Alcoa of Australia Limited

PINJARRA ALUMINA REFINERY REVISED PROPOSAL

Environmental Offset Proposal

EPA No. 2253
EPBC No. 2022/09204

March 2025

Version	Description of Changes	Date	Approved by
A	Issued for Internal Review	09 January 2025	KM
B	Issued for Review	22 January 2025	KM
C	Issued for Approval	10 February 2025	AB
1	Issued for use	17 March 2025	KM

Executive Summary

Alcoa of Australia Limited (Alcoa) has been operating as an integrated bauxite miner and alumina producer in the south-west of Western Australia (WA) since 1963. In WA, Alcoa operates two bauxite mines (Huntly and Willowdale), three alumina refineries (Kwinana[1], Pinjarra, Wagerup) and two ports (Kwinana and Bunbury).

Alcoa is proposing to increase production at the Pinjarra Refinery by 5 per cent from 5.00 Mtpa to 5.25 Mtpa; and transition the Huntly Mine, located within Mineral Lease 1SA, to the proposed Myara North and Holyoake mine regions and re-enter the O'Neil mine region, for the purpose of mining bauxite for the Pinjarra Alumina Refinery and the Kwinana Alumina Refinery[2].

The Pinjarra Alumina Refinery Revised Proposal (the Proposal) has been referred to the WA Environmental Protection Authority (EPA) under Part IV s38 of the *Environmental Protection Act 1986* (EP Act) (assessment number is 2253). The Huntly Bauxite Mine Transition (assessment number is 2022/09204) has been referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Myara North and Holyoke Development Envelopes are being assessed as an accredited assessment under the WA EP Act.

The Proposal is in the Peel region of Western Australia (WA), approximately 100 km south-east of Perth and within a 23,900 hectare (ha) Mine Development Envelope that is proposing to clear up to 7,500 ha of native vegetation. The Proposal is summarised in ES Table 1-1.

ES Table 1-1: Proposal summary

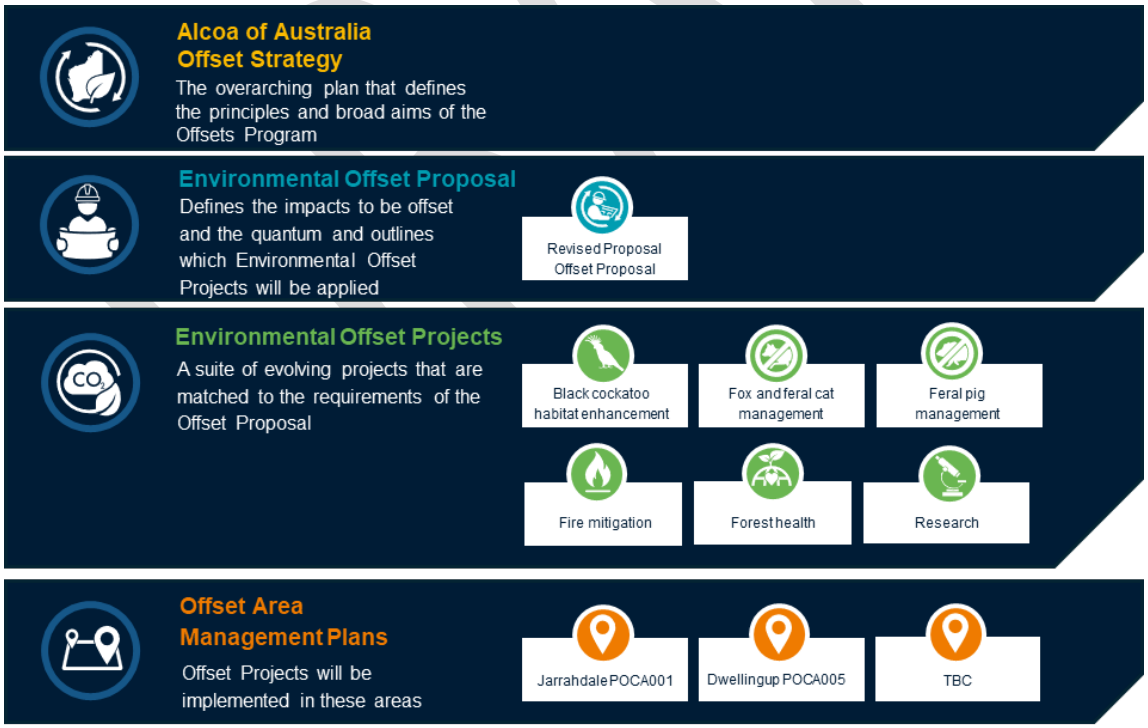
Item	Summary
Proposal name and assessment number	EPA assessment number 2253 - Pinjarra Alumina Refinery Revised Proposal EPBC Act assessment number 2022/09204 - Huntly Bauxite Mine Transition (DCCEEW)
Proponent name	Alcoa of Australia Limited
Proposal description	Alcoa of Australia Limited is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5.0 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite mine to the proposed Myara North and Holyoake mine regions and re-enter the O'Neil mine region (the Proposal). The Proposal is in the Peel region of Western Australia (WA), approximately 100 km south-east of Perth.

[1] Currently in curtailment
[2] The Kwinana Refinery was curtailed in 2024 but will reopen within the lifespan of this Proposal subject to market conditions.

Item	Summary
	The Proposal is within a 23,900 hectare (ha) Mine Development Envelope and will require the clearing of up to 7,500 ha of native vegetation.

Even after strict adherence to the mitigation hierarchy[3], clearing vegetation within State Forest may result in significant residual impacts[4] through loss of habitat for threatened fauna species. Alcoa has undertaken an assessment (Alcoa, 2025b) to determine the SRI for conservation significant species that are likely to be significantly impacted by the Proposal. Under the WA environmental offset framework, environmental offsets are required to provide environmental benefits which counterbalance the significant residual environmental impacts of a proposal. In the context of the EPBC Act Environmental Offset Policy, environmental offsets are a mechanism to address significant residual impacts on nationally significant fauna, flora, habitats or places.

Alcoa's Environmental Offset Strategy provides a systematic approach for the provision of its environmental offsets. It states Alcoa will prepare an Environmental Offset Proposal for each future mining and/or mining related project that requires an environmental offset. The Environmental Offset document framework, provided in ES Figure 1-1, shows how the offset documents are organised.



ES Figure 1-1: Environmental Offset Document Framework

[3] The WA Environmental Offsets Guidelines (GoWA 2014) define the mitigation hierarchy as avoid, minimise, rehabilitate and offset. The EPBC Act Environmental Offsets Policy (DSEWPC 2012) defines the offsets mitigation hierarchy as avoid, mitigate and offset.

[4] Under the EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012) the term "residual significant impacts" (RSI) is used to identify significant impacts on a matter protected (MNES) under national environment law (the EPBC Act) that remain following avoidance and mitigation measures. The term significant residual significant impact (SRI) will be used in this document but is to be taken to have the same meaning as residual significant impact (RSI).

The purpose of this Environmental Offset Proposal is to demonstrate that if the Proposal is implemented, the significant residual impacts to threatened fauna species can be offset. The Offset Proposal is summarised in ES Table 1-2.

ES Table 1-2: Summary of the Offset Proposal

Item	Summary
Significant residual impacts to environmental value(s) to be offset	Chapter 6 and Chapter 15 of the Environmental Review Document (ERD) (Alcoa, 2025b) identified environmental offsets should be proposed for significant residual impacts[5] to environmental values as follows: Myara North and Holyoake • 5,757 ha of habitat for forest red-tailed black cockatoo • 5,776 ha of habitat for Baudin's cockatoo • 5,131 ha of habitat for Carnaby's cockatoo • 3,147 ha of habitat for woylies • 4,434 ha of habitat for chuditch • 472 ha of habitat for quokkas O'Neil • 815 ha of habitat for forest red-tailed black cockatoo • 815 ha of habitat for Baudin's cockatoo • 712 ha of habitat for Carnaby's cockatoo • 637 ha of habitat for woylies • 849 ha of habitat for chuditch • 411 ha of habitat for quokkas
Aim	The aim of this Offset Proposal is to demonstrate that if the Proposal is implemented, the significant residual impacts to threatened fauna species can be managed and offset.
Environmental objectives	The environmental objectives in this Offset Proposal are to: • Identify areas of important habitat within the NJF that support the ongoing viability of threatened species impacted by the Proposal. • Implement recovery, threat abatement and conservation actions that enhance important habitat for black cockatoos, chuditch, woylie and quokka. • Contribute to ongoing research, knowledge and understanding of threatened species habitat and movement in the NJF.

[5] These significant residual impacts are based on application of the EPBC offset assessment guide.

Item	Summary
	• Provide information on the appropriateness, suitability and effectiveness of recovery, threat abatement and conservation or management actions. • Provide beneficial conservation outcomes for other species that may also utilise the habitat, including but not limited to numbats, western ring tailed possums, quenda, brush-tailed phascogale, western brush wallaby and rakali. • Help resolve key knowledge gaps, identified in consultation with DBCA, that will lead to landscape scale and multi-organisation cooperation to maintain the ongoing ecological integrity of the NJF.
Environmental outcomes (delivered in tranches)	Myara North and Holyoake • Deliver a net-gain in the condition of at least 17,600 hectares of vegetation that provides habitat for forest red-tailed black cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 19,275 hectares of vegetation that provides habitat for Baudin's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 17,550 hectares of vegetation that provides habitat for Carnaby's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 11,600 hectares of vegetation that provides habitat for woylie through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 14,350 hectares of vegetation that provides habitat for chuditch through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 1,525 hectares of vegetation that provides habitat for quokka through a one point increase in the weighted average habitat quality score against

Item	Summary
	the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Contribute information to address key knowledge gaps that will ultimately assist with maintenance of the ongoing ecological integrity of the Northern Jarrah Forest Interim Biogeographic Regionalisation of Australia Subregion. O'Neil • Deliver a net-gain in the condition of at least 2,750 hectares of vegetation that provides habitat for forest red-tailed black cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 2,790 hectares of vegetation that provides habitat for Baudin's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 2,500 hectares of vegetation that provides habitat for Carnaby's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 2,290 hectares of vegetation that provides habitat for woylie through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 2,670 hectares of vegetation that provides habitat for chuditch through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period. • Deliver a net-gain in the condition of at least 1,370 hectares of vegetation that provides habitat for quokka through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.

Item	Summary
	• Contribute information to address key knowledge gaps that will ultimately assist with maintenance of the ongoing ecological integrity of the Northern Jarrah Forest Interim Biogeographic Regionalisation of Australia Subregion.
Key components of the Offset Proposal	• Alcoa propose to deliver the environmental offsets through environmental offset projects implemented within proposed offset conservation areas within the NJF. • Environmental offset projects will continue to be developed in consideration of recovery actions and threat abatement activities relevant to environmental values being offset. • Alcoa propose to implement environmental offset projects for this Proposal in proposed offset conservation areas (POCA) that contain at least sufficient habitat for black cockatoos, woylie, chuditch and quokka to meet the proposed outcomes. • Two initial POCAs have been identified by Alcoa, POCA001 in Jarrahdale (approximately 2,715 ha) and POCA005 in Dwellingup (approximately 5,087 ha). • Alcoa's internal Environmental Offset Team will be responsible for overseeing the implementation of the environmental offsets. programs. • Each Environmental Offset Project Plan will include a monitoring program specific to the project and the corresponding POCAs. The monitoring program includes targets, performance indicators, trigger, threshold and response actions, the monitoring methodology and schedule, reporting requirements and evaluation and response actions. • Alcoa have been consulting with the landowner (the WA Government) and the vested agency (DBCA) during the development of this Offset Proposal. Consultation is ongoing. • Alcoa is continuing or will commence consultation with other key stakeholders including WA Government agencies, Traditional Owners and the community. • Alcoa will fund the delivery of the environmental offset projects. • Environmental offset projects will be delivered over a 20 year period, following which the management of the areas will return to the landowner (WA Government) and land manager (DCBA). • The environmental offsets proposed in this Offset Proposal are consistent with WA and Commonwealth offset policy and guidance and the EPA public advice on regional scale offsets. The intent is to deliver environmental offset projects across large, strategically located, areas of State Forest close to the impact areas.

Item	Summary
Project partners (proposed)	• DBCA • Gnaala Karla Booja (GKB) Aboriginal Corporation • Additional partners TBC following consultation
Project stakeholders	• Conservation and Parks Commission (CPC) • DBCA • DCCEEW • EPA • WA Department of Water and Environmental Regulation (DWER) • WA Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) • GKB Aboriginal Corporation • Additional stakeholders TBC
Project funding	Alcoa proposes to fund environmental offset projects through transferring an AUD rate per approved hectare cleared each year into a self-managed fund on a prospective basis. The rate will be agreed prior to the commencement of actions under assessment and consider the expected costs to implement reasonable and cost-effective conservation projects. Alcoa will make annual payments into the fund based on the actual approved hectares cleared each year on a prospective basis after the Proposal has been approved. Alcoa have benchmarked rates against comparable and contemporary environmental offset funds and/or conditions and considers that $3,500 (excluding GST) per hectare of habitat cleared is an appropriate and reasonable rate.

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Acronyms

Abbreviation	Definition
BC Act	*Biodiversity Conservation Act 2016* (WA)
Black cockatoo(s)	Carnaby's cockatoo (*Zanda latirostris*), Baudin's cockatoo (*Zanda baudinii*) and forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DE	Development Envelope
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
EP Act	*Environmental Protection Act 1986* (WA)
EPA (WA)	Environmental Protection Authority
ERD	Environmental Review Document
GKB	Gnaala Karla Booja Aboriginal Corporation
IBRA	Interim Biogeographic Regionalisation for Australia.
ha	hectares
km	kilometers
m	meters
ML1SA	Mineral Lease 1 State Agreement
MNES	Matters of National Environmental Significance
NJF	Northern Jarrah Forest
POCA	Proposed offset conservation area
SRI	Significant residual impact (has the same meaning as RSI or Residual significant impact, the term applied by DCCEEW)
WA	Western Australia

Definitions

Term	Definition
Black cockatoo(s)	Includes the three species of south-west black cockatoos: Carnaby's cockatoo (*Zanda latirostris*[6]), Baudin's cockatoo (*Zanda baudinii*[6]) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)
Black Cockatoo known nesting tree	Trees (live or dead but still standing) which contains a hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).
Black Cockatoo suitable nesting tree	Trees with suitable nesting hollows present, although no evidence of use.
Black Cockatoo suitable nest hollow	Any hollow with dimensions suitable for use for nesting by black cockatoos or assessed by a suitably experience ecologist based on hollow size, shape, and entry angle, irrespective of signs of use for breeding.
Black Cockatoo potential nesting trees	Trees that have a suitable DBH to develop a nest hollow, but do not currently have hollows. Trees suitable to develop a nest hollow in the future are 300 mm DBH (for wandoo) or 500 mm DBH for other tree species (e.g. jarrah or marri).
Offset period	On-ground management with POCA for up to 20 years

[6] The scientific name of the Carnaby's cockatoo has changed from *Calyptorhynchus latirostris* to *Zanda latirostris* and the Baudin's cockatoo from *Calyptorhynchus baudinii* to *Zanda baudinii*.

1. Context, scope and rationale

Alcoa of Australia Limited (Alcoa) has been operating in the Northern Jarrah Forest (NJF) for over 60 years with its operations approved under robust statutory processes. Alcoa is modernising its approvals framework to a more contemporary process, with the new mining areas being assessed by the Western Australian (WA) Environmental Protection Authority (EPA) and the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW).

This Offset Proposal has been prepared to support the environmental approval assessment by the WA EPA and DCCEEW by demonstrating that if the Proposal is implemented, the significant residual impacts to threatened fauna species can be offset.

1.1 Background

Alcoa began operations in Western Australia (WA) in 1963 with the commissioning of the Kwinana Refinery, in accordance with the *Alumina Refinery Agreement Act 1961*. This State Agreement, between Alcoa and the WA Government, permitted Alcoa to mine bauxite within Mineral Lease 1SA (ML1SA). ML1SA extends from Mundaring to Collie, and the agreement initially only supported development of the Kwinana Refinery. Since then, Alcoa and the WA Government struck two further State Agreements covering the development of the Pinjarra Alumina Refinery and the Wagerup Alumina Refinery:

- *Alumina Refinery (Pinjarra) Agreement Act 1969*.
- *Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978*.

These three State Agreements support the entirety of Alcoa's operations in Western Australia. Alcoa's Western Australian operations include the following facilities:

- Two bauxite mines (Huntly and Willowdale).
- Three alumina refineries (Kwinana[7], Pinjarra and Wagerup).
- Two dedicated port facilities (Kwinana and Bunbury).

Alcoa's operations are assessed through various Environmental Impact Assessment processes by the WA Government and relevant agencies. To date, Alcoa's operations have been approved under these robust statutory processes with the inclusion of specified controls. Alcoa complies with the processes under relevant State Agreements, legislation, and legislative instruments.

Alcoa are modernising its approvals framework to a more contemporary process. This includes referring new mining areas to the WA EPA under the WA *Environment Protection Act 1986* (EP Act) and to Commonwealth DCCEEW under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Alcoa referred the Proposal to expand the Huntly mine into two new mining regions, Myara North and Holyoake, to EPA (in June 2022) and DCCEEW (in July 2022). In 2024, Alcoa included re-entering the O'Neil mine region into the Proposal.

[7] Currently in curtailment

Even after strict adherence to the mitigation hierarchy (avoid, minimise[8] and rehabilitate[9]), clearing of vegetation may result in significant residual impacts[10] to environmental values within State Forest. Environmental offsets will counterbalance any significant residual environmental impacts.

Under the WA environmental offset framework, environmental offsets are required to provide environmental benefits which counterbalance the significant residual environmental impacts of a proposal. In the context of the EPBC Act Environmental Offset Policy, environmental offsets are a mechanism to address significant residual impacts on nationally significant fauna, flora, habitats or places.

1.2 Purpose and scope

The purpose of this Offset Proposal is to demonstrate that if the Proposal is implemented, the significant residual impacts to threatened fauna species can be offset.

This Offset Proposal is limited to a draft for consultation. It has been prepared in alignment with the *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA, 2024a), the Commonwealth's Environmental Offset Policy (DSEWPC, 2012) and the *Environmental Management Plan Guidelines* (DCCEEW, 2024). This draft will be finalised following consultation with the EPA, DCCEEW, Department of Biodiversity, Conservation and Attractions (DBCA), stakeholders and the public.

1.3 Proposal overview

Alcoa of Australia Limited is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5.0 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite mine to the proposed Myara North and, Holyoake mine regions, and re-enter the O'Neil mine region (the Proposal). The Proposal is in the Peel region of Western Australia (WA), approximately 100 km south-east of Perth. The Proposal is within a 23,900 hectare (ha) Mine Development Envelope and will require the clearing of up to 7,500 ha of native vegetation. The Proposal is summarised in Table 1-1 and shown in Figure 1-1.

[8] The EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012) terms this action as mitigation.
[9] Rehabilitation does not form part of the mitigation hierarchy under the EPBC Act.
[10] Under the EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012) the term "residual significant impacts" (RSI) is used to identify significant impacts on a matter protected (MNES) under national environment law (the EPBC Act) that remain following avoidance and mitigation measures. The term significant residual significant impact (SRI) will be used in this document but is to be taken to have the same meaning as residual significant impact (RSI).

Table 1-1: Proposal Details

Item	Details
Proponent	Alcoa of Australia Limited
Proposal Name and Assessment Number EPA Referral	**Pinjarra Alumina Refinery Revised Proposal** Referred February 2020 under Part IV of the EP Act Assessment number 2253 Assessed as a Public Environmental Review (10 weeks)
Proposal Name Proposal Name and Assessment Number EPBC Referral	**Huntly Bauxite Mine Transition** Referred July 2022 under the EPBC Act EPBC number 2022/09204 Myara North and Holyoake elements of the Proposal are being assessed as a Controlled Action under an Accredited Assessment with the Western Australian Government
Region	Peel
Project Description	Alcoa of Australia Limited is proposing to increase production at the Pinjarra Alumina Refinery by 5 per cent from 5.0 million tonnes per annum (Mtpa) to 5.25 Mtpa and transition the Huntly Bauxite mine to the proposed Myara North and Holyoake mine regions and re-enter the O'Neil mine region (the Proposal). The Proposal is in the Peel region of Western Australia (WA), approximately 100 km south-east of Perth. The Proposal is within a 23,900 hectare (ha) Mine Development Envelope and will require the clearing of up to 7,500 ha of native vegetation. The Myara North, Holyoake and O'Neil Development Envelopes (collectively the Mine DE) are shown in Figure 1-1.

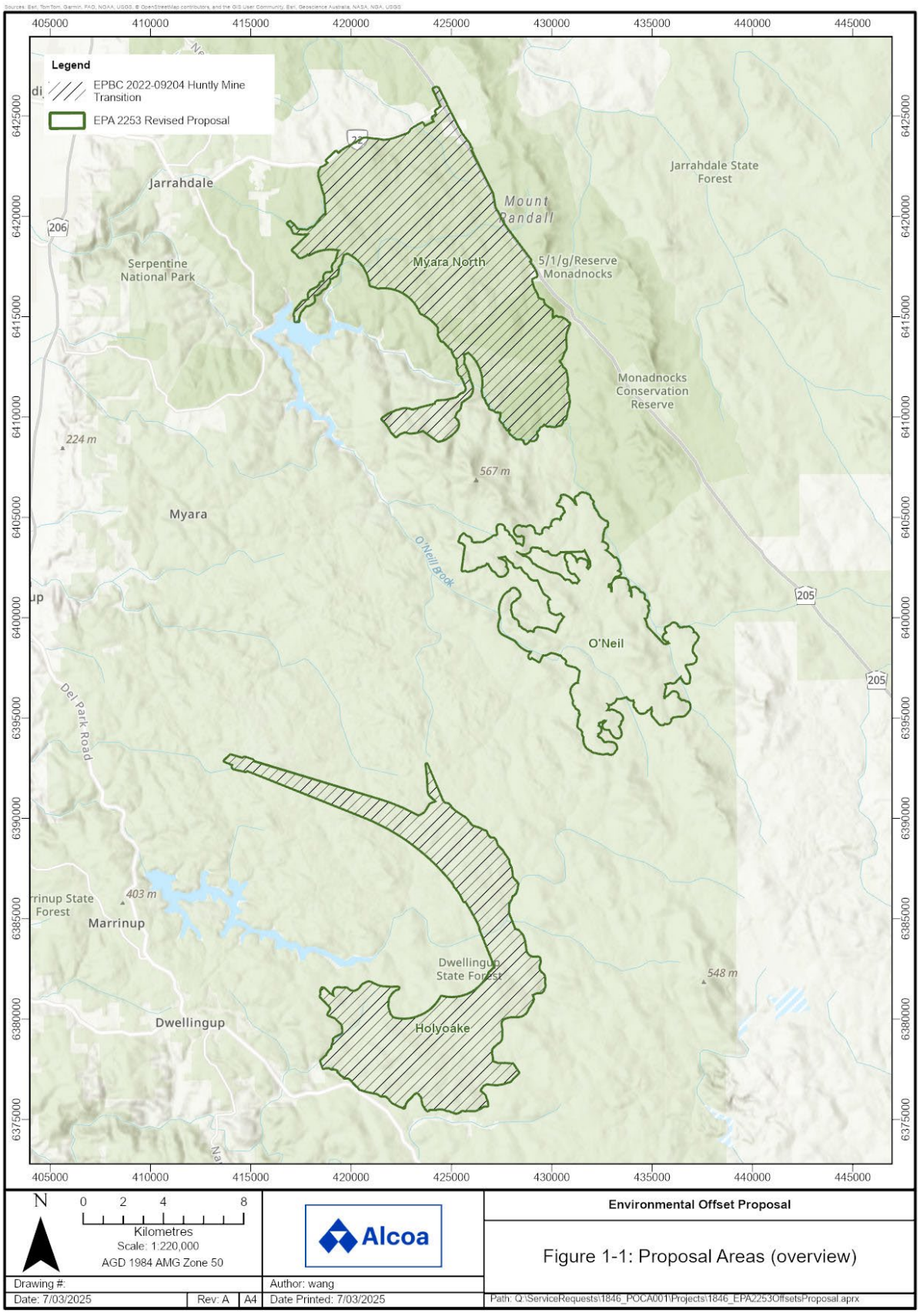

Figure 1-1: Proposal Areas (overview)

2. Proposal description

Alcoa has prepared an Environmental Review Document (ERD) (Alcoa, 2025b) detailing the environmental impact assessment (EIA) process. The ERD documents demonstrate how the EPA's key environmental factors and Commonwealth's Matters of National Environmental Significance (MNES) can be managed and the likely extent of the Proposal's direct and indirect impacts.

