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EFFECTS OF PRESCRIBED BURNING IN COASTAL SAGE
SCRUB COMMUNITY AT SAN ONOFRE STATE PARK, CALIFORNIA

by

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Following the assumption that fire suppression is counter to ecological balance in nature (Biswell 1974), San Onofre State Park conducted a prescribed (experimental) burn December 7 and 8, 1981 at three sites (totaling 15 hectares [ha]) in coastal sage scrub, the dominant community of the park (Thorne 1976). The main purposes of the burn were twofold: 1) test to see if light intensity burning would reduce the exotics which had invaded the coastal sage scrub, while enhancing the native vegetation; 2) to determine if wildlife (small rodent populations) would recover from the effects of the burn.

Methods

Identical pre- and post-burn data on vegetation structure (Lathrop and Martin 1982) and rodent populations (Wirtz 1982; Blankenship 1982) were compared for the first year's regrowth, sampled December, 1982, twelve months after the burn. In addition, rodent and seedling populations were also sampled four months following, in April, 1982.

Twenty-one permanent 8m x 8m quadrats were set up in the burn sites, to sample the three arbitrary subdivisions (associations) of the coastal sage. These were: 1) typical coastal sage scrub, consisting mainly of California sagebrush (*Artemisia californica* Less.) and bush monkey flower (*Diplacus puniceus* Nutt. 2) exotic, consisting of anise (*Foeniculum vulgare* Mill.), tree tobacco (*Nicotiana glauca* Grah.) and castor bean (*Ricinus communis* L.); and 3) brush, with coyote brush (*Baccharis pilularis* DC. ssp. *consanguinea* (DC.) C.B. Wolf., bladderpod (*Cleome isomeris* Greene) and lemonadeberry (*Rhus integrifolia* Nutt.) Brew. & S. Wats.

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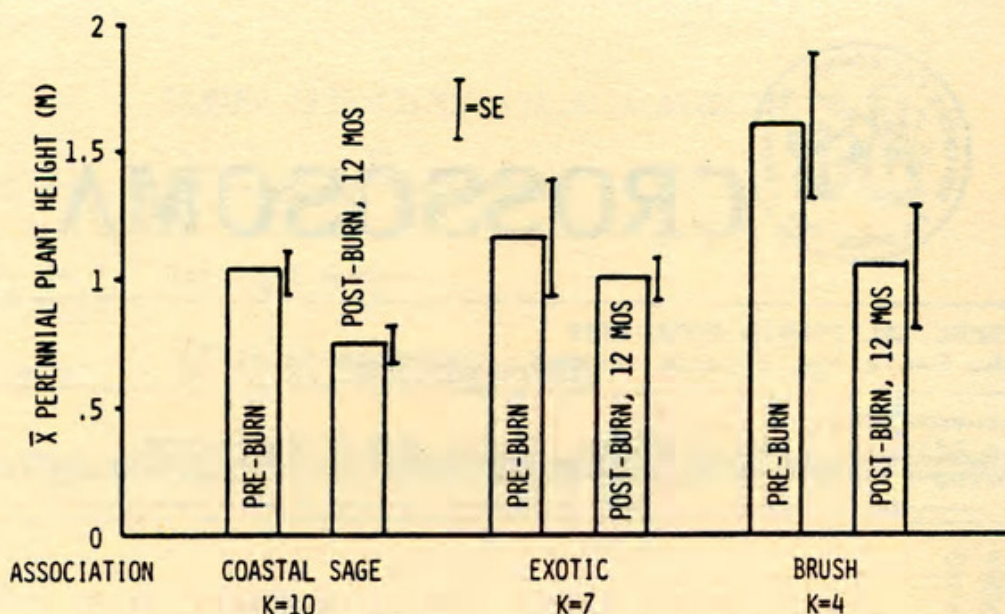


Fig. 1. Mean (\bar{X}) perennial plant height (m) in pre- and post-burn quadrats (K) at San Onofre State Park, California.

Measurements taken in the quadrats within each association were: 1) perennial plant height (m) and density (no/ha); and 2) seedling density (no/ha) (Cox 1980). Rodents were sampled by saturation trapping in line transects (Cox 1980) at the three association sites (700 trap nights each for pre- and post-burn samples).

