Annual Compliance Report

22 September 2022 to 21 September 2023

EPBC 2019/8516
Residential Development, Collingwood Park, Ipswich, Queensland

Prepared for HB QLD Pty Ltd
12th December 2023

9641 E

Document Control

Document: Annual Compliance Report (Issue A), prepared by Saunders Havill Group for HB QLD Pty Limited, dated 12 December 2023.

Document Issue

Issue	Date	Prepared By	Checked By
A	21/11/2023	LB	SM
B	12/12/2023	LB	MS

Prepared by

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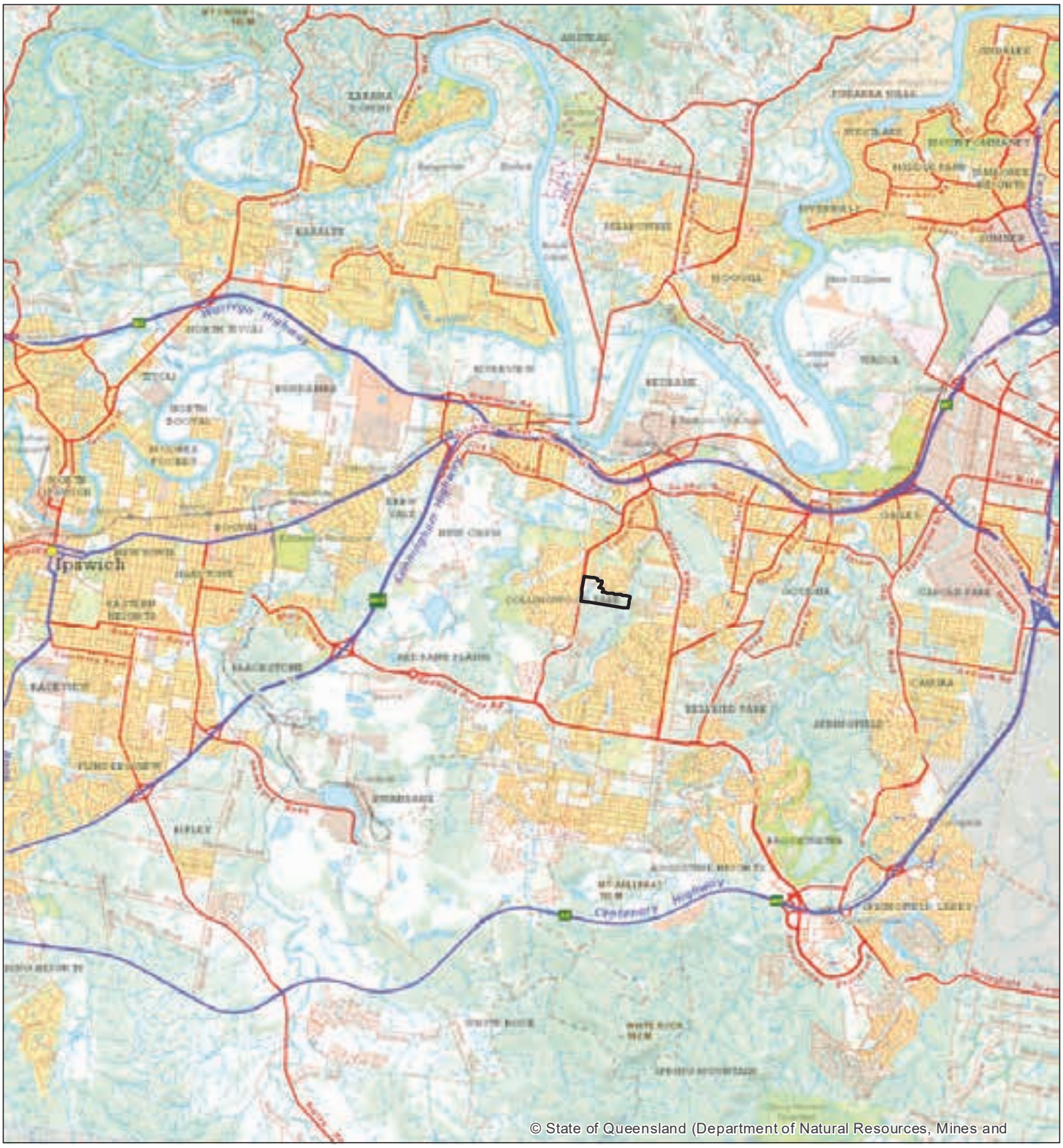
1. Introduction

Saunders Havill Group (SHG) was engaged by HB QLD Pty Ltd to prepare this Annual Compliance Report for the Residential Development located at Collingwood Park, Ipswich, Queensland. This report provides an assessment of project compliance with the approval granted under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (ref EPBC 2019/8539) and is specifically required by condition 11 of the approval granted on 06 September 2021 (refer **Appendix A**). This report is the second Annual Compliance Report for the project.

The project area covers approximately 24.89 hectares (ha) and is located 6 kilometre (km) south of the Ipswich Town Centre (refer to project context map at **Figure 1**). Within the project area, an impact to 24.89 ha of Matters of National Environmental Significance (MNES) habitat being koala and grey-headed flying-fox (GHFF) habitat was permitted under the approval conditions.

1.1. Approval details

Commonwealth reference	EPBC 2019/8516
Approval holder	HB QLD Pty Ltd
ABN	26 638 077 415
Approval date	06 September 2021
Expiry date of approval	31 December 2051
Approved action	Residential development and associated infrastructure located at Collingwood Park, Ipswich, Queensland.
Controlling provision	Approved – listed threatened species and communities (sections 18 & 18A)
Project commencement	22 September 2021
Reporting period	22 September 2022 – 21 September 2023 (Year 2)
Address	Collingwood Park, Ipswich, Queensland
Local government area	Ipswich City Council



Legend

Proposed action area

Figure A1

Site Context

File ref. 9641 E Figure A1 PD Site Context A
Date *26/07/2019*
Project *Collingwood Drive, Collingwood Park*

0 0.5 1 2 3 *km*

N

Scale (A4): 1:100,000 [GDA 1994 MGA Z56]

WEIYA DEVELOPMENT PTY LIMITED

saunders havill group

Layer Source: *© State of Queensland (Department of Natural Resources, Mines and Energy) 2019.*

1.2. Declaration of accuracy

In making this declaration, I am aware that sections 490 and 491 of the EPBC Act make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed	
Full name	Murray Saunders
Position	Director
Organisation	Saunders Havill Group ABN 24 144 972 949
Date	12 December 2023

2. Description of activities – approval area

Construction activities at Collingwood Park, Ipswich, Queensland, known as 'The Pocket' commenced on 22 September 2021 with a high level of diligence afforded by the Proponent to minimise the likelihood that koalas were harmed by the action. The approval provided for the clearing of the site in two (2) stages with Stage 1 allowed to commence with the approval and Stage 2 able to be cleared once the full approval of the Offset Management Plan had occurred.

Prior to and during clearing of Stage 1, an appropriately qualified fauna spotter catcher (FSC) was engaged to identify the presence of any koalas within the works area. The clearing was undertaken in a two-stage manner which involves the clearing of the midstory and groundcover vegetation 24 hours prior to clearing the habitat features on-site. This process allows arboreal fauna to disperse over night after the initial disturbance and results in fewer animal interactions. Stage 1 was cleared in February 2022 and with the approval of the OMP in March 2022 the balance of the land was cleared in October 2022. At the date of this ACR all clearing had been completed in accordance with the volume, locations and areas of the approval.

Refer to **Appendix B** for the pre-clearing and post clearing reports prepared by Queensland Fauna Consultancy who were the engaged FSC. Stage 1 FSC Reports are contained in ACR 1 and for file size reasons not repeated in this ACR.

During Year 1, a total of 14.89 ha was cleared. The majority of the total clearing has now been completed and has not exceeded the approved limit of 24.89 ha, calculated at 22.81ha. The variation in this number relates to edge refinements not yet completed at the development progresses. Importantly no clearing has occurred external to the approved development zone. Refer **Figure 2** for most recent aerial of the action area and the current clearing extents in alignment with the approval plan. Following the completion of clearing and prior to the commencement of construction, a temporary koala exclusion fence was erected around the construction works area (refer to **Photo 1** & **Appendix C** for additional images of the Temporary Exclusion Fence). This exclusion fencing remains in place between the retained area and the completed clearing works. Additionally, a daily fauna exclusion fence check is undertaken by the engaged civil contractor to ensure that no fauna are trapped within the construction area.

Within the approval site, activities which have continued in Year 2 include:

- Road construction
- Landscape works along new roads and entry areas
- Soil stabilisation and seeding
- Erosion and sediment control devices (fencing / basins / drainage swales)
- Continued staged civil construction works of roads and local streets
- Allotment benching and sealing
- House construction

Figure 2: Site Aerial & Clearing Area

Photo 1: Evidence of temporary koala exclusion fencing erected at the impact site.

3. Description of activities – offset area

During Year 1 of the approval, the offset provider has lodged and received approval for their Offset Management Plan (OMP) (refer to **Appendix D** for the OMP approval notification). **Appendix E** contains a copy of the Year 1 Offset Area Annual Report (OAAR) provided by Habitat Exchange. The OAAR report covers the period from the Offset Management Plan approval in March 2022 to Year 1 of offset actions through to March 2023. Actions during this period include:

- Legally securing the offset area via Voluntary Declaration under the *Vegetation Management Act 1999* on 9 September 2021.
- Baseline surveys and mapping for weeds (Initial outcomes of weed management)
- Baseline Surveys for pest species – including some initial pest management activities:
    - Two (2) overnight targeted shooting events.
    - Targeted wild dog baiting program using restricted S7 poisons supplied and implemented in collaboration with the Scenic Rim Regional Council (SRRC).
- Weed and Pest Management Plan (Contained as an Attachment within the OAAR)
- Fence construction
- Ground preparation for planting works
- Natural regeneration activities

The approved OMP is published on the proponent's website at the following URL: https://thepocketlife.com.au/wp-content/uploads/2022/11/9641-E-1-OMP-A.pdf

4. EPBC approval conditions compliance table

The EPBC approval conditions for the Collingwood Park, Ipswich, Queensland residential development are replicated in **Table 1** with a designation on compliance or non-compliance if the condition was applicable during the reporting period, and evidence and comments as necessary. A copy of the EPBC approval and conditions is provided in **Appendix A**.

Table 1: EPBC approval conditions compliance table

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
Part A – Conditions specific to the action			
1	The approval holder: a) Must not clear more than 24.89 hectares of Koala habitat and Grey-headed Flying-fox foraging habitat within the development area; b) Must retain 2.21 hectares Koala habitat and Grey-headed Flying-fox foraging habitat in Goodna Creek riparian buffer; and c) Must not clear outside of the development area.	Compliant	As per Figure 2, the approval holder has cleared 22.81ha of vegetation during Year 1 and 2. The approval holder has retained the Goodna Creek riparian buffer and has not cleared outside of the development area. The total volume of clearing as of the date of the ACR is below the allowance in approval Condition 1.
2	To minimise the risk of injury or death to Koalas and Grey-headed Flying-fox within the development area during clearing and construction, the approval holder must: a) ensure that a qualified fauna spotter catcher is present during all clearing and is given sufficient authority to guide all clearance to ensure that Koalas and Grey-headed Flying-foxes have safely	Compliant	As per **Appendix B,** a suitably qualified Fauna Spotter Catcher was present during all clearing activities. Its noted that no MNES Species (as per the approval or listed since the approval) were encountered during the February 2022 Stage 1 clearing of the October 2022 Stage 2 clearing. As demonstrated in **Photo 1** and in **Appendix C**, a temporary koala exclusion fence was erected around all construction works areas prior to

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
	moved out of the development area identified for clearing, of their own volition, before Koala habitat and Grey-headed Flying-fox foraging habitat is cleared; and b) install temporary Koala exclusion fencing around all construction works. Temporary Koala exclusion fencing must be installed immediately after any clearing and prior to the commencement of any construction so as to prevent any Koala entering during construction. Temporary Koala exclusion fencing must remain in place around any construction area until all construction activities within the fenced area are completed.		the commencement of construction. As shown this temporary fence remains in place between retained vegetation and cleared areas as construction is ongoing.
3	For the ongoing protection of the Koala population at the development area, the approval holder must install and maintain for the duration of the approval, fauna movement solutions on all roads that run adjacent to Goodna Creek riparian buffer, including Koala awareness signage, speed management measures and fauna friendly crossings. The approval holder must ensure a maximum speed limit of no greater than 40 km / hour is enforced during the construction phase in the development area at all times until a government entity assumes control of all roads in the development area.	Not applicable	During Year 2 the proposed action has not advanced to the point at which it adjoins the Goodna Creek riparian buffer with infrastructure or development. Clearing has occurred in this zone, however no road or allotment construction has commenced in this zone and the area cannot be accessed by vehicles or the public.
4	To compensate for the clearing of 24.89 hectares of Koala habitat and Grey-headed Flying-fox foraging habitat, the approval holder must:	Compliant	The offset area was legally secured on 9 September 2021. The Department was notified via email with an attachment of the offset area shapefiles on 10 September 2021. (Evidence of this is contained in ACR Year 1)

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
	a) Legally secure at least 34.7 ha of land at the Scenic Ridge Offset Management Zone 1 area prior to the commencement of the action; and b) within 20 business days of legally securing the Scenic Ridge Offset Management Zone 1 area, provide the Department with written evidence demonstrating that the Scenic Ridge Offset Management Zone 1 area has been legally secured (e.g. legal security documentation), including shapefiles and the offset attributes.		
5	The approval holder must, within one month of this approval decision, submit an Offset Management Plan for Scenic Ridge Offset Management Zone 1 for approval by the Minister. The approval holder must not commence works within the Phase 2 Area until the Offset Management Plan for Scenic Ridge Offset Management Zone 1 has been approved by the Minister in writing. The approval holder must implement the Offset Management Plan approved by the Minister for Scenic Ridge Offset Management Zone 1.	Compliant	As demonstrated within ACR 1 the OMP was submitted to the Department on 6 October 2021.
6	The Offset Management Plan for Scenic Ridge Offset Management Zone 1 must be consistent with the Department's Environmental Management Plan Guidelines, and must include the following: a) A summary of the residual impacts to Koala habitat and Grey-headed Flying-fox foraging habitat that will be compensated for by the offset. This summary must include the area(s) of habitat for protected	Compliant	The OMP was assessed and approved by the Department on 25 March 2022. The OMP was deemed to be consistent with the Department's Environmental Management Plan Guidelines and approved for implementation. A copy of the approval letter is included as **Appendix F**. A full copy of the approved OMP is available on the proponent's website at the following URL: https://thepocketlife.com.au/wp-content/uploads/2022/11/9641-E-1-OMP-A.pdf

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
	matters and its condition and quality at all impact sites which the particular offset is to address. b) Detailed survey methodologies for determining baselines on the proposed offset for feral animal abundance and extent of weed cover, modified habitat quality assessment for Koala, and a Grey-headed Flying-fox habitat assessment; and detailed methodologies for specifying baseline levels based on the survey data. c) The environmental objectives, relevant to Koala and Grey-headed Flying-fox, and a reference to the EPBC Act approval conditions and other applicable conditions of approval (including State approval conditions), if any, to which the Offset Management Plan refers. d) A table of commitments made in the Offset Management Plan to achieve the environmental objectives, and a reference to where the commitments are detailed in the Offset Management Plan. e) Reporting and review mechanisms, and documentation standards to demonstrate compliance with management and environmental commitments in the Offset Management Plan. f) An assessment of risks to achieving environmental objectives and risk management strategies that will be applied.		

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
	g) Impact avoidance, mitigation and/or repair measures, and their timing. h) A monitoring program, which must include: i. measurable performance indicators to monitor attainment of the offset completion criteria; ii. trigger values for corrective actions; and iii. the timing and frequency of monitoring to detect trigger values and changes in the performance indicators. i) Proposed corrective actions, if trigger values are reached or performance indicators not attained.		
Part B – Standard administrative conditions			
7	The approval holder must notify the Department in writing of the date of commencement of the action within 10 business days after the date of commencement of the action.	Compliant	The action commencement on 22 September 2021. The Department was notified via email on 28 September 2021 of the formal commencement of the action. Evidence of this notification is included ACR Year 1.
8	If the commencement of the action does not occur within 5 years from the date of this approval, then the approval holder must not commence the action without the prior written agreement of the Minister.	Not applicable	-
9	The approval holder must maintain accurate and complete compliance records.	Compliant	This Annual Compliance Report is the second report produced for this action. This report will be available online via the approval holders website.
10	If the Department makes a request in writing, the approval holder must provide electronic copies of compliance records	Not applicable	-

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
	to the Department within the timeframe specified in the request.		
11	The approval holder must prepare a compliance report for each 12 month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must: a) publish each compliance report on the website within 60 business days following the relevant 12 month period; b) notify the Department by email that a compliance report has been published on the website and provide the weblink for the compliance report within 5 business days of the date of publication; c) keep all compliance reports publicly available on the website until this approval expires; d) exclude or redact sensitive ecological data from compliance reports published on the website; and e) where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.	Compliant	This Annual Compliance Report is the second report produced for this action. This report will be available online via the approval holders website. The Department will be notified following publication.
12	The approval holder must notify the Department in writing of any incident, non-compliance with the conditions, or non-compliance with the commitments made in plans. The notification must be given as soon as practicable, and no	Not applicable	-

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
	later than 2 business days after becoming aware of the incident or non-compliance. The notification must specify: a) any condition which is or may be in breach; b) a short description of the incident and/or non-compliance; and c) the location (including co-ordinates), date, and time of the incident and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.		
13	The approval holder must provide to the Department the details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying: a) any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future; b) the potential impacts of the incident or non-compliance; and c) the method and timing of any remedial action that will be undertaken by the approval holder.	Not applicable	-
14	The approval holder must ensure that independent audits of compliance with the conditions are conducted for the three-year period from the date of this approval and subsequently as requested in writing by the Minister.	Not applicable	-

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
15	For each independent audit, the approval holder must: a) provide the name and qualifications of the independent auditor and the draft audit criteria to the Department; b) only commence the independent audit once the independent auditor and the audit criteria have been approved in writing by the Department; and c) submit an audit report to the Department within the timeframe specified in the approved audit criteria.	Not applicable	-
16	The approval holder must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of this approval.	Not applicable	-
17	The approval holder must: a) submit plans electronically to the Department; b) unless otherwise agreed to in writing by the Minister, publish each plan on the website within 20 business days of the date that the plan was approved by the Minister in writing; c) exclude or redact sensitive ecological data from plans that are to be published on the website or provided to a member of the public; and d) keep plans published on the website until the end date of this approval.	Compliant	All plans, including the OMP have been lodged electronically to the Department.

Condition number / reference	Condition	Compliant / Non-compliant / Not applicable	Evidence / comments
18	Within 30 business days after the completion of the action, the approval holder must notify the Department in writing and provide completion data.	Not applicable	-

5. Appendices

Appendix A

EPBC approval and conditions granted 06 September 2021

Appendix B

Pre-clearing and Post-clearing Reports

Appendix C

Temporary Koala Exclusion Fence Photos

Appendix D

OMP Approval Letter

Appendix E

Year 1 - Offset Area Annual Offset Report (Habitat Exchange)

Appendix A

EPBC approval and conditions granted

06 September 2021

Australian Government
Department of Agriculture, Water and the Environment

APPROVAL

Residential development, Collingwood Park, Ipswich, Queensland, (EPBC 2019/8516)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999 (Cth).* Note that section 134(1A) of the **EPBC Act** applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Weiya Development Pty Ltd
ACN or ABN of approval holder	ABN 31 161 405 732
Action	To construct a new residential development at Lot 801 on SP157194, Lot 1 on RP22251 and Lot 2 on RP22251, Collingwood Park 186, 218 and Lot 2 Collingwood Drive, Collingwood Park, Ipswich, Queensland.

Approval decision

My decision on whether or not to approve the taking of the action for the purposes of the controlling provision for the action is as follows.

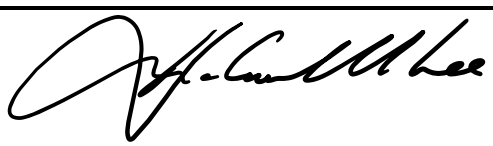
Controlling Provision

Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve

Period for which the approval has effect

This approval has effect until 31 December 2051.

Decision-maker

Name and position	Andrew McNee Assistant Secretary Environmental Assessments Queensland and Sea Dumping Branch
Signature	
Date of decision	6 September 2021

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

1. The approval holder:

   a) must not **clear** more than 24.89 hectares of **Koala habitat** and **Grey-headed Flying-fox foraging habitat** within the **development area**;

   b) must retain the 2.21 hectares **Koala habitat** and **Grey-headed Flying-fox foraging habitat** in **Goodna Creek riparian buffer**; and

   c) must not **clear** outside of the **development area**.

2. To minimise the risk of injury or death to **Koalas** and **Grey-headed Flying-fox** within the **development area** during **clearing** and **construction**, the approval holder must:

   a) ensure that a qualified **fauna spotter catcher** is present during all **clearing** and is given sufficient authority to guide all **clearance** to ensure that **Koalas** and **Grey-headed Flying-foxes** have safely moved out of the **development area** identified for **clearing**, of their own volition, before **Koala habitat** and **Grey-headed Flying-fox foraging habitat** is **cleared**; and

   b) install temporary **Koala exclusion fencing** around all **construction** works. Temporary **Koala exclusion fencing** must be installed immediately after any **clearing** and prior to the commencement of any **construction** so as to prevent any **Koala** entering during **construction**. Temporary **Koala exclusion fencing** must remain in place around any **construction** area until all **construction** activities within the fenced area are completed.

3. For the ongoing protection of the **Koala** population at the **development area**, the approval holder must install and maintain for the duration of the approval, **fauna movement solutions** on all roads that run adjacent to **Goodna Creek riparian buffer**, including **Koala awareness signage,** speed management measures and fauna friendly crossings. The approval holder must ensure a maximum speed limit of no greater than 40 km / hour is enforced during the **construction** phase in the **development area** at all times until a government entity assumes control of all roads in the **development area**.

4. To compensate for the **clearing** of 24.89 hectares of **Koala habitat** and **Grey-headed Flying-fox foraging habitat,** the approval holder must:

   a) **Legally secure** at least 34.7 ha of land at the **Scenic Ridge Offset Management Zone 1** area prior to the **commencement of the action**; and

   b) within 20 **business days** of **legally securing** the **Scenic Ridge Offset Management Zone 1** area, provide the **Department** with written evidence demonstrating that the **Scenic Ridge Offset Management Zone 1** area has been **legally secured** (e.g. **legal security documentation**), including **shapefiles** and the **offset attributes**.

5. The approval holder must, within one month of this approval decision, submit an Offset Management Plan for **Scenic Ridge Offset Management Zone 1** for approval by the **Minister**. The approval holder must not **commence works** within the **Phase 2 Area** until the Offset Management Plan for **Scenic Ridge Offset Management Zone 1** has been approved by the **Minister** in writing. The approval holder must implement the Offset Management Plan approved by the **Minister** for **Scenic Ridge Offset Management Zone 1**.

6. The Offset Management Plan for **Scenic Ridge Offset Management Zone 1** must be consistent with the **Department's Environmental Management Plan Guidelines**, and must include the following:

   a) A summary of the residual impacts to **Koala habitat** and **Grey-headed Flying-fox foraging habitat** that will be compensated for by the offset. This summary must include the area(s) of habitat for **protected matters** and its condition and quality at all impact sites which the particular offset is to address.

   b) Detailed survey methodologies for determining baselines on the proposed offset for feral animal abundance and extent of weed cover, modified habitat quality assessment for **Koala,** and a **Grey-headed Flying-fox** habitat assessment; and detailed methodologies for specifying baseline levels based on the survey data.

   c) The environmental objectives, relevant to **Koala** and **Grey-headed Flying-fox,** and a reference to the **EPBC Act** approval conditions and other applicable conditions of approval (including State approval conditions), if any, to which the Offset Management Plan refers.

   d) A table of commitments made in the Offset Management Plan to achieve the environmental objectives, and a reference to where the commitments are detailed in the Offset Management Plan.

   e) Reporting and review mechanisms, and documentation standards to demonstrate compliance with management and environmental commitments in the Offset Management Plan.

   f) An assessment of risks to achieving environmental objectives and risk management strategies that will be applied.

   g) Impact avoidance, mitigation and/or repair measures, and their timing.

   h) A monitoring program, which must include:

      i. measurable performance indicators to monitor attainment of the offset completion criteria;

      ii. trigger values for corrective actions; and

      iii. the timing and frequency of monitoring to detect trigger values and changes in the performance indicators.

   i) Proposed corrective actions, if trigger values are reached or performance indicators not attained.

Part B – Standard administrative conditions

Notification of date of commencement of the action

7. The approval holder must notify the **Department** in writing of the date of **commencement of the action** within 10 **business days** after the date of **commencement of the action**.

8. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.

Compliance records

9. The approval holder must maintain accurate and complete **compliance records**.

10. If the **Department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **Department** within the timeframe specified in the request.

Note: **Compliance records** may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **Department**'s website or through the general media.

Annual compliance reporting

11. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:

    a. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period;

    b. notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within 5 **business days** of the date of publication;

    c. keep all **compliance reports** publicly available on the **website** until this approval expires;

    d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website;** and

    e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

Note: **Compliance reports** may be published on the **Department**'s website.

Reporting non-compliance

12. The approval holder must notify the **Department** in writing of any **incident**, non-compliance with the conditions, or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than 2 **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:

    a. any condition which is or may be in breach;

    b. a short description of the **incident** and/or non-compliance; and

    c. the location (including co-ordinates), date, and time of the incident and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.

13. The approval holder must provide to the **Department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:

    a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;

    b. the potential impacts of the **incident** or non-compliance; and

    c. the method and timing of any remedial action that will be undertaken by the approval holder.

Independent audit

14. The approval holder must ensure that **independent audits** of compliance with the conditions are conducted for the three-year period from the date of this approval and subsequently as requested in writing by the **Minister**.

15. For each **independent audit**, the approval holder must:
    a. provide the name and qualifications of the independent auditor and the draft audit criteria to the **Department**;
    b. only commence the **independent audit** once the independent auditor and the audit criteria have been approved in writing by the **Department**; and
    c. submit an audit report to the **Department** within the timeframe specified in the approved audit criteria.
16. The approval holder must publish the audit report on the **website** within 10 **business days** of receiving the **Department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval.

Submission and publication of plans

17. The approval holder must:
    a. submit **plans** electronically to the **Department**;
    b. unless otherwise agreed to in writing by the **Minister**, publish each **plan** on the **website** within 20 **business days** of the date that the **plan** was approved by the **Minister** in writing;
    c. exclude or redact **sensitive ecological data** from **plans** that are to be published on the **website** or provided to a member of the public; and
    d. keep **plans** published on the **website** until the end date of this approval.

Completion of the action

18. Within 30 **business days** after the **completion of the action**, the approval holder must notify the **Department** in writing and provide **completion data**.

Part C - Definitions

In these conditions, except where contrary intention is expressed, the following definitions are used:

Business day means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.

Clear, Cleared, Clearing, Clearance means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including weeds – see the *Australian weeds strategy 2017 to 2027* for further guidance).

Commence the action / Commencement of the action means the first instance of any specified activity associated with the action including **clearing** and **construction**. **Commencement of the action** does not include minor physical disturbance necessary to:

i. undertake pre-clearance surveys or monitoring programs
ii. install signage and /or temporary fencing to prevent unapproved use of the project area
iii. protect environmental and property assets from fire, weeds and pests, including installation of temporary fencing, and use of existing surface access tracks
iv. install temporary site facilities for persons undertaking pre-commencement activities so long as these are located where they have no impact on the **protected matters.**

Commence works means the first instance of any specified activity associated with the action including breaking ground, clearing and construction.

Completion data means an environmental report and spatial data clearly detailing how the conditions of this approval have been met. The Department's preferred spatial data format is **shapefile**.

Completion of the action means the date on which the **Minister** advises in writing (in response to a request from the approval holder) that the approval holder is not required to submit any further compliance reports.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in the approval holder's possession or that are within the approval holder's power to obtain lawfully.

Compliance reports means written reports:

i. providing accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans**

ii. consistent with the **Department's** *Annual Compliance Report Guidelines* (2014)

iii. include a **shapefile** of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12 month period

iv. annexing a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12 month period.

Construction means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site; the alteration, maintenance, repair or demolition of any building or structure; preliminary site preparation work which involves breaking of the ground (including pile driving); the laying of pipes and other prefabricated materials in the ground, and any associated excavation work.

Department means the Australian Government agency responsible for administering the **EPBC Act**.

Development area means the area enclosed by the bold black line designated as the 'Proposed Action Area' on Attachment B, and as per the coordinates in Attachment E, comprising Lot 801 on SP157194, Lot 1 on RP22251, Lot 2 on RP22251 and 186, 218 and Lot 2 Collingwood Drive, Collingwood Park, Queensland.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Environmental Management Plan Guidelines means *Environmental Management Guideline. Commonwealth of Australia 2014*.

Fauna movement solutions means, but is not limited to, **Koala awareness signage**, speed management measures and fauna friendly crossings, such as a poles, canopy bridges and culverts, undertaken as described in the Queensland Department of Transport and Main Roads (2010) Fauna Sensitive Road Design Guidelines Volume 2.

Fauna spotter catcher means a person licenced under the Queensland *Nature Conservation Act 1992* to detect, capture, care for, assess, and release wildlife disturbed by **clearance** activities who has at least three years experience undertaking this work with **Koalas**.

Goodna Creek riparian buffer means the area adjacent to Goodna Creek shaded green and designated 'Habitat retention area' on the map at Attachment A and bounded by a line joining the coordinates designated 'Habitat retention area' in Attachment E to this decision.

Grey-headed Flying-fox(es) means *Pteropus poliocephalus* - Grey-headed Flying-fox listed as threatened species under the **EPBC Act**.

Grey-headed Flying-fox foraging habitat means areas of vegetation that contain **Grey-headed Flying-fox** foraging trees such as Eucalyptus, Angophora and Corymbia species, including winter and spring flowering species.

Incident means any event which has the potential to do, or does, impact on one or more **protected matters** other than as authorised by this approval.

Independent audit means an audit conducted by an independent and **suitably qualified person** as detailed in the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines, Commonwealth of Australia 2019.*

Koala(s) means the Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) listed as a threatened species under the **EPBC Act**.

Koala awareness signage means prominent, legible, clearly understood signage for the purpose of alerting drivers that **Koalas** may be in the vicinity.

Koala exclusion fencing means fencing which prevents the movement of **Koalas**. Suitable examples of **Koala exclusion fencing** design are provided in *Koala-sensitive Koala-sensitive Design Guideline: A guide to koala sensitive designed measures for planning and development activities, version 2.0 (Queensland Department of Environment and Science, 2020)*.

Koala habitat means any forest or woodland containing species that are known Koala food trees, or shrubland with emergent food trees (as defined in the **Koala referral guidelines**). Koala food trees means a species of trees of the genus *Angophora*, *Corymbia*, *Eucalyptus*, *Lophostemon* or *Melaleuca*, with a height of more than 4 metres or with a trunk circumference more than 31.5 centimetres at 1.3 metres above the ground, the leaves of which are known to be consumed by the **Koala**.

Koala referral guidelines means the **Department**'s *EPBC Act referral guidelines for the vulnerable koala (combined population of Queensland, New South Wales and the Australian Capital Territory*), Department of the Environment, 2014.

Legally secure (d/ing) means to provide ongoing conservation protection on the title of the land, under an enduring protection mechanism, such as voluntary declaration under the *Vegetation Management Act 1999* (Qld) or another enduring protection mechanism agreed to in writing by the **Department**.

Legal security documentation means documentation associated with legally securing offset site(s), including (but not limited to) management plans.

Minister means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.

Offset attributes means an 'xls' file capturing relevant attributes of the offset area, including:

a) **EPBC Act** reference number;

b) physical address;

c) coordinates of the boundary points in decimal degrees;

d) **protected matters** that the offset compensates for;

e) any additional **EPBC Act** listed threatened species and communities that are benefitting from the offset; and

f) size in hectares.

Phase 2 Area means the entire area shaded blue designated 'Phase 2 Area' in the map at Attachment D.

Plan(s) means any of the documents required to be prepared, approved by the **Minister**, implemented by the approval holder and/or published on the **website** in accordance with these conditions (includes action management plans and/or strategies).

Protected matter(s) means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect.

Scenic Ridge Offset Management Zone 1 is located on Lot 15 on W311675, on Geiger Road, Allandale, Queensland. Scenic Ridge Offset Management Zone 1 covers the area located within the red line designated as 'Offset management zone 1 (34.7 ha)' on the map at Attachment C.

