

Three-year review of the National Psa-V Pest Management Plan – Full report

July 2016



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1 Summary and recommendations

May 2016 marked three years since the National Psa-V Pest Management Plan (NPMP) was put in place. As a result, KVH has undertaken an internal non-statutory review on the NPMP. The review considered if a NPMP is still needed, then focused on ensuring the NPMP remains effective going forward and identifying improvements to align with ongoing Psa control challenges.

The KVH Board has confirmed the need to continue with a comprehensive plan to combat the ongoing impacts of Psa, particularly since it has only been a relatively short period of time since such a major biosecurity incursion occurred, and in addition, the bacteria are evolving and starting to show signs of product resistance.

Key areas for improvement and associated recommendations are:

1. Psa-V Risk Management Plans – growers and postharvest/processors

Recommendation is to apply the lessons learnt from Psa from the Sapere Report; and broaden the scope of Psa-V Risk Management Plans to become Biosecurity Management Plans. This will capture wider on-orchard biosecurity practices that serve the long term needs of the industry while still including the Psa-V specific management requirements to meet NPMP compliance.

2. Establishment of new exclusion regions

Recommendation is to provide for new 'exclusion' regions, with the aim of protecting new growing regions and sites outside of current grower regions through movement controls of high-risk items to these sites. This recommendation has already been actioned, with policy covering this and the first new exclusion region (Far North) approved by the KVH Board.

3. Boundaries of existing regions

Recommendation is to retain existing boundaries, noting the KVH board can adjust movement controls over time to provide for greater ease of movement for growers, and tailor this to level of risk as our understanding this is further refined or changes over time. Existing boundaries are advantageous in terms of managing more virulent or resistant/tolerant forms of Psa-V and ability to limit spread of new biosecurity threats that may be present but not detected.

4. Mandatory Monitoring

Recommendation is to further rationalise monitoring requirements to limit mandatory monitoring requirements to non-detected orchards. This recommendation has already been actioned and new requirements announced.

5. KVH movement controls and protocols

Recommendation is to review movement controls and protocols to ensure they are aligned and remain appropriate to the Plan's objectives and the needs of the industry. An initial review of movement controls and protocols was completed. Two areas, pollen and budwood, still need to be better aligned with other aspects of the programme. KVH/Zespri are investing in research to improve measures (e.g., treatments) that would assist with such alignment.

6. Abandoned/unmanaged orchards and wild kiwifruit

Recommendation is to continue with KVH's existing approach to unmanaged and abandoned orchards and wild kiwifruit, including maintaining and establishing further agreements as needed with regional councils (e.g., Tasman) similar to BOPRC arrangements.

7. Research & Development

Recommendation is to continue to strengthen the R&D programme in the four major programmes areas:

- I. Systemic Psa infection and management of the endophytic Psa population.
- II. Growing G3 economically in a Psa environment.
- III. Understanding Psa population dynamics for improved control
- IV. Understanding Psa microbiome

8. Psa Biosecurity Levy

Recommendation is to reduce funding to 0.28 cents per kilogram of kiwifruit (1 cent per tray equivalent) for gold kiwifruit, which aligns this with the current rate for green kiwifruit.

The KVH Board also took opportunity to review progress against Sapere recommendations, from its 2014 report to KVH on *Lessons learned from the response to Psa-V*. The vast majority of recommendations had been effectively progressed, and residual areas are addressed in the Board's recommendations above.

The KVH Board's initial findings were tested with Industry through the NZKGI Forum, July Zespri Road Shows, National Field Days, Tech Reps, and one-on-one meetings with some Post-harvest reps. Overall there was general support for the Board's findings and agreement the Board had focused on the right areas in this review. The key areas of concern raised were in relation to ease of plant material movement across regions. The full range of matters raised during consultation and the KVH board's consideration of this are included in this report.

In parallel with this review KVH and MPI agreed MPI would complete its independent assessment of NPMP consistency with the new *National Policy Direction on Pest Management* (this is a new government regulation/requirement, which all NPMP's must comply with). KVH completed its own assessment initially, which determined our NPMP was consistent with the new requirements. MPI completed its independent statutory assessment and advised the Minister for Biosecurity, who has confirmed our NPMP is fully compliant and no changes are required.

The next review of the NPMP is scheduled for May 2019.

2 Purpose

This paper records results of the KVH Board's three-year non-statutory review of the National Psa-V Pest Management Plan.

3 Background

The NPMP is subject to a non-statutory review after three years (being May 2016). This review after three years is something the KVH Board committed to when it submitted the *National Psa-V Pest Management Plan Proposal* to the Minister for Biosecurity in 2012. The Board at that time, and the current board, viewed a three-year review as "good practice" and an ideal time at which to "check in" and test if the NPMP is still delivering intended value and if any changes are needed (including if the NPMP is still needed at all?). There is no legal requirement or Ministerial requirement for this review, and no specific issues have triggered this review.

Several relevant considerations for the KVH Board when setting terms of reference (TOR) for this review were:

- In 2014 the KVH Board commissioned "Sapere" to undertake an independent, non-statutory review of the Psa-V response (2014). The scope of the Sapere review included capturing lessons learned during the initial response phase, the transition to a NPMP, and the initial year of NPMP implementation. The KVH Board prepared a response to Sapere's recommendations (Appendix 1); and
- The Government approved a National Policy Direction for Pest Management (NPD) in 2015, which requires the Minister to make a determination as to whether all National Pest Management Plans are consistent with the *National Policy Direction on Pest Management*, by February 2017. If not consistent the government would require existing plans to be changed to align with the NPD.

The NPMP is a legal instrument (an Order in Council – refer to legal overview of the NPMP below), which means KVH cannot vary the requirements of the Order; any substantive change to the Order itself must go through a regulatory review process and be approved by the Governor General.

3.1 Legal overview of the NPMP

The NPMP is an Order in Council, which is a notice of an administrative decision issued by the Governor General, and a legislative Order in relation to and authorised by an existing Act of Parliament. In this case the existing Act of Parliament that supports the Order is section 65 of the Biosecurity Act 1993.

The NPMP has two primary objectives:

1. Preventing the spread of Psa-V
2. Minimising its impact on kiwifruit production

In addition, there are eight secondary objectives, as follows

1. Ensuring exclusions regions are, and remain free of Psa-V
2. Establish on a regular basis that exclusion regions are free of Psa-V
3. Enable swift and decisive action to contain any outbreak in an exclusion region
4. Limiting further spread within and from containment regions
5. Reduce where possible the distribution of Psa-V within containment regions
6. Reduce inoculum levels in recovery regions

7. Reduce the risk of Psa-V spreading from recovery regions to other places
8. Supporting recovery of kiwifruit production in recovery regions by minimising overall production losses and enabling successful establishment of new kiwifruit varieties

The Order requires the establishment of exclusion, containment, and recovery growing regions based on specified conditions, and based on these to undertake monitoring, manage diseased and abandoned orchards and wild kiwifruit plants, applying movement controls of risk items that may cause spread, and providing best practice Psa-V management in orchards.

There are rules (and accompanying powers) in order to implement the plan, as follows:

1. Every orchard must have a Psa-V management plan
2. Every Post-harvest operator must have and operate in accordance with a Psa-V risk management plan
3. Every person must report Psa-V within 48 hours of first recognising the symptoms
4. Information must be provided to KVH in order to monitor, trace, and identify when risks items have moved
5. Effective Crop protection program must be in place
6. Unmanaged orchard management
7. Abandoned orchard management

Lastly there are criteria by which the Plan's objectives can be monitored and measured as follows:

- Number(s) of the different types of regions, and how these change over time
- Number of new infections in exclusion regions, and how these were likely caused
- Rate and pattern of spread within containment regions
- Estimated impact on kiwifruit production
- Portion of orchards in which a Psa-V orchard management plan has been implemented
- Level of preparedness within exclusion regions
- Management of unmanaged or abandoned orchards, and wild kiwifruit
- Compliance with movement controls
- Levels of awareness and compliance with requirements relating to Psa-V controls

4 Terms of Reference and review process/timeline

4.1 TOR

The review had two key parts:

- 1) Consider whether the industry needs a NPMP going forward? – this was a “STOP/GO” decision for the board; and if needed
- 2) Ensure the NPMP and its implementation are fit for purpose and support growers and the industry into the future.

