

# National Khapra Beetle Action Plan 2021–2031: implementation schedule 2023

The success of the [National Khapra Beetle Action Plan 2021–2031](#) depends on cooperation and collaboration between importers, shipping businesses, agricultural industries, all levels of government, non-government organisations and individuals, experts and research agencies. This implementation schedule will be used to:

- record the progress of actions set out in the plan
- document roles, responsibilities and funding mechanisms
- communicate progress with stakeholders.

Actions in this plan will complement actions in other [national action plans for priority plant pests](#).






Plant Health Committee (PHC) is responsible for endorsing plans and overseeing implementation. The Department of Agriculture, Fisheries and Forestry (DAFF) will host annual forums with key stakeholders to monitor and review implementation schedules. The purpose of these forums is to collect implementation information and discuss potential proposals to support the plan. PHC will be provided with forum findings. PHC will consider how implementation will occur where no lead has been identified for an action.

The overall success of the plan will be assessed against 6 measures:

- 1) High level of engagement and support from stakeholders (e.g. over 50 stakeholders at annual forums).
- 2) Improved diagnostic capacity and treatment capability since the development of the plan.
- 3) Increased awareness among importers, international and domestic shipping providers, Australian industry, governments and the general public, of the potential risks to Australian industry, the environment and social amenity from Khapra beetle since the development of the plan.
- 4) Number of projects initiated to provide data to fill knowledge gaps, and number of projects successfully concluded since the development of the plan.
- 5) High level of confidence in national surveillance and diagnostic capability to provide evidence of Australia's pest-free status for Khapra beetle.
- 6) Higher level of preparation among stakeholders to respond to a border incident or incursion of a Khapra beetle pest since the development of the plan.

Implementation of the plan's actions are shown in Table 1 (prevention), Table 2 (detection), Table 3 (response) and Table 4 (cross-cutting). Indicative timeframes are short term (up to 3 years), medium term (4 to 8 years) and long term (up to 10 years).

**Status key**

	Completed – project finished
	On track – project commenced
	Ongoing – business as usual activity underway
	Pending – project or activity is yet to commence
	Deleted – project has been deleted or incorporated into another project

**Table 1 Implementation of activities for Area 1: Prevention**

Action	Project or business as usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
<p><b>Action 1.1:</b> Conduct a new pest risk assessment of Khapra beetle and maintain appropriate regulation at the Australian border to minimise the risk of introduction into Australia.</p> <p><b>Expected benefit and outcome:</b> A pest risk assessment is being conducted to support emergency measures. New information on geographical distribution and host range will be taken into consideration as it becomes available and import conditions will be revised as appropriate.</p> <p>Maintain appropriate regulation at the Australian border to minimise the risk of introduction into Australia.</p> <p>Urgent actions on a range of plant products that are hosts of Khapra beetle.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	1.1.1 Draft pest risk assessment	On track – project commenced The draft pest risk assessment is under preparation with consultation expected in 2024 <a href="https://agriculture.gov.au/khapra-beetle-pest-risk-analysis">Khapra beetle pest risk analysis - DAFF (agriculture.gov.au)</a>	Commonwealth (BPSSD, PSARA)	Commonwealth	Supports many other action areas, including action 1.2, 1.4, 3.1, 3.2, 3.4  Supports: <ul style="list-style-type: none"> <li>National Invasive Ant Biosecurity Plan action 1.1</li> <li>National Hitchhiker (Contaminating) Plant Pest Action Plan action 1.1</li> </ul>
	1.1.2 Maintain appropriate regulation at the Australian border	Ongoing – business as usual	Commonwealth (CED)	Commonwealth	Supports many other action areas, including action 1.2, 1.4, 3.1, 3.2, 3.4
	1.1.3 Urgent actions to protect against Khapra beetle	Completed – project finished <a href="https://agriculture.gov.au/measures-for-plant-products-under-the-khapra-beetle-urgent-actions">Measures for plant products under the khapra beetle urgent actions - DAFF (agriculture.gov.au)</a>	Commonwealth (BPSSD, HHWG)	Commonwealth	Supports many other action areas, including action 1.2, 1.4, 3.1, 3.2, 3.4
<p><b>Action 1.2:</b> The Cargo Compliance Verification program can be used to inform the biosecurity risk profile of Khapra beetle.</p> <p><b>Expected benefit and outcome:</b> Random verification inspections are undertaken by the Cargo Compliance Verification program for about 0.5 per cent of consignments to monitor that the</p>	1.2.1 Develop a project to inspect multiple containers specifically to gather information	Completed – project finished	Commonwealth (CED, BPSSD,HHWG)	Commonwealth	Relates to action 1.1

