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**Spatial ecology, habitat use, and the impacts of rats on  
chevron skinks (*Oligosoma homalonotum*) on Great  
Barrier Island**

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science in Conservation Biology

Massey University, Auckland,  
New Zealand

Benjamin Philip Barr

2009

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Fact: Chevron skinks make everyone happy

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## Abstract

The chevron skink (*Oligosoma homalonotum*) is one of the largest, yet least observed skink species in New Zealand. The species was thought to have once been widespread in Northern New Zealand, however currently it is only found on Great Barrier and Little Barrier Islands. Great Barrier Island is the apparent stronghold for the species although it appears to be in decline there, despite a net increase in habitat. Recent studies have increased the understanding of the general ecology of the species, however little is known about the threats to the survival of this species.

This study had two main objectives; the first was to establish if rats are a threat to chevron skinks, and the second was to increase current knowledge of the species ecology. The research was undertaken in an area of extensive rodent control (Glenfern Sanctuary) and an adjacent unmanaged reserve in Port Fitzroy, on Great Barrier Island in 2008. The first objective of this study involved confirming that rat densities in the treatment (Glenfern Sanctuary) were sufficiently different to allow meaningful comparisons of chevron skink population characteristics between sites. This was achieved by determining absolute rat densities using Zippin's removal method at four sites, and correlating these with a relative abundance measure (tracking rates) to give confidence in the observed trends. Rat densities were high (1.94 - 3.00 rats ha<sup>-1</sup>) in the control, and low (0.00 and 0.06 rats ha<sup>-1</sup>) in the treatment sites, and these correlated well with tracking rates. In light of these clear differences between the treatment and control, the population structure and condition of chevron skinks were compared between sites. The population structure showed erosion of juvenile and sub-adult size categories, which indicated differences in vulnerabilities between size categories. Physical evidence of failed rat predation was also observed in adult skinks in the unmanaged control, which confirmed that rats were interacting with chevron skinks. Although the adults survived the attacks they suffered injuries including eye damage, punctures, cuts and tail loss. Smaller skinks would be unlikely to survive such attacks due to the severity and scale of the injuries, supporting the assertions of the population structure that smaller skinks may be more vulnerable than adults. The extent of tail loss

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was converted to a condition index to determine if failed rat predation was more widespread in the population, than was observed by conspicuous injuries. This condition index (body-tail condition index) was stable through all size categories in the treatment, but significantly reduced in adults in the unmanaged sites. That there was no reduction in the condition of smaller skinks in the unmanaged control sites despite high rat densities suggests that interactions between rats and smaller skinks are fatal, and thus not represented in the data.

Nine chevron skinks were radio-tracked to determine habitat use, home range and ranging behaviour. Habitat use of chevron skinks was similar to a previous study and demonstrated that trees, crevices and logs were important refuge sites. Chevron skinks were more likely to be found at sites with trees, crevices and debris dams. Chevron skink home ranges indicated that adults moved further away from streams than previously anticipated at this time of year, and skinks demonstrated site fidelity. There was also overlap in home ranges between individuals, and skinks with overlapping home ranges shared common refuges. During flooding events, chevron skinks exhibited an arboreal response that appears to be a behaviour specific to stream associated animals, which allows them to avoid being taken by floodwaters.

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## Acknowledgements

I can't believe that I'm actually writing these acknowledgements, such has been the journey... nay the odyssey that is so nonchalantly boiled down to three humble letters... MSc.

It all began with the St Mary's gecko club of 1987 (James Dansey, Nick Hakaraia, Richard Orgias and Dominic Blackie). Thanks guys for joining me in my expeditions into the urban reserves of the North Shore in pursuit of various geckos and skinks. I would also like to thank my teacher Judy Lane for keeping a forest gecko in class. I am not sure I would have had such an obsession with lizards were it not for you.

