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## **Recent rain, snow don't add up to end of Arizona drought**

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**Strong monsoon rains, early winter storms and the presence of El Niño provide some relief from the ongoing drought, but it takes years of such weather to end the dry spell.**

### **Story Highlights**

- It will take several years of above average precipitation to end drought conditions.
- In 2014 Phoenix saw about 8.5 inches of rain, an inch above normal.
- El Niño conditions could result in the southwest seeing more significant precipitation this winter.

Neither rain nor snow or even the presence of El Niño will provide real relief from the ongoing drought Arizona is experiencing any time soon.

Heavy rains toward the end of the 2014 monsoon and a series of wet early-winter storms have provided some short term relief to parts of the state. An El Niño winter, meaning warm waters in the Pacific ocean are expected to add moisture to this season's storms, should help boost rain and high country snow, totals this year.

But to break the grip of the drought that is approaching 20 years by some estimates, it will take several years of above average precipitation.

Nancy Selover, a research professor at Arizona State University and the State Climatologist, said a series of cool winters with lots of snow in the mountains are what's needed.

"We need to have a situation where we store water when it's cold and we're not demanding it," Selover said. "We need to have it melt and runoff so we can recharge the ground water system and some of the streams. To have real drought recovery is going to require several years of above average precipitation, particularly winter precipitation."

Last year Phoenix saw almost 8.5 inches of rain, an inch above normal. That was due largely to a record-breaking storm on Sept. 8 that dropped 3.29 inches of rain on the city.

Most areas of the state saw above average totals. Selover said those heavy rains last fall and early this winter provided help in some parts of the state.

"We've had a little improvement in drought in the area where Coconino, Yavapai and Gila counties all meet," Selover said. "That was extreme drought condition and there has been some relief from that. This is short term drought. We've had some improvement in southeastern part of the state as well. They tend not to get so much winter precipitation in southeastern part of the state so if we get a bunch of storms that dig down that deeply, it will be really helpful for them."

Mike Crimmins is an associate professor and climate science extension specialist at the University of Arizona. He also serves as a drought monitoring expert on the Governor's Drought Task Force.

Crimmins said the rains heavy rains have helped, but even that depends on what part of the state you're talking about. He agreed with Selover that it would take years of above average rain and snow to put an end to the dry spell.

"We need good consistent rainfall from one season to the next," Crimmins said. "This summer, largely, was an amazing good step in the right direction. We were looking for this

winter to start stacking up rain. It has, but we need things to continue through next month and March. And believe it or not, it does precipitate in April, we just haven't seen it do that in over a decade."

And though there have been a number of rain storms in the fall and early winter, the state has also experienced warmer than usual weather. Above average temperatures also play a role in perpetuating the drought.

Warmer temperatures mean the snow level is higher in winter storms. That means more of the precipitation that falls will be rain, as opposed to snow that lasts longer.

Higher temperatures also speed up evaporation and accelerate the growing season for plants. A longer growing season means those plants need more water, earlier in the year, than normal.

There is hope that the above average precipitation levels will continue, at least for this year.

A recent cycle of La Niña (the opposite of El Niño, with cooler waters in the Pacific) winters is ending and the trend is swinging back in the direction of El Niño conditions. If that turns out to be the case, the southwest could see a few more wet storms this winter.

It would be especially helpful if those storms dump snow on northern Colorado, where the Colorado water river originates. That could help replenish the depleted Lake Mead and Lake Powell reservoirs.

"We're not sure, but for right now the outlook is for this to be a little wetter than average winter in Arizona and Colorado as well," Selover said. "There is a moderate, sort of weak-to-moderate, El Niño circulation pattern, that means we tend to get a little more subtropical moisture coming through. The southern tier of states tend to be a little wetter in El Niño years."

But the real answer might be for Arizonans and other people of the southwest to adapt to living under drought conditions.

"We expect it to be a lot wetter than it is and it should be," Crimmins said. "Just look around, the landscape tells the story. This is not a wet place. When it is wet we should just be thankful that it is and expect that most of the time it will be drier than our expectations."