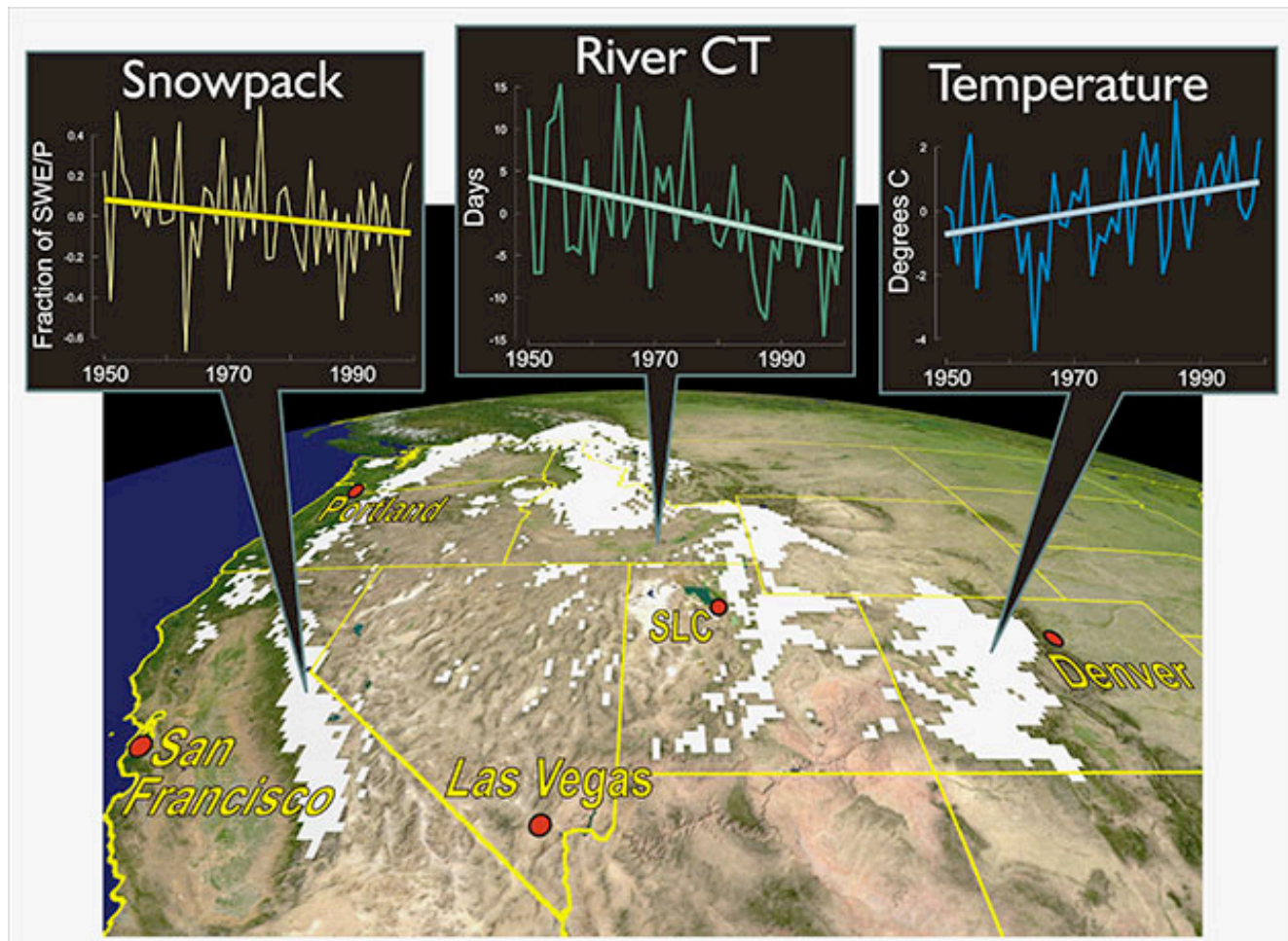


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Study: Climate Change Escalating Severe Western Water Crisis

By Alexis Madrigal 01.31.08 | 11:00 AM



This image illustrates the higher winter temperatures, reduced snowpack and earlier river flow that typify our new manmade Western climate.

