

**The socio-ecology of two species of  
Australian native rodent –  
*Notomys mitchelli*  
and  
*Notomys alexis***

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November 2008



# Contents

|  |              |
|--|--------------|
| <b>List of Figures</b> .....   | <b>ix</b>    |
| <b>List of Tables</b> .....  | <b>xv</b>    |
| <b>List of Plates</b> .....  | <b>xvii</b>  |
| <b>Abstract</b> .....  | <b>xix</b>   |
| <b>Acknowledgements</b> .....  | <b>xxiii</b> |
| <b>1. Introduction</b> .....   | <b>1</b>     |
| 1.1. Mammalian social systems.....   | 1            |
| 1.2. Social groups and dispersal .....   | 3            |
| 1.3. Australian arid ecosystems .....  | 5            |
| 1.3.1. Adaptations in arid habitats .....  | 5            |
| 1.4. Australian conilurine rodents.....  | 7            |
| 1.4.1. Behaviour of Australian rodents.....  | 9            |
| 1.5. Research summary .....  | 14           |
| 1.5.1. Study species.....  | 14           |
| 1.5.2. Study outline and hypotheses .....  | 19           |
| <b>2. The biogeography of <i>Notomys mitchelli</i> and <i>Notomys alexis</i></b> ..... | <b>23</b>    |
| 2.1. Introduction.....   | 23           |
| 2.1.1. Environmental effect on social behaviour .....                                  | 23           |
| 2.1.2. The known distribution of <i>Notomys mitchelli</i> .....                        | 24           |
| 2.1.3. The known distribution of <i>Notomys alexis</i> .....                           | 27           |
| 2.1.4. Bioclimatic modelling.....  | 28           |
| 2.1.5. Aims & hypotheses .....   | 31           |
| 2.2. Methods .....   | 32           |
| 2.2.1. Locality data.....  | 32           |
| 2.2.2. Bioclimatic analyses .....  | 33           |
| 2.3. Results .....   | 36           |

|   |           |
|---|-----------|
| 2.3.1. <i>Notomys mitchelli</i> distribution.....                                     | 36        |
| 2.3.2. Predicting <i>Notomys mitchelli</i> distributions from geographic subsets..... | 41        |
| 2.3.3. <i>Notomys alexis</i> distribution.....  | 45        |
| 2.3.4. Predicting <i>Notomys alexis</i> distributions from geographic subsets.....    | 49        |
| 2.3.5. <i>Notomys mitchelli</i> and <i>Notomys alexis</i> compared .....              | 52        |
| 2.3.6. <i>Notomys mitchelli</i> and <i>Notomys alexis</i> in South Australia .....    | 55        |
| 2.3.7. Distributions over time .....  | 60        |
| 2.4. Discussion .....   | 65        |
| 2.4.1. Preferred environment – <i>Notomys mitchelli</i> .....                         | 65        |
| 2.4.2. Preferred environment – <i>Notomys alexis</i> .....                            | 68        |
| 2.4.3. Known range over time .....  | 70        |
| 2.4.4. Environmental predictability .....   | 73        |
| <b>3. The population ecology of <i>Notomys mitchelli</i>.....</b>                     | <b>77</b> |
| 3.1. Introduction .....   | 77        |
| 3.1.1. The semi-arid mallee environment .....   | 77        |
| 3.1.2. Mitchell’s Hopping Mouse – <i>Notomys mitchelli</i> (Ogilby, 1838).....        | 79        |
| 3.1.3. Study aims .....   | 81        |
| 3.2. Study area and methods.....  | 82        |
| 3.2.1. Middleback Ranges study area.....  | 82        |
| 3.2.2. Capture techniques.....  | 88        |
| 3.2.3. Subadult definition.....   | 89        |
| 3.2.4. Burrow location techniques.....  | 89        |
| 3.3. Results.....   | 92        |
| 3.3.1. <i>Notomys mitchelli</i> trapping success .....                                | 92        |
| 3.3.2. <i>Notomys mitchelli</i> captures by site .....                                | 93        |
| 3.3.3. <i>Notomys mitchelli</i> captures by sex .....                                 | 94        |

