A BIOGEOGRAPHICAL ANALYSIS OF BIRD COMMUNITIES IN THE EVERARD RANGES, SOUTH AUSTRALIA

by

Kathleen Sharon Shurcliff

B.A.(Hons.)

A thesis submitted in fulfillment of the requirements for the degree of *Master of Arts* in the Department of Geography.

The University of Adelaide

May, 1978

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

SUMMARY

The relationship between the vegetation and avian components of the biogeocoenoses within a South Australian arid mountain range was investigated. Eight biogeocoenoses, based on landform types and vegetation associations, were delimited in two study areas. Each biogeocoenose was characterized by its plant species composition, foliage cover profile, plant species diversity, plant life form diversity, foliage height diversity, bird species composition, and several bird community characteristics including total number of individuals, number of species, species diversity, and a dominance index. In addition, bird feeding profiles and spectra were constructed for the biogeocoenoses.

Bird species composition was sampled using both mist net captures and transect counts. Since a comparison of the two sets of data indicated that the mist net captures underestimated the total number of individuals and number of species in those biogeocoenoses with a tree layer (>8 m), most analyses were based on the transect data.

Three of the bird community characteristics measured were significantly correlated with life form diversity. However, life form diversity did not accurately predict the total number of individuals for those units in which White-plumed Honeyeaters accounted for over half of the total population sampled. Total number of individuals was predicted by a foliage height diversity index, which is also an index of total foliage cover. These results support those of other arid area bird studies and indicate the difficulties of extending principles developed by extensive work in one vegetation type to other vegetation types.

Although vegetation physiognomy successfully predicted the bird community characteristics, geographic proximity was the main factor affecting the similarity of bird species composition, as indicated by

both a discriminant function analysis and a Motyka similarity matrix. Investigation of the pattern of feeding profiles and spectra indicated that they were not closely related to the foliage cover profiles. Thus, foliage cover does not appear to be a very accurate index of resource availability in the vegetation types sampled. This helps to explain why foliage height diversity is not significantly related to the bird community characteristics. Also, life form diversity was not significantly correlated with feeding spectra diversity. Inadequacies of the procedures used to determine feeding behavior could be largely responsible for these results.

The results of this study indicate that biogeocoenoses, as determined by plant associations, are useful organizing units for detailed investigations of bird communities in a limited geographic area.

I hereby declare that none of the material contained within this thesis has been submitted for a degree at any other university and that, to the best of my knowledge and belief, none of the material has been previously published or written by another person, except where due reference has been made in the text.

ACKNOWLEDGEMENTS

I wish to thank the Mimili Aboriginal Community who, as guardians of the Everard Ranges, generously shared with me their time, interest, and knowledge of the area. I would also like to thank J. and L. Lester, T. and M. Brown, and J. and A. McClelland for their warm hospitality and assistance.

No field study can be completed without the enthusiastic support of willing field workers. In this case they were D. Close, E. Close, R. Davies, J. Job, B. Riceman, L. Riceman, and M. Whesson. A very special note of gratitude must be paid to A. Shurcliff, who was my invaluable assistant and companion throughout most of the field work.

The following individuals and bodies gave assistance or permits in several stages of the work: Australian Department of Aboriginal Affairs, Australian C.S.I.R.O. Bird Banding Scheme, South Australian Branch of the Bureau of Meteorology, South Australian Institute of Technology and in particular K. McCloy, South Australian National Parks and Wildlife Division, and South Australian State Herbarium, especially D. Whitley.

Financial assistance was received from the Department of Geography at the University of Adelaide, and the author held an Australian Commonwealth Postgraduate Research Award.

Further thanks are due to B. Gepp and J. Kikkawa for helpful discussions on the study; and to M. Andrew, C. Barrington, M. Foale, J. Nolan, W. Sulda, and V. Upton for assistance with the preparation of the manuscript. A very special debt of gratitude is owed to S.G. Taylor, Lecturer in Biogeography at the University of Adelaide, for her thorough supervision of this study in all its aspects.