

Review of the National Bovine Tuberculosis Pest Management Strategy

Regulatory Impact Statement

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Publication Adviser
MAF Information Bureau
P O Box 2526
WELLINGTON

Telephone: 0800 00 83 33

Facsimile: 04-894 0300

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Agency Adequacy Statement

This Regulatory Impact Statement (RIS) has been prepared by the Ministry of Agriculture and Forestry Biosecurity New Zealand (MAF).

It provides an analysis of options to control bovine tuberculosis in New Zealand. MAF, the Animal Health Board (AHB) and other funding stakeholders have jointly undertaken the regulatory impact analysis presented in this paper. The process has included development of options, informal consultation with key funding partners and farmers, formal public consultation, a cost benefit analysis, and this regulatory impact statement.

The analysis concludes that the preferred option would be to continue seeking measured reductions in disease rates and vector risk areas from status quo levels and to test the assumptions about eradicating Tb from vector risk areas.

Implementing the preferred option would involve the continued exercise of powers under the Biosecurity Act 1993. This will mean a continuation of some:

- additional costs on businesses in the beef, dairy and deer farming sectors; and
- impaired private property rights because of movement controls and vector control programmes.

The preferred option would not override fundamental common law principles, and it will be implemented in a way that will:

- balance the need for competition in the markets for disease testing and vector control with the need to maintain sufficient capacity; and
- create incentives for disease testing and vector control firms to innovate and invest in order to reduce their costs to achieve short run profits.

Stephanie Rowe
Policy Manager
Policy and Risk Directorate

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Status Quo and Problem Definition

BACKGROUND

Bovine tuberculosis

Bovine tuberculosis (Tb) is an infectious disease caused by the bacterium *Mycobacterium bovis* that can infect most warm-blooded mammals, including humans.

Tb infection in cattle and deer can result in serious production losses for the beef, dairy and deer farming sectors. The impacts of infection range from minor lesions in the lymph nodes of the upper respiratory system through to more advanced cases of lesions filled with pus or a gritty mass in the lungs and other organs of the body. At the extreme end, Tb can cause chronic wasting and eventually death.

The main causes of Tb in New Zealand cattle and deer herds are direct transfer within and between herds and direct contact with Tb-infected possums. Possums are unusually susceptible to Tb and the disease quickly progresses to an infectious stage. The possum population was estimated in 2009 to be around 30 million.

Tb poses a trade risk

Humans are susceptible to Tb. New Zealand has strict controls in place to manage the risk of human infection from consuming Tb-infected meat and dairy products. Although the risk to consumers is managed, there are still two residual types of trade risks for New Zealand:

- Harm to New Zealand's reputation as a supplier of high-quality and safe agricultural products. Escalating rates of Tb prevalence could prompt an adverse reaction by overseas consumers to exports of New Zealand beef, dairy or venison – even though the products pose no health risk. Such an event could manifest itself in reduced demand and reduced trade prices for a period.
- Prevention from being officially classified as free of Tb by the World Organisation for Animal Health (OIE). Markets wishing to obtain this classification must have no more than 0.2 percent of cattle and deer herds infected for a period of three years. Many of New Zealand's major trading partners are recognised as free from Tb.

STATUS QUO

Control of Bovine Tuberculosis under the Biosecurity Act 1993

New Zealand has had compulsory testing of cattle and slaughter of infected animals in place since 1970 under various legislative instruments. From 1984 to 2008, New Zealand spent approximately \$1.26 billion in 2007/08 dollars on the Tb control programme.

Tb is currently controlled under the Biosecurity (National Bovine Tuberculosis Pest Management Strategy) Order 1998 (the Strategy) pursuant to the Biosecurity Act 1993. The Strategy creates rules and provides access to Part 6 powers under the Biosecurity Act. The Strategy primarily involves:

- disease control – a programme that involves Tb-testing of cattle and deer herds, slaughter of stock considered likely to be infected, and various restrictions on the movement of cattle and deer; and
- vector control – a large-scale possum and ferret control programme.

The Strategy's delivery is supported by research, communications, and farmer education.

The Strategy's objective is to reduce the percentage of cattle and deer herds infected per year to no more than 0.2 by 2013, and then do the minimum amount of control to maintain the gains. Progress on achieving the objectives of the current Strategy is ahead of the targets needed to meet the year 2013 objective. Since the Strategy was introduced in 1998, the number of infected cattle and deer herds has fallen from over 900 to 98 (as at March 2010). Prior to that, disease incidence had peaked at over 1700 infected herds in 1994.

