Department of Industry and Resources

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2629/1

Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **BHP Billiton Iron Ore Pty Ltd**

1.3. Property details

Property: *Iron Ore (Mount Newman) Agreement Act 1964*, Lease 3116/3687, Special Lease for Mining Operations, I 154279 L (Lot 65 on Deposited Plan 48920); Lease 3116/6297, Special Lease for Mining Operations, I 150310 L (Lot 140 on Deposited Plan 48922)

Local Government Area: Town of Port Hedland

Colloquial name: Bing Siding to Walla Siding

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

The area applied to clear has been broadly mapped at a scale of 1:250,000 as:

Beard Vegetation Association 93 - Hummock grasslands, shrub steppe; kanji over soft spinifex;

Beard Vegetation Association 589 - Mosaic: Short bunch grassland - savanna/ grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex;

Beard Vegetation Association 619 - Medium woodland; River Gum (*Eucalyptus camaldulensis*); and

Beard Vegetation Association 647 - Hummock grasslands, dwarf-shrub steppe; *Acacia translucens* over soft spinifex.

Ecologia Environment Pty Ltd (2008a) conducted a Level 1 flora and vegetation survey of the proposed rail duplication area between 6 and 8 April 2008 in order to describe finer scale vegetation types within the proposed rail duplication area than those described by Beard vegetation mapping. The flora and vegetation survey consisted of 16 quadrats, each 50 metres x 50 metres (the standard size for surveys carried out in the Pilbara) (Ecologia Environment Pty Ltd, 2008a). In addition, 10 transects were walked through different vegetation types along the length of the proposed rail duplication to ensure that a representative species list was produced for the survey area. The following seven vegetation units (associated with three distinct landforms) were described from the proposed rail duplication area:

River/Creek bank

1. Sparse *Eucalyptus ?camaldulensis var. obtusa* and *Corymbia deserticola subsp. deserticola* medium to low trees, with open Melaleuca argentea low trees, over numerous mixed low shrubs, dominated by *Stemodia grossa*, with sparse to open patches of *Eulalia aurea* tussock and scattered Triodia spp. hummock grasses (quadrats 2 and 10);

2. Open *Acacia colei var. colei* low trees, over sparse *Cullen lachnostachys* low shrubs, with sparse mixed **Cenchrus ciliaris* tussock and *Triodia pungens* hummock grasses (quadrat 12 and transect 8);

Plain with minor channel

3. Very disturbed - Sparse dead stems, over open mixed low shrubs of *Cullen lachnostachys* and **Aerva javanica*, over open mixed dwarf shrubs of *Corchorus elachocarpus*, with open *Triodia angusta* hummock grass (transect 7);

4. Moderately dense mixed *Acacia trachycarpa* and *A. ancistrocarpa* medium to tall shrubs, over moderately dense *Triodia pungens* hummock and open **Cenchrus ciliaris* and **Cenchrus setiger* tussock grasses (quadrat 6);

Plain

5. Scattered Corymbia spp. low trees, over open to moderately dense patches of mixed *Acacia bivenosa* and *A. ancistrocarpa*, sometimes with *A. colei var. colei*, *A. adsurgens* or *A. orthocarpa*

medium to tall shrubs, over sparse to open *A. stellaticeps* low shrubs, with moderately dense *Triodia pungens*, patches of *T. angusta*, *T. schinzii* or *T. epactia* hummock and sparse **Cenchrus ciliaris* tussock grasses (quadrats 3, 5, 7, 8, 9, 11, 13-16, transects 1-7 and 9);

6. Scattered *Acacia inaequilatera* medium shrubs, over moderately dense *Triodia angusta* or *T. pungens* hummock grassland (quadrats 1 and 4, transects 1, 2 and 10);

7. Very disturbed - Open mixed low shrubs, with open **Cenchrus ciliaris* tussock, and scattered patches of *Triodia pungens* hummock grass (along the entire length of the survey area).

Ecologia Environment Pty Ltd (2008b) undertook a Level 1 flora and vegetation survey of the Quarry 1 lease area on 8 April 2008. The flora and vegetation survey consisted of 9 quadrats, each 50 metres x 50 metres. In addition, transects were walked through different vegetation types within the lease to ensure that a representative species list was produced for the survey area. The following four vegetation units (associated with two distinct landforms) were described from the Quarry 1 lease area:

Sandy plain

1. Sparse to moderately dense patches of *Acacia adsurgens* / *Acacia ancistrocarpa* / *Acacia bivenosa* medium to tall shrubs, over sparse to moderately dense *Indigofera monophylla* dwarf shrubs, over moderately dense *Triodia pungens* or *Triodia basedowii* hummock grassland;

2. Scattered to open *Corymbia hamersleyana* low trees over open *Acacia adsurgens* / *Acacia ancistrocarpa* / *Acacia bivenosa* tall to medium shrubs over open to moderately dense *Acacia stellaticeps* low shrubs over moderately dense *Triodia pungens* or *Triodia basedowii* hummock grassland;

3. Open to moderately dense *Acacia bivenosa*, and sometimes *Acacia inaequilatera*, medium shrubs over open to moderately dense *Acacia stellaticeps* low to very low shrubs over moderately dense *Triodia pungens* or *Triodia basedowii* hummock grassland;

Granite outcrop

4. Open *Acacia colei var. colei* low trees, over moderately dense **Cenchrus ciliaris* tussock grass and sparse *Triodia pungens* hummock grass.

