



# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

Permit application No.: 8123/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: BHP Billiton Iron Ore Pty Ltd

### 1.3. Property details

Property: Iron Ore (McCamey's Monster) Agreement Authorisation Act 1972, Mineral Lease 266SA (AM 70/266)  
Local Government Area: Shire of East Pilbara  
Colloquial name: Caramulla Project

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
200		Mechanical Removal	Exploration, geological and hydrological investigations, construction and maintenance of access roads, pipelines, water bores, monitoring equipment and associated activities

### 1.5. Decision on application

Decision on Permit Application: Grant  
Decision Date: 18 October 2018

## 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*);
- 28: Open low woodland; mulga;
- 29: Sparse low woodland; mulga, discontinuous in scattered groups;
- 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*;
- 111: Hummock grasslands, shrub steppe; *Eucalyptus gamophylla* over hard spinifex;
- 199: Hummock grasslands, shrub steppe; mulga over soft spinifex on rises; and
- 216: Low woodland, mulga (with soft spinifex) on rises. (GIS Database).

Numerous flora and vegetation surveys have been undertaken within the application area, the most relevant are:

- *Reconnaissance Flora and Vegetation Survey Caramulla* (Onshore, 2018); and
- *Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure* (Onshore, 2014).

The following vegetation associations were recorded within the application area (Onshore, 2018):

#### **Acacia High Shrubland**

MI AerAaancAnl TtEuaErmu Aa - High Shrubland of *Acacia eriopoda*, *Acacia ancistrocarpa* and *Androcalva luteiflora* with Open Tussock Grassland of *Themeda triandra*, *Eulalia aurea* and *Eriachne mucronata* with Low Open Woodland of *Acacia aptaneura* on brown sand on minor drainage lines.

CP As TrlEncCc RheSeahSeaf - High Shrubland of *Acacia sclerosperma* subsp. *sclerosperma* over Open Tussock Grassland of *Tripogonella loliiformis*, *Enneapogon caerulescens* and *\*Cenchrus ciliaris* with Open Shrubland of *Rhagodia eremaea*, *Senna artemisioides* subsp. *helmsii* and *Senna artemisioides* subsp. *filifolia* on orange sandy loam on calccrete plains.

FS AptAwAs Tb Apt - High Shrubland of *Acacia pteraneura*, *Acacia wanyu* and *Acacia sclerosperma* subsp. *sclerosperma* over Open Hummock Grassland of *Triodia basedowii* with Low Open Woodland of *Acacia pteraneura* on brown sandy clay loam on footslopes.

#### **Acacia Low Open Forest**

SL AcaAay SieErfo ErmuMopAri - Low Open Forest of *Acacia catenulata* subsp. *occidentalis* and *Acacia ayersiana* over Open Shrubland of *Sida ectogama* and *Eremophila forrestii* subsp. *forrestii* over Very Open Tussock Grassland of *Eriachne mucronata*, *Monachather paradoxus* and *Aristida inaequiglumis* on brown sandy clay loam on hardpan plains.

FP Aa EuaTtChf PtoErfoMav - Low Open Forest of *Acacia aptaneura* over Open Tussock Grassland of *Eulalia*

*aurea*, *Themeda triandra* and *Chrysopogon fallax* with Low Open Shrubland of *Ptilotus obovatus*, *Eremophila forrestii* subsp. *forrestii* and *Maireana villosa* on brown sandy clay loam on drainage areas/floodplains.

HC AcaApt ErIIDovSegl Ar - Low Open Forest of *Acacia catenulata* subsp. *occidentalis* and *Acacia pteraneura* over Shrubland of *Eremophila latrobei* subsp. *latrobei*, *Dodonaea viscosa* and *Senna glutinosa* subsp. *x luerssenii* with High Open Shrubland of *Acacia rhodophloia* on orange sandy loam on breakaways.

#### **Acacia Low Woodland**

SL AaAcaApr Tb ErfoSie - Low Woodland of *Acacia aptaneura*, *Acacia catenulata* subsp. *occidentalis* and *Acacia pruinocarpa* over Open Hummock Grassland of *Triodia basedowii* with Open Shrubland of *Eremophila forrestii* subsp. *forrestii* and *Sida ectogama* on brown clay loam on hardpan plains.

SL Apt Apt Tb - Low Woodland of *Acacia pteraneura* over High Open Shrubland of *Acacia pteraneura* and Very Open Hummock Grassland of *Triodia basedowii* on brown silty loam on hardpan plains.

