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Inspector-General of Biosecurity

Robustness of biosecurity measures to prevent entry of khapra beetle into Australia

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Images
Khapra beetle (*Trogoderma granarium*), Department of Agriculture, Water and the Environment

Khapra beetle target risk countries, Department of Agriculture, Water and the Environment

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1. Executive summary

Khapra beetle is designated as Australia's second most important priority plant pest by the National Plant Health Committee. It is regarded as a serious pest threat to the whole of Australia's grains sector.

The Department of Agriculture, Water and the Environment (the department) began to focus more sharply on khapra beetle in mid-2019 following a series of detections of dead khapra beetle in rice from Thailand. Khapra beetle had been detected only several times a year for the past 15 years, and then in a 6-week period there was the quantity of detections normally expected in a full year. This spate of commodity-related detections followed an incident in 2018 where khapra beetle was identified in a sea cargo container carrying plastic beads, a commodity that does not pose a biosecurity risk and is not normally associated with khapra beetle. Despite the container being fumigated several times, khapra beetle located in the door seals were still alive. The department rightly asked 'What has changed?'.

The department's response, over the 2 years of extra focus on khapra beetle, has grown from an initial review of current risks and departmental arrangements to a major program of work over the next several years, supported by 2 sizeable budget appropriations. This review is timely, as it provides an assessment of the department's khapra beetle activities at a time when a new program of work associated with khapra beetle is being scoped, within the broader context of 'hitchhiker pest' risks.

Other reviews undertaken by the Inspector-General of Biosecurity have highlighted the dedication and passion of biosecurity officers for protecting Australia from unwanted pests and diseases. The work of the biosecurity officers involved in the department's khapra beetle activities is no exception.

But, as also seen in numerous Inspector-General reviews, the department continues to struggle with fundamentals that go to its regulatory maturity. The department's understanding and effective use of the Biosecurity Act 2015 remains a significant weakness, as is its understanding of the control frameworks and their relative effectiveness. With the level of investment already expended on khapra beetle, and significant investment to come, a roadmap of where the department is going and how its different elements will support the future preventative biosecurity system—and not just for khapra beetle – should already be in place but is not.

The review team undertook over 30 interviews across the department's Canberra office and regional functions over a 4-week period. The engagement was excellent, and the officers were knowledgeable and open in discussions about their work, and generally proudly so. The number of interviews, more than initially intended, reflects how many different activities have been undertaken and are ongoing in relation to khapra beetle. Interviewees were generally aware of the other activities and would refer the review team to another person or area for more detail.

Evidence of project planning was provided; however, the Inspector-General was not assured that there was comprehensive programming or project management against an agreed overarching strategy. From the beginning, the need to implement urgent actions relied heavily on regular team meetings to progress work. Project plans were developed for latter phases using e-collaboration software, and these plans changed to reflect the complexity of the phases and activities at hand. There was a khapra beetle roadmap; however, no detailed documentation was provided to the Inspector-General that reflected an overarching strategy that linked the khapra beetle work to the broader biosecurity system. The different areas involved were making the necessary changes and exploring new options within the context of their responsibilities as members of, and guided by, the newly established Khapra Beetle Working Group (KBWG). These different areas needed to be working more effectively within a clear, agreed overarching strategy and program management context, not only within the context of their own responsibilities. There was no documentation provided the reflected availability of a clear overarching strategy.

It would be easy to expect that the KBWG, established in July 2020 to implement the recommendations of the preliminary pest risk analysis (PRA) should have been responsible for this overall program of work; however, the KBWG was given the task of implementing a set of measures recommended in the PRA. The term 'working group' reflects the intent: its role was to coordinate, not to manage work across divisions in a program or project management sense. The anticipated time frame was short, with the task to be completed in a month or two. The work was more complex than expected. The time frame for implementation turned out to be years not months, and one of the major recommendations of the PRA could not be implemented. However, despite the increasingly complex set of measures and the growing number of interrelated research projects, the department's approach to managing the projects remained unchanged. The teams dealing with the khapra beetle ramp-up were highly committed but were hamstrung by the historical failure of the department to embed a culture and a system of program and project management into the complex biosecurity divisions.

At an activity level, many of the department's responses to khapra beetle have been managed well. Engagement across the Biosecurity Group was extensive. The training, communications and awareness materials were informative, widely disseminated and well received by industry and biosecurity officers. Industry was generally positive about the timeliness and level of engagement across several implementation areas (approved arrangements and communications). But industry also commented that it would have been beneficial if the department had engaged industry in the co-design of the proposed khapra measures, particularly in relation to the proposed reporting requirements for 5 years of container movement data.

The khapra beetle work stimulated the inclusion of eDNA methodology into the biosecurity 'toolkit' and has both attracted interest from existing research and development (R&D) activities and generated new interest and ideas. In time, these R&D activities may assist the department in its longer-term consideration of how to manage both khapra beetle and other biosecurity risks within the preventative biosecurity system. However, there was a tendency to focus on future R&D deliverables, mostly

years away from being operationally deployable, as being the 'fix' for current gaps in controls. The risk pressures are too urgent and serious for this disconnection to be tolerable, with khapra beetle incursions highly likely to occur more quickly than R&D outputs can be delivered and applied as effective preventative biosecurity measures.

The requirements of the international trade framework were an important consideration that shaped the department's response to khapra beetle. The department met its international obligations in a timely and comprehensive manner. Meeting these obligations does not appear to have limited or delayed the department's response to khapra beetle.

However, in a number of areas, some fundamental to success, the department's actions were less comprehensive or lacked a preventative biosecurity system-level perspective and an appropriate program management framework. These include:

- The department has stated that it monitors international developments in pest and disease risk, but it did not begin to act on khapra beetle until 2020. The US Animal and Plant Health Inspection Service (APHIS) introduced similar legislated measures relating to non-commercial pathways in 2011 and commodity-based risks in 2015.
- The department decided to prioritise khapra beetle efforts in early 2020 with a focus on non-commercial pathways and then commodities. This was despite the initial khapra beetle detections occurring in the commercial sea cargo pathway and the changed risk profile relating to khapra beetle as a cryptic hitchhiker pest in sea containers.
- Rather than implementing a system-level approach, the department relied on a transactional regulatory management approach underpinned by individual officer decision-making. The stated 'ban' and 'mandatory' requirements have no legal effect or consequence in relation to the imports but are based on an anticipated future decision by each biosecurity officer at the time of importation.
- There was no PRA for khapra beetle (Australia's no. 2 plant pest) until July 2020, and similarly for many of the other 42 national plant priority pests (NPPPs).
- The risk assessment has gone through several iterations to meet the requirements in the *Biosecurity Act 2015* in order to justify changes to the Biosecurity (Conditionally Non-prohibited Goods) Determination 2021 (Goods Determination), and at the time of writing in October 2021 was still in draft form.
- The department decided not to (or apparently did not consider the need to) place at-border controls on containers that were assessed as posing an unacceptable biosecurity risk for between 5 and 8 months. This reflects a focus on implementing the recommendations of the PRA as the priority, rather than prioritising the 'here and now' management of biosecurity risk.
- The time frame to effect the necessary changes to the biosecurity system was believed to be months but will be several years.
- There are no roadmaps at a preventative biosecurity system level and pathway level that illustrate current controls and their estimated cumulative effectiveness, planned controls and future controls emerging from research and development activities.

The department's response to the khapra beetle risk indicates that the biosecurity control framework it has adopted is increasingly specialised, with controls often being developed in response to specific risks, using specific funding in response to a specific incident. The Beale review (2008) sought funding to boost the capacity and capability of the biosecurity system as a whole, recognising that preventative biosecurity controls need to operate across most biosecurity risks. The department's funding streams in recent years have been issue focused – for example, focusing on African swine fever

rather than on emergency animal diseases – which has led to single issues being addressed, but not necessarily in a manner that has provided greater underpinning capability, integration and consistency for the broader system.

There has also been a focus on measures, often 'technological solutions', rather than additional frontline biosecurity officers. Government staffing caps have been one driver of this change. Inspector-General reports (IGB 2019b, IGB 2020a and IGB 2021a) have previously recommended that cost-recovered staff involved in inspection activity be exempt from such caps. What the department's khapra beetle response has shown is that good biosecurity ultimately relies on physical intervention to inspect, sample, test and verify the effectiveness of controls, monitor the nature of risks, and collect and analyse verified data about biosecurity risk and compliance. Data analytics is an area in which the department has invested significant resources and is starting to see some positive return, but without real data about what is happening at the border, its potential value will be constrained.

A reliance on transactional clearance of documents – particularly for controls undertaken offshore, such as fumigation, without appropriate levels of verification – can provide a false sense of security about the robustness of the biosecurity system. It is also necessary to understand the long-term impact on industry resource commitment that an apparent small policy change has on the preventative biosecurity system. For example, the mandatory requirement for certain containers to be treated offshore is the equivalent of establishing a global offshore treatment program. This approach will require ongoing and, if successful, expanding appropriation funding, but will raise ongoing questions about efficacy. The assurance element of the offshore treatment project is currently an early-stage R&D project, but the policy is already operational in the field. There is a serious question as to the level of confidence that the Inspector-General can have in relation to its efficacy, particularly in the absence of a preventative biosecurity control system framework that takes into consideration differences in the effectiveness of control measures.

Rob Delane

Inspector-General of Biosecurity

22 December 2021

2. Recommendations

Recommendation 1

That the department improve its level of regulatory agility, encompassing risk inputs and legal risk tolerances, in responding to changed pest and disease risks. The department should ensure that the elements necessary to support agile legislation-based system-level decision-making are codified according to the responsibilities of the relevant areas of the department, with an expectation of response time frames of days or weeks, not months or years.

Recommendation 2

Given the centrality of the Goods Determination and the Biosecurity Import Conditions system (BICON) to the operation of the preventative biosecurity system, that the department develop clear policy on the interrelationship between the two. The department should also review BICON to ensure that, where necessary, requirements have an appropriate legislative foundation.

Recommendation 3

That the department prioritise system-level regulatory approaches over transactional approaches to the management of pest risks.

Recommendation 4

That the department develop a hitchhiker pest framework within the Goods Determination that supports flexible and agile system-level responses to current and future hitchhiker pest risks.

Recommendation 5

That the department update its risk analysis production approach to ensure that assessments are timely and provide the necessary coverage of operational considerations, such as import pathways and hitchhiker potential, to support agile regulation-based responses under the *Biosecurity Act 2015*.

Recommendation 6

That the department consider legislative change to provide for the approval of 'provisional conditions' where there is a suspected new or changed risk profile but where a full risk assessment will take some time to complete. This change should allow for the temporary implementation of measures while the necessary research and analysis is performed to verify the risk status.

Recommendation 7

That the department develop risk assessment products that provide for assessments of changing pest and pathway biosecurity risks necessary to support legislation-based and operationally timely preventative biosecurity measures.

Recommendation 8

That the department apply good-practice program and project management governance and methodologies to the delivery of reform activities.

Recommendation 9

That the department review the risk of allowing goods requiring an import permit to be permitted entry through non-commercial pathways, particularly international mail, when a condition of the permit involves at-border inspection.

Recommendation 10

That the department clarify the scope of its post-biosecurity activities as it relates to preventative biosecurity functions.

Recommendation 11

That the department develop clear materials regarding post-biosecurity functions that articulate governance arrangements, roles and responsibilities, and include operational support materials for frontline officers undertaking post-biosecurity activities.

Recommendation 12

That the department develop a coherent roadmap for strengthening the preventative biosecurity system for khapra beetle and other hitchhiker pests. This roadmap needs to be underpinned by system and pathway level control maps that identify controls and their relative effectiveness and are used to inform future investment.

Recommendation 13

That the Biosecurity Group develop more robust methods for determining prioritisation of responses when dealing with changed risk profiles. Priorities should be based on managing the greatest biosecurity risk – moving away from the popular public sector concept of 'quick wins', which are rarely such and, in relation to the management of biosecurity risk, often delay implementation of the most needed measures.

3. Assessment of the department's prevention readiness

Measures in place	IGB assessment	Recommendation no.
1. Threat assessment of known and likely offshore sources of khapra beetle, including:		
a. a.primary khapra beetle infested risk regions	Optimal	
b. most likely future risk regions (including transshipment sites)	Marginal	5, 6, 7
2. Identification and assessment of major current and likely risk pathways, including:		
a. vessels pathway	Not reviewed	
b. cargo (containers) pathway	Marginal	12, 13
c. airfreight/mail pathway	Optimal	9
d. passenger pathway	Optimal	
e. other pathways	N/A	
3. Appropriate infrastructure and operational capability in place, including:		
a. documentary assessment capability	Optimal	
b. inspection capability	Optimal	
c. detection technology	Unsatisfactory	12
4. Coordinated, agile management arrangements with efficient cooperation, including:		
a. inter-department management arrangements	Optimal	
b. inter-division management arrangements	Optimal	

Measures in place	IGB assessment	Recommendation no.
5. Funding arrangements enabling the department to respond appropriately and consider:		
a. resourcing – quantity, targeted application and flexibility	Marginal	12, 13
b. resource agility	Marginal	11, 13
c. other resourcing issues	Optimal	
6. Regulatory powers and capability to apply regulation, including:		
a. appropriate regulations and processes	Unsatisfactory	1, 2, 4
b. frontline staff equipped to apply regulations	Optimal	3
7. Relevant approved arrangements audited and compliance/ enforcement actions taken	Optimal	
8. Appropriate technical support at all key sites	Optimal	
9. Appropriate khapra beetle-related data and management information, including:		
a. practical data capture systems	Unsatisfactory	10, 12
b. timely, accurate management reports.	Marginal	10, 12
10. Adequate public information about the biosecurity risk of khapra beetle, targeted at: a. importing business b. relevant import sector business/ personnel cohorts c. others	Optimal	
11. Appropriate partnership with industry pre-border and at the border, including with: a. import transport and logistics sector b. grains/agribusiness sector c. state and territory governments	Marginal	8, 10
12. Plans for sustainable khapra beetle measures with appropriate threat and vulnerability assessments, audits and verifications	Unsatisfactory	9, 10, 12, 13

Note: The Inspector-General of Biosecurity (IGB) assessment rating for each measure, where not otherwise specified, integrates the ratings for sub-items. Ratings may be 'Optimal', 'Marginal' or 'Unsatisfactory'.

4. Background

Authority of the Inspector-General of Biosecurity

Australia's biosecurity system relies on various government programs that ensure the safe international movement of people and goods. These programs are mainly delivered by the Department of Agriculture, Water and the Environment (the department) in cooperation with industry. They minimise the risk of the entry, establishment and spread of exotic pests and diseases that could cause significant harm to people, animals, plants and Australia's unique environment.

The Inspector-General of Biosecurity's mission is to enhance the integrity of Australia's biosecurity systems by independently evaluating and verifying their performance across the biosecurity continuum – pre-border, at the border and post-border. The Inspector-General makes recommendations for system improvements and provides assurance to stakeholders.

The *Biosecurity Act 2015* defines the Inspector-General's role, authority and independent powers of review. The Inspector-General is responsible for reviewing the Director of Biosecurity's performance of functions and exercise of powers. The Secretary of the department is the Director of Biosecurity.

The Inspector-General is independent of the Minister for Agriculture and the Director of Biosecurity and is not subject to their direction in relation to the priority to be given to a particular review (Biosecurity Regulation 2016, paragraph 91(4)). However, the Inspector-General may:

- consider the Minister's request for a review
- seek immediate action from the Director of Biosecurity (or senior departmental executives) and the Minister to protect or enhance the integrity of Australia's biosecurity systems.

On behalf of the Department of Health, the department implements certain biosecurity risk management measures and systems that relate to human health. The Inspector-General has the authority to review those measures and systems.

Under section 567(1) of the *Biosecurity Act 2015*, the Inspector-General may review the performance of functions or the exercise of powers by biosecurity officials under provisions of the Act.

The Inspector-General's scope does not extend to Australia's national biosecurity policies, international trade issues and market access opportunities.

5. Introduction

Objective

To examine the adequacy of the department's preventative biosecurity measures to mitigate the risk of khapra beetle entering Australia.

Scope

To enable the Inspector-General to provide an assurance assessment of the robustness of biosecurity measures to prevent entry of khapra beetle in Australia, this review sought to have the department demonstrate to the Inspector-General, through documented evidence (information and data) and interviews, that a positive assessment should be made. Any recommendations for improvement were to be made as part of the assurance assessment.

This review was completed in 2 phases. It considered:

1. the department's approach to assessing and addressing international khapra beetle prevalence and risk pathways (likely entry routes into Australia), and the adequacy and agility of at-border and pre-border preventative biosecurity controls
2. the adequacy of:
    a. application of khapra beetle specific risk assessments to delivery of appropriate control measures
    b. operational pathway threat and vulnerability assessments, and scientific and technological capabilities to provide rapid specialist support to frontline biosecurity officers
    c. the department's actions to urgently address identified weaknesses in at-border biosecurity measures and develop longer term preventative biosecurity solutions.

The initial phase of the review considered the department's assessments/reviews, reports, and briefings about recent khapra beetle interceptions and leakage, and resultant preventative biosecurity improvements. An informed decision was then made to conduct further detailed assessment.

To complete this work, the Inspector-General:

- reviewed the department's pre-border and at-border activities helping to keep khapra beetle out of Australia
- reviewed the department's verification activities and outcomes (end-point/leakage survey results) to ascertain 'residual risk' for major pathways
- reviewed the sampling and testing regimes of intercepted/seized risk products in which khapra beetle has been detected to inform decision-making at policy and operational levels
- evaluated the department's industry engagement strategies to prevent incursion of khapra beetle risk material (excluding post-border awareness and other post-border preparedness activities)
- evaluated the department's data and information technology management systems used for recording observations and outcomes, and their performance
- reviewed the prospects for timely changes to international agreements and commercial operations that would make substantial practical changes to risks posed by sea containers
- made targeted virtual site visits to inspect processes and meet with companies and frontline departmental officers
- made an overall assessment of the department's khapra beetle prevention readiness measures using the framework set out in section 3 of this report.

Out of scope

This review did not examine:

- post-border preparedness and response aspects of khapra beetle post-border detections
- policy and activities that are the responsibility of stakeholders other than the department – including state/territory agencies/governments and biosecurity industry participants
- commercial considerations, except to the extent that generic commercial drivers may impact preventative biosecurity behaviour in businesses and supply chains.

6. Khapra beetle

Biosecurity risk

Australia is relatively free of many of the serious animal and plant pests and diseases that exist in other countries. This gives our export-oriented agricultural industries an advantage in global markets and helps maintain the uniqueness of Australia's natural environment. Managing threats to the community, industry and the environment is an essential function of Australia's preventative biosecurity system.

Khapra beetle (*Trogoderma granarium* Everts) is a serious pest of stored grain, nuts, and dry foodstuffs worldwide. Considered native to India, khapra beetle is found throughout the Middle East, Asia, Africa and a few countries in Europe.

Khapra beetle adults are small (1.6–3 mm long and 1–2 mm wide) and yellowish brown, with an oval-shaped body covered by dense, short hairs and with 3 indistinct transverse bands of pale hairs on the elytra (hardened forewings) (Figure 1). In stored products, particularly cereals, grain movement will damage dry dead adults, making identification based on morphological characteristics difficult. In most individuals, the legs and antennae will break off and most of the setae on the elytra and pronotum will be rubbed off. Wings may be almost completely broken off.

Figure 1 Dorsal view (left) and lateral view (right) of an adult khapra beetle

Source: Simon Hinkley and Ken Walker, Museums Victoria

Khapra beetle eggs hatch into small, hairy larvae that are reddish brown and darken as they mature, growing up to 1.6–4.5 mm long. The larvae have characteristic long hairs all over their bodies, especially noticeable at the rear end. Khapra beetle larvae can survive without food for over 12 months by entering a facultative diapause, which can be triggered by temperature, lack of or inadequate food sources, and isolated or crowded conditions. When provided with food after a period of starvation, most diapausing khapra beetle larvae will pupate after some feeding, but some will return to diapause as larvae. This behaviour may be responsible for reports of diapausing larvae surviving for up to 10 years (DAWE 2021a).

The establishment of khapra beetle in Australia could cause serious produce losses and quality downgrades for plant industries, jeopardise exports of plant products, and have a significant impact on the economy. It is estimated that the establishment of khapra beetle would cost the Australian economy $17 billion over 20 years (DAWE 2021b). Australia's geographic isolation provides a degree of natural protection from exotic pests such as khapra beetle, provided effective preventative biosecurity measures are in place.

Khapra beetle principally spreads through movement of stored grain and products or through contamination of shipping containers, used bags and sacks, feed, machinery and straw. The following characteristics make khapra beetle a serious and difficult biosecurity pest to manage (DAWE 2021a).

1. Khapra beetle is a pest of most stored products and can infest areas where stored products are kept or transported.
2. It is a 'dirty feeder' that destroys stored products, makes foodstuffs inedible and is a potential human health risk.
3. It is small and frequently cryptic, sheltering in cracks in walls, under paint, between joins, and under floors in sea containers.
4. It is capable of maintaining a low-level, very difficult to detect 'background' population for extended periods in areas almost free of host material.
5. Khapra beetle adults do not fly, rarely eat, and lay large numbers of eggs.
6. Khapra beetle produces numerous larvae with voracious appetites for stored products.
7. Its larvae can enter a facultative diapause and survive without food for over 12 months, or up to 10 years when food is intermittently available.
8. In larval stages it is not reliably identifiable using traditional morphological taxonomy, particularly early instar larvae, owing to their similarity to closely related Dermestidae, particularly other *Trogoderma* species.
9. It is challenging to treat with fumigation.
10. Its spread is human mediated.
11. It has the potential to significantly impact Australian exports of grain and stored products.

In 2016 Australia's Plant Health Committee identified 42 national priority plant pests. Of these, 23 are associated with hitchhiking on shipping containers or cargoes (DAWE 2021b). Khapra beetle was designated as priority pest no. 2 (DAWE 2019a).

7. Biosecurity regulatory framework

International framework

International obligations

Australian biosecurity controls on imports must conform to Australia's rights and obligations as a World Trade Organization (WTO) member country. These rights and obligations derive principally from the 1995 WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) and are recognised in the *Biosecurity Act 2015*.

International standards relating to trade of plant-based commodities are developed and promulgated by the International Plant Protection Convention (IPPC) (IIGB 2016). The development and adoption of standards, recommendations, diagnostic protocols and phytosanitary treatments is the major role of the Commission on Phytosanitary Measures and the IPPC Secretariat. IPPC standards are recognised by the WTO as international benchmarks for trade in plant commodities.

All WTO members are signatories to the SPS Agreement, under which they have both rights and obligations. The SPS Agreement provides a framework of rules to guide WTO member countries in the development, adoption and enforcement of sanitary (human and animal health) and phytosanitary (plant health) measures. The SPS agreement provides WTO members with the right to use sanitary (human and animal health) and phytosanitary (plant health) measures (SPS measures) to protect human, animal and plant life or health (DAWR 2016). The basic obligations are that SPS measures must:

- be applied only to the extent necessary to protect life or health and not be more trade restrictive than required
- be based on scientific principles and not maintained without sufficient scientific evidence
- not constitute arbitrary or unjustifiable treatment or a disguised restriction on trade.

Each WTO member country is entitled to maintain a level of protection it considers appropriate to protect health within its territory. This is called the appropriate level of protection (ALOP).

The department works closely with state and territory governments and industry to implement international plant protection standards to protect Australia's plant resources from harmful pests, while ensuring that the measures are justified and are not used as unjustified barriers to international trade (DAWE 2020a).

SPS and the department's risk analyses

The SPS Agreement allows WTO members to determine their own appropriate level of sanitary and phytosanitary protection. It must be applied in a consistent manner. Consistent with the SPS Agreement, Australia bases its sanitary and phytosanitary measures on international standards developed by the World Organisation for Animal Health, the IPPC and the Codex Alimentarius where such measures exist and where the measures meet Australia's ALOP (Department of Agriculture 2014).

Under this standard, commodities can generally be imported unless they are prohibited or conditionally non-prohibited under the Biosecurity Act. If they are conditionally non-prohibited, then the biosecurity risk can then be reduced to ALOP. The Australian Government uses risk analyses to consider the level of biosecurity risk associated with importation of plants and plant material, consistent with SPS obligations and noting relevant IPPC standards (IIGB 2016).

Australia has its own biosecurity laws and policies, which consider international trade obligations when conducting risk analyses. Australia bases its risk analysis methodologies and import risk management measures for plant health on the standards, guidelines and recommendations of the IPPC, including International Standard for Phytosanitary Measures (ISPM) 2, *Framework for pest risk analysis* and ISPM 11, *Pest risk analysis for quarantine pests (IPPC 2005)*.

However, when such standards do not achieve Australia's ALOP, or relevant standards do not exist, Australia exercises its right under the SPS agreement to apply appropriate measures, justified on scientific grounds and supported by risk analysis (DAWR 2016).

SPS emergency measures

The IPPC makes provision for contracting parties to report appropriate emergency action taken on the detection in an imported consignment of an organism posing a potential phytosanitary threat. IPPC Article VII.6 states that:

> *… contracting parties may take appropriate emergency action on the detection of a pest posing a potential threat to its territories or the report of such a detection. Any such action shall be evaluated as soon as possible to ensure that its continuance is justified. The action taken shall be immediately reported to contracting parties concerned, the Secretary, and any regional plant protection organization of which the contracting party is a member. (IPPC 2005)*

ISPM 1, *Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade*, states:

> *Contracting parties may adopt and/or implement emergency actions, including emergency measures, when a new or unexpected phytosanitary risk is identified. Emergency measures should be temporary in their application. The continuance of the measures should be evaluated by pest risk analysis or other comparable examination as soon as possible, to ensure that the continuance of the measure is technically justified. (IPPC 2005)*

Furthermore, ISPM 20, *Guidelines for a phytosanitary import regulatory system*, states:

> *Emergency action may be required in a new or unexpected phytosanitary situation, such as the detection of quarantine pests or potential quarantine pests:*
>
> - *in consignments for which phytosanitary measures are not specified.*
> - *in consignments or other regulated articles in which their presence is not anticipated and for which no phytosanitary measures have been specified.*
> - *as contaminating pests of conveyances, storage places or other places involved with imported commodities.*

Phytosanitary action similar to that required in cases of non-compliance may be appropriate. Such actions may lead to the modification of existing phytosanitary measures, or the adoption of provisional measures pending review and full technical justification. (IPPC 2005)

Biosecurity Act emergency measures

The SPS uses the term 'emergency' to address a changed risk profile that necessitates new or changed import measures to maintain a country's ALOP. These emergency measures can be applied pending completion of a full risk assessment, which can take several years to complete. The Biosecurity Act also uses the term 'emergency', but the context of its use is different and the powers associated with an emergency have a different focus.

In the Biosecurity Act the term 'emergency' relates to controlling 'the establishment or spread of a declared disease or pest in Australian territory during a biosecurity emergency period (such as a severe and widespread outbreak of foot-and-mouth disease that affects multiple Australian states)' (Department of Agriculture 2014). Since the commencement of the Biosecurity Act in 2016, these 'emergency' powers have not been used for biosecurity purposes. The equivalent powers for human biosecurity purposes, contained in Chapter 8 of the Biosecurity Act, were used for the first time in response to the COVID-19 pandemic.

The department recognised the different uses of the term 'emergency' and that the circumstances relating to khapra beetle did not meet the threshold for an emergency response under the Biosecurity Act. The department adopted the term 'urgent actions'. Unlike 'emergency', 'urgent actions' has no international or meaning in the Biosecurity Act. The term reflected the department's intent to quickly address the recently prioritised khapra beetle risk.

Khapra SPS notifications

At the time of writing, Australia had issued 14 SPS notifications in relation to the khapra beetle emergency measures. The first, on 4 August 2020, included the following statements:

Notification to trading partners, that within the next two months Australia proposes to implement emergency measures to high-risk plant products that are hosts of khapra beetle (Trogoderma granarium) to safeguard Australia against the entry, establishment and spread of this pest.

