

NEW ZEALAND ECOLOGICAL SOCIETY

Newsletter

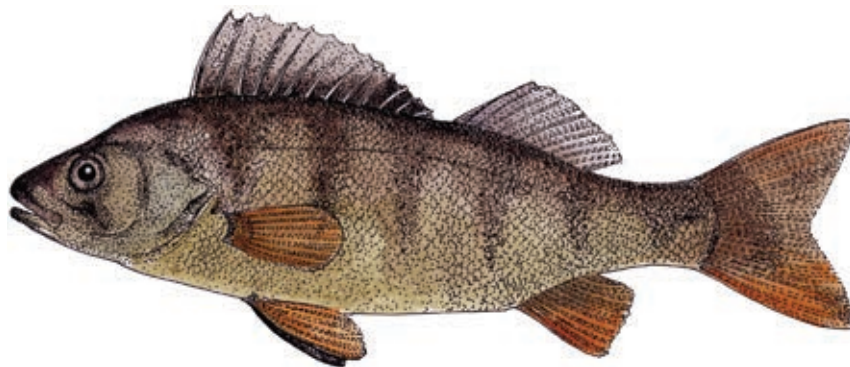
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No. 144, June 2013

FROM THE EDITOR

Nominations for this year's NZ Ecological Society awards are due on **1 July 2013**. Many ecologists have made outstanding contributions to the study and application of ecological science. However, the NZES Council relies on members to nominate deserving people for these awards. So get thinking, write your nominations, and email them to George Perry by 1 July (see p. 2 for details). This year's joint NZ Ecological Society and Ecological Society of Australia conference (EcoTas13) will be held in Auckland, and is shaping up to be a memorable event (p. 2). In addition to the standard events (talks, posters, student day and field trips), the conference will include workshops and a photo competition. It will also include a novel session for presentations given in alternative formats (e.g. poetry and musical presentations), which I'm sure will be entertaining. Abstracts are due by **28 June 2013**. Conference details are available at <http://ecotas13.org/>.

ILLUSTRATE ECOLOGY



Originally from England, Perch (*Perca fluviatilis*) were widely released in New Zealand in the 1870s. They can be distinguished from other freshwater fish species by the two dorsal fins. Perch have six or more dark bands along their sides, and bright red-orange at the bottom of the caudal, anal and pectoral fins. Perch prefer slow-moving and still water habitats and are carnivorous, with adults eating mainly other fish. Perch reduce the abundance of common bullies, inanga, smelt and crayfish in lakes where they have been introduced

Caption source: NIWA Fish Atlas online <http://www.niwa.co.nz/freshwater-and-estuaries/nzffd/NIWA-fish-atlas/fish-species/perch>.

Illustrated by Sonia Frimmel (see article p. 4).

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The deadline for submissions for the next issue of this newsletter is **Friday 6 September 2013**.

NZES ANNUAL AWARDS 2013 — CALL FOR NOMINATIONS

TE TOHU TAIO – AWARD FOR ECOLOGICAL EXCELLENCE

Nominations are invited for the Te tohu taiao award (formerly NZES award). This award is presented annually to recognise individuals who have made an outstanding contribution to the study and application of ecological science. The award is made to the person(s) who have published the best original research in ecology of New Zealand, and its dependencies (including the Ross Dependency) or person(s) who have made the most outstanding contribution to applied ecology particularly conservation and management.

NB. This award used to be presented to members only, but a council decision in 2006 supported the recommendation to make non-members eligible.

Please email any nominations for this award to George Perry, george.perry@auckland.ac.nz, by **1 July 2013**. Nominations must include a statement of support, which will be considered by the NZ Ecological Society council.

NZES ECOLOGY IN ACTION AWARD

This award was established to recognise individuals who are achieving excellence and best practice in the promotion of ecology, including communication, education and transfer of ecological science at the grass roots. The Society would like to recognise work of individuals achieved in promoting ecology and education at a local government level, with landowners, community groups, politicians and councils. This award is for individuals, whose role is primarily the transfer of ecology and research, but who are not necessarily involved in pure ecological research. This award reflects one of the primary aims of the society that includes promotion of the study of ecology and the application of ecological knowledge in all its aspects. The society also recognises that the transfer of ecological knowledge at a community and local government level is important in changing behaviours and achieving practical protection and restoration of biodiversity, particularly of our threatened lowland ecosystems.

The Society offers recipients:

1. \$500 contribution towards attending the next NZ Ecological Society Conference;
2. \$500 prize to the recipient.

Recipients of the award are invited to present a paper at the next annual NZ Ecological Society Conference. The work can also be given profile via a media item, or highlighted in the NZ Ecological Society newsletter. Nominations for this award should include a statement of support and will be considered by the NZ Ecological Society's council, and should be emailed directly to George Perry, george.perry@auckland.ac.nz, by **1 July 2013**.

HONORARY LIFE MEMBERSHIP

Honorary life memberships are conferred from time to time to recognize excellence and longstanding service in the study or application of ecological science in New Zealand. Nominations should be presented to council, seconded and must include statements of support. The selection committee will consider candidates' eminence in the scientific field and contribution to original research or the application of such research in New Zealand and the extent of their association with the Society.

Please email any nominations for this award to George Perry, george.perry@auckland.ac.nz, by **1 July 2013**. Nominations should also include a statement of support.

George Perry
 NZES Council Awards Convenor
george.perry@auckland.ac.nz

ECOTAS13 CONFERENCE UPDATE



5th joint conference of
 New Zealand Ecological Society
 and Ecological Society of Australia
 Auckland | 24 – 29 November 2013

Celebrating ecology on both sides of the Tasman: diversity and opportunity

We invite you to attend the latest joint conference held between the Ecological Society of Australia and the New Zealand Ecological Society to celebrate advances in ecological science, and the ecological connections and differences between the two countries. The conference will create a critical forum on ecology for researchers, managers and policy

makers, and we urge ecologists covering the full range of ecosystems, life forms, approaches, and scales to attend and highlight their valuable contributions.

Conference details are available on the website at www.EcoTas13.org. Registrations for the conference will open on 21 June.

Call for Abstracts

We are currently accepting abstracts for EcoTas13.

Please submit abstracts at <http://ecotas13.org/abstracts/abstract-submission/>. Abstracts close on 28 June, 2013.

Three main presentation types will be catered for at the conference: oral presentations (12 minute talk + 3 minutes for questions), speed talk (4 minutes talk + 1 minute changeover), and poster presentations. This year we are also running a session catering for presentations given in **alternative formats** (e.g., poetry, or musical presentations, etc.). Please consider giving this type of contribution.

We are also asking for expressions of interest in running workshops in association with the conference. If you are interested in running a workshop, please email ecotas13@auckland.ac.nz for more information before 28th June.

