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EFFECTS OF HABITAT TYPE AND HUMAN DISTURBANCE  
ON AN ENDANGERED WETLAND BIRD:  
BELDING'S SAVANNAH SPARROW

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by  
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## ABSTRACT

The Belding's Savannah sparrow (Passerculus sandwichensis beldingi) was placed on the California state endangered species list after population estimates showed fewer than 1500 birds. Little work has been done to determine factors that affect the abundance and distribution of the Belding's Savannah sparrow. Effective measures for the management and protection of these sparrows need to be developed.

To determine how vegetation structure affects the abundance and distribution of the Belding's Savannah sparrow, fourteen study plots were established in two coastal salt marshes; Tijuana Estuary and Los Penasquitos Lagoon. The numbers of breeding pairs, the size of their territories, and vegetation characteristics were measured at each plot. Regression analyses showed a negative relationship between territory size and percent cover of Distichlis spicata ( $r = 0.66$ ) and a positive relationship between territory size and percent cover of Salicornia virginica ( $r = 0.58$ ) when data from both study areas were combined. When data from this study were combined with

those from a study done at the Santa Margarita Estuary a positive relationship was found between the number of nesting pairs and mean plant height ( $r = 0.41$ ).

To examine the effects of human disturbance on the abundance and distribution of the Belding's Savannah sparrow the intensity of disturbance at each of the fourteen study plots was determined. The amounts of both direct and indirect disturbance was correlated with both territory size and nesting pair density. No relationships were found.

The effects of direct human disturbance on the behavior of the Belding's Savannah sparrow were investigated through field experiments. The flushing distances of the sparrows were measured over three habitat types utilized for foraging. This gave a measure of the effects of direct disturbance on the birds over their entire range of habitats. The sparrows flushed when disturbed by a person walking at an average distance of 25-m. No differences in flushing distances were found between habitat types.

Several types of human disturbance were introduced experimentally in the sparrows' primary breeding habitat. No differences were found for singing and perching behaviors before and after disturbance. Sample sizes were small.

Variations in territory size and nesting pair density may be related to food availability or the availability or quality of habitat. Optimal breeding habitat seems to consist of thick mats of Distichlis spicata or tall dense vegetation. Responses to short-term changes in habitat may not be apparent due to site tenacity.

Belding's Savannah sparrows flush easily in all types of habitats utilized for foraging and non-breeding activities. During nesting behavioral changes due to human disturbance are not apparent. This may be because territorial birds or birds with young may flush only as a last resort. An examination of the effects of human disturbance on the reproductive success of the Belding's Savannah sparrow is necessary.

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