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Habitat associations of the long-nosed potoroo (*potoroos tridactylus*) at multiple spatial scales

Melinda A. Norton
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HABITAT ASSOCIATIONS OF THE LONG-NOSED POTOROO (*Potoroos tridactylus*) AT MULTIPLE SPATIAL SCALES

Melinda A. Norton BSc. (Hons) UNSW

A thesis submitted in fulfilment of the requirements for
the degree of

Master of Science (Research)

School of Biological Sciences,
University of Wollongong
March 2009



CERTIFICATE OF ORIGINALITY

I, Melinda A. Norton, declare that this thesis, submitted in accordance with the regulations of the University of Wollongong in fulfilment of the requirements for the degree Master of Science (Research). The work in this thesis is wholly my own unless otherwise references or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Melinda Ann Norton

31 March 2009

ABSTRACT

*The long-nosed potoroo (*Potorous tridactylus*) is a threatened, ground-dwelling marsupial known to have been highly disadvantaged by changes brought about since European settlement in Australia. Key threats to the species are believed to be fox predation and habitat loss and/or fragmentation. In order to conserve the species, the important habitat elements for the species at both the coarse and fine scale need to be identified and managed appropriately. The aims of this study were to examine the coarse- and fine-scale habitat preferences of the long-nosed potoroo, using a variety of techniques, in two National Park reserves (Barren Grounds Nature Reserve and Budderoo National Park) in the Southern Highlands of New South Wales in order to inform management. The ecology of the long-nosed potoroo in this region is poorly understood, making this study both timely and critical. Assessments of the morphometrics of the local long-nosed potoroo populations and their relative abundance, in addition to fox predation pressure at these localities, were also undertaken to assist in the conservation of the local potoroo population.*

Live-trapping was conducted in autumn and spring, from 2004 to 2008, at 103 trap sites across the two study areas and morphometric data were collected. The local long-nosed potoroos were found to be larger in size than Victorian animals but smaller than north-eastern NSW animals supporting the concept of a cline in body size for the species with weight increasing with latitude on the mainland. Sexual dimorphism was also observed with adult males having larger body weights, head lengths and pes lengths. Between one to two thirds of all males and females at either study area were only captured in a single trapping session, indicative of high levels of transience and/or low levels of survivorship.

Of the two study areas, Barren Grounds Nature Reserve supported a larger number of individuals and appeared to have a greater degree of home range overlap between individuals, which was considered indicative of a higher quality habitat at this study area. Overall, the two study area populations appear to have increased over the course of the study. The sand plot technique, used in both study areas each Autumn and Spring from 2005 to 2008 as a second technique to monitor potoroo relative abundance, was considered less effective than trapping. This was due to its inability to decipher between individuals with overlapping home ranges in higher density populations and the species' reduced utilisation of tracks compared to many other species.

A number of habitat attributes were examined at each trap site to allow comparison with trap success ratings as an indication of macrohabitat preferences. In Spring 2007 and Autumn 2008, microhabitat use was also examined at both study areas, using the spool-and-line technique and an assessment of forage diggings. The results indicated that while potoroos were trapped at sites with a wide range of macrohabitat attributes, the species displayed a number of macrohabitat preferences, particularly for greater levels of canopy and shrub cover, for ferns as a dominant ground cover type and for lower levels of floristic diversity in ground cover. Differences in the macrohabitats present at each study area, as well as those preferred at either study area, were also observed. Microhabitat attributes were assessed along the spool paths as well as in the available habitat to allow comparison of observed and expected usage. The spooling results revealed that while most individual potoroos had significant preferences for some microhabitat attributes, no clear trends were evident across all individuals spooled. Comparison of the presence/absence of forage diggings and associated microhabitat attributes at systematic sample points within the available habitat was also undertaken. Potoroos also displayed preferences for foraging in locations with

higher shrub cover densities and more open ground cover. Between the two scales of investigation, patterns of habitat preferences differed. The species' habitat use appears to be influenced by both macro- and micro-scale preferences, highlighting the importance of examining habitat associations at multiple scales.

The relative abundance of foxes fluctuated over the study as indicated by sand plots monitored in both Autumn and Spring from 2005 to 2008 in both study areas. Yet despite the often high fox predation risks, individual potoroos were not all preferentially utilising higher levels of ground cover or habitat complexity. Despite dense vegetative cover being a common attribute in potoroo habitat, my results support the theory that the species requires habitat patchiness, with structural and floristic preferences varying during different activities. This includes the use of relatively open, floristically-diverse patches for foraging activity, providing some level of cover from aerial but not ground predation during foraging. Analysis of fox scats at the same study sites indicated a high prevalence of potoroo remains. Consequently, it was not considered likely that the species is afforded adequate protection against fox predation by its use of habitat.