Confirmed keynote speakers

- Prof Chris Thomas (University of York) – Impact of climate change on ecosystems
- Prof Tom Kompas (ANU) - Natural Resource and Environmental Economics
- Prof Don Cowan (University of Pretoria) – Antarctic Ecology
- Prof Richard Duncan (University of Canberra) – Biological Invasions and Extinctions
- Assoc Prof John Ogden – Forest and Conservation Ecology
- Prof Ian Jamieson (University of Otago) – Conservation Genetics
- Winner of the 2013 Australian Ecology Research Award.

Symposia

Confirmed symposia for the conference are:

1. Ecosystem development and retrogression on both sides of the Tasman
2. Invasive species in a changing world: theoretical and applied perspectives
3. Monitoring restored and remnant vegetation in agricultural landscapes: What ecosystem services do they provide?
4. Understanding socio-ecological systems for effective conservation.
5. The ongoing evolution of predictive ecosystem-scale ecological modeling
6. Using genetic data to study ecological patterns and processes across landscape
7. New frontiers in elevated CO₂ impacts on terrestrial ecosystems
8. Microbial ecology
9. Ecological management of urban landscapes: a cross-Tasman perspective
10. eResearch in ecology: a new paradigm
11. Antarctic ecology
12. The future of forests in Australasia: impact of *Phytophthora* on plant composition and ecosystem functioning
13. Functional community ecology: trait-based approaches to the paradox of community assembly
14. Insects and climate change
15. Ecosystems and economics
16. Back to fundamentals: linking Indigenous and western ecologies

Other events

A student day will be held on Sunday 24 November prior to the main conference and a full suite of field trips is currently being prepared with most running on Friday 29th November. There will also be an ecology-themed photographic competition run in conjunction with the conference. Details of these events will run on the conference website shortly.

The Local Organising Committee is working hard to develop an excellent and noteworthy conference for the potential delegates and look forward to seeing you in Auckland in November.

Bruce Burns, Conference Co-convenor

ARTICLES

EIANZ: ECOLOGICAL IMPACT ASSESSMENT GUIDELINES FOR USE IN NEW ZEALAND

Judith Roper-Lindsay

A team of ecologists* in the New Zealand Chapter of the Environment Institute of Australia and New Zealand is preparing a set of guidelines for carrying out ecological impact assessment in New Zealand, based on the draft currently available on the Institute's web-site (www.eianz.org). Currently nine authors are working on an initial draft document which will undergo a period of peer review, workshops and consultation in spring 2013. The aim is to finalise the EIANZ Guidelines by the end of the year.

The project arose in 2008-2009 when ecologists working on both side of the Tasman identified problems with making consistent and rigorous ecological assessments in different environments, states, regions and districts; this in turn led to inconsistent decision-making in planning, and unsatisfactory outcomes for biodiversity. The draft EIANZ Guidelines issued in 2010 provide useful background on ecological considerations, but are not directly applicable under the Resource Management Act 1991. This updated guidance addresses New Zealand environments and legislation more specifically. It also introduces a section on ethics and practice, to assist ecologists to deal with the challenges of being professionals.

The EIANZ Guidelines will address issues around: professional ethics and conduct; project scoping, carrying out site work, assessing effects, mitigation and monitoring, presentation of findings, and preparation of reports. Terrestrial and freshwater environments are being covered initially; guidelines for assessments in coastal marine areas may follow. It is intended that they will be used by a wide range of ecologists and planners in consultancy, local and central government, research, and universities or colleges.

There will be opportunities for NZES members to input or comment on the draft later in the year. Anyone with a strong interest in being involved can contact Judith Roper-Lindsay (Judith@roperlindsay.com) or any of the other contributing authors.

*authors: Judith Roper-Lindsay, Ian Boothroyd, Stephen Fuller, Caroline McParland, Robin Mitchell, Justine Quinn, Mark Sanders, Graham Ussher, Geoff Walls.

LINKING PEOPLE TO PLACE WITH CREATIVE SPACE

Sonia Frimmel, *What's the Story*

Inspired by a life-long love of the outdoors, Waikato-based artist and writer Sonia Frimmel has built a career capturing New Zealand's natural environment in words and pictures. She has her own interpretation planning and design company, but she fell into this line of work a bit by accident. "I trained as a nurse and spent some years out of New Zealand and worked at an Outward Bound school... When it was time to come home I didn't want to go back to work in a hospital, so went to Lincoln University to do a Diploma in Parks and Recreation. I'd never heard of interpretation at that stage—I just wanted a job where I could spend time in the hills!" ... "I was hooked on interpretation from the first class. I loved the idea of being able to forge links between the landscape, its many stories, and the people who came to see or experience the place." Interpretation offered an opportunity to mix all of Sonia's interests—science, art, history, and conservation—and occasionally she does get field trips into the hills!



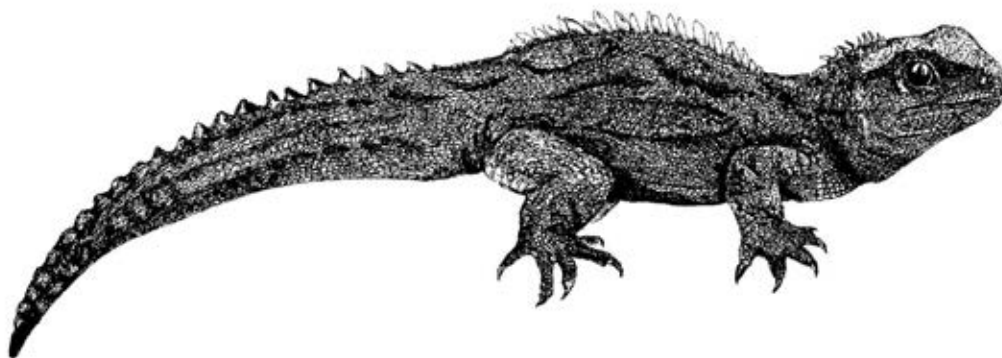
Clematis paniculata (illustrated by Sonia Frimmel).

While working for the Department of Conservation and producing signs and publications, Sonia often found it difficult to get the right images to illustrate the stories—and so dusted off the drawing skills that been dormant since she left high school. She recalls needing a photo of an obscure slug, though can't recall why. *"There were a few fuzzy old photos and some technical descriptions but no nice clear image, so I drew one. Someone saw that and asked me to draw a bat"*. The challenge was that they wanted it to look "cute" as it was for an information pack going out to potential sponsors—the perpetual conundrum for those seeking commercial help to protect the obscure, the ugly or the under-rated. Things progressed from there and, over the years, she has developed a catalogue of over 400 line drawings—everything from bugs to birds, and flowers to fish—both native species and pesty introductions. Most of the illustrations are black and white or coloured line drawings but Sonia also creates vivid artworks in oil pastels—all with natural heritage themes.

