

MAF Biosecurity New Zealand Biosecurity Surveillance Strategy

Review of the Current State of the Biosecurity Surveillance System



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Contents

- Introduction 4
- 1. Role of Biosecurity Surveillance..... 7
- 2. Governance and Funding of Biosecurity Surveillance..... 11
- 3. Relationships, Responsibilities and Capability in Biosecurity Surveillance..... 13
- 4. Prioritisation of Biosecurity Surveillance Programmes in Biosecurity New Zealand .. 16
- 5. Biosecurity Surveillance Methodology 18
- 6. Biosecurity Surveillance Information Management 21
- 7. Use of Research in Biosecurity Surveillance 23
- 8. Use of Communications in Biosecurity Surveillance 25
- Appendix 1: Glossary of Terms 27
- Appendix 2: Glossary of Acronyms 31
- Appendix 3: Current Biosecurity Surveillance Research..... 33
- Appendix 4: List of Recent Surveillance Activities Occurring In New Zealand..... 34
- Appendix 5: List of Submitters 39

Introduction

MAF Biosecurity New Zealand (MAFBNZ) is recognised as a world leader in the management of biosecurity risks. MAFBNZ's biosecurity surveillance systems have, to date, successfully supported New Zealand's trade in primary sector products and they continue to detect incursions that threaten New Zealand's natural advantage, enabling timely and successful responses. However, the biosecurity surveillance system is under pressure as trade and passenger volumes increase and new threats emerge.

In August 2002, Prime Consulting International Ltd completed a substantial review of New Zealand's biosecurity surveillance system (the Prime review).¹ The review contained important findings and several recommendations for improvements to the biosecurity surveillance system. Some recommendations have subsequently been addressed by specific pieces of work. For example, the forestry surveillance programmes were reviewed, in conjunction with industry, resulting in *The Status and Future Needs of Forest Biosecurity Surveillance in New Zealand* and subsequent changes to the surveillance programmes in this sector. Other recommendations from the Prime review, because of the passage of time, are no longer relevant. Many remain valid and are worthy of attention, but have not been given sufficient priority.

Tiakina Aotearoa – Protect New Zealand: The Biosecurity Strategy for New Zealand (The Biosecurity Strategy), released in August 2003, referred to the Prime review and established six expectations for biosecurity surveillance:

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

These expectations have not been sufficiently addressed since the release of the Biosecurity Strategy.

MAFBNZ is, therefore, developing a Biosecurity Surveillance Strategy, incorporating the plant, animal, and marine, terrestrial and freshwater environments, to enable these expectations and recommendations for the biosecurity surveillance system to be addressed.

¹ Pearson, Alan B (August 2002) *Review of New Zealand's Biosecurity Surveillance Systems*, Prime Consulting International Ltd. <http://www.biosecurity.govt.nz/pests-diseases/surveillance-review/index.htm>. Accessed 11 February 2008.

The first step in this process has been the production of this report, which reviews the current state of the biosecurity surveillance system in New Zealand. This assessment has been done by considering the findings of key previous reviews and the Biosecurity Surveillance Strategy expectations. The review is divided into eight areas, which reflect the supporting systems and processes required for biosecurity surveillance.

These areas are:

1. the role of biosecurity surveillance;
2. governance and funding;
3. relationships, responsibilities and capability;
4. prioritisation;
5. methodology;
6. information management;
7. research;
8. communications.

The draft report on the review was prepared and tested at a series of workshops during June 2007 involving people within MAFBNZ who contribute to, or rely on, the outcomes of surveillance.

The next step was to determine whether external stakeholders broadly agreed with the key findings of the review. We identified a target group of experts and key participants in the surveillance system to provide informed comment. Because of the scope of the Biosecurity Surveillance Strategy, this selection includes individuals and organisations from the animal, environment, plant and marine sectors. We would like to thank all those organisations and groups that responded. A list of submitters can be found in Appendix 5.

Forthcoming work requires development of the Biosecurity Surveillance Strategy, which will contain a cohesive vision and consistent principles and approaches for the future biosecurity surveillance system. The subsequent implementation plan will establish a path for the successful transition from the current state to the preferred future biosecurity surveillance system.

The development of the Biosecurity Surveillance Strategy, and its implementation, is expected to result in:

- the efficient use of resources by developing a formal prioritisation system;
- improved collaboration and an integrated approach through clarification of the roles and responsibilities of contributors to the biosecurity surveillance system;
- high-quality biosecurity surveillance outputs that give stakeholders improved confidence in New Zealand biosecurity and biosecurity surveillance systems by using consistent quality measures;
- improved decision making and increased resourcing options for biosecurity surveillance activities through an agreed model for working together, which includes both governance and resourcing;
- increased value from biosecurity surveillance information by improving handling and sharing of data with users of biosecurity surveillance information;

- appropriate infrastructure to support the biosecurity surveillance system by identifying future needs and developing capability;
- cutting-edge biosecurity surveillance programmes using the best available science and technology through identifying and closing gaps in knowledge to support biosecurity surveillance activities; and
- development of linkages between all areas of MAFBNZ and external stakeholders.

This is the final report of the review of the current state of the biosecurity surveillance system. It is not a discussion document, and public submissions are not being sought. Public consultation will take place in mid-2008 after the draft Biosecurity Surveillance Strategy has been issued (for information on this process see <http://www.biosecurity.govt.nz/strategy-and-consultation/strategy/strategy/pest-management/surveillance>).

If you would like further information on this document or the development of the Biosecurity Surveillance Strategy please refer to the website above or contact NZBiosecuritySurveillance@maf.govt.nz. This address will be monitored and your request will be forwarded to the appropriate person for response.

1. Role of Biosecurity Surveillance

What is the contribution of biosecurity surveillance to New Zealand's overall biosecurity system?

Key findings

- Biosecurity surveillance is an important process that supports MAFBNZ in its lead role in preventing the arrival of unwanted pests and diseases and for controlling, managing or eradicating them should they arrive or become established in New Zealand.
- There is not always a consistent view between, and within, agencies and organisations on the scope, objectives and importance of biosecurity surveillance activities.
- The objectives for biosecurity surveillance activities are not being met across the entire spectrum of New Zealand's primary industry and environmental sectors.

1.1 What is biosecurity surveillance?

Biosecurity surveillance is the collection, collation, analysis, interpretation and timely dissemination of information on the presence, distribution or prevalence of pests or diseases and the plants or animals that they affect.

MAFBNZ's mission is to protect New Zealand's natural advantage by making timely and informed biosecurity risk management decisions and implementing them. The biosecurity surveillance systems have, to date, successfully supported the ongoing fulfilment of this mission by facilitating New Zealand's trade in primary sector products and detecting incursions, enabling timely and successful responses. However, the formation of Biosecurity New Zealand in 2004 widened the organisation's mandate substantially, from pests and diseases affecting managed species to include those affecting native flora and fauna in the terrestrial, freshwater and marine environments.

Biosecurity surveillance is an important process that supports MAFBNZ in its lead role in preventing unwanted pests and diseases from being imported, and for controlling, managing or eradicating them following their arrival or establishment. The contribution of biosecurity surveillance to the biosecurity system has not, as yet, been formally identified across all sectors.

