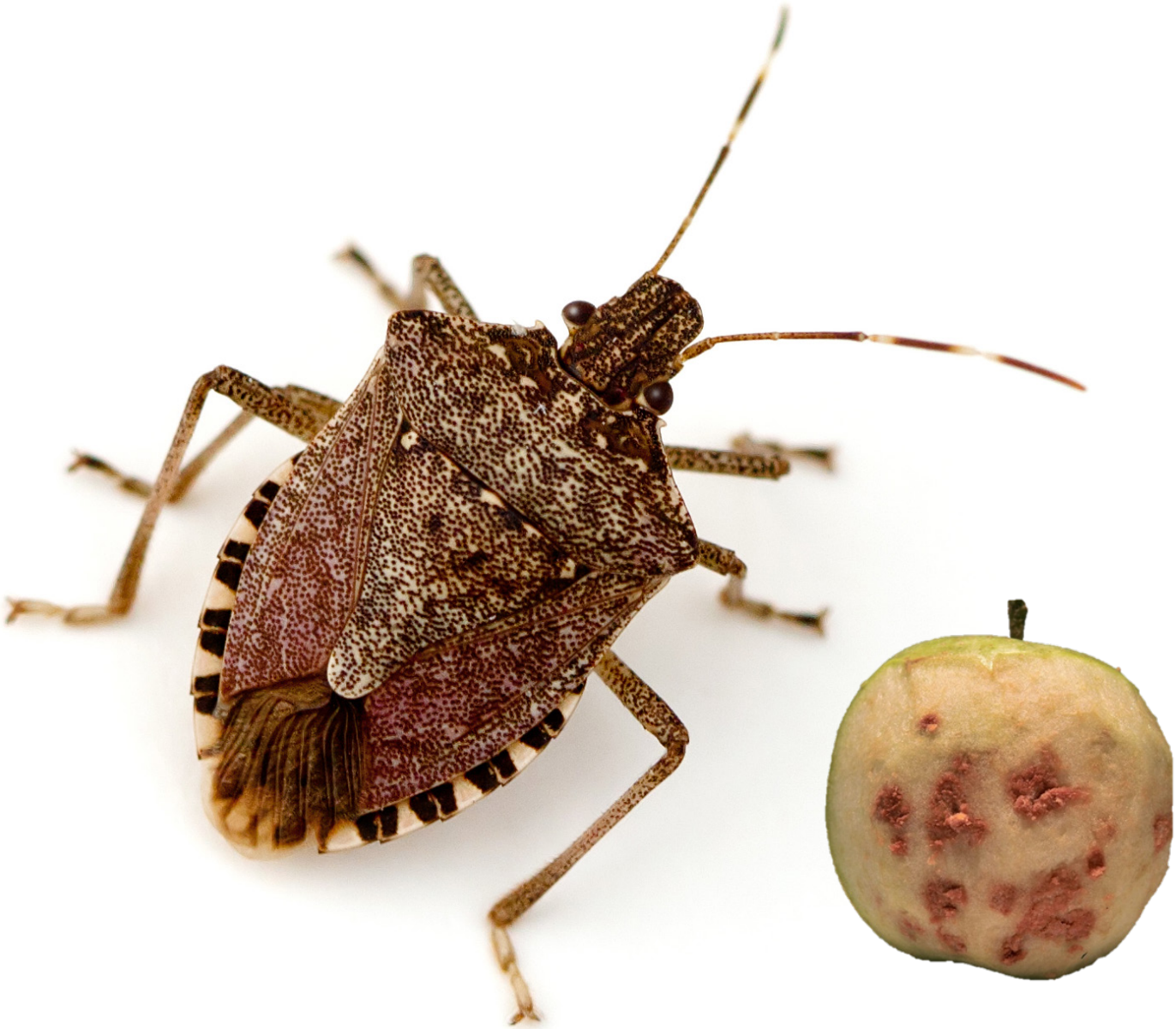
Australian Government
Inspector-General of Biosecurity

Effectiveness of biosecurity measures to manage the risks of brown marmorated stink bugs entering Australia

REVIEW REPORT NO. 2018–19/06



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Purpose

On 15 January 2019, the Minister for Agriculture and Water Resources requested the Inspector-General of Biosecurity (IGB) to carry out this review. The aim was to assess the effectiveness of the Australian Government Department of Agriculture and Water Resources' (the department) biosecurity measures to manage risks of brown marmorated stink bug (BMSB) entering Australia and determine the potential for improving efficiencies along the biosecurity continuum.

The review examined:

1. the effectiveness of measures used by the department to manage the risks of brown marmorated stink bug (BMSB) entering Australia
2. the department's engagement and consultation with industry in managing the risks
3. what if any improvements should be made to the current arrangements.

Scope

The scope of this review covered operational policy and the activities of the department relevant to BMSB intercepted at border, and management of risks of those pests detected after release of goods from biosecurity control. It excluded the responsibilities of state/territory governments, individuals and biosecurity industry participants.
The review considered:

- governance of the current system of BMSB management, including:
  - processes of BMSB profiling, assessment, inspection and treatment of BMSB-infested conveyances and cargo arriving in Australia
  - legal powers to take action
  - suitability and robustness of information technology systems used
- effectiveness of BMSB management measures, including:
  - approval/accreditation of offshore and onshore treatment providers (including approved arrangements)
  - verification of effectiveness of offshore and onshore treatments and level of compliance
  - industry compliance with updated biosecurity requirements
- engagement and consultation with industry in managing the risks
- identifying improvements required to manage biosecurity risks.

Review methodology

During this review, the IGB consulted extensively within and outside the Department of Agriculture and Water Resources. In particular, the IGB:

- conducted an entry meeting and subsequent in-person/phone meetings with key stakeholders to:
  - communicate the review's objectives and scope
  - outline responsibilities
  - identify risks related to the review and any appropriate mitigation strategies
  - obtain initial background information regarding management of BMSB
  - provide an opportunity for all parties to discuss/brainstorm and seek points of clarification from the IGB about the proposed review process
- invited submission from stakeholders, considered the 25 submissions received from government agencies and industry representative bodies, and published all the non-confidential submissions on the IGB's website, as listed in Appendix B.
- discussed preliminary data and information requirements with relevant departmental officers, and requested further data and information
- conducted a desk audit of relevant departmental data and documentation (such as standard operating procedures, policies and communications material) and inspection and verification procedures relevant to high-risk countries and goods
- undertook fieldwork at third-party approved arrangements in Sydney and Melbourne to observe and verify:
  - operations (such as fumigation treatments) at first-hand
  - the department's procedures and operations
- visited regional offices in Melbourne and Sydney for discussions with department staff at all levels
- held meetings with key stakeholders regarding the department's management measures for BMSB at first points of entry and their interaction with the department
- considered potential risks, including whether:
  - the department's border risk-based intervention measures are inadequate, or not applied correctly by staff, to intercept high-risk exotic pests (such as BMSB) and biosecurity risk material
  - the department's risk-based methodologies and post-border intervention measures are inadequate to detect high-risk exotic pests in cargo or conveyances post-release
  - the department's data recording and risk management methods for exotic pests and biosecurity risk material entering Australia are inadequate or not applied correctly
  - powers under the *Biosecurity Act 2015* are inadequate to manage risks of BMSB entering Australia in a timely and efficient manner
  - the department lacks timely internal mechanisms to identify and respond effectively to emerging risks
  - the department does not have sufficient resources or capabilities available to address current and new or emerging biosecurity risks
  - standard operating procedures/instructional material used by the departmental staff are difficult to follow or outdated

  - information and communications technology (ICT) systems fail to support operational requirements and departmental processes efficiently
  - stakeholders fail to provide the department with appropriate or timely information to allow it to carry out its responsibilities
  - the department fails to provide stakeholders with appropriate or timely information to allow them to carry out their responsibilities.
- conducted an exit meeting with department's executives to:
  - provide an overview of initial review findings
  - provide an opportunity for executives to correct any misunderstandings and provide feedback on the review process
  - outline the process of release and response of the issues paper and draft report
- developed a draft review report with key findings and recommendations, and requested a 'fact check' by the department's relevant line areas to correct any errors or misunderstandings and to provide further evidence.

As required by the *Biosecurity Act 2015* I presented my draft report to the Director of Biosecurity for a formal response. The department's response to my recommendations is included in this report. Further, I provided a copy of my final report to the Director of Biosecurity and the Minister for Agriculture and Water Resources and this report is published on the IGB's website.

Summary

The brown marmorated stink bug (BMSB, *Halyomorpha halys*) is an exotic pest that poses a significant biosecurity risk to Australia's agricultural industries, with potential high impacts on temperate plant industries and social amenity in affected areas. It can feed on over 300 host plants, particularly temperate vegetables, fruits and nuts, and important agricultural crops such as apples, grapes, cotton, citrus, corn, soybeans and tomatoes. Key areas of Australia and New Zealand would provide a favourable environment for BMSB, where it could significantly impact both countries' horticultural and crop production and export value. Australia is at high risk of a BMSB incursion that could prove difficult or impossible to eradicate.

BMSB is spreading steadily from its native East Asia. Since the 1990s, when it was first found in the United States of America (USA), it has spread to 43 US states and four Canadian provinces. In Europe, after being found first in 2008 in Switzerland, it spread to Germany by 2012, France and northern Italy by 2013, and Hungary by 2014. In 2017, it was first found in the southern hemisphere in Chile, where it was reported to be confined to the suburbs of Santiago.

Before 2014, live BMSB adults had been found as 'hitchhikers' on various goods from several countries within BMSB's native range, such as China and Japan, and from the USA where BMSB was invading. From 2015, detections on goods from Europe became an increasing problem, with a massive increase in 2018–19. Accordingly, its international spread and the risk profile of incoming goods will need to be reviewed and adjusted regularly.

As BMSB is associated with goods that are unregulated for phytosanitary purposes, no government-to-government assurance can be obtained for its risk management before the export of cargo from other countries to Australia. Many BMSB-risk goods have no phytosanitary requirements for trade. Hence, arrangements must be negotiated directly for industry to apply offshore risk management measures and verification of compliance can be more difficult.

Long and complex supply chains for many goods make BMSB risk management very difficult. Initial manufacturing plants may be far from the port of export. Vehicles and other cargo may be stored after manufacture anywhere along the distribution route to the port, or at a marine terminal, for significant periods before export. One consignment may be manufactured in or pass through an area when BMSB are moving into hibernation, and become infested, while another may be treated or kept away from any such risk. On board the ship, some bugs emerging from hibernation may move and contaminate previously clean cargo. Other bugs may not emerge until after arrival, posing a risk of incursion unless cargo is treated.

From 2014, the department progressively changed import requirements for break-bulk and containerised sea cargo from risk countries to manage increasing BMSB risks. Between September 2014 and April 2019, the department issued 52 industry advice notices relating to BMSB operational policy changes, often at short notice, to manage new risks as they became apparent. Policies and advice notices were sent to different groups of staff and industry stakeholders, onshore and offshore, who had to adjust their operations accordingly.

From 2015 the department expanded approved treatments for BMSB from only heat treatment (HT) or methyl bromide (MB) fumigation to include sulfuryl fluoride (SF) fumigation. Managing offshore SF treatment provision required further policy changes in 2018. Research into alternative fumigants to replace MB is ongoing but none are yet verified to the point of approval for BMSB treatment.

The department attempts to keep biosecurity risks offshore wherever possible. It is actively working to optimise pre-border and border measures to handle BMSB risks offshore and minimise disruption to movement of imported goods through the border. However, BMSB's continued spread means that intensified efforts on a wider front will be needed to keep it out of Australia.

Onshore, the department oversees biosecurity treatment applications on incoming goods by fumigators and other treatment providers through a series of approved arrangements under the *Biosecurity Act 2015*. By April 2019, the department had 582 onshore approved arrangement treatment locations or providers. 267 providers were approved for fumigation, 43 for MB fumigation, 11 for SF and 16 for heat treatment.

In 2018–19, the department applied more stringent BMSB risk management measures to far more vessels carrying break-bulk cargo, and to far more containerised cargo consignments, than in previous years. The BMSB response in 2018–19 stretched Australia's border biosecurity system close to breaking point and had severe impacts on sections of the shipping and importing industries. Delays and extra costs in cargo ship unloading and cargo release from biosecurity control were significant but unavoidable during the implementation of a complex array of measures to deal with the large numbers of arriving BMSB. Software systems to select and hold sea containers for biosecurity intervention, departmental staff resources to assess and inspect incoming cargo, and local industry facilities to hold and treat at risk cargo, were almost overwhelmed by the BMSB onslaught. Other important biosecurity programs were substantially reduced so that scarce resources could be mobilised against BMSB.

The risk management measures implemented appear to have prevented a BMSB incursion in 2018–19 although a number of border breaches were still under management and surveillance in April 2019. These emergency responses imposed more resourcing demands on the department and on state government agencies. Extra targeted surveillance and risk mitigation near first ports of entry, container parks and intermodal transport hubs will be needed to manage the risk of BMSB entering Australia.

In early 2019, Australia and New Zealand jointly agreed on key elements of the proposed measures to manage BMSB risks in 2019–20. The department further developed these and undertook industry consultation to finalise the measures by May, which would allow three months for industry to prepare before the BMSB season started in September 2019.

Effective BMSB risk management from 2019 onwards will require:

- improved inspection efficiency
- improved national border and post-border surveillance
- improved internal and external coordination, and especially
- improved biosecurity resourcing.

Further strategic investment in both people and systems improvement, with surge capacity to handle biosecurity 'emergencies' while maintaining ongoing business, will be essential into the foreseeable future.

Departmental resourcing was and is inadequate to meet the BMSB challenge. The volume of incoming cargo needing BMSB intervention was predicted to increase by at least 15 per cent in 2019–20. However, the overall staff cap for the department for 2019–20 was set by the Australian Government at 217 less than the total for 2018–19. This cut followed others which had already led to a 25 per cent drop in frontline biosecurity inspection staff between 2013–14 and 2017–18. These arbitrary staff caps should be removed for cost-recovered and critical biosecurity assurance and oversight functions. Diversion of resources for crisis management from other parts of the biosecurity system is not sustainable and will increasingly imperil Australia with risks of other severe pest or disease incursions, and further trade disruption.

Independent oversight by the Inspector-General of Biosecurity of how the department carries out its essential role in protecting Australia from biosecurity threats, also needs to be better funded, to ensure more timely, comprehensive and transparent reporting to the Australian public on departmental performance and biosecurity system improvements.

Review recommendations

The list below outlines the IGB's recommendations to address the risks of a BSMB incursion into Australia, as detailed in this report. The full departmental response to the recommendations is at Appendix A.

Recommendation 1

The department should continue to cooperate closely with New Zealand in risk profiling and risk assessment for BMSB of countries, pathways and goods; in developing and administering risk mitigation measures such as offshore quality systems and consistent border controls; in industry communication; and in identifying gaps in scientific knowledge and prevention, preparedness and response measures.

Department's response: Agreed.

The department has been working extremely closely with New Zealand Ministry for Primary Industries (MPI) to align BMSB measures for the 2019–20 season where possible, and a number of changes have already been agreed by both agencies. It is important to note that complete alignment of measures is not feasible due to differing trade patterns, legislative frameworks and biosecurity systems. The department will continue to work closely with MPI to identify opportunities for further alignment.

Recommendation 2

The department should improve and streamline the existing BMSB offshore treatment certificate verification system to improve its accuracy and facilitate expanded use of the system by customs brokers.

Department's response: Agreed.

Work is underway to identify potential information technology changes to improve and automate BMSB treatment systems. This work includes changes that would streamline the BMSB offshore treatment certificate verification system and expansion to other offshore treatments. This may identify business improvements and development of a system for industry to access and verify treatment certificates. Future uptake of such a system would be a commercial decision for brokers.

Recommendation 3

The department should work with industry to conduct contingency planning for sufficient high-quality biosecure onshore treatment provision near key ports of entry.

Department's response: Agreed.

As part of preparations for the 2019–20 BMSB season the department is working with the shipping industry to assist operators to develop contingency plans to manage BMSB detections on vessels on arrivals, including, in certain circumstances, the option of onshore treatment.

Further, the department will continue to work with industry and promote the compliance requirements for onshore treatment providers. However, while the department can raise awareness of the importance of treatment providers' ability to manage treatment capacity and the opportunities for commercial entities to carry out these activities, it is ultimately a decision for industry to enter into arrangements.

Recommendation 4

The department should mandate use of automatic data loggers by onshore fumigators and introduce random unannounced audits of treatment providers as a standard rather than an exceptional practice.

Department's response: Agreed.

The department will expand the use of automatic data loggers by onshore fumigators. While data logging will not necessarily lead to better treatment outcomes, the department would have better information about treatments which would assist in verification of treatment compliance. The department supports, and already undertakes, unannounced audits, and will consider further their frequency.

Recommendation 5

The department should work with state and territory governments to implement a national harmonised framework to deliver effective biosecurity treatments across import, export and domestic pathways.

Department's response: Agreed.

The National Biosecurity Committee, comprising the Commonwealth and all states and territories, has already agreed to develop a national harmonised framework to deliver effective biosecurity treatments across import, export and domestic pathways.

Recommendation 6

The department should urgently prepare a broader request for a major upgrade or replacement of S-Cargo and seek high-level cooperation of Home Affairs to invest in necessary and complementary improvements to integrated cargo system.

Department's response: Agreed.

The department will upgrade existing systems and automated processes for management of BMSB. Resourcing of this will be a matter for government. In the interim, to meet requirements for the upcoming season, the department is undertaking repairs of the current S-Cargo system to manage increased cargo volumes. Complementary to this, the department is conducting a detailed analysis of business processes and system improvements to identify the most effective and efficient enhancements for management of the risk posed by BMSB next season. The department will also continue to work with Home Affairs and seek any necessary improvements to the Integrated Cargo System (ICS), including changes to profiles, messaging and extraction of information from within ICS to better support BMSB management.

Recommendation 7

The department should consider introducing a dedicated BMSB hotline manned by experienced staff as an escalation point for urgent BMSB enquiries that meet agreed criteria if workload in the 2019–20 season warrants it.

Department's response: Agreed.

The department is already implementing a direct line for industry organisations as part of its 'green lane' policy, and has established a dedicated email inbox for seasonal pest policy, including BMSB policy enquiries.

The department has established mechanisms for triaging all general enquiries (including BMSB-related) received through the national contact number.

The department is also further strengthening its training and workforce allocation processes to ensure urgent and complex enquiries are handled by suitably trained staff.

Recommendation 8

The department should urgently expand the detector dog program to increase training and numbers of dogs (and their handlers) to detect high-risk pests, including brown marmorated stink bugs, for deployment in high BMSB risk cargo pathways for next season.

Department's response: Agreed.

The department will expand the detector dog program as part of a suite of controls to detect high risk pests. Managing BMSB risks offshore remains the department's preferred approach as it gives the highest level of biosecurity protection for this expansion. Detector dogs will be used to augment this, with particular focus on verification. Resourcing will be a matter for government.

Ship holds and break-bulk pathways present some limitations for utilising detector dogs.

Recommendation 9

The department, in collaboration with state and territory governments and the relevant plant industries, should continue active international collaboration in BMSB research, development and extension.

Department's response: Agreed.

The department will continue to collaborate with state and territory governments and relevant plant industries to undertake BMSB research, development and extension.

Recommendation 10

The department should strengthen the National Border Surveillance program by increasing targeted surveillance for BMSB at major ports, approved arrangements and high-risk post-border sites.

Department's response: Agreed.

The department will continue to explore opportunities to increase targeted surveillance of high risk sites.

Recommendation 11

The department should work with states and territories and relevant industries to develop and deliver a nationally coordinated BMSB education/awareness campaign for all government, industry and community stakeholders. Similar targeted and coordinated campaigns should also be mounted for other serious pests and diseases that are spreading rapidly such as Xylella and African swine fever.

Department's response: Agreed.

The department has worked closely with industry and implemented a range of targeted BMSB awareness/education activities for personnel involved in import supply chain logistics. The department will continue to work with states and territories to develop key education and awareness activities through the National Biosecurity Communication and Engagement Network.

Recommendation 12

The department should convene internal incident management teams to manage future major biosecurity threats and ensure that summary progress information is provided to all key stakeholders in a timely manner.

Department's response: Agreed.

The department has a well-established framework for dealing with incident management and convenes incident managements in accordance with this framework. A standing Incident Management Team was established for last season and will be established again for the coming season.

The Critical Incident Response Plan sets out the department's arrangements for managing an incident which may impact on its portfolio responsibilities and interests, such as the outbreak of a significant plant or animal disease, a live animal export incident, or a business continuity event.

Recommendation 13

The department should consider convening an industry-government BMSB Council to oversee Australia's BMSB prevention, preparedness and response.

Department's response: Agreed.

The department worked closely with industry on controls for the coming season through its equivalent BMSB Council processes. The department has well-established consultative forums through the Department of Agriculture and Water Resources Cargo Consultative Committee (which includes freight and logistics supply chain representatives) and Plant Health Australia (PHA), in conjunction with Australia's agricultural industries.

Well-established arrangements for industry-government consultative committees also exist under the Emergency Plant Pest Response Deed to respond to post border detections of BMSB that require a national response. Arrangements under the Deed have been activated in recent BMSB seasons.

Recommendation 14

The Australian Government should commit to ensuring adequate long-term funding for biosecurity risk management, and review biosecurity cost recovery arrangements to ensure that funds raised are sufficient for needed restoration or expansion of other priority frontline, support, system improvement and oversight operations. Funding should be linked to growth in imports and biosecurity risks, with cost-recovered functions exempt from efficiency dividends and staff ceilings.

Department's response: The response to this recommendation will be a matter for government.

Dr Helen Scott-Orr
Inspector-General of Biosecurity
28 May 2019

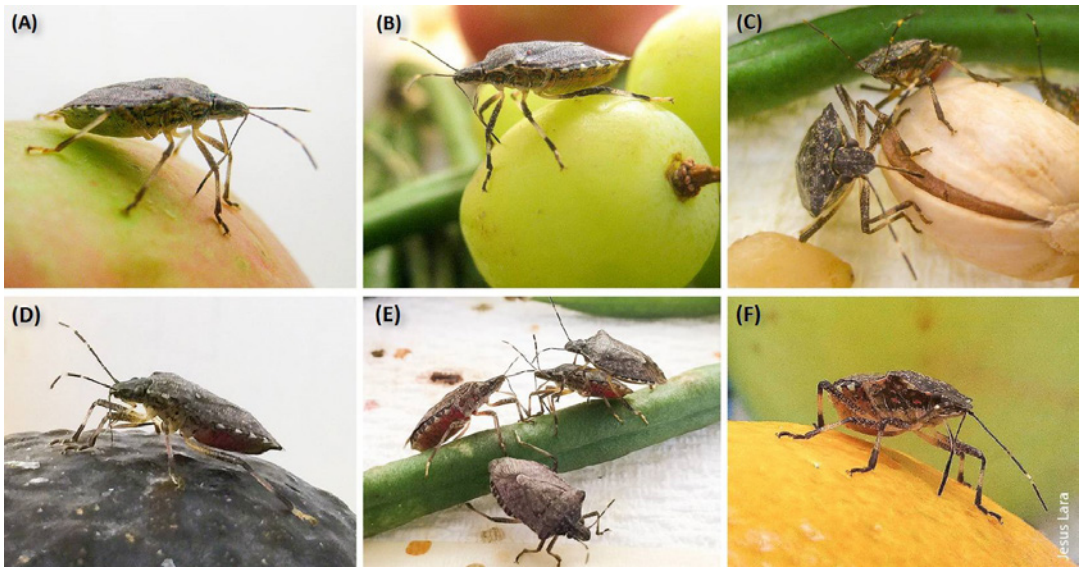
Chapter 1

BMSB pest risk to Australia

1.1 BMSB biology

The brown marmorated stink bug (BMSB, Halyomorpha halys) is an exotic pest that poses a significant biosecurity risk to Australia's agricultural industries. The bugs feed on many types of plant tissues such as fruit, kernels, buds, stems and bark, using straw-like, piercing-sucking mouthparts that penetrate tissues and inject digestive enzymes (Haye et al. 2015). They attack over 300 plant species (Ghosh et al. 2017, Peiffer and Felton 2014, WA Agriculture 2019)—particularly temperate vegetables, fruits and nuts, and key agricultural crops such as apples, citrus, corn, cotton, grapes, soybeans and tomatoes (Figure 1). A list of host plant species is at Appendix C.