Her work in heritage interpretation can be seen from Northland to Greymouth, from information panels in national parks and reserves, to brochures and information booklets in visitor centres and museums. *"It's great being able to work with such a variety of people and organisations and on so many themes—I've learnt a lot about some amazing places and projects. I've worked with community groups on very local ventures and on large scale projects involving many players—like the Whanganui River interpretation project."*

Interpretation is a bridge between people and place. It's one creative tool that can be used to help convey scientific concepts, historical perspectives, ideas and issues in a digestible and, ideally, inspirational way. The right illustration in that context, to use a cliché, can speak 1000 words.

You can check out some of Sonia's work on www.whatsthehistory.co.nz or contact her at sonia@whatsthehistory.co.nz



Tuatara (illustrated by Sonia Frimmel).

CONFERENCE REPORTS

THE 2013 NZ PLANT CONSERVATION NETWORK CONFERENCE IN AUCKLAND: A PERSONAL PERSPECTIVE

Frances Schmechel

The conference kicked off on Thursday May 23 at a fantastic venue—the Auckland Botanic Gardens—with three concurrent workshops: plant identification, seed collecting, and plant propagation. Word had it the workshops were so popular they could have been filled twice over. At \$35 including lunch it would have been a bargain at twice the price.

The evening 'warm up' social at the historic and congenial Brew on Quay across from Queens Warf (and 'The Cloud') was a great way to start things. According to the website, the pub owners pride themselves over their range of well crafted beer and nibbles—I'm a believer. This would be a bargain at two hundred times the price as it was 'free'—one drink and all the food was included in the cost of registration. Hats off to the conference organisers who showed not only taste and flair, but also compassion for anyone travelling on their own coin (I suspect they donated a lot of time finding sponsors.)

Next came the main course with two days of talks, which were of an exceptional quality across the board. Also very popular with the punters was the single 'stream of talks'—no concurrent sessions to agonize over.

The theme was 'Are we there yet?' I came away with a sense of an exciting and hopeful journey with some very talented and dedicated folks. Secondary themes that emerged were people and plants, and plant-animal interactions.

Key note talks on day one covered taxonomy and why it matters so much (it really does); an update on DOC's prioritisation process for ecosystems and species (they've been combined); and the recent review and changes in threat rankings for all the vascular plants. (The good news—none were listed as having gone extinct. The bad news—a lot

more are listed as threatened. The good news—some of that is because of taxonomic revisions.) Ilse Breitwieser gave a preview of how the next generation of floras will be portable, nimble and smart enough for your phone.

A representative from Kew Gardens gave a presentation on the ambitious Millennium Seed Bank Partnership which aims to store 25% of world's plant species seeds by 2050. At the Kew facility viability is regularly tested every five years (so far, so good—they have the technology sorted). You can look up the NZ seeds that are in the collection at the Kew facilities online. Very cool. Not only are the seeds collected and tested over time for viability, but they are a resource that can be used for research and other things. Hopefully this will see the launch of NZ as one of the active partners in this project. And as a partnership, the bulk of seeds may be stored in facilities in NZ with support from Kew.

I especially enjoyed two thought-provoking talks about natives outside their natural range. One suggested provided compelling reasons we may want to apply kaitiakitanga locally and treat NZ plants outside their native range as 'exotics'. The other gave provided criteria to use in thinking about these native invaders and what to do about them. At first glance at odds with one another, but after further thought I've concluded these are potentially complimentary approaches.

There were also a whole slew of excellent talks ranging from who's who among seed dispersers in the sub-alpine zone (keas are king, possums poo seeds into dark forests); threats to rare bryophytes from coal mining; kahikatea conservation and shallow ground water (they need it); the role of nurseries and landscaping in plant conservation (lots of very wonderful natives out there still underutilised and also some being misused), and native plants at the Auckland zoo.

In the zoo talk we got to have giraffes instead of graphs. During the course of the two days the secrets of several 'confusograms' were revealed satisfactorily making us all feel very intelligent. But to keep us humble we also puzzled with Debra Wotton over why some plants are rare—and in spite of a very well designed and executed study we still don't know.

On day two Dame Anne Salmond took us on a fascinating journey into history of plants and humans as well as sharing challenges and inspiration including the Te Araroa Riparian Restoration vision of restoring 1000+ rivers by 2050.

Prof Dave Kelly gave a fast paced overview of plant-animal interactions, and reviewed how understanding has changed from concern about seed dispersal to more recent concerns about the extent of pollen limitation. He 'cheered' the silvereys, as they do plants a great service. He also included fascinating snippets such as the case of 'apparent competition' where the decline of plants after a fire near Cass turned out to be because of snail habitat and predation, rather than direct competition between the plants.

Marie Brown gave a superb talk on biodiversity offsets, compliance rates, and what this all means for plant conservation. My take home message—there is still a lots of room for improvement here. Two talks on mangrove management generated discussion among the punters (and some wondered why neither speaker spoke about addressing the cause of mangrove spread).

The audience was also treated to interesting journeys into the practical challenges of plant conservation: lawn mowing weeds at a remote Molesworth Station ephemeral tarn; rabbits climbing ladders to attack a whole suite of highly threatened plant species tenuously clinging to survival on the top of a tiny limestone bluff in Otago; and some serious spraying as the key to the survival of baby *Olearia adenocarpa* on an island in the Rakaia River.

The conference talks closed with an inspirational presentation about Project Gold—a kowhai restoration project featuring the Otago Rail trail. All the talks were recorded and will be available on the web at www.allaboutauckland.com/search/?q=nzpcn.

The formal conference closed with the conference dinner where two funds were launched: the David Given Research Fund and an endowment fund for threatened plant conservation on-the-ground projects. There was a great buzz and energy at the post dinner auction—it was a crisp, professional, fun and fair affair. Almost \$3,000 was raised for the new funds. The dinner, which included pre-dinner drinks and wine at the tables, was another great deal (\$45).

This is the 10 year anniversary of NZPCN and one of the network's goals is no extinctions. In Jeremy Rolfe's presentation of the most recent review of plant threat status there were no extinctions listed! So the network can proudly tick that goal met so far.



Fieldtrip attendees at Mataia Farm, Kaipara Harbour, home to mature mangrove forest (Photo: Debra Wotton).

