

# Biodiversity Offsets Strategy

# E





---

**EASTERN LEASES PROJECT**

# **EPBC ACT BIODIVERSITY OFFSETS STRATEGY**

for  
**South32 Pty Ltd**  
May 2015

# EASTERN LEASES PROJECT

# EPBC ACT BIODIVERSITY OFFSETS STRATEGY

*Prepared by:*

**HANSEN BAILEY**  
215 Adelaide Street  
Brisbane QLD 4000

12 May 2015

*For:*

**SOUTH32 PTY LTD**  
108 St Georges Terrace  
Perth WA 6000

## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	PROJECT OVERVIEW .....	1
1.2	PROJECT SETTING .....	1
1.3	PROJECT APPROVAL PROCESS .....	2
1.4	REQUIREMENT FOR OFFSETS .....	3
1.5	DOCUMENT STRUCTURE .....	4
<b>2</b>	<b>SIGNIFICANT RESIDUAL IMPACTS.....</b>	<b>5</b>
<b>3</b>	<b>PROFILE OF TARGET SPECIES .....</b>	<b>7</b>
<b>4</b>	<b>DIRECT AND INDIRECT OFFSETS.....</b>	<b>9</b>
4.1	DIRECT OFFSETS .....	9
4.2	INDIRECT OFFSETS.....	9
4.3	MECHANISM FOR PROJECT OFFSETS .....	10
<b>5</b>	<b>PROJECT OFFSETS .....</b>	<b>12</b>
5.1	OVERVIEW OF OFFSETS .....	12
5.2	RESEARCH PRINCIPLES .....	12
5.3	POTENTIAL RESEARCH PROGRAMS .....	14
5.3.1	Feral Cat Research.....	14
5.3.2	Research into Brush-tailed Rabbit-rat .....	15
5.3.3	Research on Mine Rehabilitation .....	17
5.4	CONSISTENCY WITH EPBC ACT ENVIRONMENTAL OFFSETS POLICY.....	18
<b>6</b>	<b>CONCLUSIONS .....</b>	<b>19</b>
<b>7</b>	<b>REFERENCES .....</b>	<b>20</b>

## LIST OF TABLES

Table 1	EIS Terms of Reference Requirements in Relation to Biodiversity Offsets
Table 2	Profile of Target Species
Table 3	Conservation Gains from Direct Offsets

## LIST OF FIGURES

Figure 1	Location Plan
Figure 2	Project Setting
Figure 3	Biodiversity Offset Strategy Flowchart

## LIST OF APPENDICES

Appendix A	Criteria for Research and Education Programs
------------	--

## LIST OF ABBREVIATIONS

ALC	Anindilyakwa Land Council
ALRA	<i>Aboriginal Land Rights (Northern Territory) Act 1976</i>
BOS	Biodiversity Offsets Strategy
DPAW	Department of Parks and Wildlife
DotE	Federal Department of the Environment
EA Act	<i>Environmental Assessment Act</i>
Eastern Leases	ELR28161 and ELR28162
EIS	Environmental Impact Statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GEMCO	Groote Eylandt Mining Company Pty Ltd
IPA	Indigenous Protected Area
MNES	Matters of National Environmental Significance
NT EPA	Northern Territory Environment Protection Authority
NT	Northern Territory
SPRAT	Species Profile and Threats Database
the project	Eastern Leases Project
TOR	Terms of Reference
TPWC Act	<i>Territory Parks and Wildlife Conservation Act</i>
WA	Western Australia

## **EASTERN LEASES PROJECT BIODIVERSITY OFFSETS STRATEGY**

*for*  
**South32 Pty Ltd**

### **1 INTRODUCTION**

#### **1.1 PROJECT OVERVIEW**

Groote Eylandt Mining Company Pty Ltd (GEMCO) operates a manganese mine (the existing mine) on Groote Eylandt in the Gulf of Carpentaria, approximately 650 km south-east of Darwin in the Northern Territory (Figure 1). Operations at the existing mine involve mining manganese ore by open cut mining methods, and then processing the ore in a concentrator to produce a washed ore. The concentrate is transported from the mine by road train to GEMCO's port facility at Milner Bay (Figure 2).

GEMCO is proposing to develop the Eastern Leases Project (the project) in order to access additional mining areas, located to the east of the existing mine. The additional mining areas comprise two Exploration Licences in Retention (ELRs) which are termed the Eastern Leases. ELR28161 is termed the Northern Eastern Lease (Northern EL) and ELR28162 is termed the Southern Eastern Lease (Southern EL). The project will use the same open cut mining methods used at the existing mine. Project mining areas will be connected to the existing mine via a new haul road (Figure 2). Manganese ore will be transported via this haul road to the existing mine for processing.

The project is an additional mining area that will be operated as part of the existing mine, rather than an independent mine. The project will make use of infrastructure (e.g. concentrator, stockpiles) at the existing mine. No upgrades to this infrastructure are required as a result of the project. Construction of the project is anticipated to commence in 2017, subject to the receipt of necessary approvals. Mining would take place for approximately 13 years. The project and the existing mine would operate concurrently.

#### **1.2 PROJECT SETTING**

Groote Eylandt is Australia's third largest island, with a land area of approximately 2,285 km<sup>2</sup>. It is the largest island in the Gulf of Carpentaria in north-eastern Australia. It forms part of an archipelago of islands, with other nearby islands including Bickerton Island, Connexion Island and Winchelsea Island. Groote Eylandt is Aboriginal land, scheduled under the Commonwealth *Aboriginal Land Rights (Northern Territory) Act 1976* (ALRA). The Land Council responsible for Groote Eylandt is the Anindilyakwa Land Council (ALC).

Groote Eylandt, and the other islands in the archipelago, have significant ecological value because the terrestrial fauna species present on the island are relatively protected from key threatening processes (such as Cane Toads) that exist on the mainland. There is also very little development on Groote Eylandt. Development is limited to the existing mine and three small townships. The remainder of the island is undeveloped and is used primarily for traditional Aboriginal practices such as hunting and gathering. There are no agricultural activities on Groote Eylandt.

The Groote Eylandt Archipelago has been declared an Indigenous Protected Area (IPA). An IPA is an area of Indigenous-owned land or sea where Traditional Owners have entered into an agreement with the Federal Government to promote biodiversity and cultural resource conservation (Department of the Environment, 2013a). The Groote Eylandt Archipelago was declared the Anindilyakwa IPA in 2006, and is administered by the ALC.

The project site consists of the Eastern Leases and the proposed haul road corridor which connects them to the existing mine (Figure 2). The project site is characterised by elevated rocky outcrops and gently sloping valleys. The Emerald River and Amagula River traverse the project site. The land within and surrounding the project site comprises natural bushland that is mainly eucalypt dominated open forest, woodland and shrubland. The land within the project site is used for traditional Aboriginal practices. The other key land use within the project site is GEMCO's ongoing mineral exploration activities. There is no infrastructure within the project site, although there are a number of unsealed tracks.

