



November 2017

BRIEFING DOCUMENT

To provide background information relating to the AFB in New Zealand and outline the activities of the AFB ` Pest Management Plan.

What is American foulbrood disease?



Figure 1: A honey bee pupa with American foulbrood disease

American foulbrood disease (AFB) (Fig. 1) is a disease of honey bee larvae and pupae. It is the most serious honey bee disease in New Zealand, the control of which is a major cost to beekeepers. In 1996, the combined cost of the disease (including beehive inspection, destruction of diseased beehives and loss of production) was estimated at NZ\$2.9 million, or roughly 6% of the annual gross returns of the New Zealand beekeeping industry at the time.

How is it managed?

Unlike most other countries, New Zealand beekeepers do not use antibiotics to control AFB (the use of drugs to control AFB is illegal under New Zealand law). Control is through managing honey bee colonies to reduce the spread of disease and the destruction of colonies that are found to have AFB.

The necessity to prevent the spread of AFB places restrictions on the way beekeepers manage their hives. When control measures fail and disease levels get out of control, AFB can result in the complete destruction of commercial beekeeping businesses.

American foulbrood is the most serious honey bee disease in New Zealand

Market access for our bee products is supported by a robust Pest Management Plan and our determination to produce antibiotic drug free premium food and health products.





The start of AFB

American foulbrood is a bacterial disease infecting brood of the honey bee (*Apis mellifera*). The disease is present in almost all countries where honey bees are found. American foulbrood was first recorded in New Zealand in 1877; 38 years after honey bees were introduced. Within 10 years, the disease had spread to all parts of New Zealand and was being blamed for a 70% reduction in the nation's honey production.

Information on the numbers of beehives infected with the disease was not recorded during the early period of beekeeping development in New Zealand. Part of the reason was that beekeepers attempted to manage the disease, rather than destroy infected hives.

Early management

Honey bee colonies with light infections were "shook swarmed". Bees were shaken from infected hives into hives that contained only foundation. While the method was often effective at eliminating the disease, painstaking effort was required, and some colonies still developed heavy infections and had to be destroyed.

Early attempts at managing AFB using "shook swarming" make interesting reading:

"The districts in which the Ruakura State Apiary is situated were amongst the worst in the Dominion for foulbrood. The colonies I started the State Apiary with, that were already on the farm, were affected. By constant attention and treatment we were able to keep the disease from spreading and when we left for the Christchurch Exhibition (1906) there were six out of over 70 slightly affected with foulbrood. When we returned in the following June we found the disease had spread through robbing to nearly every colony. Early in the following season we treated a number of the worst cases and replaced bad with clean combs. As this did not turn out as satisfactory as we hoped, I hoped to treat the whole of the colonies the next spring."

A new approach

In 1950, it was decided that the incidence of AFB could not be reduced further if shook swarming continued to be used. Beekeepers were therefore instructed by the Department of Agriculture to "destroy the contents of diseased hives and to sterilise thoroughly any remaining hive equipment, by approved methods".

Shook swarming is illegal in New Zealand.





What is AFB and how is it caused?

American foulbrood disease is caused by the bacterium *Paenibacillus larvae*. Until recently, the bacterium was known as *Bacillus larvae*, but scientists have now determined that the organism should be in its own unique genus (*Paenibacillus*).

Life cycle of AFB

The bacterium causing AFB exists in two forms (the spore form and the vegetative form), both of which are microscopic in size.

Bacterial spores can be thought of as seeds that assist the bacteria in spreading from one suitable host to another and resisting adverse conditions. Spores of *Paenibacillus larvae larvae* can survive outside a honey bee colony for more than 35 years, and are able to withstand very high temperatures, including boiling water.

The spores are also resistant to a range of disinfectants. AFB spores can survive more than 35 years, and withstand boiling water and many disinfectants.

A honey bee larva is usually infected by being fed AFB spores which contaminate the brood food placed in its cell by nurse bees. The larva eats the spores, which then germinate in the larval gut, and turn into the vegetative form of the bacterium.

The vegetative form is in the shape of rods. These rods penetrate the gut wall of the larva, where they multiply, consuming the larval tissues. Death of the developing bee usually occurs either in the pre-pupal stage or just after pupation. When the vegetative rods have consumed all of the larval tissues, they turn into spores again. A single diseased larva may contain more than 2.5 billion spores. House bees in the colony try to remove diseased larvae and pupae and in so doing become contaminated with spores. New larvae are infected when they are fed contaminated food.

Spores are the only form of the disease that can infect healthy larvae. As well, the spores can only increase in number by infecting a larva. They do not multiply in any other environment (e.g. honey or beekeeping equipment). AFB spores will only multiply inside a larva.

Recognising the AFB spores resilience, the AFB Pest Management Plan is focussed on the eradication of AFB from managed beehives and colonies, this is the primary goal. This is an achievable outcome.

First reports of AFB





The first reliable report on the incidence of AFB in New Zealand was in 1947, when 74% of hives were inspected by government employees, and 1.7% were found to be infected with AFB. This was repeated in 1950 when 78% of the hives were inspected and 2.02% were found to be infected.

There were no reliable AFB disease statistics collected between 1950 and 1960. By 1961, however, the reported incidence of AFB had reduced to 0.23% of hives. The decline in disease levels during the 1950s may have been due to the move away from shook swarming (managing AFB), and the adoption of the practice of destroying diseased hives.

AFB on the increase

The percentage of beehives reported to be infected increased over the next 30 years, reaching a peak of 1.2% in 1990. During this time the New Zealand Government ran and paid for the AFB disease control programme. In 1991 most government funding was removed and the National Beekeepers Association (NBA) instituted its own AFB control programme.

Support and education for beekeepers introduced

The programme included the inspection of approximately 4% of the nation's apiaries by government inspectors, voluntary inspections carried out by NBA branches (called "diseaseathons"), the counselling of beekeepers with AFB problems, a research programme elucidating the factors contributing to the spread of AFB and an extensive education programme.