A huge thankyou also needs to go to my lecturers during my papers year. Thankyou Doug Armstrong, Dianne Brunton, Weihong Ji, Isabel Castro, Murray Potter and Nick Roskruge. I would also like to thank Kathy Hamilton for being the most helpful administrator in the world. To the gang at the Ecology and Conservation group, our esteemed leaders Dianne Brunton, Weihong Ji, David Raubenheimer, Karen Stockin, and Marleen Baling (the glue), to Kevin Parker, Mike Anderson, Luis Ortiz Cathedral, Birgit Ziesemann, Jo Peace, Monique van Rensburg, Mark Delaney, Taneal Cope, Kirsty Denny, Kate Richardson, Manue Martinez, Gabrielle, Jodi, Jurgen Kolb, Rosemary Barraclough, Brigitte Kreigenhofer, Mark SD, Anna Gsell, and Idan "not on the rug man" Shapiro, and last but not least team herp Dingo van Winkel, Manu Barry, Chris Wedding, Cheeho Wong, and Virginia Moreno. I would also like to especially thank my year mates - Virginia and Jodi for being the best, team write-up - Monique, Kirsty and Kate for being in the zone with me, and team surf - Dingo and Kev (not that we did much).

To the Great Barrier DOC team - Halema (don't worry you'll get more thanks later), Ben, John, Elisa, Ken, Duane, Matt, Hillary, Haku, Jamie. Special thanks to Stan and Des for giving me lifts around the place, George for his many offers of logistical support, Jo Duck for rainfall info and being all round good value, and Brownly for

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helping fix my suspension, flat tyres and for his ever present smile and most enjoyable laugh. Finally to Bryan and Abby, it was hilarious, ridiculous, and often ludicrous... thanks for being great pals, looking after me and allowing me to use you as a dumping ground for ill-conceived jokes. Off the chain! Many people opened their homes to me during my time on Great Barrier Island, particularly during inclement weather... in fact I stayed at 12 different locations, including four different camping sites, 6 different houses and a boat. Thanks DOC for free camping, Bryan and Abby, Tony and Mal Bouzaid, Halema and Alan, Scotty and Emma, Judy Gilbert and the Little Windy Hill trust and the Orama Christian Community (particularly Steve and Paul) and OPC.

Several other people on Great Barrier made my stay particularly enjoyable. Huge thanks to Alan for being so welcoming and generous, and for showing me around to some amazing locations, and to Belle and Kura for keeping pork in the freezer. I would also like to thank Dennis the petrol pump dude, Steve and Judy from Glenfern, David Speir, Don Armitage, Katie and Gerald Endt for the best fresh veggies, Stez and the Great Barrier Airlines team.

This project also made use of free labour... special thankyou to my chief volunteer Abby, to the rat brigade Mum, Dad, Jo, Hamish Craig, and Yvette Cottam and also to the frenchman Jerome Guillotel.

Several people other than my supervisors offered their expert advice during the formation of this project, and on scaley matters throughout. To Halema (again), Matt Baber, Tony Whitaker, Trent Bell, Marleen Baling, Keri Neilson, Alison Cree, Jo Hoare and especially David Towns. To Murray Potter for all his help with the rat element of this research, Beatrix Jones and Michael Anderson who gave me extra help with statistics, and to Dingo who showed me the Ranges ropes... cheers.

The tangata whenua Ngāti Rehua and Ngāti Manuhiri were very supportive of this project and I am extremely grateful. Tony and Mal Bouzaid of Glenfern Sanctuary let me roam all over their land chasing rats and lizards and were extremely supportive of this project. You guys do an amazing job at Glenfern Sanctuary... keep it up.

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Special thanks to Team Meys. Thanks for all the quick pit-stop meals, a made bed, and all the logistical help including old green (my tent), and swiss cheese (my fishing vessel), which was priceless until it started attracting sharks.

Mum and Dad thank you so much for supporting me and encouraging me to pursue my dreams, and thanks for letting the gecko club use your glass jars. Mum, extra thanks for coming to clean the house in the last few weeks. To the rest of the whanau Jimi, Dave, Megs, Trish, Steve, Carly, Jack, Ruby, Noah, Henry, Harriett (the new lizardhunter) and Benji thanks for being so fantastic.

