Are we there yet?

10 years of the NZ Plant Conservation Network

NZPCN 2013 conference

Parnell, Auckland

Thursday 23 – Sunday 26 May 2013

New Zealand Plant Conservation Network
PO Box 16-102
Wellington
info@nzpcn.org.nz
www.nzpcn.org.nz

Sponsors

Principal sponsors for this conference are Auckland Council, Department of Conservation, Millennium Seed Bank (UK), Auckland Botanic Gardens, Landcare Research and Auckland Botanical Society.

Sponsors of the charity auction are:
Craig Potton Publishing, Oratia Native Plant Nursery, Casey Moore, Lynne and Trev Huggins, Ian Spellerberg, Mike Wilcox, Richard Reeve, Pukerau Nursery, Audrey Eagle, Puketi Forest Trust, Matt Ward and the Department of Conservation.

Sponsors of this publication are takana native trees ltd and O2 Landscapes.

We thank all the sponsors for their support of the Plant Conservation Network and this conference.

Auckland Council

Department of Conservation
Te Papa Atawhai

Landcare Research
Manaaki Whenua

AUCKLAND BOTANICAL SOCIETY INC.

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Kew

Welcome and conference overview

Welcome to Auckland for the Plant Conservation Network's conference that has the theme:

Are we there yet? 10 years of the Plant Conservation Network.

We would like to thank you for participating and hope that you will enjoy this exciting event.

We are honoured to have Dame Anne Salmond presenting at this conference and to have Dr Peter Heenan presenting this year's Tane Ngahere lecture, as well as Michael Way from the Millennium Seed Bank and Professor Dave Kelly, Dr Mike Wilcox and Dr Leon Perrie giving keynote addresses as part of our conference symposia.

We also have an excellent, diverse line up of speakers that will all contribute to the on-going discussion about plant conservation in New Zealand.

Please make the most of your time here, enjoy yourself and leave inspired and ready to continue researching, conserving and promoting New Zealand's native plant life.

Conference Organising Committee
New Zealand Plant Conservation Network

Venue
The conference will be held at the Quality Hotel, Parnell. Morning and afternoon teas and lunches will be provided. All morning and afternoon teas and lunches will be served in the rooms in the venue. The conference dinner will also be held at the conference venue on Saturday 25 May. A packed lunch and bottle of water will be provided to all field trip attendees.

Emergencies
In the event that the building is to be evacuated (earthquake, volcano eruption etc) the assembly area is the front of the building.

Registration desk
The conference registration desk is located in the entrance to the conference venue. It will be open from 8.00 a.m. on Friday 24 May and Saturday 25 May.

Video of Conference presentations
The Department of Conservation has sponsored the video recording of all presentations to the 2013 conference. These will be made available at (web address) shortly after the conference concludes. The organising committee encourage you to review the presentations and invite others to view them as well.

Conference dinner and charity auction
This will be held on Saturday 25 May from 7pm onwards. The venue is the conference venue—the Quality Hotel Parnell.

Cell phones
Please have your cell phone turned off while in conference sessions.

Messages
All messages for conference attendees will be posted at the registration desk.

Name badges
Conference attendees are requested to wear name badges at all times as admission to sessions and morning and afternoon teas and lunches is by name badge only.

Quick guide to the conference

Thursday 23 May 2013

Training day (9am – 4pm) (sponsored by the Auckland Botanic Gardens)
Training day at the Auckland Botanic gardens from 9am till 4pm:

- Plant identification course run by the Department of Conservation
- Seed collection course run by the Millennium Seed Bank (UK)
- Plant propagation course run by Auckland Botanic Gardens and Otari Wilton's Bush

Welcome event (6pm – 8pm)

Conference welcome event to be held from 6pm till 8pm at Brew on Quay, 102 Quay Street, central Auckland.

Friday 24 May

Registration desk opens at 8 am.
Programme beings at 9 am.

Tane Ngahere Lecture

Presented by Dr Peter Heenan (Landcare Research)

Symposium papers (9am – 5.20pm)

- Defining, understanding and banking our biota. Understanding our biota through systematics, biogeography and research on seed banks, plant diseases and autecology.
- Naturalising natives – friend or foe? The biogeography and impact of native weeds such as karaka, pohutukawa, mangrove and pohuehue amongst others.
- Back from the brink – threatened plant recovery on islands, on private land, in sanctuaries and in the city. Recovery, monitoring and adaptive management of threatened plant populations by government, communities and landowners.

5.20 p.m. Conference second day concludes.

Saturday 25 May

Symposium papers (9am – 5.20pm)

Registration desk opens at 8 am.
Programme begins at 8.50 am.

- Beyond the converted – plant conservation advocacy. Promotion of the indigenous flora—engaging with business, farmers, communities, gardeners and the public to use and protect native plants.
- Back from the brink – threatened plant recovery on islands, on private land, in sanctuaries and in the city. Recovery, monitoring and adaptive management of threatened plant populations by government, communities and landowners.
- The urban native plant oasis – the importance of trees and urban habitats. The importance of parks, road corridors, natural fragments, trees and the urban forest and novel, human induced ecosystems in the urban matrix.

5.20 p.m. Conference second day concludes.

Conference dinner

This will be held at the conference venue in Parnell from 7pm.
A charity auction will be held during this dinner to raise money for the David Given Threatened Plant Research Trust and the Network's new Plant Conservation Endowment Fund.

Sunday 26 May

Rotoroa Island trip departs from Pier 4, Quay Street at 8-45am. Mataia and the Urban Forest field trips depart from the Quality Hotel Parnell (Mataia at 8am and Urban Forest at 9am).

Field trips return at 4pm for the Mataia and Urban Forest trips and at 6-40pm for the Rotoroa Island trip. More information about each of the field trips is provided later in this document.

Sponsors

Principal sponsors for this conference are Auckland Council, Department of Conservation, Landcare Research, Millennium Seed Bank (UK), Auckland Botanic Gardens, O2 Landscapes, and Auckland Botanical Society. We thank all the sponsors for their support of the Network and this conference.

The organising team

The organising committee for this conference were: Gary Bramley, Mike Wilcox, Philip Smith, Bruce Burns, Jo Ritchie, Paul Duffy, Mark Bellingham, Janeen Collings, Alicia Warren, Sue Barker, Brenda Osborne and John Sawyer.

Instructions to presenters

If you are a presenter please read the following:

1. Note the time of your session and the time available for your talk.
2. Please see the Chair of your session 10 minutes before it starts
3. Please bring your presentation on a CD or USB/Flash Drive. Please ensure it is loaded onto the lecture room computer well in advance of your presentation.
4. Please note that most presentation slots are 20 minutes long. Session chairs will stop you at 18 minutes for questions before the next speaker.

Instructions to those with displays or posters

If you would like to put up a display of a poster please ensure it is installed on boards in the downstairs hall before 9.00 a.m. on Friday 24 May. Please remove them by 5.30 p.m. on Saturday 25 May.

Airport airbus

Departs Auckland airport and Auckland City every 10 minutes during the week –
see http://www.airbus.co.nz
Travel time: 40 minutes to the city centre.
Price: $28 Return.

Taxis

Various taxi companies are available for all flights.
Travel time: 40 minutes to the city centre.

Cost: $30–50. Prices may vary by each taxi company. Preferred suppliers at Auckland International Airport are:

- Auckland Coop Taxis - ph: 09 300 3000: http://www.cooptaxi.co.nz
- Corporate Cabs—ph: 09 377 0773

Shuttles

A door-to-door service is available, from various companies, to all parts within Auckland. **Travel time:** 45 – 60 minutes to your destination
Cost: $15–20 per person. Cost reduces for two or more passengers travelling together. Super Shuttles: www.supershuttle.co.nz/Default.aspx
Book online or call 0800-SHUTTLE (748885).

Smoking

Smoking is not permitted inside the conference venue or the Auckland Botanic Gardens buildings.

Keynote speakers

Dame Anne Salmond (University of Auckland)

Symposium: ***Beyond the converted – plant conservation advocacy***

Dame Anne Salmond from The University of Auckland's Faculty of Arts is renowned New Zealand author and Distinguished Professor of Māori Studies and Anthropology and the 2012 Kiwibank New Zealander of the Year.

