Department of Environment and Conservation

# Clearing Permit Decision Report

## 1. Application details

### 1.1. Permit application details

**Permit application No.:** 1760/1
**Permit type:** Area Permit

### 1.2. Proponent details

**Proponent's name:** Sharpe Brothers Pty Ltd

### 1.3. Property details

**Property:** LOT 1 ON DIAGRAM 55913 (Lot No. 1 KEENAN MONJINGUP 6450)
**Local Government Area:** Shire Of Esperance
**Colloquial name:**

### 1.4. Application

| Clearing Area (ha) | No. Trees | Method of Clearing | For the purpose of: |
|---|---|---|---|
| 0.8 | | Mechanical Removal | Extractive Industry |

## 2. Site Information

### 2.1. Existing environment and information

*2.1.1. Description of the native vegetation under application*

| Vegetation Description | Clearing Description | Vegetation Condition | Comment |
|---|---|---|---|
| Beard Vegetation Association 7048:<br><br>Shrublands; banksia scrub-heath on coastal plain in the Esperence Plains Region<br>Beard Vegetation Association 42:<br>Shrublands of mallee and acacia scrub on south coastal dunes. | The vegetation is described as 'a sand ridge heath dominated by Melaleuca eleutherostachya, Calothamnus gracilis and Adenanthos cuneatus, with a scattered overstorey of Banksia speciosa and Nuytsia floribunda. The wetland thicket in the north was not investigated in detail because it will not be impacted on by the sand excavation. This community is a thicket of Melaleuca cuticularis, Agonis linearifolia and Acacia cyclops around the edges with an understorey of reeds and rushes. The sand ridge heathland is typical of the local sand ridge vegetation but represents a transition between the more coastal calcareous sand dunes and the more inland yellow and white sand dunes. Species from both types of community are present' (Landform Research 2006). | Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994) | The proposed clearing of 0.8ha is for the purpose of sand extraction within the Shire of Esperance. This region is characterised by a suite of wetlands oriented east-west across the south-western region of the Esperance Shire.<br><br>Aerial photography suggests that the vegetation under application is generally in Very Good condition (Keighery, 1994), although surrounding areas appear to have been previously disturbed, as evidenced by vehicle tracks and small cleared areas are visible from aerial photography.<br><br>The vegetation under application can be divided into two areas, the northern and south. A vegetation survey as reported by Landform Research (2006) recorded the central area as being in excellent to good condition (equivalent to Keighery (1994) Pristine to Very Good condition) and the southern area as being in very good to fair condition (equivalent to Keighery (1994) Excellent to Good condition). |

## 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 at variance to this Principle**

The proposed clearing of 0.8ha is for the purpose of sand extraction within the Shire of Esperance. This region is characterised by a suite of wetlands oriented east-west across the south-western region of the Esperance Shire. Aerial photography and topographic contours indicate that the application area is low lying, with a number of small wetlands and areas subject to inundation in the immediate surrounding landscape.

Aerial photography suggests that the vegetation under application is generally in Very Good condition

(Keighery, 1994), although surrounding areas appear to have been previously disturbed, as evidenced by vehicle tracks and small cleared areas are visible from aerial photography. The vegetation under application can be divided into two areas, the central and south. A vegetation survey as reported by Landform Research (2006) recorded the central area as being in excellent to good condition (equivalent to Keighery (1994) Pristine to Very Good condition), and the southern area as being in very good to fair condition (equivalent to Keighery (1994) Excellent to Good condition). The vegetation under application adjoins a large area of previously cleared land to the west, which appears to have been used for extractive industry.

Although the Beard vegetation associations (7048 and 42) that occur over the vegetation under application are well represented (82.1 and 95.6% remaining respectively), aerial photography indicates that the local area (10km radius) is highly cleared with ~20% of vegetation remaining. The area under application is part of a coastal remnant, which is fragmented in areas not under reserve, close to the Esperance townsite. North of this coastal remnant is highly cleared due to agricultural activity. This area is, therefore, within the EPA Position Statement No. 2 (2000) agricultural area, which has identified this highly cleared part of the State and aims to protect biodiversity values by only allowing clearing of small areas providing biodiversity values are addressed.

