



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 7313/1
Permit Holder:	Grenleigh Pty Ltd
Duration of Permit:	18 August 2017 – 18 August 2022

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

PART I – CLEARING AUTHORISED

1. Purpose for which clearing may be done

Clearing for the purpose of irrigated agriculture and associated activities.

2. Land on which clearing is to be done

Lot 1539 on Deposited Plan 69939, Eighty Mile Beach, Shire of Broome (Wallal Downs Station – Pastoral Lease Number: N050388).

3. Area of Clearing

The Permit Holder must not clear more than 450 hectares of native vegetation within the area cross-hatched yellow on attached Plan 7313/1.

4. Application

This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

PART II – MANAGEMENT CONDITIONS

5. Avoid, minimise etc clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:

- avoid the clearing of native vegetation;
- minimise the amount of native vegetation to be cleared; and
- reduce the impact of clearing on any environmental value.

6. Direction of clearing

The permit holder shall conduct clearing in a progressive manner from one direction to the other (e.g. west to east) to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

7. Fauna management

- (a) Immediately prior to undertaking any clearing authorised under this Permit, the Permit Holder shall engage a *fauna specialist* to undertake clearance surveys using transects spaced at a maximum 100 metres on average within the area cross-hatched yellow on attached Plan 7313/1 and of surrounding areas for the fauna species listed below:
 - (i) greater bilby (*Macrotis lagotis*); and
 - (ii) brush-tailed mulgara (*Dasymercus blythi*).
- (b) Immediately prior to undertaking any clearing authorised under this Permit, the Permit Holder shall engage a *fauna specialist* to relocate any fauna found under condition 7(a) of this permit, in accordance with a fauna licence pursuant to Regulation 15 of the *Wildlife Conservation Regulations 1970*.
- (c) Where fauna are identified and relocated under condition 7(a) and 7(b) of this Permit, the Permit Holder shall include the following in a report submitted to the Department of Water and Environmental Regulation:
 - (i) the scientific name and gender of each fauna captured under condition 7(a);
 - (ii) the location of any fauna species, as listed in condition 7(a), captured using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (iii) the date, time, vegetation type and weather conditions at each location where a fauna species is captured under condition 7(c)(ii);
 - (iv) the scientific name and gender of each fauna relocated under condition 7(b);
 - (v) the location of any fauna species, as listed in condition 7(b), relocated using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
 - (vi) the date, time, vegetation type and weather conditions at each location where a fauna species is relocated under condition 7(c)(v);
 - (vii) the name of the fauna specialist that relocated fauna under condition 7(b); and
 - (viii) a copy of the fauna licence authorising the relocation of fauna under condition 7(b).

PART III - RECORD KEEPING AND REPORTING

8. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

- (a) In relation to the clearing of native vegetation authorised under this Permit:
 - (i) the species composition, structure and density of the cleared area;
 - (ii) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;
 - (iii) the date that the area was cleared; and
 - (iv) the size of the area cleared (in hectares).

9. Reporting

- (a) The Permit Holder must provide to the CEO on or before 30 June of each year, a written report:
 - (i) of records required under condition 7 and 8 of this Permit; and
 - (ii) concerning activities done by the Permit Holder under this Permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this Permit was undertaken between 1 January to 31 December of the preceding calendar year, a written report confirming that no clearing under this permit has been carried out, must be provided to the CEO on or before 30 June of each year.
- (c) Prior to 12 May 2022, the Permit Holder must provide to the CEO a written report of records required under condition 7 and 8 of this Permit where these records have not already been provided under condition 9(a) of this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit:

fauna specialist: means a person who holds a tertiary qualification specializing in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the CEO as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the *Wildlife Conservation Act 1950*.

