

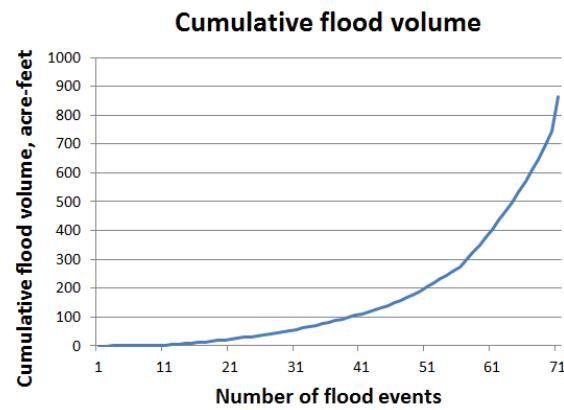
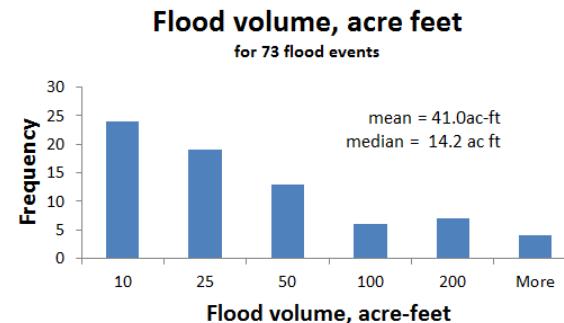
March 2015

This fall we wrapped up the initial three years of playa monitoring planned for Phase 1. Thanks to everyone for their cooperation in making the project a success!

We've come a long way over the last three years towards an understanding of how much water playas collect and how they contribute to recharging the Ogallala. We've found that playas don't typically hold as much water as some previous work suggested; instead of millions of acre-feet per year, we found a 20-year average of just about 200,000 acre feet of water per year in Texas playas. And the amount of water in playas has declined over the last 20 years, affected by decreased rainfall, increased evaporation, and changes in agricultural practices. Compared to the 6,000,000 acre-feet per year of Ogallala groundwater used for irrigation the playas are a drop in the bucket, but for some users who need a modest amount of water over the long term, and who are in areas where the aquifer is already depleted, playa recharge may still be a viable option.

We observed over 70 flood events during the three years of monitoring, despite one of the worst droughts on record. Most the flood events were small, with a median volume of

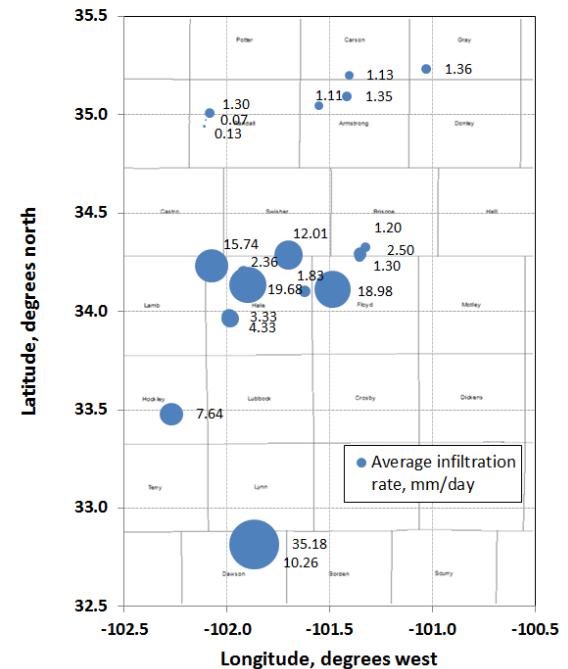
only 14 acre-feet, but the total volume of water in playas was dominated by a few large floods in large playas, with almost 75 percent of the total water volume in the 18 largest flood events, as shown in two graphics below.



Current playa recharge rates vary widely across the High Plains, as shown in the figure below, reflecting the changes in soil properties across the region. Playas to the south and west have much higher infiltration rates than playas along the eastern margin of the High Plains or north of Plainview. Farmed playas also have higher

infiltration rates than playas managed as rangeland, perhaps because of increased erosion and sedimentation in these basins.

#### Geographic distribution of playa infiltration rates



Infiltration rates also vary with the size of the flood. For playas in the south with relatively high infiltration rates, infiltration increases with flood depth; higher water pressure pushes more water through the soil and down towards the aquifer. Playas in the north with low infiltration rates behave differently. These playas have higher infiltration rates with small flood events where most of the runoff drops into the network of cracks that form in the dry

soil. With larger floods or floods onto already wet soil the infiltration rate drops to near zero.



**Soil cracking in a dry playa**

Putting all these pieces together, we now have a set of tools for deciding which playas might be the best candidates for recharge modification. We can use satellite imagery and survey data to estimate how much runoff a playa will receive and how long it holds water. With some soil tests we can estimate how much recharge could be gained. These are the basic engineering issues for Phase 2 testing.

From here it is mostly a matter of economics and politics—how much does it cost and who will pay? For now we're waiting on guidance from the Texas Legislature. The Legislature

initiated this project back in 2009, and it is ultimately up to them to fund its continuation through Phase 2 testing if they see fit. But beyond that, we need feedback from producers such as you on the value of increasing recharge; what would an extra 50 acre-feet of water per year be worth to you?

The other side of the political and economic equation for playa modifications is their effect on wetland ecosystems. We have an exemption from Farm Bill requirements for project activities but, in the long run, if recharge modifications are viewed as destroying wetlands they may be difficult to adopt on a broader scale. The current status of Federal wetland regulations is in flux, with the EPA set to promulgate new rules sometime soon. The intent of these rules is mainly to clarify current policy regarding classification of wetlands as waters of the United States. Playas have not previously been classified as waters of the United States by the U.S. Army Corps of Engineers but have nonetheless been afforded protection as wetlands under various USDA programs. The situation remains as clear as, well... mud.

Some references to current and proposed EPA policies can be found at:

<http://water.epa.gov/lawsregs/guidance/wetlands/cwaag.cfm>

<http://www2.epa.gov/uswaters/documents-related-proposed-definition-waters-united-states-under-clean-water-act>



**Canadian geese over Armstrong County**



**Winter thaw**