

NEW ZEALAND ECOLOGICAL SOCIETY

Newsletter

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FROM THE EDITOR

It's been a busy time nationally for ecological issues. The National Policy Statement for Freshwater Management was released recently, as was the proposed National Policy Statement on Biodiversity. This issue's guest editorial by Mike Joy is highly topical, and provides an insight into the status of our freshwater ecosystems and their management. The NZ Ecological Society made a submission on the proposed National Policy Statement on Biodiversity, and members can find out more in the newsletter and on our website. On a sadder note, the highly respected ecologist Phil Knightbridge passed away last month. Kate McNutt pays tribute to Phil's life and his contribution to ecology in NZ.

This is the last newsletter before the annual conference in Rotorua, which is fast approaching. The deadline for submission of abstracts is 6 June 2011. Preparations are now well advanced including an exciting line-up of fieldtrips. Please note that the Society has had to change its PO Box number as a result of the Christchurch earthquake. We are temporarily using PO Box 5221, Papanui, Christchurch 8542 and will have a new PO Box number when one becomes available.

I hope you enjoy this issue of the newsletter, and I look forward to seeing you in Rotorua.

The deadline for submissions for the next issue of this newsletter is 16 September 2011.

EDITORIAL

The clean, green NZ myth

One hundred percent pure, clean and green Aotearoa honoured the 2010 United Nations Year of Biodiversity with the appalling revelation that we are now among the world's worst biodiversity losers.

The scandalous news is that we have 2,788 species listed as threatened with extinction. Worse still, the ominous reality that if more funding were available for further investigation the species now classified as "data limited" would likely be listed as threatened and therefore double the number on that list.

The historical reasons for this biodiversity tragedy are unmistakable. We drained 90% of our wetlands, removed over 70% of our native forests, dammed, straightened, stop-banked and engineered most of our rivers. Indeed, we altered everything to suit us with total abandon.

Now, apart from alpine areas, we have totally transformed the landscape and have more alien plant species than native. In the lowland areas the transformation has been so comprehensive that in Canterbury or

Debra Wotton
*Landcare Research
Lincoln*
E-mail: newsletter@nzes.org

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Manawatu you can get into a car and drive for an hour in any direction and not see a single naturally occurring native plant or animal.

This immense change didn't stop with the realisation that the damage done was irreversible. In fact it has picked up speed—especially in the last 20 years. Already compromised ecosystems are now showing their inability to cope. Nearly half of our lakes are classed as polluted, around 90% of our lowland rivers too (and often fail swimming standards) and nearly all national and regional river monitoring sites show ongoing declines over most of the parameters measured. New Zealand's freshwater biodiversity reflects these impacts; our only freshwater mussel, freshwater crayfish, more than half of our fifty native freshwater fish species and all native aquatic plants are now listed as threatened.

It is crucial that these native freshwater species are seen not just as a loss of a biodiversity component of freshwaters, but also as the canary in New Zealand's environmental coalmine. This decline is a loud and clear message to us all that we have gone too far. Surely it is time to admit, even if just to ourselves, that far from being 100% pure, natural, clean, or even green, the real truth is we are an environmental/biodiversity catastrophe.

Why is it that New Zealanders are not outraged that we have slipped so far environmentally in such a short time? Surely this apathy reflects the power of the business lobby to keep the ecological truth hidden and to convince us that the economy is of prime importance. It appears this odd belief, that the economy is more important than the environment, has pervaded most government economic and social policy.

The reality is that until we all face up to the ecological truth there is no chance we can generate the political will to make the tough decisions required. Only then can we start to turn around these declines and possibly earn our clean green image once again.

As a first step we must learn by looking at how we got into this mess in the first place. The controversial management of freshwater ecosystems in New Zealand is a good case study to see where it all went wrong.

There is a fundamental flaw in freshwater protection in New Zealand. It is the bizarre fact that the most pervasive impacts are not controlled in any way. The main impacts are diffuse nutrient pollution from intensive farming and sedimentation—mostly from inappropriate hill country farming. The dire condition of our lowland streams is directly related to the intensity of farming within their catchments and the vegetation clearance in steep country. Neither of which are regulated at all. As long as there is a complete failure to control the major impacts of farming intensity and inappropriate landuse then there is no way there will be a change for the better let alone a halt in the decline.

Of all the impacts on freshwaters only the "out-of-pipe" discharges are controlled in any way. While they do go through a consent process via the Resource Management Act (RMA) there are major weaknesses, failings and discouraging outcomes from this process.

For those of us fighting to protect freshwater in New Zealand there is the bleak realisation that there is a stark difference between the lofty ideals and promise of the RMA and the sad reality of the outcomes of its application. There is a relentless stampede of applications to take more from and/or discharge into the natural world, but that world is already overtaxed by supplying our basic 'ecosystem services'—clean air and water. The ever-increasing consent application onslaught is handled by under-resourced council staff acting under the pressure of central government to speed up the process. Sadly, throughput speed is given precedence over the quality of the decisions.

I have seen many instances where regional councils, for economic and political reasons, have allowed consent-holders to repeatedly fail to meet consent conditions. In a recent example, the Wairoa Affco meat processing plant was allowed to breach the conditions placed on their discharge into the Wairoa River. The Hawke's Bay Regional Council justified these breaches on the basis of the polluter's claim that the cost of meeting the conditions would mean closing the plant with the loss of 100 jobs.

This is not an isolated case. Other examples are district and city councils being allowed to repeatedly fail to comply with the minimal restrictions on their wastewater discharges because enforcing them would mean fining ratepayers—and obviously that would be political suicide.

Now that regional councils are openly admitting to not enforcing consent conditions, in order to protect the local economy, it is clear that the RMA has been compromised to its very core. Here is a case of a, supposedly, democratic consent condition-setting process being emasculated by economic expediency. This is an example of local government bureaucrats attempting to protect their local economy ignorant of the long-term economic and environmental ramifications of their actions—or lack of them.

On the rare occasions where legal action is taken by councils and polluters are fined, the fines are generally pathetically small. It is often cheaper for the developer to risk a fine than to do the 'right thing' environmentally, and in most cases, the risk of getting caught is minimal anyway as councils generally do not have the staff or resources to monitor or follow up consent breaches. Prosecution takes time and money that cash-strapped councils simply cannot spare.

The ideals of the RMA are, in fact, compromised by regional councils at nearly every step - from choosing not to publicly notify consent applications to stacking hearings panels with commissioners known to be sympathetic to a desired result. Regional councils are not, as some people imagine, independent arbitrators of the environment—they have a vested interest in "economic development" and, because of the election cycle, it's the short term gain that's important to them and not the long term loss to the environment.

The way environmental management occurs in New Zealand is in stark contrast to its portrayal in the media. Here the RMA is depicted as being 'too tough'—holding up 'necessary' development at great economic cost. Vested interests go to great lengths to ensure their spin on the process is reported.

