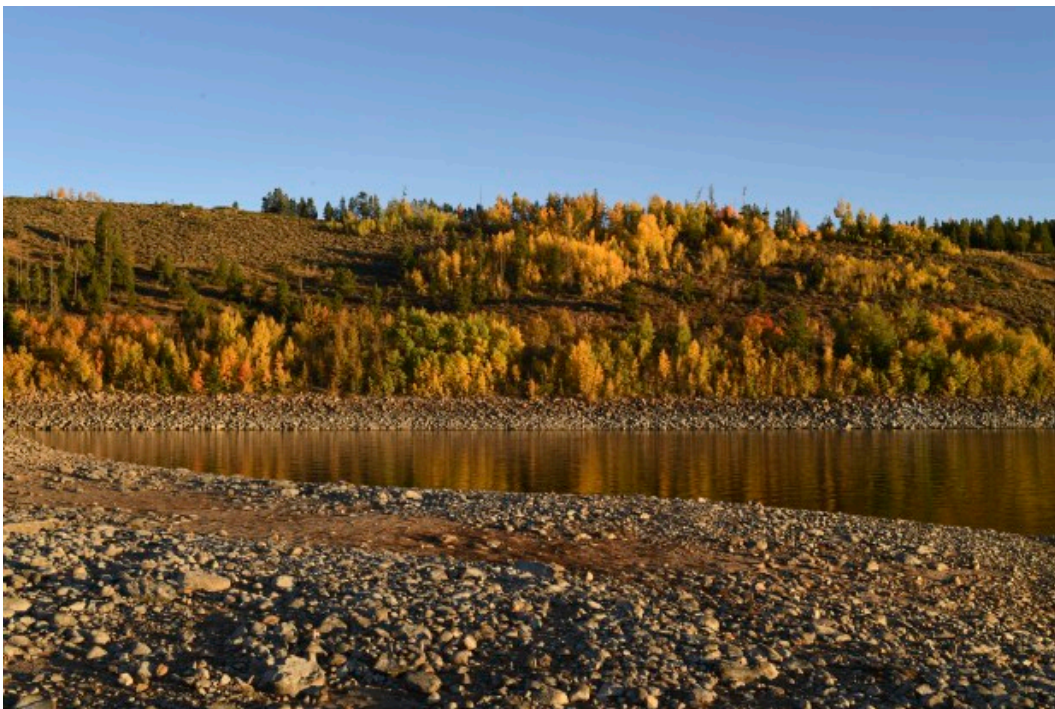
However, other major reservoirs in Colorado remain relatively full with surpluses from last spring and in-flow of water offsetting withdrawals. Northern Water officials said their reservoirs supplying high-growth Front Range cities and farming measured 111 percent of normal for this time of year. Similarly, the John Martin Reservoir in southeastern Colorado was at 140 percent and Pueblo Reservoir was at 125 percent of the norm. Recent rain on the Eastern Plains has enabled late planting of wheat.

Statewide, federal data show reservoir storage at 82 percent of normal for September, which is about half full. Few have gone dry.

But as reservoirs serve their purpose of minimizing suffering during [dry times](#) before refilling in spring, the low flows in rivers are changing the environment — and causing more damage in some places than the [toxic drainage from metal mines](#). Southwestern Colorado's Animas River, for example, has dwindled to a record-low trickle before it disappears in New Mexico. Tens of thousands of [fish have died](#).

Hickenlooper last week issued an executive order to help cattle ranchers who lack water get by. Some have been adapting by importing more hay and face price hikes from \$180 to \$220 a ton. The governor's order lifts restrictions on the height and overall volume of hay hauled into Colorado on trucks, so ranchers could bring more per load and shave fuel costs.

Colorado leaders are working with counterparts in other Western states to [manage Colorado River water](#) at a time when federal officials have warned they may declare an unprecedented "shortage" because low river flows and withdrawals have left Lake Powell, straddling the Utah-Arizona border, less than half full and Nevada's Lake Mead 38 percent full. They're developing response plans that focus on reducing water use and taking advantage of any high flows to replenish reservoirs.



RJ Sangosti, The Denver Post

The sun rises over Dillon Reservoir on Sept. 12, 2018 in Frisco.

## Rising temperatures

Conservation gains in recent years enabled population growth with more people and producers surviving on less water despite hotter, drier conditions.

But Colorado officials are trying to make sure a growth and development boom can continue. Taryn Finnessey, the state's senior climate change specialist, oversees more-or-less continual monitoring of precipitation, stream flows and reservoirs.

“Certainly, the drier and lower we go, the more the impact. That’s problematic. What those impacts are, specifically, will depend on where you are in the state,” Finnessey said.

The average temperature in Colorado has increased by about 2 degrees Fahrenheit over the past century. National Weather Service meteorologists also have measured a trend toward more days where highs reach 90 degrees or hotter. (In metro Denver, temperatures hit 90 or higher on 56 days so far this year, and four of the five years with the highest average temperature on record were after 2006.)