|   |            |
|---|------------|
| 3.3.4. Recruitment to the <i>Notomys mitchelli</i> study population and evidence of reproduction..... | 95         |
| 3.3.5. Recaptures and resident <i>Notomys mitchelli</i> .....   | 98         |
| 3.3.6. <i>Notomys mitchelli</i> burrow use.....   | 100        |
| 3.4. Discussion.....  | 109        |
| 3.4.1. <i>Notomys mitchelli</i> capture behaviours .....  | 109        |
| 3.4.2. <i>Notomys mitchelli</i> burrow use behaviours .....   | 112        |
| 3.4.3. <i>Notomys mitchelli</i> social groups.....  | 114        |
| 3.4.4. Summary .....  | 115        |
| <b>4. The population ecology of <i>Notomys alexis</i>.....</b>  | <b>117</b> |
| 4.1. Introduction.....  | 117        |
| 4.1.1. The arid zone environment.....   | 117        |
| 4.1.2. Social behaviour of arid-zone rodents.....   | 118        |
| 4.1.3. The spinifex hopping mouse – <i>Notomys alexis</i> (Thomas, 1922).....                         | 121        |
| 4.1.4. Study aims.....  | 123        |
| 4.2. Methods .....  | 124        |
| 4.2.1. Roxby Downs study area .....   | 124        |
| 4.2.2. Habitat .....  | 126        |
| 4.2.3. Trapping methods.....  | 129        |
| 4.2.4. Burrow location techniques .....   | 131        |
| 4.3. Results .....  | 132        |
| 4.3.1. <i>Notomys alexis</i> trapping success.....  | 132        |
| 4.3.2. <i>Notomys alexis</i> capture frequencies .....  | 132        |
| 4.3.3. <i>Notomys alexis</i> captures by sex.....   | 133        |
| 4.3.4. <i>Notomys alexis</i> captures by age .....  | 134        |
| 4.3.5. Known To Be Alive and residency in the <i>Notomys alexis</i> population .....                  | 136        |

|   |            |
|---|------------|
| 4.3.6. <i>Notomys alexis</i> burrow use .....                             | 138        |
| 4.4. Discussion .....   | 150        |
| 4.4.1. Capture behaviour of <i>Notomys alexis</i> .....                   | 150        |
| 4.4.2. <i>Notomys alexis</i> burrow use behaviours.....                   | 152        |
| 4.4.3. <i>Notomys alexis</i> social groups .....                          | 155        |
| 4.4.4. Summary .....  | 156        |
| <b>5. The spatial behaviour of two species of <i>Notomys</i> spp.....</b> | <b>159</b> |
| 5.1. Introduction .....   | 159        |
| 5.1.1. Observing rodent spatial behaviour .....                           | 160        |
| 5.1.2. Rodent home range characteristics in arid environments .....       | 163        |
| 5.1.3. Long distance movements and home range size .....                  | 165        |
| 5.1.4. Aims and hypotheses .....  | 167        |
| 5.2. Methods.....   | 169        |
| 5.2.1. Study areas.....   | 169        |
| 5.2.2. Radio-telemetry.....   | 169        |
| 5.2.3. Analysis.....  | 173        |
| 5.3. Results.....   | 174        |
| 5.3.1. <i>Notomys mitchelli</i> movements .....                           | 174        |
| 5.3.2. <i>Notomys alexis</i> movements .....                              | 196        |
| 5.3.3. <i>Notomys mitchelli</i> and <i>Notomys alexis</i> compared .....  | 209        |
| 5.4. Discussion .....   | 213        |
| 5.4.1. Movement behaviour of <i>Notomys mitchelli</i> .....               | 213        |
| 5.4.2. Movement behaviour of <i>Notomys alexis</i> .....                  | 219        |
| 5.4.3. Movement behaviour summary .....                                   | 221        |
| <b>6. The behaviour of <i>Notomys alexis</i> in captivity .....</b>       | <b>223</b> |
| 6.1. Introduction .....   | 223        |

