Government of Western Australia
Department of Mines, Industry Regulation and Safety

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8700/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Fortescue Metals Group Ltd**

1.3. Property details

Property: Miscellaneous Licence 47/777
Miscellaneous Licence 47/805
Miscellaneous Licence 47/865
Miscellaneous Licence 47/870
Miscellaneous Licence 47/871
Miscellaneous Licence 47/872
Miscellaneous Licence 47/873
Miscellaneous Licence 47/899
Miscellaneous Licence 47/908
Local Government Area: Shire of Ashburton
Colloquial name: Eliwana Northern Access Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
206		Mechanical Removal	Road construction and maintenance

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 30 January 2020

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

The vegetation of the application area is broadly mapped as the following Beard vegetation associations:
18: Low woodland, mulga (*Acacia aneura*);
82: Hummock grasslands, low tree steppe; snappy gum over soft spinifex;
175: Short bunch grassland - savanna/grass plain (Pilbara);
178: Hummock grasslands, grass steppe; hard spinifex, *Triodia basedowii*;
565: Hummock grasslands, low tree steppe; bloodwood over soft spinifex; and
567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedowii* (GIS Database).

More than 20 flora and vegetation surveys have been undertaken in the greater Eliwana Project area between 2008 and 2019 to inform environmental impact assessments. Some of these surveys have covered extensive areas such as Biota Environmental Sciences' (2018) 134,177 hectare study area and Ecoscape's (2012) 119,544 hectare study area.

To assist with this native vegetation clearing permit application, Ecologia (2019) mapped and described the vegetation units over a majority of the clearing permit application area (along the existing Mt Brockman road where widening and realignment is proposed and along the proposed new Donkey Pool Road alignment) between 29 November and 1 December 2019. The survey covered the area where approximately 80% of the proposed clearing will take place. The following 18 vegetation associations were recorded by Ecologia (2019):

AapTe – *Acacia aptaneura* low woodland; *Triodia epactia* low open hummock grassland;

AatEgAeTeTw – ±*Eucalyptus leucophloia subsp. leucophloia* low isolated trees; *Acacia atkinsiana*, *Eucalyptus gamophylla* low open shrubland/mallee woodland; *Triodia epactia* low open hummock grassland;

AatEgTe - *Acacia atkinsiana*, *Eucalyptus gamophylla* tall open shrubland/mallee woodland; *Triodia epactia* mid open hummock grassland;

AiTw - *Acacia inaequilatera* mid isolated shrubs; *Triodia wiseana* low open hummock grassland;

AxAsTeMp - *Acacia xiphophylla* low open woodland; *Acacia synchronicia* mid isolated shrubs; *Triodia epactia*, *Maireana pyramidata* low sparse hummock grassland/shrubland;

AxSaoEx - *Acacia xiphophylla* low open woodland; *Senna artemisioides subsp. oligophylla* mid sparse shrubland; *Eragrostis xerophila* low sparse tussock grassland;

AxTl - *Acacia xiphophylla* low isolated trees; *Acacia synchronicia* mid sparse shrubland; *Triodia longiceps*, *Cenchrus ciliaris* mid sparse hummock grassland/tussock grassland;

ChAtGrTeCa - *Corymbia hamersleyana* low isolated trees; *Acacia tumida var. pilbarensis*, *Gossypium robinsonii* tall sparse shrubland; *Triodia epactia*, *Cymbopogon ambiguus* low open hummock grassland/tussock grassland;

ChElAanTe - *Corymbia hamersleyana*, *Eucalyptus leucophloia subsp. leucophloia* low open woodland; *Acacia ancistrocarpa* mid open shrubland; *Triodia epactia* mid open hummock grassland;

Dss - *Dichanthium sericeum subsp. sericeum* low tussock grassland;

EcEvAcTe - *Eucalyptus victrix*, *Eucalyptus camaldulensis* mid woodland; *Acacia citrinoviridis* tall sparse shrubland; *Bothriochloa ewartiana*, *Cyperus vaginatus* low open tussock grassland/sedgeland;

ElAatAanTe - *Eucalyptus leucophloia subsp. leucophloia* low open woodland; *Acacia ancistrocarpa* sparse shrubland; *Triodia epactia* low open hummock grassland;

