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

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.:	7176/1
Permit type:	Purpose Permit

1.2. Proponent details

Proponent's name:	**Hanson Construction Materials Pty Ltd**

1.3. Property details

Property:	Mining Lease 70/1316
Local Government Area:	City of Wanneroo
Colloquial name:	McKinley Road Sand Mine

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
600		Mechanical Removal	Sand Mining

1.5. Decision on application

Decision on Permit Application:	Grant
Decision Date:	18 May 2017

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

Beard vegetation associations have been mapped for the whole of Western Australia and are useful to look at vegetation in a regional context. Two Beard vegetation associations have been mapped within the application area:

Beard vegetation association 6: Medium woodland; tuart and jarrah; and

Beard vegetation association 949: Low woodland; banksia (GIS Database).

A survey was conducted over a small portion of the application area in August 2014 by PVG Environmental (PVG). An area of approximately 550 hectares was surveyed by PVG, using a total of 15 quadrats to identify a representative sample of the vegetation present. The unsurveyed areas consist of pine plantation with areas of regrowth native vegetation of various quality, condition and age (DPaW, 2017a).

The entire application area sits within the Gnangara pine plantation which was established during the 1930's. The surveyed parts of the application area have been progressively cleared of pines between 2006 and 2013. PGV (2014) described the history of the surveyed parts of the pine plantation, as well as the structure of the current day vegetation below:

<u>Block 1 (Cleared 2011)</u>
This block is located at the northern end of the application area and is extensive at around 350 hectares of pines cleared in 2011. The pattern of regeneration within this large block was very uniform and predominantly consisted of low shrubs and herbs. *Acacia pulchella* was particularly dominant with cover percentages up to 60% in places and a height of one meter. Other common native species included *Xanthorrhoea preissii, Stirlingia latifolia, Jacksonia densiflora* and *Anigozanthos humilis.* One stand of *Jacksonia sternbergiana* Tall Shrubland up to 2 meters high occurred within this block. The Shrubland contained several native shrub and herbaceous species as well as common weed species. Very few trees occur in the cleared pine plantation with only occasional scattered Jarrah trees observed. Several young pine seedlings were observed in the area previously cleared but not in high numbers.

<u>Block 2 (Cleared 2007)</u>
Block 2 is a large block of around 100 hectares in the centre of the application area that was cleared in 2007. The portion of this block east of the well-formed limestone track Lisbon Road was planted prior to 1963 and therefore has a minimum age of pine plantation of 44 years. The portion of this block west of Lisbon Road was planted between 1965 and 1974 and therefore has an age of 33-42 for the pine plantation when cleared. The structure of the regeneration in this block is very different from the adjoining block 3 even though the age of regeneration is only one year apart. The dominant vegetation on the block is that of a woodland of Marri (*Corymbia calophylla*) trees over an open low understorey dominated by *Gastrolobium capitatum* and with other native species such as *Acacia pulchella, Xanthorrhoea preissii, Gompholobium tomentosum, Hibbertia hypericoides* and *Hardenbergia comptoniana* common. The Marri trees are tall, up to 8-12 meters high, but with relatively small trunk sizes making ageing of the trees difficult. Aerial photography for the site from 1974 indicates that the pine plantation was densely planted in a grid pattern and does not show patches of native vegetation or individual trees remaining at the time of planting the pines. The height of the trees suggests the Marri trees were present in the pine plantation

at the time of clearing the pines. A variety of ages of Marri plants occurred on the block. In the vicinity of tall Marri trees was also found new seedlings and young saplings up to 3 meters high. The age structure of the Marri plants indicates regeneration following clearing of the Marri trees. A small stand of Tuart trees (*Eucalyptus gomphocephala*) up to 12 meters high occurred in one part of this block. Several pine seedlings 3-4 meters were regenerating among the Tuarts. The understorey was similar to that under the Marri woodland vegetation. The regeneration in the areas of this block without Marri or Tuart trees was a Low Open Heath with *Gastrolobium capitatum* the dominant species and a mix of other natives, none of which were particularly abundant. Common weed species included Pigface, Ursinia, Lupins and Clover (*Trifolium* sp.).

Block 3 (Cleared 2008)
Block 3 is a small area of around 20 hectares located in the centre of the application area adjoining Old Yanchep Road and the unmade Tavira Road track. The block was planted prior to 1963 and cleared in 2008 giving an age of pine plantation of at least 45 years. The structure of the regeneration was very uniform throughout the block with scattered small Jarrah trees up to 4 meters high over an open heath understorey dominated by sparse native shrubs such as *Stirlingia latifolia, Gastrolobium capitatum* and *Daviesia triflora* and abundant weed species including Lupins, Veldtgrass and Pigface (*Carpobrotus edulis*). A stand of *Jacksonia furcellata* Tall Shrubland up to 3 meters high occurred to the south of the firebreak running through the centre of the block. The understorey was similar in composition of native and weeds species as the scattered Jarrah regeneration seen in Block 1.

Block 4 (Cleared 2006)
Block 4 was located towards the southern end of the application area east of Lisbon Road. The portion of the block cleared (of pines) in 2006 within the study area is approximately 75 hectares. The dominant vegetation type regenerating in this block is a Low Open Woodland of Marri 6-10 meters high over a weedy understorey with Lupins and Veldtgrass very common. Scattered shrubs of *Jacksonia sternbergiana, Xanthorrhoea preissii* and *Macrozamia fraseri* occur in the understorey. Several large dense stands of *Jacksonia furcellata* up to 3 meters high mixed with *Acacia saligna* and *Acacia pulchella* occur on the block. The *Jacksonia* stands are very weedy with Lupins, Flatweed, Ursinia and Pigface common.

