Tiakina Aotearoa
Protect New Zealand

The Biosecurity Strategy for New Zealand

August 2003

The Kakapo...

Perhaps the most significant site in New Zealand for those who care about our native species is a small circle of punga logs on Pigeon Island in Dusky Sound. This modest enclosure was built in 1894 by Richard Henry, New Zealand's first conservator of native birds, to temporarily hold the Kakapo he was trying to save from the ferrets, stoats and weasels imported ten years earlier to control rabbits. This importation, "the rash act of the greatest fool that was ever called a naturalist"[1] was a disastrous state-sponsored attempt at biological control. It was New Zealand's worst ever biosecurity decision, taken in the face of strong opposition from scientists and the public.

A century later, the proliferation of ferrets, stoats and weasels throughout the country imperils all our native birds and threatens ground-dwelling birds (kiwi and yellow-eyed penguin in particular) with extinction.

Richard Henry understood this threat earlier than most. He spent almost six years, working in incredible hardship and total isolation, capturing Kakapo in the South Island then rowing across Dusky Sound to release them on Resolution Island. This large barrier island to the far south west of New Zealand was considered too remote for the predatory ferrets, stoats and weasels to invade. Tragically, early in 1900 a weasel was sighted on Resolution Island. Richard Henry hoped the sighting was mistaken, until he saw a weasel later that year and spent three weeks trying to catch it, without success. Richard Henry's six years of personal sacrifice had been in vain – despite successfully transferring 700 Kakapo to Resolution Island, he'd failed to protect the species.

Despondent, Richard Henry wanted to leave the island but the Government convinced him to stay on, so he continued to study his beloved Kakapo for a further seven years, observing their decline.

His pioneering work in biosecurity forms the basis of our knowledge of these wonderful birds and has contributed to the current programme to prevent their extinction. It stands in sharp contrast with the shortsighted decision to import the predators.

One hundred years later...
In June 2002 a large number of wild rosella parakeets in pre-export quarantine in Auckland started dying from an unknown disease. Although the owner tried to conceal this event, MAF's surveillance systems soon detected the epidemic. Poxvirus - an exotic disease of parrots - was considered a possible cause so MAF responded with stringent quarantine measures while investigating the problem. When parrot pox was confirmed all 'in-contact' birds in three aviaries were destroyed and the premises disinfected. Ultimately, while it is clear this exotic disease did enter the country, there is no evidence that it escaped into wild populations. But MAF remains watchful. MAF maintains biosecurity measures to keep New Zealand free from diseases like parrot pox that could harm our native birds, including the Kakapo.

Nowadays it wouldn't be possible to make a decision as foolhardy as the importation of weasels and stoats.

The Environmental Risk Management Agency (ERMA) runs a transparent and precautionary decision-making process, taking into account all possible impacts (economic, environmental and social) before the introduction of a new species can be approved.

Surveillance and response programmes run by the Ministry of Health (MoH) and Ministry of Agriculture and Forestry (MAF) protect New Zealand from exotic mosquitoes and the diseases they might carry. Hawaii, similarly isolated, is a case study in the importance of managing this risk - avian malaria, spread by exotic mosquitoes, has killed many of its rare native birds.

The Department of Conservation (DOC) operates a number of internal biosecurity barriers to stop pests and diseases from invading the last Kakapo sanctuaries on outer islands.

This Biosecurity Strategy is dedicated to

Richard Henry
(1845-1929)

for his wisdom, foresight and concern, and to all those who have followed his example in providing biosecurity for our native species

The Kakapo is now extinct on mainland New Zealand, and the last survivors have been moved to the offshore islands of Codfish, Maud and Little Barrier. It used to be common throughout the country; now there are fewer than 100. The Kakapo's sole defence mechanism, a pungent smell, only helped advertise its presence to humans wanting the feathers, skin and flesh.

Kakapo live for about 60 years, with a slow breeding cycle. It is the world's heaviest and only flightless parrot, measuring up to 60 cm in length and weighing up to 3.5 kilograms. It is incapable of flying but can climb trees, using its wings to parachute to the ground. It is nocturnal, solitary and secretive.

During the breeding season, male Kakapo 'boom', a sound like distant thunder. They boom about 1,000 times each hour, all night long, for up to four months. The highly distinctive noise is audible up to five kilometres away.

Over the past decade DOC has led the Kakapo Recovery Plan, a significant effort by many dedicated people to save the Kakapo from extinction[2]. Last year their numbers slowly increased from 62 to 86 - but it will be many years before their survival is assured.

[1] A Newton, Professor of Zoology at Cambridge, England, in a letter to NZ naturalist W L Buller in 1876 on the proposed introduction of the polecat into New Zealand.
[2] For more information, www.kakaporecovery.org.nz

Office of Hon Jim Sutton
Minister of Agriculture
Minister for Biosecurity
Minister of Forestry
Minister for Trade Negotiations
Minister for Rural Affairs
MP for Aoraki

Kia Ora

Growing international trade, greater mobility and climate change make New Zealand's border increasingly vulnerable to new pests and diseases, many of which could destroy our economy, our lifestyle and our iconic species of birds and plants. Too many species have been lost forever; others are imperilled.

New Zealand's isolation from ravaging diseases, such as Foot-and-Mouth, isn't just due to geography. Responsible people understand many of the issues, but it is imperative that all New Zealanders (and all our visitors) understand why we have such rigorous biosecurity measures to protect us, and future generations. Obeying biosecurity rules must become as fundamental as wearing seat belts in cars.

New Zealand has had some major biosecurity successes, but many challenges remain. Biosecurity deals with living problems, inevitably changing, so we must ensure our systems are dynamic, constantly evolving to keep pace. New Zealand's response, one of continuous improvement, must be relentless.

Our biosecurity interests have been actively policed by our biosecurity agencies (Agriculture & Forestry, Conservation, Fisheries and Health), for which we should all be grateful. As Minister for Biosecurity, I'm giving my full support to the recommendations of "Tiakina Aotearoa – Protect New Zealand'' (New Zealand's first biosecurity strategy). It is the result of months of consultation and deliberation. I would like to record my appreciation to the wide spectrum of interested parties who contributed - amongst others the government departments, regional councils, representatives of industry and farming, and conservation organisations.

I hope this strategy will be widely read and that it will encourage everyone to take personal responsibility for biosecurity, and remain vigilant. As Minister for Biosecurity, I will be working to ensure the Biosecurity Council's expectations are fully implemented by the Government.

Yours sincerely

Hon Jim Sutton
Minister for Biosecurity

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Part I

Foreword

John Hellström, Biosecurity Council chair

New Zealand is more dependent on biosecurity than any other developed country. Our economy and trade are largely based on the exotic species brought here by settlers in the 19th century; and our freedom from major pests and diseases is critical to producing efficiently and trading freely.

Almost 60% of our exports and 20% of our Gross Domestic Product (GDP) depend on efficient and healthy primary production. Importing countries are becoming increasingly concerned about any risks to their own production systems; consumers care more about pests and diseases carried on produce. This strategy illustrates just how much we all have at risk.

But biosecurity is equally important to two other special aspects of Aotearoa – our unique indigenous flora and fauna and our relative freedom from pests that affect human health and welfare.

> Charles Darwin visited New Zealand in 1835[1], 24 years before he published the 'Origin of the Species', on the Beagle, a British navy brig. In Waimate, Northland he observed imported species over-running native plants and animals. "It is said that the common Norway rat, in the short space of two years, annihilated in this northern end of the island, the New Zealand species", Darwin wrote. "In many places I noticed several sorts of weeds, which, like the rats, I was forced to own as countrymen." "A leek has overrun whole districts, and will prove very troublesome, but it was imported as a favour by a French vessel. The common dock is also widely disseminated, and will, I fear, for ever remain a proof of the rascality of an Englishman, who sold the seeds for those of the tobacco plant."

Over the past 100 years there has been a profound change in the way Pakeha New Zealanders regard native species. From the time of James Cook's voyages, Europeans have been trying to modify New Zealand's biota. By the time of Darwin's visit, in 1835, the transformation of New Zealand's indigenous biodiversity was already unstoppable. In the next 60 years, the primeval environment of Aotearoa was changed forever. Only then, and almost too late, did people like Richard Henry start trying to protect what remained. Now, most New Zealanders recognise that what we have left of the native biodiversity is unique and precious, and endangered.

The activities we now call biosecurity started in 1849, initially to protect the newly introduced farmed species from pests and diseases that would cause economic loss. By the 1960s, we had world-leading systems to protect our farms, exotic forests and orchards, and our ability to trade. Still, little thought had been given to protecting our native flora and fauna on the land and in lakes, rivers and wetlands from pests; none had been given to protecting our marine eco-systems.

DEFINITION: Biosecurity is the exclusion, eradication or effective management of risks posed by pests and diseases to the economy, environment and human health.

It is against this background of development in systems, expertise and changing social values that biosecurity has come under scrutiny and challenge in the last decade.

New Zealand's Biosecurity Act, passed in 1993, was a world first; a law specifically to support systematic protection of all our valued biological systems - introduced and indigenous - from the harmful effects of exotic pests and diseases. Unfortunately, scant resources were applied too slowly, making it impossible to achieve the changes in systems and attitudes needed to match this new concept.

[1] NZ Herald, June 19, 2003

It has become clear - not least from the numerous recent reviews - our biosecurity system is struggling to cope. This is not because our biosecurity people don't care, or aren't committed. Instead, they have been unable to develop the capabilities required because of the dual challenges - huge increases in pressure on the border, and heightened public expectation about the protection of our natural heritage, both marine and terrestrial.

Despite this, New Zealand has been well served by a system that has kept our livestock amongst the healthiest in the world, and our fields and forests highly productive and tradable. But our national biological assets are now under greater threat than before as the volume, sources and speed of movement increases the chances of exotic pests arriving with imported goods and passengers. Our biosecurity systems have to evolve quickly and perform even better than in the past. They need to become more extensive as the border becomes more diffuse, more adaptable to respond quickly to unpredictable threats and more robust to repel invading species.

This poses a challenge to all New Zealanders, not just those with formal biosecurity roles. We need support, participation and compliance from all New Zealanders to protect our ideal - a country where healthy systems of primary production thrive alongside a secure and stable indigenous biodiversity and where people remain untroubled by harmful pests that are venomous or spread disease.

The Biosecurity Council has recommended changes it believes are needed urgently to provide the foundations for achieving that vision. Beyond that, there is little detail on implementation in this strategy; much of this is contained in the Cabinet decisions to be released in conjunction with this strategy. Instead, there is an explicit set of expectations throughout this strategy. Many of these expectations need to be achieved soon, over the next three to five years; others are longer term.

The Council expects this document will still be a useful benchmark ten years from now, providing evidence that biosecurity is evolving and delivering the outcomes expected. We must all remember that biosecurity is not the dream; it is a set of tools to achieve the dream.

It's not going to be easy. But it will be far harder, perhaps impossible, if we don't work towards common goals in a spirit of cooperation and mutual support. Our current system suffers from an inability to reach balanced decisions for the greatest good. That's why there are so many gaps in the system that are known but not filled. Reaching agreement on priorities often seems like negotiating at Babel.

This strategy proposes a unifying decision-making and prioritisation process that is set out in more detail in Cabinet papers. But this strategy can't be comprehensive in the sense that decisions will become easy. The complexities of varying value sets and perspectives mean it will only work if officials and stakeholders are committed to its success. The decision-making process must learn from accumulated decisions and evolve as our understanding of impacts and interactions grows. It is clear from stakeholder comments that the public will be intolerant of any failure to address this problem now that the opportunity is here.

Today our biosecurity system routinely keeps out many more bugs, and deals quickly with much more of what gets in, that it ever did in the past. The worry is that it isn't getting better fast enough. The three-year process that has generated this strategy has raised expectations that our biosecurity systems will improve and in some areas improve quickly.

This strategy proposes a direction for New Zealand's biosecurity, to meet the mounting pressures and society's growing expectations. This is a very challenging goal, but one to which we should all aspire, for ourselves and for future generations.

It's been talked about for ages; now it's time for action.

— John Hellström

Boundaries of the strategy

Biosecurity is inevitably riddled with grey zones – where does it start or end?

In its broadest sense biosecurity covers all activities aimed at managing the introduction of new species to New Zealand and managing their impacts once here. This includes intentional (including illegal) and unintentional introductions and the containment of new and unwanted organisms in laboratories, quarantine facilities and zoos. It also covers the management of weeds and animal pests by central and local government agencies, industry and individual landowners. The only human diseases it covers are those spread by animals.

The focus of this strategy is on pre-border, border and post-border activities designed to keep out new pests. These are central to the Crown's biosecurity responsibility. Beyond this, the strategy addresses the Crown's role in maintaining and monitoring the framework for pest management under which agencies, industry and individuals take collective actions against pests.

The strategy does not focus on the framework for managing the intentional introduction of new organisms, including Genetically Modified Organisms (GMOs), because this has been the subject of a separate review process - firstly by the Royal Commission on Genetic Modification, then by the Government in developing its response (which includes the New Organisms and Other Matters Amendment Bill). Nor does this strategy focus on the role and capability of ERMA, which has been the subject of a separate review. The Council is unaware of any scientific basis to treat GMOs as a different class of biosecurity risk, requiring some special approach. The need for appropriate surveillance and response capability to deal with possible GMOs incursions does need to be addressed.

Bioterrorism is not discussed in this strategy. Conceptually, bioterrorism is simply another vector for transmission of unwanted pests and species. The intent, however, is quite different and the scale of damage potential catastrophic. New Zealand needs to remain conscious of the potential risk and use this strategy as firm foundation for any further work. For instance, Foot-and-Mouth Disease (FMD) could be introduced into New Zealand as an act of terrorism, with potentially disastrous results for farmers, business interests, tourism and the nation. Work has been undertaken to understand and mitigate this risk.

Vision & goals

Our vision – New Zealand's biosecurity in 2010

"New Zealanders, our unique natural resources, our plants and animals are all kept safe and secure from damaging pests and diseases"

In 2010... New Zealand has a high performing, integrated system for managing biosecurity risks to the economy, environment and human health. New Zealanders understand and have confidence in the biosecurity system; committed and playing their vital role, from pre-border through to pest management.

Biosecurity is making a significant contribution to achieving a range of goals for the economy, environment and human health, including:

- ✓ Protecting marine and terrestrial primary industries and facilitating exports and tourism;
- ✓ Protecting New Zealand's indigenous biodiversity – our native species, natural habitats, ecosystems and landscapes;
- ✓ Enabling sustainable use of natural resources and protection of the natural environment;
- ✓ Maintaining the relationship between Maori and their culture and traditions with ancestral lands, waters, sites, waahi tapu and taonga;
- ✓ Protecting the health of New Zealanders from zoonotic and pest-borne diseases and from venomous species; *and*
- ✓ Reducing the damage caused by pests and diseases introduced in the past.

New Zealand's biosecurity system is providing evolving protection as risks are identified and change. Decisions are made on a case-by-case basis within a consistent, transparent decision-making framework. Cooperating agencies are clearly accountable and reporting on performance. A comprehensive review of the Biosecurity Strategy has just been completed, with refined goals and adjustments to programmes agreed.

