

Autumn – 2008

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Protect



New Zealand
Biosecurity Institute

Our mission: "To preserve and protect New Zealand's natural resources from the adverse impacts of invasive pests."

NZBI thanks Horizons Regional Council for printing and posting the hard copy of *Protect*.



Autumn 2008

Magazine of the

New Zealand Biosecurity Institute

Contents

Editor’s Note	4
NZBI Contacts	4
News from the Executive	5
News from the Branches		
	Canterbury7
	Top of the South8
NETS2008 – Highlighting outstanding regional projects	9
NZBI Awards – get your nominations in	9
Member Profile: Sarah Dodd		...10
Member Profile: Graham Strickett		...11
Intercepting exotic mosquitos – protecting New Zealand		
	Rachel Cane and MarkDisbury	...13
Weedbusters works	Carolyn Lewis	...15
Vertebrate pest control: Ethics and welfare	Bruce Warburton	...16
New crop weed – butter print	Greg Hoskins	...19
Exhibition pricks preconceptions of iconic plant of the NZ landscape		
	Craig Davey	...20
The IUCN Red List – impacts on threatened taxa	Shyama Pagad	...21
MAF Biosecurity New Zealand News		...23

Editor's Note

Welcome to the Autumn issue of *Protect*. It is nice to see the seasonal change with the days cooling off and the much-needed rain finally arriving in some areas of the country.

In this issue we have a suite of great articles from members covering a wide range of issues and projects, thanks to all those who have contributed.

We have part one of a two part story from Rachel Cane and Mark Disbury, NZ BioSecure Entomology Laboratory, about intercepting exotic mosquitoes; Bruce Warburton of Landcare Research discusses the "how" and "why" of animal pest control with regard to ethics and animal welfare practices; Hugh Gourlay has an update on biocontrol agent releases; and Greg Hoskins warns of a new crop weed.

Also in this issue Shyama Pagad of the ISSG talks us through the International Union for the Conservation of Nature (IUCN) Red List and its

impacts on threatened taxa; and MAFBNZ has news of the recent potting mix weed incursions, their response to potential incursions from defouling an oil rig in Tasman Bay and the National Interest Pest Responses (NIPR) initiatives.

We celebrate the work and achievements of Graham Strickett, who is retiring after 40 years in biosecurity, and we check in on four years progress of the Weedbusters programme.

The dates for the up-and-coming NETS 2008 have been set and are July 23-25, with the event taking place in Hamilton. Registrations open in May. Watch the website www.biosecurity.org.nz and your email for updates.

Enjoy the articles, email me with any feedback and let me know if you'd like to contribute to the winter issue.

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[Return to Contents Page](#)

News from the Executive

Kia ora and hello from the Executive!

Hello and welcome to another edition of our wonderful quarterly magazine.

Well, just when you were starting to hope that the collective power of positive biosecurity thinking was preventing more incursions into New Zealand, along comes potting mix. Thirty-four(!) new-to-New Zealand species of plant were identified growing in mix manufactured from imported coir fibre.

The upside of this potentially serious incursion was that the nursery which noticed the new plant, the importer and the Nursery and Garden Industry Association (NGIA) knew exactly what needed to be done and reported the find to MAFBNZ. Diligence, quick thinking and a desire to work together to contain the problem and resolve this chink in the armour of our border is highly commendable and an example to other industries that suffer similar threats.

Along similar lines there is a bill before Parliament attempting to amend the Biosecurity Act to confirm that the Biosecurity Act, rather than the HaSNO Act, is the correct statute for making decisions on incidentally imported new organisms.

The amendment aims to fix a situation where incidental organisms — those new to New Zealand and for which applications for importation have not been granted, and obviously have not undergone a risk assessment — would, under current legislation, technically require both approval by ERMA under the HaSNO Act and the Biosecurity Act.

This matter arose to resolve issues from the Court of Appeal's judgment ruling in favour of beekeepers to block honey imports that may or may not contain a micro-organism.

The bill will also ensure that Biosecurity Act import health standard process isn't used as a "backdoor" for deliberately introducing new organisms.

Constitution

For those that haven't caught up with the new constitution as amended at NETS2007 please visit the website www.biosecurity.org.nz (contact *Protect* Editor or Executive member if you need the password).

Further to the AGM and November Executive meeting we suggest the following amendment to Clause 3, for your consideration prior to the AGM at NETS2008. If you have any questions or comments please forward them to the Executive well before the AGM at NETS2008 when the amendments will be voted on.

The amended Clause three (3) now reads:

3. Mission Statement and Aims

3.1 Mission Statement

- *Working together to ensure New Zealand is protected from the adverse impacts of invasive organisms.*

3.2 Aims

Our aims are to:

- *Raise awareness of the Institute and biosecurity issues;*
- *Encourage the development and application of best practice in biosecurity;*
- *Connect people and organisations involved in all aspects of biosecurity to share knowledge; and*
- *Create opportunities for professional development of members.*

Subscriptions to NZBI

As usual the deadline for subs is March 31. There are two important reasons for paying your subs by this date. The first is that at \$30 they are \$10 cheaper than subs paid after March 31, and secondly you are only eligible for a member's registration fee at NETS if you have paid by, March 31.

If you know of people intending to join for the first time, then attending a NETS conference will allow them to join as trial members and get 18 months free membership.

It would also be good if members could keep us up to date with their current details, in particular, when members change jobs — please let us know if you are resigning or have new contact details. Our treasurer spends a lot of time chasing lost members and rejected email addresses which can be frustrating as well as time consuming.

Branches

This is a reminder that branch AGMs need to be held no later than six weeks prior to the national AGM, which this year means no later than June 12. Following branch AGMs the national Secretary also needs to be notified of any changes in personnel.

The Executive has agreed that if there are multiple nominations for any national position then it will endeavour to circulate information about the nominees beforehand so members can make more informed voting decision, and people can lodge more meaningful proxy votes.

There is a Vice President position vacant on the Executive so if you are keen to help and be part of the group that guides the NZBI please put your hand up.

Executive News Continued



One recipe for a healthy branch: fresh air and team work. Canterbury branch hard at work on their planting day at Quail island. Photo Nick Ledgard

NETS2007

The final accounts for NETS2007 have been handed over to the NZBI. NETS2007 finished with a small surplus of \$767. This is a great result considering the difficulties involved in hosting a Wellington seminar. The committee should feel very proud of putting together such an excellent seminar.

