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**Kiwifruit Vine Health**

# **Lessons learned from the response to Psa-V**

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*Douglas Birnie and Anna Livesey*

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## About the Authors

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**Douglas Birnie** specialises in providing advice on sector and organisational strategy, government/local government/industry partnerships, legislative/regulatory design and compliance, business case development and pricing design. Douglas has significant experience in performance, change and employment management. Douglas has over 15 years of experience in various public sector analyst, manager and then director roles in the public service. Douglas has a biosecurity background and is currently a technical expert on contract to the World Bank assisting with the reform of biosecurity/quarantine functions in several overseas countries. Douglas holds a BSocSC (Hons) from the University of Waikato and a GradDipBus from Massey University.

**Anna Livesey** provides rigorous analysis and insights in complex policy areas including telecommunications, cyber-security, local government, housing, machinery of government, and education. She has experience across the public policy cycle including policy development, stakeholder consultation, business case preparation, performance audit and evaluation. Anna holds an MBA (Dist) from Cheung Kong Graduate School of Business, Beijing, an MPP (Dist) and an MA (Dist) in Creative Writing from Victoria University of Wellington.

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<p><b>Wellington</b> Level 9, 1 Willeston St PO Box 587 Wellington 6140 Ph: +64 4 915 7590 Fax: +64 4 915 7596</p>	<p><b>Auckland</b> Level 17, 3-5 Albert St PO Box 2475 Auckland 1140 Ph: +64 9 913 6240 Fax: +64 9 913 6241</p>	
<p><b>Sydney</b> Level 14, 68 Pitt St GPO Box 220 NSW 2001 Ph: + 61 2 9234 0200 Fax: + 61 2 9234 0201</p>	<p><b>Canberra</b> Unit 3, 97 Northbourne Ave Turner ACT 2612 GPO Box 252 Canberra City, ACT 2601 Ph: +61 2 6267 2700 Fax: +61 2 6267 2710</p>	<p><b>Melbourne</b> Level 2, 65 Southbank Boulevard GPO Box 3179 Melbourne, VIC 3001 Ph: + 61 3 9626 4333 Fax: + 61 3 9626 4231</p>

For information on this report please contact:

Name: Douglas Birnie  
Mobile: 021855335  
Email: [dbirnie@srgexpert.com](mailto:dbirnie@srgexpert.com)

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## Executive summary

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The kiwifruit industry was totally ill prepared when Psa-V was found in Te Puke in late 2010. Even though Psa-V was causing major damage to orchards in Italy where some New Zealand industry members were involved, there was no plan in place to respond should it get to New Zealand. The industry had virtually no experience in dealing with *any* new serious pest or diseases so it was essentially starting from scratch.

Psa-V has had a major impact. New Zealand kiwifruit – specifically gold kiwifruit – production volumes and export values have fallen significantly. Export values are down significantly over the four years from 2011-2014, compared to the most recent forecasts made before Psa-V was found. Psa-V would be one key reason for this downturn. But the Government and industry's lack of biosecurity preparedness for this type of bacteria almost certainly worsened the impact.

Despite this, industry confidence has recovered more quickly than anticipated. Production volumes and values are forecast to exceed where they were prior to the arrival of Psa-V by 2017. The New Zealand kiwifruit industry has quickly become the world leader in Psa-V management. However, some in the industry suggest the recovery in confidence is overstated and that further significant impacts from Psa-V are likely.

Many we interviewed considered that the industry's relatively quick recovery to date has been largely the result of luck, with the new G3 strain proving significantly more tolerant to Psa-V than 16A, and two good growing seasons since the arrival of Psa-V.

From what we have been able to ascertain, the recovery – at least thus far – can be attributed to more than good luck. The industry seems to have been well served by its:

- Integrated nature and existing governance systems.
- Quick decision to establish a dedicated body to manage the response.
- Extremely skilled leadership operating under enormous pressure.
- Relationships with Government and the banking sector.
- Focus on managing the human impacts of the bacteria not just the bacteria itself.
- “Can do” attitude and ability to adapt.
- Substantial (past and current) investment in the new kiwifruit breeding programme (which created G3).

In short, the kiwifruit industry bred much of its luck.

It was by no means “plain sailing” during the initial response, however. The initial response was by all accounts very intense, challenging to manage, and quite traumatic for many of those directly involved. Industry leaders faced substantial pressures on multiple fronts – not the least being from their “home” orchards.

The lack of biosecurity awareness led to an acute sense of crisis during the early days. Initial testing found Psa to be widespread. Further testing uncovered a highly virulent strain (now known as Psa-V) and much less virulent strain (Psa-LV), of which only Psa-LV was widely spread at the time. There was confusion about the objective of the initial response. Many

industry players were hoping Psa-V could be eradicated, but the Ministry of Primary Industry (MPI) and some industry leaders were skeptical about eradication right from the beginning.

In the absence of a clearly agreed plan and objective, there was a lot of tension around key decisions. Establishment of Kiwifruit Vine Health (KVH) helped significantly, however.

The industry spent \$17 million on a cut out and compensate program that, in hindsight, almost everyone acknowledges was not the most effective way to combat the bacteria. Most people we interviewed, however, considered that that initial cut out approach was the best decision at the time, given the industry's need to see a strong response to generate momentum and hope.

It is not clear that the right skills, capabilities or experience were always being brought to the table. The industry's "can do" attitude – while extremely helpful – appeared to sometimes lead to an inability to acknowledge the skills and experience that others, such as key staff in MPI or the apple sector (which has managed bacteria for years), might be able to offer.

The transition to a formal pest management plan took over two years – far longer than anticipated by some. The industry did not have the right to use legal powers directly until the plan was implemented. Control of Psa-V therefore relied largely on industry co-operation in the period between MPI withdrawing use of its powers in late 2010, and the implementation of the Kiwifruit Industry National Psa-V Pest Management Plan ("the Plan") in May 2013.<sup>1</sup>

The Plan now in place appears to have strong support in the regions outside Bay of Plenty, where the movement controls are considered important for continuing to control the spread of Psa-V. There seems to be less support within the Bay of Plenty region and particularly around Te Puke, where we were advised that people feel that Psa-V is "in every vine", meaning that the remaining movement controls there add cost, but little value.

Concern is growing that parts of the industry might be becoming complacent about both Psa-V and broader biosecurity risks. The attitude, particularly in the Bay of Plenty, seems to be that hygiene practices could be re-introduced when next needed i.e. when the next pest is found, and in the meantime are not necessary. But this ignores the risk that such a pest might be in New Zealand for a significant period of time *before* it is discovered.

There is more widespread support for the Psa-V management tools research programme, however.

#### *Lessons to be learned*

Prior to Psa-V the kiwifruit industry appeared to consider itself immune to serious pests and diseases given NZ's geographic isolation and strong border controls. The industry has been forced to change this view. Aside from the controversial circumstances surrounding how Psa-V may have entered the country, the reality is while the operation of the border can mitigate such risks it cannot eliminate them. Indeed, some pests and diseases can be as difficult to manage offshore and at the border as they are on-shore.

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<sup>1</sup> The exception to voluntary compliance in this period was MPI's legal controls on nursery stock in the Te Puke area which continued until after the Plan was in place.

So the more the industry can recognise its exposure, the better off it will be in our view. An industry that is aware of some key pests and diseases offshore can advocate far more effectively for their pre-border and border management by MPI, and can prepare plans should they arrive.

Some challenges were always going to arise with Psa-V. But the amount of effort that had to go into developing and revising strategy, identifying funding, capabilities and resources, coordinating efforts, communicating with those affected and providing support, points to clear benefits in putting in place arrangements now that can be triggered for future responses – rather than having to set all this up from scratch during the next response.

In our view, the above lessons point strongly towards the benefits of having/retaining a dedicated function that can unambiguously lead on biosecurity matters, represent the entire industry and engage with the Government going forward. Core responsibilities should include:

- i. Identifying emerging exotic pest/disease risks, advocating for their management offshore and at the border, and planning potential responses should an incursion occur.
- ii. Coordinating any actual responses, (including, for example, briefing the banks).
- iii. Liaising with like-minded industries and the financial community.
- iv. Coordinating industry-wide biosecurity related research.
- v. Providing up to date guidance on basic movement and hygiene practices for industry operations and the risks of not having these in place.

There also do seem to be benefits from keeping the provision of these functions (apart from the provision of research) separate from the single regulated marketer, given their different purposes.

Pre-planning for the top pests and diseases of concern to the industry should reduce the chances of spending large sums of money on strategies that are unlikely to succeed, and lead to better use of skills and experience from within and outside of the kiwifruit industry. Planning should also allow future incursions to be seen less as a crisis that threatens the viability of the industry as a whole, and more as an event that can be managed. Planning should include both the human impact element as well as the need to manage the disease or pest concerned.

While it is not possible to predict exactly which pests or diseases might arrive in the future, in our view, there is still a case for at least a level of basic planning. A generic readiness plan could set out the roles and actions of the key players in the first 3-6 months of any response and could have “sub chapters” based on the most likely responses that will be made to different types of pest and disease such as bacteria, fungi, insects etc. We understand work is underway on this now. For those pests that might prove difficult to eradicate these plans should extend up to the point that a pest management plan could take over.