There are several conservation reserves in close proximity to the area under application. They include a nature reserves 2.4km west and 589m south and the ANCA protected Pink Lake wetland suite, 998m south. The proposed clearing of this vegetation will incrementally impact these reserves as it will further fragment a highly cleared landscape.

The vegetation complexes mapped over the areas under application include Beard Vegetation Complexes 42 and 7048. Complex 42 is described as shrublands of mallee and acacia scrub on south coastal dunes. Complex 7048 is described as shrublands of banksia scrub-heath on coastal plain in the Esperence Plains Region.

The soil type is mapped as A15 which is described as coastal dunes and their intervening swales with saline flats, swamps, and lakes; some lunettes with some estuarine areas. Chief soils seem to be calcareous sands on the recent dunes fronting the coast, and siliceous sands on the older dunes and lunettes. There are various undescribed soils around the saline flats and swamps, around estuarine areas, and on aeolianite. As mapped, areas of unit Ca26 are included, particularly on headlands (Northcote et al. 1968).

Forty-three known records of 21 species of Priority Flora occur within the local area (10km radius). Of these records, twelve species occur on the same vegetation and soil types as the vegetation proposed to be cleared. This includes four Priority 1, three Priority 3 and five Priority 4 species.

DEC regional advice (2008) stated that two of these species may occur within the vegetation under application. The remaining species are unlikely to occur given their habitat preferences and current recorded populations. The two species and the preferred habitat are:
Astartea sp. Esperance (A. Fairall 2431) (P1) is an erect spreading shrub, to 150cm high, to 250cm wide, flowering white in Sep-Oct. It can be found in sandy gravel, sandy clay and loam in saline depressions, near salt pans and lake margins.
Pityrodia chrysocalyx (P3) is an erect, branched shrub, 30 to 100(-100)cm high, flowering white in Aug-Oct. It can be found on sandy soils.

A report was produced by Landform Research (2006) as an assessment of the vegetation within the property. As part of the assessment, flora surveys were undertaken on the 30 May 2003 and 22 June 2003. Some species may have been missed during these surveys as their flowering periods are generally later in the year, however, even if these above mentioned weren't flowering the genus could have been identified (DEC 2008). The site was walked at intervals of 20 meters, however, no GPS coordinates or maps showing this route have been recorded.

The vegetation was described as 'a sand ridge heath dominated by Melaleuca eleutherostachya, Calothamnus gracilis and Adenanthos cuneatus, with a scattered overstorey of Banksia speciosa and Nuytsia floribunda. The wetland thicket in the north was not investigated in detail because it willn ot be impacted on by the sand excavation. This community is a thicket of Melaleuca cuticularis, Agonis linearifolia and Acacia cyclops around the edges with an understorey of reeds and rushes. The sand ridge heathland is typical of the local sand ridge vegetation but represents a transition between the more coastal calcareous sand dunes and the more inland yellow and white sand dunes. Species from both types of community are present' (Landform Research 2006).

A total of 55 native species were recorded as part of the survey. One significant species, Melaleuca incana subsp. tenella (P3), was recorded within the property. This species was recorded in a wetland area in the north of the property, not within the area under application (which is on a sand ridge).

Although the surveys undertaken did not find any Priority within the vegetation proposed to be cleared, the above mentioned flora that are annual species and flower outside the survey times may occur in the vegetation under application.

Given the very good condition of the vegetation in a highly cleared part of the State and the proximity to wetlands and to local reserves, the vegetation under application may be significant in maintaining the current status of biological diversity in an area that has been extensively cleared and is at variance to this Principle. A

condition to revegetate the site after the sand extraction and revegetation conditions for nearby wetlands will be imposed which will address the loss of vegetation in this cleared landscape.

