GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 389/2
Permit Holder:	Iluka Resources Limited
Duration of Permit:	1 October 2006 to 1 October 2031

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 mineral exploration.

2. **Land on which clearing is to be done**
   Mineral Sands (Eneabba) Agreement Act 1975, Mining Lease 267SA
   Mining Lease 70/683
   Mining Lease 70/684
   Mining Lease 70/685
   Mining Lease 70/686
   Mining Lease 70/687
   Mining Lease 70/688
   Mining Lease 70/689
   Mining Lease 70/821
   Mining Lease 70/870
   Mining Lease 70/879
   Mining Lease 70/984
   Mining Lease 70/1039
   Mining Lease 70/492
   Exploration Licence 70/953

3. **Area of Clearing**
   The Permit Holder must not clear more than 30 hectares of native vegetation within the area cross-hatched yellow on attached Plan 389/2.

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.

5. **Type of clearing authorised**
   The Permit Holder shall not clear any native vegetation after 1 October 2026

PART II –MANAGEMENT CONDITIONS

6. Dieback and weed control

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

(i) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(ii) ensure that no *dieback* or *weed*-affected soil, 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) At least once in each 12 month period for the term of this Permit, the Permit Holder must remove or kill any *weeds* growing within areas cleared under this Permit.

7. Vegetation management - watercourses

(a) Where practicable the Permit Holder shall avoid clearing *riparian vegetation* within any *watercourse*.

(b) Where a *watercourse* is to be impacted by clearing, the Permit Holder shall maintain the existing surface flow.

8. Vegetation management - wetlands

The Permit Holder shall not clear native vegetation within 50 metres of the *riparian vegetation* of any *wetland* within and the area cross-hatched yellow on attached Plan 389/2.

9. Flora management

(a) Prior to undertaking any clearing authorised under this Permit, the Permit Holder shall engage a *botanist* to conduct a *targeted flora survey* of the Permit Area for the presence of rare flora listed in the *Wildlife Conservation (Rare Flora) Notice* and *priority flora* in accordance with *Guidance Statement No. 51*.

(b) Where rare or *priority flora* are identified under condition 9(a) of this Permit, the Permit Holder shall engage a *botanist* to map the *critical habitat* of the identified rare or *priority flora* within the Permit Area.

(c) Prior to undertaking any clearing authorised under this Permit, the Permit Holder shall provide the results of the *targeted flora survey* in a report to the CEO.

(d) If rare or *priority flora* are identified within the Permit Area, the *targeted flora survey report* must include the following:

(i) the location of each rare and/or *priority flora*, either as the location of individual plants, or where this is not practical, the areal extent of the population and an estimate of the number of plants, 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; and

(ii) the species name of each rare and/or *priority flora*, identified; and

(iii) the methodology, used to survey the Permit Area and to establish the *critical habitat* of flora; and

(iv) the extent of the *critical habitat* of the identified rare and/or *priority flora* shown on a map; and

(v) a site description of the *critical habitat* of rare and/or *priority flora* found.

(e) Where rare or *priority flora* are identified under condition 9(a) of this Permit, the Permit Holder shall ensure that no clearing of *critical habitat* of the identified rare or *priority flora* occurs, unless first approved by the CEO.

10. Threatened ecological community management

(a) Prior to undertaking any clearing authorised under this Permit, the Permit Holder shall engage an *ecologist* to conduct a *flora and vegetation survey* of the Permit Area to identify *threatened ecological communities* and *priority ecological communities*.

(b) Prior to undertaking any clearing authorised under this Permit, the Permit Holder shall provide to the CEO, the results of the *flora and vegetation survey* in a report.

(c) If *threatened ecological communities* and *priority ecological communities* are identified, the *flora and vegetation survey* report must include the following:
   (i) the location of *threatened ecological communities* and *priority ecological communities* 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; and
   (ii) the name of each *threatened ecological community* and *priority ecological community* identified; and
   (iii) the methodology used to survey and identify *threatened ecological communities* and *priority ecological communities*; and
   (iv) the extent of the *threatened ecological communities* or *priority ecological communities* shown on a map.

(d) Where *threatened ecological communities* or *priority ecological communities* are identified under condition 10(a) the Permit Holder shall ensure that:
   (i) no clearing occurs within 1000 metres of identified *threatened ecological communities*, unless first approved by the CEO; and
   (ii) no clearing occurs within 20 metres of identified *priority ecological communities*, unless first approved by the CEO.