The new Health & Safety Laws have halted the industry driven "diseaseathon" programme, as the combined H&S risk to the AFB NPMP is too high, you cannot insure the liability. Inspections are now under a managed programme using Authorised Persons Level 2.

Reported AFB cases decreasing

During the seven years the programme was in existence, the reported incidence of the disease decreased by an average of 12% per annum, reaching a low of 0.38% in 1998, the last year of the programme. Since then, reported disease levels have fluctuated between 0.31 and 0.26%.

New Zealand is fortunate to have detailed statistics on AFB incidence. The data is based both on beekeeper reports of AFB findings in their hives (including an annual disease declaration by every beekeeper every year), and on reports by trained inspectors. The data has been collected over a number of years. Very few other countries have comparable data. The New Zealand statistics therefore provide useful information on the spread of AFB in a beekeeping industry that does not use antibiotic drugs to control the disease.





Although New Zealand's AFB disease statistics are more comprehensive than most, the information must still be treated with caution as it relies heavily on information provided by beekeepers. Even though it was a statutory requirement in New Zealand for beekeepers to report diseased colonies:

- not all beehives were inspected
- not all AFB infections were detected in those beehives that were inspected
- not all cases of AFB were reported when found.

New Zealand's AFB statistics are therefore an underestimate of the actual disease levels. However, the trends in disease levels are probably reliable. As the Government and NBA inspection programmes were targeted towards locations where inspectors thought there might be diseased hives, the AFB statistics generated from the programmes cannot be used to determine AFB levels in New Zealand. However, it is significant that when reported disease levels were increasing up to 1990, the inspectors also found increasing numbers of hives with AFB. The converse was also true after 1990 when reported AFB levels were decreasing.

Biosecurity (National American Foulbrood Pest Management Plan) Order 1998

On the 7th September 1998 the above Order in Council was formed, it is the direction and the principles contained that drives the Pest Management Plan and its operations in New Zealand. The primary objective is to manage AFB so as to reduce the reported incidence rates by 5% per year. The secondary objectives of the plan are –

- (a) To locate all places where beehive are situated and ensure that each honey bee colony is inspected at least once a year for AFB.
- (b) To identify AFB cases in beehives
- (c) To eliminate AFB in beehives by destroying any AFB cases and associated bee products, and destroying or sterilising associated appliances.

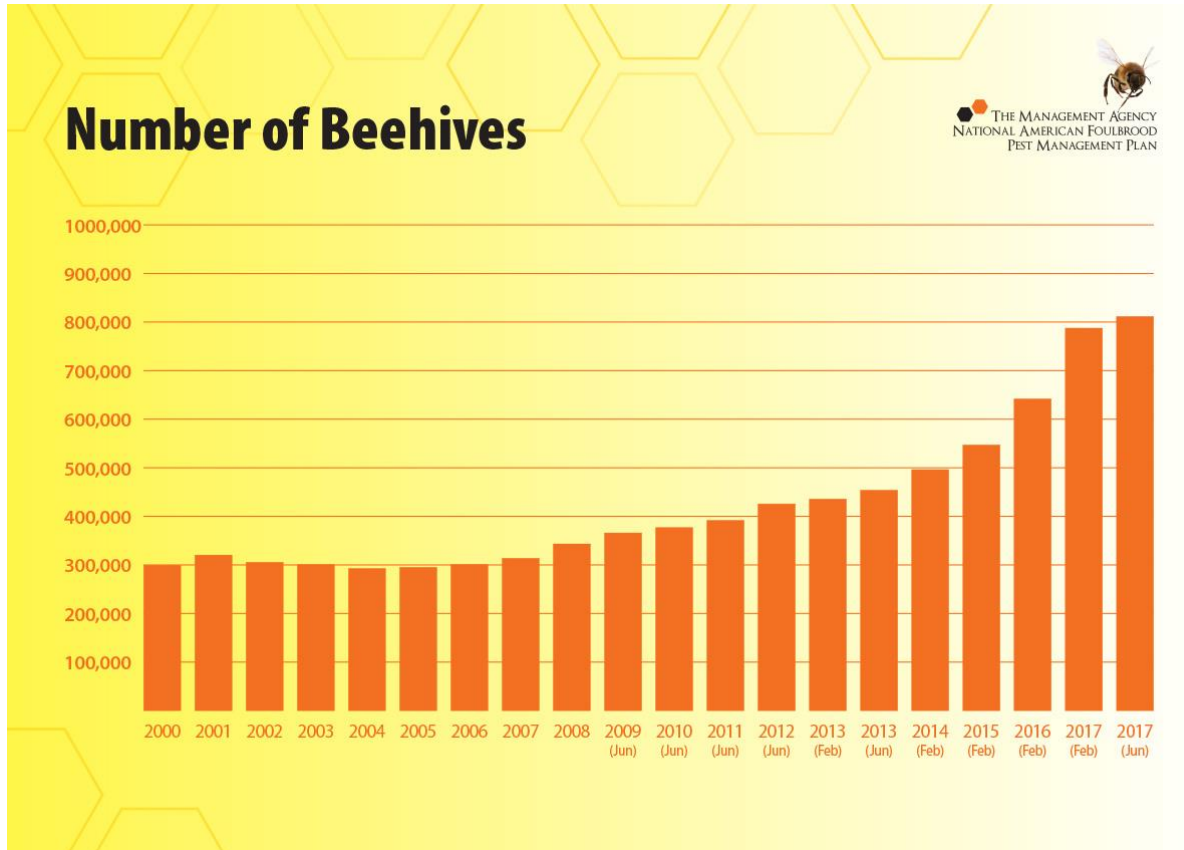
Biosecurity (American Foulbrood – Apiary and Beekeeper Levy) Order 2003

On the 20th October 2003, the above Order in Council was ordered; it imposes a Levy on all beekeepers in New Zealand. The Levy funds the activities of the Pest Management Plan, including Administration & Training, Contractor Services AP1 activities, Contractor Services APS Field operations and other primary services and activities. Over the last 10 years the levy take has equated to approximately \$1.00 per hive annually.



