NEW ZEALAND ECOLOGICAL SOCIETY

Newsletter

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Inside

From the Editor

Kia ora koutou,

Welcome to the July 2018 newsletter. Details of the upcoming conference in Wellington in November are being finalised. Keep an eye out for further information in the next few weeks. In this issue of the newsletter, we have included profiles of the current NZES council members. Feel free to pass on any ideas or suggestions you have about the society and its activities. The proposed Special Issue of the NZ Journal of Ecology on Mātauranga Māori and shaping ecological futures is an exciting initiative. Thank you to all the contributors to this newsletter. Hope you enjoy the read.

Ngā mihi
Angela Simpson

Newsletter Editor: Angela Simpson. Email: newsletter@nzes.org.nz
Deadline for submissions for the next issue of this newsletter is **Friday 20th September 2018**

Illustrate Ecology

Photo: Ben Cranston (PhD student at The University of Auckland)

Tynan Burkhardt (University of Auckland) and Freddie Hjelm (The Living Tree Company) among the tree tops of a kauri forest. A 24-hour measurement period at Huapai Scientific Reserve provided night-time transpiration and photosynthetic rates as part of an ongoing drought experiment. You can see more photos and read about this project in this blog post aucklandecology.com/2018/04/16/a-great-day-and-night-of-tree-climbing/

Ecotones – New ecological research

Bruce Burns and Kiri Wallace

A selection of recently published research on or relevant to New Zealand ecology (except that published in the New Zealand Journal of Ecology or 'in press'). The list of other publications on New Zealand ecology can be found towards the end of the newsletter.

1. The mystery of the disperser of New Zealand's large seeds deepens

One of the long-standing questions of New Zealand seed dispersal ecology is what dispersed the largest seeds? New Zealand has a number of tree species with large to moderately large seeds that seem too large for the extant seed dispersing bird guild, except for kererū. Were these tree species as dependent on a single bird for dispersal as today would suggest or were they also dispersed by animals now extinct? Five trees in particular have characteristics consistent with dispersal by large ground-dwelling animals such as moa (e.g. early abscission, thick seed coats), and seeds of some of these species have been found in moa gizzards. Carpenter et al. (2018) have recently analysed moa gizzards and coprolites to determine whether moa ate and dispersed large seeded species. Their results show that moa did indeed eat large seeds such a mataī and hīnau, but the moa crop ground these seeds to a meal so they would not have survived gut passage. Moa would have only dispersed small seeds. Also simulated abrasion and acid wash applied to large seeds, mimicking the moa gut environment, did not speed up germination, so even if these seeds did survive passage intact, presence in the moa gut would not increase germination rates. Where does this now leave us? If moa didn't disperse these large seeds, are the current limited dispersal agents enough for these species, or should we be looking at other possibilities, e.g. kiwi, weka, to answer the riddle. As this paper comments, their results 'slay a beautiful hypothesis with an ugly fact', but to some extent close off a blind alley for dispersal research.

Carpenter JK, Wood JR, Wilmshurst JM, Kelly D 2018. An avian seed dispersal paradox: New Zealand's extinct megafaunal birds did not disperse large seeds. Proceedings of the Royal Society B: Biological Sciences 285: art. no. 20180352.

2. Signs of humpback whale population recovery in New Zealand

Humpback whales (*Megaptera novaeangliae*) in New Zealand waters are part of a population that feeds in Antarctica in summer, then migrates to tropical waters to breed in winter, probably around New Caledonia. Southern hemisphere populations of humpbacks were hunted to near extinction by intensive illegal Soviet whaling in the Antarctic from 1947 to 1973, with population estimates at the end of this period at only between 100-200 whales around New Zealand and Australia. Whaling historically also occurred in New Zealand, with shore-based whaling occurred at Perano Station in Cook Strait until 1964, although not at the scale of the Soviet whaling effort. Fortunately, since hunting has stopped (eventually after about 1986), humpback whale populations are known to have increased regionally, with substantial gains in waters off eastern Australia. In New Zealand, that part of the northern migration of humpback whales passing through Cook Strait were observed by ex-whalers of the Perano Station and other observers from 2004 to 2015 in a truly amazing data collection effort. Gibbs et al (2018) have analysed this observation data and determined a small but significant increase in the population of humpbacks undertaking this northern migration to their breeding grounds (from 1 to 6 sightings per day). In these days of what seems like declining populations of wildlife everywhere, these signs of population recovery are very welcome, and hopeful for the future of humpbacks around New Zealand. As well, the story of the Perano whalers working in the service of the whales they used to hunt is extraordinary, and reflects the complex nature of New Zealanders relationship with nature.

Gibbs NJ, Dunlop RA, Gibbs EJ, Heberley JA, Olavarría C 2018. The potential beginning of a postwhaling recovery in New Zealand humpback whales (*Megaptera novaeangliae*). Marine Mammal Science 34: 499-513.

3. Greenhoods: Soliciting for sex in the bush?

Greenhood orchids (mostly *Pterostylis* spp.) is the largest group of native orchids within New Zealand, and are characterised by the strange fusion of the sepals and petals of the

flower that form an enclosed green vessel. As well, the labellum (modified petal) of the flower is hinged and, when touched, flicks back in a mechanism which temporarily creates a trap in the base of this vessel. The only way an insect can escape this trap is by crawling past the pollinia and, subsequently, stigmatic surface of the flower which enables pollination. But what lures an insect into this trap in the first place? One commonly held hypothesis has been that insects, in this case fungus gnats, are enticed to enter greenhood flowers by sexual deception. That is, the flowers emit a chemical attractant (pheromone) similar to females of particular insect species that pull in frisky males of that species and cause them to engage in copulatory behaviour with parts of the flower. Thalwitzer et al (2018) have now provided strong evidence that such a specialised pollination system occurs with New Zealand *Pterostylis* species. They used sticky insect traps around flowers of three different *Pterostylis* species, and identified insects caught and particularly those carrying orchid pollinia. Only males of specific fungus gnat species were associated with each *Pterostylis* species, and genetic analysis of the attached pollinia confirmed they came from the relevant orchids. This work is significant as highly specialised pollination systems are rare in New Zealand, and sexual deception is probably at work.

Thalwitzer L, Kelly D, Smissen RD, Butler R, Suckling DM, El-Sayed A 2018. Species-specific male pollinators found for three native New Zealand greenhood orchids (*Pterostylis* spp.) suggest pollination by sexual deception. Australian Journal of Botany 66: 243-254.

4. Artificial light: Negatively affecting wētā night life

Artificial light is known to have a powerful effect on behaviour of nocturnal creatures. While this could become a valuable tool to deter rodent incursions at breaks in pest-proof fences, it could simultaneously affect behaviour of endemic invertebrates such as wētā. Farnworth et al. (2018) found that wētā in the fence hood at Maungatautari Ecological Island had a significantly reduced presence in lit conditions (by 87.5%). Males in particular avoided light, probably as an anti-predator behaviour that allows them to remain inconspicuous while roaming for new roosting galleries and mating partners. Reduction of these important activities would have undesirable long-term ramifications for wētā populations. It is likely these results extend to other nocturnal New Zealand invertebrates as well.

