NEW ZEALAND ECOLOGICAL SOCIETY

Newsletter

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Mana painting by Dr. Julia Schmack, former PhD student at the Centre for Biodiversity and Biosecurity, University of Auckland.
About the painting: The Tūī was the first bird to greet me on my arrival in New Zealand. I was intrigued by its erratic song, the vigorous flapping of its wings and the silly little ruffle on its chest – like an excited William Shakespeare. More than four years and a PhD later, I feel like I got to know this bird a lot better, as well as myself: its adaptability to new resources, the determination and perseverance to stand its ground, and the eagerness to enjoy the abundance of good times. Arohanui.

Contents

From the Editor

Kia ora koutou,

Welcome to the first NZES newsletter of 2021! I'm still trying to figure out how it is already almost the end of March – it's been a busy and productive year so far for the NZES Council.

I've enjoyed compiling this newsletter – it is very colourful and full of photos, starting with the photo of Julia Schmack's painting of a tūī and finishing with a photo of Zachary Carter, a PhD student at the University of Auckland. This newsletter features an Illustrate Ecology contribution from John Flux, Ecotones from Bruce Burns and Cate Macinnis-Ng, as well as a call for contributions to a new book. If you are keen to be part of the NZES's mentoring scheme, read on for more information and don't forget to sign up.

With that, I give you the 174th NZES newsletter.

Ngā mihi,
Rowan

News from NZES council

Kia ora koutou and happy New Year! Council had its first meeting of 2021 in February. It was originally planned to be one of our two face-to-face meetings of the year (the other being the conference), but the minor covid outbreak in Auckland prevented that and it was back to our old friend Zoom.

Things are busy on Council; what follows is just a taste of our current activities. Our new Hot Topics editors, Anna Probert and Bridgette Farnworth, have hit the ground running and have commissioned several new Hot Topics pieces. Keep an eye out for new articles on invasive bees in NZ and plastic pollution, among others. Kate McAlpine has taken on the role of Mentoring Scheme Coordinator to continue the work of the scheme's founder, Cate Macinnis-Ng. Kate will provide more information on the scheme, including a call for participants, later in the year. Led by Simon Moore, the Council is also setting its priorities for the year based on our progress against the Strategic Plan.

The dates for our 2021 conference in Kerikeri have been set: 29 November to 1 December. The organising committee led by Olly Ball and Dai Morgan have been hard at work and more details will be forthcoming. Jenn Sheppard, our Sustainability Officer, is working with the organisers to continue to improve on our sustainability efforts at the conference.

Finally, we bring news of the sudden passing of Steve Wratten, professor of ecology at Lincoln University. Steve arrived in New Zealand from England in 1993 and was well known for his work on ecosystem services and ecological entomology, and his mentoring of many postgraduate students.

Tim Curran

NZES Mentoring Scheme 2021

Kate McAlpine

The New Zealand Ecological Society mentoring scheme is kicking off for 2021. We've been running the mentoring scheme for a couple of years now, and the feedback has been very positive. The aim of the scheme is to connect members throughout the country and give everyone an opportunity to share their experiences.

We're looking for mentors and mentees. Mentees can be students or early career ecologists (typically within 7 years of completing their highest qualification allowing for career gaps) and mentors can be anyone working in ecology. Mentees must be current members of NZES and mentors are encouraged to join or renew their membership. We are always short on male mentors, so guys, please consider signing up.

Some people can be both a mentor and a mentee, for instance, a postdoc could mentor a student and seek mentoring from a more senior ecologist. Mentoring pairs will be matched based on experience of the mentor and needs of the mentee. Mentoring topics include balancing work and family, writing a paper and getting it published, developing a CV and any other topics pairs decide they would like to cover. In response to feedback, we will be providing some ideas for pairs to cover in their meetings.

The scheme is run online and we generally suggest mentoring pairs meet every four to six weeks via Skype or Zoom between the months of May and November. People who have taken part in the scheme previously are welcome to apply again this year. We will do our best to accommodate everyone.