**Methodology**

EPA (2000)
Keighery (1994)
Landform Research (2006)
Shepherd et al. (2001)
GIS Database:
- ANCA wetlands - Environment Australia 26/3/99
- CALM Managed Lands and Water - CALM 01/08/04
- Esperance Townsite 20cm Orthomosaic - Landgate 07
- Hydrography Linear - DoE 1/2/04
- Pre European Vegetation - DA 01/01
- Topographic Contours, Statewide - DOLA 12/09/02

**(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.**

**Comments**

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

Twenty-four known records of seven Declared Threatened and Priority Fauna species occur within a 10km radius of the application area. Three of these species are marine fauna that are unlikely to be impacted by the proposed clearing. Two species were recorded in the 1950's and are now unlikely to occur in the area.

The remaining two species, the Hooded Plover (Charadrius rubricoolis, Priority 4) and the Recherche Cape Baron Goose (Cereopsis novaehollandiae grisea, listed as vulnerable under the Environmental Protection and Biodiversity Conservation Act (EPBC Act 1999)) have specific habitat requirements.

The Hooded Plover frequents the margins and shallows of salt lakes, also along coastal beaches, where it forages for invertebrates along the water's edge. This species was recorded on the nearby Pink Lake wetland suite which is a hypersaline salt lake. The proposed clearing is close to small wetlands and areas subject to inundation, however, they are not salt lakes and are therefore, unlikely to provide habitat for Hooded Plovers.

The Recherche Cape Baron Goose (Cereopsis novaehollandiae grisea), occurs on the islands of the Recherche Archepelago and is occasionally recorded on the mainland. The area under application is 8.1km from the coast and is unlikely to support this species.

Although the vegetation under application is unlikely to support these significant species, the clearing with further fragment this highly cleared landscape, incrementally restricting the movement and habitat of local indigenous fauna and, as such, may be at variance to this principle. A condition to revegetate the site after the sand extraction and revegetation conditions for nearby wetlands will be imposed which will address the loss of vegetation in this cleared landscape.

**Methodology**

GIS Database:
- Esperance Townsite 20cm Orthomosaic - Landgate 07
- SAC Biodatasets - accessed 12 Mar 08

**(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**

No rare flora species have been recorded within the local area (10km radius).

A report was produced by Landform Research (2006) as an assessment of the vegetation within the property. As part of the assessment, flora surveys were undertaken on the 30 May 2003 and 22 June 2003. The site was walked at intervals of 20 meters, however, no GPS coordinates or maps showing this route have been recorded.

The surveys undertaken did not find rare flora within the vegetation proposed to be cleared

It is not likely that any rare flora occur within the vegetation under application, given that there are no rare flora in the local area.

Therefore, the proposal is not likely to be at variance to this Principle.

**Methodology**

DEC Florabase (2008)
Landform Research (2006)
GIS database:
- SAC Biodatasets - accessed 12 Mar 08

## (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 may be at variance to this Principle**

There are three Threatened Ecological Communities (TEC) in the local area (10km radius).

The closest is Pink Lake, a Priority 1 hypersaline lake that is habitat for stromatolites.

The other two are Esperance Sandplains scrub heath communities (Priority 3), comprised of Banksia and Lambertia on deep sand. The proposed clearing is unlikely to impact on these two TEC's due to their distance from the property.

Threats to Pink Lake include broad scale vegetation clearing, changing hydrology (water becoming hyposaline and leaching of water from Lake Warden system) and pollution (nutrient enrichment and eutrophication) (DEC 2002). The proposed clearing is within the same low lying part of the sub catchment (Bandy Harbour) as that for Pink Lake. Clearing of 0.8ha will incrementally add to the run off into Pink Lake and contribute to the threatening process of hyposalinity within the lake.

The proponent has indicated that the site will be rehabilitated once the sand has been extracted which will reduce some of the run off from the proposed clearing. Additionally, revegetation of nearby wetland areas will be a condition of the permit.

Due to the incremental impacts of the proposed clearing on Pink Lake, the proposed clearing may be at variance to this Principle.

