NEW ZEALAND ECOLOGICAL SOCIETY

Newsletter

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FROM THE EDITOR

This issue of the Newsletter includes thought-provoking articles on a range of topical issues, which I'm sure members will enjoy reading. Fleur Maseyk reports on a landmark Environment Court decision on the Horizons Regional Council proposed One Plan. The One Plan incorporates the Regional Policy Statement and land, water, air and coastal Regional Plans. Among other things, the court decision recognised that all areas of rare or threatened habitat types shall be considered ecologically significant. Robert Holdaway and Susan Wiser's article on threatened rare ecosystems is particularly timely given this decision, which is likely to set a precedent.

Larry Burrows, Alan Mark and Ali Timms explore the complex topic of exotic conifers in the High Country. The article covers thorny issues from carbon sequestration to wilding control on public land and landscape values. Hopefully this will stimulate healthy debate during the related symposium at the upcoming NZES conference in Lincoln.

I've introduced a new section for the Newsletter where postgraduate ecology students get a chance to tell members about themselves and their research. Thanks to all those people who submitted items to make it such an interesting issue. This is the last newsletter before the NZES annual conference—I hope to see you there!

ILLUSTRATE ECOLOGY

Richard Henry

The kakapo patriarch (illustration by Dan Barrett, University of Otago).

INSIDE:

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Layout and design: Jeremy Rolfe

*The deadline for submissions for the next issue of this newsletter is **Friday 14 December 2012**.*

GUEST EDITORIAL

THERE WAS AN AWFUL LOT OF BULLSHIT IN BRAZIL

Matt McGlone, 386 Ilam Rd, Christchurch (mcglonem@xtra.co.nz)

A cherished myth of the environmental movement is that it is global. A supporting infrastructure of treaties, international agreements, protocols and declarations have grown up around this idea. Some still believe that international agreements will shame governments into action. The recent farce in Rio (United Nation Conference on Sustainable Development: June 20–22 2012 or Rio+20 for short) shows that, rather than getting support from the collective wisdom of the world, we are being undermined by these jamborees. How so? Well, let's consider the progression of United Nation Conferences on the subject.

The first was in Stockholm (1972) and resulted in the "Declaration of the United Nations Conference on the Human Environment". It was pushed along by a decade of agitation by environmentalists who had realised the impact that economic development and unconstrained population growth were having on the planet. Thus the declaration was clear about some issues:

Proclamation 2: The protection and improvement of the human environment is a major issue…

Proclamation 5: The natural growth of population continuously presents problems for the preservation of the environment…

By the second Conference in 1992 (The Rio Earth Summit) 'The Rio Declaration on Environment and Development' commitment had weakened. Principle 1 stated that 'human beings are at the centre of concerns for sustainable development' and recognition that our crowding of the planet is a problem was relegated to Principle 8 'to achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies'. As worryingly, Principle 11, which deals with effective environmental legislation, goes on state: 'Standards applied by some countries may be inappropriate and of unwarranted economic and social costs to other countries, in particular developing countries.'

By Rio +20, environment had fallen out of the title of the conference and ranked a clear third in the much repeated line up of 'economic, social and environment' and derivatives thereof. In the first part of 'The Future We Want' – the document that came out of the conference – there is no mention of population growth at all. More curious, the emphasis is now on economic growth. Thus, of the two major threats to the environment, human population growth and larger demands per capita via economic growth one is not mentioned, and the other lauded.

George Monbiot[1] has in two blistering columns attacked the underlying message Rio+20 has delivered. As he puts it:

'In 1992, world leaders signed up to something called "sustainability". Few of them were clear about what it meant; I suspect that many of them had no idea. Perhaps as a result, it did not take long for this concept to mutate into something subtly different: "sustainable development". Then it made a short jump to another term: "sustainable growth". And now in the 2012 Rio+20 text that world leaders are about to adopt, it has subtly mutated once more into "sustained growth"'.

Sustained growth?? Wasn't that what got us to this situation? Granted that we need to meet the economic aspirations of the global population (including ourselves), but if this is to be in any recognizable sense sustainable economic growth, it cannot come at further cost to the environment. This is what we get instead:

"We recognise that planet Earth and its ecosystems are our home and that "Mother Earth" is a common expression in a number of countries and regions, and we note that some countries recognize the rights of nature in the context of the promotion of sustainable development. We are convinced that in order to achieve a just balance among the economic, social and environmental needs of the present and future generations, it is necessary to promote harmony with nature."

As George says it might as well be illustrated with rainbows and psychedelic unicorns and stuck on the door of your toilet for all the good it can do.

Well, one might argue, it is after all an agreement about development: what more could be expected? True enough; maybe our hopes were a tad too high. But surely we could have expected more from an agreement focussed on biodiversity? Perhaps the Convention on Biological Diversity signed onto by 150 nations at the 1992 Rio Earth Summit offers more hope:

Article 1. Objectives. Convention on Biological Diversity

The objectives of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to relevant technologies, taking into account all rights over those resources and to technologies, but appropriate funding.

Just to make it crystal clear, all the words concerned with economics have been underlined. And that is just the beginning: the whole document is shot through with anxiety that peoples will be robbed of their fair share of the wealth to be gained by exploiting biodiversity, and stresses that conservation is never to be undertaken at the expense of development.

We probably should not care for good or ill what is written in these documents. They are largely ignored by governments[2]. Even the UN Environment Programme admits we now have 'treaty congestion' as world leaders have signed up to 500 internationally recognised environmental agreements in the last 50 years. UNEP reports in its recent Global Environment Outlook that the world has missed all but four of its 90 most important environmental goals. The reason is clear. No country wants its economic growth to suffer in the slightest from measures taken to preserve the environment. That is why the phrase 'green growth' is so hot now. It suggests that we can painlessly have it all. And the rich countries do not want to pay for conservation in poor countries.

Where to now for New Zealand? Is there any point at all in us turning up to UN conferences where the main concern is national interest and anxiety over being bound to concrete action? Probably not. Better for us have a minimal presence at the international circuses, and to focus our efforts on this country, here and now.

All well and good. But what do we do? A solid 40 years or more of dedicated effort by government staff, NGOs and activists alike have barely deflected the New Zealand environment from a steady downward course. We spend less on environmental protection than we do on alcohol consumption, which rather undermines the argument that economic growth would mean enhanced resources for the environment. Maybe the heart of the problem is that regardless of what they may say, citizens will vote for economic growth over environmental protection any day of the week. And attempts to bind us with paper fetters through legislation are ineffective without community good will. Most laws are difficult to enforce. They inherently rely on citizens agreeing with them in principle and sanctioning those who break them. Goodwill does not necessarily or even often follow the mere promulgation of agreements, acts, and regulations. Which means the essential question is how can environmentalists win the hearts and minds of New Zealand so that environmental protection not only is the right thing to do, but an attractive, sane option. There is no easy solution. Years of ridiculing environmental activists as hopeless dreamers and deprecation of the Nanny State have taken their toll on the New Zealand psyche. But I will make an attempt at outlining what a solution might involve in my next contribution.

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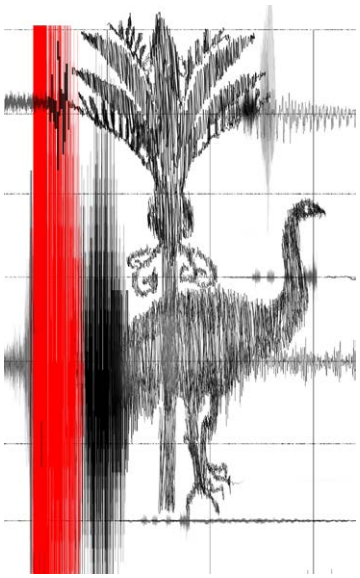
John Vidal: Guardian Weekly, 15–21 June 2012.

NZES CONFERENCE UPDATE



25–29 November 2012
Lincoln University

IS NEW ZEALAND ECOLOGY ON SOLID FOUNDATIONS?

The conference will address the theoretical and natural history underpinnings of ecological research in New Zealand and ask whether they are adequate to meet the demands of New Zealand's rapidly changing modern environments. Confirmed keynote speakers are Richard Hobbs, Trevor Worthy, Hamish Campbell, J. Bastow Wilson, and Lesley Hughes (winner of the Ecological Society of Australia award last year). We will also celebrate 50 years of teaching ecology at Lincoln University.

Conference details including start and finish times, plenary speakers and evening activities are available on the NZES website http://nzes.org.nz/events/conference-2012.

Registration

The online registration page is now open:
https://www.regonline.co.nz/ecologicalsociety
Early Bird registration deadline: **30 September**

Symposia

The conference will include the following symposia:

- Restoration Ecology

- Microbial Ecology
- Plant Functional Traits
- Drylands Research
- Next Generation Sequencing
- Wildlife Management and Conservation
- Community-led Projects
- Data Archiving

Student Day

The Student Day will be held on **Sunday 25 November** and aims to be an interactive and informative skill-building experience for participants. The day will include:

- A mix 'n mingle at the start to meet other students
- Workshops on a range of topics, such as networking and presentation skills
- Short presentations from students on their work, with constructive feedback provided by students themselves
- A discussion session with students and academics to talk about all those things you've always wanted to know about research and careers etc.
- A quiz, beer and pizza night to finish!