NETS2008

The hard yards have been done and now it's only the

waiting to get through before another great opportunity to catch-up on the latest and greatest in biosecurity is upon us. See page 9 for a sneak preview of the programme.

So etch NETS2008, July 23-25, 2008, Novotel Tainui, Hamilton, New Zealand, into your diaries now.

Craig Davey
President

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News from the Branches

Canterbury – Biocontrol releases

On February 12, a public field day was held at the Leslie Hills release site near Culverden of the broom leaf moth (*Agonopterix assimilella*) and the gall mite (*Aceria genistae*).

This field day was well attended by most of the Canterbury Broom Group, which funds the project through grants made to them by the MAF Sustainable Farming Fund, the National Biocontrol Collective and Environment Canterbury (ECan). A number of people came from the Resource Care group at ECan plus a few local farmers and Tim Cronshaw of *The Press* newspaper. About 50 moths and 20 galls were released at the site on the day.

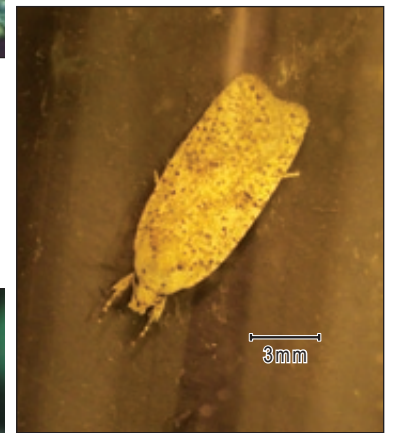
The caterpillars of the shoot moth tie shoots together and then feed on the green foliage up and down the shoots with high populations able to defoliate the plants completely. The mite gets into new buds and forms a gall which deforms the bud. So, instead of growing into a shoot, it develops into a deformed piece of green foliage which does not set as a flower, and does not seed.

This release is a culmination of more than 20 years research into finding, importing and releasing three new agents for the biocontrol of broom in New Zealand. We now have five imported biocontrol agents released in the country for broom; the broom seed beetle (*Bruchidius villosus*), broom psyllid (*Arytainilla spartiophila*) and the leaf beetle (*Gonioctena olivaceae*), along with the latest two released. A self-introduced insect, the broom twigminer (*Leucoptera spartifoliella*), is also quite commonly found on broom in NZ now. We expect to make more releases of the beetle, moth and mite into the North Canterbury region during next spring/summer.

Broom currently occupies only about 20% of its potential range and without improved control measures it will continue to spread. It out-competes and displaces gorse which has always been considered our number one pest plant. For more than 150 years we have been hammering gorse and trying to get rid of it and



Caterpillar (above) and adult (right) life stages of *Agonopterix assimilella*, biocontrol agents recently released in Canterbury.



A gall (left) produced on broom by a mite gall (*Aceria genistae*).

Photos: Landcare Research

everyone's ignored broom. Gorse is still a problem but it's relatively stable in its distribution while broom is rapidly accelerating and is taking over large expanses of high country land.

Hugh Gourlay

GourlayH@LandcareResearch.co.nz

Branch News Continued

Top of the South

A field day covering invasive ants and marine biosecurity was organised by Tasman District Council biosecurity staff on February 20. It was well attended by colleagues from other councils in the Top of the South, Nelmac contractors and Cawthron staff.

The first part of the day involved a presentation by Alice McNatty and myself outlining the known history of invasive ants in Nelson city and Tasman district, and developments in surveillance and management. Alice took the group to a nearby ant-infested site to demonstrate visual surveillance and the use of pottles.

Both Argentine and Darwin's ants are present in Nelson city and Tasman district; both species are listed as Containment Pests in the 2007-2012 Tasman-Nelson Regional Pest Management strategy. All residents with ant-infested properties and those with properties adjoining these sites receive letters and

are asked to undertake baiting if ants are present on their properties. The Council has worked closely with Landcare Research, Biosecurity NZ and the Department of Conservation in the development of its surveillance and management practices.

The second half of the field day was spent on marine biosecurity with a visit to the marina at Port Nelson and a discussion about plastic wrapping techniques led by Bruce Lines of Diving Services NZ Ltd, the lead agency involved in wrapping of piles, pontoons and vessels in the ports of Nelson, Tarakohe, Picton and Auckland.

Graham Strickett outlined the marine advocacy work being undertaken in the ports of Tarakohe, Nelson and Picton on behalf of Biosecurity NZ.

Lindsay Vaughan

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NETS2008

Highlighting outstanding regional projects

Mark July 23-25 in your diaries for NETS2008 being held at the Novotel Tainui in Hamilton. There's a great range of keynote speakers lined up, including Dr Rachel McFadyen from Weeds CRC Australia, and Dr Mick Clout from the Global Invasive Species Programme, as well as concurrent session speakers from a range of disciplines in the field of biosecurity.

The spotlight will also be on outstanding regional projects, including the Maungatautari Ecological Island project, and the Hamilton Halo Project. Fieldtrips will include exotic animal biosecurity in a zoo setting, wetland biosecurity, a look at the gully restoration work being done as part of the urban biodiversity focus in Hamilton city, and aquatic biosecurity around the



mighty Waikato River. There is also the chance to try your hand at claybird shooting or possibly abseiling.

It's going to be an eye-opening three days of biosecurity updates, issues and networking. Make sure you don't miss out — registrations open in May.

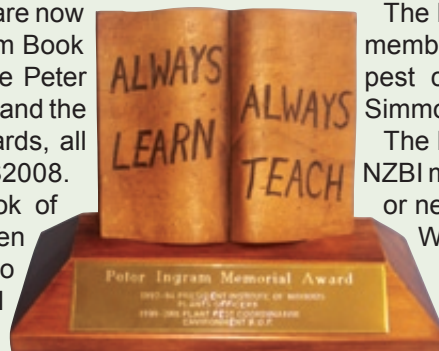
For more information, check out the NZ Biosecurity Institute website at www.biosecurity.org.nz

NZBI Awards – get your nominations in

Who of your colleagues has been outstanding this year?

Nominations are now open for the Peter Ingram Book of Knowledge Award, the Peter Nelson Memorial Trophy and the "Heroes and Zeros" awards, all to be presented at NETS2008.

The Peter Ingram Book of Knowledge Award is open to NZBI members who further their personal pest plant education in a



significant way, or enable others to do so. For further information contact Tim Senior.