The conference concluded for me with the Kaipara Harbour field trip. We started at a beautifully restored historic home with a Devonshire tea and an introduction about the scope of work being done (animal pest control, a QEII covenant, and recently released kiwi). This was followed by a great, if at times slightly muddy, walk through the working farm. We enjoyed exploring a local estuary, several types of regenerating forest including kauri, fernbirds, and shorebirds. The fruits of successful rat control were evident in the abundant regeneration of nikau palms and the ungnawed seeds of matai. We were lucky with the weather, in spite of the forecast for rain—we had clouds clearing with a beautiful afternoon. Again—a very affordable \$35 including lunch.



Mataia Farm has extensive saltmarsh habitat bordering the Kaipara Harbour, with a healthy population of rare endemic fernbirds (Photo: Debra Wotton).

I greatly appreciate the energy and work that John Sawyer, Sarah Beadel, and others put into organising and running the entire conference. From a participant's perspective things went very smoothly, it was a huge success, and I would highly recommend future NZPCN conferences to those interested in plant conservation.

CANADIAN SOCIETY FOR ECOLOGY AND EVOLUTION CONFERENCE 2013

Nicola Day, PhD Candidate at University of Guelph, Ontario, Canada

The 2013 Canadian Society for Ecology and Evolution conference was held at the Okanagan campus of the University of British Columbia in Kelowna, British Columbia, 12–16 May. I flew cross country from Ontario and it was fantastic to see real mountains again! Two 5 hour workshops were run on the Sunday to kick the conference off. Brian Ohsowski and I ran the "Introduction to R" workshop for all those people still stuck in SAS (why this program is still used is beyond me!). Ashley Shade and Miranda Hart ran the concurrent workshop introducing people how to analyse the large amount of data from the ever-growing techniques of next generation sequencing that ecologists commonly use to investigate microbial communities.

All the talks and posters were a very high standard and I am refreshed and inspired (well, maybe I'll be more refreshed after I get some sleep!). Pierre Legendre won the 2013 President's award and he did an excellent talk on investigating beta diversity over landscapes. I thoroughly enjoyed this talk and it was an honour to meet him in person since I am constantly referring to his book, "Numerical Ecology" (incidentally, there was a new edition just last year and the topic of his talk was from chapter 14). The plenary was by Fred Allendorf, who is a conservation geneticist. His talk was also excellent and was a discussion of the minimum population size required for a species to not go extinct. There was a New Zealand theme here, because he has worked with Ian Jamieson and spent some time talking about the kakapo and how this theoretically should be extinct under traditional theories surrounding minimum population sizes. NZ also appeared later in the day in Tony Sinclair's talk about effective restoration of habitats and ecological function. I felt very invigorated by these talks because they emphasised the high quality of NZ ecological research and its global relevance.

With about 400 attendees it was a good sized conference with a relaxed feel making it easy to meet people and reminding me of NZES conferences. A real highlight for me was the all-day symposium on plant-microbe interactions because my PhD is focussed on root fungal endophytes in an invasive plant species (*Vincetoxicum rossicum*). It was great to have a bunch of enthusiastic people talking about such diverse research in this relatively young area of community ecology. Other sessions I enjoyed included invasive species, community ecology and quantitative methods in ecology; I was surprised by how popular this session was and how understandable the talks were.



View of Osoyoo desert from Nk'Mip Desert Cultural Centre.

Field trips were run on the last day and I went to the Osoyoo desert and saline lakes. Unfortunately the water table was too high for the lake colours to be apparent, and in this Central Otago-like environment I had to keep reminding myself that the abundant Ponderosa pines are not invasive here! The plethora of vineyards in the area made for a relaxed wine tasting event and a good time at the banquet on the last night. Thanks to Jason Pither and the rest of the organising committee. Can't wait for next year in Montreal!



Okanagan valley near saline lake with Ponderosa pines.

RESTORATION IN THE HAURAKI GULF—A WORKSHOP HOSTED BY THE CENTRE FOR BIODIVERSITY AND BIOSECURITY

University of Auckland, Monday 18 February 2013

Mel Galbraith, Unitec

The Hauraki Gulf Marine Park was established under the Hauraki Gulf Marine Park Act (2000) to recognise and protect the significance of the natural and heritage resources within the Gulf, specifically ensuring protection of nationally significant ecological systems and access and enjoyment for people and communities. However, the Hauraki Gulf Forum's 2011 State of Our Gulf report lists a raft of on-going anthropogenic impacts that continue to degrade the environmental quality of the Hauraki Gulf. The report also recognised the success of island and marine restoration activities that are producing positive outcomes. The aim of this workshop was to foster sharing of knowledge and collaboration between these restoration projects occurring within the Hauraki Gulf.

Attendees of the workshop represented ecological science, community groups and local government. The programme consisted of a range of presentations that provided updates on current status of projects, an exchange of information and experience and reported on current research. An intention of the gathering was also to facilitate networking to identify common needs and potential cooperative actions. Talks in the early part of the day established clearly the ecological significance of the Hauraki Gulf—the islands of the Park are refuges for about a quarter of New Zealand's reptile species and one third of the seabirds. With the removal of feral mammals from over 20 islands, new and relict populations of indigenous biodiversity have moved into recovery mode. Reporting on restoration activities was a focus for the latter part of the workshop.

Throughout the day, the need for whole-community buy-in of the Gulf's ecological and social values, and their management, was emphasised, and the workshop was hailed as an important mechanism for promoting these values to the wider community. Many attendees voiced their support for the workshop, so there are bound to be future workshops focusing on the Hauraki Gulf's future. The convenor of the workshop was Dr Bruce Burns of the School of Biological Sciences, University of Auckland, immediate past-President of the NZES.

BOOK REVIEW

MOA: THE LIFE AND DEATH OF NEW ZEALAND'S LEGENDARY BIRD

Reviewed by Laura Molles, Lincoln University

Author: Quinn Berentson

Publisher: Craig Potton Publishing, Nelson

Published: 2012

ISBN: 978-1-877517-84-6 (hardcover)

300 pp.



I was braced for disappointment. A book about moa? Hasn't that been done? Aren't musings from a producer of shows about "serial killers and human cannonballs" (among other things—I'm being unflatteringly selective here) just going to leave me mildly annoyed and misinformed? Happily, the book was not what I expected. Rather than re-cataloguing results of scientific research from the arrival of Europeans onwards, this book delves into the trials, twists and tribulations of the western world's introduction to the moa, as well as the quirky personalities responsible. Rivalries flare, careers rise and fall, and many an ill-equipped, fair-skinned lad trained for the ministry traipses into the wild hinterlands, faces terrible peril, and finds salvation in the form of helpful natives. It's all very adventurous.

Quinn Berentson frames the narrative, appropriately, as the unravelling of a great mystery; although the dramatic phrasing occasionally gets a bit out of hand, overall the writing and structure are effective and engaging. I may print and frame the bit about central Otago's travelling cat salesman from page 266. The accompanying images are not flashy—and I'd seen some of them before—but are interesting, and nicely complement the historical ambience of the text.

