

# LOCAL GRASSLAND RESTORATION AFFECTS INSECT COMMUNITIES

SCAN FOR PAPER



IN THIS STUDY:  
WE WERE INTERESTED IN  
HOW LOCAL-SCALE GRASSLAND  
RESTORATION COULD BE USED TO  
IMPROVE HABITATS FOR  
NATIVE INSECTS  
THAT ARE DECLINING,  
ESPECIALLY NATIVE  
BUMBLE BEES.

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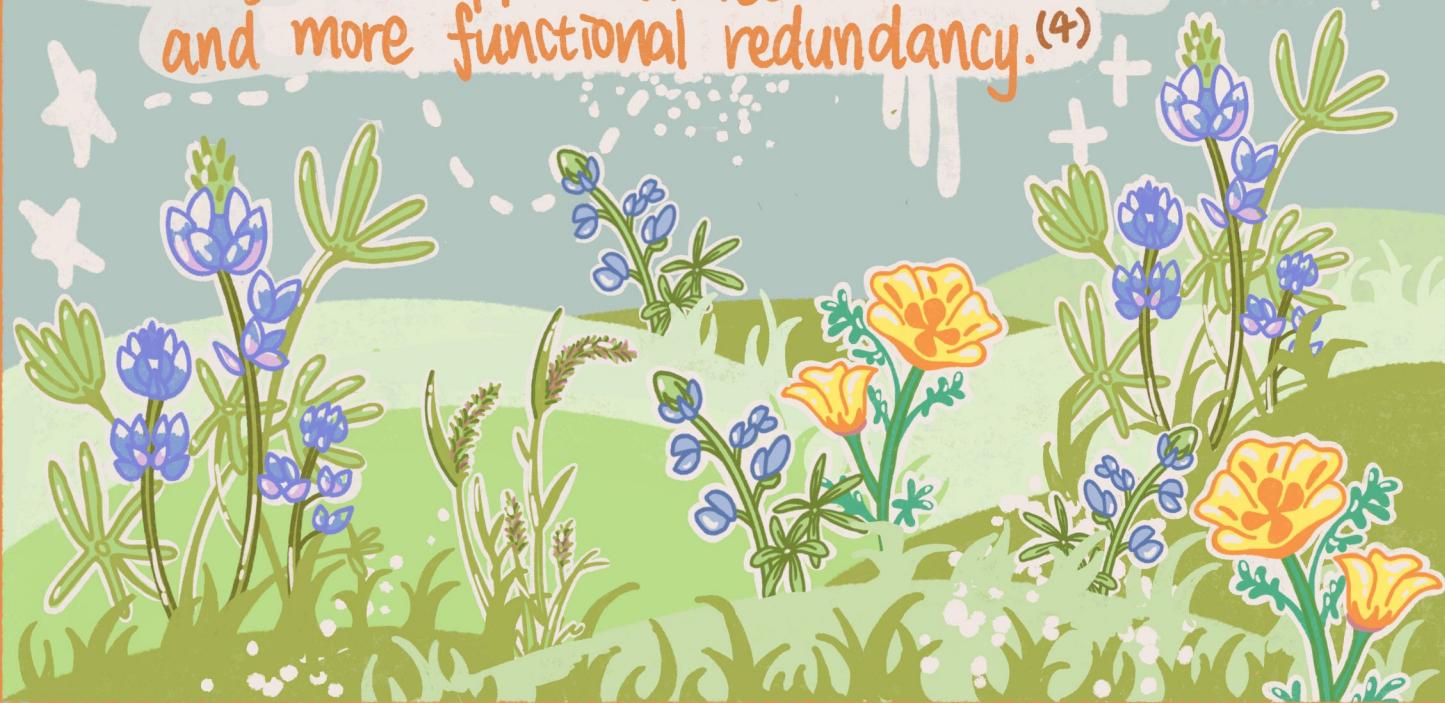
# INTRODUCTION

1) Land use change causes loss of native grassland habitats, leading to declines in native insects.<sup>(1)</sup>

2) Ecological restoration is a tool designed to recover damaged ecosystems and has been shown in other places to support a greater diversity of native insect species.<sup>(2)</sup>

3) Because restoration can lead to more functional redundancy in grasslands, loss of a single species from the ecosystem would be less likely to impact overall ecosystem function.<sup>(3)</sup>