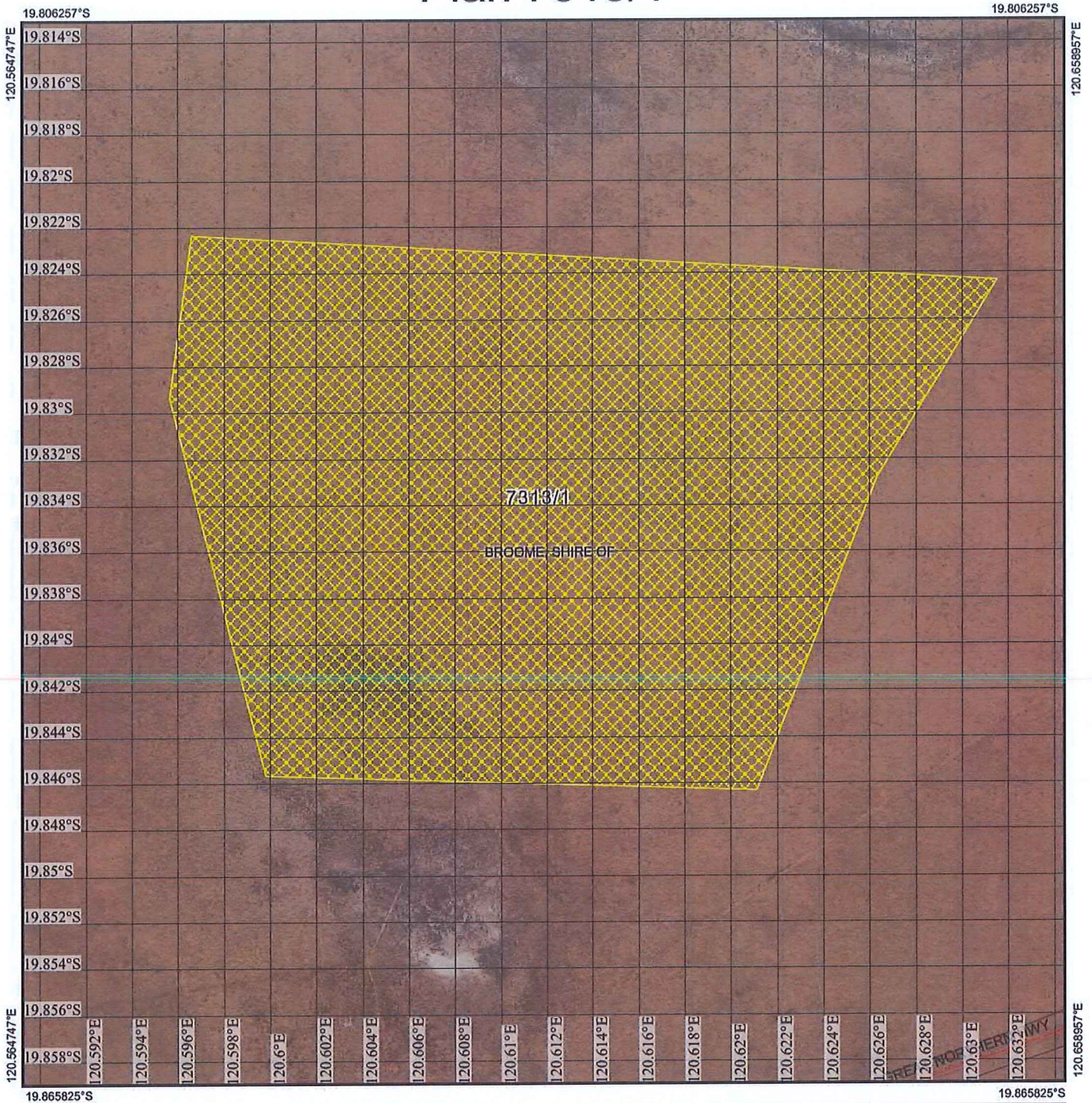


Kelly Faulkner
EXECUTIVE DIRECTOR
REGULATORY SERVICES (ENVIRONMENT)

Officer delegated under Section 20
of the *Environmental Protection Act 1986*

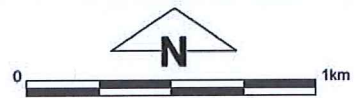
18 July 2017

Plan 7313/1



Legend

-  Imagery
-  Clearing Instruments Activities
-  Local Government Authority




1:25,000

(Approximate when reproduced at A4)

GDA 94 (Lat/Long)

Geocentric Datum of Australia 1994

 Date 18/7/17

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986



1. Application details

1.1. Permit application details

Permit application No.: 7313/1
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Grenleigh Pty Ltd

1.3. Property details

Property: Lot 1539 on Deposited Plan 69939, Eighty Mile Beach
Colloquial name: Homestead Precinct Irrigated Horticulture - Wallal Downs Station
Local Government Authority: Shire of Broome
DER Region: North West
DPaW District: West Kimberley
LCDC: Roebourne - Port Hedland
Localities: Eighty Mile Beach

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
450		Mechanical Removal	Pivot irrigation and associated activities

1.5. Decision on application

Decision on Permit Application: Grant

Decision Date:

18 July 2017

Reasons for Decision:

The clearing permit application was received on 8 October 2016, and has been assessed against the clearing principles, planning instruments and other matters in accordance with section 51O of the *Environmental Protection Act 1986*.

The Delegated Officer determined that the proposed clearing is at variance to Principle (a), may be at variance to Principles (b) and (g), and is not likely to be or is not at variance to the remaining clearing principles.

The Delegated Officer determined that the application area comprises an area of high biodiversity, may be necessary for the maintenance of significant habitat for indigenous fauna, and that the proposed clearing may cause land degradation in the forms of wind and water erosion between clearing and pasture establishment.

The Delegated Officer has granted the clearing permit subject to conditions requiring:

- pre-clearance surveys to identify any greater bilbies within the application area, and the relocation of any greater bilbies recorded during pre-clearance surveys; and
- one directional clearing to allow fauna to move into adjacent habitat.

In determining to grant a clearing permit, subject to conditions, the Delegated Officer found that the clearing of native vegetation is unlikely to lead to an unacceptable risk to the environment.

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

One Beard vegetation association is mapped within the application area. Beard vegetation association 32 is described as shrublands, pindan; acacia shrubland with scattered low trees over *Triodia* spp. (Shepherd *et al.*, 2001).

A site inspection of the application footprint and surrounds was conducted by officers of the former Department of Environment Regulation (DER) and former Department of Parks and Wildlife (Parks and Wildlife) on 20 April 2016 as part of the assessment of clearing permit application CPS 6744/1, which was previously withdrawn by the applicant.

The site inspection was conducted along an access track intersecting the centre of the application area. Nine vegetation communities were recorded in total, with the following four recorded within the application area (DER, 2016):

- open shrubland with mixed *Acacia* species and *Terminalia* sp. over *Triodia* sp. and *Melaleuca glomerata* on red pindan sands;
- mixed *Melaleuca* shrubland on red pindan sands;
- thicket of *Acacia coleii* and *Melaleuca* sp. on red pindan sands; and
- woodland of *Acacia coleii* and *Melaleuca lasiandra* with sparse understorey on transitional 'pink' soils.

Additional vegetation communities identified along the central track north and east of the application area include (DER, 2016):

- shrubland with mixed *Acacia* species (*Acacia coleii* and *Acacia* sp.), *Melaleuca glomerata* and *M. lasiandra* on red pindan sands;
- spinifex (*Triodia* sp.) shrubland on red pindan sands;
- spinifex (*Triodia* sp.) and *Melaleuca glomerata* shrubland on red pindan sands;
- thicket of *Acacia* sp. on red pindan sands; and
- *Acacia coleii* over herbs and grasses on grey loam.

The above vegetation communities and/or additional vegetation communities may occur within the application area, but were not recorded along the central track.

Clearing Description

The applicant proposes to clear up to 450 hectares of native vegetation within a total boundary of approximately 755 hectares for the purpose of pivot irrigation and associated activities.

Vegetation Condition

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994);

To:

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

Comment

Vegetation condition was determined during a site inspection (DER, 2016).

Vegetation in a completely degraded (Keighery, 1994) condition occurs where access tracks have been cleared. The remainder of the application area is in very good to excellent (Keighery, 1994) condition (DER, 2016).

3. Assessment of application against clearing principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments

Proposed clearing is at variance to this Principle

The applicant proposes to clear up to 450 hectares of native vegetation within a total footprint of approximately 755 hectares (application area) within Lot 1539 on Deposited Plan 69939 (the property), 'Homestead', Eighty Mile Beach, for the purpose of pivot irrigation and associated activities. This application relates to a previous clearing permit application (CPS 6744/1) to clear 600 hectares within a 6,219 hectare footprint. CPS 6744/1 was withdrawn on 31 August 2016. In submitting a new application, the application area has been reduced from 600 hectares within a 6,219 hectare footprint to 450 hectares within a 755 hectare footprint.