In relation to the first part the KVH board considered three inter-related questions:

- i. Do our Psa-V management objectives today, based on what we've learned and where we are today, still align with NPMP objectives set out in the Order in Council?
- ii. If we didn't have a NPMP what would we not be able to do that we need to in the foreseeable future? What would we be missing out on?
- iii. If we didn't have a NPMP in place today, what would the current justification be for putting one in place?

In relation to the second part the KVH board established objectives and scope as below.

Objectives:

- Consider issues and opportunities to improve NPMP implementation so the NPMP achieves its objectives at minimal cost (including ensuring KVH implements the plan as efficiently as possible and with appropriate flexibility, and that compliance actions are the least necessary)
- Review whether relevant lessons and recommendations from the Sapere review have been adequately addressed
- Ensure NPMP requirements are relevant and scientifically justifiable
- Consider opportunities to further strengthen the R&D programme (including ensuring it effectively supports achieving NPMP objectives and delivers maximum value to growers).

- Evaluate whether the NPMP is consistent with the National Policy Direction on Pest Management [Note: this was a consistency check carried out by KVH, as distinct from an independent statutory assessment carried out by MPI]
- Recommend any changes needed to ensure the NPMP appropriately supports growers and the industry into the future
- Recommend any changes needed to ensure the NPMP is equitably funded

Scope - includes:

- All aspects of the NPMP implementation, including research and development
- Review of progress against NPMP objectives and performance measures (refer to section 3 above)
- Considering opportunities to improve how KVH operates and supporting systems
- Considering appropriateness of current funding mechanisms
- Assessing consistency with the National Policy Direction on Pest Management (KVH non-statutory assessment, as above)
- Evaluating progress against Sapere’s review recommendations and the KVH response to these (Appendix 1)

Scope - Excludes:

- Review of Psa-V response or management prior to the NPMP coming into effect in May 2013
- Any statutory review processes [Noting MPI’s independent statutory assessment of NPMP consistency with the new National Policy Direction on Pest Management, was out-of-scope of this Review]
- Wider biosecurity and any matters relating to GIA
- Implementation of review findings (noting where it makes sense and early opportunities are identified, some changes the board decides and improvements management identifies may be implemented in parallel with the review, while others may be implemented following completion of the review over time)

4.2 Process and timeline

The KVH Board directed an internal review carried out by KVH management with process and timeline as follows:

- | | |
|---|-------------|
| 1) KVH Board workshop – does the industry still need an NPMP? | Feb-March |
| 2) Internal KVH management review | March-April |
| 3) KVH Board workshop – improvements to ensure NPMP is fit for purpose/supports growers and the industry into the future. | April |
| 4) KVH further evaluate and develop improvements | May – June |
| 5) Industry consultation (testing KVH Board initial findings) | June – July |
| 6) KVH board consider industry feedback and finalise review | July |
| 7) KVH AGM (proposed Levy rate change requiring member Vote /resolution at AGM) | August 31st |

5 Sapere review – have recommendations been addressed?

The KVH Board assessed progress against “Sapere’s Recommendations” as follows:

Recommendation 1: The industry has a dedicated function that can unambiguously lead on biosecurity matters, represent the entire industry and engage with the Government. Core responsibilities should include assessing emerging risks, advocating for their management and planning for them should they arrive, coordinating any actual responses, liaising with other “like minded” industries and the financial sector, organising industry-wide biosecurity related research, and providing best practice science-based guidance on good hygiene and movement practices across the industry.

Assessment: The objectives (and corresponding functions) of KVH encompass those recommended by Sapere and KVH is active in all of these areas.

Recommendation 2: The industry should continue work on response plans for the top unwanted pests and diseases under the Government Industry Agreement framework with the MPI.

Assessment: Work on response planning is underway and is a focus within the current negotiation with MPI on a Sector Operational Agreement (OA) under GIA.

Recommendation 3: The industry should also continue to develop a high level generic response plan with sub chapters for key types of pests and diseases (e.g. bacteria, fungi, flying insects, crawling insects etc.) for use with all “new” pests and diseases for which there is no existing plan.

Assessment: This is the approach KVH has adopted to date and agreed with MPI as part of Sector OA negotiations.

Recommendation 4: Response plans should extend out past the initial response to the point where a legal pest management plan could take over if need be so as to at least cover any likely financial/compensation policies and need for legal powers like movement controls.

Assessment: As per recommendation 3.

Recommendation 5: All response plans should explicitly consider how best to assist those affected by the pest or disease concerned, including any likely compensation, particularly in the early stages of the responses.

Assessment: As per recommendation 3, also noting that approach to compensation has been considered further since the Sapere review as part of the Fruit Fly OA process. In brief industry cannot waive the rights to compensation under the Biosecurity Act of an individual entity - we have no legal ability to negotiate any waiver of rights to compensation. NZKGI has developed and confirmed a set of principles to guide any industry non-statutory compensation in the future.

Recommendation 6: The industry pastoral care arrangements organised through Kiwifruit Growers Incorporated should continue. More support should be provided to all those undertaking leadership roles during actual responses in future, in addition to the support provided to orchardists and others affected.

Assessment: KVH continues to work with NZKGI to support its focus on pastoral support, which extends to those undertaking leadership roles during response. This key aspect of response is explicitly recognised within internal response governance arrangements agreed by the KVH Board (and IAC), and a formal link within KiwiNet to pastoral care is established to assist raising the profile of pastoral care preparedness.

Recommendation 7: The “biosecurity insurance” type benefits from the industry’s extensive new breeding programme should be explicitly acknowledged and considered with any future changes to this breeding programme.

Assessment: While the benefits of the breeding programme are well recognised by Zespri and others, the Board questioned whether breeding programmes were currently considering biosecurity threats other than Psa-V and requested KVH test this and discuss such implications with plant breeders.

Recommendation 8: The industry should become more open to learning from other sectors and from the Ministry of Primary Industries (MPI) in managing current and future pests and diseases.

Assessment: KVH has built a much more actively-engaged relationship with MPI and other primary industries over the last five years. This has been through participating in ongoing GIA governance and working groups, regular collaboration with other product groups and Hort NZ, information exchange with other sectors (e.g., Forestry, Dairy) and during responses, such as the three Queensland Fruit Fly responses. However, considering

the kiwifruit industry as a whole KVH believes there is still further opportunity to be more open to learning from other sectors.

Recommendation 9: Efforts should continue to identify best practice management and hygiene practices for the management of not just Psa-V but other potential pests and diseases. This guidance should emphasize the risks around a new pest or disease being in New Zealand and spreading for some time before it is actually discovered so as to provide a clearer justification for industry players to embed such hygiene practices as “business as usual”.

Assessment: This is still to be addressed through development of Psa-V Orchard and Post-Harvest risk management plans that have a wider biosecurity focus.

Recommendation 10: A review should be undertaken of the last remaining movement-related controls covering the Bay of Plenty region in the Psa-V Pest Management Plan to assess their likely compliance rates and therefore effectiveness and fairness.

Assessment: Controls and protocols have been reviewed on an on-going basis since the NPMP came into effect, and a further update of these completed as part of this review (refer to Issue 2. “Movement controls and KVH protocols” above).

Recommendation 11: KVH should continue with its comprehensive communications approach during adverse events (such as the recent fruit fly find in Whangarei) but should better target its more “ongoing” communication efforts to critical times of the kiwifruit growing season so as to ensure industry engages when they really need to (and do not switch off completely outside adverse events).

Assessment: KVH completed a communications survey and made a number of changes in response to this recommendation at the time, including reducing the KVH Bulletin to a fortnightly publication (from weekly) and introducing “Special bulletins” to cover serious and urgent events. Our comprehensive approach to communication was then used during the subsequent 2015 Auckland QFF response, and again received positive feedback from the industry. The KVH website has also been reviewed - another step in continually seeking to improve KVH communications and relevance to growers.