* = introduced flora species

Clearing Description

BHP Billiton Iron Ore Pty Ltd (BHP Billiton) have applied for a Purpose Permit to clear up to 260 hectares of native vegetation within a boundary of approximately 386 hectares (GIS Database). The proposed clearing involves duplicating a 41 kilometre section of the Newman to Port Hedland rail line between Bing and Walla Siding, located approximately 21 - 62 kilometres south of Port Hedland. Associated works will include upgrading signalling infrastructure, installation of power and communications cabling, establishment of access roads, borrow pits, temporary construction site office facilities and laydown areas. In addition, three new dual track railway bridges will be constructed at Bore Creek, East Turner River and an un-named creek.

A majority of the proposed vegetation clearing is within the existing rail lease (Special Lease 3116/3687) which is approximately 80 metres wide. A quarry lease (Special Lease 3116/6297) will be used to accommodate the temporary construction site office facilities and laydown areas due to the limited space available within the narrow rail corridor. Vegetation clearing will be undertaken using mechanical means.

Vegetation Condition

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

to

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

Comment

The vegetation condition rating was determined by Ecologia Environment Pty Ltd (2008a; 2008b) during Level 1 flora and vegetation surveys of the proposed Bing to Walla Siding rail duplication and Quarry One lease areas. Factors taken into consideration when determining the vegetation condition were:

- weeds;
- grazing;
- litter; and
- ground disturbance (tracks and other cleared areas).

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 proposed clearing area is located 21 - 62 kilometres south of Port Hedland in the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). A very small portion (a 700 metre length of the northern-most section of the proposed rail duplication) falls within the boundaries of the Roebourne subregion. The remainder of the proposed clearing area is within the Chichester subregion (GIS Database).

The Chichester subregion is characterised by undulating granite and basalt plains with significant areas of basalt ranges. Plains support shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, whilst *Eucalyptus leucophloia* tree steppes occur on ranges (Kendrick and McKenzie, 2002).

Ecologia Environment Pty Ltd (2008a) recorded 153 taxa from 33 families and 82 genera during a flora and vegetation survey of the Bing – Walla rail corridor. Floristic richness was comparable to other areas throughout the Pilbara bioregion. Seven vegetation units were described from three distinct landform types, and it was concluded that the survey area was very homogenous and contained vegetation units typical to the Pilbara bioregion. Vegetation along the rail corridor was generally described as 'degraded' due to high levels of disturbance, large numbers of introduced flora species, grazing and litter (especially on the western side of the rail corridor).

Ecologia Environment Pty Ltd (2008b) recorded 71 taxa from 26 families and 47 genera during a flora and vegetation survey of the Quarry One lease area. Floristic richness was comparable to other areas in the Pilbara, as suggested by comparison to other vegetation and flora surveys in the bioregion. For example, 144 taxa were recorded in a survey of the proposed Cowra Camp (approximately double the number of taxa recorded at Quarry One). This survey encompassed an area approximately double the size of the Quarry One lease area, and of a similar disturbance level. Four vegetation units were described from two distinct landform types at Quarry One, all of which are typical of vegetation previously described for the Pilbara bioregion. Vegetation condition of the Quarry One lease area was 'degraded' surrounding the existing quarry, with gravel pits, safety bunds, access tracks, weeds, litter and stock grazing evident. Minimal disturbance was present in areas away from the existing quarry, and these areas were generally rated as 'excellent' condition (Ecologia Environment Pty Ltd, 2008b).

Eight introduced flora species were recorded during a flora and vegetation survey of the Bing – Walla rail corridor. These included: Ruby Dock (*Acetosa vesicaria*), Kapok Bush (*Aerva javanica*), Buffel Grass (*Cenchrus ciliaris*), Birdwood Grass (*Cenchrus setiger*), Colocynth (*Citrullus colocynthis*), Ulcardo Melon (*Cucumis melo*), Pigweed (*Portulaca oleracea*) and Mimosa Bush (*Vachellia farnesiana*). Buffel Grass and Kapok Bush were observed almost continuously along the length of the rail corridor, varying from between 2 and 70% cover. The remaining introduced species were generally recorded at several locations throughout the proposed clearing area (Ecologia Environment Pty Ltd, 2008a).The presence of introduced species diminishes the biodiversity value of the proposed clearing area. Should a clearing permit be granted, it is recommended that appropriate conditions be imposed to minimise the risk of clearing operations spreading or introducing weeds to non-infested areas.

Four introduced flora species were recorded during a flora and vegetation survey of the Quarry One lease area (Ecologia Environment Pty Ltd, 2008b). However, these were all confined to the immediate vicinity of the quarry itself, an area which has been excluded from this clearing permit application by BHP Billiton. Care needs to be taken to ensure that vehicles and machinery brought onto the Quarry One lease area does not introduce weeds to non-infested areas. The most effective way of achieving this is to ensure that all vehicles and machinery are thoroughly cleaned to remove soil, plant matter and propagules prior to entering the lease.

Ecologia Environment Pty Ltd (2008c) conducted a level one fauna assessment of the Bing – Walla rail corridor in April 2008. Animal activity was high at the time of the survey, particularly reptiles which were recorded in abundance. A diverse array of fauna habitats were recorded, none of which appear to be unique, restricted or of particular conservation value (Ecologia Environment Pty Ltd, 2008f).