Sensitive ecological data means data as defined in the Australian Government Department of the Environment (2016) *Sensitive Ecological Data – Access and Management Policy V1.0.*

Shapefile(s) means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx', '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes**.**

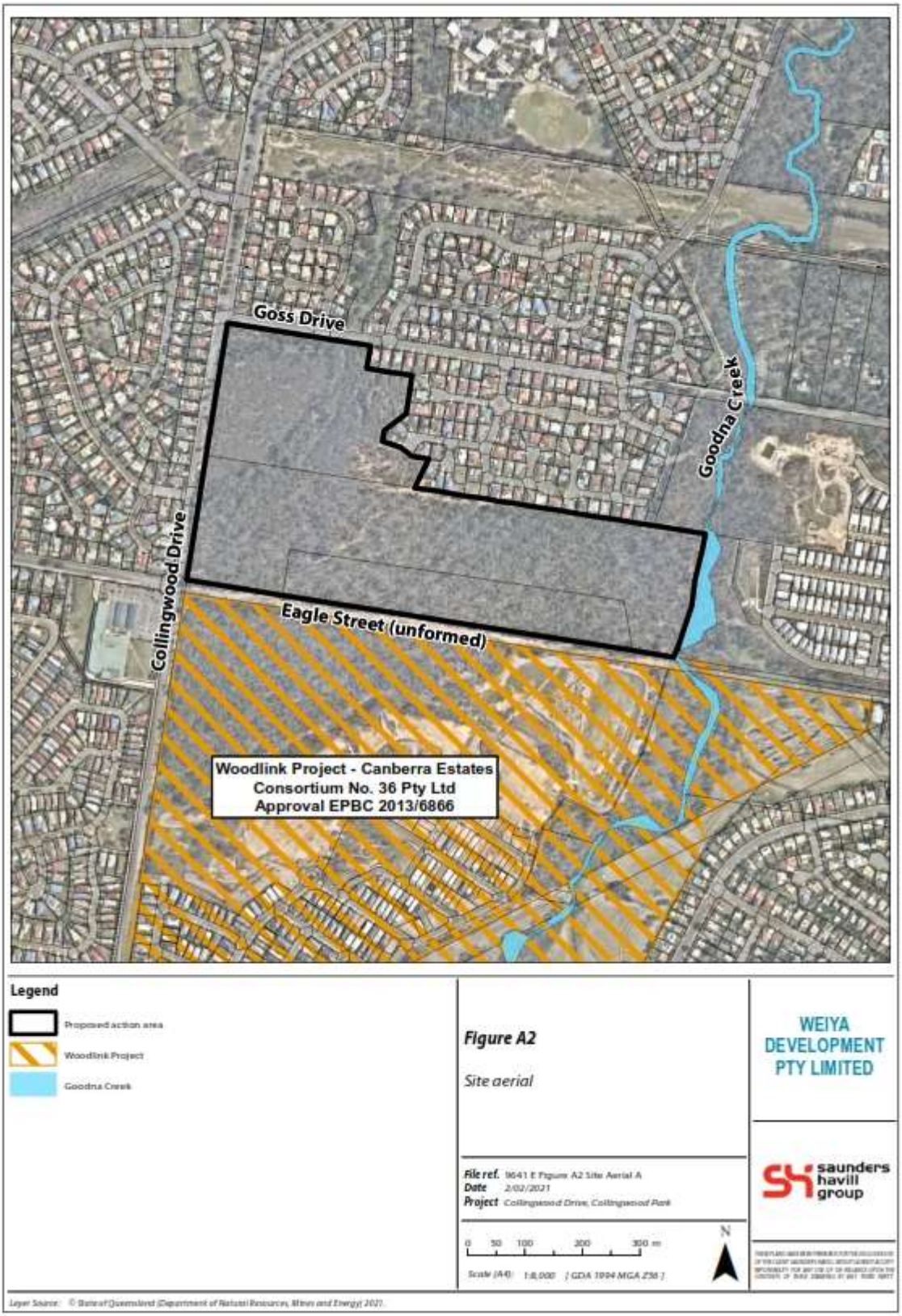
Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

ATTACHMENTS

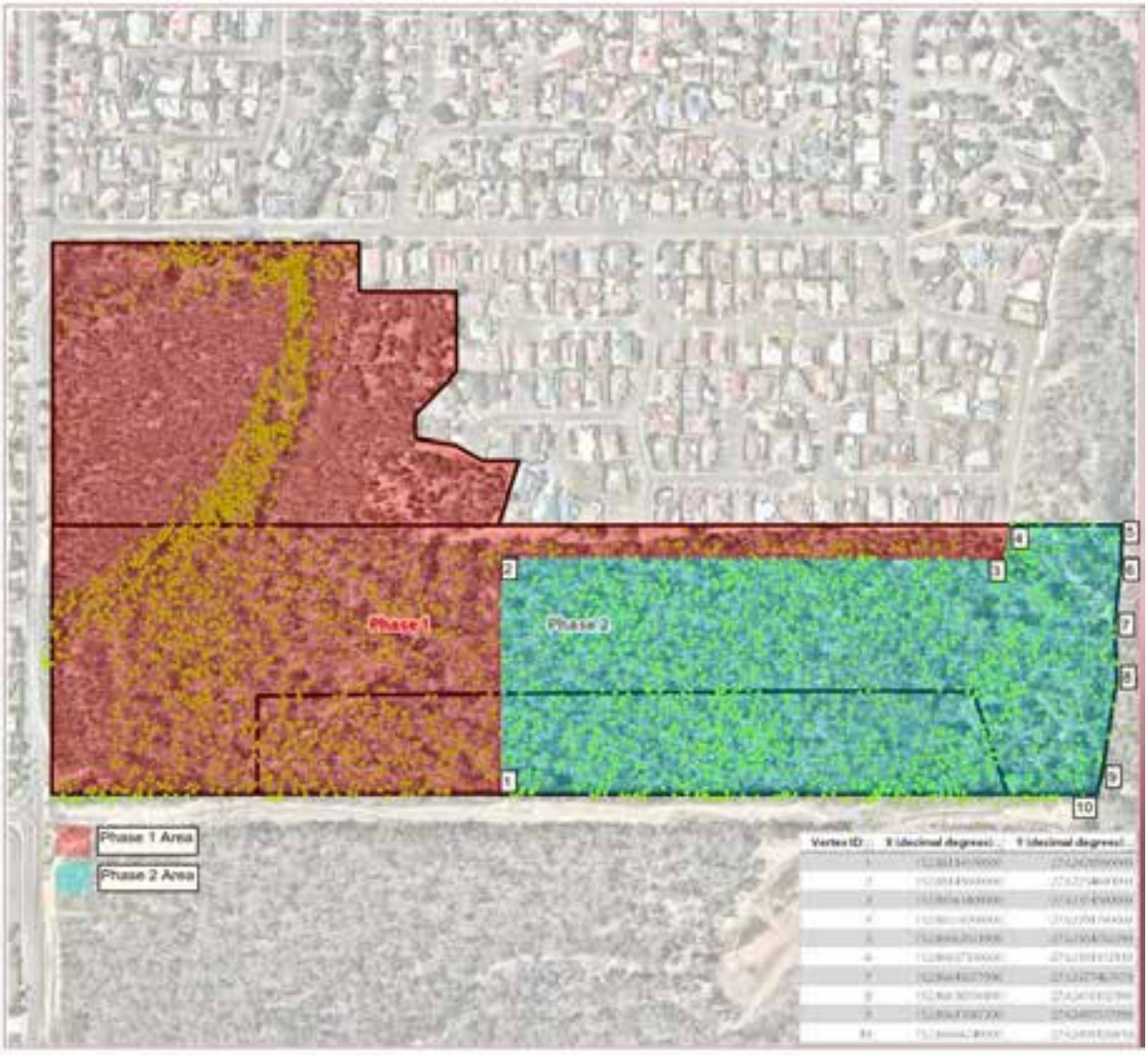
Attachment A: 2.21 hectares habitat retention area (green area)

Attachment B: Location of development area delineated by bold black line area. Collingwood Park development location is within Lot 801 on SP157194, Lot 1 on RP22251 and Lot 2 on RP22251.



Attachment C: Map of the Scenic Ridge Offset Management Zone 1

Attachment D: Phase 1 and Phase 2 Areas



Attachment E: Coordinates in decimal degrees for the development area and retention area adjacent to Goodna Creek at Collingwood Park.

Vertex ID	X Coordinate (decimal degrees)	Y Coordinate (decimal degrees)	Boundary
1	152.85865905200	-27.62054612520	Proposed action area
2	152.85883154300	-27.61981156660	Proposed action area
3	152.86070783300	-27.62007643390	Proposed action area
4	152.86064438500	-27.62043309200	Proposed action area
5	152.86144521200	-27.62054612520	Proposed action area
6	152.86133893600	-27.62114354230	Proposed action area
7	152.86094458400	-27.62140779310	Proposed action area
8	152.86091309900	-27.62158311940	Proposed action area
9	152.86123026900	-27.62167652000	Proposed action area
10	152.86144220700	-27.62182266290	Proposed action area
11	152.86174128100	-27.62186487830	Proposed action area
12	152.86148229300	-27.62231510190	Proposed action area
13	152.86578190200	-27.62292761410	Proposed action area & Habitat retention area
14	152.86662021900	-27.62304702290	Proposed action area & Habitat retention area
15	152.86661719100	-27.62306427770	Proposed action area & Habitat retention area
16	152.86659799100	-27.62317364990	Proposed action area & Habitat retention area
17	152.86657350600	-27.62331312110	Proposed action area & Habitat retention area
18	152.86643677900	-27.62377467670	Proposed action area & Habitat retention area
19	152.86638356800	-27.62418152390	Proposed action area & Habitat retention area
20	152.86613587300	-27.62485579390	Proposed action area & Habitat retention area
21	152.86608593300	-27.62495474370	Proposed action area & Habitat retention area
22	152.86606749900	-27.62499126850	Proposed action area
23	152.85745085000	-27.62376535730	Proposed action area
24	152.85780523800	-27.62179116190	Proposed action area
25	152.85818190900	-27.61971985490	Proposed action area
26	152.86600828600	-27.62321576530	Habitat retention area
27	152.86561040200	-27.62330707970	Habitat retention area
28	152.86561625900	-27.62329128680	Habitat retention area
29	152.86562430500	-27.62326956660	Habitat retention area
30	152.86562624100	-27.62326335910	Habitat retention area
31	152.86566233200	-27.62316625620	Habitat retention area
32	152.86575722100	-27.62296980970	Habitat retention area
33	152.86656138400	-27.62308998930	Habitat retention area
34	152.86648465000	-27.62310643800	Habitat retention area
35	152.86627612000	-27.62315429670	Habitat retention area
36	152.86600828600	-27.62321576530	Habitat retention area
37	152.86603747200	-27.62494294270	Habitat retention area
38	152.86600599100	-27.62493845880	Habitat retention area
39	152.86415147700	-27.62467430130	Habitat retention area
40	152.86418378400	-27.62449445210	Habitat retention area
41	152.86476010000	-27.62457648140	Habitat retention area
42	152.86481648000	-27.62458450590	Habitat retention area

43	152.86487434200	-27.62459274150	Habitat retention area
44	152.86497178000	-27.62454079940	Habitat retention area
45	152.86505914400	-27.62443575860	Habitat retention area
46	152.86516193600	-27.62430331270	Habitat retention area
47	152.86520899600	-27.62423275560	Habitat retention area
48	152.86524419100	-27.62417998780	Habitat retention area
49	152.86533669100	-27.62407038380	Habitat retention area
50	152.86543431600	-27.62396535560	Habitat retention area
51	152.86545100100	-27.62393818110	Habitat retention area
52	152.86545158100	-27.62393496120	Habitat retention area
53	152.86545217200	-27.62393165350	Habitat retention area
54	152.86545315800	-27.62392617470	Habitat retention area
55	152.86545432400	-27.62391968650	Habitat retention area
56	152.86545962200	-27.62389019440	Habitat retention area
57	152.86545996300	-27.62388829530	Habitat retention area
58	152.86546171700	-27.62387853480	Habitat retention area
59	152.86546537000	-27.62385819330	Habitat retention area
60	152.86546843400	-27.62384113530	Habitat retention area
61	152.86547170300	-27.62382294960	Habitat retention area
62	152.86547247500	-27.62381865630	Habitat retention area
63	152.86547336000	-27.62381373550	Habitat retention area
64	152.86547421600	-27.62380898390	Habitat retention area
65	152.86547518700	-27.62380356450	Habitat retention area
66	152.86547703000	-27.62379331470	Habitat retention area
67	152.86547720500	-27.62379233960	Habitat retention area
68	152.86549627900	-27.62368614290	Habitat retention area
69	152.86549657700	-27.62368448020	Habitat retention area
70	152.86549711200	-27.62368151410	Habitat retention area
71	152.86550349400	-27.62364598000	Habitat retention area
72	152.86551068400	-27.62360594110	Habitat retention area
73	152.86551089200	-27.62360478250	Habitat retention area
74	152.86551890600	-27.62356017160	Habitat retention area
75	152.86551988100	-27.62355473960	Habitat retention area
76	152.86552043400	-27.62355165770	Habitat retention area
77	152.86552066100	-27.62355036860	Habitat retention area
78	152.86552127200	-27.62354816840	Habitat retention area
79	152.86552283800	-27.62354510030	Habitat retention area
80	152.86552465200	-27.62354017320	Habitat retention area
81	152.86552546600	-27.62353796560	Habitat retention area
82	152.86588283200	-27.62343586180	Habitat retention area
83	152.86587629900	-27.62333931020	Habitat retention area
84	152.86602146900	-27.62330598760	Habitat retention area
85	152.86609240900	-27.62328970390	Habitat retention area
86	152.86641904600	-27.62321472620	Habitat retention area
87	152.86652724300	-27.62318988980	Habitat retention area
88	152.86654454400	-27.62318591860	Habitat retention area

Appendix B

Pre-clearing and Post-clearing Reports

QUEENSLAND FAUNA CONSULTANCY Pty Ltd

October 2022

Fauna Spotter Catcher Pre-clearance and Habitat Values Survey

The Pocket (Stages 5 & 6) - 218 Collingwood Drive Collingwood Park, Queensland

Report prepared for Shadforth Civil Pty Ltd

Report prepared by

QLD Fauna Consultancy Pty Ltd

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Date:	20/10/2022
Title:	Fauna Spotter Catcher Pre-clearance and Habitat Values Survey The Pocket (Stages 5 & 6) – 218 Collingwood Drive, Collingwood Park, Queensland
Author/s:	Bryan Robinson, Jasmine Zeleny
Reviewed by:	Bryan Robinson
Field personnel:	Stefan Szwedzinski
Status:	Final Report
Filed as:	Shadforth Collingwood Park Oct 2022.docx

Contents

1. Introduction

1.1 Project Background

Queensland Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Pty Ltd to conduct a Fauna Spotter Catcher Pre-clearance and Habitat Values Survey and present a subsequent report for The Pocket Stages 5 & 6 at 219 Collingwood Drive, Collingwood Park, Queensland. The site location is presented in Map 1.

The objective of this report is to summarise the existing fauna values present and assign mitigatory strategies applicable to probable species likely to be encountered during the clearing of identified habitats throughout or within specific localities of the site. Fauna species both common and of elevated conservation value have been considered within the parameters of onsite investigations and, where provided to QFC, include review of current fauna and floristic reports that may influence the assemblages expected to utilise the micro habitats evident within the site.

This review encompasses species identified under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Queensland *Nature Conservation Act 1992*. Further consideration is given, where applicable, to species of iconic, cultural and/or regional significance identified under commonwealth, state or local planning instruments aimed at the persistence of biodiversity values within the area.

Map 1: **Locality Plan**

Source: Google Earth/Maxar Technologies (2022)

1.2 Current Permits and Authorities

All activities conducted during the site investigations were implemented under the provisions of several permits issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), and the Department of Employment, Economic Development and Innovation (DEEDI). These permits and additional authorities are listed in Table 1.

Table 1: **Current Permits and authorities issued to QFC**

Permit/Authorisation	Permit Number	Expiry Date
Damage Mitigation Permit	WA0018804	10th November 2022
Rehabilitation Permit	WA0026789	16th September 2023
Scientific Purposes Permit	WA0032325	3rd March 2026
Scientific User Registration	Registration Number 589	27th February 2025
Animal Ethics	CA 2022/01/1569	27th February 2025
General Fisheries Permit	207015	16th April 2023

These permits and approvals enable QFC to conduct the investigation, observation and relocation of protected animals exposed to disturbance due to infrastructure expansion resulting in the destruction of natural and artificial habitats.

2. Methodology

A site inspection was carried out on 18th October 2022 by Qld Fauna Consultancy. A standard set of observational techniques aimed at maximising the detection of fauna and the probable habitats they may occupy were employed to ascertain and identify the current fauna values throughout the project area. Where species of elevated conservation significance where foreseen as potentially present targeted searches were instigated to further evaluate individual species habitat.

Due to the habitat variability expressed across the development site the composition of investigations may include a range of features that entail specific components indicative of the presence of particular species or faunal groups. This may include where evident, observation of activity or signs of both historical and current use.

These may include but are not limited to the following:

- Identification of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, stands of heavy vegetation, fallen branches and bark exfoliations;
- Identification of arboreal micro habitats including basal, trunk and limb hollows, tree fissures, bark exfoliates and arboreal termitaria;
- Identification of constructed arboreal micro habitats including bird nests and Ringtail Possum dreys;
- Artificial habitats including but not limited to ornamental gardens, discarded rubbish, human dwellings and other infrastructure;
- Observation and investigation of aquatic habitats including dams, soaks, creeks, rivers and seasonally inundated vegetation communities. Artificial aquatic habitats may include constructed drains and culverts. Further components of interest include bank profiles and undercuts, submerged and/or exposed timber and rock, immediate aquatic and riparian vegetation, surfacing animals, nesting and/or feeding birds;
- Direct observation of active or exposed fauna within terrestrial, aquatic and arboreal habitats;
- Identification of scats, tracks and scratchings to determine fauna potentially present or to have historically utilised the site for either transient or longer-term life history purposes.

2.1 Specific methodology for Koalas *Phascolarctos cinereus*

Due to specific requirements and the cryptic nature of the Koala the following techniques were employed to assist in ascertaining the current and historical presence/absence status of the species at the site:

- Use of binoculars to inspect the crown, forks and trunk of trees for individuals currently occupying the site;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

3. Findings

The findings endeavor to demarcate the existing habitat profiles and the features present into three distinct groups: terrestrial, arboreal and aquatic. All habitat features present onsite are noted, however it is probable additional features will be present with these being accounted for during the Fauna Spotter Catcher process to be applied to all vegetation clearing across the site.

3.1 Terrestrial Habitat Features

The terrestrial fauna values of the site consist of a variety of different components and microhabitat features. This includes an open low-level understorey of *Eucalyptus, Acacia*, and Soap Tree *Alphitonia excelsa* regrowth (Figure 1 and Figure 2), with sections exhibiting dense cover provided by dense grass (Figure 3) and weed species such as Lantana *Lantana camara*. These features represent a moderate terrestrial fauna habitat value for numerous common reptile, amphibian and small mammal species.

Dense leaf litter and bark exfoliations also feature on site being present in abundance and at variable depths (Figure 4), providing both refugial opportunities and microhabitat connectivity that can be exploited by a number of different native terrestrial vertebrate and invertebrate species.

Further the site exhibits woody debris, hollow logs, hollow stumps, and small areas of surface rock that may provide habitat opportunities for reptiles and small mammals (Figure 5 to Figure 8). Artificial debris is also present in the locality adding to its potential habitat value for resident and transient fauna (Figure 9 to Figure 11).

Terrestrial termite mounds of various sizes and condition are also present on site, with a number of mounds exhibiting excavations (Figure 12 and Figure 13). Some mounds exhibited excavations that are likely indicative of Short-beaked Echidna *Tachyglossus aculeatus* foraging activities. These mounds may also provide refugial opportunities for reptile and mammal species.

Mammal assemblages may comprise both native and introduced species. A Red-necked Wallaby *Notamacropus rufogriseus* was sighted during the inspection and macropod activity within the clearance zone was also indicated by fresh scat in several locations (Figure 14). The introduced European Hare *Lepus europeaeus* was also sighted during the inspection.

These features collectively contribute to the potential presence of a wide variety of native fauna species utilising the area for refugial, foraging and other resources. Probable species include the Wall Skink *Cryptoblepharus pulcher*, Dark-flecked Garden Sunskink *Lampropholis delicata*, Lively Rainbow Skink *Carlia vivax*, Dubious Dtella *Gehyra dubia*, Eastern Blue-tongued Lizard *Tiliqua scincoides*, Common Tree Snake *Dendrelaphis punctulatus,* Coastal Carpet Python *Morelia spilota mcdowelli* and Eastern Bearded Dragon *Pogona barbata.*

GPS coordinates for identified terrestrial habitat features are shown in Table 2

Table 2: **Localities for identified terrestrial habitat features**

Number	Habitat Feature	GPS Coordinates (Latitude, Longitude)
1	Artificial Debris	-27.623847,152.8595864
2	Artificial Debris	-27.6244172,152.8623919
3	Artificial Debris	-27.6245574,152.8631226
4	Artificial Debris	-27.6244319,152.8635441
5	Artificial Debris	-27.6247347,152.863593
6	Artificial Debris	-27.6241578,152.8651119
7	Artificial Debris	-27.6234939,152.8647364
8	Hollow Log	-27.6237217,152.8606247
9	Hollow Log	-27.6239818,152.8607053
10	Hollow Log	-27.6240163,152.8609241
11	Hollow Log	-27.623774,152.8626184
12	Hollow Log	-27.62457,152.8631069
13	Hollow Log	-27.6230772,152.8623555
14	Hollow Stump	-27.6240561,152.861375
15	Hollow Stump	-27.6233534,152.8597375
16	Hollow Stump	-27.6229303,152.8627608
17	Surface Rock	-27.6240261,152.8601063
18	Surface Rock	-27.6230478,152.8646856
19	Terrestrial Termitaria	-27.6230814,152.8618552
20	Terrestrial Termitaria	-27.6230664,152.8618644
21	Terrestrial Termitaria	-27.6239008,152.8612857
22	Terrestrial Termitaria	-27.6238714,152.8611825
23	Terrestrial Termitaria	-27.6238031,152.8608922
24	Terrestrial Termitaria	-27.6240919,152.8605134
25	Terrestrial Termitaria	-27.6242405,152.8612075
26	Terrestrial Termitaria	-27.6233367,152.8627724

27	Terrestrial Termitaria	-27.6235471,152.8640977
28	Terrestrial Termitaria	-27.6243035,152.8647632
29	Terrestrial Termitaria	-27.6237753,152.8649627
30	Timber Stockpile	-27.6226504,152.8629071
31	Woody Debris	-27.6246087,152.8633879

Figure 1: Understorey

Figure 2: Understorey

Figure 3: Dense grass

Figure 4: Dense leaf litter and bark exfoliations

Figure 5: Woody debris

Figure 6: Hollow log

Figure 7: Hollow log

Figure 8: Rocks

Figure 9: Artificial debris

Figure 10: Artificial debris

Figure 11: Artificial debris

Figure 12: Terrestrial termitaria

Figure 13: Terrestrial termitaria with excavation

Figure 14: Macropod scat

3.2 Arboreal Habitat Features

The clearance site consists predominantly of regrowth Eucalypt woodland (Figure 15 to Figure 17). Onsite trees exhibit potential feeding and nesting resources for a number of bird and mammal species. The intermittent contiguous canopy structure (Figure 18) within some of the vegetation represented may be facilitative of arboreal progression for species such as Common Brushtail Possum *Trichosurus vulpecula*, Common Ringtail Possum *Pseudocheirus peregrinus* and Squirrel Glider *Petaurus norfolcensis* (sighted during inspection).

Hollow-bearing trees and stag trees are present in the clearance area (Figure 19 and Figure 20), which may provide habitat opportunities for arboreal mammals, reptiles, and birds. Exfoliating bark on tree trunks (Figure 21) may provide refugial opportunities for reptile species including skinks and geckos.

A high number of arboreal termite mounds of varying size and condition are also present across the site (Figure 22), with numerous mounds exhibiting excavations (Figure 23 to Figure 25). A number of suitable mounds were located with the potential for use as egg deposition and incubation sites by species such as the Lace Monitor *Varanus varius,* Laughing Kookaburra *Dacelo novaeguineae,* and Sacred Kingfisher *Todiramphus sanctus.* Mammals such as the Common Brushtail Possums *Trichosurus vulpecula* have also been known to utilise these features for shelter where hollows are not readily available.

Three avian stick nests were located during the inspection but did not appear active at the time of the survey (Figure 26 to Figure 28). However, further inspections are recommended immediately prior to clearing commencement. Avian species observed utilising the site at the time of the inspection (foraging or perching) are presented in Table 4.

No Possum dreys were located during the inspection, however, the dense vegetation structure in some areas may have concealed visibility and further inspections are recommended immediately prior to clearing commencement. Possum activity was evident in the form of scratchings on several tree trunks (Figure 29).

Koala food trees located in the clearance area include *Eucayptus tereticornis, E. siderophloia, E. moluccana, E. admenoides, E. crebra, E. fibrosa, E. seeana, E. propinqua, Corymbia citriodora, C. tesselaris, C. henryi, C. intermedia, Angophora leiocarpa,* and *Lophostemon suaveolens.* However, no evidence was observed to indicate recent use of these trees by koalas. No koala scats were found during ‘drip zone’ searches and characteristic scratchings were not found during trunk investigations. A Koala habitat values map for the clearance area is presented in Appendix A.

GPS coordinates for identified arboreal habitat features are shown in Table 3.

Table 3: **Localities for identified arboreal habitat features**

Number	Habitat Feature	GPS Coordinates (Latitude, Longitude)
1	Arboreal Termitaria	-27.6225723,152.8620527
2	Arboreal Termitaria	-27.6228883,152.8621408
3	Arboreal Termitaria	-27.6233672,152.8618356
4	Arboreal Termitaria	-27.6235675,152.8618527
5	Arboreal Termitaria	-27.6237937,152.86164
6	Arboreal Termitaria	-27.623881,152.8613092
7	Arboreal Termitaria	-27.6238246,152.8597639
8	Arboreal Termitaria	-27.6240073,152.8581738
9	Arboreal Termitaria	-27.6240867,152.8601427
10	Arboreal Termitaria	-27.6241189,152.8610507
11	Arboreal Termitaria	-27.624219,152.8612194
12	Arboreal Termitaria	-27.6242044,152.8617622
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19	Arboreal Termitaria	-27.623922,152.8625052
20	Arboreal Termitaria	-27.6243979,152.8624534
21	Arboreal Termitaria	-27.6244825,152.8629822
22	Arboreal Termitaria	-27.6238174,152.8626057
23	Arboreal Termitaria	-27.6238883,152.862746
24	Arboreal Termitaria	-27.6239311,152.8627401
25	Arboreal Termitaria	-27.6243766,152.8632291
26	Arboreal Termitaria	-27.6239398,152.8632959

27	Arboreal Termitaria	-27.6234715,152.8634726
28	Arboreal Termitaria	-27.6226866,152.8623316
29	Arboreal Termitaria	-27.6227466,152.8622989
30	Arboreal Termitaria	-27.6226547,152.8626606
31	Arboreal Termitaria	-27.6228065,152.862565
32	Arboreal Termitaria	-27.6228836,152.8627869
33	Arboreal Termitaria	-27.6228188,152.8631111
34	Arboreal Termitaria	-27.6228946,152.8629861
35	Arboreal Termitaria	-27.6228728,152.8630829
36	Arboreal Termitaria	-27.6236291,152.8652063
37	Arboreal Termitaria	-27.6229699,152.8640815
38	Arboreal Termitaria (with excavation)	-27.623803,152.8608914
39	Arboreal Termitaria (with excavation)	-27.6238409,152.8605123
40	Arboreal Termitaria (with excavation)	-27.6237921,152.8604632
41	Arboreal Termitaria (with excavation)	-27.6238984,152.8614036
42	Arboreal Termitaria (with excavation)	-27.6241017,152.8618623
43	Arboreal Termitaria (with excavation)	-27.6241041,152.8617736
44	Arboreal Termitaria (with excavation)	-27.6240779,152.8618025
45	Arboreal Termitaria (with excavation)	-27.6236223,152.8623031
46	Arboreal Termitaria (with excavation)	-27.623874,152.8623293
47	Arboreal Termitaria (with excavation)	-27.6238699,152.8625076
48	Arboreal Termitaria (with excavation)	-27.6240663,152.8624486
49	Arboreal Termitaria (with excavation)	-27.6244519,152.8629559
50	Arboreal Termitaria (with excavation)	-27.6242083,152.8627772
51	Arboreal Termitaria (with excavation)	-27.6234995,152.8625456
52	Arboreal Termitaria (with excavation)	-27.6233251,152.8621607
53	Arboreal Termitaria (with excavation)	-27.6236497,152.8627545
54	Arboreal Termitaria (with excavation)	-27.6239296,152.8627455
55	Arboreal Termitaria (with excavation)	-27.6240174,152.862999

56	Arboreal Termitaria (with excavation)	-27.6239327,152.8633044
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58	Arboreal Termitaria (with excavation)	-27.6246214,152.8636836
59	Arboreal Termitaria (with excavation)	-27.6239423,152.8634242
60	Arboreal Termitaria (with excavation)	-27.6234814,152.8634695
61	Arboreal Termitaria (with excavation)	-27.623462,152.8634521
62	Arboreal Termitaria (with excavation)	-27.6225942,152.8625737
63	Arboreal Termitaria (with excavation)	-27.6228725,152.8629355
64	Arboreal Termitaria (with excavation)	-27.6231434,152.8629867
65	Arboreal Termitaria (with excavation)	-27.6247099,152.8639803
67	Arboreal Termitaria (with excavation)	-27.6239755,152.8653821
68	Arboreal Termitaria (with excavation)	-27.6227927,152.8638514
69	Arboreal Termitaria (with excavation)	-27.6227442,152.8634339
70	Arboreal Termitaria (with excavation)	-27.6229262,152.8633993
71	Arboreal Termitaria (with excavation)	-27.6227473,152.8631885
72	Arboreal Termitaria (with excavation)	-27.6232364,152.8635886
73	Bird Nest	-27.622756,152.8628455
74	Bird Nest	-27.6233326,152.8631977
75	Bird Nest	-27.6230979,152.8642254
76	Dead Stag	-27.624605,152.8633859
77	Dead Stag	-27.6235403,152.8626952
78	Dead Stag	-27.6227237,152.8621937
79	Dead Stag	-27.6227035,152.8626801
80	Dead Stag	-27.6234653,152.8636822
81	Dead Stag	-27.6233866,152.8637257
82	Dead Stag	-27.6228027,152.8635033
83	Dead Stag	-27.6230296,152.8632523
84	Exfoliating Bark (Arboreal)	-27.6233853,152.8617364
85	Hollow Bearing Tree	-27.624179,152.8604238

86	Hollow Bearing Tree	-27.6240508,152.861728
87	Hollow Bearing Tree	-27.6242327,152.8612727
88	Hollow Bearing Tree	-27.6232252,152.8625246

Figure 15: Site overview

Figure 16: Site overview

Figure 17: Site overview

Figure 18: Contiguous canopy

Figure 19: Hollow-bearing tree

Figure 20: Stag tree

Figure 21: Exfoliating bark

Figure 22: Arboreal termite mound

Figure 23: Arboreal termite mound with excavation

Figure 24: Arboreal termite mound with excavation

Figure 25: Arboreal termite mound with excavation

Figure 26: Bird nest

Figure 27: Bird nest

Figure 28: Bird nest

Figure 29: Possum scratches on tree trunk

Table 4: **Arboreal Fauna Species Observed**

Number	Common Name and *Scientific Name*
1	Sacred Kingfisher *Todiramphus sanctus*
2	Laughing Kookaburra *Dacelo novaeguineae*
3	Rainbow Lorikeet *Trichoglossus haematodus*
4	Squirrel Glider *Petaurus norfolcensis*

3.3 Aquatic Habitat Features

No aquatic habitat features were identified within the clearing area.

3.4 Endangered, Vulnerable and Near Threatened (EVNT) & Special Least Concern (SLC) Species

It is not envisaged that any EVNT or SLC fauna species will be detrimentally impacted by the proposed works. However, four species identified within the Online EPBC Protected Matters Report (Appendix B) and the Queensland Government Wildlife Online Search Tool (Appendix C) were considered possible to occur within the site and will require further mitigation during clearing activities.

Although evidence was not found during the site inspection of recent Koala use, the species has previously been recorded in the area. The site contains habitat identified as Core Koala Habitat under the Koala Habitat in South East Queensland mapping sourced from the Queensland Globe online search tool (see Appendix A).

It is advised that dedicated methodologies be employed by a qualified Fauna Spotter specific to the detection of these identified species prior to vegetation clearing activities.

