



# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

Permit application No.: 5877/1  
Permit type: Purpose Permit

### 1.2. Proponent details

Proponent's name: Atlas Operations Pty Ltd

### 1.3. Property details

Property: Mining Lease 45/1179  
Mining Lease 45/1241  
Local Government Area: Shire of East Pilbara  
Colloquial name: Abydos DSO Stage 2

### 1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
134		Mechanical Removal	Mineral Production

### 1.5. Decision on application

Decision on Permit Application: Grant  
Decision Date: 3 July 2014

## 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 for the whole of Western Australia and are useful to look at vegetation in a regional context. One Beard vegetation association has been mapped within the application area (GIS Database):

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

A Level 2 flora survey was conducted by Woodman Environmental Consulting (Woodman) across the larger Abydos area during several visits in 2008, 2010 and 2011 (Woodman, 2013). A targeted survey for the Priority 1 flora *Pityrodia* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) was also undertaken on 28 May – 4 June 2013. Five floristic community types (FCTs) were recorded within the application area (Woodman, 2013):

**FCT 2a:** Tall open shrubland of mixed species dominated by *Grevillea wickhamii* subsp. *hispidula*, *Acacia tumida* var. *pilbarensis* and *Acacia orthocarpa* over low sparse shrubland of mixed species including *Dampiera candidans*, *Goodenia stobbsiana* and *Corchorus laniflorus* over low hummock grassland dominated by *Triodia epactia* or *Triodia bitextura* on red-brown silty loams over ironstone on hill crest and slopes;

**FCT 4:** Low isolated trees of *Corymbia hamersleyana* or *Eucalyptus leucophloia* subsp. *leucophloia* over tall sparse shrubland of mixed species including *Acacia inaequilatera*, *Acacia acradenia* and *Grevillea wickhamii* subsp. *hispidula* over low sparse shrubland of mixed species including *Acacia ptychophylla*, *Acacia spondylophylla*, *Acacia hilliana* and *Dampiera candidans* over low hummock grassland of mixed *Triodia* species dominated by a combination of *Triodia wiseana*, *Triodia brizoides* and *Triodia lanigera* on brown sandy clay loams over ironstone, calcrete or sandstone on hill crests and slopes, and occasionally on undulating plains and low rises;

**FCT 6:** Low isolated trees of *Eucalyptus leucophloia* subsp. *leucophloia* over tall sparse shrubland of mixed *Acacia* species including *Acacia tumida* var. *pilbarensis* over low sparse shrubland of mixed species including *Acacia ptychophylla* over low hummock grassland dominated by *Triodia brizoides* with *Eriachne mucronata* also common on red to red-brown sandy and clay loams over ironstone on hill slopes, crests and in gorges;

**FCT 7:** Tall sparse shrubland of mixed species dominated by *Grevillea wickhamii* subsp. *hispidula*, *Acacia ancistrocarpa* and/or *Acacia acradenia* over low isolated shrubs of mixed species over low hummock grassland dominated by *Triodia lanigera* or occasionally *Triodia epactia* on red-brown sandy and clay loams, occasionally with ironstone or quartz pebbles, on undulating plains and flats; and

**FCT 10:** Mid woodland of *Eucalyptus camaldulensis* subsp. *obtusata*, *Eucalyptus victrix* and *Melaleuca argentea* over tall shrubland of mixed species including *Acacia ampliceps*, *Acacia trachycarpa*, *Acacia pyrifolia* var. *pyrifolia*, *Acacia tumida* var. *pilbarensis*, *Atalaya hemiglauca*, *Melaleuca glomerata* and *Melaleuca linopylla* over low open grassland and sedgeland of mixed species including *Triodia epactia*, *Triodia longiceps*, *Cenchrus ciliaris* and *Cyperus vaginatus* on red and brown sands, loams and silts in river and major creek channels and gorges.

<b>Clearing Description</b>	Abydos DSO Project Stage 2. Atlas Operations Pty Ltd (Atlas) has applied to clear 134 hectares of native vegetation within a total boundary of approximately 164 hectares, for the purpose of mineral production. The application area is located approximately 65 kilometres west of Marble Bar, in the Shire of East Pilbara.
<b>Vegetation Condition</b>	Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994);  to:  Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).
<b>Comment</b>	Vegetation condition was determined by botanists from Woodman (2013). Stage 2 of the Abydos DSO Project includes the development of three additional open pits, five waste rock dumps, topsoil stockpiles, access tracks, drainage structures and ramps.  The original application submitted on 4 November 2013 applied to clear a total of 156 hectares within an application area of 222 hectares. Following extensive consultation with the proponent, the final application proposes the clearing of 134 hectares within an application area of approximately 164 hectares.