New Zealanders have confidence in the management of biosecurity risks and are satisfied there is strong leadership and commitment at all levels. The biosecurity system is well organised, information is shared and efforts are well coordinated and focused.

Decisions are founded on good information, based on quality science, taking into account the full range of values at stake and with transparent trade-offs. There is efficient use of the biosecurity budget and biosecurity risk management (from pre-border to pest management) provides an appropriate and sustainable level of protection for New Zealand.

The impacts of biosecurity are most important in:

1. **New Zealand's economy;**
2. **New Zealand's biodiversity; and**
3. **New Zealanders' health.**

The challenge lies in the implementation.

New Zealand's biosecurity system leads the world, but it's under increasing pressure. Ever since humans began travelling, assorted livestock, crops, pets, terrestrial and aquatic pests[1] and weeds have tagged along. While our primary production industries are based on valuable introduced species, many other exotic species have become major problems for agriculture and have devastated native species and ecosystems.

Globalisation has seen increasing volumes of goods and people moving at greater speeds around the world. New Zealand's freedom from the world's worst pests and diseases is crucial to our success and welfare – as a nation, we rely on trade and travel, so robust biosecurity is fundamental to New Zealanders' future prosperity and well-being. Performance across the system needs to lift to meet the challenges of the 21st century and deliver the level of biosecurity appropriate to protect New Zealand's people, environment and economy.

Keith Broome, Crown Copyright:
Department of Conservation Te Papa Atawhai (2003)

Punga tree damaged by possums. Possums were introduced from Australia in 1837, for the fur industry. Possums literally eat trees to death, in particular pohutakawa, rata, totara and kowhai. They also spread bovine tuberculosis to cows, cattle and deer.

[1] Several submitters preferred the term 'invasive alien species' rather than 'pests, pests and diseases'. In this document, all three terms can be regarded as having equivalent meanings - for simplicity's sake the common term 'pests' has been used.

Biosecurity contributes to achieving wider goals, including those set out in the New Zealand Biodiversity Strategy, the Government's Growth and Innovation Strategy and the Government's principles for sustainable development. Biosecurity is a crosscutting issue, contributing to a wide range of outcomes for the economy, biodiversity, human health, and national identity.

But biosecurity is more than protecting against potentially catastrophic pests and diseases. Our goal is to have the best possible biosecurity system – identifying, assessing and responding appropriately to all pests posing a significant threat to agriculture, forestry, horticulture, fisheries, native biodiversity, and human health. Appropriate responses will include eradication, containment, and on-going control.

Our vision can be broken down into a number of goals for the different activities in biosecurity. These are:

- Prevention and exclusion: preventing the entry and establishment of pests and unwanted organisms capable of causing unacceptable[2] harm to the economy, environment and people's health;
- Surveillance and response: early detection, identification and assessment of pests and unwanted organisms capable of causing unacceptable harm and, where appropriate, deployment of a rapid and effective incursion response that maximises the likelihood of eradication; *and*
- Pest management: effective management (including eradication, containment and control) of established pests and unwanted organisms capable of causing harm to the economy, environment and people's health.

To achieve these goals, the biosecurity system needs to have the following elements:

- Strong global and regional relationships to identify and manage emerging risks;
- Identification of all risk pathways and high risk organisms, and implementation of pre-border and border measures to prevent pests and diseases entering New Zealand;
- Comprehensive, competent surveillance programmes and diagnostic services to detect and identify the arrival and spread of pests and diseases;
- Sufficient capability to conduct timely assessment of the threats from new or expanding species;
- Rapid response capability to eradicate new pests and diseases before they establish and spread;
- Seamless integration between the appropriate agencies of central, regional and local government, each with clear roles and accountabilities;
- Effective strategies in place for eradicating, containing and controlling pests and diseases already established;
- Effective education and awareness programmes to encourage compliance with biosecurity rules and regulations;
- Strong enforcement of our biosecurity laws which are reviewed and rationalised as required;
- A strong input of scientific advice to all levels of policy, planning and decision-making;
- The support of all stakeholders across the spectrum of biosecurity interests; *and*
- A strong culture of continuous improvement.

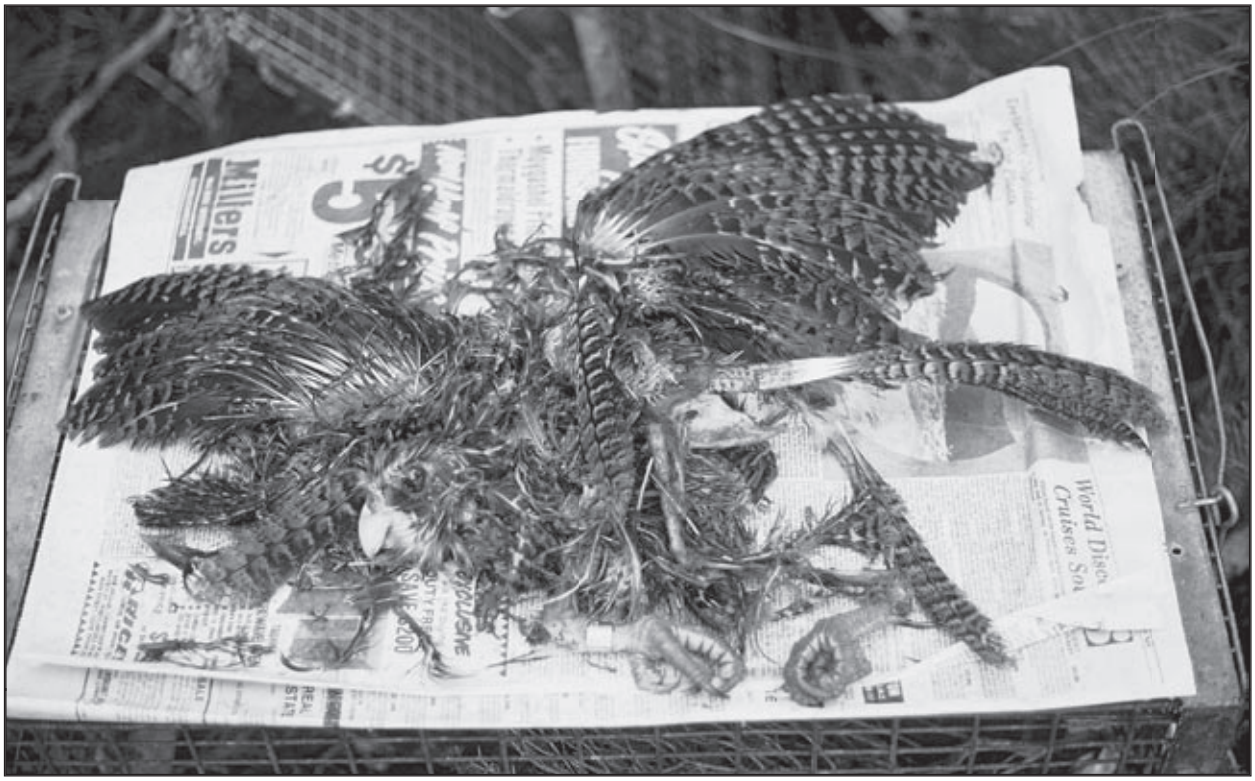
[2] Unacceptable means that there are no cost-effective control or eradication options OR that there are no other benefits which outweigh the costs (costs and benefits should include both the tangible and the intangible).

If biosecurity is working

Biosecurity is an important issue for a large range of stakeholders, so it is expected this strategy will mean:

1. Primary producers will know the best efforts are being taken to reduce risks to production, with strong border controls and well-planned and resourced surveillance and incursion response capabilities in place.
2. The public will understand biosecurity's importance, comply with its rules, report the unusual and have confidence that dangerous incursions are minimised and managed appropriately.
3. Environmental groups will know risks to flora and fauna are being minimised, established environmental pests are being managed appropriately, and the biodiversity of our native ecosystems are being protected.
4. Maori will be involved in biosecurity.
5. Scientists will know decisions are based on the best scientific knowledge available, gaps in science capability are being closed, and there are incentives for them to work collaboratively across agencies.
6. Regional councils will recognise central government's leadership role - facilitating national coordination (where appropriate) and involving regional councils transparently in relevant decisions and actions.
7. The public health sector will know the risk of zoonotic and pest-borne diseases and venomous species being introduced is being managed effectively.
8. Industry sectors – such as importers, exporters and the travel industry – are playing a major role in reducing biosecurity risks.
9. Government will be confident that New Zealand's biosecurity system is robust.

Expectations – Biosecurity operations	
The overall expectation is:	
1.	That the biosecurity system is fully integrated, operating efficiently and transparently in an environment of continuous improvement (measure, review and refine)



Don Merton, Crown Copyright: Department of Conservation Te Papa Atawhai (2003)

The remains of a Kakapo, after being attacked by a cat on Stewart Island. Cats and dogs are natural hunters, so even domestic pets can be very destructive to our native birds. In addition, there are thousands of feral cats – unwanted kittens, strays and, of course, their offspring – in New Zealand. DOC rescued the remainder of Stewart Island's Kakapo population after this killing. North Island saddleback, pied tit, tui and red-crowned parakeet were eliminated on Cuvier Island, off the Coromandel coast, mostly through predation by cats. Cats were introduced to Mangere Island, in the Chathams, to control rabbits but in addition eliminated at least two species of seabirds and most forest birds by 1950. In 1987 a dog was on the loose in the Waitangi State Forest in the Bay of Islands for six weeks. By the time it was caught, as many as 500 of the 900 kiwi living there had been slaughtered. This was not an isolated incident - between 1990 and 1995, dogs caused 135 (70%) of 194 kiwi deaths reported in Northland. Deaths caused by pets included dogs being taken for day time walks and dogs not tied up at night, at home or camping. In the same period five kiwi were also killed by a feral cat and more by ferrets, stoats and weasels.

What will change

This strategy will have made a difference if the following have occurred:

- Clearer accountabilities: agencies are delivering on their clearly defined roles, strongly aligned to expectations and accountabilities;
- Strong integration across stakeholders: efforts of central and regional government are well coordinated and integrated with the efforts of industry groups and Non-Government Organisations;
- Effective capability: agencies are developing the necessary capabilities to deliver on their responsibilities;
- Clear risk profile and priorities: there is a much clearer view of New Zealand's current and emerging risk profile and decision tools are being used to help identify priorities; *and*
- Key performance indicators are in place across the biosecurity system, linking the Government's overarching goals for the economy, environment and health.

Part II

Consistent themes from stakeholders

Just over three years ago, the Government's biodiversity strategy 'Our Chance to Turn the Tide' highlighted the need to improve the protection of our shores from the damaging effects of invasive species. Consultation began in June 2000, leading to an issues paper sent to nearly 2,000 individuals and groups (including schools, community organisations and environmental groups). This was followed by an extensive round of consultation including hui, meetings and workshops throughout New Zealand. These submissions were collated and analysed, and it soon became clear there were some strong views on the way biosecurity should evolve; even stronger views on the current system's flaws. This work led to the release of the draft biosecurity strategy, 'Guarding Pacific's Triple Star', late in 2002.

Nearly 150 submissions on the draft strategy were received by mid-March 2003 and our website (www.biostrategy.govt.nz) received over 17,000 hits. These submissions were categorised in a 98 page analysis and an 18 page summary; both documents are on the website.

Since the beginning of the year, a group has been working on an implementation plan to support the final biosecurity strategy. Both the strategy and the implementation plan draw substantially on the plethora of biosecurity reviews and reports produced in recent years and listed in the appendix.

The consistent themes from the consultation with stakeholders on the draft strategy have been:

1. **For clearer accountability of biosecurity performance;**
2. **To improve the coordination and management of the highly fragmented biosecurity system;**
3. **To consider the full range of possible impacts when making biosecurity decisions;**
4. **To have a consistent approach to assessing and managing risks across all sectors;**
5. **For biosecurity to be run far more strategically; *and***
6. **For greater levels of funding for biosecurity activities and a consistent approach to funding those activities.**

Looking to the future

A series of biosecurity reviews have focused on the system's faults, looking at short-term fixes and responses, without necessarily looking to the future. This document, New Zealand's first biosecurity strategy, proposes a fundamental shift in our approach to biosecurity.

Growing threats

Despite constantly improving technology we will have to 'run harder to stand still'. Over the past 10 years trade volumes have increased by 76%[5] and international passengers by 93%; a high level of growth should continue. This pressure on the border increases the chances of known pests and diseases entering New Zealand. It is imperative New Zealand remains free of diseases – like Bovine Spongiform Encephalopathy (BSE), Foot-and-Mouth Disease (FMD) and Pine Pitch Canker – and pests like fruit flies. Any one of these could cause major economic damage.

Additionally, new threats will emerge across all sectors; nature is not standing still. Every few years completely new diseases appear in the world - BSE, HIV-AIDS, Sudden Acute Respiratory Syndrome (SARS) and Rabbit Calicivirus Disease (RCD) have spread rapidly. Some like BSE and RCD become major biosecurity threats. We have also seen the arrival of Painted Apple Moth, Guava Moth, Scolliid Wasp and Tropical Grass Web Worm. These particular organisms couldn't have been predicted on the basis of pest profiles in their home countries.

Changing climatic conditions mean the ranges for certain pests are steadily extending. Invasive pests are an emerging global problem threatening biodiversity everywhere; evolving and adapting as they spread. These emerging pests and diseases are likely to be carried along new and different pathways, and are more likely to be resistant to current treatments.

Meeting the challenge

Biosecurity will need to be adaptable, robust and competent to handle these growing threats. It will need to be built on a solid footing, which means addressing the six key themes identified by stakeholders in the box above ('Consistent themes from stakeholders'). Currently, these foundations are not complete, as evidenced by the continuing stream of reviews. It is imperative this strategy (and the Government's consequent decisions) allows biosecurity to address these concerns.

Building a biosecurity system to meet our future needs means an organisational mind-shift to embrace all the values at risk in the definition of 'biosecurity' and to deal with them strategically. This will not happen unless there are changes in systems, structures and decision-making processes – along with increased capability and capacity. New Zealand's ability to manage biosecurity risk needs bolstering, support and challenge. It will require strong leadership from within – and oversight from stakeholders in providing feedback and constructive criticism.

Three key areas need developing:

1. **The ability to prioritise across activities (pre-border to pest management) and sectors (conservation, agriculture, forestry, aquatic and human health);**
2. **Establishment of systems and standards to allow monitoring and continuous improvement; *and***
3. **Building underpinning knowledge and decision support systems.**

Biosecurity protects all our biological resources, which contribute to environmental quality, economic prosperity, health and lifestyle. Biosecurity is about controlling living systems, which requires ongoing effort. It is not enough to provide it for one day; it must be provided every day.

At agency level – central and local government – we have significant strengths built through the experience developed to protect primary production. These now need to be built on to address indigenous biodiversity and health threats, in a much more integrated manner.

The process has started. The mind shift began with the Biosecurity Council's formation in 1997; which brought together the chief executives of relevant government departments with representatives from regional councils, primary producers and environmental groups. The policies it developed are now used across agencies.

The mission of MAF's Biosecurity Authority shows good intent: – "to protect New Zealand's unique biodiversity and to facilitate exports by managing risks to plant and animal health and animal welfare." But the matching transformation has not been made. In the past four years the Biosecurity

[5] 1991/2 – 2001/2, Statistics New Zealand (www.stats.govt.nz). The trade figures represent the increase in the import value index.