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Action	Project or business as usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
<p>biosecurity import controls are operating effectively for the full container load (FCL) containerised sea cargo pathway. There are many unknowns in relation to the threat of Khapra beetle as a hitchhiker, including residual risk which can only be addressed by surveillance.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>					
<p><b>Action 1.3:</b> Assurance activities to ensure compliance following 'prohibition'.</p> <p><b>Expected benefit and outcome:</b> The department will consider the need for targeted operations as part of its assurance activities to ensure compliance with the urgent actions introduced in 2020/21 to address the risk of Khapra beetle on a range of plant products that are hosts of this pest.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	<p>1.3.1 Consider the need for targeted operations as part of its assurance activities to ensure compliance with the urgent actions introduced in 2020/21 to address the risk of Khapra beetle on a range of plant products that are hosts of this pest</p>	<p>Ongoing – business as usual</p> <p>Various Import Document Assessment Verification and assurance activities have occurred for different Khapra phases. This includes verification of broker and departmental assessed entries.</p> <p>Not implementing 6B measures at this stage</p>	<p>Commonwealth (CED, BOD)</p>	<p>Commonwealth</p>	<p>Not applicable</p>
<p><b>Action 1.4:</b> Improve hygiene of shipping containers imported into Australia.</p> <p><b>Expected benefit and outcome:</b> Increase awareness of pest risks of sea containers with industry and National Plant Protection Organisations (NPPOs) through</p>	<p>1.4.1 Reviewing Khapra beetle resource material to provide up to date resource materials including training manuals</p>	<p>Completed – project finished</p> <p>Produced educational materials for domestic and international audiences, including posters and videos to raise awareness of Khapra beetle risks and promote sea container cleanliness</p> <p>Undertaking training every 3 years in effective Khapra beetle</p>	<p>Commonwealth (CED, BOD, BPSSD, PLAE)</p>	<p>Commonwealth</p>	<p>Supports many other action areas including 1.5</p>

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Action	Project or business as usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
harmonising data collection and sharing risk information. <b>Priority:</b> high <b>Time frame:</b> long term		detection methods for shipping containers			
	1.4.2 Ongoing promotion of uptake of the Cargo Transport Unit code (an industry developed informative material on preventing contamination during packing containers) and providing guidance material to NPPOs on container risk management	Ongoing – business as usual Promoted awareness of the international Cargo Transport Unit Code	Commonwealth (CED, BOD, BPSSD, PLAE)	Commonwealth	Supports many other action areas including 1.5
	1.4.3 Develop specific Khapra beetle focused guidelines for inspection of containers by authorised officers of companies receiving containers into upcountry areas with the intention of repacking them with Khapra beetle susceptible commodities	Completed – project finished	Commonwealth (CED, BOD, BPSSD, PLAE)	Commonwealth	Supports many other action areas including 1.5
	1.4.4 Consider undertaking container risk surveys as part of the targeted operations under Action 1.3	Ongoing – business as usual	Commonwealth (BSRD, CED, DBD, PPEBD, BPSSD)	Commonwealth	Relates to action 1.3
	1.4.5 Address an ongoing issue with brokers providing a destination metro address and not advising of unpack at rural postcode, in order to avoid a tailgate inspection	Ongoing – business as usual	Commonwealth (BSRD, CED, DBD, PPEBD, BPSSD)	Commonwealth	Supports many other action areas including 1.5
	1.4.6 Continue to address system capability	Ongoing – business as usual	Commonwealth (BSRD, CED, DBD, PPEBD, BPSSD)	Commonwealth	Supports many other action areas including 1.5

