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Wilting under the heat

Global warming blamed for deaths of trees in area

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By Dale Rodebaugh | *Herald Staff Writer*

Drought and increasing temperatures - conditions of global warming - may have killed millions of piñon pines in the Four Corners, a scientific consortium reported last week.

"While we've had droughts of this magnitude before, they have never been coupled with such high temperatures," said Lisa Floyd-Hanna, a professor of botany and biology at Prescott College in Prescott, Ariz.

"Even seemingly small changes in temperatures have had devastating effect on our vegetation," Floyd-Hanna said. "I have no problem linking the results of our study with global warming."

Floyd-Hanna, of Kline, currently on sabbatical, is a member of the consortium that released its report Tuesday.

The consortium compared 2000-03 and 1953-56, periods that saw prolonged drought and hot temperatures. The 2000-03 piñon pine die-off exceeded the earlier phenomenon in the same 60,000 square miles, which included Mesa Verde National Park.

"The resulting landscape changes will affect the ecosystem for decades," a consortium news release said. "Hotter temperatures coupled with drought are the type of event predicted by global climate-change models. The new findings suggest big, fast changes in ecosystems."

Dan Wand, assistant district forester with the Colorado State Forest Service based at Fort Lewis College, explained how a given piece of ground can support only so much vegetation.

"Something had to give," he said.

Trees stressed by drought and heat were pushovers for the ips beetle, the direct cause of tree death, Wand said.

"Insects are opportunist," said Wand, not a member of the consortium. "Everything is interrelated."

Mesa Verde public information officer Tessy Shirakawa said officials don't know how many diseased or dead piñons the park contains.

"Huge fires have killed thousands of piñons," she said. "We've also had lengthy periods when we lost piñon pines aside from fires."

While the drought in the 1950s was drier, the drought in 2000-03 was hotter, the scientists found.

"We documented temperature differences during the two droughts in many ways – high/low, summer/winter, annual/monthly," Floyd-Hanna said. "The difference was as much as 3 degrees Fahrenheit in the June-July maximum average."

Research found that 40 percent to 80 percent of piñon pines in study areas in Colorado (Mesa Verde National Park), Utah, Arizona and New Mexico died in 2002 and 2003.

Scientists said on-the-ground monitoring was confirmed by aerial surveys and satellite image analysis. Ninety percent of piñons died at one site near the Los Alamos National Laboratory.

Floyd-Hanna has lost many piñons on her 35 acres near Kline.

Under the National Science Foundation, the ongoing investigation brought many scientists together, said Floyd-Hanna, who has studied the fire history of Mesa Verde National Park since 1990.

“We had a lot of data on pre-drought mortality patterns,” she said. “When we compare the two worst regional droughts, there is a significant difference in average minimum and average maximum temperatures.”

According to the study, 53 percent of piñons died at Mesa Verde National Park in 2002 and 2003. The corresponding percentage of die-off was 40 percent in Utah (Canyonlands), 66 percent in Arizona (Flagstaff) and 80 percent in New Mexico (Mesita del Buey).

While bark beetles were the immediate cause of piñon deaths, beetle infestations are closely related to a shortage of water, the consortium report said. Lack of water made the trees vulnerable because they could not produce enough sap to eject the beetle hordes.

The scientific consortium had members from Colorado State University, Northern Arizona University, the University of New Mexico, the University of Kansas, Prescott College and the U.S. Geological Survey in Moab, Utah, and Los Alamos, N.M. The National Science Foundation, the Forest Service, the U.S. Geological Survey, NASA, the National Institutes of Health and Los Alamos National Laboratory funded the research.

Scientists fear that if drought and hot temperatures continue to coincide, piñons could be in even more jeopardy, Floyd-Hanna said.