Ecologia Environment Pty Ltd (2008d) conducted a level one fauna assessment of the Quarry One lease area in April 2008. Animal activity was high at the time of the survey, particularly reptiles which were recorded in abundance. No particularly sensitive habitats were recorded, however unique 'man-made' habitat is present (quarry with rocky scree, steep cliff sides and graded soft-soiled shoreline). Scats of the Northern Quoll (*Dasyurus hallucatus*) were recorded during the survey, and a follow-up targeted survey for the Northern Quoll was conducted in May 2008 using Elliot traps. This survey confirmed the presence of the Northern Quoll in the Quarry One lease area, with suitable den sites present in and around the rocky scree associated with the quarry itself (Ecologia Environment Pty Ltd, 2008d). The presence of the Northern Quoll within the Quarry One lease area is significant from a biodiversity perspective, given that this species is currently protected under both Commonwealth and State legislation. The species has experienced significant range reductions as a result of altered fire regimes and cattle impacting vegetation structure, predation, and more recently, poisoning from the Cane Toad in the Northern Territory and Queensland (Ecologia Environment Pty Ltd, 2008e). BHP Billiton has excluded the quarry area from the clearing permit application to allow a 50 metre buffer to be maintained between known den sites and the proposed clearing. A Northern Quoll Management Plan has also been developed in consultation with DoIR and DEC to avoid, minimise and manage the impacts of the proposed clearing and subsequent construction activities on the Northern Quoll.

In summary, the section of the existing rail corridor subject to this clearing permit application is largely degraded and contains vegetation assemblages and fauna habitats that are well represented throughout the Pilbara bioregion (Ecologia Environment Pty Ltd, 2008f). No Threatened Ecological Communities (TEC's), Declared Rare Flora (DRF) or Priority Flora which would increase the biodiversity value of the area were recorded (Ecologia Environment Pty Ltd, 2008f). The Quarry One lease area is generally in excellent condition away from the quarry, however no particularly sensitive habitats or restricted vegetation communities were recorded. Unique 'man-made' habitat is present on the lease, however this has been excluded from the

clearing permit application area. The presence of the Northern Quoll on the Quarry One lease represents an important biodiversity value.

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

Should a clearing permit be granted, it is recommended that suitable conditions be imposed for the purposes of weed management and rehabilitation, and to ensure that impacts to the Northern Quoll are avoided, minimised and managed.

Methodology

Ecologia Environment Pty Ltd (2008a).
Ecologia Environment Pty Ltd (2008b).
Ecologia Environment Pty Ltd (2008c).
Ecologia Environment Pty Ltd (2008d).
Ecologia Environment Pty Ltd (2008e).
Ecologia Environment Pty Ltd (2008f).
Kendrick and McKenzie (2002).
GIS Database:
- Interim Biogeographic Regionalisation for Australia (Subregions).

(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

Ecologia Environment Pty Ltd (2008c; 2008d) undertook Level one vertebrate fauna assessments of the proposed Bing - Walla rail duplication and Quarry One lease areas subject to this clearing permit application in April 2008. Both assessments involved desktop database searches and literature reviews prior to field reconnaissance in order to compile potential species inventories for the study sites. The following databases and references were consulted:

- Western Australian Museum Faunabase;
- Birds Australia Birdata;
- Department of Environment and Conservation (DEC) Threatened Fauna database;
- Department of Environment and Water Protected Matters database;
- field guides for birds, mammals, reptiles and amphibians; and
- other vertebrate fauna assessments in the local area, including Biota (2004) and Ecologia Environment Pty Ltd (2008g).

Desktop studies revealed that 226 vertebrate fauna species may potentially occur in each of the study sites.

Field reconnaissance of the proposed Bing - Walla rail duplication area was undertaken between 19 and 21 April 2008. The main objectives of the field reconnaissance included:

- to provide a description of the main habitat types;
- to look for species of conservation significance;
- to undertake a risk assessment to determine likely impacts and threatening processes on vertebrate fauna; and
- to make recommendations to minimise impacts to fauna (Ecologia Environment Pty Ltd, 2008c).

Methods employed during the field reconnaissance included:

- walking transects through the project area to provide a description of the major habitat types;
- conducting 20 minute avifauna surveys in selected 2 hectare areas throughout all of the major habitat types encountered;
- opportunistic sightings of fauna;
- hand searching opportunistic sites. This involved searching for cryptic fauna by over-turning logs and stones, breaking open old logs and dead free-standing trees and searching burrows;
- looking for secondary evidence of fauna such as scats, tracks, diggings and burrows; and
- spotlighting using vehicle-mounted spotlights and head torches to record nocturnal fauna (Ecologia Environment Pty Ltd, 2008c).

Six major fauna habitats were identified from the proposed rail duplication area:

1. Acacia Shrubland over Triodia hummock grassland with or without isolated *Corymbia hamersleyana* or *Eucalyptus leucophloia* trees;

2. Triodia hummock grassland with or without isolated *Corymbia hamersleyana* trees;

3. Sparse *Eucalyptus leucophloia* woodland over sparse to moderately dense Acacia spp (*inaequilatera, ancistrocarpa*, *bivenosa* and others) shrubland, with moderately dense to dense understorey of mixed shrubs including Solanum sp. and mixed Acacia spp., over moderately dense soft grasses;

4. Sparse Acacia spp. shrubland with open to moderately dense understorey of mixed shrubs including Solanum and Acacia with or without isolated *Corymbia hamersleyana* trees;

5. Bare rocky ground with isolated Triodia hummocks or short shrubs; and

6. Riverine vegetation - Eucalyptus/Melaleuca riparian vegetation, sandy riverbed and pools of shady water.

Ecologia Environment Pty Ltd (2008c) noted that the proposed rail duplication area was largely comprised of low, undulating quartz-mantled clayey and sandy plains supporting various vegetation types. Based on fauna assessments undertaken to the north and south of the proposed clearing area, these landforms are typical of the region. Creeklines, riverbeds and riverbanks are listed as sensitive habitats by Ecologia Environment Pty Ltd (2008c), and it is recommended that disturbance to these habitats be avoided wherever possible.

Ecologia Environment Pty Ltd (2008c) concluded that there will be an unavoidable loss of biodiversity as a result of vegetation clearing for the proposed rail duplication. Loss of local vertebrate communities, loss of ecological function, displacement of local fauna into surrounding areas (where they will face increased competition), mortality (during clearing or vehicle strike), noise, dust, accidental fire, and increases in feral fauna are all likely impacts of the proposed vegetation clearing and subsequent construction activities.

