

FORESTS:

Lake Tahoe's trees to be singed by rising temperatures

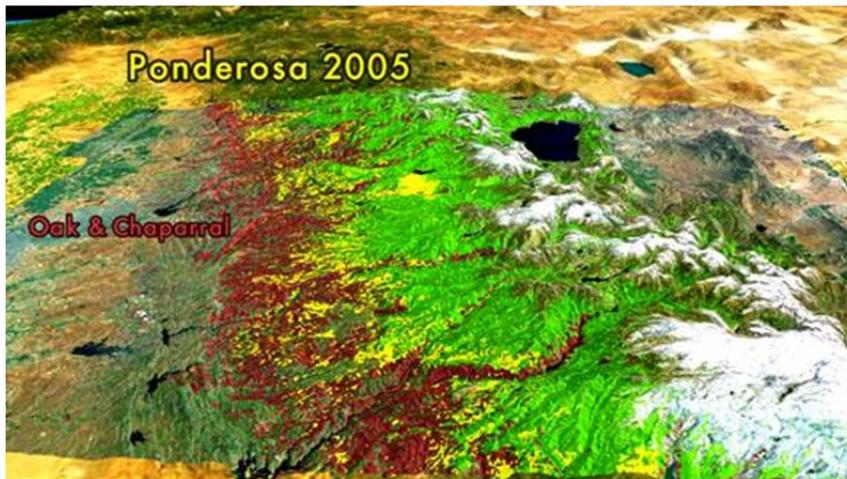
Julia Pyper, E&E reporter

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INCLINE VILLAGE, Nev. -- Hiking through parts of the Sierra Nevada Forest that embrace Lake Tahoe, it's difficult to imagine that the robust pine and oak trees are in any kind of danger.

The trees and shrubbery seem to cling to the rocky mountaintops in the most stubborn way. But as temperatures in the region have increased, research shows that tree populations have shifted and in some cases started to decline.

According to the most recent University of California, Davis, "State of the Lake" report, the daily high temperatures in the Tahoe Basin rose by a little less than 2 degrees Fahrenheit and the daily low air temperatures overnight increased by 4 degrees over the past 100 years.



The lowest-lying among the ponderosa pine population near Lake Tahoe have moved up the mountain slope 300 vertical feet. Photo courtesy of the University of California, Davis, Tahoe Environmental Research Center.

"Snowmelt is occurring through nighttime as well as the day, which leads to a much, much quicker loss of soil moisture, and as a result, systems are drier by the end of the summer than they probably would have been 50 to 70 years ago," said Hugh Safford, regional ecologist with the Forest Service in the Pacific Southwest Region.

Ultimately it's the availability or lack of water that affects the health of the soil and the forest, he added. Less freezing means an earlier snowmelt -- UC Davis research shows spring melt in Tahoe Basin now occurs in May instead of June -- which can have devastating effects on both trees and humans.

For a region like Tahoe that relies on winter tourism, higher night temperatures can have a major economic impact if ski hills can't maintain snow or make new supplies. Higher temperatures overall also lengthen summers and make for a drier growing season, which creates favorable conditions for forest fires and insect infestations.

Climate models of the region show precipitation increasingly falling as rain instead of snow, which would accelerate these attacks.

"I'm not so worried about the temperature changes as I am about the ecosystem processes that are driven to an extent by temperature change," Safford said. "Those indirect effects, those are going to be what's going to change the way that forests look."

Some species 'enjoying' climate change -- for now

In the 1930s, forester Albert Everett Wieslander carried out a detailed and extensive survey of California's vegetation. By comparing its research to Wieslander's, the UC Davis Tahoe Environmental Research Center found that the lower edge of the ponderosa pine tree population on the west slope of the Sierra Nevada range has moved about 300 vertical feet upslope over the past 75 years.

Where the pine trees once dominated, oak and chaparral have moved in. The shift coincides with rising temperatures recorded in the nearby town of Placerville, Calif., over the past 75 years, according to the research center.

In the forest area surrounding Lake Tahoe, which is about 4,500 feet higher than Placerville, researchers haven't observed any significant shifts in tree populations. Some predictions said subalpine forests like Tahoe's would be driven off the mountain by climate change, Safford said. But so far there haven't been any major changes at high elevations.

"We are seeing more fires in the subalpine zone, but what I can tell you is that most of the species at higher elevations are probably enjoying climate change so far because they live in a place where you might have a seven- to 10-week growing period per year, and that's it," he said. "They're under an incredible amount of snow every year, it blows like heck and it's just freezing."

The Forest Service has observed, however, that the warmer summers and longer growing seasons are encouraging the growth of younger trees.

New trees have actually been sprouting across the Tahoe Basin since the Comstock mining era of the late 1800s when about two-thirds of the forest was clear-cut. But the density of young trees is worrisome, Safford said, because the forest is now relatively homogeneous and more susceptible to diseases and fires.

From slow onset to sudden danger

Modeling research being conducted by Portland State University shows that Tahoe's forests are in for a scorching future. Initial simulation work shows that the land area burned in the Tahoe Basin could increase by up to 40 percent in the next century.

"Climate change by itself might be a creeping hazard, but if climate change causes a lot more fires it could become a really rapid hazard," said Robert Scheller, assistant professor of environmental sciences at Portland State, who is leading a fire research project on the Tahoe region.

"The fuels -- or the forest -- become drier at higher temperatures," said Louise Loudermilk, environmental science researcher at Portland State. "That's why we're seeing those increases in area burned."

The irony, Safford said, is that the forest actually needs to experience some smaller controlled fires to get rid of dry and dead vegetation, in order to prevent more destructive burns in the future. Currently, the Forest Service is told not to use fire for ecological reasons, he said.

"Fire is probably the most difficult management conundrum that we have moving forward," he said. "We know it's getting warmer, we know the inertia for fire is getting stronger and stronger and stronger. It's almost as if we're trying to hold the top on a boiling pot of water and it's boiling over on us. We've got to find a way to turn down the heat.

"The only way we're going to be able to do that is to somehow reduce fuels across the landscape," he added. "Some of that will get done through human active fuels management. ... But we'll never be able to treat the landscape we need to treat if we don't reintegrate fire."

ABOUT CLIMATEWIRE

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