



1. Application details

1.1. Permit application details

Permit application No.: 2719/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Shark Bay Resources Pty Ltd

1.3. Property details

Property: Shark Bay Solar Salt Industry Agreement Act 1983, Mining Lease 260SA (AM 70/260)
Local Government Area: Shire Of Shark Bay
Colloquial name: Useless Loop Project

1.4. Application

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

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Vegetation within the application area has been mapped at a 1:250,000 scale as the following Beard vegetation association (Shepherd et al., 2001; GIS Database);

112: Hummock grasslands, shrub steppe; *Acacia ligulata* over *Triodia plurinervata*.

Mattiske Consulting Pty Ltd undertook a flora and vegetation survey of the *Shark Bay Solar Salt Industry Agreement Act 1983* Mining Lease 260SA from 29 July to 2 August 1996. The flora and vegetation survey included the area under application. The vegetation within the lease area was defined and mapped at a scale of 1:25,000. A total of 17 vegetation associations were recorded during the survey of the lease area. One vegetation association was identified and described for the application area (Mattiske, 1996).

Association 9: Low Closed to Open shrubland with occasional emergent *Acacia ligulata* over *Triodia plurinervata* and/or *Triodia bromoides* on red sand dunes, occasionally with limestone pebbles larger than 20 centimetres, on the lower to upper slopes above birridas.

Clearing Description Shark Bay Resources Pty Ltd proposed to clear up to 11.2 hectares of native vegetation for borrow pits in order to access materials (sand, clay and rock) which can be used for the maintenance of roads, levies and batters. The vegetation will be cleared by excavator or bulldozer.

The vegetation and topsoil will be collected and stockpiled for the use in future rehabilitation of borrow pits and other degraded areas on the lease area. Shark Bay Resources has stated that the clearing will be slow and incremental in such a way that fill will be taken as required in order to perform general maintenance (Shark Bay Resources, 2008). The application area incorporates the previously granted CPS 2377/1, granted for the same purpose. It will be negotiated with Shark Bay Resources to surrender the existing CPS 2377/1 should CPS 2719/1 permit be granted.

The area applied to clear has been reduced from 11.2 hectares to 10.9 hectares due to the unauthorised clearing of 0.26 hectares of native vegetation within the application area. This incident has been referred to the DEC for their consideration.

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

To

Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994)

Comment Mattiske (1996) notes that the vegetation association of the application area (Association 9) was common in the northern lease area and also common off the lease area.

The vegetation condition of the application area was assessed from photographs submitted with the application, Mattiske (1996) and from a site inspection on 1 May 2008.

The Assessing Officer notes that in Mattiske (1996) *Triodia bromoides* was originally referred to as the Declared Rare Flora species *Plectrachne bromoides*. *Plectrachne bromoides* is a nomenclatural synonym of *Triodia bromoides* and that the conservation status of the species has been downgraded to Priority four (Florabase, 2008).

On 18th September 2008, Shark Bay Resources cleared 0.26 hectares of native vegetation prior to a permit being granted over the area. As a result of the unauthorised clearing, the area applied to clear has been reduced from 11.2 hectares to 10.9 hectares. This incident has been referred to the DEC for their consideration and it has been determined that Shark Bay Resources will receive a letter of warning on this occasion

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 is located within the Geraldton Sandplains Interim Biogeographic Regionalisation for Australia (IBRA) region which encompasses an area of 3,140,478 hectares (Shepherd et al., 2001; GIS Database). Approximately 42.24% of the pre-European vegetation remains within the Geraldton Sandplains IBRA region (GIS database; Shepherd et al. 2001). The vegetation of the Geraldton Sandplains IBRA region comprises mainly proteaceous scrub-heaths, rich in endemics on sandy earths. In terms of its flora and fauna, the area represents the interzone between the south-western bioregions of Western Australia and the Carnarvon bioregion (Desmond and Chant, 2001).