If you are interested in being part of the scheme, please apply using this google form by April 30th. Please fill in the form twice if you would like to be both a mentor and a mentee.
https://docs.google.com/forms/d/e/1FAIpQLSfJ6LYxjDfdod-73q5lWIlmsk18IcdQxip4s1QFgjDwH-z9wQ/viewform?vc=0&c=0&w=1&flr=0

If you have any questions, please email the mentoring scheme coordinator Kate McAlpine - kmcalpine@doc.govt.nz

Illustrate Ecology

John Flux

Intelligent dandelions

Not being a botanist, I was surprised how soon dandelions adapted to my new "No mow" lawns. After a year the mixed grasses varied from 50 mm *Poa* swards to 1 m cocksfoot clumps. Dandelion flowers opened for 2-4 days at the height needed for pollinators: bumble bees (*Bombus terrestris*), hoverflies (mainly *Melangyna novaezelandia* and *Eristalis nemorum*), and a few honey bees. Then the flowers closed and the stems (scapes) doubled in height over 7-11 days to give the fluffy seeds clearance to blow away (1-2 days). These stages are shown by the single plant on the left. For the illustration, each flower with a pinch of vegetation came from the first 10 plants picked at random; the

horizontal scape came from the plant on the right. The 10 tallest flowered at 467 mm (370-600), and seeded at 757 mm (660-930).

Ecotones – New ecological research

Bruce Burns and Cate Macinnis-Ng, University of Auckland

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

1. Identification of the (not harmless!) Adams Event using kauri tree rings.

The Earth's magnetic poles have reversed multiple times over its geological history, but the environmental impact of such reversals has been ambiguous. In revolutionary research, a global team including New Zealand ecologists, using data from 'swamp kauri' tree cores, have built a picture of events that happened around the last major magnetic inversion (Cooper et al. 2021). In particular, they identify a time around 42,000 years ago and immediately before the reversal when the Earth experienced a weakened geomagnetic field – the Adams Event (named after Douglas Adams of 'Hitchhikers Guide to the Galaxy' fame). The impacts they describe are mind-boggling, and include drastic climatic and environmental changes particularly across the Earth's middle and lower latitudes. They show that lowered geomagnetic field intensity led to changes in the intensity of cosmic radiation, increased levels of ultraviolet radiation and dramatic shifts in global climate. Cooper et al. (2021) point out that major changes in biota, archaeology and ecosystem states in different parts of the world correspond to this date suggesting the Adams Event as a direct cause. These include several megafaunal (and Neanderthal) extinctions, intensification of cave art, and changes of ecosystems to different stable states. Identification of these impacts focuses attention on what previous changes have occurred with other older, past magnetic reversals. As well, the fact that the Earth's magnetic field has been weakening recently (~9% in the past 170 years), has led to the speculation that another reversal may be imminent!

Cooper A, Turney CSM, Palmer J, Hogg A, McGlone M, Wilshurst J, Lorrey AM, Heaton TJ, Russell JM, McCracken K, Anet JG, Rozanov E, Friedel M, Suter I, Thomas P, Muscheler R, Adolphi F, Dosseto A, Faith JT, Fenwick P, Fogwill CJ, Hughen K, Lipson M, Liu J, Nowaczyk N, Rainsley E, Ramsey CB, Sebastianelli P, Souilmi Y, Stevenson J, Thomas Z , Tobler R, Zech R 2021 A global environmental crisis 42,000 years ago. Science 371: 811-818.

