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**Vocalisations of the
New Zealand Morepork
(*Ninox novaeseelandiae*)
on Ponui Island**

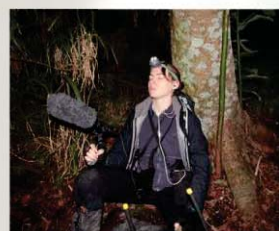
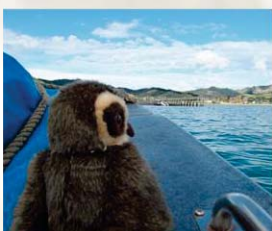
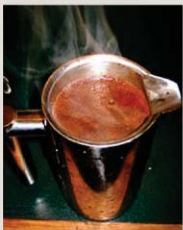
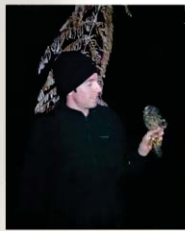
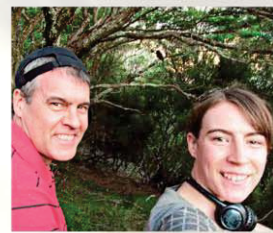
**A thesis presented in partial fulfilment of the requirements for
the degree of**

Master of Science in Zoology

at Massey University, Palmerston North, New Zealand

Alex Brighten

2015





Abstract

Vocalisations provide an effective way to overcome the challenge of studying the behaviour of cryptic or nocturnal species. Knowledge of vocalisations can be applied to management strategies such as population census, monitoring, and territory mapping. The New Zealand Morepork (*Ninox novaeseelandiae*) is a nocturnal raptor and, to date, there has been little research into their vocalisations even though this offers a key method for monitoring morepork populations. Although not at risk, population monitoring of morepork will help detect population size changes in this avian predator which may prey on native endangered fauna and may suffer secondary poisoning.

This study investigated the vocal ecology of morepork on Ponui Island, Hauraki Gulf, New Zealand from April 2013 to April 2014. The initial goal was to develop a monitoring method for morepork. However, due to a lack of detailed basic knowledge of their vocalisations, the primary objective shifted to filling that knowledge gap and providing baseline data for future research. The aims of this study were thus to characterise all of the calls given by the morepork on the island; to investigate spectral and temporal parameters of three main calls; to plot the amount of calling across a night and a year; and to study the responses of morepork to playback calls.

Eight morepork were caught using mist-nets and subsequently tracked by radio-telemetry. Vocalisations were recorded using manual and automatic digital sound recorders and calls were analysed with manual and automated sound analysis software. I described eleven distinct calls, referred to as *more-pork*, *trill*, *rororo*, *more-more-pork*, *weow*, *low trill*, *copulation squeal*, *single hoot*, *distress squeak*, *chicketting* and *juvenile begging trill* and I further analysed the spectral and temporal characteristics of three main calls, *more-pork*, *trill* and *rororo*. I found variation between individual morepork in acoustic parameters of these call types. I found no evidence of sexual variation in the fundamental frequency, fundamental duration nor inter-syllable duration of the three call types. However, sample sizes were small (2 males to 7 females) and a larger sample size would be needed to confirm these results.

The average number of all morepork call types showed temporal variation both nightly and monthly. A low amount of calling in winter months compared to summer

appeared to coincide with the morepork breeding cycle. The highest numbers of call were heard from November to January, with the numbers of calls during this period being significantly higher than in all other months. The number of calls per hour showed two peaks: one around the middle of the night and the other during the last hour of darkness. The number of calls heard in the first two hours after sunset were significantly lower than during the rest of the night.

Playbacks were effective in eliciting responses from morepork, but the proportion of responses to playback was lower than to natural calls. Response rates did not seem to be affected by season. Session time and order of playback had an effect on proportional responses as well as playback call-type whereby *rororo* elicited the most responses and *trill* elicited the fewest.

This project broadened our knowledge of morepork vocal ecology and therefore contributes to our knowledge of raptor vocal communication. The study also presents information and recommendations that will be useful to future research and also in management of morepork. In particular, this project provides background information needed to help develop protocols for acoustic monitoring of morepork. The techniques used in this study and the general results can be used or applied to studies of other nocturnal species.



Acknowledgements

I have so many people to whom I'm indebted a little or a lot for their varied assistance over the course of this little, not so little, project. When I began this thesis I thought I could do it by myself, without needing to trouble anyone else, save annoying my supervisors of course. How wrong I was. Without so many people's help and support, this thesis simply would not exist. I hope I have not missed anyone, but if I have, thank you, blame the sleep deprivation.

To my supervisors, Isabel and Murray, thank you so much for your support even when the thesis grew in time scale and size. It's certainly been a journey of ups and downs but on balance it's been a great experience and I have learnt so much. It's difficult to do justice with words my gratitude for all your help. Isabel, your time-efficiency, dedication and field work ethic are inspirational. Thank you for your friendship and advice throughout. Thank you, Murray, for your kind encouragement and for finding time for me despite competing time pressures. Thank you both for your editing and proof reading, but as you can tell from these acknowledgments I'm still learning to write succinctly!