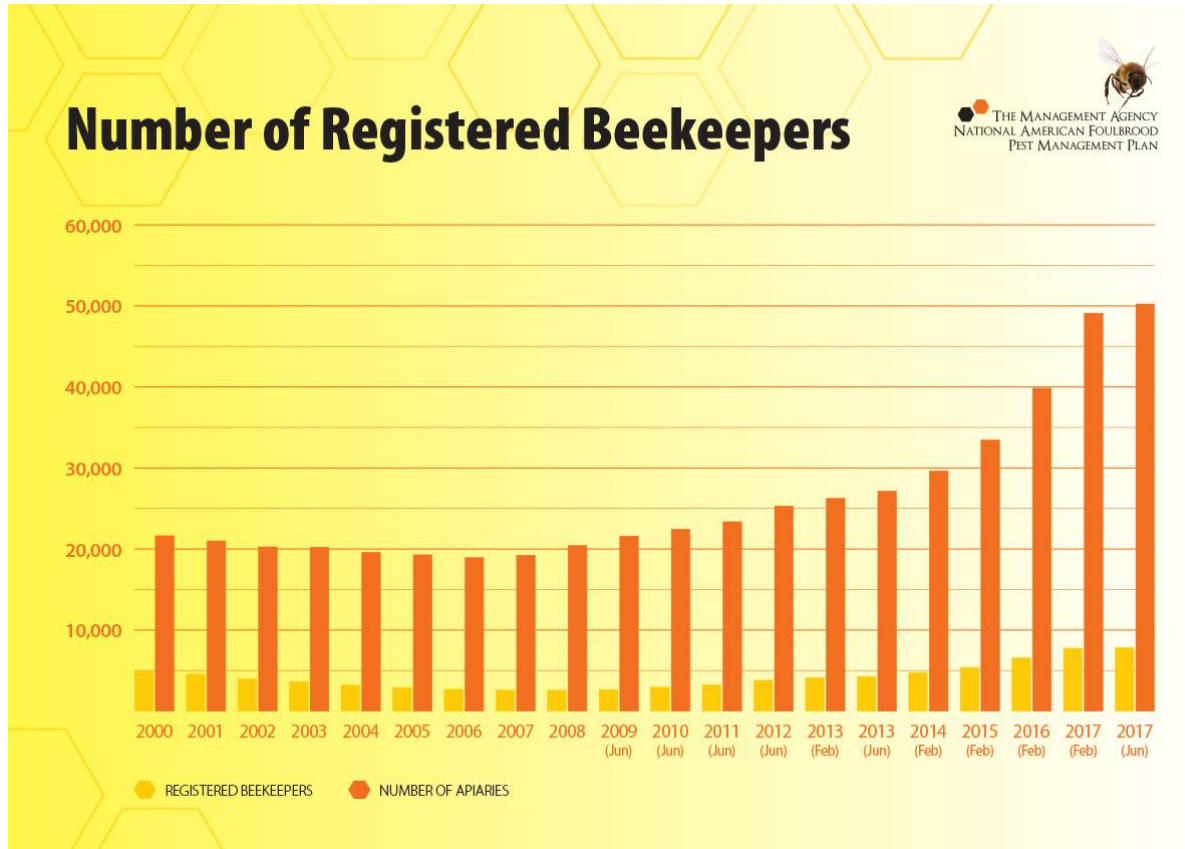


Industry position June 0217



Critical fact – almost 50% of industry have less than 5 years beekeeping experience, the number of apiary sites has doubled in the same time period. Hive density is now a serious issue and disease transfer is a serious risk, couple this with migratory beekeeping, inexperience and the potential for a serious outbreak is very real.





Control AFB by understanding how it spreads

To be able to control the spread of AFB, it is important to understand how the disease is transferred between colonies. A number of possible means of spread have been suggested by beekeepers.

These include:

- Extracted honey supers
- Transfer of brood frames and honey frames
- Empty used comb
- Other contaminated hive parts
- Robbing
- Drift
- Queens and package bees
- Swarms





- Bees wax foundation
- Varroa control strips
- Beekeeping equipment (gloves, hive tools, honey extractors, etc.)
- Flowers and the ground in front of hives
- Feeding contaminated honey and pollen

Dispelling myths

In discussing the possible ways that colonies can become infected with AFB, it is important to remember that AFB infections do not occur because a single bacterial spore finds its way into a colony.

In controlled experiments it has been shown that several million spores need to be fed to a honey bee colony in either sugar syrup or honey to infect one or more larvae.

Obviously, large numbers of spores are usually required to initiate an AFB infection. So probably the best way to assess the importance of the various means of spread is to compare their relative ability to transfer large numbers of spores from one colony to another.

Common causes of AFB spread

Beekeeping practice

Unfortunately, by far the most common causes of AFB spread are beekeeping management practices. The most significant of these are:

1. The movement of extracted honey supers between hives (often a year later)
2. Transferring brood or honey frames between colonies.

Most of the other causes beekeepers normally blame for the spread of AFB turn out not to be as significant or widespread as poor beekeeping management practices.

Robbing

Robbing can be an important cause, but when it leads to an AFB infection, it is usually the result of inadequate levels of beehive inspection (i.e. poor beekeeping management practice). Robbing of feral colonies is not a major source of AFB, at least in most situations and areas of New Zealand.





Drift

Although the drift of bees from AFB hives to healthy hives can spread AFB, particularly if the infection advanced, it is probably not an important factor in the transmission of AFB from lightly infected colonies.

Beekeeping equipment

Such things as hive tools, smokers and gloves, as well as the soil in front of hives, foundation, and queen bees, are of little consequence as sources of spread of the disease.

More information

Possible means of spread of AFB are discussed in greater detail on the AFB website – www.afb.org.nz.

OPERATIONAL REVIEW – October 2016

In September 2016, the AFB NPMP Board determined that a continuation of current compliance management would only maintain the status quo at best; the NPMP would not be able to deliver the targeted goal of a 5% annual reduction in clinical AFB incidents.

