Government of **Western Australia**
Department of **Mines and Petroleum**

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2843/1
Permit type: Purpose Permit

1.2. Proponent details

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

1.3. Property details

Property: Mining Leases 47/283, 47/284, 47/289, 47/290, 47/291, 47/292;
Other land pursuant to the *Iron Ore (Marillana) Agreement Act 1991*
Local Government Area: Shire Of Ashburton & Shire Of East Pilbara
Colloquial name: Kurrajura Siding to Yandi Wye Rail Duplication Project

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description
Beard vegetation associations have been mapped at a 1:250,000 scale for the whole of Western Australia, and are a useful tool to examine the vegetation extent in a regional context. Two Beard vegetation associations are located within the application area (GIS Database):

18; Low woodland; mulga (*Acacia aneura*).

82; Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana.*

Ecologia Environment (Ecologia) conducted three separate flora surveys in relation to this clearing permit application:

1) Level 1 flora and vegetation survey of Yandi Spur alignment (between Kurrajurra Siding and Yandi Wye) from 28 to 30 March 2008 (Ecologia, 2008c);
2) Level 1 flora survey at Yandi Rail Repeater Station 1 on 14 May 2008 (Ecologia, 2008c); and
3) Floristic survey targeting Declared Rare and Priority flora within Mining Tenements M47/283, M47/284, M47/289, M47/290, M47/291 and M47/292 on 24 and 25 October 2007 (Ecologia 2008b).

From these surveys the following vegetation associations were identified;

Yandi Spur
Creek Bed/Bank
1. Open to moderately dense *Eucalyptus camaldulensis* var. *obtusa* medium to high trees, over sparse *Acacia tumida* var. *pilbarensis*, *A. maitlandii* and *Petalostylis labicheoides* high shrubs, over moderately dense mixed *Themeda* sp. Mt Barricade (M.E. Trudgen 2471), *Cymbopogon procerus, Eulalia aurea* and *Chrysopogon fallax* tussock grasses.

2. Very scattered *Eucalyptus tephrodes* medium trees, over sparse *Corymbia hamersleyana* low trees, sometimes with *Eucalyptus gamophylla* low mallee trees, over moderately dense mixed high shrubs of *Acacia elachantha, A. tumida* var. *pilbarensis* and *A. inaequilatera*, over open mixed medium to low shrubs of *Gossypium robinsonii*, *Indigofera monophylla, Tephrosia rosea* var. *glabrior*, *Senna notabalis* and *Goodenia stobbsiana*, over sparse to moderately dense patches of *Cenchrus ciliaris* (weed), *Cymbopogon obtectus* and *Themeda* sp. Mt Barricade (M.E. Trudgen 2471) tussock grasses, with scattered *Triodia epactia* hummock grass.

Rocky Hill Slopes
3. Scattered *Eucalyptus leucophloia* subsp. *leucophloia* low trees, sometimes with *Corymbia hamersleyana*, over scattered varying high shrubs of *Grevillea wickhamii, Petalostylis labicheoides, Acacia bivenosa, Acacia monticola*, over scattered mixed low shrubs of *Acacia hilliana* and *Acacia adoxa* var. *adoxa*, with moderately dense *Triodia basedowii* hummock grass.

4. Scattered *Grevillea wickhamii* and *Acacia inaequilatera* high shrubs, over open *Grevillea wickhamii* medium to low shrubs, over sparse *Acacia spondylophylla* low shrubs, over open to moderately dense mixed *Triodia basedowii*, *Triodia epactia* and *Triodia wiseana* hummock grass, with scattered *Eriachne mucronata* tussock grass.

Minor Channel on Midslope
5. Sparse *Eucalyptus leucophloia* subsp. *leucophloia* medium to low trees, with scattered *Corymbia hamersleyana* and *Corymbia ferriticola* low trees, over scattered *Acacia inaequilatera* high shrubs, over open mixed low shrubs of *Gossypium robinsonii*, *Senna artemisioides* subsp. *oligophylla* and *Dodonaea pachyneura*, over sparse *Acacia adoxa* var. *adoxa* low shrubs, over sparse mixed *Cymbopogon obtectus*, *Themeda* sp. Mt Barricade (M.E. Trudgen 2471) tussock grass and *Triodia epactia* and *Triodia basedowii* hummock grasses.

6. Scattered *Eucalyptus leucophloia* subsp. *leucophloia* medium to low trees, over sparse medium seedlings of *Eucalyptus leucophloia* subsp.

leucophloia, over open low shrubs of *Mirbelia viminalis*, *Acacia adoxa* var. *adoxa* and *Goodenia stobbsiana*, over open *Triodia epactia* hummock grass.

