MACKAY SULPHATE OF POTASH PROJECT REVISED OFFSET STRATEGY

PREPARED FOR AGRIMIN LIMITED

April 2024

EPA Assessment No. 2193 (WA) EPBC Act No. 2018/8834 (Cth)



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19 April 2024

Corporate Endorsement

"I hereby certify that to the best of my knowledge, the information within this Revised Offset Strategy is true and correct."

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Abbreviations

Abbreviation	Term
Agrimin	Agrimin Limited
BC Act	Biodiversity Conservation Act
CEMP	Construction Environmental Management Plan
Cth	Commonwealth
DAWE	Commonwealth Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEE	Department of Environment and Energy
DMIRS	Department of Mines, Industry Regulation and Safety
DMP	Department Mines and Petroleum
DoT	Department of Transport
DoW	Department of Water
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DSS	Desert Support Services
DWER	Department of Water and Environmental Regulation
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ERD	Environmental Review Document
FVEMP	Flora and Vegetation Environmental Management Plan
ha	hectare
IRP	Impact Reconciliation Procedure
IRR	Impact Reconciliation Report
IUCN	International Union for Conservation of Nature
km	kilometre
m	metres
MNES	Matter of National Environmental Significance
NIDE	Northern Infrastructure Development Envelope
NT	Northern Territory
Off-LDE	Off Lake Development Envelope
On-LDE	On Lake Development Envelope
SIDE	Southern Infrastructure Development Envelope
SME	Subject Matter Expert
TFEMP	Terrestrial Fauna Environmental Management Plan
WA	Western Australian

Agrimin Limited

REVISED Offset Strategy

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Appendix A: Offset Project Plans and Offset Research Plans

A.1 Night Parrot Offset Research Plan (NPRP1) Mackay Sulphate of Potash Project Regional Night Parrot Survey and Predictive Distribution Modelling

A.2 Offset Project (OP1) Mackay Sulphate of Potash Project Regional Feral Predator Control to Benefit the Night Parrot, Great Desert Skink and Greater Bilby

Appendix B: Offset Assessment Guide Calculations

- B.1 Night Parrot Offset Assessment Calculation
- B.2 Greater Bilby Offset Assessment Calculation
- B.3 Great Desert Skink Offset Assessment Calculation

1. Introduction

1.1 Proposal Overview

Agrimin Limited (Agrimin) proposes to develop a greenfields potash fertiliser operation, the Mackay Sulphate of Potash Project (the Proposal), approximately 490 kilometres (km) south of Halls Creek, adjacent to the Western Australian (WA) and Northern Territory (NT) borders (Figure 1-1). The Proposal involves the extraction of brine from a network of shallow trenches established on the surface of Lake Mackay. The brine will be transferred into evaporation ponds for the precipitation of salt which will be harvested and then processed to produce a potash fertiliser product. Disturbance of the lake's surface and clearing of native vegetation are required for Proposal development. The Proposal is remote and extensive (263,675 ha) and comprises four Development Envelopes shown in Figure 1-1. The following areas and applicable terms relevant to the Proposal and this revised Offset Strategy are outlined below:

- Study Area refers to the boundary within which all investigations and field surveys were undertaken, extending beyond the Proposal Area.
- Proposal Area The combined area in which the four Development Envelopes are contained.
 - Development Envelopes the boundary within which the elements of the Proposal are situated. The Development Envelopes occur entirely within the Study Area and comprise four components that make up the Proposal. The Proposal includes disturbance of up to 15,000 ha of the lake's surface and clearing of approximately 1,500 ha of native vegetation. The proposed extent of the physical and operational elements includes four Development Envelopes:
 - On-lake Development Envelope (On-LDE): On-lake development of trenches, extraction of up to 100 GL/a of brine, and solar evaporation and harvesting ponds for potash salts, including ground disturbance of approximately 15,000 ha contained within the 217,261 ha On-LDE.
 - Off-lake Development Envelope (Off-LDE): Off-lake development of a processing plant and associated site infrastructure, including access roads, accommodation camp, airstrip, and solar farm, including clearing of approximately 200 ha of native vegetation within the 688 ha Off-LDE.
 - Southern Infrastructure Development Envelope (SIDE): Development of borefield, water pipeline and access tracks for abstracting up to 3.5 GL/a of processing water and off-lake access to Lake Mackay, including clearing of approximately 300 ha of native vegetation within the 11,799 ha SIDE.
 - Northern Infrastructure Development Envelope (NIDE): Haul road for trucking potash product to Wyndham Port, including clearing of approximately 1,000 ha of native vegetation within the 33,928 ha NIDE.
 - Indicative Footprint The proposed Indicative Footprint (IF) occurs entirely within the Proposal Area and refers to the area that is proposed to be directly disturbed by the Proposal (e.g. clearing of native vegetation). The layout of the IF may be subject to change; however, total disturbance will not exceed the maximum extent of disturbance for each Development Envelope according to the ERD. Proponent-led avoidance and mitigation measures have been implemented where possible to reduce and minimise potential impacts on areas of high ecological or heritage value through the detailed design of the IF.

Offset Management Area: This is specific to the area that the Offset Strategy applies and includes three Indigenous Protected Areas (IPAs), approximately 9,811,678 hain size (**Figure 1-1**). Approval for land access from representative Aboriginal Corporations and collaboration with Indigenous Rangers will be required (Agrimin have begun these discussions) for implementation of offset projects.

1.2 Objectives and Scope

Offsets are defined as measures that compensate for the residual adverse impacts of an action from a Proposal, resulting in improved environmental outcomes (DSEWPC, 2012). Offsets provide environmental benefits to counterbalance significant residual impacts that remain after a Proposal has implemented avoidance and mitigation measures (DSEWPC, 2012). Offsets apply to Protected Matters; Matters of National Environmental Significance (MNES), which includes threatened species and ecological communities listed under State and Commonwealth legislation. In addition to Commonwealth offset requirements, offsets apply to biodiversity offsets required as a condition of Western Australian environmental approval processes. Offsets can be separated into the following categories (DSEWPC, 2012) as follows:

• Direct land acquisition offsets for the protection of environmental values through improved security of tenure or restricting the use of the land.

- On Ground management (Offset Projects), comprising the implementation of on-ground management actions (on-ground improvement, rehabilitation, and conservation of habitat) designed to result in a net benefit to applicable MNES; and
- Research projects , to improve scientific knowledge and awareness of environmental values, to inform conservation and management actions for applicable MNES.

The objective of this Offset Strategy is to outline the framework for three listed threatened MNES species under the EPBC Act; Night Parrot (Pezoporus occidentalis; Endangered), Greater Bilby (Macrotis lagotis; Vulnerable) and Great Desert Skink (Liopholis kintorei; Vulnerable). The Proposal is expected to have significant residual impacts that remain on the critical habitat of these species due to clearing for the Proposal.

The objective has been addressed by undertaking the following:

- Summarising the assessment of impacts from the Proposal on MNES species, following application of avoidance and mitigation measures;
- Detailing the avoidance and mitigation measures and subsequent significant residual impacts from habitat clearing for the Proposal on the three species;
- Outlining proposed offsets for the species (Offset Projects and Research Projects), considering threats to the three species, potential recovery actions and research opportunities;
- Proposing on-ground management measures Offset Projects, aligning with conservation priorities, species' conservation advice, recovery plans and threat abatement plans, to achieve a tangible improvement in environmental values within the Offset Management Area;
- Developing Research Projects, in alignment with research priorities for the three species;
- Calculating offsets that are reasonable and proportional to the Proposal and significance of residual impacts, considering the conservation status (and statutory protection) of each species;
- Outlining the process for governance, implementation, and reporting of the Offset Strategy; and
- Develop Offset Projects and Research Projects, with examples of applicable plans for MNES species.





Figure 1-1: Overview of the Development Envelopes that comprise the Proposal Area, Study Area, and Offset Management Area.

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2. Supporting Management

This Offset Strategy supports the assessment of the Proposal undertaken by the WA Environmental Protection Authority (EPA) under Part IV of the Environmental Protection Act 1986 (EP Act) and by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). It should be read in conjunction with the Environmental Review Document (ERD) for the Proposal and the associated Environmental Management Plans (EMPs) developed to avoid and minimise potential environmental impacts, comprising;

- Construction Environmental Management Plan (CEMP);
- Flora and Vegetation Environmental Management Plan (FVEMP);
- Terrestrial Fauna Environmental Management Plan (TFEMP);
- Night Parrot Management Plan (NPMP) and
- Inland Waters Environmental Management Plan (IWEMP).

3. Legislative Context

The Proposal will impact on MNES listed under the EPBC Act and therefore will require environmental offsets under an assessment bilateral agreement with the Commonwealth. The application and assessment of offset requirements for the Proposal have been undertaken with consideration of the following State and Commonwealth policies and guidelines:

3.1 State Policies and Guidelines:

The Proposal being assessed under accredited assessment, formal consultation mechanisms exist for interaction between the agencies to align any offset requirements as far as possible (Government of Western Australia, 2014). The following State policies and guidelines apply:

- WA Environmental Offsets Policy (Government of Western Australia, 2011); and
- WA Environmental Offsets Guidelines (Government of Western Australia, 2014).

 Table 3-1 summarises how this Offset Strategy complies with the WA offset principles (Government of Western Australia, 2011).

3.2 Commonwealth Policies and Guidelines:

The EPBC Act environmental offsets policy (the policy) outlines the Australian Government's approach to the use of environmental offsets ('offsets') under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The policy is accompanied by the Offsets assessment guide (the guide). The guide gives effect to the requirements of the policy, utilising a balance sheet approach to estimate impacts and offsets for threatened species. The following Commonwealth policies and guidelines apply to this Strategy:

- Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPC, 2012); and
- Offsets Assessment Guide Calculator (DAWE, 2012).

Table 3-2 summarises how this Offset Staretgy compliaes with the Commonwealth offset principles (DSEWPC,2012).

3.2.1 Types of Offsets

Significant residual impacts are outlined in Section 4 and must be offset.

Offsets delivered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) are to compensate for residual significant impacts to listed threatened species. Different types of offsets can include:

- Direct offset: through securing an area of land (referred to as offset site) that is secured for conservation purposes and registered on the land title, the implmentation of threat abatement programs, or captive breeding and release, or propagation and supplementary planting programs.
- Indirect offset: (also known as other compensatory measures): including research and education programs identified as priority actions in recovery plans, threat abatement plans, conservation or listing advices, Commonwealth-approved management plans or other relevant documents.

Generally, where the offset requirement cannot be satisfied through direct methods, offset proposals can be made up of a minimum of 90% through direct offsets, with the remaining 10% through other compensatory measures if there is a demonstrated benefit to the protected matter in doing so.

This Offset Strategy is subject to approval by the EPA and DCCEEW, prior to implementation.

WA Offset Principle	Compliance in this Offset Strategy
 Environmental offsets will only be considered after avoidance and mitigation options have been pursued. 	A summary of the assessment of significant residual impact for MNES is provided within Section 4 of this Strategy. Additional, detailed assessments for MNES are provided within Section 12 of the ERD. Potential impacts from the Proposal were assessed in accordance with MNES Guidelines 1.1 (Commonwealth of Australia, 2013).
	After applying the mitigation hierarchy, significant residual impacts may occur to the critical and/or supporting habitats for three MNES species; Night Parrot, Greater Bilby and Great Desert Skink (Table 4-1). This will be from clearing for implementation of the Proposal.
	In addition to mitigation measures outlined in the ERD, Agrimin have also developed EMPs comprising the CEMP, FVEMP, IWEMP, TFEMP and NPMP, with associated monitoring programs to avoid or minimise potential impacts to MNES. Agrimin also understands its obligations to offset significant residual impacts from the Proposal.
2. Environmental Offsets are not appropriate for all projects.	Environmental offsets are considered appropriate for the Proposal due to significant residual impacts expected to occur to critical and/or supporting habitat for the Night Parrot, Greater Bilby and Great Desert Skink, from clearing (Table 4-1).
3. Environmental offsets will be cost- effective, as well as relevant and proportionate to the significance of the	The Night Parrot is listed as Critically Endangered at the State level, as Endangered at the Commonwealth level, and internationally is listed on the IUCN Red List of Threatened Species as Endangered. It is considered at very high risk of extinction. The Great Desert Skink and the Greater Bilby are listed as Vulnerable at the State and Federal levels.
environmental value being impacted.	The offsets presented within the Offset Strategy (Section 9.3) are proportionate to potential impacts and the financial contribution has been aligned with the statutory protection that applies to each species as follows:
	• Offset Projects will enable increased protection of the Night Parrot, Greater Bilby and Great Desert Skink populations;
	The strategy allows for building partnerships and capacity with Traditional Owners, to provide input and to assist with implementation to improve governance and coordination for species recovery actions on IPAs; and
	 Research Projects for the Night Parrot, Greater Bilby and Great Desert Skink have the potential to increase knowledge of the species' to better inform conservation management.
4 Environmental offsets will be based on sound environmental information and knowledge.	Offset Projects and Research Projects for environmental offsets are underpinned by robust scientific data and information collected during baseline studies for the Proposal and have also been informed by stakeholder engagement and recent advice from relevant SME's and approved species conservation advice, strategies, and recovery plans.
5. Environmental offsets will be applied	The Offset Strategy will be applied within a framework of adaptive management whereby:
within a tramework of adaptive	Projects will be refined and improved as knowledge and understanding increases.
	Actions undertaken as part of approved Offset Projects may change in response to review and evaluation and based on the outcomes achieved
	Where applicable, knowledge gained from Research Projects will inform Offset Projects, management, and mitigation of impacts for the Proposal.
6. Environmental offsets will be focussed on longer term strategic outcomes.	Environmental offsets will be designed to be enduring, enforceable and deliver long term strategic environmental outcomes that result in a net gain for MNES species. The Offset Strategy includes provisions for management, monitoring and auditing to ensure that expected environmental outcomes are realised.

Table 3-1: Offset Strategy compliance with the WA offset principles (Government of Western Australia, 2011).

Table 3-2: Compliance with the Commonwealth offset principles (DSEWPC, 2012).

Commonwealth Offset Principle	Compliance in this Offset Strategy
Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.	The Offset Strategy ensures that Offset Projects and Research Projects for environmental offsets are underpinned by robust scientific data and information collected during baseline studies for the Proposal. These projects have also been informed by stakeholder engagement and recent advice from relevant SME's and approved species conservation advice, strategies, and recovery plans. There will be supporting opportunities for involvement by Indigenous Ranger groups on IPAs, to provide input and assist in delivering net gains and conservation outcomes for the Night Parrot, Greater Bilby and Great Desert Skink. Implementing Research Projects for these MNES species will also better inform conservation management.
Suitable offsets must be built around direct offsets but may include other compensatory measures.	A land acquisition offset is not considered appropriate as land outside of the Indicative Footprint is held across several IPAs. In addition, the nearest available land to purchase is not considered comparable habitat for use as an offset and is located hundreds of kilometres from the Proposal area. Instead, Agrimin have focused on addressing current key threats to MNES species through a managed offset fund, specifically to implement on ground threat abatement actions (Offset Projects) and indirect offsets (Research Projects). Research Projects address key threatening processes for the Night Parrot, Greater Bilby and Great Desert Skink, comprising predation by feral predators, altered fire regimes, and habitat degradation.
Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.	The Night Parrot is listed as Critically Endangered at the State level, as Endangered at the Commonwealth level, and internationally is listed on the IUCN Red List of Threatened Species as Endangered. It is considered at very high risk of extinction. The Great Desert Skink and the Greater Bilby are listed as Vulnerable at the State and Federal levels. The Offset Strategy is considered proportionate to the statutory protection that applies to each species as follows:
	 Offset Projects will enable increased protection of the Night Parrot, Greater Bilby and Great Desert Skink populations. The strategy allows for building partnerships and capacity with Traditional Owners, to provide input and to assist with implementation to improve governance and coordination for species recovery actions on IPAs; and Research Projects for the Night Parrot, Greater Bilby and Great Desert Skink have the potential to increase knowledge of the species' to better inform conservation management.
Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	The offset value has been calculated using comparative Commonwealth rates applied to MNES species, and of a suitable size and scale to offset the loss of critical and/or supporting habitat.
Suitable offsets must effectively account for and manage the risks of the offset not succeeding.	Risk management strategies will be included in the formalised managed fund agreements to minimise the risk of offsets failing. These strategies may include objectives, targets, monitoring, thresholds, and contingencies. A risk matrix detailing the risk man agement strategies is provided in Table 12-2 .
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 proposed offsets are in addition to conservation actions already required by relevant State and Federal legislation.
Suitable offsets must be efficient, effective, timely, transparent, scientifically robust, and reasonable.	Offset Projects and Research Projects for environmental offsets are underpinned by robust scientific data and information collected during baseline studies for the Proposal and have also been informed by stakeholder engagement and recent advice from relevant SME's and approved species conservation advice, strategies, and recovery plans.
Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited, and enforced.	Agrimin proposes a strategic approach (aligning with Principle 6 of the WA Offset Policy) through establishing a Managed Offset Fund. A formalised managed fund model is considered an appropriate mechanism to enable funding of a third party to undertake agreed offset actions, such as on-ground conservation management (including feral animal control and fire management) and research into the ecology of MNES species that may be impacted by the Proposal.

4. Significant Residual Impacts

A summary of key environmental factors relating to the Proposal is provided within the ERD, with the detailed environmental impact assessments (EIAs) provided in Section 6 (Flora and Vegetation), Section 7 (Terrestrial Fauna), Section 8 (Subterranean Fauna), Section 9 (Inland Waters) and Section 10 (Social Surroundings). The potential for significant residual impacts from the Proposal was also considered for each of the key factors in accordance with the principles and the model within Part IV of the WA Environmental Offsets Policy. Additionally, within each of the relevant key environmental factors, consideration was also given to criteria under Part V (Clearing Principles) of the WA Environmental Offsets Policy (Government of Western Australia 2011) principles and Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPC, 2012). The residual impacts for the Proposal include:

- Terrestrial Fauna significant residual impact (refer to Section 4.1).
- Rare flora, TECs and remnant vegetation- no significant residual impact:
 - The Proposal will not impact upon any TECs, PECs or conservation reserves. Vegetation types and significant flora are not restricted locally and are distributed widely in the regional context.
 - No groundwater-dependent vegetation has been shown to occur in the Proposal area, and precautionary mitigation and monitoring actions will be implemented to protect any potential impacts to riparian vegetation.

• Wetlands Inland Waters – no significant residual impact:

- There are no Ramsar wetlands or wetlands of national importance in the vicinity of the Proposal area.
- Major inundation events that cause a boom cycle of primary producers and aquatic invertebrates supporting waterbirds are rare. Modelling indicates there will be limited effects on the frequency, maximum extent, depth and duration of surface water on the lake in these larger inundation events.
- This will be aided by engineered crossovers within the trench network to assist in maintaining hydrological processes and ecological function, with no expected direct or indirect impacts to the lake.
- Buffer zones have been established for the islands to maintain habitat and reduce groundwater drawdown. Groundwater modelling also suggests that during operations, the Proposal is not expected to impede biological productivity of the lake during major flood events. Large rainfall events will assist with naturally mitigating drawdown and complete recovery is expected within seven years. There is also a predicted increase in extreme rainfall events (supported by rainfall records and satellite imagery analysis (post 2000)), that may offset any potential changes associated with development and operation of the Proposal.
- Progressive breaching of bunds following cessation of BMU mining will return flows to the lake and breaching of the evaporation ponds and bunding at closure will also assist a gradual reintegration of salts back into the environment, with no expected changes to the overall salt balance of the lake.

• Subterranean fauna- no significant residual impact:

- The majority of the Proposal area has limited or no habitat prospectivity for stygofauna and troglofauna. The lake bed sediments and hypersaline groundwater associated with the playa are not conducive to subterranean fauna, while the SIDE borefield also has limited habitat within the fine textured alluvials. Complete recovery of groundwater levels in the lake bed sediments is predicted to occur following cessation of pumping, with 95% recovery to occur within two to five years.
- Social Surrounds no significant residual impact.

4.1 Significant Fauna and MNES

The Proposal was determined to be a 'Controlled Action' in accordance with the EPBC Act, requiring consideration of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPC, 2012) in relation to MNES. Of relevance to the Proposal this comprises the following listed threatened species:

- Greater Bilby (Macrotis lagotis) (Vu, Vu);
- Brush-tailed Mulgara (Dasycercus blythi) (P4);

- Night Parrot (Pezoporus occidentalis) (En, Cr);
- Great Desert Skink (Liopholis kintorei) (Vu, Vu);
- Spotted Ctenotus (Ctenotus uber. Johnstonei) (P2).
- Migratory or threatened waterbirds and shorebirds (confirmed or considered likely to occur) including:
 - Red-necked Stint (Calidris ruficollis) (Mi: migratory shorebird);
 - Sharp-tailed Sandpiper (Calidris acuminata) (Mi: migratory shorebird);
 - Marsh Sandpiper (Tringa nebularia) (Mi: migratory shorebird);
 - Oriental Plover (Charadrius veredus) (Mi: migratory shorebird);
 - Common Greenshank (Tringa nebularia) (Mi: migratory shorebird);
 - Glossy Ibis (Plegadis falcinellus) (Mi);
 - Gull-billed Tern (Sterna nilotica) (Mi);
 - White-winged Black Tern (Sterna leucopterus) (Mi); and
 - Fork-tailed Swift (Apus pacificus) (Mi).

The following State listed significant species assessed as having no significant residual impacts by the Proposal included the following species (Stantec, 2022):

- Northern Marsupial Mole (P4);
- Southern Marsupial Mole (P4);
- Spectacled Hare-wallaby (P3);
- Princess Parrot (Vu, P4);
- Grey Falcon (Vu, Vu);
- Striated Grasswren (P4);
- Fork-tailed Swift (Mi);
- Dwarf Desert Spike-rush (Eleocharis papillosa), listed as Vulnerable; and
- Broad-eyed Slider (P1).

A summary of the avoidance and mitigation measures for these species is presented in **Table 4-1**, with the detailed assessments provided in **Section 12** of the ERD. Potential impacts from the Proposal were assessed for each of these species in accordance with Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and *Biodiversity Conservation Act 1999* (Commonwealth of Australia, 2013). After applying the hierarchy of mitigation, and following discussions and agreeance with the DCCEEW, significant residual impacts from the Proposal were found to occur on the habitats of three MNES species; **Night Parrot, Greater Bilby and Great Desert Skink (Table 4-1)**. There were no significant residual impacts from the remaining listed species (**Table 4-1**).

Agrimin proposes to offset significant residual impacts to compensate for the loss of critical and supporting habitat for the three MNES species. The proposed offsets, presented in this Offset Strategy, have been developed in accordance with WA Environmental Offsets Policy (Government of Western Australia, 2011) and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy(DSEWPC, 2012).

Detailed and revised EMPs have also been prepared to avoid and minimise potential impacts to these species. Specifically, the TFEMP comprises measures to protect the Great Desert Skink and Greater Bilby, while the Night Parrot is detailed in a standalone EMP. However, Agrimin also understands and acknowledges its obligations to offset significant residual impacts from the implementation of the Proposal on the species, which are detailed within this Offset Strategy.

Table 4-1: Significa	le 4-1: Significant fauna (including MNES) species associated with significant residual impacts from the Proposal (grey font indicates no significant residual impacts and the species was not considered for offsets).										
Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?	
Night Parrot (Pezoporus occidentalis)	En - EPBC Act /CE - BC Act	Old growth spinifex in association with: • claypan and claypan mosaic habitat; and • saline flats and depressions* • Lake margin complex (critical foraging habitat) * No records from this habitat, but importance inferred based on literature.	 Drainage line Ridge slope 	 2 populations identified within drainage features that run between 5 km and 10 km perpendicular to the proposed haul road alignment 2 to 5 individuals in the north 2 to 3 individuals in the south Targeted surveys identified foraging calls on 58 autonomous recording units (ARUs) of which two calls were from within the Indicative Footprint 3 additional populations discovered outside Proposal area 	 Critical habitat: 11,522 ha of old growth spinifex within the Study Area (based on spatial analysis) 15,961 ha of claypan and claypan mosaic habitat within the Study Area 8,069 ha of Saline flats and depressions habitat within the Study Area. Lake Margin Complex 14,884ha. Supporting habitat: drainage line-40.98ha ridge slope – 94ha 	Direct impacts through the clearing of Night Parrot habitat: • Critical habitat: • claypans and claypan mosaic habitat - 42.22ha • saline flats and depressions - 3.44ha • lake margin complex - 22.36ha • Supporting habitat: • drainage line - 0.55ha • ridge slope - nil • Mangaement and mitigation measures inlcuded within the NPMP, IWEMP and FVEMP, CEMP mitigate the following potential direct impact to the Night Parrot to within an acceptable level: • Potential for Direct loss (mortality or injury) from clearing operations or vehicle interaction.	 No significant indirect impacts: Nil indirect impacts expected to Lake Margin Complex and drainage line habitat provide critical foraging habitat for the Night Parrot. Modelling indicates that there are no expected impacts (indirect) to the Lake Margin Complex habitat that fringes Lake Mackay as a result of groundwater drawdown. Management and mitigation measures included within the NPMP, IWEMP and FVEMP, CEMP mitigate the following potential impacts to the Night Parrot to within an acceptable level: Habitat fragmentation; Degradation of habitat and individual mortality from unplanned project- related fire; Increased predation by feral predators (feral cats and foxes); Degradation of habitat through changes in hydrology from surface water flow in proximity to critical Night Parrot habitat intersecting the haul road, increased introduced weed species, fugitive dust, increased light or noise, or contamination; Spread or introduction of Psittacine beak and feather disease to Night Parrot populations; Increased profile of Night Parrots within the region may result in an increase in opportunity for the Illegal collection of Night Parrots within the region may result in an increase in opportunity for the illegal collection of Night Parrots within the region may result in an increase in opportunity for the illegal collection of Night Parrots within the region may result in an increase in opportunity for the illegal collection of Night Parrots within the region may result in an increase in opportunity for the illegal collection of Night Parrots within the region may result in an increase in opportunity for the illegal collection of Night Parrots populations who are less resilient to other threats, for example feral predators as a result. 	 Avoidance: The Indicative Footprint has been aligned to minimise direct clearing of old growth spinifex hummocks within the broad drainage features. The Proposal will minimise impacts to the Night Parrot via the following mitigation measures: pre-clearance listening surveys will be undertaken in the vicinity of the records to identify the potential occurrence of any roost sites within the Indicative Footprint in accordance with the NPMP. Methods advised by Nigel Jacket (Jackett et al. 2017) (roost & nest sites). NP avoidance buffers will include: 300 m buffer of recorded Night Parrot nest sites; 300 m buffer of recorded Night Parrot nest sites; 300 m buffer of a roost site as determined during pre-clearance surveys (NPMP) Haulage will only be undertaken during daytime hours and there will be no project-related (operational) travel from dusk to dawn when the species is active, unless for an unplanned event. Appropriate avoidance buffers (up to 500m from trenches) have been implemented to avoid impacts to the lake edges and largest islands. Implement and enforce the following speed limits on the Haul Road: 40km along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during daylight hours); and 60 km/ hour speed limit implemented for unsealed indusing inportion (40km/ hour at night-time along the haul road in proximity to Night Parrot critical habitat): Signs will not specifically mention the Night Parrot (due to the risk of poaching occurring), however, will advise of speed reduction to 40km in these areas. The sianage approach within 	Yes	Yes	

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
								proximity to Night Parrot critical habitat will be determined following consultation with DBCA prior to installation.		
								 A component of the signage will include local indigenous language (following adequate consultation with Traditional Owners) who utilise the road. 		
								• To minimise potential impacts to drainage line and riparian Lake Margin Complex habitat (suitable foraging habitat for the Night Parrot) additional mitigation measures are outlined within the following management plans:		
								 Inland Waters Environmental Management Plan (IWEMP): to minimise potential direct and indirect impacts to Night Parrot habitat resulting from groundwater abstraction and altered surface water hydrology. 		
								 Flora and Vegetation Environmental Management Plan (FVEMP): to minimise potential direct and indirect impacts to riparian vegetation. 		
								 Construction Environmental Management Plan (CEMP): includes management provisions to minimise project-related impacts from clearing to Night Parrot habitat. 		
								 Progressive rehabilitation of disturbed or cleared land where possible, with specific rehabilitation measures proposed for critical (eg. old growth spinifex) and supporting habitat for Night Parrot. 		
								 Agrimin have designed road infrastructure and manage road verges to avoid and minimise roadside water sources and maximise visibility of road edges for drivers. 		
								 Night-time speed limits applied to areas along the haul road in proximity to known Night Parrot populations and critical habitat. 		

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
								 Undertaking haulage during daylight hours only and strictly adhering to authorised access routes. 		
								• There will be no operational use (non- haulage activities) of haul road at night, unless for unplanned events (for example emergency response).		
								• All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only.		
								 Agrimin propose to engage and educate other haul road users of the importance in restricting driving to day-time hours and following night- time speed restrictions along critical habitat sections of the haul road. 		
								 Signage will be installed where high value fauna habitat (critical Night Parrot habitat) intersects with the impact footprint and advise of reduction in speed limits (to 40 km/ hour) within these areas during night- time hours. 		
								 Observations and records of Night Parrot mortalities or injury will be recorded and reported to the Department of Biodiversity Conservation and Attractions (DBCA), DWER and DCCEEW in accordance with the reporting provisions outlined in the Night Parrot Management Plan. In the event that an injured Night Parrot is found, it will be handled in accordance with the Injured Fauna Management Procedure in the NPMP. 		
								Appropriate handling and storage of chemicals, hydrocarbons, and other environmentally hazardous materials in accordance with Dangerous Goods Safety Act 2004 and associated regulations, including use of a bunded and sealed assembly areas for hazardous containerised chemicals to prevent surface water and groundwater contamination.		
								 Fence off artificial water sources to deter predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species. 		
								 Mitigate spread of Psittacine beak and feather disease by ensuring that proper hygiene measures are undertaken during surveys and monitoring at Night Parrot populations. 		
								The following monitoring will be undertaken to measure the effectiveness		

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
								 of proposed management measures for the Night Parrot: Riparian vegetation monitoring to be undertaken in accordance with FVEMP. Groundwater monitoring conducted in accordance with Appendix A of the IWEMP. Night Parrot Monitoring in accordance with Appendix A of the NPMP. Feral animal monitoring and control program in accordance with Appendix E of the TFEMP. 		
Greater Bilby (Macrotis lagotis)	Vu - EPBC Act / Vu - BC Act	 Gravel spinifex plain (recorded at 92 locations) Spinifex sandplain (recorded at 33 locations) Claypan and claypan mosaics (3 locations) Dune-field (1 location) Dune (1 location). 	• Nil	 130 records (burrows, diggings, scats) including 77 active burrows in Study Area 7 active burrows in Indicative Footprint 	 Critical habitat in Study Area: 103,435 ha of spinifex sandplain. 9,646 ha of gravel spinifex plain 15,961 ha of claypan and claypan mosaic habitat 41,418 ha of dune- field habitat 6,521 ha of dune habitat 	 Critical habitat: gravel spinifex plain - 248.12ha spinifex sandplain - 754.20ha claypan and claypan mosaics - 42.22ha dunefield - 281.82ha dune - 19.27ha 	 No significant indirect impacts whereby indirect impacts to be managed to within an acceptable level following the implementation of key avoidance and mitigation measures for the Bilby/ GDS: Habitat fragmentation Increased predation by feral and native predators (Cats, Foxes and Silver Gulls). Degradation of habitat from unplanned project- related fire, changing surface hydrology, spread of weeds, or contamination. Fauna entrapment in the trench network on the lake. Increased noise and vibration, or light exposure resulting in disruption of fauna behaviour; and Increased fugitive dust emissions from clearing of native vegetation and haulage, resulting in degradation of habitats. Potential proposal impacts compounding the effects of climate change to Greater Bilby/ GDS populations who are less resilient to other threats, for example feral predators as a result. 	 Clearing is limited as far as practicable. Realignment of the Indicative Footprint would be unlikely to mitigate potential impacts as the species continually establishes new burrows, potentially in the new footprints. Mitigation measures are outlined within the TFEMP and will involve: pre-clearance surveys and encouraged relocation within the Bilby's home range in alignment with guidelines within(DBCA, 2018). All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only. Adequate suitable habitat and foraging resources to remain following pre clearance surveys through habitat buffer areas (equivalent to the home range for the Bilby 1.5km in area) for the Bilby within proximity to an active Bilby burrow in the DE (outside of the IF) Installation of signage (containing a component of local indigenous language) in accordance with the TFEMP to advise of: Speed limits 80km/ hour on haul road, with the exception of 40km/ hour at night-time in proximity to Night Parrot habitat), Speed limit of 60km/hr speed limit for unsealed access roads Advising that the northern section of the haul road is for private vehicle use only. Haulage and non-haulage operational use to be undertaken during daytime hours only unless for unplanned events (for example emergency response). Monitoring and enforcement of speed limits and driving restrictions in the TFEMP and Traffic Management Plan 	Yes	Yes

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
								 Implementing the Feral Predator Monitoring and Control Program (TFEMP). Artificial water sources fenced according to best practice fencing measures. Regional Feral Predator control undertaken in accordance with the Revised Offset Strategy. Fire management for the Bilby to improve Bilby habitat at a regional scale to be codesigned and in consultation with TO's is included as on ground management offset Project for the Bilby under the Revised Offset Strategy. Measures to minimise potential noise, dust and artificial light impacts to the Bilby (TFEMP). Implement the Bilby Monitoring Plan (TFEMP) for the LOM. Adaptive management in response to new scientific data, monitoring results and increased regional knowledge of the Bilby (TFEMP). Ongoing commitment to working with TO ranger groups and the facilitation of two-way knowledge sharing (TEEMP) 		
Great Desert Skink (Liopholis kintorei)	Vu - EPBC Act / Vu - BC Act	• Spinifex sandplain	• Nil	 Yagga Yagga population (64 active burrows) Murrawa and Lake Mackay populations now extinct No known active burrows in the Development Envelope or Indicative Footprint despite extensive survey work 	 Critical habitat in Study Area: 103,435 ha of spinifex-sandplain 	 Critical habitat: spinifex sandplain - 754.20ha 		 Avoidance: Haul road re-alignment to avoid the Yagga Yagga population (this sedentary species forages to within 150 m of their burrow). Realignment of the haul road to avoid direct impacts to the Yagga Yagga population. Restriction of haulage options to daytime hours. There will be no operational use (non-haulage activities) of haul road at night, unless for unplanned events (for example emergency response). Monitoring in accordance with the GDS Monitoring Program (IFEMP). All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only. Significant fauna avoidance buffer zones (GDS) are in place following completion of pre-clearance surveys, where applicable. Access to the significant fauna avoidance buffer zones (GDS) is restricted to authorised personnel and there are no incidents of unauthorised access. Proposal will avoid impacts to GDS burrows through the implementation of a 150 m buffer around active burrows recorded during preclearance surveys and 	Yes	Yes

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
		within the study Area						 a 300m buffer around known GDS population active burrows. Progressively rehabilitate areas as opportunities become available in accordance with rehabilitation procedures outlined in the MCP. Rehabilitation procedures specific to reinstating high value significant fauna habitat will be undertaken in accordance with IFEMP. Clearing being undertaken within these areas. For significant fauna avoidance buffer zones protecting high value MNES species (such as GDS) an inconspicuous marking will be used and communicated to relevant staff and contractors. Restrict access to fauna buffer zones to authorised personnel only and TO's where applicable. Implement fire mitigation measures in accordance with TFEMP. Fence off artificial water sources to deter predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species. Introduced predators identified will be reported to Environmental personnel and recorded to monitor occurrences. Avoid attraction of introduced predators by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins): Putrescible waste to be stored and disposed of in a way that cannot be accessed by fauna. Landfill wastes will be covered promptly, and active waste disposal cells will be fenced to exclude large fauna. Implement and enforce the following speed limits on the Haul Road: 40 km/hr along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during night-time (noting that significant fauna such as the Greater Bilby/ Mulgara and GDS are not active during the daytine); and (b) the remanded waste during the daytine); and 		
								implemented for unsealed access roads.		

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
Australian Painted Snipe (Rostratula australis)	En	 claypans and claypan mosaic saline flats and depressions (1 location) 	 salt lake playa lake margin 	 Recorded once in the Study Area on the eastern edge of Lake Mackay in 2017 	 8,069 ha of saline flats and depressions habitat within the Study Area 15,961 ha of claypan and claypan mosaic habitat within the Study Area 	 claypans and claypan mosaic - 42.22ha saline flats and depressions - 3.44ha 	 No significant residual indirect impacts following implementation of avoidance and mitigation measures in the TFEMP. 	 Avoidance: The Indicative Footprint has been aligned to minimise direct clearing of the Saline flats and depressions habitat and the claypan and claypan mosaic habitat Implementation of mitigation measures in accordance with the TFEMP. Waterbird Monitoring Program 	No	No
								implemented in accordance with the TFEMP.		
Dwarf Desert Spike-rush (Eleocharis papillosa)	Vu	Not recorded. Inferred habitat based on literature: • claypans and claypan mosaic. • saline flats and depressions (1 location).	• Nil	• Not recorded	 Critical habitat: 8,069 ha of saline flats and depressions habitat within the Study Area 15,961 ha of claypan and claypan mosaic habitat within the Study Area 	 Critical habitat: claypans and claypan mosaic - 42.22ha saline flats and depressions - 3.44ha 	 No significant residual indirect impacts following implementation of avoidance and mitigation measures in the TFEMP. 	 Avoidance: The Indicative Footprint has been aligned to minimise direct clearing of the Saline flats and depressions habitat and the claypan and claypan mosaic habitat Implementation of mitigation measures in accordance with the TFEMP. 	No	No
Princess Parrot (Polvtelis alexandrae)	Vu - EPBC Act / P4 - BC Act	• Nil	• Dune-field	 Sighting of a flock of 12 to 30 parrots near Lake Mackay (2012) Sightings of a flock of 11 parrots flying over an island on Lake Mackay (2021) 	 41,418 ha of dune- field habitat occurs within the Study Area. 	• dune-field habitat - 282ha.	 No significant residual indirect impacts following implementation of avoidance and mitigation measures in the TFEMP. Indirect impacts: Degradation of habitat and individual mortality through altered fire regimes Increased predation by introduced and feral predators (feral cats and foxes); and Loss (mortality or injury) of individuals from vehicle interaction. 	 No records from Indicative Footprint Implementation of mitigation and avoidance measures t provisioned for within the FVEMP and TFEMP. Feral Predator Monitoring and Control Program in accordance with the TFEMP. 	No	No
Migratory and Threatened Waterbirds: Red-necked Stint (Calidris ruficollis): Mi - EPBC Act / IA - BC Act Sharp-tailed Sandpiper (Calidris acuminata): Mi - EPBC Act / IA - BC Act Marsh Sandpiper (Tringa stagnatilis): Mi - EPBC Act / IA - BC Act Oriental Plover (Charadrius veredus): Mi -	Listed as Migratory under EPBC Act/IA BC Act	 Primary habitat: Saline flats and depressions Lake margin Claypan and claypan mosaics following inundation Salt lake playa. 	• Nil	 A total of at least 34 confirmed waterbird species were recorded at Lake Mackay including 12 threatened and priority waterbird species (360 Environmental, 2017; Duguid et al., 2005; Stantec, 2021e). 4,200 Banded Stilts (<i>Cladorhynchus</i> <i>lecocephalus</i>) displaying breeding behaviour on a lake island (Stantec, 2021e) Banded Stilts with juveniles were observed on the lake from three other surveys including in internationally important numbers in 2001 (360 Environmental, 2017; 	 8,069 ha of saline flats and depressions habitat. lake margin complex 14,884ha. 15,961 ha of claypan and claypan mosaic habitat ; and Salt lake playa-243,271 ha. 	 Saline flats and depressions - 3.44ha lake margin complex 22.36 claypans and claypan mosaic - 42.22ha salt lake playa- 13,363. 	 No significant residual indirect impacts following implementation of avoidance and mitigation measures in the TFEMP and IWEMP. 	 Clearing will only occur in approved ground disturbance areas. Limit disturbance within the On-LDE (4.55%; <15,000 ha). NT portion of the lake will remain undisturbed (56,506 ha). Exclusion zone on WA side of the lake that will remain undisturbed (32,261 ha). The On-LDE has been designed to incorporate exclusion buffers around islands to avoid direct and potential secondary impacts (total of 20,119 ha of islands excluded from On-LDE): Landform islands (3 islands in total) – buffer size will be 500 m. Intermediate and Large islands (52 islands in total) – buffer size will be 250 m. 	No	No

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
EPBC Act / IA - BC Act Common Greenshank (Tringa nebularia): Mi - EPBC Act / IA - BC Act Gull-billed Tern (Sterna nilotica): Mi - EPBC Act / IA - BC Act White-winged Black Tern (Sterna leucoptera): Mi - EPBC Act / IA - BC Act Glossy Ibis (Plegadis falcinellus): Mi - EPBC Act / IA - BC Act Glossy Ibis (Plegadis falcinellus): Mi - EPBC Act / IA - BC Act Banded Stilt (Cladorhynchus leucocephalus): not listed but Lake Mackay is recognised as an important breeding site.				Duguid et al., 2005; Pedler et al., 2018; Stantec, 2021e). In addition, several significant species were recorded from the lake and its peripheral wetlands, including: Internationally important numbers of Sharp-tailed Sandpipers (Calidris acuminate) Nationally important numbers of Red-necked Stints (Calidris ruficollis) The Australian Painted Snipe (Rostratula australis) (360 Environmental, 2017; Stantec, 2021d)				 Small islands (216 islands in total) – buffer size will be 100 m. The location and layout of the On- LDE infrastructure has been designed to avoid impacts to the lake margin habitat that fringes the lake. Waterbird Monitoring Program implemented in accordance with the TFEMP. 		
Spotted Ctenotus (Ctenotus uber subsp. johnstonei)	Priority 2 - BC Act	 Primary habitat: Gravel spinifex plain (6 locations) Secondary habitat: Outcropping and stony rise (1 location) Ridge slope (1 location). 	• Nil	The Spotted Ctenotus has been recorded from eight locations within the Study Area represented by 55 records.	 Primary habitat: 9,646 ha of gravel spinifex plain Secondary habitat: outcropping and stony rise-491 ha ridge slope- 94ha. 	 Primary habitat: gravel spinifex plain- 248.12ha Secondary habitat: outcropping and stony rise- 5.36 ha ridge slope- nil. 	• No significant residual indirect impacts following implementation of avoidance and mitigation measures in the TFEMP.	 Mitigation and avoidance measures to be implemented for significant fauna in accordance with the TFEMP and CEMP. Preclearance surveys in accordance with the TFEMP. Feral Predator Monitoring and Control Program in accordance with the TFEMP. 	No	No
Northern / Southern Marsupial Mole (Notoryctes caurinus / Notoryctes typhlops)	Priority 4 - BC Act	Primary habitat: o dune (6 locations) and o dune-field (3 locations).	• Nil	 Marsupial Moles have been recorded in the Study Area on 10 occasions: Six locations were from Phase 1 of the Stantec Survey, via motion camera, tracks (mainly burrows identified during pitfall trap establishment) and a deceased individual. The remaining records are from surveys in and overlapping the Study Area (Cowan 	 Primary habitat: 41,418 ha of dune- field habitat occurs within the Study Area. dune -6,521ha. 	 Primary habitat: dune-field habitat - 282ha. dune- 19.27ha. 	 No significant residual indirect impacts following implementation of avoidance and mitigation measures in the TFEMP and IWEMP. 	 Mitigation and avoidance measures to be implemented for significant fauna in accordance with the TFEMP and CEMP. Preclearance surveys in accordance with the TFEMP. Feral Predator Monitoring and Control Program in accordance with the TFEMP. 	No	No

Species	Conservation Status	Critical Habitat within the Study Area	Supporting Habitat in the Study Area	Records	Mapped Habitat Extent in the Study Area	Direct Impacts	Assessment of Indirect Impacts	Summary of Mitigation and Avoidance Measures	Significant Residual Impact	Offset Required?
				et al., 2015; DBCA, 2020) (ecologia, 2017; Outback Ecology, 2012) No Marsupial Moles were captured during the systematic trapping surveys and the identity of moles captured on camera or identified via tracks could not be confirmed to species level.						
Brush-tailed Mulgara (Dasycercus blythi)	Priority 4 - BC Act	 Primary habitat: Spinifex sandplain (19 locations) 	 Secondary habitat: Gravel spinifex plain (1 location) Dune-field (2 locations) Dune (1 location) Saline flats and depressions (1 location) Lake margin (1 location). 	 Recorded at 25 locations within the Study Area (Figure 2 3). This included 15 locations within the NIDE, two within the SIDE and eight within the Study Area but outside the Proposal Area. Additionally, the Brush- tailed Mulgara has been recorded at 31 locations from 2012 – 2016 in the surrounding region (150 km), of which two locations were near the Study Area (25 km) (DBCA, 2020; Outback Ecology, 2012; Paltridge, 2015). 	 Primary habitat in Study Area: 103,435 ha of spinifex sandplain. Secondary habitat in Study Area: gravel spinifex plain-9,646 ha 41,418 ha of dune-field habitat occurs within the Study Area. dune -6,521 ha. 8,069 ha of saline flats and depressions habitat. lake margin complex 14,884 ha. 	 Primary habitat: Spinifex sandplain- 103,435ha Secondary habitat: gravel spinifex plain - 248.12ha Dune-field habitat - 282ha dune- 19.27ha saline flats and depressions - 3.44ha lake margin complex- 22.36ha 	 No significant residual indirect impacts following implementation of avoidance and mitigation measures in the TFEMP and IWEMP. 	 Mitigation and avoidance measures to be implemented for significant fauna in accordance with the TFEMP and CEMP. Preclearance surveys in accordance with the TFEMP. Feral Predator Monitoring and Control Program in accordance with the TFEMP. 	No	No

5. Proposed Offset Strategy

5.1 Managed Offset Fund

As the Proposal is located within WA's Extensive Land-use Zone and intercepts three IPAs, Agrimin has developed a Managed Offset Fund for this Offset Strategy, which aligns with Principle 6 of the WA Environmental Offsets Policy (Government of Western Australia, 2011).