Authority has made progress – but challenges appear to be arriving with greater speed than the current arrangements can manage.

Hindered by a lack of legitimate authority, and insufficiently equipped to deal with the additional challenges, MAF largely continues to work to a vital but more limited mission – protection of primary production and trade. This is demonstrated by priorities still largely determined by risks to agriculture and forestry.

Management of pathways where the main risk is to our indigenous flora and fauna and people has not been acted on with the same degree of urgency. There has been confusion in roles and responsibilities for some biosecurity functions relating to human health, for example responses to interceptions and incursions of venomous spiders.

Achieving multiple outcomes

Biosecurity is not an end in itself. Its origins lie in protecting our primary production; that remains vital to our economic welfare with an increasing range of threats to manage. But its scope is expanding. Our biosecurity system must now also embrace the protection of our flora and fauna, both on the land and in the sea; valuing our health; valuing aspects of our lifestyle and national identity and assessing how much we are prepared to pay to protect each of these. Although some submitters argued these values should be set in a hierarchy, the Biosecurity Council does not agree. Our biodiversity, economy and society are inextricably interdependent so all must be considered equally and consistently when making biosecurity decisions.

Outcomes supported by biosecurity activities

- Environmental - including protecting indigenous & valued introduced species, biodiversity, ecosystems & landscapes;
- Commercial - including primary production, industry, tourism & service sectors;
- Safeguarding Maori cultural & spiritual values;
- Human health & well-being; *and*
- Social - including lifestyle & historical values.

Building our institutions

New Zealand has an internationally recognised strength in biosecurity because of the strong systems developed to protect our ability to produce and trade.

There is now considerable infrastructure (particularly at the border) to protect our access to international markets. MAF also has a strong reputation and presence in international negotiations – clearly, this needs to be maintained. But these strengths must be extended to better protect people and the environment, and MAF needs to take account of the strengths built up elsewhere – within DOC, regional councils, the Ministry of Fisheries (MFish), MoH and with science providers.

This background plays an essential role in understanding our current position and future direction. Many submissions indicated concern about the proposed arrangements for government departments, although there was no consensus over alternative solutions, nor much useful analysis of their relative strengths or weaknesses. One general theme was the need to think about the system as a whole, with many concerns about fragmentation of effort, gaps in accountability and confusion of legitimate authority. These matters must be addressed but, most importantly, there must be a commitment to making decisions; rather than the current tendency to avoid them, simply because the decision faced is outside perceived agency boundaries.

Institutions require supportive legislation. The existing legislation has been heavily amended and remains far from perfect, but not imperfect enough to warrant a full-scale overhaul. Biosecurity is covered in many pieces of legislation, including the Biosecurity Act, Conservation Act, Fisheries Act, Wildlife Act, Wild Animal Control Act and Resource Management Act.

These Acts will all need to be reviewed incrementally in order to achieve this strategy's expectations.

MAF as lead agency

The new proposal significantly simplifies arrangements. Government agencies have elected, subject to Cabinet approval, for one lead agency (MAF) to take responsibility for end-to-end biosecurity, taking a whole-of-government and whole-of-New Zealand perspective. This agency will be responsible for pre-border and border activities, surveillance, incursion responses and eradication, and the grey zone of transition to pest management.

MAF is the natural agency to take this lead role. The Biosecurity Council, however, recognises MAF needs to develop systems capable of protecting the wider interests in biosecurity and improve its connections with the aquatic, environmental and health sectors. MAF will have to make some big changes, largely to make its responsibilities and accountabilities more explicit and its decisions more transparent.

A number of mechanisms are proposed to support the expansion of MAF's biosecurity mandate. The key first steps will be the establishment of a ministerial committee and a chief executives' forum to develop the overall strategic direction for biosecurity, and monitor system performance. Other important mechanisms will include a central/regional government forum, and the Biosecurity Council reconstituted as a ministerial advisory group.

MAF will need to delegate (to other departments) where there is specific knowledge and advantage. The need to assume responsibility for that task can not be delegated; the Director-General of MAF will remain accountable. Further, departments will organise themselves into a cross-departmental grouping (the chief executives' forum), taking collective responsibility across agencies with an interest in all outcomes.

The purpose of the chief executives' forum will be to support MAF's Chief Executive in the delivery of end-to-end biosecurity, and its members will be accountable for working together to achieve this purpose. This will include, for example, contributing to the preparation of the MAF Statement of Intent as it relates to biosecurity, prioritising biosecurity-related new initiative bids, developing a biosecurity research strategy, and implementing a Maori responsiveness strategy.

As the officer responsible for end-to-end biosecurity, MAF's Chief Executive will lead the forum and ensure its effective operation.

This document clarifies the Council's expectations and provides markers to assess MAF's performance. There is a real expectation MAF will take its expanded roles seriously by protecting the aquatic and terrestrial environments and

human health on behalf of DOC, MoH and MFish, and work with regional councils to ensure better pest management.

MAF is the proposed lead agency – strengthened, collating independent strategic advice for the Minister, and with a mandate for end-to-end biosecurity management in aquatic and terrestrial environments.

The other biosecurity agencies - DOC, MoH and MFish - will work with MAF through chief executives.

The Director-General of MAF will take lead accountability for biosecurity.

Expectations – Institutional arrangements	
2.	That a single agency (MAF) is accountable for ensuring the full range of biosecurity activities are delivered effectively and efficiently to meet the outcome expectations of agencies with a biosecurity interest

Maori

Our biosecurity system must respond to the needs and aspirations of Maori. Understanding of Maori interests in biosecurity – the protection, sustainability and management of taonga for present and future generations – is pivotal to any effective relationship between Maori and the biosecurity agencies. Taonga are resources highly prized by Maori - including fisheries, indigenous flora and fauna and traditional food gathering areas on land, in rivers and in the sea.

Maori hold significant economic interests that are focused on primary production (spanning agriculture, horticulture, forestry, fishing, marine farming) and tourism so their interest in robust biosecurity is similar to any other producer. Maori cultural and social values and economic interests may favour particular solutions and disallow others. Maori, for example, may have specific issues with some methods of pest control, or concerns with the management of species such as the kiore (Polynesian rat) or a particular interest in marine biosecurity. The tradition of mahinga kai (food gathering systems) is pivotal to Maori culture so the loss of wetlands, pollution of waterways, introduction of exotic species and control of pests and weeds has particularly significant cultural and economic implications for them, not always adequately appreciated by the biosecurity agencies.

Maori are concerned at the lack of understanding by non-Maori of their customs and the value of traditional knowledge in managing indigenous species. Direct involvement by Maori in biosecurity decision-making processes would inform both biosecurity agencies and the wider community of Maori specific outcomes. Local iwi need to be involved in the protection of taonga. If taonga are threatened by incursions, kaitiaki (guardians) from local iwi can assist. Biosecurity agencies must have an ongoing process of review and responsiveness to Maori.

Expectations – Maori	
3.	That the Chief Executive of MAF is responsible for developing a Maori responsiveness strategy for biosecurity agencies
4.	That capacity and capability is developed within the biosecurity agencies with specific training (specialist skills and knowledge) to ensure Maori are involved meaningfully
5.	That existing channels (under the Resource Management Act, Fisheries Act, District Health Boards or conservancies) are used in consulting on pest management strategies and during incursions
6.	That kaitiaki are invited to work with central government and regional councils on biosecurity matters
7.	That Maori values are explicitly considered in decision-making criteria

The Wananga tradition - a way forward

Maori as kaitiaki and owners of land and resources have a vested interest in protecting taonga from imported pests and diseases for future generations. Te Whare Wananga o Awanuiarangi, on a marae in Whakatane, offers a three-year Bachelor of Environment Studies degree that incorporates a Maori vision of the environment, together with science. The degree focuses on practical studies, including investigation of the region - mountains, rivers, and wetlands as well as coastal, estuarine and marine environments.

Awanuiarangi has relationships with Maanaki Whenua (Landcare), Te Papa Atawhai (DOC) and various regional councils. For example, students work on Moutohora (Whale Island), a reserve administered by DOC where imported mammals (goats, sheep, rats and mice) had destroyed the plants and bird life. After 20 years of management these mammals have been eliminated and a planting programme has regenerated its landscape.

Now Moutohora is covered with vegetation (mainly pohutukawa, mahoe and kanuka forest) and the birds are returning.

Ngati Awa Research Centre

Nobel prize winner Professor Alan McDiarmid with Pouroto Ngaropo opening the new Te Whare Wananga o Awanuiarangi laboratory at Poroporo Marae in February 2003. The $450,000 science laboratory is the first built specifically for Maori.

Stakeholders' voice

It is imperative people trust biosecurity management and are confident in its decisions; currently they clearly don't. Many submitters doubted the ability of MAF and/or MFish to make the culture shift required to deliver an end-to-end biosecurity system.

The new institutional arrangements need to recognise these concerns and ensure there is a means to provide stakeholder oversight of the full biosecurity system: from pre-border through to pest management.

The Biosecurity Council fits this role – partially. It was formed shortly after the ministerial portfolio was established in 1997 to coordinate the four government agencies and the regional councils. The Council's mix of public servants, regional councils and stakeholders was an attempt at cohesion. The Council has guided this strategy's development with government agencies and regional councils in order to find a way forward.

A reconstituted Biosecurity Council can continue its vital strategic role, monitoring system performance as new biosecurity measures and systems are introduced. Inevitably, today's system will evolve as its management becomes more transparent and the needs of biosecurity change. The Biosecurity Council should be the vehicle through which stakeholders can have a voice.

The key objectives of the Biosecurity Council will be:

1. Providing independent advice to the Minister;
2. Evaluating the ongoing management of the system to be satisfied mechanisms work; *and*
3. Ensuring stakeholders have a voice in the system's governance.

Membership of the reconstituted Biosecurity Council will be a decision for Government but an indicative list appropriate for representation is:

- Primary production;
- Maori;
- Regional councils;
- Environment;
- Health;
- Marine;
- Research;
- Transport (including ports and airports); *and*
- Tourism.

It would also be advisable to appoint individuals with strong strategic skills who are supported by, rather than advocating for, particular interest groups.

Partnership with regional councils

The Biosecurity Council agrees there is a need to establish tangible, ongoing and effective arrangements between central government and regional councils at a number of levels. The major issue is ensuring formal inclusion of regional councils in the strategic decisions responding to an incursion, or handling the new invader within pest management. Regional councils, together with DOC and private interests, often see themselves as the 'victims' of biosecurity failure, as they bear the costs of leakage across the border.

A regional council and central government forum needs to be formed to address the issues of pest management with a national perspective. The forum needs to set clear and transparent boundaries, for management of pests between those boundaries, and to facilitate a combined effort to manage pests. DOC must be part of such an arrangement.

Linking with industry

Industry's role is critical, both as a significant funder of Crown-led activity and a major participant. Industry needs to work actively in surveillance and eradication programmes.

There are considerable other points of connection for a biosecurity authority – indeed, there appear to be too many. Agencies need to look at the myriad committees, decide which ones are most important, then concentrate on making them work; generalised meetings of large groups with diffuse agendas are much less useful.

There clearly needs to be a specific vehicle that pulls together the various industry forums currently lying within the biosecurity agencies, to recognise the nature of their relationships and the need for a cooperative and clear policy environment.

Measuring performance

Biosecurity needs a full performance monitoring system - driven off high quality, published information - and discussed with stakeholders regularly. Government departments will drive its development through their statement of intent process, but ongoing evaluation is needed for daily management and monitoring.

There is some information on performance measuring in the system. For example, there is a measure identifying border leakage (it may need updating, but at least it exists) but the information is not used for higher-level decision-making. Even more worrying is the lack of activity reporting, and even basic accounting systems are unable to identify activity costs.

A public forum is needed to ensure ongoing monitoring, such as an annual review of biosecurity activity focusing on results. In its early stages, it is likely to comment on necessary developments to bring the system up to speed.

Implementing the next steps

MAF needs to take leadership of the next stage of development. The Biosecurity Council believes the chief executive should determine which direction to take, in conjunction with taking counsel from the chief executives' forum. The Council sees its future role as one of giving independent advice and stakeholder comment. Clearly, there is a great deal to be done and the Council expects to be engaged in the process of development as it gets underway.

Expectations – Stakeholders' voice	
8.	That the system encourages all New Zealanders to participate and support biosecurity
9.	That there is an annual review with external stakeholders on the performance and development of biosecurity, with an overall review in 2010
10.	That a reconstituted Biosecurity Council monitors this strategy's implementation on behalf of stakeholders for the Minister
11.	That a central government/ regional council forum is established to address the joint issues of incursion response and pest management
12.	That appropriate links with industry are formed to address priorities and who should pay for what

Capability gaps

The specialisation of many biosecurity activities makes them hard to replicate. Risk management, surveillance and incursion responses require particular skills that can be applied across organisms and environments. This strategy focuses on the efficient development, astute deployment and utilisation of these specific skills to achieve the New Zealand most of us want.

Biosecurity faces increasing demands from growing risk and increased volumes of activity, at the same time as coping with high profile incursion responses. The system has been holding together, but at some cost to its core abilities. The system has not become strategic; the identification and management of risks has become increasingly reactive - while the cost escalates. The full consequences can be seen in the recent failure to contain the Painted Apple Moth incursion when it was first discovered.

The fragmentation of biosecurity activities across several agencies makes identifying overall gaps difficult. There has been no attempt, nor incentive, for agencies to assess all the gaps across the entire biosecurity system. The system operates in isolated silos designed to address sector interests, with no overview.

Different sectors of the biosecurity system are at different stages of development. In some sectors there are critical gaps in baseline knowledge, in others capabilities are lacking (such as diagnostic and treatment tools), while some need to refine existing programmes to ensure high impact risks are effectively managed.

Gaps in the system

More than 80 gaps have been identified during the strategy and cabinet paper development process. These range from pre-border to pest management activities, affecting environmental, economic and human health outcomes. Some are simple and can be readily addressed (for example, enhanced Saltmarsh Mosquito surveillance), others are complex (for example, management of marine risks) and will take significant resources and time to resolve.

Here are some examples:

1. Important biosecurity data is stored in a range of information systems run by different groups. This results in gaps and duplication, inconsistency and poor accessibility of information. A coordinated information strategy is needed to ensure this information is shared;
2. A more proactive approach is needed in assessing emerging threats, to enable identification of potential pests and pathways and implementation of measures to prevent their entry, spread and establishment;
3. Effective tools are needed to implement responses to a range of pests and diseases. In some areas, such as ballast water testing and treatment, no effective tools have been developed. In other areas existing tools are under threat due to health, environmental and humanitarian concerns; for example, 1080 poison, methyl bromide for fumigation and 'leghold' traps for possum control. Some tools are no longer available, for example, effective anti-fouling paints, others (such as pheromones) do not have regulatory approvals;
4. There is a major knowledge gap in marine biosecurity, including information about the marine environment's current status, high value marine ecosystems and potential pest threats (other than a few high impact species);
5. There is a range of exotic species of animals and ornamental plants held in zoos, private collections, fishponds and even suburban gardens. Some have the potential to become serious environmental pests. There is inadequate knowledge about New Zealand's baseline – the range of species present and where they are located – yet this information is necessary to develop effective surveillance and response programmes;
6. There are unresolved regulatory issues which could delay access to imported vaccines in the event of a FMD outbreak;
7. There are significant knowledge gaps in risk analysis, for example the likelihood of different products carrying pests or viruses and their response to various treatments (such as heat). Such gaps can only be addressed by research that, since the agents are always exotic, could be carried out in research institutes abroad or under suitable containment provisions in this country;
8. Reference laboratories have coped with a three-fold increase in investigations, primarily related to indigenous biodiversity over the past five years. This trend will continue so increased capability is needed urgently; *and*
9. Targeted surveillance systems for exotic pests & diseases, in forests and plant nurseries.