Analysis of the nature of the biosecurity surveillance activities that have been undertaken to date indicates that the overall objectives of the biosecurity surveillance system have been to:

1. detect incursions of exotic pests and diseases early enough to allow for optimal management to occur;
2. demonstrate freedom from pests and diseases to facilitate trade and comply with international obligations;
3. monitor emerging pests, diseases and threats to mitigate risks to New Zealand;

4. describe the distribution and prevalence of pests and diseases, and the animals and plants that they affect, within New Zealand;
5. produce and disseminate timely and accurate information to support biosecurity decision making within MAFBNZ and other stakeholder groups

1.2 Leadership and co-ordination for biosecurity surveillance

MAFBNZ provides the framework to achieve co-ordinated and highly effective management of biosecurity risks. MAFBNZ's leadership of biosecurity surveillance activities has been limited by the availability of internal resources and the lack of co-ordination among the disparate groups that contribute to biosecurity surveillance activities, for example, government departments, industry organisations and regional councils. In some circumstances, where there has been a strong trade or human health imperative for biosecurity surveillance (for example, Transmissible spongiform encephalopathies programmes), MAFBNZ has taken the lead in co-ordinating industry and across government activities. To date, MAFBNZ has not provided sufficiently effective leadership for biosecurity surveillance activities in sectors where these imperatives are not present. Also, there has not always been a consistent view between and within agencies and organisations on the scope, objectives and importance of biosecurity surveillance activities.

1.3 Detection of incursions of new pests and diseases

A key aim of many biosecurity surveillance activities has been to detect incursions of new pests and diseases in order to provide sufficient opportunity to enact effective control or eradication, where appropriate. Notable examples of success in this area include the eradication of Mediterranean fruit fly and Asian gypsy moth incursions. However, the recent incursions and subsequent spread of post-weaning multi-systemic wasting syndrome (PMWS) among pig farms, and the continued spread of gum leaf skeletoniser, indicate that detection does not always lead to disease or pest elimination.

At present, targeted or active surveillance programmes cover only a small number of the potential risks and, therefore, New Zealand also relies upon passive surveillance for the detection of pests and diseases.

There are currently few systematic surveillance programmes for diseases and pests affecting:

- the aquaculture industry (apart from salmon production);
- the plant production/horticultural industry (apart from fruit fly surveillance);
- forage crop production;
- the terrestrial and freshwater environment (other than exotic ants and didymo);
- companion animals, wildlife and feral animals including zoonotic organisms in these species.

These gaps reflect the historical focus of the biosecurity surveillance system toward farmed species and that MAFBNZ activities have not necessarily been aligned with the enlarged MAFBNZ mandate. Considerable progress has been made in some areas, most notably the marine environment, where there are now surveys underway to detect unwanted pests and diseases in high-risk areas.

1.4 Demonstrate freedom from pests and diseases

There are several biosecurity surveillance programmes that aim to demonstrate freedom from pests and diseases to enable and support trade. These activities also support the development and implementation of import health standards, which allow New Zealand to apply internationally acceptable measures at the border and are intended to prevent the introduction of risk organisms.

Surveillance activities intended to demonstrate freedom from disease are most notable in the farmed animals sector, and less well developed in the horticultural and forestry sector. Internationally, there is an increasing demand to provide rigorous evidence of absence to support claims of disease and pest freedom. MAFBNZ uses passive surveillance programmes, supported by thorough investigation of suspected incursions, to support New Zealand's status with respect to several diseases and pests. To date, there have been limited requirements to demonstrate freedom from diseases or pests for trade purposes in the marine or environmental sectors.

1.5 Monitoring of emerging pests, diseases and threats

There are limited formal assessments, for example the use of strategic foresight methods, undertaken to identify and monitor the risks associated with emerging pests, diseases and threats.

The majority of biosecurity surveillance activities are currently focused within mainland New Zealand. However, monitoring the offshore distribution of high-impact exotic species (for example, ant surveillance in the Pacific islands) allows MAFBNZ to modify border processes and post-border biosecurity surveillance, to maximise the chances of prevention and/or early detection.

1.6 Distribution and prevalence of pests and diseases

An understanding of the presence, distribution and prevalence of pests and diseases within New Zealand (and the mechanisms of arrival, establishment and spread) is required to target biosecurity surveillance appropriately, improve existing surveillance programmes, detect new incursions and to provide effective management of these organisms within the country. The provision of this information is also essential for assessing the effectiveness of any control measures and may inform consideration of alternatives.

Currently, there is no central and accessible repository of such information. In addition, knowledge of the biodiversity of both exotic and indigenous species within New Zealand is incomplete, and established and previously unidentified organisms are still detected on a regular basis.

To some extent, these knowledge gaps are being addressed. For example, in the marine sector, baseline surveys to determine the presence and distribution of established organisms are being conducted. Similarly, in the terrestrial plants arena, work is also undertaken by non-governmental organisations (NGOs), regional councils and the Department of Conservation, among others. The animal production industries are also proactive in undertaking disease surveillance, for example, monitoring of the occurrence of campylobacters and salmonellas by poultry producers. The Ministry of Health, together with MAFBNZ and other parties, has a strong interest in biosecurity surveillance where human health is a key driver.

Appendix 4 contains examples of specific surveillance programmes that have been conducted within New Zealand during the last 10 years.

1.7 Information to support biosecurity decision making

The ability to produce timely and accurate information to support biosecurity decision making is dependent on how well MAFBNZ and other partners concerned in biosecurity surveillance achieve all of the above activities. Biosecurity decision-making challenges become apparent where there are gaps or shortcomings in the information provided by the biosecurity surveillance system.

2. Governance and Funding of Biosecurity Surveillance

Who makes the decisions in the biosecurity surveillance system, how are they made and resourced?

Key findings

- The formal governance structures that exist within government agencies, between government agencies and industry, and with other stakeholders have not always been used effectively to lead and co-ordinate surveillance activities.
- Governance structures established to manage specific surveillance issues have, in general, functioned very effectively.
- Areas of responsibility and accountability are not always clear within and between agencies.
- There are no clear guidelines on how MAFBNZ should be involved in industry-led programmes.
- Funding decisions are generally made in an ad hoc fashion, and the decision criteria surrounding the sourcing and allocation of funding for biosecurity surveillance activities are not always transparent.

2.1. Governance

MAFBNZ has the mandate and is recognised as the lead biosecurity agency within New Zealand, also encompassing biosecurity of the marine and terrestrial environments (transferred from the Ministry of Fisheries and Department of Conservation).

There are several formal governance structures in place to provide strategic leadership and to co-ordinate biosecurity activities within government agencies, and between government agencies and industry and other stakeholders. However, these structures have not always been used effectively to provide leadership and co-ordination for surveillance activities. For some specific surveillance activities, governance structures have been established, usually on a reactive basis, during a response to the first detection of an unwanted organism in New Zealand. These groups have included MAFBNZ as co-ordinator and lead organisation, and a range of other parties, including independent experts, industry bodies, local government and other government agencies, as required. This flexible approach to the governance of responses to specific issues has generally functioned very effectively.

In some circumstances, for example, when food safety or human health considerations have been predominant, other government agencies have led with support from MAFBNZ. Typically, areas of responsibility and accountability between agencies have not always been clear, and co-ordination of activities has sometimes been limited.

Regional government is not always effectively involved in surveillance decision making. The recent focus on internal border and pathway management, including the establishment of forums such as the Biosecurity Co-ordination Group, a revamped National Pest Plant Accord and specific partnership initiatives, is providing the potential for improved co-ordination of surveillance activities.

There are, at present, no clear guidelines as to how MAFBNZ should be involved in industry-led surveillance programmes. There are, however, projects underway examining potential models that would assist government and other stakeholders to work together more effectively than they do at present.

2.2. Funding

Funding for biosecurity surveillance programmes is provided by three main sources:

1. the Crown: through baseline funding for MAFBNZ (Vote Biosecurity), New Initiative Bids, and other government agencies;
2. local government: through funding from rates;
3. industry: through direct funding from industry groups or individual companies, or through levies.

In-kind support is also given in several cases, both from MAFBNZ, and other government agencies and industry sectors, via the provision of expertise and available resources to assist the programmes. This has included the provision of assistance with the development, co-ordination and implementation of surveillance programmes.

Because of the nature of biosecurity surveillance activities, it is challenging to determine the extent and appropriate sources of funding.

This is, in part, because of the difficulty in applying traditional economic decision support tools, such as cost:benefit analysis, to activities of which the outcomes are frequently intangible and are of value to a broad spectrum of stakeholder groups. There is currently no overarching strategy for ensuring consistency and equity in the decisions surrounding the sourcing and allocation of funding for biosecurity surveillance activities.