Floodplain
7. Scattered *Corymbia hamersleyana* low trees, over sparse to open *Acacia inaequilatera* and *Grevillea wickhamii* high shrubs, over sparse *Corchorus laniflorus, Tephrosia rosea* var. *glabrior* and *Indigofera monophylla* low shrubs, over moderately dense *Triodia epactia* hummock grass, with sparse to moderately dense patches of *Cenchrus ciliaris* (weed) tussock grass.

Rail Repeater Station One
Rocky Hillslopes
1. Scattered *Eucalyptus leucophloia* subsp. *leucophloia* low trees, over scattered *Senna glutinosa* subsp. *pruinosa* medium shrubs, over sparse *Goodenia stobbsiana* low shrubs, over open to moderately dense *Triodia basedowii* hummock grass.

2. Scattered *Corymbia hamersleyana* low trees, over sparse low *Eucalyptus gamophylla* mallee trees, over sparse *Grevillea wickhamii* high shrubs, over open mixed low shrubs of *Acacia adoxa* var. *adoxa*, *Goodenia stobbsiana* and *Acacia hilliana*, over open *Triodia basedowii* hummock grass, with scattered *Eriachne lanata* and *Amphipogon caricinus* var. *caricinus* tussock grasses.

Drainage Channel
3. Moderately dense mixed *Grevillea wickhamii*, *Acacia tumida* var. *pilbarensis* and *A. inaequilatera* high shrubs, over sparse to open *Cleome viscosa* and *Acacia hilliana* low shrubs, over moderately dense *Triodia epactia* hummock grass.

Borrow Areas
Rocky Plain Vegetation
1. Open *Acacia inaequilatera* high shrubs, with sparse *Eucalyptus gamophylla* low mallee trees, over varying mixed low regrowth shrubs, with open mixed *Aristida holathera* var. *holathera* tussock and open *Triodia pungens* hummock grasses - Recently burnt.

2. Sparse *Gossypium robinsonii* high shrubs, over open mixed low to medium shrubs, dominated by *Corchorus lasiocarpus* subsp. *parvus* and *Ptilotus exaltatus* var. *exaltatus*, with open mixed *Triodia pungens* hummock and *Aristida holathera* var. *holathera* tussock grasses - Recently burnt.

3. Open *Grevillea wickhamii* subsp. *hispidula* medium to high shrubs, over sparse mixed *Ptilotus obovatus* and *Tephrosia* aff. *densa* low shrubs, with open mixed *Cenchrus ciliaris* (weed) tussock and sparse *Triodia pungens* hummock grasses.

4. Open *Corymbia hamersleyana* medium trees, over moderately dense *Acacia tumida* var. *pilbarensis* and *Grevillea wickhamii* subsp. *hispidula* medium to high shrubs, over open *Cenchrus ciliaris* (weed) and *Themeda triandra* tussock grasses.

5. Sparse *Corymbia hamersleyana*, *Eucalyptus leucophloia* subsp. *leucophloia* and *Eucalyptus xerothermica* low trees, over open *Grevillea wickhamii* subsp. *hispidula* high shrubs, over moderately dense *Triodia pungens* hummock grass.

6. Scattered *Corymbia hamersleyana - semiclara* (intergrade) low to medium trees, over open *Acacia inaequilatera* high shrubs, over sparse *Senna artemisioides* subsp. *oligophylla* x *helmsii* low shrubs, with open *Trichodesma zeylanicum* and *Cleome viscosa* herbs and mixed open *Eriachne aristidea* and *Enneapogon lindleyanus* tussock grasses.

Plain Near Gully Base Vegetation
7. Scattered *Ficus brachypoda* low trees, over open *Grevillea wickhamii* subsp. *hispidula* and *Acacia tumida* var. *pilbarensis* medium to high shrubs, over mixed low shrubs, with open *Cymbopogon ambiguus* tussock grass.

Rocky Footslope vegetation
8. Open *Eucalyptus xerothermica* and *Corymbia hamersleyana* low trees, over open herbs and *Triodia pungens* hummock grass seedlings - Recently burnt.

9. Sparse mixed *Eucalyptus leucophloia* subsp. *leucophloia* and *Corymbia deserticola* subsp. *deserticola* low trees, over open *Grevillea wickhamii* subsp. *hispidula* medium to high shrubs, over open *Acacia hilliana* and *Goodenia stobbsiana* low shrubs, over moderately dense *Triodia basedowii* hummock grass.

Clearing Description
BHP Billiton Iron Ore Pty Ltd (BHP Billiton) have applied to clear up to 189 hectares of native vegetation within a purpose permit boundary of approximately 221 hectares. The proposed clearing involves duplicating a 16.5 kilometre section of the Newman to Port Hedland rail line from Kurrajura Siding to Yandi Wye, located approximately 95 kilometres north-west of Newman (BHP Billiton, 2008). Associated works will include installation of communications cabling, upgrade of Rail Repeater Station One and signalling infrastructure, improvement of access roads and the establishment of borrow pits and laydown areas (BHP Billiton, 2008).