Results

Comparisons of the post-fire data with those of pre-burn show several significant changes due to the prescribed burning in December, 1981. The canopy height of the native shrubs was reduced (Fig. 1) while some of the weedy annual elements (i.e. mustards, *Brassica nigra* (L.) Koch. and *B. rapa* L. ssp. *sylvestris* (L.) Janchen.) greatly increased in height and density. Shrubs increased in density in both the coastal sage and brush associations but decreased in density in the exotic association, twelve months following the burning (Fig. 2). Seedlings of the main perennial plant species significantly increased at both the 4 and 12 month post-fire sampling dates (Fig. 3).

Trapping efficiencies for rodents were 17% and 10% for pre- and post-burns respectively. The most abundant rodents sampled in the pre- and post-burn transects were the white-footed mouse (*Peromyscus eremicus*, *P. boyllii* and *P. maniculatus*) and the western harvest mouse (*Reithrodontomys megalotus*). The pocket mouse (*Perognathus californica*) and the common house mouse (*Mus musculus*) were less abundant but also present. They were found mostly in the exotic association transects. The wood rat (*Neotoma lepida*) was found only once, in a pre-burn transect in coastal sage. Diversity of the small mammals (7 species total) was little affected by the burning.

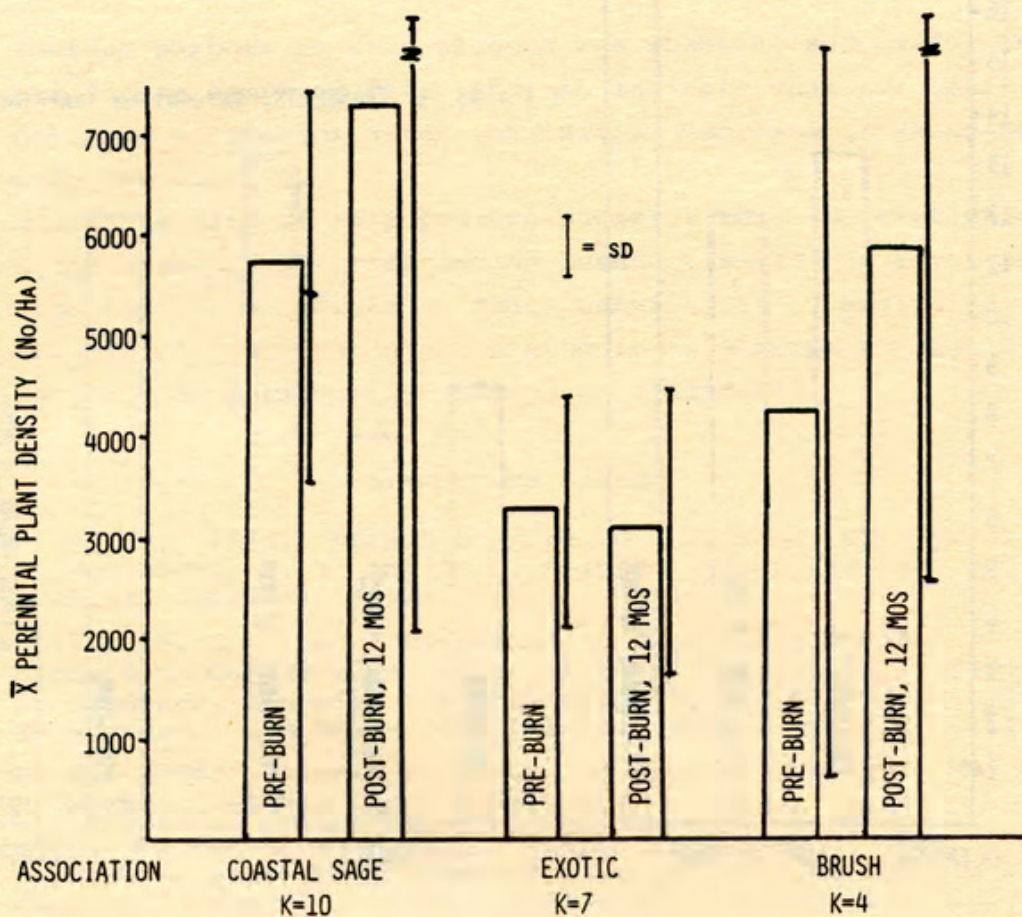


Fig. 2. Mean perennial plant density (no/ha) in pre- and post-burn quadrats at San Onofre State Park, California.