Block 5 (Cleared 2013)
The youngest block cleared was located at the southern end of the application area straddling Wesco Road. Most of the area is very open as would be expected from a site cleared of pines only around one year previously. Most of the block is scattered with native shrubs such as *Jacksonia furcellata* regrowing at low densities and a high density of herbaceous weed species covering the ground, particularly Clover (*Trifolium* sp.) and Flat Weed (*Hypochaeris glabra*). In places, scattered young Marri (*Corymbia calophylla*) trees occur up to 8 meters high over a mix of native and weedy understorey shrubs and herbs. The height of the Marri trees and their thin stature indicates that the trees would have been present within the pine plantation at the time of clearing. Small stands of Jarrah trees up to 6m high also occur on the lower eastern part of this block. The age of the Jarrah trees and the *Xanthorrhoea preissii* and Zamia Palm (*Macrozamia fraseri*) shrubs (1-1.2 meters) also indicates these species have been growing in the pine plantation for many years prior to clearing of the pines. The native vegetation adjoining the eastern boundary of this cleared block contains Banksia woodland with scattered Sheoak (*Allocasuarina fraseriana*), Jarrah and Marri in very good condition. No regenerating Banksia seedlings or mature trees were observed in Block 5. Several young pine seedlings were observed in the area previously cleared but not in high numbers.

Several native species were recorded in all five blocks during the 2014 survey and included *Macrozamia fraseri*, *Xanthorrhoea preissii, Acacia pulchella*, *Gompholobium tomentosum*, *Hardenbergia comptoniana* and *Stirlingia latifolia* (PVG, 2014). Weed species that occurred on all five blocks included *Gladiolus caryophyllaceus*, *Carpobrotus edulis*, *Ursinia anthemoides* and *Pelargonium capitatum.*

Clearing Description

McKinley Road Project.
Hanson Construction Materials Pty Ltd applied to clear up to 2,311.86 hectares of native vegetation within a total boundary of approximately 2,311.86 hectares, for the purposes of sand mining. However, only 600 hectares of clearing has been approved .The project is located approximately 12 kilometres north of Wanneroo, in the City of Wanneroo.

Vegetation Condition

Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994);

To:

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

Comment

The vegetation condition was derived from a flora and vegetation survey conducted by PGV (2014) over parts of the application area. The survey consisted of a reconnaissance site inspection, where 15 quadrats (20 metres by 20 metres in size), located within five blocks of previously cleared/thinned pine plantations were sampled. The survey was undertaken to provide information on the patterns of natural regeneration of the previously cleared pine plantation (RPS, 2016a).

The sections of the application area surveyed were comprised of pine plantations until 2006 to 2012 when the pine trees were cleared and harvested by the Forest Products Commission (PGV, 2014). Given the history of the application area (cleared pine plantation) a desktop component was not included in the survey by PGV and would likely offer little value, as the vegetation is not representative of the surrounding natural environment.

The proponent will not be undertaking any clearing of existing remnant bushland complexes, as the proposed sand mining will occur in areas of the Gnangara-Moore River State Forest pine plantation after clearing of remaining pine trees is undertaken by the Forest Products Commission (RPS, 2016a).

It is likely that the proponent will have to clear any regrowth native vegetation that establishes following the clearing of remaining pines by FPC. The potential for regrowth is heightened by the fact FPC will undertake clearing of large portions of the application area (e.g. 100 hectares at any one time) however, the proponent will limit sand mining activities to approximately 30 hectares at any one time over the life of the project (RPS, 2016a).

There are 22,000 hectares of pine plantations within the Gnangara system, 5,000 hectares of which has been harvested to date as part of the Gnangara Sustainability Strategy (GSS). The GSS is a joint project between the Department of Water (DoW), Department of Agriculture and Food WA (DAFWA), Department of Parks and Wildlife (DPaW), Department for Planning, FPC, Water Corporation and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (RPS, 2016a). The GSS intended to provide a framework for a whole of government approach for land use and water planning issues associated with the Gnangara groundwater system (RPS, 2016a).

Three pine plantations are to be harvested by FPC by 2028, with no new plantations to be established (RPS, 2016a, RPS, 2016b).

Sand mining operations are to be conducted in stages, with an anticipated total mine life of approximately 50 years. The indicative commencement area is estimated to be 188.31 hectares, followed by staged planning for the next 10 years, then future stages from year 10 onwards (RPS, 2016a). The area originally applied to be cleared was 2,311.86 hectares, with a requested permit duration of 42 years. The clearing was requested on an Area Permit. A 20 year Purpose permit was considered more appropriate given the staged nature of operations and that the environmental values of the application area are likely to change considerably over an extended period of time. Further to this, within the approved mining proposal the proponent has committed to only mining 30 hectares at any one time over the life of the project (RPS, 2016a). In consideration of Mining Act approvals and future changes in environmental values over time, only 600 hectares is recommended for approval.

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 application area occurs within the Perth subregion (SWA2) of the Swan Coastal Plain Interim Biogeographical Regionalisation of Australia (GIS Database). The Perth subregion is comprised of colluvial and Aeolian sands, alluvial river flats, and coastal limestone. It is characterised by Heath and/or Tuart woodlands on limestone, Banksia and Jarrah- Banksia woodlands on Quaternary marine dunes of various ages, and Marri on colluvial and alluvials (CALM, 2002).

The application area is entirely located within the Gnangara-Moore River State Forest, which is currently used for pine plantation (Appeals Convenor, 2015; RPS, 2016a; RPS 2016b). The pine plantation has been cleared progressively over an extended period, although there are considerable numbers of pine trees that remain. The remaining/existing pine plantation will be cleared by the Forest Products Commission (FPC) prior to the commencement of mining activities proposed by the proponent. It has been estimated by the proponent that approximately 70% of the clearing permit boundary area has been cleared of pine trees (Appeals Convenor, 2015).