The application area occurs within a continuous portion of the property between Eighty Mile Beach and the Great Northern Highway. This portion of the property is approximately 41,415 hectares in size.

The application area is located within the Nita land system abutting the Mannerie land system to the north (Commissioner of Soil and Land Conservation [CSLC], 2015). The Nita land system comprises deep red sand that generally supports shrubby hard and soft spinifex, and the lower lying areas of the Mannerie land system contain seepage areas on paleo-tidal plain that supports melaleuca thicket and halophytic shrubs (CSLC, 2015). Eighty two percent of the Nita land system has been mapped in very good condition (former Department of Agriculture and Food Western Australia [DAFWA], 2004). A site inspection of the project footprint conducted by officers of the former DER and former Parks and Wildlife identified that the vegetation and soils within the application area is mostly representative of the Nita land system, with some areas that appeared to represent a transitional area between the two land systems (DER, 2016). Due to this observation, it is likely that vegetation within this portion of the property (between the Great Northern Highway and Eighty Mile Beach) differs from the remainder of the property that extends inland of the Great Northern Highway.

The application area is located within the Dampierland Interim Biogeographic Regionalisation of Australia (IBRA) region, which is characterised by *Acacia* thickets with scattered trees, grasslands, and savannahs over extensive plains, ranges and gorges (Bastin and ACRIS Management Committee, 2008), and retains approximately 99 per cent of its pre-European extent of native vegetation cover. The vegetation within the application area is mapped as Beard vegetation association 32, which is well-represented within the IBRA region (Government of Western Australia, 2016). However, the site inspection recorded four vegetation communities across a central track within the application area, and additional vegetation communities may occur (DER, 2016). The site inspection observed that the majority of the vegetation within the application area is in an excellent to very good (Keighery, 1994) condition, with the exception of an access track intersecting the centre of the application area (DER, 2016).

Approximately 55 per cent of the local area (defined as land within 40 kilometres of the application area) is covered by pastoral leases that are likely to be subject to various levels of grazing pressure. Parks and Wildlife advised that the application area "had minimal impact from cattle and fire" (Parks and Wildlife, 2016).

An irrigation management plan produced by Advanced Fertigation Systems for irrigated agriculture within Wallal Down Station notes that the weed species buffel grass (*Cenchrus ciliaris*) and bird grass (*C. setiger*) occur within the property (Advanced Fertigation Systems, 2015). The site inspection found little to no weed invasion within the application area (DER, 2016).

A total of two priority 1 flora species (*Bonamia oblongifolia* and *Nicotiana heterantha*), one priority 2 species (*Eragrostis fillicaulis*) and two priority 3 flora species (*Terminalia kumpaja* and *Whiteochloa capillipes*) have been recorded in the local area.

Nicotiana heterantha occurs within seasonally wet flats with black clay. Based on the absence of this habitat type, this species is not likely to occur within the application area.

Bonamia oblongifolia has a restricted distribution, having been recorded at three locations within the Dampierland IBRA region (Western Australian Herbarium, 1998-). Priority 1 flora species are known from one or a few locations (generally five or less) that are potentially at risk, and all occurrences are either small, on lands not managed for conservation, or otherwise under threat of habitat destruction or degradation.

A targeted survey for *B. oblongifolia* was conducted by EnviroWorks Consulting (EnviroWorks) during 16 - 24 August 2016. *B. oblongifolia* was recorded within the application area and the surrounding vegetation (EnviroWorks, 2016). EnviroWorks estimated the local population to comprise 1,170,000 plants over 5,600 hectares (EnviroWorks, 2016). The number of *B. oblongifolia* within the application area is estimated to be 30,752 plants over 450 hectares (EnviroWorks, 2016). Parks and Wildlife advised that given the patchy distribution of this species, "the area occupied [rather than the estimated population size] is the preferred measure when determining this species representation in the local area, and hence the potential impact to the species" (Parks and Wildlife, 2016). The proposed clearing will remove eight per cent of the surveyed habitat for this species in the surrounding area (EnviroWorks, 2016). The recorded species density within the application area (estimated 68 plants per hectare) is lower than surrounding areas (estimated 206 plants per hectare) (EnviroWorks, 2016). Parks and Wildlife advised that in the absence of regional scale flora surveys, there is the potential for local and cumulative impacts to *B. oblongifolia* as a result of the proposed clearing (Parks and Wildlife, 2016).

There is one record of *Whiteochloa capillipes* within the local area, occurring within hummock grassland over pindan soils. There are five records of *Terminalia kumpaja* within the local area in a variety of habitat types including a red sand dune. Priority 3 flora species are poorly known, but do not appear to be under imminent threat. While suitable habitat for these species may occur within the application area, both species have moderate to large distributions and are not likely to be impacted on a local or regional scale by the proposed clearing (Western Australian Herbarium, 1998-).

The application area is located approximately 4.3 kilometres from the mapped boundary of the Eighty Mile Beach Ramsar site. This Ramsar site was listed on 7 June 1990, is made up of Eighty Mile Beach and Mandora Salt Marsh, and covers approximately 175,487 hectares along 220 kilometres of coastline and adjacent intertidal mudflats (Department of the Environment and Energy [DotEE], 2016). The application area is located approximately four kilometres from the Eighty Mile Beach Marine Park.

Excluding marine species, 36 conservation significant fauna (including eight threatened fauna, 26 migratory birds protected under international agreements and two priority fauna) have been recorded within the local area (40 kilometre radius) (Parks and Wildlife, 2007-; Bamford, 2016a). Of these, the application area provides suitable foraging habitat for migratory bird species, and suitable habitat for the greater bilby (*Macrotis lagotis*) and brush-tailed mulgara (*Dasyercus blythi*; priority 4). Parks and Wildlife also advised that the application area may provide habitat for the spectacled hare-wallaby (*Lagorchestes conspicillatus leichardti*; priority 3) (Parks and Wildlife, 2016).