FIGURE 1 Brown marmorated stink bug feeding on horticultural crops



BMSB feeding on (A) apple, (B) grape, (C) pistachio, (D) Hass avocado, (E) green bean and (F) orange
Source: Lara et al. (2016)

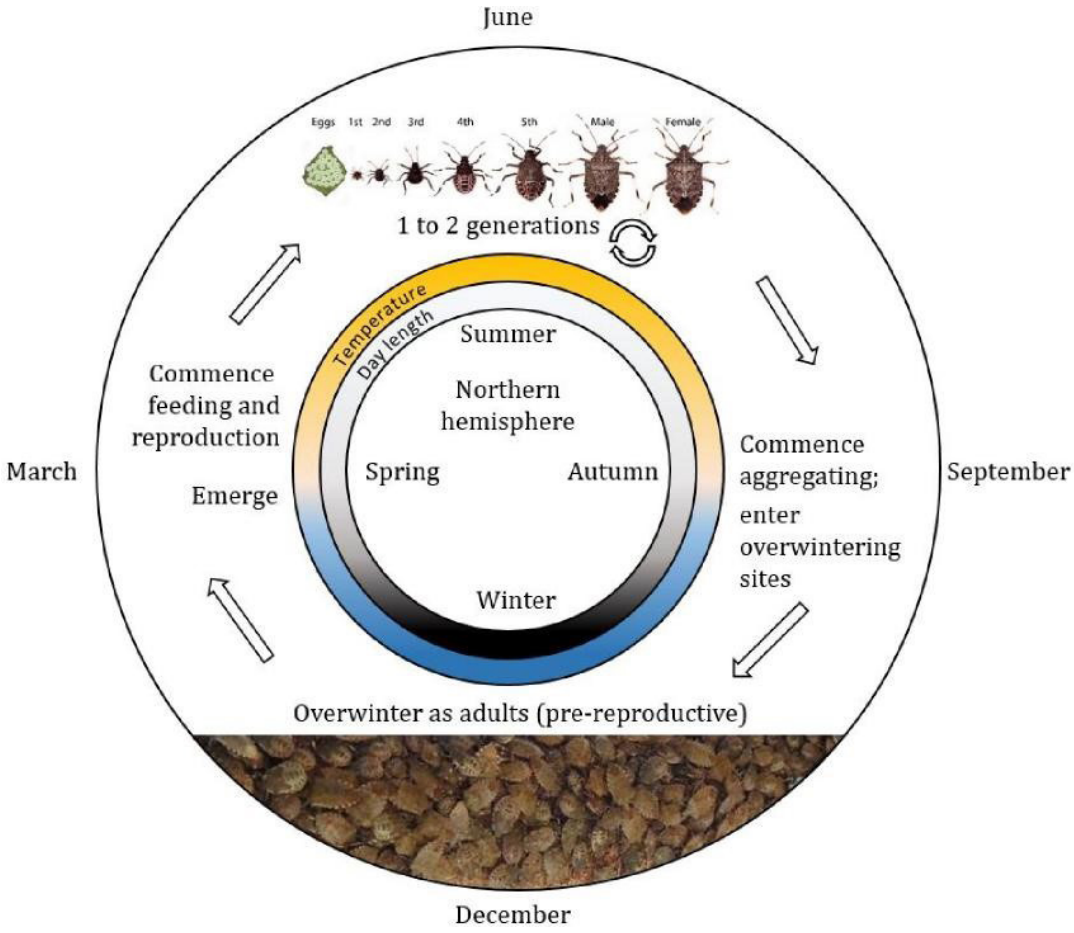
The life cycle of BMSB includes the female laying a cluster of 20 to 30 eggs, five flightless nymphal instars ranging from 2.4 to 12 millimetres long, and a final winged adult stage (Figure 2). Adults range from 12 to 17 millimetres long and from 7 to 10 millimetres wide (Hoebeke & Carter 2003).

BMSB prefer temperate climates. In autumn, pre-reproductive adults move in large clusters to hibernate in dark narrow sheltered spaces—not only in natural sites such as under tree bark, but also in a very wide range of inanimate materials. In spring, as temperatures increase and days become longer, they gradually emerge from these sites. In northern Asia, Europe and North America, they emerge mainly from March to April and into May, although some individuals may remain in overwintering sites until early June (Figure 2). Females emerge with undeveloped ovaries and become reproductively mature after one to two weeks feeding in the field, at temperatures over 17°C.

BMSB adults can fly 5 kilometres and have a high reproductive output—a single female can produce several hundred eggs over her lifetime. This enables them to spread easily and establish in invaded regions. Long distance dispersal of stink bugs occurs by human-assisted means, particularly as they seek refuge as part of their overwintering strategy in autumn and winter. They can hitchhike across continents and oceans in cargo, packing crates, aircraft, machinery, vehicles and personal luggage (Haye et al. 2015). BMSB is also a nuisance pest, infesting homes, offices and factories, with smelly secretions that can cause allergic reactions.

As BMSB invades orchards and crops, it causes major damage to both young shoots and to ripe fruit, and may taint citrus or grape juice (WA Agriculture 2019). High levels of pesticide spraying are needed to control the pest, which disrupts integrated pest management and makes organic production of unblemished fruit almost impossible.

FIGURE 2 Life cycle of brown marmorated stink bug in the northern hemisphere



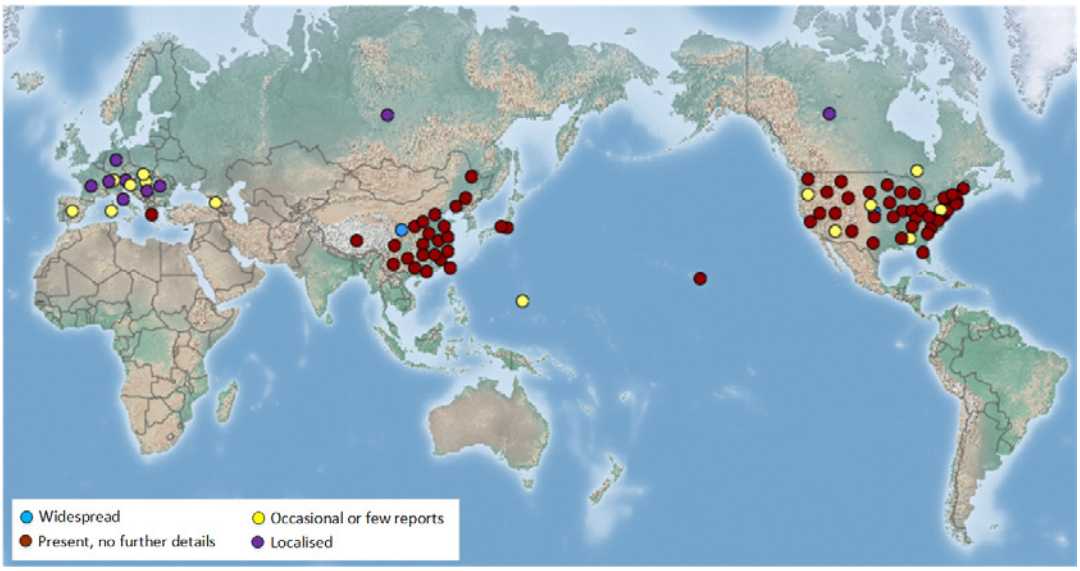
Note: The Australian 'BMSB risk season', from 1 September each year to 30 April the following year, coincides with the period in the northern hemisphere when the bugs could hibernate in cargo. If BMSB were to establish in southern hemisphere countries, the Australian BMSB risk season would become year-round.
Source: Department of Agriculture and Water Resources (2017)

1.2 Overseas spread

BMSB is spreading steadily from its native East Asia. It was first found in the United States of America (USA) in the 1990s and by 2018 it had spread to 43 US states and four Canadian provinces. In Europe, after being found first in 2008 in Switzerland, it had spread to Germany by 2012, France and northern Italy by 2013, and Hungary by 2014, and was projected to spread further to nearby cool temperate countries and regions (Map 1). In 2017, it was first found in the southern hemisphere in Chile, where it was reported to be confined to the suburbs of Santiago. Surveillance was still ongoing in April 2019.

BMSB proliferates to very high numbers in the first few years after entering a new country, due to the absence of any predators. In its East Asian countries of origin, its prevalence is lower due to natural biological control by parasitic wasps (*Trissolcus* spp.) or certain fungi. A key parasite *Trissolcus japonicus*, the Samurai wasp, has moved naturally to the USA, and this has coincided with some reduction in the severity of BMSB infestations there in recent years. New Zealand (NZ) has pre-emptively researched the use of the Samurai wasp use as a biocontrol agent. In 2018, the NZ Environmental Protection Agency pre-approved the release of this wasp species as part of an arsenal of measures in the event of a BMSB incursion. The successful application, submitted by the NZ Brown Marmorated Stink Bug Council, is valid for 10 years. However, as the wasp also attacks stink bugs native to Australia, it may not be permitted here.

MAP 1 Global distribution of BMSB, 2019



Source: CABI/EPPO 2016

1.3 Potential impact of BMSB in Australia

Because of these increasing BMSB risks, in 2015 the Department of Agriculture and Water Resources (the department) began a formal pest risk analysis (PRA). In 2017, the department released a draft PRA report for stakeholder consultation, which it intended to finalise in mid-2019.

The draft PRA found that, if BMSB became established in Australia, it could significantly impact the country's horticultural production and export value. The analysis evaluated the likelihood of BMSB becoming established and spreading in different regions of Australia. The draft PRA identified over 240 host plants that could be impacted by BMSB (Appendix C) (Department of Agriculture and Water Resources 2017). Given BMSB's wide host range, dispersal capacity and cryptic colouration, as well as its lack of natural predators and our own inability to provide highly sensitive detection techniques, the draft PRA considered that successful eradication of an established BMSB population would likely require a significant effort across a large area.

Seven submissions to this IGB review were from agricultural industry bodies, mainly horticultural, concerned with the potential severe economic impacts if BMSB were to establish in Australia.

> The Centre for Agriculture and Biosciences International (CABI/EPPO 2016) has found evidence that BMSB can cause:
>
> - losses of up to 90 per cent for pome and stone fruit
> - damage exceeding 50 per cent under heavy infestations of vegetable crops
> - taint and contamination of harvested fruit, particularly for small fruit and grapes.
>
> (Plant Health Australia submission)

> The pest is a concern to the wine sector for a number of reasons. Juveniles and adult bugs can feed on and damage grapes impacting both quality and yield. The volatile molecules excreted by BMSB have potential to be imparted to grape juice and at significantly high levels could potentially be transferable to wine … Once established in Australia, an exotic pest outbreak such as BMSB will be complex to exclude from entering vineyards … Prevention must be placed at the forefront of biosecurity efforts.
> (Australian Grape and Wine submission)

> BMSB can have a major effect on hazelnuts mainly in the area of nut quality. The insects are known to pierce the hard shell of the nut and penetrate the kernel resulting in damage to the kernel. This leads to a downgrading on the nut/kernel.
> (Hazelnut Growers of Australia Inc. submission)

Sixteen review submissions to the draft PRA were from import industry participants representing shipping lines, brokers, freight forwarders and logistics organisations. These submissions recognised the importance of biosecurity while putting forward strong views on how these departmental BMSB measures or performance should be modified. Many had constructive suggestions to improve BMSB risk management efficiency, without compromising its effectiveness.

In May 2016, Plant Health Australia (PHA) had developed a BMSB emergency response preparedness strategy in consultation with the Australian, NSW, Tasmanian and Queensland governments as well as industry (Department of Agriculture and Water Resources 2016). The strategy provided information to assist in determining requirements for an emergency response to a BMSB incursion.

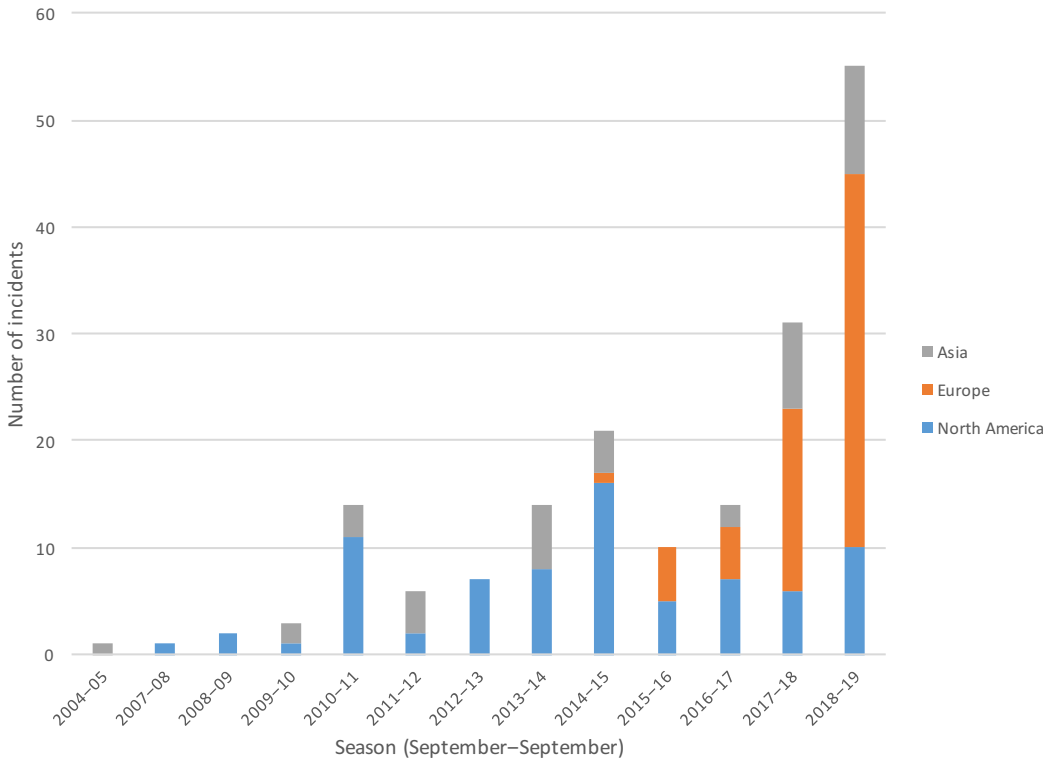
The draft PRA proposed that countries with established BMSB be permitted to export goods to Australia, subject to applying risk management measures to cargoes and conveyances leaving these countries from 1 September each year to 30 April the following year ('the BMSB season'). Progressive implementation of these measures, pending PRA completion, is discussed in this report.

1.4 BMSB approach rate to Australia

Before 2014, live BMSB adults were found as hitchhikers on various goods from several countries within the native range for BMSB, such as China and Japan, and from the United States (USA) where BMSB was invading. From 2015, live detections on goods from Europe became an increasing problem, with a massive upsurge in 2018–19 (Figure 3).

Up to mid-2019, Australia and New Zealand remained BMSB-free, due to intensive preventative efforts, despite increasing approach rates to both these countries. BMSB arrived on an increasing range of cargo imported from a wider range of countries as it spread around the northern hemisphere. This meant that specialised offshore treatments, and onshore biosecurity risk assessment, inspection and treatments had to be applied to a large array of goods in more countries which were previously not of biosecurity concern.

FIGURE 3 Number of live BMSB incidents by season and continent, 1 September 2004 to 7 May 2019



From 1 September 2018 until 10 April 2019, a total of 274 BMSB detections were recorded in the department's incident data base. Over half of these detections originated from Europe (Figure 4). The unknown category is a result of detections on vessels or within containers of mixed origin goods.

FIGURE 4 BMSB detections, 2018–19 to 10 April 2019

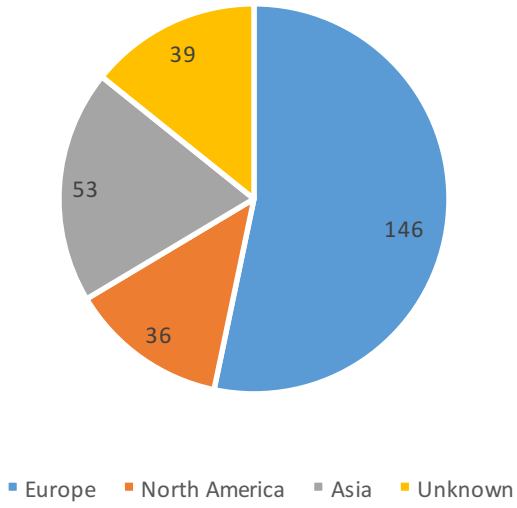


Table 1 shows the numbers of BMSB detections at- and post-border, and those which contained one or more live bugs or only dead bugs. Post-border detections of BMSB varied from finding single dead bugs on imported goods free from biosecurity control, to finding live bugs in traps near cargo depots.

Twenty-six (12 per cent) of detections at the border contained live bugs, as did 31 (52 per cent) of post-border detections, mainly in goods imported from Europe (23 per cent) and North America (25 per cent).

TABLE 1 At-border and post-border BMSB detections, 2018–19 to 10 April 2019

Continent	Numbers of BMSB at border		Numbers of BMSB post-border		Total	
	Live	Dead	Live	Dead	Number	% live BMSB
Europe	13	88	21	24	146	23
North America	3	24	6	3	36	25
Asia	8	42	3	0	53	21
Unknown	2	34	1	2	39	8
Total	**26**	**188**	**31**	**29**	**274**	**21**

Numbers of bugs in a detection can vary from one to several, and in some instances amounted to hundreds of bugs in a single detection. Most detections (76 per cent) were of one to five bugs, while larger detections came mainly from Europe (Table 2).

TABLE 2 Numbers of BMSB per detection during 2018–19 season

Continent	No. of BMSB per detection			
	1–5	6–20	More than 20	Unknown
Europe	89	19	9	2
North America	26	0	4	1
Asia	32	8	2	1
Total	**147**	**27**	**15**	**4**

1.5 Responses to post-border detections of BMSB in Australia

In the 2017–18 BMSB season, there were three post-border detections of live bugs. This led to two nationally cost-shared emergency responses (in NSW and Western Australia) between agricultural industries and governments under the Emergency Plant Pest Response Deed (EPPRD) (PHA 2018). These responses involved 15 different cropping sectors, including horticulture, cotton and grains industries. Each response saw swift and effective measures put in place—risk assessment, fumigation, trapping and monitoring—to prove freedom from the pest.

In the 2018–19 season to 10 April, eight post-border detections of live bugs were referred to the Consultative Committee on Emergency Plant Pests (CCEPP)—three in Queensland, three in Victoria and two in Western Australia—but there were no cost-shared emergency responses, with each incident being handled by the relevant state government. For instance, a response by the Queensland Government, triggered by small numbers of live BMSB on a consignment of resin chairs from Italy, concluded on 25 March 2019, after three months of surveillance and trapping operations at the affected sites.

Chapter 2

BMSB risk management issues

2.1 Lack of overseas government regulation of BMSB

Under the World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures and standards developed by the relevant standard setting body, the International Plant Protection Conventions (IPPC), nominated government agencies (National Plant Protection Organisation) may have to certify that phytosanitary requirements for regulated pests are met before goods are exported. However, as BMSB is usually associated with conveyances rather than goods and are outside the scope of the IPPC phytosanitary certification IPPC standard, no government-to-government assurance can be obtained for BMSB risk management of these goods before their export from other countries to Australia. Many BMSB-risk goods have no phytosanitary requirements for trade. Hence, arrangements must be negotiated directly for industry to apply offshore risk management measures and verification of compliance can be more difficult.

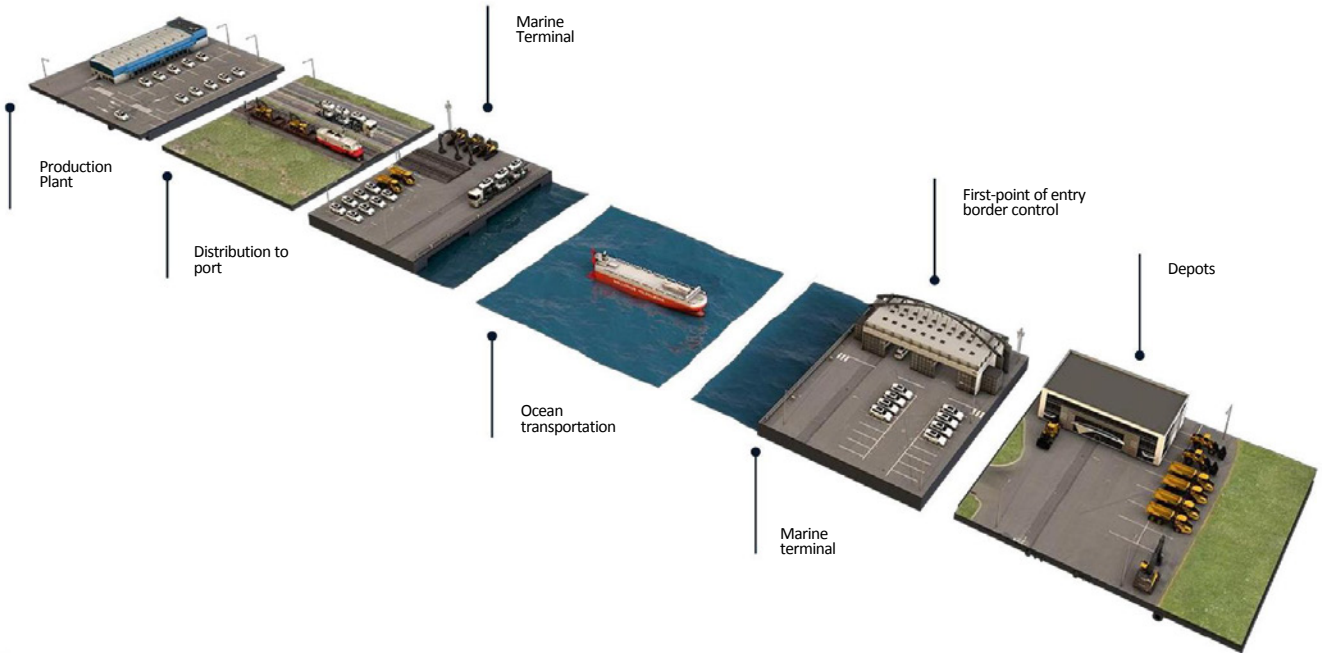
2.2 Long and complex supply chains where BMSB may infest cargo

The risk of BMSB infestation depends on whether a cargo was open or exposed in an infested country when BMSB were moving to hibernate, and whether the cargo was adequately treated and subsequently protected from infestation by being sealed, segregated and/or transported promptly from any infested area. Thus offshore measures must be implemented to reduce the time between treatment and shipping, and to segregate treated goods and conveyances from untreated goods at all times, to prevent contamination with BMSB.

2.2.1 Break bulk cargo

The difficulty for USA or European break-bulk cargo shippers in managing BMSB risks is shown in Figure 5, which depicts a supply chain for vehicles. Initial vehicle production plants may be far from the port of export. Vehicles and other cargo may be stored after manufacture anywhere along the distribution route to or at the port for significant periods before export. One consignment may be manufactured in or pass through an area when BMSB are hibernating, and become infested, while another consignment may be treated or kept away from any such risk. On board the ship, some bugs emerging from hibernation may move onto previously clean cargo, posing a hitchhiker risk once they arrive in Australia.