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	1.4.7 BRIL Container Challenge	Completed – project finished in 2021 Work with small to medium businesses to explore the use of sensing/imaging technology and deep learning architecture to scan containers in large numbers at the wharf, and for this information to be sent to the department for remote triaging and decisions on further intervention	Commonwealth (BSRD, CED, DBD, PPEBD, BPSSD)	Commonwealth	Supports many other action areas including 1.5
	1.4.8 Through the International Plant Protection Convention promote the creation of more commodity class, such as food stuffs, and conveyance-specific phytosanitary standards to supplement the existing suite of phytosanitary standards	Ongoing – business as usual Work is underway by the Sea Container Focus Group (SCFG) to recommend for Commission on Phytosanitary Measures' consideration a standard on Sea Containers in 2024.	Commonwealth (BSRD, CED,, PPEBD, BPSSD, HHWG)	Commonwealth	Supports many other action areas including 1.5
	1.4.9 New container design should be considered, including containers without wooden floorboards for potential use	On track – project commenced Work is underway by the SCFG to recommend this for Commission on Phytosanitary Measures' consideration in 2023.	Commonwealth (BSRD, CED, PPEBD, BPSSD, HHWG)	Commonwealth	Supports many other action areas including 1.5
<b>Action 1.5:</b> Reduce incidental contamination and use data to inform risk management decisions. <b>Expected benefit and outcome:</b> Encourage regular exchange of information about emerging pest concerns. Given the significance of Khapra beetle as a pest, increasing Australia's international dialogue on this pest	1.5.1 Progress eDNA work and use the information coming out of the data created to inform the identification of high-risk containers and the approach to interventions more broadly	Completed – project finished Used eDNA information to identify high-risk shipping containers	Commonwealth (BPSSD, HHWG, TID)	Commonwealth	Supports many other action areas including 1.4
	1.5.2 Biosecurity issues are regularly discussed between Australia and international trading partners	Ongoing – business as usual Opportunities for upcoming international engagement include IPPC meetings, bilateral plant health meetings, Quads, etc.	Commonwealth (BPSSD, PPEBD, TID)	Commonwealth	Supports many other action areas including 1.4

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<p>would assist in preventing the entry of the pest into Australia and potentially other pests.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> medium term</p>	1.5.3 Continue work on recommendation on Contaminant Pests for the IPPC Commission on Phytosanitary Measures	<p>On track – project commenced</p> <p>IPPC engagement has continued through the SCFG, which was established to consider workshop outcomes and Sea Container Task Force recommendations regarding global solutions to reduce the movement of pests in the sea container pathway.</p> <p>The recommendation aims to engage with IPPC member countries on issues including clean trade, container hygiene and minimisation of transport of contaminant pests.</p>	Commonwealth (BPSSD, HHWG, TID)	Commonwealth	Supports many other action areas including 1.4
	1.5.4 Develop and implement measures to minimise the risk of Khapra beetle, with initial focus on specific containers arriving from countries with Khapra beetle before expanding the measures to all other high-risk containers	Completed – project finished pending outcomes of Khapra beetle pest risk analysis	Commonwealth (BPSSD, HHWG, BOD, TID)	Commonwealth	Supports many other action areas including 1.4
	1.5.5 The Centre of Excellence for Biosecurity Risk Analysis (CEBRA) has also been engaged on a project to establish the residual risks of hitchhiker pests (including Khapra) and developing key performance indicators for containers	Completed – project finished Two CEBRA projects were completed: 22B: Sea Cargo Risk Management, 21D: Value Added – Modelling the marginal return on investment within and across pathways (including a case study on the sea container pathway).	Commonwealth (BPSSD, HHWG, PPEBD, TID)	Commonwealth	Supports many other action areas including 1.4
	1.5.6 Post border hitchhiker risk mapping (Khapra beetle, BMSB, snails) Australia Priority Plant & Disease Model (AAPDIS) modelling for	On track – project commenced <a href="http://grdc.com.au">Modelling the incursion and spread of hitchhiker and windborne plant pests in Australia (grdc.com.au)</a>	CEBRA	GRDC	Not applicable

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Action	Project or business as usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
	management decisions – Khapra beetle and HPPPs				
<p><b>Action 1.6:</b> Review and evaluate methyl bromide alternative phytosanitary treatments.</p> <p><b>Expected benefit and outcome:</b> Research into methyl bromide treatment alternatives needs to consider and mitigate against the cryptic nature of Khapra beetle biology, deal with all life stages and prevent chemical resistance.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> long term</p>	1.6.1 Undertake research to develop an effective alternative to pre-shipment treatment for Khapra beetle (as well as other pests) needed because of the phasing out of the commonly used methyl bromide treatment	Ongoing – business as usual The department is funding research on ethyl formate as an alternative to methyl bromide for Khapra beetle.	Commonwealth (BSRD, BPSSD, CED, HHWG)	Commonwealth	Not applicable
	1.6.2 Identify and evaluate methyl bromide alternative phytosanitary treatments currently available for use in plant commodities, and to implement those practical for operational use in on-arrival and pre-shipment situations in Australia	On track – project commenced Alternative treatments are being considered in the pest risk analysis	Commonwealth (BPSSD, CED)	Commonwealth	Not applicable
	1.6.3 Investigate insecticidal treatments for containers as an alternative to methyl bromide	Completed – project finished Deltamethrin has been approved as a provisional treatment. We have published an application methodology. <a href="#">Methodologies and documents for biosecurity treatments - DAFF (agriculture.gov.au)</a> and <a href="#">(Guide to treating sea containers with deltamethrin (agriculture.gov.au))</a>	Commonwealth (BPSSD, CED, HHWG)	Commonwealth	Not applicable
	1.6.4 Run a trial on heat treatment of containers and run a ‘real world’ trial to develop a method that is practical and able to be implemented	Completed – project finished Trial of heat treatment of containers completed and is an approved Khapra treatment option	Commonwealth (BPSSD, CED, HHWG)	Commonwealth	Not applicable
	1.6.5 Efficacy and practicality of treatments for infrastructure, from mail and small articles to	Ongoing – business as usual Update the plan to reflect any research on new and effective	Commonwealth (BPSSD, CED)	Commonwealth	Not applicable