6 Does the industry need a NPMP going forward?

6.1 Do our Psa-V management objectives today, based on what we’ve learned and where we are today, still align with NPMP objectives set out in the Order in Council?

The focus of the programme on “preventing spread” has changed. Only the South Island remains free of Psa-V as far as we know, and Psa-V is now widely distributed and present across most growing area in the North Island (see key statistics below). Of the North Island regions that are not already “recovery” regions (Hawke’s Bay, North-West Auckland, Gisborne and Whangarei), based on experience to date it is likely we will see Psa-V progress within these and these regions transition to be “recover” regions in the next 1-3 years. The value of preventing the common New Zealand Psa-V biovar has diminished and will continue to do so.

Situation (as at March 2016) – Key statistics, regional status and potential new regions

- 85% of orchards and 89% of kiwifruit growing area (% of hectares on an orchard with Psa-V identified) are now known to be infected with Psa-V.
- The South Island remains free of Psa-V as far as we know, and successfully excluding Psa-V from the South Island remains an achievable goal. The South Island currently represents 4.3% of total kiwifruit production.
- Whangarei is also an exclusion region, however, the first positive orchard in Whangarei was confirmed in 2015, infected plants removed, and a controlled area is in place to minimise risk of further spread.
- Hawke’s Bay, North-West Auckland and Gisborne are currently containment regions.
- The remaining regions are all recovery regions, within which Psa-V is now widespread.
- Greenfields development is increasing, particularly with new licence releases.
- We currently have some commercial kiwifruit or kiwiberry operations outside of existing/traditional growing regions (an emerging issue); examples include including a trial kiwiberry orchard in Central Otago, expansion of kiwifruit orchards in the far north, and nurseries, male orchards and pollen mills operating remote from current growing regions.

The programme’s focus has shifted increasingly toward “preventing spread of new Psa-V biovars that are more likely to be a problem than the common NZ Psa-V biovar”; that is, strains that are resistant to chemical control

tools, more virulent or have a wider host range than the common NZ strain of Psa-V (refer to the current situation/ explanation of these below).

Situation (as at March 2016) – New Psa-V biovars that are more of a problem than the Psa-V we are dealing with today

The potential for new chemical resistant or tolerant Psa-V biovars was raised by experts and recognised by KVH at a very early stage, with a streptomycin and copper resistance testing programme initiated in 2011. Copper and streptomycin resistance or tolerance to *Pseudomonas* has been recorded overseas and in NZ. Likewise, the potential for development or introduction of more virulent biovars of Psa-V was also recognized at an early stage.

The following is a quote from Joel Vanneste (Plant and Food Research);

The New Zealand Psa population is evolving due to mutations, reorganisation of their genetic material, and exchange of genetic material with local New Zealand plant associated bacteria (those are natural phenomenon which we cannot predict or prevent). In addition, there is always the risk of introduction of new biovars of Psa (some of them might not have been characterised yet). This means that Psa could acquire some characteristics which make it more of a problem than it already is. For example, strains could become resistant to antibiotics and copper, could be more virulent or have an extended host range.

In 2015 the above testing programme picked up two new and different strains of streptomycin resistance; these were found in nine orchards, with six of these in Te Puke and a further three in Whakatane/Edgecumbe Regions. Copper tolerant strains of Psa-V have been found in five orchards to date, all in the Te Puke region.

The identification of copper tolerance on several orchards in the Te Puke region was also confirmed earlier in 2015. Laboratory based analysis determined the level of tolerance was at approximately 1/16th of the copper label rate, reinforcing the importance of using full label rates of copper to ensure efficacy. However, copper tolerance/resistance is incremental in its development, complicated by a number of resistance mechanisms and genes being involved.

There are two main mechanisms that cause streptomycin and copper resistance:

- i. Bacteria present in the environment carry genes for resistance, which through horizontal gene transfer can be transferred to Psa. Typically these genes are held on plasmids which easily move from one bacterial species to another.
- ii. A spontaneous chromosomal mutation occurs naturally during bacterial growth. During DNA copying, sometimes mistakes are made, and some mistakes in the gene *rpsL* can make bacteria resistant to streptomycin. This resistance will be maintained in progeny - but not transferred to neighbouring bacteria.

Our understanding of chemical resistance and tolerance development/the emergence of new Psa-V biovars and implications for management is itself emerging, and the subject of considerable research.

As well as risk associated with changes to the New Zealand Psa-V biovar, New Zealand does not have some of the other known Psa-V biovars offshore. Different outbreaks of Psa have been caused by five related, but genetically distinct lineages of *Pseudomonas syringae* and it is likely that many more exist in wild kiwifruit populations. Psa1 (Japan, Italy) and Psa2 (Korea), are of particular concern as these biovars are more virulent against Hayward cultivars than the New Zealand Psa-V biovar.

While potential for new and more problematic biovars is not a new focus for KVH, what has changed is this theoretical threat is now a reality and the rate of change is even faster than experts had predicted. Science is still catching up with a rapidly evolving disease and this is a useful reminder that five to six years is a very short timeframe in terms of learning to manage a significant new disease for any industry. While the Psa-V recovery has also been exceptional in international terms, these are still early days.

To date our strategies/approach to managing Psa-V risk has not significantly changed in response to discovery of new biovars; rather this has reinforced the on-going importance of effective application of crop protection products (in accordance with label requirements), managing vine health, hygiene practices, control over movement of high risk items (particularly kiwifruit plant material), removing reservoirs for disease (e.g., wild kiwifruit and abandoned orchards) etc. However, significant changes may yet be required, for example, if efficacy of existing crop protection tools is undermined, if impacts on existing or future cultivars change

and/or if new hosts emerge. Timely understanding of such requirements and responsiveness/capacity to rapidly implement changes remain key.

A further consideration relating to the programme's future focus on "preventing spread" is protecting green fields developments beyond traditional growing regions or at remote locations within existing growing regions (as above).

The programme's focus on "minimising impacts on kiwifruit production" has similarly shifted toward understanding and managing impacts of Psa-V biovars that are more of a problem than the common NZ Psa-V biovar. KVH's focus supporting growers to exclude Psa-V from the South Island and minimise Psa-V spread within and between orchards in containment regions is still an important focus, but as above the relevance of this role is likely to diminish over coming years. KVH's focus on understanding and minimising Psa-V impacts on future new cultivars will continue to be important to long term success of the industry (covered below).

In terms of alignment, the KVH board clarified that the NPMP accommodates new biovars of Psa-V and clarified the NPMP objectives are broad and encompass the shift in focus described above. The NPMP objectives are still relevant, there is no misalignment with the NPMP. Such shifts in focus will be captured in future reviews of the KVH Board's NPMP strategy and annual NPMP Operational Plan reviews [Note this was reflected in the 2016/17 Operational Plan submitted to the Minister on 6 June 2016].

6.2 If we didn't have a NPMP what would we not be able to do that we need to in the foreseeable future? What would we be missing out on? If we didn't have a NPMP in place today, what would the current justification be for putting one in place?

Eight key things KVH would not be able to do, which our industry would be missing out on and that justify the need for a NPMP, are as follows:

- A. **Responsiveness to new biovars that are more of a problem than the Psa-V we are dealing with today** – covered above. This includes ability to put in place control measures to contain or slow the spread of new biovars, as KVH has done recently with streptomycin resistance and copper tolerance cases. Most growers and post-harvest have cooperated but not all have and legal tools have been essential to protect the wider industry.
- B. **Ability to manage risk associated with "abandoned orchards"** – The NPMP establishes clear legal requirements on land owners or occupiers to remedy abandoned orchards, and gives KVH ability to remove these and recover costs. Importantly, it also gives KVH ability to access land to investigate reports of potential abandoned orchards. In practice access to land has typically be granted and agreements (including cost-sharing) have been reached with landowners and in some cases regional councils without any need for legal action. However, KVH has dealt with some difficult landowners and the existence of legal tools has been essential to reaching such agreement in many if not most cases.

