Government of Western Australia
Department of Mines, Industry Regulation and Safety

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8877/1

Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **BHP Billiton Nickel West Pty Ltd**

1.3. Property details

Property: *Nickel (Agnew) Agreement Act 1974*, Mineral Lease 255SA (AML 70/255);
General Purpose Leases 36/49-51, 53/11-14;
Mining Leases 36/4, 36/9, 36/78, 36/87, 36/102-103, 36/129-131, 36/155-156, 36/158-160, 36/183-185, 36/216-220, 36/230, 36/242-243, 36/246-247, 36/285-286, 36/288-291, 36/294, 36/306-307, 36/336, 36/389, 36/399, 36/409, 36/422, 36/439-440, 36/452-457, 36/467, 36/509-510, 36/517, 36/549, 36/618, 36/631, 36/658, 36/676-677, 53/56-57, 53/165-167, 53/187, 53/218, 53/243, 53/371, 53/410-411, 53/462-463, 53/466-467, 53/475, 53/483-489;
Miscellaneous Licences 36/51-54, 36/56, 36/60, 36/67-81, 36/85-86, 36/88-91, 36/93-95, 36/97, 36/101-104, 36/109-110, 36/206, 36/240, 53/31, 53/54, 53/56, 53/58, 53/63-65, 53/67, 53/76, 53/82, 53/109-110, 53/122-132

Local Government Area: Shire of Wiluna; Shire of Leonora

Colloquial name: Northern Operations Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
6,000		Mechanical Removal	Mineral Exploration, Mineral Production and Associated Activities

1.5. Decision on application

Decision on Permit Application: Grant

Decision Date: 22 October 2020

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

The vegetation of the application area is broadly mapped as the following Beard vegetation association/s:
18: Low woodland; mulga (*Acacia aneura*);
29: Low woodland; paperbark (*Melaleuca* sp.);
39: Shrublands; mulga scrub;
107: Hummock grasslands, shrub steppe; mulga and *Eucalyptus kingsmillii* over hard spinifex;
109: Hummock grasslands, shrub steppe; *Eucalyptus youngiana* over hard spinifex;
125: Bare areas; salt lakes;
202: Shrublands; mulga & *Acacia quadrimarginea* scrub;
204: Succulent steppe with open scrub; scattered mulga & *Acacia sclerosperma* over saltbush & bluebush; and
676: Succulent steppe; samphire (GIS Database).

BHP Billiton Nickel West Pty Ltd and its predecessor Western Mining have commissioned numerous flora and vegetation surveys over the local and regional area, including the application area, since the mid 1990's (BHP, 2020). The following vegetation associations have been recorded within the application area (BHP, 2020):

- Low woodland, open low woodland or sparse woodland; Mulga *Acacia aneura* and associated species;
- Salt lake, lagoon, clay pan;
- Saltbush and bluebush with scrub or open scrub; Mulga, other wattle *Atriplex* spp, *Maireana* spp. with *Acacia aneura* & other *Acacia* spp.;
- Samphire; *Tecticornia* spp. communities in saline areas;
- Scrub, open scrub or sparse scrub; Wattle, teatree & other species *Acacia* spp. *Melaleuca* spp.; and
- Shrub-steppe; Hummock grassland with scattered shrubs or mallee *Triodia* spp. *Acacia* spp., *Grevillea* spp. *Eucalyptus* spp.

Clearing Description

Northern Operations Project.
BHP Billiton Nickel West Pty Ltd proposes to clear up to 6,000 hectares of native vegetation within a boundary of approximately 59,210.66 hectares, for the purpose of mineral exploration, mineral production and associated activities. The project is located adjacent to Leinster from 16 kilometres south-east of the town, to 100 kilometres north, within the Shires of Wiluna and Leonora.

Vegetation Condition

Pristine: No obvious signs of disturbance (Keighery, 1994).

To

Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment

The vegetation condition was derived from a consolidated vegetation survey collated by BHP (2020).