Khapra beetle, Trogoderma granarium (Everts 1898) [Coleoptera: Dermestidae], is a quarantine pest for Australia and quarantine procedures are in place to prevent its introduction.

The number of interceptions of Khapra beetle in goods and containers has increased in recent years worldwide especially from countries where established populations of Khapra beetle exist. Khapra beetle is also being intercepted in goods from countries where the beetle is not known to occur. These detections are significant and are indicative of a changing pathway risk profile. (DAWE 2020b)

The emergency phytosanitary measures implemented by the department for khapra beetle were consistent with IPPC obligations and processes and were supported by preliminary non-commercial (August 2020) and commercial (September 2020) pathway 'rapid risk assessments'. The product type 'rapid risk assessment' is one that developed over the course of the khapra beetle response. Initially it was referred to as a 'mini risk assessment' and focused on particular pathways to support the implementation of the 'urgent actions'.

The department advised that a full pest risk assessment would normally take between 18 and 36 months to complete. At the time of writing, in October 2021, the department was still reviewing the draft PRA that will support the khapra beetle measures transitioning from IPPC 'emergency' to 'standard' measures and underpin changes to the Goods Determination (see section 8).

Finding: The requirements of the international trade framework formed one of the main considerations that shaped the department's response to khapra beetle. The department met its international obligations in a timely and comprehensive manner. Meeting these requirements does not appear to have limited or delayed the department's ability to respond to the changed khapra beetle risk environment.

National framework

Appropriate level of protection

The Biosecurity Act provides the national legislative framework for the management of biosecurity risks in a manner that is consistent with international obligations and Australia's ALOP (Department of Agriculture 2014). Australia's ALOP is defined in the Act as being 'a high level of sanitary and phytosanitary protection aimed at reducing biosecurity risks to a very low level, but not to zero'. Successive Australian governments have adopted this standard in managing biosecurity risks, reflecting expectations about the importance of maintaining Australia's relative freedom from exotic pests and diseases.

Applying measures to imported goods

Consistent with SPS obligations, where a risk assessment finds that the risks associated with importing goods exceeds a 'very low level', risk management measures in the form of conditions to mitigate the risk to an acceptable level may be applied. The Biosecurity Act provides that:

> *The Director of Biosecurity and the Director of Human Biosecurity may jointly determine that specified classes of goods must not be brought or imported into Australian territory unless specified conditions (including conditions for administrative purposes) are complied with.*

If biosecurity risks cannot be reduced to an acceptable level, these imports may not be permitted entry into Australia.

Goods may be defined as either prohibited absolutely (prohibited goods) or prohibited unless certain conditions are satisfied (conditionally non-prohibited goods). Goods are prohibited if the level of biosecurity risk associated with the goods or class of goods is unacceptable and if biosecurity measures could not be taken to reduce that level of risk to a level consistent with Australia's ALOP (Department of Agriculture 2014). These conditions may relate to, for example, how the goods are manufactured, prepared or used, the origin of the goods, and whether they have been treated. In certain circumstances a permit providing specific approval is required. The decision to determine prohibited or conditionally non-prohibited goods is a technical and scientific decision based on whether it is deemed possible to satisfactorily manage biosecurity risk (Department of Agriculture 2014). Conditions may be applied pre-border, at-border and post-border (see Figure 2).

Figure 2 Import pathway for plants and plant products

Australian Government
Department of Agriculture, Water and the Environment

IMPORT PATHWAY FOR PLANTS AND PLANT PRODUCTS

This diagram shows the biosecurity processes for the importation of plants and plant products into Australia.

PRE-BORDER

Production practices

Growers in overseas countries must produce goods to meet Australia's biosecurity import requirements, which may include:

1. Pre-planting
- use of certified plant material from approved sources
- planting in pest free areas
- choosing pest and disease free varieties.

2. Pre-harvest
- pest and disease monitoring and management.

3. Harvest
- harvesting at a specific stage of development
- harvesting specific varieties.

4. Post-harvest
- using grading systems to assess quality standards
- manufacturing and packing facility certification in place.

Import conditions

Inspection

Imported plants and plant products (goods) are assessed by the exporting country to ensure that Australia's import conditions and quality standards are met. This includes meeting Australia's biosecurity requirements as set out in the Biosecurity Import Conditions (BICON) system. Any necessary supporting documents, such as an import permit or a plant health certificate, are obtained.

Additional import conditions

Sometimes additional import conditions must be met to manage the risk of pests and diseases in imported goods. These may include treatments (e.g. irradiation, fumigation, heat or cold treatment), testing, sourcing the goods from areas free of pests, and producing the goods under an approved systems approach.

Transport

Goods that meet Australia's biosecurity requirements and quality standards can be imported into Australia via sea or air freight, mail or passengers. For transportation, goods are:
- packed in clean, new packaging
- segregated to prevent cross-contamination.

BORDER

Biosecurity border clearance

Before goods are permitted entry into Australia, they must be cleared at the border, which may include:
- verification of import documentation
- inspection of goods to verify compliance with import conditions to ensure pests and diseases are not present.

Goods that meet Australia's import conditions are cleared. Goods that do not meet Australia's import conditions will be exported, treated or destroyed.

POST-BORDER

Distribution

After imported goods are cleared at the border, they may be transported within Australia. This includes distribution to wholesalers and retailers. All state and territory regulations on the movement of imported goods must be complied with during distribution.

End use

The final use of goods once they reach their final destination in Australia is restricted to the end use specified in BICON. Examples can include:
- human consumption or use
- seed propagation or nursery stock
- use in processing or manufacturing.

The Goods Determination

Conditionally non-prohibited goods are goods, or classes of goods, specified in the Biosecurity (Conditionally Non-prohibited Goods) Determination 2021 (Goods Determination). At the time of writing, no khapra beetle related conditions had been specified in the Goods Determination, despite the department's intention to make these changes by September 2020. The Inspector-General was advised that the rapid risk assessment available at the time was considered sufficient to support the Goods Determination. The significant delay was reportedly due to a change in direction to address the risk of khapra in sea containers; the requirement to consider how to address khapra risks in seeds for sowing in the mail pathway; and an unrelated risk assessment being undertaken to support a change to the Goods Determination.

Finding: The nature of the changed khapra beetle risk had been reasonably defined in the context of 'SPS emergency measures' as early as July 2020, and a series of risk mitigation measures had also been broadly defined by this time. Despite this, the department has not made changes to the Goods Determination as intended and needed to support an appropriate regulatory response. This delay is an illustration of the department's continuing regulatory immaturity, whereby:

- the department does not have the risk assessment inputs to support timely legislation-based system-level decision-making, or
- the design of the risk assessment products does not support legislation-based decision-making, or
- the department's legal risk tolerance level is too high, which necessitates an excessive level of documentary support, or
- a combination of all three.

Recommendation 1

That the department improve its level of regulatory agility, encompassing risk inputs and legal risk tolerances, in responding to changed pest and disease risks. The department should ensure that the elements necessary to support agile legislation-based system-level decision-making are codified according to the responsibilities of the relevant areas of the department, with an expectation of response time frames of days or weeks, not months or years.

Biosecurity Import Conditions system

The department's Biosecurity Import Conditions (BICON) system contains the import requirements and risk management measures for more than 20,000 animal, plant, microbial, mineral and human products. BICON predates the commencement of the Biosecurity Act. The department's website (DAWE 2021c) describes BICON's purpose as:

> *To help protect Australia's unique environment from unwanted pests and diseases, the Department of Agriculture, Water and the Environment regulates products imported into Australia. The importation of some products is, by law, subject to certain biosecurity import conditions. Some products are not permitted entry while other products are only allowed into Australia subject to meeting import conditions that mitigate the biosecurity risk. This may include a requirement for an import permit.*

You can use the Biosecurity Import Conditions system (BICON) to determine whether a commodity intended for import into Australia:

- *is permitted*
- *is subject to import conditions*
- *requires supporting documentation*
- *requires treatment*
- *needs an import permit.*

The review requested that the department clarify the linkage between the Goods Determination and BICON, noting that changes had not been made to the Goods Determination but that new requirements for the management of khapra beetle had been made to BICON. The department advised that BICON is:

a communication tool that:

a. *advises importers of recommended procedures which they can undertake to reduce biosecurity risk*

b. *is used to communicate when an import permit is required and, in most instances, the alternative conditions for conditionally non-prohibited goods as stipulated in the GD*

c. *provides importers general information about biosecurity measures that may be taken in respect of their goods, including the likely onshore outcomes instances where the recommended procedures are not complied with …*

This description suggests a much looser connection between the requirements specified in BICON and those specified in the Goods Determination.

To explore this issue further, the Inspector-General compared the conditions specified for 2 classes of goods in the Goods Determination and in BICON. The case of a khapra beetle related good of biosecurity concern was used: rice imported from India. It was compared to the case of cut flowers, which has recently been reviewed. For a detailed comparison of the conditions for each of the goods see Appendix B. This comparison provides evidence that the requirements specified for cut flowers in the Goods Determination have a direct relationship to the requirements specified in BICON. By contrast, for the class 'cereals, grains, legumes, pulses and oil seeds for human consumption', which includes rice, the Goods Determination has no direct relationship with the requirements specified in BICON. The requirements specified in BICON for rice imported from India are far more stringent than those specified for rice in the Goods Determination.

Finding: The Inspector-General's question as to the relationship between the Goods Determination and BICON goes to the department's level of regulatory maturity and the appropriate use of the biosecurity legislative framework. For example, the department's failure to make changes to the Goods Determination has not prevented it from making regulation-based statements in BICON that certain khapra beetle risk goods are 'banned'.

The department may argue that 'banned' does not mean 'prohibited' or 'conditionally non-prohibited' as defined in legislation, and that officers have the power to make individual decisions based on risk. While this may be true, the Inspector-General considers that the reliance on an approach based on transactional decision-making by individual biosecurity officers rather than legislation-based system-level decision-making, where the conditions are defined in the Goods Determination and apply automatically when goods become subject to biosecurity control, without the need for individual officer decision-making, reflects regulatory immaturity of a national regulator.

Recommendation 2

Given the centrality of the Goods Determination and the Biosecurity Import Conditions system (BICON) to the operation of the preventative biosecurity system, that the department develop clear policy on the interrelationship between the two. The department should also review BICON to ensure that, where necessary, requirements have an appropriate legislative foundation.

Transactional management of khapra beetle risk

Instead of relying on a legislation-based set of conditions enabled through the Goods Determination (a legislation-based system-level decision-making approach), the department chose, and at the time of writing continues to rely on, transactional management of goods using powers exercised by individual biosecurity officers.

To support the transactional decision-making by biosecurity officers and to assist them in making the 'correct' decision, the department developed a series of decision support policies for frontline officers in mid-2020. The policies primarily focused on document assessors, covering the department's 'urgent actions' phases 1, 2, 6Ai and 6Aii, as discussed in section 9. These policies included:

- *Policy for managing high risk goods that pose a high risk of hosting khapra beetle (Trogoderma granarium) through the international traveller and international mail pathways*
- *Policy for managing goods that pose a high risk of hosting khapra (Trogoderma granarium) in unaccompanied personal effects and goods arriving through low value air and sea freight*
- *Policy for managing the hitchhiking risk of khapra beetle (Trogoderma granarium) in sea containers that are subject to khapra measures.*

In these policies, officers are advised that:

> *The risk assessment estimated that without offshore risk management measures in place for high-risk containers (including target risk containers), the overall likelihood for the entry, establishment and spread of khapra beetle in Australia is unacceptable.*

It is therefore recommended that non-compliant sea containers (untreated sea containers) arriving in Australia are directed to be exported under Chapter 3 – Section 135 of the Biosecurity Act 2015, unless the goods are imported under exceptional circumstances or when the department's in-transit policy is enacted.

During consultations, explanations as to why the transactional approach was and continues to be used rather than a system-level approach were vague and referred to the uncertainty around the nature and timing of Phase 6B measures. As noted in relation to the language in BICON referring to a 'ban', the use of the term 'mandatory', which is on the department's website as well as in BICON, appears inconsistent with the conditions, or lack thereof, in the Goods Determination (DAWE 2021d).

The Biosecurity Act provides the framework for a system-level approach to managing the khapra beetle risk, supported by assessment and management powers exercised by biosecurity officers at the border. The Inspector-General considers it understandable and perhaps appropriate for the department to adopt a transactional approach in the initial 2 phases of the 'urgent actions'. However, phases 6Ai and 6Aii were implemented 5 and 8 months after a dedicated team was established to bring about urgent fixes to address the khapra beetle risk, which the Inspector-General considers ample time for a mature regulator to implement system-level changes.

Finding: As noted in the previous Inspector-General review (IGB 2021a), the department continues to lack adequate regulatory maturity and struggles in its timely and effective use of the available Biosecurity Act powers. The Act has now been in operation for over 5 years and was in development, with implementation preparation for 5 years before that. Despite this, the department continues to struggle in its delivery of legislation-based system-level responses due to a lack of alignment of the business activities in different areas of the department with the requirements of the Act.

Recommendation 3

That the department prioritise system-level regulatory approaches over transactional approaches to the management of pest risks.

Goods Determination hitchhiker framework

Division 3 of the Goods Determination relates to goods that are likely to contain hitchhiker pests either in or on the goods and provides for additional conditions to be applied to such goods. Section 56 provides the basis of a framework that is intended to support the agile management of hitchhiker pests. This section was developed to manage brown marmorated stink bug (BMSB). It supports agile responses to changing hitchhiker pest risk profiles, due to the framework referring to lists that reside on the department's website. These lists can be updated from time to time without recourse to legislative change. The use of lists within a well-structured legislative framework would ideally support the department's responsiveness to a range of changing hitchhiker pest risks, including khapra beetle.

The risk assessment estimated that without offshore risk management measures in place for high-risk containers (including target risk containers), the overall likelihood for the entry, establishment and spread of khapra beetle in Australia is unacceptable. It is therefore recommended that non-compliant sea containers (untreated sea)

BMSB hitchhiker framework

Section 56 provides for the specification of classes of goods that pose a hitchhiker pest biosecurity risk. These goods must meet 2 criteria:

1. The goods must be listed in relation to one or more specified hitchhiker pests in the List of Hitchhiker Pest Host Countries or Regions.
2. The goods must be, or have been, produced, stored or loaded onto an aircraft or vessel in a country or region specified in that list for those goods, during the risk period specified in that list for that country or region and those goods and that pest.

Goods that meet these criteria must not be brought or imported into Australian territory unless they have met the following conditions:

a. *the goods:*

   i. *have been treated, using a treatment listed for the goods in the List of Hitchhiker Pest Host Countries or Regions, by a treatment provider listed for that treatment in the List of Treatment Providers; and*

   ii. *are accompanied by a certificate stating that the goods have been treated in accordance with subparagraph (i); and*

   iii. *are free from any live listed hitchhiker pests; or*

b. all of the following apply:

   i. *the goods are contained in one or more sealed shipping containers;*

   ii. *each shipping container remains sealed after its arrival in Australian territory until it is opened for the goods to be treated in accordance with subparagraph (iii);*

   iii. *the goods are treated, in accordance with an approved arrangement and while subject to biosecurity control, using a treatment the Director of Biosecurity is satisfied is appropriate to manage the biosecurity risks associated with the goods to an acceptable level.*

This framework provides a flexible model based on specifying pests (listed hitchhiker pests), places (List of Hitchhiker Pest Host Countries or Regions) and persons (list of treatment providers) for the management of biosecurity risks offshore. The details of the parameters are not in the Goods Determination but can be specified from time to time by the Director of Biosecurity through the publication of lists on the department's website. For example:

> **listed hitchhiker pest** *means an insect or other pest that is listed in the List of Hitchhiker Pests prepared by the Director of Biosecurity and published on the Agriculture Department's website, as existing from time to time.*

The incorporation of a list of treatment providers for BMSB is noteworthy as it brings within the scope of the Biosecurity Act commercial providers of fumigation treatment services located offshore being 'regulated' through a departmental approval process. Prior to this, the department had only approved offshore entities through the Goods Determination for government bodies – for example, the List of Overseas Authorities – Aquatic Animals for Import. This framework has the potential to support a flexible approach to the changing risk profile of a range of hitchhiker pests, including khapra beetle.

The incorporation of khapra beetle into the hitchhiker framework, based on the department's phased measures, would require a number of additional parameters, including practices (e.g. treatment types), products (e.g. commodities) and pathways (e.g. sea cargo, travellers). While the framework is clearly still evolving, the use of lists defined through the Goods Determination covering key parameters such as products, pests, places, persons, practices and pathways represents a coherent regulatory framework that effectively ties together legislative requirements, scientific risk, threat assessment and operational management considerations.

Table 1 provides a comparison of the khapra beetle 'Urgent Action' phases with those of the BMSB measures using the '6P' (pest, pathway, place, person, product and practice) framework. The use of a set of broader lists linked to the Goods Determination would:

- give the department greater flexibility in managing changing hitchhiker pest risks
- allow the incorporation of existing hitchhiker risks that are currently managed through a variety of arrangements outside the Biosecurity Act (for example, the sea container hygiene scheme).

At the time of writing, a new Division of the Goods Determination specifically for khapra beetle had been drafted. This new section will largely 'hard code' khapra beetle measures, with some flexibility provided by the use of associated lists. In response to the Inspector-General's question as to why the department would create a khapra beetle specific Division, rather than continuing to develop a flexible list-based hitchhiker framework, the department advised:

- Unlike BMSB, khapra beetle is not a seasonal pest.
- Khapra conditions need to include a specific requirement to exclude high-risk goods from traveller, mail and unaccompanied personal effects (UPE) pathways.
- Khapra conditions require differentiation in the risk status of hosts of khapra beetle (high risk versus other risk).
- Unlike BMSB, khapra is a regulated pest worldwide and consequently can be endorsed on a phytosanitary certificate.
- Because treatments can be undertaken under the supervision of a national plant protection organisation (NPPO) (even for unapproved treatment providers), the department could not simply use the same reference to a list of approved treatment providers included in the BMSB list.
- Unlike BMSB measures, khapra measures included specific phytosanitary certification requirements that could not be housed in lists.

The Inspector-General does not consider these factors contradictory to those proposed in the Goods Determination; rather they complement and provide added integrity to the operation of the preventative biosecurity system.

The Inspector-General considers that the addition of a seventh 'P' (time period) would provide the basis for a robust and agile hitchhiker framework, instead of the 'hard coded' and long lead time approach of developing new sections in the Goods Determination for each hitchhiker pest (see Table 1).

Recommendation 4

That the department develop a hitchhiker pest framework within the Goods Determination that supports flexible and agile system-level responses to current and future hitchhiker pest risks.

Table 1 Comparison of 2 offshore pest management frameworks (sea containers)

	Khapra beetle—transactional			BMSB—systems level	
	KBWG 3	KBWG 6Ai	KBWG 6Aii	BMSB High-risk goods	BMSB Risk goods
Pest	Khapra beetle	Khapra beetle	Khapra beetle	Listed hitchhiker pest*	Listed hitchhiker pest*
Pathway	Sea containers	Sea containers	Sea containers	Sea containers	Sea containers
Period (time)	January–December	January–December	January–December	September–April	September–April
Place	High-risk target country list	High-risk target country list	1. High-risk target country list 2. Postcode list of grain-growing areas	List of Hitchhiker Pest Host Countries or Regions*	List of Hitchhiker Pest Host Countries or Regions*
Person (specified)	National plant protection office in each country	National plant protection office in each country		List of treatment providers*	
Product	High-risk plant products	High-risk plant products		Target high-risk goods	Target risk goods
Practice (measures)	1. Treatment container 2. Treatment certificate 3. Treatment goods 4. Phyto goods	1. Treatment container 2. Treatment certificate 3. Phyto goods	1. Treatment container 2. Treatment certificate	1. Treatment goods 2. Treatment certificate	Increased onshore intervention through random inspection

* Lists specified in the Goods Determination.

8. Pest risk assessment

The department undertakes a range of risk analyses in response to requests to import goods into Australia, where those goods have not been imported before or have not been imported into Australia from a particular country or region. The department also undertakes reviews of existing trade. Risk analyses consider the level of biosecurity risk that may be associated with the importation of a good and identify appropriate ways to manage these risks in order to meet the ALOP. According to published guidance (DAWR 2016), the department undertakes 2 main types of risk analyses:

- Biosecurity import risk analysis, which is conducted through a regulated process provided for in the *Biosecurity Act 2015* and the Biosecurity Regulation 2016
- Non-regulated risk analysis, such as scientific review of existing policy and import conditions, pest-specific assessments, weed risk assessments, biological control agent assessments or scientific advice.

The department noted that the Biosecurity Act also provides for risk assessments to be conducted for the purpose of exercising powers under section 174 (conditionally non-prohibited goods), section 524A (lists of goods for purposes of infringement notices), and section 179 (import permits). No evidence or advice was provided to the review that there were formal arrangements, processes or product types in place for the conduct of these risk assessments.

The department advised that risk analyses may be pest specific, or commodity specific. Of the 42 national priority pests, 5 have been subject to a PRA and 2 (khapra beetle and Xylella) are currently in development. The department advised that a pest-specific risk analysis potentially assesses the biosecurity risk of the pest for a variety of hosts/commodities, and sometimes for various commodity end-uses. A commodity-specific risk analysis assesses all pests potentially associated with the commodity pathway, commonly for one country or a small number of countries of origin. Within a commodity-specific risk analysis, pest risk assessments are conducted for all pests that have been identified as having potential to be on the pathway and that meet the definition of a quarantine pest. For example:

- Several fruit fly species (NPPP 4) were assessed in various commodity-specific risk analyses, e.g. mangoes (from Thailand, Vietnam, Indonesia, India, Pakistan, Taiwan, the Philippines); dragon fruit (from Vietnam, Indonesia); breadfruit (from Fiji, Samoa, Tonga); citrus/oranges (from Egypt, Israel, Italy); jujubes (from China); mangosteen (from Thailand, Indonesia); lychees (from China, Taiwan, Vietnam, Thailand).
- Fire blight (NPPP 18) was assessed in the commodity-specific risk analysis for apples from New Zealand.

- Citrus canker (NPPP 16) was assessed in the commodity-specific risk analysis for unshu mandarins from Japan.
- Panama disease (NPPP 22) was assessed in the commodity-specific risk analysis for bananas from the Philippines.
- various tobamoviruses (NPPP 32) were assessed in the commodity-specific risk analysis for cucurbitaceous vegetable seeds.

The department advised that most exotic high-impact pests including those on the priority pest list have been regulated and managed, particularly on high-risk import pathways such as nursery stock, regardless of whether a PRA had been completed.

The department also advised that risk analyses are generally undertaken in the broad, meaning that they do not consider pathway specific risks related to the cross-border movement of goods. The khapra beetle risk analysis required the department to address aspects of border clearance not previously considered in detail, to enable actions to be progressed offshore with NPPOs and onshore in relation to the implementation of 'bans'. These were the risks posed by khapra beetle in non-commercial goods, and the risk posed by khapra beetle as a hitchhiker pest.

The department advised that while some PRAs have been completed within as little as 10 months (dragon fruit from Vietnam and strawberries from the Republic of Korea), most PRAs take between 18 and 36 months to complete.

In late 2020 the department developed a generic risk assessment template for 'rapid risk assessments' that supported the Director of Biosecurity and the Director of Human Biosecurity in determining what measures were required to meet ALOP. This template was developed to support future changes to the Goods Determination and was independent of the process established for the khapra beetle rapid risk assessment. In March 2021 the first risk assessments in this new format were approved. The khapra beetle rapid risk assessment was redrafted using the new template and has been subject to several subsequent iterations.

The department has advised that all classes of goods in the current Goods Determination are supported by a risk assessment conducted for the purposes of specifying these goods in the Determination.

It is noted that the department developed a short-form rapid risk assessment by mid-August 2020 to support changes to the Goods Determination and to enable urgent changes to BICON to support immediate management of the risk of khapra beetle. However, in September 2021 the department advised that the khapra beetle risk assessment was still under review, with issues relating to 'how the measures will reduce the risk in order to achieve the ALOP, and the distinction between alternative conditions and an import permit' still being progressed.

The Inspector-General is concerned that, some 5 years after the introduction of the Biosecurity Act, the department still does not have arrangements in place for legislatively appropriate risk assessments that provide consideration of the different pathway risks within the preventative biosecurity system. Through the khapra beetle review, the plant risk assessment processes have been shown to be out of date (based on the import risk analysis model) in terms of providing timely and actionable assessments consistent with the Biosecurity Act requirements.

The department has risk assessments – full, partial or in draft – for 12 of the 42 national priority plant pests. Based on average completion times, it will take the department between 45 and 90 years to complete the remaining 30, if they are undertaken singularly and in a sequential manner. Noting current risk assessment production rates, completion of the remaining 30 risk assessments is likely to take between 10 and 15 years. It is also noted that in the partial assessments not all risk pathways have been considered, which would be an additional body of work if, for example, measures were to be applied against individual pathways as with khapra beetle.

Finding: The quality and rigour of the department's risk assessments is exemplary. However, as they are currently undertaken, they do not meet the requirements of an operational biosecurity regulator in terms of providing timely assessments that support the implementation of system-level preventative biosecurity measures under the Biosecurity Act. A change in the risk assessment approach is required to support the production of timely and actionable assessments and to reduce production time frames.

Recommendation 5

That the department update its risk analysis production approach to ensure that assessments are timely and provide the necessary coverage of operational considerations, such as import pathways and hitchhiker potential, to support agile regulation-based responses under the *Biosecurity Act 2015*.

Recommendation 6

That the department consider legislative change to provide for the approval of 'provisional conditions' where there is a suspected new or changed risk profile but where a full risk assessment will take some time to complete. This change should allow for the temporary implementation of measures while the necessary research and analysis is performed to verify the risk status.

Risk countries

In developing the list of 'target-risk' khapra beetle countries, the department undertook a comprehensive review of published literature on the status of khapra beetle in various countries, including scientific papers, interception data in international trade, and SPS notifications. Based on this research, which formed part of the rapid risk assessment, the department reduced the number of 'target risk' khapra beetle countries from over 80 to 41.

The department now recognises that khapra beetle is currently present in Afghanistan, Albania, Algeria, Bangladesh, Benin, Burkina Faso, Côte d'Ivoire, Cyprus, Egypt, Ghana, Greece, India, Iran, Iraq, Israel, Kuwait, Lebanon, Libya, Mali, Mauritania, Morocco, Myanmar, Nepal, Niger, Nigeria, Oman, Pakistan, Qatar, Saudi Arabia, Senegal, Somalia, South Sudan, Sri Lanka, Sudan, Syria, Timor-Leste, Tunisia, Turkey, United Arab Emirates (UAE) and Yemen. These countries are shown in Figure 3 (DAWE 2021e).

Figure 3 Countries with khapra beetle

Target risk countries versus approaching risk

Since 2016, khapra beetle has been identified in cargo or within marine containers from a range of non-target-risk countries in Europe, north Asia and South-East Asia (Table 2).

The department has arrangements with some neighbouring countries for surveillance activities to monitor for khapra beetle. The presence of khapra beetle in Timor-Leste was identified and confirmed by the department through these surveillance activities.

The department monitors international information sources to identify any changes in geographical distribution of khapra beetle. Where khapra beetle is intercepted in consignments of goods from 'other-risk' khapra beetle countries, research is undertaken to determine if the interceptions relate to potential container contamination or changes to geographical distribution of the pest. The department revises the list of target-risk khapra beetle countries based on changes in the assessed pest distribution.

Table 2 Khapra beetle detections by commodity origin, 2016–2021

Commodity region	2016	2017	2018	2019	2020	2021*	Total
North Asia					2	2	4
South Asia	1	1	1	2	3	2	10
Europe					2		2
Oceania	1				4		5
Africa			1				1
Middle East			2		2		4
South-East Asia				8	3	2	13
Total	2	1	4	10	16	6	39

Note: Countries highlighted blue are non-khapra target-risk countries.

* To June 2021.