Following the application of avoidance and minimisation, the Proposal is expected to clear no more than 7,500 ha of native vegetation. Pre-clearance surveys will identify any areas of high ecological value within the localised areas to be cleared within each DE to allow Alcoa to include further avoidance and minimisation measures.

Due to the nature of the ore pods, the Huntly Mine is characterised by a constantly moving mining footprint followed by progressive rehabilitation. Following mining, mine pits and associated haul roads are rehabilitated to jarrah forest. Alcoa's target duration between initial clearing and the completion of rehabilitation in individual mine pits is approximately three years. Haul roads are rehabilitated once all activities in the respective area are completed.

All information in this section (Section 2) is summarised from the ERD. Additional references are provided in text.

2.1 Summary of the Project

The Huntly Mine is in the NJF Interim Biogeographic Regionalisation of Australia[11] (IBRA) subregion, within Alcoa's mining tenement (ML1SA), approximately 100 km south-east of Perth. The Proposal comprises three development envelopes (DE's). The Myara North DE comprises an area consisting of the Myara North mine DE and adjacent infrastructure corridors equating to approximately 10,705 ha. The Holyoake DE comprises an area consisting of the Holyoake mine DE and adjacent infrastructure corridors equating to approximately 7,624 ha. The O'Neil DE comprises approximately 5,571 ha within the O'Neil mine region of which portions have been previously cleared for mining and associated activities with most of the cleared areas rehabilitated between 2012-2021.

Alcoa proposes to continue to operate the Huntly Mine through an initial transition into the O'Neil DE, the northern end of the Holyoake DE and then the Myara North DE, with construction to commence in 2026, on receipt of the applicable approvals. Alcoa propose to transition into the remainder of the Holyoake DE in about 2031 following the construction of a new conveyor spur; construction to commence from about 2027. This staging will ensure continuity of bauxite supply to the Pinjarra Alumina Refinery.

2.1.1 Mining process

Mining activities will move progressively across the DEs, meaning that clearing will take place over the majority of the life of mine. Prior to the clearing of any vegetation, Alcoa undertakes pre-clearance surveys to identify locations of high ecological value within the localised area designated for clearing. Pre-clearance surveys focus on identifying suitable

[11] The Interim Biogeographic Regionalisation for Australia (IBRA) classifies Australian's landscapes into 89 geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. The bioregions are further refined to form 419 subregions.

and known black cockatoo nesting trees, threatened and priority flora and vegetation, threatened and priority fauna and additionally assess the presence of dieback.

Bauxite occurs as tabular ore pods that vary in depth from 2 - 10 m and average about 3.5 m. The mining pits are located within the ore pods. The ore is overlayed with gravel and soils varying in depth from 0 - 1.5 m. The upper part of the ore frequently presents as cemented caprock, ranging in thickness from 0 - 2.5 m. Beneath the caprock is a friable zone that merges into clay with uneconomic quantities of bauxite. Mine development occurs progressively on a pit-by-pit basis and comprises clearing, overburden stripping and caprock removal.

Mine pits are linked via a network of haul roads to a crusher and facilities area. Haul roads are aligned to avoid areas of conservation value including granite outcrops and recorded black cockatoo breeding trees with known and suitable hollows, and to minimise disturbance within creek lines and swamps, where practicable.

Due to the nature of the ore pods, the mine is characterised by a constantly moving mining footprint followed by progressive rehabilitation. The mining sequence is illustrated in Figure 2-1.

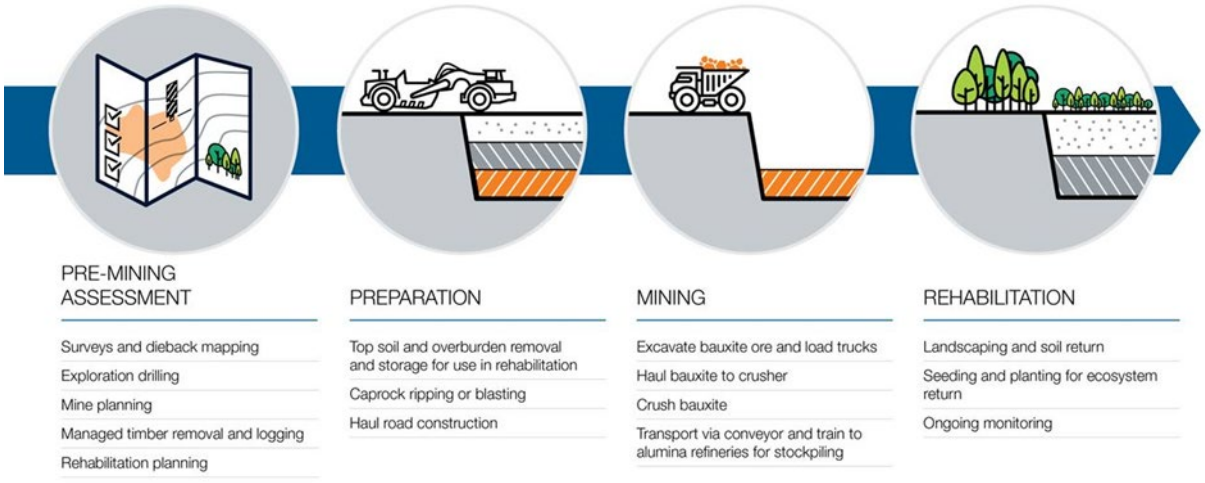

Figure 2-1: Mining cycle sequence

2.1.2 Proposal areas

The Myara North DE comprises an area consisting of the Myara North mine DE and adjacent infrastructure corridors[12] equating to approximately 10,705 ha. The Myara North mine region lies north of the existing Myara mine region. The Myara North mine region is broadly bounded by Jarrahdale State Forest to the west, Serpentine Dam to the south, Monadnocks Conservation Park to the east, and the former Jarrahdale Bauxite Mine to the north.

The Holyoake DE comprises an area consisting of the Holyoake mine DE and adjacent infrastructure corridors equating to approximately 7,624 ha. The Holyoake mine region lies south of the former McCoy mine region, which retains operating mine facilities. The Holyoake mine region is bound by Lake Banksiadale (South Dandalup Dam) to the north-

[12] The Proposal does not include the mining of bauxite ore within the Infrastructure Corridors.

west and the Bibbulmun Track to the south. Dwellingup townsite and Lane Poole Reserve lie approximately 5 km to the west and south-west of the Holyoake mine region, respectively.

The O'Neil DE comprises approximately 5,571 ha within the O'Neil mine region of which portions have been previously cleared for mining and associated activities with most of the cleared areas rehabilitated between 2012-2021. The O'Neil mine region is bound by the Myara mine region to the north, the Serpentine River to the east and McCoy mine region to the west.

2.1.3 Mine zones

To address uncertainty in the mine planning process, Alcoa has sought to better define the areas within a mine DE where: mine development is likely to take place, no development will take place, and locations where infrastructure is required to support or link together mine pits. The total area within a mine DE is then apportioned across these three categories (Infrastructure Corridor DEs can only contain infrastructure development). These three categories are referred to as:

- Avoidance Zones (AZ): Alcoa has adopted a series of environmental, social and heritage constraints to define zones within which it will not develop mine pits, to avoid the direct impacts arising from the extraction of bauxite ore.
- Mine Development Zones (MDZ): Areas within the mine DEs outside of the Avoidance Zones where pit development and ore extraction will take place.
- Low Disturbance Areas (LDA): Alcoa considers the construction of infrastructure and haul roads to be low disturbance activities relative to pit development and ore extraction. These low disturbance activities will be constrained to the MDZ where possible, but it will be necessary to undertake them within the AZ for various mine planning reasons e.g., to connect the pits and provide a route to the crushers, connect facility areas to the public highway, construct a conveyor spur to the proposed Holyoake crusher. LDA are areas within the AZ where these activities must be undertaken. A subcategory of LDAs, LDA fixed, are areas subject to the additional constraint of requiring a Section 18 Aboriginal Heritage consent to undertake the works.

Based on the bauxite ore resource estimates for a mine region, the mine plan, using past experience, can estimate how much clearing will be required to extract the ore and construct the necessary haul roads and other infrastructure, but not the precise locations. Using the process described in Chapter 4 of the ERD (Alcoa, 2025b), Alcoa's Mine Planners, Infrastructure Engineers and Environmental Scientists determined the locations of the AZ, MDZ and LDA within a mine region's DE and apportion the estimated clearing budget (7,500 ha) between the MDZ and LDA.

2.1.4 Proposal timing

The estimated clearing of vegetation to deliver the mine plan associated with the transition of the Huntly Mine's operations into the Myara North, Holyoake and O'Neil DEs over the Proposal period (~2026-2045) is in Table 2-1 .

Table 2-1: Indicative breakdown of clearing within Myara North, Holyoake and O'Neil DEs for the Proposal

Component	Total	Myara North	Holyoake	O'Neil
Project life (years)	20	~7	~15	~4
Clearing within a mine DE (ha)	6,361	2,906	2,393	1,062
Clearing within an Infrastructure corridor DE (ha)	1,139	313	826	0
Total clearing	**7,500**	**3,219**	**3,219**	**1,062**

2.2 Environmental impact

Alcoa have implemented avoidance and mitigation measures to the extent possible at this stage of the assessment. Pre-clearance surveys will be conducted and used to incorporate further avoidance and mitigation measures during operations. Following mining, Alcoa rehabilitate mine pits to jarrah forest, returning habitat for fauna. Haul roads and other infrastructure are rehabilitated once all activities in the respective area are completed.

Alcoa will clear no more than 7,500 hectares of vegetation under this Proposal over an approximate 20 year (~2026-2045) period, if the Proposal is implemented. The environmental impact assessment (Alcoa, 2025b) concluded the Proposal is unlikely to have a significant residual impact on flora and vegetation and therefore no environmental offsets for this EPA factor are proposed. However, the assessment concluded that if implemented, the Proposal is likely to have a significant residual impact on habitat for some species of Threatened fauna.

2.2.1 Flora and vegetation factor

Chapter 5 of the ERD (Alcoa, 2025b) concluded the Proposal, if implemented, is likely to result in residual impacts to the EPA's Flora and Vegetation factor; however, the Proposal is unlikely to cause a *significant residual impact* to Threatened or Priority flora or vegetation. This is in part due to no occurrences of threatened flora or ecological communities being recorded during field surveys. Alcoa will avoid any impacts to threatened or priority flora or ecological communities where possible. Thus, the Proposal is unlikely to have a significant impact on the local extent of habitat for threatened or priority flora species. As the Proposal is unlikely to have a *significant residual impact* on flora and vegetation, no environmental offsets for this EPA factor are proposed.

2.2.2 Terrestrial fauna factor

Alcoa developed an impact avoidance framework with consideration to Recovery Plan guidance for threatened species known, likely or with potential to occur in the Mine DE, including the recovery objectives for each species. Alcoa's objectives to avoid clearing high value habitats for terrestrial fauna[13] include:

[13] Note the three species of south-west black cockatoos: Carnaby's cockatoo, Baudin's cockatoo and forest red-tailed black cockatoo will be collectively referred to as black cockatoos in this document.

- Avoid and/or minimise clearing known and suitable nesting trees for black cockatoos.
- Avoid and/or minimise clearing high value habitat for black cockatoos comprising mature age forest and proximity to perennial water sources.
- Avoid and/or minimise clearing high value habitat for critical weight range comprising in mature age forest and riparian and swamp vegetation.
- Avoid and/or minimise clearing habitat for known populations of threatened fauna with small home ranges: woylie, quokka and Carters freshwater mussel.
- Avoid and/or minimise clearing mesic, restricted range habitats for short-range endemic fauna comprising riparian, swamp and granite outcrop vegetation.

2.2.2.1 Avoidance measures

Avoidance measures are those that include reducing the footprint or changing the location of the footprint to avoid areas with high environmental values (GoWA, 2014). Alcoa's integrated impact avoidance framework for the Mine component of the Proposal, avoids impacts across multiple key environmental factors including terrestrial fauna. Avoidance measures include:

- The Myara North and Holyoake DEs were amended post-referral to avoid approximately 12,133 ha of foraging and potential breeding habitat located within 2 km of perennial water sources; avoid approximately 3,964 ha of mature age forest, being approximately 70 per cent of the mature age forest within the DE at referral and avoid 63 ha of old growth forest, being all old growth forest mapped within the respective DEs at referral[14].
- Inclusion of Avoidance zones which cover approximately 1,644 ha of mapped riparian and swamp vegetation and incorporates a 100 m buffer to mapped riparian and swamp vegetation, approximately 174 km of mapped seasonal streams, approximately 395 ha of mapped granite outcrop vegetation and a series of seasonal pools at Jack Rocks.
- Undertaking targeted surveys in accordance with Alcoa's Fauna Environmental Management Plan to identify all black cockatoo known and suitable nesting trees, and nighttime roosting trees, determine the occupancy of woylie, chuditch and within 100 m of riparian and swamp vegetation to determine the occupancy of quokka. Targeted surveys undertaken for proposed clearing areas for threatened fauna species will include provision to record opportunistic sightings.

2.2.2.2 Mitigation measures

Mitigation measures are measures proposed to be implemented to minimise the impacts of a proposal on the environment (GoWA, 2014). Examples are restricting clearing to outside of breeding seasons. Mitigation measures employed by Alcoa include:

- Ecological linkages will be established within the Mine DE to mitigate fragmentation impacts to on ground fauna, including threatened critical weight range mammals

[14] A small portion of mapped old growth forest (0.26 ha) remaining within the O'Neil DE will be contained within an Avoidance Zone and avoided.

such as chuditch, quokka and woylie. The ecological linkages will be established via a network of Avoidance Zones along riparian corridors within the Mine DE.

- Haul roads, conveyors and other infrastructure will be planned to minimise the area of disturbance within stream zone fauna habitats within the Mine DE, as far as practicable.
- Clearing will be conducted in a progressive manner to allow fauna to relocate, as far as practicable.
- Black cockatoo nesting trees with suitable hollows to be retained within the Mine DE and inspected post clearing activities in the vicinity.
- Mining construction and operations contractors and personnel will be inducted on avoidance of black cockatoo known or suitable nesting trees.

2.2.2.3 Post-mining rehabilitation

Where impacts are not permanent, rehabilitation of disturbed areas can be undertaken. Effective rehabilitation can substantially reduce the permanent impact of a project. Rehabilitation efforts are aimed at restoring the maximum environmental value that is reasonably practicable (GoWA, 2014).

Rehabilitation is a critical component to Alcoa's environmental management system in protecting the biodiversity and ecological integrity of the NJF. Alcoa's rehabilitation approach has demonstrated performance over more than three decades against completion criteria approved by DBCA. These completion criteria aim to meet the objective of a self-sustaining jarrah forest ecosystem that meets multiple forest uses (Alcoa, 2025b).

Alcoa's success in implementing and evolving its rehabilitation program provides confidence in its capacity to adapt as the objective for rehabilitation changes into the future. This may include new WA Government objectives for the NJF with the cessation of timber harvesting and release of the 2024 Forest Management Plan and the potential requirement for enhanced resilience to future climate change and changing fire regimes. Alcoa remains committed to collaborating with DBCA and other agencies to ensure that the Huntly Mine rehabilitation achieves outcomes that protect the biodiversity and ecological integrity of the NJF.

3. Environmental impacts

Under the WA Environmental Offsets Guidelines (GoWA, 2014) significant residual impacts (SRI) are impacts to conservation significant species that remain following application of avoidance and mitigation measures and consideration of rehabilitation of areas not required for permanent infrastructure.

Under the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (DSEWPC, 2012) the term "residual significant impacts" (RSI) is used to identify significant impacts on a matter protected (MNES) under national environment law (the EPBC Act) that remain following avoidance and mitigation measures, where a significant impact is an impact which is important, notable, or of consequence, having regard to its context or intensity (DotE, 2013).

Note: The term significant residual significant impact (SRI) will be used in this document but is to be taken to have the same meaning as residual significant impact (RSI).

3.1 Direct impacts

The Proposal will result in clearing of 7,500 ha at the Huntly Mine over the period of approximately 2026 to 2045, associated with the transition of the Mine to the Myara North, Holyoake and O'Neil regions.

The majority of the clearing (6,592 ha or 87.9 per cent of total) is within the jarrah-marri forest habitat type, due to its association with lateritic soils. This habitat type is anticipated to be subject to mining as well as infrastructure. The jarrah-marri forest provides high quality foraging habitat and scattered breeding habitat for black cockatoos, as well as high value habitat for chuditch, and woylie and priority fauna.

The Proposal is expected to result in limited clearing (up to 1.3 per cent of the total clearing) to blackbutt and bullich forest, flooded gum woodland and melaleuca damplands; these habitat types are more restricted in extent than jarrah-marri forest and are high value for threatened mammals (chuditch, woylie, quokka) and priority fauna. Blackbutt forest is also high quality foraging habitat for forest red-tailed black cockatoo.

Riparian and swamp habitats are important for amphibians and provide seasonal aquatic habitat. Clearing for the Proposal represents up to 3 per cent of the 4,027 ha of riparian and swamp habitats mapped within the Mine DE and up to 1.2 per cent and 0.2 per cent, respectively, of the associated Yarragil and Swamp vegetation complexes remaining in the NJF subregion.

The Proposal is expected to result in very limited clearing (up to 61 ha or <1 per cent of total clearing) to Granite outcrop associations. These habitats are the most restricted in extent within the NJF and provide high value habitat for chuditch and priority fauna.

The direct impacts to habitat (with a habitat quality score of 5 or above[15]) include:

- Clearing of up to 7,415 ha of foraging habitat, up to 7,118 ha of potential breeding habitat for forest red-tailed black cockatoo.

[15] The quantum of impact was only determined for habitats with a quality of 5 (Low to Moderate) or better, as impacts to Low, Marginal or Negligible quality habitats were not considered a significant residual impact.

- Clearing of up to 7,437 ha of foraging habitat, up to 7,065 ha of potential breeding habitat for Baudin's cockatoo.
- Clearing of up to 7,431 ha of foraging habitat, up to 7,160 ha of potential breeding habitat for Carnaby's cockatoo.
- Clearing of up to 7,354 ha of woylie habitat.
- Clearing of up to 7,395 ha of chuditch habitat.
- Clearing of up to 1,359 ha of quokka habitat.

3.2 Significant residual impacts

The significant residual impact (SRI) of the Proposal is the remaining impact after the implementation of avoidance and mitigation measures. Alcoa has undertaken an assessment to determine the SRI for conservation significant species that are likely to be significantly impacted.

Calculations for SRI have been undertaken in consideration of the Offsets Assessment Guide (OAG), which is used to determine offsets under the EPBC Act (DSEWPC, 2012). Offset guidance is also available from the State (DWER, 2021), however, to align the State and Commonwealth EIA processes, Alcoa has elected to use the Commonwealth OAG. The quantification of SRI using the OAG under the EPBC Act does not provide rehabilitation credits within the calculation. The State DWER Environmental Offsets Calculator (DWER 2021) enables the user to determine the environmental value of onsite rehabilitation that would reduce the significant impacts of the Proposal. Through not factoring onsite rehabilitation into the SRI calculation, the resultant Commonwealth SRI is considered more conservative.

Habitat quality within the Mine DE was scored from 0 (no habitat) to 10 (excellent) based on site condition, site context, and species stocking rate. The habitat quality scoring framework has been developed with consideration to EPBC Act and WA environmental offsets guidance and the habitat descriptions in species conservation advice and literature. The habitat quality scoring framework is in Appendix A.

The quantum of impact was determined by multiplying the area of each habitat quality impacted by the quality score divided by ten, then summing across the range of habitat qualities to obtain the total quantum. The average weighted quality score was determined based on the total quantum divided by the total habitat impacted. The quantum of impact was only determined for habitats with a quality of 5 (Low to Moderate) or better, as impacts to Low, Marginal or Negligible quality habitats were not considered a significant residual impact. Determination of the habitat quality score used in the OAG is in Appendix B.

The SRI calculations for conservation significant species affected by the Proposal are presented in Table 3-1. For the purposes of the accredited assessment, the SRI for Myara North and Holyoake are presented separately to the SRI for O'Neil. OAGs are in Appendix C.

Table 3-1: Significant Residual Impact (Commonwealth OAG)[16]

Species	EPBC Act Status	Total area of habitat impacted (ha)	Average weighted habitat quality score	Quantum of impact (ha) (SRI)	Total area of habitat impacted (ha)	Average weighted habitat quality score	Quantum of impact (ha) (SRI)	Total area of habitat impacted (ha	Total Quantum of impact (ha) (SRI)
		Myara North and Holyoake			O'Neil			Proposal	
Forest red-tailed black cockatoo	VU	6,396	9	5,757	1,019	8	815	7,415	6,572
Baudin's cockatoo	EN	6,418	9	5,776	1,019	8	815	7,437	6,591
Carnaby's cockatoo	EN	6,413	8	5,131	1,017	7	712	7,430	5,843
Woylie	EN	6,293	5	3,147	1,061	6	637	7,354	3,783
Chuditch	VU	6,334	7	4,434	1,061	8	849	7,395	5,282
Quokka	VU	674	7	472	686	6	411	1,360	883

[16] Hectares have been rounded to whole numbers. This may result in some total values appearing +/- 1 hectare. At this scale this is not expected to make a material difference to the outcomes.

4. Proposed offsets

Alcoa's mining operations impact vegetation in State Forest. The WA Environmental Offsets Guidelines (GoWA, 2014) expect that impacts to the public conservation estate (including State Forests) will be offset by actions and activities that benefit the estate. Therefore, Alcoa propose to provide an environmental benefit that maintains or enhances environmental values and vegetation within areas of State Forest, as near to the impacts as possible (Alcoa, 2025a). This will provide beneficial conservation outcomes for the surrounding vegetation and species using habitat in the local area. Alcoa propose to deliver these environmental offsets through environmental offset projects implemented within proposed offset conservation areas (Alcoa, 2025a).

4.1 Proposed objectives

In the context of this Offset Proposal, the environmental objectives are the overall aims that Alcoa is seeking to achieve through the implementation of the offset.

The objectives of this Offset Proposal are to:

- Identify areas of important habitat within the NJF that support the ongoing viability of threatened species impacted by the Proposal.
- Implement recovery, threat abatement and conservation actions that enhance important habitat for black cockatoos, chuditch, woylie and quokka.
- Contribute to ongoing research, knowledge and understanding of threatened species and the way they use the NJF.
- Provide information on the appropriateness, suitability and effectiveness of recovery, threat abatement and management actions.
- Provide beneficial conservation outcomes for other species that use the habitat including but not limited to numbats, western ring tailed possums, quenda, brush-tailed phascogale, western brush wallaby and rakali.
- Help resolve key knowledge gaps, identified in consultation with DBCA, that will lead to landscape scale and multi-organisation cooperation to maintain the ongoing ecological integrity of the NJF.

4.2 Proposed outcomes

Alcoa intends to measure success progression towards the achievement of the proposed environmental outcomes. Alcoa will work with the land manager (DBCA), key stakeholders and forest and species ecologists to determine the best method for achieving the proposed outcomes and will report progress on the proposed outcomes to the EPA and DCCEEW annually.