A survey was conducted over a small portion of the application area in August 2014 by PVG Environmental (PVG). The unsurveyed areas consist of pine plantation with areas of regrowth native vegetation of various quality, condition and age (DPaW, 2017a).

The clearing permit boundary area has considered all sensitive features and was designed to remove as many intersections with Environmentally Sensitive Areas (ESAs), Wetlands, Threatened Ecological Communities (TECs), Priority Ecological Communities (PECs) and Bush Forever sites as possible. Three sensitive features remain within the boundary area. One is providing a buffer to a TEC (Limestone ridges - SCP26a) and a PEC (Northern Spearwood shrublands and woodlands – SCP24), the other is the buffer zone of an aquatic root mat community (a TEC), which has an extent of 0.805 hectares and is located at least 3 kilometres from the nearest section of the application area.

The proposed clearing will allow access to a sand resource located within the Gnangara Pine Plantation (PGV, 2014). Native vegetation has returned/regenerated, and there are now a number of flora species located within the application area, in addition to the once Pine (*Pinus pinaster*) dominated structure. Planting of the areas of pine plantation that were surveyed by PGV in 2014, commenced around 1963 and continued until sometime in 1974 (PGV, 2104). The area was then progressively cleared of pines between 2006 and 2013 (PGV, 2014). It must be noted that when establishing the Gnangara Pine Plantation, native vegetation was cleared within other parts of the application area as early as the 1930's. Clearing and thinning activities have since followed and continue.

Sand mining operations are to be conducted in stages. The indicative commencement area is estimated to be 188.31 ha, followed by staged planning for the next 10 years, then future stages from year 10-50 (RPS, 2016a). The clearing permit boundary area is 2,311.86 hectares, however the proponent has committed to only mining 30 hectares at any one time over the life of the project (RPS, 2016a). Such a commitment allows for the establishment of additional areas of regrowth vegetation, ensures progressive rehabilitation can take place and offers protection for future environmental values. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition that aligns with existing mining commitments and limits the clearing of native vegetation to areas that are actively mined.

Based on aerial imagery and photographs provided by PGV (2014), the condition of the vegetation within the the application area ranges from 'Good' to 'Completely Degraded' (Keighery, 1994). PGV (2014) conducted a survey over parts of the application area and recorded a total of 92 flora taxa, of which 75 were native and 17 were introduced species. However, it must be noted that large parts of the application area were not surveyed. Various sites where native vegetation had regenerated within the application area were notable for the complete lack of Banksia species and Sheoak (PGV, 2014). No vegetation units within the application area were considered to be of high conservation significance and habitat diversity was low (PGV, 2014) despite being located within the Gnangara-Moore River State Forest (GIS Database).

One Priority 4 flora species, *Jacksonia sericea*, was recorded in low numbers within a section of the application area. This species appears to be a disturbance opportunist, and is often found in disturbed sandy sites (PGV, 2014) and is known to occur in higher numbers in the local area (Western Australian Herbarium, 1998-). The proposed clearing of a few individuals of *Jacksonia sericea* is unlikely to impact the conservation significance of this species.

No Threatened flora, TECs or PECs have been recorded within the application area (DPaW, 2017a; GIS Database) and none were noted during a reconnaissance survey (PGV, 2014). However, as stated above, the application area is situated within the buffer of two TECs and two occurrences of one PEC (GIS Database). Significant impacts to nearby TECs and PECs are not anticipated, given the amount of existing disturbance within these buffer areas, and that the vegetation under application offers limited value as a buffer.

The application area is situated within a known dieback risk zone (GIS Database) and weed species have established throughout. While the application area lacks dieback indicator species, it is not possible to detect whether dieback is present or absent, and the area is considered un-interpretable (RPS, 2016a). This being considered, the proponent has committed to manage the area and implement hygiene guidelines in order to reduce the risk of dieback introduction or spread (RPS, 2016a). Weeds and dieback have the potential to significantly change the dynamics of a natural ecosystem and lower the biodiversity of an area. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed and dieback management condition.

The proponent has committed to a number of management measures, including (RPS, 2016a):

- limiting clearing to areas of cleared pine plantation (no bushland complexes will be cleared);
- maintaining adequate buffers to all areas of remnant vegetation in surrounding bush forever sites and nearby wetlands;
- restricting vehicles to designated access roads and imposing speed limits on roads;
- removing cleared pine tree stumps and native vegetation in stages to assist in stabilising the soil;
- rehabilitating areas of potential fauna habitat following the completion of operations; and
- implementing management measures to reduce indirect disturbance of surrounding fauna habitat.

The condition of the vegetation proposed to be cleared has been significantly altered by the establishment and clearing of plantation pines (GIS Database). DPaW (2017b) did not raise any specific environmental concerns with the proposed clearing and has no objection to the proposed clearing of regrowth native vegetation. Given the altered nature of the vegetation present within the application area, the vegetation to be cleared is not considered to comprise a high level of biodiversity.

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

Methodology

Appeals Convenor (2015)
CALM (2002)
DPaW (2017a)
DPaW (2017b)
Keighery (1994)
PGV (2014)
RPS (2016a)
RPS (2016b)
Western Australian Herbarium (1998-)

GIS Database:
- Dieback Occurance
- IBRA Australia
- Imagery
- Pre-European vegetation
- Threatened Ecological Sites Buffered

(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 may be at variance to this Principle

No fauna surveys have been conducted over the application area, although evidence of Carnaby’s cockatoo’s (*Calyptorhynchus latirostris* – VU) foraging on Marri nuts was observed within some parts of the application area during a reconnaissance site inspection (PGV, 2014). Compared to adjacent areas of native vegetation in the local area, the structure of the vegetation present within the application area is greatly altered and reduced species richness is a feature (PGV, 2014).