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
BHP Billiton commissioned Ecologia (2008c) to conduct a flora and vegetation survey of the application area in 2008. Factors taken into consideration when determining the vegetation condition were; weeds, grazing, litter and ground disturbance (tracks and other cleared areas). Based on this survey the vegetation condition was derived.

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 is not likely to be at variance to this Principle

The application area is located within the Hamersley subregion of the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). The Hamersley subregion is characterised by mulga woodlands over bunch grasses on fire textured soils in valley floors, and *Eucalyptus leucophloia* over *Triodia Brizoides* on skeletal soils of the ranges (Kendrick, 2001).

Ecologia (2008c) recorded 175 flora taxa from 39 families and 91 genera during a flora and vegetation survey of the rail corridor between Kurrajura Siding and Yandi Wye. Ecologia (2007c) considered the vegetation of the application area to represent a moderate level of diversity, compared to other flora and vegetation surveys conducted in the Pilbara. Other flora and vegetation surveys conducted in the local area found a similar level of floristc diversity. For example, 188 flora taxa from 38 families and 92 genera were recorded during the Cowra Siding to Kurrajura Siding flora and vegetation survey (Ecologia, 2008c), an area of similar size and disturbance level. Seven vegetation units were described from four distinct landform types during the Kurrajura Siding to Yandi Wye mainline vegetation survey, all of which are typical of vegetation units previously described for the Pilbara bioregion (Ecologia, 2008c). No vegetation communities of conservation significance were recorded during the survey (Ecologia, 2008c).

Ecologia (2008c) recorded 85 flora taxa from 30 families and 53 genera during a flora and vegetation survey of the Rail Repeater Station 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, 86, 79 and 77 flora taxa were recorded at the Rail Repeater Stations Nine, Three and Four Respectively, areas of similar size and disturbance level (Ecologia, 2008c). Three vegetation units were described from two distinct landform types at Rail Repeater Station One, all of which are typical of vegetation units previously described for the Pilbara bioregion (Ecologia, 2008c). Vegetation condition of the Rail Repeater Station One lease area was rated as 'excellent', with low levels of disturbance, few introduced flora species and limited evidence of grazing (Ecologia, 2008c).

Ecologia (2008a) recorded 122 taxa from 31 families and 68 genera during a Rare and Priority Flora survey of the proposed Borrow Pit areas. Floristic richness was comparable to other areas in the Pilbara (Ecologia, 2008a). Nine vegetation units were described from three distinct landform types at the proposed Borrow Pit locations, all are typical of vegetation units previously described for the Pilbara bioregion (Ecologia, 2008a).

Desktop surveys revealed that 258 vertebrate fauna species may potentially occur within the application area (Ecologia, 2008b). Fauna diversity was comparable to other areas in the Pilbara, as suggested by other comparable fauna surveys in the bioregion. For example 227 vertebrate fauna taxa were recorded with potential to occur within the survey area of Spring Siding to Turner Camp (Ecologia, 2008b).

Ecologia (2008b) concluded that the application area was largely comprised of land systems and vegetation types that are well represented both locally and regionally. There will be an unavoidable loss of biodiversity as a result of vegetation clearing for the proposed rail duplication. From a faunal perspective, Ecologia (2008b) report that no significant impacts to biodiversity are anticipated. Whilst a number of fauna species indigenous to Western Australia are expected to use habitat within the proposed clearing area, this is not considered significant habitat. Fauna habitats within the rail lease are generally degraded, subject to traffic from vehicles, railway construction and maintenance and secondary impacts such as dust and noise (Ecologia, 2008b).

One introduced fauna species, cattle (*Bos Taurus*), was recorded during the Ecologia (2008b) fauna survey, however, the following feral fauna have also been noted in previous surveys in proximity to the application area; House Mouse (*Mus musculus*); Cat (*Felis catus*); Donkey (*Equus asinus*); and Camel (*Camelus dromedaries*). Introduced species are capable of out competing native fauna for food and shelter sources. Furthermore, larger carnivorous introduced species are likely to feed directly on native fauna, reducing the biodiversity of the area (Ecologia, 2008b)

No flora species listed as Declared weeds under the *Agriculture and Related Resources Protection Act 1976* were recorded during the Kurrajura Siding to Yandi Wye flora survey while five general environmental weeds were recorded (Ecologia, 2008a; 2008c): *Bidens bipinnata* (Bipinnate Beggartick); Bladder Dock (*Acetosa vescicaria*); Buffel Grass (*Cenchrus ciliaris*); Colocynth (*Citrullus colocynthis*); and Kapok Bush (*Aerva javanica*). Buffel Grass and Kapok Bush were the most commonly recorded weed species during the Kurrajura Siding to Yandi Wye flora survey at a cover of up to 70% and 2% respectively (Ecologia, 2008c). The remaining three introduced flora species were recorded at lower densities at various locations in the application area (Ecologia, 2008c).