It is important not to overstate the impact of new pests and diseases – by far the majority turn out to be manageable – and not to understate the likely ability of the kiwifruit industry to respond. But given that Psa-V may have cost up to \$930 million in lost exports *already*, the case for some investment in preparedness seems strong.

By contrast, there are concerns about growing complacency in the industry towards Psa-V and biosecurity protection more generally. An increasing view appears to be that movement and hygiene controls in place for Psa-V are no longer necessary in areas where the bacteria is endemic but could be triggered again in the future with a new pest if need be.

However, this ignores the key risk of a new pest arriving in New Zealand and taking some time to be discovered – while spreading in the meantime. From what we understand now about Psa-V (and the potential examples of human related spread of Psa-V even in our interviews) it would seem that if the industry had had better movement control and hygiene practices in place when Psa-V arrived in New Zealand and *before* Psa-V was discovered, it seems likely that it would not have spread as fast as it did.

From what we have been able to ascertain, there seems a strong case for:

- (i) Maintaining at least a level of movement and hygiene controls around orchards and pack-houses as business as usual – to reduce the risks of spreading existing and any new pests and diseases that might not have been discovered yet.
- (ii) The provision of industry wide coordinated research and guidance on orchard best practice for Psa-V management and broader pest and disease management.

It is important for the on-going credibility of the biosecurity effort that the requirements in the current Psa-V pest management plan are seen as fair and reasonable, and are complied with. If some of them are not, they should be reviewed.

Equally, if communication messages, particularly during biosecurity events, are to be listened to, then communications outside of such events need to be targeted so industry representatives do not stop listening completely. We suspect that ongoing industry-wide biosecurity related communications could be better targeted at critical times in the growing season and reduced at other times.

In summary, in light of the kiwifruit industry's experience in managing Psa-V we recommend that:

- i. 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, organizing industry-wide biosecurity related research, and providing best practice science-based guidance on good hygiene and movement practices across the industry.
- ii. The industry should continue work on readiness plans for the top unwanted pests and diseases under the Government Industry Agreement framework with the MPI.
- iii. The industry should also continue to develop a high level generic readiness 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.
- iv. Readiness 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 major

financial/compensation policies and any likely significant need for legal powers like movement controls.

- v. Readiness 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.
- vi. 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.
- vii. 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.
- viii. The industry should become more open to learning from other sectors and from the Ministry of Primary Industries in managing current and future pests and diseases.
- ix. 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 emphasise 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”.
- x. 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.
- xi. 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 growing season so as to ensure industry engages when they really need to (and do not switch off completely outside adverse events).



## Acknowledgement

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At the outset we would like to acknowledge all the people who we were able to interview for this exercise. It was an incredible opportunity to meet so many passionate and committed industry leaders and managers in such a short space of time. In our view, the caliber and commitment of the kiwifruit industry's leaders and managers seems a significant strength.

We are by no means experts in kiwifruit or its production so please accept our apologies if some of our terminology is not technically as accurate as it could be. Our background is in managerial advice and systems and processes and that is where we have focused our attention.

## Purpose and approach

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We were hired by Kiwifruit Vine Health Ltd (KVH) to undertake a lessons learned exercise with the arrival of Psu-V in this country. The aim was to identify lessons that could be taken forward to inform future responses to new pest and disease arrivals that might impact on the kiwifruit industry. We were asked to focus on overall decision-making, information flows and systems and processes rather than technical detail from the time of the arrival of Psu-V in the country, which we were very happy to do.

To undertake this task we were provided with a range of background documents leading up to and including the current Psu-V Pest Management Plan, including past minutes of the Industry Advisory Council and KVH Board.

We then agreed a set of quite extensive interview questions with KVH and proceeded to interview over 20 representatives of the kiwifruit industry covering:

- Kerikeri.
- Franklin.
- Katikati through to Te Puke.

And including:

- Orchardists.
- Pack-house operators.
- Zespri representatives.
- A number of industry leaders who were/are on the Board of KVH or employed or contracted by it.
- Ministry of Primary Industry representatives.

Interviews typically lasted between 60 and 90 minutes.

We then collated all this material and prepared this report.

We have deliberately kept this report concise so as to aid its readability and usefulness.

We have not sought to go through the response to Psu-V in great detail and assess each decision at a micro level. This is deliberate. We do not think it is appropriate to pass judgment on the specific decisions taken at each point in the response as we were not there at the time. We also think this would be quite disrespectful to those involved, given the pressure they were under.

We have sought to step back from the individual decisions and assess the outputs and results, and the likely drivers of these. We have tried to assess what factors might have been helpful in enabling the industry to recover as quickly as it has done. We have also tried to assess what factors might have hindered the response or made it less effective or more costly than it could have been. Where appropriate we suggest ways the former might be embedded and the latter removed/reduced. We do this not to criticise but encourage thinking and debate. For that is the essence of learning.

The product of our thinking is reflected in the remainder of this report.

## Background

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On a day in November 2010 the kiwifruit industry effectively lost its biosecurity innocence. A highly virulent strain of Psa-V was discovered on an orchard near Te Puke. Previously, the industry had never had to deal with any form of serious disease or insect outbreak – unlike other primary sectors. But Psa-V was (and still is) considered the most serious bacteria that could impact on the kiwifruit industry. Despite industry experience of its impacts on New Zealand part-owned or managed orchards in Italy, its arrival in New Zealand caused disbelief, shock and anger across the domestic kiwifruit industry.

MPI and Zespri lead the initial response, but did not have a clearly agreed, shared objective. Early tests for Psa-V could not distinguish between Psa-V and its much less virulent (and essentially harmless) cousin, Psa-LV, leading to confusion about how widespread the new, virulent bacteria was.

Within days, MPI appeared to reach the view that eradication was infeasible. But the industry felt that the strongest possible response was called for, in the hope that Psa-V might be eradicated. The industry quickly found \$25 million, which was matched by the Government to provide a \$50 million fighting fund. Kiwifruit Vine Health (KVH) was established to take over leadership and co-ordination of the response.

The KVH Board authorised a cut out of affected orchards in Te Puke to try and eradicate, or at least halt the spread, of the bacteria. But it proved impossible to be certain about exactly where Psa-V had already spread – and it was spreading fast. Green vines showed some symptoms of the disease, but did not seem as badly affected as gold vines (Hort16A). The potential cost of the cut-out and compensate approach increased as the number of orchards infected grew. In February 2011, the cut out and compensate approach was restricted to infected gold vines, or any green vines showing secondary symptoms. At the end of May 2011, the compensation for cutting out infected vines was stopped altogether.

In its place KVH introduced subsidies for copper sprays. Then Zespri announced it would advance the roll out of G3 stock to replace Hort16A. These two decisions proved turning points in the industry's recovery. The G3 stock proved more tolerant to Psa-V and enabled a recovery in gold production. Spraying appeared to mitigate the effect of Psa-V on green and gold (G3 and G14) orchards.

The industry then developed a pest management plan to try and keep Psa-V out of the remaining parts of New Zealand and manage it where it is now endemic. This plan continues today as the National Psa-V Pest Management Plan, administered by KVH.

### Outcomes

Almost four years since the initial discovery of the highly virulent strain of Psa-V near Te Puke, most kiwifruit growing parts of New Zealand have Psa-V. It is considered widespread around Te Puke. Other regions have Psa-V in some but not necessarily all orchards (e.g. Franklin, Kerikeri). Whangarei and the top of the South Island are the only significant regions in the country that still appear entirely free from the bacteria.

Psa-V has had a major impact on kiwifruit production and exports. Gold production and export values are well down on forecasts undertaken prior to the arrival of Psa-V although obviously other factors like exchange rate fluctuations could be potential contributors too.

Higher gold prices driven by the sharp fall in production have provided some relief, but the overall cost has been substantial and potentially far greater than even originally envisaged.

Despite this, we have been advised that production volumes are now recovering and confidence and land values have recovered sharply. Some orchardists report production back to pre-Psa-V levels. Others forecast they will be back to such levels either next year or the following year. Overall the industry is expecting to be back above pre-Psa-V levels of production volumes and export earnings by 2017.

This turnaround in industry confidence has been far quicker than almost anyone forecast at in the early days following the initial discovery of Psa-V. The industry seems to be learning to live with the bacteria faster than initially imagined. But the industry has also benefited from two good growing seasons.

There is strong support for the way the kiwifruit industry itself responded to the disease. There is also huge respect for the pastoral care provided to industry players most affected – ensuring no suicides during the darkest days of the response.

However, there was also a strong sense of chaos evident from our interviews of people involved during the earlier stages of the response. Some considered a level of chaos inevitable. But almost every issue had to be worked through “on the go” and the leaders of the industry faced huge pressure on multiple fronts, including on their “home” orchards.