The Peter Nelson Memorial Trophy is open to NZBI members for achievements in the field of vertebrate pest control. For further information contact Bill Simmons.

The Heroes and Zeros awards are open to anyone, NZBI member or otherwise, who contributes positively or negatively to biosecurity efforts in New Zealand.

We can have some real fun with this one!

Put your thinking caps on, and get nominating. Forward all nominations to the NZBI Secretary/Executive.

Member Profile: Sarah Dodd

Role: Plant pathologist and molecular microbiologist
Landcare Research
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How did your work in the biosecurity field evolve?

I completed my PhD studies in plant pathology at Auckland University in 1996 and since have had a number of jobs in science. These include MAF Quality Management in their plant diagnostic/quarantine laboratory at Lynfield, Lincoln University working in the field of biological control of plant pathogens (i.e. use fungi to control fungi that attack plants), two years at the USDA in Beltsville continuing my work on biocontrol of plant pathogens, and three years at Crop and Food Research in Lincoln where I worked in their molecular microbiology lab.

During this time I developed my skills in plant pathology, biological control, molecular diagnostics and environmental microbiology. I also met and married my husband while working for Crop and Food and shortly afterwards he secured a promotion in Auckland. We moved back north and I was fortunate enough to secure my current position as plant pathologist with Landcare Research based at their Tamaki campus.

In my current position I now use the plant pathogens to control invasive weeds. So now the pathogens are the good guys!!! I have only really been involved in biosecurity research since I started my work on weed biocontrol with Landcare in January 2007. Even though herbicides are good at knocking plants back, their application is labour intensive and the killed plants are often replaced over time. Biological control offers a more sustainable method for controlling invasive weeds with the biological agents remaining viable and so able to attack new plants as they emerge or arrive. There are two plant pathologists at Landcare in Auckland working on weed biocontrol and, along with the insect specialists in the team, we follow a tried-and-true method for finding agents.

What is an important biosecurity issue in your area?

Although Landcare has had a number of successes in their weed biocontrol programme, there are still instances where a promising agent is inconsistent in its



Sarah Dodd, plant pathologist at Landcare Research based in Auckland.

performance. It is now known that microbes resident on and within plants can protect the plants from pests and diseases or, in some cases, render them more susceptible. Consequently, I am also involved in a number of studies where we are investigating the role of these microbes in the success/failure of a biocontrol agent.

What motivates you to be involved with biosecurity?

Like most Kiwis, I enjoy the outdoors and want to preserve those stunning landscapes with their unique flora and fauna. It is a privilege to be in a position to make a difference.

Member Profile: Graham Strickett

“It’s important to achieve a balance in our use of land between sustainable management and ecosystem preservation as one part of the community pushes the boundaries for development and another part pushes for conservation. This will also be the case for the coastal marine environment,” says Graham Strickett, retiring after 40 years in pest management.

Biosecurity officer Graham Strickett has decided it is time to retire after 40 years in pest management. Graham was on the Executive of the Noxious Plant Institute from 1975 to 80, Senior Vice-President from 1980 to 1982, and President from 1983 to 1984. The Institute was one of the two bodies that were merged to form the NZ Biosecurity Institute.

He started working at Rabbit Island for the Waimea County Council in 1967 when rabbits were plentiful and control methods involved shooting, poisoning and trapping. He also developed extensive areas for picnicking and recreation and undertook roadside plantings. By the mid-1970s, he was the council inspector with responsibility for pest animal control, noxious weed control, dog control and stock ranger. In 1984, he moved to Wellington as National Field Officer with the Noxious Plants Council where he developed national pest management programmes and promoted quality management throughout New Zealand by District Noxious Plants Authorities.

In 1992, he became self-employed, working in pest management with local government and with MAF, with some additional work in crop nutrition. After an OE year in UK that included estate management and pest control in Scotland, he came to Tasman District Council as a Biosecurity Officer, covering Golden Bay, Abel Tasman and the Motueka /Mapua area.

During this time, Graham has seen many changes in the management of pest control programmes with the most recent being the increasing focus on pests that impact on the natural environment. He has always been strongly committed to promoting sustainable land use while protecting the natural environment.

Graham is widely respected by his colleagues for his unique range of skills that include a wealth of practical experience, extensive local knowledge, an excellent understanding of the adverse effects of pests, meticulous operational planning, a good understanding of the legislation, good business practices and an ability to work with a wide range of people.

Graham rates the control of *Spartina* as one of his most satisfying achievements. By 1970, there were extensive areas of the plant that had been planted along the shoreline and in the estuaries of Tasman Bay and Westhaven Inlet. He started this work in the late 1970s



Graham Strickett: Still out in the hills and enjoying it after 40 years.

by treating the roots with Tandex, applied with a lance at 15 cm centres. This was subsequently replaced by spraying the leaf surface with Dalapon, Amitrol and a wetting agent, using knapsack sprayers, after the leaf surfaces were washed to remove silt by a gang of PEP (unemployed) workers using sacks tied to poles during the out-going tide. Productivity improved with the introduction of tankers with hoses and handguns and the use of a specially developed spray nozzle. The introduction of Galant in the early 1990s provided much better control of *Spartina* with much lower volumes being used.

Another success story has been the development of a pest management programme at Torrent Bay that eventually involved Tasman District Council, the landowners and the Department of Conservation, three parties who, at times, have been at loggerheads. It started in 2001 with a request from local landowners to trap possums around the baches, and then extended

Member Profile continued



Graham Strickett, standing centre in white shirt and tie, at the Awatere field day for Noxious Weed Officers in 1973 representing Institute members from Westland, Greymouth, Buller, Inangahua, Waimea/Nelson, Golden Bay, Marlborough and Kaikoura. He said of the day: "It was my first trip with the Institute and I was advised to dress up and be prepared to accept office of the branch from the brief meeting held that day!!!!"

to cover stoats, and later, rats. It was expanded in 2004 to cover adjoining areas with the introduction of the new DOC traps as well as the use of toxins outside public-use areas. In recent times, work has started on the removal of wilding pines. The rapid return of the birdlife to the area has provided positive feedback from landowners and the public. This work is likely to be extended with the formation of the Birdsong Trust, in which visitors will be levied to provide a contribution to ongoing predator and plant pest control throughout Abel Tasman National Park.