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	factory buildings also needs to be considered	means of applying eradication treatments in urban environments where non-chemical treatments may be available			
<p><b>Action 1.7:</b> Improve detection of at-risk containers.</p> <p><b>Expected benefit and outcome:</b> Detecting high risk containers requires data describing the load port and contents carried by the container for direct importation pathways (requires data describing a container’s current load port and contents) and indirect importation pathway (over the last five years on journeys that did not touch Australia).</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	<p>1.7.1 The department to continue working with industry and the European Union on a pilot to obtain more container transportation information from shipping lines</p>	<p>Ongoing – business as usual</p> <p>Work is underway by the SCFG to explore the acquisition of historical global container movement data</p>	<p>Commonwealth (CED, HHWG)</p>	<p>Commonwealth</p>	<p>Supports many other action areas</p>
	<p>1.7.2 The department to continue engaging with the Department of Home Affairs on obtaining relevant commodities data, an approach which potentially could streamline efforts significantly by substantially reducing the data cleansing task</p>	<p>Completed – project finished</p> <p>Undertook a pilot study to get more container transportation information</p> <p>5 years of historical data has been obtained from Department of Home Affairs. Engagement continues to ensure provided data is fit for purpose, and to arrange an ongoing data stream.</p>	<p>Commonwealth (DBD)</p>	<p>Commonwealth</p>	<p>Supports many other action areas</p>

**Table 2 Implementation of activities for Area 2: Detection**

Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
<p><b>Action 2.1:</b> Build and strengthen national diagnostic capability.</p> <p><b>Expected benefit and outcome:</b> Australia has a diverse range of endemic and established species of <i>Trogoderma</i>, which increases the complexity of accurately diagnosing Khapra beetle. There is a need to strengthen and maintain expertise in Australia to identify species of <i>Trogoderma</i>.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	2.1.1 Develop and run further regular training to maintain skills in jurisdictions	Completed – project finished Developed and conducted regular training to maintain skills in jurisdictions, and train more scientists, both in-house and in universities	Commonwealth (PPEBD)	Commonwealth	Relates to action 2.2
	2.1.2 Finalise review of the national diagnostic protocol	Completed – project finished The Khapra beetle NDP was endorsed by SPHD last year and uploaded onto the NPBDN website [NDP45 <a href="http://plantbiosecuritydiagnostics.net.au">[plantbiosecuritydiagnostics.net.au]</a> ] however update of the NDP is currently being considered following the completion of the DAFF funded project "Grant to conduct integrative taxonomic revision of Australian <i>Trogoderma</i> species" Activity 2.1.3 by CSIRO.  The National Diagnostic Protocol (NDP45) is currently being updated with the diagnostic tools developed through the project described in 2.1.4 with the revised NDP due to be completed early 2024.	NPBDN SPHD	Commonwealth	Relates to action 2.2
	2.1.3 Conduct integrative taxonomic revision of Australian <i>Trogoderma</i> species	Completed – project finished in September 2023 This project investigated the revision of <i>Trogoderma</i> , using a combination of modern best	CSIRO	Commonwealth	Relates to action 2.2 Relates to project 2.1.4

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
		practice molecular and morphological approaches to resolve the taxonomy of the Australian genera of Dermestidae and to provide a comprehensive revision of species of the Australian dermestids, <i>Trogoderma</i> .			
	2.1.4 Continue to progress the comprehensive identification tool to help diagnose 'Dermestidae of biosecurity interest' utilising the national Dermestid reference collection comprising several thousand Australian native <i>Trogoderma</i> specimens as well as other Dermestids and <i>Trogoderma granarium</i> haplotypes	Completed – project finished in September 2023 This project was delivered as part of 2.1.3 and developed identification tools such as morphological key to adults and problematic life stages, as well as associated molecular DNA barcodes for most of the recognised Dermestids taxa. These project outputs enable diagnosticians to rule out Dermestids of biosecurity concern from native species present in Australia.	CSIRO	Commonwealth	Relates to action 2.2 Relates to project 2.1.3
	2.1.5 Continue to deliver the National Plant Health Proficiency Program and consider mechanisms to incorporate NPPPs (including Khapra beetle) into the program	On track – project commenced SPHD has delivered the National Plant Health Proficiency Testing Program (NPHPTP) since 2012. The Proficiency Testing Coordinator, appointed by SPHD, manages the delivery of the program in conjunction with Australian National Quality Assurance Program (ANQAP).	SPHD	Commonwealth	Relates to action 2.2