The application area is located within a section of the Shark Bay Resources State Agreement Mining Lease that has been impacted on by mining activities over a long period of time. A site visit to the application area by the Assessing Officer indicated that the area is located adjacent to several salt crystallisation ponds, two access roads and several historical borrow pits. It was evident that the vegetation has been significantly impacted on by past and present mining activities and as a result the vegetation condition ranged from good to degraded.

Mattiske (1996) surveyed the Shark Bay Resources State Agreement Mining Lease area and recorded a total of 185 vascular plants species from 124 genera and 54 families. The floristic diversity of the vegetation that has been identified across the mining lease area would be considered high. The vegetation within the application area was identified and described as Association 9: Low closed to open shrubland with occasional emergent *Acacia ligulata* over *Triodia plurinervata* and/or *Triodia bromoides* on red sand dunes, occasionally with limestone pebbles larger than 20 centimetres, on the lower to upper slopes above birridas (Mattiske, 1996). Mattiske (1996) commented that Association 9 was common in the north of the lease area and also off the mining lease area.

The previous disturbances that have occurred within the application area and nearby mining activities are likely to have impacted on the biodiversity of the area, which would otherwise be quite high. Given the widespread distribution of higher quality vegetation throughout and off the mining lease area (Mattiske, 1996), the vegetation within the application area is unlikely to be considered an area of outstanding biodiversity.

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

Methodology Desmond and Chant (2001)
Mattiske (1996)
Shepherd et al. (2001)
GIS Database:
- Interim Biogeographic Regionalisation of Australia

(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**

The application area is located within the Shark Bay Resources mine site at Useless Loop (Shark Bay Resources, 2008; GIS Database). The mine site operates within the Shark Bay Area Register of National Estate which has been noted for its importance as it provides significant marine and terrestrial fauna habitat for native fauna species, particularly habitats associated with steep salinity gradients in the bay and undisturbed refugial areas on isolated islands and peninsulas (Australian Heritage Database, 2008). The area under application is located on the Heirisson Prong within the Edel subregion and has been described by Desmond and Chant (2001) as a refuge for endangered mammals and reptiles. The subregion is also known to be a centre of high endemism for reptiles (Australian Heritage Database, 2008).

The assessing officer conducted a desktop database search of the Western Australian Museum's Faunabase (Western Australian Museum, 2008), using the coordinates 24.0158° S, 113.509° E and 26.2927° S, 117.0881° E, representing a search area of 950 square kilometres around the application area. This search revealed a total of 14 Amphibian, 37 Mammal, 137 Reptile and 218 Avian fauna species. This demonstrates that the Shark Bay region is a centre of endemism for both reptiles and birds, due to the diversity of habitats available within the region, and the overlap between southern and northern faunal provinces.

Of those species recorded within the search area, 18 are of conservation significance. Based on the habitat present within the application area, the following species of conservation significance may occur within the application area: Burrowing Bettong (Boodie) (*Bettongia lesuer lesuer*), Woma Python (*Aspidites ramsayi*), Black-striped Legless Lizard (*Pletholax gracilis edelensis*), a Skink (*Lerista lineata*), Peregrine Falcon (*Falco*

peregrinus), Dirk Hartog Island Fairy-wren (*Malarus leucopterus leucopterus*), Rainbow Bee-eater (*Merops ornatus*) and Australian Bustard (*Ardeotis australis*).

The Burrowing Bettong (Boodie) (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is confined to offshore islands and isolated predator controlled environments in the Shark Bay area (DEC, 2008). It is unlikely to occur within the application area due to a lack of predator control.

The Woma Python (Schedule 4 - Fauna that is in need of special protection, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) has been located from the Peron Peninsula, Shark Bay. The woma occurs in the arid zones of Western Australia, favouring open myrtaceous heath on sandplains, and dune fields dominated by spinifex (*Triodia* spp.) (DEC, 2008). Whilst the vegetation within the application area may support the species, the disturbed nature of the vegetation suggests that the vegetation is not significant habitat for this species.