### **1.3 PROJECT APPROVAL PROCESS**

The project is subject to an environmental assessment process in accordance with the Northern Territory's *Environmental Assessment Act* (EA Act) and *Environmental Assessment Administrative Regulations*. The Northern Territory Environment Protection Authority (NT EPA) has determined that an Environmental Impact Statement (EIS) is required for the project and has produced Terms of Reference (TOR) for the EIS (NT EPA, 2014). The EIS process supports an application for Authorisation under the *Mining Management Act*. The project cannot proceed until the EIS process is complete, and Authorisation under the *Mining Management Act* has been granted.

The project was declared a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The controlling provisions are potential impacts on listed threatened species and communities and listed migratory species. The EIS prepared under the EA Act has been accredited to support the EPBC Act approval.

## 1.4 REQUIREMENT FOR OFFSETS

Environmental offsets are actions taken to counterbalance the significant residual impacts of a project. Offsets are required for Matters of National Environmental Significance (MNES) protected under the EPBC Act (i.e. threatened species and communities and migratory species) in the event that significant impacts are predicted to remain after avoidance and mitigation measures have been taken. This Biodiversity Offsets Strategy (BOS) describes the significant, residual impacts on MNES predicted for the project and describes the offsets that are proposed for these impacts. The BOS has been structured to address the requirements of the EPBC Act Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities, 2012). It also addresses the requirements of the EIS TOR, which are outlined in Table 1. Northern Territory (NT) legislation does not contain any requirement for offsets although the NT EPA has published a general guideline on the concept of offsets (Guidelines on Environmental Offsets and Associated Approval Conditions, NT EPA, 2013)

**Table 1**  
**EIS Terms of Reference Requirements in Relation to Biodiversity Offsets**

Terms of Reference Requirement	BOS Section Reference
<p>3.5.6 Offsets</p> <p>The <i>Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy</i> requires residual significant impacts to be offset, with a focus on direct offsets. Offsets are measures that compensate for the residual impacts of an action on the environment, after avoidance and mitigation measures are taken. Where appropriate, offsets are considered for assessment and approval under the EPBC Act. The suitability of a proposed offset is considered as part of the decision to approve or not approve a proposed action under the EPBC Act. The EIS should provide information on:</p> <ul style="list-style-type: none"> <li>• Any identified impacts or detriments that cannot be avoided, reduced or mitigated at reasonable costs and whether these impacts could be considered as 'significant' under the EPBC Act;</li> <li>• Risks of failure of management actions (such as rehabilitation, weed control, etc.) and uncertainties of management efficacy should be identified; and</li> <li>• Proposed offsets for residual significant impacts to listed threatened species or ecological communities and listed migratory species and an explanation as to how these proposed offsets meet the requirements of the <i>Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy</i> and other relevant guidance.</li> </ul>	<p>Section 2 provides a summary of the project's significant residual impacts on MNES. It draws on information in the EIS Terrestrial Ecology Report and the EIS Aquatic Ecology Report.</p> <p>The EIS Terrestrial Ecology Report and the EIS Aquatic Ecology Report detail management measures, including risk of failure. These reports are able to draw on experience at the existing mine, particularly experience with mine rehabilitation.</p> <p>The remainder of this BOS outlines the offsets that are proposed for significant residual impacts on listed threatened species or ecological communities or listed migratory species. Section 5.4 specifically describes the way in which the BOS is consistent with the EPBC Act Environmental Offsets Policy.</p>

## **1.5 DOCUMENT STRUCTURE**

The BOS is structured as follows:

- Section 1 – Introduction (this section) – provides an overview of the project, its setting and approval status, and outlines the requirement for the BOS;
- Section 2 – Significant Residual Impacts – draws on the findings of the EIS specialist studies in order to define the predicted significant residual impacts on MNES;
- Section 3 – Profile of Target Species – provides a brief description of the MNES species which require offsets, including their distribution, habitat requirements, threats and identified research and management priorities;
- Section 4 – Direct and Indirect Offsets – explains the difference between direct and indirect offsets, and explains why indirect offsets are most suitable for the project;
- Section 5 – Project Offsets – explains the offset programs that are proposed for the project, including providing a high level overview of each program; and
- Section 6 – Conclusions.

## 2 SIGNIFICANT RESIDUAL IMPACTS

Comprehensive ecological studies, addressing terrestrial and aquatic ecology, were undertaken as part of the EIS. These studies involved desktop work, including a review of previous flora and fauna surveys and database searches. The desktop work was followed by multi-season flora and fauna surveys of the project site. This work allowed for the characterisation of the flora and fauna of the project site, and enabled the development of a comprehensive species list for the project site.

The EIS Terrestrial Ecology Report contains a list of threatened and migratory terrestrial fauna species under the EPBC Act that were recorded from the project site or were assessed as having a high or moderate potential to occur on the project site. No aquatic species listed under the EPBC Act were assessed as being present or having a high or moderate potential to occur on the project site. Similarly, no threatened ecological communities or flora species listed under the EPBC Act have been assessed as being likely to occur on the project site.

A detailed assessment of potential impacts on threatened species was undertaken, as detailed in the EIS Terrestrial Ecology Report. It included assessing potential impacts on EPBC Act listed species in accordance with the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Department of the Environment, 2013b). These guidelines were used to prepare assessments of significance for any EPBC Act listed species present on the project site, or assessed as having a high or moderate potential to occur. It was determined that the project has the potential to give rise to significant, residual impacts on the following species:

- Northern Hopping-mouse (*Notomys aquilo*); and
- Brush-tailed Rabbit-rat (*Conilurus penicillatus*).

Both species are listed as Vulnerable under the EPBC Act. The Brush-tailed Rabbit-rat is also listed as Endangered under the *Territory Parks and Wildlife Conservation Act* (TPWC Act) and the Northern Hopping-mouse is listed as Vulnerable under the TPWC Act. Although the project is predicted to impact a number of other threatened and/or migratory species, the management measures that are proposed for these species (e.g. progressive rehabilitation) are proven to be effective at the existing mine for these species. The project is therefore not predicted to have a significant residual impact on these species, as defined by the *Significant Impact Guidelines*. Offsets are only required for significant, residual impacts.

The impacts on the Northern Hopping-mouse and the Brush-tailed Rabbit-rat are largely as a result of the proposed clearing of habitat for these species. Vegetation clearing will be undertaken progressively for the project and will give rise to the following loss of habitat:

- Clearing of approximately 1,125 ha of open forest, and sandstone woodland and rock outcrop habitat that is potentially suitable for the Northern Hopping-mouse. This clearing represents approximately 1% of the potential habitat on the island for the species.
- Clearing of approximately 1,525 ha of Brush-tailed Rabbit-rat habitat, which represents approximately 1% of potential habitat for this species on the island.