BHP Billiton Nickel West Pty Ltd currently holds eleven native vegetation clearing permits for their Northern Operations: CPS 1695, 2193, 2222, 2837, 2845, 3094, 4544, 7439, 7818, 8008, 8348. BHP Billiton Nickel West Pty Ltd is proposing to amalgamate these permits into a strategic permit, and once the permit is granted will surrender these existing eleven clearing permits. These eleven permits currently have a combined approved clearing area of 2,645.07 hectares. The strategic permit is proposing to clear up to 6,000 hectares for the purpose of mineral exploration, mineral production and associated activities. This permit will allow for the strategic expansion of the project over the next 10 years.

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 clearing permit application area is located within the Eastern Murchison subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Murchison Bioregion (GIS Database). The Eastern Murchison subregion is characterised by internal drainage, extensive areas of elevated red desert sandplains, salt lake systems, broad plains of red-brown soils and breakaway complexes, and red sandplains. The vegetation is dominated by mulga woodlands rich in ephemerals; hummock grasslands, saltbush shrubland and *Tecticornia* shrublands (CALM, 2002). The sub-region is rich and diverse in both its flora and fauna but most species are wide ranging and usually occur in adjoining regions (CALM, 2002).

The flora of the application area is relatively well studied with targeted surveys commissioned by BHP Billiton Nickel West Pty and its predecessor Western Mining covering the local and regional area since the mid 1990's (BHP, 2020). Extensive survey by Western Botanical has contributed to the State's understanding of the distribution of a number of priority flora in the local area, with information collected from surveys enabling two once-presumed rare species (*Grevillea inconspicua*, and *Hemigenia exilis*) to become delisted (BHP, 2020). The proposed clearing area has been subject to desktop, reconnaissance and detailed surveys as well as targeted surveys (BHP, 2020).

The consolidated flora survey has not identified any Threatened Flora species within the application area (BHP, 2020). Seventeen Priority flora species (listed below) have been recorded within the application area, with a number expected to be impacted by the proposed clearing, but not at a level which would alter the conservation status of most of the taxa, apart from *Hibbertia* sp. Sherwood Breakaways (R.J. Cranfield 6771) and *Thryptomene* sp. Leinster (B.J. Lepschi & L.A. Craven 4362). 3,518 individuals of the Priority 2 flora species *Hibbertia* sp. Sherwood Breakaways (R.J. Cranfield 6771) have been identified within the application area, and 1,160 individuals of the Priority 3 flora species *Thryptomene* sp. Leinster (B.J. Lepschi & L.A. Craven 4362). Hibbertia sp. Sherwood Breakaways (R.J. Cranfield 6771) is currently known from just four populations, but as it is restricted to breakaway areas that, within the application area, are also largely protected as areas of Indigenous heritage areas, the populations will not be significantly impacted by the proposed clearing (BHP, 2020).

Potential impacts to these two species may be managed by a flora management condition. BHP Billiton Nickel West Pty have committed to undertaking targeted surveys for Priority flora, prior to any clearing (BHP, 2020). All information on population numbers and spatial extent will be provided to the Department of Biodiversity, Conservation and Attractions (DBCA) (BHP, 2020). The other higher order Priority flora species are not restricted to the application area (BHP, 2020). *Anacampseros* sp. Eremaean (F. Hort, J. Hort & J. Shanks 3248) is found across hundreds of kilometres from north of Kalgoorlie, Wiluna to north of Geraldton; *Frankenia georgei* is found from Norseman to Wiluna; *Eremophila* sp. long pedicels (G. Cockerton 1975) does not have a wide distribution but is known from four separate populations (with 624 identified outside the permit boundary) and its habitat (mulga woodlands) is extensive in both Northern Operations, locally and regionally (BHP, 2020).