ElAatAmTwCl - *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland; *Acacia atkinsiana*, *Acacia maitlandii* mid sparse shrubland; *Triodia wiseana*, *Corchorus lasiocarpus* low sparse hummock grassland/shrubland;

ElGoTe - *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland; *Triodia epactia*, *Gompholobium oreophilum*, *Amphipogon sericeus* low sparse hummock grassland/shrubland/tussock grassland;

ElTlTw - *Eucalyptus leucophloia* subsp. *leucophloia* low isolated trees; *Triodia longiceps*, *Triodia wiseana* low open hummock grassland;

ElTw - *Eucalyptus leucophloia* subsp. *leucophloia* low open woodland; *Triodia wiseana* low open hummock grassland;

EvAcCvTl - *Eucalyptus victrix* mid open woodland; *Acacia citrinoviridis* tall sparse shrubland; *Cyperus vaginatus*, *Triodia longiceps* low sparse sedgeland/hummock grassland;

EvAcEa - *Eucalyptus victrix* mid woodland; *Acacia citrinoviridis* tall sparse shrubland; *Eulalia aurea* mid open tussock grassland.

Clearing Description

Eliwana Northern Access Project
Fortescue Metals Group Ltd proposes to clear up to 206 hectares of native vegetation within a boundary of approximately 3,172 hectares, for the purpose of road construction, maintenance and associated activities including borrow pits, water bores and turkeys nest dams. The new and upgraded roads will facilitate access to enable construction of the associated Eliwana Rail Project. The Eliwana Northern Access Project is located approximately 90 kilometres west-north-west of Tom Price, within the Shire of Ashburton.

Vegetation Condition

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

to

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

Comment

The vegetation condition was derived from a detailed Eliwana flora and vegetation study undertaken by Biota Environmental Sciences (2018) and information provided by Fortescue Metals Group Ltd (2019).

3. Assessment of application against Clearing Principles

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

Comments

Proposal may be at variance to this Principle

The clearing permit application area is located within the Hamersley subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara Bioregion (GIS Database). The Hamersley sub-bioregion consists of sedimentary ranges and plateaus dissected by gorges. Surface drainage flows into either the Fortescue River to the north, the Ashburton River to the south or the Robe River to the west. Environmental features of conservation value in the sub-bioregion include the gorges of the Hamersley Range (particularly in Karijini National Park), Palm Springs and Duck Creek, the Themeda grasslands of the Pilbara, and isolated areas of Mulga on Red Hill Station. Land use in the subregion is dominated by pastoral grazing and mining (CALM, 2002).

There have been 768 native vascular flora species and 99 vegetation types recorded in the greater Eliwana study area (134,177 hectares), spanning a distance of approximately 160 kilometres. The species richness is considered higher than expected when compared with surveys of a similar size and intensity. The species richness reflects the extensive sampling that has taken place at Eliwana and the wide variety of habitats and vegetation units that occur (Biota Environmental Sciences, 2018). Species richness was higher in the long, linear Eliwana Rail study area (651 species) compared to the Eliwana Mine study area (554 species); reflective

of the greater diversity of habitats and vegetation types encountered. Species diversity in the clearing permit application area may be expected to be similar to the Eliwana rail study area given its long, linear nature and presence of similar land systems and vegetation types (Fortescue Metals Group Ltd, 2019).

There have been 27 weed species recorded in the Eliwana study area (Biota Environmental Sciences, 2018). Whilst no declared weeds have been recorded, weeds have the potential to out-compete native species and reduce the biodiversity of an area, and care should be taken to prevent the introduction or spread of weeds in the application area. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

There are no known Threatened Ecological Communities (TECs) within the application area (GIS Database; Fortescue Metals Group Ltd, 2019; DBCA, 2020). However, the Themeda Grasslands TEC is 350 metres from the application area, at its nearest point, and the application area dissects two mapped occurrences of the Brockman Iron cracking clay communities of the Hamersley Range Priority 1 ecological community (DBCA, 2020). Approximately 12,540 hectares of this PEC is recorded on the TEC database, extending from Mt Delphine to Karijini National Park. It is estimated that this proposal will clear approximately 8.1 hectares or 0.06% of the current mapped extent of the PEC. The clearing proposal is unlikely to affect the conservation status of the PEC as a whole, however ongoing cumulative impacts are likely to threaten its conservation status in the longer term (DBCA, 2020).