Monitoring developments

The United States Animal and Plant Health Inspection Services (APHIS) commenced introducing legal restrictions on goods from khapra beetle countries in response to increased detections in non-commercial and commercial (commodity and container) pathways commencing in 2011 (DAWE 2020c; DAWE 2021e). In 2011 APHIS introduced phytosanitary requirements for soybeans, safflower seeds and chickpeas from khapra beetle risk countries. In 2015 it made more extensive changes related to commodities in commercial pathways, but not the containers they were transported in:

> *… we amended the khapra beetle regulations in 7 CFR part 319 by adding rice (Oryza sativa), chick peas (Cicer spp.), safflower seeds (Carthamus tinctorius), and soybeans (Glycine max) to the list of regulated articles in § 319.75-2 and prohibiting their entry into the United States unless accompanied by a phytosanitary certificate with an additional declaration stating that the articles in the consignment were inspected and found free of khapra beetle in accordance with § 319.75-9. We also added bulk, unpackaged seeds to the list of regulated articles due to their potential for infestation by khapra beetle. In addition, we updated the list of regulated countries in § 319.75-2(b) …*
>
> *Finally, we updated the regulations for certain commodities due to changes in industry practices that have affected the risk of khapra beetle being introduced into the United States. These actions were necessary to prevent the introduction of khapra beetle from infested countries on commodities that have been determined to be hosts for the pest, reflect current industry practices, and make it easier to make timely changes to the list of regulated countries. (APHIS 2015).*

It is noted that the department has in place longstanding import conditions that full container load (FCL) consignments of seeds, grains, and plant products from khapra countries are accompanied by a phytosanitary certificate with an additional declaration stating that the goods were inspected and found free of khapra beetle. These conditions are not specified in the Goods Determination.

The measures introduced by APHIS in 2011 for non-commercial pathways are similar to those that the department initiated in 2020, in particular prohibiting the entry of khapra beetle risk goods from khapra beetle risk countries in travellers' baggage and personal effects. The 2015 measures address certain commodity issues, as proposed by Phase 3, which was implemented in September 2021, and Phase 4, which remains as proposed measures with no time frame specified.

Finding: The implementation of the department's khapra beetle measures for phases 2, 3 and 4 is unrelated to the changed risk profile involving khapra beetle as a hitchhiking pest in sea containers. The Inspector-General questions how closely the department has been monitoring overseas trends, and why similar khapra beetle measures for non-commercial pathways are only being introduced in Australia between 5 and 10 years after being first introduced in the United States by APHIS.

9. Priorities, planning and urgent actions

Khapra beetle workshop in August 2019

In response to an increased number of khapra beetle detections during 2018 and the first half of 2019, the department held a workshop in August 2019 to 'discuss a review of import conditions for imported plant pathways, in order to manage the risk of khapra beetle' (DAWE 2019b). The focus was limited to commodity issues, with the workshop's minutes noting:

> *Notwithstanding that non-commodity pathways form a significant and challenging component of the risk profile for khapra beetle, the workshop focused on addressing gaps and/or areas for improvements and future directions in managing potential introductions through commodity imports. (DAWE 2019b)*

In particular, the workshop focused on rice imports. Rice was chosen as a case study due to the series of khapra beetle detections in rice from Thailand (a non-khapra-beetle country) at this time (see 'Investigation of Thai rice detections').

The workshop discussed general principles underlying the department's regulatory policy for khapra beetle, options to shift risks offshore and the adequacy of border measures in verifying compliance with conditions.

The workshop's 14 'action items' included 'several short-term and longer-term actions that may be explored by the department to enhance the effectiveness of the pathway'. The workshop's participants agreed to reconvene in November 2019 to 'confirm the proposed areas responsible for the next steps and their timeframes for completion'. The November workshop did not occur, but progress on the actions was monitored and this was reported on in March 2020. The actions have continued to be monitored as part of the suite of activities undertaken by the department to address khapra beetle risk. This work can be grouped into 5 areas of activity:

- conducting pest risk assessments for risk countries, risk pathways, pathway management and treatments (discussed in section 8)
- examining rice-related risks (e.g. vacuum-sealed packaging), conditions, inspection rates and inspection procedures
- updating khapra beetle awareness materials
- developing an incident management plan for high-priority pests found in imported goods at the border
- exploring hitchhiker pest risks.

Most of these actions were completed during the period August to December 2019. The incident management plan was completed in April 2021. The rapid risk assessment for khapra beetle was completed in mid-August 2020 to support the implementation of the 'urgent actions'. At the time of writing, the full PRA is still to be finalised.

Investigation of Thai rice detections

Following 8 khapra beetle detections at the border in rice from Thailand between April and July 2019, the department commenced a review of the khapra beetle risk from Thailand. Thailand was not (and is not) a declared khapra beetle country. Australia had not had a detection of khapra beetle from Thailand prior to the April 2019 detection but has since had 2 non-commodity detections and one rice-related detection. The khapra beetle detected in the 8 shipments in 2019 were dead at the time of detection and were identified through mandatory biosecurity inspection procedures for imported rice.

The department commenced a review in May 2019 following 4 detections. This review included requesting the Thai Department of Agriculture (DoA) to investigate the operations of the supplier from which the detections had occurred (it is noted that all the detections came from one supplier in Thailand). It was reported that the Thai DoA undertook a factory-wide survey, which included surrounding areas, raw material storage areas, finished product storage areas, by-product storage areas, packing material storage areas, the production line and packing process, silos and related equipment. The inspections did not identify khapra beetle, but as a precautionary measure the factories were fumigated in accordance with the Australian Fumigation Accreditation Scheme standard. The Thai DoA also undertook to conduct monthly inspections for 6 months.

The source of the dead khapra beetle could not be confirmed (e.g. they could have been from packaging from an untraced source).

The department's early action in engaging the Thai DoA after several detections had an immediate impact on detections, with the last detection of dead khapra beetle occurring on 4 July 2019. The last 3 detections, between 25 June and 4 July 2019, would likely have been in transit by the time the Thai DoA undertook its investigation and applied remedial measures.

This case provides a good example of a timely response by the department to khapra beetle detections, which was facilitated by an equally timely response by the relevant NPPO to investigate and address the issue.

Border detections and departmental responses

Detections

Detections of khapra beetle in sea containers between 2016 and early 2019 spiked the department's interest but did not result in a change in its management approach. These detections had novel characteristics. The 2016 post-biosecurity detection in South Australia involved plastic containers (non-agricultural commodities) from New Zealand (non-risk country origin). The 2018 post-biosecurity incident in Victoria involved polymer beads (non-agricultural commodities) from the United Arab Emirates (a known khapra beetle country). In both cases there were live khapra beetle (DAWE 2021e). From 2020 there was a dramatic step-up in the number of detections compared to the previous 15 years (see Table 3).

Table 3 Khapra beetle detections by pathway, 2003–2021 (June)

	2003	2004	2005	2006	2008	2009	2010	2013	2015	2016	2017	2018	2019	2020	2021	Total by pathway
Airports	2	1		1				1			1	1				7
Import clearance	1	1	1	2	3	2	2	2		1		1	3	15	6	40
Imported foods														1		1
Mail												1				1
Post-biosecurity detection									1	1		1				3
Seaports			1													1
Total by year	3	2	2	3	3	2	2	3	1	2	1	4	3	16	6	53

Historically, border detections of khapra beetle were primarily identified in commercial sea cargo within goods that were known food sources for khapra beetle, predominantly rice. There were also a very small number of non-commercial detections in goods carried by air travellers. The first container detection involving khapra beetle as a hitchhiker pest was recorded in 2013 in a consignment from India. Given India is a known source country for khapra beetle, this detection is unlikely to have raised significant interest. However, the next recorded detections, in 2016 and in 2018, were unusual. Furthermore, in the 2018 detection subsequent examination of the container identified significant infestation of live khapra beetle (over 400 g of khapra beetle material) in the under-floor area of the sea container, even after the container had been fumigated using the standard treatment in place at the time (see Figure 4).

The number of detections of khapra beetle involving goods that are not khapra beetle risk commodities, many from non-khapra-beetle countries, increased significantly from mid-2020, with 11 detections in the period July 2020 to June 2021. Several of these involved post-biosecurity detections in cardboard packaging of refrigerators from Thailand, children's highchairs from Italy, and wheel rims and baby nappies from China. The department's research and development activities using eDNA/eRNA technology (discussed in section 11) on sweepings from containers suggests that the problem of khapra beetle as a hitchhiker pest may be far more widespread than previously realised.

After the 2019 incident the department undertook increased monitoring involving the removal of container floors in cases where khapra beetle had been detected to assess possible infestation of the container. This limited response is perhaps not surprising given that at any one time the department only has capacity available to deal with a certain number of issues. At the time, the department's BMSB response was becoming increasingly complex; the reforms of cut flower import requirements and processes were proving difficult to finalise; and in other areas of the department, responses were being managed for white spot syndrome virus in prawns and live animal export issues. While these last 2 issues do not directly involve plant officials, they do significantly draw on resources from other areas of the department, including legal, operations and compliance.

This said, it is apparent that the department did not have a monitoring or alert system for plant risks that may have been triggered by these events. If it had, these unusual detections should have prompted a preliminary scan of the international environment, particularly as the department did not have a PRA for khapra beetle. Such a scan would

have shown, as discussed in section 8, that APHIS had been taking increasingly active measures across non-commercial pathways since 2011 and had increased commercial commodity measures in 2015 due to increasing numbers of khapra beetle detections.

Finding: With the information now available, the Inspector-General considers it unlikely that the 2016 and 2018 incidents of khapra beetle container contamination were isolated events. The size and cryptic behaviour of khapra beetle make it extremely difficult to locate and if, as appears increasingly likely, there is widespread container contamination, its potential for entry into Australia over a number of years is probably greater than previously estimated.

Figure 4 Khapra beetle detected under the floor of a sea container

Larvae and larval skins in the corner of the container after the floor was removed

Beginnings of a response

In February 2020, during a mandatory at-border inspection of UPEs arriving from Iran at an approved arrangement site, a biosecurity officer identified live khapra beetle in rice. In response to this detection, after the spate of detections in 2019, the department reviewed whether non-commercial imports of khapra beetle risk commodities should be banned. The pathways potentially impacted by this review included travellers, international mail, UPEs and self-assessed clearance (SAC) cargo arriving as air and sea cargo. The pest risk assessment needed to support these actions was in development, being an outcome of the August 2019 khapra beetle workshop.

It was not until July 2020 that the department completed a rapid risk assessment addressing the pest risk, country risk, commodity risk and commercial and non-commercial pathway risks. This rapid risk assessment concluded that:

> *The entry of high-risk plant products including seed for sowing (but excluding trade samples and research purposes) through unaccompanied personal effects (air and sea freight), including low value air freight, low value sea freight (SAC), or with travellers or through mail from all sources will not be permitted entry into Australia.*
>
> *Importation of high-risk plant products as non-commercial consignments will require an import permit issued by the department. This will reduce the risk of Khapra beetle associated with plant products imported as non-commercial consignments to achieve the ALOP for Australia. (DAWE 2021e)*

Finding: At the time of writing, non-commercial goods are not required to have an import permit as this measure has not been required through an amendment to the Goods Determination. As discussed above, khapra beetle risk goods imported through commercial and non-commercial pathways continue to be managed on a transactional basis.

Finding: The department produces high-quality, academically rigorous and comprehensive pest risk assessments that provide a high level of confidence in relation to risk and compliance with international obligations. However, the time frames for assessing biosecurity risks, particularly where there is evidence of changed risk profiles, as with khapra beetle, are too long. The khapra beetle rapid risk assessment was finalised 11 months after the review was tasked at the khapra beetle workshop in August 2019, and at the time of writing, in October 2021, the PRA is still not finalised.

Recommendation 7

That the department develop risk assessment products that provide for assessments of changing pest and pathway biosecurity risks necessary to support legislation-based and operationally timely preventative biosecurity measures.

Khapra Beetle Working Group

While seeking to address the management of non-commercial khapra beetle risks between May and July 2020, there were a further 7 detections of khapra beetle in containers in July and August. After the first 5 detections in July, the KBWG was formed, comprising representatives from across the Biosecurity and Compliance Group, with the intent to strengthen the risk management policy for this pest. This was an unprecedented number of detections, several of which were atypical of the existing khapra beetle risk profile:

- Only one of these detections was from a declared khapra beetle country, India, with the other containers originating from Papua New Guinea (3), China (1), Vietnam (1) and Thailand (1).
- Three of the detections involved agricultural commodities, 2 involved non-agricultural commodities (wooden doors and refrigerators), and 2 of the containers were empty.

What commenced as a short-turnaround project to address khapra beetle risk goods in non-commercial pathways had by August 2020 been significantly expanded to include a suite of new measures, primarily focused on offshore management across all import pathways and involving commodity and non-commodity risks. The department developed a plan of action, which was articulated as:

> *Based on risk assessment and an assessment of detection data from both commercial and non-commercial pathways we have identified three areas where urgent actions can be implemented:*
>
> a. *restricting high-risk plant goods, such as rice and certain seeds and spices, from being brought in through non-commercial pathways i.e. luggage, mail and unaccompanied personal effects*

b. *extending phytosanitary certification to all high-risk goods verifying freedom from Trogoderma sp. from all countries – this will require government officials of the exporting country to verify freedom of Khapra beetle from goods*

c. *introducing mandatory offshore treatment of high-risk goods from countries determined to pose an unacceptable Khapra beetle risk – this measure targets the highest risk countries with a pre-export treatment and inspection to ensure freedom from Khapra beetle.*

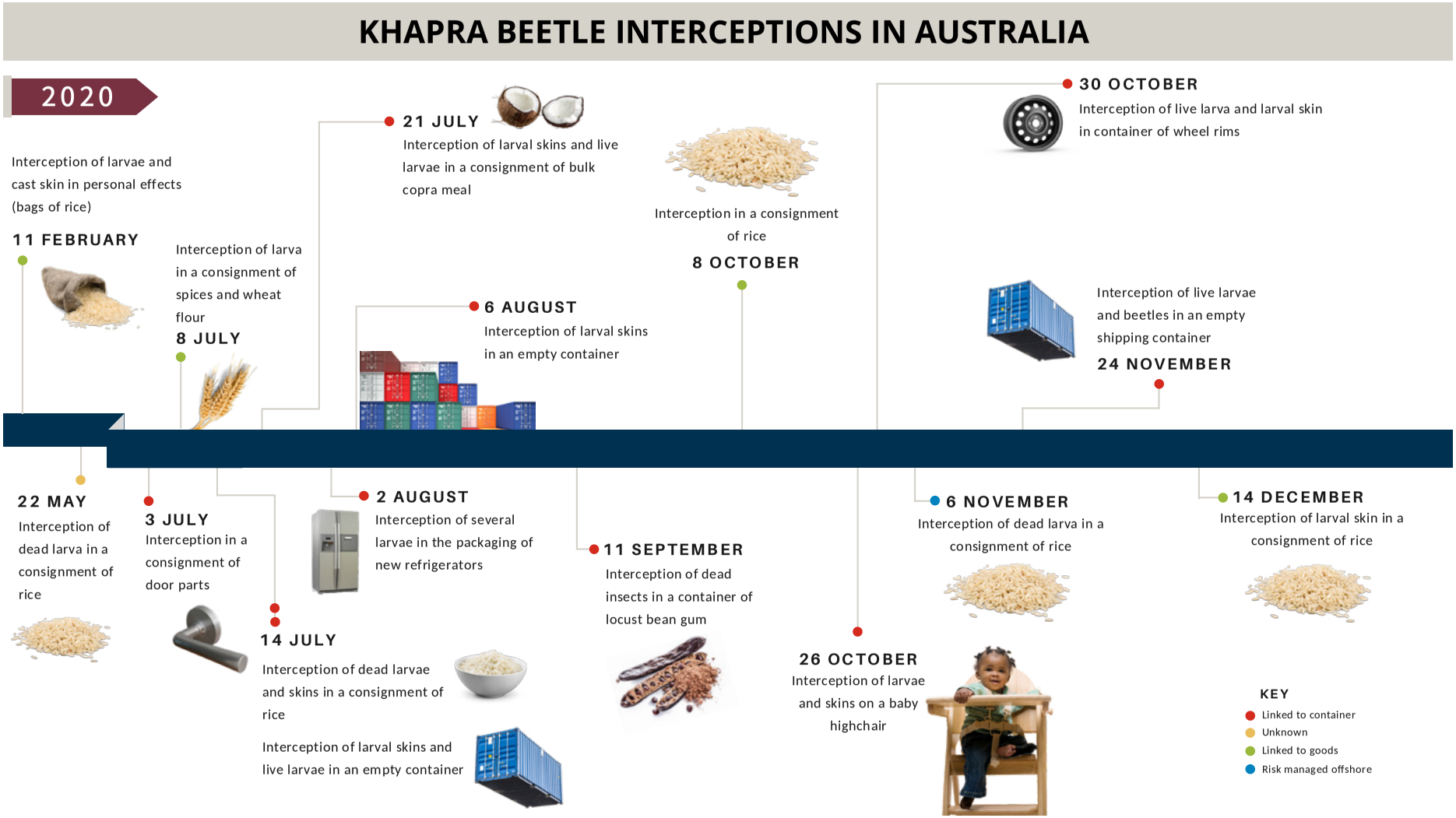
We are getting on now with immediate implementation.

The department developed a phased implementation of its 'urgent actions' covering both commercial and non-commercial pathways and commodity and non-commodity risks (see Table 4). The initial priority, for which much of the work had already been undertaken during May and July, was to address the non-commercial pathways (phases 1 and 2). The next priorities were commodity-based plant risks (phases 3, 4 and 5) and finally non-commodity risks associated with sea containers (phases 6Ai, 6Aii and 6B). This ordering reflected a combination of what was considered easy to implement, the 'quick win' in non-commercial pathways, and the work that had been undertaken since the August 2019 workshop on commodity pathways. It is noted that preparatory work was taking place for other phases at the same time. Non-commodity risks, as seen with the incidents in 2016 and 2018, were known to arise but little was known about these risks.

Table 4 Phased implementation of khapra beetle 'urgent actions'

Phase	Description
1	Ban on high-risk plant products in UPEs and low-value freight
2	Ban on high-risk plant products via international travellers and mail articles
3	New requirements for high-risk plant products imported via all commercial pathways
4	New requirements for other risk plant products
5	Introduction of phytosanitary certificates for all commercial imports of seeds for sowing
6Ai	Offshore treatment of containers carrying high-risk plant products from a designated khapra beetle country
6Aii	Offshore treatment of containers carrying products other than high-risk plant products, packed into a container in a country that has khapra beetle and then unpacked in a rural grain-growing area in Australia.
6B	New treatment requirements for containers that have carried high-risk plant products in the past 5 years.

Figure 5 Khapra beetle interceptions in Australia, 2020



The department was apparently confident in its ability to quickly implement the agreed 'urgent actions' in early August 2020, stating that:

… the department is aiming to finalise the pest risk assessment before mid-August. This will enable urgent changes to be made to BICON to support immediate management of the risk of Khapra beetle. Changes will be made to the Biosecurity (Prohibited and Conditionally non-prohibited Goods) Determination 2016 by the beginning of September [2020].

The department lodged an SPS 'Notification of emergency measures for khapra beetle' on 4 August 2020 (DAWE 2020b). The notification advised that a range of measures would be introduced over coming months (see Figure 6).

Figure 6 Australia's SPS notification of khapra beetle emergency measures (DAWE 2020b)

6.	**Description of content:** Notification to trading partners, that within the next two months Australia proposes to implement emergency measures to high risk plant products that are hosts of khapra beetle (*Trogoderma granarium*) to safeguard Australia against the entry, establishment and spread of this pest. The emergency measures for high risk plant products will be implemented in a number of phases and include (but are not limited to): Prohibiting high risk plant products, from being brought in through non-commercial pathways i.e. luggage, mail and unaccompanied personal effects from all countries Introducing mandatory offshore treatment of high risk plant products from countries determined to pose an unacceptable khapra beetle risk. III. Extending phytosanitary certification to all high risk plant products verifying freedom from species of *Trogoderma*. Prohibiting high risk plant products from being brought in through the unaccompanied personal effects pathway (phase 1) is expected to be implemented in August 2020. Addendums to this SPS notification will be published to notify the implementation date for phase 1; and to notify the measures and implementation dates for subsequent phases. Specific details regarding the measures will be outlined in the Biosecurity Import Conditions system (BICON) on the Australia's Department of Agriculture, Water and the Environment website prior to the implementation date. Additional measures for lower risk plant products are also being considered and may include extending phytosanitary certification to include verification of freedom from species of *Trogoderma*. Additional measures to manage the hitchhiking risk of khapra beetle in containers are being considered which may include treatments of containers prior to loading of goods; and treatment of empty containers. To assist with the implementation, Australia is requesting countries for relevant information consistent with ISPM 8 on the status of *T. granarium* in their territories. This notification provides an opportunity for Australia's trading partners to provide any information on the status of *T. granarium* in their countries, and to identify evidence to support their response.

Finding: The KBWG's phased implementation approach was comprehensive in its intent to address the range of khapra beetle risks, and consistent with the known risk environment based on the rapid risk assessment.

Finding: The department provided timely advice consistent with its WTO and SPS obligations on its proposed 'emergency measures' in response to the changed khapra beetle risk.

Implementation of the 'urgent actions'

The Phase 1 'ban' commenced on 3 September 2020 and Phase 2 on 15 October 2020. Despite the use of the term 'ban' for these 2 measures, this was a 'ban' based on a policy position that was to be exercised by biosecurity officers on a transactional basis. The department planned to amend the Goods Determination by September 2020 but, at the time of writing, no khapra beetle related changes have been made.

A 'ban' based on the exercise of biosecurity management powers requires all officers to arrive at the same decision and provides no avenue for enforcement action (civil or criminal prosecution) for the noncompliant importer. This approach may 'get the job done' but it is a workaround approach, rather than a systematic approach using the powers in the *Biosecurity Act 2015* available to the department.

During the implementation of phases 1 and 2 the risk environment continued to change. On 2 August, khapra beetle was identified in a shipment of refrigerators from Thailand; there were 2 detections in empty containers from Papua New Guinea in July and August; and there were detections in highchairs from Italy and wheel rims from China in late October (see Figure 5). The refrigerator and highchair detections required significant post-biosecurity response activities and attracted mainstream media attention. These detections led the department to reconsider its implementation priorities.

In late August the non-commodity risk associated with hitchhiking khapra beetle in sea containers came into focus and a project to develop a better understanding of this 'unknown' was planned:

> *… in recognition that khapra beetle can hitchhike as a contaminant in containers, the department is looking at changes to manage container risks. To support this work a three-month period of data collection from imported shipping containers is being undertaken, a risk assessment of the container pathway is being completed and industry consultation will help inform feasible actions.*

The evolving intelligence on khapra beetle risk led to a reprioritisation of the phased implementation of the 'urgent actions' in November 2020 (see Table 5). Actions addressing non-commodity risks from khapra beetle countries (phases 6Ai and 6Aii) were brought forward, and those addressing commodity-based risks were delayed, with implementation dates to be determined. At the time of writing, implementation time frames for Phase 6B (as originally drafted) are still listed as 'late 2021', with little likelihood of these actions being implemented in this time frame, and phases 4 and 5 remain 'to be determined'.

Table 5 Revised phased implementation of khapra beetle 'urgent actions'

Phase	Description	Date
1	Ban on high-risk plant products in UPEs and low-value freight	3 Sep 20
2	Ban on high-risk plant products via international travellers and mail articles	15 Oct 20
6Ai	Offshore treatment of containers carrying high-risk plant products from a designated khapra beetle country	12 Apr 21
6Aii	Offshore treatment of containers carrying products other than high-risk plant products, packed into a container in a country that has khapra beetle and then unpacked in a rural grain-growing area in Australia.	12 Jul 21
3	New requirements for high-risk plant products imported via all commercial pathways	30 Sep 21
6B	New treatment requirements for containers that have carried high-risk plant products in the past 5 years	Late 2021
4	New requirements for other risk plant products	TBD
5	Introduction of phytosanitary certificates for all commercial imports of seeds for sowing	TBD

Following Phase 1, planning by the department became more formal as the scope and complexity of the implementation of the 'urgent actions' became apparent. Continued cross-divisional coordination was required, and involved planning and implementation across the following activities:

- Rapid khapra beetle risk assessment for containers
- Commodity policy changes
- Non-commodity policy changes
- Legislation amendments (Goods Determination) – policy, drafting, implementation, SPS notifications
- Engagement with affected NPPOs
- Data collection on container contamination risk
- Engagement with domestic industry
- Operational policy changes
- Approved arrangement condition changes
- Integrated Cargo System (ICS) profiling – build, test and deploy
- Agriculture Import Management System (AIMS) system changes – business requirements, build, user acceptance testing (UAT) and verification
- SEAPEST system changes – business requirements, build, UAT and verification
- Treatments – investigation of treatment alternatives (including trials), treatment approvals, testing efficacy of new and existing treatments and treatment methodologies
- Operational change readiness assessments – impacts and preparedness of border operations
- Instructional material changes
- Training (risk and procedural) – development and deployment
- Technical communications (website, BICON, assessment services, automatic entry processing for commodities (AEPCOMM) brokers) – development and deployment
- Awareness communications – development and deployment
- Verification and assurance – development, deployment and analysis.

The department used various task lists and Gantt charts to manage the development and implementation of the 'urgent actions'. These were informal to begin with, but as the scope and scale of the work expanded, elements of project management methodology were introduced to define scope, identify responsibilities, and track progress.

The use of good-practice project and planning methodologies at the beginning of the project would have quickly highlighted that the time frames proposed for the delivery of the measures were unrealistic. For instance, changes to approved arrangements to allow customs brokers to assess document compliance with import requirements would take 3 months to implement. The development and delivery of training materials to support frontline officers would also take several months. Changes to IT systems needed to be scoped, designed and implemented, which is rarely a 'quick fix'.

Finding: The department's use of project and planning methodologies and tools remains limited and too often as an afterthought, rather than as a foundation for a project or program of work. As stated in Recommendation 5 of the IGB review of express airfreight: 'The department should apply a basic project management model to business risk assessment and improvement, and all significant business testing … and improvement projects and processes' (IGB 2020).

Recommendation 8

That the department apply good-practice program and project management governance and methodologies to the delivery of reform activities.

Container measures

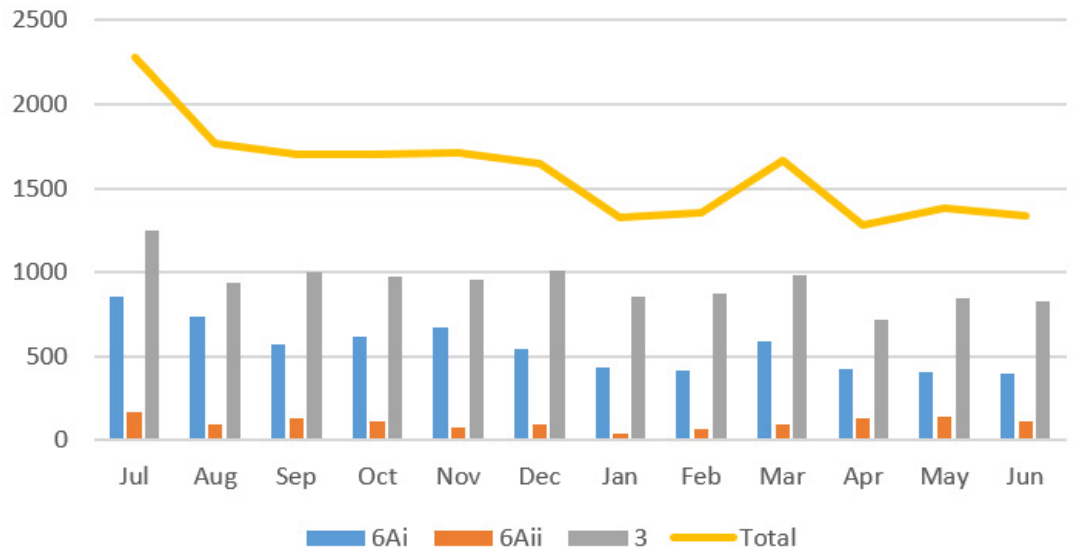
Data requested for this review from the department's Biosecurity Analytics Centre provided a reasonable understanding of the impacts of phases 3, 6Ai and 6Aii. In total these measures impact approximately 19,000 container movements per annum (Figure 7). The number of treatments required for Phase 3, due for implementation on 30 September 2021, will likely be larger than the number of containers shown, as under this phase containers and high-risk goods from khapra beetle infested countries that are not treated with methyl bromide will require the container and goods to the be treated separately. The number of imports impacted by this cannot be calculated yet, as data on the type of treatment performed under 6Ai is not collected in a format that can be analysed.

