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# The Southwest's 'perfect drought' means it's time to plan

**By Alison Hewitt** December 13, 2010

From California to New Mexico, the Southwest is in the midst of a drought that just won't quit while experiencing the warmest decades in more than a thousand years, the latest issue of the Proceedings of the National Academy of Sciences (PNAS) reports.

Whether it's caused by greenhouse gases or nature, it's still climate change, said Glen MacDonald, a UCLA professor specializing in drought research and the guest editor of PNAS's new drought issue. From research on devastating historical droughts to climate models from top scientists predicting only a drier, warmer future, the articles spell trouble for the region, he said.

"It doesn't matter what side of the debate you're on," MacDonald said. "We're facing a chronic water shortage. These things can happen. They've happened in the past. We're in the midst of a prolonged drought and we have to plan for it."

In cities like Phoenix, population growth alone is on track to cause a water shortage, even without the drought, study authors found. Residents will essentially have to give up lawns — landscaping sucks up 50 to 70 percent of urban water use — or water supplies won't sustain the city, one PNAS article predicted.

MacDonald was tapped by PNAS editors to oversee the special sustainability issue of the oft-cited weekly journal, which features important scientific information from a wide range of disciplines. MacDonald's drought issue comes out Tuesday, Dec. 14, with eight articles on topics like the current state of the Southwest; the region's worst drought over the past 1,000 years (a medieval, 11th-century drought); the current climate's effect on local forests; and future climate models. The PNAS issue focuses on the "Early 21st Century Drought," which has lasted since 2001 in California, Nevada, Utah, Arizona and New Mexico.

"I felt quite honored," recalled MacDonald, who is also director of UCLA's Institute of the Environment and Sustainability. "I decided to get the people

who were doing the most exciting and influential work on the science and policy sides about water today, in the future and in the past."

The combination of an unusually long drought — 2001–09 so far — that also affects even the region's distant water supplies converges like the perfect storm to make this the "perfect drought," MacDonald said. Many cities have already enacted water restrictions, he writes in his introductory article, but it's not enough. While the water shortage continues, growing populations mean demand is still increasing.

With roughly 80 percent of water use going to agriculture, and 50 to 70 percent of urban water use going toward landscaping, those are the obvious places to conserve, MacDonald said.

"We're not talking about cutting back on drinking or bathing," he said. "I'm all for a pretty landscape, but if we look at where our major urban water savings can be, it's in landscaping."

Likewise, farms will have to find ways to cut back. Improved irrigation practices and breakthroughs will help, and genetically modified low-water crops might be another solution, he said.

"Finally, which crops are you going to grow?" MacDonald asked. "If water is a precious resource, which ones should we focus on?" Sod grown for lawns is first on his list of crops to cut.

In an article MacDonald collaborated on, researchers analyzed centuries of paleoclimate data — more than 1,000 years of data from tree rings, fire scars, lake sediments and more — to find the region's worst drought. A series of medieval droughts that marked the region's driest decades offers a useful example of what a devastating modern drought could do to the Southwest, the paper notes.

"Drought in the mid-1100s far exceeds the severity and duration of any modern or prehistoric droughts over the past 1,000 years," the article states. Alarmingly, while evidence shows it was an unusually warm time, it was "not as warm as the late 20th and early 21st centuries," the article added, suggesting that a similar drought would take an even greater toll now.

The 1100s were warm because of increased solar radiation and decreased volcanic activity, the article said. Though current warming is thought to be caused by human activity, the cause of the current drought can't yet be pinned down, MacDonald said.

"We still can't attribute this 100 percent to greenhouse gases," he said. "We need to do more studies before we can emphatically say it's outside the range of natural variability ... What we're seeing in the Southwest is consistent with greenhouse-gas climate change, but being cautious scientists, we can't say that yet. We also can't confidently say it's not."

Whatever's causing it, climate models suggest it's only going in one direction: warmer and drier.

"I suspect some people will use the medieval drought to say we don't really have to worry about greenhouse gas, but we don't have evidence to show that, either," MacDonald continued. "We have to deal with these arid conditions whether greenhouse gases caused it or not. We have increasing demand and decreasing supply. It seems wise to me to start planning now."

The Water Conservation Alliance of Southern Arizona (Water CASA) was established in 1997 to promote the efficient use of water in the region. It is an alliance of Southern Arizona water providers working to enhance the public's awareness and understanding of conservation issues, methods, and practices.