Of 118 recorded abandoned orchards, only three are yet to be removed. Some of the abandoned orchards already removed are subject to active monitoring (to ensure removal has been successful). New reports of abandoned orchards have recently become less frequent (there have been 36 abandoned orchards reported to KVH in the last two years; 15 in the last year). However, there will always be a risk of marginal orchards being abandoned in the future, especially if the market fluctuates and the price of Hayward comes down, or if Psa-V or other disease and/or environmental pressures have cumulative impact.

The need to deal with pest and disease issues associated with abandoned orchards is not unique to the kiwifruit industry. Pipfruit is the only other industry that has any statutory ability to address abandoned orchard issue, by virtue of having two Regional Pest Management Plans (Phytosanitary Plans) in place covering the major growing regions for Pipfruit (Hawke's Bay and Nelson-Tasman regions). KVH could replicate Pipfruit New Zealand's approach, but the cost and time associated with doing so across kiwifruit growing regions would be high and very inefficient relative to the current NPMP approach.

- C. **Ability to manage risk associated with "unmanaged orchards"**- The NPMP establishes the requirement for growers to keep their orchard(s) in a managed state, so they don't unreasonably put other growers at risk. This is more subjective territory, however, there are minimum requirements all growers must meet.

Of 20 unmanaged orchard reports since 2013, two are still active with others already resolved. It is not uncommon for an unmanaged orchard report to be an extension of existing conflict between neighbours. In practice, access to land has been granted and voluntary agreements have been voluntarily reached to return

orchards to a managed state, but again the existence of legal tools has been essential to reaching such agreement in more difficult cases, particularly where there is significant conflict.

The only tools other industries have to achieve this are typically supply agreements and peer pressure.

- D. **Controlling “wild kiwifruit”** –While there is no specific rule in the NPMP requiring the control of wild kiwifruit, KVH has the ability (through use of general powers) to deal to wild kiwifruit populations on public or private land where these present a risk.

However, at this time KVH typically works in partnership with regional councils to jointly manage wild kiwifruit populations, given dual threat of wild kiwifruit to both industry (disease risk) and the public (biodiversity threat). To date most regional councils have been willing to take the lead on any compliance action, using their Regional Pest Management Plans (most of which include wild kiwifruit). However, not all councils cooperate with KVH and some councils are exclusively interested in control of wild kiwifruit where there is a threat to biodiversity. Current arrangements cannot be taken for granted, and fostering strong relationships and partnerships with Councils to achieve mutual benefits remains important. Without the NPMP our industry will be entirely reliant on regional councils to enable control of wild kiwifruit populations, which are a potential risk as a reservoir for both Psa-V and other pests and diseases.

If not addressed the risk of, and cost associated with controlling, wild kiwifruit would grow exponentially. There has been significant investment over decades in the Bay of Plenty to successfully get on top of this issue. In some other regions (e.g., Nelson-Tasman) wild kiwifruit is at a very early stage in its invasion cycle and we have a strategic opportunity to “nip the problem in the bud” early and at low cost.

- E. **Ability to control movement of risk items (including the Kiwifruit Plant Certification Scheme)** – The NPMP gives KVH the ability to control the movement of high risk items by associated industries (e.g., nursery plants, pollen) as well as within our industry (e.g., budwood). This is through the ability to establish and enforce movement control notices (with corresponding protocols), either generally as we have at the level of growing regions, or in relation to specific places as we have for serious compliance issues (e.g., restricted place notice on “recovery region” plants moved to the Hawke’s Bay).

While the NPMP can only be used to manage risk of Psa-V, in practice KVH can leverage off this as we have with the Kiwifruit Plant Certification Scheme to cover wider biosecurity issues (i.e. the NPMP provides the legal foundation that makes it illegal for nurseries to supply our industry unless they achieve KVH certification for their product).

Achieving any form of certification without a legal foundation is extremely difficult as other horticulture industries have found. The number of backyard nurseries operating and their vocal resistance to the Kiwifruit Plant Certification Scheme also highlights this.

Without the NPMP the Kiwifruit Plant Certification Scheme is likely to fall over, and our ability to improve management of risks associated with other pathways (e.g., pollen, budwood) are likely to be undermined.

The alternative for our industry to control risk items if we do not have an NPMP is to go down the track of a “National Pathway Management Plan” (Biosecurity Act) or special legislation. Both are very difficult routes to take and more likely to fail than establishing or maintaining a NPMP.

- F. **Understanding and minimising Psa-V impacts on future new cultivars** – As a pan-industry body KVH provides independent advice to help growers understand how tolerant new varieties are to Psa-V, and to understand any differences in management practices needed to minimise Psa-V impact on new varieties. This includes side-by-side trials, independent monitoring of new varieties pre-commercialisation, and targeted advice to growers on practices to reduce impact on specific new varieties (e.g., as KVH has done for G3). This applies across new cultivars introduced by Zespri, Turners & Growers and other parties rolling out new cultivars, and the independent role of KVH continues to serve a useful purpose for the industry as a whole.
- G. **Ability to fund Psa-V research** – Research to date has been possible through use of both NPMP levy and Zespri funds, and KVH will be able to draw down all of the MPI/Industry funding by the 31st August 2016 as a result of the NPMP being in place. In the future the NPMP allows for on-going research either funded by the NPMP levy and/or Zespri.
- H. **Ability to export budwood and pollen (international quarantine requirements)** – a number importing countries’ phytosanitary requirements are linked to the NPMP, only allowing export of plant material (e.g.,

budwood, pollen) from exclusion regions. An example of this is Japan's requirement for a Phytosanitary Certificate with the additional declaration "This budwood (nursery stock) originates from an exclusion region as defined under the New Zealand Biosecurity (National Psa-V Pest Management Plan) Order 2013". International phytosanitary requirements would have to be renegotiated with importing countries to enable continued export of NZ plant material if the NPMP was removed. At best this would lead to temporary delays in exports (months and possibly years), but with risk that importing countries view removal of the NPMP as opportunity to suspend such pathways. This puts at risk the opportunity for varietal owners and others seeking to establish facilities in newly established "exclusion regions" (e.g., Christchurch and Northland have been identified as a potential options) to create a sustainable pipeline for such exports.

A final consideration is capability and resource implications. When our industry is faced with new or emerging risks, as was the case with the Auckland Queensland Fruit Fly outbreak, KVH needs to be able to draw on wider and specialist capability than can be funded through the current Biosecurity Readiness & Response Levy. The reality is the Biosecurity (National Psa-V Pest Management Plan) Levy currently funds significant capability that can be leveraged for wider biosecurity purposes during emergency response events [Noting use of this capability for such purposes is funded through a different mechanism under GIA, which ensures levy funds are only used for the purposes for which they are collected].

6.3 Conclusions

While the recovery from Psa-V to date has been impressive, the Psa-V disease management programme is still at an early stage and a NPMP is still required. New Psa-V biovars that are more of a problem than the common NZ biovar are now a reality, and as an industry we are still learning about these and management implications. Without a NPMP our industry loses key tools needed to respond to these, loses its ability to deal with abandoned and unmanaged orchards, loses its ability to control movement of risk items and operate risk management schemes (such as the Kiwifruit Plant Certification Scheme) and creates reliance on on-going support of regional councils to deal with wild kiwifruit. Discontinuing the NPMP also removes the associated levy funding stream, and some of this resource would need to be replaced to ensure sufficient KVH capacity is in place to effectively respond to incursions. Some disruption to exports of kiwifruit plant material are also likely to result.

The requirements in the NPMP (Order in Council) remain relevant and valid, even though Psa-V is now more widespread than when the Plan was implemented. The KVH board's focus and objectives today are still encompassed by the current NPMP, and such changes in focus will usefully be reflected in future reviews of the KVH Psa-V Strategy and annual NPMP Operational Plans.

7 Assessment of issues and opportunities to improve NPMP implementation

Eight issues and/or opportunities were identified and assessed as follows:

7.1 Regional classification

Issues and/or opportunities: The classification of regions has created issues at times; including calls for recovery regions to be combined to free up ability to move plant material, resistance of growers in containment regions to be reclassified as recovery regions, and activities that occur outside of traditional growing regions (e.g., nurseries, new orchards).

