the Australia and New Zealand School of Government

CASE PROGRAM 2006-10.1

The Painted Apple Moth Eradication Programme (A)

"We've got another lymantriid, and it's well established." With this message, on 5 May 1999, Dr Ruth Frampton learned of a new and potentially serious biosecurity incursion. Dr Frampton, the Ministry of Agriculture and Forestry (MAF)'s Chief Forestry Officer, was very familiar with the successful eradication of another member of the family Lymantriidae, the White Spotted Tussock Moth, a threat to New Zealand forests. Now a MAF entomologist was telling her that a related moth had been found. Over a hundred insects, at all life stages including the distinctive hairy caterpillars, could be seen. In the four months Ruth Frampton had been in the job, newly created within the recently merged Ministry of Agriculture and Forestry, Forest Biosecurity was already managing Dutch Elm Disease, the Gum Leaf Skeletoniser, and Subterranean Termites. She now had a new threat to assess and respond to.

New Zealand biosecurity

As startled airline passengers once could attest,[1] finding themselves sprayed before disembarkation, New Zealand has always been proactive in protecting its export-dependent, agriculture-based economy from pests and diseases. As the country adopted its free trade policies from the late 1980s, and as tourism grew in importance, the job of defending the borders became more challenging.

This case was developed by the Australia and New Zealand School of Government (ANZSOG) and funded by the New Zealand Ministry of Agriculture and Forestry (MAF). The case was written by Janet Tyson, with supervision by Dr Richard Norman, Victoria University of Wellington. It describes events preceding those in cases 2006-10.2 and 2006-10.3 but can be used in its own right. It has been prepared as a basis for class discussion rather than to illustrate either effective or ineffective handling of a managerial situation. The assistance of Ruth Frampton, Ian Gear, Peter Maddison, Barry O'Neil, Brett Sangster, Murray Sherwin, Max Suckling, and Peter Thomson is gratefully acknowledged.

[1] The practice of spraying passengers with insecticide has largely been superseded by the use of long-lasting residual spray, applied to empty cabins.

New Zealand's biosecurity[2] model evolved to replace long-established border inspection and quarantine systems. The Biosecurity Act was passed in 1993, and the

Technical Officer (CTO)[3], appointed for relevant expertise, was the pivotal person in responding to a biosecurity incursion. To ensure that technical considerations took priority in decision-making, the Act gave CTOs, reporting directly to their Chief Executive, extensive statutory powers. These were backed by the Minister's ability to grant some exemptions from the provisions of other legislation if necessary to eradicate a pest.

Incursions and responses

A biosecurity agency may handle up to 40 different incursions at any one time. It must manage a constantly changing array of unpredictable threats, from sleepy snakes in imported tyres to exotic-named intruders like the Glassy-Winged Sharpshooter, the Red-Vented Bulbul, and the Southern Saltmarsh Mosquito.

For pests identified as "most wanted" surveillance systems are in place, such as the nationwide network of traps set up in 1993 for the Asian Gypsy Moth. For well-researched major threats, like Foot and Mouth Disease in animals, substantial funds are immediately available if an emergency response is needed. At MAF, known and long-standing problems, like Subterranean Termites, are managed within the "business as usual" budget. At the outset, the same approach is taken to unexpected arrivals. For Forest Biosecurity the recently-arrived Gum Leaf Skeletoniser was in this category.

Top priority in a suspected incursion is to confirm the identity of the pest and extent of its spread, by conducting a "delimiting survey", and concurrently beginning containment measures. Once the size of the threat is known it can be decided, considering factors including the probability of success, the likelihood of harm to other creatures, and potential economic impact, whether eradication should be attempted, and how. With eradication such a complex challenge, the only option is often long-term management.