Following a meeting held with DCCEEW on 23 June 2022 (**Table 16-2**), the option for a direct land offset through land acquisition was investigated however it was concluded that a direct land offset was unsuitable, with no nearby comparable land acquisition available for the Proposal due to the following:

- The land outside of the Indicative Footprint is held across three IPAs;
- The nearest available land to purchase is not comparable habitat and is unsuitable for use as an offset; and
- The nearest available land (with comparable or suitable habitat) to purchase is located hundreds of kilometres from the Proposal.

The land surrounding the Proposal Area is largely intact, comprising the three Indigenous Protected Areas (IPAs) that are intersected by the Proposal: Tjurabalan, Ngururpa and Kiwirkurra and is not currently under direct threat of clearing or destruction. Therefore, offsets for the Great Desert Skink, Greater Bilby and Night Parrot for the Proposal are most likely achievable (i.e. improving existing habitat in the surrounding region and reducing known threats to the species and their habitats). Suitable Offset Mechanisms on Indigenous owned lands (DSEWPC, 2012) include:

- Offsets having customary law protection with Traditional Owners holding a non-transferable interest in the land with a commitment to its long-term protective management; and
- Offsets including a commitment from Traditional Owners to accept and manage the offset.

Indigenous Protected Areas in proximity to the Proposal are discussed in further detail in Section 6.

A Managed Offset Fund (to be managed by the Proponent) is therefore considered an appropriate mechanism to enable funding for agreed and approved offset actions of on-ground threat abatement management actions (Offset Projects) (Section 5.3.1) and 'other compensatory measures' (indirect) offsets in the form of Research Projects (Section 5.3.2). These projects will address key threatening processes and aligning with management priorities for the species and implement Research Projects to address knowledge gaps relating to the species, to better inform conservation management for the Night Parrot, Greater Bilby and Great Desert Skink (Table 5-1).

The Offset Projects and Research Projects will be co-designed and co-delivered with the Traditional Owners and Ranger groups, who are supportive of this approach and the economic and development opportunities for direct involvement in on-ground conservation management.

The Managed Offset Fund and associated governance agreement model for the Proposal will be developed in consultation with relevant regulatory departments and stakeholders (including Indigenous Ranger groups). A formalised managed fund agreement will minimise the risk of offsets failing and will outline objectives, targets, monitoring, thresholds, and contingencies.

Agrimin will liaise with DCCEEW/ EPAS to agree upon a lump sum payment to be paid as an initial payment into the Managed Offset Fund (proponent managed fund). The amount to be paid up front is determined on a case-by-case basis, additional amounts will be paid into the fund during phasing of implementation and prior to the commencement of Offset Projects and/or Research Projects.

The time frame for provision of the funding for the Offsets Managed Fund is proposed to be 120 days post Final Investment Decision or prior to the commencement of clearing, whichever is sooner. This lump sum amount paid up front will be subtracted from the total offset payable (following impact reconciliation) for the Proposal.

Agrimin will provide financial contributions to the Managed Offset Fund only on receipt of approval from the Minister. Agrimin proposes that this financial contribution will be provided as a mutually agreed up front sum and then additional contributions to be made on an annual basis, with payment to the Managed Offset Fund within 30 days of submission of the annual Impact Offset Reconciliation Report (IRR). Evidence of this payment will be provided to the Minister within 30 days of payment.

5.2 EPBC Offset Assessment Guide

• The offsets package within this Strategy is based on the implementation of on-ground threat abatement (Offset Projects) through the implementation of on-ground threat abatement management actions and includes additional 'other compensatory measures' (indirect) offsets in

the form of Research Projects. The EPBC Act Offset Assessment Guide was used to determine the appropriateness of Offsets proposed within this Strategy though assigning certain parameters for each protected matter and its habitat (eg. Night Parrot, Greater Bilby and Great Desert Skink). A summary of the parameters input into the Offset Assessment Guide includes (but are not limited to) the following: **Annual probability of Extinction (in the wild)** – value based on criteria for the International Union for the Conservation of Nature (IUCN) Red List for threatened species. For example, for Vulnerable species such as the Greater Bilby and Great Desert Skink, the probability is considered to be at least 10% within 100 years.

- **Protected matter attribute** what attribute of the protected matter is being affected by the Proposal. For the Great Desert Skink, Night Parrot and Greater Bilby the major impacts are likely to be increased mortality through predation by introduced predators, and decreased area of habitat, through land clearing and potential changes in fire regimes.
- Quality score for area of habitat how well the offset site supports the species, including three components:
 - **Site condition**: in terms of threatened species' ecological requirements (e.g., vegetation condition and structure, diversity of habitat species present and number of relevant habitat features).
 - **Site context**: relative importance in terms of its landscape position, considering the threatened species' connectivity needs to other areas of suitable habitat, and the site's role relative to the population or extent of the species.
 - **Species stocking rate**: usage of the site, and/or density of a species at a site, including consideration of the site's role in regards to the overall species population viability or community extent.
- Habitat Quality The EPBC Act Offset Assessment Guide incorporates three measures of habitat quality including: current habitat quality, future quality without offsets and future quality with offsets (i.e. the 'do-nothing' approach versus the active management/improvement approach).
- **Time over which loss is averted** the number of years over which changes in the level of risk to a proposed offset site can be considered and quantified (e.g., duration of active management and protection of habitat for the purpose of conservation gain). Longer time frames are valued more highly than shorter time frames. The timeframe for this offset is the estimated LOM (duration of 20 years).
- Time until ecological benefit the number of years it takes for the proposed offset habitat to improve to the point of conservation gain. For example, introduced predator control as an offset measure is assigned a short timeframe (in this case 2 years has been assigned to show measurable improvement). Whereas habitat improvement actions (e.g., management of fire) may take longer (approx. 10 years) to provide the required improvement in habitat quality.
- **Risk of loss** the chance (%) that the offset habitat will be completely lost (i.e. no longer hold any value for the protected matter) over the foreseeable future (either the life of the offset or 20 years, whichever is shorter). The proposed offset site/s are within the immediate surrounding region of the Proposal area on IPAs managed by traditional owners, the risk of loss is expected to be very low. Active monitoring and management of that offset site for the Greater Bilby, Great Desert Skink and Night Parrot is included in the Offset Strategy and as a component of each detailed offset plan which further reduces the risk of loss.
- Confidence in result describes the level of certainty (%) about the success of the proposed offset. For example for the Great Desert Skink, the confidence assigned is high as the main threats to the species decline is attributed to predation by feral predators. Active on-ground management of suitable habitat containing Great Desert Skink populations will maintain the populations of the species at offset sites within the region in the Offset Management Area.
- **Cost** The estimated cost of the offset should be entered here. Where a direct offset does not meet 100% of the impact, this figure is used to calculate a dollar value for the other compensatory measures required in an offset package. Strong evidence must be provided by the proponent to support any estimate of cost.

The offset assessment guide demonstrates that the offsets proposed for the Great Desert Skink, Greater Bilby and the Night Parrot within this strategy meet the minimum of 90% of the offset requirements under the EPBC Offsets Policy. The rationale for inputs entered into the EPBC Offset Assessment Guide are summarised in **Table 7-6**, **Table 8-4** and **Table 9-4** for the Night Parrot (in **Section 7**), Greater Bilby (**Section 8**) and the Great Desert Skink (**Section 9**), respectively.

5.3 Offset Projects and Research Projects

Agrimin will implement offsets through on-ground management actions (Offset Projects) and Research Projects, aligning with this Offset Strategy and the conditions of approval for the Proposal, as required. Agrimin (or contracted Third Party) will not commence these projects until approved in writing by the DCCEEW and EPA. Following approval, the project will be implemented, unless otherwise agreed with regulatory departments.

5.3.1 Offset Projects

Offset Projects that target species recovery activities for the Night Parrot, Greater Bilby and Great Desert Skink will focus on long-term strategic outcomes and will be undertaken within an adaptive management framework (**Section 19**). Offset Projects may be implemented in parallel, or subsequent to, each other.

An Offset Project for the Proposal will include:

- On-ground management actions and methods to be implemented;
- Monitoring to assess the effectiveness of the Offset Project implementation measures and achievement against outcomes for the Night Parrot, Greater Bilby and Great Desert Skink populations; and
- Performance targets to measure the success of the Offset Project.

A detailed Offset Project Plan will be submitted to DCCEEW and EPA for approval and access agreements will be required, prior to implementation of the Research Project. The Offset Project Plan will include the following:

- Offset Project title, description and background;
- Tenure;
- Location and nature of Offset Project activities;
- Goals (applicable MNES and key threats), objectives and targets;
- Alignment with the Offset Strategy and the principles of the EPBC Act Environmental Offsets Policy;
- Key stakeholders and roles and opportunities for engagement and land management on IPAs;
- Management strategies to be implemented;
- Monitoring program details to measure the success of management;
- Implementation schedule, timeframe and budget;
- Limitations and assumptions;
- Risks and mitigation measures;
- Benefits to MNES;
- Performance targets/ key milestones; and
- Reporting requirements and references.

Table 5-1: Managed fund model summarising offsets and reference to applicable section of the Offset Strategy.

Managed Fund Proposed Governance Model The Offset Proposal's Managed Fund Governance Agreement Model will be developed in consultation with relevant Government departments and stakeholder groups, and include consideration for the following provisions:

- Proponent-managed fund
- Decision-making arrangements
- Approval requirements set out in the Ministerial Conditions
- Objectives
- Key offset actions and strategies
- Rules of expenditure

- Principal amount
- Probity standards
- Reporting requirements demonstrating approval conditions are met
- Legislative requirements.

Offset Type	Offset Summary	Location	Reference to Section of Offset Strategy
Research	Research Projects Prepared in consultation with key stakeholders and designed to increase the knowledge base and better inform conservation management for the: Night Parrot	 Great Sandy Desert Bioregion 	 Sections 7.3.1, 8.3.1 and 9.3.1
	• Bilby		
	Great Desert Skink		
On-ground Management Actions (Offset Projects)	Funding of on-ground Offset Projects aligning with key recovery actions to result in a net benefit for the: • Night Parrot: • regional survey • predator control • fire management. • Bilby: • predator control • regional Survey	 Ngururrpa and Kiwirrkurra IPAs Great Sandy Desert Bioregion 	• Sections 7.3.1, 8.3.1 and 9.3.1
	 tire management. Great Desert Skink: predator control habitat improvement fire management. 		

5.3.2 Research Projects

Research projects can add significant value to the outcomes of on-ground management and the understanding of the environmental value being impacted. Research Projects will be designed to result in positive conservation outcomes and may be targeted at improving the management of EPBC listed species in alignment with government initiatives, policies or strategies.

A Research Project for the Proposal will be:

- Tailored to postgraduate education level; with scope to engage other levels in educational programs;
- Present findings that can be peer-reviewed and publish findings in an internationally recognised peer-reviewed scientific journal or be of a standard acceptable for publication;
- Publications will be submitted to free open access journals and data and information will have creative commons licensing and be freely accessible (except for Night Parrot Research Projects, where data will be restricted, and may be published in collaboration with Indigenous Ranger groups, where applicable); and
- Research outputs will inform future management for MNES species and, where possible, be readily applicable to other similar groups or species.

A detailed Research Project Plan will be submitted to DCCEEW and EPA for approval prior to being implemented. Access agreements will be required prior to implementation of the Research Project. The Research Project Plan will include the following:

- Research Project title, description and background;
- Location and nature of Research Project activities;
- Research Project aim and goals (applicable MNES and key threats);
- Alignment with the Offset Strategy and criteria for research and education specified in the EPBC Act Environmental Offsets Policy;
- Key stakeholders and roles and opportunities for engagement and land management on IPAs;
- Implementation schedule, timeframe and budget;
- Limitations and assumptions;
- Risk management;
- Benefits to MNES;
- Reporting requirements and references.

5.4 Term of the Offset Strategy

The term of the Offset implementation in accordance with the Offset Strategy is for the duration of the Project.

6. Indigenous Protected Areas

The NIDE traverses three Indigenous Protected Areas (IPAs) comprising the Tjurabalan, Ngururpa and Kiwirkurra IPAs (**Figure 1-1**). IPAs are voluntarily dedicated by indigenous groups on indigenous owned or managed land or sea country, in accordance with Traditional Owner objectives. They are recognised by the Australian Government as an important part of the National Reserve System, protecting the nation's biodiversity for the benefit of all Australians.

The Ngururpa IPA is managed through their prescribed body corporate, the Parna Ngururpa Aboriginal Corporation and includes most of the haulroad and the Proposal's NIDE. It is bounded by the Tjurabalan IPA (managed by the Tjurabalan Native Title Land Aboriginal Corporation) to the north and the Kiwirkurra IPA (managed by the Tjamu Tjamu Aboriginal Corporation) to the south (**Figure 1-1**).

The IPAs are managed to protect biodiversity and cultural resources, based on indigenous perspectives of connecting and looking after country, complemented by western knowledge and management principles (Tjamu Tjamu Aboriginal Corporation, 2014). They are supported by a number of strategies including the including the Ngururpa IPA – Plan for Country 2020-2025 (Parna Ngururpa, 2019) and Kiwirrkurra IPA – Plan for Country (Tjamu Tjamu Aboriginal Corporation, 2014).

These plans outline management actions to protect natural and cultural values, and provide a range of economic, educational, health and wellbeing benefits for communities. There is also a focus on Traditional Owners working collaboratively with scientists to undertake fauna surveys and monitoring, increase conservation experience, and protect habitat and manage feral animals. For the Kiwirrkurra IPA, additional detail is provided in the Science and Monitoring Plan (SMP), with supporting objectives and actions (Paltridge & Crossing, 2016).

6.1 Traditional Owner Engagement

Agrimin have Native Title Agreements (NTA) in place for the Parna Ngururpa, Tjamu Tjamu and Tjurabalan Peoples'. Commitments in these NTAs focus on consultation and reasonable endeavours, to avoid adverse impacts to the environment or areas of cultural concern from the Proposal as well as to maximise development opportunities for the communities. Agrimin will provide opportunities for engagement through co-design and participation in environmental surveys and monitoring, and the management of feral animals and fire, and align with this Offsets Strategy. Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal. A key outcome of this Offset Strategy and associated plans is to provide ongoing opportunities for (funded) involvement of Traditional Owners and their Ranger groups in the implementation of conservation actions, improve understanding of local populations (abundance and dynamics) of significant fauna (Bilby, GDS, Migratory Birds) and facilitate TO knowledge-sharing for these species.

Feedback has been incorporated into this Offset Strategy based on discussions with Kate Crossing of Desert Support Services on behalf of both the Kiwirkurra and Ngururpa Ranger programs. Engagement with Traditional Owners and Ranger groups will be ongoing through the life of the Project and Agrimin are committed to ongoing discussions with the groups as the Offset Strategy and associated plans are refined, land access permissions granted, and data sharing facilitated. The Managed Offset Fund outlined in this Offset Strategy will build capacity of Indigenous Ranger Groups to undertake monitoring, management, and conservation activities on their prescribed lands.

The proposed on-ground management offset actions such as regional fire management, feral animal control, monitoring are designed to provide additional benefit to significant species in the Offset Strategy and will be carried out in areas additional to those being managed as part of the Proposal's mitigation and management actions. The locations and nature of the on-ground management actions will be complementary to but will provide additional benefit to existing management activities relating to fire and predator control conducted by Ranger groups regionally across IPAs.

Agrimin undertook a desktop review of Aboriginal heritage sites that may be impacted by the NIDE, utilising the DPLH Aboriginal Heritage Inquiry System. The Aboriginal Heritage Inquiry System review identified 13 Aboriginal heritage sites that directly intersected with the NIDE, four sites that were within a 500 m buffer area, and 11 sites that were located within a 1 km buffer of the NIDE (**Figure 6-1**) Additional heritage locations are likely to occur within the surrounding region. Ongoing consultation with TO groups and a search of the Registered Aboriginal heritage listed on WA's Department of Planning, Lands and Heritage Aboriginal sites will occur prior to the implementation of projects under this Offsets Strategy. Should an offset project be located in proximity to a registered aboriginal heritage site then additional approvals may be required under the WA Aboriginal Heritage Act 1972.



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Figure 6-1: Registered heritage sites in proximity to the Proposal Area.

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7. Night Parrot Offset

Agrimin are committed to supporting the conservation of the Night Parrot. Baseline studies, survey work and analysis (ERD **Section 7.6.3.2** and **Section 12.4.1**) have substantially contributed to the knowledge of this species. However, it is acknowledged that there are remaining gaps, which may better inform the conservation management of the species across its range. Some of these gaps will be addressed through future monitoring and offsets for the Proposal. Agrimin are committed to delivering offsets that have meaningful conservation outcomes, resulting in a net benefit for the Night Parrot, through the implementation of Offset Projects and Research Projects, while concurrently providing opportunities for the engagement of Indigenous Rangers on IPAs. Further details are described in subsequent sections.

7.1 Occurrence in the Proposal Area

The Night Parrot is a small green, highly cryptic nocturnal parrot. It is currently known only from isolated populations in south-west Queensland and northern inland WA. The species uses multiple roosts in the landscape, primarily within long, unburnt spinifex habitat, feeding on the seeds of grasses and herbs (DPaW, 2017b).

Based on fine-scale desktop mapping undertaken for the baseline studies for the Proposal, it is estimated that a total of 11,522 ha of old growth spinifex occurs within the Study Area, of which 23.55 ha (0.2%) occurs within the Indicative Footprint. Additionally, regional modelling has identified 46,199 ha of additional habitat occurs within 10 km of the Proposal which is likely to be suitable for the Night Parrot.

During baseline studies for the Proposal, foraging calls were recorded in two areas with long, unburnt spinifex along drainage features that run between 5 km and 10 km perpendicular to the proposed haul road alignment in the NIDE. These populations are estimated to be two to five individuals in the north (Population A) and two to three individuals in the south (Population B) (**Figure 7-1**). Both of these areas comprised mosaic claypan habitats which, within the broader landscape, likely prevent the spread of fire within old growth spinifex.

Subsequent to the discovery of these two populations, Ngurumpa rangers discovered an additional three locations within 5-15 km from the Proposal during the first half of 2021 (Populations C, D and E) (Figure 7-1). Additional surveys in the region by Ngurumpa rangers have brought the total to 11 known Night Parrot populations known from the NIDE and the Offset Management Area.

Additionally, Kiwirrkurra rangers have recently recorded isolated Night Parrot foraging calls in the vicinity of Lake Mackay. However, none of the calls were indicative of roosting or nesting as they were recorded during the middle of the night.

Based on current guidance and known records critical habitat within the Proposal Area for the Night Parrot comprises claypans and claypan mosaic, lake margin complex (critical foraging habitat) and saline flats and depressions for the species, with supporting habitat including drainage line.

7.1.1 Potential Impacts

Considering the key assumptions and uncertainties, the potential impacts of the Proposal on the Night Parrot include:

- Potential direct impacts:
 - Direct loss (mortality or injury) from clearing operations or vehicle interaction; and
 - Direct loss of habitat through clearing of vegetation.
- Potential indirect impacts:
 - Habitat fragmentation;
 - Degradation of habitat and individual mortality from unplanned project-related fire;
 - Increased predation by feral predators (feral cats and foxes);
 - Degradation of habitat through changes in hydrology from surface water flow in proximity to critical Night Parrot habitat intersecting the haul road, increased introduced weed species, fugitive dust, increased light or noise, or contamination;
 - Spread or introduction of Psittacine beak and feather disease to Night Parrot populations;
 - Increased profile of Night Parrots within the region may result in an increase in opportunity for the Illegal collection of Night Parrots and/or their eggs; and
 - Potential Proposal impacts compounding the effects of climate change to Night Parrot populations who are less resilient to other threats, for example feral predators as a result.

7.1.2 Modelling to inform indirect impacts:

Changes to lake hydrology and potential indirect impacts to lake margin complex are addressed within the IWEMP. With respect to critical Night Parrot habitat (lake margin complex) indirect impacts from changes in hydrology are not expected to occur:

- Hydrological modelling has informed mitigation and management measures with no drawdown expected to occur on the margins of the lake on the mainland, and negligible drawdown beneath the largest islands on the lake that falls within the natural variation in dry conditions (outlined in the IWEMP).
- Lake margin complex and drainage line habitat provide potential foraging habitat for the Night Parrot. Modelling indicates that there are no expected impacts (indirect) to the Lake Margin Complex habitat that fringes Lake Mackay as a result of groundwater drawdown, which may be used by Night Parrot for foraging:
 - Groundwater modelling indicates that as brine abstraction progresses in the southwest portions of the lake over the first 10 years, drawdown of up to 3.0 m is predicted to occur in the trenches, with drawdown in between trenches ranging between 0.0 m to 1.5 m (noting trenches are located 1 km apart). In the eastern portion of the lake the drawdown may be up to 1.8 m between trenches, expected to occur later in the proposal (up to year 20), and overall aquifer thickness will reduce by only 4-8% over the LoM. However, drawdown is restricted to the lake only and does not extend into NP Lake Margin Complex habitat on the mainland.
- Lake Margin Complex habitat is dominated by chenopod shrublands, of which *Tecticomia* is the dominant component, and is not considered groundwater dependent, with a root zone of approximately 30cm below surface (Botanica, 2017), with this taxon instead accessing freshwater (or low salinity water in the vadose zone). There are no expected indirect impacts on *Tecticomia* from drawdown in the riparian zone.
 - Groundwater associated with this habitat is brine and not freshwater (and therefore not a resource for riparian vegetation persistence).
 - Flooding along the northern margin from evaporation ponds may increase inundation of the shoreline for a brief period (48-72hrs), which will typically be within natural variation limits encountered during large rainfall events.

No indirect impacts to riparian vegetation within the salt lake margin complex or drainage habitat are expected as a result of altered hydrological regimes (ground water drawdown or changes to surface water hydrology) as a result of the Proposal, therefore offsets are not required.

7.1.3 Avoidance and Mitigation Measures

The following avoidance and mitigation measures have been applied to Night Parrot for potential direct and indirect impacts for Night Parrot within the disturbance footprint. These measures will apply to Night Parrot populations roosting and / or nesting within the development envelope, and populations roosting/nesting outside the development envelope and foraging within the development envelope:

The Proposal will **avoid** direct and indirect impacts to the Night Parrot via the following:

- Approximately 30% of the haulage corridor will be constructed on the existing cleared track, reducing total clearing.
- Pre-clearance surveys for Night Parrot in accordance with NPEMP to avoid adverse impacts to the Night Parrot as a result of project-related clearing.

Disturbance to critical Night Parrot habitat (known nesting and/or roosting sites and water sources in proximity) will be avoided by implementation of appropriate management buffers. The location of potential roost and nest sites is to be determined during the pre-clearance surveys. Approach and methods for pre-clearance surveys to inform the requirement for buffers is presented within the NPEMP. Buffers will include:

- 300 m buffer of recorded Night Parrot nest sites.
- 300 m buffer of permanent and prominent ephemeral water sources in proximity to recoded Night Parrot nest sites; and
- 300 m buffer of a roost site as determined during pre-clearance surveys (Section 5 of the Night Parrot Management Plan).
- Haulage will only be undertaken during daytime hours and there will be no project-related (operational) travel from dusk to dawn when the species is active, unless for an unplanned event.
- Appropriate avoidance buffers (up to 500m from trenches) have been implemented to avoid impacts to the lake edges and largest islands.

The Proposal will **minimise** impacts to the Night Parrot via the following mitigation measures:

- Implement and enforce the following speed limits on the Haul Road:
 - 40km along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during daylight hours); and
 - 60 km/ hour speed limit implemented for unsealed access roads.
 - Signage will be installed along access roads to advise of speed reduction (40km/ hour at night-time along the haul road in proximity to Night Parrot critical habitat):
 - Signs will not specifically mention the Night Parrot (due to the risk of poaching occurring), however, will advise of speed reduction to speed limit reduction to 40km in these areas. The signage approach within proximity to Night Parrot critical habitat will be determined following consultation with DBCA prior to installation.
 - A component of the signage will include local indigenous language (following adequate consultation with Traditional Owners) who utilise the road.
 - To minimise potential impacts to drainage line and riparian Lake Margin Complex habitat (suitable foraging habitat for the Night Parrot) additional mitigation measures are outlined within the following management plans:
 - Inland Waters Environmental Management Plan (IWEMP): to minimise potential direct and indirect impacts to Night Parrot habitat resulting from groundwater abstraction and altered surface water hydrology.
 - Flora and Vegetation Environmental Management Plan (FVEMP): to minimise potential direct and indirect impacts to riparian vegetation.
 - Construction Environmental Management Plan (CEMP): includes management provisions to minimise project-related impacts from clearing to Night Parrot habitat.
 - Progressive rehabilitation of disturbed or cleared land where possible, with specific rehabilitation measures proposed for critical (eg. old growth spinifex) and supporting habitat for Night Parrot.
 - Agrimin have designed road infrastructure and manage road verges to avoid and minimise roadside water sources and maximise visibility of road edges for drivers.
 - Night-time speed limits applied to areas along the haul road in proximity to known Night Parrot populations and critical habitat.
 - Undertaking haulage during daylight hours only and strictly adhering to authorised access routes.
 - There will be no operational use (non-haulage activities) of haulroad at night, unless for unplanned events (for example emergency response).
 - All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only.
 - Agrimin propose to engage and educate other haul road users of the importance in restricting driving to day-time hours and following night-time speed restrictions along critical habitat sections of the haul road.
 - Observations and records of Night Parrot mortalities or injury will be recorded and reported to the Department of Biodiversity Conservation and Attractions (DBCA), DWER and DCCEEW in accordance with the reporting provisions outlined in Section 5.5.3 of the Night Parrot Management Plan. In the event that an injured Night Parrot is found, it will be handled in accordance with the Injured Fauna Management Procedure in the NPMP.
 - Appropriate handling and storage of chemicals, hydrocarbons, and other environmentally hazardous materials in accordance with Dangerous Goods Safety Act 2004 and associated regulations, including use of a bunded and sealed assembly areas for hazardous containerised chemicals to prevent surface water and groundwater contamination.
 - Fence off artificial water sources to deter feral predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species. Requirements for fencing in proximity to Night Parrot habitat to deter Night Parrots from getting caught in fencing is outlined in the Night Parrot Management Plan.
 - Mitigate spread of Psittacine beak and feather disease by ensuring that proper hygiene measures are undertaken during surveys and monitoring at Night Parrot populations.

The following **monitoring** will be undertaken to measure the effectiveness of proposed management measures for the Night Parrot:

- Riparian vegetation monitoring to be undertaken in accordance with FVEMP.
- Groundwater monitoring conducted in accordance with Appendix A in the IWEMP.
- Night Parrot Monitoring in accordance with Appendix A of the NPMP.
- Feral animal monitoring and control program in accordance with Appendix E of the TFEMP.
- Road usage and speed compliance monitoring in accordance with the Traffic Management Plan, CEMP, TFEMP and NPMP.




Figure 7-1: Night Parrot records within the Offset Management Area of the Proposal.

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7.1.4 Residual Impacts

The residual impacts to the Night Parrot from clearing of critical and supporting habitat for the Proposal will be offset (no loss of individuals is expected).

For critical habitat this area represents 42.22 ha of claypan and claypan mosaic habitat, 3.44 ha of saline flats and depressions, and 22.36 ha of lake margin complex, totalling 68.02 ha, and for supporting habitat of drainage line totals 0.55 ha (**Table 4-1**). No residual indirect impacts to lake margin complex from altered hydrology and altered surface water regimes to drainage line habitats in proximity to the haul road are expected to occur as a result of the Proposal.

Agrimin will offset these significant residual impacts through funding and implementation of Offset Projects and Research Projects (**Table 7-5**). These projects have considered key threatening processes to the Night Parrot, as well as management and conservation plans, strategies, and advice available for the species.

7.2 Consideration of Plans, Strategies and Advice

Consideration of applicable Night Parrot management plans and strategies, species recovery plans, conservation advice, IPA plans, and threat abatement plans for feral animals, in relation to the Offset Strategy is provided in **Table 7-1**. Further detail is provided in the sections below, in the context of threatening processes and species recovery priorities, used to inform offsets for the Night Parrot.

7.2.1 Threatening Processes

Key threatening processes identified for the Night Parrot (NESP, 2019; TSSC, Threatened Species Scientific Committee, 2016a) include:

- Predation by feral predators, including feral cats (Felis catus):
 - Behaviour and nesting of the Night Parrot means it is highly vulnerable to cat predation (Murphy et al., 2017), and research suggests this is likely to be one of the major causes of the species' decline (J.Watson pers. comm.).
- Altered fire regimes:
 - The Night Parrot is likely to rely on dense clumps of vegetation for roosting and nesting that are long and unburnt, meaning it is susceptible to increased fire frequency and intensity (Murphy et al., 2017). Current known locations appear to be naturally buffered by bare ground which reduces the frequency of fires being carried into these areas.
- Proliferation of weeds:
 - Buffel grass has infested parts of the distribution range for the Night Parrot and has the potential to degrade critical habitat by outcompeting native grasses and leading to more intense fires (NESP, 2019; TSSC, Threatened Species Scientific Committee, 2016a)
- Collision with barbed wire fences:
 - Nigh Parrots are at risk of these collisions since the species tend to fly low to the ground and have lower visual acuity that may increase the risk of entanglement (NESP, 2019; TSSC, Threatened Species Scientific Committee, 2016a).
- Disease:
 - The Conservation Advice for the Night Parrot (TSSC 2016d) has identified that Australian psittacine bird species are susceptible to, and equally likely to be infected by psittacine beak and feather disease.
- Illegal collection:
 - There is a suspected threat that Night Parrots will be illegally collected.
- Altered hydrological regimes
- Vehicle interaction
- Artificial Lighting
- Noise and Vibration:

The species is likely sensitive to noise and vibration impacts. However, the full extent of the impact on the species is currently unquantified.

• Changing climatic conditions:

• Increases in temperature due to climate change are likely to increase the need for the species to find water or succulent species (55% water) during summer and increase the risk of fire (Kearney et al. 2016).

Table 7-1: Consideration of Night Parrot plans, strategies and advice for the Offset Strategy.

Plan, Advice or Strategy	Application in Offset Strategy
Ngururrpa IPA – Plan for Country 2020-2025 (Parna Ngururrpa 2019)	 Sets out strategies and actions aimed at conserving the Night Parrot, including: Rangers to work with elders and scientists to undertaken regular tracking surveys, and other surveys, to monitor fauna. Rangers to learn from other Ranger groups that have experience in conservation of the same fauna. carefully burn country to maintain good habitat. manage feral animals including cats, foxes, rabbits, and camels.
Kiwirrkurra IPA Science and Monitoring Plan (SMP) Paltridge and Crossing 2016).	The SMP provides more detail on some of the management strategies identified in the Kiwirrkurra IPA – Plan for Country, particularly the 'Looking after Country' theme. Objectives and actions have been developed to manage, monitor, and reduce key threats, and improve the condition of land within the IPA. A key focus of the SMP is building the capacity of the Traditional Owners to implement the management actions required.
Night Parrot Approved Conservation Advice Pezoporus occidentalis (TSSC, 2008)	 Identifies Priority future recovery actions for the species as: Control feral cats and foxes at all known sites. Protect known sites from fire and from over-grazing; and Continue management and monitoring of known and potential Night Parrot locations.
Threatened Species Strategy – Year 3 Priority Species Scorecard Night Parrot Pezoporus occidentalis (DCCEEW 2018)	Identifies key threats and recovery actions for the Night Parrot.
Threat Abatement Plan for Predation by Feral Cats (Commonwealth of Australia 2015) Threat Abatement Plan for Predation by the European Red Fox (Commonwealth of Australia 2008)	Provides priorities for management of feral animals.

7.2.2 Species Recovery Priorities

Key recovery priorities for the Night Parrot (TSSC, Threatened Species Scientific Committee, 2016a) (DCCEEW 2018) include:

- Protection against habitat loss, disturbance, and modification:
 - Where known populations can be identified, monitor these to identify key threats.
 - Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.
 - Liaise with managers/owners of any properties found to support the Night Parrot to ensure management practices support the requirements of the species.
- Prevention from trampling, browsing or grazing:
 - Ensure impacts of livestock and feral herbivores are minimised in key areas.
- Control of animal predation and/or competition:
 - Implement appropriate management recommendations outlined in the Threat Abatement Plans for Predation by Feral Cats (DoE, 2015) and the European Red Fox (DEWHA, 2008).
 - Develop and implement a management plan for the control and eradication of feral camels and other herbivores in the local region.
- Managing fire regimes:
 - Develop and implement a suitable fire management strategy for the Night Parrot.
 - Restrict burning to discrete patches, or until further scientific information on the fire ecology of the species and its key food plants is available.

7.3 Proposed Offset

This Offset Strategy aligns with the species recovery priorities for the Night Parrot through the provision of onground management (Offset Projects) and Research Project offsets, addressing key species' recovery and threat abatement actions as follows:

- Implementation of on-ground recovery actions via Offset Projects to manage existing key threats to the Night Parrot comprising feral predator control and fire management. Offset projects that target feral predators will be:
 - Strategic (i.e., landscape scale, collaborative planning and implementation);
 - Implemented long term; and
 - Implemented at a scale that demonstrates a conservation gain for the Greater Bilby (regionalbased level).
- Funding of Research Projects to increase knowledge of the Night Parrot to better inform conservation management of the species; and
- Undertaking regional monitoring programs (Offset Projects) and regional surveys (Research Projects) for the Night Parrot.

Offset Projects and Research Projects to be implemented under this Offsets Strategy for the Night Parrot are discussed in further detail in the following sections.

7.3.1 Offset Projects

The priorities for on-ground management actions for the Night Parrot, through Offset Projects for the Proposal, have been informed by collaboration and contemporary and traditional knowledge sharing with Traditional Owners and relevant SME's (Section 16), along with consideration of species recovery priorities and approved conservation advice. Offsets Projects for the Night Parrot are presented in Table 7-3 (including estimated costings) and are ranked according to priority, the highest of which includes:

- Feral animal control at the regional, habitat or targeted population scale, to manage existing key threats to the species; and
- Implement traditional burning techniques and fire management practices to reduce fuel loads and prevent hot fires within critical Night Parrot habitat.

It is anticipated that the Offset Projects implemented will have the following benefits:

• Opportunities for direct engagement and two-way knowledge sharing with Indigenous Rangers to manage land on respective IPAs; and

• Meaningful, long-term conservation outcomes (resulting in a net species gain) for the Night Parrot.

A detailed offset plan for regional feral predator control to benefit the Night Parrot is provided in **Appendix A**, subject to input, revision, and approval from all stakeholders, including Indigenous Ranger groups. Subsequent detailed Offset Project plans will be submitted to DCCEEW (and the EPA as required) for approval post assessment phase in accordance with Ministerial conditions and prior to implementation (Section 5.3). Each plan will include details of the Offset Project, budget, and implementation schedule in accordance with Section 5.3.1.

7.3.2 Research Projects

The Approved Conservation Advice for the Night (TSSC, 2008) states the following research opportunities will inform future regional and local priority actions for the species:

- Design and implement a monitoring program.
- Identify key food plants and habitat requirements.
- Determine the nesting requirements; and
- Investigate the fire ecology.

Due to its cryptic nature and a sparsity of records, there are key knowledge gaps for the Night Parrot ecology, threats, status, and landscape management for conservation. Primary research activities undertaken in Queensland for the Night Parrot as part of the Threatened Species Hub National Environmental Science Program (TSSC, 2017) focused on the following:

- Use of GPS tags to track the movements of individual Night Parrots across the spectrum of resource availability conditions (during wet and dry periods).
- Detailed analysis of habitats and diet, to understand required resources, and changes over seasons.
- Widespread surveys for other populations using automatic acoustic recorders, to understand rates of occupancy, and build a potential predictive distribution model for populations; and
- Continuing analysis of threats, including the impact of introduced predators, and the impact of grazing on food plants.

The current Conservation Advice for the Night Parrot (TSSC, Threatened Species Scientific Committee, 2016c) identifies current research priorities are to continue to implement the research priorities identified within the Night Parrot Research Plan (Murphy, 2014) as summarised in **Table 7-2**.

Research Area	Priority	Brief description and rationale
Detection Strategies	Critical	Some information exists based on recent work. Developing and testing strategies is critical to locate new populations or to monitor existing populations.
Habitat preferences and use	Critical	Little existing information. Understanding what habitats are important and why underpins successful management and guides survey effort.
Distribution	Critical	Limited existing information. Underpins successful management. Additional research depends on locating new populations.
Threatening Processes	Critical	Some existing knowledge inferred. Understanding may help define preferred habitat model. Critical for long-term conservation
Human and social aspects and communications strategy	High	Complex issue involving stakeholder attitudes and engagement, managing biosecurity threats from illegal collecting and developing a communications strategy to manage interest in the project and potential visitor pressure at important sites.
Diet and drinking	High	Little existing information about either. Detailed study would involve time budgets, energetics, water balance etc. in addition to basic descriptions of resources. This level of detail on diet is not likely to help locate new populations.
Nomadism and landscape- scale movements	High	Practically no existing information about either. Detailed knowledge not likely to help locate new populations, at the moment but could be important for long-term management. Difficult question to tackle.
Breeding biology and life history	Nice to know	Little existing information. Breeding biology per se not considered high priority given other knowledge gaps and context. Proper study involves detailed, well replicated, potentially invasive work (regular nest checks etc.). Data collected opportunistically about basic

Table 7-2: Research priorities for Night Parrot, description and rationale (Murphy, 2014).

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Research Area	Priority	Brief description and rationale
		aspects (site, season, vocalisations etc.) when possible.
Population structure	Nice to know	No existing information. Potentially some management implications. Some genetic work possible now based on museum samples. Considered low priority given context.
Captive Breeding	Nice to know	No existing information. Information would underpin breed and release program and act as insurance against extinction. May be considered necessary once better picture of distribution emerges, but not considered high priority given context.

Research Projects for the Night Parrot, as offsets for the Proposal, have been developed following extensive consultation with relevant SME's (**Section 16**). These Research Projects are summarised in **Table 7-4** (including estimated costings) and are designed to increase knowledge and enhance conservation outcomes for the species. The highest priority for the Night Parrot comprise:

- Regional scale survey to identify additional populations of Night Parrots; and
- New information on genetics of NP populations, through genetic analysis of opportunistically collected (feathers or eggshell) from NP.

A detailed Research Project Plan for the Night Parrot is provided in **Appendix A**. Any subsequent Research Project Plan (**Section 5.3**) required will be developed and may be further refined in consultation with relevant regulatory departments and stakeholders (including Indigenous Ranger groups) and submitted to the DCCEEW (and the EPA as required) for approval post assessment.

Table 7-3: Offset Projects for the Night Parrot.

Managem ent Priority *	Project Reference	Offset Project	Description	Summary of method	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
High	• OP1 (NP, GB and GDS.	 Regional Feral Predator Control to benefit the NP, GDS and GB. 	Targeted regional feral predator control in regional locations (where a NP population is discovered in regional Night Parrot survey) and or in suitable critical habitat for Night Parrot	 Detailed methods provided in the detailed Offset Plan Appendix A (A.2) 	 Environmental manager to engage third party (consultant). Project to be undertaken in collaboration with TO ranger groups. (Fauna licence required/ethics/ Department of Health permits, DBCA approval required and specialist training required). 	Feral predator numbers: Statistically significant decline in predator population compared to baseline numbers over time	Regional Feral animal monitoring	 Detailed timeline for regional feral animal predator control to benefit the NP, GB and GDS is provided in Appendix A.2 including: Establishment of feral predator monitoring and control to commence in year 3 following completion of baseline (one off cost). Annual ongoing feral animal control to commence at year 5 for duration of the Project Annual feral predator and threatened fauna monitoring (to commence at year 3 following completion of 2 years of baseline) for duration of the Project. 	Total overall cost to deliver feral predator control program to benefit GDS, NP and GB is \$2,900,000*: • Feral Predator and Threatened Fauna Monitoring Program: \$1,710,000* • Feral Predator Control Program: \$1,190,000*. Detailed cost breakdown for regional feral animal predator control to benefit the NP, GB and GDS is provided in Appendix A.2	 Regional Feral predator control will likely have a benefit to multiple significant fauna species (for example Great Desert Skink, Greater Bilby, Mulgara etc. and not just target significant species). Targeted long-term management of feral animals will provide a net benefit through increasing the likelihood of persistence of the known population and maintaining the area of occupancy for the Night Parrot. Two-way knowledge sharing: Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well- defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.
High	• NPOP2	Regional Fire Management	Progressive and targeted annual burning to manage and reduce fuel loads in areas surrounding known or discovered Night Parrot locations.	 Fire management techniques should be implemented in concert with feral animal control and habitat restoration measures. To be developed to codesign, collaboration and two-way knowledge sharing with TO groups and in consultation with SME's. Fire management practices will focus on the protection of key Night Parrot habitats and should be undertaken in areas surrounding critical and supporting habitat(s) for the Night Parrot to reduce the risk of large hot fires occurring. Design and implement species-protective fire management practices for the life of the Proposal within 	 Environmental Manager in consultation with Traditional Owners. Opportunity to manage country contributing additional fire management programs within respective IPAs in the region by Ranger groups. * *Offsets will be additional to any existing operations be undertaken by TO groups on IPAs within the region and in consultation and agreement with TO groups. 	 Modelled change in patch size prior to fire management being undertaken. Persistence of Night Parrot habitat (areas of old growth spinifex) over time. 	 Aerial/GIS monitoring fire age/patch size. Monitoring of NP calls at known populations 	 Ongoing (for life of the Project) 	 \$15,000/year To be rolled out concurrently with fire management for offset projects with funding provided under the GDS and Greater Bilby offsets package to achieve a net benefit to all three species. 	 Opportunity to engage TO's in two-way knowledge sharing for NP fire management. social benefits including training and employment opportunities for TOs. Potential to inform future management of the species.

