



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 2964/2
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **BHP Billiton Yeerlerie Development Company P/L**

1.3. Property details

Property: *Uranium (Yeerlerie) Agreement Act 1978*

Temporary Reserve 70/6899, Mineral Claims: 36/2667, 36/2668, 36/2677, 36/2679, 36/2707, 36/2708, 36/2709, 36/2710, 36/2711, 36/2712, 36/2713, 36/2714, 36/2715, 36/2716, 36/2717, 36/2718, 36/2771, 36/3313, 36/3314, 36/3315, 36/3316, 36/3317, 36/3694, 53/1098, 53/1100, 53/1102, 53/1103, 53/1104, 53/1105, 53/1106, 53/1107, 53/1111, 53/1112, 53/1113, 53/1114, 53/1115, 53/1116, 53/1117, 53/1118, 53/1119, 53/1120, 53/1121, 53/1122, 53/1165, 53/1166, 53/1167, 53/1168, 53/1170, 53/1171, 53/1172, 53/1173, 53/1174, 53/1175, 53/1176, 53/1177, 53/1178, 53/1179, 53/1180, 53/1181, 53/1182, 53/1183, 53/1184, 53/1185, 53/1186, 53/1187, 53/1188, 53/1189, 53/1190, 53/1191, 53/1192, 53/1193, 53/1194, 53/1196, 53/1197, 53/3147, 53/3148, 53/3149, 53/3150, 53/3151, 53/3152, 53/3153, 53/3767, 53/3769, 53/3770, 53/3771, 53/3772, 53/3773, 53/3774, 53/3775, 53/3785, 53/3871, 53/3872, 53/3877, 53/3878, 53/3904, 53/3905, 53/3911, 53/3912, 53/3914, 53/3933, 53/3934, 53/3939, 53/3940, 53/3941, 53/3942, 53/3943, 53/4115, 53/4126, 53/4127, 53/4358, 53/4359, 53/4360, 53/4529, 53/4531, 53/4536, 53/4805, 53/5303, 53/5304, 53/5305, 53/5306, 53/5307, 53/5308, 53/5309, 53/5310, 53/5311, 53/5312, 53/5313, 53/5314, 53/5315, 53/5316, 53/5317, 53/5318, 53/5319, 53/5320

Local Government Area: Shire of Leonora & Shire of Wiluna
Colloquial name: Yeerlerie Uranium Project Phase 3

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
10		Mechanical Removal	Hydrological exploration, bore construction, geotechnical investigations, exploration drilling and associated works.

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 useful to look at vegetation extent in a regional context. Five Beard Vegetation Associations are located within the application area (GIS Database):

- 18: Low woodland; Mulga (*Acacia aneura*);
- 107: Hummock grasslands, shrub steppe; Mulga and *Eucalyptus kingsmillii* over hard Spinifex;
- 125: Bare areas; salt lakes;
- 389: Succulent steppe with open low woodland; Mulga over saltbush; and
- 676: Succulent steppe; samphire.

Western Botanical (2009a; 2009b) has undertaken a flora and vegetation survey and significant flora assessment which includes the central portion of the application area. The north-western and south-eastern sections of the application area have not been surveyed at the time of undertaking this assessment.

The following 20 vegetation communities were described by Western Botanical (2009a) from the central portion of the Yeerlerie Project area:

1. Sandplain Spinifex *Acacia prainii* Shrubland with Mallee (SASp-M) - *Acacia prainii* shrubland with *Triodia basedowii* hummock grasses to 0.4 metres, Plant Foliage Cover (PFC) 2-10% with emergent *Eucalyptus trivalvis* mallees 3-4 metres, PFC 10 - 15%;

