NETS 2017

New Zealand Biosecurity Institute

9-11 August Wellington

Major Sponsors

Absolutely Positively Wellington City Council
Me Heke Ki Pōneke

Land Information New Zealand Toitū te whenua
Boffa Miskell
BIOSECURITY PARTNERSHIP

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

Ministry for Primary Industries
Manatū Ahu Matua

Sponsors & Trade Displays

Wildlands

Key Industries
Protecting people, crops and native species

Landcare Research
Manaaki Whenua

SCION
FORESTS ▪ PRODUCTS ▪ INNOVATION

horizons
regional council

NIWA
Taihoro Nukurangi

WEEDBUSTERS

Thank you to all our NETS2017 sponsors...

Major Sponsors

greater WELLINGTON
REGIONAL COUNCIL
Te Pane Matua Taiao

Absolutely Positively
Wellington City Council
Me Heke Ki Pōneke

Ministry for Primary Industries
Manatū Ahu Matua

Land Information New Zealand
Toitū te whenua
Boffa Miskell
BIOSECURITY PARTNERSHIP

Sponsors

SCION
FORESTS ▪ PRODUCTS ▪ INNOVATION

Landcare Research
Manaaki Whenua

horizons
regional council

NIWA
Taihoro Nukurangi

Wildlands

Trade Displays

Key Industries
Protecting people, crops and native species

WEEDBUSTERS

WELCOME to NETS2017...

I would like to extend a warm welcome to everyone who has joined us for our 67th annual NZBI National Education and Training Seminar (NETS) in Wellington. NETS is a fantastic opportunity to learn, connect, be encouraged and participate in the spreading of the biosecurity knowledge at a national level, and I know that this will happen.

NETS2017 is about you, the practitioners, of biosecurity in New Zealand. This week will bring you a broad range of topics, a range of experts and people working at the coalface of pest management. NETS is the opportunity to show and tell what we do!

The theme for NETS2017 is Birds, the Beehive and Biosecurity: Capital Results, Working Together. The emphasis is on collaboration between agencies, councils, government departments, NGOs, industry and the community in biosecurity. This is a fantastic theme when considering the fledgling initiative of the Biosecurity 2025 target, of making 4.7 million biosecurity officers for which we are all absolutely key in helping this happen.

But what a time to be involved in biosecurity and pest management with some fantastic national opportunities like Predator Free NZ, Biosecurity 2025, and more locally with industry stepping up and seeing biosecurity as something they can lead. This is so important in the ever changing space of biosecurity and pest management. Now is the time to get involved!

This NETS experience would not happen without a strong organising committee: Davor Bejakovich, Gary Sue, Tim Gale, Richard Romijn, Mike Urlich, Sara Moylan, Fiona Bancroft, Jack Keast, Illona Keenan, Katrina Merrifield and NETS organizer Carolyn Lewis.

Also I would like to acknowledge all our sponsors whose support enables us to charge modest registration fees to NZ's premier biosecurity event: Greater Wellington, Wellington City Council, Ministry for Primary Industries, Boffa Miskell/Land Information New Zealand, Landcare Research, SCION, Horizons, Weedbusters, Wildlands, Key Industries, and NIWA.

Our NZBI Mission is –
"Working together to ensure New Zealand is protected from the adverse impacts of invasive species."

Much of what we do to support this mission is not visible to the general public, so this week at NETS, as well as during July's Biosecurity Month, we will make what is invisible, visible to all of New Zealand.

So we have a great line-up of speakers, field trips, workshops and networking opportunities. I trust you will find NETS2017 an enjoyable and valuable experience.

Darion Embling
NZBI National President

Day 1 Wednesday 9 August 2017

9.00 Conference opening - powhiri, official welcomes

9.30 Opening Speaker - Rawiri Faulkner, Greater Wellington Regional Council

10.00 *Morning tea*

10.30 GEMS - short presentations & poster papers

11.00 Biosecurity Partnership in Action - Boffa and LINZ (*D. Mole, LINZ & K. Gimblett, Boffa Miskell*)

11.20 Building a Biosecurity Team of 4.7 million – It's Your Gig Too! (*A. Bell, Ministry for Primary Industries*)

11.40 Predator Free NZ - the Big Picture (*J. Morgan, Predator Free NZ*)

12.00 New Tools for the Biosecurity Battlefield (*B. Richardson and S. Pawson, SCION*)

12.40 *Lunch*

	WEEDS	VERTEBRATES	INSECTS & MODELLING
1.40	Velvetleaf in the Waikato: What's the Buzz? *H. Pene, Waikato Regional Council*	Development of the rat specific toxin norbormide *L. Shapiro, Boffa Miskell*	*Culex quinquefasciatus* (Diptera: Culicidae), a cosmopolite in NZ *J. Kasper, NZ Biosecure Ltd*
2.00	Commercial composting as a management tool for Araujia hortorum (moth plant) *S. Killick, Unitec*	Hard to control rabbits *G. Sue, Greater Wellington RC*	Vespula biocontrol revisited *R. Groenteman, Landcare Research*
2.20	Prioritising initial wilding conifer control across New Zealand *K. Lloyd, Wildland Consultants Ltd*	The economics of monitoring traps with wireless networks *B. Warburton, Landcare Research*	Plume Modelling For More Biosecurity Effective Responses *Z. Yu, MPI*
2.40	Upskilling a botanically challenged world - not all green is good *S. Brill, Northland Regional Council*	A community's perspective of wild pigs *P. Edwards, AUT*	Developing and using online tools for improved decision making *A. Gormley, Landcare Research*

3.00 *Afternoon tea*

	WEEDS	CATS	POLICY & PARTNERSHIPS
3.30	A tale of three wetland weeds: the importance of networks and early intervention. *D. Havell, DOC*	An overview of the National Cat Management Strategy Group	The balance game - Biosecurity Act policy development vs community/political will *J. Underwood, Marlborough District Council*
3.50	Persistence, accuracy and timeliness: finding, mapping and managing non-native plant species on the island of South Georgia *B. Myer, Kaitiaki o Ngahere*	Where does kitty wander? Results from the Cat Tracker New Zealand Citizen Science project *H. Kikillus, Wellington City Council*	Improving risk communication and engagement between biosecurity agencies and their key partners and stakeholders – a passive surveillance example *L. Earl, MPI*
4.10	Woody weed populations in New Zealand: persistent or ephemeral? *K. McAlpine, DOC*	Non-traditional partnerships: fundamental to the management of domestic cats *M. Emeny, Wellington City Council*	Collaboration in Biosecurity Management: the only way to go! *R. Bowman, Environment Southland*
4.30	National Interest Pest Responses (NIPR) Programme: coordination and collaboration on longterm eradication programmes *F. Velvin, MPI*	Our pets vs. pests: An overview of the multi-agency Bay of Plenty Community Cat Project. *S. Kinsella, Rotorua SPCA & D. Williams, BOPRC*	Partnerships - lessons from dramas faced with retaining 1080 and developing emerging vertebrate pest control technologies *C. Eason, Lincoln University*

5.00 *New Zealand Biosecurity Institute Annual General Meeting*

6.00 *Mix 'n' Mingle, InterContinental*

Day 2 Thursday 10 August 2017

	BIOCONTROL	TOOLS	AQUATICS
8.30	An introduction to the horehound biological control group *G. Loxton, merino sheep farmer*	Other ways to capture and report data *TBC, Greater Wellington Regional Council*	Validating Check, Clean and Dry *T. Burton, NIWA*
8.50	Progress on the biocontrol of tutsan and Japanese honeysuckle *H. Gourlay, Landcare Research*	Automated pest detection technology *H. Blackie, Boffa Miskell*	Aquatic Weed Management Tools *M. Girvan, Boffa Miskell*
9.10	Biocontrol of Tradescantia in Wellington. How are our beetles coping? *K. Van Der Walt, Wellington City Council*	A bird's eye view for biosecurity *P. Peterson, Landcare Research*	Future-proofing aquatic weed control: developing toolboxes for best practice *P. Champion, NIWA*
9.30	SCION's current biological control projects to combat tree pests – tortoise beetle and giant willow aphid *T. Withers, SCION*	Conservation Dogs Programme – a collaboration between DOC, Auckland Council and Kiwibank *F. Buchanan, DOC*	When are aquatic herbicides risky for freshwater health? *M. De Winton, NIWA*

9.50 *Morning tea*

FIELD TRIP BACKGROUNDERS

10.20 Predator Free Wellington (*J. Willcocks, Wellington City Council*)
10.40 Predator Free NZ - every landowner the social norm (*K. Hastie, Crofton Downs Predator Free Community*)
11.00 Wellington's Halo Project (*I. Keenan, Wellington City Council*)
11.20 They've come - do we still need to build it? (*B. Smith, Wellington City Council*)
11.40 Key Native Ecosystems in Greater Wellington Region (*R. Romijn, Greater Wellington Regional Council*)

12.00 *LUNCH*

FIELDTRIPS

WILD SOUTH COAST & MIRAMAR PENINSULA
Enjoy a scenic round-the-bay's tour of Wellington's South Coast and Miramar Peninsula. We will stop at Owhiro Bay to showcase our boneseed pest plant containment programme, and for those wanting more of a walk you will be able to see Red Rocks seal colony. At Seatoun, you'll hear about the challenges of making Mirimar Peninsula predator-free. Then it's Tarakena Bay where the Forest and Bird, Places for Penguins project has been restoring habitat, increasing local awareness, and helping prevent the little penguin/korora from becoming an endangered species.

MATIU/SOMES ISLAND
Take the ferry across Wellington Harbour to Matiu/Somes Island - a haven for wildlife with a rich and diverse history. Currently the island is a Department of Conservation (DOC) scientific and historic reserve, under iwi ownership, and you'll learn about it's fascinating past as a quarantine station and plans for its future as a predator free island. With time to wander the many paths around the island, you may be lucky enough to spot some of the rarer native species that live here - including tuatara and giant weta!

KI UTA KI TAI – FROM THE MOUNTAINS TO THE SEA
Greater Wellington manages a large network of regional parks, using an integrated catchment management approach. This fieldtrip will travel up Te Awakairangi or Hutt River, from where it meets the sea to its origins in the Rimutaka Mountains. There will be various stops to learn about native forest regeneration in regional parks, balancing pest and weed control with recreational use of parks, and you'll even get a chance to have a Lord of the Rings moment at 'Rivendell' walking through some incredible old growth forests.

KAPITI COAST
Visit three very different ecosystems on the Kapiti coast: Paekakariki Escarpment, part of the Te Araroa walkway being restored by the local community; Waikanae River where you can stretch your legs and see some of the great restoration work in progress; and Waitohu dunes where the long-term efforts of pest control are producing good biodiversity outcomes. All three projects are 15 years plus, and show restoration transformation at the landscape level. Guest speakers at each site will talk about past and future challenges and lessons learned in pest control operations.

THE HALO AND ZEALANDIA
The 'halo' around Zealandia is ever expanding. We'll visit some halo sites explaining community and council biosecurity and biodiversity initiatives such as expanding trapping effort, university research and the ongoing weed challenges. Then we'll take you on a guided walk around Zealandia, the world's first fully-fenced urban ecosanctuary. The Zealandia field trip will cover eradication, fence breeches, the impacts of mice and some future work with pest fish, weeds and biosecurity education. There will be plenty of time for you to explore Zealandia on your own as part of this fieldtrip.

BUSTING CLAYS
The annual competition for the claybird shooting trophy takes place again at a local gun club.

