GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986 (WA)(CI)

Purpose Permit number:	CPS 7040/1
Permit Holder:	Phosphate Resources Limited trading as Christmas Island Phosphates
Duration of Permit:	13 August 2016 – 13 August 2021

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

1. **Purpose for which clearing may be done**
   Clearing for the purpose of exploration.

2. **Land on which clearing is to be done**
   Exploration Licence ECI 70/2

3. **Area of Clearing**
   The Permit Holder must not clear more than 2.06 hectares of native vegetation within the combined areas hatched yellow on attached Plan 7040/1a and Plan 7040/1b.

4. **Application**
   This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

PART II – MANAGEMENT CONDITIONS

5. **Avoid, minimise etc 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.

6. **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 a Weed Management Plan approved by the General Manager responsible for Territories Department of Infrastructure and Regional Development. This plan is to be developed by the Permit Holder within 12 months of this permit being granted.

(c) At least once in each 3 month period prior to the Weed Management Plan required in condition 6(b) being approved, the Permit Holder must remove or kill any weeds growing within areas cleared under this permit.

7. 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.

8. Fauna management - giant gecko (*Cyrtodactylus sadleiri*)

(a) Prior to clearing any vegetation within a minimum buffer distance of 100 metres of known giant gecko (*Cyrtodactylus sadleiri*) locations the Permit Holder must prepare a giant gecko Management Plan and submit it to the CEO for the CEO's approval.

(b) If it is necessary to modify the giant gecko Management Plan under 8(a) then the Permit Holder must provide that modified giant gecko Management Plan to the CEO for the CEO's approval prior to implementing the modified giant gecko Management Plan.

(c) The Permit Holder shall implement the latest version of the giant gecko Management Plan approved by the CEO.

9. Buffers to national park

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

PART III - RECORD KEEPING AND REPORTING

10. Records must be kept

(a) The Permit Holder must maintain the following records 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) The Permit Holder must maintain a description of the activities undertaken in relation to the giant gecko Management Plan pursuant to condition 8 of this permit.

11. Reporting

(a) The Permit Holder must provide to the CEO, of the Department of Environment Regulation, on or before 30 June of each year, a written report:
  (i) of records required under condition 10 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 year, a written report confirming that no clearing under this permit has been carried out, must be provided to the CEO, of the Department of Environment Regulation, on or before 30 June of each year.

(c) Prior to 14 May 2021, the Permit Holder must provide to the CEO, of the Department of Environment Regulation, a written report of records required under condition 10 of this Permit where these records have not already been provided under condition 11(a) of this Permit.