Dr Peter Heenan (Landcare Research)

Symposium: ***Defining, understanding and banking our biota***

Peter is a plant taxonomist who has worked for Botany Division, DSIR, and Landcare Research where he currently leads the Allan Herbarium plant systematics research program. He has research interests in the biology and taxonomy of indigenous and naturalised flowering plants and the phylogenetic and biogeographic history of the New Zealand flora. Peter has published over 140 papers on New Zealand botany as well as being co-author of the book *Threatened Plants of New Zealand* (2010).

Dr Leon Perrie (Te Papa Tongarewa)

Symposium: ***Naturalising natives – friend or foe?***

Leon is a botanist based at Te Papa museum, and works with its collection of plant specimens. He specialises in the evolutionary history and taxonomy of ferns. He is interested in the distributions of New Zealand's plants,
in terms of both documenting them and understanding the causes. This includes study of the geographic distribution of genetic variation within species.

Professor Dave Kelly (Canterbury University)

Symposium: ***Back from the brink – threatened plant recovery***

Dave Kelly grew up in Wellington, got a B. Sc. Hons from Massey University in 1977 and a PhD from Cambridge University in 1982, and has been at the University of Canterbury since 1985. His main research interests are in plant- animal interactions, particularly mast seeding, bird pollination, fruit dispersal, and weed biological control. He is a Fellow of the Royal Society of NZ, and the NZ Ecological Society gave him the Te Taio Tohu award in 2000 and honorary life membership in 2006. For many years through the NZ Ecological Society he has published advice on how to give a good conference talk, which opens his talks to close examination to see if he follows his own rules.

Dr Mike Wilcox (Auckland)

Symposium: ***The urban native plant oasis***

Mike is a retired forestry consultant and research director, living in Mangere Bridge. He is President of the Auckland Botanical Society, Fellow of the NZ Institute of Forestry, and member of the International Dendrology Society. Forest & Bird Protection Society and Auckland Tree Council, and takes a keen interest in the trees of Auckland. He is also an Honorary Research Associate at the Auckland Museum, engaged in documenting the seaweed flora of Auckland's diverse coasts.

Michael Way (Millennium Seed Bank, Royal Botanic Gardens, Kew)

Symposium: ***Defining, understanding and banking our biota***

Michael Way CEnv MIEEM is Head of Collecting & Network Support for the Millennium Seed Bank Partnership, Royal Botanic Gardens, Kew. Through an international network of over 100 partner organisations in 50 countries, RBG Kew provides technical leadership in the collection and long-term storage of wild plant germplasm in seed banks. Already storing samples of over 10% of the world's seed bearing plant species, the group prioritises useful and threatened species which can be propagated and used in recovery and restoration programmes. Based at RBG Kew's country garden of Wakehurst Place in Sussex, United Kingdom, Michael is one of the founders of the UK Native Seed Hub initiative, which provides high quality seed and technical advice to UK wildflower growers in order to stimulate more effective habitat restoration with appropriate origin seed. Michael has a degree in Applied and Environmental Biology from the University of York, UK (1988) and has field experience primarily from UK and from the Americas, where he coordinated Kew's seed conservation projects until 2010. He develops and shares best practice in access to genetic resources and seed collecting through a wide range of projects and through the MSB technical training programme.

Conference programme

Friday 24 May

Time	Name	Organisation	Title
9am – 9.10	Sarah Beadel	NZPCN President	Introduction
9.10 – 9-40	Peter Heenan	Landcare Research	Tane Ngahere Lecture: "Discovery and description of the New Zealand flora ….. more than just a name"
9.40-10.00	John Leathwick	Department of Conservation	Prioritising the Department of Conservation's ecosystem and threatened species management
10.00-10.20	Jeremy Rolfe	Department of Conservation	Update on the NZ Threat Classification System 2012 review of vascular plants
10.20 – 10.50	**Morning tea**		
10.50-11.10	Michael Way	Millennium Seed Bank (UK)	*Ex situ* conservation in a changing world: the Millennium Seed Bank partnership
11.10-11.30	Ilse Breitwieser	Landcare Research	The next generation of NZ Floras
11.30-11.50	Steve Wagstaff	Landcare Research	Species coalescence in the Marlborough rock daisies (Pachystegia, Asteraceae): an endemic genus from New Zealand
11.50-12.10	Debra Wotton	Landcare Research	Why are some plant species rare? A search for mechanisms
12.10-12.30	Brenda Osborne, John Sawyer and Karlene Hill	Auckland Council	Using Ecosystem Classification To Better Understand Auckland's Ecosystems
12.30-1.20	**Lunch**		
1.20-1.50	Leon Perrie	Te Papa Tongarewa	Native plants outside their natural range
1.50-2.10	Claire Webb	Auckland Council	Mangrove management in Auckland – a balancing act
2.10-2.30	Geoff Walls	Taramoa Limited	Feral pohutukawa and other island stories
2.30-2.50	Carolyn Lundquist	NIWA	Can we turn back the clock? Managing mangrove expansion in northern New Zealand
2.50-3.10	Jane Gosden	University of Canterbury	What prevents hybridisation in Celmisia?

3-10-3.40	**Afternoon tea**		
3.40-4.00	Laura Young	University of Canterbury	What animals disperse seeds of subalpine fleshy-fruited plants and is seed dispersal effective for plant regeneration?
4.00-4.20	Rob Smissen	Landcare Research	Progress towards the delimitation of species in New Zealand Craspedia
4.20 – 4.40	Zoe Stone	Auckland University	The importance of plant phenology in understanding flora-fauna interactions
4.40-5.00	David Glenny	Landcare Research	Current threats to bryophytes from coal mining industry.
5.00-5.20	Rob Kennedy	University of Bonn	Science for conservation: kahikatea dendrochonology

Saturday 25 May

Time	Name	Organisation	Title
8.50am – 9.00	Sarah Beadel	NZPCN President	Introduction
9.00 – 9.30	Dame Anne Salmond	University of Auckland	Rivers, Plants and Networks
9.30-9.50	Geoff Davidson	Oratia Native Plant Nursery	Are we there yet? We have barely started
9.50-10.10	Marie Brown	University of Waikato	Compensating for ecological harm - implications for the New Zealand flora
10.10-10.30	Elizabeth Heeg	Queen Elizabeth II National Trust	Using species lists and threat information to inform management of conservation covenants on private land
10.30 – 11.00	**Morning tea**		
11.00-11.20	Philip Grove	Environment Canterbury	Recovery of a population of the threatened shrub *Olearia adenocarpa* on Canterbury Regional Council reserve land at Rakaia Island
11.20-11.40	Cathy Jones and Jan Clayton-Greene	Department of Conservation	Update on saving an ephemeral wetland and its threatened plants
11.40-12.00	Esther Dale	University of Auckland	Cook's scurvy grass (*Lepidium oleraceum* s.s.): current threats and the importance of seabirds
12.00-12.30	Dave Kelly	University of Canterbury	The importance of species interactions for plant conservation

12.30-1.20	**Lunch**		
1.20-1.50	Mike Wilcox	Auckland Botanical Society	Auckland's Remarkable Urban Forest
1.50-2.10	Friederike Behrens	Lincoln University	Ecological tree selection for urban street and park trees
2.10-2.30	Philip Smith	02 Landscapes	Under the radar: realising the potential of rare species for landscape design
2.30-2.50	**Dave Galloway, Rick Kooperberg and Janet Ledingham**	Landcare Research	Urban lichens in New Zealand: a forgotten resource?
2.50-3.10	Hugo Baynes	Auckland Council	Auckland zoo's contribution to the native plant oasis
3.10-3.40	**Afternoon tea**		
3.40-4.00	Melissa Hutchison	Wildland Consultants	Back from the dead: the rediscovery of *Pittosporum obcordatum* on Banks Peninsula after 170 years of local extinction
4.00-4.20	Joy Comrie and Alice Shanks	Department of Conservation and Queen Elizabeth II National Trust	Managing a hotdot – limited options when numbers get very low
4.20 – 4.40	Victor Anton	Victoria University of Wellington	Seedling survival in forest revegetation projects within Wellington City
4.40-5.00	Lisa Forester	Northland Regional Council	Northland Coastal Dune Lakes – rare treasures worth protecting
5.00-5.20	John Barkla	Department of Conservation	Project Gold – Celebrating and cherishing kowhai

Charity auction at Network conference dinner

The Network will be holding an auction at its conference dinner on Saturday 25 May.

Money raised at this auction will be gifted to the David Given Threatened Plant Research Trust as well as contributing to establishing the Network's new Plant Conservation Endowment Fund to sponsor plant conservation action.