The condition of the vegetation proposed to be cleared ranges in condition from 'Good' to 'Completely Degraded,' (Keighery, 1994) and has been significantly altered by the establishment and subsequent clearing of a pine plantation (GIS Database).

In addition to the Carnaby's cockatoo, available databases show there to be a further five Threatened fauna species, eleven migratory bird species protected under international agreement (IA), one specially protected bird species, two Priority 3 listed fauna species and six Priority 4 listed species known from the local area (10 kilometre radius) (DPaW, 2017b). The migratory bird species are unlikely to be dependent on the remaining pine trees and regrowth native vegetation within the application area and would likely prefer to frequent nearby wetland areas.

The Threatened fauna species mentioned above consist of the Woylie or Brush-tailed Bettong *(Bettongia penicillata subsp. ogilbyi – T), Curlew Sandpiper (Calidris ferruginea – T), Great Knot (Calidris tenuirostris - T), Chuditch, Western Quoll (Dasyurus geoffroii - T), (Black-flanked Rock-wallaby (Petrogale lateralis subsp. lateralis – T).*

Woylies require dense myrtaceous shrubland or mallee health and/or tall eucalypt forest woodland to persist. Such habitat is absent from the application area (Yeatman and Groom, 2012). Curlew Sandpiper and Great Knot are migratory species that prefer intertidal mudflats, estuaries, lakes and other water bodies as refuge. (DoEE, 2017a).

Chuditch are known from a range of habitats including forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest (DEC, 2012*).* Chuditch require adequate numbers of suitable den and refuge sites to survive (DEC, 2012). It is unlikely that the vegetation structure of the application area provides the essential habitat requirements for this species.

The Black-flanked rock-wallaby record was collected as a fossil (skull and bones) (DPaW, 2017b). This species is no longer known from the Swan Coastal Plain and can only be found in the Avon Valley within sanctuary areas. This species prefers to shelter during the day under deep shade in rocky areas such as caves, cliffs, screes and rockpiles, and emerge at dusk to feed on grasses, forbs, shrubs and occasionally seeds and fruits (TSSC, 2016). Such areas are not present within the application area.

The Priority fauna species recorded from the area include a cricket (*Austrosaga spinifer* – P3), Bee (*Hylaeus globuliferus* – P3), Southern Brown Bandicoot (*Isoodon obesulus* – P4), Quenda (*Isoodon obesulus* subsp. *fusciventer* – P4), Western Brush Wallaby (*Macropus Irma* – P4), Blue-billed Duck (*Oxyura australis* – P4) and Graceful Sunmoth (*Synemon gratiosa* – P4). The proposed clearing of pine trees and regrowth native vegetation is not expected to impact on the conservation status of these Priority fauna species.

The proponent has committed to a number of management measures in order to reduce potential impacts to local fauna species, including (RPS, 2016a):

- limiting clearing to areas of cleared pine plantation (no bushland complexes will be cleared);
- maintaining adequate buffers to all areas of remnant vegetation in surrounding bush forever sites and nearby wetlands;
- restricting vehicles to designated access roads and imposing speed limits on roads;
- removing cleared pine tree stumps and native vegetation in stages to assist in stabilising the soil;
- rehabilitating areas of potential fauna habitat following the completion of operations; and
- implementing management measures to reduce indirect disturbance of surrounding fauna habitat.

The proposed clearing activities have been planned so that areas of remnant vegetation will not be removed (RPS, 2016a). The areas to be cleared have been limited to areas where pine has been cleared, or is planned to be cleared in the future. It is unlikely that the existing regrowth vegetation under application is providing significant habitat for the majority of local fauna species (including species of conservation significance). Adjoining areas of native vegetation offer better value habitat and many such areas contain Banksia woodland, Jarrah and Marri in very good condition (PGV, 2014). Based on the current structure of the vegetation that has regenerated within the surveyed parts of the application area, PGV (2014) concluded that no areas of cleared pine plantation will naturally regenerate into banksia woodland. In addition to this, DPaW (2017b) did not raise any specific environmental concerns with the proposed clearing and have no objection to the clearing of regrowth native vegetation within the State Forest.

While the native regrowth vegetation present within the application area is not likely to currently offer significant foraging habitat for Carnaby's cockatoo's, these birds are also known to feed on pine nuts. Carnaby's feed mainly on seeds and occasionally on other items such as nectar, fruit and insect larvae. Carnaby's have learned to use introduced plant species, such as pine trees, which are now important resources in areas that have been largely cleared of native vegetation (DoEE, 2017b; DPaW, 2013). While introduced plant species such as pines are not considered native vegetation and are not offered any statutory protection under the *Environmental Protection Act 1986*, it has been demonstrated that pine plantations provide an important food source for Carnaby's (DoEE, 2017b; DPaW, 2013). Historically plantations have been managed on a rotation basis resulting in a consistent food supply over the landscape and over years. The removal process for pines in the Gnangara, Pinjar and Yanchep plantations is underway (staged removal between 2004 and 2031) with no stated plan to re-establish the pine plantations. Not providing an alternative food resource following removal of pines is likely to have a significant impact on the food resources available to Carnaby's in the Perth region (DoEE, 2017b; DPaW, 2013). The long-term survival of a robust population of Carnaby's depends on the availability of suitable woodland breeding habitat and tree hollows, and foraging habitat capable of providing enough food to sustain the population (DPaW, 2013).

The removal, without adequate replacement, of extensive areas of commercial pine plantations on the Swan Coastal Plain, and elsewhere, on which major flocks now depend for food, has the potential to negatively impact on Carnaby's (DPaW, 2013). To reduce potential impacts to Carnaby's foraging habitat, the proponent has committed to undertake rehabilitation activities. Following sand extraction, the application area will be rehabilitated using low water use native vegetation comprised of species native to the Swan Coastal Plan 2 (SWA2) IBRA subregion, that facilitates ease of ongoing management and provides benefits to the conservation of Carnaby's (RPS, 2016b). The proponent will utilise its best practise restoration knowledge, acquired from over 20 years of Banksia woodland restoration research conducted in partnership with Kings Park Botanical Garden (KPBG) to rehabilitate cleared area, unless planning instruments (i.e. the Green Growth Plan) direct alternative actions (RPS, 2016a, RPS, 2016b).