Please submit your "Student Day" abstract to Belinda.Whyte@lincolnuni.ac.nz by 1 November 2012.

For more information on the activities planned for the Student Day, please visit https://sites.google.com/site/nzesstudentday2012/.

Field trips

The field trips will be held on **29 November** and include a trip to Quail Island sanctuary and a tour of Christchurch's natural areas. Details of conference field trips are also available on the website.

NZES CONFERENCE STUDENT TRAVEL GRANTS

The NZ Ecological Society is offering travel grants to help students attend the NZES 2012 Conference in Lincoln.

Grant description

Travel grants can be used towards the costs of conference and field trip fees, travel to and from the conference venue, accommodation, and meals during the course of the conference. The amount of grant awarded to any one individual (to a maximum of NZ$400) will be based on the likely relative travel costs of all applicants. Up to eight travel grants may be awarded each year.

Criteria for eligibility

- All applicants must be a postgraduate student currently enrolled at a tertiary educational

POST-NZES CONFERENCE WRITING WORKSHOP

Encouraging the publication of ecological research—post-conference workshop and retreat!

30 Nov–1 Dec 2012

The NZES is organising a writing workshop and retreat for early-career ecologists; it will be held directly after the 2012 conference at Lincoln University. The aim is to foster the writing and publication of ecological research. On Friday morning (30 Nov) there will be a series of short seminars held at the university—these will be open to all attendants of the conference. Topics of the seminars are to be confirmed, but are likely to include clarity of writing, planning and structuring your paper and an overview of the publishing process.

Following the seminars, there will be a writers' retreat (Friday—Sunday) at the Cass Field Station. It is amazing what a focussed writing retreat with a group of people with a common goal, and away from internet-access, can do to advance your chapter or manuscript! All costs will be covered—accommodation and food during the writer's retreat will be covered by the NZES, made possible by the successful 2011 Rotorua conference; and we are seeking sponsorship for transport and logistical support. So sign up to go into the draw to attend to get your paper closer to publication!

Eligible are students and early-career ecologists with no (or limited) experience in publishing scientific papers; and you will need to have a chapter/manuscript ready to write. The retreat is not a place to analyse your data, but is intended to be a focused time to write with the view to substantially progress a chapter or manuscript for publication. Of course we hope that some of the articles worked on during the retreat will be published in the New Zealand Journal of Ecology, but this is not a requirement. There will be no internet access, so you will need to come prepared with a laptop and all the files etc. that you may need in the process. People with limited access to support in the writing process may be given preference to attend.

Send your expression of interest to attend the writer's retreat to: cieraade@landcareresearch.co.nz by **5 October 2012**. Please put "NZES writer's retreat" in the email subject. In the main body of the email, in max 100 words, describe what manuscript you will be working on during the retreat and what you would gain from attending; also don't forget to include your contact details, including the institution you work for/study at. We will draw up to 20 names out of the pool, and let the lucky attendants know by 10 October 2012.

Organisation by Ellen Cieraad, Landcare Research and Tim Curran, Lincoln University—both representatives of the International Network of Next-Generation Ecologists (www.innge.net).

institute, or been enrolled at a tertiary educational institute in the last six months prior to the date of the conference.
- All applicants must have applied to present at either the student day or main conference (poster or oral) OR be involved in the organisation or running of the conference (including the student day and field trips).
- Applicants must not have accepted an NZES student travel grant in the last two years.
- Membership of NZES is not required.

Further details and the application form are available at http://www.nzes.org.nz/awards-grants/student-travel-grants

Please submit your completed application form along with required documentation to: Fleur@thecatalystgroup.co.nz by FRIDAY 12 OCTOBER 2012.

Applicants can expect a decision by 26 October 2012.

ARTICLES

WHAT IS THE RIGHT TREE AND WHERE IS THE RIGHT PLACE FOR EXOTIC CONIFERS ON HIGH COUNTRY LANDS?

Larry Burrows[a], Alan Mark[b] and Ali Timms[c]

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c Chair Mid Dome Wilding Trees Charitable Trust; Chair, Environment Southland, Invercargill, ali.timms@gmail.com

Recent publicity has again raised the perennial issue of the place of exotic conifers in the New Zealand high country. Offsetting greenhouse gas emissions is being used as a driver for new woodlot establishment of exotic conifers in high country lands. How do we judge the right tree species and the right place for them when new research and wide experience of private landowners, Regional Authorities and Government Departments suggest we still have a lot to learn about managing their impacts? Decisions to establish exotic conifers have very long-term implications and risks as an economic land-use option, particularly when considered for carbon offsets. Such decisions should not be made casually. Some Regional Councils are tackling these questions now; others ignore the issue, but at present in our High Country lands this is a major issue that requires considerable further effort to urgently resolve.

Douglas fir has been planted on Waipori Station, Otago[1,2,3]. In a letter to the editor[4], P. Weir (Chair NZ Forest Owners Environment Committee) advocates that with '*afforestation in the South Island High Country using Douglas-fir in particular, it is entirely possible to sequester carbon at world beating rates*'. It is technically feasible to establish exotic trees in much of the High Country and that this afforestation can be a carbon sink. However it is questionable whether that is a desirable activity or suitable land-use option for pastoral leasehold or other high country land when other important values or actual costs are considered. Many Regional Authority or District Plans place restrictions on afforestation by exotic conifers (deliberate or accidental) in some high country lands because of perceived or actual problems with resulting tree invasion. As we gather new understanding of long-term legacies created by what were thought to be safe tree species at the time, and despite management guidelines for reducing risk, experience shows that what is the right tree and where is the right place for them, still remains unresolved.

We have all heard how good trees can be at sequestering carbon, but trees or afforestation also have other adverse effects; on landscapes, water productivity, successions, biodiversity, natural habitat and primary production. These effects are reflected in District or Regional plans and National policy statements/reviews that concern weeds and pests.

Figure 1. *Tussock area burned and planted in Douglas fir on Waipori Station, Lammerlaw Range, Otago as a carbon offset. According to the Wilding Spread Risk Calculator[5] the species presents a high risk as a source of wilding spread, and features of the site creates high risk of wilding invasion onto adjacent land at this location. (Photo: S Maturin).*

Mark et al.[1] point out in the recent case of the Waipori Station, Lammerlaw Range, that exotic afforestation adjacent to the Te Papanui (tussockland) Conservation Park (downwind) and Stoney Creek (tussockland) Scenic Reserve "*poses a clear threat of predictable and highly undesirable spread on to prime conservation tussock lands, currently free of wildings.*" They are also deeply concerned that "*the proposed mitigation measures, 100m to 250m unplanted buffer zone and double perimeter of ponderosa pine, would be ineffectual in minimising infestation of adjoining conservation lands ... given the very windy nature of the site*" (Fig. 1).

Plantations of exotic trees have a stark effect on landscapes and the concept of Outstanding Natural Landscapes has been investigated and confirmed near this Lammerlaw location by the Environment Court in relation to a proposed wind-farm. When should the landscape effect of plantations be taken into account?

Have we not learned from a legacy of unproven afforestation management options being tested inappropriately and in a way that will add to the vast extent of existing wilding weed problems? It is accepted that Douglas fir has high invasion potential so that the feasibility of clearing wildings by hand or grazing management (Douglas fir are relatively unpalatable) on adjacent conservation land is now questioned[6]. In the decades ahead whose responsibility will be wildings beyond the narrow buffer, and what will be the on-going cost of their long-term management? New techniques are now being implemented at considerable cost.

Recent studies and reports have shed new light on wilding issues and, in some cases, differ from earlier work on exotic conifer afforestation in the high country. Until recently, Douglas fir was not thought to present a significant wilding problem, but we now know it has very high spreading potential and it is now seen as a greater problem than the spread of *P. radiata*[7]. The invasion potential of Douglas fir is likely to be increased by the spread of its associated ectomycorrhizal fungi (i.e., beneficial fungi found on roots that can promote tree survival and growth). This may be a key reason for not only world-beating rates of growth in Douglas fir plantations, but also for world-beating rates of spread and wilding invasion. Studies from Australia, North and South America show that conifer species that create problems in New Zealand can have relatively slow rates of unwanted invasion elsewhere. The same environmental conditions that make New Zealand a prime location for fast plantation forest growth underpins why New Zealand also exhibits world-beating rates of invasive wildings.

Management tools to control wilding spread

There a numerous standard practices and guidelines recommended for managing wilding tree spread from planted stands[8]. These include grazing, direct marginal weed control techniques, species selection, site selection and others. As we learn more it is clear that for any particular site some may work, some need more understanding or method refinement, and some we don't yet know. Case studies of model exotic conifer plantings set up in the best locations and with the best possible intentions have with time ended up being an unexpected economic headache and source of wildings on neighbouring lands (Fig. 2).