4) The microhabitats that restoration may create, can support diverse communities and more functional redundancy.<sup>(4)</sup>

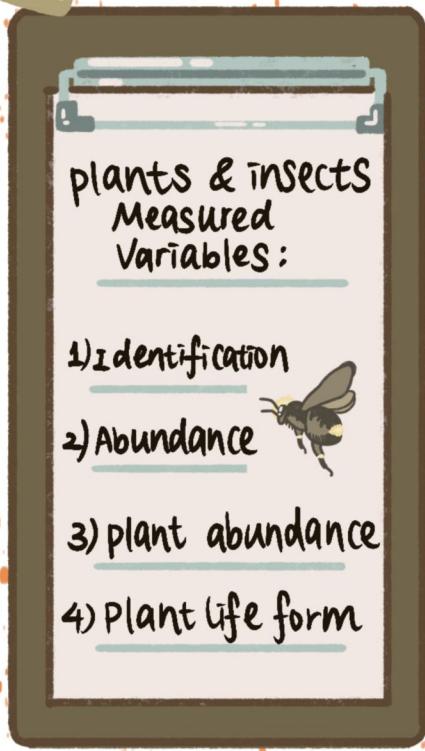


# METHODS

10 A.M ~ 4 P.M.



Observing for 9 weeks



Nets	Aspiration	Dissection	Hand collection	Beating

Lupinus bicolor (Miniature lupine) is an annual pea family plant (Fabaceae) commonly used for California grassland restoration. It was selected as a target species for focused insect collection.

No.1



## Non-restored sites



These sites were selected because *L.bicolor* was documented at each site in previous years.

No.1



Restoration consisted of planting native species and weeding non-natives.