|  |            |
|--|------------|
| 6.1.1. Social behaviour .....  | 223        |
| 6.1.2. Reproductive Suppression.....                                 | 224        |
| 6.1.3. Infanticide.....  | 225        |
| 6.1.4. Territoriality .....  | 225        |
| 6.1.5. Dispersal .....   | 226        |
| 6.1.6. Social Behaviour in Captivity .....                           | 228        |
| 6.1.7. Observing population regulation in captivity .....            | 232        |
| 6.1.8. Aims and hypotheses.....                                      | 234        |
| 6.2. Methods .....   | 235        |
| 6.2.1. Study species.....  | 235        |
| 6.2.2. Subjects .....  | 236        |
| 6.2.3. Housing .....   | 237        |
| 6.2.4. Observations .....  | 240        |
| 6.3. Results .....   | 241        |
| 6.3.1. Captive <i>Notomys alexis</i> population growth.....          | 241        |
| 6.3.2. Time budgets in captivity .....                               | 246        |
| 6.3.3. Interactions between captive <i>Notomys alexis</i> .....      | 252        |
| 6.3.4. Spatial separation and dispersal behaviours in captivity..... | 255        |
| 6.4. Discussion.....   | 256        |
| 6.4.1. Juvenile deaths in captivity.....                             | 257        |
| 6.4.2. Dispersal.....  | 261        |
| 6.4.3. Summary .....   | 263        |
| <b>7. Discussion .....</b>   | <b>265</b> |
| 7.1. Study objectives review .....                                   | 265        |
| 7.2. Bioclimatic modelling .....                                     | 266        |
| 7.3. The socio-ecology of <i>Notomys mitchelli</i> .....             | 269        |

|      |  |            |
|------|--|------------|
| 7.4. | The socio-ecology of <i>Notomys alexis</i> .....                         | 275        |
| 7.5. | Movement and density in free-living <i>Notomys</i> spp. populations..... | 279        |
| 7.6. | <i>Notomys alexis</i> in captivity .....                                 | 283        |
| 7.7. | Study conclusions .....  | 287        |
|      | <b>References .....</b>  | <b>289</b> |

## List of Figures

|   |    |
|---|----|
| Figure 2.1: Known distributions of the five extant species of the genus <i>Notomys</i> : A) <i>N. alexis</i> , B) <i>N. aquilo</i> , C) <i>N. cervinus</i> , D) <i>N. fuscus</i> , E) <i>N. mitchelli</i> ..... | 26 |
| Figure 2.2: The <i>Notomys mitchelli</i> and <i>Notomys alexis</i> location points used in the BIOCLIM analyses .....   | 35 |
| Figure 2.3: Known locations and predicted distribution map, <i>Notomys mitchelli</i> .....  | 40 |
| Figure 2.4: Predicted distribution maps for each geographic subset, <i>Notomys mitchelli</i> .....  | 44 |
| Figure 2.5: Known locations and predicted distribution map, <i>Notomys alexis</i> .....   | 48 |
| Figure 2.6: The two geographic subsets for <i>Notomys alexis</i> .....  | 51 |
| Figure 2.7: Predicted distributions for both <i>Notomys mitchelli</i> and <i>Notomys alexis</i> .....   | 54 |
| Figure 2.8: South Australian subsets predicted distribution maps for <i>Notomys mitchelli</i> and <i>Notomys alexis</i> .....   | 59 |
| Figure 2.9: Predicted distributions for <i>Notomys mitchelli</i> : records collected prior to 1960 and during 1990–99.....  | 63 |
| Figure 2.10: Predicted distributions for <i>Notomys alexis</i> : records collected prior to 1960 and during 1990–99.....  | 64 |
| Figure 3.1: Aerial view of Middleback Ranges study site and trapping areas.....   | 86 |
| Figure 3.2: <i>Notomys mitchelli</i> captures per 100 trapnights for each sampling session ..   | 92 |
| Figure 3.3: Capture frequencies for male and female <i>Notomys mitchelli</i> in the Middleback Ranges.....  | 95 |
| Figure 3.4: Captures for new and recaptured <i>Notomys mitchelli</i> by field session in the Middleback Ranges.....   | 96 |
| Figure 3.5: Weight at first capture (grams) for individual <i>Notomys mitchelli</i> in the Middleback Ranges, by age class and sex .....  | 96 |