Other significant achievements include:

Control of old man's beard in the Upper Buller between 1984 and 1992 using aerial spraying followed by hand treatment of residual vines

Control of nodding thistle in areas around the Wangapeka and Wakefield using 2,4-D dust

Dramatically reducing rabbit populations in the coastal zone of western Tasman Bay, the Wangapeka and the Nelson Lakes areas using a range of toxins including strychnine, phosphorus, cyanide gas and 1080.

Lindsay Vaughan

Tasman District Council

Intercepting exotic mosquitos – protecting New Zealand

By Rachel Cane and Mark Disbury

SMS New Zealand BioSecure Entomology Laboratory

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Exotic mosquitoes pose a significant risk to the health and welfare of New Zealand's human and animal (domestic and wildlife) populations.

With increasing trade and movement of people and goods around the world, there has been a marked increase in the incidence and spread of exotic mosquitoes and the diseases they vector. As an island country, New Zealand is continuously working to prevent the establishment of exotic mosquito species which are regularly detected at our borders.

New Zealand's mosquitoes comprise of 12 native species, three introduced species and one species subject to eradication, out of an estimated 3500 species worldwide. All three introduced species



***Aedes albopictus* adult female. This species is on the world's 100 most invasive organisms. It is a known disease vector that can spread dengue, Ross River virus, Chikungunya virus, many encephalitis viruses including West Nile virus, and also dog heartworm.**

Photo: ©2007 R.Cane SMS-NZB www.smsl.co.nz

Human disease spreading potential

Mosquitoes are responsible for three types of human pathogenic organisms:

- Arboviruses – viruses causing diseases such as dengue, yellow fever and various encephalitides. The term arbovirus is derived from arthropod-borne-virus

- Plasmodia – protozoans which are the cause of malaria
- Filarial worms – nematodes that cause lymphatic filariasis

Although vaccines, chemoprophylaxis, chemotherapy, genetics and vector-control measures are becoming more sophisticated, none of the major mosquito-borne diseases of the world can be said to be under complete control.

Mosquitoes act as transmitters, or vectors of pathogens or parasites by one of two methods: mechanical or biological. Although mechanical transmission of pathogenic organisms occurs via mosquitoes with some animal diseases, biological transmission is predominant for human parasites.

Mechanical transmission occurs where the pathogen has no biological association with the vector with the pathogen being picked up from one source and carried to another location passively on the biting mouthparts of a mosquito which has fed on an infected host passes into a second host at a subsequent feeding.

Biological transmission refers to the situation where the pathogen or parasite undergoes a period of development and/or multiplication within the vector (which acts as a true intermediate host and is essential for the completion of the cycle) before being passed on to another host following this incubation period (sometimes called the "intrinsic" incubation period to differentiate it from the incubation period in the vertebrate host, the "extrinsic" incubation period).

Some diseases spread by mosquitoes are associated with animal reservoirs and are called zoonoses (e.g. yellow fever, viral encephalitides, Brugian filariasis) while others involve only human reservoirs (e.g. dengue, malaria, Bancroftian filariasis). However, in all cases the crucial factor in transmission to humans – the epidemiology of the disease – is the amount and type of contact between the mosquito vector and the human host. The incidence and prevalence of disease in an area depends on the presence of the disease, of susceptible vectors, and the amount of human-vector contact. The more that the potentially infective mosquito intrudes into the human environment or the more that humans intrude into the environments where mosquitoes harbour pathogenic organisms, the greater the risk of initiating an urban outbreak or epidemic.

Intercepting exotic mosquitos Continued

as well as the species being eradicated, are known disease vectors overseas. Studies are currently under way by several research organisations into the disease vectoring capability of local species, a topic about which little is known.

The Ministry of Health (MoH) is responsible for New Zealand's mosquito surveillance programmes targeting high-risk sites such as first ports of entry as well as our extensive salt-marsh habitat, for the early detection of any exotic mosquitoes should they be introduced. In most instances mosquitoes are detected on their way in, before having the opportunity to establish, however early detection of establishing populations which may have penetrated the border is critical for keeping New Zealand free of exotic threats. Airports and sea ports are continually monitored by the country's Public Health Services (PHSs) while the salt-marsh habitat is covered by the National Saltmarsh Mosquito Surveillance Programme (NSP). These programmes utilise specially developed surveillance and response plans and rely on effective communications between all parties involved.

Since July 2001, there have been a total of 35 confirmed exotic mosquito interceptions detected, and another 32 suspected interceptions involving species already established in New Zealand. At least 18 exotic species have been positively identified, with the most commonly, and one of the most recently intercepted species being *Aedes (Stegomyia) albopictus* (see photo). This species is considered the most invasive mosquito species globally and is included on the world's 100 most invasive organisms list. It is a known disease vector that can spread dengue, Ross River virus, Chikungunya virus, many encephalitis viruses including West Nile virus, and also dog heartworm.

The NSP has successfully discovered a new population of the southern saltmarsh mosquito (*Aedes camptorhynchus*) in the Coromandel while the infestation was at relatively low levels. This species is currently the subject of an ongoing eradication attempt in New Zealand and early detection of additional populations enhances the likelihood of eradication being successful. This programme also discovered a previously unknown species in the Chatham Islands during 2007; further investigation into this find is under way. [See the next issue of Protect for more on the NSP programme.]

The most recent interception event involved two species intercepted simultaneously on January 16 this year. Two used sewage trucks, in a shipment of vehicles coming from Japan, were each found to be harbouring exotic mosquito larvae. One truck contained *Ae. albopictus* while the other, *Aedes togoi*. *Ae. togoi*



Blood-fed *Aedes (Finlaya) notoscriptus*, one of the three exotic species established in New Zealand. It is generally believed that these species pose little disease risk however some people react to mosquito bites in an extreme way.

Photo: © 2006 M.Disbury SMS-NZBEL www.smsl.co.nz

has never been previously intercepted in New Zealand but has been collected from used tyres imported into the United States from Asia. Both species have fairly cosmopolitan distributions and have been intercepted entering other countries via risk goods. These mosquitoes are known vectors of exotic diseases of people and animals, and could potentially establish in part, if not throughout New Zealand.

New Zealand's mosquito surveillance programmes appear to be working effectively with no known newly established populations of exotic mosquito species in this country since 2001. Continued vigilance at the border, comprising ongoing collaboration between the MoH and MAFBNZ, and good communication between PHSs and other stakeholders is necessary to effectively keep New Zealand free of unwanted exotic mosquito species.