The Black-striped Legless Lizard (DEC - Priority 3), occurs in spinifex on coastal dunes, low open *Triodia plurinervata* under low *Acacia* sp. on light pink-brown sandy loam and very sparse *Acacia* sp. shrubs over dense low heath on grey loamy sand (Shea and Peterson, 1993). This species was first collected from a location 1.9 km south of the application area (Storr, 1978) and has mainly been found in the vicinity of Useless Loop and Hamelin Bay, although it has been recorded as far south as Kalbarri National Park. The specimen recorded above was found in identical vegetation to that found within the application area. Therefore, it is very likely that the species may occur within the application area. However, this vegetation type is common in the Useless Loop area and it is likely that this species occurs throughout the southern Shark Bay region. Given the abundance of its potential habitat within the region and the degraded nature of the vegetation within the application area, it is unlikely that this vegetation represents significant habitat for the Black-striped Legless Lizard.

Lerista lineata (DEC - Priority 3) is a skink that has been located at Woodleigh Station, near the Peron Peninsula, and is more commonly found on the Swan Coastal Plain (Western Australian Museum, 2008). This species may occur within the application area, however, given the disturbance that the application area has been subject to, better representative habitat is likely to be found in adjoining vegetation.

The Peregrine Falcon (Schedule 4 - Other specially protected fauna, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is known to inhabit most areas in Australia and utilise cliffs, tall trees and granite outcrops for nesting (Australian Museum Online, 2007). The Peregrine Falcon is likely to occur sporadically within the application areas, but is not known to nest in the area. Given the vast amounts of available habitat within the Pilbara region that this species can utilise, it is unlikely that the vegetation within the application areas is significant habitat for this species.

The Dirk Hartog Island Black and White Fairy-wren (Schedule 1 - Fauna that is rare or likely to become extinct, *Wildlife Conservation (Specially Protected Fauna) Notice, 2008*) is confined to Dirk Hartog Island and is unlikely to be found within the application area.

The Rainbow Bee-eater (protected under Federal Migratory Bird Agreements) is able to utilise a wide range of habitat types and nests in sandy soils. It may utilise the application areas for feeding and nesting. Given the large amounts of potential habitat within the Shark Bay region, it is unlikely that the vegetation within the application areas is significant habitat for this species.

The Australian Bustard (DEC Priority 4) prefers tussock grassland, *Triodia* hummock grassland, grassy woodland and low shrublands (Garnett et al, 2000). This species may occur within the application area. However, given the widespread distribution of this species and the extent of native vegetation that is available for this species in the bioregion, the vegetation within the application area is not significant habitat for this species.

A site inspection of the application area was undertaken by the Assessing Officer on 1 May 2008. The application area was located adjacent to several salt crystallisation ponds, two access roads and several historical borrow pits. The vegetation condition ranged from good to degraded, and the vegetation cover within the application area was relatively sparse. It was evident that the vegetation within the application area has been disturbed by past and present mining activities which are likely to have impacted on the habitat value for the area. It was observed that there was a low diversity of landforms within the application area that provide habitat for fauna.

The vegetation within the application area has been described by Matiske (1996) as low closed to open shrubland with occasional emergent *Acacia ligulata* over *Triodia plurinervata* and/or *Triodia bromoides* on red sand dunes, occasionally with limestone pebbles large than 20 centimetres, on the lower to upper slopes above birridas. Matiske (1996) stated that the vegetation association of the application area was common in the north of the mining lease area and that the vegetation association is common off the lease area. As the vegetation and landforms within the application area are common throughout the lease area and adjoining areas, it would be considered likely that most fauna would be able to relocate into these surrounding areas if present within the application upon clearing commencing.

Given that the application area has been disturbed by past and present mining activities and that larger areas of higher quality vegetation exist throughout and adjacent to the Shark Bay Resources mining lease area, it is

unlikely that the vegetation within the application area would be considered as significant habitat for fauna.