The greater bilby is specially protected under the *Wildlife Conservation Act 1950* (WC Act) and vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A survey was conducted for the greater bilby by Bamford Consulting Ecologists (Bamford) on 17-18 August 2016. The survey determined that the station provides habitat for this species (Bamford, 2016b). One old, abandoned burrow was recorded within the application area, and two recently active bilby burrows were recorded within the property 15 kilometres south-west of the application area (Bamford, 2016b). Vegetation between the application area and the site with two recently active bilby burrows was not surveyed. Parks and Wildlife advised that "the survey was sufficient to confirm the recent use of the area by [the greater] bilby" and "the [application area] has highly suitable and potentially important bilby habitat...that has had minimal impact from cattle and fire" (Parks and Wildlife, 2016).

The other threatened fauna species are shorebirds that, based on known habitat requirements (DotEE, 2017), are not likely to be dependent on habitat within the application area for foraging, breeding or shelter.

The 26 migratory bird species may utilise habitat within the application area for opportunistic foraging, however they are unlikely to be specifically reliant on habitat within the application area.

Given that available information indicates:

- the presence of at least four vegetation communities in an area where only one vegetation association is mapped;
- the presence of vegetation predominantly in a very good to excellent (Keighery, 1994) condition that supports conservation significant flora and fauna; and
- up to 55 per cent of the local area is subject to grazing pressure within pastoral leases;

it is considered that the application area comprises a high level of biological diversity and the proposed clearing is at variance to this Principle.

While the application area contains a high level of biological diversity, it is acknowledged that the values present within the application area also occur within the immediate vicinity, and may occur throughout the portion of the property that occurs between the Great Northern Highway and Eighty Mile Beach. The proposed clearing is not likely to have a significant impact on the level of biological diversity in the local area.

The applicant has proposed management measures to minimise impacts to the greater bilby and brush-tailed mulgara. Management measures include conducting pre-clearance surveys for the greater bilby, and relocating greater bilbies into suitable habitat outside the application area.

Methodology

References:
Advanced Fertigation Systems (2015)
Bamford (2016a)
Bamford (2016b)
Bastin and ACRIS Management Committee (2008)
CSLC (2015)
DAFWA (2004)
DER (2016)
DotEE (2016)
DotEE (2017)
EnviroWorks (2016)
Government of Western Australia (2016)
Keighery (1994)
Parks and Wildlife (2007-)
Parks and Wildlife (2016)

Shepherd et al. (2001)
Western Australian Herbarium (1998-)

GIS Database:
- Pastoral leases
- SAC bio datasets (Accessed December 2016)

(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

Proposed clearing may be at variance to this Principle

The vegetation within the application area is mapped as Beard vegetation association 32, which is well-represented within the IBRA region (Government of Western Australia, 2016). It is understood that the Beard mapping within the Pilbara region was undertaken at a broad scale of 1:1,000,000 and may therefore not identify local vegetation communities.

As discussed in Principle (a), the majority of the application area is in an excellent to good (Keighery, 1994) condition (DER, 2016).

The greater bilby survey conducted by Bamford described one fauna habitat type within the application area of 'sparse low shrubland (*Acacia*, *Grevillea* and *Melaleuca* spp.) over spinifex hummock grassland on red sand and sandy-loam' (Bamford, 2016b). It is possible that the proposed clearing will cause habitat fragmentation on a local scale that may impede fauna movement through the landscape for species with small home ranges or low dispersal ability.

The Eighty Mile Beach Ramsar wetland is located approximately 4.3 kilometres from the application area. This Ramsar site was listed on 7 June 1990, is made up of Eighty Mile Beach and Mandora Salt Marsh, and covers approximately 175,487 hectares along 220 kilometres of coastline and adjacent intertidal mudflats (DotEE, 2016). The Ramsar site supports a number of fauna species of conservation significance, is considered to regularly support in excess of 500,000 birds, and is recognised as important refugia for biological diversity in arid Australia and one of the most important sites in Australia for migratory shorebirds listed under international agreements (DotEE, 2016).

As discussed in Principle (a), the application area provides suitable foraging habitat for 26 migratory bird species, and suitable habitat for the greater bilby, brush-tailed mulgara and spectacled hare-wallaby (Parks and Wildlife, 2016).

The greater bilby once occurred across 70 per cent of mainland Australia, but has now disappeared from up to 90 per cent of its historical range and occurs in fragmented populations in south-western Queensland, drier areas of the Northern Territory, and northern Western Australia (Pavey, 2006; Narayan et al., 2014). In Western Australia, the species occurs in a portion of the Gibson Desert and Great Sandy Desert bioregions, portions of the Pilbara bioregion, the Dampierland bioregion (within which the application area is located) along Eighty Mile Beach and north to Beagle Bay, and in the Central Kimberley and Ord-Victoria Plains bioregions south of the Fitzroy and Margaret Rivers. The distribution of the greater bilby is highly fragmented in this area (Pavey, 2006).

An assessment of the greater bilby on Wallal Downs Station by Bamford states that the property provides habitat for this species (Bamford, 2016b). One old, abandoned greater bilby burrow was recorded within the application area, and two greater bilby burrows (active 2-4 weeks ago and approximately 4 weeks ago, respectively) were recorded within the property approximately 15 kilometres west of the application area (Bamford, 2016b). Parks and Wildlife advised that there are "multiple Departmental records of the [greater] bilby from Wallal Down Station over the last two decades, including a record from 2016 within four kilometres of the [application area]" (Parks and Wildlife, 2016). Parks and Wildlife advised that "the [application area] has highly suitable and potentially important bilby habitat comprised of deep sand spinifex with *Melaleuca* sp. overstorey that has had minimal impact from cattle and fire".

A survey methodology for the greater bilby within Wallal Downs Station was proposed by the applicant and endorsed by Parks and Wildlife in December 2015 (Ref: A1080725). Parks and Wildlife advised that "the bilby survey methodology employed was not consistent with the proposal that was endorsed by Parks and Wildlife in December 2015 with regard to survey effort, and the suggestion to survey adjacent suitable habitat was not adopted. Whilst the survey was sufficient to confirm the recent use of the area by [greater] bilby, further surveys are required to determine the level of bilby activity, likely impact of clearing to the species and appropriate mitigation strategies" (Parks and Wildlife, 2016).

Parks and Wildlife advised that the proposed clearing also has the potential to impact habitat for the brush-tailed mulgara (*Dasyercus blythi*; priority 4) and spectacled hare-wallaby (*Lagorchestes conspicillatus leichardti*) (Parks and Wildlife, 2016).