For moth intruders, immediate measures might include the use of insecticides, as a spray or in combination with baits, and removal of the "host" vegetation the caterpillars liked eating. To find how far an intruder had spread, visual surveys would be made working outwards from known infestations, while trace-back would try to identify its path of entry. A far more effective means of finding moths, and monitoring control efforts, is a network of traps, ideally using the most potent lure, the pheromone or sex attractant emitted by adult females; use of this technique was limited by available females – or pheromones. To further evaluate the threat, formal "host testing" aimed to find what chosen foods in its new environment would enable it to thrive and reproduce. Longer-term strategies could include biological control and the release of sterile insects to disrupt breeding.

[2] Biosecurity is now defined as the exclusion, eradication, or effective management of risks posed by pests and diseases to the economy, environment and human health. It covers terrestrial, freshwater and marine environments.
[3] Then referred to by their area of expertise e.g. Chief Forestry Officer, Chief Plants Officer.

Fruit flies and tussock moths

In early May 1996, several Mediterranean fruit flies, potentially very damaging for horticultural crops, were trapped in Auckland, New Zealand's largest city (with the largest port and busiest international airport). The National Adviser, Plant Pest Surveillance (later Acting Chief Plants Officer) Dr Ruth Frampton, of MAF Regulatory Authority[4], led the response. After three weeks of spot spraying with protein bait laced with insecticide, no more fruit flies could be found.

It would be a lengthier exercise to control the white spotted tussock moth, discovered around the same time, and also in Auckland. The moth was feared as a major threat to forestry, and the response – Operation Ever Green - was led by the Ministry of Forestry (MOF), vocally championed by its Minister, John Falloon. The main control method for the tussock moth incursion was "blanket" (extensive) aerial spraying over 4000 ha, including some of the most desirable residential areas in Auckland. The spray contained as its active ingredient the biological insecticide Btk,[5] available commercially as Foray 48B. The programme also included establishing and enforcing the movement and disposal of vegetation within the infested region.

A scientific breakthrough helped speed the tussock moth eradication. New Zealand and Canadian scientists developed a synthetic pheromone, allowing the trapping programme to be expanded much faster than could have been done by breeding live females in a captive colony. Within twelve months, while the breeding colony at the Forest Research Institute (FRI) was battling disease, an effective synthetic pheromone was developed. In short order, intensive trapping began. By June 1998, the tussock moth was declared eradicated, at a total cost of $12 million.

"Compulsory dousing by air"

The Btk-based spray targetted leaf-eating caterpillars of *Lepidoptera* (butterflies and moths) but did not harm other insects. Over 35 years, there had been no documented adverse health effect on humans from Btk applied aerially. As Operation Ever Green began, it was not thought there would be a need to manage health concerns. Other issues came to the fore; the eradication team spent $20,000 relocating ponies that might be disturbed by low-flying aircraft.

In February 1997, journalist Warwick Roger wrote of his surprise that East Auckland residents were just forming a health action group, "following their compulsory mass dousing by air of the spray Btk….

> "People in …the most-doused areas of a five-month period report headaches, influenza-like problems, tiredness and hot flushes. One incidence of nosebleeds has been recorded. … These problems are remarkably similar to those reported by a Vancouver study of workers in a major spray programme using the same chemical there…..this study received very little mention in the welter of uncritical media cheerleading about the Auckland spraying." [6]

[4] Which was then responsible for plant (horticultural and arable crops) and animal biosecurity, while the Ministry of Forestry handled forest biosecurity

[5] *Bacillus thuringiensis kurstaki*

[6] *Evening Post*, 24-2-97, 'Sitting Ducks and Airborne Irritants'.

As community concerns grew, Aeraqua Medical Services Ltd (AMS) was contracted to operate a service for people with health worries, while the Auckland District Health Board began monitoring for health impacts.