Trunk of an ancient kauri tree from Ngāwhā, Northland. Image source: Nelson Parker

2. Climate change impacts on the biological heritage of Aotearoa

A group of biologists working in terrestrial, alpine, freshwater and urban ecosystems and studying a range of taxa including animals, plants and invasive species got together in late 2017 to explore the impacts of climate change in Aotearoa. The workshop, funded by NZ's Biological Heritage National Science Challenge resulted in a piece recently published in Frontiers in Ecology and the Environment (Macinnis-Ng et al. 2021). The paper brings together information about some of the known unknowns and potential unknown unknowns around climate change impacts in different systems. Detecting the influence of climate change in NZ's mild and variable maritime climate is difficult, especially because we have few long-term datasets to work with. We also know the impacts of climate change in NZ are mostly through interactive and indirect processes (e.g. exacerbation of invasive species impacts, habitat fragmentation effects) and these complicated processes can be masked in complex systems. Including Māori researchers and communities in climate change work is essential because local knowledge is key to understanding change processes and Indigenous communities across the globe are highly vulnerable to climate change impacts. Including climate change impacts in management and planning activities is essential for effective conservation outcomes.

Macinnis-Ng, C., Mcintosh, A.R., Monks, J.M., Waipara, N., White, R.S., Boudjelas, S., Clark, C.D., Clearwater, M.J., Curran, T.J., Dickinson, K.J., Nelson, N., Perry, G.L.W., Richardson, S.J., Stanley, M.C., Peltzer, D.A. 2021. Climate-change impacts exacerbate conservation threats in island systems: New Zealand as a case study. *Frontiers in Ecology and the Environment*. Available online open access https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/fee.2285

Workshop participants in front of their musings. Image source: Cate Macinnis-Ng

3. Polygyny in a tree hole: when do wētā aggregate?

Polygynous mating systems are common in many animal species, with one male defending a group of females from other males and being the sole mate of those females. The selective advantage for the male is obvious, but not quite so for the females. The selective advantage for females, however, may simply arise from being in an aggregation that can cooperate on defence from predators, or in protecting key resources. As well, in some animals the sex ratio of a population and population density seem to influence whether polygyny arises at all, and the nature of any grouping.

Tree wētā (*Hemideina* spp.) in New Zealand are widely reported as forming aggregations of multiple females with a single male in natural populations. Recently, Griffin et al. (2020) experimentally varied the sex ratio and density of captive populations of *H. thoracica* to examine how these variables would affect mating aggregations. For this species, the authors found more flexibility in mating aggregations in their experimental setup than expected for most species with female-defence polygyny. Sex ratio did have an effect on the composition of aggregations – females associated with males more often in female-biased populations, but preferred to be alone in male-biased populations. As well, wētā occurred in larger aggregations at higher population density, but these often consisted of multiple males and females rather than being aggregations involving a single male. Wētā, therefore, are non-conformists when it comes to aggregation structure with females apparently more flexible in their decisions than found elsewhere. Wētā mating behaviour seems ripe for more attention.

Griffin MJ, Holwell GI, Symonds MRE 2020. From quiet-night-in to party animal: sex ratio and density affect male/female aggregations in a 'harem' polygynous insect. Animal Behaviour 170: 111-118.

Tree weta aggregation in an artificial roost. Image source: Steven Trewick, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons.

4. Are areas outside fenced ecosanctuaries halos or habitat traps?

Fenced ecosanctuaries within New Zealand, although costly to establish and maintain, have had substantial success at increasing the abundance of valued pest-sensitive species within their borders. Flying birds (and other flighted animals), however, move into and out of ecosanctuaries and, therefore, the performance of ecosanctuaries can influence and be influenced by adjacent habitat outside the fence. What is the potential of this habitat to augment or reduce the conservation effectiveness of ecosanctuaries? Burge et al. (2021) have considered this question in a recent paper. They measured both the amount of habitat around New Zealand ecosanctuaries and the functional connectivity of these ecosanctuaries to the surrounding landscape. Generally, there was surprisingly low quantities of habitat around most ecosanctuaries and low levels of connectivity. As might be predicted, fenced ecosanctuaries on peninsulas, whilst having lower fence construction costs than ecosanctuaries more embedded in terrestrial landscapes, also had less connectivity to habitat outside the fence and therefore less ability to influence that habitat by dispersal. This research suggests that there are latent opportunities in locating any new ecosanctuaries in areas surrounded by habitat, and also that the value of existing ecosanctuaries could be increased by efforts to extend and improve the condition of any surrounding habitat.