2. Acacia-Eremophila shrubland on Calcrete (AESC) - *Acacia burkittii* 4 metres, *Senna artemisioides* ssp. *filifolia* 1.5 metres, occasional *Eremophila arachnoides* ssp. *arachnoides* (P3) 1.5 - 2.5 metres, *Acacia synchronicia* 1- 3 metres, PFC 10 -15%. Soil is a pale red-brown fine sand with calcrete below with discontinuous lag gravel 0.5 to 2 centimetres. Gently inclined (1 - 2%) to level sites forming a fringe around *Acacia burkittii* Shrubland on Calcrete (AbSC) from which it receives significant run-on. Also forms a mosaic with *Eucalyptus gypsophila* woodland (EgW) community. Both neighbouring communities could also support *Eremophila arachnoides* ssp. *arachnoides* (P3);
3. *Eucalyptus gypsophila* woodland (EgW) - Tall open woodland of *Eucalyptus gypsophila* ms 8-12 metres, PFC 30- 60%. Mid storey of occasional, scattered *Acacia burkittii* and *Templetonia ?egena* PFC 2 -5%. Approx 50% leaf litter and 50% bare ground. Soil is calcrete gravels with pale creamy coloured sand;
4. Sandplain Spinifex Mulga Shrubland (SAMU) - *Acacia aneura* 4-5 metres, PFC 15% over *Eremophila forrestii* ssp. *forrestii* 1.5 metres, *Acacia prainii* 1.5 metres, PFC 2 -5% over *Triodia basedowii* 0.3 metres, PFC 40-60%. Long Unburnt;
5. Hard Pan Mulga Shrubland (HPMS) - *Acacia aneura* 4-5 metres, PFC 25- 40% with occasional *Grevillea berryana* 3-6 metres, *Acacia tetragonophylla* 3 metres, *Acacia ramulosa* ssp. *linophylla* 2 metres, PFC 5% over scattered *Eragrostis eriopoda* 0.3 ,metres, *Monachather paradoxus* 0.3 metres, occasional *Rhagodia drummondii* 0.7 metres at base of larger plants, *Ptilotus obovatus* (typical form), PFC 10%. Occasional occurrence of *Acacia* sp. *fragrant*;
6. Claypan (CPN) - Bare Claypan fringed by Halophytes including *Lycium australe* 1 metre, *Atriplex* sp. 0.8 metres. *Maireana pyramidata* and *Cratystylis subspinescens*;
7. *Melaleuca lanceolata* - *Lycium australe* Lake fringe Shrubland (MLaS) - Very scattered clumps of *Melaleuca lanceolata* 2.5 metres with scattered plants of *Lycium australe*, *Atriplex* sp. Low calcrete or gypsiferous dunes with cemented crust;
8. *Melaleuca interioris* Shrubland (MiS) - Patchy shrubland of *Melaleuca interioris* 2- 3 metres, *Eremophila longifolia* 3 metres, PFC to 70% over *Ptilotus obovatus* 0.4 metres, grasses, PFC 10% within clumps with mosaic of bare Claypan between patches;
9. *Acacia* spp., *Ptilotus obovatus* shrubland (ApoS) - *Acacia aneura*, *Acacia ramulosa* ssp. *linophylla*, *Acacia burkittii* 2-3 metres, PFC 10% over *Ptilotus obovatus* (typical form) shrubland 0.4 metres, PFC 15-20% on red sand over hardpan;
10. *Eremophila longifolia* Grove (EIG) - Grove of *Eremophila longifolia* 4-5 metres, PFC 30% with emergent *Hakea lorea* ssp. *lorea* 8 -9 metres. Mid storey of *Acacia aneura*, *Acacia tetragonophylla*, to 4 metres, PFC 30% over *Ptilotus obovatus* (Typical form) 0.3 metres, PFC 5%. Internally drained site with run-on from adjacent MLS habitats;
11. *Melaleuca lanceolata* - *Ptilotus obovatus* Shrubland (MIPoS) - Very open shrubland of *Melaleuca lanceolata* 2.5 metres, occasional *Melaleuca interioris* 2.5 metres, PFC 5- 10% with scattered *Ptilotus obovatus* (Typical form) 0.4 metres, PFC 20%. Much bare ground, hardpan/ Claypan between clumps of shrubs;
12. *Melaleuca lanceolata* low Forest (MIFr) - Low forest of *Melaleuca lanceolata* to 8 metres, PFC 25-30%, trees Diameter at Breast Height (DBH) to 50 centimetres, with understorey of *Rhagodia drummondii* 0.8 metres, *Maireana* spp., *Lycium australe* 1 metre, PFC 20%. On eastern margin of Claypan;
13. *Acacia burkittii* Shrubland on Calcrete (AbS) - Shrubland of *Acacia burkittii* 3 metres, PFC 10% with occasional emergent *E. gypsophila* 6-7 metres, no understorey;
14. *Atriplex* sp. Shrubland Plain (AtSP) - Shrubland of *Atriplex* sp. (domed shrub 0.6 metres), PFC 30% with occasional emergent *Lycium australe* 1.5 metres and *Melaleuca lanceolata* shrubs 3 metres, occasional trees to 6 metres, PFC < 5%. Soil is a red-brown cracking, self-mulching cyith calcrete gravel;
15. Gilgai - Low lying, drainage focus with heaving, cracking light brown clay soil with numerous sink holes. Vegetation of *Eragrostis setifolia*. Situated at the junction of Calcrete rise (AESC community) and PMS community;
16. *Casuarina pauper* Woodland (CpW) - Woodland of *Casuarina pauper* 6 -12 metres, PFC 10-25% with mid storey of *Acacia burkittii* 2 metres, *Senna artemisioides* ssp. *filifolia* 1.5 metres, may support *Eremophila arachnoides* ssp. *arachnoides* (P3) 2 metres, PFC 5-25%. Lowest stratum of *Ptilotus obovatus* (Typical form) 0.4 metres, PFC 10-20%;
17. *Atriplex* sp, *Lycium australe* and *Cratystylis subspinescens* Shrubland (AtLaCsS) - Mid shrubland of *Lycium australe* 1.5 metres, *Cratystylis subspinescens* 1.5 metres PFC 10% over *Atriplex* sp. #7 0.5 metres, PFC 10%. Soil is a mosaic of red self mulching clay and creamy-red cracking clay with calcrete gravel. Occasional emergent *Melaleuca lanceolata* and *Eucalyptus gypsophila*;

18. *Eremophila longifolia* Groved Woodland - Gilgai Mosaic (EIGW-GM) - Mosaic of (i) clumps of *Eremophila longifolia* 6-7 metres with *Ptilotus obovatus* (understorey restricted to the tree canopy drip line) and (ii) Open grassy plains with *Eragrostis eriopoda* and large, deep Gilgai sink holes;

19. Hard Pan Grassy Plain (HPGP) - Level hard pan plain with small clumps of dead annual grasses and continuous cryptogamic crust. Occasional scattered *Grevillea berryana* 4-5 metres, *Senna artemisoides ssp. filifolia*, *Acacia burkittii* or clumps of *Melaleuca lanceolata* to 5 metres high, PFC < 5%;

20. *Cratystylis subspinescens* - *Maireana pyramidata* Shrubland (CsMpS) - Shrubland of *Cratystylis subspinescens* 1.5 metres, *Maireana pyramidata* 1 metre, PFC 30% on level red hard packed silty clay in depression. ?Underlying calcrete. Supports the taxonomically significant species *Scaevola spinescens* terete leaf form.

Clearing Description

BHP Billiton Yeelirrie Development Company Pty Ltd (hereafter referred to as BHP Billiton) have applied for a Purpose Permit to clear up to 10 hectares of native vegetation within an application area of approximately 27, 676 hectares.