According to available databases, the spectacled hare-wallaby has not been recorded in the local area (40 kilometre radius), and is not likely to be significantly impacted by the proposed clearing.

The 26 migratory bird species may utilise habitat within the application area for opportunistic foraging, however none are unlikely to be specifically reliant on habitat within the application area.

The Irrigation Management Plan notes that liaison has occurred with the former Department of Environment and Conservation to ensure no sensitive ecological receptors will be impacted by the proposed pivot irrigation activities (Advanced Fertigation Systems, 2015).

Based on the 755 hectare area of the project footprint, the extent of clearing proposed (450 hectares), and records of greater bilby burrows within (one) and nearby the application area (two), the vegetation within the application area may be necessary for the maintenance of, and may comprise, significant habitat for indigenous fauna.

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

The applicant has proposed management measures to minimise impacts to the greater bilby and brush-tailed mulgara. Management measures include conducting pre-clearance surveys for the greater bilby and brush-tailed mulgara, and relocating greater bilbies and brush-tailed mulgara into suitable habitat outside the application area.

Methodology

References:

Advanced Fertigation Systems (2015)
Bamford (2016b)
CSLC (2015)
DER (2016)
DotEE (2016)
Government of Western Australia (2016)
Keighery (1994)
Narayan et al. (2014)
Parks and Wildlife (2007-)
Parks and Wildlife (2016)
Pavey (2006)

GIS Databases:

- RAMSAR sites
- SAC bio datasets (Accessed December 2016)

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

Comments

Proposed clearing is not likely to be at variance to this Principle

According to available databases, no rare flora species have been recorded within the local area.

According to aerial imagery, the Beard vegetation association mapped within the application area is well-represented within the local area (Government of Western Australia, 2016). It is understood that the Beard mapping within this region was undertaken at a broad scale of 1:1,000,000 and may therefore not identify local vegetation communities.

A site inspection of the project footprint conducted by officers of DER and Parks and Wildlife identified four vegetation communities within the application area and five vegetation communities north and south of the application area (DER, 2016). The site inspection identified that the majority of the application area includes vegetation in an excellent to good (Keighery, 1994) condition (DER, 2016).

A flora survey was conducted by EnviroWorks on 16 - 24 August 2016 (EnviroWorks, 2016). While no rare flora were recorded, the survey was targeting the priority 1 flora *Bonamia oblongifolia*.

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

Methodology

References

DER (2016)
EnviroWorks (2016)
Government of Western Australia (2016)
Keighery (1994)

GIS Databases:

- SAC bio datasets (Accessed December 2016)

(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

Proposed clearing is not likely to be at variance to this Principle

According to available databases, there are no known threatened ecological communities (TECs) within the local area. The nearest TEC is the 'Assemblages of the organic springs and mound springs of Mandora Marsh area', located approximately 70 kilometres east, north-east of the application area.

The vegetation within the application area is not considered to represent a TEC.

TECs in the Dampierland IBRA region endorsed by the Minister for Environment include monsoon vine thickets on coastal sand dunes of Dampier Peninsula (also listed under the EPBC Act), and four assemblages associated with several organic and/or mound springs in the region. According to available databases, no springs are mapped within the application area. The application area is not likely to comprise the whole or a part of, or be necessary for the maintenance of any TEC.

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

Methodology GIS Database:
- SAC bio datasets (Accessed December 2016)

(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 Proposed clearing is not at variance to this Principle

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 percent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

The application area is located within the Dampierland IBRA bioregion, which retains approximately 99 per cent of the pre-European extent of native vegetation cover (Government of Western Australia, 2016).

The vegetation within the application area is mapped as Beard vegetation association 32, which retains approximately 99 per cent of its pre-European extent at both a State and bioregional level (Government of Western Australia, 2016).

The application area is located within the Shire of Broome, within which there is approximately 99 per cent pre-European vegetation extent remaining (Government of Western Australia, 2016).

Based on aerial imagery, the local area (defined as a 40 kilometre radius around the application area) is well vegetated and retains an estimated 99 per cent of the pre-European extent of native vegetation cover.

On the basis that the native vegetation extents present within the application area, the Shire, the IBRA region and the local area retain more than 30 per cent representation respectively, it is considered that the vegetation within the application area is not significant as a remnant of native vegetation within an area that has been extensively cleared.

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

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Extent in Parks and Wildlife Managed Lands (%)
IBRA Bioregion*				
Dampierland	8,343,939	8,319,8729	99	1
Local government*				
Broome, Shire Of	5,469,3379	5,436,1039	99	1
Beard vegetation association in Bioregion*				
32	244,297	244,265	99	0

Methodology References:
*Government of Western Australia (2016)

GIS Database:
- IBRA WA (Regions - Sub Regions)
- Imagery
- 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 Proposed clearing is not likely to be at variance to this Principle

According to available databases, no wetlands, watercourses or areas subject to inundation are mapped within the application area. No wetlands or watercourses were observed within the application area during the site inspection (DER, 2016).

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

Methodology References:
DER (2016)

GIS Databases:
- Hydrography, linear

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

Comments Proposed clearing may be at variance to this Principle

The CSLC provided advice in regards to the previously withdrawn clearing permit application CPS 6744/1, which was located over the application area. The CSLC advised that this advice also applies to the current application CPS 7313/1 (CSLC, 2016).

The application area occurs within the Nita land system, and is south of the Mannerie land system. The CSLC advised that the Nita land system comprises deep red sand that generally supports shrubby hard and soft spinifex, and the lower lying areas of the Mannerie land system contain seepage areas on paleo-tidal plain that supports *Melaleuca* thicket and halophytic shrubs (CSLC, 2015). The Nita land system supports shrubby hard and soft spinifex over deep red sand with no organised drainage features (Van Vreeswyk et al., 2004).

The CSLC advised that the boundaries between land systems in this area are often gradual, and it is possible for Nita sandplain soils along the northern boundary of the application area to be overlying fine saline soils of the Mannerie land system (CSLC, 2015).

A site inspection of the project footprint conducted by officers of DER and Parks and Wildlife identified that the vegetation and soils within the application area are mostly representative of the Nita land system. The site inspection also identified areas that appeared to be a transitional zone between the two land systems, indicated by the presence of *Melaleuca* species within the application area, and 'pink' soils likely to be a mix between red pindan soils of the Nita land system and grey soils of the Mannerie land system present north of the application area (DER, 2016).