Burge OR, Innes JG, Fitzgerald N, Guo J, Etherington TR, Richardson SJ 2021. Assessing the habitat and functional connectivity around fenced ecosanctuaries in New Zealand. Biological Conservation 253: art. no. 108896.

Inside and outside the pest-proof fence, Zealandia. Photo source: Bruce Burns

5. Less insect chewing in plant diverse ecosystems

Over the last 20-30 years, the positive relationship between plant diversity and the production of biomass in ecosystems has become clear. How higher plant diversity impacts other trophic levels and ecosystem functions, however, is still ambiguous. For example, will ecosystems with higher plant diversity experience higher or lower arthropod herbivore impacts than those with lower plant diversity. Just published, Barnes et al. (2021) explore the nature of such a relationship between plant diversity and arthropod herbivory using data from two high profile grassland experiments in Europe (Jena Experiment) and USA (Cedar Creek). They constructed 487 arthropod food webs occurring on plots of different plant diversity from these two experiments, and quantified energy fluxes along trophic linkages for each foodweb. They also calculated herbivore feeding rates per unit plant biomass for ecosystems of different plant diversity. The results of these measurements consistently showed that higher diversity led to lower herbivore impacts and this occurred through two mechanisms. First, higher plant diversity reduced the energetic efficiency of herbivores present and second, arthropod predation rates were higher with higher plant diversity. These are stunning results with far-reaching implications. They indicate that conserving high plant biodiversity in agroecosystems will lead to higher natural herbivore control. In turn, this should reduce the use of agrochemicals in such systems, with a range of financial, environmental and social benefits.

Barnes AD, Scherber C, Brose U, Borer ET, Ebeling A, Gauzens B, Giling DP, Hines J, Isbel F, Ristok C, Tilman D, Weisser WW, Eisenhauer N 2020. Biodiversity enhances the multitrophic control of arthropod herbivory. Science Advances 6: art. no. eabb6603.

Lacewing larva feeding on an aphid Photo source: Eric Steinert, https://commons.wikimedia.org/w/index.php?curid=1698970

Call for Contributors to Book on Protection and Restoration of New Zealand's Native Forests

Moshe Rapaport

I am seeking contributors for an edited book on the protection and restoration of New Zealand's native forests, in international perspective.

Description: New Zealand was once highlighted as a classic case of "ecological imperialism."[1] In recent decades advances have been made in native species reforestation, pest management, predator-proof ecosanctuaries, and Indigenous stewardship. Now the country is vaunted as a "leader in conservation technology and research".[2] Is this praise justified? To what extent have such achievements been matched in similar biodiverse locations?

Details: Submissions should be broad overviews of any of the topics listed below, or other relevant topics, approximately 7,000 words in length. Submissions should be received by 1 October 2021.

Topic Outline:

1. Native Forests
2. Native Wildlife
3. Disturbance and change
4. Kaitiakitanga
5. Community action
6. Legislation
7. Fencing
8. Pest management
9. Reforestation
10. Translocation
11. Urban restoration
12. Novel ecosystems
13. Hawai'i
14. New Caledonia
15. Madagascar
16. Australia

Contact Dr. Moshe Rapaport at M.Rapaport@massey.ac.nz with questions or expressions of interest by 15 April.

[1] Crosby, Alfred W. *Ecological Imperialism. The Biological Expansion of Europe, 900-1900.* Cambridge University Press, 1986.
[2] Simberloff, David, New Zealand as a leader in conservation practice and invasion management, *Journal of the Royal Society of New Zealand* 49(3), 2019.

Postgrad Profile: Zachary Carter

Zachary Carter

Photo caption: Zach posing with a longfin eel (*Anguilla dieffenbachia*) on Motukawanui, an island invaded by kiore within the Cavalli Island group.