Net benefit associated with the Strategy

Benefits can be broken down as follows:

- Financial benefits are primarily around a future reduction in costs as a result of investment now in progressively reducing Tb rates in domestic herds and wildlife vectors. These future cost reductions can be classified as follows:
 - continued reductions in the loss of value of livestock slaughtered following detection of Tb, or found to have Tb at the abattoir; and
 - reductions in the indirect costs to farmers of complying with on farm testing regulations and movement control restrictions.
- A reduced (or eliminated) degree of trade risk.
- Biodiversity benefits such as the costs to the Department of Conservation (DOC) and others saved because of the vector control by the AHB. That is, Tb programmes that control possum numbers in ecologically sensitive areas mean that DOC and others do not have to do as much in those same areas¹.
- Other wider benefits to farmers and land owners include reduced impacts on herds in Crown owned land, reduced impact on land values, reduced economic and social impacts on herd owners, and a substantially reduced risk of Tb resurgence from vector contact areas.

The costs of a Strategy can be split into two categories: direct costs; and indirect costs. Direct costs include:

- Programme management costs (common costs) such as research, communication, costs associated with levy collection, administration, TBfree committees, AHB board costs, and costs associated with reviewing the Strategy and securing funding.
- Disease control costs such as testing of cattle, administration costs associated with database for allocation of testing, compensation for reactors and depopulation of non-reactors and infected herds.
- Vector control costs that are incurred as part of the possum control programme, and include wild animal surveillance and management costs.

The Strategy's annual expenditure is currently \$82 million, consisting of:

- \$10.0 million on common costs (communications, research and AHB overheads);
- \$18.5 million on disease control costs; and
- \$53.5 million on vector control on costs.

The indirect costs are the compliance costs associated with deer and cattle disease testing and the other compliance costs incurred by farmers and sectors in complying with the Strategy.

¹ There is some overlap between vector control areas and possum-vulnerable native habitats recognised by DOC.

Funding arrangements

The current funding arrangements for the Strategy are as follows:

- The three industry sectors meet their shares of disease control costs. These are easily apportioned, as the actual costs incurred by each sector can be measured or calculated.
- An agreed split of vector control costs between the Crown, industry, and regions. The present split was agreed in the last Strategy review as:
 - 50 percent Crown;
 - 40 percent Industry;
 - 10 percent Regions.
- The three industry sectors have agreed on how to divide among themselves the industry share of vector control costs.

All funding stakeholders pay a share of the common costs. Further information about the funding arrangements is attached in the additional background section at the end of this document.

PROBLEM DEFINITION

The Strategy is currently under review, as is required every five years under section 88 of the Biosecurity Act. The review seeks to determine the focus for new Strategy, and to identify a number of ways to improve the efficiency and effectiveness of the Strategy.

Bovine Tb causes production losses and creates a market risk

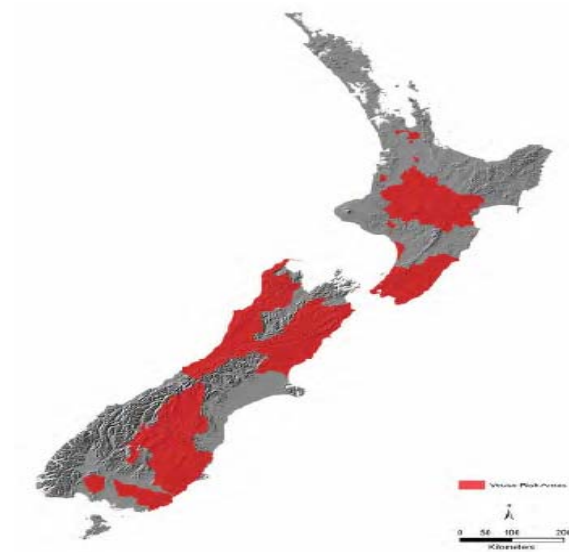
Tb infection of cattle and deer can result in serious production losses for beef, cattle and deer farmers, and a large scale outbreak could harm New Zealand's reputation as a supplier of high-quality beef, dairy and venison products.

Controlling Tb requires ongoing disease and vector control

New Zealand has had a disease control programme in place to control Tb in cattle herds since 1970 and in deer herds since 1990. The current Strategy has reduced disease levels from over 900 infected herds in 1998 to 98 infected herds in March 2010.

However, given that possums, and to a lesser extent ferrets, cause about 80 percent of Tb infections in cattle and deer herds, managing these vectors is key to managing Tb. So, although New Zealand has been successful in its disease control programme, nearly 40 percent of New Zealand is still classified as vector risk area (as indicated in red in Figure 1).

Figure 1. Vector Risk Area as at September 2009



New Zealand cannot achieve low infected herd rates in the long-run and reduce the ongoing cost of controlling Tb without significantly reducing the size of the Tb vector risk areas

Cattle and deer herds in these vector risk areas remain exposed to the risk of infection from contact with infected possums, and herd infection rates will rapidly climb if vector control measures are relaxed.