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
		A review of the National Plant Health Proficiency Testing program has been completed by DAFF. SPHD are currently considering the outcomes from this review including options for the inclusion of NPPPs within the program. For more information see: <a href="#">Proficiency Testing</a> Khapra beetle is not currently included in the program.			
	2.1.6 Review and update list of draft and endorsed NDPs for NPPPs, as part of the National Diagnostic Protocol Implementation Plan	Ongoing – Business as usual Review evaluation every 5 years unless triggered sooner	SPHD	Not applicable	Supports: <ul style="list-style-type: none"> <li>National Xylella Action Plan action 2.1</li> <li>National Hitchhiker Action Plan action 2.2</li> </ul>
<p><b>Action 2.2:</b> Review field-based surveillance, trapping, and diagnostic methods and tools</p> <p><b>Expected benefit and outcome:</b> The development, endorsement and implementation of more consistent and coordinated surveillance across all jurisdictions would be beneficial for early detection.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	2.2.1 Continue investment in environmental DNA (eDNA) for Khapra beetle as this detects DNA present in environmental samples such as soil or sediments	<p>Completed – project finished Project Complete. Developed Environmental DNA (eDNA) diagnostic process to detect Khapra beetle in soil or sediments.</p> <p>The protocol design to collect, extract and test Khapra beetle eDNA/RNA has been tested in post-border biosecurity applications in QLD.</p> <p>Organisms release DNA into their environment through secretions and discharges such as saliva, shed skin cells, faeces, gametes, hair or bodily remains. The technology offers a sensitive and cost-efficient alternative to traditional methods of species monitoring</p>	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1

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		which can be expensive and challenging.			
	2.2.2 Roll out the recently developed Khapra beetle LAMP assay diagnostics to Commonwealth laboratories and relevant regional locations to further improve surveillance and diagnostic capability	Completed – project finished Introduced Khapra beetle loop-mediated isothermal amplification (LAMP) assay diagnostics to Commonwealth laboratories and relevant regional locations	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.3 Compare and evaluate surveillance methods used in Australian jurisdictions and in other countries particularly New Zealand	Ongoing – business as usual The development, endorsement and implementation of more consistent and coordinated surveillance methods and tools across all jurisdictions would be beneficial for early detection.	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.4 Continue the current work being undertaken to resolve the taxonomy of native <i>Trogoderma</i> species to enable accurate detection and identification of Khapra beetle	Deleted In 2023, this project was agreed to be deleted, as it is the same as project 2.1.3.	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.4 Evaluate the benefit of training workshops on identification of storage pests for selected businesses—including how to identify <i>Trogoderma</i> species, where to send samples for confirmation and how to report/escalate suspect positive detections	Ongoing – business as usual Some of these businesses may participate in the development/field-testing of cost-effective <i>Trogoderma</i> species trapping/surveillance methods.	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.5 Review and update training and operational procedures for targeted visual surveillance as needed. Include development of training materials for states and territories	Ongoing – business as usual The development of training videos/packages would support early warning surveillance confidence, but also ensure	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
		timely and robust surveillance efforts during the early days of a response—particularly if surveillance personnel have not previously been exposed to surveillance methodologies for the pest. The establishment of nationally developed surveillance training materials will also ensure a more consistent methodology is applied nationally in times of response.			
	2.2.6 Consider strengthening diagnostic capability by developing and implementing triage systems, pooling national expertise, and training more scientists, both in-house and in universities	Ongoing – business as usual	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.7 Consider the value of surveillance in cities and towns with a concentration of businesses with higher volumes of shipping container movements—imports and exports; for example, southern Queensland and northern New South Wales—Toowoomba, Dalby, Goondiwindi, Kingaroy, Moree	Ongoing – business as usual	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.8 Consider the value of surveillance of specialist food shops that import higher risk food products from countries known to have Khapra beetle	Ongoing – business as usual. In addition to the latest implementation schedule update both WA and NSW have undertaken pantry blitz activities. Other jurisdictions are considering similar activities and will implement where appropriate. This	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1