Following two good climatic and growing seasons, there are now concerns of growing complacency in the industry now with Psa-V and biosecurity protection more generally. Psa-V can still easily cause significant production losses in unfavorable conditions unless actively managed.

Still, almost everyone we spoke to thinks the worst is over and the industry is well and truly on a path to recovery even if there are bumps in the road ahead.

The question is what can be taken from all this? And what should be picked up for the future?

# Observations from the Psa-V response

## Industry hit hard but now on path to recovery

### Industry has taken a bigger hit than originally envisaged

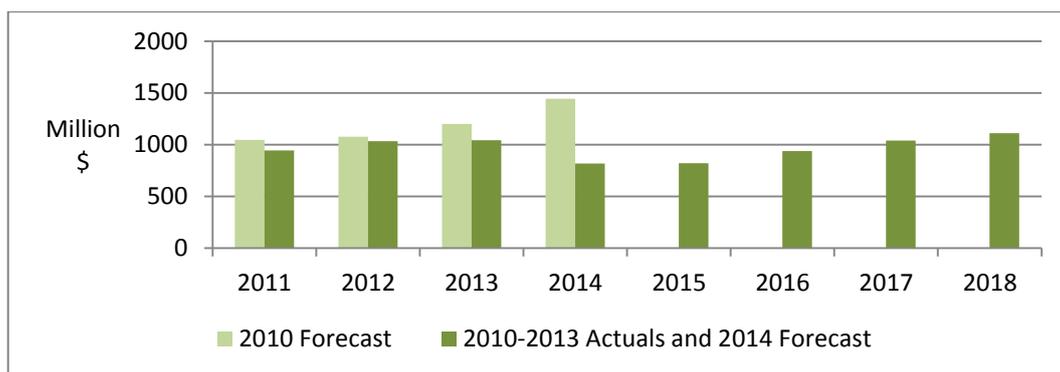
The industry has suffered losses in production and exports as a result of the arrival of Psa-V that could already amount to hundreds of millions of dollars. Economic work by Lincoln University in 2012 predicted costs of between \$310 and \$410 million in the first five years of Psa-V<sup>2</sup> although it noted the actual cost could well be higher than this.

Compared to the forecasts made in 2010, before Psa-V arrived, actual export values for the four years 2011-14 are reflected in Table 1 and Figure 1 below. Psa-V would seem likely to be a key determinant for this decrease although obviously other factors such as exchange rate movements could have contributed too.

**Table 1: Forecast and actual kiwifruit exports pre and post Psa-V (\$NZ'000)**

	2011	2012	2013	2014	2015	2016	2017	2018
2010 Forecasts	1045	1076	1199	1444				
Actuals and 2014 Forecasts	944	1034	1043	817	821	938	1039	1110

**Figure 1: Forecast and actual kiwifruit exports pre and post Psa-V**

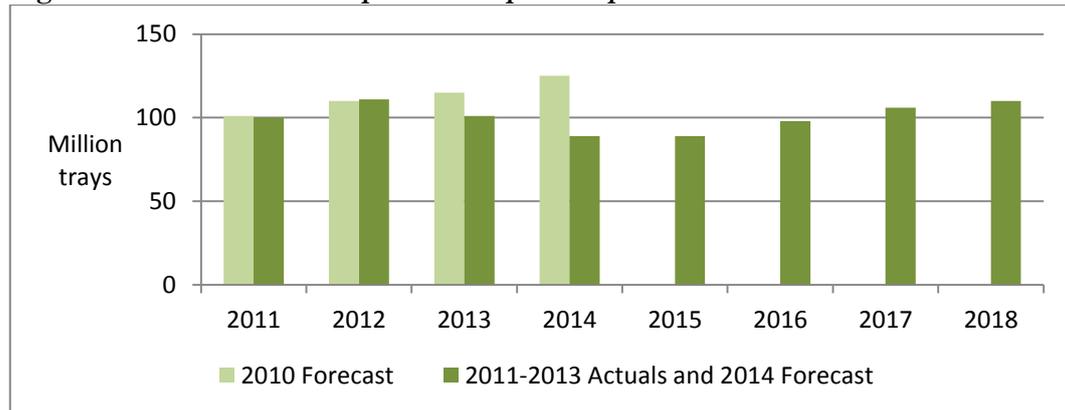


<sup>2</sup> Greer, Glen and Saunders, Caroline, *The Costs of PSA-V to the New Zealand Kiwifruit Industry and the Wider Community*, Lincoln University, May 2012, p.vi.

Note: the 2010 forecast is from the MAF Situation Outlook for Agriculture and Forestry June 2010. The other data set is actual exports from 2010-2013 and the 2014 forecast from the MPI Situation Outlook for Primary Industries June 2014.

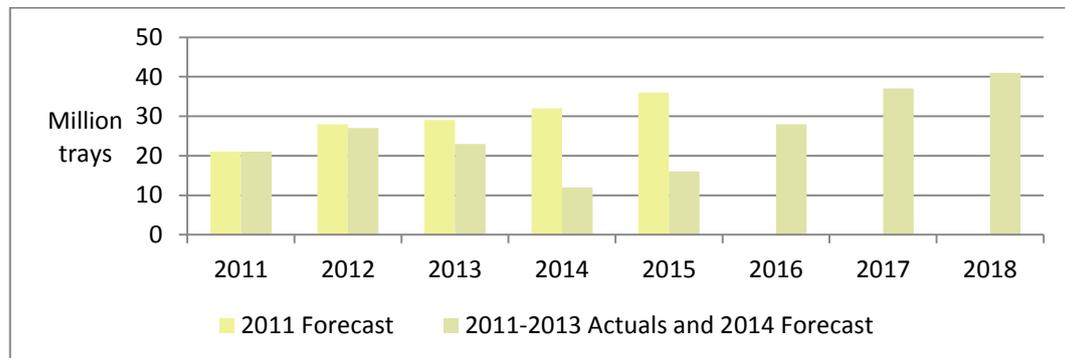
Kiwifruit production is expected to recover to pre-Psa-V levels by 2017/2018 as demonstrated in Figure 2 below.

**Figure 2: Kiwifruit total production pre and post Psa-V**



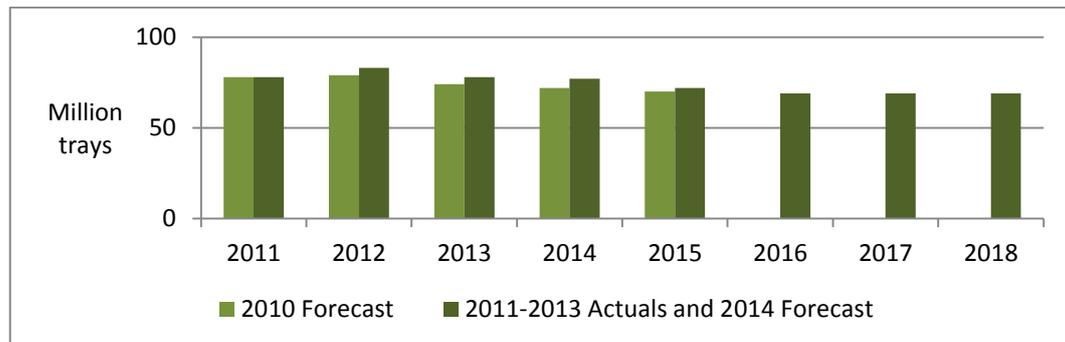
Gold production has been affected quite severely as depicted in Figure 3 below.

**Figure 3: Kiwifruit gold production pre and post Psa-V**



By contrast green production is marginally higher than forecast prior to the arrival of Psa-V as depicted in Figure 4 below:

**Figure 4: Kiwifruit green production pre and post Psa-V**



The above figures seem to indicate that Psa-V has effectively “robbed” the kiwifruit industry of a period of growth in gold production that it will never be able to recoup.

## **Integrated industry enabled rapid response**

The industry’s ability to set aside \$25 million of its own funding, secure matching funding from the Crown, and establish Kiwifruit Vine Health Ltd – all within weeks of the first discovery of Psa-V – indicate significant benefits from its integrated structure. The speed with which these decisions were made and implemented was critical to the response.

Without the integrated structure of the kiwifruit industry, it would have been more difficult to make and implement these decisions so quickly. Many we interviewed also noted that Psa-V appeared to have had a far bigger impact in Italy largely because the industry there was far more fractured than here in New Zealand.

## **Industry well served by exceptional leadership**

The industry showed extremely skillful leadership during critical stages of the response, and the leaders involved appear to be widely respected as a result.

There is strong support for the way the kiwifruit industry responded to the disease and particularly the support it provided to industry players most affected, ensuring no suicides during the darkest days of the response.

This was a clear source of pride for many in the industry.

The industry also ensured that industry secondees were available for key roles in managing the response. This meant that people who understood the industry and had existing networks and credibility in the industry were able to help manage the response.

## **Established communication channels worked**

The kiwifruit industry had well-established communication channels. For example, industry-wide meetings could be called quickly, with excellent attendance.

Many people commented on the importance of industry networks in getting information out to those who needed it, especially during the initial response.

