



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: 8032/1
File Number: DER2018/000517
Duration of Permit: 30 May 2019 to 30 May 2028

PERMIT HOLDER

Phosphate Resources Limited trading as Christmas Island Phosphates

LAND ON WHICH CLEARING IS TO BE DONE

Mining Tenement MCI 70/1A

AUTHORISED ACTIVITY

The Permit Holder must not clear more than 44 hectares of native vegetation within the area hatched yellow on attached Plan 8032/1a.

CONDITIONS

1. Avoid, minimise and reduce the impacts and extent of clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:

- (a) avoid the clearing of native vegetation;
- (b) minimise the amount of native vegetation to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

2. Weed control

(a) When undertaking any clearing, or other activity pursuant to this permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of weeds:

- (i) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (ii) ensure that no *weed*-affected *mulch*, *fill* or other material is brought into the area to be cleared; and
- (iii) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

(b) Weed management activities will be undertaken by the Permit Holder in accordance with commitments in the Environmental Management Plan as approved by the Minister for Territories Department of Infrastructure, Regional Development and Cities.

3. Fauna management - Abbott's booby (*Papasula abbotti*)

A minimum buffer distance of 30 metres to Abbott's booby (*Papasula abbotti*) nest sites must be maintained.

4. Fauna management - giant gecko (*Cyrtodactylus saddleiri*)

When clearing within 100 metres of a *known giant gecko location* the Permit Holder shall search, capture and relocate giant geckos from the area to be cleared, including but not limited to the following activities:

- (a) *staff* are to traverse the area, spaced 10 metres apart and search for giant geckos;
- (b) *staff* are to stop every two metres to search surfaces for giant geckos;

- (c) all sightings of giant geckos are to be recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
- (d) where practical capture by hand, any giant gecko observed within the clearance zone;
- (e) place captured giant geckos individually into linen bags;
- (f) release captured giant geckos 50 metres outside of the clearance zone within similar habitat to the capture site;
- (g) release individuals within 60 minutes of capture; and
- (h) giant gecko capture and release activities are to occur over three consecutive nights immediately prior to clearing.

5. Fauna management – red crabs (*Gecarcoidea natalis*)

The track running east to west through Field 20 (cross hatched in red on Plan 8032/1b) will be closed to all mining and haulage vehicles from the 1 December to the 28 February of each year to minimise mortality to red crabs during migration and periods of high crab activity.

6. Schedule of clearing and rehabilitation

In relation to the area cross hatched red on attached Plan 8032/1b (Field 20) the Permit Holder shall:

- (a) undertake clearing in the staged order specified in Appendix 1;
- (b) at any one time no more than one stage (refer to Appendix 1) can be actively mined;
- (c) mine to ground level (stockpile removal only), ensuring that at least 1 meter of soil profile remains;
- (d) progressively relinquish each stage back to the Crown once mining activities have ceased;
- (e) within six months following completion of mining activities in any given stage, *rehabilitate* the area(s) that are no longer required for the purpose for which they were cleared under this Permit by:
 - (i) ripping the site to remove soil compaction; and
 - (ii) lay vegetative material on the ripped site.

7. Buffers to national park

A minimum buffer distance of five metres to Christmas Island National Park must be maintained.

8. Rehabilitation

The Permit Holder shall notify the General Manager having responsibility for the Indian Ocean Territories, Department of Infrastructure, Regional Development and Cities, Australian Government within one month after the completion of phosphate mining activities within each lease area.

9. Records must be kept

The Permit Holder must maintain the following records for activities done in pursuant to this Permit:

- (a) In relation to the clearing of native vegetation authorised under this Permit:
 - (i) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;
 - (ii) the date that the area was cleared; and
 - (iii) the size of the area cleared (in hectares).
- (b) Actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 1 of the Permit.
- (c) Actions taken to minimise the risk of the introduction and spread of *weeds* in accordance with condition 2 of the Permit.
- (d) The Permit Holder must maintain a description of the activities undertaken in relation to the giant gecko Management Plan pursuant to condition 4 of this Permit.
- (e) The Permit Holder must keep a record of the actions and dates in which the haulage road is closed pursuant to condition 5 of this Permit.
- (f) In relation to the *rehabilitation* of areas pursuant to condition 6 of this Permit:
 - (i) the date mining activities ceased in each stage;

- (ii) the location of any areas *rehabilitated*, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
- (iii) a description of the *rehabilitation* activities undertaken;
- (iv) the size of the area *rehabilitated* (in hectares).

10. Reporting

- (a) The Permit Holder must provide to the *CEO* on or before 30 June of each year, a written report:
 - (i) of records required under condition 9 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this Permit was undertaken between 1 January to 31 December of the preceding calendar, a written report confirming that no clearing under this permit has been carried out, must be provided to the *CEO* on or before 30 June of each year.
- (c) Prior to 28 February 2028, the Permit Holder must provide to the *CEO* a written report of records required under condition 9 of this Permit where these records have not already been provided under condition 10(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

CEO means the Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*;

known giant gecko location means locations as identified either in the Island Wide Survey (IWS) completed by Parks Australia (2013 and 2015) and in recent surveys completed by Range to Reef Environmental in 2016.

fill means material used to increase the ground level, or fill a hollow;

mulch means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;

rehabilitation also known as site rectification, means that the land is left in a condition that is compliant with any other regulatory obligations, including but not limited to the *Mining Act 1978* (WA)(CI), and in a condition appropriate to the likely future use of the land;

Staff means a person who has undertaken pre-removal training run by an expert with knowledge of effective search strategies and the safe and humane protocols used during capture, handling and release of giant geckos. A minimum of 3 hours training at night, between 19:00 and 24:00 is to be undertaken;

weed/s means any plant -

- (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*;
- or
- (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or
- (c) not indigenous to the area concerned.