Areas cleared for the project will be progressively rehabilitated to a self-sustaining open woodland, similar to the pre-mining environment and the surrounding disturbed land. The rehabilitation will aim to create similar habitat to the pre-mining environment. GEMCO has a good track record with mine rehabilitation and there are areas of mine rehabilitation that are older than 30 years, and are documented as providing habitat for threatened species. However, the Northern Hopping-mouse and Brush-tailed Rabbit-rat have not been recorded in mine rehabilitation to date. Consequently, a precautionary approach is proposed in the EIS, and the assumption has been made that the clearing of habitat for these species will be a permanent (i.e. residual) impact for these species. This impact has been assessed as being significant, under the *Significant Impact Guidelines*. The EIS also assesses indirect impacts on these species (e.g. lighting, noise, introduction of pests), but these impacts were not considered to be significant and/or could be mitigated.

Offsets will therefore be provided to compensate for the direct loss of habitat for the Northern Hopping-mouse and the Brush-tailed Rabbit-rat. These species are termed the target species in this BOS.

### 3 PROFILE OF TARGET SPECIES

Conservation Advice under the EPBC Act has been published for the Brush-tailed Rabbit-rat (Department of the Environment, Water, Heritage and the Arts, 2008b) and a multi-species recovery plan has been published for the Northern Hopping-mouse (Woinarski, 2004). These documents, along with the Species Profile and Threats Database (SPRAT) profiles for the species, *The Action Plan for Australian Mammals 2012* (Woinarski et al., 2014) and other published descriptions provide information on the distribution, biology, threats to these species, and provide conservation and research priorities. Table 2 provides a summary of this information.

**Table 2**  
**Profile of Target Species**

Species	Northern Hopping-mouse	Brush-tailed Rabbit-rat
<b>Description</b>	Small rodent with a long tufted tail, and large eyes and ears (Woinarski, 2004).	Robust rodent, notable for its long, tufted tail (Department of the Environment, 2013c).
<b>Distribution</b>	Groote Eylandt (particularly coastal dunes and sandsheets), and coastal north-eastern Arnhem Land (Woinarski, 2004).	Limited distribution, with all records from monsoonal northern Australia, adjacent islands and southern New Guinea (Department of the Environment, 2013c).
<b>Habitat Preference</b>	Grassland, shrubland and open forest habitats, mostly in sandy areas near the coast (Woinarski, 2004).	Restricted to mixed open eucalypt open forest and woodland, or on dunes with Casuarina. Shelters in tree hollows, logs and less frequently the crowns of pandanus or sand-palms. Appears to prefer habitats that are not burnt annually, and that have an understory of perennial grasses (Department of the Environment, 2013c).
<b>Threats</b>	According to Woinarski (2004), potential threats include: <ul style="list-style-type: none"> <li>Habitat change due to altered fire regimes and introduced herbivores;</li> <li>Feral cats;</li> <li>Disease; and</li> <li>Habitat loss, specifically mining activities on Groote Eylandt and north-eastern Arnhem Land.</li> </ul>	According to DotE (2013c), potential threats include: <ul style="list-style-type: none"> <li>Habitat change due to altered fire regimes and introduced herbivores;</li> <li>Habitat loss, specifically a forestry project on the Tiwi Islands, and mining activities on Groote Eylandt and potentially the Mitchell Plateau in Western Australia;</li> <li>Feral cats; and</li> <li>Disease (as a possible threat).</li> </ul>
<b>Research and Conservation Priorities</b>	According to Woinarski (2004), research and conservation priorities include: <ul style="list-style-type: none"> <li>Undertake research on the species to better understand total population, population trends, distribution, habitat suitability, and susceptibility to threatening</li> </ul>	According to Conservation Advice for this species (DEWHA, 2008b), research priorities include: <ul style="list-style-type: none"> <li>Develop and maintain a monitoring program across the species' national range; and</li> <li>Assess population size, distribution, ecological requirements and the</li> </ul>

Species	Northern Hopping-mouse	Brush-tailed Rabbit-rat
	<p>processes; and</p> <ul style="list-style-type: none"> <li>• Manage populations of the species, including fire management and minimising predation by feral cats.</li> </ul> <p>Woinarski et al. (2014) provide the following additional management measures:</p> <ul style="list-style-type: none"> <li>• Develop mine rehabilitation procedures that would favour this species;</li> <li>• Establish captive insurance populations on Groote Eylandt;</li> <li>• Examine options for using these captive populations for:               <ul style="list-style-type: none"> <li>– Reintroducing the species to areas on the mainland where it has become extinct; and</li> <li>– Research into mine rehabilitation options;</li> </ul> </li> <li>• Maintain or enhance constraints on cat imports to Groote Eylandt;</li> <li>• Monitor the effectiveness of management measures; and</li> <li>• Involve Indigenous ranger groups in survey, monitoring and management.</li> </ul>	<p>relative impacts of threatening processes (e.g. fire, introduced herbivores, feral cats).</p> <p>Woinarski et al. (2014) provide the following additional management measures:</p> <ul style="list-style-type: none"> <li>• Constrain further encroachments of invasive pasture grasses;</li> <li>• Establish captive insurance populations;</li> <li>• Enhance quarantine and surveillance to reduce risks of incursions of new threats to islands;</li> <li>• Monitor the effectiveness of management measures; and</li> <li>• Involve Indigenous ranger groups in survey, monitoring and management.</li> </ul>

## 4 DIRECT AND INDIRECT OFFSETS

The EPBC Act Environmental Offsets Policy makes provision for direct offsets and other compensatory measures. These two mechanisms for providing offsets are described in the following sections, along with an overview of the offset mechanism proposed for the project. The policy also provides for advanced offsets, which are a supply of offsets for potential future use, transfer or sale. Advanced offsets are not relevant to the project and are not discussed further in this report.

### 4.1 DIRECT OFFSETS

According to the EPBC Act Environmental Offsets Policy, direct offsets are actions that provide a measurable conservation gain for an impacted protected matter. Conservation gain may be achieved through measures such as:

- Improving existing habitat for the protected matter;
- Creating new habitat for the protected matter;
- Reducing threats to the protected matter; and
- Averting the loss of a protected matter or its habitat that is under threat.

A common model for direct offsets involves the project proponent acquiring land that is degraded, but provides habitat or potentially provides habitat for the protected matter. The land is then secured under a covenant or other mechanism, and the land is managed to improve its habitat value (e.g. weed and pest management; removal of stock; replanting of vegetation). Monitoring is undertaken to confirm that habitat values are being improved. Land in close proximity to the impacted area is favoured, and a higher offset ratio (i.e. additional land) is required if land is located further from the impacted area.