|  |     |
|--|-----|
| Figure 3.6: Captures of <i>Notomys mitchelli</i> subadults, reproductive females (perforate, pregnant or lactating) and non-reproductive adult females ..... | 97  |
| Figure 3.7: Number of months <i>Notomys mitchelli</i> were Known To Be Alive at three sites in the Middleback Ranges .....                                   | 99  |
| Figure 3.8: Location of <i>Notomys mitchelli</i> burrows on the dunes of trapping areas A and B.....   | 101 |
| Figure 3.9: Proportion of vegetation cover at ground level in the area immediately surrounding <i>Notomys mitchelli</i> burrows, by trapping area.....       | 101 |
| Figure 3.10: Indicators of <i>Notomys mitchelli</i> burrow size: number of popholes located per burrow .....   | 104 |
| Figure 3.11: Width of the <i>Notomys mitchelli</i> burrow between the two widest popholes vs. the total number of popholes found at the burrow .....         | 105 |
| Figure 3.12: Distance between one active <i>Notomys mitchelli</i> burrow and others active at the same trapping area, in the same session.....               | 106 |
| Figure 3.13: The <i>Notomys mitchelli</i> social groups identified inhabiting burrows, by study area .....   | 107 |
| Figure 4.1: Map of <i>Notomys alexis</i> distribution .....  | 125 |
| Figure 4.2: Aerial view of Roxby Downs study site and trapping areas .....   | 127 |
| Figure 4.3: Captures per 100 trapnights for <i>Notomys alexis</i> caught near Roxby Downs, South Australia, by field session .....                           | 132 |
| Figure 4.4: Capture frequencies for male and female <i>Notomys alexis</i> near Roxby Downs .....   | 133 |
| Figure 4.5: Number of <i>Notomys alexis</i> individuals captured, by trapping area of capture.....   | 134 |
| Figure 4.6: Weight at first capture (grams) for individual <i>Notomys alexis</i> at Roxby Downs, by age class and sex .....                                  | 135 |

|   |     |
|---|-----|
| Figure 4.7: <i>Notomys alexis</i> individuals by age and trapping session at Roxby Downs, South Australia.....  | 136 |
| Figure 4.8: Number of sessions in which captured and number of months Known To Be Alive for <i>Notomys alexis</i> near Roxby Downs, South Australia .....                 | 137 |
| Figure 4.9: The position of <i>Notomys alexis</i> burrows in the dune system. Roxby Downs, South Australia.....   | 139 |
| Figure 4.10: Proportion of vegetation cover in the area immediately surrounding the <i>Notomys alexis</i> burrows near Roxby Downs .....                                  | 140 |
| Figure 4.11: Width of the <i>Notomys alexis</i> burrow between the two widest popholes vs. the total number of popholes found at the burrow.....                          | 141 |
| Figure 4.12: Mean distance ( $\pm$ S.E.) between an active <i>Notomys alexis</i> burrow and all other active burrows located at the same trapping area .....              | 142 |
| Figure 4.13: The number of <i>Notomys alexis</i> identified in a burrow (a social group) during a single period of occupancy .....  | 144 |
| Figure 4.14: The social groups identified in occupied <i>Notomys alexis</i> burrows near Roxby Downs.....   | 144 |
| Figure 4.15: The relationship between <i>Notomys alexis</i> burrow size and group size—the number of popholes present vs. the number of animals found at the burrow ..... | 145 |
| Figure 4.16: Comparison of the position of burrows in the dune system for <i>Notomys mitchelli</i> and <i>Notomys alexis</i> .....  | 148 |
| Figure 4.17: Comparison of the amount of vegetation surrounding burrows for <i>Notomys mitchelli</i> and <i>Notomys alexis</i> .....                                      | 148 |
| Figure 4.18: Comparison of <i>Notomys mitchelli</i> and <i>Notomys alexis</i> social group types as identified at the Middleback Ranges and Roxby Downs field sites ..... | 149 |
| Figure 5.1: Inter-trap movements (mean $\pm$ S.E.) made by <i>Notomys mitchelli</i> within single sessions, by season of session .....                                    | 176 |

