NEW ZEALAND ECOLOGICAL SOCIETY

Newsletter

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Contents

From the Editor

Kia ora koutou,

Welcome to the fourth newsletter of 2020 from the NZ Ecological Society! This will be our last newsletter for this year, and what a year it has been.

While our NZES Conference was cancelled this year, we will still have our AGM and plenary talks from our 2019 prize winners on 4 December. The AGM will be

fully online, and the talks will be both in person at Lincoln and online. Following the AGM and talks, we're coordinating Regional Hub gatherings – read on for further information in this newsletter!

This Newsletter features the notice and agenda of our NZES AGM on 4 December, Ecotones from Bruce Burns, Introductions to our new Hot Topics Editors/ Coordinators, and several other announcements. I hope you enjoy it, and have a safe rest of your year!

Ngā mihi,
Rowan

News from NZES council

Kia ora koutou,

At our recent meeting, the NZES Council co-opted Anna Probert and Bridgette Farnworth as co-editors of Hot Topics. Anna is an entomologist and behavioural ecologist who is doing a postdoc at the University of Fribourg, Switzerland. Bridgette is also a behavioural ecologist, though with more of a focus on rodents (but also weta), and is a postdoc at the University of Waikato. Welcome to council, Anna and Bridgette! We look forward to seeing how you further develop the Hot Topics project.

The focus of Council's recent work has been getting ready for our upcoming AGM, now just four weeks away on Friday 4 December. This AGM will be entirely online, hosted out of the University of Auckland. Shortly after that finishes we will switch to an event at Lincoln, where our 2019 prize winners (Sarah Richardson and Laura Young) will give their plenary speeches and the 2020 winners announced in front of a live audience and via video link. Finally, there will be some regional social events held to allow members to get together physically. Please see the article elsewhere in this newsletter for more details for all these activities. We hope to see you there and need as many members to attend as possible to ensure we have a quorum.

Finally, a huge thank you to all of our members who endured the Auckland lockdown and in doing so quashed NZ's second wave of Covid-19. Here is hoping that NZ continues to have low or no community cases, and follows the best scientific advice to suppress them when we do.

Ngā mihi,

Tim Curran

NZES AGM Notice and Agenda

The 2020 NZES AGM will be on 4 December from 1-2pm. The AGM will be held **online** this year on Zoom (Use this link to join; passcode: kauri). We are requesting that you sign up to attend the AGM using this spreadsheet. This will help us ensure that we will be able to meet our quorum, and means that we will be able to send you a link for the online stream. Please join us to see what the council has been up to this year, what's new in the society, honour our speakers, and hear about the 2020 awards! The AGM is only open to members of the society, but non-members are welcome to attend the talks.

The Agenda for the AGM is as follows:

1. Welcome and apologies - Tim Curran
2. Approval of 2019 AGM minutes - Tim Curran
3. President's report - Tim Curran
4. Election of office bearers - Tim Curran
5. Treasurer's report - Chris Bycroft
6. Membership report - Olivia Burge
7. Journal report - George Perry
8. Webmaster report - Sarah Wyse
9. Newsletter report - Rowan Sprague
10. Society Awards
11. Any other business - chaired by 2021 President

Please send any apologies to Kate McAlpine, NZES Secretary: secretary@newzealandecology.org.

NZES 2019 Award Talks and Regional Gatherings on 4 December

Following our AGM, plenary talks from our 2019 prize winners will be given in front of a **live audience in Lincoln** and **streamed live online** from 2:30-4pm on 4 December. Please stay tuned for the link to these talks and more details about the gathering in Lincoln.

After the plenary talks, we are encouraging our members to coordinate regional gatherings. Social activities to follow the AGM and plenary talks will be held in various regions around the country and are open to members and non-members. This spreadsheet details the events planned so far. Use this spreadsheet to sign up for an event, or if you can't see one in your area, please consider organising one! As members add new hub activities this online spreadsheet will be updated - so be sure to check back now and then to sign up for something in your area!

Introducing our new Hot Topics Editors and Coordinators

The NZES Council has appointed Anna Probert and Bridgette Farnworth as our new Hot topics Editors and Coordinators. Below are brief bios and photos of them, and we're excited to work with them in their new roles!

Anna Probert

I am currently a post-doctoral researcher at The University of Fribourg in Switzerland where my research focuses on uncertainty in the environmental and socio-economic impacts of non-native species. I'm originally from Tāmaki Makaurau / Auckland, and completed my PhD at The University of Auckland in 2019 where I looked at ecological risk to native ecosystems, focusing on non-native ants. I have a broad interest in ecological research and love getting out and assisting people in the field to learn about different study systems.