SL Aa ArcAriEua SegfErfrErfo - Low Woodland of *Acacia aptaneura* over Open Tussock Grassland of *Aristida contorta*, *Aristida inaequiglumis* and *Eulalia aurea* with Open Shrubland of *Senna glaucifolia*, *Eremophila fraseri* and *Eremophila forrestii* subsp. *forrestii* on brown sandy clay loam on hardpan plains.

SP AcaGrbAptSieErfo TpTb - Low Woodland of *Acacia catenulata* subsp. *occidentalis*, *Grevillea berryana* and *Acacia pteraneura* over Shrubland of *Sida ectogama* and *Eremophila forrestii* subsp. *forrestii* over Very Open Hummock Grassland of *Triodia pungens* and *Triodia basedowii* on brown silty loam on stony plains.

HS Apt Aw Tv - Low Woodland of *Acacia pteraneura* over High Shrubland of *Acacia wanyu* over Open Hummock Grassland of *Triodia vanleeuwenii* on brown loamy sand on hillslopes.

#### **Acacia Shrubland**

SL AwPsiErfo AaApt AaAptAw - Shrubland of *Acacia wanyu*, *Psydrax latifolia* and *Eremophila forrestii* subsp. *forrestii* with Low Open Woodland of *Acacia aptaneura* and *Acacia pteraneura* and High Open Shrubland of *Acacia aptaneura*, *Acacia pteraneura* and *Acacia wanyu* on brown sandy clay loam on hardpan plains.

#### **Aristida Open Tussock Grassland**

SL ArcEauAri AaAp SeaoScnSip - Open Tussock Grassland of *Aristida contorta*, *Eulalia aurea* and *Aristida inaequiglumis* with Low Open Woodland of *Acacia aptaneura* and *Acacia paraneura* and Low Open Shrubland of *Senna artemisioides* subsp. *helmsii*, *Sclerolaena cornishiana* and *Sida platycalyx* on orange clay loam on hardpan plains.

#### **Corymbia Low Woodland**

FP CoasAa TTAriEua - Low Woodland of *Corymbia aspera* and *Acacia aptaneura* over Tussock Grassland of *Themeda triandra*, *Aristida inaequiglumis* and *Eulalia aurea* on brown light clay on floodplains.

#### **Eremophila Low Shrubland**

FS ErcuSemaosct ApApt Aw - Low Shrubland of *Eremophila cuneifolia*, *Senna* sp. *Meekatharra* x *?artemisioides* subsp. *oligophylla* and *Sclerolaena cuneata* with Low Open Woodland of *Acacia aptaneura* and *Acacia pteraneura* and High Open Shrubland of *Acacia wanyu* on brown sandy loam on footslopes.

SL ErmaSemaoscn Apt AptAsAte - Low Shrubland of *Eremophila margarethae*, *Senna* sp. *Meekatharra* x *?artemisioides* subsp. *oligophylla* and *Sclerolaena cornishiana* with Low Open Woodland of *Acacia pteraneura* and High Open Shrubland of *Acacia pteraneura*, *Acacia sclerosperma* subsp. *sclerosperma* and *Acacia tetragonophylla* on brown sandy loam on hardpan plains.

#### **Eriachne Tussock Grassland**

GP ErIEauChf AaHIIAmac Ate - Tussock Grassland of *Eriachne flaccida*, *Eulalia aurea* and *Chrysopogon fallax* with Scattered Low Trees of *Acacia aptaneura*, *Hakea lorea* subsp. *lorea* and *Acacia macraneura* and Scattered Tall Shrubs of *Acacia tetragonophylla* on brown light medium clay on gilgai plains.

#### **Eucalyptus Low Woodland**

ME EcAptEv TtThaEua BbChsi - Low Woodland of *Eucalyptus camaldulensis*, *Acacia pteraneura* and *Eucalyptus victrix* over Open Tussock Grassland of *Themeda triandra*, *Themeda avenacea* and *Eulalia aurea* over Very Open Herbs of *Bidens bipinnata* and *Cheilanthes sieberi* on orange clayey sand on medium drainage lines.

#### **Eucalyptus Woodland**

MA Ec AciAcp CyaEuaCc - Woodland of *Eucalyptus camaldulensis* over Low Woodland of *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* over Open Tussock Grassland of *Cymbopogon ambiguus*, *Eulalia aurea* and *Cenchrus ciliaris* on brown sand on major drainage lines.