The first 185 pages of the book follow the story from 1835 to 1900, and along the way provide a nice introduction to this period of New Zealand history in general, especially if, like me, you're from elsewhere and have never quite got around to reading up on it. The real stars of the show, however, are the scientists and explorers. Richard Owen and Gideon Mantell play the leading roles, and Berentson really relishes digging into their characters and bitter rivalry. They battle it out for decades, then pass the torch to Haast and Hector, who carry the story through the rest of the 19th century. It's entertaining reading, and reminded me how fortunate we are to live in a time when science is so much less competitive and ego-driven.*

Around this point, the exploration of the characters involved becomes more superficial, which was probably my main disappointment with the book. I'd been drawn in by the characters, and suddenly they'd all died off. Perhaps the rivalries were less intense, or the personal lives of the people involved were, well, more personal. Whatever the cause, the 40 pages or so devoted to the 20th century were somewhat less engaging because the players were not as "fleshed out" as they had been during the 1800's narrative. However, it is in this stretch that the moa themselves began to be fleshed out, based on a spate of spectacular paleontological finds during the 1900s.

The final portion of the book focuses on what has been learned about moa, thanks largely to DNA analysis, in the last 10 years. Berentson summarises recent interpretations of the moa family tree, moa ecology, and of course their rapid extinction following human colonisation; for some readers, this will provide an easy way to catch up on what's happened since the 2002 publication of Worthy and Holdaway's blockbuster *The Lost World of the Moa*¹.

In this section, Berentson also finally acknowledges an omission that had been bothering me throughout the book: surely some of the early questions about the great birds, for example whether they had ever co-existed with humans, could have been answered by Maori? I'd started to wonder if anyone had even bothered to ask. Although I was somewhat relieved to find out they *had* been asked, this set of players in the moa story is presented almost entirely through the writings—and excavations—of European scientists. Perhaps this, like the less personal approach to the 1900's material, is inevitable given the information that was available to Berentson.

Overall, I found this to be easy and enjoyable evening reading. Berentson held my attention, heightened my interest in (and knowledge of) New Zealand history, and taught me a fair bit about moa. I'll probably draw on the book to liven up a few of my undergraduate lectures—after I've tracked down some of the source material. While citations are provided for direct quotes, the failure to list the many scientific papers that underlie the final section of the book seems to me a substantial shortcoming. It didn't, however, detract from *Moa* being a good read, and one that will be accessible and appealing to non-scientists with an interest in ecology or history—I'll certainly recommend it to my dad the next time he's visiting.

*If anyone knows of a font universally recognised to indicate sarcasm, please contact me.

Reference

¹ Worthy T. and Holdaway R. (2002) *The lost world of the moa: prehistoric life of New Zealand*. Canterbury University Press.

NEWS FROM COUNCIL

A voice for ecology, natural resource management, and sound decision making

Fleur Maseyk, NZES Vice President

In the last couple of months several members of NZES have prepared submissions¹ on behalf of the society in regards reforms to the RMA. What follows is part update on recent submission activity and part a rallying cry as to the importance of NZES expressing its voice in issues of national importance—that is, the voice of a professional body of ecologists.

Many times I have been told by people around me—all definitely older (*when you grow up*) and most often a bit more jaded (*what you have yet to learn*)—that life is but one big cyclic journey, full of peaks and troughs, and it is just a case of riding out the bad times, because the good times are sure to be coming back around. My immediate internal response to such wisdom is wondering whether perhaps I should: a) just stay in bed, or b) give up on analytical thinking until those golden days do actually roll back around.

My problem with the whole cyclic thing is, sometimes it can be a long wait lolling around in the trough of dark environmental times, and I'm not naturally inclined to patience. Sometimes a bit of "get up, stand up" is called for.

Take right now for example—surely an unhappy chapter in our environmental history by the standards of anyone. In recent times, there have been quite a few government decisions supported by a paper-thin rationale that have a direct impact on New Zealand's natural environment, or the way in which New Zealanders interact, manage, and benefit from that natural environment. It's a classic case of environmental degradation by a thousand legislative and policy cuts.

Let us focus on just one example—and it's a biggie. The reform of the Resource Management Act (RMA): a two phase process.

Phase one, was completed back in 2009 when the Resource Management (Simplifying and Streamlining) Amendment Bill was passed into Act and Phase two was kicked off in December last year, when the Resource Management Reform Bill 2012 was introduced to Parliament. The justification for the reforms is placed squarely on the need to cut the red tape that the RMA allegedly throws in the way of progressing development², and a less emphasised but nonetheless obvious link to the Government's Growth Agenda³.

The 2012 Bill continues the rhetoric of the 2009 streamlining process, in particular for Auckland's Unitary Plan, speeding up the granting of consents by imposing time limits on processing, and enabling easier direct referral to the Environment Court.

There are, however, other aspects of the RMA reforms that cannot be contained within the justification of expediency of consent granting or administrative improvements and these include substantive changes within Part II of the RMA.

Part II of the RMA contains the principals and purpose⁴ of the Act, and it is here that the concept of sustainable management of resources is fully embedded, underpinning all else that follows. Proposed reforms within Part II (to sections 6 and 7⁵) seriously undermine the very heart of the Act.

The nature of the proposed reforms essentially shifts the RMA from a piece of environmental legislation to a piece of economic legislation, and does so in the absence of defensible justification, or indeed any sound policy analysis⁶. While there are some proposed reforms that will result in improved resource management and better ecological outcomes, the vast majority add up to the most radical and short-sighted reforms in over twenty years.

It's time for some action!

There are many ways to exert influence, chaining oneself to trees and placard waving just two. Another is to respond with a clear, concise, evidence-based submission to the public engagement process. And as tempting as it was to get tee-shirts printed with I *heart* the RMA, it was the rational and referenced statement approach the Council took in representing NZES⁷.

The involvement of NZES in issues under public consultation⁸, such as the RMA reform process, is considered to be imperative on the grounds that:

1. A core objective of the society is to promote the application of ecological knowledge in all its aspects; and
2. To not submit would leave a void in the public debate where the informed ecological voice should be.

Right about the same time as the resource management reform submission process was on the go, and with an equally tight turn-around period, a parallel process of public engagement on 'Freshwater reform 2013 and beyond'⁹ was being run. Such excitement! We here at the NZES 'submissions office' could barely contain ourselves.

Happily, and in stark contrast to the RMA reforms, this discussion document contained much to be positive about and to lend the support of the Society to. In particular: the enabling of more integrated, targeted, and sustainable management of the fresh water resource within the RMA and the building on the good work of the Land and Water Forum (LAWF).