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

Methodology Australian Heritage Database (2008)
Australian Museum Online (2007)
DEC (2008)
Desmond and Chant (2001)
Garnett et al (2000)
Mattiske (1996)
Shark Bay Resources (2008)
Shea & Peterson (1993)
Storr (1978)
Western Australian Museum (2008)
GIS Database:
- Shark Bay North 1.4m Orthomosaic - DLI 02

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

Comments Proposal is not likely to be at variance to this Principle

According to available datasets there are no known records of Declared Rare Flora (DRF) or Priority flora species within the application area (GIS database). The nearest recorded population of DRF is located approximately 72 kilometres south-east of the application area (GIS Database).

Mattiske Consulting Pty Ltd carried out a flora and vegetation survey of Shark Bay Resources Mining Lease area (Mattiske, 1996). The flora and vegetation survey included a search of the Department of Conservation and Land Management's (now the Department of Environment and Conservation) Threatened (Declared Rare) Flora databases for DRF and Priority flora species, a field survey to define and map the vegetation communities within the survey area and a search for the existence of conservation significant species (Mattiske, 1996).

Mattiske (1996) identified the vegetation within the application area as Association 9 - Low Closed to Open shrubland with occasional emergent *Acacia ligulata* over *Triodia plurinervata* and/or *Triodia bromoides* on red sand dunes, occasionally with limestone pebbles larger than 20 centimetres, on the lower to upper slopes above birridas. Mattiske (1996) reported that Association 9 comprised of the DRF *Triodia bromoides*. The Assessing Officer reviewed Florabase on 1 April 2008 and notes that *Triodia bromoides* has been reclassified as a Priority 4 species (Western Australian Herbarium, 1998-2008). Given the vegetation type of the application area, *Triodia bromoides* is likely to be present within the application area. Mattiske (1996) stated that *Triodia bromoides* is common in many areas of the south-eastern and southern parts of the Shark Bay Resources Mining Lease area and that Association 9 was common on and off the lease area. The Assessing Officer notes that it was evident from a site visit, that the vegetation within the application area was sparse and vegetation condition varied from good to degraded. If present within the application area, the proposed clearing may impact on a small number of individuals of *Triodia bromoides*. Given that *Triodia bromoides* is common in many areas of the south-eastern and southern parts of the lease area, the proposed clearing is unlikely to significantly impact on the conservation of this species.

Other Priority species that were identified by Mattiske (1996) on the Shark Bay Resources lease area include *Abutilon* sp. Hamelin (Priority 2), *Melaleuca huegelii* subsp. *pristicensis* (Priority 2), *Olearia occidentissima* (Priority 2), *Rhodanthe oppositifolia* subsp. *ornata* (Priority 2) and *Stenanthemum divaricatum* (Priority 3). All of these Priority 2 or Priority 3 species were identified within different vegetation associations to that of the application area (Mattiske, 1996). As a result, it would be considered unlikely that these species would occur within the application area.

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

Methodology Mattiske (1996)
Western Australian Herbarium (1998 - 2008)
GIS Database:
- Declared Rare and Priority Flora List

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

Comments Proposal is not likely to be at variance to this Principle

There are no known Threatened Ecological Communities (TEC?s) within the application area (GIS database; Shark Bay Resources, 2008). The nearest known TEC is located approximately 77 kilometres east-north-east of the application area (GIS database). Given the distance between the proposal and the nearest known TEC, the proposed clearing is unlikely to impact on the conservation of that TEC.

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

Methodology Shark Bay Resources (2008)
 GIS Database:
 - Threatened Ecological Communities

(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 clearing application area is located within the Geraldton Sandplains Interim Biogeographic Regionalisation for Australia (IBRA) region in which approximately 42.2% of the pre-European vegetation remains See table below (GIS database; Shepherd et al. 2001).

The vegetation of the clearing application area has been mapped as Beard vegetation association 112: Hummock grasslands, shrub steppe; *Acacia ligulata* over *Triodia plurinervata* (GIS Database). According to Shepherd et al., (2001) approximately 98.3% of Beard vegetation association 112 remains within the State (See table below).