The proposed outcomes in this Offset Proposal have been developed with regards to:

- WA *Environmental Offsets Policy* (GoWA, 2011)
- WA *Environmental Offsets Guidelines* (GoWA, 2014)

- WA EPA *Public Advice: Considering environmental offsets at a regional scale* (EPA, 2024b)
- EPBC Act *Environmental Offsets Policy* (DSEWPC, 2012)
- *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (EPA, 2024a)
- *Environmental outcomes and outcomes-based conditions Interim Guidance* (EPA, 2021)
- *Outcomes-based conditions policy* (Commonwealth of Australia, 2016b)
- *Outcomes-based conditions guidance* (Commonwealth of Australia, 2016a)

Alcoa has proposed surrogate[17] (habitat-based) outcomes with SMART - specific, measurable, achievable, reasonable\realistic and timebound – completion criteria that reflect the condition of the environmental value at the conclusion of the offset period. Surrogate (habitat-based) outcomes are appropriate for this Offset Proposal as:

- The Proposal's significant residual impacts reflect a reduction in habitat for black cockatoos, chuditch, woylie and quokka; albeit with habitat returned for some species in shorter timeframes through Alcoa's post-mining rehabilitation program.
- Habitat-based outcomes support positive conservation outcomes for black cockatoos, woylie, chuditch and quokka. The extent and quality of habitat can be improved by changing non or low functional habitat (i.e. suitable habitat that lacks important habitat features or is impacted by other factors) to functional habitat (habitat that fully supports a species and/or its lifecycle).
- Measuring habitat condition provides a consistent, cost and time-efficient way of monitoring the outcomes.
- Outcomes will be achieved through the implementation of a suite of environmental offset projects, with each project contributing towards achieving the proposed outcomes. That is, no one project alone will achieve the proposed outcome for each species.
- Changes in populations of black cockatoos, woylie, chuditch and quokka can be difficult to monitor accurately in unfenced areas given their highly mobile nature, large areas of occupancy and/or lack of population information and baseline survey data across the NJF.

4.2.1 Myara North and Holyoake

Through the implementation of the environmental offsets, Alcoa proposes the following environmental outcomes, delivered in tranches, to counterbalance impacts from clearing of habitat in Myara North and Holyoake:

- Deliver a net-gain in the condition of at least 17,600 hectares of vegetation that provides habitat for forest red-tailed black cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each

[17] Surrogate outcomes specify an outcome (or a level of performance to be achieved) for something which directly supports the protected matter (Commonwealth of Australia, 2016b)

corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.

- Deliver a net-gain in the condition of at least 19,275 hectares of vegetation that provides habitat for Baudin's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 17,550 hectares of vegetation that provides habitat for Carnaby's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 11,600 hectares of vegetation that provides habitat for woylie through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 14,350 hectares of vegetation that provides habitat for chuditch through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 1,525 hectares of vegetation that provides habitat for quokka through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Contribute information to address key knowledge gaps that will ultimately assist with maintenance of the ongoing ecological integrity of the Northern Jarrah Forest Interim Biogeographic Regionalisation of Australia Subregion.

4.2.2 O'Neil

Through the implementation of the environmental offsets, Alcoa proposes the following environmental outcomes, delivered in tranches, to counterbalance the Pinjarra Alumina Referring Revised Proposal's impacts from clearing of habitat in O'Neil:

- Deliver a net-gain in the condition of at least 2,750 hectares of vegetation that provides habitat for forest red-tailed black cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 2,790 hectares of vegetation that provides habitat for Baudin's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset

conservation area, within 5 years; then maintain this score until the completion of the offset period.

- Deliver a net-gain in the condition of at least 2,500 hectares of vegetation that provides habitat for Carnaby's cockatoos through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 2,290 hectares of vegetation that provides habitat for woylie through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 2,670 hectares of vegetation that provides habitat for chuditch through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Deliver a net-gain in the condition of at least 1,370 hectares of vegetation that provides habitat for quokka through a one point increase in the weighted average habitat quality score against the baseline within each corresponding offset conservation area, within 5 years; then maintain this score until the completion of the offset period.
- Contribute information to address key knowledge gaps that will ultimately assist with maintenance of the ongoing ecological integrity of the Northern Jarrah Forest Interim Biogeographic Regionalisation of Australia Subregion.

4.3 Environmental offset projects

Alcoa is developing a suite of environmental offset projects that, when implemented over the life of the offset period, will collectively deliver a net-gain for black cockatoos, chuditch, woylie and quokka and meet the outcomes in this Offset Proposal. The environmental offset projects address recovery and threat abatement actions such as:

- Management and monitoring of black cockatoo breeding and non-breeding habitat and associated feeding habitat
- Retain and improving habitat critical for survival for woylie, chuditch and quokka
- Predator and feral pest control
- Investigation and on-ground trials of fire mitigation technologies
- Rehabilitation of remnant vegetation
- Surveys which contribute to understanding of distribution and population structure and patterns of habitat usage.

Environmental offset projects will be delivered at a local, landscape or regional scale. Conservation actions delivered at a local scale will provide ecological benefit at a landscape scale due to cumulative effect of offset projects. Environmental offset projects will be delivered implemented as close to the impacts as possible.

Alcoa has applied a framework of adaptive management, with contingency actions built into the project plans to account for risks of unexpected events. Alcoa will continually develop, monitor and adapt environmental offset projects over the offset period. Projects will be subject to change based on outcomes of pre-clearance and/or baseline surveys; or if new research findings, best-practice methodology, survey information or conservation action indicate a new project should be developed or existing project revised (i.e. incorporate learnings from implementation of projects). Thus, Alcoa require the ability to adapt the environmental offset projects over the offset period, while still ensuring the environmental offset projects deliver the environmental outcomes.

Through on-going stakeholder consultation Alcoa propose to align additional conservation actions to support current relevant management plans, recovery plans or other conservation actions. The proposed suite of indicative environmental offset projects for this Proposal is presented in Table 4-1.

These conservation actions have been developed based on a high confidence in providing a tangible outcome to fauna and/or their habitat; and being additional to those proposed or that are currently undertaken by the DBCA in the management of State Forest under the 2024 – 2033 Forest Management Plan (CPC, 2023).

Environmental offset projects will be implemented in proposed offset conservation areas by Alcoa delivery partners.

4.3.1 Environmental offset project plans

Each Offset Project will have a corresponding Environmental Offset Project Plan that will be developed in accordance with WA and Commonwealth Government guidance on preparation of environmental offset management plans. Environmental Offset Project Plans

will setup the framework for the delivery of the project. Environmental Offset Project Plans will:

- Demonstrate how the project will provide, or contribute to providing, a net gain for the species or matter of national environmental significance impacted by the Proposal.
- Demonstrate how the actions are additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs.
- Demonstrate how the project will compliment other regional or recovery plans, efforts across government, natural resource management organisations and industry to deliver cost effective and strategic on-ground change.
- Be based on advice from the DBCA, forest ecologists and species experts and use sound environmental information and knowledge.
- Apply an adaptive management framework, including performance criteria, triggers and indicative contingency actions to effectively account for, and manage, the risk of the environmental offset project not succeeding.
- Have deliverables, milestones and targets that can be readily measured, monitored and audited.
- Contain achievable, scientifically robust and reasonable project-specific targets that can be peer-reviewed.
- Be relevant and improve the knowledge and understanding of the impacted species in the scientific community and the public.
- Provide a mechanism by which the project progress will be published or made publicly available.
- Be cost-effective and make the best use of the funds and resources to deliver desired outcomes.
- Be consistent with relevant offset policies and guidelines and in compliance with other relevant legislation and regulations (e.g., have relevant licences and permits such as ethics approval).

Draft Environmental Offset Project Plans have been provided in Appendix D to detail the conservation actions proposed to be undertaken.

Table 4-1: Proposed environmental offset projects overview

Project overview and proposed objectives	Key conservation actions and relationship to environmental value	Relevant recovery plan action	How conservation actions address recovery and/or threat abatement actions

Black cockatoo
 	
Enhance black cockatoo foraging, roosting and breeding habitat to address threatening processes.
 	
Proposed objectives
 	
• Identify, manage and protect important black cockatoo habitat within the Northern Jarrah Forest.
 	
• Develop a network of permanent drinking water points for black cockatoos throughout State Forest.
 	
• Contribute to ongoing research, knowledge and understanding of black cockatoo movement and use of habitats in the Northern Jarrah Forest.
 	
• Provide information on the appropriateness, suitability and effectiveness of black cockatoo conservation measures.
 	
• Provide beneficial conservation outcomes for other species that use the habitat including but not limited to chuditch, woylie, quokka, numbats, western ring tailed possums, quenda, brush-tailed phascogale, western brush wallaby and rakali.
	Key conservation actions
	
	• Spatially map key black cockatoo habitat.
	
	• Survey, monitor and protect black cockatoo known and suitable nest trees.
	
	• Maintain / repair black cockatoo known nest hollows.
	
	• Survey and monitor black cockatoo potential nest trees.
	
	• Install and maintain permanent drinking water points for black cockatoo.
	
	Directly benefits
	
	• Forest red-tailed black cockatoo
	
	• Baudin's cockatoo
	
	• Carnaby's cockatoo
	
	Indirectly benefits
	
	• Vegetation health and condition
	
	• Ground dwelling native species including chuditch, woylie and quokka
		Carnaby's Cockatoo Recovery Plan (DPaW2013)
		
		• Action 1 Protect and Manage Important Habitat
		  ○ Management of breeding habitat and associated feeding habitat
		  ○ Protection and management of non-breeding habitat
		• Action 2 Undertake Regular Monitoring
		  ○ Monitoring breeding
		  ○ Monitoring non-breeding factors
		• Action 3: Conduct Research to Inform Management
		
		Forest Black Cockatoo (Baudin's Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan (Chapman, 2008)
		
		• 14.1. Seek the funding required to implement future recovery actions.
		
		• 14.6 Identify factors affecting the number of breeding attempts and breeding success and manage nest hollows to increase recruitment.
		
		• 14.7 Determine and implement ways to minimise the effects of mining and urban development on habitat loss.
		
		• 14.8 Determine and implement ways to manage forests for the conservation of Forest Black Cockatoos.
		
		• 14.9 Identify and manage important sites and protect from threatening processes.
		
		• 14.10 Map feeding and breeding habitat critical to survival and important populations and prepare management guidelines for these habitats.
		
		• 14.11 Monitor population numbers and distribution.
		
		• 14.12 Determine the patterns and significance of movement.
			• **DIRECT**: Use of areas for biodiversity offsets supports protection from future habitat loss from clearing.
			• **INDIRECT**: Spatial mapping of key black cockatoo habitat in areas of State Forest to enable additional protection measures. Supports conservation planning actions including addressing threatening process and prescribed burning.
			  ○ Identification of areas that are critical to the survival of Carnaby's cockatoo, specifically locating and mapping breeding sites.
			  ○ Identify and manage important Baudin's and forest red-tailed black cockatoo sites and protect these areas from threatening processes.
			  ○ Map feeding and breeding habitat critical to survival of Baudin's and forest red-tailed black cockatoos.
			• **DIRECT:** Provide drinking water points, identify and maintain natural hollows, implement on-ground protection measures around breeding habitat
			  ○ Protecting and enhancing existing Carnaby's cockatoo habitat, including existing and potential breeding, foraging and roosting habitat.
			  ○ Maintaining natural and artificial water sources used by Carnaby's cockatoos.
			  ○ Increase hollow availability by repairing damaged and suboptimal hollows used by Carnaby's cockatoos for breeding.
			• **INDIRECT:** Monitor black cockatoo movement, foraging, roosting and breeding activities
			  ○ Identify factors affecting the number of Baudin's and forest red-tailed black cockatoo breeding attempts and breeding success and manage nesting hollows to increase recruitment.
			  ○ Inform management of the forest for the conservation of Baudin's and forest red-tailed black cockatoos.
			  ○ Support monitoring of population numbers and distribution of Baudin's and forest red-tailed black cockatoos in the NJF.
			  ○ Provide information towards determining the patterns and significance of movement of Baudin's and forest red-tailed black cockatoos in the NJF.
			
			Indirect conservation outcomes will lead to direct benefits for all three species of black cockatoos as it will provide additional information to inform direct conservation actions.

Project overview and proposed objectives	Key conservation actions and relationship to environmental value	Relevant recovery plan action	How conservation actions address recovery and/or threat abatement actions

Feral fox and cat management
 	
Reduce feral fox and cat abundance and/or distribution in important threatened species habitat areas.
 	
Proposed objectives
 	
• Identify areas of habitat that support populations of quokka, chuditch and/or woylies.
• Implement feral fox and cat controls to reduce the abundance and/or distribution of feral foxes and cats in areas in and around identified populations of quokka, chuditch and/or woylies.
• Sustain or improve abundance and/or distribution of chuditch, woylie and quokka within the proposed offset conservation area to support the species ongoing viability in the NJF16F[18].
• Contribute to ongoing research, knowledge and understanding of feral predator movements, seasonal cycles, cause/effect of managing feral foxes on feral cat populations, response of native fauna to feral fox and cat management in different aeras or habitats within the NJF.
• Provide information on the appropriateness, suitability and effectiveness of targeted fox and feral cat management measures when combined with (or without) aerial baiting.
• Provide beneficial conservation outcomes for other species that use the habitat including but not limited to numbats, western ring tailed possums, quenda, brush-tailed phascogale, western brush wallaby and rakali.
	Key conservation actions
	
	• Map habitat that supports populations of quokka, chuditch and/or woylies.
	• Determine and implement suitable and appropriate feral fox and cat control measures.
	• Ongoing monitoring of identified chuditch, woylie and quokka habitat and/or populations.
	
	Directly benefits
	
	• Woylie
	• Chuditch
	• Quokka
	
	Indirectly benefits
	
	• Forest red-tailed black cockatoo
	• Baudin's cockatoo
	• Carnaby's cockatoo
	• Vegetation health and condition
	• Other ground dwelling native species
		National Recovery Plan for the woylie *Bettongia penicillata* (Yeatman & Groom, 2012)
		
		• Action 2: Minimise predation by introduced foxes and cats at priority sites.
		• Activity 10 Continue baiting introduced predators under the relevant WA Government (Western Shield and Whiteman Park in WA, Bounceback in SA) and private management programs (AWC sanctuaries, Shire of Narembeen and private property), enhancing the effectiveness of these, where possible.
		• Activity 11 Identify and implement an appropriate feral cat control method to achieve enhanced woylie conservation.
		• Activity 13 Monitor the effectiveness of predator control programs on the activity and/or abundance of target predator species and the responses by woylies.
		
		Chuditch (*Dasyurus geoffroii*) National Recovery Plan (DEC, 2012)
		
		• Action 1. Retain and improve habitat critical for survival.
		• Action 2. Determine impacts of feral cats on chuditch
		• Action 3. Determine the impact of feral cat control methods on chuditch.
		• Action 4. Continue, expand and improve baiting of foxes and feral cats.
		• Action 5. Determine population abundance and distribution of chuditch populations.
		• Action 6. Establish reference sites for monitoring chuditch population abundance to evaluate the effectiveness of fox and cat control.
		
		Quokka *Setonix brachyurus* Recovery Plan (DEC, 2013)
		
		• Undertake survey and regular monitoring
		• Undertake research and monitoring to improve understanding of threats and effectiveness of mitigation programs
		• Continue introduced predator control programs on WA Government land, and where possible, coordinate baiting programs across different land tenures to maximise effectiveness.
			• **DIRECT:** Use of areas for biodiversity offsets supports protection from future habitat loss from clearing.
			• **DIRECT:** Improve habitat availability and functionality for chuditch, woylie and quokka through reductions in presence of feral foxes and cats.
			• **DIRECT:** Reduce infant and adult mortality with the reduction in presence of feral foxes and cats.
			• **INDIRECT:** Provides information on
			  ○ the impact of feral foxes and cats on chuditch, woylie and quokka in the NJF
			  ○ best / most appropriate use of targeted on-ground fox and feral cat control methods in the NJF
			• **INDIRECT**: Provides long-term monitoring and information on population abundance and distribution of chuditch, woylie and quokka populations in the NJF.

[18] Chuditch are a native predator of the woylie. The interaction between these species requires further study to fully understand the balance between abundance and density of woylies compared to the abundance and density of chuditch within a naturally functioning ecosystem.

Project overview and proposed objectives	Key conservation actions and relationship to environmental value	Relevant recovery plan action	How conservation actions address recovery and/or threat abatement actions

Feral pig management
 	
Reduce feral pig abundance and/or distribution in important threatened species habitat areas.
 	
Proposed objectives
 	
• Identify areas of riparian (or other) habitat that support populations of quokka, chuditch and/or woylies.
• Implement feral pig controls to reduce the abundance and/or distribution in areas in and around identified populations of quokka, chuditch and/or woylies.
• Sustain or improve abundance and/or distribution of chuditch, woylie and quokka within the proposed offset conservation area to support the species ongoing viability in the NJF[19].
• Contribute to ongoing research, knowledge and understanding of feral pig movements, seasonal cycles, cause/effect of managing feral pig populations, response of native fauna to feral pig management in different aeras or habitats within the NJF.
• Provide information on the appropriateness, suitability and effectiveness of targeted feral pig management measures.
• Provide beneficial conservation outcomes for other species that use the habitat including but not limited to numbats, western ring tailed possums, quenda, brush-tailed phascogale, western brush wallaby and rakali.
	Key conservation actions
	
	• Map habitat that supports populations of quokka, chuditch and/or woylies.
	• Determine and implement suitable and appropriate feral pig control measures.
	• Ongoing monitoring of identified chuditch, woylie and quokka habitat and/or populations.
	
	Directly benefits
	
	• Woylie
	• Chuditch
	• Quokka
	• Carnaby's cockatoo
	• Baudin's cockatoo
	• Forest red-tailed black cockatoo
	• Vegetation health and condition
	• Stream health and condition
	• Other ground dwelling native species
		National Recovery Plan for the woylie *Bettongia penicillata* (Yeatman & Groom, 2012)
		
		• Does not list recovery actions specific to habitat improvement or reduction in feral pigs, however predation, habitat degradation, competition and disease transmission by feral pigs is listed as a threatening process.
		
		Chuditch (*Dasyurus geoffroii*) National Recovery Plan (DEC, 2012)
		
		• Action 1. Retain and improve habitat critical for survival.
		
		Quokka *Setonix brachyurus* Recovery Plan (DEC, 2013)
		
		• 14.4 Protect and manage key populations and habitats
		  ○ Identify and implement feral pig control at priority sites where control will have the greatest conservation outcome for quokka.
			• **DIRECT:** Use of areas for biodiversity offsets supports protection from future habitat loss from clearing.
			• **DIRECT:** Improve habitat condition through reducing feral pigs.
			• **INDIRECT:** Provides information on
			  ○ the impact of feral pigs to habitat for quokka, woylie and chuditch in the NJF
			  ○ best / most appropriate use of targeted feral pig control methods in the NJF
			
			• **INDIRECT**: Provides long-term monitoring and information on population abundance and distribution of chuditch, woylie and quokka populations in the NJF.

[19] Chuditch are a native predator of the woylie. The interaction between these species requires further study to fully understand the balance between abundance and density of woylies compared to the abundance and density of chuditch within a naturally functioning ecosystem.

Project overview and proposed objectives	Key conservation actions and relationship to environmental value	Relevant recovery plan action	How conservation actions address recovery and/or threat abatement actions

Fire mitigation (phase 1[20])
 	
Investigate the appropriateness and suitability (feasibility) of using early fire detection technologies in the NJF.
 	
Proposed objectives
 	
• Determine if early fire detection technologies used in other Australian states are suitable and appropriate for use in the NJF in high value habitat areas (for example, black cockatoo known breeding areas) or at scale across the region.
	Key conservation actions
	
	• Undertake a feasibility study of early fire detection technologies.
	
	• Develop a framework for a trial (if appropriate) of early fire detection technologies.
	
	Directly benefits
	
	• Flora
	
	• Vegetation
	
	• Native fauna
	
	• Waterways
		Carnaby's Cockatoo Recovery Plan (DPaW, 2013)
		
		• Action 1 Protect and Manage Important Habitat
		  ○ Implement management to protect and improve the condition of breeding habitat and associated feeding habitat, including activities that manage fire regimes
		
		Forest Black Cockatoo (Baudin's Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan (Chapman, 2008)
		
		• 14.8. Determine and implement ways to manage forests for the conservation of Forest Black Cockatoos.
		  ○ 4. Marking and protection of known nest trees from logging, fire and firefighting activity.
		
		Chuditch (*Dasyurus geoffroii*) National Recovery Plan (DEC, 2012)
		
		• Action 1. Retain and improve habitat critical for survival.
		
		National Recovery Plan for the woylie *Bettongia penicillata* (Yeatman & Groom, 2012)
		
		• Does not list recovery actions specific to habitat improvement or fire, however it identifies altered fire regimes as reducing the effective area of habitat that meets all of the food and shelter requirements of woylies and increases their vulnerability to exotic predators.
		
		Quokka *Setonix brachyurus* Recovery Plan (DEC, 2013)
		
		• 14.4 Protect and manage key populations and habitats
		  ○ No specific actions around fire management other than to implement the DEC Quokka Fire Management Guideline No S5 and monitor success.
			INDIRECT: Feasibility study that identifies and assesses the appropriateness and potential suitability of early fire detection technologies within native vegetation of the Northern Jarrah Forest.
			
			DIRECT: If an appropriate and potentially suitable early fire detection technology (or technologies) is considered feasible in the NJF, development of a trial/testing program in an appropriate location.
			
			INDIRECT: Report detailing the results from the trial installation and testing; with recommendations for scaling and rolling out the technology to the NJF.

[20] If the evaluation demonstrates that the implementation of early fire detection technologies will provide a significant benefit, including the reduction in large scale high frequency high intensity bushfires, Alcoa will investigate a second phase that looks at how the offsets can support the roll-out of the technology across a wider area in the NJF.

Project overview and proposed objectives	Key conservation actions and relationship to environmental value	Relevant recovery plan action	How conservation actions address recovery and/or threat abatement actions

Forest health: Management of dieback and / or disease
 	
Reduce the anthropologic spread of dieback in high value habitat areas.
 	
Proposed objectives
 	
• Identify high value habitat areas (for example, black cockatoo known breeding areas) at risk of dieback or other disease in the NJF.
 	
• Reduce the impacts from dieback or other disease in high value habitat areas (for example, black cockatoo known breeding areas) in the NJF.
	Key conservation actions
	
	• Spatially map key black cockatoo habitat.
	
	• Spatially map habitat that supports populations of quokka, chuditch and/or woylies.
	
	• Undertake dieback mapping[21].
	
	• Installation of dieback wash stations between infested and uninfected areas, especially where there are walking and/or vehicle tracks into/out of high value habitat areas.
	
	• Install "green bridges" (limestone) between infested and uninfected areas.
	
	• Fence or prohibit access to high priority uninfected areas.
	
	• Stem injection with phosphite around high value habitat areas.
	
	Directly benefits
	
	• Flora
	
	• Vegetation
	
	• Native fauna
	
	• Waterways
		Carnaby's Cockatoo Recovery Plan (DPaW, 2013)
		
		• Action 1 Protect and Manage Important Habitat
		  ○ Implement management to protect and improve the condition of breeding habitat and associated feeding habitat, including activities that …manage dieback
		
		Forest Black Cockatoo (Baudin's Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan (Chapman, 2008)
		
		• 14.8. Determine and implement ways to manage forests for the conservation of Forest Black Cockatoos.
		  ○ Mapping of risk areas and provision of other information needed to identify areas of high priority for protection of important forest habitat from *Phytophthora cinnamomi* dieback.
		
		National Recovery Plan for the woylie *Bettongia penicillata* (Yeatman & Groom, 2012)
		
		• Activity 6 Implement a plan to reduce the risk of introduction of Phytophthora infection into important woylie population habitats.
		
		Chuditch (*Dasyurus geoffroii*) National Recovery Plan (DEC, 2012)
		
		• Action 1 Retain and improve habitat critical for survival.
		  ○ Does not list recovery actions specific to dieback.
		
		Quokka *Setonix brachyurus* Recovery Plan (DEC, 2013)
		
		• 14.4 Protect and manage key populations and habitats
		  ○ No specific actions around dieback management however does state the loss of forest structure through *Phytophthora* dieback has the potential to increase the risk of predation of, and result in the loss of food resources for quokka.
		
		• 14.3 Undertake research and monitoring to improve understanding of threats and effectiveness of mitigation programs.
		  ○ Investigate the historical and contemporary impacts of *Phytophthora* dieback on quokka distribution and habitat and make management recommendations based on the findings.
			• **INDIRECT**: Spatial mapping of key black cockatoo, chuditch, woylie and/or quokka habitat in areas of State Forest.
			
			• **INDIRECT:** Spatial mapping of dieback risk areas.
			
			• **DIRECT**: Reduction in the anthropologic spread of dieback, particularly in identified areas of high value habitat.
			
			• **INDIRECT**: Information of the applicability and outcomes from use of any new detection or mitigation technologies applied to dieback management.