As identified by the Biosecurity Funding Review 2005,² funding decisions are made in an ad hoc fashion and the decision criteria are not transparent. The review provided the principles for determining the appropriate funding source for surveillance activities, but these have not been applied. The majority of biosecurity surveillance activities led by MAFBNZ are funded by government. However, there are some examples of programmes where full industry funding or joint funding has been successful.

² Biosecurity New Zealand. *Future Funding of Biosecurity Services – Biosecurity New Zealand Discussion Paper No: 04/01*. <http://www.biosecurity.govt.nz/bio-strategy/papers/biosecurity-funding-review.htm>. Accessed 11 February 2008.

3. Relationships, Responsibilities and Capability in Biosecurity Surveillance

How do the participants in the biosecurity surveillance system interact, and what are their responsibilities and areas of capability?

Key findings

- MAFBNZ has a central role in conducting biosecurity surveillance for unwanted pests and diseases (except with regard to food safety and diseases in humans) in border and post-border situations.
- A wide range of stakeholders contribute to biosecurity surveillance activities, but the boundaries of responsibility for biosecurity surveillance between organisations can be unclear.
- All biosecurity surveillance activities are dependent upon a high level of diagnostic and taxonomic expertise to identify pests and diseases. In some areas, this capability has not been established within New Zealand and, in others, there has been a gradual loss of capability.
- MAFBNZ has not always accessed or effectively used resources and capability that may be available in other government agencies or regional government.

3.1. Relationships

Biosecurity surveillance in New Zealand involves many different groups and organisations interacting with one another. These stakeholders include:

- MAFBNZ;
- industry representatives;
- NGOs;
- local government;
- other government departments (for example, the Ministries of Health, Fisheries and Environment, and the Department of Conservation);
- members of the public and community groups;
- research organisations and service providers;
- Māori;
- international organisations, networks and trade partners.

Relationships exist between MAFBNZ and the majority of formal stakeholder groups across the marine, environment, plant and animal sectors. Some relationships are still being developed, and not all stakeholders are necessarily represented by a formal organisation, which can make it difficult to maintain effective relationships. MAFBNZ is aware of the need to support the development of relationships, and pays particular attention to groups and sectors where relationships are still developing. Some organisational relationships are based on good communication and understanding between individual staff members, leaving both MAFBNZ and the stakeholder organisation vulnerable to staff turnover.

The relationships between MAFBNZ and current service providers are well established, although MAFBNZ may not be aware of all available service providers, or their areas of capability. The relationships between MAFBNZ and research agencies are sometimes not well developed.

MAFBNZ has not undertaken any formal exercise to ascertain stakeholder requirements of the biosecurity surveillance system, and there is currently no formal relationship with Māori focusing specifically on biosecurity surveillance.

The relationships between participants in the biosecurity surveillance system may be complex and can exist at numerous levels in the organisations concerned. Often, these relationships involve interdependencies on other stakeholders and a requirement for mutual consultation that can sometimes reduce the pace of progress that is achievable through working in partnership. However, such relationships can have significant benefits. For example, surveillance for Transmissible spongiform encephalopathies in livestock has relied upon complex but effective communication between MAFBNZ, livestock industry organisations, veterinarians and farmers, to positive effect.

At present, no agreed framework exists for establishing partnerships between MAFBNZ and stakeholders for the purpose of undertaking surveillance. However, analogous structures are in place for other purposes, for example, concerning import and export facilitation.

While several groups within the government sector are active in biosecurity surveillance, they do not always co-ordinate their activities to present a unified approach. However, formal boundaries for biosecurity surveillance responsibilities are clear in some areas. For example, the Ministry of Health has responsibility for disease surveillance in humans, even when the diseases of interest are also animal pathogens for which MAFBNZ undertakes surveillance.

3.2. Responsibilities

MAFBNZ has the lead role in excluding unwanted pests and diseases from New Zealand, and for eradication and effective management, should they arrive. Biosecurity surveillance is conducted by MAFBNZ for many reasons, but primarily to support the achievement of these goals.

Legislative grounds for biosecurity surveillance are provided in the Biosecurity Act 1993. Other Acts that may have input in to the biosecurity surveillance system include the Resource Management Act 1991, Conservation Act 1987, Wild Animal Control Act 1977, Health Act 1956 and the Hazardous Substances and New Organisms Act 1996.

Other government agencies, regional and local government and industry groups are enabled to conduct biosecurity surveillance (for example, as part of a pest management strategy). However, the boundaries of responsibility for biosecurity surveillance between organisations often overlap or can be unclear.

3.3. Capability

All biosecurity surveillance activities are dependent upon a high level of diagnostic and taxonomic expertise and the availability of diagnostic tools to identify pests and diseases. Failure to develop and maintain these capabilities may affect New Zealand's ability to undertake effective biosecurity surveillance in years to come. Not all areas of diagnostics and taxonomy are equally affected. In some situations, for example, where limited worldwide expertise exists, timely access to expert opinion is a critical gap. These issues have been recognised for some time (for example, in the Prime review) and also present a challenge for agencies in other countries. Additionally, the greying of expertise and rapid organisational change within MAFBNZ has led to a loss of knowledge in some areas of capability.

Biosecurity surveillance activities also depend on the availability of trained field personnel who can conduct surveillance and sample collection. Capability exists in other organisations, particularly the Department of Conservation and regional councils. Some regional councils have supported MAFBNZ's effort in both communications and surveillance in the management of didymo. However, MAFBNZ has generally not accessed or effectively used surveillance capability that may exist. Improved technology has mitigated reduced capability in some areas but itself relies on adequate capability for implementation.

The development and maintenance of biosecurity surveillance infrastructure and expertise within the private sector is particularly difficult in areas where there is potentially low commercial incentives to maintain surveillance (for example, surveillance for pests and diseases that are new, rare or that affect non-commercial organisms).

In most sectors, work is not currently undertaken to assess capability needs or to address identified deficiencies. Work does, however, occur in some areas (for example, MAFBNZ assists local councils to identify their biosecurity surveillance needs and to develop areas of capability).

4. Prioritisation of Biosecurity Surveillance Programmes in Biosecurity New Zealand

How does MAFBNZ decide which biosecurity surveillance programmes to undertake, and what techniques are available to support these decisions?

Key findings

- The prioritisation of resources for biosecurity surveillance activities by MAFBNZ has sought to make the best use of limited resources to produce positive economic, environmental, social and cultural outcomes for New Zealand.
- Historically, there has been little or no formal prioritisation of MAFBNZ's biosecurity surveillance programmes and this has resulted in the suboptimal utilisation of resources, inability to realign biosecurity surveillance programmes and a lack of transparency surrounding the rationale behind decision making in this area.
- Prioritisation of surveillance activities between government agencies and industry, and with other stakeholders has not been well developed.

4.1. Prioritisation systems

Although there has been some variation between sectors and projects, informal or ad hoc prioritisation within MAFBNZ has usually taken into account some or all of the following considerations:

- The cost:benefit of the programme, including consideration of:
 - potential economic, environmental, social, and/or cultural animal/plant or human health impact of the pest(s) and disease(s) in the programme;
 - risk of introduction, spread and establishment of pest(s) and disease(s) in the programme;
 - feasibility and effectiveness of the programme;
 - maintenance of export markets.
- Availability of funding from stakeholders and government.
- Legal or other obligations set out in international agreements.
- Stakeholder support and feedback.
- Applicability to work being undertaken by other areas of MAF and MAFBNZ.
- Requests from ministers and other government departments.

