



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 3665/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Moly Metals Australia Pty Ltd

1.3. Property details

Property: General Purpose Lease 45/276
Miscellaneous Licence 45/160
Miscellaneous Licence 45/185
Miscellaneous Licence 45/186

Local Government Area: Shire of East Pilbara
Colloquial name: Spinifex Ridge Iron Ore Project

1.4. Application

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

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 1:250,000 scale for the whole of Western Australia, and are a useful tool to examine the vegetation extent in a regional context. One Beard vegetation association is located within the area proposed to be cleared (GIS Database):

- Hummock grasslands, shrub steppe; kanji over soft Spinifex.

Outback Ecology Services (2006a) undertook a dual season flora and vegetation survey of the Spinifex Ridge Iron Ore Project area (which included the southern section of the application area) in July 2005 and April 2006. In addition, G&G Environmental (2007) undertook a flora and vegetation survey of the proposed borefield/pipeline corridor within the northern section of the application area in April 2007. The following vegetation associations were recorded within the application area during these two flora and vegetation surveys:

Plains:

- **P1:** *Acacia inaequilatera* high shrubland to scattered shrubs over *Triodia epactia* hummock grassland;
- **P2:** *Acacia inaequilatera* high open shrubland to scattered shrubs over *Triodia wiseana* hummock grassland with some *Triodia epactia*;
- **P9:** Mixed *Grevillea* and *Acacia* scattered tall shrubs over *Triodia epactia* hummock grassland;

Plains - spinifex steppe:

- **Pss (1, 2):** *Triodia longiceps* and/or *Triodia epactia* steppe on flat sandy plains;
- **Pss (2):** *Triodia epactia* steppe on flat sandy plains;

Plains - shrublands:

- **Ps (47):** Open *Acacia colei* and *Grevillea pyramidalis* shrubland over *Triodia epactia* tussock grassland on flat plains;
- **Ps (42, 47, 50, 54):** Open shrubland to shrubland of *Acacia* sp, *Grevillea* sp, or *Pluchea* sp, over *Triodia epactia* tussock grassland on flat plains;

Plains - woodlands:

- **Pw (18):** Low open *Corymbia hamersleyana* woodland over an open *Acacia ancistrocarpa* heath to shrubland over a *Triodia epactia* and *Triodia longiceps* tussock/hummock grassland in low lying area;

Creeklines:

- **RC (13):** *Acacia coriacea ssp. pendens*, *Bauhinia cunninghamii* and *Eucalyptus camaldulensis* woodland over a tall *Acacia coleii*, *A. farnesiana* and *Carissa lanceolata* shrubland over a *Triodia longiceps* hummock grassland with scattered *Cyperus vaginatus*;

- **D10:** *Acacia tumida var. pilbarensis* and *Crotalaria cunninghamii* high open shrubland over *Pluchea ferdinandmuelleri* and *Pluchea tetranthera* low shrubland over scattered herbs and grasses;

Stony Rises:

- **SR (1, 2):** *Triodia wiseana* mid dense tussock grassland on stony rises with or without overstorey of scattered *Acacia inaequilatera* and *Grevillea pyramidalis* shrubs;

Disturbed Areas:

- **DA (5) Disturbed:** Borrow Pits virtually devoid of vegetation.

Clearing Description	<p>Moly Metals Australia Pty Ltd have applied to clear 43 hectares of native vegetation within a 375 hectare purpose permit boundary for the Spinfex Ridge Iron Ore Project. The project will comprise an air strip, camp, landfill and a water pipeline to the DeGrey Borefield (Moly Metals Australia Pty Ltd, 2010). The disturbance associated with the pipeline will be low impact as the pipeline will be laid on the ground over vegetation.</p> <p>The area applied to clear is located approximately 46 kilometres north-east of Marble Bar in the Pilbara region of Western Australia (GIS Database).</p>
Vegetation Condition	<p>Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994)</p> <p>To</p> <p>Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994)</p>
Comment	<p>The vegetation condition was derived from a document provided by Moly Metals Australia (2010) which summarises the results of the flora and vegetation surveys undertaken by Outback Ecology Services and G&G Environmental.</p>

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 within the Chichester subregion of the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion (GIS Database). The Chichester subregion is characterised by undulating granite and basalt plains with significant areas of basalt ranges. Plains support shrub steppe characterised by *Acacia inaequilatera* over *Triodia wiseana* hummock grasslands, whilst *Eucalyptus leucophloia* tree steppes occur on ranges (Kendrick & McKenzie, 2002).