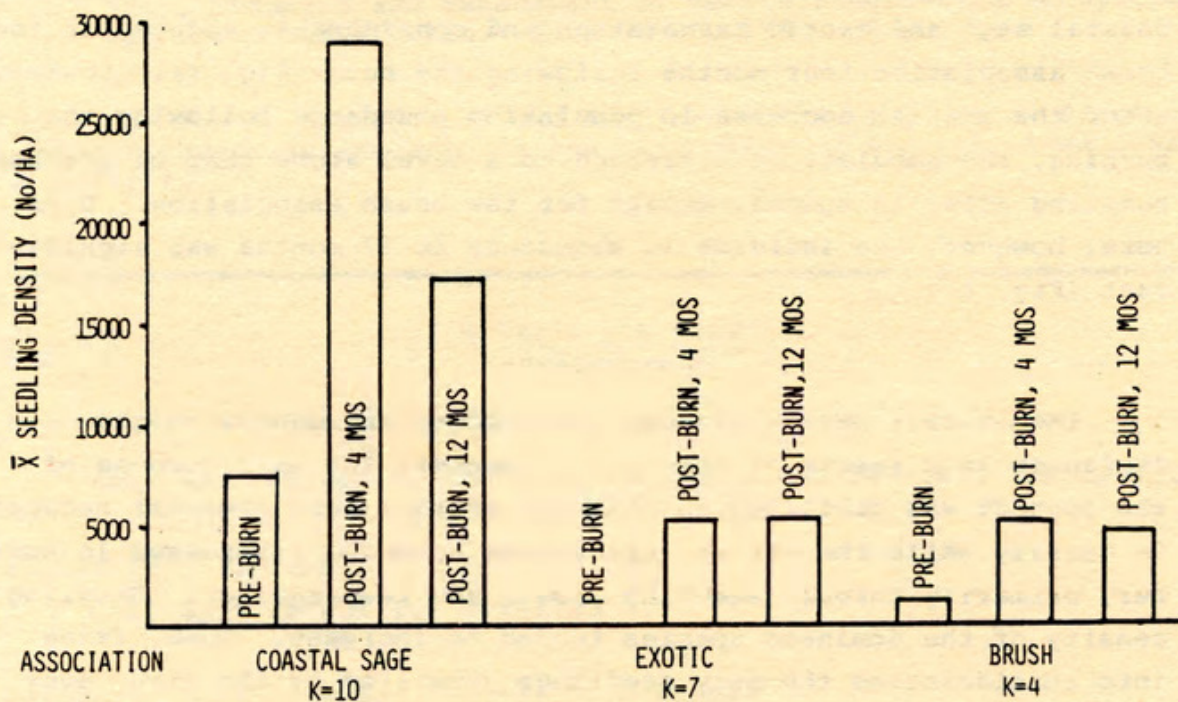


Fig. 3. Mean perennial plant seedling density (no/ha) in pre- and post-burn quadrats at San Onofre State Park, California.