|  |     |
|--|-----|
| Figure 5.2: Total inter-trap distance travelled by <i>Notomys mitchelli</i> within a single session, by sex .....  | 177 |
| Figure 5.3: Total inter-trap distance travelled by <i>Notomys mitchelli</i> within a single session, by the number of inter-trap distances recorded in the session ..... | 177 |
| Figure 5.4: Distance travelled by <i>Notomys mitchelli</i> between trapping sessions, by sex .....   | 179 |
| Figure 5.5: Distance travelled by <i>Notomys mitchelli</i> between sessions versus the number of days between sessions .....   | 181 |
| Figure 5.6: Mean distance travelled by <i>Notomys mitchelli</i> between consecutive radio locations ( $\pm$ S.E.), by season of session.....                             | 183 |
| Figure 5.7: Total distance travelled in a session for radio-tracked <i>Notomys mitchelli</i> , by sex .....  | 185 |
| Figure 5.8: Total distance travelled for radio-tracked <i>Notomys mitchelli</i> in a session versus the number of locations per animal for the session .....             | 185 |
| Figure 5.9: Total number of points per animal used to calculate <i>Notomys mitchelli</i> minimum convex polygons, males and females .....                                | 186 |
| Figure 5.10: The number of points used to calculate <i>Notomys mitchelli</i> minimum convex polygons for data collected within a single session; males and females.....  | 187 |
| Figure 5.11: Minimum convex polygon area for <i>Notomys mitchelli</i> in discrete field sessions, males and females .....  | 188 |
| Figure 5.12: <i>Notomys mitchelli</i> minimum convex polygons for data collected in a single field session, by the season of the session.....                            | 189 |
| Figure 5.13: <i>Notomys mitchelli</i> MCP areas (from a single field session) according to the method of data collection .....   | 190 |
| Figure 5.14: Minimum convex polygon overlap for five <i>Notomys mitchelli</i> observed at Middleback Ranges trapping area B in July 2001. ....                           | 193 |

|  |     |
|--|-----|
| Figure 5.15: Minimum convex polygon overlap for six <i>Notomys mitchelli</i> observed at the Middleback Ranges trapping area A in September 2000.....                          | 194 |
| Figure 5.16: Minimum convex polygons for a regularly trapped and tracked <i>Notomys mitchelli</i> male.....  | 195 |
| Figure 5.17: Distance travelled by <i>Notomys alexis</i> between field sessions by the number of days separating the captures .....  | 198 |
| Figure 5.18: Mean distance travelled by <i>Notomys alexis</i> between consecutive radio locations within a session ( $\pm$ S.E.), by trapping area.....                        | 199 |
| Figure 5.19: Mean distance travelled by <i>Notomys alexis</i> between consecutive radio locations within a session ( $\pm$ S.E.), by season of session.....                    | 200 |
| Figure 5.20: Total distance travelled between consecutive locations by radio-tracked <i>Notomys alexis</i> within a single session by sex.....                                 | 201 |
| Figure 5.21: Mean ( $\pm$ S.E.) total distance travelled by radio-tracked <i>Notomys alexis</i> within a single session by trapping area.....                                  | 201 |
| Figure 5.22: Mean ( $\pm$ S.E.) total distance travelled by radio-tracked <i>Notomys alexis</i> within a single session by the season in which the session was conducted ..... | 202 |
| Figure 5.23: The number of points used to calculate within-session minimum convex polygons for <i>Notomys alexis</i> , males and females.....                                  | 203 |
| Figure 5.24: Minimum convex polygon areas (hectares) for radio-tracked <i>Notomys alexis</i> within discrete field sessions, by sex.....                                       | 204 |
| Figure 5.25: Mean MCP area (hectares $\pm$ S.E.) for radio-tracked <i>Notomys alexis</i> within discrete field sessions, by trapping area .....                                | 205 |
| Figure 5.26: Mean MCP area (hectares $\pm$ S.E.) for radio-tracked <i>Notomys alexis</i> within discrete field sessions, by the season in which the session was conducted..... | 205 |
| Figure 5.27: Minimum convex polygon overlap for three <i>Notomys alexis</i> observed at Roxby Downs trapping area C in April 2001 .....  | 207 |

