

Summer — 2002-03

Protect



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Protect

Summer 2002-03

Magazine of the New Zealand Biosecurity Institute

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Editor's Note

Another issue of *Protect* is out and contains quality material from many sources. Thanks to all who have contributed.

This *Protect* contains the usual news from the executive which incorporates the New Zealand Biosecurity Institute's goals for the next year in the annual plan.

A workshop on aquatic biosecurity issues held by the Northland/Auckland Branch is reviewed in branch news, while the Central North Island Branch reports back on a proposal to establish a plant pest identification course.

The Department of Conservation's new National Weeds Public Awareness Co-ordinator, Amber Bill, is featured in this issue's Member Profile. An article by Amber calling for an united front against plant pests follows.

The high quality of the biosecurity work being carried out in New Zealand was affirmed when Ian Popay and Susan Timmins and four other DOC "weedos" attended a weeds conference in Perth.

One of the major pieces in this issue is Chrys Horn and Margaret Kilvingtons' article on Māori and 1080 which outlines ways of carrying out meaningful consultation to ensure that the reasons for any poisoning campaigns are well understood before they get under way.

A trial on the efficacy of a variety of methods to control snakefeather is reported on in the Practical Tips section of this issue, and MAF asks that everyone be on the look out for poxvirus that could potentially damage our parrot populations both introduced and endemic if it got a hold.

An article by Otago University lecturer Mike Hilton on a study of invasive weeds on the south coast of Australia and around Tasmania outlines some of the problems being faced over the Tasman and outlines some possible scenarios if the same species arrives here.

And to finish on a lighter note, a poem penned by Ian Popay concludes this edition.

To those submitting pictures and diagrams for use in *Protect*: If possible, please send any pictures as stand-alone files, preferably .tif, .jpg. or pdf format. Pictures and diagrams embedded in Word documents are difficult to extract and seldom produce a good final result. It is best to send them about the size of a postcard print or a size that makes the picture, diagram, or graph easy to see and use. Material scanned to 200dpi is useable in most situations.

Thanks to all those who have contributed to *Protect*, such an abundance of high quality material makes for a vital and relevant magazine — thanks to you all.

Col Pearson
Editor

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News from the executive

NETS2003

Make a note in your new diary not to miss "Biosecurity at the Centre of New Zealand" (aka NETS2003) which is going to be held at The Rutherford Hotel, Nelson, from July 9 to 11, and the opportunity to visit the fabulous Abel Tasman National Park immediately afterwards.

This year NETS is likely to be even bigger and better than ever before! In response to feedback from NETS2002 that some members

would like more emphasis on vertebrate pests, we have asked the Vertebrate Pest Management Institute of New Zealand to come on board and help make this possible. I think it is about 10 years since the two groups, in their previous manifestations, held a joint conference, so this is a really positive step towards presenting a united front against pests. In order to cater for all our members' needs it is likely that we will need to organise some concurrent as well as plenary sessions. The organising committee also hopes to be able to offer several field trips such as a trip to the port of Nelson, a visit to the mainland island project at St Arnaud, a weed tour, and a winery tour.

One of the focuses of this year's conference will be on promoting greater industry involvement and finding out what biosecurity means to the likes of grape growers, forestry companies, orchardists, fishermen etc. We also want to focus on people working at the biosecurity coal face and hear their stories. So please don't be backward in coming forward if you have something to say! If you would like to offer to give a paper, or have a suggestion for a topic that you would like to know more about, please contact Mike Taylor (michael@cawthron.org.nz).

NETS2004

After further investigation the executive has decided to shelve the idea of holding a joint conference with the Australian Weeds Society at Wagga Wagga in 2004. Unfortunately the organising committee on the other side of the Tasman was not that thrilled about expanding what is already a very large conference. They did suggest we could have a day at the end to organise our own thing but the prospect of doing so from afar was not very appealing. The cost was also a major deciding factor. Registration for the Australian Weeds Society

Conference was likely to be two to three times what we currently pay for NETS and then our day would have been extra on top. So after due consideration we feel that members would get more value out of a conference here and that we should continue to promote better linkages by ensuring that overseas visitors regularly attend our conference. It is likely that NETS2004 will now be held in the Bay of Plenty Region.

Travel/Study Awards

Shortly after the close of the extended deadline we were able to inform two people that they had successfully gained awards from us. We are giving Chris Buddenhagen, formerly with the Department of Conservation now at the Charles Darwin Research Station in the Galapagos, a travel award to allow him to attend NETS2003. Chris will tell us about his work dealing with invasive plants in the Galapagos National Park (which incidentally covers 96% of the land area available in the 17 islands that comprise this group). Introduced plants now make up half of the flora and some are beginning to cause serious problems. A number of vertebrate pests, introduced by whalers, are also causing a headache.

While on the topic of vertebrate pests, we are giving Timothy McKenzie, a Masters student at the University of Canterbury, a study award to assist with a project he is undertaking on resource use by red deer and chamois. Attitudes towards introduced herbivores, such as these, range widely among different sectors of society and control programmes can be extremely controversial. Therefore it is extremely important to have good evidence to show why control programmes are necessary. As well as the resource use study, Tim is also evaluating wild animal management in New Zealand since goats were released by Captain Cook in 1773. We plan to get Tim along to speak at a future NETS once he has completed this work.

There is likely to be another call for nominations for the next round of these awards towards the end of 2003.



New Members

We would like to warmly welcome the following new members:

Amber Bill – DOC, Christchurch

Helen Harman – Landcare Research, Auckland

Dr Hamish Maule – School of Biological Sciences, Bristol, UK

Olga van den Bosch-Lotze – Huntly

News from the executive Continued

Posters

The publicity sub committee is working on some posters to publicise the existence of the NZBI and what we do. We hope to be able to complete a design, print it and distribute copies to members during the first half of 2003.

Biosecurity Strategy

Well, the much-awaited draft biosecurity strategy finally came out just before Christmas. If you haven't been sent a copy then you can download one from www.biostrategy.govt.nz. Note that the closing date for submissions is February 28. Our policy and strategy subcommittee (Paul Champion, Ian Popay, Andrew Wilke, and Mike White) will be formulating a response on behalf of the NZBI so if you have any concerns

about anything being proposed in the draft strategy please contact one of these people.

Subs

A reminder that subs are now again due for the 2003 year. If you pay before March 31 it will cost you \$30. After this time the price goes up and it will cost you \$40. We have introduced this new payment scheme in an effort to encourage people to pay more promptly. If you have a good reason why you are unable to pay before March 31, contact the treasurer, Ken Massey, and ask for a special dispensation. If you joined in the second half of last year and paid a sub at the time you won't be asked to pay again until 2004.

Annual Plans

We have set ourselves some new plans to aspire to in 2003, which build on the previous set of plans which we successfully managed to achieve (there will be a full report on this at our next AGM). The new plans are:

1. **Seek to increase our membership by signing up at least 20 new members, especially from groups that are poorly represented at present (e.g. MAF, health, people involved with vertebrate and invertebrate pests, industry representatives etc).**

We will encourage all branches to invite prospective members to attend branch activities and NETS (non-members attending NETS will pay a higher registration fee that will automatically sign them up for the following 18 months). We intend to attract more members by raising our profile (see 2, 3 & 8 below). We intend to continue to grow and diversify in subsequent years in a sustainable way.

2. **Seek to raise awareness of the NZBI and biosecurity issues.**

We will print some promotional posters and make at least two press releases. We will investigate ways of enhancing media coverage of NETS. We will write to DOC's National Weeds Public Awareness Co-ordinator with an offer of technical assistance and support for Weedbuster Week in 2003.

3. **Seek to ensure that the NZBI becomes more involved in matters of policy, strategy and advocacy.**

We will comment on any matters or documents where it is appropriate for us to do so.

4. **Seek to make it easier for our members to access the knowledge and information they require to do their jobs effectively.**

We will seek to improve the amount of information available on our skills register. We will endeavour to more effectively interact and network with other like-minded organisations both here and overseas.

5. **Seek to improve biosecurity in New Zealand by offering a scholarship to allow one member to travel to learn new skills and another scholarship to assist a student to undertake some relevant research.**

We will assess the success and viability of these awards and decide what should be offered in 2003/04.