11. Retain vegetative material and topsoil, revegetation and rehabilitation

The Permit Holder shall:

(a) retain the vegetative material and topsoil removed by clearing authorised under this Permit and stockpile the vegetative material and topsoil.

(b) within six months following clearing authorised under this permit, *revegetate* and *rehabilitate* the areas that are no longer required for the purpose for which they were cleared under this Permit by:
   (i) re-shaping the surface of the land so that it is consistent with the surrounding 5 metres of uncleared land;
   (ii) laying the vegetative material and topsoil retained under condition 11(a) on the cleared area; and
   (iii) ripping the ground on the contour to remove soil compaction.

(c) within 4 years of undertaking *revegetation* and *rehabilitation* in accordance with condition 11(b) of this Permit:
   (i) engage an *environmental specialist* to determine the species composition, structure and density of the area *revegetated* and *rehabilitated*; and
   (ii) where, in the opinion of an *environmental specialist*, the composition structure and density determined under condition 11(c)(i) of this Permit will not result in a similar species composition, structure and density to that of pre-clearing vegetation types in that area, *revegetate* the area by deliberately *planting* and/or *direct seeding* native vegetation that will result in a similar species composition, structure and density of native vegetation to pre-clearing vegetation types in that area and ensuring only *local provenance* seeds and propagating material are used.

PART III - RECORD KEEPING AND REPORTING

12. Records to be kept

The Permit Holder must maintain the following records for activities done 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 or decimal degrees;
   (ii) the date that the area was cleared;
   (iii) the size of the area cleared (in hectares); and
   (iv) purpose for which clearing was undertaken.

(b) In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 11 of this Permit:
   (i) the location of any areas *revegetated* and *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;
   (ii) a description of the *revegetation* and *rehabilitation* activities undertaken; and
   (iii) the size of the area *revegetated* and *rehabilitated* (in hectares).

13. Reporting

(a) The Permit Holder must provide to the CEO on or before 30 June of each year, a written report demonstrating adherence to all conditions of this permit, and setting out the records required under condition 12 of this permit in relation to clearing carried out between 1 January and 31 December of the previous calendar year.

(b) If no clearing authorised under this Permit was undertaken between 1 January and 31 December of the previous calendar year, 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 each year.

(c) Prior to 1 July 2031, the Permit Holder must provide to the CEO a written report of records required under condition 12 of this Permit where these records have not already been provided under condition 13(a) of this Permit.

DEFINITIONS

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

botanist means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience in identification and surveys of flora native to the bioregion being inspected or surveyed, or who is approved by the CEO as a suitable botanist for the bioregion;

critical habitat means any part of the Permit Area comprising of the habitat of flora or fauna species and its population, that is critical for the health and long term survival of the flora or fauna species and its population;

dieback means the effect of *Phytophthora* species on native vegetation;

direct seeding means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species;

dry conditions means when soils (not dust) do not freely adhere to rubber tyres, tracks, vehicle chassis or wheel arches;

ecologist means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience in flora identification, flora and vegetation surveys and vegetation data analysis of flora and vegetation native to the bioregion being inspected or surveyed, or who is approved by the CEO as a suitable ecologist for the bioregion;

environmental specialist means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the CEO as a suitable environmental specialist;

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

flora and vegetation survey means a field-based investigation, including a review of established literature, of the biodiversity of flora and vegetation of the Permit Area, focusing on habitat suitable for priority or threatened ecological communities. The survey should include sufficient surrounding areas to place the permit area into local context;

Guidance Statement No. 51 means the Environmental Protection Authority Guidance Statement No 51, Guidance for the Assessment of Environmental Factors - Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2004);

local provenance means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared;