The CSLC advised that the sandy soils of the Nita system are prone to wind erosion following the removal of vegetation (CSLC, 2015).

According to available databases, no watercourses, wetlands or areas subject to inundation are mapped within the application area. Advanced Fertigation Systems advised that some sheet flow occurs in the vicinity of the application area following heavy rainfall (Advanced Fertigation Systems, 2015). Given the proposed clearing occurs within an area of flat topography, the proposed clearing is not likely to cause appreciable land degradation in the form of water erosion.

The CSLC advised that the proposed clearing is unlikely to cause appreciable land degradation in the forms of waterlogging, salinity or eutrophication (CSLC, 2015).

Based on the extent of clearing proposed and the potential for wind erosion between clearing and pasture establishment, it is considered that the proposed clearing may cause land degradation.

The CSLC advised that the pindan soils of the Nita land system have been successfully irrigated for many years without causing appreciable land degradation (CSLC, 2015). The CSLC advised that the risk of wind erosion can be managed by irrigation and crop establishment, and management after baling to retain approximately 50 per cent ground cover in stubble (CSLC, 2015). An irrigation management plan has been developed for the project, outlining management measures to be implemented during pivot irrigation activities (Advanced Fertigation Systems, 2015). The irrigation management plan states that greater than 90 per cent ground cover will be maintained, which is likely to mitigate the risk of wind erosion within cleared areas (Advanced Fertigation Systems, 2015).

Based on the potential for wind erosion to occur, the proposed clearing may be at variance to this Principle.

Methodology References:
Advanced Fertigation Systems (2015)
CSLC (2015)
CSLC (2016)
DER (2016)
Van Vreeswyk et al. (2004)

GIS Databases:
- Imagery
- Rangeland land system mapping

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

Comments Proposed clearing is not likely to be at variance to this Principle

According to available databases, the application area does not include any conservation areas or Parks and Wildlife managed lands.

The application area is located approximately 4.3 kilometres from the mapped boundary of the Eighty Mile Beach Ramsar site. This Ramsar site was listed on 7 June 1990, is made up of Eighty Mile Beach and Mandora Salt Marsh, and covers approximately 175,487 hectares along 220 kilometres of coastline and adjacent intertidal mudflats (DotEE, 2016).

The Eighty Mile Beach Marine Park is located approximately four kilometres north of the application area.

Given the separation distance between these conservation areas and the application area, it is considered that the proposed clearing is unlikely to impact on the environmental values of nearby conservation areas.

An irrigation management plan notes that liaison has occurred with the former Department of Environment and Conservation to ensure no sensitive ecological receptors will be impacted by the proposed pivot irrigation activities (Advanced Fertigation Systems, 2015).

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

Methodology References:
Advanced Fertigation Systems (2015)
DotEE (2016)

GIS Databases:
- Parks and Wildlife 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 Proposed clearing is not likely to be at variance to this Principle

According to available databases, no watercourses or wetlands are mapped within or adjacent to the application area. An irrigation management plan notes that some sheet flow occurs in the vicinity of the application area following heavy rainfall (Advanced Fertigation Systems, 2015). Given the proposed clearing occurs within an area of nearly-flat topography, it is considered that the proposed clearing is unlikely to impact the flow or quality of surface water following rainfall.

The application area is located within the Nita land system abutting the Mannerie land system to the north (CSLC, 2015). The Nita land system comprises deep red sand that generally supports shrubby hard and soft spinifex, and the lower lying areas of the Mannerie land system contain seepage areas on paleo-tidal plain that supports melaleuca thicket and halophytic shrubs (CSLC, 2015). The CSLC advised that given the nature of the pindan soils, it is unlikely that the proposed clearing will cause appreciable land degradation in the forms of salinity or eutrophication (CSLC, 2015). Groundwater salinity within the application area is low (approximately 500-1,000 milligrams per litre total dissolved solids). Based on this, it is considered that the proposed clearing is unlikely to cause deterioration in the quality of groundwater.

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

Methodology References:
Advanced Fertigation Systems (2015)
CSLC (2015)
DER (2016)

GIS Databases:
- Hydrography, linear
- Groundwater salinity, 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 Proposed clearing is not likely to be at variance to this Principle

The application area is located within the Sandy Desert Basin catchment, which has a total area of 29,288,220 hectares.

Mean annual rainfall in Shellborough, located approximately 124 kilometres west of the application area, is approximately 317 millimetres (Bureau of Meteorology [BoM], 2016). The Dampierland bioregion has a semi-arid to tropical monsoonal climate, receiving much of its rainfall during summer months (Bastin and ACRIS Management Committee, 2008; BoM, 2016). It is likely that during times of intense rainfall there may be some localised flooding. The proposed clearing is unlikely to significantly alter the intensity of flooding within the application area or surrounding areas.

The applicant's irrigation management plan states that annual rainfall has a very high variability from year to year influenced by cyclonic weather, however is generally between 200-1,200 millimetres per annum at Wallal Downs (Advanced Fertigation Systems, 2015). The irrigation management plan states that drainage on the pindan sandplain is poorly defined and generally falls towards the coast, with wide-spaced ephemeral drainage depressions holding water only after heavy rainfall (Advanced Fertigation Systems, 2015).

Noting that the risk of standing water and water erosion is associated with high rainfall events and that local runoff is likely to be for short durations, it is considered that the proposed clearing is unlikely to cause or exacerbate the incidence or intensity of flooding.

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

Methodology References:
Advanced Fertigation Systems (2015)
Bastin and ACRIS Management Committee (2008)
BoM (2016)

GIS Database:
- Hydrographic catchments - catchments

Planning instruments and other relevant matters.

Comments Background

The previous lease holder applied to clear:

- 25 hectares within a 154 hectare footprint on the property to establish Stage 1 of two pivots (CPS 4390/1). On 3 November 2011 clearing permit CPS 4390/1 was granted. An application to increase the extent of clearing to 90 hectares was submitted but later withdrawn.
- 520 hectares within a 3,282 hectare footprint on the property to establish Stages 2 and 3 of six pivots each (CPS 4563/1). The application was later withdrawn due to other approvals not being obtained.
- 210 hectares within an 833 hectare footprint on the property to establish six pivots (CPS 5166/1). On 27 December 2012 clearing permit CPS 5166/1 was granted. Under this permit approximately 142.5 hectares was cleared and three pivots were established prior to the permit expiring.