Personally, it has come as a terrible realisation to me that in the five decades I have lived in New Zealand we have gone from a world famous clean, green paradise to an ecologically compromised island nation wallowing on the ecological league tables—somewhere near the bottom of the heap of so-called developed countries. The rate of decline has been shocking and worse is the apathetic acceptance of this loss in the name of economic gain.

It seems that it's the power that economists hold to strike fear into the hearts of all that promotes this march toward ecological decline. The technique is simple: claim that if we forgo some particularly destructive development then the economy will suffer and jobs or house values will decline. This tactic is particularly effective during an economic downturn such as we are currently experiencing.

The core of the problem is a total lack of leadership from central government. Examples are the overdue (by 20 years) National Policy Statement on Freshwater Management, and the emaciation of the Department of Conservation, all the while increasing funding to developers like the Ministry of Economic Development.

As a scientist and researcher, instead of working to develop solutions to the dilemma, I frustratingly spend much of my time attempting to expose the denials from vested interests. This is the ploy they employ, just keep denying and the status quo can continue.

I fear that the goose that laid the 'clean, green' golden eggs for New Zealand is now a limping, featherless wreck. We need to face the fact that the economy is but a tiny subset of the environment—not vice versa.

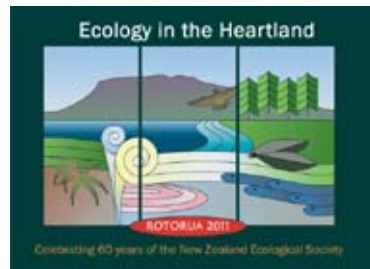
This country could easily be a high producing clean, green example of sustainability for the rest of the world but it will take courageous, knowledgeable leadership on ecological sustainability, and a realisation of the true value of healthy intact ecosystems—now and for future generations.

Mike Joy

Dr. Mike Joy is a Senior Lecturer in Environmental Science and Ecology at Massey University and was the 2009 recipient of the NZ Ecological Society Ecology in Action Award. This article is a summary of Mike's plenary talk at the NZ Ecological Society conference in Dunedin, November 2010.

NEW ZEALAND ECOLOGICAL SOCIETY CONFERENCE 2011

Willie Shaw and
Chris Bycroft
Conference Co-convenors



Rotorua,

28 August–1 September 2011

Ecology in the Heartland: Celebrating 60 years of the New Zealand Ecological Society.

The 2011 New Zealand Ecological Society conference will be in Rotorua from 28 August to 1 September at the Energy Events Centre. The theme for the conference will be Ecology in the Heartland: Celebrating 60 years of the New Zealand Ecological Society. The student day will be on Sunday the 28th, with three days of concurrent sessions from Monday 29 August to Wednesday 31 August, and the field trips on Thursday 1 September.

The venue (Energy Events Centre) has a large central theatre and breakout rooms in a central location. Rotorua is a great place to visit, so bring your walking shoes, bikes, and binoculars. There are exciting ecological features within walking distance of the conference venue, as well as a good array of cafes and bars.

Conference website

The conference website is live at <http://nzecologyconference2011.com>.

Sponsorship

Waikato University has generously become our lead sponsor for the 2011 conference. We are still interested in hearing from any potential sponsors for the conference. If you wish to offer sponsorship, or have any key contacts in any organisations that may be prepared to sponsor some aspect of the 2011 conference, please forward your suggestions to willie.shaw@wildlands.co.nz

Joint meeting with New Zealand Society of Plant Biologists

We welcome the “The New Zealand Society of Plant Biologists”, who will be joining us at the conference.

Conference logo

This conference logo represents the ecological diversity of the Rotorua region, including Mt Tarawera, kārearea (NZ falcon), trees representing indigenous and/or plantation forests (2011 is the United Nations International Year of Forests), mangle leaves and fruit, a geyser, pink terrace, and the fish are kōaro.

Symposia

The following symposia are confirmed for the conference:

Bryophyte Ecology – from trait characteristics to ecosystem services

Ecology of Plantation Forests

Forest Ecology (2011 is the International Year of Forests)

Freshwater Ecology – linking theory and practice

Global Change Biology

Landscape ecology: measuring and modelling movement

Mires Matter! Wetland Science 60 Years On

Plant Physiological Ecology

Restoration Ecology

Threatened Fauna

Volcanic Plateau Ecology

We will also have some open concurrent sessions where talks on other themes of ecology may be presented.

Student day

The conference student day will be on Sunday 28 August. For details see <http://nzecologyconference2011.com/index.cfm?id=197>.

Field trips

The field trips will be on 1 September. We have four field trips planned for the conference. More details will be put on the website shortly. Field trips will be to:

- Waimangu and Lake Tarawera (final locations to be confirmed)
- Mokoia Island
- Whirinaki and Kaingaroa Forests
- Bird conservation sites and restoration projects around Rotorua.

OBITUARY FOR PHIL KNIGHTBRIDGE

15 October 1969 – 26 April 2011

Some people in this world are just born to do what they do best, and for Phil Knightbridge, his love and passion for the natural world encompassed everything he was as a person. Phil tragically passed away in Hokitika on 26 April 2011. His passing has left a gaping hole in many people's lives that he touched during his amazing and fulfilling life.

Phil grew up on a small family farm in West Auckland (always a "westy" he would say) and it is here he developed an interest in the flora and fauna around him. Phil completed his MSc from Auckland University in 1993 on the regeneration ecology and establishment patterns of northern rata. His fieldwork took him into the depths of the many magnificent rata forests of the North Island. Phil always had a soft spot for *Metrosideros* that never left him and later he became involved in restoration initiatives to improve the regeneration success of northern rata.

Phil moved on from university to take up a science technician position with Landcare Research based in Palmerston North. Nearly always in the field, Phil could bound up hills while plant collecting and identifying at the same time. Phil's unique character shone through on fieldtrips. He had a seemingly endless supply of enthusiasm and energy for any new valley, forest patch and plant species he encountered. Even when field conditions were downright nasty, working with Phil was always fun because he genuinely loved what he did.

In 1997 he left Landcare Research to move to Hokitika as DOC's West Coast Conservancy threatened plant botanist, a position he held for the next 10 years. Here, Phil cemented himself as a well respected botanist and became expert on threatened plant protection and management. Phil's advice and judgement were eagerly sought after, yet he was always humble about his expertise and knowledge—whether it were on dunelands, wetlands, forests, sub-alpine herb fields, large leaved mistletoe or coastal cresses, just to name a few.

Phil sought a new challenge and joined the Conservancy's vegetation monitoring team in 2007, partly lured by the wide ranging fieldwork opportunities to satisfy his natural love of ecology. Phil was soon regarded as a senior member of DOC staff on the coast because he was a smart and strategic thinker. Phil just naturally became a mentor to other staff. His commitment and drive to understand the impacts of animal pests on West Coast forests are inspirational and he is nationally recognised for his achievements.