#### **Triodia Hummock Grassland**

HS Tv AaApt EreAmaSes - Hummock Grassland of *Triodia vanleeuwenii* with Low Woodland of *Acacia aptaneura* and *Acacia pteraneura* and Shrubland of *Eremophila exilifolia*, *Acacia maitlandii* and *Senna stricta* on brown sandy loam on hillslopes/breakaways.

HS Tv AptAprGrb SeglErllErfo - Hummock Grassland of *Triodia vanleeuwenii* with Low Open Woodland of *Acacia pteraneura*, *Acacia pruinocarpa* and *Grevillea berryana* and Open Shrubland of *Senna glutinosa* subsp. *x luerssenii*, *Eremophila latrobei* subsp. *latrobei* and *Eremophila forrestii* subsp. *forrestii* on brown sandy loam on hillslopes.

SA TscTb Eg AmeGrjAanc - Hummock Grassland of *Triodia schinzii* and *Triodia basedowii* with Very Open Mallee of *Eucalyptus gamophylla* and High Open Shrubland of *Acacia melleodora*, *Grevillea juncifolia* and *Acacia ancistrocarpa* on brown loamy sand on sandplains.

SA Tb ChHIIAa ApacAancAten - Hummock Grassland of *Triodia basedowii* with Low Open Woodland of *Corymbia hamersleyana*, *Hakea lorea* subsp. *lorea* and *Acacia aptaneura* and High Open Shrubland of *Acacia pachyacra*, *Acacia ancistrocarpa* and *Acacia tenuissima* on red sand on stony sand plains.

SA Tb ChHIIApr Aanc - Hummock Grassland of *Triodia basedowii* with Low Open Woodland of *Corymbia hamersleyana*, *Hakea lorea* subsp. *lorea* and *Acacia pruinocarpa* with High Open Shrubland of *Acacia ancistrocarpa* on orange brown sand on sand plains.

Fs Tv Grw AancAbAten - Hummock Grassland of *Triodia vanleeuwenii* with High Open Shrubland of *Grevillea wickhamii* subsp. *hispidula* and Open Shrubland of *Acacia ancistrocarpa*, *Acacia bivenosa* and *Acacia tenuissima* on brown loamy sand on footslopes.

HS Tv AprHII AhiCacaEre - Hummock Grassland of *Triodia vanleeuwenii* with Low Open Woodland of *Acacia pruinocarpa* and *Hakea lorea* subsp. *lorea* with Low Open Shrubland of *Acacia hilliana*, *Calytrix carinata* and *Eremophila exilifolia* on brown sandy loam on hillslopes.

SA Tb AaAancApac AaChHII - Hummock Grassland of *Triodia basedowii* with High Shrubland of *Acacia aptaneura*, *Acacia ancistrocarpa* and *Acacia pachyacra* with Low Open Woodland of *Acacia aptaneura*, *Corymbia hamersleyana* and *Hakea lorea* subsp. *lorea* on orange loamy sand on sand plains.

FS Tv Ere AprHIIAa - Hummock Grassland of *Triodia vanleeuwenii* with Low Open Shrubland of *Eremophila exilifolia* and Scattered Low Trees of *Acacia pruinocarpa*, *Hakea lorea* subsp. *lorea* and *Acacia aptaneura* on orange/brown sandy loam on footslopes.

#### **Triodia Open Hummock Grassland**

SA Tb AaApApt ErfrAsuAa - Open Hummock Grassland of *Triodia basedowii* with Low Open Woodland of *Acacia aptaneura*, *Acacia paraneura* and *Acacia apteraneura* and High Open Shrubland of *Eremophila fraseri*, *Acacia subcontorta* and *Acacia aptaneura* on brown sandy loam on sand plains.

SP Tsc Apt ErfrApt - Open Hummock Grassland of *Triodia schinzii* with Low Open Woodland of *Acacia pteraneura* and High Open Shrubland of *Eremophila fraseri* and *Acacia pteraneura* on orange sandy loam on sandy/stony plains.