Items to be auctioned include:

Original poetry donated by Dunedin based poet Richard Reeve including a hand written copy of the poem 'Backcountry' and four books:

- The life and the dark
- Dialectic of mud
- In Continents
- The Among

Auckland's Remarkable Urban Forest by Mike Wilcox published by Auckland Botanical Society in 2012. Donated by Mike Wilcox.

Ian Spellerberg's Native Plant book trilogy. Donated by Ian Spellerberg:

- Going Native. Edited by Ian Spellerberg and David Given
- Living with Natives - New Zealanders talk about their love of native plants. Edited by Ian Spellerberg and Michelle Frey. Photography by John Maillard.
- Native by Design - Landscape design with New Zealand plants. Edited by Ian Spellerberg and Michelle Frey. Photography by John Maillard.

Voucher for two nights' Bed and Breakfast in Invercargill staying with Lynne and Trev Huggins.

Original Lands and Survey Scenic Reserve sign (made of aluminium with real bullet dents!) donated by Mark Seabrook-Davison.

A copy of the two volume book "Eagle's Complete Trees and Shrubs of New Zealand" signed by the author. This beautiful two-volume set brings together Audrey Eagle's botanical artworks from her best-selling 1975 and 1983 publications. It includes over 170 new paintings, bringing the total number of plants to more than 800 - all in colour and life-size. Flowers, fruits, and other features are shown in superb detail. Comprehensive notes, written in consultation with expert botanists, accompany the illustrations. This set is an outstanding contribution to botany in New Zealand - and an essential addition to any library. Donated by Mrs Audrey Eagle.

Threatened and common native plants donated by Geoff Davidson at Oratia Native Plant Nursery.

$100 plant voucher donated by Arne Cleland at Pukerau Nursery in Gore.

Plant books donated by Craig Potton Publishing:

- Field guide to New Zealand's Native trees by John Dawson and Rob Lucas
- Above the Treeline - A Nature Guide to Alpine New Zealand by Alan F. Mark (2 copies)
- New Zealand's Native trees by by John Dawson and Rob Lucas

A guided botanical tour of Puketi Forest, Northland
Puketi has 370 species of higher plant, many of which are rare or threatened. Puketi Forest Trust

has been working to restore the forest since 2003 and one of the Trust's founders, Ian Wilson - a local resident and keen amateur botanist, will lead a group of up to four people to explore the botanical highlights of Puketi (exact tour dependent on participants' interest and fitness).

An original plant painting by Network Council Member Matt Ward.

Plant photograph by Casey Moore (http://caseymoore.com/) - a British photographer who recently spent time in Dusky Sound, Fiordland.

Hut passes and Great walk passes donated by the Department of Conservation.

Field trips

Three field trips will be held on Sunday 26 May.
A packed lunch will be provided. Three concurrent field trips depart as follows:

Mataia Private Restoration Project, Kaipara Harbour

Leaders: Janeen Collings and Maureen Young

Departs 8am from Quality Hotel, Parnell and returns 4pm.

Mataia farm, set within the stunning Kaipara harbour, comprises 1300ha of sheep and beef farm of which 400 ha of conservation land is set aside. Working with the local community, conservation management aims to ensure a range of habitats are restored and the local wildlife is well protected. Our hosts Shane and Jenny will take you through a range of habitats including a small remnant kahikatea/totara forest, manuka shrub land, regenerating kauri, mature coastal broadleaf forest, saltmarsh flats and mature mangrove stands. This trip is designed for you to experience a range of vegetation types that characterise the Kaipara Ecological District and to highlight the incredible amount of conservation effort happening within the private sector.

Rotoroa Island Restoration, Hauraki Gulf

Leader: Jo Ritchie

Departs 8.45am from Pier 4, Quay Street and returns 6.40pm.

Rotoroa Island Trust has established a public arts and conservation estate on 80 hectare Rotoroa island in the Hauraki Gulf. . The island has undergone a transformation with 20,000 pine trees felled and almost 400,000 plants sourced from local seed, propagated and planted on the island.
A state-of-the-art exhibition centre and museum now showcase the island's fascinating history and heritage buildings such as the jail, chapel and schoolhouse, have been restored.

Auckland's Urban Forest

Sponsored by Auckland Botanical Society
Leader: Mike Wilcox

Departs 9am from Quality Hotel, Parnell and returns 4pm.
Visiting native bush reserves on Auckland's North Shore, including Sacred Grove, Takapuna (ancient pohutukawa); Sylvan Park, Takapuna (kohekohe / puriri / karaka forest on edge of Lake Pupuke; Smiths Bush, Northcote (kahikatea forest); Eskdale Reserve (mixed forest including swamp). Lunch will be provided at Kaipatiki Project Environment Centre, Birkdale, where we will also hear about this project and visit the native plant nursery. A full schedule is provided on the next page.

See following page for more detailed itinerary of this field trip.

Tour of Auckland's urban native bush reserves:
Sunday 26 May 2013

Auckland City is flanked by extensive native bush in the Waitakere Ranges and Hunua Ranges. There are also numerous small fragments of native bush within the urban area, with around 1800 ha in Auckland Council reserves and perhaps even more under private ownership. During the tour we will visit several Council reserves, concentrating on the North Shore. We will see a wide range of different types of forest, and discuss aspects of management such as biodiversity, ongoing protection, weed contamination, community involvement, and recreational and educational opportunities in these forest fragments.

Takapuna Beach Reserve (Sacred Grove, Te Urutapu), 0.4 ha. An example of ancient large pohutukawa (*Metrosideros excelsa*) trees preserved adjoining Takapuna Beach. The grove includes several large trees in the grounds of private apartments. There is an impressive boardwalk. *Access: The Promenade off Hurstmere Rd.*

Sylvan Park, Lake Pupuke, Takapuna, 1.4 ha. This patch of forest occurs on tuff deposits from the volcanic explosion crater, now Lake Pupuke. The forest here is a fine example of broadleaved forest, the dominant species being kohekohe (*Dysoxylum spectabile*) and karaka (*Corynocarpus laevigatus*). There is also puriri (*Vitex lucens*), kowhai (*Sophora chathamica*), rewarewa (*Knightia excelsa*) and hinau (*Elaeocarpus dentatus*). *Access: Sylvan Park Rd off Kitchener Rd.*

Smiths Bush Scenic Reserve, Northcote, 10.0 ha. One of Auckland's finest and most popular patches of urban bush. Kahikatea (*Dacrycarpus dacrydioides*) is the dominant tree, but there are also groves of totara (*Podocarpus totara*), taraire (*Beilschmiedia taraire*), and a sprinkling of puriri, karaka, kohekohe, kowhai, matai (*Prumnopitys taxifolia*) and milk tree (*Streblus heterophyllus*). A Bioblitz was conducted here in 2008, recording 946 species of plants, fungi and animals. *Access: Off Northcote Rd beside ASB Netball Stadium.*

Kaipatiki Project, Birkdale. This project started in 1998, and so far has restored 70 ha of native bush and stream banks. The centre has a nursery, teaching garden and environmental centre. *Access: 17 Lauderdale Rd, Birkdale.*

Eskdale Reserve, Glenfield, 54.0 ha. This extensive tract of native bush is an amalgam of several formerly separate reserves (Hiwihau Scenic Reserve, Birkenhead Domain, and Eskdale Bush Scenic Reserve & Lauderdale Reserve). The area has had a long history of logging for kauri, gum digging, and clearing. Much of the vegetation is regrowth dating back to the 1930s. Among the forest types we will visit are stands of kanuka (*Kunzea ericoides*) and a grove of swamp maire (*Syzygium maire*). *Access: Track entrance opposite 215 Glenfield Rd.*

Kauri Park, Birkenhead, 10.6 ha. The main feature of this well-preserved forest is kauri (*Agathis australis*). Other trees here include hard beech (*Nothofagus truncata*), kanuka, kahikatea, tawa, taraire, kanuka, white maire (*Nestegis lanceolata*), miro (*Prumnopitys ferruginea*) and tanekaha (*Phyllocladus trichomanoides*). Kauri associates can be seen. *Access: Between 36 & 38 Rangatira Rd, Birkenhead*.

Withiel Thomas Reserve, Mt Eden, 0.7 ha. This is an example of a "rock forest" on a lava flow from Mt Eden. The principal trees here are mahoe (*Melicytus ramiflorus*), mangeao (*Litsea calicaris*), titoki (*Alectryon excelsum*) and puka (*Griselinia lucida*). *Access: Withiel Drive off Mountain Rd or Gillies Ave*.