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		information will be incorporated when further updates are made to the implementation schedule. Consideration needs to be given to how a detection resulting from of a 'pantry blitz' style surveillance event would be managed.			
	2.2.9 Research to understand the effectiveness of current trapping and baiting systems is needed for Khapra beetle in Australian conditions	Ongoing – business as usual	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.10 Assess whether crevice traps are useful and whether baiting or other treatments can be used to break diapause	Ongoing – business as usual	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
	2.2.11 Review the placement of traps by Commonwealth officers in the event that Khapra beetle is detected	Ongoing – business as usual The placement of traps upon initial detection and/or treatment (whether within an Approved Arrangement or at-border) creates a very high potential cost efficiency and time efficiency.	Commonwealth (BPSSD, BOD, CED)	Commonwealth	Relates to action 2.1
<b>Action 2.3:</b> Develop and implement national surveillance using best practice tools and methods <b>Expected benefit and outcome:</b> To improve detection capability in relation to Khapra beetle through cost-effective field-based	2.3.1 The Subcommittee on National Plant Health Surveillance to guide the development, endorsement and implementation of any national surveillance protocols, as well as guide the development of surveillance design processes to provide nationally agreed benefits	Completed – project finished Developed communication materials to raise Khapra beetle awareness and promote reporting	SNPHS	Commonwealth	Not applicable

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diagnostic tools and procedures as part of surveillance activities. <b>Priority:</b> medium <b>Time frame:</b> short term	2.3.2 Undertake eDNA Proficiency Testing to ensure detection is reproducible across facilities	Ongoing – business as usual Training modules for end-users are being developed to ensure sample collection is completed without compromising detection capability.	University of Canberra <a href="#">National eDNA Reference Centre (NRC) - EcoDNA</a>	Commonwealth	Not applicable
	2.3.3 Develop/enhance on-wharf detector dog surveillance of cars, machinery and break bulk cargo discharged from roll on roll off vessels at Brisbane	Ongoing – business as usual	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable
	2.3.4 Focus surveillance at high-risk sites including the border on the import supply chain, giving particular attention to environments where Khapra beetle might survive (for example, inside heated warehouses where grain products are stored)	Ongoing – business as usual	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable
	2.3.5 Consider a Pantry Blitz similar to that undertaken by the Western Australian Department of Primary Industries and Regional Development in 2016 and 2017	Ongoing – business as usual This survey engaged households in Perth, and utilised sticky traps that contained pheromones to attract pantry pests that included Khapra beetle. Consider expanding this to include warehouses or factories and other places of that may be of concern.	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable
	2.3.6 Engage with industry about surveillance, and data storage from lower risk sites is needed for where industry could be conducting its own surveillance	Ongoing – business as usual	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable



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	2.3.7 BRII Container Challenge. Work with small to medium businesses to explore the use of sensing/imaging technology and deep learning architecture to scan containers in large numbers at the wharf and for this information to be sent to the department for remote triaging and decisions on further intervention	Ongoing – business as usual	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable
	2.3.8 The department is undertaking business analysis to determine which system options are preferable, and what future actions may subsequently be required to implement the proposed reforms (including management of low-risk containers through industry arrangements)	Ongoing – business as usual	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable
	2.3.9 After the completion of business analysis, the department, subject to funding availability, will progress the necessary system enhancements to support the implementation of container reforms	Ongoing – business as usual	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable
	2.3.10 Continue supporting and improving National Border Surveillance	Ongoing – business as usual This process also entails targeted and general surveillance of First Points of Entry and Approved Arrangements as well as in the environment	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable
	2.3.11 Continue supporting the External Territories Plant Health Surveillance program by continuing community and stakeholder engagement to ensure future	Ongoing – business as usual This program provides early warning of pests entering our near neighbour countries	Commonwealth (PPEBD) Jurisdictions	Commonwealth	Not applicable

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
	sustainability of the external territories' surveillance program as well as broader biosecurity management	(Papua New Guinea and Timor-Leste).			
	2.3.12 Continue supporting Grains farm biosecurity program for exotic Khapra beetle surveillance	Ongoing – business as usual	PHA	Grains Produce Australia, Jurisdiction	Not applicable