Table 5: **Significant species deemed possible to occur within the clearance survey area**

Common Name **Scientific Name**	**Species Information**	**Likelihood of Occurrence within the Clearance Survey area**
Mammals		
Koala *Phascolarctos cinereus* **EPBC:** Endangered **NCA:** Endangered	Inhabits a range of open forest and woodland communities which may include any of the following noted food trees: *Eucalyptus*, *Corymbia*, *Melaleuca*, *Angophora* and *Lophostemon*.	***Possible*** Known food trees for the transient Koala (*Phascolarctos cinereus)* occur on the clearance site and the species is well documented within the area.
Greater Glider *Petauroides volans* **EPBC:** Vulnerable **NCA:** Endangered	The Greater Glider lives in a variety of Eucalypt-dominated habitats, feeding almost exclusively on eucalypt leaves. Dens are constructed in suitable hollow-bearing trees with the breeding season occurring from March to June (Strahan R (ed) 1995).	***Possible*** Suitable vegetation communities containing both feeding and nesting resources occur on and adjacent to the clearance site.
Grey-headed Flying-fox *Pteropus poliocephalus* **EPBC:** Vulnerable **NCA:** Least Concern	The Grey-headed Flying-Fox roosts in aggregations of various sizes on exposed branches, commonly of emergent trees. Roost sites are typically located near water, such as lakes, rivers or the coast. Habitat includes open forests, woodlands, urban parks and gardens.	***Possible*** Suitable vegetation communities containing both feeding and roosting resources occur on and adjacent to the clearance site.
Short-beaked Echidna *Tachyglossus aculeatus* **EPBC:** Not Listed **NCA:** Special Least Concern	Inhabits a broad range of habitat types across Australia where there is a supply of ants or termites. Echidnas will shelter within hollow logs, under bushes and debris (Van Dyck & Strahan 2008).	***Possible*** Suitable feeding resources occur onsite and evidence of diggings observed onsite.

4. Assessment, Conclusion and Fauna Management Recommendations

A number of conclusions and recommendations are presented, with the specific intention of providing a comprehensive management structure to facilitate minimal impact to fauna during the clearing of vegetation and subsequent disturbance of habitats. The directives given by Fauna Spotter Catchers should embrace a "best practice" approach which includes implementation of proven specific management techniques for identified habitat types and compliance with legislation relevant to the activity.

Fauna management is presented here specific to EVNT fauna, general terrestrial and arboreal fauna. Although each is treated separately, overlap does occur within target techniques providing a comprehensive approach for target species of all conservation significance.

4.1 EVNT and SLC Fauna

It is not envisaged that any species, listed under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* or the *Nature Conservation Act 1992*, other than those listed in Table 5, will require specific management during vegetation clearing activities.

However, specific management for those identified EVNT or SLC species will include targeted investigations immediately prior to vegetation removal activities on each day of clearing and subsequently whilst clearing takes place. Preliminary investigations will be supported by additional monitoring applied during clearing activities with a designated fauna spotter operating with each machine actively involved in vegetation or identified habitat disturbance. These should include the following:

Koala:
As favoured Koala food trees on site exceed a diameter of 100mm at 1.3 metres from the ground, requirements under the Koala Plan's 'Koala Habitat Area' provisions trigger the need for inspection and monitoring during vegetation clearing by a qualified Fauna Spotter.

Historically known to occur within the area the Koala will feature highly in daily search efforts with a dedicated and detailed methodology employed.

Direct observational methodology will include the following components:

- Use of binoculars to inspect the crown, forks and trunk of trees for individuals currently occupying the site;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas;
- Repeat observations made of single trees from numerous angles at repeated times throughout the clearing activities by the assigned fauna spotter.

In the event a Koala is detected; the Fauna Spotter will determine the appropriate course of action with exclusion zones implemented and alterations to the clearing plan discussed with the Site Supervisor. Once defined, these directions will be communicated to the plant operators and clearing will proceed in accordance with the recommendations made.

Changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees. These provisions entail an increased responsibility by developers and land clearance operators alike to ensure the welfare of potentially present Koalas in areas identified as having significance for the persistence of this species.

Where significance under planning instruments is assigned provisions may include the restriction of all clearance that directly interferes with any tree a Koala is residing in or surrounding trees that, when felled, may impact on the crown of the host tree. Koalas are to leave via their own volition through a corridor designated by the Fauna Spotter to the closest remaining suitable habitat.

Throughout this time, the Koala may not be interfered with by any means unless special dispensation has been sought through the appropriate government body or where the Koala is evidently in a state of compromised health. Only when Koalas have vacated a tree can clearance operations include the identified host tree and surrounding vegetation which composes the established exclusion zone. Recommendations made by the Fauna Spotter on site will embrace these provisions.

Greater Glider:
Although no Greater Gliders or dens were noted during the site survey, the cryptic nature of this species and the abundance of available feeding resources and suitable habitat trees would see probability for the species to utilise the site.

The following recommendations are made for management of potentially occurring Greater Glider:

- Daily Inspection of hollow-bearing trees assigned for removal be conducted to detect potential nesting Gliders; involving 'Drip zone' searches at the base of suitable trees for the presence of Glider scat and inspection of trunks for scratchings indicative of use by Gliders;
- Trees found to contain or considered probable for nesting Greater Gliders are to be felled in a manner directed at minimising potential risk of injury to fauna, and hollows to be 'plugged' to prevent animals from escaping during the soft felling procedure.

Grey-headed Flying Fox:
Although no Flying Fox camps or roosts were noted during the site survey, the transient nature of this species and the abundance of available feeding resources would see probability for the species to intermittently utilise the site.
The following recommendations are made for management of potentially occurring Grey-headed Flying Fox:

- Daily Inspection of trees assigned for removal be conducted to detect potential roosting Flying Foxes;
- Trees found to contain roosting Flying Foxes to be left standing and re assessed at the end of each days clearing. Being a transient species, the disturbance associated by the

surrounding clearing is likely to see individuals fly off via its own volition come nightfall and not return the following morning, thus negating the need for direct disturbance.

Short-beaked Echidna

Although no individuals were observed during the survey, evidence of echidna use had been observed during inspections by QFC and would see possibility for the Short-beaked Echidna to be encountered during clearing activities.

The following recommendations are made for management of potentially occurring Short-beaked Echidna:

- Daily inspection of areas to be cleared for transient individuals.
- Inspection daily for potential burrow sites.
- Monitored dismantling of identified microhabitats by fauna spotters with machinery assistance.

A DES approved Fauna Spotter should be in attendance throughout all disturbance of vegetation associated with identified EVNT habitats. No clearing is to commence prior to the Fauna Spotter being satisfied all required investigations have been undertaken within the designated areas to be cleared.

4.2 General Terrestrial and Arboreal Fauna

Overall the site contains high value refugial opportunities for arboreal and terrestrial fauna species (see Section 3.1 and 3.2). The species expected within the site are likely to primarily reflect common fauna assemblages for the region however provisions are proposed directly for common fauna and species of conservation significance.

It is advised that all identified fauna habitats onsite be inspected by a DES approved Fauna Spotter prior to vegetation clearing and all vegetation removal activities be supervised during the clearing process. Terrestrial load reduction activities will be conducted ahead of the clearing front where possible. Fauna captured will be relocated to adjacent habitat consistent with the life history requirements of the species requiring translocation.

4.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) will be clearly identified and subsequently marked for supervision during felling and inspected once felled. Efforts will be made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks) on the day(s) of clearing. Where no signs are found or potentially occupant species are undeterminable, machinery operators will be instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

All identified micro habitats will be inspected via ground based observation and the direction of felling will be determined considering the safety of personnel, machinery and potentially occupant fauna. Felling procedures will see implementation of a soft felling technique specifically constructed by QFC to achieve minimal deceleration and impact upon felling. This will be achieved under direction of the Fauna Spotter present directly communicating with the plant operator(s).

5. References

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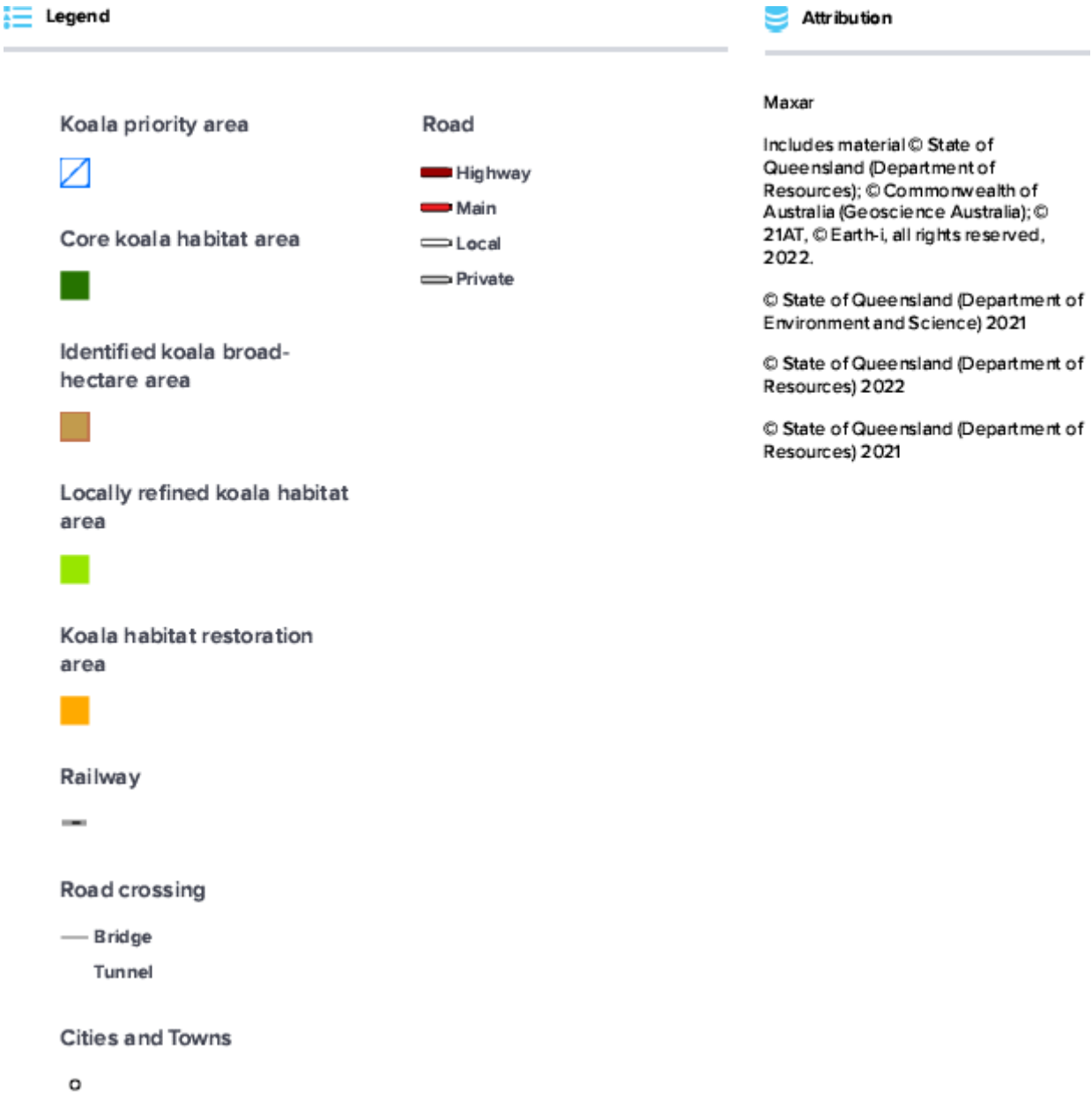
Queensland Museum (2007) *Wildlife of Greater Brisbane,* 2nd edition, Brisbane: Queensland Museum Publishers.

6. Appendix A: Koala Habitat Values


Legend
Koala priority area
Core koala habitat area
Identified koala broad-hectare area
Locally refined koala habitat area
Koala habitat restoration area
Railway
Road crossing
Bridge
Tunnel
Cities and Towns
Road
Highway
Main
Local
Private
Attribution
Maxar
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7. Appendix B: EPBC Act Protected Matters Report

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 20-Oct-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	69
Listed Migratory Species:	37

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	42
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	39
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Moreton bay	20 - 30km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community likely to occur within area	In feature area
Grey box-grey gum wet forest of subtropical eastern Australia	Endangered	Community likely to occur within area	In buffer area only
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area	In feature area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Neoceratodus forsteri Australian Lungfish, Queensland Lungfish [67620]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
FROG			
Mixophyes fleayi Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area	In feature area
INSECT			
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area	In feature area
Phyllodes imperialis smithersi Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area	In feature area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat may occur within area	In feature area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
PLANT			
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Corchorus cunninghamii Native Jute [14659]	Endangered	Species or species habitat may occur within area	In buffer area only
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat may occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Fontainea venosa [24040]	Vulnerable	Species or species habitat may occur within area	In feature area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Notelaea ipsviciensis Cooneana Olive [81858]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Plectranthus habrophyllus [64589]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Plectranthus omissus [55729]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidochelys olivacea			
Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area	In buffer area only
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
SHARK			
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]		Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis			
Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Macronectes giganteus			
Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli			
Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Phaethon lepturus			
White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]		Species or species habitat may occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Orcaella heinsohni as Orcaella brevirostris Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
White Rock	Conservation Park	QLD	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Bellbird Park Primary School Development Project	2022/09296		Referral Decision	In buffer area only
Controlled action				
Brentwood Residential Estate, Bellbird Park, Ipswich, QLD	2013/7074	Controlled Action	Post-Approval	In buffer area only
Casino Ipswich Pipeline	2007/3877	Controlled Action	Completed	In buffer area only
Citiswich Stage 7 - Commercial Development	2021/9112	Controlled Action	Assessment Approach	In buffer area only
First Nine Master planned residential development, Brookwater, Qld	2016/7676	Controlled Action	Post-Approval	In buffer area only
Redbank Plains	2021/9065	Controlled Action	Further Information Request	In buffer area only
Residential Development, Collingwood Park, Ipswich, Qld	2019/8516	Controlled Action	Post-Approval	In feature area
Residential subdivision, Lot 901 and 902 Eugene St, Bellbird Park, Qld	2018/8350	Controlled Action	Assessment Approach	In buffer area only
Scenic Precinct Residential Development	2020/8651	Controlled Action	Further Information Request	In buffer area only
Southern Regional Water Pipeline	2006/2593	Controlled Action	Post-Approval	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Springfield Residential Development	2019/8575	Controlled Action	Further Information Request	In buffer area only
Spring Mountain mixed use master planned community development, Springfield, Qld	2013/7057	Controlled Action	Post-Approval	In buffer area only
Springview Village One, Springfield, Ipswich City, QLD	2014/7306	Controlled Action	Post-Approval	In buffer area only
Woodlink Residential Community, 246-326 Collingwood Drive, Collingwood Park	2013/6866	Controlled Action	Post-Approval	In feature area
Woody Weed Removal at Woogaroo Creek	2007/3760	Controlled Action	Completed	In buffer area only
Woogaroo Heights master planned residential development, Springfield, Qld	2017/7875	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Bellbird Park State High School development, Redbank Plains, Qld	2014/7323	Not Controlled Action	Completed	In buffer area only
Blackstone Power Station	2012/6252	Not Controlled Action	Completed	In buffer area only
BrisWest Holdings - Release 5 Operational Works	2021/9086	Not Controlled Action	Completed	In buffer area only
Collingwood Park stage 8 Subdivision	2011/6075	Not Controlled Action	Completed	In feature area
Fernbrooke Ridge residential estate development - Balance Land, Redbank Plains, Qld	2013/6818	Not Controlled Action	Completed	In buffer area only
Goodna and Bundamba Sewage Treatment Plant Upgrades	2010/5612	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
New motorway alignment called the Goodna Bypass	2007/3648	Not Controlled Action	Completed	In buffer area only
Northern Link Parallel Road Tunnels Project	2007/3824	Not Controlled Action	Completed	In buffer area only
REMONDIS Waste to Energy Facility	2020/8806	Not Controlled Action	Completed	In buffer area only
Removal of Grey-headed Flying-fox Habitat	2005/2284	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Removal of Grey-headed Flying-fox Habitat	2005/2137	Not Controlled Action	Completed	In buffer area only
South West Transport Corridor	2006/2547	Not Controlled Action	Completed	In feature area
Streambank Rehabilitation - Removal of woody weeds	2006/2658	Not Controlled Action	Completed	In buffer area only
Swanbank Gas Fired Combined Cycle Plant	2008/4087	Not Controlled Action	Completed	In buffer area only
Swanbank Waste Management Facility Stage 1B extension Area, Qld	2015/7581	Not Controlled Action	Completed	In buffer area only
Underground Bus and Train Project, Brisbane	2013/7106	Not Controlled Action	Completed	In buffer area only
Urban Residential Development Priors Pocket Road	2012/6662	Not Controlled Action	Completed	In buffer area only
Wastewater treatment plant augmentation for Brisbane southwest region involving	2002/807	Not Controlled Action	Completed	In buffer area only
Western Corridor Recycled Water Project/Bundamba 1B AWTP and Oxley-Bundamba Pipeline	2006/3163	Not Controlled Action	Completed	In buffer area only
Not controlled action (particular manner)				
Construction & Operation 275/330kV Transmission Line	2006/2820	Not Controlled Action (Particular Manner)	Post-Approval	In feature area
Cross River Rail	2010/5427	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Paper Mill	2003/915	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Bioregional Assessments			
SubRegion	BioRegion	Website	Buffer Status
Clarence-Moreton	Clarence-Moreton	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

8. Appendix C: WildNet Species List

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: Animals
Type: Native
Queensland status: Rare and threatened species
Records: All
Date: Since 1980
Latitude: -27.6232
Longitude: 152.8623
Distance: 5
Email: jasmine@qfc.com.au
Date submitted: Thursday 20 Oct 2022 20:14:42
Date extracted: Thursday 20 Oct 2022 20:20:03

The number of records retrieved = 10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		12
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	7
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	2
animals	birds	Psittacidae	*Lathamus discolor*	swift parrot		E	CE	1
animals	birds	Rostratulidae	*Rostratula australis*	Australian painted-snipe		E	E	4
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		66
animals	mammals	Delphinidae	*Orcaella heinsohni*	Australian snubfin dolphin		V		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	308
animals	mammals	Pseudocheinidae	*Petauroides armillatus*	central greater glider		E	E	10
animals	mammals	Vombatidae	*Vombatus ursinus*	common wombat		NT		1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*.
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*.
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

November 2022

Fauna Management and Spotter/Catcher Services Report

The Pocket (Stages 5 & 6) - 218 Collingwood Drive Collingwood Park, Queensland

Report prepared for Shadforth Civil Pty Ltd

Report prepared by

QLD Fauna Consultancy Pty Ltd

Phone: (07) 3376 9780

Email: fauna@qfc.com.au

Date:	16/11/2022
Title:	Fauna Spotter Catcher Pre-clearance and Habitat Values Survey The Pocket (Stages 5 & 6) – 218 Collingwood Drive, Collingwood Park, Queensland
Author/s:	Bryan Robinson, Jasmine Zeleny
Reviewed by:	Bryan Robinson
Field personnel:	Stefan Szwedzinski, Anna Lukan
Status:	Final Report
Filed as:	QFC FMR Shadforth Collingwood Park Nov 2022.doc

Contents

1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Pty Ltd to conduct Fauna Spotter/Catcher and Fauna Management activities for works at The Pocket Stages 5 & 6 at 219 Collingwood Drive, Collingwood Park, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0026789) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in October and November 2022.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day of clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required. Refer to Appendix A for fauna photos.

Monday 31st October 2022

- Pre-clearance activities carried out (refer to Methodology) at The Pocket - 218 Collingwood Drive, Collingwood Park
- Vegetation clearance carried out at The Pocket - 218 Collingwood Drive, Collingwood Park
- Refer to **Fauna Register** for fauna found
- 3 trees flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 25 Nest (N) - inactive ☒Y ☐N Hollows (H) ☒Y ☐N Arboreal termitaria (ATM) ☒Y ☐N Other: Exfoliating bark No. & size of hollow/s (mm): 100-149: 2
Terrestrial Microhabitats: Hollow logs ☒Y ☐N Woody debris ☒Y ☐N Rock piles ☒Y ☐N Burrows ☐Y ☒N Other: Dense lead litter, bark exfoliations, timber stockpiles, terrestrial termitaria, artificial debris
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N

Tuesday 1st November 2022

- Pre-clearance activities carried out (refer to Methodology) at The Pocket - 218 Collingwood Drive, Collingwood Park
- Vegetation clearance carried out at The Pocket - 218 Collingwood Drive, Collingwood Park
- Refer to **Fauna Register** for fauna found
- 3 trees flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 9 Nest (N) ☒Y ☐N Hollows (H) ☒Y ☐N Arboreal termitaria (ATM) ☒Y ☐N Other: Exfoliating bark No. & size of hollow/s (mm): 50-99: 2, 100-149: 2
Terrestrial Microhabitats: Hollow logs ☒Y ☐N Woody debris ☒Y ☐N Rock piles ☒Y ☐N Burrows ☐Y ☒N Other: Dense lead litter, bark exfoliations, timber stockpiles, terrestrial termitaria, artificial debris
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N

Wednesday 2nd November 2022

- Pre-clearance activities carried out (refer to Methodology) at The Pocket - 218 Collingwood Drive, Collingwood Park
- Vegetation clearance carried out at The Pocket - 218 Collingwood Drive, Collingwood Park
- Refer to **Fauna Register** for fauna found
- 7 trees flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 24 Nest (N) ☐Y ☒N Hollows (H) ☒Y ☐N Arboreal termitaria (ATM) ☒Y ☐N Other: Exfoliating bark No. & size of hollow/s (mm): 0-49: 4, 50-99: 4, 100-149: 2, 150-199: 2, 200-249: 1
Terrestrial Microhabitats: Hollow logs ☒Y ☐N Woody debris ☒Y ☐N Rock piles ☐Y ☒N Burrows ☐Y ☒N Other: Dense lead litter, bark exfoliations, artificial debris
Aquatic habitat/s: Dam ☐Y ☒N Creek ☐Y ☒N Wetland ☐Y ☒N

Thursday 3rd November 2022

- Pre-clearance activities carried out (refer to Methodology) at The Pocket - 218 Collingwood Drive, Collingwood Park
- Vegetation clearance carried out at The Pocket - 218 Collingwood Drive, Collingwood Park
- 1 tree flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 4 Nest (N) ☐Y ☒N Hollows (H) ☒Y ☐N Arboreal termitaria (ATM) ☒Y ☐N No. & size of hollow/s (mm): 0-49: 1, 50-99: 2
Terrestrial Microhabitats: Hollow logs ☐Y ☒N Woody debris ☒Y ☒N Rock piles ☐Y ☒N Burrows ☐Y ☒N Other: Dense leaf litter, bark exfoliations
Aquatic habitat/s: Dam ☐Y ☒N Creek ☒Y ☐N Wetland ☐Y ☒N
No Fauna Found

4 Fauna Register

			Capture Location							Release Details			Actions					
Collectors Name	**Date**	**Time**	**Capture Location**	**Latitude**	**Longitude**	**Count Type**	**Status**	***Common Name - Scientific Name***	**Count**	**Date**	**Latitude**	**Longitude**	**R1**	**R2**	**D**	**I**	**Release Location Description**	**Comments**
Stefan Szwedzinski	31/10/2022	09:33	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6237	152.8598	Alive	Least Concern	Eastern Bearded Dragon *Pogona barbata*	1	31/10/2022	-27.6249	152.8602	X				Into hollow log	
Stefan Szwedzinski	31/10/2022	10:14	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6243	152.8622	Alive	Least Concern	Common Brushtail Possum *Trichosurus vulpecula*	2	31/10/2022	-27.6247	152.8614	X				Self-relocated top adjacent vegetation	1x adult, 1x aub-adult
Stefan Szwedzinski	31/10/2022	14:23	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6237	152.8614	Alive	Least Concern	Sugar Glider *Petaurus breviceps*	1	31/10/2022	-27.6249	152.8603	X				Into hollow log	
Stefan Szwedzinski	01/11/2022	09:22	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6235	152.8623	Alive	Least Concern	Sugar Glider *Petaurus breviceps*	1	01/11/2022	-27.6237	152.8659	X				Into hollow stump	

Stefan Szwedzinski	01/11/2022	12:13	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6238	152.8649	Alive	Least Concern	Laughing Kookaburra *Dacelo novaeguineae*	1	01/11/2022	-27.6238	152.8649	X				Self-relocated	Adult
Stefan Szwedzinski	01/11/2022	13:56	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6236	152.8619	Alive	Least Concern	Red-necked Wallaby *Notamacropus rufogriseus*	1	01/11/2022	NA	NA	X				Self-relocated	
Stefan Szwedzinski	01/11/2022	13:56	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6236	152.8619	Deceased	Least Concern	Sacred Kingfisher eggs Todiramphus sanctus	2	NA	NA	NA			X			2x eggs. Broke during felling. Unviable.
Stefan Szwedzinski	01/11/2022	15:55	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6234	152.8626	Alive	Least Concern	Tawny Frogmouth *Podargus strigoides*	1	01/11/2022	NA	NA	X				Self-relocated	
Stefan Szwedzinski	01/11/2022	16:39	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6232	152.8628	Alive	Least Concern	Sugar Glider *Petaurus breviceps*	1	01/11/2022	-27.6249	152.8603	X				Into hollow log	

Anna Lukan	02/11/2022	08:01	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6234	152.8642	Alive	Least Concern	Dubious Dtella *Gehyra dubia*	1	02/11/2022	-27.6227	152.8666	X				Released into fissure of tree	
Anna Lukan	02/11/2022	08:15	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6234	152.8639	Alive	Least Concern	Yellow-footed Antechinus *Antechinus flavipes*	1	02/11/2022	-27.6222	152.8667	X				Released into hollow tree stump covered in grass	
Anna Lukan	02/11/2022	08:27	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6234	152.8639	Alive	Least Concern	Sugar Glider *Petaurus breviceps*	1	02/11/2022	-27.6221	152.8667	X				Into tree hollow	
Anna Lukan	02/11/2022	10:46	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6230	152.8622	Alive	Least Concern	Dubious Dtella *Gehyra dubia*	1	02/11/2022	-27.6227	152.8666	X				Released into fissure of tree	
Anna Lukan	02/11/2022	10:50	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6230	152.8622	Alive	Least Concern	Torresian Crow *Corvus orru*	1	02/11/2022	NA	NA		V				Nestling age chick taken to RSPCA Wildlife Hospital Wacol (07) 3426 9999

Anna Lukan	02/11/2022	11:41	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6237	152.8629	Alive	Least Concern	Rainbow Lorikeet *Trichoglossus haematodus*	1	02/11/2022	NA	NA		V				1x juvenile taken to RSPCA Wildlife Hospital Wacol (07) 3426 9999
Anna Lukan	02/11/2022	12:02	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6228	152.8641	Alive	Least Concern	Striped Marsh Frog *Limnodynastes peronii*	1	02/11/2022	-27.6227	152.8666	X				Released next to creek in woody/leafy debris	
Anna Lukan	02/11/2022	14:52	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6231	152.8646	Alive	Least Concern	Tawny Frogmouth *Podargus strigoides*	1	02/11/2022	-27.6229	152.8659	X				Released into adjacent vegetation	Adult female
Anna Lukan	02/11/2022	16:45	The Pocket (Stages 5 & 6) - 218 Collingwood Drive, Collingwood Park	-27.6227	152.8627	Alive	Least Concern	Robust Velvet Gecko *Nebulifera robusta*	1	02/11/2022	-27.6228	152.8661	X				Into tree hollow	

5 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Pty Ltd and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017.*

No Koalas were observed during clearance. Other fauna found during clearance works were relocated (or self-relocated) to adjacent localities comprising suitable refugia and feeding resources consistent with individual species requirements. Young were taken to a certified wildlife carer or veterinary clinic.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*. Queensland Government.

References for nomenclature

Anstis, M. (2013) *Tadpoles and Frogs of Australia*, Sydney: New Holland Publishers.

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Simpson, K. & Day, N. (2004) *Field Guide to the Birds of Australia*. Penguin Group, Australia

Strahan, R. And Van Dyck, S. (2008) *The Mammals of Australia*, 3rd edn Sydney: New Holland Publishers.

Vanderduys, E. (2012) *Field Guide to the Frogs of Queensland*. Collingwood: CSIRO Publishing.

Wilson, S. (2015) *A Field Guide to Reptiles of Queensland*. 2nd edn, Sydney: New Holland Publishers.

7 Appendix A: Fauna Photos

Eastern Bearded Dragon
Pogona barbata

Sugar Glider
Petaurus breviceps

Common Brushtail Possum
Trichosurus vulpecula

Tawny Frogmouth
Podargus strigoides

Yellow-footed Antechinus
Antechinus flavipes

Dubious Dtella
Gehyra dubia

Striped Marsh Frog
Limnodynastes peronii

Rainbow Lorikeet (juvenile)
Trichoglossus haematodus

Torresian Crow (juvenile)
Corvus orru

Robust Velvet Gecko
Nebulifera robusta

Appendix C

Temporary Fence Photos


TREE
PROTECTION
ZONE
DO NOT ENTER

Appendix D

OMP Approval Letter

Australian Government
Department of Agriculture, Water and the Environment

2019/8516

Mr Wei Wang
Managing Director
Weiya Development Pty Ltd
Suite 208 2-8 Brookhollow Avenue
BAULKHAM HILLS NSW 2153

Dear Mr Wang

EPBC 2019/8516: Residential development, Collingwood Park, Ipswich, Queensland – Approval of Offset Management Plan

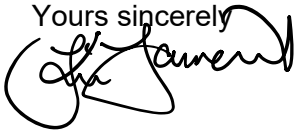
On 7 October 2021, Saunders Havill Group wrote to the Department of the Agriculture, Water and the Environment on your behalf seeking approval of the Scenic Ridge Offset Management Plan in accordance with conditions 5 and 6 of the above project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Officers of the Department have advised me of the Offset Management Plan and the requirements of the conditions of the approval for this project. On this basis, and as a delegate of the Minister for the Environment, I have decided to approve the *Scenic Ridge Offset Management Plan version 5 dated 15 March 2022*. This plan must now be implemented.

As you are aware, the Department has an active monitoring program which includes monitoring inspections, desk top document reviews and audits. Please ensure that you maintain accurate records of all activities associated with, or relevant to, the conditions of approval so that they can be made available to the Department on request.

Should you require any further information please contact Brooke Connors at postapproval@awe.gov.au.

Yours sincerely



Kim Farrant
Assistant Secretary
Environment Assessments (Vic, Tas) and Post Approvals Branch
Environment Approvals Division

25 March 2022

Appendix E

Offset Area Annual Report (Yr1)

Scenic Ridge Offset Area Annual Report Year 1

HB DEVELOPMENTS

25th Of March 2022- 25th Of March 2023

EPBC 2019/8516

HABITAT EXCHANGE SOLUTIONS

1. Offset Land Management Actions

This Offset Area Annual Report (OAAR) is provided to HB Qld Pty Ltd providing an outline of offset activities and management actions at Offset Area 1 at the Scenic Ridge Offset Property.

Primary Works in this stage of the offset have been the completion of baseline surveys for pest animal and weed species and the preparation of a Pest Management Plan (Attachment 1). Table 1 provides an ongoing review against the approved management actions of the *Scenic Ridge Offset Management Plan version 5 dated 15 March 2022* approved by the Commonwealth Government on the 25th of March 2022.