Priority Flora Within the Application Area		
Species	Conservation Status Level (WA)	No. within application area
Anacampseros sp. Eremaean (F. Hort, J. Hort & J. Shanks 3248)	Priority 1	2
Frankenia georgei	Priority 1	10
Eremophila sp. long pedicels (G. Cockerton 1975)	Priority 2	135
Hibbertia sp. Sherwood Breakaways (R.J. Cranfield 6771)	Priority 2	3,518
Austroparmelina macrospora	Priority 3	1
Bossiaea eremaea	Priority 3	5
Goodenia modesta	Priority 3	2

Hybanthus floribundus subsp. *chloroxanthus*	Priority 3	222
Olearia mucronata	Priority 3	1
Phyllanthus baeckeoides	Priority 3	3
Sida picklesiana	Priority 3	17
Thryptomene sp. Leinster (B.J. Lepschi & L.A. Craven 4362)	Priority 3	1,160
Tribulus adelacanthus	Priority 3	13
Verticordia jamiesonii	Priority 3	15
Eremophila pungens	Priority 4	5
Grevillea inconspicua	Priority 4	35
Hemigenia exilis	Priority 4	35

The findings of the flora surveys conducted over the application area suggest that the application area is host to many priority species and species of taxonomic interest. Western Botanical (2007) has previously suggested that this is due to a combination of a high degree of habitat variation, extensive surveys in the local area and lack of survey throughout the region. The application area encompasses landforms such as breakaways and ironstone outcrops that have high concentrations of conservation significant flora species, and includes populations of flora that have not been recorded extensively in the local area, but may occur extensively throughout the region Western Botanical, 2007).

There are no Threatened Ecological Communities mapped within the area, but five Priority 1 Priority Ecological Communities (PEC) are intersected by the proposed clearing area:

- Albion Downs calcrete groundwater assemblages;
- Lake Miranda East calcrete groundwater assemblages;
- Lake Miranda West calcrete groundwater assemblages;
- Yakabindie calcrete groundwater assemblages;
- Lake Way South calcrete groundwater assemblages;
- Violet Range Vegetation Complexes.

Each of the groundwater assemblage PECs are described as a unique assemblage of invertebrates that have been identified in the groundwater calcretes (DPaW, 2014), and are unlikely to be impacted by the proposed clearing. Potential impacts to these PECs are regulated under the *Mining Act, 1978* (Mining Proposal (Reg ID 76846)) and Ministerial Statement 1087.

Although clearing within the Violet Range PEC has already been approved under Ministerial Statement 1087, further clearing under the clearing permit will be limited to critical clearing and clearing will be avoided wherever practicable (BHP, 2020). BHP Billiton Nickel West Pty will utilise the mitigation hierarchy (avoid, minimise, mitigate and revegetate) prior to any proposed clearing (BHP, 2020).

Although the clearing permit envelope encapsulates approximately 39.4% of the Violet Range PEC, the amount of actual disturbance proposed in this PEC represents less than 10% (BHP, 2020). Anecdotal assessment by consultants suggests that this PEC extends further than currently mapped (BHP, 2020) and therefore the proposed clearing is not considered likely to have a significant impact locally or regionally. BHP Billiton Nickel West Pty have committed to minimising clearing within the PEC, and to only clear areas critically required (BHP, 2020).

Very few weeds have been recorded during the surveys of the application area (BHP, 2020). Weeds have the potential to alter the biodiversity of an area, competing with native vegetation for available resources and making areas more fire prone. This can in turn lead to greater rates of infestation and further loss of biodiversity if the area is subject to repeated fires. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

The vegetation associations, fauna habitats and landform types present within the application area, are well represented in surrounding areas (BHP, 2020; GIS Database). The application area is unlikely to represent an area of higher biodiversity than surrounding areas, in either a local or regional context.