A total of 21 Beard Vegetation Associations in the Chichester subregion are listed by Kendrick & McKenzie (2002) as a high priority for reservation. None of these are present in the application area (GIS Database). In

general, the vegetation associations within the proposed clearing area are relatively widespread across the Pilbara and all are present within conservation reserves (G&G Environmental, 2007; Outback Ecology Services, 2006a).

The D10 and RC (13) vegetation associations are considered to be of moderate local significance as they have a relatively limited local distribution. Moly Metals Australia Pty Ltd (2010) have committed to avoid the RC (13) vegetation association during the life of the project. Moly Metals Australia Pty Ltd (2010) have also designed the layout of the project so there is minimal impact to the D10 vegetation association with approximately 0.1 hectares proposed to be cleared of a total 545 hectares mapped. Based on vegetation mapping, the assessing officer notes that there is adequate representation of the D10 vegetation community outside of the proposed clearing area.

During the flora and vegetation surveys of the application area, a total of 188 plant taxa (including subspecies and varieties) were recorded (Moly Metals Australia Pty Ltd, 2010). The 188 taxa were from 42 families and 101 genera, with Poaceae, Papilionaceae and Mimosaceae the most dominant families across the survey area.

During the flora surveys there were approximately there were eight weed species recorded within the application area (Moly Metals Australia, 2010). The proposed vegetation clearing has the potential to introduce further weed species into the local area should adequate hygiene practices not be put in place. Weeds can affect biodiversity in a number of ways, including out competing native species for resources and increasing the fire risk. Standard weed management protocols can manage the risks posed by the introduction and spread of weeds.

The majority of vegetation associations recorded in the application area were described as being in 'excellent' condition, with others varying from 'Very Good' to 'Degraded' (Moly Metals Australia Pty Ltd, 2010). The degraded areas included borrow pits along the Muccan-shay Gap road and service corridor where a Telstra optic fibre cable has been installed. The three drainage lines within the application area had also been subject to disturbance from grazing (Moly Metals Australia Pty Ltd, 2010). On this basis, the proposed clearing area is not likely to exhibit a higher level of floristic diversity than other areas in the bioregion.

Fauna surveys of a larger survey area which included the application area were undertaken by Outback Ecology Services in 2006 and 2007. During the fauna surveys 26 species of mammals, 63 species of birds, 30 species of reptiles and 4 amphibians were recorded (Outback Ecology Services, 2006b). Outback Ecology Services (2006b) have stated that the diversity of fauna species recorded was similar to that in other studies undertaken in the local area such as fauna surveys undertaken at BHP Goldsworthy; approximately 50 kilometres to the north.

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

Methodology G&G Environmental (2007).
Kendrick & McKenzie (2002).
Moly Metals Australia Pty Ltd (2010).
Outback Ecology Services (2006b).

(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

Outback Ecology Services (2006b) undertook a Level 2 dual season terrestrial vertebrate fauna survey of the Spinifex Ridge Iron Ore Project area (which included the application area) during August 2005 and April 2006. As a result, the following two fauna habitat types were recorded in the application area:

-Spinifex plains: Stony to sandy, level Spinifex plains; and

-Minor drainage lines.

Outback Ecology Services (2006b) have stated that the two habitat types within the application area are well represented elsewhere in the bioregion, including in conservation reserves such as Meentheena Conservation Park (approximately 27 kilometres to the south) and Millstream-Chichester National Park (approximately 240 kilometres west south-west of the proposed clearing area). In addition, all land systems present in the project area are widespread in the region (Outback Ecology Services, 2006b).

A number of conservation significant fauna species were highlighted as potentially occurring in the application area, these include: Northern Quoll (*Dasyurus hallucatus*), Orange Leafnosed-bat (Pilbara Form) (*Rhinionictis aurantius*), Ghost Bat (*Macroderma gigas*), Night Parrot (*Pezoporus occidentalis*), Northern Marsupial Mole (*Notoryctes caurinus*), Mulgara (*Dasyercus cristicauda*), Greater Bilby (*Macrotis lagotis*), Rainbow Bee-eater (*Merops ornatus*), Australian Bustard (*Ardeotis australis*), Peregrine Falcon (*Falco peregrinus*), Princess Parrot (*Polytelis alexandrae*) and Pilbara Olive Python (*Liasis olivaceus barroni*).