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

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; and

weed/s means any plant -

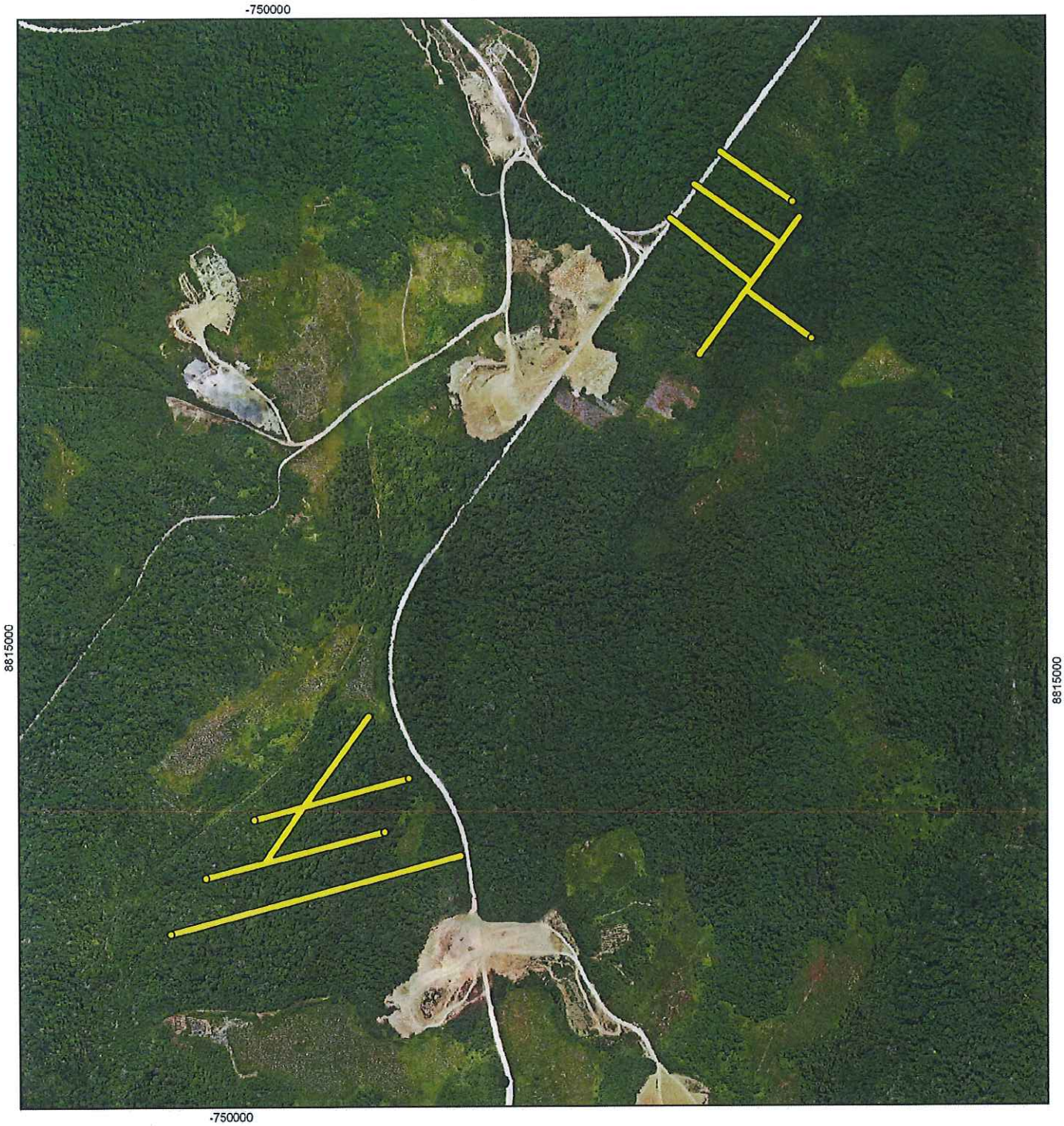
(a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or
(b) published in a Department of Parks and Wildlife Regional Weed Rankings Summary, regardless of ranking; or
(c) not indigenous to the area concerned.

James Widenbar
A/SENIOR MANAGER
CLEARING REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

14 July 2016

Plan 7040/1a



Legend

Clearing

Virtual Mosaic

Areas approved to clear

N

1:13,739

MGA 94
Geocentric Datum of Australia 1994

.....Date. 14/7/16

James Widenbar

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

GOVERNMENT OF
WESTERN AUSTRALIA

Plan 7040/1b

Legend

Clearing

Virtual Mosaic

Areas approved to clear

N

1:13,731

MGA 94
Geocentric Datum of Australia 1994

JWidenbar Date 14/7/16

James Widenbar

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

GOVERNMENT OF WESTERN AUSTRALIA

Government of Western Australia
Department of Environment Regulation

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 7040/1
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Phosphate Resources Limited TA Christmas Island Phosphates

1.3. Property details

Property: UNALLOCATED CROWN LAND, CHRISTMAS ISLAND
ROAD RESERVE - 11831920, CHRISTMAS ISLAND
ROAD RESERVE - 11831919, CHRISTMAS ISLAND
ROAD RESERVE - 11485188, CHRISTMAS ISLAND
Colloquial name: EXPLORATION LICENCE ECI 70/2
Local Government Authority: SHIRE OF CHRISTMAS ISLAND
Localities: CHRISTMAS ISLAND

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
2.06		Mechanical Removal	Mineral exploration

1.5. Decision on application

Decision on Permit Application: Granted
Decision Date: 14 July 2016
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 (a) and (b), is not likely to be at variance to principles (c), (g), (h) and (i), and is not at variance to the remaining clearing principles.

Through assessment it has been determined that the area under application 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 prepare and implement a management plan for this species, where it has been recorded within 100 metres of the application area, will help ensure that the proposed clearing does not impact on giant gecko populations.

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.

Relevant State policies and other relevant policies have been taken into consideration in the decision to grant a clearing permit.