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

30 April 2019

APPENDIX 1

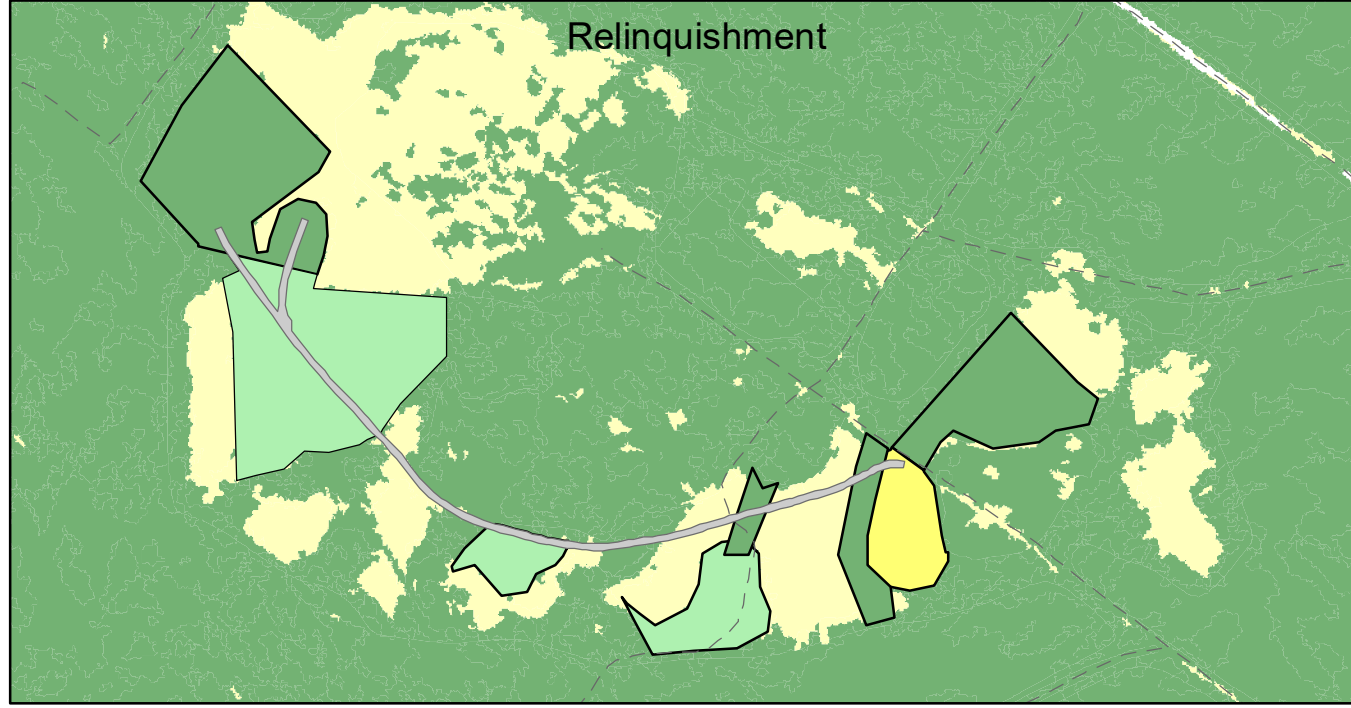
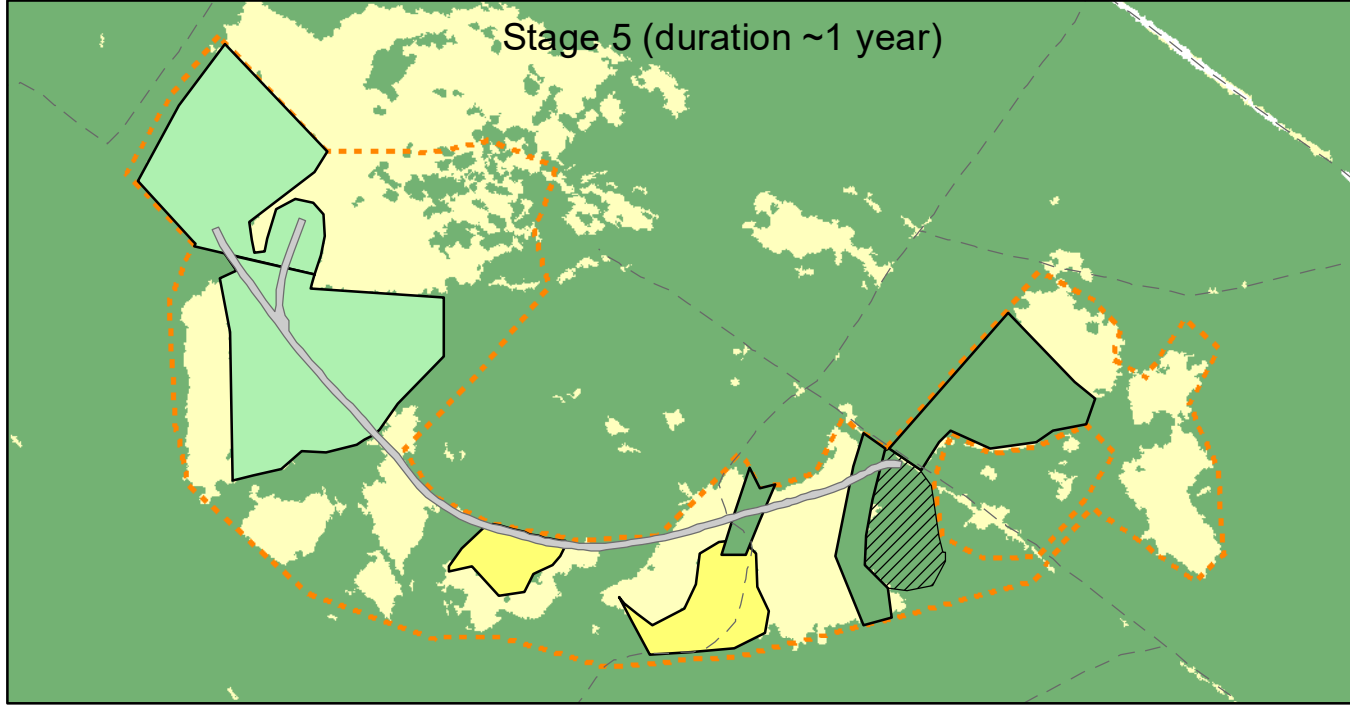
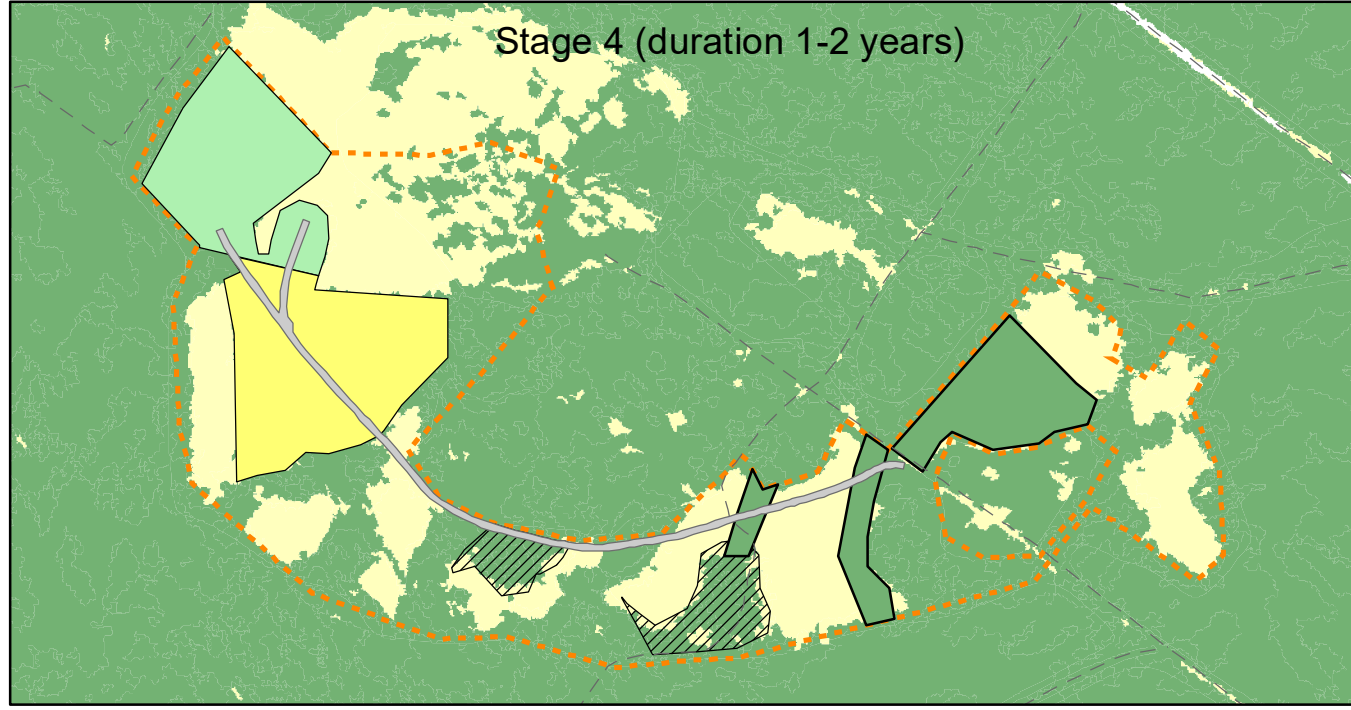
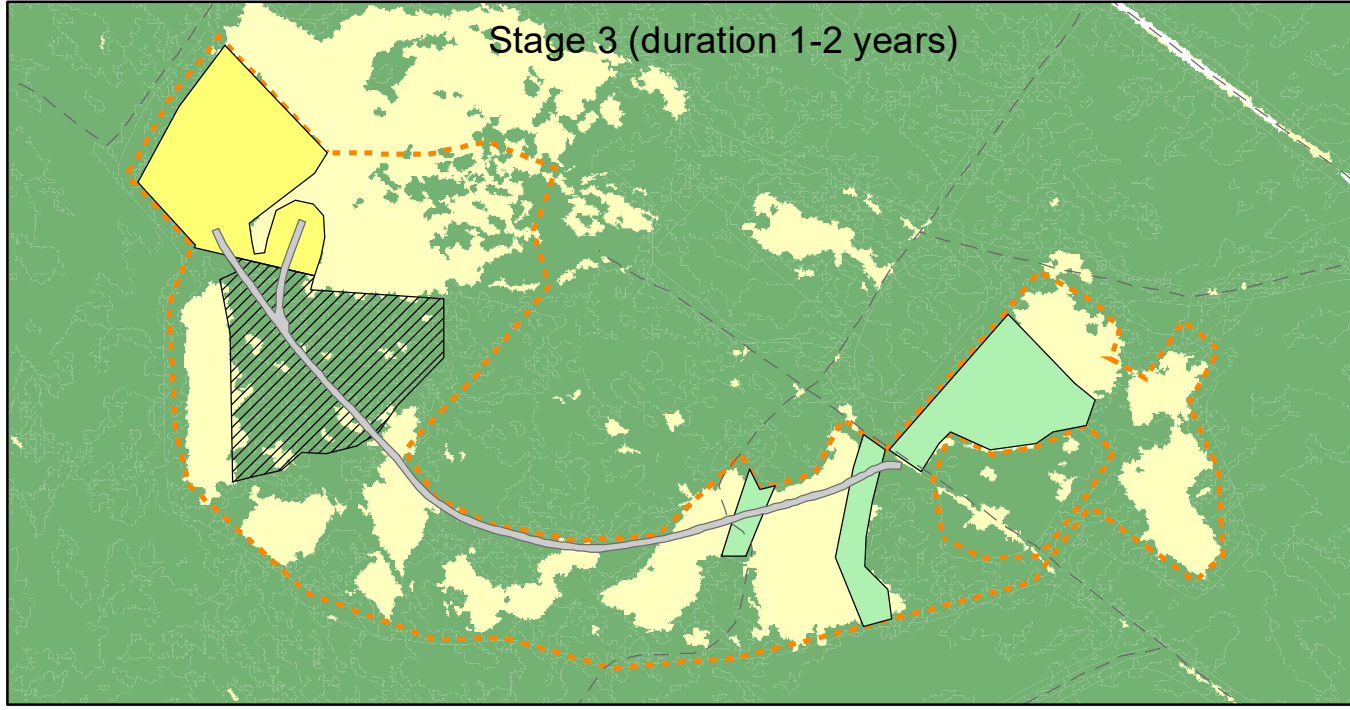
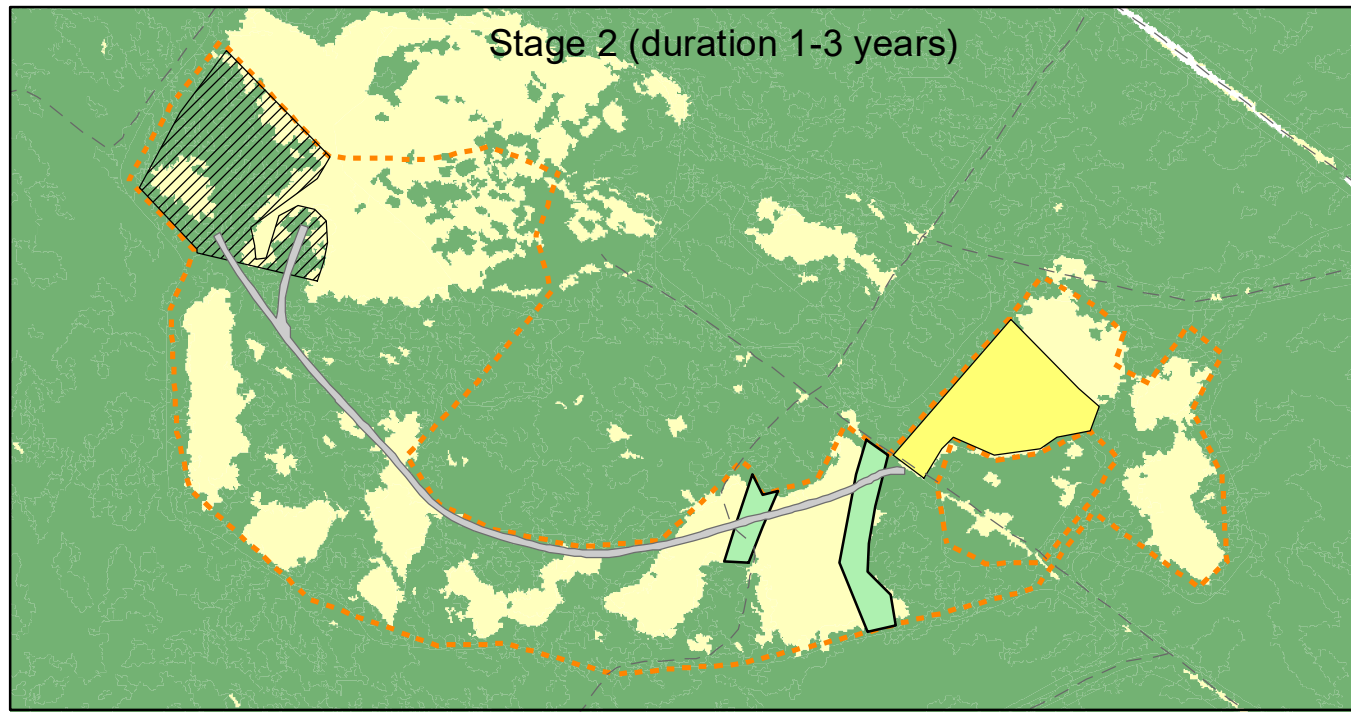
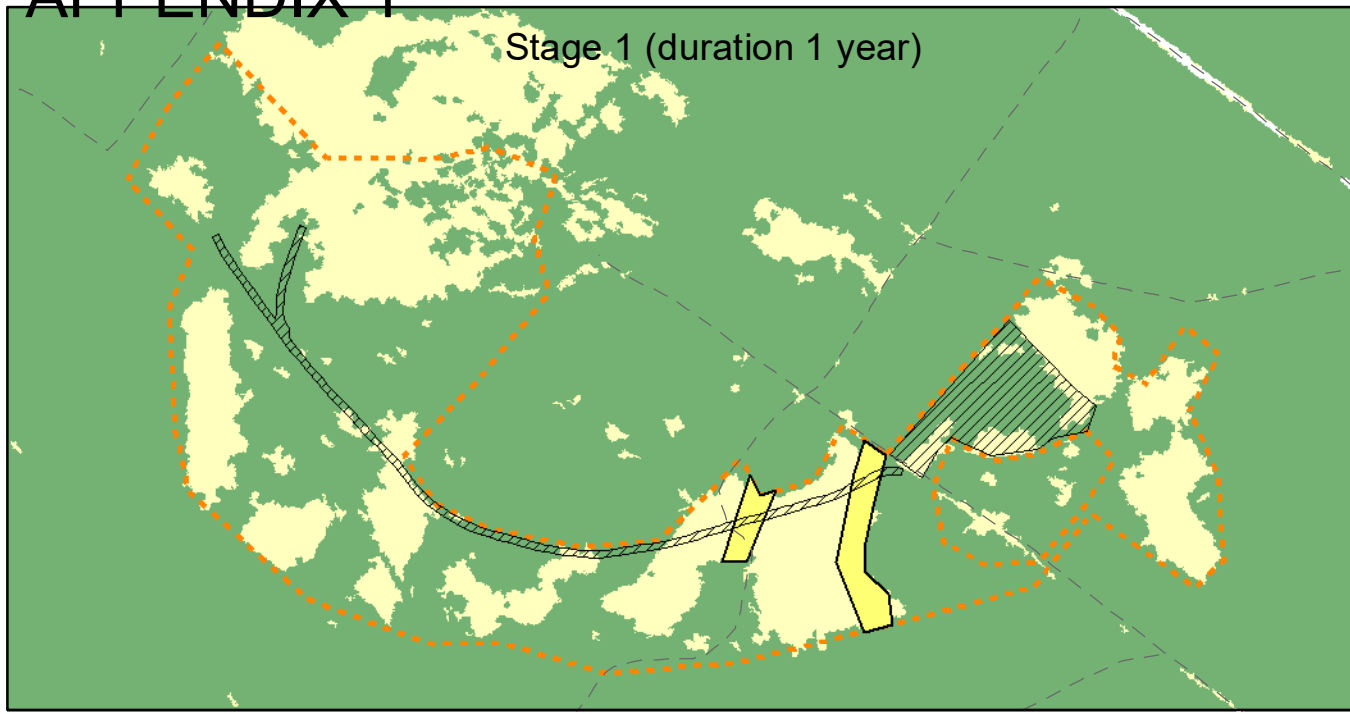
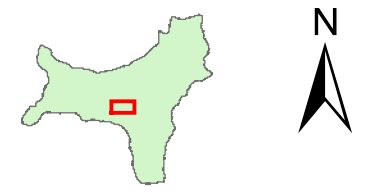