Many of the conservation significant fauna species noted above were recorded during the fauna survey.

However, these species were all recorded in the rocky slopes of the Talga Range which is found to the south of the application area (Outback Ecology Services, 2006b). One conservation significant species; the Rainbow Bee-eater was recorded in the application area:

The Rainbow Bee-eater is a breeding resident in northern Western Australia, migrating between Australia and north as far as Japan (Pizzey & Knight, 1998). It occupies numerous habitats including open woodlands with sandy loamy soil, sandridges, sandpits, riverbanks, road cuttings, beaches, dunes, cliffs, mangroves and rainforests (Pizzey & Knight, 1998). It was observed over the majority of the larger Spinifex Ridge Iron Ore Project area during both surveys (Outback Ecology Services 2006b). Due to the broad habitat requirements of this species, and the fact that it is a common migrant in the Pilbara, it is highly unlikely the proposed clearing is likely to significantly reduce the overall habitat of this species.

The application area lacks any significant habitat features such as hollow logs, permanent water holes, tree hollows, rocky outcrops, cliffs, caves, crevices or heavy leaf litter which would provide suitable habitat for many of the conservation significant fauna species highlighted above (Outback Ecology Services, 2006b). The habitat types recorded in the application area are well represented in the Pilbara region and in surrounding conservation reserves. It is highly unlikely that the spinifex vegetation proposed to be cleared represents significant habitat for fauna species in the local area.

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

Methodology Knight & Pizzey (1998).
Outback Ecology Services (2006b)

(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 GIS databases, there are no known records of Declared Rare Flora (DRF) or Priority flora within the application area (GIS Database).

Outback Ecology Services (2006a) undertook a dual season flora and vegetation survey of the Spinifex Ridge Iron Ore Project area (which included the southern section of the application area) during July 2005 and April 2006. Prior to the July 2005 survey there had been minimal rainfall received in the project area, whilst the April 2006 survey was undertaken after a larger cyclonic rainfall event. The results of the flora and vegetation survey show that there were no DRF or Priority flora recorded in the application area (Outback Ecology Services, 2006a).

G&G Environmental (2007) undertook a flora and vegetation survey of the proposed borefield/pipeline corridor near the De Grey River within the northern section of the application area in April 2007. Consequently, there were no DRF or Priority flora species recorded during this flora and vegetation survey (G&G Environmental, 2007).

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

Methodology G&G Environmental (2007).
Outback Ecology Services (2006b).
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) or Priority Ecological Communities (PEC's) within the proposed clearing area or in the general vicinity (GIS Database). Kendrick & McKenzie (2002) report that there are no known TEC's in the Chichester subregion.

Outback Ecology Services (2006b) did not record any TEC's or PEC's during vegetation and flora surveys of the application area during April 2007.

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

Methodology Kendrick & McKenzie (2002).
Outback Ecology Services (2006b).
GIS Database:

(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 IBRA Pilbara Bioregion (GIS Database). Shepherd (2007) reports that approximately 99.9% of pre-European vegetation still exists in this Bioregion. The vegetation in the application area is recorded as:

- Beard Vegetation Associations 93: Hummock grasslands, shrub steppe; kanji over soft spinifex.

According to Shepherd (2007) there is approximately 100% of this vegetation type remaining at both a state and bioregion level. Although large scale mining operations are located in close proximity to the application area, the region in which the clearing is proposed to occur has not undergone broad scale clearing. Hence the application area does not represent a significant remnant of native vegetation in an area that has been extensively cleared.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in IUCN Class I-IV Reserves
IBRA Bioregion - Pilbara	17,804,187	17,894,646	~99.9	Least concern	6.3
Beard vegetation associations - State					
93	3,044,308	3,044,249	~100	Least concern	0.4
Beard vegetation associations - Bioregion					
93	3,042,113	3,042,064	~100	Least concern	0.4

* Shepherd (2007)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002).
Shepherd (2007).
GIS Database:
- Pre-European Vegetation.
-IBRA Australia.

(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

There are three ephemeral drainage lines which intersect the application area (GIS Database). None of these watercourses are Ramsar Wetlands or wetlands listed on the Directory of Important Wetlands in Australia (GIS Database).