The Board brought together an experienced team of beekeepers and the science community to facilitate the development of an action plan to re-vitalise the programme and bring to the table new technology options to better assist the achievement of the agreed goals.

THE STRATEGY & ACTION PLAN 2017 to 2022

Six system improvement areas were identified, together with the actions required:

1. LEGAL REFORM

Actions:

- 1.1 Revise and update the American Foulbrood National Pest Management Plan Order 1998 to be fit for New Zealand apiculture now and in to the future.
- 1.2 Work with and guide the Ministry for Primary Industries to develop New Orders in Council to give legal force to the updated National Pest Management Plan and a revised Levy order.
- 1.3 Work with the Ministry for Primary Industries to upgrade enforcement powers through better offence provisions and powers for authorised persons.





2. RESOURCES

Actions:

- 2.1 Future proof the Levy Order provision to deliver the money needed to reach our outcomes while fairly apportioning costs amongst beekeepers.
- 2.2 Attempt to establish cost sharing arrangements with other beneficiaries that matches contribution to the benefits they receive.

3. MEASURING AND MONITORING

Actions:

- 3.1 Fix the imputing, interaction, and reporting processes associated with the Apiweb system and institute checking and audit procedures.
- 3.2 Extend surveillance, utilising new technology and tools to strengthen and increase targeted inspection frequency.
- 3.3 Invest in new science and technology development, such as qPCR spore testing for bees and honey, detector dog surveillance, and other science based opportunities.
- 3.4 Develop safe handling destruction capability for plastic infected hive ware.
- 3.5 Institute rapid reporting to beekeepers and their neighbours of disease incidence

4. COMMUNICATIONS

Actions:

- 4.1 Empower all beekeepers to actively shape an effective American Foulbrood management system by creating opportunities for meaningful engagement in the change processes.
- 4.2 Make communications frequent, engaging and fit for beekeepers' needs.
- 4.3 The AFB NPMP Board, MPI, and their contractors will drive culture change and improvement in systems and resources.

5. COMPLIANCE

Actions:

- 5.1 Actively create a culture of compliance with American Foulbrood National Pest Management Plan requirements through social marketing.
- 5.2 Revise compliance systems to reward compliant operators with reduced administrative burdens and recognition for good practice.
- 5.3 Support non-compliant operators to improve.
- 5.4 Improve enforcement systems to make non-compliance untenable.
- 5.5 Seek extension of the powers of authorised persons to enforce the requirements.





5.6 Review the Biosecurity National Foulbrood Pest Management Plan Order and the Levy Order so they are fit for purpose for the apiculture industry going forward.

6. TRAINING

Actions:

6.1 Structure American Foulbrood training into all levels of apiculture training including that for: beginner beekeepers, new industry staff, refreshers for experienced beekeepers, inspection, compliance, and enforcement personnel.

6.2 Work actively with large beekeeping businesses to ensure their staff have the necessary American Foulbrood skills and qualifications to ensure full bee products compliance is achieved.

6.3 Reduce language barriers.

6.4 Increase uptake of beekeepers attending AFB refresher courses.

6.5 Increasing access so that everyone needing training is being trained.

6.6 Ensuring training standards and specifications are consistent and being adopted.

MEASURES: The success of this Plan will be measured by timely implementation of these actions and by reduction in the measured incidence of Foulbrood in apiaries from 0.32% in 2016 (2,409 hives of 730,093 based on self-reporting) with the number initially rising with more accurate detection.

WHY WE NEED AN ACTION PLAN

Left unchecked American Foulbrood can adversely affect the health of our honey bees, and devastate both bee populations and the bee industry in New Zealand. From a biosecurity perspective, American Foulbrood free status would make it very hard to justify honey imports into New Zealand.

Eradication of Foulbrood as a problem in New Zealand is not only possible; it is practical in the medium term. *Varroa* has eradicated a lot of feral hives that were a potential source of American Foulbrood spores, so it's a lot more realistic to plan eradicate now, than in 1998 when the American Foulbrood National Pest Management Plan was notified.

We can eradicate the clinical signs of American Foulbrood here before European Foulbrood arrives in New Zealand. With European Foulbrood here, eradication of American Foulbrood would get a lot harder, if not impossible. Given European Foulbrood is in Australia, the probability of arrival at some point is high.

Since 1998 the underlying management systems for American Foulbrood have been improved, but an outdated funding system has meant that these could not keep up with what was required. When first written, nobody envisaged hive numbers would triple and beekeeper numbers would reach 8,000. A potential opportunity to eradicate American Foulbrood was missed when attention shifted over an extended period to the challenges of *Varroa* mite management.

Parts of the American Foulbrood management system are no longer fit for purpose. The number of hives in New Zealand has nearly tripled since 1998. The value of honey exports jumped to \$317 million in 2017, a value of \$37 per kilo FOB, from just \$36 million a decade ago, and less than \$10 million in 1998. This means that the industry is now far bigger, far more complex, and far more important to New Zealand than when the American Foulbrood National Pest Management Plan was established. Over this time, new technologies have been developed that could change the management tools and beekeeper control systems for American Foulbrood management, but resource constraints and the legal/political framework (red tape) have prevented their further





development and adoption.

New Zealand market access for our food products is under constant international pressure and, therefore, we need to show we have appropriate systems and controls in place. The apiary database is a critical element in the toolbox for stakeholders.

The American Foulbrood Pest Management Plan Board believes the industry should take this opportunity to link the needs relating to food security and traceability with a single national database upgrade, this view is under serious consideration by the relevant Government agencies.

Good management of American Foulbrood is now more important than ever. The value to New Zealand economy from the pollination provided by honey bees is conservatively estimated to have reached \$5,000,000,000 per annum. Markets require high levels of assurance about compliance and the quality of bee products. American Foulbrood is a potential risk that we must continually manage and strive to eradicate, particularly when our trading partners have the potential to use AFB spores as a market access regulatory tool.

Reform is timely and urgent. This Plan sets out the way forward.

PURPOSE

The purpose of this Strategy is to create practical steps that New Zealand beekeepers can take to eradicate American Foulbrood.