[21] Use of advanced dieback detection techniques, for example dieback detector dogs, may be considered under this project.

Project overview and proposed objectives	Key conservation actions and relationship to environmental value	Relevant recovery plan action	How conservation actions address recovery and/or threat abatement actions

Forest health: understory rehabilitation
Undertake actions that improve the habitat for threatened fauna, primarily in the understory.
Proposed objective
• Rehabilitate degraded understory to improve habitat for threatened fauna.
	Key conservation actions
	• Weed control.
	• In-fill planting with appropriate native species at appropriate densities in suitable locations.
	• Improve vegetation that encourages prey species for chuditch and woylie or browse habitat for quokka.
	• Provide artificial dens for chuditch or woylie where the number of den logs and stumps is inadequate.
	Directly benefits
	• Flora, vegetation, native fauna and waterways
		Carnaby's Cockatoo Recovery Plan (DPaW, 2013)
		• Action 1 Protect and Manage Important Habitat
		  ○ Management of breeding habitat and associated feeding habitat
		  ○ Protection and management of non-breeding habitat
		Forest Black Cockatoo (Baudin's Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan (Chapman, 2008)
		• 14.9 Identify and manage important sites and protect from threatening processes.
		• 14.10 Map feeding and breeding habitat critical to survival and important populations and prepare management guidelines for these habitats.
		National Recovery Plan for the woylie *Bettongia penicillata* (Yeatman & Groom, 2012)
		• Does not list recovery actions specific to habitat improvement.
		Chuditch (*Dasyurus geoffroii*) National Recovery Plan (DEC, 2012)
		• Action 1. Retain and improve habitat critical for survival.
		Quokka *Setonix brachyurus* Recovery Plan (DEC, 2013)
		• Identify areas of potential quokka habitat and apply management regimes to maintain these habitats for quokkas. Identify suitable areas of remnant vegetation that can be protected or enhanced through revegetation and hydrological management.
			To be prepared following baseline habitat surveys.

Forest health: overstory rehabilitation Undertake actions that improve the habitat for threatened fauna, primarily in the overstory. **Proposed objectives** • Rehabilitate degraded overstory to improve habitat for threatened fauna.	**Key conservation actions** • In-fill planting with appropriate native species at appropriate densities in suitable locations. **Directly benefits** • Flora, vegetation, native fauna and waterways		To be prepared following baseline habitat surveys.
Forest health: ecological corridors Undertake actions that improve the riparian or wetland habitat for threatened fauna **Proposed objective** • Rehabilitate degraded riparian vegetation to improve habitat for threatened fauna.	**Key conservation actions** • Weed control. • In-fill planting with appropriate native species at appropriate densities in suitable locations. • Improve vegetation that encourages prey species for chuditch and woylie or browse habitat for quokka. **Directly benefits** • Flora, vegetation, native fauna and waterways		To be prepared following baseline habitat surveys.

Project overview and proposed objectives	Key conservation actions and relationship to environmental value	Relevant recovery plan action	How conservation actions address recovery and/or threat abatement actions
Research Research projects will be prepared with clear objectives that relate directly to the impact and provide positive conservation outcomes for the species. Environmental offset projects will build on the knowledge and understanding of species movement and use in the forest, management of threats and suitability of conservation actions. Environmental offset projects will be planned with Alcoa's research staff so that the information and data obtained during the implementation of conservation actions can be used to support the proposed research objective. **Proposed objective** • Improve the management and protection of existing conservation estate, adding to existing government initiatives, policies or strategies or address priority knowledge gaps.	N/A	**Carnaby's Cockatoo Recovery Plan (DPaW, 2013)** • Action 3: Conduct Research to Inform Management **Forest Black Cockatoo (Baudin's Cockatoo *Calyptorhynchus baudinii* and Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*) Recovery Plan (Chapman, 2008)** • Determining (and implementing) ways to remove feral Honeybees from nesting hollows. **National Recovery Plan for the woylie *Bettongia penicillata* (Yeatman & Groom, 2012)** • Activity 8 Support post-graduate and other external research that is most relevant to woylie recovery. • Activity 14 Monitor the health, breeding, condition, population abundance and demographics at known mainland woylie populations at least annually and population genetics at least every 5-10 years. • Activity 15 Ensure relevant translocation and population research results are incorporated in improved recovery planning. **Chuditch (*Dasyurus geoffroii*) National Recovery Plan (DEC, 2012)** • Action 2 Determine impacts of feral cats on chuditch • Action 3 Determine impacts of feral cat control methods on chuditch • Action 5 Determine population abundance and distribution of chuditch populations. • Action 6 Establish reference sites for monitoring chuditch population abundance to evaluate the effectiveness of fox and cat control **Quokka *Setonix brachyurus* Recovery Plan (DEC, 2013)** • 14.3 Undertake research and monitoring to improve understanding of threats and effectiveness of mitigation programs.	To be completed once appropriate research projects are identified. Research projects will be developed in consultation with the DBCA, stakeholders and Alcoa's Forest Research Centre.

4.4 Proposed offset conservation areas

Weerheim (2008) states the identification of key habitat areas is an important step in conservation planning. Alcoa's proposed offset conservation areas (POCAs) have been identified through a rigorous and robust assessment, followed by a desktop assessment and initial terrestrial fauna habitat survey. Alcoa will continue to work with the WA Government and other key stakeholders to identify and secure further POCAs.

4.4.1 Methodology for identifying POCAs

Alcoa's mineral lease, ML1SA, is around 710,000 hectares of mostly intact native vegetation classified as State Forest. Alcoa also owns freehold land within the NJF IBRA subregion.

Alcoa reviewed its landholdings, and while there are some parcels that may be suitable for revegetation, the areas are small and scattered throughout the subregion. While revegetation to create habitat for threatened species is highly regarded, given the context of the region, this parcel-by-parcel approach is unlikely to provide significant additional value in the context of the quantum of habitat present in the subregion.

To identify offset areas that would contribute to the enhancement of vegetation and species habitat in the NJF in a holistic and meaningful way, Alcoa proposes to implement the conservation actions in State Forest as close to the impact area as possible.

Alcoa has conducted an extensive review of its mineral lease area to locate areas that have high environmental values that would benefit from additional conservation actions.

To locate these areas Alcoa considered:

- Alcoa's long term mine plans.
- State Forest proposed for higher conservation tenure in the 2024-2033 Forest Management Plan.
- Areas that are of high conservation value and/or adjoin protected areas[22].
- Former mining areas that contain unmined forest and older post-mining rehabilitation.
- Areas that have high social, recreational, environmental or cultural values.
- Consultation with DBCA regional staff, forest and species ecologists and subject matter exerts, the local community, local government, other proponents, rangers and indigenous groups.

[22] Protected areas are defined as per the Collaborative Australian Protected Areas Database (CAPAD) as clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values (IUCN Definition 2008). These areas are mapped in the DBCA - Legislated Lands and Waters (DBCA-011) with an IUCN classification of I, II, III, IV, V or VI.

4.4.2 Methodology for assessing POCA suitability

Following identification of areas that may be suitable as offset areas, Alcoa engaged suitably experienced field ecologists to undertake a desktop study and an initial terrestrial fauna habitat survey. The desktop study and terrestrial fauna habitat assessment was conducted in accordance with the EPA *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

The desktop study included obtaining and/or reviewing:

- The Protected Matters Search Tool (PMST) to identify communities and species listed under the (EPBC Act) and species modelled areas of distribution.
- The DBCA NatureMap database for fauna species previously recorded within or within a 5 km buffer of the POCA (DBCA 2007-).
- Current[23] threatened and priority flora and fauna database search results received from the Species and Communities Branch of the DBCA.
- Publicly available geographic information system (GIS) data and datasets including broad-scale vegetation mapping, geology/soils and hydrological information and the Atlas of Living Australia.
- Previous survey information held by Alcoa relating to fauna recorded in Alcoa's ML1SA mining lease within the NJF.
- Ecological data provided under data sharing agreements.
- Aerial or satellite photography or other remote sensing data.

The terrestrial fauna habitat assessment provided:

- High level mapping and description of fauna habitat(s).
- Assessment of the suitability of habitat to support foraging, shelter, denning/breeding or dispersal for threatened fauna.
- Recorded sightings of significant[24] fauna and/or evidence or signs of their presence/absence.
- Recorded sightings of pest or feral[25] fauna species and/or evidence or signs of their presence.
- Assessed the likelihood of occurrence of significant fauna and feral predators, based on habitat type and observations/evidence.
- Identified potential future survey site locations and site logistics and access.

[23] No older than six months
[24] For this scope of work, significant fauna means fauna identified as a Matter of National Environmental Significance (MNES), or fauna listed under the WA Government *Biodiversity Conservation Act 1986*.
[25] For this scope of work, pest or feral fauna are any introduced species that are a threat to the native fauna and/or its habitat. Examples include pigs, goats, deer, foxes, cats, rabbits and/or bees.

4.4.3 Stakeholder Consultation

Alcoa are consulting with the landowner (the WA Government) and the vested agency (DBCA) to secure the land for the implementation of the conservation actions described in Section 4.4.4.

Consultees include:

- The DBCA and the Conservation and Parks Commission of WA.
- The Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) for long-term protection from disturbance.
- The Department of Jobs, Tourism, Science and Innovation (JTSI) to ensure the areas align with Alcoa's State Agreement(s).
- Traditional Owners.
- Communities and environmental non-government agencies.
- The Department of Planning, Lands and Heritage (DPLH) to align with regional planning processes.
- The Department of Water and Environmental Regulation (DWER).

4.4.4 Proposed offset conservation areas

Alcoa has identified two initial offset conservation areas that will contribute to the proposed outcomes. The proposed offset conservation areas (POCAs) are summarised in Table 4-2, the locations are in Figure 4-1 and the draft Offset Area Management Plans are in Appendix E.

Further offset conservation areas will be identified in accordance with methodology and timings outlined in this section.

Table 4-2: Proposed offset conservation areas

Proposed offset conservation area	Indicative habitat area within the POCA
Jarrahdale - POCA001	• 2,536 hectares of forest red-tailed black cockatoo habitat including foraging, potential roosting and potential breeding habitat • 2,343 hectares of Baudin's cockatoo foraging habitat, including foraging, potential roosting and potential breeding habitat • 2,343 hectares of Carnaby's cockatoo foraging habitat, including foraging, potential roosting and potential breeding habitat • 2,684 hectares of woylie habitat, including 323 hectares of dense riparian vegetation and 2,360 hectares of open upland vegetation

Proposed offset conservation area	Indicative habitat area within the POCA
	• 2,685 hectares of chuditch habitat, including 323 hectares of dense riparian vegetation and 2,362 hectares of open upland vegetation • 2,684 hectares of quokka habitat, including 323 hectares of habitat critical to the survival of quokka and 2,360 hectares of open upland vegetation that may be used opportunistically by quokka.
Dwellingup – POCA005	Data presented is indicative and will be revised following field surveys. • 4,665 hectares of forest red-tailed black cockatoo habitat • 4,665 hectares of Baudin's cockatoo habitat • 4,665 hectares of Carnaby's cockatoo habitat • 4,665 hectares of woylie habitat • 4,665 hectares of chuditch habitat • TBC hectares of quokka habitat

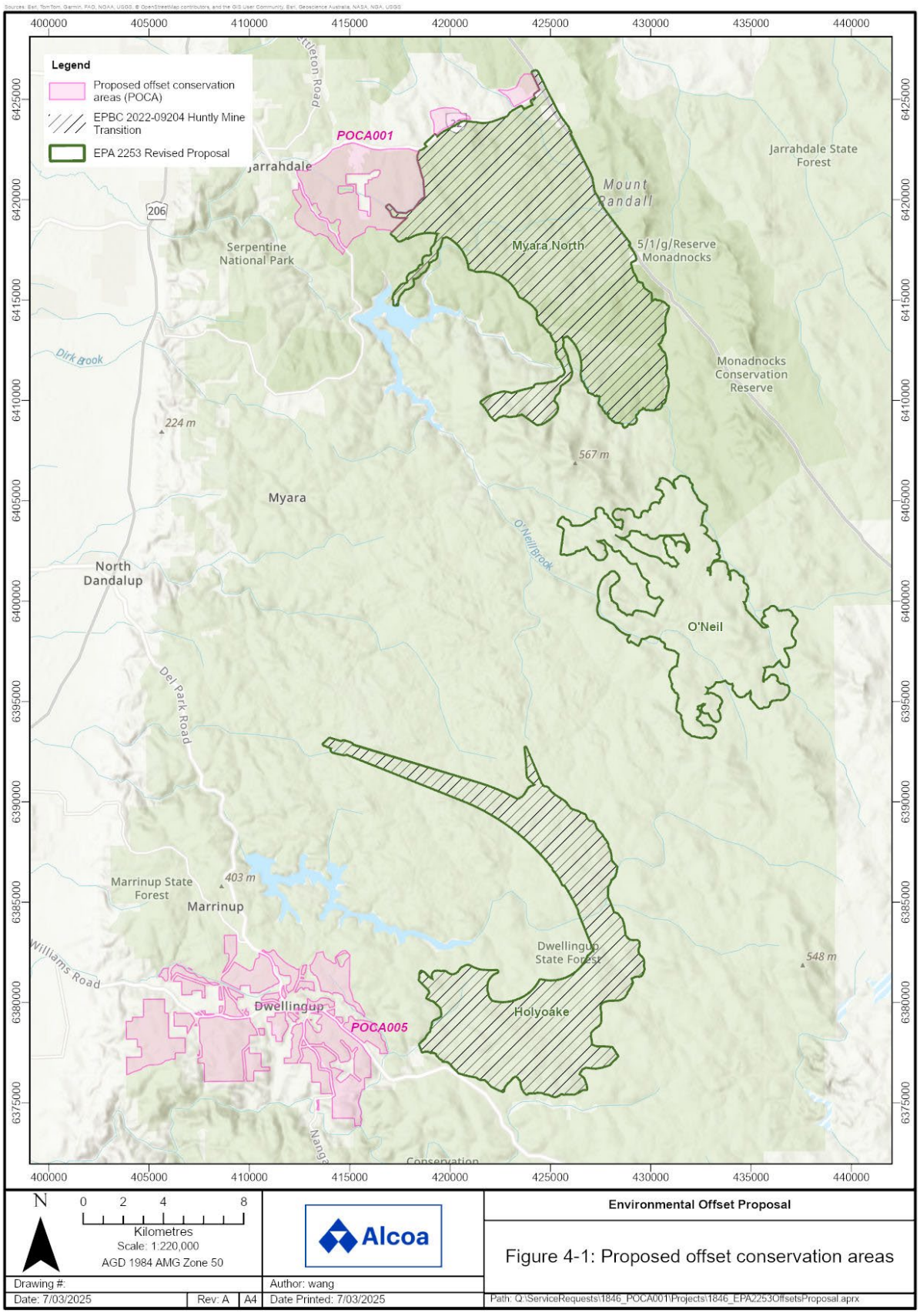

Figure 4-1: Proposed offset conservation areas

4.4.5 Security Mechanism

4.4.5.1 Short-term

The areas proposed for offset conservation are State Forest. State Forest is created under the *Conservation and Land Management Act 1984* for the purposes of timber production, conservation and recreation, although native timber harvesting ceased on 1 January 2024. The land is owned by the Crown, vested to the Conservation and Parks Commission and managed on behalf of the Commission by the DBCA.

Alcoa hold a mining tenement over the area, with exclusive rights to access the bauxite. Therefore, the proposed offset conservation areas in State Forest are afforded some conservation protection by virtue of Alcoa's lease and commitment not to develop the area.

4.4.5.2 Long-term

Alcoa will consult and engage with the WA Government to seek agreement to add the POCAs into the conservation reserve system, such that they will be protected in an enduring way whilst being actively managed to maintain or improve the habitat. Working with the WA Government, Alcoa will seek to get all parties to agree to protect the habitat from disturbance or developments. Parties include but are not limited to the Conservation and Parks Commission, the DBCA, the Forest Products Commission (FPC), Water Corporation, DEMIRS, JTSI, Main Roads, Traditional Owners and planning agencies. In the interim, through the offset program, Alcoa will commit to implementing the conservation actions for the offset period.

Should Alcoa acquire or use private property for an offset conservation area, with the landowners permission, the land will either be ceded to the WA Government for the purposes of conservation of flora and fauna or have an appropriate conservation covenant placed on the land title.

4.5 Proposed offset extent

Following on from the OAG calculations of the significant residual impacts in Section 3.2, Alcoa have used the Commonwealth OAG[26] as a guideline to calculate a reasonable and appropriate offset area to which offset measures are to be applied.

The significant residual impacts and offsets have been calculated using area in hectares. Alcoa uses fauna spotters and other management measures to avoid direct mortality or injury to fauna. The impacts to fauna are from the loss or degradation of their habitat. Therefore, the impacts and offsets are calculated based on loss of habitat.

A summary of the proposed offset quantum is in Table 4-3. The assumptions, values and justification used in the application of the OAG's calculator are in Table 4-4 (Myara North and Holyoake) and Table 4-5 (O'Neil). The OAGs are in Appendix C.

The proposed offset extent is considered proportional, appropriate and reasonable given Alcoa implements post-mining rehabilitation to return fauna habitat for several species in the short to medium term time frame.

[26] The Commonwealth OAG is a tool developed for expert users in the government to assess the suitability of offset proposals and is available to proponents to assist with planning and estimating future offset requirements.

Table 4-3: Proposed offset extent (Commonwealth OAG)[27]

Species	EPBC Act Status	Quantum of impact (ha) (SRI)	Proposed offset extent (ha)	Ratio of offset to SRI	Quantum of impact (ha) (SRI)	Proposed offset extent (ha)	Ratio of offset to SRI	Quantum of impact (ha) (SRI)	Proposed offset extent (ha)	Ratio of offset to SRI
		Myara North and Holyoake			O'Neil			Proposal		
Forest red-tailed black cockatoo	VU	5,757	17,600	3.1	815	2,750	3.4	6,572	20,350	3.1
Baudin's cockatoo	EN	5,776	19,275	3.3	815	2,790	3.4	6,591	22,065	3.3
Carnaby's cockatoo	EN	5,131	17,550	3.4	712	2,500	3.5	5,843	20,050	3.4
Woylie	EN	3,147	11,600	3.7	637	2,290	3.6	3,783	13,890	3.7
Chuditch	VU	4,434	14,350	3.2	849	2,670	3.1	5,282	17,020	3.2
Quokka	VU	472	1,525	3.2	411	1,370	3.3	883	2,895	3.3

[27] Hectares have been rounded to whole numbers. This may result in some total values appearing +/- 1 hectare. At this scale this is not expected to make a material difference to the outcomes.

Table 4-4: Application of the DCCEEW offset assessment guide – Myara North and Holyoake[28]

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
EPBC Act Status	V	E	E	E	V	V	Obtained from the DCCEEW Species Profile and Threats Database (Species Profiles (SPRAT))
Impact Calculator							
Raw impact (area, ha)	6,396	6,418	6,413	6,293	6,334	674	As assessed in Chapter 6 of the ERD (Alcoa, 2025b).
Impact habitat score (quality) (scale 1 – 10)	9	9	8	5	7	7	Alcoa has used a weighted average score across the impact area. Applying a weighted average methodology accounts for the relative importance of each habitat quality type across the impact area. The weighted average methodology allows the impact quality score to be measured against the indicative offset habitat quality scores. The calculations are provided in Appendix B.
SRI (quantum of impact)	5,757	5,776	5,131	3,147	4,434	472	Automatically calculated.
Offset Calculator							
Start area (ha)	17,600	19,275	17,550	11,600	14,350	1,525	Minimum area required to fulfil 100 per cent of the offset requirement under the offset assessment guide. This area is used to guide the extent to which offset measures are proposed to be implemented.

[28] Hectares have been rounded to whole numbers. This may result in some total values appearing +/- 1 hectare. At this scale this is not expected to make a material difference to the outcomes.

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
Time over which loss is averted (years)	20	20	20	20	20	20	Alcoa are consulting with the WA Government and relevant agencies with regards to improving conservation tenure of proposed offset conservation areas. Alcoa propose to manage each of the proposed offset conservation area(s) for at least 20 years.
Risk of loss without offset (%)	10	10	10	10	10	10	A value of 10 % (low risk of future loss) has been assigned. Proposed offset conservation area(s) are on Crown land, classified as State Forest. State Forest is not considered a protected area under IUCN tenure. Native timber harvesting is no longer permitted. However, Alcoa hold a mineral lease over a large portion of the NJF with the right to access bauxite (pending appropriate approvals are attained). There is also a potential for areas to contain additional resources and thus may be at risk from future mining or other developments. This aligns with the DWER (draft) guidance (DWER, 2022) for existing reserves: Depending on vesting purpose, generally 5–15% (some risk that the site could be cleared over the next 20 years) but possibly higher for some reserve types which allow extractive use. It also aligns with the Guidance for deriving 'Risk of Loss' (ROL) estimates when evaluating biodiversity offset proposals under the EPBC Act (Evans et al., 2017). This suggests an average annual background rate of loss of 4.74 per cent for the Shire of Murray and Waroona,

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
							however it also notes these shires as "outliers" and used a proxy. Thus, the ROL may not take into account the potential ROL by mining and other developments in these LGA's.
Risk of loss with offset (%)	0	0	0	0	0	0	A value of 0 % (minimal to no risk of future loss) has been assigned. Alcoa hold a mineral lease over a large portion of the NJF with the right to access bauxite (pending appropriate approvals are attained) but will commit to not mining or otherwise disturbing offset conservation areas (other than for conservation and monitoring purposes). Alcoa will work with the WA Government with the aim of securing the offset conservation areas from any future disturbance. By their nature, areas allocated for environmental offsets are less appealing for future development given the likely additional offset requirements.
Confidence in risk of loss result (%)	90	90	90	90	90	90	Alcoa have a high level of confidence in the Risk of Loss values based on the explanations provided above.
Time until ecological benefit (years)	5	5	5	5	5	5	The suite of environmental offset projects will include conservation actions that have short, medium and long term benefits.

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
							For example, if implemented the Black Cockatoo Environmental Offset Project will provide short term benefits through installing permanent drinking water points (5 years has been selected to allow for the black cockatoos to locate and use the water on a regular basis). Repairing of hollows is also likely to have an immediate effect although some on-ground management actions (rehabilitation) may take up to 5 years[29] to provide benefit. Likewise, the habitat quality and functionality for chuditch, woylie and quokka will improve in a relatively short time frame with a reduction in foxes, feral cats and feral pigs if these environmental offset projects are implemented.
Start quality (scale 1 – 10)	9	9	8	5	7	7	Alcoa has assumed that the proposed offset conservation area will have habitat quality similar to, or slightly reduced, from the impact area as Alcoa will target areas of State Forest that are degraded (in terms of habitat suitability or functionality for species). The habitat scoring framework and the weighted average will be applied, following the baseline habitat assessments of proposed offset conservation areas.
Future quality without offset (scale 1 – 10)	7	7	6	3	5	5	Alcoa expects that without additional management of threats and increasing impacts from climate change, the

[29] For example, it can take two to three years for a banksia planted from seed to flower and around five to six years to attain its full height.

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
							habitat in proposed offset conservation areas would degrade significantly (CPC, 2023; Maron, 2021).
Future quality with offset (scale 1 – 10)	10	10	9	6	8	8	Alcoa expect that with the conservation actions described in Table 4-1 the habitat quality and functionality will be improved from baseline by at least one point.
Confidence in habitat result (%)	90	90	90	90	90	90	Conservation actions proposed in Table 4-1 have demonstrated and proven success to achieving proposed outcomes. Coupled with appropriate resources and funding, an extensive monitoring program (Section 4.7), adaptive management (Section 4.9) and contingency actions, Alcoa have a high level of confidence in the habitat quality values.
Net present value (adjusted hectares)	5,756	5,779	5,138	3,149	4,445	472	Automatically calculated
% of impact offset	100.00%	100.05%	100.14%	100.08%	100.26%	100.13%	Automatically calculated

Table 4-5: Application of the DCCEEW offset assessment guide – O'Neil[30]

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
EPBC Act Status	V	E	E	E	V	V	Obtained from the DCCEEW Species Profile and Threats Database (Species Profiles (SPRAT))
Impact Calculator							
Raw impact (area, ha)	1,019	1,019	1,017	1,061	1,061	686	As assessed in Chapter 6 of the ERD (Alcoa, 2025b).
Impact habitat score (quality) (scale 1 – 10)	8	8	7	6	8	6	Alcoa has used a weighted average score across the impact area. Applying a weighted average methodology accounts for the relative importance of each habitat quality type across the impact area. The weighted average methodology allows the impact quality score to be measured against the indicative offset habitat quality scores. The calculations are provided in Appendix B.
SRI (quantum of impact)	815	815	712	637	849	411	Automatically calculated.
Offset Calculator							
Start area (ha)	2,750	2,790	2,500	2,290	2,670	1,370	Minimum area required to fulfil 100 per cent of the offset requirement under the offset assessment guide. This area is used to guide the extent to which offset measures are proposed to be implemented.