### 3. Assessment of application against clearing principles

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

##### Comments **Proposal may be at variance to this Principle**

The application is located within the Pilbara (PIL) Interim Biogeographic Regionalisation of Australia (IBRA) region and the Chichester (PIL1) subregion (GIS Database). The Pilbara region represents a transitional zone between semi-arid and tropical climates (Kendrick, 2001). The Chichester IBRA subregion consists of undulating granite and basalt plains, which support both a shrub steppe dominated by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, and a tree steppe within ranges dominated by *Eucalyptus leucophloia* (Kendrick and Mckenzie, 2001). The vegetation within the application area is mapped as belonging to Beard association 82 (GIS Database). A flora and vegetation impact assessment undertaken by Woodman (2013) identified five floristic community types (FCTs) to occur within the application area, including FCT 2a, FCT 4, FCT 6, FCT 7 and FCT 10. These vegetation types are all widespread within the local area, and the proposed clearing is limited to 0.01 – 15% of the total mapped area of each vegetation type. None of the vegetation communities were identified as being a Threatened or Priority Ecological Community (Woodman, 2013).

Weeds have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area (DEC, 2011). One weed species, Buffel Grass (*Cenchrus ciliaris*), was identified at one location within the application area (Woodman, 2013). Given the proficiency of this species in invading recently disturbed areas, the proposed clearing may facilitate an increase in the abundance of this weed. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

A total of 263 floristic taxa from 112 genera and 40 families were recorded within the application area during flora surveys, including the Priority 1 flora *Pityrodia* sp. Marble Bar (G. Woodman and D. Coultas GWDC Opp4) (Coffey, 2013; Woodman, 2013). The known distribution of this species extends across an area of approximately 20 kilometres north-south and 31 kilometres east-west, with the proposed clearing located in the centre of this area (OEPA, 2014). A total of 1,934 individuals of *Pityrodia* sp. Marble Bar have been identified across all known populations (OEPA, 2014), and it occurs in small, isolated populations on south-facing, steep rocky conglomerate and granite slopes (DPaW, 2013a). DPaW (2014a) advise that this species is most likely to be reliant on insects for pollination. The total area of occupancy of this species has been calculated at 11.2 square kilometres (DPaW, 2014a).

Targeted searches for *Pityrodia* sp. Marble Bar recorded 143 individuals of this species from 35 locations within the original application area (Woodman, 2013). Following consultation with the proponent, the application was amended to avoid one population of *Pityrodia* sp. Marble Bar situated within Ironstone and Sandstone Gorge habitat (Atlas, 2014). Seventy three individuals remain within the current application boundary (Woodman, 2013; Atlas, 2014). These individuals are located within the eastern third of the application area, and represent approximately 3.8% of all known individuals. The *Pityrodia* sp. Marble Bar populations present within the Abydos DSO Stage 2 footprint form a linkage corridor from the south-west to north-east extents of this species' distribution (OEPA, 2014; DPaW, 2014a). It has been advised that the removal of large portions of *Pityrodia* sp. Marble Bar habitat may inhibit insect dispersal throughout the landscape, causing fragmentation and producing a barrier to gene flow between populations (DPaW, 2014a). Impacts to *Pityrodia* sp. Marble Bar may be minimised by the implementation of a flora management condition which requires a separate CEO approval to clear within 10 metres of this species.

A terrestrial short-range endemic (SRE) invertebrate fauna assessment of the Abydos DSO Project was conducted by Outback Ecology (2012c), and recorded a total of six SRE species. Outback Ecology (2013a) assessed the potential for each habitat type within the application area to support SRE based on the availability of suitable microhabitats. Four of the seven habitats were assessed to have a low potential to support SRE species, and three (Ironstone Ridge, Ironstone and Sandstone Gorge and Major Drainage Line) had medium potential (Coffey, 2013; Outback Ecology, 2013a). However, none of the SRE species recorded by Outback Ecology (2012c) were subsequently found to be restricted to the application area, and the impact on SRE

fauna is expected to be low (Coffey, 2013; Outback Ecology, 2012c; Outback Ecology, 2013a).

