

New climatologist predicts normal winter

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Most of Wyoming continues to be in the grip of a seven-year drought, with no real signs of relief.

That's the message from Steve Gray, the new state climatologist. He succeeded Jan Curtis in that position in June. Gray has a doctorate in paleoclimatology from the University of Wyoming, and most recently worked for the U.S. Geological Survey in Tucson, where he studied tree rings for their evidence about past climate changes and droughts.

For this upcoming winter, said Gray, there's no real clear-cut sign of above or below average conditions for the state as a whole. He's looking at a very weak El Niño in the Pacific, meaning it is not strong enough to cause any definite change over the upcoming months. Smaller areas, such as the far northwest corner in Yellowstone, have a slightly higher than average chance of a dry winter. A strong El Niño would mean much warmer Pacific waters that have produced droughts in the west and northwestern United States.

"We're not talking about a tremendous dryness," he said. In the southeast corner of the state -- the Sierra Madres and Medicine Bow mountains, there's a "10-15 percent" of better moisture, said Gray.

Gray believes this winter will be a bit warmer. If that warming trend continues into the spring and early summer, there could be serious consequences, he said, with an earlier runoff and a lack of stream flow in late summer and early fall.

Gray and UW faculty are collaborating in research to better understand what's happening to the Wind River glaciers, and what it may mean to downstream water users. Gray is studying tree rings to get a better idea of what's happened over time to the glaciers, and using civil engineering and architecture students to gather samples in the high country. Gray said there may be a short-term benefit of excess water in summers.

"How much of a reserve do we have up there, and what do we do when it is gone?" he asked.

Gray said Wyoming hasn't seen a drought this severe in 100 years, but he finds droughts as bad or worse in tree rings that date back to 1500 A.D. Every 500 years or so, the West and Southwest get hit with what Gray calls "mega-droughts," lasting 15-20 years. Yet back in 900 A.D., there was something even worse -- a drought that lasted 50-60 years.

So what about global warming?

"First of all, even in the absence of human burning of fossil fuels, we can see some tremendous changes in the past 1,000 years, and we always have natural climate variability," he said. "First we have to recognize what makes us vulnerable and how can we insulate ourselves when we do face a drought. As for human interference with climate, there is no doubt in the scientific community as to whether the chemistry of our atmosphere is being changed by humans. That will have consequences."

Gray said scientists have a pretty good idea that it will be warmer, but there is less agreement on what that means for precipitation. "Even a small amount of warming could have a tremendous impact on our water resources," he said "Most of our water is runoff from high mountains. Just a little temp increase in spring means earlier and faster runoff, for less availability in August and September." That means huge impacts on agriculture and fisheries,

forestry, tourism, the way Wyoming operates its reservoir savings account.

Gray said he didn't want to leave the impression that fossil-fuel burning is the only cause of climate change. There are other human activities, such as massive land cover changes, such as clearing forests and converting that land to concrete and asphalt. Colorado's Front Range urbanization has changed the local climate, he said, because lots of concrete raises city temperatures. Also, cutting down the Amazon rainforest has real consequences for world climate.

Weather, he said, is an extremely complicated heat engine. If man adds more heat to this system, the variability increases and predictability decreases, he said.

Gray communicates with a lot of people around the state. "Mostly we talk about the holes we have in our knowledge, the things we don't know or that we aren't getting the information we need. We have a network of weather stations, but not enough eyes in all the places where we need them -- mostly we lack coverage in the high regions," he said.

What's needed, said Gray, are more sophisticated, high-tech weather stations in the high country, simply to give a better understanding of what's happening up there so people can figure out what it might mean below, to irrigators, businesses and residents. "We need more observations of things like snowpack, buildup of snowpack, especially in areas on the cusp between snow and rain fall—the snow line. We need more sensors outside city limits.

That takes money, he said.

Gray suggested that funding might come from downstream states as well, since Wyoming is the headwaters of three major river systems -- Colorado, Columbia, Missouri/Mississippi. "We can improve forecasting far downstream," he said, "and better water forecasting saves money."