6.00 *Happy Hour*

7.00 *Conference Dinner*

Day 3 Friday 11 August 2017

	MARINE	LANDSCAPE	COMMUNITY
9.00	Paving the pathway (marine biosecurity) *S. Clark, Northland Regional Council*	Creating a healthier Hunua *J. Miles, Auckland Council*	Pest Detective: the clues and the culprits *S. McCahon, NPCA*
9.20	Mediterranean fanworm – working collaboratively to manage an established marine pest *K. Walls, MPI*	Towards a pest free Auckland *B. Butland, Auckland Council*	Balancing operational realities against expectations: incursion response for brown bullhead catfish in Lake Rotoiti. *S. Grayling, BOPRC*
9.40	Marine biosecurity in Fiordland, a joint-agency approach *S. Cunningham, Environment Southland*	Restoring Taranaki – creating a new normal *L, Honnor, Wild for Taranaki*	Biosecurity awareness of ferry passengers travelling to islands in the Hauraki Gulf. *C. Neverman & J. Lardner, Unitec*

10.00 *Morning tea*

	MOTIVATING for COMMUNITY ACTION	BETTER BREWS for BLITZING WEEDS	OLD TRICKS for NEW DOGS
10.30	People are illogical and irrational! But psychological frameworks can be used to motivate them to action. Attendees will develop a basic understanding of the steps necessary to change behaviour, hear relevant NZ examples, and work through a challenge of their own.	Come to this workshop if you want to help update the information available around new and improved chemical rates and methods. Share what works, what doesn't, and find answers for your problem weed species.	Be a part of the conversation of how pest species are being trapped throughout NZ - tips and tricks, 'X factors' and what works in the field.

Closing Session

11.45 From Little Things, Big Things Grow - Kimbolton School's restoration and monitoring project (*H. Morton and students, Kimbolton School*)

12.15 Closing address and awards

12.30 *Lunch*

Day 1 Wednesday 9 August 2017

Biosecurity Partnership in Action

Dave Mole (Land Information New Zealand), dmole@linz.govt.nz
Ken Gimblett (Boffa Miskell Ltd), ken.gimblett@boffamiskell.co.nz

Dave Mole is the Biosecurity Manager for Land Information New Zealand (LINZ), managing biosecurity on LINZ administered land across New Zealand. Ken Gimblett is a Planner and Partner at Boffa Miskell Ltd. Dave and Ken have been part of the Strategic Biosecurity Partnership since its inception.

New Zealand's unique native biodiversity and ecosystems are central to our national identity and therefore effective biosecurity is essential for the overall benefit of New Zealand. The Strategic Biosecurity Partnership between Land Information New Zealand (LINZ) and Boffa Miskell Limited (BML) is driving innovation into the critical biosecurity sector. The efficiencies, benefits, advocacy and investment in technologies all contribute to the partnership being widely regarded as the first of its kind whilst at the same time enabling both parties to achieve their business objectives.

Dave and Ken will outline the partnership approach, the key successes organisationally and explain how this strategic partnership is delivering better value biosecurity outcomes.

Building a Biosecurity Team of 4.7 million - it's your gig too!

Andrew Bell, MPI

Andrew is the manager, Border and Biosecurity Systems, at MPI

The Biosecurity 2025 Direction Statement provides the high level strategy for New Zealand's biosecurity system. This session would provide an over view of the direction statement, how it is being implemented and opportunities for involvement. The session will also provide an introduction to the initial actions and include an opportunity for attendees to input into developments related to the Biosecurity System Engagement Plan, the Post-Border Review, the Governance Review and any other actions underway by August 2017.

Predator Free NZ – the big picture

Jessi Morgan, Predator Free New Zealand

What is Predator Free NZ? This talk will look at how PFNZ is set up and funded, who does what, how it all works, and how it fits into the bigger picture of biosecurity and biodiversity work that agencies and communities are already involved with.

It will also cover the PFNZ, what is being done, and why winning over the hearts and minds of every New Zealander is so important. It also looks at why this movement needs to grow from the grass roots and why sharing science and learnings is important to maintain momentum.

Pest Eradication: New Tools For The Urban Battlefield

Brian Richardson, Steve Pawson and Tara Strand

Brian Richardson is a Principal Scientist in Scion's Forest Protection Team. Brian has 34 years' experience in research relating to forest pest management, biosecurity and aerial spray application. He has participated in many technical advisory groups supporting national pest eradication campaigns.
Stephen Pawson is Research Leader Entomology at Scion and has 10 years' experience working on forest biosecurity issues. He leads Scion's market access phytosanitary research project and general surveillance programmes. He has participated in several technical advisory groups related to biosecurity and is a working group member of Biosecurity 2025 theme 2.

With the scale of the plant pest threat to New Zealand increasing in proportion to increases in trade and tourism, it is critical to NZ's future prosperity that we improve our capability to eradicate plant pests before they become established. Urban environments are focal points because they are in close proximity to the likely points of pest incursion – sea and air ports – and have the highest density of citizens who may be affected by and therefore constrain eradication methods, particularly use of aerial application.

There are three key requirements for effective eradication of pests before they become established: 1) pests must be detected quickly while the population is still small through improved surveillance and pest detection methods, 2) alternatives to broadcast aerial spraying, the only effective means of eradication for many pests (e.g. those found in tall trees), must be developed to reduce pesticide usage and social impacts, 3) improved engagement with potentially affected communities is needed to ensure licence to operate.

As part of the MBIE funded programme, "Protecting New Zealand's primary sector from plant pests; a toolkit for the urban battlefield", a range of new tools and methods are being developed to meet these challenges. To (1) improve pest detection we are investigating novel ways of actively seeking pests, rather than relying on current passive methods of attracting pests to traps. To (2) deliver improved pesticide application methods we are developing targeted spraying methods from helicopters and unmanned aerial vehicles (or UAVs) that reduce pesticide usage and total areas sprayed. In addition, we are evaluating non-chemical or reduced-chemical approaches to pest eradication that are based on habitat manipulation and understanding population dynamics. Finally (3) we are working with MPI and other stakeholders to ensure NZ community perspectives, including Maori, are integrated into pest eradication responses.

A second project, as part of the Biological Heritage National Science Challenge and Envirolink Tools, recognises that biosecurity is everyone's responsibility in alignment with MPI's desire for a biosecurity team of 4.7 million to augment existing surveillance efforts. The aim is to develop a technology and communication platform that facilitates greater participation in general surveillance activities. A combination of mobile technology tools will be used to facilitate the submission and subsequent triage of observations. The technology solutions developed will be flexible and allow biosecurity intelligence from the Ministry for Primary Industries and other agencies to be communicated to specific primary industry sectors and/or localities.

Both project teams are working closely with central and regional government, Iwi/Māori, and a range of primary industry sectors.

WEEDS

Velvetleaf in the Waikato – What's the buzz

Heidi Pene Biosecurity Pest Plant Officer C G Hale Ltd; contractor to Waikato Regional Council heidi.pene@pestplants.co.nz

Heidi graduated from University of Waikato 2003 with a Masters in Biology, and has worked as a pest plant officer for Waikato Regional Council since 2000. Heidi has a keen passion for preserving the beauty of Aotearoa.

Velvetleaf (VL) was discovered in a maize crop in the Waikato Region in 2011. At that stage the weed was not classified as an unwanted organism and was not in the Regional Pest Management Strategy so there was no mandate to require control of the plant.

Research indicated that if left uncontrolled the weed could spread quickly throughout the industry. Losses of up to 34% have been reported in maize and soya bean crops in North America where it is their foremost broadleaf weed. Immediate action was taken to contain further movement of the plant by machine hygiene and chemical and physical control. VL was introduced to the RPMP in 2014 as a containment pest plant.

In 2016 VL was discovered in particular strains of fodderbeet crops throughout New Zealand triggering a nationwide response led my MPI. This led to an intense awareness and containment campaign in the Waikato Region based at the civil defence building in Hamilton. Tracing of movement through machinery, fodder, stock and bird manure revealed that there are a number of mechanisms by which this plant has spread with clear evidence pointing to movement by harvesting machinery and maize silage.

By February 2017, 34 infestations were confirmed and are being closely monitored and managed in the Waikato Region. Tracing is still being undertaken and farm management plans have been negotiated and given to all landowner/occupiers of confirmed sites. Dog and drone detection methods are being trialled for more efficient monitoring at some of the larger sites.

Commercial composting as a management tool for moth plant

Sarah Killick, University of Auckland and Unitec Institute of Technology skillick@unitec.ac.nz
Jane O'Hagan, Auckland Council jane.o'hagan@aucklandcouncil.govt.nz

Sarah Killick is a Research Assistant at Unitec Institute of Technology, and a Masters of Science student at the University of Auckland. Her research focuses on invasive plant dispersal and management, with a particular emphasis on moth plant.

The perennial climber *Araujia hortorum* (moth plant) is rated as the 'worst weed' in both Auckland and Northland due to its smothering habit, high reproductive ability, and potential dispersal abilities. Every year vines become laden with choko-like pods, each containing over 400 seeds. These seeds are highly viable, increasing the importance of containing and terminating seeds to prevent further spread. Previously, the preferred method was to dispose of plastic rubbish sacks of pods in landfill stations: an expensive and environmentally unsustainable management method. Here, we consider commercial composting as an alternative management tool. Moth plant pods were buried in a newly formed compost windrow. Pods were tested for viability and germination success at 33, 66, and 99 days after burial. A second laboratory-based experiment simulated compost conditions over a short timeframe to confirm initial results under a controlled environment.

Prioritising initial wilding conifer control across New Zealand

Dr Kelvin Lloyd, Wildland Consultants Ltd kelvin.lloyd@wildlands.co.nz
Dr Des Smith, Wildland Consultants Ltd. des.smith@wildlands.co.nz
Roger Bawden, Wildland Consultants Ltd. roger.bawden@wildlands.co.nz.

Kelvin is a Senior Ecologist based in Dunedin, with practical and strategic experience in woody weed management and considerable experience in South Island high country landscapes.

In 2015 and 2016 Wildland Consultants Ltd were contracted by MPI to help prioritise initial wilding control sites across New Zealand. A new bid was being prepared for budget funding, and it was necessary to show that a plan was available to get started on wilding conifer control should funding be made available. During the project, we worked with key staff from MPI and LINZ as well as having regular meetings with an Operational Advisory Group comprising a range of stakeholders including DOC, High Country Federated Farmers, Regional Councils, and the New Zealand Defense Force.

With a database of some 630 wilding control sites to contend with, initial thinking was on the attributes that could be used to prioritise sites. Key attributes were the invasiveness of the different wilding conifers present at sites, and the vulnerability of the landscape surrounding sites. While existing work on invasibility and vulnerability was helpful, a framework in which vulnerability was expressed nationally was needed. As time was short, we used an expert consensus approach, where we sent a questionnaire to expert stakeholders asking them to rank the invasibility of different wilding conifer species in different land cover types (from LCDB4.1). The results of the questionnaire were

modelled in R which provided predicted scores for invasiveness and vulnerability that were used in the prioritization algorithm.

As initial control should generally start with outliers and work in toward the source, we chose a cost-effectiveness metric to prioritise sites with sparse spread that could be cost-effectively controlled, thus aiming to first reduce the extent of the wilding conifer problem. We also used a benefit metric by assessing the amount of invasible land around each control site. The outcome was list of priority sites, which were then developed into initial control areas. Another outcome of the project was a national scale vulnerability map that was influential at Ministerial level, and helped generate $16M for wilding conifer control over four years. The initial control areas defined by the project recently received government funding for wilding conifer control.