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

Methodology

BHP (2020)
CALM (2002)
DPaW (2014)
Western Botanical (2007)

GIS Database:
- IBRA Australia
- Pre-European Vegetation
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers
- Threatened and Priority Flora

- Threatened Fauna

(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 (2020) has collated the findings of previous fauna surveys of the application area and has:

- summarised the likely and recorded terrestrial fauna assemblage of the study area;
- described the broad terrestrial fauna habitats available within the study area and the significance of each; and
- assessed the likelihood of occurrence of conservation significant terrestrial fauna species based on known records and the availability of habitat.

Based on this report, the following thirteen fauna habitats have been recorded within the application area (Biota, 2020):

- Stony plains with acacia shrublands and halophytic shrublands (9,860 ha);
- Hills and ranges with acacia shrublands (9,458 ha);
- Sandplains and occasional dunes with spinifex grasslands (9,155 ha);
- Wash plains on hardpan with mulga shrublands (8,093 ha);
- Wash plains and sandy banks on hardpan, with mulga shrublands and wanderrie grasses or spinifex (5,463 ha);
- Sandy plains with acacia shrublands and wanderrie grasses (4,704 ha);
- Mesas, breakaways and stony plains with acacia or eucalypt woodlands and halophytic shrublands (4,263 ha);
- Low hills with eucalypt or acacia woodlands with halophytic undershrubs (1,603 ha);
- Low hills and stony plains with acacia shrublands (1,452 ha);
- Calcrete plains with acacia shrublands (1,007 ha);
- Salt lakes and fringing alluvial plains with halophytic shrublands (515 ha);
- Alluvial plains with halophytic shrublands (205 ha); and
- Calcrete plains with spinifex grasslands (21 ha).

Plains dominate the study area, with hardpan plains accounting for 42%, sandy plains for 24.8% and calcrete plains for 1.8%. Examination of aerial imagery and elevation information indicates that the most significant areas of elevation are in the Sir Samuel area, including Mount Sir Samuel itself; this encompasses the majority of the Hills and Ranges habitat occurring within the study area (22.4%). Breakaway habitat occurs at the edges of the study area, particularly in association with Mount Falconer, and accounts for 7.6% the habitat.

The majority of fauna habitat types recorded within the application area are representative of the region and are well represented in surrounding areas (BHP, 2020). The exception is the 'Calcrete plains with acacia shrublands' habitat type comprising Melaleuca and Cunyu land systems, which represents one of the rarest habitat types within the northeastern Goldfields (Biota, 2020). This habitat type once represented the preferred habitat of the Burrowing Bettong, which is extinct on the mainland but has been reintroduced at Matuwa (ex-Lorna Glen), where the species has again showed preference for this habitat type (Lohr 2019). However, none of the conservation significant vertebrate fauna potentially occurring within the application area have a strong preference for this habitat type (Biota, 2020). This habitat type represents a very small portion of the application area, containing only 21 hectares within a permit boundary of 59,210.66 hectares.

The proposed clearing is considered unlikely to significantly impact any of the mapped habitat types, nor significantly impact the continued use of the habitat areas by the suite of fauna (including conservation listed) known to utilise them in the area (BHP, 2020; Biota, 2020). No corridors for movement will be cleared and habitat fragmentation is not likely to increase as the immediate area retains almost 100% remnant vegetation, and clearing will be concentrated around existing disturbance and exploration areas (BHP, 2020).

No Threatened fauna has been recorded within the application area, however the Priority 4 Brush-tailed Mulgara has potential to utilise the habitats of the local and regional area (BHP, 2020). No threatened or priority listed fauna are expected to be significantly impacted by the proposed clearing (BHP, 2020).

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

Methodology

BHP (2020)
Biota (2020)
Lohr (2019)

GIS Database:
- Imagery
- Pre-European Vegetation
- Threatened Fauna

(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

There are no known records of Threatened flora within the application area (GIS Database). Flora surveys of the application area did not record any species of Threatened flora (BHP, 2020).

The vegetation associations within the application area are common and widespread within the region (BHP, 2020; GIS Database), and the vegetation proposed to be cleared is unlikely to be necessary for the continued existence of any species of Threatened (rare) flora.