The presence of introduced species diminishes the biodiversity value of the proposed clearing area. Care needs to be taken to ensure that vehicles and machinery brought onto the Rail Lease areas do not introduce weeds to non-infested areas. 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.

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

Methodology Ecologia (2008a)
Ecologia (2008b)
Ecologia (2008c)
Kendrick (2001)
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 (2008b) undertook a Level 1 vertebrate fauna survey of the application area (Kurrajura Siding to Yandi Wye) in May 2008. The survey involved desktop database searches and literature reviews prior to field reconnaissance in order to compile potential species inventories for the study sites (Ecologia, 2008b). The following databases and references were consulted by Ecologia (2008b):

- Western Australian Museum Faunabase;
- Birds Australia Birdata;
- Department of Environment and Conservation (DEC) Threatened Fauna database; and
- other vertebrate fauna assessments in the local area, including several of the Newman – Port Hedland Mainline rail lease.

Desktop studies revealed that 258 vertebrate fauna species may potentially occur in the application area including 14 species of conservation significant fauna, comprising 11 species of rare fauna and three species of migratory bird (Ecologia, 2008b).

Field reconnaissance of the proposed Kurrajura Siding to Yandi Wye duplication area, Rail Repeater Station One and Borrow Pit areas was undertaken between 9 and 13 May 2008 (Ecologia, 2008b). 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, 2008b).

Nine major fauna habitats were identified from the proposed rail duplication area by Ecologia (2008b):

1. Low rocky rise with open low shrubs *Acacia*, *Grevillia*, and *Senna* over open to moderately dense low spinifex and other grasses.

Fauna habitats: spinifex, flowering *Grevillia*, leaf debris accumulated below;

2. Rocky face and boulder scree. Scattered shrubs, grasses, and *Ptilotus* sp., over low herby shrubs, *Ficus* sp. growing from rock.

Fauna habitats: rockface, jumbled boulders with detrital topsoil mantle;

3. Open *Corymbia* and *Eucalyptus*. Scattered *Hakea* and scattered *Acacia*, *Grevillia*, over open to dense patches of spinifex, low shrubs on rocky ridge and lower rocky slope.

Fauna habitats: low spinifex patches, rocky cracks and crevices;

4. Open *Acacia tumida* and buffel grass plain with scattered *Corymbia hamersleyana*, jumbled boulders and rock wall behind. Soft loamy soil in open plan area.

Fauna habitats: rocky cracks and crevices, jumbled boulders, dense grasses and shrubs. Soft, loamy soil;

5. Open *Corymbia* and *Eucalyptus* woodland over open *Acacia* and scattered *Grevillea* and *Hakea* sp. Medium shrubs over dense spinifex on rocky, stony soil.

Fauna habitats: spinifex for shelter;

6. Open *Corymbia* and *Eucalyptus* woodland over saplings and seedlings over clumpy open to dense low spinifex and low sparse *Acacia* shrubs on stony hilltop. Bunch grasses and low herby shrubs.

Fauna habitats: small rocky gully on northern slope, sloping rocky soil suitable for Western Pebble-mouse mound formation, tree hollows, repeater tower for nesting, scattered rockpiles (man-made) beneath larger rocks;

7. Rocky gully with wide (approximately 30 metres) valley floor. *Corymbia hamersleyana* in the valley floor (low trees less than 12 metres). *Eucalyptus* on gully sides also low trees (6 – 12 metres). Both open *Ficus* sp.

present in fissures in the gully sides. Recently burnt, little spinifex on gully sides but regenerating spinifex present. Ground cover of grasses and herbs on thick soft lam of valley bed. Grasses and spinifex on gully sides. Scattered regenerating *Grevillea* in valley plain and scattered low-medium shrubs.

Fauna habitats: rocky cracks an crevices, caves, and ephemeral pools (some containing water – suitable habitat for Olive pythons). Soft, loamy soil;

8. Rocky creekline and rocky face. Rocky minor drainage channel with dense mixed low shrubs of *Grevillia* and *Acacia* (flowering), and other tall woody herbaceous shrubs on grasses and rocky creekbed; rocky cliff face above with rocky scree and medium spinifex.