The proposed clearing will allow the proponent to undertake hydrological exploration activities and associated works on mineral tenure overlying the Yeelirrie Pastoral Station, located some 110 kilometres north-west of Leinster.

The application area is large, consisting of a series of proposed drill lines (with a buffer of 1 kilometre applied) spanning a distance of approximately 70 kilometres in a north-west/ south-east orientation (GIS Database).

The proposed clearing will allow Phase 3 of a multi-phase uranium exploration programme to be undertaken. It is proposed that Phase 3 will consist of:

- Drilling a maximum of 220 aircore holes along numerous drill lines. It is estimated that a maximum disturbance footprint of 25 square metres will be necessary at each drilling location. A majority of the proposed drill lines occur along existing access tracks and fence lines, therefore there will be no requirement to clear native vegetation in most instances. Four of the proposed drill lines (totalling approximately 27.5 kilometres in length) do not occur along tracks and fence lines, and consequently will require native vegetation clearing of a maximum 3 metre width (this is considered adequate given the small size of the drill rig which will be used). It is expected that clearing will be restricted to driving over Spinifex, clearing clumps of Spinifex and trimming overhanging tree branches (URS Australia Pty Ltd, 2009). The one kilometre buffer applied to the proposed drill lines will give the drill rig operator plenty of flexibility to manoeuvre around trees and shrubs, and keep vegetation clearing to an absolute minimum (URS Australia Pty Ltd, 2009).
- Establishing nine permanent production bores and associated sumps. A maximum disturbance footprint of 50 square metres will be necessary for each production bore hole. Associated sumps will require a maximum disturbance footprint of 900 square metres (30 metres x 30 metres); and
- Excavating ten geotechnical test pits. Each test pit will require a maximum disturbance footprint of eight square metres (4 metres x 2 metres x 1 metre in depth). Given their small size, it is likely that test pits will be easily positioned in naturally bare areas to avoid native vegetation clearing (URS Australia Pty Ltd, 2009).

Vegetation Condition

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

to

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

Comment

The vegetation condition rating is based on available information provided by URS Australia Pty Ltd (2009a), Western Botanical (2009a; 2009b) on behalf of BHP Billiton.

Clearing permit CPS 2964/1 was granted by the Department of Mines and Petroleum on 18 June 2009 and was valid from 18 July 2009 to 31 July 2014. The clearing permit authorised the clearing of 10 hectares of native vegetation. An application for an amendment to clearing permit CPS 2964/1 was submitted by BHP Billiton on 14 February 2011. The proponent has requested an amendment to the purpose on the permit to include exploration drilling. This will not increase the environmental impact of the clearing. The clearing permit boundary and amount of clearing permitted will remain unchanged.

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 proposed clearing area is located approximately 110 kilometres north-west of Leinster in the Eastern Murchison subregion of the Murchison Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The Eastern Murchison subregion is characterised by rich and diverse flora and fauna,

internal drainage and extensive areas of elevated red desert sandplains with minimal dune development (CALM, 2002). Vegetation of the subregion is dominated by Mulga woodlands (often rich in ephemerals), hummock grasslands, saltbush shrublands and Halosarcia shrublands (CALM, 2002). Pastoral grazing occurs over a vast majority of the subregion, and consequently, much of the subregion has been severely degraded by feral herbivores. Mining for gold and nickel in the region is considerable, with most mining tenements occurring on pastoral land (CALM, 2002).

The Australian Natural Resources Atlas (ANRA) notes that regions containing endemic species are considered to have high biodiversity conservation values because opportunities to conserve those species do not exist elsewhere; however most flora and fauna species in the Murchison bioregion are wide ranging and usually occur in adjoining regions (ANRA, 2009).

Western Botanical (2009a) undertook a flora and vegetation survey over the Yeelirrie Phase 1 resource definition drilling area (the central portion of the area subject to this clearing permit application) between 9 and 11 December 2008. Twenty vegetation communities were described and a total of 64 species from 31 genera and 19 families were recorded. This is considered to be relatively low species richness for the region (Western Botanical, 2009a). However, a significantly larger number of annual species would be expected in the area following suitable rainfall (Western Botanical, 2009a). A majority of the species recorded are regionally widespread and common on the soils and communities supporting them (Western Botanical, 2009a).

The Assessing Officer, DMP, considers that floristic diversity is unlikely to be significantly impacted by this clearing proposal given the low impact, non-contiguous nature of the clearing over a much larger application area.

The prevalence of weed species within the application area is difficult to ascertain given that a majority of the area has not been subject to a flora and vegetation survey at the time of undertaking this assessment. A formal weed assessment should be undertaken following adequate rainfall to provide a more accurate account of weed status in the area (Western Botanical, 2009a). Current knowledge indicates that Ruby Dock (*Acetosa vesicaria*) is present within rehabilitated native vegetation in the Yeelirrie Project area. Dead stalks of Wards Weed (*Carrichtera annua*) have been noted on calcrete soils in the central portion of the proposed clearing area (Western Botanical, 2009a). Given that the application area is located on the Yeelirrie Pastoral Station, there is a potential for weed species to be present.

Introduced flora species have the potential to impact upon biodiversity in a number of ways, including competition with native plant taxa for resources and increasing the risk of fire. Care must be taken to ensure that earth-moving machinery used during the clearing operations is clean of soil material, propagules and plant material prior to entering and exiting the project area. Strict hygiene practices will minimise the risk of weed seeds or weed-affected soil material being introduced and spread throughout the proposed clearing area. In addition, hygiene practices will minimise the risk of weed seeds or weed-affected soil material being transported off site.

