Viability of non-suppression strategies in the Gearhart Wilderness

By Josh McDaniel
Summer 2011

Advances in Fire Practice is highlighting projects produced by students of the Technical Fire Management course, a course presented by the Washington Institute to mid-career fire and fuels professionals. The course is designed to enable wildland fire managers to apply the most current fire-related technology to the management of fire-dependent ecosystems

In some areas of the western U.S., mountain pine beetle has ravaged entire forest landscapes. The immense scale of the beetle kill has caused fire managers to adjust suppression and management approaches. A recent mountain pine beetle outbreak on the Fremont-Winema National Forest spurred fire managers to update fire management plans to emphasize less-direct suppression of fires in the affected area– safety was a driving factor.

“Fire management in beetle kill is more difficult,” says Rick Mowery, a fire ecologist who formerly worked on the Fremont-Winema NF and is now on the Mendocino NF. “There are so many snags that fire managers were concerned about unnecessarily putting people on fires in some areas.”

As a part of his project for the Technical Fire Management course, Mowery decided to model fire spread within a 79,000 acre analysis area that included the Fremont’s Gearhart Wilderness (22,800 acres) and an adjacent roadless area (57,000 acres), a portion of which had been severely impacted by beetles. Major vegetation types include sage scrubland, aspen, ponderosa pine, lodgepole/whitebark pine and mixed conifer stands consisting of ponderosa, douglas fir, white fir and incense cedar.

Fire managers are currently revising suppression strategies for beetle-impacted areas to put greater emphasis on confining/containing fires there. However, managers were uncertain if fires that are allowed to burn within the analysis area would remain confined to it and not leave the analysis area. Mowery decided to conduct an analysis that would help with the planning effort.

“The fire managers were less interested in seeing how a fire would move without suppression than they were with understanding what areas would cause problems,” noted Mowery.

So, Mowery began his analysis by testing the hypothesis that on September 20 of any given year (the average date of the last lightning fires of the season), at least 20% of the analysis area was viable for non-suppression of new fire starts. An area was considered viable if fire starts in those locations were not predicted to leave the analysis area by October 22nd (by which time there was an 80% probability of a season-ending weather event).

Beetle kill along Deadhorse Rim within the analysis area on the Fremont National Forest. Credit: Rick Mowery

Fire weather analysis and fire behavior prediction tools, including FireFamilyPlus, RERAP, FlamMap and ArcGIS were used to delineate the viable areas for non-suppression. Mowery analyzed historical weather data from nearest RAWS station using FireFamily Plus to determine typical fuel moistures for the period from September 20th to October 22nd. Fuels data was obtained from the LANDFIRE project and included existing vegetation, fuel models, canopy cover, crown bulk density and canopy base heights. Some of the data had to be corrected based on ground-truthing and personal experience. For example, Mowery found that LANDFIRE incorrectly identified rock flats as areas that would burn like tall brush fields.

The results of the analysis indicated that for ignitions on September 22, ignitions in 24% of the analysis area were not predicted to leave the boundaries by October 20. This means a substantial proportion of the analysis area appears to be viable for management for resource benefit.

Mowery says that the analysis proceeded mostly according to expectations.

“It burned out to the boundaries a little faster than I thought,” he noted. “The center of the analysis area is dominated by peaks so I thought it would tend to burn to the middle.”

Despite some limitations in the modeling, including the ways in which ArcGIS predicted fastest path of spread and the method for determining wind speed, Mowery feels that the analysis was an effective exercise and should contribute to the Forest’s fire management planning. The modeling was relatively straight-forward, and Mowery feels that anyone with basic ArcGIS skills could do something similar for their own unit.
