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

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3698/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Dampier Salt Limited**

1.3. Property details

Property: Mineral Lease 253SA (AML70/253)
Dampier Solar Salt Industry Agreement Act 1967
Local Government Area: Shire of Roebourne
Colloquial name: Dampier Operations – Cyclone Protection Works

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
170.7		Mechanical Removal	Cyclone protection works

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
The vegetation of the application area is broadly mapped as Beard vegetation associations: 127: Bare areas mudflats; and 589: Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex. Biota Environmental Sciences (2008a) describe the vegetation of the application area as comprising of the following 15 vegetation types: **Alluvial Clay Plains / Cracking Clay Areas** ACP1*: Acacia coriacea* subsp. *coriacea* scattered low trees over *A. bivenosa (A. inaequilatera)* shrubland over *Triodia wiseana, T. epactia* hummock grassland. CCA1*: Eriachne flaccida, Eragrostis tenellula, Astrebla pectinata, Sorghum plumosum* open tussock grassland over *Ptilotus gomphrenoides* herbland. ACP2: *Triodia wiseana* hummock grassland, sometimes with some *T. longiceps* also present. ACP3: *Acacia stellaticeps* open heath over *Triodia epactia* hummock Grassland. ACP4: *Eragrostis xerophila* tussock grassland. **Coastal Clay-loam Plains** CCLP1: *Acacia stellaticeps* low open shrubland to shrubland over *Triodia longiceps (T. wiseana)* hummock grassland with *Eriachne helmsii, Sorghum plumosum, *Cenchrus ciliaris* very open tussock grassland. CCLP2: *Triodia longiceps (T. epactia)* hummock to closed hummock grassland over *Eriachne obtusa, *Cenchrus ciliaris* very open tussock grassland with *Ptilotus exaltatus* very open herbland. CCLP3: *Trianthema turgidifolia* low open shrubland over **Cenchrus ciliaris* open tussock grassland.	Dampier Salt Limited proposes to clear up to 170.7 hectares of native vegetation within an application area of approximately 388.1 hectares to undertake cyclone protection works. The proposed works include constructing a levee to prevent run-off from heavy rainfall events flowing into the saltfield concentrator ponds and crystallisers, and an associated drainage channel to collect and drain run-off westward to the sea (Biota Environmental Sciences, 2010). Clearing is proposed to be conducted mechanically with a lowered blade (Biota Environmental Sciences, 2010). Topsoil and vegetative material will be collected and stockpiled prior to the excavation works.	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).	Vegetation condition has been provided by Biota Environmental Sciences (2008a).

CCLP4: *Indigofera trita, I. colutea, I. linifolia, Neobassia astrocarpa* low shrubland over *Triodia epactia* hummock grassland and **Cenchrus ciliaris (Chrysopogon fallax)* tussock grassland.

CCLP5: *Indigofera trita* low open shrubland to low shrubland over *Triodia longiceps (T. epactia)* open hummock grassland and **Cenchrus ciliaris* open tussock grassland to tussock grassland.

Freshwater Drainage Areas in Clay Plains
FDA1: *Acacia coriacea* subsp. *coriacea* low woodland over *Eulalia aurea, Chrysopogon fallax* open tussock grassland.

FDA2: *Crotalaria cunninghamii* open heath over *Goodenia microptera, Alternanthera nana* open herbland and *Eragrostis eriopoda, Eriachne obtusa, Whiteochloa cymbiformis* open tussock grassland.

FDA3: *Hakea chordophylla* tall open shrubland over **Cenchrus ciliaris* open tussock grassland and *Dichanthium sericeum* subsp. *humilius* open bunch grassland.

Low-lying Saline Drainage Areas
SD1: *Tecticornia indica* subsp. *leiostachya, Neobassia astrocarpa* low shrubland to open heath over *Eragrostis dielsii* bunch grassland.

SD3: *Tecticornia indica* subsp. *leiostachya, T. halocnemoides* subsp. *tenuis* low open shrubland to open heath over *Eragrostis falcata* bunch grassland to very open bunch grassland.

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 area is situated approximately 10 kilometres west of Karratha, within the Roebourne subregion of the Pilbara Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database).