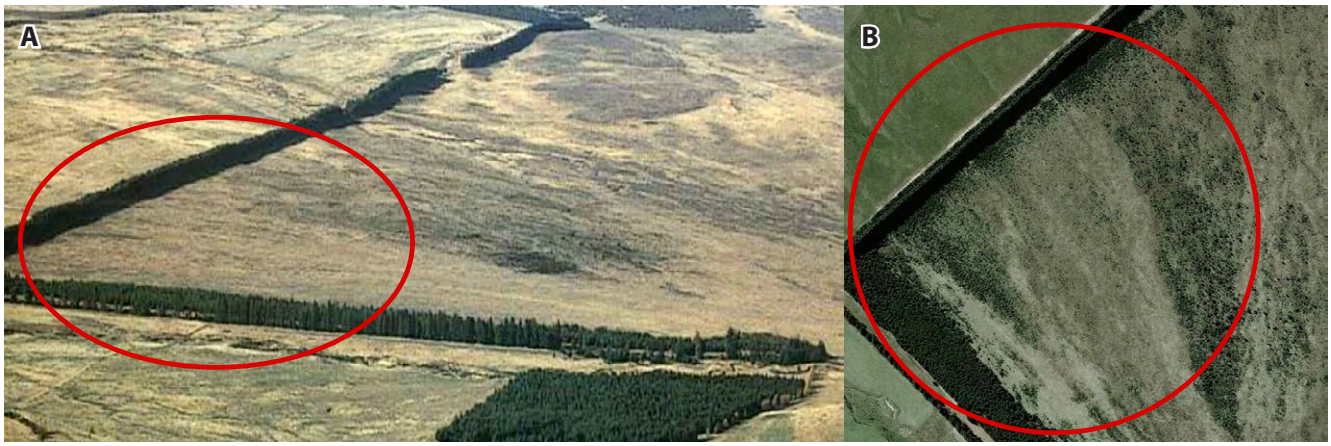

Figure 2: *A. An area of shelter belts and plantations on Ribbonwood Station, Omarama, described in 1999 as 'a minimum-spread risk situation… woodlots have been sited on sheltered land with improved pasture and intensive grazing immediately downwind.'[9]. And B. pasture adjacent to those shelter belts in 2010 with extensive marginal wilding spread onto grazed land.*

Grazing as a management tool for containing wilding tree weeds may be effective in some circumstances, but not in High Country situations where grazing is sporadic, low intensity, or weed spread is into retired or conservation land. Even short breaks in intensive grazing have been shown to result in rapid conifer invasion[10]. Traditional 'take-off' sites of tree seeds from near high points in the landscape are being revised as we learn more about wind turbulence and flow dynamics. Planting margins of plantations with belts of pine species of low spreading vigour has been recommended as a means to limit seed spread. Some such stands with buffers have been established but this remains an unproven technique.

Existing wildings

It is still to be resolved where the cost and responsibility rests for controlling up to 800 000 ha[11] of wilding conifers already in New Zealand. Those costs have yet to be quantified but influence the economic benefit of any resulting carbon sink. Clearing pre-1990 wilding stands will incur a deforestation liability to account for the carbon lost. Exemptions from a deforestation liability can be claimed under certain conditions[12], but that simply shifts the liability to the Crown.

On Mid Dome in northern Southland, where a major wilding tree clearance operation is under way, the government is offsetting the huge financial cost in C credit removals and the deforestation liability of removing the pre-1990 planted *Pinus contorta* stands (estimated by Ministry of Primary Industry as $3 million for ca. 250 ha). That is in addition to the >$12 million to carry out the actual clearance. Interestingly, the 2012–13 work program of the Mid Dome Trust to remove more pre-1990 high-risk seed sources of tree weeds is on hold because the Climate Change Convention is yet to announce details of a commitment period beyond December 31st, 2012.

Nearby in northern Southland a 190 ha block of Douglas fir, planted on Glenfellen high country pastoral lease ten years ago was recently cleared by the Conservation Department, at a cost of ca. $200,000, because of the high risk of wilding infestation down-wind into remote high country tussocklands. At the same time land-owners on other nearby properties are establishing hundreds of hectares of exotic conifers on lands with similar risks. So it costs the Crown to deal with wilding problems from the past, and it will cost the Crown as new liabilities occur in the future.

Should ownership of any liability caused by new plantings be carried by the taxpayer or should there be an industry levy that can be used to deal with the certain problems that will occur?

A recent study of ecosystem carbon in high country lands[13] showed there is little effect of extensive pastoral land-use on ecosystem carbon. This suggests there is little need for direct agricultural emissions offsets on high country lands. Some effects of trees are counter-intuitive. For example, we know that conifers can cause a loss, not a gain, in soil carbon[14]. Investigations of trade-offs between ecosystem services potentially provided by high country lands (e.g. carbon, provision of clean water[15], regulation of water-flow, reduction of soil erosion, provision of food and fibre, regulation of climate, provision of natural habitat) are now being made with novel outcomes[16,17] that will influence land-use decisions. Taking account of these effects means that, for most High Country farmers, it is simply not economic to embark on the consent process to establish exotic plantations.

Recent examples by some local Councils developing district plans show that concerns about wilding conifers and landscape values are considered more important than carbon credit potential.

There are a number of additional and promising new tools for aiding management of exotic conifers in the High Country. Some are under development or still on the horizon. Simply establishing more exotic conifers in the High Country for the sake of a carbon sink appears to have very little merit and considerable risk until those tools are in place. More work is required to understand the role of ectomycorrhizal fungi in tree invasions, on landscape values and social acceptance of trees in montane tussock grasslands, on sterile conifers, on the trade-offs of tree carbon with other ecosystem services, on when and where grazing management works to control woody weeds, on improved spatial predictions of wind-dispersed conifer spread, on environmental and economic costs and responsibility of existing and new wildings, on the effectiveness of tree buffers to limit seed spread, and many other related subjects.

With care and in time, we will be able to better judge the right tree species and the right place for it. However, but such decisions have very long-term implications and risks as an economic land-use option, particularly for carbon credits. This is a major issue in our High Country environment that must be urgently addressed.

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THREAT ASSESSMENT OF NEW ZEALAND'S NATURALLY UNCOMMON ECOSYSTEMS

Robert Holdaway & Susan Wiser, Landcare Research, Lincoln

Since human settlement of New Zealand, many ecosystems have declined extensively in area and function. Despite one-third of New Zealand's land area being legally protected, there is a strong bioclimatic bias in the distribution of reserves toward montane and alpine regions, and many of our lowland ecosystems are facing on-going and increasing threats from agricultural intensification, conversion to plantation forestry, mining, urban development, and invasive non-native species. New Zealand is not unique in this regard; globally, ecosystems are under increasing anthropogenic pressure and many are at risk of complete elimination.

In an attempt to inform conservation priority setting and stem ecosystem loss, the International Union for Conservation of Nature (IUCN) has recently proposed a quantitative approach to ecosystem-risk assessment1. Species-level assessments of extinction risk have been used successfully at multiple scales. In combination with information on other factors—such as cultural preferences and probability of success and funding of conservation projects—species-level assessments have been used to set priorities for species conservation. Traditional species-based conservation, however, only indirectly addresses ecosystem-level decline, and is often biased toward easily measured taxonomic groups, such as vascular plants or birds. Conservation approaches that are based on a higher level of biological organization—the ecosystem—may therefore provide a more pragmatic and cost-effective means of conserving multiple levels of biological diversity. Building on the success of species Red Lists, the IUCN ecosystem threat assessment criteria transparently assess the risk of ecosystem elimination based on properties of the ecosystem, including the degree to which it is geographically restricted, the presence of serious on-going threats, and observed declines in geographic extent, ecological function, and ecosystem processes.

New Zealand's naturally uncommon (also referred to as "naturally" or "historically" "rare") ecosystems represent unusual/extreme environments and are often hotspots for biodiversity. For example, we estimate that naturally uncommon ecosystems contain 145 (85%) of mainland New Zealand's taxonomically distinct nationally critical, nationally endangered, and nationally vulnerable plant species, 66 (46%) of which are endemic to naturally uncommon ecosystems. As such, naturally uncommon ecosystems have been widely recognised as priority areas for conservation protection. There is, however, a need to identify the most threatened naturally uncommon ecosystem types to allow prioritisation of conservation efforts.

We addressed this need by applying the draft IUCN's Ecosystem Red-List criteria to New Zealand's naturally uncommon ecosystems. This process provided the first indication of which naturally uncommon ecosystems are most threatened with elimination at a national level. In total, our results show that 18 naturally uncommon ecosystems are critically endangered, 17 endangered, and 10 vulnerable (Table 1)2. Threatened naturally uncommon ecosystems were spread across all higher-level ecosystem classes (wetlands, inland and alpine, geothermal, etc.), and a significant number of ecosystems had multiple criteria conferring their current threat status. Notably, there was a greater number of threatened plant species (per unit area) in critically endangered ecosystems than in ecosystems classified as non-threatened.

We used expert opinion to assess changes in ecosystem distribution and function over the past 500 and the last 50 years. Ecological integrity indicators (e.g. declines in native vegetation cover and increases in abundance of exotic weeds and pests) were used as a framework to evaluate reduction in ecosystem processes. These ecosystem-level criteria, and their associated thresholds, are linked to current ecological theory predicting probability of elimination.