<b>Clearing Description</b>	<p>Caramulla Project.</p> <p>BHP Billiton Iron Ore Pty Ltd (BHP) proposes to clear up to 200 hectares of native vegetation within a boundary of approximately 12,434 hectares, for the purpose of exploration, geological and hydrological investigations, construction and maintenance of access roads, pipelines, water bores, monitoring equipment and associated activities. The project is located approximately 50 kilometres east of Newman, within the Shire of East Pilbara.</p>
<b>Vegetation Condition</b>	<p>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994);</p> <p>to</p> <p>Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994).</p>
<b>Comment</b>	<p>The vegetation condition was derived from a vegetation survey conducted by Onshore (2018).</p> <p>A portion of the western aspect of the application area is covered by an existing permit, which was granted for mineral exploration.</p>

### **3. Assessment of application against Clearing Principles**

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

<b>Comments</b>	<p><b>Proposal may be at variance to this Principle</b></p> <p>The clearing permit application area is located mostly within the Fortescue subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara Bioregion, and partly within the Augustus subregion of the Gascoyne Bioregion (GIS Database). The Fortescue subregion can be described as alluvial plains with <i>Acacia aneura</i> over grass communities and <i>Eucalyptus camaldulensis</i> woodlands fringing drainage lines (CALM, 2002). The Augustus subregion can be described as mountainous range country divided by broad flat valleys with mulga / snakewood low woodlands occurring on shallow earthy loams over hardpan on the plains, with mulga scrub and <i>Eremophila</i> shrublands on the shallow stony loams of the ranges (CALM, 2002).</p> <p>The application area does not intersect any Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs) or known locations of Threatened flora (GIS Database).</p> <p>A reconnaissance flora and vegetation survey over the application area was conducted by Onshore (2018), covering the entire application area. A total of 30 vegetation associations classified into 12 broad floristic formations were described and mapped from the survey area, which is comparable to previous surveys completed within a 25 kilometre radius (Onshore, 2018).</p>
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The vegetation within the application area is considered to be in 'Excellent' to 'Good' condition, with the majority of the vegetation considered to be in an 'Excellent' condition (Onshore, 2018).

The flora and vegetation survey recorded five Department of Biodiversity, Conservation and Attractions (DBCA) listed Priority Flora species within the application area:

- *Eremophila capricornica* (Priority 1);
- *Ipomoea racemigera* (Priority 2);
- *Crotalaria smithiana* (Priority 3);
- *Rhagodia* sp. Hamersley (M. Trudgen 17794) (Priority 3); and
- *Goodenia nuda* (Priority 4).

Priority flora species *Eremophila capricornica* and *Ipomoea racemigera* are considered to be of high conservation significance due to the restricted geographical range and poor records. Potential impacts to these species may be minimised by the implementation of a flora management condition. The remaining priority flora species recorded have reasonably broad distributions, the proposed clearing of 200 hectares within 12,434 hectares is not expected to significantly impact these species at a regional scale.

A Level 1 terrestrial fauna survey was conducted by Biologic (2018), covering the entire application area. The literature review and database searches identified a total of 299 species of vertebrate fauna which have previously been recorded and / or have the potential to occur within the survey area. This comprised of 38 native mammals, nine non-native mammals, 142 birds, 102 reptiles, seven amphibians and one fish (Biologic, 2018). It was noted that the database searches undertaken covered a larger area than the survey area, therefore some of the species are unlikely to occur in the survey area due to the absence of some habitats. Many species may also be patchily distributed even where appropriate habitats are present, and species of birds may only occur occasionally due to their high mobility.

A total of 36 vertebrate fauna species, comprising eight mammal species (three of which were introduced), 20 bird species, and eight reptile species were recorded from the field survey of the application area (Biologic, 2018). The number of species recorded was comparable to other surveys of similar scope conducted in the vicinity of the survey area (Biologic, 2018). The application area is not considered to represent a higher level of biological diversity than surrounding areas.

Nine fauna habitats were identified by Biologic (2018) from the survey area. Three fauna habitats, the Breakaway / Cliff, Sand Plain and Major Drainage Line habitats, were considered to be of higher biodiversity significance, as evidence of conservation significant fauna were recorded from these habitats. The Stony Plain and Hillcrest / Hillslope habitats were considered to be of moderate significance, due to the potential of supporting conservation significant fauna. The remaining habitats were deemed to have a low significance as they do not support species of high conservation value and / or such species are not dependent on these habitats at a broad-scale.

