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# Comparison of Recapture Frequencies for White-crowned Sparrows Night-released in Preferred and Marginal Cover at a Winter Roost

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## INTRODUCTION

Survival among overwintering temperate-zone migrants is influenced, in part, by certain physical attributes of habitat. One attribute of winter habitat is the roost site (Ketterson and Nolan 1983:377). Quality roosts protect birds from direct exposure to wind, rain and low ambient temperatures (Brenner 1965, Francis 1976, Warrilow et al. 1978, Yom-Tov et al. 1977).

One temperate-zone migrant, Gambel's White-crowned Sparrow (*Zonotrichia leucophrys gambelii*), roosts in a perennial leafed shrub, quail brush (*Atriplex lentiformis*), while overwintering in central California (Barrentine 1990, 1991). This sparrow prefers to roost in densely foliated quail brush and appears to shun roosting in quail brush that is sparsely foliated or defoliated (personal observation).

In this study, I seek evidence of differential survival among White-crowned Sparrows released after dark in preferred and marginal cover at a winter roost. Survival is assessed using recapture data. I assume that the probability for recapture is the same for immatures and adults, and that recapture frequency can be used as an index of survivorship. Thus, if recapture frequencies are the same for birds in treatment groups, then the quality of the cover at a roost site does not affect overnight survival.

## METHODS

Gambel's White-crowned Sparrows were mist-netted at a winter roost near Bakersfield Kern County, California (lat-long 352-1190, 150 m elevation). The roost site consisted of isolated stands of quail brush, bordered by fallow fields of annual grasses (*Bromus* sp.) in the Kern River flood plain.

Sparrows were captured at dusk during four December netting sessions: 4, 11, 21 and 30 December 1991. Birds were sorted by age (immature and adult) at the time of capture, and individuals of each age class were then randomly assigned to one of two treatment groups before release. Birds in the first group were released after dark in preferred cover (i.e., densely foliated quail brush). Birds in the second group were released after dark in marginal cover (i.e., defoliated quail brush). Shrubs were of similar size and separated by ca 20 m. All birds were released at the same communal roost, by flashlight, between one and three hours after sunset. Birds were held individually in cloth bags between the time of capture and release.

Recaptures in this study included only those birds banded in December that repeated at least once in the same season and at the same location during one or more of 17 weekly netting sessions, beginning 11 December 1991 and ending 9 April 1992.

Local climatological data were obtained from a National Weather Service station, 10.5 km NE of the roost site (NOAA 1991). Microclimatic conditions at the roost were not measured in this study. Recapture data were compared using Chi-square analysis of 2 x 2 contingency tables ( $\alpha = 0.05$ ).

## RESULTS

**Recapture Frequencies.** — A total of 210 White-crowned Sparrows were banded and released in this study (Table 1). Of 103 birds

released in preferred cover, 64.8% of the immatures and 59.2% of the adults were recaptured in subsequent netting sessions. Of 107 birds released in marginal cover, 50.0% of the immatures and 67.4% of the adults were recaptured. There was no statistical difference between recapture frequencies for immature or adult birds that were released in preferred and marginal cover.

**Table 1.** Number and percent recaptures for immature and adult White-crowned Sparrows night-released in preferred and marginal cover.

Cover Type	Immatures			Adults			All Birds					
	Total	Recaptures		Total	Recaptures		Total	Recaptures				
	N	N	%	N	N	%	N	N	%			
Preferred	54	35	64.8	} NS	49	29	59.2	} NS	103	64	62.1	} NS
Marginal	58	29	50.0		49	33	67.4		107	62	57.9	
Total	112	64	57.1	98	62	63.3	210	126	60.0			

**Climatic Conditions.** — The mean December air temperature was 9.0° C, the normal expected mean temperature for this month (NOAA 1991). Mean maximum and minimum air temperatures were 14.8° C and 3.2° C, respectively. Minimum temperatures on four release nights ranged from 1 to 3° C ( $\bar{x} = 1.9°$  C). Total precipitation for December was 2.65 cm. There was no precipitation on release nights. Wind conditions were not satisfactorily quantified, but wind was negligible on release nights.

## DISCUSSION

White-crowned Sparrows may experience climatic conditions that compromise survival, but this may occur at the northern limits of

their winter range where ambient temperatures are low and food is scarce (Ketterson and King 1977, King and Farner 1966).

In this study, the overnight survival of White-crowned Sparrows was not affected by the quality of the cover at a winter roost. It is likely that local December air temperatures were not low enough to induce physiological stress, thus differential survival between age and treatment groups was not observed.

Although undocumented, it may be possible that the quality of the cover at winter roosts does affect the overnight survival of White-crowned Sparrows in some areas of their winter distribution, but that is not likely to occur during a normal December at Bakersfield, California.

## ACKNOWLEDGMENTS

I thank Shelby J. Barrentine and B. Randolph Smith for assistance with the field work, and John P. Dirkse for assistance with statistical analyses. C.J. Ralph provided helpful comments on an earlier draft of this manuscript.

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