Fauna habitat: rocky cracks and crevices, rocky scree slope, dense low shrubs, rocky creekbed; and

9. Loose-bedded sedimentary rockface with open *Eucalyptus* and *Corymbia* woodland of low trees, over grasses and weedy herbs, young *Acacia* and *Ficus* growing from rock.

Fauna habitats: cracks and spaces between rock plates, rocky hillslope. Possible pygmy python habitat.

Ecologia (2008b) concluded that the application area was largely comprised of land systems and vegetation types that are well represented both locally and regionally; however, there will be an unavoidable loss of fauna habitats as a result of vegetation clearing for the proposed rail duplication.

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, 2008b). 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 (Ecologia, 2008b). Fauna species most likely to be impacted by this proposal are discussed below.

The Orange Leaf-nosed Bat (*Rhinonicteris aurantia*) is found in the Pilbara, Kimberley, Northern Territory and north-western Queensland, however, a separate Pilbara form is also recognised based on genetics as well as nasal apparatus morphology and call type (Ecologia, 2008b). The Pilbara form discussed here is listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*, and as 'Schedule 1 - Fauna that is rare or likely to become extinct' in the *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*. The Pilbara form of the Orange Leaf-nosed Bat will hereafter be referred to as the Pilbara Leaf-nosed Bat in accord with the nomenclature of the most recent “Mammals of Australia” (Ecologia, 2008b).

The Pilbara Leaf-nosed Bat requires roosts that provide warm and humid conditions which allow them to conserve body heat and water during the day (Ecologia, 2008b). Two “stronghold” colonies and several small numbers of individuals in granite rockpiles have been recorded for the species in the eastern Pilbara and Hamersley Range (Ecologia, 2008b) . Roost sites have previously been found in deep and partially flooded mines that trap pockets of warm, humid air (Ecologia, 2008).

Calls from the Pilbara Leaf-nosed Bat were recorded at one location during the Kurrajura Siding to Yandi Wye fauna survey. No potential roost sites were observed in the application area, however, the species is thought to forage up to 10 kilometres from roost sites. The calls recorded are likely to be from foraging bats. Regional impacts to this species are expected to be low as no potential roost sites were located in the Project area (Ecologia, 2008b).

The Pilbara subspecies *(Liasis olivaceus barroni)* of the Olive Python only occurs in the ranges of the Pilbara region of Western Australia, inhabiting watercourses and areas of permanent water in rocky gorges and gullies (Ecologia, 2008b). The Pilbara form discussed here is listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999*, and as 'Schedule 1 - Fauna that is rare or likely to become extinct' in the *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*. In warm, wet conditions the python can disperse widely, usually in close proximity to water and rock outcrops (Ecologia, 2008b). Population size estimates are difficult to determine due to the python’s cryptic nature and lack of a reliable trapping or survey technique (Ecologia, 2008b). The main threats to this subspecies are likely to come from predation by feral cats and foxes, competition with foxes for food, and destruction of habitat (Ecologia, 2008b).

No specimens of the Pilbara Olive Python were recoded within the application area, however, it is considered to have a medium likelihood occurrence in the application area given that the species has been previously recorded from the Yandi area (DEC records) and the project area contains suitable habitat in the form of small gully systems containing ephemeral waterbodies (Ecologia, 2008b). Only small sections of the rail lease impact on these fauna habitats, which are widely represented in adjacent areas, suggesting that the overall impact to the regional population will be low (Ecologia, 2008b). The assessing officer therefore considers the application area is not significant habitat for this species.

The Ghost Bat (*Macroderma gigas)* is listed as a Priority 4 species (taxa in need of monitoring) by the Department of Environment and Conservation (DEC). The Ghost Bat’s distribution is patchy and has retracted northward substantially in the last 200 years (Ecologia, 2008b). Therefore, the Pilbara populations represent some of the southern most remaining populations of the species.
The species inhabits rock outcrops composed of Marra Mamba geology and granite rock piles where it roosts in caves and disused mines. The Ghost Bat is Australia’s only strictly carnivorous bat (Ecologia, 2008b) and it

is known to forage within 1-2 kilometres of its roost site (Ecologia, 2008b).

Calls from the Ghost Bat were recorded at two locations within the Kurrajura Siding to Yandi Wye fauna survey. No potential roost sites were observed in the Project area. The recorded calls are likely to be from foraging bats. Regional impacts to this species are expected to be low as no potential roost sites were located in the Project area (Ecologia, 2008b).

The Western Pebble-mound Mouse (*Pseudomys chapmani)* is listed as a Priority 4 species (taxa in need of monitoring) by the Department of Environment and Conservation (DEC). It inhabits gentler slopes of rocky ranges where the ground is covered by stony mulch and vegetated by hard spinifex, often with a sparse overstorey of eucalypts and scattered shrubs, typically *Senna*, *Acacia* and *Ptilotus* (Ecologia, 2008b). The Western Pebble-mound Mouse builds a permanent, above-ground structure of stones on top of a subterranean burrow system (Ecologia, 2008b).