There were five weed species recorded from the application area, none of which were listed as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007* (BAM Act). Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

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

**Methodology** BHP Billiton (2018)  
Biologic (2018)  
CALM (2002)  
Onshore (2018)

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

**(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 may be at variance to this Principle**

The following nine fauna habitats have been recorded within the application area, listed below in increasing order of extent (Biologic, 2018):

- Breakaway / Cliff (<1%)
- Claypan (<1%)
- Minor Drainage Line (<1%)

- Major Drainage Line (2%)
- Stony Plain (5%)
- Drainage Area / Floodplain (12%)
- Hillcrest / Hillslope (18%)
- Mulga Woodland (31%)
- Sand Plain (31%)

Three fauna habitats, the 'Breakaway / Cliff', 'Sand Plain' and 'Major Drainage Line' habitats, were considered to be of high significance as evidence of conservation significant fauna were recorded from these habitats. The 'Breakaway / Cliff' habitat may provide denning and foraging habitat for the Northern Quoll, Long-tailed Dunnart, Peregrine Falcon and Pilbara Olive Python (Biologic, 2018). The proponent has committed to minimising disturbance within this habitat and the only disturbance will be for the purpose of access tracks (BHP Billiton, 2018). Potential impacts to conservation significant fauna within the 'Breakaway / Cliff' habitat as a result of the proposed clearing may be minimised by a restricted clearing condition.

Evidence of Greater Bilby and Brush-tailed Mulgara were recorded from the 'Sand Plain' habitat, while the Night Parrot and Spectacled-Hare Wallaby may also utilise the habitat if present. An inactive Greater Bilby burrow was recorded, while active and inactive Brush-tailed Mulgara burrows were recorded, along with one dead Brush-tailed Mulgara individual (Biologic, 2018). Potential impacts to conservation significant fauna within the 'Sand Plain' habitat as a result of the proposed clearing may be minimised by a fauna management condition.

The 'Major Drainage Line' habitat provides key dispersal habitat for the Northern Quoll and Pilbara Olive Python, while also potentially providing suitable habitat for the Peregrine Falcon and the Grey Falcon. Potential impacts to conservation significant fauna within the 'Major Drainage Line' habitat as a result of the proposed clearing may be minimised by a watercourse management condition.

The 'Breakaway / Cliff' habitat comprises of rugged, incised rocky hills and ranges. Large rock fragments and rock outcropping occur in this habitat, and significant habitat features such as caves are occasionally encountered. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred. This habitat occurs in the east of the application area, and is suitable for conservation significant species such as the Northern Quoll, Pilbara Olive Python, Long-tailed Dunnart and Peregrine Falcon (Biologic, 2018). However this habitat type represents a very small part of the application area.

The 'Sand Plain' habitat is characterised by relatively deep sandy soils supporting dense spinifex grasslands and sparse low shrubs. This habitat is extensive throughout the central portion of the application area, and is suitable for the Greater Bilby, Brush-tailed Mulgara, Spectacled Hare-Wallaby and Night Parrot (Biologic, 2018).

The 'Major Drainage Line' habitat comprises of mature River Red Gums / Coolibahs over dry river pools. This habitat type is characterised by open, sandy or gravelly riverbeds. This habitat flows south to north through the western boundary of the application area, and joins the Fortescue River near the marsh. This habitat is common throughout the Pilbara and is generally associated with all the major rivers in the Pilbara. Conservation significant species such as the Northern Quoll, Pilbara Olive Python, Peregrine Falcon and Grey Falcon may utilise this habitat type (Biologic, 2018).

The 'Stony Plain' and 'Hillcrest / Hillslope' habitats were considered to be of moderate significance, due to the potential of supporting conservation significant fauna such as the Western Pebble-mound Mouse. The proponent has advised that active Western Pebble-mound Mouse mounds identified within the application area will be avoided using a 10 metre buffer where practicable (BHP Billiton, 2018).

The 'Stony Plain' habitat mainly supports hard spinifex, and occasionally soft spinifex, with a mantle of gravel and pebbles. This habitat occurs sporadically in the western, northern and eastern portions of the application area. Conservation significant species such as the Northern Quoll, Western Pebble-mound Mouse, Spectacled Hare-wallaby, Short-tailed Mouse and *Ctenotus uber* subsp. *johnstonei*, may occur in this habitat (Biologic, 2018). However, the 'Stony Plain' habitat is common throughout the Pilbara and this habitat extends outside of the application area.