|   |     |
|---|-----|
| Figure 5.28: Minimum convex polygons for a <i>Notomys alexis</i> female, observed at trapping area A in both April 2001 and May 2001 .....  | 208 |
| Figure 5.29: Mean distance ( $\pm$ S.E.) travelled between consecutive locations for radio-collared <i>Notomys</i> spp., by species and sex .....   | 210 |
| Figure 5.30: Mean distance ( $\pm$ S.E.) travelled between consecutive locations for radio-collared <i>Notomys</i> spp., by species and season of field session (summer and autumn only)..... | 210 |
| Figure 6.1: Housing system for the <i>Notomys alexis</i> captive study .....  | 239 |
| Figure 6.2: Number of <i>Notomys alexis</i> young born in captivity: frequency of litter size .....   | 243 |
| Figure 6.3: Population growth of <i>Notomys alexis</i> in captivity, by group.....  | 243 |
| Figure 6.4: The sex ratio (males : females) of the <i>Notomys alexis</i> captive groups, by week of observation .....   | 244 |
| Figure 6.5: Time budget of <i>Notomys alexis</i> (all ages), by time of day (reversed light conditions); mean percentage of observations ( $\pm$ S.E.).....                                   | 247 |
| Figure 6.6: <i>Notomys alexis</i> behavioural profile: mean percentage of observations ( $\pm$ S.E.); males and females.....  | 248 |
| Figure 6.7: <i>Notomys alexis</i> behavioural profile: mean percentage observations ( $\pm$ S.E.); adults and younger animals.....  | 250 |
| Figure 6.8: <i>Notomys alexis</i> behavioural profile: mean percentage of observations ( $\pm$ S.E.) by group.....  | 251 |

## List of Tables

|   |     |
|---|-----|
| Table 1.1: Happold's (1976a) observations of conilurine rodent social behaviour .....   | 11  |
| Table 2.1: The number of records for <i>Notomys mitchelli</i> and <i>Notomys alexis</i> in each time-step applied to the BIOCLIM analysis .....               | 34  |
| Table 2.2: Bioclimatic profile for <i>Notomys mitchelli</i> based on 557 validated records ....   | 38  |
| Table 2.3: Comparison of 0–100% and 10–90% envelopes, <i>Notomys mitchelli</i> .....  | 39  |
| Table 2.4: Bioclimatic profile means for <i>Notomys mitchelli</i> geographic subsets.....   | 43  |
| Table 2.5: Bioclimatic profile for <i>Notomys alexis</i> based on 653 validated records .....   | 46  |
| Table 2.6: Comparison of 0–100% and 10–90% envelopes, <i>Notomys alexis</i> .....   | 47  |
| Table 2.7: Geographic subsets bioclimatic profiles, <i>Notomys alexis</i> .....   | 50  |
| Table 2.8: <i>Notomys mitchelli</i> and <i>Notomys alexis</i> profiles compared.....  | 53  |
| Table 2.9: South Australian subsets bioclimatic profiles (0–100% envelopes), <i>Notomys mitchelli</i> and <i>Notomys alexis</i> .....                         | 57  |
| Table 2.10: South Australian subsets bioclimatic profiles (10–90% envelopes), <i>Notomys mitchelli</i> and <i>Notomys alexis</i> .....                        | 58  |
| Table 2.11: BIOCLIM profiles for <i>Notomys mitchelli</i> over time.....  | 61  |
| Table 2.12: BIOCLIM profiles for <i>Notomys alexis</i> over time.....   | 62  |
| Table 3.1: Middleback Ranges trapping effort by site .....  | 85  |
| Table 4.1: Trapping effort and capture success at Roxby Downs 2001–02; target and non-target captures .....   | 131 |
| Table 4.2: Comparison of burrow demographics, <i>Notomys mitchelli</i> (Middleback Ranges, South Australia) and <i>Notomys alexis</i> (Roxby Downs, SA) ..... | 147 |
| Table 6.1: Observations of captive <i>Notomys alexis</i> made under reversed light conditions – hours per group .....   | 241 |