## Restored Sites

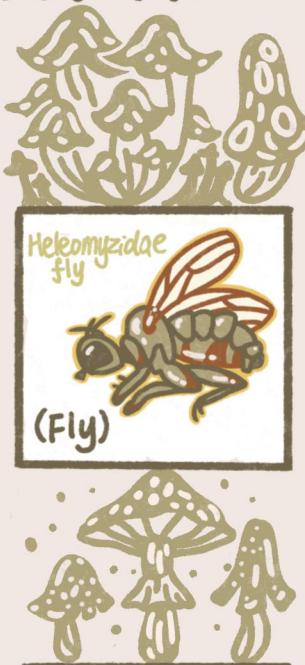


# INSECT COMMUNITIES

## Herbivores



## Detritivores



## Predators



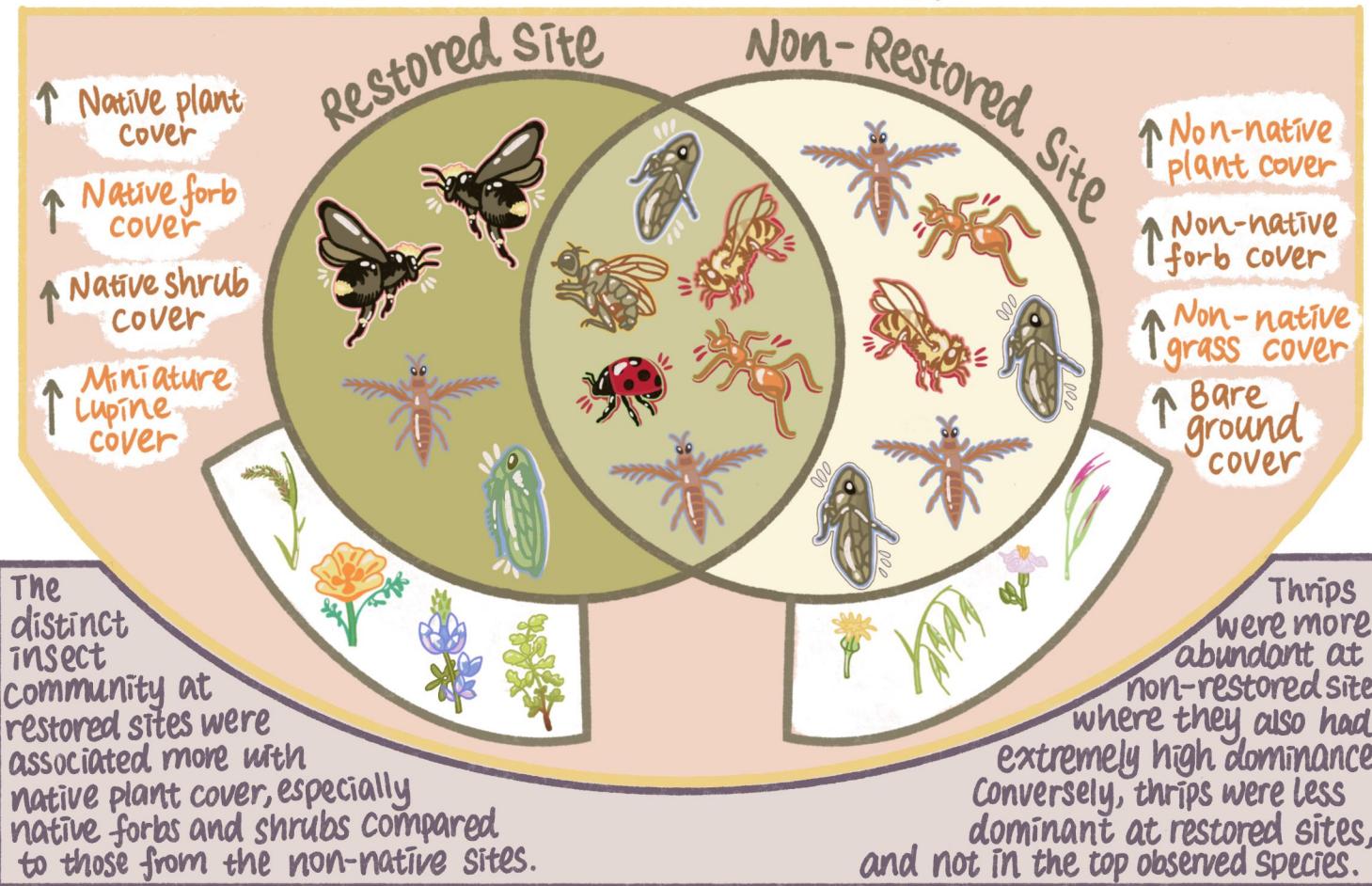
## Pollinators



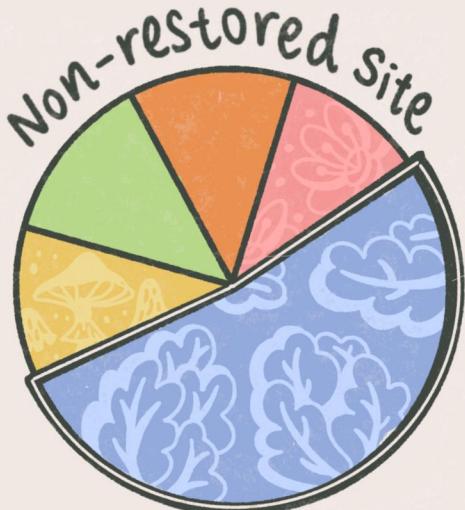
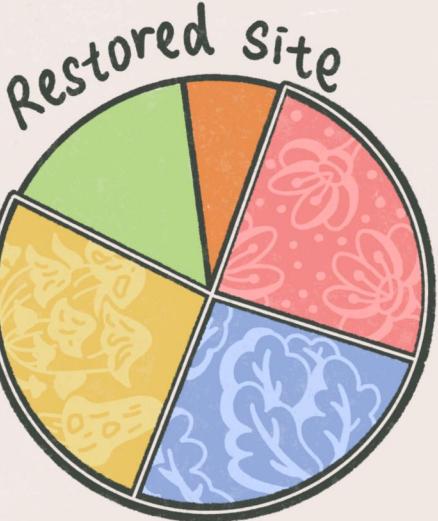
# RESULTS

## RESTORED SITE VS. NON-RESTORED SITE

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Restored grasslands had different insect community composition compared to non-restored areas, but there were some similarities.



## FEEDING GUILD PERCENTAGE



■ Detritivore ■ Herbivore ■ Nectivore ■ Parasitoid ■ Predator

- Non-restored sites were dominated more so by herbivores than any other feeding guild.
- Although herbivores were also abundant at restored sites, they were only more dominant compared to parasitoid and predatory insects, but not compared to detritivore and nectivores.