This work illuminates (pun intended) the serious impact light pollution could have on NZ wētā and emphasizes the effects of artificial light at night as an emerging research field for New Zealand. While localized lights in pest-proof fences may not have population-wide effects, there are implications here for more widely-lit areas, such as urban green spaces. If we are to successfully restore the iconic and ecologically valuable wētā to urban forest ecosystems, we should consider ways to mediate light in these areas.

Farnworth B, Innes J, Kelly C, Littler R, Waas JR 2018. Photons and foraging: Artificial light at night generates avoidance behaviour in male, but not female, New Zealand wētā. Environmental Pollution 236:82-90.

5. What helps late-successional tree seedlings survive in restoration plantings?

Forest restoration of greenfields (e.g. retired pastures, urban greenspace) is a growing practice, and due to the isolation of extant forest patches in many areas reducing their efficacy as potential seed sources, it's up to humans to make sure all plant species are re-instated. This begs the question: when after initial plantings can we add enrichment species? These late-successional "Goldilocks" plants don't like to be too hot or cold, and therefore must be added under an established canopy to minimise their exposure and also competition with herbaceous weeds. Without them, the forest ecosystem will not return to a long-term

diverse, functional state. We can't skip planting them, but don't want to waste money by planting in the wrong conditions and watching plants die.

Here the authors planted six late-successional enrichment forest species into an urban restored forest chronosequence at Waiwhakareke Natural Heritage Park (Hamilton). The chronosequence ranged from 2-7 years old. They found that the forest canopy developed in a predictably linear fashion, regardless of tree species composition. By about 5 years old, the canopy was 80% closed, creating conditions hospitable to enrichment plant survival and growth. Interestingly, large proportions of tea tree (*Leptospermum* & *Kunzea* spp.) in canopies of this age decreased growth and survival of the seedlings. Exact mechanisms for this are unknown but its possible belowground forces such as allelopathy may play a role. To enhance enrichment plant success and long-term restoration success, they suggest planting a balanced mix of tea tree and broadleaved species in the original planting.

Laughlin DC, Clarkson BD 2018. Tree seedling survival depends on canopy age, cover and initial composition: trade-offs in forest restoration enrichment planting. Ecological Restoration 36(1):52-61.

News from NZES council

Complied by Cate Macinnis-Ng

Kia ora koutou! We held our second NZES Council meeting for 2018 in Hamilton on 14th June. As usual, we had some great conversations. As a special treat, we had a lunch-time stroll through the University of Waikato fern garden.

Exciting developments I'd like to share with you include a new initiative similar to the Ecological Society of Australia's Hot Topics https://www.ecolsoc.org.au/groups/hot-topics and the much anticipated mentoring scheme for students and early career ecologists. Watch this space for more information coming soon. Our annual awards are now open for nominations so please get those in by the end of August. More information on our website https://newzealandecology.org/awards-grants.

We'd like some help with management of our website so if you are web-savy and would like to make a contribution, please get in touch with me c.macinnis-ng@auckland.ac.nz. We can offer training and the opportunity to connect with ecologists across the country.

Wishing you all a warm winter filled with all things ecology!

Mā te wā,
Cate Macinnis-Ng (President)

NZES Conference update 2018

The 2018 conference will take place in Wellington from 26th to 29th November, at Victoria University of Wellington. Sunday 25th will be a student day. Conference talks will occur from Monday to Wednesday, and on Thursday 29th there will be a selection of field trips to local and regional sites of ecological interest. We anticipate symposia on urban ecology, animal behaviour, and cultural perspectives. Members who would like to suggest additional symposium

topics are encouraged to email details to Stephen.Hartley@vuw.ac.nz or chowell@doc.govt.nz including names of likely contributors.

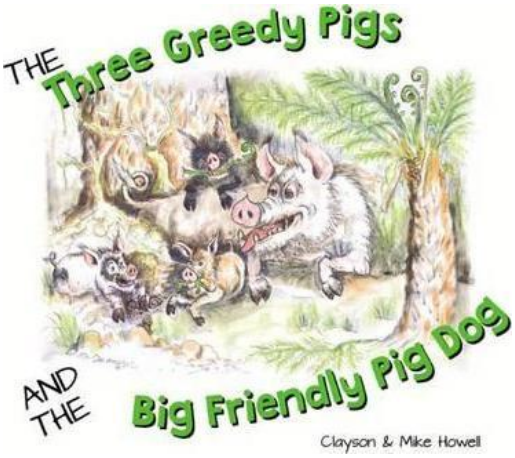
The website for submission of abstracts and early bird registrations will open on 9th August.

Profiles of NZES Office Holders

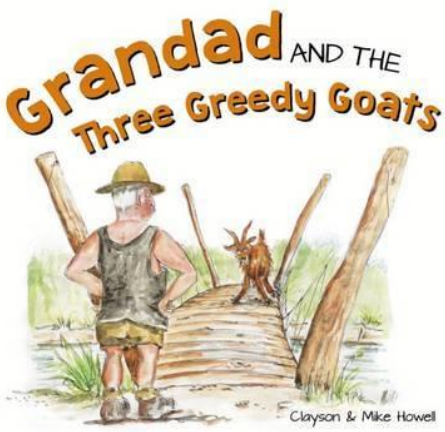
President: Cate Macinnis-Ng

Cate is Senior Lecturer in Ecology in the School of Biological Sciences at the University of Auckland. Cate and her team work on a range of plant ecophysiology projects with a focus on the influence of climate on plant water relations. In 2015, Cate was awarded a Rutherford Discovery Fellowship to study the impact of drought on kauri. Before moving to Auckland in 2010, Cate worked and studied in Sydney. When not working, she enjoys spending time with her husband and kids, swimming, and baking brownies.

Immediate past president: Clayson Howell



Clayson is an ecologist who works for the Department of Conservation in Wellington. His research is national scale weed ecology and control, and he is particularly interested in wilding conifer invasions in montane areas. Clayson was NZES treasurer for 8 years and President from 2015-2017. He lives in Wellington and has written two kids books where pigs and goats are pests not heroes.



Vice president: Tim Curran

Tim is a senior lecturer in ecology at Lincoln University. His research interests lie mainly in the field of plant functional ecology and in using functional traits to understand plant responses to disturbances, such as drought, fire, frost and cyclones. A recent research focus has been to compare the flammability of a range of species by burning samples of them on his 'plant BBQ' (see photo). The aims are to assess whether some plants have evolved to be more flammable, and also provide advice to farmers and fire managers as to which plants might promote or reduce fire spread across the landscape.

Photo credit: David Hollander, Lincoln University.

Secretary: Kiri Wallace

Kiri completed a BSc in animal science and an MSc in wildlife ecology at the University of Delaware in the United States. In 2013 she received the University of Waikato Doctoral Scholarship and moved to New Zealand to study her PhD on urban forest restoration ecology at the University of Waikato. She is a Kiwi/American dual citizen and decided it was time to come live in New Zealand, obviously the superior country.
Today she is happily settled as a post-doctoral scholar in the Environmental Research Institute at the University of Waikato and spends most of her time working with the People, Cities & Nature programme. As of January 2018 she also became secretary for the New Zealand Ecological Society, which she has been a member of since 2013, and received Best Student Poster from at the 2015 Christchurch conference. She hopes to continue developing her research career in community and restoration ecology along with helping people reconnect to nature. She also loves playing ultimate frisbee, reading a good book, and tramping among the beautiful wild places of New Zealand.

