

# The Costs of Drought on the Rio Grande

By Zack Guido

*This article is the second in a two-part series exploring effects of the current drought in New Mexico's Lower Rio Grande Valley and impacts to pecan farming. Part one discussed observed and expected changes in water supply and how regional water managers are responding.*

Nearly all of the surface water has been drained. The Rio Grande below New Mexico's Elephant Butte Reservoir is flowing at a trickle and sandy bars are now exposed where the chocolate-colored river had flowed only weeks ago. For Greg Daviet, a pecan farmer in the Mesilla Valley outside Las Cruces, the drone of groundwater pumps fills the air, and his wells spit crystalline water onto thirsty orchards.

Despite another dry year—the ninth time in the last decade that farmers received a fraction of the surface water they need to sustain their crops—the pecan trees are healthy thanks to bountiful groundwater that is drawn from wells to nourish the crop.

The extra pumping during the dry times, however, comes at a price. Groundwater costs more per acre-foot than surface water and is more harmful to crops. For Daviet and some other farmers in the region, the drought's toll is burdensome—but not bankrupting—and may force some creative measures to dampen the financial strain.

“The water is still sufficient in a drought, but how we [manage] it needs to change,” Daviet said. “Drought will never be as profitable as wet times.”

For other farms, the added expenses from continued dry conditions may push them to the brink.

## Current Conditions

Back-to-back La Niña events during the 2010 and 2011 winters helped steer storms away from the Upper Rio Grande



Pecan trees bathe in irrigation water near Hatch, New Mexico, in July. Photo credit: Zack Guido

Basin in Colorado, where most of the water flowing in the Rio Grande originates. Rain and snow totaled less than 82 percent of the 1971–2000 average during those winters.

The scant precipitation has contributed to a decreasing trend in reservoir storage that began around 1999, and as of September 1, the region's largest reservoir—Elephant Butte—stood at less than 5 percent of capacity. The water available for future irrigation, doled out by the Elephant Butte Irrigation District (EBID), is now completely exhausted. For the foreseeable future, the amount of surface water available to farmers will depend entirely on the previous winter's precipitation and likely will be insufficient to meet demand. To compensate, irrigators will continue to rely heavily on groundwater.

“Around half a million acre-feet of water is the amount of water that needs to be put on the fields [in EBID],” Daviet said. “In wet years, the reservoirs provide plenty of that. In years when we are drier, we supplement that with groundwater pumping.”

## A Protective Shield

While Elephant Butte Reservoir stores water above ground, porous sediments below the Rio Grande form another, larger

reservoir. The aquifer beneath Mesilla Valley is more than 2,000 feet thick in some places, providing ample water that safeguards farmers during droughts.

“It's a rather unique system we have here,” said Phil King, professor of civil engineering at New Mexico State University and an EBID consultant. “The surface water and the groundwater are all the same water; they are closely linked. When there's plenty of surface water, the aquifer recharges. In times of drought, though, you have to go back and make withdrawals that deplete the groundwater that will be paid back by future surface water supplies. This allows the region to buffer wild fluctuations.”

Groundwater not only protects trees from inadequate surface water allotments, it also allows farmers to apply water on demand. This is critical for ensuring productive crops and is needed even in times of copious surface water because bottlenecks arise in EBID deliveries. In the middle of the summer when demand is high, for example, EBID can move only a fraction of the water needed, and some farmers have to wait. In the absence of groundwater, these delays can stress the trees and ultimately reduce crop yields.

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Even though groundwater pumping has ramped up in recent years, water levels have dropped only 30 feet after 10 years of drought, which doesn't worry some farmers or water managers.

"We are not in a long-term declining groundwater situation here," King said.

### The Added Costs

Ample water and vibrant crops do not mean farmers are immune to drought. Rather than drying out their fields, the drought has shriveled their savings.

"When we have to pump nearly all of our water, for a pecan farmer it adds 10 to 15 percent to our normal expenditures," Daviet said.

These unwanted costs can skyrocket when large capital improvements need to be made to irrigation systems—added investments that occur more often in times of drought. When watering, Daviet needs to flood his fields with about 2,500 gallons per minute to quench the thirst of his trees. During a period year, he could pump only 1,900 gallons after one well failed and the lower water tables diminished his capacity in his other two wells.

"About every 10 feet that our water table drops, I lose about a 100 gallons per minute," Daviet said.

Daviet to spend \$150,000 on a new well, to overcome this shortfall, a significant portion of his operating budget. For profitable farms, these added expenditures can be absorbed. For farms functioning on the margins of profitability, it can push them over the edge.

"Big infrastructure improvements could be as much as 30 to 40 percent [of annual budgets] in years that big improvements need to be done to enable groundwater pumping," Daviet said. "When you are talking about that level of investment, if you have a farm that is marginal, that could be the straw that breaks them."



Young chili peppers sprout in Jim Lytle's fields in Hatch, New Mexico in early July. Photo credit: Zack Guido

The added costs affect more than pecan growers. In Hatch, about 40 miles north of Daviet's farm, the chili pepper is king. Jim Lytle and his family have been farming the valley since the late 1800s and have helped pioneer chili production in the region. A variety of pepper even bears the name of Lytle's father: the Big Jim. The drought has been a burden on his family as well.

"We use approximately four feet of water to irrigate one acre of chili," Lytle said. "We were only allocated [10] inches [this year], so the rest of it we have to pump. That's going to impact us significantly, and what it comes to is at the tail end we are going to make, probably, half of what we normally make."

### Salty Soils

Groundwater also has other, hidden costs. Despite its translucent color—giving the impression of pure water—groundwater carries higher concentrations of salts and minerals than surface water.

"Those minerals and salts can be detrimental to the health of the trees," Daviet said.

The drought exacerbates salinity problems because increased groundwater pumping progressively draws water from deeper levels where salinity is enriched.

It also pulls water from the fringes of the aquifer, where salts concentrate. In other words, the longer and more vigorously wells are pumped, the more saline the water becomes, eventually leading to saltier soils. This is particularly true near Hatch, where the aquifer is around a 100 feet thick.

"This is our fourth year of limited river water and so we're just fighting sodium in the soils," said Rosie Lack, sales executive for Lack Farms, which stretches over about 1,500 acres. "You can walk across the ground and it's like stepping on crackers."

In this region, fighting salinity is best waged with surface water, a difficult proposition when the resource is scarce. It is not impossible, however. It requires other coping strategies, including more coordinated management. Daviet, for example, can sell his surface water allocation to farms in Hatch in return for adequate financial compensation for the added expenditure of pumping more groundwater.

"We can work together to find solutions to these complex problems," Daviet said. "Drought is not the end of the world. We can adjust to it. We do adjust to it, as long as you don't fight change and try to adapt to it."