Kia ora! My name is Zachary Carter; I am a PhD student in the School of Biological Sciences at the University of Auckland. I have taken quite a meandering path through academia, having received both my B.Sc. and M.Sc. in Biosystems Engineering from Michigan State University. I am interested in many aspects of ecology and conservation, including island ecosystems, biogeography, invasive species and decision-making.

My research broadly seeks to prioritise management actions for the control of invasive species. More specifically, I have spent the majority of my PhD developing novel methods to facilitate eradicating invasive mammals from New Zealand. I have recently finished a project prioritising management efforts for rat-invaded islands based on the amount of time required for successful eradication to occur (https://doi.org/10.1111/gcb.15502), and am currently working on a project prioritising the implementation of control tools across the New Zealand mainland. My hope is that this research provides conservation decision-makers with solutions to preserve New Zealand's uniquely rich biological heritage indefinitely.

I am supervised by James Russell (School of Biological Sciences and Department of Statistics) and co-supervised by George Perry (School of Environment).

Publications in the current issue of NZ Journal of Ecology (Volume 45, Issue 1)

Research Articles

Do woody plants create 'fertile islands' in dryland New Zealand? :

Amadou Camara

Dual aerial 1080 baiting operation removes predators at a large spatial scale : 3428

Margaret Nichols, Helen Nathan, Nick Mulgan

Dactylanthus flower visitation by New Zealand lesser short-tailed bats appears to be influenced by daily rainfall : 3436

Zenon J. Czenze, Tertia Thurley

Managing and protecting native biodiversity on-farm – what do sheep and beef farmers think? : 3420

Fleur J. F. Maseyk, Bruce Small, Roxanne J. T. Henwood, Jennifer Pannell, Hannah L. Buckley, David A. Norton

Occupancy and relative abundances of introduced ungulates on New Zealand's public conservation land 2012–2018 : 3437

Paul D. Moloney, David M. Forsyth, David S. L. Ramsay, Mike Perry, Meredith McKay, Andrew M. Gormley, Benno Kappers, Elaine F. Wright

Assessing kea perception of cereal baits using modelling of spectral reflectance : 3421

Amy L. Brunton-Martin, Maggie Nichols, Anne C. Gaskett

Measuring rat relative abundance using camera traps and digital strike counters for Goodnature A24 self-resetting traps : 3430

Markus Gronwald, James C. Russell

Networks and themes in the publications of the New Zealand Ecological Society over the last six decades : 3438

George L. W. Perry, Matt S. McGlone

Protecting the unseen majority: Land cover and environmental factors linked with soil bacterial communities and functions in New Zealand : 3422

Steven A. Wakelin, Sean T. Forrester, Leo M. Condron, Maureen O'Callaghan, Peter Clinton, Rebecca L. McDougal, Murray Davis, Simeon J. Smaill, Sarah Addison

Review Article

Forum Article

Short Communication

Other recent publications on New Zealand ecology

Bruce Burns, University of Auckland

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.

Addamo AM, Miller KJ, Häussermann V, Taviani M, Machordom A 2021. Global-scale genetic structure of a cosmopolitan cold-water coral species. Aquatic Conservation: Marine and Freshwater Ecosystems 31 (1): 1-14.

Baillie BR, Evanson AW, Kimberley MO, Bergin DO 2020. Combined effects of an anthropogenic (forest harvesting) and natural (extreme rainfall event) disturbance on headwater streams in New Zealand. Freshwater Biology 65 (10): 1806-1823.

Bell G, Young MJ, Seddon PJ, Van Heezik Y 2020. Effects of unregulated visitor access on chick fledging mass and survival in yellow-eyed penguins. Wildlife Research 47 (6): 468-475.

Bohorquez J, Nilsen AR, Larcombe MJ, Orlovich DA, Lord JM 2021. Spore viability and germination of some ectomycorrhizal fungi from New Zealand and implications for forest restoration. New Zealand Journal of Botany in press.