FIGURE 5 The vehicle supply chain—an overview



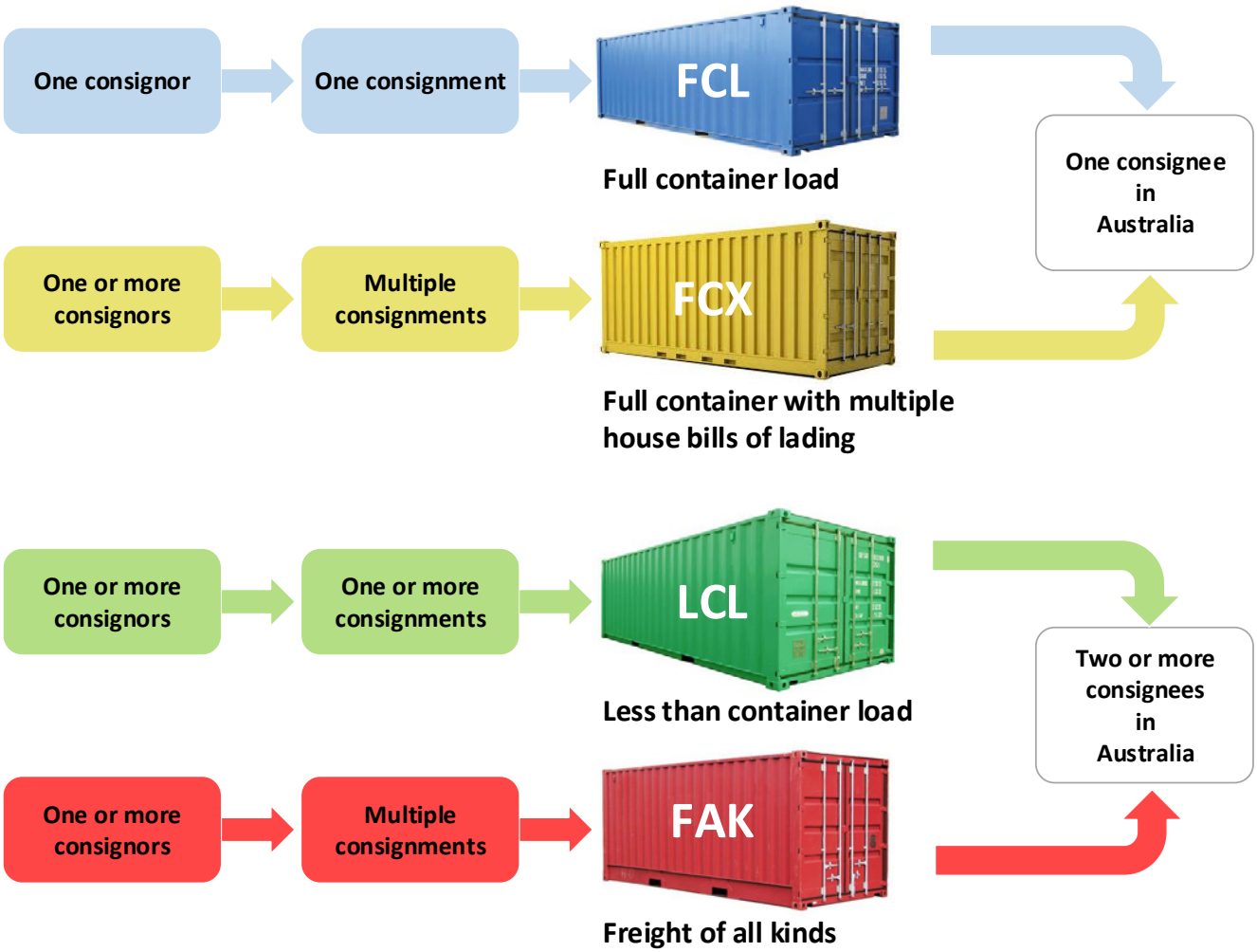
Source: Adapted from WW Oceans submission

2.2.2 Complex supply chains for containerised cargo

Different uses of sea containers for handling single or mixed consignments, destined for one or more consignees, are designated in the shipping industry by four acronyms (Figure 6). These are:

- **FCL** (Full container load)—a container where all the contents are consigned from one consignor to one consignee. There is only one consignment in the container.
- **FCX** (Full container with multiple house bills of lading)—a container where all the contents are consigned to one consignee and where there are two or more consignments in a container.
- **LCL** (Less than container load)—a consignment that does not occupy the full space available in the container, and cargo is consolidated by a 'Master Consolidator' with one or more consignments in a container. The consignments in this container must have at least two different consignees.
- **FAK** (Freight of all kind)—a carrier's tariff classification for various kinds of goods that are pooled and shipped together at one freight rate in a container.

FIGURE 6 Types of sea container consignments



While BMSB risk management of FCL containers can be handled relatively simply, by various interventions, FCX, LCL and FAK containers pose more challenges. A BMSB-risk consignment could be mixed in the container with others that then become at-risk, as any BMSB could move around inside the container. LCL and FAK consignments pose extra onshore risks as the containers will be unpacked and different consignments sent to different consignees, distributing any pests that might be present.

2.3 Widened range of BMSB-risk goods

All imported goods entering Australia are classified in the Department of Home Affairs' Integrated Cargo System (ICS) based on tariff chapters set out in Schedule 3 of the *Customs Tariff Act 1995* (the Customs Act). Each chapter may have numerous lines describing different classes of goods—there are about 100 chapters and almost 11,000 lines. Some chapters of goods, such as live animals and live plants, are referred automatically by ICS to the department for assessment of biosecurity risks, while a large proportion are considered of negligible biosecurity risk.

However, by the 2018–19 BMSB season, the spread of BMSB in North America and Europe, and its habit of hibernating in inanimate goods, led to a large expansion in the tariff chapters considered as BMSB target high-risk goods and target risk goods (Appendix D), with extra BMSB risk management requirements.

Any type of goods that may become infested with BMSB are referred to as 'at-risk' goods. At-risk goods include break-bulk cargo, vehicles and machinery. At-risk goods from BMSB countries that were assessed as high likelihood of association with BMSB contamination (using criteria including previous BMSB detections and contaminants) were classified as target high-risk. Target high-risk goods required mandatory treatment. At-risk goods from BMSB countries that were assessed as lower likelihood of association with BMSB contamination were classified as target risk goods. Target risk goods were subject to increased random inspections to monitor risk status.

Target high-risk goods—listed in 25 chapters of Schedule 3 of the Customs Act—range from explosives, wooden articles, textiles, electonic equipment, railway locomotives and parts thereof, vehicles, aircraft, ships and boats, to arms and ammunition (Appendix D). Their BMSB risk management measures were if shipped:

- **as break-bulk** (including flat rack and open top containers) required mandatory offshore treatment, with untreated goods directed for export on arrival.
- **in enclosed containers** required treatment offshore or onshore at the whole container level. Deconsolidation or removal of goods was not permitted prior to treatment. However, the department allowed deconsolidation and treatment at consignment level if the goods were shipped in a LCL/FAK container from a non-target risk country.

Target risk goods—listed in 14 chapters of Schedule 3 of the Customs Act—included goods such as fertilisers, organic and inorganic chemicals, plastic and rubber articles, paper and paper products, and printed books and newspapers. These goods did not require mandatory treatment but were subject to increased onshore random inspection.

Chapter 3

Increasing efforts to manage BMSB risks

3.1 Changing operational policies

From 2014, the department implemented additional measures almost every year to manage the increasing seasonal and geographic risks of BMSB infestations approaching Australia in break-bulk and containerised sea cargo from different regions. The 'BMSB season' from 1 September each year to 30 April the following year, coincides with the period in the northern hemisphere when the bugs seek hibernation sites and could contaminate cargo. Updated operational policies (at least 13 in 2018–19 alone) and industry advice notices were developed, often very quickly, to manage new risks as they became apparent, due to the progressive spread of BMSB described in Chapter 1.

Appendix E summarises departmental industry advice notices relating to BMSB operational policy changes, with the number of advices per risk season rising from seven for 2014–15, zero for 2015–16, two for 2016–17, 11 for 2017–18, and up to 32 for the 2018–19 BMSB risk season. These were sent to several different groups of staff and stakeholders who had to adjust their operations accordingly.

3.2 Industry communication

The department communicates with key industry stakeholders involved in pre-border and border biosecurity risk management through various channels and peak organisations. For importers, two key bodies are the Departmental Cargo Consultative Committee (DCCC) and the Import Industry Finance Consultative Committee (IIFCC).

Major efforts were made to keep industry informed of changing BMSB management requirements through meetings of these and more specialised committees, as well as through industry advice notices and website updates. Industry stakeholders considered that the industry advice notice system was more useful at communicating important policy and process changes to the wider industry than the department's website, where it is often hard to ascertain policy changes or updates to the content.

However, in 2018–19, the rapid changes in policy due to changing BMSB risks overwhelmed this communication system. A large number of submissions to this review noted various industry problems in complying with these revised policies at short notice and were very critical of the department for lack of prompt communication.

> There have been instances where a measure was presented to a hastily convened DCCC teleconference 'consultation' requiring 'immediate implementation' without time to adequately assess the impact of the measure to industry, leading to consequential delays, costs and dislocation to industry.
> (Australian Federation of International Forwarders submission)

Some but not all industry players managed to keep up with the changing requirements but these coincided with greatly increasing volumes of vessels and goods needing intervention, so lack of time to manage risks further up the supply chain became a major problem.

For the 2019–20 BMSB season, the department was hoping to have all seasonal BMSB measures finalised after industry consultation by the end of May 2019, giving three clear months for importers and shippers to prepare for necessary actions they might need to take.

3.3 Managing increasing BMSB risks from USA

3.3.1 USA, 2014–15 BMSB season

In December 2014 large populations of BMSB were detected on a vessel carrying new vehicles from the US port of Savannah, Georgia (Box 1).

After this, the department began full inspection of vessels carrying break-bulk vehicles, machinery and auto parts arriving from Savannah, USA. Several further incidents in 2014–15 involved entire ships with hundreds of vehicles and many hundreds or possibly thousands of BMSB throughout the holds. Some generated multiple quarantine management actions as their cargo was destined for several Australian ports.

Box 1 Heavily BMSB-infested ship arrives in Brisbane from USA

In December 2014, staff inspecting the unloading of a ship carrying cars and other break-bulk cargo were shocked to see hundreds of bugs marching and flying out of the hold as the ship's ramp was lowered. The vessel was quickly shut again and directed out of the Port of Brisbane until a comprehensive discharge management plan could be developed. This involved several insecticide foggings, a complete residual insecticide spray of all exposed surfaces of the vessel, individual wrapping on board of the suspect source vehicles and then comprehensive inspections of the vessel and cargo by biosecurity officers. Discharge was then permitted with all cargo directed for sulphuryl fluoride (SF) fumigation in a large grain fumigation shed next to the wharf. (The shed operated under an approved arrangement with the department and was fortunately empty). Each vehicle was assessed and inspected again on the vessel ramp, sprayed underneath with a residual spray, then driven via a dedicated and residually treated pathway directly into the enclosed shed. As the contaminated trucks were being prepared for fumigation in the shed, their windows were wound down for fumigant penetration, and even at this stage, more BMSB started to emerge from deep in the vehicles. Biosecurity officers based themselves at the final door to ensure no escapes, sealed the doors and then supervised the fumigation with over 3 tonnes of SF gas released into the shed.

Consequently, in February 2015 stronger measures, including mandatory offshore treatment for break-bulk and containerised machinery and vehicle cargo, were applied to shipments from all US east coast ports. From March 2015, these measures were applied to targeted break-bulk vehicles and agricultural machinery and new, unused FCL containerised goods in several more tariff classes from all US ports.

3.3.2 One high-risk country—USA, 2015–16 and 2016–17 BMSB seasons

BMSB requirements continued to apply to target goods from the USA. All used high-risk machinery in the target tariffs needed to be cleaned and treated offshore. All new machinery in the target tariffs were required to undergo offshore treatments, unless alternative safeguarding arrangements were implemented. Safeguarding is a detailed pest risk management plan/system that can be implemented by manufacturers offshore to ensure that there is no BMSB contamination from the time of manufacture to the time of export, as an alternative to the mandatory pre-shipment requirements.

The target goods were revised to include only agricultural, roadwork, passenger and non-passenger vehicles as well as ships and boats. The department also revised treatment conditions to align with New Zealand.

Figure 3 shows that these measures effectively reduced the approach of live BMSB from North America in 2015–16 and 2016–17, but detections in ships and cargo from Europe were increasing.

3.4 Managing increasing BMSB risks from Europe

3.4.1 Two high-risk countries—USA and Italy, 2017–18 BMSB season

Measures applied to select cargo from the USA were extended progressively to similar goods shipped from Italy, and from other European ports if the goods were manufactured or stored in Italy during the risk period. Break-bulk cargo such as new and used vehicles, machinery and large machinery parts were the primary pathway.

In December 2017, the department began inspecting a broader range of goods from Italy, including containerised goods such as electronics and equipment and timber furniture. In January 2018, the department required all target containerised goods arriving from Italy to be treated onshore, unless previously treated offshore.

In late January 2018, the department also began heightened vessel surveillance on roll-on/roll-off (ro-ro) vessels carrying wheeled cargo, such as cars and trucks. All ro-ro vessels were subject to a BMSB questionnaire via the department's Maritime Arrivals System (MARS) to determine if a seasonal pest inspection was required upon arrival at a port.

3.4.2 Nine high-risk countries—seven more from Europe, 2018–19 BMSB season

The department responded to the increasing BMSB spread in Europe by extending seasonal BMSB risk management measures. It applied extra offshore fumigation, and onshore inspection and treatment for an increased range of target goods to cargoes from seven additional European countries— France, Georgia, Germany, Greece, Hungary, Romania and Russia.

Heightened vessel BMSB surveillance was applied to any ro-ro or general cargo vessel that transhipped or loaded goods from these countries, as well as from Japan.

The department began undertaking a low rate of random onshore inspections from emerging risk countries. These countries included Austria, Bulgaria, Croatia, Slovakia, Slovenia, Spain, Switzerland, Turkey and Serbia. 'Emerging BMSB risk countries' are those that the department analysed as future risk countries using criteria including reported presence of BMSB, climate, detection rate, volume and type of tariff. The department also targeted other countries of concern including all remaining European countries, Canada, Chile, China, Japan and Korea.

There was an increasing flurry of operational policy changes and industry advice notices, relating to offshore and onshore treatment requirements and oversight, with specific measures applied to certain vessels and container types, and ways to deal with the increasing failures of an overloaded border biosecurity system. These changes are described in more detail in following chapters.

The department adapted the S-Cargo system to apply holds on LCL containers requiring treatment to reduce the risk of cross contamination with other containers.

3.5 Risk analysis and policy development with New Zealand

From 2014–15, when BMSB problems on break-bulk cargo from the USA began, the department and New Zealand Ministry for Primary Industries (NZ MPI) worked together to align conditions to mitigate BMSB risk. There was good technical agreement on where risks lay and how in general to reduce these risks. The two countries shared data on BMSB border interceptions and seasonality, and on risk pathways and the effectiveness of offshore risk management measures over time.

While both countries had access to the same scientific data about presence of BMSB in different countries, they assessed risks somewhat differently. For the 2018–19 BMSB season, Australia listed nine target high risk BMSB countries, while New Zealand listed 16 BMSB-risk countries. Both countries have agreed to a common list of 32 countries likely to present increased BMSB risk in 2019–20. A common list of target high-risk countries allows for more harmonised regulations to prevent BMSB from being shipped in cargo destined for Australia and New Zealand. Without this, it is difficult for carriers to enforce effective treatment procedures when loading cargo at ports in those countries.

However, differences in trade patterns, biosecurity systems and climates meant that specific BMSB conditions—such as treatment methodologies, target risk countries and target risk goods—have varied between the two countries. Australia and New Zealand also have very different systems in place to manage border and post-border risks for different types of goods, and volumes. For example, New Zealand imports more used cars from Japan compared to Australia. Hence management of specific goods and pathways may differ between countries for each country to achieve its appropriate level of protection (ALOP).

This created some problems for industry in meeting the different requirements, particularly when ships and cargo might be destined for ports in both countries. These problems became intense during the 2018–19 BMSB season. Many submissions to this review requested closer alignment between many aspects of the two countries' policies and procedures.

BMSB is continuing to invade new countries and Australia and New Zealand remain at high risk of incursions. Currently this risk is only serious for two-thirds of the year—the BMSB season from 1 September to 30 April the following year—since BMSB is confined to the northern hemisphere. However, if the pest were to establish in South America or southern Africa, its management would be far more complex. BMSB could arrive in a hibernating state and potentially remain in cargo many months after arrival, emerging when potential risks are long forgotten. Continued active BMSB risk analysis will be needed to monitor this and to take early action as needed.

Joint approaches to innovation are also needed. Australia held a joint workshop with New Zealand in September 2017, focused on:

- surveillance, detection and management of BMSB
- consideration of the risk of BMSB establishment for large parts of Australia and New Zealand, with further work foreshadowed on the effect of BMSB on Australian and New Zealand native plant species
- development of national surveillance strategies for both countries
- pre-registration of potential chemical controls (emergency permits) for BMSB.

Recommendation 1

The department should continue to cooperate closely with New Zealand in risk profiling and risk assessment for BMSB of countries, pathways and goods; in developing and administering risk mitigation measures such as offshore quality systems and consistent border controls; in industry communication; and in identifying gaps in scientific knowledge and prevention, preparedness and response measures.

Department's response: Agreed.

The department has been working extremely closely with New Zealand Ministry for Primary Industries (MPI) to align BMSB measures for the 2019–20 season where possible, and a number of changes have already been agreed by both agencies. It is important to note that complete alignment of measures is not feasible due to differing trade patterns, legislative frameworks and biosecurity systems. The department will continue to work closely with MPI to identify opportunities for further alignment.

Chapter 4

Treatment of goods for BMSB

4.1 Types of treatments

The department relies on effective offshore and onshore treatments to manage certain biosecurity risks. Each approved treatment, if applied properly, should kill all BMSB in a treated consignment.

Three biosecurity treatments can effectively manage the risks associated with heat treatment (HT), methyl bromide (MB) fumigation and sulfuryl fluoride (SF) fumigation. All three have been approved by the department to mitigate BMSB, with BMSB-specific treatment rates set since January 2015. The availability of SF as an offshore treatment option was restricted in response to specific concerns about the conduct of treatments (discussed further at 4.2.2).

New Zealand's required treatment options for BMSB are the same as Australia's, but up until and during the 2018–19 season some treatment rates differed. In early 2019, both countries agreed on broad treatment conditions, subject to possible minor variations in methodology required by each country.

4.1.1 Application of treatments

The department prescribes treatment methodologies, setting minimum standards for providers to conduct treatments, with sufficient equipment, access to chemicals and trained staff. Treatment methodologies are supported by proven, efficacious treatment schedules for different commodity/pest combinations. Treatment methodologies underpin the department's regulation of treatments, forming part of relevant approved arrangement classes and the Offshore BMSB Treatment Providers Scheme (discussed at 4.2.2).

During the 2018–19 BMSB season, all BMSB treatments conducted onshore under an Approved Arrangement and offshore under the Offshore BMSB Treatment Providers Scheme were required to be completed in accordance with the relevant treatment methodology.

4.1.2 Heat treatment

New broad conditions agreed in 2019 between Australia and New Zealand governments for heat treatment were 56°C for 30 minutes or 60°C for 10 minutes, ensuring that entire loads are held at the target temperature for the required time.

Heat treatment has a wide application but needs to be carefully applied to protect different goods—not all are suitable. Heat is especially suited to treating goods with low thermal mass and high conductivity, such as metal goods. Vehicles and shipping containers can be brought to target temperature quickly by circulation of heated air, but goods with high thermal mass, such as tiles or bricks, could take days.

4.1.3 Methyl bromide fumigation

Methyl bromide (MB, CH_3Br) is a colourless, odourless, non-flammable ozone-depleting gas. It was used extensively as a pesticide until it was phased out from 1987 under the Montreal Protocol on Ozone Depleting Substances (UNEP 1987), which contained an exemption for quarantine uses. Australia prohibited the use of MB in 2005, other than for quarantine and pre-shipment or feedstock applications. The EU prohibited all uses of MB in March 2010.

Methyl bromide is effective against a wide range of pests, is inexpensive and relatively fast-acting. Australia and New Zealand agreed in 2019, based on current best scientific evidence, that broad conditions to achieve effective MB fumigation in at-risk goods were:

- concentration-time of 200 grams per hour per cubic metre, or more
- a minimum temperature of 10°C
- a minimum exposure time of 12 hours
- a minimum end point concentration of 8 grams per cubic metre.

Fumigant exposures, expressed as concentration (C) and time (t) products (Ct), are calculated following draft IPPC 2014-004 ISPM requirements (International Plant Protection Convention 2014) for the use of fumigation as a phytosanitary measure.

4.1.4 Sulfuryl fluoride fumigation

Sulfuryl fluoride (SF, SO_2F_2) is a colourless, odourless gas (4,800 times more potent as a greenhouse gas than carbon dioxide), often used as an alternative to MB. Australia and New Zealand agreed in 2019, based on current best scientific evidence, that broad conditions to achieve effective SF fumigation for BMSB in at-risk goods were:

- concentration-time of 200 grams per hour per cubic metre, or more
- a minimum temperature of 10°C
- a minimum exposure time of 12 hours
- a minimum end point concentration of 8 grams per cubic metre.

4.1.5 Other alternative fumigants

Research into alternative fumigants to replace MB has been underway for some time. The main obstacles to their approval are proof of efficacy and safety, acceptance by importing and exporting agencies, lack of financial incentives, and changes with logistics and cost.

Australia and New Zealand have recently approved **ethanedinitrile (EDN, C_2N_2)** as a MB alternative for the export of logs (Pranamornkith et al. 2014). EDN has also been approved as a soil fumigant for strawberry production in Australia (NZ EPA 2018). Further research is required to test if EDN is effective against BMSB.

Phosphine or hydrogen phosphide (PH_3) is a highly toxic, low boiling-point compound that diffuses rapidly and penetrates deeply into materials, such as large bulks of grain or tightly packed materials. The gas is produced from formulations of metallic phosphides (usually aluminium or magnesium phosphide) that contain additional materials to regulate release of the gas (Cox 2017). The required log fumigation exposure period for phosphine is considerably greater than for MB (3–4 days compared to 24 hours).

Ethyl formate ($C_3H_6O_2$) is non-toxic and generally regarded as safe for use in foods, and a formulation in carbon dioxide is already registered for use in Australia. Research to investigate the use of ethyl formate with nitrogen as fumigation treatment for container disinfestation indicated it was effective in killing surface pests in 20- and 40-foot containers loaded with various goods (Ren and Newman 2015). Mixing with nitrogen overcomes the highly flammable nature of ethyl formate that may allow its use for in-transit fumigation of containers on trucks and ships (Nicholas 2018).

4.2 Offshore BMSB treatment oversight

4.2.1 Offshore BMSB treatment providers scheme

The department has historically accepted treatment certification from a range of offshore sources with varying levels of assurance. Before March 2018, the department accepted BMSB treatment certificates from offshore treatment providers if they simply met the department's *Minimum documentary and import declaration requirements* policy, to show that offshore treatments were conducted to meet Australia's import conditions.

During the 2017–18 BMSB season, the department found ongoing non-compliance issues, including detection of live BMSB in consignments declared to have been treated in Italy with sulfuryl fluoride (SF) treatments, and uncertainties about the authenticity of treatment certification and access to SF in Italy. As a result, it briefly ceased accepting SF treatment certificates from all Italian treatment providers and required all goods (apart from excluded tariff groups) from Italy to be treated onshore. Other treatment failures, including under the International Standard for Phytosanitary Measures No. 15 (International Plant Protection Convention 2016) for wood packaging, led the department to question its acceptance of offshore treatment certification from all countries.

In March 2018, the department established a Treatments Taskforce to provide guidance on assurance and verification measures that would give confidence that offshore and onshore treatments consistently and reliably achieve required biosecurity outcomes. Shortly after it introduced the *Offshore brown marmorated stink bug treatment providers scheme* (Department of Agriculture and Water Resources 2019a). This scheme sets out the process for the department to determine suitability of other parties to perform effective offshore BMSB treatments of goods to be imported into Australia, detailing approved methodologies and equipment, chemicals and staff training requirements.