Nick Mair
General Manager
Habitat Exchange Solutions Pty Ltd

Phone: 0402 403 286
Email: nick@habitatexchange.com.au

Table 1: Approved Management Actions

	Completion Criteria	Progress	Evidence
Management Action 1 – Feral Animal Control			
Year 1	Complete detailed baseline / seasonal feral animal management survey(s) Consult Scenic Rim Regional Council and / or the Regional Pest Management Representative Develop a Pest Management Implementation Strategy	Base line surveys have been completed for Pest Species (Weeds and Animals) through the Offset Site. A Pest Management Plan has been prepared in accordance with the Queensland Government Pest Management Plan template	Refer Attachment 1 of this OAAR.
Year 5	Replicate the Year 1 detailed baseline / seasonal pest management survey(s) to demonstrate less than 5% of the Year 1 baseline survey results.	NA at the time of this Report	NA
Year 10, 15 & 20	Repeat the baseline surveys in year 10, 15 and year 20 to demonstrate a maintenance of year 5 statistically reduced vertebrate pest species incidence and or occurrence below the 5%-year 1 baseline survey results.	NA at the time of this Report	NA
Adaptive Management	If greater than 5% of the baseline pest survey results remain in the Year 5 survey and reporting, Year 10 survey results to demonstrate that the less than 5% of the baseline survey has been achieved.	NA at the time of this Report	NA
Management Action 2 - Weeds of National Significance Control			
Year 1	Complete detailed baseline / weed extent surveys utilising an antenna based GPS system	Base line surveys have been completed for Pest Species (Weeds and Animals) through the Offset Site. A Pest Management Plan has been prepared in accordance with the Queensland Government Pest Management Plan template	Refer Attachment 1 of this OAAR.
Year 5	Replicate Detailed Weed Extent Re-Survey through the OMZ1 – Include plans and calculations in the Year 5 OAAR demonstrating less than 5% of the OMZ1 area to contains weed infestations.	NA at the time of this Report	NA
Year 10	Replicate Detailed Weed Extent Re-Survey through the OMZ1 – Include plans and calculations in the Year 10 OAAR demonstrating less than 5% of the OMZ1 area to contains weed infestations	NA at the time of this Report	NA
Year 15 & 20	Repeat of Baseline surveys in year 15 and year 20 to demonstrate a maintenance of year 10 significant reductions to the extent of Lantana spp. below 5% of the OMZ1 area to contains weed infestations	NA at the time of this Report	NA
Management Action 3 – Livestock Control			
Year 2	Complete all fencing as per the Indicative OMZ1 Fencing Plan	NA at the time of this Report	NA
Other	Annual inspection of the fencing integrity and stock breaches	External fencing are inspected regularly and are maintained to both keep cattle within the property and neighbouring cattle external to the property.	No Stock breaches during the period / physical inspection of the fences.
Management Action 4 - Access and Trespass Control			
Year 1	Inspection and rectification of all perimeter fencing		

	Notification of offset areas, purpose and outcomes to all adjoining land holders	Primary adjoining land holder is government gazetted road reserve. Wesley Nugent is the registered owner of allotments to the east and south and has been notified of proposed future works within the offset area. Wesley provides ongoing weed spraying and control over the balance areas of the property as a paid contractor.	NA
Other	Access gates and signage to be installed where OMZ1 fencing crosses tracks required to be maintained for access	NA at the time of this Report	NA
Management Action 5 – MNES Habitat Restoration			
Year 1	Finalise locations, sequence and timing for revegetation program	No change has occurred to the proposed replanting zones.	NA
	Cultivate and prepare OMZ1 (34.7ha) area in preparation for year 2 planting	NA at the time of this Report	NA
	Create OMZ1 water source for revegetation establishment (purpose located dam or broadscale irrigation)	NA at the time of this Report	NA
	Establish photo monitoring points and protocols for the OMZ1	NA at the time of this Report	NA
		NA at the time of this Report	NA
Year 2	Complete OMZ1 MNES habitat restoration (34.7ha)		NA
Year 5	Replicate transects surveys completed in accordance with the Modified Habitat Quality Assessment (Koala) and Grey-headed Flying-fox Foraging Habitat Assessment tools, species stocking rate surveys and photo point monitoring	NA at the time of this Report	NA
	For the OMZ1, achieve a MHQA score of 3/10 and GHFF FHA score of 4/10		
Year 10	Replicate transects surveys completed in accordance with the Modified Habitat Quality Assessment (Koala) and Grey-headed Flying-fox Foraging Habitat Assessment tools, species stocking rate surveys and photo point monitoring	NA at the time of this Report	NA
	For the OMZ1, achieve a MHQA score of 4/10 and GHFF FHA score of 5/10		
Year 15	Replicate transects surveys completed in accordance with the Modified Habitat Quality Assessment (Koala) and Grey-headed Flying-fox Foraging Habitat Assessment tools, species stocking rate surveys and photo point monitoring	NA at the time of this Report	NA
	For the OMZ1, achieve a MHQA score of 6/10 and GHFF FHA score of 7/10		
Year 20	Replicate transects surveys completed in accordance with the Modified Habitat Quality Assessment (Koala) and Grey-headed Flying-fox Foraging Habitat Assessment tools, species stocking rate surveys and photo point monitoring	NA at the time of this Report	NA
	For the OMZ1, maintain a MHQA score of 7/10 and GHFF FHA score of 8/10		
Other			
Annually & Year 5, 10, 15 & 20	Complete Offset Area Annual Reports, with major milestone reporting completed in Year 5, Year 10, Year 15 and Year 20.	NA at the time of this Report	NA

Attachment A – Pest Management Plan (Year 1)

HABITAT EXCHANGE SOLUTIONS

Pest Management Plan

(Year 1 – March 2022- March 2023)

Year 1 Pest Management Plan Scenic Ridge Offset Area 1
April 2022 – EPBC 2019/8516

Introduction:

EPBC 2019/8516 for the Residential Development at Collingwood Park in Ipswich was approved on the 3rd of September 2021. Condition 4 and 5 of EPBC 2019/8516 relates to the preparation and lodgement of an Offset Management Plan (OMP) for an area of 34.7ha (Offset Area) at the Scenic Ridge Offset Site, located east of Boonah in the Scenic Rim Regional Council. The OMP was lodged with the Department on the 6th of October 2021 and formally approved by the Department via separate letter dated the 25th of March 2022. The approved version of the OMP is referenced as:

Scenic Ridge Offset Management Plan version 5 dated 15 March 2022 (OMP)

Within the Approved OMP two management actions focus on the control of weeds and pests. These are:

- **Management Action 1:** Feral Animal Control (primarily targeting wild dogs) [Section 5.1 of OMP]
    - ***Year 1:*** *Complete detailed baseline / seasonal feral animal survey(s);*
    - ***Year 1:*** *Develop a Pest Management Plan;*
- **Management Action 2:** Weeds of National Significance Control (reduction and management) [Section 5.2 of OMP]
    - ***Year 1:*** *Complete detailed baseline / weed extent survey utilising an antenna-based GPS system to map the full extent of all Lantana camara areas within the OMZ1. Results of baseline weed extent surveys to be included in year 1 Offset Area Annual Report for inclusion in the project ACR.*

This Pest Management Plan presents the findings of Year 1 baseline surveys and outlines the framework for works to be completed in years 2-5 for pests and weeds.

Format:

This Pest Management Plan adopts the Queensland Government Pest Management Template, specifically designed for management of pest animals and weeds on rural properties. The template provides a number of registers for risks and completed actions which are familiar for pest contractors to understand, implement and record actions within. The template is developed for the Queensland Agricultural sector and thus is altered for the necessary focus on environmental outcomes of the Offset Area, however in many instances activities remain complimentary. This document is purely a tool for the tracking, compiling and measuring offset activities relating to weeds and pest species only over future years and ultimately the life of the offset. Refer to the broader reporting for the Offset Area Annual Report (OAAR) for more details on balance offset items.

1. Property details and background

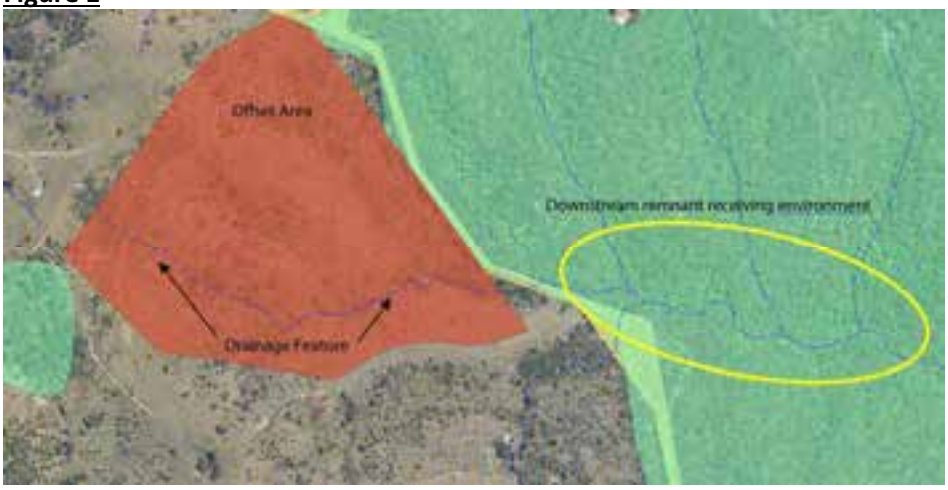
Ownership and property information	
Tenure	Freehold
Property name	Scenic Ridge Offset Property
Lot / Plan property description	Lot 15 on W311675
Property size (ha)	240 (ha) – Total Property (Offset Area = 34.7ha – Refer to Attachment 1 for Property and Offset Area Map).
Shire	Scenic Rim Regional Council
Responsibility	Nick Mair **General Manager** Habitat Exchange Solutions Pty Ltd **Phone:** 0402 403 286 **Email:** nick@habitatexchange.com.au
Property location / address	528 Geiger Road, Allandale – Directly East of Boonah Township
Postal address if different from above	PO Box 5249 Kenmore East Qld 4069
Phone home:	NA
Phone business:	0402 403 286
Fax:	NA
Email:	nick@habitatexchange.com.au

Other items and attributes • ***permits*** • ***state interests (main roads, national parks, stock routes)*** • ***agreements (e.g. nature refuge agreement)*** • ***easements licences approvals*** • ***developmental controls***	NA – Voluntary Declaration exists over the Offset Area – Queensland Government Department of Natural Resources (DoR) Dealing Notice 2021/002664. (Refer Attachment 2 for VDEC Plan)
Enterprise description and land use	
Current uses	The majority of the property is grazed for cattle retaining between 90 to 130 head year in year out. The property includes 2 dwellings, multiple sheds, bores, tanks, two sets of cattle yards and extensive perimeter and internal fencing. Approximately 5 small dams occur sporadically over the land holding.
Property area	240 (ha) – Total Property (Offset Area = 34.7ha – Refer to Attachment 1 for Property and Offset Area Map).

2. Weed species

Overview of weed species on property *Please display these attributes on a property map, preferably on an image base, if possible. Mark areas on clear overlays if you do not wish to draw directly onto the map.*	
What weed/s does this plan cover?	• *Lantana Camera* (Lantana) • *Solanum mauritianum* (Wild Tobacco) • *Cirsium vulgare* (Spear Thistle) • *Opuntia spp.* (Prickly Pear) • *Sporobolus pyramidalis, S. natalensis* (Giant Rat's Tail Grass) *Other weeds exist on the property in small areas and acute locations, however are not considered to occur in volumes or of a type likely to cause any risk to offset outcomes (eg some domestic weeds historically occur around the homestead and care-takers dwelling)*
How long have these weeds been on the property?	Unknown – At least since 2018

How were these weeds introduced to your property?	Unknown – Likely a combination of the following: • Direct spread from upstream waterways and adjoining properties • Cattle movement on and off the property. Likely high dispersal method within the property. • Red Deer have been observed feeding on the Lantana berries within the area (not the site) • Bird seed and fruit dispersal • Vehicle movements • Wind • 3rd party machinery (Slashing contractor, etc)
What is the % cover of these weed/s on the property? **Note: see Section 2, Step 3 a) of the guidelines for how to estimate weed cover %.**	Weeds over the entire property have not yet been mapped, however most waterways contain weed infestations, as do areas within and immediately adjoining the cattle yards. Weeds through the 34.7ha approved offset area have been mapped and described on-site and are estimated to impact between 37-42% of the Offset Area. (Refer to Attachment 3 for Weed Map and Photos)
Show on a map or overlay where weeds are distributed, and their estimated densities.	(Refer to Attachment 3 for Weed Map and Photos) Weeds occur within large single patches or in areas interspersed with native vegetation, including areas of healthy natural regeneration. The dominant weed species over the site is *Lantana Camera*, however a greater diversity of weeds are recorded within well incised drainage lines.
Do they pose a threat to other areas within the property? If yes, which areas? (e.g. southwest corner of property at risk of parthenium infestation from seeds carried downstream).	Yes – If left untreated weeds will continue to infest through the site waterways and gully lines. They already dominate in these locations and as the land holding does not retain existing native canopy cover, limited natural resistant to weed expansion occurs. Currently where weeds occur they are observed to suppress natural regrowth and regeneration which assists in achieving the offset outcomes. *Lantana Camera* is the dominate weed infesting areas through the offset area. Lantana clumps on waterways also provide movement and refuge areas for pest species (wild pigs and dogs).

Do they pose a threat to neighbouring properties? If yes, which ones?	Partially – Several minor drainage lines and 1 stream order scale 1 waterway are mapped through the Offset Area capturing run off from within the offset site and directing it directly west into Lot 11 on SP 891206, through the Gieger Road – Road Reserve an ultimately into significant land areas of remnant native vegetation. (See Figure 1) **Figure 1** 
Is the control of these weeds a priority?	Yes – Control of weeds within this part of the property is a regulated requirement of EPBC Approval 2019/8516. Additionally control of the weeds will support the following committed actions within the Approved Offset Management Plan (March 2022): • *A reduction in Lantana sp to 10% of the baseline within the Offset Area by Year 5.* • *A reduction in Lantana sp to 5% of the baseline within the Offset Area by Year 10.* • *enable extensive areas of native regenerating saplings to establish through the offset area.* • *Remove a movement and foraging area for pest species.* • *Will support the further growth and development of existing native species.* • *Will prevent major weed outbreak within replanted zones of the Offset Area.*
Plant life cycle	

How do the existing weeds spread?	Refer Attachment 4 for weed technical sheets. Lantana: • Fruit eating birds and mammals • Spreads directly via layering and creeping root system Wild Tobacco • Birds seed dispersal • Dumped garden waste • Seed dispersed via soil in waterways Spear Thistle • By seed – parachute seed spread by wind • Machinery and vehicle spread Prickle Pear • Animals and local flooding / run off spread pads which re-shoot • Can be spread as ornamental garden species Giants Rats Tail Grass • Spread via livestock in manure, on fur or hooves. • Mud, hay and native animals also distribute seeds • Vehicles / Machinery commonly distribute seed
When do the weeds flower and seed?	Lantana: • Flowering and fruiting can occur all year round – subject to conditions. Less likely during the South East Queensland Winter. Wild Tobacco • Flowers all year round • Fruiting produced in late Spring / early Summer Spear Thistle • Seeds germinate in two periods – Autumn to late Winter and Spring. Prickle Pear • Flowers in bloom through May to July • New Seedlings grow in Spring Giants Rats Tail Grass • Summer / Autum – excludes any frosting periods.

Is there a critical period for control? (e.g. plants must be removed prior to setting seed in February-March)	Lantana: • Manual or mechanical control can occur during any season • Fire management can occur subject to low risk fire seasons and local permits • Foliar chemical control is most effect between February and May • Stem chemical control can occur year round, however more effective in Summer. Wild Tobacco • Foliar chemical application in Spring to Autumn • Cut sump or basal bark all year round • Manual or mechanical control can occur during any season Spear Thistle • Chemical application should occur prior to centre flowering stem development for best results (Autumn) Prickle Pear • Foliar spray or injection, drill, frill or cut stump can be applied year round. • Manual removal to be avoided due to the high likelihood disturbed pads regerminate. Giants Rats Tail Grass • Best chemical results in Summer (usually multiple spray rotations required)
Control/ management methods *Please complete the attached yearly activity calendar.*	
What is the recommended best practice for your situation? (include source of recommendation).	Refer Attachment 4 for weed technical sheets. A variety of these detailed control methods will be adopted bespoke to the specific scenario the weed is occurring. To date Lantana clumps have been treated via foliar spray using *Grazon Extra*, in accordance with recommended manufacturer specifications. Photo Plan 3 in Attachment 3 shows the impacts on treated Lantana. This application method is only suitable for substantial clumps of Lantana, general separated from native vegetation or areas of native natural regeneration. Moving forward specific methods espoused in the *Using herbicides on Lantana – A guide to best management practices* (Attachment 5) will be adopted.
Details of any agreed weed treatment program for your property	Nil

Are native animals and/or plants/ ecosystems impacted by these control measures? Detail mitigation methods for native species. **Note: see Step 3 b) of the guidelines for examples.**	Provided the methods listed in the technical data sheets for areas which contain native vegetation and waterways are adopted and deployed for each weed species impacts are not considered likely.
Are watercourses, wetlands and/or soils impacted by these control measures? Detail mitigation methods for these areas.	Waterways do represent the area of greatest weed infestations within the offset site and the property more broadly. Lantana is the dominant waterway weed. Methods recommended in the technical sheets contained in Attachment 4 and specific Lantana treatment guide in Attachment 5 will be deployed to minimise impacts on waterway values.
Frequency and timing of monitoring of the weed infestation.	
New threats/weed hygiene *Please mark high risk areas for weed invasion on your property map.* ***Note**: Refer to Step 3 d) of the guidelines for suggestions.*	
Are there weeds that have the potential to threaten your property but are not yet a problem? Please list these weed species.	None Identified. Weeds found on the property are common tot the local area, adjacent land holdings and road reserves.
How do you monitor threats? **Can your monitoring be improved? How?**	Visual observation supported by bi-annual surveys. Monitoring is considered sufficient. Major baseline surveys are re-run at 5 year intervals.
What are your current weed hygiene practices? **List any additional weed hygiene practices that would be useful for your property.**	All vehicles accessing the site immediately after wet periods are washed down at the machinery shed located at the property entry. Machinery (property vehicle, tractor, quad and UTV) washed down as needed. The property is privately owned and primarily used for and transitioning to an offset site, which includes the regular monitoring and measuring of weed species and extents. Additional hygiene practices are not considered warranted at this stage in the project.

3. Pest animals/plague pests

Overview of pest animal species on your property: ***Note**: refer to Step 3 e) of the guidelines for more information*	
What pest animal problems are there on your property?	• *Canis familiaris, C. familiaris dingo, C. lupus familiaris, C. lupus dingo* (Feral Dogs) • *Sus scrofa* (Wild Pigs) • *Oryctolagus cuniculus* (Hares / Rabbits) • *Axis axis and Cervus timorensis* (Feral Deer) • Rats & Mice
What damage is this pest animal causing, e.g. stock losses, crop damage? Include any impacts on native animals and plants/ecosystems	Feral Dogs • Risk to native wildlife and in areas of cattle agistment have previously killed a calve. Wild Pigs • Digging up waterways and grass pasture areas Hares / Rabits • Feeding on native regeneration • Breeding in large numbers • Attracting other predators (Feral dogs) Red Deer • Stomping up waterways with pack hoofs • Wearing gaps in in external fencing • Eating and spreading Lantana fruits Rats & Mice • Breeding and foraging at houses and site sheds / eating wiring on vehicles and machinery • Attracting other predators (Feral dogs)

Where is this occurring? ***Display as an overlay on the base map.***	Pest have been observed anecdotally and through formal survey over the property during the base line survey period and other observations prior to this period. Informal observations: • feral dog observed external to offset area on western boundary line creek (by cattle farmer) • Wild Pigs have been observed in entire families on various parts of the property including within the waterway incising the offset area • Pig drove damage very extensive during the baseline survey period along several waterways and open areas. • Wild pig hair found on external fencing barb wire and cleared grass area access points into the property. • Hares, Rabbits, Mice and Rates are consistently observed over the property, particularly around infrastructure and maintained areas. • A killed calf was located in the northern part of the property as part of surveys for the OMP – suspected by the cattle supervisor as a feral dog attack. • Machinery wiring has been constantly defrayed by rats and mice. Feral dogs surveys were completed in two methods in addition to general observations by land owners, works contractors and consultants at the offset property and further anecdotal information from the cattle agistment supervisor. Methods: 2 x Nighttime Shooting events occurred in April and May 2022. Both events included 3 shooters and a single night of baiting and shooting. Neither event resulting in the spotting or killing or a feral dog Baited Camera traps were placed in the offset area through Autmn of 2022 and again in Spring 2022. Two cameras were located within the offset area and 1 camera located just adjacent at a rocky outcrop den where fox footprints had been previously observed by the cattle supervisor prior to any offset approval. The cameras consistently captured a moderate size drove of wild pigs within the offset area and other native species, however did not located any feral dogs during the survey period. The offset area is a relatively small area in the scheme of the total property and the broader rural landscape in which it occurs and this is the likely contributor to no direct record obtained within the offset area during the survey period. A wild dog was observed during the day in a creek line bordering the western boundary and a calf has previously been killed in the northern part of the property. Ongoing surveys are occurring into year 2 in order to establish a more substantial baseline of data. Wild Pigs have been prolific over the property and in the local area with neighbouring properties also dealing with a seasonally high level of occurrence. Refer Attachment 6 for Pest Management Maps and Photos.

When does this species breed?	Feral Dogs • April to June – (9week gestation) Wild Pigs • In good conditions occurs all year round – Sows can produce 2 litters per year. Hares / Rabits • All year round – typically during wetter seasons Red Deer • March to April (6-12 week period) Rats & Mice • Typically Spring
Is there a critical time for carrying out control programs? **(e.g. foxes should be baited 4–6 weeks before lambing; wild dogs should be baited in the autumn when they are mating, and again in the spring when there are pups around).**	Feral Dogs • High activity periods – March / May and September / November Wild Pigs • All year round – typically responses to evidence of occurrence Hares / Rabits • All year round Red Deer • NA Rats & Mice • All year round

Is control of this pest animal a priority in your local government area?	Feral Dogs • Yes - Feral dogs are abundant and widespread throughout the Scenic Rim region. The impact of wild dog activity has increased in the past 10 years due mainly to the increasing population in the region. Residents are increasingly engaged in raising livestock, resulting in a readily available food sources for feral dogs. Wild Pigs • Yes – included as a declared pest species by the Scenic Rime Regional Council. Feral pig population has increased due to increased animal husbandry, and availability of food sources such as feed lots and the feeding of livestock like horses on rural residential blocks. Hares / Rabits • Yes – included as a declared pest species by the Scenic Rime Regional Council. Rabbits have been a major problem throughout Australia since settlement, and despite the construction of the rabbit-proof fence and legislation to prohibit the keeping of rabbits in Queensland, populations and sightings are on the increase. The migration of residents from southern states where the rabbit is not a prohibited animal often results in the escape of the rabbits into the wild. This has major implications for native flora and fauna, and may result in severe damage to crops, landscapes and erosion. Red Deer • Yes – included as a declared pest species by the Scenic Rime Regional Council. Rats & Mice • No specified as a priority because of its equal occurrence within rural and urban settings.
Is this pest a new one identified under the local government area pest management plan?	No – All species located at the site occur commonly in the Scenic Rim Regional Council Area and are listed in the *Draft* Scenic Rim Regional Biodiversity Plan 2023-2028
Control/ management methods: *Please complete the attached yearly activity calendar for your current methods. You may fill out other yearly activity calendars for future years after working through the following sections of the template.*	

What control methods are you currently using?	Feral Dogs • Targeted shooting • In August 2022 Contact was made with Scenic Rim Regional Council Ranger Andrew Richter for inclusion in the September 1080 Council Baiting Program (copy of Council Material Included as Attachment 7) Wild Pigs • Shooting and pig traps have both occurred throughout the 12 month period. 6 pigs have been killed, however a high number continue to be observed. Hares / Rabits • Opportunistic shooting Red Deer • Nil Rats & Mice – • Poison baits and traps permanently deployed around infrastructure and machinery. Refer Attachment 8 for relevant technical specifications and treatment of pest species by the Queensland Government.
Are they consistent with current best practice?	Yes
What restrictions, if any, apply to these control methods?	None at this property – Neighbours and cattle agistment supervisor are advised of baiting proposals and timing and shooting events.
Are you coordinating monitoring and control with neighbouring properties?	Advising but not coordinating.
If not, is it possible to begin doing so?	The land primarily adjoins road reserve or bushland and neighbouring activities don't occur adjacent to the boundary.
Are the pest animals damaging any particular areas?	Primarily waterways and where reasonable open grass areas occur.
How do you currently check (monitor) pest animal damage and numbers?	Surveys, observations and documentation (Primarily photos) Ongoing baseline surveys.

What actions, if any, could you take to utilise this pest animal as part of your management program? (e.g. sell feral pigs for pet food trade)	Nil
New threats	
Are there any pest animals in the local area that have the potential to threaten your property?	Yes: *Vulpes vulpes* (European Fox) A fox den is located within a rock outcrop adjacent to the offset area and prior to offset approval the cattle agistment supervisor has advised of seeing foxes in this location. A motion sensor camera was placed at this location, however failed to locate a fox during the survey period despite older evidence of usage. *Solenopsis Invicta* (Red Imported Fire Ants) Fire ants are increasingly entering the Scenic Rim area and the Queensland Government's Fire Ant Department have inspected the site for nests. None detected so far, however ongoing issue with repeated inspections requested.
What would be the likely impact of these species on your property?	Foxes would contribute to the impacts of feral dogs. Fire ants would cause issues with cultivation and pre-planting works, however, should ultimately be able to be controlled once cattle agistment is complete.
What monitoring program do you have in place to detect any threat from these species? **Can your monitoring be improved? How?**	State Government provide monitoring for Fire Ants and broader region surveys and controls. Foxes will be monitoring in accordance with all other pest species.

4. Assessing risk and assigning priorities

Note: for further information on risks and priorities, please refer to Step 4 of the Guidelines.

4.1 Risk assessment matrix

Plot the pest species on the matrix (examples of wild dogs and parthenium are given). Consider each species individually – locate them along each axis (i.e. impact on property and likelihood) and enter them in the appropriate box. Continue with all pest species for your property until all species are listed.
You can now assign priorities according to where the risk to your property lies – fill out section 4.2. The species placed nearest the bottom right hand corner are likely to represent the greatest risk to your property and surrounding area (in the example below, parthenium represents greater risk than feral pigs).

Risk assessment matrix

		Likelihood of occurrence			
		Unlikely	Possible	Likely	Certain
Impact on property and surrounding area if occurs	Minor	Very low	Low	Low	Low
	Moderate	Low	Low	Medium	High
	Major	Low	Medium	High	Very High e.g. wild dogs on sheep property
	Irreversible	Low	High	Very High e.g. parthenium	Extreme

4.2 Pest species priorities

Consider the risk to your property, surrounding area, legal requirements, etc.

Pest	**Location/paddock**	**Priority (e.g. low, medium or high)**
Lantana Camera (Lantana)	Offset Area 1	High
Solanum mauritianum (Wild Tobacco)	Offset Area 1	High
Cirsium vulgare (Spear Thistle)	Offset Area 1	Low
Opuntia spp. (Prickly Pear)	Offset Area 1	Low
Sporobolus pyramidalis, S. natalensis (Giant Rat's Tail Grass)	Offset Area 1	Medium
Feral Dogs	Offset Area 1	High to Very High
Wild Pigs	Offset Area 1	Medium to High
Hares / Rabbits	Offset Area 1	High (at times of juvenile re-plantings)
Red Deer	Offset Area 1	Low
Rats / Mice	Offset Area 1	Very Low
Potential Species		
Fox	Offset Area 1	High
Fire Ants	Offset Area 1	Medium

5. Goals, targets and actions **(to control existing pests and prevent entry of new pests)**

5.1 Setting overall goals

Note: for further information on goals, please refer to Step 5 a) of the Guidelines).

Vision (usually one vision)	**Goals (may be many)**
Management Action 1: Feral Animal Control (primarily targeting wild dogs) [Section 5.1 of OMP]	• Reduce the occurrence of feral animal species (namely wild dogs) to below 5 % of the baseline survey in the OMZ1 within 5 years from the commencement of the action; • Maintain occurrences of feral animal species within the OMZ1 to 5 % or below of the baseline survey results for the life of the approval; and • Ensure no koala injury or mortality occurs within the OMZ1 for the life of the approval.

	• Removal and control of all major *Lantana camara* infestations from within the OMZ1 using a variety of mechanical and herbicide methods. *Lantana camara* infestations are to be reduced to below 5 % of the OMZ1 area. Areas identified as containing higher infestations are to be targeted during weed removal events. • Ongoing maintenance to ensure that *Lantana camara* extents within the OMZ1 are retained at or below the 5 % of the total area through weed management actions; and • Prevent the further spread or establishing of new *Lantana camara* outbreaks within the OMZ1 by excluding cattle from the offset management zone.

5.2 Preliminary Targets and actions

Note: See table on next page for an example on how to fill out this table—for more information on targets & actions, refer to Step 5 b) of the Guidelines.

Targets/goals	Management actions	Who	When	Cost	Completed
1A	Complete baseline surveys – Pest Animals – Completed and ongoing	NM	Year 1	$15,000 / event	Year 1
1B	Complete Baseline Weed Surveys	NM / SHG	Year 1	$22,000 / event	Year 1
1C	Development Pest Management Plan	NM	Year 1	NA	Year 1
2A	Undertake Bi-annual trapping and shooting for feral dogs	Contractor	April / October	$8,000 p.a.	Year 2 and ongoing
2B	Continued Inclusion for the property in SRRC 1080 Bating Program	NM / Council Ranger	Sept	$2,000 p.a.	Year 2 and ongoing
2C	Apply broadscale herbicide and spot spray during high germination summer periods (Nov-March).	Contractor	Nov-March	$15,000 p.a.	Year 2 and ongoing
3	Repeat Detailed baseline surveys for Pest Animal and Plant Species	Consultant	2028	$40,000 per event	As required.

Forms for completing throughout pest management activities and review period

Monitoring records

Note: See next page for an example on how to fill out this table—for more information on monitoring, please refer to step 6 of the Guidelines.

Date/time period	Number/amount/density	Change/trend	Comment
Pest species: ……..			
Pest species: ……..			
Pest species: ……..			

Monitoring records table – Feral Dogs

Date/time period	Number/amount/density	Change/trend	Comment
Pest Species: Feral Dogs			
2023-2024			
2024-2025			
2025-2026			
2026-2027			
2027-2028			
2028-2029			
2029-2030			
2030-2031			

Monitoring records table – Wons - Lantana

Date/time period	Weed Volume	Change/trend	Comment
Pest Species: WONS - Lantana			
2023-2024			
2024-2025			
2025-2026			
2026-2027			
2027-2028			
2028-2029			
2029-2030			
2030-2031			

7. Yearly Activity Calendar

Activities	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec

8. Yearly review

Note: for further information, please refer to Step 6 b) of the Guidelines.

8.1 What has worked well this year?

_____
_____

_____
_____

8.2 What has not worked this year?

_____
_____

_____
_____

8.3 What changes can I/we make for the next year?

_____
_____

_____
_____

8.3 Other comments

_____
_____

_____
_____

Attachments:

Attachment 1 – Property and Offset Area Extents

Attachment 2 – VDEC declaration plan for the Offset Area

Attachment 3 – Weed Extents Mapping and Photos

Attachment 4 – Weed Treatment technical Specification Sheets (Queensland Government)

Attachment 5 – Best Management Practice Guide – Lantana

Attachment 6 – Pest Surveys and Observations and Photos

Attachment 7 – Council 1080 Bating Program and Instructions

Attachment 8 – Pest Species – Queensland Government Technical Data Sheets (Feral Dogs and Wild Pigs)

Attachment 1 – Property and Offset Area Extents

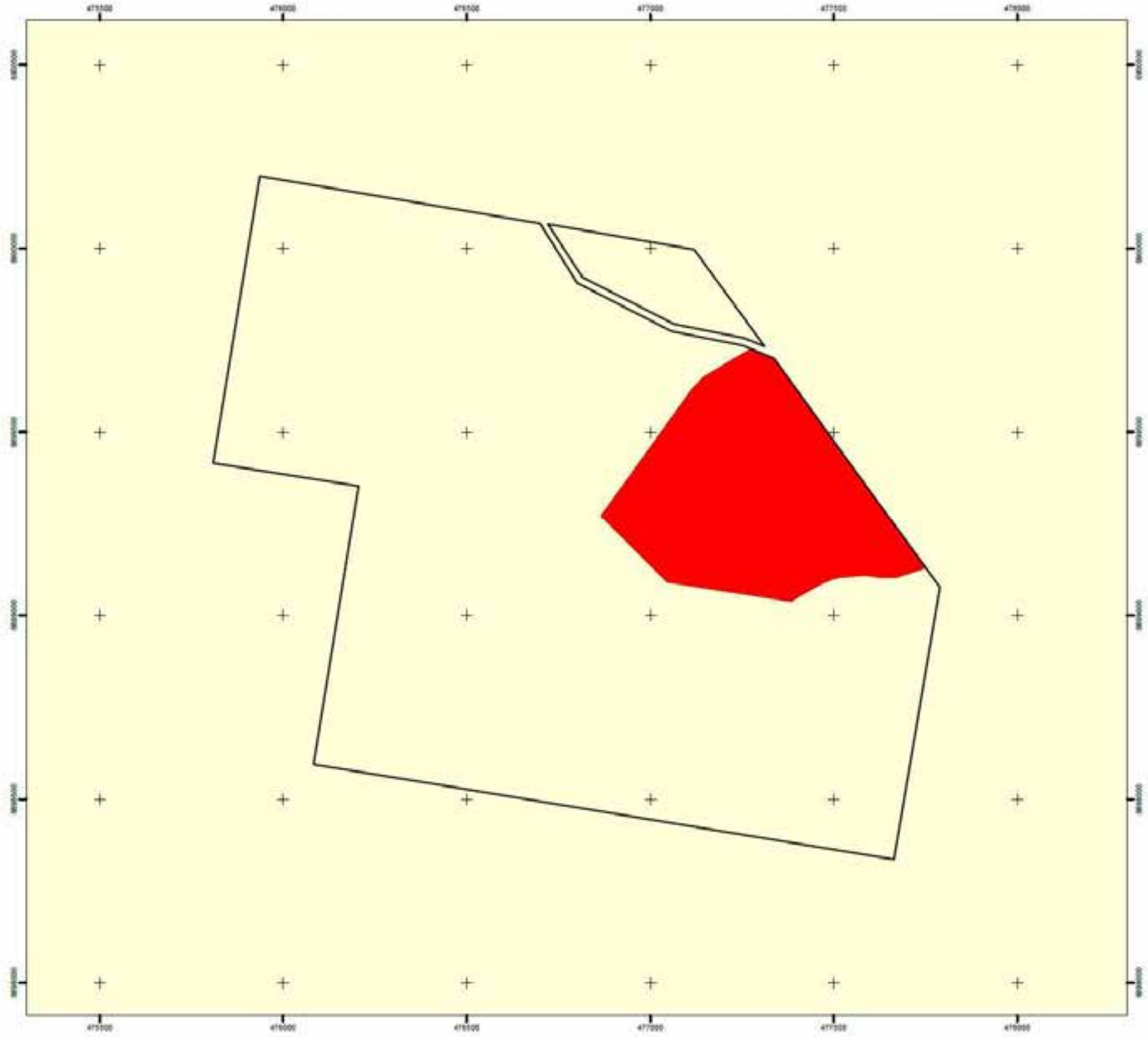
HABITAT EXCHANGE SOLUTIONS

Offset Allotment & Area

March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 13/04/2023)

Attachment 2 – VDEC declaration plan for the Offset Area



Property Map of Assessable Vegetation

Sheet 1 of 1

PMAV 2021/002668

LOT on PLAN
15W311675

Queensland Government

Scale 1:10 000 at A3 paper size

0 250 500 750 m

LEGEND

Subject Lot(s)
Area to which the PMAV does not apply

Vegetation Category Area

Category A area (see 2021002664)

N

Notes.