No Threatened Flora have been recorded in the Eliwana area, despite numerous flora and vegetation surveys (Fortescue Metals Group Ltd, 2019). There are 44 Priority flora species known from the greater Eliwana study area (Biota Environmental Sciences, 2018). Of these, nine Priority flora species are known to occur within the clearing permit envelope, based on Fortescue Metals' database of Priority flora records (Fortescue Metals Group Ltd, 2019):

Ipomoea racemigera (Priority 2) is a creeping annual herb or climber generally found in drainage lines and exposed creek beds. It has been recorded from the Gascoyne, Pilbara and Victoria Boneparte IBRA bioregions. In the Pilbara, this species has been recorded from the Chichester, Fortescue and Hamersley IBRA subregions (Fortescue Metals Group Ltd, 2018). Ten populations and 101 individuals of this species are known from the associated Eliwana Rail Development Envelope that was assessed and approved under Part IV of the *Environmental Protection Act 1986*; however none of these populations or individuals are within the indicative infrastructure footprint, hence no loss of these populations or individuals is expected (Fortescue Metals Group Ltd, 2018). Based on available information, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Pentalepis trichodesmoides subsp. hispida (Priority 2) is an upright shrub found in Triodia hummock grasslands. The species has been recorded from the Chichester, Hamersley and Roebourne IBRA subregions (Fortescue Metals Group Ltd, 2018). Four records of this species are known to occur in conservation estate (Fortescue Metals Group Ltd, 2018). Ten populations and 53 individuals of this species are known from the Eliwana Rail Development Envelope, however none of these populations or individuals are within the indicative infrastructure footprint, hence no loss of these populations or individuals is expected (Fortescue Metals Group Ltd, 2018). Based on available information, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Astrebla lappacea (Priority 3) is a perennial grass that occurs on deep soft clay loam and areas of cracking clay substrate. It is often associated with the Brockman Iron cracking clay communities PEC (Fortescue Metals Group Ltd, 2018). Ten populations and nearly 6,000 individuals of this species are known from the Eliwana Rail Development Envelope, however none of these populations or individuals are within the indicative infrastructure footprint, hence no loss of these populations or individuals is expected (Fortescue Metals Group Ltd, 2018). Based on available information, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Glycine falcata (Priority 3) is a perennial herb that typically occurs on clay soils along drainage depressions or on river floodplains. It has been recorded from both the Hamersley and Fortescue IBRA subregions, with 15 records from Naturemap and 40 known populations (Fortescue Metals Group Ltd, 2018). There are 12 populations and 2,935 individuals of this species known from the Eliwana Rail Development Envelope, of which 3 populations and 401 individuals occur within the indicative infrastructure footprint and are likely to be impacted. Despite some expected impacts from the Eliwana Railway Project, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Indigofera sp. Bungaroo Creek (Priority 3) is an erect shrub that typically occurs on red-brown sandy loam in drainage lines, floodplains and rocky gullies. The species has been recorded from a 320 kilometre range throughout the Hamersley IBRA subregion, with 45 records from Naturemap and 199 known populations (Fortescue Metals Group Ltd, 2018). There are 19 populations and 504 individuals of this species known from the Eliwana Rail Development Envelope and aren't expected to be impacted, with the exception of one individual (Fortescue Metals Group Ltd, 2018). Based on available information, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Ptilotus subspinescens (Priority 3) is a compact low shrub, known from the Hamersley IBRA subregion. There are 50 Naturemap records of this species and 40 known populations (Fortescue Metals Group Ltd, 2018). The Eliwana Rail Project is expected to result in the loss of 16.5% of known local populations and 38.5% of known local individuals. At a regional scale, 5% of known populations and 1.4% of known regional individuals will be