Not long afterwards, the spray programme ceased, and so did the visible signs of anti-spray activity. One legacy of the tussock moth campaign was to strengthen the quality of scientific advice available to eradication programmes by establishing technical advisory groups with a range of relevant expertise. Another was the awareness that future responses involving aerial spraying should factor in health concerns. Although the 50 reported health complaints were described as "annoying rather than debilitating", there was some evidence that the spray might worsen pre-existing conditions.[7]

Ruth Frampton, highly regarded in the scientific community, had been an official adviser for part of the tussock moth programme. The message she personally took from it was the need to be very cautious about undertaking any future aerial operation.

> "Eradication is no easy feat. If there is something that you really need to eradicate, you must have access to tools and an armoury. And if you use them [too readily] then you are actually almost abusing the public's goodwill."

Later, she was one of a three-person team[8] asked to undertake a government-commissioned review of the tussock moth programme. One of its findings, unpopular with MOF, was a criticism of the early decision to start extensive spraying.[9]

The tussock moth campaign, described in the *International Journal of Pest Management* as the world's first successful eradication of a forest pest established in an urban area,[10] went on to win a supreme public relations award for its communications.

The Ministry of Agriculture and Forestry

In 1997, over 90 percent of all biosecurity funding was allocated to the Ministry of Agriculture (MAF), which had been responsible for the long-standing plant and animal quarantine regimes. The remainder was shared between four other agencies: MOF, Ministry of Health, Ministry of Fisheries, Department of Conservation.

On 1 March 1998, the Ministry of Agriculture (with a staff of 2000) merged with the previously stand-alone Ministry of Forestry (a staff of 175) as the Ministry of Agriculture and Forestry. The new department retained the acronym MAF, and Professor Bruce Ross, formerly Director-General of Agriculture, was appointed to lead it. Dr John Valentine, who had created MOF and built its close working relationship with the industry, moved to the seafood sector.

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[7] *The Dominion,* 26-2-97, Ed 2 p6. 'Moth spray may make some illnesses worse', Alison Tocker. Quotes Auckland Medical Officer of Health, Dr Virginia Hope.

[8] The others were Dr Bas Walker, formerly chief executive of the Ministry for Research, Science and Technology and subsequently head of the Environmental Risk Management Authority; and Dr Grant Sinclair, Chief Executive of the New Zealand Wool Board.

[9] Audit report p 63 and *The Dominion,* 14-5-97, Ed 1, p14. 'Scientists Defend Advice on Moth'.

[10] G. Hosking, J. Clearwater and others, in the International Journal of Pest Management, Publisher Taylor and Francis, Volume 49, Number 1/January 1, 2003 pages 17-24.

On the forestry side, the merger was widely viewed as a takeover, with agriculture people getting the best deal in structures and appointments. "Every step of the way…forestry got pissed off."[11] The change was managed concurrently with the separation and split-up of the technically-focussed business unit MAF Quality Management, which would be completed later in the year *(Exhibit 1).*

Bruce Ross told forestry industry representatives, concerned at loss of industry knowledge:

> "The roles, and therefore to some extent the cultures of the two ministries, have to date been quite different, despite the fact that they are working with the same basic resources of land, water and climate. This division could not continue."[12]

Forest biosecurity would be significantly boosted within MAF, Ross said, with a new chief technical officer position dedicated to it. Gordon Hosking, a scientist from the Rotorua-based FRI[13] was seconded to this role and to align the two biosecurities. Dr Hosking was involved in leading the MOF operational response to the tussock moth.

An appointee from agriculture

In November 1998, it was announced that an appointee from the agriculture side, Dr Ruth Frampton, had been chosen to become Chief Forestry Officer (later known as Director Forest Biosecurity). Although she would be new to forestry, Ruth Frampton had previous experience in plant protection, and had led the emergency response to the 1996 fruit fly incursion. She had international experience, and having been seconded for two years to the Office of the Minister for Biosecurity,[14] had been closely involved in amending the Biosecurity Act. MAF's media release on the appointment said Frampton's background positioned her to build on Gordon Hosking's "excellent" alignment work and develop the new role to be "extremely valuable for MAF, forestry and New Zealand."[15]

Frampton knew that, in some influential forestry circles, her appointment was regarded as inappropriate. There were fences to be mended with the forestry sector and relationships would be delicate. With many new entities in their infancy, some areas of responsibility remained ill-defined. One of them was how the newly established MAF National Plant Pest Reference Laboratory (NPPRL) fitted with the long-established FRI.