Until vector risk areas can be eliminated or significantly reduced, New Zealand will remain liable in perpetuity for a resurgence of Tb.

Objectives

The characteristics of a successful Tb control strategy would be to:

1. Reduce Tb disease levels in cattle and deer to a level that:
 - enables New Zealand to be recognised as free from Tb with our major overseas trading partners; and
 - ensures that New Zealand's reputation as a supplier of high-quality beef, dairy and venison products is not adversely affected.
2. Significantly reduce the size of vector risk areas to prevent a resurgence of Tb levels in future.
3. Reduce the ongoing cost of the Tb control programme.
4. Ensure that there is adequate funding support for the preferred option.

The following factors have been taken into account:

- Uncertainty – there is some uncertainty about the technical feasibility and economic cost of eradicating Tb.
- Funding arrangements – funding for the Strategy is by agreement with industry, and therefore any option chosen needs to have the support of the funding stakeholders. Stakeholders will review the funding arrangements for the Strategy prior to the next Strategy review in 2016 so how much each party contributes to funding a Strategy is not under review at present.
- Funding increases – given the ongoing impacts from the global financial crises, some funding stakeholders are unwilling to increase funding contributions significantly in the short run.
- The use of 1080 poison in vector control – the Environmental Risk Management Authority has determined, in accord with the Hazardous Substances and New Organisms Act 1996, that 1080 is appropriate for use in pest management². There is significant opposition to the continued use of 1080, and its use may be subject to further review in the future.

² The Environmental Risk Management Authority, *The Reassessment of 1080 – An Informal Guide to the August 2007 Decision of the Environmental Risk Management Authority*, 2007.

Regulatory Impact Analysis

The four options considered are:

- a Strategy continuing the status quo (i.e. continue the existing Strategy);
- no Strategy and ad hoc control;
- a Strategy testing the ability to eradicate Tb (preferred option);
- a Strategy that eradicates Tb.

PROCESS LEADING TO THE OPTIONS

The Strategy review process began with a series of workshops about the potential options and preferences with the Strategy's key stakeholders: the AHB, MAF, DairyNZ, the New Zealand Deer Industry Association, Meat and Wool New Zealand and Local Government New Zealand. An economic model was prepared for this, comparing the options of no Strategy and ad hoc control with a Strategy continuing the status quo and a Strategy that eradicates Tb.

The preference of the AHB and some of the other stakeholders was for an eradication option. MAF and DairyNZ had a number of reservations about committing to an eradication option, particularly around:

- the AHB's assumptions about the technical feasibility of eradicating Tb;
- the AHB's assumptions about the projected costs of eradicating Tb; and
- the substantial increase in funding needed in the short run.

All groups worked together on a compromise option involving further testing of the eradication concept before taking any decision to commit to eradication. Another economic model was prepared to compare the option of no Strategy and ad hoc control with the preferred option. The options in the two economic models are not directly comparable, as they are based on different cost assumptions and had different objectives.

OPTIONS ANALYSIS

Status quo (i.e. continue the existing Strategy)

This option would continue the existing Strategy of protecting New Zealand's reputation as a supplier of high-quality beef, dairy and venison products, and reducing Tb disease levels in cattle and deer to a level that enables New Zealand to be recognised as free from Tb with our major overseas trading partners. As a secondary objective, this option would aim to contain Tb in the current vector risk areas and prevent an increase in Tb disease levels.

Analysis

Although this option fits with the objective around reducing disease levels, this option has insufficient focus on the vector risk liability posed by the significant size of New Zealand's vector risk area.

Consequently, New Zealand would likely need to continue ongoing disease and vector controls. There are four key problems with an ongoing Tb control programme:

- the ongoing indirect compliance costs for the agriculture sector;
- the ongoing direct costs for funding stakeholders;
- the reliance on 1080 remaining available as a pest management tool; and

- the risk that vector risk area might expand.

Stakeholders were concerned about the prospect of ongoing costs and significant risk to achieving the Strategy objectives.

In particular, the cost of this option is highly dependent on 1080 remaining available as a pest management tool. If 1080 ceased being available, then the costs of maintaining vector risk areas at their current size would increase significantly.

This option would cost less than the preferred option if stakeholders decide against the eradication option, as it would not incur the costs associated with the proof of concept phase. This status quo option would cost significantly less than the eradication option in the medium term, but as noted above the direct and indirect compliance costs would be ongoing.