lost (Fortescue Metals Group Ltd, 2018). Despite the expected impacts from the nearby Eliwana Railway Project, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Gymnanthera cunninghamii (Priority 3) is a tall shrub species that generally occurs in sandy soils in drainage areas. It is broadly distributed over a range of more than 800 kilometres from the Carnarvon bioregion through the Pilbara, though it is only sporadically recorded (Biota Environmental Sciences, 2018). Ecologia (2019) recorded this species from a drainage line at one sampling location in the clearing permit application area during its November/December 2019 survey. The species has previously been recorded from a number of surveys in the Eliwana area (Biota Environmental Sciences, 2018). The preferred habitat for this species is common throughout the Pilbara. Based on available information, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Goodenia nuda (Priority 4) is an erect to ascending, slender herb; typically found growing near creeklines and in other wet areas. This species is known from the Pilbara, Gascoyne and Little Sandy Desert IBRA bioregions (Fortescue Metals Group Ltd, 2018). There are 112 records of this species from Naturemap and 331 known populations. Based on available information, it is considered unlikely that this clearing permit application will have a significant impact on this species.

Rhynchosia bungarensis (Priority 4) is a compact, prostrate shrub known to occur on pebbly, shingly coarse sand amongst boulders. It has been recorded in the Carnarvon, Gascoyne and Pilbara IBRA bioregions. In the Pilbara, the species has been recorded from the Chichester, Hamersley and Roebourne subregions (Western Australian Herbarium, 1998-). Biota Environmental Sciences (2018) notes the species is widely distributed through the central and western Pilbara, with known records from over 150 locations. Based on available information, it is considered unlikely that this clearing permit application will have a significant impact on this species.

The application area is expected to support a range of vertebrate fauna species, however is unlikely to be more diverse than surrounding areas based on the common and widespread habitat types expected to be present, lack of significant habitat features (such as permanent water, gorges and gullies) and the presence of existing roads and tracks (Ecoscape, 2018; Fortescue Metals Group Ltd, 2019).

In summary, the greater Eliwana area is floristically diverse and is known to support a range of vegetation communities, including the Themeda Grasslands TEC, Brockman Iron cracking clay communities of the Hamersley Range PEC and numerous Priority flora species. Whilst this clearing proposal is unlikely to have a significant impact on the TEC, PEC or Priority flora species, further cumulative impacts from mining-related disturbances may impact upon the biodiversity values at Eliwana in the longer term. Based on the above, the proposed clearing may be at variance to this Principle. It is considered that Fortescue Metals Group Ltd has designed this proposal to minimise impacts on biodiversity as far as practicable, by utilising existing roads and tracks and avoiding known sensitive features.

Methodology

Biota Environmental Sciences (2018)
CALM (2002)
DBCA (2020)
Ecologia (2019)
Ecoscape (2018)
Fortescue Metals Group Ltd (2018)
Fortescue Metals Group Ltd (2019)
Western Australian Herbarium (1998-)

GIS Database:
- IBRA Australia
- Pre-European Vegetation
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers
- Threatened and Priority Flora
- Threatened Fauna

(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

Proposal is not likely to be at variance to this Principle

Fortescue Metals Group Ltd (2019) reports that the clearing permit application area is likely to contain four broad habitat types, based on the findings of the consolidated vertebrate fauna assessment of the Eliwana Project by Ecoscape (2018):

1. Plain (Stony/Gibber)
2. Lower Slopes/Hillslopes
3. Hills/Ranges/Plateaux
4. Drainage Line/River/Creek (Minor)

A majority of the clearing permit application area occurs in the Plain (Stony/Gibber) habitat type. Infrastructure and clearing have been designed to avoid the Hills/Ranges/Plateaux habitat type as much as possible (Fortescue Metals Group Ltd, 2019).

Ecoscape (2018) noted that the land systems, vegetation communities and fauna habitats recorded at Eliwana are not restricted to the survey area. All habitat types recorded during the survey were noted to be well represented outside the study area.

Fortescue Metals Group Ltd (2019) reports that a range of conservation significant fauna species are likely to utilise habitat within the clearing permit application area, based on the expected habitat types present and the known distributions of conservation significant fauna. These species include: Northern Quoll, *Dasyurus hallucatus* (EN), Pilbara Olive Python, *Liasis olivaceus barroni* (VU), Pilbara Leaf-nosed Bat, *Rhinonicteris aurantia* (VU), Ghost Bat, *Macroderma gigas* (VU), Peregrine Falcon, *Falco peregrinus* (OS), Grey Falcon, *Falco hypoleucos* (VU) and Western Pebble-mound Mouse, *Pseudomys chapmani* (P4).