## **The initial response proved extremely challenging**

### **Lack of biosecurity awareness contributed to sense of crisis**

The kiwifruit industry in New Zealand was simply not prepared for the incursion of a serious biosecurity pest. The early days of the response exhibited a strong sense of chaos and crisis. A lot of issues had to be worked through “on the go” and the lack of any planning and preparedness by the industry was cited by almost everyone as a major drawback. Many also acknowledged the lack of even basic hygiene practices by industry players.

Many in the industry feared the impact of Psa-V on their livelihoods and that of the whole industry. In this atmosphere, the leadership of the industry faced huge pressure to act quickly and decisively - in some cases despite their own reservations about the likely effectiveness of the actions they were endorsing.

## **Lack of full collaboration between government and industry**

The initial response to Psa-V was led by the then MAF (now MPI) and, in effect, Zespri. But it was quite apparent that there were dual responses rather than a single coordinated one. MPI did station senior staff in the Zespri offices in Mt Maunganui during the early months of the response. However, despite this, more than one person from industry told us that while “MPI governed from Wellington”, Zespri really determined what happened “*on the ground in the Bay*”.

Some industry members were very critical of the costs of the initial response from MPI andASUREQuality – arguing that some of the costs would have been reduced had industry capability been used. There was also a sense that the ASUREQuality staff were not knowledgeable about the industry and seemed to be taking actions more appropriate to, for example, an outbreak of foot and mouth disease.

Conversely, the industry did not seem to take advantage of the information MPI could have provided. For example, the industry learned during the response that safe disposal of infected material is a critical issue. MPI staff could have advised on this from the beginning. Similarly, MPI advice on the initial drafting of the pest management plan in 2011 was not taken up by industry/KVH at the time and the draft had to be substantially re-worked and redrafted as a result, causing further delays.

While most of the industry people we spoke to now appreciate the skills and value that MPI staff can bring to a response, some industry members see little value in MPI during a response, apart from the obvious value of securing Crown funding. This seems unfortunate and unwise. While MPI staff do not have experience working in the kiwifruit sector per se, they do have substantial experience in dealing with incursions, (some, like varroa mite, with remarkable similarities to Psa-V) and in assisting in the preparation and review of pest management plans.

## **Objective of the initial response – eradication or containment?**

One of the things that we found hardest to pin down in our interviews was the objective(s) of the initial Psa-V response.

Early tests indicated that Psa-V was widespread throughout the country. However, these early tests did not distinguish between Psa-V, the virulent strain of the disease, and Psa-LV, another, essentially harmless strain, which was much more widespread. Consequently, pinpointing the real problem was difficult.

We understand that right from the outset that MPI was highly skeptical about the likelihood of eradication and effectively resolved within days that the objective was going to have to be long-term management. But this view was not clear at the time to many industry players.

Some industry players believed, at the time, and still do, that the purpose of the initial response was to eradicate Psa-V from New Zealand. Other industry leaders told us that they were skeptical of the chances of eradication from very early on, but felt that the industry as a whole was not ready to hear the message that Psa-V was here to stay. Others expressed a concern that they never heard about MPI's skepticism about eradication, and only heard from industry leaders who talked about eradication as the goal of the response.

## **Decision to cut out supported but expensive**

Early on, the readiness plan involved KVH negotiating with growers on or near infected orchards to cut out their vines – both green and gold. But it quickly became apparent that it was impossible to be certain about where Psa-V had already spread and that the fighting fund would be exhausted by compensation payments if the cut out approach continued. Negotiations for cut outs were also taking longer than hoped.

Given these factors, KVH withdrew the policy of “cut out and compensate”. In February 2011, KVH decided that should no longer be funding green growers to cut out their orchards if Psa-V was identified and withdrew compensation for cutting out to green growers. At the end of May 2011, compensation for gold growers who cut out their orchards was also stopped. KVH replaced the “cut out and compensate” approach with a new focus on management tools, including encouraging the cutting out of just visible Psa-V infection and subsidizing the use of copper sprays.

There is now widespread acknowledgement that the initial policy of cutting out both green and gold orchards was effectively a waste of money in terms of mitigating the spread and impact of Psa-V. The green vines were, in fact, relatively Psa-V-tolerant if managed with sprays, and could have been spared. On the other hand, the gold cultivar, Hort16A, was highly susceptible and also a generator of substantial inoculum, and had to go – but the cut out and compensate approach could not be extended to every grower with Hort16A on their properties.

Despite the ineffectiveness in containing the spread of Psa-V, nearly everyone we spoke to considered that the cut-outs to have been “the right decision at the time” for the industry. In the absence of a pre-agreed plan, and without experience in dealing with any major new pest or disease including new bacteria, there was a clear need to maintain confidence in the broader industry by taking drastic action early on. The cut-out programme for the Hort16A vines was also considered by at least one industry leader as an essential signal to the industry that Hort16A was finished, and that a replacement was needed.

Some interviewees considered that, if more extensive cutting out had been undertaken earlier on, Psa-V might have been eradicated or contained better. The more common view was that more extensive cut outs early on would in fact have left the industry in a worse position, by removing more green vines unnecessarily, and spending more compensation money, without improving the outcome.

With the benefit of hindsight, many people we spoke to felt that the cut out and compensate approach could have been stopped sooner. We understand that the compensation cost about \$17 million. Similarly, questions were also raised about whether the industry was slow in turning its attention to management options, such as copper sprays.

However, there was a strong sense from many that the industry had to “go through the process” to fully appreciate the nature of bacteria like Psa-V and get used to having to live with it.

## **Establishment of KVH seen as a critical step**

Almost everyone we interviewed – including the MPI representatives – considered that establishing KVH was a key step to getting better control over the response. Setting up KVH was widely perceived to have resulted in better engagement and buy-in from the industry. It was also seen as a further demonstration of the benefits of the integrated industry structure, given that KVH was up and running within two months of the identification of Psa-V in New Zealand.

The comprehensive membership of KVH Board, with representatives from growers, pack-houses and the marketer, provided KVH with a mandate to lead the response for the entire industry, without being perceived as being captured by any one part of the industry. This and its ability to engage credibly with the industry, were seen as crucial benefits. This mandate allowed KVH to develop a comprehensive Psa-V science research programme reflective of the entire industry’s needs, for example.

The desire to take over the response so quickly from MPI was considered a weakness by some, however, as there was a perception that the industry had little idea of how to actually manage a large-scale biosecurity response. Some perceived the industry had no real idea what it was getting itself into.

## **Focus on human impacts strongly supported**

The support arrangements for growers coordinated through KGI received widespread praise from across the industry people we interviewed. The efforts of a few key individuals made sure that the people affected by Psa-V were cared for – not just their businesses. Indeed, the lack of suicides is widely considered a key measure of success of the response. Key to this success was considered to be the use of the “grief cycle” in understanding the likely responses from orchardists and others affected by Psa-V and managing them accordingly.

The pressure on the leaders themselves during the response, however, was by some accounts intense. Some have clearly paid quite a personal toll for their involvement that might not be widely appreciated or understood. Several leaders noted that they were so busy focusing on others that they had little time to get the support they themselves needed – and this placed strain on families and spouses, as well as the leaders themselves.

We were also advised that KGI lobbied and secured tax relief from IRD and rates relief from local councils for affected orchardists. KGI also sought to have the outbreak declared an “adverse event” under MPI policy, in order to access government funding for the human support part of the response. Following KGI advocacy to MPI, the Psa-V outbreak was officially declared the equivalent of an “adverse event” in December 2012 and its application was phased to apply to each region as it was affected by the bacteria.

At the time of the incursion, the adverse events policy was focused on floods or other natural disasters, and was not scoped to include biosecurity events. We understand the Biosecurity Recovery Policy now addresses this issue. This seems entirely appropriate.

## Communication improved under industry leadership

There was some concern about the way ASureQuality managed communications during the initial stages of the response – with their lack of knowledge of the industry quite apparent particularly in the way they treated growers.

Almost everyone we interviewed felt that the communication improved once industry set up KVH and took over the response. For example, many cited how helpful it was to have industry people with experience in managing orchards leading KVH and fronting meetings and to have other orchardists who had orchards with Psa-V to brief them.

However concern was expressed by a few when they learned from us that MPI thought eradication was almost certainly infeasible from the very first days of the response. They did not feel that KVH had made this clear to the industry at the time.

Interviewees outside Te Puke felt that communication with them from KVH was slow to get going.

## Reliance on negotiating cut-out contracts undesirable

It was quite apparent from several of our interviews that agreeing compensation packages with some growers was difficult. While KVH negotiated with growers, Psa-V continued to spread. We were given examples of some infected orchards being quickly cut out, but negotiations with the owners of neighboring infected orchards carrying on for weeks.

If the point of the cut out programme was to attempt eradication or at least contain the spread of Psa-V, time was of the essence. The longer it took to negotiate the packages the less the benefit there was to be gained from cutting out the orchard *and* the orchards around them.

The time it took to negotiate the compensation packages undermined the very intent of the cut out policy.