[30] Hectares have been rounded to whole numbers. This may result in some total values appearing +/- 1 hectare. At this scale this is not expected to make a material difference to the outcomes.

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
Time over which loss is averted (years)	20	20	20	20	20	20	Alcoa are consulting with the WA Government and relevant agencies with regards to improving conservation tenure of proposed offset conservation areas. Alcoa propose to manage each of the proposed offset conservation area(s) for at least 20 years.
Risk of loss without offset (%)	10	10	10	10	10	10	A value of 10 % (low risk of future loss) has been assigned. Proposed offset conservation area(s) are on Crown land, classified as State Forest. State Forest is not considered a protected area under IUCN tenure. Native timber harvesting is no longer permitted. However, Alcoa hold a mineral lease over a large portion of the NJF with the right to access bauxite (pending appropriate approvals are attained). There is also a potential for areas to contain additional resources and thus may be at risk from future mining or other developments. This aligns with the DWER (draft) guidance (DWER, 2022) for existing reserves: Depending on vesting purpose, generally 5–15% (some risk that the site could be cleared over the next 20 years) but possibly higher for some reserve types which allow extractive use. It also aligns with the Guidance for deriving 'Risk of Loss' (ROL) estimates when evaluating biodiversity offset proposals under the EPBC Act (Evans et al., 2017). This suggests an average annual background rate of loss of 4.74 per cent for the Shire of Murray and Waroona,

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
							however it also notes these shires as "outliers" and used a proxy. Thus, the ROL may not take into account the potential ROL by mining and other developments in these LGA's.
Risk of loss with offset (%)	0	0	0	0	0	0	A value of 0 % (minimal to no risk of future loss) has been assigned. Alcoa hold a mineral lease over a large portion of the NJF with the right to access bauxite (pending appropriate approvals are attained) but will commit to not mining or otherwise disturbing offset conservation areas (other than for conservation and monitoring purposes). Alcoa will work with the WA Government with the aim of securing the offset conservation areas from any future disturbance. By their nature, areas allocated for environmental offsets are less appealing for future development given the likely additional offset requirements.
Confidence in risk of loss result (%)	90	90	90	90	90	90	Alcoa have a high level of confidence in the Risk of Loss values based on the explanations provided above.
Time until ecological benefit (years)	5	5	5	5	5	5	The suite of environmental offset projects will include conservation actions that have short, medium and long term benefits.

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
							For example, if implemented the Black Cockatoo Environmental Offset Project will provide short term benefits through installing permanent drinking water points (5 years has been selected to allow for the black cockatoos to locate and use the water on a regular basis). Repairing of hollows is also likely to have an immediate effect although some on-ground management actions (rehabilitation) may take up to 5 years[31] to provide benefit. Likewise, the habitat quality and functionality for chuditch, woylie and quokka will improve in a relatively short time frame with a reduction in foxes, feral cats and feral pigs if these environmental offset projects are implemented.
Start quality (scale 1 – 10)	8	8	7	6	8	6	Alcoa has assumed that the proposed offset conservation area will have habitat quality similar to, or slightly reduced, from the impact area as Alcoa will target areas of State Forest that are degraded (in terms of habitat suitability or functionality for species). The habitat scoring framework and the weighted average will be applied, following the baseline habitat assessments of proposed offset conservation areas.

[31] For example, it can take two to three years for a banksia planted from seed to flower and around five to six years to attain its full height.

Environmental Value	Forest red-tailed black cockatoo	Baudin's cockatoo	Carnaby's cockatoo	Woylie	Chuditch	Quokka	Rationale
Future quality without offset (scale 1 – 10)	6	6	5	4	6	4	Alcoa expects that without additional management of threats and increasing impacts from climate change, the habitat in proposed offset conservation areas would degrade significantly (CPC, 2023; Maron, 2021).
Future quality with offset (scale 1 – 10)	9	9	8	7	9	7	Alcoa expect that with the conservation actions described in Table 4-1 the habitat quality and functionality will be improved from baseline by at least one point.
Confidence in habitat result (%)	90	90	90	90	90	90	Conservation actions proposed in Table 4-1 have demonstrated and proven success to achieving proposed outcomes. Coupled with appropriate resources and funding, an extensive monitoring program (Section 4.7), adaptive management (Section 4.9) and contingency actions, Alcoa have a high level of confidence in the habitat quality values.
Net present value (adjusted hectares)	818	817	714	638	850	413	Automatically calculated
% of impact offset	100.38%	100.19%	100.31%	100.20%	100.16%	100.23%	Automatically calculated

4.6 Proposed offset tranches

Alcoa proposes to implement the environmental offsets in a staged manner (tranches) so that:

- Conservation actions can be confirmed following pre-clearance surveys aligned to mine plans. This information provides a better understanding of the impacts and allows the conservation actions to be targeted to the impacted species, environmental value or matter.
- Environmental offset projects can be developed using knowledge, learnings and outcomes attained in earlier projects.
- Environmental offset projects can be responsive to ongoing monitoring, new scientific findings or emerging threats.
- Environmental offset projects can be aligned with actions where regional, or recovery plans are revised or updated.
- There is a provision for an on-going source of conservation funding within the region.
- Alcoa can consider project proposals from external groups (including Traditional Owners, universities, conservation and community groups) throughout the offset period.

Alcoa propose that tranche 1 provides 30 per cent of the overall offset quantum for the Proposal, generally aligned with the first five years of clearing and representing 100 per cent of the proposed offset quantum for the O'Neil mine DE, and ~20 per cent of the proposed offset quantum for Myara North and Holyoake.

Tranches 2 and 3 have been proposed to allow time to develop and/or revise environmental offset projects to align with any significant residual impacts identified the pre-clearance surveys that may not have been identified in the surveys used in the assessment process.

An indicative schedule of tranches is in Table 4-6.

Table 4-6: Proposed Offset Tranches

Tranche	Year(s) impacts occur	Percent of overall offset (%) to be provided	Proposed offset extent (ha) [32]	Justification
Tranche 1	Years 1 - 5	30	6,620	Alcoa propose to provide 30 per cent of the proposed offset quantum for the Revised Proposal in tranche 1. The total proposed offset quantum is 22,065 hectares (2,790 hectares for O'Neil and 19,275 hectares for Myara North and Holyoake). Thirty per cent of the total is 6,620 hectares. Alcoa propose to provide 100 per cent of the offset quantum for O'Neil (2,790 hectares) in tranche 1, with the remainder (3,830 hectares) allocated towards the offset quantum for Myara North and Holyoake. Alcoa has identified two proposed offset conservation areas that provide approximately 7,200 ha of threatened species habitat.
Tranche 2	Years 6 - 10	40	8,825	POCAs for tranche 2 will be identified during the first five years with enough time to allow for implementing the offset ahead of the proposed impacts. This timeframe allows Alcoa to work with stakeholders to locate strategic and priority areas for management. The timing also allows Alcoa to 1) evaluate the results from the offset implementation in the first tranche; 2) evaluate the results from pre-clearance surveys; and 3) revise or develop new environmental offset project plans to incorporate findings from the offset implementation or pre-clearance surveys.
Tranche 3	Years 11-20	30	6,620	POCAs for tranche 3 will be identified during years six to nine, with enough time to allow for implementing the offset ahead of the proposed impacts. As for tranche 2, this aligns with the progressive clearing and allows for adaptation of environmental offset project plans to respond to pre-clearance surveys.
Total	**-**	**100%**	**22,065**	**-**

[32] This has been calculated using the largest proposed offset area (for Baudin's cockatoo).

4.7 Monitoring Program

Monitoring, reporting and evaluating the results of the implementation of an environmental offset is important to:

- Verify that on-ground management actions proposed have been implemented as per environmental offset management plans; and
- Demonstrate the ecological responses are on a trajectory to achieve the proposed outcomes.

Alcoa's Environmental Offset Team will be responsible for overseeing the environmental offset program. This includes ensuring this Offset Proposal, if approved, is delivered as conditioned in Ministerial Statements, EPBC Act Approvals or other regulatory instruments. The roles and responsibilities of the Environmental Offset Team are described in Alcoa's Offset Strategy (Alcoa, 2025a).

4.7.1 Monitoring

A monitoring program specific to each project is described in each Environmental Offset Project Plans. This includes target criteria, performance indicators, trigger, threshold and response actions, the monitoring methodology and schedule, reporting requirements and evaluation and response actions. The location of monitoring points will be mapped in Offset Area Management Plans.

The progress towards achieving the outcomes of this Offset Proposal will be monitored by the Environmental Offset Team through:

- Review of operational and fauna habitat assessment reports.
- Review of actions undertaken where trigger or threshold criteria were exceeded.
- Regular engagement with delivery partners.
- Site inspections to confirm conservation actions are being undertaken as outlined with Environmental Offset Project Plans and Offset Area Management Plans.

4.7.2 Reporting

Each Environmental Offset Project Plan contains a schedule of reporting details of offset implementation. This includes but is not limited to:

- Annual reporting:
    - Progress towards milestones, deliverables and targets.
    - Actions undertaken, demonstrating the delivery provider is implementing the on-ground actions as agreed.
    - Project evaluation identifying areas for improvement, identification of approaches which are working well and suggestions for adaptive management.
    - Responses to unanticipated events (such as severe weather events, fire) and the appropriateness, suitability and/or outcome of the response.

- Exceedance of the trigger or threshold criteria including proposed corrective actions and timeframes for implementation of the corrective actions.
- A review of any project-related risks (funding, resource, access) and how they can be mitigated or minimised.
- The outcomes of the monitoring program including field surveys and/or habitat assessments.

Reports showing the progress of the environmental offset projects will be provided to regulators on an annual basis and key stakeholders (as required). Alcoa will also provide information[33] on the progress of the environmental offset projects on its website.

4.7.3 Evaluation

The Environmental Offset Team will review all information relevant to the environmental offset including but not limited to the annual reports, field surveys, habitat assessments and any current peer-reviewed scientific literature.

A technical assessment of the results from the monitoring program will be assessed against the baseline data and reference sites to determine progress towards outcomes. The team will also consider the outcomes in the context of the wider state of the environment to understand if broader issues in the jarrah forest are having an effect (positive or negative) on the outcomes.

Where a performance indicator suggests the targets are not on a positive trajectory, the Environmental Offset Team will work with the delivery partner, ecologists, DBCA, species experts, researchers or other appropriately trained personnel to adapt the management action(s) to resolve the issue.

4.7.4 Spatial Data

Spatial data will be collected, collated and shared with appropriate stakeholders and regulatory bodies in accordance with legislative requirements. At this point in time, this includes the IBSA (Index of Biodiversity Surveys for Assessments) format for Western Australia; and the Guide to providing maps and boundary data for EPBC Act projects (DAWE, 2021).

4.8 Risk Management

Alcoa has considered the risks to the implementation of this Offset Proposal as well as the risk to the overall successful achievement of the proposed outcomes.

Risks can be proponent-based, from environmental stochastic events or external-based.

- Proponent-based events are within Alcoa's direct control and include aspects such as establishing appropriate governance, funding and resourcing that enable the environmental offset projects to meet the proposed outcomes.
- Environmental stochastic events are random environmental events, outside Alcoa's direct control, that can influence the population or ecosystem within an offset

[33] Environmentally or commercially sensitive information will not be made publicly available.

conservation area. Environmental stochastic events that can directly affect vegetation structure and condition include events such as drought, fire, floods or extreme storm events. Stochastic events that can directly affect the population of a species may include the introduction of a fatal disease to the natural population within the offset conservation area.

- External events are also outside Alcoa's direct control and include aspects such as the WA Government agreeing to accept environmental offsets on Crown land, changes in government or government policy or the withdrawing of permission to operate on government land.

Alcoa have applied the qualitative risk assessment methodology suggested in (DCCEEW, 2024). Each environmental risk was given a rating in terms of likelihood and consequence using the DCCEEW criteria in Table 4-7. The ratings were then combined using the DCCEEW risk rating table to generate a risk rating of low, medium, high or severe, see Table 4-8. The risk assessment is presented in Table 4-9 and considers:

- Events and threats that will, may, or are likely to impact the achievement of the expected environmental outcomes.
- Threat levels before (initial risk rating) and after (residual risk rating) risk mitigation strategies are applied.
- Risk mitigation strategies, with trigger criteria for corrective actions should risks eventuate.

Alcoa proposes to manage risks associated with this Offset Proposal through the following actions.

- On-going consultation with stakeholders and delivery partners (Section 4.12).
- Clearly defined outcomes, indicators and response actions (Section 4.7).
- Reporting and evaluation mechanisms (Section 4.7).
- Clear governance arrangements (Section 4.10).
- Ensuring sufficient funding is available, including for contingency actions (Section 4.11).

Table 4-7: Risk Matrix – Likelihood and Consequence

RISK MATRIX	
Likelihood (L): A qualitative measure of how likely is it that this event/circumstances will occur both before and after management activities are implemented	
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Consequence (C): Qualitative measure of what will be the consequence/result if the event/circumstances occur	
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

Table 4-8 Risk Rating (R) Matrix

		Consequence				
Likelihood		**Minor**	**Moderate**	**High**	**Major**	**Critical**
	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

Table 4-9: Risk Assessment

Risk Event or Circumstance	Risk Description (e.g. cause and effect)	Initial Risk Rating			Risk mitigation strategy(ies)	Residual Risk Rating			Management Trigger(s)	Monitoring Mechanism(s)	Corrective Action(s)
		L	C	R		L	C	R			
Proponent Based Events											
Funding	Financial provisions for the delivery of the environmental offsets are underestimated. Insufficient funding allowed for contingencies.	L	H	H	Alcoa proposes to fund environmental offset projects through transferring an AUD rate per approved hectare cleared each year into a self-managed fund on a prospective basis. Environmental Offset Project Plans will be costed in advance of implementation to allow sufficient funding to be allocated to the project. Each Project will have an itemised budget across the offset period. The financial provisions will include an allowance for contingency and project management. Project expenditure will be monitored through annual operational reports.	P	M	M	Annual expenditure exceeds budgeted expenditure by more than 20 per cent for two consecutive years.	Environmental Offset Project annual operational reports.	Alcoa will conduct a financial review of expenditure to understand why budget is exceeded, forecast expenditure and where cost-efficiencies can be obtained. If necessary, additional funding may be allocated to the Environmental Offset Project, or cost-efficiencies realised.
Resourcing / Internal Governance	Resource provisioning for managing the Environmental Offset Program is underestimated. And/or the governance provisions are ineffective.	U	H	M	Alcoa is undertaking planning for an internal Environmental Offset Team that is adequately resourced by appropriately experienced staff and subject to existing proven internal governance structures. Alcoa has experience in establishing and allocating funding for internal teams whose roles is to implement these types of operational aspects of the business. Examples include the Rehabilitation Team and the Forest Research Centre.	U	M	L	The Environmental Offset Team is not established and sufficiently resourced three months prior to the anticipated decisions on the Proposal.	Environmental Offset Team has been established and remains a functional area within Alcoa's corporate structure.	Alcoa will reallocate internal staff with appropriate skills to the Environmental Offset Team until permanent resources are engaged.
Resourcing / Delivery Partner	Insufficient resources in the industry to deliver the environmental offset projects.	P	H	M	Alcoa has established and existing relationships with environmental consultancies. Environmental offset projects will be implemented by multiple delivery partners. Alcoa is engaging with potential delivery partners to assess their level of interested in delivering projects. Alcoa will enter long-term legally binding contracts with delivery partners to deliver the Environmental offset projects.	P	M	M	Unable to secure delivery partners prior to the anticipated commencement date of Environmental offset projects.	Executed memorandum of understanding, agreements and/or contracts.	Alcoa will continue to seek appropriate delivery partners. Alcoa may undertake the conservation actions using internal suitably experienced botanists, ecologists and environmental scientists.

Risk Event or Circumstance	Risk Description (e.g. cause and effect)	Initial Risk Rating			Risk mitigation strategy(ies)	Residual Risk Rating			Management Trigger(s)	Monitoring Mechanism(s)	Corrective Action(s)
		L	C	R		L	C	R			
Outcomes	Proposed outcomes will not provide a conservation net gain for the impacted species.	P	C	S	The proposed outcomes have been developed in alignment with WA and Commonwealth Government offset polices and guidelines as well as condition setting guidance. Alcoa have provided an indicative suite of environmental offset projects as well as draft Environmental Offset Project Plans and draft Offset Area Management Plans to demonstrate the type of works to be undertaken to meet the proposed outcomes. The indicative suite of environmental offset projects has been prepared following reviews of recovery plans and scientific literature and consultation with forest and species ecologists and scientists. Environmental Offset Project Plans will ensure conservation actions are appropriate, reasonable, implementable and likely to achieve positive benefits for threatened species. They will also include robust monitoring programs with trigger and threshold levels and response actions.	U	C	H	Alcoa have not developed a comprehensive set of Environmental Offset Project Plans and Offset Area Management Plans during the assessment period.	Regulatory assessment process	Alcoa will revise and provided additional Environmental Offset Project Plans following stakeholder and public consultation.
Environmental Stochastic Events											
Drought, bushfire, floods or extreme storm events.	Significant loss or degradation of vegetation / habitat.	L	H	H	Environmental offset projects will be developed to mitigate against climate change and environmental events. Funding for contingency actions will be built into projects. Monitoring of the area and regular presence of environmental staff allows for early identification of issues and faster response actions. Alcoa will seek advice from subject matter experts post fire or storm events to determine the most appropriate actions to restore the vegetation / habitat or provide short-term solutions for species.	L	M	M	Occurrence of drought, bushfire, floods or extreme storm events.	Regularly monitoring of the environment; regular engagement with the scientific community and government agencies.	Alcoa will work with research scientists, the scientific community and government agencies to implement contingency actions to mitigate against the impacts of the event.

Risk Event or Circumstance	Risk Description (e.g. cause and effect)	Initial Risk Rating			Risk mitigation strategy(ies)	Residual Risk Rating			Management Trigger(s)	Monitoring Mechanism(s)	Corrective Action(s)
		L	C	R		L	C	R			
Introduction of disease.	Significant loss or degradation of vegetation / habitat. Fauna injury or mortality.	P	H	M	Alcoa has a team of environmental scientists and experts (including the Forest Research Centre) with contacts throughout the environmental industry, again allowing for early identification of issues and response. Monitoring of the area and regular presence of environmental staff allows for early identification of issues and faster response actions.	P	M	M	Awareness that a disease is encroaching on or present in the Northern Jarrah Forest.	Regularly monitoring of the environment; regular engagement with the scientific community and government agencies.	Alcoa will work with research scientists, the scientific community and government agencies to plan for, develop and implement appropriate prevention, mitigation or eradication strategies.
External Events											
WA Government do not accept the Offset Proposal.	The WA Government does not accept Alcoa delivering the environmental offset projects in areas of State Forest.	P	M	H	Alcoa are consulting with the WA Government on appropriate conservation actions and areas that are complementary and additional to current management of the State Forest. Alcoa will seek formal agreement from the WA Government to allow the implementation of this Offset Proposal in State Forest areas.	P	M	H	Unable to secure WA Government acceptance prior to the anticipated commencement date of offsets.	Regulatory assessment process and schedule. Executed memorandum of understanding or agreements.	Alcoa will consider alternate locations to deliver the environmental offsets including private property or other land within the NJF or in other bioregions.
Environmental regulators do not accept the Offset Proposal.	The WA EPA and/or DCCEEW do not accept this Offset Proposal, environmental offset projects or proposed offset conservation areas.	P	M	H	Alcoa have developed an Offset Proposal that is consistent with offset policy and guidance and objectives in species recovery plans. Alcoa have consulted with the EPA and DCCEEW throughout the development of the Offset Strategy and Offset Proposal.	P	M	H	Feedback from EPA and DCCEEW indicates that the Offset Proposal is unlikely to be accepted in its current form.	Regulatory assessment process and schedule.	Alcoa will respond to, and/or revise Offset Proposal following regulatory, stakeholder and public consultation.

4.9 Adaptive management and continual improvement

An adaptive management framework ensures there are mechanisms in place to take account of the risk of the Offset Proposal not meeting its objectives in the timeframe predicted, and to manage any unforeseen consequences.

Alcoa has built flexibility into the Offset Proposal through:

- Staging of environmental offset projects – outcomes from new scientific findings or implementation of preceeding environmental offset projects can be used to inform future environmental offset projects.
- Procedures – reviewing and evaluting the progress of on-ground management allows the offset program manager to adapt the decision-making process over time.
- Resources – engaging the most appropriate contractor or delivery agent for the action(s). Allows the distributuion of works to be shared across businesses, agencies and eNGOs. Built in contingency to account for unanticiapted events.
- Actions – undertaking continuous review of the outcomes of management actions, surveys and reports. Applying best practice or emerging technologies.

Reports will be reviewed by forest and species ecologists / subject matter experts to ensure appropriate responses are developed to potential or actual events.

4.10 Governance

As per the Offset Strategy (Alcoa, 2025a), Alcoa propose to form an Environmental Offset Team. The team will be responsible for delivering approved environmental offsets conditioned in Ministerial Statements, EPBC Act Approvals or other regulatory instruments; and developing environmental offsets during approvals and assessment processes.

Any agreements between Alcoa and delivery partners will be legally binding, such as contracts, grant agreements or service agreements. Governance documents will include requirements for timeframes, reporting, financial management, milestones, deliverables, completion criteria and other legal or governance requirements as appropriate.

Likewise, agreements between the landowner and Alcoa to operate and implement the environmental offsets will be appropriately binding and secure.

4.11 Financial commitment

Alcoa will be responsible for funding the implementation of the Offset Proposal, including all environmental offset projects and associated administration, monitoring and reporting.

Alcoa proposes to fund environmental offset projects through transferring an AUD rate per approved hectare cleared each year into a self-managed fund on a prospective basis. The rate will be agreed prior to the commencement of actions under assessment and consider the expected costs to implement reasonable and cost-effective conservation projects.

Alcoa will make annual payments into the fund based on the actual approved hectares cleared each year on a prospective basis after the Proposal has been approved. Alcoa have benchmarked rates against comparable and contemporary environmental offset funds and/or

conditions and suggest $3,500 (excluding GST) per hectare of habitat cleared is an appropriate and reasonable rate.

Funds will be released to the delivery partner as agreed in governance documents or as required by the Environmental Offset Project Plan or Offset Area Management Plan.

4.12 Stakeholder consultation

Alcoa has identified key stakeholders for the development and implementation of this Offset Proposal. Key stakeholders for the implementation of this Offset Proposal include WA Government agencies responsible for Crown land tenure and management, landowners and potential delivery partners.

Alcoa has consulted with species and forest ecology experts to understand key recovery actions required and threatening processes to be addressed for targeted threatened fauna species in the Northern Jarrah Forest. The outcomes from these informal discussions have informed the environmental offset projects. Alcoa intend to continue discussions with species ecologists and specialists through the on-going development of the environmental offset projects.

Alcoa will continue to consult with Traditional Owners to understand ways in which traditional land management practices can be incorporated into the environmental offset program and agree the role local people can play in the delivery Alcoa's offsets.

Alcoa will also consult with the additional stakeholders, as appropriate, including but not limited to the Forest Products Commission, local government agencies, the Department of Planning, Lands and Heritage, the Department of Primary Industries and Regional Development, the Department of Agriculture, Fisheries and Forestry the Department of Water and Environmental Regulation, Main Roads Western Australia, the Water Corporation, and conservation or environmental non-government organisations.

Decision making authorities and the public will be able to provide feedback on this Offset Proposal during the public consultation period for the Proposal.

Key stakeholders are identified in Table 4-9. A high-level summary of stakeholder engagement relevant to this Offset Proposal to December 2024 is in Table 4-10.