Vertebrate fauna surveys conducted within the Abydos DSO Stage 1 and Stage 2 project area recorded a collective 149 species, consisting of 21 mammals, 45 reptiles, 75 birds, five amphibians and three fish (Bamford Consulting Ecologists, 2009; Outback Ecology, 2011c; Outback Ecology, 2013a). The cumulative findings of all previous surveys within the Abydos area (Bamford Consulting Ecologists, 2009; Outback Ecology, 2011a; Outback Ecology, 2011c; Outback Ecology, 2012a; Outback Ecology, 2012b) recorded eight conservation significant vertebrate fauna species, including:

- the Northern Quoll (*Dasyurus hallucatus*, Schedule 1);
- Pilbara Leaf-nosed Bat (*Rhinonictis aurantia*, Schedule 1);
- Pilbara Olive Python (*Liasis olivaceus barroni*, Schedule 1);
- Ghost Bat (*Macroderma gigas*, Priority 4);
- Bush Stone-curlew (*Burhinus grallarius*, Priority 4);
- Western Pebble-mound Mouse (*Pseudomys chapmani*, Priority 4);
- Australian Bustard (*Ardeotis australis*, Priority 4); and
- Rainbow Bee-eater (*Merops ornatus*, Schedule 3).

The Northern Quoll, Pilbara Leaf-nosed Bat, Pilbara Olive Python and Ghost Bat are locally abundant throughout the Abydos Project area (Outback Ecology, 2013a). Outback Ecology (2013a) advises that an additional 22 conservation significant fauna could potentially occur within the Abydos Project area. DPaW (2013b; 2014b) have advised that the diversity and abundance of conservation significant fauna indicates that the Abydos area is of high regional value.

Outback Ecology Services (Outback Ecology, 2013a) recorded seven broad fauna habitats within the application area, including Ironstone and Sandstone Gorges, Ironstone Ridges, Major Drainage Lines, Minor Shallow Gorges and Gullies, Sandstone Ridges, Stony Lower Slopes and Undulating Plains, and Low Rounded Hills. In particular, Ironstone and Sandstone Gorges, Ironstone Ridges, Major Drainage Lines and Minor Shallow Gorges are important for the persistence of numerous conservation significant species and contain significant habitat features such as Cliff Lines, Caves and Water Dependent Ecosystems (Outback Ecology, 2013a).

Following consultation with the proponent, a proportion of Ironstone and Sandstone Gorge habitat and Cliff Line habitat was removed from the application area (Atlas, 2014). The amount of significant fauna habitat which now exists outside the application boundary may be sufficient to maintain viable populations of Northern Quoll, Pilbara Olive Python, Ghost Bat and Pilbara Leaf-nosed Bat in the surrounding area.

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

<b>Methodology</b>	Atlas (2013) Atlas (2014) Bamford Consulting Ecologists (2009) Coffey (2013) DEC (2011) DPaW (2013a) DPaW (2013b) DPaW (2014a) DPaW (2014b) Kendrick (2001) Kendrick and Mckenzie (2001) OEPA (2014) Outback Ecology (2011a) Outback Ecology (2011c) Outback Ecology (2012a) Outback Ecology (2012b) Outback Ecology (2012c) Outback Ecology (2013a) Woodman (2013) GIS Database: <ul style="list-style-type: none"><li>- IBRA WA (Regions – Sub Regions)</li><li>- Pre-European Vegetation</li></ul>
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**(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 at variance to this Principle**

**Habitat Types**

Seven fauna habitats were identified within the application boundary (164 hectares) by Outback Ecology (2013a), including:

- Major Drainage Lines (1.26 hectares);
- Ironstone and Sandstone Gorges (3.04 hectares);
- Minor Shallow Gorges and Gullies (4.5 hectares);
- Stony Lower Slopes and Undulating Plains (4.92 hectares);
- Low Rounded Hills (17.38 hectares);
- Sandstone Ridges (43.1 hectares); and
- Ironstone Ridges (89.98 hectares);

Given the availability of similar habitats in the wider region, impacts to Major Drainage Lines, Stony Lower Slopes and Undulating Plains, and Low Rounded Hills habitat types are not considered to be significant (Coffey, 2013; Outback Ecology, 2013a).

Minor Shallow Gorges and Gullies occur throughout the ironstone and sandstone ridge systems in the area and include drainage areas with gentle vegetated slopes, minor areas of outcropping and a small number of caves (Coffey, 2013; Outback Ecology, 2013a). As some areas of ironstone outcropping with caves occur, this habitat has the potential to support a range of conservation significant species, including the Northern Quoll, Pilbara Leaf-nosed Bat, Ghost Bat, and possibly *Ramphotyphlops ganeii* (Outback Ecology, 2013a). However, the conservation value of this habitat type within the Abydos region is not considered to be significant, given that records of conservation significant fauna have primarily occurred elsewhere in Ridge or Ironstone/ Sandstone Gorge habitats (Coffey, 2013; Outback Ecology, 2013a).