Both the animal and marine sectors have recently utilised the MAF Integrated Risk Management Framework (IRMF) to prioritise programmes and research. This prioritisation tool has now been superseded by the MAF Biosecurity Decisions Framework. While this prioritisation system is being gradually implemented across MAFBNZ, it is not currently applied to the biosecurity surveillance priority setting. At present, some groups within MAF use five criteria (strategic fit, net benefit, feasibility, resources and barriers) for the prioritisation of their work. There is no requirement for quantitative assessment to be used by groups when prioritising, although weighting of the criteria can be used.

Governance structures have not been sufficiently well developed or utilised to enable and co-ordinate the prioritisation of surveillance activities between government agencies and industry, and with other stakeholders.

Historically, stakeholders have had limited influence in the prioritisation of biosecurity surveillance programmes conducted by MAFBNZ, and, in many cases, have had little awareness of the programmes undertaken. However, MAFBNZ has been able to develop relationships with some stakeholders to allow a combined approach to prioritisation. An example of this is the Forest Biosecurity Surveillance Review in 2004,³ which gave industry the opportunity to be involved in setting priorities for future forest pest surveillance in New Zealand.

4.2. Limitations

To date, a systematic assessment of biosecurity surveillance needs, which might inform priority setting, has not been performed, and this is a known constraint. In addition, it is recognised that it is challenging to identify and quantify the benefits accrued by biosecurity surveillance activities. The absence of a formal prioritisation process operating across biosecurity surveillance is hindering the most efficient direction of surveillance resources and preventing the flexible reallocation of funds according to shifting trends in the spectrum of threats posed by different pests and diseases.

For all sectors, and in particular the environmental sector, human resources have been the major limiting factor in the development of new biosecurity surveillance programmes and strategic prioritisation. With the formation of the Biosecurity Surveillance Group within MAFBNZ in late 2006, human resource capability has improved. However, with the increased opportunity and need to develop biosecurity surveillance activities, prioritisation has become increasingly important to enable appropriate distribution of the available resources.

³ *The Status and Future Needs of Forest Biosecurity Surveillance in New Zealand: A Discussion Document* (June 2004). Prepared by Brendan D Murphy, Ministry of Agriculture and Forestry, Wellington.

5. Biosecurity Surveillance Methodology

What biosecurity surveillance methodologies and approaches are available, and how are they being used throughout the biosecurity surveillance system?

Key findings

- There are no formal criteria used to guide the appropriate application of surveillance methods to specific pests and diseases.
- In general, current MAFBNZ surveillance programmes are aligned with the objectives of MAFBNZ.
- Biosecurity surveillance programmes require minimum standards and aligned objectives.
- There is no formal process for review of methods used in biosecurity surveillance programmes.

5.1. Current biosecurity surveillance methodology

A wide range of methods is employed for biosecurity surveillance in New Zealand. While there are no formal criteria for guiding the choice of technique used, most are selected in response to needs identified by government and other stakeholders and the scientific information available. Passive or active⁴ surveillance approaches are adopted depending on the objectives of the surveillance, and take into account any international requirements and considerations about the costs and benefits of the proposed programme. While current MAFBNZ programmes differ in design, including sampling strategy and field methods, they are all more or less aligned with the objectives of MAFBNZ.

International guidelines and standards (for example, ISPM 6 (International Standards for Phytosanitary Measures) are available for surveillance, although they do not specifically identify best practice in all situations and sectors. International guidelines are used more for surveillance for diseases in the animals sector (for example, World Organisation for Animal Health (OIE) Terrestrial Animal Health Code) than other sectors.

Integral to all biosecurity surveillance programmes is the identification of specimens and samples gathered during the programme. At present, identification and diagnostic service providers include government departments, state-owned enterprises (for example, AgriQuality), Crown research institutes (for example, the National Institute of Water and Atmospheric Research (NIWA)) and universities and private companies (for example, Flybusters/Antiants). Standards are set by the requestors of the service (usually MAFBNZ), and vary across sectors. For example, while ISO17025 (International Organization for Standardization) is recommended by the Sanitary and Phytosanitary (SPS) Agreement, its implementation is not currently mandatory in all laboratories used by MAFBNZ.

⁴ Definitions of active and passive surveillance can be found in Appendix 1.

There are differences between identification and diagnostic service providers in their ability or authorisation to undertake testing or identification of specimens and samples. Testing for exotic diseases affecting animals is at present restricted largely to the Investigation and Diagnostic Centre (IDC), whereas identification of exotic diseases in specimens and samples in the other sectors is assessed, at least initially in some cases, by other organisations (for example, Crown research institutes).

5.2. Quality criteria for assessing current surveillance plans

Biosecurity surveillance programmes require minimum standards and aligned objectives. The quality of MAFBNZ biosecurity surveillance programmes is currently measured, to a large extent, by how closely the programmes meet the needs of MAFBNZ, as set out in its operational specifications, or international obligations. MAFBNZ biosecurity surveillance programmes are internationally recognised, and, in some cases, are world leading.

The suitability of current biosecurity surveillance programmes to meet the objectives of biosecurity surveillance is currently assessed on an ad hoc basis according to some or all of the following criteria:

- cost:benefit analysis (of pest or disease impact and the ability of the biosecurity surveillance programme to meet its objectives);
- effectiveness of the design of the biosecurity surveillance programme (for example, likelihood of detection of pest in time to control effectively) in relation to stated purpose and pest/disease phenology/biology and so on;
- impact on community (of pest/disease and of surveillance programme);
- feasibility of implementation of surveillance programme;
- legal or other obligations, including international standards and agreements;
- scientific peer review;
- support from government, industry and other stakeholders;
- other criteria determined by a technical advisory or other stakeholder group prior to starting a programme.

5.3. Triggers and process for review of existing programmes

Within MAFBNZ, there are a number of programmes that have been reviewed and changed over the last five years, whereas several have not been subject to revision for some time. In the cases where programmes have been reviewed, the triggers have included:

- changes in risk status (including new finds, awareness of emerging pest/disease);
- changes in availability of resources (for example, staff and funding);
- significant changes in protocols or technologies, or changes in international requirements;
- requests from stakeholders;
- other scientific/public feedback;
- issues identified during audit (internal or external);
- failure to detect a target species during targeted surveillance.

While there is no formal process for the specific review of biosecurity surveillance programmes, there are generic review mechanisms built into the project management methodology and response systems used within MAFBNZ. These processes are not very detailed. For example, there is no agreement on standard audit time frames for biosecurity surveillance programmes.

6. Biosecurity Surveillance Information Management

How does MAFBNZ manage and utilise the information gathered and generated throughout the biosecurity surveillance process?

Key findings

- There are extensive repositories of information that is of relevance to biosecurity surveillance, however, awareness of, and access to, this information is limited.
- Management of biosecurity surveillance information (including collection, organisation, storage, processing, analysis, integration and distribution) varies across the biosecurity system.
- There is currently limited capability or capacity for central data management.
- There are no consistent management standards for information of relevance to biosecurity surveillance.

6.1. Information needs

To provide and maintain an effective and efficient biosecurity surveillance system there is a fundamental need to have timely access to quality information. The programmes and activities (both current and historic) that MAFBNZ undertakes, or utilises, require that large amounts of data be collected or accessed, organised, stored, integrated, analysed, interpreted and delivered in a timely manner. This information is used to support decision making and enable reporting requirements to be met.

6.2. Data management

The current information management system (including collection, storage and organisation) supports the historic needs of the biosecurity surveillance system. However, there is a lack of consistency in how biosecurity surveillance information is managed across all groups and organisations. Combined with the limited uptake of the information technology available, this lack of consistency is restricting the ability of the biosecurity surveillance system to work efficiently.

There are numerous agencies external to MAFBNZ that form part of the biosecurity surveillance system, and many of these have both extensive repositories of information relevant to biosecurity surveillance and well-developed information management capabilities (for example, Crown research institutes, state-owned enterprises and so on). However, system-wide understanding of the information being collected and managed is limited.

Management of, and access to, biosecurity surveillance information currently varies depending on a range of factors, including:

- the agencies undertaking the activity;
- the sector (animals, plants, marine, environmental);
- where, how and in what format the data is collected and stored;
- the objectives and requirements of the biosecurity surveillance programmes.