6. **Seek to improve biosecurity in New Zealand by holding a National Education and Training Seminar (NETS) in July.**

The organising committee and executive will consult widely about the topics and activities to be covered at NETS and prepare a questionnaire that will go in the registration packs to allow participants to provide feedback about NETS and any other matters relating to the NZBI. We will use this feedback to help us to continue run at least

News from the executive Continued

one highly successful NETS per year. We will explore the possibility of running joint conferences with other like-minded organisations.

7. Seek to improve biosecurity in New Zealand by producing quarterly issues of *Protect*.

We will make every effort to cover a broad spectrum of topics, as well as information about members, branch and nationwide activities. We will assess the size, style and frequency of *Protect* now that it is being posted on our website.

8. Seek to improve biosecurity in New Zealand by developing and maintaining a website.

We will continue to maintain and improve our website. We will again hold a forum at NETS to discuss our website. We will seek to be included as a hot link on more other relevant websites.

9. Seek to ensure that the NZBI continues to be an active organisation that gets things done and makes a difference.

The executive will meet on at least a quarterly basis and annual and strategic planning will be undertaken every year. Reports on progress and achievement will be provided in *Protect* and at the AGM.

Bye for now
Lynley 

News from the branches

Northland/Auckland Branch

On October 23, the Northland/Auckland Branch of the NZBI held a very informative meeting, hosted by Northland Regional Council, at NIWA's Research Centre in Ruakaka.

The day started with the branch meeting, then a couple of interesting seminars, followed by a delicious lunch and a tour of NIWA's newly opened fish farm facility.

In the first talk, Paul Champion from NIWA, outlined the results of a recent survey of the aquatic vegetation present in 33 Northland lakes. Of the 65 aquatic plant species found, 47 were native. Five endangered native aquatic plants were found — *Utricularia protrusa*, *Thelypteris confluens*, *Hydatella inconspicua*, *Myriophyllum robustum*, and *Isolepis fluitans*. *Fimbristylis velata* and *Isoetes kirkii* are restricted to small localities. The most commonly encountered native aquatic plants were *Chara corallina*, *C. fibrosa*, *Nitella hookeri/cristata*, *Potamogeton cheesemanii*, *P. ochreatus*, *Lilaeopsis novae-zelandiae*, *Glossostigma* spp., *Eleocharis sphacelata*, *Baumea articulata*, and *B. arthrophylla*.

Since the last survey of Northland lakes undertaken in 1985, the condition of the lakes has deteriorated. In the recent survey, 19 lakes were dominated by native species, six lakes were dominated by exotic species, two lakes had a mixture of exotic and native species and six were completely de-vegetated.

Important alien species found were — *Egeria densa*, *Ceratophyllum demersum*, *Lagarosiphon major*, *Elodea canadensis*, *Potamogeton crispus*, *Utricularia gibba*, *Callitriche stagnalis*, *Alternanthera philoxeroides*, and *Zizania latifolia*.

The recent survey provides a good mechanism for choosing priority lakes for conservation. It is not too late to save some of the Northland lakes that are currently in good condition. This will require management of both the land around the lakes and the people who use

them.

Then Bryn Gradwell from NZ Biosecure, gave us an overview of the eradication programme for the Salt marsh mosquito in the Kaipara. The Southern salt marsh mosquito is an unwanted import from Australia that can carry a number of human diseases. The mosquito was successfully eradicated from an area of 650 ha in Napier in 2002. It was found in Helensville

in February 2001, with the potential to spread to an area of 2700 ha. A survey of possible habitat in the Kaipara has delimited a control area of 300ha. This corresponds to 38 different properties.

To proceed with the eradication programme in the Kaipara, a lengthy process of public consultation was necessary to gain resource consent. This process has resulted in much community support for the eradication project. Sites will be sprayed with sand or granule-based formulations of s-methoprene for two summers and monitoring will continue for a further two years.

After a huge Northland lunch, it was off to tour the fish farm, which makes use of some of the facilities previously used for an old power station on the site. Brendan Gara from NIWA, showed us around the recently built fish farm. The facility uses filtered sea water collected and exhausted using the pipes previously used by the power station.

The larger sea life grown on the farm (fish, shellfish) need large daily supplies of algae. Brendan explained how this is accomplished and then we had the chance to view colourful flasks and huge vats growing algae. Then we were shown tanks with fish, minute mussels, oysters, and tiny eels.



Alligator weed, *Alternanthera philoxeroides*, was among important alien aquatic species found in a recent survey of 33 Northland lakes reported on during a meeting of the Northland/Auckland Branch.

Photo: Auckland Regional Council

Central North Island Branch

Proposed pest plant identification course

By Paul Champion

After discussing the need for an identification course to allow pest plant officers and other interested groups to become familiar with and identify the plants on the pest plant accord, the Central North Island Branch of the Institute decided to scope out the requirements for such a course and its possible structure. At our last branch meeting two actions were initiated:

- Esther van den Bosch would receive submissions from individuals within the Institute (see appendix) and forward these to:
- David Stephens, Ian Popay and Paul Champion who would review responses and determine what the proposed course would look like.

Since that meeting I have also discussed a proposed course with Barney Stephenson (MAF), Rob Phillips (Chair of the Regional Biosecurity Managers Group) and Ewen Cameron (Auckland Museum).

The following steps were identified to construct a course that would provide PPO's and other interested parties with sufficient information to allow them to suspect that one of the species on the plant pest accord is being traded. In every case this would need confirmation by a trained botanist.

Approaches we need to take are:

- Develop and/or enhance existing living plant collections of all available species with duplicate collections in North and South Islands. These should be kept under secure conditions. Walter Stahel has volunteered to maintain the NI collection. Collection of additional material to be carried out by NZBI as and when opportunity arises.
- Develop a web page with links to as many images as possible of these species. This could be housed on the members or general part of the NZBI website.
- Include material of all life stages where possible,

especially plants at a similar stage to those likely to be sold.

- Ensure that identification information includes vegetative characteristics used to distinguish plants from similar species as most nursery material is not flowering at the time of sale. It is recognised that confident identification is impossible using sterile (non-flowering) material in some cases, and the course must highlight this.
- Provide material of similar species, where confusion in identification could occur, for comparison with plant pests.
- Provide instruction on the protocol for nursery inspections (which has been developed by various bods in Auckland, Waikato and BOP) as part of this course providing nursery inspectors with a one-stop source of information.
- Produce a booklet for all participants outlining the information provided in the course.

We propose that a botanist with good communication skills be contracted to design the course, with a maximum number of 20-25 participants per course and have suggested Ewen Cameron of the Auckland Museum as a good potential candidate. He has enormous experience with many of the species on the list (and has been instrumental in getting them included on the list), has run similar courses and is well resourced. The protocol for the nursery inspection part of the course is likely to be run by someone involved with the development of this initiative. MAF have undertaken to investigate the legal aspects of this.

I'll be meeting with Ewen in the New Year to discuss further details and we'll keep you posted regarding further developments.

Responses to plant pest identification course concept

The following are responses to the concept of a plant pest identification course received from members:

- 1) Apart from anything else, I would like to get the chance to see some of these weird and wonderful weeds myself. I know some well, but not all by

Responses to plant pest ID course continued

any means. Problem with herbarium or preserved specimens is that you don't get a feel for the general appearance, and these need to be complemented with photographs and (best of all) by live plants.

I think that's what others need as well, and perhaps a professional guide to what the key features are, both in vegetative and flowering stages. Another useful thing would be to know how to differentiate them from similar or related species. Nothing beats looking at and poking the specimens themselves, but a professional guide helps, as does written material as reminders of the important identification steps.

Out of general interest, I don't know what sort of training Regional Council biosecurity officers get in dealing with people, and wonder whether people-handling skills aren't as important as the other bits!

2) Hi Ester,

Ideas for training on the NPPA:

*Good diagnostic/distinctive features are always a big help!

*Link to a website with pictures &/or pictures with info to take away for reference.

3) Hello Esther,

A training course would need to include how to identify the pest plants identified in the accord and how to recognise closely related plants to those identified in the accord along with a protocol on how to enforce the accord where pest plants are found and the following procedures.