Figure 2. Vegetation cover over time

Note: This is an indicative schedule only and may be affected by operational constraints and market factors.



Legend

--- Road/Track

Stage

■ Haul Road

▨ Clearing

■ Land prepared for rehabilitation

■ <5 year vegetation growth

■ >5 year vegetation growth

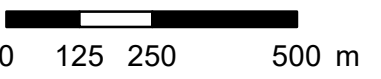
⋯ Mining Lease

Pre-existing vegetation

■ Vegetation >5 m

■ Vegetation <5m (typically fern field)

■ Unvegetated



Plan 8032/1a

105°39'0"E



Legend

-  cadastre
-  CPS areas approved to clear
-  Local Government Authorities



MGA 94
Geocentric Datum of Australia 1994

Mathew Gannaway
2019.04.30 16:45:42
+08'00'

Officer with delegated authority under Section 20
of the Environmental Protection Act 1986






GOVERNMENT OF
WESTERN AUSTRALIA

Plan 8032/1b



Legend

-  cadastre
-  CPS subject to conditions
-  Local Government Authorities



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Geocentric Datum of Australia 1994

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Officer with delegated authority under Section 20
of the Environmental Protection Act 1986



GOVERNMENT OF
WESTERN AUSTRALIA



1. Application details

1.1. Permit application details

Permit application No.: 8032/1
Permit type: Area Permit

1.2. Applicant details

Applicant's name: Phosphate Resources Limited
Application received date: 27 March 2018

1.3. Property details

Property: Mining Lease MCA 70/1A
Local Government Authority: Shire of Christmas Island
Localities: Christmas Island

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	Purpose category:
44		Mechanical Removal	Phosphate mining

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 30 April 2019

Reasons for Decision: The clearing application has been assessed against the clearing principles, planning instruments and other matters in accordance with s51O of the *Environmental Protection Act 1986*, and has concluded that the proposed clearing may be at variance to principles (b) and (h), is not likely to be at variance to principles (a), (c), (g) and (i), and is not at variance to the remaining clearing principles.

Through assessment it was identified that Abbott's booby nests are located within the vicinity of the application area. It was determined that the application area is unlikely to be necessary for the continued existence of fauna utilising nearby nest sites. However, to ensure that nesting birds are not impacted by the proposed clearing a condition requiring that no clearing occurs within 30 metres of any known Abbott's booby nest has been added to the permit.

Through assessment it has been determined that the application area does not contain significant habitat for the giant gecko, but the act of clearing may impact on individual giant geckos. A requirement for the applicant to search for, capture and release this species prior to clearing, will help ensure that the proposed clearing does not impact on giant gecko populations.

The Delegated Officer determined that the proposed clearing had the potential to impact on crab migration pathways. Through the assessment process the applicant amended the application and provided mitigation strategies, including commitments not to use an access track during migration, staged clearing and progressive rehabilitation. These commitments have been included as conditions on the permit to minimise impacts to red crabs.

Christmas Island National Park is located within close proximity to some of the clearing areas. To ensure the environmental values of the national park are not impacted by clearing a condition has been added to the permit requiring a minimum buffer of five metres be maintained to the national park.

The proposed clearing may impact the environmental values of adjacent vegetation through the introduction or spread of weeds. Weed management measures will minimise impacts to this vegetation.

2. Site Information

Clearing Description

Phosphate Resources Limited trading as Christmas Island Phosphates (CIP) (the applicant) initially applied to clear 51.5 hectares of native vegetation within Mining Lease MCA 70/1A, Christmas Island, for the purpose of mining phosphate.

In response to the Department of Water and Environmental Regulation's Preliminary Assessment and correspondence dated 21 August 2018 the applicant reduced the application area to 44 hectares to minimise impacts to red crab migration pathways.

Table 1 outlines the change made to each of the ten areas under application.