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

Methodology

BHP (2020)

GIS Database:
- Pre-European Vegetation
- 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

There are no known Threatened Ecological Communities (TECs) located within or in close proximity to the application area (GIS Database).

Numerous flora and vegetation surveys of the local and regional area, including the application area, have not identified any TECs (BHP, 2020).

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

Methodology

BHP (2020)

GIS Database:
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers

(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 Murchison Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 99.7% of the pre-European vegetation still exists in the IBRA Murchison Bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation associations 18: Low woodland; mulga (*Acacia aneura*); 29: Low woodland; paperbark (*Melaleuca* sp.); 39: Shrublands; mulga scrub; 107: Hummock grasslands, shrub steppe; mulga and *Eucalyptus kingsmillii* over hard spinifex; 109: Hummock grasslands, shrub steppe; *Eucalyptus youngiana* over hard spinifex; 125: Bare areas; salt lakes; 202: Shrublands; mulga & *Acacia quadrimarginea* scrub; 204: Succulent steppe with open scrub; scattered mulga & *Acacia sclerosperma* over saltbush & bluebush; and 676: Succulent steppe; samphire (GIS Database). At least approximately 90% of the pre-European extent of each of these vegetation associations (with seven of the nine at approximately 99%) remains uncleared at both the state and bioregional level (Government of Western Australia, 2019).

Therefore, 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 DBCA managed lands
IBRA Bioregion – Murchison	28,044,823	28,044,823	~99	Least Concern	7.77
Beard vegetation associations – WA					
18	19,892,306	19,843,148	~99	Least Concern	6.62
29	7,903,991	7,898,973	~99	Least Concern	6.28
39	6,613,567	6,602,578	~99	Least Concern	12.02
107	2,815,387	2,813,996	~99	Least Concern	11.54
109	949,307	948,338	~99	Least Concern	11.37
125	3,485,785	3,146,487	~90	Least Concern	7.62
202	448,529	448,344	~99	Least Concern	22.91
204	199,475	198,735	~99	Least Concern	6.75
676	2,063,414	1,693,882	~95	Least Concern	14.69
Beard vegetation associations – Murchison Bioregion					
18	12,403,172	12,363,252	~99	Least Concern	4.96
29	2,956,382	2,955,695	~99	Least Concern	3.15
39	1,148,400	1,138,065	~99	Least Concern	3.56
107	2,792,383	2,790,992	~99	Least Concern	11.6
109	310,285	309,324	~99	Least Concern	24.44
125	711,484	710,255	~99	Least Concern	7.2
202	339,743	339,641	~99	Least Concern	21.25
204	185,602	184,861	~99	Least Concern	7.26
676	382,819	382,704	~99	Least Concern	2.31

* Government of Western Australia (2019)
** 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 (2019)

GIS Database:
- IBRA Australia
- Pre-European Vegetation

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

Comments

Proposal is at variance to this Principle

There are no permanent watercourses or wetlands within the area proposed to clear (Ref, Year; GIS Database). Numerous seasonal creek line passes through the application area and there are several mulga floodplains also present (GIS Database). Creek lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall (BHP, 2020; BoM, 2020).

Based on the above, the proposed clearing is at variance to this Principle. Potential impacts to vegetation growing in association with watercourses may be minimised by the implementation of a watercourse management condition.

Methodology BHP (2020)
BoM (2020)

GIS Database:
- Hydrography, Lakes
- 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

The application area lies within 32 land systems (GIS Database). These land systems have been mapped and described in technical bulletins produced by the former Department of Agriculture (now the Department of Primary Industries and Regional Development).

The Ararak land system is described as 'Broad plains with mantles of ironstone gravel supporting mulga shrublands with wanderrie grasses.' Drainage features on this generally flat country are poorly developed and soil erosion is rarely encountered (Pringle, 1994).