A national database which records the details of suppliers that have been found propagating, distributing or selling pest plants in the accord and what the pest plants actually where may be useful to councils also. As many of the nurseries and garden centres are sourcing their plants from national suppliers, this would allow councils to identify which of the suppliers are offending repeatedly.

4) Dear Esther

I recently received an email from Paul Champion (NIWA) suggesting a training programme for Pest Plant Officers covering the ID etc., of species listed in the Pest Plant Accord. Paul requested that any suggestions for such training are forwarded to you.

On behalf of officers employed by the Wellington Regional Council I make the following comments:

1. Plant ID training is a requirement for most officers. However to remember a large number of species viewed at some training session is not practical for most people. Good quality photos or other ID material would also need to be supplied for future reference.

2. Only those species most likely to be propagated or sold should be dealt with rather than the full Accord list.

3. All ID training for the key species would need to cover each at various stages of growth. At retail level, plants are generally sold as seedlings or juveniles and we need to be able to recognise species at these stages.

4. Part of any programme could also train officers in ways to recognise garden plants that are developing into problematic species and should be considered as additions to the Accord.

I hope these suggestions are useful. Certainly WRC officers would be interested in any practical training programme on Accord species or other issues involving the subject.

5) Hi Dave/ Paul,

Training to ID most of Nat Accord plants is a must to most of us, and I think that we should look at a mini training seminar of approx two days at a Hamilton venue in early February 2003 when hopefully most plants will still be at an active growing stage.

For those attending it would be appreciated if they could bring along live potted samples or even some fresh pruned samples with flowers and foliage.

Live samples are a "must" as I have found little value in viewing dried specimens at the Herbarium.

I feel sure that four of us from NRC would attend if live samples could be guaranteed, and a suitable programme put in place.

I would be happy to assist with some of the co-ordination of this if required.

Look forward to hearing more planning results.

6) Hi Ken,

The problem is going to be getting those persons who are familiar with some of the rearer species to come forward with live plant material. But of course we all know at least 75% of the species on the list, the problem is the 75% of species, varies from person to person. Possibly the best way to approach this is to distribute two tables and tick those we want to know more about and those species we can offer live plant material if required. I can assist with the table if required and look forward to seeing the other 25% in the flesh (chlorophyll).

7) Hi Esther,

We got this email from Ken Massey, we think that his suggestions are excellent, and agree with the comments about needing real plant samples rather than dried specimens. We are not interested in anything too

Responses to plant pest ID course

continued

technical re classification of plants etc, we just want to be able to accurately identify plants on the NPPA.

8) Esther,

I understand you are co-ordinating this.

One of us from DOC Canterbury might be interested.

I understand Christchurch City Council may be interested as well.

I was talking to one of the Environment Canterbury staff who did not seem to have got the emails, we thought it might be good to have a South Island session to save on travel costs. Would it be possible to get some of the live material used couriered down here? Is this a possibility? What do you think? If it is a goer, I will see if I can persuade someone to volunteer to organise it — it is probably better for one of the regional council people to do this as it is a bit outside my role.

Member Profile: Amber Bill

Where does a BSc in ecology and a BA in psychology lead you? Weeds Public Awareness of course!

I got passionate about weeds (or about the trouble they cause) through my love of ecology.

Weeds kept coming up as a main threat throughout my research on forest remnants in Southland as part of my postgraduate Diploma of Science in ecology at Otago University, and again when identifying sites of natural significance for Invercargill City Council, and yet again while I was working with the Ecological Consultants – Wildland Consultants.

Finally, I decided to take weeds head on, in a strategic sense, and have worked for DOC on weed-related contracts for the last four years. This has included work on weed management plans, standard operating procedures, and weeds public awareness.

My weeds public awareness work includes co-ordinating a campaign called “Stop the Spread”, a campaign fronted by Tim Shadbolt and targeted at Southlanders. The aim of the campaign was to raise awareness and understanding about weeds, and it

certainly managed to raise awareness. I can say this conclusively because I also researched the effectiveness of the campaign as part of my PhD research (now officially on the backburner...) into effective environmental campaigns.

Although getting back to the PhD is an option for the future, for now I am thrilled to be in the thick of the action. I look forward to working with you all.



Amber Bill: Keen to raise public awareness about weeds.

Amber Bill

National Weeds Public Awareness Co-ordinator
Department of Conservation

Working together for effective public awareness of weeds

By Amber Bill

National Weeds Public Awareness Co-ordinator
Department of Conservation
Canterbury Conservancy

The cry; "we've got to work together!" is echoing throughout the land of weed awareness. Now, with the Department of Conservation's (DOC) appointment of a National Weeds Public Awareness Co-ordinator, the potential for working across lines has never looked better.

As National Weeds Public Awareness Co-ordinator (can anyone think of a shorter title, please!), I have two main tasks: One is to provide national level weeds public awareness support for the Department of Conservation; and the other is to be the national co-ordinator for a weed public awareness campaign in 2003/04. Because weeds are managed by several agencies, it follows that we should work together in weeds public awareness and present a united front to the public.

DOC recently asked what people thought were the biggest threats to the New Zealand environment (including rivers and lakes, forests, high country, coastal areas and the marine environment). Weeds/pest plants were listed as second only to pollution (including littering, discharges from industry, and run-off), and coming in above possums. New Zealanders are certainly beginning to acknowledge that a problem exists. The next step is to encourage individual ownership of the problem (as promoted by the Protect NZ campaign) and to provide the capacity for people to deal with it.

Gardeners and the gardening industry are arguably the group of people who have had, and continue to have, the greatest impact on New Zealand's biodiversity. Here, 75% of our terrestrial invasive weeds have been introduced as ornamental plants. The Pest Plant Accord List is a great step forward, but garden escapes and garden dumping can not be solved by legislation alone.

There are strong parallels with the situation in Australia, where from 1971 to 1995, 65% of new weeds



Surrounded and Gunnera-ing for weeds, DOC's National Weeds Public Awareness Co-ordinator, Amber Bill: Let's work together to get people thinking beyond their own backyard, accepting responsibility for their environment, and knowing how to garden in an environmentally friendly manner.

had been deliberately introduced as garden plants. At last year's NETS conference we were privileged to hear from Sandy Lloyd (Department of Agriculture, Western Australia). Sandy talked about weed public awareness and surveillance in Australia and introduced many of us to their national Weedbuster Week.

Australia's Weedbuster Week provides a focus to raise awareness about weed control and weed issues. Weedbuster Week started in Queensland in 1994, and was such a success that three years later it became a national campaign that is still going strong (visit www.weedbusterweek.info.au).

Many people in New Zealand have been following Weedbuster Week with interest, and in 2001, Wendy Baker from Environment Bay of Plenty visited the Australians to see how it was done (refer to her story in *Protect*, Summer 2002). This trip was supported by the Queen Elizabeth II Technicians Award Trust,

Working together continued

Environment BOP, and the New Zealand Biosecurity Institute.

It was probably no coincidence then, when last year the New Zealand Biosecurity Institute expressed interest in holding a Weedbuster Week in New Zealand, and recommended that DOC was in the best position to run such a national-level campaign. This recommendation coincided with DOC's own goals of co-ordinating weeds awareness. A 'weed-aware' public and community involvement are essential for DOC's weed-led, site-led and surveillance programmes, just as they are essential for local authorities, MAF, environmental NGOs, and any other groups and agencies involved in protecting New Zealand's environment. DOC has taken up the New Zealand Biosecurity Institute's challenge and is leading this initiative with \$300,000 over the next two years.

DOC is proposing to follow the Weedbusters model, but for this to have the best possible effect all the agencies involved need to combine forces, both for the campaign itself and for all other weed awareness work. There are many ways that we can improve our skills at

"crossing the line"; from having regular 'Weeds Liaison Group' meetings with local groups managing weeds, through liaising with the nursery and gardening groups, to increasing media coverage through media releases and special features. Auckland Regional Council's new *Plant me Instead* booklet is an excellent example of co-ordinating weed awareness efforts, and included the support and involvement of the NGIA (Nursery and Garden Industry Association), LIANZ, Environment BOP, Northland Regional Council, Environment Waikato, and Protect NZ (MAF Biosecurity) (see Mike White's story in the Autumn 2002 *Protect*). This could be a great initiative to launch around the country.