Of course I am eternally indebted to my fantastic supervisors Dianne Brunton and Weihong Ji who always managed to find time (goodness knows how) to help me with some conundrum, to proof read a draft of this or that and offer good, constructive criticism. Thankyou for taking me on as a student. You guys are extra brilliant.

Halema Jamieson has been so amazing. Her enthusiasm, belief and know how have enabled this project to happen and also to prosper. Thank you for showing me the ways of chevron skinking, always having the time to discuss ideas, get a grid reference for me, help out with pesky customs officers, let me live in your house and have me for tea. I am truly astounded at your excitement for chevron skinks... it's inspiring.

Almost finally, to my very special friend Joanna Meys (soon to be Barr). Thanking you would require a Masters thesis in itself, and a PhD, and a few post docs.

Dear Joey, thankyou, quite literally, for everything.

And finally I would like to thank Tahi the chevron skink. Tahi my friend, you are an amazing and fascinating creature. I hope that I have helped you out in some small way and that we can meet again someday on your terms... I promise I won't stick a transmitter on your tail.

Cheers bro.

The research in this thesis was approved by the Massey University Animal Ethics Committee (07/134) and the Department of Conservation (AK – 21951 – FAU). Funding from the Massey Masterate scholarship, Purehuroa scholarship, and a Tainui education grand was greatly appreciated.



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# Table of Contents

<b>ABSTRACT .....</b>	<b>III</b>
<b>ACKNOWLEDGEMENTS.....</b>	<b>V</b>
<b>TABLE OF CONTENTS.....</b>	<b>VIII</b>
<b>LIST OF FIGURES .....</b>	<b>XI</b>
<b>LIST OF TABLES.....</b>	<b>XIV</b>
<b>LIST OF APPENDICES.....</b>	<b>XV</b>
<b>CHAPTER 1 GENERAL INTRODUCTION .....</b>	<b>1</b>
1.1 INTRODUCTION .....	2
1.2 CHEVRON SKINK MORPHOLOGY.....	2
1.3 DISTRIBUTION – PAST AND PRESENT .....	3
1.4 CHEVRON SKINK ECOLOGY .....	5
1.5 THREATS .....	7
1.6 CONSERVATION MEASURES AND RESEARCH TO DATE .....	9
1.6.1 <i>Recovery plans and achievements</i> .....	9
1.7 RESEARCH STUDIES .....	10
1.7.1 <i>Habitat use of chevron skinks</i> .....	10
1.7.2 <i>New monitoring techniques</i> .....	11
1.7.3 <i>Captive and genetic studies</i> .....	11
1.7.4 <i>The effects of control of introduced rats on chevron skink on Great Barrier Island</i> .....	12
1.8 KNOWLEDGE GAPS .....	13
1.9 NEW RESEARCH OPPORTUNITIES.....	13
1.10 THESIS OBJECTIVES AND STRUCTURE .....	14
1.11 REFERENCES.....	16
<b>CHAPTER 2 CONFIRMING THE EFFECTS OF EXTENSIVE RODENT CONTROL: RAT DENSITIES FROM ABSOLUTE AND RELATIVE ABUNDANCES. ....</b>	<b>20</b>
2.1 ABSTRACT.....	21
2.2 INTRODUCTION .....	22
2.2.1 <i>Introductions and impacts of rats in New Zealand</i> .....	22
2.2.2 <i>Rodent abundance estimation methods</i> .....	23
2.2.3 <i>Interactions between rat species</i> .....	25
2.2.4 <i>Research objectives</i> .....	26
2.3 METHODS.....	27
2.3.1 <i>Study area</i> .....	27
2.3.2 <i>Study Design</i> .....	32
2.3.3 <i>Data analysis</i> .....	36
2.4 RESULTS.....	40
2.4.1 <i>Rat morphometrics, identification and population dynamics</i> .....	40
2.4.2 <i>Rat density estimation</i> .....	42
2.4.3 <i>Tracking tunnel calibration</i> .....	44
2.4.4 <i>Response of kiore</i> .....	44
2.5 DISCUSSION .....	46
2.5.1 <i>Rat density estimation</i> .....	46
2.5.2 <i>Tracking tunnel calibration</i> .....	48
2.5.3 <i>Correctly identifying kiore</i> .....	49