Table 4-10: Key Stakeholders

Stakeholder	Role
Conservation and Parks Commission (WA)	Where a proposed conservation area overlays land vested to the Conservation and Parks Commission. Alcoa will seek endorsement / agreement to implement additional conservation actions on land vested to the Commission.
DBCA (WA)	State Forest is managed on behalf of the Commission by the DBCA. Alcoa are engaging with the DBCA and will seek endorsement / agreement to implement additional conservation actions with the DBCA where a proposed conservation area overlays State Forest. Conservation actions will be additional to management actions within the Forest Management Plan 2024-203.
DEMIRS (WA)	DEMIRS role is to build the State's economy and ensuring resources are developed in a sustainable and responsible manner. Alcoa will seek endorsement / agreement with DEMIRS to use areas within ML1SA as an environmental (conservation) offset. Use of an area as an offset will support Alcoa's proposal to implement mining in an ecologically sustainable manner.
DJSTI (WA)	DJSTI oversees Alcoa's operations under the State Agreement. Alcoa will seek support from DJSTI to use areas within ML1SA as an offset in the context of the State Agreement.
Traditional Owners	Alcoa operate on land of the Bindjareb people, the Whadjuk people and the Wardandi people of the Noongar nation. The POCAs may contain Registered Aboriginal Sites. Alcoa will seek to partner with the Traditional Owners to implement the conservation actions and obtain relevant approvals (if required) to implement conservation actions within registered sites.
EPA DCCEEW	Alcoa are engaging with the EPA and DCCEEW to demonstrate the suitability of the conservation actions as an environmental offset for the Proposal.
Delivery Partner(s)	Delivery Partner(s) will be responsible for delivery the environmental offset projects in areas indicated in Offset Management Plans.

Table 4-11: Stakeholder consultation

Stakeholder	Date	Purpose of engagement	Outcome
DBCA	August 2022	Alcoa met with DBCA Conservation and Ecosystem Management branch to introduce Alcoa's offset roadmap.	DBCA requested further information around areas Alcoa's considers may be appropriate and suitable as environmental offsets. Information was provided by Alcoa following the meeting. Following the meeting, Alcoa sent a request to the DBCA seeking information on specific land offsets, consideration of regional parks, possible protection measures and research opportunities.
WABSI (Western Australian Biodiversity Science Institute)	November 2022 - current	Proposal to collaborate with other proponents under the southwest sustainability agreement to develop a pathway towards a regional (strategic) approach to biodiversity offsets within the Northern Jarrah Forest.	WABSI was funded to undertake the research project "Biodiversity Offsets in the Northern Jarrah Forest Strategy"
DBCA EPA Services DCCEEW	November 2022	Collective discussion on Alcoa's proposed offset approach for the Pinjarra Alumina Refinery Revised Proposal.	Acknowledgement of the challenges surrounding provision of environmental offsets at scale in the NJF. Alcoa to engage with the WA Government agencies around use of Crown land for offsets. Alcoa to ensure details of the tenure, timeframes, outcomes and commitments to mitigate the risks of the offset approach is provided in offset documents.

Stakeholder	Date	Purpose of engagement	Outcome
DBCA	December 2022	Alcoa provided spatial data of proposed offset conservation areas with DBCA for discussion.	DBCA gave advice on obtaining further information on proposed offset conservation areas. Apply to DBCA Species and Communities Branch for flora and fauna data. Alcoa to continue to engage with DBCA around management areas and actions within the NJF. Organise to meet with Forest Management Plan (FMP) personnel to discuss the offset proposal and areas of alignment with the FMP.
DCCEEW EPA Services	February 2023	Discussion on the application of the DCCEEW offset assessment guide and application of post-mining rehabilitation under the EPBC offset policy.	Alcoa provided further information to DCCEEW on rehabilitation completion criteria, as requested. DCCEEW provided habitat scoring tools developed for black cockatoos and chuditch.
DCCEEW EPA Services	February 2023	Establish a monthly cadence of meetings to discuss aspects of the impact assessment including environmental offsets.	Monthly meeting cadence established.
DBCA	February 2023	Discuss alignment between Alcoa's proposed offset strategy with DBCA priority areas for the protection and management of the Northern Jarrah Forest under the draft 2024-2033 Forest Management Plan (FMP).	Acknowledgement that there is interest from both the DBCA and the public to see an increase in the extent of land under conservation tenure in the State Agreement areas.

Stakeholder	Date	Purpose of engagement	Outcome
DCCEEW EPA Services	June - August 2023	Discussion of an offset approach that partially employed use of a private environmental offset fund.	DCCEEW considered the fund approach met with EPBC offset policy but required Alcoa to provide detailed information on how the fund would work and the types and nature of proposed offset projects.
Black cockatoo subject matter experts (SMEs)	January 2024	Informal group discussion and information exchange on threats, priority actions and potential conservation actions for black cockatoos relevant to the NJF.	Information provided by SMEs has been used to inform the proposed conservation actions and the environmental offset project plans.
Critical weight mammal (CWM) SMEs	March 2024	Informal group discussion and information exchange on threats, priority actions and potential conservation actions for threatened chuditch, quokka and woylie relevant to the NJF.	Information provided by SMEs has been used to inform the proposed conservation actions and the environmental offset project plans.
Black cockatoo subject matter experts (SMEs)	May 2024	Technical discussion on potential black cockatoo conservation actions.	Advised that permanent suitable drinking water points was a key requirement for black cockatoos. Installation of a network of permanent suitable drinking water points has been incorporated in the draft black cockatoo environmental offset project.
Critical weight mammal (CWM) SMEs	May 2024	Technical discussion on potential quokka conservation actions.	Advised that feral pigs were a major threat to quokka and/or their habitat in the NJF. Feral pig control was an ongoing challenge for land managers. Alcoa propose to develop a feral pig control environmental offset project plan for proposed offset conservation areas.

Stakeholder	Date	Purpose of engagement	Outcome
DBCA	July 2024	DBCA provided an opportunity for Alcoa to present its current position on offsets to the Executive Director of the Conservation and Ecosystem Management branch, the Policy and Legislation team, the Forest Management team, species and communities branch and the Swan region. Alcoa presented an overview of proposed offset program and some indicative land areas as examples. Discussions centred on engagement with other WA Government agencies and the Gnaala Karla Booja Aboriginal Corporation; options for land tenure improvements, additionality, monitoring and ecological thinning.	DBCA confirmed that they are not a decision-making authority on offsets, rather have an advisory function within Government. DBCA were receptive to the challenges Alcoa faces in delivering offsets at scale across the NJF and the unique tenure arrangements with underlying State Forest the primary tenure overlapping ML1SA. DBCA to meet with EPA Services to discuss offset proposal.
Black cockatoo subject matter experts (SMEs)	July – December 2024	Technical discussion on potential black cockatoo conservation actions in the NJF.	Information provided by SMEs has been used to inform the proposed conservation actions and the environmental offset project plans.
DCCEEW EPA Services	August 2024	Alcoa presented progress on offset program: document framework, offset areas, proposed surveys, performance indicators, projects/management actions.	Information to address queries raised by DCCEEW not already included or incorporated into offset documents has been added.
Flora and vegetation SMEs	October 2024	Discussion on beneficial conservation projects in NJF for flora and vegetation.	Information provided by SMEs has been used to inform the proposed conservation actions and the environmental offset project plans.

Stakeholder	Date	Purpose of engagement	Outcome
EPA Board	November 2024	Alcoa presented the proposed environmental offset strategy to the board. Request the board consider if Alcoa's proposed offset approach meets their expectations and public advice on regional offsets, provide advice and feedback via EPA Services officers. Respond to board queries on the offset proposal.	Alcoa to incorporate feedback into the offset proposal. At the EPA Chair's request Alcoa hosted a site visit for new EPA Board members on 10-11 March 2025.
DCCEEW	November 2024	Discuss the black cockatoo offset project - context, actions, outcomes.	Information to address queries raised by DCCEEW not already included or incorporated into offset documents has been added.
DBCA	December 2024	Alcoa were seeking engagement with Western Shield to discuss potential strategic opportunities for feral fox and cat control in the NJF.	DBCA provided online resources for Alcoa to use in the development of the feral fox and cat environmental offset project.

4.13 Delivery partners

Alcoa will maintain responsibility for the delivery of actions in Environmental Offset Project Plans or Offset Area Management Plans. However, delivery of conservation actions may be undertaken by various delivery providers. Delivery providers may include Alcoa, WA Government agencies (e.g. DBCA), Traditional Owners (e.g. ranger groups), environmental practitioners, consultants or specialists, environmental non-government organisations and/or community groups. The delivery partners will be determined following consultation and expressions of interest.

Agreements between Alcoa and delivery partners will be legally binding, such as contracts, grant agreements or service agreements. Agreements will be executed only if the Proposal is approved.

4.14 Offset acquittal

If the Proposal is approved, Alcoa anticipates environmental offsets will be a condition of the approval.

Alcoa expects the State environmental offset will be met when Alcoa is notified in writing that the Chief Executive Officer (CEO) of the department responsible for administering the EP Act (or its equivalent) accepts the Ministerial Conditions relating to environmental offsets have been met; and, the outcomes specified in the approved Offset Proposal, unless otherwise agreed in writing by the Minister prior to the specified time, have been achieved.

Alcoa expects the Commonwealth environmental offset will be met when Alcoa is notified in writing that the Australian Minister for the Environment and Water accepts the EPBC Act approval conditions relating to environmental offsets have been met; and, the outcomes specified in the approved Offset Proposal, unless otherwise agreed in writing by the Minister prior to the specified time, have been achieved.

5. Consistency with Offset Policies and other relevant documents

Proponents need to demonstrate how their proposed offsets are consistent with WA Government and Commonwealth offset policy and guidance documents. Alcoa has developed an offset strategy, and this offset proposal, considering the policy and guidance in the following documents:

- Western Australian *Environmental Offsets Policy* (GoWA, 2011) and Western Australian *Environmental Offsets Guidelines* (GoWA, 2014)
- Western Australian P*ublic Advice: Considering environmental offsets at a regional scale* (EPA, 2024b)
- EPBC Act *Environmental Offsets Policy* (DSEWPC, 2012).

Alcoa has also considered information in:

- Recovery plans, approved conservation advice, threat abatement plans and/or strategies provide actions that can be taken to help in the recovery of threatened species. Alcoa has demonstrated how the conservation actions proposed in this Offset Proposal will contribute to the recovery of impacted species in Section 4.3.2.
- The Forest Management Plan (2024-2033) has been prepared to protect and manage over 2.5 million hectares of forests in the south-west of Western Australia. Alcoa has demonstrated how it has considered the management actions set out in the Forest Management Plan, and how Alcoa's proposed additional management actions will support the outcomes proposed in the Forest Management Plan in Section 5.4.
- The 2022-2032 Threatened Species Action Plan (DCCEEW, 2022), released in October 2022, maps a pathway to protect, manage and restore Australia's threatened species and important natural places. Section 5.5 summarises how the actions in this Offset Proposal support actions in the Threatened Species Action Plan.
- The Commonwealth government responded to the independent review of the EPBC Act (the Samuel review) with the Nature Positive Plan. The Nature Positive Plan outlines how the government intends to reverse the decline and change policy to create circumstances where nature is being repaired and regenerated. DCCEEW intends to prepare National Environmental Standards to accompany the Nature Positive Plan.
- Conservation actions have been proposed based on current scientific knowledge but with enough scope to adaptive to respond to increasing threats (as cited).

5.1 WA Government offset requirements

Environmental offsets should meet the six principles identified in the WA Environmental Offset Policy (GoWA, 2011) and the key concepts and requirements of the WA Environmental Offsets Guidelines (GoWA, 2014). The application of the principles and concepts of WA Government offset requirements are in Table 5-1 and Table 5-2.

Table 5-1: Application of the principles in the WA Environmental Offset Policy

Principle	Consideration
Environmental offsets will only be considered after avoidance and mitigation options have been pursued.	Alcoa has fully pursued avoidance and minimisation measures at this stage of the mine plan. Avoidance and mitigation measures relative to flora, vegetation and terrestrial fauna is in Chapter 5 and 6 of the ERD (Alcoa, 2025b) and summarised in Section 2.2.2. Avoidance and mitigation measures include reducing the DEs, demarcating avoidance areas within the DEs, undertaking pre-clearance surveys, implementation of fauna management plans, clearing in a progressive manner, engaging fauna spotters, installing fauna underpasses and undertaking progressive rehabilitation once mining in a pit ceases. Alcoa will continue to investigate alternatives to avoid disturbance.
Environmental offsets are not appropriate for all Proposals.	Environmental offsets are appropriate for this Proposal. The Proposal delivers significant economic and social benefits across the region. This Proposal is essential for the continued operation of Alcoa's Huntly Bauxite Mine, Pinjarra Alumina Refinery and the future recommissioning of the Kwinana Alumina Refinery. These operations are integral to the overall viability and success of Alcoa's Western Australian business, which has been operating since 1963. Alcoa Australia's operating expenditure in 2023 was about $3.4 billion, of which about $2.7 billion was spent in Australia. In 2023, Alcoa's operations directly supported 1,520 Australian businesses. Across its Australian operations Alcoa employs approximately 4,670 people, with around 4,100 employees located in Western Australia. Approximately 2,300 of its Western Australian employees live in the Peel region and across the communities near to where it operates, delivering significant economic and social benefits across the region. In 2023, Alcoa paid about $831 million in Australian wages, salaries and associated benefits.

Principle	Consideration
	In 2023, Alcoa paid about $397 million in local, state and federal taxes and royalties. In addition, as required under the *Alumina Refinery Agreement Act 1961*, Alcoa pays in the order of $6 million annually (indexed to CPI) to the State as compensation for forest clearing associated with its mining activities. Alcoa contributes about $1 million annually (indexed to CPI) to the State under the Forest Enhancement and Works Agreement for prescribed burns, forest road upgrades and other forest management activities and provides an additional $416,000 per year (indexed to CPI) to the State for conservation and recreation management initiatives.
Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value impacted.	This Offset Proposal is cost-effective, relevant and proportionate solution to the impacts as: • Alcoa will provide funding for additional conservation actions within State Forest that support the WA Government's conservation of the forest. • Proposed offset conservation areas contain habitat for multiple threatened, priority and other native species. • Conservation actions will provide favourable outcomes for threatened, priority and other native species, as well as general improvements in vegetation health and condition. • Data collected through survey, monitoring and management will add to the broader knowledge basis of species, conservation and management of the NJF. • Proportionality is demonstrated through funding, aligned with similar offset funds applied in WA and Australia. • Proportionality is also obtained through application of the Commonwealth offset assessment guide in determining the area to which conservation actions are applied. • Proportionality also takes into account that some of the habitat loss is temporal and is returned through Alcoa's post-mining rehabilitation program.

Principle	Consideration
Environmental offsets will be based on sound environmental information and knowledge.	This Offset Proposal has been prepared by Alcoa based on recovery plans, approved conservation advice, threat abatement plans, research findings and discussions with fauna and forest ecology specialists. Species experts Alcoa spoke with generally had at least 15-20 years' experience working with black cockatoos and threatened mammals in the Jarrah Forest. They understand the current threats specific to the forest and the targeted on-ground actions that are key to maintaining the long-term viability of population(s) of black cockatoos, chuditch, woylie and quokka in the Northern Jarrah Forest. In addition, Alcoa has used scientific papers to prepare the environmental offset projects.
Environmental offsets will be applied within a framework of adaptive management.	Alcoa has built adaptive management into the Offset Proposal through staging of environmental offset projects, the monitoring, evaluation and reporting program and engagement with the Offsets Advisory Group. Findings from the implementation of on-ground management actions (effectively applied research) will be evaluated and used to inform future actions. Project targets, both successful and those not so successful, will be evaluated by the Offsets Advisory Group and be used to refine and update the on-ground management actions, identify knowledge gaps that are a priority for research and respond to any adverse or unforeseen events outside the projects control – such as wildfire, droughts, storms or human interference (such as the re-release of pigs into the conservation area).
Environmental offsets will be focused on longer-term strategic outcomes.	This Offset Proposal aims to implement on-going on-ground conservations actions in the NJF over the offset period. Proposed environmental offset areas have been located strategically near to existing reserves, ecological corridors or remnant vegetation. Environmental offset projects will deliver conservation actions that provide short-term benefits that lead to long term strategic outcomes for species (for example installing black cockatoo drinking water points) and projects with longer timeframes but provide

Principle	Consideration
	long-term outcomes for the application of conservation across the NJF (for example investigating the use of early fire detection technologies). Thus, the commitment to fund, manage and monitor key fauna habitat areas for offset period provides confidence that the habitat will be maintained for the foreseeable future. This long-term management will promote species resilience to threats, but also a rapid response to emerging or unforeseen threats. Long-term strategic outcomes will be delivered through: • The offset includes spatially mapping key fauna habitat areas in the NJF. When the mapping data from this Offset Proposal is consolidated with other data and datasets it will add to the knowledge and information on species habitat areas and populations. This information can be used to inform future management actions, impact assessment and environmental offsets. • The proposed offset conservation areas will be strategically located to adjoin existing or proposed conservation areas. • Collectively the proposed offset conservation areas will provide for larger areas of the NJF in the conservation reserve system and under additional direct on-ground management. • On-ground management in the proposed offset conservation areas will support management actions implemented by the land manager in the adjoining conservation reserves. This provides a more landscape scale approach to threatening processes (for example fox and feral cat management).

Table 5-2:Application of the principles in the WA Environmental Offset Guidelines

Concept	Consideration
Type	This Offset Proposal is a direct offset. On-ground conservation measures include rehabilitation (repair of ecosystem processes and management of weeds, disease or feral animals) and will provide tangible improvements to environmental values in the offset areas. The environmental offset projects will additionally provide indirect benefits such as increasing scientific knowledge and data on vegetation, habitats and species in the NJF.
In proximity to area of impact	Proposed offset conservation areas adjoin or will be located as close to the impact area as possible.
Similar or better vegetation condition than area impacted	The impact area is predominantly jarrah-marri open forest in good to very good condition. The proposed offset conservation areas are likewise expected to be predominantly jarrah-marri open forest.
Similar habitat structure to undisturbed examples of impacted vegetation type	The impact and offset area are mostly jarrah-marri forest habitat that have been subject to disturbance from harvesting, fire and dieback.
Has a better area to perimeter ratio than the area impacted	Bauxite occurs as tabular ore pods that vary in depth from 2 – 10m with an average depth of about 3.5m. Mine pits range in size from a single hectare to tens of hectares but average around 30 hectares. Due to the nature of the ore pods, the mine is characterised by a constantly moving mining footprint followed by progressive rehabilitation. The mine consists of a mosaic of ore pods, linked via a network of haul roads to a crusher and facilities area. Therefore, the mining footprint can be considered pods connected by linear corridors. The proposed offset conservation areas will be large mostly contiguous areas and therefore have a better area to perimeter ratio than the area impacted.
Contains additional rare or otherwise significant species and threatened species of community compared with the impact site	Additional threatened and priority species likely to be present in the offset areas.

Concept	Consideration
Close to or contiguous with an existing conservation area	POCA001 (Jarrahdale) adjoins the Serpentine National Park. POCA005 (Dwellingup) adjoins the Lane Poole Conservation Reserve.
Likely to enhance biological corridors or ecological linkages between conservation areas	The conservation actions will enhance the connection through improved feral predator controls and management of stream zones and riparian vegetation.
It includes actions to address threatening processes	The conservation actions in this Offset Proposal have been proposed based on actions to address the following threatening processes in species recovery and threat abatement plans. Actions include: • Protection of habitat • Control of invasive species • Early fire detection • Climate Change mitigations
Allows for secure management arrangements in place that will provide for long term conservation	The areas proposed for offset conservation are State Forest, owned by the Crown, vested to the Conservation and Parks Commission and managed on behalf of the Commission by the DBCA. Alcoa will be responsible for ensuring the conservation actions are implemented within each offset conservation area for at least 20 years. Upon completion of the offset, the responsibility for land management will return the landowner (WA Government) and/or land manager (currently the DBCA). Alcoa intends that the offset conservation areas are relatively self-sustaining when returned to the WA Government as the land manager and require only minimal intervention to maintain the habitat quality.
Sound knowledge and adaptive management	This Offset Proposal has been prepared by Alcoa based on recovery plans, approved conservation advice, threat abatement plans, research findings and discussions with experience subject-matter/species experts. The adaptive management framework has been outlined in Section 4.9.

Concept	Consideration
	Findings from the implementation of on-ground management actions (effectively applied research) will be evaluated and used to inform future actions.
Likely offset success. Can the values be defined and measured? What is the operator experience / evidence of previous success?	Alcoa considers this Offset Proposal has a very high likelihood of success. Conservation actions have been used in similar environments with proven results. Fauna habitat extent and condition can be defined and measured. Fauna presence, abundance and density can be measured or estimated using existing methodologies. Alcoa has been operating in the NJF for over 60 years. Alcoa's rehabilitation program has successfully returned fauna habitat following mining and its research program has provided valuable information to the broader scientific community.
Time lag	Alcoa intend, where possible, to commence the environmental offset projects prior to the impacts occurring. On-ground actions will provide benefits within around 5 years (increased feral predator controls and installation of black cockatoo drinking water points).
Long term strategic outcomes	The commitment to fund, manage and monitor key fauna habitat areas within offset conservation areas for a period of 20 years provides confidence that the habitat will be maintained for the foreseeable future. This long-term management will promote species resilience to threats, but also a rapid response to emerging or unforeseen threats.

5.2 Commonwealth offset requirements

Environmental offsets should meet the principles identified in the Commonwealth's Environmental Offset Policy (DSEWPC, 2012). The application of the Commonwealth offset policy principles is in Table 5-3.

Table 5-3: Consistency with Commonwealth Environmental Offset Policy

Principle	Consideration
Suitable offsets should 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 protecting, managing, maintaining and/or improving threatened species habitat. The actions will mitigate against threatening processes to ensure the on-going health and condition of species habitat within the proposed offset conservation area. Collectively, the area of habitat managed and maintained for threatened species will be significant.
Suitable offsets must be built around direct offsets but may include other compensatory measures.	Direct offsets are actions that provide a measurable conservation gain for a threatened (MNES) species. Conservation gain will be achieved through: • improving existing degraded threatened fauna habitat (installation of water points, feral pig management in waterways) • reducing known threats to threatened fauna species (feral foxes, cats and pigs) in known habitat areas • support the increase in potential habitat areas through removal of threatening processes.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.	This Offset Proposal is in proportion to the level of statutory protection that applies to the protected matter. • Alcoa will provide funding for additional conservation actions within State Forest that support the WA Government's conservation of the forest. • Proposed offset conservation areas contain habitat for multiple threatened, priority and other native species. • Conservation actions will provide favourable outcomes for threatened, priority and other native species, as well as general
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	

Principle	Consideration
	improvements in vegetation health and condition. • Data collected through survey, monitoring and management will add to the broader knowledge basis of species, conservation and management of the NJF. • Proportionality is demonstrated through funding, aligned with similar offset funds applied in WA and Australia. • Proportionality is also obtained through application of the Commonwealth offset assessment guide in determining the area to which conservation actions are applied. • Proportionality also takes into account that some of the habitat loss is temporal and is returned through Alcoa's post-mining rehabilitation program.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding.	The Offset Proposal has considered the risks to the implementation of, or the risks of not achieving the proposed outcomes. This includes the allocation of appropriate funding, contingency actions for (environmental) stochastic events and changes in WA or Commonwealth regulatory or other policies.
Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs.	The State Agreement requires that Alcoa pay: • Compensation to the WA Government for each hectare of forest cleared in relation to its mining activities; • An annual payment to DBCA for services provided that enable safe and efficient performance of Alcoa's mining operations; and • An allocation towards Northern Jarrah Forest enhancement projects. Alcoa is also required under the State Agreement, to progressively restore and re-afforest the areas cleared for mining. Environmental offset projects will provide conservation actions over and above the current requirements of the State Agreement. Where environmental offset projects support existing conservation projects, the funding and actions undertaken as part of the offset will be

Principle	Consideration
	additional to the actions in the existing conservation project. Conservation projects already required by law or planning regulations or agreed to under other schemes or programs will not be accepted as an environmental offset project unless it is demonstrated that the funding will be used to perform conservation or threat abatement actions over and above that defined by the appropriate legislation. Alcoa has proposed this offset as it provides a like for like offset (i.e. impacts to State Forest vegetation\habitat will be offset in similar vegetation\habitat in State Forest).

Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable.	The offset proposed are:
	• Efficient – this offset supports the work DBCA does in managing the forest, with proponent and WA Government working collectively to provide better environmental outcomes at a landscape scale.
	• Effective – management actions have proven outcomes.
	• Timely - time to ecological benefit is likely to be relatively short, for example in terms of feral predator management.
	• Transparent – this Offset Proposal, associated plans, surveys, studies and reports will be shared and/or made publicly available.
	• Scientifically robust – this Offset Proposal has been prepared based on best-available and current science with methodologies that are proven, repeatable and measurable.
	• Reasonable – the proposed offset is reasonable considering:
	  ○ Alcoa has committed to not mining in proposed offset conservation areas.
	  ○ Alcoa will rehabilitate impacted areas within reasonable timeframes.
	  ○ Alcoa conducts extensive research in the Northern Jarrah Forest.
	  ○ Alcoa funds social and environmental programs.

Principle	Consideration
	○ Alcoa provides compensation to the WA Government for loss of timber resource. ○ It is acknowledged that protecting and improving existing habitat is an important recovery action.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited, and enforced	This Offset Proposal, along with the associated plans and the Offset Strategy, will be made publicly available. On-going reporting of the implementation and progress towards outcomes is also expected to be made publicly available. Performance indicators and methodologies use to measure the outcomes are proven, repeatable and measurable.

5.3 EPA's Public Advice: Considering Environmental Offsets at a Regional Scale

Alcoa has considered the need for environmental offset program to be part of a broader suite of integrated strategic actions across the bioregion. Table 5-4 demonstrates how this Offset Proposal considered the guiding principles set out in the EPA's Public Advice: Considering Environmental Offsets at a Regional Scale (EPA 2024).

Table 5-4: Consideration of the guiding principles in the EPA's Public Advice on Regional Scale Environmental Offsets

Guiding Principle	Consideration
Prioritise restoration offsets	There are limitations to restoration (revegetation) options within the area in which Alcoa operates. Delivering environmental offsets in the Northern Jarrah Forest is constrained by land tenure (most of ML1SA is Crown land) and vegetation extent (most of ML1SA contains intact native vegetation). The proposed offset conservation areas identified for Tranche 1 of the Offset Proposal are for the implementation of conservation projects that protect and enhance existing vegetation and habitat in State Forest against current and emerging threats. Alcoa are continuing to identify appropriate proposed offset conservation areas for Tranche 2 and 3 of the Offset Proposal and will prioritise locating areas that provide opportunities for revegetation where appropriate.

Guiding Principle	Consideration
Be consistent with new and emerging regional plans, reserve management plans, recovery plans, strategic programs and other regional level protection instruments	Environmental offset projects have considered the current species recovery plans, threat abatement plans, and any relevant peer-reviewed research or scientific findings and will deliver conservation actions that are complementary and additional to the high-level management measures outlined in the Forest Management Plan. This Offset Proposal provides the flexibility to develop and adapt the environmental offset projects based on any new or emerging recovery or threat abatement plans, regional plans or other programs.
Builds and maintain resilience in ecological functions and ecosystem services	Proposed offset conservations areas are near to or adjoin existing or proposed conservation reserves. This will help to maintain ecological linkages and conservation areas and places of ecological significance. The environmental offset projects include actions to mitigate against current on-ground threats (for example invasive species), emerging on-ground threats (for example new invasive species or disease) and threats from climate change (for example reduced drinking water for black cockatoos). The environmental offset projects will carefully consider the overall ecosystem balance within the offset conservation areas.
Contribute to environmental knowledge of a region	The environmental offset projects contribute to environmental knowledge of a region. Implementation of on-ground conservation actions and adaptive management will lead to understanding of the effectiveness of and most appropriate conservation actions in certain areas or habitat types. Environmental offset projects include a monitoring program that will lead to an accumulation of data on vegetation, habitat and species over the life of the offset period. Environmental offset projects may be research based or include trials.
Provides outcomes that are like for like, or are similar to the impacted value	Both the impact and proposed offset areas are predominantly jarrah-marri open forest in State Forest in good to very good vegetation condition but have threats that have or will lead to degradation of fauna habitat over time without conservation actions.
Demonstrate connectedness of the physical or ecological function values with those being impacted	Alcoa has proposed the implementation of environmental offset projects in the Northern Jarrah Forest, in as similar habitat as possible to the impacted area. Where possible, offset conservation areas will be located as close to the impacts as possible to support the persistence of the local population of the impacted species. However, Alcoa acknowledge that for some species, environmental offsets in other subregions or bioregions might provide significant beneficial outcomes for that species and therefore like for similar

Guiding Principle	Consideration
	offsets will be considered where like for like offsets are either not available or have been exhausted. As above, Alcoa intends to locate offset conservations areas that are near to or adjoin existing or proposed conservation reserves.
Provide greater co-benefits	Environmental offset projects that enhance vegetation and habitat in the NJF will provide positive outcomes for many environmental values including flora, vegetation, native fauna and waterways. This will also improve the environmental value for cultural, heritage and social values. In addition to providing positive outcomes to the environment, the environmental offsets will provide cultural, heritage and social benefits through employment, training and recreational opportunities. Alcoa are consulting with relevant stakeholders including Traditional Owners, environmental groups, government agencies and the community to ensure the co-benefits are valuable.

5.4 Forest Management Plan

The Forest Management Plan 2024-2033 is a statutory plan that outlines high-level strategic goals and provides management objectives and activities in accordance with the *Conservation and Land Management Act 1984* (CALM Act), under four foundations: Noongar cultural heritage and management partnerships; biodiversity conservation; forest health and climate resilience and social and economic benefits and opportunities. Each management objective has one or more activities to be implemented to meet the objective.

This Offset Proposal has been developed to align or complement management activities in the Forest Management Plan. Coordinating and implementing management activities alongside the DBCA will support achieving the management objectives and overall strategic goals for the Northern Jarrah Forest.

This also supports Alcoa's strategic approach to delivering conservation actions and achieving conservation outcomes across the Northern Jarrah Forest and surrounding areas.

5.5 Threatened Species Action Plan

The 2022-2032 Threatened Species Action Plan (DCCEEW, 2022), released in October 2022, maps a pathway to protect, manage and restore Australia's threatened species and important natural places. The plan list 20 priority places and 110 priority species and has four objectives and 22 targets to be met over a ten-year period.

Priority species were selected after careful and strategic prioritisation principles derived from consultation with threatened species experts and the wider community. The Commonwealth government also states:

Prioritising attention and effort on these selected species over the next 5 years will generate better outcomes for threatened species and other wildlife that shares the same habitat or threats. It also helps focus efforts of the Australian Government and others to collaborate, combining efforts to achieve better outcomes.

Relevant to this Offset Proposal, the Threatened Species Action Plan specifically lists the Carnaby's cockatoo, chuditch and quokka as priority species. Other priority species that inhabit the Northern Jarrah Forest are also likely to benefit from the conservation actions.

This Offset Proposal will contribute to actions identified under Target 2: Implementation of priority actions for priority species through:

- Identifying key Carnaby's cockatoo, chuditch and quokka habitat in the Northern Jarrah Forest.
- Identifying threats to key Carnaby's cockatoo, chuditch and quokka habitat in the Northern Jarrah Forest.
- Identifying actions required to improve key Carnaby's cockatoo, chuditch and quokka habitat in the Northern Jarrah Forest.
- Commencing key recovery actions and/or build on activities underway, expanding collective recovery and threat management to key Carnaby's cockatoo, chuditch and quokka habitat in the Northern Jarrah Forest.

Data and information obtained from implementation of this Offset Proposal will be shared with DCCEEW (via the appropriate means requested by DCCEEW).

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Appendix A – Habitat quality scoring framework

Report

26 February 2025

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From	Heath Morgan	**Project No.**	12633192
Project Name	Pinjarra Alumina Refinery Revised Proposal – Environmental Review Document		
Subject	Threatened fauna habitat scoring tool – explanatory report		

1. Introduction

1.1 Purpose of this report

The purpose of this report is to describe the process and outcomes of the development of fauna habitat quality scoring methods to support the calculation of residual significant impacts[1] to threatened fauna habitat, for presentation in the Pinjarra Alumina Refinery Revised Proposal ('the Proposal') Environmental Review Document (ERD).

2. Scope and limitations

2.1 Scope of work

The scope of the work completed was:

– Develop scoring method for threatened fauna species habitat, for species likely to occur in the Proposal Development Envelope (DE) (Carnaby's, Baudin's and Forest Red-tailed Black Cockatoo, Chuditch, Quokka and Woylie)
– Provide rationale and justification as to the suitability of the scoring methodology with respect to fauna habitats within the Northern Jarrah Forest IBRA (Interim Biogeographic Regionalisation for Australia) sub-region.

2.2 Limitations

This report: has been prepared by GHD for Alcoa of Australia and may only be used and relied on by Alcoa of Australia for the purpose agreed between GHD and Alcoa of Australia as set out in section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than Alcoa of Australia arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

[1] The Commonwealth use the term residual significant impact, whereas the Western Australian Government use significant residual impact. Within this report, residual significant impact is used to refer to both terms.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 2 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

3. Threatened fauna habitat scoring

3.1 Habitat scoring guidance

The development of threatened fauna habitat scoring for the Proposal ERD has considered guidance on habitat quality in the EPBC Act *How to Use the Offsets Assessment Guide* (undated) and the WA *Environmental offsets metric: Quantifying offsets in Western Australia* (DWER 2021). Table 1 presents a summary of the EPBC Act and WA guidance with respect to threatened species. As presented, the two guidance documents align broadly on three habitat scoring components, being site condition, site context, and species population.

The development of threatened fauna habitat scoring has also considered guidance of habitat requirements and key threats for the six EPBC Act listed fauna species assessed as known or likely to occur in the Proposal DE (the 'subject listed species'), namely:

Known to occur:

– Baudin's Cockatoo (*Zanda baudinii*) (Endangered)
– Carnaby's Cockatoo (*Zanda latirostris*) (Endangered)
– Forest Red-tailed Black-Cockatoo (FRTBC) (*Calyptorhynchus banksii naso*) (Vulnerable)
– Chuditch (*Dasyurus geoffroii*) (Vulnerable)
– Quokka (*Setonix brachyurus*) (Vulnerable)

Likely to occur:

– Woylie (*Bettongia penicillata ogilbyi*) (Endangered)

A summary of the guidance of habitat requirements and key threats is presented in Table 2 for Black Cockatoos and Table 3 for the subject listed species that are critical weight range (CWR) mammals.

3.2 Habitat scoring framework

The overall rationale for the habitat scoring framework is to score habitat quality based on available datasets at the time of preparing the ERD, such as the fauna habitat / vegetation types or vegetation condition mapped over the Proposal DE, or inferred water habitats mapped in proximity to the DE. Accordingly, habitat quality elements that do not have available datasets at the time of preparing the ERD are excluded (e.g. canopy cover, den density, density of prey species, density of feral predators). These habitat quality elements may potentially be introduced into the habitat scoring framework at a later stage (e.g. offset monitoring) if the necessary datasets become available.

The habitat guidance and literature (Table 2, Table 3), baseline survey results (GHD 2024, 2025a, 2025b), and advice by specialists (T. Kirkby, M. Craig, pers. comm.) indicate that the importance of site condition, context and species stocking for Black Cockatoos is substantially different from that of the subject CWR mammals. Accordingly, a separate scoring framework is proposed for each of the two fauna groups.

Black Cockatoos are dependent on foraging resources and habitat features (nest trees, roost trees and drinking water) that vary substantially with fauna habitat / vegetation types. In contrast, the subject CWR mammals can forage across all fauna habitat / vegetation types but are substantially affected by feral predators (in the case of Quokka, restricting the habitat types it would otherwise occupy) and/or habitat fragmentation. The collection of field records for Black Cockatoos and CWR mammals also differs substantially. Black Cockatoos are readily identified during field surveys, with distinctive calls and daytime visibility while roosting, in flight, or by conspicuous foraging residues. The subject CWR mammals are comparatively cryptic, being nocturnal and with relatively small, localised (in the case of Quokka) and/or sparse populations that reduce the recording of individuals or their signs (e.g. scats, diggings).

The habitat scoring framework has adopted three habitat components considering both the EPBC Act and WA guidance, namely:

1. Site / vegetation condition, including:
    - vegetation condition, using the condition scale developed for the Proposal DE (Mattiske 2024)
    - presence of habitat species and features
2. Site context, including:
    - species movement patterns
    - proximity to suitable habitat
    - context of species population
    - presence of threats
3. Species stocking rate / habitat value:
    - species presence and population

The scoring for each habitat component is generally scored out of 3. Site condition is scored out of 4 for Black Cockatoos, reflecting its relative importance for these highly mobile species, whereas site context is scored out of 4 for CWR mammals, reflecting the importance of key threats and connectivity for ground fauna. Scores for each habitat component are then summed to make a score out of 10.

The habitat scoring framework is presented in Table 4 for Black Cockatoos and Table 5 for CWR mammals. Each framework contains supporting notes, where relevant. Table 6 provides supporting definition of habitat / features for input into the scoring framework.

Table 1 Threatened species habitat quality – EPBC Act and WA environmental offsets guidance

EPBC Act offset guide habitat quality component	Description in relation to threatened species	WA offset metric habitat quality component	Description in relation to threatened species
Site condition	Condition of a site in relation to the ecological requirements of a threatened species. Includes considerations such as: – vegetation condition and structure, – the diversity of habitat species present, and – the number of relevant habitat features.	Vegetation condition	Condition of the native vegetation present at a site. Evaluation should include (but not be limited to) consideration of: – forms of disturbance and/or threats: disturbance from land use and management practices, edge effects – number of weeds: disturbance opportunistic, those carried by vectors, persistent perennials, aggressive invaders in the absence of disturbance – soil stability: the presence of stems and other plant bases, surface feeder roots, humus/organic matter, duricrust, cryptograms, lichens, litter and debris – number of native plants: species composition of a particular vegetation type, and a sense of whether there has been a loss of components – number of strata: vegetation structure of a particular vegetation type, and a sense of whether there has been a loss of components – seedlings and sapling presence: regenerative capacity, for resilience – vegetation health: general health of the overstorey and understorey, signs of stress, atypical leaf colouration, leaf/limb or whole plant death. It may be appropriate for the condition to be determined using the Keighery scale in the intensive land use zone.
Site context	The relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of a threatened species. Includes considerations such as: – movement patterns of the species, – the proximity of the site in relation to other areas of suitable habitat, and – the role of the site in relation to the overall population or extent of a species or community.	Site context	The relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of the threatened species. Evaluation should include (but not be limited to) consideration of: – movement patterns; that is, where a mobile species – proximity of the site in relation to other areas of suitable habitat, such as size of the site in the context of the surrounding landscape/region, – connectivity with other suitable or known habitat – proximity to water – importance of the site in relation to the overall species population – vegetation extent, such as extent of vegetation type within the bioregion, percentage of vegetation coverage within the local area – the occurrence of threats on or near the site.
Species stocking rate	Usage and/or density of a species at a particular site. The principle acknowledges that a particular site may have a high value for a particular threatened species, despite appearing to have poor condition and/or context. Includes considerations such as: – survey data for a site in regards to a particular species population. – the role of the site population in regards to the overall species population viability.	Habitat value	The ability of a site to support the threatened species. Evaluation should consider whether a particular site may have a high importance for the threatened species, despite, for example, appearing to have low-scoring vegetation condition. The evaluation should include (but not be limited to) consideration of: – the presence of a species on the site (confirmed/modelled through survey data) – the density of a species at the site – the context of a species population at the site in regard to the overall species population – any threats present at the site that may impact the survival of species.

Table 2 Summary of published habitat guidance – Black Cockatoos

Species	Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*)	Baudin's Cockatoo (*Zanda baudinii*)	Carnaby's Cockatoo (*Zanda latirostris*)
Habitat description (with relevance to Northern Jarrah Forest habitats)	Referral guidelines (DAWE 2022) Foraging – Primarily seeds of Jarrah and Marri in woodlands and forest, also Allocasuarina cones and fruits of Snottygobble. Less important foods include Blackbutt, Bullich, Sheok, and Hakea spp. Breeding – Generally in woodland or forest, but may also breed in partially cleared woodland or forest, including isolated trees. Nest in hollows in live or dead trees (many eucalypt species may provide suitable hollows), particularly Marri, Wandoo, Bullich, Blackbutt, and Jarrah. Roosting – Any tall trees may provide roosting habitat, but particularly tall Jarrah, Marri, Blackbutt, and introduced eucalypt trees or large trees on the edges of forests.	Referral guidelines (DAWE 2022) Foraging – Primarily seeds of Marri, rarely Jarrah, in woodlands and forest, and seeds of native proteaceous plants (e.g. Banksia, Dryandra and Hakea spp.). Also insects and insect larvae, Kangaroo Paw, tips of Pinus spp. Breeding – Generally in woodland or forest, but may also breed in partially cleared woodland or forest, including isolated trees. Nest in hollows in live or dead trees (many eucalypt species may provide suitable hollows), particularly Marri, Jarrah, Wandoo and Bullich. Roosting – Generally in or near riparian environments or other permanent water sources. Any tall trees may provide roosting habitat, but particularly Jarrah, Flooded Gum, Blackbutt, and introduced eucalypts.	Referral guidelines (DAWE 2022) Foraging – Native shrubland, kwongan heathland and woodland on proteaceous plants (e.g. Banksia, Hakea and Grevillea spp.), as well as Callistemon spp. and Marri. Also seeds of Pinus spp, insects and insect larvae. Breeding – Woodland or forest, but also in partially cleared woodland or forest, including isolated trees. Nest in hollows in live or dead trees (many eucalypt species may provide suitable hollows), particularly Wandoo, Jarrah, Flooded Gum, and Marri. Roosting – Generally in or near riparian environments or natural and artificial permanent water sources. Any tall trees may provide roosting habitat, but particularly Wandoo, Marri, Blackbutt, introduced eucalypts and pines.
Critical habitat	Recovery Plan (DEC 2008): – areas currently occupied by the cockatoos; – natural vegetation in which the cockatoos nest, feed and roost – natural vegetation through which the cockatoos can move from one occupied area to another; and – suitable vegetation within the recorded range in which undiscovered cockatoo populations may exist – Marri, Karri and Jarrah forests, woodlands and remnants in the south-west of Western Australia receiving more than 600 mm of annual average rainfall.	Recovery Plan (DEC 2008): – areas currently occupied by the cockatoos; – natural vegetation in which the cockatoos nest, feed and roost – natural vegetation through which the cockatoos can move from one occupied area to another; and – suitable vegetation within the recorded range in which undiscovered cockatoo populations may exist – Marri, Karri and Jarrah forests, woodlands and remnants in the south-west of Western Australia receiving more than 600 mm of annual average rainfall.	Recovery Plan (DPaW 2013): – The eucalypt woodlands that provide nest hollows used for breeding, together with nearby vegetation that provides feeding, roosting and watering habitat that supports successful breeding; – Woodland sites known to have supported breeding in the past and which could be used in the future, provided adequate nearby food and/or water resources are available or are re-established; – In the non-breeding season, the vegetation that provides food resources as well as the sites for nearby watering and night roosting that enable the cockatoos to effectively utilise the available food resources.
Key threats	Recovery Plan (DEC 2008): – killing by illegal shooting – feral honeybees (sting deaths / nest exclusion) – habitat loss (clearing, harvesting) – nest hollow shortage – nest hollow competition (other birds, feral bees)	Recovery Plan (DEC 2008): – killing by illegal shooting – feral honeybees (sting deaths / nest exclusion) – habitat loss (clearing, harvesting) – nest hollow shortage – nest hollow competition (other birds, feral bees)	Recovery Plan (DPaW 2013): – loss of breeding habitat (hollow bearing trees) Loss of non-breeding foraging and night roosting habitat – tree health (e.g. Phytophthora dieback) – mining and extraction activities – illegal shooting and taking – climate change – collisions with motor vehicles – disease

Table 3 Summary of habitat guidance – critical weight range mammals

Species	Chuditch (*Dasyurus geoffroii*)	Woylie (*Bettongia penicillata ogilbyi*)	Quokka (*Setonix brachyurus*)
Habitat description (with relevance to Northern Jarrah Forest habitats)	Recovery Plan (DEC 2013): The major portion of the remaining natural populations occur in varying densities in jarrah forests and woodlands in the south-west corner of WA, and in woodlands, mallee shrublands and heaths along the south coast, east to the Ravensthorpe area. Chuditch are solitary animals for most of their life. In the absence of foxes, they occupy relatively large home ranges, males ranging over 15 km² and females 3-4 km². Home ranges may overlap; however there tends to be a smaller non-overlapping 'core' area defined by den locations: 4 km² and 0.9 km² for males and females respectively. Both sexes occur at similar densities in the jarrah forest.	Recovery Plan (Yeatman and Groom 2012): Known from a variety of habitats. Current habitat includes tall eucalypt forest and woodland, dense myrtaceous shrubland, kwongan (proteaceous) or mallee heath. Thickets and other suitable habitat types such as heath, provide refuges for woylies against predators. Woylie occupy home ranges, the size of which varies between habitats, sites and according to woylie density. Small home ranges (less than 6 ha) are generally observed at high density occurrences.	Habitat use in the northern jarrah forest is largely restricted to swamps and riparian habitat (Hayward et al 2005, Dundas et al 2017). Within swamps, they are habitat specialists, preferring early seral stages that have been burned within the previous 10 years. This preference derives from a combination of dietary requirements and refuge from predation. As swamps mature they become suboptimal, forcing quokkas to colonize new patches. Since the collapse of the metapopulation following the introduction of the fox, quokkas have been forced to remain at a site because predation inhibits dispersal (Hayward et al 2005). Home-range sizes are estimated at approximately 6-7 ha and core ranges approximately 1.2 ha (Hayward et al 2004). Ranges shift to the edge of swamps in winter, and toward the centre in autumn as the swamps dried.
Critical habitat	Recovery Plan (DEC 2012) – areas currently occupied by chuditch; – areas of natural vegetation in which chuditch breed, forage or use to move from one area to another; – areas of suitable vegetation within the recorded range in which undiscovered populations may exist; – areas not currently occupied due to recent fire but capable of supporting populations when sufficiently recovered – areas previously occupied that provide suitable habitat and into which can be reintroduced Chuditch have historically been present in a large variety of habitats so it is not possible to list a set of characteristic habitats that should be preserved. However, some key aspects are required for chuditch survival in an area. These are: adequate den resources (e.g. hollow logs, burrows or rock crevices), adequate prey resources (particularly large invertebrates) and sizeable areas (> 20 000 ha.).	Recovery Plan (Yeatman and Groom 2012) Although habitat suitable for the woylie varies across its current range, a number of key habitat requirements appear to be essential for the persistence of the species within this range. Woylies may persist in the following habitats where there is adequate introduced predator (fox and cat) control or exclusion: – tall eucalypt forest and woodland; – dense myrtaceous shrubland; and, – kwongan (proteaceous) or mallee heath. All habitat meeting these key requirements within the current range, which is either known to be occupied by woylies or to have the identified potential to be occupied by woylies, is considered habitat critical to the survival of the species.	Recovery Plan (DEC 2013) Habitat critical to the survival of the quokka has been well defined for the northern jarrah forest subpopulation and comprises Taxandria linearifolia swamps. Quokkas are thought to occur as, or previously occurred as, metapopulations dispersing from swamp to swamp over time as vegetation structure changes with time since fire. Habitat critical to survival includes areas of natural vegetation where the understorey is sufficiently thick and complex to provide a predation refuge close to more open, recently burnt vegetation which is used as a food source. Habitat changes seasonally, in wetter months after wetlands become inundated the quokkas core home range shifts toward the periphery of the swamp, leaving the quokka more exposed to predation. When this habitat is altered, and in the presence of feral predators, the carrying capacity of a site may also be reduced.
Key threats	Recovery Plan (DEC 2012) – land clearing, particularly of riparian vegetation, and the removal of suitable den logs and den sites – predation by, and competition from, foxes and feral cats – mortality from poisoning, trapping, illegal shooting, and road kills	Recovery Plan (Yeatman and Groom 2012) – fox predation – cat predation – habitat alteration (clearing, Phytophthora dieback) – native predators – climate change, particularly reduced rainfall and increasing temperatures – disease	Recovery Plan (DEC 2013): – fox predation – cat predation – feral pigs - destruction of habitat – Phytophthora dieback (impact likely to be variable) – clearing of habitat – altered fire regimes – altered hydrological regimes – climate change – disease