Fun fact about me is that I am voting for the toroa for this year's Bird of the Year!

Bridgette Farnworth

I am a post doc at the University of Waikato with a long-standing interest in ecology and I am particularly enthusiastic about conservation biology in New Zealand. I have a broad interest in foraging ecology and my work tends to ask animals 'who' are they eating, 'how' are they eating, or 'where' do they like to eat. I specialise in mammalian predators, but I am particularly fond of rats and mice! My previous research has focused on house mice (*Mus musculus*) and ship rats (*Rattus rattus*), though this year I've completed the rodent tri-factor with my most recent project on Norway rats (*Rattus norvegicus*).

I like to spend my free time outdoors, except when swimming: I recently discovered that competitive ocean swimming makes me seasick.

Ecotones – New ecological research

Bruce Burns, 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. Cloudy with a chance of pīwakawaka

The evidence that we are in a biodiversity crisis is abundant, with conspicuous signs that biodiversity is being lost all around us (such as fewer dead bugs on windscreens, but see Acorn 2016). Monitoring systems for biodiversity, however, are generally fragmented spatially and temporally, and usually focus on only a few taxa, so it is difficult to objectively follow where and when the crisis is unfolding and any results of mitigation actions. Filling this need, Bellingham et al (2020) describe the implementation and measurement of a number of Essential Biodiversity Variables (EBVs – Pereira et al. 2013) across New Zealand over the last decade. EBVs measured in this initiative have quantified population and community variables focussing on vegetation, birds and non-native mammals with samples taken on an 8km x 8km grid on public and private land. Analysis of these data have revealed both somewhat expected and surprising results. For example, that native birds were 2.5 times more abundant in forests than non-forests in New Zealand seems a little unsurprising,

but I didn't anticipate the intriguing fact that possums and hares have almost mutually exclusive distributions. The analysis also developed an index of invasion intensity by non-native organisms, with greatest expression of this index in southeastern South Island and Northland (Fig. 1). This system provides a fundamental and objective baseline for assessing New Zealand's biodiversity and is a great step forward. I'll look forward to the next remeasurement to clarify our trajectory.

Acorn J 2016. The windshield anecdote. American Entomologist 62(4): 262-264.

Bellingham PJ, Richardson SJ, Gormley AM, Allen RB, Cook A, Crisp PN, Forsyth DM, McGlone MS, McKay M, MacLeod CJ, van Dam-Bates P, Wright EF 2020. Implementing integrated measurements of essential biodiversity variables at a national scale. Ecological Solutions and Evidence 1: e12025

Pereira HM, Ferrier S, Walters M, Geller GN, Jongman RHG, Scholes RJ, Bruford MW, N. Brummitt N, Butchart SHM, Cardoso AC, Coops NC, Dulloo E, Faith DP, Freyhof J, Gregory RD, Heip C, Höft R, Hurtt G, Jetz W, Karp DS, McGeoch MA, Obura D, Onoda Y, Pettorelli N, Reyers B, Sayre R, Scharlemann JPW, Stuart SN, Turak E, Walpole M, Wegmann M 2013. Essential biodiversity variables. Science 339: 277–278.