Future management should aim to perpetuate the diversity of vegetation attributes at each of the study areas while avoiding practices that simplify such habitat. The effective control of foxes in and around potoroo habitat was also considered likely to assist in the conservation of the species

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TABLE OF CONTENTS

ABSTRACT	I
ACKNOWLEDGEMENTS	IV
1.0. INTRODUCTION	1
1.1. THEORY OF HABITAT USE	1
1.2. TECHNIQUES USED TO EXAMINE THE HABITAT USE OF SMALL AND MEDIUM-SIZED MAMMALS	6
1.2.1. Trapping	7
1.2.2. Direct observations	11
1.2.3. Fluorescent Pigment tracking	13
1.2.4. Radio-tracking	14
1.2.5. Spool-and-line	15
1.2.6. Hair tubes	18
1.2.7. Indirect observations of activity	19
1.3. THE LONG-NOSED POTOROO – A MEDIUM-SIZED GROUND-DWELLING MAMMAL	23
1.3.1. Taxonomy and conservation status	23
1.3.2. Description	24
1.3.3. Reproduction	25
1.3.4. Habits	25
1.3.5. Diet	27
1.3.6. Potential threats	29
1.4. HABITAT ATTRIBUTES AND THEIR USE BY POTOROO SPECIES	31
1.4.1. Habitat use by the Long-nosed potoroo	32
1.4.2. Habitat use by the Long-footed potoroo	40
1.4.3. Habitat use by Gilberts potoroo	42
1.5. AIMS AND RATIONALE FOR THIS STUDY	43
2.0. STUDY AREAS	47

2.1. LOCATION	47
2.2. VEGETATION AND CLIMATE	48
2.3. FAUNA	50
3.0. MORPHOMETRICS AND TRAP SUCCESS OF THE LONG-NOSED POTOROO AND THE THREAT POSED BY THE LOCAL FOX POPULATION	54
3.1. INTRODUCTION	54
3.2. METHODS	57
3.2.1. Potoroo live trapping	57
3.2.2. Potoroo processing	61
3.2.3. Loss of pouch young	64
3.2.4. Sand plot monitoring	65
3.2.5. 1080 fox baiting	66
3.2.6. Assessing fox diet	66
3.3. RESULTS	67
3.3.1. Potoroo morphometrics	67
3.3.2. Trapping and potoroo occurrence	69
3.3.3. 1080 baiting, fox abundance and diet at the two study areas	73
3.4. DISCUSSION	77
4.0. MACROHABITAT USE BY THE LONG-NOSED POTOROO	86
4.1. INTRODUCTION	86
4.2. METHODS	88
4.2.1. Potoroo live trapping	88
4.2.2. Trap site macrohabitat attributes	88
4.2.3. Statistical analysis	95
4.3. RESULTS	97
4.3.1. Macrohabitat attributes	98
4.3.2. Macrohabitat complexity scores	103
4.3.3. Trap success ratings in relation to cover	104

4.4. DISCUSSION	106
5.0 MICROHABITAT USE BY THE LONG-NOSED POTOROO	111
5.1. INTRODUCTION	111
5.2. METHODS	112
5.2.1. Potoroo live trapping for spool-and-line tracking	112
5.2.2. Spool-and-line tracking	113
5.2.3. Microhabitat attributes along spool paths	116
5.2.4. Microhabitat availability	119
5.2.5. Microhabitat foraging preferences	123
5.2.6. Statistical analysis	124
5.3. RESULTS	125
5.4. DISCUSSION	133
6.0. GENERAL DISCUSSION	139
7.0. REFERENCES	147