**Methodology**

DEC (2002)
GIS databases:
- Hydrographic catchments, subcatchments - DoW 01/06/07
- SAC Biodatasets - accessed 12 Mar 08
- Topographic contours statewide - DOLA and ARMY 12/09/02

## (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 at variance to this Principle**

The property in question has approximately 12.45 ha (59%) of native vegetation remaining on the property. After the proposed clearing there will be 10.05 (47.9%) of vegetation remaining. There is ~20% of vegetation remaining in the local area (10km radius).

| | Pre-European (ha) | Current Extent (ha) | Remaining (%) |
|---|---|---|---|
| IBRA Bioregion* | | | |
| Esperance Plains^ | 2 899 944 | 1 482 950 | 57.1 |
| Shire** | | | |
| Esperance | 4 242 884 | 3 011 033 | 71.0 |
| Beard Vegetation Complex* | | | |
| 7048 | 134 625 | 110 560 | 82.1 |
| 42 | 310 084 | 296 496 | 95.6 |

** (Shepherd et al. 2006)
* (Shepherd et al. 2001)
^ Area within Intensive Land Use Zone

Although the Beard vegetation associations (7048 and 42) that occur over the vegetation under application are well represented (82.1 and 95.6% remaining respectively), aerial photography indicates that the local area (10km radius) is highly cleared with ~20% of vegetation remaining. The area under application is part of a coastal remnant which is fragmented in areas not under reserve close to the Esperance townsite. North of this coastal remnant is highly cleared due to agricultural activity. This area is, therefore, within the EPA Position Statement No. 2 (2000) agricultural area, which has identified this highly cleared part of the State and aims to protect biodiversity values by only allowing clearing of small areas providing biodiversity values are addressed.

As the proposed clearing is for 0.8ha in Pristine to Good condition (Keighery 1994, Landgate Research 2006) and in the EPA Position Statement No. 2 (2000) agricultural area the proposal is at variance to this Principle.

A condition to revegetate the site after the sand extraction and revegetation conditions for nearby wetlands will be imposed which will address the loss of vegetation in this cleared landscape.

**Methodology** EPA (2000)
Hopkins et al. (2001)
Keighery (1994)
Landgate Research (2006)
Shepherd (2006)
Shepherd et al (2001)
GIS Databases:
- Esperance 20cm Orthomosaic - Landgate 07
- Interim Biogeographic Regionalisation of Australia - EA 18/10/00
- Local Government Authorities - DLI 8/07/04
- Pre European Vegetation - DA 01/01

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

**Comments**

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

The vegetation proposed to be cleared is 0.8ha for the purpose of sand extraction within the Shire of Esperance. This region is characterised by a suite of wetlands oriented east-west across the south-western region of the Esperance Shire.

Aerial photography and topographic contours indicate that the area is low lying (20m AHD), with a number of small wetlands and areas subject to inundation in the immediate surrounding landscape. The proposal site adjoins a large area of previously cleared land to the west, which also appears to have been used for extractive industry.

A number of South Coast Significant Wetlands occur within a 10km radius of the application area. These include the Lake Warden System (Ramsar and ANCA wetland) which includes Windabout Lake, Woody Lake, and Wheatfield Lake; Pink Lake (ANCA wetland); and Lake Monijinup (not classed). The closest of these to the proposed clearing is Pink Lake, an Environmentally Sensitive Area, located to the south.

Threats to Pink Lake include broad scale vegetation clearing, changing hydrology (water becoming hyposaline and leaching of water from Lake Warden system) and pollution (nutrient enrichment and eutrophication) (DEC 2002). The proposed clearing is within the same low lying part of the sub catchment (Bandy Harbour) as that for Pink Lake. Clearing of 0.8ha will incrementally add to the run off into Pink Lake and contribute to the threatening process of hyposalinity within the lake.

As a condition on the Extractive Industry Licence granted by the Shire of Esperance for this location, the Shire has advised that no clearing is to be undertaken within 40m of a watercourse or within 20m of a boundary.

Buffer requirements for wetlands are generally in the order of 50m to maintain ecological processes and protect the wetland from any potential impacts (DoW 2005). Adequate buffers have been retained and revegetation conditions will be placed on the permit to reinstate vegetation surrounding these wetlands. Additionally, the site will be revegetated as a condition of the permit to ensure any incremental impacts on Pink Lake are minimal.