Upskilling a botanically challenged world - not all green is good

Sara Brill, Northland Regional Council, sarab@nrc.govt.nz

Sara has worked in biosecurity for 13 years and has been involved in upskilling the public on what weeds look like for many years. She is currently a biosecurity officer at Northland Regional Council.

One of the first things required for people to begin to take action on weeds is being able to distinguish between the 'good green' and the 'bad green'. Education is the key - from primary to tertiary level to get individuals and communities engaged in recognizing and taking action on weeds especially for vegetation restoration. Social media as an effective learning tool needs to be utilised more in education.

VERTEBRATES

Development of the rat specific toxin norbormide

Prof. Charles Eason [1, 2]; Duncan MacMorran, [D3]; Dr Lee Shapiro[4]; Dr Helen Blackie[4]; Dr Elaine Murphy[2, 5]; Dr Dave Rennison[6]; Dr Morgan Jay-Smith[6], Prof. Margaret Brimble[6].
[1]Cawthron Institute, Nelson. [2]Centre for Wildlife Management and Conservation, Faculty of Agriculture and Life Sciences, Lincoln University. [3]Connovation Ltd, Auckland. [4]Boffa Miskell Ltd, Auckland. [5]Dept of Conservation, Christchurch. [6]School of Chemical Sciences, University of Auckland, Auckland.

lee.shapiro@boffamiskell.co.nz

Lee Shapiro is an ecologist who working for Boffa Miskell Ltd in Auckland and has spent the last 10 years involved in the research and development of tools and methodologies for the control of invasive vertebrate pest species. Lee recently completed his PhD thesis that focused on the potential of the food preservative sodium nitrite as a vertebrate toxic agent for the control of feral pigs and possums.

Norbormide is a rat specific toxicant. It causes vasoconstriction (narrowing) of small arteries and vasodilation (widening) of large arteries in rats, which causes a rapid fall in blood pressure. Death is thought to result from circulatory disorders and heart failure due to irreversible coronary constriction. The constriction of small blood vessels is rapid and unique to rats. The lack of toxicity of this compound to mice is a disadvantage but in terms of other non-target species its specificity is a considerable advantage. It was developed in the 1960s, but its use was discontinued as anticoagulant toxins became more popular. In the past taste aversion limited its effectiveness and field efficacy results were poor. Methods of overcoming taste aversion to norbormide have been investigated including encapsulation and the development of analogues. Recent research by Connovation Ltd and the University of Auckland has identified an effective method of synthesising norbormide without the taste aversion in Norway and ship rats. Extensive cage trials have proven this formulation to be both effective and fast acting and trials to determine its field efficacy are planned for late-2017. The ability to target rats with a very low risk of impacting non-target species will enable both widespread rat control across remote locations and targeted control in sensitive areas like islands and in close proximity to urban areas.

Urban Rabbits: How GW manages wild rabbits with limited tools in difficult locations.

Gary Sue, Greater Wellington Regional Council

Controlling wild rabbits around built up urban areas is difficult. GW uses a range of tools and methods to help manage rabbit populations in these areas while ensuring public safety foremost. With increased public awareness and concerns over ATV use some tools are restricted in there use so other alternatives need to be considered. This talk will help create discussions and thoughts about how things could be done differently and what tips or tricks others may have or have been using.

The economics of monitoring traps with wireless networks

Bruce Warburton, Landcare Research warburtonb@landcareresearch.co.nz
Campbell Leckie, Wendy Rakete-Stones

Bruce is a science team leader at Landcare Research, Lincoln who carries out research on the tactical and strategic aspects of vertebrate pest control.

Over recent years there has been an increasing number of vertebrate pest control programmes using permanent networks of traps to maintain pest numbers at low levels. At such low densities of pests, few traps are sprung, and staff or contractors often spend more time checking traps that are still set than dealing with captures. Consequently, there has been a growing interest in the potential of wireless systems for remote monitoring of traps to minimise the time and cost associated with checking them. In this paper we explore the economic factors that might determine whether wireless monitoring is economically viable, and if not, what critical factors need to be addressed to ensure the most benefits can be gained from using this new technology.

A community's perspective of wild pigs

Peter Edwards MSc student AUT – Auckland University of Technology pekakiri@vodafone.co.nz

Peter is a mature student who decided to make a career change and upskill after 20+ years in the timber industry. Upon leaving a middle management position there Peter first completed a two-year Diploma in Marine studies at the Bay of Plenty Polytech, a year later graduated from Waikato University with a BSc in Biological Science, in 2016 a Postgraduate Diploma in Science (Applied Conservation) at AUT, and is now completing a MSc in Applied Conservation also at AUT. Peter has strong interests in ecology/biodiversity/biosecurity management of both the terrestrial and marine realms as well as a keen interest in socio-ecology.

Wild pigs (*Sus scrofa*) are recognised on a global scale as a tantalising and delicious food source. However, they are also a major pest species and cause millions of dollars of destruction each year. Does this create opposing views in how society values wild pigs? Due to their negative effects on biodiversity, many Regional Unitary Authorities in New Zealand seek to control wild pig numbers. However, stakeholder views and values have not been considered in the management process. Therefore, leaving local and national officials open for criticism and strong opposition from other stakeholders. This study aims to provide the first insight into community values of wild pigs as well as the management of wild pigs. We conducted a series of semi-structured interviews with 10 individuals from different stakeholder groups (local and regional council, iwi groups, pest control groups and hunters) and their views and their values were collected and analysed using various analytical methods and the NVivo software program. This research is thought to be the first of its kind in New Zealand and will provide essential information to guide future wild pig management.

INSECTS & MODELLING

Culex quinquefasciatus (Diptera: Culicidae), a cosmopolite in NZ

Dr Julia Kasper NZ BioSecure Julia.kasper@smsl.co.nz

Julia is the Principal Entomologist at NZ BioSecure Entomology Lab where she studies mosquito biology and advises for the Ministry of Health as part of the National Mosquito surveillance. Trained in Germany she has been a member of the Museum of Natural History Berlin for 15 years where she specialised in medical entomology and also led undergraduate and graduate student courses in zoology, entomology and parasitology for the Humboldt University. Living in Wellington for almost 8 years Julia has worked at Te Papa with collections of fleas and mosquitoes and as part of community projects she educated the public about insects and freshwater ecology.

New Zealand has only 12 described endemic mosquito species, which are mainly bird-biters and have a very low vector competence. The biology of these species has received little study, and they are becoming increasingly rare with distributions altered by introduced species.

The introduced mosquito species (Ades notoscriptus (Skuse), Ae. australis (Erichson) and Culex quinquefasciatus (Say) (Diptera: Culicidae)) have spread uncontrolled over New Zealand, invading regions with the most favourable climates rapidly (*Holder, 1999*). The eventual occurrence of (arthropod borne - arboviral) diseases is possible as they have vector competence of dog heartworm, Ross River virus and West Nile virus (*Russel, 1997, Kay et al. 2007*). They could also act as a vector of Dengue fever together with other exotic species (*Watson &Kay, 1999*). Diseases can affect both humans and native wildlife.

It is not known if Cx. quinquefasciatus, which occurs worldwide, and the endemic Cx. pervigilans can interbreed. Additionally, it is possible that specimens from overseas intercept New Zealand's border's frequently without our knowledge. The distribution of Cx. quinquefasciatus in NZ over the last 10 years as well as population DNA analysis can help to understand the pathways of t introduced mosquito species and and can be used for incursion protection planning of vector competent exotic species.

Holder, P, Browne, G. and Bullians, M.1999. The mosquitoes of New Zealand and their animal disease significance. Surveillance 26: 12-15: Kay, BH, Boyd, AM, Ryan, PA and Hall, RA. 2007. Mosquito feeding patterns and natural infection of vertebrates with Ross River and Barmah Forest viruses in Brisbane, Australia. American Journal of Tropical Medicine and Hygiene 76: 417-23: Russell, R.C. and Geary, M.J. 1997. Which mosquitoes are the 'best' vectors of dog heartworm in southeastern Australia? Arbovirus Research in Australia 7: 243-246.

Vespula biocontrol revisited

Dr Bob Brown, Dr Ronny Groenteman Landcare Research, PO Box 69040, Lincoln 7640 groentemanr@landcareresearch.co.nz

Ronny works at Landcare Research since 2008 as part of the biocontrol group. She works on target and non-target effects in weed biocontrol, and is also working on biocontrol for environmentally invasive invertebrates.

European Vespula wasps have become invasive in several parts of the world, but biological control against them has so far only been seriously attempted in New Zealand. Parasitoids of the genus Sphecophaga were introduced in the late 1980s and shortly thereafter the biocontrol programme was abruptly discontinued. The parasitoids released up to that point established at a limited range and, in the time passed, did not bring wasp populations down to an acceptable level. Wasp populations probably increased further at least in parts of the range. This talk will describe the journey through the renewed interest in the biocontrol option against wasps, which has seen the programme revived in 2014, first with examination of the new species of mite, *Pneumolaelaps niutirani*, which was first discovered on wasps in New Zealand, followed by re-introduction of Sphecophaga from a more suitable geographic range, which is nearing completion. More recently we have been awarded funding to explore new promising candidate agents from the wasps' native range – *Volucella inanis*, *Leopoldius coronatus* and *Metoecus paradoxus*.

This programme would not have been possible if it wasn't for joint widespread support from Government agencies (MPI, DOC), a large number of regional and district councils, several primary industry sectors and community groups, all united in desire to find a long-term solution to wasps.

Plume Modelling For More Biosecurity Effective Responses

Zhidong Yu and Rebecca Martin Senior advisor Biosecurity Response and Senior Adviser, Conservation - Long Term Planning and Transition Team, Readiness and Response Services Ministry for Primary Industries zhidong.yu@mpi.govt.nz; Rebecca.Martin@mpi.govt.nz

Zhidong Yu has been working on biosecurity response and readiness activities at MPI. One area of readiness focus is to understand the potential spread of foot and mouth disease (FMD) in New Zealand, should it occur, and the use of vaccination as an additional response tool. Zhidong Yu is also managing a plume dispersion emergency modelling system (PDEMS), a critical intelligence tool in support of disease incursion responses.

Rebecca Martin's role MPI requires her to effectively engage, communicate and work proactively with DOC, industry stakeholders, iwi and other partners to progress a range of biodiversity and environmental biosecurity issues for NZ, both pre- and post-border. Progressing NZ's myrtle rust preparedness is of major concern to both MPI and DOC due it's potential impact on a range of NZ native species and ecosystems, as well as it's potential economic impacts on the forestry, honey and beekeeping industries.

Natural airflows play a big role in the spread of some high impact diseases and pests. Suitable climatic conditions can move disease agents, like viruses for Foot and Mouth Disease (FMD) and fungal spores for Myrtle rust (Puccinia psidii), long distances away from their known incursion site(s). Transmission of disease agents by airflows (plumes), if not detected early, will lead to reduction in response effectiveness.

Modelling the air-borne spread of disease agents provides the intelligence to enable deployment of surveillance for early detection of potential "runaway" spread, allowing timely implementation of response activities which are crucial for minimising the impact of an exotic disease or pest incursion.

A plume dispersion emergency modelling system (PDEMS) was set up in 2004 as a critical intelligence tool in support of disease incursion responses. NIWA is contracted by MPI to maintain this system to ensure it can be activated promptly under agreed conditions. A recent upgrade in 2016 allows it to reproduce more sensible and consistent results through using better technologies and weather data. This talk aims to improve the awareness of PDEMS in New Zealand and its potential during an emergency, using FMD and myrtle rust as case studies.

Developing and using online tools for improved decision making.