Table 1. Block sizes

Block	Original Application Area (ha)	Amended Application Area (ha)	Change (ha)
105-MB2	1.3	1.3	0
106-MB12	6.3	6.3	0
106-MB15	6.9	6.9	0
106-MB16	0.9	0.9	0
109-MB1	9.6		
110-MB1	15.3	17.4	-7.5
116-MB5	4.3	4.3	0
116-STP23B	2.1	2.1	0
126-STP9F	2.03	2.03	0
127-STP9E	2.8	2.8	0
Total	51.5	44	-7.5

Vegetation Description

Approximately 41 hectares of the application area has been mapped as regrowth vegetation, 0.02 hectares has been mapped as rehabilitation and the remainder is degraded land mapped as bare ground, fern field, infrastructure, **Leucaena leucocephala* dominant, minor or mixed weed and pioneer species (Geoscience Australia, 2014; Range to Reef, 2018a).

All vegetation within the survey area was mapped by Geoscience Australia as Regrowth or Weed Dominated Vegetation and Pioneer Regrowth. The mapped height of vegetation was typically in the 5- 15 metre range, with occasional trees to 20 metres (Range to Reef, 2018a). Areas 126-STP9F and 127-STP9E had some taller vegetation to 25 metres on their south-west boundaries. Among the regrowth were patches of Weed Dominated Vegetation and Pioneer Regrowth, typically thickets of **Cordia curassavica*, native vines and Pandanus. Of note were a small area of dense bird's nest ferns (*Asplenium nidus*) in 127-STP9E and a grove of mature Pandanus in 106-MB12 (Range to Reef, 2018a).

Vegetation Condition

Excellent; Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).

To

Degraded; Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

The average condition across the ten areas was good.

Good; Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).

Soil type

Approximately half of Christmas Island is covered with a layer of phosphate rich soil material over limestone (Range to Reef, 2018a).

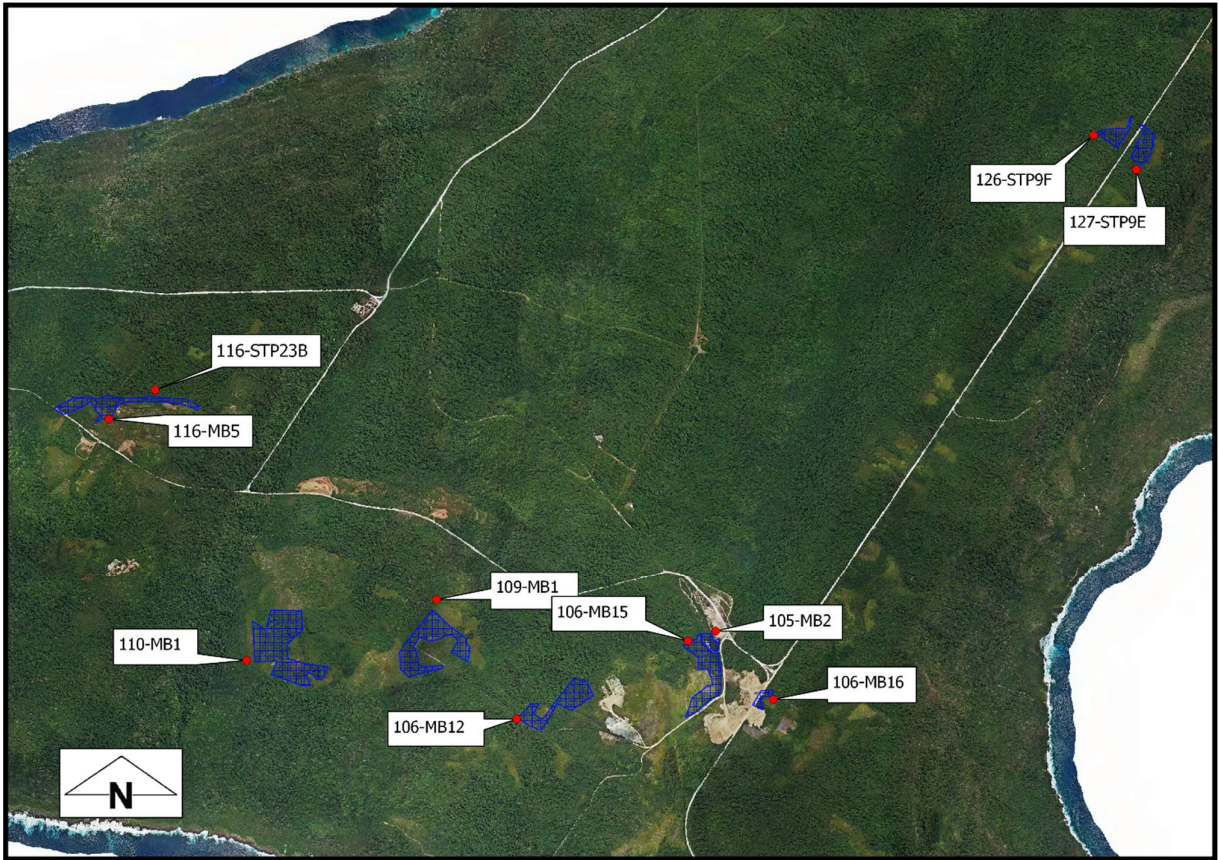


Figure 1: Original Application Area

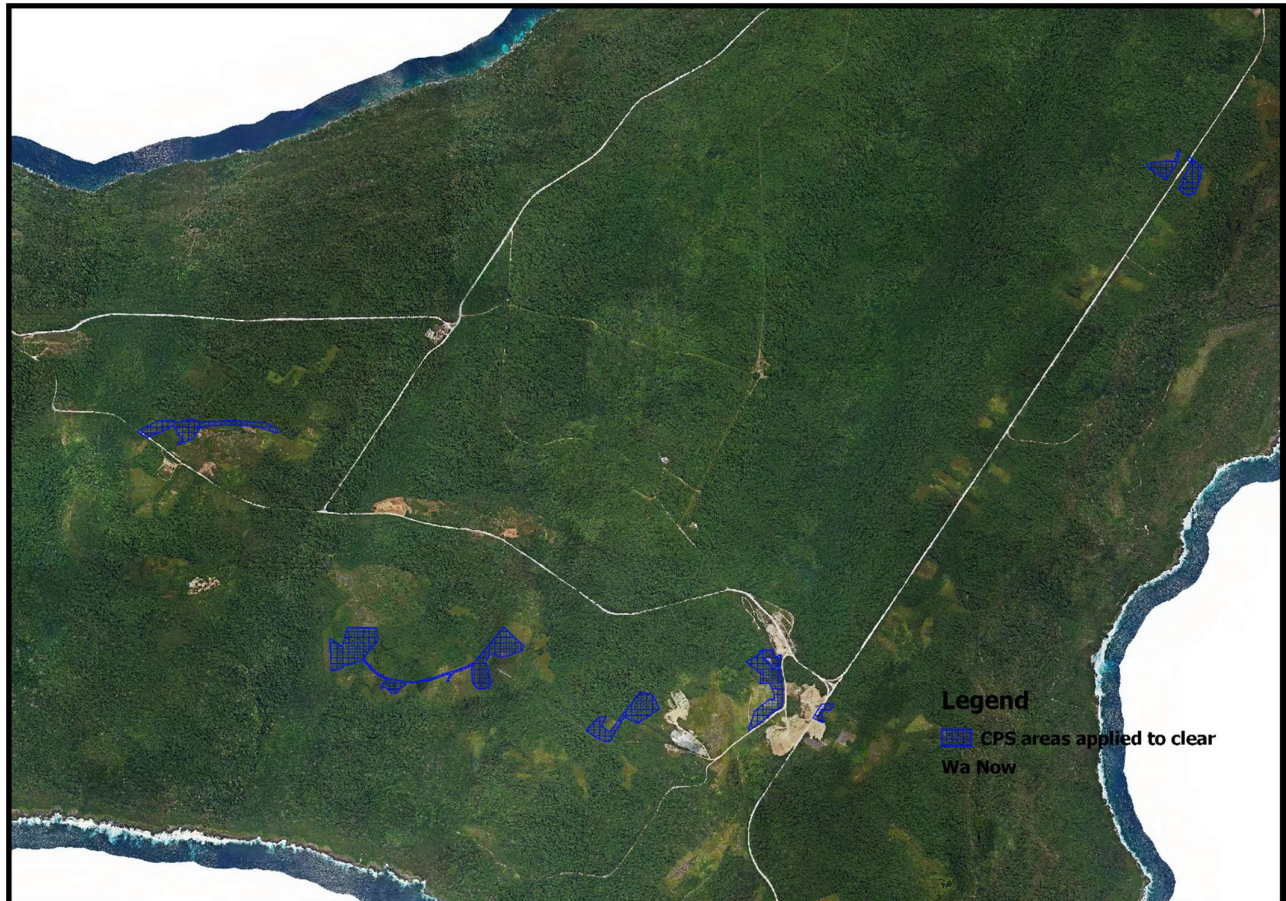


Figure 2: Amended Application Area

The applicant originally applied to clear 51.5 hectares of native vegetation within Mining Lease MCA 70/1A, Christmas Island, for the purpose of mining phosphate. The 51.5 hectares is spread out over ten areas. The following assessment is the preliminary assessment of the original 51.5 hectare area. Sections 4 and 5 below outline the amendments made by the applicant and the consideration of the variances made in response to the amendments.

3. Preliminary assessment of application against clearing principles, planning instruments and other relevant matters

(a) Native vegetation should not be cleared if it comprises a high level of biodiversity .

Proposed clearing is not likely to be at variance to this Principle

The ten application areas have been previously cleared and contain regrowth vegetation (Range to Reef, 2018a).

