



Environmental Offset Strategy

Yathroo Wind Farm

DRAFT

June 2026

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Prepared by
Umwelt (Australia) Pty Limited

On behalf of
Neoen Australia

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Acknowledgement of Country

Umwelt acknowledges the Traditional Owners of Country throughout Australia and their continuing values, culture and connection to the land, waters and sky.

We pay our respects to Elders past and present.

The below image is from the artwork *Yapung Maryiyang* (Pathway Forward) by Saretta Fielding.



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Executive Summary

This Environmental Offset Strategy responds to the Department of Climate Change, Energy, Environment and Water's Request for Information under the *Environment Protection and Biodiversity Conservation Act 1999* in relation to the Neoen Australia Yathroo Wind Farm project (the Project). The Offset Strategy has also been prepared to support a Native Vegetation Clearing Permit Application under Part V of the *Environmental Protection Act 1986* (WA).

A suitable offset site has been identified following a targeted assessment of four potential offset areas. The assessment considered the capacity of each area to regenerate habitat for the impacted environmental values. The selected offset site provides a high level of confidence in achieving successful revegetation and long-term habitat outcomes. Additional offsets in the form of artificial nest boxes are also proposed in suitable areas.

The proposed offset effectively counterbalances the residual impacts of the Project on native vegetation and Matters of National Environmental Significance; Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo foraging and potential breeding habitat. The proposed revegetation area exceeds 100% of the calculated offset required by Commonwealth and State regulators, and artificial nest boxes are proposed at a ratio of 3:1 for each impacted potential breeding hollow. Together, these measures demonstrate compliance with Commonwealth and State environmental offset policies and guidelines. In addition to fully offsetting the total area of impact, the proposed offset delivers the following additional environmental net gain:

- The revegetation offset site will be implemented as a single, large, contiguous area of native vegetation providing the relevant habitat values, rather than multiple small and fragmented offset areas reflecting the dispersed nature of the proposed Project clearing.
- The revegetation offset site is adjacent to two areas of good-quality native remnant vegetation that are currently disconnected. By linking these areas, the offset would improve landscape connectivity and enhance ecological integrity across the surrounding area.
- The offset focuses on the regeneration and protection of land currently used for cropping, delivering substantial habitat quality gains rather than relying solely on the protection of existing native vegetation.

As the Project progresses through detailed design, the total area of vegetation clearing may reduce from the currently assessed maximum area of 23.06 ha, which comprises 10.28 ha of remnant native vegetation, 5.45 ha of isolated remnant native trees and shrubs, 5.05 ha of planted native vegetation and 2.28 ha of planted non-native trees and shrubs. Of this vegetation, 14.92 ha comprise Low to Moderate-High quality foraging habitat for black cockatoos. The proposed offset of 19.34 ha of revegetation exceeds the maximum offset requirements associated with this clearing, providing confidence that the offset is suitable, robust and capable of delivering enduring environmental outcomes.

Neoen has reached in-principle agreement with the landholder to secure the required offset site for conservation purposes. The offset site will be protected in perpetuity through the establishment of a suitable covenant, ensuring long-term conservation management and protection.

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1.0 Introduction

1.1 Project Overview

The Yathroo Wind Farm (the Project) is located within the Shire of Dandaragan and is within the Central Coast subregion of the Wheatbelt. It is approximately 5 km south of the town of Dandaragan, 6.3 km north of Regans Ford, and 120 km north of Perth, WA (**Figure 1.1**). The Project will involve the construction and operation of up to 65 wind turbines with a maximum production capacity of up to 500 MW, a Battery Energy Storage System (BESS) with a capacity of 400 MW/3,200 MWh, and associated infrastructure. The Project Site is predominantly cleared land used for agriculture and livestock grazing, with patches of remnant and regrowth woodland.

The Project proposes clearing of native vegetation that comprises habitat for two Threatened fauna species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Biodiversity Conservation Act 2016* (BC Act):

- Carnaby's Cockatoo (*Zanda latirostris*) - Endangered
- Forest Red-tailed Black-cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable.

Following application of the mitigation hierarchy, some residual impacts remain which Neoen proposes to counterbalance through the implementation of an environmental offset.

The Project was referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and determined a 'controlled action' on 10 February 2026. The DCCEEW issued a RFI for the controlled action requiring preparation of an offset package for residual impacts to Matters of National Environmental Significance (MNES) under the EPBC Act.

The Project was also referred under Part IV of the *Environmental Protection Act 1986* (WA) (EP Act) to the WA Environmental Protection Authority (EPA), with a 'not assess' decision received on 24 December 2025. Native vegetation clearing will be regulated via a Native Vegetation Clearing Permit (NVCP) under Part V of the EP Act.

It is anticipated that the Department of Water and Environmental Regulation (DWER) will require identification of environmental offsets as part of the NVCP application to counterbalance significant residual impacts of the proposed clearing of native vegetation and habitat for black cockatoos.

This Offset Strategy is intended to provide certainty to DCCEEW and DWER that residual impacts to native vegetation and threatened species habitat will be counterbalanced through a suitable environmental offset.

1.2 Purpose and Aims

The purpose of this Offset Strategy is to summarise the requirement for an environmental offset under the EPBC Act and Part V of the EP Act and describe how Neoen proposes to address this requirement. In particular, this Offset Strategy:

- summarises the regulatory frameworks under which an environmental offset is required

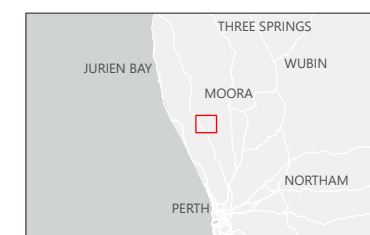
- details the application of the mitigation hierarchy and total impact quanta for each environmental value with significant residual impacts associated with the Project
- identifies the offset area being considered and summarises its key components
- provides certainty to DCCEEW and DWER as to how the impacted matters will be counterbalanced through the proposed offset.

Legend

-  Project Area
-  Potential Offset Sites
-  Disturbance Footprint
-  Road
-  Waterbody

DBCA - Legislated Lands and Waters

-  Nature Reserve



Response	Count
Yes	3
No	2

Scale 1:120,000 at A4
GDA2020 MGA Zone 50



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2.0 Regulatory Frameworks for Offsets

Offsets are measures that compensate for the residual significant impacts of a project on the environment, after avoidance and mitigation measures are taken. This section summarises the regulatory frameworks for environmental offsets under the Commonwealth EPBC Act and the WA EP Act.

2.1 Commonwealth

The EPBC Act Environmental Offsets Policy (EPBC Offset Policy) (Commonwealth of Australia, 2012) outlines the approach for the use of environmental offsets under the EPBC Act. The Commonwealth Offset Assessment Guide (DCCEE, 2022) and corresponding guidance are used to quantify impacts and offset requirements.

Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act. The suitability of a proposed offset is considered as part of the decision to approve or not approve a proposed action.

Offsets implemented under the EPBC Act Environmental Offsets Policy are required to consider several key principles, which are addressed in **Section 5.0**.

2.2 Western Australia

The Environmental Offsets Policy (Government of Western Australia, 2011) and Environmental Offsets Guidelines (Government of Western Australia, 2014b) provide the overarching framework for offset design, quantification, and implementation in Western Australia. Offsets are required to address significant residual impacts to protected State matters and may be implemented under the *Biodiversity Conservation Act 2016* (WA) (BC Act), or Part IV or V of the EP Act. Depending on the legislation under which the offsets are implemented, the regulating agency may be EPA, DWER or the Department of Biodiversity, Conservation and Attractions (DBCA). The Environmental Offsets Calculator (DWER, 2021) is utilised to calculate the quantum of impact and associated quantum of offset required to counterbalance the impact that requires an offset under the BC Act or EP Act.

The Clearing of Native Vegetation Offsets Procedure (Government of Western Australia, 2014a) also provides guidance on preparation of offset strategies to native vegetation clearing permit applicants, based on the WA Environmental Offsets Policy and Guidelines.

Offsets implemented under the WA Environmental Offsets Policy are required to consider several key principles, which are addressed in **Section 5.0**.

3.0 Residual Impacts from the Project

This section summarises the significant residual impacts to environmental values from the Project.

3.1 Mitigation Hierarchy

Neoen has undertaken an iterative design review process to apply avoidance and mitigation principles to reduce potential impacts to MNES as far as practicable. The following measures have been applied through the Project design to minimise impacts to terrestrial fauna and native vegetation:

- Early identification and avoidance of some key blocks of native remnant vegetation (300 ha) presumed to be in good condition or better.
- Avoiding clearing any Rank 1 or Rank 2 black cockatoo nesting trees.
- Avoiding areas with higher foraging value for black cockatoos to reduce likelihood of turbine collision.
- Avoiding clearing of native vegetation in Very Good condition or better.
- Avoiding known black cockatoo roosting sites, with turbines set back 4 km from the main observed roosting site.
- Minimising clearing of native vegetation mapped as 'Good'. The Project sought to avoid clearing native vegetation in 'Good' condition, however 'Good' condition vegetation has been found in many of the road reserves that infrastructure will need to traverse. At these locations, clearing widths have been minimised and infrastructure will seek to cross in a perpendicular fashion where practicable.
- Adopting a minimum blade tip height above the typical flight height for black cockatoos.
- Setting turbines back from Lake Guraga by 5 km (outside the Project Area) and wetlands in the eastern part of the Project Area by 3.5 km as an initial setback prior to completion of survey in consideration of potential migratory bird presence.
- Locating 97% of Project infrastructure on cleared agricultural land, minimising native vegetation clearing and direct impacts to black cockatoo habitat.
- Avoiding all TEC in Good condition or better. The access route from Brand Highway to the proposed BESS site was relocated from its original planned location within a patch of TEC in Good condition, to a location comprising existing cleared tracks and Degraded vegetation.
- Avoiding larger areas of intact native vegetation, with proposed clearing mostly comprised of the edges of patches of degraded or completely degraded vegetation.
- Avoiding the area where *Grevillea curviloba* was recorded
- Minimising the number of creek crossings, and utilising existing creek crossings to minimise clearing.
- Development and commitment to implement a Project Construction Environmental Management Plan (CEMP), Bushfire Management Plan and Bird and Bat Adaptive Management Plan (BBAMP).

