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Fire and Community Susceptibility to Invasive Plants, Fire and Community Susceptibility to Invasive Plants

Introduction

Disturbances that create a disequilibrium in distribution of resources may alter species composition through shifts in resource availability, which in turn may create conditions favoring invasion of non-native species and deletions of native species. Two important disturbance factors in the Western U.S. are grazing and fire and both have been linked to patterns of biodiversity and plant invasions.

Objectives

This research program objective is to evaluate the relative roles of grazing and fire on community invasibility and patterns of species richness and cover for vascular plants in low and mid-elevation communities of the southern Sierra Nevada Range, primarily in Sequoia and Kings Canyon national parks. We have restricted our attention to sites below 2000 m because in this region invasive plants are of limited occurrence at higher elevations.

Our focus has been on determining species richness patterns at different scales of relevance to these communities (1 - 1000 m^2). This is often critical to the detection of diversity 'hot spots' and separating effects that are evident at different grains. The tenth hectare plot is a widely used scale and appears appropriate for community level questions. In order to evaluate the role of plant cover and be able to distinguish alternative hypotheses driving richness patterns (e.g., null models of random placement we have also determined abundance and cover as well.

Results to Date

A total of 128 sites have been sampled from the foothill blue oak woodlands to mixed coniferous forests in both parks. Patterns of species richness and non-native plant abundance decreases with elevation. Within the blue oak community there are slightly significant differences in both of these parameters between cattle grazed, horse grazed and deer grazed sites. In the coniferous forests there are marked increases in species richness in response to fire with significant interactions between time since fire and fire intensity. In general the lowest species richness is in unburned forests and the highest plant species richness is found in gaps generated by intensity burning 3-5 years after fire.

Future Plans

No more field work is planned on this project and the data are currently being analyzed. The primary work remaining is to do regression analysis of soil nutrient changes in response to time and fire intensity and test for correlations with plant parameters. Writing is expected to be completed by June 2001 and will include a final report to be submitted to the Park along with a manuscript that will be simultaneously submitted for publication in a scientific journal.