Managem ent Priority *	Project Reference	Offset Project	Description	Summary of method	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
				 and around Night Parrot avoidance buffer zones (known nesting and roosting locations) in consultation with SMEs and TO groups. Critical roosting habitat for Night Parrot is long-unburnt hummock-forming spinifex, thickets or dense shrubby samphire will be protected from the occurrence of fires. Maintenance of the naturally occuring firebreaks surrounding the Night Parrot avoidance buffer zones (nesting/roosting areas) will be undertaken through weed control in accordance with the Weed Control Program (outlined in the FVEMP). 						

¹Based on risk assessment in the NPMP.

*Night Parrot contribution: Annual feral predator and threatened fauna monitoring and control- \$30,000

Table 7-4: Research Projects for the Night Parrot.

Research Priority*	Referenc e Number	Research Project²	Description	Summary of Methods ¹	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
High	NPRP1	Night Parrot Regional Survey	Regional survey to assess calls targeting potential claypan mosaic habitat to detect additional locations of NP on IPAs.	Monitoring in accordance with methods outlined in Appendix A (A.1)	 Environmental manager Third party (consultant) in collaboration with TO ranger groups. 	 Desktop study completed to inform regional survey. Regional survey completed with the discovery of new Night Parrot populations. Better understanding of habitat requirements for the species based on known Night Parrot records and habitat. Development of a species distribution model. 	Monitoring/measurabl e outcome (in comparison to control sites):	Year One (one off desktop analysis and survey)	\$315,000	Benefit through increased knowledge of population size, distribution and habitat requirements which may inform future management of the species.
High	NPRP2	Roosting Patterns of the Night Parrot	Baseline surveys indicate that there was evidence of individuals using multiple roost locations. Investigate roosting patterns of the Night Parrot.	 Areas where Night Parrot are roosting can be inferred by records of calls within the first hour of sunset or last hour before sunrise. During the targeted surveys for the Proposal, calls were recorded during these timeframes at different locations on different nights. This indicated that the birds were changing their roost sites over time. Methods to evaluate roost patters as part of an offset plan could include the following: Monitoring data: Analysis of call times from the monitoring program (total of 50 permanently mounted recorders across 5 locations). The monitoring programs will collect a large volume of data during each monitoring event (quarterly) and over time (life of the proposal). There exists the opportunity to analyse calls indicative of roosting (close to sunset/sunrise) across the monitoring locations and over time in response to season to better understand roosting patterns. Triangulation of roost locations: during preclearance surveys and through separate targeted surveys there exists the opportunity to triangulate the location of roost siles and for acoustic recorders to deployed at these locations to investigate roosting patterns. The triangulation method involves having observers stationed 200 m to 400m apart after sunset and before sunrise in an area of known Night Parrot activity. If a presumed Night Parrot call is heard, observers will note a description of the call, the exact time of the call, the approximate direction from which the calls were heard and an estimated distance to the call. This will allow observers to triangulate the location to the roost for the next survey opportunity (that evening or next morning) progressively getting closer over each survey opportunity until the roost site is located. The method using monitoring data will provide an understanding of Night Parrot roosting patterns over a large area, while the triangulation method is likely 	 Environmental manager Third party (consultant) in collaboration with TO ranger groups. 	Roosting patterns	One off monitoring event.	Post rainfall	\$85,000	Benefit through increase in knowledge of NP roosting patterns, which may inform future management of the species.

Research Priority*	Referenc e Number	Research Project²	Description	Summary of Methods ¹	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
				to result in monitoring of single or a small number of roosts but with greater certainty at that location.						
Medium	NPRP3	Collection of Material for Genetic Analysis	Genetic Analysis of Night Parrot populations.	 Collection and analysis of genetic material. Identify opportunities to work with Ranger groups on IPAs. The following advice is a summary of techniques that will be followed for the handling of salvage material from Night Parrots provided by the Night Parrot Recovery team available at https://niahtparrot.com.au/index.php/resource s/collecting-material-for-genetic-analysis/: Feathers – photograph the material in situ before disturbance and handling if possible. Handle the feathers as little as possible to avoid contamination with human DNA. Eggshell – photograph the material <i>in situ</i> before disturbance and handling if possible. Handle eggshell and eggs as little as possible. Dead nestlings/dead birds – photograph the material in situ before disturbance and handling if possible. Report as an incident in accordance with procedure in TFEMP and any salvage material of Night Parrots should be sent to the bird section of the State Museum in which the material is found. Follow appropriate hygiene protocols in accordance with TFEMP to minimise risk of spread of disease. 	 Environmental manager Third party (consultant) in collaboration with TO ranger groups. 	New information on genetics of populations	NA	Ongoing (opportunistic)	\$25, 000 cost for genetic analysis of material	 Benefit through increase in knowledge of population genetics and potentially number of individuals present, which may inform future management of the species. Opportunities to involve Ranger groups.

*Based on risk assessment in the NPMP and research priorities for the species

7.4 Offset Assessment Guide

Agrimin proposes to offset any significant residual impacts to critical and supporting Night Parrot habitat, resulting from the Proposal.

The areas to be offset (ha) for residual impacts to Night Parrot are outlined in **Table 7-5** to offset the direct clearing of critical and supporting habitat for the Night Parrot (no indirect impacts to salt lake margin habitat expected). Rationale for the inputs included in the offset assessment calculator for the Night Parrot are summarised in **Table 7-6**. The EPBC Offset Assessment Calculation for the Night Parrot is provided in **Appendix B**.

MNES Species	Offset Area (ha)	Habitat Type	Habitat Value Rating	Justification
Night Parrot	42.22	Claypans and claypan mosaic habitat;	Critical habitat	Based on records in the Study Area within this habitat type
Night Parrot	3.44	Saline flats and depressions	Critical habitat	Based on regional records (Murphy et al., 2017)
Night Parrot	22.36	Lake margin complex	Critical habitat	Potential foraging habitat
Night Parrot	0.55	Drainage line	Supporting habitat	

Table 7-5: Areas offset (ha) for the Night Parrot.

Table 7-6 Summary of Offset Calculator inputs for Night Parrot

Criteria	Rationale for Input
Impact site	
Area	 A total of 68.57 ha of habitat for the Night Parrot occurs within the impact footprint comprising: 68.02 ha of critical habitat; and 0.55 ha of supporting habitat.
Quality	 The habitat quality rating is evaluated based on the key ecological attributes of the species: Habitat requirements and variability: nesting, breeding, foraging, dispersal, and/or roosting requirements of the species. Lifecycle and population dynamics: The key life cycle stages of the species and how these impact its population viability. Species movement patterns and how the population functions across the landscape Threatening processes contributing to the loss of the species. The value applied relates only to the area of habitat that the Night Parrot may utilise within the Development Envelope. A value of 8 was assigned for habitat quality for the following reasons: Site condition: Old growth spinifex and lake margin complex considered critical habitat for the Night Parrot. Overall vegetation condition in the Proposal Area is considered Excellent, however some minor disturbance from broadscale fire and local access tracks is present (Stantec, 2021b). Feral predators are known to occur at the site and are recognised as a key threatening process for the Night Parrot.
	Site context (within the impact footprint):
	 The impact footprint contains 68.02 ha of critical Night Parrot habitat that may provide potential nesting/ roost locations or critical foraging habitat for the species and a total of 0.55 ha of supporting habitat. Night Parrot populations occurring within the Development Envelope habitat are subject to several threatening processes including predation by feral predators and the occurrence of hot fire events.
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Criteria	Rationale for Input
	Species stocking rate:
	• There are two Night Parrot populations that are intersected by the Proposal and each population has received four rounds of targeted survey work using acoustic recorders. Analysis of the calls indicates that across the surveys, on average there were between two and five individuals in the northern population and between two and three individuals in the southern population.
Information Source	Proposal Environmental Surveys and Management Plans
	360 Environmental (2017)360 Environmental. (2018). Lake Mackay Sulphate of Potash Project: Single Phase Level 2 Fauna Survey at Lake Mackay. Unpublished report prepared for Agrimin Limited.
	DBCA, Department of Biodiversity, Conservation and Attractions. (2020). Threatened and Priority Fauna Database (custom search).
	ecologia Environment. (2019). Night Parrot Monitoring Lake Mackay. Unpublished report prepared for Agrimin Ltd.
	Outback Ecology. (2012). Toro Energy Ltd Theseus Project: Level 1 Flora and Vegetation Assessment.
	Paltridge, R. (2012). Kiwirrkura Threatened Species Survey 2012. Report produced for the Ngaanyatjara Council.
	Paltridge, R. (2015). Looking for animals on Ngururrpa Country. Consultancy Report prepared for Central Desert Native Title Services.
	Stantec. (2021a). Lake Mackay Potash Project: Detailed and Targeted Vertebrate Fauna Survey and Consolidation. Unpublished report prepared for Agrimin Ltd.
	Stantec. (2022). Mackay Sulphate of Potash Project Environmental Review Document. Prepared for Agrimin Ltd.
	Stantec. (2023a). Lake Mackay Construction Environmental Management Plan (CEMP). Prepared for Agrimin Ltd, Perth, Western Australia.
	Stantec (2024). Mackay Sulphate of Potash Project Night Parrot Management Plan and Monitoring Program. Prepared for Agrimin Ltd, Perth, Western Australia.
	Stantec. (2023b). Lake Mackay Terrestrial Fauna Environmental Management Plan (TFEMP). Prepared for Agrimin Ltd, Perth, Western Australia.
	Stantec, Australia. (2021c). Lake Mackay Night Parrot (Pezoporus occidentalis) Habitat Modelling Memorandum. Unpublished report prepared for Agrimin Ltd.
	Stantec, Australia. (2021d). Lake Mackay Night Parrot (Pezoporus occidentalis) Targeted Survey Memorandum. Unpublished report prepared for Agrimin Ltd.
	Strategen. (2018). Lake Mackay Sulphate of Potash Project: Level 2 Vertebrate and Targeted Fauna Survey. Unpublished report prepared for Agrimin Ltd.
	Strategen Environmental. (2018). Lake Mackay Sulphate of Potash Project: Level 2 Vertebrate and Targeted Fauna Survey. Unpublished report prepared for Agrimin Ltd.
	Scientific articles and species recovery plans
	Blyth, J. (1996). Night Parrot (Pezoporus occidentalis) Interim Recovery Plan for Western Australia. Western Australian Threatened Species and Communities Unit, Department of Conservation and Land Management.
	Burbidge, A. (2020). Interim night parrot habitat statement. Available online at https://niahtparrot.com.au/index.php/2022/04/05/niaht-parrot-habitats/ .
	DBCA, Department of Biodiversity Conservation and Attractions,. (2017a). Threatened Species and Communities: Night Parrot. Available online at <u>https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/487-night-parrot</u> .
	DENR, Department of Environment and Natural Resources. (2018). Buffel Grass Management Guide for Central Australia.

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Criteria	Rationale for Input
	DEWHA, Department of the Environment, Water, Heritage and the Arts. (2008). Threat abatement plan for predation by the European Red Fox.
	DoE, Department of the Environment. (2013). Threat Abatement Plan for Predation by the European Red Fox (2008): Five Yearly Review.
	DEWHA, Department of Environment Water Heritage and the Arts. (2008b). Threat abatement plan for predation by Feral Cats. Canberra, Australian Capital Territory.
	DoE, Department of the Environment. (2015). Threat Abatement Plan for Predation by Feral Cats.
	DotE, Department of the Environment. (2016). Conservation Advice: Pezoporus occidentalis Night Parrot. Commonwealth of Australia, Canberra, Australian Capital Territory.
	DPaW. (2017). Interim guideline for preliminary surveys of night parrot (Pezoporus occidentalis) in Western Australia. Perth, Western Australia.
	Leseberg, N. P. (2021). Conservation Biogeography of the Night Parrot (Pezoporus occidentalis). The University of Queensland.
	Leseberg, N. P., Kutt, A. S., Evens, M. C., Nou, T., & Spillias, S. (2023). Establishing effective conservation management strategies for a poorly known endangered species: A case study using Australia's night parrot (Pezoporus occidentalis).
	Meeting to provide DBCA with an update on the Project, prior to submitting the first draft of the ERD to the EPA. Key topics included the Great Desert Skink, Night Parrot, Greater Bilby and waterbirds. 8/Oct/20
	Murphy, S. A. (2014). Night Parrot (Pezoporus occidentalis) Research Plan. https://www.environment.gov.au/epbc/notices/assessments/2010/5696/2010- 5696-approved-management-plan.pdf
	TSSC, Threatened Species Scientific Committee. (2008). Conservation Advice: Pezoporus occidentalis Night Parrot. https://www.environment.gov.au/biodiversity/threatened/species/pubs/59350- conservation-advice.pdf
	TSSC, Threatened Species Scientific Committee. (2016a). Approved Conservation Advice Pezoporus occidentalis night parrot. Commonwealth of Australia, Canberra, ACT. 32(8-9), 2869-2891. <u>https://doi.org/10.1007/s10531-023-02633-8</u>
	TSSC, Threatened Species Scientific Committee. (2017). Conservation of the Night Parrot (fact Sheet). <u>https://www.nespthreatenedspecies.edu.au/media/xrblpmvn/2-5-night-parrot-factsheet_low-res.pdf</u>
	Weeds Australia. (2021). Integrated weed management. Weeds Australia.
Offset site	
Time over which loss is averted	A value of 20 years has been nominated.
Start area (ha)	Start Area is 200 ha.
	The actual area of Night Parrot habitat to be managed with threat abatement (delivered through Offset Projects) in this Offset Strategy is likely to be larger to deliver a net benefit to the species based on the following:
	 On ground management offsets projects for the Night Parrot have been costed within the Offset Strategy and a detailed offset proposal for on ground management is provided in Appendix A.2 of the Offset Strategy "Offset Project Plan (OP1): Mackay Sulphate of Potash Project Regional Feral Predator Control to Benefit the Night Parrot, GDS and Greater Bilby" Continued consultation and onaoing engagement is required with TO's in
	accordance with land access agreements to implement on ground management actions to achieve a net benefit to the Night Parrot. Agrimin also have Native Title Agreements (NTA) in place for the Parna Ngururrpa, Tjamu Tjamu and Tjurabalan Peoples'.

Criteria	Rationale for Input
	The location of Night Parrot offset sites (where on ground management actions will be undertaken) within the IPAS is to be determined following habitat mapping, Night Parrot regional survey (Appendix A.1) and consultation with TOs.
Risk of loss without offset	A value of 0% has been nominated based on The University of Queensland (2017) Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act.
	There are a number of factors that influence the risk of loss of a site outlined in the The University of Queensland (2017) report, including:
	 presence and strength of formal protection mechanisms currently in place on the proposed site (e.g. zoning, restrictive covenants or state vegetation clearing laws); presence of pending development applications, mining leases or other activities on the proposed offset site that indicate development intent and likelihood; and average risk of loss for similar sites.
	The offset sites for Night Parrot will occur within the offset management area which comprises the three IPAs that are intersected by the Proposal: Tjurabalan, Ngururrpa and Kiwirrkurra. The IPA's are listed as a conservation reserve, however this does not preclude the proposed Night Parrot offset sites from being subject to future development. Any allowable development (i.e. that not prevented by the protection mechanism, such as mineral exploration or extraction) would trigger an offset requirement within suitable Night Parrot habitat and therefore the risk of any future loss is neutralised.
Risk of loss with offset	A value of 0% has been nominated as the offset site is to be within IPAs managed by Traditional Owners and the land is a conservation reserve. The proposed offset site contains an EPBC Act listed threatened species or ecological community and any allowable development within Night Parrot habitat at the offset sites with the offset management area, (such as mineral exploration or extraction) would trigger an offset requirement and therefore the risk of any future loss is neutralised.
Confidence in result (top row)	A confidence score of 80% has been nominated given the following: For the of area of habitat attributes, there are two components to which confidence in result relates: change in habitat quality and averted loss. For the change in habitat quality component, the confidence in result captures the level of certainty about the successful achievement of the proposed change in habitat quality can be met. The proposed-on ground management actions align with current management priorities to provide a net benefit and maintain the area of occupancy for the Night Parrot. Night Parrot experts consider cat management the single most effective management strategy for the Night Parrot (Leseberg et al., 2023). However, a combination of protecting and actively managing existing intact Night Parrot habitat through management of controlling feral cats and managing fire specifically to maintain Night Parrot habitat is considered to result in the greatest conservation gains for the Night Parrot (Leseberg et al., 2023). The most cost-effective strategies are thought to be fire management to maintain Night Parrot habitat. Protecting and restoring potentially suitable, but degraded, Night Parrot habitat is considered the least effective and least cost- effective management strategy for the Night Parrot given that critical habitat to support populations comprise old growth spinifex (Leseberg et al., 2023). A conservation gain is the benefit that an on-ground threat abatement delivers maintains or increases its viability or reduces any threats of damage, destruction or extinction for the Night Parrot by: Improving existing habitat quality for the Night Parrot; and Reducing threats to the Night Parrot at regional offset management sites. That is, confidence in results considers not only the confidence in being able to achieve the net conservation gain for the Night Parrot, but also takes into account the risk that the offset may not be delivered. The success of the offset projects will be reliant on the projects being delivered in consul

Criteria	Rationale for Input
	include them as Offset Sites under the Offset Plan, options will be investigated with Traditional Owner groups for other known sites within the Offsets Management Area to be adopted as Offsets Sites under the Offset Plan. Currently there are understood to be in excess of 10 locations of Night Parrots populations within the Offset Management Area.
Time until ecological benefit	5 years following commencement of feral predator control and fire management to benefit Night Parrot populations.
Start quality	Offset sites for Night Parrot are to be determined based on presence of NP populations in regional survey areas and ongoing consultation with TOs. The start quality of the Night Parrot offset sites is assigned a value of 8, under the assumption that a similar quality habitat of old growth spinifex is required to support additional Night Parrot populations within the region.
Future quality without offset	A value of 5 has been assigned for the future quality without the offset, as the habitat quality for the Night Parrot could be progressively degraded through undesirable vehicle access, the risk of hot unplanned fire events without appropriate ongoing fire management around regional Night Parrot populations (in areas not currently being managed for fire in proximity to NP populations on IPAs). Fire has the potential to devastate Night Parrot habitat in long unburnt spinifex and result in a significant population decline. Without ongoing targeted feral predator control in proximity to Night Parrot populations the populations may significantly decline over time and potentially reduce the area of occupancy for the species over time.
Future quality with offset	A value of 9 is assigned as the implementation of on ground management of fire and feral predator control to benefit the Night Parrot will result in an increase in habitat quality rating for the species at Night Parrot offset management sites.
Confidence in result (bottom row)	 Confidence score of 80% assigned based on the following: Estimates for costs provisioned under the offsets strategy have been estimated to be as accurate as practicable including all aspects such as TO involvement, helicopters, accommodation etc. A site-specific assessment of regional night parrot offset sites will be undertaken to confirm habitat quality matches calculator inputs (to be refined once a specific offset site has been selected following the regional Night Parrot survey). Research Projects for the Night Parrot, as offsets for the Proposal, have been developed following extensive consultation with relevant SME's (Section 16). These Research Projects are summarised in Table 7-4 (including estimated costings) and are designed to increase knowledge and enhance conservation outcomes for the species. The highest priority for the Night Parrot comprise: Regional scale survey to identify additional populations of Night Parrots; New information on genetics of NP populations, through genetic analysis of opportunistically collected (feathers or eggshell) from NP. A detailed Research Project Plan for the Night Parrot is provided in Appendix A. Any subsequent Research Project Plan (Section 5.3) required will be developed and may be further refined in consultation with relevant regulatory departments and stakeholders (including Indigenous Ranger groups) and submitted to the DCCEEW (and the EPA as required) for approval post assessment.
% of impact offset	 109.91 % EPBC Offset Assessment Calculation for Night Parrot is provided in Appendix B.

8. Greater Bilby Offset

Agrimin are committed to supporting the conservation of the Greater Bilby. Baseline studies, survey work and analysis (ERD **Section 7.6.3.2** and **Section 12.4.1**) have substantially contributed to the knowledge of this species. Agrimin are committed to delivering offsets that have meaningful conservation outcomes, resulting in a net benefit for the Greater Bilby, through the implementation of Offset Projects and Research Projects, while concurrently providing opportunities for two-way knowledge exchange and collaboration through the engagement of Indigenous Rangers on IPAs. Further details are described in subsequent sections.

8.1 Occurrence in the Proposal Area

The Greater Bilby formerly occurred in over 70% of arid and semi-arid mainland Australia and currently has a patchy distributed from the Tanami Desert in the Northern Territory to Broome and Warburton in WA. It occupies a range of habitats including desert sandplains and dune-fields with Acacia shrubland and spinifex hummock grasslands. In south-west Queensland they are also known from clay and stony areas (Menkhorst & Knight, 2011; van Dyck et al., 2013; van Dyck & Strahan, 2008).

The Greater Bilby is solitary and shelters in deep burrows. They have large, shifting home ranges that change in response to food resources, comprising an omnivorous diet of insects, larvae, seeds, bulbs, fruit and fungi (van Dyck & Strahan, 2008). Greater Bilby burrow use is relatively dynamic, with individuals maintaining several burrows at once and abandoning, re-using, or excavating new burrows continually (van Dyck & Strahan, 2008).

In the Study Area, baseline work recorded the Greater Bilby at 130 locations (77 burrows) via tracks, digs, burrows, scats and camera trap photos. Additionally, the species was recorded at 165 locations in the surrounding region (150 km), of which 66 occur near the Study Area (within 25 km). Based on the locations of records and known ecology within the Study Area, critical habitat for the Greater Bilby was identified as gravel spinifex plain (92 locations) and spinifex sandplain (33 locations claypan and claypan mosaic, dune-field and dune habitats. Greater Bilby records from the Study Area are shown in **Figure 8-1**, in the context of the Offset Management Area.

8.1.1 Potential Impacts

Potential direct impacts from the implementation of the Proposal include:

- Direct loss (mortality or injury) from clearing, operations or vehicle interaction or infrastructure; and
- Loss of key habitat during clearing.

The following indirect impacts from the Proposal:

- Habitat fragmentation;
- Increased fugitive dust emissions from clearing of native vegetation and haulage, resulting in degradation
 of habitat;
- Increased predation by introduced and feral predators (feral cats and foxes);
- Creation of artificial watering points may contribute to the expansion of feral predators;
- Increased noise and vibration, or light exposure resulting in disruption of fauna behaviour; and
- Potential proposal impacts compounding the effects of climate change to Greater Bilby populations who are less resilient to other threats, for example feral predators as a result.

8.1.2 Avoidance and Mitigation Measures

Realignment or avoidance of the haulroad for the Proposal, within the Indicative Footprint, is considered unlikely to mitigate potential impacts to the Greater Bilby, as the species continually establishes new burrows (van Dyck & Strahan, 2008). However, the following avoidance measures will be implemented by the Proposal to minimise potential impacts to the Greater Bilby, detailed in the ERD (Section 7), CEMP and TFEMP:

- The location and layout of the On-LDE infrastructure has been designed to avoid impacts to the lake margin habitat that fringes the lake;
- Minimise disturbance to critical habitats, particularly gravel spinifex plain (location of borrow pits);
- Conduct Greater Bilby pre-clearance survey within the Indicative Footprint in accordance with the CEMP and TFEMP; and

• 30% of the haul road will be constructed on the existing cleared track reducing total clearing.

The Proposal will **minimise** impacts to the Bilby via the following:

- Restrict haulage operations to daylight hours to minimise road strike, and restrict road access to designated private use only, restricted to operational traffic (daytime only unless during an unplanned event) and local Indigenous communities;
- Where clearing of burrows in the IF is unavoidable following pre-clearance surveys, mitigate impacts by relocating individuals according to guidance (DBCA, 2018) (DSEWPaC, 2013) and by retaining adequate suitable Greater Bilby habitat and foraging resources (equivalent to the home range for the Greater Bilby 1.5km in area) within proximity to an active Greater Bilby burrow in the DE (outside of the IF) through the implementation of a Greater Bilby habitat buffer in accordance with the TFEMP and CEMP;
- Implement and enforce the following speed limits on the Haul Road:
 - 40 km/hr along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during daylight hours);
 - 80 km/hr speed limit to apply to the remaining NIDE. Key avoidance measures implemented whereby no haulage or operational use of haulroad is to be undertaken during night-time (noting that significant fauna such as the Greater Bilby/ Mulgara and GDS are not active during the day-time); and
 - 60 km/ hour speed limit implemented for unsealed access roads.
 - Installation of culverts to facilitate the movement of Greater Bilby across the haul road;
 - All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only;
 - Implement pre-clearance surveys for Greater Bilby in accordance with the CEMP and TFEMP;
 - Implement and enforce speed limits for all traffic, particularly at dawn/dusk and night-time in habitats and areas of importance to significant species;
 - During road construction within drainage features, maintain ecosystem function i.e., surface hydrology (within and outside the Development Envelope);
 - There will be no operational use (non-haulage activities) of haulroad at night, unless for unplanned events (for example emergency response);
 - Fauna egress will be provided for temporary ponds such as Turkeys nests along the haul road;
 - Fencing will be installed around the perimeter of artificial water sources to deter feral predators such as permanent freshwater storage dam/s in accordance with best practice..
 - Develop training and awareness packages and inductions in relation to significant fauna (including Greater Bilby).



Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied i electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Figure 8-1 Locations of Greater Bilby records within the Offset Management Area of the Proposal.

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8.1.3 Residual Impacts

The residual impacts to the Greater Bilby from clearing of critical habitat for the Proposal will be offset (no loss of individuals is expected). For critical habitat this area represents 1345.63ha of critical habitat, comprising:

- Gravel spinifex (248.12 ha);
- Spinifex sandplain (754.20 ha);
- Claypan and claypan mosaics (42.22 ha;)
- Dunefield (281.82 ha); and
- Dune (19.27 ha).

Agrimin will offset these significant residual impacts through funding and implementation of Offset Projects and Research Projects (**Table 7-5**). These projects have considered key threatening processes to the Greater Bilby, as well as management and conservation plans, strategies, and advice available for the species.

8.2 Consideration of Plans, Strategies and Advice

Applicable species recovery plans, conservation advice and research priorities were considered for the Greater Bilby, as well as the threat abatement plan for feral animals, in relation to the Offset Strategy. These included the following:

- Conservation Advice for the Greater Bilby (Macrotis lagotis) (TSSC, Threatened Species Scientific Committee,, 2016);
- National Recovery Plan for the Greater Bilby (Macrotis lagotis) (Pavey, 2006);
- Recovery Plan for the Greater Bilby (Macrotis lagotis) (DCCEEW, 2023) The Conservation and Management of the Greater Bilby (Macrotis lagotis) (DPaW, 2017a); and
- Threat Abatement Plan for Predation by Feral Cats (DoE, 2015) and Threat Abatement Plan for Predation by the European Red Fox (DoE, 2013).

Further detail is provided in the sections below, in the context of threatening processes and species recovery priorities, used to inform offsets for the Greater Bilby.

8.2.1 Threatening Processes

Key threatening processes identified for the Greater Bilby (Commonwealth of Australia, 2019) include:

- Predation by foxes, cats, and wild dogs;
- Habitat loss;
- Fragmentation and genetic isolation;
- Feral herbivores (habitat degradation by domestic and other introduced species);
- Altered fire regimes (fire effects on habitat suitability and facilitation interactions (FHF), fire effects on predator-prey interactions (FPI) and fire effects on competitive interactions (FCI));
- Loss of Traditional Owner knowledge and land management;
- Reduction in population resilience and genetic fitness in wild and intensively managed population;
- Weeds infestations leading to increased fire intensity and competition with Greater Bilby food resources;
- Climate change (changes to food sources and habitat suitability and indirect increased risk of largescale fires, and feral herbivores and predators); and
- Direct vehicle interaction.

8.2.2 Species Recovery Priorities

Key recovery priorities for the Greater Bilby (Macrotis lagotis) (Commonwealth of Australia, 2019) include:

- Managing and monitoring feral predators;
- Improving and maintaining critical habitat; and
- Managing meta-populations (regional group of connected populations of the species).

8.3 Proposed Offset

This Offset Strategy aligns with the species recovery priorities for the Greater Bilby through the provision of on ground management Offset Projects and Research Projects, addressing key species' recovery and threat abatement actions as follows:

- Implementation of on-ground management actions via Offset Projects to manage existing key threats to the Greater Bilby comprising regional feral predator control and fire management; and
- Funding of Research Projects (radio tracking) to increase knowledge of the Greater Bilby to better inform conservation management of the species.

Potential opportunities for Offset Projects and Research Projects for the Greater Bilby are discussed in further detail in the following sections.

8.3.1 Offset Projects

The priorities for on-ground management actions for the Greater Bilby, through Offset Projects for the Proposal, have been informed by extensive consultation undertaken with relevant SME's (**Section 16**), along with consideration of species recovery priorities and approved conservation advice. Opportunities for Offsets Projects are presented in **Table 8-1** (including indicative costings) and are ranked according to priority, the highest of which includes:

- Feral animal control at the regional, habitat or targeted population scale, to manage existing key threats to the species; and
- Implement traditional burning techniques and fire management practices to reduce fuel loads and achieve conservation outcomes.

Offset projects that target feral predators will be:

- Strategic (i.e., landscape scale, collaborative planning and implementation);
- Implemented long term; and
- Implemented at a scale that demonstrates a conservation gain for the Greater Bilby (landscapebased level).

It is anticipated that Offset Projects will have the following benefits:

- Opportunities for direct engagement of Indigenous Rangers to manage land on respective IPAs; and
- Meaningful, long-term conservation outcomes (resulting in a net species gain) for the Greater Bilby.

A detailed Offset Project Plan will be submitted to DCCEEW (and the EPA as required) for approval prior to implementation post assessment phase in accordance with Ministerial conditions, prior to implementation (**Section 5.3**), subject to input, revision, and approval from all stakeholders, including Indigenous Ranger groups. Each plan will include details of the Offset Project, budget, and implementation schedule.

8.3.2 Research Projects

Research Projects) for the Greater Bilby have also been identified following consultation with SME's (Section 16), which are summarised in **Table 8-2** and are designed to increase knowledge and enhance conservation outcomes for the species. In addition, potential research opportunities listed in The Draft Recovery Plan for the Greater Bilby (Macrotis lagotis) (Commonwealth of Australia, 2019) include:

- Greater Bilby biology, ecology, population dynamics and genetic diversity;
- Predator biology, ecology, interdependencies, control methods and effects;
- Habitat quality, extent, processes and threats, such as fire and grazing;
- Factors that influence the spread of fire, and its effects on habitat and food availability;
- The effects of, and opportunities associated with, a changing climate; and
- Interdependencies between predators (including the dingo), fire, water availability and introduced species.

A Research Project Plan (**Section 5.3**) will be developed and may be further refined in consultation with relevant regulatory departments and stakeholders (including Indigenous Ranger groups) and will be submitted to the DCCEEW (and the EPA as required) for approval post assessment phase in accordance with Ministerial conditions, prior to implementation.

Table 8-1: Offset Projects for the Greater Bilby.

Management Priority 1	Project Reference	Offset Project	Description	Summary of Methods*	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
High	• OP1 (NP,GB and GDS).	 Regional Feral Animal Control to benefit Greater Bilby, GDS and Night Parrot. 	Targeted Felixer trap (approximate radius 3km) program to maximise outcomes for Bilby in habitat within regional locations within Greater Bilby habitat.	 Refer to detailed Offset Project plan (Appendix A) 	 Environmental manager to engage third party (consultant). Project to be undertaken in collaboration with TO ranger groups. (Fauna licence required/ethics/ Department of Health permits, DBCA approval required and specialist training required). 	 Feral predator interactions with species are reduced, leading to an increase in species population numbers. Measure change in Greater Bilby population over time in response to feral animal control. Measure change in feral animal population over time to evaluate effectiveness of control method. 	Long term regional feral animal monitoring and monitoring of regional Greater Bilby populations over time.	Detailed timeline for regional feral animal predator control to benefit the NP, GB and GDS is provided in Appendix A.2 including: • Establishment of feral predator monitoring and control to commence in year 3 following completion of baseline (one off cost. Annual ongoing feral animal control to commence at year 5 for duration of the Project. Annual feral predator and threatened fauna monitoring (to commence at year 3 following completion of 2 years of baseline) for duration of the Project.	Total overall cost to deliver feral predator control program to benefit all three species (GDS, NP and GB)* is \$2,900,000* • Feral Predator and Threatened Fauna Monitoring Program: \$1,710,000* • Feral Predator Control Program: \$1,190,000*. Detailed cost breakdown for regional feral animal predator control to benefit the NP, GB and GDS is provided in Appendix A.2.	 Regional Feral predator control will likely have a benefit to multiple fauna species (for example Great Desert Skink, Night Parrot and mulgara not just target significant species). Net benefit for Greater Bilby populations.
High	• GB0P2	Regional Fire Management	 Undertake program(s) of fire management incorporating traditional burning techniques with the aim of reducing the frequency of high intensity fires and promoting mosaics of vegetation with heterogeneous structure and age classes, to achieve maximum conservation outcomes for the Greater Bilby within the region. 	 Consult with Indigenous rangers to consolidate knowledge about links between habitat, fire behaviours and the relevant species habitat. Undertake a literature review and SME consultation to understand the interactions of fire frequencies and intensities on the Greater Bilby habitat quality, food availability, competitors and predators and inform fire management practices. Advice following initial consultation with Martin Dziminski: Greater Bilby SME (DBCA) suggests implementing the following fire management practices: Avoid burning adjacent to roads. Implement burning patch mosaic burning fire heterogeneity to increase habitat 	 Opportunity to manage country contributing additional fire management programs within respective IPAs in the region by Ranger groups. * *Offsets will be additional to any existing operations being undertaken by TO groups on IPAs within the region and in consultation and agreement with TO groups. 	 Aerial/GIS monitoring fire age/patch size to assess effectiveness of fire management techniques. Measure change in Greater Bilby population over time in response to fire management. 	 Aerial/GIS monitoring analysis of aerial imagery/ fire age/ modelled change in patch size prior to fire management being undertaken. Measure change in Bilby population over time in response to fire management. 	Ongoing (for life of project)	• \$40,000 annually*.	 Managing bilby habitat using fire in proximity to the haul road to reduce Bilbies being attracted to an area near the Haul Road and potentially being struck by vehicles. Critical habitats for the Greater Bilby are effectively protected from high intensity or large scale (widespread) bushfires. Species populations and ranges are able to increase from baseline data.

devely of noglonal scole. Avoid burning during Bury thereing is acoust telefibres a structure telefibres a structure managed could burn to parent longe widths the development the development	Management Priority 1	Project Reference	Offset Project	Description	Summary of Methods*	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
					 diversity at regional scale. Avoid burning during Bilby breeding season. Establishing a suitable firebreak surrounding managed populations to prevent large wildfires destroying vegetation structure and food resources (Wright & Clarke, 2007) and allowing easy predator access (Doughty et al., 2015; McGregor & Moseby, 2014) within managed populations. Implementing patch mosaic burning to create fire age heterogeneity, increasing habitat and resource diversity for bilbies (Southgate & Carthew, 2007; Southgate & Carthew, 2007; Southgate & Carthew, 2006; Southgate et al., 2007). Fire management and burning at and around bilby populations may attract introduced predators to existing Greater Bilby population. The best practice management needs to manage both fire and introduced predators concurrently to avoid this effect. This could be achieved by combining localised fire management with localised introduced 						

¹Based on risk assessment in the TFEMP

*Greater Bilby contribution: Annual feral predator and threatened fauna monitoring and control- \$40,000

Table 8-2: Research Projects for the Greater Bilby.

Research Priority²	Project Reference	Research Project	Description	Summary of Methods	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Total Approximate Cost (excl. GST) for LOM	Net Benefit
High	• GBRP1	 Impacts of fire regimes (history) on presence of Greater Bilby 	 Investigate potential relationship between fire histories and occurrence of Greater Bilbies. 	 Results from GB monitoring surveys to be analysed against areas with different burn ages. Investigate potential relationship between fire histories and occurrence of Greater Bilbies through presence absence of Greater Bilby records. Compile Traditional and contemporary ecological Knowledge about links between habitat, fire behaviours and the Greater Bilby in consultation with TO groups. 	 Environmental manager Third party (consultant) in collaboration with TO ranger groups. 	 Presence/ absence - Records of Greater Bilby in relation to fire scar age. 	 Using results of regional Greater Bilby survey to inform the study 	 One off initial desktop with comparison of results of regional Greater Bilby survey. 	• \$35,000 (one off)	• \$35,000 (one off)	 Inform fire management practices to increase conservation outcomes for the Greater Bilby.
High	• GBRP2	 Greater Bilby tracking (if relocation requires trapping in accordance with the TFEMP) 	 Monitoring the success of Greater Bilby relocation via tracking. 	 Methodology to be determined in consultation with TOs, DBCA and SME's (e.g. Martin Dziminski or Harry Moore). Tracking of Bilbys to better understand success of relocation and may inform movements of individuals to inform home range usage and response to resource availability and fire. 	 Environmental manager Third party (consultant) in collaboration with TO ranger groups. 	 Persistence, movement and habitat usage of Greater Bilby following relocation. 	 Tracking for a duration of 2 weeks (seasonal) 	 Clearing or Operational phase. 	 \$50,000 per tracking event 	 \$50,000 (per event) (up to 2x events) 	 Provide additional knowledge on the success of relocation methods for the species. Inform habitat usage, home range and dispersal patterns of the Bilby within the region and inform management of the species
Medium	• GBRP3	Effectiveness of drone monitoring to detect the Greater Bilby	Research into the use and effectiveness RGB and thermal imagery to detect individuals and secondary signs of Greater Bilby.	 Survey will use two drones (RGB and thermal imagery) to detect individuals and secondary signs of Greater Bilby and compare the data to simultaneously conducted on ground monitoring surveys. Two 500m x1 km plots with the final selection of plots to be surveyed will depend on land access approvals and accessibility. The size of each plot has been determined by the calculated flight times, drone flight limitations (e.g. line of sight flights) and logistics (e.g. battery time and charging needs). Drone survey to be conducted simultaneously with Bilby monitoring event to allow for on ground validation of drone survey results and analysis of effectiveness of drones to detect Bilby presence. 	 Environmental manager Third party (consultant) in collaboration with TO ranger groups. 	Objective of the survey is to provide a data-driven framework to compare traditional on- ground survey work and drone- based surveys, to evaluate the efficacy and accuracy of the different methods.	 Surveying two plots. Drone survey to be conducted simultaneously with Bilby monitoring event to allow for comparisons of effectiveness. 	 One off research project (simultaneously with on ground bilby monitoring) 	• \$90, 000 (one off)	• \$90, 000 (one off)	 Increased efficiency and outcomes for regional monitoring of the Greater Bilby in desert areas. Potential to locate additional Greater Bilby populations. Potential to inform regional monitoring methods.

*Based on risk assessment in the TFEMP and research priorities for Greater Bilby.

8.4 Offsets Assessment Guide

Agrimin proposes to offset any significant residual impacts to critical and supporting Greater Bilby habitat, resulting from the Proposal. This will occur through the Managed Offset Fund and implementation of Offset Projects and Research Projects as part of the total offset package. The total value of the offset package for the Proposal is provided in **Table 10-1** for all three MNES species.

The areas to be offset (ha) for residual impacts to the Greater Bilby are outlined in **Table 8-3** to offset the direct clearing of critical habitat for the Greater Bilby. Rationale for the inputs included in the offset assessment calculator for the Greater Bilby are summarised in **Table 8-4**. The EPBC Offset Assessment Calculation for the Greater Bilby is provided in **Appendix B**.

MNES Species	Offset Area (ha)	Habitat Type	Habitat Value Rating	Justification
Greater Bilby	248.12	Gravel spinifex plain	Critical habitat	92 locations recorded in this habitat type
Greater Bilby	754.20	Spinifex sandplain	Critical habitat	33 locations recorded in this habitat type
Greater Bilby	42.22	Claypan and claypan mosaics	Critical habitat	3 locations recorded in this habitat type
Greater Bilby	281.82	Dune-field	Critical habitat	1 location recorded in this habitat type
Greater Bilby	19.27	Dune	Critical habitat	1 location recorded in this habitat type

Table 8-3: Areas Offset (ha) for the Greater Bilby.

Table 8-4 Summary of Offset Calculator inputs for Greater Bilby.

Criteria	Rationale for Input					
Impact site						
Area	A total of 1345.63 ha of critical Bilby habitat occurs within the impact footprint					
Quality	The habitat quality rating is evaluated based on the key ecological attributes of the species:					
	 Habitat requirements and variability: breeding, foraging, and/or dispersal requirements of the species. 					
	 Litecycle and population dynamics: The key lite cycle stages of the species and how these impact its population viability. 					
	• Species movement patterns and how the population functions across the landscape					
	• Threatening processes contributing to the loss of the species.					
	The value applied relates only to the area of habitat that the Greater Bill may utilise within the Development Envelope. A value of 8 was assigned habitat quality for the following reasons:					
	Site condition:					
	 Vegetation condition considered Excellent, however some minor disturbance from broadscale fire and local access tracks (Stantec, 2021b). 					
	Site context:					
	• Site contains critical habitat for the species which supports foraging and breeding activity (Stantec, 2021a). Additionally, there is good connectivity to the broader landscape allowing for movement and dispersal of individuals. Feral predators are known to occur at the site and are recognised as a key threatening process for the Bilby (DCCEEW, 2023).					
	Species stocking rate:					
	 Baseline surveys completed for the Proposal yielded a high number of Bilby records (130 locations) suggesting the site holds high value for the species (Stantec, 2021a). 					

Criteria	Rationale for Input
Information Source	Environmental Surveys and Management Plans
	360 Environmental (2017)360 Environmental. (2018). Lake Mackay Sulphate of Potash Project: Single Phase Level 2 Fauna Survey at Lake Mackay. Unpublished report prepared for Agrimin Limited.
	Cowan, M., Bray, R., & Paltridge, R. (2015). Kiwirrkurra Indigenous ProtectedArea Western Australia: Survey of Mammals and Reptiles.
	DBCA, Department of Biodiversity, Conservation and Attractions. (2020). Threatened and Priority Fauna Database (custom search).
	Desert Support Services. (2018). Bilby Blitz Survey on the proposed Ngururrpa Indigenous Protected Area.
	Meeting to provide DBCA with an update on the Project, prior to submitting the first draft of the ERD to the EPA. Key topics included the Great Desert Skink, Night Parrot, Greater Bilby and waterbirds. 8/Oct/20
	Outback Ecology. (2012). Toro Energy Ltd Theseus Project: Level 1 Flora and Vegetation Assessment.
	Paltridge, R. (2012). Kiwirrkura Threatened Species Survey 2012. Report produced for the Ngaanyatjara Council.
	Paltridge, R. (2015). Looking for animals on Ngururrpa Country. Consultancy Report prepared for Central Desert Native Title Services.
	Stantec. (2021a). Lake Mackay Potash Project: Detailed and Targeted Vertebrate Fauna Survey and Consolidation. Unpublished report prepared for Agrimin Ltd.
	Stantec. (2022). Mackay Sulphate of Potash Project Environmental Review Document. Prepared for Agrimin Ltd.
	Stantec. (2023a). Lake Mackay Construction Environmental Management Plan (CEMP). Prepared for Agrimin Ltd, Perth, Western Australia.
	Stantec. (2023b). Lake Mackay Terrestrial Fauna Environmental Management Plan (TFEMP). Prepared for Agrimin Ltd, Perth, Western Australia.
	Strategen. (2018). Lake Mackay Sulphate of Potash Project: Level 2 Vertebrate and Targeted Fauna Survey. Unpublished report prepared for Agrimin Ltd.
	Strategen Environmental. (2018). Lake Mackay Sulphate of Potash Project: Level 2 Vertebrate and Targeted Fauna Survey. Unpublished report prepared for Agrimin Ltd.
	Scientific articles and species recovery plans
	Commonwealth of Australia. (2019). Recovery Plan for the Greater Bilby (Macrotis lagotis) DRAFT. Commonwealth of Australia
	DBCA, Department of Biodiversity Conservation and Attractions. (2018). The conservation and management of the bilby (Macrotis lagotis) in the Pilbara. Annual Report 2017 - 18.
	DCCEEW, Department of Climate Change, Energy, the Environment and Water. (2023). Recovery Plan for the Greater Bilby (Macrotis lagotis).
	DENR, Department of Environment and Natural Resources. (2018). Buffel Grass Management Guide for Central Australia.
	DEWHA, Department of the Environment, Water, Heritage and the Arts. (2008). Threat abatement plan for predation by the European Red Fox.
	DoE, Department of the Environment. (2013). Threat Abatement Plan for Predation by the European Red Fox (2008): Five Yearly Review.
	DEWHA, Department of Environment Water Heritage and the Arts. (2008b). Threat abatement plan for predation by Feral Cats. Canberra, Australian Capital Territory.