Further avoidance of native vegetation is proposed as part of detailed design, and as such the total area of native vegetation clearing is likely to be less than 20.78 ha.

3.2 Overview of Significant Residual Impacts

Following application of the mitigation hierarchy as outlined above, the Project proposes clearing of up to 23.06 ha of vegetation comprising:

- 10.28 ha of remnant native vegetation
- 5.45 ha of isolated remnant native trees and shrubs
- 5.05 ha of planted native vegetation
- 2.28 ha of planted non-native trees and shrubs.

The majority of native vegetation proposed to be cleared (13.5 ha/ 82.82%) is in Completely Degraded and Degraded condition and comprises small, isolated strips or patches of vegetation surrounded by cleared land or agriculture. No more than 2.23 ha (14.17 %) of native vegetation proposed to be cleared are in Good condition.

Of the 23.06 ha of vegetation to be cleared, up to 14.92 ha provide Low quality (HQS 2) to Moderate/High quality (HQS 7) black cockatoo foraging habitat.

Five Rank 3 potential black cockatoo nest trees, with suitable hollow entrances but no evidence of nesting, will be impacted by the Project. Seven Rank 4 trees and 100 Rank 5 trees will also be cleared (see **Table 3.1**).

Significant residual impacts on environmental values are summarised in **Table 3.1**.

Table 3.1 Residual Impacts of the Project on Environmental Values

Environmental Value	Habitat Quality (1-10; (Bamford, 2020))	Native Vegetation Residual Impact (ha)	Planted Vegetation Residual Impact (ha)	Maximum Residual Impact (ha)
Carnaby's Cockatoo (<i>Zanda latirostris</i>) (Endangered) foraging habitat	Negligible to Low (1)	2.99	3.74	6.73
	Low (2)	3.55	0.78	4.33
	Low to Moderate (5)	5.67	1.59	7.26
	Moderate (6)	2.45	0.23	2.68
	Moderate to High (7)	0.65	0	0.65
Total		15.31	6.33	21.64
Forest red-tailed black cockatoo (<i>Calyptrorhynchus banksii naso</i>) (Vulnerable) foraging habitat	Negligible to Low (1)	0.19	0.02	0.21
	Low (2)	2.39	0.37	2.76
	Low to Moderate (5)	3	0.09	3.09
	Moderate (4)	3.04	0.23	3.27
	Moderate to High (7)	0.03	0	0.03
Total		8.65	0.71	9.36
Potential breeding trees for black cockatoos (Rank 5^, no nesting hollows, broken branches or cavities)				100
Potential breeding trees for black cockatoos (Rank 4^, large hollows or broken branches; not preferred orientation)				7
Potential breeding trees for black cockatoos (Rank 3^, suitable hollow entrances)				5
Remnant native vegetation				15.73

^ Bamford (2023)

3.3 Impact Quantum

Following the implementation of avoidance and mitigation measures, the Project will result in the removal of no more than 21.64 ha of vegetation (15.31 ha of remnant native vegetation and 6.33 ha of planted vegetation) that comprises foraging habitat for black-cockatoo species.

Both the Commonwealth and WA Environmental Offsets Calculators were used to provide adjusted impact quanta, based on the habitat quality scores of the associated residual impact areas. The impact quanta for each of these values is provided in the following sections.

The impact areas were surveyed by Umwelt (2025a, 2025b) to support the Project environmental impact assessment and referrals. Vegetation quality was described using the vegetation condition scale presented by EPA (EPA, 2016) for the South West and Interzone Botanical Provinces (Umwelt, 2025a). Assessment of black cockatoo foraging habitat quality was undertaken using the Bamford (2020) system (**Appendix A**) (Umwelt, 2025b). Further description of this method is provided in **Section 4.2.1.1**.

Assessment of black cockatoo potential breeding trees was undertaken using a widely adopted method by Bamford (2023) of assessing tree hollow entrances from the ground. Further inspection of the Rank 3 trees will be required to determine the number of suitable hollow entrances, to inform the final offset requirement for artificial nest boxes.

3.3.1 Commonwealth Offset Calculator Impact Quantum

Table 3.3 presents the adjusted impact quantum and the required area to achieve a 100% direct offset for black cockatoo foraging habitat, determined using the EPBC Act Environmental Offsets Calculator. Calculator input assumptions are provided in **Section 4.5.1**.

As discussed during a meeting with DCCEEW on 3 June 2026, black cockatoo foraging habitat scored as 'Negligible to Low' quality has not been included in impact quantum calculations contributing to a required offset, as reflected in **Table 3.2**. Vegetation scored as 'Negligible to Low' using the Bamford (2020) system is assigned a value of 1 for Site Condition and a score of 0 for both Site Context and Species Density (see **Section 4.2.1.1** and **Appendix A** for further explanation of foraging habitat quality scoring).

For the Project, a Site Condition score of '1' was generally applied to paddock areas that may or may not have had any evidence of palatable plant taxa present but that at least had the potential to support one or more of the following:

- lower-preference plants
- palatable plants at very low densities
- forage sources that are unreliable or transient in their availability or accessibility
- plants that have poor condition or quality.

In a practical sense, most of these areas offer little to no value to black cockatoos almost all of the time and are not expected to support black cockatoo foraging but they have some minor potential, on occasion, to provide a food resource if suitable conditions occur. Typical examples of these at the Project include palatable planted annual crops (such as canola, *Brassica napus*), palatable weed species (such as Afghan or Camel Melon, *Citrullus lanatus*, and Stork's-bill species, *Erodium* spp.), and eucalypts that are rarely foraged (e.g. nuts and blossoms of native wandoos, *Eucalyptus*

accedens and *E. wandoo*, or exotic Blue Gum, *Eucalyptus globulus*). Loss or disruption to areas with a Site Condition score (and, hence, overall FHQS) of '1' are not expected to have any material impact to black cockatoo foraging and, therefore, black cockatoo ecology. The implication is that these areas have practically no conservation value in relation to foraging for black cockatoos.

Table 3.2 EPBC Act Offset Calculator Impact Quantum and Required Offset Area: Black-Cockatoo Species Foraging Habitat

Species	Habitat Quality Score	Residual Impact Area (ha)	Impact Quantum (adjusted ha)	Required Offset Area (ha)
Carnaby's Black-Cockatoo	Negligible to Low (1)	6.73	0.67	N/A
	Low (2)	4.33	0.87	2.15
	Low to Moderate (5)	7.26	3.63	8.99
	Moderate (6)	2.68	1.61	3.99
	Moderate to High (7)	0.65	0.46	0.99
	Total	21.64	7.24	16.12
Forest Red-tailed Black-Cockatoo	Negligible to Low (1)	0.21	0.02	N/A
	Low (2)	2.76	0.55	1.33
	Low to Moderate (5)	3.09	1.55	3.72
	Moderate (6)	3.27	1.96	4.73
	Moderate to High (7)	0.03	0.02	0.05
	Total	9.36	4.10	9.90

3.3.2 WA Environmental Offsets Calculator Impact Quantum

The EP Act Part V NVCP application seeks approval to clear up to 15.73 ha of remnant native vegetation within a purpose permit boundary, however the actual area of clearing is likely to reduce as the Project proceeds through detailed design. Non-native vegetation and planted native vegetation (for purposes other than for conservation) is excluded from the NVCP application, as it does not meet the definition of native vegetation under the EP Act. Following detailed design, Neoen will potentially apply for an amendment to the NVCP area and would finalise the offset requirement as part of the amendment process.

Table 3.3 presents the adjusted impact quantum and the required area to achieve a 100% direct offset for black cockatoo foraging habitat and native vegetation, determined using the WA Environmental Offsets Calculator. Calculator input assumptions are provided in **Section 4.5.1**.

Table 3.3 WA Offset Calculator Impact Quantum and Required Offset Area

Species	Habitat Quality Score	Residual Impact Area (ha)	Impact Quantum (adjusted ha)	Required Offset Area (ha)
Carnaby's Black-Cockatoo Foraging Habitat	Negligible to Low (1)	2.99	0.30	0.58
	Low (2)	3.55	0.71	1.37
	Low to Moderate (5)	5.67	2.84	5.48
	Moderate (6)	2.45	1.47	2.84
	Moderate to High (7)	0.65	0.46	0.70
	Total	15.31	5.78	10.97
Forest Red-tailed Black-Cockatoo Foraging Habitat	Negligible to Low (1)	0.19	0.02	0.04
	Low (2)	2.39	0.48	0.88
	Low to Moderate (5)	3	1.50	2.77
	Moderate (6)	3.04	1.82	3.37
	Moderate to High (7)	0.03	0.02	0.04

Species	Habitat Quality Score	Residual Impact Area (ha)	Impact Quantum (adjusted ha)	Required Offset Area (ha)
	Total	8.65	3.84	7.10
Native Vegetation	Completely Degraded (1)	5.45	1.36	1.2
	Degraded (2)	8.05	2.9	3.55
	Good (5)	2.23	1.12	2.46
	Total	15.73	5.38	7.21

4.0 Proposed Offset

4.1 Overview of Offset Strategy

The proposed offset involves Neoen undertaking the following fundamental components of this Offset Strategy to counterbalance the residual impacts to two fauna species and remnant native vegetation:

- Identifying suitable land to counterbalance the impact of clearing native vegetation and black cockatoo foraging habitat.
- Undertaking revegetation and management of the land.
- Protecting this land for the purposes of conservation.
- Identifying suitable locations to install artificial cockatoo nest boxes to offset the impact of clearing trees with potential nest hollows.