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;

planting means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species;

priority ecological community/ies mean those ecological communities described as priority classes 1, 2, 3, 4 or 5 in the Department of Parks and Wildlife's Priority Ecological Communities for Western Australia (as amended);

priority flora means those plant taxa described as priority flora classes 1, 2, 3, 4 or 5 in the Department of Parks and Wildlife's Threatened and Priority Flora List for Western Australia (as amended);

regenerate/ed/ion means re-establishment of vegetation from in situ seed banks and propagating material (such as lignotubers, bulbs, rhizomes) contained either within the topsoil or seed-bearing mulch;

rehabilitate/ed/ion means actively managing an area containing native vegetation in order to improve the ecological function of that area;

revegetate/ed/ion means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area;

riparian vegetation has the meaning given to it in Regulation 3 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004;*

targeted flora survey means a field-based investigation, including a review of established literature, of the biodiversity of flora and vegetation of the permit area, focusing on habitat suitable for flora species that are being targeted and carried out during the optimal time to identify those species. Where target flora are identified in the permit area, the survey should also include sufficient surrounding areas to place the permit area into local context;

threatened ecological community/ies has the meaning given to it in clause 3 of the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*;

watercourse/s has the meaning given to it in section 3 of the *Rights in Water and Irrigation Act 1914*;

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;

wetland/s means an area of seasonally, intermittently or permanently waterlogged or inundated land, whether natural or otherwise, and includes a lake, swamp, marsh, spring, dampland, tidal flat or estuary; and

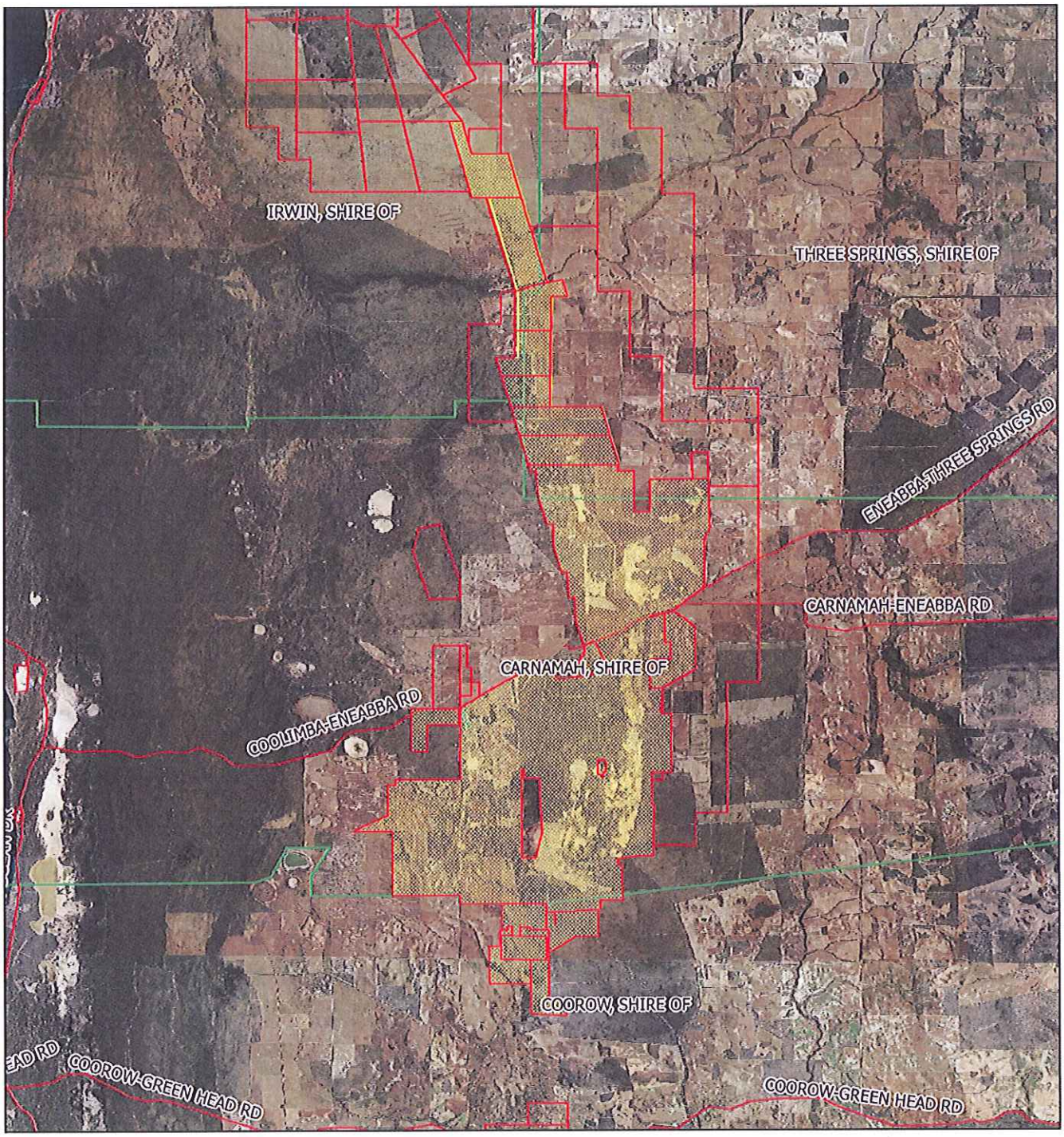
Wildlife Conservation (Rare Flora) Notice means those plant taxa gazetted as rare flora pursuant to section 23F(2) of the *Wildlife Conservation Act 1950* (as amended).