Evolving systems

Technology will create many opportunities for improved management of biosecurity threats; these must be harnessed to ensure an evolving biosecurity system. Rapid improvements in x-ray and luggage tracking technology were adapted to increase border security in the past decade. New technologies (such as automation, sniffer detection, data management systems, improved profiling methods and other anti-terrorism tools) will provide improved border protection. The same will happen with surveillance and incursion response capabilities. New, targeted biological control (possibly using GM technology), improved pesticides and herbicides, and new ecological approaches will add to the pest management toolbox.

Building strategic capability

A strengthened, more strategic and strongly led biosecurity system should be better at coping with emerging threats. Attempts to forecast the future are likely to fail, so foresight and flexibility must be built into all systems. Belief that change can be addressed, and challenges met, is more important than fortune telling.

Much of the operational capability exists but there is a lack of strategic capability to look ahead, identify all the gaps and agree priorities across the system. Investment is needed to integrate the different pieces. then to close gaps through a rational and prioritised process.

New Zealand must do the most important and achievable things first, recognising that lower priorities may not be achievable in the near future.

Standardisation of process

There is a lack of consistency in most activities, sometimes for valid reasons; but mostly due to the haphazard nature of development. Areas of significant concern are risk management methods and the approaches to surveillance and incursion response by the different agencies. Biosecurity activities have developed reactively, learning only partially from past experience. For instance, a specific team standing to one side of MAF is dealing with the Painted Apple Moth incursion – it has essentially rebuilt incursion management systems.

Beyond the obvious risks of duplication of past effort, the lack of attention to systems and standards is wasteful of scarce time and effort, with inconsistency of lower level management decisions, incursion response processes and surveillance.

The first major point of leverage is to standardise risk management, then ensure the following repeatable processes are much more consistent – diagnostics surveillance, eradication, pest management strategy development, Import Health Standards (IHS), etc.

Developing knowledge systems

The biosecurity system's fragmentation is reflected in its underpinning knowledge and decision systems. Key information systems for decision-making do not communicate, or are incomplete. People who need access to systems do not have it. One small example of the need for a substantially better approach is the lack of an agreed list of recent incursions.

The processes for evaluating consequences and assessing external impacts (for example, global warming) are either missing, rudimentary, or operating in isolation – hardly what would be expected in such a complex system.

Expectations – Capability gaps	
13.	That central government is committed to maintaining a clear and effective role as overall steward of the biosecurity system
14.	That funding baselines for biosecurity are increased over the next five years specifically to close the gaps in the system
15.	That immediate funding is provided to ensure sufficient capacity and capability for rational and strategic management of the total biosecurity system
16.	That central government develops a comprehensive set of possible initiatives for increased expenditure each financial year - clearly prioritised across all agencies, sectors, environments and functions
17.	That the IHS for risk management of sea containers is fully implemented
18.	That pre-border and border measures to reduce risks to the marine environment are being addressed as a high priority
19.	That the appropriate data management systems are in place to support quality decision-making and performance monitoring
20.	That all critical eradication tools such as vaccines and pheromones are available for responding to incursions

Science

Science is a critical element underpinning biosecurity; it can have an enormous input to managing the risks and uncertainties, and ultimately the effectiveness of any decision. It can provide key information for many questions and can help determine which questions should be asked. Identifying the right advice is the key to making good decisions so scientific input must be considered, in conjunction with public and stakeholder opinion.

Scientists from the agencies, Crown Research Institutes (CRI) and private science providers are involved in some way in virtually all aspects of biosecurity, from researching the implications of pre-border trade agreements to judging the most acceptable and effective means of eradicating pests. Scientists provide advice at many stages: during incursions, on medium to long-term pathway mitigation and on responses to eradicate or control pests.

Tensions are inevitable at times between the need for rapid decisions (with clear accountability) and the need for adequate information; tension is also likely in managing relations with commercial science providers such as the CRI. Processes are, however, just a means to an end; the goal must always be the best possible decision in a timely manner.

New Zealand's biosecurity is held in high regard internationally but the thousands of biosecurity policy and funding decisions taken every year could be improved through more effective application of scientific techniques.

The following key issues have been identified:

- **Connections:** the need to integrate science into biosecurity policy and decision making, not just in the implementation of incursion responses;
- **Capability:** the need to protect and develop science capability across the spectrum, from pre-border through to pest management, with proper funding of those involved; *and*
- **Balance of Investment:** the need to move more investment into pre-border (ie prevention) and to develop whole-of-government priorities for spending.

It is apparent:

- A Biosecurity Research Strategy needs to contain some overall agreed medium to long-term research priorities to guide the Foundation for Research, Science and Technology (FRST) and the agencies;
- Scientists should be included more actively in a wider range of decisions, not just brought in on a piecemeal basis to help with incursion responses. The ad-hoc and reactive use of science needs to be reviewed, as it risks poorer decisions and reduced science capacity;
- Work needs to be undertaken to assess the benefits of pre-border and border interventions and related research, and combined with the prioritisation work to ascertain whether a case can be made for more research funding;
- Greater emphasis is needed on developing long-term partnerships with scientists to build capability and knowledge, although cost control remains important; *and*
- There is a need for all parties to be open in exchanging information. Scientific information for biosecurity management is a public good and a critical component in decision-making, yet access to it varies across the spectrum.

Expectations – Science	
21.	That science is closely involved in the development of biosecurity strategy
22.	That the purchase of science is integrated across providers
23.	That investment in science is long term to ensure maintenance of key capabilitites
24.	That the priority for research to improve biosecurity is understood

Federated Farmers of New Zealand (Inc.)

Despite being a major sheep producer, New Zealand is one of very few countries to have remained free from scrapie, a sheep disease with major trading ramifications. On the rare occasions when scrapie has been detected in imported sheep the animals have been slaughtered immediately, with the carcasses burnt. Infected flocks experience significant production losses, making it impossible to export breeding stock, semen, and embryos to many other countries.

Addressing priorities

The Biosecurity Council sees the need for central government to ensure significant increases in funding over the next three to five years, based on carefully justified priorities, supported by all biosecurity agencies.

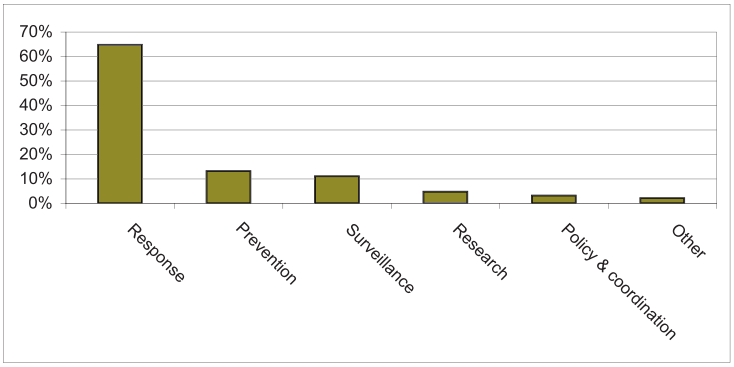
There is considerable concern whether the resource allocation is optimal. Similar concerns exist over funding allocations across agencies, sectors and environments. Often money is spent on known risks and activities, in preference to recognised threats about which we know very little. This disparity may be sensible in minimising the potential damage from incursions or spread of pests and diseases; equally it possibly reflects a tendency to devote resources to areas most understood, or a tendency to repeat what has been done before.

The priority must be to ensure sufficient capacity to enable the system to function as a whole. Capacity is needed to gather information, analyse it and execute change in an orderly manner. As indicated already, some gaps are apparent.

Addressing the gaps will require a broad approach to ensure risk management is commensurate with the level of risk being faced.

Where the Government spends our money

Around $500million is spent annually on biosecurity in New Zealand, with activities undertaken by central government, regional councils, industry and private landowners. It is estimated government agencies are responsible for $304million of this.



'Other' includes assurance (1%), audit and enforcement (1%) and international (0%). Figures do not add to 100%, due to rounding

It is not clear whether this spending and activity is a good fit with the objectives of biosecurity; most stakeholders strongly believe more resources are needed. The Biosecurity Council agrees but has deliberately stopped short of offering specific recommendations on the necessary level of increase. Experience suggests decisions on overall funding levels are best taken in incremental steps rather than as a single exercise.

Integrating decisions

Lack of agreed, high-level outcomes is an obstacle. Central government biosecurity agencies need to establish priorities and be able to assess the relative contributions of different activities.

The four main central government biosecurity agencies have made concerted efforts over recent years to improve their decision-making practices, but their processes for assessing and prioritising activities are in varying stages of development with considerable inconsistency in criteria and methods. Despite the complexity of decision-making in biosecurity, information limitations can be severe, requiring over-simplification and major assumptions.

This significantly limits the scope for comparison of spending alternatives or different approaches to managing a particular risk. These problems result in inconsistent decision-making that undermines the public's confidence. Decisions must be robust, consistent and accurately reflect relative priorities, rather than the undue influence of the assessment method chosen. Put bluntly, departments must join together to form a pan-departmental view of biosecurity priorities.

This is still a long way from being achieved – during the development of Cabinet papers to accompany this strategy, for example, officials were unable to agree the table of top priority gaps to plug.

To address these problems, the Council expects a framework for prioritising investments across both the spectrum (pre-border to pest management) and sectors (conservation, agriculture, forestry, aquatic and human health).

This framework must be sufficiently flexible to accommodate the required wide range of applications, the complexity of biosecurity decision-making, the inherent uncertainty, and the inevitable trade-offs between risk and benefit.

Benefits and costs are a key consideration, bringing together biological risk analysis with operational capability and effectiveness in assessing measures to manage the risks facing what New Zealanders value.

This field of endeavour is fraught with difficulties. Valuation of environmental and cultural effects is particularly tricky when assessing benefits and costs. Other areas of difficulty include uncertainty, society's changing risk preferences, long-term effects resulting in discounting of major impacts far off and the impossibility of reversing some decisions. In addition, individual assessments are limited in reflecting the aggregate and cumulative risks posed by multiple pests and pathways. These complex difficulties require progressive improvements to information bases and assessment methods.

Priorities framework

The Biosecurity Council proposes a generic, integrated framework comprising an initial intervention test, followed by prioritisation of activities according to a range of criteria, including benefits and costs.

The intervention test should assess whether activities are:

- Justified & appropriate - for central government biosecurity agencies;
- Consistent - with domestic legislation & international agreements (trade, environmental & human health); *and*
- Mandatory - under domestic legislation or international agreements.

The proposed prioritisation criteria are:

- Technical - feasibility, suitability & probability of success;
- Practicality - logistics, resourcing, timing, opportunities & risks, past achievements & stability;
- Benefits and costs - encompassing the full range of effects across all sectors;
- Strategic - contribution to goals & key priorities, long-term benefits, synergy & coverage; *and*
- Acceptability - stakeholder concern, needs of Maori, international interests, distributional considerations & risk preferences.

The criteria for benefits & costs across all sectors should be:

- Environmental - including indigenous & valued introduced species, biological systems & biodiversity;
- Commercial - including primary production, industry & service sectors;
- Maori cultural & spiritual values;
- Human health & well-being; *and*
- Social - including personal property.

Expectations – Priorities	
25.	That the criteria for assessment of benefits and costs includes the full range of effects across all sectors and in particular consequences for the environment, human health & well-being, economic production, and Maori cultural values
26.	That there is an integrated framework for establishing whole-of-system priorities and providing greater transparency and accountability in risk management

Who should pay?

The Government has overall responsibility for funding biosecurity, in particular border management, surveillance and incursions.

Government agencies are responsible for $304million of spending on biosecurity; central government responsible for 90% and regional councils for the balance. Taxpayers are not entirely liable, 20% is recovered from third parties and 9% from ratepayers. Industry contributes through fees and levies. There is no clear rationale in the level of third party funding and the allocation is wildly inconsistent - prevention 40%, surveillance 24%, and response 18%. Within these general activities there is further variation. In prevention, for example, there is full cost recovery for cargo and container clearance but no private contribution to costs for aircraft and mail clearance, nor any third party contribution to the funding of research.

Inconsistent funding leads to erratic development of capability to prevent and manage risks. The FMD outbreak in Europe, for example, provided the spur to gain additional funding for x-ray machines and sniffer dogs – this provided some reduction in the risk of FMD (by increasing meat interceptions) but the principal (yet unintended effect) was to reduce risks to indigenous biodiversity and plant health.

The Privy Council recently ordered MAF to repay passenger clearance charges to Freedom Air, Hamilton and Palmerston North airports. It ruled MAF's charges at regional airports were unlawful because taxpayers funded the cost at the established international airports of Wellington, Auckland and Christchurch. Charges from 1995 to June 2003 totalled $3.296million.

This ruling has implications for other regional airports.

Transparent framework needed

The Council expects central government and regional councils to apply a clear framework for determining who should pay for a particular service, and to review existing activities to ensure consistency with this framework.

The principles of funding have been dealt with over the years with clear policies espoused in different areas of government; the ground has been well trodden. Broadly speaking, it is a cascade principle: charges on exacerbators should be investigated and applied if possible; if not possible, levies on the beneficiaries should be investigated and implemented if they are practical, fairer than taxpayer funding, and capable of implementation at reasonable cost. Finally, taxpayer (in some instances, ratepayer) funding is relevant.

This cascading decision rule, if applied consistently, will ensure the funding source is the best way to ensure consistency with goals such as minimised risk, minimised costs, fairness, consistency with international obligations and ongoing improvements.

There is wide support for the development of a clear and consistent set of funding principles (based on transparency, accountability, equity and practicality) and strong support for the 'polluter pays' principle rather than 'one size fits all'; many feel their sector should not pay more.

There is, however, moderate support for recovering the costs of increased activity at the border through charging for passenger and cargo inspection activities – except from the tourism and transport sectors, which have expressed concern about the economic impacts of reduced passenger numbers. There will also need to be a set of ongoing discussions with the primary sector about cost sharing (where relevant and fair) on activities around incursion management and surveillance.

The Biosecurity Act has punitive powers, allowing government agencies to pursue individuals and companies who breach it. Individuals may be fined up to $100,000 in addition to possible prison sentences of five years[6]; companies face maximum fines of $200,000. But enforcement is difficult, as the exacerbator must be identified and intent proven. Investigation and prosecution costs are expensive, and prosecution capacity is limited. The direct costs of an incursion are so high that no punishment reflects the potential damage to our economy and lifestyle. No culprit can be identified for any of the major recent incursions (Painted Apple Moth, Southern Saltmarsh Mosquito or Varroa bee mite) yet combined they cost the taxpayer over $150million – with much larger potential costs for primary industry.