Criteria	Rationale for Input
	DoE, Department of the Environment. (2015). Threat Abatement Plan for Predation by Feral Cats.
	DPaW, Department of Parks and Wildlife. (2017a). The conservation and management of the bilby (Macrostis lagotis) in the Pilbara.
	Southgate, R., & Carthew, S. (2007). Post-fire ephemerals and spinifex-fuelled fires: a decision model for bilby habitat management in the Tanami Desert, Australia. International Journal of Wildland Fire, 16(6), 741–754.
	Southgate, R., & Carthew, S. M. (2006). Diet of the bilby (Macrotis lagotis) in relation to substrate, fire and rainfall characteristics in the Tanami Desert. Wildlife Research, 33(6), 507-519.
	Southgate, R., Paltridge, R., Masters, P., & Carthew, S. (2007). Bilby distribution and fire: a test of alternative models of habitat suitability in the Tanami Desert, Australia. Ecography, 30(6), 759-776.
	TSSC, Threatened Species Scientific Committee,. (2016). Approved Conservation Advice Macrotis lagotis greater bilby.
	Weeds Australia. (2021). Integrated weed management. Weeds Australia.
Offset site	
Time over which loss is averted	A value of 20 years has been nominated.
Start area (ha)	Start Area is 4350 ha.
	The actual area covered for on ground threat abatement management actions (Appendix A.2) proposed for the Greater Bilby within the Offset Management Area is likely to be higher.
Risk of loss without offset	A value of 0% has been nominated based on The University of Queensland (2017) Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act.
	There are a number of factors that influence the risk of loss of a site outlined in the The University of Queensland (2017) report, including:
	 presence and strength of formal protection mechanisms currently in place on the proposed site (e.g. zoning, restrictive covenants or state vegetation clearing laws); and
	 presence of pending development applications, mining leases or other activities on the proposed offset site that indicate development intent and likelihood; and average risk of loss for similar sites.
	The offset sites for Greater Bilby will occur within the offset management area which comprises the three IPAs that are intersected by the Proposal: Tjurabalan, Ngururrpa and Kiwirrkurra. The IPA's are listed as a conservation reserve, however this does not preclude the proposed Greater Bilby offset sites from being subject to future development.
	Any allowable development (i.e. that not prevented by the protection mechanism, such as mineral exploration or extraction) would trigger an offset requirement within suitable Greater Bilby habitat and therefore the risk of any future loss is neutralised.
Risk of loss with offset	A value of 0% has been nominated as the offset site is to be within IPAs managed by Traditional Owners and the land is a conservation reserve.
	The proposed offset site contains an EPBC Act listed threatened species or ecological community and any allowable development within Greater Bilby habitat at the offset sites with the offset management area, (such as mineral exploration or extraction) would trigger an offset requirement and therefore the risk of any future loss is neutralised.
Confidence in result (top row)	80%
Time until ecological benefit	5 years
Start quality	The Offset Sites for the Greater Bilby have not been defined at this time of completing this Offset Plan (prior to assessment of the Proposal). The Greater Bilby is widespread and the results of surveys in the region indicate

Criteria	Rationale for Input
	that the species is relatively common in the Offset Management Area in association with preferred habitats (BushBlitz, 2015; Desert Support Services, 2018; Paltridge, 2012, 2015; Stantec, 2021a). A value of 8 has been assigned for start quality as similar habitat to the impact site is known to occur in the broader region.
Future quality without offset	A value of 6 has been assigned for the future quality without the offset as it is expected that the quality of the site will decrease if no regional feral predator control is undertaken. Additionally, there is a risk of regional hot fire without ongoing management. During baseline surveys it was observed that broadscale fires had degraded habitat in the surrounding region (Stantec, 2021a).
Future quality with offset	A value of 9 is assigned as it is expected that the quality of habitat at the Greater Bilby offset sites will increase following implementation of ongoing feral predator control and fire management.
Confidence in result (bottom row)	80%
% of impact offset	 96.26% EPBC Offset Assessment Calculation for the Greater Bilby is provided in Appendix B.

9. Great Desert Skink Offset

Agrimin are committed to supporting the conservation of the Great Desert Skink. Baseline studies, survey work and analysis (ERD **Section 7.6.3.3** and **Section 12.4.5**) have substantially contributed to the knowledge of this species. Agrimin are committed to delivering offsets that have meaningful conservation outcomes, resulting in a net benefit for the Great Desert Skink, through the implementation of Offset Projects and Research Projects, while concurrently providing opportunities for two-way knowledge sharing through the engagement of Indigenous Rangers on IPAs. Further details are described in subsequent sections.

9.1 Occurrence in the Proposal Area

The Great Desert Skink is a large burrowing lizard that occurs in the western desert region of central Australia. The species has undergone widespread decline, with many historic populations no longer occur. It tends to occupy habitats including sandplains and swales with hummock grasses and scattered shrubs and lives communally in multi-generational family groups, occupying burrow systems. The species is long lived and individuals are relatively sedentary, while foraging for insects and small lizards (DAWE, 2020).

Knowledge of the species current fine-scale distribution is unclear due to the remote and inaccessible nature of sites. However eight key populations occur across Australia (TSSC, Threatened Species Scientific Committee, 2016b), including Western Australia (three populations of approximately 3,000 or more individuals), the Northern Territory (four populations of <2,250 individuals) and South Australia (one population of <50 individuals) (McAlpin, 2001).

During baseline studies for the Proposal, one new Great Desert Skink populations were recorded within the NIDE, including the Yagga Yagga population (64 active burrows) and the Lake Mackay population (no longer present). The Yagga Yagga population was better defined through additional targeted survey work, with the NIDE and haul road for the Proposal subsequently realigned to provide a buffer of 300 m from all active burrows. The species has also been recorded at 138 locations in the region surrounding the Proposal Area (150 km), almost all of which occur along a 30 km stretch of the Kiwirkurra Road; the Kiwirkurra population (DBCA, 2020). Recently, an additional population has been discovered by TO Rangers to the north-east of Lake Mackay outside the Development Envelope for the Proposal (Kate Crossing pers. comm. 18 March 2024). The known Great Desert Skink records within the Offset Management Area for the Proposal are shown in **Figure 9-1**. Critical habitat for the species comprises spinifex sandplain, with no supporting habitat due to the sedentary nature of the skink.

9.1.1 Potential Impacts

Potential direct impacts from the implementation of the Proposal include:

- Direct loss (mortality or injury) from clearing, operations or vehicle interaction or infrastructure; and
- Loss of key habitat during clearing.

The following indirect impacts from the Proposal:

- Habitat fragmentation;
- Increased fugitive dust emissions from clearing of native vegetation and haulage, resulting in degradation of habitat;
- Increased predation by introduced and feral predators (feral cats and foxes);
- Creation of artificial watering points may contribute to the expansion of feral predators;
- Increased noise and vibration, or light exposure resulting in disruption of GDS behaviour; and
- Potential proposal impacts compounding the effects of climate change to GDS populations who are less resilient to other threats, for example feral predators as a result.

9.1.2 Avoidance and Mitigation Measures

The following avoidance and mitigation measures will be implemented by the Proposal to minimise potential impacts to the Great Desert Skink. These are also detailed in the ERD (Section 6.3.3 and 12.4.5), CEMP and TFEMP, and can be summarised as follows:

- Realignment of the haul road to avoid direct impacts to the Yagga Yagga population;
- Restriction of haulage options to daytime hours;

- There will be no operational use (non-haulage activities) of haulroad at night, unless for unplanned events (for example emergency response);
- Monitoring in accordance with the GDS Monitoring Program (TFEMP);
- All vegetation clearing will be carried out during daylight hours. Trenching will be undertaken on the lake over a 24hr period for the first 2 years of operations only. Trenching will then move to daytime only;
- Significant fauna avoidance buffer zones (GDS) are in place following completion of pre-clearance surveys, where applicable;
- Access to the significant fauna avoidance buffer zones (GDS) is restricted to authorised personnel and there are no incidents of unauthorised access;
- Proposal will avoid impacts to GDS burrows through the implementation of a 150 m buffer around active burrows recorded during preclearance surveys and a 300m buffer around known GDS population active burrows;
- Progressively rehabilitate areas as opportunities become available in accordance with rehabilitation procedures outlined in the MCP. Rehabilitation procedures specific to reinstating high value significant fauna habitat will be undertaken in accordance with TFEMP;
- Clearing being undertaken within these areas. For significant fauna avoidance buffer zones protecting high value MNES species (such as GDS) an inconspicuous marking will be used and communicated to relevant staff and contractors;
- Restrict access to fauna buffer zones to authorised personnel only and TO's where applicable;
- Implement fire mitigation measures in accordance with TFEMP;
- Fence off artificial water sources to deter predator access, following best practice exclusion fencing guidelines to allow ongoing dispersal of fauna species;
- Introduced predators identified will be reported to Environmental personnel and recorded to monitor occurrences;
- Avoid attraction of introduced predators by implementing domestic waste management procedures (e.g. fencing of landfills, regularly covering putrescible waste, secure lids on bins):
 - Putrescible waste to be stored and disposed of in a way that cannot be accessed by fauna.
 - Landfill wastes will be covered promptly, and active waste disposal cells will be fenced to exclude large fauna.
- Implement and enforce the following speed limits on the Haul Road:
 - 40 km/hr along the haul road during night-time in the vicinity of NP populations (noting that NP are not active in the day and haulage will only be undertaken during daylight hours); and
 - 80 km/hr speed limit to apply to the remaining NIDE. Key avoidance measures implemented whereby no haulage or operational use of haulroad is to be undertaken during night-time (noting that significant fauna such as the Greater Bilby/ Mulgara and GDS are not active during the daytime); and
 - 60 km/ hour speed limit implemented for unsealed access roads.

9.1.3 Residual Impacts

The residual impacts to the Great Desert Skink from clearing of critical habitat (noting there is no supporting habitat) for the Proposal will be offset (no loss of individuals is expected). For critical habitat this area represents a total of 754.20 ha of spinifex sandplain (**Table 4-1**). Agrimin will offset these significant residual impacts through funding and implementation of Offset Projects and Research Projects (**Table 7-5**). These projects have considered key threatening processes to the Great Desert Skink, as well as available management and conservation plans, strategies, and advice available for the species.



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Figure 9-1: Great Desert Skink records within the Offset Management Area of the Proposal.

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9.2 Consideration of Plans, Strategies and Advice

Applicable species recovery plans, conservation advice and research priorities were considered for the Great Desert Skink, as well as the threat abatement plan for feral animals, in relation to the Offset Strategy. These included the following:

- Conservation Advice for the Great Desert Skink (Liopholis kintorei) (TSSC, Threatened Species Scientific Committee, 2016b);
- A Recovery Plan for the Great Desert Skink (Egernia kintorei) 2001-2011 (McAlpin, 2001)
- Threat Abatement Plan for Predation by Feral Cats (DoE, 2015) and Threat Abatement Plan for Predation by the European Red Fox (DoE, 2013).

Further detail is provided in the sections below, in the context of threatening processes and species recovery priorities, used to inform offsets for the Greater Bilby.

9.2.1 Threatening Processes

Key threatening processes identified for the Great Desert Skink (DAWE, 2020) include:

- Predation by feral predators including feral cats.
- Habitat loss
- Altered fire regimes.
 - Fire poses a significant threat to the Great Desert Skink as it removes groundcover making the species more vulnerable to predation from feral predators.
- Habitat degradation by feral camels and rabbits.
- Habitat fragmentation.
- Proliferation of weeds such as buffel grass.
- Climate change (changes to food sources and habitat suitability and indirect increased risk of largescale fires, and feral herbivores and predators); and
- Direct vehicle interaction.

9.2.2 Species Recovery Priorities

Key recovery priorities for the Great Desert Skink (Dennison et al., 2015; McAlpin, 2001) include

- Preservation of critical habitat;
- Management of fire regimes (through local patch burning);
- Reducing the risk of further localised population declines and predation pressure (and erosion of genetic diversity); and
- Improving community knowledge and increasing community involvement in recovery management.

The Offset Strategy will align with this objective through seeking opportunities for Traditional Owner engagement within on ground recovery actions (Offset Projects).

9.3 Proposed Offset

This Offset Strategy aligns with the species recovery priorities for the Great Desert Skink through the provision of on ground management (Offset Projects) and Research Projects, addressing key species' recovery and threat abatement actions as follows:

- Implementation of on-ground recovery actions via Offset Projects to manage existing key threats to the Great Desert Skink comprising feral predator control and fire management; and
- Undertaking regional monitoring programs (Offset Projects).
- Funding of Research Projects to increase knowledge of the Great Desert Skink to better inform conservation management of the species;

Potential opportunities for Offset Projects and Research Projects for the Great Desert Skink are discussed in further detail in the following sections.

9.3.1 Offset Projects

The priorities for on-ground management actions for the Great Desert Skink, through Offset Projects for the Proposal, have been informed by extensive consultation undertaken with relevant SME's (**Section 16**), along with consideration of species recovery priorities and approved conservation advice. Opportunities for Offsets Projects are presented in **Table 9-1** (including indicative costings) and are ranked according to priority. The highest priority is the implementation of targeted feral animal control to manage existing key threats to known populations of the species.

It is anticipated that Offset Projects will have the following benefits:

- Opportunities for direct engagement of Indigenous Rangers to manage land on respective IPAs; and
- Meaningful, long-term conservation outcomes (resulting in a net species gain) through the implementation of regional feral predator and fire management for the Great Desert Skink.

A detailed Offset Plan for the implementation of regional feral animal control to benefit the Great Desert Skink is provided in **Appendix A**, Detailed Offset Project Plans for subsequent projects (fire management) will be submitted to DCCEEW (and the EPA as required) for approval post assessment phase in accordance with ministerial statements prior to implementation (**Section 5.3**), subject to input, revision, and approval from all stakeholders, including Indigenous Ranger groups. Each plan will include details of the Offset Project, budget, and implementation schedule.

9.3.2 Research Projects

Research Projects for the Great Desert Skink have also been identified following consultation with SME's (Section 16), which are summarised in **Table 9-2** and are designed to increase knowledge and enhance conservation outcomes for the species. The highest priority for the Great Desert Skink comprise:

- Addressing knowledge gaps for the Great Desert Skink populations and habitat preferences within a regional context; and
- Understanding the species population genetics of the Yagga Yagga Great Desert Skink population.

The Research Projects outlined in **Table 9-2** are considered indicative only and one or more may be implemented as a part of the Offset Strategy. A Research Project Plan (**Section 5.3**) will be developed and may be further refined in consultation with relevant regulatory departments and stakeholders (including Indigenous Ranger groups) and will be submitted to the DCCEEW (and the EPA as required) for approval.

Table 9-1: Opportunities for Offsets Projects for the Great Desert Skink.

Management Priority 1	Project Reference	Offset Project	Description	Summary of Methods	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost	Net Benefit
			<u> </u>							
High	• OP1 (NP,GB and GDS	Regional Feral Predator Control to benefit the NP, GB and GDS.	Targeted (Feral Cat control Program) install Felixer traps surrounding the known Great Desert Skink control population (Kiwirrkurra).	Detailed Offset Project Plan provided in Appendix A.	 Third party (consultant) in collaboration with TO ranger groups. (Fauna licence required/ethics/ Department of Health permits, DBCA approval required and specialist training required). 	 Measure change in Feral animal activity over time- (monitored through Felixer trap camera records). Measure change in Great Desert Skink population over time in response to feral animal control. 	Monitoring of feral animal and GDS activity over time.	Detailed timeline for regional feral animal predator control to benefit the NP, GB and GDS is provided in Appendix A.2 including: • Establishment of feral predator monitoring and control to commence in year 3 following completion of baseline (one off cost. • Annual ongoing feral animal control to commence at year 5 for duration of the Project • Annual feral predator and threatened fauna monitoring (to commence at year 3 following completion of 2 years of baseline) for duration of the Project.	Total overall cost to deliver feral predator control program to benefit all three species (GDS, NP and GB)* is \$2,900,000*: • Feral Predator and Threatened Fauna Monitoring Program: \$1,710,000* • Feral Predator Control Program: \$1,190,000*. Detailed cost breakdown for regional feral animal predator control to benefit the NP, GB and GDS is provided in Appendix A.2	 Regional Feral predator control will likely have a benefit to multiple significant fauna species (for example Night Parrot, Greater Bilby, Mulgara etc. and not just target significant species). Targeted long-term management of feral animals will provide a net benefit through increasing the likelihood of persistence of the known population and maintaining the area of occupancy for the GDS. Two-way knowledge sharing: Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.
High	• GDSOP2	• Fire Managem ent	 Targeted fire management to benefit the Great Desert Skink 	 Great Desert Skinks occupy a variety of habitat types within the western deserts region (Indigenous Desert Alliance, 2023) with the species showing a preference for habitat comprising at least 50% bare ground, and inhabits areas of varying post-fire regeneration age, ranging from 3–15 years (Ridley et al., 2018). The species is often associated with spinifex sandplains and swales with hummock grasses and scattered shrubs (Pavey, 2006). In consultation with SMEs and TO groups. Fire management programs will be designed in accordance with contemporary and traditional knowledge of significant fauna species-appropriate fire management practices including but not limited to: 	 Opportunity to manage country contributing additional fire management programs within respective IPAs in the region by Ranger groups. *Offsets will be additional to any existing operations be undertaken by TO groups on IPAs within the region and in consultation 	 Measure change in Great Desert Skink population over time in response to fire management practices. 	 Monitoring of feral animal and GDS activity over time post fire managem ent 	 Ongoing for duration of the Project. 	• \$ 30,000 / annual	 Net benefit to GDS populations through increasing chance of persistence of known populations. Increased understanding of fire management practices for the species. Two-way knowledge sharing: Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in fire management

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 Control of the control of the control	Management Priority 1	Project Reference	Offset Project	Description	Summary of Methods	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
 TO groups and TO Ranger groups have invaluable knowledge of the local area and experience, expertise and skills in conducting fire management to benefit the Great Desert Skink. Two-way knowledge sharing and co-design with TO groups will play an integral part in this Project. Design and implement fire management practices around know / newly discovered regional Great Desert Skink burrow areas (not currently being managed by TO groups) Maximise the coverage of spinifex and notive groundcovers around burrows. Undertake species-appropriate fire management: priorities small winter 											
<pre>(or early dry season) burns to provide a mosaic of habitat ages and densities and to reduce the intensity and area size of fires (Cadenhead et al., 2016; Moore et al., 2015). Burning activities around GDS burrows and key habitats should not be undertaken during the breeding season (September to October) (Dennison, 2015). Fire management fechniques will be implemented in concert with feral anial control and habitat restoration measures/ weed control,</pre>					 TO groups and TO Ranger groups have invaluable knowledge of the local area and experience, expertise and skills in conducting fire management to benefit the Great Desert Skink. Two-way knowledge sharing and co-design with TO groups will play an integral part in this Project. Design and implement fire management practices around known/ newly discovered regional Great Desert Skink burrow areas (not currently being managed by TO groups) Maximise the coverage of spinifex and native groundcovers around burrows. Undertake species-appropriate fire management: prioritise small winter (or early dry season) burns to provide a mosaic of habitat ages and densities and to reduce the intensity and area size of fires (Cadenhead et al., 2016; Moore et al., 2015). Burning activities around GDS burrows and key habitats should not be undertaken during the breeding season (September to October) (Dennison, 2015). Fire management techniques will be implemented in concert with feral animal control and habitat 	and agreement with TO groups.					activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.

¹Based on risk assessment in the TFEMP

* GDS allocation for feral predator control: Annual cost monitoring and control following establishment: \$85,000.

Table 9-2: Summary of opportunities for Research Projects for the Great Desert Skink.

Research	Project	Research Project	Offset Project Description	Summary of Methods	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate	Net Benefit
Priority	Reference								Cost	
High	• GDSRP1	Regional Survey for GDS	Regional large-scale survey in suitable habitat for the GDS.	 Few known populations in the region (knowledge gap) Critical habitat for the Great Desert Skink within the Study Area has been identified as spinifex sandplain habitat. The regional Great Desert Skink survey presents an opportunity to engage with and work alongside TO Ranger groups from the Ngururpa, Tjurabalan, and Kiwirkurra IPAs, a key objective of the Great Dest Skink Monitoring Program and the National Recovery Plan (Indigenous Desert Alliance 2023a). The TO Ranger Groups all have well-defined threatened species protection strategies, and extensive experience and skills in a range of survey monitoring, protection and management activities for the GDS. This GDS survey will be codesigned with Indigenous Desert Alliance on behalf of the Kiwirkurra and Ngururpa people and build upon advice shared that represents local knowledge and experience from existing programs undertaken by ranger groups within the region. Agrimin are committed to ongoing discussions with both groups, which will involve spending time on country and engaging in two-way knowledge sharing. Through these ongoing discussions, there may be refinement in the locations of some of the reference sites, based on any recent additions to knowledge about significant fauna in the area. It is also acknowledged that monitoring methods may change over time, through adaptive management, in line with most recent scientific practices. Presence of Great Desert Skink burrows will be recorded as follows; GPS coordinates. Burrow status (active or inactive); Number of latrines present. Presence and count of adult, sub- adult, and juvenile scats in a latrine. Signs of feral predator presence (i.e., tracks and scats) and age of signs (fresh, recent, old); Evidence of disturbance (i.e., fire); and Fauna habitat type present (Opportunities for Traditional owner involvement, co- design and two way knowledge sharing. Target similar habitat types within regional areas and within IPAs In consultation with SME's 	 Discovery of new GDS population(s) in the region 	 Should new population be discovered it would be added to existing GDS monitoring program through adaptive management process. 	One off regional survey	 \$240,000 (one off survey) 	 Potential for new population(s) to be discovered. Increase knowledge of species habitat preferences
				 spinifex sandplain). The Great Desert Skink Survey will be undertaken by suitably qualified zoologists trained in survey methods for GDS. Potential for Species Distribution Modelling to be undertaken. This would patentially allow. 						
				be undertaken. This would potentially allow the search area to be refined. Inputs for the model could be informed by the locations where Great Desert Skink have been recorded at the Yagga Yagga, Kiwirkurra						
				and the new population NW of Lake Mackay.						
Research Priority	Project Reference	Research Project	Offset Project Description	Summary of Methods	Responsible Person	Measurable Outcome	Monitoring	Timing	Approximate Cost (excl. GST)	Net Benefit
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High	• GDSRP2	 Genetic study of Yagga Yagga' population 	 Determine how the 'Yagga Yagga' population fits into the current known genetic regions for the GDS. 	 A genetic study has previously been undertaken of inter-relatedness between GDS populations across Australia (Dennison et al., 2015). This work looked at individuals from six locations and found that there are three main genetic regions. This research Project would include the Kiwirrkurra IPA population which was not part of the study by (Dennison et al., 2015) and Yagga Yagga population in context of the study. 	 Research Student, Agrimin Environmental Officer, Specialist Consultant. 	Genetic interrelatedness between isolated populations	One off study with scientific reporting requirement	• One off study	 \$ 50,000 Funded researc h project (potenti al honours project) 	 Increase knowledge of the species. Potential implications for conservation management of the species.

*Based on risk assessment in the TFEMP and research priorities for GDS.

9.4 Offset Assessment Guide

Agrimin proposes to offset any significant residual impacts to the Great Desert Skink, resulting from the Proposal. This will occur through the Proponent Managed Offset Fund and implementation of Offset Projects and Research Projects as part of the total offset package. The area (ha) to be offset for the Great Desert Skink is summarised in **Table 9-3**. The total value of the Proposal's offset package is provided in Table 10-1 for all three MNES species. Rationale for the inputs included in the offset assessment calculator for the Great Desert Skink are summarised in **Table 9-4**. The EPBC Offset Assessment Calculation for the Great Desert Skink is provided in **Appendix B**.

Table 9-3: Offsets rates applied for the Great Desert Skink.

Environmental Value (Listing)	Amount of Area to be Offset (ha)	Habitat Type	Habitat Value Rating	Justification		
Great Desert Skink	754.20	Spinifex sandplain	Critical habitat	All three populations recorded in this habitat type. Given the sedentary nature of the species, there is no supporting habitat.		

Table 9-4 Summary of Offset Calculator inputs for Great Desert Skink

Criteria	Rationale for input
Impact site	
Area	A total of 754.2 ha of critical Great Desert Skink habitat occurs within the impact footprint.
Quality	The habitat quality rating is evaluated based on the key ecological attributes of the species:
	 Habitat requirements and variability: breeding, foraging, and/or dispersal requirements of the species. Lifecycle and population dynamics: The key life cycle stages of the species and how these impact its population viability. Species movement patterns and how the population functions across the
	 Iandscape Threatening processes contributing to the loss of the species.
	The value applied relates only to the area of habitat that the Great Desert Skink may utilise within the Development Envelope. A value of 7 was assigned for habitat quality for the following reasons:
	Site condition:
	• Vegetation condition considered Excellent, however some minor disturbance from broadscale fire and local access tracks (Stantec, 2021b).
	Site context:
	 Impact site contains critical habitat for the species (Stantec, 2021a). Feral predators are known to occur at the site and are recognised as a key threatening process for the GDS (Indigenous Desert Alliance 2023). Feral predators, particularly feral cats are already known to occur within the vicinity of the Proposal and are currently exerting pressure on populations of threatened fauna (e.g. feral cats have been observed predating on Great Desert Skinks at the Yagga Yagga population during the Great Desert Skink Targeted Survey ((Stantec, 2021c).
	Species stocking rate:
	 Detailed baseline fauna surveys recorded the following records of GDS: Yagga Yagga population (64 active burrows); and Murrawa and Lake Mackay populations now extinct. Suitable habitat occurs, however no known active burrows in the Development Envelope or Indicative Footprint despite extensive survey work.

Criteria	Rationale for input
Information source	Environmental Surveys and Management Plans
	360 Environmental (2017)360 Environmental. (2018). Lake Mackay Sulphate of Potash Project: Single Phase Level 2 Fauna Survey at Lake Mackay. Unpublished report prepared for Agrimin Limited.
	Cowan, M., Bray, R., & Paltridge, R. (2015). Kiwirrkurra Indigenous Protected Area Western Australia: Survey of Mammals and Reptiles.
	Desert Support Services. (2018). Bilby Blitz Survey on the proposed Ngururrpa Indigenous Protected Area.
	DBCA, Department of Biodiversity, Conservation and Attractions. (2020). Threatened and Priority Fauna Database (custom search).
	Meeting to provide DBCA with an update on the Project, prior to submitting the first draft of the ERD to the EPA. Key topics included the Great Desert Skink, Night Parrot, Greater Bilby and waterbirds. 8/Oct/20
	Outback Ecology. (2012). Toro Energy Ltd Theseus Project: Level 1 Flora and Vegetation Assessment.
	Paltridge, R. (2012). Kiwirrkura Threatened Species Survey 2012. Report produced for the Ngaanyatjara Council.
	Paltridge, R. (2015). Looking for animals on Ngururrpa Country. Consultancy Report prepared for Central Desert Native Title Services.
	Stantec. (2021a). Lake Mackay Potash Project: Detailed and Targeted Vertebrate Fauna Survey and Consolidation. Unpublished report prepared for Agrimin Ltd.
	Stantec. (2022). Mackay Sulphate of Potash Project Environmental Review Document. Prepared for Agrimin Ltd.
	Stantec. (2023a). Lake Mackay Construction Environmental Management Plan (CEMP). Prepared for Agrimin Ltd, Perth, Western Australia.
	Stantec. (2023b). Lake Mackay Terrestrial Fauna Environmental Management Plan (TFEMP). Prepared for Agrimin Ltd, Perth, Western Australia.
	Strategen. (2018). Lake Mackay Sulphate of Potash Project: Level 2 Vertebrate and Targeted Fauna Survey. Unpublished report prepared for Agrimin Ltd.
	Strategen Environmental. (2018). Lake Mackay Sulphate of Potash Project: Level 2 Vertebrate and Targeted Fauna Survey. Unpublished report prepared for Agrimin Ltd.
	Stantec. (2021 c). Mackay Sulphate of Potash Project: Great Desert Skink Targeted Survey Memorandum.
	Scientific articles and species recovery plans
	Cadenhead, N. C. R., Kearney, M. R., Moore, D., McAlpin, S., & Wintle, B. A. (2016). Climate and Fire Scenario Uncertainty Dominate the Evaluation of Options for Conserving the Great Desert Skink: Resolving uncertainty in fire management. Conservation Letters, 9, , 181–190. <u>https://doi.org/10.1111/conl.12202</u>
	DAWE, Department of Agriculture, Water and the Environment. (2020). Species Profile and Threats Database: Liopholis kintorei
	bin/sprat/public/publicspecies.pl?taxon_id=83160
	DBCA, Department of Biodiversity, Conservation and Attractions. (2020). Threatened and Priority Fauna Database (custom search).
	Dennison, S. (2015). Social organisation and population genetics of the threatened great desert skink, Liopholis kintorei. Macquarie University,]. https://figshare.mq.edu.au/articles/thesis/Social organisation and population genetics of the threatened great desert skink Liopholis kintorei/19440560/1
	Dennison, S., McAlpin, S., Chapple, D. G., & Stow, A. J. (2015). Genetic divergence among regions containing the vulnerable Great Desert Skink (Liopholis kintorei) in the Australian arid zone. PLoS One, 10(6). https://doi.org/doi:10.1371/journal.pone.0128874

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Criteria	Rationale for input					
Sinona	DENR, Department of Environment and Natural Resources. (2018). Buffel Grass Management Guide for Central Australia.					
	DEWHA, Department of the Environment, Water, Heritage and the Arts. (2008). Threat abatement plan for predation by the European Red Fox. C. o. Australia.					
	DoE, Department of the Environment. (2013). Threat Abatement Plan for Predation by the European Red Fox (2008): Five Yearly Review.					
	DEWHA, Department of Environment Water Heritage and the Arts. (2008b). Threat abatement plan for predation by Feral Cats. Canberra, Australian Capital Ferritory.					
	DoE, Department of the Environment. (2015). Threat Abatement Plan for Predation by Feral Cats.					
	Indigenous Desert Alliance. (2023). Looking after Tjakura, Tjalapa, Mulyamiji, Warrarna. A National Recovery Plan for the Great Desert Skink (Liopholis kintorei). Canberra					
	McAlpin, S. (2001). A Recovery Plan for the Great Desert Skink (Egernia kintorei) 2001-2011. Arid Lands Environment Centre.					
	Moore, D., Kearney, M., Paltridge, R., McAlpin, S., & Stow, A. (2015). Is Fire a Threatening Process for Liopholis Kintorei, a Nationally Listed Threatened Skink? Wildlife Research, 42(3), 10.					
	Pavey, C. (2006). Great Desert Skink (Tjakura): Egernia kintorei (Threatened Species of the Northern Territory Fact Sheet, compiled for the Northern Territory Government Department of Natural Resources, Environment and the Arts).					
	TSSC, Threatened Species Scientific Committee. (2016b). Conservation Advice - Liopholis kintorei Great Desert Skink.					
Offset site						
Time over which loss is averted	A value of 20 years has been nominated.					
Start area (ha)	Start Area is 1070 ha.					
	The actual area covered for on ground threat abatement management actions (Appendix A.2) proposed for the Great Desert Skink in the Offset Management Area is likely to be higher.					
Risk of loss without offset	A value of 0% has been nominated based on The University of Queensland (2017) Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act.					
	There are a number of factors that influence the risk of loss of a site outlined in the The University of Queensland (2017) report, including:					
	 presence and strength of formal protection mechanisms currently in place on the proposed site (e.g. zoning, restrictive covenants or state vegetation clearing laws); and presence of pending development applications, mining leases or other 					
	activities on the proposed offset site that indicate development intent and likelihood; and average risk of loss for similar sites.					
	The Offset Management Area consists of three IPAs and is therefore considered a conservation reserve. This however does not preclude the proposed offset site from being subject to future development.					
Risk of loss with offset	A value of 0% has been nominated as the offset site is to be within IPAs managed by Traditional owners and is considered a conservation reserve.					
	The offset site contains an EPBC Act listed threatened species. Any allowable development (i.e. that not prevented by the protection mechanism, such as mineral exploration or extraction) would trigger an offset requirement and therefore the risk of any future loss is neutralised.					
Confidence in result (top row)	80%					
Time until ecological benefit	5 vears					

Criteria	Rationale for input
Start quality	A start quality of 7 is applied assuming that habitat at regional locations will be similar quality to known populations of GDS.
	The actual locations of Offset Sites for the GDS have not been defined at this time of completing this Offset Plan (prior to assessment of the Proposal).
	If additional populations of Great Desert Skink cannot be located as part of the regional survey, options will be investigated with Traditional Owner groups for other known sites within the Offsets Management Area to be adopted as Offsets Sites under this Offset Plan.
Future quality without offset	A value of 3 has been assigned for the future quality without the offset. It is expected that the quality of the offset site will decrease if no regional feral predator control is undertaken. Additionally, there is a risk of regional hot fire without ongoing management. During baseline surveys it was observed that broadscale fires had degraded habitat in the surrounding region (Stantec, 2021a).
Future quality with offset	A value of 8 is assigned as it is expected that the quality of the site will increase due to ongoing feral predator and fire management under this Strategy.
Confidence in result (bottom row)	80%
% of impact offset	 96.7% EPBC Offset Assessment Calculation for the GDS is provided in Appendix B.

10. Total Offset Package and Justification

The total offset package for the Proposal is based on the potential loss of critical and supporting habitat for the Night Parrot, Greater Bilby and Great Desert Skink. Comparable rates and the financial summary of offsets applied for the Proposal are presented in **Table 10-1**, which satisfy regulatory requirements, and are summarised as follows, equating to greater than 100% of offsets met by the Proposal:

The Total value of the Proposed Offset Package for the Proposal is \$5,534,855.

The application of this funding split between on ground management (Offset Projects) and Research Projects is proposed as follows:

- Greater than 90% offset achieved (Offset Projects) for Great Desert Skink (totalling approximately \$2,200,000) for on-ground threat abatement actions; and
- 10% for Research Projects for Great Desert Skink (approximately \$290,000).
- Greater than 90% offset achieved for on ground management (Offset Projects) for Greater Bilby (approximately \$1,590,000) for on-ground threat abatement actions; and
- 10% allocation for Research Projects for Greater Bilby (approximately \$225,000).
- Greater than 90% offset achieved through the delivery of on ground management actions (Offset Projects) for the Night Parrot; (approximately \$785,000); and
- An additional allocation for Research Projects to address key knowledge gaps in the region for the Night Parrot (approximately \$440,000).

This funding allocation approach will increase the understanding and scientific knowledge base of the Night Parrot, with improved conservation and management outcomes for a net benefit to the species. Funding from offsets for Offset Projects and Research Projects for the Proposal, will also result in a net benefit to the Greater Bilby and Great Desert Skink, and other environmental values (including additional significant fauna species present within the region, listed under the State and Commonwealth).

The exact location of infrastructure within the impact footprint from the Proposal has not yet been finalised, however, these are the predicted clearing areas within each habitat. Therefore, the areas requiring offsets in **Table 10-1** are considered estimates only. The actual quantum of impact and offsets required will be determined through the Impact Reconciliation Procedure (IRP) in accordance with EPA requirements (**Section 18**). A portion of the offset will be paid as a lump sum payment (determined on a case-by-case basis), payable prior to ground disturbing activities. This amount will be subtracted from the total offset payable for the Proposal.

Table 10-1: Summary of the Proposal's total offset package for the Night Parrot, Greater Bilby and Great Desert Skink.

Environmental	Amount of Area to be Offset (ha)	Habitat Type	Habitat Value Rating	Justification
Value (Listing)				
Great Desert Skink	754.20	Spinifex sandplain*	Critical habitat	All three Great Desert Skink populations recorded in this habitat type.
			TOTAL: Great De	sert Skink (Offset Calculator amount: \$2,432,825)(Apper
Bilby	248.12	Gravel spinifex plain	Critical habitat	92 locations recorded in this habitat typ
Bilby	754.20	Spinifex sandplain*	Critical habitat	33 locations recorded in this habitat typ
Bilby	42.22	Claypan and claypan mosaics*	Critical habitat	3 locations recorded in this habitat type
Bilby	281.82	Dune-field	Critical habitat	1 location recorded in this habitat type
Bilby	19.27	Dune	Critical habitat	1 location recorded in this habitat type
			TO	TAL: Bilby (Offset Calculator amount: \$1,735,674)(Apper
				b
Night Parrot	42.22	Claypans and claypan mosaic habitat*	Critical habitat	Baseline survey records within this habite
Night Parrot	3.44	Saline flats and depressions	Critical habitat	Based on regional records (Murphy et a
Night Parrot	22.36 *no indirect impacts	Lake margin complex	Critical habitat	No records from the baseline survey, ho identified in the literature as potential supporting habitat (DPgW, 2017b)
Night Parrot	0.55 *no indirect impacts	Drainage line	Supporting habitat	No records from the baseline survey, ho identified in the literature as potential supporting habitat (DPaW, 2017b)
			TOTAL: N	Night Parrot (Offset Calculator amount: \$785,000)(Apper
Iotal Proposed Offset Packag	ge			

*Cost provisioned to deliver proposed Offset and Research Projects for the species under this Strategy: GDS are sedentary and allocation of offset funding includes a targeted approach to feral predator control using felixers (higher cost) as opposed to the Bilby which includes baiting to cover a wider area (more cost effective) because they are mobile within the landscape

^ Additional funding has been provisioned to ensure delivery of other compensatory programs (research projects).

	Total Offset Summary Amount (Excl. GST)
ndix B.3)	\$2,493,385*
	On ground threat abatement (offset projects): \$2,200,000 (Table 9-1) Additional indirect offsets (offset research): \$290,000 approx.^ (Table 9-2)
be	
be	
)	
ndix B.2)	\$1,815,688*^
	On ground threat abatement (offset projects): \$1,590,000 (Table 8-1) Additional indirect offsets (offset research): \$225,000 approx ^ (Table 8-2)
at type	
ıl., 2017)	
wever	
wever	
ndix B.1)	\$1 225 782*A
	On ground threat abatement (offset projects): \$785,000 (Table 7-3) Additional indirect offsets (offset research): \$440,000 approx.^ (Table 7-4)
	\$5,534,855

11. Offset Monitoring

Monitoring will be undertaken to monitor the effectiveness of on-ground management (Offset Projects) and Research Projects (where applicable) under the Offset Strategy.

This monitoring is in addition to operational monitoring programs which monitor the effectiveness of management actions in the TFEMP and NPMP, as follows:

- Monitoring and management actions to assess potential impacts to MNES fauna (Greater Bilby and Great Desert Skink), as a result of the Proposal are outlined in the TFEMP and associated Monitoring Programs.
- Monitoring and management actions to assess potential impacts to the Night Parrot, as a result of the Proposal, are outlined in the NPMP and associated Monitoring Program.

Monitoring plans and methods for monitoring the effectiveness of Offset Projects and Research Projects will be submitted within individual Offset Plans and Research Plans to DCCEEW and EPA (as required), for approval prior to implementation. Monitoring is included in the detailed Offset Project Plans and Research Project Plans presented in Appendix A. Monitoring to evaluate the effectiveness of these projects may include:

- Regional Feral animal monitoring to assess control programs and achieve positive conservation outcomes for the Night Parrot, Greater Bilby and Great Desert Skink.
- Monitoring of fire regimes to determine Night Parrot, Greater Bilby and Great Desert Skink population trends over time and in relation to fire management programs; and
- Regional monitoring of Night Parrot, Greater Bilby and Great Desert Skink population trends over time to measure the success of the implementation of the Offset Strategy.

Monitoring results will also likely inform adaptive management following the implementation of on-ground recovery actions (Offset Projects). This will ensure that the Proposal will result in a net benefit can be recognised for MNES species and improve environmental values.

12. Risk Management

Potential risks to the implementation of the Offset Strategy include the following:

- Environmental risks.
- Administrative risks.
- Financial risks; and
- Governance risks.

The identification and control of environmental risks is undertaken in accordance with management standards, which align with the Australian & New Zealand Standard AS/NZS 31000:2018 Risk Management - Principles and Guidelines (Standards Australia, 2018). A summary of this risk management framework (**Table 12-1**) and potential risks identified for the successful implementation of the Offset Strategy and the proposed mitigation measures to manage these risks is provided in **Table 12-2**.

Likely	Moderate	High	Extreme	Extreme			
Possible	Moderate	High	High	Extreme			
Unlikely	Low	Moderate	High	High			
Rare	Low	Low	Moderate	Moderate			
	Insignificant	Minor	Moderate	Major			
	SEVERITY						

Table 12-1: Risk matrix framework adapted from (DWER, 2017)

Table 12-2: Risks and mitigation measures identified for the Proposal pre and post implementation of control and management measures.

Offset Strategy Component	Risk Category	Description	Likelihood (pre-controls)	Consequence (pre-controls)	Risk Rating	Risk Treatment: Controls and / or Management Measures	Likelihood (post-controls)	Consequence (post-controls)	Risk (post-controls)
Managed Fund	• Governance	Inadequate Governance of Offset Strategy	Unlikely	Moderate	High	 Risk management strategies will be included in the formalised managed fund agreements to minimise the risk of offsets failing. These strategies may include objectives, targets, monitoring thresholds, and contingencies. An Annual Offset Report will be submitted to DCCEEW and will include the following information (for the previous calendar year): Contributions to the Managed Offset Fund List of Offset Projects / Research Projects commenced, on-going, or completed (where applicable) Status of existing Offset Projects / Research Projects, including: Project schedule (commencement date, proposed end date) Funds expended on Offset Projects by Agrimin in the last year, including financial milestones. Status of project objective, and progress towards performance criteria, milestones and targets Any project risks realised and corrective actions implemented in consultation with DCCEEW and EPAS. 	Unlikely	Moderate	Moderate
Offset Strategy	 Financial Governance 	Financial provisioning insufficient to meet offsets commitments.	Rare	Moderate	Moderate	 Defails of stakeholder consultation undertaken in the last year. Mitigation: Detailed up front cost estimate provided for offsets. Annual reporting. Financial liability allocated appropriately. Agrimin will liaise with DCCEEW/ EPAS to agree upon a lump sum payment to be paid as an initial payment into the Managed Offset Fund (proponent managed fund). Determined on a case-by-case basis, payable prior to ground disturbing activities. This amount will be subtracted from the total offset payable for the Proposal. An Annual Offset Report will be submitted to DCCEEW. Contingency action: Agrimin will write to the Minister, within 10 business days of being aware or having concerns, that the offset outcomes specified for the Offsets Project(s) may not be achieved for the Night Parrot, Greater Bilby and Great Desert Skink. 	Rare	Minor	Low
Offset Project/ Research Project	• Environmental Risk	Offset Project or Research Project does not achieve their desired outcome.	Possible	Moderate	Moderate	 Mitigation: Clear Offset Project/ Research Project objectives and methods set out in the associated plan. Offset Project or Research Project to be submitted to DCCEEW for approval prior to implementation. Monitoring undertaken to evaluate the effectiveness of Offset Project within an adaptive management framework. Key milestones included to measure against the delivery of project implementation. Contingency action: Agrimin will write to the Minister, within 10 business days of being aware or identifying concerns, that the offset outcomes for projects may not be achieved for the Night Parrot, Greater Bilby and Great Desert Skink. 	Unlikely	Moderate	Moderate
Offset Project/ Research Project	Environmental RiskAdministrative	Offset Project not running according to schedule.	Possible	Moderate	Moderate	 Mitigations to ensure project completion is on time and budget, will include: Third party contractual conditions where a third party is involved with delivery of offset Project. Mid-term review with stakeholders Annual compliance reporting. 	Unlikely	Minor	Low
Offset Project/ Research Project	• Environmental	Unplanned natural events	Unlikely	Major	High	 Offset Projects will consider how environmental uncertainty in the landscape may be minimised. Implement regional approach/ landscape scale Offset Projects Implement appropriate fire management in accordance with TFEMP and in consultation with TO groups facilitating two way knowledge exchange to reduce risks of unplanned fire events relating to the project 	Rare	Major	Moderate
Offset Project/ Research Project	 Environmental Administrative Financial 	Third Party does not deliver Offset Project the required timeframe and budget	Possible	Moderate	Moderate	 Mitigations to ensure project completion is on time and budget, will include: Third party contractual conditions implemented. Third parties undertaking Offset Projects funded by Agrimin will provide regular reports to Agrimin on the Offset Project/ Research program status. Consider knowledge and experience of third-party contractor to undertake the Offset Project / Research Project. Third party staff resourcing to complete the proposed Offset Project. 	Unlikely	Minor	Low

Offset Strategy Component	Risk Category	Description	Likelihood (pre-controls)	Consequence (pre-controls)	Risk Rating	Risk Treatment: Controls and / or Management Measures	Lik elihood (post-controls)	Consequence (post-controls)	Risk (post-controls)
						 Regular meetings with third parties and Agrimin to discuss progress and project delivery milestones. 			