|   |     |
|---|-----|
| Table 6.2: Captive <i>Notomys alexis</i> births: young born and surviving young, by group<br>.....  | 242 |
| Table 6.3: <i>Notomys alexis</i> behavioural observations; mean proportion of behaviour<br>types observed per session, males (n=438) and females (n=534)..... | 249 |
| Table 6.4: <i>Notomys alexis</i> behavioural observations; mean proportion of observations<br>by age .....  | 250 |

## List of Plates

|   |     |
|---|-----|
| Plate 1.1: <i>Notomys mitchelli</i> (photo and copyright Peter Robertson) .....   | 15  |
| Plate 1.2: <i>Notomys alexis</i> (image adapted from Strahan 1998).....   | 17  |
| Plate 3.1: Typical vegetation at Middleback trapping area A.....  | 87  |
| Plate 3.2: View to Iron Knight mine, across Middleback trapping area B .....  | 87  |
| Plate 3.3: Trap placement at Middleback trapping area C.....  | 88  |
| Plate 3.4: A single pophole <i>Notomys mitchelli</i> burrow located in the Middleback Ranges (width=0.0m, proportion vegetation cover < 33%). ..... | 103 |
| Plate 3.5: A large <i>Notomys mitchelli</i> burrow at trapping area B. ....   | 103 |
| Plate 4.1: Dune system typical of Roxby Downs trapping areas A, B, and C.....   | 128 |
| Plate 4.2: Typical vegetation on the dunes outside of the Roxby Downs township...   | 128 |
| Plate 4.3: <i>Callitris</i> spp. habitat at Roxby Downs trapping area D.....  | 129 |
| Plate 4.4: <i>Notomys alexis</i> burrow pophole in open ground showing obvious signs of activity (Roxby Downs, South Australia, April 2001).....    | 138 |
| Plate 5.1: One of the three Yagi antenna towers used at the Middleback Ranges field site .....  | 171 |



## Abstract

Past research suggests that social organisation in Australian rodent species is determined by the predictability of resources in the environment (Happold 1976a). *Notomys alexis* (the spinifex hopping mouse or tarrkawarra) is widely distributed throughout the Australian arid-zone (Breed 1998a; Watts & Aslin 1981). Large groups of animals have been found sharing burrows in the wild and laboratory observations suggest that the species is highly social (Happold 1976a; Stanley 1971). A closely related species, *Notomys mitchelli* (Mitchell's hopping mouse or pankot) is relatively common throughout the southern semi-arid zone (Watts 1998a; Watts & Aslin 1981). Much less is known about *N. mitchelli*; field studies have been subject to low recapture rates and few laboratory studies have involved this species (Baverstock 1979; Cockburn 1981a; Crichton 1974). Following Happold (1976a), it was hypothesised that the socio-ecology of *N. mitchelli* will be qualitatively different to that of *N. alexis*.