[6] To date the heaviest fine for an individual has been $15,000; and the longest prison sentence 18 months

The Crown will continue to bear substantial costs for biosecurity, as it must retain responsibility due to the complex components - the crosscutting nature of benefits and the difficulties of identifying culprits and imposing levies.

The Minister for Biosecurity is recommending Cabinet adopt the following 'cascading decision rule' for officials to develop recommendations on future funding arrangements for services for which the Government is responsible:

1. Costs should be recovered from the users of each service, or those whose actions caused the need for the service or function to be provided, where this is practical and cost-effective.
2. Otherwise the funds required should be raised through the imposition of levies on those who benefit from the provision of the service or function, where they are an identifiable individual or class of individuals and where the cost of doing so is reasonable.
3. Otherwise taxpayer funding should be used.

Expectations – Funding sources	
27.	That central government and regional councils are applying a clear and consistent cascading framework for determining who should pay what
28.	That funding arrangements for all existing activities are progressively reviewed

Biosecurity Council's first recommended steps	
1.	Make MAF clearly accountable for overall management of the whole biosecurity system, on behalf of all New Zealanders;
2.	Put in place the necessary systems, structures and capabilities within MAF to support its role - starting with strong strategic capability;
3.	Establish governance mechanisms (including a reconstituted Biosecurity Council and chief executives' forum) to support this strategy's implementation and monitor performance;
4.	Encourage all New Zealanders to support and participate in biosecurity through a social marketing programme;
5.	Identify ways to involve Maori in biosecurity issues and decisions, nationally and locally;
6.	Identify, prioritise and review current and emerging risks – from pre-border to pest management and across aquatic and terrestrial environments;
7.	Establish national leadership and coordination of pest management;
8.	Recognise the contribution of science to biosecurity (strategically and operationally) and fund it properly;
9.	Ensure decision-making processes take account of risks to the economy, biodiversity, taonga, human health and lifestyle in setting priorities; *and*
10.	Increase funding over the next five years for priority areas and build organisational capability across the system.

The Biosecurity Council recommends immediate implementation of these steps, in addition to identifying and plugging the most immediate gaps.

Part III

The biosecurity system

Effective biosecurity systems rely on information about pests, pathways and capabilities to manage the risks properly.

Risks

New Zealand is threatened by hundreds of thousands of exotic species that could cause harm. Some are well known with recognised impacts; others are not recognised as pests until their impact is discovered. For example, toxic algal blooms in shellfish are examples of native species causing adverse effects on human health.

Potential pests range from tiny microbes (such as the virus that causes FMD), to plants and animals in aquatic and terrestrial environments. New Zealand's pests nearly all originate from other countries.

New Zealand's legacy of breaches, including many intentional introductions that became major pests, means we are stuck with expensive ongoing pest control to protect our forests, farms, waterways and coastal environments. Some pests establish quickly while others lie seemingly dormant for a period before spreading significantly; many plants and animals already here have yet to reach their full potential in terms of establishment, spread and impacts.

The sheer number of introduced species and the lag time between species naturalising then showing their full potential for damage means major pest management problems inevitably lie ahead. There are big information gaps. For example, a recent DOC study found 11 species of freshwater plants traded as ornamentals have serious weed potential – and were plants not even known to be present in New Zealand.

Our understanding of aquatic ecosystems and potential pest impacts is even more limited. Poor baseline information means it is often difficult to know whether a species is introduced or native. To address this information gap, MFish is undertaking baseline surveys.

Introduced pests are the biggest single threat to our native species and habitats; they also impact upon recreational, Maori, cultural and health values, plus agricultural production and hydroelectric power.

DC6 aerial spraying at dawn to eradicate the white-spotted tussock moth over Auckland's eastern suburbs in 1997

How do pests get here?

A large number of species were deliberately introduced during early European settlement of New Zealand. Some rapidly became pests due to favourable conditions or lack of predators and diseases. Many pest plants started off as ornamental plants (wild ginger, for example).

Nowadays strict controls apply to deliberate (legitimate) new introductions so they are unlikely to become pests. The greatest risk now comes from accidental introductions, smuggling of organisms or contaminated goods.

Potential pests can enter New Zealand through many different pathways; as hitchhikers carried by another plant or animal, or inanimate objects such as a backpacker's tent. Some pathways are targeted very strongly; others less so, for reasons including feasibility, efficiency, and estimates of risk. Although much is known about the pathways through which pests and diseases enter and move about, more scientific research is needed to identify better tools for blocking pathways and detecting pests.

MFish has identified over 20 marine risk pathways, some representing significant risk (ballast water, hull fouling, aquarium trade, aquaculture equipment, live bait for fishing and fish food for aquaculture).

Managing pathways

Pathways are difficult to manage, as they cut across the various intervention points (pre-border, border, etc). Any one of these pathways can introduce a wide range of pests unless effectively managed. For example, the sea containers pathway has recently been reviewed - pests can be found in the contents, any packaging material, or contaminating the container itself.

Major pathways include:

- Imported goods
- Ships and aircraft
- Ships' ballast water
- Vessel hull fouling
- Shipping containers
- Used vehicles & machinery
- Passengers' effects
- Mail & courier packs
- Smuggling (such as parrots or seeds)
- Wind & ocean currents

The number of containers arriving in New Zealand has increased by approximately 50% over the past five years, from an increasing range of countries with varying interests in maintaining biosecurity. Potential threats include:

- Packaging material harbouring wood-boring insects could impact on our forests and cause significant damage to wooden buildings;
- Pooled water harbouring mosquito larvae could carry serious human diseases; *and*
- Contamination of containers with seeds, plant material, insects, spiders and even snakes.

In addition, the products in the containers may be risk goods such as fruit or meat, which can be hosts for a range of pests. It is impractical to check all containers at the wharf; many are transported inland for miles before being unloaded without supervision and many containers are judged low risk – this must be taken into account when managing this pathway.

Mitigating risk

Biosecurity is about mitigating risk, which is done at different points - before the border, at the border or post-border (including pest management). Generally, the cost of mitigation increases as pests move across the border and become established; hence the significant focus on prevention and early detection and eradication (if possible).

Impact of Foot-and-Mouth Disease[7]

Stock Image Group

Scenes like this became common in the British countryside two years ago – we don't want them here. Foot-and-Mouth Disease is caused by a virus – it's one of the biggest biosecurity threats faced by New Zealand. It entered Britain as a result of failed border controls.

Foot-and-Mouth Disease (FMD) is a highly contagious viral disease of cloven-hoofed animals; although not very lethal in adult animals it causes serious production losses and devastates trade because no one wants produce from an infected country.

The virus can travel long distances by wind. Animals can be infected through inhalation of virus aerosols, ingestion and through reproduction. The disease is mostly spread through the movement of infected animals; other sources of infection include contaminated vehicles, equipment, people and products.

The virus survives in frozen lymph nodes, bone marrow and viscera, also in salted and cured meats, and in non-pasteurised dairy products. The virus can survive for long periods in fresh, partially cooked, cured and smoked meats.

This hypothetical scenario assumes a FMD outbreak initially occurring in pigs (through waste food) then spreading to sheep or cattle. The outbreak is contained within the North Island, allowing trade from the South Island to resume earlier:

- Dairy exports would face bans from trading partners for perhaps six weeks. Storage restraints would mean some produce was lost permanently, and some trade partners may be slow to resume importing New Zealand dairy products.

  Meat exports would be affected for longer, possibly up to one year, and export prices would be significantly hit. New Zealand has the capacity to store about one month's production of meat, so any further production would be lost; much would depend on the season of the outbreak.

- It could take at least 4 – 5 weeks to get vaccines produced and back to New Zealand.

- Two-thirds of our export trade would be at risk for at least 4 – 5 months, possibly longer. Export prices of meat would suffer a long-lasting decline, as loss of reputation would hit the premium currently enjoyed by New Zealand lamb and beef products. Prices wouldn't return to normal for about four years.

[7] Based on a paper prepared by the Reserve Bank and Treasury, for the Department of the Prime Minister and Cabinet, February 2003, (www.rbnz.govt.nz/research/0130346.html); a speech by Murray Sherwin, Director-General, MAF, in February 2002; and R P Kitching, Journal of Comparative Pathology. 1998

- Real GDP would be reduced by 4% (relative to its potential) in the first three months of the outbreak. The cumulative loss in nominal GDP would be around $6billion after one year; around $10billion after two years. The loss would continue to increase because potential output would be lowered, and would be exacerbated by slumps in domestic demand for meat and the negative reaction of trading partners.
- For this exercise, it was assumed the $NZ would drop initially by about 20% in the first three months, and the recovery of the exchange rate would take around 2½ years.
- The Government would spend $200million on controlling the outbreak and compensating farmers for animals slaughtered.
- There would be a significant drop in tourism; in the United Kingdom, the impact on tourism was 10 times greater than on the primary production sector.
- Unemployment would rise by 1%; 15,000 – 20,000 jobs would be lost although the impact would be greater in vulnerable sectors (and could last longer).
- Foreign investors would be increasingly reluctant to expose themselves to the New Zealand market and additional overseas borrowing of $8billion would be necessary.
- Business confidence would plummet temporarily, which would reduce investment; this would mean a permanent decline in the stock of productive capital and the long-term potential output of the economy.
- Household wealth would be reduced, as would the Government's tax revenue.

Changing behaviours

Individuals have always played a significant role in New Zealand's biosecurity – they are responsible for about 40% of our pest management. Alert members of the public have also detected many of New Zealand's biosecurity incursions – including the Painted Apple Moth, Southern Saltmarsh Mosquito, Australian banjo frog, termites, snakes, seaweed and fish – providing a crucial, but largely unsupported link in the monitoring of pathways. In addition, people are themselves a significant pathway.

Carrots & sticks

Approximately 25,000 undeclared seizures are made annually at airports, equating to around 500 undeclared seizures each week. The use of heavy fines, supported by public information, sends a strong signal that deliberate or careless flouting of biosecurity rules will not be tolerated. Instant $200 fines were introduced in 2001 for inbound travellers making incorrect biosecurity declarations. An unexpectedly low enforcement rate was attributed to the large number of passengers whose English was inadequate – this language barrier is the most pressing issue.

Airport quarantine seizures - 2001/02

- 8.0 tonnes of meat products
- 15.9 tonnes of fruit
- 2.6 tonnes of seeds
- 3.2 tonnes of dairy products
- 3.2 tonnes of fish products
- 5,800 live plants or bulbs

In 2001/02 there were 219 seizures of live animals, including turtles & live eggs. 28% of the meat & poultry products seized were undeclared, the majority from countries with FMD.

Getting the public to listen

'Protect New Zealand' was a two-year $3million campaign, launched in 2000, specifically to educate people about their biosecurity responsibilities in light of the FMD outbreak in Europe. The current funding of $300,000 per year makes it difficult to run an effective campaign.

The *'Protect New Zealand'* team initiated the television series *Border Patrol,* now one of the most popular programmes screened[8]. Since the campaign started, New Zealanders have become more aware of what biosecurity involves (including the risks and consequences) and their personal responsibilities. It is hard to know how much of this improvement can be directly attributed to the campaign because of other factors (for example, the Genetic Engineering debate before the 2002 election and the outbreak of FMD in Europe).

Individual responsibility and contributions remain vital if we are to continue succeeding. This strategy aims to create a framework that actively encourages private individuals to play their part. This will become even more important as risk grows with increasing trade and climate change.

Public support

Biosecurity is one of the most critical issues in the shaping of our country's future well-being, so the need for public support cannot be underestimated. The biosecurity agencies will operate more effectively if people support their goals (possibly through incentives, for example to encourage public interest in community surveillance). The long-term implications of biosecurity's social marketing should be considered on a par with other public education campaigns – drinking and driving, anti-smoking and Accident Compensation.

New Zealand needs to fund research to learn how to encourage the public to listen, get the right programmes operating, and measure the impacts. It needs major funding. The aim is not to make the biosecurity agencies look good, but to increase public cooperation. It is imperative people understand the significance of our stringent quarantine regulations, so everyone can play their part in protecting New Zealand from the unwelcome arrival of pests, weeds and diseases.

[8] National Business Review, July 18, 2003 cited Nielsen Media Research (week to July 12); it showed *Border Patrol* as the 5th most popular TV programme, marginally behind *Coronation Street* and *One News* and ahead of *Holmes*.

Campaign snapshot

Passengers travelling to and from the Pacific Islands frequently carry:

- Fresh fruit and vegetables;
- Meat and fish;
- Traditional herbal medicines; *and*
- Plants and goods made from plant materials.

MAF's quarantine service had difficulty in getting its message across to people in the Pacific Islands. Initial attempts included using the local quarantine services (unsuccessful), multi-language in-flight videotapes, multi-language arrival declarations into New Zealand and the very successful multi-language '*Declare it for New Zealand*' pamphlets. Meetings were held with the Pacific Island church leaders and quarantine staff participated on an Auckland radio station popular with Pacific Island peoples. Then MAF's '*Protect New Zealand*' campaign, launched in September 2000, specifically targeted Cook Islanders, Fijians, Tongans and Samoans living in or visiting New Zealand.

Since June 2001, the percentage of undeclared seizures from the Pacific has dropped. Although Pacific Island peoples continue to bring in a lot of food products, much is now covered by phytosanitary certificates and their compliance is now better than average.

The illegal introduction of the varroa bee mite illustrates the problem of people breaking the very rules designed to protect them; at the same time it illustrates what happens when there's no post-entry quarantine system in New Zealand.

A beekeeper smuggling queen bees (to enhance a hive's breeding population) probably imported the varroa mite inadvertently. It only lives for two hours outside its host so must have arrived here on a live bee.

If that's the case, it was a hugely irresponsible and criminal act by someone who should have known better.

To date the incursion has cost the Government $12million but the ultimate cost could be hundreds of millions of dollars in lost pastoral production.

Camping equipment is a pathway for insects, weed seeds, disease and fungal spores. That's why it must be cleaned before being brought into New Zealand.

Expectation – Changing behaviours	
29.	That all New Zealanders, and our visitors, are encouraged to support and participate in our biosecurity

Pre-border activities

New Zealand takes a leading role (disproportionate to its relative size) in international organisations working to reduce the risk of importing - or exporting - pests and diseases.

Participating countries are required to notify significant changes in the occurrence or distribution of pests and diseases, including major diseases of wildlife. For example, an outbreak of FMD in one country will usually result in immediate suspension of some trade and rapid and significant changes in the processing of the movement of goods and people by other countries. This type of information allows New Zealand to adjust its pre-border and border controls rapidly.

> New Zealand has an obligation to meet its international commitments under multilateral environmental agreements, such as the Convention on Biological Diversity and the United Nations' Convention on the Law of the Sea that include specific provisions for protection, eradication or management of pest species.

Countries are also expected to prevent aircraft spreading mosquitoes and other pests. New Zealand is also working towards the adoption of international controls on ballast water to reduce the risk of transferring marine species between countries.

New Zealand is also working with small Pacific nations to help them manage biosecurity risks to our mutual benefit.