Campbell DI, Glover-Clark GL, Goodrich JP, Morcom CP, Schipper LA, Wall AM 2021. Large differences in CO2 emissions from two dairy farms on a drained peatland driven by contrasting respiration rates during seasonal dry conditions. Science of the Total Environment 760: art. no. 143410.

Chand RR, Cridge BJ 2021. Upscaling pest management from parks to countries: A New Zealand case study. Journal of Integrated Pest Management 11 (1): art. no. 8.

Chilvers BL 2021. Isotope values from milk and blood serum in New Zealand sea lions: are pups feeding on milk a trophic level higher than their mothers? Marine Biology 168 (1): art. no. 12.
Davenport D, Butcher P, Andreotti S, Matthee C, Jones A, Ovenden J 2021. Effective number of white shark (*Carcharodon carcharias*, Linnaeus) breeders is stable over four successive years in the population adjacent to eastern Australia and New Zealand. Ecology and Evolution 11 (1): 186-198.
Dawes TN, Burns KC 2020. Facultative hemiepiphytism as a recruitment strategy in small-seeded tree species. Journal of Vegetation Science 31 (6): 1102-1113.
De Cahsan B, Westbury MV 2020. Complete mitochondrial genomes offer insights into the evolutionary relationships and comparative genetic diversity of New Zealand's iconic kiwi (*Apteryx* spp.). New Zealand Journal of Zoology 47 (4): 291-299.
Dieskau J, Bruelheide H, Gutknecht J, Erfmeier A 2020. Biogeographic differences in plant–soil biota relationships contribute to the exotic range expansion of *Verbascum Thapsus.* Ecology and Evolution 10 (23): 13057-13070.
Dominati EJ, Mackay AD, Rendel JM, Wall A, Norton DA, Pannell J, Devantier B 2021. Farm scale assessment of the impacts of biodiversity enhancement on the financial and environmental performance of mixed livestock farms in New Zealand. Agricultural Systems 187: art. no. 103007.
Franks VR, Ewen JG, McCready M, Thorogood R 2020. Foraging behaviour alters with social environment in a juvenile songbird. Proceedings of the Royal Society B: Biological Sciences 287 (1939): art. no. 20201878.
Fromant A, Bost C-A, Bustamante P, Carravieri A, Cherel Y, Delord K, Eizenberg YH, Miskelly CM, Arnould JPY 2020. Temporal and spatial differences in the post-breeding behaviour of a ubiquitous Southern Hemisphere seabird, the common diving petrel: Variation in post-breeding behaviour. Royal Society Open Science 7 (11): art. no. 200670.
Gerard PJ, Barratt BIP 2021. Risk assessment procedures for biological control agents in New Zealand: two case studies for generalists. BioControl 66 (1): 143-150.
Guímaro HR, Thompson DR, Paiva VH, Ceia FR, Cunningham DM, Moors PJ, Xavier JC 2021. Cephalopods habitat and trophic ecology: historical data using snares penguin as biological sampler. Polar Biology 44 (1): 73-84.
Hall MM, Wehi PM, Whaanga H, Walker ET, Koia JH, Wallace KJ 2021. Promoting social and environmental justice to support indigenous partnerships in urban ecosystem restoration. Restoration Ecology 29 (1): art. no. e13305.
Hamberg L, Saksa T, Hantula J 2021. Role and function of *Chondrostereum purpureum* in biocontrol of trees. Applied Microbiology and Biotechnology 105 (2): 431-440.
Heenan PB, McGlone MS, Wilton AD 2021. Te reo Māori and botanical nomenclature as complementary naming systems for New Zealand's flora. New Zealand Journal of Botany, in press.
Heggie-Gracie SD, Krull CR, Stanley MC 2020. Urban divide: predictors of bird communities in forest fragments and the surrounding urban matrix. Emu - Austral Ornithology 120 (4): 333-342.