### 4.2 INDIRECT OFFSETS

The EPBC Act Environmental Offsets Policy makes provision for other compensatory measures (i.e. non-land based offsets, also called indirect offsets). These are measures that do not directly offset the impacts on the protected matter, but are anticipated to lead to benefits for the impacted protected matter. Funding for research of educational programs are examples of indirect offsets. Indirect offsets should relate to the impacted aspect of the protected matter. The EPBC Act Environmental Offsets Policy provides the example of research into effective revegetation techniques for a particular ecological community as a suitable indirect offset for clearing of that ecological community.

The EPBC Act Environmental Offsets Policy provides detailed requirements for indirect offsets.

The EPBC Act Environmental Offsets Policy favours direct offsets, and contains a requirement for direct offsets to comprise 90% of the offset. However, it allows deviation from this principle in particular circumstances, such as where it can be “demonstrated that a greater benefit to the protected matter is likely to be achieved through increasing the proportion of other compensatory measures in an offsets package” (Section 2.4.1, page 8 of EPBC Act Environmental Offsets Policy).

### 4.3 MECHANISM FOR PROJECT OFFSETS

An assessment of the various types of conservation gains that could be achieved by direct offsets (based on the EPBC Act Environmental Offsets Policy) was undertaken. Table 3 lists the various mechanisms by which conservation gain can be achieved, according to the EPBC Act Environmental Offsets Policy and describes the extent to which these mechanisms are relevant to Groote Eylandt.

As indicated in Table 3, direct offsets have very limited potential to achieve conservation gains. This is because the land on Groote Eylandt is of high conservation value, largely undeveloped and not subject to grazing or weed infestation. Groote Eylandt is Aboriginal land and is already subject to a fire management program run by the ALC Rangers. The potential to achieve ecological gains by managing land on Groote Eylandt is therefore very limited.

**Table 3**  
**Conservation Gains from Direct Offsets**

<b>Mechanism to Achieve Conservation Gain<sup>1</sup></b>	<b>Applicability to Target Species on Groote Eylandt</b>
Improve existing habitat for the protected matter	Given the high ecological value of the land on Groote Eylandt, there is no land on the island that would lend itself to being managed to provide improved habitat for either species.
Creating new habitat for the protected matter	The land on Groote Eylandt is largely undeveloped and there is no degraded land that could be managed/rehabilitated in order to create new habitat. There is no potential to create new habitat for either of species on Groote Eylandt, or on surrounding islands. The only potential creation of new habitat would be through improving the value of mine rehabilitation for the target species. This is the subject of the proposed indirect offsets program (Section 5.3.3).
Reducing threats to the protected matter	The threats to these species are listed in Table 2. There is some management of these threats on Groote Eylandt (e.g. lack of cattle, some management of fire) at present, but further research is required to manage these threats. This is the subject of the proposed indirect offsets program (Section 5.3).
Increasing the values of a heritage place	Not applicable to this protected matter.

<b>Mechanism to Achieve Conservation Gain<sup>1</sup></b>	<b>Applicability to Target Species on Groote Eylandt</b>
Averting the loss of a protected matter or its habitat that is under threat	There are no proposals (other than the project) to clear or disturb habitat for these species on Groote Eylandt, and consequently there is no potential to avert the loss of a protected matter or its habitat that is under threat.

1. Source: Section 4.2.1 of EPBC Act Environmental Offsets Policy

Direct offsets beyond Groote Eylandt are also not feasible. The remainder of the islands in the Groote Eylandt Archipelago are subject to the same constraints for direct offsets as Groote Eylandt. Managing populations of the target species on mainland East Arnhem Land is also not practical, given a lack of knowledge about target populations that could be managed. The Northern Hopping Mouse has not been recorded beyond Groote Eylandt in the past ten years (Woinarski et al., 2014). The distribution of the Brush-tailed Rabbit-rat is poorly understood and it would be difficult to locate a target population to form the basis of direct offsets.

Although there is a very limited scope for direct offsets on Groote Eylandt or beyond, the island is a highly suitable location for undertaking research programs that could ultimately provide significant benefits to the target species (including benefits to mainland populations of the species). As noted in Table 3, there are a number of areas where further information is required in order to understand and manage threats to the species. The proponent intends funding research in this regard as part of an indirect offset program.

Indirect offsets, involving well-planned research that is relevant to priorities and threats identified for these species, have a much greater likelihood of providing a benefit to the species overall than direct offsets. As noted in Section 4.2, the EPBC Act Environmental Offsets Policy allows indirect offsets to comprise a greater proportion of the offsets package when it can be demonstrated that a greater benefit to the protected matter is likely to be achieved through increasing the proportion of other compensatory measures. This provision is relevant to the project, given that indirect offsets will provide greater benefit to the species than direct offsets. Section 5 provides further detail on the proposed indirect offsets for the project.

## 5 PROJECT OFFSETS

### 5.1 OVERVIEW OF OFFSETS

The offset program proposed for the project involves sponsoring research on the threats to the target species and/or the research priorities identified in the conservation advice for the target species. A high level overview of the offset programs is provided in Section 5.2 and 5.3.

Figure 3 provides a summary of the process to develop and implement the BOS and the offset programs. It shows the timing and stages of the offset process relative to the statutory EIS process. As indicated in Figure 3, there will be an opportunity for Department of the Environment (DotE) to review and comment on the BOS as part of the statutory EIS process. The specific offset programs have not been finalised at this stage and, as shown in Figure 3, there is still to be consultation with stakeholders such as the ALC, government agencies, and various research institutes in relation to the programs. As detailed in Section 5.2 and shown in Figure 3, the research will ultimately be undertaken in accordance with detailed research plans, which will be developed prior to the commencement of the Eastern Leases Project and provided to the DotE for approval.

### 5.2 RESEARCH PRINCIPLES

The offset program involves undertaking research that would benefit the target species. The research would comply with the requirements outlined in Appendix A (Criteria for Research and Educational Programs) of the EPBC Act Environmental Offsets Policy. These criteria are reproduced in Appendix A of this BOS. The research will comply with the following principles:

- The research will be structured to improve the viability of the target species, and will be targeted toward research priorities or threats identified in advice prepared by DotE.
- The research will be undertaken in a transparent, scientifically robust and timely manner.

The research will be undertaken in accordance with a research plan, submitted to DotE prior to commencement of the project. The research plan will outline the following:

- Objectives of the research;
- Potential benefits to target species;
- Proposed research methods, with a description of the way in which research methods comply with best practice research approaches;
- Qualifications and experience of the researchers;
- A research work program;

- A process for providing updates to DotE on the progress of the research and the key findings;
- A commitment to provide research publications and outputs to DotE prior to public release;
- Commitments in relation to publication of the research. The research would be published in an internationally recognised peer-reviewed scientific journal, or be of a standard that would be acceptable for publication; and
- The process for administering research funds and keeping financial records in relation to the research.

