

Increased tree mortality in the Applegate AMA

BY BILL SCHAUPP

In the Applegate Adaptive Management Area (AMA), which encompasses the entire Applegate River watershed, the 2015 aerial detection survey results showed large increases in acres with conifer mortality and killed trees, as compared with the three previous years (Figure 1).

These increases were likely due to heightened tree stress and lowered tree defense initiated by dry weather, especially the severe drought of 2013 and smaller and less persistent snow amounts in 2014 and 2015. Heightened temperatures added additional stress and likely exacerbated the impact of reduced precipitation. Conifer mortality was concentrated in crowded stands on lower-quality growing sites.

In our report on the 2015 mortality increase, in the Spring 2016 *Applegater*, we described the aerial detection surveys. That article began with a lengthy quote from our previous article on “all those dead trees” in the June 2003 *Applegater*. The quote ends with “But even after decades of close observation, we can sometimes be a bit surprised by how quickly things change and how large the scale of impacts can be.” In certain areas of the AMA, there was indeed a bit of surprise in 2016.



Aerial detection surveys show increases in conifer mortality and killed trees. Photo: USFS.

Compared with 2015, the aerial survey results for 2016 indicate a doubling of acres with current mortality and nearly six times more killed trees, an amount that is literally “off the chart” (Figure 1). This averages overall to about four killed trees per mapped acre in 2016, as compared with a bit over one tree per mapped acre in 2015, indicating an intensification as well as an expansion of conifer mortality last year.

Ninety percent of the conifer mortality mapped in 2016 in the AMA affected Douglas fir and was attributed to the flatheaded fir borer, *Phaenops drummondii*, a beetle species in the family Buprestidae, the metallic woodborers (Figure 2).

As in previous years, fieldwork found that the flatheaded fir borer (FFB) was the only agent consistently associated with such mortality of Douglas fir in the Applegate drainage.

This woodborer-caused Douglas fir mortality is a characteristic situation primarily occurring in the Klamath-Siskiyou ecoregion of southwest Oregon, although it occurs elsewhere in the West associated with drought. At Ferris Gulch, for example, smaller amounts of Douglas fir mortality occurred occasionally in previous years, becoming epidemic in 2015 and 2016. Other locations in the AMA that were heavily impacted by FFB in 2016 include lower Thompson Creek and Armstrong Gulch near Buncom, although FFB-caused mortality was widespread at lower elevations, especially in the Jackson County part of the AMA.

In addition to large losses of Douglas fir, pine mortality remained at an elevated level in 2016, due almost entirely to the western pine beetle (*Dendroctonus brevicomis*) killing large and medium-sized ponderosa pines (Figure 2). The mountain pine beetle killed an estimated 150 sugar pines in 2016, more than two to four times the total in each of the previous six years. Beetle-killed sugar pines are often among the larger pines in a stand, survivors of previous selective logging and the introduced pathogen *Cronartium ribicola*, the cause of white pine blister rust disease. In 2016, fewer than half as many true firs were killed by fir engravers, *Scolytus ventralis*, as compared with 2015. Although still at an elevated level, the reduction in true-fir mortality may result from improved moisture conditions at the higher elevations of the AMA.

It is unknown if this level of mortality will persist in 2017. A relatively large amount of precipitation has fallen thus far in fall and winter, which, if continued, should reduce tree stress in 2017 and favor tree defense over beetle attack. However, a large adult beetle generation emerged in 2016 from the many infested and killed trees, and this may have successfully overcome additional host trees that will die in 2017.

The relatively crowded condition of many forest stands in the AMA indicates a potentially significant degree of background stress caused by competition for limited resources, especially around pines, which need space and light to thrive and which succumb to bark beetles when crowded and stressed. Douglas fir growing on sites in the AMA that are marginally suited for them are already stressed; unfavorable weather adds more stress, providing opportunistic insects an improved chance to reproduce at the expense of more trees. Unfortunately, the surprisingly large recent mortality increase in the AMA in 2016 prevents reasoned predictions for 2017.