There are still few international agreements to notify trading partners about environmental pests (such as ants, snakes or highly invasive weeds). A number of informal networks are emerging through organisations such as the International Union for the Conservation of Nature (IUCN). New Zealand has been successful in getting the International Plant Protection Convention to start addressing highly invasive weeds.

Pre-border standards promulgated through IHS are the second level of protection from offshore risks; examples include heat treatment of imported foods, disease testing of animals and inspection of used vehicles before shipment. They were established to reduce the risk of harmful species entering the country in traded goods, initially to protect our primary industries from risks associated with the importation of plants and animals and goods such as used cars, old packaging materials or sports and camping equipment which may be carrying living hitchhiker organisms.

IHS have had a strong terrestrial and primary production focus, so have not worked well for aquatic and environmental pests, and they are of limited use with unidentified pests. New approaches may be needed to help address these shortcomings although newer IHS are more balanced.

The IHS process has become increasingly rigorous over the past decade. During their development, extensive consultation is conducted to ensure all risks are identified and covered by pre-entry measures such as testing, inspection, treatment or quarantine. Sometimes additional post-border conditions are imposed, to provide further safeguards.

The IHS procedures are under stress; indeed MAF is unable to provide information on the total number as there is no consistent definition across the agency. Many of the earlier standards need to be reviewed to ensure consistency with more recent ones. MAF states there is a very large backlog of unfinished IHS. Alternative approaches are being studied to hasten the process and meet New Zealand's trade obligations without increasing biosecurity risks.

Finally there is the requirement for ERMA to take a precautionary approach before approving the importation of any new organism.

Expectations – Pre-border	
30.	That there is a continuous, targeted programme to move risk reduction measures offshore
31.	That all relevant pre-border regulations and standards are in place - robust, consistent and subject to appropriate review processes
32.	That New Zealand is using wider international - multilateral or bilateral - arrangements to reduce potential threats to indigenous biodiversity
33.	That New Zealand is benefiting from and contributing to international standards to protect production and trade
34.	That New Zealand's coastal waters are protected from threats carried in ballast water or on fouled hulls
35.	That New Zealand is helping Pacific countries reduce biosecurity threats to the region

Biosecurity & trade

Our biosecurity strategy must strike a balance reflecting New Zealand's overall national interests. Our continuing economic well-being depends on our participation in the global economy - trade in goods and services represents significantly more than half of New Zealand's GDP; for example, more than 90% of our dairy and meat production is exported. We trade with more than 200 countries and our long-term economic prosperity depends on access to open global markets, particularly as primary produce exports are particularly vulnerable to unjustified sanitary and phytosanitary restrictions.

The global economy is also an essential source of imports for New Zealand, which is necessary to meet New Zealanders' consumer demands. As a nation that wants to survive and prosper, we want world-class, dependable imports at the best prices. So, as a trading nation, New Zealand cannot expect other nations to accept our exports if we are not prepared to apply comparable objective scientific criteria to our imports.

- The wider importance of such objective criteria is illustrated by the recent World Trade Organisation (WTO) ruling on Japan's quarantine measures against fireblight in apples, which has been a long-running obstacle for New Zealand's horticulture exporters. The WTO ruled in July that scientific evidence did not support Japan's restrictions, which were inconsistent with its international obligations.

- The current review of our IHS must be demonstrably responsive to legitimate demands from our trading partners for access to the New Zealand market.

Borders – marine & terrestrial

Leakage through borders is inevitable, particularly with increasing globalisation, as sealing of the border is impossible. Aside from the risks presented by trade and tourism, new pests and diseases arriving through wind dispersal pose a constant threat.

Border activity is targeted at ensuring risk goods comply with the requirements of IHS, and preventing the entry of exotic organisms that may imperil agriculture (for example, fruit fly), health (for example, mosquitoes), freshwater ecosystems (for example, piranha) or our indigenous flora and fauna (for example, exotic ants).

Borders have become more diffuse and are no longer only at the point of entry. Containers offloaded at ports may be opened and inspected at hundreds of regional and rural sites around the country. Suitable responses must be considered carefully, such as targeting surveillance activities around sites where containers are opened.

Marine borders are hard to manage, as there is no single physical point of arrival. For example, organisms living on a vessel's hull ('hull fouling') can be reproducing and infecting New Zealand's coastal zone while arriving at port, then continue to infect any area the vessel visits after border clearance.

Growth in border risks

Over the past five years, air passengers and crew arrivals have increased by 40%, container arrivals by 47% and used vehicle imports by 54%. Cruise ship passengers have increased by more than 250%. International mail parcels have increased by 32%, and small parcels shipped with courier companies are a new source of risk. The sources of risk material have also increased, particularly with the growth of Internet mail order as marine organisms are readily available (for example, *Caulerpa taxifolia*[9]) - exotic species from such sources have been found in New Zealand.

The risk exposure at Auckland airport was more than halved by the introduction of x-ray machines and detector dogs in 1997, then nearly halved again by the introduction in 2001 of 100% x-raying or searching of baggage.

Similarly, marine border risks have increased substantially. Ballast water volumes have risen nearly 20% per annum and recreational craft visits increased in 2003 due to the America's Cup. The ballast water of one vessel typically carries over 300 species, of which over 50 are environmental, economic or societal pests in some location around the globe. Their potential impact is significant – about 10 large ships enter New Zealand ports daily. Similarly, one merchant vessel can transport over 100 species through hull fouling.

In 2002, there were over 3,300 international vessel visits – 2,581 merchant vessels, 794 pleasure craft, 34 passenger ships, and 12 barges/tugs. Although each category presents a different hull fouling risk, only merchant vessels and tug/barges additionally present a ballast water risk. Merchant vessels are estimated to have discharged over 3.9million tonnes of ballast water in New Zealand ports in 2002.

Border activities undertaken

New Zealand undertakes a wide range of activities to prevent the introduction of exotic organisms, based around the major entry points for cargo, passengers and mail:

- X-ray machines and detector dogs were introduced at international airports six years ago in response to the Mt Roskill outbreak of Mediterranean fruit fly; then all luggage was x-rayed and opened following the 2001 outbreak of FMD in the United Kingdom.
- Instant fines for passengers failing to declare risk goods were introduced in June 2001; more than 9,000 fines were issued in the year ending March 31, 2003.
- The fines, coupled with the 'Protect New Zealand' awareness programme, appear to have increased compliance at airports.
- Baggage is periodically searched at the airport, after it has been passed by the airport x-ray machines, in order to validate inspection systems and measure their sensitivity.
- Cargo clearance occurs at the major international ports and airports to ensure all risk goods conform to import requirements.

9 *Caulerpa taxifolia*, a marine plant, has caused significant environmental, economic and societal impacts worldwide. In the Mediterranean it has spread to cover 58,000 hectares since 1980. The invasive strain of *Caulerpa taxifolia* is available through the aquarium trade and readily obtained over the Internet.

- Manifests for sea containers are screened and risk cargo is processed according to relevant IHS. 24% of containers are sampled to ensure the validity of the cleaning certificate and the absence of exotic species. Non-conforming containers are sent for cleaning or fumigation.
- X-ray machines, backed up by detector dogs, have screened most international mail since September 1998. Since then, mail seizures have increased by 160%, despite parcel numbers increasing by only 32%.
- All imported machinery and used cars are now inspected for contamination and hitchhiking pests.
- Every vessel visiting New Zealand is required to exchange its ballast water before entering our economic zone. MAF inspectors, on behalf of MFish, check the information during their initial boarding procedures, before allowing the vessel to discharge ballast in New Zealand waters. On average, one vessel every six months is refused permission to discharge its ballast.

In the year ending in March 2003, MAF:

- ✓ Checked the luggage of more than 3.7million air passengers and crew;
- ✓ Cleared over 450,000 sea containers;
- ✓ Inspected over 150,000 used imported vehicles;
- ✓ X-rayed over 49million mail items;
- ✓ Cleared 3,400 international vessels; *and*
- ✓ Checked over 60,000 consignments of imported risk cargo.

Approximately 139,000 seizures were made from air passengers and mail, including 17 tonnes of fruit fly host material and 8 tonnes of meat (which can host FMD).

Smuggling of risky foods, plants and animals is a serious biosecurity problem. There are regular border interceptions of seeds, plants and birds' eggs that people are trying to bring in illegally.

Serious diseases probably caused by smuggling over the last few years include RCD, varroa in bees and parrot pox. Smuggled grape rootstock, which could cause severe harm to our wine industry, has also been intercepted.

Some people allege this irresponsible and criminal behaviour is encouraged by the lack of post entry ('third level') quarantine facilities – lack of legitimate ways to import bees, parrots and plants means people are tempted to smuggle them, posing a huge biosecurity risk to New Zealand.

MAF assesses the risk of all uncleared goods (based on the item, country of origin, associated potential pests and diseases, degree of processing and end use).

Lack of marine capacity

New Zealand's marine border controls have been unable to meet the increase in risk. This failure can be attributed to:

1. A lack of capacity which has forced a triage approach – systems are only treated if an impact is highly likely;
2. A lack of explicit inter-agency arrangements for comprehensive border management; *and*
3. A significant lack of management tools for key pathways (for example, hull fouling).

NZ Seafood Council

The Pacific oyster (Crassotrea gigas) may be our best-known marine hitchhiker. It's believed to have travelled to New Zealand from Hiroshima about 25 years ago, tagging along on the extensions to the Auckland Harbour Bridge. It didn't take long for it to naturalise; now it's the dominant cultivated oyster in New Zealand.

Continuing progress

Marine biosecurity is in its infancy globally. Although pathways for marine risks have been identified, many are not yet being effectively monitored. It is imperative to improve their management. New Zealand must quickly develop and fund a comprehensive marine biosecurity programme.

Border risk mitigation activities are, however, monitored regularly. For example, the recent review of sea containers, which recommends trained and accredited industry personnel be made responsible for examining all containers (internally and externally) for contaminants - including live organisms - in the approved container inspection ('de-vanning') sites around New Zealand.

Capacity is gradually being added to monitor other pathways, to reduce risk to a manageable level through post-border activities, such as surveillance and response. In addition, the cost and impact of mitigation activities will be determined so scarce resources can be allocated efficiently, achieving the best border protection possible with the funds available.

Biosecurity arrangements are being improved continuously:

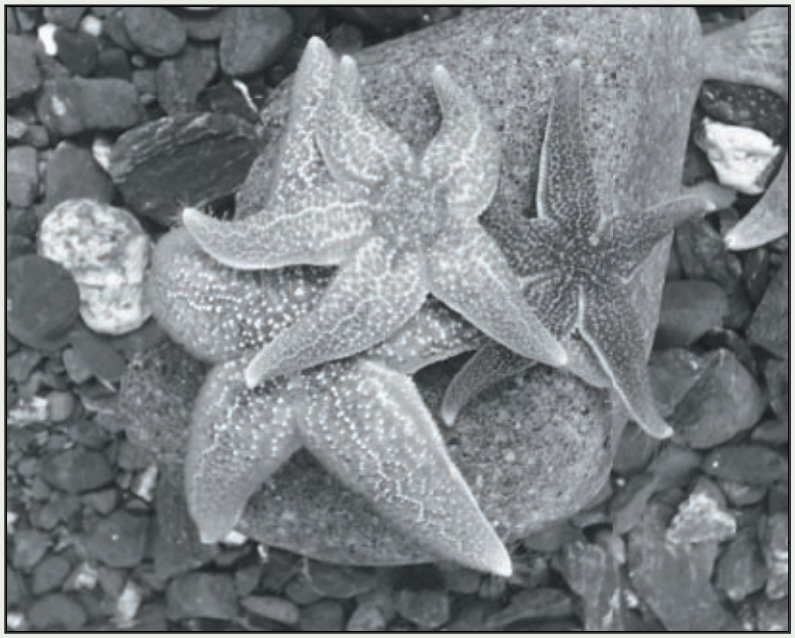
- International standards for the standardisation and transfer of x-ray records will increase the efficiency of scanning luggage. A trial using pre-departure baggage x-rays is planned for early 2004, although full implementation may be 3 -7 years away;
- Implementation of the new sea container clearance processes should commence in September 2003, rolling out progressively over 12 months; *and*
- Accreditation of private sector operators at de-vanning sites.

The economic opportunity costs of getting it wrong are enormous, as flow of trade must continue if New Zealand is to prosper. Similarly, it is imperative cost effectiveness – the fine balance between compliance costs and lost opportunities – remains a vital consideration.

It is important to educate biosecurity's front line by working with industry organisations (such as the Freight Forwarders' Association) to maintain vigilance about the pests that may be on their way to New Zealand.

Expectations – Borders	
36.	That clear and transparent measurements of risk mitigation are providing appropriate information about residual risk or 'leakage' across the border
37.	That all significant hitchhiker pathways are covered where possible
38.	That all significant pathways are covered
39.	That border compliance is managed cost-effectively
40.	That effective post-entry quarantine facilities are available where appropriate
41.	That all high-risk entry points for the marine environment are evaluated, with risk mitigation measures in place

Potential Impact of the Northern Pacific Seastar[10]



Jan Haaga, US Department of Commerce

- The Northern Pacific Seastar *(Asterias amurensis)* is native to the northwest Pacific (Japan, Korea and the Kamchatka Peninsula in Russia). It is a voracious predator of a vast range of other species including clams, mussels, sea urchins ('kina') and paua.
- Northern Pacific Seastar populations can become extremely dense. In Port Phillip Bay, Victoria the population reached approximately 30million within two years.
- The impacts of the Seastar on marine biodiversity and the environment are profound. It can eliminate all clams and mussels in an area; in Tasmania, densities of one Seastar per square metre were enough to eliminate over 90% of the native biomass.
- The Seastar is a major pest of shellfish farming and wild harvest industries. In New Zealand, they would have a significant economic impact on aquaculture and fishing industries as well as on shipping. Scallop, mussel, paua, cockle and kina industries could be devastated. In Australia, industry viability has been threatened.
- The New Zealand shellfish industry is worth $315million[11] in export earnings. If the Northern Pacific Seastar became widespread in New Zealand, stock could be reduced by 10 – 50%, with commensurate economic and social impacts.
- Any biosecurity response to Northern Pacific Seastar would entail domestic and international controls to limit further spread.
- Incursion response and subsequent control activities could cost $1million annually per incursion.
- Costs to international shipping industry could be $2million annually in management costs to reduce spread.
- Increased surveillance would cost $500,000 – $1million annually.
- Maori interests would be significantly impacted by a widespread Seastar incursion. The cost to customary harvest values cannot be quantified.

[10] Based on a series of published papers on the current impacts in Australia

[11] SeaFIC Dec 2001

Surveillance

The four biosecurity agencies undertake a wide range of surveillance activities directed at both detecting new species (which cross the border through inevitable gaps) and monitoring the health and pest status of plants, animals and ecosystems. Some monitoring supports health status declarations for trade; some assists pest control; some is species specific (based on high impact risks such as fruit flies, FMD and toxic algae); some targets pathways.

Surveillance is not a latent capability waiting for the big one; there are many alerts every year. MAF's reference laboratories receive about 1,000 calls each month to their freephone number from observant members of the public, a volume for which the system was not designed nor funded. These lead to several hundred investigations each month, including one or two for suspected FMD outbreaks. Almost 40% of the calls relate to potential environmental pests; many of the others relate to horticultural threats.