There is no information available to indicate the extent of Beard vegetation association 112 remaining within the Geraldton Sandplains IBRA region.

According to the Bioregional Conservation Status of Ecological Vegetation Classes the conservation status for the Geraldton Sandplains Bioregion is 'Depleted'. With approximately 42.2% of the pre-European vegetation remaining, the conservation status of the Geraldton Sandplains IBRA region is unlikely to be considered at risk of becoming listed as 'Vulnerable' (Department of Natural Resources and Environment, 2002).

According to the Bioregional Conservation Status of Ecological Vegetation Classes the conservation status for Beard vegetation association 112 is of 'Least Concern' (Department of Natural Resources and Environment, 2002).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-european % in IUCN Class I-IV Reserves
IBRA Bioregion – Geraldton Sandplains	3,136,277	1,324,440	~42.2	Depleted	15.3
Beard veg assoc. – State					
112	26,457	26,007	~98.3	Least Concern	1.1
Beard veg assoc. – Bioregion					
No information available					

* Shepherd et al. (2001)

** Department of Natural Resources and Environment (2002)

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

Methodology Department of Natural Resources and Environment (2002)
 Sheperd et al., (2001)
 GIS Database:
 - Interim Biogeographic Regionalisation of 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 drainage lines within the application area (GIS Database). A site visit to the application area by the Assessing Officer indicated that the vegetation within the application area is not growing in association with a wetland or watercourse (GIS Database; Shark Bay Resources, 2008)

No groundwater dependent ecosystems are known to occur in or near the application area (GIS Databases).

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

Methodology Shark Bay Resources (2008)
GIS Database:
- Geodata, Lakes - GA 28/06/02
- Hydrography, Linear - DoE 1/2/04
- Shark Bay North 1.4m Orthomosaic - DLI 02
- Potential Groundwater Dependant Ecosystems - DoE 2004
- Rivers

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

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

According to the Department of Agriculture in Technical Bulletin No 73 "An inventory and condition survey of rangelands in the Carnarvon Basin, Western Australia" the application area is located within the Edel Land System (Payne et al, 1987).

The Edel Land System consists of four land units (Payne et al., 1987). These are;

Unit 1: Longitudinal dunes: Longitudinal dunes and dune-like sandy crests over limestone ridges with soils consisting of reddish brown calcareous sands.

Unit 2: Stony rises and plains: Restricted limestone plains and rises which are densely strewn with pebbles, cobbles or boulders. Soils are variable but include very shallow sand, loamy or clayey sand and red, reddish-brown or yellow-brown sand.

Unit 3: Undulating sandy plains: Swales and undulating plains, sparsely to moderately strewn with limestone gravels. Soils consist of yellow-red or red-brown sands or loamy sands; and

Unit 4: Saline sands: Low-lying saline plains, lightly to moderately strewn with limestone cobbles or pebbles. Soils consist of very shallow grey loamy sands with calcareous inclusions (Payne et al., 1987).

It was evident during a site visit that the application area is most likely located within Edel landform Unit 3 - Undulating sandy plains. This landform unit has a mild susceptibility to wind erosion if the vegetative cover is removed (Payne et al., 1987). Due to its coastal location, the application area is likely to be exposed to prevailing onshore westerly winds, as well as offshore easterly winds that blow across Denham Sound. There is likely to be a moderate risk of wind erosion occurring within the application area if the vegetative cover is cleared. Shark Bay Resources (2008) have advised that the proposed clearing within the application area will be incremental and that the cleared area will be rehabilitated as the area is exhausted of useful borrow material. In order to prevent wind erosion, Shark Bay Resources propose to rehabilitate the cleared area by moonscaping the landscape (Shark Bay Resources, 2008). To facilitate rehabilitation Shark Bay Resources propose to collect and stockpile topsoil and vegetation for use in rehabilitation, as well as direct seeding the rehabilitated area with species endemic to the area (Shark Bay Resources, 2008).