MAFBNZ is currently undertaking a strategic review of how information management will be approached across the organisation as a whole. This process is likely to have implications for the management of biosecurity surveillance information within MAFBNZ.

Data quality is fundamental to the confidence that can be placed in the information collected for biosecurity surveillance purposes. While high standards are set, in some areas, by MAFBNZ, there are no consistent data quality requirements. Biosecurity surveillance information is collected from, and by, a wide range of stakeholder groups, and the diversity of methods used for collection, collation and storage of this information presents challenges when attempting to assess and compare the quality of these data. The use of paper-based data collection methods in current surveillance systems can also reduce the quality of the final data.

Information of relevance to biosecurity surveillance is generally stored in a variety of locations, both internally and externally to MAFBNZ (that is, service or research providers, industry, international sources and so on). The storage location and organisation of information is largely determined by the needs and objectives of the respective surveillance programme(s) and/or the prevailing information management systems within the organisation concerned. There is, at present, limited capability within MAFBNZ to facilitate central data storage, access to data, or consistent “end-to-end” management of data and standards for information of relevance to biosecurity surveillance.

6.3. Access and availability

The availability of, and access to, biosecurity surveillance information across the system depends mainly on the requirements of the surveillance programme, international responsibilities, considerations of privacy, and knowledge of the existence of the information. These issues vary considerably between, and within, sectors across biosecurity surveillance programmes and between agencies. This is mostly as a result of factors such as data format, storage location, degree of integration, uncertainty around roles and responsibilities, accountabilities, contractual arrangements, information technology issues and effectiveness of collaborative working arrangements, among others.

MAFBNZ often relies heavily on external agencies for access to, and in some instances for interpretation and presentation of, data (such as geospatial information). This places limitations on MAFBNZ’s ability to access and analyse data in a timely manner. The results of biosecurity surveillance activities are generally made available through a range of methods, including publications (for example, the magazines *Biosecurity* and *Surveillance*, technical reports or scientific papers), notifications directly to respective stakeholders (as appropriate) and presentations to stakeholders.

6.4. Analysis tools

MAFBNZ is largely dependent on lower-end technology solutions for data analysis, including manual processes. There are a number of sophisticated analysis tools available that are not being used consistently within MAFBNZ. Analysis of surveillance data is usually undertaken in accordance with the objectives and requirements of the respective surveillance programmes.

7. Use of Research in Biosecurity Surveillance

How is research to support biosecurity surveillance conducted?

Key findings

- The provision of funding for specific biosecurity surveillance research in New Zealand is uncertain in both process and outcome.
- Historically, there has been a MAFBNZ-wide lack of strategic direction and co-ordination of research funding for surveillance.
- There has been a lack of collaboration and co-ordination between research providers, government departments and funding bodies both located within New Zealand and overseas.

7.1. Current biosecurity surveillance research

Robust, science-based research underpins most active biosecurity surveillance activity. In many cases, national and international research is incorporated into surveillance activities through literature review prior to the design or modification of the surveillance programmes.

However, there is no formal process for ensuring the utilisation of the outputs of biosecurity surveillance research.

Over the past 10 years, several research projects with biosecurity surveillance components have been performed within the MAF Operational Research programmes and Foundation for Research, Science and Technology (FRST) funded projects (for example, the marine Outcome-based Investment (OBI) research). In some instances, these research programmes were part of a larger incursion response, for example, development of the pheromone for gum leaf skeletoniser surveillance. Because biosecurity surveillance can often be only a small component of a research project, and there is no central repository for storing and interrogating this information, it is difficult to obtain a complete picture of research related to surveillance. Some of the research projects that have included a biosecurity surveillance component, or were primarily biosecurity surveillance oriented, are described in the communications material (for example, websites) of various funding organisations and research providers. In the marine sector, in particular, significant pieces of research have been resourced within baseline Crown funding.

There is a recognised need for further research across all sectors – animals, plants, marine, freshwater and terrestrial environments, to address gaps in knowledge applicable to conducting surveillance. For example, the recently completed discussion paper, *A Biosecurity Science, Research and Technology Strategy for New Zealand*,⁵ identified a number of goals within the action plans that have a strong surveillance research component. Specifically, these include research to further improve detection tools for diseases and pests, particularly within aquatic environments.

⁵ *A Biosecurity Science, Research and Technology Strategy for New Zealand* (8 November 2006). Draft for Public Consultation. Biosecurity New Zealand Discussion Paper No 2006/04.

There are also requirements for the development of new detection methodologies to identify organisms at low prevalence, those that are difficult to detect (for example, plant viruses) or organisms that have pathogenic strains or variants. Knowledge gaps also exist in the areas of pest invasion dynamics and in new pests and disease emergence.

The initiation of biosecurity surveillance research at MAFBNZ has traditionally been constrained by differing combinations of limited time, human resources or funding. Research priorities are sometimes unclear and this can make it difficult to ensure that the outputs delivered are consistently and closely aligned with MAFBNZ objectives.

In New Zealand, there is no central body that provides leadership in setting the direction for biosecurity surveillance research. This has resulted in a lack of collaboration and co-ordination within MAFBNZ and between MAFBNZ and other research funding bodies and providers. In some cases, this has resulted in excessive duplication of research on surveillance-based projects, although it is recognised that some duplication is appropriate in order to cross-validate and compare findings. However, there has been improvement in collaboration between MAFBNZ and research institutes since FRST funding was provided for specific biosecurity research (for example, the Better Border Biosecurity project and the Effective Management of Marine Biodiversity and Biosecurity OBI). Further opportunities exist to collaborate with industry for surveillance of specific organisms of interest to both MAFBNZ and industry.

There are strong links to expertise overseas (through the quadrilateral scientific collaboration initiatives (QUADs), of which Australia, Canada, New Zealand and the United States of America are involved), and examples of co-operation on joint research projects between local and overseas research providers (for example, Ensis and the Commonwealth Scientific and Industrial Research Organisation (CSIRO)).

7.2. Funding for biosecurity surveillance research

The amount of funding in current biosecurity surveillance research projects is difficult to quantify. In many research projects, there are several beneficial outcomes, only some of which relate to biosecurity surveillance. Surveillance research is not the sole domain of MAFBNZ, with other organisations, such as the Department of Conservation, planning and implementing their own surveillance research.

In the past, funding for specific biosecurity projects was often provided on a short-term basis (sometimes less than a year), which made it difficult to achieve the research outcomes and goals. More recently, this has improved. For example, FRST is funding projects over longer periods (up to 12 years in some cases), allowing for improved continuity of research funding and staffing. Currently, there is no specific budget within MAFBNZ that is dedicated to surveillance research. Surveillance research is funded through operational research and, as such, competes with other projects for funding.

8. Use of Communications in Biosecurity Surveillance

How does MAFBNZ approach communication with those interested in biosecurity surveillance?

Key findings

- Past and present communications initiatives have resulted in an increased level of awareness of biosecurity issues and the importance of passive surveillance, although this is variable across sectors.
- Communications between MAFBNZ and stakeholders with respect to biosecurity surveillance vary in frequency, efficacy and format across sectors.
- Communication tends to be reactive, or managed on an issue-specific basis.
- Strategic communication frameworks are not uniformly evident across different sectors.

8.1. General awareness

General awareness of biosecurity issues is consistently rated as being important to passive surveillance, and various educational approaches are employed to maintain this awareness. These include: awareness campaigns targeted at specific industries and issues (including reporting of surveillance results to participants), production and distribution of fact sheets and pest identification guides, ad hoc consultations and biosecurity stakeholder workshops, social marketing, presentations to stakeholder groups, committees and conferences, and media appearances or articles. These messages have been reinforced through the communication efforts of many other organisations and groups, including industry, regional councils, other government agencies and non-governmental organisations. However, the messages are not necessarily available freely to all stakeholders in all sectors, and do not completely cover the full range of surveillance activities undertaken.