Assessment: A change to the overall regional classification scheme would require a legal change and this is not needed as the issues above do not relate to the classification scheme itself.

The KVH Board has the ability to shift boundaries, combine regions and change classifications in the future if the review supports this. The ability to maintain distinct regions to address the actual and potential issues associated with new more virulent or resistant strains of Psa-V is a relevant consideration here.

The two key issues commonly raised within the industry are:

- Should all or some of the Bay of Plenty regions be combined?
- How to best protect new growing regions through use of Exclusion status.

7.1 (a) Should all or some of the Bay of Plenty regions be combined?

The key advantage of combining regions is greater ease of movement for growers & post-harvest operators with orchards that span across different recovery regions, and likewise for associated industries (e.g., nurseries, pollen operators etc.). The key arguments for this are:

- the common strain of Psa-V is already widespread across the Bay of Plenty, and there is not complete separation between the existing regions as there is typically one or several orchards less than 10km from orchards in neighbouring regions (up to 10km being the distance the modellers tell us Psa-V has been able to spread through natural transmission); and
- in practice, the way KVH is currently managing pollen and harvest bin movements is consistent with a single BOP region (effectively Waihi through to Opotiki).

Notably, KVH can create greater ease of movement for some items (as it does already for lower risk items such as machinery and equipment, harvest bins etc.) through making changes to movement controls (i.e. to controlled area notices and associated protocols). This can be readily achieved without any change to the boundaries and/or status of regions.

The key disadvantages of combining regions are reduced ability to manage risk associated with spreading new forms of Psa (including copper & streptomycin resistance), and reduced ability to limit spread of new biosecurity threats that may be present and not yet detected. These matters were comprehensively considered by the KVH Board in its deliberations on the Kiwifruit Plant Certification Scheme (KPCS) in late 2015, and the Board confirmed the controls established for the KPCS set the risk management approach/benchmark for the wider programme at this time. The board identified the need to review controls relating to other types of plant material (namely pollen and budwood) to improve alignment with its decisions on the KPCS, and has directed management to continue to investigate options to improve risk management for pollen and budwood (including research).

Potential options considered by the Board were:

- Maintain the status quo
- Combine into sub regions – the most logical sub-regions based on distribution/density of orchards would be to combine Te Puke, Tauranga & Katikati into a single region, distinction from a combined Opotiki and Whakatane region, distinct from a separate Waihi region.
- A single combined BOP region including all of the above.

Option iii. was least preferred, as our industry would lose any ability to contain or slow spread of new forms of Psa and other wider biosecurity threats over 80-90% of our production area. The Board judged that risk too high. Option i. gives more control (ability to slow spread) relative to Option ii, and the Board could not see any other advantages associated with Option ii. given it can ease restrictions on movements of risk items (a key area of concern raised by some Growers) over time through changing movement controls.

7.1 (b) How to best protect new growing regions through use of “Exclusion region” status.

The opportunity identified is to protect new growing regions, including regions growing commercial fruit for export (e.g., current development of new sites in Northland) and producing disease-free plant material (e.g., pollen, budwood, young plants) for export¹ and/or domestic supply.

The options are:

- Create new Exclusion regions for specific new growing areas
- Create an “All of NZ” Exclusion Region – where all areas outside existing growing regions are classified as “Exclusion”

The key advantage of Option i. over Option ii. is it enables KVH to target and focus NPMP requirements to where they are specifically needed, which is likely to minimise compliance costs and reduce administration. As the movement of risk items from Containment and Recovery to Exclusion Regions is tightly controlled, under Option ii. the movement controls would likely have unintended and unjustifiable consequences for other industries (e.g., bee keepers, those moving machinery and equipment throughout New Zealand).

Option i. relies upon those in the industry being aware of the protection mechanism (ability of KVH to establish targeted exclusion areas to protect our industry’s strategic assets) and proactively making KVH aware of the opportunity – this can be managed through good communication.

The disadvantage of Option i. is that new plantings outside of current growing regions may continue to occur requiring continual development of Exclusion regions to accommodate these. And the release of more G3

¹The role of the NPMP in supporting exports of budwood and pollen was covered in the March 2016 Board Paper, *National Psa-V Pest Management Plan Review – Does the industry need such a plan?*

licence and future new variety releases and potential dynamics in other primary sectors (e.g., dairy trends) may encourage this practice. The Board determined it has sufficient flexibility and the administrative burden is not high, so this disadvantage is minimal.

The other legal complication with Option ii. is one of the primary criteria for an exclusion region is an exclusion region may be established where.... Psa-V is not present in any place within 10 km of any boundary of that region. Therefore, current regional boundaries would need to be changed to accommodate this (i.e. adjusted so there is a 10km buffer between where any given region's boundary meets the "All-of-NZ exclusion region" boundary). This would not be a show stopper, just an extra step with a legal (including consultation) process to work through for KVH.

Option i. was clearly preferred, and the KVH Board directed KVH to develop a new policy on establishment of exclusion regions as part of the review (completed: refer http://www.kvh.org.nz/Policies_Reports) and communicate this to the industry.

Decision(s):

- No legal change to the regional classification scheme (within the Order in Council) is needed
- Maintain existing regions within the Bay of Plenty and continue to use movement controls (permissions) to create appropriate ease of movement for Growers and Associated Industries.
- Create new Exclusion regions for specific new growing areas as these are needed, clarify for the industry how this protection mechanism will work, and encourage early engagement with KVH where such protection may be advantageous.

7.2 Movement controls and KVH protocols

Issues and/or opportunities:

- The opportunity to refocus protocols to capture practices that address wider biosecurity risks to the kiwifruit industry, inclusive of any specific NPMP requirements.
- Ensuring movement controls and protocols are fit for purpose to manage risk (including risk associated with new forms of Psa-V more resistant, pathogenic and/or with wider host range), there is appropriate consistency and alignments across these, and they make sense and are easy to understand.
- The Kiwifruit Plant Certification Scheme has established a benchmark against which consistency and alignment should be checked (in particular for other types of kiwifruit plant material - budwood and pollen – that pose equivalent high risk).
- As the industry develops new varieties pathways need to exist for safe movement of these to all growing regions.

Assessment: An initial review and alignment of protocols to be completed as part of this review, and on-going. The initial alignment check and minor updates have been completed, with key residual areas of misalignment in relation to pollen and budwood still to be addressed, and not straight forward.

Decision: Review existing movement controls and protocols in light of the issues identified in this paper

7.3 Orchard management plans for Psa-V

Issues and/or opportunities: The NPMP includes a rule requiring that all growers shall have, and operate in accordance with, a Psa-V orchard management plan, which indicates the approach they are taking to managing Psa-V on their orchards. The value of these plans has diminished over time as Psa has become more widespread and Psa-V management has become business-as-usual.

An opportunity exists to refocus these plans to capture wider on-orchard biosecurity practices that serve the long term needs of the industry while still including the Psa-V specific management requirements to meet NPMP compliance.

Compliance with this requirement is monitored through Zespri GAP. This approach works well in all regions except the South Island where growers are typically audited under GLOBAL GAP which doesn't include this requirement.

Assessment: A large proportion of the industry are not actively maintaining their current Psa-V orchard management plans. As KVH is seeing increasing evidence of Psa-V evolving and new strains emerging, a renewed focus is required by growers if we are to limit the spread of these new forms of Psa-V.

Requiring all growers to maintain a “Biosecurity Management Plan” will provide growers an opportunity to rethink their approach to Psa-V management in light of the risks these new forms of Psa-V present. The Biosecurity component of the Management Plan will provide KVH with an opportunity to increase awareness of other biosecurity risks and ensure growers are taking responsibility and implementing best practice to mitigate the impacts of any future incursion.

It is expected the Biosecurity Management Plans would continue to be audited under Zespri GAP, however, consideration will need to be given on how to capture the South Island GLOBAL GAP growers.

