INTRODUCTION

Trapping Methods

Figure 1. The four study sites in San Diego, CA, were Little Cedar Ridge, Elliott Chaparral Reserve, Rancho Jamal Ecological Reserve, and Santa Ysabel Open Space Preserve.

Figure 2. Pitfall trap array with drift fence and funnel traps used to sample reptiles and amphibians.

Figure 3. The net change, pre-fire to post-fire, in the Shannon Diversity Index with standard error bars. Levels of significance are indicated as * (p < 0.05) and ** (p < 0.01).

Figure 4. Non-metric multi-dimensional scaling plots (MDS) for A) chaparral and B) coastal sage scrub. These MDS plots are based on Bray-Curtis similarity matrix using square root transformed species data collected across all plots within each vegetation type. Open symbols represent non-razed samples and closed symbols represent razed samples.

Figure 5. Razed samples have shifted away from the communities detected in the non-razed samples. Open symbols represent non-razed samples and closed symbols represent razed samples.

MATERIALS AND METHODS

Abstract

In 2003, southern California experienced several large fires which burned thousands of hectares of wildlife habitats and conserved lands. In order to investigate the effects of the fires on reptile and amphibian communities, we compared the results from herpetofauna sampling from several years prior to the fires to results from sampling in the second and third years after the fires among 38 burned and 17 unburnt plots. The sampling plots were spread over four vegetation types and four open space areas within San Diego County. Our capture results indicated that burned plots of chaparral and coastal sage scrub lost herpetofaunal species diversity after the fires and displayed significant shifts in overall community structure. Additionally, post-burn herpetofauna community structure was more similar to that found in unburned grassland. We did not find differences in herpetofaunal species diversity or community composition in grasslands or woodland/priparian vegetation after the fires. We foresee that a continued unnatural fire regime for southern California may result in a simplification of the southern California reptile and amphibian communities.

Study Sites

Four study sites (Figure 1)

• Elliott Chaparral Reserve (ELL)
• Little Cedar Ridge (CED)
• Rancho Jamal Ecological Reserve – Hollebenn Canyon Wildlife Area (RAJ)
• Santa Ysabel Open Space Preserve (SYR)

Each site was impacted by 2003 wildfires in part or in whole

• Four vegetation types
  • Chaparral (CHAP) • Coastal sage scrub (CSS)
  • Grassland (GRASS) • Woodland/priparian (WR)

Trapping Methods

Pitfall trap array (Figure 2)

• Three 15-m arms of drift fence
• Seven 19-L pitfall traps
• Three hardware-cloth funnel traps

Sample schedule

• Pre-fire sampling varied based on original purpose of study site
• Post-fire sampling was conducted at four or five week intervals, resulting in 8 to 10 samples per year
• During sample session, traps were checked daily

Data collection

• Captured animals were processed, we recorded:
  • species, sex, age
  • class, weight, and length
  • Marked for identification of recaptures

• Released at point of capture

ANALYSES

Community Structure

• Bray-Curtis similarity matrix
• Analysis of similarity (ANOSIM) to test for differences in community structure
• Razed samples (post-fire impact) compared against non-razed samples (pre-fire control, pre-fire impact, and post-fire control)

• PRIMER-E used to analyze community changes

CONCLUSION

The southern California wildfires of 2003 impacted the herpetofauna species diversity and community structure in chaparral and coastal sage scrub study plots.

We detected significant shifts in species diversity and community composition in these vegetation types. No changes in diversity or community composition were measured in grasslands or woodland/priparian plots where vegetative structure was not substantially affected from the fires.

Most importantly, the herpetofauna communities in burned CSS and chaparral were more similar to those of unburned grasslands. We will continue to monitor these communities to document the longer term effects in light of the more frequent fire regime in southern California.

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