13. Performance Criteria, Milestones and Targets

The Offset Strategy aims to achieve meaniful conservation outcomes, resulting in a net benefit for the Night Parrot, Greater Bilby and Great Desert Skink, through the Proposals' funding of beneficial environmental management actions and monitoring. To align with this, the following performance criteria apply:

- To increase/maintain the number of Offset Projects implemented, to support long-term recovery actions for the Night Parrot, Greater Bilby and Great Desert Skink, over the duration of the Offset Strategy.
- To increase/maintain the number of Research Projects implemented, to contribute to improved knowledge and management of the Night Parrot, Greater Bilby and Great Desert Skink, over the duration of the Offset Strategy.
- Offset funding will be allocated to ensure that no more than 90% of funds are used for on-ground threat abatement actions (Offset Projects) and no more than 10% is used for Research Projects with the exception of the Night Parrot where 35% of funds will be allocated to research projects and 65% to on ground mangement activities to address knowledge gaps for the species in the region.
- Develop and build on partnerships with Traditional Owners and Ranger groups associated with the IPAs, to support projects in regional areas that contain suitable habitat for the Night Parrot, Greater Bilby and Great Desert Skink.

Each performance criterion is supported by key milestones and measurable targets, presented in **Table** 14-1.

14. Approval and Implementation of Offsets

This Offset Strategy may be further refined prior to the construction and operation phases of the Proposal. Financial contributions will be made to a Managed Offset Fund for Offset Projects and Research Projects, which will result in a net benefit and improved conservation outcomes for the Night Parrot, Greater Bilby and Great Desert Skink. This fund will be approved in writing by the Commonwealth Minister for Environment (the Minister). In order to gain approval for this purpose, Agrimin will apply to the Minister in writing, to:

- Explain the Managed Offset Fund governance (Proponent managed fund);
- Outline one or more Offset Project that the fund will be implementing (detailed examples are provided in **Appendix A**); and if
- Following implementation, a description of the conservation benefit to the Night Parrot, Greater Bilby and Great Desert Skink that will be realised as a result of funding.

Agrimin will provide financial contributions to the Managed Offset Fund only on receipt of approval from the Minister. Agrimin proposes that this financial contribution will be provided as a mutaully agreed up front sum and then additional contributions to be made on a annual basis, with payment to the Managed Offset Fund within 30 days of submission of the annual Impact Offset Reconcilliation Report (IRR). Evidence of this payment will be provided to the Minister within 30 days of payment.

Table 14-1: Performance criteria and targets for the Offset Strategy.

Perfomance Criteria	Offset Strategy Milestones	Offset Strategy Targets
To increase/maintain the number of Offset Projects implemented, to support long-term recovery actions for the Night Parrot, Greater Bilby and Great Desert Skink, over the duration of the Offset Strategy.	 Maintain existing Offset Projects or Research Projects; and/or Submit a plan for one or more new Offset Project or Research Project. 	 Monitoring and review of Offset Project sites for Night Parrot, Bilby or GDS in accordance with approved plans, resulting in no significant decline in the species. Successful implementation of approved Offset Project.
To increase/maintain the number of Research Projects implemented, to contribute to improved knowledge and management of the Night Parrot, Greater Bilby and Great Desert Skink, over the duration of the Offset Strategy.		 Monitoring and review of Research Projects in accordance with approved research plans, and successful implementation. Successful implementation of approved Research Project.
Offset funding will be allocated to ensure that no more than 90% of funds are used for on-ground threat abatement actions (Offset Projects) and no more than 10% is used for Research Projects with the exception of the Night Parrot where 35% of funds will be allocated to research projects to address knowledge gaps for the species.	 A financial commitment has been allocated based on detailed cost estimates so that the requirement for a 90% for on-ground threat abatement actions and approximately 10% for research is met. Payment of agreed up front lump sum with DCCEEW/ EPAS to be paid into the managed fund prior to implementation of the Offset Strategy. To be determined on a case-by-case basis, payable prior to ground disturbing activities. This amount will be subtracted from the total offset payable for the Proposal. 	• Offset funding reflects that there is no less than 90% of funds used for on-ground threat abatement actions and no more than 10% used for Research Projects, with the exception of the Night Parrot where 35% of the offset funds will be allocated to Research Projects and 65% to on-ground mangement Offset Projects.
Develop and build on partnerships with Traditional Owners and Ranger groups associated with the respective IPAs, to support offset projects in areas that are in addition to on ground mangement actions being undertaken by traditional owners that contain suitable habitat for the Night Parrot, Greater Bilby and Great Desert Skink.	• By Year 5 of implementation of the Offset Strategy, Agrimin has successfully developed partnerships and built capacity for Traditional Owners to implent onground recovery actions for the long term management of the Night Parrot, Bilby and GDS on IPAs in the region surrounding the Proposal Area.	 Five yearly review of the Offset Strategy demonstrates that traditional landholders have the skills (through training), funding (through the Proponent manged offset fund) and the active engaement, two way sharing of knowledge and demonstrated participation of Ranger groups to implement Offset Project(s) under this Offsets Strategy within IPAs for the recovery of the Night Parrot, Bilby and GDS, where applicable.

15. Roles and Responsibilities

The key roles and responsibilities for the implementation and reporting of the Offset Strategy are summarised in **Table 15-1**. These have been applied based on stakeholders, and include Agrimin, DCCEEW, EPA, SMEs, Traditional Owners and Ranger groups, and suitably qualified third-party consultants.

Table 15-1: Roles and responsibilities for Offset Strategy according to stakeholders.

Stakeholder	Role and Responsibility
Agrimin	 Compliance with regulatory departments approval conditions Implementation of the Offset Strategy. Provision Managed Offset Fund (following approved by the Minister). Prepare and submit Offset Project/(s) Proposals (for approval by DCCEEW). Prepare and submit Research Project/(s) Plans (for approval by DCCEEW). Consult and seek advice from Subject Matter Experts (SMEs), where required and species research priorities. Implement appropriate monitoring to monitor the success of on-ground Offset Projects and to allow for monitoring the success of adaptive management. Facilitate implementation of an approved Offset Project (which may be delivered by a third party). Preparation of annual Offset Reconciliation Reports and Offset Compliance Reporting.
DCCEEW	 Provide advice and review/ approve Offset Project and Research Project Proposals. Review and provide advice/ determination of approval for Offset Strategy. Review and provide advice/ determination for Managed Offset Fund. Determine initial lump sum payment for the managed Offset Fund.
EPA	• Review and provide advice/ determination of approval for Offset Strategy.
Subject Matter Experts (SMEs)	 Provide technical advice and support as required relevant to area of expertise.
Traditional Owners and Ranger Groups	 Provide input and feedback on the Offset Strategy. Facilitate two-way knowledge sharing through active engagement and consultation process. Provide land access requirements and engage in consultation. Participate in or deliver Offset Projects with/for Agrimin as per formal agreement to enable mutually beneficial outcomes.
Suitably Qualified Third-Party Consultant	 Implement monitoring to monitor the success of on ground Offset Projects/ Research projects (as required). Implementation of an approved Offset Project/Research Project (as required).

16. Stakeholder Consultation

Agrimin recognises the value of building positive relationships with key stakeholders and the community to successfully implement their Proposal. They are seeking to build sustainable partnerships with business partners, governments, non-government organisations, Traditional Owners and Ranger groups from representative IPAs, and other stakeholders to support mutually beneficial outcomes of the Offset Strategy.

Extensive consulation has been undertaken on the Proposal to date, with key stakeholders including (albeit not limited to) EPA, DCCEEW, DBCA, NT EPA, Traditional Owners, and SMEs. Key stakeholders for the Proposal are presented in **Table 16-1**, with relevant consultation summarised applicable to the Offset Strategy summarised in **Table 16-2**. This included meetings (virtual and in-person), workshops with SMEs to ensure mitigation, management and offsets aligned with current research and regulatory expectations, and email and phone consults. Consultation will continue as the Proposal progresses, and the scope and objectives of the Offset Strategy may be further refined with relevant government departments and stakeholders, as required.

Table 16-1: Key stakeholders for the Offset Strategy.

Stakeholder Sector	Key Stakeholders
State/ Commonwealth Government Agencies	 DCCEEW Environmental Protection Authority (EPA) Department of Water and Environmental Regulation (DWER) Department of Biodiversity, Conservation and Attractions (DBCA) Department of Planning, Lands and Heritage (DPLH) Main Roads Western Australia (MRWA) Department of Fire and Emergency Services (DFES)
Local Government Authorities	 Shire of East Pilbara Shire of Halls Creek Shire of Wyndham-East Kimberley
Native Title Representative Bodies	Central Desert Native Title ServicesKimberley Land Council
Indigenous Groups	 Tjurabalan Native Title Land Aboriginal Corporation Parna Ngururrpa Aboriginal Corporation and Ngururrpa People Tjamu Aboriginal Corporation and Kiwirrkurra People. Ranger groups
Environmental Interest Groups	 Conservation Council of Western Australia (CCWA) Night Parrot Recovery Team: Dr Allan Burbidge (Principal Research Scientist WA Department of Biodiversity, Conservation and Attractions) Water bird Conservation Group
Subject Matter Experts	 Mark Cowan: SME Great Desert Skink (DBCA) Nigel Jackett: WA Night Parrot specialist (DBCA) Martin Dziminski: Bilby SME (DBCA) Dr Rachel Paltridge: Arid zone specialist (Indigenous Desert Alliance) including Greater Bilby, Great Desert Skink and Night Parrot (Night Parrot Recovery Team) Kate Crossing: Indigenous survey coordinator (Desert Support Services)
Industry Groups	Chamber of Commerce and Industry

Table 16-2: Stakeholder consultation register for the Proposal and of relevance to offsets.

Stakeholder	Date of Consultation	Type of Consultation	Attendees	Summary of Consultation	Outcomes of Consultation	
Consultations completed from 2014 to 2016, with relevant regulatory agencies, government departments and indigenous groups are summarised as follows: - Regular meetings with representatives of the Kiwirkurra People and CDNTS to discuss country, arrangements for an exploration agreement and negotiation protocols and discussions on heritage surveys. - Meetings with the DMP (now DMIRS) to discuss environmental assessments and management plans and discuss options of applying the Mining Act to brine mineral resources. Subsequent discussions with the DSD and						
- Meeting with th - Meeting with D	ne DOW to discus PAW (now DBCA	s implications on grou) to discuss arrangeme	ndwater dependent ecosystems in relation to the ents for flora and vegetation, terrestrial fauna and	e project. I subterranean fauna surveys in relation to the project.		
DOW	14/Feb/17	Project Briefing Meeting at DOW Office	Agrimin: Tom Lyons DOW: Gary Humphreys, Josephine Searle, Lilly Magombedze, Natalie McAlpine	DOW recommends to check for Groundwater Dependent Ecosystems (GDEs) south of Lake Mackay. For riparian vegetation, Agrimin must note any drawdown impacts from activities on the lake. Agrimin must also investigate whether there are GDEs on the islands and potential impacts on the bore water supply of the Kiwirrkurra Community.	Agrimin will check for GDEs community's bore but Agrin that riparian vegetation will will monitor this.	
DPAW (now DBCA)	16/02/17	Project Briefing Meeting at DPAW Office	Agrimin : Tom Lyons DPAW: Sandra Thomas, Murray Baker, Michelle Corbellini	Agrimin should focus on conservation significant flora species. Salt lakes are ecological islands. Survey fringing vegetation and islands, restricted species, new species, range extensions, target these in surveying, with transects preferred over individual quadrats. Include impact area and outside of the footprint. Flora taxonomy to be verified by WAH and specimens to be vouchered. Investigate migratory waterbirds during flood and aquatic invertebrates. Target significant terrestrial fauna (Bilby, Great Desert Skink) and map habitat, avoiding habitat. Assess potential for subterranean fauna in relation to calcrete aquifer systems.	Future studies to incorporat hole drilling to incorporate use of existing bores as far o	
EPA	21/Feb/17	Project Briefing Meeting at EPA Office	Agrimin: Tom Lyons EPA: Chris Stanley	Ensure guidance document recommendations are incorporated into environmental assessments. Provide technical environmental reports to the EPA Technical Team for review and feedback. Ensure early consultation on project with the Commonwealth Government.	Provided technical reports review. Initiated contact with Con	
DMP	21/Mar/17	Project Briefing Meeting at DMP Office	Agrimin: Tom Lyons DMP: Brian Lloyd	General project introduction was provided. Discussion of DMP site visit to Mackay SOP Project.	Agrimin will be in contact to the visit when required.	
DMP	17/Apr/17	Project Briefing Meeting at DMP Office	Agrimin: Tom Lyons DMP: Demelza Dravnieks	Impacts to surface water hydrology from trenching (bund wall influence on surface flows) should be assessed. Use of piping constructed through bunds to direct surface flow over trenches. Strategies should be considered to allow fauna egress from trenches if required. Groundwater drawdown, including depth and extent, and impacts to flora and subterranean fauna needs to be considered. Closure planning.	Trench configuration const flow. Piping strategy succes and practical egress meas hydrological modelling req planning to be addressed	
Shire of East Pilbara	23/Mar/17	Project Briefing Meeting at Newman Shire Office	Agrimin: Tom Lyons Shire of East Pilbara: Allen Cooper, CEO, Rick Miller	Shire is interested in promoting positive impact on local communities. Pleased that the project can offer local employment opportunities, road upgrades and business development opportunities.	Agrimin to work closely with opportunities.	
DMP	4/Jul/17	Project Briefing Meeting at DMP Office	Agrimin: Tom Lyons DMP: Demelza Dravnieks	Impacts to surface water hydrology from trenching (bund wall influence on surface flows) should be assessed. Use of piping constructed through bunds to direct surface flow over trenches. Strategies should be considered to allow fauna egress from trenches if required. Groundwater drawdown, including depth and extent, and impacts to flora and subterranean fauna needs to be considered. Closure planning.	Trench configuration constr flow. Piping strategy succes and practical egress meas hydrological modelling req planning to be addressed	
DMIRS	23/Aug/17	Project Briefing Meeting at DMIRS Office	Agrimin: Tom Lyons DMIRS: Demelza Dravnieks, Phil Boglio	The Department of Mines, Industry Regulation and Safety ("DMIRS") was given a project update and discussion was held regarding the current fieldworks. Discussion of proposed pilot evaporation ponds and the approvals process.	Agrimin to provide supporting the design and management submitted and approved.	
DOW	13/Sep/17	Project Briefing Meeting at DOW Office	Agrimin: Tom Lyons DOW: Hermes Medina	Updated Section 5C and 26D Licencing to be provided for further trench and bore completion activities. Licences applied for and advertisements taken out in the West Australian and North West Telegraph	Licence application ackno	
DSS	15/Sep/17	Baseline Studies Teleconference Meeting	Agrimin: Tom Lyons DSS: Kate Crossing	IPA Ranger involvement in environmental baseline studies, particularly with respect to conservation significant flora and fauna.	Cultural leaders & IPA Rang collaboratively with Agrimi	
DBCA	11/Oct/17	Night Parrot Meeting at DBCA	Agrimin: Tom Lyons DBCA: Allan Burbidge	The DBCA advised the use of SM2 acoustic recording units is important in determining presence/absence of Night Parrots, particularly roosting and foraging locations. Camera traps less effective. Agrimin should focus survey work on proposed disturbance areas, including groundwater abstraction (borefield) area. Habitat for Night Parrots includes old, complex, spinifex ring areas close to claypans and samphire flats.	The advice from SMEs will be Agrimin to provide regular	
DSS	24/Oct/17	Baseline Studies Teleconference Meeting	Agrimin: Tom Lyons DSS: Kate Crossing	Discussed logistical requirements and targeted survey activities including scheduling for the November 2017 field survey for baseline studies.	Improved understanding of Agreed on dates for the su	
DSS	31/Oct/17	Baseline Studies Teleconference Meeting	Agrimin: Tom Lyons DSS: Kate Crossing	Coordination of field survey activities for baseline studies to be held in November 2017 at Lake Mackay involving IPA Rangers and zoology/botany consultants.	Very positive response with survey and the activities pl IPA Rangers to engage as significant species.	

Minister for State Development's office regarding this

s. Unlikely that project will impact the Kiwirrkurra min will monitor for any draw-down effects. Unlikely II be impacted by activities on the lake but Agrimin

te advice from government agencies. Future bore e calcretes on- and off-footprint. Agrimin will make as practicable for subterranean fauna assessments.

s on flora, vegetation and vertebrate fauna for

nmonwealth (DEE) regarding project briefing.

o arrange a site visit. Will be in contact to arrange

tructed to minimise interference with surface water ssful elsewhere under similar conditions. Appropriate sures to be considered for trenches. Further quired to quantify drawdown impacts. Closure as part of project's development studies.

h Shire and local communities to identify

ructed to minimise interference with surface water ssful elsewhere under similar conditions. Appropriate sures to be considered for trenches. Further quired to quantify drawdown impacts. Closure as part of project's development studies.

ing documentation with POW application to detail ent of the evaporation ponds. POW application

owledged. Licences approval expected soon.

gers enthusiastic about opportunity to work in and expert consultants.

e incorporated into future Night Parrot surveys, with updates on progress.

f involvement in the survey work and deliverables. urvey period involving IPA Rangers.

h regard to the duration of involvement with the lanned.

planned in field activities relating to conservation

Stakeholder	Date of Consultation	Type of Consultation	Attendees	Summary of Consultation	Outcomes of Consultation
DSS	10/Nov/17	Baseline Studies Teleconference Meeting	Agrimin: Tom Lyons DSS: Kate Crossing	IPA Rangers keen to be involved in environmental surveys within their conservation area, particularly regarding conservation significant species, and engage in two-way learning process with scientists from mining consulting team.	Welcome involvement of I knowledge coupled with th and species of conservation 4 IPA Rangers committed Mackay. Close collaboration betwe of survey opportunities wit involved.
DBCA	10/Nov/17	Night Parrot Meeting with DBCA Office	Agrimin: Tom Lyons DBCA: Dr Allan Burbidge	DBCA advised the use of SM2 acoustic recording units important in determining presence/absence of Night Parrots, particularly roosting and foraging locations. Camera traps less effective. Agrimin should focus survey work on proposed disturbance areas, including groundwater abstraction (borefield) area. Special interest habitat for parrots includes old, complex, spinifex ring areas close to clay pans and samphire flats (also supported through conversations with Dr Stephen Murphy, expert in Night Parrot behavioural ecology).	SM2 acoustic units to be d disturbance areas, includir Special interest habitat to b specialists such as Dr Steph incorporated into survey m relating to Night Parrot stuc Parrot work at Lake Macke
DWER	28/Nov/17	Soils Meeting at DWER Office	Agrimin: Tom Lyons DWER: Steve Appleyard	DWER indicated that disturbance of soils off lake in relation to infrastructure development may present issues related to elevated in situ uranium and thorium levels. Requires management plans and procedures in place prior to ground disturbance to prevent potential contamination issues arising.	Implementation of approp necessary to address pote uranium and thorium in soil:
DMP (now DMIRS)	9/Dec/17	Approvals Meeting at DMP Office	Agrimin: Tom Lyons DMIRS: Tony Bullen, Ivor Roberts, Neil Spence, Mike Freeman	Acknowledge the limitations associated with applying the Mining Act to brine mineral resources. Several options have been discussed internally by DMIRS. Limited progress has been made towards rectifying the issue.	Agrimin will meet with Hon I for Mines & Petroleum acc
DEE (now DCCEEW)	21/Dec/17	Pre-referral Teleconference Meeting	Agrimin: Tom Lyons DEE: Matt Whitting, Mallory Owen	DEE requires hydrogeological modelling for the project with regard to groundwater and surface water availability. Concentrations of uranium (U) and thorium (Th) in sediments/soils of the Project impact area is a concern and requires assessment. If U and Th concentrations are elevated, actions will need to meet the requirements of the EPBC Regulations, particularly Regulation 2.02. Investigate potential hydrology impacts on the Dwarf Desert Spike-rush <i>Eleocharis papillosa</i> and any other plant species similarly impacted, as well as potential impacts to fauna such as Bilby that may be dependent on these species.	Preliminary groundwater ar lake water modelling targe borefield yet to commence Agrimin to assess U and The Project related activities. Stantec will re-visit flora surv look for other similar flora sp (lowering of water table) a DEE's comments should cur detailed information beco
EPA	3/May/18	Referral Meeting at EPA	Agrimin: Tom Lyons EPA: Chris Stanley	The EPA provided feedback for the draft referral supporting document and identified areas to be addressed.	Agrimin to address each of as appropriate. Technical reports were not have facilitated an unders
Tjamu Tjamu Aboriginal Corporation	14/May/18	Draft Referral Feedback	Integrate Sustainability: Belinda Bastow (comments provided)	Clarify extent to which stakeholder engagement has taken place, eg provision of Stakeholder Register. Hydrology/Hydrogeology assessments of the Project area should be provided to address potential surface and groundwater impacts. Chemical characteristics of the salt lake surface and waste salts need to be addressed in more detail.	Agrimin will address each o as appropriate. Technical document which may hav commented on.
DEE (now DCCEEW)	9/May/18	Referral Teleconference Meeting	Agrimin: Tom Lyons DEE: Thomas Schindl	The EPA requires further information to consider whether or not the project constitutes a nuclear action in accordance with Section 22 of the EPBC Act, Regulations 2.01 – 2.03 of the EPBC Regulations 2000 and the Australian Radiation Protection and Nuclear Safety Regulations 1999. The EPA also require further information in regard to the quality and extent of impacts vegetation and habitats as well as Night Parrot survey methodology.	Agrimin to address each of as appropriate. Technical reports were not have facilitated an unders
DSS	27/Nov/18	Engagement Teleconference Meeting	Agrimin: Tom Lyons DSS: Kate Crossing	Meeting to discuss planned environmental surveys in 2019 and where there are opportunities for the Kiwirrkurra IPA Rangers to be involved (i.e. flora and fauna surveys on the islands and along the haul road), and expected dates for the surveys.	Agrimin are excited about
DSS	27/Feb/19	Flora and Fauna Teleconference Meeting	Agrimin: Tom Lyons Stantec: Paul Bolton, Crystal Heydenrych DSS: Kate Crossing, Rachel Paltridge	Phase 1: Meeting to discuss details of how TO will be involved during the upcoming fauna surveys, particularly targeted surveys work for the Bilby and Great Desert Skink amongst other spp.	Agrimin are excited to be
EPA	6/Mar/19	Aquatic and Terrestrial Ecology Meeting at EPA Office	Agrimin: Tom Lyons Stantec: Sarah Osborne, Kate Stanbury Approvals, Fiona Taukulis, Paul Bolton, Alice Bott EPA: Chris Stanley, Helena Mills , Claire Stevenson	Discussion on key topics including Haul Road corridor flora, vegetation and fauna survey, consolidation of previous survey work within the on-lake and off-lake development envelopes, SRE surveys within the Haul Road corridor and in the vicinity of the lake, aquatic ecology survey during flooding (or rewetting trials as an alternative).	Preliminary feedback provi
EPA	18/May/21	Mitigation Measures Fauna Meeting at EPA Office	Stantec: Paul Bolton, Matt Spence EPA: Clare Stevenson, Kym Abrams, Gareth Watkins	Presented avoidance measures for the Great Desert Skink – realignment of the road around the key population. Presented Night Parrot survey results. Discussed measures that will be implemented to avoid impacts to Night Parrot including daytime travel, speed limits and signage, sealing of the haul road to reduce dust.	Agrimin to provide prelimin on 26 May 2021).
Office of Minister for Regional Development, Agriculture and Food	6/Jun/19	Meeting at Dumas House	Agrimin: Tom Lyons Stantec: Sarah Osborne Policy Advisers: Craig Huxtable and Thomas Edwards, Policy Advisors	Provided an overview of the project, approvals and timelines.	Successful briefing.

IPA Rangers in survey work. Traditional ecological tracking skills used to great effect in locating habitat ion significance.

to 4-day baseline studies field programme at Lake

een mining consultants and IPA Rangers on a range th positive engagement and feedback from all

deployed as part of survey work across proposed ing proposed borefield area, and off footprint. be targeted, where present. Knowledge from other when Murphy and the local IPA Rangers to be nethodology. Interested in receiving Project updates dies. Dr Allan Burbidge to receive updates on Night cay.

priate management plans, especially off-lake, will be ential contamination risks associated with in situ ls.

Bill Johnston, Minister for Mines & Petroleum. Minister cepted a meeting.

and surface water modelling on-lake completed. Offgeting potential impacts related to proposed ce by Agrimin.

concentrations in soils and sediments impacted by

vey work to check for presence of *E. papillosa* and op which may be impacted by changed hydrology and consider related impacts to dependent fauna. Irrently be considered a guide at best in lieu of more oming available.

f the comments and amend the referral document,

t provided with the supporting document which may standing of the issues commented on.

of the comments and amend the referral document, I reports were not provided with the supporting ve facilitated an understanding of the issues

f the comments and amend the referral document,

t provided with the supporting document which may standing of the issues commented on.

the opportunity to work together on future surveys

conducting the surveys together.

ided on approaches for surveys

nary Night Parrot Memorandum to the EPA (provided

Stakeholder	Date of	Type of	Attendees	Summary of Consultation	Outcomes of Consultation
DSS	19/Sep/19	Baseline Studies Teleconference	Agrimin: Tom Lyons Stantec: Paul Bolton	Meeting to discuss details Traditional Owner involvement during fauna surveys, particularly targeted surveys work for the Bilby and Great Desert	Agrimin are excited to be
DoT	31/Oct/19	Meeting Barge Loading Meeting at DOT	Agrimin: Tom Lyons Stantec: Sarah Osborne DOT: Donna West, Kim Davis, Ron Zappara	Skink. Provided an update of the project and introduced Ian Junk of Transhipment Services Australia. Discussed the licences and leases that Agrimin will require in order to develop and operate proposed barge loading facility. DOT does not foresee any specific issues with plans, however requires a formal proposal to assess. DOT explained that KPA is expected to take over responsibility for the Wyndham Port in January 2020 (or June 2020 at the latest) and therefore any proposal must also be reviewed by KPA.	Agrimin to provide a propo which is being prepared by tabled at DOT's next meet
EPA	25/Feb/20	Project Change Meeting at EPA Office	Agrimin: Tom Lyons Stantec: Sarah Osborne EPA: Peter Tapsell	Peter Tapsell (EPA) advised that following adequate information within the flora and fauna memos there is no requirement to meet with Agrimin and Stantec. Also advised that the Section 43a and ESD can be submitted concurrently and ERD will reflect the proposed changes.	Agrimin to proceed with lo
DMIRS	2/Apr/20	Mining Regulations and Cost Teleconference Meeting	Agrimin: Tom Lyons Stantec: Sarah Osborne DMIRS: Kate Buckley	AMEC Minerals in Brine Workshop held with SOP companies, AMEC and DMIRS. Discussion of issues relating to the appropriateness of tenement rental rates, mining rehabilitation fund contributions and royalty rates for brine- hosted mineral deposits.	DMIRS to review and propo
DSS	7/Aug/20	Baseline Studies Teleconference Meeting	Agrimin: Tom Lyons Stantec: Paul Bolton DSS: Kate Crossing, Angie Reid	Meeting to plan for upcoming targeted Great Desert Skink surveys and Night Parrot surveys with Traditional Owner groups.	Successful planning session
EPA	20/Aug/20	Meeting at EPA Presentation to EPA Board	EPA Board	Agrimin provided a project presentation to the EPA Board.	The presentation was well raised.
EPA	2/Sep/20	Project Update Meeting at EPA Office	Agrimin: Tom Lyons Stantec: Sarah Osborne EPA: Liesl Rohl, Vanessa Robinson, Helena Mills, Claire Stevenson	EPA advised that stygofauna environmental assessments will be required and should be a priority given timeline issues with other projects in the State.	EPA recommended to focu water hydrology, sediment hydrological flows to maint vegetation communities.
EPA	30/Sep/20	Fauna Meeting at EPA Office	Agrimin: Tom Lyons Stantec: Sarah Osborne, Paul Bolton EPA: Liesl Rohl, Vanessa Robinson, Helena Mills, Claire Stevenson	Agrimin presented key findings of field surveys to DWER and EPA including Night Parrot and Great Desert Skink. Discussions around findings and next steps for further survey and impact assessment work for inclusion within the ERD.	Recommended that anoth species be undertaken.
DBCA	8/Oct/20	Pre-ERD Meeting at DBCA Office	Agrimin: Michael Hartley, Tom Lyons Stantec: Matt Spence, Paul Bolton, Fiona Taukulis DBCA: Charlotte Patrick, Juanita Renwick, Amy Mutton, David Chemello, Ben Corey, David Pickles, Alicia Whittington, Allan Burbidge, Bruce Greatwich, Mark Cowan	Meeting to provide DBCA with an update on the Project, prior to submitting the first draft of the ERD to the EPA. Key topics included the Great Desert Skink, Night Parrot, Greater Bilby and waterbirds.	DBCA aware of project an
DSS	12/Oct/20	Baseline Studies Teams Meeting	Agrimin: Tom Lyon Stantec: Paul Bolton DSS: Kate Crossing, Angie Reid	Summary of recent results and planning of surveys involving Traditional Owners.	Survey planned.
Night Parrot Recovery Team	20/Oct/20	Email to Night Parrot Recovery Team	Night Parrot Recovery Team: 11 members	Email providing an update of survey findings in relation to the Night Parrot.	Email sent.
DAWE (now DCCEEW)	5/Nov/20	ERD Update Teleconference	Agrimin: Tom Lyons, Mark Savich, Michael Hartley Stantec: Sarah Osborne, Peter De San Miguel, Matthew Spence, Paul Bolton DAWE: Cassandra Elliott, Dylan Stinton	Provided DAWE assessment officers a project update, including recent survey findings from Night Parrot and Great Desert Skink investigative works, including preliminary management approaches.	Successful briefing.
DAWE (now DCCEEW)	31/Mar/21	Teams Meeting	Stantec: Paul Bolton, Matthew Spence DAWE: Dylan Stinton, Cassandra Elliott	Meeting to workshop approach to addressing the Commonwealth's comments raised in the DMA consultation process. Also, to present a number of avoidance measures that are being proposed to re-align the haul road to avoid key MNES in the project area.	Agrimin will ensure advice p
DEPWS	30/Apr/21	Project Teams Meeting	Agrimin: Mark Savich, Tom Lyons, Michael Hartley Stantec: Peter de San Miguel, Fiona Taukulis, Paul Bolton, Matthew Spence DEPWS: Paul Purdon, Lisa Bradley, Kylie Fitzpatrick, Maria Wauchope	Agrimin/Stantec introduced the project and discussed the key issues that could relate to the NT side of the lake, such drawdown, which is considered negligible. Key discussion points included key mitigation strategies, hydrogeological model outcomes and relevant impact predictions.	DEPWS have an increased relating to hydrogeology.
DSS	1/Jun/21	Night Parrot Teleconference Meeting	Agrimin: Tom Lyons Stantec: Paul Bolton DSS: Kate Crossing, Angie Reid	Discussion of Night Parrot findings and information sharing session from both combined and individual survey efforts. The Rangers groups continue to express interest in working together on environmental surveys.	Agrimin are committed to i
NT EPA	1/Jun/21	Briefing Note	NT EPA Board: Formal agenda item at the meeting attended by Paul Vogel (briefing note provided)	Agrimin provided a detailed briefing note to inform the Northern Territory EPA to outline construction and operatation of the Project and potential environmental impacts and mitigation measures of relevance.	These were well received b
EPA	11/Oct/22 to 12/Oct/22	Site Visit to Lake Mackay	Agrimin: Mark Savich, Tom Lyons Stantec: Peter Tapsell, Fiona Taukulis, Paul Bolton EPA: Lee McIntosh, Jenny Pope, Troy Sinclair, Liesl Rohl, Cristina Angel	Opportunity to show EPA/DWER the project area and discuss on site potential impacts and mitigation to Flora and vegetation, waterbirds, SREs, Night Parrot, Subterranean fauna and inland waters.	EPA have an increased und environment and findings in

conducting the surveys together.

osal including the engineering design and layout y Transhipment Services Australia. Proposal will be ting with KPA.

odging \$43a change notice.

ose suitable changes.

received. No specific comments or issues were

us the attention of the ERD on changes to surface s drying, impacts to Tecticornia and maintaining tain priority Tecticornia species and supporting

her discussion with DBCA around significant fauna

nd findings to date.

provided is considered in relation to project design.

understanding of the project specific to the NT,

involving the Ranger groups in future survey work.

by the NT EPA Board.

derstanding of the nature of the project, relation to the impact assessment for key factors.

Stakeholder	Date of Consultation	Type of Consultation	Attendees	Summary of Consultation	Outcomes of Consultation
EPA	9/Nov/21	Regulatory Advice Teams Meeting	Agrimin: Tom Lyons, Michael Hartley, Mark Savich Stantec: Matthew Spence, Peter Tapsell, Fiona Taukulis, Paul Bolton EPA: Liesl Rohl, Troy Sinclair	Meeting to seek EPA guidance and advice on a number of actions raised regarding the second draft of the Lack Mackay Potash Project's ERD (as per matters raised by Liesl Rohl, Manager EIA North, letter dated 29 October 2021).	EPA provided additional c
DCCEEW, EPA	8/Mar/22	Teams Meeting	Agrimin: Tom Lyons, Michael Hartley DWER: Troy Sinclair, Liesl Rohl DCCEEW: Cassandra Elliott, Julie Kennett, Dylan Stinton Industry: Lin Cheng	Discussion on environmental offsets for the Lake Mackay Potash Project	Agrimin will consider the d
DCCEEW, EPA	17/Jan/22	Teams Meeting	Agrimin: Tom Lyons, Michael Hartley, Mark Savich Stantec: Matthew Spence, Peter Tapsell, Fiona Taukulis, Paul Bolton DCCEEW: Dylan Stinton, Laura Dennis EPA: Liesl Rohl, Troy Sinclair	Discussion on potential impacts to significant fauna and expectations on potential offset requirements	Agrimin will consider the d
DBCA	20/Apr/22	Studies Update Teams Meeting	Agrimin: Michael Hartley, Tom Lyons, Mark Savich Stantec: Fiona Taukulis, Paul Bolton DBCA: Charlotte Patrick, Murray Baker, Allan Burbidge, Harley Taylor, Brooke Halkyard, Cho Lamb, Teagan Johnson, William Oversby.	Meeting to update DBCA on the latest results on targeted surveys and proposed mitigation to be presented in the ERD. Key topics included Great Desert Skink, Night Parrot, Greater Bilby and waterbirds.	General consensus that the much better understandin informed potential impact
DCCEEW	23/Jun/22	Offsets Teams Meeting	Agrimin: Mark Savich, Tom Lyons, Michael Hartley Stantec: Fiona Taukulis, Peter Tapsell, Paul Bolton DCCEEW: Julie Kennett, Dylan Stinton	Discussion on offsets. Given lack of comparable land for acquisition, options were put forward for management offsets (feral predator control and fire management).	Agreeance that comparal could be applied provided populations of threatened
DCCEEW, EPA, DBCA	3/Jun/22	Fauna Mitigation, Management and Offsets Teams Meeting	Agrimin: Michael Hartley, Tom Lyons, Mark Savich Stantec: Paul Bolton, Fiona Taukulis, Peter Tapsell DCCEEW: Julie Kennett, Stephen Bolton, Dylan Stinton, Tim McGrath EPA: Troy Sinclair, Claire Stevenson, Tania Liaghati DBCA: Charlotte Patrick, Murray Baker, William Oversby, Allan Burbidge, Martin Dziminski	The meeting focused on potential impacts and options for mitigation and environmental offsets with a focus on Night Parrot and Greater Bilby. Discussion was also	Specific advice provided b on how offsets could best
DBCA	15/Jun/22	Fauna Mitigation, Management and Offsets Teams Meeting	Stantec: Fiona Taukulis, Paul Bolton DBCA: Charlotte Patrick, Mark Cowan, William Oversby, Harley Taylor	The meeting focused on potential impacts and options for mitigation and environmental offsets with a focus on the Great Desert Skink	Specific advice provided to on how offsets could best
DCCEEW, DWER	26/Jul/22	Teams Meeting	Stantec: Fiona Taukulis, Paul Bolton EPA: Troy Sinclair DCCEEW: Julie Kennett, Dylan Stinton, Cassandra Elliott	Meeting to discuss DBCA feedback on significant fauna species and to seek consensus on the approach for offsets with EPA and DCCEEW.	DWER and DCCEEW would on offsets approach.
EPA	19/Jan/23	Feedback and Assessment Meeting at EPA Office	Agrimin: Tom Lyons, Michael Hartley, Mark Savich Stantec: Peter Tapsell, Fiona Taukulis, Paul Bolton EPA: :Lee McIntosh, Tania Liaghati, Sandra Dowding, Capri Beck	Discussion on current stage of the Project and next steps to progress to assessment. Key regulatory concerns for the Project and advice.	Agrimin to revise manager concerns of comments rai
DSS	25/Jun/23	Night Parrot Teams Meeting	Agrimin: Michael Hartley Stantec: Fiona Taukulis, Paul Bolton DSS: Kate Crossing and Stuart Bradfield	Discussion on management plans, input from Ranger Groups, recognition of work completed on IPAs to date, permissions and discussions required for land access.	DSS to review and provide Agrimin to continue to eng groups in surveys and prov available.
EPA/DWER	30-Nov-23	Meeting	Agrimin: Debbie Morrow, Michael Hartley Stantec: Fiona Taukulis, Paul Bolton DWER: Capri Beck, Casey Webb, Gareth Watkins, Claire Stevenson	Meeting to seek clarification from EPA of their regulatory feedback to Agrimin's Response to Submissions (RTS) document (10 August 2023) received on 10 November 2023.	Agrimin will address each o
DCCEEW, DWER	1-Feb-24	Meeting (roundtable and Teams)	Agrimin: Debbie Morrow, Ingrid KenweryStantec: Fiona Taukulis, Paul Bolton, Sonja PuglisiDWER: Casey WebbDCCEEW: Chris Phillips, Carolyn Young, Cassandra Elliot	Meeting to seek clarification from DCCEEW of their regulatory feedback to Agrimin's Response to Submissions (RTS) document (10 August 2023) received on 17 October 2023.	Agrimin will address eac department SMEs and prov
DSS	15-Feb-24	Meeting	Agrimin: Debbie Morrow, Ingrid Kenwery DSS: Kate Crossing and Ranger coordinators TTAC: Julian Santamaria	Meeting to provide Desert Support Services and Tjamu Tjamu Aboriginal Corporation (TTAC) an Environmental Approvals update and introduce Agrimin CEO Debbie Morrow and consultant Ingrid Kenwery. Agrimin talked through status of work and timeframe for resubmission to EPA and DCCEEW.	Agrimin and DSS discussion plans, monitoring program

commentary on second draft and comments.

discussion points raised in relation to project offsets.

discussion points raised in relation to project offsets.

ne additional targeted surveys had contributed to a ng of the species at the site and subsequently ts and options for mitigation.

able land was not available and that management ad the objectives were to maintain or improve d fauna.

by SMEs on options to further mitigate impacts and t be used to result in net gains to this species.

by SMEs on options to further mitigate impacts and t be used to result in net gains to this species.

organise a separate meeting to provide consensus

ment plans, offset strategy and focus on key ised by EPA for next round of submissions.

e feedback on the Night Parrot Management Plan. gage with DSS to discuss land access, involve Ranger vide feedback on the Offset Strategy when

of the comments.

ch of the comments. DCCEEW will discuss with vide clarification of issues raised by Agrimin.

on approach for review of updated management s and offset plans.

DWER	20-Feb-24	Teams Meeting	Agrimin: Michael Hartley, Ingrid KenweryStantec:FionaTaukulis,MikeJorgensen,Cameron LoveDWER:CaseyWebb,CapriBeck,GaryHumphreys,MarianaDeMoraes,Rory	Meeting to provide DWER an overview of recent work by Agrimin and Stantec on H3 Hydrogeological Assessment and associated environmental impacts and mitigations arising from EPAS/DWER regulatory feedback to Agrimin's Response to Submissions document (direct and indirect impacts).	DWER clarified key points o
DSS	7-Mar-24	Teams Meeting	Agrimin: Debbie Morrow, Ingrid Kenwery Stantec: Fiona Taukulis, Paul Bolton DSS: Kate Crossing PNAC: Lucy Muir	Agrimin Offsets Strategy discussion with DSS and Parna Ngururrpa Aboriginal Corporation (PNAC).	Agrimin will send through up Parrot and Great Desert Sk discussion.
DSS	18-Mar-24	Meeting	Agrimin: Debbie Morrow, Ingrid Kenwery Stantec: Fiona Taukulis, Paul Bolton DSS: Kate Crossing, Jarrah Dale, Luke Parker TTAC: Julian Santamaria	Feedback on monitoring programs review by DSS.	DSS provided feedback to monitoring programs. Usefi monitoring methodology a surveys and programs.
DBCA	25-Mar-24	Teams Meeting	Stantec: Paul Bolton, Caitlin Roberts DBCA: Harry Moore	Meeting with SME to discuss design of the Bilby Monitoring Program and appropriate feral predator control at known Bilby populations.	SME provided advice on d appropriate feral predator into monitoring programs
EPA, DCCEEW	26-Mar-24	Meeting	Agrimin: Michael Hartley, Ingrid Kenwery Stantec: Fiona Taukulis, Paul Bolton EPA: Capri Beck, Casey Webb, Tania Liaghati, Gareth Watkins, Claire Stevenson DCCEEW: Carolyn Young	Meeting addressed progress on Revised Offset Strategy and further clarification on approach (Commonwealth vs State offsets), eg proportion of on ground management (offset projects) versus research projects for Night Parrot species to deliver net benefit. Discussion of why no offsets for WA listed species for direct and indirect impacts.	Endorsement was sought fr will be submitted for assess be developed post-appro Agrimin will refer to WA Off
DCCEEW, EPA	27-Mar-24	Teams Meeting	Agrimin: Michael Hartley, Ingrid Kenwery Stantec: Fiona Taukulis, Paul Bolton, Sonja Puglisi DCCEEW: Chris Phillips, Carolyn Young EPA: Casey Webb	Targeted discussion on Bilby buffer zone and Commonwealth offsets. Agrimin/Stantec outlined offsets allocations for each of 3 agreed MNES species, especially for Night Parrot, plus voluntary NP offset contribution.	DCCEEW supported appro submitted for assessment of developed post-approva Night Parrot offsets allocati to re-submission. Agrimin to emphasise in re- communicate that it will b

Note: Numerous personal communications (not shown) have been undertaken with SMEs throughout the process and have been cross-referenced throughout the Offset Strategy and other documentation where appropriate.

f their regulatory feedback to Agrimin.

pdated Offset Strategy and the Greater Bilby, Night kink Offset Plans when ready for review and

Agrimin and Stantec from their review of the ul feedback provided on reference site selection, nd Indigenous ranger groups' involvement in future

design of the Bilby Monitoring Program and r control methods. Stantec to incorporate this advice

om the EPA that two detailed proposed offset plans sment and the remaining proposed offset plans will oval, allowing for sufficient liaison and planning time. fsets Policy and principles in the Offsets Strategy.

ach that two detailed proposed offset plans will be and the remaining proposed offset plans will be II, allowing for sufficient liaison and planning time. ion will be considered and DCCEEW will clarify prior

-submission why direct offsets not feasible, and to be a self-managed offset fund.

