

## FIRES AND CLIMATE CHANGE

**NOTE:** Chapter Past-President Lisa Hokholt received the following transcript of a PBS News Hour special on "Fires and Climate" from a contact at the Lawrence Livermore National Laboratory. This article is based on the Lab's research and relates to our discussions there at the Chapter's 2008 Fall Technical Workshop.

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### **Scientists: More Wildfires in West a Consequence of Climate Change**

*Quinn Bowman*

Large wildfires in the western United States, such as the week-old Station Fire that has charred more than 215 square miles north of Los Angeles, have been increasing in both frequency and size in recent years.

In addition to claiming lives and property, the massive fires sap dwindling state resources. California has already spent \$106.5 million of its \$182 million emergency firefighting fund for the current fiscal year, and the state is battling at least eight fires, the Associated Press reported.

Among scientists who study wildfires a broad consensus is developing that global climate change -- caused by increased levels of carbon dioxide in the atmosphere -- is increasing the risk of these sorts of fires in the West. U.S. government climate change research shows that the average temperature in the Southwest has increased approximately 1.5 degrees Fahrenheit from a 1960-1979 baseline, and that will increase another 4 to 10 degrees by 2100.

Scientists also warn that the cost of fighting wildfires will also increase as they become more frequent. "Basically what we know is that across the western United States, both frequency and length of fire season have been increasing in recent decades, since 1990s," said Peter Frumhoff, director of science and policy for the Union of Concerned Scientists, a nonprofit organization that promotes a healthy environment. "There are many reasons for any particular fire, but basically the (wildfire) pattern is a reflection of two things related to higher temperatures - earlier spring snow melt and also higher spring and summer temperatures," he added.

A widely cited 2006 study published in the journal *Science* entitled "Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity" examined increases in the length of the forest fire season and size of the fires. The study authors, all professors or researchers based in California and Arizona, wrote that large wildfire activity in the West increased suddenly in the mid-1980s, with more frequent large fires and an increase in the fire season.

While national news media typically offer considerable coverage of large fires in heavily populated Southern California, the authors found that 60 percent of the increase in large fires since the 1970s came from the Rocky Mountains. "The greatest increases occurred

in mid-elevation, Northern Rockies forests, where land-use histories have relatively little effect on fire risks and are strongly associated with increased spring and summer temperatures and an earlier spring snowmelt," the authors wrote.

In 2007 testimony before the Senate Committee on Energy and Natural Resources, study coauthors Anthony Westerling and Thomas Swetnam said that causes of forest fires were varied and interacting, but that evidence suggests that rising temperatures would increase large fire activity in North America.

"A recent influence of warming climates and increasing drought is apparently manifest in the rising areas burned and occurrences of 'megafires' (greater than 100,000 acres) in many places across North America and elsewhere," they said. "Under increasing greenhouse gas scenarios, the available evidence points to a likely continuation of rising areas burned, more megafires, greater damages and costs incurred, and additional human lives lost."

The committee also heard testimony that other factors that can lead to wildfires include increased forest density due to smaller fires being extinguished, invasive species that allow fires to spread quickly and an increased human presence in fire-prone areas.

But some researchers say climate change doesn't necessarily lead to a higher risk of wildfires. "Scientists found that changes in vegetation trumped past climate changes in determining wildfire frequency, based on research into Alaskan forests," according to a USA Today article in May about a study published in "Ecological Monographs." "For example, although the researchers discovered a transition from a cool, dry climate to a warm, dry climate some 10,500 years ago in Alaska, wildfires actually declined at that time because of a vegetation change from flammable shrubs to fire-resistant deciduous trees."

"There's a complex relationship between fuels and climate," study author Tom Brown of the **Lawrence Livermore National Laboratory** in California told the newspaper. "Vegetation can have a profound impact on fire occurrences that are opposite or independent of climate's direct influence on fire.

"If all we did was look at rising temperatures and ignore the vegetation in the area," he added, "that wouldn't be a good predictor of the likelihood of wildfires in a particular region." Brown's colleague on the study, Feng Sheng Hu, a professor at the University of Illinois at Urbana-Champaign and an expert on Boreal forests such as ones found in the Alaskan wilderness, offers more perspective on the North American fires. His research shows even the Arctic tundra is burning more often. "Even in the tundra region in Alaska there was a very large fire in 2007," he said. "If you look at the fire record of the last 50 years for tundra regions in Alaska north of 68 degrees latitude - - a single fire event doubled the amount of area burned." That large fire, which started in the summer near Lake Toolik in northern Alaska, coincided with a year in which Arctic sea ice had retracted to record levels and the area was its warmest and driest of the past 60 years.

Furthermore, an analysis of charcoal samples from the ground showed that it was the only fire in that area in the past 5,000 years. Frumhoff said evidence collected by scientists clearly shows that climate change significantly increases the risk of the type of fires currently burning in California. "There is no single cause (of wildfires). But if you're interested in asking whether climate change is currently increasing the risk of wildfires and projected to do so more, the answer is yes," he said.