New Zealand's naturally uncommon ecosystems are defined as those with an estimated maximum total area of <0.5 % of New Zealand's land area3. This translates to each ecosystem having an estimated maximum total extent prior to

human arrival of <134,000 ha. A total of 72 naturally rare ecosystems have been recognized to date; defined based on their unique physical and physiognomic characteristics. Fact sheets about the naturally uncommon ecosystems can be found on the Landcare Research website www.landcareresearch.co.nz/science/plants-animals-fungi/ecosystems/rare-ecosystems. Our results show that since human settlement of New Zealand, many of these ecosystems have declined extensively in area and function and some are now at risk of complete elimination (Table 1).

It is important to note that the results in Table 1 should be viewed as first approximations, and ecosystems may change status as more information is collected. Furthermore, our analysis also represents only a subset of New Zealand's ecosystems that are potentially threatened because it does not encompass ecosystems that had a large extent historically (i.e., naturally common) but have a small current extent as a consequence of human activities.

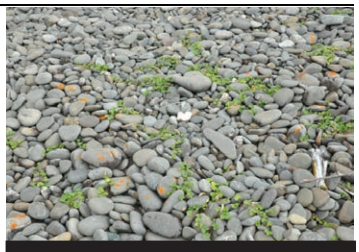
Naturally uncommon ecosystems have been included in national-level conservation policy and our recent application of the IUCN's Ecosystem Red-List criteria to these ecosystems now provides a rational basis to identify which ecosystems are the most threatened and so inform conservation priority setting. Recognition of our research internationally has led to our involvement in the IUCN working group that is developing a red list for Ecosystems similar to the IUCN species Red List. A second revision of the IUCN criteria is under consideration. Underpinning the revised criteria will be the requirement for a strong description of the ecosystem, its key biota, and the key ecological process that sustain it. We hope that this research will provide the framework and starting point for conducting an extinction risk assessment of New Zealand's other ecosystem types.

Table 1. Status of the 45 threatened naturally uncommon ecosystems in New Zealand.

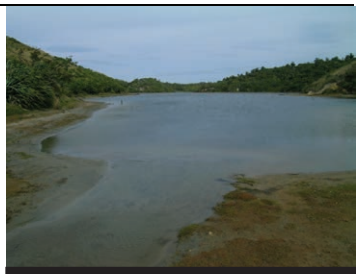
Critically endangered
Shell barrier beach (chenier plain)
Coastal turf
Old tephra plains (frost flats)
Inland sand dunes
Outwash gravels
Inland saline
Leached terraces
Fumeroles
Geothermal stream sides
Geothermal heated ground
Geothermal hydrothermally altered ground
Seabird guano deposits
Seabird burrowed soil
Marine mammal influenced sites
Cave entrances
Ephemeral wetlands
Gumlands
Damp sand plains
Endangered
Active sand dune
Dune deflation hollow
Stony beach ridge
Shingle beach
Stable sand dune
Coastal cliffs on calcareous rock
Ultramafic sea cliffs
Volcanic dunes
Sandstone erosion pavements
Frost hollows
Volcanic boulder fields
Sinkholes
Dune slacks
Domed bog (*Sporadanthus*)
Lagoons
Braided riverbeds
Seepages and flushes
Vulnerable
Coastal cliffs on mafic rock
Screes of calcareous rock
Young tephra plains and hill slopes
Boulder fields of calcareous rock
Cliffs, scarps & tors of mafic rocks
Cliffs, scarps & tors of calcareous rocks
Moraine
Lake margins
Blanket mire
Estuary


Geothermal heated ground


Leached terraces


Shingle beach


Sandstone erosion pavements


Lake margins

Photos taken by Susan Wiser, Sarah Richardson, Robert Holdaway, Rowan Buxton & Janet Wilmshurst

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ENVIRONMENT COURT DECISION HERALDS NEW DIRECTIONS FOR RESOURCE MANAGEMENT

Fleur Maseyk

Back in 2007 Horizons Regional Council notified the proposed One Plan (POP). The One Plan is the consolidated Regional Policy Statement and Regional Plans (land, water, air and coastal), and brings into one document what was previously addressed in seven.

The proposed One Plan caused a stir from the get-go and was never far from the media spotlight as anyone reading the paper, listening to the radio, or watching Rural Delivery over the last five years could attest to. Variously heralded as ground-breaking resource management or draconian regulatory-heavy legislation that would stymie economic growth and impinge on private property rights, opinion on the virtues of the One Plan was strongly divided. Such interest, emotion, and debate—heard across the board and sustained over the best part of a decade—reflect that regional policy really is where the rubber hits the road on a great number of our national resource management issues.

Over the course of process—from plan development, public meetings, technical caucusing and council level hearings, through to post decision appeals, mediation and finally into the Environment Court—two things remained unchanged. Firstly, the strong focus within the Plan of 'The Big Four' (water quality, water quantity, land, and biodiversity), and secondly, that the policy was responsive to need. Simply, evidence-based policy.

A huge amount of clever thinking was invested in the One Plan development. Readers might well recall any of the many presentations by Horizons' science and policy staff at various conferences (e.g. NZES, NZFSS, and Hydro Soc), national forums, industry meetings, and every other opportunity over the last few years. Horizons' case was supported by over thirty external technical experts from across the CRIs and academic institutions. This wealth of evidence certainly informed not only the Plan in the first instance, but the decisions of the Hearing Panel and the Environment Court.

So why did the proposed One Plan end up in the Environment Court? In a nutshell, although many issues under contention were resolved between various parties along the way (e.g. as part of the council level hearing or through mediation on appeals post release of the hearing decision), there were a number of critical elements of the plan where interested parties held intractable positions. No amount of mediation can resolve such situations, especially when dealing with fundamental philosophical positions—at both ends of the spectrum—regarding resource management.

The many appeal points made against the hearing decision on the proposed One Plan can grossly be summarised as falling into two camps: 1) the hearing decisions were felt to have diluted measures taken in the notified plan and parties wanted to see the 'tougher' position reinstated, and 2) some parties continued to feel the proposed plan was too economically onerous and restrictive on land use.

On the back of a mountain of evidence presented to the Environment Court at the beginning of this year, the Court released its decision in early September. The decision is an extremely considered one and provides a number of strong messages that are likely to become precedent for similar issues elsewhere in the country.

Underlying the Decision, are several clear explanations provided by the court as to why it arrived at the place it did, including: where the problems were real and the solutions known, there exists no excuse for further inaction[1]; voluntary initiatives are useful but only go so far and it is not far enough; and environmental bottom lines and critical thresholds need to be respected. These sentiments are echoed throughout decisions made on all the plan chapters.

The 198 pages from the Court has, put simplistically, reinstated the One Plan to the flavour it contained when it was notified and prior to the decision of the hearing panel. This is indeed a strong and brave decision whose confidence stems from the robust science-based foundation of the policy that held up under intensive testing.

The progress of the proposed One Plan has been closely watched by other councils, central government, industry, environmental groups, and national forums such as the Land and Water Forum. The Decision on the proposed One Plan will be influential in shifting the space in which these groups operate.

Nothing short of a game-changer.

A few key outcomes of the Environment Court Decision:

- catchment based management for both water allocation and water quality standards
- the use of the Land Use Capability (LUC) framework as a foundation for a policy instrument
- introduction of clear limits for diffuse discharges into waterways which has led to a 'consent to farm' regime
- strong regulatory protection for indigenous biodiversity
- the recognition that all areas of rare or threatened habitat types are to be considered ecologically significant
- that 'condition' or 'functioning ecological processes' should not be prerequisite criteria when assessing ecological significance
- the institution of hierarchy for application of biodiversity offsets/ mitigation

[1] *The court felt so strongly about this that it even went so far as to overturn positions agreed to by all parties during the course of mediation (e.g. The Court called for total stock exclusion from wetlands and waterways in priority catchments despite the mediated agreement not requiring this).*

IN THE NEWS

TOUGHER PENALTIES FOR WILDLIFE SMUGGLING

The Cabinet has agreed to introduce tougher penalties for those caught smuggling native wildlife out of New Zealand. The Wildlife (Smuggling Deterrence) Amendment Bill will increase the maximum penalty for smuggling the likes of tuatara, geckos and kakariki from six months' imprisonment or a $100,000 fine, to up to five years in jail and a $300,000 fine. The Department of Conservation has successfully brought four prosecutions involving seven foreign nationals and 68 lizards since 2010. The new law will also give DOC rangers limited powers of arrest so that the smugglers can't abscond before police arrive. The Bill will be introduced to the House later this year.

New Zealand's unique lizards such as the Marlborough green gecko are unfortunately a target for the illegal international trade in wildlife.
Photo: Debra Wotton.

HIGH COURT BACKS NIWA CLIMATE DATA

The High Court of New Zealand has backed the science behind NIWA's temperature data, rejecting claims in a legal challenge brought against them. In 2010 the New Zealand Climate Science Education Trust applied to the high court for a judicial review of the National Institute of Water and Atmosphere (NIWA)'s actions in publishing temperature records, claiming that adjustments in the data used led to an artificial increase of 1 degree C warming between 1909 and 2008.