## The road to recovery

### Rolling out G3 and copper sprays proved critical

The decisions to:

- (i) subsidise copper spraying following advice from other horticultural industries; and
- (ii) advance the roll out of G3 after promising but not definitive indications that it would have greater Psa-V tolerance,

are widely considered to have been the crucial decisions in getting the industry on the road to recovery.

G3 proved more tolerant (but not immune) to Psa-V, and copper spraying proved a critical tool in mitigating the risk of Psa-V outbreaks on orchards infected with the bacteria.

## **R&D programme focused on industry-wide needs**

The funding package and establishment of KVH allowed the rapid establishment of a research programme worth \$12 million to date (and now being supplemented with Zespri funding) into Psa-V. The research programme is comprehensive, with an initial focus on research into Psa-V's basic characteristics, then research into ways of managing it, and then ultimately the breeding of Psa-V resistant cultivars.

This programme provides the industry with the best longer term insurance against the bacteria – i.e. investment in the underlying science and possible tools – in a way that would not otherwise have been possible so quickly.

The KVH structure also enables rapid dissemination of the results of this research programme out to orchardists and other parts of the industry.

## **Local government played an important role**

Local government undertook a number of important roles during the response – such as in supporting response operations and communications and fast-tracking regulatory approvals. For example, Bay of Plenty Regional Council contributed significantly to the early response by making their field and operational staff and equipment available to MPI and the industry. Bay of Plenty Regional Council also brought together territorial authorities where needed to coordinate and expedite any RMA approvals needed (using emergency provision under s.330 RMA), such as for disposal sites.

Some regional councils (in particular Bay of Plenty, Northland and Auckland) have continued to partner with KVH to progress control of wild kiwifruit and removal of abandoned orchards, with 70 out of 93 orchards identified as abandoned in February 2013 already removed, and the others under various stages of management.

## **Briefing the banks important**

The briefing of the key financial institutions with loan exposure in the kiwifruit sector seems to have been a critical factor in ensuring that the banks stood by orchardists and pack-houses as they went through sharp drops in their cash-flows and asset values post the arrival of Psa-V. The alternative would have been a round of foreclosures which would have further affected confidence and investment in the industry. These briefings, undertaken by industry leadership, seem to have shored up the confidence of the banks and enabled a faster recovery than would have been possible with wholesale foreclosures.

It is not entirely clear to us, however, the extent to which the broader industry understand the role played by key leaders in KVH, NZKGI and Zespri in briefing the banking community on a regular basis. We suspect this role needs better recognition during future responses.

## **Psa-V bred a stronger, more agile industry**

The “can do” attitude of the industry was cited by many as a key strength. From our interviews it would seem that many in the industry simply would not contemplate “defeat” and were willing to try anything to recover and succeed. The fact that many of them have recovered so well must be, we suspect, at least in part due to this attitude.

Indeed, the arrival of Psa-V led to a swathe of possible technologies and other solutions being put forward – only some of which proved of use. This willingness to try new things led to innovation and better ways to manage Psa-V.

But Psa-V has also caused industry members to actually take a deeper look at how they operate. We had feedback from quite a number of players that – in hindsight – the arrival of Psa-V had forced them to review their whole operations, leading to the identification of broader efficiency and other improvements to their businesses. Many stated they were focusing far more on the factors that affected their production than before. In short, they were better orchardists and pack-house operators. Many also noted that the impacts of Psa-V had appeared to force players who were not performing that well prior to the arrival of the bacteria to exit the industry.

Pack-house operators report strong pressure on margins and a round of rationalization driven by the need to find cost savings. Greater competition within the post-harvest sector – fighting for their share of the reduced total crop – drove reduced packing costs.

This “enforced” rationalization could be another key variable behind the recovery of the industry – and be worth remembering during “times of crisis” in the future. Many we interviewed noted that Psa-V had created winners and losers in the industry. Those who were struggling financially prior to the arrival of Psa-V tended to be the ones most adversely affected – and many of these people have apparently exited the industry, handing over their businesses to those more able to manage Psa-V. This has allowed these more successful players to expand.

The result is a stronger industry with better orchard management practices.

## **Transition to pest management plan took a long time and left gaps**

The development of the PSA-V Pest Management Plan took over two years – far longer than originally anticipated – and this caused frustration for some.

KVH’s initial attempt to draft a pest management plan took over a year and suffered from a lack of staff with the appropriate experience for the job. MPI apparently offered advice regarding experienced consultants, but KVH continued to work on the plan in-house and the result was a draft that was simply not appropriate.

Under new leadership at KVH, the plan was redrafted and widely consulted on to better reflect the needs of the industry in managing Psa-V in accordance with the requirements of the Biosecurity Act. It was presented to MPI within 5 months – an extremely short period of time.

However, it then took seven months to get the plan through the Government approval process. We were informed that MPI was particularly careful in its scrutiny of the plan due to potential legal risks – this included requiring KVH to undertake additional consultation on one aspect of the plan. But such an emphasis on managing legal risks ignores the other key risk – that the pest or disease continues to spread in the meantime.

The time put into developing and approving the plan needed to balance at least two tensions – ensuring the plan was legally robust and ensuring it was in place as quickly as possible.

During the time the plan was being prepared, legal powers, including legally enforceable movement controls, were not directly available to KVH. Instead, KVH relied on the voluntary co-operation of industry. MPI did agree to use powers under the Biosecurity Act to control the movement of nursery stock, but by and large there was little use of legal controls during this period.

Some we interviewed considered that it would have been undesirable for KVH to have legal powers without the checks and balances provided for in a pest management plan. This seems reasonable. But Psa-V did not stop spreading in the intervening period, and we understand deliberate and serious breaches of KVH protocols occurred during this period and even up to immediately prior to the plan coming into legal effect.

## **Mixed views on current pest management plan**

From our interviews, there appears to be strong support for the National Psa-V Pest Management Plan in regions outside of the Bay of Plenty. Indeed, there was some optimism that the collective efforts of the industry, supported by KVH, might actually be containing the spread of Psa-V in some of these regions (e.g. Franklin, Kerikeri).

Views are more mixed on the benefits of the Plan in the Bay of Plenty, given the spread of Psa-V throughout that region. Some noted that they have not read the Plan and consider that it is now up to orchardists and pack-houses to just manage the disease, at least in their region. There were mixed views on the benefits of the budwood and rootstock movement controls, and the hygiene and management requirements that still exist for the Bay of Plenty. There is a perception that some hygiene efforts, such as boot-washing or bin sanitizing, are now irrelevant, given that Psa-V is so widespread. Implementation of these types of measures may be dropping, especially around Te Puke. We note that this view does not take into account the risk that another pest may enter New Zealand, and that some time might elapse before it was found, during which time poor hygiene practices could contribute to its spread.

There appears to be a strong perception that the Plan is really just focused around movement controls i.e. keeping it out of areas where it has not spread yet. But given this even interviewees within the Bay of Plenty recognised the value of the Plan for regions where Psa-V is not yet endemic.

However, when we reminded interviewees that the Psa-V management tools research programme was also part of the Plan, there was strong support for this component even within the Bay of Plenty.

There was also a minority view that the requirements in the pest management plan are not strong enough. Every orchard is required to have a Psa-V management plan for that orchard, which must include at least one application of an approved spray, but effectiveness of the individual pest management plans is not assessed. There was some concern that some orchardists could still be doing less than is really necessary to control Psa-V on their orchards, even if they are complying with their orchard management plan.

A number of our interviewees considered that the industry is not yet “out of the woods” when it comes to Psa-V, and were concerned about an apparent growing complacency, fueled by two good growing seasons which have made managing Psa-V easier. They see a

continuing need for assistance to be provided to orchardists and others in managing Psa-V, especially if this turns out to be a wet spring.

By way of example, an interactive web-based tool has been developed to allow orchardists to determine appropriate spraying responses in light of weather forecasts (the “KVH Psa-V Risk Model”). There is concern that orchardists are not using this tool even though it could prove helpful in mitigating the impacts of Psa-V around wet weather events and we did not interview anyone who seemed to be regularly using this tool. Feedback we received indicated that the tool might not be used that much because the lesson behind it was essentially quite simple: that prior to rain events it pays to spray/far more frequent spraying was desirable. Once orchardists learned this lesson they would not likely use the management tool again. The question is whether it might be better to target pack-house on-orchard advisors who would seem to be more likely to use the tool, and pass the information on to their growers.

## **Biosecurity management and role of KVH going forward**

When we asked interviewees to consider the future biosecurity-related needs of the kiwifruit industry, there was a clear majority broadly in favor of the current direction and arrangements, with a minority concerned primarily with the costs and perceived inefficiencies associated with having (another) separate industry body for biosecurity.

There was widespread agreement that a core need of the industry was to focus on the assessment of key pests and diseases that might arrive in New Zealand and affect the kiwifruit industry. There was also significant agreement on the desirability of preparing readiness plans for top pests and diseases. Some, however, expressed concern around how much detail such plans should go into – given the likelihood that such detail might not be relevant/ might need to change “on the day”.