Mike Wilcox
Auckland Botanical Society

Conference Talk Abstracts

Abstracts are in alphabetical order by speaker.

Please note: abstracts are not available for all talks.

Seedling survival in forest re-vegetation projects within Wellington City

Victor Anton
Victoria University of Wellington
Victor.Anton@vuw.ac.nz

In the last few decades, there has been an exponential increase in the number of forest restoration projects throughout the New Zealand urban areas. Local government and community groups are in charge of these projects. Survival rates of trees in these projects, however, are still unclear. My research investigates the survival rates of three tree species commonly used in the forest re-vegetation projects within Wellington City (Wineberry: Aristotelia serrata, Cabbage Tree: Cordyline australis and Lemonwood: *Pittosporum eugenioides*). I identify and analyse the factors influencing seedling performance within the initial five years after transplanting. I then develop guidelines to minimize the effects of the detrimental factors influencing seedling survival. By implementing these new guidelines, community groups and government agencies will achieve more cost- and labour-efficient management strategies in their forest re-vegetation projects.

Project Gold – Celebrating and cherishing kowhai

John Barkla
Otago Conservancy, Department of Conservation
jbarkla@doc.govt.nz

Project Gold is a Department of Conservation initiative launched in 2011 that encourages people to get involved in conservation by appealing to their special fondness for kowhai. It has been the catalyst for community planting programmes throughout Otago, with particular emphasis on the Central Otago Rail trail. Project Gold uses the kowhai flagship to engender support for conservation and restoration of native woodland biodiversity. Key resources and information have been produced and made easily accessible to landowners, community groups and schools. The project pushes the eco-sourcing message and a very popular product has been regionally focused seed-packs that encourage enthusiasts to grow their own.

To maximize biodiversity objectives, the project needs to move towards an ecosystem focus where kowhai associates, including threatened species, are promoted. Tools and strategies also need to be developed to help achieve protection of existing natural kowhai stands. It is intended that Project Gold will evolve into a self-sustaining community owned and driven project. Given the spread of New Zealand's eight kowhai species, Project Gold has the potential to be applied nationally.

Auckland Zoo's contribution to the urban native plant oasis

Hugo Baynes
Auckland Zoo
hugo.baynes@aucklandcouncil.govt.nz

The presentation will give a brief overview of the zoo's botanical metamorphic journey from its early days to the present and cover aspects of more recent developments that have helped transform areas of the zoo into native immersion based experiences.

Ecological Tree Selection for Urban Street and Park Trees

Dr Friederike Behrens
rieke@behrens.co.nz

Urban street and park tree selection focusses on finding an 'appropriate' tree species that will produce environmental, social and economic benefits for the urban dweller. Street and park trees could also bring ecological benefits. They could provide habitat, extend habitat or connect habitat for local urban wildlife. What if the present finding-an-'appropriate'-tree-species selection-approach for urban street and park trees could be changed from a small scale individual tree focus to a broad scale urban forest approach that aims at establishing an ecological functional urban ecosystem? Integrating ecological criteria designed to be applied at different spatial planning levels and in the day-to-day practice of selecting urban street and park trees may hold an answer.

Some New Zealand cities have used ecological knowledge of local biodiversity in some planting projects in the past. However, this approach has not been explicit and has not become 'main-stream'. In my presentation I focus on ecological criteria for urban street and park tree selection, their application, their benefits and possible disadvantages. An example will show what may be possible in street tree planting to promote local biodiversity without rejecting other considerations, such as shade, uniformity, or physical requirements.

The Next Generation of New Zealand Floras

Dr Ilse Breitwieser, Aaron Wilton, and Peter Heenan
Allan Herbarium, Landcare Research, Lincoln, New Zealand
breitwieseri@landcareresearch.co.nz

Our goal is to provide a dynamic, continually updated electronically-based Flora for New Zealand. This next generation Flora of New Zealand is aimed at a wide range of users. We are extending the concept of a Flora to include delivery of our original research via a variety of tailored products from books to delivery of different profiles via the internet to smartphone apps. This requires a different, new approach to Flora writing and development. We are developing an information system that allows integration of data from a range of sources. Central to achieving this is the development of processes that allow the capture and analysis of granular, highly linked data to ensure that data used to create the Flora are up-to-date. We have to deal with a number of technical challenges such as efficient processes to capture data linked to specimens, and the development of processes to analyse these data. Also, there are new social and legal challenges such as changing working practices by scientists and the recognition of authorship and copyright. We will present our experiences in developing this new electronic Flora of New Zealand, what we have achieved so far, and some of our plans.

Compensating for ecological harm - implications for the New Zealand flora

Marie Brown
University of Waikato
mab57@waikato.ac.nz

Ecological compensation (including biodiversity offsets) in New Zealand is widely used; usually required by resource consent to help counter-balance the adverse effects of activities on flora, fauna and their habitats. A three year investigation into the implementation of these mechanisms under the Resource Management Act has yielded a range of outcomes on levels of regulatory compliance, consideration of ecological matters in the planning process and an understanding of the views and experience of stakeholders involved in the field. This research shows that New Zealand has some way to go in effectively implementing the compensation for ecological harm, and that the implications of this shortfall are potentially quite negative for our biodiversity. This talk will reflect on those research outcomes and draw out important elements as they relate to the protection, management and restoration of native flora.

Managing a hotdot - limited options when the numbers get very low

Joy Comrie, Department of Conservation and Alice Shanks, QEII National Trust.
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Awahokomo karstland in the lower Waitaki valley is a 40 ha site protected by a QEII covenant. Central to the site is a tower of 4 flat-topped plateaux that provide refuge to a rich array of herbaceous flora including 16 threatened species, and a number of new and unresolved taxa. With some plants numbering less than 50, we have been grappling with the question of how to manage this tiny and vulnerable site that has been invaded by hawkweed, stonecrop, Echium, exotic grasses and black medic. And what happens when rabbits gain access to the top of the plateau, probably assisted by the very ladder you built to gain access to the site yourselves. This talk will traverse some of the issues around managing an intensely concentrated population of threatened plants - including the risks, the problems and the successes of pooling the resources and expertise of the landowner, QEII National Trust, and the Department of Conservation to halt impending extinction.

Cooks scurvy grass (*Lepidium oleraceum* s.s.): current threats and the importance of seabirds.

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Cook's scurvy grass (*Lepidium oleraceum*, Brassicaceae) is an endemic coastal cress. The range of *Lepidium oleraceum* s.s. (part of a larger species complex) extends from the Kermadec Islands to the top of the South Island and there is also a single record from the Chatham Islands. Early records indicate it was previously widespread and abundant along New Zealand coastline. Since then L. oleraceum s.s. has experienced on-going declines and current populations are small and almost entirely restricted to offshore islands.

Lepidium oleraceum s.s. tends to occur at seabird colony sites and like other ornithocoprophilous endemics is thought to thrive in the nutrient-rich and high disturbance environment which accompanies seabird colonies. New Zealand previously had an abundant seabird fauna which declined following arrival of mammalian predators. This has raised the question: are declines in L. oleraceum s.s. driven by declines in seabirds? This paper presents research on the current state of the larger wild populations of L. oleraceum s.s. which remain on several Hauraki Gulf and Cook Strait Islands to explore this question.

Populations were surveyed on Matariki, Mahuki, Stephens and North Brother Islands to look at distribution of *L. oleraceum* in relation to seabirds, associated plants, herbivory and occurrence of the oomycete *Albugo candida*. *Lepidium oleraceum* was restricted to sites with seabird-influenced soils and at these sites its distribution was related that of seabirds. Competing plants and Albugo seem to be problematic for some *L. oleraceum* populations. This indicates seabirds are important to the perpetuation of *L. oleraceum* populations, though a combination of factors are likely contributing to on-going declines. This research will increase understanding of ecology of *L. oleraceum* s.s. and drivers of its decline to enable improved management of this ecologically, culturally and historically important threatened species.

Are we there yet? We have barely started

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For nearly 40 years Oratia Native Plant Nursery has been expanding its range of native plants into ever more obscure and rare native plant species. For 33 years the NZ Native Forests Restoration Trust has been securing important native habitat for future generations.

The common factor between the two is Geoff Davidson, and his staff who have a passion for ensuring our native heritage is secure. Protection methods, both in situ and ex situ, are important. The future of our biodiversity depends on all New Zealanders accepting they have a responsibility to help protect it.