2.5.4	<i>Response of kiore</i> .....	50
2.6	SUMMARY AND CONCLUSIONS.....	52
2.7	REFERENCES.....	53
2.8	APPENDIX.....	59
<b>CHAPTER 3 THE IMPACTS OF RATS ON CHEVRON SKINKS: POPULATION STRUCTURE AND CONDITION, AND PHYSICAL EVIDENCE OF RAT PREDATION. ....</b>		<b>60</b>
3.1	ABSTRACT.....	61
3.2	INTRODUCTION.....	62
3.2.1	<i>Impact of rats to New Zealand lizards</i> .....	62
3.2.2	<i>Research objectives</i> .....	64
3.3	METHODS.....	65
3.3.1	<i>Study area</i> .....	65
3.3.2	<i>Study design</i> .....	65
3.3.3	<i>Study sites</i> .....	66
3.3.4	<i>Rat densities</i> .....	70
3.3.5	<i>Chevron skink sampling</i> .....	70
3.3.6	<i>Growth rates</i> .....	72
3.3.7	<i>Population structure</i> .....	72
3.3.8	<i>Skink condition</i> .....	72
3.4	RESULTS.....	75
3.4.1	<i>Chevron skink captures</i> .....	75
3.4.2	<i>Growth rates</i> .....	77
3.4.3	<i>Population structure</i> .....	77
3.4.4	<i>Evidence of attempted rat predation – sublethal injuries</i> .....	80
3.4.5	<i>Skink condition</i> .....	85
3.5	DISCUSSION.....	87
3.5.1	<i>Population structure</i> .....	87
3.5.2	<i>Evidence of attempted rat predation – sublethal injuries</i> .....	90
3.5.3	<i>Skink condition</i> .....	94
3.6	SUMMARY AND CONCLUSIONS.....	99
3.7	REFERENCES.....	100
<b>CHAPTER 4 HABITAT PREFERENCES, HOME RANGE AND RANGING BEHAVIOUR OF CHEVRON SKINKS.....</b>		<b>108</b>
4.1	ABSTRACT.....	109
4.2	INTRODUCTION.....	110
4.2.1	<i>Habitat preferences</i> .....	110
4.2.2	<i>Home ranges</i> .....	112
4.3	RESEARCH OBJECTIVES.....	113
4.4	METHODS.....	114
4.4.1	<i>Study area</i> .....	114
4.4.2	<i>Skink capture</i> .....	114
4.4.3	<i>Radio-tracking</i> .....	115
4.4.4	<i>Habitat use</i> .....	119
4.4.5	<i>Ranging behaviour</i> .....	120
4.4.6	<i>Home Ranges</i> .....	121
4.4.7	<i>Data analysis</i> .....	121
4.5	RESULTS.....	123
4.5.1	<i>Transmitter attachment</i> .....	123
4.5.2	<i>Habitat use</i> .....	123
4.5.3	<i>Ranging behaviour</i> .....	128
4.5.4	<i>Home ranges</i> .....	131
4.6	DISCUSSION.....	134
4.6.1	<i>Transmitter attachment</i> .....	134
4.6.2	<i>Habitat use</i> .....	134
4.6.3	<i>Ranging behaviour</i> .....	139
4.6.4	<i>Home ranges</i> .....	140
4.7	SUMMARY AND CONCLUSIONS.....	142
4.8	REFERENCES.....	143