Let's work together to get people thinking beyond their own backyard, accepting responsibility for their environment, and knowing how to garden in an environmentally friendly manner.

Please feel free to contact me if you have any queries, suggestions or requests. I am based at DOC, Canterbury Conservancy, Christchurch. You can email me at abill@doc.govt.nz or phone (03) 371 3720.

Six DOC weedos go wild in Western Australia

By Ian Popay & Susan Timmins
Department of Conservation

In early September, six DOC weed enthusiasts — Ian Popay, Kate McAlpine, Susan Timmins, Keith Briden, Phil Dawson, Tony McCluggage — joined 10 other Kiwis and about 500 delegates at the 13th Australian Weeds Conference in Perth, Western Australia. Although it's an Australian conference, there were delegates from Europe, the USA, South America, Africa, and Asia. It was certainly a great place to share experiences and stories of weeds from everywhere.

The conference brings together weed scientists, planners, public awareness professionals and field staff. Australia has a commendable level of public involvement in weed work from control work by 'Friends Groups' to rearing of biological control agents by school children. Plenty of ideas for us to emulate in New Zealand; time and again the papers demonstrated the need to translate scientific information into useable form for the weed practitioners out in the field. Similarly, it is important for research to be presented in such a way that the results can be used by planners and policy folk to demonstrate the impact of weeds on our natural environment, and their huge economic cost.

One of the most interesting parts of the trip was discovering the very high regard that Australians, and others, have for DOC's weed control efforts. Several Australian speakers publicly stated their admiration for the way we do things. Immediately after the conference, a group of Hawaiian visitors came across to Auckland to find out how New Zealand's biosecurity works — they don't seem to have comparable systems in place in Hawaii. At the time of the conference, DOC was about to appoint a national weed awareness co-ordinator (Amber Bill has now been appointed — see her article in this issue) so we got the chance to talk with those involved in Weedbuster activities in Australia. It was great, too, to meet some of the famous Australian experts on environmental weeds—people like Kate Blood, Sandy Lloyd, and Rod Randall.

After the conference Kate McAlpine spent two days at a workshop run by Rod Randall, one of the world's leading authorities on weed risk assessment. The workshop was attended by weedos from South Africa, France, the Galapagos, the USA, and all states of Australia, all keen to learn about Western Australia's weed risk assessment system. Rod's tools



The field trip team in Karri forest, Western Australia. From left: Philip Thomas (Hawaii), Sarah Brunel (France), John Randall (California), Kate McAlpine (NZ), Daniel Stock (Australia), Kate Blood (Australia), Rod Randall (Australia) and Susan Timmins (NZ). Ian Popay (NZ) seated in front.

and processes are so useful that Kate is intent on getting them for use in DOC here.

You've probably all heard about Western Australia's famous wild flowers, and the wild flower season was just beginning when we were there. Sadly, though, these days you need to take an expert to tell you which are the wild flowers and which are the weeds. King's Park, for example (beautiful parkland in the middle of Perth), has extensive areas of *banksia* trees and underneath them are lots of beautiful, fragrant ... freesias. They are attractive garden plants, but they originated in South Africa, and have become wild weeds in several parts of Australia.

Several of us enjoyed the weekends before and after the conference on field trips with local weed experts. For example, we travelled to Margaret River, 300km south of Perth, to experience the joys of the famous local wines, as well as, I hasten to add, the wild flowers and also weeds like coastal tea-tree, *Leptospermum laevigatum*, originally from Eastern Australia and now going wild in the west. We stopped to admire an awe-inspiring stand of native karri, *Eucalyptus diversicolor*, a magnificent hardwood, but were sad to see the first signs of invasion by arum lily,

DOC weedos in WA Continued



Arum lily, Zantedeschia aethiopica, a weed that was seen often by the six DOC weedos when they visited Western Australia.

Zantedeschia aethiopica, a weed we saw plenty of during our foray.

Previously, the Australian Weeds Conference has been held every three years, but in future it will be held every two years. New Zealand societies such as the Biosecurity Institute and the Plant Protection Society have been invited to organise their meetings in association with the next Australian conference. When it comes to making useful weed contacts and finding out what's happening in the weed world, the Australian Weeds Conference is hard to beat. Look forward to seeing more of you New Zealand weedos in Wagga Wagga in 2004.

Māori and 1080

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Aerial application of 1080 to control possum populations for the purpose of either conservation or Tuberculosis (Tb) control, continues to be hugely controversial, and meets with strong opposition from a wide range of individuals and community groups. Many Māori too oppose the use of 1080, but some iwi and hapu *have* agreed to it being used within their rohe or tribal area. We undertook a research project funded by the Foundation for Research, Science and Technology in mid-2002 to determine what communication processes had been used in cases where local iwi had agreed to the use of 1080.

Following a literature review, we used a range of qualitative methods to study the consultation processes and resulting experiences of a range of Māori communities. We held a series of interviews/discussions with individual Māori and iwi representatives, with staff of regional councils and the Department of Conservation, contractors employed by the Animal Health Board, and researchers and facilitators. We thank them all for their contributions.

Overall, arguments about 1080 within the Māori community are broadly similar to those among non-Māori, with there being no single Māori view of 1080

and each runanga seemingly having a different point of view — while some feel the use of 1080 is justified, others regard it as a threat to some aspect of their lives. For example, Māori who hunt do not like to see deer killed by baits dropped for possums. Others are upset by the potential threat to native birds and the danger to dogs when 1080 poison is used. Also at issue is the potential effect on water supplies and human health.

Some concerns of Māori embody cultural differences, so that their concern about native bird deaths may reflect a worry about the loss of cultural harvest potential. Similarly, Māori sometimes couch their objection to extensive use of poison in the environment in terms of spirituality or a set of underlying spiritual principles about the care of the earth.

Arguments about 1080

Arguments for and against 1080 use surfaced time and again in discussions with the different groups, and the following list summarises these points of debate.

Generally Māori prefer not to use poisons as a matter of principle. However, given the nature of the pest problem, issues associated with Tb, and the health

Table 1: Arguments surrounding 1080.

Arguments against 1080 use	Arguments for 1080 use
It gets into the water supply	It breaks down quickly in water
It kills deer and that interferes with hunting	It kills deer and that is a bonus
It kills native birds	It allows native bird populations to increase in the long term
It kills dogs	Dogs can be controlled when 1080 is laid
New Zealand uses 85% of the world's 1080 – that can't be good	Most other places in the world can't use 1080 because they have native mammals
There is no known antidote	There is now
We do not know the cumulative effects of 1080	1080 does not persist in the environment
Dropping 1080 from the air is too indiscriminate	Dropping 1080 from the air is the most cost-effective method we have for killing possums
1080 found in carcasses could pose a threat to our meat exports	The threat that Tb poses in lost agricultural earnings is bigger and more likely than the threat 1080 poses.
Our use of 1080 threatens our "100% pure," clean and green image	We use much less 1080 now so there is less unintended impact
We need jobs. Bring back the bounty	The bounty does not get possum numbers low enough
We are not considering the alternatives	There are few alternatives

Māori and 1080 continued

of native species such as kūkupa/kererū, and kiwi, the issues are not simple. Each community needs to debate the costs and benefits of 1080 compared to other pest control options.

Overall, both Māori and non-Māori opposed to 1080 fall into four main groups:

1. Recreational hunters who feel their activities are being threatened by the non-target deaths of deer, and who, as an interview respondent put it: "use any other effects such as bird deaths and poison in waterways to get traction on the issue".
2. Those unhappy about using toxins because of the often unknown effect on the environment and the risks to human health. They regard aerial drops as worse than bait stations because they feel there is less control over the poison than when bait stations are used.
3. Dog owners who fear for their animals because 1080 is highly toxic to dogs.
4. People who feel that in some consultation processes "the government", DOC or the AHB are controlling what happens to them and their local area. This is particularly true where there is little possibility for communities to influence the decisions that are made about possum control.