The 'Hillcrest / Hillslope' habitat tends to be more open and structurally simple due to their recent depositional history than other fauna habitats, and are dominated by various species of spinifex. This habitat occurs in the east and west of the application area in large extents, and is suitable for conservation significant species such as the Northern Quoll, Western Pebble-mound Mouse and Peregrine Falcon (Biologic, 2018).

The 'Drainage Area / Floodplain' habitat is characterised by *Eucalyptus xerothermica* and *Corymbia hamersleyana* woodland over broad-leafed *Acacia* shrubland on sandy loam soils sometimes with exposed rocky areas. This habitat can have high vegetation density, complexity and diversity, and often have deeper and richer soils than other fauna habitats (Biologic, 2018). This habitat occurs in the east of the application area, with a small occurrence in the west. This habitat is not suitable for any conservation significant species, however, may harbor fauna indigenous to Western Australia due to the high density and diverse vegetation.

The condition of habitats within the application area ranged from 'Very Good' to 'Pristine' (Biologic, 2018).

The majority of the habitat types recorded within the application area are well represented within the region. The proposed clearing of up to 200 hectares within an application area of approximately 12,434 hectares is unlikely to have a significant impact on fauna habitat availability at a regional scale.

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

**Methodology** BHP Billiton (2018)  
Biologic (2018)

GIS Database:  
- Imagery  
- Pre-European Vegetation

**(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). The flora and vegetation survey of the application area did not record any species of Threatened flora listed under either the *Wildlife Conservation Act 1950* or the *Environment Protection and Biodiversity Act 1999* (Onshore, 2018).

The vegetation associations within the application area are well represented within the region (Onshore, 2018; GIS Database), and 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** Onshore (2018)

GIS Database:  
- Pre-European Vegetation  
- 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 two Threatened Ecological Communities (TECs) in the Pilbara bioregion: the 'Themeda grasslands on cracking clays (Hamersley Station, Pilbara)' and the 'Ethel Gorge aquifer stygobiont community'. Neither TEC is located within or in close proximity to the application area (GIS Database).

Flora and vegetation surveys of the application area did not identify any TECs (Onshore, 2018).

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

**Methodology** Onshore (2018)

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 and Gascoyne Bioregions of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 99% of the pre-European vegetation still exists in the IBRA Pilbara and Gascoyne Bioregions (Government of Western Australia, 2018). The application area is broadly mapped as Beard vegetation associations 18: Low woodland; mulga (*Acacia aneura*); 28: Open low woodland; mulga; 29: Sparse low woodland; mulga, discontinuous in scattered groups; 82: Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana*; 111: Hummock grasslands, shrub steppe; *Eucalyptus gamophylla* over hard spinifex; 199: Hummock grasslands, shrub steppe; mulga over soft spinifex on rises; and 216: Low woodland, mulga (with soft spinifex) on rises (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, 2018).

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	17,733,584	~99	Least Concern	10.12
IBRA Bioregion – Gascoyne	18,075,219	18,067,441	~99	Least Concern	10.27
<b>Beard vegetation associations – WA</b>					
18	19,892,306	19,843,729	~99	Least Concern	6.62
28	395,895	392,171	~99	Least Concern	-
29	7,903,991	7,900,200	~99	Least Concern	6.28
82	2,565,901	2,553,217	~99	Least Concern	11.52
111	762,963	762,326	~99	Least Concern	9.55
199	62,758	62,758	~99	Least Concern	-
216	280,759	279,237	~99	Least Concern	-
<b>Beard vegetation associations – Pilbara Bioregion</b>					
18	676,556	672,424	~99	Least Concern	25.17
28	18,323.72	18,323	~99	Least Concern	-
29	1,133,220	1,132,939	~99	Least Concern	9.38
82	2,563,583	2,550,898	~99	Least Concern	11.53
111	550,286	550,232	~99	Least Concern	6.95
199	12,680	12,680	~99	Least Concern	-
216	26,669	26,372	~98	Least Concern	-
<b>Beard vegetation associations – Gascoyne Bioregion</b>					
18	3,273,579	3,271,339	~99	Least Concern	9.66
28	153,279	153,264	~99	Least Concern	-
29	3,802,459	3,799,635	~99	Least Concern	7.82
82	2,318	2,318	~99	Least Concern	-
111	212,465	211,882	~99	Least Concern	16.32
199	46,167	46,167	~99	Least Concern	-
216	254,089	252,864	~99	Least Concern	-

\* Government of Western Australia (2018)

\*\* 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 (2018)

GIS Database:  
- IBRA Australia

**(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 (Onshore, 2018; GIS Database), however a number of ephemeral creeks, including Caramulla Creek, Davidson Creek and 13 Creek, traverse the area (GIS Database). Creek lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall.

