



Weyerhaeuser



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Surveyed Locations: Burned and Unburned Forests









We depict our study 4th-order watersheds found within and near the Claremont-Bear fire boundary (2020), Nothern Sierras of California. We randomly selected stands within each watershed, stratified by age and burn severity.

Background

Wildfires can significantly alter forested landscapes and ecosystems. These alterations can be exemplified in managed forests.

Previous studies suggest that bee abundance and diversity in postfire systems differs by burn severity₂.

Social and solitary bees vary in forage preference, nest habitat, and floral preferences¹. Therefore, we evaluated groups of social and solitary bees present in burned areas of varying severity.

Sampling Methods

We collected data within the Claremont-Bear, Beachie, and Holiday Farm 2020 Wildfires in Oregon and northern California.

We stratified sites within watersheds and forested stands differing in age.

We collected pollinators from May-September 2021 using blue vane traps and a hand-netting protocol under our CDFW permit.

We identified *Bombus* and *Apis* to the species level, and solitary bees to their genus.

Social Bees

- Bumble and honey b (eusocial)
- Division of labor wit
- Cooperative brood c
- Distinct floral prefer and foraging behavior



Agapostemon sp.: These bees are generalists, feeding on a variety of flower types. They are one of the most abundant and diverse genera found in North America. While classified as a solitary species, some have been observed nesting communally.



Osmia sp.

Osmia sp.: Osmia are well known as one of the most efficient pollinators for fruit and nut orchards. Like other leaf cutting Megachilids, Osmia have specialized hairs on the bottom of their abdomens which help with pollen collection They are commonly referred to as mason bees because of their use of mud to construct multi-leveled nesting tunnels.

Evaluating Social and Solitary Bee Communities in Recent Wildfires in Oregon and California Forests



V	S .	Solitary Bees
bees	•	All other bees Construct nests individually
hin hives are ences or	•	Provisions broods individually Distinct floral preferences and foraging behavior



Figures 1 & 2. We plotted a preliminary index of bee diversity and a normalized fire burn ratio (NBR) within surveyed stands. We identified 2 social bees (*Bombus, Apis*) and 17 solitary bee genera. We expect higher diversity following solitary bee identification, but preliminary examination suggests an increased number of species by burn severity, similar to Galbraith et al. (2019).









Bombus sp.: Bumble bees are specialized pollinators because of their ability to buzz pollinate (e.g., tomatoes are *only* pollinated by bumble bees or humans electric toothbrushes). These bees can fly in colder temperatures, allowing them to work within cooler forested areas. Bumble bees are social cavity nesters meaning one queen can rear a colony ranging from 50-500 individuals.



Figure 3. We plotted a preliminary number of individuals and a normalized fire burn ratio (NBR) within surveyed stands within or adjacent to three wildfires (2020). Number of individuals is highly variable based on colony size and resources, but our results align with increased floral resources and bare ground for nesting in recently burned stands.



Melissodes sp.: 'Long-horned' bees are floral specialists. Common physical features include long antennae, specialized scopal hairs on hind legs, and iridescent blue/green eyes. Long-horned bees are solitary ground nesters.



bumble and honey bees appear wasp-like with no pollen leaving its larvae to be fed by the other species.



Results & Next Steps

Results are preliminary and are representative of only one season of data and within one year of a fire event.

of Solitary Bee individuals

Nonetheless, results indicate that abundance and diversity of both bee groups may be affected by fire severity and stand age.

We speculate that increases in diversity and abundance in severely burned and younger stands is a result of an increase in available floral resources, such as forbs and shrubs, preferred by bees and other pollinating insects.

Data that were used was collected as part of an ongoing project surveying pollinator populations and floral preferences conducted by NCASI Inc¹. As the project continues, we hope to perform similar analyses and track bee populations as ecosystems recover from wildfires.



Acknowledgements/ **Literature Cited**

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