Ironstone and Sandstone Gorges comprise steep sided gorges which contain permanent and seasonal waterholes, dense *Melaleuca* and *Eucalypt* woodland, and caves (Coffey, 2013; Outback Ecology, 2013a). The elevated moisture in the gorges support dense riparian vegetation and provide habitat for a number of conservation significant species, including the Bush Stone-curlew, Pilbara Olive Python, Pilbara Leaf-nosed Bat, Ghost Bat and Northern Quoll (Coffey, 2013; Outback Ecology, 2013a). These species have all been recorded within this habitat type during previous surveys of the application area (Bamford Consulting Ecologists, 2009; Outback Ecology, 2011c). In particular, Northern Quolls were recorded in abundance throughout Ironstone and Sandstone Gorges (Bamford Consulting Ecologists, 2009; Outback Ecology, 2011b; 2012b). The original application area contained up to 7.1 hectares of this habitat type. Following consultation with the proponent, over half of this area was removed from within the application boundary. Approximately 3.04 hectares of Ironstone/ Sandstone Gorge habitat remains within the application area, which is not likely to represent a significant impact to this habitat type on a local or regional scale.

Ironstone Ridge habitat is considered to be of higher fauna habitat value than Sandstone Ridge habitat within the application area, as records of conservation significant fauna (Northern Quoll, Pilbara Leaf-nosed Bat, Ghost Bat, Western Pebble-mound Mouse and Rainbow Bee-eater) are more prevalent within Ironstone Ridges (Outback Ecology, 2013a). Ironstone Ridge habitat supports hummock grasslands of *Triodia wiseana* and *Triodia pungens*, with *Acacia* and *Senna* shrublands and scattered *Eucalyptus*. This habitat type comprises small valleys, deeply incised gorges, and cliff lines, which are important habitat features for the conservation significant fauna known to occur within the application area (Coffey, 2013; Outback Ecology, 2013a; DPaW, 2013b; 2014b; 2014c). Ridge tops of both habitat types have been previously disturbed by exploration activity, which is likely to have impacted on fauna assemblages (Outback Ecology, 2013a).

### **Significant Habitat Features**

#### **Cliff Lines:**

Approximately 1.132 kilometres of cliff/ ridge line will be directly impacted by the proposed clearing, which consists of two sections of a 2.42 kilometre cliff line (Atlas, 2013; Outback Ecology, 2013a). Cliff lines within the Abydos project area contain a number of caves, overhangs and crevices, which provide important denning habitat for fauna (Outback Ecology, 2013a). While cliff/ ridge lines do occur throughout the Pilbara, they are a limited habitat resource and are not common in the area directly surrounding the Abydos project. Cliff lines are significant or locally important for a number of conservation significant fauna, including the Northern Quoll; Pilbara Leaf-nosed Bat, Ghost Bat, and Pilbara Olive Python. Furthermore, DPaW (DPaW, 2013b; 2014b; 2014c) has advised that mining activity should not impact breakaway areas that represent high quality fauna habitat. The proposed clearing will increase the cumulative amount of disturbance to cliff lines within the Abydos DSO Project to approximately 3.1 kilometres of a total 11.1 kilometres. Cliff lines which remain are largely continuous, and therefore may be sufficient to maintain local populations of the conservation significant fauna listed above.

**Caves:** Two caves are located within the application boundary, and a total of 14 caves have been identified just outside the application boundary. One of these, referred to as Cave C, occurs within the western boundary of the application area (Outback Ecology, 2013a). Both Pilbara Leaf-nosed Bats and Ghost Bats were recorded within this cave, and it is likely that the cave is used as a roost during the night (Outback Ecology, 2013a). An additional cave, labelled Cave SC-C1 by Outback Ecology (2011c) is located on the far eastern boundary of the application area and is also likely to be used by the Pilbara Leaf-nosed Bat and Ghost Bat as a night roost (Bamford Consulting Ecologists, 2009; Outback Ecology, 2011c). Outback Ecology (2011c) advises that the destruction of Cave SC-C1 may have a significantly negative impact on the Ghost Bat. A further three caves lie within 200 metres of the application area, and may be impacted by the proposed clearing through noise and dust emissions from clearing (Outback Ecology, 2013a).