NO STRATEGY AND AD HOC CONTROL

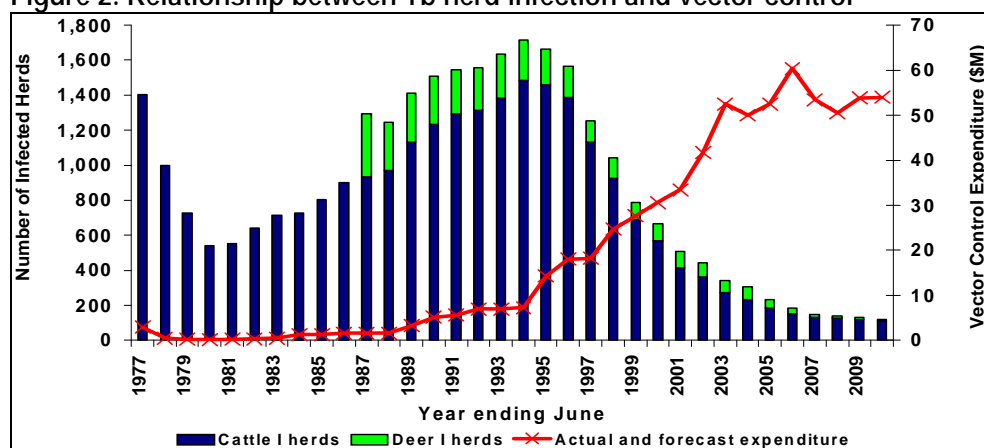
This option would disband the nationally co-ordinated approach to controlling Tb. Control programmes in each region would be managed by land owners, industry and regional councils on an ad hoc basis.

Analysis

This option would empower landowners and local governments to decide if-and-how they want to manage Tb.

MAF does not support this option, primarily because it would be less efficient at controlling Tb, but also because it has been tried in the past. During the 1980s, New Zealand relaxed its national vector control operations, which led to a resurgence of herds being infected by the disease. Figure 2 shows herd infection rates increasing during periods of low or no spend on vector control and decreasing with spending on vector control. It also shows a lag between expenditure on vector control and infected herd rates decreasing.

Figure 2. Relationship between Tb herd infection and vector control



In addition, this option would effectively waste the gains achieved by the current Strategy from the \$1.26 billion spent on controlling Tb since 1984.

This option is the lowest-cost option, costing \$355.9 million³, which is significantly less than the preferred option and the other alternative. This option would also have the highest indirect

³ See Appendix Two: Results from the Cost Benefit Analysis comparing the preferred option with the option of no Strategy and ad hoc control.

compliance costs for the agriculture sector, as more of the burden of managing Tb would fall on farmers.

Regional and ad hoc control programmes are unlikely to be as effective⁴ as a nationally co-ordinated approach to controlling Tb, and this may cause the vector risk area to increase. This would result in an increase in production losses and damage to New Zealand's reputation as a supplier of high-quality beef, dairy and venison products. It would also substantially increase costs and put at risk the effectiveness of a future Strategy needed to manage Tb. MAF considers that the production and trade impacts would inevitably trigger the need to revert to a formal Strategy.

A STRATEGY TESTING THE ABILITY TO ERADICATE TB (PREFERRED OPTION)

This option would maintain and continue to seek measured reductions to the disease rate and vector risk areas from status quo levels, and would test assumptions about, and projected costs for, eradicating Tb from vector risk areas. The option would also:

- test the feasibility of eradicating Tb from populations of wild animals in two large areas of heavy forest (current proposals are for one in the central North Island and one in Southland);
- reduce the size of some of the five large vector risk areas, particularly in North Canterbury and the northern Wairarapa; and
- introduce changes to herd testing and movement control policies to reduce the risk of herd-to-herd transmission, and over time reduce the need for herd testing in low risk areas.

Once the assumptions about the feasibility and cost of eradicating Tb are evaluated, a decision will be made about whether to commit to eradicating Tb, or to continue with the status quo.

Analysis

This option fits with the objective around reducing disease levels. It would pave the way for a Strategy that addresses the vector risk liability posed by the significant size of New Zealand's vector risk area. Achieving this will depend on whether stakeholders commit to eradicating Tb at the next Strategy review in 2016.

All of the funding stakeholders support the approach taken by this option. This support is significant given that funding for the Strategy is by industry agreement and any option chosen needs to have the support of the funding stakeholders.

The cost benefit analysis estimated the costs associated with this option to be \$949.8 million in 2007-08 real dollar terms⁵ – assuming that stakeholders commit to an eradication option. The preferred option is likely to cost more than the “pure” eradication option because of the delay caused by the proof of concept phase. The proof of concept phase would also mean that this option would cost slightly more than the status quo (continued control).

This option manages the risk that an eradication option may not be feasible or may require further development before it is fully implemented.

⁴ It is important to note that improvements in the co-ordination of regional pest management brought about by amendments to Part V of the Biosecurity Act and livestock traceability brought about by the National Animal Identification and Traceability Bill could improve the effectiveness of regional pest management.

⁵ See Appendix Two: Results from the Cost Benefit Analysis comparing the preferred option with the option of no Strategy and ad hoc control.