According to current database information, the majority of the application area is located within the buffer area of a number of confirmed roost sites for Carnaby's cockatoo's (GIS Database). The northern half falls within a confirmed breeding area (GIS Database). The buffers on a cockatoo roost are based on the foraging radius of the cockatoos as the cockatoos usually forage/feed within 6 kilometres of the roost site. If the quantity and quality of foraging habitat in the vicinity of a roost is significantly reduced, then the roost may no longer be viable to support that particular flock of cockatoos, as there may not be adequate food resources available to them (DPaW, 2014). Given that evidence of Carnaby's foraging within the application area was observed (PGV, 2014), it is reasonable to suggest that the existing regrowth vegetation does offer some value. Based on the current quality of the vegetation proposed to cleared, it is questionable as to whether its removal would have a major impact on local Carnaby's food resources. However, surveys of Carnaby's populations and their feeding and roosting habits show that the Northern Region of the Swan Coastal Plain (SCP) appears to be an important area throughout the feeding and roosting season (Shah, 2006). The cumulative loss of areas currently or potentially used as feeding habitat may result in adverse impacts to Carnaby's (DPaW, 2013).

It should be noted that the proposed sand mining and clearing activities are to occur over a long period of time. It is possible that the fauna habitat values of the area may improve where a delay exists between clearing of pines and the commencement of mining. Regrowth native vegetation may establish in cleared areas and areas scheduled for future mining that remain uncleared for long periods. Given this uncertainty, management and mitigation measures are necessary. The proponent has committed to a staged approach to mining, where no more than 30 hectares will be mined at any one time over the life of the project (RPS, 2016a). Such a commitment allows for the establishment of additional areas of regrowth vegetation, ensures progressive rehabilitation can take place and offers protection for future environmental values, including the ongoing availability of fauna habitat within the application area. Potential impacts to local fauna species as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition that aligns with existing mining commitments and limits the clearing of native vegetation to areas that are actively mined.

The proponent is proposing to construct Western Australia's first production seed farm for Banksia species and intends to develop seed farms that will secure Banksia seed for long-term use in the Gnangara Pine Plantation for restoration after mining (RPS, 2016a, RPS, 2016b). Where mining occurs in feeding habitat and is followed by revegetation, this could be considered only a short to medium term loss of habitat. Depending on the species involved and the quality of establishment, revegetation of feeding habitat can begin providing food resources for black cockatoos in eight years (DPaW, 2013).

The proponent originally applied for an Area permit to clear a 2,311.86 hectare area within a permit boundary of the same area and requested a permit duration of 42 years. The proponent does not yet know exactly when the majority of the applied area is to be cleared. This creates uncertainty as to what environmental values will be lost when clearing actually takes place. Given that mining operations are to be conducted in stages, the anticipated total mine life is 50 years and additional areas of regrowth native vegetation may establish over time, an Area permit was not considered appropriate.

Within the approved mining proposal the proponent has committed to only mining 30 hectares at any one time over the life of the project (RPS, 2016a). In consideration of Mining Act approvals and future changes in environmental values over time, a 20 year Purpose permit that allows for the clearing of up to 600 hectares of native vegetation within a permit boundary of 2,311.86 hectares has been recommended for approval.

The proposed clearing of up to 600 hectares of native vegetation within a permit boundary of approximately 2,311.86 hectares, that has been significantly modified and impacted by pine plantation establishment and clearing, is not likely to contain habitat that is necessary for the continued existence of any local fauna species, including species of conservation significance. Provided management measures and rehabilitation activities are conducted (as committed to in the approved Mining Proposal), significant impacts to local fauna species (including species of conservation significance) are not anticipated to result from the proposed clearing. Given that mined areas will be progressively rehabilitated and Banksia woodland habitat is to be established as a result, impacts to Carnaby's cockatoo's will likely be reduced as new food resources become available over the life of the project.

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

Methodology

DEC (2012)
DPaW (2013)
DPaW (2014)
DPaW (2017b)
DoEE (2017a)
DoEE (2017b)
EPA (2016)
Keighery (1994)
PGV (2014)
RPS (2016a)
RPS (2016b)
Shah (2006)
TSSC (2016)
Yeatman and Groom (2012)

GIS Database:
- Imagery
- 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

According to available databases, two Threatened flora species (*Marianthus paralius* and *Calectasia cyanea*) have been recorded within the local area (10 kilometre radius) (DPaW, 2017a; GIS Database).

Marianthus paralius is often associated with areas of dense vegetation and limestone ridges/cliffs (Western Australian Herbarium, 1998-). Such areas are absent from the application area. *Calectasia cyanea* can occur on white sand, grey or yellow sand, gravel, however is usually associated with limestone and/or ridges (Western Australian Herbarium, 1998-). This species is a clump forming woody perennial herb with a distinctive blue/purple star-shaped flower (Western Australian Herbarium, 1998-). The survey was conducted during the flowering period for this species, and if present within the application area, it would have likely been identified.

No Threatened flora species were recorded during a reconnaissance site inspection of the application area, where a total of 15 quadrats were surveyed (20 metres by 20 metres in size) within five pine plantation blocks. Although the reconnaissance site inspection did not cover large sections of the application area, given that the vegetation to be cleared is not representative of a typical vegetative structure (i.e. pine plantation with regrowth native vegetation), the survey work undertaken is considered acceptable in assessing the potential impacts to Threatened flora in this setting.

