

September, 2015

After monitoring playas through four years of exceptional drought conditions we got to see a different side of things this summer. May 2015 was the wettest May on record for many locations around Texas, including much of the High Plains. Virtually every playa got some water, and many flooded deeper than any time in at least the last 20 years (Figure 1). And climatologists tell us that we may not be finished with the wet weather. El Nino conditions are present in the equatorial Pacific, and that often translates into wetter than normal winters in Texas.

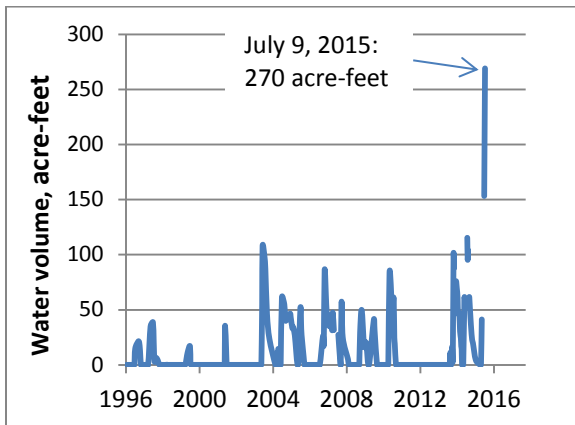


Figure 1. Water volume in the Minton playa

All that water will help us answer some questions about how recharge moves from the playas into the aquifer. One theory is that water

mostly infiltrates through large cracks and burrows in the first hours or days after the playa floods. Another theory holds that infiltration mostly occurs when playas fill deep enough to flood the sandy soils around the edges of the basin. Now we have data both from drought periods, when the playa bottoms were dry and deeply cracked, and from floods when the water spread out beyond the clay bottoms.

Preliminary analysis suggests that neither theory may be entirely correct. Rapid infiltration through open cracks shuts off quickly and its effects seem to be restricted to the upper six to eight feet of the playa soil. It is possible that some water moves deeper though a few large openings and is not picked up by our sensors, but only a small volume of recharge can get through this way. On the other hand, deep flood events don't always seem to produce any more infiltration than shallow floods once we've corrected for differences in hydraulic head. At some sites water depth and infiltration plot along a straight line, indicating that infiltration is solely a function of the increased pressure from deeper water (Figure 2). At other sites we see some evidence that more infiltration is happening on the playa margins and infiltration is significantly higher with deeper floods (Figure 3).

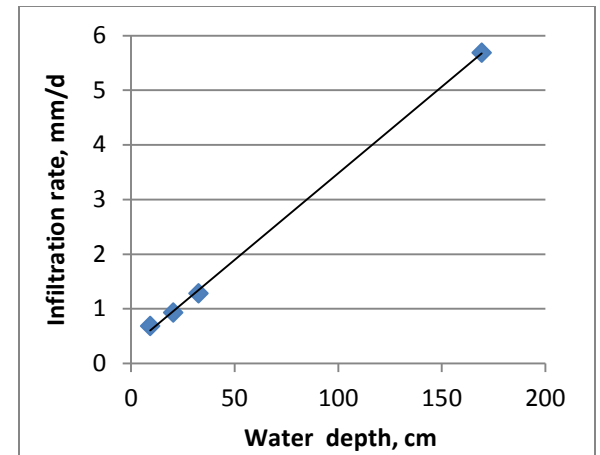


Figure 2. Infiltration and water depth, Davenport playa

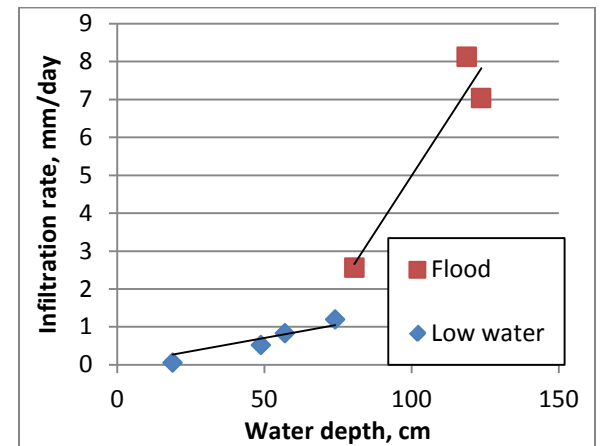


Figure 3. Infiltration and water depth, Minton playa

The flooding poses some monitoring challenges too. We have removed our electronics from a couple of sites that flooded especially deep and we have moved the equipment up as high as possible on the tripods at many other playas. So far we have kept most of the electronics above the waves.