Dr Andrew Gormley, Landcare Research – Manaaki Whenua
gormleya@landcareresearch.co.nz

Andrew is a quantitative animal ecologist at Landcare Research, working in the areas of population modelling, monitoring and decision analysis.

Wildlife ecology and management often requires applying complex quantitative methods, such as data analysis or simulation modelling. For example, in an area being managed, how many traps should we deploy to achieve a desired kill rate of possums? And what would be the effect of changing trap spacing and/or trap duration? In the absence of carrying out large number of field trials, we can gain some insight by building simulation models. These models are likely however to be difficult to understand and confusing to run.

A recent computer package called Shiny enables the development and deployment of web-based apps by a programmer/biometrician, that can then be easily be used by managers, field technicians etc via a simple user interface without the user requiring any knowledge of computer coding. Running on the powerful R software, it enables custom written apps to be written specific to the question at hand. It can be easily updated and then deployed to run on any internet-enabled device, such as laptops and smartphone.

This talk presents three examples of recent Shiny apps we have developed that are being used by agencies to make better informed decisions.

- A trapping simulation tool developed for the Hawkes Bay regional council to investigate the effect of varying levels of predator control in the Cape to City footprint.
- A decision support tool for OSPRI staff to determine how much wildlife surveillance for TB is required to achieve a desired level of freedom.
- A tool that provides daily updates for contractors on their progress towards targets of survey coverage

WEEDS

A tale of three wetland weeds - the importance of networks and early intervention.

Dave Havell DOC Dhavell @doc.govt.nz

Dave is a technical adviser at DOC, based in Auckland.

Three examples of the management of potential pest plants are presented to illustrate the importance of early detection, communication within networks and early management in reducing biosecurity risk. Nature Watch or equivalent systems are extremely important in reducing biosecurity risk by documenting pest plant sites and new incursions, but experience and conventional botanical networks and processes are also important. Wider understanding of the biosecurity network is required by those outside biosecurity agencies.

Butterwort (*Pinguicula grandiflora*) occurs in two sites in New Zealand, both on public conservation land. At one site researchers detected and removed the butterwort plants; at the other site local DOC staff, alerted by a Nature Watch record and researchers, reduced butterwort to zero density.

Another exotic species, bladderwort (*Utricularia sandersonii*) is only present in New Zealand at one of the butterwort sites; unfortunately knowledge of the first butterwort and bladderwort site was either lost or not communicated to DOC operational staff so bladderwort control was delayed until surveillance for butterwort occurred following detection of the second bladderwort site.

A third species, golden dodder (*Cuscuta campestris*) is a serious agricultural/horticultural pest overseas but is not considered a serious pest plant in New Zealand. Golden dodder was detected during surveillance flights for other pest plants species over the Whangamarino wetland where it was found in extensive patches bordering farmland and streams. Dodder can both infect and smother other plants and has high visual impact. Methods based upon overseas research show that control methods are available but methods are likely to be limited as the infected area is extensive and detection of all individuals difficult. Eradication is unlikely. More extensive ecosystem management may be required to control dodder.

Persistence, accuracy and timeliness: finding, mapping and managing non-native plant species on the island of South Georgia

Bradley Myer Managing Director of Indigena Biosecurity International and Kaitiaki o Ngahere brad@ kaitiakirestoration.co.nz

Bradley Myer is the Managing Director of Indigena Biosecurity International, based in New Zealand. Brad has been working in the field of ecological restoration and biosecurity for 18 years and has spent 2 field seasons on South Georgia. Brad co-authored the South Georgia Non-Native Plant Management Strategy 2016—2020 with Kelvin Floyd and Dr Jennifer Lee. Indigena has been contracted by the Government of South Georgia and the South Sandwich Islands to implement the strategy over a 5 year term.

South Georgia (353,304 ha) is part of the UK Overseas Territory of South Georgia & the South Sandwich Islands. It is located in the South Atlantic approximately 1,450 km south-east of the Falkland Islands. The landscape of South Georgia is mountainous and glaciated with only the coastal fringes which are snow free in the summer months supporting vegetation. An estimated 8% of the land mass of South Georgia provides suitable habitat for vascular plants. There are 25 indigenous vascular plants species and 41 non-native plants present on South Georgia.

The objective was to develop and implement a non-native plant management strategy as an integral part of an ecosystem-based habitat restoration programme supporting rodent and reindeer eradications.

Following removal of grazing pressure from introduced mammals, surveys were conducted to quantify non-native plant populations and enable a control strategy to be developed for the island. Due to the vast scale of the island,

multiple seasons were required to carry out rapid surveys of key indicators. These indicators are the species, the area of plant coverage in square meters and age class (mature or juvenile); they are also used for long-term control-based monitoring of outcomes. Both survey and control data are entered into a spatial database to enable analysis and allow data informed management decisions.

Forty one non-native plant species are present on the island and their distributions' mapped; of these, 34 are being managed at zero density with 56,851 m2 controlled to date; 4 species are managed at specific sites with 22,443 m2 controlled to date, the remaining 3 species are widely established and receive limited control.

Spatially quantifying the distribution and control of non-native plants, has enabled the development and implementation of an effective management strategy which contributes to the restoration of South Georgia's native biodiversity.

Woody weed populations in New Zealand: persistent or ephemeral?

Kate G. McAlpine1, Susan M. Timmins1, Sarah D. Jackman2, Shona L. Lamoureaux2 1Department of Conservation, 2AgResearch kmcalpine@doc.govt.nz

Kate McAlpine is a weed ecologist with the Department of Conservation

Resources to manage plant invasions are limited, so the ability to determine which species are likely to die out naturally is valuable. One of the main indicators of long-term persistence at a site (in the absence of disturbance) is the ability of a species to regenerate under its own canopy, and thus replace individuals as they die. In this study, understory regeneration was surveyed at sites dominated by a mature, closed-canopy population of one species of woody weed to determine which weed species are likely to persist, and which might be replaced by native plant succession.

In total, 132 populations of 41 woody weed species were surveyed. Twenty-seven weed species had zero, or very few, conspecific seedlings or saplings present beneath the parent canopy. These species appear to be least likely to persist in the absence of further disturbance, particularly where a dense native understory is present. Fourteen species had high numbers of conspecific seedlings and/or saplings present, and thus appear more likely to persist. Some weed species had variable regeneration, with high numbers of seedlings at some sites, but none at others. There was a dense native understory present at many sites, with more than 170 native species recorded overall. *Melicytus ramiflorus* was by far the most common native species, present at 67% of sites.

Results demonstrate that managers should inspect the understory of woody weed populations before embarking on control; sites with a predominantly native understory could return to native dominance without any active management.

The National Interest Pest Responses (NIPR) Programme: coordination and collaboration on long term eradication programmes

Frances Velvin Ministry for Primary Industries Frances.Velvin@mpi.govt.nz

Frances is a senior adviser at MPI, the Programme Coordinator for the National Interest Pest Response (NIPR) Programme, and the MPI response manager for two of the NIPR species, hydrilla and Manchurian wild rice. For the previous ten years she specialized in responding to new biosecurity threats in New Zealand.

MPI is responsible for the coordination of the National Interest Pest Response (NIPR) programme, which currently includes the eradication or long term management of nine terrestrial and freshwater aquatic weeds - Manchurian wild rice, pyp grass, Johnson grass, Cape tulip, white bryony, phragmites, salvinia, hydrilla and water hyacinth. Frances will discuss the collaborative aspects of the programme including the key role MPI plays of coordination across the many organisations, regions and communities involved or affected by these weeds.

CATS

An overview of the National Cat Management Strategy Group (NCMSG)

Cats are very popular pets in New Zealand, but also have the ability to negatively impact native wildlife and cause a nuisance to neighbours – hence their management is a major challenge. No national body or law for the management of owned cats currently exists in New Zealand. However, in November 2014, several organisations came together to form the 'National Cat Management Strategy Group' (NCMSG). Member organisations include the New Zealand Veterinary Association (NZVA), the New Zealand Companion Animal Council, the Royal New Zealand Society for the Prevention of Cruelty to Animals, the Morgan Foundation, and Local Government New Zealand. Technical advisors to the group include the Department of Conservation and the Ministry for Primary Industries. This group's primary objective is to promote responsible cat ownership, environmental protection, and humane cat management. This talk will provide an overview and current update from the NCMSG.

Where does kitty wander? Results from the Cat Tracker New Zealand Citizen Science project

Heidy Kikillus Biodiversity Advisor Victoria University of Wellington & Wellington City Council Heidy. Kikillus@gmail.com

Heidy is an urban ecologist with an interest in biosecurity, specifically pets than can become pests

In 2015 and 2016, over 200 pet cats in the Wellington region were tracked via Global Positioning System (GPS) units and their movements mapped on www.cattracker.nz. This large-scale Citizen Science project also collected copious amounts of information regarding cats and public attitudes towards them and their management This project aimed to help better understand the cats' home range, how much time they spend in different kinds of habitat, and how owners can manage pet cats to reduce their impact on wildlife. This talk will discuss the overall findings from the Cat Tracker project, including day / night travels and comparisons to cats in other countries.

Non-traditional partnerships are fundamental to the management of domestic cats

Myfanwy Emeny. Wellington City Council myfanwy.emeny@wcc.govt.nz

Myfanwy is the Urban Ecology team leader at Wellington City Council

Cats are very popular pets in New Zealand, but also have the ability to negatively impact native wildlife and cause a nuisance to neighbours – hence their management is a major challenge. No national body or law for the management of owned cats currently exists in New Zealand. At present, regulations and bylaws pertaining to the management of owned cats in New Zealand are piecemeal among individual councils. Wellington City Council is the first council to require pet cats to be microchipped for identification purposes.

Additionally, in partnership with the SPCA and local veterinarians, the Wellington City Council has recently been involved in a low cost desexing and microchipping campaign ("Snip n Chip") which saw almost 2,000 local cats microchipped and their details registered with the New Zealand Companion Animal Register. Further programmes to encourage responsible pet ownership are in the planning stages. This talk will discuss the challenges of setting boundaries for cat ownership in Wellington and creating new partnerships and non-traditional collaborations to reach the common goal of balancing cats and conservation.

Our pets vs. ‘pests’: An overview of the multi-agency Bay of Plenty Community Cat Project.

Sue Kennedy1, Dr Liza Schnider2, Dale Williams3 1. SPCA Rotorua, 2. ARRC Wildlife Trust Tauranga, 3. Bay of Plenty Regional Council manager@rotoruaspca.org.nz liza@holisticvets.co.nz dale.williams@boprc.govt.nz
Dale Williams, Bay of Plenty Regional Council

Sue is the Manager SPCA in Rotorua
Liza is the owner/operator of Holistic Vets Tauranga, a fully integrated vet practice combining conventional medicine and surgery with complimentary therapies; also founding trustee of the ARRC Wildlife Trust, a charitable trust which provides vet care and services to rehabilitate wildlife.
Dale is a Biosecurity Officer with the Bay of Plenty Regional Council with 30 years of experience as a research technician and technical advisor focusing mainly on vertebrate pest control and threatened species management.

Populations of unowned cats around the Bay of Plenty are being targeted by a new community project to ensure the wellbeing of owned cats and native wildlife in the area, as well as addressing long-running community frustrations.

The Bay of Plenty Community Cat Project (BOPCCP) sees collaboration between local animal authorities with backing by the Bay of Plenty Regional Council, hopes to see a dramatic decrease in unowned cat populations around the region within three to five years.

Within 10 years, it is hoped the unowned cat populations will be minimised and managed, protecting both the native wildlife in the region as well as ensuring the health of owned cats.