The number of containers requiring treatment is large, but far smaller than the number of containers requiring treatment under BMSB requirements.

While requiring treatment is feasible for phases 3, 6Ai and 6Aii, the department's measures require that these treatments occur offshore and in countries that are not part of the department's offshore treatment arrangements. The department has estimated that approximately 80% of Phase 3 treatments will be in Australian Fumigation Accreditation Scheme (AFAS) and Offshore BMSB Treatment Providers Scheme countries – India, Turkey and Sri Lanka – but has not provided figures for phases 6Ai or 6Aii. See section 10 for further discussion on offshore treatment arrangements.

The volumes impacted by phases 3 and 6 were used to estimate the impacts on the Biosecurity Operations Division (BOD) and the commercial impacts. This information was shared with the KBWG and incorporated into the BOD operational change request, and for the commodity phases a regulatory impact statement process was undertaken which included estimating impact.

Figure 7 Container volumes by 'urgent action' phase, 2020–21



Phase 6B

The department's website states that 'Phase 6B is expected to commence in late 2021 and will introduce measures to a broader range of containers (i.e. all high-risk containers)' (DAWE 2021f). The rapid risk assessment determined that high-risk containers in Phase 6B includes any container that has held high-risk plant products from a khapra beetle risk country in the past 5 years. If a threat or pathway assessment had been conducted in relation to Phase 6B, prior to recommendations being made and announced, it would likely have resulted in the department considering an alternative approach.

Engagement with industry occurred in mid to late 2020 and the complexities associated with implementing Phase 6B measures were identified:

- Containers move globally and data is not readily accessible that would enable easy identification of high-risk containers, particularly over a 5-year period.
- Treatment was the only known risk mitigation option for managing container-associated khapra risks. This was of concern to industry given the logistical constraints associated with sea container movement.

In response, the department commenced data collection activities to better understand the khapra container risk using the cargo compliance verification (CCV) inspections that assess compliance of containers that are not of biosecurity interest or have been released based on document assessment. One of the criteria assessed through these inspections is the container's cleanliness, which was given heightened focus in the khapra CCV inspections. Based on the results of the CCV information, the department determined that until better data is available to support identification of high-risk containers, any imported container from any pathway may be a potential risk. Consequently the department chose to actively pursue broad international awareness and engagement as an interim measure, while working on better understanding the risk and how it could be managed. This work is continuing.

In late 2020 the department engaged a consultant to explore possible sources of

historical container movements data. The consultant was unable to identify any complete sources of data that would enable the department to implement Phase 6B as recommended. They noted that shipping lines hold the historical information for container movements and goods (high-level descriptions only) but that this data may not be readily accessible.

The department also initiated discussions with the European Union (EU) to explore access to data currently collected for containers entering the EU. The department's report Sea container track and trace: the European Union trial concluded that the EU data would enable the department to identify higher risk container pathways. However, the EU data did not include commodity details (a critical element of the Phase 6B measure), and strict data privacy rules prevent the relevant EU agency from sharing the data with the department (DAWE 2021h).

The recommendation for Phase 6B was based on khapra's biology, the scientific literature, available treatment options and, importantly, an analysis of 16 containers in which khapra beetle had been detected, for which the department had reconstructed the container histories. Sea containers generally carry a diverse range of cargoes on each movement, as shown by the trace-back of a container detected with khapra beetle in Brisbane in May 2020, which had passed through 65 ports and carried goods as diverse as toilet paper, refrigerators and spices between 2015 and 2020 (see Table 6) (DAWE 2020c).

Table 6 Historical container movements of one container, 2015–2020

Year	Container movements and commodities
2015	Costa Rica (toilet paper) – Mexico (empty) – China (furniture) – US
2016	US (empty) – China (printer) – US (empty) – Hong Kong (empty) – China (electrical goods) – Singapore – Saudi Arabia (empty) – China (joss paper) – Singapore (general cargo) – Malaysia (baby diapers and accessories) – Singapore (general cargo) – Malaysia (general cargo) – Singapore – US – Canada
2017	Canada (newsprint) – Malaysia – India (grinding wheels) – Malta – Netherlands – Belgium (building material) – US (lumber) – Singapore – Indonesia (refrigerators) – Philippines (empty) – Thailand (refrigerators) – Singapore – Turkey
2018	Turkey (tyres) – Netherlands – France (pet food) – South Korea (plastic auto interior) – US (aeroplane parts) – Germany (steel bars) – Saudi Arabia (polyethylene) – Singapore
2019	Singapore (amino resins) – Vietnam (washing machines) – China – US (empty) – China (festival decorations) – Australia (empty) – China (stocking carts) – US (paperboard) – Japan (pipes) – Singapore – Pakistan (bed linen) – US
2020	US (wastepaper) – India (spices) – Malaysia – Australia: khapra beetle detected (empty) – Malaysia – China

It was estimated based on these 16 cases that the khapra beetle infestation took place where the container was loaded with a high-risk commodity in a high-risk country. The approach rate trial conducted in early 2021 (see section 11) has provided further insights, with some 10% of containers returning positive results for khapra beetle eDNA (a sign of dead khapra beetle) and 1% showing signs of eRNA (a sign that khapra beetle were alive within the last 48 hours); however, these are preliminary results (Institute for Applied Ecology 2021).

The department has requested container history data on the 2000 containers in the

approach rate trial, and industry is endeavouring to provide this data, with over half of the required data having already been obtained. The review was advised that no modelling has been undertaken as to the likely number of containers that would match the Phase 6B criteria, as the necessary data is not yet available. The department is also seeking longer term historical data and live data feeds of global movements and cargoes to assist the analysis, to better manage khapra risk and hitchhiker risk more broadly. This data is likely to have broader application across biosecurity risk management, law enforcement border management and national security.

The department has had discussions with a variety of organisations including the Department of Home Affairs, Shipping Australia, and commercial data aggregators, and negotiations are underway to procure available datasets, noting that no single source of data is available and that the department will need to develop a composite dataset using multiple sources. While still in an early stage of exploration as to the actual value of the data and possible avenues for access to it, the department received funding in the 2021–22 Budget to progress container data acquisition and integration (DAWE 2021j).

Finding: Based on the information provided to the Inspector-General, this investment appears speculative with a medium-term delivery window relative to other controls that the department could be applying to containers currently arriving into Australia. This is particularly the case for containers that are being moved to rural areas for the export of khapra beetle risk commodities without biosecurity intervention.

Understanding, even as an order of magnitude, the impacts of a biosecurity measure is important prior to its promulgation and should represent standard departmental practice. The Inspector-General has done this using basmati rice exports from India as a case study, but notes that this is something the Centre of Excellence for Biosecurity Risk Analysis (CEBRA) should have been engaged to model. Such modelling of risk approach rates (and complexity), logistics of biosecurity inspection, eDNA testing and regulatory response, and business impact of various intervention measures would inform the department and its key stakeholders, enabling co-design of optimal solutions.

India is a khapra beetle risk country. Over the last decade it has become the largest exporter of rice, followed by Thailand and Vietnam (Thuong 2018). India exports approximately 16 million tonnes (mt) of rice annually. Approximately 4.5 mt of this is basmati rice, of which 90% is exported as containerised cargo (Kulkarni 2021). The other 11.5 mt of rice is exported through a combination of break-bulk and containerised cargo, but no figures as to the percentage of each export method is available.

For 4.5 mt of basmati rice, 90% (or 4.05 mt) is exported by container. A 20-foot equivalent (TEU) container holds a maximum of 24.75 tonnes. Given this, a minimum of 163,636 TEU container movements would be required annually to export basmati rice from India. If 5 years of data is considered, this equates to over 800,000 container movements. As seen in Figure 7, general cargo containers do not carry only one type of cargo but are moved globally depending on demand.

Basmati rice is only one commodity from one of the 40 khapra beetle countries. The ability to treat even a small sub-population of the target containers would likely exceed reasonable measures under SPS and WTO. Furthermore, to achieve the necessary level of understanding the department will need to collect data on all movements of the estimated 30–40 million containers in the global container fleet with over 750 million port clearances per year (Routley 2018). Five years' worth of global container movements totals approximately 3.5 billion movements, growing at 750 million per year.

Finding: The department did not provide evidence of a consistent approach to translating pest risk assessments into biosecurity controls. The department's response to the khapra beetle PRA recommendations would have benefited from a structured threat assessment and feasibility assessment, which could then have been overlayed on a pathway map of existing controls. This would have avoided measures such as Phase 6B being announced, when the scope and feasibility was not understood. The Inspector-General observes that a robust assessment of value, including CEBRA-based modelling and a return on investment (ROI) assessment, would have been valuable prior to the department progressing with attempts to acquire this data based solely on khapra beetle risk.

Finding: A more structured approach to the translation of PRAs into biosecurity controls would allow the department to clearly distinguish between control measures that can be implemented now, R&D projects aimed at future control measures, and measures that are possibly not feasible or not cost-effective for the additional control enhancement obtained.

Threat and feasibility assessments

The 'urgent actions' were based on recommendations from the rapid risk assessments that were conducted between July and November 2020. The rapid risk assessments were brought together into a single draft risk assessment in the first half of 2021. It is noted that the KBWG assessed the proposed controls in relation to the existing suite of controls. This was completed through a series of workshops with the Khapra Beetle Working Group where the group mapped out the controls and then articulated them in a summary document. The Inspector-General did not receive information to indicate that threat or feasibility assessments relating to these measures were undertaken prior to commencing implementation of the 'urgent actions'.

In the Inspector-General's review of the international express airfreight pathway, it was noted that the department conducted several threat and vulnerability assessments on certain aspects of cargo entry pathways, including the types of entities or goods, and environmental or commercial requirements (IGB 2020a). The Inspector-General continues to be supportive of the application of threat and vulnerability assessment, as this contributes to the department's understanding of how best to manage biosecurity risk in the preventative biosecurity system. The Inspector-General also recognises that an effective biosecurity system requires multiple considerations to operate effectively, including relevant elements of science, legal, policy, ICT, operations, industry functioning and compliance. However, the absence of consistent governance and project management for departmental change projects means that these inputs into the design of measures are not adequately undertaken in all instances, with khapra beetle being one of them.

The Inspector-General is of the view that if the khapra beetle measures had been subject to a fuller range of preparatory assessments, this would likely have:

- identified a range of operational feasibility considerations, including departmental and industry impacts of the proposed measures
- resulted in more accurate estimates of the time required to implement the 'urgent actions'
- raised questions as to whether some actions were actually possible to implement.

In making this observation, the Inspector-General notes that there was pressure for changes to be made 'immediately', something that the department's legislative framework and processes continuously show they are not well suited to. This further highlights the department's inadequate regulatory maturity and insufficient systemisation of preventative biosecurity approaches, which has been highlighted previously by the Inspector-General.

The Inspector-General has not been presented with evidence that the khapra beetle measures set out in the 'urgent actions' were considered within the context of the department's broader regulatory controls. While the KBWG had representatives across the Biosecurity and Compliance Group 'to assess the impact of the regulatory controls', the department does not have documented regulatory control maps for most pathways against which such assessments can be considered and reviewed. For instance, what is the difference in control outcomes from a BMSB treatment provider compared to an unregulated treatment provider conducting offshore fumigations in the management of khapra beetle risk? The department should better understand such differences if it is to develop appropriate additional controls, as is now permitted through the Goods Determination, and for the development of verification activities.

The Biosecurity Operations Division did undertake an operational change assessment and has an area dedicated to this work. The operational change request assessment is used to ensure that the incremental and cumulative impact of measures proposed by operational policy areas does not overwhelm frontline operational capacity. This type of assessment was conducted for all phases of the work undertaken by the KBWG. The team that produced operational change requests was a member of the KBWG.

This approach also prevents innovation in biosecurity system operation, as the recommended mitigation measures are based predominantly on the knowledge of scientific areas (including departmental scientists, state and territory scientists and NPPOs). This approach is not closely connected to the operational environment or the logistics sector. The *Biosecurity Act 2015* provides for a range of options for the management of biosecurity risk, in particular approved arrangements. As noted in the Inspector-General's Operational Model review, the department's use of approved arrangements has been relatively narrow since the introduction of the Biosecurity Act. The Inspector-General proposed using these tools more flexibly to achieve biosecurity risk mitigation objectives. Alternative risk management options and alternative operating arrangements are not considered under the current approach of scientific risk assessors setting and recommending the mitigation measures. The Inspector-General proposes a cumulative assessment with appropriate 'stage gates' that leads to a more holistic consideration of how risks could be managed across the preventative biosecurity system prior to selecting specific measures for implementation (see Figure 8). This has added relevance when considering the difference between needing to manage a changed biosecurity risk involving an imminent threat and program reform activities.

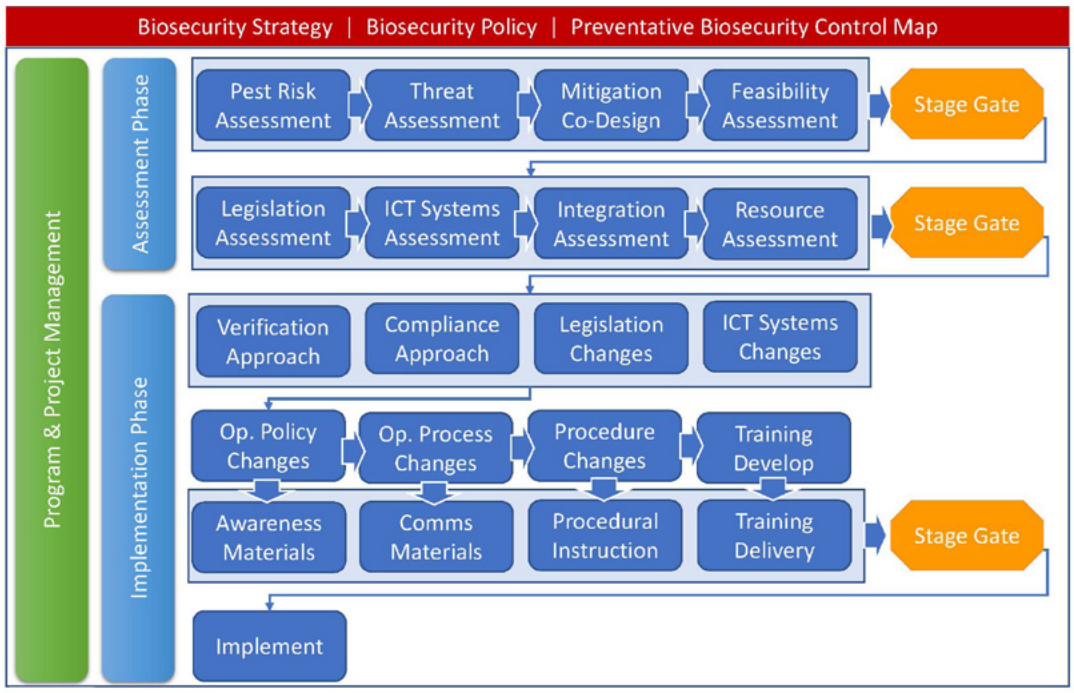
This approach is consistent with the Inspector-General's previous recommendation in the express airfreight review that (IGB 2020a):

> *[Recommendation 8] The department should establish a standard approach to risk pathway mapping and decision-making, including biosecurity risk trends, pathway threats, critical control points, intervention measures, audit and verification reports, change decisions, review milestones, overall pathway risk assessment and improvement plan and accountabilities.*
>
> *This pathway assessment and management documentation should be routinely available and understood by the accountable First Assistant Secretary. It should also be formally reviewed at least annually by all materially relevant First Assistant Secretaries and signed off by the Deputy Secretary.*

The Inspector-General acknowledges that this recommendation was yet to be published at the time khapra beetle measures were being considered. However, the Inspector-General expects to see this level of governance in relation to the significant new funding provided for khapra beetle and hitchhiker pest reforms.

The Inspector-General also notes the regulatory design analysis undertaken in relation to pratique in 2020 following the *Ruby Princess* incident, which analysed the continuing effectiveness of the regulatory design (legislation, policy and procedures) in achieving biosecurity outcomes, and the identification of vulnerabilities and opportunities that have the potential to contribute to or prevent regulatory underperformance or failure (DAWE 2020d). This type of analysis can assist in understanding regulatory issues and provide a valuable input into future design thinking.

Figure 8 Biosecurity measures planning and implementation framework



10. Treatment policy

In March 2021 the explanatory statement of the Goods Determination was published, which sets out the department's policy on where the treatment for goods that pose a risk of hitchhiker pests is required to occur:

> *Goods which must not be brought or imported into Australian territory unless treated offshore are classes of goods where any hitchhiker pests that may be present are not able to be contained or managed upon arrival in Australian territory (e.g. vehicles and other break bulk goods which are exposed to the environment when unloaded from conveyances). This is because if hitchhiker pests arrive in Australian territory on goods where the risk is not able to be contained until treatment, there is a risk that those hitchhiker pests may escape and become established in Australia. Where the risk of hitchhiker pests is able to be contained within a sealed shipping container until treatment, goods have the option of being treated onshore.*

During the 2019–2020 BMSB season, some 65,493 containers/break bulk items – over 40% of containers subject to BMSB requirements – were treated offshore (DAWE 2020e). This was both a good biosecurity outcome and a practical necessity as the volume of containers requiring treatment was unprecedented. The treatment could not have been completed in Australia without substantial supply chain disruptions. Unlike khapra beetle, BMSB generally infest goods, not containers, and the physical size of the BMSB means that once inside a container it cannot escape through floor crevices or vents. In this way, BMSB poses a different risk to khapra beetle, which has been identified in the underfloor areas of containers and is small enough to fit through vents, cracks and holes. Therefore the department's treatment policy requires that treatment occur offshore.

Offshore treatment as a biosecurity control strategy has some clear advantages in reducing the approach rate of biosecurity risk. However, to be an effective risk management option it also requires sufficient appropriation funding to ensure reliable sources of offshore treatment capability, including through verified registration processes and offshore audit programs, and onshore assurance through transactional and entity-level documentary review and physical verification through container and commodity inspection, potentially in the future using some of the R&D technologies currently under development.

Treatment location

The department recognises 4 categories of treatment providers, one onshore and 3 offshore (see Figure 9). These categories have been developed over the last several decades in response to different departmental requirements.

Onshore

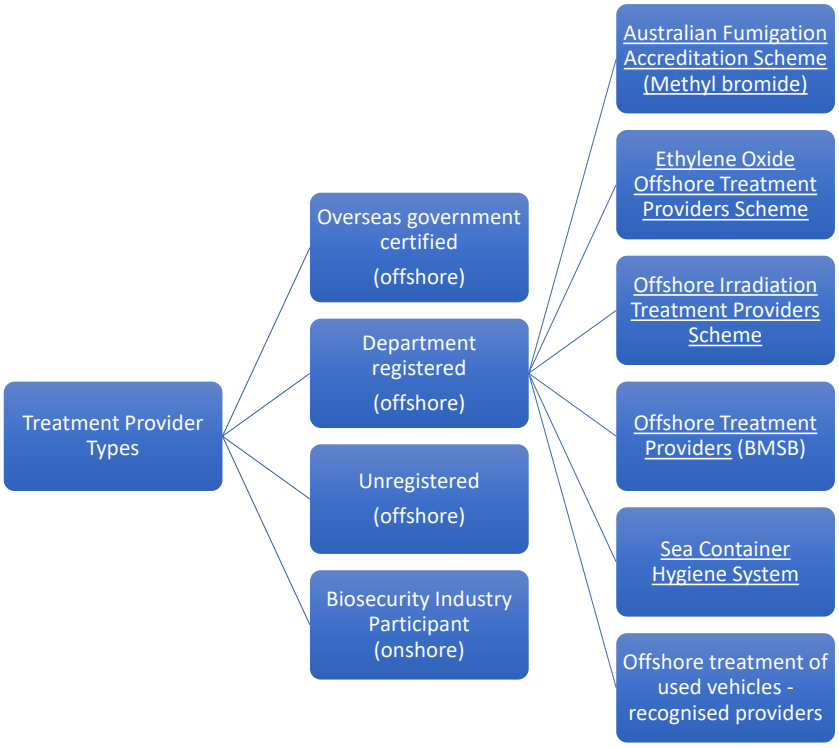
Onshore treatment providers are regulated as biosecurity industry participants (BIPs) and operate under the conditions specified for Class 12 approved arrangements (AAs) (DAWE 2021i). The IGB review report *Effectiveness of approved arrangements in managing biosecurity risks in Australia* (IGB 2019a) found that of the 42 Class 12.1 AAs (methyl bromide treatment providers) operating across Australia between February 2016 and February 2019, 36% of those audited recorded critical noncompliances. Of these, almost half have had repeated noncompliances, resulting in the suspension of 2 sites.

The Inspector-General concluded that:

> *... tighter management of the AAs offering onshore fumigation of imports is needed. High levels of non-compliance must be addressed both by more effective regulatory action and by increasing and verifying requirements for training and more efficient processes and equipment such as automated data logging. Harmonisation of requirements for fumigation for import, export and interstate movement is also needed. (IGB 2019a)*

This review is not specifically concerned with onshore treatment, as treatments are required to be undertaken offshore for the khapra beetle measures. However, it is interested in considering the compliance issues associated with onshore fumigators who are registered as BIPs. Onshore fumigators are regulated by both state and territory and Commonwealth governments and, as BIPs, are audited and in some cases are subject to post-fumigation inspections by biosecurity officers.

Figure 9 Offshore and onshore treatment provider types



An Inspector-General review report (IGB 2019a) found high rates of noncompliance for regulated onshore fumigators and recommended tighter management. Given this, the Inspector-General is concerned at the implications of these findings for the confidence the department can have in all offshore fumigation treatment providers.

Offshore

Offshore treatment providers for khapra beetle purposes are either part of AFAS or registered for the Offshore BMSB Treatment Providers Scheme, or are unregistered.

- AFAS was established by the Australian Quarantine Inspection Service in 2004 to reduce ineffective methyl bromide fumigations performed offshore for Australian quarantine purposes. It incorporates:
  - a management system run by overseas government agencies participating in AFAS to ensure continued compliance of fumigators with the treatment requirements
  - a training and accreditation system for fumigators and regulatory officers
  - a registration system for fumigation companies
  - remote or on-site compliance assessment of providers' facilities and procedures, including all equipment and operating procedures (AQIS 2011; DAWE 2020f)
  - an annual joint system review which includes observation of overseas government practices, training, mentoring of auditors and compliance verification activities.
- The Offshore BMSB Treatment Providers Scheme sets out the minimum registration and compliance requirements for providers conducting BMSB treatments on goods bound for Australia and/or New Zealand. It incorporates:
  - registration under the scheme through assessment of an application form, any supplementary documentation, compliance history and the results of any remote or on-site compliance verification, where relevant
  - remote or on-site compliance assessment of providers' facilities and procedures, including all equipment and operating procedures
  - a requirement for each provider to sign a letter of agreement acknowledging its obligations under the scheme
  - re-registration required annually (DAWE 2021k).
- Unregistered treatment providers are treatment providers who are not approved under one of the department's offshore treatment schemes. Overseas treatment providers not registered under a scheme are able to conduct treatments in some cases, unless they are on the 'Unacceptable Treatment Providers' list (DAWE 2021l).

For most commodities and pathways, the department accepts treatment certification from treatment providers not regulated under AFAS or the BMSB scheme. The department has no visibility over the capacity or capability of these unregulated treatment providers to conduct effective biosecurity treatments. This is of concern given the poor rates of compliance identified for fumigators operating as BIPs. The department is limited to documentary assessment and intermittent inspections to monitor the compliance of these unregulated offshore treatment providers, and due to the COVID-19 pandemic this has been extremely difficult (DAWE 2021m). It is noted that for Phase 3 the NPPO must inspect the goods after treatment to verify freedom from live khapra. Biosecurity officers also inspect every treated consignment on arrival to verify freedom under Phase 3.

In September 2021 the department recognised 503 approved offshore treatment providers under AFAS, and 219 treatment providers under the BMSB scheme (2019–20 BMSB risk season). The department has undertaken extensive and valuable work over nearly 2 decades to build AFAS and the BMSB scheme and implement system-

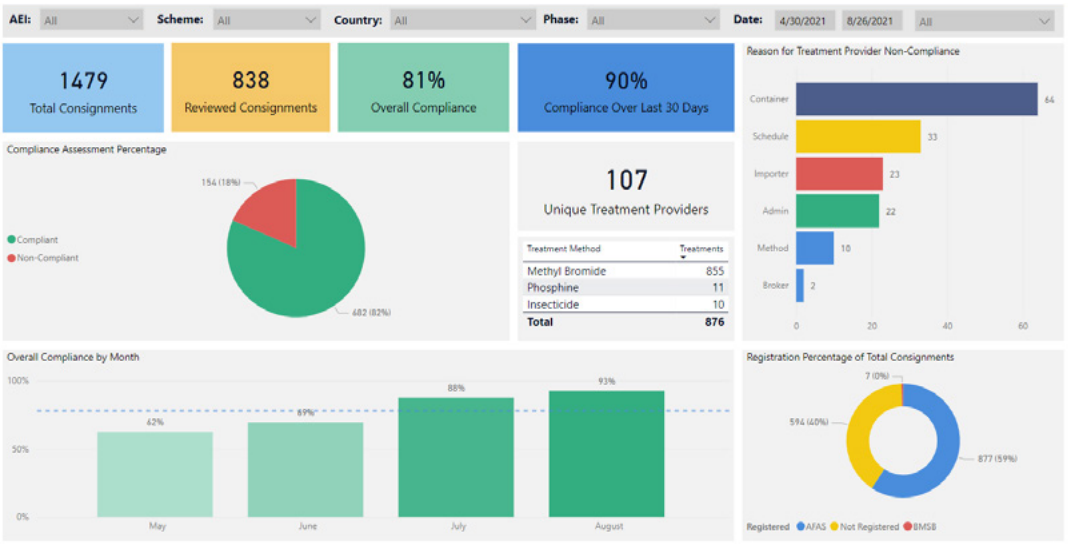
based assurances through the establishment of standards and by working with NPPOs, fumigators and registered providers of fumigants. Treatment providers can be suspended from these schemes for failing to comply with the department's treatment requirements. The department reported that there were 97 suspended AFAS providers and 8 suspended BMSB scheme providers (DAWE 2021m).

The department determined that for Phase 3 and Phase 6ai that 80% of treatments would be performed in AFAS/BMSB countries (India, Sri Lanka and Turkey). It is noted that for the remaining 20%, the assurance processes that exist for AFAS and BMSB providers are not in place and are classed as 'unregistered treatment providers' by the department. Details – name, origin, services and number of fumigations undertaken – are not available for unregistered treatment providers. No data on the treatment provider is captured electronically if it is not part of the AFAS or the BMSB scheme. Treatment providers operating outside of AFAS and the BMSB scheme can be deemed 'unacceptable' when failed treatments are detected or falsified treatment documents are identified. There are currently 69 unacceptable treatment providers in the unregulated category. There is nothing to stop an 'unacceptable' treatment provider simply changing their letterhead and continuing to issue treatment certificates.

Documentary assessment is the most widely used control to provide assurance of treatment provider compliance (see Figure 10). Treatment documentary assessment is performed in a range of capacities across the department. In general, transactional documentary assessment can be effective at identifying inadvertent noncompliance. It can, however, be less effective at identifying deliberate noncompliance and fraudulent behaviour.

Most treatment providers suspended for falsifying treatment documents have been identified during audit. Falsified treatment documents are often misidentified as compliant during documentary assessment. The most common form of documentary assessment conducted by the department is a transactional assessment conducted during import. Unfortunately, departmental systems do not consistently capture information on this assessment that can be analysed to determine the compliance of offshore treatments.