Figure 4. Flooding creates maintenance challenges

Thanks to the free Loggerlink app (<https://www.campbellsci.com/loggerlink>), you can now connect to our network via smartphone, although modem problems may limit connectivity at some sites. Connection details are shown below:

Site	IP address	Port	PakBus
Crowell	166.130.34.45	6785	19
Davenport	166.130.34.44	6785	100
Durrett	166.130.34.52	3001	7
Finley	166.130.34.43	3001	6
Harrell	166.130.34.41	6785	16
Herring	166.130.34.55	6785	14
Hollenstein	166.130.34.50	6785	1
Macha	166.130.34.53	6785	27
Mahagan	166.130.34.42	6785	12
Minton	166.130.34.40	6785	21
Moore	166.130.34.54	6785	22
Myatt	166.130.34.51	6785	15
Obert	166.130.34.49	6785	26
Younger	166.130.34.48	6785	8

We plan to remove most of the playa monitoring equipment in early 2016. This phase

of monitoring was planned to last three years and we have now completed over five years at most sites. We have data documenting current conditions in terms of the water volume collected and the amount of recharge generated. It is time for us to pull equipment back in for repairs and refurbishment. We'll leave small, self-contained water level sensors at each playa, and we'll get meteorological data from near-by West Texas Mesonet sites. Once our weather stations are gone we will only visit each playa a couple of times a year.

The second phase of the project remains on hold. Our current budget is not enough to support full-scale construction and the 84th Legislature did not take up the issue. Where there is local interest and capacity we can help monitor the effects of playa modifications, but we can't fund the construction. Some interesting ideas have been put forward, such as pumping flood water into old gravel pits or assessing the performance of subsurface drains; we hope to test these concepts in the future. If you are interested in trying one of these ideas on your playa, please let us know.

In a separate effort, the Playa Lakes Joint Venture (PLJV) and the Natural Resources Conservation Service (NRCS) are planning a wetland restoration initiative to fill playa pits in targeted areas of the Southern High Plains. The goal is to increase the wetland areas available for duck habitat. Filling pits is intended to slow water loss from the playas so that they hold water longer. The TWDB is cooperating with the

PLJV and NRCS to assess the effects of pit-filling on groundwater recharge.

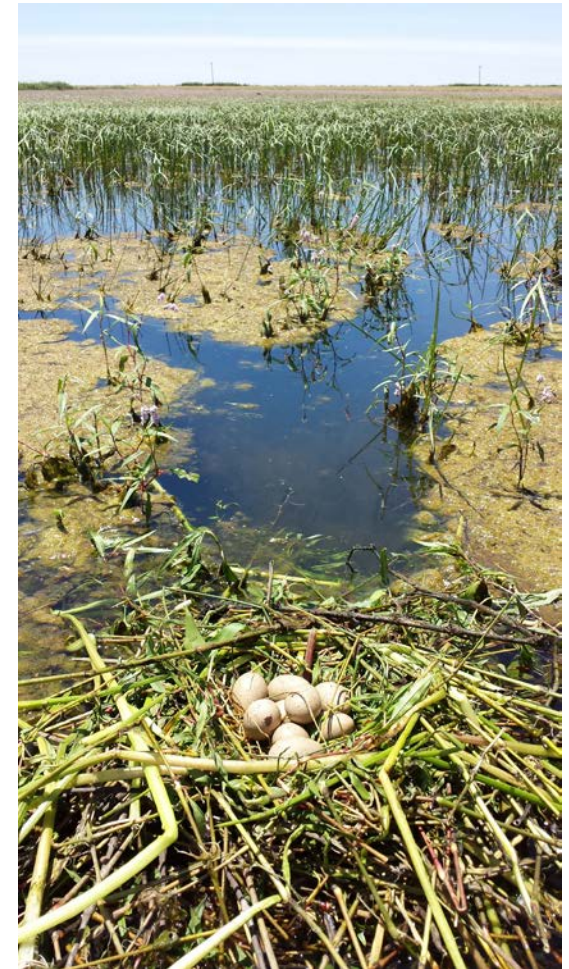


Figure 5. Duck nest in Briscoe County playa