Phil was always doing something because he was a social and interesting person. He was an accomplished home beer brewer, to the benefit of his friends and family. His vegetable patch was always amazing (especially his pumpkins) and he was pretty good at soccer too. He loved to hunt and was an avid photographer. Phil was a loving husband to his wife Sharon and dad to his two children Ruby (8 years) and Dylan (6 years). Phil was really proud of his kids and was actively involved in all aspects of their lives.

We are all devastated with Phil's passing. His infectious passion for ecology was embedded into who he was as a person and is a wonderful legacy we will all benefit from.

Kate McNutt

A fund has been established for Phil's family. Donations to the Knightbridge Family Appeal can be made at any Westpac Bank to account number 03-0850-0109993-000. Donations will help support the Knightbridge family in the future.

BOOK REVIEW

Bec Stanley

THREATENED PLANTS OF NEW ZEALAND

Peter de Lange, Peter Heenan, David Norton, Jeremy Rolfe and John Sawyer. 472pp ISBN 978-1-877257-56-8 Canterbury University Press, 2010.

This book is the most comprehensive threatened plant book ever seen in this country covering the most threatened plants in NZ (nationally critical, endangered and vulnerable), almost 200 in total. The authors are authorities on NZ's threatened plants with three of them also compiling the 2008 threatened plant list (de Lange et al. 2008) on which the book is based. The book was commissioned by the New Zealand Plant Conservation Network (NZPCN) and sponsored by MWH Consultancy. Their goal was to provide an updated account of NZ's threatened flora as well as produce a book that was easily accessible to both specialist and non-specialists alike. Being all things to all people is a challenge and it's tackled by the juxtaposition of highly technical botanical descriptions alongside attractive photos (most plants are illustrated by a minimum of two photos and many have more) and a recognition text box which highlights similarities to "look alike" taxa and particular distinctive features. The book's accessibility is enhanced by its presentation in a hard-cover coffee-table style.

The book is structured in order of threat starting with extinct plants and ending with the less threatened plants (nationally vulnerable). The structure sets the scene—we have lost these plants and here are the ones we could lose next. Two plants became extinct as recently as the 1950s (*Trilepidea adamsii* and *Lepidium obtusatum*) and unbelievably by today's standards no photos of them

in the wild exist. Today photos communicate the plight of plants so well; take for example the photo of *Olearia adenocarpa* (p 25) in the introduction of the book. This shrub is alone, homeless and under attack battling for survival while we drive though a tranquil rural scene without any inkling to its high conservation significance.

A strength of the book is the threat synopsis for each plant. It is here that the interesting stories of these plants are told. *Metrosideros bartlettii* (p 154) is a typical illustration of the threat conundrum story for threatened plants—it's never one thing that threatens them, it's many. This tree is threatened by its presence mainly on private land where it has no legal protection. Plants are too far apart to be adequately cross-pollinated and it is, like the rest of our *Metrosideros* species, very palatable to possums. The introduction summarises threats to plants in NZ as habitat loss, predation, competition, reproductive failure and ignorance. Ultimately it is our ignorance that this book aims to affect. Increasing understanding and instilling pride in our unique flora is an essential pathway to engaging people in the plight of our plants and hopefully inspiring their involvement. As the introduction of this book points out, protecting our threatened plants can't just be done by government agencies. So this book

is timely, as it comes at a time when there is increasing awareness of biodiversity loss, and local communities are becoming involved in local restoration projects. I've already been told of an instance of someone realising they had discovered a threatened plant based on seeing the pictures in this book.

My interest in threatened plants is partly these stories, these puzzles of why something grows here and not there. Who can't be intrigued by *Epilobium hirtigerum*, which now grows in a housing subdivision and a carpark, or *Ophioglossum petiolatum*, which grows in a roadside drain half an hour's drive from NZ's biggest city. On one level it is sad that their more usual, past, habitat is gone but on another—it's these kind of stories that will engage people, not



Nationally Critical shrub *Olearia adenocarpa* growing in a sward of introduced grasses that limit seedling recruitment. Photo: Peter Heenan.

guilt-trips reminding us everything is disappearing and the situation is hopeless. What is fascinating too is having all of these plants in one book and you see (as a microcosm of our flora as a whole) their diversity—from grasses to orchids, shrubs, climbers, trees and herbs. I am in awe when I flick through this book at the diversity and beauty of our threatened flora. I mean “beauty” not in any “that would look great in my garden” sense but who couldn’t look at *Myosotis colensoi* (p 162), *Ranunculus paucifolius* (p 214) or *Gentianella calcis* subsp. *taiko* (p 108) for example and not want to devour more?

This book is a one-stop shop for threatened plant information and it is one you know will be a trusted resource for many years to come. I am sure some plants and locations will come and go (hopefully not many more will go) but as it is over twenty years since the last NZ threatened plants book (Given & Wilson 1989), which is still used and referred to today, I am confident this book will stand the test of time.

FEATURE ARTICLE

WIRED WETA!

People love them, fear them or loathe them ... yet virtually everyone is fascinated by weta. Their large size and somewhat fearsome appearance combined with their habit of hiding in boots or letterboxes do little for public relations. But the humble weta, and there are over 100 different types of them, is one of New Zealand’s very special animals. Yet surprisingly little is known about these intriguing, shy insects.

Within New Zealand conservation, there is an overwhelming focus on threatened native vertebrates, particularly birds and reptiles. But their insect equivalents are just as important. These large-bodied flightless insects are ‘flagship species’ for insect conservation in New Zealand and many are rare or threatened. Most weta species (particularly giant weta) have declined due to habitat destruction and the combined effects of predation and browsing of their habitat by introduced mammals. New populations of some weta have been established where these threats have been eliminated or severely reduced (e.g. islands) in order to reduce the risk of extinction.

Since 1977, the Cook Strait giant weta (*Deinacrida rugosa*) has been translocated to four new mammal-free islands, both for the conservation of the species and as part of island ecosystem restoration programmes. Beginning in 2007, Cook Strait giant weta were translocated into Karori Sanctuary in Wellington where all mammalian pests except mice have been eradicated. This species is now back on the mainland where it had been extinct for over 100 years. Some giant weta were fitted with radiotransmitters and followed for 2 months after the translocation. On average, male Cook Strait giant weta travelled significantly further per night than females (18 m versus 8 m, respectively), with one amorous male moving at least 296 m per night. Radiotelemetry has extended our knowledge of Cook Strait giant weta, particularly after translocation, and this monitoring technique could be applied to other large invertebrate taxa.

