Coyote Brush as Facilitator of Native California Plant Recovery in the Santa Monica Mountains

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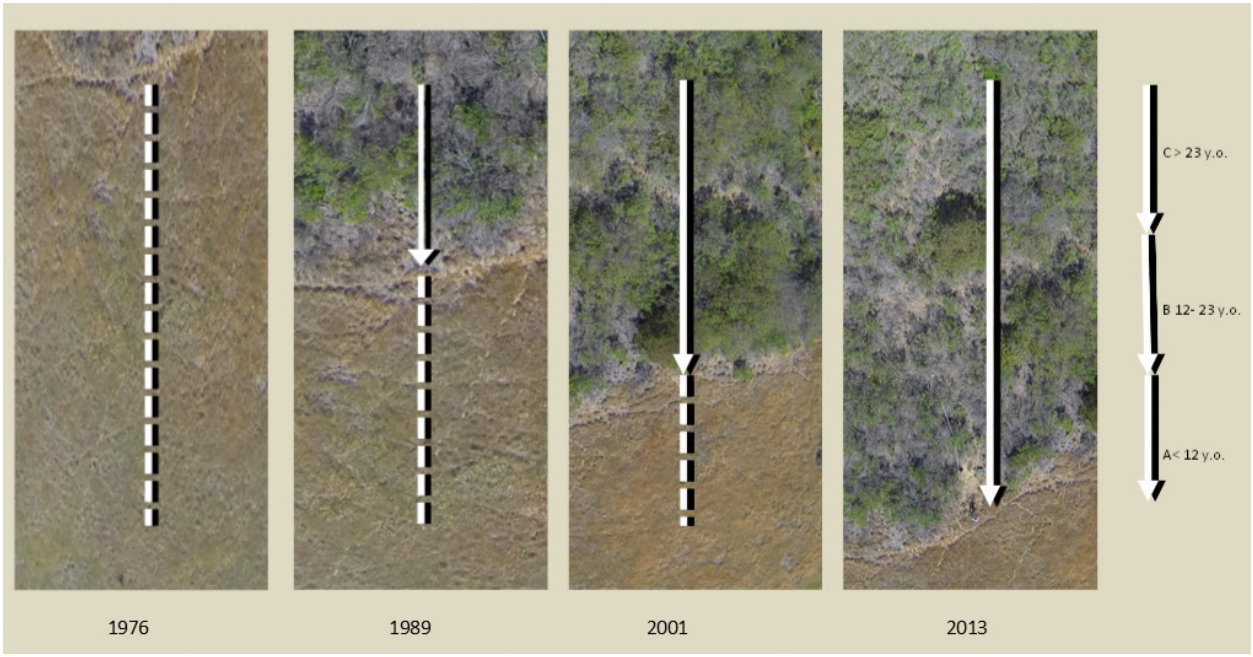
Significance Statement

Large areas of Southern California are dominated by exotic annual grass species whose competitive dominance poses a significant barrier to the restoration of native grassland species. Restoration efforts can thus be ineffective and take long periods of time. DeSimone and Zedler's "*Baccharis* hypothesis" describes a useful tool for restoration of native grasses and forbs to areas dominated by exotic species. *Baccharis pilularis* (Coyote Brush) is capable of colonizing invaded lands more easily than most other CA sage scrub (CSS) species, a controversial characteristic since the colonization results in a type conversion away from historic grassland. This wind-dispersed invasion helps to exclude many ground level plants in a number of ways and frequency of exotic annuals decreases. As *B. pilularis* begins to senesce, however, the opening in the canopy allows for establishment of native species back into the landscape. The results of this study show that recovery of native grassland species can be facilitated and expedited by the invasion of *B. pilularis*.



Schematic of study design showing progression of coyote brush advancement.

Summary

This study took place in Southern California, in the western Santa Monica Mountains and the Simi Hills to the north. This area constitutes a complex landscapes with many canyons and valleys and variable soil and climate characteristics which change rapidly over small distances. This geographic variability can support a diverse plant community: chaparral on steep, unstable slopes; California sage scrub (CSS) on lower, drier slopes; oak in canyons with deep soil; and grasslands in valleys and lower slopes.

Researchers in this study focused on *B. pilularis*, which is a common component of the CSS community. *B. pilularis* has been shown to invade grasslands and convert them to shrubland. This is done by decreasing the amount of light available to ground-level plants and providing habitat for small animals which forage on plants and seeds (particularly non-native ones). By displacing the non-native grass species however, *B. pilularis* may help facilitate the reintroduction of native species back into the landscape.

Methods

To test this, researchers chose 11 sample sites within the study area. Each of these sites were in an area where *B. pilularis* had progressively invaded farther into the grassland with each year. Researchers compared historic aerial photos to determine the ages of the shrubs and grouped them into categories: A, less than 12 years old; B, 12-23 years old; and C, more than 23 years old. These age classes were important because as *B. pilularis* ages, the canopy opens up and decreases the effects of its initial invasion. They determined the plant species diversity underneath the canopy of *B. pilularis* using belt transects to see if there were differences between the shrub's different age classes.

Results

This research supported the *Baccharis* hypothesis. Data showed that there were more native plant species than non-native species under the older age classes of *B. pilularis*. As the frequency of *B. pilularis* individuals increased, the number of non-native species decreased, but there was very little change among native species. Interestingly, the data also showed that shrub recovery rate seems to be dependent on the history of mechanical disturbance in the area, meaning there was slower recovery in previously disturbed places, shown by differences in age class length over all the transects.