Angora Fire Effects Monitoring
Lake Tahoe Basin Management Unit
2007

Project Description: The Angora Fire burned 3100 acres of Jeffrey pine and mixed conifer forest in the Lake Tahoe Basin, California and Nevada, at the end of June, 2007. Although more than 250 homes were lost and most of the fire burned at high severity, portions of the fire area had been treated for fuels in the previous 3-7 years, and preliminary observations suggested that fire severity and home loss had been ameliorated where fuels treatments had been completed. In collaboration with the Lake Tahoe Basin Management Unit and The Nature Conservancy, California Chapter, the Forest Service Region 5 Ecology Program carried out field sampling within the fire perimeter to determine whether statistically significant differences in fire severity existed between treated and adjacent untreated areas. We finished field sampling within one month of the fire. We have not completed data analysis, but our preliminary results show a clear effect of fuels treatments on fire severity along the SE perimeter of the fire (Angora Creek area). In this portion of the fire, we found that:

1. Fuels treatments significantly decreased tree mortality
    - Tree mortality based on first-order estimates was about 77% in untreated areas, about 21% in treated areas

2. Fuels treatments significantly lowered flame lengths and reduced the effects of fire to the tree canopy
    - 100% of trees in the untreated sample had torching effects to their crown, vs. about 11% in the treated sample
    - The vertical extent of crown torching, crown scorching, and bole char was much greater in the untreated area
    - Surface flame lengths (as estimated by bole char) averaged more than 32 feet in the untreated area, compared to about 7.5 feet in the treated area
    - Within the untreated sample area, crowns in most trees were completely scorched, and more than 40% of trees had >90% of their crowns combusted by fire

Fuels treatments in the Angora Creek area significantly changed fire behavior, reduced fire effects to the ecosystem, and acted to slow and ameliorate the intensity of the fire as it approached homes in the Tahoe Paradise subdivision.

Implementation Plan and Accomplishment to Date: We began the project in July, 2007. We expect to have data analysis complete and a manuscript submitted to a scientific journal by March, 2008. Our work involved field sampling of fire severity attributes (e.g., mortality, % crown scorch, bole char height, scorch height, etc.), statistical analysis of the data, and completion of a report and manuscript summarizing

our results. Work was carried out by Hugh Safford, Regional Ecologist; David Schmidt, Fire Ecologist, The Nature and Conservancy and Forest Service (cost share position); Randy Striplin, Fire Ecologist, Lake Tahoe Basin Mgt.

Contact Person: Hugh Safford, Regional Ecologist, USDA Forest Service, Pacific Southwest Region. 707-562-8934; hughsafford@fs.fed.us

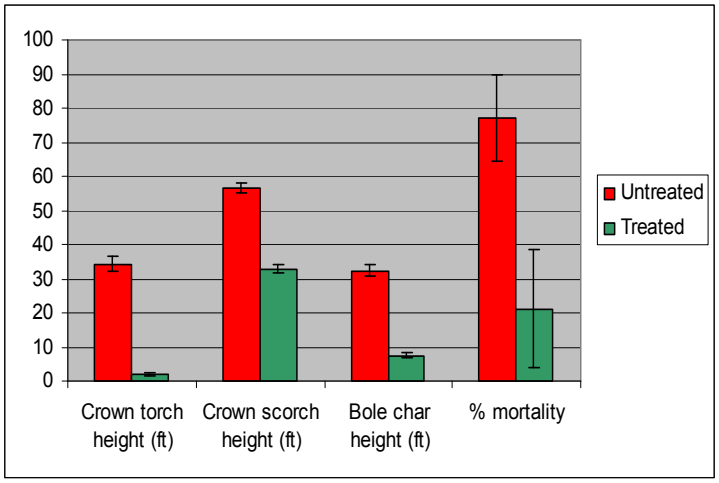

Figure 1. Summary of selected fire severity data, areas treated for fuels vs. areas untreated, SE portion of the Angora Fire. All differences are significantly different at $P < 0.001$.

Figure 2. Left: SE area of Angora Fire near Tahoe Paradise subdivision, one week after the fire. This area was treated for fuels between 2002 and 2005. Tree mortality was 10% in this stand. **Right:** untreated area immediately adjacent to fuels treatment pictured on the left. Tree mortality was 100% in this stand.