Portions of the application areas have been subject to previous clearing permit applications (CPS 3472/1 and CPS 4506/1), however were not granted and the assessment was deferred to be assessed on a 'case by case' basis. The assessment of these areas were deferred due to their proximity to Christmas Island National Park, Abbott's booby (*Papasula abbotti*) nests and the use of keystone fauna species such as red crabs.

Christmas Island is home to approximately 420 species of vascular plants, including 177 introduced species and 242 species thought to be indigenous to the island. Eighteen species are known to be endemic to Christmas Island, with the other flora being more widely distributed through the Indo-Malayan and Malesian regions, or throughout the tropical IndoPacific (Range to Reef, 2018a).

The application areas were surveyed by Range to Reef and a total of 77 flora taxa (from 45 families and 69 genera) was identified within the survey area, from 23 survey sites and opportunistic collections. This included 24 introduced and three endemic flora taxa.

No priority flora species are listed for Christmas Island.

Christmas Island is home to three threatened flora species, being; *Asplenium listeri* (Christmas Island Spleenwort), *Tectaria devexa* var. *minor* and *Pneumatopteris truncate*. The areas under application were surveyed by Range to Reef and no threatened flora were identified (Range to Reef, 2018a).

No state or federally listed priority or threatened ecological communities (TEC) are located on Christmas Island.

During the 2018 surveys, Range to Reef identified eight fauna species of conservation significance. The majority of the identified species are wide spread and highly mobile species. Sites 109-MB1 and 110-MB1 were identified to contain habitat necessary for the continued existence of red crabs. Fauna is discussed in more detail under principle (b).

Two of the ten application areas have been identified as containing significant habitat for indigenous fauna, however the entire area under application has been previously cleared and does not contain a high level of biodiversity when compared to remnant forest which covers approximately 65 per cent of the island. Therefore, the proposed clearing is not likely to be at variance to this principle.

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.

Proposed clearing is at variance to this Principle

Christmas Island provides habitat for several species of fauna indigenous to the island including fourteen native bird species and nine species of seabird which use the island for breeding. Four seabird taxa and nine land bird taxa are endemic to the island. A further 108 migratory or vagrant bird species have been recorded on the island. Six of the island's endemic birds are listed as threatened under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Abbott's booby is a large, long lived seabird, with the only known extant nesting colony on Christmas Island. Abbott's booby is listed as Endangered under the EPBC Act and is listed as Critically Endangered under the IUCN Red List. Most recent surveys have estimated the population to be 2500 pairs. On Christmas Island most nests are situated on the central and western areas, in tall plateau forest. Abbott's booby prefers nest sites on the lee side of slopes and gullies, with a clear area below and immediately downwind to facilitate take-off and landing.

Southeast trade winds prevail between April and November. Wind tunnel experiments have demonstrated that clearing forest increases turbulence in the canopy (Brett, 1989 in Boland et al. 2012), lowering fidelity, and increasing adult mortality of Abbott's Booby nesting in surrounding areas (Reville et al. 1990 in Boland et al. 2012). Studies have shown that birds nesting within 300 metres of the areas cleared for mining activities suffered lower breeding success and increased mortality because of greater wind turbulence (Reville et al. 1990 and Brett, 1989 in Boland et al. 2012).

Range to Reef were commissioned to undertake an Abbott's booby (*Papasula abbotti*) survey for the areas proposed to be cleared. Prior to the field survey, a 300 metre buffer to the application areas was examined in ArcGIS to determine whether any Abbott's booby had previously been recorded (Range to Reef, 2018a). Abbott's booby records were then uploaded to a GPS. The field survey was undertaken from 18 to 26 June 2017, with 163.2 hectares covered over 7.5 days (Range to Reef, 2018a). In the field, the north-west quadrant of the 300 metre buffer of the application areas was traversed in intervals of 100 to 200 metres. Any Abbott's booby calls heard, or scat accumulations, were followed up with a closer search for nest sites (Range to Reef, 2018a).

The survey did not identify any Abbott's booby nest sites within the application areas. The survey found an average of 0.68 Abbott's booby per hectare within the area 300 metres downwind of the assessment areas. This included 0.49 new records per hectare surveyed, indicating that there are more birds present than historical records suggest, and that the birds are in new locations, with some old nest sites abandoned (Range to Reef, 2018a).

Sixty two historic nests sites were identified in the ArcGIS search. Of the 62 historic records, just under half were confirmed as Abbott's booby trees (42 per cent; 26 waypoints). A further eight waypoints fell into the 'likely' and 'maybe' categories, giving a total of 55 per cent (34 waypoints) that could be conservatively confirmed as Abbott's booby nest trees (Range to Reef, 2018).

Abbott's booby nests were confirmed (Range to Reef, 2018a) to be located within approximately 50 metres of three of the application areas (106-MB12, 106-MB15 and 127-STP9E). Two other sites (109-MB1 and 116-MB5) had nests identified within 100 metres. In all of these cases, the application area contains regrowth vegetation which is lower in height (the mean height being approximately 15 metres) than the surrounding primary forest in which the nests were identified.

The recommended buffer of 300 metres is based on the forest having a 30 metre canopy height (Range to Reef, 2018a). Given that the application areas have been previously cleared and that the regrowth vegetation is lower in height than the surrounding forest, the nests are likely to already be subject to increased turbulence. Therefore the application area is unlikely to be necessary for the continued existence of Abbott's booby utilising nearby nest sites. A condition requiring that no clearing occurs within 30 metres of any known Abbott's booby nest site will ensure that nesting birds are not impacted by the proposed clearing.

In addition to Abbott's booby, seven other conservation significant fauna species were observed during the flora survey, being; robber crab (*Birgus latro*), red crab (*Gecarcoidea natalis*), Christmas Island white eye (*Zosterops natalis*), Christmas Island thrush (*Turdus poliocephalus erythropleurus*), Christmas Island imperial pigeon (*Ducula whartoni*), Christmas Island goshawk (*Accipiter fasciatus natalis*) and Christmas Island emerald dove (*Chalcophaps indica natalis*).

Christmas Island white eye is endemic to Christmas Island and occupies all forested habitats on the island. This species used to be confined to Christmas Island, however has now been introduced to Cocos Keeling Islands (DotEE, 2018a). The Christmas Island white eye is not listed as threatened under State legislation, nor is it listed under the EPBC Act.

Christmas Island thrush is listed as Endangered under the EPBC Act. This species is confined to Christmas Island, where it is considered to be widespread. The extent of occurrence is estimated to be 137 kilometres squared (DotEE, 2018b).

Christmas Island imperial pigeon is mainly found on the inland plateau of Christmas Island in rainforest and to some extent, in secondary regrowth dominated by the introduced Japanese Cherry (*Muntingia calabura*). It nests in the top of rainforest trees and other dense vegetation, and feeds in the canopy on fruits, as well as buds and leaves (DotEE, 2018c). This species is not listed as threatened under State legislation, nor is it listed under the EPBC Act.

Christmas Island emerald dove is confined to Christmas Island, where it is widespread and common in areas of rainforests. The extent of occurrence is estimated to be 137 kilometres squared (DotEE, 2018d). This species is endemic to Christmas Island and is listed as Endangered under the EPBC Act.

Christmas Island goshawk is confined to Christmas Island where it is described as being widespread but uncommon. The goshawk has been recorded across most of the island and in all major habitats from primary and marginal rainforests to suitable areas of secondary regrowth vegetation (Hill, 2004).

The Christmas Island white eye, Christmas Island thrush, Christmas Island imperial pigeon, Christmas Island goshawk and Christmas Island emerald dove are widespread and highly mobile and therefore the proposed clearing is not likely to significantly impact upon these species. In addition, approximately 63 per cent of the island is National Park which provides better quality habitat for these species.

Robber crabs are found on most parts of Christmas Island, from the shore terrace to the highest plateau areas (Parks Australia, 2018a). In 1981 this species was listed as vulnerable under the International Union for Conservation of Nature (IUCN) Red List. In 1996 their status was changed to 'data deficient'. Populations continue to decline as a result of harvesting for food, habitat loss, interaction with humans and the impact of introduced predators (Orchard, 2015).

Robber crabs are habitat generalists and all areas of previously uncleared rainforest are considered critical to this species. Although it is likely that this species will be present in the areas under application it is unlikely that the application area provides significant habitat given that they have been previously cleared.

Red crabs are most common in the moist environment of the rainforest, however also inhabit a variety of other habitats. The only habitat they are not found in are the areas cleared of rainforest and stripped of soil for phosphate mining. Current estimates of population size are about 50-60 million (Orchard, 2015). At the beginning of the wet season (around October to December) every year adult red crabs migrate from the forest to the coast, to breed and spawn. The majority of the application areas are not located within important migration pathways, however two of the application areas (109-MB1 and 110-MB1 – see Figure 3 below) have been identified as being important for crab migration.