Fauna most likely to be impacted by the proposed vegetation clearing include highly territorial species which are unlikely to leave the impact footprint even if the habitat is cleared, young mammals and birds still under parental care and species relying on a specialised habitat type where there is no suitable habitat nearby (Ecologia Environment Pty Ltd, 2008c). Young individuals of ground breeding birds such as the Australian Bustard (*Ardeotis australis*) or the Bush Stone-curlew (*Burhinus grallarius*) may be present at most times of the year as these species lay eggs from March to September and July to January respectively. Burrowing animals are also vulnerable to direct mortality during clearing operations, in addition to habitat loss, as they may be unlikely to vacate burrows if disturbed. Nocturnal snakes such as the Woma Python (*Aspidites ramsayi*) shelter in hollow logs, animal burrows or thick vegetation during the day and may also remain sheltered in response to clearing, thereby facing direct mortality (Ecologia Environment Pty Ltd, 2008c).

Field reconnaissance of the Quarry One lease area was undertaken on 21 April 2008. A second reconnaissance survey was undertaken on 7 May 2008, following the discovery of scats belonging to the Northern Quoll (*Dasyurus hallucatus*) throughout rocky scree areas near the base of the quarry during the April survey. The objectives and methods of the Quarry One fauna survey undertaken in April 2008 were mostly similar to those of the Bing - Walla rail duplication survey, however the objectives and methods of the May 2008 survey differed in that:

- the May 2008 survey was undertaken to confirm the presence of the Northern Quoll; and
- methods included the use of 24 Elliot traps which were baited and left overnight in the May 2008 survey in an attempt to trap the Northern Quoll (Ecologia Environment Pty Ltd, 2008d).

Six major habitats were identified during field reconnaissance of the Quarry 1 lease area:

1. Disturbed area of the quarry, comprising rocky scree, vertical rocky cliffs, an ephemeral pool and an embankment of soft soil, supporting very little vegetation;

2. Other open, revegetated or disturbed areas with little vegetation cover and significant weed penetration (eg. *Cenchrus ciliaris*);

3. Rocky granitic hill with numerous, naturally formed rocks and sparse spinifex;

4. Dense to moderately dense *Acacia bivenosa*/ *Acacia stellaticeps* low shrubs over spinifex on sandy alluvium;

5. Open, spinifex dominated sandplain with or without quartz rocks at the surface, with scattered Acacia spp. low shrubs and scattered Corymbia spp. low trees; and

6. Drainage channels supporting taller Acacia spp. and other shrubs, scattered Corymbia spp. low trees, weeds and grasses on soft sandy or eroded ground.

The Quarry One lease area covers approximately 65 hectares. This clearing permit application boundary includes approximately 47 hectares within the Quarry One lease area, however a maximum disturbance footprint of 20 hectares is proposed for the lease should a clearing permit be granted. By including 47 hectares of the lease area in the clearing permit application, the proponent has the flexibility to avoid sensitive areas and make full use of disturbed areas wherever possible (Ecologia Environment Pty Ltd, 2008f).

The following general conclusions were reached about the habitat and fauna assemblages of the Quarry One lease area (Ecologia Environment Pty Ltd, 2008d):

- Whilst the Pilbara bioregion has been relatively well surveyed, little previous fauna survey work has been conducted surrounding the lease area;
- vegetation of the lease is similar throughout;
- no particularly sensitive habitats were encountered (although the lease contains unique 'man made' habitat);

- reptile, bird and mammal activity was high at the time of the survey. This was particularly the case for reptiles, with 9 species being recorded; three of which were recorded in abundance (28, 11 and 9 times respectively);
- no amphibians were recorded despite the presence of standing water in the quarry and in drainage ditches adjacent to the rail access road (both north and south of the lease);
- no caves were recorded from the lease, and as a result, the area is not likely to provide roosting habitat for bat species;
- very few trees were noted within the lease area. Those that were present were young and low; and
- no termite mounds were recorded (Ecologia Environment Pty Ltd, 2008d).

Habitat type 1 (identified above) has been excluded from the clearing permit application. Two male and two female Northern Quolls were trapped by Ecologia Environment (2008d) from 24 Elliot traps baited overnight on 7 May 2008. The quarry itself is a unique 'man-made' habitat which provides den sites for Northern Quolls. Ecologia Environment Pty Ltd (2008d) noted that the free-standing water in the quarry also attracts bird life, including four species of waterbird which were observed during the survey (Pacific Back Duck, White-faced Heron, Black-winged Stilt and Black-fronted Dotterel). Other birds recorded during the survey (eg Fairy Martins) are likely to have been attracted to the quarry due to the abundance of flying insects surrounding the ephemeral pool (Ecologia Environment Pty Ltd, 2008d).

The most important value of the Quarry One lease area is the presence of the Northern Quoll, listed as 'Endangered' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and as 'Schedule 1 - Fauna that is rare or likely to become extinct' in the *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*. Northern Quolls are solitary marsupials that primarily feed on insects but also feed on mammals, birds, frogs, reptiles and flesh fruits when available. The species is arboreal, terrestrial and primarily nocturnal (Oakwood, 2002; 2008) cited in Ecologia Environment Pty Ltd (2008e). Northern Quolls are known to inhabit dissected rocky escarpments, open forests of lowland savannah, woodland, around human settlements and occasionally in rainforest patches or on beaches throughout their distribution (Ecologia Environment Pty Ltd, 2008e).