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

Methodology

DPaW (2017a)
Western Australian Herbarium (1998-)

GIS Database
- Threatened 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

The application area lies within the buffer of two Threatened Ecological Communities (TECs); The Aquatic Root Mat Community Number 1 of Caves of the Swan Coastal Plain (Caves SCP01) and *Melaleuca huegelii* - *Melaleuca systena* shrublands on limestone ridges (SCP 26a).

The Caves SCP01 community itself is located more than 3 kilometres from the north west corner of the application area and has a mapped extent of only 0.805 hectares (GIS Database). There are multiple disturbances between the aquatic root community and the application area, and it is considered unlikely that the vegetation under application is an important component of an already compromised buffer. Impacts to a community of this size and nature will most likely be restricted to the near vicinity and could potentially arise from adjacent land use practises.

The SCP01 community is located approximately 100 metres from the nearest section of the application area and has a mapped extent of 0.891 hectares. There is an existing sand mine to the west of SCP01 and a large cleared track to the east, which separates it from the application area. While mining activities have the potential to impact this community (i.e. dust, wind-blown sand, etc.), the clearing permit boundary area only intersects a small section of the buffer area. The vegetation under application is not considered to be necessary for the maintenance of the SCP01 community.

The application area is also situated within an area mapped as "Banksia woodlands of the Swan Coastal Plain ecological community," which is listed as a TEC under the *Environment Protection and Biodiversity Conservation Act 1999* (DoEE, 2017c). This community is described as typically being comprised of a prominent tree layer of *Banksia* with scattered eucalypts and other tree species present within or emerging above the Banksia canopy, and a species rich understorey including sclerophyllous shrubs, graminoids and forbs (DoEE, 2017c). The vegetation present within the application is not analogous to any known TECs and none were noted during a reconnaissance survey (PGV, 2014).

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

Methodology DoEE (2017c)

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 likely to be at variance to this Principle

The application area falls within the Swan Coastal Plain IBRA bioregion (GIS Database). The vegetation within the application area is recorded as Beard vegetation associations 6 and 949 (GIS Database).

Beard vegetation association 949 retains approximately 56% of its pre-European extent which is more than the 30% threshold level recommended in the National Objectives Targets for Biodiversity Conservation below which, species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). According to the Government of Western Australia (2016), Beard vegetation association 949 retains approximately 57% of its pre-European extent in the Swan Coastal Plain bioregion and Perth subregion. The local area has been extensively cleared, however the area proposed to be cleared is not a significant remnant of native vegetation. Beard vegetation association 6 retains approximately 23% of its pre-European extent which is less than the 30% threshold level recommended in the National Objectives Targets for Biodiversity Conservation, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DPaW Managed Lands (and post clearing %)
IBRA Bioregion - Swan Coastal Plain	1,501,222	578,432	38.53	Depleted	17.70 (37.85)
IBRA Subregion - Perth	1,117,757	464,855	41.59	Depleted	20.19 (38.68)
Local Government - Wanneroo	67,517	29,805	44.15	Depleted	47.56 (53.68)
Beard vegetation associations - State					
6	56,343	13,353	23.70	Vulnerable	21.38 (37.46)
949	218,194	123,038	56.39	Least Concern	42.03 (55.80)
Beard vegetation associations - Bioregion					
6	56,343	13,353	23.70	Vulnerable	21.38 (37.46)
949	209,983	120,237	57.26	Least Concern	17.45 (29.78)
Beard vegetation associations - subregion					
6	56,343	13,353	23.70	Vulnerable	21.38 (37.46)
949	184,476	104,034	56.39	Least Concern	45.62 (59.01)

* Government of Western Australia (2016)
** Department of Natural Resources and Environment (2002)

Whilst it is acknowledged that Beard vegetation association 6 is below the minimum recommended thresholds (EPA, 2000), assessment of aerial imagery confirms that the proposed clearing is within a highly degraded area and that the clearing of native vegetation will be predominantly regrowth. Further clearing will not reduce the ecological linkages within the local area, and is unlikely to impact the conservation significance of the pre-European vegetation remaining within the local and regional area. The proposed clearing of areas of regrowth native vegetation will not impact on remaining vegetation representations.

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

Methodology

Commonwealth of Australia (2001)
Department of Natural Resources and Environment (2002)
EPA (2000)
Government of Western Australia (2016)

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 not likely to be at variance to this Principle

According to available databases, there are no watercourses or wetlands within the application area (GIS Database) and PGV (2014) did not identify any riparian vegetation during a Level 1 flora survey, conducted over small sections of the application area. Camel Swamp (a resource enhanced wetland) is surrounded by a south west portion of the application area. There are also large areas of multiple use wetlands located along the south east boundary of the application area. A 50 metre buffer has been included in the clearing permit boundary design to ensure impacts to nearby wetlands are minimised. The proponent has also committed to implementing management measures in order to contain any surface water on site and design drainage to prevent excess run-off into nearby areas (RPS, 2016a).

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

Methodology

PGV (2014)
RPS (2016a)

GIS Database:
- Geodata, 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 is associated with subdued dune-swale terrain with limestone at depth (Northcote et al, 1960-68; GIS Database). Chief soils are white sandy soils (Northcote et al, 1960-68). Generally, these soils have a high risk of wind erosion and a low risk of water erosion due to the high infiltration rates associated with sands. The majority of the area under application has a low risk of salinity. The proposed clearing has a high risk of wind erosion given the sandy soils associated with the area under application, and without appropriate management for exposed surfaces the proposal may cause appreciable land degradation. In order to minimise the potential for land degradation impacts, the proponent has committed to applying treatments (e.g. mulch, ground cover) to stabilise any bare areas which might be prone to wind erosion (RPS, 2016a, RPS 2016b). The application area will be rehabilitated following mining operations and it is expected that the established vegetation will minimise the potential for long term erosion issues (RPS, 2016a, RPS, 2016b). The proponent has also committed to a staged approach to mining, where no more than 30 hectares will be mined at any one time over the life of the project (RPS, 2016a). Potential land degradation issues that may arise as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition.