Emma Bramwell
A/ MANAGER
CLEARING REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

1 September 2016

Plan 389/2



Legend

Mining Tenements

- Live
- Areas approved to clear
- Roads

Virtual Mosaic

N

1:220,000

MGA 94
Geocentric Datum of Australia 1994

.....Date 01/09/16

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.: 389/2
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Iluka Resources Limited

1.3. Property details

Property: *Mineral Sands (Eneabba) Agreement Act 1975*, Mining Lease 267SA
Mining Lease 70/683
Mining Lease 70/684
Mining Lease 70/685
Mining Lease 70/686
Mining Lease 70/687
Mining Lease 70/688
Mining Lease 70/689
Mining Lease 70/821
Mining Lease 70/870
Mining Lease 70/879
Mining Lease 70/984
Mining Lease 70/1039
Mining Lease 70/492
Exploration Licence 70/953

Local Government Authority: Shire of Carnamah, Shire of Coorow, Shire of Irwin and Shire of Three Springs
DER Region: Midwest
DPaW District: Moora
LCDC:
Localities: Eneabba, Arrowsmith, Warradarge and Arrowsmith East

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 1 September 2016
Reasons for Decision: The clearing permit application has been assessed against the clearing principles, planning instruments and other matters in accordance with section 51O of the *Environmental Protection Act 1986*.

The Delegated Officer has determined that the proposed clearing is at variance to clearing principles (c) and (f), may be at variance to principle (d), (e), (g), (h) and (i), is not likely to be at variance to the remaining clearing principles.

To reduce the environment impacts, the Permit Holder is required to:

- conduct targeted surveys prior to clearing activities, and avoid the clearing of critical habitat for rare flora species;
- conduct vegetation surveys to identify TECs, and ensuring no clearing occurs within one kilometre of TECs;
- undertake revegetation activities within six months of clearing for mineral exploration;
- ensure native vegetation within 50 metres of the riparian vegetation of a wetland is not cleared;
- the implement weed and dieback management practices.

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
Four Beard vegetation associations have been mapped within the application area (Shepherd et al., 2001):	The applicant has proposed to clear 30 hectares within	Completely degraded: No longer intact;	Vegetation condition was determined using aerial imagery.

Beard vegetation association 49 is described as shrublands; mixed heath; Beard vegetation association 378 is described as shrublands; scrub-heath with scattered *Banksia* spp., *Eucalyptus todtiana* and *Xylomelum angustifolium* on deep sandy flats in the Geraldton Sandplain Region; Beard vegetation association 379 is described as shrublands; scrub-heath on lateritic sandplain in the central Geraldton Sandplain Region; and Beard vegetation association 392 is described as Shrublands; *Melaeuca thyioides* thicket.	a footprint of 28,777 hectares for the purpose of mineral exploration.	completely/almost completely without native species (Keighery, 1994); To: Excellent: No obvious signs of disturbance (Keighery, 1994).	Portions of the application area have been historically cleared for mining and agricultural activities. Based on available databases, approximately 12,595 hectares of remnant vegetation occurs within the application footprint.

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 is not likely to be at variance to this Principle

The application is to amend Clearing Permit CPS 389/1 by extending the duration of the permit to 1 October 2026 and increasing the size of the permit boundary (footprint) from 25,580 to 28,777 hectares. The extent of proposed clearing remains at 30 hectares within the overall footprint.

The application area is located within the Lesueur Sandplain subregion of the Geraldton Sandplains Interim Biogeographic Regionalisation for Australia bioregion. The Lesueur Sandplain is characterised by shrub-heaths rich in endemics occurring on a mosaic of lateritic mesas, sandplains, coastal sands and limestones as well as heath on lateritised sandplains along the subregions north-eastern margins (CALM, 2002).