Northern Quolls are broadly distributed across the Pilbara bioregion and have recently been recorded at the BHP Billiton Goldsworthy minesite, Callawa exploration area (both approximately 175 kilometres east of Port Hedland), and at the Moly Mines Spinifex Ridge minesite (50 kilometres north-east of Marble Bar). Records of the Northern Quoll on the Abydos Plain (which includes this clearing permit application area) include a Level 2 fauna survey of the Fortescue Metals Group rail corridor, Hope Downs Rail Corridor and older records from Cadjeput Gorge and Edgina Granites. Northern Quolls have also been recently recorded by Ecologia Environment Pty Ltd during surveys of the 'Quarry Two' and 'Quarry Three' leases, located approximately 73 and 132 kilometres south of Port Hedland respectively (Ecologia Environment Pty Ltd, 2008e).

BHP Billiton has developed a Northern Quoll Management Plan in consultation with DEC and DoIR, to be implemented during the current Newman to Port Hedland rail duplication project. Some of the key management actions outlined in this document include (Ecologia Environment Pty Ltd, 2008e):

- Conduct targeted pre-disturbance surveys of habitat identified as potentially containing Northern Quoll den sites. Annual trapping surveys will be conducted in April/May for the duration of the construction activities in the vicinity of probable den sites, and for one year following cessation of construction activities;

- Maintain a minimum 50 metre buffer between probable Northern Quoll den sites and clearing/construction activities where practicable;

- If probable Northern Quoll den sites will be disturbed, develop trapping and relocation procedures, in consultation with DEC;

- Minimise night-time activities in the vicinity of probable Northern Quoll den sites where practicable;

- Use directional lighting to minimise light overspill and illumination of probable den sites (if night time activity must be undertaken to meet operational and scheduling requirements).

Other key actions include:

- Site induction for contractors and personnel to include information on minimisation of impact on Northern Quolls. This will include education on the location of probable den sites, the importance of adherence to speed limits to minimise the potential for road kills, prohibition of Northern Quolls being captured or fed by personnel and appropriate waste storage and disposal to discourage Northern Quolls from work areas;

- Putrescible waste to be stored in lidded waste receptacles and removed from site regularly;

- Conduct activities in accordance with the *Environmental Protection (Noise Regulations 1997)*;

- Northern Quoll death or injury must be reported as an environmental event;

- An event investigation must be conducted within 72 hours of an event occurring;
- Northern Quoll mortality must be reported to DEC Pilbara Regional Office within 72 hours of the event occurring; and
- Implement preventive and corrective actions appropriate to the nature and scale of the environmental event, reducing the probability of re-occurrence (Ecologia Environment Pty Ltd, 2008e).

BHP Billiton will monitor the implementation of management controls outlined in the Northern Quoll Management Plan via weekly inspections of work areas and quarterly environmental audits. The effectiveness of the management plan will be reviewed quarterly and as required in the event of Northern Quoll mortality or injury. Reports will be provided to DEC and other government agencies as required, detailing the results of annual monitoring surveys, any recorded Northern Quoll deaths and the status on the implementation of management measures (Ecologia Environment Pty Ltd, 2008e).

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

Should a clearing permit be granted, it is recommended that suitable conditions be imposed to ensure that impacts to the Northern Quoll are avoided, minimised and managed.

Methodology Biota (2004).
Ecologia Environment Pty Ltd (2008c).
Ecologia Environment Pty Ltd (2008d).
Ecologia Environment Pty Ltd (2008e).
Ecologia Environment Pty Ltd (2008f).
Ecologia Environment Pty Ltd (2008g).

(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 Declared Rare Flora (DRF) or Priority Flora within the proposed clearing area (GIS Database).

Ecologia Environment Pty Ltd (2008a; 2008b) undertook Level 1 flora and vegetation surveys of the proposed Bing to Walla Siding rail duplication and Quarry One lease areas subject to this clearing permit application. No DRF or Priority Flora species were recorded during the surveys.

Themeda sp. Hamersley Station (P3) was previously recorded in the vicinity of the proposed clearing area by Ecologia Environment Pty Ltd (2003), cited in Ecologia Environment Pty Ltd (2008a). No other Priority Flora taxa or DRF have been recorded in other surveys undertaken in the area (Biota, 2004; Biota & Trudgen, 2002; Ecologia Environment Pty Ltd, 2002a; 2002b; cited in Ecologia Environment Pty Ltd; 2008a).

The vegetation communities present within the proposed clearing area are typical of those found within the Chichester and Roebourne subregions, as described by Kendrick (2001) and Beard (1975); cited in Ecologia Environment Pty Ltd (2008a). It is not expected that the proposed clearing will result in a loss of significant habitat necessary for the continued existence of DRF or Priority Flora species.

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

Methodology Ecologia Environment Pty Ltd (2008a).
Ecologia Environment Pty Ltd (2008b).
GIS Database:
- Declared Rare and Priority Flora List.

(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 (TEC's) within the proposed clearing area (GIS Database). Ecologia Environment Pty Ltd (2008a; 2008b) did not record any TEC's or Priority Ecological Communities (PEC's) within the proposed Bing to Walla Siding rail duplication or Quarry 1 lease areas subject to this clearing permit application.

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

Methodology Ecologia Environment Pty Ltd (2008a).
Ecologia Environment Pty Ltd (2008b).
GIS Database:
- Threatened Ecological Communities.

(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 area applied to clear is within the Interim Biogeographic Regionalisation for Australia (IBRA) Pilbara bioregion (GIS Database). According to Shepherd et al (2001) there is approximately 99.9% of the pre-European vegetation remaining in the Pilbara bioregion. The vegetation of the application area is classified as Beard Vegetation Association 93 - Hummock grasslands, shrub steppe; kanji over soft spinifex; Beard Vegetation Association 589 - Mosaic: Short bunch grassland - savanna/ grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex; Beard Vegetation Association 619 - Medium woodland; River Gum (*Eucalyptus camaldulensis*); and Beard Vegetation Association 647 - Hummock grasslands, dwarf-shrub steppe; *Acacia translucens* over soft spinifex.