The project is based on work already successfully undertaken in the past five years by Tauranga-based ARRC (Animal Rescue and Rehabilitation Centre) Wildlife Trust.

The project is the vision of ARRC and the Rotorua SPCA, working collaboratively and proactively with the Regional Council, Department of Conservation, Rotorua Lakes Council and the Kawerau, Whakatane and Opotiki SPCA’s to address the issue in our region around working in a humane manner to decrease the populations of unowned cats and educate people about the problem, ultimately leading to the improvement of welfare of the cat population as a whole.

The three main aims of the project are to prevent the unnecessary predation on the region’s wildlife; improve overall cat welfare; and support a frustrated public with an important community service.

POLICY & PARTNERSHIPS

The balance game - Biosecurity Act policy development vs community/ political will

Jono Underwood Marlborough District Council jono.underwood@marlborough.govt.nz

*Jono has worked in biosecurity at Marlborough District Council for eight years, the last five as Biosecurity Coordinator. He became involved in policy development at a key time when substantial changes were afoot with amendments to the Biosecurity Act 1993 as how Councils develop their Regional Pest Management Pl*ans.

Yes…..wake up, its policy time. A somewhat light-hearted look at the challenges involved, and an approach taken mixing legislative policy tools and community expectation. While there is a clear legislative framework available to Councils, to ensure the use of legislative tools are strategic, we all know how powerful and influential the power of a community with a certain way of thinking can be. How does this play out?

Using rubrics to improve risk communication and engagement between biosecurity agencies and their key partners and stakeholders – a passive surveillance example

Lynsey Earl, Ministry for Primary Industries, PO Box 2526 Wellington 6140 – lynsey.earl@mpi.govt.nz
Andrea Grant, Scion, P.O. Box 29 237, Christchurch 8540 – andrea.grant@scionresearch.com Will Allen, Learning for Sustainability – http://learningforsustainability.net, Christchurch – willallennz@gmail.com

Lynsey Earl (lynsey.earl@mpi.govt.nz) Surveillance Advisor, Ministry for Primary Industries, New Zealand. Lynsey is a veterinary epidemiologist in the Surveillance team at MPI. Part of her role is leading a project to enhance engagement with stakeholders to improve timely notifications of new and emerging pests and diseases.
Dr Andrea Grant (andreamariagrant@gmail.com) Social scientist, Scion, New Zealand. Andrea is a social scientist specialising in communicating risk and uncertainty from the perspective of social learning and systemic inquiry. She has a background in social studies of science and an interest in issues of ecological and social sustainability such as biosecurity and climate change adaptation.
Dr Will Allen (willallennz@gmail.com) Independent systems scientist, participatory action researcher and evaluator, with 30 years of experience in sustainable development and natural resource management. Will manages the Learning for Sustainability portal – http://learningforsustainability.net – providing links to material on collaboration and adaptation.

Currently existing biosecurity programs often fail to effectively engage their key stakeholder groups, and emphasize one-way and top-down communication approaches that tend to see engagement as additional to other program areas, rather than embedded within them. A growing challenge for biosecurity management is to manage two-way risk communication and engagement strategies that more closely link key stakeholder groups and operational partners. Recent research in this area highlights that agencies must step beyond a technical operational focus, to simultaneously engage more meaningfully with a range of partners and stakeholders, and enter into collaborative approaches based on participation, trust and understanding. Although these needs are known, there are a lack of methodologies and tools to guide agencies in undertaking this two-way approach to communication and engagement.

Recent work with the Ministry of Primary Industries biosecurity monitoring and surveillance group looked at using rubrics as a design and assessment approach to explore how they can improve the way they engage with stakeholders in general surveillance systems. The use of rubrics provides a tool to guide more two-way or dialogic communication that is required to support more participatory and partnership modes. This presentation will outline how to use this assessment-based approach to design, evaluate and improve a biosecurity surveillance system. Developing the rubric helps people understand the bigger picture, and the way in which assessments are conducted invites people to explain in objective terms what is happening from their perspective. The approach also supports an outcomes orientation. We use the example of Myrtle Rust in New Zealand as a demonstration of how these methods can be used, both to encourage constructive discussion among multiple stakeholders and as an assessment tool.

Collaboration in Biosecurity Management: the only way to go!

Richard Bowman Biosecurity Manager Environment Southland richard.bowman@es.govt.nz

Richard Bowman is Biosecurity Manager for Environment Southland, based in Invercargill. Since 1994 he has been involved in biosecurity and biodiversity management in Southland but has also played an active national role through the BioManagers Group and its predecessors.

New Zealand is a small, isolated, geographically diverse country with a population the size of a small northern hemisphere city. New Zealanders enjoy an advanced standard of living and have high expectations about what the natural resource base can deliver and the quality of the environment they live in. In terms of biosecurity, i.e., managing the adverse impacts of harmful organisms, this means that people demand a high level of protection but often do not have the means to afford it. At the same time different organisations and stakeholders all face similar problems in different parts of the country. The only effective way to address this scarcity of resources for biosecurity management is collaboration both vertically within the hierarchy of institutions and laterally across the geographic regions.

Historically New Zealand has had a varied record in the area of biosecurity collaboration but over the last two and a half decades its level and effectiveness have improved significantly. This has arisen as much by necessity as by design.

Regional Councils and Unitary Authorities (regional councils) have statutory responsibilities as well as other self-appointed roles in biosecurity management. Most regional councils cover substantial land areas and many have small population bases which often result in acute scarcity of funding and other resources to meet legislative and community needs. To address this problem regional council biosecurity and biodiversity managers have operated a national collective network since the early 1990's to solve common problems.

Today this collective is represented as the BioManagers Group. It has been instrumental in a wide range of national collaborative projects involving central Government agencies, industry sectors, research providers, funders, stakeholder groups, etc. This paper examines some of the factors that have led to successful collaborative outcomes.

Interagency and multidisciplinary partnerships- lessons from dramas faced with retaining 1080 and developing emerging technologies (for vertebrate pest control)

Eason, CT (Charlie); Murphy, E; Ogilvie, S; Shapiro, L E; Rennison, D; Brimble M; Blackie H; Ross, J; MacMorran D; Gregory N.
charles.eason@cawthron.org.nz

Professor Eason has played a part in the registration and application of many animal pest control tools in collaboration with councils, government departments, NGOs and community groups. He has specialised in vertebrate pesticide toxicology and has communicated extensively on the pros and cons of 1080 and alternative poisons, with research aimed at improved safety, effectiveness and license to operate.

Over the last 20 years, the number of tools available for the control of small mammals has declined internationally, and in New Zealand traditional tools and toxins have been under pressure. Retaining and improving the use of 1080 has required very extensive collaboration between pest managers and researchers, interagency collaboration and long-term commitments. Research endeavouring to develop new toxins and delivery systems to reverse more effectively the decline of NZ's threatened and endangered species has advanced. However, uptake of the technologies developed has been slow and there have been failures and partial successes. New toxins have been advanced, namely para-aminopropiophenone (PAPP) for stoats and feral cats, zinc phosphide for possums and encapsulated sodium nitrite for possums and feral pigs. Research on rodenticides, including diphacinone with the additive cholecalciferol (D+C) and a palatable form of norbormide, and lures continues. Toxin-delivery devices, with resetting capability for possum and stoat control, were partially completed in 2015. Humane and selective toxins, lures of greater potency and improved resetting killing devices are not yet realising their potential for endangered species protection. Lessons learned from the research, registration, technical and design dramas associated with attempting to advance emerging technologies will be presented. Hopefully, sharing these experiences will enable common, and sometimes unusual, pit-falls to be avoided in future plans and be helpful to researchers and pest managers advancing new technologies.

BIOCONTROL

Harnessing the power of biocontrol to overcome horehound: an introduction to the horehound biological control group.

Mr Gavin Loxton Sawdon@lupins.nz, merino sheep farmer Ronny groenteman GroentemanR@landcareresearch.co.nz Landcare Research

Horehound (*Mrrubium vulgare*), a perennial herb in the mint family, is becoming a serious weed in high country farms, especially in lucerne stands, but also in other pasture compositions. Chemical and mechanical control options are uneconomic, and the relief they provide is not sustained – the weed comes back before any desirable pasture species can take hold. In addition, chemical control is harsh on pasture species, and leaves residuals in the soil, which can prevent growth of legumes for a number of years. Horehound takes advantage of dry conditions to increase its range, and this range expansion is clearly evident in drought years. The projection for these invaded dry regions to become even more drought-prone under climate change scenarios, together with the push to increase area in lucerne in dryland farming systems generates optimal conditions for rapid horehound invasion. Biological control of horehound has been successful in Australia, and our goal is to assess whether the Australian success can be replicated in New Zealand.

The cost of the weed is not well documented, but preliminary results from a survey held in August 2016 suggest horehound invasion drives high-country land to become un-economic to farm. On top of doubling wool processing costs, the main cost of horehound is due to control actions. Chemical control costs $55 per ha on average (up to $180 per ha by one respondent), mechanical control actions amount to $30 per ha on average, and both options provide 75-80% effective control of above-ground material, but most respondents commented on the rapid return of horehound from the seedbank following control operations, and the damage to lucerne stands following chemical sprays (40% damage on average). Another cost comes in the shape of lucerne replacement frequency, which becomes roughly three times more frequent as a result of this chemical damage, and horehound invasion: if lucerne was replaced on average every 12-13 years normally, it now gets replaced on average every 5 years in horehound infested-land, at an average cost of $550 per ha. Horehound infestations are estimated to double in size on average every 3 years on the surveyed properties.

Given these preliminary results, and given the estimates that between 150,000 and 200,000 ha of New Zealand farming sector are already planted in lucerne (and the number is growing rapidly), we can estimate the annual cost of horehound to the sector at $29m to $39m in control and lucerne replacement costs alone; these estimates do include the doubling of wool processing costs due to vegetable material contamination from horehound seed burrs attaching to fleece. These estimates may be considered exaggerated due to small sample size; but even if the costs were half that amount, the case for a one-off investment in a biocontrol programme (estimated at $0.4m) is well-demonstrated.

Australia introduced in the 1990s two species of moths which provided successful biocontrol. The horehound group has made a successful application to AgMardt for ($20K)to explore the feasibility of replicating the successful Australian biocontrol programme. The study will specifically look to introduce these two species, the horehound plume moth *Wheeler spilodactylus* Curtis (Lep:Pterophoridae) and the horehound clearwing moth *Chamaesphecia myisinformis*, Rambur (Lep:Sesiidae) to New Zealand.

If the feasibility study is positive, we have a Sustainable Farming Fund (SFF) REF 405246. Of $285,450.00 available from June 2017 to introduce and distribute the two moths into New Zealand. At least 20% of financial introduction costs are directly funded from individual farmers, or farming related organisations.

As part of the SFF, a proportion of the budget is allocated for extension hence the request for inclusion in the Wellington NZBI Conference. Feedback from fellow NZBI members would also be valuable at this early stage.

Progress on the biocontrol of tutsan and Japanese honeysuckle:

Hugh Gourlay, Landcare Research

So far this season we have made over 25 releases of the tutsan moth in the central North Island. Early observations suggest that establishment should not be difficult.

Releases of the tutsan beetle have not gone well and only one field release has been made this season. Rearing of the beetle is proving difficult.

The stem boring long-horned beetle planned for release for the biocontrol of Japanese honeysuckle is expected to go ahead later this year. After much time spent experimenting with rearing the beetles on whole plants and artificial diet we have had some promising results.

Biocontrol of Tradescantia in Wellington. How are our beetles coping?

