

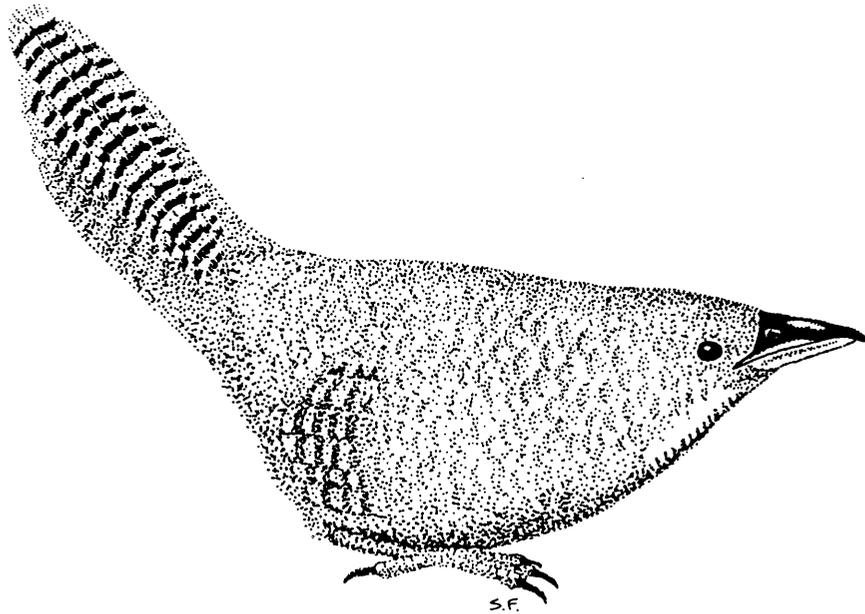
THE STATUS OF THE RUFOUS SCRUB-BIRD *ATRICHORNIS RUFESCENS* :
HABITAT, GEOGRAPHICAL VARIATION AND ABUNDANCE.

by

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".....my attention was drawn to the note of a bird I had never before heard, and from that moment I knew it would prove a prize should I have the good luck to procure it. I followed it up on my hands and knees (for the scrub was too thick to stand up in) until the voice appeared almost at the muzzle of the gun; here I remained fixed for quite half an hour, and during that time I can scarce describe my feelings. I was almost inclined, although not superstitious, to think some evil spirit was playing me a trick; for at one moment it would give out its own notes apparently just in front of me, and the next minute mimic the Spine-tailed Orthonyx (*O. spinirostris*) in another direction; then the Scrub-Robins's note would be imitated in some other place; and even sometimes its voice seemed to come from the ground, at other times from the trees above me.

This state of things lasted until I became painfully cramped from the position I had to lie in, and my eyes painful from staring about so long. I was just about to give up, when, to my delight, I saw my tormentor hop from one bush to another, not more than 7 or 8 feet from where I had been lying the whole time."

James Wilcox describing
the discovery of the
Rufous Scrub-bird (in
Ramsay 1866b).

PREFACE

I certify that the substance of this thesis has not already been submitted for any degree and is not being currently submitted for any other degree.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.



Simon Ferrier

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ABSTRACT

The status of the Rufous Scrub-bird *Atrichornis rufescens* has always been difficult to assess due to the bird's secretive nature and the density of its habitat. The primary aim of this study has been to provide a scientific basis for future assessment of status by answering questions concerning three aspects of the species' biology: detectability, habitat requirements, and geographical variation. A secondary aim of the study has been to provide a preliminary assessment of status based on the results of an exploratory survey, interpreted within the context of the intensive research findings.

The loud and penetrating song produced by territorial males provides the only useful means by which the Rufous Scrub-bird can be detected. A detailed study was made of song output and detectability in a sample of known territorial males located along trial transects. Detectability was found to be correlated with time of year (highest September to January), weather (highest in still, humid but mist-free conditions), forest type (highest in open forest), and distance from the transect (highest close to the transect). The data were used to develop a mathematical model describing the probability of detecting an average territorial male under any combination of the above factors. Estimates of detectability derived from this model can be used to adjust transect counts obtained elsewhere under a wide variety of conditions.

The habitat requirements of the Rufous Scrub-bird were studied in two areas, one consisting mostly of subtropical rainforest, and the other consisting of a mosaic of open forest and cool temperate rainforest. In each area, multivariate habitat comparisons were made between plots centred on male territories and plots located at random throughout unoccupied forest. The critical factors determining whether or not habitat was suitable appeared to be identical in the two areas, despite broad differences between the forest types occupied. The major requirements were extremely dense cover 2-50cm above the ground, moderately dense cover 50-100cm above the ground, a moist microclimate at ground level, and abundant leaf litter. The relationship between habitat suitability and logging was found to vary with intensity of logging, time since logging,

and forest type. Selective logging increased habitat suitability in rainforest, but lowered suitability in open forest. Habitat suitability in open forest was also found to be negatively correlated with distance from the nearest rainforest.

A variety of home range models was used to estimate the area of habitat required by an average territorial male. Birds were found to spend 95% of their time within an area of 1.13 ha. Home range size varied little in relation to forest type, habitat quality, song output, and proximity of neighbouring males.

The study of geographical variation concentrated on song variation and, to a lesser extent, morphological variation. Song displayed little variation within each population but varied significantly between populations. Populations fell into two groups. Birds in the northern group sang phrases with more syllables, delivered more rapidly, and less frequently inflected upward compared to birds in the southern group. These differences were shown to be unrelated to differences in habitat. The song differences were correlated with a regional shift in tarsus length. It is suggested that the two races warrant at least informal recognition for the purposes of conservation, but that formal description should await the results of further research.

The results of an exploratory survey were analyzed within the context of the intensive research findings summarized above. The density of Rufous Scrub-bird territories was found to be correlated with altitude (highest at high altitudes), average annual rainfall (highest in high rainfall areas), rainforest proximity (highest in or near rainforest), and rainforest buffering (highest in areas more or less surrounded by patches of rainforest). A mathematical model was developed describing territory density in relation to these environmental factors. The model was used to map the predicted distribution of the species. The total present population was estimated to be about 2,400 territories (700 for the northern race and 1,700 for the southern race), compared to an estimated 11,900 territories at the time of European settlement. Future changes in abundance are difficult to predict because of the unknown future influence of "altitudinal retreat", long term forest management, and stochastic extinction of small isolated populations.

It is recommended that the species' listing in the ICBP Red Data Book should be changed from "rare" to "vulnerable". Guidelines are presented for future management and research, with emphasis on monitoring of changes in abundance (at least once every 10 years), research on the long term effects of forest management practices, and exclusion of disturbance from known territories.

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