Two vegetation associations recorded within the application area occur along major and medium ephemeral watercourses (BHP Billiton, 2018):

- MA Ec AciAcp CyaEuaCc - Woodland of *Eucalyptus camaldulensis* over Low Woodland of *Acacia citrinoviridis* and *Acacia coriacea* subsp. *pendens* over Open Tussock Grassland of *Cymbopogon ambiguus*, *Eulalia aurea* and *Cenchrus ciliaris* on brown sand on major drainage lines; and
- ME EcAptEv TtThaEua BbChsi - Low Woodland of *Eucalyptus camaldulensis*, *Acacia pteraneura* and *Eucalyptus victrix* over Open Tussock Grassland of *Themeda triandra*, *Themeda avenacea* and *Eulalia aurea* over Very Open Herbs of *Bidens bipinnata* and *Cheilanthes sieberi* on orange clayey sand on medium drainage lines.

These vegetation associations occur along Caramulla Creek in the west, and Davidson and 13 Creek in the east. These creek lines are ephemeral and discharge into the Fortescue River. Due to the small proportion of creek line habitat within the application area, as well as the proponent advising that clearing will be kept to a minimum within these areas and only when necessary (BHP Billiton, 2018), the proposed clearing is not considered to have a significant impact on riparian vegetation at a local or regional scale.

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

**Methodology**

BHP Billiton (2018)  
Onshore (2018)

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 may be at variance to this Principle**

The application area is comprised of 13 different land systems (GIS Database). The Divide, Newman, Washplain, Fortescue and Zebra land systems are the main components of the proposed clearing area, with smaller parts mapped as Boolgeeda, Cadgie, Jamindie, McKay, River, Robertson, Sylvania and Talga land systems. 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 Divide land system is described as sandplains and occasional dunes supporting shrubby hard spinifex grasslands. Vegetation in the Divide land system is subjected to fairly regular burning. Immediately after burning there is some susceptibility to wind erosion, however stabilisation occurs rapidly following rainfall (Van Vreeswyk et al, 2004).

The Fortescue land system is described as alluvial plains and flood plains supporting patchy grassy woodlands and shrublands and tussock grasslands. Alluvial plains and levees of this land system are highly susceptible to erosion is vegetative cover is lost (Van Vreeswyk et al, 2004).

The Jamindie land system is described as stony hardpan plains and rises supporting groved Mulga shrublands, occasionally with spinifex understorey. This land system is not generally susceptible to erosion (van Vreeswyk et al., 2004). Drainage tracts are moderately susceptible to erosion, however, due to the minimal proposed disturbance within these areas it is unlikely the proposed clearing will increase the amount of erosion.

The River land system is described as active flood plains, major rivers and banks supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands. This land system is largely stabilised by buffel and spinifex and accelerated erosion is uncommon, however, susceptibility to erosion is high or very high if vegetative cover is removed (van Vreeswyk et al., 2004).



The Sylvania land system is described as gritty surfaced plains and low rises on granite supporting Acacia-Eremophila-Cassia shrublands. Drainage floor and some saline and sandy plains have slight to moderate susceptibility to erosion, while other units are generally not susceptible (van Vreeswyk et al., 2004).

The Washplain land system is described as hardpan plains supporting groved mulga shrublands. Some areas of this land system, such as alluvial plains, groves and tracts, are moderately susceptible to erosion (van Vreeswyk et al., 2004).

The Boolgeeda, Cadgie, McKay, Newman and Zebra land systems are generally not prone to erosion (van Vreeswyk et al., 2004).

Given the varying landforms of the application area, some areas are more prone to land degradation than others. Biologic (2018) generally report that sandy soils are characteristic of the majority of the application area. Following vegetation removal, loose soils in the proposed clearing area will be exposed to the erosive forces of intense summer rainfall events associated with cyclonic activity. The implementation of a staged clearing condition and rehabilitation condition may minimise the potential for erosion.