Karin Van Der Walt & Jessica Jenkins Conservation and Science Advisor - Wellington Gardens Wellington City Council karin.vanderwalt@wcc.govt.nz

Karin is the Conservation and Science Advisor for the Wellington Gardens. Karin's role has a wide focus ranging from establishing a globally recognized ex situ plant conservation programme, sustainable practices in the gardens and conducting research in collaboration with partners.

Tradescantia fluminensis is a prolific weed in New Zealand where it quickly forms a dense mass which smothers all other low-growing plants. The species' ability to rapidly spread vegetatively makes mechanical control mostly unsuccessful while chemical control is difficult with a low success rate. Three criocernine beetles with complementary types of larval feeding were approved for release in 2008 by Landcare Research with the first release in Wellington City Council in December 2012. The three beetle species - *Neolema ogloblini* (Leaf Beetle), *N. abbreviata* (Tip Beetle) and *Lema basicostata* (Stem Beetle) - are native to Argentina and Brazil and although these areas experience some frost, it is unclear how the Wellington climate will affect survival, breeding, and establishment in Wellington. We conducted initial research trails to compare the breeding rate under three temperature conditions using the heated glasshouse facilities at the Wellington Botanic Garden. We also compared survival and establishment amongst the five release sites within WCC in relation to site variables such as temperature, aspect, shading etc. This baseline information provides us with a better understanding of the ecology of the beetles and will be used to inform site selection for future releases throughout the Wellington region.

Scion's current biological control projects to combat tree pests – tortoise beetle and giant willow aphid

T.M. Withers, S.L. Sopow and A. Pugh 1Scion, Private Bag 3020, Rotorua 3046, New Zealand, toni.withers@scionresearch.com

Classical biological control is being attempted for *Paropsis charybdis* (Coleoptera: Chrysomelidae: Chrysomelinae), an Australian eucalypt pest, and *Tuberolachnus salignus* (Hemiptera: Aphididae: Lachninae), a sap-sucking insect pest of willows (*Salix* spp.). In both cases solitary endoparasitoids have been identified as promising biological control agents. The insect containment facility at Scion, Rotorua, will be used to safely contain the parasitoids and undertake mass-rearing and host range testing. Non-target species lists have been compiled for host range testing in consultation with specialists. In the case of *P. charybdis* biocontrol, a number of beneficial Chrysomelids have already been imported into NZ as weed biological control agents. So those species most closely related to the target pest, and sharing similar niches, phenology, and biology have been those prioritised for host testing against the parasitoid. For the aphid *T. salignus* no beneficial aphids exist in NZ, but we have a number of unrelated native aphids in our fauna, and a representation of these will need to be tested. We will report on progress to date and interim results.

TOOLS

Other ways to capture and report data

Biosecurity Officer – Pest Animals, Greater Wellington Regional Council

Reporting on field data can be extremely hard when it's not collected correctly or hard to extrapolate. Greater Wellington Regional Council has been working on a systems that is easy for field staff to collect and simple for managers to report on.

Automated pest detection technology

Helen Blackie Senior Ecologist Boffa Miskell Ltd helen.blackie@boffamiskell.co.nz

Helen is a senior ecologist at Boffa Miskell specializing in pest control and ecological restoration. She is actively involved in R&D and innovation within the pest management and biosecurity sector.

Over the last few years, our research consortium has successfully developed a new technology for animal detection and monitoring, using 'digital' trackpads. The system works by obtaining prints from animals running over a digital surface and runs a series of algorithms to identify the species. The data (including species ID, location, time and date of interaction), can then be provided remotely to relevant individuals/parties. Critically, the digital trackpads can automatically isolate and assess all animal interactions, requiring minimal, if any, human data analysis, even for weeks of data collection.

The technology can be employed simply as a long-life, automated pest detection and monitoring tool, as a biodiversity monitoring tool, as an educational tool, and as a means to improve management decisions. This presentation will provide an overview of how the system works, and outline results of trials conducted in NZ and Australia. The technology has been proven highly sensitive and adaptable to a large array of species, and has multiple applications in the field of wildlife management.

A bird's eye view for biosecurity

Paul Peterson Science technician Landcare Research petersonp@landcareresearch.co.nz

Paul Peterson has more than 25 years' experience assessing invasive weed biocontrol. He has recently started using high resolution photography to map weed distribution and spread. Paul's presentation shows how this technology can be used to manage and assess weed control operations.

Biosecurity issues are often hard to comprehend. How big is the issue? What happens when we do something? Does it make a long term difference? What if we just did nothing? For many decades invasive legumes (gorse, broom and tree lupin) have been marching across the Central Plateau of the North Island including areas in Tongariro National Park and the Waiouru Military training ground. Like most organisms that undergo exponential increase things go from hardly detectable to 'It's everywhere!' within what seems to be a very short time period. During 2014 eight agencies got together to sign a Memorandum of Understanding to help prevent this happening alongside the Desert Rd/SH1 between Waiouru and Turangi. As part of this process Landcare Research was enlisted to help deliver an assessment tool. Aerial imagery taken before (2012) and after (2016) control operations for broom have not only helped to assess progress but have also helped to direct control efforts.

Conservation Dogs Programme – a collaboration between DOC, Auckland Council and Kiwibank

Fin Buchanan Technical Advisor Threats (Pest Detection Dogs)

Co-presenters are;
Carol Nanning (Island Biosecurity Ranger, DOC, Auckland), dog handler conducting Island Biosecurity for the Hauraki Gulf islands
Brian Shields (Biosecurity Officer, Auckland Council) dog handler conducting Island Biosecurity for the Hauraki Gulf islands

Fin leads the Pest Detection Dog unit for the Department of Conservation.

Dogs, with their keen sense of smell, have the ability to detect both protected and pest species in a way that humans or our technology cannot emulate. While advances have been made with the use of tools such as tracking cameras, infra-red photography and sound recording, dog-detection is often the best way of searching localities and transported goods. Just as they are used at airports! Dogs are a vital tool to ensure species can be found, low pest numbers can be removed and pests prevented from reintroduction. This enable the protection and maintenance of sanctuaries off-shore and an increasing number of New Zealand mainland island sanctuaries. Working together with Kiwibank and Auckland Council allows us to unleash the potential of these incredible dogs.

AQUATICS

Validating Check, Clean and Dry protocols for freshwater pests

Tracey Burton, John Clayton National Institute of Water and Atmospheric Research (NIWA) Tracey.burton@niwa.co.nz

Tracey is a scientist in NIWA's Freshwater Biosecurity team with more than 15 years' experience in submerged vegetation management, with a focus on the use of aquatic plants as indicators of lake ecological condition. Her current research includes the assessment and validation of pathway management strategies for the prevention and spread of invasive species in lake environments.

Following the detection of the invasive algae *Didymosphenia geminata* (didymo) in 2004, MAF Biosecurity New Zealand developed a social marketing campaign aimed at preventing its spread. Freshwater users were asked to Check, Clean and Dry all boats, recreational equipment and clothing when moving between waterways. This message has since transformed into a long-term incursion response management program for the prevention of all freshwater pests in New Zealand, including high risk aquatic weed species.

While the Check, Clean and Dry protocols have been tested successfully for didymo, little experimental testing has been carried out to validate the existing methods for use on other freshwater pests. This presentation presents the results of a study carried out to validate the Check, Clean and Dry methods, with a focus on the treatment of three of New Zealand's worst aquatic weed species: hornwort (*Ceratophyllum demersum*), *Lagarosiphon major* and *Egeria densa*. All of these weeds are actively spreading around the country by boat traffic (e.g., trailers, jet motor intakes, anchor wells) and/or other recreation activities (e.g., fishing equipment, canoes). In addition to these weed species, the current Check, Clean and Dry protocols were also tested for use against two other freshwater invasive species causing concern over potential future impacts: lake snow (*Cyclotella bodanica* (Lindavia intermedia)) and the ear pond snail (*Radix (Lymnaea) auricularia*).

Aquatic Weed Management Tools

Mr Marcus Girvan Boffa Miskell Ltd Marcus.girvan@boffamiskell.co.nz

Marcus Girvan is a biosecurity consultant at Boffa Miskell. Marcus provides biosecurity services to a range of clients, most notably Land Information New Zealand (LINZ) and the Mid Dome Wilding Trees Charitable Trust. Managing complex aquatic weed control projects is a significant part of the service Boffa Miskell provides to their biosecurity partner, LINZ, and research into new, innovative control tools is a key facet of his role.

Land Information New Zealand (LINZ) administers approximately 8% of New Zealand, including the beds of many of its iconic lakes. Aquatic weeds have plagued a number of these lakes and waterways for over 60 years, with many control programmes having never achieved any level of enduring control. Whilst we have a number of tools available to us, successful aquatic weed management requires new, effective tools and innovative ways of utilising existing tools. With a limited choice of effective herbicides, and high costs associated with mechanical control methods, LINZ continues to explore new ways of managing aquatic weeds in a variety of challenging environments, from high public use lakes to those experiencing high sediment inflows. Hornwort (*Ceratophyllum demersum*) continues to be one of New Zealand's worst aquatic pests, reaching the peak of its biomass in the height of summer, choking waterways which impact on recreational users, aesthetic values, hydro-generation and biodiversity. With hornwort not present in the South Island, *Lagarosiphon major* thrives in the cooler, low-nutrient waters, with similar impacts to that of hornwort. With ever decreasing public tolerance to the use of herbicides to control and limit the spread of aquatic weeds, alternative control options are sought to manage these weeds more effectively, more efficiently and for longer.

Future-proofing aquatic weed control: developing toolboxes for best practice

Paul Champion, Deborah Hofstra Aquatic Ecologist National Institute of Water and Atmospheric Research (NIWA) paul.champion@niwa.co.nz

Paul Champion is the Programme Leader of Freshwater Biosecurity at NIWA, working there for over 20 years. He specialises in risk assessment, developing strategies for the prevention of aquatic weed spread and protection of unimpacted water bodies, and designing and implementing eradication programmes for aquatic weeds. He also has experience in wetland ecology and conservation needs and management plans for nationally endangered aquatic and wetland plants. He previously worked with the Ministry of Agriculture and Forestry (now MPI) coordinating eradication programmes for nationally important weeds.

NIWA is currently working to develop a web-based framework of best practice (BPF) to support decision-making and management of aquatic weeds by regional councils, also involving the government agencies MPI, LINZ and DOC. The tool will comprise three main components: strategic analysis tool, incursion detection tool, and the aquatic weed control toolbox. This tool will provide interpretation of the National Policy Direction (NPD) for Pest Management to ensure the best use of available resources to prevention, reduction, or elimination of the adverse effects of aquatic weeds.

The strategic analysis tool will inform the rationale for aquatic weed control by providing an evaluation of desired outcomes from management. This tool will include identification of problem and potential problem species, their current and potential distribution, potential impacts and risks these species pose (weed risk assessment), including the types of habitat likely to be severely affected and analysis of perceived benefits provided by some aquatic weed species compared with benefits accrued from their effective management. This component will address dispersal pathways of species and their relative importance.

The incursion detection tool includes prioritisation of target species based on their proximity to the region and dispersal pathways, regional prioritisation of sites for surveillance, the use of modelling to characterise human drivers of aquatic weed spread. Additionally, this toolbox will include surveillance techniques and their strategic application, prioritisation of sites for surveillance and strategies to improve their containment.
The control toolbox will include details of methods for aquatic weed control, recommended approaches for use and identifying management goals. Legislation affecting the use of control methods and legal constraints on their use (e.g., EPA controls or RMA consents) are included in this component, along with environmental monitoring.

This talk will focus on the strategic analysis tool, with work on the other tool boxes scheduled for 2018.