A widening body of research focuses on how much this increased heat, compared with precipitation, affects water levels in rivers — due to increased evaporation and transpiration from plants. A study released last month found that higher temperatures caused 53 percent of the overall 16 percent reduction of water over the past century in the Colorado River — three times more than previously believed.

“You have a greater atmospheric thirst because the air is warming. And plants use more water because it is warmer. And the plants have a longer growing season,” said study author Brad Udall, senior scientist at Colorado State University’s Colorado Water Institute.

“What is a surprise is the magnitude of the loss,” Udall said.

For the first time this year, state officials ordered restrictions on water use along the [Yampa River, crucial for agriculture](#) in northwestern Colorado. This is an area where snowpack on April 1 measured relatively high — around 90 percent of normal. Yet river flows still ran low, virtually disappearing near Dinosaur National Monument.

National Weather Service data show that the average high temperatures since April 1 along that river in Steamboat Springs, Hayden and Craig topped 75 degrees and ranked among the hottest on record in that area.

“We’re seeing, even in systems where we get average snowpack, less water flows because of the high temperatures. More evaporation is occurring,” said Ted Kowalski, director of the Walton Family Foundation’s Colorado River Initiative. “Even where we see average snowpack, we’re getting less water.”

Climate scientists anticipate [continued increasing temperatures due to the unprecedented, rising global concentrations of heat-trapping greenhouse gases](#) from burning fossil fuels, which has led to carbon dioxide levels topping 410 parts per million.

## Build more reservoirs?

The low flows in waterways raise questions about [the viability of new reservoirs](#), even if there was a consensus to build them.

“Reservoirs are very handy when you have big swings between wet years and dry years. They no doubt are useful. The question is: Can building more reservoirs translate to having more water available year after year? In a lot of places, we don’t have the water flows to fill reservoirs. I’m skeptical,” said Douglas Kenney, director of the University of Colorado’s Western Water Policy Program and chairman of the Colorado River Research Group.

“You can build more reservoirs. But if you don’t have the water to put in, then it does no good. ... There is certainly some logic to the argument that we need to be able to capture water in the really wet years so that we can get through the dry years,” Kenney said. “The reality is the West is just becoming drier.”

Hotter, drier conditions in the South Platte River Basin that Denver Water relies on have led to increased siphoning from Lake Dillon through the 10-foot diameter Roberts Tunnel under the Continental Divide. Recreational boating marina crews, noting that they have seen worse drawdowns, adapted by reconfiguring their docks. Denver Water officials said most of the drawdown is due to releasing water from the reservoir to senior water rights holders downriver.

Denver Water manager Jim Lochhead has encouraged [conservation and efficiency](#) but also favors significantly increased storage capacity strategically spread across mountain basins.

A current imbalance in where Denver draws water “underscores the need and importance of the Gross Reservoir Expansion Project (in western Boulder County), which is in the final stages of approval after nearly 15 years of permitting,” Lochhead said. “When it is completed, Denver Water will have more flexibility throughout our system to react to year-to-year changes in snowpack levels, extreme weather swings and unbalanced conditions across the state.”

## “A rough, dry summer”

Agriculture accounts for more than 85 percent of the water used in Colorado. Livestock producers have adapted to low flows by reducing or liquidating herds. Farmers lacking sufficient water have planted fewer crops and improvised to fulfill contracts.

“It’s been a rough, dry summer for us” due to “dealing with the lack of water supply,” said San Luis Valley producer Cleave Simpson, who manages the Rio Grande Water Conservation District.

When river flows hit near-record lows, farmers under state orders to gradually replenish the depleted underground aquifer that they tap as a water savings account during dry times reverted this year to pumping groundwater.

“It will be a 200,000 acre-feet decline, after four years of recovering about 350,000 acre-feet,” Simpson said. “There’s a price we will pay for that. It’s going to bite us.”

Under legal agreements with downriver states, nearly two-thirds of the water that originates in Colorado must be left in streams and rivers.





RJ Sangosti, The Denver Post

Cleave Simpson works on his alfalfa farm on June 10, 2018 in Alamosa. Simpson is worried about water shortage in the area and was not able to plant alfalfa in all the fields that he normally would due to a lack of irrigation water.

Environmental advocacy groups raise concerns that too much alarm could whip up sentiments for building more reservoirs.

Save the Colorado River director Gary Wockner, who has worked with groups including WildEarth Guardians and the Sierra Club in filing lawsuits, advocates increased conservation and transferring water from farmers to cities as the best solution. He's urging water utilities to begin "cash for grass" programs that pay urban residents to remove lawns.

"Conservation is fast, easy and cheap. And farmers have a right to sell their water. They've been doing that by thousands of acre-feet per year and will keep doing it. If cities are going to continue to be obsessed with growth, they should get water from conservation and farmers, not our rivers," Wockner said.

"If a city tries to drain a river, we will try to stop it," he said. "It will be harder for a city, take longer and probably be more expensive. And the water will not be guaranteed because a court might stop the project from getting built."

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