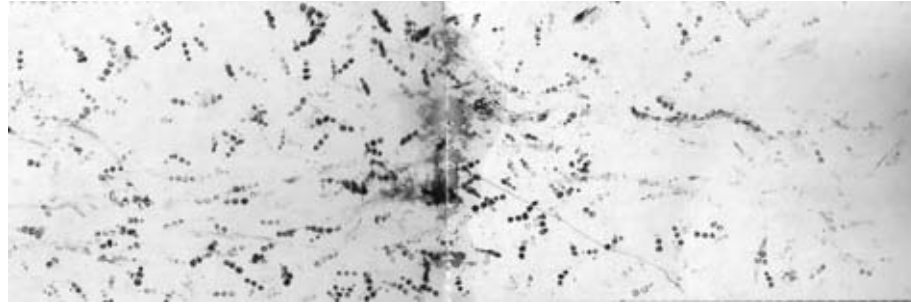
It is important to monitor weta translocations to determine whether successful establishment has occurred and then to make any adjustments to increase the chances of success. Giant weta have mostly been monitored by searching through habitat during the day or spotlighting at night but this is time-consuming and the results depend on the skill of the searcher. Recently, we used footprint tracking tunnels to successfully detect adult wetapunga (*D. heteracantha*) and to distinguish their presence from other weta species. Tracking tunnels are commonly used for monitoring small mammals in New Zealand, but had not previously been used for other taxa. Weta footprints were detected in 72% of tracking tunnels over three nights and 89% of these appeared during the first night. While this technique is a breakthrough in detecting the presence of adult giant weta, its ability to monitor population density has yet to be proven.

Corinne Watts
Corinne Watts is an Invertebrate Ecologist at Landcare Research in Hamilton. For her PhD at Canterbury University she examined invertebrate community restoration after peat mining in the Waikato. She works on a diverse range of research topics including wetland ecology, restoration and management, restoration of invertebrate communities and threatened invertebrate species management.



Wired weta. A Cook Strait giant weta with a radiotransmitter. Photo: Danny Thornburrow, Landcare Research, Hamilton.

Adult wetapunga footprints in a tracking tunnel from Little Barrier Island. The wetapunga appear to have had a party on this card, consuming all the peanut butter bait. Note the incredibly large footprints and the body drag mark down the centre of the card.



Recently, we found strong indications that tracking tunnels can be used to estimate to number of adult Cook Strait giant weta present in a population but this probably depends on their responses to weather conditions that are not yet understood. We also found that giant weta love peanut butter and will queue in the tracking tunnels for a taste—a very important discovery!

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NEWS FROM COUNCIL

Fleur Maseyk

NATIONAL POLICY STATEMENT ON BIODIVERSITY

NZES contributes to development of national policy to protect indigenous biodiversity

Much of New Zealand's remaining unprotected indigenous biodiversity (especially lowland habitat) occurs on private land, the responsibility for which is the mandate of local authorities (regional, district and unitary councils). Local authorities are inconsistent in the way they fulfil their obligations to protect biodiversity under the Resource Management Act 1991 (RMA), their application of rules and policies, and their degree of willingness to enforce compliance.

In January of this year, the Ministry for the Environment (MfE) released a proposed National Policy Statement on Indigenous Biodiversity for public submission. National policy statements (NPS) are tools enabled by the RMA to manage issues of national importance. Local authorities must develop policy in accordance with an operative NPS. Since an operative NPS dictates how indigenous biodiversity is protected and managed by local authorities, the NZES Council felt that it was imperative that the Society make a submission to MfE on the proposed document.

The proposed NPS intends to provide more clarity around the role of local authorities in protecting indigenous biodiversity and to provide guidance on what is to be considered significant indigenous vegetation or significant habitat of indigenous fauna (a long-standing debate¹). While the proposed NPS does not limit what local authorities can consider to be significant under s6(c) of the RMA,

¹ Norton DA, Roper-Lindsay J 2004. Assessing significance for biodiversity conservation on private land in New Zealand. *NZ Journal of Ecology* 28: 295-305; Walker S, AL Brower, BD Clarkson, WG Lee, SC Myers, WB Shaw, RT Theo Stephens 2008. Halting indigenous biodiversity decline: ambiguity, equity, and outcomes in RMA assessment of significance. *NZ Journal of Ecology* 32 (2): 225-237.

it does provide a base-line that local authorities are required to give regard to. This base-line is based on the National Priorities², and the list of elements to be considered significant (as a minimum) includes naturally rare ecosystems, sand-dunes, wetlands, threatened environments, and threatened species.

Although the objective of the proposed NPS is protectionist in flavour, an inherent intention of the NPS, is one of balance and reasonable use of land. No doubt the submission process will see the continuation of the debate between those who perceive they hold property rights that environmental legislation only serves to impinge upon, and those who feel any such rights come hand-in-hand with environmental responsibilities and obligations. Often a point of contention is the concept of 'reasonable' and where and how thresholds should be defined. Getting the balance right is critical for real and sustained protection and enhancement of those elements of our biodiversity which are scarce, fragmented and vulnerable to further decline (e.g. rare ecosystems, threatened habitats, and threatened species).

While bringing some local authorities up to a minimum level of inclusion of biodiversity in their planning documents, the proposed NPS is not written to raise the bar or advance the level of biodiversity protection. Despite this, the NZES submission is generally supportive of the development of an NPS in recognition that an operative NPS is an important component within the hierarchy of policy documents relating to biodiversity and that would fill a national policy gap between legislation, other national policy statements, and regional and district plans. Further, an operative NPS will be an important mechanism for fulfilling New Zealand's international (e.g. Convention on Biodiversity) and national responsibilities (e.g. the New Zealand Biodiversity Strategy) for the protection and restoration of New Zealand's unique indigenous biodiversity.

We did feel the NPS could be strengthened in places and our submission highlighted these areas, in particular: incorporating the intent of the objective (protection of indigenous biodiversity) into the policies; including consideration of ecological processes and ecosystem services; incorporating aquatic biodiversity, providing more teeth to the policies regarding enhancement and management of sites; providing for connections between habitats and ecosystems; and recognising that mapping and scheduling of sites has limitations and cost implications that new tools and methodologies can overcome or reduce.

Previous attempts have been made to develop an NPS on indigenous biodiversity, and several iterations of draft documents have circulated over the past years. An important point of difference this time around is the inclusion within the proposed NPS of a policy on biodiversity offsets. The NZES submission recognises that offsets can be a useful mechanism to address residual, unavoidable adverse impacts in order to achieve no net loss. Attempts at offsets (or mitigation) have been made by local authorities for a long time now, although most efforts do not account for the true value of the biodiversity lost, and therefore do not adequately offset the loss, don't incorporate uncertainty or time-lags, and are rarely monitored. In light of this, the NZES submission welcomes the formalisation of offset policies, but cautions that it is critical to have strong, clearly defined principles that are enforceable, monitored and transparent. The policy needs to provide the utmost rigour in regards implementation of offsets.