A total of 309 taxa of terrestrial vascular flora from 156 genera belonging to 52 families were recorded from the survey area, which included the vegetation within the application area. This included nine taxa of introduced (weed) species from eight genera and eight families (Biota Environmental Sciences, 2008a). Biota Environmental Sciences (2008a) have stated that the survey area (including the application area) has a species richness value within the range expected for its size when compared to five other study areas surveyed on the Pilbara coast (three at Onslow, one at Port Hedland and one at Cape Preston).

No Declared Rare Flora was recorded within the application area, however, three Priority flora species (*Themeda* sp. Hamersley Station (Priority 3), *Gomphrena leptophylla* (Priority 3) and *Goodenia nuda* (Priority 4)) were recorded within or in close proximity to the application area (Biota Environmental Sciences, 2008a). *Themeda* sp. Hamersley Station and *Goodinia nuda* have a broad distribution through the Pilbara bioregion and *Gomphrena leptophylla* has a distribution from the Pilbara and Kimberley regions (Western Australian Herbarium, 2010). A further four Priority flora species, *Gymnanthera cunninghamii* (Priority 3), *Terminalia supranitifolia* (Priority 3), *Acacia glaucocaesia* (Priority 3) and *Stackhousia clementii* (Priority 3), have been recorded within a 20 kilometres radius from the application area (GIS Database).

Fifteen vegetation types as described by Biota Environmental Science (2008a) were identified within the application area, and the vegetation condition ranged from 'Excellent' to 'Very Good'. No Threatened Ecological Communities were identified within the application area, however, two vegetation types are representations of Priority Ecological Communities (PEC's). These are the Priority 1 Roebourne Plains coastal grasslands with gilgai microrelief on deep cracking clays PEC (Roebourne Plains gilgai grasslands) and the Priority 3 Horseflat land system of the Roebourne Plains PEC.

Vegetation type 'Cracking Clay Area 1' (CCA1) is representative of the Roebourne Plains gilgai grasslands PEC (Biota Environmental Sciences, 2010). This vegetation type occurs as a mosaic with vegetation type 'Alluvial Clay Plains 1' (ACP1), and as a result, has been mapped as the single vegetation type ACP1 (Biota Environmental Sciences, 2008a; Biota Environmental Sciences, 2010). Dampier Salt Limited (2010) advise that approximately 48.35 hectares of this vegetation type occurs within the application area. Within the area surveyed by Biota Environmental Sciences (2008a), vegetation type ACP1 was recorded over an area covering approximately 196 hectares. In addition, a total of approximately 1,114 hectares of the Roebourne Plains gilgai grasslands PEC has been mapped in the Roebourne area (Hamersley Iron Pty Ltd, 2010). The total impact to the ACP1 vegetation type by the proposed cyclone protection works is likely to be less than 48.35 hectares given that only 170.7 hectares of the 388.1 hectare application area (44%) will be impacted.

Vegetation type 'Alluvial Clay Plains 4' (ACP4) is representative of the Horseflat land system of the Roebourne Plains PEC. This vegetation also occurs as a mosaic with vegetation types 'Alluvial Clay Plains 2' and 'Alluvial

Clay Plains 3', and as a result, has been mapped as vegetation type ACP (Biota Environmental Sciences, 2008a; Biota Environmental Sciences, 2010). Dampier Salt Limited (2010) advise that approximately 196.1 hectares of this PEC occurs within the application area. Within the area surveyed by Biota Environmental Sciences (2008a), vegetation type ACP was recorded over an area covering approximately 1,401 hectares. This community has an extent from Cape Preston to Whim Creek, and according the available GIS datasets and rangeland mapping by Van Vreeswyk et al. (2004), the Horseflat land system covers a broad area outside of the application area in the Roebourne sub-region. The proposed clearing activities are unlikely to significantly impact on the conservation of the Horseflat land system PEC.

The presence of Priority flora and PEC's within the application area raises the diversity of the area from a floristic perspective, however, the Priority flora species and the PEC's have been recorded outside of the application area in both the local area and throughout the Roebourne subregion. However, it is important to note that the distribution and extents of the PEC's outside of the survey and application areas are not accurately known.

Fauna surveys conducted by Biota Environmental Sciences (2008b) recorded a combined total of 124 vertebrate species including one amphibian, 42 reptiles, 10 native non-volant mammals, six bats, two introduced mammals, and 63 species of bird. Based on this search, it appears the application area may support a high number of reptile and bird species.

