Safety Alert for Wildland Firefighters: Fuel Conditions in Spruce-Beetle-Killed Forests of Alaska*

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The fire environment on Kenai Peninsula and in south-central Alaska has experienced significant changes due to the recent spruce beetle epidemic (Fastabend 2002). Firefighters and fire researchers do not have enough experience with wildland fires that occur in the dead-spruce/cured-grass fuel complexes to appraise potential fire behavior in these fuel types accurately. All firefighters, despite their general experience level, should use caution when approaching fire incidents in beetle-killed areas.

Look Up, Look Down, Look Around—and Look Out!

The Fireline Safety Reference (NWCG 1993) lists "bug kill" as a fuel component indicator of potentially erratic fire behavior. When evaluating and suppressing a wildland fire in spruce-beetle-killed forests in Alaska, the LCES (lookouts, communications, escape routes, safety zones) checklist (Gleason 1991) must address the factors shown below. The factors are based on fuel and stand sampling in spruce-beetle-killed stands, observations of recent wildland fires in similar fuel situations, experimental fires in other, similar insect-affected fuel types (Stocks 1987), and accepted fire behavior principles.

- Spruce beetle-killed forests are usually more flammable than live spruce forests. Therefore, they exhibit characteristics associated with extreme, difficult-to-predict fire behavior.
- The increase in grass fuels following a spruce beetle outbreak will predispose the dead and dying forests to fires that rapidly spread in the spring before greenup. Spread rates and fire intensities are usually greater in beetle-killed areas than in healthy spruce stands.
- Candling, torching, and crown fires are common in spruce-beetle-killed areas, even under seemingly mild burning conditions.
- Prolific fire spotting and the potential for "mass fire" or area ignition are usual in spruce-beetle-killed areas.
- Dead trees that have blown or fallen down in beetle-killed areas will impede fireline construction and hinder escape to safety zones. The combination of dead grass and large quantities of dead and down timber will severely limit fire shelter deployment opportunities.
- Falling snags can be expected in spruce-beetle-killed areas during strong winds and along the fire perimeter after passage of an active flame front.

Spruce-beetle-killed forest, Kenai Peninsula, AK, illustrating the dead-tree and cured-grass components of these fuel complexes. Photo: W. Wahrenbrock, Alaska Department of Natural Resources, Division of Forestry, Soldotna, AK, 1998.

Heavy accumulations of dead and down woody surface fuels associated with a Sitka spruce stand killed by the spruce beetle, Kenai Peninsula, AK. Note the individual (W. Wahrenbrock) in the background. Photo: W. Oja, USDA Forest Service, Chugach National Forest, Steward Ranger District, Steward, AK, 2002.

References

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On the Cover:

A fast-moving firestorm sweeps upslope through pine on the 2000 Hash Rock Fire, Ochoco National Forest, OR. Rolling 10-year averages for acres burned on the National Forest System suggest a dramatic rise in fire season severity since the 1980s. For a discussion of growing fire season severity and management response, see the articles by Dale Bosworth beginning on page 4 and by Stephen F. Arno and Steven Allison-Bunnel beginning on page 12. Photo: Thomas Iraci, USDA Forest Service, Pacific Northwest Region, Portland, OR, 2000.

The FIRE 21 symbol (shown below and on the cover) stands for the safe and effective use of wildland fire, now and throughout the 21st century. Its shape represents the fire triangle (oxygen, heat, and fuel). The three outer red triangles represent the basic functions of wildland fire organizations (planning, operations, and aviation management), and the three critical aspects of wildland fire management (prevention, suppression, and prescription). The black interior represents land affected by fire; the emerging green points symbolize the growth, restoration, and sustainability associated with fire-adapted ecosystems. The flame represents fire itself as an ever-present force in nature. For more information on FIRE 21 and the science, research, and innovative thinking behind it, contact Mike Apicello, National Interagency Fire Center, 208-387-5460.

Firefighter and public safety is our first priority.

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