Based on a desktop fauna review, 285 vertebrate fauna species were listed as potentially occurring within the Yeelirrie Project area. This included 154 bird species, 86 reptile species, 35 mammal species and 10 frog species. This total includes 31 conservation significant species which are likely to occur in, or utilise habitat within the Yeelirrie Project area (Bamford Consulting Ecologists, 2009).

The fauna assemblage expected to occur in the proposed clearing area is diverse. The Yeelirrie area is a transition zone where ranges of species with predominantly southern, eastern and northern distributions overlap. Species typical of the Murchison, Central Desert and South-West would all be expected to occur (Bamford Consulting Ecologists, 2009).

Bamford Consulting Ecologists (2009) reports that the most significant habitats within the Yeelirrie Project area are the low calcrete rises and clay flats and claypans. Whilst these habitats may not be rich in biodiversity, they are limited in extent and may support a distinctive and restricted faunal assemblage (Bamford Consulting Ecologists, 2009).

The Assessing Officer, DMP, considers that faunal diversity is unlikely to be significantly impacted by this clearing proposal given the low impact, non-contiguous nature of the clearing over a much larger application area.

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

Methodology ANRA (2009).
Bamford Consulting Ecologists (2009).
CALM (2002).
Western Botanical (2009a).
GIS Database:
- IBRA WA (Regions – 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 is not likely to be at variance to this Principle

Bamford Consulting Ecologists (2009) were commissioned by URS Australia Pty Ltd to undertake a fauna assessment of the Yeelirrie project area. The fauna assessment consisted of two phases:

1. A desktop review and brief field reconnaissance of the project area in February 2009; and
2. Detailed Level 2 field investigations undertaken in March 2009.

At the time of undertaking this assessment, Bamford Consulting Ecologists (2009) only presents findings of the desktop review and field reconnaissance, with results of the Level 2 fauna survey yet to be compiled.

The following databases and references were consulted as part of the desktop review:

- Western Australian Museum Faunabase;
- The Department of Environment and Conservation's (DEC's) Naturemap;
- Birds Australia Atlas Database;
- DEC Threatened and Priority Fauna Database;
- EPBC Protected Matters Search Tool; and
- Field guides for birds, mammals, reptiles and amphibians.

The purpose of the desktop review was to compile a list of vertebrate fauna species potentially occurring within the Yeelirrie Project area. This included 154 bird species, 86 reptile species, 35 mammal species and 10 frog species. This total includes 31 conservation significant species which are likely to occur in, or utilise habitat within the Yeelirrie Project area (Bamford Consulting Ecologists, 2009).

On 12 - 13 February 2009, Bamford Consulting Ecologists (2009) undertook a brief reconnaissance survey of the project area. The main purpose of the reconnaissance survey was to:

- identify major habitat types within the Yeelirrie Project area;
- identify the likelihood of significant species being present; and
- locate and record evidence of conservation significant species.

Bamford Consulting Ecologists (2009) identified five major fauna habitats within the Yeelirrie project area, each of which is discussed below:

1. Granite outcrops and breakaways - This habitat occurs to the north and south of the Yeelirrie Project area, being very extensive to the south. However, in a regional context this habitat is small in extent. Direct impacts to this habitat type are likely to be of low significance given the scale and nature of this clearing proposal.
2. Sandplains supporting spinifex and open Acacia/Eucalypt woodland - Whilst very extensive in the immediate Yeelirrie area, this habitat is regionally uncommon. This habitat may be important from a local biodiversity perspective as spinifex on sands are generally rich in reptile species. Significant species such as the Mulgara (*Dasyercus cristicauda*) and *Egernia kintorei* may be present here. Direct impacts to this habitat type are likely to be of low significance given the scale and nature of this clearing proposal.
3. Loam and clayey-loam plains supporting Acacia woodlands - This habitat type is extensive regionally, not species rich and not expected to support significant species. Direct impacts to this habitat type are likely to be of low significance given the scale and nature of this clearing proposal.
4. Low calcrete rises with Eucalypt open woodland over a sparse shrubland - This habitat type is restricted in extent, occurring on the margins of claypan areas. It is not well represented outside of the Yeelirrie Project area. Whilst this habitat may not be species rich, it may support a distinctive and restricted faunal assemblage associated with the leaf litter and soil type present. Some lizard species and short range endemic invertebrates are examples of fauna that may be restricted to this habitat type (Bamford Consulting Ecologists, 2009). It is also noted that the largest trees in the immediate area are located in this habitat type, and may be of local importance for bird species. However, URS Australia Pty Ltd (2009) note that a majority of the proposed drill lines are located along existing access tracks and fence lines in cleared areas and impacts to large trees will be avoided by manoeuvring vehicles and machinery around trees and significant stands of vegetation during the proposed drilling program.
5. Clayey-loam and clay flats - This habitat type is restricted in extent, with similar areas nearby appearing to be more saline (Bamford Consulting Ecologists, 2009). Leaf litter and soils in this habitat type are distinctive and may be important for some short range endemic invertebrates and some lizard species. Whilst this habitat may not necessarily be species rich, it may support a distinctive and restricted faunal assemblage (Bamford Consulting Ecologists, 2009). Direct impacts to this habitat are unlikely to be significant given the low impact, non-contiguous nature of the clearing proposal.

Habitats 4 and 5 (identified above) are likely to be the most significant fauna habitats impacted by this proposal. Whilst they may not be rich in biodiversity, they are limited in extent (on the basis of current knowledge) and may support distinctive and restricted faunal assemblage (Bamford Consulting Ecologists, 2009).

Impacts to fauna species as a result of the proposed clearing may include:

- direct mortality of fauna during vegetation clearing or vehicle strike;
- minor loss of habitat for foraging, shelter and/or nesting;
- habitat fragmentation;
- increased risk of introduction of feral animals;
- noise pollution;
- direct and indirect impacts associated with dust; and
- increased risk of fire.