Caves are also known to be important for Northern Quolls as denning habitat. Any disturbance to caves cannot be remediated by rehabilitation, and therefore any impact to cave refugia will be significant and permanent (DPaW, 2013b). Impacts to cave habitat may be minimised by the implementation of a fauna management condition to exclude Cave SC-C1 from clearing.

Water Dependent Ecosystems: Permanent and near-permanent springs, seeps and waterholes are important to the Pilbara Leaf-nosed Bat, Ghost Bat, Pilbara Olive Python and Northern Quoll, all of which have been recorded within the application area during previous surveys (Outback Ecology, 2013a). There is one waterhole within the application area (Bamford Consulting Ecologists, 2009; Atlas, 2013; Outback Ecology, 2013a). Water dependent ecosystems that comprise these habitat features are particularly valuable not only to conservation significant species, but to all fauna, as they provide a source of water even through dry seasons or drought (Outback Ecology, 2013a). Water Dependent Ecosystems are particularly sensitive to disturbance (Outback Ecology, 2013a), and will be impacted by increased sedimentation through a loss of vegetative cover.

### **Impacts on Conservation Significant Fauna**

Fauna species which rely on habitats and habitat features that are limited in extent, such as rocky ridges, gorges and major drainage lines, will be at greatest risk to clearing due to their decreased opportunities to move through a matrix of consistent habitat. Conservation significant species which fall into this category include the Northern Quoll, Pilbara Olive Python, and Long-tailed Dunnart (Outback Ecology, 2013a). Further to the direct loss of habitat under the proposed clearing activity, Outback Ecology (2013a) advised that the fragmentation of these habitats and the subsequent impacts on local fauna may be of concern.

On 3 June 2014, the Abydos DSO Stage 2 Project received Commonwealth approval under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). The approval requires adherence to a Significant Species Management Plan, and includes the provision of funds towards research for the Northern Quoll, Pilbara Leaf-nosed Bat, and Pilbara Olive Python.

Northern Quoll: Ironstone and Sandstone Gorge habitat, Major Drainage Line habitat, Cliff Lines, and Water Dependent Ecosystems within the Abydos area comprise critical habitat for this population (DPaW, 2013b; Outback Ecology, 2013a). A permanent decline within the locally abundant Northern Quoll population was expected as a result of the proposed clearing under the original application, due to a direct loss of regionally important foraging and denning habitat (DPaW, 2013b; Outback Ecology, 2013a). DPaW (2013b) advised that the original application was likely to have a significant impact on Northern Quolls on a local scale. Although this habitat does exist elsewhere in the region, the potential for this species to disperse from the application area and find vacant, available habitat in the nearby vicinity is low (Outback Ecology, 2013a). However, the amendments which have been made to the application boundary decreases the proposed impact to cliff lines and Ironstone/ Sandstone Gorge habitat by 53.2% and 57.2% respectively, and therefore the proposed clearing may not cause a significant population decline in this species.

Pilbara Leaf-nosed Bat: The Pilbara Leaf-nosed bat is known to occur and forage within the application area, and roosts in caves within 400 metres of the application boundary (Outback Ecology, 2013a). Given the scarcity of known roosts of the Pilbara Leaf-nosed Bat, Outback Ecology (2013a) advises that it is reasonable to presume that this population may potentially be an important population, i.e. a 'key source population', or 'necessary for maintaining genetic diversity'. This is supported by advice received from DPaW (2013b). The proposed clearing will remove areas of high quality foraging habitat and includes two caves which are considered to be used for nocturnal foraging (Outback Ecology, 2013a). This is likely to reduce the carrying capacity of the environment for the current population of Pilbara Leaf-nosed Bats, which may lead to a long-term decrease in the population size and occupancy of this important population (Outback Ecology, 2013a). DPaW (2013b) advise that the decline of this population may have a significant local impact on this species. The clearing activity may also disrupt the breeding cycle of the resident population (Outback Ecology, 2013a). Impacts to cave habitat may be minimised by the implementation of a fauna management condition to exclude Cave SC-C1 from the clearing area.

Pilbara Olive Python: Habitat within the original application area was considered likely to comprise critical habitat for this species on a local scale (DPaW, 2013b). A permanent decline of the Pilbara Olive Python was initially considered likely following the proposed clearing (Outback Ecology, 2013). The application area contains a large portion of habitats likely or confirmed to be used by the Pilbara Olive Python, including Ironstone Ridge, Minor Shallow Gorges and Gullies, and Major Drainage Line habitat (Outback Ecology, 2013a). An amendment to the application area excluded a portion of Ironstone/ Sandstone Gorge habitat, one permanent spring, and one waterhole from the application area (Atlas, 2014). One waterhole remains within the disturbance footprint, which may be subjected to high sedimentation and/or altered hydrology as a result of the proposed clearing.