Treasurer: Chris Bycroft

Dr Chris Bycroft is a Senior Ecologist and Botanist at Wildland Consultants (Rotorua office) where he has worked since 2000. He works as a botanist in a diverse range of habitats including geothermal, alpine, wetlands, forest, and in the alpine zone. He also undertakes avifauna surveys. Prior to working at Wildlands he completed a Ph.D. in the Botany Department, University of Otago, on the ecology and management of copper tussock grassland. He had four years on the NZES Council (2007–2011) where he was Awards Convenor. Chris co-organised the 2011 NZES conference in Rotorua. He was President of the Society for two years from November 2013 and since then has been the Treasurer. In his spare time he enjoys tramping, running, photography, and visiting wild places throughout New Zealand.

Councillors:

Martin Bader (also webmaster)

Martin is an ecologist with a research focus on plant ecology, plant-insect and plant-pathogen interactions and global change biology with a strong background in modern statistical modelling techniques. He received his PhD from the University of Basel, Switzerland, investigating the effects of elevated atmospheric CO_2 on forest trees. After a postdoctoral stint in Western Australia, he joined the NZ Forest Research Institute (Scion) in a dual role as plant ecologist and biostatistician before joining AUT as a lecturer in ecology in 2017. His recent research focuses on plant water and carbon relations, kauri dieback and the ecology of native and invasive insects.

Bruce Burns

Hi, I'm Bruce Burns, an Associate Professor in Plant Ecology at the University of Auckland. My research portfolio is focussed on understanding mechanisms driving plant community composition and structure, generally working in forests in natural, restoration and urban settings. Within that broad framework, specific projects I am currently undertaking with my brilliant students include the ecology of tree ferns, nest

epiphytes, impacts of kauri dieback on forests, structure and dynamics of urban forests and grasslands, and restoration of retired pastures. I rejoined the New Zealand Ecological Society Council as a councillor at the 2017 conference, but have previously served on the Council for several years, including two years (2010, 2011) as President. I see the Society as crucial to the promotion of ecology as a discipline within New Zealand and as a home and support base for professional ecologists. I hope to maintain and improve the Society as a 'place' for ecologists to network, and improve the services that the Society provides to its members. As a human, I'm keen on family, travel, food (particularly caramel slice), and Spanish guitar (though I can't play).

Simon Moore

Simon is an ecologist with the Department of Conservation's Terrestrial Ecosystems Unit based in Nelson. He provides operational support for biodiversity restoration and ecosystem management. This takes the form of advice to staff, partners and externals on plant ecology, inventory and monitoring, and natural area assessments. He dips his toe into research occasionally. Some recent work has been a collaboration with Project Janszoon in Abel Tasman National Park trialling techniques to reinstate black beech onto coastal headlands.

Rachel Nepia

Rachel is a PhD student at the University of Waikato. Her main research interest is in pollination ecology. Rachel's current research, funded by New Zealand's Biological Heritage NSC, is focused on understanding the role of introduced honeybees in New Zealand submontane forest. As a student herself, Rachel represents the interests of students and early career researchers on the NZES council. Any suggestions or feedback in this area is welcomed and can be directed to ret12@students.waikato.ac.nz.

George Perry (also Scientific Editor of the *New Zealand Journal of Ecology)*

George works in the School of Environment at the University of Auckland. After studying at the University of Canterbury, George moved to the University of Melbourne where his PhD considered how altered fire regimes have affected forest dynamics in New Caledonia. He then worked for four years at King's College London, before returning to New Zealand in 2004. His

research focuses on the spatial dynamics of NZ forest ecosystems, the effects of altered disturbance regimes on forest landscapes, and the environmental transformations that accompanied human settlement of the Pacific.

Angela Simpson (Newsletter editor)

Angela is an ecologist at Wildland Consultants (Rotorua office) where she has worked since 2015. Angela completed a MSc in Biological Science at the University of Waikato. Her thesis investigated how physiological traits of sixty-five native tree species vary across environmental gradients and how this knowledge can improve ecological restoration planning. At Wildlands, Angela works on a range of projects, including vegetation monitoring, vegetation mapping, and restoration planning. After being a member for a few years, Angela offered to be newsletter editor, which is proving to be an enjoyable way to help the society.

Special Issue of New Zealand Journal of Ecology in 2019

New Zealand Journal of Ecology is calling for submissions for a 2019 Special Issue entitled "Mātauranga Māori and shaping ecological futures".

Māori have distinct cultural knowledge, values, and perspectives that establish rights, responsibilities and relationships with flora and fauna. There is increasing recognition from scientists, practitioners, environmental managers, policy makers and others that mātauranga Māori enhances our understanding of ecology and provides valuable perspectives and frameworks to guide research, management and policy development. However, few papers published in the New Zealand Journal of Ecology address and explore these interfaces.

This special issue invites submissions with a focus on mātauranga Māori and how it is informing current and future research and decision-making in ecology. We seek a mix of short (<5000 word) thematic and review-style manuscripts that showcase how mātauranga Māori is shaping ecological research and decision-making. We also invite submissions that provide opinion and share experiences in this field. As such, submissions may not necessarily conform to the usual manuscript structure of the New Zealand Journal of Ecology. We encourage publication of manuscripts with abstracts in te reo Māori and English, and lay summaries in te reo Māori and English.

Papers may (but are not limited to) address one or more of the following topics:

- te ao Māori worldview representations in ecology
- Case studies demonstrating the complementarity of mātauranga Māori with western science, and kaupapa Māori approaches for using it effectively alongside western science
- Strategies for effectively engaging with Māori communities, enhancing Māori voices through collaboration, and in science communication
- Indigenous ecological knowledge

- Māori review of research data and interpretation of findings
- Story as research; how narratives and mātauranga Māori are understood, and history, oral history and histiography as they relate to understandings of mātauranga Māori
- Use of mātauranga within kaitiakitanga-based approaches and practices

The anticipated date of publication is 30 November 2019 and the manuscript submission deadline is 15 March 2019. The guest editorial team currently includes Cilla Wehi, Jacqueline Beggs and Tara McAllister. Please send a title, list of authors and a preliminary abstract which briefly describes your proposed manuscript to the chief guest editor, Cilla Wehi (WehiP@landcareresearch.co.nz) by 31 August 2018.

The guest editors will inform authors by the 30 September 2018 whether their proposed manuscript has been selected for the Special Issue. The invitation to submit a full manuscript does not necessarily guarantee acceptance: manuscripts will be subject to the normal peer review process, and authors will need to meet critical time schedules.

Please contact Cilla Wehi or Tara McAllister (tara.mcallister0@gmail.com) if you have any queries.