The current lease holder (being the applicant) has applied to clear:

- 170 hectares within an 831 hectare footprint on the property to establish three pivots (CPS 6697/1 'Cooragoora'), overlapping the area authorised under clearing permit CPS 5166/1;
- 600 hectares within a 6,219 hectare footprint on the property to establish ten pivots (CPS 6744/1 'Homestead' – located over the current application area and surrounds); and
- 350 hectares within a 2,065 hectare footprint on the property to establish ten pivots (CPS 6950/1 'Chirup'), overlapping a portion of the area applied for in application CPS 4563/1.

Clearing permit application CPS 6697/1 was amended to 75 hectares and granted on 13 October 2016. Clearing permit applications CPS 6950/1 and 6744/1 were withdrawn on 1 August 2016 and 31 August 2016, respectively.

According to section 38 of the *Environmental Protection Act 1986* (EP Act), a proponent of a strategic proposal or any person or a decision-making authority may refer a proposal to the Environmental Protection Authority (EPA). A strategic proposal, as defined under the EP Act, means a future proposal that will be a significant proposal. A significant proposal, as defined under the EP Act, means a proposal likely, if implemented, to have a significant effect on the environment. Multiple clearing permit applications submitted within Wallal Downs may have a significant cumulative effect on the environment as a result of the clearing of native vegetation and the end land uses. Therefore, any future applications/stages within Wallal Downs may be referred to the EPA.

The clearing permit application was advertised in *The West Australian* newspaper on 31 October 2016 for a 21 day submission period. No public submissions were received.

Management measures

On 12 July 2017, the applicant provided a management plan to minimise environmental impacts resulting from the proposed clearing and land use. Management measures include the following (EnviroWorks, 2017):

Clearance survey methods:

Brush-tailed Mulgara and Greater Bilby clearance surveys will be conducted in areas to be cleared, prior to work commencing. Clearance surveys will be conducted as follows:

1. Clearance surveys will occur within 1 month of the proposed clearing (and minimised to less than a month if possible).
2. The survey will be designed to determine if the Bilby or Mulgara are present and particularly if there are any occupied burrows in the area to be cleared.
3. The survey will involve two personnel walking transects through the proposed clearing area, with the transects spaced at approximately 100 m intervals (on average).
4. If burrows are present, it will be confirmed if there are animals in the burrows. This will be done through the use of motion-sensitive cameras and lightly blocking holes with dry grass.
5. Experienced fauna specialists will conduct the surveys.

Bilby and mulgara relocation methods:

If Mulgara or Bilbies are found to be present:

1. Relocation will be carried out by fauna specialists.
2. Relocation planning and methods will consider the breeding season of the target species.
3. Potential release sites will be inspected to confirm suitability and selected to minimise the chance of animals returning to the clearing area.
4. The relocation plan will be discussed with local Department of Biodiversity, Conservation and Attractions (DBCA) - Parks and Wildlife Service officers prior to enacting it.
5. An appropriate licence will be obtained under the *Wildlife Conservation Regulations, 1970*.
6. Details of any Mulgara or Bilbies that are relocated during the clearance surveys will be recorded with as much detail as possible. The information will be passed onto DBCA. At a minimum the following details will be recorded:
 - Species (if known);
 - Sex (if known);
 - GPS coordinates of site of capture and relocation;
 - Weather conditions;
 - Vegetation type;
 - Reliability of identification;
 - Date and time of sighting; and
 - Name of observer.

Measures to prevent mortality during clearing:

The following management measures will be implemented during the clearing phase:

1. Clearing will occur in one direction, so that animals have a chance to escape ahead of the clearing activity.
2. Induction and awareness training of all staff and contractors on aspects of the management plan will be carried out prior to works commencing. Training materials will be developed by a qualified environmental scientist or consultant.
3. All staff working on site will be made aware during the induction, that native fauna (including Mulgara and Bilbies) are protected.
4. The fauna specialist will communicate with on-site staff regarding bilby/mulgara identification and protection (whilst on site during the clearance survey) where practicable.
5. Planning and operation of the clearing phase will aim to retain and protect as much natural habitat as possible.
6. During site works, areas requiring clearing will be clearly marked and access to other areas restricted to prevent accidental clearing/damage of areas to be retained.
7. Staff and contractors that encounter Mulgara or Bilbies on site will be required to report it immediately to the project manager. Operations in that area (if likely to harm the animal) will cease and/or the animals location monitored until it either leaves the area of its own accord or is removed by a qualified expert and relocated to a nearby protected area with similar habitat in consultation with the DBCA local office.
8. An Emergency Response Plan will be prepared prior to clearing commencing to deal with all potential emergency situations that may have an impact upon the environment. The plan will include procedures and responses for dealing with bushfires.
9. All sightings of Mulgara or Bilbies within the project area will be recorded by the project manager (or delegate) with as much detail as possible. The information will be passed onto the local DBCA office.
10. If a Mulgara or Bilby is injured during construction, contact will be made with a pre-arranged qualified veterinarian or qualified wildlife carer and appropriate action taken to ensure the animal's welfare.

Measures to protect adjacent habitat:

1. Planning and operation of the clearing phase where possible will aim to retain and protect as much natural habitat as possible.
2. Clearing lines will be pegged or flagged prior to clearing commencing so that they are clearly delineated and no clearing will occur beyond the line. During site works areas requiring clearing will be clearly marked and access to other areas restricted to prevent accidental clearing/damage of areas to be retained.
3. If any fuel or chemicals are spilt, contaminated soil will be removed and disposed of by a licensed operator and disposed of in accordance with legal requirements.
4. An Emergency Response Plan will be prepared prior to clearing commencing to deal with all potential emergency situations that may have an impact upon the environment. The plan will include procedures and responses for dealing with bushfires (to avoid fire destruction of adjacent habitat). The plan will reduce the risk of unplanned fires and provide contingency measures to minimise any associated impacts.
5. All employees will have emergency contact numbers available within all vehicles.