The application area is located at Useloop Loop which experiences mean annual rainfall of 200 millimetres and mean annual evaporation of approximately 2,600 millimetres (Shark Bay Resources, 2008; GIS Database). Due to the sandy nature of the soils within the application area, it would be expected that any runoff from normal season rainfall events would infiltrate into the soil which would thereby minimise the risk of water erosion or water logging occurring. On a site visit to the application, no water erosion was observed despite recent heavy rainfall.

Groundwater salinities within the application area have been measured in the range of 3,000-7,000 milligrams/Litre Total Dissolved Solids (GIS Database). The area under application is situated approximately 50-100 metres east of several salt crystallisation ponds which would be considered as hyper-saline. Topographic information indicates that application area is located at a vertical elevation of approximately 5-10 metres above the crystallisation ponds (GIS Database). Given the distance and elevation of the application area from the salt crystallisation ponds, the proposed clearing is unlikely to increase land salinisation on or off site.

Based on the above, the proposal may be at variance to this Principle. It is recommended that should the permit be granted a condition be imposed on the permit for the purpose of rehabilitation.

Methodology Payne et al., (1987)
Shark Bay Resources (2008)
GIS Database:
- Evaporation Isopleths
- Groundwater Salinity, Statewide
- Topographic Contours, 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 nearest Department of Environment and Conservation (DEC) managed land is Friday Island Nature Reserve which is located approximately 4 kilometres north-west of the application area (GIS Database). Friday Island is listed as an 'A' Class nature reserve and is an important guano deposit and rookery for Cormorants.

Given its isolation and distance from the application area, it is unlikely that the proposed clearing will have an impact on Friday Island Nature Reserve or the Cormorants that reside on the island.

The application area is located within the Shark Bay Area Register of National Estate (RNE) and the marine area surrounding the application area is part of the Shark Bay Marine Park (Australian Heritage Database, 2008; GIS Database). The Shark Bay Marine Park boundary is located approximately 1.5 kilometres west of the application area at the closest point (GIS Database). The Shark Bay Area RNE and Shark Bay Marine Park have immense conservation value as they provide significant habitat for a high number of marine aquatic and terrestrial fauna species (Australian Heritage Database, 2008). The application area is located within the operational Shark Bay Resources mine site and as a result the vegetation has been subject to a considerable degree of disturbance over many years (Shark Bay Resources, 2008). Given the disturbance that has occurred, it is likely that the conservation value of the area has been reduced. Taking into consideration the relatively small scale of the proposed clearing activities, it is unlikely that the conservation value of the Shark Bay Area RNE or Shark Bay Marine Park would be adversely impacted by the proposed clearing.

The Heirisson Prong Biosphere Project situate approximately 7.5 kilometres north-west of the application area is of conservation significance as the project aims to re-establish rare and endangered mammals on a mainland peninsula at Shark Bay, Western Australia (Wildlife Research and Management Pty Ltd, 2005). The area north of the predator proof fence is managed by the Useless Loop Community Biosphere Project Group Inc (ULCBPG) under a management agreement signed in 1990 between the ULCBPG and SBSJV (Richards et al. 2000). Because of the distance between the Heirisson Prong Biosphere Project and the application area, it is unlikely that the proposed clearing will have a detrimental impact to the conservation values of the area.

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

Methodology Australian Heritage Database (2008)
Richards et al., (2000)
Shark Bay Resources (2008)
Wildlife Research and Management Pty Ltd (2005)
GIS Database:
- CALM Managed Lands and Waters

(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

A site inspection by the Assessing Officer indicated that there are no permanent wetlands or watercourses within the application area (GIS Database). The application area is situated adjacent to several salt evaporation ponds which are used by Shark Bay Resources for the production of salt. The quality of surface water within the salt evaporation ponds is likely to be considered hyper-saline. The application area is characterised by low rainfall, high evaporation and sandy porous soils (Short, 2000; GIS Database). Given the small scale of the proposed clearing and the porosity of the soils, the proposal is unlikely to cause water erosion or subsequent sedimentation and turbidity in nearby water bodies.