The Bevon land system consists of 'Irregular low ironstone hills with stony lower slopes supporting mulga shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Bullimore land system is described as 'Extensive sand plains supporting spinifex hummock grasslands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Brooking land system is described as 'Prominent ridges of banded iron formation supporting mulga shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Carnegie land system is described as 'Salt lakes with extensively fringing saline plains, dunes and sandy banks, supporting low halophytic shrublands and scattered tall acacia shrublands; lake beds are highly saline; gypsiferous and mainly unvegetated.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Cosmo land system is described as 'Broad plains with mantles of ironstone gravel supporting mulga shrublands with wanderrie grasses.' This land system is not generally susceptible to erosion, although it may occur in areas between calcrete platforms that receive substantial run-on. (Pringle, 1994).

The Cunyu land system is described as 'Calcrete platforms and intervening alluvial floors and minor areas of alluvial plains, including channels with acacia shrublands and minor halophytic shrublands.' This land system is not generally susceptible to erosion, although it may occur in areas between calcrete platforms that receive substantial run-on (Pringle, 1994).

The Darlot land system is described as 'Salt lakes and fringing saline alluvial plains, with extensive, regularly arranged sandy banks and numerous clay pans and swamps, supporting halophytic shrublands and spinifex and wanderrie grasslands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Desdemona land system is described as 'Extensive plains with deep sandy or loamy soils supporting mulga and wanderrie grasses.' Drainage features on this generally flat country are poorly developed and soil erosion is rarely encountered (Pringle, 1994).

The Duketon land system is described as 'Stony wash plains with mulga shrublands and wanderrie banks.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Felix land system is described as 'Plains with quartz mantles supporting mulga shrublands locally with wanderrie grasses.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Gransal land system is described as 'Stony plains and low rises based on granite supporting mainly halophytic shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Hamilton land system is described as 'Hardpan plains, stony plains and incised drainage lines supporting mulga shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Jundee land system is described as 'Hardpan plains with ironstone gravel mantles and occasional sandy banks supporting mulga shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Laverton land system is described as 'Greenstone hills and ridges with acacia shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Melaleuca land system is described as 'Sandy-surfaced plains and calcareous plains supporting spinifex or mulga wanderrie shrublands.' This land system is not generally susceptible to erosion, although it may occur in areas between calcrete platforms that receive substantial run-on (Pringle, 1994).

The Mileura land system is described as 'Saline and non-saline calcreted river plains, with clayey flood plains interrupted by raised calcrete platforms supporting diverse and very variable tall shrublands, mixed halophytic shrublands and shrubby grasslands.' This land system is not generally susceptible to erosion, although it may occur in areas between calcrete platforms that receive substantial run-on (Pringle, 1994).

The Monk land system is described as 'Hardpan plains with occasional sandy banks supporting mulga tall shrublands and wanderrie grasses.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Nubev land system is described as 'Gently undulating stony plains, minor limonitic low rises and drainage floors supporting mulga and halophytic shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Rainbow land system is described as 'Hardpan plains supporting mulga shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Ranch land system is described as 'Hardpan plains and prominent broad drainage tracts supporting dense mulga shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Sherwood land system consists of 'Breakaways, kaolinised foot slopes and extensive gently sloping plains on granite supporting mulga shrublands and minor halophytic shrublands.' This land system may be susceptible to erosion if vegetation cover is removed (Pringle, 1994).