Decision(s)

- Broaden the scope of Psa-V Orchard Management Plans to become Biosecurity Orchard Management Plans, while still including the Psa-V specific management requirements to meet NPMP compliance.
- KVH develops the associated materials (with leading growers, post-harvest and technical specialists) to send to all growers

7.4 Psa-V Risk Management plans for post-harvest and processors

Issues and/or opportunities: The NPMP includes a rule requiring that all post-harvest operators and processors shall have, and operate in accordance with, a Psa-V risk management plan. An equivalent opportunity exists (similar to orchard management plans above) to consider how these plans can be refocused to capture good biosecurity practices that serve the long term needs of the industry, including any Psa-V specific management requirements of the NPMP.

All pack-houses have these plans in place and submit each year to KVH for sign off prior to the start of harvest/packing followed by a KVH site audit to ensure they are complying with their plan.

To date, the only issues with this requirement have been from one major supplier over the need for bin sanitising particularly in recovery regions, which is a legal requirement of the NPMP. However, this has now been resolved and all pack-houses have systems in place to meet this requirement.

Assessment: A “Biosecurity Management Plan” provides an opportunity to increase awareness of biosecurity risks to the kiwifruit sector and best practices to mitigate these risks for post-harvest operators and processors.

There are multiple approaches to how this might be achieved, but a KVH developed folder collating all biosecurity material is possibly the most desirable. This folder could also serve as a holding place for KiwiNet material, thereby creating a single resource for readiness and response material for all kiwifruit post-harvest and processors. This will be tested with Post-harvest and Processors.

Maintaining the current Psa-V requirements would assist in the industry’s ability to manage new strains of Psa-V as they arrive or are detected, as well as ensuring compliance with the NPMP. Most of the practices required for Psa-V under the NPMP are effective in mitigating other biosecurity threats, such as not transporting unwanted kiwifruit plant material, sanitising bins and maintaining effective traceability systems.

It is expected that there will not be significant opposition associated with the change to Biosecurity Management Plans, as changes may be minor, operators are likely to support the rationale, and post-harvest are used to widening their Documented Quality Systems to include additional requirements e.g. changing market access requirements, Global Gap, BRC, specific customer requirements (Tesco etc.)

Decision(s):

- Broaden the scope of Psa-V Risk Management Plans to become Biosecurity Management Plans
- KVH to develop plan templates with associated material that are sent to all post-harvest and processors, testing what approach will work best with them.

7.5 Effective crop protection programme

Issues and/or opportunities: The NPMP requires every landowner or occupier responsible for management of a kiwifruit orchard to have an effective crop protection program in place. This rule (Rule 5) requires the application of at least one KVH approved Psa-V protection spray product if the orchard has Psa-V. Products on the KVH list of approved products require ACVM registration, ensuring sound data supports efficacy claims

against Psa-V and ensures product compliance with NZ Environmental Protection Agency and other standards.

Crop protection programmes for the management of Psa-V are well understood and widely adopted by the industry.

The main issue with this rule under the NPMP comes from growers that run biological systems and are philosophically opposed to use of products on the KVH list. In some cases, these growers may be effectively managing Psa-V on their orchards but are in breach of Rule 5 of the NPMP.

The kiwifruit industry is undergoing a gradual shift to more sustainable crop protection practices, driven in part by Zespri's Integrated Fruit Production (IFP) project. The industry currently has a limited number of products with efficacy against Psa-V, and over time we expect some of these options to no longer be viable as a result of legislative changes, consumer pressure or loss of effectiveness through pathogens acquiring resistance. Growers pursuing effective Psa-V management through novel techniques may develop knowledge which might be of significant value for the IFP programme or when more conventional control tools are no longer available.

Assessment: KVH's current practice is to issue an exemption for those growers who can clearly demonstrate they are effectively managing the risk of Psa-V on their orchard without meeting the requirements of rule 5. Under the Biosecurity Act KVH is able, as the management agency for NPMP, to issue exemptions to Plan rules. This approach is to continue going forward.

Other related issues for KVH to keep focus on going forward are:

- Ensure grower confidence in crop protection recommendations is maintained and challenges posed by tolerance/resistance developing for key control products are well managed
- Ensure spray programmes remain part of an integrated approach towards Psa management
- Continue research into additional control products which align with industry IFP programme objectives. Particular focus should be on elicitors, and biological options for organic growers
- Refinement of spraying best practice advice including further development of KVH Psa-V risk model to support spray decisions

Decisions(s):

- Continue to issue exemptions to NPMP Rule 5 where growers can clearly demonstrate they are managing the risk of Psa-V on their orchard
- Ensure best practice advice and R&D programmes are targeted to prevent resistance arising but also to develop solutions should this occur. Efforts to be aligned with that of the Zespri IFP Programme.

7.6 Mandatory monitoring requirements

Issues and/or opportunities: The requirement for growers to undertake monitoring and report monitoring results to KVH differs across exclusion, containment and recovery regions. The results of more recent monitoring have not provided useful information, and the relevance going forward is likely to be in relation to exclusion regions and other Psa-V not detected orchards.

There is an opportunity to refocus monitoring requirements so that any low value monitoring and reporting is removed.

There is also an opportunity for the industry to monitor for symptoms of new biosecurity threats which can be achieved through the Biosecurity Orchard Management Plans.

Assessment: Changes to monitoring requirements do not require a legal change but can be achieved either through a change to the operational plan, or making and communicating a change to monitoring requirements at any time (then reflecting this in the operational plan at its next review). Growers are required to have an effective monitoring plan as part of their Psa -V Orchard Monitoring Plan and are also required to report symptoms or potential symptoms of Psa-V within 48 hours of first recognising them.

Monitoring for Psa-V is of most value for non-detected orchards (regardless of region), which is currently about 11% of the industry.

Independent monitoring of exclusion and containment regions with limited infection is also still of value, but is best carried out by KVH (or its contractors) directly.

Decision(s)

- That mandatory monitoring for Psa-V apply to not-detected orchards, regardless of region, in spring [Note this change has been completed – reflected in the 2016/17 Operational Plan and announced in the KVH Bulletin].
- That KVH undertake independent monitoring in exclusion and containment regions with limited infection.

7.7 Abandoned and unmanaged orchards and wild kiwifruit and associated compliance

Issues and/or opportunities: The on-going relevance and value of the NPMP in controlling abandoned and unmanaged orchards and wild kiwifruit is covered in section 4.2 of this report. The only outstanding issue identified is a specific technical issue relating to the legal definition of “abandoned” orchards.

Assessment: Overall KVH has made good progress in each of these areas, including:

- 116 out of 119 known abandoned orchards (recorded over the last three years) have been addressed. KVH has set timeframes for two of the remaining orchards in which the owner must meet NPMP requirements. [Note MPI is leading compliance in relation to the third remaining case].
- Twenty unmanaged orchard complaints have been received and resolved by KVH over the last three years, with growers and KVH agreeing a range of actions, including increased cutting out of infected vines, increased or more targeted application of protectant products and more robust monitoring
- Over the last three years 9300 wild kiwifruit vines have been controlled in the BOP across 102 properties alone in the BOP.

Voluntary agreements have been reached with landowners in all cases led by KVH. Notably, achieving these has not always been straight forward and some landowners have been particularly “difficult”. Rules in the NPMP have been key to achieving many of the agreements in relation to abandoned and unmanaged orchards – without legal backing of the NPMP some landowners would not have cooperated.

In relation to wild kiwifruit, KVH has agreements (MOUs) and co-funding arrangements in place with some regional councils to identify wild kiwifruit infestations and progress control through the provisions of their Regional Pest Management Plans (i.e. Council-led and jointly funded). Where this isn’t the case (e.g., Tasman District) KVH currently leads and funds with local government benefiting but not contributing. The NPMP gives us legal tools needed to do this, although notably KVH does not have the ability to require a “landowner contribution” as some Council’s do through their plans.

Assessment: This aspect of the plan is generally working very well. It is unlikely KVH will receive a significant number of new reports of abandoned orchards or unmanaged orchards unless there is a significant financial downturn in crop returns or a major escalation in the damaging effects of any present or new-incursion pest. Progress in relation to wild kiwifruit control is building momentum again, with the need to ramp up investment and effort in the Bay of Plenty already discussed with the Board and agreed with BOPRC in 2015 and under action.