What are the methods we can use and how can the average person get involved? Perhaps more importantly, how can we, the NZPCN members get them involved? Questions are easy but the answers are more difficult. We will explore some practical ways to make it happen.

Northland Coastal Dune Lakes – rare treasures worth protecting

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Northland lakes are of national and international significance, the predominant lake type being coastal dune lakes. These lakes are internationally uncommon occurring in only seven places in the world. Northland has the greatest number of dune lakes nationally, and probably internationally with over 200 lakes larger than 1ha. In addition Northland dune lakes represent a large proportion of the warm, lowland NZ lakes still with relatively good water quality (Sorrell et al. 2006). These lakes and their surrounding wetland margins support a range of endemic endangered species providing the only known habitat, or strongholds for a range of biota including Northland mudfish, dune galaxias, dwarf inanga, *Utricularia australis*, *Trithuria inconspicua* and *Thelypteris confluens* (Champion and de Winton 2012). In addition some of the submerged plant communities which are becoming rare internationally such as the characean algal meadows, are still in good condition in many Northland lakes.

Coastal dune lakes form in high rainfall areas from the actions of wind, deposited material and water. Northland has a full range of the six different dune lake classes as defined by Timms (1982) on three ages of dune soils and occur mainly on west coast sands. The way the lakes form and their parent material is likely to affect water chemistry and therefore influence species assemblages in submerged and marginal vegetation. Most dune lakes are small and shallow and there are a number of unusual lakes and lakes with high ecological values in Northland. Although many of the Northland dune lakes are still in very good ecological condition, the overall trend is one of deterioration of these values (Champion and de Winton 2012). Indicators are decrease in lake water quality (trophic level index) and loss of species from individual lakes.

Perhaps the most outstanding character of the Northland lakes is the currently limited impact of invasive weed and pest fish species which is unparalleled in any other region of mainland New Zealand (Champion and de Winton 2012). Representative lakes are considered worthy of active protection. Northland has an programme for Northland lakes with 86 lakes surveyed so far and a number of these under active water quality testing, pest surveillance and long term five year ecological monitoring by NIWA, Northland Regional Council (NRC) and Department of Conservation. Several lakes are currently receiving pest management or fencing supported by council and government agencies. In 2012 NIWA was commissioned by NRC to produce a Lakes Strategy for Northland which provides the first comprehensive classification of Northland lakes plus a ranking of ecological values and lake threats. In March 2013 Regional Councillors approved addition of nine extra lakes ranked by NIWA as “Outstanding” to the list of Northland Regions outstanding water bodies making a total of 12 “Outstanding” dune lakes a priority for protection. The next phase will be to develop and implement management plans for each lake starting with the lakes where the threats are most urgent.

Urban lichens in New Zealand: a forgotten resource?

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Lichens in urban New Zealand are unjustifiably neglected. Urban environments in New Zealand offer a diverse range of habitats and substrata for the colonization and growth of lichens. With changing episodes of atmospheric and terrestrial pollution, and also at a time of changing climate, lichens in town and cities deserve much greater attention as fast-acting indicators of environmental change. Besides being sensitive biomonitors of a variety of pollutants, lichens also actively adapt to the built environment in various fascinating ways. Lichen mybobiotas of towns and cities, and urban habitats such as parks, gardens, walls, fences, roads, footpaths and cemeteries will be discussed from a New Zealand perspective and comparisons made with what is known of urban lichens in the Northern Hemisphere. A plea for the inclusion of lichens in studies of urban environments in New Zealand is made.

The current threat to bryophytes from the coal mining industry in New Zealand

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Eight bryophyte and lichen species at the Denniston Escarpment mine site have “Threatened” status, compared to no vascular plants with that status (10 have “At Risk” status). The Buller coal plateaux of Denniston and Stockton are New Zealand’s most threatened ecosystem, and for liverworts and lichens a hotspot for rare taxa, with species often shared with South-West Tasmania where they are equally rare. I argue that there is no real difference in the confidence level for liverworts and flowering plants on the threatened and rare lists, but rare and threatened lichens are much less well-known but are likely to keep their threatened status. The Environment Court’s decision has treated these groups differently, with no liverworts or lichens regarded as “species of significance” for the purposes of the consent. Areas mined or consented to be mined at Stockton and Denniston are 43% and 14% of the land area respectively, but a further 5-10% of Stockton and 22% of Denniston are likely to be consented in the next ten years.

What prevents hybridisation in Celmisia?

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Hybridisation is a natural process occurring in approximately 25% of all plant species and 10% of all animal species. New Zealand in particular has high rates of hybridisation within the native flora, especially in New Zealand's third largest plant genus, Celmisia. Despite this wild hybrids are considered rare compared to their abundant parent species. My study investigated the effectiveness of reproductive isolating barriers in the prevention of hybrid formation amongst sympatric species of Celmisia. I studied three potential isolating barriers; 1) flowering time separation, 2) pollinator specialisation, and 3) hybrid death in 12 species of Celmisia at Craigieburn Valley, inland Canterbury. Overlap in flowering time between species was recorded in permanent transects that were monitored weekly throughout the flowering season. Pollen dispersal by insects was examined by observing visitation patterns of visitors to six different types of pair-wise Celmisia arrays. I measured hybrid death through counts of seed predators found in the seed heads of the hybrid *C. xpseudolyallii* and both its parent species (*C. lyallii* and *C. spectabilis*), as well as through germination experiments that measured germination success in the same hybrid and its parents. I found some evidence for segregated flowering times between some species of Celmisia, but most species displayed random flowering overlaps. Celmisia species shared flower visitors, but some visitors did show a slight preference that was driven by subtle differences in floral characteristics. I found no evidence to suggest hybrid death via either seed predation or germination failure acted as a reproductive isolating barrier in the hybrid *C. xpseudolyallii*. Overall I found evidence for weak prezygotic reproductive isolation and no evidence for postzygotic isolation in the four barriers I examined in Celmisia.

Recovery of a population of the threatened shrub *Olearia adenocarpa* on Canterbury Regional Council reserve land at Rakaia Island

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A new species of small-leaved shrubby Olearia from lowland parts of the Rakaia and Waimakariri river systems in Canterbury was described by Heenan and Molloy (2004). At that time, about 650 plants of *O. adenocarpa* divided unequally between two subpopulations were known, with both populations largely lying on Canterbury Regional Council reserve land. No recruitment of young plants was recorded by Heenan and Molloy (2004). In 2004 the smaller Rakaia Island population consisted of only four mature flowering plants and seven mature but heavily-browsed plants where flowering was suppressed. Seed was collected from the flowering individuals and approximately 150 nursery-grown seedlings planted within three rabbit-fenced plots over the period 2010-11. Mature browsed plants were also fenced. Herbicide was used prior to planting to suppress competition form the existing grasses and herbs, and the planted areas kept weed free by regular herbicide treatment. Olearia survival and growth rates have been high within the planting sites. Flowering of the planted *O. adenocarpa* occurred within two growing seasons and in the last growing season natural regeneration of *Olearia adenocarpa* seedlings was observed within the oldest planting site. This is, as far as we know, the only record of in situ recruitment of young *O. adenocarpa* observed in recent times.

Using species lists and threat information to inform management of conservation covenants on private land

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Private protected areas are increasingly recognized as important tools for habitat conservation. In New Zealand, Queen Elizabeth II National Trust works in partnership with landowners to put legal covenants on their land to protect areas of significance in perpetuity. The Trust then provides regular monitoring and advice to landowners to help them manage their covenanted areas. Often, in the course of monitoring a covenant, field staff may encounter plants that landowners know little about, whether they are pests or rare native flora. Case studies will be presented that exemplify some of the interesting findings in private land covenants. These occasions illustrate the importance of sharing species knowledge with non-experts, and the role of private protected area management in the larger framework of botanical conservation in New Zealand.

Discovery and description of the New Zealand flora ….. more than just a name

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New Zealand botany has a rich legacy that dates back to the discovery of the islands by both Maori and European explorers. From the time of the first use and naming of the indigenous flora there has always been a strong interest in its discovery and description, along with understanding species' relationships, origins, evolutionary history, and historical and present distributions. The myriad of DNA data now available and new methods of analysis are revolutionising our understanding of the origins, evolution, and composition of the flora. This presentation provides a contemporary synthesis of our endeavours at "discovery and description" of the New Zealand flora.