There are about ten new species incursions in New Zealand each year (a partial list of those found since January 2000 is in the appendix).

A major review of biosecurity surveillance systems conducted in 2002 noted a number of key issues:

- Some programmes appeared to be working well; for example, fruit fly and mosquitoes at ports;
- There has been major progress in establishing a rational approach to marine surveillance programmes;
- Many surveillance activities had very little technical support;
- There were many gaps in the system;
- There was significant under-investment in some areas, particularly on new threats to indigenous biodiversity;
- Surveillance activities are poorly defined and some need substantial review;
- Growth in border risks is increasing demands on the surveillance systems; *and*
- Investment in terrestrial surveillance has reduced substantially over the past 10 years.

Continuing progress

A series of recommendations and a work programme is under way. Within the next 3 – 5 years the Council would expect:

- A consistent policy for the development of surveillance programmes across all sectors;
- Discussion and integration between central and regional councils over surveillance needs and programmes;
- Explicit surveillance objectives, designed and resourced to ensure delivery;
- A programme responsive to changes in risk profiles as new pests and diseases emerge and others decline; *and*
- Programmes based on the best available science, technology and sampling methodologies.

Expectations – Surveillance	
42.	That there is a consistent policy for developing surveillance programmes across all sectors, based on the overall goals for biosecurity
43.	That explicit surveillance objectives and performance standards, are based on these and are resourced to ensure delivery
44.	That there is strong coordination of, and wide access to, the set of databases supporting surveillance activities
45.	That quality information is available to the public to help them identify new or emerging pests
46.	That the surveillance programme responds to changes in risk profiles as new pests and diseases emerge and others decline
47.	That the programmes are based on the best available technology and sampling methodologies

Impact of Pine Pitch Canker

James Lawson, Rural Images

New Zealand's forestry industry is dominated by the exotic conifer Pinus radiata with forestry exports worth $NZ3.7billion in 2002 (12.5% of New Zealand's total merchandise exports). Forestry products could become one of our largest export earners, so New Zealand is increasingly vulnerable to any timber disease.

The most striking symptom of Pine Pitch Canker is 'pitching', causing large amounts of white pitch (sap) to seep from the cankers caused by the fungus. Cankers effectively ring bark tree trunks, which kills them. The fungus that causes Pine Pitch Canker can survive in the soil or infected timber for over six months. Pine Pitch Canker is a significant fungal disease of conifers; Pinus radiata is particularly susceptible. An outbreak of Pine Pitch Canker in New Zealand would have a significant impact:

- Nurseries (probably the first affected) could suffer 80 – 100% seedling mortality. Substantial investment in above ground seedling nursery systems would be required to reduce the seedling loss to manageable levels.
- Young tree mortality (50–80%) in new or rotation plantations could require substantially higher initial planting densities and necessitate later re-planting.
- Established plantations could suffer tree mortality rates as high as 80%.
- Substantial investment would be required to hybridise Pinus species resistant to the disease.
- Australia, China and Korea are amongst our top five export destinations for unprocessed wood exports (logs, timber & wood chips). They don't have Pine Pitch Canker so could require our wood exports to be heated before export to protect their own forests.
- The extra cost of heat-treating would substantially reduce the profit margin, especially on products that would not gain added value from the treatment; for example, wood chips. It is not considered economically feasible to heat treat Pinus radiata logs. Around 50% of New Zealand's harvested wood is exported as logs, of which approximately 70% goes to China and Korea.

Incursion response

New Zealand regularly responds to incursions by a wide range of exotic species, including mosquitoes capable of carrying human or animal diseases, new pests and diseases of plants and animals, hitchhiker organisms such as ants, snakes and scorpions (which can enter in imported goods) through to GMOs found in imported seeds.

Once an organism has been detected, an incursion response is initiated to stop or restrict the spread of the organism, identify it and define its distribution ('delimitation'), followed by an assessment of management options - including control or eradication.

Response plans have been prepared for major threats such as exotic mosquitoes, FMD, fruit flies, the Northern Pacific Seastar and gypsy moth. The full range of threats to New Zealand is too broad to be covered by specific programmes, but generic programmes cover most threats.

The main capability for managing an incursion response sits within MAF – its Biosecurity Authority is responsible for planning, setting priorities, managing high-level incursion responses and maintaining contracts. Its capabilities are tested many times every year, in addition to annual simulation exercises (run from the Biosecurity Authority).

MFish and MoH manage marine and mosquito incursions respectively, although both agencies contract out most of the field activities. Exotic threats to indigenous biodiversity are managed by MAF for DOC. Contractors provide most of the field activity during an incursion response.

Internationally, successful marine responses are rare – effectiveness depends on early detection and a commitment to eradication.

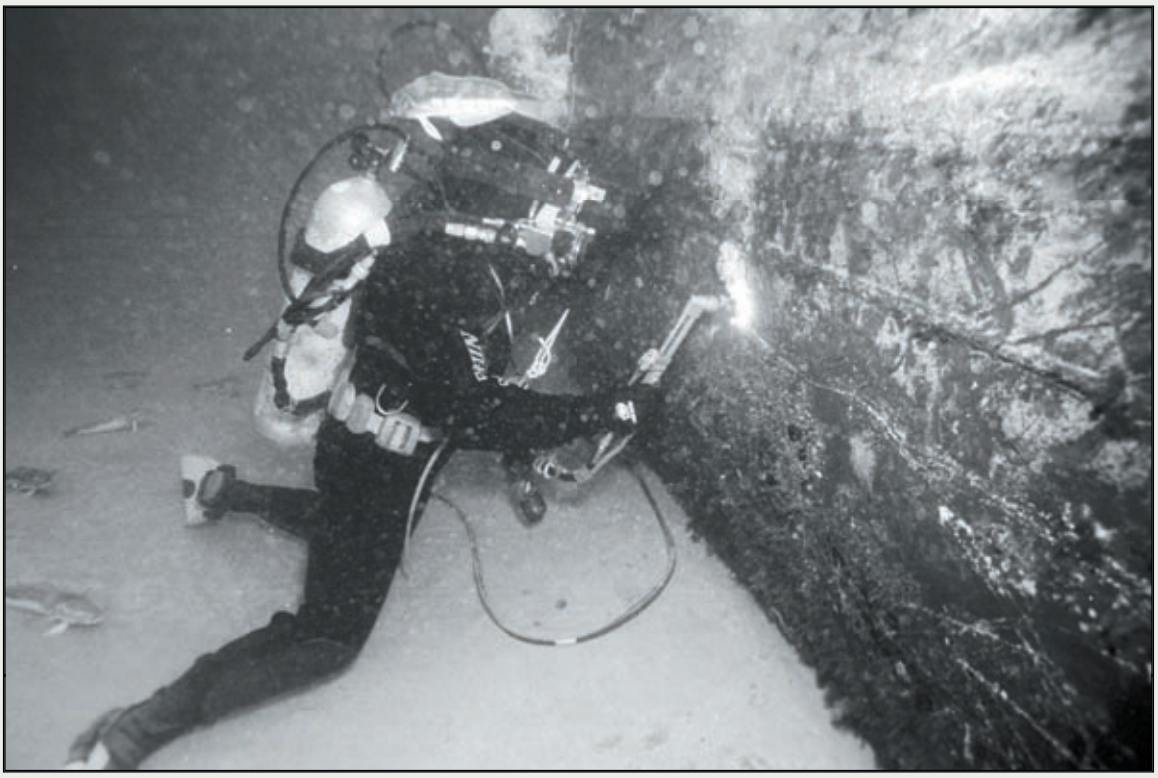
Incursion funding

Money for incursions needs to be found quickly. The Crown bears the ultimate responsibility; so it needs to make the decisions, then find the funding. 'Guarding Pacific's Triple Star' did not support establishing a dedicated fund for rapid initial response to incursions, although some submitters argued it was important. After further analysis, the Biosecurity Council remains unconvinced. It can remain on the wish list, but there are already funds available for incursion management - the problems appear to lie elsewhere.

> "New Zealand primary producers are well aware of the threats posed by the introduction of unwanted organisms. Weeds such as ragwort (*Senecio jacobaea*), gorse (*Ulex europaeus*), blackberry (*Rubus fruticosus agg*), argentine pampus grass (*Cortaderia jubata and Cortaderia selloana*), nodding thistle (*Carduus nutans*) and Hieracium and diseases such as Bovine TB have involved significant losses in productivity or required major costs to control. The impact of exotic pests, weeds and diseases on the economy has been estimated at about 1% of GDP, per year, plus intangibles." – G Bertram, 'The Impact of Exotic Pests on the NZ Economy'

Expectations – Incursions	
48.	That there is sufficient access to expertise and enough operational capacity available to respond immediately to high impact incursions
49.	That specific response plans are in place and routinely updated for an agreed set of high impact pests and diseases
50.	That generic response capability is maintained for all other incursions
51.	That financial restraints do not delay the implementation of rapid responses to high impact incursions
52.	That all initial incursions are controlled until decisions about future actions can be made
53.	That explicit expectations are established for marine incursion management

Eradication success in the Chatham Islands



The remoteness of the Chatham Islands has helped protect it from exotic species, including *undaria*, an unwanted seaweed already established in New Zealand. So it was a potential disaster in March 2000, when a fishing boat sank with *undaria* on its hull.

MFish ordered the vessel to be moved (using its powers under the Biosecurity Act) but weather prevented salvage attempts. MFish then decided to use new treatment techniques to eradicate the seaweed from the hull. The hull was heat-treated (effectively, the vessel was 'cooked') to kill the microscopic stages of *undaria*, which can't survive high temperatures.

Plywood boxes with foam seals were attached to the hull by magnets. Electric elements (powered by a diesel generator on the surface support vessel) inside the boxes heated the seawater to 70ºC for 10 minutes, with a flame torch used for inaccessible areas.

It took divers four weeks to complete the treatment, but a monthly monitoring programme over three years indicates the eradication has been entirely successful. The Chatham Islands' shoreline has been surveyed regularly for *undaria* and no plants have been found.

Pest management

Controlling established pests and weeds represents over half biosecurity's total expenditure.

DOC spends $53million on managing pests and weeds (mostly under Vote Conservation), and regional councils $26million. Pest management is now showing examples of sound strategic thinking, particularly by DOC and some regional councils which are focusing on eradicating or containing potential pests, and on controlling pests at priority sites to protect particular values.

DOC is developing decision tools and supporting databases for pest management, including 'Pestlink' to monitor pest management operations, and identify trends and best practice approaches. As a major landowner, it is imperative the Crown, through DOC, meets its obligations in managing pests and weeds on its property.

Pest management also includes 'internal biosecurity' strategies for long-term containment of species already here, either in captivity or in the wild. Examples of internal biosecurity undertaken under a range of legislation includes:

- Movement restrictions on bees and hives to manage varroa bee mite;
- Movement restrictions on marine farming equipment and spat to prevent spread of undaria seaweed;
- Restricting the farming of deer and other wild animals to specified areas;
- Controls on transferring freshwater fish to new areas;
- Prohibition on the movement and sale of live koi carp;
- Restrictions on introduction of new species into the coastal marine environment;
- Designating some garden plants as 'unwanted organisms' which prohibits their sale and distribution; *and*
- Bans on releasing caged birds and domestic animals into the wild.

Despite these advances, many decisions are being made in isolation – or not at all. The pest management roles of central and local government are at times muddled, with a lack of communication and coordination. This means pest management lacks strong national leadership and overview:

- Roles and responsibilities remain unclear with overlaps and gaps;
- Inconsistency in managing pests at national level;
- Pest problems remaining unmanaged, or falling to individual agencies such as DOC and regional councils;
- Lack of proactive and strategic pest management;
- Specific pest management tools such as National Pest Management Strategies are not being used;
- Little monitoring of the system or of the toolkit for managing pests; *and*
- Regional councils remain concerned the Biosecurity Act is preventing effective pest management, including surveillance within the context of pest management.

MAF, as the agency in charge of managing the biosecurity system, will have to be more active in ensuring agencies have specific areas of responsibility, with clear communications between central and regional government and appropriate legislative tools.

The Biosecurity Council is not suggesting MAF should take on the pest management responsibilities of agencies such as DOC, or the responsibilities of industry or individual landowners. MAF should, however, have an overview of the whole biosecurity system.

The Council expects a review and rationalisation of legislative tools for pest management over time, eventually bringing powers for long-term containment of pests under the Biosecurity Act where appropriate. This is consistent with the overall expectation that New Zealand's biosecurity system will be integrated and continuously improved.

Expectations – Pest management	
54.	That there is clear and effective national leadership and coordination of pest management activities within central government, local government and the private sector
55.	That there are transparent and effective performance measures to monitor and forecast the establishment of pest and weed impacts and pathways
56.	That the Crown meets its obligations as a landowner
57.	That there is a routine programme of national and regional communication and coordination including ongoing assessment and review of both individual programmes and the overall system

John Hellström

Captain Cook noted the striking bird life and plant biodiversity at Snake Point, in Queen Charlotte Sound. In the past 80 years, it has become a monoculture of self-seeded wilding pines, now spreading as weeds through the Marlborough Sounds. Wilding pines have become a problem throughout New Zealand, especially in the Sounds and tussock lands.

Southern Saltmarsh Mosquito

The Southern Saltmarsh Mosquito (*Ochlerotatus camptoryhnchus*) is a known vector for the debilitating Ross River Virus disease and has a high nuisance value because it bites during the day and is very aggressive. Ross River Virus disease (*Epidemic polyarthritis*) is endemic in Australia. It causes inflammation of the joints, with symptoms ranging from pain and tenderness in the muscles and joints to flu-like symptoms; most people fully recover within a month. No locally acquired cases of the disease have been reported in New Zealand to date.

Tourists and returning travellers can carry the disease but it cannot be transmitted from person-to-person, the disease can only be spread through the bites of certain mosquito species, including the Southern Saltmarsh Mosquito. Animals – possums and horses, for example – are known reservoirs for Ross River virus.

Establishment of the Southern Saltmarsh Mosquito could impact on native birds and possibly act as a vector for other wildlife diseases. The mosquito has many intangible costs – mainly impacts on lifestyle, tourism, and outdoor workers.

The Napier incursion was initially detected in 1998 through complaints of nuisance biting. The Ministry of Health led the eradication programme, because of the human health impacts. The Southern Saltmarsh Mosquito was eradicated from the Napier area by June 31 2002; no adults have been found for 28 months, and no larvae for 24 months. This local eradication of the species is a world-first and the same approach is now being used to eradicate the species in other parts of New Zealand.

The eradication programme included:

- ✓ Habitat modification and elimination - including clearing drains to remove weed and ensure water flows instead of ponding, completely drying out other drains during drier periods of the year so they didn't need treatment, filling depressions to eliminate ponding, removing dense vegetation, aerial surveillance and liasing with landowners and stakeholders to ensure any land modification which could produce new habitat was identified;
- ✓ Use of control agents - Bti and s-methoprene, maintenance of lethal concentrations of s-methoprene in all wet habitats for at least two summers and use of Bti for spot treatments;
- ✓ Surveillance - ongoing surveillance, enhanced at wet habitats after each water event, any live larvae or pupae collected and returned to the laboratory for screening identification;
- ✓ Consultation with local communities, landowners, territorial authorities, environmental groups, Maori and other interested parties; *and*
- ✓ Public information including newsletters, public notices, media statements, fact sheets about the control agents, a freephone queries number and daily updates on areas being treated with control agents.