Dr Ruth Frampton took up her new role in January 1999. As a third tier manager, she was one of the most senior women in MAF. That month she joined the six-person Ministry of Health-led Technical Advisory Group for the eradication of the Southern Saltmarsh Mosquito in Hawke's Bay.[16]

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[11] 'Taking Pines to Pasture, Merging the Ministries of Agriculture and Fisheries', Sally Riad, Victoria Link, Wellington 2001, p 35.
[12] Source: www.maf.govt.nz/mafnet/press/archive/1998/190298for.htm downloaded 9/9/05
[13] A Crown Research Institute (CRI) (see also 2006-10.2)
[14] Rt Hon Simon Upton in the first instance, latterly Hon John Luxton.
[15] MAF Media Release, 27-11-98: Chief Forestry Officer appointment.
[16] Ministry of Health Media Release, 19-1-99: Experts advise Ministry of Health on mosquito.

Forest Biosecurity comprised the Chief Forestry Officer, two National Advisers (both formerly with MOF) and a part-time administrative assistant. Ruth Frampton's peers in the MAF Regulatory Authority, the Chief Plants Officer and Chief Veterinary Officer each had teams of over 20. Each group had its own budget: Forest Biosecurity's funding had already been determined at $1.5 million. This was to cover routine surveillance activities and export systems, as well as management of incursions.

In February 1999, it was announced that the MAF Regulatory Authority would be split into Food Assurance and Biosecurity Agencies. Barry O'Neil, then Chief Veterinary Officer,[17] had been selected in an international search process to become Assistant Director General/Group Director of the Biosecurity Authority. From July, as Director, Forest Biosecurity, Ruth Frampton would report to O'Neil. In her Chief Forestry Officer role, the Biosecurity Act still provided a direct reporting line to Director-General Ross.

In April, following an external review, the Forest Health Team of MAF was sold to the FRI. The group of 14, based around the country, carried out a range of forest surveillance and pest management services, and had first-hand experience of the tussock moth campaign. This move was welcomed by the industry, which saw many synergies with other FRI functions, and by MAF, which saw it as non-core business that could in future be purchased as needed.[18]

Weeks later, MAF Forest Biosecurity would contract some of the same people, now Vigil Forest Health, an FRI business - to help control the newly discovered pest.

The Painted Apple Moth

In April 1999, entomologist Dr Peter Maddison took a phone call from the owner of an industrial site in Glendene, a suburb of Waitakere City in West Auckland. The woman was concerned about a large number of unusual, hairy caterpillars she had found eating their way into a clump of wattle (*Acacia* species) trees on the property, and sought Dr Maddison's advice. As the local president of the Forest and Bird Protection Society, (and a Council candidate in the 1998 local government elections) he was frequently quoted on conservation and wildlife issues in the *Western Leader* community newspaper.

Arriving at the site, Dr Maddison discovered hundreds of caterpillars as well as moths, egg masses and pupae. Maddison, now an independent consultant but earlier head of an entomology research team at the former Department of Scientific and Industrial Research (DSIR), knew the moth was not a native, and suspected what it might be. Entomologists from MAF's NPPRL were called to the site immediately, taking samples for identification.

Peter Maddison later called Landcare Research[19] which he knew had a major responsibility for pest and disease identification. He said he suspected the find was

[17] The Regulatory Authority, which also covered meat inspection services, was known for the large number of people with veterinary training in its ranks.
[18] MAF Media Release, 13-4-99: Forest health group moves to Forest Research.
[19] Another Crown Research Institute. More detail in 2005-10.2.

the Painted Apple Moth, which he recognised from an outbreak in Tasmania. He offered to give any help or advice that he could.