Figure 10 Khapra beetle treatment certificate compliance overview



The department advised that documentary assessment and inspection are important assurance controls, but audit is considered the most effective control to measure treatment provider compliance, particularly in relation to deliberate noncompliance.

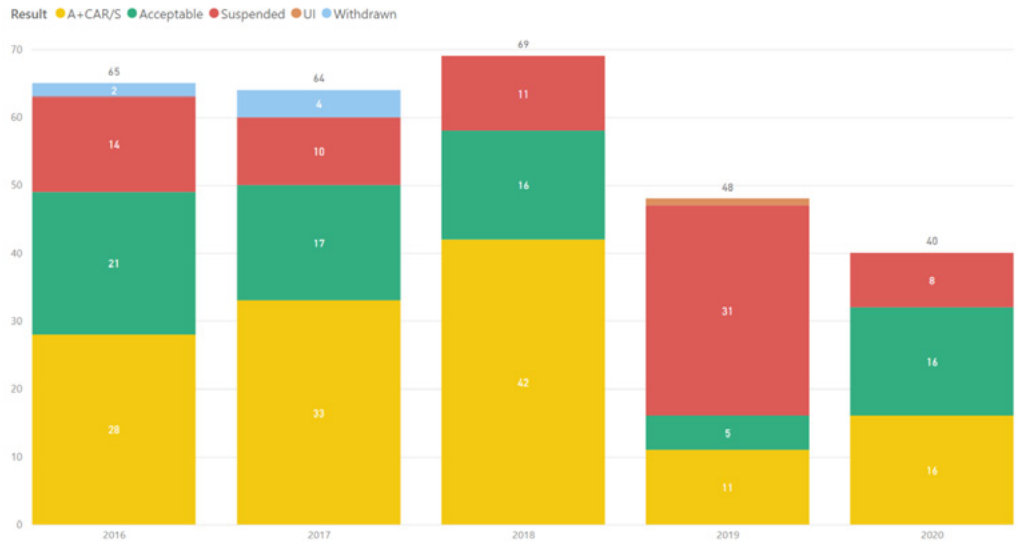
Outside of the AFAS and the BMSB scheme, the department does not have a mechanism to require offshore treatment providers to participate in audits, and COVID-19 related travel safety restrictions make it extremely difficult for departmental officers to conduct offshore audit and verification inspections.

Monitoring offshore treatment compliance

In late 2018, the department substantially refined its offshore treatment provider audit approach. This was in part a response to previous Inspector-General recommendations for the department to better utilise unannounced audits to measure industry compliance more accurately. This approach included undertaking unannounced audits, improving the ability to identify key indicators of fraudulent activity, improving the ability to collect evidence of fraudulent activity through interview, and better targeting of treatment providers for audit based on departmental data and local intelligence.

This improved method for conducting audits has enabled the more effective identification of deliberate and sophisticated noncompliance. This can be seen in the increase in suspensions resulting from AFAS provider site audits since late 2018 (see Figure 11). Many of the companies suspended for falsification and fraudulent behaviour had previously been assessed as compliant based on documentary assessment and previous announced audits. It is worth noting in this context that AFAS fumigators are regulated by NPPOs and, in practice, have the highest level of regulatory oversight of all offshore fumigators.

Figure 11 AFAS site audits conducted as part of joint system reviews – results



Since the introduction of COVID-19 related international travel restrictions, the department has been conducting remote audits of AFAS treatment providers. While these remote audits provide some level of assurance, they are challenging to undertake (often requiring translators), and are less efficient and less effective in identifying noncompliance.

Remote audits also provide limited opportunities to directly observe treatment practices and procedures. Subtle indicators of noncompliance, including proficiency of personnel and the state of equipment, are difficult to assess remotely. While connection issues (both genuine and exaggerated) are obvious challenges, it can also be difficult to isolate personnel to interview and independently verify accounts. Requesting information that should be readily available to support accounts is also difficult in a virtual environment.

Capturing data on treatments

The import data collected in AIMS and other systems does not accurately identify consignments treated offshore. For some treatments, there are fields that can be used as proxies for offshore treatment information. However, any information collected using these proxies only provides partial data which is not reliably accurate.

At a systems level, because the department cannot accurately identify entries that have been treated offshore, live detections cannot always be linked to offshore treatments. Each live detection requires manual assessment to determine whether it indicates an offshore treatment failure.

Additionally, the way the department captures information from the results of documentary assessment and inspection does not provide sufficient information to identify treatment noncompliance. Direction results are not consistently captured and do not provide enough detail to determine the cause of a failure, making it difficult to link back to offshore treatment noncompliance.

The department has introduced systems and processes along some pathways to collect better data, including the use of a web form method to capture BMSB treatment information to inform verification activities. The department has also introduced a manual data capture process as part of expanded khapra verification activities, which is being used to inform the khapra beetle verification dashboard. However, there is a lack of contextual data for unregulated pathways that makes it impossible to accurately quantify the effectiveness of regulatory schemes like AFAS and the BMSB scheme over unregulated pathways.

Finding: The ability to compare this data for regulated and unregulated pathways, specific countries, goods and treatment types would greatly improve the department's ability to prioritise and quantify the value of risk management resourcing.

Finding: If the khapra beetle risk and the risks of other external container hitchhiker pests are to be managed offshore, the department will need to build a bilateral global treatment program. This will require suitable longer-term commitment and investment on the part of the department to establish and maintain.

Finding: Current offshore compliance arrangements do not support the accurate identification of unregulated treatment providers. Documentation from these treatment providers, despite the department's absence of knowledge about their operations, is accepted for documentary assessment in the same manner as documentation from regulated treatment providers, and without requirements for increased levels of physical assurance. Given the rate of noncompliance even among registered providers, this is likely creating a false sense of security about the efficacy of the department's regulatory controls.

Finding: The Inspector-General's BMSB review noted that 'There may be merit in harmonising the BMSB and AFAS offshore providers' schemes with a view to eventually merging them' (IGB 2019b). It is recommended that this be expanded to include all 6 external registered treatment arrangements.

11. Risk pathways

The department's khapra beetle response divided import pathways into 2 main categories: commercial (commodity and container) and non-commercial (commodity). Commercial pathways primarily consist of air and sea cargo, while non-commercial pathways include travellers, mail, SAC, cargo and UPEs.

Non-commercial pathways

The non-commercial import pathway generally involves goods for which the department receives limited or no information about what is being imported or when it will be imported. Identification of goods carried by travellers and mail is based on broad profiles and then broad screening of baggage and mail items. For khapra beetle risk goods, most detections in the international mail pathway are detected through X-ray screening (Figure 12). The international traveller detections during 2020–2021 will not be representative of what might be expected in a non-COVID-19 environment (Figure 13).

For SAC cargo and UPEs the department receives more information prior to arrival of the goods, but again the information is provided by an individual, generally without assistance or advice from people who are knowledgeable about Australia's complex import requirements. In consideration of possible controls, the rapid risk assessment noted that 'it is unlikely that phytosanitary measures such as offshore treatment and pre-export inspection and certification by the exporting country NPPO will be practical for non-commercial consignments' (DAWE 2019b).

For all non-commercial import pathways, the ability to inform senders or arriving travellers about biosecurity risks and requirements is limited. The department did prepare a range of information to support education activities across the non-commercial pathways and engaged with operators in the SAC pathway, in particular the Conference of Asia Pacific Express Carriers (CAPEC) and Australia Post. The information provided promoted the messaging 'do not bring or send' khapra beetle risk goods. The effectiveness of this awareness raising as a prevention measure for khapra beetle risk goods is being monitored by the department, using dashboards developed to track detection activity (Figure 12 and Figure 13).

Import permits in non-commercial pathways

The department's *Risk assessment: plant products as a pathway for khapra beetle* states that the importation of high-risk plant products as non-commercial consignments should be excluded unless they are accompanied by an import permit issued by the department (DAWE 2019e). It notes that import permits are not automatically issued by the department and that the Director of Biosecurity (or their delegate) can refuse to grant an import permit if they are not satisfied that imposing permit conditions can reduce the risk to an acceptable level. The Inspector-General notes this recommendation and the findings of the Interim Inspector-General's review *Managing biosecurity risks associated with international online purchases* (IIGB 2015), which found:

> *Similar to international mail items, items that enter Australia as SAC consignments and require an import permit are not readily identifiable. The IIGB was advised that, on some occasions, SAC consignments that required import permits were released without inspection.*

Given this finding and the recommendation in the khapra beetle risk assessment that import permits be issued for goods in non-commercial pathways, it is questionable whether sufficient consideration has been given to the practical implementation of risk management measures. Non-commercial pathways that rely on broad profiles and mass-screening identification methods rather than system-based pre-arrival reporting make identification of goods with import permits unreliable or even unlikely.

Recommendation 9

That the department review the risk of allowing goods requiring an import permit to be permitted entry through non-commercial pathways, particularly international mail, when a condition of the permit involves at-border inspection.

Figure 12 Detection of goods that are high risk for khapra beetle in international mail, September 2020 to August 2021

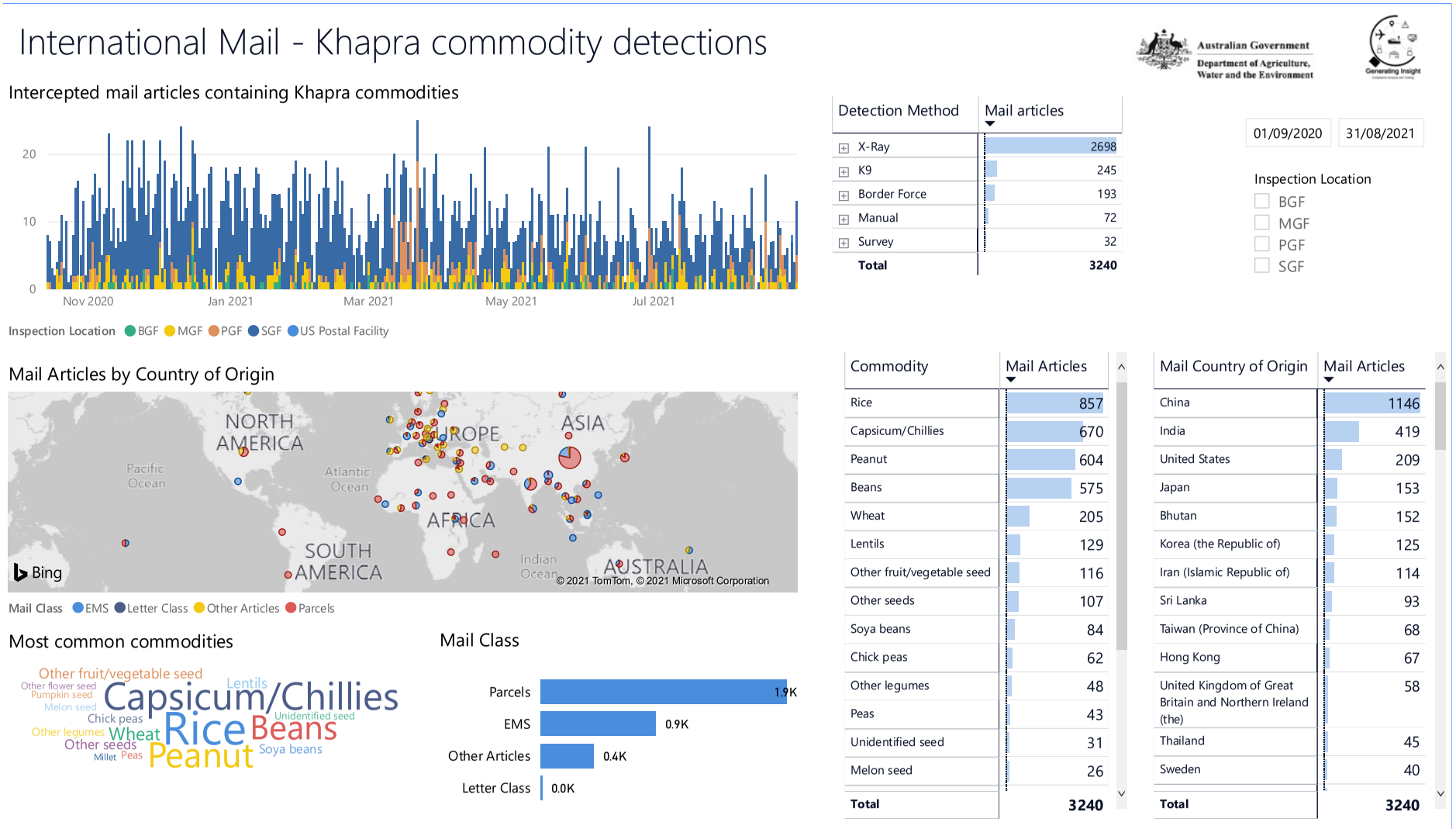
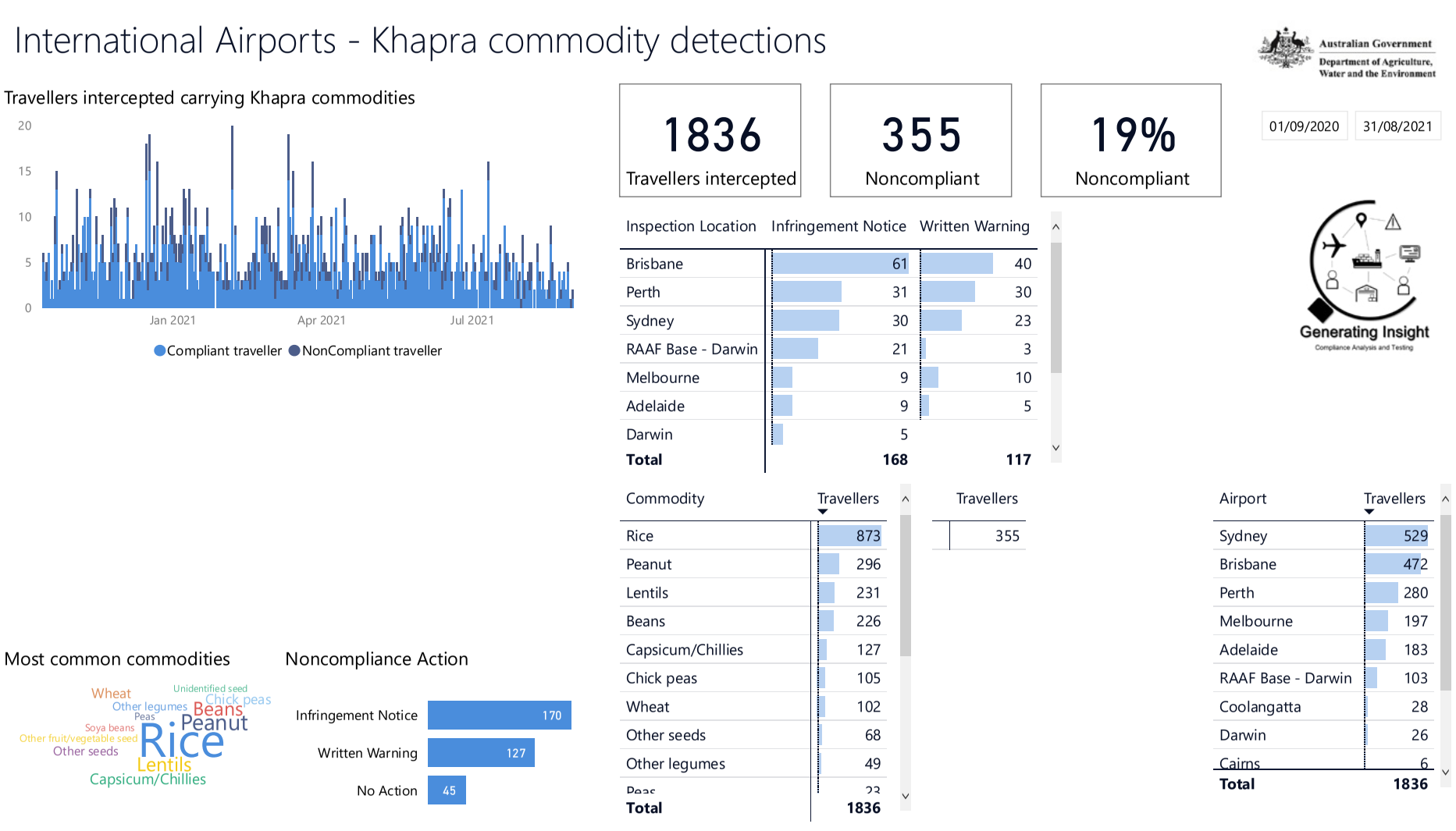


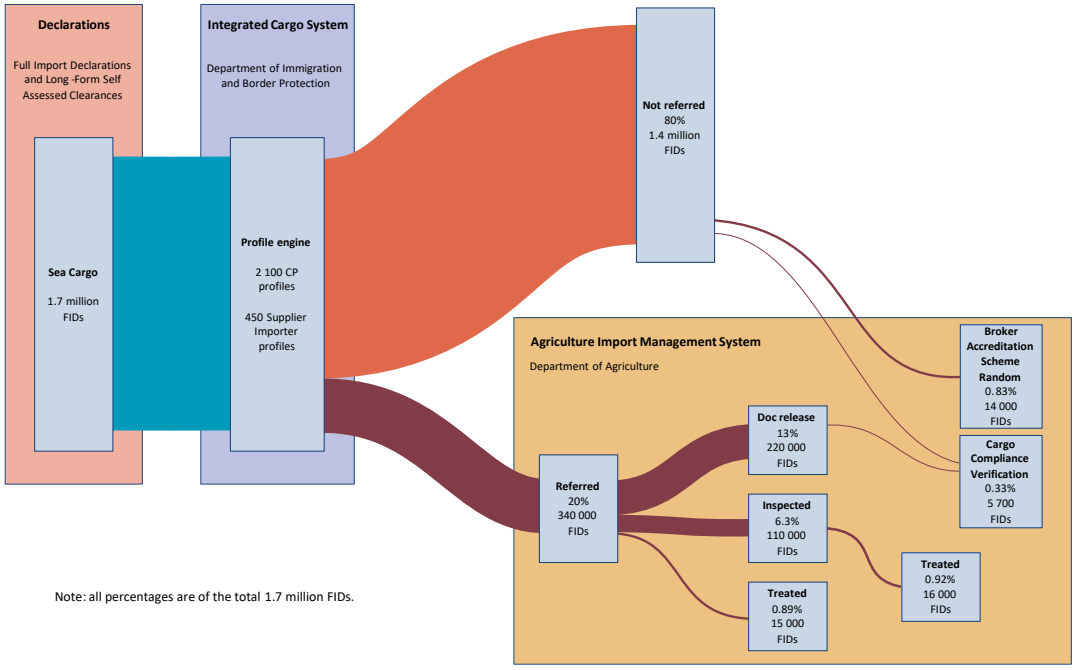
Figure 13 Detection of goods that are high risk for khapra beetle at international airports, September 2020 to August 2021



Commercial pathways

For commercial imports, the biosecurity system is primarily structured around the identification and management of correctly reported biosecurity risk goods and imported foods that have been identified through the profiling of import clearance declarations. For sea cargo, approximately 340,000, or 20% of total import declarations, are referred to the department for further assessment each year (Figure 14). The referred declarations and supporting documents are subject to document assessment either by the department's assessment services officers or by a customs broker operating under an AEPCOMM approved arrangement (Class 19.1 or Class 19.2).

Figure 14 Sea cargo full import declaration intervention flow, 2018–19



Approximately 65% of referred declarations are cleared based on documentary assessment, with the remainder subject to inspection or treatment. The biosecurity clearance process relies heavily on the accuracy of the import declaration and other supporting documentation, such as treatment certificates as discussed in section 11.

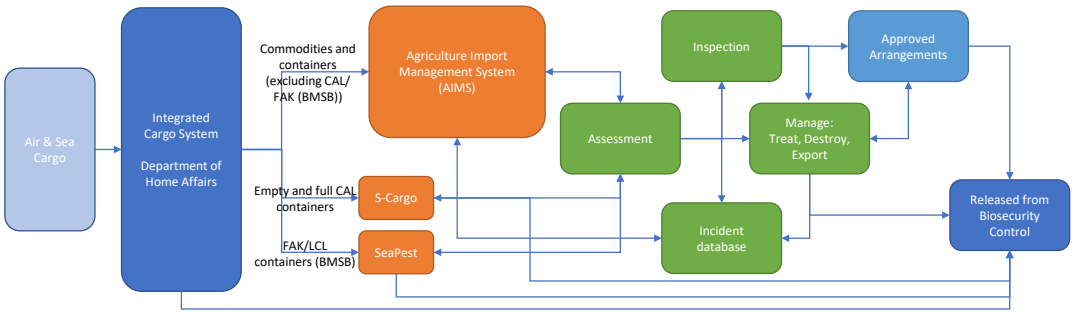
Biosecurity intervention

The department creates profile rules for different goods in the ICS and reviews profiles based on compliance history and the overall hit rate of each profile (Figure 15).
The ICS has a 'profiling engine' that electronically refers commercial consignments with potential biosecurity risks to the department's AIMS for further assessment by biosecurity officers. AIMS automatically assigns a unique identifier for each entry.

The ICS also checks SAC 'free text' declarations for the presence of words and phrases that could indicate a biosecurity risk and, if matched, refers these to the department. The rapid increase of parcel mail ordered online and entering Australia via private company warehouses makes this an important emerging pathway. The department also conducts verification activities on this incoming cargo at CAPEC depots to monitor SAC profile performance to ensure that risks are being effectively targeted.

After assessing the documentation of each consignment referred from the ICS to departmental systems (SAC, Import Management System and AIMS), biosecurity staff may release goods from biosecurity control without further intervention or to be screened, inspected, treated, or held for destruction or re-export (see Figure 15).

Figure 15 Imported cargo biosecurity risk management system



Stakeholder engagement

Interviews conducted for this review with departmental staff and industry representatives noted that consultations on khapra beetle occurred early and regularly in relation to the department's adopted measures. Most industry interviewees commented that they received initial correspondence from the department in July 2020, shortly after the planning of the phased implementation of the rapid risk assessment measures. Within the department, the different areas required to deliver components necessary to support implementation of appropriate biosecurity measures were generally satisfied that they had been advised early, consulted on what they needed to deliver, and given the required time to complete their component of the implementation.

It was also noted by industry that the department produced a range of khapra beetle related awareness materials, including brochures on the risks and measures, posters for approved arrangements, an infographic roadmap for the phased measures, and decision-support tools.

Feedback to the Inspector-General was generally complimentary about the department's engagement on khapra beetle issues. Some industry groups expressed the view that the engagement was advisory rather than collaborative. This was most marked in comments about Phase 6B. Industry representatives expressed concern about the feasibility and impact of this measure and considered that a co-design approach would have been beneficial. This approach would have allowed the department to identify at an earlier stage the significant impediments associated with implementation, including requiring industry to provide data that it cannot readily access.

In the Inspector-General's review of the department's operational model, concerns about the nature of the department's stakeholder consultations were also raised. The Inspector-General (IGB 2021a) noted that:

... import industry organisations stated that their members have a strong desire to work collaboratively with the department to devise workable and effective solutions for their specific risk pathway or industry-based sector. Industry representatives are seeking an approach based on 'practical co-working groups', not 'information-sharing forums'.

The department needs to continue to build upon the work initiated in 2021 to redesign the way it works with key industry representative bodies on biosecurity operational policy design and implementation issues.

The Inspector-General (IGB 2021a) previously recommended:

> *Joint working groups should be established to cover all import pathways. This would enable the department to make more informed decisions while keeping key stakeholders engaged throughout the process. Seeking industry's input to jointly develop solutions to issues would assist the department to apply regulation in an efficient, consistent and predictable way that encourages voluntary compliance. Having industry organisations that actively and positively communicate biosecurity messages and promote the department's work, as well as providing a conduit for industry intelligence about trends, issues and concerns, is likely to be invaluable to the department.*

Finding: The internal and external engagement activities of the teams engaged in khapra beetle related activities were broad and well received. Industry representatives were generally positive but there was a view that a co-design approach to the development would have been beneficial, particularly in relation to Phase 6 measures. This would have assisted the department in understanding some of the impediments and allowed for early consideration of alternatives.

Operational readiness

Resource assessment

The Biosecurity Operations Division has a structured resource assessment methodology for assessing the impacts of significant proposed changes, as it receives requests from a range of different areas for new activities or changes to existing activities. This methodology has been in operation for several years and has reached a good level of maturity. A documented process, with modelling spreadsheets underpins the assessment, is used to consider impacts across 10 criteria:

- Human health
- Import pathway
- Process/operations
- People
- Workload
- Training
- Communications
- Location
- Work health and safety
- Technology.

It is acknowledged that the likely impact on operations and policy areas more broadly was considered through the regular KBWG meetings, through the funded initiative 'Khapra Surge' and in other weekly discussions, and that this influenced resource planning and assessment of impacts on existing control arrangements.

Training

In response to the changed khapra beetle measures, the Biosecurity Operations Division prepared new and updated existing training materials. A new e-learning module, 'Khapra beetle awareness and detection training', was developed during August and September 2020 and went live on 15 October 2020 (see Table 7). Biosecurity officers across the division and operational managers were encouraged to complete this course.

Other existing modules were also updated with new content based on the preliminary PRAs and the new management measures. The number of completions of these modules was lower than for the new module, as the intended audience was new starters and COVID-19 had affected staff commencements and the ability to conduct face-to-face training.

Table 7 Updated training courses and staff completion numbers

LearnHub Course, Course status and BOD attendance	Modality	Attendance	Staff	Published date	Deactivated date
Current Courses					
BOD Core—Introduction to Pests and Disease	Face to Face/ screen	35	35	23rd Nov 2020	
Khapra Beetle Awareness and Detection Training	eLearning	638	630	15th Oct 2020	
Pests and Disease—Hitchhiker	eLearning	49	49	14th Dec 2020	
Pests and Disease—Stored Products	eLearning	45	45	14th Dec 2020	
Pests and disease workshop	Face to Face/ screen	0	0	26th Aug 2021	
Deactivated Courses					
Course 1: Pest and disease detections—an introduction	eLearning	201	195		14th Dec 2020
Course 2: Pest and disease detections in the workplace	eLearning	175	170		14th Dec 2020
Course 3: Pest and diseases—pathways, signs and symptoms	eLearning	129	129		17th Dec 2020
Course 4: Pest and diseases detections: face-to-face workshop (old course)	Face to Face/ screen	46	46		To be deactivated

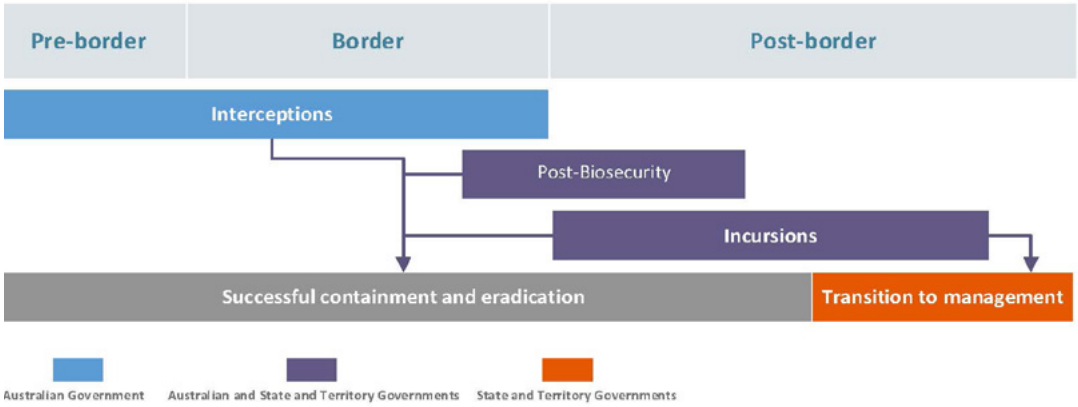
Finding: The department responded quickly in its development and implementation of new khapra-related training materials. Rates of completion by operational staff are high and were roughly aligned to the commencement of Phase 1 and 2 measures.