4.2 Revegetation Offset Site Assessment

Four potential revegetation offset sites were assessed to identify the most suitable site to counterbalance the Project's maximum impact area.

A desktop review of aerial imagery and regional soil and historical vegetation type mapping was undertaken in and around the Project Area. Several sites were identified within appropriate soil and vegetation types, and with connectivity with adjacent to remnant native vegetation, that could provide suitable offset for the Project residual impacts to cockatoo foraging habitat and native vegetation. Of the initial sites, Neoen identified four potential sites to further assess for suitability as an offset (**Figure 4.1**).

In assessing site suitability, the following factors were considered:

- presence of existing values required to be offset
- potential for averted loss and quality gains to produce an overall net benefit to the impacted values
- connectivity with similar values in the broader landscape and their ability to act as an ecological linkage between areas of suitable habitat
- feasibility and risk profile of achieving the forecasted averted loss and quality gains
- landowner preferences and requirements regarding different parcels of land.

The methodology for assessing suitability of potential sites included:

- Desktop review of flora, vegetation and fauna habitat survey reports and data for the Project impact areas.
- Desktop review of public datasets and flora, vegetation and fauna survey reports, where available, for the potential offset sites.
- A site assessment to assess the suitability of offset sites and the potential to have successful revegetation.

- Advice on offset site suitability and management provided by Umwelt Principal Ecologists and a Consultant from Tranen Revegetation Systems.

Information was used to determine the most suitable option and create inputs for the Commonwealth and WA Environmental Offsets Calculators. Details of the most suitable option are presented in **Section 4.4**.

4.2.1 Site Visit

A site visit was undertaken at four of the most suitable potential offset sites to ground-truth information from previous survey reports and desktop information.

Only site 6 is contained within the Yathroo Wind Farm Project Area and was subject to detailed vegetation and flora survey, and fauna survey (Umwelt, 2025a, 2025b). For all potential offset sites, desktop databases and aerial photography were used prior to the site assessment to identify bioregion, soil types, regional vegetation types, topography and connectivity to surrounding habitat.

Observations were also recorded of the local context, current threats and possible opportunities for the proposed offset sites.

4.2.1.1 Cockatoo Foraging Habitat Values

The assessment of black cockatoo foraging habitat has been undertaken using the Bamford (2020) foraging habitat quality scoring system (**Appendix A**). The Bamford method was specifically developed for the three threatened black-cockatoo species occurring in Western Australia (Carnaby's, Baudin's and Forest Red-tailed Black-Cockatoo) and is widely applied in environmental impact assessment and referrals to the Commonwealth and State regulators.

The Bamford method was designed to align with the Commonwealth Offset Assessment Guide, while providing a level of ecological specificity and practicality necessary for application in Western Australian environments. It incorporates species-specific ecological requirements and foraging ecology, including the relative importance of key food species (e.g. Proteaceae and eucalypts), and provides a structured, field-applicable framework for assessing habitat value.

A key strength of the Bamford scoring system is its explicit consideration of vegetation composition, structure and condition, including factors such as the density of palatable food species, canopy cover, maturity of vegetation, and overall vegetation health ('Site Condition'). These attributes directly influence the availability and reliability of foraging resources for black cockatoos and provide an ecologically meaningful measure of habitat quality.

In addition, the method incorporates 'Site Context' and 'Species Density' (akin to species stocking rate) through separate scoring components, recognising the high mobility of black cockatoos and the importance of habitat connectivity and regional habitat availability. The sum of the three scoring components provides an overall Foraging Habitat Quality Score.

While other methods of foraging habitat assessment have been suggested (and generally follow similar principles), the Bamford (2020) system allows for more flexibility and much more nuance when assigning scores to potential foraging sites. This includes the ability to assess habitat at finer scales than other tools.

Importantly, the Bamford scoring system has been developed and consistently applied in consultation with, and accepted by, the DCCEEW, including its use in supporting EPBC Act referrals

and assessments in Western Australia. It is therefore considered an appropriate and defensible method for quantifying impacts to black cockatoo foraging habitat and informing offset requirements for this Strategy.

4.2.1.2 Specialist Revegetation Advice

Tranen Revegetation Systems (Tranen) is a revegetation consultancy with experience in more than 1,000 projects primarily around the Swan Coastal Plain, Southwest, Midwest and Wheatbelt regions of WA. Tranen completed initial mapping of actual and predicted vegetation types within the potential offset areas and identified potential risks that may threaten or limit the success of a revegetation program.

The scope of the site assessment also included the predicted improvement in vegetation condition for all four areas, the implementation budget, and an overview of the revegetation methodology. A report was prepared to inform offset site selection (Tranen Revegetation Systems, 2026).

4.3 Artificial Breeding Habitat Offset

The proposed offset includes the installation of artificial hollows to provide an immediate benefit for black cockatoo breeding habitat. Artificial hollows can support the conservation of threatened black cockatoo species, including Carnaby's Cockatoo, by increasing nesting opportunities in areas where natural hollows are limited (DBCA, 2023).

Artificial hollows will be installed on large eucalypts with the objective of increasing the availability of potential breeding habitat in the local area. To increase the chances of the artificial hollows being used by black cockatoos, consideration will be given to the following when determining suitable placement:

- regional utilisation of habitat by black cockatoos
- proximity to known breeding areas
- proximity to suitable foraging habitat and/or areas with foraging evidence
- increasing the availability of breeding habitat in areas that are lacking suitable hollows
- accessibility for monitoring and maintenance
- land security and protection from public access
- suitably designing and positioning hollows.

Preliminary advice was sought from black cockatoo specialist, Tony Kirky, on potentially suitable locations for artificial hollows in the local area (within approximately 12-20 km of the proposed offset site). The outcomes of this discussion were that:

- Nearby known black cockatoo breeding sites are not likely to be suitable for artificial hollows due to either having numerous hollows already that aren't being utilised or being on private land that is potentially inaccessible.
- Generally, any location with large trees is suitable, particularly in proximity to known foraging habitat.

- The remnant vegetation between the two areas of proposed revegetation at offset site 2 would be suitable for artificial hollows due to being within an area with foraging evidence, proximity to Banksia woodland foraging to the east, easy access for monitoring and maintenance, and no public access.

Confirmed numbers and locations for artificial cockatoo hollows will be detailed in the Offset Management Plan.

FIGURE 4.1

Offset Sites Assessed for Suitability

Legend

-  Project Area
-  Potential Offset Sites
-  Road
-  Railway
-  Watercourse
-  Waterbody

Cockatoo Breeding and Roosting Areas

-  Black Cockatoo Breeding Sites
-  Black Cockatoo Roosting Sites
-  Carnaby Cockatoo Confirmed Breeding Areas

DBCA - Legislated Lands and Waters

-  National Park
-  Nature Reserve
-  Conservation Park
-  Section 5(1)(g) Reserve
-  Section 5(1)(h) Reserve
-  State Forest



0 2 4
Kilometres

Scale 1:320,000 at A4
GDA2020 MGA Zone 50



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4.4 Proposed Offset

4.4.1 Revegetation Offset Site Description and Values

The four potential offset sites are a mix of valley floor, mid slope, dune and ridgeline systems. Vegetation condition ranges from completely degraded farm paddocks, degraded parkland cleared woodlands and remnant vegetation in good to very good condition. The vegetation types are a mosaic of marri (*Corymbia calophylla*) woodlands, marri / York gum (*Eucalyptus loxophleba*) woodlands and two banksia woodlands (*Banksia attenuata* / *Banksia menziesii* woodlands and *Banksia prionotes* / *Eucalyptus tottiana* woodlands).

Sites lower in the landscape (site 1, 5, 6) are at risk of salinity and waterlogging, and site 5 has a greater presence of weeds and evidence of potential Phytophthora disease. These sites are also smaller in size.

Based on the site suitability assessment, the most suitable offset option is to revegetate areas of cleared land within site 2 for the following reasons:

- Appropriate soil type for revegetation of Marri woodland.
- Connectivity to adjacent remnant vegetation that provides suitable foraging habitat for black cockatoos.
- High in the landscape with no evidence of salinity or water logging.
- No evidence of disease observed.

The total area of land available for offset at site 2 is approximately 30 ha of completely degraded (cleared) paddock with approximately 10 isolated remnant trees, suitable for revegetation with Marri woodland and Banksia woodland.

Further details of the offset site and comparison with impact areas are provided in **Table 4.1** and locations illustrated in **Figure 4.2**.

