

A Defensible Fuel Profile Zone (DFPZ) Gets Put to the Test

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On May 28, 1999 the Dow Wildland Fire started on the Eagle Lake Ranger District of the Lassen National Forest. It was located approximately 2 miles North of Eagle Lake on the F.S. 22 (County 105) road. The fire started approximately 200 feet outside an uncompleted Defensible Fuel Profile Zone (DFPZ) and burned through both the untreated and treated sections of the DFPZ. It provides a good comparison on the fire behavior outside and within a DFPZ and the resulting fire effects. The fire was human caused and burned a total of 80 acres.

The Eagle Lake Ranger District has been constructing Defensible Fuel Profile Zones (DFPZ) since 1996 as part of a pilot project initiated by the Quincy Library Group. The overall purpose of a DFPZ is to reduce the number of acres that would be burned by high intensity stand replacing fires. The objective of DFPZ's are:

1. Reduce the potential for crown fire and
2. Allow fire suppression personnel a safer location from which to take action against a wildfire.

The DFPZ that the fire burned through was only partially completed. The West side of DFPZ had been completed and the East side was in the process of being completed under a "Hand Thin and Pile" Contract.

The fuels at the point of origin were primarily mountain mahogany brush and scattered pine in a rocky area. The fire quickly spread into an Eastside pine timber stand. A Fuel Model 9 most accurately describes the fire behavior characteristics of this fuel type. The primary carrier of the fire in this fuel type is the surface fuels that consist of pine needles and surface litter. Concentrations of dead and down woody material and ladder fuels contributed to torching of trees, spotting, and crowning.

Weather conditions during the initial attack period were warm and dry for the time of year but were not considered extreme. Maximum temperatures of 73 degrees F and minimum relative humidities of 18% were recorded at the nearest representative weather station. Wind direction was fairly constant from the West, Southwest and wind speeds averaged from 3-9 miles per hour.

The topography of the fire area was varied. It started and spread on fairly flat ground with slopes ranging from 0-5%. When the fire crossed the 22 road to the East it spread up slopes that ranged from 21 to 34%.

Fire Behavior

The fire initially spread as a surface fire from the point of origin with flame lengths generally less than four feet. It spread into the timber stand, which had higher fuel loadings and ladder fuels. There it quickly transitioned into torching of individual trees and small pockets of trees. Flame lengths ranged from 2-8 feet in the surface fuels and exceeded 40 feet when trees torched. The fire was first reported at 1454 hours and spotting across the 22 road occurred at approximately 1523 hours. Maximum spotting distances of ¼ to ½ mile were observed. The fire made rapid upslope runs when the fire spotted onto the steeper slopes on the East side of the road. Fire behavior did not decrease significantly until approximately 2030 hours when temperatures dropped to 50 degrees and the relative humidity increased to 45%.

The fire intensity had a direct correlation to burn severity. Areas of low fire intensity in the treated areas had low burn severity with very little tree scorch or mortality. Areas of high fire intensity outside the treated DFPZ had high burn severity with significant tree scorch and mortality. Approximately 70-80% of the burned area had 100% tree mortality and resulted in a fire salvage timber sale.

Summary

These conclusions reflect my experience as the Incident Commander, District Fuels Officer and a qualified Fire Behavior Analyst.

- Fire that burned through the completed DFPZ exhibited lower intensity fire behavior with lower flame lengths and reduced rates of spread. This resulted in significantly lower scorch heights and mortality than surrounding areas.
- The lower intensity fire behavior and fire effects within the completed DFPZ was due to the combination of:
 1. Treatment of surface fuels by prescribed burning to reduce fuel loadings.
 3. Removal of ladder fuels by biomass thinning which increased the live crown base height.
- The partially completed DFPZ did not allow fire suppression personnel a safer location to control the fire because the fire spotted above the DFPZ.
- DFPZ design and width specifications need to take into account the effects of spotting from outside the DFPZ. Even if this DFPZ had been completed, the ¼ mile width would not have been a sufficient fuelbreak taking into account the fire behavior and spotting distances experienced.
- DFPZ's wider than ¼ mile would have reduced the potential for crown fire and reduced the number of acres of high intensity stand replacement fire.

Dow Fire
Photo Point #1

Completed DFPZ*



Treated DFPZ on East Side of road. Fire behavior was lower intensity due to removal of ladder fuels and under-burning of surface fuels.

Uncompleted DFPZ*



Untreated section of DFPZ on West side of road. Fuel loadings and ladder fuels created conditions for torching. This started spot fires in and across the treated DFPZ.

Photo Point #2 taken from one point looking on opposite sides of road.
Completed DFPZ* Uncompleted DFPZ*



Treated DFPZ with significantly less crown scorch and 0-10% tree mortality.



Untreated DFPZ with 100% mortality.

***Defensible Fuel Profile Zone**