Parts of the application footprint have been previously cleared for mining and agricultural activities. Approximately 12,595 hectares of pre-European vegetation remains within the 28,777 hectare application footprint.

Based on available databases, a total of 23 rare and 179 priority flora species have been recorded within 10 kilometres of the application area. Of these, the application footprint contains records for nine rare and 63 priority flora species. Appropriate flora management practices will ensure critical habitat for rare and priority flora is not impacted by the proposed clearing activities.

There are no threatened ecological communities (TEC) or priority ecological communities (PEC) mapped within the application area. There is one TEC mapped approximately 25 metres from the application boundary, which is a ferricrete floristic community (rocky springs type). The application footprint is partly located within the buffer zone of this TEC. Critical habitat for the ferricrete floristic community (rocky springs type) is considered to be the area of occupancy of the known occurrences corresponding to the red and brown sandy loams over ferricrete, the aquifer providing the conditions for the formation and maintenance of the ferricrete substratum, and the local catchment for the surface waters that inundate these areas (Hamilton-Brown et al., 2004). It is considered that the proposed clearing may impact on this occurrence of the ferricrete floristic community (rocky springs type) if clearing occurs in close proximity to the TEC.

A total of five threatened and eight priority fauna species have been recorded within 10 kilometres of the application area (Parks and Wildlife, 2007-). Noting the habitat requirements of these species and the extent of the proposed clearing, it is considered that the proposed clearing is unlikely to significantly impact on any of these species.

Clearing activities have the potential to increase the spread of weeds and *Phytophthora* sp. (dieback), which may alter the biodiversity of an area via direct mortality of flora (dieback), and competing with native vegetation for available resources and making areas more fire prone (weeds). Impacts to biodiversity as a result of clearing activities will be minimised by the implementation of weed and dieback management practices.

While the overall footprint may contain a high level of biological diversity, it is considered that the proposed clearing of 30 hectares within the 28,777 hectare footprint is unlikely to impact on the level of biodiversity on a local or regional scale.

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

Impacts to conservation significant flora species may be minimised by conducting targeted surveys for rare and priority flora prior to clearing, and avoiding critical habitat for rare and priority flora. Impacts to any TECs or PECs that may occur within the application area may be minimised by the implementation of flora and vegetation surveys to identify TECs or PECs, and ensuring no clearing occurs within one kilometre of TECs and 20 metres of PECs. Impacts to biodiversity resulting from the spread of weeds and dieback may be minimised by the implementation of weed and dieback management practices.

Methodology References:

CALM (2002)
Hamilton-Brown et al. (2004)
Parks and Wildlife (2007-)

GIS Databases:
- Imagery
- Remnant vegetation
- SAC bio datasets (Accessed July 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 is not likely to be at variance to this Principle

The application is to clear 30 hectares of native vegetation within a 28,777 hectare footprint. The footprint contains areas historically cleared for both mining and agricultural land uses. The footprint retains approximately 12,595 hectares (approximately 44 per cent) remnant vegetation cover, which varies from completely degraded (Keighery, 1994) to excellent (Keighery, 1994) condition. Extensive areas of native vegetation occur to the west and south of the application area, much of which is within conservation tenure.

A total of five threatened and eight priority fauna species have been recorded within 10 kilometres of the application area (Parks and Wildlife, 2007-). Of these, the following species may utilise habitat within the application area:

- Carnaby's cockatoo (*Calyptorhynchus latirostris*; rare or likely to become extinct under the *Wildlife Conservation Act* 1950 [WC Act]) (foraging habitat present);
- shield-backed Trapdoor Spider (*Idiosoma nigrum*; rare or likely to become extinct under the WC Act);
- scorpionfly (*Austromerope poultoni*; priority 2);
- cricket (*Phasmodes jeeba*; priority 2);
- cricket (*Hemisaga vepreculae*; priority 2);
- bee (*Hylaeus globuliferus*; priority 3);
- black-striped snake (*Neelaps calonotos*; priority 3);
- blue-billed duck (*Oxyura australis*; priority 4); and
- graceful sunmoth (*Synemon gratiosa*; priority 4).

The vegetation types mapped within the application area are locally widespread and suitable fauna habitat in the same or better condition than habitat within the application area is likely to occur in the surrounding area.