## INSECT COMMUNITY RANKING BASED ON ABUNDANCE

↔ RESTORED SITE ↔



↔ NON-RESTORED SITE ↔

\* The font size represents the relative dominance of insect species.

Red = non-native; Blue = native



1) Bumblebees were the most observed species at restored sites, but not even in the top five in non-restored sites.

2) Thrips are more commonly found in non-restored sites, where there was also less even distribution of species diversity compared to restored sites.

# CONVERSATION

Based on this study from Santa Barbara, we found that local restoration is a potential tool for insect conservation in coastal CA, USA.



1) RESTORATION LED TO DIFFERENCES IN INSECT COMMUNITIES AND FEEDING GUILDS.

2) AT RESTORATION SITES, HERBIVORES ARE LESS DOMINANT AND POLLINATORS ARE MORE COMMON, COMPARED TO NON-RESTORED SITES.



3) NATIVE BUMBLEBEES, ARE KNOWN TO BE DECLINING, BUT OUR WORK SHOWS THAT LOCAL GRASSLAND RESTORATION CAN PROVIDE THEM HABITAT REFUGIA.



# REFERRENCES

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2. Menz, M.H.M., Phillips, R.D., Winfree, R., Kremen, C., Aizen, M.A., Johnson, S.D. et al. (2011) Reconnecting plants and pollinators: challenges in the restoration of pollination mutualisms. *Trends in Plant Science*, 16, 4–12.
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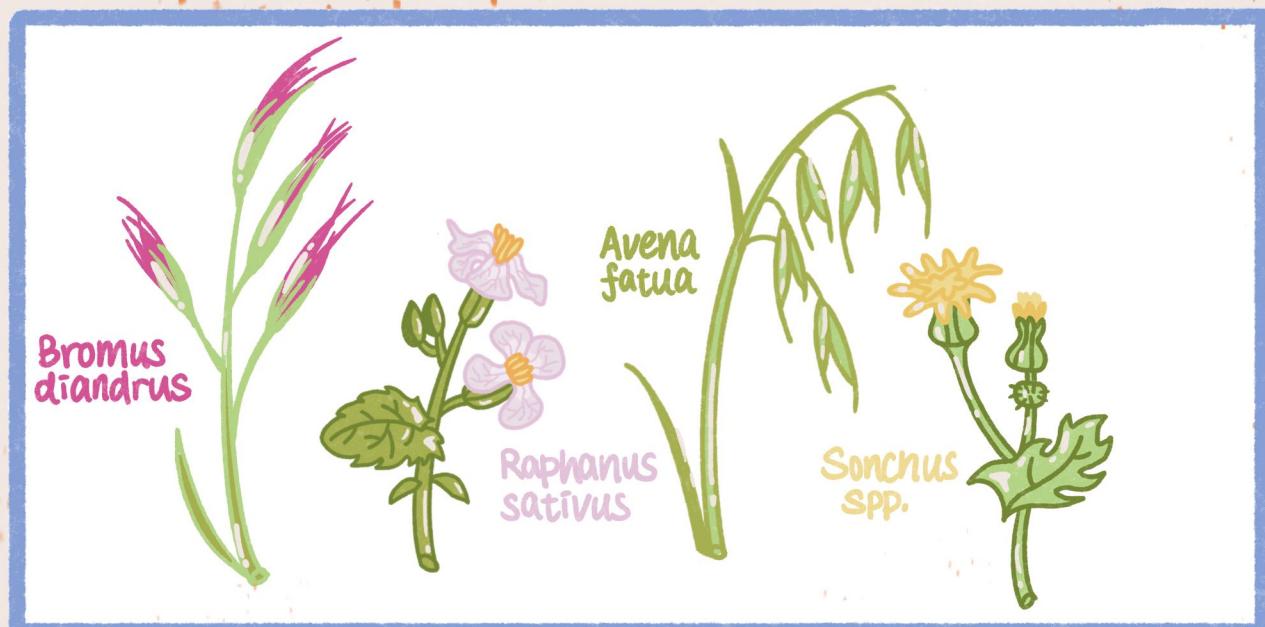
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# APPENDIX

## Common non-native plants



## Common native plants