For more information on mosquitos go to www.smsl.co.nz/biosecure

If you or your community contacts see an unusual mosquito you can contact the Ministry of Health 0800 MOZZIE (669943) line or call your local Public Health Unit.



Weedbusters works

By Carolyn Lewis

National Weedbusters Co-ordinator

info@weedbusters.org.nz

It's hard to believe that Weedbusters recently celebrated its fourth anniversary. From its launch late in 2003, this national programme has gone from strength to strength in raising awareness about weeds, and involving communities in finding solutions to their local weed issues.

Amber Bill, the first national Weedbusters co-ordinator, aptly described Weedbusters as a "controlled snowball". It has been my job since I took over as national co-ordinator in 2005 to keep this snowball rolling as it grows in size and popularity, and steer it in a relatively straight line towards the outcomes of the five-year Weedbusters strategy that are now visible on the horizon.

The success of Weedbusters has been mainly due to the willingness of organisations and individuals to jump on board and see where Weedbusters takes them, adding their own unique flavour and style as the snowball rolls along. At times, the ride has been rather rocky. Along the way, there may have been worries that we were collectively heading for a spectacular uncontrolled crash, or even a gradual meltdown, at the end of all the time and effort invested in Weedbusters.

But, after four years, it is becoming apparent that yes, Weedbusters is sustainable, and yes, it is helping provide the awareness, behaviour change, and community involvement that have long been sought in relation to weeds' issues in New Zealand.

In August this year, a repeat of the weeds awareness survey first carried out as a baseline in 2003 will be



Waiheke Weedbusters tackling boneseed.

Photo: George Gardner, Waiheke Marketplace

undertaken. Hopefully this will give us some guidance on how Weedbusters is doing, and allow us to determine future directions to be most effective. It will also help in the review of the five-year Weedbusters strategy to take us into the future.

With the continued enthusiasm and support of those involved, Weedbusters will continue to grow as an effective interagency and community programme addressing weed issues in New Zealand.

This March, *What's Up with Weedbusters? Progress Report 2003-2007* will be released. If you would like an email or a printed copy, please contact Carolyn Lewis, National Weedbusters Co-ordinator, on info@weedbusters.org.nz

Vertebrate pest control: Ethics and welfare

By Bruce Warburton
Animal Welfare Scientist,
Landcare Research
warburtonb@landcareresearch.co.nz

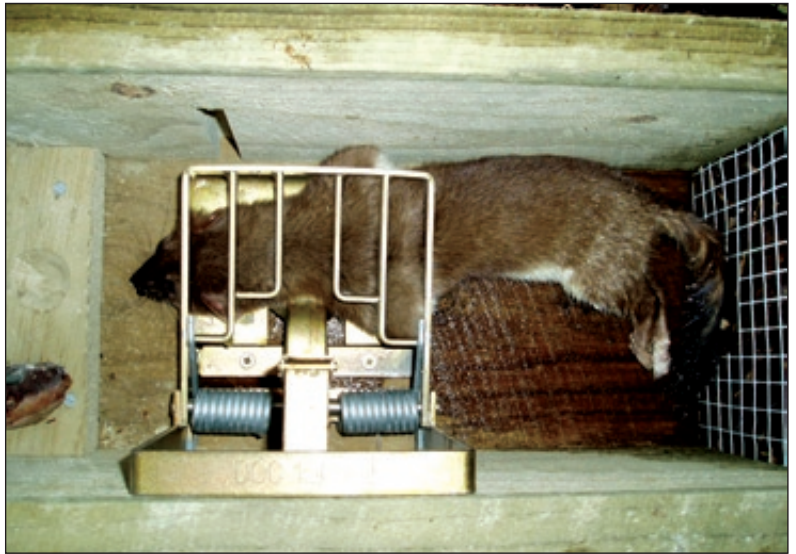
New Zealand has more than its fair share of invasive alien animal species and there has been a sophisticated array of control tools and strategies developed to control or eradicate them. All the vertebrate invasives and some molluscs are “sentient species”, meaning they have the ability to sense pain, and consequently deserve special consideration in how we treat them.

The Animal Welfare Act (1999) defines an animal as a live member of the animal kingdom that is a mammal, bird, reptile, amphibian, fish (bony or cartilaginous), or any octopus, squid, crab, lobster, or crayfish (including freshwater crayfish). These groups of animals have been included in the Act because there is a wide acceptance that they are sentient and capable of feeling pain.

The Act does not apply, however, to the hunting or killing (including pest control) of animals in a wild state. Nevertheless, unusual and cruel acts and practices towards wild animals (such as pouring petrol over a possum and setting it alight) are covered by the Act as they are acts that occur outside of what is considered “normal” practice.

Even though killing of vertebrate pests during routine pest control is outside the Act, there is a growing acceptance that any harm (including pain or distress) as a consequence of pest control should be minimised as far as is practicably possible.

There are two main aspects to vertebrate pest control that we need to be concerned about in relation to animal welfare: the how and the why. The “how” is the easiest issue to deal with and relates to the control tools and strategies used, especially the welfare impacts they have on the target and non-target animals. The “why” or justification for carrying out pest control is more challenging to deal with, and a critical examination of control programmes shows we often do not deal with the why very well.



A stoat caught in a DOC trap. There is a growing acceptance that any harm (including pain or distress) as a consequence of pest control should be minimised as far as is practicably possible.

Photos: Darren Peters, Dept of Conservation

The “how” of vertebrate pest control

Pest management in New Zealand has traditionally focused on pest mammals. For several decades the welfare performance of traps has been an issue, and the New Zealand National Animal Welfare Advisory Committee (NAWAC) has developed a trap-testing guideline for both kill and restraining (these include leghold) traps. For kill traps to be acceptable they must be able to render target animals irreversibly unconscious within three minutes, and for restraining traps there must be no more than a certain percentage of captured animals with injuries classified as moderate or moderately severe. As a result of such initiatives, several poor-performing trap models have been identified, and kill traps, such as the DOC 150, 200 and 250 series, have been developed that provide significant improvements to the welfare of trapped animals. Recently, prohibitions of the Lanes-Ace trap and No.1½ sized leghold traps have been announced, and over time a declining use of these traps will also

Vertebrate pest control: Ethics and welfare Continued

improve the welfare of trapped animals.