When are aquatic herbicides risky for freshwater health?

Mary de Winton1, Fleur Matheson1, Roger Fitzgerald2, Steve Bezar2, RohanWells1, Ralph Dickson1
Aquatic Plant Ecologist 1National Institute of Water and Atmospheric Research (NIWA); 2Marlborough District Council mary.dewinton@niwa.co.nz

Mary is a Freshwater Ecologist at NIWA, Hamilton, with more than 30 years of research experience on management of submerged vegetation. During this time Mary has worked on (and in) over 155 New Zealand lakes. Research interests include the biosecurity management of invasive water weeds, the enhancement and restoration of native submerged plants, resource survey, management of aquatic plant data and its application to research questions, and the taxonomy of New Zealand charophytes (freshwater algae akin to seaweeds).

Resource Consents for aquatic herbicides frequently require monitoring of dissolved oxygen as one condition of use. The underlying assumption is that large amounts of decomposing vegetation create an oxygen demand that can drive oxygen levels down to dangerous levels for aquatic life. But what is the risk actually? Ironically, the risk of depressed oxygen conditions may even be increased by not managing vegetation biomass!

This presentation explores continuous oxygen records in eight watercourses treated with the aquatic herbicide diquat or by glyphosate, compared with untreated sections of the same watercourses. We ask if the risk of herbicide impacts on oxygen concentrations required by aquatic life can be predicted with more certainty by considering the instream biomass of plants that are susceptible to herbicide, levels of aeration maintained by effective water conveyance, and by existing watercourse conditions (temperature and dissolved oxygen concentrations). Based on our observations we also suggest that natural events might have a greater discernable impact than management using aquatic herbicides.

FIELDTRIP BACKGROUNDERS

Key Native Ecosystem sites – background for field trips.

Richard Romijn, Greater Wellington Regional Council

Greater Wellington Regional Council's (GWRC) Key Native Ecosystem (KNE) programme is a non-regulatory voluntary programme that seeks to protect some of the best examples of original ecosystem types in the Wellington region by managing, reducing or removing threats to ecological values. KNE sites can be located on private or publically owned land. Land managed by DOC is generally excluded from this programme.

The KNE programme began in the early 1990s with the aim of protecting native flora and fauna at selected sites in the region and mainly focused on pest animal control programme. Review of the programme began in 2011 using systematic conservation planning. Sites with multiple ecosystem types present were prioritised for inclusion within the programme and other sites were included based on the ecosystem type they represented in order to try to establish a full range of original ecosystem types within the KNE programme. There are currently 58 sites in the programme ranging in size from small forest remnants to the Akatarawa Forest (approx. 12,000 ha). Sites are managed in accordance with three-year management plans prepared by GWRC in collaboration with landowners, iwi and other stakeholders.

Three of the field trips will view sites that are part of the KNE programme: Kapiti Coast (Waitohu Coast, Paekākāriki Escarpment, Waikanae River Complex), Kia Uta Ki Tai – From Mountains To Sea (Belmont – Dry Creek, Kaitoke Regional Park), Wild South Coast and Miramar Peninsula (Wellington South Coast).

Predator Free Wellington

James Willcocks Predator Free Wellington Project Director Wellington City Council James.willcocks@wcc.govt.nz

James has built his career in conservation, starting as a Department of Conservation ranger. He was most recently DOC's National Volunteering Manager, leading the department's strategic approach for working with volunteers and conservation community groups. When James first heard about Predator Free Wellington he knew he had to be part of the action. "It is not just about conservation and the environment, I think a Predator Free Wellington will have positive cultural, social and economic outcomes as well." James believes people will be the key to the success of the project. "So much great work is already going on to rid Wellington of predators, so we are not starting from scratch. This is about harnessing the energy already in play and providing opportunities for others to get on board. I believe Wellingtonians will be up for the challenge to create a world first predator free capital."

Predator Free Wellington was launched in September 2016, since then there has been a huge volume of work and collaboration. This is a joint project with NEXT foundation, Wellington City Council and Greater Wellington Regional Council. A Technical Advisory Group (TAG) has been formed, including representatives of Wellington City Council, Greater Wellington Regional Council, NEXT Foundation, Zero Invasive Predators (ZIP), Department of Conservation (DOC), ZEALANDIA and Goodnature. The TAG group is looking at the best tools and monitoring systems to rid Miramar Peninsula of rats and stoats. Miramar Peninsula was chosen as the first area to attempt rat and stoat eradication as it is a peninsula (it's easier to stop pest re-invasion) and possums were eradicated from the area in 2006. Involving the community is an important part of the pilot, which will provide the learning to then roll out into the rest of the city. Other activities that will be outlined include a wide scale chewcard monitor of the Miramar peninsula, a public survey and the establishment of many predator free communities.

Predator Free NZ, every landowner the social norm

Kelvin Hastie from Crofton Downs Predator Free Community kelvinenhalo@gmail.com

Wellingtonian Environmentalist of the year 2017
Creator of Crofton Downs Predator Free Community
Instigator of Predator Free Wellington
NEXT Predator Free Community Champion
On the Technical Advisory Group for Predator Free Wellington

When Kelvin Hastie saw a Weasel outside his house in mid-2014 he knew there was a problem. Not in the bush or beyond but in a central Wellington suburb. And so it was Crofton Downs Predator Free Community was formed. From there Predator Free Wellington was created and now 24 suburbs in Wellington have adopted the Crofton Downs predator Free programme

A partnership between the NEXT Foundation, Wellington City Counil and Greater Wellington has been created to support these commnuities in their quest. As we move towards a Predator Free New Zealand community will have the biggest role to play, or will it?

The Halo and Zealandia

Illona Keenan, Wellington City Council

Illona is the Biosecurity Technical Advisor, Urban Ecology Team, Wellington City Council. Illona manages the pest plant and animal contracts in Wellington City Council's parks and reserves.

You have been woken up at 4am by the raucous chatter of kaka, cycled to work serenaded by tieke, and dive bombed by karearea all in one morning. This is the urban dream becoming reality for many Wellington residents. We like to "walk with a purpose" and trap predators in our local reserves, and university students are undertaking urban ecology research throughout the city. There is the "mothership", Zealandia, the world's first fully-fenced urban ecosanctuary,

with an extraordinary 500-year vision to restore a Wellington valley's forest and freshwater ecosystems as closely as possible to their pre-human state. The 225 hectare ecosanctuary is a groundbreaking conservation project that has reintroduced 18 species of native wildlife back into the area, 6 of which were previously absent from mainland New Zealand for over 100 years. Since 1995 widespread possum control and Zealandia have contributed to all of Wellington's incredible urban nature and this presentation aims to share what has been happening, to initiate discussion and national collaboration.

They've come…Do we still need to build it? Community pest animal control in Wellington City Council reserves

Bernard Smith Biosecurity Liaison Officer Wellington City Council Bernard.Smith@wcc.govt.nz

Bernard is the Biosecurity Liaison Officer, Urban Ecology Team, Wellington City Council. Bernard looks after community pest animal groups across the Council's reserves.

Within the last few years there has been an exponential growth and interest in pest animal control within Wellington City Council reserves. With limited resources, the management of motivation and demand is challenging. This presentation outlines suggestions to offer ongoing support to interested parties as well as tricks and tips to mobilise scarce resources. This includes spatial modelling, facilitating workshops, and providing tools to get the job done.

Day 3 Friday 11 August 2017

MARINE

Paving the pathway (marine biosecurity)

Sophia Clark Northland Regional Council sophiac@nrc.govt.nz

Sophia is the science and planning specialist for the Northland Regional Council and has been working on the new regional pest management plan for Northland, including the new marine pathway plan.

Northland Regional Council has been developing a marine pathway plan for managing spread and establishment of new and existing marine pests. This talk will examine a marine pathway approach as part of a three tiered system for managing marine pest spread and provide insight into how to develop a robust cost-benefit analysis, getting the message across and determining who pays for marine biosecurity.

Mediterranean fanworm – working collaboratively to manage an established marine pest

Kathy Walls Ministry for Primary Industries Katherine.walls@mpi.govt.nz

Kathy is a senior adviser at MPI. She has focused on responding to incursions of invasive species throughout her career with MPI, with many responses involving marine pests.

Mediterranean fanworm (Sabella spallanzanii) is both an Unwanted Organism and a Notifiable Organism under the Biosecurity Act, 1993. Outside of its native habitat in Europe, this species of fanworm forms dense, filter-feeding colonies over a range of marine habitats, both manmade and natural. It poses risks to New Zealand's native biodiversity and our aquaculture industry. The fanworm was first detected in 2008 in Lyttelton, then in Auckland in 2009. Since 2012, it has been found in seven other regions. MPI has been working collaboratively with the affected councils to eliminate local populations, where possible, in an effort to slow its spread around New Zealand. During this time Mediterranean fanworm has become the call to action for building marine capability across the country. This presentation will cover the current state of fanworm elimination programs, an overview of the capability development that has been gained and the next steps for managing this marine pest.

Marine biosecurity in Fiordland, a joint-agency approach

Shaun Cunningham Environment Southland
shaun.cunningham@es.govt.nz

Shaun is a Biosecurity Officer at Environment Southland focused on marine biosecurity programmes in Southland and Fiordland.

A number of non-native marine species incursions have occurred throughout New Zealand requiring intensive resources to mitigate and eradicate. Fiordland is no exception, and back in 2010, the invasive seaweed *Undaria pinnatifida* was detected in the isolated Sunday Cove in Breaksea Sound. The establishment of *U. pinnatifida* initiated a joint agency eradication response to the incursion involving Environment Southland, Ministry for Primary Industries, Department of Conservation and the Fiordland Marine Guardians. The eradication of *U. pinnatifida* from Fiordland is looking promising, however, the program is still ongoing today. This instance of *U. pinnatifida* is not the only threat, the ecological state and quality of the Fiordland Marine Area is constantly at risk to marine pests introduced via human-mediated pathways. Although the incursion was unwanted, the response formed an effective working relationship among the agencies towards marine biosecurity management in Fiordland. A few years after the *U.*

pinnatifida incursion, to help prevent pest establishment, the government implemented its marine biosecurity pathway policy by introducing Pathway Management Plans as an amendment to the Biosecurity Act 1993. Rather than solely concentrating resources on responding to incursions and established invasive organisms, the pathways approach provides an opportunity to focus greater efforts proactively on the vectors pests may take to reach a new destination such as vessels and fishing/recreational gear. Because Fiordland is such a difficult and costly area to survey and respond, the agencies and Guardians decided effective pathways focused management is of the upmost importance and will be a great tool to manage Fiordland's unique marine environment. This year the agencies, Guardians and Ngāi Tahu implemented the countries first Regional Pathway Management Plan. Here, the joint-agency marine biosecurity programs, and the approach to Fiordland's marine biosecurity issues and management will be discussed.

LANDSCAPE

Creating a healthier Hunua

Jonathan Miles, Auckland Council

Kei roto ngaa ringa ote ira taangata te kaitiakitanga me te maaramatanga hei oranga mo Te Waonui o Taane Mahuta. "It is in our hands, the guardianship and the enlightenment to sustain and look after the vast realms of Tane."

The Auckland Plan is positioned as a watershed opportunity for Auckland Council to better recognise and deliver on Māori aspirations and values. The Plan acknowledges a Māori identity that is Auckland's point of difference in the world, and to achieve this, the plan requires that "the mana of Tāmaki Makaurau iwi and hapū is enabled and recognised in their customary kaitiaki role".