Justice Geoffrey Venning, in a High Court ruling released in early September, rejected the Coalition's challenge of the official NIWA temperature record. Justice Venning also awarded costs to NIWA.

In a media statement endorsed by a number of leading NZ climate scientists, Prof James Renwick of Victoria University said he was pleased that the court had respected and reaffirmed the credibility of the scientific process. "Scientific analysis and discussion is carried out through the peer-reviewed literature," Prof Renwick continued.

CONFERENCE REPORT

REPORTING BACK ON LIVING DATA—THE DATAVERSITY CONFERENCE ON BIODATA MANAGEMENT

James Lambie, Science Coordinator (Horizons Regional Council) and Chair for Dataversity

Sunday 27 August 2012, Neil Armstrong, the pioneering spirit of space exploration passed away. On the same day, the participants of Living Data—Dataversity's 2-day conference for 2012—kicked off with a foray into the diversity of terrestrial life forms at Otari-Wilton's Bush native botanic garden and forest reserve. There we remembered another pioneering spirit—Dr Leonard Cockayne. The work of these two explorers helped popularise science, they increased our access to knowledge of things our forebears could only imagine, and their endeavours continue to influence the way our society thinks about our place in space and on planet earth. I doubt Living Data could have started more auspiciously.

Living Data was an opportunity for biodiversity and biosecurity data and information practitioners to get together for a couple of days and collectively do our bit to change the world—even just a little. Around 100 people attended the conference on day one and about 50 people participated in a workshop on the second day. The audience throughout was a good mix of local government (regions and territories), non-governmental organisations, CRIs, and central government (particularly DOC, MPI, and MFE). The conference on day one showcased current efforts to integrate data, highlighting the inter-agency collaboration toward data federation. The day culminated in the launch of the New Zealand Organisms Register (NZOR)—the backbone of a federated system.

The vision for NZOR is to create an accurate, authoritative, comprehensive and continuously updated catalogue of the circa 140,000 names applied to New Zealand biota and other taxa of importance to us. To achieve that vision NZOR has two fundamental components, the network of data providers and the information infrastructure to collate and deliver data to end-users. NZOR has a website demonstrating the web services—see http://demo.nzor.org.nz.

The workshop on day two was spent exploring further opportunities to collaborate and identify the next steps toward the holy grail of agreed data standards and database interoperability. Why? Because we are coming to realise that management of biological data is too complex and expensive for us to continue to develop systems in isolation of each other. Working collaboratively on a network of federated biodata systems offers untapped gains in efficiency and effectiveness.

By employing common data collection and management practices and reducing data and database duplication, the cost of implementing data management systems can be shared. By increasing access to data, we increase the potential for re-use. By increasing collective awareness of the location, state and trend of biodiversity values and biosecurity threats to biodiversity and productive capacity, we have a more informed community.

By working collectively and federating biological data, we can make better decisions for better environmental outcomes locally, nationally and globally. Go to http://dataversity.org.nz to join the movement.

BOOK REVIEW

PLANT GALLS

Reviewed by Nicholas Martin, Plant and Food Research
Based on a review first published in The Weta 43, July 2012.

Author: Margaret Redfern

Publisher: HarperCollins Publishers, London

Published: 2011

ISBN: 978-0-00-220144-5 (paperback), ISBN: 978-0-00-220148-8 (hardcover)

RRP: £30 (softcover), £50 (hardcover)

Series: Collins New Naturalist Library No. 117

Plant galls provide diverse opportunities for ecological study. This book of 562 pages provides a comprehensive account of galls, the organisms (microorganisms, nematodes and arthropods) inducing galls and other organisms associated with galls. It also covers ecological, evolutionary and historical aspects of galls. In short it is an excellent introduction to all aspects of plant galls and a place to extend ones existing knowledge of the subject.

After an introductory chapter on 'The Nature of Galls' the book is divided into four parts. Parts 1–3 deal with galls and the organisms associated with them while part 4 covers what the writer calls the ecology of galls.

"What is a gall?" is discussed on page two. In short, galls are growths on plants formed of plant tissue, but caused (induced) by other organisms. This first chapter, typical of others, is thorough in its analysis of the topic using simple clear language. All technical terms are explained, and there are detailed explanations of key topics in boxes so that the flow of the text is uninterrupted. In this chapter, a box covers the classification of galls, while another examines the possible processes involved in the development of galls.

In parts 1–3, groups of similar types of galls are described; Virescences and solid galls, Open galls, and Closed chamber galls. Within each set of chapters there are detailed descriptions of the variety of structures of that group of galls and details of the major groups of organisms inducing that kind of gall. For example in the first section viruses, bacterial and fungi are covered. Later in the chapter there is more detail about important groups of organisms such as rust fungi. These descriptions of the organisms are followed by descriptions of the specific galls with details of the structure of galls and the relevant biology of the host and inducing organism. Galls induced by rusts are a good example of use of clear diagrams illustrating some of the complex lifecycles accompanying the lucid text.

The same process is followed for all groups of gall inducing mites, insects and nematodes. The book is part of a British series and where possible the author uses examples of galls found in the British Isles. However, it uses examples from other parts of the world and puts the subject in a global context.

Because this book is comprehensive, and appears to give such fulsome coverage of the subject, it is sad to point out a few small errors. It omits a mite family, Tenuipalidae, and a fly family, Agromyzidae, that include species that induce galls. There have also been failings when compiling the index and Appendices, omitting all reference to the book's coverage of the remarkable mutualistic relationship between species of *Fergusonina* (Diptera: Fergusoninidae) and species of *Fergusobia* (Nematoda: Neotylenchidae) that induce galls in *Eucalyptus* and other Myrtaceae. I became aware of these omissions because these organisms induce galls in New Zealand.

Another area for improvement relates to figure captions. The names of the organisms are given, but it is not always clear what kind of insect it is. This means searching the nearby text to see for example if it belongs to the Cecidomyiidae

(Diptera) or Cynipidae (Hymenoptera). For someone browsing the book rather than reading whole chapters, it would be helpful if all captions indicated the type of organism(s) illustrated.

The last five chapters cover wider aspects of the subject—food webs associated with galls, evolution of galls, galls and geography, galls and people and galls in history. They all contain fascinating reading. The chapter 'Interactions and Adaptations' that includes details of parasites associated with galls also describes some of the inquilines, organisms that take over an existing gall. I had previously read about the thrips galls in Australia where colonies have a soldier caste to protect the gall. The chapter gives examples of weevils whose larvae burrow in sawfly (Hymenoptera) galls. The chapter on 'Galls in History', starts with the Greek, Theophrastus, a pupil of Aristotle, who was the first to document the subject, while 'Galls and People' includes the effects of people eating ergot infested grain and the resulting symptoms at one time called St Anthony's fire. And much more.

There is a comprehensive Glossary and separate Appendices listing gall inducers, host plants, inquilines and enemies of gall inducers. These are followed by the references grouped by chapter, though preceded by 'general references'. Finally there are a species index and a subject index.

While New Zealand is not specifically mentioned in the book (not in index) galls affect some crops and they are common in our native habitats. As each gall type on a plant species is associated with a specific organism, galls are potentially useful biodiversity indicators that non-experts could use with the help of pictorial guides. In the meantime recommend your library buys this book that is amazing value for its comprehensive coverage of the subject of galls.

NEWS FROM COUNCIL

PROPOSED CHANGES TO NZES RULES

The Council will propose a number of changes to the Society's rules, to be considered at the AGM in November. These proposed changes (Moved M. Galbraith / seconded S. Myers) are:

NZES AGM NOTICE

The New Zealand Ecological Society Annual General Meeting (AGM) will be held during the Annual Conference at Lincoln University at **5pm on Tuesday 27 November 2012**.

1. Membership classes

We have been exploring the option for NZES members to join the Ecological Society of Australia at a concessionary rate. This reciprocal arrangement will allow electronic access to all respective publications. The agreed policy refers to this trans-Tasman membership as the "Tasman Linkage", and represents a new membership class for the society.

The proposed changes to Section 3 (Membership) of the rules are:

- change the number of membership classes to <u>four</u>;
- insert Tasman Linkage members as part (iv).

3. MEMBERSHIP

(a) There shall be <u>four</u> classes of members:-
  (i) Ordinary members
  (ii) Unwaged members
  (iii) Honorary life members
  <u>(iv) Tasman Linkage members (joint with Ecological Society of Australia)</u>

2. Council membership

This proposed change addresses the discussion at the 2011 AGM to allow some flexibility in the length of the term for council members, primarily to avoid the situation where council members retire all at once, or resign after a single year service. This is considered important to ensure some carry-over of experience on Council each year.

The proposed changes to Section 6 (Council) of the rules are:

- in clause 6(e), change the term of election for Council members to read "<u>one or two years</u>";
- in clause 6(f) (ii), change the (maximum) term of service for Council members to read "<u>four consecutive years</u>".

6. COUNCIL

(e) The members of the Council shall be elected to serve a term of <u>one or</u> two years.

