Does post-mining rehabilitation on the Weipa bauxite plateau restore bird habitat values?

by

Susan F. Gould

Submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy
of the Australian National University
February 2010

Candidate's Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university. To the best of the author's knowledge, it contains no material previously published or written by another person, except where due reference is made in the text.

Susan F. Gould Date:1 June 2009

Dedication

This work was inspired by love and gratitude for the birds of the Weipa bauxite plateau, who make the forests ring with song, but have no voice in shaping the plans of mankind for their forest homes. This thesis is dedicated to them.

Acknowledgements

It has been a privilege and a pleasure to be mentored by people who are experts in their respective fields, clear thinkers, and fine people to boot. I thank all of the members of my supervisory panel for their generosity in mentoring me through this process: Professor Brendan Mackey (chair) - Fenner School of Environment and Society at ANU, Professor Henry Nix - Fenner School of Environment and Society at ANU, Dr John Ludwig - CSIRO Sustainable Ecosystems Tropical Forest Research Centre at Atherton, David Tongway - Visiting Fellow Fenner School of Environment and Society at ANU, and Dr Penny Olsen - Visiting Fellow Botany and Zoology at ANU. Dr Ross Cunningham also provided early advice on research design before retiring from ANU.

Conducting this research was made possible through financial support from an ANU Graduate School Scholarship. Rio Tinto Aluminium Weipa provided substantial financial and in-kind support. Thanks are due to Neale Dahl, Sinead Kaufman, Owen Fisher, Flo New, Sandy Eldridge, Des Land and Haakon Nielsen from the Rio Tinto environment team. Thanks too, to the crew leaders, superintendents and operators in the mine who provided direction and practical assistance as needed. CSIRO Sustainable Ecosystems – Tropical Forest Research Centre at Atherton also supported this research by providing affiliated researcher status, supervision and library assistance.

Special thanks are due to the team of volunteers who assisted with vegetation sampling under arduous conditions making the work not only bearable but enjoyable: Rod Thorn, Merinda Nash, Amelia Elgar, Michael Barnett, David Wingrove, Nyree Gay, John Doherty, Chris Masters and Owen Pittman generously volunteered their time. Sandy Eldridge and Flo New from Rio Tinto also provided valued assistance with field work.

Thanks to the many other people who provided assistance in various ways during the course of this research: Emlyn Williams and Bob Forrester (ANU Statistical Consulting Unit); Colin Pain (GeoScience Australia); Peter Thompson and Aaron Crosby (CYPDA-Sustainable Fire Project); Gary Wilson, John Clarkson, John Neldner, Rosemary Niehus and Paula Peeters (Queensland EPA); Clive Hilliker, Steve Leahy and Karl Nissen (ANU Fenner School of Environment and Society); the support staff at the Fenner School; and the ANU library staff who provided a very efficient off-campus document delivery service. Conversations with other Fenner school students were also very helpful. Thanks to Adam Leavesley, Nicola Munro and Julian Reid.

Finally, special thanks are due to Henry and Katharine Nix who generously shared their home and family, and even provided a dog to walk and cuddle when I was visiting Canberra. None of this would have been possible without the extraordinary support of my husband Rod.

Abstract

Rehabilitation is seen as a key strategy for minimising biodiversity losses. Although most rehabilitation strategies aim to provide habitat for fauna, they usually focus entirely on establishing vegetation. Successful vegetation establishment, however, does not necessarily provide habitat to the same species that are threatened by habitat loss. Improved understanding of faunal response to rehabilitation is required if rehabilitation techniques are to be refined and deliver the hoped for biodiversity outcomes. This study aimed to assess to what extent post-mining rehabilitation on the Weipa bauxite plateau has restored the bird habitat values of the pre-mining native forest.

Bird assemblages, vegetation, and landscape functionality were compared between: (1) *Eucalyptus tetrodonta* open forest reference sites representative of the pre-mining native forest; (2) two reference land units of *Eucalyptus tetrodonta* tall woodland that have previously been nominated as ecologically appropriate analogues for the post-mining landscapes; and (3) a chronosequence of post-mining rehabilitation sites up to 23 years old.

Bird species richness and mean bird abundance increased with rehabilitation age. Bird species composition also changed and became more similar to native forest bird assemblages with increasing age. Significant differences remained, however, in mean bird abundance and composition of the bird assemblages between the oldest age class of mine rehabilitation and reference native forest land units. The mean bird species shortfall index in the oldest age class of mine rehabilitation was 63%, compared to a mean species shortfall index of 27% for pre-mining native forest sites. There were also significant differences in vegetation composition and structure between reference native forest land units and post-mining rehabilitation sites. Most importantly, the framework plant species that dominate the native vegetation community occurred at much lower densities in mine rehabilitation than in reference land units. Site detection rates of birds were strongly related to vegetation composition and structure.

It is concluded that mining and post-mining rehabilitation on the Weipa bauxite plateau has so far resulted in habitat conversion rather than habitat restoration. It therefore contributes to the causes of biodiversity decline. Post-mining rehabilitation created new habitat for 18 bird species not sourced from the pre-mining native forest. It also provided partial habitat for many of the generalist native forest bird species recorded, although their presence in the landscape remained dependent on access to native forest. However, rehabilitation did not provide the habitat resources that are required by habitat specialists and foraging specialists. This study found that the native forest bird species most sensitive to habitat loss, and most in need of habitat restoration, may be the last to return to rehabilitation if they return at all. The findings of this study have implications for rehabilitation practices, biodiversity conservation on the Weipa bauxite plateau, as well as broader implications for policies that rely on the assumption that rehabilitation can offset biodiversity losses.

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