

Ground water is depleting in the Colorado River Basin

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A recent study of water loss in the Colorado River Basin since late 2004, published in *Geophysical Research Letters*, has determined that 75 percent of the loss came from underground sources. Seven western US states (Wyoming, Colorado, Utah, New Mexico, Nevada, Arizona and California) rely on the Colorado River and its tributaries for water for both individual use and agriculture. It is estimated that agriculture by itself currently uses approximately 60 percent of Colorado River ground water.

The basin supplies water to about 40 million people in seven states, as well as irrigating roughly four million acres of farmland. The study notes that the water of the Colorado River is the most over-allocated in the world. While the situation is not yet critical, increased demand will soon outstrip the available resources, “suggesting that limited groundwater reserves will play an increasingly important role in meeting future water needs.” Thus, any decrease in the groundwater, particularly during a drought, “may threaten the long-term ability to meet future allocations to the seven Basin states.”

The research team, led by scientists from NASA and the University of California, Irvine, used data obtained from NASA’s Gravity Recovery and Climate Experiment (GRACE) satellite mission in order to track changes in the Colorado River Basin, which are related to changes in water amounts on and below the surface.

The GRACE satellite has provided the means for researchers and scientists to quantify much more accurately the degree of water loss in the basin. Previously, the primary means for detecting groundwater has been well data, which is inconsistent and unreliable. In addition, individual states are left to regulate groundwater on their own, with dubious accuracy and in many cases a complete lack of

regulation. Some states, such as California, have no groundwater management rules whatsoever.

While above-ground reservoirs can refill in years of normal precipitation, it can take decades or longer to replenish underground aquifers. Drought stresses above-ground sources, increasing reliance on more underground wells, which further depletes the aquifer.

Across western states generally, both urban users and agricultural users are experiencing a decline in water table levels, a further indication of depletion.

In addition, land subsidence due to excess pumping results in a lower collection point for water, producing a feedback loop of increasing depletion of the aquifer. More water is being pumped out than is being naturally replenished, and as a result, groundwater levels are falling rapidly. In any event, for the areas served by the Colorado River Basin, far more water is being taken than is renewable by natural precipitation and snowmelt.

Monthly measurements of the change in water mass from December 2004 to November 2013 revealed the basin lost nearly 53 million acre feet (65 cubic kilometers) of freshwater, almost double the volume of the nation’s largest reservoir, Nevada’s Lake Mead.

Lake Mead was built in the 1930s to store Colorado River water. The lake was created by the Hoover Dam and has historically stored several years’ flow of Colorado River water. As a result of the last 14 years of drought, the lake’s level has steadily dropped to the lowest level since just after the dam’s completion. At its current level, Lake Mead stores only nine months of river flow.

The situation has been greatly exacerbated by the severe drought in the western US, one result of which is a declining snowpack, which historically has constituted a primary source for ground water

replenishment. The last 14 years have been the driest in the last century. To make matters worse, climatological projections forecast that the frequency and severity of drought will continue to increase in the coming decades. The bottom line is that the western US is running out of fresh water.

“We don’t know exactly how much groundwater we have left, so we don’t know when we’re going to run out,” said Stephanie Castle, a water resources specialist at the University of California, Irvine, and the study’s lead author. “This is a lot of water to lose. We thought that the picture could be pretty bad, but this was shocking.”

The effects of ground water depletion are a major threat to agriculture and human habitation in the western US. A similar threat to water supplies also holds sway in California’s Central Valley. This situation is aggravated by inefficient and wasteful irrigation practices carried out by western agribusiness in pursuit of profit maximization.

The inherent inability of the capitalist profit system to rationally plan the allocation of natural resources in accord with the needs of humanity threatens the future of both humanity and nature.



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