Although there is no specific strategy for biosecurity surveillance communications, MAFBNZ has reviewed its communications needs and developed an organisation-wide communications strategy that incorporates biosecurity surveillance activities. Some MAFBNZ communications, while not surveillance focused, have spin-off benefits for biosecurity surveillance.

8.2. General communication

Broad publicity campaigns are not currently undertaken for all biosecurity issues. MAFBNZ tends to focus its public awareness communications towards encouraging the public to notify MAFBNZ of potential incursions. However, in some sectors, MAFBNZ's communications are targeted towards particular industries, stakeholder groups and locations. Other sectors receive little or no targeted or general communication on biosecurity surveillance. Stakeholder forums have worked well in facilitating increased communications with particular sectors, as has been the case with the marine sector.

At present, the biosecurity surveillance section of the MAFBNZ website (www.biosecurity.govt.nz) is difficult to find and navigate, and does not effectively contribute to the distribution of biosecurity surveillance information. It is generally used for the publication of research or biosecurity surveillance results, and to increase public awareness of biosecurity.

8.3. International representation and reporting

International representation and reporting is essential for disease and pest status verification to enable overseas trade. This information is provided to international organisations, for example the OIE and trading partners, on a regular basis through official reporting structures. Production of this information is currently resource intensive. Reports are also delivered on an ad hoc basis at conferences and international meetings. The reporting requirements differ markedly between sectors, with the animal sector having extensive reporting requirements.

8.4. Publications

The magazine *Surveillance* is a useful communication and reporting mechanism for animal biosecurity surveillance information. Because it has an animal disease focus, its use by other sectors is limited (it occasionally includes environmental surveillance articles). The magazine's advantage is that it is published at regular intervals, is technically focused, broadly available and supports international reporting. It also has a worldwide distribution and appears in scientific reference databases such as CAB Abstracts.

The magazine *Biosecurity*, while useful for raising public awareness, has to cover a wide range of biosecurity topics and is designed for a non-technical audience. It does, however, report some official biosecurity surveillance results to a wider audience.

Industry or sector publications are used by MAFBNZ on a regular basis for various specific industries or campaigns, but this is not consistent between sectors or surveillance issues.

Appendix 1: Glossary of Terms

Word	Biosecurity surveillance strategy definition
Active surveillance	Part of a population/area is selected, sampled and tested for a specific pest(s) and/or disease(s) to assess its occurrence.
Animal sector	Historically, this term has been used in MAFBNZ to cover farmed terrestrial animals (mammals, birds and bees) and aquaculture (all life stages (including eggs and gametes) of fish, molluscs and crustaceans raised or kept for breeding, stocking or marketing).
Baseline surveillance	The initial survey of a defined area to determine the status (for example, presence, absence, prevalence, distribution) of pests and diseases in that area.
Biosecurity surveillance	The collection, collation, analysis, interpretation and timely dissemination of information on the presence, distribution or prevalence of pests or diseases.
Delimiting survey	Survey conducted to establish the boundaries of an area considered to be infested by, or free from, a pest or to include the presence or absence of a disease.
Disease	The clinical and/or pathological manifestation of ill-health.
Distribution	The spatial or temporal distribution of a pest(s) or disease(s) in an animal or plant population or geographical area.
Emerging disease or pest	A new infection/infestation resulting from the evolution or change of an existing organism, a known infection/infestation spreading to a new geographical area or animal/plant population, or a previously unrecognised pest or disease diagnosed for the first time and that has the potential to have a significant impact on the environment, or animal/plant or public health.
Endemic	<p>This word has different meanings in different areas of surveillance responsibility and to members of the public. For this reason, where possible, the word should not be used. If this cannot be done, then what the word means exactly in that particular context should be explained in a footnote.</p> <p>Animal Surveillance Definition: An animal, plant, pest or disease established in New Zealand.</p> <p>Environment, Marine and Plant Surveillance Definition: An animal, plant, pest or disease that is native to a certain region.</p>
Environmental sector	Historically, this term has been used in MAFBNZ to cover terrestrial and freshwater natural environs.
Established	When a breeding and viable population of an animal, plant, pest or disease is present in a geographical area, species or subpopulation of a species.

Word	Biosecurity surveillance strategy definition
Exotic	<p>This word has different meanings in different areas of surveillance responsibility and to members of the public. For this reason, where possible, the word should not be used. If this cannot be done, then what the word means exactly in that particular context should be explained in a footnote.</p> <p>Animal Surveillance Definition: An animal, plant, pest or disease not established in New Zealand.</p> <p>Environment, Marine and Plant Surveillance Definition: An animal, plant, pest or disease that is not native to New Zealand.</p>
Incidence	The number of new cases of a disease, or new infestations of a pest, that occur in a measurable or counted population over a specific period of time.
Incursion	The occurrence of an organism not previously known to be present in New Zealand, where there is a likelihood that the specimen(s) found is part of a self-sustaining/breeding population. Note that re-invasion of a species that has already been eradicated or controlled is considered a new incursion.
Import Health Standard	Issued under Section 22 of the Biosecurity Act 1993. The Director-General may, issue an import health standard specifying the requirements to be met for the effective management of risks associated with the importation of risk goods before those goods may be imported, moved from a biosecurity control area or a transitional facility, or given a biosecurity clearance.
Interception	Where a risk organism, not known to be present in New Zealand, is found but there is no evidence that a self-sustaining/breeding population is present. Destroying/treating the risk organism removes the threat.
Marine sector	Historically, this term has been used in MAFBNZ to cover the marine environment.
Monitoring	The active and/or passive routine collection of information on a pest or disease with the purpose of detecting changes over time in a plant or animal population or geographical area.
Organism	Any entity that includes a genetic structure that is capable of replicating itself (whether that structure comprises all or only part of an entity, and whether it comprises all or only part of the total genetic structure of an entity) (Biosecurity Act 1993, section 2).

Word	Biosecurity surveillance strategy definition
Passive surveillance	Surveillance that relies on members of the public, industry groups, plant or animal health professionals and/or laboratories reporting suspected cases of plant or animal disease or the presence of a pest at their discretion. This may also include surveillance that uses existing information sources or networks of individuals or organisations.
Pest	Any species, strain or biotype of organism injurious to, or impacting on, any species, animal/plant product or the environment (including prions).
Pest agent	Any organism capable of: (a) helping a pest replicate, spread or survive; or (b) interfering with the management of a pest (Biosecurity Act 1993, section 2).
Plant sector	Historically, this term has been used in MAFBNZ to cover terrestrial plants (including forestry and horticulture)
.Prevalence	The total number of: individuals, or cases/outbreaks or new infections of a disease, or infestations of a pest, present in a population at risk (without distinction between old and new cases) in a particular geographical area, at one specified time or during a given period. 'Point prevalence' refers to the amount of infestation/infection at a particular point in time.
Risk-based surveillance	Surveillance of a population of plants or animals or geographical area that is considered to be more at risk of the introduction of a pest(s) and/or disease(s), more susceptible to infestation/infection, or signs of infestation/infection are more easily detectable, compared with the rest of the population or country.
Risk goods	Any organism, organic material, or other thing or substance, that (by reason of its nature, origin or other relevant factors) it is reasonable to suspect constitutes, harbours or contains an organism that may: (a) cause unwanted harm to natural and physical resources or human health in New Zealand; or (b) interfere with the diagnosis, management or treatment, in New Zealand, of pests or unwanted organisms (Biosecurity Act 1993, section 2).
Scanning surveillance	To monitor plant and/or animal populations or geographical areas to detect unexpected and/or undefined pests and diseases and/or changes in health status or proxies for health status.
Sector	Historically, this term has been used in MAFBNZ to split the biosecurity spectrum into management areas. For details, see animal sector, environmental sector, marine sector and plant sector.
Sensitivity	The proportion of truly positive units that are correctly identified as positive by a test, (OIE Terrestrial Animal Health Code).