Property boundaries provided by Department of Resources
The property boundaries on this plan are a spatial representation of the property boundaries.
They are not the legal property boundaries and are subject to change as more accurate information becomes available.
The PMAV does not move with changes to the property boundaries.

Labelled Category B areas indicate a change in Regional Ecosystem classification as a result of detailed assessment.

Map Information:
Horizontal Datum: GDA 2020
Projection: Universal Transverse Mercator - Zone 56

This is a colour map and should only be reproduced in colour.

This PMAV is made under section 20B of the *Vegetation Management Act 1999* (VMA) as section 20B(1)(a) of the VMA applies to the area. This PMAV replaces PMAV 2009/003635 for the subject area under section 20D of the VMA.

Signed for the Chief Executive of the Department of Resources by

Name: Sandra Witheyman

Title: Senior Natural Resource Management Officer

Signature:

Date: 9 September 2021

Map Prepared by: NWF

Department of Resources
PO Box 2286, North Ipswich, Qld, 4305

Map Preparation Date: 07/09/2021

VMGIS-2082

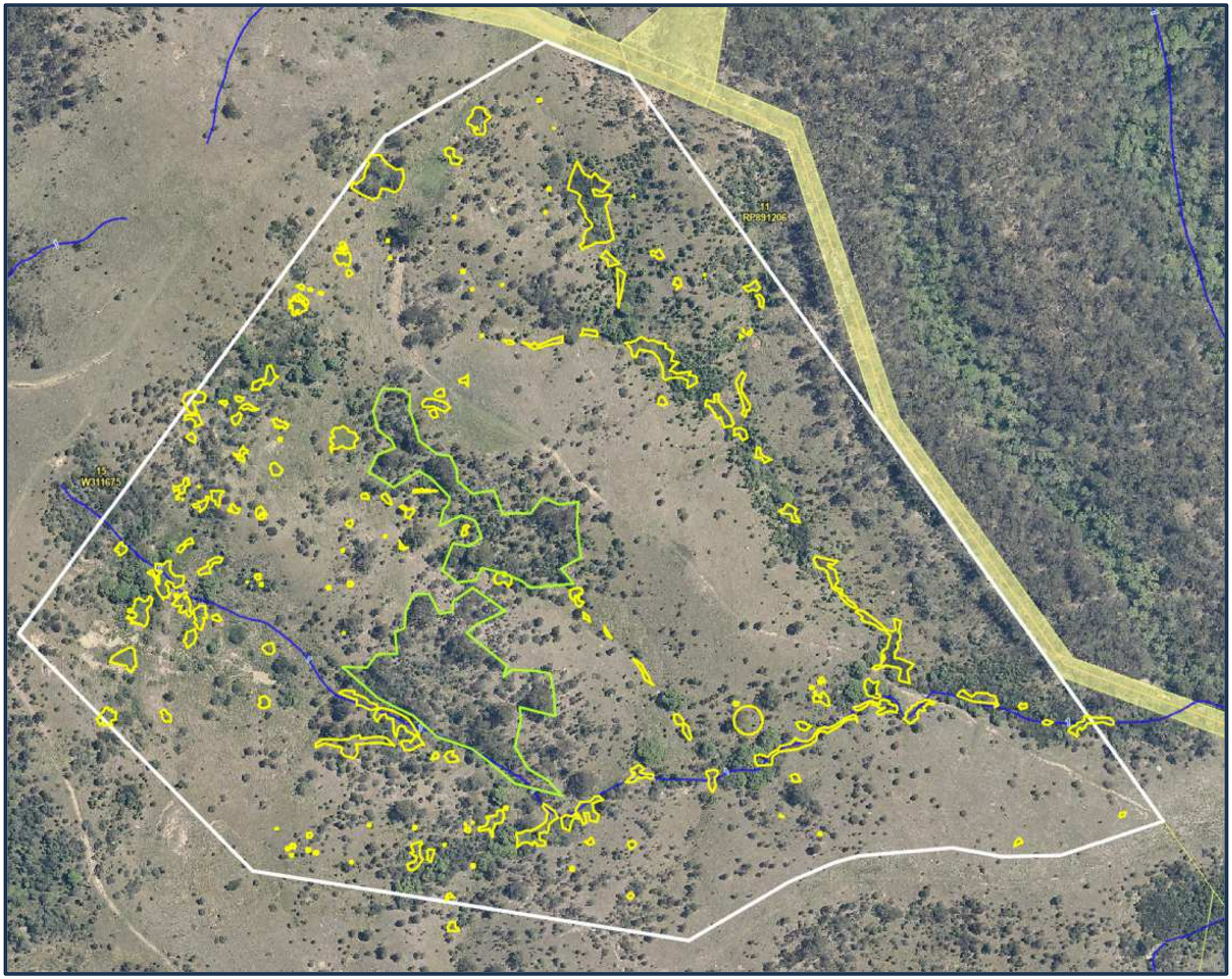
HABITAT EXCHANGE SOLUTIONS

VDEC – Declaration Area

March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 13/04/2023)

Attachment 3 – Weed Extents Mapping and Photos



Weed infestation Clump

Mixed Weeds amongst Native Saplings and Trees

Individual Weed Tree

Extent of Offset Area and Surveys

HABITAT EXCHANGE SOLUTIONS

Weed Surveys & Mapping

Weed Species Surveys and Mapping
March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 28/03/2023)

HABITAT EXCHANGE SOLUTIONS

Weed Surveys & Mapping
Photos

Photos Weed Species Recorded March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 28/03/2023)

HABITAT EXCHANGE SOLUTIONS

Weed Surveys & Mapping
Photos

Photos Weed Species Recorded March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 28/03/2023)

HABITAT EXCHANGE SOLUTIONS

Initial Weed Treatment Photos

Photos treated weed clumps 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 28/03/2023)

Attachment 4 – Weed Treatment technical Specification Sheets (Queensland Government)

Lantana

Lantana camara

Currently, lantana covers more than 5 million ha of subcoastal New South Wales to Far North Queensland. Small infestations of lantana have also been found in central west Queensland, the Northern Territory, Western Australia, South Australia and Victoria. Efforts are under way to control these.

Lantana is mainly spread by fruit-eating birds and mammals. It forms dense thickets that can smother and destroy native vegetation and are impenetrable to animals, people and vehicles.

Queensland

Research indicates more than 1400 native species are negatively affected by lantana invasion, including many endangered and threatened species. As lantana is a woody shrub that has thin, combustible canes, its presence can also create hotter bushfires, altering native vegetation communities and pastures.

Legal requirements

All lantana species (*Lantana camara* and *Lantana montevidensis*) are category 3 restricted invasive plants under the *Biosecurity Act 2014*. They must not be given away, sold, or released into the environment. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

At a local level, each local government must have a biosecurity plan that covers invasive plants in its area. This plan may include actions to be taken on lantana. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Lantana camara is a heavily branched shrub that can grow in compact clumps, dense thickets or as a climbing vine.

The stems are square in cross section, with small, recurved prickles. Most leaves are about 6 cm long and are covered in fine hairs. They are bright green above, paler beneath and have round-toothed edges. Leaves grow opposite one another along the stem. When crushed the leaves produce a distinctive odour.

Flowers appear throughout most of the year in clustered, compact heads about 2.5 cm in diameter. Flower colours vary from pale cream to yellow, white, pink, orange and red. Lantana produces round, berry-like fruit that turn from glossy green to purplish-black when ripe.

Life cycle

Flowering and germination occurs all year round but peaks after summer rains. Several thousand seeds can be produced per square metre and these can remain viable for several years.

Research indicates some ornamental lantana varieties have the ability to set seed and can spread vegetatively. They also produce some viable pollen and have the potential to cross-pollinate with wild forms, creating new varieties that could naturalise in the environment.

If the number of naturalised varieties increase due to genetic drift from ornamental varieties, it will make finding effective biological control agents even more difficult and potentially extend the climatic tolerances and range of the weed's spread.

Methods of spread

Spread mostly through the garden ornamental trade, by fruit eating birds and mammals.

Lantana camara can also spread via a process known as layering, where horizontal stems take root when they are in contact with moist soil. It will also reshoot from the base of vertical stems.

Habitat and distribution

Lantana camara is native to the tropical and subtropical regions of North, Central and South America.

Lantana camara is found throughout most coastal and subcoastal areas of eastern Australia, from the Torres Strait islands to southern New South Wales. It grows in a wide variety of habitats, from exposed dry hillsides to wet, heavily shaded gullies.

Toxicity

Many lantana varieties are poisonous to stock. It is difficult to tell which varieties are toxic so it is better to treat all forms as potentially poisonous. The toxins in lantana include the triterpene acids, lantadene A (rehmannic acid), lantadene B, and their reduced forms.

Most cases of lantana poisoning occur when new stock are introduced into lantana-infested areas. Stock bred on lantana-infested country avoid lantana unless forced to eat it due to lack of other fodder. Young animals introduced to lantana areas are most at risk.

Symptoms of lantana poisoning depend on the quantity and type of lantana consumed and, under some circumstances, the intensity of light to which the animals are exposed.

Early symptoms of depression are noticeable, with head swaying, loss of appetite, constipation and frequent urination. After a day or two the eyes and the skin of the nose and mouth start yellowing with jaundice, and the muzzle becomes dry and warm. The eyes may become inflamed and have a slight discharge. The animal also becomes increasingly sensitive to light. Finally, the muzzle becomes inflamed, moist and very painful ('pink nose'). Areas of skin may peel and slough off. Death commonly occurs 1–4 weeks after symptoms occur. Death from acute poisoning can occur 3–4 days after eating the plant.

If animals show any of the early symptoms, they should be moved to lantana-free areas, kept in the shade and monitored. Veterinary treatment should be sought immediately. Some remedies may include intravenous fluids, treating skin damage with antibiotics, or drenching with an activated charcoal slurry.

Care should be taken when introducing new or young animals into a paddock if lantana is present. Ensure they have enough fodder to stop them eating lantana in quantities sufficient to result in poisoning. During drought, animals should not be placed in lantana-infested areas without alternative food.

Control

Managing *Lantana camara*

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by *Lantana camara*. This fact sheet provides information and some options for controlling *Lantana camara*.

A general principle is to commence control programs in areas of light infestations and work towards the denser infestations using a mix (integration) of control methods. Size, density and geographic location of infestations are important considerations for choosing which mix of control methods to use.

For large lantana infestations, treatment with herbicides by foliar spraying is usually not economically feasible. However, fire, dozing/stick raking, slashing/cutting and aerial helicopter spraying are options that can reduce dense infestations, making follow-up spot treatments with herbicides more economically viable.

Lantana camara seed banks remain viable for at *least* four years, so follow-up control to kill seedlings before they mature is vital to ensure initial management efforts to control the parent bush are not wasted.

Appropriate fire regimes may become part of a management program to ensure *Lantana camara* invasiveness is reduced and pasture is maintained.

Removal of *Lantana camara* within areas of remnant vegetation may require a permit under the *Vegetation Management Act 1999*. Further information should be sought from the Department of Natural Resources before works commence.

Mechanical control

Stick raking or ploughing can be effective in removing standing plants. However, regrowth from stumps and/or increased seedling germination in disturbed soil is common and the site will require follow-up treatment.

Grubbing of small infestations—for example, along fence lines—can be a useful and effective method of removing plants, although this is time consuming.

Repeated slashing can also reduce the vigour of lantana, exhausting its stored resources and reducing its likelihood of re-shooting.

Some locations—for example, very steep inclines or gullies—are not suitable for mechanical control options because of the danger of overturning machinery and soil erosion.

Fire

Regular burning will reduce the capacity of plants to survive; however, initial kill rates are variable.

The effectiveness of this method will depend on the suitability of available fuel loads, fire intensity, temperature, relative humidity, soil moisture and season.

Pasture re-establishment can then provide competition to inhibit lantana seed germination. Fire is not recommended in non–fire tolerant vegetated areas such as rainforest, or wooded or plantation areas.

A typical control program for fire may include:

- exclude stock to establish a pasture fuel load
- burning (may require a permit)
- sow improved pastures—consult your local Biosecurity Queensland officer for advice
- continue to exclude stock until pasture has established and seeded
- burn again in summer before rain and spot spray *Lantana camara* regrowth when › 0.5 m high and when it is actively growing (see Table 1).

Biological control

Since 1914, 32 biological control agents have been introduced into Australia in an attempt to control lantana. Eighteen have established, of which several insect species cause seasonal damage, reducing the vigour and competitiveness of lantana in some areas.

Biosecurity Queensland research programs continue to investigate agents suitable for release in Australia, and test the viability of these agents in an effort to identify more effective biological control agents.

It is important to remember that biological control alone should not be relied upon for managing lantana infestations. Consideration should be given to other available control techniques.

The four most important biological control agents are:

- **sap-sucking bug (*Teleonemia scrupulosa*)**
  Found in dry areas from Cooktown to Wollongong, the small, mottled bug feeds on the underside of leaves, growing tips and flower buds, causing the leaves to drop early and stop the plant from flowering.
- **leaf-mining beetle (*Uroplata girardi*)**
  Found in most lantana infestations from Cape Tribulation to Sydney as well as around Darwin, except in very dry or high altitude areas. The adult beetles are dark brown. They shelter in curled leaves and feed on the upper leaf surfaces. Larvae feed in leaves causing blotches to spread across the leaf. This beetle reduces plant vigour and can suppress flowering.
- **leaf-mining beetle (*Octotoma scabripennis*)**
  Found in most lantana infestations from Atherton to Wollongong. Adults of this species feed on the upper leaf surface, while larvae feed and mine the centre of the leaf and cause blotches. This activity reduces plant vigour and can suppress flowering.
- **seed-feeding fly (*Ophiomyia lantanae*)**
  Found from Cape Tribulation to Eden in New South Wales and also around Darwin and Perth. *Ophiomyia* is a small black fly that feeds on flowers and lays eggs on the green fruits. The maggots of the fly eat the seed and make the fruit unattractive to birds, reducing seed spread.

Other agents such as *Aconophora compressa* (a stem-sucking bug) and *Leptobyrsa decora* (a sap-sucking bug) have caused some damage in specific geographic areas.

Note: Landholders are advised not to consume their time collecting established insects for distribution. Due to their own ability to disperse, these insects will be periodically/seasonally present in areas that are climatically suitable for them.

Herbicide control

Herbicide recommendations for lantana are shown in Table 1. Users of herbicides have a legal obligation to read herbicide labels and use only the registered rates.

Variation in results can be a result of inconsistent application methods, mix rates or seasonal variation. Red-flowered and pink-edged red-flowered lantana are often considered the most difficult to control because their leaves are often smaller and tougher. However, herbicides can kill these varieties if you carefully follow application procedures.

For single-stemmed lantana, basal bark spraying and cut stump methods also give good results at any time of year (but best when the plant is actively growing). On multi-stemmed varieties, you will obtain best results by carefully applying herbicide to each stem.

When treating actively growing plants less than 2 m high, overall spraying of foliage to the point of run-off is recommended. Splatter gun techniques are also effective and particularly useful in hard-to-access areas. This is best done in autumn—when sap flows draw the poison down into the root stock, but before night temperatures get too cold.

Remove grazing animals from spray areas during and soon after treatment. Stress can cause increased sugar levels in the leaves of lantana plants, making them more palatable.

Landholders and contractors should check if the property is situated in a hazardous area. This prevents the use of some herbicides, as defined in the *Agricultural Chemicals Distribution Control Act 1966*.

More information

Contact your local government office for more information or visit biosecurity.qld.gov.au.

Table 1. Herbicides for control of *Lantana camara*

Situation	Herbicide	Rate	Optimum time[1]	Comments
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Fluroxypyr 200 g/L (e.g. Flagship 200)	500 mL to 1 L/100 L water	October to April	Thorough wetting of plants is required, higher rate should be used for larger plants.
	Fluroxypyr 333 g/L (e.g. Starane Advanced)	300–600 mL/100 L water		
	Fluroxypyr 400 g/L (e.g. Comet 400)	250–500 mL/100 L water		
Domestic areas, commerical, industrial and public service areas, agricultural non-crop areas, forests and rights-of-way	Glyphosate 360 g/L (e.g. Roundup Biactive, Glyphosate 360)	1 L/100 L water	October to April	Wet plant thoroughly. Glyphosate affects any green plant it comes into contact with. Glyphosate is available in a range of strengths. Consult labels for rates for other glyphosate formulations.
	Glyphosate 450 g/L (e.g. Glyder 450)	800 mL/100 L		
	Glyphosate 540 g/L (e.g. Roundup PowerMax)	660 mL/100 L		
	Glyphosate 700 g/kg (e.g. Macspred Dri 700)	500 g/100 L		
Agricultural non-crop areas, commercial and industrial areas, pastures and rights-of-way	2,4-D 300 g/L + Picloram 75 g/L (e.g. Tordon 75-D)	0.65 L/100 L water	March to May	Thoroughly wet foliage and soil around base of plant. Legumes are affected if sprayed.
Non-crop and rights-of-way	Dichlorprop 600 g/L (e.g. Lantana 600)	500 mL/100 L water	December to April	Must thoroughly wet all leaves. Please refer to product label for situation details.
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 300 g/L + Picloram 100 g/L + aminopyralid 8 g/L (e.g. Grazon Extra®)	350–500 mL/100 L water	Summer to autumn	Wet plant thoroughly. Use the higher rate on plants over 1 m. Legumes may be affected if sprayed.
	Triclopyr 300 g/L + Picloram 100 g/L (e.g. Conqueror)			
Pastures, rights-of-way and industrial areas	2 ,4-D amine 625 g/L (e.g. Ken-Amine 625)	320 mL/100 L water	March to May	Use a coarse spray with sufficient pressure to penetrate canopy and wet stems as well as foliage. Spray at the end of a wet Summer (March to May). Defoliation should occur but respraying of new growth will be necessary in following Autumn. Broadcast grass seed and keep stock off following Summer to allow the pasture to establish. Damage may result to pasture legumes. Red-flowered lantanas are more resistant to 2,4-D .
	2 ,4-D amine 700 g/L (e.g. Amicide Advance 700)	285 mL/100 L water Consult label for other formulations of 2,4-D		
Native pastures, rights-of-way, commercial and industrial areas	Metsulfuron-methyl 600 g/kg (e.g. Associate, Lynx® 600)	10 g/100 L water plus wetter	March to May	Plants up to 2 m tall. Thoroughly wet all foliage and stems. Spray should penetrate throughout the bush. Addition of a wetting agent e.g. Pulse is recommended. Results variable. Not found effective in tropics. Follow-up sprays are necessary.
Native pastures, rights-of-way, commercial and industrial areas	Glyphosate 360 g/L (e.g. Weedmaster Duo, Glyphosate 360) plus Metsulfuron-methyl 600 g/L (e.g. Associate, Ken-Met 600) + tank mix	400 mL glyphosate 360 + 3 g metsulfuron/ 100 L water	March to May	Apply to actively growing bushes up to 2 m tall. Spray to thoroughly wet all foliage and stems. Spray to penetrate throughout the bush. Do not apply during periods of summer drought stress. Addition of a wetting agent e.g. Pulse is recommended
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Fluroxypyr 140 g/L + Aminopyralid 10 g/L (e.g. Hotshot)	500–700 mL /100 L water	October to April	Apply to actively growing plants. Spray all foliage, including stems, to the point of run-off. Use the lower rate on seedlings and regrowth 0.5–1.2 m tall and the higher rate on plants 1.2–2 m tall.
	(i) Basal bark **(ii) Cut stump**			
	Triclopyr 600 g/L (e.g. Garlon 600)	1 L/60 L diesel	Any time Best results when actively growing	(i) Apply to lower 40 cm of every stem Must ensure complete coverage around stem (ii) Cut close to ground level Immediately apply herbicide
	Triclopyr 240 g/L + Picloram 120 g/L (e.g. Access)			
	Picloram 44.7 g.L + Aminopyralid 4.47 g/L (e.g. Vigilant II® Herbicide Gel)	3–5 mm gel		(ii) If diameter of stump is › 20 mm, use a minimum of 5 mm gel thickness

Table 1. Herbicides for control of *Lantana camara* (continued)

Situation	Herbicide	Rate	Optimum time[1]	Comments
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Glyphosate 360 g/L (e.g. Roundup, Weedmaster Duo)	Undiluted	Any time Best results when actively growing	APVMA permit PER11463 (expires 30/04/2027) Prior to using the herbicides listed under PER11463 you must read or have read to you and understand the conditions of the permit To obtain a copy of this permit visit apvma.gov.au.
	Splatter gun			
	Glyphosate 360 g/L (e.g. Weedmaster Duo, Glyphosate 360)	1:9 glyphosate + water	October to April	2 x 2 mL dose per 0.5 m height of lantana. Addition of Pulse Penetrant may improve control.
	Metsulfuron methyl 600 g/L (Associate, Lynx® 600)	2 g/L water	March to May	
	Aerial			Follow label directions for equipment and other requirements for aerial application.
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 300 g/L+ Picloram 100 g/L (e.g. Conqueror) or Triclopyr 300 g/L + Picloram 100 g/L + Aminopyralid 8 g/L (Grazon Extra)	10 L/ha	When actively growing	Helicopter only. Minimum of 200 L water per ha. Follow-up re-spray will be required. Do not burn within six months of treatment.
	Triclopyr 300 g/L + Picloram 100 g/L (e.g. Conqueror) or Triclopyr 300 g/L + Picloram 100 g/L + Aminopyralid 8 g/L (Grazon Extra) + 2,4-D amine 625 g/L (e.g. Ken-Amine 625)	1.5 L + 6 L 2,4-D /ha		Helicopter only. Minimum of 200 L water per ha. Follow-up re-spray will be required. Do not burn within six months of treatment.
Non-crop and rights-of-way	Dichlorprop 600 g/L (e.g. Lantana 600)	6–8 L/ha		

[1]Optimum times are only a guide. *Lantana camara* must be actively growing for the herbicide to work.
Labels often recommend the additional use of a wetting agent or surfactant within the mix. Herbicides types vary in their selectivity against other species and soil residual.

Read the label carefully before use and always use the herbicide in accordance with the directions on the label.

Opuntioid cacti

Austrocylindropuntia, Cylindropuntia and *Opuntia* species

Three types (genera) of opuntioid cacti have naturalised in Australia and are now considered Weeds of National Significance: *Austrocylindropuntia, Cylindropuntia* and *Opuntia*. They are drought resistant because of their succulent nature, their lack of leaves and their thick, tough skins. These features result in plants that use the majority of their internal tissues for water storage and their outer parts to reduce water loss and damage by grazing and browsing animals. They can remain vigorous in hot, dry conditions that cause most other plants to lose vigour or even die. Some species develop underground bulbs that enable the plant to resist fire and mechanical damage.

Dense infestations compete with native vegetation, limiting the growth of small shrubs and groundcover species. The plant's sharp spines or barbs can cause injury to stock and native animals and contaminate wool and hides, reducing or preventing grazing activities and productivity.

Queensland

Large stands of cacti provide harbour for pest animals, such as foxes and rabbits and, due to their spiny nature, can limit access for stock mustering and recreational activities. The spines are capable of causing serious injury to animals and humans.

Legal requirements

All cholla cacti (*Cylindropuntia* spp.) and prickly pear (*Opuntia* spp.) not listed below are prohibited invasive plants and the *Biosecurity Act 2014* requires that all sightings to be reported to Biosecurity Queensland within 24 hours. By law, everyone has a general biosecurity obligation (GBO) to take all reasonable and practical measures to minimise the risk of these cacti spreading until they receive advice from an authorised officer.

The following species are restricted invasive plants under the Act. The Act requires that all sightings of these cacti must be reported to Biosecurity Queensland within 24 hours of the sighting. By law, everyone has a GBO to take all reasonable and practical measures to prevent or minimise the biosecurity risk of spread of these cacti until they receive advice from an authorised officer:

- Hudson pear (*Cylindropuntia pallida* and *C. trunicata*)
- jumping cholla (*Cylindropuntia prolifera*)
- bunny ears (*Opuntia microdasys*)
- riverina pear (*Opuntia elata*)

The following species are restricted invasive plants under the *Biosecurity Act 2014*. They must not be given away, sold, or released into the environment. The Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants under their control. This is called a GBO. This fact sheet gives examples of how you can meet your GBO.

- Cane cactus (*Austrocylindropuntia cylindrical*)
- Eve's pin cactus (*Austrocylindropuntia subulata*)
- Coral cactus (*Cylindropuntia fulgida*)
- Devil's rope pear (*Cylindropuntia imbricata*)
- Snake cactus (*Cylindropuntia spinosior*)
- Common pest pear, spiny pest pear (*Opuntia stricta* Syn. *O. inermis)*
- Drooping tree pear (*Opuntia monacantha* Syn. *O. vulgaris*)
- Tiger pear (*Opuntia aurantiaca*)
- Velvety tree pear (*Opuntia tomentosa*)
- Westwood pear (*Opuntia streptacantha*)

Indian fig (*Opuntia ficus-indica*) is not prohibited or restricted invasive plant and allowed to keep.

At a local level, each local government must have a biosecurity plan that covers invasive plants in its area. This plan may include actions to be taken on opuntioid cacti. Some of these actions may be required under local laws. Contact your local government for more information.

Description

Opuntioid cacti vary significantly in their form and habit, ranging from low-growing shrubs under 50 cm to erect trees up to 8 m tall.

Plants are normally leafless succulent shrubs. Stems are divided into segments (pads or joints) that are flat and often incorrectly called leaves.

Young shoots have true leaves resembling small fleshy scales that fall off as the shoot matures.

Flowers are large, normally seen during spring and can be yellow, orange, red, pink, purple or white depending on the species. Fruits vary between species and can be red, purple, orange, yellow or green.

Areoles (spots with clusters of spines) are found on both the pads (joints, segments) and fruit. In addition to spines, areoles often have clusters of sharp bristles (glochids) and tufts of fibre ('wool'). Each areole contains a growing point that can produce roots or shoots.

Hudson pear *(Cylindropuntia pallida* and *C. tunicata)*

Densely branched cactus up to 1.5 m tall and 3 m wide. Spines are extremely sharp, 4.5 cm long, enclosed in whitish papery sheaths. Spines on *C. pallida* are white and *C. tunicata* are brown. Flowers on *C. pallida* are pink-purple, and on *C. tunicata* they are pink-yellow, 5 cm wide. Stem segments are green to grey-green, cylindrical, 90 cm long, 4 cm wide. Fruit is oval-shaped, up to 4.5 cm long, yellow when ripe.

Jumping cholla (*Cylindropuntia prolifera*)

Low shrub 0.4 to 1 m tall. Spines 7–11, 1–2 cm long, light to dark brown, interlacing, white to light tan sheath firmly attached. Flowers are rose to magenta, 25–30 mm wide. Stem segments are dull green to greenish grey, whorled or subwhorled, cylindrical, 4–15 cm long, 4–5 cm wide, waxy flaky surface when dry. Prominent tubercles and segments easily detached. Fruit obovoid to globose, solitary or forming chains, up to 20–50 mm long, green. Seed not seen in Australia.

Bunny ears *(Opuntia microdasys* and *Opuntia rufida)*

Dense shrub 40–60 cm tall, occasionally more. Stems are pad-like, 6–15 cm long, 4–12 cm wide. No central stem, pads always grow in pairs, giving appearance of bunny ears. Has no spines, but instead has numerous white or yellow glochids (hair-like prickles), 2–3 mm long, in dense clusters. Flowers are yellow, 3 cm wide. Fruits are fleshy, globular, 3 cm long, red-purple.

Riverina pear *(Opuntia elata)*

Branched shrub with erect branches up to 2 m high. Spines absent or 1–3 short spines, whitish yellow present at some areoles. Flowers are orange, 3–4 cm wide. Stem segments are glossy green, sometimes with a purple tinge (especially around the areoles and margins). Often more than 2 cm thick, 5–25 cm long. Fruit club shaped, up to 6 cm long, purplish red.

Cane cactus *(Austrocylindropuntia cylindrica)*

Dark green shrub, 0.5–1.5 m tall. Branches 35–40 mm diameter. Leaves on new growth, deciduous, 3–5 mm long, but up to 10 mm on regrowth. Spines without papery sheath, 3–6 major ones per areole, 9–25mm long, and 3–4 minor ones, to 5.5 mm long. Flowers are red to red-orange. Fruit solitary or in small chains of 2–4. 30–60 mm long, dark green to yellow-green.

Eve's pin cactus *(Austrocylindropuntia subulata)*

Robust shrub to 3 m tall. Branches 40–50 mm diameter. Spines without papery sheath, 1 per areole on new growth, additional smaller ones (up to five) developing in successive years, mostly 35–70 mm long. Flowers are pink. Stem segments are glossy green, sometimes with a purple tinge (especially around the areoles and margins). Often more than 2 cm thick, 5–25 cm long. Fruit large, solitary or in small chains of 2–4, green, 50–135 mm long.

Coral cactus *(Cylindropuntia fulgida)*

Coral cactus grows as a branching shrub 1–1.5 m high. The stems of coral cactus are divided into green cylinder-like pads that are fist-like and obtuse at their apex. Mature coral cactus pads widen, become distorted and wavy, and resemble a piece of coral. Areoles along the pads have a number of short white spines.

Coral cactus produces small (1–2 mm wide) scarlet flowers. The fruit is yellow-green and 2–5 cm wide.

Devil's rope pear *(Cylindropuntia imbricata)*

This open-branching shrub grows 1.5–3 m high. The stems are divided into hairless, dull green, cylindrical pads that vary up to 37 cm in length and are 3.5–5 cm thick. The pads have a series of short raised ridges that give them a twined, rope-like appearance. The areoles are found on these ridges and produce 3–11 pale yellow or white spines, with the longest being 2.5 cm long. Papery sheaths cover these spines.

The flowers are a dull, red-purple colour and found at the ends of pads. The yellow fruit resembles a small, 5 cm wide custard apple and has a spineless areole at the top.

Snake cactus *(Cylindropuntia spinosior)*

This open-branching shrub grows 1–2 m high. The stems are divided into hairless, dull green, cylindrical pads that vary up to 20 cm in length and are 3.5–5 cm thick. The pads have a series of short raised ridges that give them a twined rope-like appearance. The areoles are found on the bottom of these ridges and produce 5–10 pale yellow to brown spines, with the longest being 3 cm long.

The flowers are light red to dark rose and commonly 5–7 cm wide. Snake cactus produces fruit that is yellow and 2–5 cm wide.

Common pest pear, Spiny pest pear *(Opuntia stricta)*

This spreading cactus grows up to 1.5 m high and forms large clumps. The stems are divided into oval, blue-green spineless pads 20 cm long and 10 cm wide. Areoles are in diagonal lines along the pads 2.5 cm to 5 cm apart and have a cushion of brown wool containing bristles but usually no spines. When spines occur they are stout, yellow and up to 4 cm long.

Flowers are 7.5 cm wide, bright lemon yellow and green at the base. The fruit is oval-shaped, has a deep cavity on one end and tapers at the other. It is purple, 6 cm long and 3 cm wide, with carmine-coloured (dark red) seeds and a fleshy pulp.

Drooping tree pear *(Opuntia monacantha)*

This erect succulent shrub with fibrous roots grows up to 5 m high but is usually 2–3 m high. The branches are divided into glossy light green pads up to 45 cm long, 15 cm wide and 1.5 cm thick. The dark grey trunk grows up to 25 cm in diameter. Drooping tree pear gets its name because the upper segments tend to droop. The areoles on the older pads have 1–5 sharp spines about 5 cm long.

Small, scale-like leaves are found on areoles of very young pads and are quickly shed as the pad grows. Drooping tree pear produces yellow flowers that are 6 cm wide and have red markings on the back. The fruit is pear-shaped and 4–7 cm long with a green skin. The flesh of the fruit is red and pulpy and contains round seeds that are yellow or pale brown. The fruits have areoles with tufts of fine, barbed bristles.

Tiger pear *(Opuntia aurantiaca)*

This succulent low shrub with underground tubers usually grows 30–60 cm high. The stems are divided into very spiny, slightly flattened pads that are 1–30 cm long and 1–5 cm wide. The stems are dark green to purple and red in colour. The areoles have 3–7 brown barbed spines up to 4 cm long surrounded by tufts of short, fine bristles. The pads detach easily and are transported on the skins of animals. Small and scale-like leaves are found on areoles of immature pads.