While the overall footprint may contain significant habitat for indigenous fauna including species of conservation significance, it is considered that the proposed clearing of 30 hectares within the 28,777 hectare footprint is unlikely to impact on significant habitat for indigenous fauna on a local or regional scale.

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

Methodology

References:
Keighery, 1994)
Parks and Wildlife (2007-)

GIS Databases:
- Imagery
- Parks and Wildlife tenure
- Pre-European vegetation
- Remnant vegetation

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

Comments

Proposed clearing is at variance to this Principle

There are records for nine rare flora species within the application area.

Given the above, the proposed clearing is at variance to this Principle.

Impacts to rare flora will be avoided by the implementation of targeted surveys prior to clearing activities, and avoiding the clearing of critical habitat for rare flora species.

Methodology

GIS Database:
- SAC bio datasets (Accessed July 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 may be at variance to this Principle

There are no TECs mapped within the application area. Three TECs have been mapped within 10 kilometres of the application area, with the closest TEC (ferricrete floristic community (rocky springs type) mapped

approximately 25 metres from the application boundary. The application footprint is partly located within the buffer zone of this TEC.

Critical habitat for the ferricrete floristic community (rocky springs type) is considered to be the area of occupancy of the known occurrences corresponding to the red and brown sandy loams over ferricrete, the aquifer providing the conditions for the formation and maintenance of the ferricrete substratum, and the local catchment for the surface waters that inundate these areas (Hamilton-Brown et al., 2004). It is considered that the proposed clearing may impact on this occurrence of the ferricrete floristic community (rocky springs type) if clearing occurs in close proximity to the TEC.

Given the above, the proposed clearing may be at variance to this Principle.

Impacts to TECs that may occur within the application area will be minimised by the implementation of flora and vegetation surveys to identify TECs, and ensuring no clearing occurs within one kilometre of TECs.

Methodology

References:
Hamilton-Brown et al. (2004)

GIS Database:
- SAC bio datasets (Accessed July 2016)

(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 may be at variance to this Principle

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

The application area occurs within the Geraldton Sandplains Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, which retains approximately 45 per cent pre-European vegetation extent (Government of Western Australia, 2015).

The vegetation within the application area is mapped as Beard vegetation associations 49, 378, 379 and 392, of which 37, 64, 24 and 79 per cent remains within the Geraldton Sandplains IBRA region, respectively (Government of Western Australia, 2015).

- Beard vegetation association 379 has less than 30 per cent of its pre-European extent remaining, however the remaining extent is approximately 129,497 hectares which is spatially greater than any of the other of the vegetation associations within the application area, and it is considered that the proposed clearing of 30 hectares is unlikely to significantly impact this extent.
- Beard vegetation association 392 has the lowest extent of the vegetation association mapped within the application area, with 1,333 hectares remaining. Noting that approximately 78 hectares of this vegetation association occurs within the 28,777 hectare footprint, it is considered that the proposed clearing of 30 hectares is unlikely to significantly impact this extent.

The application area is located between an extensively vegetated area to the west, and an extensively cleared area to the east. The north-eastern portion of the application footprint is located within the Shire of Three Springs, which has been extensively cleared and contains 22 per cent of its pre-European vegetation extent (Government of Western Australia, 2015). Native vegetation within the Shire of Three Springs and the application area may represent a significant remnant on a local scale.

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Extent in Parks and Wildlife Managed Lands (%)
IBRA Bioregion*				
Geraldton Sandplains	3,136,038	1,404,373	45	40
Shire*				
Carnamah	287,231	118,659	41	42
Coorow	418,948	166,711	40	43
Irwin	236,968	117,014	49	24
Three Springs	265,736	58,018	22	9
Beard Vegetation Association in Bioregion*				
49	39,718	14,490	37	24
378	95,109	61,032	64	22
379	546,507	129,497	24	22
392	1,678	1,333	79	21

Given the above, the proposed clearing may be at variance to this Principle.

Impacts to remnant vegetation within the Shire of Three Springs may be minimised by the implementation of revegetation activities within six months of clearing for mineral exploration.

Methodology

References:
Commonwealth of Australia (2001)
Government of Western Australia (2015)

GIS Database:
- Remnant vegetation

(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 at variance to this Principle

A number of watercourses and wetlands occur within the application area including minor, non-perennial watercourses, areas subject to inundation, and sumpland, dampland and playa wetlands.