Reaction to the proposed NPS has been mixed, with those who feel it lacks teeth and doesn't go far enough,

"If a national policy statement doesn't increase protection on private land, it isn't worth the paper it's written on," he said. "It's just greenwash." (Russell Norman, co-leader of the Green Party)³;

2 Ministry for the Environment. 2007c. Protecting Our Places. Introducing the National Priorities for Protecting Rare and Threatened Biodiversity on Private Land. *Pamphlet Publication No. ME 799*. Ministry for the Environment, Wellington, New Zealand.

3 5 July 2010 www.stuff.co.nz/national/politics/3883689/Government-greenwash-alleged

to those who feel the proposed NPS is too far reaching, infringes on property rights and limits development.

Federated Farmers president Don Nicolson said it was “*all fine*” for people interested in biodiversity to map native vegetation on private land. However, he said if rules were slapped on landowners, then there should be compensation, adding: “*They don’t have the right to take away the rights and property that people have.*”³

*“This is the most socialist thing the country has ever tried to do. It’s taking land by stealth. They’re saying, ‘It’s yours—but it’s really ours.’” (Farmer, Taranaki)*⁴

He was concerned the statement policy would override the district’s plans. “*I wonder if we should be doing something even more vehement and determined [than a submission].*” If applied to the letter [the policy] could make new farming developments nigh extinct. “*It’s totally skewed in one direction... it has the potential to be a ticking timebomb.*” (Jim Hopkins, Waitaki District Councillor)⁵

The loss of indigenous biodiversity in New Zealand has followed a non-random pattern, and what is remaining is not equally distributed across the country. This raises concern for some local authorities who are wary that the cost of protection and perceived loss of production land that they may encounter is disproportionately higher than other areas of the country. Such concerns reinforces the need for the NPS to provide smart, outcome focused policy that allows for comprehensive biodiversity protection without restricting local authorities to adversarial and resource hungry methodologies to identify areas of significant indigenous biodiversity.

Despite the importance of getting the NPS right (a process being well worthy of an informed, evidence-based public debate), MfE will not be holding a hearing on the submissions received. Instead the Minister will receive recommendations on submissions from MfE staff in order to finalise the NPS.

The government has signaled that a decision will not be announced prior to the release of a report from the Waitangi Tribunal on claim 262 (which relates to environmental, resource and conservation management), and with an election looming it could well be some time before we see an operative NPS on indigenous biodiversity. In the meantime, we have offered to meet with MfE staff to further discuss NZES’s submission. Whether MfE decides to take up this offer remains to be seen.

The NZES submission was prepared by Shona Myers with input from Fleur Maseyk and Bruce Burns and can be viewed on our website at <http://nzes.org.nz/news>

You can view the proposed NPS on indigenous biodiversity here: www.mfe.govt.nz/publications/biodiversity/indigenous-biodiversity/index.html

ECOTONES – NEW ECOLOGICAL RESEARCH

Bruce Burns

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

Overwhelming evidence of the importance of diversity to ecosystem functions critical to humans

Over the last couple of decades, one of the focal areas of global ecological research has been in understanding the impact that biodiversity has on ecosystem functioning. This has arisen under the cloud of global biodiversity loss and in trying to predict the consequences of this to how ecosystems will function, particularly in terms of productivity, nutrient retention, and decomposition. Such functions are fundamental to the quantity and quality of human life on earth. Cardinale et al (2011) have recently published the most comprehensive

4 28 April 2011 www.stuff.co.nz/taranaki-daily-news/farming/4935668/Pay-to-preserve-farmers-say

5 20 April 2011 www.stuff.co.nz/timaru-herald/news/4907900/Biodiversity-policy-a-timebomb

meta-analysis to date of the results of experiments designed to answer this fundamental question. In total, they looked at 368 independent experiments in which plant diversity has been manipulated and the consequent impact on ecosystem functions observed. From this, they conclude that there is now unequivocal evidence that biodiversity does indeed regulate several processes that are essential to the functioning of ecosystems and that many of these functions are critically important for humanity. They also conclude that these effects are driven not only by highly productive species, but by species acting in a complementary fashion—so ecosystem function can't just be left to a few super-species without consequence. Biodiversity does rule after all, and this paper firmly supports the view that conservation is a 'need to have' not a 'nice to have' for our common future.

Cardinale BJ, Matulich KL, Hooper DU, Byrnes JE, Duffy E, Gamfeldt L, Balvanera P, O'Connor MI, Gonzalez A 2011. The functional role of producer diversity in ecosystems. *American Journal of Botany* 98(3): 572–592.

What determines the distribution of different moss species on the South Island?

Bryophytes are small, cryptic and notoriously difficult to identify, so most plant ecologists avoid including them in large-scale vegetation surveys. However, there are 523 species of mosses and 595 species of liverworts in New Zealand, so they contribute significantly to plant diversity, and, in some wet forest types, the biomass of bryophytes on the forest floor and tree surfaces can be large. Plant ecologists will therefore welcome the first quantitative analysis of the relationships between 15 common moss species and biotic and abiotic environment on South Island and Stewart Island (Michel et al 2011). These authors used data from 723 forest plots collected between 2002 and 2007 and related moss presence to 22 predictive variables. Although relationships with these variables differed between species, the most important variables predicting the presence of species were mean annual temperature and total plant biomass. The preference of species for sites with high biomass probably reflects the advantages for bryophytes of living in dense forest interiors with stable, moist environments. Of more interest were several relationships indicated between the presence or absence of some canopy tree species and particular bryophyte species. For example, having *Nothofagus* in the forest canopy increased the probability of the presence of *Dicranoloma billardierei* and *D. robustum*. The intriguing area of relationships between specific vascular plants and bryophytes, probably mediated through mechanisms such as allelopathy, may be a productive area for future ecological research in New Zealand.

Michel P, Overton JM, Mason NWH, Hurst JM, Lee WG 2011. Species–environment relationships of mosses in New Zealand indigenous forest and shrubland ecosystems. *Plant Ecology* 212: 353–367

Native birds benefit more from pest control than introduced birds

On oceanic islands such as New Zealand where birds evolved without predatory mammals, the presence of defensive strategies to minimise predation risk appears to be lacking. For example, nest behaviour of continental birds experiencing higher mammalian predation risk includes more rapid chick development, subdued chick begging and reduced nest visitation rates compared to New Zealand birds. This hypothesis suggests that New Zealand native birds should be more vulnerable to mammalian predation than introduced birds on nests, but also that pest removal will disproportionately favour native bird reproduction. Starling et al (2011) have recently tested this hypothesis in forest fragments near Kaikoura by following nest survival of introduced and native birds both with and without pest control. The authors followed the fates of 1076 nests in total, spread between 8 different species—4 native and 4 introduced. Whereas predator control substantially increased nest success of all the native bird species,

it slightly increased nest success of 2 and decreased nest success of 2 introduced species. The results at this site are important as they suggest that mammalian pest control can improve native bird populations without also allowing build-up of populations of competing introduced bird species.