A STRATEGY THAT ERADICATES TB FROM NEW ZEALAND

This option would focus on eradicating Tb from New Zealand by:

1. Reducing Tb disease levels in cattle and deer to a level that:
 - enables New Zealand to be recognised as free from Tb with our major overseas trading partners; and
 - ensures that New Zealand's reputation as a supplier of high-quality beef, dairy and venison products is not adversely affected.
2. Eradicating Tb from all vector risk areas to ensure that Tb levels cannot increase in future.

Analysis

This option fits with both the objectives of reducing disease levels and reducing the vector risk liability posed by the significant size of New Zealand's vector risk area.

This option would cost less than the preferred option as, based on the assumption that it is technically feasible, it avoids the costs associated with the proof of concept phase. Although this option would cost significantly more than the status quo option, once Tb was eradicated, there would be no or minimal ongoing direct and indirect compliance costs.

More importantly, stakeholders do not support this option as they have concerns about the assumption that eradication is feasible. In addition, initial expenditure on vector control under this option would likely be \$20 to \$30 million more per year for the first 15 years than the preferred option as the AHB increased vector control to roll back the size of the vector risk area significantly. Given the current global financial crises and the Government's negative operating balance, there is little appetite to increase funding in the short run.

Consultation

NOVEMBER 2007 CONSULTATION BY THE AHB WITH MEMBERS AND FUNDING STAKEHOLDERS

In November 2007, the AHB consulted with AHB members and funding stakeholders, including the Crown, on the discussion document: *Review of the National Bovine Tuberculosis Pest Management Strategy: A Discussion Paper on Future Strategy Options*.

The discussion paper set out options for the future of the strategy, and was supported by two more detailed background papers: *Technical Assumptions for the 2009 TB Strategy Review Options*, and *Economic Analysis of the 2009 TB Strategy Review Options*.

Some stakeholder organisations supported an option for eradicating Tb. Other stakeholders, including MAF and Dairy New Zealand, requested further review. As a result, the Technical Assumptions paper and the Economic Analysis were reviewed and the preferred option in this paper was developed.

JUNE 2009 CONSULTATION BY THE AHB WITH FARMERS

In June 2009, the AHB consulted with farmers on a discussion document setting out the preferred option. 322 submissions were received from beef farmers, 113 from dairy farmers and 58 from deer farmers. The consultation was followed up with a survey of 1000 farmers by telephone. Almost two-thirds of farmers declared support for the preferred option.

SEPTEMBER 2009 CONSULTATION WITH STAKEHOLDERS BY THE MINISTER OF AGRICULTURE ON A PAPER ANALYSING THE PREFERRED OPTION

In September 2009 the Minister of Agriculture invited public submissions on a discussion document *National Bovine Tuberculosis Pest Management Strategy* that set out the preferred option, and detailed proposed changes to implement the preferred option.

The Minister received 97 submissions on the proposal, displayed below in Table 1. Submissions were received from organisations representing all funding stakeholders of the Strategy, including farmers from the dairy, beef and deer industries, and regional councils.

Table 1: Summary of Submissions

Position on the proposed option	Number of submitters
Not specified	1
Oppose amendment proposal	13
Oppose amendment proposal due to use of 1080	13
Support overall with conditions	48
Support status quo	13
Support proposed option	9
Total	97

Apart from 13 submissions that oppose the Strategy based on the use of 1080, almost all submissions supported continuation of the Strategy in some form. The majority of issues that were raised related to operational aspects of the proposals. The AHB has addressed most of these operational issues by:

- providing submitters with additional information clarifying the points they expressed concerns about;
- discussing the proposals in more detail; or
- agreeing to modify the operational proposals in response to the concerns.

These concerns related to:

- the implications from changing the focus from lowering herd infection rates to testing the ability to eradicate Tb;
- suggestions to review funding shares;
- suggestions that some areas of high vector risk such as the West Coast will "lose out" in comparison to other regions with the amended proposal's increased emphasis on eradication; and
- the implications from changes to the movement controls.

MAF and other funding stakeholders have agreed to review the Strategy's funding arrangements before the proposed new Strategy expires in July 2016.

Conclusions and recommendations

The option of a Strategy testing the ability to eradicate Tb is favoured over the status quo (control) option. Although the status quo option fits with the objective of reducing disease levels, it has insufficient focus on addressing the liability posed by the significant size of New Zealand's vector risk area. Consequently, New Zealand would need to continue disease and vector controls, resulting in ongoing indirect compliance costs for the agriculture sector and direct costs for funding stakeholders. For slightly higher cost, the preferred option gives stakeholders the ability to test the assumptions about the technical feasibility and costs to eradicate Tb.

The preferred option is favoured over the option of no Strategy and ad hoc control. Although the no Strategy option has the lowest direct cost, none of the key funding stakeholders supported abandoning the Strategy.