Thank you to the Chamberlin family for welcoming me into your island home with such warmth and generosity and for making me feel part of your extended family. To Dave, Ros and Louise especially, thank you for putting up with me for what has been one of the best year-and-a-bits of my life. Without you, this thesis would not have been possible. For your kind friendship, delicious dinners, fruit, fresh milk, and countless coffees, as well as your advice, support and the innumerable laughs, thank you. I'm grateful for all the good times and the tough ones too. Cheers for checking in on me when I'd not been seen for a while and apologies for my initial failed attempts to ninja past your dogs at unsociable hours of the night. A big thanks too, for allowing us to turn your pretty cottage into something of a field laboratory and for not minding our unconventional use of the freezer! Thank you, Peter and Pat Chamberlin, for the advice and stories, your hospitality, and lifts into town. To the many friends and extended family of Ponui Island, it was a pleasure to meet you all, especially Di, Harvey and Margaret, Dan, and your families.

To start out in field research in such a special place was a blessing - you could hardly dream of a better study site. We Ponui students have been thoroughly spoilt and I know I speak for all of us when I say how deeply grateful we are and that we'll cherish our time on Ponui forever.

To my wonderful parents, mum, dad, without your constant support this thesis would not be complete. From your fostering my curiosity for animals and love of exploring the woods and

putting up with my repetitive requests for my favourite bedtime story, Owl Moon; to your encouragement, advice and belief in me, I'm so very grateful. I'm so glad I got to show you the island and prove that I wasn't running away from town each month to bunk off work and chill on an island. While I was certainly running away, you found it was anything but chilled. Your timely supply of chocolate and coffee was a potent antidote to the stress and sleep deprivation. Both your work ethics in the face of adversity are inspirational. Mum, your hawk-eyed proof reading skill and an ability to be succinct so foreign to me were so effective at turning my drafts into legible documents. Dad, your photographic knowledge, visual creativity, and formatting skills were a massive help with the thesis presentation. Thanks to the rest of my family for your encouragement from distant Blighty, especially to my brother, George, and my nan, Crystal.

To my fellow students of Ponui, you guys are legends. For all the fantastic times on the island, for your company, the laughs, advice, and support, I am so grateful. Cheers, Tom Dixon, for being an awesome island buddy and for all the laughs and crazy times over the course of our projects. It was so good to have a night-work-friend to provide motivation when the idea of retreating into a warm sleeping bag seemed all too tempting. For the jokes, HIMYM-watching sessions, and sleep deprived chats when the weather killed our night work plans, and the support as we both took on the challenge of the write-up, thank you. Natasha Bansal, your ability to remain positive in tough times is inspirational, thank you for motivating me when it seemed too tough and for all the coffees, your help, and advice. Thank you for being such a good friend and for the fun times on and off the island and the long journeys in between. I can't wait for the next field-work adventure!

Thank you, Tim Arnold, for the invaluable life advice, help in the field, and North Island-spanning road trips. To Nirosha Priyadarshani, my sound-analysis saviour! Without you, I would still be trawling through my 4000+ hours of sound recordings, or alternatively, completely barking mad out in the wilderness. Thank you for ensuring I emerged with some sanity intact and for your patience at my slow uptake of your detailed explanations of the inner workings of the sound analysis software. Cheers for tolerating my computer software illiteracy; your work ethic, attention to detail, and dedication are incredible. Thank you David Izquierdo, for your help with catching the owls and your valuable experience and advice; your enthusiasm, good humour and positivity were very much appreciated.

I owe a big thanks to the past students of Ponui, Alex Wilson and Sian Bent, who in 2013 helped me learn telemetry and how not to get lost in the bush. Alex, I'm still refining my bush-

ninja technique, I'll perfect it one day! Thanks also to Nora Carlson who introduced me to sound recording and analysis and for valuable advice on the characteristics of some of my recorded calls.

Catherine Carter, thank you for proofreading my woeful first attempts, and for the countless chats over coffee providing much needed down-to-earth views and all round boosts to my sanity. Thanks to Nicki van Zyl and Kat Strang for the many coffee dates and your useful advice, and to Nicki cheers for also sitting through my attempt at a first draft and for your suggestions.

To the other Ponui visitors, especially the campers sleeping rough whom I probably traumatised whilst legging it up Camp Hill late for a playback session after midnight, clanking my gear and panting under the weight of it all (mainly those 12 volt batteries), my apologies. Also to those camping by the mangroves whom I may have disturbed by clumsily ninja-ing after my owl by the light of the moon, not my fault, I think she enjoyed leading me a merry dance whilst she hunted up and down that hill side.

