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Prescribed Burning Helps Managers Avoid Soil Damage

ALBANY, CA (July 29, 2010) - Wildfire suppression during the 20th century helped shape the condition of most western forests. While this practice served to protect human lives, property and the forests themselves, it allowed unnaturally high levels of woody fuels to accumulate, contributing to increased wildfire hazard. Today, forest practioners are using an assortment of fuels-reduction techniques, including prescribed burning, to reduce the century-long accumulation of fuels.

Matt Busse, with the USDA Forest Service, Pacific Southwest Research Station (PSW), measured the soil-heat pulse when burning heavy concentrations of woody residues to determine the optimal soil moisture conditions needed to limit soil damage. In a study funded by the Joint Fire Science Program and the National Fire Plan, soil heating was measured during a series of experimental burns that compared several soil types and moisture contents.

The study revealed that soil-moisture content greater than 20 percent by volume effectively quenched the heat pulse in a wide variety of soils. From these findings, a predictive model was presented that allows fire managers to identify fuel load and moisture conditions to avoid soil damage during burning.

"There are obvious dangers in introducing fire to forests that have a build-up of woody fuels," says Matt Busse, a soil scientist at the PSW Research Station, who led the research team. "The potential for escaped fire or soil damage are important considerations. Our intent was to identify field conditions that help protect the soil from excessive heating. We found that soil moisture was a key variable and the simple precaution of burning when soils are moist will effectively limit heat damage."

Results from the study were published in the May-June 2010 issue of the *Soil Science Society of America Journal*. The research was also presented at the 2006 International Fire Ecology Congress in San Diego, California.

Since 2005, research at the Station is expanding the findings of this study to other natural and treated fuel types. Carol Shestak, Ken Hubbert, and Eric Knapp, all of PSW in Redding,CA, are working to determine the temperature thresholds that cause soil chemical and microbial changes in natural forest settings. They are also investigating the decay characteristics of woody residues

to learn about their contribution to soil carbon storage if they are left unburned on the soil surface.

For more information on the Pacific Southwest Research Station, please visit: www.fs.fed.us/psw.

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