The option of testing the ability to eradicate Tb has unanimous support from all of the funding stakeholders, whereas the eradication option does not. For a slightly higher cost than the status quo, the preferred option tests the AHB's assumptions about eradicating Tb and allows for an evaluation of the options at the next Strategy review in 2016, taking into account the increased information about eradicating Tb, and interim changes to the AHB's cost structure and operating environment..

MAF supports the preferred option for the reasons given in this paper.

Implementation

AMENDMENTS TO THE BIOSECURITY (NATIONAL BOVINE TUBERCULOSIS PEST MANAGEMENT STRATEGY) ORDER 1998

Three clauses in the Order in Council will need to be amended, relating to:

- the expiry date;
- the objectives; and
- the strategy rules, by requiring slaughter premises to record and report the official identification of slaughtered animals and other information.

CHANGES TO THE AHB'S OPERATIONS

As noted earlier, the changes will not impose additional compliance costs or regulatory impact on affected individuals and companies. The National Animal Identification and Traceability Bill will mean that the traceability and reporting requirements for slaughter premises will no longer be regulated by the Strategy.

The AHB remains the best placed entity to implement and deliver the Strategy. In the course of implementing the current and previous Strategies, the AHB has developed highly effective systems to support disease and vector control operations including strategic planning tools, databases and information systems, contract management, research management, financial planning and management of contributors' funds, communications and stakeholder relations.

Operational disease and vector control work in the field will be implemented mainly by external service providers under contestable, performance-based contracts.

A 2010 independent review of the AHB's expenditure and ability to deliver the Strategy found that the AHB:

- is carrying out its operations in a cost-effective manner;
- is administering the Strategy to deliver a quality programme in a cost-effective manner; and
- has adequate measures in place to ensure ongoing cost-effectiveness and value for money.

The AHB's plan to enforce the Strategy will be updated alongside the operational plan that implements the Strategy.

CHANGES TO MAF'S OPERATIONS

MAF will continue to support the AHB to implement the Strategy as necessary. This support includes technical advice, statutory appointments, and the exercise of necessary statutory functions by MAF's chief technical officers.

Monitoring, evaluation and review

MONITORING

The principal measurements that enable the Animal Health Board to report the progress of the preferred option fall into the following categories:

Disease control measurements

The principal disease control measurements are:

- the numbers of infected herds;
- the numbers of reactor animals and their status at post-mortem;
- non-reactor animals found to be tuberculous at post-mortem;
- the rate of breakdown of herds;
- the rate of clearance of infection from herds that have broken down.

The AHB will set targets for the animal period prevalence, number of infected herds, breakdown and clearance rates by year and actual numbers will be assessed and reported against these targets.

Vector control measurements

Vector control operations will be required to meet specified possum density performance targets. This will include not only meeting the overall target set but also within-operation targets where the operational area has been stratified on the basis of differences in risk.

A technical priority under the preferred option will be development of improved tools and metrics to assess the degree of risk of vector infection in given areas and to obtain accurate estimates of the probability that TB has been eradicated from vector populations.

Vector control programme progress measures

The AHB will measure progress in vector control by considering the duration and measured effectiveness of vector control activities in meeting forecast phases of control across all vector control areas at five-yearly intervals.

Each vector control area will be within one of the following operational phases at any one time:

- Initial
- Maintenance
- Eradication
- Post eradication
- Surveillance

The milestones for the preferred option are shown in the following table as the total land area (hectares) in each operational phase at the commencement and at five-year intervals throughout the Strategy.

Years from commencement of strategy	No Control	Maintenance	Eradication	Post-eradication	Surveillance
0	2,454,000	6,969,000	1,247,000	338,000	
5	2,454,000	6,234,000	1,002,000	981,000	338,000
10	2,434,000	3,893,000	2,423,000	930,000	1,327,000
15	2,434,000	3,843,000	2,009,000	169,000	2,553,000

The Strategy will be evaluated according to the above milestones and the AHB will be accountable to the responsible Minister for the management of the Strategy and to MAF for the prudent expenditure of Crown funds.

The directors of the AHB are also accountable to the members of the Society and, through them, to farming and regional government stakeholders for the conduct of the Strategy and the prudent use of the funds they contribute.

REVIEW

Review of the Strategy in 2016

The Biosecurity Act requires a review of the Strategy in 2016. MAF will again work with the AHB and its members to evaluate the previous Strategy period, and develop, and assess the various options for the future of the Strategy. MAF will ensure that the cost benefit analysis considers all of the options.

Review of Strategy's funding arrangements prior to 2016

MAF and other funding stakeholders have agreed to review the Strategy's funding arrangements before the proposed new Strategy expires in July 2016. The current funding arrangements are not delivering a consistent and efficient stream of funding to enable the AHB to optimise its planning and delivery of the Strategy. The funding review's timeline will be planned to minimise any potential disruptions to the next Strategy review.