This voluntary scheme only applies to:

- **registered offshore BMSB treatment providers**—all BMSB treatment providers in all target risk countries that wish to be listed on the department's website must register under the scheme (by application), while providers in non-target risk countries are encouraged to register if they treat goods transhipped from target risk countries, to reduce the intervention on these goods
- **goods with departmental requirements for BMSB treatment**—excluding goods that require phytosanitary certification.

The implementation of the scheme in 2018, and validation and approval of offshore treatment providers by the department proved challenging due to the expanding range of high-risk countries and ports of loading, which were in scope of the BMSB measures. The department relied on offshore treatment providers to proactively register for the scheme, but also actively attempted to engage with as many as possible. In Italy, offshore treatment providers were identified and publicised through the Italian Fumigation Association, Australian customs brokers, and the department's website, as well as by analysis of previous BMSB season import and treatment failure data.

On 8 August 2018, the department communicated with industry about the finalised BMSB seasonal measures, which included both the expanded list of seven more European countries, and treatment technical specifications—dosage, temperature and duration—for MB or SF fumigations, or heat treatments. This left importers and shippers with a very short time period to finalise commercial consultations and contract arrangements with potential offshore treatment providers before the BMSB season commenced on 1 September 2018.

In submissions to this review, several broker and freight forwarder industry stakeholders noted that delay in implementing the offshore treatment providers' scheme for the 2018–19 BMSB season resulted in late treatment provider registrations. This meant that there were insufficient approved offshore treatment providers in high-risk countries to accommodate the sudden escalation in volumes in all of the target high-risk countries and major ports in adjacent countries. In turn, this led to more containers arriving without treatment, creating major delays in DAWR processing shipments, treatment providers becoming overwhelmed with containers to be treated, trade disruptions, delays and additional costs to industry.

However, the department continued registering providers. At 31 March 2019, there were 194 approved offshore treatment providers in 23 countries, of which 64 were approved for MB fumigations, 74 for SF fumigations and 108 for heat treatment (Table 3).

TABLE 3 Offshore BMSB treatment providers, by country and treatment type, 31 March 2019

Country	Types of treatment			Total no. of providers
	Heat treatment	Methyl bromide	Sulfuryl fluoride	
Canada	0	1	0	1
United States	17	39	44	66
Austria	1	0	0	1
Belgium	7	0	4	9
Czech Republic	2	0	0	2
Finland	1	0	0	1
France	17	0	6	18
Germany	15	0	7	18
Greece	6	0	0	6
Italy	16	0	5	20
Netherlands	3	0	2	4
Romania	3	0	0	3
Russia	7	0	0	7
Slovenia	1	0	0	1
Spain	4	0	3	5
Switzerland	1	0	0	1
United Kingdom	1	0	2	2
Indonesia	0	7	1	7
Japan	4	0	0	4
Malaysia	0	2	0	2
Singapore	1	12	0	12
United Arab Emirates	1	0	0	1
Vietnam	0	3	0	3
Total	**108**	**64**	**74**	**194**

Note: Some providers offer more than one type of treatment.

4.2.2 Ensuring offshore treatment provider compliance

BMSB treatment certification verification

To discourage fraudulent certification, treatment providers registered on the scheme must provide the department with details and copies of all BMSB treatment certificates they issue. Information is only accepted from a single validated email address for each treatment provider. The certificates are used to create a master list of verified BMSB treatment certification that the department cross-checks when receiving consignment documentation on its arrival in Australia. This process is currently handled manually via email and Excel spreadsheets. Streamlining of this system would enable greater accuracy and verification capacity and allow expanded use of the system by customs brokers in future BMSB seasons.

Recommendation 2

The department should improve and streamline the existing BMSB offshore treatment certificate verification system to improve its accuracy and facilitate expanded use of the system by customs brokers.

Department's response: Agreed.

Work is underway to identify potential information technology changes to improve and automate BMSB treatment systems. This work includes changes that would streamline the BMSB offshore treatment certificate verification system and expansion to other offshore treatments. This may identify business improvements and development of a system for industry to access and verify treatment certificates. Future uptake of such a system would be a commercial decision for brokers.

BMSB failed treatment management

When the department intercepts BMSB on goods treated by providers registered on the scheme, it assesses the circumstances of the pest interception, consignment and treatment details, and uses a decision tree flowchart to determine if the failed treatment can be directly attributed to the treatment provider.

Where offshore treatment failure is determined, registered treatment providers are suspended from the scheme. From the date of suspension, the department stops accepting all treatment certification from the suspended treatment provider. If goods are in transit when a treatment provider is suspended, the department allows onshore treatment of these goods if the risk can be contained and managed on arrival. The department details BMSB treatment provider suspensions on its website and alerts industry through an industry advice notice. This inevitably causes some disruption on arrival of goods in transit but minimises biosecurity risks from failed treatments.

Following suspension, the department engages directly with the suspended treatment provider to obtain relevant records and information relating to the specific treatment and their treatment practices more broadly. To be reinstated onto the scheme, a suspended provider must prove to the department that it has adequately addressed the flaws in treatment practices and can conduct compliant BMSB treatments in future. Proof may be by providing adequate documentary or video evidence, or by an onsite audit at the treatment provider's expense. All audits are conducted against the scheme's compliance requirements and the treatment(s) they are registered to conduct. If a treatment provider is reinstated, the department only accepts BMSB treatments conducted after the date of its reinstatement.

During December 2018, the department suspended four offshore Italian BMSB treatment providers and in January 2019, reinstated three of them. The fourth provider was provided with the opportunity for an offshore audit to be conducted to review their suspended status, but chose not to accept.

General compliance verification activities

The department conducts ongoing verification of registered treatment providers by:

- Assessing samples of BMSB treatment certification to ensure they contains all mandatory compliance details, with feedback and advice provided where minor non-compliance is identified. Most registered treatment providers' certificates are sampled, with higher priority for those companies conducting the most treatments.
- Assessing individual BMSB treatment records from registered treatment providers for compliance against relevant treatment methodologies and rates, and for consistency with the associated certification issued. Treatment providers with significant non-compliances found in certification assessments are prioritised for these assessments, with the department intending to assess treatment records from all registered providers.

These regular compliance activities demonstrate, to registered treatment providers and the broader importing industry, the department's commitment to ensuring ongoing compliance for BMSB treatments through ongoing verification.

Treatment provider communications

Throughout the 2018–19 BMSB risk season, the department provided regular feedback and advice to all registered treatment providers about BMSB treatments they conducted, including:

- clarification of heat treatment method and temperature sensor placement requirements
- clarification of treatment certification verification requirements to ensure providers send correct details to the department to avoid consignment delays on arrival in Australia
- summaries of BMSB treatment provider and export industry meetings
- management of post-treatment integrity of goods.

Departmental staff visited the USA and made three visits to the EU, mainly Italy, in 2018 and 2019, to better understand BMSB risk and engage with treatment providers, fumigation manufacturers and industry regarding biosecurity practice. These visits also provided the opportunity to conduct 14 compliance assessments and three post-suspension re-assessments. Ongoing maintenance of this visit program, in concert with New Zealand, will be needed to assure ongoing compliance and better performance by scheme participants.

4.3 Onshore BMSB treatment oversight

4.3.1 Approved arrangements covering onshore treatment providers

The department oversees required biosecurity treatment applications to incoming goods by fumigators and other types of treatment providers through a series of approved arrangements (AAs) under the *Biosecurity Act 2015*. All approved arrangement proponents must pass a 'fit and proper person' test, and other generic requirements. Guidelines for each class of approved arrangement spell out both generic and specific technical criteria for that class.

'Onshore treatment provider approved arrangements' are entities which are authorised to conduct different treatments on incoming goods under biosecurity control at fixed facilities such as sea and air freight depots, or to provide mobile treatment services at various locations. Relevant classes to mitigate BMSB risks on cargo in Australia are class 4.6: Fumigation, which contains all other approved arrangements offering fumigation, including 12.1: Methyl bromide and 12.2: Sulfuryl fluoride; and class 4.1: Heat treatments. Table 4 lists by state the numbers of different approved arrangement classes which offer fumigation or heat treatment services.

TABLE 4 Onshore approved arrangement treatment provision, April 2019

Class number and name	NSW	Vic.	Qld	WA	SA	Tas.	ACT	NT	Total
A. Depots with fumigation available									
1.1: Unrestricted sea and air freight depot	9	2	15	4	7	3	0	1	41
1.3: Restricted sea and air freight depot	41	88	41	9	16	6	1	2	204
B. Treatment providers									
4.1: Heat treatment	4	4	2	4	2	0	0	0	16
4.6: Fumigation	53	98	62	14	27	9	1	3	267
12.1: Methyl bromide	8	9	13	7	4	1	0	1	43
12.2: Sulfuryl fluoride	1	4	2	3	1	0	0	0	11
Total	**116**	**205**	**135**	**41**	**57**	**19**	**2**	**7**	**582**

This array of onshore treatment providers was inadequate to cope with the demands for onshore treatment in the 2018–19 BMSB season, particularly in Sydney and Melbourne. Industry requested that the department extend onshore treatment timelines to reflect the shortage of onshore treatment providers. Currently, the direction is for goods to be treated onshore within seven days, which leaves importers and customs brokers liable for infringement notices. Increasing this timeline could lead to biosecurity risks.

In December 2018, the department allowed onshore fumigators to vertically stack containers for fumigation (if permitted by relevant state fumigation licensing authorities). This measure was to manage delays to onshore fumigation of imported goods and increase capacity to store containers at approved arrangements sites prior to treatment or inspection.

While the department attempts to require as much treatment as possible to be carried out offshore, consideration needs to be given to contingency planning for high-quality biosecure onshore treatment provision near key ports of entry. Given the expected increased volumes of imported goods requiring BMSB interventions, onshore treatment providers will need to scale their operations to meet demand.

Recommendation 3

The department should work with industry to conduct contingency planning for sufficient high-quality biosecure onshore treatment provision near key ports of entry.

Department's response: Agreed.

As part of preparations for the 2019–20 BMSB season the department is working with the shipping industry to assist operators to develop contingency plans to manage BMSB detections on vessels on arrivals, including, in certain circumstances, the option of onshore treatment.

Further, the department will continue to work with industry and promote the compliance requirements for onshore treatment providers. However, while the department can raise awareness of the importance of treatment providers' ability to manage treatment capacity and the opportunities for commercial entities to carry out these activities, it is ultimately a decision for industry to enter into arrangements.

4.3.2 Oversight of fumigators in Australia

Fumigation with either MB or SF is a technically complex operation with implications for human and environmental health and safety and for the effectiveness of control of different target pests. It is prescribed by the department under the *Biosecurity Act 2015* for treating goods that may carry BMSB and also other insect pests into Australia. Other countries have similar requirements for various goods being exported from Australia and the department oversights these under the *Export Control Act 1982*.

State and territory governments also regulate various aspects of fumigation. Environmental and workplace health and safety requirements are handled by relevant environmental protection agencies, some of which require accreditation of fumigators. Efficacy requirements for particular treatment methodologies against different pests are specified in biosecurity regulations administered by agricultural or primary industries departments. These help with interstate certification assurance for movement of produce which may carry pests like fruit fly.

During recent fieldwork, I observed operators at a busy fumigation approved arrangement managing a high workload inadequately. Poor management practices included inaccurate recording of data, duplication of paperwork and stacking of fumigated goods next to non-fumigated goods. The field trip was organised during a busy period to observe how a fumigation treatment provider works under pressure.

Each record was hand written and delivered to the department's office for entry into the department's computer system. Many of these records were written quickly and were almost illegible. Information needed in a record of fumigation includes concentration, temperature, time and dose rate. Automatic data loggers should be employed to ensure that data is accurately recorded and quickly transferred to the department's systems. Using data loggers could also reduce duplication of paperwork and time taken to conduct audits.

In 2018, the department conducted a series of random audits on a class of approved arrangements in response to non-compliant MB treatment practices. Significant non-compliance was identified at these audits. Audits are usually conducted on a rostered schedule, which gives the auditee plenty of warning to ensure compliance. Random unannounced audits are far harder and more costly to arrange. However, this IGB field trip and random audit activities by the department show that random audits and checks are more effective at detecting non-compliance than scheduled visits.

Recommendation 4

The department should mandate use of automatic data loggers by onshore fumigators and introduce random unannounced audits of treatment providers as a standard rather than an exceptional practice.

Department's response: Agreed.

The department will expand the use of automatic data loggers by onshore fumigators. While data logging will not necessarily lead to better treatment outcomes, the department would have better information about treatments which would assist in verification of treatment compliance. The department supports, and already undertakes, unannounced audits, and will consider further their frequency.

4.3.3 Safe inspection of SF-fumigated goods

Residual fumigants in enclosed shipping containers and goods could pose a risk of exposure to an inspecting officer. It is a departmental requirement that containers fumigated offshore are accompanied by a certificate provided by the fumigator that shows the final fumigant level after venting. Departmental staff are issued with gas monitors that can detect low-range concentrations of volatile organic compounds, such as methyl bromide, to verify that residual gas levels are safe prior to inspection.

In late 2018, a review of the department's work health and safety measures revealed that the current gas detection devices issued to biosecurity officers could not detect residual SF. The requirement to inspect goods that had been fumigated offshore with SF ceased when measures were put in place to ensure safety of inspectors.

On 5 February 2019, the department introduced interim measures for SF-treated goods requiring industry representatives to arrange for an approved third-party SF detection and monitoring operator to be present at all seals intact, supervised unpack or tailgate inspections. It produced a register of 15 such operators—two in NSW, two in Queensland, three in South Australia, and four each in Victoria and Western Australia.

If the presence of SF is 3 parts per million (ppm) or less, the operator issues a certificate attesting to the fact, and the biosecurity officer then undertakes the inspection. If the reading is greater than 3 ppm, the container is allowed to vent until the detected gas reaches safe levels. This measure allowed the safe inspection of containers but also contributed to delays in the inspection process.

These interim measures will continue until the department purchases suitable SF detection and monitoring devices for staff, after testing a range of devices to ensure they are fit for purpose.

4.4 Harmonising import, export and domestic treatment requirements

Currently, offshore registered treatment providers are required to comply with the Offshore BMSB Treatment Providers' Scheme and methodology requirements only when conducting BMSB treatments. The scheme's requirements could be expanded to include all offshore biosecurity treatments required by the department, which would provide greater assurance that offshore treatments are conducted by legitimate companies and are effective.

To manage the high biosecurity risk posed by ineffective offshore fumigation treatments of fresh produce and flower imports, the department also administers the Australian Fumigation Accreditation Scheme (AFAS) to ensure continued compliance of fumigators with treatment requirements of participating countries, including Australia, Fiji, India, Indonesia, Lao, Malaysia, Papua New Guinea, Peru, the Philippines, Sri Lanka, Thailand and Vietnam. These AFAS participating countries are not the target risk countries identified in the BMSB measures. However, the fumigation principles are similar. There may be merit in harmonising the BMSB and AFAS offshore providers' schemes with a view to eventually merging them.

Onshore treatment systems are administered by various Australian Government, state and territory regulatory bodies, resulting in inconsistent requirements, controls and regulatory oversight. Inconsistency between jurisdictions in treatment standards and requirements, and audit and sanctions policies, causes uncertainty, creates loopholes in administration, increases costs of compliance for treatment providers and has resulted in treatment failures.

The department identified separate work on treatment standards and methodologies being progressed with little consultation or collaboration. Many treatments are used in both biosecurity and export certification applications. All governments need to be assured that phytosanitary treatments meet biosecurity and export requirements.

There is a clear need to strengthen the regulation of onshore treatment providers and have consistent treatment methodologies across approved arrangements. This will require a nationally consistent competency based training, assessment and qualification for the national accreditation and licensing of biosecurity treatment providers.

Recommendation 5

The department should work with state and territory governments to implement a national harmonised framework to deliver effective biosecurity treatments across import, export and domestic pathways.

Department's response: Agreed.

The National Biosecurity Committee, comprising the Commonwealth and all states and territories, has already agreed to develop a national harmonised framework to deliver effective biosecurity treatments across import, export and domestic pathways.

Chapter 5

BMSB risk management, 2018–19 season

5.1 Vessels and break-bulk cargo

For the 2018–19 BMSB season, BMSB risk management measures were applied to vessels berthing in or carrying certain break-bulk and general cargo manufactured in, or shipped from France, Georgia, Germany, Greece, Hungary, Italy, Japan, Romania, Russia, and the USA. This involved additional pre-arrival reporting with a BMSB questionnaire, and daily checks conducted by vessel masters. On arrival, either routine vessel inspection or seasonal pest inspections were carried out by biosecurity officers.

5.1.1 Pyrethroid fogging

Pyrethroid fogging (pyfogging) of vessels involves misting with a ready-to-use pyrethroid chemical via a hand-held thermal fogging device in and around all cargo on board. The irritating chemical may bring BMSB and other bugs out of hibernation but will not kill them at all. Once active, BMSB will search for water and food and if none is found, will die after some time. Pyfogging reduces but does not eliminate the risk of other live BMSB still being on board.

Pyfogging was first required by the department in March 2015 on arrival at first port of vessels from the USA carrying target break-bulk cargo, followed by pre-discharge inspection. The department may also require this procedure when conducting heightened vessel surveillance, to assist with seasonal pest inspections conducted on vessels.

5.1.2 Heightened vessel surveillance

From 2018, the department required heightened vessel surveillance during the BMSB season from 1 September to 30 April each year. Masters of ro-ro ships from target ports were required to submit a BMSB questionnaire via the Maritime Arrivals Reporting Scheme (MARS). Vessels reporting the presence of BMSB or any bugs might be asked to conduct further daily inspections to determine the extent of the infestation. Following arrival, the vessel with its cargo might be given a routine vessel inspection (RVI) or a more intensive seasonal pest BMSB inspection, and, subject to biosecurity risk, be treated at anchorage, further inspected and treated, or even ordered offshore.

Heightened vessel surveillance for BMSB considerably increased the workload of frontline biosecurity officers at ports receiving break-bulk cargo, with many ships and cargoes requiring seasonal pest inspections (Figure 7).

FIGURE 7 Conducting a BMSB seasonal pest inspection

(A) Imported vehicles stored in a depot under biosecurity control (B) Biosecurity officer inspecting a vehicle for exotic pests (C) Emerging BMSB in an imported vehicle

Conducting a BMSB seasonal pest inspection of a large ship carrying break-bulk cargo usually took three and four biosecurity officers between two and four hours, and occasionally up to six. If suspect bugs (dead or alive) were found, they were sent to the department's entomologists for identification and determination as to how long they had been dead. Finding only long-dead bugs could indicate successful pre-embarkation treatment of an infested cargo, and consequently an acceptable biosecurity risk, while finding freshly dead or live bugs showed that there could be an undetected residual live population on board.

From the beginning of the 2018 season (1 September), the department required all high-risk break-bulk cargo to be treated offshore. Untreated break-bulk was prevented from being unloaded and directed for containment and/or export. Discharge of cargo was also disrupted by requirements to inspect cargo on the wharf for bugs and identify any that were found. A positive finding could lead to orders to reload cargo onto ships or apply further treatment on the wharf and re-inspect. In three cases ships were ordered to leave Australian waters without discharging cargo (Box 2). Similar instances occurred in New Zealand.

These requirements disrupted berthing arrangements at some major cargo ports and also affected some shipping and cargo discharge timetables substantially, with flow-on costs from delayed delivery of agricultural and mining machinery, infrastructure and motor vehicles.

These incidents obviously created very strong incentives for shipping companies to manage their biosecurity as well as they could. A major improvement in vessel cleanliness was noted later in the 2018–19 BMSB season. Some shipping companies took additional measures such as repeated cargo inspection and pyfogging of vessels at the last load port or well before the vessel arrived in Australian waters, to reduce the likelihood of live stink bugs being found prior to their arrival in Australia or New Zealand. One company called for at-border inspections of cargo on board all vessels, so that the authorities do not rely solely on carriers to report any findings. When BMSB are found, clear and workable onshore and offshore treatment solutions are needed in Australia and New Zealand so they can be implemented consistently.

Clearly, many of the BMSB risk management measures also needed to be applied further up the supply chain by parties responsible for manufacturing, packing, transporting and storing the goods before they were loaded onto ships. Shippers felt that the responsibility for regulatory compliance and for providing clean cargo needs to rest specifically with cargo owners, in line with international practice. It may be possible to apply some on-board segregation of different break-bulk cargoes on a ro-ro ship, but this may not prevent emerging BMSB that have hibernated in one cargo from walking or flying to infest other cargoes.

Box 2 Vessels infested with BMSB ordered to leave Australian waters

Vessel 1, carrying cars from China, Korea and Japan—all three non-target BMSB risk countries—reported no pre-arrival suspect BMSB detections in the required BMSB questionnaire on 25 October, and was allowed to moor at the port of Brisbane subject to routine vessel inspection (RVI).

- On 30 October 2018, the department found two exotic bug species, and directed the vessel to undergo pyfogging and another intensive inspection the next day, which found a further 67 exotic stink bugs including 23 BMSB, one of which was a live female. Most bugs were either freshly or recently dead, so they had been alive during the voyage to Australia. On 1 November 2018, the vessel was directed to return to anchorage at not less than three nautical miles from any land mass, provide an adequate risk management plan and undertake an approved treatment for BMSB for the department to consider.
- On 22 November 2018, the department found a further six exotic stink bugs, including one live BMSB. Daily detections (by the vessel's crew) of live and/or freshly dead exotic stink bugs had continued while the vessel was at anchorage, indicating an undetected residual live population on board.
- On 23 November 2018, the vessel was directed to leave Australian territory.

Vessel 2, carrying cars from Germany and Belgium bound for Fremantle, reported the pre-arrival finding of 11 dead suspect BMSB on 22 November 2018 via the required BMSB questionnaire. The department directed the vessel to remain at anchorage at least three nautical miles from shore and provide daily inspection reports for two days. These revealed a further six live specimens, including three BMSB.

- On 25 November the vessel was treated with pyfogging at anchorage, and the next day arrived in Fremantle where a more intensive inspection by the department found 16 exotic actionable insects, including eight BMSB. Two more inspections on 28 November and 2 December found a further 29 specimens of six different actionable exotic species, including three live BMSB.
- The vessel was ordered back to anchorage, where daily deck inspections by the vessel's crew found about 20 new live and dead specimens each day and indicated a larger residual undetected live population on board the vessel.
- Consequently Vessel 2 was directed to leave Australian waters on 13 December.

Vessel 3, carrying cargo loaded in Germany, Belgium, Spain and South Africa bound for Fremantle, on 12 December 2018 reported pre-arrival finding of 64 dead suspect BMSB, and the department directed it to remain at anchorage and provide daily inspection reports for 2 days—revealing a further 21 dead specimens.

- On 14 December, the vessel was directed to undergo RVI and pyfogging followed by a more intensive inspection on 16 December, which revealed two exotic actionable insects, including one BMSB.
- On 18 December 2018, controlled discharge and inspection of cargo was permitted under departmental supervision. A live BMSB was found on the outside of a vehicle. Cargo discharge ceased immediately and the department inspected all cargo on the wharf, tarping where possible and reloading where alternative containment strategies were not possible. The vessel was also directed to return to anchorage. Eighty-three units offloaded from the vessel remained tarped and secured in a shed on site and were subsequently treated using sulfuryl fluoride, inspected and released from biosecurity control.
- The department engaged with the vessel operator over several days and provided them with the opportunity to identify and propose an appropriate management plan for the vessel. However, it proved impossible to develop an agreed management plan. Daily detections by the vessel's crew of actionable exotic species on the vessel while it was at anchorage continued and indicated a larger undetected residual live population on board.
- On 4 January 2019 the vessel was directed to leave Australian territory.

5.2 Containerised cargo

5.2.1 Changing onshore treatment requirements for BMSB

In July 2018, the department issued BMSB seasonal measures prescribing that target high-risk goods in sealed six-sided FCL containers could be treated either offshore or onshore at an approved arrangement within seven days of arrival.