Decision(s):

- Continue existing approach to unmanaged and abandoned orchards and wild kiwifruit, including maintaining and establishing further agreements as needed with regional councils (e.g., Tasman District) similar to BOPRC arrangements.

7.8 Opportunities to further strengthen the R&D programme and ensure NPMP requirements are relevant and scientifically justifiable

The R&D program has gone through a significant review over the last 12 months, involving input from the R&D steering group, KVH Boards, and targeted grower meetings to identify gaps in our ability to understand and manage Psa. This has resulted in the development of 4 major programs of R&D work, each comprising a number of projects and stop goes, and each programme of work will run for 4 to 5 years:

Programme 1. Systemic Psa infection and management of the endophytic Psa population.

Programme 2. Growing G3 economically in a Psa environment.

Programme 3. Understanding Psa population dynamics for improved control

Programme 4. Understanding Psa microbiome

The Board has agreed to the new direction and supported these major programs of work, along with the first specific projects under 3 of the programmes (agreed by the KVH Board out of session). The 4th programme is being finalised and will be presented to the R&D steering group at its next meeting.

With the govt/industry funding being fully drawn down this year, KVH will not have the financial ability to support the level of investment that these programmes require, and as a result we have sought and reached agreement from Zespri that they will be funded from within Zespri's innovation budget.

The final issue to resolve is establishing a working group to oversee each of the programmes of work, along with reviewing the makeup of the R&D steering group.

With the R&D programme being repositioned to ensure it is focussing on the key issues of relevance to growers in order to minimise the impacts of Psa, we are not proposing any further changes to the R&D area under the NPMP unless the KVH Board sees otherwise.

8 Changes needed to ensure the NPMP is equitably funded

8.1 Background

The Board has assessed the relative risk (including tolerance/susceptibility) of green versus gold varieties in order to consider whether the funding split of two cents a tray for gold and red varieties, and one cent a tray for green varieties is still equitable.

The differential funding was considered appropriate three years ago when 16A was the major gold variety being grown, which was seen as very susceptible to Psa and as such had more to benefit from the recovery pathway implemented through the NPMP.

However, as of last season we only had 394 ha of 16A still in production, significantly less than the 2600 ha when Psa first arrived in NZ, and the remaining amount is likely to reduce even further once the GOFO concludes next year. At the same time 4800 ha of the more tolerant G3 has been released, which has become the only significant gold variety being produced. In 2015 there was still 73 ha of Zespri's G9 in production but this will go with the variety being de-commercialised this year.

In addition, there are small volumes of non Zespri other gold varieties being produced (e.g. Y356, Y374, Enza Gold making approximately 132,000 trays last year) but it is unlikely these varieties will be significant into the future, due either to their Psa susceptibility or other commercial issues associated with them.

When the NPMP was being developed, red varieties were in pre-commercial trials, but since then Psa has significantly impacted on the commercialisation of these varieties. While it is likely that new red varieties will be put into pre-commercial trials over the course of NPMP before the next internal review in three years' time, it is unlikely that a red variety will be fully commercialised before then, and if they were there would only be very small volumes of reds produced.

Therefore, the funding of the NPMP over the course of the next three years is going to be predominantly from HW and G3, with small amounts of G14. The question the Board has therefore considered is whether there is any significant difference in susceptibility of HW compared to G3 that would mean a funding differential was still appropriate.

8.2 Discussion

There are two main approaches to assess whether G3 is more susceptible compared to Hayward; firstly a subjective assessment of performance in the field, and secondly the three-year long side by side trial which compared susceptibility of multiple varieties in the same location.

In the field we have many variables related to the amount of Psa impacts that are seen; including orchard location, elevation, orchard shelter and drainage, age of orchard, type of soil etc. With these variables it's extremely difficult to make direct comparisons at an orchard level. One season may have a higher or lower level of Psa impacts on each variety within a location, but KVH's observation is that when averaged out over the time it's very difficult to show either is more or less susceptible.

KVH gets called to the worst situations and while we have been to G3 orchards that have had to cut back over 50% of their canopy in the control of Psa, or young establishing G3 where growers have cut back to the graft, this is still very much the exception. Organic growers have struggled especially in challenged sites, and some have made the call to convert to conventional growing systems due to the lack of control tools available to organic growers. While some individual HW orchards have struggled with the impacts of Psa, these orchards often struggled to be high producers prior to Psa

As we know symptoms of Psa vary between varieties, and arguably the males of both G3 and HW are the most susceptible to Psa, due to the management (cutting) required. G3 primarily shows Psa in the forms of cankers early in the season and then cane collapse during spring and early summer. HW shows cankers as well in early season, but then leaf spotting and flower infection, which adds to the difficulties in making a comparison between varieties.

In summary, it is very difficult to compare the Psa impacts between G3 and HW at a vine or orchard level due to the variables mentioned above, however, KVH is not seeing any significant differences where orchards have good growing conditions. There are many orchards that grow both HW and G3, and while we do see the obvious differences in expression of disease between the two varieties, it is not possible to conclude whether Psa is having a greater or lesser impact on each variety.

One of the ways at the highest level of determining the impacts of Psa is to compare production levels and areas grown of the varieties. While there are other drivers of production and growing area, including economic returns and seasonal climate change, if Psa was having a significant impact on either HW or G3 we would expect to see some impact on both.

The table below summarises average production of the main varieties from 2010 until 2015, along with hectares grown. It is very hard to conclude from this information that Psa is having a negative impact on either variety, and while 10,000 ha of HW was being grown in 2010, which has reduced to 7,600 in 2015, this is primarily been driven by conversion to gold varieties. Average green production has increased from 7,500 trays per ha in 2010, to over 10,500 trays per ha in 2015. G3 production has obviously also increased, but it's not possible to compare trays per ha between years due to in most cases G3 still being established on orchards, but we know that with established orchards G3 will produce over 15,000 trays per ha.

Production Analysis – April 2016

	2015/16		2014/15		2013/14		2012/13		2011/12		2010/11		2009/10	
	Producing Hectares	TE Supplied per ha	Producing Hectares	TE Supplied per ha	Producing Hectares	TE Supplied per ha	Producing Hectares	TE Supplied per ha	Producing Hectares	TE Supplied per ha	Producing Hectares	TE Supplied per ha	Producing Hectares	TE Supplied per ha
Zespri Green														
Total Producing hectares	7,614		7,892		8,612		8,947		9,335		9,937		9,871	
Average TE Supplied per hectare		10,590		8,812		8,049		7,982		8,273		7,330		7,495
Zespri Green Organic														
Total Producing hectares	537		597		552		587		575		558		506	
Average TE Supplied per hectare		7,254		5,908		5,724		5,508		6,147		5,993		6,661
Zespri Gold & Organic Gold (Hort16A)														
Total Producing hectares	394		555		1,056		2,230		2,589		2,330		2,149	
Average TE Supplied per hectare		11,077		11,586		7,459		10,213		11,538		9,203		10,287
Zespri Sun Gold & Organic Gold (G3)														
Total Producing hectares	3,339		1,814		384		174							
Average TE Supplied per hectare		8,234		5,770		6,028		5,859						
Zespri Charm (Gold 9)														
Total Producing hectares	73		154		169		193							
Average TE Supplied per hectare		9,690		11,106		5,171		6,015						
Zespri Sweet Green (Green 14)														
Total Producing hectares	223		223		171		134							
Average TE Supplied per hectare		6,109		4,020		2,547		2,801						

The second assessment is based on the three-year side by side trial in Te Puke P&F Research Station where multiple varieties were grafted randomly in the same block, and scientifically assessed for Psa symptoms over the course of a three-year period.

Observations of field symptoms in this trial we believe is the most effective way to test varieties for “real world” susceptibility to Psa, as plants have gone through the same phases of development to those in commercial orchards, including grafting, development of new canopies and cropping, however the one difference was no crop protectant products were used during the trial. The trial was conducted between grafting in August 2012 until the study completed in June 2015.