Formerly the mouse inhabited a much wider area but it appears to have suffered recent retractions in its range. Its decline in the Murchison and Gascoyne has been attributed predominantly to the introduction of exotic herbivores and the increase in numbers of foxes (Ecologia, 2008b). While the species still remains widespread in the Pilbara, suitable habitat is patchy (Ecologia, 2008b).

During the Kurrajura Siding to Yandi Wye survey a total of six mounds were recorded. Five of these mounds were considered to be active/recently active as determined by evidence of fresh maintenance, lack of shrubs on the mounds and well-shaped peaks. One mound was determined inactive (rounded to flat peaks, vegetation and no evidence of recent use). The mounds were located along the Yandi Repeater Station One access track (Ecologia, 2008b). BHP Billiton propose to install fibre optic cable from the railway formation to the Yandi Repeater Station, however this will be installed within the existing cleared access track and therefore, impacts to suitable habitat and known locations of this species will be minimal (BHP Billiton, 2008).

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

None of the abovementioned fauna species are likely to be specifically dependant on habitats found within the application area, although they may use the application area as part of a foraging ground (Ecologia, 2008b). The fauna habitats occurring within the application area are well represented within several conservation reserves, and in the Pilbara region generally (Ecologia, 2008b). The application area has suffered previous disturbance from railway construction and maintenance activities, fire, and weed invasion, and is unlikely to represent an area of significant fauna habitat in comparison to other undisturbed areas in the region.

Methodology Ecologia (2008b)

(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

Ecologia (2008c) conducted a Level 1 flora and vegetation survey of the Mainline Rail Lease (80 metres wide, 16.5 kilometres long) between Yandi Wye to Kurrajura Siding (the application area) between 28 and 30 March 2008. Further to this, Ecologia (2008c) conducted a Level 1 flora and vegetation survey over the location for the proposed Rail Repeater Station One on 14 May 2008 and a Rare and Priority flora survey over five proposed borrow pit areas between 24 and 25 October 2007 (Ecologia, 2008a).

According to available databases, there are no known records of Declared Rare Flora (DRF) or Priority Flora within the application area (Ecologia, 2008a; 2008c).

Two DRF are known to occur in the Pilbara bioregion, *Lepidium catapycnon* and *Thryptomene wittweri*; neither of these taxa were recorded during the flora surveys (Ecologia, 2008c). These taxa prefer steep rocky slopes and ridges and the potential for their occurrence in the application area is considered to be low (Ecologia, 2008c).

Currently, 97 Priority Flora species are known from the Pilbara bioregion (Ecologia, 2008a; 2008c). An examination of available databases and historic literature showed records of 18 Priority flora species which have the potential to occur within a 20 kilometre radius of the application area (Ecologia, 2008c).

Although there is potential for some Priority Flora species to occur within the application area, Ecologia (2008a; 2008c) did not record any DRF or Priority Flora species during flora and vegetation surveys of the proposed rail duplication area, Rail Repeater Station One or Borrow Pit areas.

The vegetation communities present within the proposed clearing area are typical of those found within the Hamersley subregion, as described by Kendrick (2001). 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 (2008a)

Ecologia (2008c)
Kendrick (2001)

(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

According to available databases there are no Threatened Ecological Communities (TEC's) within the application area (GIS Database). The nearest TEC is located approximately 45 kilometres to the south-west (GIS Database).

The vegetation units described by Ecologia (2008c) within the application area were not considered to be TEC's or an ecological community at risk.

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

Methodology

Ecologia (2008c)
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 application area 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 18 - Low woodland; mulga (*Acacia aneura*) and Beard vegetation association 82 - Hummock grasslands, low tree steppe; snappy gum over *Triodia wiseana* (GIS Database).

There is approximately 100% of the pre-European vegetation remaining of Beard Vegetation Associations 18 and 82 in the Pilbara bioregion (Shepherd et al., 2001). These vegetation types are represented within conservation reserves at both the state and bioregional level (see table below). The application area 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 18 or 82 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					
18	19,892,437	19,890,348	~100	least concern	2.1
82	2,565,930	2,565,930	~100	least concern	10.2
Beard veg assoc. – Bioregion					
18	676,561	676,561	~100	least concern	16.8
82	2,563,610	2,563,610	~100	least concern	10.2

* 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 Directory of Important Wetlands or Ramsar wetlands within the application area (GIS Database).

