



Research Brief for Resource Managers

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Chaparral Fuel Structure after Mechanical Treatments

Brennan, T.J. and J. E. Keeley. 2015. Effect of mastication and other mechanical treatments on fuel structure in chaparral. International Journal of Wildland Fire. <http://dx.doi.org/10.1071/WF14140>

Mechanical fuel treatments have become the preferred method of managing fire risk in southern California because of the high risk to communities from extreme chaparral fire behavior and the proximity of wildlands to urban areas. Despite widespread use of mechanical treatments in the region, there have been few studies that have quantified the change in chaparral fuel bed structure after mechanical treatments.

To look at the effects of mastication treatment type, time since treatment, and vegetation type on fuel properties, Brennan and Keeley established fuels plots on treatment sites throughout the four southern California national forests (Fig. 1). The study compared six chaparral types and four mechanical treatments that included crushing, mastication, re-mastication, and mastication-burning (Figure 2). The time since treatment varied from 1-8 years. All treatment plots had control plots in adjacent untreated vegetation.

While there was large site to site variability in fuel characteristics, there were significant differences in all fuel categories that depended on the treatment type, the time since the treatment and the vegetation type. For example, downed woody mass was greatest for the crushed treatments and least for the masticated-burned treatments, while

Management Implications

- There are significant differences in fuels characteristics of mechanically treated chaparral depending on the method of treatment and vegetation type; treatment outcomes should be consistent with long-term fuel objectives.
- Mechanically treated chaparral fuels rapidly recover the live woody fuel component and greatly increase the herbaceous fuel component. Treatments therefore need to consider both treatment effectiveness and maintenance costs.
- Quantitative fuels data for masticated chaparral are available at [South West US Photo Series](#). It is important to validate masticated fuel models that can accurately predict fire behavior in these complicated fuel structures.

dead herbaceous and litter mass was 2-3 times greater in masticated and re-masticated sites.

Most importantly for management, in all treatments there was rapid recovery of the live woody fuel components including height, mass and cover, and these increased with time. Average live woody fuel recovery was 50% across treatment and vegetation types. All treatments also showed a significant increase in the herbaceous fine fuel component but this was independent of time, indicating that herbaceous fuels established soon after treatment and persisted over time.