(f) All officers and members of the Council shall be eligible for immediate re election, PROVIDED ALWAYS that;

(i) No person having held the same office either of President, or Vice President for two successive years shall be eligible for immediate re election to that office, and;

(ii) No person having been a member of Council for <u>four</u> consecutive years shall be eligible for re-election as a member of the Council until a further period of two years has elapsed.

3. Charitable status

The Society is not a registered as a charitable organisation, and as such, donations to the Society are ineligible for tax deductions, and our income (interest on deposits) is taxed. Prior to applying for charitable status, our rules require changing to reflect a charitable status—a clear statement that the Society is not acting for private financial benefit or profit to an individual, and that all actions may only advance the charitable purposes. The winding-up clause must also clearly state that, in the event of this happening, any property remaining after the settlement of the organisation's debts and liabilities must be used to further a charitable purpose or purposes. The proposed changes to Section 7 (Finances) and Section 12 (Winding up) to accommodate this are:

- insert the following clauses (as recommended by the Charities Commission) into Section 7 (Finances):
- All income, benefit, or advantage must be used to advance the charitable purposes of the organisation.
- No member of the organisation, or anyone associated with a member, is allowed to take part in, or influence any decision made by the organisation in respect of payments to, or on behalf of, the member or associated person of any income, benefit, or advantage.
- Any payments made must be for goods or services that advance the charitable purpose and must be reasonable and relative to payments that would be made between unrelated parties. ;
- alter clause numbering of Section 7 (Finances) to accommodate the above insertion;
- insert "similar charitable purpose or purposes" into Section 12 (Winding up).

7. FINANCES

(a) All income, benefit, or advantage must be used to advance the charitable purposes of the organisation.
(b) No member of the organisation, or anyone associated with a member, is allowed to take part in, or influence any decision made by the organisation in respect of payments to, or on behalf of, the member or associated person of any income, benefit, or advantage.
(c) Any payments made must be for goods or services that advance the charitable purpose and must be reasonable and relative to payments that would be made between unrelated parties.
(d) The control and investment of the funds of the Society shall be wholly within the power of the Council, which may open and operate accounts at any bank or banks, as it deems fit. The Trustees of any such account shall be the Treasurer (or Secretary-Treasurer) and any five officers or members of the Council appointed by the Council for that purpose; cheques and withdrawal warrants shall be signed by any two of the Trustees.
(e) The Treasurer shall keep a correct account of all funds received and expended by the Society, and shall prepare at the end of each financial year a Balance Sheet and Statement of Accounts for that year.
(f) The accounts of the Society shall be audited at the end of each financial year by an Honorary Auditor, who shall be a member of the New Zealand Society of Accountants. The Honorary Auditor shall be appointed each year by the new Council and a reappointment in case of a casual vacancy can be made by Council as required.
(g) The financial year of the Society shall end on the 31st March in each year.
(h) The Society shall not have the power to borrow money.

12. WINDING UP

In the event of dissolution of the Society any remaining assets of the Society after payment of all liabilities shall be disposed of for a similar charitable purpose or purposes in such manner as the last Annual or Special General Meeting shall decide, or, failing any such decision, shall, *ipso facto*, become the property of the Royal Society of New Zealand.

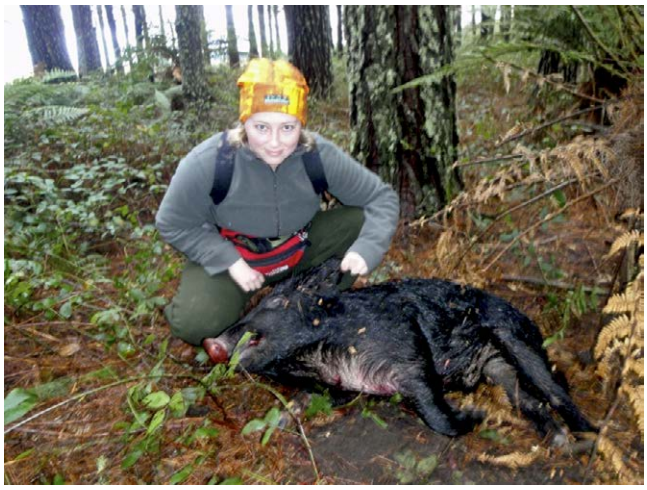
NEW ZEALAND JOURNAL OF ECOLOGY 2011 IMPACT FACTOR 1.778!

The New Zealand Journal of Ecology did extremely well in the 2011 Impact Factor rankings. The Society's journal ranked 70th out of 131 Ecology journals with an impact factor of 1.778 (only 2 places below Austral Ecology). This is a big jump from 2010 when its impact factor was 1.286 and it was ranked 88th out of 130 Ecology journals. Another great reason to publish your ecological research in NZ Journal of Ecology! Thanks to the previous Journal Editor K.C. Burns for his hard work to achieve this great result. I'm sure the new Editor Jo Hoare will ensure the journal continues to go from strength to strength.

POSTGRAD PROFILES

CHERYL KRULL, UNIVERSITY OF AUCKLAND

Cheryl recently completed her PhD thesis at the University of Auckland, where she is now a post-doctoral research fellow investigating the interaction between invasive rodents and roads, with a view to optimising pest control strategies.



Cheryl Krull with a culled pig.

Despite the presence of feral pigs in New Zealand for more than 200 years, the impact of this invasive species on New Zealand ecosystems has not been adequately quantified. Consequently this species has generally not been considered a high priority for eradication or control efforts. My PhD encompassed research on the impacts of feral pigs on vegetation, ecosystem processes and plant pathogen transmission. It also assessed current management regimes and used population modeling to make future management recommendations (Krull 2012).

I evaluated the impacts associated with ground disturbance by pigs, by excluding pigs from previously disturbed areas. This research showed that feral pig ground disturbance directly affects plant communities through direct removal of vegetation, but also has indirect effects via increased soil nitrate, leading to changes in species composition.

The newly discovered soil pathogen, *Phytophthora* 'taxon Agathis' (PTA) is a serious threat to endemic kauri (*Agathis australis*: Araucariaceae) in New Zealand and my research examined the potential for feral pigs to act as vectors of PTA. I detected 19 species of plant pathogens in the soil on pig trotters and snouts, including a different *Phytophthora* species (*P. cinnamomi*), although no PTA was isolated from the samples (Krull et al. 2012).

Another part of my research determined the effects of a three-year culling program on pig density and the extent of pig ground disturbance (impact) in the Waitakere Ranges, Auckland. A model created by Choquenot and Parkes (2005) was parameterised with data from this feral pig management program. The model was used to provide management recommendations for pig control in the Waitakere Ranges by identifying the management scenarios that would be most effective and efficient in reducing pig ground disturbance.

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Krull, C., Waipara, N. W., Choquenot, D., Burns, B. R., Gormley, A. M. and M. C. Stanley. In Press. Absence of evidence is not evidence of absence: Feral pigs as vectors of soil-borne pathogens. Austral Ecology.

DAN BARRETT, UNIVERSITY OF OTAGO

Dan is a University of Otago Master's student from the wild Pacific Northwest in the United States. When he isn't rummaging through rotting logs and rocks for peripatus, he spends his free time reading and compulsively drawing.

The ever elusive velvet worm.

The entire Onychophora phylum, commonly known as 'peripatus' or 'velvet worms', are classified as 'vulnerable' by the International Union for Conservation of Nature (IUCN). According to the IUCN one of the greatest threats to the phylum is habitat disturbance, limiting peripatus to areas of indigenous vegetation. Yet there are examples in the literature of peripatus persisting in exotic forest plantations and urban areas. In the late 1980s a peripatus population was discovered in piles of bricks and old kitchen rubbish in an urban neighbourhood in Dunedin, New Zealand. Peripatus have also been discovered in green reserves, and private gardens throughout the Dunedin area. For decades invertebrate scientists have

recognised the need for research on the ecology of peripatus to aid in their conservation, yet the value of those urban habitats has gone unexamined.

Understanding the ecology of vulnerable species is key to identifying their conservation needs. Employing resource selection functions I investigated the relationship between an assortment of habitat variables, and the presence or absence of peripatus in Dunedin reserves. Resource selection was studied at multiple scales: a 0.5 metre radius micro scale, a 10 metre radius macro scale, and a landscape scale. At each scale several competing models were fitted, compared, and averaged using logistic regression and information-theoretic approaches. A resource selection probability function was also calculated to create a probable distribution map of peripatus across the city.

The purpose of my research is to test two hypotheses: resource selection occurs at multiples scales, even for sedentary invertebrates; and the presence of peripatus is primarily affected by the condition of cover objects within reserves, not the geometry of the reserves or the condition of surrounding matrix.

LAURA YOUNG, UNIVERSITY OF CANTERBURY

Laura has just finished her PhD based on seed dispersal mutualisms in mountain ecosystems. She's an NZES council member and also the NZES webmaster. She loves field work and outdoorsy sports like rogaining, MTB, mountain running and tramping and is even doing a 12hr adventure race this month.

Laura Young doing the annual Kea Conservation Trust summer kea population survey in the mountains of Arthurs Pass National Park, January 2012.