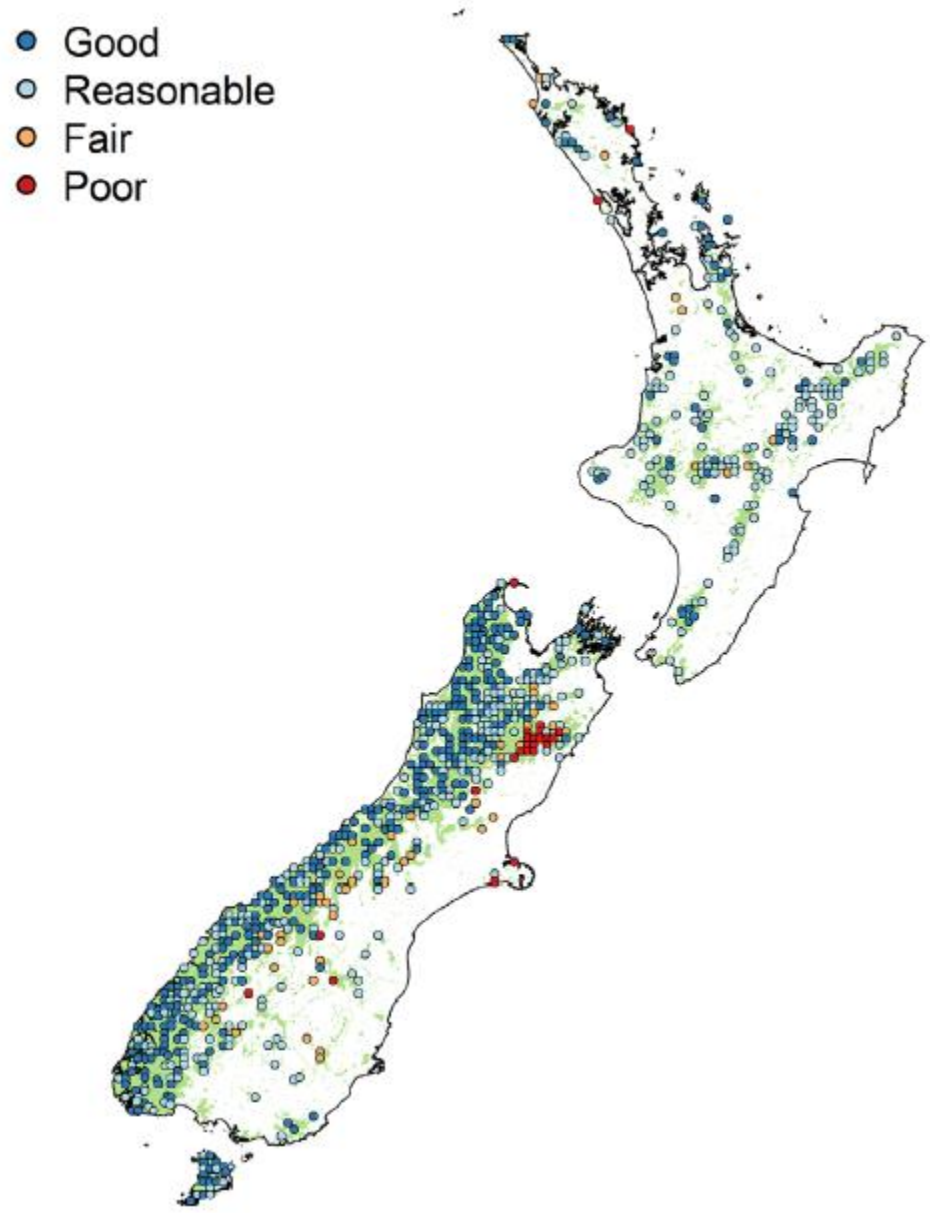


Fig. 1. Map of an aggregated measure of invasion by non-native plants, birds and mammals. The classifications Reasonable, Fair, and Poor represent where 1, 2 or 3 of the taxonomic groups respectively exceed a threshold of a high degree of invasions. Source: Bellingham et al. (2020).

2. Changing old pine to new native forest

During the 20th century, many areas of indigenous forest were logged, cleared and then planted with exotic conifers mainly *Pinus radiata*. In recent years, as these tree crops have become due for harvest, a surprising range of land managers have sought to re-establish indigenous forests after clearfelling. For example, Watercare purchased 2200 ha of plantation forestry land in the Hunua Ranges in 2017 and is now restoring the area to native forest (https://www.waterforlife.org.nz/hunua-ranges-regeneration-project). Similarly, Ngāti Whare near Whirinaki wish to restore indigenous forest on their land as they gradually harvest commercial plantations. Populations of indigenous tree

species still occur mixed with the plantation forests or are often adjacent, so a key question is how much can land managers rely on natural regeneration from these populations to regenerate forests (passive restoration), and how much will they need to plant seedlings (active restoration) for the most cost-effective approach. Forbes et al. (2021) have attempted to answer this question using vegetation data from plots measured in clear-fells (2-14 years post-harvest) on Ngāti Whare land. Their analysis of the abundance of indigenous seedlings and weeds on these plots suggested that weed control would be needed almost everywhere regardless of restoration approach, but seedlings would only need to be planted on 48% of the restoration area. Moreover, the areas requiring planting were predictable based on site factors. By using existing regeneration sources, this approach promises to improve the efficiency of restoration practice.

Forbes AS, Allen RB, Herbert JW, Kohiti K, Shaw WB, Taurua L 2021. Determining the balance between active and passive indigenous forest restoration after exotic conifer plantation clear-fell. Forest Ecology and Management 479: art. no. 118621.