It is clear that people weigh up arguments about 1080 according to their value systems, the information resources to which they have access, the level of trust they have in those information sources, and the way in which consultation processes allow discussion of, and learning about, the issues. As one respondent mentioned:

It's hard to progress a debate by arguing about science. It's better not to argue about 1080, but to talk instead about the values at stake and to look at the big picture.

For example, some arguments are based on how different individuals rate the importance of native biodiversity versus the presence of a good hunting resource. But even this is not a simple classification, because some environmentalists regard the use of a poison as a greater environmental concern than the risks that possums present to native biodiversity. Thus, people with strong environmental concerns may end up on different sides of the argument. It is also likely that while 1080 is the focus of contention at present, people would respond to the widespread aerial use of any poison in a similar way.

Information-consultation-participation

You have to decide carefully whether you are in fact "informing" or "consulting". A

lot of people fall into the trap of saying they are consulting when in fact they are really informing and then they get into the pooh. (DOC Communications person).

Consulting and informing are different processes that are not always distinguished. Of particular interest in the 1080 debate are informing, consultation and partnership processes. All three can be used successfully, but they are *not* interchangeable.

Informing is essentially a one-way process in which decisions are made by an agency and then the community is told about them.

Consulting involves an agency collecting information from a community and using it to make a decision jointly.

Partnership involves community groups and agencies working together to make a decision.

From the experiences of our respondents, informing communities who have no previous relationship with the agencies running pest control operations is unlikely to result in constructive outcomes. However, where a partnership already exists and there is mutual trust and a clear relationship, informing *may* be adequate. Without trust and an established relationship, informing can increase a community's distrust of an agency. It appears that in many of the cases that have hit the media, "consultation" has been more about informing groups of what is happening than about working with groups to agree on the need for pest control and then work out how best to achieve it. Thus, the way in which an agency engages with a community depends on that agency's history of interacting with that community.

It appears that in "new" areas, where an agency is driving the use of 1080, most successful operations have a lead-in time of at least a year from planning through to the actual control operation. In these cases, an agency begins the process of building trust. However, trust is about relationships between people rather than between agencies, and in this, the two main agencies that use 1080 are markedly different. While DOC is represented by staff who live usually locally, the AHB does not have a local presence. This is best summarised by one of our respondents:

... It is difficult to know who the AHB actually are. They are based in Wellington and contract all their work out, so they are a faceless, nameless group of people and the runanga end up dealing with all sorts of different people who are acting in the name of the AHB, but there is no clear relationship between iwi and the AHB.

A major difficulty in contracting out pest control is that

Māori and 1080 continued

the contractor has no mandate to change what they are doing — the decisions have been made some distance up a chain of contractual relationships. Community groups in Southland, for example, have little or no access to the people who decided on the pest control operations there. As one iwi representative said of an operation that had “gone wrong”:

The AHB decided that they wanted to do a 1080 drop and consulted with local Māori although not in a particularly good way and the AHB themselves admit this. Generally, they decide what needs to be done, where and when and they contract it out by tender and the tenderer does the consultation. This puts the contractor between a rock and a hard place because they already know what they have to achieve and how much they have to spend and so they are caught needing to fulfil the needs of the AHB and at the same time trying to consult with the community. There is no room for any flexibility.

Contractors appear to range widely in their approach to consultation. While objections may be localised, adverse publicity can affect other communities and add to a wider public climate of mistrust. When trouble flares, 1080 gets back into the news across the country and so does the agency involved. Thus, as one respondent noted, without some national-level strategy for managing consultation processes, the good work that occurs at one location can be undermined by problems occurring in another.

Examples of good consultation

Informing and communicating about risks is more likely to succeed when treated as a two-way process, when participants are seen as legitimate partners, and when people's attitudes and “worldviews” regarding environment and technology are respected. This is particularly true in the case of risk controversies. Acceptance of risks is not an information/education issue, it results from a societal discourse.

(Rohrmann 2000: 2)

Good consultation aims at a participatory process in which agencies (as the instigators of pest control programmes) are prepared to address the concerns of the communities concerned. The following discussion uses the framework provided by the Integrated Systems for Knowledge Management (Allen et al. 2001) to discuss the findings of this research in terms of improving consultation processes.

Entry – beginning a relationship

Respondents noted that it was important for agencies and iwi to find a point of agreement from which they could start their negotiations. For example, successful communicators would begin by reaching agreement on the need to improve conservation outcomes or control bovine Tb. Beginning negotiations this way allows consideration of a greater range of alternatives and increases the perception of control, particularly for the community group in question.

Accessing relevant data and knowledge

Communities need access to a range of relevant information they can trust. Respondents mentioned that it can be very difficult and expensive for members of the public to get access to the scientific information on 1080. Not only is physically getting a copy of the documents difficult, individuals must have the time and capacity to read technical scientific reports and papers. For example a respondent noted that:

Information is a problem – I have a box of stuff on 1080 most of which I haven't read — too busy. What we really need is a synthesis because it is very difficult to do the work from original reports. If there was a reliable, neutral party who could put together and summarise the work that has been done, that would be ideal. There is some worry that the AHB or DOC might not be neutral and therefore might slant their information to their own advantage. So some kind of, even, peer reviewing might work or even contracting to independent agencies like Landcare Research might be necessary.

There is a need for information to be collated and synthesised by a trusted group and put somewhere accessible like a public website.

A few respondents felt that getting scientists to come and talk to them about 1080 had been useful for them. One respondent felt that his good access to scientists who were willing to come to the marae and talk about 1080 was one of the main reasons his group had elected to use 1080 as a form of possum control. Showing people the damage caused by possums has also been successful, as in the case of Gisborne DOC working in the Urewera National Park. Other respondents noted that taking Māori to see places where possums had been controlled was a good way to show them the adverse effect possums have on birdlife and the beneficial effects of pest control programmes on that birdlife.

Agencies should give groups all the information and

Māori and 1080 continued

it appears that it is best to err towards a worst-case scenario. For example, one respondent noted it was better to tell dog owners that they had to watch their dogs for six months to be sure the area would be safe, than to suggest a shorter time and run the risk of a dog being poisoned by eating a carcass.

Community dialogue

Consulting is a two-way process in which agencies need to ascertain what people feel about 1080, what their main concerns are, and then to ask how those concerns might be addressed. This is needed even when the questioner thinks they know the answers to those questions.

One respondent noted that at times when her organisation could not meet the requests of a Māori group, and she had come back with an alternative and explained why they could not take that course of action (e.g., that the cost would be too great), groups had been willing to negotiate ways to meet the needs of the agency, for example by fundraising or providing free labour.

This same respondent noted that in situations where concerns have been met previously and the agency and community had established some mutual trust and understanding, it was possible to move to informing groups of upcoming operations. However, she noted that this strategy only works where there is a strong and well-established relationship between the agency and the group in question.

Implementation and monitoring

Another way to improve the relationship between an agency and a Māori community is by involving them in some way. Ngai Tahu, for example, is involved setting up ways of monitoring the effects of aerial 1080 across the ecosystem and of being involved more in monitoring their own areas. Respondents from the North Island note also that local iwi are involved in monitoring the effects of 1080 use.

When things go wrong

When things go wrong, people tend to go into battle mode, hunker down and close the hatches. Their body language makes their stance all too obvious. It is really very important to stay open and it's very hard to do. I've been on the end of it and I find that it's best just to let them go and nod sympathetically and eventually they run out of steam. Then you find you can start to talk it over.

Despite the best efforts to do everything right, things can still go wrong. From our observations of

a number of conflict situations, everyone's instinct is to try and convince others — by out-reasoning or out-shouting them. As the respondent above notes, it is an instinctive response to “go into battle mode” and yet this just encourages battle mode in the other party. The result is an unconstructive argument that repeats old arguments.

Instead, it is important to stay open and listen. This looks simple when expressed as a short sentence, but it is very difficult to do and almost impossible to do without learning to understand and control one's own responses. For most people, it takes practise, and the encouragement and support of others who can model the appropriate behaviour and provide a lead. In other words, expecting people with expertise in pest control to run a consultation process without the assistance of skilled communicators seems unwise.