There is approximately 100% of the pre-European vegetation remaining of Beard Vegetation Associations 93, 589, 619 and 647 in the Pilbara bioregion (Shepherd et al, 2001). These vegetation types are poorly represented within conservation reserves at both the state and bioregional level (see table below). The area proposed to clear does not represent a significant remnant of vegetation in the wider regional area. The proposed clearing will not reduce the extent of Beard Vegetation Associations 93, 589, 619 or 647 below current recognised threshold levels, below which species loss increases significantly.

It is acknowledged that iron ore mining activities in the Pilbara have resulted in an increase of native vegetation clearing at the bioregional scale in recent years. This trend is expected to continue with proposed BHP Billiton and Rio Tinto expansion projects. It will therefore become increasingly important in the future to consider the cumulative impacts of native vegetation clearing both locally and regionally.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Pilbara	17,804,164	17,794,651	~99.9	least concern	6.3
Beard veg assoc. – State					
93	3,044,326	3,044,267	~100	least concern	0.4
589	809,764	809,647	~100	least concern	1.6
619	119,159	119,038	~100	least concern	0.2
647	196,373	196,373	~100	least concern	0
Beard veg assoc. – Bioregion					
93	3,042,131	3,042,082	~100	least concern	0.4
589	730,724	730,690	~100	least concern	1.8
619	118,706	118,706	~100	least concern	0.2
647	196,372	196,372	~100	least concern	0

* Shepherd et al. (2001) updated 2005
** 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).
Shepherd et al (2001).
GIS Databases:
- Interim Biogeographic Regionalisation of 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

According to available databases, there are no known ANCA wetlands, RAMSAR wetlands or wild rivers within the proposed clearing area (GIS Database).

The proposed rail duplication will involve the construction of three new dual track bridges to cross Bore Creek, East Turner River and an un-named creek (and the removal of the existing bridges). Forty six culverts will be installed along the length of the proposed rail duplication at areas of minor drainage and sheet flow, replicating the existing drainage infrastructure associated with the railway line (Ecologia Environment Pty Ltd, 2008f).

The proposed clearing for the rail duplication will involve the removal of riparian native vegetation, as described by Ecologia Environment Pty Ltd (2008c). This includes Eucalyptus/Melaleuca riparian vegetation growing on sandy riverbeds in pools of water.

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

Of the 260 hectares proposed to clear, only a small portion will include riparian native vegetation. Clearing will be kept to a necessary minimum to construct the three rail bridges which cross major drainage lines. Bridge design specifications are detailed below:

Bore Creek Bridge

length - 106.5 metres
width - 9.55 metres
clearance from creek bed - 3 metres (maximum)

Un-Named Creek Bridge

length - 63.9 metres
width - 9.55 metres
clearance from creek bed - 3 metres (maximum)

East Turner River Bridge

length - 243.3 metres
width - 9.55 metres
clearance from creek bed - 4.5 metres (maximum)

Some native vegetation will need to be cleared on the banks on both sides of Bore Creek, Un-named Creek and East Turner River, whilst steel piers (spaced at 21.3 metre intervals) will be placed on the creek beds as part of the bridge structure. An application for a Section 17 permit under the *Rights in Water and Irrigation Act 1914* to interference with the bed and banks of watercourses, including construction of culverts and bridges was submitted to the Department of Water on 4 July 2008 and approved on 15 September 2008 (Ecologia Environment Pty Ltd, 2008a).

No vegetation is present on the beds of Bore Creek or the un-named creek that will be directly impacted for bridge construction. The two new bridges over these drainage lines will be constructed on disturbed areas (existing access tracks which cross the creek beds as part of the existing rail disturbance). Some minor clearing will be necessary for new access tracks and an area associated with the construction, however the native vegetation in these areas is sparse and significantly degraded. Some Eucalyptus and Melaleuca trees exist within the footprint for the East Turner River bridge and will need to be removed (Ecologia Environment Pty Ltd, 2008f).

Some native vegetation is likely to be cleared at areas of minor drainage and sheet flow, with 46 culverts to be installed along the length of the proposed rail duplication. Whilst benefiting from ephemeral flows, this vegetation would not be classified as riparian. Similarly, some minor, sandy drainage channels are present within the Quarry One lease area, however Ecologia Environment Pty Ltd (2008b) have not described distinct riparian vegetation units associated with these features.

It is unlikely that the proposed clearing will have a significant environmental impact upon watercourses or wetlands.

Methodology

Ecologia Environment Pty Ltd (2008a).
Ecologia Environment Pty Ltd (2008b).
Ecologia Environment Pty Ltd (2008c).
Ecologia Environment Pty Ltd (2008f).
GIS Database:
- ANCA Wetlands.
- Hydrography, linear.
- RAMSAR Wetlands.
- Wild Rivers (Priority).

(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

Land system mapping by the Department of Agriculture Western Australia has mapped a variety of land systems for the Pilbara bioregion. Land systems are mapped based on biophysical features such as soil and landform type, geology, geomorphology and vegetation type (Van Vreeswyk et al, 2004). The proposed clearing area includes five different land systems (GIS Database) namely:

1. Uaroo
2. Macroy
3. Mallina
4. Robe
5. River

The Uaroo land system is characterised by broad sandy plains supporting shrubby hard and soft spinifex grasslands. Erosion is occasionally evident on drainage tracts, but this land system is generally not susceptible to erosion (Van Vreeswyk et al, 2004). Approximately half of the proposed clearing area falls within the Uaroo land system (GIS Database).