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
The areas under application have been classified as: Closed canopy evergreen forest – 1.7 hectares Not vegetated: less than 0.01 hectares Regrowth – 0.22 hectares Semi-deciduous forest – 0.10 hectares	The proposed clearing of 2.06 hectares of native vegetation within unallocated Crown land, Christmas Island is for the purpose of assessing potential phosphate resources.	Pristine; No obvious signs of disturbance (Keighery, 1994). **Adapted Scale** Mature, undisturbed rainforest or very advanced secondary regrowth. Disturbance is limited to cyclone damage occurring in February 2014. Climax species dominate and full structural complexity is present with	Range to Reef Environmental (2016) provides the following advice in regards to the composition and condition of the vegetation under application: Area 3 (Plan b) - well developed Semi-Deciduous Forest to 25 metres with emergents to 30 metres on gentle slopes of the limestone terrace. The vegetation in this area was in pristine to excellent (Keighery, 1994) condition (Range to Reef

Semi-deciduous scrub – 0.03 hectares

Weed dominated vegetation and pioneer regrowth – less than 0.01 hectares

(Geoscience Australia, 2014; Range to Reef Environmental, 2016).

epiphytic orchids and ferns, terrestrial orchids and ferns, Pandanus, palms, buttressing and woody lianes (Range to Reef Environmental, 2016).

To

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

Adapted Scale
Vegetation at very early successional stages with a canopy of one to two species and an understory dominated by ferns or weeds, typically adjacent to completely degraded land. May have the potential to develop into better quality vegetation as the canopy develops if weeds are managed (Range to Reef Environmental, 2016).

Environmental, 2016).

Area 10 (Southern area on Plan a) – The majority of the vegetation surrounding the five drill lines in this area is undisturbed Closed-Canopy Evergreen Forest, with one end of lines being in areas mapped as Regrowth. The majority of the vegetation within this area was in pristine (Keighery, 1994) condition (Range to Reef Environmental, 2016).

Area 13 (Northern Area on Plan a) -The majority of the vegetation surrounding the six drill lines in this area is undisturbed Closed-Canopy Evergreen Forest, with one end of lines being in areas mapped as Regrowth. The majority of vegetation in this area was in pristine to excellent (Keighery, 1994) condition. The one site recorded as regrowth was in degraded (Keighery, 1994) condition.

3. Assessment of application against clearing principles

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

Comments

Proposed clearing may be at variance to this Principle

This application proposes to clear 2.06 hectares of native vegetation within three areas on unallocated Crown land, covered by exploration lease ECI 70/2, for the purpose of exploration drilling. The proposed clearing consists of clearing 12 drill lines, totalling 4.02 kilometres in length, to a maximum width of five metres to facilitate access by a 4WD mounted drill rig.

Areas 10 (Southern area on Plan a) and 13 (Northern Area on Plan a) have previous been cleared for exploration activities. Area 3 (Plan b) has not been previously cleared.

A field survey of the application area was undertaken from 6-13 November 2015. This survey was undertaken by a suitably experienced botanist and zoologist. The purpose of the field survey was to confirm the Geoscience Australia (2014) vegetation mapping, describe vegetation condition, record any fauna observations and to determine whether any conservation significant flora identified by the desktop assessment occurred or were likely to occur within the application area (Range to Reef Environmental, 2016).

The field survey recorded 52 flora species, of which 46 were native and six were introduced (Range to Reef Environmental, 2016). The total survey effort (proposed exploration lines and the surrounding vegetation) recorded 84 flora species (Range to Reef Environmental, 2016).

No priority ecological communities have been recorded on Christmas Island.

There is 6,536 hectares of closed canopy evergreen forest remaining on Christmas Island, 1,977 hectares of semi-deciduous forest and 1,343 hectares of semi-deciduous scrub. The proposed clearing would impact approximately 1.7 hectares of closed canopy evergreen forest (0.026 per cent of the remaining closed canopy evergreen forest), 0.10 hectares of semi-deciduous forest (less than 0.005 per cent) and 0.03 hectares of semi-deciduous scrub (less than 0.002 per cent) (Range to Reef Environmental, 2016).

Two species identified as potentially conservation significant by Holmes and Holmes (2002) were found within the proposed clearing areas. These were *Pteridrys syrmatica* and *Tectaria dissecta*. *Pteridrys syrmatica* and *Tectaria dissecta* were both identified as common on the island by Holmes and Holmes (2002). Given the relatively small scale of the proposed clearing, it is not likely to have a significant impact on these species.