Tiger pear produces 6 cm wide yellow flowers. The rarely formed fruits are pear-shaped and about 2.5 cm long. When ripe, they are red with purple markings.

Velvety tree pear *(Opuntia tomentosa)*

This tree-like plant forms a central woody trunk over 40 cm wide and grows up to 5 m high. The stems are divided into oblong pads that are dull green and velvety to touch due to the dense covering of short fine hairs. The pads are 15–35 cm long, 8–12 cm wide and 1.5–2 cm thick.

Young plants have 2–4 white or pale yellow spines located in the areoles with one spine reaching a length of 2.5 cm. The areoles usually become spineless as the plant matures. A more spiny variety does exist and has more than 50 spines in each areole on the trunk.

The flowers are a deep orange. The fruit is egg-shaped, about 5 cm long and 3 cm wide, and dull red. The top of the fruit is saucer-shaped with circular lines that meet in the centre and give the fruit a shrivelled appearance. The fruit produces many seeds within a reddish pulp.

Westwood pear or Cardona pear *(Opuntia streptacantha)*

Westwood pear is a shrub-like or tree-like plant that forms clumps by branching from the base and is usually 2–4 m high. The stems are divided into almost circular dull green pads, 25–30 cm long and 15–20 cm wide. The areoles have white spines that vary in number and size when the plant matures.

Young pads have 2–5 white spines 1–2 cm long, accompanied by two hair-like spines 0.5 cm long in the lower part of the areole. Spines increase in number (up to 20) and size (5 cm long) in areoles along the trunk of the plant.

The flowers are yellow and fruits are barrel-shaped, 6 cm long and 5 cm wide with a flat top. The fruit has a purple skin and a rind that is 1 cm thick. Fruits contain red seeds buried in a dark red (carmine) pulp.

Habitat and distribution

Native to the Americas, Opuntioid species are found throughout most Australian states and territories and there is potential for further spread.

In Queensland Opuntioid species are mainly found in low rainfall areas but can be are found in gardens, along beaches and on off shore island.

Life cycle

Opuntioids reproduce both sexually and asexually. Birds and other animals readily eat the many seeded fruits and deposit seeds in their droppings. The seeds have hard seed coats that allow them to survive heat and lack of water. Asexual reproduction (cloning) of cacti occurs when pads (joints, segments) or fruits located on the ground take root and produce shoots.

Methods of spread

Animals and floods move broken pads long distances. These pads can survive long periods of drought before weather conditions allow them to set roots. People can spread cacti for ornamental plantings.

Control

Managing opuntioid cacti

The GBO requires a person to take reasonable and practical steps to minimise the risks posed by opuntioid cacti. This fact sheet provides information and some options for controlling opuntioid cacti.

Mechanical and fire control

Mechanical control using machinery is difficult because prickly pear pads can easily re-establish. Mulching systems have been used where the pads and stem of the plant is destroyed. Regrowth may occur from the stump and any unmulched pads.

Biological control

Investigations into biological control agents against prickly pear began in 1912. Over 150 insect species were studied throughout the world, with 52 species selected for transport to Queensland. Following intensive host specificity testing, 18 insects and one mite were released in Queensland. Nine insects and the mite remain established in Queensland. These species are:

- *Cactoblastis cactorum*, a stem-boring moth
- *Dactylopius ceylonicus*, a cochineal mealy bug
- *Dactylopius opuntiae*, a cochineal mealy bug
- *Dactylopius confusus*, a cochineal mealy bug
- *Dactylopius tomentosus*, a cochineal mealy bug
- *Dactylopius austrinus*, a cochineal mealy bug
- *Chelinidea tabulata*, a cell-sucking bug
- *Tucumania tapiacola*, a stem-boring moth
- *Archlagocheirus funestus*, a stem-boring beetle
- *Tetranychus opuntiae*, prickly pear red spider mite.

These biological control agents continue to keep several prickly pear species under control. It is important to remember not all the agents attack all species.

The most successful of these agents were the moth *Cactoblastis cactorum* and five cochineal mealy bugs—*Dactylopius ceylonicus, D. opuntiae, D. confusus, D. tomentosus* and *D. austrinus*. The other agents are still around but not in sufficient numbers to provide control.

Cactoblastis cactorum (cactoblastis moth)

Larvae of this moth were introduced from Argentina in 1925. Cactoblastis proved to be the most effective agent against the common and spiny pest pears, destroying massive infestations in Australia. Larvae keeps these two pest pears controlled to an acceptable level most of the time, although it is less effective in some coastal and far western areas.

The larvae collectively eat out the contents of the pads, leaving empty pad skins and piles of mushy droppings. The orange and black larvae are occasionally observed on the outsides of pads. Cactoblastis also attacks most types of prickly pear but is not effective against them.

Dactylopius spp. (cochineal insects)

All female cochineal insects are small, sessile mealy bugs that spend their adult lives permanently attached to their host plants sucking plant juices. They are covered by a fine, white, waxy secretion and when crushed yield a carmine colouring. The adult males are small, free-flying insects that do not feed.

Dactylopius ceylonicus (monacantha cochineal, Argentine cochineal)

This South American mealy bug was released in 1914 and 1915 to control drooping tree pear. It destroyed the dense infestations existing at that time. It is specific to drooping tree pear and today remains the only effective biological control agent for drooping tree pear. This insect needs to be distributed manually.

Dactylopius opuntiae (prickly pear cochineal)

This mealy bug was introduced from Mexico and southern United States between 1920 and 1922. It is effective against common pest pear, spiny pest pear, velvety tree pear and Westwood pear and remains the main biological control agent against velvety tree pear and Westwood pear. This insect spreads slowly in nature and can be assisted manually.

Dactylopius confusus (prickly pear cochineal)

This mealy bug was introduced from Florida and released in 1933 against spiny pest pear. It remains effective against spiny pest pear in central Queensland but spreads slowly. This insect can be spread manually.

Dactylopius tomentosus (devil's rope pear cochineal)

This mealy bug was introduced from southern United States in 1925 and 1926. It is effective against devil's rope pear but works slowly.

Dactylopius austrinus (tiger pear cochineal)

This mealy bug was introduced from Argentina in 1932. It is specific to and effective against tiger pear. It rapidly reduces tiger pear populations but dies out in a paddock after the destruction of tiger pear. It needs to be reintroduced after tiger pear regrows.

Chelinidea tabulata (prickly pear bug)

This plant-sucking bug was introduced from Texas in 1921. It was effective against dense common pest pear before *Cactoblastis cactorum* was but is now relatively ineffective. This insect also attacks most other prickly pears. The adult is a pale brown bug up to 20 mm long that leaves characteristic round bleached spots on the surface of the cactus.

Tucumania tapiacola (prickly pear moth-borer)

This moth was introduced from Argentina in 1934 against tiger pear. Its solitary larvae feed internally and eat out tiger pear pads with limited effect. It has been observed attacking common pest pear and harrisia cactus.

Archlagocheirus funestus (tree pear beetle)

This stem-boring beetle was introduced from Mexico in 1935. It was effective against velvety tree pear and Westwood pear but has become rare since the dense stands of these prickly pears have gone.

Tetranychus opuntiae (prickly pear spider mite)

This mite was introduced from southern United States and Mexico in 1922. It was effective against common pest pear but is now rare and difficult to find. It causes distinctive scar tissue formation around areoles.

Distributing biological control agents

Cactoblastis

Cactoblastis can be spread manually by distributing eggs or larvae. Cactoblastis moths lay chains of eggs (eggsticks) on prickly pear pads from January to February and from September to November. The eggsticks are distinguished from spines by their curved appearance.

1. Collect the fragile eggsticks carefully.
2. Glue single eggsticks to small pieces of paper using a starch-based adhesive.
3. Pin the egg papers to prickly pear pads. (Eggs take up to one month to hatch.)
4. Collect pads or plants in which larvae are obviously still active.
5. At a release site place all the collected plant material in a small part of the infestation.
6. Subsequent generations of moths will disperse through the infestation.
7. Follow up the biological control with either herbicide or mechanical treatment.

Cochineals

Because several cochineal insects affect some prickly pears and not others, it is essential to know what prickly pear you wish to control.

1. Identify your prickly pear type.
2. Find the same prickly pear type which is being attacked by a cochineal.
3. Collect pads of the prickly pear with the insects.
4. Place affected pads against unaffected prickly pears at the release site.
5. Follow up the biological control with either herbicide or mechanical treatment.

Tiger pear cochineal

Tiger pear cochineal is easy to multiply quickly after collection.

1. Carefully collect a reasonable quantity of unaffected tiger pear in a container (box or bucket).
2. Place a few pieces of cochineal-affected tiger pear into the same container.
3. Cover the container with a cloth and store under cover for a few weeks.
4. Check the cactus occasionally.
5. When most of the tiger pear in the container has cochineal, it is ready to distribute.
6. At the release site place affected pads against unaffected prickly pears.
7. Follow up the biological control with either herbicide or mechanical treatment.

Note: It is best to multiply tiger pear cochineal before release.

Herbicide control

Herbicide options available for the control of opuntioid cacti in Queensland are provided in the relevant species fact sheet. Please search for the relevant species on the Biosecurity Queensland website pageLandholders and contractors should check if the property is in a hazardous area as defined in the *Agricultural Chemicals Distribution Control Act 1966* prior to spraying.

More information

More information is available from your local government office or visit biosecurity.qld.gov.au.

Snake cactus (*Cylindropuntia spinosior*)

Coral cactus (*Cylindropuntia fulgida*)

Common pest pear (*Opuntia stricta)*

Velvety tree pear (*Opuntia tomentosa*)

Jumping cholla (*Cylindropuntia prolifera*)

Hudson pear (*Cylindropuntia pallida*)

Eve's pin cactus (*Austrocylindropuntia subulata*)

Opuntia sulphurea

Bunny ears (*Opuntia microdasys*)

Tiger pear (*Opuntia aurantiaca*)

Riverina pear (*Optunia elata*)

Drooping tree pear (*Opuntia monacantha*)

Variegated (*Opuntia monacantha)*

Devil's rope pear (*Cylindropuntia imbricata*)

Wheel cactus (*Opuntia robusta*)

03/23

Rat's tail grasses

Sporobolus pyramidalis, S. natalensis, S. jacquemontii and *S. fertilis*

Rat's tail grasses are invasive grasses that can reduce pasture productivity, out-compete desirable pasture grasses and cause significant degradation of natural areas. They are often referred to as weedy *Sporobolus* grasses.

These species were originally introduced and trialled as pasture grasses and for soil conservation and have been unintentionally spread from these initial introductions and other accidental introductions as contaminants in pasture seed, fodder, on vehicles and machinery and in and on livestock. Rats tail grasses have now adapted well to large areas of northern, eastern and southern Australia. They have low palatability when mature, are difficult to control and can quickly dominate a pasture, especially following drought, overgrazing or soil disturbance. They can affect cattle health and productivity reducing weight gain and growth rates and weaning percentages and weights. These grasses are a significant threat to the broader environment given they are well adapted to Australia, difficult to control and form dense almost mono-specific stands where conditions allow.

Queensland

Four species of introduced Sporobolus grasses are invasive plants in Queensland:

- giant rat's tail grass *(Sporobolus pyramidalis and Sporobolus natalensis*)
- American rat's tail grass *(Sporobolus jacquemontii)*
- giant Parramatta grass *(Sporobolus fertilis)*.

Legal requirements

Giant, American and giant Parramatta rat's tail grasses are category 3 restricted invasive plants under the *Biosecurity Act 2014*. A person must not release these invasive plants into the environment, give away or sell as a seed, plant or something infested with its seeds. The Act requires everyone to take all reasonable and practical measures to minimise the biosecurity risks associated with invasive plants under their control. This is called a general biosecurity obligation (GBO). This fact sheet gives examples of how you can meet your GBO.

At a local level, each local government must have a biosecurity plan that covers invasive plants in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Description and distribution

Rat's tail grasses are robust, perennial tussock grasses growing up to 2 m high. They are difficult to distinguish from other pasture grasses before maturity. However, their leaves are noticeably tougher than those of any other species.

They can also be difficult to distinguish from native *Sporobolus* grasses; however, the native grasses tend to be shorter and softer and have less dense seed heads than giant rat's tail grass. The seeds of all species are indistinguishable in pasture seed samples using current identification techniques.

Giant rat's tail grass

Giant rat's tail grass grows up to 2 m high, with a seed head of up to 45 cm long and 3 cm wide. Seed head shape changes from a 'rat's tail' when young to an elongated pyramid shape at maturity. Unlike Parramatta grass and giant Parramatta grass, giant rat's tail grass does not develop 'sooty spike' on its seed heads.

Distribution: Coastal and sub-coastal areas from Cape York (Queensland) to the Central Coast of New South Wales including the Central Highlands of Queensland.

American rat's tail grass

American rat's tail grass grows to 50–75 cm tall, with a seed head of up to 25 cm long and 0.5–3 cm wide. Distribution: Coastal and sub-coastal areas from Cape York to South East Queensland.

Giant Parramatta grass

Giant Parramatta grass grows to 0.8–1.6 m tall, with a seed head of up to 50 cm long and 1–2 cm wide. The branches of the seed head are pressed against the axis and overlap, although lower ones generally spread at maturity. Distribution: Coastal and sub-coastal areas from Cape York to South Coast of New South Wales.

Life cycle and adaptation

Rat's tail grasses flower and seed in the frost-free period of the year, with the main seeding in summer/autumn.

They are prolific seed producers with seed production of 85,000 seeds per square metre recorded in dense stands of giant rat's tail grass in a single year. The viability of rat's tail grass seed is about 90% with a significant proportion of seed remaining viable for up to 10 years.

Rat's tail grasses are well adapted to a wide range of soils from low to high fertility, acid to alkaline and sandy to heavy clay soils in high and low rainfall locations. This includes the seasonally dry monsoonal tropics, wet and dry tropics, subtropical and temperate regions of Australia. They also tolerate saline soil conditions.

Methods of spread

Seeds spread by livestock in manure and on fur and hooves. It can also spread on the coat of invasive and native animals, in mud, hay, and untested pasture seed.

Vehicles and machinery are also important spreaders of seed. Rivers, watercourses and any fast-flowing water can also move significant amounts of seed over long distances particularly where there are low levels of ground cover.

Control

Managing rat's tail grasses

The GBO requires a person to take reasonable and practical steps to minimise the risk of spreading rat's tail grass seed and the establishment of new infestations. This fact sheet provides information to assist with minimizing spread and a summary of options for controlling rat's tail grasses.

Prevention and early detection

Maintain competitive pastures with high levels of ground cover as this reduces the risk of rat's tail grass establishment. Heavy grazing does not control rat's tail grasses —research indicates that continuous heavy grazing actually favours its spread.

When moving stock from infested areas into clean areas, spell the stock in yards or a small holding paddock for at least seven days to allow rat's tail grass seed to pass through the gut of the animal. Similarly, quarantine new stock in yards or small holding paddocks before releasing them into large paddocks to minimize the risk of rats tail grass seed spread and enable early detection and control of any rat's tail grass plants that establish. Move stock when there is no dew or rain, to decrease the amount of seed sticking to their coats (see Table 1).

Establish weed-free buffer strips along boundary and internal fences where necessary, drainage lines and roadsides to restrict the spread of rat's tail grasses. When practical, **regularly** controlling rats tail grasses in riparian zones will reduce the movement of seed by water and limit spread. Always clean machinery thoroughly after working in infested areas. Follow integrated control strategies using herbicides, pasture management practices that maintain high levels of ground cover and property hygiene practices that limit the risk of seed spread.

Consider the attributes of replacement pasture grasses when deciding what to sow. If possible, choose grasses that are:

- well adapted to local environmental conditions and soil types
- stoloniferous or rhizomatous in growth habit
- resistant to heavy grazing
- palatable and productive
- competitive all year (i.e. do not open up in late winter/spring)
- not inclined to decline as soil fertility decreases
- fast to establish.

If a sown pasture species does not contain most of these attributes, it is unlikely to be successful as part of a rat's tail grass control program.

Some pasture species, while providing strong competition once established, are weak competitors with rat's tail grasses in their early stages of establishment (e.g. Koronivia grass and Bisset creeping bluegrass). These grasses are most successful against rat's tail when sown with other grasses that are vigorous when young and provide early competition against rat's tail grasses (e.g. Rhodes grass).

Biological control

Biosecurity Queensland is investigating potential biological control agents. To date no agent has been approved for the control of rat's tail grasses.

Management strategies

Always commence control programs in areas of light infestation, and work towards the denser infestations.

If, after considering the management options set out below, you choose to use a herbicide option, ensure you apply all herbicides strictly according to the directions on the label and the directions of any Australian Pesticides and Veterinary Medicines Authority (APVMA) permit. You **must** read APVMA permit 9792 if you wish to prepare or use products for the control of rat's tail grasses in situations other than those specified on the product label.

Some herbicides permitted or registered for giant rat's tail grass control have withholding periods and significant ongoing management requirements in grazing and dairy farming. If you have or may have dairy or beef cattle on your property at any stage in the future, carefully consider these requirements when choosing herbicides for use on your property.

Some details of management options are provided below.

Scattered plants and light infestations

Choose **one** of the following options:

(a) spot spray with glyphosate
(b) spot spray with flupropanate
(c) use glyphosate through a pressurised wick wiper
(d) hand chip, bag and remove stools from the paddock and burn them.

Dense infestations on arable land

(a) Cropping option

First summer (early)

1. Boom spray with glyphosate as per label or permit directions and burn prior to ploughing.
2. Spot spray or hand chip fence lines, headlands, drainage lines, shelter belts etc. for weedy rat's tail grasses missed in cultivation. Plant a long-season forage sorghum variety using a recommended pre-emergent herbicide.
3. Spot spray or hand chip any surviving rat's tail grasses to prevent reseeding.

Second summer

1. Boom spray with glyphosate to control new seedlings and crop regrowth prior to cultivation.
2. Follow the same procedures and similar cropping as for the first summer.

Third summer

1. Boom spray with glyphosate to control crop regrowth and any rat's tail grass seedlings.
2. Plant paddocks with improved pastures using minimum tillage techniques to restrict bringing buried seed to the surface. Use a direct drill planter or surface broadcasting and rolling techniques. Plant fast-growing pasture grasses at triple the standard sowing rates to compete with rat's tail grass seedlings.
3. Fertilise the pasture for fast pasture establishment.
4. Spot spray or hand chip rat's tail grass seedlings.

(b) Pressurised wick wiper option

To be effective, this option requires three treatments over an 18-month period.

First treatment (midsummer)

1. Make sure there is a 30 cm height difference between rat's tail grasses and other pasture plants by selective grazing of the 'good' pasture.
2. Wick wipe rat's tail grass using glyphosate as per label or permit directions.
3. Graze using increased stocking rates after wick wiping.

Second treatment (late summer or autumn)

Wick wipe rat's tail grass using glyphosate as per label or permit directions.

Third treatment (next summer)

Wick wipe rat's tail grass using glyphosate as per label or permit directions.

Dense infestations on non-arable land

Choose **one** of the following options:

(a) In summer, apply glyphosate through a pressurised wick wiper (if terrain and timber allow).

(b) In summer, boom or blanket spray with glyphosate in split applications as per label or permit directions (see Table 2) and replant the pasture using fast-growing pasture grasses at double the standard sowing rates.

(c) In winter or spring, boom or blanket spray with flupropanate as per label or permit directions.

More information

For more information contact your local government or visit biosecurity.qld.gov.au.

Table 1. Best practices for management for rat's tail grass infestations

Dos	Don'ts
Cattle	
• Manage the grazing and stocking rate to maintain high levels of ground cover. • Where possible muster only in the afternoon when the dew has dried to minimise seed plants and seeds are dry. • Restrict cattle to a small paddock or a laneway free of rat's tail grasses with sufficient feed for seven days after grazing the rat's tail grass paddock to minimize seed spread in manure.	• Don't overgraze, as this will reduce ground cover to a low level which will promote rat's tail grass seedling emergence. • Where possible avoid mustering on wet days or when the soil is muddy. • Don't deliberately overstock paddocks infested with rat's tail grass as this generally promotes rats tail grass.
Machinery	
• Provide a specific hose-down tarmac/area to clean contaminated machinery. • Keep roadways, laneways, stock routes and machinery corridors free of rat's tail grass to minimise risk of seed movement by machinery/vehicles. • If necessary in rats tail grass infested areas operate machinery when plant material and soil are dry to minimise seed movement.	• Don't slash areas infested with rat's tail grasses unless slashing is part of an integrated control program. • Don't knowingly drive vehicles through rat's tail grass infestations as contaminated vehicles are a major source of seed spread.
General hygiene	
• Enclose specimens for identification in tied bags or closed containers while transporting to prevent seed spread.	• Don't drive around the farm with a loose suspected rat's tail grass specimen in the cabin or in the back of a vehicle as this spreads seed.
Pasture management	
• Maintain sown pasture vigour with a maintenance fertiliser program. • Use planting methods that minimise soil disturbance when planting legumes into an infested pasture. • Plant the recommended competitive pasture grasses suitable for your climate and soil type.	• Don't allow soil fertility run-down as this reduces the competitiveness of sown pasture species and favours rat's tail grass. • Don't renovate an infested pasture as soil disturbance will favour rats tail grasses. • Don't burn the pastures infested with rat's tail grasses unless burning is part of an integrated control program such as a wick wiping, pre-cropping pasture
Hay and pasture seed	
• Determine the origin of hay to ensure there is a minimal risk of contamination with rat's tail grasses. • Feed hay in a yard, feedlot or small holding paddock so any rats tail grass plants introduced in the hay can be readily detected and controlled. • Only purchase seed from a reputable seed merchant.	• Don't knowingly purchase hay or seed contaminated with rat's tail grass. • Don't buy seed without knowing its origin.
Control strategies	
• Choose the most suitable control strategy based on your situation and the rat's tail grass population before starting the job. • If dairy or beef cattle will be in the paddock at any time in the future, carefully consider the exclusion and withholding requirements of the herbicides and the long-term implications before commencing treatments. • If spot spraying with glyphosate, operate close enough to spray downwards on to the plant to limit off target damage. • Use low-pressure spraying equipment to reduce the risk of off target damage.	• Don't spot spray with glyphosate using a high-pressure gun from the cabin of a vehicle as this results in off target damage increasing the risk of rats tail grass establishment. • Don't overspray with glyphosate past the point of spray run-off.

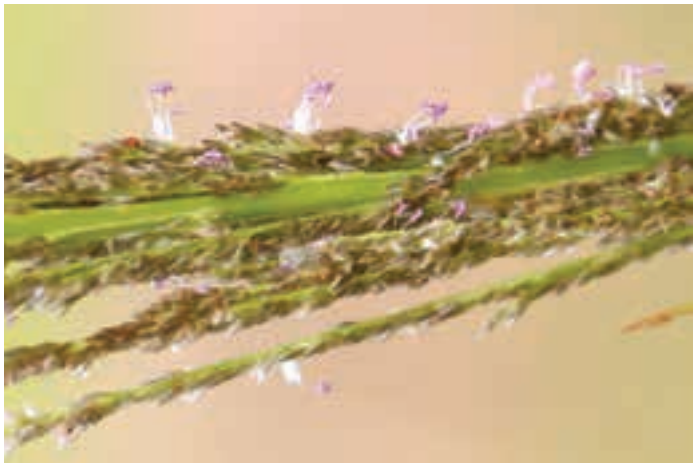
Table 2. Herbicides for the control of rat's tail grasses

Situation	Application method	Herbicide[1]	Rate	Comments
Pasture, grazed woodlands and agricultural situations prior to sowing, tree and vine crops, lucerne and agricultural non-crop situations	Boom spraying	Glyphosate 360 g/L (e.g. Roundup Biactive, Weedmaster Duo)	6 L/ha	Follow up the first treatment with a later knockdown treatment such as herbicide or tillage
Wasteland, forest and conservation areas, margins of aquatic areas, roadsides and easements, rights-of-way, commercial and industrial areas and public service areas	Boom spraying Double knockdown split application		3 L/ha + 3 L/ha	
Pasture, grazed woodlands and agricultural situations prior to sowing, tree and vine crops, lucerne and agricultural non-crop situations Wasteland, forest and conservation areas, margins of aquatic areas, roadsides and easements, rights-of-way, domestic, commercial and industrial areas, turf, playing fields, golf courses, public service areas and areas surrounding agricultural buildings	Spot spraying		1 L per 100 L water	
	Double knockdown split application		1 L + 1 L per 100 L water	
	Wick wiping		3.3 L per 10 L water	
Pasture, grazed woodlands, agricultural non-crop situations	Boom spraying	Flupropanate 745 g/L (e.g Tussock, Taskforce)	1.5–2 L/ha	**Do not** use in channels, drains or watercourses **Do not** reseed treated areas until at least 100 mm of leaching rain has fallen **Do not** spray near desirable susceptible trees **Do not** apply above 3 L/ha to steeply sloping sites Allow 3–12 months for control, depending on weather conditions and growth stage of plant
Wasteland, forest and conservation areas, roadsides and easements, rights-of-way commercial and industrial areas	Suppression of seedlings in improved pasture		0.5–2 L/ha	
Pasture, grazed woodlands and agricultural non-crop situations	Spot spraying		200 mL per 100 L water	
Wasteland, forest and conservation areas, roadsides and easements, rights-of-way, commercial and industrial areas, golf courses, public service areas and areas surrounding agricultural buildings	Wick wiping		500 mL per 10 L water	

[1]Read APVMA permit PER9792 for rates for products containing glyphosate 450 g/L or glyphosate 540 g/L.

The herbicides in Table 2 are permitted under PER9792 (expires 30 November 2025). You **must** read the permit if you wish to prepare or use products for the control of rat's tail grasses in situations other than those specified on the product label. The permit is available on the APVMA website apvma.gov.au

Read the label carefully before use and always use the herbicide in accordance with the directions on the label.



Fact sheets are available from biosecurity.qld.gov.au. The control methods recommended should be used in accordance with the restrictions (federal and state legislation, and local government laws) directly or indirectly related to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of this information, the department does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.

03/23

Invasive plant

Wild tobacco

Solanum mauritianum

Originating in Argentina, wild tobacco is a weed of almost any open situation. It is tolerant of various soils and moderate shade, and often forms dense stands suppressing growth of other species.

Wild tobacco is a coloniser of disturbed sites, and germination of soil-stored seed is stimulated by fire. In north Queensland, the species can act as a pioneer cover tree in rainforest successions, particularly on fertile soils. All parts of the plant are poisonous to humans, especially the green berries. However, the ripe fruit is sometimes a food source for birds.

Legal requirements

Wild tobacco is not a prohibited or restricted invasive plant under the *Biosecurity Act 2014*. However, by law, everyone has a general biosecurity obligation (GBO) to take reasonable and practical steps to minimise the risks associated with invasive plants under their control.

Local governments must have a biosecurity plan that covers invasive plants in their area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws.

Queensland Government

Description

Wild tobacco is a shrub that grows up to 4 m. The trunk is grey-green, woody to 15 cm in diameter.

Leaves are lance-shaped, up to 30 cm long and 10 cm wide, yellowish-green above, paler beneath and densely covered with 'felty' hairs. Leaves are tapered at both ends, with short, thick stalks and two stipules at the leaf base and smell when crushed.

Flowers are lavender-blue, with yellow stamens in compact clusters at the ends of the branches. Fruit are small, 10–15 mm wide, round and turn from green to yellow as they ripen. Containing 150–200 seeds per fruit. Seeds are light brown or yellowish, 1.5–2 mm long.

Control

Manual control

Ring bark tall plants as close to the ground as possible. Pull out seedlings in the wet season when the soil is soft.

Be aware that some people react to the fine hairs that become airborne when working with this weed. Cover your arms and mouth.

Herbicide control

Several herbicides are currently registered for the control of wild tobacco in Queensland.

See Table 1 for the treatment options.

Follow up

Check treated areas regularly for new seedlings and regrowth.

Further information

Further information is available from your local government office, or by contacting Biosecurity Queensland on 13 25 23 or visit biosecurity.qld.gov.au.

Table 1. Herbicides for the control of wild tobacco

Situation	Herbicide	Rate	Comments
Agricultural non-crop areas, commercial and industrial areas, forests, pastures and rights-of-way	Triclopyr 300 g/L + picloram 100 g/L (e.g. Conqueror) or Triclopyr 300 g/L + picloram 100 g/L + aminopyralid 8 g/L (Grazon Extra)	350 mL per 100 L water	High volume foliar spray Spray plants up to 2 m tall during spring to autumn Pasture legumes including lucerne, clover and medics may be damaged unless well protected by grasses
		500 mL/10 L water	Low volume high concentration foliar application (gas powered gun, sprinkler sprayer)
Pastures, rights-of-way, industrial	2,4-D amine 625 g/L and other formulations (many trade names)	240 mL per 15 L water For other formulations consult label	Cut stump Swab or cut stump within 1 hour of cutting Apply by pouring can or knapsack
Non-crop areas, including: native vegetation, conservation areas, gullies, reserves and parks	Picloram 44.7 g/L + aminopyralid 4.47 g/L (Vigilant II)	Use undiluted	Cut stump Apply 3–5 mm layer over lower cut surface
Agricultural non-crop areas, commercial and industrial areas, fence lines, forestry, pastures and rights-of-way	Triclopyr 240 g/L + picloram 120 g/L (e.g. Access)	1 L/60 L diesel	Cut stump Basal bark Consult label for detailed instructions

Read the label carefully before use. Always use the herbicide in accordance with the directions on the label.

This fact sheet is developed with funding support from the Land Protection Fund.

Attachment 5 – Best Management Practice Guide – Lantana

Using herbicides on lantana

a guide to best management practices

Queensland Government
Natural Resources and Water
Dow AgroSciences
AGRICROP
DUPONT
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Photographs
Front cover: pink flowered lantana (J. Wright); splatter gun technique, Border Ranges National Park, New South Wales (D. Stock).
Back cover: spraying lantana, Yarraman, Queensland (A. Clark); two-man team using cut stump method (M. Richards).

Planning flow chart for using herbicides in lantana control

Use this flow chart to work your way through the brochure.

1. Application method — **Page 5**
Identify the application method that suits your situation using Table A.

2. Safety and legislation — **Page 12**
Be familiar with: • safety when using herbicide
• compliance with the law.

3. Develop a lantana control plan — **Page 15**
Develop a lantana control plan and be strategic about which areas you have the capacity to treat and maintain over time. Estimate the area of target land to be controlled.

4. Calculate volume of herbicide mix — **Page 17**
Estimate the lantana density of each situation using the photo guide in Table B, then determine the volume of mix required per hectare using Table C as a guide.

5. Select the best herbicide — **Page 16**

1. Determine the herbicide that best suits your needs, the season, available equipment and budget.
2. Using Table D, calculate the following:
   (A) Total herbicide mix volume (L) = Area for treatment (ha) x the volume of mix per hectare (L/ha)
   (B) Volume of herbicide concentrate = (A) Total mix volume (L) x mix rate (mL/L)
   (C) Approximate costs ($) = (B) Volume herbicide concentrate x $/L (or $/kg)

6. Read manufacturers' recommendations and tips — **Page 24**
Implement your lantana control plan in the best season and using manufacturers' recommendations—see Tables E and F. Ensure adequate records are maintained.

Introduction

Lantana (*Lantana camara*) was introduced to Australia as a garden ornamental plant in the 1840s. Since then, it has adapted to the Australian climate and has been allowed to spread virtually unimpeded. Lantana is now a Weed of National Significance due to its detrimental impacts on Australia's environment and agriculture. Its invasiveness and its potential for fuelling intense wildfires are threats to biodiversity. Lantana is toxic to stock, and reduces profitability for many landholders by out-competing pasture and increasing mustering costs.

By using integrated management practices, lantana can be controlled in most land-use situations.

Herbicide is one way to control lantana, but there is a large range of control options available to suit every situation. Other methods are detailed in the *Lantana control manual*.[1] Investment in control can achieve good returns for landholders in terms of increased production and conservation of natural vegetation.

Knowledge of the variety of herbicides available is required to select those suitable for each situation. Cost is one factor that influences selection, but there can be many other reasons for choosing one herbicide over another. This publication will guide landholders through this selection process. The information provided will aid in identifying the correct volume of mix that should be applied at various lantana densities to achieve effective and economic use of herbicides.

Why use herbicides?

Herbicides can increase the carrying capacity of a property by removing lantana from otherwise good grazing land. Often, herbicides allow safe and simultaneous use of the land (with some stock withholding periods). Herbicide spraying has some advantages in specific situations such as aerial application or splatter gun techniques, where dense lantana prevents other conventional methods being used. Herbicides also minimise the disturbance of natural vegetation and soil, thereby minimising germination and invasion by other weeds.

[1] Department of Natural Resources, Mines and Energy 2004, *Lantana control manual: current management and control options for lantana* (Lantana camara) *in Australia*, NRM&E, Queensland.

However, there are many situations where the use of herbicide should not be the first or the only method considered. All control methods should be integrated with herbicide use to develop best management outcomes. This makes sense for both economic and environmental reasons.