However, the most significant habitat types identified by Ecoscape (2018) at Eliwana are absent in the clearing permit application area (Fortescue Metals Group Ltd, 2019). These habitat types include the Gorge/Gully habitat type which provides potential suitable denning habitat for the Northern Quoll, potential suitable roosting habitat for the Pilbara Leaf-nosed Bat and Ghost Bat, and critical habitat for the Pilbara Olive Python; and the major drainage line habitat that is more likely to support Pilbara Olive Pythons and provide preferred foraging habitat for bat species (Ecoscape, 2018).

Whilst a range of conservation fauna species may utilise habitat within the application area for foraging, the habitat is unlikely to be considered significant given the lack of denning and roosting habitat, extent of similar habitat in the surrounding area, the presence of existing roads and tracks within a majority of the clearing permit area and the mobile nature of most species, enabling dispersal into adjoining uncleared areas at the onset of clearing.

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

Methodology Ecoscape (2018)
Fortescue Metals Group Ltd (2019)

GIS Database:
- Imagery
- Pre-European Vegetation
- Threatened Fauna

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

Comments **Proposal is not likely to be at variance to this Principle**

There are no known records of Threatened Flora within the application area (GIS Database). No Threatened Flora species have been recorded within the Eliwana area or within a 200 kilometre radius of the application area, despite over 20 separate flora and vegetation surveys being conducted (Fortescue Metals Group Ltd, 2019).

The vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened (rare) flora.

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

Methodology Fortescue Metals Group Ltd (2019)

GIS Database:
- Threatened and Priority Flora

(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 **Proposal is not likely to be at variance to this Principle**

There are no known Threatened Ecological Communities (TECs) within the application area (GIS Database; Fortescue Metals Group Ltd, 2019; DBCA, 2020). The closest recorded TEC, is the Themeda Grasslands on Cracking Clays, located approximately 350 metres to the east of the existing Mt Brockman - Homestead road link in the western portion of the application area. Proposed road widening in this area will not impact the TEC (Fortescue Metals Group Ltd, 2019).

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

Methodology DBCA (2020)

Fortescue Metals Group Ltd (2019)

GIS Database:
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers

(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

Proposal is not at variance to this Principle

The application area falls within the Pilbara Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 99.5% of the pre-European vegetation still exists in the IBRA Pilbara Bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation associations:

- 18: Low woodland, mulga (*Acacia aneura*);
- 82: Hummock grasslands, low tree steppe; snappy gum over soft spinifex;
- 175: Short bunch grassland - savanna/grass plain (Pilbara); 178: Hummock grasslands, grass steppe; hard spinifex, *Triodia basedowii*;
- 565: Hummock grasslands, low tree steppe; bloodwood over soft spinifex; and
- 567: Hummock grasslands, shrub steppe; mulga & kanji over soft spinifex & *Triodia basedowii* (GIS Database).

Approximately 99% of the pre-European extent of each of these vegetation associations remains uncleared at both the state and bioregional level (Government of Western Australia, 2019).

Therefore, the application area does not represent a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DBCA managed lands
IBRA Bioregion – Pilbara	17,808,657	17,731,764	~99.5	Least Concern	10.1
Beard vegetation associations – WA					
18	19,892,306	19,843,148	~99.7	Least Concern	6.6
82	2,565,901	2,553,206	~99.5	Least Concern	11.5
175	526,957	524,640	~99.5	Least Concern	7.6
178	578,161	578,161	~100	Least Concern	0.4
565	143,438	143,427	~99.9	Least Concern	-
567	777,506	774,895	~99.6	Least Concern	25.3
Beard vegetation associations – Pilbara Bioregion					
18	676,556	671,843	~99.3	Least Concern	25.1
82	2,563,583	2,550,888	~99.5	Least Concern	11.5
175	507,860	507,466	~99.9	Least Concern	7.9
178	47,181	47,181	~100	Least Concern	3.8
565	108,956	108,945	~99.9	Least Concern	-
567	776,823	774,213	~99.6	Least Concern	25.4

* Government of Western Australia (2019)
** Department of Natural Resources and Environment (2002)

Based on the above, the proposed clearing is not at variance to this Principle.