Ghost Bat: There is a large Ghost Bat population within the Abydos area (Outback Ecology, 2013a). A permanent, local decline is expected in this species as a result of the proposed clearing (Outback Ecology, 2013a). Several key habitat types for the Ghost Bat will be directly impacted by the proposed clearing, including Ironstone and Sandstone Gorges, Minor Shallow Gorges and Gullies, Water Dependent Ecosystems, cliff lines, and caves. It is most likely that habitat within the application area is an important foraging resource for this species (Outback Ecology, 2013a). Impacts to cave habitat used by this species may be minimised by the implementation of a fauna management condition to exclude Cave SC-C1 from the clearing area.

The Species and Communities Branch at the Department of Parks and Wildlife advised that the proposed clearing under the original application was likely to have a direct impact on habitat critical to the persistence of the conservation significant fauna, and that habitat within the Abydos area is significant on a local and regional scale (DPaW, 2013b; DPaW, 2014c). However, the amended application submitted by Atlas (2014) reduced the area proposed to clear from 156 hectares within a total boundary of 222 hectares, to 134 hectares within a total boundary of 164 hectares and excluded a proportion of significant fauna habitat. Following a review of the amended application, DPaW (2014d) advised that the proposed impacts to fauna were substantially decreased. The amended application decreases the proposed impact to critical habitat to a level which may be sufficient to maintain viable populations of conservation significant fauna in the surrounding area.

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

**Methodology** Bamford Consulting Ecologists (2009)  
 Atlas (2013)  
 Atlas (2014)  
 DPaW (2013b)  
 DPaW (2014b)  
 DPaW (2014c)  
 Outback Ecology (2010b)  
 Outback Ecology (2011a)  
 Outback Ecology (2011b)  
 Outback Ecology (2011c)  
 Outback Ecology (2012b)  
 Outback Ecology (2013a)

**(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**  
 No Threatened flora species have been recorded within the application area during flora surveys (Woodman, 2013). Similarly, available databases contain no records of Threatened flora within a twenty kilometre buffer surrounding the application area (DEC, 2013; GIS Database).

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

**Methodology** DEC (2013)  
 Woodman (2013)  
 GIS Database:  
 - Threatened and Priority Flora

**(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.**

**Comments** **Proposal is not likely to be at variance to this Principle**  
 According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area. The vegetation survey by Woodman (2013) did not identify any of the vegetation recorded as being a TEC.

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

**Methodology** Woodman (2013)  
 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 application area falls within the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, in which approximately 99.6% of the pre-European vegetation remains (see table) (Government of Western Australia, 2013; GIS Database).

The vegetation within the application area has been mapped as Beard vegetation association 82 (GIS Database). Over 90% of this Beard vegetation association remains at both a state and bioregional level (see Table; Government of Western Australia, 2013). Therefore, the area proposed to be cleared does not represent a significant remnant of native vegetation within an area that has been extensively cleared. Based on satellite imagery, the vegetation within the application area is neither a remnant itself nor does it form part of any remnants within the local area (Google Earth, 2013).

	Pre-	Current extent	Remaining	Conservatio	Pre-European % in
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	European area (ha)*	(ha)*	%*	n Status**	DEC Managed Lands
IBRA Bioregion – Pilbara	17,808,657	17,733,584	~99.6	Least Concern	8.4
Beard veg assoc. – State					
82	2,565,901	2,553,217	~99.5	Least Concern	10.51
Beard veg assoc. – Bioregion					
82	2,563,583	2,550,899	~99.5	Least Concern	10.52

\* Government of Western Australia (2013)

\*\* Department of Natural Resources and Environment (2002)

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

**Methodology** Department of Natural Resources and Environment (2002)  
Government of Western Australia (2013)  
Google Earth (2013)  
GIS Database:  
- IBRA WA (Regions – Sub Regions)  
- Pre-European Vegetation

**(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**

**Comments Proposal is at variance to this Principle**

There are several non-perennial watercourses and drainage lines that occur within the application area (Woodman, 2013; GIS Database). Floristic Community Type 10 was recorded to occur in association with river and major creek channels and gorges (Coffey, 2013). This FCT is dominated by *Eucalyptus camaldulensis* and *Melaleuca argentea*, which are both known to rely on the availability of permanent groundwater (Department of Water, 2010). Approximately 8.39 hectares of this FCT lies within the amended application area, which comprises 1.18% of the total area covered by FCT 10 in the larger Abydos area (Woodman, 2013). Therefore, the proposed clearing is not likely to represent a significant impact to this riparian vegetation type on a local or regional scale.