Herbicides are suitable for lantana heights from 0.5–2.0 m at times of active growth. Some herbicide labels make recommendations for use against large, dense bushes; however, herbicide is not likely to be the most economical method available in these situations. Landholders should consider extremes of lantana size and plant health before using herbicide as a control option. Any control operation should be planned and properly managed to increase the likelihood of success. A landholder's money and effort are wasted if treatments merely stunt or suppress lantana. Planning can be developed into a property pest management plan, to include other weeds and pests that threaten enterprises or land value.

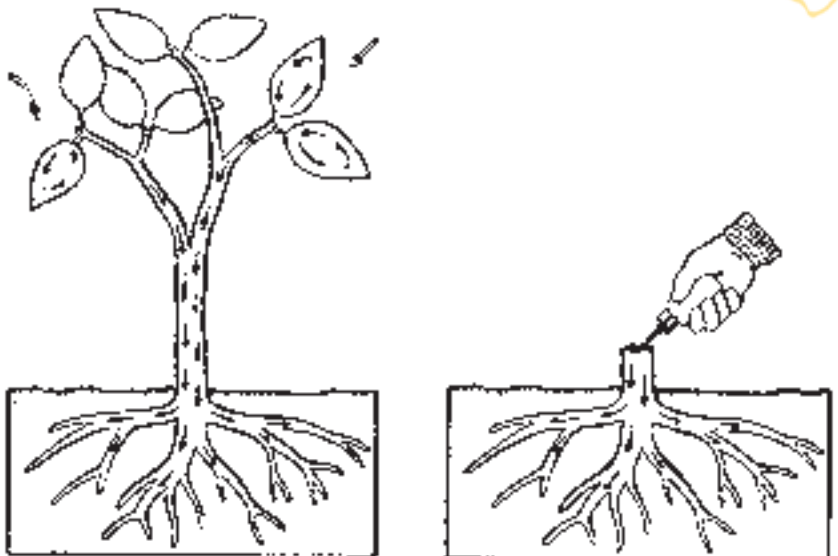
Herbicides can provide a selective approach to control. Some selective herbicides have the advantage of not affecting pasture or eucalypt trees. Some have a residual capacity to help control new lantana seedlings, thus providing an opportunity for pasture to gain a competitive edge. Other herbicides are useful in sensitive native vegetation areas and break down immediately on contact with soil. These choices must be considered before undertaking an operation. Any planned herbicide treatment should include follow-up controls and consolidate previous work before beginning work on new infested areas.

Legal implications

The control methods in this publication should only be used in accordance with regulations and registrations found in legislation or on product manufacturers' labels. These restrictions may prevent the use of one or more of the methods referred to, depending on the individual circumstances.

How do they work?

Herbicides are absorbed into lantana's sap system through its leaves and roots. Spraying foliage is a common method of application as it allows herbicide to absorb (translocate) into this sap system. Low volume applications—using splatter guns on foliage, spraying the base of stems (basal barking) and painting cut surfaces (cut stump)—are also very suitable for achieving herbicide absorption. Other forms of lantana, such as *Lantana montevidensis* (creeping lantana) can be controlled with registered herbicides that specifically target their biology.



Herbicide entering lantana's sap system

1. Application method

There are many application techniques for using herbicide, and different situations in which to use each method. Choosing which application method to use depends on the situation in which it is to be used, and the equipment available. The information below and Table A will provide some guide. Further information can be sought from the herbicide labels. Always check the label to ensure that the method chosen is registered for the intended use.

Methods for use can be selected from high volume methods (e.g. handgun, knapsack, aerially by helicopter) and low volume methods (e.g. splatter gun, basal bark, cut stump).

High volume methods deliver large amounts of herbicide mixture, at a low concentration, to thoroughly wet plants.

Handgun, hose, reel and tank
High-pressure foliar spray via a handgun is a common technique to spray lantana over larger areas. Vehicles which have retractable hoses and pumps loaded, such as Quikspray® units, are an advantage to deliver high volumes easily.

- This method is useful to obtain maximum spray coverage of plants where vehicles can access spray area.
- It is likely to achieve application of herbicide in the quickest time frame.
- Plants should be sprayed to the point of run-off.

Using a high volume Quickspray unit (Photo: D. Stock)

Foliar spraying with dye (Photo: D. Stock)

Knapsack

This method involves a low-pressure foliar spray delivered via a hand-held container (usually 15 L or less) with spray nozzle. The volume and rate used is the same as for handgun foliar spraying.

- It allows mobile delivery on foot or by quad-bike around the plants where access by vehicles may be restricted.
- It is useful for spot-spraying seedlings and regrowth where only small amounts of herbicide are required.
- Plants should be sprayed to the point of run-off; otherwise, failure of control is likely.

Spraying using a hand-held container (Photo: M. Richards)

Aerial spraying

This method allows application by helicopter (not fixed wing aircraft) using a higher concentration of herbicide.

- It is useful for areas with difficult access or dense infestations.
- It may be economical for controlling large areas of dense lantana in open areas.
- Application should use a half overlap, opposite pass technique with a nozzle configuration to ensure lantana canopy penetration.

Close view of spray jets (Photo: A. Clark)

Spraying lantana by helicopter can be cost effective for large dense areas—Yarraman, Queensland (Photo: A. Clark)

Low volume methods deliver small volumes of high concentrate herbicide mixture to plants to reduce chemical usage and off-target damage.

Splatter gun or gas gun
This method involves applying a concentrated herbicide mixed with water to foliage, squirting large droplets from 6–10 m away.

- All foliage does not need to be covered, so it is useful in areas of difficult access or sensitive vegetation.
- It allows specific targeting of herbicide, so a marker dye is recommended to identify splattered bushes.
- Apply approximately 15–20 mL per splatter to achieve the registered rate of 2 x 2 mL per 0.5 m of bush height.

Drenching gun used for splatter technique (Photo: A. Clark)

Using splatter gun with dye (Photo: D. Stock)

Basal bark spraying

This method consists of low-pressure spray application or painting the stem base with oil-soluble herbicides and diesel.

- Use on larger mature plants and those defoliated.
- Use this method year-round, with the best results when lantana is actively growing.
- Completely saturate the circumference of the stem base from ground level to 30 cm of height.

Basal barking lantana (Photo: M. Richards)

Spray completely around the base of the stem (Photo: M. Richards)

Cut stump control

This method involves the application of concentrated herbicide, sometimes with diesel, to cut area of stump by spraying or painting.

- It allows germination of other species in sensitive areas by clearing foliage, but retains stump roots in the ground to help prevent potential erosion.

Cutting lantana stem (Photo: M. Richards)

4 Use this method year-round, with the best results achieved when lantana is actively growing.

4 Cut the stem 5–10 cm above the ground and apply herbicide to the cut surface within 15 seconds.

Dousing freshly cut lantana stump (Photo: M. Richards)

Penetrants and surfactants

The addition of penetrants and surfactants (adjuvants) to some herbicides may increase the ability of the herbicide to absorb into the lantana's sap system. Surface-wetting agents reduce the surface tension of water and increase the herbicide's spreading or wetting properties. Some adjuvants are designed for use with specific herbicides. Please read the label carefully.

Some commonly used adjuvants are:

- non-ionic organosilicone penetrants/surfactants such as Pulse® or Input®
- non-ionic alcohol alkoxylate surfactants such as Chemwet® 1000 or Wetspray® 1000
- spraying oils such as Uptake® Spraying Oil
- specially designed surfactants for use with specific herbicides such as Bonus®.

Dyes

Manufacturers and herbicide users recommend using a marking agent. Dyes should be used to mark areas already treated, to ensure that an adequate volume has been sprayed and areas are not missed.

Painted stumps with dye (Photo: D. Stock)

Table A: Application method by land use

This is general information only. Always adhere to registered methods and rates on the product label.

Land use \ Density	Light	Medium	Heavy (reduce bio-mass before using herbicides)
Pasture	Handgun or knapsack. Follow up control of regrowth and seedlings.	Handgun or aerial spray. Follow up control of regrowth and seedlings and restore pastures by seeding and de-stocking.	Mechanical, fire or aerial spray to reduce lantana bio-mass. Follow up control of regrowth and seedlings by spot spraying and restore pasture by seeding and de-stocking.
Open eucalypt forest and other woodland	Handgun, knapsack or splatter gun (dependent on accessibility). Follow up with the same technique until native grasses or vegetation is re-established.		Options: 1. Mechanical or fire to reduce lantana bio-mass (vegetation clearing and fire permits may be required). 2. Splatter gun in areas of difficult access. 3. Handgun or knapsack in accessible areas. Follow up regrowth and seedlings with foliar spraying or splatter gun until native grass or vegetation is re-established.
Watercourses	Handgun or knapsack using a non-residual herbicide registered for use near waterbodies. Low volume applications: basal bark, cut stump, or splatter gun to reduce off-target damage. Follow up control of regrowth and seedlings ensuring use of revegetation/regeneration techniques. Be cautious of over-spraying watercourses to prevent off-target damage and degradation of water quality. The addition of a surfactant will negate the environmental rating given to some some herbicides		
Roadsides, easements, railways and fence lines	Handgun. Follow up control of regrowth and seedlings.		Mechanical or handgun. Follow up control of regrowth and seedlings.

2. Safety and legislation

Safety when using herbicide
Always read the label carefully before using any herbicide product and use only as directed. The herbicide label and Material Safety Data Sheet (MSDS) are available for all products for your safety.

Note the poison schedule ratings below. Some herbicides are 'unscheduled' and they do not appear on the schedule. This information is contained in the herbicide MSDS.

Ensure personal safety and practise safe work procedures. You should:

- wear personal protective clothing and use equipment in accordance with the manufacturer's label recommendations. This may require wearing full head and body covering with respirators and filters, and impermeable boots and gloves
- minimise exposure to herbicides when mixing, by wearing elbow-length PVC gloves and a face shield
- keep equipment leak-free and in good working order
- use equipment that meets Australian standards
- spray only in ideal wind and weather conditions to reduce drift and spray away from the direction of the wind.

Keep first aid equipment on hand and have an adequate knowledge of appropriate procedures. You should:

- treat any personal contact with chemicals immediately by washing the skin or contacted area and seeking medical advice. Remove contaminated clothing, hats and shoes and wash separately from other clothing.
- recognise over-exposure symptoms (such as nose bleeds, skin irritation or nausea) requiring urgent medical attention.

Poisons schedule

Schedule level	Toxicity	Signal words present on product label
Schedule 7	Extremely toxic	Dangerous Poison
Schedule 6	Moderately toxic	Poison
Schedule 5	Toxic	Caution

Mixing herbicides wearing correct safety gear (Photo: M. Richards)

Compliance with the law
Be responsible to the law.
You should:

- read the registered label of the chemical thoroughly to understand all the requirements
- adhere to legislation when using herbicides and chemicals. Regulatory requirements differ between state governments and local governments. Check the requirements in your area
- use only pesticides and herbicides registered with the Australian Pesticides and Veterinary Medicines Authority (APVMA), for the intended situation of use, at the suggested rates and only by methods registered on the label.

Record chemical applications and give appropriate notification of chemical use. Make note of the following information as a record:

- landholder (name, address and other contact details of the owner/occupier of the property being sprayed)
- date and time of spraying (start and finish)
- operator details (name, address and contact details)
- crop or place where pesticide was applied (include fallow land and land adjacent to spraying)
- type of equipment and methods used
- name of herbicide used (all chemicals and adjuvants)
- amount of concentrated herbicide used

- total quantity of mix applied (including water or other wetters mixed with herbicide)
- size of block sprayed
- order in which the blocks were sprayed
- weather conditions (wind speed and direction, temperature and humidity), particularly if labels describe limiting weather conditions for use.

Undertake training and ensure people applying the herbicide have met the appropriate certification and training requirements necessary for handling or using herbicides. Obtain an APVMA permit if you or they wish to vary the label directions or use.

For more information regarding record keeping, notification requirements and training in the use of herbicides and pesticides, contact your state government or refer to the appropriate legislation.

Spaying herbicides wearing correct safety gear (Photo: M. Richards)

3. Develop a lantana control plan

The most important step when undertaking lantana control is to develop a plan of action. This ensures that control methods will be effective, saving time and money while also increasing the success of control.

1. Set targets

Rather than trying to eradicate an infestation over the entire property in the first attempt, set smaller milestones to gradually achieve the final goal:

- Restore one site or small infestation at a time.
- Restore one heavily infested site by small sections.
- Aim to prevent further spread from current infestations.

2. Prioritise

Identify which areas will provide the best return on investment or are of the highest value:

- Choose a site based on the ease of achieving eradication or with the highest future production or conservation value.
- Deal with smaller outlying infestations first and minimise the spread of weeds.

3. Plan and implement

- Consider the site location when choosing the application technique, especially when it is near environmentally sensitive areas, watercourses, nearby crops, residences or native vegetation.
- Choose the herbicide according to its registered use and plan the application methods given current site conditions. High volume options may be the most cost-effective and practical applications, but in some locations a low volume application may be the most appropriate to minimise risk of off-target damage.
- Check seasonal conditions and only use herbicides in optimum seasons and weather conditions.
- Integrate techniques to increase effectiveness of control methods.
- Follow up control of regrowth and seedlings by re-spraying and planting competitive species (e.g. pasture).
- Monitor actions over a series of years.

4. Record progress

Keep notes of herbicide use (see section 2):

- Track the effectiveness of the control methods on your property in a diary or record changes on a map.
- Take photos at pre-determined intervals to give a visual record of changes to the infestation over time.
- Assess the cost efficiency of various treatments from your records.

4. Calculate volume of herbicide mix

Table B: Lantana density

Light
- Plants are sporadic with grass areas between them
- < 500 plants per hectare *
- Usually less than 1.0 m high**
- Access available to individual bushes

Medium
- Plants in clumps with some grass areas
- 500–2000 plants per hectare *
- About 1–2 m high**
- Access diminished to vehicles, but not to humans

Heavy
- Plants are generally impenetrable without cutting access trails
- > 2500 plants per hectare *
- Usually > 2 m high**
- Access denied except through initial mechanical or fire treatments

* Plants per hectare will depend on the maturity of the lantana and whether recent controls have influenced density of new seedlings.

1000 plants/hectare = 400 plants/acre

** Height of plant may vary with maturity

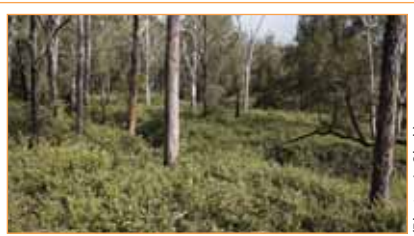
Grazing paddock	Eucalypt/woodland areas	Woodland edges
 (Photo: A. Clark)	 (Photo: A. Clark)	 (Photo: D. Stock)
 (Photo: A. Clark)	 (Photo: A. Clark)	 (Photo: D. Stock)
 (Photo: M. Day)	 (Photo: A. Clark)	 (Photo: M. Day)

Table C: Volume (approx.) of herbicide mix required for treating lantana

Method of application	Lantana density	Lantana height			
		<0.5 m	0.5–1.0 m	1.0–1.5 m	1.5–2.0 m
High volume and high pressure foliar spraying (handgun, hose and reel)	Heavy Medium Light		3000 L/ha 2000 L/ha 1000 L/ha	4000 L/ha 3000 L/ha 2000 L/ha	5000 L/ha 4000 L/ha 3000 L/ha
High volume and low pressure foliar spraying (knapsack and spot spraying)	Medium Light		20 L/100 m^2 10 L/100 m^2		
Aerial application by helicopter (boom)	Heavy			200 L/ha	200 L/ha
Splatter gun (approximate values to equate to registered rate)	Heavy Medium Light	4 mL 4 mL 4 mL	12 mL 10 mL 8 mL	16 mL 14 mL 12 mL	20 mL 18 mL 16 mL
Basal barking (sprayed)	Light to medium		< 100 mL/bush		
Cut stump	Light to medium	Dependent on density and thickness of stems			

5. Select the best herbicide

Table D: Active herbicide ingredients, rates and approximate costs

Active constituent	Brands + mixes	Registered rates	States registered	Nominal retail price*/L or kg (incl GST) *at time of publishing	Approx. costs / 100 L	Indicators for use against lantana
Foliar spray high volume either handgun or knapsack						
Glyphosate (360, 540 g/L)	360 g/L Roundup® Roundup® Biactive™ Weedmaster® Duo Wipe-out® 360	Handgun: 1 L/100 L water; Knapsack: 150 mL/15 L water + penetrant at 200 mL/100 L (e.g. Pulse®, Freeway Gold®)	Qld NSW (NT for some)	$6–7/L plus Pulse $40-42/L	$14–16 (with surfactant) or $6–8 (without surfactant)	Non-residual, non-selective. Use where off-target damage can be limited. Will affect pasture and legumes. Clear amber or light green liquid, with faint amine odour. Poisons schedule: S5.
	540 g/L Roundup® PowerMAX™ Credit® and Bonus® pack	Hand gun; 660–670 mL/100 L water Knapsack; 100 ml/15 L water + Powermax™ add penetrant at 200 mL/100L (e.g. Pulse) + Credit® and Bonus® surfactant at same rate as herbicide	All states	$10–12/L + Pulse $40–42/L or Bonus (included with Credit®)		
Picloram + Triclopyr (100 g/L + 300 g/L)	Grazon® DS Conqueror® Fightback®	Height 1m; 350 mL/100 L water + adjuvant at 500 mL/100 L (e.g. Uptake® Spraying Oil) or + penetrant at 100 mL/100 L (e.g. Pulse®) Height 1–2m; 500 mL/100 L water Mature lantana; 750 mL/100 L water	All states	$42–45/L + (At 350 mL rate include Uptake® $7–9/L or Pulse $40–42/L)	$19–21 (low rate) or $21–23 (mid-rate) or $32–35 (high rate)	Selective, residual. Use in non-crop areas, forests, pasture and rights of way. Will affect legumes. Clear brown liquid. Compatible used with 2,4-D amine. Also treats creeping lantana. Poisons schedule: S6.

Active constituent	Brands + mixes	Registered rates	States registered	Nominal retail price*/L or kg (incl GST) *at time of publishing	Approx. costs / 100 L	Indicators for use against lantana
Picloram + 2,4-D amine (75 g/L + 300 g/L)	Tordon® 75-D	650 mL/100 L water	Qld NSW SA WA Vic.	$53–55/L	$33-36	Selective, residual. Use in pasture and rights of way. Will affect legumes. Dark brown to black liquid. Poisons schedule: S5.
Dichlorprop (600 g/L)	Lantana® 600 (previously DP® 600)	Handgun: 1 L/200 L water Spot spray: 5 mL/1 L water	Qld NSW NT	$11–12/L	$6-7	Selective, residual. Use in non-crop areas. Will affect legumes. Brown liquid with faint phenolic odour. Also treats creeping lantana. Poisons schedule: S5.
Fluroxypyr (200 g/L)	Starane® 200 Flagship® 200 Comet® 200	Height 0.5–1.2 m; 500 mL/100 L water Height 1.2–2 m; 1 L/100 L water	Qld NSW	$31–33/L	$16-17 $31-33	Selective, residual. Use in non-crop areas, forests, pasture and rights of way. Will affect legumes. Black to brown liquid. Also for creeping lantana. Poisons schedule: S5.
2,4-D amine (625 g/L or 300 g/L)	2,4-D Amine 625 Amicide® 625	320 mL/100 L water	Qld NSW ACT SA	$7–8/L	$3-4	Non-selective, non-residual. Use in pastures, non-agricultural land and rights of way. will affect legumes. Results may only suppress lantana. Clear red-brown liquid with ammonia odour. Poisons schedule: S5.
	Affray® 300	7 L/ 1000 L water (for creeping lantana only)	Qld	$13–15/L	$9-11	Only for creeping lantana. Light straw-coloured liquid. Poisons schedule: S5.

Active constituent	Brands + mixes	Registered rates	States registered	Nominal retail price*/L or kg (incl GST) *at time of publishing	Approx. costs / 100 L	Indicators for use against lantana
Metsulfuron methyl (600 g/kg)	Brush-Off® Brushkiller® 600 Lynx® 600 Bushwacker® WG Metsulfuron 600 WG	10 g/100 L water or can be mixed with + 200 mL glyphosate 360 + non-ionic surfactant at 100–200 mL/100 L (e.g. Wetspray® 1000, Chemwet® 1000)	Qld NSW + (WA, ACT some brands)	$155–165/kg + glyphosate $6–7/L + surfactant $5–6/L	$2 0r $4-5 with mix	Non-selective, residual. Use in native pastures and rights of way. Will affect pasture and legumes . Results against lantana variable in the tropics. Off-white granulated solid with no odour. Poisons schedule: not scheduled, glyphosate S5.
		3 g/100 L water + 400 mL glyphosate 360 + penetrant at 100 mL/100 L (e.g. Pulse®) (not for Brush-Off® or Brushkiller®)	All states	$155–165/kg + glyphosate $6–7/L + Pulse $40 –42 /L	$7-8	
	Cut-Out® (pack includes glyphosate)	95 g/100 L water + penetrant at 100 mL/100 L (e.g. Pulse®)	Qld NSW ACT	$35–37/kg + Pulse $40–42/L	$7-9	Non-selective, residual. Use in pastures and rights of way. Will affect pasture and legumes. Results against lantana variable in the tropics. White to fawn odourless solid. Poisons schedule: S5.
	Trounce® Brush-pack™ (pack includes glyphosate)	173 g/100 L water + penetrant at 100 mL/100 L (e.g. Pulse®)		$51–53/kg + Pulse $40–42/L	$13-15	
Aminopy-ralid + fluroxypyr (10 g/L + 140 g/L)	Hotshot®	Height 0.5–1.2 m: 500 mL/100 L water Height 1.2–2.0 m: 700 mL/100 L water	All states	$23–25/L	$11-13 (low rate) or $16-18 (high rate)	Selective and residual. Use in non-crop areas, forests, pasture and rights of way. Will affect legumes, but not pasture and eucalypts. Also for creeping lantana. Poisons schedule: S6.

Active constituent	Brands + mixes	Registered rates	States registered	Nominal retail price*/L or kg (incl GST) *at time of publishing	Approx. costs / 100 L	Indicators for use against lantana
Aerial spraying (helicopter only)					**Approx $/100 L**	
Dichlorprop (600 g/L)	Lantana® 600	6-8 L/ha	Qld NSW NT	$11–12/L	$33–48	Spray mix at 200 L/ha. Poisons schedule: S5.
Picloram + Triclopyr (100 g/L + 300 g/L)	Grazon® DS	10 L/ha	Qld NSW NT	$42–45/L	~$220	Spray mix at 200 L/ha. Limit spraying over native trees. Poisons schedule: S6.
	Grazon® DS + 2-4,D amine	1.5 L Grazon + 2,4-D Amine 625 at 6 L/ha		$42–45/L + Amine 625 $7–8/L	$52–58	
Glyphosate	Glyphosate is registered for aerial application at 4 L/ha (but not specifically for lantana); however, this would not provide effective kills for mature lantana.					
Splatter or gas gun		**Ratio: X parts product + Y parts water**			**Approx $/5L**	
Glyphosate (360 g/L or 540 g/L)	Roundup® 360 Weedmaster® Duo Roundup® Biactive	1:9 glyphosate + water 2 x 2 mL dose per 0.5 m bush height	Qld NSW NT	$6–7/L	$3–4	Non-selective and non-residual herbicide. Poisons schedule: S5.
	Credit®	1:13 glyphosate + water + Bonus® surfactant at same rate as Credit®	All states	$10–12/L	$3–5	
Metsulfuron-methyl (600 g/kg)	Brushkiller® 600 Lynx® 600	2 g/L water + surfactant at 10 mL/5 L (0.2 %) (e.g. Pulse®)	Qld NSW (WA included for Lynx 600®)	$155–156/kg + Pulse® $40–42/L	$2–3	Non-selective and non-residual herbicide. Poisons schedule: not scheduled.

Active constituent	Brands + mixes	Registered rates	States registered	Nominal retail price*/L or kg (incl GST) *at time of publishing	Approx. costs / 100 L	Indicators for use against lantana
Basal bark and cut stump					Approx $/5L	
Picloram + Triclopyr (120 g/L + 240 g/L)	Access®	1 L/60 L diesel Basal bark: Plants < 50 mm diameter Cut Stump: Plants > 50 mm diameter	All states	$81-83/L + diesel $1.40/L	$13–15	Clear brown liquid. Poisons schedule: S6.
Picloram (43g/kg)	Vigilant® Herbicide Gel	Cut stump: Neat 3–5 mm gel on cut surface If diameter > 20 mm use minimum of 5 mm gel thickness	All states	$104–107/kg	N/A	Direct application. Brown translucent water-soluble gel. Poisons schedule: not scheduled.
Triclopyr (600g/L)	Garlon® 600 Safari® 600 Invader®	1 L/60 L diesel Basal bark: Plants < 5 cm diameter Cut Stump: All plants sizes	All states	$55–58/L + diesel $1.40/L	$11–12	Clear amber liquid with characteristic odour. Poisons schedule: S6.
2,4-D n-butyl ester (800 g/L)	Rubber Vine Spray®	Basal bark/cut stump: 1 L/40 L diesel	Qld	$17–19/L + diesel $1.40/L	$9–10	For pink lantana only. Clear brown liquid. Poisons schedule: S5.
Glyphosate (360 g/L)	Roundup® Weedmaster® Duo	Cut stump: Neat	Off-label permit (check your state)	$6–7/L	N/A	Clear amber liquid or light green liquid with faint amine odour. Poisons schedule: S5.

6. Read manufacturers' recommendations and tips

Table E: Recommended spray season

Active ingredient	Example product name	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Foliar spraying, aerial spraying and splatter gun													
Glyphosate	Roundup®, Glyphosate 360, Weedmaster Duo, Credit	6	6	t	4 4	4 4	4 4	4	t	6			
Picloram + Triclopyr	Grazon® DS, Conqueror®, Fightback®					6							
Picloram + 2,4-D	Tordon® 75-D		6		6		6	6	t	4 4	4 4	4	t
Dichlorprop	Lantana® 600			6	6		t	t		t	4 4	4 4	4
Fluroxypyr	Starane® 200, Flagship®, Comet® 200	6	6	6	6	t	4 4	4 4		4	t		6
2,4-D amine	Amicide 625, Amine 625	6	6	6		6	6	6		6	6		
Metsulfuron methyl	Brush-Off®, Brushkiller®, Lynx® 600, Bushwacker® WG, Savannah®	6	6	6	6	6	6	6	6	4 4	4	6	
Metsulfuron methyl + glyphosate	Cut-Out®, Trounce®	6	6	t	t	t	t	t	t	4 4	4	6	
Aminopyralid + fluroxypyr	Hotshot®	6	6	t	t	t	t	4	4 4	4	4	6	
Basal bark and cut stump													
Picloram + Triclopyr	Access®	t	t	4 4	4	4 4				4		4 4	4
Picloram	Vigilant® Herbicide Gel	t	t	4 4	4	4 4	4 4	4 4		t			
Triclopyr	Garlon® 600												
2,4-D n-butyl ester	Agricrop Rubber Vine Spray®					t	t						

Key to spraying: 4 = optimal to spray at this time 6 = not effective to spray at this time t = if conditions are suitable and plant is actively growing

General advice and manufacturers' recommendations

General advice may vary between herbicides, therefore any use of these recommendations should be in strict accordance with the label of the herbicide product being used.

Mixed spray

- Only mix herbicide in quantities that are likely to be used in one day, and use promptly. Some herbicides, like Grazon® DS, Starane® 200 and Tordon® 75-D, can remain in diluted form for up to one week. Other herbicides cannot be stored for more than two days (e.g. metsulfuron methyl) and some cannot be stored for prolonged periods in direct sunlight (e.g. Lantana® 600).
- Some herbicides require agitation to keep active ingredients in suspension, but for others this can create excessive foaming.
- Be aware of the mixing container being used. Some herbicides such as metsulfuron methyl and glyphosate cannot be mixed in galvanised steel or unlined steel containers, as this will produce hydrogen gas. Other herbicides may have corrosive effects on aluminium.
- Some herbicides are pre-packed with two mixer chemicals or solid herbicides in water-soluble bags to allow easier mixing and reduce the chance of mess or spillage. Some pre-packed herbicide gels are also available for cut stump work for ease of application.
- Be aware of the hardness of the water. Reduced results may occur if the herbicide is mixed with water containing soil or calcium salts. Some herbicides are readily miscible in hard or soft waters.

Cleaning

- Clean all equipment by thoroughly washing with water for at least 10 minutes (or as per the label directions) and clean tanks by using the cleaning chemicals specified for that product. When some cleaning chemicals are mixed with certain herbicides they may have chemical reactions and produce harmful gases that are flammable or toxic.

Application of herbicides

- Spray lantana in the best season according to product guidelines. As a rule of thumb, only spray lantana when it is actively or vigorously growing. A sign of active growth is after rain when lantana is flowering. Some herbicides have higher registered rates for mature lantana.
- Spray lantana to thoroughly wet all foliage and stems to the point of run-off. Apply thoroughly and evenly to wet all foliage and stems, ensuring the herbicide penetrates through the bush to hidden foliage. Use a nozzle configuration that ensures canopy penetration. It is recommended to use a side-by-side pattern to ensure the herbicide is evenly applied to all sides of the plant. Some selective herbicides also recommend wetting the soil around the base of the plants with herbicide mix, to help with uptake through the root system and residual control of seedlings that may germinate.
- Do not treat lantana that may be stressed, as a reduced level of control may result. The best results will not be achieved with lantana that is stressed from prolonged periods of extreme cold, moisture stress (water-logging or drought), poor nutrition, presence of disease, heavy insect attack or previous herbicide treatment. Some herbicides (e.g. fluroxypyr) may still be able to achieve good kill rates with poor foliage cover, but only by using the highest registered rate. Re-treatment of lantana may be required if the herbicide only suppresses the plant.
- Spray in the cooler parts of the day when evaporation will have less effect.
- Ensure clean water is used when mixing. A reduced result will occur if using glyphosate with water containing suspended clay or organic matter from dams, streams or irrigation channels or high levels of calcium, magnesium or bicarbonate ions.
- Do not spray if rain is predicted, and delay treatment of plants with heavy dew or when rainwater droplets fall off leaves when touched. Heavy rain is likely to wash any chemical off the leaves and produce a poor result. If rain is predicted within 4–6 hours do not commence work;

however, products containing fluroxypyr, picloram and triclopyr are rainfast in one hour. Rainfastness of herbicides varies, so refer to the herbicide label for these constraints. Rainfastness can be reduced if lantana is not actively growing, is under stress or is in conditions of low light.

- The addition of a surfactant or penetrant may improve the success of control efforts for specific herbicides. Use the label recommendations.
- Weather conditions are important at the time of spraying. Do not use when weather conditions are expected to cause spray drift onto nearby susceptible plants, usually at times of high wind. Treatment should also commence after any annual flooding.
- While large mature lantana plants can be treated using herbicides, the best results will occur for lantana 0.5–2.0 m high, actively growing and flowering. Some variation in results may occur between herbicide products, seasonality, operator methods and lantana variety and maturity.

Visible damage

- The visible damage to lantana from herbicides can be slow, appearing over a period of weeks. Wilting, yellowing and dieback of the leaves occurs, which then advances to complete browning of above-ground growth and deterioration of root stems. When using most knockdown herbicides, complete brownout occurs in 4–6 weeks and death of the plant occurs in 9–12 weeks. For metsulfuron, full brownout may take up to 3–6 months.
- Seedling germination and growth will often have to be treated with a separate application.
- In adverse conditions, the visible damage may be slower or may only stunt or suppress lantana, requiring repetition of herbicide treatment during the best season.
- Spraying early in the season after the first flush of growth may result in brownout of leaves and defoliation, but the resultant kill rate may be low. Spraying of new growth will be necessary the following season.
- Lantana, native plants, crops, legumes and some native grasses are likely be affected by most herbicides.

- Selective herbicides may control lantana without impacting on improved pasture and eucalypt trees. For example, picloram and dichloroprop can remain active in the soil for extended periods depending on soil type, rainfall, temperature, humidity, soil moisture and organic matter; however, they do allow most pastures to establish quickly after treatment. In addition, fluroxypyr does not usually affect pasture and eucalypts.

Minimise off-target damage

- Spray drift from some herbicides will cause off-target damage. When foliar spraying, ensure spray drift does not affect desirable plants, crops, cropping land, pasture legumes or native vegetation. Read the herbicide label to ensure the use is appropriate and reduce off-target damage by careful application.
- Ensure spray drift does not drift over the operator, by standing up-wind. Still days with no wind are not ideal, as spray drift cannot be predicted.
- Be aware of draining or flushing equipment near native or non-target trees or other plants, on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots.

Coffs Harbour, New South Wales
(Photo: A. Clark)

Aerial spraying

- Spraying lantana by helicopter can provide a good rate of dieback to allow access and follow up. Always spray with a properly calibrated boom to ensure adequate coverage of the target infestations. Use a half overlap, opposite pass technique to ensure lantana is sprayed from two different directions, as this will also ensure maximum coverage. Do not apply herbicide aerially in wind greater than 15 km/hr and air temperatures above 35°C.
- While glyphosate is registered for aerial spraying (but not specifically for lantana), the registered rates are not suitable for killing lantana. The risk of damage to pasture and other native species can be high depending on the situation.