Table 4 Scoring framework – black cockatoos

Guidance summary	Site / vegetation condition	Site context	Species stocking rate / habitat value
EPBC Act offset guide	Ecological requirements of a threatened species. – vegetation condition and structure, – the diversity of habitat species present, and – the number of relevant habitat features.	Relative importance in terms of the landscape, taking into account connectivity needs. – movement patterns of the species, – proximity in relation to other areas of suitable habitat, and – role in relation to the overall population or extent of a species or community.	Usage and/or density of a species. – survey data for a site. – the role of the site population in regards to the overall population viability.
WA offset metric	Vegetation condition, as per Keighery in the intensive land use zone	– movement patterns – proximity of the site in relation to other areas of suitable habitat – connectivity with other suitable or known habitat – proximity to water – importance in relation to the overall species population – vegetation extent – occurrence of threats.	– presence of species (confirmed/modelled through survey data) – density of species – context of species population in regard to the overall population – any threats present[2].
Score	**Site / vegetation condition**	**Site context**	**Species stocking rate / habitat value**
4	– vegetation cover is dominated by foraging species, AND – contains potential breeding and/or roosting habitat, AND – vegetation condition is Good or better	n/a (scored out of 3)	n/a (scored out of 3)
3	– vegetation cover is dominated by foraging species, AND – vegetation condition is Good or better OR pine plantation (Carnaby's Cockatoo only)	– within 2 km of perennial water resources, AND – within 6 km of extensive (> 1000 ha) foraging resources	– local resident population in high numbers, including breeding
2	– vegetation cover is dominated by foraging species, AND – vegetation condition is Degraded or worse OR – vegetation has limited foraging species, AND – vegetation condition is Good or better	– between 2-3 km of perennial water resources, AND – within 6 km of extensive (> 1000 ha) foraging resources	– local resident population in small numbers, including breeding, with seasonal use by non-residents (no breeding)
1	– vegetation cover has limited foraging species, AND – vegetation condition is Degraded or worse	– more than 3 km from perennial water resources OR – between 6-12 km of extensive (> 1000 ha) foraging resources	– seasonal or transient use by small numbers (no breeding)
0	– vegetation cover does not contain foraging species	– more than 12 km of extensive (> 1000 ha) foraging resources	– no historic records, or records during baseline surveys
Notes	– The NJF is mapped as predominantly comprising open forest with 30-70% projection foliage cover of tallest stratum (Heddle et al 1980, NVIS[3]). No data on foliage cover is available at the local scale. – Presence and abundance of foraging species, as well as roosting and breeding habitat features, vary considerably across native vegetation types in the Jarrah forest. – While Degraded or Completely Degraded condition vegetation may provide foraging, breeding or roosting habitat (e.g. scattered trees in a parkland cleared context), the degraded vegetation condition may reduce recruitment and replacement of habitat species over the long term. Phytophthora dieback infestation may affect tree health for vulnerable species (e.g. Jarrah, Banksia spp.), noting most key foraging, breeding and roosting species (including Marri, Blackbutt, Bullich and Pinus spp.) are not vulnerable. – Vegetation condition mapping using condition scale developed for the Proposal DE by Mattiske Consulting (2024). – Note: pine plantation provides highly productive foraging resources for Carnaby's Cockatoo that is artificially recruited despite Completely Degraded vegetation condition. – Black Cockatoos favour key foraging species (Marri, Jarrah, Pinus spp.) (T. Kirkby, pers. comm.) that dominate the vegetation cover in their respective vegetation types, foraging on other plant species (and insects) as required.	– Black Cockatoos forage over a wide area, mainly nesting within 12 km of foraging resources and roosting within 2 km of water resources (DAWE 2022). – Craig et al. (2022) found ¾ of known nest hollows used by FRTBC were within 3 km of perennial water bodies. Unpublished data (M. Craig, pers. comm.) found a statistically significant increase in FRTBC foraging residues within 2 km of perennial water bodies compared to further than 2 km from perennial water bodies. – Unpublished observations are that FRTBC will use water sources from rural areas (particularly elevated troughs) and river pools (T. Kirkby, pers. comm.), whereas use of reservoirs occurs in low numbers (M. Craig, pers. comm.). Baudin's and Carnaby's Cockatoo will use water sources from rural areas, river pools, reservoirs, and seasonally from running streams (T. Kirkby, pers. comm.). – Population scored under species stocking rate / habitat value. – Modelled distribution of all three Black Cockatoos covers the Proposal MDE and surrounding land. Not scored. – No spatial data available to score key threats (feral honeybees, nest availability, nest competition, climate change). Phytophthora dieback threat scored as site / vegetation condition.	– Black Cockatoos are conspicuous and readily identified through calls, observation while roosting/flying, and/or foraging residues. – Forest-red Tailed Black Cockatoos occupy the Proposal DE as a resident, breeding population (T. Kirkby, pers. comm.). Baseline surveys (GHD 2024, 2025a, 2025b) recorded numerous observations of the species within the Proposal DE. – Baudin's and Carnaby's Cockatoos primarily occupy the DE on a seasonal basis, foraging during the non-breeding season of autumn-winter and returning to their breeding habitat for the spring-summer. Small, resident breeding populations also occur in proximity to the MDE (T. Kirkby, pers. comm). Baseline surveys (GHD 2024, 2025a, 2025b) recorded sparse observations of both species within the Proposal DE.

[2] Note this is a repeat from site context so is covered by the site context component.
[3] **https://www.agriculture.gov.au/sites/default/files/documents/mvg3-nvis-eucalypt-open-forest.pdf**

Table 5 Scoring framework – critical weight range mammals

Guidance summary	Site condition	Site context	Species stocking rate
EPBC Act offset guide	Ecological requirements of a threatened species. – vegetation condition and structure, – the diversity of habitat species present, and – the number of relevant habitat features.	Relative importance in terms of in the landscape, taking into account connectivity needs. – movement patterns of the species, – proximity in relation to other areas of suitable habitat, and – role in relation to the overall population or extent of a species or community.	Usage and/or density of a species. – survey data for a site. – the role of the site population in regards to the overall population viability.
WA offset metric	Vegetation condition, as per Keighery in the intensive land use zone	– movement patterns – proximity of the site in relation to other areas of suitable habitat – connectivity with other suitable or known habitat – proximity to water – importance in relation to the overall species population – vegetation extent – occurrence of threats.	– presence of species (confirmed/modelled through survey data) – density of species – context of species population in regard to the overall population – any threats present.
Score	**Site condition**	**Site context**	**Species stocking rate**
4	n/a (scored out of 3)	– key threats absent: • all species: feral predators eliminated (e.g. fenced enclosure, intensive control), AND • Quokka: feral pigs eliminated (e.g. fenced enclosure, intensive control), OR • Chuditch: no sealed roads within 2.2 km (male range) AND – high connectivity of habitat: • Chuditch: connected to > 20,000 ha of native vegetation with limited fragmentation	n/a (scored out of 3)
3	– Excellent or Pristine vegetation condition	– key threats reduced: • all species: feral predators suppressed (Western Shield baiting), AND • Chuditch: no sealed roads within 1.1 km (male core area / female range), OR • Quokka, Woylie: dense riparian vegetation that provides refuge from feral predators AND – high connectivity of habitat: • Chuditch: connected to > 20,000 ha of native vegetation with limited fragmentation • Quokka, Woylie: connected to a large riparian corridor > 5 km in length	– resident population in high numbers
2	– Good or Very Good vegetation condition	– key threats reduced: • all species: feral predators suppressed (Western Shield baiting), AND • Chuditch: no sealed roads within 1.1 km (male core area / female range), OR • Quokka, Woylie: dense riparian vegetation that provides refuge from feral predators AND – moderate connectivity of habitat: • Chuditch: connected to 5,000-20,000 ha of native vegetation with limited fragmentation • Quokka, Woylie: connected to a moderate riparian corridor 1-5 km in length	– resident population in small numbers
1	– Degraded vegetation condition	– key threats prevalent: • all species: feral predators suppressed (Western Shield baiting), AND • Chuditch: sealed roads within 1.1 km (male core area / female range), OR • Quokka, Woylie: open upland vegetation that does not provide refuge from feral predators OR – low connectivity of habitat: • Chuditch: connected to <5,000 ha of native vegetation with limited fragmentation • Quokka, Woylie: connected to a small riparian corridor < 1 km in length	– sparse population, transient use
0	– Completely degraded vegetation	– key threats prevalent: • all species: no feral predator suppression (e.g. outside of Western Shield baiting)	– species, if present, is below detectable densities
Notes	– All native vegetation / fauna habitat types within Jarrah forest are expected to	– Chuditch males range over 15 km^2 (2.2 km radius) with a core area of 4 km^2 (1.1 km radius), females range over 3-4 km2 (1.1 km radius) with a core area (0.54 km radius) (DEC 2012).	– No local population estimates are available for Chuditch. The total population of the Jarrah forest (north and south) is estimated at approximately 1,400 to 12,500 adults, however the

Guidance summary	Site condition	Site context	Species stocking rate
	provide foraging and denning resources for CWR mammals. – Degraded condition vegetation (including Phytophthora dieback impact) reduces the diversity and abundance of native flora, reducing the foraging resources for native herbivores, and impacting the food web and thus foraging resources for native carnivores. – No spatial data available to score dens as habitat features, which may occur throughout	– Chuditch require sizable areas (>20,000 ha) to survive. Chuditch need large natural areas because of their large home ranges and resource requirements (DEC 2012). – Limited fragmentation includes scattered forest tracks with infrequent traffic and timber harvesting. High fragmentation includes mining, rural development and sealed roads. – Modelled distribution of all three CWR mammals cover the Proposal MDE and surrounding land. Not scored. – CWR mammals are less reliant on watering habitat for drinking. – Population scored under species stocking rate / habitat value. – No spatial data available to score threats of climate change or fire regime. Phytophthora dieback threat scored as site / vegetation condition.	sparse and dispersed / nomadic nature of the species makes it difficult to accurately estimate abundance and/or density, and to define key populations (DEC 2012). – Woylie populations are estimated to be sparse over the Northern Jarrah Forest, at approximately 400 animals over 7750 km^2 as at 2010 (TSSC 2018) or an average of 1 animal per 19 km^2. The largest natural populations are located in Upper Warren (Perup and Kingston) and Dryandra, with a number of translocated populations in offshore islands and fenced sanctuaries that provide refuge from feral predators (TSSC 2018). – Quokka populations in the Northern Jarrah Forest persist in small, isolated populations around favoured riparian habitat (Dundas et al 2017). Populations recorded in the vicinity of the Huntly Mine are estimated to be small, with approximately 5-25 animals recorded in each swamp (Dundas et al 2017).

Table 6 Supporting definition of fauna habitat / features for input to scoring framework

Fauna habitat types mapped over MDE	Associated vegetation types mapped over MDE	Black Cockatoos – site / vegetation condition – habitat species / habitat features			CWR mammals – site context – vegetation density as a predator refuge
		Forest Red-tailed Black-Cockatoo	Baudin's Cockatoo	Carnaby's Cockatoo	
Blackbutt Forest	AW, C, CW	Foraging, breeding, roosting	Limited foraging, roosting	Limited foraging, roosting	Dense / predator refuge
Bullich Forest	W	Foraging, breeding, roosting	Limited foraging, breeding, roosting	Limited foraging, roosting	Open
Flooded Gum Woodland	AC	Limited foraging, roosting	Limited foraging, roosting	Limited foraging, breeding, roosting	Dense / predator refuge
Granite Outcrop Association	G, G1, G2, R	Limited foraging	Limited foraging	Limited foraging	Open
Jarrah Marri Forest	D, DA, DG, E, P, PG, PS, PT, PW, Q, S, SP, ST, SW, T, TP, TS	Foraging, breeding, roosting	Foraging, breeding, roosting	Foraging, breeding, roosting	Open
Melaleuca Dampland	A	Limited foraging	Limited foraging	Limited foraging	Dense / predator refuge
Wandoo Woodland	Y, YG, AY	Foraging, breeding, roosting	Foraging, breeding, roosting	Foraging, breeding, roosting	Open
Mine rehabilitation		Foraging	Foraging	Foraging	Open
Pine Plantation		None	Foraging	Foraging, roosting	Open
Watering habitat based on available spatial datasets					
Perennial watering habitat		– Rural and urban zoned land – Permanent river pools	– Rural and urban zoned land – Permanent river pools – Drinking water reservoirs	– Rural and urban zoned land – Permanent river pools – Drinking water reservoirs	n/a

4. References

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Project name		Pinjarra Alumina Refinery Revised Proposal – Environmental Review Document					
Document title		Report | Threatened fauna habitat scoring tool – explanatory report					
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File name		12633192-REP-Fauna habitat score development_ERD Rev3.docx					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S3	A	T Sleigh	H Morgan		H Morgan		14/06/23
S3	B	T Sleigh	H Morgan		H Morgan		22/10/24
S3	C	T Sleigh	H Morgan		H Morgan		12/11/24
S3	0	T Sleigh	H Morgan		H Morgan		26/02/25

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Appendix B – Habitat quality score calculations

Weighted average habitat quality score calculations - Myara North and Holyoake

Species	Direct impact	Habitat quality score (out of 10)	Weighting of habitat area (per cent)	Weighted score
Forest red-tailed black cockatoo (VU)	1,875	10	29%	2.93
	1,768	9	28%	2.49
	2,562	8	40%	3.20
	92	7	1%	0.10
	98	6	2%	0.09
	2	5	0%	0.00
Total	6,396	-	100%	8.82
Average weighted quality score (rounded, out of 10)				**9**
Baudin's cockatoo (EN)	1,844	10	29%	2.87
	1,758	9	27%	2.47
	2,573	8	40%	3.21
	113	7	2%	0.12
	126	6	2%	0.12
	5	5	0%	0.00
Total	6,418	-	100%	8.79
Average weighted quality score (rounded, out of 10)				**9**
Carnaby's cockatoo (EN)	1,844	9	29%	2.59
	1,758	8	27%	2.19
	2,573	7	40%	2.81
	113	6	2%	0.11
	126	5	2%	0.10
Total	6,413		100%	7.79
Average weighted quality score (rounded, out of 10)				**8**
Woylie (EN)	101	8	2%	0.13
	234	7	4%	0.26
	338	6	5%	0.32
	5,620	5	89%	4.46
Total	6,293		100%	5.18
Average weighted quality score (rounded, out of 10)				**5**
Chuditch (VU)	416	8	7%	0.53
	5,763	7	91%	6.37
	40	6	1%	0.04
	115	5	2%	0.09
Total	6,334		100%	7.02
Average weighted quality score (rounded, out of 10)				**7**

Weighted average habitat quality score calculations - Myara North and Holyoake

Species	Direct impact	Habitat quality score (out of 10)	Weighting of habitat area (per cent)	Weighted score
Quokka (VU)	101	9	15%	1.35
	234	8	35%	2.78
	4	7	1%	0.04
	335	5	50%	2.48
Total	674		100%	6.66
Average weighted quality score (rounded, out of 10)				**7**

Weighted average habitat quality score calculations - O'Neil

Species	Direct impact	Habitat quality score (out of 10)	Weighting of habitat area (per cent)	Weighted score
Forest red-tailed black cockatoo (VU)		10	0%	0.00
		9	0%	0.00
	840	8	82%	6.59
	124	7	12%	0.85
	55	6	5%	0.32
	0	5	0%	0.00
Total	1,019	-	100%	7.77
Average weighted quality score (rounded, out of 10)				**8**
Baudin's cockatoo (EN)		10	0%	0.00
		9	0%	0.00
	826	8	81%	6.49
	124	7	12%	0.85
	67	6	7%	0.39
	1	5	0%	0.01
Total	1,019	-	100%	7.74
Average weighted quality score (rounded, out of 10)				**8**
Carnaby's cockatoo (EN)		9	0%	0.00
		8	0%	0.00
	826	7	81%	5.68
	124	6	12%	0.73
	67	5	7%	0.33
Total	1,017		100%	6.75
Average weighted quality score (rounded, out of 10)				**7**
Woylie (EN)	121	8	11%	0.91
	99	7	9%	0.66
	465	6	44%	2.63
	376	5	35%	1.77
Total	1,061		100%	5.97
Average weighted quality score (rounded, out of 10)				**6**
Chuditch (VU)	685	8	65%	5.16
	376	7	35%	2.48
		6	0%	0.00
		5	0%	0.00
Total	1,061		100%	7.65
Average weighted quality score (rounded, out of 10)				**8**

Weighted average habitat quality score calculations - O'Neil

Species	Direct impact	Habitat quality score (out of 10)	Weighting of habitat area (per cent)	Weighted score
Quokka (VU)	121	9	18%	1.59
	99	8	14%	1.16
	5	7	1%	0.05
	461	5	67%	3.36
Total	686		100%	6.15
Average weighted quality score (rounded, out of 10)				**6**

Appendix C – Offset Assessment Guides

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Forest red-tail black cockatoo
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Myara North / Holyoake Direct impacts to forest red-tailed black cockatoo habitat	**Area**	6396	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025)
			Quality	**9**	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	5756.40	Adjusted hectares	Implement conservation actions for black cockatoos in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	17600	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	1760.00	90%	1584.00	1521.95	5756.24	100.00%	Yes	
									Future area without offset (adjusted hectares)	15840.0	**Future area with offset (adjusted hectares)**	17600.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**9**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**10**	3.00	90%	2.70	2.67				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	5756.4	5756.24	100.00%	**Yes**	$0.00	#DIV/0!	#DIV/0!
Area of community	0				$0.00		$0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Baudin's cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Myara North / Holyoake Direct impacts to Baudin's cockatoo habitat	**Area**	6418	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025)
			Quality	**9**	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	5776.20	Adjusted hectares	Implement conservation actions for black cockatoos in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	19275	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	1927.50	90%	1734.75	1366.55	5779.19	100.05%	Yes	
									Future area without offset (adjusted hectares)	17347.5	**Future area with offset (adjusted hectares)**	19275.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**9**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**10**	3.00	90%	2.70	2.54				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	5776.2	5779.19	100.05%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Carnaby's cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Myara North / Holyoake Direct impacts to Carnaby's cockatoo habitat	**Area**	6413	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025)
			Quality	**8**	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	5130.40	Adjusted hectares	Implement conservation actions for black cockatoos in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	17550	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	1755.00	90%	1579.50	1244.25	5137.56	100.14%	Yes	
									Future area without offset (adjusted hectares)	15795.0	**Future area with offset (adjusted hectares)**	17550.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	90%	2.70	2.54				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	5130.4	5137.56	100.14%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Woylie
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Myara North / Holyoake Direct impacts to woylie habitat	**Area**	6293	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025)
			Quality	**5**	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	3146.50	Adjusted hectares	Implement conservation actions for woylie in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	11600	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	1160.00	90%	1044.00	822.41	3149.04	100.08%	Yes	
									Future area without offset (adjusted hectares)	10440.0	**Future area with offset (adjusted hectares)**	11600.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**5**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**6**	3.00	90%	2.70	2.54				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	3146.5	3149.04	100.08%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Chuditch
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Myara North / Holyoake Direct impacts to chuditch habitat	**Area**	6334	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025)
			Quality	**7**	Scale 0-10	
			Total quantum of impact	#####	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	4433.80	Adjusted hectares	Implement conservation actions for chuditch in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	14350	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	1435.00	90%	1291.50	1240.91	4445.12	100.26%	Yes	
									Future area without offset (adjusted hectares)	12915.0	**Future area with offset (adjusted hectares)**	14350.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**8**	3.00	90%	2.70	2.67				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	4433.8	4445.12	100.26%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Quokka
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Myara North / Holyoake Direct impacts to quokka habitat	**Area**	674	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025)
			Quality	**7**	Scale 0-10	
			Total quantum of impact	471.80	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	471.80	Adjusted hectares	Implement conservation actions for quokka in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	1525	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	152.50	90%	137.25	131.87	472.39	100.13%	Yes	
									Future area without offset (adjusted hectares)	1372.5	**Future area with offset (adjusted hectares)**	1525.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**8**	3.00	90%	2.70	2.67				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	471.8	472.39	100.13%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Forest red-tail black cockatoo
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	ONeil Direct impacts to forest red-tailed black cockatoo habitat	**Area**	1019	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025a)
			Quality	**8**	Scale 0-10	
			Total quantum of impact	815.20	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	815.20	Adjusted hectares	Implement conservation actions for black cockatoos in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	2570	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	257.00	90%	231.30	222.24	818.32	100.38%	Yes	
									Future area without offset (adjusted hectares)	2313.0	**Future area with offset (adjusted hectares)**	2570.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	90%	2.70	2.67				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	815.2	818.32	100.38%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Baudin's cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	ONeil Direct impacts to Baudin's cockatoo habitat	**Area**	1019	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025a)
			Quality	**8**	Scale 0-10	
			Total quantum of impact	815.20	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	815.20	Adjusted hectares	Implement conservation actions for black cockatoos in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	2790	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	279.00	90%	251.10	197.80	816.74	100.19%	Yes	
									Future area without offset (adjusted hectares)	2511.0	**Future area with offset (adjusted hectares)**	2790.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	90%	2.70	2.54				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	815.2	816.74	100.19%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Carnaby's cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	O'Neil Direct impacts to Carnaby's cockatoo habitat	**Area**	1017	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025a)
			Quality	**7**	Scale 0-10	
			Total quantum of impact	711.90	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	711.90	Adjusted hectares	Implement conservation actions for black cockatoos in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	2500	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	250.00	90%	225.00	177.24	714.12	100.31%	Yes	
									Future area without offset (adjusted hectares)	2250.0	**Future area with offset (adjusted hectares)**	2500.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**8**	3.00	90%	2.70	2.54				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	711.9	714.12	100.31%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Woylie
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	O'Neil Direct impacts to woylie habitat	**Area**	1061	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025a)
			Quality	**6**	Scale 0-10	
			Total quantum of impact	636.60	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	636.60	Adjusted hectares	Implement conservation actions for woylie in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	2290	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	229.00	90%	206.10	162.36	637.90	100.20%	Yes	
									Future area without offset (adjusted hectares)	2061.0	**Future area with offset (adjusted hectares)**	2290.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**4**	**Future quality with offset (scale of 0-10)**	**7**	3.00	90%	2.70	2.54				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	636.6	637.90	100.20%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Chuditch
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	O'Neil Direct impacts to chuditch habitat	**Area**	1061	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025a)
			Quality	**8**	Scale 0-10	
			Total quantum of impact	848.80	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	848.80	Adjusted hectares	Implement conservation actions for chuditch in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	2670	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	267.00	90%	240.30	230.89	850.16	100.16%	Yes	
									Future area without offset (adjusted hectares)	2403.0	**Future area with offset (adjusted hectares)**	2670.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**9**	3.00	90%	2.70	2.67				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	848.8	850.16	100.16%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Quokka
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	**0.2%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	O'Neil Direct impacts to quokka habitat	**Area**	686	Hectares	Alcoa - Pinjarra Alumina Refinery Revised Proposal Environmental Review Document (Alcoa 2025a)
			Quality	**6**	Scale 0-10	
			Total quantum of impact	411.60	Adjusted hectares	
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	No				**Risk-related time horizon (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Threatened species habitat																				
Area of habitat	Yes	411.60	Adjusted hectares	Implement conservation actions for quokka in State Forest	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	1370	**Risk of loss (%) without offset**	10%	**Risk of loss (%) with offset**	0%	137.00	90%	123.30	118.47	412.53	100.23%	Yes	
									Future area without offset (adjusted hectares)	1233.0	**Future area with offset (adjusted hectares)**	1370.0								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**4**	**Future quality with offset (scale of 0-10)**	**7**	3.00	90%	2.70	2.67				
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	411.6	412.53	100.23%	**Yes**	$0.00	N/A	$0.00
Area of community	0				$0.00		$0.00
					$0.00	**$0.00**	**$0.00**

Appendix D – Environmental Offset Project Plans (draft)

Appendix E – Offset Area Management Plans (draft)