Table 4.1 Comparison of Impact Area and Offset Site

Attributes	Impact Area	Offset Area
Tenure	NA	In-principle agreement with landowner to secure land for offset.
Security	NA	Restrictive covenant or conservation covenant
IBRA Region	Swan Coastal Plain (SWA) Geraldton Sandplains (GS)	Swan Coastal Plain (SWA)
IBRA Sub-region	Dandaragan Plateau (SWA01) Perth (SWA02) Lesueur Sandplain (GS2)	Dandaragan Plateau (SWA01)
Area (ha)	The impact area includes 23.06 ha of vegetation comprising: • 10.28 ha of remnant native vegetation • 5.45 ha of isolated remnant native trees and shrubs • 5.05 ha of planted native vegetation • 2.28 ha of planted non-native trees and shrubs.	The total area available for the offset is approximately 30 ha of completely degraded land (cleared cropland with isolated paddock trees).
Vegetation Type	• Four Vegetation System Associations (VSA) are mapped within the impacted native vegetation areas: ◦ Bassendean 125 (Salt lake, lagoon, clay pan) – 0.62 ha ◦ Bassendean 1030 (Low woodland; <i>Banksia attenuata</i> & <i>B. menziesii</i>) – 2.42 ha ◦ Bassendean 1031 (Mosaic: shrublands; hakea scrub-health / Shrublands; dryandra heath) – 5.11 ha ◦ Dandaragan 999 (Medium woodland; marri) – 7.75 ha. • Dandaragan 999 has 11.26% pre-European extent remaining statewide; the remaining three VSAs have more than 30% pre-European extent remaining statewide. • Umwelt mapped six native vegetation types (VTs) across the impact areas within the Project Area (VT1, VT2, VT3, VT4, VT6 and Isolated Trees (IT)). The most prevalent vegetation was isolated remnant trees in paddocks and road verges (IT), followed <i>Corymbia calophylla</i> (Marri) woodland (VT1) and	• One VSA: Dandaragan 999 (Medium woodland; marri) • Located in the mid to upper slopes. Red sand soils are suitable for Marri and Banksia. • Approximately 30 ha of cleared paddock available, which is suitable for revegetation with Marri, York Gum. • Approximately 10 remnant isolated paddock trees (Marri) remain. • The site is outside the Umwelt flora and vegetation survey area, however is completed cleared with isolated trees.

Attributes	Impact Area	Offset Area
	woodland of <i>Banksia prionotes</i> with <i>Eucalyptus tottiana</i> (VT2); and lesser areas of <i>Eucalyptus tottiana</i> (Blackbutt) and <i>Banksia</i> spp. woodland (VT3), <i>E. rudis</i> (Flooded Gum) shrubland (VT4) and <i>E. loxophleba</i> (York Gum) woodland.	
Dominant Species	<i>C. calophylla</i> , <i>E. rudis</i> subsp. <i>rudis</i> , <i>E. tottiana</i> , <i>E. loxophleba</i> subsp. <i>loxophleba</i> , <i>Banksia attenuata</i> , <i>B. prionotes</i> , <i>B. menziesii</i>	Isolated paddock trees of <i>C. calophylla</i> .
Current Condition	- Majority of vegetation to be cleared is in Completely Degraded and Degraded condition. - Up to 2.23 ha of vegetation in Good condition. These areas were mapped by Umwelt as <i>Corymbia calophylla</i> (Marri) woodland (VT1), <i>Banksia prionotes</i> with <i>Eucalyptus tottiana</i> (VT2) and <i>Eucalyptus tottiana</i> (Blackbutt) and <i>Banksia</i> spp. woodland (VT3).	Completely Degraded (cleared with isolated paddock trees).
Fauna Habitat	- Predominantly patches of degraded vegetation on the edges of remnants and along roads, suitable as foraging habitat for black cockatoos (see Table 3.2). 100 Rank 5 and 7 Rank 4 potential black cockatoo breeding trees. - Five Rank 3 potential black cockatoo breeding trees. <i>Banksia</i> woodland/heath within the Brand Highway road reserve, suitable as foraging habitat for black cockatoos.	- Up to 30 ha of cleared paddock suitable for revegetation. - Majority is suitable for revegetation of Marri, Jarrah and York Gum woodland as high value black-cockatoo forage and potential future breeding habitat. - A small portion is suitable for revegetation of <i>Banksia</i> woodland as high value black cockatoo foraging habitat. - Approximately 10 remnant isolated paddock trees will be retained in the offset area.
Ecological Communities	0.11 ha of degraded <i>Banksia</i> woodlands of the Swan Coastal Plain vegetation community (EPBC Act Threatened Ecological Community (TEC)/DBCA Priority Ecological Community (PEC)) are within the Development Footprint. All occurrences of the TEC/PEC in Good or better condition have been avoided. Impacts to 0.11 ha of degraded TEC is not considered to be a significant residual impact.	None, the vegetation is Completely Degraded.

Attributes	Impact Area	Offset Area
Additional Values		• Restoration of cleared areas providing greater potential for habitat quality gain. • Adjacent to area of high-quality remnant vegetation to the north, where evidence of black cockatoo foraging was recorded. The proposed revegetation will provide a connection in the landscape between the remnant to the north and another remnant corridor to the east, where there is currently a gap. This additional connectivity is likely to also benefit ground dwelling and arboreal fauna and contribute to the longevity of the currently isolated remnant. • Nearby water sources include a dam within 1.2 km and a chain of lakes including Lake Yangy, 3 km from the proposed offset site.
Current Threats		• Currently agricultural land use that provides little habitat for black cockatoos. • Ongoing habitat loss without offset is a risk, as evidenced by reduction of isolated paddock trees in the last 10 years. Cropping also suppresses potential for self-regeneration of vegetation. • Potential predation of fauna by feral cats and foxes.
Opportunities		• Inspection of remnant paddock trees for black cockatoo breeding habitat potential. • Revegetation of cleared areas to provide higher quality habitat for black cockatoos. • Establish linkage of the site to adjacent remnant vegetation to increase landscape connectivity.

4.4.2 Artificial Breeding Habitat Offset

The Rank 3 potential black cockatoo breeding trees proposed for clearing have been identified as having hollow entrances that appear suitable for black cockatoos based on ground-based observations. Inspection of the hollow entrances is required using a pole camera to confirm whether the entrances progress into hollows with characteristics suitable for black cockatoo breeding, and how many hollows rather than entrances are in each tree.

Artificial hollows of appropriate design for black cockatoos will be placed in large trees in an appropriate area close to known foraging habitat, and easily accessible for monitoring and maintenance. The remnant vegetation directly adjacent to the proposed offset site, in between the two areas of revegetation, is suitable for placement of artificial hollows. Proposed locations for artificial hollows for black cockatoos will be detailed in the Offset Management Plan.

4.5 Offset Calculations

The offset value offered by revegetation of cleared land within site 2 has been calculated using the Commonwealth and WA Environmental Offset Calculators and Guidelines. All calculations for the required offset are based on the strategy to revegetate and manage cleared paddock and protect the land through a conservation covenant. This section summarises the assumptions used in offset calculations and the outputs that have guided the magnitude of the proposed offset.

4.5.1 Offset Attribute Assumptions

Table 4.2 outlines the inputs applied in the Commonwealth Offset Calculator and the rationale for each input. These values were derived with consideration of the Offset Assessment Guide (DCCEEW, 2022) and further informed by discussions with DCCEEW on 3 June 2026.

Table 4.2 Commonwealth Offset Calculator Assumptions for Black Cockatoo Foraging Habitat

Attribute	Input Value	Rationale
Time over which loss is averted (duration of offset)	20 years	Maximum calculator value.
Time until ecological benefit	17 years	2 years to commence revegetation. 15 years for self-sustaining community of Marri woodland vegetation to achieve foraging habitat benefits.
Start quality (0-10)*	2	Bamford foraging scale applied during site assessment. Cleared cropping land with very isolated paddock trees (<2%).
Future quality without offset (0-10)*	1 – CBC 0 – FRTBC	Site observations and historic aerial photos suggest that loss of the remaining paddock trees is likely in the next 20 years. Crops provide foraging value for Carnaby's Cockatoo in the absence of paddock trees.
Future quality with offset (1-10)*	6 – 7	Implementation of an adequate Offset Management Plan with monitoring and management is expected to result in a foraging

Attribute	Input Value	Rationale
		habitat quality of 6, which will offset impact areas with quality up to 6, comprising: - Quality score of 4 (20-40% Marri woodland or 20-40% Banksia woodland), site context score of 1, species density score of 1. A portion of the revegetation will aim to achieve a foraging HQS 7 to offset impact areas with value of 7, comprising: - Quality score of 5 (40-60% Marri woodland or >60% Banksia woodland), site context score of 1, species density score of 1.
Risk of loss without offset	80%	DCCEEW advised that they apply a 0% risk of loss without offset based on the assumption there would be no clearing of habitat without DCCEEW approval. However, aerial photography shows that remnant trees in the offset area have reduced by 50% in the past 10 years, and further removal of paddock trees in adjacent areas was observed whilst on site. Therefore, there is a high likelihood that in the next 20 years the remaining paddock trees in the offset area will also be removed.
Risk of loss with offset	5%	The risk of loss of the offset will be managed through secure tenure and ongoing management of revegetation (fencing, weed control, maintenance planting). It is considered that there is a future risk of loss as conservation covenant is not as secure as conservation reserve; this value is in line with the annual background rate in the Guidance for Deriving Risk of Loss (Department of the Environment and Energy, 2017).
Confidence in result (averted loss)	80%	There remains some potential failure due to unforeseen natural events (storm, fire).
Confidence in results (change in quality)	50-60%	Value assigned based on discussion with DCCEEW, indicating that the 70% confidence is the maximum value that is generally accepted. The calculations assume 60% confidence in achieving HQS 6, and 50% confidence in achieving HQS 7 through: - selection of appropriate site - An approved Offset Management Plan that includes: - revegetation by a specialist, with infill planting/seeding - management (fencing, weed control, monitoring). Low rainfall region and episodic weather conditions may affect results.
Percentage of impact offset target	100%	The proposed offset will counterbalance at least 100% of residual impacts

*Foraging habitat quality as per the Bamford (2020) scale

Table 4.3 outlines the inputs applied in the WA Offset Calculator for black cockatoo foraging habitat and native vegetation and the rationale for each input. These values were derived with consideration of the Environmental Offsets Guidelines (Government of Western Australia, 2014b), Clearing of Native Vegetation Offsets Procedure (Government of Western Australia, 2014a) and informed by discussions with DWER on 8 June 2026.