Based on the above, the proposed clearing may be at variance to this Principle. However, given that the vegetation in the local area comprises similar diversity, the linear and narrow nature of the proposed clearing is not likely to significantly impact on the biodiversity values of the local area

Methodology

Biota Environmental Sciences (2008a)
Biota Environmental Sciences (2008b)
Biota Environmental Sciences (2010)
Dampier Salt Limited (2010)
Hamersley Iron Pty Ltd (2010)
Van Vreeswyk et al. (2004)
Western Australian Herbarium (2010)
GIS Database:
- IBRA WA (Regions - Sub Regions)
- Declared Rare and Priority Flora List

(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

Biota Environmental Sciences (2008b) conducted fauna surveys in October/November 2005 and September 2006 of an area totalling approximately 4,195 hectares. The application area is located on the southern boundary of this survey area, comprising of a corridor that varies from 100 metres in width in the west and up to 800 metres in width in the east.

Based on fauna habitats described by Biota Environmental Sciences (2008b), three main fauna habitats are present within the application area:

- Flat to gently sloping clay plains, typically supporting tussock grasslands or *Triodia* hummock grasslands;
- Minor ephemeral flowlines, supporting *Acacia* tall shrublands; and
- Low-lying saline basin, supporting *Tecticornia* low open heath.

The primary fauna habitats within the application area are widespread and well-represented in the locality (Biota Environmental Sciences, 2008b).

Three Priority fauna species listed with the Department of Environment and Conservation are likely to utilise these fauna habitats: the Little North-western Mastiff bat (*Mormopterus loriae cobourgiana*) (Priority 1), Australian Bustard (*Ardeotis Australis*) (Priority 4), and Short-tailed Mouse (*Leggadina lakedownsis*) (Priority 4).

Of these species, the Short Tailed Mouse is the most likely to occur as a resident within the application area (Biota Environmental Sciences, 2008b). This species was trapped from the clay plains along the northern boundary of the application area during the fauna survey in 2006 (Biota Environmental Sciences, 2008b). The proposed clearing will only impact on a small portion of this fauna habitat type within the local area, therefore, impacts to the Short Tailed Mouse or its habitat would not be considered significant.

The two other species listed above are likely to move through the application area on an occasional basis, and given their mobility, would not be expected to be impacted by the proposed clearing (Biota Environmental Sciences, 2008b).

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

Methodology

Biota Environmental Sciences (2008b)

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

Comments

Proposal is not likely to be at variance to this Principle

According to available datasets there are no known records of Declared Rare Flora (DRF) within the application area (GIS database). The nearest record of DRF is located approximately 235 kilometres south-east of the application area (GIS Database).

Biota Environmental Sciences (2008a) conducted flora and vegetation surveys in October 2005 and July 2006 of an area totalling approximately 4,200 hectares. This survey included the vegetation within the application area.

No Declared Rare Flora (DRF) was recorded during the survey (Biota Environmental Sciences, 2008a). There are no historic records of DRF occurring within the application area and none would be expected to occur (Biota Environmental Sciences, 2008a).

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

Methodology

Biota Environmental Sciences (2008a)
GIS Database:
- Declared Rare and Priority Flora List

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

Comments

Proposal is not likely to be at variance to this Principle

There are no known Threatened Ecological Communities (TEC's) within the application area (GIS Database).

Biota Environmental Sciences (2008a) mapped 15 vegetation types that occur within the application area during flora and vegetation surveys in October 2005 and July 2006. None of the vegetation types identified represent Threatened Ecological Communities listed under the *Environment Protection and Biodiversity Conservation Act 1999*, or by the Department of Environment and Conservation (Biota Environmental Science, 2010).

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

Methodology

Biota Environmental Sciences (2008a)
Biota Environmental Sciences (2010)
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 is located within the Pilbara bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Shepherd (2007) report that approximately 99.9% of the pre-European vegetation remains in the Pilbara bioregion. The vegetation in the application areas is broadly mapped as Beard vegetation associations:

- 127: Bare areas mudflats; and
- 589: Mosaic: Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex (GIS Database).