NZES award nominations 2018

The following New Zealand Ecological Society awards are now open for nominations:

- Te Tohu Taiao - Award for Ecological Excellence
- Ecology in Action
- Outstanding Publication on New Zealand Ecology
- Honorary Life Membership

Details of the awards and nomination requirements are available on the website at http://newzealandecology.org/awards-grants.

The awards are an opportunity to recognise New Zealand ecologists who have made an outstanding contribution to academic or applied ecology, transfer of ecological knowledge and service to the New Zealand Ecological Society.

Nominations close **Friday 31 August 2018**. Please email all nominations to Tim Curran at awards@newzealandecology.org or Timothy.Curran@lincoln.ac.nz

The Council aims to spread the judging of awards across a range of disciplines and to balance the representation from different institutions and agencies. Please contact awards@newzealandecology.org or Timothy.Curran@lincoln.ac.nz if you can help.

NZES student travel grants 2018

Applications are also open for student travel grants to attend the 2018 NZ Ecological Society conference in Wellington. Applications are due by **Friday 14 September 2018**. Details about the grants can be found here https://newzealandecology.org/awards-grants/student-travel-grants

Please email your application form and accompanying documentation to travelawards@newzealandecology.org

News from across the ditch

The Ecological Society of Australia November bulletin included articles about the values of attending conferences, Australia's draft National Biodiversity Strategy, and a tribute to David Goodall. You can read more online here: https://www.ecolsoc.org.au/files/bulletins/bulletin_june2018.pdf

Auckland Zoo Conservation Fund supports ecology

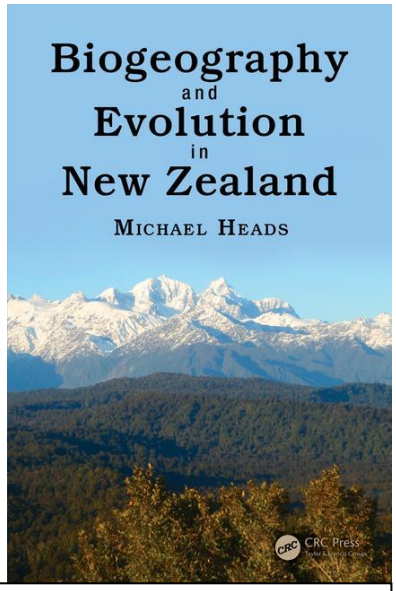
Bridgette Farnworth, University of Waikato

I was awarded some funding from the Auckland Zoo Small Grants Program for a research project and one of the conditions of the award was to make a publicity video. Here is the link for Auckland Zoo's facebook page where the video was shared recently. https://www.facebook.com/AKLZOONZ/videos/10155686921021984/ The hypothesis was that artificial light could deter invasive rodents from entering pest free sanctuaries, like Maungatautari Ecological Island. Related work was also featured in Ecotones, article 4.

The Auckland Zoo Conservation Fund supports conservation efforts in New Zealand and overseas. The Auckland Zoo Conservation Fund Small Grants Programme exists to help provide relatively small levels of funding for ongoing projects or pilot programmes with clear conservation value. More information on this funding can be found here: https://www.aucklandzoo.co.nz/get-involved/conservation-fund

Book review: Biogeography and Evolution in New Zealand

Bill Lee



Michael J. Heads 2017. Biogeography and Evolution in New Zealand. CRC Biogeography Series, Taylor and Francis Group. 635 pp. https://www.crcpress.com/Biogeography-and-Evolution-in-New-Zealand/Heads/p/book/9781315368177

I hesitated to write a few comments about Michael Heads's latest book on biogeography and evolution in New Zealand because I have never really understood panbiogeography, although I was aware of the debates about approaches to biogeography that surfaced in New Zealand late last century. However, I am intensely interested in the evolution, biogeography and ecology of our biota and will read anything that attempts to explain the patterns and features we see today.

The book is substantial, comprising 17 chapters and 635 pages. It begins with an introduction to the spatial basis of biogeography and evolutionary timelines before providing an extensive account of New Zealand geology. This is followed by an introduction to New Zealand biota, and then more detailed regional accounts of northern New Zealand and southern New Zealand, including the Chatham Islands, Stewart Island, the northern South Island, and regions adjoining the Alpine Fault. The next three chapters are case studies focusing on the age, origin and diversification of various plant and animal groups. The final chapters cover aspects of evolutionary ecology, combining detailed accounts of the morphological types and shifts of various plants and animals in New Zealand. The final chapter revisits the centre of origin concept, and how a panbiogeographic approach might influence conservation.

I enjoyed reading this book, for several reasons. For a start, it contains a huge compilation of distributional information for New Zealand, and elsewhere, across a broad range of taxa, deriving explanations to explain current geographical ranges and overlaps. In his search for patterns, Heads takes the full range of organisms and where they live seriously, crossing the traditional biotic boundaries observed by many researchers. He also covers interesting issues relating to how plants and animals evolved in New Zealand in relation to our past and present geography, geology and climate history. In this he includes some of the distinctive features we have here, such as animal flightlessness and plant architecture. This is refreshing and places current questions in an appropriate time frame and context. Heads brings a clear, uncompromising polemic to these issues, especially in terms of the foundational and enduring importance of geology, and the minor role for long-distance dispersal-driven speciation and ecology generally, in the origin of lineages and community assembly. Finally, in his quest for coherence, the author sees history and

occupancy as invariably linked, forcing neo-ecologists to test the assumptions we make about range limits, environmental correlations and recent movements.

The topics Heads covers are deeply interesting and relevant to understanding the origin and distribution of life in New Zealand. His is a thought-provoking book with a clear perspective that sees limited relevance for ecology and evolution in the diversification of life. However, at times ideology seems to override the data, and in places explanations are frankly incomprehensible. Many New Zealand researchers are critiqued at some point for their assumptions and interpretations. For Heads, biotic distributions form the process of origination, and it is unclear what additional - if any - mechanisms he acknowledges. On this basis, niche specialisation should prevail over niche expansion in most lineages, but both appear to be important in the plant radiations I am familiar with in New Zealand.

I think ecologists need to acknowledge the importance of history, but many will find it hard to accept Heads's insistence that lineages are hard-wired spatially to particular geologies, not least because of the occasional success of non-native plant species in foreign, natural, non-modified ecosystems. In New Zealand, distributional limits often coincide with geological boundaries or faults, as these are both widespread and frequently parallel with climate types or gradients. Heads argues that a local biota emerges with a particular geology, but this is impossible to sustain, in my view, over epochs and through tectonic and environmental change, especially when some lineages appear quite young. In my view Heads takes ideas that may be true in one context and extends them to cover all eventualities. The mantra that Earth and Life systems evolve together is clearly correct, but the idea that geological legacy effects extend from the Mesozoic across all terranes is, I believe, false. His argument that species may be much older than the Pleistocene, or even than what current molecular phylogenies indicate, is likely correct for some groups, but certainly not all.

I am comfortable with panbiogeography having an exposure in peer-reviewed scientific journals. Testable, evidence-based views should be welcomed and evaluated as part of the hypothesis-testing evolution of science. My perspective is that some of the ideas Heads advances are valid, some have been refuted, some appear outside the realm of science, and some are potentially testable in the years ahead. If you read science books to consolidate conventional orthodoxy then I suspect this is not a book for you. If you enjoy natural history, like to debate perspectives, and want some new ideas to test, then you may find this book informative.