By then, Ruth Frampton knew that Forest Biosecurity's new intruder was a completely unexpected arrival, "under the radar" of surveillance systems and not figuring on existing lists of potential pests.

Exhibit 1: MAF History

The current Ministry of Agriculture and Forestry is a descendent of the old Department of Agriculture which was founded back in 1892 from the amalgamation of the Stock and Agriculture Branches of the Department of Crown Lands. Its job back then was to provide farmers with expert scientific advice to improve both the quality and quantity of their production.

Since then, the Ministry has undergone a series of major restructurings, which have also changed its role and key functions. The core Ministry of Agriculture (i.e. MAF Policy, MAF Regulatory Authority, Corporate Group and Corporate Affairs) became primarily a policy and regulatory organisation. These functions were separated from service delivery, which is carried out by MAF Quality Management (MQM). On 1 July 1995, MQM was internally separated from the rest of MAF, pending a review of its functions. Farm advice services were taken over by Agriculture New Zealand, initially a State Owned Enterprise, but late privatised.

Another change which occurred on 1 July 1995 was the giving over of all responsibilities for fisheries, which since 1972 had been the work of the old Ministry of Agriculture and Fisheries, to a new Ministry of Fisheries. However, Cabinet decided that, despite the loss of "Fisheries" the newly created Ministry of Agriculture should continue to be known by the acronym "MAF", and should still use the same logo, because of the high recognition and regard for the name and logo amongst our overseas trading partners.

On 1 March 1998, the Ministry of Agriculture and the Ministry of Forestry merged to become the Ministry of Agriculture and Forestry.

On 1 November 1998, MAF Quality Management was replaced by two SOEs; Asure New Zealand Ltd and AgriQuality New Zealand. The purpose of establishing the SOEs was to separate the service delivery arm from the core Government tasks of policy advice and regulatory standards, and to improve the efficiency and performance of both businesses to ensure their viability. The move to establish the SOEs follows three strategic reviews (1996, 1997 and 1998) of the Crown's involvement in MAF Quality Management. The reviews concluded that operations within MQM were capable of achieving commercial viability.

July 1999 saw the Regulatory Authority divided into MAF Food Assurance Authority and MAF Biosecurity Authority.

MAF Restructuring 1987 to Present

1987 - amalgamation of 10 functional Divisions into 4 Business Groups (MAF Technology, MAF Quality Management, MAF Fisheries and MAF Corporate Services) in response to requirements from Government to become more businesslike and generate third party revenue;
1990 - separation of MAF Policy (Agriculture and Fisheries) from service delivery functions in the other Business Groups;
1992 - science restructuring - MAF Tech split among CRIs. Agriculture New Zealand (farm consultants) retained but moved over time to full cost recovery;
1992 - Policy restructuring I - creation of Regulatory Authority to focus on implementation of policy;
1994 - Policy restructuring II - separation of agricultural and fisheries policy;
1995 - sale of Agriculture New Zealand to Wrightsons;
1995 - creation of Ministry of Fisheries;
1998 - merger of Ministry of Agriculture and Ministry of Forestry;
1998 - Forestry Export Certification transferred to AgriQuality.
1998 - MAF Quality Management split into Asure New Zealand Ltd and AgriQuality New Zealand Ltd (SOEs) - Verification Agency and Quarantine Service retained within MAF. The Animals and Plants Laboratories were retained as part of core MAF;
1999 - sale of Forest Health to Forest Research;
1999 - separation of Regulatory Authority into Biosecurity Authority and Food Assurance Authority.
2002 - MAF Food Assurance Authority and parts of Ministry of Health combine to become the New Zealand Food Safety Authority, a semi-autonomous business within MAF
2004 - MAF Biosecurity Authority becomes Biosecurity New Zealand.