Back from the dead: the rediscovery of *Pittosporum obcordatum* on Banks Peninsula after 170 years of local extinction

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In February 2012, *Pittosporum obcordatum* (heart-leaved kohuhu) was rediscovered in a small gully on private land on Banks Peninsula during an ecological survey for Christchurch City Council. Prior to this, the species had been presumed to be locally extinct, as it had not been seen on the Peninsula for over 170 years. The species was first discovered in the Akaroa area by Etienne Raoul and named in 1844, but was never found again on Banks Peninsula, despite intensive searching by a number of experienced botanists. Other populations of *P. obcordatum* had been discovered at scattered locations in the North Island (Northland, East Coast, Hawkes Bay, Taihape, Wairarapa) and southern South Island (Manapouri and The Catlins), but the Banks Peninsula population had remained elusive – until last year.

Pittosporum obcordatum is an endemic shrub or small tree that grows to about 5 m tall. It is cryptic and easily confused with several other small-leaved shrub species. Its typical habitat is alluvial forest or shrubland below 500 m a.s.l., particularly sites that are periodically flooded or waterlogged, frost-prone in winter and drought-prone in summer. The species has a current threat ranking of "Nationally Vulnerable", as remaining populations are small and isolated, and most have little or no recruitment. Threats include habitat destruction and modification, browsing animals, and competition with introduced weeds.

In September 2012, with the assistance of the DOC Biodiversity Advice Fund, I began a study of *P. obcordatum* on Banks Peninsula, with the aim of determining its distribution, population size, and conservation requirements. The study involves conducting a detailed survey of the initial discovery site and surrounding area, determining the age structure, gender balance, and condition of the population, collecting foliage for genetic/taxonomic research, and collecting seeds for cultivation. The overall objectives are to determine the most appropriate management strategy for protecting and enhancing the existing population of *P. obcordatum,* and to identify suitable sites for potential establishment of new populations on Banks Peninsula.

Update on Saving an Ephemeral Wetland and its Threatened Plants: The ongoing battle with *Carex ovalis*

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In the late 1980s, according to the conservation thinking of the time, a recommendation was made to fence an ephemeral tarn in the dry eastern South Island of New Zealand which contained diverse turf, gravel and wetland communities. These communities are the only site for a woollyhead daisy (*Craspedia* "tarn") and also contain five other threatened plant species. The communities, and these taxa within them, were considered to be threatened by cattle trampling, pugging and browsing.

Fencing in1996 resulted in the increasing dominance of the exotic sedge, *Carex ovalis*, which came close to extinguishing the native vegetation in and on the margins of the tarn. In 2008, after careful experimentation to avoid harming the remnants of native communities, the focus of management in the wetland became the removal of *Carex ovalis* by any means possible including conventional and less conventional methods. Some of the methods and the results achieved to date are described.

The importance of species interactions for plant conservation

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Plants are usually rare either because of direct human impacts, or because of interactions with other species (sometimes indirectly affected by humans, e.g., through introductions of herbivores).

Understanding these interactions can be important for successful plant conservation. The roles of herbivores have often been considered, but other types of species interactions have had less attention. Here I present some information about the role of species interactions in maintenance of healthy plant populations, based on a range of recent New Zealand work. There is quite a lot known about
pollination and dispersal, but less about competition, herbivore-mediated apparent competition, and soil mutualisms.

Science for Conservation: Kahikatea dendrochronology

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Kahikatea, New Zealand's tallest tree species, is typically found in wetter areas of the catchment. The once expansive populations of this previously dominant lowland species have been severely reduced to small, isolated and senescing patches in most regions. The species' biogeography and ecology is dictated by dynamic and forceful hydrological processes; physiologically the species has been shown to be extremely water demanding and sensitive to heavy silt inundation during flooding. Typically, distributions are restricted to habitats with shallow unconfined aquifers and the species is vulnerable to the effects of increasing groundwater demands, and reduced aquifer levels. In most regions, current river and land management practices largely negate any opportunity for cohort renewal of Kahikatea.

This research uses samples from alongside the Waiohine River in the Wairarapa Valley, a relatively low rainfal region. The tree-ring analysis proves the potential of this technique a viable method for investigating Kahikatea hydro-ecology and climate relationships. The results of tree-ring analysis confirm that Kahikatea trees are dependent on shallow groundwater. These findings are consistent with predictions from laboratory-based physiology trials and the investigations of drought response on the stand level. These results strongly support the hypothesis that actions that reduce groundwater levels impact on the ecology of these trees, ultimately causing tree death.

There is a real urgency to acknowledge the conservation needs of this species and to adopt integrated water management strategies that value ecology as well as simple economics. Without timely intervention we are in danger of continuing to lose not only these trees and their valuable ecosystem service and function, but also our ability to understand how our environment has operated. The tree-rings of Kahikatea provide an internationally significant climate proxy record, and valuable knowledge for the community such as proxy records of flood events and earthquakes spanning many hundreds of years.

Prioritising the Department of Conservation‘s ecosystem and threatened species management

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New Zealand’s biodiversity strategy, published in 2000, sets out a number of high level goals for the conservation of our biodiversity. Progressing towards these goals has posed a considerable challenge to New Zealand’s conservation organisations. Over the last 5-8 years, the Department of Conservation has progressively refined tools that enable the ranking of biodiversity management projects to provide more efficient delivery against two objectives aligned to Goal Three of the Biodiversity Strategy: maintaining a full range of New Zealand’s ecosystems in a healthy functioning state, and ensuring the persistence of nationally threatened species.
Although initial approaches to project ranking addressed these two goals separately, they have now been explicitly integrated. This recognises that (i) management of a full range of ecosystems protects many species, and (ii) that species management will generally be most efficient when implemented at sites also managed for their ecosystem values.

Our current approach uses spatial prioritisation software to calculate rankings for around 1000 candidate projects, each of which aims to conserve the ecosystems and/or threatened species of a particular management unit. Rankings are calculated using a series of steps that consider the representation of ecosystems, the presence of threatened species, the difference made by management, and the project cost.
Successful adoption of a centralised ranking approach poses considerable institutional challenges, requiring the development of a collaborative approach that involves a full range of stakeholders to build the sense of joint ownership required for uptake.

Can we turn back the clock? Managing mangrove expansion in northern New Zealand

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Mangroves in New Zealand are increasing in distribution, and have responded favourably to changing land-use and increased rates of sediment deposition in estuaries. Communities often see mangroves as pest species that have decreased their coastal access or viewshed, and there is widespread support for estuarine restoration projects that result in removal of mangrove forest. Consent decisions for mangrove removal projects are often centred on ethical arguments about removing native trees, historical mangrove abundance, and human uses of the marine environment such as cultural or recreational access, flood protection, drainage, and coastal erosion. However, the likelihood of successful restoration is rarely considered in consent decisions. Compiling scientific evidence on where mangrove removals have been successful can assist in estuarine restoration projects in identifying areas either too expensive to maintain, or unlikely to benefit from restoration efforts. Key information needs to assist decision-making for restoration activities that involve mangrove removal include: 1) what defines recovery, and should we expect sandflats to return where historical impacts have changed the underlying habitat; 2) what physical attributes (exposure, tides, sediment type, catchment, freshwater influx) and biological attributes are associated with limited (or fast) recovery; 3) what methods (both machinery used, and spatial and temporal scale of removals) are associated with speed of recovery; and 4) are long-term costs of maintaining a restoration site free from mangroves linked to physical and biological attributes? This information can provide general guidelines for evaluating site-specific suitability for restoration projects involving mangrove removals.

Using Ecosystem Classification To Better Understand Auckland's Ecosystems

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Understanding ecosystem diversity, distribution, condition and ecological function is critical to their protection and restoration. Developing a Significant Ecological Area overlay for the draft Unitary Plan highlighted the need for a comprehensive understanding of Auckland's terrestrial ecosystems. Existing mapping and survey data was collated and analysed. Knowledge gaps were identified and survey work was then prioritised in these areas. Over 1800 sites were surveyed on public and private land throughout the region, to supplement or update the existing information about Auckland's ecosystems. The sites needed to be grouped by ecosystem type to determine which are ecologically significant as nationally or regionally threatened ecosystems or are representative of a particular ecosystem type, as specified by the Unitary Plan significance criteria.