SCOPE

This Strategy is about management and eradication of American Foulbrood. It does not include the management of other pests, diseases, or other elements of apiculture.

STRATEGY

Diligently detecting and destroying infected bee colonies is sufficient to eradicate American Foulbrood.

Our strategy is to ensure that all bee colonies are exposed to detection, and that these detections are reported and acted on.

The beekeeping community is diverse. It includes the primary production segments of hobbyists, small and large scale commercial operators, and corporate enterprises, including exporters. There are also associated processing and marketing industries, those involved in administration and compliance work, and hive-ware importers/manufacturers and sales.

To lift industry standards, we propose to recognise four levels of practice (A to D)

- A. **Exemplars of good practice**, managing apiaries well beyond legal requirements, and active in supporting the success of beekeeping, including American Foulbrood control, across the sector. We will become active in recognising, rewarding, and building on their practice.
- B. **Beekeepers utilising current best practice**. These beekeepers are fully compliant with all American Foulbrood management requirements. We will recognise their good practice.
- C. **Beekeepers that are not compliant** with American Foulbrood regulations. In many cases these beekeepers do not have the skills and knowledge to fully comply. We will support these non-compliant practitioners to become compliant by providing education, information and advice.
- D. **Chronically non-compliant beekeepers**. Some **registered** beekeepers have the information to be compliant, but lack the motivation to accept their responsibilities to undertake the necessary actions. Our approach is to make continued non-compliance by these beekeepers untenable by rigorously and fairly enforcing the law. This method will also be used for beekeepers with **unregistered hives**.





These beekeepers are either unaware of the requirements of the American Foulbrood regulations, or choose to ignore them. They are currently outside our management systems. We will increase surveillance to detect such operations and bring them into compliance, or shut them down.

We will assess the practice of all beekeepers to measure current compliance, and invest in **moving all into categories A or B**

THE ACTIONS:

Action 1 – Legal reform

Goal

Our goal is that the legal framework, regulations, and rules are up to date and fit for purpose.

What's the problem?

The bee keeping industry faces a range of legal impediments and inadequacies. Some of these directly relate to American Foulbrood Pest Management Plan management under the Biosecurity Act, and others involve related legislation and systems. Outside of the scope for this Strategy are other aspects of beekeeping such as food safety.

In terms of American Foulbrood Pest Management Plan management under the Biosecurity Act:

- The current American Foulbrood National Pest Management Plan (1998) no longer best serves the needs of a rapidly growing sector.
- The American Foulbrood National Pest Management Plan (1998) does not meet the requirements of the National Pest Management Policy Direction, the Minister has directed and ApiNZ is legally required, to review and update it in a timely manner
- The Levy Order is ineffective in funding the outcomes and the targets that have been set, eradication at present is virtually impossible at this level of funding. Non-compliance and inexperience is undermining progress, and our enforcement powers are inadequate to deal with this.

What will we do?

- 1.1 Revise and update the American Foulbrood National Pest Management Plan Order 1998 to be fit for New Zealand apiculture now and in to the future.
- 1.2 Work with and guide the Ministry for Primary Industries to develop New Orders in Council to give legal force to the updated National Pest Management Plan and a revised Levy order.
- 1.3 Work with the Ministry for Primary Industries to upgrade enforcement powers through better offence provisions and powers for authorised persons.

What will it cost us?

The beekeeper will decide, it is their Plan and their commitment.

Planning and costing this work is an urgent action. Currently the American Foulbrood Pest Management Plan levy provides \$0.8 million to support to an apiculture sector worth \$550 million annually, and underpins an estimated \$5 billion each year for the agriculture and horticulture sectors through pollination.

When will this happen?

The Minister for Primary Industries has determined that the American Foulbrood National Pest Management Plan (1998) does not comply with the new legal requirements of the National Policy Direction for Pest Management. The Ministry for Primary Industries has provided guidance and





advice on the specific areas of non-compliance and the requirements of the review process. The Board together with the Ministry for Primary Industries will begin the review process in the third quarter of 2017. The process will take around 18 months to complete.

Action 2 – Resources

Goal

Our goal is to have the finance, human resource, technology, knowledge, systems, and processes in place to eradicate American Foulbrood from New Zealand by 2030.

What's the problem?

- Currently we do not have the resources and key elements required to eradicate American Foulbrood from New Zealand.
- The Levy Order is our major source of income; it is insufficient and does not deliver the money needed to achieve the targets set now or eradication in the future.
- Other beneficiaries, associated industries, and Government are not contributing in proportion to the benefits they receive (noting Government represents the public and whole of New Zealand interest).

Each year beekeepers in New Zealand are burning approximately 2,000 hives and the associated pollination and crop potential at an estimated cost (give or take) of up to \$2,400 per hive, therefore American Foulbrood is costing the industry a minimum of \$24 million in direct costs over five years at current levels of operation and infection. On top of this are the current direct costs of administering and enforcing the system, \$800,000 through levies, plus the training and other costs directly paid by industry stakeholders annually meaning the real costs of Foulbrood are in the order of \$30 million over 5 years. Market impact costs have not been included.

Assuming a further doubling in hive numbers, with infection remaining at current levels, eradication of American Foulbrood in New Zealand would save the industry at least \$10 million per annum in direct costs by 2030. This is certainly an underestimate as the value of the undetected hives and the downstream costs have not been factored in.

Consider this, what would be the benefit and return on investment over 14 years if we reduced the level of AFB to 0.01% by 2022 and achieved eradication by 2030?

Being really conservative but as a realistic guide, we can project based on the 2016 prices for honey, propolis and beeswax, using an average value, but excluding any pollination value. This gives a figure give or take of \$1,000 per hive plus \$1,000 for the product it contained or would have produced in that year.