Formal approaches to assessing the welfare impacts of the poisons used as vertebrate toxic agents have also been developed. Assessing poisons is more complicated than assessing traps, because each poison has a different mode of action (e.g. 1080 kills by inhibiting cellular energy production, while anticoagulants kill by decreasing the ability of blood to coagulate leading to fatal haemorrhage), producing different progressions and signs of poisoning in different species, and various times to death. Nevertheless, using behavioural observations, pathology, and knowledge of the physiological action of the poisons, the relative humaneness of each poison can be assessed for a particular pest species.

Less commonly, this process has been applied to assess the relative welfare impacts on non-target species.

Even though current techniques for welfare assessment of traps and poisons could be further

refined, they do enable relative rankings on a spectrum of “best” to “worst”, so that by selecting the “best” option, harm can be minimised. This process does not determine what is “humane”, but only what is most acceptable given the tools available. Harm minimisation, like economic cost minimisation, is part of cost–benefit analysis of economists and of the utilitarian approach advocated by the philosopher Jeremy Betham and popularised by Peter Singer in his book, *Animal Liberation*. Because we cannot always quantify the benefits (pleasure) and therefore compare them with the costs (harm), the process by necessity becomes one of cost/harm minimisation.

Given there have been improvements in the performance of traps, and poisons can be ranked by their relative humaneness, this knowledge now needs to be integrated into vertebrate pest control programmes so any harm to target and non-target animals is minimised and any scrutiny of control methods used can be dealt with positively.



Trap baited with egg. Animal rights advocates may challenge control programmes as “wanton” killing of animals and therefore unethical

The “why” of vertebrate pest control

Even if control programmes use the least harmful control options, killing sentient animals risks challenge from animal welfare and animal rights advocates who might argue that “wanton” killing of animals is unethical. Control programmes (not just the tools used) therefore need to be defensible. This can only be done if there are clearly defined outcomes and the benefits of achieving those outcomes are measured. Often pest control managers do not have a tried and proven “recipe” that always guarantees the desired outcome. In such cases, where there is a high level of uncertainty about what, where, when, and how much control action should be applied, then control programmes should be established in such a way that learning is maximised. By doing this, future programmes can be improved to increase the benefits relative to any costs. This requires appropriate trial design and levels of monitoring to be able to adequately determine and interpret outcomes. The Department of Conservation has used the Adaptive Experimental Management approach to structure its control programmes in such a way that possible alternative strategies can be tested and compared for their effectiveness and efficiencies.

A good example of “why” vertebrate pest control programmes are carried out is the National Pest Management Strategy for Bovine Tuberculosis managed by the Animal Health Board. This management strategy meets the four requirements

Vertebrate pest control: Ethics and welfare Continued

necessary for achieving effective and ethically justified pest control. It has: (1) a target threshold for possum population reduction that needs to be achieved to meet the goal, (2) an objective methodology for assessing whether the target reductions have been achieved, (3) effective control tools for achieving those reductions including a performance-based contract system for service delivery, and (4) the necessary legislative support to ensure compliance. Unfortunately, for other pest management outcomes, requirement (1) is often not known, and consequently control operations are carried out with poorly defined objectives, such as to protect biodiversity, and/or inadequate quantification of benefits. In these cases, because programme objectives are not clearly defined or measurable, such programmes are open to criticism. Consequently, to enable control programmes to be defended against the possible criticism that they are not ethically justifiable, managers need to ensure their programmes have clear measurable outcomes and that these outcomes are measured and achieved.

There are two major philosophical positions held regarding the killing of animals: one focusing on individuals (animal rights and animal liberation); the other on communities and ecosystems (holistic ecocentric or biocentric ethics). Those holding a strict animal rights position (e.g. Tom Regan) argue that sentient animals have a "right to life". Such a view means there can be no distinction made between introduced vertebrate pests and threatened indigenous species (they should be treated equally). Animal liberationists argue that the interests of sentient animals should be given equal moral consideration (to humans) and their capacity to suffer must be considered. Both these positions

may conflict strongly with outcomes of vertebrate pest management, especially when many thousands of sentient animals are killed to protect either non-sentient species (e.g. possums killed to protect vegetation) or only a few sentient individuals (e.g. thousands of rats killed to protect a few kokako).

Because these individual-based ethics do not provide clear guidance on what is morally acceptable, especially when ecosystems are clearly being degraded, those concerned about communities and ecosystems argue for an ecocentric ethic that recognises ecosystems and communities as moral entities that have intrinsic value (e.g. Baird Callicott). Critics argue, however, that ecocentric ethics also fail to support effective environmental management because they do not adequately deal with the multiple values that pervade environmental issues.

An alternative pragmatic, pluralistic, and policy-based approach suggested by Bryan Norton recognises humans value things in different ways, that those values might be context or site dependent, and that often differing values will be in conflict. Although such an approach does not provide a unified ethic (cf. ecocentric ethic), it does provide a process for dealing with the reality of managing our natural environments in the face of uncertainty and in the presence of multiple values.

A pluralistic, policy-based process could contribute to the improved definition of objectives for a control programme, but unless the resultant action that delivers those objectives does so with conscious reference to welfare impacts, and at the very least updates our knowledge of how better to achieve successful outcomes, then such management will continue to be at risk of serious challenge.

New crop weed – butter print

By Greg Hoskins
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A plant recently found growing in a field of maize at Helensville has been identified as butter print, China jute or velvet leaf (*Abutilon theophrasti*). Butter print is an erect annual herb that can reach heights of 0.3 to 1.5m, is covered with fine hairs and has velvety heart-shaped leaves about 3 to 15cm long. The plant comes originally from tropical Asia but has naturalised in SE Europe, the Mediterranean, USA and Canada.

The unusual plant that looks like a mallow was noticed in the corner of a field of maize near Helensville in late January this year. The farmer and local farm supply company representatives had not seen the plant before and asked me if I knew anything about it. As it looked like a mallow I checked out mallow species on a weed website and noticed it had similarities to the weed, *Abutilon theophrasti*. This was later confirmed by researchers and botanists.

The farmer has since removed the *A. theophrasti* plants on his property and burned them. He suspects the species was introduced onto his farm as a contaminant in maize seed. In *Flora of New Zealand Volume IV*, the plant has also been recorded in Ararimu, Papakura and Lincoln in pasture and cultivated land, first recorded as naturalising in New Zealand in 1978.