Image: Courtesy of David W. Pierce, SIO; land image courtesy of NASA's Earth Observatory

A water crisis in the Western United States is primarily due to manmade global warming, and it could force difficult choices for the region as farmers, residents and biofuel producers fight for their share of water.

Sixty percent of the changes in the West's water cycle are due to increased

atmospheric greenhouse gases, write scientists in a paper published Thursday in *Science*. Small increases in winter air temperature, the research found, reduce the amount of snow falling in mountains. In turn, snow packs that previously acted as time-release water storage provide less water as they melt in the spring.

"In a place like California, the snow pack is going away or melting earlier. We don't have enough dams to catch it all so we have to let it go out to the ocean," said [Tim Barnett](#), a research physicist at Scripps Institution of Oceanography and the study's lead author. "All of our infrastructure has been set up to take advantage of climate the way it was, but things are changing."

The new research comes as Western states are already struggling to supply water for both their farms and cities. Increased migration to the water-poor regions of the Southwest into cities like Los Angeles, Phoenix and Las Vegas has increased the amount of water necessary to support the rising U.S. population. With such a constrained supply and rising demand, the cost of water is likely to rise, experts said. Some California farmers, responding to a record water shortage, are even beginning to consider [selling their water rights](#), instead of their crops.

Barnett's team worked with climate models to simulate the impact of greenhouse gases on the Western water cycle. If their models for the future prove as accurate as their modeling of the past, the paper predicts unprecedented water shortages.

"We're already at a level that can't be sustained," said Barnett. "Climate models show there will be less water supply while we continue to grow more cities out in the desert."

Under the new conditions, what to do with the water we do have will become increasingly important, said [Erik Straser](#), a partner at the venture capital firm Mohr Davidow Ventures, a firm that invests in clean technologies.

"Four out of five gallons of water go to agriculture," Straser said. "We have to make hard choices and the choices are going to be between agriculture and people."

Changes in water pricing and allocation, Straser said, could help equalize the prices between farmers and urban residents, who can pay five to 10 times more for their water.

The new research adds complexity to issues surrounding biofuel crop production. Proponents say biofuels will decrease the greenhouse gases that the study found to be diminishing Western water supplies. But the crops used to make biofuels, like corn and soybeans, will need water.

Prodded by [President Bush's plan to ramp up ethanol production](#) to 36 billion gallons by

2022, many "green" investors including [Vinod Khosla](#), have poured money into biofuels. But water constraints, or legislation of the sort Straser suggests, could complicate investors' plans.

"Growing biofuels is going to place enormous amounts of pressure on land and water," said Liz Marshall, senior economist with the [Biofuels Production and Policy](#) project at the think tank World Resources Institute.

In October 2007, the [National Research Council](#) released a report saying that while biofuel was unlikely to make an impact on the national water supply for crops in the near-term, there could be major repercussions in areas already dealing with water scarcity like the West.

Straser said that policymakers will need to manage how a benefit in one "green" category -- like reducing greenhouse gas emissions -- might impact another, like water availability.

While most green investors focus on reducing the "carbon footprint" category, one hedge fund, [Terrapin Capital Management](#), runs a fund that only invests in water-related businesses.

"Tremendous growth in Southern California has created a problem around water of incredible proportions," said Eric Pederson, the fund's manager. "How do you continue to feed this incredibly dry part of the country with ever-increasing amounts of water when flows from the Colorado River are declining and the demands upstream of California?"

Pederson declined to disclose specific investments, but he said the solution would be a combination of new technologies in desalination, water conservation technologies like greywater recycling and low water-volume toilets improving the water grid.

Dilapidated infrastructure wastes between 25 and 40 percent of all water, Pederson said.

"Most infrastructure is made of ductile iron with a lifespan of 50 to 100 years," he said. "And most of it was put into the ground well before 50 to 100 years ago."

He pointed to a variety of government agencies that have estimated the capital costs of merely [keeping our existing water infrastructure](#) at over \$300 billion.

Regardless of their solutions to the problem, scientists, investors and policy groups are coming to a consensus that water will be a larger part of the environmental debate in coming years.

"The reality is either water is so abundant that you build water parks for amusement or

it's so scarce that you fight wars over it. In human history, we've gone back and forth between abundance and scarcity with water," Straser said. "We're about to enter a period of structural lack of water as we continue to change our relationship with our environment."