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

**Methodology** Coffey (2013)  
Department of Water (2010)  
Woodman (2013)  
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 may be at variance to this Principle**

A majority of the application area falls within the Capricorn land system, which consists of hills and ridges of sandstone and dolomite (GIS Database). A small portion of the application area lies within the Boolgeeda land system (GIS Database). These land systems are considered to have a low risk of erosion (Van Vreeswyk et al., 2004). Outback Ecology (2013b) reported that very little pre-existing erosion is evident within the application area, due to the high content of coarse material within soils, which armours surfaces against erosion. However, minor sheet erosion was observed at one site within a lower scree slope landform association within the Boolgeeda land system (Outback Ecology, 2013b). Furthermore, Woodman (2013) advise that given clearing is planned to occur upon a steep area of the landscape, significant erosion has the potential to occur. Potential land degradation from erosion may be minimised by the implementation of a staged clearing condition.

Acid sulphate soils were not identified within the application area (Outback Ecology, 2013b). Soil within the application area has a range of pH values, with a lowest pH of 4.4 within ridge lines (Outback Ecology, 2013b).

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

**Methodology** Outback Ecology (2013b)

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**

The application area does not lie within any conservation areas or DPaW managed lands (GIS Database). The nearest conservation area is the Mungaroo Nature Reserve, vested in the Conservation Commission of WA, which is located approximately 75 kilometres south west of the application area (GIS Database). At this distance the proposed clearing is not likely to have any impacts on the environmental values of the Nature Reserve.

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

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

The application area is located within the upper reaches of the Strelley River Catchment within the De Grey River Basin (MWH, 2013; GIS Database). The proposed clearing does not occur within a Public Drinking Water Source Area (PDWSA), however it is located within the proclaimed Pilbara groundwater area under the *Rights in Water and Irrigation Act 1914* (GIS Database). Any groundwater extraction and/or taking or diversion of surface water for purposes other than domestic and/or stock watering is subject to licence by the Department of Water.

There are a number of ephemeral watercourses and one waterhole identified within the application area (Bamford, 2009; Outback Ecology, 2013a; GIS Database). MWH (2013) advise that the proposed clearing under Stage 2 of the Abydos Project will increase the disturbance within the Strelley River Catchment under the project from 0.15% to 0.21%. While this level of disturbance is not considered by MWH to significantly alter surface water regimes in the greater catchment area of 2,800 square kilometres (MWH, 2013), on a local catchment scale (13.5 square kilometres) the cumulative area of disturbance as a result of Stage 1 and 2 equates to 42.6%; 11.6% from Stage 2 alone (MWH, 2013). Local scale impacts are expected to manifest through an interruption of natural drainage channels (MWH, 2013). Furthermore, the proposed clearing is expected to lead to an increase in sediment runoff and water erosion by removing vegetative cover and concentrating stormwater and flood flows (MWH, 2013). In particular, this is likely to impact on the waterhole within the application boundary by disrupting drainage sources and increasing sedimentation (Outback Ecology, 2013a). Therefore, there is the potential for the proposed activities to impact surface water quality both within and outside the application area.

Atlas plans to implement a number of design measures including channels, floodways and culverts to minimise the disturbance to natural flow regimes (Coffey Environments, 2013). Potential impacts to surface water will be further managed under approvals obtained under the *Mining Act 1978* and in consultation with the Department of Water (DoW).

The groundwater over the Abydos area ranges from near potable along areas of higher elevation, to brackish within low lying areas (MWH, 2009; Coffey, 2013). These lower areas also contain the highest Total Dissolved Solids (TDS) (MWH, 2009). Alteration to existing salinity levels within the application area is not expected to occur, nor is the proposed clearing likely to cause a deterioration in the quality of groundwater.