There are no permanent watercourses or wetlands within the application area, however, the application area crosses a number of ephemeral drainage lines (Ecologia, 2008c). Three distinct vegetation units associated with drainagelines were identified by Ecologia (2008a; 2008c) during a flora and vegetation survey of the proposed rail duplication area:

Creek Bed/Bank
1. Open to moderately dense *Eucalyptus camaldulensis* var. *obtusa* medium to high trees, over sparse *Acacia tumida* var. *pilbarensis*, *A. maitlandii* and *Petalostylis labicheoides* high shrubs, over moderately dense mixed *Themeda* sp. Mt Barricade (M.E. Trudgen 2471), *Cymbopogon procerus, Eulalia aurea* and *Chrysopogon fallax* tussock grasses;

2. Very scattered *Eucalyptus tephrodes* medium trees, over sparse *Corymbia hamersleyana* low trees, sometimes with *Eucalyptus gamophylla* low mallee trees, over moderately dense mixed high shrubs of *Acacia elachantha, A. tumida* var. *pilbarensis* and *A. inaequilatera*, over open mixed medium to low shrubs of *Gossypium robinsonii*, *Indigofera monophylla, Tephrosia rosea* var. *glabrior*, *Senna notabalis* and *Goodenia stobbsiana*, over sparse to moderately dense patches of *Cenchrus ciliaris* (weed), *Cymbopogon obtectus* and *Themeda* sp. Mt Barricade (M.E. Trudgen 2471) tussock grasses, with scattered *Triodia epactia* hummock grass; and

Minor Channel on Midslope
3. Sparse *Eucalyptus leucophloia* subsp. *leucophloia* medium to low trees, with scattered *Corymbia hamersleyana* and *Corymbia ferriticola* low trees, over scattered *Acacia inaequilatera* high shrubs, over open mixed low shrubs of *Gossypium robinsonii*, *Senna artemisioides* subsp. *oligophylla* and *Dodonaea pachyneura*, over sparse *Acacia adoxa* var. *adoxa* low shrubs, over sparse mixed *Cymbopogon obtectus*, *Themeda* sp. Mt Barricade (M.E. Trudgen 2471) tussock grass and *Triodia epactia* and *Triodia basedowii* hummock grasses.

The application area runs parallel to an unnamed major creek, which contains many tributary branches which cross the application area. For this reason the application area contains approximately 51 hectares of vegetation which are growing in association with these minor ephemeral drainage lines.

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

The entire application area is contained within land systems which contain hills and ridges with dissected slopes and valleys containing ephemeral drainage lines (Van Vreeswyk et al., 2004). Although, the drainage lines themselves comprise a relatively small total area, their distribution is quite widespread throughout the Pilbara. Ecologia (2008c) states that the vegetation, including riparian vegetation, of the application area is typical of vegetation previously described for the Pilbara area. Therefore, the loss of a small percentage of vegetation associated with drainage lines is not expected to have a large environmental impact.

In addition, much of the vegetation of the application area has been degraded. Ecologia (2008a; 2008c) report that the vegetation along the rail corridor is generally degraded as a result of disturbance from the construction of the original rail corridor, which has resulted in the introduction of a high numbers of weeds.

The proponent has applied to the Department of Water for a Section 17 permit under the Rights *in Water and Irrigation Act 1914* for interference with the beds and banks of water courses (BHP Billiton, 2008).

Methodology

BHP Billiton (2008)
Ecologia (2008a)
Ecologia (2008c)
Van Vreeswyk et al. (2004)
GIS Database:
-ANCA wetlands
-RAMSAR wetlands

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

Comments

Proposal is not likely to be at variance to this Principle

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 areas include four different land systems (GIS Database). A broad description of each land system is given below.

1. Boolgeeda - The Boolgeeda land system is characterised by stoney lower slopes and plains below hill

systems supporting hard and soft spinifex grasslands and mulga shublands. Vegetation is generally not prone to degradation and the system is not susceptible to erosion (Van Vreeswyk et al., 2004). Approximately 10 percent of the application area is within this land system (Ecologia, 2008c).

2. Newman - The Newman land system is characterised by rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grassland. (Van Vreeswyk et al., 2004). Approximately 60 percent of the application area is within this land system (Ecologia, 2008c).

3. Platform - The Granitic land system is characterised by dissected slopes and raised plains supporting hard spinifex grassland. This system is not susceptible to erosion (Van Vreeswyk et al., 2004). Approximately 25 percent of the application area is within this land system (Ecologia, 2008c).

4. Robe - The Robe land system is characterised by low limonite mesas and buttes supporting soft spinifex (and occasionally hard spinifex) grasslands. The system is generally not susceptible to vegetation degradation or erosion (Van Vreeswyk et al., 2004). Approximately four percent of the application area is within this land system (Ecologia, 2008c).