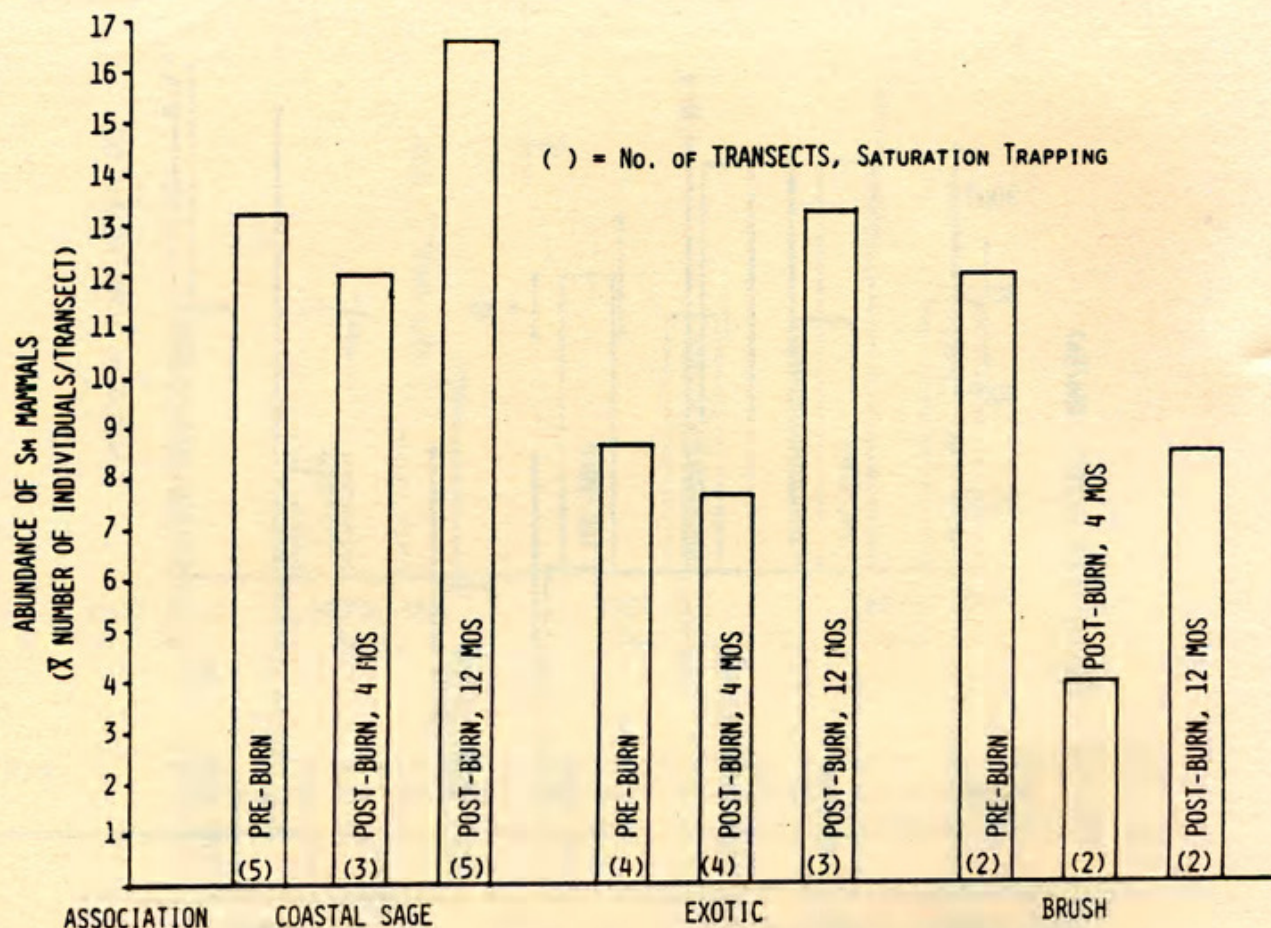


Fig. 4. Mean abundance of small mammals (rodents) in pre- and post-burn sample transects at San Onofre State Park, California.

Population abundance of the rodents was slightly reduced in the coastal sage and exotic association and considerably reduced in the brush association four months following the burn (Fig. 4). However, after the initial decrease in population abundance following the burning, the populations increased to a level above that of pre-burn sampling after 12 months, except for the brush association. Even here, however, the increase in abundance at 12 months was significant (Fig. 4).

Conclusions

The overall perennial vegetation cover and canopy height decreased as a result of the burn. However, the main purpose of the project was fulfilled in that the exotics were somewhat reduced in density while the native shrubs were enhanced (increased in number, primarily through seedling growth and resprouting). Seedling density of the dominant species tended to increase. When taking into consideration the many seedlings generated by the fire, many of the shrub species may even further increase in density in the near future. However, there is a tendency for the initial increase in native shrub seedlings, following fire, to decrease after some months (Fig. 3).

Another purpose in this project was somewhat successful in that the rodent sampling data tends to indicate that the small mammals can make a comeback after the initial decrease in abundance following the burning.

While the data of this project suggests that the exotics can be reduced somewhat by prescription burning, while not adversely affecting the native shrubs or small mammals, it is suggested that the park official try repeated burning in an attempt to see if the exotics could be permanently reduced or eliminated.

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FIELD TRIPS AND EVENTS

August 5-7 (Fri-Sun) San Gabriel Mountains.

Call Walt Wright in the afternoon at (714) 641-8820 for details.

August 26 - September 5 Cabo San Lucas

Call Walt Wright for details.

October 8 (Sat) Annual SCB Pot Luck Dinner.

Mark this date on your calendar NOW! Details will be announced in October issue of *Crossosoma*. Plan to attend! A great time is had by all who attend.



Lathrop, Earl W., Martin, Bradford D , and Blankenship, Daniel. 1983. "Effects of Prescribed Burning in Coastal Sage Scrub Community Onofre State Park, California." *Crossosoma* 9(4), 1–5.

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