



# Plant Community Changes Associated with Prairie Dog usage of a Suburban Remnant of the Shortgrass Steppe

Rocky Mountain High School biology students in collaboration with the staff, graduate students, and faculty associated with the Shortgrass Steppe Long Term Ecological Research Program

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## Site Description



Cathy Fromme Prairie Natural Area is a 659 acre remnant of native shortgrass steppe managed by the City of Fort Collins. The site is bounded on the east, south, and north by suburban housing developments, open to the foothills on the west, has a bike path along the northern edge, and a raptor viewing area. The site contains low hills, three ephemeral tributaries to Fossil Creek, has no recorded history of tillage and remains home to 27 species of native and 4 species of non-native trees & shrubs; 54 species of native and 18 species of non-native grasses and grasslike plants; 145 species of native and 53 species of non-native wildflowers, vines, and other forbs; 103 species of birds including bald eagle, ferruginous hawk, and burrowing owl; 17 species of mammals including coyotes and black-tailed prairie dog (dominant to the site); 7 species of amphibians/reptiles including prairie rattlesnakes. A comprehensive list of flora and fauna is maintained by the City of Fort Collins Dept of Natural Resources.

The research site is located in the NE corner and contains an active prairie dog colony that extends from the intersection of the bike path with the location of an underground pipeline (disturbed prairie dog town) southward to a relatively undisturbed area (undisturbed prairie dog town), an abandoned prairie dog colony north of the bike path, and an area with no visible evidence of prairie dog habitation (control area).

## Research Methods

Prior to field work, students are trained at the schoolyard research plot at Rocky Mountain High School. Students in the field are accompanied by a teacher, graduate student, or volunteer.

Students estimate % cover of grasses, forbs, litter, and bare ground using a Daubenmire frame. Canopy height over the frame is measured.

Between 20 and 30 random points are measured at each site type: uncolonized grassland (control), active prairie dog colony by the bike path (disturbed), active prairie dog colony away from the bike path (undisturbed), and abandoned prairie dog colony (abandoned).

Students record data in September (Fall) and May (Spring).

Starting in Fall 2004, total nitrogen samples have been taken on the disturbed prairie dog town and the control area. Commercial cationic and anionic probes are inserted and left for one week, removed, washed, and returned to the company for analysis of nitrate and ammonium.

## Introduction

Dr. Detling and others have documented changes in plant communities in the mixed grass prairie caused by the herbivory of the Black-tailed prairie dog, *Cynomys ludovicianus*. Canopy height, litter cover, and graminoid cover relative to forbs decrease, while species diversity, nitrogen mineralization, and plant shoot protein increase. The shortgrass steppe is significantly different from the mixed grass prairie: precipitation is lower, the grasses are dominated by the drought resistant (hence grazing resistant) grass blue grama, and prairie dog colonies are killed off periodically by plague. Additionally, in the suburban setting, large herbivores are excluded, habitat is fragmented, human interaction is increased, and there is an increased presence of non-native species. Currently, SGS-LTER graduate students are researching changes in plant communities in response to prairie dog herbivory on the shortgrass steppe at the SGS-LTER site and Pawnee National Grasslands in order to compare to the results from the mixed grass prairie. In this study, we are tracking changes in the plant community in response to prairie dog herbivory on a suburban shortgrass steppe remnant which we hope to compare to the results from the SGS-LTER/PNG and the mixed grass prairie. We hope to provide useful data for local agencies creating management plans for natural areas along the front range.



Jeff Baylock

## Discussion

The results are labeled preliminary as no statistical analyses have been performed yet.

The preliminary data show some trends consistent with the data from the mixed grass prairie and SGS-LTER. Canopy height is reduced and grasses decrease relative to forbs, but these results may not be statistically significant or hold up over time. As the project continues, data will accumulate and become more amenable to analysis. Rabbit co-herbivory has been observed on the active prairie dog towns and needs to be examined as a possible confounding factor. It is not known if rabbit herbivory occurs on the abandoned or control sites.

The nitrogen data shows increased nitrogen on prairie dog colonies, presumably from animal nitrogenous waste or increases in nitrogen cycling rates.



Dr. Detling showing changes in the mixed grass prairie in response to prairie dog herbivory.

## Preliminary Results