Analysis of aerial photography indicates that ephemeral drainage lines are a common feature both locally (within a 50 kilometre radius) and regionally (within the Pilbara bioregion) (GIS Database).

There are two vegetation associations associated with drainage lines which were recorded in the application area:

-D10: *Acacia tumida* var. *pilbarensis* and *Crotalaria cunninghamii* high open shrubland over *Pluchea ferdinandmuelleri* and *Pluchea tetranthera* low shrubland over scattered herbs and grasses; and

-RC (13): *Acacia coriacea* ssp. *pendens*, *Bauhinia cunninghamii* and *Eucalyptus camaldulensis* woodland over a tall *Acacia coleii*, *A. farnesiana* and *Carissa lanceolata* shrubland over a *Triodia longiceps* hummock grassland with scattered *Cyperus vaginatus*.

Both of these vegetation associations are considered to be of moderate local significance as they have a relatively limited local distribution (Moly Metals Australia Pty Ltd, 2010).

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

However, Moly Metals Australia Pty Ltd (2010) have committed to avoid the RC (13) vegetation association during the project. In regards to the D10 vegetation association, Moly Metals Australia Pty Ltd have designed the project so there will be minimal disturbance of just 0.1 hectares out of 545 hectares mapped over the larger Spinfex Ridge Iron Ore Project area (Moly Metals Australia, Pty Ltd, 2010). In the two drainage lines to be disturbed, the pipeline will be buried so drainage can be maintained. The vegetation clearing in these areas will be temporary as retained topsoil and cleared vegetation will be used to rehabilitate the areas accordingly (Moly Metals Australia Pty Ltd, 2010). Therefore, the impacts to vegetation associated with these drainage lines will be minor and of a temporary nature when considering the level of disturbance (0.1 hectare) in comparison to the mapped distribution of this vegetation association (545 hectares).

Methodology Moly Metals Australia Pty Ltd (2010).
GIS Database:
- ANCA Wetlands
- 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

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

Mallina Land System - This land system is characterised by sandy surfaced alluvial plains supporting soft spinifex (and occasionally hard spinifex) grasslands. This land system is moderately - highly susceptible to erosion if vegetation cover is removed (Van Vreeswyk et al., 2004). Approximately 7.7 hectares of clearing is proposed within this land system (Moly Metals Australia Pty Ltd, 2010).

Macroy Land System - This land system is characterised by stony plains and occasional tor fields based on granite supporting hard and soft spinifex grasslands. This land system has low or very low erosion hazard (Van Vreeswyk et al., 2004). Approximately 16.8 hectares of clearing is proposed within this land system (Moly Metals Australia Pty Ltd, 2010).

Talga Land System - This land system is characterised by hills and ridges of greenstone and chert and stony plains supporting hard and soft Spinifex grasslands (Van Vreeswyk et al., 2004). This system is not susceptible to erosion. Approximately 0.5 hectares of this land system will be disturbed as part of this proposal (Moly Metals Australia Pty Ltd, 2010).

On the basis of land system descriptions, the proposed native vegetation clearing is unlikely to cause appreciable land degradation within the Macroy and Talga Land Systems. The Mallina Land System is most at risk from erosion, however; disturbance in this area will involve the laying down of pipe over spinifex vegetation. There will be no vegetation removed from the ground as part of this process and it is unlikely there will be any significant disturbance to the soil profile as a result.

There are two sections where the pipeline will intersect minor drainage lines within the Macroy Land System (GIS Database). Moly Metals Australia Pty Ltd (2010) have stated that in these two areas the pipeline will be buried underground to ensure that drainage is maintained. It is possible that the disturbance in these drainage lines may initiate some temporary soil erosion, particularly during cyclonic events and flooding.

Given that clearing is required within watercourses, the proposed clearing may be at variance to this Principle. However, the risk of erosion occurring is likely to be minimal given that vegetation and topsoil will be retained and rehabilitation will commence following the completion of works associated with the burial of the pipeline (Moly Metals Australia, 2010).

Methodology Moly Metals Australia Pty Ltd (2010).
Van Vreeswyk et al (2004).
GIS Database:
- Hydrography, linear (medium scale)

(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 located within a conservation reserve (GIS Database). The nearest known Department of Environment and Conservation (DEC) managed estate is the Meentheena Conservation Park, located approximately 27 kilometres to the south-east at its closest point (GIS Database).

