

Ecological response of California chaparral to mastication

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Introduction

- California's chaparral is symbolic of the state's impressive biodiversity and an integral component of the California Floristic Province.
- Mechanical fuel reduction treatments that are suspected to potentially type-convert landscapes are used in chaparral to manage wildfire risk to human populations due to their strategic advantages.
- Building on previous research (Brennan and Keeley, 2017), this study examines the ecological response of central and northern California chaparral to mastication and how this treatment emulates wildfire disturbances.
- This study can further inform future land management and research in shrubland ecosystems in Mediterranean climates.

Methods

- Chaparral sites that have been independently masticated or burned in a wildfire once in the past 2-5 years were identified for this study.
- Sites were further filtered to include only those that had not previously experienced an unnatural disturbance that may have altered the successional trajectory.
- Eight suitable sites were ultimately identified for each treatment group (mastication and wildfire). Adjacent control plots were identified for comparisons to the nearby treatment.
- 250 m² plots were randomly generated in ArcGIS Pro for examination using empirical line-point intercept, gap-intercept, and quadrat sampling observations.

Preliminary Results

- Thus far, masticated chaparral has been observed in this study to have overall lower shrub density and cover, taller shrub height, and a similar number of total species compared to chaparral burned in a wildfire.
- Masticated sites have also been observed to have a greater diversity of forb and grass species, but fewer shrub species and a similar number of tree species.
- A subjective examination of two-year-old masticated and burned chaparral sites (Figure 1 and 3) demonstrate differing trajectories post-disturbance.

Conclusions

- Thus far, chaparral response to mastication compared to wildfire has demonstrated observable differences in variables that represent chaparral structural integrity.
- Masticated chaparral sites may be on an altered early successional trajectory compared to masticated sites, but the variation observed to date in this study indicates overall differences are minimal.
- Additional sampling is necessary to reduce variability and to more conclusively determine whether treatment type produces significant differences in shrub density, cover, height, and species richness, and composition.



Figure 1: Two-year-old masticated chaparral



Figure 3: Two-year-old wildfire-burned chaparral

Hypotheses

- H₁: Shrub density, cover, and height is significantly different in masticated chaparral compared to chaparral burned by wildfire.
- H₂: Plant species composition is significantly different in masticated chaparral compared to chaparral burned by wildfire.

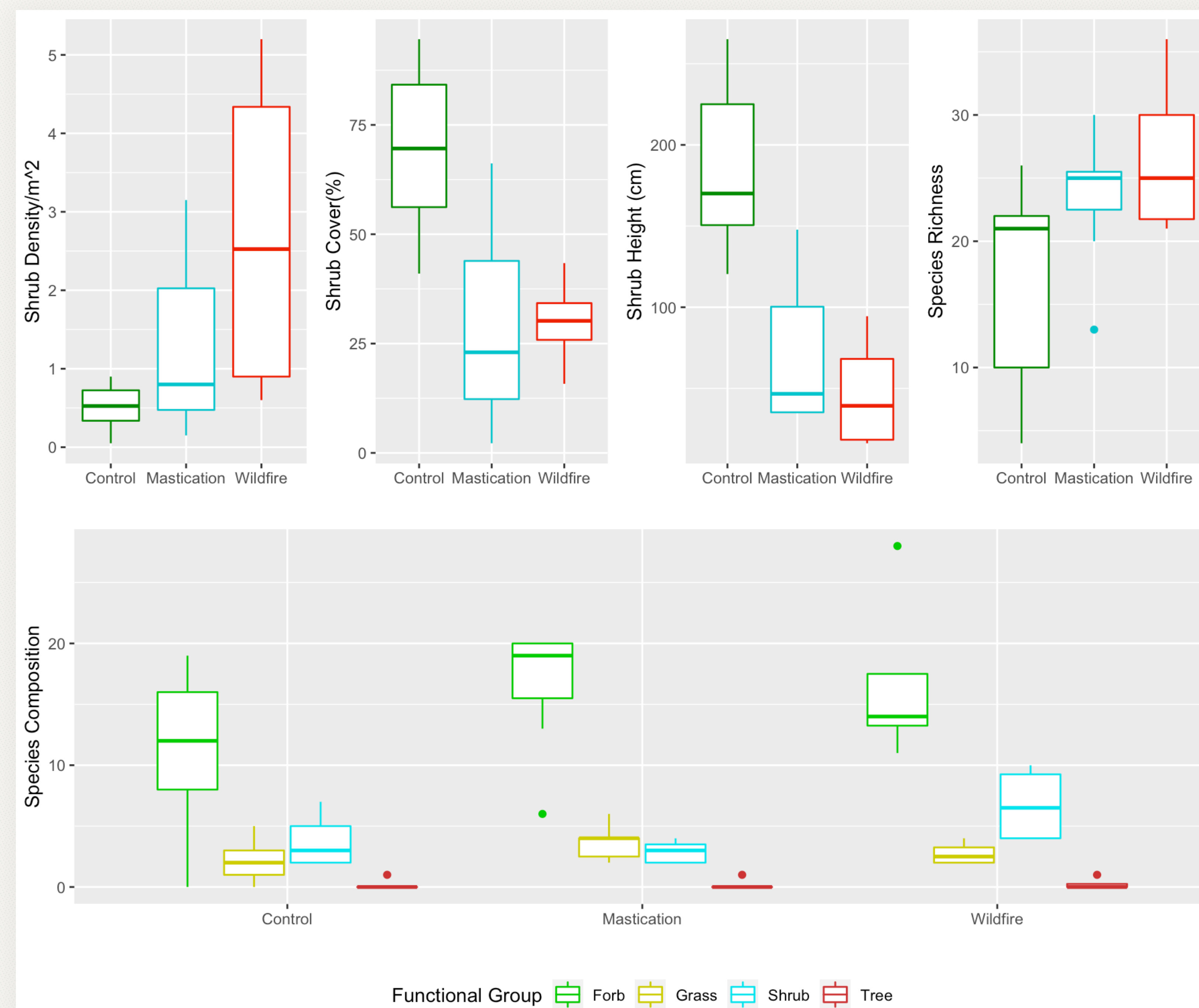


Figure 2: Shrub density, cover, height, and species richness and composition of mature (n=8), masticated (n=7), and wildfire-burned chaparral (n=4)

References and Acknowledgements

Brennan, T. J., & Keeley, J. E. (2017). Impacts of Mastication Fuel Treatments on California, USA, Chaparral Vegetation Structure and Composition. *Fire Ecology*, 13(3), 120–138.

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