The field survey identified 11 conservation significant fauna species within, or overflying the application areas. The majority of these species are widespread and highly mobile and therefore the proposed clearing is unlikely to significantly impact upon these species. Abbott's booby (*Papasula abbotti*) nests have been recorded within approximately 20 metres of one of the proposed exploration lines within Area 10 and another two have been recorded within approximately 30 metres of the same Area. The nests are located upwind of the proposed drill

lines, however as no tall trees are proposed to be cleared, the proposed clearing is unlikely to increase turbulence to these nests. The maintenance of a minimum 30 metre buffer to Abbott's booby nest sites will assist to ensure that this species is not disturbed by the proposed clearing. The area under application is not likely to contain significant habitat for the giant gecko (*Cyrtodactylus sadleiri*) however, the conservation advice for this species notes that no disturbance should occur in areas where the giant gecko is known to occur. The applicant will be required to prepare and implement a giant gecko management plan for area where the giant gecko has been recorded within 100 metres of the application area.

The disturbance caused by the proposed clearing will increase the risk of weeds being spread into adjacent vegetation. Weed management practices will assist in minimising this risk.

The proposed clearing contains; vegetation in pristine (Keighery, 1994) condition, an area which has not previously been cleared, and may support giant gecko therefore the application may contain a high level of biodiversity and the proposed clearing may be at variance to this principle.

Methodology

References:
Geoscience Australia (2014)
Holmes and Holmes (2002)
Keighery (1994)
Range to Reef Environmental (2016)

(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 indigenous to Western Australia.

Comments

Proposed clearing may be at variance to this Principle

A field survey undertaken on 6-13 November 2015 identified 11 conservation significant fauna species within, or overflying the proposed clearing areas, being: Christmas Island thrush (*Turdus poliocephalus erythropleurus*), Christmas Island white eye (*Zosterops natalis*), Christmas Island imperial pigeon (*Ducula whartoni*), Christmas Island goshawk (*Accipiter hiogaster natalis*), Christmas Island emerald dove (*Chalcophaps indica natalis*), Christmas Island frigatebird (*Fregata andrewsi*), white-tailed tropicbird (*Phaethon lepturus lepturus)*, red-footed booby (*Sula sula)*, Christmas Island flying-fox (*Pteropus melanoyus natalis*), red crab (*Gecarcoidea natalis*) and robber crab (*Birgus latro*) (Range to Reef Environmental, 2016).

Christmas Island thrush is confined to Christmas Island, where it is considered to be widespread. The extent of occurrence is estimated to be 137 kilometres squared (DotE, 2016a). This species is listed as endangered under the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act).

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 (DotE, 2016b). The Christmas Island White Eye is not listed as threatened under State legislation, nor is it listed under the EPBC Act.

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 (DotE, 2016c). This species is not listed as threatened under State legislation, nor is it listed 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).

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 (DotE, 2016d). This species is endemic to Christmas Island and is listed as Endangered under the EPBC Act.

In Australia the Christmas Island frigatebird is confined to Christmas Island where it breeds in terrace forests in only three small areas totalling approximately 170 hectares. Much of the breeding colony areas for this species lie outside of the national park and do not have any formal protection (Hill and Dunn, 2004). This species is listed as vulnerable under the EPBC Act.

White-tailed tropicbird is a migratory species that breeds at three locations within Australia; in the Cocos-Keeling Islands, at Ashmore Reef and at Rowley Shoals, Western Australia (DotE, 2016e). This species is not known to breed on Christmas Island and therefore the proposed clearing is not likely to impact this species.

Red-footed booby is a migratory species which has an extensive distribution. This species is not globally threatened.

The above mentioned species are highly mobile and therefore the proposed clearing of 2.06 hectares of native vegetation over a number of narrow exploration lines is not likely to significantly impact upon these species. The applicant has advised that significant vegetation i.e large trees will be avoided by diverting equipment around them. This clearing method will assist in ensuring that impacts to these species will be minimised.

Christmas Island flying-fox is endemic to Christmas Island. There are only three known breeding colonies on Christmas Island (TSSC, 2014). The majority of roost sites for this species are close to the coast, presumably

for ease of take-off and access to updrafts (Tidemann, 1985 cited in TSSC, 2014). Foraging occurs in rainforests, gardens, and post-mine revegetation (where this contains trees and shrubs). This species is listed as critically endangered under the EPBC Act.

Red crabs are most common in the moist environment of the rainforest, however also inhibit a variety of other habitats including limestone pinnacle areas on the coastal shore terraces and domestic gardens. 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). Range to Reef environmental (2016) has advised that clearing will be undertaken during the dry season to minimise impacts on red crabs (i.e avoiding months when crabs are active or migrating).

Robber crabs are found on most parts of Christmas Island, from the shore terrace to the highest plateau areas. 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 this species was identified within the application area it is unlikely that the proposed clearing of 2.06 hectares of native vegetation over a linear length of 4.02 kilometres will impact upon significant habitat for this species. Range to Reef environmental (2016) has advised that an observer will remove robber crabs from the proposed clearing area prior to clearing.