Review of the AHB's operations prior to the next Strategy review

MAF will continue to monitor the AHB's operations and expenditure of Crown funds. Following Cabinet's direction, MAF commissioned an assessment of the cost effectiveness of the AHB's operations this year (2010). MAF intends to reassess the cost effectiveness of the AHB's operations prior to the next Strategy review in 2016.

Appendix One: Information relating to the funding arrangements for the current Strategy

It is proposed that current Tb strategy funding (approximately \$82 million per year) be maintained under the proposed strategy, at least initially, along with current funding shares as between the Crown, the dairy, beef and deer industries, and regions. If the status quo was maintained, the amount of funding would begin to decline.

Current Strategy funding is guided by the funding principles set out in Section 61 of the Biosecurity Act. In summary, these require that a proposal for a national pest management strategy should specify the:

- extent to which persons or classes of persons benefit from the strategy;
- extent to which persons or classes of persons create, continue or exacerbate the problems to be resolved by the strategy
- rationale for allocation of costs.

The classes of person have come to be referred to as beneficiaries and exacerbators. In the case of the Tb Strategy, the AHB's rationale for allocation of costs that flow from this is:

- the dairy, beef and deer industries contribute funds for disease control and vector control as beneficiaries, because these industries benefit from Tb control;
- the Crown contributes funds for vector control because Crown land is a major source of vector-borne Tb, and the Crown recognises obligations to control possums on its land as a "good neighbour". The Crown also contributes as a beneficiary in light of the environmental benefits of vector control, and the wider (non-industry) economic benefits of Tb control (from protection of export revenues); and
- regions primarily contribute funds for vector control on behalf of other (non-Crown) landowners, because their lands may be sources of vector-borne Tb. Regions also contribute as beneficiaries in recognition of regional economic and environmental benefits from Tb control.

Putting this rationale into effect leads to the following outcomes:

- The three industry sectors meet their shares of disease control costs. These are easily apportioned, as the actual costs incurred by each sector can be measured or calculated.
- An agreed split of vector control costs between the Crown, industry, and regions. The present split was agreed in the last Strategy review as:
 - 50 percent Crown;
 - 40 percent Industry;
 - 10 percent Regions.
- The three industry sectors have agreed on how to divide among themselves the industry share of vector control costs.

In the past there has been significant debate as to how the industries should divide their share of vector control costs, because it is not possible to apportion vector control costs to the sectors on a direct benefit basis. The benefits are undoubtedly shared by the sectors, but they are shared to varying degrees from operation to operation in a manner not readily amenable to analysis.

A 2002 Ministerial Board of Inquiry into the Strategy suggested an inter-industry allocation of costs on the following basis:

- each industry should fund costs in proportion to the export risk faced by that sector in the Strategy's absence; and
- in the absence of any agreed information on the export risks faced by each sector, the allocation of costs should be based on each sector's share of total export revenues.

The current sharing of vector control costs between the beef, dairy and deer industries resulted from negotiated agreement rather than applying any particular formula or model.

The present funding agreements between the Crown, the regions, and industry gave rise to the following Strategy funding contributions in 2007/08:

Sector	Cattle Levies	Industry Grants	Crown Funding	Regional Funding	Other Income	Total
Deer		1,973			4	1,977
Beef	19,995				72	20,027
Dairy	5,956	16,977			58	22,991
Crown			30,671			30,671
Regions				6,256		6,256
TOTAL	25,911	18,950	30,671	6,256	134	81,922

Direct contributions by farmers to this funding were:

- A levy of \$11.50 on all adult cattle sent to slaughter (AHB slaughter levy collected by MAF).
- A contribution of 1.1 cents per kg of milksolids (paid to AHB by DairyNZ from its commodity levy).
- Contributions of four cents per kg of venison and 40 cents per kg of velvet (paid to AHB by Deer Industry NZ from its commodity levy). Most Tb testing in deer herds is paid for separately and directly by deer farmers, whereas all cattle Tb testing is levy-funded. (figures GST exclusive).

Regional funding is raised by contributions from regional or unitary councils, along with funding from a Biosecurity Act land levy in Otago Region.

Contribution of a regional share towards Tb vector control provides for the following outcomes:

- A collective funding contribution on behalf of landowners whose land may harbour bovine Tb vectors.
- Regions with bovine Tb vector problems to make a contribution to Tb control costs which is not imposed on regions without Tb vector problems.
- A regional contribution towards the sustainability of profitable livestock-based economic activity in the region.
- Regions to enjoy varying degrees of secondary environmental and biodiversity benefits from possum control under the Strategy.

As noted above, MAF and other funding stakeholders have agreed to review the Strategy's funding arrangements before the proposed new Strategy expires in July 2016.