A clear majority of those interviewed favored KVH continuing in its current roles, including: undertaking risk assessment and developing new plans; advocating for improved management of identified risks at the border and offshore; coordinating the current Psa-V response; and coordinating any future responses with government on behalf of the industry. A few favored dis-establishing the organization and moving its functions into Zespri, but this was strongly opposed by most others, including all the Zespri representatives we interviewed.

Interviewees agreed on the benefit of accessing government funding and resources in the event of another incursion. Even those who were skeptical about the benefits of a stand-alone KVH acknowledged that having a biosecurity organization that could interact with government on behalf of the entire industry would be helpful in that respect.

There is growing frustration in certain parts of the industry, e.g. around Te Puke, at the continuation of KVH and the volume and nature of its communications. In short, many have not read the current Plan, have stopped reading KVH emails and consider that KVH is becoming a bureaucracy.

Other regions remain very supportive of KVH and the support and information they are receiving from KVH. There was a perception that KVH has passed on the lessons learnt in

the Bay of Plenty, meaning that their regions have had relatively “better” experiences in managing Psa-V.

## Looking forward – lessons to embed

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### **Psa-V has had major impact that need not be repeated**

Psa-V has lost the kiwifruit industry potentially hundreds of millions of dollars because (i) Psa-V is a significant disease *and* (ii) because the industry and Government were so ill prepared to manage it.

Leaving aside the very strong concern around how Psa-V might have entered New Zealand in 2010, if the industry and Government were better focused on the risks posed by Psa-V– it seems quite reasonable to assume (i) the risks of it entering New Zealand would have been reduced and (ii) the costs of any incursion could have been significantly lower.

Future incursions, while probably inevitable to some degree, need not necessarily be as likely or have impacts that are as severe. Some of the costs from future responses could be better mitigated or avoided by embedding the lessons from Psa-V. In short, better preparedness should reduce the risks and costs from future incursions.

### **Benefits of a dedicated biosecurity function representing entire industry**

Some challenges were always going to arise with managing Psa-V. But the amount of effort that had to go into:

- developing and revising strategy,
- securing funding,
- sourcing resources,
- coordinating efforts,
- developing guidance on hygiene and movement controls,
- communicating with those affected, and
- providing support,

almost certainly made the response far more challenging to manage.

The scale of the effort required, and the generic nature of some of the tasks, points to clear benefits from having pre-agreed arrangements that can be triggered for future responses or remain in place as part of business as usual (e.g. basic hygiene controls) rather than having to start from scratch again *during* the next response.

Indeed, based on the industry's experience with Psa-V, there seems to be clear benefits in an industry-wide function that can unambiguously lead and organise such biosecurity matters and engage with the government on behalf of the whole industry. Core responsibilities of such a function should include:

- i. Identifying emerging exotic pest/disease risks, advocating for their management offshore and at the border, and planning potential responses should an incursion occur.
- ii. Coordinating any actual responses, (including, for example, briefing the banks).
- iii. Liaising with like-minded industries and the financial community.
- iv. Coordinating industry-wide biosecurity related research.
- v. Providing up to date guidance on basic movement and hygiene practices for industry operations and the risks of not having these in place.

There also do seem to be benefits from keeping the provision of these functions (apart from the provision of research) separate from the single regulated marketer. Zespri does not represent the industry in a way that KVH can. The “industry good” focus on biosecurity also risks being lost inside a larger organization like Zespri and caught up in the issues around the regulation of the industry’s marketing functions and/or its commercial imperatives.

## Preparing for future incursions

### **The border doesn’t eliminate risk - need for the industry to look offshore and prepare onshore**

The border is a critical risk mitigation intervention. But it does not eliminate all biosecurity risk and never will. Some pests and disease are difficult to manage – whether pre-border, at the border or post-border. Furthermore, the challenge of keeping pests and diseases out increases as trade and passenger volumes increase each year.

While the issues around how Psa-V first got into New Zealand remain very “raw” with many in the industry (and we have not assessed these issues at all given the previous review undertaken), the industry now understands that some pests and diseases might get into New Zealand in the future. It is in the industry’s interest to understand potential pests and diseases that might arrive and to invest in research into the highest risk ones, including understanding the pathways through which they might enter the country and spread and tools for managing these pathways.

A few players consider that MPI should take sole responsibility for this type of risk analysis. But the reality is the kiwifruit industry is best placed to understand what pests and diseases present the biggest risks – and the industry has the strongest incentives to find out about them. Once the industry is informed it is in a far better position to work with MPI to ensure MPI is doing all it can with pre-border and border measures to keep them out, and create preparedness plans should they still manage to get in. Obviously the science community can and should assist with this work.

However, the industry does not seem so aware of the risk that a new pest or disease might arrive here and remain undiscovered for a period of time – and spreading during this period. This is despite at least some potential indications that Psa-V might have been here some time (and spreading) before it was discovered.

## **Joint Government/industry planning should ensure better value**

Both industry and government offer valuable skills and resources towards any significant response. And neither has quite the full set of skills and resources to operate a response effectively on their own. Industry has knowledge, networks, funding, research capacity and on the ground capability. Government can offer funding, broader biosecurity response capability, experience, related research, and can contract in on-the-ground capacity if required. Local government can provide localised rules, funding and pest management capability. By working together and using each other's skills and experience, there is the opportunity to reduce overall cost and achieve a better result.

The Government Industry Agreement model provides a vehicle to jointly:

- prepare and agree plans for potential new pests and diseases,
- pre-commit funding,
- identify the most appropriate roles and resources, (including how the National Response Capability Network will be drawn on),

all before a pest actually arrives.

The framework aims to create much better co-ordination between government and industry during any actual response and should also enable a much smoother transition to any national pest management plan, should one prove necessary.

The kiwifruit industry's experience with Psa-V seems to point strongly towards the benefits of using the Government Industry Agreement framework to develop plans for new pests and diseases and, to manage any future responses - and including local government in such plans. This framework does not provide a complete solution – there isn't one - but is a significant step forward.

A key issue will be how new pests and diseases not covered by pre-agreed plans under the framework are managed. The experience with Psa-V would point to strong incentives on both Government and industry to agree to apply the Government Industry Agreement framework to such pests as if they had previously been covered.

## **Pre-agreed plans and clear objectives should result in more effective responses**

The challenges in agreeing the overall strategy and key decisions in the early stages of the Psa-V response seem to strongly imply that it would be beneficial for the kiwifruit industry to work with the Government (MPI) to:

- (i) Pre-agree readiness plans for the highest risk pests and diseases that might arrive.
- (ii) Agree a generic plan for any new biosecurity pest incursion that is not expected or for which there is no existing plan.

Plans for specific pests and diseases should have a 3-4 year time horizon with most detail on how the first 3-6 months of any response would be managed and less detail on the later stages, based on the experience the industry has had with Psa-V. Effective plans should combine available scientific understanding about a pest or disease with the likely ability of

the industry to accept advice, adapt and recover. Such plans should provide direction and assist prioritization of initial response efforts and also paint a picture of the road to recovery in the medium term, if eradication proved infeasible.

The more generic readiness plan should focus primarily on the governance arrangements, roles and process steps that will be undertaken in the first 3-6 months of any response; the means by which any transition to longer term responses will be made; and provide generic guidance on how fungi, bacteria or insects would be managed until more scientific information can become available.

We understand KVH has work underway in both of these areas.

## **Investment in science critical**

The lack of phyto-sanitary understanding around the nature of pests and diseases that might affect kiwifruit was clearly a gap in the industry prior to the arrival of Psa-V. The industry had to do a substantial amount of scientific learning as it was responding. Understanding and acting on the developing scientific information was particularly challenging given the variation in people's ability to accept new information, especially under stressful conditions.

Having a clear understanding of the underlying science of potential pests, their spread and options for eradication or management, will enable the industry to be better mitigate the risks from new pests and diseases and will significantly aid future pest and disease responses. This is likely to be the case even when the science around a specific pest or disease is not yet well known. For example, the industry now has a generic understanding of bacterial spread and management. If a new bacteria were to be found, the industry would be more likely to apply generic bacterial management measures based on what it knows now, buying itself time while detailed research was undertaken to find more specific solutions. These learnings should be captured in the generic readiness plan suggested above.

There are also clear benefits from the investment in science into understanding the nature of significant pests and diseases affecting the industry like Psa-V and tools for their management and investment in systems necessary to ensure rapid dissemination of the results out to industry. There are significant collective benefits to the entire industry from such research, pointing to the desirability of such research being coordinated and organised from an industry-wide perspective.

## **The R&D breeding programme provides “insurance” against new pests**

Many have cited to us the “good luck” that G3 is more tolerant to Psa-V thus providing the industry with an alternative “gold” product. A viable alternative gold product was crucial to the industry, as gold fruit provide higher returns than green fruit. The returns from G3 were cited as being a critical determinant in enabling the industry to recover as fast as it has done.