Table 4.3 WA Offset Calculator Assumptions for Black Cockatoo Foraging Habitat and Native Vegetation

Attribute	Input Value	Rationale
General Attributes		
Time over which loss is averted (duration of offset)	20 years	Maximum calculator value.
Time until ecological benefit	17 years	2 years to commence revegetation. 15 years for self-sustaining community of Marri woodland vegetation to achieve foraging habitat benefits.
Risk of loss without offset	80%	There is a likelihood that the site could be cleared in the next 20 years. Aerial photography shows that remnant trees in the offset area have reduced by 50% in the past 10 years.
Risk of loss with offset	5%	With the offset there is a low risk of future loss as the land will be placed under conservation covenant for perpetuity and managed under an Offset Management Plan.
Confidence in result	80%	Medium confidence in achieving offset results through: • selection of appropriate site • An approved Offset Management Plan that includes: ○ revegetation by a specialist, with infill planting/seeding ○ on-ground management (fencing, weed control) ○ monitoring. Residual potential for failure due to natural events (storm, fire). Confidence applies to the entire offset.
Percentage of impact offset target	100%	The proposed offset will counterbalance at least 100% of residual impacts
Black Cockatoo Foraging Habitat		
Start quality (0-10)*	2	Bamford foraging scale applied during site assessment. Cleared cropping land with very isolated paddock trees (<2%).
Future quality without offset (0-10)*	1 – CBC 0 – FRTBC	Site observations and historic aerial photos suggest that loss of the remaining paddock trees is likely in the next 20 years. Crops provide foraging value for Carnaby's Cockatoo in the absence of paddock trees.
Future quality with offset (1-10)*	6	Implementation of an adequate Offset Management Plan with monitoring and management is expected to result in a foraging habitat quality of at least 6 (Bamford, 2020) within 15 years comprising: • Vegetation quality score of 4 (20-40% Marri woodland or 20-40% Banksia woodland), site context score of 1, species density score of 1. DWER has advised they do not require like-for-like offset for quality, therefore for WA offset requirements a quality higher than 6 has not been included.
Native Vegetation		
Start quality (0-10)	0	The area is completely degraded with approximately 10 isolated paddock trees across 30 ha.

Attribute	Input Value	Rationale
Future quality without offset (0-10)	0	Site observations and historic aerial photos suggest that loss of the remaining paddock trees is likely in the next 20 years.
Future quality with offset (1-10)	5	Implementation of an adequate Offset Management Plan with monitoring and management is expected to result in a vegetation quality of 5 (Good condition).

*Foraging habitat quality as per the Bamford (2020) scale

4.5.2 Offset Ratio and Net Gain

4.5.2.1 Vegetation and Foraging Habitat

The Project proposes clearing of up to 23.06 ha of vegetation comprising:

- 10.28 ha of remnant native vegetation
- 5.45 ha of isolated remnant native trees and shrubs
- 5.05 ha of planted native vegetation
- 2.28 ha of planted non-native trees and shrubs providing foraging habitat for black cockatoos.

Of the 23.06 ha of vegetation, 8.14 ha provides no (HQS 0) to Negligible/Low (HQS 1) black cockatoo foraging value, with the remaining 14.92 ha providing Low quality (HQS 2) to Moderate/High quality (HQS 7) black cockatoo foraging habitat.

Commonwealth and WA offset calculators were used to identify offset requirements for black cockatoos and native vegetation. Calculations of the required offset and the resulting proposed offset are described below.

A single offset area is proposed to meet DCCEEW and DWER requirements to compensate for impacts to both Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo foraging habitat as both species utilise similar foraging habitat. The same offset area is proposed to counterbalance the proposed impacts to native vegetation. The offset requirement is therefore based on the maximum (not cumulative) impact quantum across the impacted values. The proposed offset reflects the higher total requirement.

Indicative revegetation areas are shown in **Figure 4.2**.

Commonwealth Offset Calculations

The Commonwealth Offsets Calculator was used to identify offset requirements for each black cockatoo species based on the extent and quality of impacted foraging habitat and the proposed offset attributes outlined in **Section 4.5.1**.

The proposed offset will comprise revegetation within a single offset area that provides suitable foraging habitat for both black cockatoo species. The offset will be designed to achieve equivalent or improved ecological function to the impact areas and contribute to the long-term viability of black cockatoo foraging habitat within the region. The offset requirement applied for the Project therefore reflects the higher of the calculated offset requirements for the two black cockatoo species.

Based on the calculations as summarised in **Table 4.4** revegetation of 16.12 ha is required to offset the impacted 14.92 ha of Low to Moderate/High black cockatoo foraging habitat. To provide a greater net gain in foraging habitat, 20% additional revegetation is proposed resulting in a total revegetation area of 19.34 ha, which exceeds the minimum EPBC Act offset requirement.

Table 4.4 EPBC Offset Calculator Net Gain from Proposed Revegetation

Impact Quality	Calculated Required Offset (ha)		Applied Requirement* (ha)	Proposed Offset (ha)	Proportion of Direct Offset Met
	Carnaby's Cockatoo	Forest Red-tailed Black-cockatoo			
HQS 2-6	15.13	9.78	15.13	18.15	120%
HQS 7	0.99	0.05	0.99	1.19	
Total	16.12	9.83	16.12	19.34	

*Note: The offset requirement reflects the maximum (not cumulative) offset liability across both species.

WA Offset Calculations

The WA Environmental Offsets Calculator identified offset requirements for each environmental value based on the extent and quality of impacts and the proposed offset attributes outlined in **Section 4.4.2**.

As the impacted values include native vegetation that provides suitable foraging habitat for both black cockatoo species, a single offset site is proposed to deliver offsets for all values. Accordingly, the offset requirement applied for the Project is based on the maximum (i.e. governing) offset liability across the assessed values (Carnaby's Cockatoo, Forest Red-tailed Black-cockatoo, and native vegetation).

The proposed offset will comprise revegetation, protection and management of native vegetation within a single offset area that provides foraging habitat for both black cockatoo species and like-for-like vegetation outcomes. The offset will be designed to achieve equivalent or improved ecological function to the impacted areas and contribute to long-term conservation outcomes.

Based on the calculations as summarised in **Table 4.5**, the revegetation of 19.34 ha of completely degraded area required by the Commonwealth offset calculations exceeds the minimum WA offset requirement.

Table 4.5 WA Offset Calculator Net Gain from Proposed Revegetation

Calculated Required Offset (ha)			Applied Requirement* (ha)	Proposed Offset (ha)	Proportion of Direct Offset Met
Carnaby's Cockatoo	Forest Red-tailed Black-cockatoo	Native Vegetation			
10.97	7.10	7.21	10.97	19.34	176%

*Note: The offset requirement reflects the maximum (not cumulative) offset liability across impacted environmental values.

4.5.2.2 Artificial Breeding Habitat

The number of artificial hollows for black cockatoos required will be determined using a 3:1 ratio of the number of hollows suitable for black cockatoos in the impacted Rank 3 potential breeding trees, as required by DCCEEW. Inspection of the impacted Rank 3 trees prior to clearing is required to confirm the number of hollows suitable for black cockatoos.

FIGURE 4.2
Indicative Offset Area

Legend

-  Cockatoo Foraging Evidence Locations
-  Potential Offset Sites
-  Potential Artificial Hollow Placement
-  Revegetation Areas
-  Project Area
-  Watercourse
-  Waterbody



Kilometres

Scale 1:19,200 at A4
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4.6 Offset Implementation

4.6.1 Impact Reconciliation

The area of native vegetation to be cleared will be finalised through the detailed design process. This process will aim to maximise avoidance of higher quality habitat and will ensure the approved native vegetation clearing limits are not exceeded. This will be completed by:

- Using vegetation and habitat mapping as part of the detailed design to avoid higher quality habitat as much as possible.
- Managing clearing during construction via clearing controls in accordance with the CEMP.

Should detailed design further reduce areas of native vegetation clearing, Neoen will apply for an amendment to the NVCP area and would finalise the offset requirement as part of that amendment process. The final impact quantum, offset area and proposed site would be provided via submission of an updated Offset Strategy.

4.6.2 Offset Management Plan

An Offset Management Plan will be prepared in accordance with Commonwealth and State guidance for preparation of management plans and revegetation plans (DCCEEW, 2024; DWER, 2018; EPA, 2024) and will include:

- Locations and description of offset areas and reference sites.
- Proposed management actions including site preparation, revegetation and threat abatement measures.
- Completion criteria and remedial actions.
- Monitoring and maintenance activities.
- Reporting and adaptive management mechanisms.