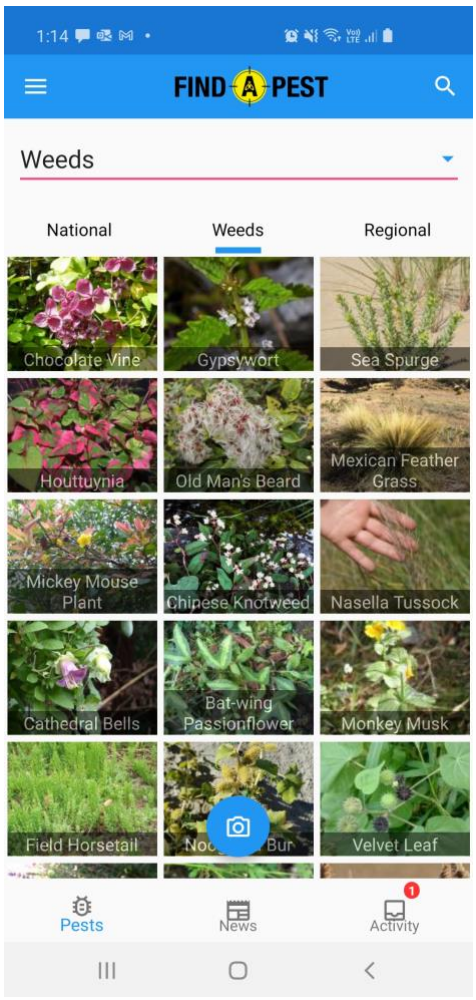
Land after clear-felling pine in the Coromandel Image source: Bruce Burns

3. Can citizen science observations help biosecurity?

Reducing the impact of invasive species requires continual vigilance to quickly locate new incursions and maximise the chance of successful eradication. The rise of citizen science as a way of increasing such vigilance seems to have substantial potential to expand biosecurity surveillance and monitoring networks. High false positives rates and the significant identification burden of submitted observations on management agencies is a key stumbling block to implementing such an approach. Pawson et al. (2020) developed and recently analysed the usefulness of one such citizen science initiative, Find-A-Pest (www.findapest.nz).

This mobile app was tested in a series of case studies from February 2019 and allows citizens to submit observations of high priority pests whenever they come across them. The data generated by Find-A-Pest is linked to iNaturalist NZ with the online community associated with this larger database helping with the identification process. During the 3.5 month case study period, Pawson et al. (2020) documented 471 observations submitted from 74 individuals. Identifiers from within the system quickly and rapidly processed these observations resulting in c. 95% accuracy. This dispersed identification model increased the quality of information passed on to biosecurity agencies without adding further costs of supply. Further, the assessment showed that Find-A-Pest is certainly fit for purpose and, with greater uptake, can add a key strength to New Zealand's biosecurity toolbox. The recently revised app has just hit the Android and Apple stores. It is designed to be flexible to allow contributions from different primary sectors. I encourage New Zealand Ecological Society members to sign up to the weeds sector particularly and help your regional council document the location of weeds. Get the app with the QR code below.

Pawson SM, Sullivan JJ, Grant A 2020. Expanding general surveillance of invasive species by integrating citizens as both observers and identifiers. Journal of Pest Science 93 (4): 1155-1166.



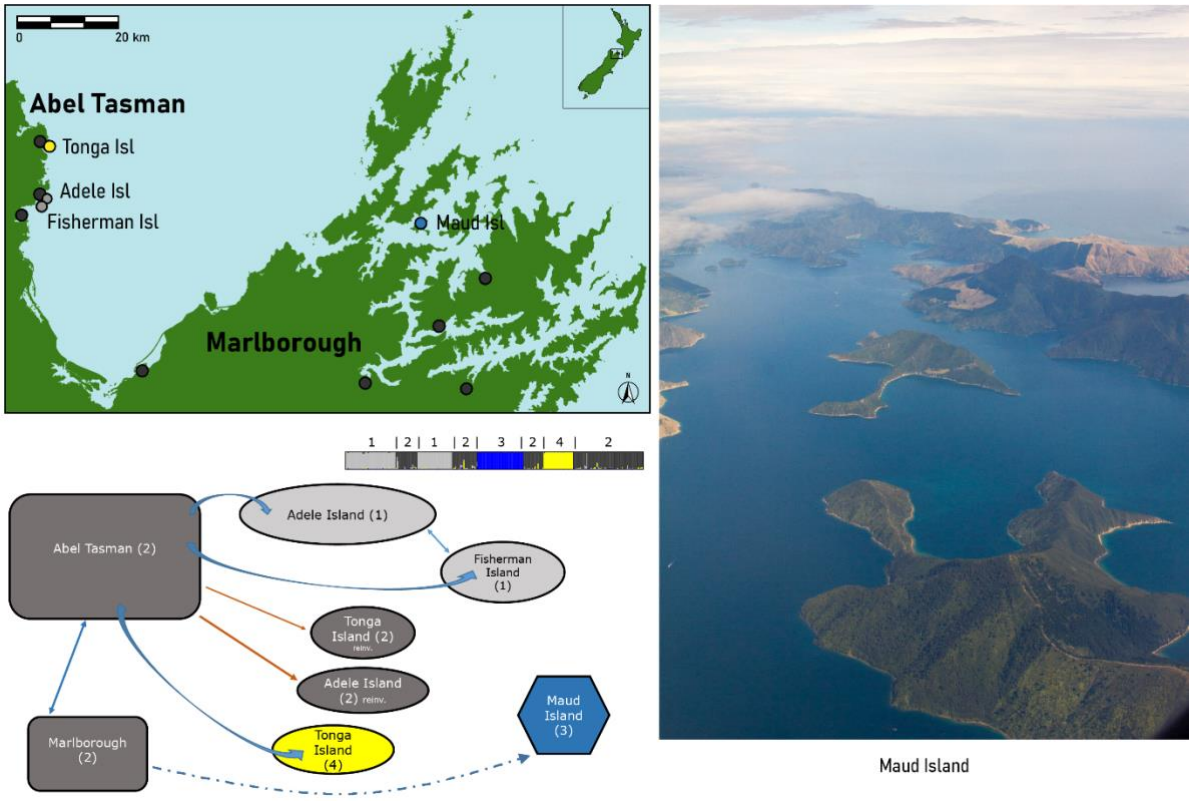
Find-A-Pest app pest screen and QR code. Image source: www.findapest.nz