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 not located within any Public Drinking Water Source Areas (GIS Database).

The application area is characterised by groundwater ranging from 3-50 metres below the ground, whilst groundwater salinity of the application area ranges from 1,000-3,000 milligrams/litre of Total Dissolved Solids (Moly Metals Australia, 2010 Pty Ltd; GIS Database). It is unlikely that the removal of 43 hectares of Spinfex/Acacia shrubland vegetation will significantly impact on the quality or depth of underground water in the application area.

Potential impacts upon surface water quality within the application area are anticipated to be minimal. The annual rainfall of the region is 300 millimetres, whilst the annual evaporation rate is 3,400 millimetres, meaning that during normal rainfall events surface water will be evaporated quickly (Outback Ecology Services, 2006a; GIS Database).

The areas most at risk of sedimentation are two minor ephemeral drainage lines where clearing will be required so the pipeline can be buried to maintain surface water flow. It is possible that clearing within this area may initiate some temporary erosion and thus reduce water quality during large rainfall events. On this basis, the proposed clearing may be at variance to this Principle. However, Moly Metals Australia Pty Ltd (2010) have committed to retain topsoil and vegetation in these areas so rehabilitation can be undertaken immediately following the completion of works.

Methodology Moly Metals Australia Pty Ltd (2010).
GIS Database:
- Evapotranspiration, Point Potential
- Groundwater Salinity, Statewide
- Hydrography, linear (medium scale)
- 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 climate of the region is described as arid to semi-arid with hot summers and cool winters. The average annual rainfall is 200 millimetres, with rains occurring in winter from cold fronts from the west, whilst in summer thunderstorms can produce heavy localised falls in short periods (Outback Ecology Services, 2006b). Based on an average annual evaporation rate of 3,400 millimetres (GIS Database), any surface water resulting from rainfall events is likely to be relatively short lived.

The clearing of native vegetation is likely to result in an increase in surface water runoff; however, the proposed clearing is not likely to increase the incidence or intensity of flooding.

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

Methodology Outback Ecology Services (2006b)
GIS Database:
- Evapotranspiration, Point Potential
- Hydrography, linear (medium scale)

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

Comments

There is one native title claim (WC99_008) over the area under application (GIS Database). The mining tenements have been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available databases, there are no Aboriginal Sites of Significance located 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 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 12 April 2010 by the Department of Mines and Petroleum inviting submissions from the public. There were no submissions received in relation to the clearing permit application.

Methodology GIS Databases:
- 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 section 51O of the *Environmental Project Act 1986*, and the proposed clearing may be at variance to Principle (f), (g) and (i), is not likely to be at variance to Principles (a), (b), (c), (d), (h), and (j), and is not at variance to Principle (e).

5. References

- 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.
- G&G Environmental (2007) Flora and vegetation survey of the proposed De Grey borefield and a pipeline corridor to the Moly Mines Spinifex Ridge Project. Unpublished report for Moly Metals Australia Pty Ltd.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Kendrick, P., & McKenzie, N. (2002) Pilbara 1 (PIL1 - Chichester subregion) in 'A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002'. Department of Conservation and Land Management, Western Australia.
- Moly Metals Australia Pty Ltd (2010) Spinifex Iron Ore Project - Application for a clearing permit (purpose permit) under the Environmental Protection Act s51E. March 2010.
- Outback Ecology Services (2006a) Spinifex Ridge Molybdenum Project Vegetation and Flora Baseline Surveys (2005-2006) - November 2006. Unpublished report for Moly Metals Australia Pty Ltd.
- Outback Ecology Services (2006b) Spinifex Ridge Molybdenum Project - terrestrial vertebrate fauna baseline surveys (2005-2006). November 2006. Unpublished report for Moly Metals Australia Pty Ltd.
- Pizzey, G & Knight, F (1997) The Graham Pizzey and Frank Knight Field Guide to the Birds of Australia, Angus and Robertson, Sydney Australia.
- 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.
- Van Vreeswyk, A.M, Payne, A.L, Leighton, K.A & Hennig, P (2004) Technical Bulletin No. 92: An inventory and condition survey of the Pilbara region, Western Australia. Department of Agriculture, South Perth, Western Australia

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.