Post-biosecurity activities

In its operational response activities, the department distinguishes between 'post-border' and 'post-biosecurity' (see Figure 16). Post-biosecurity response activity, while not clearly defined, generally occurs where a biosecurity risk is detected and the goods are still in the importer's possession although no longer under biosecurity control at the time of detection. The use of the 'post-biosecurity' delineation has seen the department undertake many response activities relating to khapra beetle detections, including in relation to fridges from Thailand, highchairs from Italy, and nappies from China. These responses, in the context of the *Biosecurity Act 2015*, would generally be post-border – not under biosecurity control, not in an approved arrangement or a first point of entry, and not in a Commonwealth place.

In the calendar year to October 2021, the department received 1,664 reports of potential post-biosecurity detections. Of these, 600 have been confirmed as requiring actions to manage biosecurity risk, with a further 80 cases still open. Each report must be assessed to determine whether the referral is actionable. This may involve phone calls or emails to advise that the reported issue is not a biosecurity concern. This may, however, also extend to visits to the premises, sample collection and diagnostics, referring the case to state or territory agencies, and numerous other actions to ensure any biosecurity risk is managed.

Figure 16 Government biosecurity risk management across the continuum



Source: Modified from a diagram in Inspector-General of Biosecurity 2019, *Pest and disease interceptions and incursions in Australia*

The department's post-biosecurity khapra beetle responses have included managing infested goods within the importer's premises, tracing goods sold at retail level, and recovering the packaging potentially infested with khapra beetle. The review was informed that many of these activities are being undertaken with the voluntary compliance of the companies and individuals involved, with biosecurity enforcement officers being deployed where voluntary compliance is not forthcoming. States and territories are advised of these incidents and undertake activities on an incident-by-incident basis. Post-biosecurity responses are generally undertaken outside of formal Commonwealth and state and territory response arrangements.

The department's operational posture in undertaking post-biosecurity activities is best described as 'protecting Australia's biosecurity first and foremost and worrying about the rest later'. This review does not seek to dissuade this type of responsiveness, as the need to control the movement of goods within fast-moving supply chains can be critical to effectively prevent an incursion of a pest or disease. The *Biosecurity Act 2015* gives the department several powers to support these types of activities, including enabling, in certain circumstances, goods to be brought back under biosecurity control and issuing biosecurity control notices to require persons to take certain actions or not do certain things, depending on how the biosecurity risk needs to be managed.

Given that these powers are being exercised outside of the at-border environment, additional care is essential, involving biosecurity officers with a detailed understanding of their legal powers, including regarding the issuing of biosecurity control notices that may shut down a business from trading for a significant period.

The Inspector-General was also informed that, operationally, each larger incident has involved 'reinventing the wheel' in terms of governance, use of powers and the nature of response activities. Operational staff commented that roles and responsibilities were not well defined and there is no 'manual' to support consistent operational responses. However, it was also noted that due to the number of recent post-biosecurity khapra beetle incidents, officers have developed a better understanding of their roles and responsibilities. There is still no training on response and there are still no activity checklists, decision-support materials or clear governance arrangements. The Inspector-General notes that the department has recently established a working group to improve responses to pests of significance, and will be interested to monitor its impact.

While post-biosecurity activities are an important extension of the department's border activities, they operate in a 'grey area' between the department's border responsibilities, and the post-border biosecurity responsibilities of the states and territories. The absence of appropriate training and guidance materials makes it an area of vulnerability for biosecurity officers and the department.

The issue of Commonwealth and state and territory responsibilities was discussed in the recent Inspector-General review of the *Ruby Princess* incident (IGB 2021b), with reference to the recommendation of the Special Commission of Inquiry into the Ruby Princess, which recommended:

> *That Human Biosecurity Officers, DAWE [Agriculture], the Commonwealth Department of Health and NSW Health develop:*
>
> a. *better awareness of their own and each other's roles and responsibilities for human biosecurity; and*
>
> b. *more formal protocols for their interaction and communication. This includes, but is not limited to, the grant of pratique.*

The issue of the Ruby Princess was still current at the time of formation of the KBWG in July 2020, and the issue of Commonwealth and state and territory responsibilities was canvassed:

… there is a grey area between border interception and tracing to locations (Cwth) verses incursion or outbreak (State) but that we work with the states to agree roles e.g. for surveillance, monitoring, treatments in that grey area.

The department is developing a near border incursion response framework to assist in clarifying responsibilities of the Commonwealth relative to those of the states and territories. The framework includes consideration of response and surveillance activities at first points of entry, approved arrangement sites, and Commonwealth places, with the aim of applying a principle-based decision-making framework in response to post-border incursions.

The department's approach of drawing on already fully deployed biosecurity inspection resources to undertake post-biosecurity response activities, as well as other activities such as compliance testing and verification, can negatively impact the efficiency of normal fee-for-service border inspection activities. Without the availability of a significant number of frontline biosecurity officers, resulting from a massive decline in international passenger movements, such a major post-biosecurity response as mounted for khapra beetle may not have been practical. Consideration should be given to the establishment of dedicated operational response teams with the requisite skills and experience, in particular advanced knowledge of legislative powers. The Inspector-General suggests that when not deployed on response activity work these staff, rather than being aligned to the inspectorate, be part of the control testing team to boost targeted verification of biosecurity controls and the active testing of vulnerabilities.

Finding: The department's recent experiences with 'grey area' operational activities have shown that they work well until they do not. The department has for many years undertaken activities in the interest of quarantine/biosecurity which push the boundaries of the department's responsibilities, for example responding to public calls relating to wood borer in products several years after import or calling upon retail consumers who purchased goods from a consignment where the carboard packaging from other goods in that consignment were known to be contaminated with khapra beetle. These activities need to occur; the issue is the need for clarity and consistency on whose role and whose responsibility it is to carry out these activities.

Recommendation 10

That the department clarify the scope of its post-biosecurity activities as it relates to preventative biosecurity functions.

Recommendation 11

That the department develop clear materials regarding post-biosecurity functions that articulate governance arrangements, roles and responsibilities, and include operational support materials for frontline officers undertaking post-biosecurity activities.

Verification

Verification of the accuracy of declarations and documentation is an important control regardless of the specific biosecurity risk being mitigated. Without robust verification arrangements focusing on both inadvertent and deliberate noncompliance, biosecurity controls could be significantly compromised. For example, to achieve the outcomes of the khapra beetle 'urgent actions', the origin of the shipment and the goods, the commodity and the destination location (postcode) in Australia must be reported correctly. It is also necessary that the treatment certificates, among other documentation, are legitimate and that the container and/or goods have had the right treatment applied.

Import documentation assessment verification

An import documentation assessment verification was undertaken to determine if the new Phase 6Ai measures on 12 April 2021 had been effectively implemented. This verification activity involved AIMS entries lodged under the relevant profiles for all countries and included automatic entry processing (AEP) verification directions. At the time of writing, the results of the verification activity were being assessed.

Cargo Compliance Verification

Cargo Compliance Verification (CCV) is an assurance program for full import declarations (FID) of FCL or full container consolidated (FCX) containerised sea cargo. It is designed to verify that the department's biosecurity controls are operating effectively on consignments that either are not normally referred to the department or are referred but released from biosecurity control after the assessment of documentation only (see Figure 14).

The assurance activity is conducted through a survey of randomly selected consignments by an automated process. A minimum of one container is unpacked, seals intact, to verify that the commodity and non-commodity aspects of the consignment match the information provided for the various controls. These controls include:

- the tariff used to categorise the goods
- responses to community protection (CP) profile questions
- non-commodity documentation used to answer the general declaration questions, i.e. packing and cleanliness declarations
- commodity documentation, i.e. commercial invoices, manufacturer's declarations and treatment certificates
- import conditions (DAWE 2020g).

A typical inspection encompasses biosecurity officers looking for biosecurity risk

material, which is contamination with soil, animal or plant material. Biosecurity officers also check the compliance of accompanying documentation. Inspections typically include the imported goods, packing material, and cleanliness of the internal and external surfaces of the container. The action taken by the biosecurity officer will depend on the level of biosecurity risk identified. The issue may be resolved on site, or the consignment may be redirected to an approved arrangement site for investigation or treatment (IGB 2020a).

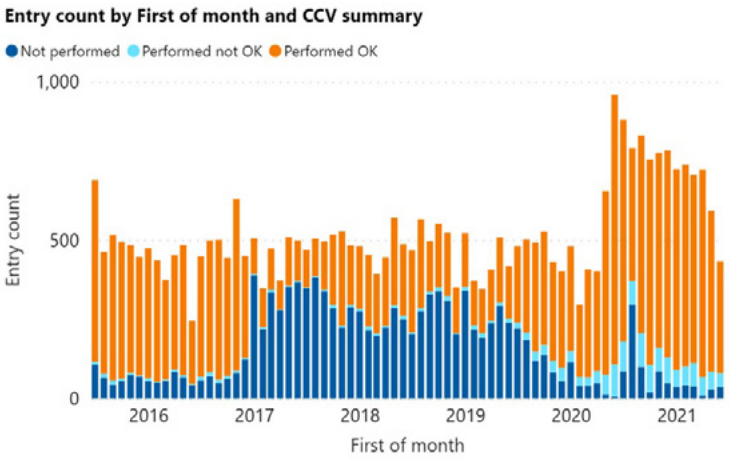
Previous Inspector-General reports have been critical of inspection reductions in the CCV program (IGB 2020b). The number of inspections dropped significantly because of the white spot syndrome virus incident in imported frozen prawns in 2017 and the 2018–19 BMSB season. While the number of 'not performed' inspections reduced in late 2019 and early 2020, this was accompanied by an overall reduction in the total number of inspections tasked (see Figure 17). There are several reasons for a CCV to be 'not performed', the most common being a lack of inspection resources. Other reasons include the delivery address being outside the service zone of the metro area, work health and safety concerns in relation to the commodity, and issues identified at the inspection.

There was an increase in CCV selections and inspections in May 2020 due to extra resources becoming available because of COVID-19 travel restrictions. Almost 8,000 consignments were inspected for CCV in 2020–21. This is the highest number for the combined CCV program and the previous Import Clearance Effectiveness program, which commenced in 2005. This level of effort was maintained until June 2021, when CCV inspections were again reduced due to the demands of fee-for-service cargo clearance workloads and COVID-19 lockdowns (see Figure 17).

The department has been able to make significant progress with a number of actions in relation to khapra beetle through application of additional resources to relevant areas that would have been very difficult prior to the COVID-19 pandemic. As Australia begins to reopen to significant international air travel, and potentially cruise shipping, the intense internal competition for appropriately skilled frontline staff will return. Additionally the coalescence of a major grain harvest and export season, the Christmas shopping peak in demand for imported goods, and demands on management and staff to implement urgent biosecurity reforms funded in the most recent Budget will challenge the department's ability to apply sufficient focused resources to mitigating the immediate khapra beetle risk.

Figure 17 CCV inspections completed with outcome, 2016–2021

2015-16 to 2020-21



Source: Khapra beetle CCV survey

A special khapra beetle CCV survey was conducted during September and October 2020. The KBWG identified the CCV process as a potential tool to capture information on the levels of container contamination. Brisbane and Perth were selected as survey locations due to the container volumes and industry logistics through these ports.

The survey required biosecurity officers to complete additional sample collection processes towards the end of the CCV inspection. In addition to conducting a visual inspection of the empty container for cleanliness, the officers were required to instruct industry staff to vacuum the container floor and crevices, using a vacuum cleaner supplied by the department. The container sweepings were collected, visually assessed on site for any immediate concerns, then delivered to the Brisbane and Perth based Operational Science and Surveillance teams for further assessment and possible diagnostics. During this survey a total of 277 consignments were inspected: 211 in Brisbane and 66 in Perth.

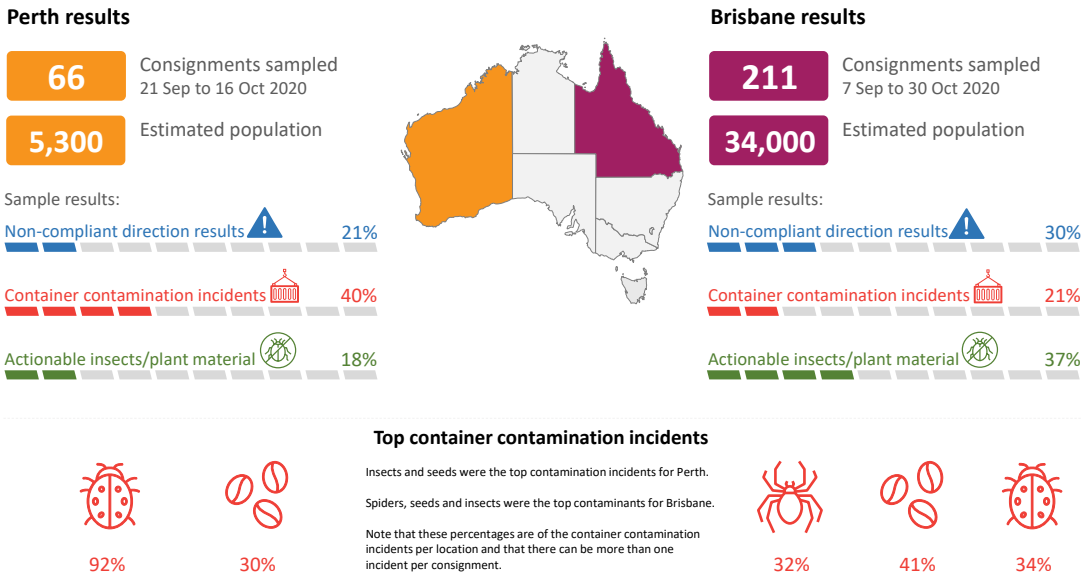
There were 63 entries in Brisbane and 14 in Perth with noncompliant direction results on the CCV Sea Cargo Survey direction in AIMS. Table 8 shows the results in the context of the sample and the results extrapolated to the estimated container population.

Table 8 Survey and estimated total population for entries with noncompliance CCV direction results

Location	Survey size	Number of fails	Fail rate	Lower limit @95% confidence	Upper limit @95% confidence	Estimate of total container population	Estimate of total container failures	Estimate of population, lower limit	Estimate of population, upper limit
Brisbane	211	63	30%	24%	37%	34,000	10,000	8,100	12,000
Perth	66	14	21%	12%	33%	5,300	1,100	640	1,800

Brisbane had a noncompliance rate of 30%. Applying these rates to the population for Brisbane of 34,000 FCL or FCX FIDs, an estimated 10,000 containers would have been noncompliant. Perth had a noncompliance rate of 21%. The point estimate for noncompliant FCL or FCX FIDs in the population is 1,100. The level of contamination and actionable plant and insect material identified through the survey is concerning, as the inspected containers had declarations stating that the container was clean and free of any contaminants (Figure 18). There were 3 entries in Brisbane that involved the detection of *Trogoderma* genus; none were identified to species level as khapra beetle.

Figure 18 Summary of CCV khapra beetle survey activity



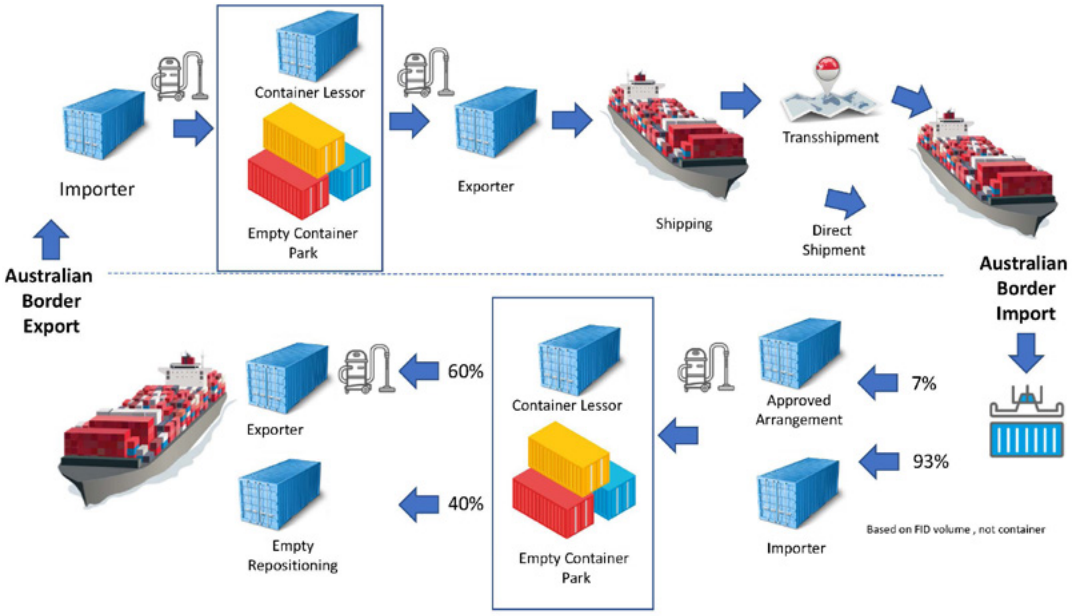
One possible reason contributing to this high level of contamination detection was the use of vacuum cleaners in place of brooms. Officers undertaking the collection of samples also noted that the containers appeared dirtier than usual, and it was suggested that this may have been a result of a breakdown in biosecurity protocols in overseas ports due to COVID-19 and the worldwide shortage of high-quality shipping containers.

Between July 2017 and June 2021 container cleanliness noncompliance (excluding khapra beetle CCV trial data) identified through CCV inspections where a broom was used had a monthly range between 1.0% and 7.3% (with a median of 3.8%). This compares to 40% in Brisbane and 21% in Perth during the khapra beetle CCV trial when a vacuum cleaner was used. Unlike a broom, a vacuum cleaner removes contaminants from the cracks and crevices of the container floor and structure. Khapra beetle are known to inhabit these areas; therefore, changing the method of cleaning will contribute to a reduction in the residual biosecurity risk material in containers. The vacuum cleaning method could be applied at different points along the logistics chain to help reduce (though not eliminate) the khapra beetle risk as shown in Figure 19.

Finding: Preventing biosecurity risk material entering Australia involves a series of control points, each designed to reduce the overall likelihood of entry of biosecurity pests. While not within the scope of this review, there are also control points associated with the export of agricultural products. Vacuuming the container rather than using a broom removes more contaminants; therefore the department should mandate this at various control points, such as approved arrangements and for export commodities. This potentially offers a relatively inexpensive and easily implementable requirement to improve general container cleanliness. Australia could also advocate for incorporating the vacuum cleaning method into standard international container cleaning protocols.

Finding: As previous Inspector-General reviews have identified, CCV is a critical tool for verifying that the preventative biosecurity system is functioning as intended. There was a spike in CCV activity resulting from the redeployment of staff during COVID-19. This is unlikely to continue as international air travel grows and cargo volumes increase in 2022. It is time for CCV and several other functions, including control testing and post-biosecurity incident response, to cease being 'nice to haves' when there are gaps in fee-for-service clearance inspections. They need to be recognised as separate functions with specialist training needs that are integral to the operation and verification of a well-structured biosecurity system. For CCV, the department's longstanding policy of not charging fees for service for this activity, as arguably permitted by the Biosecurity Regulation 2016, should be reviewed.

Figure 19 Control points to reduce biosecurity contamination risk through vacuuming



Approach rate trial

In April 2021 the department undertook the Khapra Beetle Approach Rate Trial to assess the rate of sea containers arriving in Australia that are potentially contaminated with khapra beetle, both alive and dead. Containers were sampled through vacuuming (when empty) and data on the container, last country of origin and previous contents was collected. The department is working with the shipping industry to obtain 5 years' worth of container history data for each container. An assessment of container condition and age occurred prior to any sampling activity.

Samples of live and dead insects, including adults, larvae and castings, were collected using the following sampling methods for all containers:

- The container floor was swept (only where gross contamination such as soil, plant matter and seeds were visible).
- This was followed by vacuuming the container crevices, cracks and door seals.

A small random selection of containers had their underfloor area sampled by mounting containers on container stands (or equivalent) and obtaining samples by vacuuming the underside of the container floor (Institute for Applied Ecology 2021).

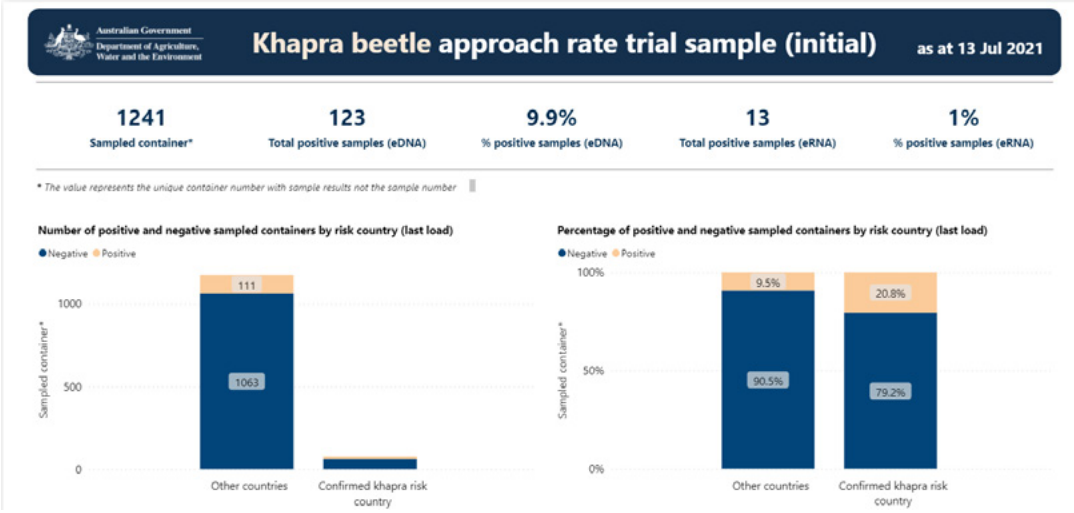
The following diagnostic methods were used:

- eDNA diagnostic technology – eDNA extraction for all samples, targeted for khapra beetle eDNA using validated species-specific assay
- eRNA diagnostic technology for samples found positive by eDNA – a subset of confirmed positive samples were tested using a novel eRNA species-specific assay designed to target khapra beetle.

Both eDNA and eRNA originate from cellular material shed by organisms (via skin and excrement) into the environment that can be sampled and monitored using molecular methods. As RNA degrades rapidly after cell death, it has been proposed that a positive eRNA result may indicate the presence of live or recently living populations.

Based on analysis of 1,241 of the 2,000 surveyed containers, there were positive eDNA results in 9.9% of containers and positive eRNA results in 1%. Containers from confirmed khapra beetle risk countries had double the rate (20.8%) of positive eDNA samples compared with containers from non-khapra-beetle countries (9.5%) (see Figure 20).

Figure 20 Khapra Beetle Approach Rate Trial – summary results

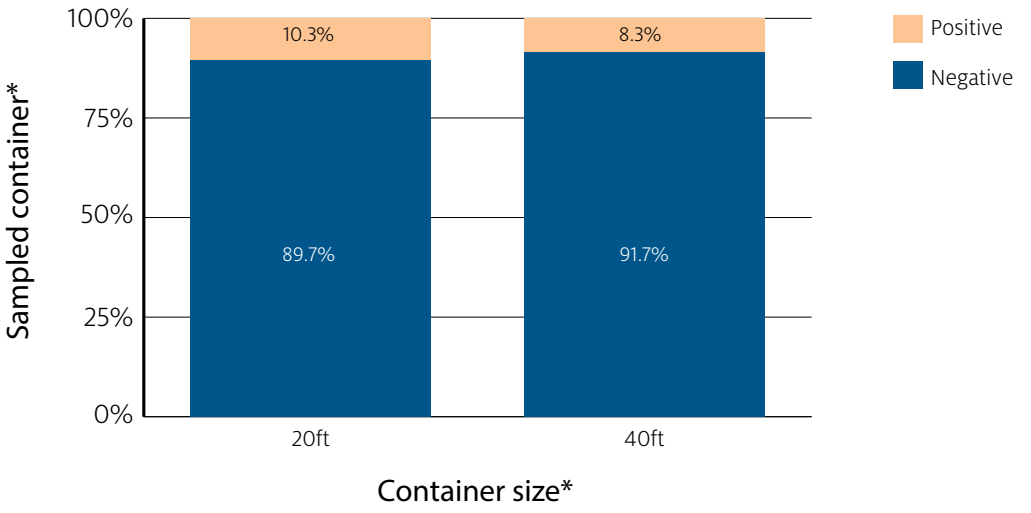


Source: Biosecurity Analytics Centre, Department of Agriculture, Water and the Environment

Factors such as size of container (20 ft or 40 ft), age of container and condition of container had little impact on the rate of positive samples (see Figure 21, Figure 22 and Figure 23).

Figure 21 Khapra Beetle Approach Rate Trial – container size

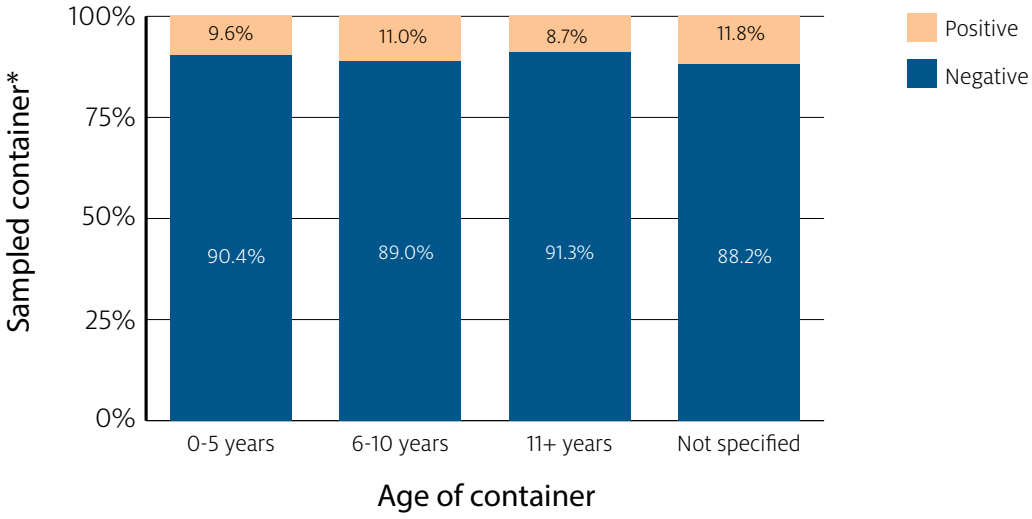
Percentage of positive and negative sampled containers by container size



Source: Biosecurity Analytics Centre, Department of Agriculture, Water and the Environment

Figure 22 Khapra Beetle Approach Rate Trial – age of container

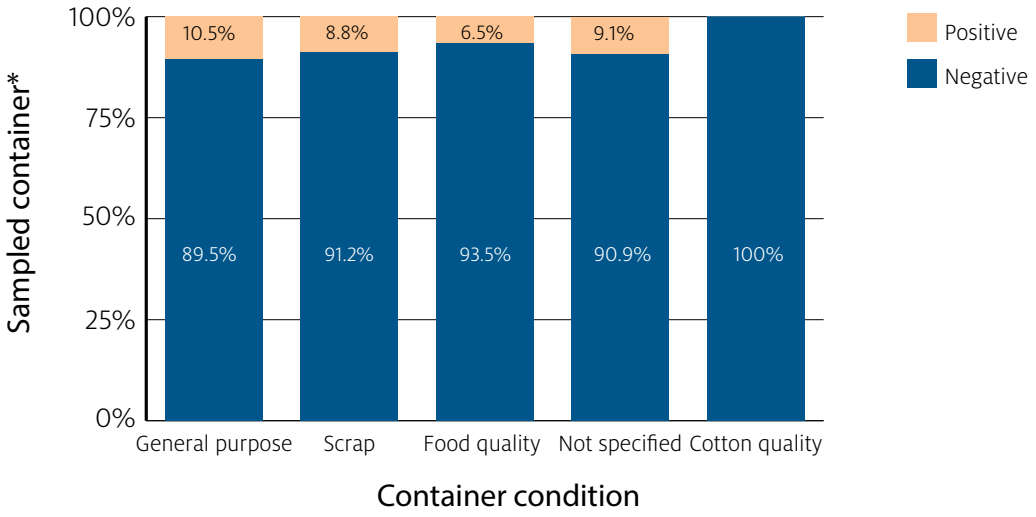
Percentage of positive and negative sampled containers by age container



Source: Biosecurity Analytics Centre, Department of Agriculture, Water and the Environment

Figure 23 Khapra Beetle Approach Rate Trial – type of container

Percentage of positive and negative sampled containers by container condition



Source: Biosecurity Analytics Centre, Department of Agriculture, Water and the Environment

Preliminary results of around 60% of samples analysed (as of 25 August 2021) indicated:

- approximately 1% of imported containers may pose a live khapra beetle risk, with around 10% of containers having evidence of previous khapra beetle presence
- no correlation between imported goods and khapra beetle risk was apparent (based on the limited goods information available)
- load countries for the sampled containers were predominately not khapra beetle risk countries
- around 40% of the positive results for presence of khapra beetle were found in containers from non-risk countries
- container size and container age do not appear to be reliable indicators for khapra beetle risk.