However, mandatory offshore treatment was to be required for LCL and FAK containers. On 20 August 2018, the department revised these measures to allow onshore treatment for LCL and FAK containers provided the whole container was treated. This revision was based on feedback from peak industry bodies, which preferred to have both onshore and offshore treatment options available. The department noted that revising this policy would require system enhancements and new business processes to be implemented, and advised industry this could lead to delays in managing the clearance of LCL and FAK containers.

Process for LCL and FAK containers, 2018–19 BMBS season

- All goods arriving from a risk country in LCL or FAK containers were subject to an ICS cargo report hold, preventing movement of these containers from the wharf for normal deconsolidation. This contributed to delays and costs to industry and strained onshore capacity to hold these containers for BMSB action.
- The cargo report hold referred the container to the department's S-Cargo system, which was not designed to manage BMSB risk at the container level.
- A dedicated assessment team was required to action each referral. The team contacted the Master Consolidator responsible for packing the container to provide a declaration (or evidence) that the goods had all been treated offshore and contained no target high-risk goods, or requested further investigation and/or onshore treatment.
- Manually identifying and contacting Master Consolidators responsible for the containers held for action was difficult, since Master Consolidators were not registered with the department.
- Relying on Master Consolidators to declare containers with goods of interest and the associated actions to be undertaken to manage the risk was also problematic. Increased non-compliance from Master Consolidators in the declarations of containers held under this process was observed as the BMSB season proceeded. Master Consolidators were encouraged to lodge declarations as early as possible, however they were not required to lodge these declarations until well after ships arrived. This resulted in many more containers being held for action than necessary as while they contained no target risk goods, this could not be ascertained until Master Consolidators had provided the relevant declaration.
- S-Cargo would lift the hold on the container once all biosecurity actions for BMSB risk had been managed. The ICS would then allow the container to deconsolidate normally and the LCL consignments were managed at the consignment level as usual.

The increased availability of onshore treatment measures for LCL and FAK containers led to substantial disruption to trade, due to the limited onshore capacity of storage facilities at approved arrangement sites and onshore treatment provider premises. The department advised industry that onshore capacity for storage and treatment would be limited, and encouraged offshore treatment to reduce these delays when the policy was revised at the request of industry. In some cases, onshore treatment facilities were overwhelmed, leading to long delays in cargo clearance.

Chapter 6

BMSB impacts on departmental biosecurity services, 2018–19 season

6.1 Failure of S-Cargo software system

Selection of containerised cargo to be held under biosecurity control for BMSB interventions depends on complex software interaction between Home Affairs' Integrated Cargo System (ICS) and the department's S-Cargo and Agricultural Import Management Systems (AIMS). These are all aging systems that are difficult to modify without losing current functionality. S-Cargo and AIMS provide risk profiling respectively on sea containers and the cargo they hold to ICS. ICS then diverts certain containers selected on the basis of these risk profiles, to be held for biosecurity assessment by the department.

6.1.1 S-Cargo software system for management of hitchhiker pest risks

S-Cargo was launched in 2011 to allow the department to manage the risks of a single hitchhiker pest—the giant African snail (*Achatina fulica*, GAS)—by interfacing with ICS to manage the holds and release of sea containers and break bulk cargo arriving from countries on the department's Country Action List (CAL). However, it could not electronically target and hold non-CAL sea containers or break bulk cargo for inspection, and had no flexibility to manage other seasonal or hitchhiker pests apart from GAS.

From 2015, the department began developing the capability through an S-Cargo Enhancement Project to allow the department to:

- apply a risk-based approach to target biosecurity risks on all sea containers
- make biosecurity decisions in real time
- apply reduced intervention rates for compliant behaviour and
- implement new container risk categories (high, medium and low) under the Integrated Risk Compliance Model (IRCM).

Further proposed enhancements would also enable the department to capture and manage biosecurity risks associated with containers transiting to or through rural areas.

The first phase of the project was intended to eliminate manual processing and speed up biosecurity decision-making, to reduce cargo clearance times, to apply reduced intervention rates for compliant behaviour, and to improve data collection and reporting. Later phases would extend S-Cargo's ability to expand profiling to hold and refer low risk, rural transit (and potentially rural destination) and seasonal pest risk containers for inspection.

My 2018 review of hitchhiker pest and contaminant biosecurity risk management in Australia (Inspector-General of Biosecurity 2018) recommended:

> The department should expedite upgrading of the S-Cargo software system to better manage container and cargo contamination risks, including rural tailgate container inspections.

The department agreed and responded:

> The department is progressing the enhancements to the S-Cargo software system as a priority. These enhancements will strengthen the department's ability to manage the biosecurity risks entering Australia on the surfaces of sea containers and break-bulk cargo. However, the department's ability to better manage container risks is also reliant on the progression of profile changes in the Integrated Cargo System (ICS).

By October 2018, the department had implemented Phase 1 of the Enhancement Project, which reduced manual processing for the Sea Container Hygiene System to support its expansion to additional ports and countries. However, phases 2 and 3 were delayed due to:

- lack of funds and time to make complementary changes in the ICS
- diversion of S-Cargo Enhancement Project funds to deal with the huge pressures placed on departmental resources in 2018–19 due to the increased approach rate of BMSB.

6.1.2 S-Cargo emergency upgrades to manage BMSB pressures

In the 2018–19 BMSB season, the huge range and volume of extra cargo that required diversion for possible BMSB management could not be handled by S-Cargo. As well, complex new rules in November 2018, about whether cargo consignments had been treated offshore for BMSB, required customs brokers to provide additional information about treatment into the ICS. The department tried to enhance the ability of the S-Cargo system to put holds on LCL and FAK containers. Budget previously allocated for Phases 2 and 3 of the S-Cargo Enhancement Project had to be spent on urgent software patches to allow the fixing of some fundamental faults. These patches—aimed at helping to manage the BMSB risk of mixed consignments in LCL containers—disallowed target containers being opened by the importers or other industry staff before biosecurity intervention.

Although implemented in November 2018, this interim solution was inadequate to fully cope with the specific workload caused by BMSB. The database of released containers had to be 'cleaned' manually every night, by a dedicated team of biosecurity officers, to prevent containers which had been released by assessment from being placed on 'hold' again.

By late November, the department's electronic cargo management systems were overwhelmed. A major S-Cargo system outage between 26 November and 5 December 2018, followed by rolling outages in several related systems, required an immense amount of manual work-around. The Christmas seasonal peak and BMSB risk season activities resulted in major clearance delays at the border. For example, as at 5 December 2018, there were 125 held containers in the S-Cargo system for BMSB due to the outage, with more containers entering the system as reported.

In an attempt to resolve the ongoing issues with S-Cargo, the department engaged DXC Technology in November 2018. In January 2019, DXC recommended an upgrade to S-Cargo database to improve stability of the current application and allow better management of containers. The department requested $0.5 million in the 2019–20 budget for this work. However, these funds would not be sufficient to carry out the previously deferred phases of the S-Cargo Enhancement Project and the systems issues that were encountered. This work will address the systems issues, which will improve the management of all containers processed through S-Cargo. Without this, if S-Cargo is utilised for the 2019–20 season, delays would continue and be exacerbated next season.

The department encountered repeated problems in interacting with Home Affairs on potentially better links with ICS, which might also need upgrades to manage increasing hitchhiker pest biosecurity risks. The Home Affairs' scheduled timetable for ICS maintenance could not meet the department's urgent needs. However, by April 2019 Home Affairs provided some options for ICS enhancements to assist the department in implementing seasonal pest requirements.

A major re-work or replacement of the S-Cargo system, with appropriate changes to systems that it links with, such as ICS and AIMS, is needed to make biosecurity risk management of cargo fit for the 21st century.

Recommendation 6

The department should urgently prepare a broader request for a major upgrade or replacement of S-Cargo and seek high-level cooperation of Home Affairs to invest in necessary and complementary improvements to integrated cargo system.

Department's response: Agreed.

The department will upgrade existing systems and automated processes for management of BMSB. Resourcing of this will be a matter for government. In the interim, to meet requirements for the upcoming season, the department is undertaking repairs of the current S-Cargo system to manage increased cargo volumes. Complementary to this, the department is conducting a detailed analysis of business processes and system improvements to identify the most effective and efficient enhancements for management of the risk posed by BMSB next season. The department will also continue to work with Home Affairs and seek any necessary improvements to the Integrated Cargo System (ICS), including changes to profiles, messaging and extraction of information from within ICS to better support BMSB management.

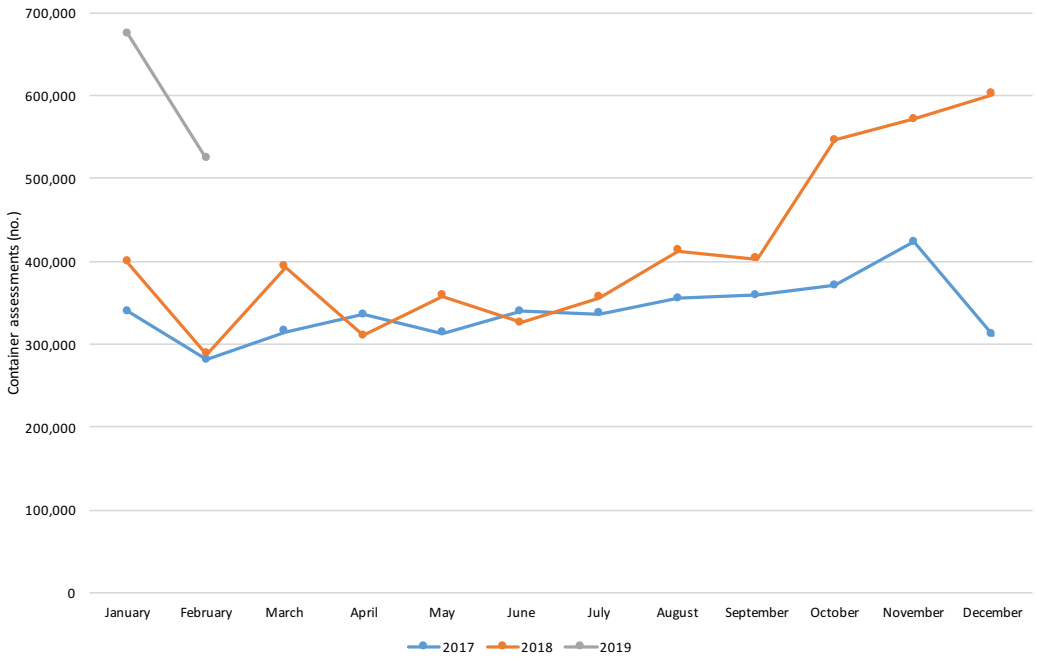
6.2 BMSB workload impact on departmental service provision

6.2.1 Assessment Services Group

The department's Assessment Services Group (ASG) staff assess documentation for all imported vessels and cargo that may be subject to biosecurity requirements, including BMSB measures. This is one of the most complex roles for biosecurity officers and is normally reserved for experienced staff.

In the 2018–19 BMSB season, ASG staff's workload increased by 20 per cent due to the additional categories and volumes of cargo needing assessment and possible intervention (Figure 8).

FIGURE 8 Total container assessments per month, January 2017 – February 2019



Frequent changes in operational policies about BMSB risk management of different classes of cargo made assessment more difficult. DAWR instructional material attempted to prepare staff as the import conditions changed, but was sometimes hard to understand or too prescriptive. Even very experienced staff had difficulty in interpreting guidelines, while temporary staff could not follow the instructions. Consequently, times to assess individual consignments extended from a normal average 15 minutes up to hours in some cases.

Between mid-September and December 2018, the 35 ASG staff incurred 7,000 hours of overtime (around an additional 15 hours per person per week) despite diverting staff from outside ASG and employing additional casual staff. This rate of overtime continued through to the end of March 2019 and led to fatigue and burn-out, and high turnover of casual staff.

In submissions to this review, several industry stakeholders noted that ASG staff were working longer hours to manage the increased workload volumes, and that there was an increase in inconsistent directions provided to industry which required reassessment. This led to delays in cargo movement from wharves and increased importer fee-for-service charges.

6.2.2 Client contact group

After the introduction of the department's Cargo Online Lodgement System (COLS) in 2014, the department moved away from front-counter interaction with industry to a national free call contact number (1800 900 090). This number is answered by staff of a Client Contact Group (CCG) who book appointments for goods to be inspected, and answer client enquiries.

From September 2018, CCG staff experienced a 15 per cent increase in calls and complaints, with some seriously abusive calls. Importing industry representatives reported significant delays in reaching a departmental officer with the skills to address any assessment and biosecurity direction issues.

A submission to this review claimed that the national contact number was not efficient for customs brokers who interfaced with the department for assessment of import entries. Customs brokers waited on line for 30 minutes or more, and many were transferred from Tier 1 and 2 officers to address their enquiries about assessment and biosecurity directions. Much communication was by different generic email addresses. Customs brokers also reported that some enquiries were referred to the BMSB policy team to provide formal advice. They considered the department should provide a direct number for customs brokers to contact senior assessment officers.

Recommendation 7

The department should consider introducing a dedicated BMSB hotline manned by experienced staff as an escalation point for urgent BMSB enquiries that meet agreed criteria if workload in the 2019–20 season warrants it.

Department's response: Agreed.

The department is already implementing a direct line for industry organisations as part of its 'green lane' policy, and has established a dedicated email inbox for seasonal pest policy, including BMSB policy enquiries.

The department has established mechanisms for triaging all general enquiries (including BMSB-related) received through the national contact number.

The department is also further strengthening its training and workforce allocation processes to ensure urgent and complex enquiries are handled by suitably trained staff.

6.2.3 Inspection Services Group

Inspection Services Group (ISG) perform import inspections on vessels and on break-bulk and containerised cargo to manage biosecurity risks. During the 2018–19 BMSB season, there was a large increase in all target high-risk and target risk goods were subject to increased onshore inspection for BMSB. As well, extra goods were profiled and randomly selected for inspection, including:

- post-treatment inspections of goods treated both onshore and offshore, to validate that the treatment was effective and for presence of BMSB
- risk goods that did not require mandatory treatment, to verify that risk profiling was effective
- high-risk goods exported from 'emerging countries'—regions that present an emerging BMSB risk—to ensure profiles could effectively find risks of BMSB arriving in target goods.

Some break-bulk goods were directed for a full inspection by a biosecurity officer at the wharves. When containerised goods were selected for inspection they were directed to approved arrangement sites for a biosecurity officer to conduct the inspection. Some containerised goods were directed for a seals-intact, full unpack inspection by a biosecurity officer at approved arrangement sites.

The only exception was goods that were shipped in LCL or FAK containers from non-target risk countries. These containers could be deconsolidated and treated at the consignment level.

From September 2018, ISG staff experienced a 20 per cent increase in bookings requiring inspection. This led to the normal time between booking by the importer and inspection increasing from three days prescribed in the department's service standards to seven to ten days in some major cities. Numerous inefficiencies resulted from these delays. As bookings are arranged sequentially, an inspector might attend a job where further BMSB containers had arrived in the interim, but were booked to other inspectors to carry out. Freight and Trade Alliance (FTA) expressed concern about the department's booking arrangements in 2018–19, and noted that:

> The booking system also remains an area of major concern. Overwhelmingly, FTA members see value in re-introducing permanent weekly booking arrangements for facilities that have a high volume of inspection requirements but which may not have enough volume to warrant a manned depot arrangement. Permanent bookings arrangements were removed by the department in 2018, creating inefficiencies, particularly when the department is not within their service charter for booking requests.
>
> FTA has received numerous examples where depots were forced to send multiple emails to the department to chase up a booking request. There is no ability to status track a booking request.

They recommended:

> The department to [should] consider better utilisation of inspection officers in the field, with an ability to combine inspections at facilities irrespective of importer, freight forwarder, goods and the day of scheduled inspection of each shipment.
>
> The Government to [should] undertake detailed industry engagement on COLS user requirements and allocate appropriate investment for any necessary upgrades.
> (Freight and Trade Alliance submission).

If live stinkbugs were found, steps were taken to secure goods pending identification. Officers worked with facility management to ensure they were briefed on the significance of the detection and any specific requirements, including building access restrictions.

An industry stakeholder submission to this review identified that:

> Some of our members have reported delays in Melbourne and Sydney of up to 21 days from vessel arrival for biosecurity clearance which includes delayed entry assessment, inspection bookings and post inspection release as the officers are not releasing the goods at the AA depot and refer the entry to a centralised team to release the goods and provide a direction.
> (Customs Brokers and Forwarders Council of Australia Inc. submission)

To manage the extra workload, the department increased the work hours of existing part-time and casual staff, employed additional casual staff and significantly increased overtime levels. They also diverted ISG staff onto BMSB inspections from other important biosecurity programs such as Cargo Compliance Verification.

6.2.4 Operational Science Services

Operational Science Services (OSS) staff provide scientific advice, including identification of insects, and pest risk assessment and treatment advice, across operational and policy areas within the department. If dead BMSB were found, OSS staff were required to determine if they were freshly dead (internal organs intact when dissected). Freshly dead BMSB could be an indicator that live BMSB were still present and therefore required further investigation, while finding only long-dead bugs might indicate successful offshore treatment measures. Any live female BMSB were of greater potential biosecurity risk, indicating there might be others in the goods that could find suitable host material and establish a breeding population onshore. If BMSB were confirmed in goods from a deconsolidated container then any distributed goods and the initial container needed to be traced and all further actions be determined through OSS and biosecurity reports. OSS staff prepared sets of photos to assist front-line biosecurity officers with stink bug identification, but many officers did not feel confident in determining whether or not bugs were BMSB or native, and high or low risk.

The specialised role of OSS staff was particularly in demand by vessel operators who might be reliant on their diagnosis of whether a bug was freshly or long-dead before they were permitted to discharge cargo or were required to undergo any on-board BMSB management measures. There were calls for entomologists to be available 24/7 to reduce in-port and cargo discharge time delays, or to allow industry to engage private entomologists to make these decisions out of hours. However, the potential for enormous conflict of interest makes the latter option undesirable.

The department responded by creating an on-call roster with entomologists available between 6 pm and 10 pm weekdays and 9.00 am and 5.00 pm on weekends, but did not have sufficient numbers of skilled staff available to be able to meet industry demands for round-the-clock availability. As with other sections, OSS staff worked long periods of overtime throughout the 2018–19 BMSB season.

Submissions to this review called for greater delegation of onshore inspection services to industry through various approved arrangements, in order to overcome departmental workload and staff availability constraints. However, the independent role of departmental biosecurity officers is a critical element in verification that necessary risk management operations have been undertaken successfully.

Chapter 7

Proposed BMSB risk management, 2019–20 season

7.1 High risk countries and goods

7.1.1 Harmonising policy with New Zealand

In early 2019, key departmental and NZ MPI staff held two workshops together to discuss issues relating to BMSB risks, risk mitigation and alignment of conditions for the upcoming 2019–20 season. They agreed that the department and NZ MPI should work together to:

- align their approved treatment methodologies based on current science and increase the focus on education for offshore treatment providers on treatment methodology, including dual branding where possible, and investigate preseason workshops in the EU to engage with offshore treatment providers and shipping lines
- establish offshore quality systems to keep BMSB risks offshore, and recognise each agency's approved systems instead of duplicating effort—for example, mutual recognition on how to approve, suspend or fail participants in the Offshore Treatment Providers' Scheme, and proposed safeguarding arrangements
- align target BMSB risk countries for the next BMSB season, develop policy triggers for changing risk profiles of pathways/countries, and consider providing explanation for why a different approach is taken for native BMSB countries
- review target list goods to ensure right commodities are being targeted
- align appropriate controls for the next BMSB season, such as: respective vessel BMSB questionnaires and how they are applied; joint communications for shipping lines on how to manage and report BMSB interceptions; and triggers for turning back vessels and controlled discharges.

7.1.2 32 high-risk countries proposed—22 more from Europe plus Canada

By May 2019, Australia and New Zealand had agreed that BMSB measures would be needed for certain goods manufactured in, or shipped as sea cargo from 32 target risk countries—Albania, Andorra, Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Czech Republic, France, Georgia, Germany, Greece, Hungary, Italy, Kosovo, Liechtenstein, Luxembourg, Macedonia, Montenegro, Netherlands, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey and the USA.

Heightened vessel surveillance would also continue to be applied to Japan, making a total of 33 countries for this measure.

7.1.3 Target risk goods

The same list of BMSB-risk goods as for 2018–19 (Appendix D) was proposed to be used in the 2019–20 season. Representatives of importing industries had argued for exempting various lines of cargo within chapters, on the grounds that they posed no biosecurity risk, but BMSB were found on some of these goods. Case-by-case exemptions might be given but emphasis would be on proof of safeguarding arrangements applying to particular goods from particular suppliers.

The extra volume of cargo and conveyances which would need BMSB risk management was unclear but might be in the order of an extra 20–25 per cent more than the 2018–19 season.

The department proposed to undertake a lower rate of random onshore inspections on goods from other countries to verify BMSB absence in goods.

7.1.4 Safeguarding arrangements for BMSB

Apart from relying on offshore treatment to prevent BMSB-infested goods being shipped to Australia, the department sought to develop arrangements with individual exporters that would safeguard goods along the supply chain from infestation. Safeguarding arrangements require the adoption of a detailed pest risk management plan/system that can be implemented by manufacturers offshore as an alternative to the mandatory pre-shipment treatment requirements. This involves a greater emphasis on secure packing of goods at source and secure supply chain assurance to prevent BMSB infestation at any time before the cargo is loaded onto a ship. Audit arrangements reward highly compliant traders over time.

Safeguarding arrangements must be approved by the department, and goods that arrive without an approved arrangement in place will require mandatory treatment onshore.

These requirements were applied to vehicles, machinery and parts from the USA for the 2015–16 BMSB risk season, and were demonstrated to be effective in preventing the arrival of live BMSB. They were again adopted for high-risk goods from the USA under the 2016–17 measures, with the department undertaking verification activity at the border on arrival of the goods to ensure compliance with the requirements.

In April 2019, the department conducted industry consultation on a revised draft scheme—Safeguarding Arrangements for BMSB—which it hoped to pilot in 2019–20 with some large manufacturers. Development of a similar program was underway in New Zealand.

Industry largely welcomed the program, which had the potential to consolidate many biosecurity practices into a master approved arrangement environment and remove a large amount of cargo volume from the complex onshore BMSB management processes.

Freight and Trade Alliance (FTA) in their submission noted that:

> BMSB profiling remains a mystery to FTA members with general feedback being that tariff categories are too broad and complex. Of significant concern is that there is no appreciation or discretion for highly compliant manufacturers and suppliers of goods such as:
>
> - food grade manufacturing
> - medical manufactured goods
> - original manufactured goods that are sealed and boxed in controlled environments
> - aeronautical equipment.

FTA requested that the commodity listings should be reviewed in consultation with industry to target genuine high-risk goods.

However, as the department had intercepted BMSB on some of these goods due to the mobile hitchhiker characteristics of the pest, emphasis in the Safeguarding scheme would be on 'original manufactured goods that are sealed and boxed in controlled environments' rather than tariff lines, and on the track record of the importer in managing safeguarding through the supply chain.

This accords with another FTA recommendation:

> The department to [should] expand the Highly Compliant Importer Program (HCIP) to facilitate proven compliant traders. An expanded HCIP program should seek to streamline procedures and allow more resources to be dedicated to genuine high-risk shipments.

7.2 Vessel measures, 2019–20 BMSB season

In response to detections and challenges in managing on-board infestations in 2018–19, and constructive industry input, the department proposed revised measures for vessels for the 2019–20 risk season in April 2019. These measures were to be discussed extensively with relevant industry groups and finalised by May 2019 to allow adequate time for implementation before the 2019–20 season.

The measures aimed to improve the ability of the department to assess risks prior to arrival, and the ability of all parties to manage risks offshore, at berth and onshore, by more effective and timely mitigation activities. The department hoped that these proposed measures would benefit industry by allowing earlier decision-making by the department on the BMSB risk posed by each vessel, and hence greater certainty on vessel status so they can proceed to discharge.