The results of the trial are confidential, but have been evaluated by the KVH board. At high level summary is that the trial could not differentiate any difference of susceptibility or tolerance between G3 and HW, whereas the trial was able to differentiate for many other varieties, with Hort 16A being at the other end of the spectrum from G3 and HW. If G3 was significantly more susceptible to Psa than HW we could therefore expect the trial would have identified this, which it didn't.

8.3 Conclusions

Based on the information available; it is not possible to argue a case that G3 is more susceptible to Psa impacts than HW, or vice versa. Therefore, the board determined there is no justification for a differential in funding the NPMP between G3 and HW, and it will propose to members at this year's AGM in August that the differential be removed (i.e. aligning the rate for gold and red varieties with green at 0.28 cents per kg - equivalent to 1 cent per tray).

Based on a change of the NPMP levy to 1 cent per tray for green and gold varieties, this would mean the KVH income will be reduced to \$1.4 million, based on an estimated 140 million tray number. This funding is sufficient for KVH to fulfil its legal role in administering the NPMP. However, there will be insufficient funding for the \$2 million per year R&D program, and as a result KVH has sought and obtained agreement from Zespri that they will fund R&D into the future through the existing KVH/Zespri Psa-V research programme arrangements.

9 Feedback from Post-Harvest and Growers

KVH sought industry feedback through the NZKGI Forum, July Zespri Road Shows, Tech Reps, and one-on-one meetings with some postharvest reps.

Overall there was general support for the Board's findings, and agreement the Board had focused on the right areas in the review.

The following areas were supported without any concerns or comments raised/made:

- Establishing new exclusion regions
- Aligning movement controls and protocols
- Biosecurity focus for orchard management plans
- Biosecurity focus for post-harvest and processor risk management plans
- Continuing current approach to effective crop protection programmes
- Changes to mandatory monitoring
- Continuing existing approach to wild kiwifruit and abandoned and unmanaged orchards
- Levy change

Specific issues identified in discussion were as follows:

1. **Regions (KPCS)** – several Growers raised concerns there should be greater freedom of plant material movement between regions. The specific examples given were wanting to source outdoor, field grown plants from other recovery regions (e.g., Tauranga to Te Puke), and wanting to move field grown plants between Containment Regions (e.g., Gisborne to Hawke's Bay).

Board consideration: The issue of appropriate restrictions on plant movements were thoroughly considered by the KVH Board in late 2015, when proposing, consulting industry on, and finalising changes to the KPCS. That included potential to combine regions, or change movement controls. The board struck a balance at that time, creating a pathway for movement of outdoor field-grown plants within a region (i.e. “within region” movements, with no requirement to test for the common NZ strain of Psu-V, an additional requirement to test for resistant/tolerant strains if Psu-V, and meeting all other requirements of the KPCS). This was based on the Board’s understanding of Psu-V virulence, tolerance and resistance issues at that time. That understanding has not materially changed at this time. KVH continues to monitor the situation, and KVH/Zespri have commission research to further understand the situation, with more virulent and bactericide resistant or tolerance strains of Psu-V. The Board will reconsider this issue in 12-months’ time (mid-2017), and at any other time if significant new information becomes available.

The issue of whether to combine regions within the Bay of Plenty was also considered as part of this NPMP (refer to section 7.1).

2. **Definition of “Grow for own use” under the KPCS** – several Growers raised concerns that the current limit of 1000 plants or less is too low. One Grower suggested a “fourth option” should be added, whereby Growers can grow for their own use with no restriction on plant numbers but with a requirement to register with KVH, risk management planning and some monitoring by KVH.

Board consideration: As above, this matter was thoroughly considered by the KVH Board in late 2015, when proposing, consulting industry on, and finalising changes to the KPCS. The limit of 1000 plants only applies to growers wanting to move plants between properties they own within the same recovery region. There is no limit if a Grower is growing plants for the same property. If a Grower wants to grow and move more than 1000 plants between their properties and/or between regions, they can still do so by achieving KPCS certification. [Note this is still subject to movement controls that apply to plants – e.g., movement to exclusion regions from another growing region is not allowed] The 1000 plant limit was set by the Board to create some flexibility for growers, recognising the relationship between scale of plant movements and risk, and recognising the need for a fair and equitable approach that is fair to growers and nurseries investing in certification (the scale of some nursery operations being not much more than 1000 plants).

3. **Orchard biosecurity plans and getting the hygiene message across to growers** – only positive feedback was received on the proposal to broaden risk management plans to cover all biosecurity risks/good sensible biosecurity practices that will serve long term interests of the industry. Inclusion of post-harvest and Growers in design of these was strongly supported. It was suggested by one Post-harvest that Growers are not currently making the link between “resistance/tolerance” issues and the need for hygiene, and KVH needs to be more explicit. And by another Post-harvest that a regular voice and simple key messages are the key to getting across to Growers, who are bombarded by messages from many.

Board consideration: The Board agrees. The resulting project to develop new kiwifruit orchard biosecurity guidelines, then to implement these, will require careful and coordinated communication. All parts of the industry will need to play their part, by contributing to development of sensible guidelines and subsequent Grower communications and support, to achieve the enduring change needed.

4. **KVH and NPMP alignment with wider industry strategy and direction** – it was suggested by one Post-harvest that KVH needs to be careful to align its advice and recommendations to Growers with other industry strategies and directions. The example given was in relation to KVH recommendations on copper use, which did not appear to consider (or at least not explicitly consider) copper build up in soils, and wider industry direction to reduce use of chemicals in response to consumer and market demands/trends.

Board consideration: This already happens. For example, KVH works closely with Zespri as a contributor to its Integrated Fruit Production (IFP) project, and is involved in all research programmes looking at bactericide use and alternatives. While KVH will work with other parts of the kiwifruit and kiwiberry industries to achieve alignment with wider industry direction, we also

have a key role to play to influence that direction to ensure Growers have appropriate access to effective Psa-V management tools, and to ensure as industries' we retain access to tools that could be needed in the future if faced with new biosecurity threats.

5. **Financial transparency** – one Post-harvest asked if it was possible for KVH to provide a detailed breakdown of where resources are invested, and value achieved from that investment. The example given was side by side trials and any work that relates to Zespri PVR/new cultivars.

***Board consideration:** KVH endeavours to be transparent in all of its dealings, including financial transparency. KVH's financial statements are published annually in its annual report. If further information is needed by industry on more specific line items the Board will seek to provide this, noting this needs to be sensible and commensurate to industry needs and generally accepted accounting practices. Review of value and ensuring KVH delivers what Growers need is part of business as usual, the NPMP review being an example of this. As is the Board's recommendation for a levy rate reduction to keep costs to Growers to a minimum, involving significant revenue reduction for KVH and careful financial management to enable this.*

6. **Risk profile for HW and G3** – within Tech Reps discussion a concern was expressed with any suggestion that risk associated with HW and G3 are the same [Note this was not a concern with the proposed levy change, just the explanation for the levy change as understood from roadshows]

***Board consideration:** No claim has been made that HW and G3 risks are the same; the Board accepts that Psa-V expression differs across the two varieties, and this may even vary between regions. But overall, having considered subjective assessment of performance in the field and the results of a three-year long side by side trial which compared susceptibility of multiple varieties in the same location, the Board has determined it is not possible to argue a case that G3 is more susceptible to Psa impacts than HW, or vice versa.*

10 NPMP consistency with the National Policy Direction on Pest Management

KVH and MPI agreed that MPI would complete its independent assessment of NPMP consistency with the new *National Policy Direction of Pest Management 2015* and advise the Minister for Biosecurity accordingly, in parallel with the KVH NPMP review. This was so if inconsistencies were identified they could be addressed as part of this NPMP review.

KVH completed its non-statutory assessment, which identified the NPMP is fully compliant with the new *National Policy Direction for Pest Management*.

MPI completed its independent statutory assessment and advised the Minister for Biosecurity, who has confirmed the *Biosecurity (National Psa-V Pest Management Plan) Order 2013* is consistent with the *National Policy Direction on Pest Management 2015*.

11 Next review

The KVH Board has identified the next review (also a non-statutory review) of the NPMP will be undertaken in a further three years' time, scheduled for May 2019.