Methodology

Department of Natural Resources and Environment (2002)
Government of Western Australia (2019)

GIS Database:
- IBRA Australia
- Pre-European 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

Proposal is at variance to this Principle

There are no permanent watercourses or wetlands within the area proposed to clear (Fortescue Metals Group Ltd, 2019; GIS Database). Several ephemeral water courses that flow only after heavy rainfall intersect the application area (Fortescue Metals Group Ltd, 2019; GIS Database).

The application area has been designed to avoid and minimise any impacts to vegetation that is associated with watercourses, however, there will be some minor instances of disturbance to riparian vegetation (Fortescue Metals Group Ltd, 2019).

Based on the above, the proposed clearing is at variance to this Principle. Potential impacts to vegetation growing in association with watercourses may be minimised by the implementation of a watercourse management condition.

Methodology

Fortescue Metals Group Ltd (2019)

GIS Database:
- Hydrography, Lakes
- Hydrography, linear

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

Comments

Proposal is not likely to be at variance to this Principle

The application area lies within the Boolgeeda, Brockman, Hooley, Jurrawarrina, Newman, Robe and Rocklea land systems (GIS Database). These land systems have been mapped and described in technical bulletins produced by the former Department of Agriculture (now the Department of Primary Industries and Regional Development).

The Boolgeeda land system is described as stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands and mulga shrublands. This land system is not susceptible to erosion (Van Vreeswyk et al., 2004).

The Brockman land system is described as alluvial plains with cracking clay soils supporting tussock grasslands. Soil erosion, despite the inherent resistance of the system, can occur if vegetative cover is severely depleted (Van Vreeswyk et al., 2004).

The Hooley land system is described as alluvial clay plains supporting a mosaic of snakewood shrublands and tussock grasslands. Those parts of the system not protected by a stony surface mantle are moderately susceptible to soil erosion (Van Vreeswyk et al., 2004).

The Jurrawarrina land system is described as Hardpan plains and alluvial tracts supporting mulga shrublands with tussock and spinifex grasses. Some hardpan washplains, drainage tracts and groves are moderately susceptible to erosion (Van Vreeswyk et al., 2004).

The Newman land system is described as rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands (Van Vreeswyk et al., 2004).

The Robe land system is described as low limonite mesas and buttes supporting soft spinifex (and occasionally hard spinifex) grasslands. This land system is not generally susceptible to erosion (Van Vreeswyk et al., 2004).

The Rocklea land system is described as basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands. The system has very low erosion hazard (Van Vreeswyk et al., 2004).

It is noted that approximately 80% of the application area occurs within the Rocklea and Boolgeeda Land Systems (Fortescue Metals Group Ltd, 2019) and that neither of these systems are susceptible to erosion. The proposed clearing of up to 206 hectares of native vegetation within a boundary of approximately 3,172 hectares, for the purpose of road construction, maintenance and associated activities is unlikely to cause appreciable land degradation.

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

Methodology Fortescue Metals Group Ltd (2019)
Van Vreeswyk et al. (2004)

GIS Database:
- Landsystem Rangelands

(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 **Proposal is not likely to be at variance to this Principle**
There are no conservation areas in the immediate vicinity of the application area. The nearest DBCA (formerly DPaW) managed land is the Karijini National Park which is located approximately 28 kilometres east of the application area, at its nearest point (GIS Database). The proposed clearing is unlikely to impact on the environmental values of any conservation area.

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

Methodology GIS Database:
- DPaW 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 **Proposal is not likely to be at variance to this Principle**
A small section (approximately 4.5 kilometres) of the eastern-most extent of the proposed access roads intersect the Millstream Public Drinking Water Source Area (PDWSA) Priority 2 area (GIS Database). DWER (2019) advises that the purpose of clearing (roads and access tracks) is compatible with P2 areas, with conditions set by the Department. Potential impacts to the surface water catchment, which recharges the Millstream aquifer (the groundwater resource of the Millstream drinking water supply) can be managed by adherence to DWER's Water Quality Protection Notes (DWER, 2019).