However the existence of G3 was not luck. G3 is one of the results of a long-standing research/breeding programme reflecting in part the integrated nature of the industry. The focused industry investment in breeding provides the industry with some insurance against new pests and diseases – in a way that is arguably not available to many other industries. The “true” value of this breeding programme has only been enhanced by the arrival of Psa-V.

Maintaining this programme provides a key insurance policy against future pest and disease outbreaks, something that should perhaps be made more explicit.

## **Hygiene controls provide protection against pests and diseases that might be here but not yet discovered**

Parts of the industry appear to mistakenly assume that more stringent movement and hygiene controls are only needed *during* a response to bacteria like Psa-V. But this ignores the risk that a new pest or disease affecting the industry might arrive in New Zealand and spread for some time *before* it is discovered. The more a pest can be contained in the very initial stages of any new incursion, the potentially greater the possibility of being able to eradicate it – all other things being equal.

Some clearly suspect this is indeed exactly what occurred with Psa-V. Some also believe that from what is now known about Psa-V, it is likely that if better movement and hygiene practices had been in place across the industry prior to the arrival of Psa-V, it would not have spread as fast as it did.

In our view, there does seem to be a case for:

- (i) Basic hygiene and movement controls across the industry as business as usual practices, given this risk and the extra costs the industry almost certainly bore by not having them in place before Psa-V arrived.
- (ii) An industry-good role in providing the most up to date guidance on good movement control and hygiene practices to orchards and pack-houses.

To be of maximum effectiveness, hygiene and movement controls need to be in place before a pest or disease arrives and not just after it is discovered. The risks around this could be more explicitly explained to industry so they can see a clearer justification for (i).

## **Kiwifruit industry can learn from others**

The “can do” attitude we picked up in interviews potentially risks myopic thinking at times. We almost got the impression that some in the kiwifruit industry do not believe others outside the industry could have useful insights for kiwifruit, despite facing similar issues.

For example, some interviewees expressed concern about the time it took for the industry to pick up bacterial management lessons from the apple and other pipfruit industries. We were advised that copper sprays are standard bacterial management tool in these industries, which have had to manage bacteria for many years. This information was apparently available from very early on in the response, but took some time to be accepted and acted on.

Learning from other sectors could be improved by the industry function responsible for biosecurity developing strong links with “like minded” sectors such as apple growers, and sourcing and providing information back to kiwifruit growers as appropriate.

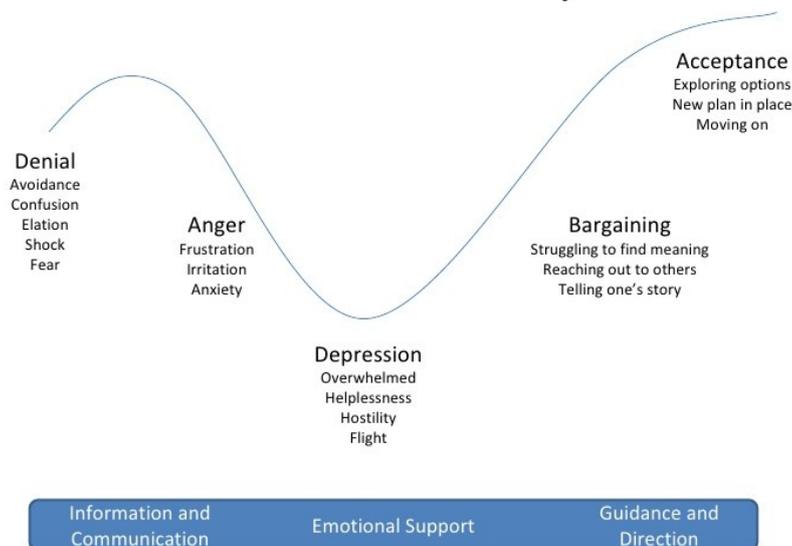
More fundamentally, joint planning with other like-minded industries over pests of mutual concern such as fruit fly could also be beneficial.

As was noted earlier, the industry should also draw on the experience of MPI in managing responses and assisting other industries to develop and review pest management plans.

## Planning for the human impact is important

A key learning from the support work provided during the response was the need to appreciate the grief cycle that people go through when receiving bad news. People go through the cycle at different speeds but often need to go through each step before reaching acceptance. The concept of the grief cycle developed by Kübler-Ross now seems well understood across key parts of the kiwifruit industry and is depicted below<sup>3</sup>.

### Kübler-Ross Grief Cycle



Managing such grief needs to be an explicit part of future responses. Support and pastoral care arrangements are vital, but the overall strategy, messaging and specific interventions are also part of helping people manage their way through this cycle. Readiness plans need to explicitly consider the human element of a major stressful event, and plan for it.

Another element that came through from our interviews is the need to ensure that leaders are themselves getting support – including professional support during outbreaks like Psa-V. In short support needs to start from the top. Those giving support need it themselves.

There could also be a learning here for MPI as it can be perceived as being very “pest focused” as opposed to “people focused” in its responses. Any response needs to consider the human as well as pest impacts and how best to manage both of these simultaneously.

## Agree compensation in advance or only as a last resort

Offering compensation can trigger a range of human reactions including opportunism or litigation. Consequently, compensation arrangement will often prove very time-consuming

<sup>3</sup> There are numerous articles on the Kübler-Ross grief cycle but the original article was provided in Kübler-Ross, Elizabeth, *‘One Death and Dying’* 1969.

to negotiate, with a few “difficult” cases impeding the speed and effectiveness of the process. Yet swift and coordinated action is usually vitally important during any response.

In circumstances where MPI invokes its powers under the Biosecurity Act to restrict movement or destroy property, compensation will be payable for losses, but this compensation will be assessed after the fact, rather than negotiated before the action is taken. For better or worse, this approach was not available to KVH during the Psa-V response.

However, pre-agreeing compensation provisions for activities undertaken during a response is part of the pre-planning that is possible under the Government Industry Agreement approach. To avoid the difficulties of negotiating compensation during a response, any proposed compensation policies or arrangements should be pre-agreed under the specific or generic readiness plans. Developing compensation options during a response should be a last resort and only done if absolutely necessary.

## **Lessons to implement during future incursions**

### **Need for clear roles, the right skills, and an agreed objective**

In our view, some of the “churn” caused during the initial stages of the Psa-V response was due to the lack of a clear response structure with roles and responsibilities and the lack of an agreed objective that all parties had clearly and publicly bought into. Clear roles and responsibilities, and an agreed objective, are critical to enable effective prioritization and targeting of actions and to allow expectations to be appropriately managed.

The first task for any future response should be to clearly agree the allocation of roles and responsibilities across the required work-streams. These work-streams should include pest/disease management, communication, support, trade impacts. The Government Industry Agreement framework should assist in this.

The second task should be to agree the initial objective for the response among all the parties involved i.e. industry and Government based on a sound understanding of whatever is known about the science at the time. The objective may change over time – for example, eradication may be agreed to be feasible when the incursion is first identified, but, if the incursion is more widespread than initially thought, or the pest harder to destroy, this objective may need to be changed. There is potentially nothing wrong with objectives changing to accommodate new information or changed circumstances as long as they are not being changed frequently. But all parties involved in the response should be aware of, and agree on, the current objective at any given time.

### **Investment in science also critical *during* responses**

There will always be some uncertainty around any new pests and diseases found here. Some new pests and diseases – like Psa-V – may be relatively new to the scientific community as well. And even if a particular pest – such as the fruit fly family – has been the subject of significant research there will always be questions about how any such pests and diseases will

adapt to the New Zealand environment. There will also likely be questions about the best management tools in the New Zealand context.

In light of this reality, investment in research into the underlying science and associated management tools for any new pests and diseases will be a critical component of any future incursions. The more such a research programme can draw on existing science networks and knowledge, reflect industry's total needs, and can produce results that are rapidly disseminated to the industry, the more effective such research will likely be.

## **Important to acknowledge the industry's resilience**

It strikes us that there is a risk that, during the initial days of any significant response, a sense of doom may set in, beyond what is justified. This is partly human nature, but New Zealand now has enough experience in managing incursion responses to know that the worst possible outcome rarely, if ever, happens. By way of example, the arrival of varroa mite into the country was seen by some as the death knell of the beekeeping industry. But, in fact, the commercial honey industry has recovered more strongly than anticipated even though many hobbyists have had to exit.

The risk of doom-saying seems to be created by too much focus on the biological nature of the pest concerned and its potential negative impact, and not enough focus on an industry's ability to cope through innovation, adaptation, rationalization and a sprinkling of good luck. In other words there seems insufficient attention paid to the human ability to recover. This is something worth thinking about in the early days of any future serious response.

Case studies that could be referred to would help. Messages like "*it is nasty but we will cope*" are far more helpful than just "*it is nasty*". Such messaging could allow people to be more accepting of medium- to longer-term plans and less likely to demand immediate and potentially unreasonable or infeasible interventions.

## **Time removes some options but creates others**

While time typically removes some options – most obviously the potential for eradication in some cases – time also provides opportunities down the track, which should be recognised.