4. Where did those mice come from?

Pests are often eradicated from nearshore islands that can act as wildlife sanctuaries. Once eradication has been achieved, however, pests still occasionally turn up again. The key question when this happens is whether these newly encountered individuals are survivors from the eradication or result from reinvasion. Genetic analyses are increasingly being used to identify the source populations of individuals and therefore invasion routes. Pichlmueller et al (2020) provide a great example of such detective work with regard to mice on nearshore islands and the mainland at the top of the South Island. They sampled mouse populations from eight mainland locations in the Marlborough-Nelson region including three in Abel Tasman National Park (ATNP). They also sampled mice on four islands – three close offshore of ATNP, and Maud Island. Mice were apparently eradicated from all these islands in either 2007 (ATNP islands) or 2015 (Maud), but reappeared at two of the ATNP islands in 2015. The genetics of the sampled populations were compared and visualized using GenePlots, a fantastic new tool developed by New Zealand statisticians (McMillan and Fewster 2017). They found that the mainland populations were generally genetically homogeneous over large scales, but that the historic (i.e. pre-2007) island populations were well differentiated from the mainland. Mice discovered on islands sometime after eradication attempts had genetics consistent with the mainland population, so were recent colonists from there rather than survivors. This indicates that surveillance and biosecurity measures to prevent recolonizations of these islands by mice have not been robust enough, and will need strengthening if these islands are to maintain a mouse-free status long term. With the reduction in costs of genetic sampling and analysis, these tools are now becoming more accessible to inform biosecurity management.

McMillan LF, Fewster RM 2017. Visualizations for genetic assignment analyses using the saddlepoint approximation method. Biometrics 73(3): 1029–1041.

Pichlmueller F, Murphy EC, MacKay JWB, Henderson J, Fewster RM, Russell JC 2020. Island invasion and reinvasion: Informing invasive species management with genetic measures of connectivity. Journal of Applied Ecology, in press.



Top left: Sampling locations of the study showing eight mainland and four island sites. Bottom left: Regional mouse invasion pathways. Different colours indicate different genotypes. Image source: Florian Pichlmueller

5. The 'Goldilocks' zone for translocation numbers.

When individuals of a species are translocated to a new area, they invariably start within a small population with all the inherent risks, e.g. Allee effects, that such low population size's experience. Therefore, to reduce these risks, translocation initiatives should translocate as many individuals as possible, i.e. more translocated is better. Often overlooked in determining numbers to translocate, however, are the impacts on source populations. Small population size risks could arise for those left behind if too many are translocated away, i.e. less translocated is better. How should we resolve this contradiction? Easton et al. (2020) have been working on a modelling approach to balance these factors when determining translocation numbers. They simulated a range of translocation scenarios varying source and translocated population sizes using a novel spatially explicit, individual-based model for *Leiopelma pakeka*, a threatened frog with source populations restricted to Maud Island in the Marlborough Sounds. They also used the model to examine how number translocated affected genetic variability in either population by modelling the probability of retaining test alleles. Their results identified a 'just right' zone of numbers to translocate: enough to ensure the translocated population will be viable but not too many so that the source population also recovers. For *L. pakeka*, this modelled number was between 120-150 frogs per translocation. This range also ensured retention of genetic variability in both populations. The

new modelling approach used here is now applicable to many other focal species.