Starling-Windhof A, Massaro M, Briskie JV 2011. Differential effects of exotic predator-control on nest success of native and introduced birds in New Zealand. *Biological Invasions* 13:1021–1028.

Tree weta might not be mutualists of tree fuchsia

The recent observation that tree fuchsia seed increased its germination rate after passing through the gut of tree weta, has led to the suggestion that a seed dispersal mutualism exists between these two species. Mutualisms require a net positive outcome for both species and Wyman et al (2011) have used this definition to analyse whether the evidence for positive outcomes supports identification of a mutualism. They found that tree weta destroyed most of the tree fuchsia seed they ate, did not move the remaining intact seed far, and did not place them in sites advantageous for seed germination. They also found that tree weta do not prefer tree fuchsia fruits over other food sources suggesting there is little benefit perceived by the weta of eating tree fuchsia fruit. They conclude there is little evidence of the mutualism previously suggested.

Wyman TE, Treweek SA, Morgan-Richards M, Noble ADL 2011. Mutualism or opportunism? Tree fuchsia (*Fuchsia excorticata*) and tree weta (*Hemideina*) interactions. *Austral Ecology* 36: 261–268.

RECENT STUDENT RESEARCH

UNIVERSITY OF WAIKATO ECOLOGY THESES 2009–2010

Ph.D.

Jurgens, Joel A (2010): Fungal biodiversity in extreme environments and wood degradation potential. Ph.D. Dissertation, University of Waikato, Hamilton. 240 pp.

This thesis reported on results from a multidisciplinary investigation of fungi from extreme locations, focussing on the Taklimakan Desert, with comparisons to polar region deserts. Additionally, the capability of select fungi isolates to decay lignocellulosic substrates and produce degradative related enzymes at various temperatures was demonstrated.

von Westernhagen, Nina (2010): Measurements and modelling of eutrophication processes in Lake Rotoiti, New Zealand. Ph.D. Dissertation, University of Waikato, Hamilton. 168 pp.

This study examined the spatial and temporal variation of phytoplankton biomass, in a morphologically diverse lake in New Zealand, and makes a detailed consideration of the performance of three-dimensional lake ecosystem models.

Daniel, Adam J (2009): Detecting exploitable stages in the life history of koi carp (Cyprinus carpio) in New Zealand. Ph.D. Dissertation, University of Waikato, Hamilton. 136 pp.

This study used telemetry to examine the movements and seasonal habitat use of adult koi carp, in order to identify key locations for efficient removal of this pest fish species from the lower Waikato River basin.

Özkundakci, Deniz (2009): Speciation and dynamics of phosphorus in relation to lake restoration methods. Ph.D. Dissertation, University of Waikato, Hamilton. 218 pp.

This study examined water column and sediment nutrient dynamics in Lake Okaro; focusing on trends in phosphorus concentrations and the ecosystem response to lake restoration efforts designed to reduce phosphorus concentrations.

Emma Coleman

Contact: E. J. Coleman

(ecoleman@waikato.ac.nz)

& B. D. Clarkson (b.clarkson@waikato.ac.nz), University of Waikato

Trolle, Dennis (2009): The influence of sediment nutrient dynamics on the response of lake ecosystems to restoration and climate change. Ph.D. Dissertation, University of Waikato, Hamilton. 140 pp.

This study examined the spatial and temporal dynamics of sediment nutrient concentrations in fourteen different lakes and the applications of complex lake ecosystem models to three New Zealand lakes. The effects of restoration measures and future climate change on lake water quality are considered.

M.Sc.

Coleman, Emma J (2010): Mechanisms of interference between kahikatea and grey willow in the Waikato. M.Sc. Thesis, University of Waikato, Hamilton. 100 pp.

Research was undertaken to determine the nature of the coexistence between kahikatea and grey willow in the Waikato Ecological Region. Specifically, whether grey willow inhibits recruitment of kahikatea and if anthropogenic disturbance influences this interaction.

Demetras, Nicholas J (2010): Phylogeography and genetic diversity of terrestrial arthropods from the Ross Dependency, Antarctica. M.Sc. Thesis, University of Waikato, Hamilton. 104 pp.

This thesis addressed phylogeographic and phylogenetic questions of two co-occurring Antarctic endemic arthropods in Southern Victoria Land, Ross Dependency, by analysing patterns of variation in the mtDNA cytochrome c oxidase sub-unit 1 (COI) gene.

*Foster, Stacey (2010): Interspecific competitive interactions between *Rattus norvegicus* and *R. rattus*. M.Sc. Thesis, University of Waikato, Hamilton. 128 pp.*

The aim of this project was to investigate the idea that a balance of exploitation and interference competition contributes to governing the current distribution of ship rats and Norway rats in New Zealand.

Fox, Danielle (2010): Rahui and marine construction: Potential for enhancement of Taonga species. M.Sc. Thesis, University of Waikato, Hamilton. 59 pp.

This study investigated whether marine reserves enhance intertidal species used by Māori, whether artificial structures in the intertidal region provide suitable habitats for traditionally harvested species, and do non-indigenous species present in these habitats affect these traditionally used species?

Lee, C Kevin (2010): The physiological and ecological characterisation of the first cultivated species of the candidate division OP10. M.Sc. Thesis, University of Waikato, Hamilton. 102pp.

This study aimed to characterise the physiology of one of the first isolated OP10 species, strain T49; and investigate and expand upon known OP10 diversity by using targeted oligonucleotide primers.

*Le Roux, Darren S (2010): Monitoring long-tailed bat (*Chalinolobus tuberculatus*) activity and investigating the effect of aircraft noise on bat behaviour in a modified ecosystem. M.Sc. Thesis, University of Waikato, Hamilton. 239 pp.*

This project monitored the spatial and temporal activity patterns of long-tailed bats (*Chalinolobus tuberculatus*) at two exotic forest fragments (Hammond Bush and an oak fragment) in Hamilton City (North Island, New Zealand) and conducted a field-based playback experiment to assess whether aircraft noise alters bat activity.

Parkes, Samantha M (2010): Are zooplankton invasions in constructed waters facilitated by simple communities? M.Sc. Thesis, University of Waikato, Hamilton. 104 pp.

This research aimed to determine if constructed water bodies (e.g., water supply reservoirs and dams) were invaded by zooplankton with greater ease than natural water bodies, and whether this was due to a lower biodiversity, and therefore lower 'biotic resistance', in constructed water bodies.

Taylor, Claire M (2010): *Reducing establishment rates of non-indigenous zooplankton in constructed waters*. M.Sc. Thesis, University of Waikato, Hamilton. 85 pp.