Other recent publications on New Zealand ecology

Bruce Burns

Apologies if I have missed your publication in my search. If I have, please send a citation to b.burns@auckland.ac.nz so I can include it in the next Ecotones.

Addison SL, Walbert K, Smaill SJ, Menkis A 2018. Edaphic properties related with changes in diversity and composition of fungal communities associated with *Pinus radiata*. Pedobiologia 66: 43-51.

Andrew SC, Awasthy M, Bolton PE, Rollins LA, Nakagawa S, Griffith SC 2018. The genetic structure of the introduced house sparrow populations in Australia and New Zealand is consistent with historical descriptions of multiple introductions to each country. Biological Invasions 20: 1507-1522.
Ausseil A-GE, Dymond JR, Newstrom L 2018. Mapping floral resources for honey bees in New Zealand at the catchment scale. Ecological Applications 28: 1182-1196.
Bartel RD, Sheppard JL, Lovas-Kiss Á, Green AJ 2018. Endozoochory by mallard in New Zealand: What seeds are dispersed and how far? PeerJ, 2018 (5), art. no. e4811.
Bayeur NM, Carpenter KL, Hughes NM 2018. Shade tolerance: an additional factor affecting the distribution of mountain beech and silver beech in New Zealand? Trees - Structure and Function 32: 539-547.
Beadel S, Shaw W, Bawden R, Bycroft C, Wilcox F, McQueen J, Lloyd K 2018. Sustainable management of geothermal vegetation in the Waikato Region, New Zealand, including application of ecological indicators and new monitoring technology trials. Geothermics 73: 91-99.
Bernes C, Macura B, Jonsson BG, Junninen K, Müller J, Sandström J, Lõhmus A, Macdonald E 2018. Manipulating ungulate herbivory in temperate and boreal forests: Effects on vegetation and invertebrates. A systematic review. Environmental Evidence 7 (1): art. no. 13.
Biddick M, Burns KC 2018. Phenotypic trait matching predicts the topology of an insular plant-bird pollination network. Integrative Zoology 13: 339-347.
Borrelle SB, Boersch-Supan PH, Gaskin CP, Towns DR 2018. Influences on recovery of seabirds on islands where invasive predators have been eradicated, with a focus on Procellariiformes. ORYX 52: 346-358.
Bourdôt GW, Saville DJ 2018. *Nassella trichotoma* – plant growth rates and effects of timing of grubbing on populations in North Canterbury grassland. New Zealand Journal of Agricultural Research, in press.
Brar S, Tabima JF, McDougal RL, Dupont P-Y, Feau N, Hamelin RC, Panda P, LeBoldus JM, Grünwald NJ, Hansen EM, Bradshaw RE, Williams NM 2018. Genetic diversity of *Phytophthora pluvialis*, a pathogen of conifers, in New Zealand and the west coast of the United States of America. Plant Pathology 67: 1131-1139.
Bridgeman B, Morgan-Richards M, Wheeler D, Trewick SA 2018. First detection of *Wolbachia* in the New Zealand biota. PLoS ONE 13 (4): art. no. e0195517.
Broadbent A, Stevens CJ, Peltzer DA, Ostle NJ, Orwin KH 2018. Belowground competition drives invasive plant impact on native species regardless of nitrogen availability. Oecologia 186: 577-587.
Brown MBGJ, Gemmill CEC, Miller S, Wehi PM 2018. Diet selectivity in a terrestrial forest invertebrate, the Auckland tree wētā, across three habitat zones. Ecology and Evolution 8: 2495-2503.
Canning AD, Death RG, Gardner EM 2018. The effect of forest canopy and flood disturbance on New Zealand stream food web structure and robustness. Austral Ecology 43: 352-358.
Cao J, Wu W, Liu Y, Hu Q, Chen D, Xiang M, Zhou Q 2018. Change in cultivated land use pattern in Oceania based on GlobeLand30. Scientia Agricultura Sinica 51: 1156-1166.
Carter AL, Kearney MR, Hartley S, Porter WP, Nelson NJ 2018. Geostatistical interpolation can reliably extend coverage of a very high-resolution model of temperature-dependent sex determination. Journal of Biogeography 45: 652-663.
Carter SN, Miller S, Meyer SJ, Gemmill CEC 2018. A new species of *Pittosporum* described from the Poor Knights Islands, Northland, Aotearoa/New Zealand. Systematic Botany 43: 633-643.
Clark LL, Shaw RC 2018. The ontogeny of food-caching behaviour in New Zealand robins (*Petroica longipes*). Behavioural Processes 151: 27-33.
Cole TL, Wood JR 2018. The ancient DNA revolution: the latest era in unearthing New Zealand's faunal history. New Zealand Journal of Zoology 45: 91-120.

Collins KE, Febria CM, Warburton HJ, Devlin HS, Hogsden KL, Goeller BC, McIntosh AR, Harding JS 2018. Evaluating practical macrophyte control tools on small agricultural waterways in Canterbury, New Zealand. New Zealand Journal of Marine and Freshwater Research, in press.

Cowie BW, Venter N, Witkowski ETF, Byrne MJ, Olckers T 2018. A review of *Solanum mauritianum* biocontrol: prospects, promise and problems: A way forward for South Africa and globally. BioControl 63: 475-491.

Davies K, Murchie AA, Kerr V, Lundquist C 2018. The evolution of marine protected area planning in Aotearoa New Zealand: Reflections on participation and process. Marine Policy 93: 113-127.

Dencer-Brown AM, Alfaro AC, Milne S, Perrott J 2018. A review on biodiversity, ecosystem services, and perceptions of New Zealand's mangroves: Can we make informed decisions about their removal? Resources 7 (1): art. no. 23.

Desmond MJ, Suárez-Jiménez R, Nelson WA, Hepburn CD 2018. Epifaunal community structure within southern New Zealand kelp forests. Marine Ecology Progress Series 596: 71-81.

Donovan GH, Gatziolis D, Longley I, Douwes J 2018. Vegetation diversity protects against childhood asthma: Results from a large New Zealand birth cohort. Nature Plants 4: 358-364.

Duggan IC, Champion PD, MacIsaac HJ 2018. Invertebrates associated with aquatic plants bought from aquarium stores in Canada and New Zealand. Biological Invasions, in press.

Efford MG, Hunter CM 2018. Spatial capture-mark-resight estimation of animal population density. Biometrics 74: 411-420.

Esperón-Rodríguez M, Curran TJ, Camac JS, Hofmann RW, Correa-Metrio A, Barradas VL 2018. Correlation of drought traits and the predictability of osmotic potential at full leaf turgor in vegetation from New Zealand. Austral Ecology 43: 397-408.

Fea M, Holwell G 2018. Combat in a cave-dwelling wētā (Orthoptera: Rhaphidophoridae) with exaggerated weaponry. Animal Behaviour 138: 85-92.

Fea M, Holwell GI 2018. Exaggerated male legs increase mating success by reducing disturbance to females in the cave wētā *Pachyrhamma waitomoensis*. Proceedings of the Royal Society B: Biological Sciences 285: art. no. 20180401.

