

# Sierra conifers stressed by drought

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SACRAMENTO — Conifer trees in the Sierra Nevada are dying at nearly double the rate of two decades ago, stressed by hotter temperatures and lower precipitation, according to a study to be presented later this week.

The 400-mile-long range has endured dry spells in the past, but its trees now are more likely to die during such periods because they are struggling with the effects of a new challenge — global warming.

“What surprised us are how sensitive these trees are to short-term changes in climate,” said Phillip van Mantgem, an ecologist with the U.S. Geological Survey and the report’s author. “That was kind of a shock.”

Researchers will present their findings Friday at a meeting of the Ecological Society of America in San Jose. They say their report is the first of its kind, coming after researchers spent 22 years examining coniferous trees in Yosemite and Sequoia national parks.

While some trees have grown faster in other parts of the nation, the USGS researchers found the opposite to be true in the Sierra.

The study, begun in 1983, examined 21,338 trees in a variety of forests — ponderosa pine-mixed conifer, white fir-mixed conifer, red fir, Jeffrey pine and subalpine.

During the study period, the average mortality rate increased every year by about 3 percent, leading to a near-doubling of the rate by the end of the period.

Most of the dying trees were smaller with younger and shallower root systems and thus had less capacity to store water that could sustain them during droughts.

“We looked at all the different forest types, and so what we were seeing was not an anomaly to one species,” van Mantgem said. “There’s probably something generally going on. Something broad scale.”

Researchers said the study was the first to analyze temperate forests in such detail. Its results add to the growing consensus that forests across the globe are changing as the Earth warms.