Management of predators:

... introduced predators such as foxes and wild dogs are a known threatening process posed to both bilbies and mulgara, and both are present on Wallal Downs. For example, a significant fox den was located about 12 km south of Homestead on 5 March 2017, approximately 1km from a cattle trough. Grenleigh is proactively reducing this threat, with management strategies including wild dog control. Grenleigh engaged the services of a dogger in February 2017, who destroyed 26 dogs on Wallal Downs Station, reducing predator impacts on both cattle and native fauna.

Other relevant approvals

The greater bilby is protected under the EPBC Act. As a matter of national environmental significance, any action

that has, or will have, or is likely to have a significant impact on the greater bilby will require approval under the EPBC Act.

Any activities with a likelihood of impacting fauna specially protected under the WC Act (including clearing activities) and the relocation of fauna require a fauna licence pursuant to Regulation 15 of the *Wildlife Conservation Regulations 1970*.

The application area is located within the Canning-Kimberley Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). A licence to take groundwater for the purpose of stock watering and irrigation of up to 900 hectares was issued by the former Department of Water (DoW) under the RIWI Act (ref. GWL150360) on 25 January 2017 (DoW, 2017).

The Shire of Broome advised development approval was granted within the application area on 26 August 2016 (Shire of Broome, 2016).

The applicant has submitted an application for a diversification permit to grow irrigated sorghum, maize and forage oats over the area subject to the native vegetation clearing permit application. DAFWA has listed these species as permitted non indigenous plant species and as being suitable for irrigated production (DAFWA, 2010). These species are considered to be lowest risk to the environment and should be suitable for most circumstances. The applicant has also applied to grow rhodes grass which DAFWA has listed as presenting a risk in certain circumstances or not being assessed for cultivation in Western Australia, risks may be manageable depending upon the specific circumstances; such as soil fertility, rainfall and proximity to wetlands or river systems (DAFWA, 2010).

An Indigenous Land Use Agreement is in place over the property (register WI2010/26).

Methodology
References:
DAFWA (2010)
DoW (2017)
EnviroWorks (2017)
Shire of Broome (2016)

4. References

- Advanced Fertigation Systems (2015) Wallal Downs Station Irrigation Management Plan. Prepared for Walla Downs Station by Advanced Fertigation Systems Pty Ltd (DER REF: A982664).
- Bamford Consulting Ecologists (Bamford) (2016a) Assessment of the Bilby *Macrotis lagotis* on Wallal Downs Station; Cooragoora project area. Unpublished report prepared by Bamford Consulting Ecologists for Grenleigh Pty Ltd (DER REF: A1157504).
- Bamford (2016b) Assessment of the Bilby *Macrotis lagotis* on Wallal Downs Station; Homestead and Chirup project areas. Unpublished report prepared by Bamford Consulting Ecologists for Grenleigh Pty Ltd (DER REF: A1176404).
- Bastin, G. and the ACRIS Management Committee, Rangelands (2008) Taking the Pulse, published on behalf of the ACRIS Management Committee by the National Land & Water Resources Audit, Canberra.
- Bureau of Meteorology (BoM) (2016) Climate Statistics for Australian Locations. A Search for Climate Statistics for Shellborough, Australian Government Bureau of Meteorology, http://www.bom.gov.au/climate/averages/tables/cw_004028.shtml (Accessed December 2016).
- Commissioner of Soil and Land Conservation (CSLC) (2015) Advice received from the Commissioner of Soil and Land Conservation on 2 December 2015 (DER REF: A1016574 and A1018629).
- Commissioner of Soil and Land Conservation (CSLC) (2016) Advice received from the Commissioner of Soil and Land Conservation on 23 December 2016 (DER REF: A1351985).
- Department of Agriculture and Food Western Australia (DAFWA) (2004) An inventory and condition survey of the Pilbara region, Western Australia. Technical Bulletin number 92. Published December 2004.
- Department of Agriculture and Food Western Australia (DAFWA) (2010) Non indigenous plant species lists for Western Australian rangelands. Department of Agriculture and Food Western Australia.
- Department of Environment Regulation (DER) (2016) Site inspection conducted on 20 April 2016 by the Department of Environment Regulation and the Department of Parks and Wildlife (DER REF: A1091533).
- Department of Parks and Wildlife (2007-) NatureMap: Mapping Western Australia's Biodiversity. Department of Parks and Wildlife. <http://naturemap.dpaw.wa.gov.au/>. (Accessed December 2016).
- Department of Parks and Wildlife (Parks and Wildlife) (2016) Parks and Wildlife advice received on 9 December 2016. Department of Parks and Wildlife (DER REF: A1340782).
- Department of the Environment and Energy (DotEE) (2016) Eighty-mile Beach Ramsar wetland description. Australian Government. URL: <http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=34> (Accessed December 2016).
- Department of the Environment and Energy (DotEE) (2017) Species Profile and Threats Database, Department of the Environment, Canberra. Available from: <http://www.environment.gov.au/sprat> (Accessed January 2017).
- Department of Water (DoW) (2017) Advice received from the Department of Water on 28 June 2017 (DER REF: A1462596).
- EnviroWorks (2017) Mulgara and Bilby Management Plan - Wallal Downs: Homestead, Cooragoora and Chirup. Plan prepared for Grenleigh Pty Ltd, 12 July 2017 (DWER REF: A1473578).
- Government of Western Australia (2016) 2016 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of October 2016. WA Department of Parks and Wildlife, Perth.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Narayan, E. J., Evans, N., & Hero, J. M. (2014) Monitoring physiological stress in semi-free ranging populations of an endangered Australian marsupial, the Greater Bilby (*Macrotis lagotis*). *European Journal of Wildlife Research*, 60(5),

727-735.

- Pavey, C. (2006) National Recovery Plan for the Greater Bilby *Macrotis lagotis*. Northern Territory Department of Natural Resources, Environment and the Arts.
- Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.
- Shire of Broome (2016) Advice received from the Shire of Broome on 30 November 2016 (DER REF: A1334042).
- Van Vreeswyk, A.M.E., Payne, A.L., Leighton, K.A. and Hennig, P. (2004) Technical Bulletin - An Inventory and Condition Survey of the Pilbara Region, Western Australia, No. 92. Department of Agriculture, Perth, Western Australia.
- Western Australian Herbarium (1998-) FloraBase - The Western Australian Flora. Department of Parks and Wildlife. <http://florabase.dpaw.wa.gov.au/> (Accessed December 2016).