Through working in partnership with Mana Whenua on Project Hunua; the aerial application of 1080 in Hunua Ranges Regional Park and DOC estate; opportunities have arisen to realise this vision and act on the priorities, particularly in the area of providing capacity and capability-building roles for and with Mana Whenua kaitiaki.

The inaugural Kaitiaki Rangers initiative responded to opportunities that arose within council's partnership with Ngāti Paoa, Ngāti Whanaunga, Ngāti Tamaoho Ngati Te Ata, Te Akitai, Ngati Maru for Project Hunua and DOC. This presentation provides context of this partnership; detail's the Kaitiaki Rangers initiative, and highlights other programmes where Auckland Council is working in a partnership approach with iwi in Tāmaki Makaurau.

Towards a pest free Auckland

Brett Butland1 1 Biosecurity, Infrastructure and Environmental Services, Auckland Council Brett.Butland@aucklandcouncil.govt.nz

Auckland's natural environment is central to the health and wellbeing of the region's people, cultural and spiritual identity and economic success. Auckland is one of the weediest cities in the world and continuing biodiversity loss is an ongoing challenge for Auckland. Less than 30% of Auckland's original native vegetation cover remains and our remnant terrestrial, marine and freshwater ecosystems are all at threat from habitat loss, invasive pest species and contaminants.

Auckland Council is facilitating an initiative to accelerate regional scale action by communities, mana whenua and landowners to protect and restore Auckland's wildlife. The initiative will be a programme of action to eradicate introduced pest plants, animals and pathogens and restore the region's native ecosystems.

The programme will comprise three key concurrent components:

- Eradicating pests and restoring ecosystems by focusing on islands, peninsulas, open sanctuaries and corridors.
- Education and community empowerment to encourage community, landowner and householder action and behaviour change to control pests, create natural habitats and prevent environmental degradation.
- Monitoring and communication applications to capture, monitor and report the pest control activities to show success and population trends, based on key indicators e.g. bellbirds in backyards.

Facilitated by Auckland Council, partnerships with Department of Conservation, mana whenua, community groups, landowners, schools, and the private and philanthropic sectors is critical to success. A process of continual review will be adopted so that lessons learned can be used to inform both how we design and implement the next projects.

Restoring Taranaki – creating a new normal

Leigh Honnor, Regional Biodiversity Co-ordinator Wild for Taranaki

‘Wild for Taranaki’ is on a mission, to create a new normal in Taranaki. Backyards, schools, parks, reserves, waterways and our coastline will be transformed. Native species will thrive in the absence of pests, water quality will be improving and we will have a healthier more connected community.

Wild for Taranaki’s 36 member groups and organisations are working to protect our biodiversity. One of our Strategic Plan directives includes developing a collaborative, high value, flagship regional project to protect a range of ecosystems by undertaking pest control on a landscape scale. Building on existing work Restoring Taranaki aims to stimulate local people and communities to take action. This ambitious programme will begin in mid-2017.

Restoring Taranaki will see existing projects thrive and grow. Under a new initiative members will work with iwi, landowners and the corporate sector to transform their land into ‘a little piece of paradise’ where biodiversity is valued, protected and flourishing with our community as its defender. It is an inter-generational project. Over time the mosaic of healthy areas will connect until the whole region is restored establishing a new normal.

The involvement of the Taranaki community is crucial to achieve success and sustainability. Restoring Taranaki hopes to achieve significant social change. The programme will begin in New Plymouth District as it is the most populated part of our region so could achieve the greatest level of engagement by our community

This presentation will outline the framework of Restoring Taranaki discussing the three inter-woven plans which focus on; community engagement; operational rollout; and fundraising. Restoring Taranaki will integrate with Project Taranaki Mounga to transform the second best region in the world, contributing to the national goal of a Predator-free New Zealand by 2050.

COMMUNITY

Pest Detective: the clues and the culprits

Shona McCahon Pest Detective Project Manager National Pest Control Agencies shonam1957@gmail.com

Shona McCahon was project manager who co-ordinated the development of the Pest Detective website for the National Pest Control Agencies (NPCA) and has a continuing role in tis maintenance. She is a self-employed writer, editor and oral historian whose work often relates to conservation and resource management and assisted NPCA with its publications and special projects for a number of years.

Essential to pest animal management is the ability to recognise the presence of pest animals in the environment and to identify the species. Yet, information on pest animal field sign in New Zealand was scattered and incomplete. The need for a comprehensive illustrated field guide was identified.

The National Pest Control Agencies (NPCA) undertook, on behalf of various agencies and interest groups who saw the need, to develop such a guide in terms of vertebrate pests and, in November 2014, launched www.pest.detective. Described as ‘a new online tool designed to help people in New Zealand identify the presence of pest animals’, the Pest Detective website was aimed at a broad audience of pest control practitioners, landowners, community conservation volunteers, students and members of the public.

This presentation will cover the origins of the project and why it developed the way it did; the challenges encountered in its pre- and post-launch development; judgements made about the amount and quality of information; and what the usage statistics and feedback reveal about the extent that the main users correspond to the target audiences. The way in which the project team resolved the technical issues that arose in designing a purpose-built website will be discussed as well as the extent to which users have responded to invitations to engage and contribute to the project.

Two-and-a-half years on, the Pest Detective website has been deemed a success and a valuable resource in New Zealand’s pest management toolbox. Nevertheless, there are still gaps in its content and potential to improve its value in the field.

A pest, a lake and a community – balancing operational realities against stakeholder and community expectation Brown bullhead catfish incursion response in Lake Rotoiti.

Shane Grayling, Bay of Plenty Regional Council shane.grayling@boprc.govt.nz

Shane has worked for the biosecurity team at BOPRC for 4.5 years, currently Team Leader managing staff responsible for the terrestrial biosecurity programme. One of Shane's few operational responsibilities is managing the brown bullhead catfish incursion response. Shane previously worked as a freshwater fish technician for NIWA for six years so has a background in freshwater fish.

What happens when an insidious pest that threatens ecological, recreational and cultural values invades an iconic environment? What happens when you couple this with an extremely engaged community that expects success regardless of the operational limitations you face? You get a complex and high stakes incursion response involving multiple stakeholders.

In March 2016 the first incursion of Brown bullhead catfish was discovered in the Bay of Plenty region, in Lake Rotoiti near Rotorua. The ensuing incursion response discovered the population was well established but confined to a small area. While the incursion response used best practice techniques, from the beginning it was decided in order to be successful innovation and science was required. Expectation amongst the community was high. They expected us to be proactive and they expected us to be successful, eradication was the only option. This led to the development of a complex programme reliant on science to provide innovation.

In this talk I will discuss the operational issues faced, the pressure that comes with an expectant community, managing stakeholder needs and concerns and the innovative programme we have developed to give us an opportunity to be successful.

Biosecurity awareness of ferry passengers travelling to selected islands in the Hauraki Gulf.

Chelsee Neverman*1, Jacqui Lardner*1, Brian Shields2, Nick Waipara2, Nigel Adams1, Diane Fraser1 (Chelsee & Jacqui to give oral presentation) Environment and Animal Science Practice Pathway, Unitec Institute of Technology, Private Bag 92025, Auckland, New Zealand. Biosecurity, Environmental Services Unit, Auckland Council, Private Bag 92300, Auckland, 1142, New Zealand Corresponding author: dfraser@unitec.ac.nz

Chelsee Neverman and Jacqui Lardner are currently in their final year of study of a Bachelor of Applied Science, majoring in Biodiversity Management and Animal Management and Welfare respectively, in the Environmental and Animal Sciences Practice Pathways at Unitec, Auckland. Chelsee and Jacqui have been selected for a summer studentship with the Treasure Islands programme through Auckland Council Biosecurity (Dr. Nick Waipara and Brian Shields), who funded the project. The results of this study will be submitted as a research project in part-fulfilment of the requirements of their degrees. Chelsee and Jacqui are supervised at Unitec by Senior Lecturer Dr. Diane Fraser and supported by Assoc. Prof. Nigel Adams.

The Hauraki Gulf Marine Park (HGMP) contains 30 major island groups. These provide refuges for some of New Zealand's endemic and endangered wildlife. The Treasure Island campaign is an advocacy programme aimed at making the public aware of the conservation value of the islands of the Hauraki Gulf and to minimise the risk of human mediated introductions of potentially damaging pests. Ferry passengers are potentially a high risk for the transport of unwanted organisms, including Argentine ants, Linepithema Humile, plague skinks, Lampropholis delicate, and kauri, Agathis australis, dieback disease within the Hauraki Gulf. Due to the increased use of the HGMP, the risk to these protected islands is of increasing concern. A survey was used to assess the level of awareness; pest-free status and biosecurity awareness, of passengers before boarding the ferries to selected island destinations. This specifically aimed to target passengers before being exposed to the biosecurity messages provided on the wharves and ferries. A comparison of passenger responses will potentially highlight gaps in passenger biosecurity knowledge and, as such, contribute to Auckland Council's biosecurity management plan for the ongoing protection of the islands of the HGMP, particularly with the refinement of education/advocacy initiatives to minimise the risk of incursions to these unique islands.

From Little Things, Big Things Grow - Kimbolton School's restoration and monitoring project

Heidi Morton, Remy Early, Hunter Jensen, Grace Haack, Le-Arna MacDonald, Ryan Rooney, Olivia Clifton. Bonnie Jacques - Kimbolton School Weedbusters, Kimbolton School.
heidi@kimbolton.school.nz

Heidi is the Enrichment/Enviroschools Teacher and Educator at Kimbolton School and the seven students accompanying her are intermediate aged children who have been working in this group for 3-4 years.

Kimbolton School from the Manawatu are active Weedbusters in their local native reserve. To add value to our Weedbusting we have been working on a long term project studying and analysing the measureable changes in native plants when weeds are removed from their growing space. Our five year project is in its fourth year.

With the support of Horizons Regional Council staff, we have used the Formak Monitoring System as a guideline for our project. In August 2013 a group of intermediate-aged students, council staff and myself built eight plots, four on each transect line, and recorded significant data including GPS location, drainage, land form, canopy type and forest type. The students began the project with only the knowledge that weeds grew faster than native plants, so therefore our hypothesis was that the removal of weeds would speed up the growth of the native plants over the five years that we planned to record data in. We randomly selected two plots on each transect to collect data from. The two remaining plots would be used as control plots.

A recording sheet was devised to suit our needs and students recorded data including plant identification, plant frequency, plant height, weed identification, weed frequency and other miscellaneous data like the presence of fungi, bird evidence, leaf litter and moss species. Photos were taken and sketches were drawn to use later when comparing change. The weeds were then carefully removed from each of the four plots that were to be monitored. Resources used included metre rulers, a camera, reference books for plant identification, clipboards and weeding sacks. Approximately every four months the students visit the forest to collect another set of data. This data is discussed on site by the students and then the recordings are typed and glued into a scrapbook. The collection includes weed percentage cover, time taken to weed the plot, number of people weeding the plot, plant names, plant quantity and average size. Weeds present within the plots are also recorded. Photos and samples are taken back to school to assist in plant identification and other points of interest are also noted and photographed. These include learning concepts such as pests and weather influences.

Our main observations so far include the reduction of time taken to weed the plots, a larger variety of native seedlings are appearing in each plot, the sub-canopy plants eg. hen and chicken fern and *Coprosma grandifolia*, are growing faster than the canopy trees eg. Tawa and Kahikatea, and there is an improvement in plant health which is identified by the lush green appearance of the plants and the absence of disease and pests.

We plan to continue to collect data from our plots every four months until August 2018. At that point we will compare the control plots with the monitored plots and present our learning and findings to Horizons Regional Council.