---

4.9	APPENDIX.....	149
<b>CHAPTER 5 GENERAL SUMMARY AND CONCLUSIONS.....</b>		<b>153</b>
5.1	INTRODUCTION .....	154
5.2	CONFIRMING THE EFFECTS OF EXTENSIVE RODENT CONTROL.....	154
5.3	THE IMPACTS OF RATS ON CHEVRON SKINKS .....	156
5.4	HABITAT PREFERENCES, HOME RANGE AND RANGING BEHAVIOUR .....	159
5.5	CONCLUSIONS.....	162
5.6	REFERENCES .....	164

---

## List of Figures

- Figure 1. The ‘teardrop’ marking on the upper and lower mandibles (top left), chin markings (bottom left) and the distinctive chevron markings seen on the dorsal side of the chevron skink (right). Photographs by author..... 3
- Figure 2. The location of Great Barrier Island (27 760 ha) in the Hauraki Gulf of New Zealand. (Map modified from DOC)..... 29
- Figure 3. Map of the rodent control network on Kotuku peninsula, Port Fitzroy, Great Barrier Island. Black lines are poison lines on Bouzaid’s property, dashed black line is poison on 25m interval, and blue lines are poison lines on OCC. Red lines are poison lines on Kotuku scenic reserve..... 30
- Figure 4. Map of the study area at Port Fitzroy, Great Barrier Island. Treatment (Glenfern walk and Fenceline) and control (Shop and Hairpin) removal and tracking grids were run in August 2008. Rodent control occurred west of bold red line (Figure 3)..... 30
- Figure 5. Historic photos of Kotuku peninsula showing early land clearance. .... 31
- Figure 6. Layout of tracking tunnels and snap-traps used to estimate rat densities and calibrate estimate indices at Port Fitzroy, Great Barrier Island in August 2008. Filled circles indicate a snap trap and a tracking tunnel; open circles indicate only a snap trap (50m spacings). The shaded area is the effective trapping area (17ha) with a 56m buffer (half the diameter of the average ship rat home range; Hooker and Innes 1995) added to the actual trapped area after Dice (1938)..... 34
- Figure 7. Comparison of external sexual features of immature and mature rats. .... 35
- Figure 8. External features of kiore that distinguish them from ship rat, found at Port Fitzroy, Great Barrier Island in August 2008. Photographs by author..... 36
- Figure 9. The three colour morphs of ship rat found during the removal experiment at Port Fitzroy, Great Barrier Island in August 2008. From left “*alexandrinus*”, “*frugivorus*” and “*rattus*”. Photograph by author. .... 37
- Figure 10. The relationship between the head body length (HBL) and the proportion of HBL/hind foot length (HF) found during the removal experiment at Port Fitzroy, Great Barrier Island in August 2008. Open circles: kiore; filled circles: ship rats. 40
- Figure 11. Catch rates/100 nights for kiore (open circles) and ship rats (closed circles) on four experimental removal grids in Port Fitzroy, Great Barrier Island in August 2008. .... 43
- Figure 12. The relationship between nightly catch of ship rats and cumulative number removed in four experimental removal grids at Port Fitzroy, Great Barrier Island in August 2008. The solid lines give the simple linear regressions, and the dashed lines give the upper and lower 95% confidence intervals. .... 43
- Figure 13. Correlation of nightly rat tracking rates and absolute densities for four experimental removal grids at Port Fitzroy, Great Barrier Island in August 2008. 44
- Figure 14. Pilot study stream sites searched for chevron skinks at Port Fitzroy, Great Barrier Island during January 2008. Ten G-minnow traps were installed in each stream (denoted by red line) until the presence of chevron skinks was confirmed. The light shaded blue area is the predator controlled area (Glenfern Sanctuary).. 67