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

**Methodology** Bamford (2009)  
Coffey (2013)  
MWH (2009)  
MWH (2013)  
Outback Ecology (2013a)  
GIS Database:  
- Groundwater Salinity, Statewide  
- Hydrographic Catchments – Catchments  
- Hydrography – Linear  
- Public Drinking Water Source Areas (PDWSAs)  
- RIWI Act, Groundwater 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**

A majority of the rainfall (60-70%) in the area occurs between January and March, in the form of heavy, localised rainfall over short periods (MWH, 2013). The proposed clearing is located in an area of topographical variation, and therefore natural flooding is likely to occur in low lying areas such as gullies or valleys which receive runoff from higher elevations (Coffey, 2013; GIS Database). The removal of vegetation may increase the quantity and flow rate of runoff in some areas. However, whilst large rainfall events may result in localised flooding of the area, the proposed clearing is not likely to lead to a significant increase in the incidence or intensity of flooding within the wider region.

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

**Methodology** Coffey (2013)  
MWH (2013)  
GIS Database:  
- Topographic contours, statewide

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

**Comments**

The Abydos DSO Stage 2 Project was deemed to be a controlled action by the Department of the Environment (DotE) under the *EPBC Act (1999)* on 9 October 2013. A decision was made on 3 June 2014 to approve the proposed activities subject to conditions.

In accordance with the Memorandum of Understanding between the Department of Mines and Petroleum (DMP) and the Environmental Protection Authority (EPA), DMP liaised with the Office of the Environmental Protection Authority (OEPA) regarding the proposed impacts under the application. Advice was received from the OEPA on 13 January 2014 that a formal referral was not required.

There is one native title claim over the area under application (GIS Database). This claim (WC1999/008) has been registered with the Native Title Tribunal on behalf of the claimant group (GIS Database). However, 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 Aboriginal Sites of Significance within the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Environment Regulation, the Department of Parks and Wildlife 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.

The clearing permit application was advertised on 11 November 2013 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received.

**Methodology** GIS Database:  
- Aboriginal Sites of Significance  
- Native Title Claims - Registered with the NNTT

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## 5. Glossary

### Acronyms:

<b>BoM</b>	Bureau of Meteorology, Australian Government
<b>DAA</b>	Department of Aboriginal Affairs, Western Australia
<b>DAFWA</b>	Department of Agriculture and Food, Western Australia
<b>DEC</b>	Department of Environment and Conservation, Western Australia (now DPaW and DER)
<b>DER</b>	Department of Environment Regulation, Western Australia
<b>DMP</b>	Department of Mines and Petroleum, Western Australia
<b>DRF</b>	Declared Rare Flora
<b>DotE</b>	Department of the Environment, Australian Government
<b>DoW</b>	Department of Water, Western Australia
<b>DPaW</b>	Department of Parks and Wildlife, Western Australia
<b>DSEWPaC</b>	Department of Sustainability, Environment, Water, Population and Communities (now DotE)
<b>EPA</b>	Environmental Protection Authority, Western Australia
<b>EP Act</b>	<i>Environmental Protection Act 1986</i> , Western Australia
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
<b>GIS</b>	Geographical Information System

ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
s.17	Section 17 of the <i>Environment Protection Act 1986</i> , Western Australia
TEC	Threatened Ecological Community

### Definitions:

{DPaW (2013) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

- T Threatened species:**  
Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna or the Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).  
Threatened Fauna and Flora are further recognised by the Department according to their level of threat using IUCN Red List criteria. For example Carnaby's Cockatoo *Calyptorhynchus latirostris* is specially protected under the *Wildlife Conservation Act 1950* as a threatened species with a ranking of Endangered.  
Rankings:  
CR: Critically Endangered - considered to be facing an extremely high risk of extinction in the wild.  
EN: Endangered - considered to be facing a very high risk of extinction in the wild.  
VU: Vulnerable - considered to be facing a high risk of extinction in the wild.
- X Presumed Extinct species:**  
Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora (which may also be referred to as Declared Rare Flora).
- IA Migratory birds protected under an international agreement:**  
Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice.  
Birds that are subject to an agreement between governments of Australia and Japan, China and The Republic of Korea relating to the protection of migratory birds and birds in danger of extinction.
- S Other specially protected fauna:**  
Specially protected under the *Wildlife Conservation Act 1950*, listed under Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- P1 Priority One - Poorly-known species:**  
Species that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, rail reserves and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes.
- P2 Priority Two - Poorly-known species:**  
Species that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, unallocated Crown land, water reserves, etc. Species may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
- P3 Priority Three - Poorly-known species:**  
Species that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
- P4 Priority Four - Rare, Near Threatened and other species in need of monitoring:**  
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.  
(b) Near Threatened. Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable.  
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
- P5 Priority Five - Conservation Dependent species:**  
Species that are not threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.