In essence, time allows pests and disease to spread. But time also allows:

- research to be undertaken – even if just based on observation - and more information to be collected,
- calmer heads and cooler minds to reflect and take stock before deciding on the next course of action, and thus
- potentially more effective responses and interventions to be undertaken.

We wonder whether at times the "can do" attitude risks some decisions being taken too quickly, when a bit more time and consideration might have improved the decisions and outcomes. We suspect application of the Government Industry Agreement framework might result in a more structured and rigorous approach to decision making during any future incursion.

At least one industry player also strongly advocated for the need for the industry to make greater use of scientific trials – even during responses if need be – in environments most

suited to such trials (i.e. that may not be in the same area as the current infestation) so as to try and learn as quickly as possible the characteristics of the pest/disease concerned and the most likely effective management options.

## Effective plain language communication

We received lots of feedback about the challenges with communication during the whole Psa-V response. Key lessons included:

- Considering what information people could receive and when – remembering the grief cycle that many were experiencing.
- Using industry people to brief industry i.e. orchardists whose orchards have Psa-V to brief those who do not have it.
- Trying to ensure messages were very concise/direct for those who were less technically minded or less willing/interested/able to read long documents.

## Use of legal powers and compensation implications

The arrival of Psa-V into the country and its subsequent spread demonstrated the difficulties of moving from an initial eradication/containment response to a longer term management plan, and the complexities of balancing industry control of a response with access to government's legal response powers. Legal powers provide the ability to impose – and ensure greater compliance with – tools like movement controls. Without legal powers, movement controls do not have credibility. With many pests and diseases it can only take one breach of a movement control for the pest/disease to spread and the controls to effectively be “undone”.

MPI's legal response powers, including movement restrictions and the ability to compel property to be destroyed, can only be invoked by a Chief Technical Officer reporting to the Director General of MPI. Use of the powers by the Chief Technical Officer may create compensation obligations for MPI. In exercising the powers in an initial response MPI must be mindful of the likely compliance cost – which can rapidly escalate. But contrary to perception, if eradication seems feasible MPI will typically seek approval to go for it.

In the case of Psa-V, MPI invoked some powers early on in the response, designating infected orchards restricted places under quarantine. However, once industry took over the leadership of the response, MPI effectively ceased to use its legal powers<sup>4</sup>, as the government funding of \$25 million, and the responsibility for leading the response, had been handed over to KVH.

At that time, KVH did not have direct access to key legal powers, so it had to rely primarily on negotiation and industry co-operation. To gain access to legal powers KVH needed to go through the process of preparing and consulting on a pest management plan, making a clear case for the legal powers. This requirement is intended to ensure there are adequate checks and balances with the use of such significant legal powers as movement controls. In the case of Psa-V there was a gap of more than two years between when MPI stepped out of the

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<sup>4</sup> With the exception of some legal controls on nursery stock.

response in late 2010, taking its access to legal powers with it, and when the industry was able to get its own powers via a pest management plan approved under the Biosecurity Act in May 2013.

Some we interviewed were concerned that if the industry had had the same access as MPI's CTO to legal powers during the initial industry response they would have undertaken far stronger action than what might actually have been justified – e.g. requiring cutting out of a far greater number of orchards.

Some felt MPI should have taken a stronger stance but noted it seemed reluctant to use the powers. In this particularly case, a reason for the perceived caution MPI exhibited in using the powers during the initial Psa-V response was that the industry had already received \$25 million from the Crown. Given that the use of legal powers would potentially create compensation liabilities, MPI was concerned that the Crown might end up “paying twice” if it invoked legal controls.

Nevertheless, if movement controls were justifiable under the initial government response and then the longer term pest management plan, it seems difficult to understand why they also would not have been justifiable during the intervening period as well. The case for using movement controls *throughout* seems strong.

Part of the answer seems to lie in the pre-agreed readiness plans under the Government Industry Agreement model covering specific pests and diseases as discussed earlier. Under this framework, it should be possible to avoid this situation of a legal void between the initial incursion and the implementation of a pest management plan. If industry and government have a pre-agreed readiness plan, it can include an agreement on the use of legal powers in certain circumstances, and can also contain pre-agreed compensation arrangements, meaning that industry does not have to rely on negotiating compensation “on the fly” during a response.

Such arrangements should also anticipate the possibility of the pest/disease becoming endemic and thus include a shift from eradication-based controls to containment/management controls and/or shift from containment to management controls. This should ensure the full range of legal as well as other response options are to be available throughout any response – with any appropriate compensation arrangements pre-agreed.

Difficulties arise for pests and diseases not anticipated and covered by a preexisting readiness plan under this framework. It would seem sensible to ensure there is a mechanism to bring such pests and diseases under the framework during the initial stages of a response, even if there is no pre-agreed plan.

What is clear is that it is absolutely essential that Government and industry work together in such situations, to avoid legal gaps during which important tools are not available, leading to higher costs and potentially worse outcomes than necessary.

## Managing Ps-a-V now

### Growing complacency/ambivalence in Bay of Plenty

We detected growing skepticism as to the merit of the remaining budwood and plant movement controls applying within the Bay of Plenty region and possibly increasing non-compliance with them. The KVH Board will likely need to make a call soon as to when these controls within the Bay of Plenty should be further eased, and ultimately transitioned to basic hygiene and movement controls as part of business as usual practices. Obviously this could be a phased process.

The requirement for orchard and post-harvest operational plans seems more justifiable as the content of them is still up to the operator to determine and such documents provide a very transparent way of recording practices in the case of the sale of such facilities to others. Similarly the legal controls around abandoned orchards appear sustainable as they impose less of a burden on normal industry operations.

Given the two strong growing seasons the industry has just experienced, we also heard concerns around the potential growing complacency of parts of the industry in the Bay of Plenty towards Ps-a-V, however. This raises the natural question as to whether or not more should be done industry-wide to combat this.

There is an obvious tension between KVH attempting to reduce such complacency through stronger rules versus leaving industry to learn the need for good hygiene and related controls for themselves, using KVH guidance material if they wish. The answer to this tension depends on who would bear the cost of poor hygiene and management practices. We were informed by a number of interviewees that an orchardist practicing good hygiene and spraying appropriately now would be able to limit the damage from high inoculum loads caused by nearby orchards that were not well managed. However, even the best management cannot eliminate the damage caused by higher inoculum loads. Consequently there seem to be roles for both industry players individually and the industry collectively in managing Ps-a-V going forward.

Almost everyone we interviewed considered that risks caused by complacency were ultimately the responsibility of individual business operators to manage, and did not favour stronger coercion via additional rules. Several noted that the market would likely force those players who did not manage Ps-a-V well out of the industry, and that this was as it should be.

But there was widespread support for science-based best practice guidance being provided to industry players. KVH seems best placed to provide this guidance to growers and pack-houses. This material could even become the basis of an evolving industry standard, akin to the GAP.

### Communication should be more focused

With the National Ps-a-V Pest Management Plan now in place, views on KVH communication were far more mixed. Some thought it was essential that KVH continue to get in front of orchardists and remind them of biosecurity issues and really appreciated its communications about new Ps-a-V research, or other finds (such as the latest fruit fly find in Whangarei).

However, others signaled that they had not read the Psa-V Pest Management Plan and had stopped reading KVH emails. A few considered that KVH's communication, e.g. the weekly newsletter, is excessive and a sign it was turning into a bureaucracy. One gave the example of a communication from KVH advising orchardists that a particular type of insect was not a pest of biosecurity concern.

Many noted that biosecurity was by no means the only issue that those in the industry needed to consider and obviously there is no point in communicating if the audience is "tuning out". Indeed the bigger risk is when KVH does have something really important to advise industry of, it may take a while for some in the industry to "tune in" again. For example, warnings may go unheeded.

This is a tricky issue that we understand KVH considers regularly. We suggest KVH continue with its current communication approach with major new finds but review its more "ongoing" communications with industry with a view to better targeting them to the time(s) of year when industry is most likely to be most receptive to hearing the messages. For example, messages about managing Psa-V might be best timed just prior to wet seasons of winter/spring, if this is when orchardists need to be vigilant about spraying (apologies if we have misunderstood the epidemiology here). But this might also be the time to provide updates on other pests/diseases they should be concerned about, as readers may be more receptive to such information at this time.

The overall approach though would be one of "less is more" i.e. fewer, more targeted, communications at relevant times. The KVH website can obviously be updated more frequently for those who wish to check up on any issues.

## Recommendations

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In light of the kiwifruit industry's experience in managing PSA-V we recommend that:

- i. 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, organizing industry-wide biosecurity related research, and providing best practice science-based guidance on good hygiene and movement practices across the industry.
- ii. The industry should continue work on readiness plans for the top unwanted pests and diseases under the Government Industry Agreement framework with the MPI.
- iii. The industry should also continue to develop a high level generic readiness 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.
- iv. Readiness 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.
- v. All readiness 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.
- vi. 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.
- vii. 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.
- viii. The industry should become more open to learning from other sectors and from the Ministry of Primary Industries in managing current and future pests and diseases.
- ix. 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 emphasise 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”.
- x. 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.

- xi. 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).

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