Environmental considerations

- Exercise caution when spraying in riparian areas due to herbicide toxicity to marine animals. Do not contaminate waterways, streams or rivers, especially potable water supply.

Gold Creek, Queensland (Photo: B. Wilson)

Herbicide labels recommend not spraying over water bodies and provide guidelines to spraying distances from any potable water source—either still reservoirs or flowing creeks.

- Roundup® Biactive™ is specifically developed for use in aquatic situations, but adding a surfactant will negate its environmental suitability.
- Herbicides such as glyphosate break down immediately on contact with soil and have no residual effect. Glyphosate that reaches the soil is tightly bound to soil particles.
- Some herbicides are considered toxic to birds, bees, fish and crustaceans.

Withholding periods

- Some herbicides will make lantana more palatable to stock after treatment. Do not allow stock to re-enter paddocks until treated poisonous plants have browned out and died down.
- Although some herbicides have a nil withholding period for stock animals, the advantage of de-stocking areas is that it allows the herbicide to uptake into the plant for at least seven days without disturbance.
- If using pasture for fodder, follow the label recommendations regarding time requirements before harvesting pasture, which can be up to eight weeks.

Ongoing control

- Delay follow-up spray treatment until regrowth has reached about 0.5–1.0 m in height.
- Burning (after complete brownout), pasture improvement and/or further treatment are recommended to control lantana seedlings and regrowth when using glyphosate. Some herbicides (e.g. Grazon® DS) do not recommend cutting or clearing for at least six months after spraying.
- If regrowth occurs, follow-up by respraying or using another control option.
- To improve paddock pasture, broadcast pasture seed and keep stock off during the following summer to allow pasture to establish.

Cut stump

- Do not apply herbicides to charcoal-coated or wet stems when using basal barking or cut stump treatments, as this can repel the diesel mixture.
- Tough barky stems can absorb more herbicide than smooth stems.

Permits

- Permits may be required for use of herbicides in your state or local area. Check the herbicide label or your local authority. For example, permits are required for using 2,4-D n-butyl ester in certain areas of south-east Queensland.

All herbicides are at risk of being overused, leading to the targeted species building a resistance to the herbicide in question. Herbicides are allocated a herbicide group code according to the science behind killing the weed. This determines the level of risk for becoming ineffective. Most lantana herbicides have a low risk of this occurring; however, to avoid this problem, herbicides from different categories should be used from time to time.

Table F: Herbicide resistance

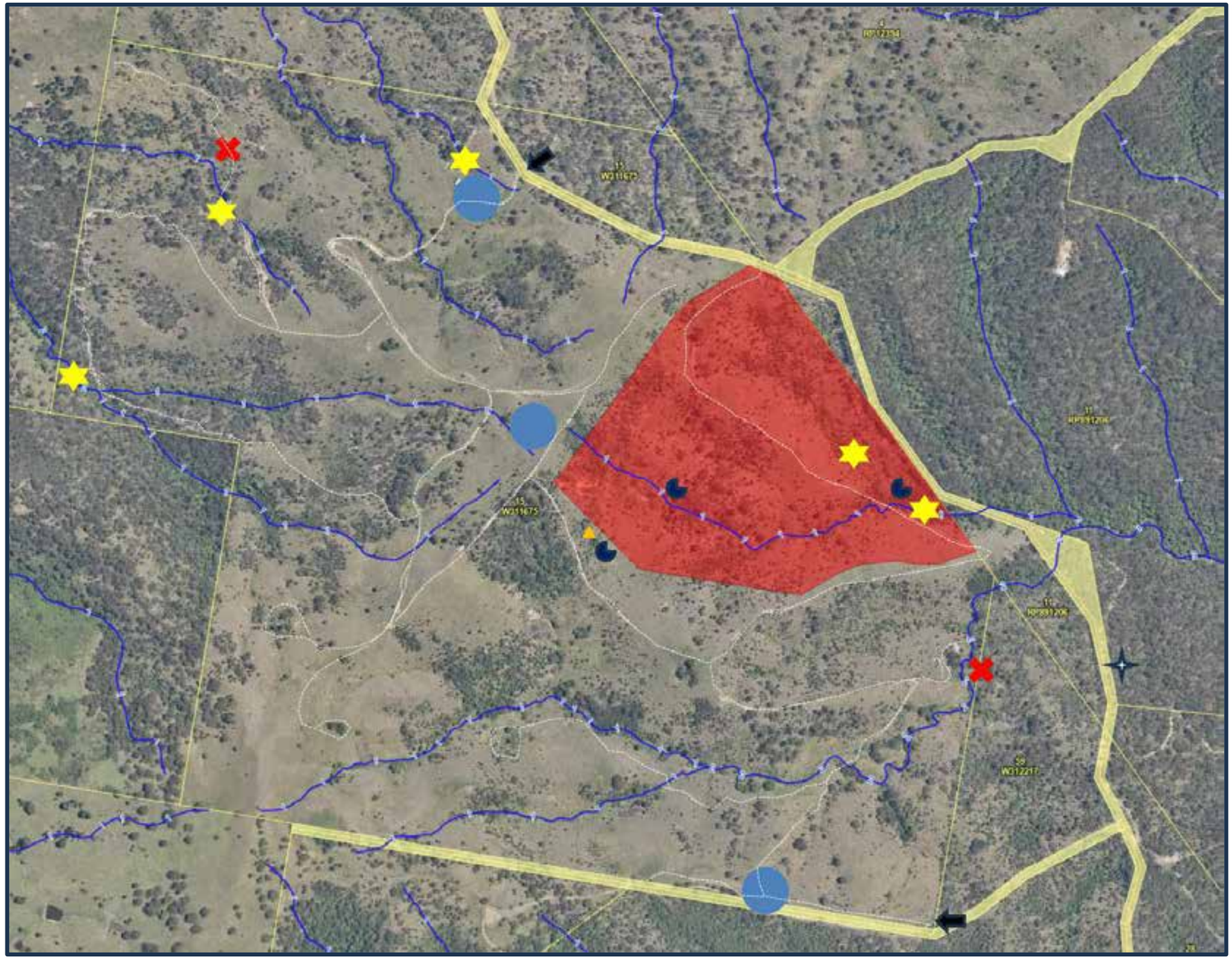
Resistance level	Herbicide group	Mode of action	Active ingredients
High	A & B	*Targets specific plant cell processes* Individuals in the weed population may have cell processes varying from those targeted by herbicides in this group, making them resistant to the chosen herbicide. These varieties soon thrive to form an infestation uncontrolled by the original herbicide.	metsulfuron methyl
Moderate	C to H	*Targets general plant cell processes* Plants with resistance to these herbicides are less common. These herbicides can be used over a number of seasons with few problems of resistance, though; it is a possibility resistance may occur.	
Low	I to M	*General or multiple modes of action* Due to the multiple modes of action, there is a smaller chance that weeds will be able to resist each action the herbicide takes, making resistance less likely to occur—though still not impossible.	glyphosate, picloram, triclopyr, dichlorprop, fluroxypyr, 2,4-D amine, 2,4-D n-butyl ester, aminopyralid

Tips for using herbicides

- The effectiveness of individual herbicides can depend upon the genetic variation between lantana plants.
- Spray plants in subtropical areas in the late summer or autumn when flowering occurs. Remember that plants in tropical areas may be more resistant to herbicides containing metsulfuron-methyl.
- Encourage coordinated land management. Work with neighbours to control weeds along property boundaries.
- Be flexible in your approach. If a more economical control opportunity presents itself, which also minimises environment impacts, use it!
- Look for other weeds that can be treated while carrying out lantana management.
- Remember the importance of following up and monitoring for regrowth and seedlings in your control program.
- Plan activities seasonally by developing a property pest management plan.
- Don't attempt a larger area than you can handle in any one season. Adequately control an area before moving on to the next infestation.

Yarraman, Queensland (Photo: D. Stock)

Attachment 6 – Pest Surveys and Observations and Photos



Feral Dog Recording

Wild Pig (Drove Recordings)

Infrastructure Zone
(Mice and Rats Recordings)

Baited Camera Survey Point
(Autumn 2022)

Fox Den on Rock Outcrop

Offsite Deer Observation

Observation Surveys

Extent of VDEC and Offset
Area

HABITAT EXCHANGE SOLUTIONS

Pest Surveys & Observations

Plan of Pest Species Observations and Records March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 13/04/2023)

HABITAT EXCHANGE SOLUTIONS

Pest Surveys & Observations

Photos

Photos Pest Species Observations and Records March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 13/04/2023)

HABITAT EXCHANGE SOLUTIONS

Pest Surveys & Observations
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Photos Pest Species Observations and Records March 2022 to March 2023

Part of Pest Management Plan
(Version 1 – NM – 13/04/2023)

Attachment 7 – Council 1080 Bating Program and Instructions

Queensland Health Departmental Standard

Dealing with restricted S7 poisons for invasive animal control — version 1

27 September 2021

Queensland Government

Queensland Health Departmental Standard: Dealing with restricted S7 poisons for invasive animal control — version 1

Published by the State of Queensland (Queensland Health), September 2021

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Disclaimer:

Version control

Version	Replaces version	Date approved	Commencement date
1	NA	12 August 2021	27 September 2021

Contents

Preface

The Departmental Standard – *Dealing with restricted Schedule 7 poisons for invasive animal control* (this Standard) has been made pursuant to section 233 of the *Medicines and Poisons Act 2019* (the Act) by the Chief Executive of Queensland Health, and establishes the minimum requirements for using restricted Schedule 7 (RS7) poisons for the control of invasive animals in Queensland.

Maintaining the health and wellbeing of users of regulated substances, as well as the general public who may be exposed to these substances, is the primary focus of the medicines and poisons regulatory framework. By achieving the main purposes of the Act, Queensland Health is confident that this outcome will be achieved.

Compliance with this Standard will assist in ensuring public health is protected during all dealings with RS7 poisons for invasive animal control.

This Standard must be followed where it is referenced by the Act or Medicines and Poisons (Poisons and Prohibited Substances) Regulation 2021 (the Poisons Regulation) or when it is required as a condition of an authority.

The Standard provides minimum criteria and acceptable actions to achieve the required outcomes. Where more than one course of action is acceptable to achieve the outcomes required, the approved person or holder of the general approval may choose the option that is practicable to their needs.

The words ‘must’ or ‘shall’ used in this Standard mean the requirement is mandatory.

The words ‘should’ or ‘may’ recommends a discretionary course of action.

Object of this Standard

The object of this Standard is to ensure that RS7 poisons are stored, applied and disposed of in a way that is safe and protective of public health, and that these regulated substances are effective for their intended use.

RS7 poisons are extremely dangerous poisons that have the potential to cause death or serious harm to human health. In addition to human health – these poisons can also inadvertently impact the health of animals not intended to be targeted by baits. However, RS7 poisons also have properties that make them useful for a range of applications in industry, agriculture and scientific processes. This means that risks to health and the environment, including non-target species must be managed effectively. Further, the integrity and quality of the poison must be maintained to ensure it is fit for purpose.

Compliance with this Standard, and the requirements prescribed in the Poisons Regulation, is required to carry out these regulated activities in the authorised way, as well as safely and effectively.

A range of activities associated with the use of poison baits have been identified and regulated in the Poisons Regulation to prevent risks to life or safety of a person or non-target animal and to ensure the integrity and quality of baits. The activities addressed in this Standard relate to:

1. Transport and storage of RS7 poisons
2. Notification of laying poison baits
3. Preparation and laying of poison baits
4. Placement of poison baits
5. Record keeping
6. Waste management
7. Incident reporting

Persons complying with this Standard must also be aware that the Poisons Regulation prescribes standard conditions and requirements relating to the use of RS7 poison baits which must also be complied with.

Scope

This Standard applies to persons who are intending to use RS7 poisons for the control of invasive animals in Queensland. This includes holders of a general approval or persons who are designated as an approved person (invasive animal controller) under Schedule 2, Part 3 of the Poisons Regulation.

Section 23 of the Poisons Regulation provides that it is a standard condition of a general approval authorising dealing with a RS7 poison to control invasive animals, that the holder of the general approval must deal with the RS7 in accordance with this Standard.

Baits may include fresh meat baits, grain baits, fruit baits, manufactured (shelf stable) baits or pest ejector devices or lethal traps.

This Standard sets out minimum requirements for mitigating public health risks associated with baiting activities using RS7 poisons. For ease of reference, this Standard is comprised of three parts.

Part 1 – General, applies to all persons who may deal with a RS7 poison either as the holder of a general approval or as an approved person. Approved persons include rural landholders authorised under Schedule 2, Part 3, Division 3 of the Poisons Regulation, who have been supplied the baits by an authorised officer under Schedule 2, Part 3, Divisions 1 and 2 of the Poisons Regulation.

Part 2 – Additional requirements for authorised officers, applies to persons authorised under the *Biosecurity Act 2014* and *Nature Conservation Act 1992*. The Poisons Regulation requires authorised officers to possess and apply baits to control invasive animals in accordance with this Standard.

Part 3 - Additional requirements for commercial baiting operators, who provide baiting services on a 'fee-for-service' basis and who are authorised under a general approval.

Where a permit has been granted by the Australian Pesticides and Veterinary Medicines Authority (APVMA) to use a RS7 poison for a specific baiting activity, the conditions of the permit must be followed, unless the permit allows the State to vary the conditions.

Part 1 - General

Transport and storage of RS7 poisons

Activity	Requirements
1.1. Storage during transport	A. RS7 poisons must be transported[1] in a sturdy, leak-proof immediate container that is stowed in the vehicle in a way that prevents contamination of the vehicle. B. The immediate container must be secured in a lockable storage area that is either securely fixed to or within the vehicle during transport. C. The key or code to the lockable storage area must only be accessible by persons authorised by the approval holder or approved person. D. The immediate container must be clearly labelled with either the manufacturer's authorised label or the words "Dangerous Poison" and the name of the poison. E. RS7 baiting devices[2] must be disarmed during transport to prevent accidental activation.
1.2. Storage other than during transport	A. The immediate container must be clearly labelled with either the manufacturer's authorised label or the words "Dangerous Poison" and the name of the poison. B. RS7 poisons must be stored in a secure area (e.g. locked box or a locked cabinet within a locked shed) to prevent access by unauthorised persons. C. Keys or codes to all storage containers and secure areas must only be accessible by persons authorised by the approval holder or approved person. D. RS7 baiting devices must be disarmed or inactivated while in storage. E. RS7 poisons must not be stored in a food/drink container or a container that resembles or may be mistaken for a food/drink container. F. Prepared (fresh meat) baits must not be stored for future use, i.e. frozen, refrigerated or dried.

[1] Restricted S7 Poisons are Class 6.1 dangerous goods under the Australian Dangerous Goods Code.

[2] For example, capsule ejector devices containing an RS7 poison.

Notification of laying poison baits

Activity	Requirements
1.3. Notification	A. Notifications may be verbal or written. If written notice is given, it may be given in either electronic or paper form. B. The notification must be: • provided to all adjoining and adjacent neighbours, including properties separated by roads and watercourses, and • given at least 72 hours prior to commencement of baiting. C. The notification must include: • the steps to be taken to ensure children, or domestic and working animals, do not gain access to baits or poisoned animals, and • the dates between which baiting will occur. • Appendix 1 to this Standard may be used to give written notification. This may also be used as a template for verbal advice. D. Baiting must commence within ten (10) days of notification. If not, a new notification must be issued giving at least 72 hours' notice. E. Records of notifications (verbal or written) must be kept for two (2) years. Appendix 2 to this Standard is a template Record of notifications of intent to use RS7 poison that may be used for this purpose.
1.4. Warning signs	A. Warning signs must be placed at all entrances to the land being baited and at the extremities of the land boundaries fronting a public thoroughfare. This must be done even if the adjoining property is carrying out baiting. B. Warning signs must be put up immediately before baiting commences on the property. C. Warning signs must be maintained for at least four (4) weeks after the authorised period of bait lay has expired or after all untaken baits have been collected. D. Warning signs must be firmly fixed, weatherproof, legible and include the following information: • name of poison used • date the baits were laid • contact details of the landowner • target animal/s; and • a warning that livestock, domestic and working animals can be affected. E. Warning signs must be replaced if damaged or no longer legible. F. If a property adjoins a public space (e.g. a roadside rest stop), warning signs should be placed in a way that is visible to a person in the public space. G. Appendix 3 to this Standard is a template for a warning sign.

Preparation and laying of poison baits

Activity	Requirements
1.5. Preparation of baits (i.e. fresh meat, grain and fruit baits)	A. Carcasses, rotten meat or meat with bones or skin attached must not be used in the preparation of meat baits. B. Baits must be prepared in accordance with the relevant APVMA permit or label instructions. C. Cereal, fruit or grain baits containing RS7 poison must be coloured green to clearly distinguish from cereal, fruit or grain used for human consumption. D. Any spills, waste or contaminated materials occurring in the bait preparation area must be collected and disposed of immediately. E. Washing facilities, spill kits and measures for disposing of waste must be readily available in the bait preparation area. F. Children, and domestic and working animals, must be prevented from entering the bait preparation area.

Placement of poison baits

Activity	Requirements
1.6. Application of baits	A. Baits containing strychnine, 4-aminopropiophenone (PAPP) or more than 0.05% fluoroacetic acid must not be applied through aerial distribution from an aircraft. B. Individual baits must not be divided or split into smaller portions prior to application. C. Baits must not be laid: • on any stock route or reserve for travelling stock without local government approval • within five (5) metres of a fenced boundary • within five (5) metres from the edge of a formed public roadway • within twenty (20) metres of permanent or flowing water bodies • within one hundred and fifty (150) metres of a dwelling.

Record keeping

Activity	Requirements
1.7. Record keeping	A. Records must be maintained in relation to the quantity of RS7 poison acquired, applied (per baiting event) or disposed of. B. Records of application of baits must state the: • name of poison • date and quantity/number of baits applied • quantity of poison used, and • location[3] where the baits were applied. C. For unused poisons/baits or waste, records must be kept for: • the quantity of unused poison/bait • the date of disposal or surrender • the location of disposal, and • if surrendered, the person it was surrendered to. D. Records must be retained for a period of two (2) years. E. Records must be made available on the request of an inspector under the *Medicines and Poisons Act 2019*.

[3] The location of baits should be recorded to allow them to be retrieved. Acceptable solutions include GPS recording of bait placement or similar mapping methods.

Waste management

Activity	Requirements
1.8. Disposal	A. RS7 poison waste, contaminated material and where possible any partially eaten baits and dead animals, must be disposed of by: • burying at a depth of at least 50 cm on the landholder's property, or • by disposal at a licensed waste disposal facility that can accept the RS7 poisons, or • by incineration[4]. B. Contaminated wastewater produced during the cleaning/rinsing of equipment, PPE or vehicles used to prepare or apply baits, must be disposed of in a way that does not contaminate food or water or endanger people or non-target animals. C. Unused RS7 poisons must only be disposed of as follows: • by burying at a depth of at least 50 cm, or • by disposal at a licensed waste disposal facility that can accept the RS7 poisons, or • by incineration[4], or • return to the licensed retailer.

Incident reporting

Activity	Requirements
1.9. Reporting of incidents	A. The following events must be reported to the Chief Executive Queensland Health: • any poisoning or suspected poisoning of a person • any loss or theft of RS7 poisons. B. The notification must be given as soon as practicable within two (2) business days of an event occurring. If an oral report is given, a written report must be provided within seven (7) business days of when the oral report was given. C. Appendix 4 to this Standard is a template - Restricted S7 poison incident notification form.

[4] Incineration of containers must be undertaken at a facility authorised under the *Environmental Protection Act 1994* to thermally reprocess or treat waste.

Part 2 - Additional requirements for authorised officers

Record keeping

Activity	Requirements
2.1. Record keeping	A. If supplying low-risk fluoroacetic acid baits to another person, records must be maintained in relation to: • the date of supply • the quantity of baits supplied • the name of the person and property supplied to, and • the quantity of any unused/waste baits that were disposed of. B. If baits containing RS7 poisons are applied by the authorised officer, the following must be recorded: • geographical location marked on a registered plan (lot/plan number) or a clear map showing the property boundary and relative location of baits • quantity of baits applied, and • the date. C. Records must be retained for a period of two (2) years.

Part 3 - Additional requirements for commercial baiting operators

Record keeping

Activity	Requirements
3.1. Record keeping	A. The approval holder must retain records of the RS7 poisons, including quantities obtained, supplied and used. B. If supplying RS7 poisons to another person, records must be maintained in relation to: • the date of supply • the quantity of baits supplied • the name of the person and property supplied to, and • the quantity of any unused/waste baits that were disposed of. C. Records of baiting activities must state the following: • name of the poison • date and quantity/number of baits applied • details of property and property owner where the bait is laid • location of baits, if applied by the approval holder, should be recorded to allow them to be retrieved, and • the quantity of unused poison, date and the location of surrender. D. A copy of the record must be provided to the landholder. E. Records must be retained for a period of five (5) years.

Appendix 1 - Notice of intent to use Restricted S7 poison

Notice of intent to use Restricted S7 poison for baiting of invasive pest animals

Date: .....

To: .....

As a neighbouring landholder I wish to inform you that I intend to:

☐ Prepare and lay: .....
(type of bait or ejector device and target animal)

☐ Lay traps poisoned with: .....
(type of bait and target animal)

(Tick whichever is relevant)

The baiting event will occur from ..... to .....
(Date) *(Date)*

The address/s at which the baiting will take place is/are:

Please be advised that ..... is a dangerous poison and is highly toxic to both animals and people.

Please ensure children and other persons in your household are restricted from entering the site.

Please ensure steps are taken to keep all domestic and working dogs safe by restraining or muzzling them during this period.

Regards

..... *(Sender's signature)*

..... *(Print name*

..... *(Telephone contact details)*

Appendix 2 - Record of notifications of intent to use Restricted S7 Poison for invasive animal control log

Name: _____ Address: _____

Baiting program dates	Neighbour's name	Neighbour's property name or address	Distance from neighbour's property to baiting site	Date notified

Appendix 3 – Sample warning sign

Appendix 4 – Restricted S7 poison incident notification form

Notification to the Chief Executive of Queensland Health

Details of person notifying the incident			
Name of notifier			
Business name		ABN	
Address of notifier			
Position of notifier			
Contact phone		Approval number	
Email address			
Business activity			

Incident details
Incident type ☐ poisoning or suspected poisoning of a person ☐ poisoning or suspected poisoning of a domestic animal ☐ contamination or suspected contamination of agricultural land or livestock ☐ loss or theft
Restricted S7 poison type ☐ strychnine ☐ 1080 ☐ PAPP ☐ other (provide details)

Incident date:	Authorised location address:
Time of incident:	

Provide a description of the incident including location, who or what was affected, the circumstances of the incident.
Who did the incident involve? (tick all that appropriate) ☐ Approved person ☐ employee of Approved person ☐ person engaged by Approved person ☐ other (provide details)
Please submit to the Public Health Unit in your area.

Glossary

Term	Definition
Approval holder	A person who holds a general approval that authorises dealing with a RS7 poison to control invasive animals.
Approved person	A person authorised under Schedule 2 of the Poisons Regulation.
APVMA	Australian Pesticides and Veterinary Medicines Authority
Authorised officer	An authorised officer appointed under the *Biosecurity Act 2014* or an authorised person appointed under the *Nature Conservation Act 1992* who is an approved person under Schedule 2 Part 3 Division 1 or 2 of the Poisons Regulation.
Bait	Food or baiting device (e.g. pest ejector devices or lethal traps) containing a poison intentionally used to attract and kill a pest or an invasive animal.
Baiting event	The preparation and laying of baits during a defined period of time.
Chief Executive	The Chief Executive of Queensland Health
Commercial baiting operators	An approval holder who provides baiting services on a 'fee-for-service' basis.
Container	Means a container that: • is appropriately labelled • is impervious to the poison it contains • does not chemically or physically react with the poison it contains • can be securely closed and is sufficiently durable to prevent it from breaking or leaking during ordinary handling, transport or storage • can be securely closed and is not, and does not appear to be, a food or drink container.
CPE	Canid Pest Ejector for the purpose of controlling wild dogs, dingoes and foxes. Used in conjunction with capsules containing fluoroacetic acid or PAPP.

Term	Definition
General Approval	As defined in section 68 of the Act: (1) A general approval is an approval that authorises a person to carry out a regulated activity with a regulated substance stated in the approval. (2) A regulation may prescribe different classes of general approvals for carrying out different types of regulated activities.
Immediate container	As defined in Part 1 of the Poisons Standard, includes all forms of containers in which a poison is directly packed but does not include any such container intended for consumption or any immediate wrapper.
Inspector	As defined in the *Medicines and Poisons Act 2019*
Invasive animals	As defined in Schedule 7, Dictionary of the Poisons Regulation
Landholder	Includes rural landowner or occupier
Licensed waste disposal facility	Waste disposal facility licensed under the *Environmental Protection Act 1994*
Low-risk fluoroacetic acid bait	As defined in section 10 of the Poisons Regulation Is a poison that is fluoroacetic acid in the form of a bait containing the acid in a concentration of not more than 0.5 grams for each kilogram of the bait *Baits may be in prepared (fresh) or manufactured (shelf-stable) form
Manufactured baits	Baits that are shelf stable and packaged to withstand storage without refrigeration.
Manufacturer's approved label	Product label approved by the APVMA
PAPP	4-aminopropiophenone (para-aminopropiophenone)
Pest	As defined in Schedule 1 of the Act: (a) means an arthropod, bird, mollusc or rodent that injuriously affects, or may injuriously affects, or may injuriously affect — i. a place by transmitting disease, a toxin or another pest in the place or by causing physical damage to the place or a thing in the place; or ii. a person by transmitting disease, a toxin or another pest to the person or by causing distress to, or an adverse physiological or social effect in, the person; but (b) does not include an invasive animal that is restricted matter *Biosecurity Act 2014*.

Term	Definition
Poisons Standard	As defined in Schedule 1, Dictionary of the *Medicines and Poisons Act 2019*: *the current Poisons Standard within the meaning of the Therapeutic Goods Act 1989 (Cwlth), section 52A(1)*
Prepared baits	Include: • Fresh meat baits that are impregnated with a RS7 poison by injection. • Grain or fruit that are impregnated with an RS7 poison by mixing or other means
PPE	Personal Protective Equipment
Records	May be hand-written or electronic
Road	As defined in the *Land Act 1994*
Restricted S7 poison (RS7 poison)	As defined in section 8 of the Poisons Regulation and listed in Schedule 1 of the Poisons Regulation For the purpose of this Standard, this includes strychnine, PAPP and fluoroacetic acid.
Secure area	As defined in Schedule 7, Dictionary of the Poisons Regulation
Spill kit	May include items such as a bucket of clean and dry sawdust/sand to use on solution spillages, additional PPE, clean containers that are capable of being closed for recovery purposes; and a broom and shovel for the collection and removal of contaminated material

A term used in this Standard that is defined in the *Medicines and Poisons Act 2019* or the Medicines and Poisons (Poisons and Prohibited Substances) Regulation 2021 and is not referred to in this Glossary, has the meaning stated in the Act or Regulation.

Attachment 8 – Pest Species – Queensland Government Technical Data Sheets (Feral Dogs and Wild Pigs)

Wild dog

Canis familaris

The term wild dog refers collectively to purebred dingoes, dingo hybrids and domestic dogs that have escaped or been deliberately released.

Wild dog control methods include baiting, trapping, shooting, fencing, and the use of guardian animals to protect stock. A planned strategy using a combination of these methods that also considers wild dog behavior will enable effective management.

Legal requirements

The wild dog is a category 3, 4 and 6 restricted invasive animal under the *Biosecurity Act 2014*. It must not be moved, kept (if a dingo), fed, given away, sold, or released into the environment. The Act requires everyone to take all reasonable and practical measures to minimise the biosecurity risks associated with invasive animals under their control. This is called a general biosecurity obligation.

Queensland

At a local level, each local government must have a biosecurity plan that covers invasive animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws. Contact your local government for more information.

Control

Managing wild dogs

To increase wild dog control effectiveness, it is essential that control programs are coordinated among adjoining properties.

Queensland research has shown that in some situations wild dogs can quickly re-colonise baited areas due to a number of factors including inconsistent bait programs which do not provide comprehensive wild dog control across the landscape. Such programs may alter the dynamics of wild dog populations in the area. To prevent livestock attacks and enhance wild dog management, it is important for producers to work together using a variety of control methods.

Wild dog ecology and seasonal variations can also influence the likelihood of wild dogs coming into contact with a control tool. The timing of control should consider seasonal variations and the availability of water (where water is restricted) and then target watering points. Many land owners bait using 1080 twice a year to target wild dogs during peaks in activity associated with breeding (March/May) and then again in September/November to target pups and juveniles. However, baiting and trapping is recommended at all times when wild dogs are active.

Fencing

Property fencing suitable to exclude wild dogs is expensive to build and requires continual maintenance to repair damage caused by fallen timber, fire, floods, feral and domestic animals, as well as vegetation regrowth. However, a properly maintained fence can restrict movement into an area where wild dogs have been controlled.

Electric fences suitable for wild dogs have been developed. Electrifying a fence creates a fear of the fence itself and deters wild dogs from approaching.

For property fencing to be successful, the fence must be maintained in good order and ongoing wild dog control conducted within the protected area to limit livestock impacts.

Fencing is the most effective method of protecting livestock and pets from wild dog attack on small acreage blocks. A fence can also be a good area to place baits and traps when wild dogs are active.

Trapping

A key success to trapping wild dogs (using foot-hold traps) depends on the skill of the operator. Visit feral.org.au to watch a PestSmart video on best practice techniques for wild dog trapping.

For humane reasons and to prevent escape, poisoning traps with strychnine is recommended to quickly kill captured wild dogs. A properly poisoned trap becomes a lethal device rather than a holding device.

A mixture of dog faeces and urine is a popular lure used by trappers. Attractiveness of lures varies with seasons and locations. No single lure has yet been found that is consistently attractive to all wild dogs and repeated use of one lure can lead to aversion amongst remaining dogs.

Traps are best placed in areas of high wild dog activity (known as leads). Here the wild dog is most likely to find and investigate the decoy/odour.

A wild dog scent post (an area where urine or faeces have been deposited) can be found by walking with a domestic dog on a lead along a known pad. Trap placement in relation to the scent post can be optimised by observing the domestic dog's behaviour as it approaches. Factors to consider are:

- where on the bush it smells
- placement of feet while urinating/defecating/sniffing
- how it approaches and where it scratches in relation to the pad and scent post.

Padded, laminated or offset foot-hold traps, in a well tuned and functioning state are recommended.

Shooting

Shooting is an opportunistic method, mostly used for control of small populations or individual problem animals.

Livestock guardian animals

Livestock guardian animals have been used to protect livestock from predators in Europe, Asia and America. Some producers in Queensland have decreased predation on sheep and goats using this method. The use of trapping and poisoning in conjunction with guardian animals must be well planned and managed to ensure guardian animal safety.

Baiting

Poison baits are the most economic, efficient and effective method of controlling wild dogs, especially in inaccessible or extensive areas. Baits can be laid quickly by hand, from vehicles and from aircraft.

Currently there are three poisons legally available for wild dog control. These are 1080 (sodium fluoroacetate), strychnine and para amino propiophenone (PAPP).

Subject to restrictions, 1080 baits, either manufactured or prepared from fresh meat can only be obtained from authorised persons. PAPP can only be supplied as a manufactured bait. A permit from the Queensland Department of Health is required for land owners to purchase strychnine. Strychnine can be used both in baits and on traps. The use of both 1080 and strychnine require adherence to the associated conditions of supply. The use of poison baits will control some but not all wild dogs. Baits should be used in conjunction with all other control tools and not be relied on as a total control method.

Meat baits are attractive both to wild dogs and a range of non-target species. When using meat baits, they can be strategically positioned as wild dogs' keen sense of smell enables them to find baits intentionally buried in sand or otherwise hidden under bushes or in hollow logs. Meat baits may also be tied to prevent their loss to non-target species.

These meat bait placement techniques help to:

- reduce the risk of poisoning non-target species
- increase wild dog contact, hence receiving a lethal dose
- minimise bait removal by non-target scavengers
- deter ants (ant-covered baits are believed to be less attractive to wild dogs).

Heavy rain within two weeks of baiting can leach 1080 from baits, but baits may still remain toxic for a considerable time.

Ejectors are a new tool in the delivery of 1080. They require a wild dog or fox to pull the ejector head to be activated. This is done by attaching a lure reward to the ejector head. A capsule of lethal dose 1080 is burst into the wild dog's or the foxes mouth. Ejectors are fixed in one stop and are only able to be activated by foxes and dogs.

More information

For more information contact your local government or visit biosecurity.qld.gov.au.

Wild dog exclusion fence

Fact sheets are available from biosecurity.qld.gov.au. The control methods recommended should be used in accordance with the restrictions (federal and state legislation, and local government laws) directly or indirectly related to each control method. These restrictions may prevent the use of one or more of the methods referred to, depending on individual circumstances. While every care is taken to ensure the accuracy of this information, the department does not invite reliance upon it, nor accept responsibility for any loss or damage caused by actions based on it.

03/23