Fischer JH, Debski I, Miskelly CM, Bost CA, Fromant A, Tennyson AJD, Tessler J, Cole R, Hiscock JH, Taylor GA, Wittmer HU 2018. Analyses of phenotypic differentiations among South Georgian Diving Petrel (*Pelecanoides georgicus*) populations reveal an undescribed and highly endangered species from New Zealand. PLoS ONE 13 (6), art. no. e0197766.

Franks VR, Thorogood R 2018. Older and wiser? Age differences in foraging and learning by an endangered passerine. Behavioural Processes 148: 1-9.

French RK, Muller CG, Chilvers BL, Battley PF 2018. Behavioural consequences of human disturbance on subantarctic Yellow-eyed Penguins *Megadyptes antipodes*. Bird Conservation International, in press.

Frericks J, Munkacsi A, Ritchie P, Luo Y-B, Lehnebach CA 2018. Phylogenetic affinities and in vitro seed germination of the threatened New Zealand orchid *Spiranthes novae-zelandiae*. New Zealand Journal of Botany 56: 91-108.

Fuller IC, Death RG 2018. The science of connected ecosystems: What is the role of catchment-scale connectivity for healthy river ecology? Land Degradation and Development 29: 1413-1426.

Gedye KR, Fremaux M, Garcia-Ramirez JC, Gartrell BD 2018. A preliminary survey of *Chlamydia psittaci* genotypes from native and introduced birds in New Zealand. New Zealand Veterinary Journal 66: 162-165.

Hand SJ, Beck RMD, Archer M, Simmons NB, Gunnell GF, Scofield RP, Tennyson AJD, De Pietri VL, Salisbury SW, Worthy TH 2018. A new, large-bodied omnivorous bat (Noctilionoidea: Mystacinidae) reveals lost morphological and ecological diversity since the Miocene in New Zealand. Scientific Reports 8 (1): art. no. 235.

Heberling JM, Mason NWH 2018. Are endemics functionally distinct? Leaf traits of native and exotic woody species in a New Zealand forest. PLoS ONE 13 (5): art. no. e0196746.
Horikoshi C, Battley PF, Minot EO 2018. Annual survival estimates and risk of fluoroacetate (1080) secondary poisoning for New Zealand falcons (*Falco novaeseelandiae*) in a managed exotic forest. Wildlife Research 45: 155-163.
Howlett BG, Lankin-Vega GO, Jesson LK 2018. *Bombus terrestris*: A more efficient but less effective pollinator than *Apis mellifera* across surveyed white clover seed fields. New Zealand Journal of Crop and Horticultural Science, in press.
Hua X, Ohlemüller R 2018. Geographic versus environmental space: Patterns of potential native and exotic woody propagule pressure on New Zealand's indigenous grasslands. New Zealand Geographer, in press.
Ireland KB, Bulman L, Hoskins AJ, Pinkard EA, Mohammed C, Kriticos DJ 2018. Estimating the potential geographical range of *Sirex noctilio*: Comparison with an existing model and relationship with field severity. Biological Invasions, in press.
Izadi S, Johnson M, de Soto NA, Constantine R 2018. Night-life of Bryde's whales: Ecological implications of resting in a baleen whale. Behavioral Ecology and Sociobiology 72 (5): art. no. 78.
Jenks GK 2018. Restoring the natural functional capacity of coastal dune ecosystems: Utilising research records for New Zealand littoral refurbishment as a proxy for analogous global responses. Journal of Coastal Conservation, in press.
Lafferty KD, Hopkins SR 2018. Unique parasite aDNA in moa coprolites from New Zealand suggests mass parasite extinctions followed human-induced megafauna extinctions. Proceedings of the National Academy of Sciences of the United States of America, 115: 1411-1413.
Leduc D, Rowden AA 2018. Not to be sneezed at: Does pollen from forests of exotic pine affect deep oceanic trench ecosystems? Ecosystems 21: 237-247.
Lee F, Simon KS, Perry GLW 2018. Prey selectivity and ontogenetic diet shift of the globally invasive western mosquitofish (*Gambusia affinis*) in agriculturally impacted streams. Ecology of Freshwater Fish 27: 822-833.
Li Y, Stift M, van Kleunen M 2018. Admixture increases performance of an invasive plant beyond first-generation heterosis. Journal of Ecology 106: 1595-1606.
Lusk CH, Clearwater MJ, Laughlin DC, Harrison SP, Prentice IC, Nordenstahl M, Smith B 2018. Frost and leaf-size gradients in forests: Global patterns and experimental evidence. New Phytologist 219: 565-573.
Malone LA, Burgess EPJ, Barraclough EI, Poulton J, Todd JH 2018. Invertebrate biodiversity in apple orchards: Agrichemical sprays as explanatory variables for inter-orchard community differences. Agricultural and Forest Entomology 20: 380-389.
Marden M, Lambie S, Phillips C 2018. Biomass and root attributes of eight of New Zealand's most common indigenous evergreen conifer and broadleaved forest species during the first 5 years of establishment. New Zealand Journal of Forestry Science 48: art. no. 9.
Massaro M, Chick A, Kennedy ES, Whitsed R 2018. Post-reintroduction distribution and habitat preferences of a spatially limited island bird species. Animal Conservation 21: 54-64.
McCulloch GA, Waters JM 2018. Does wing reduction influence the relationship between altitude and insect body size? A case study using New Zealand's diverse stonefly fauna. Ecology and Evolution 8: 953-960.
McCulloch GA, Waters JM 2018. Testing for seasonality in alpine streams: How does altitude affect freshwater insect life cycles? Freshwater Biology 63: 483-491.
McNab BK, O'Donnell C 2018. The behavioral energetics of New Zealand's bats: Daily torpor and hibernation, a continuum. Comparative Biochemistry and Physiology - Part A : Molecular and Integrative Physiology 223: 18-22.