Abbott's booby (*Papasula abbotti*) 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; Boland et al. 2012), lowering fidelity, and increasing adult mortality of Abbott's booby nesting in surrounding areas (Reville et al. 1990: 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; Boland et al. 2012). The National Recovery Plan for Abbott's booby states that "Phosphate mining in areas of primary rainforest that are either current or potential nesting sites (see 'Habitat critical to survival' above), or forested areas adjacent to nesting sites (including areas up to 300m downwind of nesting sites) is incompatible with the recovery of Abbott's Booby as clearing of such rainforest reduces the available nesting habitat" (Department of Environment and Heritage, 2004).

Three known nest sites have been recorded within 30 metres of the proposed exploration lines within Area 10. The nests are located upwind of the proposed drill lines, however as no tall trees are proposed to be cleared, the proposed clearing is unlikely to increase turbulence to these nests. The maintenance of a minimum 30 metre buffer to Abbott's booby nest sites will assist to ensure that this species is not disturbed by the proposed clearing. The applicant has advised that the disturbance associated to the proposed exploration activities will be limited to three days, one day for clearing, one for the drilling and one to return the vegetation. This short disturbance period will help to ensure that Abbott's booby are not impacted by the proposed clearing and associated activities.

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 Sadlier (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). Although, the area under application may not be significant habitat for the giant gecko the conservation advice notes that no disturbance should occur in areas where the giant gecko is known to occur. Giant gecko has been recorded in the vicinity of the application area and therefore, to help mitigate impacts to the giant gecko from the proposed clearing the applicant will be required to prepare and implement a giant gecko management plan prior to clearing in areas of know 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 potential impacts to giant gecko and Abbott's booby the proposed clearing may be at variance to this principle.

Methodology

References:

Boland et al. (2012)
Brett (1989)
Cogger and Sadlier (1981)
Cogger et al. (1983)
Department of the Environment and Heritage (2004)
DotE (2013)

DotE (2016b)
DotE (2016d)
DotE (2016a)
DotE (2016c)
DotE (2016e)
Hill (2004)
Hill and Dunn (2004)
Orchard (2015)
Range to Reef Environmental (2016)
Reville (1990)
Tidemann (1985)
TSSC (2014)

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

Comments

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

Christmas Island is home to three species listed as threatened under the *Environment Protection Biodiversity Conservation Act 1999*. 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). Suitable habitat for this species was identified within the application areas during the field assessment, however no individuals were observed (Range to Reef Environmental, 2016).

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). The field assessment of the application area identified limestone outcrops which would provide suitable habitat for this species, however no *Asplenium listeria* were observed (Range to Reef Environmental, 2016).

Pneumatopteris truncata grows colonially on permanently moist sites, in marginal rainforest and in shaded areas, between 50 and 140 metres above sea-level (DotE, 2016f). This species was not observed during the field assessment (Range to Reef Environmental, 2016)

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

Methodology

References:
Butz (2004a)
Butz (2004b)
DotE (2016f)
Range to Reef Environmental (2016)

(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.

Comments

Proposed clearing is not at variance to this Principle

No threatened ecological communities have been recorded on Christmas Island.

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

Methodology

(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.

Comments

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 pristine (Keighery, 1994) condition and contains an area which has not been previously cleared, therefore the area under application may be considered to be a significant remnant, however given the linear nature of the proposed clearing and the amount of vegetation remaining on Christmas Island it is not a significant remnant in an area that has been highly cleared.

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

Methodology

References:
Keighery (1994)

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

Comments

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.

Comments

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.

The application proposes to clear 2.06 hectares of native vegetation over a number of linear tracts and therefore the application area will be buffered by native vegetation and not prone to wind erosion.

Due to the porus 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.

Methodology

References:
GHD (2007)

(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.

Comments

Proposed clearing is not likely to be 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 majority of the National Park is uncleared primary rainforest.

Two of the proposed drill lines are located adjacent to the National Park boundary.

Honsie's spring is a Ramsar site located on the eastern side of Christmas Island, within the National Park

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 process 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.

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

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

Methodology

References:
Green et al. (2003)

(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.

Comments

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 (Range to Reef Environmental, 2014). 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 2.06 hectares of vegetation will not result in an increase in groundwater salinity.

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

Methodology

References:
Range to Reef Environmental (2014)

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

Comments

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.