Auckland Council adopted the Department of Conservation's national classification system (Singers and Rogers, in press) and has developed detailed descriptions for the 35 ecosystem types that occur in Auckland. Existing and recently surveyed data was classified using this system, and a current extent spatial layer generated for each ecosystem type. Historic vegetation mapping, current data, and advice from experts were used to compile an historic extent spatial layer for each ecosystem type. The regional conservation status of each ecosystem type will be evaluated using the recently developed IUCN threatened classification system. The data produced as a result of this project will provide vital insight into the changing state of Auckland's ecosystems, provide guidance for statutory protection, and help prioritise active management.

This presentation will discuss the methodology used to assign ecosystem types, assess current and historic extent and evaluate conservation status. A new initiative to work collaboratively with other territorial authorities and the Department of Conservation on this topic is also underway and will be discussed.

Native plants outside their natural range

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Several native New Zealand plant species are troublesome weeds overseas. Within New Zealand, many native plant species now grow beyond their pre-human ranges. These recent extensions have been human mediated. In Wellington, c. 55 non-local native plant species meet the criteria to be regarded as either casual or naturalised adventives. Some of these are troublesome weeds. This viewpoint becomes explicit when the guardianship role, which is widely-accepted for conservation at a national level, is applied at regional scales. Just because a plant species is native to New Zealand does not make it 'good' in all contexts, and our management (including monitoring) of biodiversity should reflect this.

Update on the NZ Threat Classification System 2012 review of vascular plants

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The conservation status of 2581 New Zealand vascular plant taxa at the rank of species and below (including 177 taxonomically indeterminate entities) was reassessed using the New Zealand Threat Classification System (NZTCS) in May 2012. The list includes 31 more taxa than were assessed in 2008, representing taxa newly described or discovered since then. The number of Threatened taxa has increased from 243 in 2008 to 288 in 2012, and the number of At Risk taxa has increased from 731 to 747. Some taxa have improved their status, but overall the list documents a continuing pattern of decline in our indigenous flora.

Rivers, Plants and Networks

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This paper will discuss relationships between plants, rivers and people in Te Ao Maori and in Enlightenment science, from the time of the first European landing in New Zealand to the present.

I'll explore how resonances between these different ways of understanding plants, rivers and people might help us to generate experimental ways of living with them, with reference to the Te Awaroa project for riparian restoration.

Progress toward the delimitation of species in New Zealand Craspedia

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The species level taxonomy of Craspedia (Compositae, Gnaphalieae) in New Zealand remains an outstanding taxonomic problem. Currently six species of Craspedia are recognised, but more than 45 informal, undescribed entities are known that might or might not warrant taxonomic recognition. The urgent need for a comprehensive revision is well understood, but morphological variation is quantitative and complex, making the definition and circumscription of species problematic. At least in part, this difficulty is the legacy of an extremely rapid and recent diversification of the genus in New Zealand – a scenario that produces challenges for genetic as well as morphological approaches to delimiting species. In this presentation we will review what is known about the taxonomy and evolution of Craspedia in New Zealand, present preliminary analysis of recently characterised microsatellite DNA markers from plants on Mt Owen, Mt Arthur and Mt Mytton (Kahurangi National Park), and provide a roadmap towards a functioning taxonomy based on solid science.

Under the radar: Realising the potential of rare species for landscape design

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Over the last decade, we have trialled a large range of rare species in gardens; many of which have been very successful, and become staples of our work. A considerable number of these have been introduced to us by Oratia Native Plant Nursery, with whom we share similar goals (with regards to taking the full diversity of the flora to a wider audience). Although promoting a wide range of plants involves sacrifices (it is certainly not the most commercially-minded route), conservation of threatened species is not the 'hard sell' that we might assume (amongst clients and architects). To the contrary, when presented with the stories behind our rare plants, people are genuinely interested - and proud to partake in their conservation.

The focus of this talk is to present some of the species that have shown the greatest potential, the majority of which still fly well under the radar of the landscape industry.

The importance of plant phenology in understanding flora-fauna interactions

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Plant phenology, the timing of vegetative and reproductive stages (phenophases) in a plant's life, is an important aspect of ecosystem functioning. Phenological patterns in terrestrial ecosystems provide the basic resource utilised by other organisms. Spatial and temporal variation in plant resources have significant implications for the distribution and reproductive success of the plants themselves and the animals that rely on them. This talk will present findings from MSc research conducted on Hauturu-o-Toi (Little Barrier Island) on the importance of plant phenological patterns in understanding reproductive patterns of kakapo (*Strigops habroptilus*). During the 1990s, kakapo on Hauturu-o-Toi had several breeding attempts, although the stimulus for this breeding has long been debated. Phenological patterns of over 70 plant species on the island show some patterns that coincide with breeding attempts in kakapo. In particular, kauri cone production appeared to be greatest during years of attempted kakapo breeding, and female kakapo were found to highly prefer kauri dominated forests during a breeding year using resource selection ratios. The timing of plant food resources within an ecosystem influences the distribution of organisms that play a vital role in many ecosystem processes, such as pollination and seed dispersal. The monitoring of phenological patterns in a wide range of plant species in an intact ecosystem such as Hauturu-o-Toi will improve our basic knowledge of resource distribution, and therefore aid future work on flora-fauna interactions. Understanding how plant food resources vary between years within an ecosystem can also provide useful information on the conservation and management of other native organisms, and therefore should be an important component of ecosystem monitoring.

Species coalescence in the Marlborough rock daisies (*Pachystegia*, Asteraceae): an endemic genus from New Zealand

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The Marlborough rock daisies form a distinct evolutionary lineage with a restricted distribution in New Zealand. Three species are currently accepted though distinct phenotypes have been recognized that may be recognized as new entities. The plants are prized ornamentals and are widely cultivated. Our results show the populations of *Pachystegia rufa* and *P. minor* are nested within the more widely distributed species *P. insignis*, which is paraphyletic in our analysis. Some gene flow occurs among the three species. Hybrids persist in narrow zones of contact, but cannot compete in the ecological niche of the parental species. There is discordance among gene trees and species coalescence is incomplete. This pattern suggests recent speciation in which ecological interactions are important drivers in the generation and maintenance of species diversity. Lineage through time plots show a sharp increase in the formation of new lineages and/or a corresponding decrease in the extinction rate in the last 2.5 million years. Molecular divergence estimates suggest the evolution and diversification of the rock daisies coincided with uplift in the coastal Kaikoura Ranges during the Pliocene. The accumulation of unique alleles preceded the evolution of barriers to gene flow, so the estimated divergence times in the gene trees are older than in the inferred species tree. Genetic drift and strong selection in small ecologically isolated populations have likely contributed to recent speciation in the rock daisies.

Feral pohutukawa and other island stories

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Pohutukawa has escaped from homestead gardens on D'Urville Island and is runaway in an Open Space Covenant. To celebrate or destroy? An ecological analysis of the issue is presented. Meanwhile, in the same vicinity are rengarenga, karaka, harakeke, whau and kowhai that are probably not native to the island. On the Auckland Islands are harakeke, tree fuchsia, *Olearia lyallii* and *Hebe salicifolia* that have moved in and made themselves at home. On Campbell Island are three clumps of harakeke, probably from a Southland source. In the Chatham Islands, numerous NZ natives are naturalised, most post European settlement. But one, maybe two, are much earlier arrivals, brought by the Polynesian settlers. Do these naturalised natives pose threats sufficient to require action? A personal perspective is offered.

Ex situ conservation in a changing world: the Millennium Seed Bank Partnership

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The MSB Partnership has been described as the 'most ambitious plant conservation project ever' as it strives to secure seeds of 25% of the world's plant species in seed banks around the world. However this is far from a mere insurance policy against loss of genetic resources. The MSB Partnership of over 100 organisations in 50 countries is working with forestry, agricultural and livelihoods sectors to mobilise seed of appropriate native species for applied projects, and is carrying out fundamental research into the storage and germination of seeds. NZPCN follows in the footsteps of the Australian Seed Bank Partnership which has developed a network of collectors and researchers, supported by efficient seed banks able to store and provide seed for a wide range of projects.

Mangrove Management in Auckland – a balancing act. (friend or foe?)

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Mangrove forests within the Auckland Region have expanded over the last two decades particularly in tidal inlets and estuaries. Expansion is linked to increased sediment inputs from surrounding catchments in response to land use changes.

Mangrove expansion influences not only natural systems and processes but also the way in which Aucklanders connect with and perceive the estuarine environments affected.

Mangroves have an innate ability to colonise, and facilitate, the development of suitable habitat to expand their range. As a result, the intrinsic biodiversity values and ecosystem services provided by mangroves are now in direct conflict with the community's desire to access, appreciate and use intertidal areas.