One PhD research highlight included discovering the importance of kea—the world's only mountain parrot—for seed dispersal, an essential ecosystem process. The New Zealand mountain flora is unusually high in fleshy-fruited plant species adapted for seed dispersal by animals. Extinctions and declining populations of remaining native fruit-eating birds is likely to have reduced levels of seed dispersal for some plant species. Without kea (which are declining—the estimated remaining population is <5000), the movement of subalpine and alpine fleshy-fruited plant species may be reduced, particularly between populations on different mountain ranges. Kea dispersed >90% of seeds intact, a highly unusual behaviour for any parrot in a global context, as most parrots predate seeds (see Young et al. 2012).

I also found that exotic mammals (including hares, rabbits, pigs, possums, hedgehogs, sheep, deer and chamois) can be abundant in mountain landscapes, eat lots of native fruits and disperse surprisingly large numbers of seeds of many species intact. Another surprise was that the New Zealand falcon—a largely predatory bird—also ate native alpine fruits and dispersed seeds intact (see Young and Bell 2010). I also did field germination experiments to investigate how various aspects of disperser effectiveness affected recruitment and if there was any evidence of seed limitation.

References

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ACROSS THE TASMAN

ESA

ECOLOGICAL SOCIETY OF AUSTRALIA

Wiley-Blackwell Fundamental Ecology Award

$5,000 Postgraduate grant

The Ecological Society of Australia, with support from Wiley, is offering a new postgraduate student research award in the field of fundamental ecology. The value of the award is $5,000, which can be directed towards any research that advances the science of ecology. The award also includes funded registration, accommodation and travel costs to attend ESA13 in Auckland, NZ, to present "The Wiley Fundamental Ecology Award presentation.

Open to any student who is enrolled in postgraduate research at an Australian University and is a member of the Ecological Society of Australia.

Closing date: 30 September 2012

For more information visit: http://ecolsoc.org.au/fundamentalecologyaward.htm

Any queries on the award or the application process or criteria, please contact Gail Spina, ExecutiveOfficer@ecolsoc.org.au

2012 Photo Competition: Ecology in Action

The ESA "Ecology in Action" Photographic Competition is back in 2012 with new themes and an additional category aimed at celebrating images of the unique Australian landscape. The competition aims to create a visual record of ecologists and their work and engage members in celebrating themselves, the work they do, and their colleagues / students / supervisors, as well as the wonderful Australian environment in which we work.

This year entries can be uploaded directly via the webpage—just click on the link below to get to the online entry form. A panel of judges will determine the main prize winners, but ESA members will also be invited to vote for their favourite images under the 'People's Choice' award. All entries will be available via ESA's Facebook page.

ENTRY IS FREE AND YOU DO NOT HAVE TO BE AN ESA MEMBER.

Entries are invited under three categories:

1. "Out Standing in the Field"—Ecologists in Action

Interesting portraits of ecologists in the lab, office, lecture theatre, policy arena or field. Preference will be given to images that provide a good portrait of an ecologist, and also convey what the person works on, or issues pertinent to their field.

Each image must be accompanied by a short description (maximum 60 words) that describes the ecologist and their work. Images must either be taken in Australia or its territories, or illustrate the work that Australian ecologists are undertaking in other countries.

An ecologist is defined as anyone undertaking *ecological* research or management (including conservation and restoration).

Prizes: 1st $500, 2nd $300, 3rd $100

2. "Niches & Hollows: Adaptive Behaviour and Australian Biodiversity"—Ecology in Action

Images of plants, animals, ecological communities, landscapes, study sites, experiments, people, or any other subject that illustrate ecological principals, models, theories, projects, patterns, interactions or processes. Each image must be accompanied by a short description (maximum 60 words) that describes the subject and its relevance to ecology. Images must either be taken in Australia or its territories, or illustrate the work that Australian ecologists are undertaking in other countries.

Prizes: 1st $500, 2nd $300, 3rd $100

3. "Beneath Southern Skies - Unique Australian Landscapes"—Ecology in Action

Images of the Australian landscape that illustrate the diversity and complexity of environments and ecosystems that have captivated our members and provide both a workplace and a source of wonder for Australian ecologists. Each image must be accompanied by a short description (maximum 60 words) that describes the subject and its relevance to ecology. Images must be either taken in Australia or its territories, or illustrate the work that Australian ecologists are undertaking in other countries.

Prizes: 1st $500, 2nd $300, 3rd $100

NOTE: Maximum file size for images 5MB!

Winners will be announced and displayed at the ESA 2012 conference in Melbourne and all winners will be notified.

Entries close 7 OCTOBER 2012.

For further details and an entry form see http://photos.ecolsoc.org.au/events/photo-competition/2012.

ECOTONES

Bruce Burns, Auckland University

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

Hidden biological treasures found in water-filled tree holes

Trees, particularly old trees, often form natural hollows or cavities through rotting processes, and water can fill these recesses to form small bodies of water in forest canopies. Recently Blakely et al. (2012) investigated whether these microhabitats in the canopy supported similar invertebrate communities to ground-based water bodies in rainforests on the West Coast. Surprisingly, water in the tree holes contained highly distinctive invertebrate communities, very different from aquatic habitats on the ground. The tree-hole community was dominated by dipteran larvae and included several species that were found exclusively in tree holes, e.g., an unnamed chironomid in the genus *Monopelopia* and an endemic mosquito *Maorigoeldia argyropus*. These results add to the evidence that a unique component of biodiversity in temperate forests is obligate within tree holes of various sizes. As such tree holes are much more common in old-growth forests; it adds weight to the value of conserving such structurally complex habitats.

Blakely TJ, Harding JS, Didham RK 2012: Distinctive aquatic assemblages in water-filled tree holes: a novel component of freshwater biodiversity in New Zealand temperate rainforests. Insect Conservation and Diversity 5: 202-212. DOI: 10.1111/j.1752-4598.2011.00155.x

The ecology and taxonomy of moa: a clearer picture emerges

Moa have held the imagination and interest of New Zealand ecologists since the first discovery of their remains. As the original megaherbivores of New Zealand, ecologists have long struggled to understand what their influence on natural ecosystems and native species would have been. However, as a group of extinct species for which abundant and recent remains exist, moa studies have been at the forefront of research on ancient DNA.

Much of the combined understanding of moa and their ecology was summarised in Worthy and Holdaway (2002). Now, Worthy and Scofield (2012) have summarised further advances in our knowledge since that earlier book, and provided an update describing our current understanding. In terms of taxonomy, advances in phylogenetic analysis using ancient DNA now suggest there were 9 species of moa compared to the 11 species recognised previously. Other recent work has confirmed an exaggerated K-selected life history for moa, that they had relatively small brains, and, from examination of DNA on the exterior of egg-shell fragments, that males probably incubated the eggs rather than females, in common with their kiwi cousins. There have also been advances from consideration of moa coprolites (fossilised dung), including the observation of abundant spores of the dung fungus *Sporormiella*. Previously this fungus had only been associated with mammals.

Furthering this work on moa coprolites, Wood et al. (2012) have recently published a paper looking at the composition of plant fragments present in 35 coprolites from a subalpine cave in the South Island. The coprolites were deposited by the upland moa over the last 6000 years up to the extinction of the species several centuries ago. In total, they identified 67 plant taxa suggesting that this moa species was a generalist feeder. Intact seeds present in the coprolites intriguingly suggest that moa may have been important in seed dispersal. As well, they provide evidence that moa ate flowers of nectar-rich species such as flax and tree fuchsia.

Wood JR, Wilmshurst JM, Wagstaff SJ, Worthy TH, Rawlence NJ, Cooper A 2012: High-resolution coproecology: using coprolites to reconstruct the habits and habitats of New Zealand's extinct upland moa (*Megalapteryx didinus*). PLOS ONE Volume: 7 Issue: 6 Article Number: e40025 DOI: 10.1371/journal.pone.0040025

Worthy TH, Holdaway RN 2002: The lost world of the moa: prehistoric life of New Zealand. Indiana University Press.

Worthy TH, Scofield RP 2012: Twenty-first century advances in knowledge of the biology of moa (Aves: Dinornithiformes): a new morphological analysis and moa diagnoses revised. New Zealand Journal of Zoology 39: 87-153. DOI: 10.1080/03014223.2012.665060

Why don't New Zealand monarch butterflies migrate like those from North America?

Monarch butterflies are a much admired insect wherever they occur in the world but are particularly known for their long migration journeys in North America. Monarchs (Danaus plexippus) spread to New Zealand in the mid to late 19th century from North America as part of a rapid dispersal event across many parts of the Pacific and the Atlantic at that time. There is some debate over whether this was a natural or human-induced event, although current hypotheses suggest a human-mediated introduction to New Zealand sometime in the 1840's (Zalucki and Clarke 2004). However, the New Zealand populations and other introduced populations such as in Hawaii do not migrate. Lyons et al (2012) have recently compared the genetic structure of New Zealand monarchs with eastern and western North American, and Hawaiian populations. They found significant genetic differentiation among the North American (but not between

eastern and western populations), Hawaiian, and New Zealand butterflies, and this suggests that the differences in migratory or non-migratory behaviour may have a genetic base. They suggest that the recent sequencing of the complete monarch genome will provide evidence to further research this hypothesis.