Conclusions

Generally, our findings indicate that in consultation processes where 1080 was subsequently used in pest control, communities felt that their concerns about 1080 had been addressed. This sense of empowerment was also achieved when people learned how they could mitigate the effects of 1080 usage. Good consultation, therefore, requires that agencies must genuinely work with Māori groups to negotiate a mutually agreed course of action rather than working to persuade them to allow a predetermined course of action. Another way to view this is that communities often mirror the behaviour of the agencies that are trying to consult them — if an agency tries to convince people without being prepared to change what it does, it is likely that the community will try to convince the agency of their point of view without being prepared to change their point of view. People who work constructively with communities tolerate different points of view, no matter how “irrational” they might seem, and are prepared to change the process by which they plan to achieve the outcomes they desire. This means that agencies need some flexibility in the way that they work to achieve their goals.

In every case where 1080 had been used for pest control without local protest, the consultation consisted of two-way dialogue and a genuine effort on the part of the agency to meet the concerns of the communities in question. This is not to argue that doing this will always result in the outcomes desired by agencies. However, it is likely to improve the outcomes that agencies are trying to achieve, both now and in future dealings with the same community.

It is clear that at a time when communities are

Māori and 1080 continued

increasingly negative about the use of 1080, time and resources must be allowed for consultation processes. Good consultation is central to the process of gaining community acceptance of the use of 1080. Respondents who had been involved in tense meetings and situations felt that skilled communicators provided a useful lead and were able to teach them how to manage their reactions in these situations. These people sometimes helped them reflect on their actions and learn from their experiences.

Practitioners do not always recognise the difference between information and consultation so they have not considered whether what they are doing is appropriate in the situation at hand. Much has been written about good participatory processes where two-way dialogue

helps local people feel that they have some control over the situation in question. However, it appears that there is still some way to go towards achieving these in practice.

Perhaps most importantly, this research suggests that it is unproductive to try to convince people that 1080 is good, harmless or effective. In fact, it appears that arguing about the safety of 1080 or downplaying its problems tends to make people feel their views are being dismissed. A normal reaction for people in this situation is to defend their position. Setting out to persuade or convince, therefore, can be counterproductive. Instead, agencies could more constructively use their time to work with communities to find ways to address their concerns.

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Practical Control Tips

Dealing with snakefeather

Report from first year of a WRC trial

Wellington Regional Council has released the first year assessments collated in October of a 40 plot trial to investigate control methods for Snakefeather (*Asparagus scandens*).

The trial on parkland at Mt Victoria compared physical removal with nine different herbicides. After 12 months, digging the plants out ranked as the fourth most effective method, better than any of the foliar spray methods trialled.

"Snakefeather has a reputation for regrowth after chemical treatment. We were looking for practical, low chemical methods that wouldn't spread around to harm other plants," WRC Biosecurity Officer Rosie Doole said.

"We were also looking for a method that would work at any time of year, hence application outside of the peak growing months for this pest."

Plots were checked often to observe the varying reactions to different chemicals. Simple counting, averaging and ranking were employed to compare the results.

A feature of the trial was to distinguish between leaf uptake and root uptake of herbicide. Glyphosate, Renovate and Tordon Brushkiller were trialled as both foliar sprays and as stump treatments. Turfix and Amitrole 4L were trialled as foliar sprays only. Banvine, Escort and Vigilant gel were trialled as stump treatments only. Long Term Weedkiller was spread as a granule.

"We had some interesting results. Renovate stump treatment ranked as the best method overall with some nil results after 12 months. However, Renovate foliar spray ranked 12th out of 14 methods. Conversely, Glyphosate spray gave the best foliar result at sixth place but as a stump treatment came in 13th out of the 14 control methods," Rosie commented.

Glyphosate, Renovate and Tordon Brushkiller were trialled as both foliar sprays and as stump treatments.

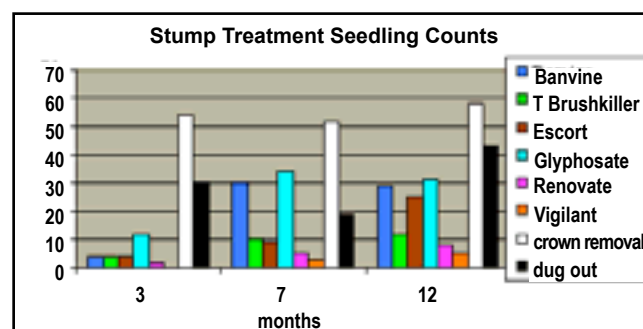
Turfix and Amitrole 4L were trialled as foliar sprays only.

Banvine, Escort and Vigilant gel were trialled as stump treatments only.

Long Term Weedkiller was spread as a granule.



Above: Results 12 months on for Glyphosate foliar spray and below, Renovate stump treatment.



The graph indicates that Vigilant is the most effective stump treatment but the fact that it was a gel made it labour intensive and difficult to control when applying.

Practical Control Tips

Crown removal was compared to digging out the whole plant. There was no evidence to suggest that other parts of the root system re-sprout. Crown removal scored lower than digging out because of missed crowns. Digging out whole plants appeared to reduce seedling numbers in heavily infested plots and reduced the number of missed crowns.

"This means that when using physical methods you don't have to chase every last tuber... the trick seems

On the basis of the trial results to date, WRC advises the best method for treating scattered, individual plants is to cut them off and spray the stumps at ground level with 10% Renovate..

Where there is too much Snakefeather to deal with individual plants, spraying with Glyphosate gives a quick knockdown. Follow-up treatments for regrowth need to be planned after six months.

to be to lift clumps of adjacent crowns when using a spade", Rosie suggested.

On the basis of the trial results to date, WRC advises the best method for treating scattered, individual plants is to cut them off and spray the stumps at ground level with 10% Renovate.

Where there is too much Snakefeather to deal with individual plants, spraying with Glyphosate gives a quick knockdown. Follow-up treatments for regrowth need to be planned after six months. Foliar spraying with Tordon Brushkiller can also give good results.

Long Term Weedkiller granules, Amitrole 4L, Turfix, and Renovate spray are not recommended at this stage.

The trial will remain in place until the end of the next growing season.

**Further advice is available from
Wellington Regional Council
ph (04) 526 5325,
or email Rosie.Doole@gw.govt.nz.**

MAF keen to hear about parrot disease, Psittacine poxvirus

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MAF is asking bird owners and enthusiasts to report any sick parrots that show signs of psittacine (parrot family) poxvirus, to help identify how far it has spread.

Psittacine poxvirus has been diagnosed in New Zealand for the first time, although other strains of avian poxvirus occur here. Experts believe that the disease could establish in New Zealand and cause high death rates among caged and wild introduced parrots, when factors combine to cause disease outbreaks.

Of even greater concern to New Zealand, however, is the potential effect on indigenous parrots such as the critically endangered kakapo, the threatened kaka and kea and the kakariki. The susceptibility of native parrot species is not known, but experts have cautioned to assume susceptibility. If native parrots are susceptible, the disease could be spread to them from introduced wild parrots, through transfer of contaminated items or by biting insects.

Disease outbreak and investigation

In July 2002, two rosellas were presented to an Auckland veterinarian. The birds subsequently died and psittacine poxvirus was diagnosed. MAF eventually traced the birds to an Auckland aviculturist, on whose property there appears to have been a large number of bird deaths. Up to 200 rosellas caught from the wild were being prepared for export, along with other birds from a large number of sources. The mortalities appear to have largely been rosellas, and the birds were disposed of without the event being reported. Depopulation and decontamination has been undertaken on three Auckland properties linked to the outbreak.

Investigating the disease outbreak has been made difficult for MAF because of the non-cooperation of some of the parties involved. The poxvirus may have come from an untraced caged bird source, however, evidence to date is inconclusive. Investigations

involving other suppliers of birds to the outbreak facility continue.

Report birds showing signs of the disease

MAF wants to find out how widespread the disease is. To do this, they need samples from sick parrots, particularly rosellas, galahs, lorikeets, cockatiels and budgerigars that show signs of poxvirus infection. An information sheet has been distributed to the bird fanciers community in New Zealand and posted on MAF's website (www.maf.govt.nz/biosecurity/pests-diseases/animals/psittacine-pox/index.htm).