**Table 3 Implementation of activities for Area 3: Response**

Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
<p><b>Action 3.1:</b> Improve management of post-border detection responses.</p> <p><b>Expected benefit and outcome:</b> To increase Australia’s response capability in relation to an incursion by Khapra beetle.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	<p>3.1.1 The department will continue to appoint a case manager role for high-priority pest detections, commencing with Khapra beetle</p> <ul style="list-style-type: none"> <li>This role will provide a coordination point for response activities associated with a post-border detection and will also involve reviewing response guidelines to improve future response planning, coordination and communication</li> </ul>	<p>Ongoing – business as usual</p> <p>A technical response coordinator was appointed in 2021.</p>	Commonwealth (BOD)	Commonwealth	Relates to action 1.1, 1.2, 1.3
	<p>3.1.2 Consider the learning from the current detections that risk assessment or ‘profiling’ of premises should be an important consideration in improving the management of post-boarder detections</p>	<p>Completed – project finished.</p> <p>Reviewed response guidelines</p> <p>This could build on the pest risk assessment considered under the Prevention action area, and more specifically look at the risk of establishment, spread and potential consequences associated with a post-border detection of Khapra beetle if it not managed appropriately.</p>	Commonwealth (BOD)	Commonwealth	Relates to action 1.1, 1.2, 1.3

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
<p><b>Action 3.2:</b> Improve capability to trace shipping containers and access their history.</p> <p><b>Expected benefit and outcome:</b> Achieve close cooperation from the shipper in providing expedient shipping information and minimising the biosecurity threat. This action should be progressed concurrently with Actions 1.2 and 1.3 and will require engagement with businesses in Australia as well as trading partners. Similar tracing ability is required within Australia to trace potentially contaminated goods and equipment.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> medium term</p>	3.2.1 Evaluate development or enhancement of technology needed to address shipping container traceability and to access past contents information	Ongoing – business as usual Work is underway by the SCFG to explore the acquisition of historical global container movement data	Commonwealth (BOD, BPSSD, HHWG)	Commonwealth	Relates to action 1.2, 1.3 Related to 1.7.1
<p><b>Action 3.3:</b> Identify and assess effective eradication treatment methods for buildings, goods and shipping containers.</p> <p><b>Expected benefit and outcome:</b> Eradication treatments need to overcome the ability of Khapra beetles and larvae to hide in cracks or crevices, and capacity of larvae to enter diapause when food is scarce or temperature is suboptimal.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> long term</p>	3.3.1 Undertake testing various fumigation protocols with gases such as ethyl formate, sulfuryl fluoride, or a combination of gases	Completed – project finished. Tested various fumigation treatment protocols	Commonwealth (CED)	Commonwealth	Relates to action 1.5, 1.6
	3.3.2 Undertake a trial on heat treatment of containers to develop a method that is practical and able to be implemented	Completed – project finished	Commonwealth (CED)	Commonwealth	Relates to action 1.5, 1.6
	3.3.3 Develop a method for insecticidal treatment of the underfloor, internal floor and door seams using insecticides and other materials including pyrethroid based chemicals, insect growth regulators, and silica	Ongoing – business as usual	Commonwealth (CED)	Commonwealth	Relates to action 1.5, 1.6
	3.3.4 Review available chemical use permits and their applications and	Ongoing – business as usual	Commonwealth (CED)	Commonwealth	Relates to action 1.5, 1.6

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
	limitations to use in relation to this action				
	3.3.5 Given the urban nature of recent and some past detections, consideration of treatment options that do not use chemicals. For various reasons, a chemical treatment may not be feasible in all instances and alternate actions should be assessed ahead of time	Ongoing – business as usual Decision-support tools to help select or assess treatment options for a particular circumstance may also be beneficial to develop—as would an assessment tool to determine any likely residual risk of infestation after certain treatment applications.	Commonwealth (CED)	Commonwealth	Relates to action 1.5, 1.6
<b>Action 3.4:</b> Develop comprehensive national contingency plans and supporting operational procedures. Validate these measures using a national simulation exercise. <b>Expected benefit and outcome:</b> Ensure agencies and industry are response ready for a Khapra beetle incursion. <b>Priority:</b> high <b>Time frame:</b> medium term	3.4.1 National simulation exercises should be conducted to reflect new treatments, diagnostic methods and surveillance techniques. One exercise should cover the pre-border and border scenarios	Pending  The timing for any national simulation exercises is yet to be determined and is dependent on resourcing. It is suggested that any simulation exercises would occur at a later time noting that between 2020-2022 there were three national responses to Khapra beetle, and DAFF is preparing a Khapra beetle strategy document.	To be determined	Not applicable	Not applicable
	3.4.2 Revise Plant Health Australia’s 2005 Industry Biosecurity Plan for the Grains Industry – Threat Specific Contingency Plan	Completed – project finished. Grains industry biosecurity plan 4.0 (2023)  The completed contingency plan provides a nationally agreed and updated approach to contingency planning for the grains industry high priority pests.  Agriculture Victoria has since developed a modular	PHA	GRDC	Not applicable