4.6.3 Proposed Offset Site Tenure and Security

Neoen has reached in-principle agreement with the landholder to secure the revegetation offset area for conservation purposes, and it will be protected in-perpetuity through one of the following two mechanisms:

- Registering a private restrictive covenant on the certificate of title in favour of the State of Western Australia, preventing clearing and development in perpetuity, to the satisfaction of the CEO.
- Entering into a conservation covenant for the protection and management of vegetation in perpetuity under s.30 of the *Soil and Land Conservation Act 1945*.

For both of the above mechanisms:

- A surveyor will be engaged to delineate the boundaries of the offset site and prepare drawings to be registered against the certificate of title.
- The covenant will preclude the development of this land for any other purposes than its use as an environmental offset as outlined in the final Offset Management Plan.

- The land will be managed by Neoen until the completion criteria have been met, after which time the land will remain fenced and protected in-perpetuity.
- Ad-hoc management activities may be undertaken by Neoen as required (e.g. repairing fencing) for the life of the Project (up to 30 years).
- Locations for artificial hollows for black cockatoos will be selected in consultation with subject matter experts, with consideration of factors including land security, access for monitoring and limited public visibility. Proposed locations for artificial hollows will be detailed in the Offset Management Plan.

4.6.4 Management Strategies

Revegetation will seek to increase the total area of suitable habitat and its quality for the impacted matters. Revegetation and management activities to be detailed in the Offset Management Plan will include:

- Establishing and maintaining fencing to control herbivore access.
- Ripping and contouring of the proposed revegetation areas as required.
- Weed control program prior to planting/seeding.
- Intensive planting of key habitat species for each of the impacted matters. This is expected to include the planting of *C. calophylla* (Marri), being a high value black cockatoo forage species, with some *E. marginata* (Jarrah), *E. loxophleba* (York Gum) and *Banksia* spp. where suitable. Vegetation will be overplanted to account for the failure of some to establish.
- Implementation of a monitoring program with revegetation success criteria to restore remnant vegetation and foraging habitat for Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo.
- Implementation of a maintenance program that includes remedial actions and follow up planting if required.
- Implementation of biosecurity protocols to minimise the risk of pathogen or weed spread.

Artificial hollows will be monitored and maintained to ensure their continuing usefulness for breeding.

Measures will be in place to prevent feral cats from accessing the artificial hollows, such as installing wire guards around tree trunks.

4.6.5 Timeframes

The following timeframes are proposed:

- Land tenure for offsets will be secured within 12 months of Project clearing commencing.
- An Offset Management Plan will be submitted to DCCEEW once the proposed offset has been approved.
- The Offset Management Plan will be submitted to DWER for CEO approval on acceptance of the final Offset Strategy and within 12 months of clearing commencing.
- Within 12 months of CEO approval, Neoen will implement the Offset Management Plan.

5.0 Proposed Offset Alignment with Offset Policy Principles

5.1 Alignment with EPBC Act Offset Policy Principles

The alignment of this Offset Strategy with the Commonwealth offset framework is summarised in **Table 5.1**.

Table 5.1 EPBC Act Offset Policy Alignment

Policy Principle	Alignment of the Offset Strategy
1. Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law and affected by the proposed action.	The proposed offset will deliver an overall conservation outcome by: - restoring and protecting 19.34 ha of cleared land to provide high-quality foraging habitat for Carnaby's Cockatoo and Forest Red-tailed Black-cockatoo. - installation of artificial hollows for black cockatoos at a ratio of 3:1 of suitable cockatoo hollows in impacted Rank 3 trees. The offset will increase the extent, condition and connectivity of suitable habitat in the local landscape and is expected to maintain or improve the viability of the impacted MNES over the long term.
2. Be built around direct offsets but may include other compensatory measures.	The offset is based on a direct offset comprising revegetation and long-term protection of a single contiguous site. Artificial hollows will also be installed in appropriate locations to improve the availability of breeding habitat in the local landscape. Management measures to be outlined in an approved Offset Management Plan (e.g. weed control, fencing, monitoring and adaptive management) are proposed to support the effectiveness and persistence of the direct offset. No indirect offsets are relied upon.
3. Be in proportion to the level of statutory protection that applies to the protected matter.	The offset has been designed to address impacts to two EPBC Act-listed threatened species: - Carnaby's Cockatoo – Endangered; - Forest Red-tailed Black-cockatoo – Vulnerable. Offset requirements have been calculated using the Commonwealth Offset Assessment Guide to ensure the offset is commensurate with the level of statutory protection applicable to these MNES.
4. Be of a size and scale proportionate to the residual impacts on the protected matter.	The proposed offset for foraging habitat exceeds the minimum calculated requirement under the EPBC Act, with 19.34 ha of revegetation proposed to offset a residual impact of 14.92 ha of Low to Moderate-High foraging habitat. The proposed offset provides a contingency to

Policy Principle	Alignment of the Offset Strategy
	account for uncertainty and ensures the offset is appropriately scaled to the residual impacts. The proposed offset includes installation of three artificial hollows for each suitable black cockatoo hollow in the impacted Rank 3 potential breeding trees, as required by DCCEEW, representing a 300% net gain of potential breeding habitat.
5. Effectively account for and manage the risks of the offset not succeeding.	Key risks to offset delivery include uncertainty associated with revegetation success, climatic variability and potential disturbance events. These risks have been accounted for in the offset planning through selection of a site with appropriate environmental values outside the Project Area, and conservative assumptions in the offset calculator. Risks will be further managed through site secure tenure and implementation of an Offset Management Plan incorporating threat management, monitoring, performance criteria and adaptive management.
6. Be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs (this does not preclude the recognition of state or territory offsets that may be suitable as offsets under the EPBC Act for the same action).	The offset involves restoration and protection of cleared agricultural land that is not currently subject to conservation obligations, and installation of artificial breeding habitat. The proposed actions are additional to existing legal requirements and are not being delivered under any other program. The offset is proposed specifically to counterbalance residual impacts under the EPBC Act, noting that a single offset area is being used to meet both Commonwealth and State requirements for the same action.
7. Be efficient, effective, timely, transparent, scientifically robust and reasonable.	The proposed offset has been developed by experienced ecologists and revegetation specialists using recognised methods, including the Commonwealth Offset Assessment Guide and established habitat quality scoring methods. Site selection and design have been informed by field surveys, desktop assessments and specialist input. Clear rationale has been provided for the methods and assumptions applied. The approach is considered reasonable, transparent and capable of delivering the intended conservation outcome within appropriate timeframes.
8. Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The offset site will be secured in perpetuity (e.g. through a conservation covenant) and managed in accordance with an Offset Management Plan. The plan will include measurable performance criteria, monitoring and reporting requirements, and provisions for corrective actions, enabling the offset to be readily assessed, audited and enforced by the relevant regulators.

5.2 Alignment with WA Offset Policy Principles

The alignment of this Offset Strategy with the State offset framework is summarised in **Table 5.2**.

Table 5.2 WA Offset Policy Alignment

Policy Principle	Alignment of the Offset Strategy
1. Environmental offsets will only be considered after avoidance and mitigation options have been pursued	The Project has implemented extensive avoidance and minimisation wherever practicable through the design and planning phase. The Project has specifically been adapted to avoid ecological values wherever possible, with remaining impacts minimised via management measures during construction and operation. The residual impact presented here and proposed to be counterbalance through offsetting represents the clearing only necessary for the Project to remain viable. Almost all clearing consists of degraded vegetation or individual trees at the perimeter of fragmented habitat patches.
2. Environmental offsets are not appropriate for all projects	The protected values which are affected by the residual impacts presented here are not considered to be unique or irreplaceable to the extent that the offsetting of these impacts is not appropriate. The degraded and fragmented nature of the values presented, as well as the distribution of small patches of clearing across the Project, are considered suitable for counterbalancing by providing better quality habitat areas that are protected in-perpetuity.
3. Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted	The WA Environmental Offsets Guidelines, field and desktop assessments by experienced ecologists and revegetation specialists were used to ensure that the proposed offset is relevant and proportionate to the residual impacts to black cockatoo foraging and breeding habitat, and native vegetation. The proposed offset provides a net gain in the size, density and diversity of native vegetation that will also provide habitat for threatened fauna species and ecological linkages in the landscape.
4. Environmental offsets will be based on sound environmental information and knowledge	Field and desktop assessments undertaken to inform the extent and quality of protected values proposed for offsetting were undertaken by experienced ecologists using their regional and site knowledge. Offset advice was provided by offset and revegetation specialists. Offsets will be implemented and managed by environmental specialists, based on further field assessments of the proposed offset site, to be detailed in an approved Offset Management Plan
5. Environmental offsets will be applied within a framework of adaptive management	Management of the offset site will be undertaken in accordance with adaptive measures outlined in an approved Offset Management Plan. Monitoring of the offset site will be completed on a defined schedule with the outcomes of these monitoring events being used to inform adaptive actions.

Policy Principle	Alignment of the Offset Strategy
6. Environmental offsets will be focussed on longer term strategic outcomes.	The offset properties and activities presented here are focused on long-term strategic goals for the values being impacted. For example, providing higher quality and better-connected habitat for black cockatoo species in the Wheatbelt that is also in proximity to known breeding areas for at least one of these species. Other outcomes such as increasing dispersal habitat for ground-dwelling and arboreal fauna are likely to contribute to broader strategic goals for improving species and population resilience in a highly degraded and cleared landscape. The proposed offset includes placement of a suitable covenant on the certificate of title to ensure long-term preservation. An approved Offset Management Plan will be prepared to guide implementation and management off the offsets to achieve success.