The application area intercepts areas categorised as 'low' to ‘moderate’ Acid Sulphate Soil (ASS) risk (GIS Database). ASS are likely to occur at depths of three metres or greater. The soil exposed from clearing native vegetation is not likely to form acid on exposure to air. On this basis, the proposed clearing activities are not likely to pose a significant ASS risk.

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

Methodology

Northcote et al (1960 - 1968)
RPS (2016a)
RPS (2016b)

GIS Database:
- Acid Sulfate Soils Risk Map, Swan Coastal Plain
- 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 is not likely to be at variance to this Principle

The application area falls within the Gnangara-Moore River State Forest which is managed by the Department of Parks and Wildlife (GIS Database). There are also several Bush forever sites in the vicinity. The proponent has considered all sensitive features during the construction of the clearing permit boundary area and removed all Bush forever sites from the application area. A 50 metre buffer area has also been retained between the application area and Bush forever sites.

The Gnangara-Moore River State Forest is over 7,000 hectares in area (GIS Database). The application area consists predominantly of regrowth native vegetation within a cleared Pine (*Pinus pinaster*) plantation that was initially cleared of native vegetation approximately 54 years ago to establish the plantation (PGV, 2014).

The vegetation under application is not considered to be providing significant value in terms of an ecological linkage or corridor for local fauna species, in addition to this DPaW (2017b) did not raise any specific environmental concerns with the proposed clearing within the state forest.

The proposed removal of up to 600 hectares of significantly altered native vegetation is not anticipated to impact the environmental values of the Gnangara-Moore River State Forest or any nearby Bush forever sites.

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

Methodology

DPaW (2017b)
PGV (2014)

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

The application area is located within the Priority One Gnangara Public Drinking Water Source Area and is within the area covered by the *Environmental Protection (Gnangara Mound Crown Land) Policy 1992* (GIS Database). The application area is also located within the proclaimed Swan River groundwater area under the *Rights in Water and Irrigation Act 1914* (GIS Database). Any groundwater extraction and/or taking or diversion of surface water for purposes other than domestic and/or stock watering is subject to licence by the Department of Water (DoW, 2017).

There are no permanent or ephemeral water bodies located within the application area (GIS Database). The application area has a groundwater salinity that is fresh (<500 milligrams/Litre Total Dissolved solids (TDS)) (GIS Database). Although the proposed clearing may increase the amount of rainwater that infiltrates to the groundwater, given the nature of the overlying materials (ie. limestone ridges overlain by yellow or brown sand) (RPS, 2016a; GIS Database), the proposed clearing is not likely to adversely impact the quality of groundwater. The proposed clearing is unlikely to deteriorate the quality of underground water.

DoW (2017) advised that a Water Management Plan (WMP) was developed by the proponent and has been endorsed by DoW. The WMP addresses water resource management issues, therefore mining operations, including the proposed clearing, should be carried out in accordance with the management measures outlined in the approved Water Management Plan (DoW, 2017).

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

Methodology

DoW (2017)
RPS (2016a)

GIS Database:
- Geodata, Lakes
- Groundwater Salinity, Statewide
- Hydrography, Linear
- Public Drinking Water Source Areas
- RIWI Act, Groundwater Areas
- Soils, Statewide

(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

Two soil types are mapped over the application area; B24 and Cb39 (GIS Database). Chief soils of B24 are siliceous sands with smaller areas of brown sands and leached sands in the wetter sites, while leached sands are a feature of Cb39 (Northcote et al. 1960-68). Sandy leached soils are generally considered to have high infiltration rates and lack water holding capacity (RPS, 2016b), therefore pose a low risk of water logging.

Mean annual rainfall for the nearest recording station (Perth) is 727.5 millimetres (BoM, 2017). There is potential for temporary pooling of surface water in some areas (probably outside the application area) following rain events, although pooling is expected to be of short duration due to the high infiltration rates and the likely short duration of any significant rain events in the area (RPS, 2016a; RPS 2016b). Flooding and inundation issues are not anticipated (RPS, 2016a; RPS 2016b).

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

Methodology

BoM (2017)
Northcote et al. (1960-68)
RPS (2016a)
RPS (2016b)

GIS Database:
- Hydrography, Linear
- Soils, Statewide

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

Comments

There is one Native Title claim over the area under application (WC2011/009) (DAA, 2017). This claim has been registered with the National Native Title Tribunal 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 no registered Aboriginal Sites of Significance within the application area (DAA, 2017). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Environment Regulation, Department of Parks and Wildlife and the Department of Water (DoW), to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

DoW (2017) recommended that clearing and excavation activities should commence in areas located away from the Water Corporation production bores. The Water Corporation (WC) was notified of the proposed clearing and is satisfied that the DoW endorsed Water Management Plan addresses potential impacts, however consideration for existing WC bores and the development of future assets should be included in planning activities (WC, 2017).

The application area intersects the proposed Barbagallo Raceway expansion (FNA 12227). The proponent is required to obtain consent from the Minister responsible for the *Mining Act 1978* with the concurrence of the Minister for Environment, prior to conducting mining activities in this area. The proponent has made a commitment to not undertake any mining activities within FNA 12227 until the proposed raceway expansion has been decided.