The Department of Parks and Wildlife recommends retaining a minimum 50 metre buffer to wetlands, measured from the mapped wetland boundary, to protect the wetland from surrounding land uses (Parks and Wildlife, 2016).

Given the above, the proposed clearing is at variance to this Principle.

Impacts to vegetation growing in association with a watercourse may be minimised by avoiding clearing in these areas where possible and maintaining the existing surface flow by use of culverts. Impacts to vegetation growing in association with a wetland may be minimised by ensuring native vegetation within 50 metres of the riparian vegetation of a wetland is not cleared.

Methodology

References:
Parks and Wildlife (2016)

GIS Database:
- Geomorphic wetlands Cervantes Eneabba
- Hydrography, linear

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

Comments

Proposed clearing may be at variance to this Principle

Two soil types are mapped within the application area:

- sandy plains with occasional pockets of sand dunes, a few small swamps, and stream courses; chief soils are leached sands, often with a sandy clay substrate between three and six feet in depth; and
- broad valleys and undulating interfluvial areas with some discontinuous breakaways and occasional mesas; lateritic materials mantle the area; chief soils are sandy acidic yellow mottled soils (Northcote et al., 1960-68).

The risk of land degradation varies within the application area from low to high (DAFWA, 2016). There are a number of watercourses and wetlands mapped within the application area, and clearing within these has a higher risk of causing land degradation via waterlogging, nutrient export, salinity and water erosion.

The sandy soils within the application area are prone to wind erosion. However, it is considered that the proposed clearing of 30 hectares within an overall 28,777 hectare footprint for the purpose of mineral exploration is unlikely to cause appreciable land degradation via wind erosion.

Given the above, the proposed clearing may be at variance to this Principle.

The risk of land degradation resulting from clearing within watercourses and wetlands may be minimised by avoiding clearing vegetation within watercourses where possible, maintaining surface water flow where watercourses are impacted, and maintaining a 50 metre buffer from vegetation associated with a wetland.

Methodology

References:
DAFWA (2016)
Northcote et al. (1960-68)

GIS Database:
- Soils, statewide

(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 may be at variance to this Principle

The South Eneabba Nature Reserve, Lake Logue Nature Reserve and an unnamed nature reserve for the purpose of camping and flora conservation partially occur within the 28,777 hectare application footprint.

Approximately 2,700 hectares of the 28,777 hectare footprint occurs within the South Eneabba Nature Reserve, 288 hectares occurs within the Lake Logue Nature Reserve and 28 hectares occurs within the unnamed nature reserve.

Noting that the application is for the proposed clearing of 30 hectares within an overall footprint of 28,777 hectares, it is considered that the level of disturbance is unlikely to significantly impact on the environmental values of these conservation areas. However, clearing activities have the potential to facilitate the spread of weeds and dieback (*Phytophthora* sp.), which may impact on the environmental values of these conservations areas.

Given the above, the proposed clearing may be at variance to this Principle.

The spread of weeds and dieback within conservation areas may be minimised by the implementation of weed and dieback management practices.

Methodology

GIS Databases:
- Parks and Wildlife tenure

(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 may be at variance to this Principle

A number of watercourses and wetlands occur within the application area including minor, non-perennial watercourses, areas subject to inundation, and sumpland, dampland and playa wetlands. Non-perennial watercourses are dispersed throughout the application area, while wetlands primarily occur in the central-western and central portions of the application area.

Should the proposed clearing occur within any of the above wetlands and watercourses, clearing activities may cause deterioration in surface water quality via sedimentation, waterlogging and altered hydrology.

Groundwater salinity within the application area is mapped as 500 to 1000 milligrams per litre total dissolved solids (TDS) and 1000 to 3000 milligrams per litre TDS. It is considered that the proposed clearing of 30 hectares within an overall 28,777 hectare footprint is unlikely to impact groundwater quality.

Given the above, the proposed clearing may be at variance to this Principle.

Impacts to vegetation growing in association with a watercourse may be minimised by avoiding clearing in these areas where possible and maintaining the existing surface flow by use of culverts. Impacts to vegetation growing in association with a wetland may be minimised by ensuring native vegetation within 50 metres of the riparian vegetation of a wetland is not cleared.