Given that there can be a significant lag time between the preparation of an EIS and commencement of the project (and hence commencement of offset programs), developing detailed plans for the offset programs is not feasible at this point in time. There is a significant body of research underway, or planned for the near future, into the decline of small mammals. Much of this research would be directly relevant to the offset programs proposed to be undertaken, and it will consequently be necessary to review the status and outcomes of existing research prior to finalising the offset programs. This will ensure that the offset programs can draw on the findings of the most recent research, and be directed to provide maximum benefit to the target species.

Although the offset programs cannot be finalised at this stage, a number of programs are being considered. The following programs are favoured at this stage, but are still to be confirmed prior to the commencement of the project:

- Research into feral cat control, specifically baiting of cats and ways to minimise impacts of baiting on non-target species (e.g. Quolls and Monitor Lizards).
- Research into the ecological requirements, distribution and threats to the Brush-tailed Rabbit-rat. GEMCO has already sponsored a PhD into the Northern Hopping-mouse, which involved research to develop an effective trapping method for monitoring the species on Groote Eylandt and research on the general ecology and natural history of the species.
- Research into improving the value of mine rehabilitation as habitat for the target species.

The above listed programs would directly benefit the target species, and could be undertaken on Groote Eylandt, with the proponent providing research funding and in-kind assistance (e.g. accommodation for researchers). The programs could be structured to enable involvement and ongoing capacity development of the ALC Rangers. The proposed offset programs are described in Section 5.3.

Other potential topics for research and offset programs include the effects of fire management on the two target species, and research into disease in small mammals. As indicated in Table 2, these are both potential threats to the target species.

## **5.3 POTENTIAL RESEARCH PROGRAMS**

### **5.3.1 Feral Cat Research**

#### ***Overview of Issue***

Groote Eylandt provides important habitat for various threatened species, including mammals, birds, marine turtles and other reptiles. However, feral cats are present on Groote Eylandt and an increase in feral cat numbers may pose a risk to the biodiversity of the island. The ALC notes that cats are considered to be one of the highest risks to threatened fauna species on Groote Eylandt (ALC, 2013). The ALC, in conjunction with the East Arnhem Regional Council, undertakes feral cat control, which involves monitoring of cat numbers using camera traps, and de-sexing cats found in townships (ALC, 2014). However, feral cat control is a significant task and feral cats have the potential to become a significant conservation issue for the island. The ALC convened a forum on feral cats in 2014, in recognition of the growing threat that cats pose to the island's wildlife (ALC Annual Report, 13/14).

Feral cats are listed as a threat to both the Northern Hopping-mouse (Woinarski, 2004) and the Brush-tailed Rabbit-rat (DEWHA, 2008b). The SPRAT profile for the Brush-tailed Rabbit-rat notes that the recent arrival of feral cats in the Sir Edward Pellew Islands (in the Gulf of Carpentaria) coincided with the decline and possible extinction of the Brush-tailed Rabbit-rat on the islands (DotE, 2013c). Greg Hunt, the Federal Minister for the Environment recently indicated in 2014 that "*nothing will have more of an impact on protecting our threatened species ... than the war on feral cats*". The Action Plan for Australian Mammals (Woinarski et al., 2014) is the most recent conservation overview published for these species. It lists the implementation of cost-effective control measures to reduce the abundance of feral cats as being a high priority management action for both the Northern Hopping-mouse and the Brush-tailed Rabbit-rat.

#### ***Proposed Program***

Work has recently been undertaken in Western Australia (WA) on the use of chemical baits in feral cat control. On 19 February 2015, the WA Department of Parks and Wildlife (DPAW) released the bait Eradicat for feral cat control. Trials have been undertaken in WA on the use of this bait, but further research is still required on the use of this bait (and other baits such as Curiosity®) for feral cat control in the NT. In particular, further research is needed on the potential effects of this bait on non-target species, such as Quolls, Dingoes and Monitor Lizards.

Groote Eylandt is an ideal setting for research into feral cat control. As an island setting it allows for controlled research. There are only small townships on the island, and there is consequently the potential to prevent, or limit, the introduction of new feral cats into the ecosystem. In addition, an important area of research in feral cat control involves researching the potential effects of baits on non-target species such as Quolls, Dingoes and Monitor Lizards. All of these species are present on Groote Eylandt.

The research could be undertaken through the provision of financial support to current research programs focussing on feral cat control. For example, the Northern Australia Hub of the National Environmental Research Program has research projects that would be directly relevant. Two particularly relevant projects being run through the Northern Australia Hub are “Research and management to reverse decline of native mammal fauna” and “Feral cat management on Indigenous lands”. These programs receive funding from DotE.

In addition to the proposed research program, the offset program could involve development and implementation of a community education program on Groote Eylandt about feral cats. Although there are restrictions on cat ownership in parts of Groote Eylandt, and there have been some efforts to increase awareness of this issue, there has not been a sustained, intensive education program on feral cats. The education program would be developed in consultation with the ALC, and would be targeted toward both Indigenous and non-Indigenous residents of Groote Eylandt. It would provide information on the unique environment on Groote Eylandt, and the threat that feral cats pose to this environment. The ALC Rangers could play an important role in the implementation of the education program. Similar programs have been implemented by the ALC Rangers and the proponent in relation to Cane Toads.

### ***Benefits for Target Species***

This research program has the potential to provide a knowledge base that will allow the application of broad-scale, cost-effective and efficient baiting programs to control feral cats on Groote Eylandt, and in other parts of Australia. This could provide benefits to the target species and other native fauna on Groote Eylandt, as well as providing wider benefits in locations beyond Groote Eylandt. The research could be coupled with an education program on Groote Eylandt, which would assist in the control of feral cats on the island. The proposed research and education programs are consistent with the Recovery Plan for the Northern Hopping-mouse (Woinarski, 2004) and the Conservation Advice for the Brush-tailed Rabbit-Rat (DEWHA, 2008b).

## **5.3.2 Research into Brush-tailed Rabbit-rat**

### ***Overview of Issue***

The Brush-tailed Rabbit-rat is poorly understood, particularly in terms of threats to the species, and the extent and magnitude of the decline that the species is undergoing (Woinarski, 2012). Further information on this species is required in order to reverse the

decline and prevent the localised extinctions that are occurring. Predictive modelling described in the SPRAT profile indicates that this species is likely to become extinct on mainland Australia over the next decade if management practices are not changed, with the potential for the species to contract to a small number of islands off the Northern Territory coast (DotE, 2013c).

There is a known need for further research into the species, with the highest priority areas being the quantification of the impact of likely threats on the species (particularly feral cats), baseline and ongoing surveys and monitoring programs to determine population sizes and distribution, and ecological and habitat preferences and requirements (DEWHA, 2008b).

### **Proposed Program**

Research into the Brush-tailed Rabbit-rat on Groote Eylandt is necessary to fill the known knowledge gaps on the species. A research program could address the following areas:

- Improving survey methods for the species;
- Species distribution, population size and population density;
- Ecological requirements of the species, including habitat preferences; and
- Quantifying the potential threats to the species, including fire regimes and disease.