The aim of this study was to determine if seeding water bodies with sediments containing native zooplankton eggs in early stages of their development will accelerate community colonisation, leading to greater biotic resistance to subsequent establishment of new zooplankton species.

Trivedi, Pathik D (2010): *Aspects of biology of the weed of arable crops broom corn millet (Panicum miliaceum L.)*. M.Sc. Thesis, University of Waikato, Hamilton. 135 pp.

This thesis described aspects of the biology of broom corn millet under New Zealand conditions. Experiments were designed to understand under what conditions broom corn millet is mostly likely to affect New Zealand corn and maize crop growth.

Weavers, Graeme M (2010): *Ecological, genetic and cultural status of Solanum aviculare, poroporo (Solanaceae)*. M.Sc. Thesis, University of Waikato, Hamilton. 198 pp.

This research documented the successional role, regeneration dynamics, morphological characteristics, genetic diversity and cultural and conservation status of *Solanum aviculare*. Recommendations were made to assist in the conservation and cultural restoration of this species.

Wilcox, Fiona J (2010): *Vegetation recovery and management of kahikatea (Dacrydium dacrydioides)-dominated forest remnants in the Waikato Region*. M.Sc. Thesis, University of Waikato, Hamilton. 120 pp.

The principle aim of this study was to determine whether fencing alone is a sufficient management tool for facilitating the recovery and persistence of indigenous flora in kahikatea-dominated forest patches in the Waikato region.

Zhang, Chenguang (2010): *High frequency monitoring and three-dimensional modelling of temporal variations in water quality of Lake Rotorua, New Zealand*. M.Sc. Thesis, University of Waikato, Hamilton. 68 pp.

This study used high frequency monitoring data to investigate the significance of lake stratification events and how these interact with changes in nutrient concentrations and the development of the cyanobacterial populations in Lake Rotorua. An ecological model was utilised to understand the relationship between physical, chemical and biological variables, and phytoplankton dynamics.

Barbier, Beatrice A M (2009): *Investigating the biodiversity of microbial communities in the McMurdo Dry Valleys, Antarctica: an inter-valley comparison study*. M.Sc. Thesis, University of Waikato, Hamilton. 92 pp.

The research presented is an inter-valley comparison study which aims to scrutinize microbial communities using automated ribosomal intergenic spacer analysis (ARISA), and examine how physico-chemical differences between soils determine their distribution in the Dry Valleys.

Carrodus, Susan K (2009): *Identification and the role of hybridisation in New Zealand Pittosporum*. M.Sc. Thesis, University of Waikato, Hamilton. 150 pp.

This study aimed to identify whether *Pittosporum turneri* is derived from hybridisation between a divaricating shrub (*P. divaricatum*) and a non-divaricating tree (*P. colensoi*), and to improve resolution of relationships among very closely related species within the genus *Pittosporum*.

Gibson, Aimee (2009): *Seasonal variation in bivalve antioxidant enzymes: can they be used as indicators of heavy metal contamination?* M.Sc. Thesis, University of Waikato, Hamilton. 91 pp.

Seasonal variations in the activity of several enzymes (glutathione reductase (GR), glutathione S-transferase (GST), and glutathione peroxidase (GPx)) involved in the glutathione cellular defence system were measured in whole tissues of the common New Zealand cockle (*Austrovenus stutchburyi*) as biomarkers of oxidative stress.

Kapa, Mieke (2009): *Ethnobotany, germination and growth of Eleocharis sphacelata*. M.Sc. Thesis, University of Waikato, Hamilton. 138 pp.

To assist *Eleocharis sphacelata* revegetation efforts, research recorded traditional ecological knowledge held by users, determined best methodologies for germination of seed, and established techniques for improved transfer of juvenile plantlets.

Kelly, Sarah R (2009): The origin, genetic diversity and taxonomy of the invasive diatom Didymosphenia geminata (Bacillariophyceae) in New Zealand. M.Sc. Thesis, University of Waikato, Hamilton. 213 pp.

This thesis investigated the origin, genetic diversity and taxonomy of *Didymosphenia geminata*, in New Zealand. *D. geminata*-specific primers were used to amplify the internal transcribed spacer (ITS) region. In addition, the small nuclear ribosomal DNA (nrDNA) subunit 18S was amplified to investigate the taxonomic placement of *D. geminata* within the pennate diatoms.

*Niemand, Clarisse (2009): The application of elemental fingerprinting techniques to identify population connectivity using *Austrovenus stutchburyi* recruits. M.Sc. Thesis, University of Waikato, Hamilton. 106 pp.*

The chemical signatures of *Austrovenus stutchburyi* shells were examined to determine the inter-site spatial differences in elemental fingerprints of shells and also to characterise the temporal stability of the signatures. Furthermore, shells were ablated at two reference points to determine the intra-shell variation in the chemical signatures.

*Pudney, Kemble (2009): The autecology of *Lonicera japonica* in a restoration context. M.Sc. Thesis, University of Waikato, Hamilton. 113 pp.*

This thesis concerned the autecology of *Lonicera japonica* in relation to ecological restoration in Hamilton. It addressed three groups of questions relating to *L. japonica*'s place in the plant community, its reproduction and spread, and its impacts on other plants.

*Simpson, Julia (2009): Effects of heavy metal contamination on burial rates of *Austrovenus stutchburyi*: implications for sediment transport. M.Sc. Thesis, University of Waikato, Hamilton. 74 pp.*

The aim of this study was to examine whether the burial rate of an ecologically important bivalve species (*Austrovenus stutchburyi*) differed between a contaminated and a lesser-contaminated site and whether burial rates were affected by density. A secondary aim was to determine whether the burial of *A. stutchburyi* affected sediment transport and consequently if this was affected by density.

*Tana, Raymond (2009): Population dynamics and migrational history of torrentfish (*Cheimarrichthys fosteri*, Haast 1874) in two Waikato streams on the North Island of New Zealand. M.Sc. Thesis, University of Waikato, Hamilton. 85 pp.*

This study investigated the population dynamics and reproductive aspects of torrentfish in two small Waikato streams and a small scale sampling in the Mangamuka River on the North Island of New Zealand. The seasonal distribution patterns of male and female torrentfish and the timing of spawning events are described.

*Taylor, Sean (2009): Flow cytometric enumeration of the blood cells of rainbow trout (*Oncorhynchus mykiss*) and New Zealand freshwater crayfish (*Paranephrops planifrons*). M.Sc. Thesis, University of Waikato, Hamilton. 95 pp.*

The aim of this study was to develop flow cytometric (FC) methods to enumerate rainbow trout (*Oncorhynchus mykiss*) whole blood cells and New Zealand freshwater crayfish (*Paranephrops planifrons*) haemocytes as non-lethal endpoints in the evaluation of physiological status.