Word	Biosecurity surveillance strategy definition
Sentinel surveillance	Use of a specified plant or animal population or geographical area with a known pest(s) and/or disease(s) status that is monitored over time to indicate the introduction and/or change in the presence of a pest(s) or disease(s).
Social marketing	The systematic application of marketing and other concepts and techniques to achieve specific behavioural changes.
Specificity	The proportion of truly negative units that are correctly identified as negative by a test (OIE Terrestrial Animal Health Code).
Survey	An investigation, in which information is systematically collected, usually carried out on a sample of a defined group or area, within a defined time period.
Syndromic surveillance	A form of scanning surveillance that monitors an animal or plant population or geographical area for an initial, or a change in the, occurrence of a defined set of disease symptoms.
Targeted surveillance	Subset of active surveillance. To collect specific information about a defined pest(s) and/or disease(s) so that its status (for example, presence, absence, prevalence, distribution) in a defined animal or plant population or geographical area is known at a point in time or for a time period. Surveillance may be targeted to a specific species, subspecies, population, subpopulation or risk group, and use of this term should include clarification of the kind of targeting that is occurring.
Transitional facility	Means: (a) any place approved as a transitional facility in accordance with section 39 of the Biosecurity Act 1993 for the purpose of inspection, storage, treatment, quarantine, holding or destruction of uncleared goods; or (b) a part of a port declared to be a transitional facility in accordance with section 39 of the Biosecurity Act 1993 (Biosecurity Act 1993, section 2).
Vector	Transportation mechanisms, including organisms or physical conveyances (for example, boats, wind), that transfer a pest or disease from one area or host to another.

Appendix 2: Glossary of Acronyms

Acronym	Biosecurity surveillance strategy definition
AI	Avian Influenza
B3	Better Border Biosecurity (B3) is a co-operative biosecurity research programme
CDRP	Cross Departmental Research Pool
CRI	Crown research institute
CRIMP	Centre for Research on Introduced Marine Pests (CSIRO Marine Research)
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DoC	Department of Conservation
ERMA	Environmental Risk Management Authority
FMD	Foot and mouth disease
FMDV	Foot and mouth disease virus
FRST	Foundation for Research, Science and Technology
HPAI	Highly Pathogenic Avian Influenza
IDCs	Investigation and Diagnostic Centres of MAFBNZ
IPPC	International Plant Protection Convention
IRMF	Integrated Risk Management Framework
ISO	International Organization for Standardization
ISPM	International Standards for Phytosanitary Measures (as approved by the IPPC)
LIC	Livestock Improvement Corporation
LPAI	Low Pathogenicity Avian Influenza
MAF	Ministry of Agriculture and Forestry
MAFBNZ	MAF Biosecurity New Zealand
MfE	Ministry for the Environment
MFish	Ministry of Fisheries
MoH	Ministry of Health
NAI	Notifiable Avian Influenza

Acronym	Biosecurity surveillance strategy definition
ND	Newcastle Disease
NGO	Non-governmental organisation
NIWA	National Institute of Water and Atmospheric Research (NIWA)
NZFSA	New Zealand Food Safety Authority
NZVA	New Zealand Veterinary Association
OBI	Outcome-based Investment
OIE	World Organisation for Animal Health (formerly "Office International des Epizooties")
PIANZ	Poultry Industry Association of New Zealand
PMWS	Post-weaning multi-systemic wasting syndrome
PCR	Polymerase chain reaction
QUADs	Quadrilateral countries are Australia, Canada, New Zealand, and the United States of America. Quadrilateral scientific collaboration initiatives provide a framework for scientific co-operation in research into biosecurity issues.
SOE	State-owned enterprise
TAG	Technical advisory group

Appendix 3: Current Biosecurity Surveillance Research

To follow is a list of examples of research related to biosecurity surveillance.

- Better Border Biosecurity Outcome-based investment (OBI). Several surveillance-related research projects are being undertaken under each of the following Intermediate Outcomes:
 - border biosecurity for the productive sectors;
 - innovations for cross-sectoral biosecurity;
 - border biosecurity for natural ecosystems.
- Effective Management of Marine Biodiversity and Biosecurity OBI. Several surveillance-related research projects are being undertaken under each of the following Intermediate Outcomes:
 - tools for marine Pest Risk Assessments;
 - surveillance and monitoring for aquatic pests;
 - management and mitigation of marine pests.
- MAFBNZ Operational Research.
- Vector borne disease and vector ecology project managed by IDC and funded by the Cross Departmental Research Pool (CDRP) managed by FRST.
- Diagnostic and taxonomic tool development (marine).
- Value mapping of New Zealand's coastline, vessel movement patterns, hull fouling and so on.
- Sentinel veterinary practice surveillance. Historical research by both Massey University (L McIntyre) and AgriQuality (Hugh Black). Massey research (VetPAD) ongoing in a limited manner because of funding constraints. Sentinel surveillance also funded by the New Zealand Pork Industry Board – E Neumann PhD project.
- IDC research related to surveillance. Examples include:
 - development of a real-time polymerase chain reaction (PCR) assay for the detection of *Coxiella burnetii* in biological samples;
 - development of a real-time Polymerase Chain Reaction for Classical Swine Fever;
 - development of a real-time Reverse Transcriptase- Polymerase Chain Reaction for influenza A and APMV-1;
 - real-time Polymerase Chain Reaction for foot and mouth disease virus (FMDV) (as part of Vesicular Disease Project);
 - Infectious Bovine Rhinotracheitis Polymerase Chain Reaction validation.
 - development of a real-time Polymerase Chain Reaction for detection of equine arteritis virus;
 - foot and mouth disease diagnostic specificity trial for cattle;
 - development of real-time Polymerase Chain Reaction assays for avian mycoplasma.

Appendix 4: List of Recent Surveillance Activities Occurring In New Zealand

A sample of active and passive biosecurity surveillance programmes carried out by New Zealand organisations over the last 10 years.

Sector	Lead agency	Description	Industry	Duration	Estimated date of occurrences	Coverage
All	MAFBNZ	Public 0800 number	Pan industry	Continuous		Mainland NZ
Animals	Animal Health Board	Bovine tuberculosis prevalence	Cattle	Continuous		Mainland NZ
Animals	Animal Health Board	Bovine tuberculosis prevalence	Wildlife	Continuous		Mainland NZ
Animals	Deer New Zealand	Johne's disease in deer	Deer	Sporadic	2006 – current	Mainland NZ
Animals	ESR	Antimicrobial resistance prevalence	Pan industry	Continuous		Mainland NZ
Animals	Harness Racing NZ	Equine Viral Arteritis prevalence	Equine	Continuous	1995 – current	Mainland NZ
Animals	Livestock Improvement Corporation (LIC)	Enzootic Bovine Leucosis prevalence	Cattle	Continuous	1996–2007	Mainland NZ
Animals	LIC	Mastitis prevalence	Cattle	Continuous		Mainland NZ
Animals	LIC	MINDA- Production animal statistics database	Cattle	Continuous		Mainland NZ
Animals	MAFBNZ	Apiculture surveillance	Bee	Annual	1998 – current	Mainland NZ
Animals	MAFBNZ	Arbovirus surveillance	Cattle	Annual	1991 – current	Mainland NZ
Animals	MAFBNZ	<i>M. Bovis</i> prevalence	Cattle	Once		Mainland NZ
Animals	MAFBNZ	Bovine Spongiform Encephalopathy absence	Cattle	Continuous		Mainland NZ
Animals	MAFBNZ	Chronic Wasting Disease absence	Deer	Continuous		Mainland NZ
Animals	MAFBNZ	Avian Influenza – wild birds	Migrating avian	Sporadic		Mainland NZ