Comments

This application was advertised in The Islander on 13 May 2016 for a 21 day submission period. No submissions from the public were received.

Exploration Licence ECI 70/2 was granted 13 December 2015.

4. References

Boland C.R.J., Smith M.J, Maple D, Tiernan B and Napier F. (2012) An island-wide survey of Abbott's Booby *Papasula Abbotti* occupancy on Christmas Island, Indian Ocean.

Brett, D. (1989) Sea birds in the trees. Ecos 61:4–8

Butz M. (2004a) National Recovery Plan for *Tectaria devexa*. Department of the Environment and Heritage, Canberra.

Butz M. (2004b) National Recovery Plan for the Christmas Island Spleenwort *Asplenium listeri*. Commonwealth of Australia, Canberra, ACT.

Cogger H and Sadlier R (1981). The terrestrial reptiles of Christmas Island, Indian Ocean. Unpublished report to Australian National Parks and Wildlife Service, Canberra

Cogger H, Sadlier R, and Cameron E (1983). The Terrestrial Reptiles of Australia's Island Territories. Australian National Parks and Wildlife Service Special Publication no. 11.

Department of the Environment and Heritage (2004) National Recovery Plan for the Abbott's Booby *Papasula abbotti*. Department of the Environment and Heritage, Canberra.

DotE (2013) Conservation Advice for *Cyrtodactylus sadleiri* (giant gecko). Department of the Environment.

DotE (2016a) *Turdus poliocephalus erythropleurus* – Island Thrush (Christmas Island) http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl taxon_id=67122 (Accessed June 2016)

DotE (2016b) *Zosterops natalis* (Christmas Island White-eye). Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the list of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). http://www.environment.gov.au/system/files/pages/5c9ac91c-ecee-443c-9cbf-646efcd4054a/files/zosterops-natalis.pdf (Accessed March 2016).

DotE (2016c) *Ducula whartoni* (Christmas Island Imperial-Pigeon). Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the list of Threatened Species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). http://environment.gov.au/biodiversity/threatened/species/pubs/ducula-whartoni.pdf (Accessed March 2016).

DotE (2016d) *Chalcophaps indica natalis* – Emerald Dove (Christmas Island), http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=67030 (Accessed March 2016)

DotE (2016e) Species Profile and Treats Database. *Phaethon lepturus* – White-tailed Tropicbird (Indian Ocean). Department of the Environment. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=66986. Accessed June 2016

DotE (2016f) *Pneumatopteris truncata* http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=68812 (Accessed June 2016)

Geoscience Australia (2014) Christmas Island Vegetation and Clearing Map. Compiled May 2014. Prepared by Geoscience Australia in collaboration with Christmas Island Phosphates and the Commonwealth Department of Environment, Canberra.

GHD (2007) Christmas Island - Airport Upgrade Environmental Impact Statement. Document Number: 31978R4

Green P.T, Lake P.S and O'Dowd D.J (2003) Resistance of island rainforest to invasion by alien plants: influence of microhabitat and herbivory on seedling performance.

Hill, R. (2004) National Recovery Plan for the Christmas Island Goshawk *Accipiter fasciatus natalis*. Commonwealth of Australia, Canberra.

Hill, R. and Dunn A. (2004) National Recovery Plan for the Christmas Island Frigatebird *Fregata andrewsi*. Commonwealth of Australia, Canberra.

Holmes, J. & Holmes, G. (2002) Conservation status of the flora of Christmas Island, Indian Ocean. Unpublished report to Parks Australia.

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Orchard, M (2015) Crabs of Christmas Island http://www.christmasislandcrabs.com (Accessed March 2016)

Range to Reef Environmental (2014) Clearing Permit Application, Supporting Documentation. Prepared for Phosphate Resources Limited (trading as Christmas Island Phosphate). September 2014 (DER Ref: A819413).

Range to Reef Environmental (2016) Supporting Documentation for Clearing Permit Application CPS 7040/1. Exploration Licence ECI 70/2. Prepared for Phosphate Resources Limited (DER Ref: A1087841).

Reville, B.J., Tranter, J.D. & Yorkston, H.D. (1990) Impact of forest clearing on the endangered seabird *Sula abbotti*. Biological Conservation 51: 23–38.

Tidemann CR (1985) A study of the status, habitat requirements and management of the two species of bats on Christmas Island (Indian Ocean). Report to Australian National Parks and Wildlife Service, Canberra.

TSSC (2014) Approved conservation advice for *Pteropus melanotus natalis*. Threatened Species Scientific Committee.