*Urlich, Shelley (2009): Identification of genes regulated by cold temperature – a study of *mdtJ1* in *E. coli* O157:H7. M.Sc. Thesis, University of Waikato, Hamilton. 134 pp.*

The aim of this project was to identify genes involved in the cold shock response of *E. coli* O157:H7 when exposed to refrigeration temperatures (4, 0, -1.5 C). We hypothesized that *E. coli* O157:H7 is able to withstand chill temperatures by up-regulating genes that allow survival in unfavourable conditions.

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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.

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Use internet banking, to credit your donation to New Zealand Ecological Society, bank account 06 0729 0465881 00, identifying the payment as "Kauri Fund".

UPCOMING MEETINGS**Ornithological Society of New Zealand**

June 4–5 2011

Lower Hutt

<http://osnz.org.nz/osnzagm.htm>

15th Australasian Vertebrate Pest Conference

June 20–23 2011

Sydney, Australia

<http://www.avpc.net.au/index.html>

New Zealand Biosecurity Institute – NETS Conference 2011

6–8 July 2011

Bruce Mason Centre, Takapuna, Auckland.

The theme of the NETS 2011 conference is "Northern Gateway, Tomorrow's Pests Today!"

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

International Botanical Congress

23–30 July 2011

Melbourne, Australia

Themes include:

Systematics, evolution, biogeography & biodiversity informatics

Ecology, environmental change & conservation

Structure, development & cellular biology

Genetics, genomics & bioinformatics

Physiology & biochemistry

Economic botany including biotechnology, agriculture & plant breeding

www.abc2011.com

AWIS (Association for Women in the Sciences) 2011 Conference

28–29 July 2011

Skycity, Auckland

www.awis.org.nz/awis-2011-conference/

NZ Ecological Society Annual Conference

28 August–1 September

Rotorua

The 3rd Combined Australian and New Zealand Entomological Societies Conference

28 August–1 September 2011

Lincoln University, Christchurch, New Zealand

Conference theme: "The Status of Australasian Entomology: Where the bloody hell are we"?

The European Ecological Federation (EEF) 12th EEF Congress

25–29 September 2011

Ávila, Spain

www.europeanecology.org

23rd Asian-Pacific Weed Science Society Conference (APWSS 2011)

25–30 September 2011

The Sebel, Cairns, Queensland, Australia

www.apwss2011.com/

Australasian Ornithological Conference

28 September–1 October 2011

Cairns, Australia

www.birdsaustralia.com.au/whats-on/australasian-ornithological-conference.html

Ecological Society of Australia 2011 Annual Conference

21–25 November 2011

Wrest Point, Hobart, Tasmania

25th International Congress for Conservation Biology (ICCB2011)

Society for Conservation Biology

29 November–3 December 2011

Sky Tower, Auckland

www.conbio.org

19th International Congress of Biometeorology (ICB2011)

5–9 December 2011

University of Auckland, Auckland

Conference theme: Climate and Society

www.icb2011.com

5th National Wetland Restoration Symposium

21–23 March 2012

Ascot Park Hotel, Invercargill

This symposium is being organised by the Southland Wetlands Working Party in conjunction with the National Wetland Trust.

www.wetlandtrust.org.nz

7th World Congress of Herpetology

8–14 August 2012

Vancouver, Canada

www.worldcongressofherpetology.org

Office Holders of the New Zealand Ecological Society 2010/2011

(Effective from 23 November 2010)

In the first instance, please send postal or e-mail correspondence to:

Secretariat (society office – Susan Sheppard)

NZ Ecological Society Secretariat
c/- PO Box 5221
Papanui
CHRISTCHURCH 8542
Physical Address:
46 Genesis Drive
Edendale, RD 1
CHRISTCHURCH 7671
P: 64 3 318 1056
F: 64 3 318 1061
E: nzecosoc@paradise.net.nz
W: www.nzes.org.nz

President

Bruce Burns

School of Biological Sciences
University of Auckland
Private Bag 92019
AUCKLAND
P: 64 9 373 7599 ex 83135
E: b.burns@auckland.ac.nz

Vice President

Mel Galbraith

School of Natural Sciences
Unitec New Zealand
Private Bag 92025,
Carrington Road, Mt Albert
AUCKLAND
P: 64 9 815 4321 ex 7296
M: 025-6948139
E: mgalbraith@unitec.ac.nz

Secretary

Ruth Guthrie

686 Takaka Valley Highway
Urewhenua
R D 1
TAKAKA
M: 027 248 5944
E: secretary@nzes.org.nz

Treasurer

Clayson Howell

Department of Conservation
PO Box 10-420,
WELLINGTON
P: 64 4 471 3113
M: 021 973 181
E: chowell@doc.govt.nz

Councillors (4)

Shona Myers (past-president)

Auckland Regional Council
Private Bag 92012
AUCKLAND
P: 64 9 366 2000 ex 8233
F: 64 9 366 2155
M: 021 708042
E: shona.myers@arc.govt.nz

John Sawyer

Department of Conservation
PO Box 5086,
WELLINGTON
P: 64 4 472 5821
F: 64 4 499 0077
M: 021 058 3894
E: jsawyer@doc.govt.nz

Chris Bycroft

Wildland Consultants
PO Box 7137
Te Ngae,
ROTORUA 3042
P: 64 7 343 9017
E: chris@wildlands.co.nz

Laura Young

School of Biological Sciences
University of Canterbury
Private Bag 4800
CHRISTCHURCH
P: 03 364 2987 ex 7048
M: 021 668 084
E: laura.young@pg.canterbury.ac.nz

Fleur Maseyk

Horizons Regional Council
Private Bag 11-025
Manawatu Mail Centre
PALMERSTON NORTH
P: 64 6 952 2903
M: 021 2277 188
E: fleurmaseyk@clear.net.nz

Journal scientific editor

K.C. Burns

Victoria University of Wellington
School of Biological Sciences
PO Box 600
Wellington 6140
P: 64 4 463 6873
E: Kevin.Burns@vuw.ac.nz

Journal technical editors

Anne Austin

Landcare Research
Private Bag 11052
Manawatu Mail Centre
PALMERSTON NORTH 4442
E: techeditor@nzes.org.nz
E: austina@landcareresearch.co.nz

with assistance from:

Christine Bezar

Landcare Research
PO Box 69
LINCOLN 7640

Newsletter editor

Debra Wotton

Landcare Research
PO Box 40
LINCOLN 7640
P: 64 3 321 9605
E: newsletter@nzes.org.nz

Webmaster

Laura Young

School of Biological Sciences
University of Canterbury
Private Bag 4800
CHRISTCHURCH
P: 03 364 2987 ex 7048
M: 021 668 084
E: laura.young@nzes.org.nz

This Newsletter was produced by Debra Wotton and Jeremy Rolfe.

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Debra Wotton

Landcare Research

P.O. Box 40, Lincoln 7640

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NZ Ecological Society
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