Hitchmough RA, Nielsen SV, Bauer AM 2020. Earning your stripes: A second species of striped gecko in the New Zealand gecko genus *Toropuku* (Gekkota: Diplodactylidae). Zootaxa 4890 (4): 578-588.
Holland P, Olson S 2020. Appetite for grass: Re-engineering landscapes of Otago and Southland 1864–1914. New Zealand Geographer 76 (3): 237-246.
Humphries T, Dowling K, Turville C, Sinclair S, Florentine S 2020. Ecology, distribution and control of the invasive weed *Nassella trichotoma* (Nees) Hack. ex Arechav.: A global review of current and future challenges. Weed Research 60 (6): pp. 392-405.
King KJ, Lewis DM, Waters JM, Wallis GP 2020. Persisting in a glaciated landscape: Pleistocene microrefugia evidenced by the tree wētā *Hemideina maori* in central South Island, New Zealand. Journal of Biogeography 47 (11): 2518-2531.
Lawson SL, Leuschner N, Gill BJ, Enos JK, Hauber ME 2020. Loss of graded enemy recognition in a whitehead population allopatric with brood-parasitic long-tailed cuckoos. Avocetta 44 (1): 3-10.
Leduc D, Nodder SD, Rowden AA, Gibbs M, Berkenbusch K, Wood A, De Leo F, Smith C, Brown J, Bury SJ, Pallentin A 2020. Structure of infaunal communities in New Zealand submarine canyons is linked to origins of sediment organic matter. Limnology and Oceanography 65 (10): 2303-2327.
Lozada SPV, Rapson GL 2021. Morphodynamics of short-lived wetlands of coastal dune slacks, Manawatū, New Zealand. Wetlands Ecology and Management, in press.
Marske KA, Thomaz AT, Knowles LL 2020. Dispersal barriers and opportunities drive multiple levels of phylogeographic concordance in the Southern Alps of New Zealand. Molecular Ecology 29 (23): 4665-4679.
Martin R, Ellis J, Brabyn L, Campbell M 2020. Change-mapping of estuarine intertidal seagrass (*Zostera muelleri*) using multispectral imagery flown by remotely piloted aircraft (RPA) at Wharekawa Harbour, New Zealand. Estuarine, Coastal and Shelf Science 246: art. no. 107046.
Meijer CG, Warburton HJ, McIntosh AR 2021. Disentangling the multiple effects of stream drying and riparian canopy cover on the trophic ecology of a highly threatened fish. Freshwater Biology 66 (1): 102-113.
Paler K, Monks A, Leschen RAB, Ward DF 2021. Determining species diversity and functional traits of beetles for monitoring the effects of environmental change in the New Zealand alpine zone. Ecological Indicators 121: art. no. 107100.
Prebble JG, Kennedy EM, Reichgelt T, Clowes C, Womack T, Mildenhall DC, Raine JI, Crouch EM 2021. A 100 million year composite pollen record from New Zealand shows maximum angiosperm abundance delayed until Eocene. Palaeogeography, Palaeoclimatology, Palaeoecology 566: art. no. 110207.
Pyšek P, Hulme PE, Simberloff D, Bacher S, Blackburn TM, Carlton JT, Dawson W, Essl F, Foxcroft LC, Genovesi P, Jeschke JM, Kühn I, Liebhold AM, Mandrak NE, Meyerson LA, Pauchard A, Pergl J, Roy HE, Seebens H, van Kleunen M, Vilà M, Wingfield MJ, Richardson DM 2020. Scientists' warning on invasive alien species. Biological Reviews 95 (6): 1511-1534.
Ribó M, Macdonald H, Watson SJ, Hillman JR, Strachan LJ, Thrush SF, Mountjoy JJ, Hadfield MG, Lamarche G 2021. Predicting habitat suitability of filter-