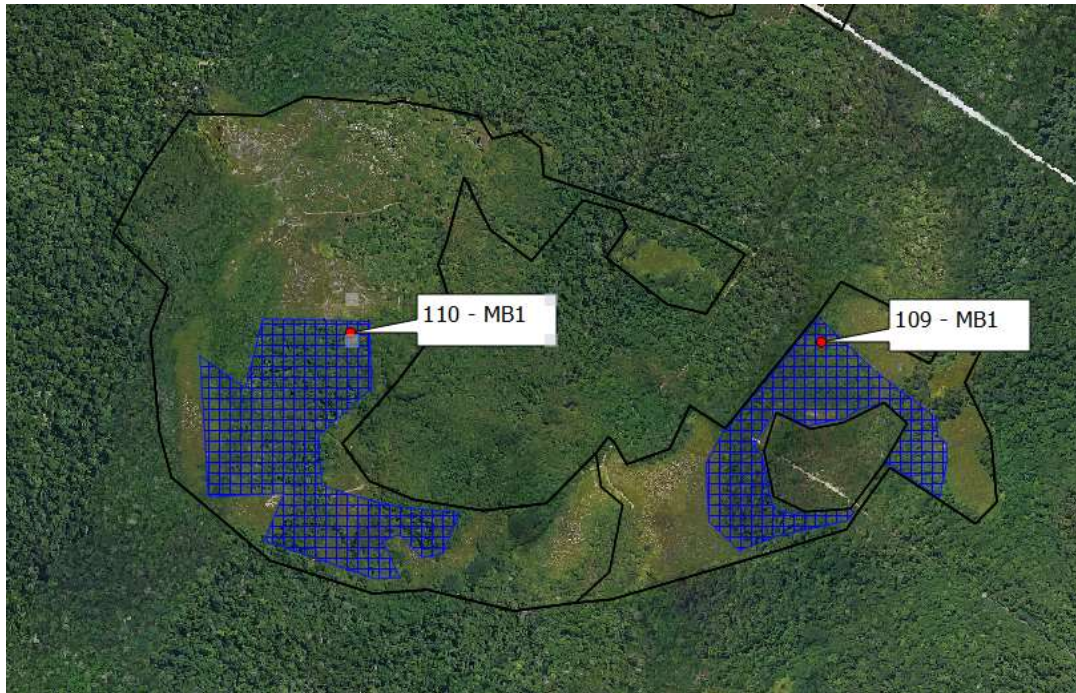


Figure 3. Sites 110 and 109

In November – December 2010 Christmas Island National Park conducted a mark and recapture experiment of red crabs on their migration in the general area of 109-MB1 and 110-MB1. This was part of a larger NRM program run by the National Park to better understand red crab migration routes and help inform where would be the best place to install crab management infrastructure (e.g. fencing and under-crossings etc.), particularly along East West Baseline (Parks Australia, 2018b). In summary, this experiment found that crabs from the central plateau to the north of these areas migrate to the south through these areas (Parks Australia, 2018b). Either side of 109-MB1 and 110-MB1 are relatively large tracts of pinnacle fields which are inhospitable to crabs (see Figure 4 below). There are also two areas in close proximity that have been approved to be cleared under a previous clearing permit (CPS 4506/2) (see Figure 4 below). From a landscape perspective, the area containing 109-MB1 and 110-MB1 is shaped like a funnel (see Figure 4 below), and the crabs get concentrated towards the bottom (southern section) of it on their downwards migration (Parks Australia, 2018b). From LiDAR data and the results of the survey it appears that 110-MB1 is a major corridor.

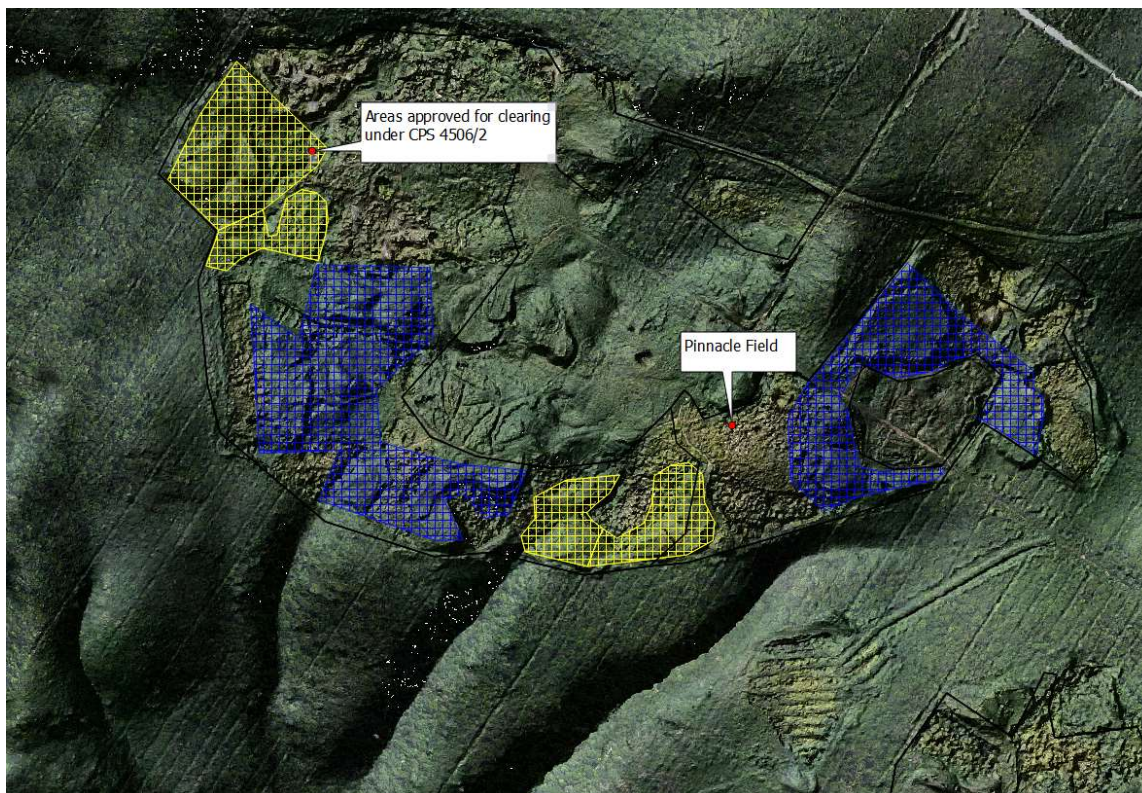


Figure 4. LiDAR data showing contours of land.

Red crabs need shade to move through the landscape and if they get caught out in the sun for anything more than approximately 20 metres they will overheat and ultimately die. The removal of these areas (109-MB1 and 110-MB1), coupled with the neighbouring areas approved for clearing and areas of pinnacle fields (which crabs cannot pass through) will mean that this area cannot be used for crab migration, and may lead to a decline in the population.

It is estimated that the catchment zone of crabs living in and traversing this area during the migration may contain approximately 430,000 crabs (Parks Australia, 2018b). This data was determined from red crab burrow density (per hectare) as determined from Christmas Island National Park Island Wide Survey. The boundary of the catchment area is based on the tracking data from 2010, subsequent observations and the topography of the Island (Parks Australia, 2018b).

Giant gecko (*Cyrtodactylus sadleiri*) is endemic to Christmas Island and is listed as endangered under the EPBC Act. This species is widespread across Christmas Island, occurring in all habitats except areas lacking in tree or shrub cover (Cogger et al., 1983; DotE, 2013). Cogger and Sadler (1981) reported that in their 1979 sampling the giant gecko was most commonly encountered in primary rainforest on the plateau of Christmas Island – where population density was very high (DotE, 2013). Conservation advice for this species notes that habitat loss has been a significant threat to this species in the past, however currently this threat is considered to be only a potential future threat as there are protections in place to preserve the remaining natural forest areas (DotE, 2013). The giant gecko was not observed during the surveys, however a giant gecko has been observed and formally recorded within 65 metres of site 116-MB5. Although, this area is not likely to be significant habitat for the giant gecko, the conservation advice for this species notes that no disturbance should occur in areas where the giant gecko is known to occur. To help mitigate impacts to the giant gecko from the proposed clearing, the applicant will be required to implement its giant gecko management plan in areas of known giant gecko habitat. The management plan should be implemented within a buffer zone of at least 100 metres of each recorded location of the giant gecko.

Given the above, sites 109-MB1 and 110-MB1 contain habitat necessary for the continued existence of red crabs and therefore the proposed clearing is at variance to this principle.

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.

Proposed clearing is not likely to be at variance to this Principle

Christmas Island is home to three species listed as threatened under the EPBC Act. These three species are *Asplenium listeri* (Christmas Island Spleenwort), *Tectaria devexa* var. *minor* and *Pneumatopteris truncata*.

Tectaria devexa var. *minor* is described as growing in shaded positions in the primary rainforest on the plateau, usually in areas of deep soil, where it may be the only forest floor species (Butz, 2004a).

Asplenium listeri (Christmas Island Spleenwort) is a fern endemic to Christmas Island, where it is known from a very small number of localities growing among rocks and on cliffs of exposed limestone outcrops (Butz, 2004b).

Pneumatopteris truncata grows colonially on permanently moist sites, in marginal rainforest and in shaded areas, between 50 and 140 metres above sea-level (DotE, 2018e).

Flora surveys of the application areas did not identify any of the abovementioned species, however a targeted search for threatened flora was not undertaken due to the difficulty of finding these species in dense regrowth vegetation and the low likelihood of the three threatened flora species occurring in regrowth vegetation (Range to Reef, 2018a).

Given the above, the proposed clearing is not likely to be at variance to this principle.

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Proposed clearing is not at variance to this Principle

No TECs have been recorded on Christmas Island.

Therefore, the proposed clearing is not at variance to this principle.

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Proposed clearing is not at variance to this Principle

Christmas Island retains approximately 75 per cent native vegetation, of which 84 per cent (63 per cent of total island area) is protected as National Park.

The application area contains vegetation in very good (Keighery, 1994) condition and contains significant habitat for indigenous fauna, therefore the area under application may be considered to be a significant remnant. However, given the amount of vegetation remaining on Christmas Island it is not a significant remnant in an area that has been extensively cleared.

Therefore, the proposed clearing is not at variance to this principle.