The proponent will implement the following strategies to minimise land degradation risks associated with vegetation clearing (BHP Billiton, 2008):

- All cleared vegetation will be stockpiled for later use in rehabilitation. To minimise disturbance, stockpiles will be located on previously 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 previously cleared or disturbed areas where practicable;
- Borrow pits will be progressively rehabilitated, 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;
- A total of 33 culverts will be installed where the rail formation crosses minor drainage lines and areas of concentrated surface runoff. Culverts have been engineered to have sufficient capacity to accommodate flow along existing drainage lines from 1 in 50 year flood event (Ecologia, 2008c). Rock protection is provided as a general specification in culvert design, and will be used in all culverts installed during construction; and
- 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). Post construction quality assurance monitoring will identify any additional erosion control which may be required (Ecologia, 2008c).

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

Methodology BHP Billiton (2008)
Ecologia (2008c)
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 application area (GIS Database). The nearest known conservation reserve is the Karijini National Park, located approximately 40 kilometres west of the eastern extent of the proposed rail duplication area (GIS Database). The distance between the reserve and the application area is considered adequate for separation of these activities and it is unlikely that the proposed clearing will impact on the environmental values of the conservation reserve.

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. Currently there are 33 culverts which maintain natural surface water flow beneath the rail line. These will be extended beneath the proposed rail duplication (BHP Billiton, 2008). These engineering structures will 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 (BHP Billiton, 2008):

- 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 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

The proposed clearing area is not located within a Public Drinking Water Source Area (GIS Database). The majority of the proposed vegetation clearing is within a linear, 80 metre wide rail corridor spanning some 16.5 kilometres. It is unlikely that vegetation clearing would result in any significant changes to local groundwater levels or quality.

The proponent has submitted and application with the Department of Water under Section 5C of the *Rights in Water and Irrigation Act 1914* to abstract ground water and construct bores.

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

Methodology

BHP Billiton (2008)
GIS Database:
-Public Drinking Water Source Area

(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

Geoscience Australia (2008) attributes four major factors which influence inland flooding. These include:

- Intensity and duration of rainfall over a catchment area;
- The capacity of the watercourses to network and convey runoff;
- The percentage of vegetation cover; and
- The topography.

Based on the four factors listed above, clearing within the application area is unlikely to exacerbate the incidence or intensity of flooding for the following reasons:

- The application area has a climate with a summer predominant rainfall pattern averaging approximately 180 millimetres per annum (Ecologia, 2008b), and a high average annual evaporation rate exceeding the average annual rainfall by nearly twenty times (approximately 3,500 millimetres) (GIS Database);
- The application area stretches over the Fortescue River, Upper Catchment. This catchment totals approximately 2,975,192 hectares (GIS Database). Although the area of proposed clearing is relatively large (189 hectares), when compared in relation to the large size of the Fortescue River, Upper Catchment, it is unlikely to result in an appreciable increase in runoff. Furthermore, where the rail corridor crosses drainages lines culverts will be installed and engineered to withstand a 1 in 50 year rainfall event (BHP Billiton, 2008);
- Vegetation cover immediately surrounding the application area is high, with nearly 100 percent of the pre-European vegetation remaining (Shepherd et al., 2001), slowing water movements to lower lying areas and increasing water infiltration and absorption; and

- The topography of the application area slowly descends from 590 metres above sea level in the south to 520 metres in the north (70 metre drop over 16.5 kilometres) (GIS Database). Water movements across the application area during significant rainfall events are expected to be slow allowing infiltration and reducing rapid mass transition of water to lower areas.

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

Methodology BHP Billiton (2008)
Geoscience Australia (2008)
Shepherd et al. (2001)
GIS Database:
- Evaporation Isopleths
- Hydrographic Catchments
- Rainfall, Mean Annual
- Topography Contours, Statewide

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

Comments

There are two native title claims over the application area (GIS Database). These claims (WC99_062 and WC99_061) have been registered with the National Native Title Tribunal on behalf of the claimant groups (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 numerous registered Sites of Aboriginal Significance within two kilometres of the proposed clearing areas (GIS Database). The proposed clearing intersects the buffer zone of nineteen of these sites (BHP Billiton, 2008). Recent heritage surveys have been undertaken by the traditional owners of the land, confirming that there are no registered Sites within the proposed clearing areas (BHP Billiton, 2008). 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 BHP Billiton (2008)
GIS Databases:
- Aboriginal Sites of Significance
- Native Title Claims

4. Assessor's comments

Comment

The proposal has been assessed against the clearing principles and is at variance to Principle (f), may be at variance to Principle (b), is not likely to be at variance to Principles (a), (c), (d), (g), (h), (i) and (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 weed management, record keeping and permit reporting.

5. References

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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.
DMP	Department of Mines and Petroleum
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.