The application area falls within areas included in the Draft Perth and Peel Green Growth Plan (GGP). The draft GGP is a strategic conservation plan, which sets out the conservation and environmental outcomes and objectives that will be achieved over its proposed 30 year lifespan (DPC, 2017). The application area is located on the Gnangara Sand Node, which is described as the largest of the Significant Geological Supply (SGS) nodes, centred 45 km north of Perth on State forest in the Gnangara pine plantation area. This is a very large, undeveloped long-term future supply area, containing sand suitable for building, concrete and landfill purposes (DPC, 2015). The proponent has considered the draft GGP and has excised all areas currently shown as red where extraction activities would not be supported.

In April 2014 the Environmental Protection Authority (EPA) assessed the proposal (Ref ID 14-724601) and set the level of assessment as “Not Assessed – Public Advice Given - Managed Under Part V of the EP Act (Clearing).” When explaining their decision, the EPA stated that “Proposal is for sand removal from areas of the Gnangara pine plantation. Bush Forever sites are avoided and buffers proposed. Sand extraction is a permitted use in a groundwater protection area subject to management conditions. Having regard to above, proposal unlikely to have a significant effect on environment and does not warrant formal assessment. DoW licencing and DMP Mining Proposal are also required to ensure proposal is implemented consistent with that referred and the site rehabilitated” (EPA, 2014).

An appeal was lodged by the proponent on the level of assessment set by the EPA, which was dismissed in June 2015. The key environmental concern raised by the appellant related to the potential for regrowth vegetation establishing in the application area (both native and non-native i.e. pine wildlings) to provide future foraging habitat for Carnaby’s cockatoo and the impact on Carnaby’s cockatoo in the event that vegetation regrowth is cleared (Appeals Convenor, 2015). The Appeals Convenor determined that the decision of the EPA not to assess the proposal was supported, potential impacts could be adequately managed under other regulatory processes and recommended that the appeal be dismissed (Appeals Convenor, 2015).

In considering the impacts that the clearing of non-native vegetation (pine trees) has on Carnaby’s cockatoo foraging habitat, the Appeals Convenor (2015) noted that the proposal area is within the broader Strategic Assessment of the Perth-Peel Region (now referred to as the Green Growth Plan), which the EPA advised will address Matters of National Environmental Significance (MNES), including a strategic plan for the protection of Carnaby’s cockatoo. It was also noted that the EPA’s expectation is that the proponent would consult with the relevant decision-making authorities to align with the objectives and outcomes of the GGP.

Impacts of clearing regrowth native vegetation for other sand quarries within the Gnangara Pine Plantation have recently been assessed by the EPA when providing public advice for related proposals in the City of Wanneroo. The EPA conducted preliminary investigations and examined existing information to reach a decision of “Not assessed, Public Advice Given” and stated that impacts to flora and vegetation are not likely to be significant due to the current use of the sites as pine plantation, the intended harvesting by FPC and the exclusion of, and provision of a 50 metre buffer to Bush Forever sites (EPA, 2016).

The proponent has submitted a Mining Proposal (MP) and a Mine Closure Plan (MCP) where the post-mining land use is discussed. The post mining land use of the area will be directed through the outcomes of the final Green Growth Plan (GGP). The draft GGP indicates that the area is to remain as State Forest (RPS, 2016b).

Following sand extraction, the application area will be rehabilitated using low water use native vegetation comprised of species native to the Swan Coastal Plain 2 (SWA2) IBRA subregion, that facilitates ease of ongoing management and provides benefits to the conservation of Carnaby's cockatoos (RPS, 2016b). The proponent has proposed to construct Western Australia's first production seed farm for Banksia species and intends to develop seed farms that will secure Banksia seed for long-term use in the Gnangara Pine Plantation for restoration after mining (RPS, 2016b).

It is noted that the proposed clearing may impact on a protected matter under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act). The proponent may be required to refer the project to the (Federal) Department of the Environment and Energy for environmental impact assessment under the EPBC Act. The proponent is advised to contact the Department of the Environment and Energy for further information regarding notification and referral responsibilities under the EPBC Act.

The clearing permit application was advertised on 6 February 2017 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received.

The proponent originally applied for an Area permit to clear a 2,311.86 hectare area within a permit boundary the same area and requested a permit duration of 42 years. The proponent does not yet know exactly when the majority of the applied area is to be cleared. This creates uncertainty as to what environmental values will be lost when clearing actually takes place. Given that mining operations are to be conducted in stages, the anticipated total mine life is 50 years and additional areas of regrowth native vegetation may establish over time, an Area permit was not considered appropriate. Within the approved mining proposal the proponent has committed to only mining 30 hectares at any one time over the life of the project (RPS, 2016a). In consideration of Mining Act approvals and future changes in environmental values over time, a 20 year Purpose permit that allows for the clearing of up to 600 hectares of native vegetation within a permit boundary of 2,311.86 hectares has been recommended for approval.

Methodology Appeals Convenor (2015)
DAA (2017)
DoW (2017)
EPA (2014)
EPA (2016)
RPS (2016b)
WC (2017)

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5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DPaW and DER)
DEE	Department of the Environment and Energy, Australian Government
DER	Department of Environment Regulation, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DRF	Declared Rare Flora
DoE	Department of the Environment, Australian Government (now DEE)
DoW	Department of Water, Western Australia
DPaW	Department of Parks and Wildlife, Western Australia
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DEE)
EPA	Environmental Protection Authority, Western Australia
EP Act	*Environmental Protection Act 1986*, 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:

{DPaW (2015) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

T **Threatened species:**
Published as Specially Protected under the *Wildlife Conservation Act 1950,* listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).

Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the Wildlife Conservation Act.

Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the Wildlife Conservation Act.

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. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EN **Endangered species**
Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

VU **Vulnerable species**
Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

EX **Presumed extinct species**
Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.

IA **Migratory birds protected under an international agreement**
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 the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.

CD **Conservation dependent fauna**
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.

OS **Other specially protected fauna**
Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950,* in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.

P **Priority species**
Species which are poorly known; or
Species that are adequately known, are rare but not threatened, and 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.