Reports of suspect disease can be made to a veterinarian or the MAF Exotic Disease Hotline (0800 809 966). MAF will send information and forms to help veterinarians collect appropriate samples for testing. Diagnosis can only be confirmed by laboratory tests.

In the meantime, MAF is also tracing sources of birds to try and identify the source of infection. Birds are being checked for infection and, where necessary, properties are being disinfected. MAF is also working with the Department of Conservation (DOC) and the Aviculture Society's Avian Disease Management Council to develop plans for managing further cases. DOC is assessing a number of contingency actions, including:

- increasing biosecurity measures at important sites,
- instructing staff to be vigilant for signs of the disease,
- evaluating contingency measures to protect at-risk parrot populations, given that there is a risk that the virus may already be established in the wild,
- possible review of hygiene protocols, associated with parrot conservation management and disease screening procedures, along with the recovery plan for threatened parrot species,
- possible temporary restrictions on the transfer of parrots from the greater Auckland region, until more is known about the spread of the poxvirus in the wild,

Parrot disease continued

- increased enforcement under the Biosecurity and Wildlife Acts, to discourage illegal parrot liberations.

Signs of disease

Psittacine pox can occur in various forms:

A cutaneous form (skin form, sometimes called 'dry' form by budgie fanciers) causes nodules on the unfeathered parts of the skin, the ceres, around the eyes and the feet. The nodules form blisters that erupt to scabby erosions. Secondary infections with other organisms may delay healing, but the mortality of birds affected with this form is low.

A diphtheritic form (sometimes called 'wet' form) causes lesions on the mucous membranes of the mouth, eyes, and throat. White plaques will be seen on affected surfaces, with fluid effusions. The disease may become systemic, with internal lesions in the throat, gastrointestinal tract, lungs and air sacs causing birds to be very ill and depressed. Mortality can be high with this form.

Birds affected with either form of the disease may appear weak and emaciated. In some cases there may be no or few outward signs, other than general depression, illness and death. There is no specific treatment or effective vaccine for psittacine pox.

Potential new invasive plants of coastal dunes: bad news from Australia

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Leonard Cockayne's survey of the early 1900s documented the extent and botanical distinctiveness of active coastal duneland in New Zealand. Since then they have declined in area by around 70% nationally¹, and up to 80% in some regions. Moreover, many of the remaining dunelands, particularly in central New Zealand, the west coast of both main islands and the south coast of the South Island, are now dominated by marram grass (*Ammophila arenaria*) and other exotic species. These dune systems have been stabilised and can no longer be considered "active dune systems". Compared with weed-free dunes, they contain little natural character, including little or no transgressive dune activity, and low native species and landscape/habitat diversity. Tahakopa Bay, in the Otago region, for example, was ranked of national significance in the early 1990s², yet marram grass now occupies over 95% of the recently active dunes. Pingao (*Desmoschoenus spiralis*) and associated species will not survive at this site without intervention. The situation is somewhat better in the North Island, particularly the upper North Island, where it appears marram grass is less vigorous and less able to disperse. The outlook for active dunelands and their flora and fauna is also more positive in the far south of New Zealand in Fiordland and on Stewart Island (Rakiura), where the Southland Conservancy of the Department of Conservation is mounting a successful programme of marram grass eradication. Elsewhere DOC, local authorities and conservation groups have been active in conserving smaller dune remnants, although on an ad hoc basis — New Zealand is yet to develop a national strategy for duneland conservation.

Duneland conservation management is likely to face

new challenges in the near future. The Australian experience demonstrates we should be alert to the establishment of new exotic plant species in our coastal dunes, particularly plants from Europe and South Africa. A number of species from these regions have established in Australia since European colonisation. Three species are of particular concern, because of their capacity to rapidly invade open sandy habitat; their capacity to form dense, virtually monospecific stands; their capacity to stabilise dunes; (and so reduce the diversity of dune habitat); their ability to displace indigenous species; and, finally, their potential to invade New Zealand dunes. Pyp grass (*Ehrharta villosa*), is already in New Zealand. Sea spurge (*Euphorbia paralias*) and sea-wheat grass (*Thinopyrum junceiforme*) are widespread along the south coast of continental Australia. They also occur in Tasmania, on a diversity of coasts with climates comparable to those in New Zealand.

Sea spurge

Euphorbia paralias should not to be confused with the endemic New Zealand shore spurge (*Euphorbia glauca*). The European shore spurge is a perennial herb of semi-vegetated coastal dunes, native to southern Europe and the Mediterranean Sea. Plants comprise multiple stems around 70cm high originating from a common base at ground level (compared with the single stem growth form of *E. glauca* where the plant is growing on accreting dunes); fleshy leaves are glabrous and glaucous, and grow to 3cm long. The sap is milky. It flowers from September to May in Australia and a vigorous plant can produce 60 flowers in a season, with 25 to 40 fruits per flower. Three round seeds, 3mm in

Potential dune invaders

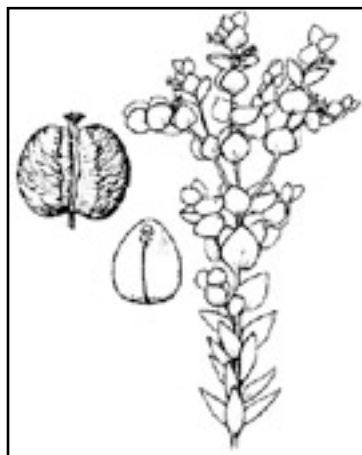
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Sea spurge, *Euphorbia paralias*, photographed in Tasmania.

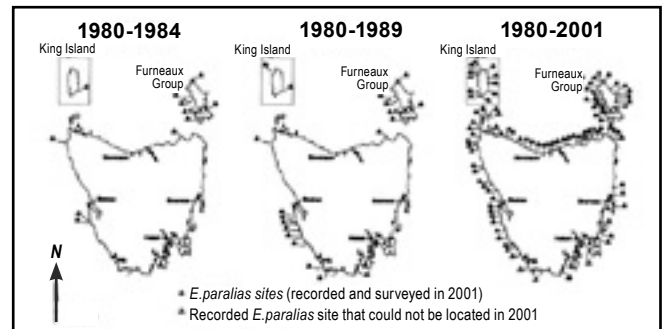
diameter are produced per fruit — annual production can be around 5000 seeds per plant. Seed is shed throughout the year. Stands in Australia may comprise many thousands of plants or more. The seeds are grey, spherical and 2.5-3.5mm in diameter.

The dispersal of sea spurge in Australia has been singularly rapid, following its accidental introduction to Western Australia and South Australia early last century, probably in ship's ballast. It



Sea spurge, *Euphorbia paralias*, showing the flowers, fruit and seeds, from Walsh, NG and Entwisle, T.J., 1999, *Flora of Victoria*, Inkata Press, Melbourne.

subsequently spread across the southern coast of the continent; reaching Kangaroo Island, South Australia, in 1958, Wilson's Promontory, Victoria in 1974; Flinders Island, Bass Strait, in 1982; the northeast coast of



Invasion history of sea spurge in Tasmania with the small black triangles showing the increasing number recorded occurrences over time.

Tasmania in 1980; and the west coast of Tasmania in 1984. Recent fieldwork by the author indicates that the species is now widespread along the north coast of Tasmania and spreading down the west coast of the state. Sea spurge is still rare on the east coast of Tasmania.

Sea spurge is adapted to marine dispersal and is probably able to drift to New Zealand from eastern Australia. The seeds possess a layer of spongy tissue containing air-spaces between the kernel and the hard testa. Dr Petrus Heyligers, formerly of CSIRO, established that the seeds have an initial dormancy period and may float in sea water and remain viable for several years (at least in the laboratory). Seed may also arrive in New Zealand aboard ships, including sand dredges that frequently work along Australian beaches infested with sea spurge.

Once ashore, sea spurge exhibits specific adaptations to substrate instability, sand accretion and drought. The seeds contain relatively large food reserves that are primarily utilized in root production. The tap root can grow to 5-6cm 3 days after germination, reaching 10-15cm within 7-14 days. Therefore, seedlings are more likely to attain a depth where the moisture content is higher and subject to less fluctuation before the onset of summer drought. This adaptation also allows the plant to minimize exposure to erosion. Sea spurge is also capable of surviving moderate rates of sand accretion.