The proposed 2019–20 measures would help the department through early notification of seasonal pest contamination, enabling monitoring of emerging risk countries and target goods, and improved options for managing the risk of BMSB (and other seasonal pest) contamination.

They were also designed to reward shipping lines that take greater responsibility for preventing and mitigating on board risks, through a Vessel Seasonal Pest Scheme (VSPS) by allowing reduced intervention levels after proof of compliance. This would also allow reduced inspection effort by the department.

Table 5 compares 2018–19 and proposed 2019–20 vessel BMSB risk management measures.

The department proposed to work with Industry stakeholders to develop an information package of **fact sheets**—frequently asked questions; a self-inspection, specimen collection and photo guide; and seasonal pest identification guide—and **templates**—loaded cargo status, risk mitigation plan, and contingency plan.

TABLE 5 Vessel BMSB risk management measures, 2018–19 and 2019–20 seasons

BMSB management measures	2018–19 season measures	Proposed measures for 2019–20 season
Target risk countries	10 countries—United States of America, Italy, Germany, France, Russia, Greece, Hungary, Romania, Georgia, Japan	33 countries—United States of America, Canada, Albania, Andorra, Armenia, Austria, Azerbaijan, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech, France, Georgia, Germany, Greece, Hungary, Italy, Japan, Kosovo, Liechtenstein, Luxembourg, Macedonia, Montenegro, Netherlands, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey
Vessel surveillance (BMSB questionnaire) for specified vessel types	BMSB questionnaire provided to all ro-ro and general cargo vessels from all countries	BMSB questionnaire provided to only ro-ro vessels from all countries of origin
Self-inspection for specified vessel types	The BMSB questionnaire directed ro-ro and general cargo vessels from all countries to perform a self-inspection	Amend: BMSB questionnaire to direct only ro-ro vessels from 33 target risk countries of origin and vessels from non-target risk countries of origin where detections of BMSB are reported via BMSB questionnaire to perform self-inspection
Mandated seasonal pest (SP) inspections of all ro-ro vessels from target risk countries	All ro-ro vessels from target risk countries subject to a mandatory SP inspection. For exception from mandatory SP inspection: • All cargo must be treated by MB, SF or heat; or • All cargo must be compliant with New, Unused and Not Field Tested (NUFT) BMSB requirements; or • All cargo must be a combination of the two conditions outlined above. • No reported detections of exotic seasonal pests.	All ro-ro vessels from target risk countries subject to a mandatory SP inspection Eligible ro-ro vessels meeting all requirements under the new 'Vessel Seasonal Pest Scheme (VSPS) may be exempted from mandatory SP inspection
Vessel Seasonal Pest Scheme (VSPS)	n/a	Introduction of a differentiated response for ro-ro vessels that can demonstrate compliance with eligibility criteria (to be trialled for 2019–20 season with selected shipping lines)

BMSB Brown marmorated stink bug. **MB** Methyl bromide. **SF** Sulfuryl fluoride.

7.3 Containerised cargo measures, 2019–20 BMSB season

The 2018–19 measures for handling FCL and FCX containerised cargo, namely treated offshore or onshore at the whole container level, were proposed to remain the same in 2019–20. However, changes were proposed to the process for handling LCL and FAK containers. The new process comprised:

- LCL consignments of target high-risk goods, packed in a FAK container with non-BMSB risk goods, would be required to be fumigated or heat treated before the container is packed and dispatched. This rule would apply whether the LCL consignment is packed in a target risk country, or packed or re-consolidated in another country.
- For example, a LCL consignment of tiles from Italy (target high-risk goods) packed in a container to Singapore, then unpacked and re-loaded into an Australia-bound FAK consolidated container, would require fumigation or heat treatment before the container is packed and dispatched in Singapore. Otherwise the container would not be allowed to enter Australia and would have to be re-exported, or the contents destroyed.
- On arrival in Australia, an improved cargo report hold would allow LCL and FAK containers to be moved to an approved arrangement depot rather than being held on the wharf, but would prevent deconsolidation until assessment of that container was completed.
- Reporting of all consignments within the container would be required within 24 hours of embarkation at the port of loading so the department could assess treatment status and biosecurity intervention for all consignments before the container can be deconsolidated.
- Offshore treatment providers would be required to provide assurance to the department that all target high-risk goods within the container have been treated.

Chapter 8

Improving future BMSB risk management

8.1 Better cargo inspection efficiency

Manual inspection and surveillance of incoming vessels and cargo for BMSB is a cumbersome, time-consuming and labour-intensive process. Despite promising research on the potential use of robots or sensors to detect pests in bulk carrier holds, no technological advancements (or devices) have yet shown promise for finding BMSB. However, detector dogs show promise.

In 2016 the NZ MPI collaborated with the US Department of Agriculture in a pilot project which showed that detector dogs could rapidly be trained to accurately detect live BMSB. Departmentally-funded research at the University of New England and later trials confirmed that dogs can be trained to detect high-risk pests in many different environments, although they are difficult to manage without workplace health and safety issues inside cargo ship holds. In 2019 the department began trialling detector dogs for inspecting car imports for BMSB.

As noted in my report on *Pest and disease interceptions and incursions in Australia* (IGB 2019), the department's detector dog program was reduced from 80 dogs in 2012 to 43 in 2018, despite their proven efficiency in detecting a wide range of biosecurity risk material. This trend should be urgently reversed to improve cargo (and passenger) inspection efficiency.

Recommendation 8

The department should urgently expand the detector dog program to increase training and numbers of dogs (and their handlers) to detect high-risk pests, including brown marmorated stink bugs, for deployment in high BMSB risk cargo pathways for next season.

Department's response: Agreed.

The department will expand the detector dog program as part of a suite of controls to detect high risk pests. Managing BMSB risks offshore remains the department's preferred approach as it gives the highest level of biosecurity protection for this expansion. Detector dogs will be used to augment this, with particular focus on verification. Resourcing will be a matter for government.

Ship holds and break-bulk pathways present some limitations for utilising detector dogs.

8.2 Stronger national border and post-border surveillance

The high level of border and post-border BMSB detections in 2018–19 indicated the need for better surveillance capacity at both Australian Government and state and territory level. The department, in cooperation with New Zealand, accessed BMSB-specific pheromone traps from the USA, and managed their deployment to state governments around key detection sites.

Further research, in cooperation with New Zealand and with Australian and New Zealand industry funding, aims to:

- develop better ways for biosecurity officers to detect BMSB by environmental sampling and real-time in-field eDNA testing
- assess the sensitivity of current detection methods and optimisation of surveillance protocols (for Australia), using a known BMSB outbreak situation
- develop a mobile phone app to distinguish BMSB from Australian native stink bugs, for use by surveillance teams and growers.

Recommendation 9

The department, in collaboration with state and territory governments and the relevant plant industries, should continue active international collaboration in BMSB research, development and extension.

Department's response: Agreed.

The department will continue to collaborate with state and territory governments and relevant plant industries to undertake BMSB research, development and extension.

Despite the clear need for more border and post-border surveillance, the department's biosecurity officers were under such pressure during the 2018–19 BMSB season that the National Border Surveillance program was greatly reduced. Staff were redeployed to time-consuming response activities such as managing BMSB traps that were put in place, where detections indicated potential risk of spread beyond the consignment. This left Australia vulnerable to undetected border breaches which, if not quickly detected, could turn into full-blown incursions by a wide range of pests and diseases.

Recommendation 10

The department should strengthen the National Border Surveillance program by increasing targeted surveillance for BMSB at major ports, approved arrangements and high-risk post-border sites.

Department's response: Agreed.

The department will continue to explore opportunities to increase targeted surveillance of high risk sites.

A large effort is needed to inform the wider community about the risks of BMSB to Australia and about its prevention and preparedness, effective early detection and response. Similar efforts are also appropriate for other serious pests and diseases that are spreading rapidly around the world such as *Xylella* (a severe bacterial plant pathogen) and African swine fever.

Recommendation 11

The department should work with states and territories and relevant industries to develop and deliver a nationally coordinated BMSB education/awareness campaign for all government, industry and community stakeholders. Similar targeted and coordinated campaigns should also be mounted for other serious pests and diseases that are spreading rapidly such as Xylella and African swine fever.

Department's response: Agreed.

The department has worked closely with industry and implemented a range of targeted BMSB awareness/education activities for personnel involved in import supply chain logistics. The department will continue to work with states and territories to develop key education and awareness activities through the National Biosecurity Communication and Engagement Network.

8.3 Better internal and external coordination

8.3.1 Internal coordination

At the start of the 2018–19 BMSB season, the department anticipated that an incursion needing a full cost-shared response might occur. It proactively set up an Incident Management Team (IMT), with representatives from all sections of the department that might be involved in such a response. Although no such responses occurred, the high level of BMSB-related activity made the IMT invaluable as a means of informing the department's executive and different sections about the rapidly changing BMSB situation and internal responses needed. IMT meetings were monthly at first but were held weekly at the height of the BMSB workload, with a total of 20 meetings over the 2018–19 season.

At the final debrief of the IMT on 14 April 2019, attendees noted the value of the IMT not only in informing the department's executive but also in preparing information for the Consultative Committee on Emergency Plant Pests, and for different industry sectors. They noted that information was mainly sent to the importing and logistics industry due to their high operational requirements, and that much less-regular summary information about detections and post-border issues was provided to the agricultural industry sectors.

Recommendation 12

The department should convene internal incident management teams to manage future major biosecurity threats and ensure that summary progress information is provided to all key stakeholders in a timely manner.

Department's response: Agreed.

The department has a well-established framework for dealing with incident management and convenes incident managements in accordance with this framework. A standing Incident Management Team was established for last season and will be established again for the coming season.

The Critical Incident Response Plan sets out the department's arrangements for managing an incident which may impact on its portfolio responsibilities and interests, such as the outbreak of a significant plant or animal disease, a live animal export incident, or a business continuity event.

8.3.2 External coordination

An enormous amount of industry, government and other stakeholder consultation and coordination is required to plan, deliver and adapt Australia's BMSB risk management program effectively. Impacts of the pest itself and of the measures put in place to manage it are felt very differently by different stakeholders. While Australian and state government biosecurity roles and responsibilities are clear, both the freight and logistics and the agricultural industries must be involved. Government and industry should understand each other's perspectives and share responsibility for mutually beneficial outcomes. Because of this, it is appropriate for industry to have a seat at the decision-making table.

New Zealand established a BMSB Council in July 2017 to oversee its BMSB Government Industry Agreement (GIA) for Biosecurity Readiness and Response. The council includes seven industry bodies and NZ MPI. These members ensure that the activities in the BMSB Operational Agreement to prepare for and respond to BMSB are achieved.

A national BMSB Council or task force with a similar purpose would be of great benefit in Australia. The Council could be composed of :

- representatives of Australian and relevant state governments
- several importing industry peak bodies which represent shippers, freight forwarders, customs brokers and importers
- Plant Health Australia to represent the diverse agricultural industries.

This group could function in a similar way to a national management group for an emergency response but would have importing freight and logistics industry representatives as well.

It would allow greater and earlier importing industry consultation on major changes to BMSB policy, which could facilitate co-design of reforms and help identify any unintended consequences, alternative solutions and industry capacity to meet requirements.

It would also help relevant agricultural industries and states gain more timely information that relates to Australia's BMSB risk and how it changes overtime.

Recommendation 13

The department should consider convening an industry-government BMSB Council to oversee Australia's BMSB prevention, preparedness and response.

Department's response: Agreed.

The department worked closely with industry on controls for the coming season through its equivalent BMSB Council processes. The department has well-established consultative forums through the Department of Agriculture and Water Resources Cargo Consultative Committee (which includes freight and logistics supply chain representatives) and Plant Health Australia (PHA), in conjunction with Australia's agricultural industries.

Well-established arrangements for industry-government consultative committees also exist under the Emergency Plant Pest Response Deed to respond to post border detections of BMSB that require a national response. Arrangements under the Deed have been activated in recent BMSB seasons.

8.4 Better departmental biosecurity resourcing

The 2019–20 biosecurity workload was conservatively expected to increase by at least 10 per cent, due to a predicted 15 per cent increase in imports needing BMSB risk management. This estimate allowed for some efficiencies in BMSB risk management, by improved industry involvement, but did not provide for the restoration of other biosecurity services to full strength, let alone any contingency for dealing with other national biosecurity pressures that might emerge.

Governments are always trying to reduce public costs by various means, including imposing cost-recovery and average staffing level (ASL) ceilings or budget cuts. The overall staff cap for the department for 2019–20 was set by the Australian Government at 217 less than the total for 2018–19. The department was committed to maintaining frontline services and thus would need to apply cuts elsewhere. This cut followed on from a succession of cuts during the previous seven years, which had already led to a 25 per cent drop in frontline biosecurity inspection staff between 2013–14 and 2017–18 (Inspector-General of Biosecurity 2017).

The department recovers a proportion of the costs of delivering frontline biosecurity services to industry but increasingly cannot recruit and train enough staff to be ready for predicted workload surges in a timely or effective manner, as it would exceed its allocated arbitrary staff number cap. Industry then cannot get the prompt service, which it needs and is prepared to pay for, but suffers further costs and delays. Biosecurity activities funded by cost-recovery should be exempt from ASL ceilings so that the department can employ and train adequate staff to manage increased imports and biosecurity risks.

In 2018–19, the department tried to meet the 20 per cent increase in biosecurity workload due to BMSB by applying overtime and on-call arrangements for unsustainable periods, by recruiting casual staff and by diverting staff from other less urgent but still very important biosecurity programs. However, experienced operational staff cannot be quickly augmented with untrained or inexperienced staff. With insufficient staff and inadequate software systems, many containers and cargoes were held for up to three weeks post-arrival before being released from biosecurity control. This delay rippled through the supply chain (causing, for example, delivery delays and costs in demurrage, storage and empty container return). The huge industry cost and frustration led to increased complaints and threats of legal action.

Apart from frontline biosecurity operations, policy, risk analysis and compliance are critical areas that need skilled and experienced staff. Developing, managing and extending offshore programs like the Offshore BMSB Treatment Providers Scheme and the Safeguarding Arrangements for BMSB Scheme; as well as managing onshore programs, involving the suite of over 3,000 approved arrangements to which the department delegates certain powers to manage biosecurity risks, require:

- careful design based on best science and data available
- huge amounts of industry consultation and international collaboration
- ongoing robust verification and adaptation.

While technological approaches such as new X-ray machines may greatly increase efficiency and save labour, there are many biosecurity functions that cannot currently be outsourced to machines. To prepare for the anticipated 2019–20 workload increase, the department has conducted a bulk recruitment round for biosecurity officers and also ongoing upskilling training programs. Recruitment action underway in April 2019, subject to current staff and fiscal caps, was basically replacing staff leaving the department and was most unlikely to meet foreseen demand for essential biosecurity functions to deal with expected BMSB workload.

The cost model for the department's biosecurity cost recovery arrangements includes program management and administrative activities. These activities include maintenance of all business systems such as information and communications technology, data and records management. These are indirect activities that should be cost recovered by the biosecurity full import declaration levy (Department of Agriculture and Water Resources 2015).

However, it is not clear that funds raised are sufficient, even for critical biosecurity operational assurance programs such as container Cargo Compliance Verification, or for restoring and expanding the detector dog program, or for an adequate National Border Surveillance program, let alone for major software upgrades which could improve efficiency.

Oversight of the department's biosecurity system, including the independent function of the Inspector-General of Biosecurity (IGB), also needs to be adequately funded. The IGB is currently supported by only 2.5 staff. An increase in staff numbers and levels would enable more timely and comprehensive consideration of how the department carries out its essential role in protecting Australia from biosecurity threats, and ensure transparent reporting to the Australian public on departmental performance and biosecurity system improvements.

Recommendation 14

The Australian Government should commit to ensuring adequate long-term funding for biosecurity risk management, and review biosecurity cost recovery arrangements to ensure that funds raised are sufficient for needed restoration or expansion of other priority frontline, support, system improvement and oversight operations. Funding should be linked to growth in imports and biosecurity risks, with cost-recovered functions exempt from efficiency dividends and staff ceilings.

Department's response: The response to this recommendation will be a matter for government.

Conclusion

Australia remains at high risk of a BMSB incursion that could prove difficult or impossible to eradicate, with consequent high impacts on temperate plant industries and social amenity in affected areas. Its international spread and the risk profile of incoming goods will need to be reviewed and adjusted regularly.

The BMSB response in 2018–19 stretched Australia's border biosecurity system close to breaking point and had severe impacts on sections of the shipping and importing industries. Delays and extra costs in cargo-ship unloading and cargo release from biosecurity control were significant but unavoidable during the implementation of a complex array of measures to deal with the large numbers of arriving BMSB.

Risk management measures implemented appear to have prevented an incursion in 2018–19, although a number of border breaches were still under management and surveillance in April 2019. These emergency responses imposed more resourcing demands on the department and on state government agencies. Extra targeted surveillance and risk mitigation, including early response activities, near first ports of entry, container parks and intermodal transport hubs will be needed to manage the risk of BMSB entering Australia.

The department is actively working to optimise pre-border and border measures to handle BMSB risks offshore and minimise disruption to movement of imported goods through the border. However, BMSB's continued spread means that intensified efforts on a wider front will be needed to keep it out of Australia. Moving from nine high-risk countries in 2018–19 to 33 high-risk countries in 2019–20 may increase the volume of incoming cargo needing BMSB intervention by at least 15 per cent.

Further strategic investment in both people and systems improvement, with surge capacity to handle biosecurity 'emergencies' while maintaining ongoing business, will be essential into the foreseeable future.

Departmental resourcing was and is inadequate to meet the BMSB challenge. It is hard to see this changing unless biosecurity funding is improved by removing arbitrary staff caps for cost-recovered and critical assurance and oversight functions. Diversion of resources from other parts of the biosecurity system is not sustainable and will increasingly imperil Australia with risks of other severe pest or disease incursions.

Appendix A
Agency response

Australian Government
Department of Agriculture and Water Resources

SECRETARY

Ref: EC19-000414

Dr Helen Scott-Orr
Inspector-General of Biosecurity
PO Box 657
MASCOT NSW 1460

Dear Dr Scott-Orr

Thank you for your letter of 26 April 2019 about your review report, *Effectiveness of biosecurity measures to manage the risks of brown marmorated stink bugs (BMSB) entering Australia*, and the opportunity to provide a response to your findings and recommendations.

The department agrees with the recommendations in the report. Specific comments in response to the recommendations are provided in Annex A.

There are no matters referenced in your report that are considered prejudicial to the public interest and should not be made publically available.

If you require any further clarification on our comments, please contact Mr Dean Merrilees, Assistant Secretary, Compliance Division, on 02 6272 3901 or by email to dean.merrilees@agriculture.gov.au.

Yours sincerely

Daryl Quinlivan

24 May 2019

ANNEX A

Department of Agriculture and Water Resources responses to recommendations

Recommendation 1

The department should continue to cooperate closely with New Zealand in risk profiling and risk assessment for BMSB of countries, pathways and goods; in developing and administering risk mitigation measures such as offshore quality systems and consistent border controls; in industry communication; and identifying gaps in scientific knowledge and prevention, preparedness and response measures.

Response:

Agreed.

The department has been working extremely closely with New Zealand Ministry for Primary Industries (MPI) to align BMSB measures for the 2019-20 season where possible, and a number of changes have already been agreed by both agencies. It is important to note that complete alignment of measures is not feasible due to differing trade patterns, legislative frameworks and biosecurity systems. The department will continue to work closely with MPI to identify opportunities for further alignment.

Recommendation 2

The department should improve and streamline the existing BMSB offshore treatment certificate verification system to improve its accuracy and facilitate expanded use of the system by customs brokers.

Response:

Agreed.

Work is underway to identify potential information technology changes to improve and automate BMSB treatment systems. This work includes changes that would streamline the BMSB offshore treatment certificate verification system and expansion to other offshore treatments. This may identify business improvements and development of a system for industry to access and verify treatment certificates. Future uptake of such a system would be a commercial decision for brokers.

Recommendation 3

The department should work with industry to conduct contingency planning for sufficient high-quality biosecure onshore treatment provision near key ports of entry.

Response:

Agreed.

As part of preparations for the 2019-20 BMSB season the department is working with the shipping industry to assist operators to develop contingency plans to manage BMSB detections on vessels on arrivals, including, in certain circumstances, the option of onshore treatment.

Further, the department will continue to work with industry and promote the compliance requirements for onshore treatment providers. However, while the department can raise awareness of the importance of treatment providers' ability to manage treatment capacity and the opportunities for commercial entities to carry out these activities, it is ultimately a decision for industry to enter into arrangements.

Recommendation 4

The department should mandate use of automatic data loggers by onshore fumigators and introduce random unannounced audits of treatment providers as a standard rather than an exceptional practice.

Response:

Agreed.

The department will expand the use of automatic data loggers by onshore fumigators. While data logging will not necessarily lead to better treatment outcomes, the department would have better information about treatments which would assist in verification of treatment compliance. The department supports, and already undertakes, unannounced audits, and will consider further their frequency.

Recommendation 5

The department should work with state and territory governments to implement a national harmonised framework to deliver effective biosecurity treatments across import, export and domestic pathways.

Response:

Agreed.

The National Biosecurity Committee, comprising the Commonwealth and all states and territories, has already agreed to develop a national harmonised framework to deliver effective biosecurity treatments across import, export and domestic pathways.

Recommendation 6

The department should urgently prepare a broader request for a major upgrade or replacement of S-Cargo and seek high-level cooperation of Home Affairs to invest in necessary and complementary improvements to integrated cargo system.

Response:

Agreed.

The department will upgrade existing systems and automated processes for management of BMSB. Resourcing of this will be a matter for government. In the interim, to meet requirements for the upcoming season, the department is undertaking repairs of the current S-Cargo system to manage increased cargo volumes. Complementary to this, the department is conducting a detailed analysis of business processes and system improvements to identify the most effective and efficient enhancements for management of the risk posed by BMSB next season. The department will also continue to work with Home Affairs and seek any necessary improvements to the Integrated

Cargo System (ICS), including changes to profiles, messaging and extraction of information from within ICS to better support BMSB management.

Recommendation 7

The department should consider introducing a dedicated BMSB hotline manned by experienced staff as an escalation point for urgent BMSB enquiries that meet agreed criteria if workload in the 2019–20 season warrants it.

Response:

Agreed.

The department is already implementing a direct line for industry organisations as part of its 'green lane' policy, and has established a dedicated email inbox for seasonal pest policy, including BMSB policy enquiries.

The department has established mechanisms for triaging all general enquiries (including BMSB-related) received through the national contact number.

The department is also further strengthening its training and workforce allocation processes to ensure urgent and complex enquiries are handled by suitably trained staff.

Recommendation 8

The department should urgently expand the detector dog program to increase training and numbers of dogs (and their handlers) to detect high-risk pests, including brown marmorated stink bugs, for deployment in high BMSB risk cargo pathways for next season.

Response:

Agreed.

The department will expand the detector dog program as part of a suite of controls to detect high risk pests. Managing BMSB risks offshore remains the department's preferred approach as it gives the highest level of biosecurity protection for this expansion. Detector dogs will be used to augment this, with particular focus on verification. Resourcing will be a matter for government.

Ship holds and breakbulk pathways present some limitations for utilising detector dogs.

Recommendation 9

The department, in collaboration with state and territory governments and the relevant plant industries, should continue active international collaboration in BMSB research, development and extension.

Response:

Agreed.

The department will continue to collaborate with state and territory governments and relevant plant industries to undertake BMSB research, development and extension.

Recommendation 10

The department should strengthen the National Border Surveillance program by increasing targeted surveillance for BMSB at major ports, approved arrangements and high risk post-border sites.

Response:

Agreed.

The department will continue to explore opportunities to increase targeted surveillance of high risk sites.

Recommendation 11

The department should work with states and territories and relevant industries to develop and deliver a nationally coordinated BMSB education/awareness campaign for all government, industry and community stakeholders. Similar targeted and coordinated campaigns should also be mounted for other serious pests and diseases that are spreading rapidly such as *Xylella* and African swine fever.