6.0 Conclusion

The proposed offset strategy is considered to provide an appropriate response to the significant residual impacts of the Project and is intended to address the applicable Commonwealth and State offset requirements.

Subject to finalisation of the offset site, implementation of the proposed Offset Management Plan, and the securing of long-term tenure arrangements, the strategy is expected to provide a measurable conservation outcome for the relevant environmental values consistent with the applicable offset frameworks.

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Appendix A

Habitat Quality Scoring Systems



A.1 Scoring system for the assessment of foraging value of vegetation for Black-Cockatoos.

Bamford Consulting Ecologists

Revised 4th April 2021

Introduction

Application of the Offset Assessment Guide (offsets guide) developed by the federal environment department for assessing Black-Cockatoo foraging habitat requires the calculation of a score out of 10. The following system has been developed by Bamford Consulting Ecologists (BCE) with assistance from Quessentia Consulting to provide an objective scoring system that is practical and can be used by trained field zoologists with experience in the environments frequented by the species.

The foraging value score provides a numerical value that reflects the significance of vegetation as foraging habitat for Black-Cockatoos, and this numerical value is designed to provide the information needed by the Federal Department of Agriculture, Water and the Environment (DAWE) to assess impact significance and offset requirements. The foraging value of the vegetation depends upon the type, density and condition of trees and shrubs in an area and can be influenced by the context such as the availability of foraging habitat nearby. The BCE scoring system for value of foraging habitat has three components as detailed above. These three components are drawn from the DAWE offsets guide but the scoring approach was developed by BCE and includes a fourth (moderation) component.

Note that the scoring system can only be applied within the range of the species or at least where the species could reasonably be expected to occur based upon existing information.

Calculating the total score (out of 10) requires the following steps:

- A. Site condition. Determining a score out of six for the vegetation composition, condition and structure; plus
- B. Site context. Determining a score out of three for the context of the site; plus
- C. Species stocking rate. Determining a score out of one for species density.
- D. Determining the total score out of 10, which may require moderation for context and species density with respect to the site condition (vegetation) score. Moderation also includes consideration of pine plantations as a special case for foraging value.

The BCE scoring system places the greatest weight on site condition (scale of 0 to 6) because this has the highest influence on the foraging values of a site, which in turn is the fundamental driver in meeting ecological requirements for continued survival.

Site context has a lower weight (scale of 0 to 3) in recognition of the mobility of the species, which means they can access good foraging habitat even in fragmented landscapes, but allowing for recognition of the extent of available habitat in a region and context in relation to activity (such as breeding and roosting). The application of scoring site context is further discussed below.

Species stocking rate is given a low weight (0 to 1) as it is a means only of recognising that a species may or may not be abundant at a site, but that abundance is dependent upon site condition and context and is thus not an independent variable. The abundance of a species is also sensitive to

sampling effort, and to seasonal and annual variation, and is therefore an unreliable indicator of actual importance of a site to a species.

Calculation of scores and the moderation process are described in detail below.

Site condition. Vegetation composition, condition and structure scoring.

Site Score	Description of Vegetation Values		
	Carnaby's Black-Cockatoo	Baudin's Black-Cockatoo	Forest Red-tailed Black-Cockatoo
0	No foraging value. No Proteaceae, eucalypts or other potential sources of food. Examples: Water bodies (e.g. salt lakes, dams, rivers); Bare ground; Developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits) or with vegetation of no food value, such as some suburban landscapes. Mown grass	No foraging value. No eucalypts or other potential sources of food. Examples: Water bodies (e.g. dams, rivers); Bare ground; Developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits).	No foraging value. No eucalypts or other potential sources of food. Examples: Water bodies (e.g. dams, rivers); Bare ground; Developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits).
1	Negligible to low foraging value. Examples: Scattered specimens of known food plants but projected foliage cover of these is < 2%. This could include urban areas with scattered foraging trees; Paddocks that are lightly vegetated with melons or other known food-source weeds (e.g. <i>Erodium</i> spp.) that represent a short-term and/or seasonal food source; Blue Gum plantations (foraging by Carnaby's Black-Cockatoos has been reported but appears to be unusual).	Negligible to low foraging value. Scattered specimens of known food plants but projected foliage cover of these < 1%. This could include urban areas with scattered foraging trees.	Negligible to low foraging value. Scattered specimens of known food plants but projected foliage cover of these < 1%. Could include urban areas with scattered foraging trees.

Site Score	Description of Vegetation Values		
	Carnaby's Black-Cockatoo	Baudin's Black-Cockatoo	Forest Red-tailed Black-Cockatoo
2	Low foraging value. Examples: Shrubland in which species of foraging value, such as shrubby banksias, have < 10% projected foliage cover; Woodland with tree banksias 2-5% projected foliage cover; Woodland with tree banksias (of key species <i>B. attenuata</i> and <i>B. menziesii</i>) with <10% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Open eucalypt woodland/mallee of small-fruited species; Paddocks that are densely vegetated with melons or other known food-source weeds (e.g. <i>Erodium</i> spp.) that represent a short-term and/or seasonal food source.	Low foraging value. Examples: Woodland with scattered specimens of known food plants (e.g. Marri and Jarrah) 1-5% projected foliage cover; Marri-Jarrah Woodland with <10% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Parkland-cleared Eucalypt Woodland/Forest with known food plants <10% projected foliage cover (poor long-term viability without management); Younger areas of (managed) revegetation with known food plants <10% projected foliage cover (establishing food sources with good long-term viability); Urban areas with scattered foraging trees.	Low foraging value. Examples: Woodland with scattered specimens of known food plants (e.g. Marri, Jarrah) 1-5% projected foliage cover; Marri-Jarrah Woodland with <10% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Sheoak Woodland with <10% projected foliage cover; Parkland-cleared Eucalypt Woodland/Forest with known food plants <10% projected foliage cover (poor long-term viability without management); Younger areas of (managed) revegetation with known food plants <10% projected foliage cover (establishing food sources with good long-term viability); Urban areas with scattered food plants such as Cape Lilac, <i>Eucalyptus caesia</i> and <i>E. erythrocorys</i>.

Site Score	Description of Vegetation Values		
	Carnaby's Black-Cockatoo	Baudin's Black-Cockatoo	Forest Red-tailed Black-Cockatoo
3	Low to Moderate foraging value. Examples: Shrubland in which species of foraging value, such as shrubby banksias, have 10-20% projected foliage cover; Woodland with tree banksias 5-20% projected foliage cover; Woodland with tree banksias (of key species <i>B. attenuata</i> and <i>B. menziesii</i>) with 10-40% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Eucalypt Woodland/Mallee of small-fruited species; Eucalypt Woodland with Marri < 10% projected foliage cover.	Low to Moderate foraging value. Examples: Eucalypt Woodland with known food plants (especially Marri) 5-20% projected foliage cover; Marri-Jarrah Woodland with 10-40% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Parkland-cleared Eucalypt Woodland/Forest with known food plants 10-40% projected foliage cover (poor long-term viability without management); Younger areas of (managed) revegetation with known food plants 10-40% projected foliage cover (establishing food sources with good long-term viability).	Low to Moderate foraging value. Examples: Eucalypt Woodland with known food plants (especially Marri and Jarrah) 5-20% projected foliage cover; Marri-Jarrah Woodland with 10-40% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Sheoak Forest with 10-40% projected foliage cover; Parkland-cleared Eucalypt Woodland/Forest with known food plants 10-40% projected foliage cover (poor long-term viability without management); Younger areas of (managed) revegetation with known food plants 10-40% projected foliage cover (establishing food sources with good long-term viability).
4	Moderate foraging value. Examples: Woodland/low forest with tree banksias (of key species <i>B. attenuata</i> and <i>B. menziesii</i>) 20-40% projected foliage cover; Woodland/low forest with tree banksias (of key species <i>B. attenuata</i> and <i>B. menziesii</i>) with 40-60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths;	Moderate foraging value. Examples: Marri-Jarrah Woodland/Forest with 20-40% projected foliage cover; Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Parkland-cleared Eucalypt Woodland/Forest with known food plants 40-60% projected foliage cover (poor long-term viability without management);	Moderate foraging value. Examples: Marri-Jarrah Woodland/Forest with 20-40% projected foliage cover; Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Sheoak Forest with 40-60% projected foliage cover; Parkland-cleared Eucalypt Woodland/Forest with known food plants

Site Score	Description of Vegetation Values		
	Carnaby's Black-Cockatoo	Baudin's Black-Cockatoo	Forest Red-tailed Black-Cockatoo
	Kwongan/ Shrubland in which species of foraging value, such as shrubby banksias, have 20-40% projected foliage cover; Eucalypt Woodland/Forest with Marri 20-40% projected foliage cover.	Younger areas of (managed) revegetation with known food plants 40-60% projected foliage cover (establishing food sources with good long-term viability); Orchards with highly desirable food sources (e.g. apples, pears, some stone fruits).	40-60% projected foliage cover (poor long-term viability without management); Younger areas of (managed) revegetation with known food plants 40-60% projected foliage cover (establishing food sources with good long-term viability).
5	Moderate to High foraging value. Examples: Banksia Low Forest (of key species <i>B. attenuata</i> and <i>B. menziesii</i>) with 40-60% projected foliage cover; Banksia Low Forest (of key species <i>B. attenuata</i> and <i>B. menziesii</i>) with > 60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Kwongan/ Shrubland in which species of foraging value, such as shrubby banksias, have 40-60% projected foliage cover; Marri-Jarrah Forest with 40-60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term). Pine plantations with trees more than 10 years old (but see pine note below in moderation section).	Moderate to High foraging value. Examples: Marri-Jarrah Forest with 40-60% projected foliage cover; Marri-Jarrah Forest with > 60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Parkland-cleared Eucalypt Woodland/Forest with known food plants >60% projected foliage cover (poor long-term viability without management); Younger areas of (managed) revegetation with known food plants >60% projected foliage cover (establishing food sources with good long-term viability).	Moderate to High foraging value. Examples: Marri-Jarrah Forest with 40-60% projected foliage cover; Marri-Jarrah Forest with > 60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Sheoak Forest with > 60% projected foliage cover; Parkland-cleared Eucalypt Woodland/Forest with known food plants >60% projected foliage cover (poor long-term viability without management); Younger areas of (managed) revegetation with known food plants >60% projected foliage cover (establishing food sources with good long-term viability).