17. Offset Compliance

Consideration of the WA Environmental Offsets Policy (Government of Western Australia, 2011) for the Proposal has been applied to this Offset Strategy, and is demonstrated in . Agrimin have applied the WA offset principles in addition to the EPA mitigation hierarchy, to avoid, minimise and rehabilitate, to mitigate potential impacts to MNES species from the Proposal.

The Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPC, 2012), including the Offsets Assessment Guide Calculator (DAWE, 2012), will be used where relevant, to assist the EPA in determining the quantum of offset contributions for the Proposal (as required). Agrimin has also considered the Commonwealth offset principles (DSEWPC, 2012) for the Proposal, summarised in .

18. Regulatory Reporting and Review

Compliance reporting against State and Federal regulatory conditions for offsets will be required for the Proposal. These reports will be provided to the EPA and DCCEEW, summarising progress specific to offsets over the prescribed period.

To ensure that offset contributions reconciled, Agrimin will prepare an Impact Reconciliation Report (IRR) for the EPA, which is typically prepared biannually. The IRR will document clearing undertaken for the Proposal and the contributions made to offsets. This is supported by an Impact Reconciliation Procedure (IRP), outlining the method used to calculate the area of vegetation impacted by the Proposal.

In addition, an Offset Report will also be required to be submitted to the DCCEEW annually, and will include the following information:

- Contributions made to the Managed Offset Fund;
- List of the Offset Project or Research Project commenced, on-going, or completed (as applicable);
- Status of the existing Offset Project or Research Project, including:
 - Project schedule (commencement date, proposed end date);
 - Funds expended by Agrimin in the last year, including financial milestones;
 - Status of project objective, and progress against performance criteria, milestones, and targets; and
 - Any project risks identified, and corrective actions implemented;
- Details of stakeholder consultation undertaken in the last year; and
- Reports from third parties undertaking projects to Agrimin on status.

19. Adaptive Management and Review

The Offset Strategy for the Proposal will be applied within a framework of adaptive management whereby:

- Offset Projects will be adaptive to allow for improvement and revision as knowledge and understanding of MNES species increases;
- Actions undertaken as part of approved Offset Projects may change following review and evaluation, in relation to the achievement of outcomes;
- Where applicable, knowledge gained from Research Projects will inform on-ground management actions (Offset Projects) and mitigation of impacts; and
- Offset Projects and Research Projects may be further refined in consultation with regulatory departments and stakeholders (including Indigenous Ranger groups) over time.

This Offset Strategy will be reviewed after five years and, if required, revised over the remaining term of the implementation period, in response to monitoring, survey results and key findings. Additional revision may also be required following this, aligning with an adaptive management approach.

20. Conclusions

There have been a substantial number of studies undertaken for the Proposal to understand potential impacts to key environmental factors and MNES. These studies have contributed significantly to scientific knowledge on the occurrence and ecology of threatened species. This information has in turn been used to develop appropriate avoidance and mitigation measures and management plans for MNES species. However, after applying the hierarchy of mitigation, the Proposal will still result in significant residual impacts to critical and supporting habitat for the Night Parrot, Greater Bilby and Great Desert Skink. Offsets, following the Managed Fund Model have developed and are presented in this Offset Strategy, aligning with State and Federal legislation and guidance.

Agrimin are committed to supporting the conservation of these three species to deliver meaningful conservation outcomes to achieve a net benefit in environmental values. It is acknowledged that without long-term effective management and intervention, the populations of the Night Parrot, Greater Bilby and Great Desert Skink are at risk from key threats such as clearing, feral predators and altered fire regimes. This Offset Strategy aligns with the recovery priorities for the species through the the provision for on-ground recovery actions for on ground management (Offset Projects) and Research Projects that include:

- Funding of research to increase knowledge of the Night Parrot, Bilby and GDS to better inform conservation management of the species;
- Implementing Offset Projects to manage existing key threats for the Night Parrot, Bilby and GDS comprising feral predator control and fire management; and
- Undertaking regional scale Night Parrot and Great Desert Skink surveys to address knowledge gaps; and
- Implementing monitoring for all three species to evaluate the effectiveness of on-ground recovery actions (Offset Projects) to inform adaptive management.

The implementations of Offset Projects and Research Projects for the Proposal will have the following benefits:

- Provide opportunities for direct engagement and involvent of Indigenous Ranger groups to manage land respective IPAs;
- Achieve meaningful conservation by addressing key threatening processes such as feral predation, altered fire regimes and habitat degredation;
- Increase the knowledge of the species by undertaking research to address knowledge gaps on distribution and ecology; and
- Provide an adaptive management framework to allow for improvement of monitoring, survey methods and mitigation and management actions.

The total offset package for the Proposal is as follows, equating to greater than 100% of offsets met by the Proposal with a total offset package for residual impacts (direct and indirect) from the Proposal, totalling **\$5,534,855**.

Monitoring will be undertaken to ensure Offset Projects and Research Projects (with regulatory approved plans) are implemented and to ensure that a net benefit and conservation outcomes are realised for the Night Parrot, Greater Bilby and Great Desert Skink. Performance criteria with key milestones and measurable targets will be used to track the implementation of projects, funding and partnerships associated with offsets. Regular compliance reporting to regulatory agencies will provide a summary of key findings of projects, including financial contributions, Proposal impacts and management actions and monitoring outcomes.

The Offset Strategy for the Proposal aims to provide meaningful environmental and social outcomes. It may be further refined in consultation with regulatory departments and stakeholders (including Indigenous Ranger groups), prior to the construction and operational phases of the Proposal and over the applicable term. The results of projects and monitoring implemented for the Offset Strategy will be used to for improvement, through an adaptive management approach.

21. References

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 EPBC Act No. 2018/8834 (Cth)

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Appendices

Appendix A Offset Project Plans and Offset Research Plans

A.1 Offset Research Plan(NPRP1): Mackay Sulphate of Potash Project Regional Night Parrot Survey and Species Distribution Modelling.

Night Parrot Offset Research Plan (NPRP1)

Mackay Sulphate of Potash Project Regional Night Parrot Survey and Predictive Distribution Modelling.

PREPARED FOR AGRIMIN April 2024

We design with community in mind



This document was prepared by Stantec Australia ("Stantec") for the account of Agrimin (the "Client"). The conclusions in the Report titled "Research Plan (Indirect Offsets): Mackay Sulphate of Potash Project Regional Night Parrot Survey" are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Revision Schedule

Rev No	Date	Description	Signature of Typed Name (documentation on file)			
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1.0	17/07/2023	Example Plan	S. Puglisi	P. Bolton	F. Taukulis	F. Taukulis
2.0	11/4/2023	Offset Strategy incorporating feedback from EPA (DWER) and DCCEEW.	S. Puglisi	P. Bolton	F. Taukulis I. Kenwery	F. Taukulis I. Kenwery
3.0	19/04/2024	Offset Strategy incorporating feedback from Kate Crossing of Desert Support Services on behalf of both the Kiwirrkurra and Ngururrpa Ranger programs.	C. Roberts	P. Bolton	F. Taukulis I. Kenwery	F. Taukulis I. Kenwery

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Abbreviations

Enter Abbreviation	Enter Full Name
Agrimin	Agrimin Limited
Cth	Commonwealth
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DWER	Department of Water and Environmental Regulation
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
IPA	Indigenous Protected Areas
km	kilometre
MNES	Matter of National Environmental Significance
MRWA	Main Roads Western Australia
NIDE	Northern Infrastructure Development Envelope
NP	Night Parrot
NT	Northern Territory
NT EPA	Northern Territory Environmental Protection Authority
SMEs	Subject Matter Experts
The Proposal	The Mackay Sulphate of Potash Project
The Plan	The Offset Research Plan for the Night Parrot
TO's	Traditional Owners
WA	Western Australian

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1 Background

1.1 Mackay Sulphate of Potash Project

A summary of the Mackay Sulphate of Potash Project (the Proposal), Environmental Protection and Biodiversity Act 1999 (EPBC Act) No. 2018/8384 (Cth), is provided in Table 1-1. This document comprises the Offset Research Plan (Reference Number NPRP1) which forms a research plan to be implemented under the overarching Offset Strategy for the Proposal (the Mackay Sulphate of Potash Project).

Project Aspect	Details
Proponent	Agrimin Limited (Agrimin)
Proposal	Mackay Sulphate of Potash Project (the Proposal)
Proposal Description	Develop a greenfields potash fertiliser operation approximately 490 kilometres (km) south of Halls Creek, adjacent to the Western Australian (WA) and Northern Territory (NT) borders.
Indigenous Protected	The Proposal traverses three IPAs, managed as follows:
Areas (IPAs)	 Kiwirrkurra IPA - Tjamu Tjamu Aboriginal Corporation Ngururrpa IPA - Ngururrpa Aboriginal Corporation Tjurabalan IPA - Tjurabalan Native Title Land Aboriginal Corporation
Offset Management Area	Offset Management Area is made up of three Indigenous Protection Areas (IPAs) of the Ngururrpa, Tjurabalan, and Kiwirrkurra people (Figure 1-1).
MNES relevant to this Research Plan	Night Parrot (NP), Pezoporus occidentalis (En)
Potential Proposal impacts to Night Parrot	 Potential direct impacts: Direct loss (mortality or injury) from clearing, operations or vehicle interaction; and Direct loss or habitat through clearing of vegetation. Potential indirect impacts: Habitat fragmentation Degradation of habitat and individual mortality from unplanned project-related fire. Increased predation by feral predators (feral cats and foxes). Degradation of habitat through changes in hydrology from surface water flow in proximity to critical Night Parrot habitat intersecting the haul road, increased introduced weed species, fugitive dust, increased light or noise, or contamination. Spread or introduction of Psittacine beak and feather disease to Night Parrot populations. Increased profile of Night Parrots within the region may result in an increase in opportunity for the Illegal collection of Night Parrots and/or their eggs. Potential Proposal impacts compounding the effects of climate change to Night Parrot populations who are less resilient to other threats, for example feral predators as a result.
Offset Strategy	The Mackay Sulphate of Potash will impact on MNES listed under the EPBC Act and therefore will require environmental offsets under the accredited assessment process with the Commonwealth. This Research Plan is in alignment with the Mackay Sulphate of Potash Offset Strategy Research Project (reference NPRP1).

Table 1-1: Information for the Mackay Sulphate of Potash Project (the Proposal).





Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplier in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Figure 1-1: Overview of the Development Envelopes that comprise the Proposal Area, Study Area, and Offset Management Area.



Stantec // Regional Night Parrot Survey for the Mackay Sulphate of Potash Project // EPBC Act No. 2018/8834 (Cth)

1.2 Night Parrot Ecology

1.2.1 Description

The Night Parrot is a small, green, highly cryptic parrot. They are nocturnal, primarily ground-feeding and inhabit remote arid and semi-arid Australia.

1.2.2 Distribution

The Night Parrot is one of Australia's most cryptic species:

- The Night Parrot was presumed extinct for a century, a population was rediscovered in 2013, but it remains one of Australia's most cryptic species. Its distribution and population numbers declined severely after European settlement, Night Parrots are now known only in isolated populations in south-west Queensland and northern inland WA.
- The overall population and distribution of Night Parrots is not well known. Given potential conservation concerns around publishing the locations of known Night Parrot populations, many of the records are kept confidential. At the time of the ERD being made publicly available (Stantec 2022) there were 13 sites where Night Parrots were known to occur in Western Australia (Nigel Jackett, pers comms). Since this time, information available through presentations and anecdotal sources suggests that there are now at least 21 sites where Night Parrots have been recorded in Western Australia. The most accurate representation of the likely distribution of the Night Parrot based on historical and recent records is presented in (Leseberg et al. 2021)

1.2.3 Habitat Requirements

Current draft guidance for the Night Parrot defines critical habitat for the Night Parrot as:

- Breeding and roosting habitat (Burbidge 2020; Murphy 2015; Murphy *et al.* 2017b; TSSC 2016b) consists of Old growth (often >50 years unburnt) dense hummock-forming spinifex, thickets of lignum, or dense shrubby samphire that is surrounded by firebreaks created by patches of ironstone, rocky bars, salt lakes or samphire flats.
- Foraging habitat (Burbidge 2020; Murphy 2015; Murphy *et al.* 2017b; TSSC 2016b): Paleo-drainage lines, ephemeral grasslands, herb-fields or samphire, gilgais, run-on areas, floodplains, or salt lake systems that support relatively high vegetative structure, seed productivity and floristic diversity that are within 10 km of breeding and roosting habitats. Gastrolith sources to aid food digestion.
- Water sources (Burbidge 2020; Murphy 2015; Murphy *et al.* 2017b; TSSC 2016b): Permanent/ephemeral water sources or areas of high soil moisture within close proximity or within 50 km of known breeding/roosting habitats.

Supporting habitat for the Night Parrot includes:

- Flyways (Burbidge 2020): Varying habitats from river and creek drainage systems, surrounding dune-fields, forbgrasslands on mainly ironstone gravel-covered plains, low ranges and low dissected tablelands supporting sparse shrublands, undulating stony clay plains supporting Mitchell Grass and Gidgee.
- Other foraging habitats (Hamilton et al. 2017; Horton et al. 2021; Murphy et al. 2017b; TSSC 2016b):
- Hummock grasslands (unburnt) in stony or sandplain environments. Spinifex shrublands in stony or sandy areas.
- Paleo-drainage features in a landscape mosaic with Triodia spp., Astrebla spp. and Acacia aneura (Mulga) woodland.
- Scattered trees and shrubs, mulga (*Acacia aneura*) woodlands, and in areas dominated by *Triodia longiceps*, *Scerolaena spp. Maireana spp. Ptilotus spp.* with some *Acacia cambagei*.
- Lateritic rises, limestone deposits, or deep reticulated sands.
- Treeless areas and bare gibber.

Recent known records of the Night Parrot within proximity to Lake Mackay (**Section 1.2.4**) indicate that low-lying ephemeral drainage areas (Claypans and Claypan Mosaic and Saline Flats and Depressions) containing old -growth spinifex appear to be important habitat within the region, as these areas provide protection from fire, sustaining the old-growth spinifex.

1.2.4 Night Parrot Records at Lake Mackay

Within the vicinity of the Proposal (within 150 km), Night Parrots have been recently recorded (acoustic recordings and photos) by Paruku rangers near Lake Gregory (~50 km west of the northern end of the Proposal) in 2017. The location of these recent records is documented along with an additional record from 2001 (~70 km north of the Proposal) in a recent publication of Night Parrot records and distributions (Leseberg et al., 2021). The species has also been recorded historically at two locations in the surrounding region (150 km) in 1972 and 1977, neither of which occur near the Proposal (DBCA, 2020).


Within the vicinity of the Proposal, two Night Parrot populations discovered in March 2020 are intersected by the Proposal (Populations A and B). Subsequent to the discovery of these two populations, Ngururpa rangers discovered an additional three locations within 5-15 km from the Proposal during the first half of 2021 (Populations C, D and E)(**Figure 2-1**). Since the discovery of these populations, Ngururpa rangers have undertaken extensive surveys over the last few years. At the time of completing this Research Plan, Agrimin has been informed that Ngururpa rangers have found an additional five populations, resulting in a total of 10 locations occurring within the Ngururpa Indigenous Protection Area (IPA). These five additional locations had not been provided to Agrimin at the time of writing this Research Plan and are therefore not included in this document. Additionally, in March 2023, Kiwirrkurra rangers recorded isolated Night Parrot foraging calls in the vicinity of Lake Mackay within the Kiwirrkurra IPA.

Targeted surveys of two Night Parrot populations intersected by the Proposal provided an opportunity to substantially improve the knowledge of the species and its habitat requirements within the region of the Proposal area. At each of the two populations, the species occurred in association with claypan and claypan mosaic habitat within broad drainage features which extend for more than 5 km on either side of the Northern Infrastructure Development Envelope (NIDE). Interspersed within this habitat were large, long unburnt spinifex hummocks which are known to form important roosting and nesting habitat for the species (**Figure 1-2**). The long unburnt spinifex hummocks are likely decades old and protected from fire by claypans and open patches which are common in this habitat.

These areas of long unburnt spinifex are visible in aerial imagery and are distinct from other areas of small spinifex which occur on the sandplains and are regularly subjected to broadscale fires. A preliminary review of aerial imagery identified similar habitat features were relatively common in the surrounding landscape, particularly in association with low lying drainage features, areas of claypans and the periphery of salt lakes. Based on the occurrence of similar habitat within the surrounding landscape, there exists potential for Night Parrots to also occur in these locations.



Figure 1-2: Long unburnt spinifex within clayplan mosaic habitat within Population A. Green square represents an acoustic recorder which recorded a Night Parrot call during the Night Parrot surveys for the Proposal.



1.3 Night Parrot Research Priorities

Due to its cryptic nature and a sparsity of records, there are key knowledge gaps for the Night Parrot ecology, threats, status, and landscape management for conservation. There has been incremental knowledge gains on the distribution and ecology of the Night Parrot over the last ten years since its rediscovery in October 2013.

The Conservation Advice for the Night Parrot in 2008 stated the following research opportunities will inform future regional and local priority actions for the species (TSSC, 2008):

- Design and implement a monitoring program.
- Identify key food plants and habitat requirements.
- Determine the nesting requirements; and
- Investigate the fire ecology.

Primary research activities undertaken in Queensland for the Night Parrot as part of the Threatened Species Hub National Environmental Science Program focused on the following (TSSC, 2017):

- 1. Use of GPS tags to track the movements of individual Night Parrots across the spectrum of resource availability conditions (during wet and dry periods);
- 2. Detailed analysis of habitats and diet, to understand required resources, and changes over seasons;
- 3. Widespread surveys for other populations using automatic acoustic recorders, to understand rates of occupancy, and build a potential predictive distribution model for populations; and
- 4. Continuing analysis of threats, including the impact of introduced predators, and the impact of grazing on food plants.

The current Conservation Advice for the Night Parrot (TSSC, 2016) identifies current research priorities are to continue to implement the research priorities identified within the Night Parrot Research Plan (Murphy, 2014) (**Table 1-2**).

Table 1-2: Where this Research F	Plan aligns with research	priorities for Night Parrot, d	escription and rationale (Murphy, 2014).
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Research Area	Priority	Brief description and rationale	Addressed in this Research Plan
Detection Strategies	Critical	Some information exists based on recent work. Developing and testing strategies is critical	Not addressed within this Research Plan.
C C		to locate new populations or to monitor existing populations.	Methods for detection are now well established.
Habitat preferences and use	Critical	Little existing information. Understanding what habitats are important and why underpins	Focus of this Research Plan.
		successful management and guides survey effort.	
Distribution	Critical	Limited existing information. Underpins successful management. Additional research	Focus of this Research Plan.
		depends on locating new populations.	Research Area aligns with item 3 of the research
			activities being undertaken in Queensland (TSSC, 2017).
Threatening Processes	Critical	Some existing knowledge inferred. Understanding may help define preferred habitat	Not addressed within this Research Plan.
		model. Critical for long-term conservation.	However, additional Offset Projects to be delivered
			under the Offset Strategy may provide additional
			understanding in relation to threatening processes,
			including:
			the regional feral predator control project to
			deliver benefits to the Night Parrot, greater
			Bilby and Great Desert Skink
			Regional fire management in proximity to Night
			Parrot populations.
Human and social aspects	High	Complex issue involving stakeholder attitudes and engagement, managing biosecurity	Not addressed within this Research Plan.
and communications		threats from illegal collecting and developing a communications strategy to manage	Insights possible from the Night Parrot Monitoring
strategy		interest in the project and potential visitor pressure at important sites.	program within the NPMP.
Diet and drinking	High	Little existing information about either. Detailed study would involve time budgets,	Not addressed within this Research Plan.
, i i i i i i i i i i i i i i i i i i i	U U	energetics, water balance etc. in addition to basic descriptions of resources. This level of	
		detail on diet is not likely to help locate new populations.	
Nomadism and landscape-	High	Practically no existing information about either. Detailed knowledge not likely to help	Not addressed within this Research Plan.
scale movements	U U	locate new populations, at the moment but could be important for long-term	Insights possible from the Night Parrot Monitoring
		management. Difficult question to tackle.	program within the NPMP.
Breeding biology and life	Nice to	Little existing information. Breeding biology per se not considered high priority given	Not addressed within this Research Plan.
history	know	other knowledge gaps and context. Proper study involves detailed, well replicated,	Insights possible from the Night Parrot Monitoring
		potentially invasive work (regular nest checks etc.). Data collected opportunistically about	program within the NPMP.
		basic aspects (site, season, vocalisations etc.) when possible.	
Population structure	Nice to	No existing information. Potentially some management implications. Some genetic work	Insights possible from the Night Parrot Monitoring
	know	possible now based on museum samples. Considered low priority given context.	program within the NPMP.
Captive Breeding	Nice to	No existing information. Information would underpin breed and release program and act	Not addressed within this Research Plan.
	know	as insurance against extinction. May be considered necessary once better picture of	
		distribution emerges, but not considered high priority given context.	

1.4 Aim and Objectives of this Research Plan

Based on the research priorities for the species (**Section1.3**), this Research Plan has been developed with the overarching aim of being to better understand the distribution of the Night Parrot within the Great Sandy Desert region and inform current knowledge gaps for the species through predictive distribution modelling.

The specific objectives of this Research Plan are to undertake a:

- **Desktop Study:** Conduct a desktop study to identify potential Night Parrot habitat within 50 km of the Proposal (complete);
- **Regional Survey:** Conduct a regional survey using acoustic recorders to evaluate and verify the presence of Night Parrot at locations identified during the desktop study and to describe habitats present (provisioned within this Research Plan); and
- Species distribution model (SDM): Develop a SDM for the Night Parrot which models occurrence of the species informed by the findings of the regional survey and surveys already completed for the Proposal provisioned within this Research Plan.

These objectives of this Research Plan aligns with areas identified as critical priority research areas for the Night Parrot by Murphy (2014) and align with research priorities identified by TSSC (2017) as identified within **Table 1-2**. These objectives have measurable outcomes and will result in net positive benefits to the Night Parrot.



Research Plan		Alignment with Rese	earch Priorities	Research Plan outcomes and benefits			
Ob	jectives	Research areas	Description	Mea	asurable Outcomes	Be	nefit to Night Parrot (net gain)
•	Desktop Study Regional Survey Species Distribution Model	Widespread surveys for other populations (TSSC, 2017)	• Regional surveys for other populations using automatic acoustic recorders, to understand rates of occupancy, and inform a potential predictive distribution model for populations in the region.	•	Desktop study completed to inform regional survey. Regional survey completed with the discovery of new Night Parrot populations.	•	Increased knowledge of population size and distribution. Increased knowledge of habitat requirements which may inform future management of the species. Increased knowledge of habitat
•	Desktop Study Regional Survey (new populations)	Distribution (Murphy, 2014)	 Limited existing information. Knowledge of the species distribution underpins successful management for the Night Parrot. Locating new populations informs species research. 	•	Better understanding of habitat requirements for the species based on known Night Parrot records and habitat. Development of a		requirements to predict potential occurrence of additional Night Parrot within the region, based on predictive models.
•	Regional Survey (habitat descriptions)	Habitat Preferences & use (Murphy, 2014)	 Little existing information. Understanding what habitats are important to the Night Parrot and why underpins successful management of the species and guides survey effort. 	-	model.		

Table 1-3: Research priorities for the Night Parrot addressed within this Research Plan.

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1.5 Traditional Owner Engagement

The Research Plan presents an opportunity to engage with and work alongside TO Ranger groups from the Ngurumpa Kiwirrkurra and Tjurabalan IPAs. The Regional Survey component of this Research Plan occurs entirely within the IPAs of these indigenous groups with engagement and two-way knowledge sharing being a key objective of this Night Parrot Research Plan.

During the baseline surveys for the Proposal, TO Rangers provided integral local knowledge of the area and conducted independent targeted surveys for significant fauna, including the Night Parrot. The TO Ranger Groups all have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities.

Feedback has been incorporated into this Offset Strategy based on discussions with Kate Crossing of Desert Support Services on behalf of both the Kiwirrkurra and Ngururrpa Ranger programs. Opportunities to involve TO Rangers in monitoring may include:

- Consulting on survey design;
- Assisting with site selection and access within the IPAs;
- Undertaking the Night Parrot regional survey; and
- Knowledge sharing to improve detection of the Night Parrot and increase understanding of species utilisation of the area.

Agrimin are committed to ongoing discussions with all three indigenous groups, which will involve spending time on country and engaging in two-way knowledge sharing. Through these ongoing discussions, there may be refinement in the locations of survey sites, based on any recent additions to knowledge about Night Parrot records in the area.

It is also acknowledged that survey methods may change over time, through adaptive management, in line with most recent scientific practices. Any refinements made to the Research Plan will be aligned with the requirements of the Offset Strategy. Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.

2 Overall Approach

This Research Plan includes three components: the desktop study, regional survey and a species distribution model. The desktop study (Section 2.1) has already been completed to inform the development of the regional survey component of this Research Plan. The targeted survey and species distribution model components of this Research Plan is to be funded by the offset's allocation under Revised Offset Strategy (Offset Project NPRP1). The three components of this Research Plan are described below:

- Desktop Study (Section 2.1): Detailed systematic assessment of drainage features within 50 km of the Proposal for potential Night Parrot habitat;
- **Regional Survey (Section 2.2)**: Regional survey of potential Night Parrot habitat identified from the desktop study to assess for the occurrence of additional Night Parrot populations; and
- **Species Distribution Model (SDM) (Section 2.3)**: Develop a SDM for the Night Parrot, collating all available collated for Proposal, to identify areas of the landscape with potential to support populations.

2.1 Desktop Study

Recent known records of the Night Parrot within proximity to Lake Mackay (**Section 1.2.4**) indicate that low-lying ephemeral drainage areas (Claypans and Claypan Mosaic and Saline Flats and Depressions) containing old -growth spinifex appear to be important habitat within the region, as these areas provide protection from fire, sustaining the old-growth spinifex. Based on a preliminary review of aerial imagery within the vicinity of the Proposal, drainage features were found to be relatively common in the region. At many of these locations, the drainage features are interspersed with claypans with large spinifex hummocks. Given the strong association between known Night Parrot records and these habitat features, it is reasonable to assume that these areas might also support undiscovered populations of the Night Parrot.

The desktop study involved a detailed and systematic review of aerial imagery for all drainage features within 50 km of the Proposal and their suitability to support Night Parrot. The desktop study ranked locations of potential habitat as having



high or moderate potential to support Night Parrot. The assessment was based on the site having similarities with the type locations where the species has been recorded. Predominantly, the assessment of similarity focused on the occurrence of large old growth spinifex that were protected from fire within drainage features.

Based on the results of the desktop assessment, within 50km of the Proposal, 60 locations were identified as having high potential to support Night Parrot, while an additional 21 locations were identified as having moderate potential to support Night Parrot. From the high potential sites, a total of ten survey locations have been selected to achieve adequate geographical coverage across the surrounding region and across all three IPAs intersected by the Proposal. These survey locations along with the other high potential sites are presented within **Figure 2-1**. Aerial imagery showing long unbumt spinifex at known Night Parrot populations and at the sites is presented in **Table 2-1**. Note, quality of imagery is variable, however the patterns of the large Spinifex hummocks were distinguishable during the desktop study. These areas have been provided at greater magnification in **Table 2-1** with all areas shown at the same scale.





is document has been prepared based on information provided by others as cited in the data sources. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no isponsibility for verifying the accuracy and completeness of the data.

Figure 2-1: Regional survey design showing known populations and areas of potential habitat to be targeted during the regional survey. Site codes on the figure correspond to site codes of aerial imagery presented in Table 2-1.



Stantec // Regional Night Parrot Survey for the Mackay Sulphate of Potash Project // EPBC Act No. 2018/8834 (Cth)

Table 2-1: Aerial imagery showing old growth spinifex at locations identified as having high potential to support Night Parrot. Site codes align with codes presented within Figure 2-1.



Population A (Night Parrot record shown)



Population B (Night Parrot record shown)



Population C (Ngururrpa Rangers)



Population D (Ngururrpa Rangers)



Population E (Ngururrpa Rangers)



Offset Site: OS01





Stantec // Regional Night Parrot Survey for the Mackay Sulphate of Potash Project // EPBC Act No. 2018/8834 (Cth)



Offset Site: OS06

Offset Site: OS07



Offset Site: OS08



Offset Site: OS09



Offset Site: OS10



Stantec // Regional Night Parrot Survey for the Mackay Sulphate of Potash Project // EPBC Act No. 2018/8834 (Cth)

2.2 Regional Survey

2.2.1 Survey Plan & Design

The regional survey intends to be undertaken entirely within the IPAs of the Ngururpa, Kiwirrkurra and Tjurabalan people (**Figure 2-1**). All of the survey locations are remote and although some areas are accessible by 4WD vehicle the majority of sites will only be accessible by helicopter. The regional survey will utilise acoustic units to detect Night Parrots as this is the most reliable method for recording the species (DPaW, 2017; Leseberg et al., 2022). Where time permits, additional sites (in addition to the 10 survey locations **Figure 2-1**) will be established at other high potential sites identified from the desktop study. Provision for analysis of recorders from up to 20 sites (80 recorders) has been provisioned within the cost estimate for this research offset. A survey plan for this work, which includes the site codes (**Table 2-1**, **Figure 2-1**) and the indigenous group is presented in **Table 2-2**. The exact location of the survey sites, will be determined through more detailed consultation with the Indigenous landholders and Ranger Groups, incorporating their knowledge of Night Parrot populations, site accessibility (including cultural considerations) and presence of suitable habitat.

2.2.2 Survey Methods

2.2.2.1 Acoustic Survey

Survey work will involve the deployment of four acoustic recorders at each of the locations identified in the desktop for a minimum of six nights in accordance with DPaW (2017). Acoustic units will be spaced a minimum of 800 m apart to account for the maximum detection radius of each unit (300- 400 m) (DPaW, 2017; Leseberg et al., 2022). This will prevent simultaneous detections of the same call and maximise coverage at a site. Acoustic units will be programmed to begin recording 20 minutes after sunset and to finish 20 minutes before sunrise each night to avoid recording large numbers of non-target species during dawn and dusk chorus. This also allows for the capture of calls associated with breeding and foraging birds, which may occur throughout the night and closer to sunset and sunrise (DPaW, 2017). Ideally, the timing of the survey will occur in the few months following significant rainfall events as this is when the species is more likely to be detected (DPaW, 2017). A summary of the survey design and intensity is as follows:

- **Survey design**: Establishment of 10-20 survey sites (informed by the desktop study)
- Site intensity: Deployment of 4 recording units/site for a minimum of 6 nights (DPaW, 2017) equating to 24 recording nights/site;
- Survey intensity: Total of 240-480 recording nights for the survey.

2.2.2.2 Habitat Assessments

In addition to the deployment of recorders, habitat assessments will be undertaken at each survey site to better understand the habitat requirements of the species. Breeding and roosting habitat (Burbidge 2020; Murphy 2015; Murphy et al. 2017b; TSSC 2016b) consists of old growth (often >50 years unburnt) dense hummock-forming spinifex, thickets of lignum, or dense shrubby samphire that is surrounded by firebreaks created by patches of ironstone, rocky bars, salt lakes or samphire flats. Habitat assessments will help to better refine the habitat requirements of the species within the Offset Management Area, with the following parameters recorded at each survey site:

- Landscape and geological (substrata) features;
- Vegetation cover, condition and species composition;
- The presence or absence of woody debris, leaf litter, hollows, outcropping or other habitat structures;
- Ground cover and composition;
- Hydrological features, such as the presence or absence of drainage line and surface water;
- Types of disturbance and levels of disturbance; and
- Any significant microhabitat features, such as water sources.



Figure 2-2: Acoustic recorder in old growth spinifex habitat at one of the Night Parrot populations.



Night Parrot: Regior	al Survey (Deployme	ent)						Regio	nal S	urvey (Colle	ction)
Survey Day		1	2	3	4	5	6	7		8	9
Sites	Indigenous Group										
OS01	Kiwirrkurra people	deploy	1	2	3	4	5	6 (coll	ect)		
OS02		deploy	1	2	3	4	5	6 (coll	ect)		
OS10		deploy	1	2	3	4	5	6 (coll	ect)		
Additional sites*			deploy	1	2	3	4	6 (coll	ect)		
OS03	Ngururrpa people			deploy	1	2	3		5	6 (collect)	
OS04				deploy	1	2	3		5	6 (collect)	
OS05				deploy	1	2	3		5	6 (collect)	
Additional sites*					deploy	1	2		4	6 (collect)	
OS06	Tjurabalan people					deploy	1		4	5	6 (collect)
OS07						deploy	1		4	5	6 (collect)
OS08						deploy	1		4	5	6 (collect)
OS09						deploy	1		4	5	6 (collect)
Additional sites*							deploy		4	5	6 (collect)
*Provision has been	made for the establis										

Table 2-2: Night Parrot Regional Survey Plan: Site codes align with those presented within Table 2-1 and Figure 2-1.

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2.2.3 Logistical Considerations

2.2.3.1 Survey Design

Several logistical factors were taken into consideration for the design and safe implementation of the Night Parrot regional survey:

- The Proposal is located in a remote area of Western Australia and mobilisation to site from Perth currently takes a minimum of 1.5 days. TO Rangers are located in communities near to the proposed locations.
- The Offset Management Area is large totalling almost 10 million hectares and comprises the IPAs of the Ngurumpa (2,963,799 ha), Kiwirrkurra (4,276,341 ha) and Tjurabalan (2,584,199 ha) people.
- Proposed Night Parrot survey sites are located within 50 km of the Development Envelop for the Proposal. Predominantly, the only land based access through this area is the Balgo Track, a rugged 4WD track, which takes up to 1.5 days to drive in entirety. There are currently no communities, accommodation, or amenities (e.g., water and fuel) located along the track. Management of safety and fatigue is imperative for field survey personnel undertaking the regional survey. Helicopter access is likely to require the arrangement of remote fuel drops/refill points.
- Consultation has been undertaken with TO Ranger groups during the development of this monitoring program. Monitoring is intended to be undertaken with involvement of TO Ranger groups.
- Additionally, a search of the Registered Aboriginal heritage listed on WA's Department of Planning, Lands and Heritage Aboriginal sites register will be completed to identify the occurrence of known sites within the Offset Management Area. The location of these sites will be considered when refining the survey design in consultation with Traditional Owners.

2.2.3.2 Land Access

Additional considerations for undertaking the survey include the following land access requirements.

- Land tenure:
 - Indigenous Protection Areas (IPAs): The proposed survey sites occur within the three IPAs of the Tjurabalan, Ngururrpa and Kiwirrkurra people. Agrimin is continuing discussions with all three groups as part of their commitment to long term stakeholder engagement.
 - Pastoral Stations: Two pastoral stations overlap the Offset Management Area: Lake Gregory Station and Billiluna Station. Both of these coincide with proposed survey sites (including high and moderate potential sites) for the regional survey.
 - Minerals tenements: The Offset Management Area is intersected by tenements held by 41 resource companies. A total of nine of these companies hold tenements that coincide with proposed survey sites (including high and moderate potential sites) for the regional survey (Table 2-3).
- Heritage sites: A search of the Registered Aboriginal heritage sites listed on WA's Department of Planning, Lands and Heritage Aboriginal sites register will be completed. This will identify the potential occurrence of known heritage sites within the Offset Management Area which may require additional approvals under the WA Aboriginal Heritage Act 1972. There is also likely to be additional unregistered heritage sites within the Offsets Management Area and additional surveys may be required. The location of any known sites (registered or unregistered) will be taken into considered when refining the survey design in consultation with Traditional Owners.
- Land Access: Land access permissions will require approval from traditional owner groups for the survey work to proceed on areas of the IPAs which occur outside the Native Title Agreement for the Proposal.

Land managers will be consulted prior to the survey being undertaken to determine access requirements/permissions.

Table 2-3: Companies that hold tenements that coincide with the proposed survey sites for the regional survey.

Resource company
Norwest Minerals Limited
Wa1 Resources Ltd
Lyza Mining Pty Ltd
Tali Resources Pty Ltd
Encounter Aileron Pty Ltd
Longreach No 1 Pty Ltd
Fmg Resources Pty Ltd
Amery Holdings Pty Ltd
Baracus Pty Ltd



2.2.4 Data Analysis

Analysis of the acoustic recordings will be undertaken in accordance with DPaW (2017) or with the most recent industry standards. All potential calls will be compared to a library of Western Australian Night Parrot calls. Acoustic analysis will be used to determine the number of Night Parrot calls, and types of calls. Night Parrots are known to use a variety of calls (including distinctive calls for fledglings and juveniles) (Leseberg et al., 2019). Further data analysis may include analysis of the relationship between Night Parrot records and environmental factors to further understand the ecology and management of the species.

Current industry standard proposed for the data analysis is presented as follows. Analysis to be undertaken analysis using the software Kaleidoscope Pro v5.1.8, targeting the frequency range of 1000 Hz – 4000 Hz, for which all known calls of the Night Parrot are distributed within (Jackett et al., 2017; Leseberg et al., 2019; Murphy et al., 2017). Searching for calls over a large frequency range such as this is likely to produce a high number of false-positive results due to many other bird species calling at similar frequencies. However, this is necessary to capture the potential repertoire of the Night Parrot. Potential Night Parrot calls detected during the analysis will be compared to a reference library comprising known Night Parrot calls from WA.



Figure 2-3: Spectrograms of representative croak call types detected during the analysis of the Night Parrot surveys for the Proposal (source: N. Jackett 2020).

2.3 Species Distribution Model (SDM)

Upon completion of the regional survey, the locations of Night Parrots records (along with existing record locations from the surveys for the Proposal) will be used to develop a predictive habitat model for the Night Parrot in the form of a Species Distribution Model (SDM). SDMs are a machine learning based approach that leverage on presence-only occurrence records and environmental variables (e.g., topography, hydrology, vegetation, etc) to model a species suitable habitat at scale. This will provide an improved ecological understanding for the species while maintaining robust data driven outcomes to inform conservation management.

Previously, Object-Based Image Analysis (OBIA) had been undertaken to inform the assessment of the Proposal. This approach identified areas of similar habitat to the known Night Parrot populations at Site A and Site B (**Figure 2-1**){Stantec, 2021 #8663}. The analysis used spectral reflectance attributes (red, green, blue, NIR, SWIR), along with size and shape properties from the existing records of the Night Parrot for the Proposal (58 record locations). However, the analysis was somewhat limited by locations used to inform the analysis being from the two populations at Site A and Site B. Additionally, the area of projection for the analysis was limited to being within 20 km of the Proposal.



The approach presented for the SDM for this Offset Plan will result in a higher confidence in the predictive habitat model for the species. This will be because the inputs for the model will build on additional record locations from the regional survey. It is worth noting that there is considered to be a relatively high level of confidence that additional Night Parrot locations will be recorded during the regional survey given the number of current locations in the area (in excess of 10 locations within the Ngururpa IPA), the prevalence of suitable habitat in the area (Section 2.1) and regional records at Lake Gregory by the Tjurabalan people which also occurs within the Offset Management Area. The output for the SDM will be a predictive habitat model for the Night Parrot which covers the entire Offset Management Area which comprises the IPAs of the Tjurabalan, Ngururpa and Kiwirrkurra people. Depending on the anticipated accuracy of the SDM (influenced by the availability of input data ie number of positive records from the regional survey), there is potential to apply the model more broadly across the Great Sandy Desert and Tanami Bioregions which overlap the Offset Management Area.

Potential management outcomes informed by the SDM could include a variety of applications including:

- Land Management:
 - Fire management: Prioritisation of areas for targeted fire management as part of traditional burning practices.
 - Conservation management: Preservation and avoidance of impacts to high potential habitat as well as the potential implementation of management measures to reduce threats to the species in these areas.
- Future Research:
 - Additional surveys: Identification high priority unsurveyed areas that have suitable habitat for the Night Parrot within the IPAs, but also more broadly across the Great Sandy Desert and Tanami Bioregions.
 - New Populations: Where additional surveys result in the discovery of new populations, there exists
 potential for improved knowledge of the species (habitat requirements, breeding ecology, distributional
 range, and genetics) to better inform conservation management.

It is the intent that an initial Night Parrot SDM will be derived from currently available data, and subsequently updated from post-field results from the regional survey. Consultation on modelling framework, and environmental variables, will be discussed with relevant stakeholders and experts to derive a robust modelling approach.

3 Personnel and Licensing Requirements

The Night Parrot regional survey will be undertaken by suitably qualified zoologists trained in the methods described in **Section 2.2** and/or knowledgeable and experienced Indigenous Rangers with existing skills in the methods described in **Section 2.2**. TO Ranger groups have invaluable knowledge of the local area and previous experience, expertise and skills conducting surveys and data collection for Night Parrots. The participation of TO ranger groups will provide an opportunity for meaningful engagement and contribute to two-way knowledge sharing for the species. Current licence requirements and access permissions comprise:

• DBCA Fauna taking (scientific or other purposes) licence to take or disturb native fauna and a Section 40 Authorisation, to take or disturb threatened species. These licenses will be obtained prior to commencement of monitoring.

4 Limitations and Assumptions

Potential limitations that may affect the survey include:

- Weather conditions: Weather can reduce the quality of acoustic recordings, in particular wind and rain. Equipment can be checked prior to deployment to ensure each unit operates reliably, however it is not possible to completely mitigate adverse environmental conditions.
- Detection: The Night Parrot is a cryptic species and the call radius on the detection units is limited to a maximum of 300-400m under good conditions. The species is known to be more active after periods of rainfall. Where possible, the timing of the field survey should occur after large rainfall events to increase the likelihood of detecting the species.

Assumptions for the survey include:

The survey sites identified during the desktop study occur outside the Native Title Agreements between Agrimin
and each of the three indigenous groups. Access permissions would need to be granted by the respective
indigenous group for the survey work to proceed. Through participation, these surveys could provide the
opportunity for continued knowledge building by the Ngururpa rangers and potentially lead to the discovery of
Night Parrots on the Tjurabalan and Kiwirrkurra IPAs with their respective ranger groups. Access permissions
would be subject to future discussions between Agrimin and each group.



5 Risk Management

The potential risks to the implementation of the Research project include the following:

- Environmental risks.
- Administrative risks.
- Financial risks.

The identification and control of environmental risks is undertaken in accordance with management standards, which align with the Australian & New Zealand Standard AS/NZS 31000:2018 Risk Management - Principles and Guidelines (Standards Australia, 2018). A summary of this risk management framework (**Table 5-1**) and potential risks identified for the successful implementation of the Offset Plan and the proposed mitigation measures to manage these risks is provided in **Table 5-2**.