A number of conservation significant fauna species (mostly birds) have previously been recorded in the Yeelirrie area or are deemed to have the potential to occur in the area. However, impacts to conservation significant fauna species as a result of this clearing proposal are mostly expected to be low, based on information provided by Bamford Consulting Ecologists (2009).

For bird species, impacts are mostly deemed low because many are migratory species, some species only occur in the area as vagrants, suitable habitat exists outside the impact zone, and/or bird species have the ability to move at the onset of clearing (Bamford Consulting Ecologists, 2009).

One bird species, the Malleefowl (*Leipoa ocellata*) warrants further discussion. This species is listed as 'Vulnerable' under the *Environment Protection and Biodiversity Conservation Act 1999* and Schedule 1 - Fauna that is rare or is likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice 2008*.

The Malleefowl Preservation Group undertook systematic surveys for the Malleefowl at Yeelirrie Station (a Pastoral Lease covering approximately 275,000 hectares) between 2000 and 2006 and found that 10 - 20 breeding pairs of Malleefowl are estimated to occur at Yeelirrie Station (Bamford Consulting Ecologists, 2009). Some 24 Malleefowl mounds have been recorded (none within the proposed clearing area), and surveys have shown that there are at least six widely separated areas on Yeelirrie Station in which Malleefowl are resident. Bamford Consulting Ecologists (2009) notes that Malleefowl have been recorded from Acacia shrublands to the north and south of the Yeelirrie Project area. Malleefowl show a strong preference for shrubby habitat with a 2-4 metre canopy (the most common association at Yeelirrie Station) and an avoidance of other habitats (Bamford Consulting Ecologists, 2009).

Based on available information, it is possible that Malleefowl use habitat within the proposed clearing area. Should a clearing permit be granted, it is recommended that suitable conditions be imposed with respect to Malleefowl management. This should include commissioning a suitably qualified fauna specialist to search for the presence of Malleefowl mounds prior to clearing, and ensuring that no clearing occurs within 50 metres of identified Malleefowl mounds.

In addition, BHP Billiton will implement the following measures to minimise potential impacts on the Malleefowl (URS Australia Pty Ltd, 2009):

- Malleefowl awareness will be included in site induction to all personnel; and
- Speed limits of 80 kilometres per hour on major access roads and 40 kilometres per hour within the exploration area shall be imposed. This will reduce the likelihood of vehicle strike.

Some conservation significant mammal species could potentially be present within the application area, including the Mulgara (*Dasyercus cristicauda*), Bilby (*Macrotis lagotis*), Long-tailed Dunnart (*Sminthopsis longicaudata*) and Black-footed Rock Wallaby (*Petrogale lateralis*). Impacts to the Mulgara and Long-tailed Dunnart are considered low given that most suitable habitat for these species is outside of the proposed impact zone. Pavey (2006) reports on the current known distribution of the Bilby, indicating that it is locally extinct in the Northern Goldfields. An unconfirmed sighting of two Black-footed Rock Wallabies was made from a breakaway just to the north of the Yeelirrie Project area, and if present, this could represent an isolated and relictual population. Impacts to the Black-footed Rock Wallaby are considered moderate, with little if any suitable habitat to be directly impacted. Indirect impacts such as an increase in feral predators such as the Fox pose the greatest threat to this species.

It is acknowledged that the proposed clearing will include low impact techniques such as driving over vegetation, trimming overhanging branches and removing small clumps of Spinifex where necessary. Clearing will be non-contiguous and will occur within an application area of approximately 27,676 hectares. Widespread clearing will not take place. Provided that appropriate measures are put in place to minimise potential impacts to the Malleefowl, significant impacts to fauna or fauna habitat are unlikely.

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

Methodology Bamford Consulting Ecologists (2009).
Pavey (2006).
URS Australia Pty Ltd (2009).

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

Comments Proposal may be at variance to this Principle

No flora and vegetation survey has been undertaken which covers the entire 27,676 hectare application area. However, Western Botanical (2009a; 2009b) has undertaken flora and vegetation surveys and significant flora assessments for Phases 1 and 2 of the Yeelirrie Uranium Exploration Project respectively. These surveys cover the central portion of the area subject to this clearing permit application.

According to available GIS databases, no Declared Rare Flora (DRF) species are known from the Yeelirrie area (GIS Database). Western Botanical (2009a; 2009b) has not recorded any DRF species in the Yeelirrie area despite a flora and vegetation survey and significant flora assessment as part of the Phases 1 and 2 of the Yeelirrie Uranium Exploration Project. It is therefore considered unlikely that this clearing proposal would impact upon DRF.

Three Priority Flora species have been recorded in the Yeelirrie area by Western Botanical (2009a; 2009b):

1. *Olearia arida* (P2);
2. *Bossiaea eremaea* (P3); and
3. *Eremophila arachnoides ssp. arachnoides* (P3)

Two undescribed species have been recorded in the Yeelirrie area by Western Botanical (2009a; 2009b):

1. *Scaevola spinescens* (terete leaf form); and
2. *Acacia sp. fragrant*

In addition, four species of taxonomic interest were also recorded by Western Botanical (2009a; 2009b) within the Yeelirrie Project area. These species could not be identified to species level due to the lack of flowering and/or fruiting material:

1. *Eremophila latrobei* (obovate leaf form);
2. *Eremophila sp. grey leaf #24*;
3. *Eremophila sp. aff. margarethae*; and
4. *Templetonia aff egena*

Until their conservation status is verified, undescribed species and species of taxonomic interest should be avoided (Western Botanical, 2009a; 2009b). Whilst it may not be possible to avoid all plants, avoidance of *Scaevola spinescens* (terete leaf form) must be treated as the highest priority as this species is not known to be either abundant or widely distributed (Western Botanical, 2009a; 2009b).