Response:

Agreed.

The department has worked closely with industry and implemented a range of targeted BMSB awareness/education activities for personnel involved in import supply chain logistics. The department will continue to work with states and territories to develop key education and awareness activities through the National Biosecurity Communication and Engagement Network.

Recommendation 12

The department should convene internal incident management teams to manage future major biosecurity threats and ensure that summary progress information is provided to all key stakeholders in a timely manner.

Response:

Agreed.

The department has a well-established framework for dealing with incident management and convenes incident managements in accordance with this framework. A standing Incident Management Team was established for last season and will be established again for the coming season.

The Critical Incident Response Plan sets out the department's arrangements for managing an incident which may impact on its portfolio responsibilities and interests, such as the outbreak of a significant plant or animal disease, a live animal export incident, or a business continuity event.

Recommendation 13

The department should consider convening an industry-government BMSB Council to oversight Australia's BMSB prevention, preparedness and response.

Response:

Agreed.

The department worked closely with industry on controls for the coming season through its equivalent BMSB Council processes. The department has well-established consultative forums through the Department of Agriculture and Water Resources Cargo Consultative Committee (which includes freight and logistics supply chain representatives) and Plant Health Australia (PHA), in conjunction with Australia's agricultural industries.

Well-established arrangements for industry-government consultative committees also exist under the Emergency Plant Pest Response Deed to respond to post border detections of BMSB that require a national response. Arrangements under the Deed have been activated in recent BMSB seasons.

Recommendation 14

The Australian Government should commit to ensuring adequate long-term funding for biosecurity risk management, and review biosecurity cost recovery arrangements to ensure that funds raised are sufficient for needed restoration or expansion of other priority frontline, support, system improvement and oversight operations. Funding should be linked to growth in imports and biosecurity risks, with cost-recovered functions exempt from efficiency dividends and staff ceilings.

Response:

The response to this recommendation will be a matter for government.

Appendix B
Review submissions

This review received a total of 25 submissions from government and industry representative. Table B1 lists all the non-confidential submissions, including the type of government or industry that they represent.

TABLE B1 Non-confidential submissions relating to review, from industry or government

Organisation	Industry or government type
Agriculture Victoria	State government
Apple and Pear Australia LTD (APA)	Horticulture
Australian Federation of International Forwarders (AFIF)	Freight Forwarders peak body
Australian Grape and Wine Inc. (AGW)	Horticulture
Australian Timber Importers Federation Inc. (ATIF)	Timber importers
Cotton Australia	Cotton growers
Customs Brokers and Forwarders Council of Australia Inc. (CBFCA)	Logistics and supply chain peak body
Dried Fruits Australia (DFA)	Horticulture
Federal Chamber of Automotive Industries (FCAI)	Auto importers
Food and Beverage Importers Association (FBIA)	Food importers
Freight and Trade Alliance (FTA)	Logistics and supply chain peak body
Hazelnut Growers of Australia Inc.	Horticulture
Nordiko Quarantine Systems Pty Ltd	Fumigation
Plant Health Australia (PHA)	Government/plant industry coordinator
Queensland Department of Agriculture and Forestry (QDAF)	State government
Shipping Australia Limited (SAL)	Shipping industry peak body

Appendix C
Host plants for BMSB

TABLE C1 Potential host plants that could be impacted by BMSB

Host species	Common name	Host species	Common name
Abelia × *grandiflora*	Glossy abelia	*Abelmoschus esculentus*	Okra
Acer × *freemanii*	Freeman maple	*Acer* × *tegmentosum*	Manchurian snakebark maple
Acer buergerianum	Trident maple	*Acer campestre*	Hedge maple
Acer circinatum	Vine maple	*Acer griseum*	Paperbark maple
Acer japonicum	Amur (Japanese downy) maple	*Acer macrophyllum*	Bigleaf maple
Acer negundo	Boxelder	*Acer palmatum*	Japanese maple
Acer pensylvanicum	Striped maple	*Acer platanoides*	Norway maple
Acer pseudoplatanus	na	*Acer rubrum*	Red maple
Acer saccharinum	Silver maple	*Acer saccharum*	Sugar maple
Actinidia deliciosa	Kiwifruit	*Aesculus* × *carnea*	Red horse-chestnut
Aesculus glabra	Ohio buckeye	*Ailanthus altissima*	Tree of heaven
Akebia spp.	Chocolate vine	*Amaranthus caudatus*	Love-lies-bleeding (amaranth)
Amelanchier laevis (syn. × *grandiflora*)	Allegheny (apple) serviceberry	*Antirrhinum majus*	Garden snapdragon
Arctium minus	Lesser burdock	*Armoracia rusticana*	Horseradish
Artemisia argyi	Argyi wormwood	*Asimina triloba*	American pawpaw
Asparagus officinalis	Asparagus	*Baptisia australis*	Blue wild indigo
Basella rubra	Ceylon spinach	*Beta vulgaris*	Beet
Beta vulgaris ssp. *cicla*	Swiss chard	*Betula* spp.	Birch
Betula nigra	River birch	*Betula papyrifera*	Paper birch
Betula pendula	European white birch	*Brassia* spp.	Orchid
Brassica juncea	Wild mustard	*Brassica napus*	Canola
Brassica oleracea	Cabbage, collards	*Buddleja* spp.	Butterflybush

TABLE C1 Potential host plants that could be impacted by BMSB

Host species	Common name	Host species	Common name
Buddleja davidii	Butterflybush	*Camellia oleifera*	Oil-seed camellia
Camellia sinensis	Chinese tea	*Cannabis sativa*	Hemp
Capsicum annuum	Cayenne pepper	*Caragana arborescens*	Siberian peashrub
Carpinus betulus	European hornbeam	*Carya ovata*	Shagbark hickory
Carya illinoinensis	Pecan	*Catalpa* spp.	Catalpa
Cayratia japonica	Bushkiller	*Celastrus orbiculatus*	Oriental bittersweet
Celosia spp.	Cock's comb	*Celosia argentea*	Feather cockscomb
Celtis occidentalis	Common hackberry	*Celtis koraiensis*	Korean hackberry
Cephalanthus occidentalis	Common buttonbush	*Cercidiphyllum japonicum*	Katsura tree
Cercis canadensis	Eastern redbud	*Cercis canadensis var. texensis*	Texas redbud
Cercis occidentalis	Hackberry	*Chaenomeles speciosa*	Japanese flowering quince
Chamaecyparis obtusa	Hinoki cypress	*Chenopodium berlandieri*	Pitseed goosefoot
Chionanthus retusus	Chinese fringe tree	*Chionanthus virginicus*	White fringe tree
Cinnamomum camphora	Camphor tree	*Citrus* spp.	Orange, mandarin, yuzu
Cladrastis kentukea (syn. *lutea*)	Kentucky (American) yellowwood	*Cleome* spp.	Cleome
Clerodendrum trichotomum	Harlequin glorybower	*Cornus* × *Stellar series*	Dogwood
Cornus florida	Flowering dogwood	*Cornus kousa*	Kousa dogwood
Cornus macrophylla	(Large-leaf) dogwood	*Cornus officinalis*	Asiatic (Japanese cornel) dogwood
Cornus racemosa	Gray dogwood	*Cornus sericea*	Redosier dogwood
Corylus colurna	Filbert, hazelnut	*Crataegus laevigata*	Smooth (English) hawthorn
Crataegus monogyna	Oneseed hawthorn	*Crataegus pinnatifida*	Chinese hawthorn
Crataegus viridis	Green hawthorn	*Cucumis sativus*	Garden cucumber
Cucurbita pepo	Field pumpkin (summer squash)	*Cupressus* spp.	Cypress
Decaisnea fargesii	na	*Dendranthema morifolium*	Chrysanthemum
Diospyros spp.	Persimmon	*Diospyros kaki*	Japanese persimmon
Elaeagnus angustifolia	Russian olive	*Elaeagnus umbellata*	Autumn olive
Eriobotrya japonica	Loquat	*Euonymus alatus*	Winged euonymus
Euonymus japonicus	Japanese spindle	*Evodia* spp.	n/a
Ficus carica	Edible fig	*Firmiana platanifolia*	Chinese parasol tree
Forsythia suspensa	Weeping forsythia	*Fraxinus americana*	White (American) ash

TABLE C1 Potential host plants that could be impacted by BMSB

Host species	Common name	Host species	Common name
Fraxinus chinensis	Chinese ash	*Fraxinus pennsylvanica*	Green ash
Ginkgo biloba	Maidenhair tree (ginkgo)	*Gleditsia triacanthos var. inermis*	Thornless common honeylocust
Glycine max	Soybean	*Gossypium hirsutum*	Upland cotton
Halesia tetraptera	Mountain (carolina) silverbell	*Hamamelis japonica*	Invasive witchhazel
Hamamelis virginiana	American witchhazel	*Helianthus annuus*	Sunflower
Heptacodium miconioides	Seven sons flower	*Hibiscus moscheutos*	Crimsoneyed rosemallow
Hibiscus rosa-sinensis	Chinese hibiscus	*Hibiscus syriacus*	Rose of sharon (hibiscus)
Humulus lupulus	Common hop	*Humulus scandens (japonicus)*	Japanese hops
Ilex aquifolium	English holly	*Ilex opaca*	American holly
Ilex verticillata	Winterberry holly	*Impatiens balsamina*	Rose balsam
Juglans nigra	Black walnut	*Juniperus virginiana*	Eastern red cedar
Koelreuteria paniculata	Goldenrain tree	*Lagerstroemia indica*	Crape myrtle
Larix kaempferi (syn. *leptolepis*)	Japanese larch	*Ligustrum japonicum*	Japanese or wax-leaf privet
Ligustrum sinense	Chinese privet	*Liquidambar styraciflua*	Sweetgum
Liriodendron tulipifera	Tulip tree	*Lonicera* spp.	Honeysuckle
Lonicera tatarica	Tatarian honeysuckle	*Lycium barbarum*	Wolfberry
Lythrum salicaria	Purple loosestrife	*Magnolia stellata*	Star magnolia
Magnolia grandiflora	Southern magnolia	*Mahonia aquifolium*	Holly leaved barberry (oregon grape)
Malus × zumi	Crab apple	*Malus baccata*	Siberian crab apple
Malus domestica	Apple	*Malus pumila* (syn. *domestica*)	Paradise apple
Malus sargentii	Sargent's crab apple	*Manihot esculenta*	Tapioca
Metasequoia glyptostroboides	Dawn redwood	*Mimosa* spp.	Sensitive plant (mimosa)
Morus spp.	Mulberry	*Morus alba*	White mulberry
Musineon divaricatum	Leafy wild parsley	*Nicotiana alata*	Jasmine tobacco
Nyssa sylvatica	Blackgum (tupelo)	*Olea oleaster*	Wild olive
Oxydendrum spp.	n/a	*Panicum miliaceum*	Common millet
Parrotia spp.	n/a	*Paulownia tomentosa*	Princess tree (paulownia)
Phalaenopsis spp.	Orchid, moth	*Phaseolus* spp.	Bean
Phaseolus lunatus	Lima bean	*Phaseolus vulgaris*	Kidney bean

TABLE C1 Potential host plants that could be impacted by BMSB

Host species	Common name	Host species	Common name
Photinia (syn. *Aronia*) spp.	Chokeberry	*Phytolacca americana*	American pokeweed
Pistacia chinensis	Chinese pistache	*Pisum sativum*	Pea
Platanus occidentalis	American sycamore	*Platycladus orientalis*	Oriental arborvitae
Polygonum perfoliatum	Mile-a-minute weed	*Populus tomentosa*	Chinese white poplar
Prunus spp.	Cherry, plum	*Prunus* × *incam*	Flowering cherry
Prunus armeniaca	Apricot	*Prunus avium*	Sweet cherry
Prunus cerasifera	Cherry plum	*Prunus domestica*	Plum
Prunus grayana	Japanese bird cherry	*Prunus incisa*	Fuji cherry
Prunus laurocerasus	Cherry laurel	*Prunus mume*	Green plum
Prunus persica	Peach	*Prunus pseudocerasus*	Cambridge cherry
Prunus serotina	Black cherry	*Prunus serrulata*	Japanese flowering cherry
Prunus subhirtella	Winter-flowering (Higan) cherry	*Pseudocydonia sinensis*	Chinese quince
Pueraria montana var. *lobata*	Kudzu	*Punica granatum*	Pomegranate
Pyracantha spp.	Firethorn	*Pyracantha coccinea*	Firethorn
Pyrus spp.	Pear	*Pyrus calleryana*	Callery (Bradford) pear
Pyrus fauriei	Korean sun pear	*Pyrus pyrifolia*	Chinese (Asian) pear
Quercus alba	White oak	*Quercus coccinea*	Scarlet oak
Quercus robur	English oak	*Quercus rubra*	Northern red oak
Rhamnus spp.	Buckthorn	*Rhamnus cathartica*	Common buckthorn
Rhodotypos scandens	Jetbead	*Rhus spp.*	Sumac
Rhus typhina	Staghorn sumac	*Robinia pseudoacacia*	Black locust
Rosa canina	Dog (native) rose	*Rosa multiflora*	Mulitflora rose
Rosa rugosa	Rugosa rose	*Rubus* spp.	Raspberry, blackberry
Rubus phoenicolasius	Wine raspberry (wineberry)	*Salix* spp.	Willow
Sambucus spp.	Elder	*Sambucus racemosa*	Red elderberry
Sassafras albidum	Sassafras	*Secale cereale*	Cereal rye
Setaria italica	Pearl millet	*Sicyos angulatus*	Bur cucumber
Solanum lycopersicum	Tomato	*Solanum melongena*	Eggplant
Solanum nigrum	Black nightshade	*Sophora japonica*	Japanese pagoda tree
Sophora japonica L. *forma pendula*	Weeping scholar tree	*Sorbus* spp.	Mountain ash
Sorbus airia	Winterbeam	*Sorbus americana*	American mountain ash
Sorghum bicolor	Sorghum	*Spiraea* spp.	Spirea

TABLE C1 Potential host plants that could be impacted by BMSB

Host species	Common name	Host species	Common name
Stewartia koreana	Korean stewartia	*Stewartia pseudocamellia*	Japanese stewartia
Styrax japonicus	Japanese snowbell	*Symphytum* spp.	Comfrey
Syringa spp.	Lilac	*Syringa pekinensis*	Peking (Chinese) tree lilac
Taxus cuspidata	Japanese yew	*Tetradium daniellii* (syn. *Euodia hupehensis*)	Bee-bee tree (Korean euodia)
Tilia spp.	Basswood	*Tilia americana*	American basswood
Tilia cordata	Little leaf linden	*Tilia tomentosa*	Silver linden
Triticum aestivum	Wheat	*Tropaeolum majus*	Nasturtium
Tsuga canadensis	Eastern hemlock	*Ulmus* spp.	Elm
Ulmus americana	American elm	*Ulmus parvifolia*	Chinese elm
Ulmus pumila	Elm	*Ulmus procera* (syn. *minor*)	English (smooth leaf) elm
Vaccinium corymbosum	Highbush blueberry	*Vibernum* spp.	Viburnum
Viburnum × *burkwoodii*	Viburnum	*Viburnum dilatatum*	Linden arrowwood
Viburnum opulus var. *americanum*	Highbush cranberry	*Viburnum prunifolium*	Viburnum (blackhaw)
Viburnum setigerum	Tea viburnum	*Vigna angularis*	Azuki bean
Vigna sesquipedalis	Chinese long bean	*Vigna unguiculata*	Cowpea
Vitex negundo	Chinese chaste tree	*Vitis riparia*	Riverbank wild grape
Vitis vinifera	Wine grape	*Weigela hortensis*	Japanese weigela
Wisteria sinensis	Chinese wisteria	*Zea mays*	Corn (field and sweet corn)
Zelkova spp.	Japanese zelkova	*Ziziphus jujube*	Jujube
n/a	Chestnut	n/a	Pine
n/a	Arrowroot	n/a	Wax myrtle
n/a	Acacia	n/a	Alder
n/a	Cedar	n/a	Chinese milk vetch
n/a	Clover	n/a	Common mallow
n/a	Hairy vetch	n/a	Hollyhock
n/a	Strawberry	n/a	Tung

n/a not available
Source: Department of Agriculture and Water Resources (2017)

Appendix D
Tariff chapters of imported goods targeted as BMSB high-risk or risk, 2018–19

TABLE D1 BMSB target high-risk goods and target risk goods, 2018–19 BMSB season

A. Target high-risk goods for BMSB seasonal management measures

Schedule 3 Chapter	Goods description
36	Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations
44	Wood and articles of wood; wood charcoal
45	Cork and articles of cork
57	Carpets and other textile floor coverings
68	Articles of stone, plaster, cement, asbestos, mica or similar materials
69	Ceramic products, including sub chapters I and II
70	Glass and glass ware
72	Iron and steel—including sub chapters I, II, III, IV
73	Articles of iron or steel
74	Copper and articles thereof
75	Nickel and articles thereof
76	Aluminium and articles thereof
78	Lead and articles thereof
79	Zinc and articles thereof
80	Tin and articles thereof
81	Other base metals; cermets; articles thereof
82	Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal
83	Miscellaneous articles of base metals
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof

TABLE D1 BMSB target high-risk goods and target risk goods, 2018–19 BMSB season

85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles
86	Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds
87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof
88	Aircraft, spacecraft, and parts thereof
89	Ships, boats and floating structures
93	Arms and ammunition; parts and accessories thereof

B. Target risk goods for BMSB seasonal management measures

Schedule 3 Chapter	Goods description
25	Salt; sulphur; earths and stone; plastering materials, lime and cement
26	Ores, slag and ash
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes—including sub chapters I, II, III, IV and V
29	Organic chemicals, including sub chapters I, II, III, IV, V, VI, VII, VIII, IX, X, XII and XIII
31	Fertilisers
38	Miscellaneous chemical products
39	Plastics and articles thereof, including sub chapters I and II
40	Rubber and articles thereof
46	Manufactures of straw, of esparto or of other plaiting materials; basket ware and wickerwork
47	Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard
48	Paper and paperboard; articles of paper pulp, of paper or of paperboard
49	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans
56	Wadding, felt and nonwovens; special yarns; twine, cordage, ropes and cables and articles thereof

Source: Department of Agriculture and Water Resources (2019b) and Department of Home Affairs

Appendix E

Industry advice notices, December 2014 – March 2019

Table E1 summarises the departmental industry advice notices relating to BMSB operational policy changes.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
December 2014	125-2014	Importers and customs brokers	Full inspection of break-bulk vehicles, machinery, auto parts arriving from US port of Savannah
22 January 2015	02-2015	Importers, forwarders and customs brokers associated with the importation of vehicles, tyres, machinery and automotive parts sourced and shipped from the east coast ports of USA	Extended measures to all break-bulk vehicles, machinery, auto parts, containerised machinery and tyres from US east coast ports arriving in Australia on or after 23 February 2015
4 February 2105	03-2015	Importers and customs brokers associated with the importation of break-bulk and containerised vehicles, machinery, automotive parts and tyres shipped from USA	Further extended 02-2015 to include all US ports arriving on or after 9 March 2015
20 February 2015	06-2015	Importers and customs brokers associated with the importation of targeted break-bulk and containerised vehicles (including boats), machinery, and automotive parts shipped from the USA	Tyres, used containerised goods and LCL consignments no longer targeted
24 February 2015	07-2015	Importers and customs brokers using the Automatic EntryProcessing for Commodities Scheme (AEPCOMM) associated with the importation of break-bulk and new, unused FCL containerised goods shipped from the USA	Entries associated with break-bulk and new, unused FCL containerised goods from USA not processed through AEPCOMM
13 March 2015	12-2015	Importers and customs brokers associated with the importation of targeted break-bulk and containerised vehicles (including boats), machinery and automotive parts shipped from the USA	Thermal fogging (Py fog) of first port vessels with targeted break-bulk from USA will occur on arrival, followed by pre-discharge inspection
24 August 2016	83-2016	Importers and customs brokers	Brown Marmorated Stink Bugs 2016–17 season—expired

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
23 September 2016	90-2016	Importers and customs brokers	Brown Marmorated Stink Bugs 2016–17 season—New Community Protection questions—expired
17 August 2017	76-2017	Importers, shipping and customs brokers	2016–17 BMSB measures will continue to apply to target goods from USA, and be extended to target goods from Italy shipped from 1 September 2017 to 30 April 2018. Heightened inspections of target goods from other countries with emerging risks.
3 October 2017	91-2017	Approved arrangements	At-risk goods from the USA being extended this season to similar goods from Italy, and other European ports if the goods were manufactured or stored in Italy during the risk period. New and used vehicles, vessels, machinery and large machinery parts are the primary pathway for these goods at this stage. Department also monitoring imports from other European countries where BMSB is known to be established.
30 November 2017	113-2017	Importers, approved arrangements	Guidelines on deconsolidating goods, inspecting locations where BMSB may congregate, including crevices or protected areas of shipping containers, on or inside the target goods, or within packaging material for these goods.
20 December 2017	123-2017	Importers, shipping, customs brokers of containerised goods	Department will be inspecting a broader range of goods arriving from Italy not currently being captured, and increasing the total amount of inspections of goods arriving from Italy.
16 January 2018	04-2018	Importers, shipping, customs brokers of containerised goods	All containerised goods shipped via sea cargo from Italy that arrive in Australia between 17 January 2018 and 30 April 2018 required to undergo an approved treatment onshore. Goods treated offshore (certified) will not require further treatment. All other containerised goods (FCL, FCX and LCL) arriving from Italy (including new and unused goods), including those already en route to Australia, will require treatment on arrival using methyl bromide, or another approved treatment for BMSB. These measures are in addition to existing import requirements. The department will inspect randomly selected containers post-treatment to validate treatment effectiveness and to collect intelligence to determine future measures.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
30 January 2018	10-2018	Shipping agents, vessel masters, operators of ro-ro vessels, importers of ro-ro cargo, stevedores	The heightened vessel surveillance window for BMSB has commenced. On 31 January 2018 the department will commence the management of BMSB risk on ro-ro vessels arriving in Australia through the Maritime Arrivals Reporting System (MARS). This activity is expected to conclude at the end of the BMSB risk season, on 30 April 2018. Ro-ro vessels arriving during the 2018 BMSB season will be risk assessed by the department to determine the need for a targeted BMSB inspection on arrival. All relevant vessels will be sent a BMSB questionnaire via MARS, as part of the pre-arrival reporting process to assess if a targeted BMSB inspection is required. Vessels found with suspected BMSB contamination during inspection may be directed to treat any cargo discharged at the first port. Further directions may be applied to treat the vessel prior to cargo discharge at a subsequent port.
14 February 2018	16-2018	Customs brokers involved in the import of SF treated consignments from Italy	AQIS Entity Identifier data must be entered into the Integrated Cargo System (ICS). Where consignments are accompanied by an Italian SF treatment certificate, Customs Brokers must select the appropriate AEI in the ICS. This requirement is effective immediately.
23 February 2018	20-2018	Shipping agents, vessel masters, operators (ro-ro) vessels, importers of ro-ro cargo, stevedores	The department is increasing the assessment and inspection of all ro-ro vessels from Monday 26 February 2018. Ro-ro vessels may receive a BMSB questionnaire via MARS. Vessels that report the presence of BMSB may be asked to conduct further daily inspections to determine the extent of the infestation. Vessels may be inspected. Following assessment the department may require treatment of the vessel at anchorage to manage an unacceptable level of biosecurity risk. Following assessment and any treatment of the vessel, any cargo unloaded may also be subject to further inspection and treatment.
8 March 2018	23-2018	Importers and customs brokers, associated with the importation of Italian goods	Any sulfuryl fluoride treatment certificates issued by any Italian treatment provider that is presented to the department from 9 March 2018 will no longer be accepted. Any Italian goods shipped on or before 30 April 2018 will need to undergo an approved BMSB treatment onshore unless they have been treated offshore using an approved BMSB treatment. Treatment certificates for approved BMSB treatments, other than sulfuryl fluoride, from Italy will still be accepted.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
14 March 2018	25-2018	Freight forwarders, importers and customs brokers associated with importing LCL containerised goods from Italy	To manage the risk of cross contamination of containers and other goods, effective from 15 March 2018 any containers arriving from Italian ports and containing goods originating from Italy shipped as LCL consignments will be held by the department under biosecurity control at the wharf. Containers of LCL consignments will require treatment at the container level at either the wharf or at a class 1.1 or 1.3 AA or at a class 2.1, 2.2, 2.3, 2,6, or 4.6 class AA site that is in a metropolitan location and has previously been approved to conduct methyl bromide fumigations. Where evidence is provided that the container has been treated the container will not require further treatment. New BMSB profiles have been implemented to place ICS holds on containers with LCL consignments from Italian ports and containing Italian goods. The ICS hold will prevent movement from a wharf until the department obtains all required information to manage the risk. The ICS Hold will be registered as a GAS HOLD. To facilitate management of the containers at ports which already deal with GAS holds, the department will provide stevedores and wharf operators with vessel lists identifying actionable containers. These lists will enable BMSB risk LCL containers to be sorted from Country Action List (CAL) containers.
3 April 2018	40-2018	Freight forwarders, importers and customs brokers	The department ceased heightened measures for the 2017–2018 BMSB risk season for goods shipped from 1 May 2018. Goods shipped on or before 30 April 2018 and still en route to Australia will be subject to BMSB measures.
15 June 2018	57-2018	Freight forwarders, importers customs brokers associated with importing goods that require BMSB treatment	The department will mandate additional measures during the 2018–19 BMSB risk season. These measures will require certain goods arriving from certain countries of risk to be treated or subject to increased intervention before arriving into Australian territory.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
23 July 2018	77-2018	Freight forwarders, importers and customs brokers associated with importing goods that require increased intervention during the BMSB risk season	For the 2018–19 BSMB risk season, the department has expanded the list of countries that will be subject to heightened measures. The additional countries are France, Georgia, Germany, Greece, Hungary, Romania and Russia. Italy and the United States of America will also continue to be subject to the seasonal measures. Certain risk goods manufactured in, or shipped as sea cargo from, these countries will be subject to increased onshore intervention. Mandatory offshore treatment will also apply to certain high-risk goods manufactured in, or shipped from, France, Georgia, Germany, Greece, Hungary, Italy, Romania, Russia, and the USA. Goods that require mandatory offshore treatment and arrive untreated or treated by an unapproved treatment provider will be exported or destroyed, unless exceptional circumstances are granted.
8 August 2018	89-2018	Freight forwarders, importers and customs brokers associated with importing goods that require increased intervention during the BMSB risk season	Target high-risk goods from manufactured in, or shipped from France, Georgia, Germany, Greece, Hungary, Italy, Romania, Russia, and the USA. Heightened vessel surveillance on all ro-ro and general cargo vessels through pre-arrival reporting with a BMSB questionnaire and daily checks conducted by vessel masters.
20 August 2018	99-2018	Freight forwarders, importers and customs brokers	All containerised cargo in sealed six sided containers could be treated onshore in Australia provided the treatment was conducted at the container level. Deconsolidation or removal of goods was not permitted prior to treatment.
14 September 2018	116-2018	Freight forwarders, importers and customs brokers	The department informed the industry that BMSB seasonal measures would likely to result in extensive clearance delays at the border.
25 September 2018	131-2018	Freight forwarders, importers, customs brokers and master consolidators	Department published a webpage called 'Management of LCL and FAK containers during the BMSB season'
25 September 2018	132-2018	Accredited persons associated with class 19.1 and 19.2 approved arrangements	Processes for lodging import declarations in the ICS changed to streamline clearance of target high-risk goods from target risk countries. This includes the expansion of the AEPCOMM AA and introduction of AEI for approved offshore BMSB treatment providers