In the USA, butter print can be found growing in cultivated fields, disturbed sites, along roadsides and beside railroad tracks. The leaves have palmate



***Abutilon theophrasti*, also known as butter print.**

venation (veins originate from a common point) and they have an unpleasant odour when crushed. The plant blooms in summer with flowers approximately 1-2cm wide, five petals, the yellow to yellow-orange blooms are quite attractive and are on short flower stalks (pedicels) in the upper portions of the plant between the stems and the leaf axils. The plant has distinctive 2cm diameter circular seedpods. These have a ring of “prickles” around the upper edge and have a series of crimps along the sides which resemble those of a piecrust edge. Hence, another common name for this plant is “pie-maker”.

The plant has become very invasive in Canada and USA with significant reduction in corn crop production claimed where it is found. The seeds can lie dormant for many years, and once disturbed can literally take over a field. The species is very opportunistic, especially at disturbed sites including farm fields and will out-compete desirable plants if given the chance.

Butter print has a variety of medicinal uses. The Chinese use the plant for many ailments such as stomach aches, fever and dysentery. In experiments it has been shown to be a depressant. It produces a strong fibre in the stems (China jute) that can be used in the making of rugs and is a source of oil.



This unusual plant that looks like a mallow was noticed in the corner of a field of maize near Helensville in late January.
 Photos: Greg Hoskins

Exhibition pricks preconceptions of iconic plant of the NZ landscape

Regan Gentry, the current artist in residence at Tylee Cottage, Wanganui, has turned a hillside of gorse (*Ulex europaeus*) into a collection of artworks that provide humour, enjoyment and amazement. Like it or loath it, gorse has become one of the iconic plants of the New Zealand rural landscape. From fence to fodder, prickly scourge to nurse crop and now art medium.

It is gorse's multiple personalities that struck Regan during a chance meeting when hitchhiking with foreigners. "What, this golden-flowered beauty is evil legumified?" Regan was inspired to use gorse timber, fibre and flowers to produce sculpture that explores both the historic and cultural impact of this "reluctant emblem".

The exhibition communicates the changing attitudes to gorse and the continual collision between benefit and problem — pest or resource. In the 1800s gorse was viewed as a utilitarian plant assisting in the "breaking-in" of New Zealand by providing cheap fences to define boundaries and contain and feed stock, as well as villain and colonial scourge of the landscape by forward thinkers. And ironically, now it has come to be seen by some as a valuable nursery species in long-term revegetation projects, protecting once-cleared land from erosion.

Gorse is one of the ultimate examples of a plant transforming an environment where it doesn't belong. However, even this point is now contested by some landscape architects who recommend that gorse hedges in Canterbury be retained for cultural significance.

Regan undertook this project while a recipient of the William Hodges Fellowship in Invercargill during 2006. Gorse was sourced with the help of Environment Southland, and an area roughly 200m² was cleared to produce enough usable wood for the project. Seeds were collected over four weeks and flowers were harvested to make wine, perfume and paper. Each piece was hewn, cut, dragged, milled, dried and then painstakingly sawn, planed, sanded before being joined and oiled or waxed. Gorse wood, high in lignin and silica, wreaked havoc on bandsaw and buzzer blades,



Regan Gentry with some of the works in his exhibition, *Of Gorse of Course*, now on at the Millennium Gallery in Blenheim.

Photo: Graig Davey

and if not broken down into timber within 10 days the rapidly diminishing oil content led to massive shrinkage causing deformed and split timber. It seems that from any angle, gorse is against the intentions of man.

This exhibition is a must-see if you've battered gorse on your own land, taken up arms against it in your work, established a hate relationship upon getting too close for comfort, or even for those that have an appreciation of the positive aspects of a gorse infestation.

Complementing the collection is a book titled *Of Gorse of Course*, which is an insightful look behind the scenes and demonstrates Regan's immersion in his subject. The book not only tells the story of this work but also the story of gorse in New Zealand.

Craig Davey

Horizons Regional Council

Of Gorse of Course is on show at Millennium Gallery, Blenheim, until April 20.

[Return to Contents Page](#)

The IUCN Red List – impacts on threatened taxa

By Shyama Pagad

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The International Union for Conservation of Nature (IUCN) Red List of Threatened Species is recognised as the most authoritative inventory of the global conservation status of species. The Red List, which covers a wide range of taxonomic groups including plants, vertebrates, invertebrates and fungi, provides information on taxa that have been globally assessed using the Red List Criteria and Categories.

Taxa that have been assessed as having a higher risk of extinction are listed as either “Critically Endangered”, “Endangered” or “Vulnerable”.

Taxa that are close to qualifying for the above three categories are listed as “Near threatened”; taxa that have been assessed as being widespread and abundant are listed as “Least concern”; and taxa that lack in distribution or abundance data and therefore cannot be assessed are listed as “Data deficient”. Two other categories assigned are “Extinct” and “Extinct in the wild”.

A typical species account includes: taxonomic, distribution and assessment information; classification information on major habitats, major threats and conservation action recommended; and detailed documentation on range, population, habitat and ecology, and conservation action ongoing. Data sources are also listed.

Threat classification which could be in the past and/or present and/or future, uses a time frame of three generations or 10 years, whichever is the longer but not exceeding 100 years into the future. Major threat categories include: Habitat Loss/Degradation (human induced), Invasive alien species (directly affecting the species), Harvesting (hunting/gathering), Accidental mortality, Persecution, Pollution (affecting habitat and/or species), Natural disasters, Changes in native species dynamics, Intrinsic Factors, Human disturbance and Other.

Threat processes vary within and between taxonomic groups and have been found to be dynamic, changing



IUCN's Red List website: www.iucnredlist.org/

over time. The 2004 Global Species Assessment (Baillie et al. 2004) explains that habitat destruction, degradation and fragmentation is overall the greatest threat for assessed terrestrial species. Birds, mammals and amphibians are vulnerable to specific threat types, 33% of threatened mammals are impacted by over-exploitation, 29% of threatened amphibians by pollution, including climate change, and 17% by disease (mainly by the chytrid fungus *Batrachochytrium dendrobatidis*).

Invasive alien species (IAS) have been identified as a major threat affecting 30% of threatened birds, 11% of threatened amphibians and 8% of threatened mammals (Baillie et al. 2004). IAS are the biggest threat to freshwater species after habitat loss and pollution.