Given that a majority of the application area has not been searched for conservation significant flora, there is a potential for clearing operations to adversely impact upon such flora if adequate management measures are not implemented.

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

BHP Billiton have purposely planned the proposed drill lines along existing access tracks and cleared fence lines to minimise the need for native vegetation clearing. As a precaution, BHP Billiton will employ a suitably qualified botanist to traverse the proposed drill lines during vegetation clearing to ensure that impacts to conservation significant flora taxa are minimised. BHP have committed to maintaining a 5 metre buffer around all individuals of Priority Flora taxa and undescribed flora taxa, should they be encountered (URS Australia Pty Ltd, 2009). The consulting botanist will also ensure that species of taxonomic interest are avoided during the clearing operations where possible (URS Australia Pty Ltd, 2009).

Should a clearing permit be granted, it is recommended that suitable conditions be imposed for the purpose of flora management.

Methodology URS Australia Pty Ltd (2009).
Western Botanical (2009a).
Western Botanical (2009b).
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

According to available GIS databases, there are no known Threatened Ecological Communities (TEC's) within the proposed clearing area (GIS Database). The nearest known TEC is the Depot Springs stygofauna community, located approximately 85 kilometres south/south-east (GIS Database).

'The Yeelirrie calcrete groundwater assemblage type on Carey paleodrainage on Yeelirrie Station' is listed as a 'Priority 1' Priority Ecological Community (PEC) by DEC, and is considered to be threatened by mining (DEC,

2008). URS Australia Pty Ltd (2009) note that this unique assemblage of invertebrates does not occur within the Yeelirrie Uranium Project area.

Priority 1 PEC's are defined as poorly known ecological communities with apparently few small occurrences, of which most are not actively managed for conservation. These communities are typically under immediate threat from known threatening processes across their range but have not been adequately surveyed for classification as TEC's. Priority 1 PEC's are not formally protected under the *EPBC Act 1999* (DEC, 2008).

The aquifer depth in the proposed clearing area is approximately 10 - 12 metres below the natural surface level. Hydrologists employed by URS Australia Pty Ltd (2009) suggest that the proposed vegetation clearing would not significantly impact upon the aquifer, therefore minimal to negligible impact on stygofauna is expected (URS Australia Pty Ltd, 2009).

Six vegetation communities associated with calcrete deposits of the Melaleuca, Mileura and Cunyu land systems appear to be regionally restricted in distribution on the basis of current information (Western Botanical, 2009a). Preliminary assessment has involved analysing land system mapping undertaken by the Department of Agriculture Western Australia (1:500,000), which has shown that land systems within the Yeelirrie Project area are small in area and widely dispersed in the Sandstone - Yalgoo - Paynes Find and North-eastern Goldfields regions. This indicates that vegetation communities may be similarly infrequent and of relatively small area (Western Botanical, 2009a).

The potentially restricted vegetation communities are:

1. *Acacia burkittii* - *Eremophila arachnoides* ssp. *arachnoides* shrubland on calcrete;
2. *Acacia burkittii* shrubland on calcrete;
3. *Casuarina pauper* woodland on calcrete;
4. *Eucalyptus gypsophila* woodland on calcrete;
5. *Melaleuca lanceolata* low forest; and
6. *Melaleuca lanceolata* - *Ptilotus obovatus* shrubland.

These six vegetation communities are associated with calcrete deposits of the Yeelirrie Paleodrainage. Calcrete communities generally have low species richness in comparison to other communities, and this tends to be a reflection of specialisation in the flora of these communities. These and other communities present within the Yeelirrie Project area will be targeted in 2009 during regional flora and vegetation surveys. This will allow habitat preferences, distribution, area of occupancy and species composition to be analysed in greater detail (Western Botanical, 2009a). It is noted that comments on vegetation communities with restricted distribution are limited to Western Botanical's knowledge in the region between Wiluna, Leinster and Yeelirrie given that regional surveys have not been conducted as yet (Western Botanical, 2009a).

Despite the presence of potentially restricted vegetation communities within the application area, it is unlikely that the proposed clearing will significantly impact upon any of these vegetation communities, given the low impact, non contiguous nature of the clearing proposal.

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

Methodology DEC (2008).
URS Australia Pty Ltd (2009).
Western Botanical (2009a).
GIS Database:
- Threatened Ecological Sites Buffered.

(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 of Australia (IBRA) Murchison bioregion (GIS Database). According to Shepherd (2009) there is approximately 100% of the pre-European vegetation extent remaining in the Murchison bioregion.

According to Shepherd (2009), there is approximately 93% - 100% of the pre-European vegetation extent remaining of Beard Vegetation Associations 18, 107, 125, 389 and 676 in the Murchison bioregion (see table overleaf).

Whilst these vegetation types are poorly represented within conservation reserves at both the state and bioregional level (see table overleaf), 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 18, 107, 125, 389 or 676 below current recognised threshold levels below the current recognised threshold level of 30% of the pre-clearing extent of the vegetation type (below which species loss accelerates exponentially at an ecosystem level) (EPA, 2000).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion – Murchison	28,120,590	28,120,590	~100	Least concern	1.1
Beard veg assoc. – State					
18	19,892,305	19,890,195	~99.9	Least concern	2.1
107	2,815,387	2,815,387	~100	Least concern	1.7
125	3,489,858	3,246,667	~93.0	Least concern	7.2
389	622,461	622,461	~100	Least concern	0.3
676	2,063,389	1,958,293	~94.9	Least concern	3.6
Beard veg assoc. – Bioregion					
18	12,403,172	12,403,172	~100	Least concern	0.4
107	2,792,384	2,792,384	~100	Least concern	1.7
125	711,483	711,483	~100	Least concern	0.5
389	474,082	474,082	~100	Least concern	0.4
676	382,819	382,819	~100	Least concern	0

* Shepherd (2009)

** 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).
EPA (2000).
Shepherd (2009).
GIS Database:
- IBRA WA (Regions – Subregions).
- 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 may be at variance to this Principle

According to available GIS databases, there are no permanent watercourses or wetlands within the proposed clearing area (GIS Database). Extensive claypans and salt lakes exist in the proposed clearing area which are subject to seasonal inundation, occurring as a result of heavy rainfall events which are usually experienced in December and January (URS Australia Pty Ltd, 2009; GIS Database).