GEMCO has recently sponsored similar research into the Northern Hopping-mouse, which has yielded valuable information about effective survey methods for this species and its ecological requirements. A similar program of research is required for the Brush-tailed Rabbit-rat.

The proposed research program on Groote Eylandt would align with the Commonwealth Conservation Advice research and action priorities detailed in the SPRAT profile (DotE, 2013c).

The research could be undertaken through sponsoring PhD research projects. Research funding and in-kind assistance could be provided. It is anticipated that the ALC Rangers could be partners to the research, given their local knowledge and the work that they have undertaken in the past in relation to this species.

### **Benefits for Target Species**

The Conservation Advice for the Brush-tailed Rabbit-rat identifies the need for further research into the species (DEWHA, 2008b). The research program proposed as part of the offset program will address this need and will provide a better understanding of the Brush-tailed Rabbit-rat, particularly on Groote Eylandt. A better understanding of the population biology of this species, and the threats to the species, is a necessary precursor to inform the design of programs to potentially reverse the high rate of population decline of the species.

### 5.3.3 Research on Mine Rehabilitation

#### **Overview of Issue**

GEMCO has a track record with undertaking rehabilitation of mined areas to create open woodland, similar to the pre-mining environment and the surrounding undisturbed land. Although extensive vegetation monitoring of rehabilitation has been undertaken, only limited fauna monitoring has been conducted within rehabilitated areas to date. However, fauna monitoring undertaken as part of the EIS (EIS Terrestrial Ecology Report) recorded the presence of a number of threatened fauna species in mine rehabilitation, including the Northern Quoll, which is listed as Endangered under the EPBC Act. The Northern Hopping-mouse and the Brush-tailed Rabbit-rat have not, however, been recorded in mine rehabilitation to date and it is unclear whether rehabilitated areas are able to provide suitable habitat for these species. Understanding ways to improve the habitat value of mine rehabilitation for these species could provide significant conservation benefits, given that several thousand hectares of land will ultimately be rehabilitated as part of project activities and the existing mine. This land will be under active management during the rehabilitation establishment phase (and subject to ongoing monitoring) and there is the potential for this land to be managed for the benefit these species.

#### **Proposed Program**

This offset program would involve funding research into ways in which rehabilitation could be improved as habitat for the target species. The research would include collection of fauna monitoring data from rehabilitation of various ages and ecosystem types, particularly targeting the Northern Hopping-mouse and Brush-tailed Rabbit-rat. It would also investigate important habitat features for the colonisation of the target species. The research would consider issues that may pose constraints to these species, such as connectivity to intact habitat, and resources for foraging, shelter and breeding. Issues such as the substrate in rehabilitated areas may be important for species such as the Northern Hopping-mouse, given that it constructs large burrow systems. The research could be undertaken through sponsoring PhD research projects. Research funding and in-kind assistance could be provided.

#### **Benefits for Target Species**

As noted above, there are several thousand hectares of current or future mining areas on Groote Eylandt that will ultimately be rehabilitated, and will be under active management during the rehabilitation establishment phase. Improving the quality of this rehabilitation to enable colonisation by the Northern Hopping-mouse and the Brush-tailed Rabbit-rat could achieve significant conservation gains for the species by providing several thousand hectares of suitable habitat. The Action Plan for Australian Mammals lists developing and implementing post-mining rehabilitation procedures that provide for repopulation by the Northern Hopping-mouse as being a medium-high management action (Woinarski et al., 2014).

#### **5.4 CONSISTENCY WITH EPBC ACT ENVIRONMENTAL OFFSETS POLICY**

The BOS is consistent with the EPBC Act Environmental Offsets Policy, given that:

- It proposed biodiversity offsets for all species that are predicted to potentially experience a significant, residual impact as a result of the project.
- Section 4.3 of the BOS has demonstrated that, for this project, indirect offsets will provide a much greater benefit to the species than direct offsets. Section 4.2.1 of the EPBC Act Environmental Offsets Policy indicates that in such circumstances indirect offsets may comprise a higher proportion of the total offsets package.
- The proposed offsets will relate directly to the impacted aspects, as required in Section 4.2.2 of the EPBC Act Environmental Offsets Policy. Section 5.3 of the BOS has clearly outlined the benefits for target species for each proposed offset program.
- The research that will be undertaken as part of the indirect offset program will be designed to be undertaken in accordance with the principles outlined in Appendix A of the EPBC Act Environmental Offsets Policy (reproduced in Appendix A of this document). As outlined in Section 5.2, the research will be undertaken in accordance with research plans, which are designed to address these principles.

## 6 CONCLUSIONS

Offsets are required to be provided for any significant residual impacts on matters protected under the EPBC Act. The project has the potential to give rise to significant residual impacts on the Northern Hopping-mouse and the Brush-tailed Rabbit-rat. This BOS outlines a framework for the provision of offsets for impacts on these species.

The Northern Hopping-mouse and the Brush-tailed Rabbit-rat are rodents that are restricted to small populations in the northern part of Australia. Several of the populations are located on offshore islands. The populations have experienced significant declines in recent years, and threats appear to include feral cats, inappropriate land management regimes (particularly fire regimes), loss of habitat, and potentially disease.

Direct (land-based) offsets for the project are not preferred in the context of the project's location on Groote Eylandt. There are no obvious opportunities to achieve conservation gain through managing specific areas of land on Groote Eylandt, given that the island is largely undisturbed, not subject to grazing or development pressures and has few weed species. No suitable land based offsets have been identified on mainland Australia. Greater benefits for the species can be achieved through other compensatory measures (indirect offsets) that involve well-planned research into the management priorities that have been identified in conservation advice for these species.

The BOS proposes an offset strategy that involves sponsoring research into the threats to these species and/or the research priorities identified in conservation advice. The specific offset programs are still to be finalised, but proposed programs could include research into feral cat control (particularly using baits), research into the ecology of the Brush-tailed Rabbit-rat, and research into improving the value of mine rehabilitation as habitat for the target species. These programs all have the potential to provide a knowledge base that will allow for more effective management of these species and their threats. In this way the proposed offsets have the potential to provide wider benefits to the species, and potentially to a number of other native species that are subject to the same threats.

The BOS outlines the research plans that will be developed for each offset program and explains the specific benefits that each plan will have for the target species. The research plans will be developed to address the requirements outlined in Appendix A (Criteria for Research and Educational Programs) of the EPBC Act Environmental Offsets Policy.