Meek PD, Shorter K, Falzon G 2018. Do lethal trap devices threaten foot-hold trap capture efficacy? International Journal of Pest Management, in press.
Meffin R, Duncan RP, Hulme PE 2018. Testing weed risk assessment paradigms: Intraspecific differences in performance and naturalisation risk outweigh interspecific differences in alien *Brassica*. Journal of Applied Ecology 55: 516-525.
Méndez V, Wood JR, Butler SJ 2018. Resource diversity and provenance underpin spatial patterns in functional diversity across native and exotic species. Ecology and Evolution 8: 4409-4421.
Miller CM, Barratt BIP, Dickinson KJM, Lord JM 2018. Are introduced plants a threat to native pollinator services in montane-alpine environments? Alpine Botany, in press.
Murray NJ, Marra PP, Fuller RA, Clemens RS, Dhanjal-Adams K, Gosbell KB, Hassell CJ, Iwamura T, Melville D, Minton CDT, Riegen AC, Rogers DI, Woehler EJ, Studds CE 2018. The large-scale drivers of population declines in a long-distance migratory shorebird. Ecography 41: 867-876.
Newnham R, Lowe DJ, Gehrels M, Augustinus P 2018. Two-step human-environmental impact history for northern New Zealand linked to late-Holocene climate change. Holocene, in press.
Ocampo-Ariza C, Bufford JL, Hulme PE, Champion PD, Godsoe W 2018. Strong fitness differences impede coexistence between an alien water fern (*Azolla pinnata* R. Br.) and its native congener (*Azolla rubra* R. Br.) in New Zealand. Biological Invasions, in press.
Oliverio AM, Power JF, Washburne A, Cary SC, Stott MB, Fierer N 2018. The ecology and diversity of microbial eukaryotes in geothermal springs. ISME Journal, in press.
Orchard DSE, Hickford MJH, Schiel DR 2018. Use of artificial habitats to detect spawning sites for the conservation of *Galaxias maculatus*, a riparian-spawning fish. Ecological Indicators 91: 617-625.
Padullés Cubino J, Buckley HL, Day NJ, Pieper R, Curran TJ 2018. Community-level flammability declines over 25 years of plant invasion in grasslands. Journal of Ecology 106: 1582-1594.
Paynter Q, Fowler SV, Groenteman R 2018. Making weed biological control predictable, safer and more effective: Perspectives from New Zealand. BioControl 63: 427-436.
Phillips C, Marden M, Basher LR 2018. Geomorphology and forest management in New Zealand's erodible steeplands: An overview. Geomorphology 307: 107-121.
Pietras M, Litkowiec M, Gołębiewska J 2018. Current and potential distribution of the ectomycorrhizal fungus *Suillus lakei* ((Murrill) A.H. Sm. & Thiers) in its invasion range. Mycorrhiza, in press.
Pohe SR, Winterbourn MJ, Goldstien SJ, Ball OJ-P, Harding JS 2018. Distribution, nymphal habitat, genetic structure and conservation of the New Zealand mayfly *Isothraulus abditus* (Insecta: Ephemeroptera) and a description of its subimago. New Zealand Journal of Zoology, in press.
Priyadarshani N, Castro I, Marsland S 2018. The impact of environmental factors in birdsong acquisition using automated recorders. Ecology and Evolution 8: 5016-5033.
Purushotham N, Jones E, Monk J, Ridgway H 2018. Community structure of endophytic actinobacteria in a New Zealand native medicinal plant *Pseudowintera colorata* (horopito) and their influence on plant growth. Microbial Ecology, in press.
Quarrell SR, Arabi J, Suwalski A, Veuille M, Wirth T, Allen GR 2018. The invasion biology of the invasive earwig, *Forficula auricularia* in Australasian ecosystems. Biological Invasions 20: 1553-1565.
Ramón-Laca A, White DJ, Weir JT, Robertson HA 2018. Extraction of DNA from captive-sourced feces and molted feathers provides a novel method for conservation management of New Zealand kiwi (*Apteryx* spp.). Ecology and Evolution 8: 3119-3130.

Rastandeh A, Brown DK, Pedersen Zari M 2018. Site selection of urban wildlife sanctuaries for safeguarding indigenous biodiversity against increased predator pressures. Urban Forestry and Urban Greening 32: 21-31.
Rastandeh A, Pedersen Zari M 2018. A spatial analysis of land cover patterns and its implications for urban avifauna persistence under climate change. Landscape Ecology 33: 455-474.
Rastandeh A, Pedersen Zari M, Brown DK 2018. Land cover change and management implications for the conservation of a seabird in an urban coastal zone under climate change. Ecological Management and Restoration 19: 147-155.
Rastandeh A, Pedersen Zari M, Brown DK, Vale R 2018. Utilising exotic flora in support of urban indigenous biodiversity: Lessons for landscape architecture. Landscape Research 43: 708-720.
Rebergen A, Glenny DS, Frogley K, Rolfe JR, de Lange PJ 2018. *Riccia cavernosa* (Ricciaceae): A new addition to the liverwort flora of New Zealand. New Zealand Journal of Botany 56: 84-90.
Redekop P, Gross EM, Nuttens A, Hofstra DE, Clayton JS, Hussner A 2018. *Hygraula nitens*, the only native aquatic caterpillar in New Zealand, prefers feeding on an alien submerged plant. Hydrobiologia 812: 13-25.
Riekkola L, Zerbini AN, Andrews O, Andrews-Goff V, Baker CS, Chandler D, Childerhouse S, Clapham P, Dodémont R, Donnelly D, Friedlaender A, Gallego R, Garrigue C, Ivashchenko Y, Jarman S, Lindsay R, Pallin L, Robbins J, Steel D, Tremlett J, Vindenes S, Constantine R 2018. Application of a multi-disciplinary approach to reveal population structure and Southern Ocean feeding grounds of humpback whales. Ecological Indicators 89: 455-465.
Roper MM, Harmer AMT, Brunton DH 2018. Developmental changes in song production in free-living male and female New Zealand bellbirds. Animal Behaviour 140: 57-71.
Ross PM, Beentjes MP, Cope J, de Lange WP, McFadgen BG, Redfearn P, Searle B, Skerrett M, Smith H, Smith S, Te Tuhi J, Tamihana J, Williams JR 2018. The biology, ecology and history of toheroa (*Paphies ventricosa*): A review of scientific, local and customary knowledge. New Zealand Journal of Marine and Freshwater Research 52: 196-231.
Sikes BA, Bufford JL, Hulme PE, Cooper JA, Johnston PR, Duncan RP 2018. Import volumes and biosecurity interventions shape the arrival rate of fungal pathogens. PLoS Biology 16 (5): art. no. e2006025.
Smale MC, Wiser SK, Bergin MJ, Fitzgerald NB 2018. A classification of the geothermal vegetation of the Taupō Volcanic Zone, New Zealand. Journal of the Royal Society of New Zealand 48: 21-38.
Smallfield BM, Joyce NI, van Klink JW 2018. Developmental and compositional changes in *Leptospermum scoparium* nectar and their relevance to mānuka honey bioactives and markers. New Zealand Journal of Botany 56: 183-197.
Smith BJ, Storey RG 2018. Egg characteristics and oviposition behaviour of the aquatic insect orders Ephemeroptera, Plecoptera and Trichoptera in New Zealand: A review. New Zealand Journal of Zoology, in press.
Sriram A, Roe W, Booth M, Gartrell B 2018. Lead exposure in an urban, free-ranging parrot: Investigating prevalence, effect and source attribution using stable isotope analysis. Science of the Total Environment 634: 109-115.
Stavert JR, Pattemore DE, Bartomeus I, Gaskett AC, Beggs JR 2018. Exotic flies maintain pollination services as native pollinators decline with agricultural expansion. Journal of Applied Ecology 55: 1737-1746.
Stevenson A, Davies JS, Williams A, Althaus F, Rowden AA, Bowden DA, Clark MR, Mitchell FJG 2018. Echinoid associations with coral habitats differ with taxon in the deep sea and the influence of other echinoids, depth, and fishing history on their distribution. Deep-Sea Research Part I: Oceanographic Research Papers 133: 27-38.

Sultan A, Tate JA, de Lange PJ, Glenny D, Ladley JJ, Heenan P, Robertson AW 2018. Host range, host specificity, regional host preferences and genetic variability of *Korthalsella* Tiegh. (Viscaceae) mistletoes in New Zealand. New Zealand Journal of Botany 56: 127-162.