If the costs of control to achieve eradication rose to \$2 million per annum by 2022, and then dropped back to \$400,000 per annum in 2030 (to sustain qPCR surveillance of every apiary):

- By 2022 we would have made net savings from hive losses of \$2.5 million while costs of control would have risen by a total of \$2.5 million over the period meaning we had reached break even.
- By 2027 we would have made net savings from hive losses of \$15 million for a net benefit of \$7million.
- By 2031 with clinical AFB eradicated we would have a net benefit of \$31 million over the 15 years.
- If we factor in the productivity of those lost hives for 2 years each, there are savings of \$38 million at today's crop value. In total combining the costs of lost hives and lost production the net saving is approximately \$70 million over 15 years or \$4.7 million per year.





Question – would beekeepers be prepared to invest 10% of this benefit annually to eradicate AFB in New Zealand? If you say yes, the cost per hive would rise from the current \$1.00 per hive per year to between \$1.50 and \$2.00 per hive per year before dropping back to less than \$0.50 per hive.

The costs of control have only been estimated, and the true costs may turn out to be double these. This would mean that the cost per hive could rise as high as \$3.00 per year, but is very unlikely to be higher; would beekeepers be prepared to invest at this level of contribution?

Cost estimates will be refined in developing new Levy proposals based on two logical options, accelerated reduction of AFB targeting less than 0.1%, or full blown eradication goal.

PROJECTED LEVY REQUIREMENTS

Guide only (tbc)

(Hive numbers 850,000)

	2017/18	%	2018/19	%	2019/20	%	2020/21	%	2021/22	%
Management & Administration	\$404,000	36%	\$427,000	20%	\$427,000	14%	\$427,000	14%	\$427,000	14%
(Secretariat, Facilities, Legal, Plan & Levy Order update, Operational Plan, Governance)										
Training & Education	\$101,000	9%	\$265,000	13%	\$365,000	12%	\$365,000	12%	\$365,000	12%
(Funded activity over recovery)										
Contractor -ApiWeb	\$315,000	28%	\$465,000	22%	\$515,000	17%	\$515,000	17%	\$515,000	17%
(Database management, Surveillance plan)										
Compliance Activities	\$291,000	26%	\$950,000	45%	\$1,800,000	58%	\$1,800,000	58%	\$1,800,000	58%
(Fieldwork, lab testing, auditing, science)										
	\$1,111,000		\$2,107,000		\$3,107,000		\$3,107,000		\$3,107,000	

What will we do?

- 1.1 Future proof the Levy Order provision to deliver the money needed to reach our outcomes while fairly apportioning costs amongst all beekeepers.
- 1.2 Open discussions which focus on cost sharing arrangements with other beneficiaries that matches the contribution to the benefits they receive.

What will it cost us?

Apart from changing the regulations, the main cost for us in getting more funding is the time of staff and Board members. The process is critically dependent on active engagement from senior Ministry for Primary Industries staff, and this support has been assured by the Minister. A key member of the MPI Directorate now sits at the AFB PMP Board table, and an active joint working group has been established.





When will this happen?

Updating the Levy Order will be done in conjunction with the review of the National Pest Management Plan with the goal of completion by mid to late 2018 with Ministry for Primary Industries assistance. Getting the resources to reform the system, however, cannot wait that long, so cost sharing arrangements and other sources of funding will be investigated as a matter of urgency.

Action 3 – Measurement and monitoring

Goal

Our goal is to have robust measurement and monitoring systems to support eradication of American Foulbrood from New Zealand by 2030.

What's the problem?

- The Apiweb system has reached a critical point, it is not compatible with all modern technology platforms, and this potentially compromises the accuracy of the data, and the interactive ability of those who wish to use the system.
- Surveillance using traditional activity is insufficient to detect unregistered hives or to sufficiently identify reporting failure to enable corrective action to be taken.
- Beekeepers have not historically been receiving timely information about infection detections.

What will we do?

- 3.1 Fix the imputing, interaction, and reporting processes associated with the Apiweb system and institute checking and audit procedures.
- 3.2 Extend surveillance, utilising new technology and tools to strengthen and increase targeted inspection frequency.
- 3.3 Invest in new science and technology development, such as qPCR spore testing for bees and honey, detector dog surveillance, and other science based opportunities.
- 3.4 Develop safe handling destruction capability for plastic infected hive ware.
- 3.5 Institute rapid reporting to beekeepers and their neighbours of disease incidence.

There is opportunity to use information technology platform to automate key elements, for example:

- New information technology systems that allow feeds to harvest declaration reports and tutin¹ test results with a cross benefit of automation to meet the traceability needs of the Ministry for Primary Industries.
- Automated GPS² location data for apiaries when they are moved.
- Reporting processes for unregistered and or abandoned apiaries.
- 6-monthly targeted follow-ups if an American Foulbrood event is recorded in an area.
- Text notification of American Foulbrood incidents to beekeepers in agreed radius.
- Email notification of American Foulbrood rob outs in an agreed radius

¹ Tutin is a poisonous plant derivative found in the New Zealand [tutu](#) plant (*Coriaria* genus, several different species). It is sometimes associated with outbreaks of [toxic honey](#) poisoning when bees feed honeydew exudate from the sap-sucking insect commonly known as the passion vine hopper, when these vine hoppers (*Scolypopa australis*) have been feeding on the sap of tutu bushes. Toxic honey is a rare event and is more likely to occur when comb honey is eaten directly from a hive that has been harvesting honeydew from passion vine hoppers feeding on tutu plants.

² Global Positioning System





Well resourced, we may consider regionally undertaking a complete audit of a geographic area over a month or six weeks, hit the area and see:

- a) How many unregistered hives exist.
- b) qPCR American Foulbrood spore test of live bee sample collection for every apiary.
- c) Detector dog follow up of “positive” apiaries finds from qPCR.
- d) Physical examination of all positive hive “finds” from dog notifications.
- e) Quarantine all “positive” beehives/colonies.
- f) See what American Foulbrood incidence we find vs what is being reported. This could then be extrapolated over the national picture to see whether the reporting was widely inaccurate.

When will this happen?

This needs to happen as soon as possible, but Apiweb³ upgrades and increased surveillance are dependent on financial resources being available. The minimum time possible, if other parties do not contribute additional resources, is to:

1. Immediately institute rapid reporting to beekeepers.
2. Commence the Apiweb rebuild by early 2018.
3. Deploy expanded surveillance once the tools have been scientifically verified and financial resources become available.