However, and just in case they missed the point the first time around, our second submission highlights that the proposed changes to Part II of the RMA could significantly undermine the positive reforms aimed at freshwater management.

To provide further weight to the scientific voice and in a coming together of mutual interests, the NZES and the New Zealand Freshwater Sciences Society (NZFSS) made a point of supporting each societies submission on both issues.

What happens now? The 'word on the street' is that Parliament is likely to pass the Resource Management Reform Bill into Act later this year—it will be interesting how much influence the public submissions will have on the final set of proposed reforms. On a bad day, the cynic in me speaks loudest and my money would be on not very much.

However, bad days and cynics can be ignored, but what mustn't be ignored is the value of giving a voice to the wealth of ecological knowledge and experience the NZES collectively holds, and the power rational, evidence-based debate brings to decision making.

That only leaves me to ask—can our voice be a bit louder?

And yes, I think it can¹⁰. Those scientists, resource managers, and retired activists amongst us may wish to lend wisdom and status to public statements, press releases, or actions (just as many of you have in the past¹¹ and recently¹²).

Have a think about it.

Very large and grateful thanks to: Shona Myers, Susan Walker, Paul Blaschke for their substantial efforts in preparing the two submissions mentioned here, and to several other NZES members, including the NZES Council, for helpful contributions and comments under very tight (streamlined!) timeframes.

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¹http://www.nzes.org.nz/sites/all/files/NZES_Submission_Improving_Resource_Management_March2013.pdf; http://www.nzes.org.nz/sites/all/files/NZ_Ecological_Society_Submission_Freshwater_Reforms_April2013.pdf

²A position not substantiated by the Ministry for the Environment's own data, which indicates over 90% of consents are granted, on time, and outside of the Environment Court and eloquently discussed by Rod Oram in his column in the Sunday Star-Times:

(<http://www.stuff.co.nz/business/opinion-analysis/8400307/Oram-A-naked-power-grab>)

³<http://www.mbie.govt.nz/what-we-do/business-growth-agenda>

⁴The purpose of the Act is to promote the sustainable management of natural and physical resources.

⁵Section 6 contains the matters of national importance that must be recognised and provided for, and section 7 contains the other matters that particular regard must to be given to.

⁶As echoed in national media by Jan Wright, the Parliamentary Commissioner for the Environment (<http://www.radionz.co.nz/national/programmes/ninetonoon/20130403>) and Sir Geoffrey Palmer who, along with Simon Upton, was the original architect of the RMA.

(<http://www.radionz.co.nz/news/political/136135/rma-architect-says-changes-could-threaten-environment>)

⁷NZES submitted in response to the public discussion document 'Improving our Resource Management System'

(<http://www.mfe.govt.nz/publications/rma/improving-our-resource-management-system-discussion-document.pdf>)

⁸NZES has a defined process for responding to issues under public consultation and attempts to put submissions in on issues: 1) Of national importance, or regional issues of considerable importance or with the potential to set national precedents; 2) where ecological knowledge and experience can or should be called upon to inform decision making; 3) to promote awareness of ecological principles and promote sound planning. Our Communication Strategy contains criteria to further identify priority issues. Both the submissions process and the Communication Strategy feed into the NZES Five Year Strategic Plan.

⁹<http://www.mfe.govt.nz/publications/water/freshwater-reform-2013/freshwater-reform-2013.pdf>

¹⁰And there are some inspirational examples coming out of Queensland right now: <http://concernedqldscientists.wordpress.com/>;

<http://www.brisbanetimes.com.au/environment/scientists-rally-for-reef-20130604-2no9s.html>

¹¹Examples that spring to mind: Save Manipouri; Pueoroa Forest; Whirinaki Forest; Hurunui River; Denniston Plateau...

¹²For example: <http://wiseresponse.org.nz/>

RECENT NZES SUBMISSIONS

- Freshwater Reform 2013 and beyond (March 2013)
 - Improving Resource Management discussion document (March 2013)
 - Resource Management Reform Bill (Sections 32 and 76) (February 2013)
 - Environmental Reporting Bill (October 2011)
 - Environment Canterbury Regional Council's Land and Water Regional Plan (October 2011)
 - Proposed National Policy Statement on Indigenous biodiversity (May 2011)
- Submissions are posted on the website at www.nzes.org.nz/about/submissions*

POSTGRAD PROFILE

Alexis Carteron, Lincoln University

Alexis has just started his PhD on drought-induced tree mortality at Lincoln University. He is fascinated by islands and their plant species, making New Zealand a perfect place to work.

Droughts in New Zealand? One would say, yes, we get them, but it's always "context-dependent". The conditions required for a drought vary from place to place. Only few consecutive dry days in a rainforest could be extreme for the organisms there, especially those which can't move to wetter locations! In other parts of the world rain may almost never reach the ground and when it does so life blooms as species race to make use of the scarce resource.

The last summer has been particularly dry in New Zealand, driving home why it is important to understand water stress on plants. One objective of my PhD research is to document past events of large-scale drought-induced tree mortality across New Zealand. Over such a large area this task is complicated, which is why I am asking for assistance from nature watchers. As Peter Wardle mentioned when writing about drought and plant mortality "too often, the evidence is noted but seldom put on permanent record" (NZ Botanical Society newsletter, June 2001). If you want to share any observations made on the effects of droughts on plants (particularly trees), I would be pleased to hear from you (carteroa@lincoln.ac.nz).

I am also very interested in research on plant functional traits that allow plants to make a living in a given environment. These traits vary among species (vive la différence!) and across environmental gradients, including rainfall gradient. During my thesis I will attempt to determine which traits best explain drought sensitivity in trees. This will improve our understanding of tree relations with water, forest dynamics, and aid predictions of forest responses to future extreme droughts.



Southern beeches including *Nothofagus fusca* (pictured) are susceptible to large-scale drought-induced mortality.

ECOTONES

Bruce Burns, University of Auckland

A selection of newly published research on or relevant to New Zealand ecology (except that published in the New Zealand Journal of Ecology)

Mast seeding cue revealed

Mast seeding is the synchronous, highly variable seed production among years in a population of perennial plants, and is a feature of many species in New Zealand. What cue or cues lead to this synchronisation has been the subject of much research, not only to understand the underlying selective processes, but to be able to predict large seed crops for management of consequent population irruptions of consumers. Up until now, warm temperatures during the growing season have been frequently associated with large seed crops in the following season. Kelly et al. (2013), however, present evidence that mast seeding plants respond more strongly to the difference in the mean temperatures in the growing seasons 1 and 2 years prior to seed production (ΔT). They used 26 mast-seeding data sets from New Zealand spanning 15 species in five plant families and compared several models based on temperatures to predict mast seeding behaviour. Of all the models tested, including the previous summer model, the ΔT model provided the best fit, and they considered that ΔT is likely the climate cue used by these plants. If this is so, then there are several major implications: it predicts that masting will be unaffected by increasing mean temperatures under climate change; it explains the rarity of consecutive high-seed years; and it will greatly improve our ability to predict when masting will occur and to prepare for the flow-on ecosystem effects.