Methodology

GIS Database:
- Geomorphic wetlands Cervantes Eneabba
- Groundwater salinity, statewide
- Hydrography, linear

(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 likely to be at variance to this Principle

The vegetation within the application area is located within the Indoon Logue catchment area, in an area that receives an average annual rainfall of 490 millimetres (BoM, 2016). The sandy soils within the application area are not susceptible to flooding (Northcote et al., 1960-68). Clearing within the watercourses or wetlands mapped within the application area may cause or increase waterlogging following heavy rainfall, however this is not likely to lead to increased flooding events.

The clearing of 30 hectares within a total footprint of 28,777 hectares is not likely to cause or exacerbate the incidence or intensity of flooding.

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

Methodology

References:
BoM (2016)
Northcote et al. (1960-68)

Planning instruments and other relevant matters.

Comments

The application is to amend Clearing Permit CPS 389/1 by extending the duration of the permit to 1 October 2026 and increasing the size of the permit boundary (footprint) from 25,580 to 28,777 hectares. The extent of proposed clearing remains at 30 hectares within the overall footprint.

A notice of proposed amendment was sent to the applicant on the 28 July 2016. On 30 August 2016 the applicant requested to waiver the 28 day notification period.

Clause 15, Item 8 of the *Mineral Sands (Eneabba) Agreement Act 1975* allows for mining activities within the South Eneabba nature reserve that intersects the area subject to the state agreement: 'Subject to the provisions of the mineral lease and such other terms and conditions as the Minister may require pursuant to approved proposals hereunder the Company shall have the right to mine such part of the land the subject of Reserve No. 31030 and any other land reserved under the Land Act as is included in the mineral lease.'

There is one native title claim over the application area (Department of Aboriginal Affairs, 2016). The mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993*, and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process. The granting of a clearing permit therefore does not constitute a future act under the *Native Title Act 1993*.

According to available databases, there is one registered Aboriginal site of significance within the application area. It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal sites of significance are damaged through the clearing process.

The clearing permit application was advertised in *The West Australian* newspaper on 20 June 2016 for a seven day comment period. No public submissions were received.

Methodology

References:
Department of Aboriginal Affairs (2016)

GIS Databases:
- Aboriginal Sites Register System

4. References

Bureau of Meteorology (BoM) (2016) Climate statistics for Australian locations, Eneabba. Bureau of Meteorology. url: http://www.bom.gov.au/climate/averages/tables/cw_008225.shtml. Accessed July 2016.

Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005, Canberra.

Department of Aboriginal Affairs (2016) Aboriginal Heritage Inquiry System. http://maps.dia.wa.gov.au/AHIS2/ (Accessed April 2016).

Department of Agriculture and Food Western Australia (DAFWA) (2016) NRMInfo (Natural Resource Management) Portal. Department of Agriculture and Food Western Australia. URL: http://maps.agric.wa.gov.au/nrminfo/. Accessed July 2016.

Department of Conservation and Land Management (CALM) (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Department of Conservation and Land Management.

Department of Parks and Wildlife (Parks and Wildlife) (2007-) NatureMap: Mapping Western Australia's Biodiversity. Department of Parks and Wildlife. url: http://naturemap.dpaw.wa.gov.au/. Accessed July 2016.

Department of Parks and Wildlife (Parks and Wildlife) (2016) Conserving and managing our wetlands. Department of Parks and Wildlife. url: https://www.dpaw.wa.gov.au/management/wetlands/conserving-and-managing-our-wetlands. Accessed July 2016.

Government of Western Australia (2015) 2015 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of June 2015. WA Department of Parks and Wildlife, Perth.

Hamilton Brown, S., Borun, G. and Rees, R. (2004) Interim Recovery Plan 154. Ferricrete floristic community (Rocky Springs type) Interim Recovery Plan 2004-2009. Department of Conservation and Land Management, Wanneroo.

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

Northcote, K.H. with Beckmann, G.G., Bettenay, E., Churchward, H.M., van Dijk, D.C., Dimmock, G.M., Hubble, G.D., Isbell, R.F., McArthur, W.M., Murtha, G.G., Nicolls, K.D., Paton, T.R., Thompson, C.H., Webb, A.A. and Wright, M.J. (1960-68): 'Atlas of Australian Soils, Sheets 1 to 10, with explanatory data'. CSIRO and Melbourne University Press: Melbourne.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.