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
		<p>contingency plan structure and user requirements for a portal that is expected to host threat specific contingency information.</p> <p>Agriculture Victoria has used existing Brown Marmorated Stink Bug (BMSB) material to trial the structure’s functionality. In addition, Department of Agriculture and Fisheries (Queensland) developed a contingency plan for the nursery industry trialed the modular structure for this project.</p> <p>Ongoing financial support to host the final IT system is still to be determined. <a href="#">Grains – Plant Health Australia</a></p>			

**Table 4 Implementation of activities for Area 4: Cross-cutting**

Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
<p><b>Action 4.1:</b> Develop an overarching communication and engagement strategy, and deliver targeted activities relevant to the stakeholder group (industry, community, government).</p> <p><b>Expected benefit and outcome:</b> To mitigate the risk of a Khapra beetle incursion through raising biosecurity awareness among stakeholder groups (industry, community, government).</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	4.1.1 Develop communication and engagement strategy to emphasis biosecurity is everyone’s responsibility and include activities to target the import supply chain, production industries, the general public and international travellers	Completed – project finished Developed communication and engagement strategy <a href="#">National Biosecurity Communication and Engagement Strategy - DAFF (agriculture.gov.au)</a>	Commonwealth (BPSSD, HHWG)	Commonwealth	Not applicable
<p><b>Action 4.2:</b> Establish governance arrangements to coordinate and monitor national actions.</p> <p><b>Expected benefit and outcome:</b> Strengthening governance arrangements will guide implementation and coordinate effort to ensure Australia is as prepared as possible for a post border detection or incursion.</p> <p><b>Priority:</b> high</p> <p><b>Time frame:</b> short term</p>	4.2.1 Collaborate with regional neighbours to align prevention and preparedness activities	Ongoing – business as usual	Commonwealth (PPEBD, TID)	Commonwealth	Not applicable
	4.2.2 Consider establishing an information repository on Khapra beetle that is regularly updated and accessible in real-time	Ongoing – business as usual	Commonwealth (PPEBD, )	Commonwealth	Not applicable
<p><b>Action 4.3:</b> Identify research and development priorities for investment and support national and international collaboration.</p> <p><b>Expected benefit and outcome:</b> To build Khapra beetle preparedness</p>	4.3.1 Research investment priorities should be informed by a stocktake of all Khapra beetle research being conducted or completed overseas and nationally, to consider gaps in research needed for Australia—including	Ongoing – business as usual	Commonwealth (PPEBD)	Commonwealth	Not applicable

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Action	Project or business-as-usual activity	Status	Lead organisation	Contributors (financial and in-kind)	Dependencies
capacity and capability it would be beneficial for relevant agencies (national or international), as well as science-based organisations to form partnerships. <b>Priority:</b> medium <b>Time frame:</b> medium term	those components identified in this plan				
	4.3.2 Undertake an assessment of international Khapra beetle research to identify gaps in understanding and assist identify key priorities for research	Ongoing – business as usual	Commonwealth (PPEBD)	Commonwealth	Not applicable
	4.3.3 Collaborate with national and international experts and to engage local providers through relevant research and development corporations to deliver relevant research for Australia	Ongoing – business as usual	Commonwealth (PPEBD)	Commonwealth	Not applicable
	4.3.4 Research priorities should be promoted for funding within the relevant research and development corporations, and the Plant Biosecurity Research Initiative	Ongoing – business as usual	Commonwealth (PPEBD)	Commonwealth	Not applicable



## Glossary

Term	Definition
BPSSD	Biosecurity Plant and Science Service Division (DAFF)
BSRD	Biosecurity Strategy and Reform Division (DAFF)
CED	Compliance and Enforcement Division (DAFF)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Department of Agriculture, Fisheries and Forestry
DBD	Digital Business Division (DAFF)
HHWG	Hitchhiker Working Group
IPCC	International Plant Protection Convention
NPBDN	National Plant Biosecurity Diagnostic Network (through SPHD)
PHA	Plant Health Australia
PHC	Plant Health Committee
PLAE	Plant and Live Animal Exports, Animal Welfare and Regulation Division (DAFF)
PPEBD	Plant Protection and Environmental Biosecurity Division (DAFF)
PSARA	Plant Sciences and Risk Assessment (DAFF)
SCFG	Sea Container Focus Group
SNPHS	Subcommittee on National Plant Health Surveillance (under PHC)
SPHD	Subcommittee on Plant Health Diagnostics (under PHC)
TID	Trade and International Division (DAFF)

### Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.

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