0	Likely	Moderate	High	Extreme	Extreme
ЮОН	Possible	Moderate	High	High	Extreme
IKELI	Unlikely	Low	Moderate	High	High
	Rare	Low	Low	Moderate	Moderate
		Insignificant	Minor	Moderate	Major

SEVERITY



Table 5-2: Offset Plan Risk Assessment

Risk Category	Description	Likelihood (pre-controls)	Consequence (pre-controls)	Risk Rating	Risk Treatment: Controls and / or Management Measures	Likelihood (post-controls)	Consequence (post-controls)	Risk (post-controls)
Financial	Financial provisioning insufficient to deliver the Research Project	Unlikely	Moderate	High	 Risk management strategies will be included in the formalised proponent managed offset fund agreements to minimise the risk of offsets failing. These strategies may include objectives, targets, monitoring, thresholds, and contingencies. Agrimin will liaise with DCCEEW/ EPAS to agree upon a lump sum payment to be paid as an initial payment into the Managed Offset Fund (proponent managed fund). Determined on a case-by-case basis, payable prior to ground disturbing activities. Detailed up front cost estimate provided for offsets including all elements to complete the project (le helicopter accommodation, meals, TO engagement). Accurate costing estimates within the Revised Offset Strategy for the Proposal. Contractual agreement(s) with third party(s) undertaking the Research Project. Contingency action: Agrimin will write to the Minister, within 10 business days of being aware or having concerns, that the funding amount required to deliver the Research Plan may not be sufficient due to unforeseen circumstances. 	Rare	Minor	Low
Environmenta Risk	Research Project does not achieve set objectives	Possible	Moderate	Moderate	 Detailed Research Plan with clear objectives and methods set out in the associated plan. Research Project to be submitted to DCCEEW for approval in accordance with requirements under the Revised Offsets Strategy prior to implementation. Key milestones included in the Research plan and timelines to measure against the delivery of project implementation. Third party contractual conditions implemented. Third party undertaking Research Project funded by Agrimin will provide regular reports to Agrimin on the Research Project status. Consideration of knowledge and experience of third-party contractor to undertake the Research Project. Third party to allocate adequate staff resourcing to complete the proposed Offset Project. 	Unlikely	Moderate	Moderate



Risk Category	Description	Likelihood (pre-controls)	Consequence (pre-controls)	Risk Rating	Risk Treatment: Controls and / or Management Measures	Likelihood (post-controls)	Consequence (post-controls)	Risk (post-controls)
					 Regular meetings with third parties and Agrimin to discuss progress and project delivery milestones. Contingency action: Agrimin will write to the Minister, within 10 business days of being aware or identifying concerns, that the Research Project may not achieved set outcomes for the Night Parrot. 			
Administrative	Offset Project not running according to schedule.	Possible	Moderate	Moderate	 Mitigations to ensure project completion include: Clear and achievable timeline set to complete research Project. Key milestones set out in the Research Plan. Third party contractual conditions where a third party is involved with delivery of the Research Plan. Mid-term review with all stakeholders. 	Unlikely	Minor	Low
Environmenta	Unplanned natural events	Unlikely	Major	High	 Research Project Plan has considered how environmental uncertainty in the landscape may be minimised. Contingency plan should field work be cancelled due to unplanned natural event. 	Rare	Major	Moderate
Administrative	Land access not permitted	Possible	Major	High	 Key stakeholders for the research plan identified. Tenure considered. Contacted Land managers prior to survey regarding access requirements. Registered Aboriginal sites search completed prior to implementation of the Research Project. Ongoing consultation with Traditional Owners for IPA's Refine survey design to avoid culturally sensitive areas. 	Unlikely	Minor	Moderate



6 Stakeholder Consultation

Agrimin recognises the value of building positive relationships with key stakeholders and the community, and seeks to build sustainable partnerships with business partners, governments, non-government organisations, host communities and other stakeholders to support mutually beneficial outcomes of the Offset Strategy.

The scope and objectives of this Research Plan may be further refined in consultation with relevant government departments and stakeholders, as required.

Extensive consultation has been undertaken with key stakeholders including but not limited to, SMEs, TO groups, Department of Biodiversity, Conservation and Attractions (DBCA), Department of Water and Environmental Regulation (DWER), DCCEEW, Northern Territory EPA (NT EPA) (**Table 6-1**).

Stakeholder Consultation in relation to this Research Plan is summarised in Table 15-2 of the Offset Strategy. A key component of this Research Plan is engagement and ongoing consultation with TO's to build on their existing knowledge of the species. Further information regarding how this Research Plan will engage with TO's to manage land is outlined in Section 5 of the Offset Strategy.

Table 6-1: Key Stakeholders for the Research Plan

Stakeholder Sector	Key Stakeholders
State/ Commonwealth	• Department of Climate Change, Energy, the Environment and Water (DCCEEW);
Government Agencies	Environmental Protection Authority (EPA);
	 Department of Water and Environmental Regulation (DWER);
	 Department of Biodiversity, Conservation and Attractions (DBCA);
	 Department of Planning, Lands and Heritage (DPLH);
	Main Roads Western Australia (MRWA);
	Department of Fire and Emergency Services (DFES).
Local Government	Shire of East Pilbara;
Authorities	Shire of Halls Creek; and
	Shire of Wyndham-East Kimberley.
Native Title	Central Desert Native Title Services; and
Representative Bodies	Kimberley Land Council.
Indigenous Groups	Tjamu Tjamu Aboriginal Corporation and Kiwirrkurra People;
	 Parna Ngururrpa Aboriginal Corporation and Ngururrpa People; and
	Tjurabalan Native Title Land Aboriginal Corporation.
Environmental Interest	Night Parrot Recovery Team: Dr Allan Burbidge (Principal Research Scientist, WA
Groups	Department of Biodiversity, Conservation and Attractions)
Subject Matter Experts	Nigel Jackett (WA Night Parrot specialist); and
	Dr Allan Burbidge (DBCA and Night Parrot Recovery Team)

7 Legislative Context

The application and assessment of offset requirements for the Proposal have been undertaken with consideration of the following State and Commonwealth policies and guidelines:

- State Policies and Guidelines:
 - o WA Environmental Offsets Policy (Government of Western Australia 2011); and
 - WA Environmental Offsets Guidelines (Government of Western Australia 2014).
 - Commonwealth Policies and Guidelines:

Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPC, 2012).

This Research Project meets the requirements of Appendix A of the EPBC Act Environmental Offsets Policy (DSEWPC, 2012), as follows:

- 1. Tailored to at least a postgraduate education level; with scope to engage other educational levels.
- 2. Findings will be presented and can be peer-reviewed.
- 3. Findings will be published in an internationally recognised peer-reviewed scientific journal or be of a standard that would be acceptable for publication in such a journal (free and open access publication).

Research outputs are expected to inform future management decisions for the Night Parrot and, where possible, will be readily applicable to MNES species.



8 Timeline summary and milestones

The timeframe for this work is to be undertaken within the first two years of approval of the Proposal. Given the uncertainty on the timeframes for approval of the proposal, precise dates and milestones for the Research Plan cannot be set at this time. However, a broad approach with steps for the components summarized below (Table 8-1).

Ideally, the regional survey would be undertaken during optimal timing to detect Night Parrots (within approximately three months following significant rainfall). Significant rainfall in the region of the proposal is more likely to occur during the wet season for northern Australia (November - April) when tropical lows have potential to move inland and cross through the desert regions resulting in substantial rainfall events. Based on this seasonal pattern, the regional survey should broadly aim to be undertaken in the months of March - May.

Task	Description	Completion Date (Indicative)
Traditional Owner Engagement	• Traditional owner endorsement, involvement and participation is a key objective of this Research Plan.	6 mths prior to Survey
Land Access Permissions	The Regional Survey will require land access permissions to survey on IPAs outside the Native Title Agreement for the Proposal.	3 mths prior to Survey
Survey Plan	• Survey Plan to include a desktop assessment, a preliminary predictive habitat model, proposed survey sites and survey methods.	3 mths prior to Survey
	• Survey Plan to be discussed and refined with TO rangers based on knowledge of the species and cultural avoidance areas.	
DBCA Licences	 Regulation 27 - Fauna taking (biological assessment) licence Section 40 authorisation under the BC Act: to disturb threatened fauna. 	1 mth prior to Survey
Safety Plan	Overarching Safety Plan for all participants on the regional survey.	Two weeks prior to Survey(s)
Regional Survey (Trip 1)	Deployment of acoustic recorders in accordance with the agreed Survey Plan.	Ideally 3mths following significant rainfall.
Regional Survey (Trip 2)	• Collection of acoustic recorders in accordance with Table 2-2 . Greater than 6 nights after deployment. Ideally longer to capture more survey nights and avoid weather conditions that would limit recording quality.	Greater than 6 nights after deployment.
Acoustic recorder analysis	Analysis of acoustic recorders for Night Parrot calls.	3 mths post Trip 2
Species Distribution Model	• Development of a Night Parrot Species Distribution Model (SDM) based on the findings of the Regional Survey and previous surveys for the Proposal.	2 months post acoustic recorder analysis
Draft Survey Report	• Draft survey report on the regional survey as per this Research Plan. Draft report to be submitted to stakeholders for review, including the Traditional Owners from the Ngururrpa, Kiwirrkurra and Tjurabalan IPAs.	1 mths post completion of SDM
Final Survey Report	Final survey report after receiving feedback and addressing comments from stakeholders.	1 mth of receiving feedback from stakeholders
Publication	Summary of findings submitted to an academic journal	6 mths from finalizing Survey report

Table 8-1: Estima	ted timeframe f	or tasks associated	with the Research Plan.



9 Budget Estimate

Table 9-1: Cost estimate for the Research Proposal.

Task	Fee Estimate	Expenses
Project Management, Survey planning & logistics	20,000	-
Field Survey: Mobilisation	20,000	10,000
Field Survey: 10 days	45,000	150,000*
Acoustic recorder analysis	5,000	20,000
Species Distribution Modelling	10,000	-
Reporting and GIS	15,000	-
Publication	20,000	-
Sub-total	135,000	180,000
Total Estimate (ex GST)		315,000

*Total includes helicopter, indigenous rangers, flights, accommodation, fuel and food.

10 Reporting requirements

A standalone technical report will be submitted to Agrimin and the Indigenous landholders at the conclusion of the survey and data analysis. Publishing the findings of this work provides the opportunity to contribute to incremental knowledge gain about the habitat and ecological requirements of the species. Publications will also provide the opportunity for Traditional Owner co-authorship.

Results of the Research Plan will be collated in a technical report, which will:

- Align with Commonwealth offset policy requirements and present findings that can be peer-reviewed.
- Publish findings in an internationally recognised peer-reviewed scientific journal or be of a standard that would be acceptable for publication in such a journal.
- Provide research outputs to inform future management decisions on the Night Parrot.

The technical report will be submitted to the DCCEEW within six months of the regional survey completion. The scientific publication will be completed within one year of completion of the regional survey. Outcomes will be reported in the Annual Offset Report under the Offset Strategy.

This structure of deliverables for the Research Plan are summarized below:

- Technical Report: A regional survey report which will present:
 - Executive Summary: Summary of key findings;
 - Introduction: Relevant background information on the local environment and the objectives of the Research Plan, as well as a summary of regulatory requirements;
 - Methods: Field survey design and survey methods, supported by survey figures, and constraints and limitations;
 - o Results and Discussion: Presentation of findings from the survey:
 - Night Parrot records including locations (figures), number and types of calls; and
 - Habitat descriptions associated with records of the Night Parrot;
 - Species Distribution Model: Predictive model of Night Parrot occurrence within the IPAs that comprise the Offset Management Area.
 - Conclusions and Recommendations: Summary of the key findings and implications for ongoing research and management; and
 - References and Appendices: reference list, site photographs, raw data, specialist report, as appropriate.
- Publication: A summary of findings in an appropriate format for publication in an academic journal.

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Appendices

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A.2 Offset Project Plan (OP1): Mackay Sulphate of Potash Project Regional Feral Predator Control to Benefit the Night Parrot, GDS and Greater Bilby.

Offset Project (OP1)

Mackay Sulphate of Potash Project Regional Feral Predator Control to Benefit the Night Parrot, Great Desert Skink and Greater Bilby

PREPARED FOR AGRIMIN April 2024

We design with community in mind



This document was prepared by Stantec Australia ("Stantec") for the account of Agrimin (the "Client"). The conclusions in the Report titled "Offset Plan (Direct Offsets) Mackay Sulphate of Potash Project Offset Feral Predator Control to Benefit the Night Parrot" are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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Quality Statement

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Revision Schedule

Rev No	Date	Description	Signature of Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
1.0	17/07/2023	Example Plan	S. Puglisi	P. Bolton	F. Taukulis	F. Taukulis
2.0	11/4/2023	Offset Strategy incorporating feedback from EPA (DWER) and DCCEEW.	S. Puglisi	P. Bolton	F. Taukulis I. Kenwery	F. Taukulis I. Kenwery
3.0	19/04/2024	Offset Strategy incorporating feedback from Kate Crossing of Desert Support Services on behalf of both the Kiwirrkurra and Ngururrpa Ranger programs.	C. Roberts	P. Bolton	F. Taukulis I. Kenwery	F. Taukulis I. Kenwery

Stantec Australia Pty Ltd Ground Floor, 226 Adelaide Terrace, Perth, 6000 TEL +61 8 9222 7000 STATUS Draft | Project No 304500994



Abbreviations

Enter Abbreviati on	Enter Full Name
Agrimin	Agrimin Limited
Cth	Commonwealth
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DFES	Department of Fire and Emergency Services
DPLH	Department of Planning, Lands and Heritage
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DWER	Department of Water and Environmental Regulation
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
GDS	Great Desert Skink
IPA	Indigenous Protected Areas
km	kilometre
MNES	Matter of National Environmental Significance
MRWA	Main Roads Western Australia
NIDE	Northern Infrastructure Development Envelope
NP	Night Parrot
NT	Northern Territory
NT EPA	Northern Territory Environmental Protection Authority
SMEs	Subject Matter Experts
The Proposal	The Mackay Sulphate of Potash Project
The Plan	Offset Project (Direct Offset) Feral Predator Control to Benefit the Night Parrot, Great Desert Skink and Greater Bilby
The Project	The Offset Project (Direct Offset) Feral Predator Control to Benefit the Night Parrot, Great Desert Skink and Greater Bilby
TO's	Traditional Owners
WA	Western Australian

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1 Background

1.1 Mackay Sulphate of Potash Project

A summary of the Mackay Sulphate of Potash Project (the Proposal), Environmental Protection and Biodiversity Act 1999 (EPBC Act) No. 2018/8384 (Cth), is provided in **Table 1-1**. This document comprises the Offset Project (Reference Number OP1) which forms an Offset Plan to be implemented under the overarching Offset Strategy for the Proposal (the Mackay Sulphate of Potash Project).

Project Aspect	Details		
Proponent	Agrimin Limited (Agrimin)		
Proposal	Mackay Sulphate of Potash Project (the Proposal)		
Proposal Description	Develop a greenfields potash fertiliser operation approximately 490 kilometres (km) south of Halls Creek, adjacent to the Western Australian (WA) and Northern Territory (NT) borders.		
Indigenous Protected Areas (IPAs)	 The Proposal traverses three IPAs, managed as follows: Kiwirrkurra IPA - Tjamu Tjamu Aboriginal Corporation Ngururrpa IPA - Ngururrpa Aboriginal Corporation Tjurabalan IPA - Tjurabalan Native Title Land Aboriginal Corporation 		
Offset Management Area	Offset Management Area is made up of three Indigenous Protection Areas (IPAs) of the Ngururrpa, Tjurabalan, and Kiwirrkurra people (Figure 1-1).		
Relevant MNES	 Night Parrot (NP) <i>Pezoporus occidentalis</i> (En); Great Desert Skink (GDS) (<i>Liopholis kintorei</i>) (Vu); and Greater Bilby (GB) (<i>Macrotis lagotis</i>) (Vu). 		
Potential Proposal impacts to MNES	 Proposal related direct and indirect impacts to significant fauna (NP, GDS and GB): Potential direct impacts: Direct loss (mortality or injury) from clearing, operations or vehicle interaction; and Direct loss or habitat through clearing of vegetation. Potential indirect impacts: Habitat fragmentation. Degradation of habitat from unplanned project-related fire, changing surface hydrology, spread of weeds, or contamination. Increased predation by feral predators (feral cats and foxes). Fauna entrapment in the trench network on the lake. Increased noise and vibration, or light exposure resulting in disruption of fauna behaviour; and Increased fugitive dust emissions from clearing of native vegetation and haulage, resulting in degradation of habitats. Potential proposal impacts compounding the effects of climate change to Night Parrot, Greater Bilby/ GDS populations which are less resilient to other threats, for example feral predators as a result. Night Parrot specific indirect impacts: Spread or introduction of Psittacine beak and feather disease to Night Parrot populations. Increased profile of Night Parrots within the region may result in an increase in opportunity for the lllegal collection of Night Parrots and/or their eggs. 		
Offset Strategy	The Mackay Sulphate of Potash will impact on MNES listed under the EPBC Act and therefore will require environmental offsets under the accredited assessment process with the Commonwealth.		

Table	1-1: Information	for the Mackay	Sulphate of Potash	Project	(the Proposal)
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(This Offset Plan is in alignment with the Mackay Sulphate of Potash Offset Strategy Offset Project (reference OP1).
Alignment with Offset Strategy	 This Offset Plan aligns with the following aims in the Offset Strategy: Outlining on ground management actions with a focus on threatened fauna (Night Parrot, Great Desert Skink and Greater Bilby), to address key threats (feral predators) to these species, recovery actions and research opportunities (including Offset Projects); Detailing on-ground management measures (Offset Project) to be undertaken in alignment with conservation priorities, the conservation advice, recovery plans and threat abatement plans, to achieve a tangible improvement to significant fauna species, including Night Parrot, Great Desert Skink and Greater Bilby) within the Offset Management Area. Listed as High priority for on ground management actions under the Offset Strategy. Following implementation, the Offset Project aims to provide a net benefit to populations of significant species (Night Parrot, Great Desert Skink and Greater Bilby) through increasing their likelihood of persistence of these species within the region. Annual Monitoring to determine the success of implementation of feral predator management to deliver "Net Benefits" to NP_GDS_Bilby





Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. S in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

Figure 1-1: Overview of the Development Envelopes that comprise the Proposal Area, Study Area, and Offset Management Area.



Stantec // Offset Plan (Direct Offsets) Mackay Sulphate of Potash Project Regional Feral Predator Control to Benefit the Night Parrot // EPBC Act No. 2018/8834 (Cth)n

1.2 Threatened fauna at Lake Mackay

A total of 21 significant fauna species have been confirmed in the Study Area for the Proposal and an additional five species were considered likely to occur (the Spectacled Hare-wallaby (P3) and four waterbirds (Migratory)). These species differ in their conservation status, relative abundance and/or potential to be impacted by the Proposal. Based on the assessment of potential impacts, three threatened fauna were identified as having a significant residual impact from the Proposal, comprising:

- Night Parrot (Pezoporus occidentalis), listed as Endangered;
- Great Desert Skink (Liopholis kintorei), listed as Vulnerable; and
- Greater Bilby (Macrotis lagotis), listed as Vulnerable.

1.2.1 Night Parrot

The Night Parrot (*Pezoporus occidentalis*) is a small, green, and highly cryptic parrot. The Night Parrot is listed as Endangered under the EPBC Act 1999 and Critically Endangered under the BC Act 2016. Due to its cryptic and noctumal nature, the current distribution of the Night Parrot is poorly understood. Broad habitat requirements for the Night Parrot includes unburnt *Triodia* plains often scattered with chenopods and areas of old-growth *Triodia* for roosting and nesting (Garnett et al., 2011; Pyke & Ehrlich, 2014). Foraging habitats are likely to include various native grasses and herbs and may or may not contain shrubs or low trees (Murphy, 2015). Night parrots have been known to fly up to 40 km or more in a night during foraging expeditions, so foraging habitat is not necessarily within or adjacent to roosting areas (DPaW, 2017).

Extensive survey work has been undertaken on the occurrence of Night Parrot throughout the Study Area, to inform the assessment of the Proposal (ecologia, 2019; Stantec, 2021a, 2021b, 2021c). Within the vicinity of the Proposal, two Night Parrot populations discovered in March 2020 are intersected by the Proposal (Stantec, 2021c),. Subsequent to the discovery of these two populations, Ngururpa rangers discovered an additional three locations within 5-15 km from the Proposal during the first half of 2021. Since the discovery of these populations, Ngururpa rangers have undertaken extensive surveys over the last few years. At the time of completing this Offset Plan, Agrimin has been informed that Ngururpa rangers have found an additional five populations, resulting in a total of 10 locations occurring within the Ngururpa Indigenous Protection Area (IPA). These five additional locations had not been provided to Agrimin at the time of writing this Offset Plan and are therefore not included in this document. Additionally, in March 2023, Kiwirrkurra rangers recorded isolated Night Parrot foraging calls in the vicinity of Lake Mackay within the Kiwirrkurra IPA.

Based on current available guidance, the occurrence of Night Parrot records and known ecology, critical habitat for the species within the Study Area has been defined as the habitats described and delineated as claypan and claypan mosaic, saline flats and depression, and lake margin complex. (Stantec, 2021b, 2021d). Specifically, these habitats have been identified as important due to the presence of old growth *Triodia* (potential roost habitat) in association with ephemeral grasses and herbs (foraging habitat).

1.2.2 Great Desert Skink

The Great Desert Skink (*Liopholis kintorei*) is a large orange/brown burrowing skink that is listed as Vulnerable under the EPBC 1999 and BC Act 2016. The Great Desert Skink constructs large burrow systems to a depth of over 1 m and up to 10 m in diameter (McAlpin et al., 2011). Burrow systems can be easily identified from the surface due to presence of at least one large external latrine. Individuals are relatively sedentary, known to move up to 150m from the burrow while foraging, however may move up to 10 km to colonise new areas (DoE, 2020).

Great Desert Skinks occupy a variety of habitat types within the western deserts region (Indigenous Desert Alliance, 2023) with the species showing a preference for habitat comprising at least 50% bare ground, and inhabits areas of varying postfire regeneration age, ranging from 3–15 years (Ridley et al., 2018). The species is often associated with spinifex sandplains and swales with hummock grasses and scattered shrubs (Pavey, 2006). There is no formal definition for habitat critical for the survival of the Great Desert Skink, however in the Study Area, the primary habitat for the species is spinifex sandplain (Stantec, 2021c). The Great Desert Skink has been recorded from three areas within the Study Area within this habitat:

- Yagga Yagga population which overlaps with the NIDE: 64 active burrows recorded approximately 22 km south of Yagga Yagga. After the population was better defined through additional targeted survey work, the NIDE was realigned so that all active burrows associated with the population were avoided with a buffer of 300 m.
- Murrawa population within the NIDE: two locations recorded in 2000. Subsequent targeted survey work has established that this population is no longer present.
- Lake Mackay southern population within the Study Area but outside the Proposal area: one location 10 km south of Lake Mackay from 2018. Subsequent targeted survey work has established that this population is no longer present.



Additionally, the species has been recorded at 138 locations in the surrounding region (150 km). Almost all are in a 30 km stretch of the Kiwirrkurra road ~20 km southeast of the Kiwirrkurra community (the Kiwirrkurra population). Recently, an additional population has been discovered by TO Rangers to the north-east of Lake Mackay outside the Development Envelope for the Proposal (Kate Crossingpers. comm. 18 March 2024) hereon referred to as the Lake Mackay northem population.

1.2.3 Greater Bilby

The Greater Bilby (*Macrotis lagotis*) (Bilby) is a solitary, nocturnal marsupial with long ears. The Bilby is listed as Vulnerable under the EPBC 1999 and BC Act 2016. The Bilby shelters in deep burrows. Burrow use is relatively dynamic, with individuals maintaining several burrows at once and abandoning, re-using, or excavating new burrows continually.

Within the Study Area for the Proposal, the Bilby was recorded at 130 locations with the majority of records occurring within gravel spinifex plain (92 locations) and spinifex sandplain (33 locations) habitat (Stantec, 2021c). Additionally, the species was also recorded in the surrounding region (150 km) at 165 locations, of which 66 occur near (within 25 km) of the Study Area (DBCA, 2020).

Based on records from surveys completed within the Study Area, (Stantec, 2021c), the preferred habitat for the Bilby within the Study Area comprises gravel spinifex plain and spinifex sandplain. Gravel spinifex plain is likely to be an important foraging habitat for the species due to the presence of *Acacia hilliana*, which is a host species for root larvae known to be an important food resource for the Bilby. According to the definition of critical habitat for the Bilby within the *Recovery Plan for the Greater Bilby* (DCCEEW, 2023) and consideration of known records of the Bilby in proximity to the Study Area, the following broad fauna habitats within the Study Area are considered critical to the survival of the Bilby (totals 1,345.63 ha): Gravel spinifex plain (92 locations); Spinifex sandplain (33 locations); Claypan and claypan mosaics (3 locations); Dune field (1 location); and Dune (1 location).

1.3 Threatening Process

There are a number of threatening processes that affect each of these threated species and these have been summarised below from relevant conservation advice and recovery plans for (**Table 1-2**). This is not an exhaustive list, however it does capture the key threatening processes for each of the threatened species with residual impacts from the proposal. A comprehensive list of threatening processes for each of these species is presented within the Offset Strategy: Night Parrot (Section 6.2.1), Greater Bilby (Section 7.2.1) and Great Desert Skink (Section 8.2.1).

Key threatening processes that align across all three species include:

- Predation by feral predators.
- Altered fire regimes.
- Habitat loss/degradation/population fragmentation; and
- Climate change.

Table 1-2: Key threatening processes for each of the Threatened Species with residual impacts from the Proposal.

Key Threatening Processes	Night Parrot	Greater Bilby	Great Desert Skink
Predation by feral predators	✓	\checkmark	✓
Altered fire regimes	\checkmark	\checkmark	\checkmark
Habitat loss/ degradation/ population fragmentation	\checkmark	\checkmark	\checkmark
Feral herbivores (habitat degradation)		\checkmark	\checkmark
Introduced weeds (Buffel grass promoting fire)	\checkmark	\checkmark	
Vehicle strike		\checkmark	✓
Changes to hydrology (resulting in an increase in feral predators)		\checkmark	
Climate change	\checkmark	\checkmark	\checkmark
Loss of Traditional Owner knowledge and land management		\checkmark	
Reduction in population resilience and genetic fitness		\checkmark	
Collision with barbed wire fences	✓		
Disease (psittacine beak and feather disease)	✓		
Illegal collection	\checkmark		



1.4 Aim and Objectives

1.4.1 Offset Plan Aim

Based on the key threatening processes for the threatened species presented within **Table 1-2**, this Offset Plan aims to reduce the existing key threat of feral predation on threatened fauna through the implementation of a Offset Feral Predator Monitoring and Control Program (the Offset Project). Feral predators, particularly feral cats are already known to occur within the vicinity of the Proposal and are currently exerting pressure on populations of threatened fauna (e.g. feral cats have been observed predating on Great Desert Skinks at the Yagga Yagga population during the Great Desert Skink Targeted Survey (Stantec, 2021c)).

1.4.2 Offset Project Objectives

This Offset Project provides the opportunity to address the key threat of feral predators to these species in the region, within the proposed Offset Management Area, which comprises the Indigenous Protection Areas (IPAs) of the Ngururpa, Tjurabalan, and Kiwirrkurra people (**Figure 1-1**). The Offset Project would provide a net benefit to populations of significant species (Night Parrot, Great Desert Skink and Greater Bilby) through increasing their likelihood of persistence within the region and maintaining the area of occupancy for these species. Feral predator control aligns with current conservation priorities for these species.

This Offset Project is in addition to operational feral predator control and control programs being undertaken by Traditional Owners within the IPA's, the components covered under the Offset Project in relation to the other monitoring and control programs completed for the Proposal is presented within. The sites within the Offset Feral Predator Control Program are in addition to control sites being undertaken in the Operational Feral Predator Control Program and feral predator control already being undertaken by TO Groups within the region. However, reference sites for potential impacts of the Proposal under the TFEMP and NPMP will also function as reference sites for this Offset Project.

Sites	Feral Predator Monitoring (Section 2)	Feral Predator Control (Section 3)	Threatened Fauna Monitoring (Section 4)	Financial provision	Relevant Plan
Offset Sites	 ✓ (offset monitoring sites) 	 ✓ (offsets feral predator control sites) 	 ✓ (Offsets GDS, NP and GB monitoring sites) 	Offset Strategy	This Offset Plan (OP1)
Reference Sites	 ✓ (functions as a reference site for offset and operational feral predator monitoring). 	* (NA)	 ✓ (functions as a reference site for offset and operational GDS, NP and GB monitoring). 	Operational Budget	This Offset Plan and TFEMP / NPMP
Impact Sites	 ✓ (operations monitoring sites) 	 ✓ (Operations feral predator control sites) 	 ✓ (Operations GDS, NP and GB monitoring sites) 	Operational Budget	TFEMP / NPMP

Table 1-3: Feral Predator monitoring, control and threatened fauna monitoring as covered under.

This Offset Project will be undertaken in proximity to known significant fauna populations (Night Parrot, Great Desert Skink and Greater Bilby). The Offset Project is proposed to be completed over a 20-year timeframe to align with the estimated life of the Proposal. The Offset Feral Predator Monitoring and Control Program comprises three components that have separate but related objectives:

- The Offset Feral Predator Monitoring Program (outlined in Section 2).
- The Offset Feral Predator Control Program (outlined in Section 3); and
- The Offset Threatened Fauna Monitoring Program (outlined in Section 4).

The objectives of these three components are detailed in subsequent sections below.
1.4.2.1 Offset Feral Predator Monitoring Program

The objective of the Offset Feral Predator Monitoring Program is to inform the effectiveness of the method and intensity of the Offset Feral Predator Control Program and to inform adaptive management. To address this objective the following will be undertaken:

- Undertake baseline monitoring of feral predator numbers prior to the implementation of feral predator control.
- Undertake ongoing monitoring of feral predator numbers after the implementation of feral predator control to evaluate the effectiveness of feral predator control being implemented and inform adaptive management i.e. refinement of methods and/or intensity; and
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country.

1.4.2.2 Offset Feral Predator Control Program

The objective of the Offset Feral Predator Control Program is to reduce the existing threat of feral predators to the Night Parrot, Great Desert Skink and Greater Bilby within the Offset Management Area for the life of the Proposal. To address this objective the following will be undertaken:

- Feral Predator Control Program is to commence after the collection of two years of baseline data.
- Ongoing control of feral predators within the Offset Management Area.
- Targeted approach for feral predator control in proximity to known significant fauna (NP, GDS and GB) populations.
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country; and
- Implement feral predator control in conjunction with other Offset Projects where appropriate such as fire management.

1.4.2.3 Offset Threatened Fauna Monitoring Program

The objective of the Offset Threatened Fauna Monitoring Program is to evaluate the effectiveness of feral predator control undertaken in the Offset Feral Predator Control Program on the persistence and potential recovery of the Night Parrot, Great Desert Skink and Greater Bilby within the region in the Offset Management Area. To address this objective the following will be undertaken:

- Monitor changes in population abundance over time in comparison to abundance of feral predators.
- Monitor the movement of individuals in the landscape in response to resources, environmental factors.
- Where the Offset Feral Predator Control Program reduces the numbers of feral predators in an area, evaluate the
 effectiveness of reduced predation pressure on the persistence and potential recovery of the Night Parrot, Great
 Desert Skink and Greater Bilby within the Offset Management Area; and
- Provide opportunities for direct engagement of TO Ranger groups, allowing opportunities for knowledge sharing and connection to country.

1.5 Traditional Owner Engagement

This Offset Project presents an opportunity to engage with and work alongside TO Ranger groups from the Ngururrpa, Tjurabalan, and Kiwirrkurra IPAs, a key objective of the Offset Project. The TO Ranger Groups all have well-defined predator monitoring and management strategies, and extensive experience in a range of monitoring and control activities.

Feedback has been incorporated into this Offset Strategy based on discussions with Kate Crossing of Desert Support Services on behalf of both the Kiwirrkurra and Ngururrpa Ranger programs. Opportunities to involve TO Rangers in this Offset Project may include:

- Consulting on monitoring survey design;
- Consulting on feral predator control methods;
- Involvement in feral predator monitoring surveys;
- Undertaking feral predator control (e.g. being trained to load cartridges into Felixers and collect SD cards); and
- Knowledge sharing to improve detection and monitoring of feral predators.

Agrimin are committed to ongoing discussions with all three indigenous groups, which will involve spending time on country and engaging in two-way knowledge sharing. Through these ongoing discussions, there may be refinement in the locations of some of the sites for this Offset Project, based on any recent additions to knowledge about significant fauna in the area.

It is also acknowledged that monitoring and control methods may change over time, through adaptive management, in line with most recent scientific practices. Any refinements made to the program will be aligned with the requirements of the Offset Strategy. Agrimin recognises and respects that the Traditional Owners and Ranger Groups have well-defined threatened species protection strategies, and extensive experience and skills in a range of monitoring, protection and management activities which are integral to ongoing discussions as part of stakeholder engagement for the life of the Proposal.

2 Overall Approach: Offset Feral Predator Monitoring Program.

2.1 Overview and Timing

The overarching approach for the Offset Feral Predator Monitoring Program is summarised in **Table 2-1**. Survey design (**Section 0**) follows a before-after-control-impact (BACI) design. The BACI design is considered optimal to evaluate the effectiveness of feral predator control being implemented and inform adaptive management i.e. refinement of methods and/or intensity. Adequate baseline monitoring data on feral predators will be collected for a two-year period prior to the implementation of feral predator control as per the Offset Feral Predator Control Program. Motion cameras for the Offset Feral Predator Monitoring Program will be downloaded and reported on annually by suitably qualified zoologists and supported by TO Ranger groups, as agreed.

The methods outlined (Section 2.3) follow standard survey techniques recommended for detection of feral cats and feral foxes including those presented in *Pest animal monitoring techniques* (PestSmart, 2021) and *A guide to surveying red foxes and feral cats in Australia* (Hradsky et al., 2021). Monitoring will be conducted in accordance with relevant guidance for terrestrial fauna surveys (EPA, 2020).

	Personnel	Timing	Monitoring Sites	Survey Effort	Monitoring Parameters									
•	Qualified zoologists (establishment of the program).	• Annual analysis / reporting.	 Five Offset sites: Two Night Parrot Offset populations. 	 5 to 10 motion cameras per Offset site. 	Detection rate of feral predators									
•	Site personnel (collection of SD cards).											 One Great Desert Skink Offset population; and 		
•	Skilled Indigenous Rangers as appropriate.												 Two Greater Bilby Offset sites. 	
				Eight Reference sites*:										
			 Three Night Parrot Reference populations. 											
			 One Great Desert Skink Reference population; and 											
			 Four Greater Bilby Reference sites. 											

Table 2-1: Offset Feral Predator Monitoring Program summary.

*Reference sites will be monitored as part of operations i.e. reference sites for potential impacts of the Proposal under the TFEMP and NPMP will also function as reference sites for this Offset Project.

2.2 Feral Predator Control Monitoring Sites

Within the Offset Feral Predator Monitoring Program, monitoring will be undertaken at:

- Offset Sites: Sites where significant species (Night Parrot, Bilby, Great Desert Skink) have been recorded and where suitable habitat is known to occur. These sites will receive feral predator control as per the Feral Predator Control Program (Section 3).
- **Reference Sites**: Sites where significant species (Night Parrot, Bilby, Great Desert Skink) have been previously recorded and where suitable habitat is known/likely to occur. These sites are likely to experience similar natural environmental conditions as the feral predator control sites which are being managed for feral predators as part of this Offset Project. These reference sites are in areas largely un-impacted by human influences.

Monitoring to determine the effectiveness of feral predator control will be undertaken at five offset sites and at eight reference sites as follows:

Offset Sites



- Two Night Parrot sites (**Section 2.2.1**).
- One Great Desert Skink site (Section 2.2.2); and
- Two Bilby sites (Section 2.2.3).
- Reference Sites:
 - Three Night Parrot sites (Appendix A of NPMP).
 - One Great Desert Skink site (Appendix C of the TFEMP); and
 - Four Bilby sites (Appendix D of the TFEMP).

2.2.1 Night Parrot: Monitoring Sites

The locations of the Night Parrot Offset Sites have not been defined at this time of completing this Offset Plan. The intention is for new Night Parrot sites, through consultation and two-way knowledge sharing with TO groups and discovered NP populations following the implementation of the Offset Research Project: Night Parrot Regional Survey (NPRP1) (**Appendix A.1** of the Offset Strategy) to be incorporated into this Offset Plan as Offset Sites following completion of the Night Parrot Regional Survey. There is considered to be a relatively high level of confidence that additional Night Parrot locations will be recorded during the Night Parrot Regional Survey given the number of current locations in the area (in excess of 10 locations within the Ngururpa IPA), the prevalence of suitable habitat in the area (**Section 2.1** within **Appendix A** of the Offset Strategy) and recent records by the Tjurabalan people at Lake Gregory which also occurs within the Offset Management Area.

If for some reason new sites are not discovered, or it is not feasible to include them as Offset Sites under this Offset Plan, options will be investigated with Traditional Owner groups for other known sites within the Offsets Management Area to be adopted as Offsets Sites under this Offset Plan. Currently there are understood to be in excess of 10 locations of Night Parrot populations within the Offset Management Area as follows (**Figure 2-1**):

- Impact Sites (Operational): Two locations (Sites A and B) are impact sites and will be monitored for potential impacts of the Proposal as per the NPMP.
- **Reference Sites**: Three locations (Sites C, D and E) are reference sites and will be monitored as reference sites for this Offset Plan and for the NPMP.
- **Regional Sites (Offset)**: Five locations (locations unknown). Rangers have discovered the locations of five additional sites for Night Parrots within the Offset Management Areas. Adoption of any of these sites as Offsets Sites under this Offset Plan will require further ongoing consultation and knowledge sharing with Traditional Owner groups.





2.2.2 Great Desert Skink: Monitoring Sites

The location of the Great Desert Skink Offset Site has not been defined at this time of completing this Offset Plan. Ideally, new populations will be discovered as part of the Research Project: Regional Survey for Great Desert Skink (Project Reference GDSRP1) as presented within the Offset Strategy. The Regional Survey for Great Desert Skink includes provision for Species Distribution Modelling (SDM) to develop a predictive model of suitable habitat for the Great Desert Skink within the Offset Management Area. SDMs are a machine learning based approach that leverage on presence-only occurrence records and environmental variables (e.g., topography, hydrology, vegetation, etc) to model a species suitable habitat at scale. The model will be informed by extant and extinct records from the local area. The output will refine the search area for new populations during the regional survey in turn increasing the likelihood of detecting new populations. Contrary to the Night Parrot which appears to have quite well-defined habitat requirements, the Great Desert Skink occurs within the widespread Spinifex Sandplain habitat and its specific habitat requirements are unknown, but may be influenced by variations in the composition of the substrate.

Currently there are understood to be three extant populations of Great Desert Skink within the Offset Management Area as follows (Figure 2-2):

- Impact Monitoring and Feral Predator Control Site (Operational): Yagga Yagga population which overlaps with the NIDE: 64 active burrows recorded approximately 22 km south of Yagga Yagga. This population will be monitored as an impact site as presented within the TFEMP given its proximity to the haul road.
- Reference Population: Lake Mackay northern population: Recently, an additional population has been discovered by TO Rangers to the north-east of Lake Mackay outside the Development Envelope for the Proposal (Kate Crossing pers. comm. 18 March 2024). This population will be monitored as a reference site as presented within the TFEMP for the impact sites and for the feral predator control sites.
- Regional Population: Kiwirrkurra Population: The species has been recorded at 138 locations in the surrounding region (150 km). Almost all are in a 30 km stretch of the Kiwirrkurra road ~20 km southeast of the Kiwirrkurra community (the Kiwirrkurra population). This population is already being monitored by the Kiwirrkurra Rangers and feral predator control is already being undertaken at this site.

If additional populations of Great Desert Skink cannot be located as part of the regional survey, options will be investigated with Traditional Owner groups for other known sites within the Offsets Management Area to be adopted as Offsets Sites under this Offset Plan.

2.2.3 Greater Bilby: Monitoring Sites

The Offset Sites for the Greater Bilby have not been defined at this time of completing this Offset Plan (prior to assessment of the Proposal). The Greater Bilby is widespread and the results of surveys in the region indicate that the species is relatively common in the Offset Management Area in association with preferred habitats (BushBlitz, 2015; Desert Support Services, 2018; Paltridge, 2012, 2015; Stantec, 2021c). Offset sites for the Great Bilby will be decided following further consultation with Traditional Owner groups to avoid any overlap with existing feral predator control programs being undertaken by TO groups within the region.

Currently Agrimin intend to monitor Greater Bilby within the Offset Management Area under the TFEMP as follows (Figure 2-3):

- Impact Monitoring and Feral Predator Control Sites (Operational): Four locations are impact sites and will be monitored for potential impacts of the Proposal as per the TFEMP.
- **Reference Sites**: Four locations are reference sites and will be monitored as reference sites for the Offset Plan and for the TFEMP.
- Offset Monitoring and Feral Predator Control Sites (Offsets): To be determined following further consultation with Traditional Owner and Ranger groups to avoid any overlap with existing feral predator control programs being undertaken by TO groups within the region (the Bilby relatively common in the Offset Management Area in association with preferred habitats). Once selected these sites will be submitted to DCCEEW, DBCA and DWER for approval prior to implementation of this Offset Plan.



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Figure 2-2: Great Desert Skink records within the Offset Management Area (monitoring sites as provisioned within the TFEMP).





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Figure 2-3: Bilby records a within the Offset Management Area (monitoring sites as provisioned within the TFEMP



2.3 Monitoring Methods

The Offset Feral Predator Monitoring Program will use motion cameras to detect presence of feral predators at Offset Sites and reference sites. This method is suitable for monitoring long-term population trends through calculation of an average detection rate (the number of feral predators detected on each camera each quarter divided by the total camera trap nights) (Moseby *et al.* 2021). At each impact and reference site, 5 to 10 motion cameras will be deployed approximately every one km on star pickets at permanent locations. Motion cameras will be powered with long lasting lithium batteries and visited annually to exchange SD cards and batteries. Motion camera data will be analysed annually by a suitably qualified zoologist to measure changes in the feral predator detection rate over time.

2.4 Data and Statistical Analyses

Statistical tests will be used to interrogate the data collected from the Offset feral predator monitoring program as appropriate, for example unpaired t-tests, ANOVA or linear models. Final selection of statistical tests will depend on the qualities of the data collected. Data analysis will be undertaken to measure any significant changes in the feral predator detection rate (e.g. number of independent detections/number of camera trap nights) observed at the feral predator control sites over time, relative to baseline data and reference sites. This analysis will evaluate the effectiveness of feral predator control being implemented and inform adaptive management i.e. refinement of methods and/or intensity as required.

3 Overall Approach: Feral Predator Control Program

3.1 Overview and Timing

The Feral Predator Control Program will be informed by the findings of the Offset Feral Predator Monitoring Program and the existing programs being undertaken by TO rangers, and undertaken in accordance with the *Threat abatement plan for predation by feral cats (DoE 2015)* and the *Threat abatement plan for predation by the European Red Fox* (DEWHA 2008b). Specific control methods and control sites will be selected following collection of two years of baseline monitoring data. Proposed Offset Sites that will receive feral predator control as part of this Offset Plan and proposed methods are presented in **Sections 0** and **Section 3.2**.

Feral predator control will be undertaken according to the following:

- Upon the collection of two years of baseline monitoring data (Section 2);
- Annually as part of the annual Offset Feral Predator Control Program;
- Informed by the findings of the Offset Feral Predator Monitoring Program;
- Adaptive over time, in line with best practices from the most current information available including other programs in the region; and
- In conjunction with other Offset Projects where appropriate such as fire management as per the Offset Strategy.

Feral predator control will be undertaken at the Offset Sites as identified within **Section 0**. These sites will be in areas where significant fauna (Night Parrot, Great Desert Skink, Greater Bilby) have been recorded, either during previous surveys or during regional surveys as provisioned within the Offset Strategy.

Feral predator control will not be undertaken at the Reference Sites as presented within **Section 0**. The effectiveness of the methods and intensity of feral predator control at the Offset Sites will be evaluated through comparisons with these Reference Sites.

3.2 Methods

Appropriate feral predator control methods will be selected based on predator density, control site characteristics and following detailed consultation with TO Rangers. TO Ranger groups are undertaking feral predator control in the surrounding region using a variety of techniques and have considerable expertise to contribute to the Offset Feral Predator Control Program. The methods and intensity provisioned within this Offset Plan are presented in **Table 3-1** with a budget breakdown presented within **Section 12** that aligns with the provisions for feral predator control across the three species



within the Offset Strategy. Appropriateness of various control methods as per McLeod and Harris (2020), Johnston and Algar (2020), DEWNR (2014), and DBCA (2017), and how they may be ultilised in the Feral Predator Control Program are presented in **Table 3-2**.

