

**Avifaunal ecology and responses to post-fire succession of  
buttongrass moorlands in the  
Tasmanian Wilderness World Heritage Area**



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Submitted in fulfilment of the requirements for the Degree of

Doctor of Philosophy

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September 2010



## **Declaration of originality**

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## **Statement of ethical conduct**

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The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government's Office of the Gene Technology Regulator and the rulings of the Safety, Ethics and Institutional Biosafety Committees of the University.

This research was approved by the Animal Ethics Committee of the University of Tasmania (Permit # A0007591 and # A0008676), and by the Biodiversity Conservation Branch to take Wildlife (Permit # FA 03171 and # FA 05282) and Plants (Permit # FL 05036) for Scientific Purposes.

## **Funding**

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This research was funded by the Birds Australia Stuart Leslie Bird Research Awards (2003-2004) and the Biodiversity Conservation Branch, Department of Primary Industries, Parks, Water and Environment, Tasmanian Wilderness World Heritage Area Fauna Conservation Research Grants (2003-2006).

## Abstract

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Fire management has become an increasingly critical issue in areas of high conservation value such as the pyrogenic buttongrass moorlands in the Tasmanian Wilderness World Heritage Area. The moorland avifauna is depauperate, comprised of only three cryptic, ground-dwelling resident species that depend exclusively upon moorlands in the study area. These include the Southern Emu-wren (*Stipiturus malachurus*), Striated Fieldwren (*Calamanthus fuliginosus*), and Ground Parrot (*Pezoporus wallicus*), in addition to a small number of species that are typically associated with adjacent forested habitats. This thesis is the first comprehensive study of the buttongrass moorland avifauna and investigated responses to post-fire succession primarily to help guide fire and conservation management. The replicated space-for-time study included sites in low productivity, blanket moorlands at Lake Pedder ( $n = 12$ ; 2-54 years post-fire) and in moderate productivity, eastern moorlands at Lake St Clair ( $n = 14$ ; 1-44 years post-fire). Avifaunal diversity, density, and habitat use over three seasons were quantified and analysed in relation to fire age, soil productivity and composition, structure, and spatial characteristics of habitats at both locations. Observed patterns of avifaunal diversity, density, and habitat use across the two chronosequences were complex and revealed high levels of inter-specific and inter-site variation in relation to habitat variables. Overall, mean densities of the resident species at Lake Pedder increased across the chronosequence, whereas at Lake St Clair they peaked 2-8 years post-fire. Mean densities of the non-resident species did not exhibit any consistent trends in relation to fire age. Observations of habitat use demonstrated that the resident and non-resident species used riparian and edge habitats disproportionately to their availability at both locations when compared to the moorland matrix. Surveys of potential arthropod prey resources conducted in matrix and riparian habitats at Lake St Clair indicated that mean abundance and mean energy content across orders were greater in riparian habitats and mid-seral sites, respectively. Thus, patterns of habitat selection by insectivorous species at Lake St Clair also appeared to reflect the differing availabilities of potential arthropod prey. Lastly, a paired before-after-control-impact study conducted at Lake St Clair ( $n = 4$ ) indicated that hazard-reduction burning in moorlands may result in overall reductions in resident avian densities and increases in non-resident densities in the short-term ( $< 1.5$  years post-fire). The implications of these findings are discussed in relation to current fire management practices and recommendations are provided to facilitate the conservation of critical resources for the moorland avifauna across the landscape and over time.

## Acknowledgements

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Due to the multidisciplinary nature of this thesis there are many people whom I would like to thank for their gracious advice, assistance, and support over the past few years. First of all, I would like to thank my parents Asif and Melanie without whose love and unwavering support I would have never been able to return to academia, and to my sister Serena for always being there for me through thick and thin.

I wish to thank my supervisors, Assoc. Prof. Alastair Richardson at the University of Tasmania and Michael Driessen at the Biodiversity Conservation Branch, who were always there with open doors when I needed their help and who have been a real pleasure to work with over the years. Special thanks to Michael who was instrumental in assisting me throughout many aspects of my project.