Kelly D, Geldenhuis A, James A, Holland EP, Plank MJ, Brockie RE, Cowan PE, Harper GA, Lee WG, Maitland MJ, Mark AF, Mills JA, Wilson PR, Byrom AE 2013. Of mast and mean: differential-temperature cue makes mast seeding insensitive to climate change. *Ecology Letters* 16: 90-98. DOI: 10.1111/ele.12020

Progress on biocontrol for *Tradescantia fluminensis*

Tradescantia fluminensis is a highly invasive plant species in New Zealand. It can form dense monospecific mats in forest understories with a dry biomass of 1kg per m² and this mat can completely suppress all seedling regeneration. There is much concern over its effects, and control attempts so far have been uniformly difficult and expensive. Fowler et al. (2013) have now documented a programme to find biocontrol agents for *T. fluminensis* from its native Brazil and introduce these into New Zealand. In Brazil, nine fungi and ten herbivorous insect species live on *T. fluminensis*, and the plant is a 'background' plant in most forests where it occurs with high foliar damage levels observed. Of these species identified in Brazil, three beetles, which attack leaves, shoot tips and stems respectively, were prioritised as potential biocontrol agents, and have been host-tested to confirm their specificity to *T. fluminensis*. These have now all been field-released in New Zealand and monitoring of their impacts is occurring. Let's hope that *Tradescantia* impacts in New Zealand will be much reduced in the future!

Fowler SV, Barreto R, Dodd S, Macedo DM, Paynter Q, Pedrosa-Macedo JH, Pereira OL, Peterson P, Smith L, Waipara N, Winks CJ, Forrester G 2013. *Tradescantia fluminensis*, an exotic weed affecting native forest regeneration in New Zealand: Ecological surveys, safety tests and releases of four biocontrol agents from Brazil. *Biological Control* 64: 323-329. DOI: 10.1016/j.biocontrol.2012.11.013

The hen coop effect. What influence did New Zealand's extinct avian ground fauna have on forest regeneration?

In the absence of mammals, flightless avian herbivores including moa, dominated New Zealand ecosystems from the Miocene onwards. Therefore, it seems probable that many ecological characteristics of these ecosystems would have been shaped by browsing and grazing birds. What functional roles did such birds have? Tanentzap et al. (2013) have carried out some simple but innovative experiments to answer this question. They mimicked scarification of the soil surface and added bird poo (hen manure) to plots within secondary forest and followed any seedling response. They also added a liquid fertiliser to some plots to try and disentangle a bird effect from a nutrient effect from the addition of manure. They found that the addition of hen manure, which had elevated NO₃⁻ levels relative to other treatments, increased the number of seedlings germinating on these plots relative to controls. They also found evidence that increased NO₃⁻ availability prior to application of experimental treatments reduced the relative invasibility of the forest understory by non-native species. These results suggest that the pre-human forest avian fauna, particularly through their repeated deposition of NO₃⁻ onto forest soils, may have indirectly influenced forest composition, stimulated seedling regeneration, and specifically been part of the regeneration strategy of some plant species. Such effects should perhaps be considered in our attempts to restore New Zealand ecosystems.

Tanentzap AJ, Lee WG, Monks A 2013. Increased nitrogen cycling facilitates native forest regeneration: potential for restoring extinct ecological processes? *Ecological Applications* 23: 36-45.

The favourite haunts of possums in the city

In New Zealand, brushtail possums are generally thought of as an invasive species of forest and rural habitats. However, they are common urban residents in Australia, and have also taken to urban habitats in New Zealand. Adams et al. (2013) have now published a study on the distribution of possums within the urban matrix of Dunedin. They looked at the habitat occupancy of possums spread across five different urban habitat types. Possums had highest occupancy in forest fragments within the city but were also present across a large proportion of residential habitat, with occupancy decreasing as housing density increased and green cover decreased. In the residential areas, possums were most often found in structurally complex vegetation, where supplementary food items like fruit trees, vegetable gardens or uncovered compost heaps were present, and close to forest fragments. Birds in urban areas are also associated with complex vegetation so their co-occurrence with possums suggests that negative impacts of possums on birds will occur in urban areas. This research points out that possum populations in cities shouldn't be ignored and the potential for community involvement in controlling such populations is high.

Adams AL, Dickinson KJM, Robertson BC, van Heezik Y 2013. Predicting summer site occupancy for an invasive species, the common brushtail possum (*Trichosurus vulpecula*), in an urban environment. *PLOS ONE* 8: e58422. DOI: 10.1371/journal.pone.0058422

Are New Zealand wind farms killing birds?

Installed wind energy capacity is increasing dramatically globally, and New Zealand is no exception to this trend. In New Zealand, there are now 16 operating wind farms, with a further 26 in various stages of planning. Wind energy is expected to provide 20% of total generation capacity in New Zealand by 2030. Generally wind energy is considered environmentally-friendly compared to alternative energy generating technologies, however, there are mounting concerns about how collisions with turbine blades may influence bird and bat populations (Parsons and Battley 2013). Bull et al. (2013) have now measured the species identities and bird strike rates of birds at a New Zealand wind farm for the first time. At Project West Wind near Wellington, they recorded deaths of 17 different bird taxa at 18 of the 24

turbines studied. The five most common species were Australasian harrier, chaffinch, paradise shelduck, southern black-backed gull, and mallard. Mortality rates for 2 years for this wind farm were 5.83 birds per turbine in year 1 and 4.64 birds per turbine in year 2. This equated to estimated losses due to this 62 turbine wind farm of 363 and 289 in each year respectively. Although such losses are of concern, to put such losses in context, Parsons and Battley (2013) recommend comparing these losses against other causes of bird mortality from human activities. For example, many birds are killed at airports and on roads every year. Nevertheless, finding ways to eliminate or reduce such wildlife mortality at wind farms seems a useful goal for ecologists for the future.

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THE NOTICEBOARD

PRIME MINISTER'S SCIENCE PRIZES—CALL FOR NOMINATIONS

The Prime Minister's Science Prizes are New Zealand's pre-eminent annual awards for excellence in science. The Government of New Zealand introduced the Prime Minister's Science Prizes in 2009 as a way to raise the profile and prestige of science in New Zealand. Each year five prizes are awarded, with prize money totalling one million dollars.