FIGURES

Figure 2.1: Location of Barren Grounds Nature Reserve and Budderoo National Park, New South Wales	47
Figure 2.2: Location of Barren Grounds NR and Budderoo NP study areas	48
Figure 2.3: Average daily maximum and minimum temperatures for each month between January 2004 and December 2008.	49
Figure 3.1: Location of trap sites and sand plots within Barren Grounds NR	59
Figure 3.2: Location of trap sites and sand plots within Budderoo NP	60
Figure 3.3: Number of new and recaptured potoroos and trap success per Autumn and Spring seasonal trapping sessions (number of trap nights) at Barren Grounds NR	70
Figure 3.4: Number of new and recaptured potoroos and trap success per Autumn and Spring seasonal trapping sessions (number of trap nights) at Budderoo NP	70
Figure 3.5: Number of individual male and female potoroos captured per seasonal trapping session across the two study areas combined	71
Figure 3.6: Potoroo captures per trap night versus percent of sand plot nights with potoroo tracks over time at Barren Grounds NR	73
Figure 3.7: Potoroo captures per trap night versus percent of sand plot nights with potoroo tracks over time at Budderoo NP	73
Figure 3.8: Percent of sand plot nights with fox tracks at Barren Grounds NR and Budderoo NP over time	74
Figure 3.9: Percent of the ‘definite’ fox scats collected at either study area containing each prey item	76
Figure 4.1: Trap locations and mapped dominant vegetation community within Barren Grounds NR	91
Figure 4.2: Trap locations and mapped dominant vegetation community within Budderoo NP	92
Figure 4.3: Proportions of nil, poor and good trap sites with each dominant vegetation community	98
Figures 4.4 a-e: Proportions of nil, poor and good trap sites with: a) each tree canopy cover percentage group, b) ferns as a dominant ground cover type, c) rushes as a dominant ground cover type, d) heath as a dominant ground cover type, e) 2-3 m touch scores, compared to expected	105
Figure 5.1: Background vegetation sample points and trap sites where spooling was conducted at Barren Grounds NR	121
Figure 5.2: Background vegetation sample points and trap sites where spooling was conducted at Budderoo NP	122
Figure 5.3 a - f: Proportions of ‘dig’ and ‘no dig’ background vegetation sample points with: a) acacia present within a 5m radius, b) each shrub cover percentage group, c) density of ground cover vegetation, d) plant debris (PD) as a dominant ground cover type, e) sedges as a dominant	132

ground cover type, f) heath as a dominant ground cover type, compared to expected

TABLES

Table 2.1: Five dominant vegetation communities and the number of trap sites within each at the Barren Grounds NR and Budderoo NP study areas	50
Table 3.1: Average body weights and measurements for male and female potoroo captures across both study sites and all seasons	68
Table 3.2: Details of instances where multiple individuals were captured at a single trap site in a single season at either study area.	72
Table 3.3: Percent of ‘definite’ predator scats (fox, dog, cat and quoll) collected from the two study areas containing potoroo remains	75
Table 4.1: Macrohabitat attributes and their relative abundance or floral categories, recorded within a 20 x 20 m quadrat around each cage trap	94
Table 4.2: Scores for the relative abundance categories of a number of microhabitat attributes used to calculate Macrohabitat Complexity Scores 1 and 2	95
Table 4.3: ANOSIM results for study areas and trap success ratings for each vegetation attribute group analysed.	101
Table 4.4: Chi-square results for Barren Grounds NR and Budderoo NP comparing observed and expected relative abundances of a number of macrohabitat attributes at ‘potoroo’ and ‘nil’ trap sites.	102
Table 4.5: Barren Grounds NR and Budderoo NP results of Analysis of Variance between ‘potoroo’ and ‘nil’ trap site Macrohabitat complexity scores	103
Table 4.6: Analysis of Variance results comparing the Macrohabitat complexity score 1 (MacroHCS1) of each trap site within each dominant vegetation community across both study areas	104
Table 5.1: Microhabitat attributes and their relative abundance categories recorded	118
Table 5.2: Scores for the relative abundance categories of a number of microhabitat attributes used to calculate Microhabitat Complexity Scores	118
Table 5.3: Spooling attempts and successes data at Barren Grounds NR and Budderoo NP (including ratio of males to females from which full spools were achieved)	126
Table 5.4: Potoroo preferences and avoidances of a number of microhabitat features at Barren Grounds NR and Budderoo NP in Spring 2007 and Autumn 2008.	128
Table 5.5: Potoroo microhabitat preferences and avoidances of dominant ground cover types at Barren Grounds NP and Budderoo NP in Spring 2007 and Autumn 2008.	129

Table 5.6: Microhabitat Complexity Scores for individuals spool paths and their available habitat at Barren Grounds NP and Budderoo NP in Spring 2007 and Autumn 2008.	131
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PLATES

Plate 2.1 a – f: Long-nosed potoroo habitat within Barren Grounds NR	52
Plate 2.2 a - d: Long-nosed potoroo habitat within Budderoo NP	53
Plates 3.1 a - b: Trap positioning within the local environment	61
Plate 3.2 a - f: Weighing; scanning for a microchip; inserting a microchip; measuring the ear: head; and pes length	63
Plate 3.3 a - b: Setting up sand plots across tracks at each study area	65
Plate 4.1 a – d: Measuring macrohabitat attributes within the study areas	93
Plate 5.1: Attachment point of spool package to potoroo rump	115
Plate 5.2 a - d: Thread paths	116
Plate 5.3: Potoroo forage diggings	123

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