Studying wild populations of *Notomys mitchelli* in the Middleback Ranges, South Australia and *N. alexis* outside the desert township of Roxby Downs, S.A., this research aimed to describe the socio-ecology of these species, with reference to the predictability of their environments. Uniquely, bioclimatic modelling of the species' known distributions was also conducted to confirm that the study's underlying assumption that the two rodents inhabit essentially different environments was correct. These studies were complemented by the observation of captive groups of *N. alexis*.

This work confirmed that the habitats of *Notomys mitchelli* and *N. alexis* are distinct; the more arid habitat of *N. alexis* is subject to greater environmental fluctuations than

that of the semi-arid dwelling *N. mitchelli*. Contrary to expectations, however, observation of free-living animals characterised *N. mitchelli* social groups as highly unstable; while particular individuals remained in the population for long periods, many animals appeared to be transients. Further, burrow groups appeared to be much smaller than predicted by Happold (1976a), and based on loose aggregations of male animals rather than small groups of females. While decidedly social in the laboratory, free-living *N. alexis* lived in groups no bigger than *N. mitchelli* and these groups were equally ephemeral in constitution. Moreover, free-living *N. alexis* appeared to utilise activity areas that were no larger than those used by *N. mitchelli*, despite occupying a more unpredictable and apparently less well-resourced habitat.

As a whole, this research represents a comprehensive examination of the principal behavioural theory commonly applied to Australian native rodent species, untested since its publication three decades ago. From the data collected during this work, it cannot be said that the environmental predictability hypothesis for native rodent social organisations as proposed by Happold (1976a) is adequate to differentiate the social behaviour of these semi-arid and arid-dwelling species. Instead, it is suggested that, while both *N. mitchelli* and *N. alexis* are undoubtedly socially *tolerant*, predation and/or parasite load, driving burrowing behaviour, has a greater influence on the social behaviour of free-living rodent populations than habitat predictability.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution. To the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text.

I give consent to this thesis, when deposited in the University Library, being made available for loan and photocopying.

Clare Bradley

November 2008

This work was conducted with the approval of the University of Adelaide Animal Ethics Committee and the South Australian Department for Environment and Heritage.



## Acknowledgements

A work that was many years in the making and one which would not be complete if not for the support and assistance of the following people:

My supervisor Sue Carthew and her laboratory of exceptional postgraduates past and present, in particular Doreen Marchesan, Meredith Brown and Darren Bos. A special thank you goes to Julie Schofield for being a fantastic field partner, a somewhat dubious camp cook, and a true friend. Also, many thanks go to David Paull and Michael Rees of the Australian Defence Force Academy as well as the staff of the School of Earth and Environmental Sciences and the School of Agriculture, Food and Wine, University of Adelaide. Thanks must also go to Linda Klopp and the technical staff of the University of Adelaide Psychology Department, where this project originated.

This study could not have been undertaken without the cooperation of Laurie and Elizabeth Jacobs of Moola Station, Eyre Peninsula SA, and the staff of the Environmental Sciences Department, BHP Billiton Olympic Dam, Roxby Downs. Vital too was the participation of a large number of field volunteers; thank you for giving up your time to help with such a trying task, your assistance was of immeasurable benefit. I would like to give special thanks to those volunteers who demonstrated particularly high recapture rates—Kirrilee Blaylock, Jarrod Eaton, Michelle Le Duff, Evan Dunn—participating in multiple field sessions for no discernable personal gain, becoming a fundamental part of the success of the project.

Funding support was gratefully received from the Sir Mark Mitchell Foundation and the Wildlife Research Fund administered by the Department for Environment and Heritage, South Australia.

Finally, I would like to thank my employer Assoc. Prof. James Harrison, my colleagues, friends and family for supporting me through this even when we were all sick of it and it seemed like it would never end. Particular thanks go to Mark, Tom, Edna and Rob—I couldn't have done it without you.