The Yeelirrie Uranium Project area is associated with a paleodrainage system, which may potentially support vegetation that depends on this system (URS Australia Pty Ltd, 2009). The Assessing Officer, DMP, notes that salt lakes and claypans within the application area may support vegetation growing in, or in association with, an environment associated with a watercourse or wetland.

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

However, given the low impact, non contiguous nature of the clearing proposal (most of which is planned for existing access tracks and cleared fence lines) it is unlikely that there will be significant impacts to wetland environments.

Methodology URS Australia Pty Ltd (2009).
GIS Database:
- Hydrography, linear.

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

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

Land system mapping by the Department of Agriculture Western Australia has mapped a variety of land systems for the Murchison bioregion. Land systems are mapped based on biophysical features such as soil and landform type, geology, geomorphology and vegetation type (Payne et al, 1998). The proposed clearing area includes nine land systems (GIS Database). A broad description of each land system is given below:

1. Bullimore Land System - This land system is characterised by gently undulating sandplain with occasional linear dunes and stripped surfaces supporting tall shrublands and hard spinifex (Curry et al., 1994). The Bullimore Land System is a very minor system in the Murchison bioregion and is not normally susceptible to erosion (Curry et al., 1994). Approximately 60 – 70% of the application area occurs on the Bullimore Land

System (GIS Database).

2. Yanganoo Land System - This land system is characterised by hardpan plains and sandy tracts with groved Mulga shrublands, hard spinifex and wanderie grass. Payne et al (1998) notes that this land system is generally not susceptible to soil erosion, except for drainage tracts. Impedence to sheet flows on hard pan plains has the potential to cause water starvation and potential loss of vigour in vegetation downslope (Payne et al, 1998). Less than 5% of the application area occurs on the Yanganoo Land System (GIS Database).

3. Melaleuca Land System - This land system is characterised by sandy tracts and drainage foci supporting Acacia shrublands. The Melaleuca Land System is generally not susceptible to soil erosion (Payne et al., 1998). Less than 5% of the application area occurs on the Yanganoo Land System (GIS Database).

4. Mileura Land System - This land system is characterised by saline and non-saline calcrete river plains and clayey floodplains interrupted by raised calcrete platforms. Tall shrublands, mixed halophytic shrublands and shrubby grasslands are described as the main vegetation types. Areas of duplex soils in this land system are moderately to highly susceptible to erosion, whilst those with loam over hardpan are less susceptible. Soils on calcrete platforms are normally not susceptible to erosion, though are widely degraded by grazing (Curry et al., 1994). Less than 5% of the application area occurs on the Melaleuca Land System (GIS Database).

5. Cosmo Land System - This land system is characterised by calcrete drainage through sandplains with Spinifex grasslands and occasional Mulga woodlands. Soils can become susceptible to wind erosion where fire has depleted Spinifex cover (Payne et al, 1998). Less than 5% of the application area occurs on the Cosmo Land System (GIS Database).

6. Cunyu Land System - This land system is characterised by calcrete drainage zones on hardpan, alluvial plains with raised calcrete platforms, calcareous shrubby grasslands and mostly non-halophytic shrublands (Curry et al., 1994). Overgrazing is a characteristic feature of the Cunyu Land System. Alluvial plains and drainage floors are mildly susceptible to accelerated erosion (Curry et al., 1994). Less than 5% of the application area occurs on the Cunyu Land System (GIS Database).

7. Carnegie Land System – This land system is characterised by salt lakes, fringing alluvial plains, kopi dunes and sandy banks supporting halophytic shrublands. Most of this land system is not susceptible to water erosion given the flat topography. Minor areas may be subject to rilling. Wind erosion is exacerbated by the loss of shrub cover, especially on lake margins (Payne et al, 1998). Less than 5% of the application area occurs on the Carnegie Land System (GIS Database).

8. Gransal Land System – This land system is characterised by stony plains and low rises on granite, supporting halophytic shrublands. Soil erosion is likely to occur where perennial shrub cover is substantially reduced (Payne et al., 1998). A small section (approximately 1-2%) of the south-eastern portion of the application area occurs on this land system (GIS Database).

9. Waguin Land System – This land system is characterised by low breakaways with short stony and sandy plains, Acacia shrublands and minor halophytic shrublands. Breakaway footslopes within this land system have fragile soils which are susceptible to erosion if disturbed (Payne et al, 1998). A very small section (less than 1%) of the application area occurs within this land system (GIS Database).

Whilst some of the land systems within the proposed clearing area are susceptible to erosion when disturbed, the low impact, non-contiguous nature of the proposal renders it unlikely to cause appreciable land degradation.

Should a clearing permit be granted, conditions should be imposed requiring the permit holder to undertake rehabilitation of all cleared areas following exploration activity.

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

Methodology Curry et al (1994).
Payne et al (1998).
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**
The proposed clearing area is not within, or in close proximity to, any known conservation areas (GIS Database). The nearest known Department of Environment and Conservation managed lands are the former Lake Mason and Kaluwirri Pastoral Leases, located approximately 30 kilometres west of Yeelirrie (Bamford Consulting Ecologists, 2009). The Wanjarri Nature Reserve is located approximately 70 kilometres east/south-east (GIS Database).

