

Groundwater Recharge through Playas



Playas are a primary source of recharge to the Ogallala Aquifer, providing clean water for future generations

What the Scientists Say

In November 2015, Playa Lakes Joint Venture held a Playa Recharge Summit with 14 scientists and researchers who study various aspects of the playa ecosystem to determine what was known about groundwater recharge through playas. The experts agreed that while the recharge rate is not fast enough to counter the amount of withdrawals due to irrigation agriculture, it can support farmers and ranchers with rainfed (dryland) crop production or grazing systems, as well as municipalities that depend on the aquifer.

Amount of Recharge through Playas

Playa experts agree that playas recharge the aquifer at the rates described in the 2009 USGS Circular: Recharge Rates and Chemistry Beneath Playas Literature Review (USGS recharge report; <http://pubs.usgs.gov/circ/1333/>), which gathered and reviewed all the scientific literature about recharge to the High Plains Aquifer. According to the report authors, "Reported recharge rates beneath playa floors range from about 0.01 to more than 10 in./yr, whereas most interplaya settings in croplands and rangelands have recharge rates reported to range from about 0.01 to 1 in./yr." The scientists at the Summit supported using an average of 3 inches per year across the region in calculating recharge rates through playas.

As the USGS recharge report indicates, recharge rates vary based on a number of factors including depth to aquifer, soil type, amount of soil saturation, evaporation and transpiration. Recharge rates also vary during the playa wet/dry cycle. According to the USGS report, most of the recharge happens when the soils are dry and have formed large cracks. Water runs off the landscape and into the cracks, eventually making its way to the aquifer (see diagram below). Then when soils become saturated and the cracks seal, recharge continues to happen through the clay soils at the edge of the playa where the clay soils meet the upland soils. Recharge during this time happens at a much lower rate.

The USGS recharge report concludes that “properly functioning playa wetlands ... are thus important for the overall recharge contribution to the southern High Plains aquifer.”

Quality of Recharge through Playas

The benefit of a healthy playa—a playa with a grass buffer and no hydrological modifications such as pits or ditches—goes beyond simple recharge. Research shows that water reaching the aquifer through playas is of higher quality than that going through other pathways. This happens in two ways: first, as rainfall and runoff travel toward the playa, the surrounding grasses trap sediments, which can carry contaminants into the playa; then, as the water moves through the clay floor of the playa, a second ‘cleaning’ process occurs as the soils beneath the playa remove nitrates and other dissolved contaminants. The result is high quality water reaching the aquifer that can then be used by those living on the land.

Time to Recharge through Playas

In general, water recharging today through playas will be available for our children and/or grandchildren. The time it takes for recharge to reach the aquifer and be available for extraction varies depending on depth to the aquifer formation and underlying soil type. If it is shallow, water will recharge in months to years. If the depth is approximately 100 feet, it will take years to decades. If the depth is approximately 200 feet, water will recharge in decades. At the deepest locations, recharge could take a century to reach the aquifer.

Direct Recharge Benefits to Landowners

When a landowner takes actions to increase recharge on his/her property, that water benefits him/her directly. Although water in the aquifer does flow horizontally, flow rates are extremely slow ($\frac{1}{2}$ -1 mile per 10 years). Thus, the water is functionally compartmentalized in a given area.

More Information

For more information, visit pljv.org/playas and listen to the following podcasts featuring interviews with some of the Playa Recharge Summit participants.

Playas Provide Clean Water for Future Generations
pljv.org/clean-water-podcast

Playas Provide Direct Recharge Benefits to Landowners
pljv.org/direct-benefits-podcast

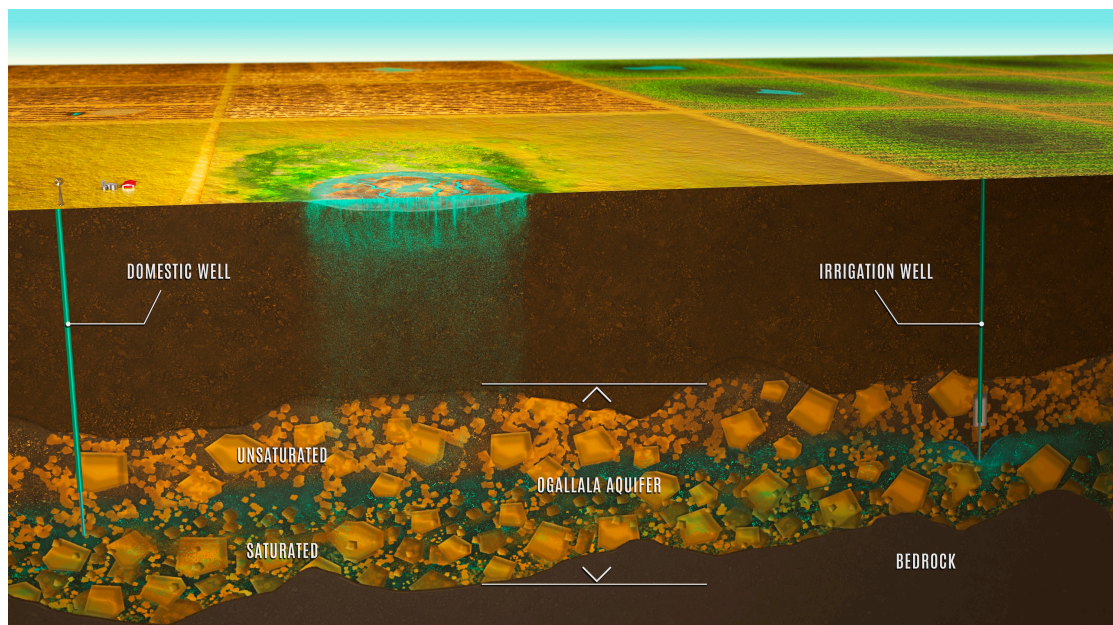


Illustration of a playa in relation to the aquifer. Rainfall and runoff flows into the playa basin, and through the cracks in a dry playa. Once water reaches the aquifer, it is yours to use. Unlike a lake, the aquifer is made up of many smaller sections with extremely slow water flow between sections ($\frac{1}{2}$ -1 mile per 10 years). That means the water recharging through your playa benefits you directly and provides high quality water that can be used by you, your children, and future generations.