Lyons JI, Pierce AA, Barribeau SM, Sternberg ED, Mongue AJ, de Roode JC 2012: Lack of genetic differentiation between monarch butterflies with divergent migration destinations. Molecular Ecology 21: 3433-3444. DOI: 10.1111/j.1365-294X.2012.05613.x

Zalucki MP, Clarke AR 2004: Monarchs across the Pacific: the Columbus hypothesis revisited. Biological Journal of the Linnaean Society 82: 111–121.

Horizon scan on conservation issues and development of protected area targets for the Antarctic

The Antarctic continent is perhaps the last great natural wilderness on Earth and is protected by the Antarctic Treaty, widely recognised as one of the most effective global collaborations in existence. However, it is under increasing pressure from human impacts. A new publication in Science has provided a horizon scan of future major challenges to conservation in the Antarctic conducted by a panel of experts including New Zealand representatives (Chown et al. 2012). The greatest immediate conservation threats are largely a consequence of regional warming, ocean acidification and changes in sea-ice distribution, but also include biological invasions. Also, there is increasing human activity in the region including more tourism, more research, greater exploitation of biological and mineral resources, and planning for permanent settlements. All these will be major challenges for future environmental management, however, that management now has a more robust basis with the publication a few years ago of the Environmental Domains of Antarctica (EDA; http://www.antarcticanz.govt.nz/environmental-stewardship/environmental-domains-analysis). This has divided the Antarctic continent into 21 different and distinct groups of environments using a similar approach to the Land Environments of New Zealand (LENZ).

In a further development of the environmental domains approach, Terauds et al. (2012) have recently combined the EDA with the most comprehensive source of Antarctic biodiversity data to identify 15 biologically distinct, ice-free, Antarctic Conservation Biogeographic Regions, encompassing the continent and close lying islands. This provides a 'wish list' of sites that should form the basis of a conservation management system for the terrestrial Antarctic. It is certainly an excellent step forward in planning to limit human impacts on Antarctic biodiversity.

Chown SL, Lee JE, Hughes KA, Barnes J, Barrett PJ, Bergstrom DM, Convey P, Cowan DA, Crosbie K, Dyer G, Frenot Y, Grant SM, Herr D, Kennicutt MC, Lamers M, Murray A, Possingham HP, Reid K, Riddle MJ, Ryan PG, Sanson L, Shaw JD, Sparrow MD, Summerhayes C, Terauds A, Wall DH 2012: Challenges to the Future Conservation of the Antarctic. Science 337: 158-159. DOI: 10.1126/science.1222821

Terauds A, Chown SL, Morgan F, Peat HJ, Watts DJ, Keys H, Convey P, Bergstrom DM 2012: Conservation biogeography of the Antarctic. Diversity and Distributions 18: 726-741. DOI: 10.1111/j.1472-4642.2012.00925.x

Not New Zealand's favourite export!

New Zealand has been hugely impacted by alien species introduced from other parts of the world, but, in turn, some of its native species have become invaders overseas, some with undesirable impacts. One of our most errant native species is the mud snail *Potamopyrgus antipodarum*. This small aquatic mollusc has now invaded all continents except Africa and Antarctica, and is continuing to quickly spread in Australia and North America. It occurs in almost any aquatic habitat including both salt and freshwater and has a fast population growth rate so can reach very high densities (Alonso and Castro-Diez 2012). Studies on its impacts show that in some, but not all, invaded ecosystems it can affect ecosystem structure and functioning, particularly through effects on nitrogen and carbon cycling. As well as a fast population growth rate, its success is also contributed to by its ability to survive passage through the gut of otherwise predatory fish species. In this way, being eaten by fish has become a dispersal strategy rather than predation. Perhaps New Zealand ecology should consider research on how to limit the impacts of our native species in other countries, as well as those of alien species in our own ecosystems.

Alonso A, Castro-Diez P 2012: The exotic aquatic mud snail *Potamopyrgus antipodarum* (Hydrobiidae, Mollusca): state of the art of a worldwide invasion. Aquatic Sciences 74: 375-383. DOI: 10.1007/s00027-012-0254-7

THE NOTICEBOARD

UNIVERSITY OF OTAGO Te Whare Wānanga o Otāgo NEW ZEALAND

VII SOUTHERN CONNECTION CONGRESS 2013

20–25 January 2013 Dunedin New Zealand

Important Update

As some of you will be aware we have been experiencing difficulties with the University of Otago portal for the VII Southern Connection Congress during the submission of abstracts process. We have therefore decided to **extend the abstract submission deadline until 30 September 2012.** Registration deadlines will remain the same.

For those who have already submitted abstracts we suggest you confirm this with the administrator (southern.connection@otago.ac.nz), if you have not already, as we are concerned that some may have been lost during entry into our website. To date all abstracts are confirmed as accepted.

Our website is now functional and has been updated with this information (http://www.otago.ac.nz/V11-southern-connection/).

We have been encouraged by the diversity and quality of the abstracts we are receiving and we believe we will have a very worthwhile congress in Dunedin.

Bill Lee and Kath Dickinson

WILDLIFE HEALTH SURVEILLANCE WORKSHOP

29–31 October 2012

New Zealand Centre for Conservation Medicine, Auckland Zoo

This 3-day workshop will use a combination of presentations and practical exercises to build your knowledge and skills about the basic principles underpinning disease surveillance, allowing you to properly plan and analyse your surveillance activities. The workshop will be run by Evan Sergeant, an experienced epidemiologist and a Director of AusVet Animal Health Services. Early-bird registration deadline 1 October.

http://training.ausvet.com.au/index.php?n=Main

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

Aboveground-belowground interactions: technologies and new approaches
Joint meeting of the British Ecological Society, the Biochemical Society and the Society for Experimental Biology
8–10 October 2012
London, UK
Abstract deadline: 13 August 2012
Early registration deadline: 10 September 2012

18th Australasian Weeds Conference
8–11 October 2012
Melbourne, Australia
http://www.18awc.com/

Australian Wind and Wildlife Conference
9 October 2012
Melbourne, Australia
http://windandwildlife.com.au/2012.

EIANZ Annual Conference
24–25 October 2012
Sebel Pier One Hotel, Sydney
www.eianz.org/conference/stronger-wiser-bolder-empowering-the-profession

NZ Ecological Society Annual Conference
25–29 November 2012
Lincoln University, Lincoln
Is NZ Ecology on solid foundations?
http://nzes.org.nz/events/conference-2012

Society for Ecological Restoration Australasia (SERA) Inaugural Conference
28–30 November 2012
Perth, Australia
www.seraustralasia.com/pages/conference.html

Ecological Society of Australia Conference
3–7 Dec 2012
Melbourne, Victoria
Ecology: Fundamental Science of the Biosphere
http://esa2012.org.au

5th International Fire Ecology & Management Congress
3–7 Dec 2012
Oregon Convention Centre, Portland, Oregon, USA
Uniting Research, Education and Management
http://afefirecongress.org/

Joint Australian and New Zealand Soil Science Conference 2012
2–7 December 2012
Hobart, Australia
Soil Solutions for Diverse Landscapes
http://www.soilscience2012.com/.

Assessing the Impacts of Petroleum & Mineral Extraction in NZ
NZ Association for Impact Assessment Annual Conference
10–11 December 2012
Te Papa, Wellington
Keynote Speaker: Dr Jan Wright, Parliamentary Commissioner for the Environment—Strategic issues facing NZ as identified in PCE report on hydraulic fracturing (due for release late Nov 2012)
www.nzaia.org.nz

VII Southern Connection Congress
Theme: Southern lands and oceans: Life on the edge?
21–25 January 2013
University of Otago, Dunedin
Abstract submission deadline: 31 July 2012

Student Conference on Conservation Science – Australia
21–31 January, 2013
The University of Queensland, Brisbane, Australia
Call for abstracts opens: 29 June 2012
Scholarship applications close: 14 September 2012
www.sccs-aus.org

International Didymo Conference
12–13 March 2013
Providence, Rhode Island, USA
www.stopans.org/Didymo_Conference_2013.htm

6th International Symposium on the Biology and Ecology of Galling Arthropods and related Endophytes
4–8 August 2013
O'Reillys Rainforest Retreat, Queensland, Australia
http://6isbegia.org/

INTECOL 11 Congress
18–23 August 2013
London, UK
Ecology—Into the Next 100 Years
www.intecol2013.org/

22nd International Grassland Congress
15–19 September 2013
Sydney, Australia
Revitalising grasslands to sustain our communities
Poster abstract submission deadline: 30 November 2012
www.igc2013.com

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(Effective from 30 August 2011)

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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.

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

Content for the December 2012 issue of the NZES Newsletter is due by Friday 14 December 2012.

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 (2011)

Full (receive journal and newsletter) .....$80* per annum

Unwaged (with journal) .....$45* per annum
Unwaged membership is available only on application to Council for full-time students, retired persons etc.
Unwaged members may receive the journal but must specifically request it.

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@nzes.org.nz

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