Sector	Lead agency	Description	Industry	Duration	Estimated date of occurrences	Coverage
Animals	MAFBNZ	IDC – exotics	Pan industry	Continuous		
Animals	MAFBNZ	Porcine Reproductive & Respiratory Syndrome prevalence	Pig	Periodic		Mainland NZ
Animals	MAFBNZ	Post –weaning Multisystemic Wasting Syndrome prevalence	Pig	Incursion response		Mainland NZ
Animals	MAFBNZ	Avian Influenza – commercial	Poultry, emu and ostrich, Preserve farms	Three years	2006–2008	Mainland NZ
Animals	MAFBNZ	Scrapie absence	Sheep	Continuous		Mainland NZ
Animals	MAFBNZ	Babesia gibsoni survey		Once	~2003	Mainland NZ
Animals	MAFBNZ	Laboratory-based syndromic surveillance	Pan industry	Continuous		Mainland NZ
Animals	MAFBNZ/Salmon Industry	Salmonid diseases surveillance	Salmon	Bi-annually	1990s – current	Mainland NZ
Animals	Massey University	Leptospirosis prevalence	Deer			
Animals	Massey University	Avian Influenza prevalence	Migrating avian	Once	2005–2006	Localised
Animals	Massey University	Veterinary sentinel surveillance	Pan industry	Pilot	2003–2006	Localised
Animals	Massey University	Campylobacter prevalence	Poultry	Once	2000–2003	
Animals	Massey University	Campylobacter prevalence	Poultry, cattle	Continuous	2005	Mainland NZ/UK
Animals	Massey University	Leptospirosis prevalence	Sheep	Once	2005–2006	Localised
Animals	Massey University/Wrightson	Anthelmintic resistance	Cattle	Once	2005–2006	Mainland NZ
Animals	Massey University/Wrightson	Anthelmintic resistance	Sheep	Once	2005–2006	Mainland NZ
Animals	New Zealand Food Safety Authority (NZFSA)	Antimicrobial resistance	Pan industry			Mainland NZ

Sector	Lead agency	Description	Industry	Duration	Estimated date of occurrences	Coverage
Animals	NZFSA	Antimicrobial resistance	Poultry			Mainland NZ
Animals		Tuberculosis	Cattle	Continuous		Mainland NZ
Animals	NZFSA	Trichinella programme	Pig	Continuous		Mainland NZ
Animals	PIANZ	Infectious bursal disease eradication programme	Poultry	Continuous		Mainland NZ
Environment	Environment Bay of Plenty	Pest ant surveillance	Ants	Continuous		Bay of Plenty
Environment	MAFBNZ	National invasive ant surveillance	Ants	Annual	2001 – current	Mainland NZ
Environment	MAFBNZ	Pacific invasive ant surveillance	Ants	Twice	2005–2008	Pacific Islands
Environment	MAFBNZ	Ant spotters – passive surveillance	Ants	Continuous	2007	Mainland NZ
Environment	MAFBNZ	Surveillance as part of responses		Continuous		
Environment	Northland Regional Council	Pest ant surveillance	Ants	Annual	2006/07	Northland
Human	ESR	Antimicrobial resistance prevalence	Human	Continuous		Mainland NZ
Human	ESR	Zoonoses	Pan industry	Quarterly		Mainland NZ
Marine	Aquaculture industry	Commercial marine phytoplankton monitoring programme	Aquaculture	Continuous	1993 – current	Mainland NZ
Marine	MAFBNZ	Targeted surveillance for exotic marine organisms	Marine	Bi-annual	2002–2006	Mainland NZ
Marine	MAFBNZ	Passive surveillance for marine pests	All	Continuous	2001 – current	Mainland NZ
Marine	MAFBNZ	Marine Invasives Taxonomic Service	All	Continuous	2005 – current	Mainland NZ
Marine	MAFBNZ	Non-indigenous and native marine species baseline port surveys and re-surveys	Marine	Three-year interval	2001 – current	16 High-risk ports and marinas

Sector	Lead agency	Description	Industry	Duration	Estimated date of occurrences	Coverage
Marine	MAFBNZ	Non-indigenous and native marine species port resurvey	Marine	Three-year interval	2005–2006	16 High-risk ports and marinas
Marine	MAFBNZ	Non-indigenous and native marine species baseline port surveys	Marine	Once	2005 – current	Kaikoura Port Underwood Kaipara Harbour Milford Sound (Fiordland) Taharoa Terminal (Waikato)
Marine	MAFBNZ	Non-indigenous and native marine species baseline port surveys	Marine	Once	2005 – current	Chatham Island
Marine	MAFBNZ	Non-indigenous and native marine species baseline port surveys	Marine	Once	2005 – current	Golden Bay Manukau Harbour, Stewart Island
Marine/Human Health	NZFSA	Non-commercial marine biotoxin monitoring programme	Public health	Continuous	2002 – current	Mainland NZ
Plants	DoC	National weed surveillance	Indigenous plants	Continuous		Mainland NZ
Plants	DoC	National weed surveillance	Indigenous plants	Continuous		Offshore islands
Plants	MAFBNZ	Gypsy moth surveillance	All plants + DoC	Annual	1992 – current	Mainland NZ
Plants	MAFBNZ	High-risk site surveillance	Forestry	Annual	1975 – current	Mainland NZ
Plants	MAFBNZ	Small forest blocks	Forestry	Annual	2001–2003	Mainland NZ
Plants	MAFBNZ	Wood boring bark beetle surveillance	Forestry	Annual	2001–2004	Mainland NZ
Plants	MAFBNZ	Fruit fly surveillance	Fruit	Annual	1975 – current	Mainland NZ
Plants	MAFBNZ	Tourist pathways	Indigenous plants	Annual	2001 – current	Mainland NZ
Plants	MAFBNZ	Sub-tropical crop species surveillance	Sub-tropical crops	Once	Sep 1998 – Jul 1999	Mainland NZ
Plants	NZ Forest Owners Association	Exotic forest surveillance	Forestry	Annual	1956 – current	Mainland NZ

Sector	Lead agency	Description	Industry	Duration	Estimated date of occurrences	Coverage
Plants	Regional councils	National surveillance plant pests	Nursery and garden industry	Continuous	1996–2006	Mainland NZ
Plants	Regional councils	National Pest Plant Accord	Nursery and garden industry	Continuous	Oct 2006 – current	Mainland NZ
Plants	Regional councils	Regional plant pest surveillance	Pan industry	Continuous		Mainland NZ
Plants	MAFBNZ/Industry	Potato wart surveillance programme	Horticulture	Continuous		Southland

Appendix 5: List of Submitters

We would like to thank all those organisations and groups that provided comment on the draft Review of the Current State of the Biosecurity Surveillance System (they are listed below in alphabetical order).

AgResearch
AgriQuality Ltd
Animal Health Board (AHB)
Aquaculture New Zealand
Biosecurity Ltd
Cawthron Institute
Centre for Biodiversity and Ecology Research, Waikato University
Department of Conservation
Egg Producers Federation of New Zealand
Environment Southland
Environmental Science and Research Limited (ESR)
Federated Farmers of New Zealand (Inc)
Flybusters Antiantis
Golder Associates (NZ) Ltd (formerly Kingett Mitchell Ltd)
Gribbles Pathology Ltd
Horizons Regional Council
Land Information New Zealand
Landcare Research
Maritime New Zealand
Massey University Epicentre
Meat Industry New Zealand
Ministry for the Environment
Ministry of Fisheries
Ministry of Health
National Beekeepers Association of New Zealand
National Institute of Water and Atmospheric Research Ltd (NIWA)
New Zealand Equine Health Association Inc
New Zealand Feed Manufacturers Association
New Zealand Fish and Game Council
New Zealand Forest Owners Association
New Zealand Pork Industry Board

New Zealand Veterinary Association
New Zealand Veterinary Pathology
Northland Regional Council
Poultry Industry Association of New Zealand
SPS Biosecurity Ltd
Tasman District Council