

Characteristics of Coastal Sage Scrub in Relation to Fire History and Use by California Gnatcatchers¹

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Abstract: Plant cover and vegetation structure were examined at two inland coastal sage scrub sites differing in fire history and use by California gnatcatchers. *Salvia mellifera* and *Eriogonum fasciculatum* dominated one site; shrub cover on gnatcatcher-occupied plots averaged 50 percent greater than on unoccupied plots. At the other site, gnatcatcher-occupied plots had high cover of *Artemisia californica* and *Encelia farinosa* while unoccupied plots were dominated by *E. farinosa* alone and had half as much total shrub cover. Gnatcatcher territories at both sites had taller shrubs than unoccupied plots. Recently burned areas and areas with little regrowth were not used by gnatcatchers.

Coastal sage scrub is a fire-dominated vegetation type that has been largely converted to agricultural and urban uses in southern California. Less than 20 percent of the original area of this vegetation type probably remains (Westman 1981). The California gnatcatcher (*Poliophtila californica*) lives only in coastal sage scrub in California and Baja California (Atwood 1993); because habitat loss jeopardizes its survival, it has been federally listed as "threatened."

Inland Riverside County contains numerous remnant areas of sage scrub. Studies of gnatcatcher habitat have been conducted in coastal Orange and San Diego counties, often by biological consultants working for developers (e.g., Bontrager 1991, Ogden Environmental and Energy Services Co., Inc. 1992), but relatively little is known about gnatcatcher requirements in inland areas (Atwood 1993). In conjunction with two ornithologists studying gnatcatcher nesting success, we undertook this study to help clarify the relationship between California gnatcatchers, coastal sage scrub, and fire history.

Methods

Two study sites were chosen in western Riverside County: the University of California, Riverside's Motte Rimrock Reserve, located in the hills near Perris, California, and Lake Mathews, a Metropolitan Water District storage reservoir near Riverside, California. Almost half of the Motte Reserve was burned in a fire in September 1979; much of the rest

burned in June 1981. California gnatcatcher territories are found only in the 1979 burn area. We sampled four plots each in known gnatcatcher territories, in 1979 burn areas without gnatcatchers, and in 1981 burn areas. Plots without gnatcatchers were randomly selected; plots in territories were chosen so as not to interfere with gnatcatcher breeding activity. On each plot, four line-point transects were randomly chosen perpendicular to a baseline. Vegetation cover was measured every 0.5 m along each 25-m transect by dropping a vertical pointer and recording the identity and height of each species touched by the pointer. Sampling was done in late spring. At Lake Mathews, plots were located in unburned vegetation occupied by gnatcatchers, unburned vegetation without gnatcatchers, and in an area burned in 1990. Sampling procedures were the same as at Motte.

Results

At Motte, plots in the 1979 burn area used by gnatcatchers averaged 50 percent greater shrub cover than 1979 burn plots not in active use. Plots in the area burned in 1981 had little live shrub cover and were not used by gnatcatchers (table 1). At Lake Mathews, unburned plots used by gnatcatchers had almost twice as much cover as those not used, and *Artemisia californica* was an important component of the cover. Shrub cover was very low in the 1990 burn plots (table 1). Plots in bird territories had taller shrubs than unoccupied plots at both sites as well (data not shown).

Discussion

California gnatcatchers do not rely exclusively on California sagebrush (*Artemisia californica*) in inland sage scrub, as they appear to do near the coast (Bontrager 1991). Gnatcatcher plots at Motte were dominated by black sage (*Salvia mellifera*) and California buckwheat (*Eriogonum fasciculatum*); those at Lake Mathews had about equal cover of California sagebrush and brittlebush (*Encelia farinosa*). Sites used by gnatcatchers averaged more than 50 percent shrub cover, similar to results tabulated by Atwood (1993). Recently burned sites were not used by gnatcatchers. Conditions that inhibit shrub recovery after fire, as apparently occurred with the 1981 fire at Motte, could reduce the amount of usable habitat available for California gnatcatchers.

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Table 1—Average percent shrub cover (standard deviation) of plots at Motte Rimrock Reserve and Lake Mathews. “Total” may not equal the sum of each column because shrubs often overlapped.

Species	----- Motte Site -----					
	Bird Plots ¹ 1979 Burn		Non-bird Plots 1979 Burn		Non-bird Plots 1981 Burn	
<i>Artemisia californica</i>	4.3	(4.0)	6.1	(10.)	0	
<i>Encelia farinosa</i>	7.9	(10.2)	0.5	(0.9)	0	
<i>Eriogonum fasciculatum</i>	19.3	(16.3)	9.5	(8.2)	4.8	(2.0)
<i>Salvia mellifera</i>	31.5	(18.1)	24.3	(10.8)	0	
Total	62.9	(24.3)	40.4	(12.3)	4.8	(2.0)
Species	----- Mathews Site -----					
	Unburned		Unburned		1990 Burn	
<i>Artemisia californica</i>	33.6	(19.0)	1.3	(1.6)	0	
<i>Encelia farinosa</i>	28.2	(10.6)	31.1	(12.7)	2.5	(2.9)
<i>Eriogonum fasciculatum</i>	0.4	(0.4)	1.4	(1.4)	0.3	(0.5)
<i>Bebbia juncea</i>	0.7	(1.2)	0.1	(0.2)	2.5	(3.5)
<i>Lotus scoparius</i>	0		0		5.2	(7.3)
Total	62.9	(11.3)	33.9	(13.5)	10.5	(9.8)

¹ Bird plot denotes use by California gnatcatchers; non-bird plot denotes no use by California gnatcatchers in spring 1993. N=4 plots per category at Motte site; n=3 for burned plots at Mathews, n=4 for unburned plots at Mathews.

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