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is not at variance to this Principle

The proposed clearing is not growing in or associated with a watercourse or wetland.

Perennial surface water features on Christmas Island are limited to spring fed streams on coastal or sloping areas of the island.

The proposed clearing is not at variance to this principle.

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not likely to be at variance to this Principle

Christmas Island has a high annual rainfall of approximately 2000 millimetres per year. Despite this, the island has very little in the way of natural running water. Approximately 70 per cent of the rainfall is taken up by the island's plants and the remaining infiltrates through the soil to recharge the groundwater. The soil and underlying limestone rock is very porous and there is very little runoff except during torrential wet season downpours (GHD, 2007). Therefore the proposed clearing is not likely to cause appreciable land degradation in the form of water erosion.

Due to the porous nature of the soils on Christmas Island, waterlogging is unlikely to result from the proposed clearing.

The proposed clearing is not likely to be at variance to this principle.

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Proposed clearing may be at variance to this Principle

Two Ramsar listed wetlands (Honsie's Spring and The Dales) are located on Christmas Island. Both of these conservation areas are located within National Park. At its closest point, the application area (127-STP9E) is located 500 north of Honsie's Spring. The Dales are approximately four kilometres west of the application area at site 116-MB5. Given the distance to these Ramsar sites the proposed clearing is not likely to impact on the environmental value of these areas.

Christmas Island retains approximately 75 per cent native vegetation, of which 84 per cent (63 per cent of total island area) is protected as National Park. The majority of the National Park is uncleared primary rainforest.

Site ML109 is located adjacent to the national park boundary and sites MB12 and MB15 are located within five metres of national park boundary (Range to Reef, 2018a). Although ML109 is located adjacent to national park, it does not abut primary rainforest, with a buffer of 20-40 metres of regrowth vegetation lying within the boundary of National Park (Range to Reef, 2018a). Although, this area is not adjacent to Closed Canopy Evergreen Forest, a five meter buffer is still considered necessary to allow for inaccuracy with machinery.

The majority of weeds on Christmas Island cannot survive in primary rainforest mainly due to low light and consumption by crabs. Potential plant invaders of intact rainforest must possess two key traits: the ability to establish and grow under heavy shade, and the ability of both seeds and seedlings to tolerate, evade, or resist consumption by red crabs (Green et al., 2003). The majority of weeds on Christmas Island do not have these key traits are therefore unable to penetrate primary rainforest. However, there are some shade tolerant species that can spread into forested areas.

Adequate buffers (minimum of five metres) and weed management practices, including the requirement to implement a weed management plan should be sufficient to ensure that the environmental values of the above-mentioned conservation areas are not compromised.

The proposed clearing may be at variance to this principle.

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Proposed clearing is not likely to be at variance to this Principle

The proposed clearing is not growing in or associated with a watercourse or wetland.

Due to high infiltration rates on Christmas Island, erosion and sedimentation is generally localised to compacted areas such as roads and stockpiles. Therefore, the proposed clearing is not likely to cause deterioration in the quality of surface water.

Christmas Island retains approximately 75 per cent native vegetation and therefore the clearing of 51.5 hectares of vegetation, over ten areas, will not result in an increase in groundwater salinity.

The proposed clearing is not likely to be at variance to this principle.

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not at variance to this Principle

The proposed clearing will not increase the incidence or intensity of flooding due to the porous nature of the soils and the underlying rock structures on Christmas Island.

The proposed clearing is not at variance to this principle.

Planning instruments and other relevant matters.

All of the areas under application are contained within Mining Tenement MCI 70/1A. On June 2013, the tenure of MCI 70/1A was renewed until 2034.

The EPBC Act applies on Christmas Island. Mining was approved within MCI 70/1A in 1997 under the former *Environment Protection (Impact of Proposals) Act 1974* (EPIP Act) and does not require further approvals under the EPBC Act (Range to Reef, 2018a).

The rehabilitation of former mining areas is undertaken as part of the Christmas Island Minesite to Forest Rehabilitation Program. The program is funded by a conservation levy (\$2.40 per tonne exported) paid to the Territory Administration by Phosphate Resources Limited as a provision on MCI 70/1A.

The clearing permit application was advertised on the DWER website on 12 April 2018 with a 21 day submission period. The application was also advertised in *The Islander* on 20 April 2018. One public submissions was received in relation to this application. The submission raised concern that the application includes the clearing of habitat for a suite of nationally endangered birds at a high risk of extinction. It was also advised that the approval under the EPIP Act was given over 30 years ago and that a new referral under the EPBC Act should be made. In addition, it was noted that no consideration had been made to the effect of noise pollution (Submission, 2018).

The impacts to endangered birds has been assessed under Principle (b). In regards to EPBC Act referral, this is a self-referral process and therefore it is up to the proponent as to whether they consider it necessary to refer to the Commonwealth, however as noted above, the applicant's consultant has advised that as Commonwealth approval was given in 1997 further approvals under the EPBC Act are not required. The impacts of noise pollution are beyond the scope of the clearing permit process.

4. Applicant's Submissions

In response to the above assessment, the applicant subsequently amended the application, reducing the proposed clearing to 44 hectares (a reduction of 7.5 hectares). The applicant has also applied to amend Clearing Permit CPS 4506/2 to reduce the clearing area by 2.92 hectares to provide vegetation cover for red crabs.

The applicant acknowledged that the key concern was the clearing of Field 20 which had the potential to impact on the movement of red crabs from the plateau to the coast for spawning and the subsequent return to the plateau.

As depicted in Figure 5, Parks Australia identified two major crab migration corridors (D and E), and five minor corridors (A, B, C, F, G).

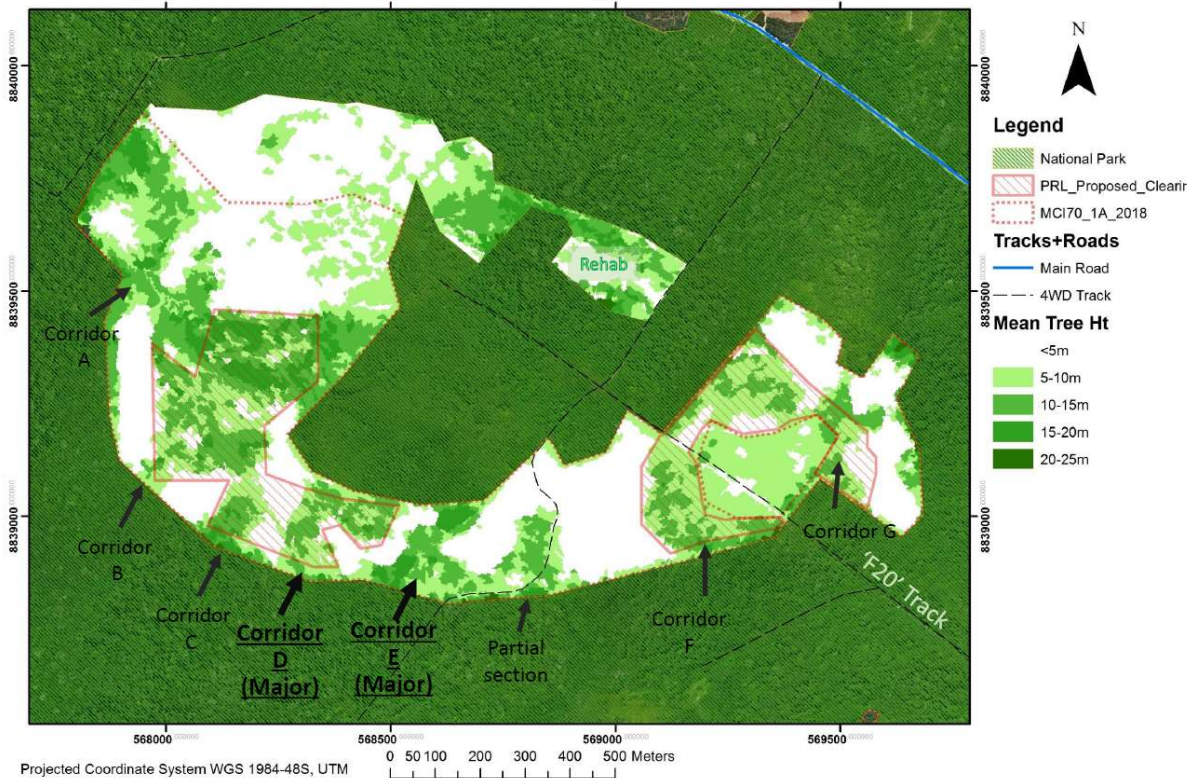


Figure 5. Crab migration corridors

The applicant's representative has proposed the following mitigation strategies (Range to Reef, 2018b):

1. Retention of existing vegetation for the purpose of maintaining red crab migration corridors in Field 20 by;
 - Removing 8.8 hectares from this application to retain vegetation in major crab corridor D, and minor corridors B, C, F and G; and
 - Amending clearing permit application CPS 4506/2 to remove 2.37 hectares to retain corridor E and 0.55 hectares of stockpile 20KA.
2. Enhancement of the abovementioned corridors by undertaking earthworks (i.e. providing soil cover over existing pinnacle field) and basic rehabilitation activities (using top soil and organic matter from adjacent clearing) to develop sufficient vegetation cover to facilitate red crab movement over areas that are currently pinnacles or dominated by ferns and impassable for crabs. This would be done to enhance minor corridors F and effectively create a future new corridor between E and F following mining and regeneration (Figure 6).
3. Scheduling of clearing and mining (Figure 7) – It is proposed to schedule works so that all clearing is spread over an extended period. This strategy will mean that the annual vegetation changes are gradual and major annual changes in vegetation cover are minimised. The objective of this is to ensure that impacts will not affect a significant proportion of vegetation in Field 20 in any one migration year. This would also allow time for areas cleared in the early stages of the potential to develop vegetative cover over several wet seasons to enhance and/or provide alternative pathways before adjacent vegetation is removed later in the mining schedule.
4. Mine approach – Stockpiles in Field 20, except 20J are only to be mined to natural ground level. Where a soil profile remains, and providing it is not compacted, vegetation will generally regrow quickly in the tropical environment.