Tomasetto F, Cianciullo S, Reale M, Attorre F, Olaniyan O, Goldson SL 2018. Breakdown in classical biological control of Argentine stem weevil: A matter of time. BioControl, in press.

Travers T, van Den Hoff J, Lea M-A, Carlyon K, Reisinger R, de Bruyn PJN, Morrice M 2018. Aspects of the ecology of killer whale (*Orcinus orca* Linn.) groups in the near-shore waters of sub-antarctic Macquarie Island. Polar Biology, in press.

Turner BL, Wells A, Andersen KM, Condron LM 2018. Consequences of the physical nature of the parent material for pedogenesis, nutrient availability, and succession in temperate rainforests. Plant and Soil 423: 533-548.

Van Der Geer AAE 2018. Changing invaders: Trends of gigantism in insular introduced rats. Environmental Conservation, in press.

van Etten ML, Sukkaewnmanee P, Tate JA, Robertson AW 2018. Pollinator service affects quantity but not quality of offspring in a widespread New Zealand endemic tree species. Conservation Genetics, in press.

Verhaegen G, McElroy KE, Bankers L, Neiman M, Haase M 2018. Adaptive phenotypic plasticity in a clonal invader. Ecology and Evolution 8: 4465-4483.

Viswam JP, Lee CK, Morgan HW, McDonald IR 2018. Laboratory rearing of huhu, *Prionoplus reticularis* (Cerambycidae): Insights into the gut microbiome. New Zealand Journal of Zoology, in press.

Waite DW, Dsouza M, Sekiguchi Y, Hugenholtz P, Taylor MW 2018. Network-guided genomic and metagenomic analysis of the faecal microbiota of the critically endangered kakapo. Scientific Reports 8 (1): art. no. 8128.

Walker LA, Holwell GI 2018. The role of exaggerated male chelicerae in male-male contests in New Zealand sheet-web spiders. Animal Behaviour 139: 29-36.

Wardle DA, Ghani A 2018. A tale of two theories, a chronosequence and a bioindicator of soil quality. Soil Biology and Biochemistry 121: A3-A7.

Wech J, Suren A, Brady M, Kilroy C 2018. The effect of willow control using a glyphosate formulation on aquatic invertebrates within a New Zealand wetland. New Zealand Journal of Marine and Freshwater Research 52: 16-41.

Wehi PM, Cox MP, Roa T, Whaanga H 2018. Human perceptions of megafaunal extinction events revealed by linguistic analysis of indigenous oral traditions. Human Ecology in press.

West AG, King CM 2018. Variation in mandible shape and body size of house mice *Mus musculus* in five separate New Zealand forest habitats. New Zealand Journal of Zoology 45: 136-153.

Whitaker T, Chapple DG, Hitchmough RA, Lettink M, Patterson GB 2018. A new species of scincid lizard in the genus *Oligosoma* (Reptilia: Scincidae) from the mid-Canterbury high country, New Zealand. Zootaxa 4377: 269-279.

Wicaksono WA, Sansom CE, Eirian Jones E, Perry NB, Monk J, Ridgway HJ 2018. Arbuscular mycorrhizal fungi associated with *Leptospermum scoparium* (mānuka): Effects on plant growth and essential oil content. Symbiosis 75: 39-50.

Wilcox M, Kelly S, Jeffs A 2018. Ecological restoration of mussel beds onto soft-sediment using transplanted adults. Restoration Ecology 26: 581-590.

Wiser SK, De Cáceress M 2018. New Zealand's plot-based classification of vegetation. Phytocoenologia 48: 153-161.

Young LM, Kelly D 2018. Effects of seed dispersal and microsite features on seedling establishment in New Zealand fleshy-fruited perennial mountain plants. Austral Ecology, in press.

Zito S, Aguilar G, Vigeant S, Dale A 2018. Assessment of a targeted trap-neuter-return pilot study in Auckland, New Zealand. Animals 8 (5): art. no. 73.

Noticeboard and upcoming conferences

NZES conference 2018

The next NZES conference will be held in Wellington, from 26th to 29th November 2018, at Victoria University of Wellington. A student day will be run on Sunday 25th November. Conference talks will occur from Monday to Wednesday, and on Thursday 29th there will be a selection of field trips to local and regional sites of ecological interest Members who would like to suggest symposium topics are encouraged to email Stephen.Hartley@vuw.ac.nz or chowell@doc.govt.nz including names of likely contributors. The website for submission of abstracts and early bird registrations will open on 9th August.

2nd International Wildlife Reintroduction Conference

Lincoln Park Zoo (Chicago, Illinois, USA) in partnership with the International Union for the Conservation of Nature's (IUCN) Reintroduction Specialist Group (RSG) will host the 2nd International Wildlife Reintroduction Conference during Nov. 13-16, 2018. The full program for the meeting is now available. Please visit https://www.reintro.org/schedule/ to view the schedule of speakers as well as to access the abstracts for the talks and e-posters that will be presented. In addition to the conference there are limited spots available for a pre-conference workshop (IUCN RSG Training for Effective Conservation Translocations), and two post-conference meetings (Reintroducing Migratory Birds Symposium, and PopLink: A data management tool for reintroduction programs Workshop) that are also available for registration. The early bird registration rates end 6 July 2018.

Please visit www.reintro.org for more information.

2ND INTERNATIONAL
WILDLIFE
REINTRODUCTION
CONFERENCE

National Wetland Restoration Symposium Registration now open

Every two years, the National Wetland Trust organises a gathering of community groups, landowners, iwi, scientists, wetland managers and students who are interested in sharing and learning about wetland restoration. Usually spread over three days, the symposia include field trips, practical training opportunities, soapbox sessions and presentations from a wide range of enthusiasts and professionals.

The next symposium will be held in Napier from 26-28 September 2018, at the Napier War Memorial Conference Centre. The format will comprise two days of presentations and workshops and a whole day field trip on the last day, returning to the venue by 4 pm.

The theme is Living Wetlands in the Living Landscape.

Keynote speakers include renowned Australian ecologist Matt Herring and Fish and Game CEO Martin Taylor. Working on more than 850 farms in the Murray-Darling Basin, Matt Herring has become a strong advocate for working alongside farmers to unleash the conservation potential of private land. He is passionate about the ideal of producing food and conserving biodiversity at the same time.

Opening of Prime Minister's Science Prizes

Entries for the 2018 Prime Minister's Science Prizes are now open, with New Zealand's most talented established and emerging scientists, science teachers and science communicators able to apply for awards worth a combined value of $1 million across five categories.

The New Zealand Government introduced The Prime Minister's Science Prizes in 2009 as a way of raising the profile and prestige of science among New Zealanders and to increase its profile as a key contributor to economic wealth and to highlight its role in solving future challenges through innovation.

The major prize, worth $500,000, is presented to an individual or team whose research has had significant impact in New Zealand or internationally. Previous winners have been recognised for research in areas ranging from health to climate change to new energy technologies.

To find out more and to lodge entries visit: www.pmscienceprizes.org.nz

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