The Macroy land system is characterised by stony plains and occasional tor fields based on granite supporting hard and soft spinifex grasslands. This land system has low or very low erosion hazard (Van Vreeswyk et al, 2004). Approximately 10 kilometres of the proposed rail duplication and almost all of the Quarry One lease area fall within the Macroy land system (GIS Database).

The Mallina land system is characterised by sandy surfaced alluvial plains supporting soft spinifex (and occasionally hard spinifex) grasslands. Alluvial plains are moderately to highly susceptible to erosion when the vegetation cover is seriously depleted (Van Vreeswyk et al, 2004). Less than five kilometres of the proposed rail duplication falls within the Mallina land system (GIS Database).

The Robe land system is characterised by 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). Approximately 1.5 kilometres of the proposed rail duplication area falls within the Robe land system (GIS Database).

The River land system is characterised by active flood plains and major rivers supporting grassy Eucalypt woodlands, tussock grasslands and soft spinifex grasslands. This land system is largely stabilised by Buffel Grass and Spinifex, therefore accelerated erosion is uncommon. However, susceptibility to erosion is high or very high if vegetative cover is removed (Van Vreeswyk et al, 2004). Approximately 1.2 kilometres of the proposed rail duplication area falls within the River land system (GIS Database).

The proponent will implement the following strategies to minimise land degradation risks associated with vegetation clearing:

- All cleared vegetation will be stockpiled for later use in rehabilitation. To minimise disturbance, stockpiles will be located on already cleared or disturbed areas where practicable;
- Topsoil will be stripped to a depth of 50 - 100 millimetres and stockpiled to a height no greater than 1.5 metres for later use in rehabilitation. To minimise disturbance, stockpiles will be located on already cleared or disturbed areas where practicable;
- Approximately 154 of the 260 hectares proposed for disturbance will be of a temporary nature. Borrow pits will be rehabilitated progressively, whilst laydown areas will be rehabilitated post construction;
- Surface water run-off from work areas shall be contained in sumps to prevent pollution and erosion. Sumps shall be filled and rehabilitated upon completion of works. Bunding will also be used where necessary to prevent sediment releases off site.
- Where the potential for erosion is high, appropriate methods for erosion control will be used (such as gabions, rip rap rock protection and reno mattresses). Designers for the civil works will determine erosion potential based on floodway reports and standard engineering experience. Rock protection is provided as a general specification in culvert design, and will be used in all 46 culverts installed during construction. Post construction quality assurance monitoring will identify any additional erosion control which may be required (Ecologia Environment Pty Ltd, 2008f).

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

Should a clearing permit be granted, suitable conditions should be imposed with respect to erosion management. This is particularly the case where clearing is proposed in areas vulnerable to erosion, such as drainage lines.

Methodology Ecologia Environment Pty Ltd (2008f).
Van Vreeswyk et al (2004).
GIS Database:
- Rangeland land system mapping.

(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 reserves in close proximity to the proposed clearing area (GIS Database). The nearest DEC managed land is the 'A' Class Mungaroona Range Nature Reserve, located approximately 75 kilometres south-west of the southern-most section of the proposed clearing area (GIS Database).

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

Methodology GIS Database:
- CALM Managed Lands and Waters.

(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 number of ephemeral drainage lines dissect the proposed rail duplication area, including Bore Creek an un-named creek and East Turner River (Ecologia Environment Pty Ltd, 2008f). It is proposed that three new dual track rail bridges will be constructed to cross these drainage lines, whilst 46 culverts will also be duplicated at numerous minor drainage features and areas of sheet flow along the 41 kilometre length of the proposed rail duplication (Ecologia Environment Pty Ltd, 2008f). Engineering structures such as bridges and culverts will be used by the proponent to ensure natural surface water flow regimes are reinstated following duplication of the railway line.

During clearing, there is a potential for surface water quality to be impacted by sedimentation should adequate management measures not be put in place. BHP Billiton will implement the following strategies to avoid, minimise and mitigate impacts to surface water quality (Ecologia Environment Pty Ltd, 2008f):

- Surface water run-off from work areas shall be contained in sumps. Bunding will also be used where necessary to prevent sediment releases off site;
- Where the potential for erosion is high, appropriate methods for erosion control will be used (such as gabions, rip rap rock protection and reno mattresses). Designers for the civil works will determine erosion potential based on floodway reports and standard engineering experience. Rock protection is provided as a general specification in culvert design, and will be used in all 46 culverts installed during construction. Post construction quality assurance monitoring will identify any additional erosion control which may be required;
- Topsoil and cleared vegetation shall be stockpiled away from watercourses; and
- Contractors shall maintain a minimum 50 metre set back from drainage lines for disturbances unless otherwise approved.

The proposed clearing area is not located within a Public Drinking Water Source Area (GIS Database). A majority of the proposed vegetation clearing is within an 80 metre wide, linear rail corridor spanning some 41 kilometres. It is unlikely that vegetation clearing would result in any significant changes to local groundwater levels or quality.

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

Methodology Ecologia Environment Pty Ltd (2008f).

(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 proposed clearing area is located in the Pilbara bioregion, an arid environment characterised by two distinct seasons; a hot Summer from October to April and a mild Winter from May to September. Peak rainfall typically occurs in the Summer months and is associated with tropical cyclones. A smaller rainfall peak is experienced between May and June and is associated with cold fronts. The average annual rainfall of Port Hedland is approximately 313 millimetres. Annual evaporation rates in the Pilbara bioregion greatly exceed average annual rainfall (Ecologia Environment Pty Ltd, 2008f).