The application area is not located within a Public Drinking Water Source Area (PDWSA) (GIS Database). The nearest PDWSA is the Carnarvon Water Reserve which is located approximately 145 kilometres north, north-east from the application area (GIS Database). Given the distance separating the application area and the nearest water supply area, the proposed clearing is unlikely to impact on the quality of the Carnarvon Water Reserve.

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

Methodology Short (2000)
GIS Database:
- Hydrography, linear_1
- Rainfall, Mean Annual
- Public Drinking Water Source Areas (PDWSAs)

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

Comments Proposal is not likely to be at variance to this Principle

The application area is characterised by low rainfall, high evaporation and sandy porous soils (Short, 2000; GIS Database). As a result, it would be expected that there would be little surface flows during normal season rains. A site inspection was undertaken on 1 May 2008 by the Assessing Officer and it was evident that the application area was located on raised ground and adjacent to several salt crystallisation ponds. No permanent or ephemeral water bodies are located within the application area (GIS Database). The applicant has advised that the proposed clearing will be incremental with sections of the application area rehabilitated as an area is exhausted of useful borrow material (Shark Bay Resources, 2008). Due to the small scale of the proposed clearing and the sandy nature of the soils, it would be expected that the majority of the volume from normal season rainfall would infiltrate the soil. The proposed clearing is unlikely to exacerbate or increase the

incidence of flooding in the area.

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

Methodology Shark Bay Resources (2008)
Short (2000)
GIS Database:
- Hydrography, linear_1
- Geodata, Lakes
- Rainfall, Mean Annual
- Evaporation Isopleths

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

Comments

There is one Native Title claim over the area under application; WC98_017. This claim has been registered with the National Native Title Tribunal on behalf of the claimant group. However, the mining tenement has been granted in accordance with the future act regime of the *Native Title Act, 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act, 1993*.

There are no Aboriginal Sites of Significance within the application area (GIS Database). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act, 1972* and ensure that no Sites of Aboriginal Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the DEC and the DoW to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licence or approvals are required for the proposed works.

Shark Bay Resources reported to this Department on 18 September 2008 that approximately 2600 square metres of native vegetation was cleared within the application area without authority in early September 2008. This matter was referred to the Department of Environment and Conservation (DEC) for their consideration. The DEC determined that Shark Bay Resources be sent a letter of warning in relation to this matter.

A submission was received from a Direct Interest Party commenting on several issues including Aboriginal Sites of Significance, bush tucker, medicinal plants and animals, as well as the World Heritage Area.

There appears to be no Aboriginal sites of significance within the application area. However, it is the proponent's responsibility to comply with the *Aboriginal Heritage Act, 1972*. The assessing officer suggests the direct interest party consult with Shark Bay Resources regarding this matter.

The amount of vegetation to be cleared (10.9 hectares) is small compared with the amount of vegetation that could be utilised by indigenous persons for access to bush tucker or medicinal plants or animals.

The assessing officer acknowledges that the application area falls within a World Heritage Area. However, the application area is within an active salt harvesting area and appears to have been previously disturbed to some degree. The assessing officer considers that the removal of vegetation within the application area will not significantly impact on the values of the World Heritage Area.

Methodology GIS Database
- Native Title Claims
- Sites of Aboriginal Significance DIA

4. Assessor's comments

Comment

The proposal has been assessed against the Clearing Principles and may be at variance to Principle (g) and is not likely to be at variance to Principles (a), (b), (c), (d), (e), (f), (h), (i) and (j).

It is recommended that should a permit be granted, conditions be endorsed on the permit with regards to rehabilitation of areas cleared, recording areas cleared and reporting against the permit conditions.