What will it cost us?

The rapid reporting to beekeepers can be instituted within current resources.

The Apiweb system rebuild, has been indicatively costed at \$300,000 to \$400,000 and could be more. The AFB NPMP and AsureQuality have jointly funded the initial Apiweb design cost and scoping development prior to going out for tender.

The expectation is that the re-build cost will be shared between the AFB NPMP, AsureQuality and the Ministry for Primary Industries, how cost share sits has yet to be determined.

The costs of expanded surveillance require further analysis. For example, qPCR spore testing of apiaries is estimated at an initial guide cost of \$10 to \$20 per apiary. It would realistically be funded directly by the beekeeper, with results via compulsory reporting forming the basis of an epidemiological national survey of all apiaries in NZ.

Action 4 – Communications and engagement

Goal

Our goal is informed, involved, and committed beekeepers shaping effective American Foulbrood eradication.

What's the problem?

- There are beekeepers who are not confident in the system or its management, and who do not feel in control, and fail to take ownership of their Pest Management Plan.
- Some beekeepers do not understand the need for urgent action, and thus are not providing the support needed to reduce the incidence of American Foulbrood.
- Those that are compliant are paying for those less vigilant to be targeted.

³ ApiWeb displays the information held on registered beekeepers. This system displays information in both textual and geospatial formats.





What will we do?

- 4.1 Empower all beekeepers to actively shape an effective American Foulbrood management system by creating opportunities for meaningful engagement in the change processes.
- 4.2 Make communications frequent, engaging and fit for beekeepers' needs.
- 4.3 The AFB NPMP Board, MPI, and their contractors will drive culture change and improvement in systems and resources.

When will this happen?

Improved communication practice has commenced and will be developed further over time.

What will it cost us?

Immediate improvement can happen with current resources. The need for money to improve systems and resources will emerge as practice changes. An active learning approach with periodic review of resource requirements will be adopted.

Action 5 – Compliance

Goal

Our immediate goal is to improve compliance with American Foulbrood National Pest Management Plan requirements.

What's the problem?

- The compliance culture has been compromised by the rapid influx of new beekeepers, increased hive numbers, the 30-day site registration rule, and the incentives created by high honey prices.
- Targeting of problem areas requires resources to deliver a stepped programme of AFB reduction and ultimately eradication.
- Enforcement is not robust enough to deter ongoing non-compliance, there are no consequences or outcomes.
- Non-compliant beekeepers may be ignorant of the requirements.
- Enforcement depends on Ministry for Primary Industries which has limited resources across many sectors and AP1 appointees who have specific warranted duties (AP1 - Authorised Persons under the Biosecurity Act with limited enforcement powers).
- AP2s (Authorised Persons under the Biosecurity Act with inspection powers) hold limited warrants and resources, physical and financial, are stretched.

What will we do?

- 5.1 Actively create a culture of compliance with American Foulbrood National Pest Management Plan requirements through social marketing.
- 5.2 Revise compliance systems to reward compliant operators with reduced administrative burdens and recognition for good practice.
- 5.3 Support non-compliant operators to improve.
- 5.4 Improve enforcement systems to make non-compliance untenable.
- 5.5 Seek extension of the powers of authorised persons to enforce the requirements.
- 5.6 Review the Biosecurity National Foulbrood Pest Management Plan Order and the Levy Order so they are fit for purpose for the apiculture industry going forward.

Overall, our approach will be to create a culture of voluntary compliance backed up by active





enforcement:

- a) Move implementation of the National Pest Management Plan away from an honesty based system, to more regular audits (and possibly instant fines). This will audit all beekeepers nationally. Audits may be physical inspections, bee samples, detector dogs or future new technology.
- b) Seek approval to commence the automatic analysis of honey samples sent in for tutin and international compliance testing to look for hotspots of American Foulbrood.
- c) Look to sample bees from all apiaries annually using qPCR⁴ technology.
- d) Work with Ministry for Primary Industries to integrate harvest declaration data so we know where honey yields are coming from, and that they accurately reflect beekeepers registered hives. This should be part of a wider information technology strategy. It is possible the existing registry could also be data-mined to look for beekeeper proximity and American Foulbrood incidence and see if there are any statistical correlations.
- e) Change the legal framework so that those who flagrantly breach the rules receive a binding fine and/or have their registration revoked.
- f) Seek extension of AP1 and AP2 powers.

When will this happen?

Improvement will commence immediately through better communications, a revision of targeting, and increased training opportunities. Improvements to enforcement will be made immediately where possible, but major changes can only happen after the Orders in Council have been changed. This means that substantially better enforcement can be expected from early 2019.

What will it cost us?

Immediate improvement can happen with current resources. The costs of better enforcement will need to be known for the National Pest Management Plan review, so these will need to be considered in September (notice just received from Minister) for consideration by December 2017.

Action 6 – Training

Goal

Our goal is that every beekeeper in New Zealand apiculture knows how to comply with the American Foulbrood National Pest Management Plan requirements within the scope of their role.

What's the problem?

- Training standards and specifications, while available, are not being adopted universally across the industry.
- Not everyone who needs to be trained is getting trained.
- Insufficient uptake on refreshers.
- Issues with language barriers.

What will we do?

6.1 Structure American Foulbrood training into all levels of apiculture training including that for: beginner beekeepers, new industry staff, refreshers for experienced beekeepers, inspection, compliance, and enforcement personnel.

⁴ Polymerase chain reaction (**PCR**) is a technique used in molecular biology to amplify a single copy or a few copies of a piece of DNA across several orders of magnitude, generating thousands to millions of copies of a particular DNA sequence.





Support this by:

- Including AFB training into the Beekeeping Code of Ethics.
- Developing education for all those associated with beekeeping but not involved in keeping bees.
- Requiring a competency assessment for all inspection, compliance, and enforcement personnel to demonstrate a high level of skill and understanding.