The running around after my owls with telemetry would not have been possible without the amazing effort of my Morepork Missions crew of July 2013. I'm sorry for the unsociable hours, the long walks with gear and the long, cold waits beneath nets willing those crafty owls down from the trees. To Shaun Nielsen and Andrew Thomas thanks for all your help, for putting up with my fledgling team-leadership skill, and for your invaluable advice and tuition. To Natasha and David, thanks for all your assistance and advice on owl handling. To Natasha, Tom, David and Isabel, cheers for the moral support when catching the last two birds in just two remaining netting sessions seemed unlikely. Most of all, thank you all for the banter, when it seemed like morepork mission impossible. The laughs certainly kept me going, or maybe that was all the coffee...

I owe a huge thank you to everyone at Massey Ecology who helped with the technical side of my project. Cheers, Cleland Wallace, for your fix-it know-how, DIY advice, microphone loan, and help even at the last minute. I know the whole Ponui crew is grateful for all your help too; you keep many of our projects up and running, especially those using the well-loved TR4s. Thanks to Paul Barrett, for your help with ordering useful things and for enabling me to decorate many of the Chamberlins' trees with flagging and reflective tape. I'd be lost without it. Thanks Sharon Wright, for all your help, I'm not sure what the Ecology Group would do without you. Cheers, Tracy Harris, for always being able to help out and for letting me borrow some entomological lures to try to entice my birds into nets. Thank you, Ed Minot, for the use of your sound gear (particularly the cool light-sabre mic) and for the inspirational

undergraduate lectures in Animal Behaviour; you're greatly missed from the Ecology Department.

Thanks to the team at SirTrack New Zealand for making my job of chasing nocturnal shadows that little bit easier; and to Chris Milne, cheers for your efficiency and professionalism, and for the interesting conference chats that meant I could pretend I'm not hopeless at networking! I would recommend SirTrack to everyone, though I can't vouch for the morepork clients. Their indignant looks each time I found them at their roosts said enough.

Thank you, Andrew Digby for the use of your automated sound recorder, which was hugely helpful in covering my ambitious data collecting plans.

To the volunteers of EcoQuest 2013 and their leaders, especially Ria Brejaart, and to the 2013 Massey Wildlife Management course crew, Pierce, Amanda, Greer, thank you for your help on those cold nights listening for morepork. To Inge and John thanks for your help, advice, interest and good yarns on the island.

To all the team at Wingspan Birds of Prey Centre, Rotorua, Debbie Stewart and Noel Hyde, Andrew Thomas, Ineke Smets and Richard Seaton, your passion for raptors, conservation and their advocacy is truly inspirational. Thank you for the opportunity to meet face to face with your morepork. I had half entertained the idea of pursuing a Master's prior to helping out at Wingspan in 2012. Meeting and working with your morepork and my week of sleeping in a countryside hut with a few hundred thousand baby Hatchery fish neighbours as a wild ruru voiced its thoughts made me certain. I needed to find out more about these feisty, vocal little owls. Thank you for being so accommodating and helpful with my captive recordings, and thanks Andrew for inquisitive-owl-proofing the sound recorder for me. Please say a big thank you to Whisper, Frodo, Wairuru and Nestor from me!

To the team and people I met at Nga Manu Wildlife Reserve, Waikanae; Bruce Benseman, Rhys Mills, and Robyn, thank you for showing such interest at my project and for helping with my captive recordings. Regrettably I wasn't able to use them as planned, but I hope to produce a short report on captive recordings for you in the future. Special thanks to David Mudge for your interest, advice, and your letter of insightful knowledge about your local wild morepork.

To Ross and Janette Campbell of Owlcatraz, Shannon, thanks for letting me record in your morepork enclosure. It was fascinating to hear how your birds interact and to hear your weka vocalise too.

Without the generous funding from the Nga Manu Trust, Julie Alley Bursary, and Graduate Manawatu Women Trust, my project would not have been possible. Thank you for believing in my project, without your financial support I would not have been able to purchase radio-transmitters and gear to run around after my owls each month collecting vocalisation data without the worry of how I'd afford the next trips.

I'm grateful for the permits to complete this project from the Department of Conservation (Permit No. 36228-FAU) and the New Zealand Banding Office (Permit No. 2012/014) and for the approval of the Massey University Animal Ethics Committee (13/21). Thank you to the Massey Equine Parentage and Animal Genetics Lab for the DNA sexing of my morepork. Thanks to David Beamish of Ngai Tai, for permitting the project and allowing me to study a taonga species.

To everyone who received late night or early morning texts, my apologies, I tend to forget that other people sleep at night! They say that researchers are often like their study subjects, well after catching a mouse with a coffee cup at 2am one morning I knew it was curtains for me. Apologies for becoming nocturnal, disappearing off into the bush for weeks on end and for all the missed social occasions.

To my owls, Kahlua, Flat White (a.k.a Fdub), Macchiato, Calypso, Espresso, Perico, and Ristretto, if only you knew how crucial you were to my study and how grateful I am for your less than voluntary participation. Perhaps then you might understand why I stalked you as quietly as a tall, clumsy, human can manage, and why I sat below your perches in the moonlight and made unwelcome daytime appearances whilst you dozed in a sun-dappled roost. To Affogato, whom I lost early on, and Ristretto, who was such a charismatic morepork, rest in peace.



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