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Note: Oregon Department of Forestry's forest health fact sheet on the flatheaded fir borer can be found online at oregon.gov/ODF/Documents/ForestBenefits/flatheadedfirborer_2016.pdf.

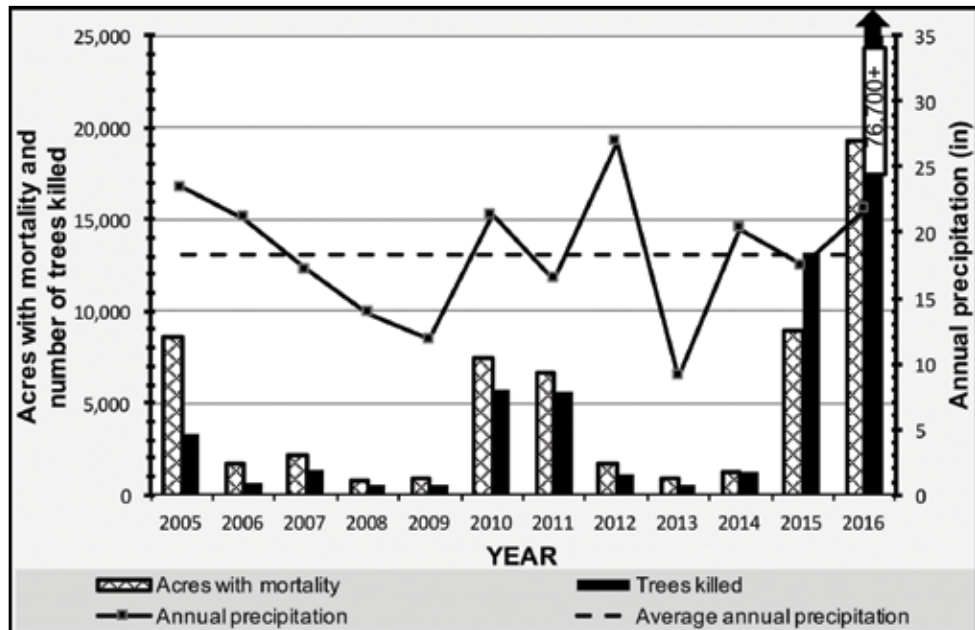
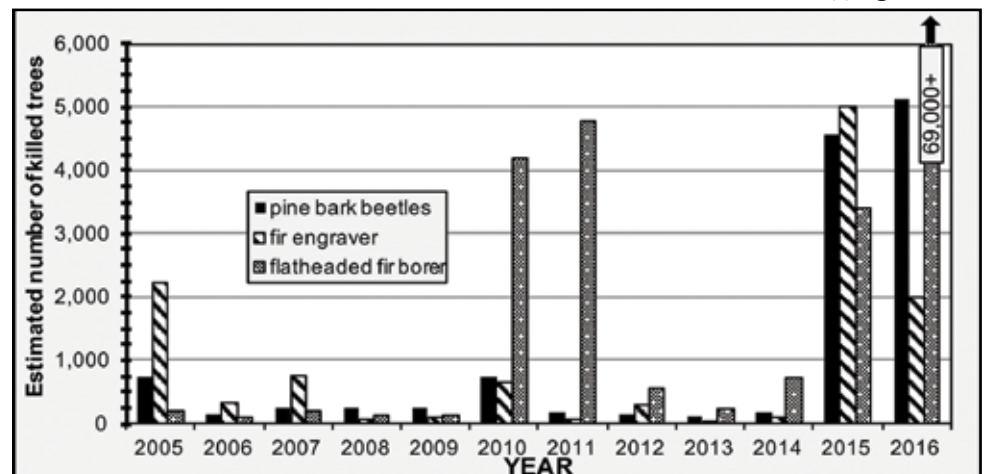


Figure 1 (left). Aerial Detection Survey from 2005 to 2016 for all lands within the Applegate Adaptive Management Area and Medford airport annual and average annual precipitation.
Figure 2 (below). Mortality by major insect agent: Aerial detection survey from 2005 to 2016 in the Applegate AMA.



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