Site Score	Description of Vegetation Values		
	Carnaby's Black-Cockatoo	Baudin's Black-Cockatoo	Forest Red-tailed Black-Cockatoo
6	High foraging value. Example: Banksia Low Forest (of key species <i>B. attenuata</i> and <i>B. menziesii</i>) with > 60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term). Kwongan/ Shrubland in which species of foraging value, such as shrubby banksias, have >60% projected foliage cover; Marri-Jarrah Forest with > 60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term).	High foraging value. Example: Marri-Jarrah Forest with > 60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term).	High foraging value. Example: Marri-Jarrah Forest with > 60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term).

Vegetation structural class terminology follows Keighery (1994).

Site context

Site Context is a function of site size, availability of nearby habitat and the availability of nearby breeding areas. Site context includes consideration of connectivity, although Black-Cockatoos are very mobile and will fly across paddocks to access foraging sites. Based on BCE observations, Black-Cockatoos are unlikely to regularly go over open ground for a distance of more than a few kilometres and prefer to follow tree-lines.

The maximum score for site context is 3, and because it is effectively a function of presence/absence of nearby breeding and the distribution of foraging habitat across the landscape, the following table, developed by Bamford Consulting in conjunction with the Department of the Environment and Energy (DEE), provides a *guide* to the assignment of site context scores. Note that 'local area' is defined as within a 15 km radius of the centre point of the study site. This is greater than the maximum distance of 12km known to be flown by Carnaby's Black-Cockatoo when feeding chicks in the nest.

Site Context Score	Percentage of the existing native vegetation within the 'local' area that the study site represents.	
	'Local' breeding known/likely	'Local' breeding unlikely
3	> 5%	> 10%
2	1 - 5%	5 - 10%
1	0.1 - 1%	1 - 5%
0	< 0.1%	< 1%

The table above provides weighting for where nearby breeding is known (or suspected) and for the proportion of foraging habitat within 15 km represented by the site being assessed. Some adjustments may be needed based on the judgement of the assessor and in relation to the likely function of the site. For example, a small area of foraging habitat (e.g. 0.5% of such habitat within 15 km) could be upgraded to a context of 2 if it formed part of a critical movement corridor. In contrast, the same sized area of habitat, of the same local proportion, could be downgraded if it were so isolated that birds could never access it.

Species density (stocking rate)

Species stocking rate is described as "the usage and/or density of a species at a particular site" in the offsets guide. The description also implies that a site supports a discrete population, which is unlikely in the case of very mobile black-cockatoos. Assignment of the species density score (0 or 1) is based upon the black-cockatoo species being either abundant or not abundant. A score of 1 is used where the species is seen or reported regularly and/or there is abundant foraging evidence. Regularly is when the species is seen at intervals of every few days or weeks for at least several months of the year. A score of 0 is used when the species is recorded or reported very infrequently and there is little or no foraging evidence. Where information on actual presence of birds is lacking, a species density score can be assigned by interpreting the landscape and the site context. For example, a site with a moderate condition score that is part of a network of such habitat where a black-cockatoo species is known would get a species density score of 1 even without clear presence data, while a species density score of 0 can be assigned to a site where the level of usage can confidently be predicted to be low.

Moderation of scores for the calculation of a value out of 10

The calculation out of 10 requires the vegetation characteristics (out of 6) to be combined with the scores given for context and species density. It is considered that the context and density scores are not independent of vegetation characteristics; otherwise habitat of absolutely no value for black-cockatoo foraging (such as concrete or a wetland) could get a foraging score out of 10 as high as 4 if it occurred in an area where the species breed (context score of 3) and are abundant (species density score of 1). Similarly, vegetation of negligible or low characteristics which could not support black-cockatoos could be assigned a score as high as 6 out of 10. In that case, the score of 6 would be more a reflection of nearby vegetation of high characteristics than of the foraging value of the negligible to low scoring vegetation. The Black-Cockatoos would only be present because of vegetation of high characteristics, so applying the context and species density scores to vegetation of low characteristics would not give a true reflection of their foraging value.

For this reason, the context and species density scores need to be moderated for the vegetation characteristic score to prevent vegetation of little or no foraging value receiving an excessive score out of 10. A simple approach is to assign a context and species density score of zero to sites with a Condition score of low (2), negligible (1) or none (0), on the basis that birds will not use such areas unless they are adjacent to at least low-moderate quality foraging habitat (≥ 3). The approach to calculating a score out of 10 can be summarised as follows:

Vegetation composition, condition and structure score	Context score	Species density score
3-6 (low/moderate to high value)	Assessed as per B above	Assessed as per C above
0-2 (no to low value)	0	0

Note that this moderation approach may require interpretation depending on the context. For example, vegetation with a condition score of 2 could be given a context score of 1 under special circumstances. Such as when very close to a major breeding area or if strategically located along a movement corridor.

Pine plantations

Pine plantations are an important foraging resource for Carnaby's Black-Cockatoo (only) but are not directly comparable with native vegetation. In comparing native vegetation with pine plantations for the purpose of calculating offsets, the following should be noted:

- Pine plantations are a commercial crop established with the intention of being harvested and thus have short-term availability (30-50 years), whereas native vegetation is available indefinitely if protected. Due to the temporary nature of pines as a food source, site condition and context differs between pines and native vegetation.
- Although pines provide a high abundance of food in the form of seeds, they are a limited food resource compared with native vegetation which provides seeds, insect larvae, flowers and nectar. The value of insect larvae in the diet of Carnaby's Black-Cockatoo has not been quantified, but in the vicinity of Perth, the birds forage very heavily on insect larvae in young cones of *Banksia attenuata* in winter, ignoring the seeds in these cones and seeds in older cones on the

same trees (Scott and Black 1981; M. Bamford pers. obs.). This suggests that insect larvae are of high nutritional importance immediately prior to the breeding season.

- Pine plantations have very little biodiversity value other than their importance as a food source for Carnaby's Black-Cockatoos. They inhibit growth of other flora. While this is not a factor for direct consideration with respect to Carnaby's Black-Cockatoo, it is a factor in regional conservation planning of which offsets for the cockatoos are a part.

Taking the above points into consideration, it is possible to assign pine plantations a foraging value as follows:

- **Site condition.** The actual foraging value of pines is high. Stock *et al.* (2013) report that it takes nearly twice as many seeds of *Pinus pinaster* to meet the daily energy requirements for Carnaby's Black-Cockatoo compared with Marri, and three times as many *P. pinaster* seeds compared with Slender Banksia. However, pines are planted at a high density so the food supply per hectare can be high. Taking account of the lack of variety of food from pines, this suggests a site condition score of 4 or 5 out of 6 (5 is used in Section A above). As a source of food, pines are thus comparable to the best banksia woodland. This site condition score then needs to be adjusted to take account of the short-term nature of the food supply (for pine plantations to be harvested. Where pines are 'ornamental, such as in some urban contexts, they can be treated as with other trees in urban landscapes). The foraging value of a site after pines are harvested will effectively be 0, or possibly 1 if there is some retention. It is proposed that this should approximately halve the site condition score; young pine plantations could be redacted slightly less than old plantations on the basis that a young plantation provides a slightly longer-term food supply. If a maximum site condition score of 5 is given, then a young plantation (>10 but <30 years old) could be assigned a score of 3, and an old plantation (>30 years old) could be assigned a score of 2. Plantations <10 years old and thus not producing large quantities of cones could also get a score of 2, but recognising they may increase in value.
- **Site context.** Although a temporary food source, pines can be very important for Carnaby's Black-Cockatoo in some contexts; they could be said to carry populations in areas where there is little native vegetation. The system for assigning a context score as outlined above (Section B) also applies to pines. Thus, a context score of 3 can be given where pines are a significant proportion of foraging habitat (>5% if breeding occurs; >10% if no breeding), but where pines are a small part of the foraging landscape they will receive a context score of less than this. Species density. As outlined above (Section C), pines will receive a species density score of 1 where Carnaby's Black-Cockatoo are regular visitors. This is irrespective of an old plantation having a moderated condition score of 2.
- **Based on the above,** pine plantations that represent a substantial part of the foraging landscape, such as in the region immediately north of Perth, would receive a total score (out of 10) of 6; young plantations in this area would receive a score of 7. In contrast, isolated and small plantations in rural landscapes could receive a score of just 2 if they are only a small proportion of foraging habitat and Carnaby's Black-Cockatoos are not regularly present.



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