Threat types listed under “Invasive alien species (directly affecting the species)” (see, www.iucnredlist.org/info/major_threats) include: 2.1. Competitors, 2.2. Predators, 2.3. Hybridizers, 2.4. Pathogens/parasites, 2.5. Other and 2.6. Unknown.

IUCN Red List Continued

Sixty seven percent of threatened birds on islands are under threat by IAS, with the predominant threat type being predator impacts. The best known example is the impact of the brown tree snake (*Bioga irregularis*) on the avifauna of Guam. The brown tree snake, native to eastern Indonesia, the Solomon Islands, New Guinea, and the northern and eastern coasts of Australia, was introduced to Guam and the Northern Mariana islands as a stowaway in military equipment and cargo.

Results of a study by Wiles et al. (2003) indicate that 22 bird species, including 17 of 18 native species, were severely affected by the brown tree snakes. The 12 extirpated (locally extinct) species include white-tailed tropicbird (*Phaethon lepturus*); brown booby (*Sula leucogaster*); Guam rail (*Gallirallus owstoni*); white-throated ground-dove (*Gallicolumba xanthonura*);

Mariana fruit-Dove (*Ptilinopus roseicapilla*); Micronesian kingfisher (*Todiramphus cinnamominus*); Guam flycatcher (*Myiagra freycineti*); rufous fantail (*Rhipidura rufifrons*); nightingale reed-warbler (*Acrocephalus luscinius*); Micronesian honeyeater (*Myzomela rubratra*); bridled white-eye (*Zosterops conspicillatus*) and the chestnut munia (*Lonchura atricapilla*). The three species which were nearly or temporarily extirpated include brown noddie (*Anous stolidus*); white tern (*Gygis alba*) and Mariana crow (*Corvus kubaryi*).

The data in the IUCN Red List is updated bi-annually or annually, with the last update in mid-2007. In-depth analyses of the data contained in the Red List are conducted periodically and results published: the last assessment conducted was in 2004. The next major analysis is due to be published in 2008.

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NIPR – ensuring working partnerships

Creating effective working partnerships is a key part of ensuring that the MAF-led National Interest Pest Responses (NIPR) achieve the goal of eradication.

The operational plans for each of the NIPR species have been developed to reflect the pivotal role biosecurity agencies play in the work on the ground. Operational agreements have been put in place between MAF and regional councils, and MAF and area offices within the Department of Conservation (DOC), with the agencies undertaking the delivery of control in the field, for many of the NIPR species.

Northland, Auckland, Environment Waikato and Greater Wellington regional councils are all working on the eradication or containment of Manchurian wild rice (*Zizania latifolia*). A best practice workshop was held in Northland recently, and provided a firsthand look at the scale of the Manchurian wild rice problem in the region. The workshop also provided a forum for discussion of effective practical field technique, promising control methods in need of further development, and barriers limiting progress and how they can be overcome.

In the Manawatu, Hawke's Bay and Waikato, DOC and regional council staff are working on white bryony (*Bryonia cretica* ssp *dioica*) and pyp grass (*Ehrharta villosa*) respectively. This allows those involved to build



Andrew Mercer, DOC, standing among pyp grass growing at a new site in Waitarere Forest, Horowhenua.

Photo: MAFBNZ



Manchurian wild rice workshop attendees inspecting Manchurian wild rice in pasture, near Dargaville in February.

Photo: Peter Joynt

on previous experience with these species, and bring to bear an increased focus on total eradication.

Greater awareness by all partners has already paid dividends in the recent identification, by a DOC staff member, of a new site of pyp grass in the Waitarere Forest, Horowhenua, well away from other known populations.

Working partnerships extend beyond the key biosecurity partners. Landowners and managers are also vital participants. This has been highlighted in both the Manchurian wild rice and the pyp grass work. Several sites of the pests occur within production forests, and have required close liaison with the owners to ensure that the pests are not spread as a result of forest management activities.

Eradication of the NIPR species is a big task, but with partners working together, it is achievable.



New measures follow potting mix weed importation

MAF Biosecurity New Zealand (MAFBNZ) is working closely with the nursery and gardening industry to limit the distribution of suspected pest weeds through contaminated imported coconut fibre.

A consignment of the fibre (known as coco peat or coir fibre) was imported from Sri Lanka last October and went to a potting mix manufacturer for further processing. It was made into a variety of potting mixes and on-sold to about 70 nurseries, plant propagators and growers, mainly in the North Island.

One of those customers noticed sprouting seeds in some of its already potted plants and, along with the supplying company and the Nursery and Garden

Industry Association (NGIA), reported the find to MAFBNZ.

A number of new-to-New Zealand weeds have been identified. MAFBNZ will conduct risk assessments to determine the likelihood of establishment and the potential impacts of the weeds. At this stage it is expected that many of the weeds, which are of tropical origin, will not successfully establish in New Zealand due to climatic limitations.

As a precautionary measure, MAFBNZ now requires all imported coir fibre to be heat treated on arrival in New Zealand to prevent entry of any further contaminated product. This is an interim measure until longer-term management options for this product are assessed.

Oil-rig defouling leads to Tasman Bay clean-up

Dredging has taken place in Tasman Bay to reduce the risk posed by marine organisms that were dislodged from an oil rig during a routine cleaning late last year.

Particularly rough seas meant the cleaning — known as defouling — was carried out in the sheltered waters of Tasman Bay. The site where the rig was cleaned was about 12 nautical miles (22km) offshore.

After the defouling was under way, MAFBNZ received survey information showing there may have been small numbers of a potentially invasive South African brown mussel (*Perna perna*) on the rig structure. *Perna perna* is classified on a global database as an invasive species, but it is not really known how well this mussel species would establish in the New Zealand environment.

On receipt of the advice, MAFBNZ surveyed the drop

zone area beneath the defouling site and found some living mussels, including a couple of suspected brown mussel individuals. Testing has yet to confirm if they are brown mussel.

As a precautionary measure, however, immediate dredging of the whole defouling site was initiated. The dredging crew has been bringing some three tonnes of debris each day back to shore for disposal in a landfill.

The clean-up is expected to take until next week, weather permitting. To date, less than one percent of mussels found in the dredged material are “suspect” in that they could be brown mussel.

The clean-up operation is being largely funded by the oil rig’s owners.

MAFBNZ is continuing to meet with local concerned parties to keep them up to date with the operation and to receive input into future actions.