There are no permanent surface water features within the application area (Fortescue Metals Group Ltd, 2019). Surface water is only present following significant rainfall events. The proposed clearing is unlikely to have a significant impact on surface water quality during these sporadic events. Appropriate vegetation clearing and materials handling management measures will be put in place to minimise the potential impact on water quality (Fortescue Metals Group Ltd, 2019). Potential impacts to surface water may also be minimised by the implementation of a watercourse management condition.

The depth to groundwater at its nearest point is approximately 30-40 metres below ground level (Fortescue Metals Group Ltd, 2019). The proposed clearing of small amounts of vegetation for linear infrastructure over a long distance is not expected to impact on groundwater levels or quality.

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

Methodology DWER (2019)
Fortescue Metals Group Ltd (2019)

GIS Database:
- Hydrography, Linear
- Public Drinking Water Source Areas

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

Comments **Proposal is not likely to be at variance to this Principle**
There are no permanent water courses or waterbodies within the application area (GIS Database). Seasonal drainage lines are common in the region and temporary localised flooding may occur briefly following heavy rainfall events, often associated with tropical cyclones and thunderstorms (Fortescue Metals Group Ltd, 2019). The proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.

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

Methodology Fortescue Metals Group Ltd (2019)

GIS Database:
- Hydrography, linear

Planning Instrument, Native Title, previous EPA decision or other matter.

Comments

The clearing permit application was advertised on 4 November 2019 by the Department of Mines, Industry Regulation and Safety (DMIRS), inviting submissions from the public. No submissions were received in relation to this application.

There are two native title claims (WC1997/089 and WC2001/005) over the area under application (DPLH, 2020). These claims have been determined by the Federal Court on behalf of the claimant groups. However, 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, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are numerous registered Aboriginal Sites of Significance within the application area (DPLH, 2020). 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. Where heritage sites cannot be avoided, Fortescue Metals Group Ltd will apply for Section 18 consent under the *Aboriginal Heritage Act 1972* in consultation with the native title holders as prescribed under the Land Access Agreements in place. Fortescue Metals Group Ltd has sought and received some Section 18 consents and expects to apply for additional Section 18 consents to facilitate the implementation of the proposal (Fortescue Metals Group Ltd, 2019).

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

The Eliwana Railway Project has been approved under Part IV of the *Environmental Protection Act 1986* via Ministerial Statement 1108 (Fortescue Metals Group Ltd, 2019). Whilst associated, the road construction and maintenance works supported by this native vegetation clearing permit application are of a minor nature and do not require assessment under Part IV.

Methodology

DPLH (2020)
Fortescue Metals Group Ltd (2019)

4. References

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

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Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.

DPLH (2020) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. http://maps.daa.wa.gov.au/AHIS/ (Accessed 23 January 2020).

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Ecoscape (2018) Eliwana Project: Consolidated Vertebrate Fauna. Prepared for Fortescue Metals Group by Ecoscape (Australia) Pty Ltd, North Fremantle, Western Australia, January 2018.

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Fortescue Metals Group Ltd (2019) Native Vegetation Clearing Permit Supporting Documentation: Northern Access – Eliwana. Fortescue Metals Group Ltd, October 2019.

Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions, Perth. https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics

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

Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) An inventory and condition survey of the Pilbara Region, Western Australia. Technical Bulletin No. 92. Department of Agriculture, South Perth, Western Australia.

Western Australian Herbarium (1998-) FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au/ (Accessed 28 January 2020).

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DBCA and DWER)
DoEE	Department of the Environment and Energy, Australian Government
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora
DoE	Department of the Environment, Australian Government (now DoEE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DoEE)
DWER	Department of Water and Environmental Regulation, Western Australia
EPA	Environmental Protection Authority, Western Australia
EP Act	*Environmental Protection Act 1986*, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	*Rights in Water and Irrigation Act 1914*, Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

T **Threatened species:**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**
Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**
Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species:

EX **Extinct species**
Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW **Extinct in the wild species**
Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species:

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI **Migratory species**
Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD **Species of special conservation interest (conservation dependent fauna)**
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS **Other specially protected species**
Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P **Priority species:**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 **Priority One - Poorly-known species**
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 **Priority Two - Poorly-known species**
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 **Priority Three - Poorly-known species**
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 **Priority Four - Rare, Near Threatened and other species in need of monitoring**
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.