Joint Fire Science Program
Fire Science First Look
RESEARCH SUPPORTING SOUND DECISIONS
October 2007

When Beetles and Fire Dance: Understanding the Interplay of Beetles and Severe Wildfire in Subalpine Forests

Management Implications

- If beetle outbreaks do not promote severe fires, as conventional wisdom has dictated, managers and planners can know better whether post-outbreak salvage logging is really required. This logging may not actually be needed to reduce fire risk, and would save time, money, and resources.
- In these subalpine forests, fire intervals are quite long—a hundred years or more—and this research may well show that beetle infestation is a "natural" thinning agent. This, too, would save time, money, and resources.
- This research will identify with greater certainty what factors actually contribute to the spread of bark beetle activity. These areas will be of great value because the information will suggest ecologically appropriate management and planning strategies.

Bark beetle outbreaks are known to disturb Western vegetation such as lodgepole pine stands. These native beetle species can sweep through forests, leaving behind dead trees with highly flammable dry, red needles. This, of course, is the perfect tinder for high intensity crown fires.

Because of the conspicuous tinder they leave behind many assume that bark beetle infestations set the stage for high intensity fires. Yet, according to Dan Tinker of the University of Wyoming, this so-called "conventional wisdom" has not been rigorously tested.

Many of the landscapes prone to bark beetle outbreaks have evolved with large, but very infrequent crown fires—on the order of a hundred years or more. So there has been a concern that beetle outbreaks that promote big fires could upset the natural balance of such forest types; primarily subalpine lodgepole pine.

And yet, says Tinker, after only a few years all those dry, red needles fall off the dead trees, leaving behind the larger sized twigs and branches in a far emptier crown. So Tinker is heading up a new study to ask whether such beetle outbreaks really do act to encourage high intensity crown fires. He suspects that in reality, the risk of fire may increase briefly after a beetle outbreak, but that the risk of severe fire should actually *drop* when the dead needles fall.

South Face Hoyt Peak beetle infestation

During the next three field seasons, Tinker's team will test this, and other ideas about the interactions of fire and bark beetles. Using historical records of beetle outbreaks and estimates of fuels (using field studies, remote sensing and GIS), they will compare that to actual historical, as well as current, fire behavior. This will allow the researchers to see how the beetle affected the stands, as well as the impact of the fire on the vegetation. In the last four to five years, he says, there have been plenty of fires *and* beetle outbreaks, so they have a rich array of information to glean from.

What's more, Tinker's team will study a current outbreak of three different bark beetle species moving across the Western landscape. They will study what factors are actually influencing the presence or intensity of the beetles' activity. They'll study diversity of the vegetation, size, composition, as well as historical fire records.

Tinker's team is also very curious about whether trees that have been stressed by fire are more susceptible to beetle outbreaks. Does the heat and damage resulting from fire leave a tree more prone to beetle attack? The researchers will measure beetle infestation in the "halo" area of still-living trees left around recent fires.

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