Easton LJ, Bishop PJ, Whigham PA 2020. Balancing act: modelling sustainable release numbers for translocations. Animal Conservation 23 (4): 434-442.

Leiopelma pakeka on Maud Island

Image source: Phil Bishop http://calphotos.berkeley.edu

Two PhD Opportunities at University of Canterbury

Dr Steve Pawson

Predator and parasitoid dynamics of *Paropsisterna cloelia* in New Zealand Eucalyptus plantations

Senior supervisors: Dr Stephen Pawson, School of Forestry, University of Canterbury Associate supervisor: Dr Toni Withers, Forest Protection, Scion.

Background: The New Zealand Dryland Forests Initiative (NZDFI) has a vision to be a world-leader in breeding ground-durable eucalypts, and to be home to a valuable sustainable hardwood industry based on eucalypt forests, by 2050. Reducing the impact of defoliating insects is critical to the success of this vision. Paropsine (Chrysomelidae) beetles are the major defoliators of eucalypts in New Zealand. *Paropsis charybdis* was the first major defoliator to establish in the early 1900s and caused widespread damage before biological control agents were introduced. Subsequently, 4 more paropsine beetles have established, culminating in the arrival of *Paropsisterna cloelia* in 2016. Since its arrival *P. cloelia* has spread from the Hawke's Bay in the North Island to the Nelson/Marlborough region of the upper South Island. Previous work has shown that *P. cloelia* is a significant defoliator of a wide range of eucalyptus species, including those that form part of the NZDFI breeding programme.

Opportunity: This PhD provide an opportunity for a suitably qualified student to research the predator and parasitoid population dynamics associated with *P. cloelia* in New Zealand. The successful candidate will implement a programme of research that includes extensive fieldwork with complimentary laboratory as required. As part of their PhD the candidate will design, establish, and monitor the effects of multi-species stand establishment to facilitate strong biological control of *P. cloelia* by generalist predatory ladybird beetles. The candidate with collaborate with other PhD students at UC and with staff at Scion (NZ Forest Research Institute) as part of their studies. The successful candidate will receive an annual tax free stipend of $28,000NZD and payment of their tuition fees.

Eligibility: Students must meet the academic entry requirements for the UC Doctoral Programme, these can be viewed here. In short the minimum requirement is an Honours or Master's degree with either First Class or Second Class Division I that is equivalent to UC standards There are also English language requirements that can be viewed here. Given that the PhD requires extensive fieldwork candidates must have demonstrated experience and a willingness to work in the field as required. Candidates should have proven experience in entomology (preferably forest entomology), basic understanding of experimental design, and competence in statistical methods and R.

COVID-19 Eligibility: Due to New Zealand border restrictions only NZ citizens and permanent residents can enter the country. As such applicants will only be accepted from candidates currently overseas if they are an existing NZ citizen or resident. There are no exceptions to this.

Applicants that have not demonstrated that they meet these eligibility requirements, particularly COVID-19 requirements, should not expect to receive a response with regards to their application.

Questions and Applications (Cover Letter and CV) should be addressed to Steve.Pawson@canterbury.ac.nz.

Phytophagous insect community ecology of kōwhai

Kōwhai (*Sophora* spp.) is an iconic genus of native trees. It is distinctive in the landscape due to its striking yellow flowers.

Kōwhai is poisonous to humans and anecdotal evidence suggests that its timber has high natural durability, hence it is a potential candidate to establish production forest stands.

Understanding the community of herbivores and how production and ecological values can co-exist is an important first step to inform the establishment of new managed kōwhai forests.

This PhD aims to provide fundamental information on the community and population dynamics of kōwhai herbivores and their natural enemies, i.e., predators, and parasitoids. Scope exists to examine the effects of mixed species stands and how insects cope with kōwhai toxins.

Research will occur in Canterbury and Northland and will require close engagement with relevant iwi.

Supervisor: Dr Steve Pawson, School of Forestry PhD Scholarship: $28,000 + fees

Send a CV and one page cover letter outlining relevant experience to: steve.pawson@canterbury.ac.nz. Note: Prospective candidates must meet UC entry requirements. Due to COVID-19 requirements this is only open to existing NZ citizens and permanent residents. Applicants without this will not receive a response.

Notice about Upcoming National Freshwater Conference

National Freshwater Conference
Examining the priorities and critical factors for a sustainable future
17-18 February 2021 | Te Wharewaka o Poneke, Wellington

The **2021 National Freshwater Conference** will be the opportunity for delegates and industry experts alike to come together to explore these important policy challenges, understand how to comply, analyse the impact they will have on their operations and collaboratively share expertise to identify successful solutions.