According to the Department of Natural Resources and Environment (2002) both of these Beard vegetation associations are classed as 'Least Concern' (see table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	% of Pre-European area in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,164	17,794,164	~99.9	Least Concern	6.3
Beard vegetation associations - WA					
127	742,644	719,966	~96.9	Least Concern	0
589	809,754	809, 637	~100	Least Concern	1.6

Beard vegetation associations - Pilbara Bioregion					
127	180,401	177,739	~98.5	Least Concern	0
589	730,718	730,683	~100	Least Concern	1.8

* Shepherd (2007)
** Department of Natural Resources and Environment (2002)

The vegetation under application is not a remnant of native vegetation in an area that has been extensively cleared.

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

Methodology Department of Natural Resources and Environment (2002)
Shepherd (2007)
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 no permanent freshwater watercourses or wetlands within the application area (GIS Database; Biota Environmental Sciences, 2010). Six minor, non-perennial watercourses supporting low woodlands of *Acacia coriacea* or shrublands of *Crotalaria cunninghamii* or *Hakea chordophylla*, over perennial tussock grasses occur within the application area (Biota Environmental Sciences, 2010). The linear and narrow clearing for the cyclone protection works will intercept these minor watercourses, and the proposed works would be expected to reduce the amount of water flowing within the downstream sections of these watercourses during flood events (Biota Environmental Sciences, 2010). The vegetation communities growing in association with these watercourses are not water dependent, and it would be expected that there would be sufficient drainage from the remaining catchment to sustain vegetation growth within the watercourses north of the application area (Biota Environmental Sciences, 2010).

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

Methodology Biota Environmental Sciences (2010)
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

According to the available datasets the application area intersects the Littoral, Cheerawarra, Mallina, and Horseflat Land Systems (GIS Database).

The Littoral Land System is characterised by bare coastal mudflats with mangroves on seaward fringes, samphire flats, sandy islands, coastal dunes and beaches (Van Vreeswyk et al., 2004). Aerial imagery demonstrates that the portion of the application area characterised by the Littoral Land System comprises of bare mudflats (GIS Database).

The Cheerawarra Land System is characterised by sandy coastal plains and saline clay plains supporting soft and hard spinifex grasslands and minor tussock grasslands (Van Vreeswyk et al., 2004). Most units of this land system are highly susceptible to wind erosion if vegetative cover is depleted (Van Vreeswyk et al., 2004).

The Mallina Land System is characterised by sandy surfaced alluvial plains supporting soft spinifex (and occasionally hard spinifex) grasslands (Van Vreeswyk et al., 2004). Alluvial plains are moderately to highly susceptible to erosion if vegetative cover is seriously depleted (Van Vreeswyk et al., 2004).

The Horseflat Land System comprises of gilgaied clay plains supporting tussock grasslands and minor grassy snakewood shrublands (Van Vreeswyk et al., 2004). Parts of this land system are moderately to highly susceptible to erosion if vegetation is depleted, though other units with clay soils and stony mantles are inherently resistant (Van Vreeswyk et al., 2004).

Several portions of the application area intercept land systems that are moderately to highly susceptible to erosion if the vegetative cover is removed. There is a risk of wind and/or water erosion occurring should these areas remain exposed. The majority of the cleared area will be used for the construction of a levee and

drainage channel. Potential erosion impacts as a result of the proposed clearing may be minimised by the implementation of a staged clearing and rehabilitation condition.

The application area intercepts a small area totalling 11.4 hectares in the north-west portion of the application area categorised as 'high to moderate' Acid Sulphate Soil (ASS) risk (GIS Database). Aerial imagery demonstrates that these areas are void of vegetation, hence no vegetation clearing is required (GIS Database). Biota Environmental Sciences (2008a) have mapped this area as Bare Saline Mudflats (BSMF). The proposed clearing activities are not likely to pose a significant ASS risk, however, the ASS risk may be heightened during the construction of the flood protection levee and drainage channel.

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

Methodology Biota Environmental Sciences (2008a)
Van Vreeswyk et al., (2004)
GIS Database:
- Acid Sulfate Soil Risk Map, Pilbara Coastline
- Dampier and Extensions 50cm Orthomosaic - Landgate 2008
- Rangeland Land System Mapping

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments **Proposal is not likely to be at variance to this Principle**
There are two un-named Nature Reserves located approximately 15 kilometres north and north west of the application area which are managed for conservation and recreation, and conservation of flora and fauna respectively (GIS Database). These Nature Reserves are located on islands off the coastline and will not be impacted on by the proposed clearing.