5. References

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6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government.
CALM	Department of Conservation and Land Management, Western Australia.
DAFWA	Department of Agriculture and Food, Western Australia.
DA	Department of Agriculture, Western Australia.
DEC	Department of Environment and Conservation
DEH	Department of Environment and Heritage (federal based in Canberra) previously Environment Australia
DEP	Department of Environment Protection (now DoE), Western Australia.
DIA	Department of Indigenous Affairs
DLI	Department of Land Information, Western Australia.
DoE	Department of Environment, Western Australia.
DoIR	Department of Industry and Resources, Western Australia.
DOLA	Department of Land Administration, Western Australia.
DoW	Department of Water
EP Act	Environment Protection Act 1986, Western Australia.
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Federal Act)
GIS	Geographical Information System.
IBRA	Interim Biogeographic Regionalisation for Australia.
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
RIWI	Rights in Water and Irrigation Act 1914, Western Australia.
s.17	Section 17 of the Environment Protection Act 1986, Western Australia.
TECs	Threatened Ecological Communities.

Definitions:

{Atkins, K (2005). *Declared rare and priority flora list for Western Australia, 22 February 2005*. Department of Conservation and Land Management, Como, Western Australia} :-

- P1** **Priority One - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat, e.g.

road verges, urban areas, farmland, active mineral leases, etc., or the plants are under threat, e.g. from disease, grazing by feral animals, etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.

- P2 Priority Two - Poorly Known taxa:** taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
- P3 Priority Three - Poorly Known taxa:** taxa which are known from several populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
- P4 Priority Four – Rare taxa:** taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5–10 years.
- R Declared Rare Flora – Extant taxa (= Threatened Flora = Endangered + Vulnerable):** taxa which have been adequately searched for, and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.
- X Declared Rare Flora - Presumed Extinct taxa:** taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such, following approval by the Minister for the Environment, after recommendation by the State's Endangered Flora Consultative Committee.

{Wildlife Conservation (Specially Protected Fauna) Notice 2005} [Wildlife Conservation Act 1950] :-

- Schedule 1 Schedule 1 – Fauna that is rare or likely to become extinct:** being fauna that is rare or likely to become extinct, are declared to be fauna that is need of special protection.
- Schedule 2 Schedule 2 – Fauna that is presumed to be extinct:** being fauna that is presumed to be extinct, are declared to be fauna that is need of special protection.
- Schedule 3 Schedule 3 – Birds protected under an international agreement:** being birds that are subject to an agreement between the governments of Australia and Japan relating to the protection of migratory birds and birds in danger of extinction, are declared to be fauna that is need of special protection.
- Schedule 4 Schedule 4 – Other specially protected fauna:** being fauna that is declared to be fauna that is in need of special protection, otherwise than for the reasons mentioned in Schedules 1, 2 or 3.

{CALM (2005). Priority Codes for Fauna. Department of Conservation and Land Management, Como, Western Australia} :-

- P1 Priority One: Taxa with few, poorly known populations on threatened lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, active mineral leases. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P2 Priority Two: Taxa with few, poorly known populations on conservation lands:** Taxa which are known from few specimens or sight records from one or a few localities on lands not under immediate threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P3 Priority Three: Taxa with several, poorly known populations, some on conservation lands:** Taxa which are known from few specimens or sight records from several localities, some of which are on lands not under immediate threat of habitat destruction or degradation. The taxon needs urgent survey and evaluation of conservation status before consideration can be given to declaration as threatened fauna.
- P4 Priority Four: Taxa in need of monitoring:** Taxa which are considered to have been adequately surveyed, or for which sufficient knowledge is available, and which are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands.
- P5 Priority Five: Taxa in need of monitoring:** Taxa which are not considered threatened but are subject to a specific conservation program, the cessation of which would result in the species becoming threatened within five years.

Categories of threatened species (Environment Protection and Biodiversity Conservation Act 1999)

- EX Extinct:** A native species for which there is no reasonable doubt that the last member of the species has died.
- EX(W) Extinct in the wild:** A native species which:
(a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
(b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
- CR Critically Endangered:** A native species which is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.

- EN** **Endangered:** A native species which:
(a) is not critically endangered; and
(b) is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
- VU** **Vulnerable:** A native species which:
(a) is not critically endangered or endangered; and
(b) is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
- CD** **Conservation Dependent:** A native species which is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.