

Los Alamos National Laboratory

Drought, heat and bark beetles a deadly trio

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LOS ALAMOS, N.M., October 11, 2005 -- Researchers at Los Alamos National Laboratory, working in collaboration with scientists from the University of Arizona, Northern Arizona University, the U. S. Geological Survey, and four additional universities, believe that severe drought, coupled with high temperatures and a bark beetle coup de grace, was the cause of death for millions of piñon pines throughout the American Southwest. The demise of the trees, visible across the region with satellite remote sensing, could affect Southwestern ecosystems for decades. The findings suggest that global climate change can produce large, abrupt, and even devastating changes to ecosystems.

In research published in the Monday's online Early Edition of the Proceedings of the National Academy of Sciences, a team lead by Los Alamos scientist Paul Rich and former Los Alamos scientist David Breshears, now a professor in the University of Arizona's School of Natural Resources in Tucson, discovered that following fifteen months of extreme drought, vast numbers of the region's *Pinus edulis* (piñon pine) died during 2002 and 2003.

According to Rich, "This drought was harder on the piñons than the drought of the 1950s, and this appears to result from higher temperatures. Our research documents a big, fast change of vegetation in response to the drought. This is of concern because it is the kind of impact we expect to see more of as global warming progresses."

Breshears commented that "This type of big, fast dieoff produces many ecological changes, including how much carbon is held in the ecosystem, how much runoff and erosion occurs, and how hot the ground gets, as well as changes in the distribution of this important and widespread tree species."

The research was coordinated through the Drought Impacts on Regional Ecosystems Network (DIREnet), a National Science Foundation sponsored mechanism designed to coordinate and foster scientific research collaborations on climate change.

Breshears and Rich's coauthors included Los Alamos scientists Randy

Balice and Clifton Meyer, as well as Neil Cobb and Jesse Anderson from Northern Arizona University; Kevin Price and Jude Kastens of the University of Kansas; Craig Allen and Jayne Belnap of the U.S. Geological Survey; William Romme of Colorado State University; M. Lisa Floyd of Prescott College in Arizona; and Orrin Meyers of the University of New Mexico.