In Tasmania, sea spurge occupies a wide range of dune environments — strandline, the face and crest of the foredune and most backdune situations, including certain shrub and grassland communities. It tolerates and is adapted to moderate rates of sand accretion. The ecological impact of sea spurge in Tasmania is

Potential dune invaders continued

the subject of ongoing research at the University of Otago. It forms dense, continuous stands, along the north coast of Tasmania, sometimes in conjunction with marram grass. It appears to have displaced *Spinifex sericeus* and associated species from the primary foredune and backdunes in northeast Tasmania. Over the medium to long-term this species is likely to inhibit or prevent sand movement and so reduce the area of habitat for indigenous species. Sea spurge may also be an agricultural weed — several hectares of sea spurge have recently established in pasture bordering dunes on the Yorke Peninsula in South Australia.



Sea-wheat grass fore dune, Coorong, South Australia, showing separation from the spatial separation from older *Spinifex*-covered dune.

Sea-wheat grass

Sea-wheat grass has transformed the foredunes of South Australia, establishing a new foredune landscape and botany. It is a perennial, rhizomatous grass, of coastal foredunes of Western Europe and the Mediterranean. This coastal grass was introduced to Australia accidentally, probably in ballast water, prior to 1933, when it was first collected in Port Philip Bay. It was subsequently cultivated and distributed as a dune stabilisation species and dispersed naturally. It is salt-tolerant and in its home range is a pioneer of beaches and sand plains around and above the strandline. In Britain and in Australia it grows closer to the sea than any other dune grass. It grows best when soil water is brackish, which is usually seaward of the crest of the pre-existing foredunes. In comparison, *Spinifex* and pingao require relatively fresh soil water, so the two species are usually spatially separated as in the picture above. It spreads rapidly by long slender wiry rhizomes. Sea-wheat grass foredunes are typically low, broad and continuous alongshore on prograding coasts. Dispersal may occur by either seed or rhizome.

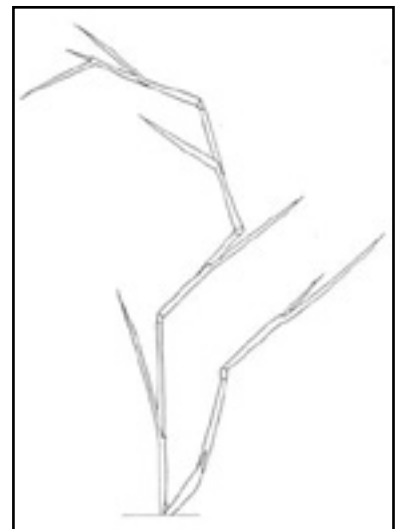
Sea-wheat grass is a comparatively recent arrival in southeast Australia and its dispersal has been singularly rapid. For example, over the last 20 years or

so it has established along the Coorong coast in South Australia so that it now forms a new, near continuous foredune over a distance of around 195km. Along most of the Sir Richard Peninsula it has colonised the stoss face of the former foredune and established a new incipient foredune, 2-4m high, 5-10m wide, continuous alongshore. In places it appears to have formed a foredune where none existed before. Sea-wheat grass foredunes occur seaward of the former *Spinifex* foredune in South Australia which appears to decline in cover and vigour following the arrival of sea wheat grass. *Spinifex* is occasionally present across the crest of such dunes but seldom contributes more than 20% of the plant cover. The development of a new foredune, across the lower slopes of the former foredune and closer to the sea, appears to have impacted the hooded plover. The width of the beach along the Coorong has probably narrowed since sea-wheat grass established a new shore morphology, with the result that the plovers are more frequently threatened by offroad vehicles. Dispersal appears to be predominantly by sea-rafting of rhizome. It is not known how long the rhizomes survive in sea water or whether the species has the potential to drift to New Zealand or survive in ballast water.

Pyp Grass

Pyp grass is a rhizomatous perennial grass of coastal sand dunes, of cool-temperate latitudes, native to South Africa (S. Lat. 32-35°). It is a successful coloniser of open sandy ground in southern Australia, where it was introduced to stabilise active dunes. Pyp grass was introduced to New Zealand for the same reason and relatively small areas occur in the Manawatu (Turakina Beach) and in Hawkes Bay (Taikura Station, Blackhead). It has a distinctive “kinky” morphology.

Pyp grass has a significant impact on the flora of sand dunes—initial results of a joint University of Adelaide-University of Otago study indicate that pyp grass on the Sir Richard Peninsula, South Australia, forms dense almost mono-specific colonies, to the detriment of the abundance and diversity of indigenous plant



Pyp grass

Potential dune invaders continued

species. It creates a mass of interwoven rhizomes and roots below the soil surface, at least 0.5m deep, which may deprive existing plants of essential nutrients. The plant is highly invasive — Lyn Hodder's study of pyp grass in the Manawatu established that rhizomes extend away from the edge of the population at rates of 7-9m/y. In South Africa, pyp grass grows more as an open herb, allowing other dune plants to grow through it. In New Zealand and Australia pyp grass grows as a dense sward and has the capacity to climb over, cover and displace coastal shrubs of 2-3m height, including *Acacia sophorae* sp.

Pyp grass is invasive in New Zealand — it was planted at Taikura Station in 1956 over an area of 10x10m — and now covers approximately 4ha. Seed is wind dispersed, however, pyp grass probably does not rely on seed production for reproduction and seed dispersal is not critical to plant survival and spread. The seed is large and sharp pointed and tends to enter the fabric of socks and boot laces. It is, perhaps, more likely to thrive in the warmer northern regions of New Zealand. The species is able to regenerate from rhizomes after being

detached from the parent plant. In South Australia pyp grass rapidly invades sandy ground in a range of dune habitats, from foredune to backdune.

Conclusions

The three species introduced here are highly invasive and destructive in Australian dune systems, including those of Tasmania in the case of sea-wheat grass and shore spurge. These species are ubiquitous along much of the south coast of Australia and in Tasmania, with serious ecological consequences. Sea spurge and sea-wheat grass have the potential to float long distances or survive in ballast water. The likelihood of them floating to New Zealand is probably increasing as they move north in southeast Australia towards New South Wales and release propagules in coastal waters at higher latitudes. Our best defence is to increase awareness of these species, in the hope that the first report of an arrival occurs early in the invasion sequence. Pyp grass is recognised as a problem species and known populations should soon be eradicated.

Notes:

- ¹ Hilton, M., Macauley, U. & Henderson, R. 2000: Inventory of New Zealand's Active Dunelands, *Science for Conservation* 157, Department of Conservation, Wellington.
 - ² Johnson, P.N. & Partridge, T. 1992: *The Sand Dune and Beach Vegetation Inventory of New Zealand. I. North Island. II. South Island and Stewart Island.* DSIR Land Resources, Christchurch.
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End paper

Good King Weedo

Good King Logan, Hugh looked out,
On the Feast of Stephen
Wandering Jew lay round about,
Deep and green and even
Brightly shone the broom that night,
Though the gorse was cruel
When a DOC man came in sight,
Scattering Tordon granule(s)

'Hither Geoff and stand by me,
If thou knowst it telling
Yonder ranger who is he,
Where and what's he felling?'
'Sire he lives a good league hence,
Underneath Karori
Right against the pestproof fence,
Killing all the morning glory.'

"Bring me Roundup, bring me Glean,
Bring me Escort hither:
Thou and I those weeds will clean,
When we bear them thither.";
Boss and manager, forth they went,
Forth they went together;
Thro' the briar's tanglement
And the noxious heather.

"Sire, the pines are taller now,
And the weeds grow stronger;
Fails my heart, I know not how,
I can spray no longer.";
Mark my slasher, good my man;
Flail thou in them boldly:
Thou shalt find the thistle's rage
Pricks thy legs less freely."

In his master's steps he trod,
Where the weeds lay dinted;
Death was in the very sod
Which the saint had treated.
Therefore, weedos all, succeed,
Spray or slasher possessing,
Ye who now will kill the weed,
Shall yourselves find blessing.

Ian Popay