It should be noted that these are preliminary results and there are caveats on the data: the containers sampled are from a single facility and may not fully represent the national profile, and the molecular technology is still undergoing validation (an R&D project).

The container history of the 2,000 sampled containers will provide the department with a substantive set of container history data linked to eDNA and eRNA results. This will enable better analysis of the historical goods/commodity/origin contamination pathway hypothesis. Being able to assess the profiling value of this hypothesis will be important before significant financial, IT and staff resources are invested in accessing all container history.

Research and development

For several measures, R&D projects have been established across multiple areas to 'support implementation' of the khapra beetle measures; it appears that these projects are being relied on as solutions to current problems, despite being in proof of concept or feasibility stages. Much of this R&D sounds promising and involves a range of new

technologies, but the Inspector-General has not been advised of any coordinated oversight or ROI assessment for this work. Certainly there are pockets of oversight, often division based; but how these different projects will serve to create a more robust preventative biosecurity system, or how they integrate into the existing control framework, has not been made evident during the review.

Emerging technologies

The Emerging Technology Program is one set of R&D projects that involve the piloting of new and innovative technologies. The program is aimed at achieving a more seamless border experience across commercial and non-commercial pathways (Table 9). A number of the technologies (RingIR technology and handheld hyperspectral surveillance and inspection tool) have been referred to in the context of the review as potential solutions to address gaps, improve efficiency or provide verification of the khapra beetle measures.

Handheld hyperspectral surveillance and inspection tool

The aim is to develop a hand-held tool that is based on a hyperspectral camera. Hyperspectral cameras produce a multi-layer image (an image cube) of reflectance of wavelengths from the infrared to the UV spectrum that is typical for the particular surface or material being imaged. The project has developed an algorithm that can identify soil, plant and animal material on a pixel-by-pixel basis with very high accuracy (greater than 99%). A surveillance tool incorporating a hyperspectral camera combined with this algorithm could help surveillance officers detect small insects such as ants, termites or khapra beetle in places that are otherwise difficult to inspect, such as cracks, crevices and floor–wall joints, in concrete floors, walls, cupboards and containers.

These are exciting projects and may over time prove suitable for certain types of operational activities. At present, and in the context of the current management of the khapra beetle risk, they are R&D projects, not operational solutions. Most of these technologies have long development times, followed by more time before being operationally ready for a regulatory agency. At best, they are medium to longer term solutions, assuming the technology delivers the required outcomes.

Having an overarching control map that clearly shows current controls and a roadmap to achieve a desired future state, incorporating R&D, would assist in clarifying the department's operational capability and the expected effectiveness of its current risk management measures. It would also support prioritising R&D projects to address operational gaps, more significant resource efficiencies or targeting effectiveness. Formal governance of R&D projects by the Biosecurity Group is recommended, including consideration of ROI and value to the biosecurity control framework, and appropriate stage gates to encourage R&D but prevent non-delivery of 'pet' projects (Figure 24). Currently there is no overarching control map, or control maps for most pathways; there is no roadmap for khapra beetle management measures.

Recommendation 12

That the department review the risk of allowing goods requiring an import permit to be permitted entry through non-commercial pathways, particularly international mail, when a condition of the permit involves at-border inspection.

Figure 24 R&D governance

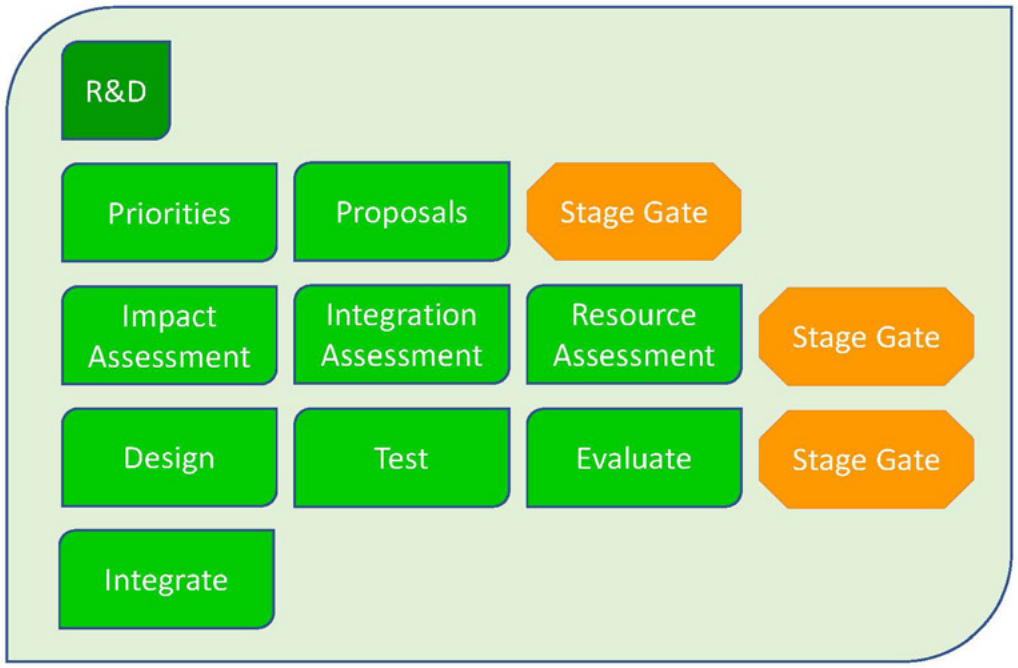


Table 9 Emerging Technology Program

Project	Description	Time frame
Pre-screening of passenger baggage	Multi-stream proof of concept trialling the use of X-ray images and biosecurity algorithms to clear passengers' bags before they have collected them on arrival	2 years
New 3D X-ray (RTT) in mail centres	Installation of 3 additional RTT 110 3D X-ray units into international mail centres	2 years
New 3D X-ray (RTT) in air cargo facility	Trial to test effectiveness and feasibility of 3D X-ray screening in the air cargo pathway	2 years
Biosecurity algorithms, software networking	Biosecurity algorithm research and development program in partnership with the New Zealand Ministry for Primary Industries (NZMPI), Rapiscan Systems and Smiths Detection.	2 years
Low-energy X-ray for seeds – phase 3	Utilisation of low-energy, high-resolution X-ray in combination with computer algorithms to automatically detect the presence of seeds and their packets	1 year
Multispectral thermal imaging	Investigate, build and validate a portable scanner utilising multispectral thermal imaging to detect biosecurity pests in and underneath shipping containers	2 years
Container screening – trellis	Utilisation of high-resolution cameras to detect biosecurity risk material on containers when they are lifted from the vessel to shore	1 year
Handheld hyperspectral surveillance and inspection tool	Development of a hand-held tool (a hyperspectral camera combined with an algorithm) for surveillance and inspection of dark and difficult to reach places and of cracks and crevices	2 years

Project	Description	Time frame
RingIR technology	Trial of real-time vapour detection – field test real-time vapour detection technology while exploring the ability to identify hitchhiking pests through their signature odours	30 June 2022
'The Bug' vehicle inspection	Joint trial with NZMPI to trial a remote-controlled vehicle fitted with cameras that is driven under commodities (vehicles, containers et cetera.) to undertake inspections	6 months

Finding: A good R&D program is important, but it should not be confused with current operational preparedness. In various discussions, R&D projects were considered in the same context as current operational capabilities. The Inspector-General is concerned that the blending of R&D and current operational capabilities has the potential to provide a false perception of the comprehensiveness and likely effectiveness of the department's controls within the preventative biosecurity system.

Finding: The mapping of controls and the understanding of their relative effectiveness is an important input into the department's R&D investment decisions. This understanding will support the department in developing an improvement roadmap from its current state through to its preferred future state.

Biosecurity ICT systems

Biosecurity integrated information systems and analytics

The 2020 Inspector-General review *Adequacy of department's operational model to effectively mitigate biosecurity risks in evolving risk and business environments* (IGB 2021a), noted that:

> *In 2015 the department established the Biosecurity Integrated Information Systems and Analytics (BIISA) program as part of the Agricultural Competitiveness White Paper – Biosecurity Surveillance and Analysis initiative (DAWE, 2015). The aim of BIISA is to:*
>
> - *replace the department's cargo (AIMS) and traveller (mail and passenger system (MAPS)) processing systems*
> - *improve business process efficiency and data quality*
> - *deliver a new application suite that improves the internal approved arrangement assessments and audit activities*
> - *create a single repository of 30 departmental pest and disease lists.*
>
> *These systems are expected to improve the department's collection, collation, storage and analysis of data and information in an integrated manner and therefore support improved biosecurity management and enhanced operational and policy decision-making. The BIISA program is expected to be fully implemented by the third quarter of 2021.*

The BIISA program accounted for almost 25% ($48.6 million) of the $200 million in funding provided as part of the 2015 Agricultural Competitiveness White Paper (IGB 2019c). The capabilities intended to be delivered by the BIISA are relevant to the operational implementation of the khapra beetle measures. The Inspector-General was advised that the Biosecurity Integrated Information Systems (BIIS) program (the 'Analytics' component having been separated following the establishment of the Biosecurity Analytic Centre) has:

- delivered systems that manage the department's approved arrangement data and entity data (approved arrangements and fit and proper person)
- created the single repository for pest, disease and weed data (Pest and Disease Repository). This repository is integrated with other BIIS workflow tools (Threat and Risk Management; Biosecurity Assessment Recording System), facilitating greater efficiencies for existing business processes and ensuring there is active data curation and management.

The department advised that these applications will be delivered and fully embedded in the business areas by 30 June 2022.

The Inspector-General noted that the main system developments, involving the replacement of AIMS and the Mail and Passenger System (MAPS), have not been delivered through this program of work. This is important as AIMS is the primary biosecurity management system for cargo; it provides for the biosecurity management of imported goods and non-commodity items. AIMS is used to:

- record the department's decisions in relation to imported consignments
- communicate required actions and decisions to industry
- manage biosecurity and food safety risks associated with imported cargo
- track and record imported consignments
- assign departmental fees and collect revenue on imported cargo.

Similarly, MAPS is the system used by the department for reporting purposes and recording noncompliance information in the airports, international mail, seaports, and the detector dog program.

The Inspector-General was advised that the Import Management System, which now incorporates the AIMS and MAPS replacements from the BIIS project, has delivered the replacement of the SAC module for certain clients, which forms the foundation for the expansion to FIDs, or broadly interpreted commercial cargo. The next stage of development of this information management capability is subject to approval and allocation of capital expenditure funding. It will involve expanded functionality to replace AIMS, which will improve data quality and business processes to contribute to better analytics and decision-making.

S-Cargo and SeaPest

Whereas AIMS is used to manage the clearance of biosecurity risk goods, the department's S-Cargo system receives details about containers matching biosecurity risk profiles. These containers are held at the port of entry unless treated by an approved treatment provider before import into Australia. Khapra beetle measures 6Ai and 6Aii were designed to address container risk; for the first time, mandatory offshore treatment is required.

The Inspector-General's report *Pest and disease interceptions and incursions in Australia* noted that since 2015 the department has been trying to upgrade the S-Cargo system to better manage sea container risks. Increasing demands to manage emerging pests such as BMSB has prevented the S-Cargo system from being upgraded (IGB 2019c). The Inspector-General concluded in that review that the net result is that risk profiling and management of the external and internal biosecurity risks of sea containers is inefficient and inadequate.

The SeaPest system was developed for BMSB to manage 'less than container load' (LCL) and 'freight all kinds' (FAK) consignments at the container level. This was required as AIMS manages imports based on import declarations, and S-Cargo manages full and

empty containers originating from Country Action List or other specified ports. The SeaPest system uses the S-Cargo interface with the ICS but will be replaced as part of recent budget measures due to capacity issues. The SeaPest system will be used for the management of LCL/FAK containers from khapra beetle countries, which were not covered under phase 6Ai or 6Aii due to ICT system limitations. Where further action is required to manage risk, such as treatment, manual entries are created in AIMS to direct containers plus consignments for management action.

System impacts on operational data collection

The Inspector-General was advised on several occasions that data for at-border verification was being recorded in Excel spreadsheets by individual business areas in the absence of appropriate shared systems – a concern expressed for numerous khapra beetle related projects. There was no effective oversight of who was collecting khapra beetle related data, the data being collected, or how it was to be integrated with the department's primary data holdings to allow for future use.

Operational Science and Surveillance teams advised that they did not have a shared system to record details of incidents and/or that some existing systems did not allow for recording of some of the data gathered during khapra beetle activities. For example, the diagnostic data collected during khapra beetle activities was placed into spreadsheets created and then adapted with some modification for the later at-border activities. This was reported as leading to some inconsistencies in how the data was entered and recorded that made the data harder to analyse. Another example provided to the Inspector-General was that there is no immediate mechanism for linking samples to parent cases in the incidents system. The high volume of samples has led to over-representation of khapra beetle incidents and downstream reporting issues.

The Inspector-General was advised that work has commenced to select and implement an incident management system and to develop a laboratory information management system (LIMS) and a specimen surveillance information management system (SIMS). It was stated that delivery of these systems will be a significant step forward in providing key data and systems required by operational science functions. The review notes that the department received funding in the mid-2010s to deliver new LIMS and SIMS capabilities, which were, as with other system developments, only partially delivered.

Finding: The inadequacies and fragmentation of the department's biosecurity ICT systems have been commented on in several Inspector-General reports over the years (IIGB 2012; IIGB 2016; IGB 2018a; IGB 2018b; IGB 2019c). Funding has been provided through specific budget measures and from internal funds on several occasions in recent years to modernise these systems. Assurances were provided in response to Inspector-General recommendations that new systems would address the identified weaknesses. However, deliverables have fallen well short of those planned, resulting in ongoing operational inefficiencies that impact the effectiveness of the preventative biosecurity system, including the department's agility in mitigating khapra beetle risks.

CEBRA key performance indicators study

The department has commissioned CEBRA to develop a performance framework for measures against hitchhiker pests in containers. This project will:

- analyse the effectiveness of certain measures against the carriage of khapra beetle by sea containers
- develop a structural model and performance indicators for the management of the biosecurity risk of the sea container pathway more generally.

The intended outcome will be to measure the effectiveness of the department's controls against khapra beetle and hitchhikers more generally on the sea container pathway, and to verify that the most appropriate controls are used. This project will provide assurance that the biosecurity risk of khapra beetle and hitchhikers is managed appropriately or recommend improvements. The twofold objective is:

- to enable the department to report against and assess the effectiveness of proposed measures against the incursion risk of khapra beetle on the sea container pathway
- to report against and assess its risk management practices (border and pre-border) in the sea container pathway in general.

The Inspector-General supports the department's commissioning of this work, which will not be completed in time for consideration by this review.

Implementation time frames

The effective implementation time frame has been approximately 2 years for recent examples of departmental responses to changed plant pest risks or changes in risk policies, such as for BMSB and cut flowers and now khapra beetle. Over this 2-year period, responses have involved the progressive implementation of measures. For BMSB and cut flowers, this included continuation or heightening of border measures while offshore measures were implemented, including offshore treatment arrangements.

Heightened onshore measures could have been applied in a timely way, specifically treatment of containers from high-risk khapra beetle countries, containers carrying high-risk khapra goods from high-risk khapra beetle countries, and containers going to rural areas. Based on the preliminary risk assessments available to the department in July 2020, heightened border measures would have been an appropriate interim measure while offshore arrangements were developed and implemented.

Recommendation 13

That the Biosecurity Group develop more robust methods for determining prioritisation of responses when dealing with changed risk profiles. Priorities should be based on managing the greatest biosecurity risk – moving away from the popular public sector concept of 'quick wins', which are rarely such and, in relation to the management of biosecurity risk, often delay implementation of the most needed measures.

International initiatives

Sea Container Task Force

The IPPC has established a special Sea Container Task Force to investigate hitchhiker and contamination issues (DAWE 2021a). The task force is working on implementing the complementary action plan developed by the Commission on Phytosanitary Measures and other complementary actions to minimise the phytosanitary risks associated with the movement of sea containers in the global supply chain. The Quad Sea Container Working Group (Australia, New Zealand, Canada and the United States) is working on identifying collaborative opportunities for jointly managing containers destined for Quad countries.

Other initiatives include the International Maritime Organization Code of Practice for Packing of Cargo Transport Units; the World Shipping Council Joint Industry Guidelines for Cleaning of Containers; and the North American Sea Container Initiative. New container design should be considered, including containers without installed floors for potential inclusion in the code of practice.

The Cargo Transport Units (CTU) Code is a non-mandatory global code of practice for the handling and packing of cargo transport units, including shipping containers, for transportation by land and sea. The code is designed to promote best practice and assist all actors involved in the global supply chain. Greater awareness and adherence to the CTU Code would help to minimise the phytosanitary risks associated with international trade.

These international activities may complement and support the department's suite of khapra beetle measures, both current and planned. However, the time frames for acceptance and implementation of these measures will be long and the comprehensiveness of their implementation cannot be relied upon to address the risk of khapra beetle to Australia. This will be particularly so for the next few years, when major disruptions to international container-based trade, and both shortages of good-quality containers and escalated costs for containers, will make it extremely difficult to reach agreement on biosecurity-based measures that carry additional costs.

Appendix A
Agency Response

Australian Government
Department of Agriculture, Water and the Environment

ANDREW METCALFE AO
SECRETARY

21 January 2022

Mr Rob Delane
Inspector-General of Biosecurity
c/o Department of Agriculture, Water and the Environment
GPO Box 858
CANBERRA ACT 2601

Dear Mr ~~Delane~~ Rob,

Thank you for your correspondence of 22 December 2021 providing your review report, *Robustness of biosecurity measures to prevent entry of khapra beetle into Australia*, inviting formal management comments on the review findings.

I appreciate your insights and remarks on the adequacy of the department's preventative border measures to manage the risk of khapra beetle entering Australia. Whilst the department notes that your report assesses many measures as functioning optimally, we agree that further work to improve detection capability and regulatory maturity is required to address future risks presented by khapra beetle and other hitchhiker pests.

The department's formal management response to the recommendations in your report is at Attachment A. I note your recommendations largely accord with reform work already underway to enable the department's committed biosecurity workforce to deliver our biosecurity risk management functions with greater effectiveness, consistency, reliability and efficiency. Your recommendations relating to the department's khapra beetle activities will serve us well as we scope a new program of work associated with khapra beetle, within the broader context of 'hitchhiker pest' risks.

I agree with all thirteen recommendations contained in your review.

The department also assessed the report for prejudicial information and identified material that should not be made publicly available because it may be the subject of legal professional privilege. Details of this information are included in Attachment B, and we request its removal from the published report.

Best wishes

Andrew Metcalfe AO
Director of Biosecurity

Attachment A
Department of Agriculture, Water and the Environment – Agency response to the IGB report: *Robustness of biosecurity measures to prevent entry of khapra beetle into Australia.*

Attachment B
Identified information in this draft report that is considered prejudicial to the public interest and should not be made publicly available.

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Attachment A: Department of Agriculture, Water and the Environment – Agency response to the IGB report: *Robustness of biosecurity measures to prevent entry of khapra beetle into Australia.*

Recommendation 1 - agreed

That the department improve its level of regulatory agility, encompassing risk inputs and legal risk tolerances, in responding to changed pest and disease risks. The department should ensure that the elements necessary to support agile legislation-based system-level decision-making are codified according to the responsibilities of the relevant areas of the department, with an expectation of response time frames of days or weeks, not months or years.

The department will work to establish a schedule for amendments to the Goods Determination at regular intervals and will regularly review the need for legislation amendments to the Act, regulations and other legislative instruments.

The department's capability to respond will be supported by the development and implementation of a refreshed Biosecurity Risk Management Framework, which will improve the ability of all biosecurity officers to make evidence-based decisions in the context of risks presented. The Biosecurity and Compliance Board will be responsible for agreeing this framework and have overall accountability for its effective implementation, supported by its Risk, Compliance and Assurance Subcommittee.

Work is currently underway on developing an agile decision-making determination to give effect to the amendments to the Biosecurity Act 2015 made by the Agriculture Legislation Amendment (Streamlining Administration) Act 2021.

Recommendation 2 – agreed

Given the centrality of the Goods Determination and the Biosecurity Import Conditions system (BICON) to the operation of the preventative biosecurity system, that the department develop clear policy on the interrelationship between the two. The department should also review BICON to ensure that, where necessary, requirements have an appropriate legislative foundation.

The department has commenced a program of work to review BICON case content to ensure it is appropriately supported by biosecurity legislation and a risk assessment. Where appropriate, consideration will be given to amendments to the relevant biosecurity legislation and BICON.

The department will develop policy that clarifies the relationship between the Goods Determination and BICON.

Recommendation 3 – agreed in principle

That the department prioritise system-level regulatory approaches over transactional approaches to the management of pest risks.

In 2021, the department published the Commonwealth Biosecurity 2030 strategic roadmap which commits to strategic actions that will strengthen regulatory interventions as biosecurity risks move across the globe and arrive at the Australian border.

1

The refreshed Biosecurity Risk Management Framework, noted in response to Recommendation 1, will further contribute to the department's system-wide regulatory capability.

Since this review was completed, the Biosecurity (Conditionally Non prohibited Goods) Amendment (Khapra Beetle) Determination 2021 has been registered (17 December 2021) and associated lists published on the department's website. This is supported by a biosecurity risk assessment.

The department notes that both systemic and transactional regulatory approaches are necessary for appropriate management of pest and disease risks, including those that evolve rapidly. The Goods Determination provides clarity on the conditions of entry into Australian territory and there are mechanisms to deal with contraventions of those conditions under the Biosecurity Act 2015, however goods which still have an unacceptable level of biosecurity risk upon entry into Australia, need to be managed transactionally by biosecurity officers using Chapter 3 management powers (Division 5, Part 1 of Chapter 3 of the Biosecurity Act 2015).

Recommendation 4 – agreed

That the department develop a hitchhiker pest framework within the Goods Determination that supports flexible and agile system-level responses to current and future hitchhiker pest risks.

The department is committed to developing a hitchhiker risk and control framework. This effort is being support by Budget 2021-22 funding of $96.9 million over 4 years towards building a stronger biosecurity system to protect Australia from hitchhiker pests in sea containers and associated cargoes. This framework will introduce heightened measures for managing hitchhiker pest risk on high-risk sea container pathways and reduce or streamline measures for compliant sea container pathways. Where required, the department will ensure these measures are regulated through appropriate supporting legislation, including the Goods Determination.

Recommendation 5 – agreed

That the department update its risk analysis production approach to ensure that assessments are timely and provide the necessary coverage of operational considerations, such as import pathways and hitchhiker potential, to support agile regulation-based responses under the Biosecurity Act.

The department will be improving its risk analysis production approach through development of a refreshed Biosecurity Risk Management Framework, as noted in the response to Recommendation 1.

It has also been refining a rapid risk assessment template to support timely assessments of risk and to support regulation-based responses under the Biosecurity Act 2015.

To ensure timely and fit-for-purpose legislative amendments occur, the department will prioritise legislative amendments based on risk analysis, and in alignment with strategic priorities as referenced in Recommendation 13. Expanded risk assessment products referenced in Recommendation 7 will be used to deliver consistent outcomes.

The department is also developing new open-source intelligence briefs and improving its strategic intelligence reporting capability, which are intended to rapidly detect and report on changes in biosecurity risk.

Recommendation 6 - agreed

That the department consider legislative change to provide for the approval of 'provisional conditions' where there is a suspected new or changed risk profile but where a full risk assessment will take some time to complete. This change should allow for the temporary implementation of measures while the necessary research and analysis is performed to verify the risk status.

The department will further investigate whether the legislation currently enables suitable 'provisional conditions' to be applied where there is a suspected new or changed risk profile, noting that to ensure compliance with international obligations, a full risk assessment and associated requirements to enact conditions may take some time to complete.

Recommendation 7 - agreed

That the department develop risk assessment products that provide for assessments of changing pest and pathway biosecurity risks necessary to support legislation-based and operationally timely preventative biosecurity measures.

The refreshed Biosecurity Risk Management Framework noted in the response to recommendation 1, will create a more systemic approach to managing biosecurity risk and control, through improved risk information and assessment products, decision-making tools and control assurance practices.

All biosecurity risk assessments must be lawful, defensible and meet Australia's international law obligations.

The referenced Risk, Compliance and Assurance Subcommittee will provide ongoing governance across the implementation and effectiveness of the framework, particularly around existing and emerging biosecurity risks.

Recommendation 8 - agreed

That the department apply good-practice program and project management governance and methodologies to the delivery of reform activities.

The department acknowledges the importance of good practice program and project management in complex reform activities, or those with broad scale impact.

The department's Biosecurity and Compliance Board, established in 2021, will continue to have oversight and visibility of progress across this activity. It will be supported by the recently established Portfolio Support function within the Biosecurity Strategy and Reform Division, which is intended to improve the maturity of portfolio, program, project management and design practices, through standard setting, assurance, and support.

Recommendation 9 – agreed

That the department review the risk of allowing goods requiring an import permit to be permitted entry through non-commercial pathways, particularly international mail, when a condition of the permit involves at-border inspection.

The department assesses biosecurity risks of commodities, including entry pathways, as part of its regular import permit, review, assurance and verification activities to determine and apply appropriate risk management measures to achieve the appropriate level of protection for Australia.

3

Recommendation 10 – agreed

That the department clarify the scope of its post-biosecurity activities as it relates to preventative biosecurity functions.

The department is supporting the development of a National Biosecurity Strategy to assist in clarifying the roles and responsibilities of all participants in the biosecurity regulatory system. The department is also working on a near-border incursion response framework, in collaboration with the states and territories, to clarify roles and responsibilities of the Commonwealth and state and territory agencies. This complements the existing Intergovernmental Agreement on Biosecurity and national emergency pest and disease eradication response agreements.

The department has refreshed its incident management framework to clarify post-biosecurity detection roles and responsibilities, enhanced its operational response capacity and capability, and is undertaking a formal exercise program to test and further refine its current post-biosecurity response arrangements (working with key government and industry partners).

Recommendation 11 – agreed

That the department develop clear materials regarding post biosecurity functions that articulate governance arrangements, roles and responsibilities, and include operational support materials for frontline officers undertaking post-biosecurity activities.

Detailed decision support materials for post-biosecurity functions, in the form of Work Instructions and Guidelines, are being updated to support activities identified in response to Recommendation 10.

Training and response exercises are planned to improve awareness and understanding of the department's incident management structures for post-biosecurity incidents.

Recommendation 12 – agreed

That the department develop a coherent roadmap for strengthening the preventative biosecurity system for khapra beetle and other hitchhiker pests. This roadmap needs to be underpinned by system and pathway level control maps that identify controls and their relative effectiveness and are used to inform future investment.

The Australian Government has committed $96.9 million over 4 years towards building a stronger biosecurity system to protect Australia from hitchhiker pests in sea containers and associated cargoes. A key project underway is the development of a hitchhiker risk and control framework. This framework will develop and introduce heightened measures for the management of hitchhiker pest risk on high-risk sea container pathways and will reduce, or streamline measures, for compliant sea container pathways. These measures will be articulated within a pathway map that clearly sets out the controls for the management of hitchhiker risks for each entry pathway; and a roadmap to achieve the future state.