## 7 REFERENCES

*Aboriginal Land Rights (Northern Territory) Act 1976 (Cth)*

ALC (2013). 12/13 Anindilyakwa Land Council Annual Report. Retrieved from [http://www.anindilyakwa.com.au/sites/default/files/files/ALC\\_AnnRep\\_13-14.pdf](http://www.anindilyakwa.com.au/sites/default/files/files/ALC_AnnRep_13-14.pdf)

Department of the Environment (2013a). Retrieved from <http://www.environment.gov.au/indigenous/ipa/index.html>

Department of the Environment (2013b). *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance*

Department of the Environment (2013c). *Conilurus penicillatus (Brush-tailed Rabbit-rat, Brush-tailed Tree-rat, Pakooma) in Species Profile and Threats Database.*, Canberra.

Department of the Environment (2013d). *Notomys aquilo (Northern Hopping-mouse, Woorrentinta) in Species Profile and Threats Database*, Canberra.

Department of the Environment (2014). Retrieved from <http://www.greghunt.com.au/Home/LatestNews/tabid/133/articleType/ArticleView/articleId/3084/Transcript-Press-Conference-Sydney.aspx>

Department of the Environment and Water Resources (2007). *Information Sheet: Northern hopping-mouse, Notomys aquilo Threatened Species Day Fact Sheet.*

Department of the Environment, Water, Heritage and the Arts (2008a). *Commonwealth Listing Advice on Conilurus penicillatus (Brush-tailed Rabbit-rat)*. Threatened Species Scientific Committee

Department of the Environment, Water, Heritage and the Arts (2008b). *Commonwealth Conservation Advice for Conilurus penicillatus (Brush-tailed Rabbit-rat)*. Threatened Species Scientific Committee

Department of Parks and Wildlife (2015). Retrieved from <http://www.abc.net.au/news/2015-01-30/western-australia-cat-trapping/6054306>

Department of Sustainability, Environment, Water, Population and Communities (2012). *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*

Environment Australia (1999). *Threat abatement plan for predation by feral cats*

*Environmental Assessment Act (NT)*

*Environment Protection and Biodiversity Conservation Act 1999 (Cth)*

*Mining Management Act (NT)*

National Environmental Research Program (2015). *Research overview*. Retrieved 9 March 2015 from <http://nerp.northern.edu.au/research/overview>

NT EPA (2013). *Guidelines on Environmental Offsets and Associated Approval Conditions*

NT EPA (2014). *Terms of Reference for the Preparation of an Environmental Impact Statement. GEMCO Eastern Leases Project*

*Territory Parks and Wildlife Conservation Act (NT)*

Woinarski, J.C.Z (2004). *National Multi-species Recovery Plan for the Carpentarian Antechinus Pseudantechinus mimulus, Butler's Dunnart Sminthopsis butleri and Northern Hopping-mouse Notomys aquilo, 2004 – 2009*. Northern Territory Department of Infrastructure Planning and Environment

Woinarski, J.C.Z., Burbidge, A.A., and Harrison, P.L. (2014). *The action plan for Australian Mammals 2012*

Woinarski, J and Hill, B (2012). *Information Sheet Threatened Species of the Northern Territory - Brush-Tailed Rabbit-Rat Conilurus penicillatus*. Department of Land Resource Management

Woinarski, J and Ward, S (2012). *Information Sheet Threatened Species of the Northern Territory - Northern Hopping-mouse Notomys aquilo*. Department of Land Resource Management