The call to manage mangroves within Auckland's inlets and estuaries presents a challenge as the biodiversity values and ecosystem services of these forests (such as productivity, nursery habitat and erosion protection) are weighed against community desires and the potential adverse effects of mangrove removals that tangible benefits to both the environment and community are achieved.

Historically, the management of dynamic ecosystems has been reactionary, often with unintended consequences and as a result, a precautionary approach is usually adopted with actions based on current best practice. Although research on temperate mangroves has progressed over the last few years, the high degree of variability associated with site specific environmental conditions makes it difficult to develop a 'one size fits all' approach to management.

In this context, mangrove management in Auckland has proceeded at a slow pace despite increasing pressure from communities to undertake removals. In response, the Auckland Council has revised the approach to mangrove management through a number of statutory and non-statutory mechanisms.

This paper discusses mangrove management within the Auckland Region in context of conflicting views on ecosystem values and the effects on recreational and amenity needs of the community.

Auckland's Remarkable Urban Forest

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Auckland is a sprawling New Zealand city approaching 1.5 million people covering 514,000 ha, embracing both rural countryside and urban environments. The urban tree cover includes numerous small remnants of public native bush totalling 1800 ha, and private bush-clad residential properties; patches of man-made native forest established mostly by community groups in regreening projects; areas of exotic woodland; amenity and fruit trees in home gardens; trees planted in streets; and public parks and gardens, campuses, golf courses and cemeteries with a diversity of old and historic trees. Each of these six forest types is described, and analyses made of species composition to determine the dominant trees to be found in Auckland.

The remnant native forests have a diverse tree flora, with good examples of kauri (*Agathis australis*), totara (*Podocarpus totara*), kahikatea (*Dacrycarpus dacrydioides*), tanekaha (*Phyllocladus trichomanoides*) and kanuka (*Kunzea ericoides*), and broadleaved canopy trees such as taraire (*Beilschmiedia tarairi*), puriri (*Vitex lucens*), karaka (*Corynocarpus laevigatus*) and kohekohe (*Dysoxylum spectabile*). Tree ferns, especially the silver fern (*Cyathea dealbata*), and nikau palm (*Rhopalostylis sapida*) are prominent in the sub canopy or understorey. Man-made native forests have generally been established and seed-sourced with fast-growing local trees, the commonest species planted being ngaio (*Myoporum laetum*), lemonwood (*Pittosporum eugenioides*), kohuhu (*P. tenuifolium*), karo (*P. crassifolium*), cabbage tree (*Cordyline australis*), and kanuka. Exotic woodlands are mainly of Monterey pine (*Pinus radiata*), maritime pine (*Pinus pinaster*), black wattle (*Acacia mearnsii*) and pedunculate oak (*Quercus robur*), but there are also "weed" forests where tree privet (*Ligustrum lucidum*), crack willow (*Salix fragilis*), Japanese hill cherry (*Prunus serrulata*), monkey apple (*Syzygium smithii)* and woolly nightshade (*Solanum mauritianum*) are commonly present.

Ornamental, fruit and shade trees in home gardens are very diverse and from all parts of the temperate world, but surveys showed that pohutukawa (Metrosideros excelsa), silver birch (Betula pendula), cherries (Prunus), sweet gum (Liquidambar styraciflua), and palms (Archontophoenix, Phoenix, Syagrus) are widely among the most popular. Cape honeysuckle (Tecoma capensis) is by far the commonest urban hedge species. A survey of 546 streets indicated that titoki (Alectryon excelsus), willow myrtle (Agonis flexuosa), Persian lilac (Melia azedarach), flowering cherries (Prunus), Australian kanooka (Tristaniopsis laurina), pohutukawa and silver birch were the most commonly used. A sample survey of tree cover over 22.5 ha in a mature suburb gave a combined street and garden density of 27.5 trees per hectare.

A survey of the tree composition in 660 urban parks, industrial estates, cemeteries, school grounds, campuses, and large historic gardens, covering 3000 ha, showed that the commonest big trees (15 m or more tall) in the city are pohutukawa, eucalypts, puriri, totara, pin oak (Quercus palustris), sweet gum, pedunculate oak, London plane (Platanus ×acerifolia), monkey apple, Monterey cypress (Cupressus macrocarpa), Norfolk Island pine (Araucaria heterophylla), Monterey pine, Canary Island date palm Phoenix canariensis), brush box (Lophostemon confertus), river sheoak (Casuarina cunninghamiana), claret ash (Fraxinus angustifolia subsp. oxycarpa 'Raywood'), silky oak (Grevillea robusta) and poplars (Populus yunnanensis, P. nigra 'Italica', P. ×canadensis). These are the species that give the primary structure to Auckland's urban forest. The predominant eucalypts are Eucalyptus botryoides, E. cinerea, E. nicholii and E. saligna. The most abundant smaller trees (<10 m) are cabbage tree, karaka, lemonwood, titoki, evergreen magnolia (Magnolia

grandiflora), karo, kohuhu and broadleaf (Griselinia littoralis).

Auckland's oldest parks dating back 150 years have an assemblage of trees from various parts of the world, with Norfolk Island pine, Queensland kauri (Agathis robusta), Moreton Bay fig (Ficus macrophylla), pohutukawa (Metrosideros excelsa), puriri, holm oak (Quercus ilex), camphor laurel, oaks (Quercus) and elms (Ulmus) being particularly prominent.

The urban forest is ecologically, socially, commercially and politically complex. A mechanism such as an "Urban Forest Collective" is needed to record and share information about the city's urban trees and to promote research, effective management and future improvement of the urban forest for the benefit of all citizens.

Why are some plant species rare? A search for mechanisms

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Globally, many plant species have small, declining populations that are threatened with extinction and will require management if they are to persist. More than a third of New Zealand's vascular plant species are considered rare. The mechanisms that influence the abundance and distribution of plant populations are poorly understood and to date have mostly been derived from comparative approaches. Our research aims to understand the underlying causes of rarity in native New Zealand plant species using an experimental approach.

We tested three hypotheses: that, relative to common species, the recruitment of rare plant species is (1) primarily limited by seed availability due to seed production or dispersal constraints, (2) constrained primarily by the availability of 'safe sites' suitable for seedling establishment, and (3) that rare species suffer from stronger negative soil-feedbacks beneath parent plants than away, relative to common species, and consequently are more dependent on seed dispersal. We conducted field and glasshouse experiments using six pairs of co-occurring rare and common congeneric plant species at four sites in Canterbury and Otago, South Island. We will present research findings and discuss the implications for conservation management of rare and threatened plants.

What animals disperse seeds of subalpine fleshy-fruited plants and is seed dispersal effective for plant regeneration?

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Fleshy-fruitedness is prevalent in New Zealands subalpine plants, thus requiring seed dispersal services from animals. Subalpine ecosystems are depauperate in indigenous frugivorous birds and lizards due to extinctions and the decline in abundance and distribution of extant fauna. This, in addition, to the relatively recent introduction of mammals, could lead to potentially devastating consequences for plant regeneration if faced by dispersal failure. I investigated whether a range of plant species were experiencing adequate fruit removal, and the relative contributions to seed dispersal (and/or predation) by the current suite of resident subalpine fauna, both native (kea in particular) and exotic. I also investigated whether various aspects of seed dispersal quality were important for plant regeneration. Factors that determine the effectiveness of frugivorous animals as seed dispersers include: effects of gut passage on seed viability and germination, the microsite into which they deposit a seed and their impacts on seedling establishment through herbivory. I used a fully-factorial field experiment for eight plant species measuring the effect on germination, seedling growth and survival to 3.5 years of: (i) fruit pulp removal (yes/no), (ii) seed deposition microsite characteristics (shaded/open), (iii) competition (turf dug/not), and (iv) seedling herbivory (caged/uncaged). Shade was the most important factor affecting seed germination, height growth and seedling survival with higher success in shaded versus light microsites for seven of the eight species. The magnitude of other effects was smaller, and varied depending on species and stage of recruitment. The microsite results were related to the effectiveness of frugivorous animals as seed dispersers using fixed-area faecal sampling transects over two fruiting seasons to record disperser type and seed deposition microsites. Possums (Trichosurus vulpecula) moved >75% of all mammal-dispersed seeds in the study, yet most possum faeces were deposited inside beech forest fragments, a largely unsuitable habitat for recruitment of these plants. Apparently-important dispersers are therefore instead transporting high numbers of non-forest plant species to their doom.

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