Appendix two: Results from the Cost Benefit Analysis comparing the preferred option with the option of no Strategy and ad hoc control

The Biosecurity Act 1993 requires that the benefits of each pest management strategy outweigh its costs. The following section outlines the analysis done to confirm this.

OVERVIEW OF THE MODEL

A financial model has been developed to analyse the relative costs and quantifiable benefits of the proposed strategy. This model was built by the New Zealand Institute of Economic Research under instruction by the AHB, and has been independently reviewed by Nimmo-Bell.

The financial model uses a cost-benefit framework to assess the net economic cost/benefit of the proposed strategy over a forecast period of 30 years beginning in the 2010/11 year. All material costs and benefits are quantified in 2007/08 monetary terms and a Net Present Value (NPV) calculation is undertaken on a real dollar basis using a discount rate of 8.0 percent.

The findings of the model are as follows:

Net present values (\$M) (discounted at 8% real)	Proposed Strategy	Ad Hoc Approach
Benefits		
Carcass value saved	209.3	-
Beef / deer / dairy production saved	14.1	-
Clinical diagnosis costs saved	5.9	-
Biodiversity benefits (DOC costs saved)	139.4	-
Total Benefits	368.7	
Costs		
Strategy programme management costs	(134.3)	-
Disease control and testing	(149.4)	-
Vector control	(631.2)	(150.0)
Testing costs (ad hoc)	0	(205.9)
On-farm costs (indirect costs due to Strategy)	(34.9)	-
Total costs	(949.8)	(355.9)
NPV benefits and costs	(581.1)	(355.9)
Marginal net cost of preferred strategy before trade risks	(225.2)	
Net trade benefit based on costs avoided	225.2	
Marginal net cost of preferred strategy after benefits trade costs avoided	-	

KEY ASSUMPTIONS

The model calculates forecast costs/benefits over a forecast period of 30 years beginning in the 2010/11 year. This start date is believed to be the first year a change in the primary objective of the current Strategy could be implemented.

The 30 year timeframe has been selected to ensure a significant proportion of the impact of Tb infection spread under the Ad Hoc comparator is captured. The option of no Strategy and ad hoc control begins with the very low infection rates achieved by the current Strategy and takes time for Tb infection to reach significantly high levels. Beyond 30 years, a terminal value is calculated to reflect the residual value of the relative costs/benefits of the proposed strategy into perpetuity.

This modelling has been undertaken using a discount rate of 8.0 percent. We believe this rate is reflective of the long term nature of the preferred option and the risks inherent in the agricultural sector. It has been determined using the Capital Asset Pricing Model (CAPM) and incorporating current market data. It is also in line with the latest Treasury guidelines requiring the use of an 8.0 percent real discount rate for (non-IT related) cost benefit analysis.

All costs and benefits in the model have been expressed in 2007-08 real dollar terms, and the terminal growth assumption is set at zero percent per annum (consistent with the modelled observable cashflows).

The specific cost and benefit assumptions are outlined in the sections above. However, the more generic modelling assumptions are as follows:

Assumptions	
Model Term	30 Years
Year 1	2011
Terminal Value Calculated	Yes
Real Discount Rate	8.0%
Terminal Value Growth Rate	0%

CONSIDERATION OF TRADE RISK IN THE MODEL

Clearly there is a possibility that the trade of New Zealand branded products will not suffer under the option of no Strategy and ad hoc control scenario no matter how high the prevalence of Tb grows in domestic herds. This would likely be because of effective marketing campaigns and demonstration of the effectiveness of food safety systems, which mean that New Zealand products remain perceived as high quality (that is, consumers remain indifferent to disease levels).

It is very difficult to estimate with any degree of accuracy the potential value of lost trade value. Nonetheless, assessment of the costs avoided relating to a trade loss event is central to an evaluation of the economic benefits of the proposed strategy. The approach has been taken to model a potential trade loss involving a 10 percent drop in consumer demand in key export markets at a future date, which recovers over the course of three years due to targeted consumer marketing and then to consider what the risk might be of this occurring.

Given that it is not possible to assess the risk of occurrence in any year, the approach taken has been to back-solve the statistical level of risk necessary in every year (beyond year eight, prior to this, the risk was assessed to effectively be nil) to generate a present value benefit exactly equal to the marginal net cost of proposed strategy before trade risks.

The result of this analysis is 0.92 percent. Arguably, this represents a conservative approach to the trade risk question; because further increases in trade risk likely to be generated by even

higher future levels of disease prevalence beyond eight years under an Ad Hoc scenario have not been modelled. If it was assumed that the risk would increase over time to levels well in excess of 0.92 percent (i.e. rather than applying the same risk factor to each year beyond year eight) then the NPV of the proposed strategy becomes positive.