

## LOCAL

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# Climate change affecting trees, streams in the West

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SALT LAKE CITY -- Around the same time the American West started heating up five years ago, Colorado started losing its lodgepole pine forests to a beetle infestation.

"The population built up rapidly and exploded. It takes out the mature trees," said Ingrid Aguayo, an entomologist for the Colorado State Forest Service, which estimates that about 60 percent of the lodgepole pines have turned red and brown.

"Now we're seeing a new carpet of forest coming up," she said.

Scientists can't be certain global warming is to blame, but the evidence is damning. Now, a new calculation of government temperature data shows that over the past five years, average annual temperatures in the Colorado River basin - the heart of the West - have risen by 2.2 degrees, or about twice as fast as the global rate.

The forthcoming report is from the Rocky Mountain Climate Organization, a coalition of local governments, businesses and others working to protect the climate. It says the West is heating up faster than any other region in the continental U.S. with more catastrophic wildfires among the consequences.

"It's already begun. We are already seeing the effects, and scientists are telling us it's going to get markedly worse," said Stephen Saunders, the organization's president in Louisville, Colo. The Natural Resources Defense Council funded and helped compile the 55-page report.

Climate change researchers are hesitant to ascribe a single cause for the warming, but they agree it's happening.

"By and large, there is a very detectable warming in this region," said Martin Hoerling, a meteorologist at the NOAA-funded Earth System Research Laboratory in Boulder, Colo. His own research suggests the West could heat up a lot more, possibly by 5 degrees by the midpoint of the century, depending on the level of greenhouse-gas emissions.

The report, "Hotter and Drier: The West's Changed Climate," crunched numbers kept by NOAA's Western Regional Climate Center in Reno, Nev.

"That sounds about right," the center's acting director, Kelly T. Redmond, said.

"It's been warming in this region for the past 35 years, after a cool period in the 1970s. We've been decidedly above average. You could put an exclamation on it," he said.

Redmond has made calculations similar to the report's 2.2-degree rise, which has meant fewer subzero nights to control the population of mountain pine beetles devastating Colorado's lodgepole pines.

At first, he said, "I didn't know whether to trust these numbers or not." They came from a network of about 2,000 thermometers across the West - from airports to weather hobbyists' backyards - recording lows and highs since the late 1800s.

But other recent patterns - earlier snowmelt in spring, earlier lilac and honeysuckle blooms - convinced Redmond the recordings were accurate.

"In 100 years, this is the largest change we've seen, so it catches your attention," he said. "We can't definitely attribute it to human causes, but my suspicion is at least part of it is due to climate change."

The West also is in the grip of a decade-long drought, which tends to raise temperatures, said Hoerling, who likewise is hesitant to attribute the warming of the West solely on carbon emissions. He believes cyclical changes in sea-surface temperatures also are to blame.

The consequences, though, are plain to see. In Yellowstone National Park, aerial photographs show vast orange-needed forests of whitebark pine that were green just three years ago. Yellowstone grizzly bears depend heavily on the fatty seeds of the whitebark pine for food. Colorado's signature aspen stands also are drying up, leaving them vulnerable to fungus.