The department has also established a national environmental DNA (eDNA) Testing Program, which will improve our ability to detect pest and diseases based on analysis of foreign materials found in consignments and containers, including post-biosecurity.

Recommendation 13 – agreed in principle

That the Biosecurity Group develop more robust methods for determining prioritisation of responses when dealing with changed risk profiles. Priorities should be based on managing the greatest biosecurity risk – moving away from the popular public sector concept of 'quick wins', which are rarely such and, in relation to the management of biosecurity risk, often delay implementation of the most needed measures.

The department notes that biosecurity risk exists across multiple pathways and where opportunity exists to implement effective measures quickly, in parallel with broader pathway management, it will take the opportunity to work on multiple response activities.

It should also be noted that, in developing responses for khapra beetle, the department has been exploring a number of innovative technologies and data analytics approaches with the potential to provide better biosecurity outcomes, while also reducing impacts on industry and supply chains.

The department recently implemented digital systems such as Change in Biosecurity Risk and the Pest and Disease Repository, which continue to be expanded to assist with assessment and prioritisation of responses when dealing with changed risk profiles.

Commonwealth Biosecurity 2030, the refreshed Biosecurity Risk Management Framework and the Investment Prioritisation Subcommittee of the Biosecurity and Compliance Board, together with commissioning of an Investment Prioritisation Framework, will further assist in determining actions and investments that provide the most value in terms of alignment with strategic priorities and management of biosecurity risk.

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Appendix B

Comparison of Goods Determination and BICON requirements for khapra beetle products and cut flowers

Khapra beetle products	Cut flowers
Goods Determination	**Goods Determination**
28 Alternative conditions – cereals, grains, legumes, pulses and oil seeds for human consumption: Any of the following: (a) grain; (b) cereals; (c) legumes and pulses, other than peanuts; (d) oil seeds	**29 Alternative conditions** – fresh cut flowers and foliage for decorative purposes: Fresh cut flowers and foliage other than for personal use
Alternative conditions: The goods have been processed to the extent needed to manage biosecurity risks associated with the goods to an acceptable level.	All of the following: (a) the goods are listed fresh cut flowers or foliage; (b) the goods are of a species that: (i) were produced in accordance with a systems approach in a country listed for that species and that systems approach in the List of Species of Fresh Cut Flowers and Foliage with Alternative Conditions for Import; or (ii) have been treated with methyl-bromide in a country listed for that species and that treatment in the List referred to in subparagraph (i); or (iii) have been treated with an alternative treatment in a country listed for that species and that treatment in the List referred to in subparagraph (i); (c) if the goods are of a species for which devitalisation treatment is listed in the List referred to in subparagraph (b)(i) – the listed devitalisation treatment has been applied to the goods; (d) the goods are free from pests; (e) the goods are packaged in pest-proof cartons or containers; (f) the goods are accompanied by a phytosanitary certificate stating: (i) the botanical name (including genus and species) of the goods; and (ii) the matters specified in paragraphs (a) to (e)

Khapra beetle products	Cut flowers
BICON cases	**BICON cases**
Non-retorted rice – *Oryza* spp. (of any species or variety) – Non-viable rice (sufficiently milled e.g. germ removed) – Goods arriving as full container load sea freight – Exported from a khapra beetle target risk country.	More than 6 small boxes, bouquets or equivalent of cut flowers and foliage – Non-propagatable species other than listed – Pre-shipment methyl bromide fumigation.
Requirements: The biosecurity import conditions and assessment outcomes of this BICON case are provided on the basis of full compliance with the import conditions as outlined in the BICON Case 'Khapra beetle sea container measures'. Failure to comply with the sea container requirements is deemed an unacceptable biosecurity risk, and the sea container will be directed for export. These conditions apply to all rice varieties of the genus *Oryza* spp. that have been sufficiently milled to render the grain incapable of germination (i.e. the germ and seed coat has been removed). The plants or plant products must be inspected or tested by the national plant protection organisation (NPPO) according to appropriate procedures and be considered free from Khapra beetle and other biosecurity pests. To demonstrate compliance withw this requirement you must present the following on a Phytosanitary certificate: The additional declaration 'The plant product(s) were inspected and found free from Khapra beetle *(Trogoderma granarium)'.* If the phytosanitary certificate is issued after dispatch the date of inspection must be identified as an additional declaration. Related Information: Website: Khapra beetle (Trogoderma granarium) information Rice must be free of paddy grains, live insects, soil, disease symptoms, contaminant seed, other plant material (e.g. leaf, stem material, fruit pulp, pod material, etc.), animal material (e.g. animal faeces, feathers, etc.) and any other extraneous contamination of quarantine concern. Contamination with other seeds and soil must not exceed the tolerances, as listed in the Department standards for seed contaminants and tolerances. If rice is packed in bags these must be clean and new and imported for human consumption only. It must not be used directly for stock feed, sown or used for agricultural purposes.	Requirements: These import conditions apply to species and plant parts listed on the non propagatable cut flowers and foliage species list. A Department of Agriculture, Water and the Environment import permit is not required. The flowers and/or foliage must be identified by their botanical name (including genus and species). To demonstrate compliance with this requirement you must present the following on a Phytosanitary certificate: The full botanical name (including genus and species or genus level). An original phytosanitary certificate must accompany the goods. Cut flowers and foliage must be free of pests. To demonstrate compliance with this requirement you must present the following on a Phytosanitary certificate: The phytosanitary certificate must include following additional declaration: 'The consignment was fumigated with methyl bromide as per the attached fumigation certificate and was inspected and found free from live quarantine pests'. AND You must present the following on a Methyl bromide fumigation certificate: The methyl bromide fumigation certificate must include evidence that the goods have been fumigated at one of the following rates: [table not included] Each consignment must be secured (i.e. made insect-proof) prior to shipment by one of the following methods: Enclosed cartons. Goods must be packed in fully enclosed cartons that have no ventilation holes and lids tightly fixed to the base. Cartons with covered ventilation holes covered. Ventilation holes must be covered with mesh/ screen with an aperture no greater than 1.6 mm. Alternatively, ventilation holes must be taped over. Polythene liners.

Khapra beetle products	Cut flowers
BICON cases	**BICON cases**
These goods have been determined to pose an unacceptable biosecurity risk for khapra beetle *(Trogoderma granarium)* and must not be imported into Australia from any country as unaccompanied personal effects or baggage carried by international travellers entering via sea or air (including crew) or within mail articles (including items posted using an international postal Express Mail Service). All consignments are subject to on-arrival inspection: During inspection if the presence or absence of the germ and seed coat is unclear, germination testing or moist heat treatment at the importer's expense will be required. **Option 1 – Germination testing** Germination testing must be conducted in accordance with ISTA standards and procedures. If the results from germination testing indicate that the seed is non-viable (i.e. nil germination), the consignment may be released from biosecurity control by a biosecurity officer. If the results indicate that the seed is still viable, the consignment is subject to one of the following mandatory treatments at the approved treatment sites and shall not be removed from these sites without prior approval from the department: Heat treatment at 95°C and 50% relative humidity for 24 hours, or Heat treatment at 85°C and 50% relative humidity for 48 hours. **Option 2 – Moist heat treatment** All consignments must be subjected to mandatory heat treatment on arrival at: 85°C for 48 hours at 50% relative humidity, or 95°C for 24 hours at 50% relative humidity. Notes for moist heat treatment: Prior to moist heat treatment, all bags/packaging must be opened or adequately punctured to allow moist heat penetration. Time measurements for the treatment are to be commenced when all product has reached the specified temperatures. Treatment of the seed must be undertaken within the metropolitan area in the first point of entry at an approved arrangement site (class 4.1). The interstate transfer of untreated seed by road or rail will not be permitted.	Vented cartons with plastic liners or bags must be sealed. Overlapping folded edges of the liner is considered sealed. Meshed or plastic (shrink) wrapped pallets or Unit Load Devices (ULDs). ULDs transporting cartons with open ventilation holes/gaps, or palletised cartons with ventilation holes/gaps must be fully covered or wrapped with polythene/plastic/foil sheet or mesh/screen of no more than 1.6 mm diameter pore size. Cartons packed in a fully enclosed container. Note: Vials of water attached to the stems of flowers are permitted. Water or ice containers/ packs used to cool the flowers are not permitted. To demonstrate compliance with this requirement you must present the following on a Phytosanitary certificate: The additional declaration: 'The consignment was packaged in pest-proof cartons or containers that eliminates the possibility of entry or egress of insect pests'. An original phytosanitary certificate must accompany the goods. Each consignment of goods must be packed in clean and new packaging. On arrival in Australian territory, the goods must be inspected to verify that they are free of live insects, seeds or fruit/berries (unless specifically permitted), plant or animal debris, soil and other biosecurity risk material. If live insects of biosecurity concern are detected the consignment will require treatment (where appropriate), or be exported or disposed of. Any required action will be at the importer's expense. If disease symptoms are found, consignments must be held pending biosecurity plant pathologist identification and advice. The consignment may be treated according to the advice of the biosecurity plant pathologist. If contaminants (e.g. seeds, trash, soil, feathers) are detected and determined to be of biosecurity concern, the consignment will require remedial action to remove or treat the contaminants, and will require re-inspection. If the contaminants cannot be effectively removed or treated, the consignment must be exported or disposed of.

Khapra beetle products	Cut flowers
BICON cases	**BICON cases**
Time measurements for the treatment are to be commenced when all products have reached the specified temperatures. Seed must be treated in such a way that allows for direct contact with steam. Prior to moist heat treatment, all bags/packaging impervious to moisture must be opened or adequately punctured to allow moist heat penetration. Correctly certified bagged rice must be forwarded to an approved arrangements site (AA site) (class 1.1, 1.3 or 2.2) for a full unpack and inspection. Rice in bags 25 kg or less will be subject to a visual inspection for insects, paddy grain, germ, weed seed, soil and other biosecurity risk materials. If paddy grains are found during the visual inspection, ISTA sample must be drawn and examined. There is a tolerance for paddy grain of 5 grains/kg (or 10 grains/2 kg) in a consignment. Bagged rice greater than 25 kg and bulk containerised rice will be subject to sampling according to ISTA rules. The sample size is to be 2 kg per lot. There is a tolerance for paddy grain of 5 grains/kg (or 10 grains/2 kg) in a consignment. If the number of paddy grains in the sample exceeds 10, the importer has the options of: 1.1. Having the consignment cleaned at an approved arrangement site, or 1.2. Devitalisation using moist heat, or 1.3. Export or disposal. Note: Germination testing of the paddy grains will not be an option for consignments exceeding the tolerances. If contaminated with other seeds or soil, the importer has the options of: 2.1. ISTA testing*, or 2.2. Having the consignment cleaned at an approved arrangement site, or 2.3. Devitalisation using moist heat (only for seed contamination), or 2.4. Export or disposal. *A sample must be drawn in accordance with ISTA procedures and submitted to a quarantine approved seed laboratory for analysis. The consignment must be held under quarantine pending results of the analysis.	Any required action will be at the importer's expense. The department will release the goods once all of the import requirements have been met. Under the Biosecurity Charges Imposition (General) Regulation 2016 and Chapter 9, Part 2 of the Biosecurity Regulation 2016, fees are payable to the Department of Agriculture, Water and the Environment for all services. Detail on how the department applies fees and levies may be found in the Charging guidelines. In addition to the conditions for the goods being imported, non-commodity concerns must be assessed including container cleanliness, packaging and destination concerns, and may be subject to inspection and treatment on arrival. Please refer to the Non-Commodity Cargo Clearance BICON case for further information.

Khapra beetle products	Cut flowers
BICON cases	**BICON cases**
Warnings and Information Notices If the ISTA testing results confirm that the contamination exceeds Department standards for seed contaminants and tolerances, the importer will be given the option to have the seed cleaned at an approved arrangement site (AA site), exported or disposed of. Any seed that requires cleaning must be re-sampled by a biosecurity officer (and tested if appropriate) to ensure that the contamination has been removed or reduced to an acceptable level. If live insects or other pests are found they will be referred to a Department of Agriculture, Water and the Environment entomologist for advice on an appropriate remedial action, which may include treatment (if an appropriate treatment is available), export or disposal. Following inspection and provided all of the above conditions have been met the consignment may be released from biosecurity control by a biosecurity officer. Under the Biosecurity Charges Imposition (General) Regulation 2016 and Chapter 9, Part 2 of the Biosecurity Regulation 2016, fees are payable to the Department of Agriculture, Water and the Environment for all services. Detail on how the department applies fees and levies may be found in the Charging guidelines. In addition to the conditions for the goods being imported, non-commodity concerns must be assessed including container cleanliness, packaging and destination concerns, and may be subject to inspection and treatment on arrival. Please refer to the Non-Commodity Cargo Clearance BICON case for further information. Once biosecurity requirements have been met, it is the importer's responsibility to comply with the Imported Food Control Act 1992 and ensure food being imported is safe and compliant with Australian standards including the Australia New Zealand Food Standards Code. Consignments of food may be referred for inspection and analysis under the Imported Food Inspection Scheme to verify safety and compliance. Some foods, such as beef and raw milk cheese, are not permitted to be imported without a recognised foreign government certificate.	

Source: List of Species of Fresh Cut Flowers and Foliage with Alternative Conditions for Import – Mainland (agriculture.gov.au) and BICON – Import Conditions (agriculture.gov.au)

Appendix C
National priority plant pests and pest risk analyses

In this appendix '*' indicates that a plant pest risk analysis has been completed and '**' indicates that a plant pest risk analysis is in development.

Priority	Pest/pest group	Scientific name(s)	Common name
1	*Xylella* and exotic vectors**	Bacterial pathogens of *Xylella* genus. Confirmed and unconfirmed exotic vectors, including: *Acrogonia citrina* *Acrogonia terminalis* *Cicadella viridis* *Dilobopterus costalimai* *Draeculacephala minerva* *Graphocephala atropunctata* *Homalodisca vitripennis* *Oncometopia fasciali* *Philaenus spumarius* *Xyphon fulgidum*	Pierce's disease (in grapevine) California vine disease (in grapevine) Anaheim disease (in grapevine) Dwarf (in lucerne) Phony disease (in peach) Leaf scald (in plum) Bacterial leaf scorch (in coffee, almond, blueberry, oleander, elm, oak, plane, mulberry, maple) Citrus variegated chlorosis (in citrus) Wilt (in periwinkle) **Vectors:** Green leafhopper Green sharpshooter Blue-green sharpshooter Glassy winged sharpshooter Spittle, meadow froghopper Redheaded sharpshooter
2	Khapra beetle	*Trogoderma granarium*	Khapra beetle
3	Spotted wing drosophila*	*Drosophila suzukii*	Spotted wing drosophila

Priority	Pest/pest group	Scientific name(s)	Common name
4	Exotic, economic fruit fly (lure and non-lure responsive)	High priority *Anastrepha ludens* *Bactrocera carambolae* *Bactrocera dorsalis* *Bactrocera trivialis* *Ceratitis capitata* *Zeugodacus cucurbitae* Medium priority *Bactrocera albistrigata* *Bactrocera correcta* *Bactrocera kirki* *Bactrocera latifrons* *Bactrocera tsuneonis* *Bactrocera zonata* *Zeugodacus tau*	Mexican fruit fly Carambola fruit fly Oriental fruit fly No common name Mediterranean fruit fly Melon fly White striped fruit fly Guava fruit fly No common name Solanum fruit fly Citrus fruit fly Peach fruit fly No common name
5	Karnal bunt	*Tilletia indica*	Karnal bunt
6	'*Candidatus* Liberibacter asiaticus' (and other strains) complex*	'*Candidatus* Liberibacter africanus' '*Candidatus* Liberibacter americanus' '*Candidatus* Liberibacter asiaticus' *Diaphorina citri* (vector) *Trioza erytreae* (vector)	Huanglongbing and vectors
7	Exotic invasive ants	*Brachyponera chinensis* *Lepisiota frauenfeldi* *Nylanderia fulva* *Solenopsis invicta* *Solenopsis richteri* *Wasmannia auropunctata*	Asian needle ant Browsing ant Tawny crazy ant or raspberry ant Red imported fire ant Black imported fire ant Electric ant
8	Gypsy moth	*Lymantria dispar asiatica* *Lymantria dispar* *Lymantria dispar japonica* *Lymantria monacha*	Asian gypsy moth Nth American/Europe gypsy moth Japanese gypsy moth Nun moth
9	Brown marmorated stink bug*	*Halyomorpha halys*	Brown marmorated stink bug
10	Internal and external mites of bees (*Apis* spp.)	*Acarapis woodi* *Tropilaelaps clareae* *Tropilaelaps mercedesae* *Varroa jacobsoni* *Varroa destructor*	Tracheal mite (internal) Tropilaelaps mite (external) Tropilaelaps mite (external) Varroa mite (external) Varroa mite (external)
11	Guava (eucalyptus) rust (exotic strains)	*Austropuccinia psidii* (exotic strains)	Guava (eucalyptus/myrtle) rust

Priority	Pest/pest group	Scientific name(s)	Common name
12	Exotic invasive snails	*Achatina fulica* *Monacha* spp. *Massylaea* spp. *Pomacea canaliculata* *Caracollina lenticula*	Giant African snail No common name No common name Golden (or channelled) apple snail No common name
13	*'Candidatus* Liberibacter solanacearum' complex*	*'Candidatus* Liberibacter solanacearum' haplotypes *Bactericera cockerelli* (vector of Haplotype A and B), exotic) *Bactericera trigonica* (vector of Haplotype D and E) *Trioza apicalis (vector of* Haplotype C*)*	Zebra chip Psyllid yellows
14	Airborne *Phytophthora* spp.*	*Phytophthora kernoviae* *Phytophthora ramorum*	Phytophthora blight Sudden oak death
15	Ug99 wheat stem rust	*Puccinia graminis* f. sp. *Tritici (exotic strains)*	Ug99
16	Citrus canker	*Xanthomonas citri* subsp. *citri*	Citrus canker
17	Exotic bees (*Apis* spp.)	*Apis cerana* (exotic) *Apis dorsata* *Apis florea* *Apis mellifera capensis* *Apis mellifera scutellata* *Apis mellifera scutellate* (hybrid)	Asian honey bee (exotic) Giant honey bee Dwarf honeybee Cape honey bee African honey bee Africanised honey bee
18	Fire blight	*Erwinia amylovora*	Fire blight
19	Potato cyst nematode (exotic strains)	*Globodera* spp. including *G. pallida, G. rostochiensis* (exotic strains)	Potato cyst nematode (golden, white, or pale)
20	Leaf miners (exotic species)	*Liriomyza bryoniae* *Liriomyza cicerina* *Liriomyza huidobrensis* *Liriomyza sativae* *Liriomyza trifolii*	Tomato leaf miner Chickpea leaf miner Serpentine leaf miner Vegetable leaf miner American serpentine leaf miner
21	Texas root rot	*Phymatotrichum omnivorum*	Texas root rot
22	Panama disease	*Fusarium oxysporum* f. sp. *cubense* Tropical Race 4	Panama disease Tropical Race 4
23	Cyst nematodes of cereals (exotic species)	*Heterodera carotae* *Heterodera filipjevi* *Heterodera glycines* *Heterodera latipons* *Heterodera sorghi* *Heterodera zeae*	Carrot cyst nematode Cereal cyst nematode Soybean cyst nematode Cereal cyst nematode Sorghum cyst nematode Maize/corn cyst nematode
24	Plum pox virus	*Plum pox virus*	Sharka
25	Exotic drywood termites	*Cryptotermes brevis* *Cryptotermes dudleyi* *Incisitermes minor*	West Indian drywood termite Drywood termite Western drywood termite

Priority	Pest/pest group	Scientific name(s)	Common name
26	Wheat stem sawfly (exotic species)	*Cephus cinctus* *Cephus pygmeaus*	Wheat stem sawfly European wheat stem sawfly
27	Barley stripe rust (exotic strains)	*Puccinia striiformis* f. sp. *hordei* (exotic strains)	Barley stripe rust
28	Hessian fly (*Mayetiola* spp.)	*Mayetiola destructor* *Mayetiola hordei*	Hessian fly Barley stem gall midge
29	Exotic subterranean termites	*Coptotermes formosanus* *Coptotermes gestroi*	Formosan termite Asian subterranean termite
30	Phytoplasmas 16SrI group	Phytoplasmas 16SrI group	Phytoplasmas 16SrI group (aster yellows group)
31	Armyworm (exotic species)	*Spodoptera eridania* *Spodoptera frugiperda*	Southern army worm Southern fall army worm
32	Exotic Tobamovirus	Cucumber fruit mottle mosaic virus Cucumber green mottle mosaic virus* Cucumber mottle virus Kyuri green mottle mosaic virus Potato 14R virus Ribgrass mosaic virus Tobacco mosaic virus – Potato strain Tomato brown rugose fruit virus Tomato mottle mosaic virus Turnip-vein clearing virus Wasabi mottle virus Youcai mosaic virus Zucchini green mottle mosaic virus	CFMMV CGMMV CMV KGMMV Potato 14R virus RMV TMV-P ToBRFV ToMMV TVCV WMoV YoMV ZGMMV
33	*Bursaphelenchus* spp. and exotic sawyer beetle vectors	*Bursaphelenchus cocophilus* *Bursaphelenchus xylophilus* *Monochamus* spp. (vector)	Red ring disease (nematode) Pine wilt nematode Pine sawyer beetle (vector)
34	Exotic longhorn beetles (*Anoplophora* spp.)	*Anoplophora chinensis* *Anoplophora glabripennis* *Anoplophora malasiaca*	Black and white citrus longhorn Asian longhorn beetle White-spotted longhorn beetle
35	Grape phylloxera	*Daktulosphaira vitifoliae*	Grape phylloxera

Priority	Pest/pest group	Scientific name(s)	Common name
36	Exotic stem borers of sugarcane and cereals (Chilo spp.)	*Chilo auricilius* *Chilo infuscatellus* *Chilo orichalcociliella* *Chilo partellus* *Chilo polychrysa* *Chilo sacchariphagus* *Chilo terrenellus* *Chilo tumidicostalis* *Eldana saccharina* *Sesamia grisescens* *Scirpophaga excerptalis*	Sugarcane stalk borer Yellow top borer of sugarcane Coastal stem borer Spotted stem borer Stem borer Spotted sugarcane borer Sugarcane stem borer Spotted sugar cane stem borer African sugarcane stalk borer Pink stalk borer Top borer
37	Potato late blight (exotic strains)	*Phytophthora infestans* (exotic strains)	Potato late blight
38	Pine pitch canker	*Fusarium circinatum*	Pine pitch canker
39	Grapevine leaf rust	*Phakopsora euvitis*	Grapevine leaf rust
40	Exotic *Begomovirus* and vectors	*Begomovirus* (exotic) *Bemisia tabaci* (exotic, vector)	Begomovirus Silver leaf whitefly (vector)
41	Dutch elm disease	*Ophiostoma novo-ulmi*	Dutch elm disease
42	Banana phytoplasma diseases	*'Candidatus* Phytoplasma *asteris'* *Candidatus Phytoplasma novoguineense*	Banana wilt associated phytoplasma Banana wilt, Banana Elephantiasis Disease

Source: National priority plant pests (2019) (DAWE 2019a)

Glossary

Agriculture Import Management System (AIMS)	A system managed by the Department of Agriculture, Water and the Environment which has records of quarantine entries for goods entering Australia. It provides quarantine management of imported goods and non-commodity items, records the department's decisions and communicates this information to the importer/broker. AIMS is used to: • manage biosecurity and food safety risks associated with imported cargo • track and record imported consignments • assign departmental fees and collect revenue on imported cargo.
Approved arrangement	An approved arrangement is an arrangement under section 406 of the *Biosecurity Act 2015*. A person may apply under section 405 for approval of a proposed arrangement for the person to carry out specified activities 'to manage biosecurity risks associated with specified goods, premises or other things'.
Beale review	Independent review of Australia's quarantine and biosecurity arrangements by a panel chaired by Mr Roger Beale AO. The report *One biosecurity: a working partnership* was released by the Australian Government on 18 December 2008.
Biosecurity Act	The *Biosecurity Act 2015* (Cth). Commenced 16 June 2016 and replaced the *Quarantine Act 1908* (Cth).
Biosecurity Import Conditions (BICON) system	A departmental system used to manage and process import conditions of imported goods.
Biosecurity industry participant (BIP)	Defined in section 14 of the *Biosecurity Act 2015* (approved arrangement holder). A person who is the holder of the approval of an approved.

Biosecurity risk	Under the Biosecurity Act, 'biosecurity risk' means (except as provided by section 310): (a) the likelihood of a disease or pest: (i) entering Australian territory or a part of Australian territory; or (ii) establishing itself or spreading in Australian territory or a part of Australian territory; and (b) the potential for any of the following: (i) the disease or pest to cause harm to human, animal or plant health; (ii) the disease or pest to cause harm to the environment; (iii) economic consequences associated with the entry, establishment or spread of the disease or pest.
Biosecurity risk material	Any plant and animal material, or inorganic material, that is of biosecurity risk or concern.
Biosecurity risk owners	Positions or groups within the department who are the ultimate advisers on managing specific biosecurity risks of different commodities, processes or pathways.
CAPEC	Conference of Asia Pacific Express Couriers (DHL, FedEx, TNT and UPS).
Cargo compliance verification (CCV)	A statistics-based end-point survey conducted on the containerised (full container load and full container load consolidated) sea cargo pathway to evaluate the effectiveness of its operational biosecurity controls. These controls include community protection profiles, document assessment and broker arrangements.
Compliance	Status whereby all aspects of products, facilities, people, programs and systems meet regulatory requirements and, where applicable, importing country official requirements.
Department	Australian Government Department of Agriculture, Water and the Environment.
Director of Biosecurity	Secretary of the Australian Government Department of Agriculture, Water and the Environment, responsible for managing biosecurity risks and ensuring Australia's international rights and obligations are met.
Document assessment	Verification of consignment documentation (such as invoices and mandatory declarations) to determine if a consignment potentially contains prohibited goods or biosecurity risk material.
Full container consolidated (FCX)	Sea cargo container with contents from multiple suppliers but consigned to one entity in Australia.
Full container load (FCL)	Sea cargo container with contents from a single supplier and consigned to one entity in Australia.
Import Management System	Departmental system to control and record importations of goods and commodities of biosecurity concern and store and track associated directions that apply to importations, their movements and treatments.
Integrated Business Model	Departmental system that deploys workforce to meet demand that is influenced by changing risk and informed targeting.
Integrated Cargo System (ICS)	Department of Home Affairs software application for all import and export reporting and processing procedures. ICS provides electronic reporting of movement of goods across Australia's borders, and is managed by the Australian Border Force. The department uses the ICS to refer imported goods into AIMS and highlight selected commodities for intervention.
Leakage	BRM that is detected during end-point surveys and was not detected by biosecurity intervention processes.

Mail and Passenger System (MAPS)	Departmental system used for reporting purposes and to record noncompliance information for the airports, international mail, seaports and detector dogs programs.
Minimum document requirements policy	Defines minimum requirements that must be met for all documents presented to the department to support risk assessment of imported cargo and/or packaging, for quarantine or food safety purposes.
Non-CAPEC members	International express air courier companies that are not part of the CAPEC group and process SAC consignments under approved arrangement class 1.2 (Air cargo terminal) or 1.3 (Sea and airfreight depot (restricted)).
Risk mitigation	Implementation of biosecurity risk measures to address a known or foreseeable biosecurity risk.
Risk profile	Assessment generated by comparing descriptions of SAC consignments with a set of profile criteria in the ICS to identify potential biosecurity risks.
Self-assessed clearance (SAC)	Clearance procedure for imported goods that have a value equal to or less than A$1,000.
Self-assessed clearance (SAC) pathway	The movement of imported low-value goods via express air courier.
Screening	The use of X-rays, detector dogs and manual inspection to screen international passengers and mail for biosecurity risk material.
Training	Departmental accredited training required by a person associated with the management of biosecurity risk at an approved arrangement site.

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