Figure 15. The four chevron skink study sites chosen from the pilot study. Green dots are locations of G-minnow traps established for chevron skinks at each study stream in Port Fitzroy, Great Barrier Island. G-minnow traps were run between January and April 2008. The light shaded blue area is the predator controlled area (Glenfern Sanctuary). .....	69
Figure 16. The ratio of total tail length:snout vent length for two chevron skinks. The body-tail condition (BTC) index = tail length(blue) /snout vent length(red). .....	73
Figure 17. Typical facial and chin photos taken of chevron skinks to detect recaptures. Each skink has a unique pattern that can be differentiated between animals. ....	74
Figure 18. Modified trapping method used to opportunistically catch a chevron skink from an arboreal retreat in a Puriri, in Port Fitzroy, Great Barrier Island. ....	75
Figure 19. The population structure of chevron skinks in the treatment ( $n = 46$ ) and unmanaged control ( $n = 39$ ) catchments caught on Great Barrier Island during trapping between January and May 2008. Skink captures were standardised to skinks caught per 100 trap days. ....	78
Figure 20. The proportions of chevron skink caught in each size category (mm) in relation to the total catch at Port Fitzroy, Great Barrier Island 2008. ....	79
Figure 21. Sublethal injuries sustained by chevron skink 1 in the Shop stream at Port Fitzroy, Great Barrier Island. Captured on 15/3/2008. Top left: dorsal view of lateral facial injuries - note dent on left side and punctures on right side. Top right and inset; close up of facial injuries on right side - note widespread punctures and scale damage. Bottom left: close up of facial injuries on left side – note two puncture holes and vertical cut. Bottom right: full body view demonstrating extensive tail loss. Photographs by author. ....	82
Figure 22. Sublethal injuries sustained by chevron skink 2 in the Shop stream at Port Fitzroy, Great Barrier Island. Captured on 14/4/2008. Top left: close up of facial injuries - note damage to eyeball. Top right; close up of facial injuries on right side – note semi-healed tear anterior to ear. Bottom left; view of dorsal injuries – note tear below left knee and puncture holes on the dorsal surface. Bottom right; close up of tail demonstrating tail loss – note puncture hole on tail. Photographs by author. ....	83
Figure 23. Skink 2 recaptured on 5/2/09 in the Shop stream at Port Fitzroy, Great Barrier Island. Top: close up of facial injuries - note eyeball damage still present. Bottom left: photo of tail demonstrating tail regrowth – note puncture hole healed on tail, and 36mm of tail regeneration. Bottom right: view of dorsal injuries – note tear below left knee has healed and puncture holes on the dorsal surface, healed over but still missing scales. Photographs by Halema Jamieson (used with permission). ....	84
Figure 24. Box plots of the body-tail condition (BTC) index of chevron skinks in the unmanaged control (top) and treatment (bottom) sites, during trapping on Great Barrier Island between January and April 2008. ....	86
Figure 25. The attachment location and camouflaging technique used for chevron skinks at Port Fitzroy, on Great Barrier Island in 2008. The top photo shows the placement of the transmitter laterally on the lee side of the rear legs posterior to the vent. The bottom photo shows how the white tape was camouflaged with black permanent marker and soil to make the transmitter relatively inconspicuous. Inset: shows transmitter strap prior to camouflage. ....	117
Figure 26. The relationship between snout-vent length (SVL) and weight of chevron skinks captured in 2006 and 2007 at Port Fitzroy, Great Barrier Island, calculated from data obtained from Halema Jamieson (DOC unpubl. data). Transmitters were	