6.2 Work actively with large beekeeping businesses to ensure their staff have the necessary American Foulbrood skills and qualifications to ensure full bee products compliance is achieved.

Support this by:

- Making training and the AFB education course material available to the in-house tutors under a formal agreement requiring demonstration of standards being met.

6.3 Reduce language barriers by:

- Having the test papers written by an interpreter in Filipino, Mandarin and Korean and making these readily accessible.
- Delivering the AFB training course documents and content in Filipino, Mandarin and Korean. Tutors may be contracted to the AFB PMB or employed within industry organisations. They will have attended the relevant training by the AFB Pest Management Agency.
- Having interpreters available at some courses with multilingual tests in the key geographical areas.
- Including a section on the AFB web site in Filipino, Mandarin and Korean of the options available.
- Including other languages as the need arises and the volume supports it.

6.4 Increase uptake of beekeepers attending AFB refresher courses by:

- Promoting subsidised refresher courses through the Hubs, clubs and groups to improve access.
- Promoting as ongoing professional development within beekeeping companies.
- Encouraging as many of these to be held before Spring as possible.
- Developing the current test on the AFB web site to meet the standard of a Refresher course.
- Making refreshers available on-line, thereby reducing the barriers to access for some in remote geographical areas.
- Change scenarios and content. Any long answer responses will need to be assessed by a tutor therefore this is a mid to long term option due to current resource constraints.

6.5 Increasing access so that everyone needing training is being trained by:

- Developing advertising for a variety of media types, including social media, to ensure all beekeepers are aware of the AFB website and AFB training options.
- Promoting the AFB app to assist as a diagnosis tool at every opportunity.
- Acknowledging that not everyone chooses to sit the test and apply for a DECA, but promoting attendance at a course or refresher as being very acceptable and accessible to all.
- Exploring the opportunity to combine exotic bee disease identification with the AFB training to make the most of the learning opportunity, increase biosecurity knowledge and awareness, and increase course or refresher appeal.





6.6 Ensuring training standards and specifications are consistent and being adopted by:

- Performance monitoring of trainers.
- Trialling open book tests.
- Reviewing test papers to ensure understanding and knowing how to access the information needed in identifying and dealing with AFB.
- Making training of tutors, and the AFB education course material, available to other entities that include AFB in their training with agreement on the minimum standards to be achieved.

When will this happen?

Work will start immediately and continue through to April 2018.

What will it cost us?

Some training improvement can be designed within current resources. Full implementation costs will be known once the overall package is designed. Full implementation may need to wait until resourcing issues have been resolved.

RISK MANAGEMENT

American Foulbrood management faces substantial risks over the next 5 years that could affect delivery of this Plan:

New pests and diseases

New pests may affect the viability of American Foulbrood eradication. In particular, European Foulbrood that is already in Australia.

Probability of occurrence is moderate for most pests and diseases, but high for arrival of European Foulbrood. Consequence for most pests is low to very high depending on the organism and its spread and very high for European Foulbrood.

The risk of further introductions of pests and diseases can be best reduced by stringent border control and increasing beekeeper engagement across the biosecurity system.

The Apiculture sector engaging in GIA⁵ offers an opportunity for enhancing this engagement and establishing a strong working relationship with key government agencies. If European Foulbrood enters New Zealand, then this Plan will face a serious challenge and potentially no longer be viable and will need to be reviewed.

Change in terms of trade

Probability of occurrence high. Consequence moderate to very high.

A global down turn in honey prices, or barriers to important markets, could affect the viability of the honey industry and potentially lead to the abandonment of hives creating a reservoir of disease and a loss of Levy income to manage American Foulbrood.

Conversely, higher prices could accelerate the pace of change in New Zealand, adding further pressure on American Foulbrood management systems.

In either case, building more American Foulbrood management capability will reduce the chance of these consequences becoming unmanageable. Given that the constraining factor is the financial resources available under the Levy, Government support will be sought to accelerate capability development.

⁵ Government Industry Agreements for Biosecurity Readiness and Response





Major changes in the terms of trade, will trigger a review of this Plan and its implementation.

Government Agencies

The need for adequate resourcing for key government agencies particularly MPI is critical, failure to deliver agreed outcomes around consequence and compliance would seriously undermine the intent of the 5-year Strategy.

Industry apathy

Failure of industry to engage with the AFB NPMP will also have serious implications on the ability of the NPMP to function correctly. It is important to learn from the past, but focus on the future and utilise the financial resources correctly.

MEASURES

The success of this Plan will be measured by

1. Timely implementation of these actions.
2. Reduction in the measured incidence of Foulbrood in apiaries.

A fully costed implementation plan will be adopted by the American Foulbrood Board which will meet quarterly to review progress. Progress reports will be made available to industry stakeholders after each meeting via the AFB NPMP website.

Measurement will move from reported incidence, to an objective and scientifically valid measurement of incidence. This will be designed in consultation with the stakeholders and implemented as soon as resources allow. In the interim reported incidence will continue to be used.

Review

The Plan will be reviewed every five years, or sooner if the American Foulbrood National Pest Management Plan changes or if measures show that our targets are not being achieved.

FINAL COMMENT

The AFB National Pest Management Plan is owned by beekeepers for the benefit of beekeepers, their hives and their livelihoods. It is a compliance based programme based on honesty and integrity.

The programme underpins the considerable value the New Zealand Apiculture Industry has developed for its bee products both domestically and internationally, it is imperative that we work in unison and cooperatively to achieve the goals that have been established.

Management of AFB is a critical element in our continued success. Some international markets are beginning to suggest that honey should not contain AFB spores. While this may simply be a market access tool understanding that those import countries do not achieve anywhere near New Zealand's AFB management results and outcomes, it is something we must not lose sight of.

Change will only come about by using smart technology, increased funding and training and ensuring every beekeeper does what is required to achieve the goal of eradication of clinical signs of AFB from managed bee colonies.





 THE MANAGEMENT AGENCY
NATIONAL AMERICAN FOULBROOD
PEST MANAGEMENT PLAN