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

**Methodology** BHP Billiton (2018)  
Biologic (2018)  
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 vicinity of the application area. The nearest DBCA (formerly DPaW) managed land is the Collier Range National Park which is located approximately 125 kilometres south of the application area (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**

There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database). There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database), however a number of ephemeral creeks, including Caramulla Creek, Davidson Creek and 13 Creek, traverse the area (GIS Database). Care must be taken to ensure that the proposed clearing activities do not cause or increase sedimentation, erosion or turbidity to watercourses on or off site. The proponent has advised that existing cleared tracks will be used to cross any of the drainage line features where possible, and where it is necessary for a new crossing to be installed, clearing will be kept to a minimum and will be constructed flat level to the surface to maintain the natural surface flow (BHP Billiton, 2018). The proposed clearing is unlikely to result in significant changes to surface water flows.

The depth to groundwater across the application area is anticipated to be approximately 60 to 80 metres below ground level (BHP Billiton, 2018). While two tree species (*Eucalyptus camaldulensis* and *E. victrix*) within the creek lines were identified to have deep root systems and potentially draw water supply from near the water table, it was found that clearing of vegetation within the application area would not alter the groundwater levels (Onshore, 2018). No studies have been undertaken to determine what impact vegetation removal will have upon groundwater quality in the area. However, the proposed clearing will be non-contiguous and there is a lack of permanent water bodies within the application area. It is not expected that the proposed clearing of up to 200 hectares scattered over an application area of approximately 12,434 hectares will significantly impact upon groundwater levels or quality.

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

**Methodology** BHP Billiton (2018)  
Onshore (2018)

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**

The climate of the region is arid, with very hot temperatures from November to February, and milder conditions in winter. The average annual rainfall at Newman is 317 millimetres (BOM, 2018), with the region having an average annual evaporation of approximately 2,500 millimetres, exceeding the average annual rainfall (BHP Billiton, 2018). Seasonal drainage lines are common in the region and temporary localised flooding may occur briefly following heavy rainfall events. However, 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** BHP Billiton (2018)  
BOM (2018)

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

**Comments**

The clearing permit application was advertised on 16 July 2018 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 is one native title claim over the area under application (DPLH, 2018). 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 no registered Aboriginal Sites of Significance within the application area (DPLH, 2018). 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.

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.

**Methodology** DPLH (2018)

**4. References**

- BHP Billiton (2018) Caramulla Strategic Native Vegetation Clearing Permit Application Supporting Document, BHP Billiton Iron Ore Pty Ltd, 4 July 2018.
- Biologic (2018) Caramulla Level 1 Vertebrate Fauna Assessment. Report prepared for BHP Billiton Iron Ore Pty Ltd, by Biologic Environmental Survey Pty Ltd, 15 June 2018.
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- Government of Western Australia (2018) 2017 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of December 2017. WA Department of Biodiversity, Conservation and Attractions. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
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- Onshore (2014) Consolidation of Regional Vegetation Mapping BHP Billiton Iron Ore Pilbara Tenure. Report prepared for BHP Billiton Iron Ore Pty Ltd, by Onshore Environmental Consultants Pty Ltd, 2014.
- Onshore (2018) Reconnaissance Flora and Vegetation Survey Caramulla. Report prepared for BHP Billiton Iron Ore Pty Ltd, by Onshore Environmental Consultants Pty Ltd, June 2018.
- Van Vreeswyk, A.M.E., Payne, A.L., Hennig, P., and Leighton, K.A. (2004) An Inventory and Condition Survey of the Pilbara Region, Western Australia. Department of Agriculture, Western Australia.

## 5. Glossary

### Acronyms:

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

### Definitions:

**{DPaW (2017) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-**

<b>T</b>	<p><b>Threatened species:</b> Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).</p> <p><b>Threatened fauna</b> is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the <i>Wildlife Conservation Act 1950</i>.</p> <p><b>Threatened flora</b> is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the <i>Wildlife Conservation Act 1950</i>.</p> <p>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.</p>
<b>CR</b>	<p><b>Critically endangered species</b> Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
<b>EN</b>	<p><b>Endangered species</b> Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
<b>VU</b>	<p><b>Vulnerable species</b> Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 3 of the Wildlife Conservation</p>

(Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

- EX Presumed extinct species**  
Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.
- IA Migratory birds protected under an international agreement**  
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 the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- CD Conservation dependent fauna**  
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- OS Other specially protected fauna**  
Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- P Priority species**  
Species which are poorly known; or  
Species that are adequately known, are rare but not threatened, and 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.