feeder communities in a shallow marine environment, New Zealand. Marine Environmental Research 163: art. no. 105218.
Sharma SS, Alfaro AC, Campbell KA 2021. Influence of habitat on meiofaunal abundance and distribution in a New Zealand temperate estuary. New Zealand Journal of Marine and Freshwater Research, in press.
Sheridan K, Waldman J 2020. Evaluating the success of reintroduction of pāteke (brown teal) to lake and forest habitats in a predator-controlled preserve in New Zealand. Ecological Management and Restoration 21 (3): 237-246.
Stilwell JD, Langendam A, Mays C, Sutherland LJM, Arillo A, Bickel DJ, De Silva WT, Pentland AH, Roghi G, Price GD, Cantrill DJ, Quinney A, Peñalver E 2020. Amber from the Triassic to Paleogene of Australia and New Zealand as exceptional preservation of poorly known terrestrial ecosystems. Scientific Reports 10 (1): art. no. 5703.
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Thébault J, Bustamante P, Massaro M, Taylor G, Quillfeldt P 2021. Influence of species-specific feeding ecology on mercury concentrations in seabirds breeding on the Chatham Islands, New Zealand. Environmental Toxicology and Chemistry 40 (2): 454-472.
Tulod AM, Norton DA 2020. Regeneration of native woody species following artificial gap formation in an early-successional forest in New Zealand. Ecological Management and Restoration 21 (3): 229-236.
van der Loop JMM, Tjampens J, Vogels JJ, van Kleef HH, Lamers LPM, Leuven RSEW 2020. Reducing nutrient availability and enhancing biotic resistance limits settlement and growth of the invasive Australian swamp stonecrop (*Crassula helmsii*). Biological Invasions 22 (11): 3391-3402.
Vianna JA, Fernandes FAN, Frugone MJ, Figueiró HV, Pertierra LR, Noll D, Bi K, Wang-Claypool CY, Lowther A, Parker P, Le Bohec C, Bonadonna F, Wienecke B, Pistorius P, Steinfurth A, Burridge CP, Dantas GPM, Poulin E, Simison EB, Henderson J, Eizirik E, Nery MF, Bowie RCK 2020. Genome-wide analyses reveal drivers of penguin diversification. Proceedings of the National Academy of Sciences of the United States of America 117 (36): 22303-22310.
West TAP, Monge JJ, Dowling LJ, Wakelin SJ, Gibbs HK 2020. Promotion of afforestation in New Zealand's marginal agricultural lands through payments for environmental services. Ecosystem Services 46: art. no. 101212.
Withers TM, Allen GR, Todoroki CL, Pugh AR, Gresham BA 2021. Observations of parasitoid behaviour in both no-choice and choice tests are consistent with proposed ecological host range. Entomologia Experimentalis et Applicata 169 (1): 97-110.

Noticeboard

New Zealand Ecological Society Conference: 29 November – 1 December 2021

The 2021 New Zealand Ecological Society conference will be held at the Turner Centre at Kerikeri from 29 November - 1 December 2021 with field trips held on 2 December.

https://www.isbe2020.com/program/call-for-abstracts/ -
Postponed to 11-16 September 2022

11th INTECOL International Wetlands Conference, Christchurch, 2021

The INTECOL Wetland Working Group (WWG) will hold the 11th INTECOL International Wetlands Conference in Christchurch, New Zealand, in October, 2021. The chair of the organizing committee is Philippe Gerbeaux, and the co-chairs are David Perenarra-O'Connell and Shona Myers. The chair of programme committee is Tim Davie. Other members of the committee are Stefanie Rixecker, Di Lucas, Deirdre Hart, Corinne Bataille, Katie Nimmo, and Jason Butt. Beautiful New Zealand is within about 10 h from most countries on the Pacific Rim. There are many outdoor pre- and post-meeting excursions available, including skiing within 1-2 hr of Christchurch. Much of Christchurch is built on wetlands. Crown Research Institutes and two universities are co-located there. The tentative conference theme is: Traditional knowledge and innovative science in wetland research and management. A strong Maori and Oceania cultural presence is guaranteed within and around the conference.

Stay tuned for more information! http://intecol.org/node/37

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(Effective from December 2019)

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