The Sunrise land system is described as 'Stony plains supporting mulga shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Teutonic land system is described as 'Hills and stony plains on acid volcanic rocks supporting acacia shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Tiger land system is described as 'Gravelly hardpan plains and sandy banks with mulga shrublands and wanderrie grasses.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Violet land system is described as 'Gently undulating gravelly plains on greenstone, laterite and hardpan, with low stony rises and minor saline plains; supporting groved mulga and bowgada shrublands and patchy halophytic shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Waguin land system is described as 'Sandplains and stripped granite or laterite surfaces with low fringing breakaways and lower plains; supports bowgada and mulga shrublands with wanderrie grasses and minor mixed halophytes.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Wiluna land system is described as 'Low greenstone hills with occasional lateritic breakaways and broad stony slopes, lower saline stony plains and broad drainage tracts; supporting sparse mulga and other acacia shrublands with patches of halophytic shrubs.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Windarra land system is described as 'Gently undulating stony plains and low rises with quartz mantles on granite, supporting acacia-eremophila shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Wilson land system is described as 'Large creeks with extensive distributary fans, supporting mulga and halophytic shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Wyarri land system is described as 'Granite domes, hills and tor fields with gritty-surfaced fringing plains supporting mulga and granite wattle shrublands.' This land system is not generally susceptible to erosion (Pringle, 1994).

The Yanganoo land system is described as 'Almost flat hardpan wash plains, with or without small wanderrie banks and weak groving; supporting mulga shrublands and wanderrie grasses on banks.' This land system is not generally susceptible to erosion (Pringle, 1994).

The proposed clearing of up to 6,000 hectares of native vegetation within a boundary of approximately 59,210.66 hectares, for the purposes of mineral exploration, mineral production and associated activities may cause appreciable land degradation due to the large size of clearing. Potential impacts may be minimised by the implementation of staged clearing condition. BHP Billiton Nickel West Pty Ltd have advised that the proposed clearing will be staged, with clearing areas minimised and managed in accordance with mine planning, which includes surface water management measures to ensure no surface water impacts (BHP, 2020). Temporarily cleared areas will be progressively revegetated and management measures for dust suppression (BHP, 2020).

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

Methodology Pringle (1994)

GIS Database:

- Landsystem Rangelands
- Soils, Statewide

(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 may be at variance to this Principle

There are no conservation areas within the application area, however the Class A Wanjarri Nature Reserve is adjacent to the application area. BHP Billiton (2020) have advised that a vegetated buffer of remnant vegetation is retained between Mt Keith and the Reserve. Surface water flows, dust and other potential off-site impacts are managed under BHP's operational controls and are considered not likely to directly nor indirectly impact of the Reserve and its conservation or visitor values (BHP, 2020). No negative impacts as a result of the current mining operations have been recorded to date (BHP, 2020).

Based on the above, the proposed clearing may be at variance to this Principle. Potential impacts to this nature reserve may be managed through commitments made in the Mining Proposal, regulated under the *Mining Act, 1978*, and Ministerial Statement 1087. Ministerial Statement 1087 was issued on 28 December 2018, enabling the Northern Operations to be implemented. Mineral production was approved on 6 February 2019 by the Department of Mines, Industry Regulation and Safety (DMIRS) in accordance with Mining Proposal (Reg ID 76846).

Monitoring of flora and vegetation at Wanjarri Nature Reserve is also undertaken under agreement with the Department of Biodiversity, Conservation and Attractions. Further potential impacts to the Wanjarri Nature Reserve may be minimised by the implementation of a weed management condition, staged clearing condition and rehabilitation/revegetation condition.

Methodology

BHP (2020)

GIS Database:
- DPaW 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 Public Drinking Water Source Areas within or in close proximity to the application area (BHP, 2020; GIS Database). There are no permanent watercourses or wetlands within the area proposed to clear (GIS Database). Creek lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall. The proposed clearing is unlikely to result in significant changes to surface water flows.

The proposed clearing is unlikely to cause deterioration in the quality of underground water.

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

Methodology

BHP (2020)

GIS Database:
- Hydrography, Linear
- Public Drinking Water Source Areas

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

Comments

Proposal is not likely to be at variance to this Principle

The climate of the region is arid, with an average rainfall of approximately 259.3 millimetres per year and total evaporation rate of approximately 3200 millimetres per year (BOM, 2020; Pringle et al., 1994). There are no permanent water courses or waterbodies within the application area (GIS Database). Remnant tropical cyclones from the north-west can occasionally bring heavy rains to the region in the summer months (Pringle et al., 1994). Whilst these large rainfall events may result in the flooding of the area, the proposed clearing is not likely to lead to an increase in incidence or intensity of flooding in the region.