A number of ephemeral drainage lines dissect the proposed clearing area, including Bore Creek, an un-named creek and East Turner River (Ecologia Environment Pty Ltd, 2008f). It is proposed that three new dual track rail bridges will be constructed to cross these drainage lines, whilst the existing bridges will be removed. In addition, 46 culverts will be duplicated at numerous minor drainage lines and areas of sheet flow along the 41 kilometre length of the proposed rail duplication (Ecologia Environment Pty Ltd, 2008f). Bridge and culvert installation will ensure that the proposed vegetation clearing and subsequent construction activities do not impede natural surface water flow.

With respect to the Quarry 1 lease area, there are some minor ephemeral drainage lines present. These may or may not be impacted by the proposed clearing, depending on where BHP Billiton chooses to position the temporary offices and construction materials. Should the drainage lines be impacted, surface water engineering controls would be implemented to minimise the impact of clearing on natural surface water flows.

Whilst natural flood events do occasionally occur in the Pilbara following cyclonic activity, the proposed clearing of 260 hectares of native vegetation is not expected to increase the incidence or intensity of such events given the size of the area to be cleared (260 hectares) in relation to the size of the Turner River (480,185 hectares), South West Creek (48,878 hectares) and Coastal (744,301 hectares) catchments in which clearing is proposed

(GIS Database).

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

Methodology Ecologia Environment Pty Ltd (2008f).
GIS Database:
- Hydrographic Catchments - Catchments.

Planning instrument, Native Title, Previous EPA decision or other matter.

Comments

There is one native title claim over the area under application (GIS Database). This claim (WC99_003) has been registered with the National Native Title Tribunal on behalf of the claimant group (GIS Database). However, the mining tenements have 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 three Sites of Aboriginal Significance in close proximity to the proposed clearing area (Ecologia Environment Pty Ltd, 2008f). Recent archaeological and ethnographic surveys have verified that these sites are located within the rail lease, but will not be impacted by the proposed clearing (Ecologia Environment Pty Ltd, 2008f). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Environment and Conservation and the Department of Water 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 Ecologia Environment Pty Ltd (2008f).
GIS Databases:
- Aboriginal Sites of Significance.
- Native Title Claims.

4. Assessor's comments

Comment

The proposal has been assessed against the Clearing Principles, and the proposed clearing is at variance to Principle (f), may be at variance to Principles (a), (b) and (g), is not likely to be at variance to Principles (c), (d), (h), (i) or (j) and is not at variance to Principle (e).

Should a clearing permit be granted, it is recommended that conditions be imposed on the permit for the purposes of minimising impacts to the Northern Quoll, erosion control, weed management, record keeping and permit reporting.

5. References

Biota (2004) Fauna habitats and Fauna assemblage of the proposed Fortescue Metals Group 'Stage A' rail corridor. Unpublished report for Fortescue Metals Group.

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.

Ecologia Environment Pty Ltd (2008a) Rapid Growth Project 5 (RGP5) Walla to Bing Sidings and Repeater One Flora and Vegetation Report. June 2008. Unpublished report for BHP Billiton Iron Ore Pty Ltd.

Ecologia Environment Pty Ltd (2008b) Rapid Growth Project 5 (RGP5) Quarry One Flora and Vegetation Report. June 2008. Unpublished report for BHP Billiton Iron Ore Pty Ltd.

Ecologia Environment Pty Ltd (2008c) RGP5 Fauna Survey: Bing to Walla Siding and Repeater 1. June 2008. Unpublished report for BHP Billiton Iron Ore Pty Ltd.

Ecologia Environment Pty Ltd (2008d) RGP5 Fauna Survey: Quarry 1. June 2008. Unpublished report for BHP Billiton Iron Ore Pty Ltd.

Ecologia Environment Pty Ltd (2008e) Rail Expansion Project Northern Quoll Management Plan. Revision 2. October 2008. Unpublished report for BHP Billiton Iron Ore Pty Ltd.

Ecologia Environment Pty Ltd (2008f) Bing Siding to Walla Siding Rail Duplication Project: Application to Clear Native Vegetation (Purpose Permit) under the Environmental Protection Act 1986. July 2008. Unpublished report for BHP Billiton Iron Ore Pty Ltd.

Ecologia Environment Pty Ltd (2008g) Newman to Jimblebar Junction Duplication Flora and Vegetation Survey. Unpublished report for BHP Billiton Iron Ore Pty Ltd.

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

Kendrick, P., and McKenzie, N. (2002) Pilbara 1 (PIL1 - Chichester subregion) in 'A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002'. Department of Conservation and Land Management, Western Australia.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia (updated 2005).

6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005*. Department of Conservation and Land Management, Como, Western Australia} :-

P1 **Priority One - Poorly Known taxa**: taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g. road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

P2 **Priority Two - Poorly Known taxa**: taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

P3 **Priority Three - Poorly Known taxa**: taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.

P4 **Priority Four – Rare taxa**: taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.

R **Declared Rare Flora – Extant taxa** *(= Threatened Flora = Endangered + Vulnerable)*: taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

X **Declared Rare Flora - Presumed Extinct taxa**: taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

Schedule 1 **Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.

Schedule 2 **Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.

Schedule 3 **Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.

Schedule 4 **Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). *Priority Codes for Fauna*. Department of Conservation and Land Management, Como, Western Australia} :-

P1 **Priority One: Taxa with few, poorly known populations on threatened lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P2 **Priority Two: Taxa with few, poorly known populations on conservation lands**: Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P3 **Priority Three: Taxa with several, poorly known populations, some on conservation lands**: Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.

P4 **Priority Four: Taxa in need of monitoring**: Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.

P5 **Priority Five: Taxa in need of monitoring**: Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Categories of threatened species (*Environment Protection and Biodiversity Conservation Act 1999)*

EX **Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.

EX(W) **Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

CR **Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

EN **Endangered:** A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.

VU **Vulnerable:** A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.

CD **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.