The Growing Weed Problem

- Over 70% of new ecological weed problems are 'garden escapes' - introduced ornamental species that have naturalised. Around Auckland alone there are four garden escapes annually, adding to the more than 200 seriously invasive weeds managed by DOC.
- 10% of plants will naturalise; 10% of these will become serious pests. There are currently 25,000 exotic plant species in gardens and nurseries in New Zealand.
- The number of naturalised exotic plants now exceeds the number of native vascular ones.
- Tourists bring new weeds to New Zealand's remote areas where they thrive in disturbed areas around tracks and huts. Mt Cook has wild cherries, raspberries, gooseberry and conifers.
- Humans = weed problems. People bring in new plants that escape; rubbish is dumped in bush reserves; and the expansion of coastal subdivisions and lifestyle blocks exacerbates the spread of pests.
- If left uncontrolled, pest problems expand exponentially. The estimated cost of controlling wilding pines in the South Island high country increases ten times every six years. It costs $3 per hectare per year to control young wilding pines compared to $1,500 for 25-year-old trees.
- Botanic gardens harbour many potential plant pests. Christchurch Botanic Gardens has a plant called Celastrus that, although not established as a weed in Canterbury, is a serious new weed in the central North Island, East Coast, and Nelson where DOC is spending $55,000 annually to attempt to eradicate or contain it.
- Hydrilla – one of the world's most noxious waterweeds – is established at four Hawke's Bay sites. In Florida $US20million is spent annually to control it. In New Zealand, little funding has been allocated to warn owners that powerboats must be clean before entering lakes.
- Many weeds grow more vigorously in the warm, moist Northland district compared to other parts of New Zealand. Climate change means weeds further south will become problems.
- In South Australia olive trees are rated as one of the worst 20 weeds. Olives have been in New Zealand for a long time without becoming a problem, but the olive industry's importation of new varieties and climate changes means olives may become a weed pest.
- Weeds are an international problem, Australia now has Siam weed, one of the world's worst, which has seeds that hook into clothing.
- A serious sand dune weed 'sea spurge' (*Glyphorbia paralias*) has invaded South Australia and Tasmania and now has a high chance of reaching New Zealand through ocean currents and ballast discharge.

Part IV

Expectations

Overall expectation

1. That the biosecurity system is fully integrated, operating efficiently and transparently in an environment of continuous improvement (measure, review and refine)

Institutional arrangements

2. That a single agency (MAF) is accountable for ensuring the full range of biosecurity activities are delivered effectively and efficiently to meet the outcome expectations of agencies with a biosecurity interest

Maori

3. That the Chief Executive of MAF is responsible for developing a Maori responsiveness strategy for biosecurity agencies
4. That capacity and capability is developed within the biosecurity agencies with specific training (specialist skills and knowledge) to ensure Maori are involved meaningfully
5. That existing channels (under the Resource Management Act, Fisheries Act, District Health Boards or conservancies) are used in consulting on pest management strategies and during incursions
6. That kaitiaki are invited to work with central government and regional councils on biosecurity matters
7. That Maori values are explicitly considered in decision-making criteria

Stakeholders' voice

8. That the system encourages all New Zealanders to participate and support biosecurity
9. That there is an annual review with external stakeholders on the performance and development of biosecurity, with an overall review in 2010
10. That a reconstituted Biosecurity Council monitors this strategy's implementation on behalf of stakeholders for the Minister
11. That a central government/ regional council forum is established to address the joint issues of incursion response and pest management
12. That appropriate links with industry are formed to address priorities and who should pay for what

Capability gaps

13. That central government is committed to maintaining a clear and effective role as overall steward of the biosecurity system
14. That funding baselines for biosecurity are increased over the next five years specifically to close the gaps in the system
15. That immediate funding is provided to ensure sufficient capacity and capability for rational and strategic management of the total biosecurity system
16. That central government develops a comprehensive set of possible initiatives for increased expenditure each financial year - clearly prioritised across all agencies, sectors, environments and functions
17. That the IHS for risk management of sea containers is fully implemented
18. That pre-border and border measures to reduce risks to the marine environment are being addressed as a high priority
19. That the appropriate data management systems are in place to support quality decision-making and performance monitoring
20. That all critical eradication tools such as vaccines and pheromones are available for responding to incursions

Science

21. That science is closely involved in the development of biosecurity strategy
22. That the purchase of science is integrated across providers
23. That investment in science is long term to ensure maintenance of key capabilities
24. That the priority for research to improve biosecurity is understood

Priorities

25. That the criteria for assessment of benefits and costs includes the full range of effects across all sectors and in particular consequences for the environment, human health & well-being, economic production, and Maori cultural values
26. That there is an integrated framework for establishing whole-of-system priorities and providing greater transparency and accountability in risk management

Funding sources

27. That central government and regional councils are applying a clear and consistent cascading framework for determining who should pay what
28. That funding arrangements for all existing activities are progressively reviewed to ensure consistency with this framework

Changing behaviours

29. That all New Zealanders, and our visitors, are encouraged to support and participate in our biosecurity

Pre-border

30. That there is a continuous, targeted programme to move risk reduction measures offshore
31. That all relevant pre-border regulations and standards are in place - robust, consistent and subject to appropriate review processes
32. That New Zealand is using wider international - multilateral or bilateral - arrangements to reduce potential threats to indigenous biodiversity
33. That New Zealand is benefiting from and contributing to international standards to protect production and trade
34. That New Zealand's coastal waters are protected from threats carried in ballast water or on fouled hulls
35. That New Zealand is helping Pacific countries reduce biosecurity threats to the region

Borders

36. That clear and transparent measurements of risk mitigation are providing appropriate information about residual risk or 'leakage' across the border
37. That all significant hitchhiker pathways are covered where possible
38. That all significant pathways are covered
39. That border compliance is managed cost-effectively
40. That effective post-entry quarantine facilities are available where appropriate
41. That all high-risk entry points for the marine environment are evaluated, with risk mitigation measures in place

Surveillance

42. That there is a consistent policy for developing surveillance programmes across all sectors, based on the overall goals for biosecurity
43. That explicit surveillance objectives and performance standards, are based on these and are resourced to ensure delivery
44. That there is strong coordination of, and wide access to, the set of databases supporting surveillance activities
45. That quality information is available to the public to help them identify new or emerging pests
46. That the surveillance programme responds to changes in risk profiles as new pests and diseases emerge and others decline
47. That the programmes are based on the best available technology and sampling methodologies

Incursions

48. That there is sufficient access to expertise and enough operational capacity available to respond immediately to high impact incursions
49. That specific response plans are in place and routinely updated for an agreed set of high impact pests and diseases
50. That generic response capability is maintained for all other incursions

51. That financial restraints do not delay the implementation of rapid responses to high impact incursions
52. That all initial incursions are controlled until decisions about future actions can be made
53. That explicit expectations are established for marine incursion management

Pest management

54. That there is clear and effective national leadership and coordination of pest management activities within central government, local government and the private sector
55. That there are transparent and effective performance measures to monitor and forecast the establishment of pest and weed impacts and pathways
56. That the Crown meets its obligations as a landowner
57. That there is a routine programme of national and regional communication and coordination including ongoing assessment and review of both individual programmes and the overall system

Part V

Some recently detected incursions

Discovered post-border, January 2000 – April 2003

Name	Common name	Organism type	Date ID confirmed
Gymnodinium catenatum	Toxic dinoflagellate	Phytoplankton	1/2000
Chaetopterus sp.	Polychate worm	Marine worm	1/2000
Radumeris tasmaniensis	Scoliid wasp	Insect	2/2000
Polygonum perfoliatum	Devil's tear thumb	Weed	4/2000
Charybdis japonica	North Pacific Crab	Crab	12/2000
	Citrus white fly	Insect	10/2002
	Acacia beetle	Insect	10/2002
Porotermes adamsoni	Damp wood termite	Insect	11/2000
Rhipicephalus sanguineus	Brown dog tick	Tick	2000
Varroa destructor	Varroa	Mite	2000
Acentrogobius pflaumi	Goby	Fish	1/2001
Potato spindle tuber viroid	—	Virus	1/2001
Solenopsis invicta	Red imported fire ant	Insect	3/2001
Pseudovalsa lanciformis	—	Fungus	9/2001
Coccotrypes dactyliperda	Bark beetle	Insect	1/2002
Frankliniella intonsa	Easter flower thrips	Insect	2/2002
Caulerpa taxifolia	Aquarium strain	Seaweed	2/2002
Polistes olivaceus	Fig wasp	Insect	4/2002
Paratrechina longicornis	Crazy ant	Insect	4/2002
Anoplolepis gracilipes	Yellow crazy any	Insect	4/2002
	Asian paper wasp	Insect	4/2002
Histiostoma sapromyzarum	Acarid mite	Mite	7/2002
Peronospora dianthii	Downy mildew	Fungus	10/2002
Psittacine poxvirus	Parrot pox	Virus	10/2002
Diadophis punctatus punctatus	Southern ringneck snake	Reptile	11/2002
Cancer gibbulosus	Cancrid Crab	Crab	12/2002
Cnemidocarpa cf lobata	----	Sea Squirt	12/2002
Microcosmos squamiger	----	Sea Squirt	12/2002
Centuroides sp.	Scorpion	Insect	3/2003
Lymantria dispar	Asian gypsy moth	Insect	3/2003
Hyphantria cunea	Fall webworm	Insect	3/2003
Biflustra savartii	Lace coral	Bryozoan	5/2003
Solenopsis geminata	Tropical fire ant	Insect	6/2003

NB: Organisms discovered but not eradicated before January 2000 are not included; for example, Southern Saltmarsh Mosquito was discovered in Napier in December 1998 and later detected in Gisborne in November 2000.

Glossary

Aquatic	In this document, for simplicity, 'aquatic' refers to both marine and fresh water environments
Beneficiaries	Those who benefit in some way from the reduction of a given biosecurity risk – for example, port companies, exporters, producers in the industry affected by the risk, purchasers of the industry's products, and the general public. It should be noted that parties will frequently be both exacerbators and beneficiaries
ERMA	Environmental Risk Management Agency
Establishment	When an exotic organism has established a sustainable reproducing population within an area
Exacerbator	Those who create, continue, worsen or can control the biosecurity risks faced by New Zealand – for example, shipping companies, importers, port companies, and transport operators. It should be noted that parties will frequently be both exacerbators and beneficiaries
FRST	Foundation for Research, Science and Technology
GE	Genetic Engineering
GMOs	Genetically Modified Organisms
IHS	Import Health Standards
Incursion	An occurrence of an organism not previously known to be established in New Zealand. Does not include interceptions
Interception	Detection of an exotic organism at the border before it enters the country and becomes an incursion
Pheromone	A natural secretion of an animal or a synthetic copy which attracts other members of the species
Sectors	For example, pastoral farming, forestry, aquaculture, horticulture, human health, fresh water fish, native plants and animals, amenity planting. It does not refer to organisations such as Federated Farmers, Forest Owners' Association, public health or environmental organisations
Unwanted organism	Any organism that a chief technical officer believes is capable or potentially capable of causing unwanted harm to any natural and physical resources or human health
Vector	An organism that transfers an infected agent from one host to another
Zoonotic	Pertaining to diseases transmitted to humans from animals

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Buller District Council; Bush Community Board; Dairy Insight Incorporated; Deer Industry New Zealand; Entomological Society of New Zealand - Conservation Subcommittee; Environment and Conservation Organisations of New Zealand Inc; Environment Bay of Plenty; Environment Canterbury; Environment Southland; Environment Waikato; Federated Farmers of New Zealand; Federation of Maori Authorities; Fonterra Cooperative Group; Forest Research; Foundation for Research, Science and Technology; Game and Forest Foundation; GE Free New Zealand (in Food & Environment); GE Free Northland (in Food & Environment); Genera; Greater Wellington - The Regional Council; Hawke's Bay District Health Board; Hawke's Bay Fruitgrowers Association; Hawke's Bay Regional Council; horizons.mw (Manawatu-Wanganui Regional Council); Horticulture and Food Research Institute of New Zealand (HortResearch); Invasive Species Specialist Group, IUCN (The World Conservation Union); Landcare Research; Landcorp Farming Ltd; Local Government New Zealand; Marlborough District Council; Massey University EpiCentre; Meat Industry Association; Meat New Zealand; Ministry for the Environment; Ministry of Agriculture and Forestry; Ministry of Economic Development; Ministry of Fisheries; Ministry of Health; Ministry of Research Science and Technology; Ministry of Tourism; Museum of New Zealand Te Papa Tongarewa; National Beekeepers Association; National Centre for Advanced Bio-protection Technologies; National Council of Local Government New Zealand; National Council of Women of New Zealand; National Institute of Water and Atmospheric Research Ltd; New Zealand Berryfruit Growers Federation; New Zealand Biosecure; New Zealand Biosecurity Institute; New Zealand Conservation Authority; New Zealand Farm Forestry Association; New Zealand Food Safety Authority; New Zealand Forest Owners Association; New Zealand Fresh Produce Importers Association; New Zealand Fruitgrowers Federation; New Zealand Institute of Forestry; New Zealand Marine Farming Association; New Zealand Marine Transport Association Inc; New Zealand Mussel Industry Council; New Zealand Plant Breeding and Research Association; New Zealand Plant Protection Society; New Zealand Seafood Industry Council; New Zealand Vegetable & Potato Growers Federation; New Zealand Wool Board; Northland Regional Council; Nursery & Garden Industry Association; NZ Pork Industry Board; Otago Regional Council; Palmerston North Airport Ltd; Pipfruit Growers New Zealand Inc; Poultry Industry Association of New Zealand (Inc); Public Health South; Regional Public Health (Hutt Valley District Health Board); Rodney District Council; Royal Forest & Bird Protection Society; Royal Forest & Bird Protection Society - Golden Bay Branch; Royal Forest & Bird Protection Society - Napier Branch; Royal Forest & Bird Protection Society - Northern Branch; Royal Forest & Bird Protection Society - Upper Clutha Branch; Royal Forest & Bird Protection Society - Waitakere Branch; Southern Saltmarsh Mosquito Technical Advisory Group; Southland District Council; Stop Aerial Spraying; Taranaki Regional Council; Tatua Cooperative Dairy Company; Tourism Industry Association of New Zealand; University of Auckland - Centre for Invasive Species Research; Waikato District Health Board - Public Health Unit; Wairarapa Federated Farmers; Waitakere Branch of the Green Party; Waitakere City Council; Westland Milk Products; Wrightson Research.

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The use of single ropes for farming mussels was pioneered in New Zealand - the growing lines can be several kilometres long, depending on the depth of water. The Greenshell™ mussel is one of New Zealand's most successful exports (earning more than $185 million[1] in 2002). The main commercial farming areas are in the Marlborough Sounds, and around the Coromandel Peninsula and Stewart Island. It's imperative to keep our coastal waters free of marine pests, such as the voracious Northern Pacific Seastar (*Asterias amurensis*), which could destroy the mussel farming industry.

[1]NZ Seafood Council

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