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

Methodology Bamford Consulting Ecologists (2009).
GIS Database:
- DEC Tenure.

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

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

There are no permanent watercourses or wetlands within the proposed clearing area (GIS Database). Claypans exist within the proposed clearing area which are subject to seasonal inundation, and sheet flow originates to the north of the proposed clearing area during periods of high intensity rainfall. Sheetflows move in a southerly direction over the proposed clearing area and then flow westwards towards Lake Way, located approximately 50 kilometres from the proposed clearing area (URS Australia Pty Ltd, 2009; GIS Database). Given that a majority of the clearing will be undertaken using raised blade techniques, it is unlikely that sheetflows would transport significant volumes of suspended sediment offsite.

The proposed clearing area is not located within a Public Drinking Water Source Area (GIS Database). Groundwater in the area is of high salinity (approximately 20,000mg/L), and occurs at a depth of approximately 5 metres below ground level (URS Australia Pty Ltd, 2009). If groundwater in the area was to rise, the high salinity content would pose a threat to plant health. However, the small and non-contiguous nature of the clearing will not be significant enough to cause the water table to rise (URS Australia Pty Ltd, 2009).

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

Methodology URS Australia Pty Ltd (2009).
GIS Database:
- Hydrography, linear.
- Public Drinking Water Source Areas.

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

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

The proposed clearing area is located in an arid environment which has an annual average rainfall between 200 and 250 millimetres (URS Australia Pty Ltd, 2009). Average annual evaporation rates are in the order of 3,400 millimetres (GIS Database). Given these climatic conditions, surface water is unlikely to persist in the proposed clearing area for extended periods of time. Furthermore, it is noted that no watercourses or wetlands are present within the proposed clearing area (GIS Database; URS Australia Pty Ltd, 2009).

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

Methodology URS Australia Pty Ltd (2009).
GIS Database:
- Evaporation Isopleths.
- Hydrography, linear.

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

Comments

There are no native title claims over the area under application (GIS Database). The mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases, there are no registered Sites of Aboriginal Significance within 2 kilometres of the proposed clearing area (GIS Database). 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.

Clearing permit CPS 2964/1 was granted by the Department of Mines and Petroleum on 18 June 2009 and was valid from 18 July 2009 to 31 July 2014. The clearing permit authorised the clearing of 10 hectares of native vegetation. An application for an amendment to clearing permit CPS 2964/1 was submitted by BHP Billiton on 14 February 2011. The proponent has requested an amendment to the purpose on the permit to include exploration drilling. This will not increase the environmental impact of the clearing. The clearing permit boundary and amount of clearing permitted will remain unchanged.

- Methodology** GIS Database:
- Aboriginal Sites of Significance.
 - Native Title Claims.

4. Assessor's comments

Comment

The application has been assessed against the clearing principles, planning instruments and other matters in accordance with s.51O of the *Environmental Protection Act 1986*, and the proposed clearing may be at variance to Principles (c) and (f), is not likely to be at variance to Principles (a), (b), (d), (g), (h), (i) and (j) and is not at variance to Principle (e).

5. References

- Australian Natural Resource Atlas (ANRA) (2009) Biodiversity Assessment – Murchison bioregion. Available: www.anra.gov.au/topics/vegetation/assessment/wa/libra-murchison.html. Accessed: 14 April 2009. Published by the Department of the Environment and Water Resources.
- Bamford Consulting Ecologists (2009) Desktop Fauna Assessment of the Yeelirrie Project Area. Prepared for URS Australia Pty Ltd.
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Murchison 1 (MUR 1 - East Murchison subregion).
- Curry, P.J., Payne, A.L., Leighton, K.A., Hennig, P., Blood, D.A (1994) Technical Bulletin No. 84: An inventory and condition survey of the Murchison River catchment and surrounds, Western Australia. Department of Agriculture, Western Australia, South Perth.
- DEC (2008) Priority Ecological Communities for Western Australia - 27 August 2008. Available: <http://www.dec.wa.gov.au/management-and-protection/threatened-species/wa-s-threatened-ecological-communities.html> Accessed: 7 April 2009.
- 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.
- EPA (2000) Environmental protection of native vegetation in Western Australia. Clearing of native vegetation, with particular reference to the agricultural area. Position Statement No. 2. December 2000. Environmental Protection Authority, Western Australia.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Pavey, C. (2006) National Recovery Plan for the Greater Bilby (*Macrotis lagotis*). Northern Territory Department of Natural Resources, Environment and the Arts.
- Payne, A.L., Van Vreeswyk, A.M.E., Pringle, H.J.R., Leighton, K.A, Hennig, P (1998) Technical Bulletin No. 90: An inventory and condition survey of the Sandstone-Yalgoo-Paynes Find area, Western Australia. Department of Agriculture, Western Australia, South Perth.
- Shepherd, D.P. (2009) Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.
- URS Australia Pty Ltd (2009) Clearing Permit Application (CPS 2964/1) Yeelirrie Uranium Project. Prepared for BHP Billiton Yeelirrie Development Company Pty Ltd.
- Western Botanical (2009a) Flora and Vegetation Assessment of Portion of Proposed Confirmation Drilling Program - Part 1: Yeelirrie Uranium Deposit. December 2008. Prepared for URS Corporation Pty Ltd.
- Western Botanical (2009b) Significant Flora Assessment of Remainder of Proposed Confirmation Drilling Program – Phase 1B Yeelirrie Uranium Deposit: March 2009. Prepared for URS Corporation Pty Ltd.

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, 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.