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

Methodology

BoM (2020)
Pringle et al. (1994)

GIS Database:
- Hydrographic Catchments - Catchments

- Hydrography, linear

Planning Instrument, Native Title, previous EPA decision or other matter.

Comments

The clearing permit application was advertised on 11 May 2020 by the Department of Mines, Industry Regulation and Safety (DMIRS), inviting submissions from the public. No submissions were received in relation to this application.

There is one native title claim over the area under application (WC2011/007) (DPLH, 2020). This claim has been determined by the Federal Court on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are numerous registered Aboriginal Sites of Significance within the application area (DPLH, 2020). 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 Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

Methodology DPLH (2020)

4. References

BHP (2020) HP Billiton Nickel West, Northern Operations, Strategic Native Vegetation Clearing Permit (NVCP) Application, Supporting Information, April 2020. Unpublished report prepared by BHP Billiton Nickel West, April, 2020.

Biota (2020) E283 BHP Nickel West Northern Operations, Strategic Fauna Assessment, August 2020. Unpublished report prepared for BHP Billiton Nickel West Pty Ltd by Biota Environmental Sciences, August, 2020.

BoM (2020) Bureau of Meteorology Website – Climate Data Online, Leinster. Bureau of Meteorology. http://www.bom.gov.au/climate/data/ (Accessed 19 October 2020).

CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.

DPaW (2014) Priority Ecological Communities for Western Australia Version 21, Species and Communities Branch, Department of Parks and Wildlife, May 2014. https://www.dpaw.wa.gov.au/images/documents/plants-animals/threatened-species/tecs/Priority_ecological_community_list_20_May2014.pdf (Accessed 19 October 2020).

DPLH (2020) Aboriginal Heritage Inquiry System. Department of Planning, Lands and Heritage. http://maps.daa.wa.gov.au/AHIS/ (Accessed 19 October 2020).

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.

Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions, Perth. https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Lohr, C. (2019). Twelve years of rangelands restoration: reintroduction of native mammals to Matuwa (ex-Lorna Glen pastoral lease): SPP 2012-024. Department of Biodiversity, Conservation and Attractions, Perth.

Pringle, H J. (1994), Pastoral resources and their management in the north-eastern goldfields, Western Australia. Department of Agriculture and Food, Western Australia, Perth. Report 22/94.

Pringle, H.J.R., Van Vreeswyk, A.M.E., Gillian, S.A. (1994) An Inventory and Condition Survey of Rangelands in the north-eastern Goldfields, Western Australia. Department of Agriculture, Western Australia.

Western Botanical (2007). Flora and Vegetation Assessment of Clearing Permit Application Area at Leinster Nickel Operation, October 2007. Unpublished report prepared for BHP Billiton Nickel West Pty Ltd by Western Botanical, 2007.

5. Glossary

Acronyms:

BC Act	*Biodiversity Conservation Act 2016,* Western Australia
BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DAWE	Department of Agriculture, Water and the Environment, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DBCA and DWER)

DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DoE	Department of the Environment, Australian Government (now DAWE)
DoEE	Department of the Environment and Energy (now DAWE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DAWE)
DWER	Department of Water and Environmental Regulation, Western Australia
EP Act	*Environmental Protection Act 1986*, Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Federal Act)
GIS	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	*Rights in Water and Irrigation Act 1914*, Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

T **Threatened species:**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**
Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**
Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**
Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species:

EX **Extinct species**

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW **Extinct in the wild species**

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species:

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI **Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD **Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS **Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P **Priority species:**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 **Priority One - Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 **Priority Two - Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 **Priority Three - Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations 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 locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

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 are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.