The Prime Minister's Science Prizes are awarded to:

- **The Prime Minister's Science prize:** An individual or team who has made a transformative discovery or achievement in science that has had a significant impact on New Zealand, or internationally.
- **The Prime Minister's MacDiarmid Emerging Scientist prize:** An outstanding emerging scientist undertaking research for a PhD in New Zealand, or within five years of the date of the award of their PhD.
- **The Prime Minister's Science Teacher prize:** A teacher for outstanding achievement in teaching Science.
- **The Prime Minister's Future Scientist prize:** A secondary school student for outstanding achievement in carrying out a practical and innovative research or technology project.
- **The Prime Minister's Science Media Communication prize:** A practising scientist who is an effective communicator; this prize provides them with an opportunity to further develop their knowledge and capability in science media communication.

Applications for the 2013 prize round close on **17 July 2013**.

To find out more about the prizes or to enter, visit www.pmscienceprizes.org.nz

DONATE NOW!

KAURI FUND FOR ECOLOGICAL SCIENCE

We invite you to help grow the science of ecology in New Zealand by contributing to the NZES Kauri Fund. This fund was established in 2001 to provide resources for initiatives that assist the development of ecology and ecologists in New Zealand. As the Fund grows, it will play an increasingly critical role in advancing the Society's goals and fund exciting new initiatives for New Zealand ecology.

Please consider a donation to the Kauri Fund, whether \$10, \$20 or \$50, now or when you renew your subscription. You can contribute in two ways:

Send a cheque made out to: "NZES Kauri Fund" to the New Zealand Ecological Society, PO Box 5075, Papanui, Christchurch 8542.

Internet banking: credit to New Zealand Ecological Society, account 06 0729 0465881 00, identify the payment as "Kauri Fund".

UPCOMING MEETINGS

21st Annual Hawai'i Conservation Conference

Living Today, Sustaining Tomorrow: Connecting People, Places and Planet

16–18 July 2013

Hawai'i Convention Center, Honolulu, Hawaii

http://hawaiiconservation.org/activities/hawaii_conservation_conference/conferences/2013

NZ Biosecurity Institute: NETS 2013

31 July–2 August 2013

Shantytown, Greymouth

<http://biosecurity.org.nz/nets/next-nets/>

6th International Symposium on the Biology and Ecology of Gallling Arthropods and related Endophytes

4–8 August 2013

O'Reillys Rainforest Retreat, Queensland, Australia

<http://6isbegia.org/>

INTECOL 11 Congress

Ecology—Into the Next 100 Years

18–23 August 2013

London, UK

<http://www.intecol2013.org/>

22nd International Grassland Congress

Revitalising grasslands to sustain our communities

15–19 September 2013

Sydney, Australia

Poster abstract submission deadline: 30 November 2012

www.igc2013.com

Conservation Incorporated Conference

What's ahead for community-based conservation in NZ?

Hosted by the Yellow-eyed Penguin Trust

17–18 October 2013

Dunedin

<http://www.yellow-eyedpenguin.org.nz/conservationinc>

2013 Australasian Wildlife Management Society Conference

Advances in reintroduction of Australasian fauna 1993–2013

20–22 November

Massey University, Palmerston North

Contact: D.P.Armstrong@massey.ac.nz

<http://www.onqconferences.com.au/events/awms2013/index.html>

EcoTas13: Joint NZES & ESA Conference

24–29 November 2013

The Aotea Centre, Auckland

Abstract deadline: 28 June 2013

<http://ecotas13.org/>

9th Pacific Islands Conference on Nature Conservation & Protected Areas

2–6 December 2013

University of the South Pacific, Suva, Fiji

Registration closes 31 August 2013

<http://www.sprep.org/pacificnatureconference>

Australasian Ornithological Conference

4–7 December 2013

Auckland

Abstract deadline: 1 June 2013

Registration opens: 1 May 2013

aoc2013@unitec.ac.nz

Island Biology 2014

7–11 July 2014

Hawaii, USA

<https://sites.google.com/a/hawaii.edu/islandbiology2014/>

To receive announcements email island.biology@gmail.com

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(Effective from 27 November 2012)

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SUBMISSIONS TO THE NEW ZEALAND ECOLOGICAL SOCIETY NEWSLETTER

Contributions from NZES members are sought in the form of:

- **Feature articles** on topics of interest to NZES members
- **Event announcements**, for listing on the Noticeboard
- **Conference reports**, on conferences of ecological relevance
- **Images**, for *Illustrate Ecology* on the newsletter cover
- **Ecology news from overseas**
- **Book reviews**
- **Post graduate profiles**

Feature articles can be up to 1,000 words accompanied by up to four images.

Conference reports should be around 600–800 words with up to three images.

Illustrate Ecology images should be accompanied by a short title and a caption explaining the ecological concept illustrated.

Unless indicated otherwise, the views expressed in this Newsletter are not necessarily those of the New Zealand Ecological Society or its Council.

Content for the September 2013 issue of the NZES Newsletter is due by Friday 6 September 2013.

Book reviews of up to 1,000 words are now published in the newsletter. If you would like to review a book of interest to NZES members, please contact the newsletter editor.

Postgraduate profiles of current or recent PhD, MSc, or Honours students should be no more than 200–300 words and include a 2-sentence blurb about yourself, a summary of your thesis written for a general scientific audience, and a photo and caption related to your research.

Please do not use complex formatting—capital letters, italics, bold, and hard returns only, no spacing between paragraphs. All images should be emailed as high resolution (300 dpi) jpg files. All contributions and enquiries can be emailed to Debra Wotton, the Newsletter Editor: newsletter@nzes.org.nz

MEMBERSHIP

Membership of the society is open to any person interested in ecology and includes botanists, zoologists, teachers, students, soil scientists, conservation managers, amateurs and professionals.

Types of Membership and Subscription Rates (2013)

Full (receive journal and newsletter)	\$80* per annum
Unwaged (with journal)	\$45* per annum
<i>Unwaged membership is available only on application to Council for full-time students, retired persons etc.</i>	
<i>Unwaged members may receive the journal but must specifically request it.</i>	
Overseas Full	\$105* per annum
School	\$12 per annum
Institutional (New Zealand)	\$NZ120* per annum (incl. GST and postage)
Institutional (Australia & South Pacific)	\$NZ130* per annum (incl. GST and postage)
Institutional (Rest of World)	\$US80* per annum (incl. air postage)

Overseas members may send personal cheques for their local equivalent of the NZ\$ amount at current exchange rates, for most major overseas currencies.

For more details on membership please write to:

NZ Ecological Society
PO Box 5075
Papanui
Christchurch 8542
NEW ZEALAND

or e-mail: info@nzec.org.nz

* There is a \$10 rebate for members who renew before Feb 15 each year, and for new members