Key Sessions
Legislative and regulatory review- NPS-FW, Three Waters Reform Programme, and Taumata Arowai
Mitigating the impacts of climate change by enhancing freshwater health
Collaborative approaches - establishing catchment groups and managing stakeholder relationships
Water security and resilience

Separately Bookable Workshops
Workshop 1: 19th February 9.00 am - 12.30 pm
Examining policy changes for horticulture and agriculture leaders
Helen Atkins, Director, Atkins Holm Majurey
Workshop 2: 19th February 1.30 pm - 5.00 pm
Local Government: Successfully delivering national freshwater policies
Rachael Zame, Senior Associate, Cooney Lees Morgan

Discount Offer
Conferenz is pleased to offer NZES members / recipients of this email a 15% discount off the conference price (both super saver and early-bird rates). Special pricing available for Central and Local Government, and Māori Trusts. To claim your discount, please use on-line booking code: MHJ9CO or mention this email if registering by phone (09) 912 3616. Valid to super saver closing on 5pm, 8 December 2020. See www.conferenz.co.nz/freshwater

Postgraduate Profile: Allison Miller

Allison Miller

Kia ora! My name is Allison Miller and I am a PhD student studying kanakana/lamprey at the University of Otago. I received my undergraduate degree (B.Sc.) from the University of California San Diego and my master's (M.Sc.) degree from the University of Guam. Afterwards, I practiced natural resource management as a biological technician with the US National Park Service. My interests include ecology, evolution, fisheries, marine invertebrates (especially echinoderms), and coral reef biology.

As a PhD student, I am utilizing genotyping by sequencing (GBS) methods to better understand the taxonomy, viability, and health of New Zealand lamprey (*Geotria australis*) populations. The New Zealand pouched lamprey, or kanakana in Te Reo Māori, is an important customary (or hereditary) fishery and my research will fill multiple key knowledge gaps while providing insight on ways to restore and enhance kanakana populations around New Zealand.

I am working in collaboration with National Institute of Water and Atmospheric Research (NIWA) Principal Scientists and I am supervised by Professor Neil Gemmell (https://gemmell-lab.otago.ac.nz).

Promoting Rauika Māngai: A Guide to Vision Mātauranga

The NZES Council encourages all of its members to read *Rauika Māngai: A Guide to Vision Mātauranga*. The purpose of this guide is to share and extend best practice approaches to Vision Mātauranga, build collective knowledge that contributes gains and benefits to whānau, hapū, iwi, and diverse Māori communities, and provide a collective Māori voice on National Science Challenge matters. Although developed primarily for National Science Challenge purposes, this guide is widely applicable to all those broadly involved in science in Aotearoa New Zealand.

This Guide was written from the perspectives and recommendations of Māori researchers and facilitators who work at the interface between the Māori and Scientific worlds, gathered at the Vision Mātauranga Leadership Hui, 30-31 October 2019. The discussions from the hui are distilled into three sections, each of which addresses a different audience: Section 1 Vision Mātauranga Leadership Development; Section 2 Bringing Vision Mātauranga to Life; and Section 3 Empowering the Future. There are sections pertinent specifically to pākehā and Māori researchers, making this a valuable resource for everyone and accessible even if you're short on time.

A pdf of this Guide can be found here, and we encourage everyone to read, reflect on, and use the helpful guidance within it.

Special Issue in BMC Zoology on Defaunation, functional extinctions and socio-ecological consequences: Call for submissions

Craig Morley

Guest Editors: Edward Narayan (The University of Queensland), Craig Morley (Toi-Ohomai Institute of Technology), Fernando Ribeiro Gomes (University of São Paulo) and Gramapurohit Narahari Prabhakar (Savitribai Phule Pune University)

The creation of ecological imbalance caused by rapid human expansion and infrastructure development has had a severe impact on global biodiversity. Wildlife has plummeted in the Anthropocene primarily due to deforestation and trade, which ultimately threatens the integrity of life as we know it. This massive shift in our global ecosystem creates dysfunctional ecological niches that brings negative changes and impacts both animal and human health, possibly leading to a catastrophic anthropomorphic-driven collapse.

Ecological resilience and response of wildlife to evolutionary adaptation is influenced by past, present and future environmental and demographic change but this has been rapidly overtaken through the need to extract energy, and to clothe and feed humans. To reduce the expansion of humans, modern agriculture and, mega infrastructure development we need solutions that require a multifaceted approach through the integration of science (both modern and indigenous) with appropriate policy development and support. We also need long-term ecological data and knowledge sharing without limits or boundaries.