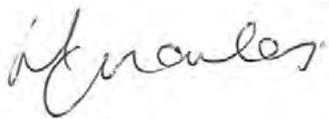
\*

\*

\*

for

**HANSEN BAILEY**



Laura Knowles  
 Principal Environmental Scientist



Peter Hansen  
 Director

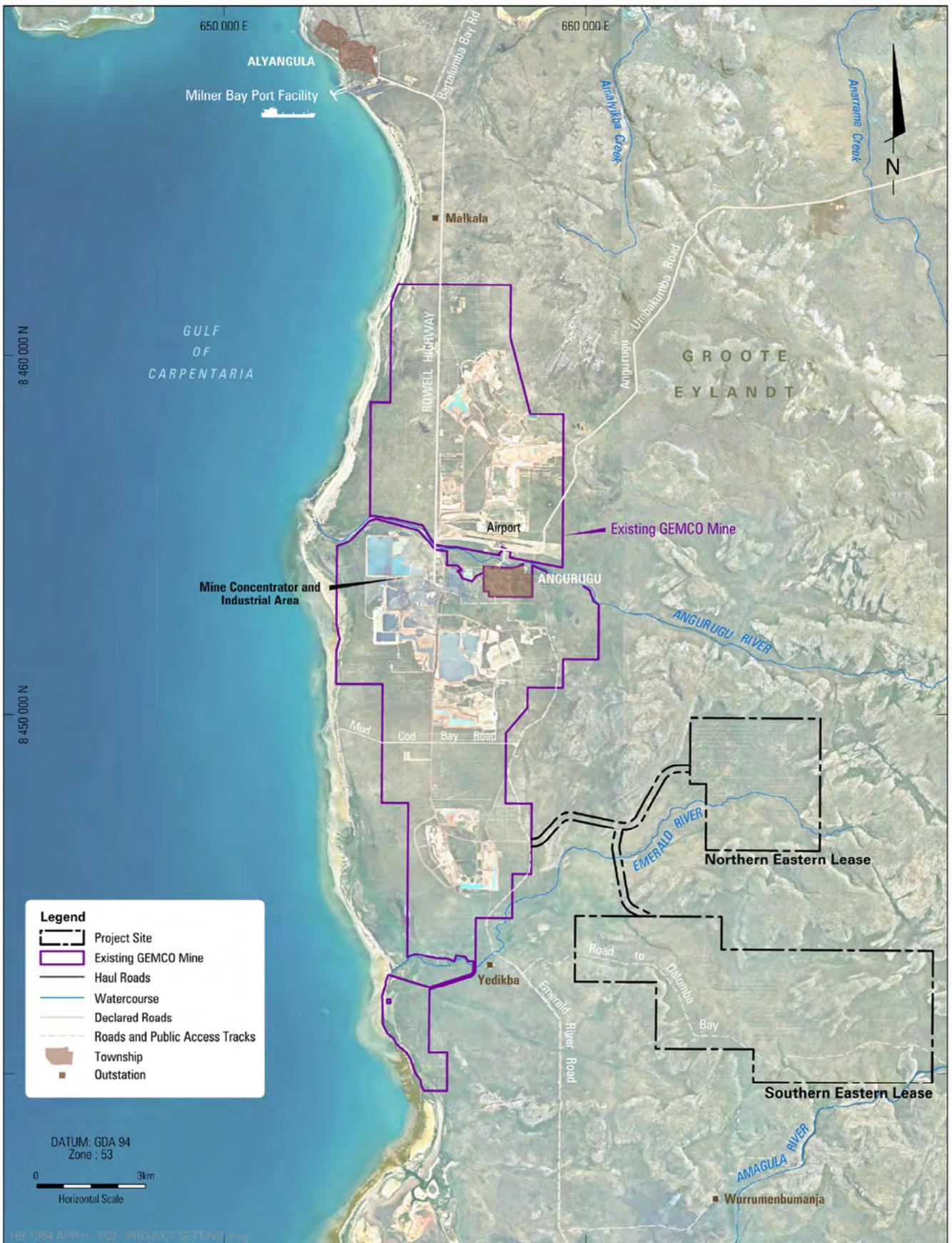
## FIGURES



EASTERN LEASES PROJECT

Location Plan

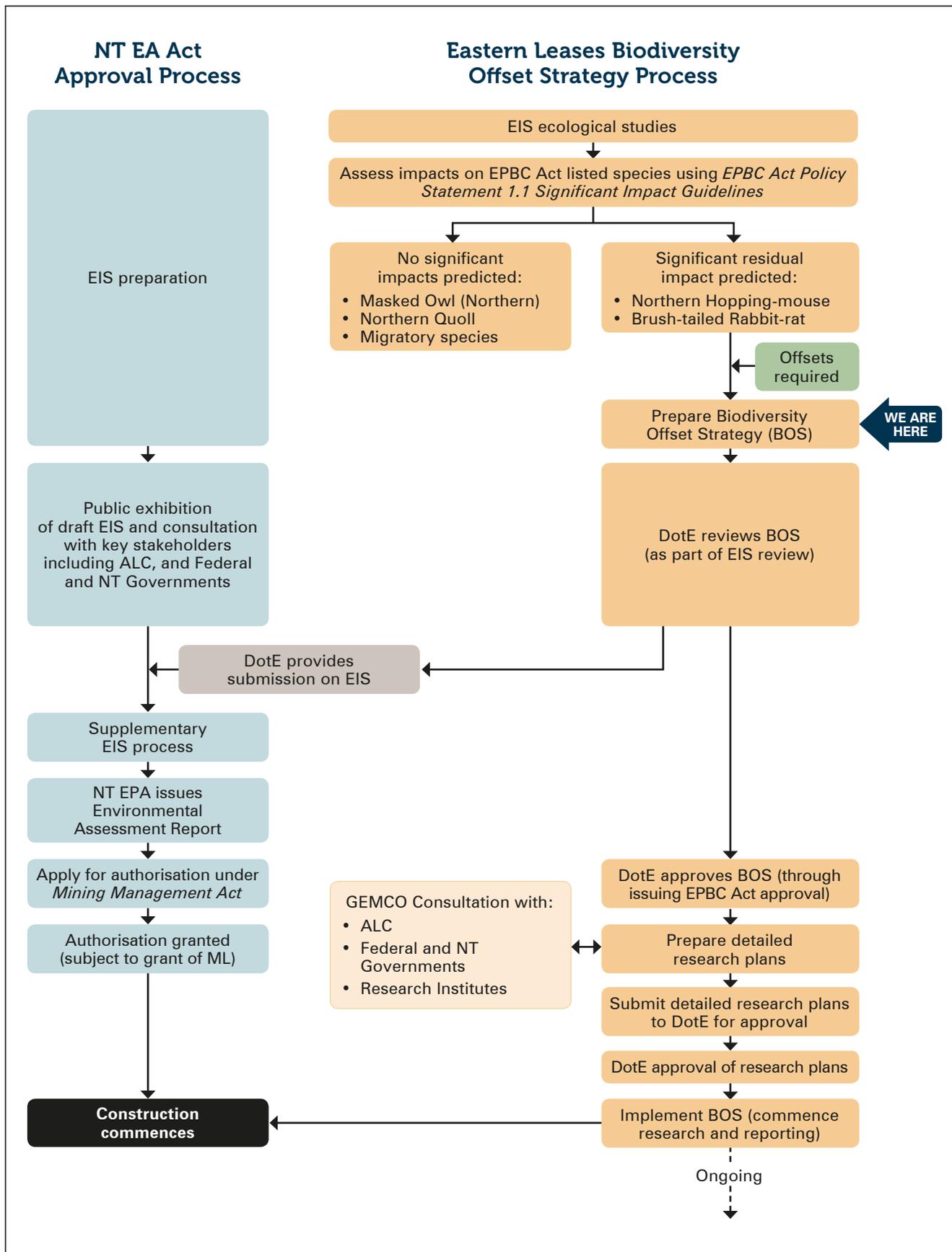
**FIGURE 1**



EASTERN LEASES PROJECT

Project Setting

**FIGURE 2**



EASTERN LEASES PROJECT

Biodiversity Offset Strategy Flowchart

**APPENDIX A**  
***Criteria for Research and Educational Programs***

Extract from *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy October 2012

## Appendix A: Criteria for research and educational programs

### A suitable research or education program must:

1. endeavour to improve the viability of the impacted protected matter, for example
  - signage in key areas to educate the public regarding the risks to a threatened animal, or
  - research into effective re-vegetation techniques for a threatened ecological community
2. be targeted toward key research/education activities as identified in the relevant Commonwealth approved recovery plan, threat abatement plan, conservation advice, ecological character description, management plan or listing document. Where Commonwealth approved guidance documents are not available or are insufficient in detail, the department will consider additional information sources such as state and territory management plans or peer reviewed scientific literature to inform priority offset activities
3. be undertaken in a transparent, scientifically robust and timely manner
4. be undertaken by a suitably qualified individual or organisation in a manner approved by the department
5. consider best practice research approaches.

### The proponent is required to:

1. select an institutional or individual host (for the purpose of executing the program) through an internationally available open tender process or provide evidence that the program can be successfully undertaken in-house. The department will not be responsible for processing tenders. Where appropriate, the tender should complement an existing research institution's (e.g. National Environmental Research Program Hub) work program as it relates to the matter of national environmental significance. This will be the responsibility of the proponent; however, the department will require that proponents follow the department's guidelines
2. provide updates on progress and key findings to the department through periodic reporting
3. ensure that funds are managed appropriately and that auditable financial records are kept and maintained
4. apply a 'no-surprises' policy to the publication, whereby research publications and outputs are provided to the department at least 5 working days before release.

### Research programs:

1. will be tailored to at least a postgraduate education level; however, there will be scope to engage other educational levels in educational programs (see below)
2. will present findings that can be peer-reviewed
3. will 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.

Publications should be submitted to free open access journals. Data and information collected should have creative commons licensing and be free and accessible

4. research outputs should inform future management decisions on the protected matter and, where possible, be readily applicable to other similar matters (species groupings etc).

**Educational programs:**

1. will be likely to vary in scope, mode of delivery and duration according to the target audience and the protected matter, (for instance, school or community programs, signage or printed materials)
2. should seek to attain measurable outcomes. Note that it may be difficult to ascertain the scope of influence of educational programs as it can be difficult to link education activities to behavioural change and subsequent improvement in the viability of the protected matter
3. should be targeted toward behavioural change and subsequent improvement in the viability of the protected matter.