Table 3-1: Feral	predator control	methods and intensi	tv provisioned	within this Offset Plan.
			.,	

Offset species	Control method	Intensity	Duration
Night Parrot	Feliyer	2 units (1 unit/population)	16vrs
Night i anot			10,13
Great Desert Skink	Felixer	1 unit	16yrs
Greater Bilby	Targeted baiting (e.g. Eradicat)	2 x 100 km (10 baits/km)	16yrs

3.3 Data and statistical analysis

Data analysis for the result of implementing the feral predator control program will be limited to monitoring the outputs of the Felixers. Felixer grooming traps take photographs of animals that pass in front of the unit and record which individuals are sprayed with the 1080 toxin. The number of feral predators sprayed with 1080 will be analysed and presented with the result of the Offset Feral Predator Monitoring Program on how many feral predators are in each area (**Section 2.4**). This will help to determine if any changes in feral predator numbers are a result of the Felixers, or if there may be other variables influencing feral predator numbers.

Control Method	Advantages	Disadvantages	Potential Uses with Respect to the Offset Feral Predator Control Program
Grooming traps (Felixers)	 Selective and target specific. Sentinel control tool capable of removing multiple feral cats. Opportunity to engage and train TO Rangers to manage the grooming traps. 	 Must be secured to ensure the poison (1080 cartridges) is inaccessible. Higher cost per unit. Limited feral predator population reduction across broadscale areas. 	 Felixer grooming traps use Lidar and camera sensors to detect feral cats and distinguish them from native animals. The trap fires a charge that applies a measured dose of toxin to passing feral cats. Due to their fastidious grooming behaviour, the targeted cat will predictably consume the toxin. The inbuilt motion cameras also provide imagery of feral and non-target species. Felixers are currently being trialled by Ngururrpa Rangers to control feral predators near known Night Parrot roosts. Learnings from this control program will be used to determine the most effective way to incorporate Felixers into the Feral Predator Control Program. Felixers are an appropriate control method to be deployed at areas where significant fauna (i.e. Night Parrot and Great Desert Skink) have been recorded. Deployment of Felixers will create a 'sink' for feral cats in the vicinity of the unit reducing overall predation pressure on threatened fauna. Given the low density of feral cats expected at Offset Sites, the potential control area is approximately one trap per 40km². This is considered a conservative approach, given the ratio of traps to cats per unit area (1:5, assuming similar density in non-drought conditions to the Gibson Desert) is double the ratio used in the successful study (1:10) by Humphrey (Unpublished). DBCA requires Felixers to be deployed for a 6-week non-toxic trial period before they can become operational. The trial period is used to confirm that the trap will not fire on native species in the predator control area. Once operational Felixers must be visited annually to load 1080 cartridges and download SD cards.
1080 Baiting (e.g. Eradicat)	 Can be applied on a broadscale by aircraft. Can be applied via a targeted approach along linear corridors by vehicle at a recommended baiting density of one bait per 100m. 	 Can be hazardous to domestic animals and some native wildlife species. Can have reduced efficacy when alternative prey resources are abundant. Broadscale baiting can disrupt existing predator/prey balance where Dingoes predate on cats. By removing Dingoes from an area through baiting, cat numbers can increase. 	 Broadscale baiting is not recommended as it may disrupt the Dingo - feral predator equilibrium, resulting in an increased abundance of feral predators. Targeted baiting along linear corridors by vehicle may be appropriate, however further consultation with TO Ranger groups is required prior to implementation. Targeted baiting is currentlybeing trialled at the Marruwa Bilby population, which does not have a large Dingo population. It is the preference of the TO groups that additional baiting is not undertaken on Indigenous lands until the effectiveness of the Marruwa baiting program is assessed. Any potential baiting program would involve an evaluation of

Table 3-2: Summary of advantages, disadvantages, and potential uses of feral predator control methods.

Control Method	Advantages	Disadvantages	Potential Uses with Respect to the Offset Feral Predator Control Program		
	• Low-cost relative to the area to be treated.	• Health and safety considerations: Native fauna (e.g. varanids) are known to consume baits. Varanids are a potential traditional food source for indigenous peoples and adequate consultation with respective TO groups is required to understand the potential implications of a baiting program within the region.	 effectiveness and implications through comparisons with baseline data and unbaited reference sites. Should a baiting program be implemented, appropriate measures such as signage and ongoing communication and consultation with TO groups regarding the timing, location and extent of the baiting program being undertaken would be required. 		
Trapping	 Can be used in areas where baiting is not appropriate. Can be targeted and will confirm removal of specific individual feral predators. 	 A proportion of feral animals will not enter traps. Difficult and increased cost to implement over a larger area. Ethical considerations for non-target fauna species. 	Trapping is unlikely to be an effective method of ongoing feral predator control at Offset sites.		
Shooting	• Selective and target specific.	 High level technical ability required. Time consuming Health and safety considerations relating to use of firearms. 	Shooting is unlikely to be an effective method of ongoing feral predator control at Offset sites.		

4 Overall Approach: Threatened Fauna Monitoring

The overarching approach for the Threatened Fauna Monitoring Program will be to undertake monitoring of threatened fauna in parallel with the Feral Predator Monitoring Program. This will allow make it possible to evaluate the effectiveness of reducing feral predator abundance on the persistence and potential recovery of the Night Parrot, Great Desert Skink and Greater Bilby within the Offset Management Area.

Survey design follows a before-after-control-impact (BACI) design. The BACI design is considered optimal to evaluate the changes in the abundance of threatened fauna as a result of feral predator control at the Offset Sites. Adequate baseline monitoring data on threatened fauna at the Offset Sites, will be collected for a two-year period prior to the implementation of feral predator control as per the Offset Feral Predator Control Program. Monitoring will be conducted by suitably qualified zoologists and supported by TO Ranger groups, as agreed. Monitoring methods for this Offset Plan have been aligned with the methods for monitoring the Night Parrot within the NPMP (Appendix A) and the Great Desert Skink and Greater Bilby within the TFEMP (Appendix C and Appendix D, respectively). A summary of these detailed methods is provided in the following sections.

4.1 Night Parrot: Monitoring Methods (summary)

The Offset Night Parrot Monitoring Program will utilise acoustic units deployed at Night Parrot populations as this is the most reliable method for recording the species (DPaW 2017; Leseberg et al. 2022). Although acoustic call analysis will not allow for determination of exact population numbers, the number of calls and call types can be used to infer abundance and activity of Night Parrot populations. A similar approach has been used successfully to monitor Pilbara Leaf-nosed Bats populations at roost sites in the Pilbara (Bat Call WA 2021).

At each Offset Site 10 acoustics units will be deployed within suitable Night Parrot habitat. Acoustic units will be spaced a minimum of 800 m apart to account for the maximum detection radius of each unit (300- 400 m) (DPaW 2017; Leseberg et al. 2022). This will prevent simultaneous detections of the same call and maximise coverage at a site. Acoustic units will be programmed to begin recording 20 minutes after sunset and to finish 20 minutes before sunrise each night to avoid recording large numbers of non-targeted species during dawn and dusk chorus. This also allows for the capture of calls associated with breeding and foraging birds, which may occur throughout the night and closer to sunset and sunrise (DPaW 2017; Jackett et al. 2017).

4.2 Great Desert Skink: Monitoring Methods (summary)

The Offset Great Desert Skink Monitoring Program will utilise a plot search technique to quantify the number of active burrows at the Offset Site. This method is recommended in the National Recovery Plan for the Great Desert Skink (Indigenous Desert Alliance 2023a) as a non-invasive and rapid method of monitoring the species, which builds upon the tracking skills of TO Rangers. Four 10 ha plots will be monitored at the Offset Site. At each 10ha plot, qualified zoologists and TO ranger groups will search for one hour and record the following:

- Presence of Great Desert Skink burrows;
 - GPS coordinates;
 - Burrow status (active or inactive);
 - o Number of latrines present;
 - Presence and count of adult, sub-adult, and juvenile scats in a latrine;
- Signs of feral predator presence (i.e., tracks and scats) and age of signs (fresh, recent, old);
- Evidence of disturbance (i.e., fire); and
- Fauna habitat type present (i.e. spinifex sandplain).

The 10 ha plot search method will allow for the detection of new burrows established through recruitment or movement of individuals within the population. All active burrows recorded during monitoring will be revisited during subsequent annual monitoring events to assess for changes over time.

4.3 Greater Bilby: Monitoring Methods (summary)

The Bilby Monitoring Program will utilise the 2 ha plot technique, which aligns with DBCA (2017) guidance and current literature (Southgate *et al.* 2018). This method is considered suitable over large areas and where directly comparable and systematically quantified data is required. The 2 ha plot method was developed over many years by Indigenous Ranger groups and partner scientists across the arid zone where "trackability" is high.

A minimum of five 2 ha plots will be selected within each Offset Site spaced approximately 4 to 5 km apart, resulting in a minimum total of 40 x 2 ha plots. The 2 ha plot locations will be stratified according to habitat type and then randomly selected. Random selection of 2 ha plots will allow for a more robust statistical analysis of Bilby occupancy (MacKenzie *et al.* 2002).

At each 2 ha plot, qualified zoologists and TO ranger groups will search for 20 minutes and record the following:

- Signs of Bilby presence including tracks, burrows, scats, and diggings (particularly at the base of plants where foraging for larvae) and age of signs (fresh, recent, old);
- Signs of feral predator presence (i.e., tracks and scats) and age of signs (fresh, recent, old);
- Evidence of disturbance (i.e., fire);
- Availability of Bilby food sources (i.e., Acacia shrub species which support root-dwelling larvae); and
- Fauna habitat type present (i.e., gravel spinifex sandplain, spinifex sandplain etc.).

If Bilbies are absent from all 2 ha plots within a monitoring site location, additional transects will be traversed. Observations will be recorded to determine if the population is present within the surrounding area to ascertain the persistence or movement patterns of Bilby in the surrounding region.

5 Personnel and Licensing Requirements

The Offset Project will be undertaken by suitably qualified, site personnel, and/or knowledgeable and experienced Indigenous Rangers with existing skills in the methods described within this Offset Plan. The participation of TO ranger groups in the Offset Project will provide an opportunity for meaningful engagement and contribute to two-way knowledge sharing for feral predator detection, control and management.

There are currently no licence requirements for deploying unbaited cameras for feral predator monitoring. Feral predator control will be undertaken by specialists and preferably in collaboration with TO Ranger groups. Depending on the method of feral predator control, different licenses and permits will be required. This may include, but is not limited to:

- Department of Health 1080 landholder application and permit.
- DPIRD Wildlife Animal Ethics Committee animal ethics permit.
- DBCA Fauna License approval.
- DBCA 1080 risk assessment and non-toxic trial (Grooming traps).

Threatened Fauna monitoring will require a DBCA Fauna taking (scientific or other purposes) licence to take or disturb native fauna and a Section 40 Authorisation, to take or disturb threatened species. These licenses will be obtained prior to commencement of monitoring.

6 Additional Considerations

6.1 Role of Dingoes in predator/prey balance.

Although feral predators are a known threat to significant fauna in the vicinity of the Proposal, it is also important to acknowledge that there may be an existing predator/prey balance between the Dingo and other feral predators. Dingoes, an apex predator, are known to occur in the vicinity of the Proposal. There is evidence that Dingoes may suppress the behaviour and/or abundance of feral predator populations and their removal (a potential unintended outcome of feral predator control) may result in an increase in feral predator abundance (mesopredator release) (Letnic & Dworjanyn, 2011; Moseby et al., 2012; Ritchie & Johnson, 2009). Implementation of any feral predator control measures should aim to avoid disrupting the current equilibrium between Dingoes and feral predators which exists in the Offset Management Area.

6.1.1 Current Control Programs undertaken by TO groups on IPA's.

The Ngururrpa and Kiwirrkurra rangers are currently trialling different methods of feral predator control on their IPAs (K. Crossingpers.com. 19 March 2024). The Ngururrpa rangers are trialling the deployment of Felixers (two units): a targeted approach in the vicinity of Night Parrot population(s). The Kiwirrkurra rangers are trialling a targeted baiting program: a predator control approach at a Bilby population where Dingoes occur in low densities.

6.2 Considerations for Broadscale Baiting

Agrimin acknowledge the importance of incremental knowledge gain and adaptive management. Based on the information available at the time of developing this Offset Project, Agrimin has adopted a targeted approach to feral predator control (Felixers) and will evaluate the option for a targeted approach for baiting once more information is available from the current trial by Kiwirrkurra rangers. At the request of the Traditional Owners, Agrimin has not adopted an approach involving broadscale baiting, which has the potential to disrupt the current balance which could lead to unintended consequences. Through adaptive management and incremental knowledge gain, baiting options will be re-evaluated as a method of feral predator control once the trial program by the Kiwirrkurra rangers is complete. Any potential baiting program would involve an evaluation of effectiveness and implications through comparisons with baseline data and unbaited reference sites.

6.3 Advancement in Scientific Knowledge

It is important to consider the role of the following in relation to the (program design and methods for monitoring and control) for the Offset Plan over the life of the Proposal:

- Feral predator control is an area of ongoing research,
- Rangers are actively working on addressing the issue of feral predators on their IPAs and the findings of their work will provide insights on what works best in the area and may differ to what works in other areas of Australia,
- New information (outcomes of current programs and new methods) will become available over the life of the Proposal,

As a result, this Offset Plan should be considered a document that will be adapted over time, through adaptive management, in line with best practices from the most current information available including other programs in the region.

6.4 Logistical Considerations

6.4.1 Survey Design

Several logistical factors are required when taken into consideration the design and safe implementation of survey work associated with the Offset Project:

- The Offset Management Area is located in a remote area of Western Australia and mobilisation to site from Perth currently takes a minimum of 1.5 days. TO Rangers are located in communities near to the proposed locations.
- The Offset Management Area is large totalling almost 10 million hectares and comprises the IPAs of the Ngururpa (2,963,799 ha), Kiwirrkurra (4,276,341 ha) and Tjurabalan (2,584,199 ha) people.
- Land based access through the Offset Management Area is limited to the Tanami Road in the north, the Kiwirrkura Road in the south and the Balgo Track which connects the two roads. The Balgo Track is a rugged 4WD track, which takes up to 1.5 days to drive in entirety. There are currently no communities, accommodation, or amenities (e.g., water and fuel) located along the track. Management of safety and fatigue is imperative for field survey personnel undertaking the regional survey. Communities within the Offset Management Area are limited to the towns of Balgo and Kiwirrkurra.
- Additionally, a search of the Registered Aboriginal heritage listed on WA's Department of Planning, Lands and Heritage Aboriginal sites register will be completed to identify the occurrence of known sites within the Offset Management Area. The location of these sites will be considered when refining the design of the Offset Project in consultation with Traditional Owners.

6.4.2 Land Access

Additional considerations for undertaking the Offset Project include the following land access requirements.

Land tenure:

- Indigenous Protection Areas (IPAs): The proposed survey sites occur within the three IPAs of the Tjurabalan, Ngururrpa and Kiwirrkurra people. Agrimin is continuing discussions with all three groups as part of their commitment to long term stakeholder engagement.
- Pastoral Stations: Two pastoral stations overlap the Offset Management Area: Lake Gregory Station and Billiluna Station.
- Minerals tenements: The Offset Management Area is intersected by tenements held by 41 resource companies.
- Heritage sites: A search of the Registered Aboriginal heritage sites listed on WA's Department of Planning, Lands and Heritage Aboriginal sites register will be completed. This will identify the potential occurrence of known heritage sites within the Offset Management Area which may require additional approvals under the WA Aboriginal Heritage Act 1972. There is also likely to be additional unregistered heritage sites within the Offsets Management Area and additional surveys may be required. The location of any known sites (registered or unregistered) will be taken into considered when refining the design of the Offsets Project in consultation with Traditional Owners.
- Land Access: Land access permissions will require approval from traditional owner groups for the Offset Project to
 proceed on areas of the IPAs which occur outside the Native Title Agreement for the Proposal.

Land managers will be consulted prior to undertaking any work associated with the Offset Project to determine access requirements/permissions.

7 Limitations and Assumptions

Potential limitations that may affect the survey include:

- Feral cat density is a conservative estimate based on density ranges in the neighbouring IBRA Bioregion: Gibson Desert. Baseline feral cat surveys may inform the density of cats present and the level of control required to achieve effective outcomes.
- The locations of Offset Sites have not been defined at this time of writing this Offset Plan. It is assumed that this
 knowledge gap can be addressed through the proposed regional surveys provisioned within the offset strategy or
 through ongoing engagement with Traditional Owners.
- The effectiveness of different feral predator control methods can depend on the region where the feral predator control is being implemented. This Offset Plan provides options on how provisions under the Offset Strategy can be implemented, however the methods and intensity will require refinement and adaptive management over the life of the Proposal, based on the outcomes of current ranger programs, ongoing consultation with Traditional Owners and in line with best practices from the most current information available.
- The quality of habitat may naturally change over time due to environmental factors unrelated to the feral predator control e.g., feral predators are attracted to recently burnt areas due to improved foraging opportunities (McGregoret al. 2016). The impact of fires is likely to affect the occurrence/distribution of feral predator change over time.

Assumptions for the survey include:

 Offset Sites for this Offset Proposal will occur outside the Native Title Agreements between Agrimin and each of the three indigenous groups. Access permissions would need to be granted by the respective indigenous group for the survey work to proceed. Through participation, this Offset Project could provide the opportunity for continued knowledge building by the Ngururrpa, Tjurabalan and Kiwirrkurra rangers on their respective IPAs. Access permissions would be subject to future discussions between Agrimin and each group.

8 Risk Management

The potential risks to the implementation of the Offset Project include the following:

- Environmental risks.
- Administrative risks.
- Financial risks.

The identification and control of environmental risks is undertaken in accordance with management standards, which align with the Australian & New Zealand Standard AS/NZS 31000:2018 Risk Management - Principles and Guidelines (Standards Australia, 2018). A summary of this risk management framework (**Table 8-1**) and potential risks identified for the successful implementation of the Offset Plan and the proposed mitigation measures to manage these risks is provided in **Table 8-2**.



Table 8-1: Risk matrix framework adapted from (DWER, 24	017)
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Likely	Moderate	High	Extreme	Extreme
Possible	Moderate	High	High	Extreme
Unlikely	Low	Moderate	High	High
Rare Low		Low	Moderate	Moderate
	Insignificant	Minor	Moderate	Major

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Table 8-2: Offset Plan Risk Assessment

Risk Category	Description	Likelihood (pre-controls)	Consequence (pre-controls)	Risk Rating	Risk Treatment: Controls and / or Management Measures	Likelihood (post-controls)	Consequence (post-controls)	Risk (post-controls)
Financial	Financial provisioning insufficient to deliver the Offset Project.	Unlikely	Moderate	High	 Risk management strategies will be included in the formalised proponent managed offset fund agreements to minimise the risk of offsets failing. These strategies may include objectives, targets, monitoring, thresholds, and contingencies. Agrimin will liaise with DCCEEW/ EPAS to agree upon a lump sum payment to be paid as an initial payment into the Managed Offset Fund (proponent managed fund). Determined on a case-by-case basis, payable prior to ground disturbing activities. Detailed up front cost estimate provided for Offset Project including all elements to complete the project (le helicopter accommodation, meals, TO engagement). Accurate costing estimates within the Revised Offset Strategy for the Offsets project. Contractual agreement(s) with third party(s) undertaking the Research Project. Where required. Contingency action: Agrimin will write to the Minister, within 10 business days of being aware or having concerns, that the funding amount required to deliver the Research Plan may not be sufficient due to unforeseen circumstances. 	Rare	Minor	Low
Environmental Risk	Offset Project does not achieve set objectives	Possible	Moderate	Moderate	 Detailed Offset Plan with clear objectives and methods set out in the associated plan. Detailed Offset Plan (this Plan) to be submitted to DCCEEW for approval in accordance with requirements under the Revised Offsets Strategy prior to implementation of the Offset Project. Key milestones included in the Offset plan and timelines to measure against the delivery of project implementation. Third party contractual conditions implemented. Third party undertaking Research Project funded by Agrimin will provide regular reports to Agrimin on the Offset Project status. 	Unlikely	Moderate	Moderate

Risk Category	Description	Likelihood (pre-controls)	Consequence (pre-controls)	Risk Rating	Risk Treatment: Controls and / or Management Measures	Likelihood (post-controls)	Consequence (post-controls)	Risk (post-controls)
					 Consideration of knowledge and experience of third-party contractor to undertake the Offset Project, where required. Third party (where required) to allocate adequate staff resourcing to complete the proposed Offset Project. Regular meetings with third parties and Agrimin to discuss progress and project delivery milestones. Contingency action: Agrimin will write to the Minister, within 10 business days of being aware or identifying concerns, that the Research Project may not achieved set outcomes for the Night Parrot. 			
Administrative	Offset Project not running according to schedule.	Possible	Moderate	Moderate	 Mitigations included in the detailed Offset Plan to ensure project completion include: Clear and achievable timeline set to complete Offset Project. Key milestones set out in the Offset Project. Third party contractual conditions where a third party is involved with delivery of the Offset Plan. Mid-term review with all key stakeholders. 	Unlikely	Minor	Low
Environmenta	I Unplanned natural events	Unlikely	Major	High	 Offset Project Plan has considered how environmental uncertainty in the landscape may be minimised. Contingency plan should field work be cancelled due to unplanned natural event. 	Rare	Major	Moderate
Administrative	Land access not permitted	Possible	Major	High	 Key stakeholders for the identified in the Offset Plan. Tenure considered prior to implementing the Offset Project. Contact respective land managers prior to implementing the Offset Project regarding access requirements. Registered Aboriginal sites search completed prior to implementation of the Offset Project. Ongoing consultation with Traditional Owners for IPA's Refine survey design to avoid culturally sensitive areas. 	Unlikely	Minor	Moderate



9 Stakeholder Consultation

Agrimin recognises the value of building positive relationships with key stakeholders and the community, and seeks to build sustainable partnerships with business partners, governments, non-government organisations, host communities and other stakeholders to support mutually beneficial outcomes of the Offset Strategy.

The scope and objectives of this Offset Plan may be further refined in consultation with relevant government departments and stakeholders, as required.

Extensive consultation has been undertaken with key stakeholders including but not limited to, SMEs, TO groups, Department of Biodiversity, Conservation and Attractions (DBCA), Department of Water and Environmental Regulation (DWER), DCCEEW, Northern Territory EPA (NT EPA) (**Table 9-1**).

Stakeholder Consultation in relation to this Offset Plan is summarised in Table 15-2 of the Offset Strategy. A key component of this Offset Plan is engagement and ongoing consultation with TO's to build on their existing knowledge of threatened fauna on their IPAs. Further information regarding how this Offset Plan will engage with TO's to manage land is outlined in Section 5 of the Offset Strategy.

Table 9-1: Key Stakeholders	for the Research	Plan
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Stakeholder Sector	Key Stakeholders
State/ Commonwealth	• Department of Climate Change, Energy, the Environment and Water (DCCEEW);
Government Agencies	Environmental Protection Authority (EPA);
	 Department of Water and Environmental Regulation (DWER);
	 Department of Biodiversity, Conservation and Attractions (DBCA);
	 Department of Planning, Lands and Heritage (DPLH);
	Main Roads Western Australia (MRWA);
	Department of Fire and Emergency Services (DFES).
Local Government	Shire of East Pilbara;
Authorities	Shire of Halls Creek; and
	Shire of Wyndham-East Kimberley.
Native Title	Central Desert Native Title Services; and
Representative Bodies	Kimberley Land Council.
Indigenous Groups	 Tjamu Tjamu Aboriginal Corporation and Kiwirrkurra People;
	 Parna Ngururrpa Aboriginal Corporation and Ngururrpa People; and
	Tjurabalan Native Title Land Aboriginal Corporation.
Environmental Interest	Night Parrot Recovery Team: Dr Allan Burbidge (Principal Research Scientist, WA
Groups	Department of Biodiversity, Conservation and Attractions)
Subject Matter Experts	Nigel Jackett (WA Night Parrot specialist); and
	Dr Allan Burbidge (DBCA and Night Parrot Recovery Team)

10 Legislative Context

The application and assessment of offset requirements for the Proposal have been undertaken with consideration of the following State and Commonwealth policies and guidelines:

- State Policies and Guidelines:
 - o WA Environmental Offsets Policy (Government of Western Australia 2011); and
 - WA Environmental Offsets Guidelines (Government of Western Australia 2014).
- Commonwealth Policies and Guidelines:
 - Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (DSEWPC, 2012).

11 Timeline summary and milestones

Given the uncertainty on the timeframes for approval of the proposal, precise dates and milestones for the Offset Project cannot be set at this time. However, a broad approach with steps for the components is summarized below (**Table 11-1** and **Table 11-2**). The Offset Project is nominated to be ongoing for the life of the Proposal with review every 24 months. The method and intensity of feral predator control, to reduce predation pressure on each of the three threatened fauna species, will be revised according following baseline monitoring and during each review.



Task	Description	Timeframe (Indicative)
Regional Surveys*	 Regional surveys to identify Night Parrot and Great Desert Skink populations. These populations to form the Offset Sites which will receive feral predator control under this Offset Plan. 	Years: 1-2.
Offset Feral Predator Monitoring Program	• Establishment of 2 years of baseline data and then ongoing monitoring of feral predators at the Offset Sites in accordance with this Offset Plan.	Years: 3-4: Baseline data Years: 5-20: Ongoing Monitoring Total: 18yrs
Offset Threatened Fauna Monitoring program	• Establishment of 2 years of baseline data and then and ongoing monitoring of threatened fauna at the Offset Sites in accordance with this Offset Plan.	Years: 3-4: Baseline data Years: 5-20: Ongoing Monitoring Total: 18yrs
Offset Feral Predator Control Program	Implementation of the feral predator control at the Offset Sites in accordance with this Offset Plan.	Years: 5-20: Feral predator control Total 16 yrs.

Table 11-1: Estimated	timeframe for tasks	associated	with the Offset Plan.

*Provisioned under separate research projects within the Offset Strategy.

Table 11-2: Estimated timeframe for tasks associated with the Offset Plan.

Brograme										Ye	ars									
Programs	1 2		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Regional Surveys*																				
Offset Feral Predator			F	Δ	۸	Δ	Δ	٨	Δ	۸	Δ	Δ	Δ	۸	Δ	۸	Δ	Δ	Δ	Δ
Monitoring Program			-			^				^						~				^
Offset Threatened Fauna			F	Δ	۸	Δ	Δ	Δ	Δ	۸	Δ	Δ	Δ	۸	Δ	۸	Δ	Δ	Δ	Δ
Monitoring program			-			^	~					$\mathbf{\Gamma}$			~	A	A	^	^	~
Offset Feral Predator					E	Δ	Δ	٨	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
Control Program					L .	~	~	~		~	~	~	~	~		~	~		~	~

*Provisioned under separate research projects within the Offset Strategy.

E = Establishment, A = Annual

Specific timeframes have been developed for the Night Parrot Regional Survey (Appendix A.1 of the Offset Strategy) and will be developed for the Great Desert Skink Regional Survey. Subsequent to the completion of the regional surveys and ongoing consultation with Traditional Owners, a timeframe will be developed for the establishment of the components of the Offset Plan as per the key tasks presented within **Table 11-3**.

Task	Description
Traditional Owner Engagement	 Rangers are actively working on addressing the issue of feral predators on their IPAs and the findings of their work will provide insights into how the Offset Plan could be implemented. Traditional owner endorsement, involvement and participation is a key objective of this Offset Plan.
Land Access Permissions	Land access permissions to undertake work on IPAs outside the Native Title Agreement for the Proposal.
Survey Plan	Survey Plan to include the key tasks associated with this Offset Plan: including proposed sites, proposed monitoring and proposed feral predator control methods.
	 Survey Plan to be discussed and refined with TO rangers based on knowledge of the species, knowledge of effective predator control methods on country and cultural avoidance areas.
Licences and	Regulation 27 - Fauna taking (biological assessment) licence.
permits	• Section 40 authorisation under the BC Act: to disturb threatened fauna.
	Department of Health 1080 landholder application and permit.
	DPIRD Wildlife Animal Ethics Committee animal ethics permit.
	DBCA Fauna License approval.
	DBCA 1080 risk assessment and non-toxic trial (Grooming traps).
Safety Plan	Overarching Safety Plan for all participants involved in undertaking on-ground work for the Offset Plan.
Monitoring and control programs	• Field surveys to establish and conduct ongoing monitoring and control of feral predators and monitoring of threatened fauna.
Data analysis	Monitoring: Feral Predator data analysis: motion cameras
	Control: Feral predator data analysis: Felixer outputs
	Monitoring: Threatened fauna data analysis:
	 Night Parrot call analysis
	 Great Desert Skink survey data analysis
	 Greater Bilby survey data analysis
Draft Survey Report (annual)	• Draft survey report on the effectiveness of the feral predator control program on reducing feral predators and the effects of any potential reduction of feral predators on threatened fauna.
	Draft report to be submitted to stakeholders for review, including the Traditional Owners from the Ngururrpa, Kiwirrkurra and Tjurabalan IPAs.
Final Survey Report (annual)	Final survey report after receiving feedback and addressing comments from stakeholders.

Table 11-3: Key tasks associated with undertaking the Offset Plan.

12 Budget Estimate

The budget summary for the program comprises a summary (**Table 12-1**) and breakdown of the each of the components is presented below:

- Feral Predator and Threatened Fauna Monitoring (Establishment: Table 12-2 and Annual: Table 12-3); and
- Feral Predator Control (Establishment: Table 12-4 and Annual: Table 12-5).

Table 12-1: Overarching Summary of the Offset Project

	Establishment	Annual	Total
Feral Predator and Threatened Fauna Monitoring Program	\$265,000	\$85,000	\$1,710,000
Feral Predator Control Program	\$140,000	\$70,000	\$1,190,000
Total Estimate (ex GST)			\$2,900,000

*Total includes provision for purchase of monitoring equipment (acoustic recorders, motion cameras) and indigenous rangers.

Table 12-2: Cost estimate for Feral Predator and Threatened Fauna Monitoring Program - Establishment.

Task	Fee Estimate	Expenses
Project Management, Equipment Purchases, survey planning, licencing & logistics	\$20,000	\$160,000
Field Survey: Mobilisation	\$10,000	\$1,000
Field Survey	\$30,000	\$23,000
Data analysis	\$6,000	\$3,000
Reporting and GIS	\$12,000	-
Sub-total	\$78,000	\$187,000
Total Estimate (ex GST)*		\$265,000

*Total includes provision for purchase of monitoring equipment (acoustic recorders, motion cameras) and indigenous rangers.

Table 12-3: Cost estimate for Feral Predator and Threatened Fauna Monitoring Program – Annual for 17yrs.

Task	Fee Estimate	Expenses
Project Management, Equipment purchases/hire, survey planning, licencing & logistics	\$10,000	\$5,000
Field Survey: Mobilisation	\$5,000	\$1,000
Field Survey	\$12,000	\$15,000
Data analysis	\$20,000	\$5,000
Reporting and GIS	\$12,000	-
Sub-total	\$59,000	\$26,000
Total Estimate (ex GST)*		\$85,000

*Total includes for indigenous rangers and establishment of Felixers at 3 sites and baiting at two sites.

Task	Fee Estimate	Expenses
Project Management, Equipment Purchases, survey planning, licencing & logistics	\$30,000	\$2,000
Field Survey: Mobilisation	\$10,000	
Field Survey	\$20,000	\$65,000
Data analysis	\$3,000	
Reporting and GIS	\$10,000	
Sub-total	\$73,000	\$67,000
Total Estimate (ex GST)*		\$140,000

Table 12-4: Cost estimate for Feral Predator Control Program - Establishment.

*Total includes provision for indigenous rangers.

Table 12-5: Cost estimate for Feral Predator Control Program – Annual for 15yrs.

Task	Fee Estimate	Expenses
Project Management, Equipment purchases/hire, survey planning, licencing & logistics	\$10,000	\$45,000
Field Survey: Mobilisation	-	-
Field Survey	-	-
Data analysis	\$3,000	
Reporting and GIS	\$12,000	
Sub-total	\$25,000	\$45,000
Total Estimate (ex GST)*		\$70,000

*Total includes provision over the life of the Offset Project for indigenous rangers, Felixers at 3 sites and baiting at two sites.

13 Adaptive Management and Review

This Offset Plan should be considered a document that will be revised over time, through adaptive management, in line with best practices from the most current information available including other programs in the region. This Offset Plan presents an approach of how feral predator control could be undertaken to benefit each of the threatened species (program design and methods for monitoring and control). However, it is also important to consider the following:

- Feral predator control is an area of ongoing research.
- Rangers are actively working on addressing the issue of feral predators on their IPAs and the findings of their work will provide insights on what works best in the area and may differ to what works in other areas of Australia; and
- New information (outcomes of current programs and new control methods) will become available over the life of the Proposal.

The methods and intensity presented within this Offset Plan will require refinement over the life of the Offset Project, based on the findings of the Offset Project, current ranger programs, ongoing consultation with Traditional Owners and in line with best practices from the most current information available. The BACI design is considered optimal to evaluate the effectiveness of feral predator control being implemented and inform adaptive management. Analysis of the findings will help evaluate the effectiveness of feral predator control being implemented and inform what adaptive management would result in better outcomes for the Offset Project i.e. refinement of methods and/or intensity as required. Any refinements made to the program will be aligned with the requirements of the Offset Strategy.

14 Reporting

A standalone technical report will be submitted to Agrimin and the Indigenous landholders at the conclusion of each annual monitoring period, presenting the key findings of the Offset Project. Outcomes of the Offset Plan (direct offset) will be reported to DCCEEW and DWER in the Annual Offset Report under the revised Lake Mackay Sulphate of Potash Offset Strategy. The report will include an assessment of the Offset Project against measurable outcomes (**Section 14.1**) and meet the requirements for reporting structure (**Section 14.2**) for the following Offset Project components:

- Offset Feral predator monitoring program.
- Offset Feral predator control program; and
- Offset Threatened Fauna Monitoring program.

14.1 Measurable outcomes

The success of the Offset Feral Predator Control Program will be measured by changes (decline) in feral predator abundance over time as evident via the Feral Predator Monitoring Program. It is anticipated that the reduced predation pressure at the Offset Sites will result in an increase in the abundance of threatened fauna (Night Parrot, Great Desert Skink, Bilby) over time as evident in the Offset Threatened Fauna Monitoring program.

The measurable outcomes of the Offset Project to include:

- Measure change in feral predator abundance over time (and relative to reference sites), through the establishment of an Offset Feral Predator Monitoring Program (motion cameras) at each of the Offset Sites.
- Measure change in abundance of threatened fauna (Night Parrot, Great Desert Skink and Greater Bilby) over time (and relative to reference sites), through the establishment of an Offset Threatened Fauna Monitoring Program at each of the Offset Sites.

Baseline data for the Offset Project will be gathered over a period of two years before the implementation of feral predator control through this Offset Project. This baseline data will inform the effectiveness of the Offset Project and inform adaptive management over time.

14.2 Reporting structure

Indicative structure of the technical report for the Research Plan is summarized below:

- Executive Summary: Summary of key findings;
- Introduction: Relevant background information on the local environment and the objectives of the Offset Plan, as well as a summary of regulatory requirements;
- Methods: Field survey design and survey methods, supported by survey figures, and constraints and limitations;

- Results and Discussion:
 - o Changes in feral predator abundance at each of the Offset Sites over time and relative to reference sites.
 - Changes in the abundance of threatened fauna at the Offset Sites over time and relative to reference sites.
 - Evaluation of the effectiveness of the Offset Feral Predator Control Program in reducing feral predator numbers and how this is benefiting Threatened Fauna in the Offset Management Area.
 - Conclusions and Recommendations:
 - Summary of the key findings
 - Recommendations including adaptive management for the Offset Feral Predator Control Program to be more effective i.e. changes to methods/intensity.
- References and Appendices: reference list, site photographs, raw data, specialist report, as appropriate.

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DESIGN WITH COMMUNITY IN MIND

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve — because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

Stantec trades on the TSX and the NYSE under the symbol STN. Visit us at stantec.com or find us on social media.

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Appendix B Offset Assessment Guide Calculations

B.1 Night Parrot Offset Assessment Calculation

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	Night Parrot								
EPBC Act status	Endangered								
Annual probability of extinction Based on IUCN category definitions	1.2%								



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			Impact calcu	lator									
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of imp	pact	Units	Information source						
				Area									
	Area of community	No		Quality									
				Total quantum of impact	0.00								
	Threatened species habitat												
			Refer to Section 7.1.1 (Potential	Area	68.57	Hectares	See table7.6 in Offset Strategy for a complete						
act calculator	Area of habitat	Yes	the Offsets Strategy: Clearing, habitat fragmentation unplanned fire	Quality	8	Scale 0-10	list of information sources (Environmental Surveys, Scientific Articles, SME advice, TSSC species profile						
			events and predation by feral animals.	Total quantum of impact	54.86	Adjusted hectares	and species recovery plans).						
lmp	Protected matter attributes	stected matter attributes Attribute relevant to case? Description Quantum of impact											
	Number of features e.g. Nest hollows, habitat trees	No											
	Condition of habitat Change in habitat condition, but no change in extent	No											
			Threatene	ed 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 o	calculate	or												
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time hori (years)	zon	Start ar qual	ea and ity	Future are quality withe	ea and out offset	Future ar quality wit	ea and h offset	Raw gain	Confidence in result (%)	Adjusted gain	Net press (adjusted	ent value 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 Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset 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	54.86	Adjusted hectares	Onground management of feral predators and fire at regional offset sites in accordance with the Offset Strateev.	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	200	Risk of loss (%) without offset Future area without offset (adjusted hectares)	0% 200.0	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0%	0.00	80%	0.00	0.00	60.29	109.91%	Yes	\$785,000.00	Section 7.2 of the Offset Strategy (consideration of species recovery plans, strategies and advice), Section 7.3.1 of Offset Strategy outlines Offset Projects (eg. fire management and feral		
							Time until ecological benefit	5	Start quality (scale of 0-10)	8	Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	9	4.00	80%	3.20	3.01					predator mangement) for the Night Parrrot and Section 7.3.2 of Offset Strategy outlines
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time hori (years)	zon	Start v	alue	Future value offse	e without t	Future val offso	ue with et	Raw gain	Confidence in result (%)	Adjusted gain	Net press	ent 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																						
									Thi	reatened s	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						Cost (\$)						
		Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Direct offset (S)	Other compensatory measures (\$)	Total (S)					
	Birth rate	0				\$0.00		\$0.00					
nary	Mortality rate	0				\$0.00		\$0.00					
Sumr	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	54.856	60.29	109.91%	Yes	\$785,000.00	N/A	\$785,000.00					
	Area of community	0				\$0.00		\$0.00					
						\$785,000.00	\$0.00	\$785,000.00					

B.2 Greater Bilby Offset Assessment Calculation

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 Signific:	ince
Name	Greater Bilby
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 imp	pact	Units	Information source						
			Ecological c	ommunities									
				Area									
	Area of community	No		Quality									
				Total quantum of impact	0.00								
	Threatened species habitat												
ator			Refer to Section	Area	1346	Hectares	See table 8.4 in Offset Strategy for a complete						
	Area of habitat	Yes	Impacts) detailed in the Offsets StrategClearing, unplanned fire events and	Quality	8	Scale 0-10	list of information soiurces (Environmental Surveys, Scientific Articles, SME advice,						
act calcul			predation by feral animals	Total quantum of impact	######	Adjusted hectares	TSSC species profile and species recovery plans).						
Imp	Protected matter attributes	Attribute relevant to case?	Description	Quantum of imp	pact	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											
			Threatene	ed 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 o	alculato	or										
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time hori (years)	zon)	Start are quali	ea and ity	Future are quality with	ea and out offset	Future ar quality wit	ea and h offset	Raw gain	Confidence in result (%)	Adjusted gain	Net prese (adjusted	ent value hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
										Ecolo	gical Com	munities										
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset Future area with offset (adjusted hectares)	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																					
ator	Area of habitat	Yes	1076.50	Adjusted hectares	Onground management of feral predators and fire at regional offset sites in accordance with the Offset Strateov	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	4400	Risk of loss (%) without offset Future area without offset (adjusted hectares)	0% 4400.0	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0% 4400.0	0.00	80%	0.00	0.00	1045.50	97.12%	Yes	\$1,590,000.00	Refert to Section 8.2 of the Offset Strategy (consideration of recovery plans, strategies and advice for the Greater Bilby), Offset Projects for GB (fire mnagement and feral predictor control)
et calcul					and onlive buildings.	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	80%	2.40	2.38					Section 8.3.1 and Research Projects for GB outlined in Section 8.3.2 of the Offset
Offs	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time hori (years)	zon)	Start v	alue	Future value offse	without t	Future val offse	ue with t	Raw gain	Confidence in result (%)	Adjusted gain	Net prese	ent 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																				
										Th	reatened s	pecies										
	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																				

				Sur	nmary							
						Cost (S)						
	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Direct offset (\$)	Other compensatory measures (\$)	Total (\$)				
	Birth rate	0				\$0.00		\$0.00				
nary	Mortality rate	0				\$0.00		\$0.00				
Sumi	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	1076.504	1045.50	97.12%	Yes	\$1,590,000.00	\$145,673.91	\$1,735,673.91				
	Area of community	0				\$0.00		\$0.00				
						\$1,590,000.00	\$145,673.91	\$1,735,673.91				

B.3 Great Desert Skink Offset Assessment Calculation

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	Great Desert Skink								
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 calcu	lator			
	Protected matter attributes	Attribute relevant to case?	Description	Quantum of imj	pact	Units	Information source
			Ecological c	ommunities			
				Area			
	Area of community	No		Quality			
				Total quantum of impact	0.00		
			Threatened sp	pecies habitat			
			Refer to Section 9.1.1 (Potential	Area	754.2	Hectares	
ator	Area of habitat	Yes	in the Offsets Strategy: Clearing, habitat fragmentation unplanned fire	Quality	7	Scale 0-10	
act calcu			events and predation by feral animals	Total quantum of impact	527.94	Adjusted hectares	
qml	Protected matter attributes	Attribute relevant to case?	Description	Quantum of imj	pact	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					
			Threatene	ed 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 o	alculato	or										
	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time hori (years)	zon	Start ard qual	ea and ity	Future are quality withe	ea and out offset	Future are quality wit	ea and h offset	Raw gain	Confidence in result (%)	Adjusted gain	Net prese (adjusted	ent value hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source
										Ecolog	gical Con	nmunities										
	Area of community	No				Risk-related time horizon (max. 20 years)		Start area (hectares)		Risk of loss (%) without offset Future area without offset (adjusted hectares)	0.0	Risk of loss (%) with offset Future area with offset (adjusted hectares)	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																					
ator	Area of habitat	Yes	527.94	Adjusted hectares	Onground management of feral predators and fire at regional offset sites in accordance with the Offset Strateov.	Time over which loss is averted (max. 20 years)	20	Start area (hectares)	1070	Risk of loss (%) without offset Future area without offset (adjusted hectares)	0%	Risk of loss (%) with offset Future area with offset (adjusted hectares)	0% 1070.0	0.00	80%	0.00	0.00	510.53	96.70%	Yes	\$2,200,000.00	Section 9.2 of the Offset Strategy (consideration of species recovery plans, strategies and advice for the GDS), Section 9.3.1 of Offset Strategy outlines Offset Projects (e9. fire management
et calcul						Time until ecological benefit	3	Start quality (scale of 0-10)	8	Future quality without offset (scale of 0-10)	3	Future quality with offset (scale of 0-10)	9	6.00	80%	4.80	4.77					and feral predator mangement) for the GDS and Section 9.3.2 of Offset Strategy
Offs	Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time hori (years)	zon	Start v	alue	Future value offse	without t	Future val offse	ue with t	Raw gain	Confidence in result (%)	Adjusted gain	Net prese	ent 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																				

				Sun	nmary							
			N .			Cost (\$)						
	Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Direct offset (\$)	Other compensatory measures (\$)	Total (\$)				
	Birth rate	0				\$0.00		\$0.00				
Summary	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	527.94	510.53	96.70%	Yes	\$2,200,000.00	\$232,824.80	\$2,432,824.80				
	Area of community	0				\$0.00		\$0.00				
						\$2,200,000.00	\$232,824.80	\$2,432,824.80				
Perth

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