Thus, we invite researchers especially those working diverse rich diverse habitats on continents, islands and unique landscapes, including rare, endangered and iconic wildlife species, as well those working on invasive species to contribute. The aim of this special issue is to generate hard-hitting objective discussion on the present and future state of the Earth in the Anthropocene where human actions have paved way to the likely or already occurring defaunation, functional extinction and social-ecological consequences. Review papers, primary research papers and research that provide a Covid-19 and global pandemic dimension added to this topic are also welcome.

Please email Alison Cuff, the inhouse editor for *BMC Zoology*, (alison.cuff@biomedcentral.com) if you would like more information before you submit.

The deadline for submissions is June 1st 2021.

To submit an article for consideration, please click here.

Publications in the current issue of NZ Journal of Ecology *in press* (Volume 45, Issue 1, 2021)

Forum Article

Understory vegetation provides clues to succession in woody weed stands

Kate G. McAlpine, Shona L. Lamoureaux, Susan M. Timmins

Research Articles

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

Amadou Camara

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

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

Assessing kea perception of cereal baits using modelling of spectral reflectance

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

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

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

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.

Ade R, Rehm M 2020. A prediction of dust mite populations in different categories of housing quality in Auckland, New Zealand. Allergo Journal International 29 (6): 187-198.

Albrecht M, Kleijn D, Williams NM, Tschumi M, Blaauw BR, Bommarco R, Campbell AJ, Dainese M, Drummond FA, Entling MH, Ganser D, Arjen de Groot G, Goulson D, Grab H, Hamilton H, Herzog F, Isaacs R, Jacot K, Jeanneret P, Jonsson M, Knop E, Kremen C, Landis DA, Loeb GM, Marini L, McKerchar M, Morandin L, Pfister SC, Potts SG, Rundlöf M, Sardiñas H, Sciligo A, Thies C, Tscharntke T, Venturini E, Veromann E, Vollhardt IMG, Wäckers F, Ward K, Wilby A, Woltz M, Wratten S, Sutter L 2020. The effectiveness of flower strips and hedgerows on pest control, pollination services and crop yield: a quantitative synthesis. Ecology Letters 23 (10): 1488-1498.

Andrews, CE, Ewen JG, Thorogood R 2020. Enhancing dietary specialization metrics in observational studies of wild animal populations. Ecosphere 11 (9): art. no. e03255.

Avosani SS, Sullivan TES, Ciolli M, Mazzoni V, Suckling DM 2020. Vibrational communication and evidence for vibrational behavioural manipulation of the tomato potato psyllid, *Bactericera cockerelli*. Entomologia Generalis *in press*.

Bagnaro A, Baltar F, Brownstein G, Lee WG, Morales SE, Pritchard DW, Hepburn CD 2020. Reducing the arbitrary: Fuzzy detection of microbial ecotones and ecosystems - Focus on the pelagic environment. Environmental Microbiomes 15 (1): art. no. 16.

Baker NJ, Boubée J, Lokman PM, Bolland JD 2020. Evaluating the impact of hydropower on downstream migrating anguillid eels: Catchment-wide and fine-scale approaches to identify cost-effective solutions. Science of the Total Environment 748: art. no. 141111.

Bellingham PJ, Richardson SJ, Gormley AM, Allen RB, Cook A, Crisp PN, Forsyth DM, McGlone MS, McKay M, MacLeod CJ, van Dam-Bates P, Wright EF 2020. Implementing integrated measurements of essential biodiversity variables at a national scale. Ecological Solutions and Evidence 1: e12025

Bennet DG, Horton TW, Goldstien,SJ, Rowe L, Briskie JV 2020. Seasonal and annual variation in the diving behaviour of Hutton's shearwater (*Puffinus huttoni*). New Zealand Journal of Zoology 47 (4): 300-323.

Boddy NC, Booker DJ, McIntosh AR 2020. Heterogeneity in flow disturbance around river confluences influences spatial patterns in native and non-native species co-occurrence. Biological Invasions 22 (11): 3457-3475.

Boonmee S, Suwitchayanon P, Krumsri R, Kato-Noguchi H 2020. Investigation of the allelopathic potential of *Nephrolepis cordifolia* (L.) C. Presl against dicotyledonous and monocotyledonous plant species. Environmental Control in Biology 58 (3): 71-78.

Booth JD 2020. Reviewing the far-reaching ecological impacts of human-induced terrigenous sedimentation on shallow marine ecosystems in a northern-

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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 Deirdre Hart, Clive Howard-Williams, Di Lucas, Aroha Mead and Shona Myers. 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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