The reduction in mining areas has necessitated a change in the haul road position, with a small amount of clearing beyond the original application area (1.3 hectares) (Range to Reef, 2018b).

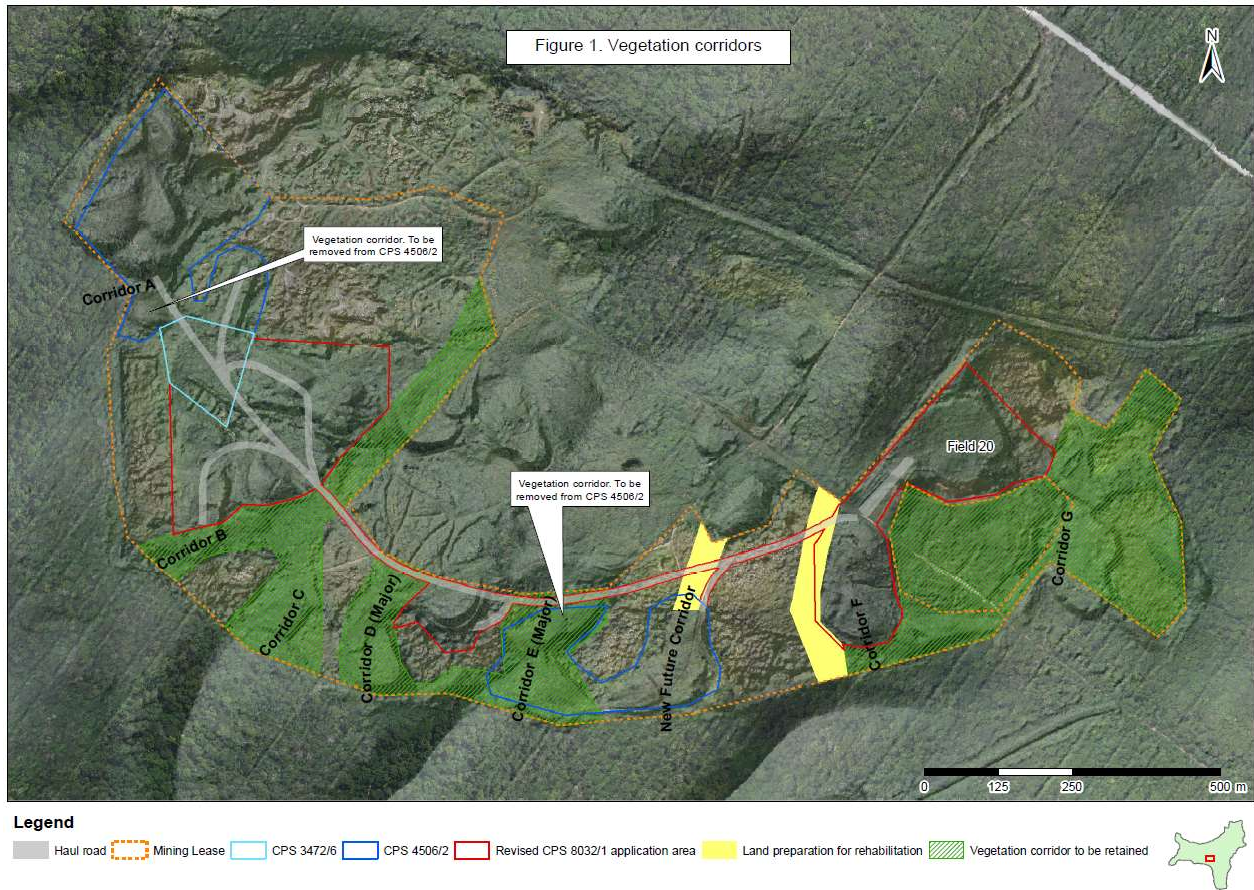


Figure 6. Corridors to be retained (Range to Reef, 2018b).

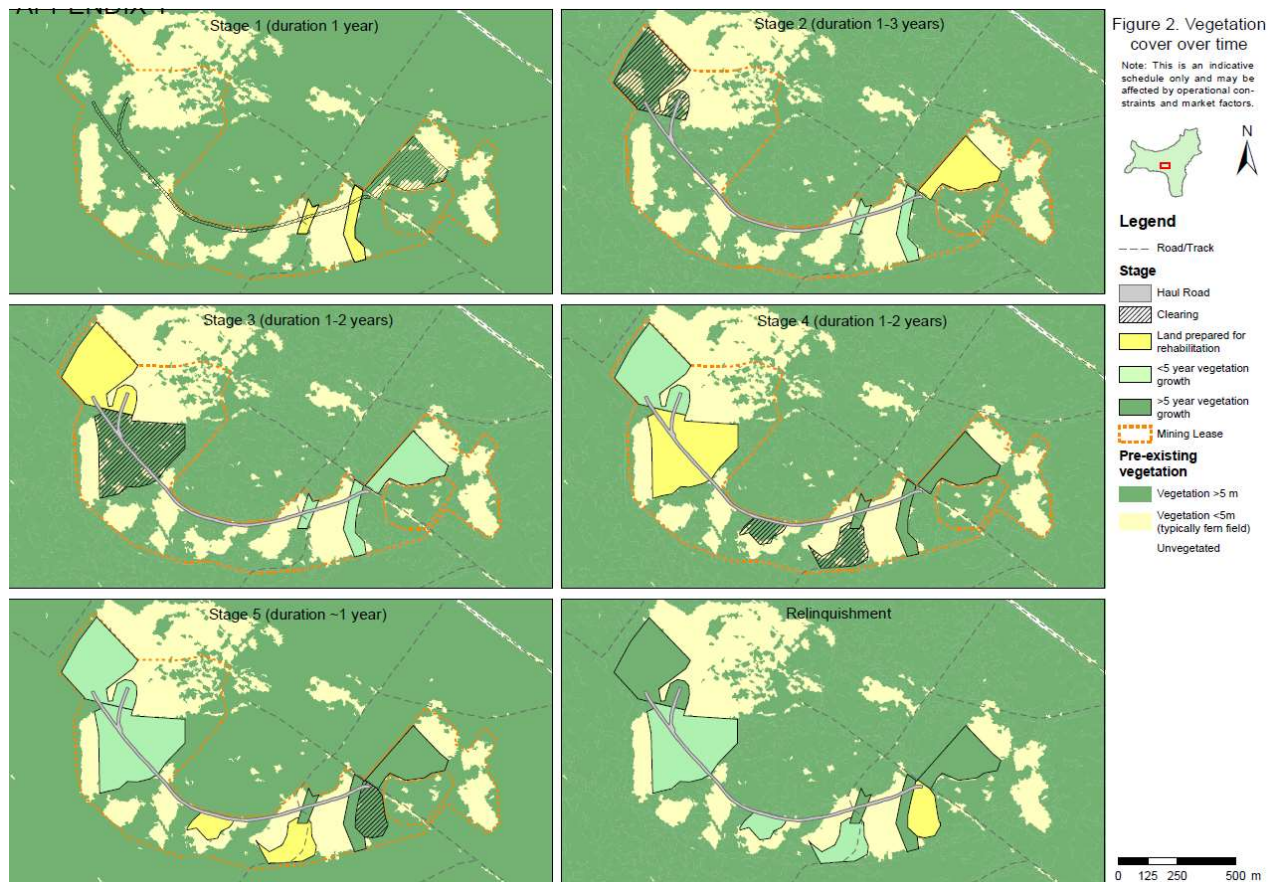


Figure 7. Scheduling of clearing and mining (Range to Reef, 2018b).

In further correspondence from the applicant's representative it was advised that the haul road proposed within Field 20 would not be used during crab migration periods as it is the plan to schedule mining and haulage activities during the 'dry' season and avoid the wetter months when crabs are active. It was noted that under the Environment Management Plan Parks Australia has the power and authority to close any road on the Island at any time to avoid red crab mortality (Range to Reef, 2019).

5. Consideration of variances following applicants submission / further information

In response to the above mitigation measure proposed by the applicant, DWER sought advice from the Department of Environment and Energy (DotEE). DotEE advised that the proposed mitigation measures for the two sites in the Field 20 provide avenues for crab migration and are likely to minimise mortality associated with crabs crossing areas of open ground >20m in width (DotEE, 2019).

In consideration of the mitigation strategies outlined in section 4 above and in line with DotEE advice, DWER is of the opinion that the applicant has adequately minimised potential impacts to fauna. Therefore the assessment of Principle (b) has been changed to 'may be at variance' due to potential impacts to red crabs, Abbott's booby and the giant gecko. As outlined in Section 1.5 of this report, management conditions have been added to the clearing permit to ensure that fauna is not negatively impacted by the clearing process.

The assessment against the remaining clearing principles remains unchanged.

6. References

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- Range to Reef Environmental (2018b) Response to DWER's correspondence of 21 August 2018. Received on 22 October 2018 (DWER Refs: A1732469, A1732468 and A1732467).
- Range to Reef Environmental (2019) Email dated 14 January 2019 regarding the use of the haul road (DWER Ref: A1755102).

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