The application area is located approximately 22 kilometres north-east of the Department of Environment and Conservation (DEC) managed former Mardie pastoral station (GIS Database). This area is a former leasehold which is proposed for conservation. The proposed clearing will not impact on this DEC managed area.

The Millstream-Chichester National Park is located approximately 55 kilometres south-east of the application area (GIS Database). The proposed clearing will not impact on the environmental values of Millstream-Chichester National Park.

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 is not likely to be at variance to this Principle**
There are no permanent freshwater wetlands or watercourses within or adjacent to the application area (GIS Database). The application area does intercept a number of minor, non-perennial watercourses which act as drainage pathways for overland flows (GIS Database). These watercourses would only support surface water for short periods following significant rainfall events.

The application area is situated approximately 1.2 kilometres south-east of a tidal flat which is located adjacent to the Indian Ocean (GIS Database). Given the proximity to the coast, the tidal areas are likely to be saline (Biota Environmental Sciences, 2010). High sediments loads may enter the tidal areas from overland flow events which result following significant rainfall events. The proposed clearing is not likely to significantly increase sediment entering the tidal areas or Indian Ocean.

The application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Roebourne Water Reserve and Harding Dam Catchment Area which are located approximately 42 kilometres east and south-east of the application area respectively (GIS Database). Given the distance separating the application area and the nearest water supply area, the proposed clearing is unlikely to impact on the water quality of the Roebourne Water Reserve and Harding Dam Catchment Area.

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

Methodology Biota Environmental Sciences (2010)
GIS Database:
- Hydrography, linear
- Public Drinking Water Source Areas (PDWSAs)

(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 application area is located within the Coastal Catchment Area which covers a total area of approximately 744,301 hectares (GIS Database). The application area is located in a low-lying coastal area and is subject to flooding following significant rainfall or cyclonic events. The proposed clearing of native vegetation for the cyclone protection works is to protect the existing salt concentrator ponds from run-off during floods events. The linear nature of the proposed clearing is not likely to significantly impact on the drainage characteristics of the catchment, or the local area.

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

Methodology

GIS Database:
- Hydrographic Catchments - Catchments

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

Comments

There is one native title claim over the application area; WC99/014. This claim has been registered with the Native Title Tribunal on behalf of the claimant group (GIS Database). However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are number of known Aboriginal Sites of Significance located within or close proximity to the clearing permit 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. Dampier Salt Limited (2010) has advised that a heritage survey is planned for the application area and that works will not commence until it has been confirmed that heritage sites are not present.

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.

The clearing permit application was advertised on 26 April 2010 by the Department of Mines and Petroleum, inviting submissions from the public. No submissions were received in relation to this application.

Methodology

Dampier Salt Limited (2010)
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 is at variance to Principle (f), may be at variance to Principles (a) and (g), is not likely to be at variance to Principles (b), (c), (d), (h), (i) and (j) and is not at variance to Principle (e).

5. References

Biota Environmental Sciences (2008a). A Vegetation and Flora Survey of the Proposed Dampier Salt Saltfield Expansion, unpublished report prepared for Dampier Salt Limited, prepared by Biota Environmental Sciences Pty Ltd.

Biota Environmental Sciences (2008b). Dampier Salt Saltfield Expansion Seasonal Fauna Survey, unpublished report prepared for Dampier Salt Limited, prepared by Biota Environmental Sciences Pty Ltd.

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Dampier Salt Limited (2010). Documentation Accompanying Clearing Permit Application for CPS 3698/1, Prepared by Dampier Salt Limited, March 2010.

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.

Hamersley Iron Pty Ltd (2010). Documentation Accompanying Clearing Permit Application for CPS 3558/1 and Advice to the Assessing Officer DMP, Prepared by Hamersley Iron Pty Ltd, February 2010.

Shepherd, D.P. (2007). 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. Includes subsequent updates for 2006 from Vegetation Extent dataset ANZWA1050000124.

Van Vreeswyk A.M.E., Payne A.L., Leighton K.A. and Hennig P. (2004). Technical Bulletin - An inventory and condition survey

of rangelands in Pilbara Region, Western Australia, No 92, Department of Agriculture, Government of Western Australia, Perth, Western Australia.

Western Australian Herbarium (2010). Florabase – The Western Australian Flora. Department of Environment and Conservation. <http://florabase.dec.wa.gov.au/>.

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.