---

only attached to chevron skinks whose weight and SVL were equal to or above this relationship, and above 25g (shaded area), unless they were gravid. To ensure wellbeing of chevron skinks, those animals outside this area were excluded from tracking because they were considered too small or not of suitable condition....	118
Figure 27. Percentage occurrence of unique refuge sites used by chevron skinks ( $n = 86$ ) during radio-tracking at Port Fitzroy, Great Barrier Island in 2008.....	125
Figure 28. The percentage occurrence of chevron skink relocation sites ( $n = 86$ ) as a function of distance from the stream edge at Port Fitzroy, Great Barrier Island in 2008. ....	125
Figure 29. Mean percentage ( $\pm$ SE) of the occurrence of substrate types where chevron skinks were radio-tracked ( $n = 86$ ) and at random sites ( $n = 172$ ) at Port Fitzroy, Great Barrier Island in 2008.....	126
Figure 30. Mean percentage ( $\pm$ SE) of the occurrence of microhabitat types where chevron skinks were radio-tracked ( $n = 86$ ) and at random sites ( $n = 172$ ) at Port Fitzroy, Great Barrier Island in 2008. ....	126
Figure 31. Left: the vapour pressure deficit (VPD) of the ambient air immediately outside a chevron skink relocation site, and at two associated random locations (5m perpendicular towards stream; 5m perpendicular towards ridge). Right: the vapour pressure deficit (VPD) of the ambient air inside chevron skink refuge site and immediately outside the refuge at Port Fitzroy, Great Barrier Island in 2008. A lower VPD corresponds to a lower rate of evaporative water loss (EWL).....	128
Figure 32. Correlation between height above ground of chevron skink arboreal retreats, and rainfall ( $r = 0.028$ ) at Port Fitzroy, Great Barrier Island in 2008. ....	129
Figure 33. The height (m) above ground radio-tracked chevron skinks ( $n = 6$ ) were relocated before, during and after flooding events at Port Fitzroy, Great Barrier Island in 2008.....	130
Figure 34. Photo of an adult chevron skink refuging <i>in situ</i> in a silver tree fern crown ( <i>Cyathea dealbata</i> ) amongst dead fern fronds at Port Fitzroy. Note the effectiveness of the camouflage amongst dead fern fronds. Photograph by author. ....	131
Figure 35. Overlapping home-ranges (95% MCP) and individual locations of chevron skinks at Port Fitzroy, Great Barrier Island in 2008.....	133

---

## List of Tables

Table 1. Total number of ship rats caught ( $n$ ) and density estimates, based on removal trapping at four sites on Great Barrier Island in August 2008. The range of ship rats is considered to be between the minimum density and the upper 95% confidence interval estimates (in bold).....	42
Table 2. Microhabitat and method of chevron skinks caught and seen (and not caught) in four stream catchments at Port Fitzroy, Great Barrier Island from January to April 2008. ....	76
Table 3. Capture/recapture dates and calculated growth rates of chevron skinks at Port Fitzroy, Great Barrier Island, 2008. ....	77
Table 4. Summary of Mann-Whitney U test statistics of chevron skink body-tail condition (BTC) index between treatment ( $N_1$ ) and unmanaged control ( $N_2$ ) sites at Port Fitzroy, Great Barrier Island in 2008. ....	85
Table 5. Attachment dates and fate of the transmitters (TX) for radio-tracked chevron skinks at Port Fitzroy, Great Barrier Island in 2008.....	123
Table 6. Summary of estimated effects of habitat variables that predict chevron skink presence from a backwards-stepwise logistic regression model using maximum likelihood (PROC GENMOD; SAS institute v9.1, Cary, NC, USA) at Port Fitzroy, Great Barrier Island in 2008.....	127
Table 7. Summary of the non-linear mixed models (individual skinks as a random factor) for each microhabitat variable that were significant in the logistic regression model (Table 6) (PROC NLMIXED; SAS institute v9.1, Cary, NC, USA). Each variable was modeled separately and significant models would indicate difference between individual skinks. ....	127
Table 8. The home ranges of chevron skinks at Port Fitzroy, Great Barrier Island in 2008. Only skinks with five or more locations were included.....	132
Table 9. Estimated area of home range overlap (95% MCP) of two pairs of chevron skinks at Port Fitzroy, Great Barrier Island. ....	133

---

## List of Appendices

Appendix 1. Rat tracking rates (% of tunnels tracked) at four separate tracking lines between February 2005 and August 2008 at Glenfern Sanctuary in Port Fitzroy, Great Barrier Island. ....	59
Appendix 2. Home ranges (95% minimum convex polygons) and individual fix points of chevron skinks at Port Fitzroy, Great Barrier Island in 2008 .....	149