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
11 October 2018	141-2018	Freight forwarders, importers, customs brokers and master consolidators	All target high-risk break-bulk cargo, must be treated offshore unless exceptional circumstances have been granted. If untreated break-bulk cargo arrives in Australia, it was prevented from discharge/unload or if unloaded, was directed for immediate containment and export. Where untreated break-bulk cargo has been identified, stevedores and wharf operators requested not to unload identified cargo. If cargo is unloaded, goods will not be permitted to leave the wharf and will require export within 48 hours.
11 October 2018	142-2018	Customs brokers, freight forwarders and importers of goods subject to BMSB measures	BMSB sealing declaration document can be used to demonstrate that goods were sealed inside a container prior to 1 September 2018 or after treatment. This document is required where: • goods were containerised prior to 1 September but shipped after this date • the bill of lading does not state the shipped on board date • goods were sealed inside a container within 120 hours of treatment occurring offshore.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
15 October 2018	144-2018	Onshore methyl bromide treatment providers and import industry	Unlike other methyl bromide fumigations, dosage compensation for temperatures below the specified minimum temperature is not permitted for BMSB treatments. The methyl bromide BMSB treatment rate is: • A dose of 16 g/m3 or above, at 15°C or above, for 12 hours or longer, with a minimum end point reading of 8g/m3. • Dosage compensation is not permitted for temperatures below 15°C. If the forecast minimum temperature is below 15°C, the fumigation must either: – be conducted in an enclosure that is heated above 15°C throughout the exposure period or – postponed until the forecast minimum temperature for the full exposure period is above 15°C. If the fumigation is conducted in a heated enclosure, the temperature within the enclosure must be monitored and recorded in accordance with the Methyl Bromide Fumigation Methodology. Importantly, the BMSB methyl bromide treatment rate specifies the minimum requirements for the fumigation. Fumigations can exceed any element of this rate (for example, a higher dose, temperature, or end point reading, or a longer exposure period), as long as all other elements are at or above the minimum level specified in the treatment rate.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
16 October 2018	145-2018	Freight forwarders, importers, customs brokers and master consolidators	The department's electronic systems and processes were amended to streamline the highly manual and complex process of managing onshore treatments of LCL and FAK containers at the container level. Issues impacting the system's ability to process the containers were identified. These profiles were deactivated on 11 October 2018. In the interim, all LCL and FAK containers shipped from target risk countries were allowed to move under bond, deconsolidate, and be managed at the Full Import Declaration (FID) level. To assist with the assessment of consignments at FID level: • Master consolidators were required to provide customs brokers with valid offshore treatment certificates if the LCL or FAK container has been treated at the container level • Customs brokers were required to submit all supporting documentation (including valid offshore treatment certificates linking it to individual consignments) through COLS as part of the standard process.
17 October 2018	146-2018	All clients who submit documentation to the department for import assessment via the Cargo Online Lodgement System (COLS)	The department has implemented measures to manage the biosecurity risk posed during the 2018–19 BMSB. This has resulted in delays to import document processing due to the increased intervention required. This additional workload also corresponds to the peak importing season from October to January. The high volumes that the department is experiencing is expected to continue until the end of March 2019.
23 October 2018	153-2108	Brokers, importers and biosecurity industry participants (BIP's) operating under the department's class 19.2 AA: Automatic entry processing for commodities (AEPCOMM)	The department will be hosting a webinar on Monday 29 October at 15:30 AEDT for accredited persons operating under the 19.2 automatic entry processing for commodities (AEPCOMM) approved arrangement. The webinar will focus on recent changes to the arrangement in relation to the BMSB season.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
31 October 2018	155-2018	Importers and customs brokers of fresh kiwi fruit from Italy	The department will inspect packaging and cartons containing kiwifruit from Italy between the dates of 14 November 2018 and 10 December 2018. The measure will comprise of an inspection of 3 per cent of cartons and involve inspecting the internal surfaces of the packaging for BMSB.
2 November 2018	158-2018	Customs brokers lodging consignments in the ICS	The department has registered offshore BMSB treatment providers to facilitate the treatment of goods offshore prior to export to Australia. Upon receipt of BMSB treatment certification customs brokers must enter the treatment provider's AEI details into the ICS. The AEI details must be entered against all target high-risk goods lines in the consignment's ICS entry. By entering valid AEI details against all target high-risk goods lines consignments will not be referred to the department unnecessarily. Full Import Declarations (FIDs) with valid AEI details entered against all high-risk goods lines will then only be randomly referred to the department for verification.
2 November 2018	159-2018	Brokers, importers and BIP's operating under the department's class 19.2 AA: AEPCOMM	On Monday 29 October the department hosted a Webinar for accredited persons operating under the 19.2 automatic entry processing for commodities (AEPCOMM) approved arrangement. The webinar focussed on recent changes to the arrangement in relation to the BMSB season.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
5 November 2018	160-2018	Freight forwarders, importers, customs brokers and master consolidators	Enhancements to the department's systems were completed, the LCL and FAK container management process (including cargo report holds for LCL/FAK containers) commenced on 8 November 2018. The interim measures which allowed all LCL and FAK containers shipped from target risk countries to be managed at the FID level were not permitted after 8 November. Cargo report holds did not apply to LCL and FAK containers with target high-risk goods that were shipped from non-target risk countries (excluding hubbed goods). These continued to be managed at the FID level. The implementation of this process may have inadvertently placed retrospective holds on already deconsolidated containers. The department indicated it would identify, and prevent, lift or cancel these holds. To assist customs brokers to clear their consignments through AIMS at the FID level from 8 November: Master Consolidators were required to provide Customs brokers with valid offshore treatment certificates if the LCL or FAK container has been treated at the container level. Customs brokers were required to enter the AEI number and the container number at the FID level (where possible). Customs brokers were required to submit all supporting documentation (including valid offshore treatment certificates linking it to individual consignments) through COLS as part of the standard process. The department provided stevedores and wharf operators with vessel lists identifying actionable containers to facilitate management of containers at ports.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
23 November 2018	165-2018	Freight forwarders, importers and customs brokers	The department suspended an offshore treatment provider which cannot perform BMSB treatments on Australian bound consignments (La Spezia Container Terminal (AEI: IT4013SB)).
27 November 2018	169-2018	Importers and brokers of sea containers and break-bulk cargo from countries listed on the County Action List (CAL)	The department is experiencing issues with S-Cargo system. This means that cargo reports lodged may experience processing delays.
30 November 2018	172-2108	Importers and brokers of sea containers and break-bulk cargo from countries listed on the CAL	Further to the IAN (169-2018) of 27, November 2018, the department is continuing to experience issues with the S-Cargo system. This means that cargo reports lodged may experience processing delays. The management of LCL/FAK containers subject to BMSB measures is also affected by this outage as cargo reports of some LCL/FAK containers may not have been referred to the S-Cargo system.
7 December 2018	184-2018	Freight forwarders, treatment providers, importers, customs brokers, and biosecurity industry participants operating AA sites with onsite fumigation facilities, specifically fumigation pads undertaking onshore treatment for BMSB	Onshore treatment providers conducting methyl bromide and sulfuryl fluoride fumigations were informed that stacking containers for fumigation was permitted. If it was allowed under state fumigation licensing authority.
11 December 2018	186-2018	Freight forwarders, importers and customs brokers	The department suspended an offshore treatment provider which cannot perform BMSB treatments on Australian bound consignments (Radit Srl (AEI: IT4006SB)).
17 December 2018	191-2018	Freight forwarders, importers and customs brokers	The department suspended an offshore treatment provider which cannot perform BMSB treatments on Australian bound consignments (Nuova Cianidrica Srl (AEI: IT4002B)).
24 December 2018	194-2018	Freight forwarders, importers, customs brokers, vessel operators, shipping lines, stevedores, wharf operators and master consolidators	All target high-risk break-bulk goods from target risk countries, must be treated offshore unless granted exceptional circumstances. Pyrethoid chemical insecticide is not an approved treatment by the department.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
24 December 2018	195-2018	Vessel masters, freight forwarders, treatment providers, BIPs, importers, customs brokers and principle agents associated with loading break-bulk goods that require increased intervention during the BMSB risk season	Break-bulk goods which were in-transit prior to the treatment provider being suspended will be permitted to discharge/unload on arrival, provided assurance is given that any potential BMSB risk will be contained and mitigated. These goods may have been subject to further inspection after onshore treatment. A risk management plan was submitted to the department, prior to goods arriving into Australia and being discharged. The plan included: • confirmation that the goods could be treated within 48 hours by a department approved onshore treatment provider • details on how the goods will be contained to manage the potential BMSB risk. Break-bulk goods that were shipped after the treatment provider was suspended were not permitted to discharge/unload within Australian. If goods had unloaded from the vessel, they were directed for immediate containment and export. The department allowed these goods a window of up to 120 hours after the suspension date, to be loaded and shipped on board to Australia. Break-bulk goods which were discharged prior to, or on the date the relevant treatment provider was suspended were permitted for onshore treatment. They required treatment within 48 hours of arrival. If not treated within 48 hours, they were directed for export, based on timeliness of treatment or export options. These goods may have been subject to further inspection after onshore treatment.
11 January 2019	05-2019	Vessel masters, freight forwarders, treatment providers, BIPs, importers, customs brokers and principle agents associated with unpacking of goods	The department removed the requirement for supervised seals intact full unpack inspection for containers that have been treated with sulfuryl fluoride fumigation on 11 January 2019. Other supervised seals intact full unpack inspections continued.
25 January 2019	09-2019	Freight forwarders, importers and customs brokers associated with importing goods that require BMSB treatment	Three offshore treatment providers have been reinstated to perform BMSB heat treatments on consignments (Nuova Cianidrica Srl (AEI: IT4002SB), La Spezia Container Terminal (AEI: IT4013SB) and Radit Srl (AEI: IT4006SB)).

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
5 February 2019	15-2019	Freight forwarders, treatment providers, BIPs, importers, customs brokers, licensed fumigators and principle agents associated with containers and unpacking of goods that require biosecurity intervention	A review of current work health and safety measures has resulted in an interim measure relating to consignments that have been treated with sulfuryl fluoride and require the following biosecurity inspection: • • seals intact • • supervised unpack • • tailgate inspection. These measures do not apply to break-bulk, machinery and containerised goods deconsolidated by an AA operator without a biosecurity officer present. Industry will be responsible for arranging a third-party sulfuryl fluoride detection and monitoring operator (SF operator) to be present at the biosecurity inspection to monitor for sulfuryl fluoride. All costs associated with the third party sulfuryl fluoride detection provider are the responsibility of the industry and the SF provider must invoice industry directly.
6 February 2019	16-2019	Vessel operators, stevedores and wharf operators associated with transporting goods that require increased intervention	Note: This notice was replaced by Industry Advice Notice 16-2019. On 11 February, all ro-ro and general cargo vessels received a BMSB questionnaire when they submitted a pre arrival report. All these vessels are required to fully complete and report findings of any BMSB or other insects. All ro-ro vessels that have berthed at, or carried cargo loaded in Japan, Italy, USA, Germany, France, Georgia, Hungary, Russia, Greece or Romania have undergone a Seasonal Pest inspection on arrival. Only ro-ro vessels that have treated 100 per cent of their loaded cargo to Australian BMSB standards and have no detections will be exempt from this inspection. All vessels that have undergone this inspection and have no detections, will not be inspected in other ports. The greatest impact was expected to be in ports in Brisbane and Fremantle.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
6 February 2019	17-2019	Freight forwarders, importers and customs brokers associated with importing goods that require BMSB treatment	The department suspended an offshore treatment provider which cannot perform BMSB treatments on Australian bound consignments (Triveneta Disinfestazioni S.r.l (AEI: IT4005SB)).
13 February 2019	20-2019	Vessel operators, stevedores and wharf operators associated with transporting goods that require increased intervention	On 11 February, all ro-ro and general cargo vessels received a BMSB questionnaire when they submitted a pre arrival report. All these vessels are required to fully complete and report findings of any BMSB or other insects. All ro-ro vessels that have berthed at, or carried cargo loaded in Japan, Italy, USA, Germany, France, Georgia, Hungary, Russia, Greece or Romania will undergo a Seasonal Pest inspection on arrival. Where a vessel has undergone this inspection and have no detections, the vessel will not be inspected in other ports. The following ro-ro vessels were exempt from this inspection if they have no BMSB detections: • vessels only carrying cargo that has been treated by an Australian approved BMSB method (methyl bromide, sulfuryl fluoride, or heat) • vessels only carrying cargo that is compliant with New, Unused and Not Field Tested BMSB requirements • vessels only carrying cargo that is a combination of a. and b. above. The greatest impact was expected to be in ports in Brisbane and Fremantle.

TABLE E1 Industry advice notices issued by the department about BMSB policy changes, December 2014 – March 2019

Date	Advice number	Target industry	Summary of change
15 February 2019	22-2019	Importers and brokers of sea containers and break-bulk cargo from countries listed on the CAL, stevedores, freight forwarders, and master consolidators	Department will be upgrading to the S-Cargo system on 16 February 2019. There may be intermittent disruption to the processing of sea containers and break-bulk cargo in S-Cargo, from 21:00 AEDT Saturday 16 February until 05:00 AEDT Sunday 17 February 2019.
19 February 2019	24-2019	Freight forwarders, treatment providers, BIPs, importers, customs brokers, licensed fumigators and principle agents associated with containers and unpacking of goods that require biosecurity intervention	The interim processes outlined in Industry Advice Notice 16-2019 did not apply to: • break-bulk • machinery • containerised goods deconsolidated by an AA operator without a biosecurity officer present. Goods subject to this interim process required industry to arrange a third party sulfuryl fluoride detection and monitoring operator to be present during the biosecurity inspection to monitor residual sulfuryl fluoride gas levels. The department will purchase sulfuryl fluoride detecting devices and will perform the necessary detection and monitoring in the future.

AA Approved Arrangements, **AEI AQIS** Entity Identifier, **AEPCOMM** automatic entry processing for commodities, **AIMS** Agriculture Import Management System, **BMSB** Brown Marmorated Stink Bug, **CAL** Country Action List, **COLS** Cargo Online Lodgement System, **FAK** freight of all kind, **FCX** full container with multiple house bills of lading, **FID** full import declaration, **IAN** Industry Advice Notice, **ICS** Integrated Cargo System, **LCL** less than container load, **MARS** Maritime Arrivals Reporting Scheme, **ro-ro** roll on-roll off.

Glossary

Term or abbreviation	Definition
AIMS	Agriculture Import Management System, managed by Department of Agriculture and Water Resources
ALOP	The *Biosecurity Act 2015* defines the appropriate level of protection (ALOP) for Australia as a high level of sanitary and phytosanitary protection aimed at reducing biosecurity risks to very low, but not to zero
approved arrangement	An approved arrangement is a voluntary legislative arrangement for a BIP (a person or company) to carry out specific activities to manage the risks associated with imported goods subject to biosecurity control on the department's behalf. They are expected to comply with legal obligations and specified expectations or conditions
approved arrangement class	The grouping of approved arrangements based on the type of activities taking place in the arrangement and the associated biosecurity risks
biosecurity	Management of risks to the economy, environment and community posed by pests and diseases entering, emerging, establishing or spreading
Biosecurity Act	*Biosecurity Act 2015* (Cth). Commenced 16 June 2016 and replaced *Quarantine Act 1908* (Cth)
biosecurity continuum	Series of locations where biosecurity risks may arise and where biosecurity activities take place pre-border, at the border and within Australia
Biosecurity Industry Participant (BIP)	Refer to the *Biosecurity Act 2015*, section 14
biosecurity officer	Refer to the *Biosecurity Act 2015,* section 545
biosecurity risk	Refer to the *Biosecurity Act 2015*, section 9
biosecurity risk material	Goods which have the potential to introduce into Australia an exotic pest or disease. This includes, goods and packaging that are, or are contaminated by, material of biosecurity risk, for example live insects, live animals and plants, products of animals and plants, soil, dirt, clay, sand, food refuse and other detritus
border breach	A pest or disease that has passed through the border undetected but is later detected in or on its original consignment or carrier material
break-bulk cargo	Non-containerised cargo that must be loaded individually or cannot fit into a container. Typical break-bulk cargo includes machinery, vehicles and timber

Term or abbreviation	Definition
cargo compliance verification	A Department of Agriculture and Water Resources statistical based end point survey conducted on the containerised (FCL and FCX) sea cargo pathway to evaluate the effectiveness of its operational biosecurity controls. These controls include community protection profiles, document assessment and broker arrangements
competent authority	Official service or authority established by government of exporting state. Has responsibility and competence to ensure or supervise implementation of animal, plant or public health standards
compliant	Satisfies biosecurity requirements
consignment	Cargo transported under the terms of a single bill of lading or air waybill, irrespective of the quantity or number of containers, packages or pieces
contamination	Biosecurity risks present in or on goods, packaging, storage place, conveyance or container, not constituting an infestation
department	The Australian Government Department of Agriculture and Water Resources
eDNA testing	Environmental DNA (eDNA) testing extracts DNA to identify an animal, plant or organism. Access to this genetic information makes a critical contribution to the understanding of population size, species distribution and population dynamics for species not well documented
Emergency Plant Pest Response DEED (EPPRD)	Cost-shared formal agreement between Australia's governments and national plant industry groups to manage the response of disease incursions
exotic pest	A plant pest or disease that is not known to exist in Australia or is outside a Pest Quarantine Area for that pest in a state
FAK	(Freight of all kind)—a carrier's tariff classification for various kinds of goods that are pooled and shipped together at one freight rate in a container
FCL/X	Term used to indicate that a requirement covers both full container load and FCX containers
FCX	Full container with multiple house bills of lading)—a container where all the contents are consigned to one consignee and where there are two or more consignments in a container
FCL	Full container load—a container where all the contents are consigned from one consignor to one consignee. There is only one consignment in the container
Fumigation	A method of pest control that completely fills an area with gaseous pesticides to suffocate or poison the pests within
Goods	The *Biosecurity Act 2015* defines goods as an animal, a plant (whether moveable or not), a sample or specimen of a disease agent, a pest, mail or any other article, substance or thing (including, but not limited to, any kind of moveable property)
hitchhiker pest	A hitchhiker pest is a live insect or other animal that has an opportunistic association with a commodity or item with which it has no biological host relationship
incursion	A pest or disease has passed through the border, migrated from its original carrier and established in other hosts or host material in Australian territory
inspection	Official visual examination of plants, plant products or other regulated articles to determine if pests are present or to determine compliance with phytosanitary regulations
interception	A pest, pathogen or biosecurity risk material is detected before it passes through the Australian border and beyond biosecurity control

Term or abbreviation	Definition
ICS	Integrated Cargo System, managed by the Australian Government Department of Home Affairs
LCL	(Less than container load)—a consignment that does not occupy the full space available in the container, and cargo is consolidated by a 'Master Consolidator' with one or more consignments in a container. The consignments in this container must have at least two different consignees
Master Consolidator	A firm that groups together orders from different companies into one shipment
pathway	A means by which an organism or biosecurity risk material can enter Australia
pest	Any species, strain or biotype of plant, animal, or pathogenic agent injurious to plants or plant products
pest risk analysis (PRA)	The process of evaluating biological or other scientific and economic evidence to determine whether an organism is a pest, whether it should be regulated, and the strength of any phytosanitary measures to be taken against it
polyphagous	Feeding on a relatively large number of hosts from different plant family and/or genera
pyrethroid	A pyrethroid is an organic compound similar to the natural pyrethrins produced by the flowers of pyrethrums. Pyrethroids constitute the majority of commercial household insecticides
Sanitary and phytosanitary measures	Entered into force 1995, Sanitary and phytosanitary (SPS) measures are: • quarantine and biosecurity measures which applied to protect human, animal or plant life or health from risks arising from the introduction, establishment and spread of pests and diseases and from risks arising from additives, toxins and contaminants in food and feed. • governed by the World Trade Organization's Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS agreement), and its Committee of Sanitary and Phytosanitary Measures (the SPS committee).
screening	The Department of Agriculture and Water Resources uses X-rays, detector dogs and manual inspection to screen international passengers and mail for biosecurity risk material
shipment	see 'consignment'
surveillance	An official process which collects and records data on pest occurrence or absence by surveying, monitoring or other procedures
treatment	Official procedure for the killing, inactivation or removal of pests, or for rendering pests infertile or for devitalisation

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