I would like to thank the following people at the University of Tasmania for their assistance and advice along the way including: Kit Williams, Sherrin Bowden, Wayne Kelly, Kate Hamilton, Adam Stephens, Tom Sloane, Richard Holmes, and Randy Rose. Thanks to Claire Lawrence, Ryan Downie, and Glenda for bumbling through buttongrass with me to set-up the transects. I would like to thank John Osborne, Arko Lucieer, Rob Anders, Mick Russell, Penny Atkinson, and Don Driscoll in the School of Geography and Environment and Geoff Allen in the School of Agricultural Science. To all fellow students past and present, especially Beth Strain, David Sinn, Kerryn Herman, John Gooderham, Glenn Dunshea, Laura Parsley, Kevin Redd, Rodrigo Hamede, Alex Kabat, and Heidi Auman for all the good times and commiserations. And to the rest of my friends in Hobart and Melbourne- thanks for helping make Australia my home away from home.

The following staff from the Biodiversity Conservation Branch provided considerable assistance throughout my project: Jayne Balmer, Colin Reed, Sib Corbett, John Corbett, Chris Collins, Sally Bryant, Mark Holdsworth, and Julian Ward. Special thanks to Drew Lee and Stephen Mallick for their assistance in the field. Thanks also goes out to John Ireson and Wade Chatterton at the New Town lab for advice on vacuum sampling and graciously lending me their equipment. Staff from Parks and Wildlife Service also provided invaluable assistance with my project. Special thanks to Jon Marsden-Smedley for assistance with identifying sites and providing me with data on fire histories, and to everyone at Lake St Clair National Park without whose help, hospitality, and company I could not have completed my research. I would like to thank Kent McConnell and Richard Hale for facilitating my use of the Park as a home base for research and Tony Nichols for getting the vacuum running when I needed it most. Thanks to Barry Batchelor, Maren Goerne, Ian

Marmion, and Shawn for their assistance in conducting Ground Parrot surveys. I would like to especially thank Trevor Norris for his willingness to share his knowledge of fire management and otherwise helping throughout my project and Adam Scurra, Sam Tacey, and Steve Locke for putting me up, putting up with me, and keeping me entertained.

I wish to thank the following people from a wide range of organisations whom provided me with advice and assistance during the research process: Peter Brown formerly at the Nature Conservation Branch; Marie Yee, Gab Warren, and Michael McDonald at Forestry Tasmania; Eric Woehler and Colin Southwell at Australian Antarctic Division; members of Birds Tasmania; Ray Brereton at Hydro Tasmania; Robert Driessen at Datavisions; Marcus Pickett at Mt. Loft Ranges Southern Emu-wren Recovery Program; Jack Baker at NSW Parks and Wildlife Service; David McFarland at QLD Environmental Protection Agency; Mike Weston and Grainne Maguire at Birds Australia; Ken Chan at University of the Sunshine Coast; Penny Greenslade at CSIRO; Owen Seeman at the Queensland Museum; Greg Horrocks, Paul Bailey, and Sheila Hamilton-Brown at Monash University; and Rick Redak at the University of California Riverside.

I am perhaps most indebted to those who provided me with much needed statistical advice and assistance throughout my research. I would like to especially thank Gerry Quinn at Deakin University who graciously volunteered his time and energy, Russell Thomson at the Menzies Center, Leon Barmuta at the University of Tasmania, and Glenn McPherson of Glenn McPherson Consulting. I would also like to especially thank Len Thomas who was instrumental in helping me to conduct my Distance analyses and the other Distance folks at the University of St. Andrews.

I would like to give special thanks to my mother-in-law Henriette Cooper Wessels for graciously and meticulously proofreading all my final drafts.

I thank Birds Australia and the Biodiversity Conservation Branch for recognising the importance of and providing funding for my research.

To Tarryn, Akuna, Tuk Tuk and other canids, for staying by my feet and keeping a smile on my face like only friends of the four-legged variety can.

And last, but certainly not least, to my wife Karen- for her unwavering love and friendship, extraordinary tolerance, continual support, ecological input, editing, and assisting me in innumerable ways. I couldn't have done it without you!



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## **Bumbling through Buttongrass**

by Todd A. Chaudhry

Golden plains under whimsical skies  
Hummocks 'n puddles and big march flies

Lurching leeches and yabbies abound  
The Roaring Forties often the only sound

For the cryptic birds and sable snakes  
Slink through the sedges and next to the lakes

Wombats amble through the tussock maze  
On a bed of peat where it can rain for days

But a spell of sunshine can dry the mire  
And a simple spark unleashes the fire

Burning buttongrass and tea-trees too  
Enabling the moorland to grow anew

A world in miniature on the grandest of scales  
Forever serenaded by the wailing westerly gales