**Methodology** DoW (2005)
GIS Databases:
- ANCA wetlands - Environment Australia 26/3/99
- CALM Managed Lands and Waters - CALM 01/06/05
- Environmentally Sensitive Areas (ESA) - DEC 30/05/05
- Hydrographic catchments, subcatchments - DoW 01/06/07
- Hydrography linear - DOW 13/7/06
- Ramsar wetlands - DEC 03
- South Coast Significant Wetlands - WRC 10/06/2003
- Topographic contours statewide - DOLA and ARMY 12/09/02

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

**Comments**

**Proposal is at variance to this Principle**

DAFWA (2007) found that the risk of salinity, eutrophication, water erosion, and water logging as a result of the proposed clearing of 0.8ha is low.

DAFWA (2007) has advised that the risk of wind erosion as a result of the clearing of 0.8ha of native vegetation 'is moderate to extreme according to soil type and land unit. The rating reflects variation in soil surface condition and exposure to wind across the site.'

However, DAFWA (2007) has recommended that the high risk of wind erosion can be managed using practices

that focus on windbreaks around the margin of the intended quarrying area, rehabilitation of bare sand areas by planting native species after quarrying ceases, and managing bare sand in current quarrying areas by using surface stabilising agents. Conditions relating to wind erosion management will be placed on the permit.

Acid Sulfate Soils (ASS) have not been mapped for the property in question. As the area is low lying and subject to waterlogging, as indicated by the nearby wetlands, there is a potential for the occurrence of ASS. The proposed clearing is over a sand ridge that is in an elevated part of the landscape and the clearing is unlikely to reach the soil profile in which ASS may occur. The risk of exposing ASS as a result of the proposed clearing is low.

**Methodology** DAFWA (2007)
GIS database:
- Esperance 20cm Orthomosaic - Landgate 07
- Topographic Contours, Statewide - DOLA 12/09/02
- Topographic Contours, Statewide - DOLA 12/09/02

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

**Comments**

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

The proposed clearing of 0.8ha is for the purpose of sand extraction within the Shire of Esperance. This region is characterised by a suite of wetlands oriented east-west across the south-western region of the Esperance Shire.

There are eight conservation areas within a 10km radius of the proposal site. These include three unnamed nature reserves, Lake Warden Nature Reserve (a Ramsar and ANCA wetland and an Environmentally Sensitive Area), Woody Lake Nature Reserve, Shark Lake Nature Reserve, Helms Arboretum (a TEC), and the Recherche Archipelago Nature Reserve. The Esperance Lakes Nature Reserve, incorporating Lake Warden and Woody Lake, lies approximately 2.8km east of the proposed clearing and are part of the Register of the National Estate. All but three of the above listed conservation reserves are associated with wetlands.

Aerial photography suggests that the vegetation under application forms an ecological linkage to vegetated areas to the north, and to an unnamed reserve located approximately 500m south of the proposed clearing. This reserve to the south borders Pink Lake, an ANCA wetland and ESA. The vegetated area immediately north of the proposed clearing appears to be contiguous with a corridor of vegetation also leading to vegetation associated with Pink Lake.

Threats to Pink Lake include broad scale vegetation clearing, changing hydrology (water becoming hyposaline and leaching of water from Lake Warden system) and pollution (nutrient enrichment and eutrophication) (DEC 2002). The proposed clearing is within the same low lying part of the sub catchment (Bandy Harbour) as that for Pink Lake. Clearing of 0.8ha will incrementally add to the run off into Pink Lake and contribute to the threatening process of hyposalinity within the lake.

The proposed clearing of this vegetation will incrementally impact these reserves as it will further fragment a highly cleared landscape and add to the processes threatening the ANCA protected Pink Lake wetland system.

The proposal may be at variance with this Principle.

A condition to revegetate the site after the sand extraction and revegetation conditions for nearby wetlands will be imposed which will address the loss of vegetation in this cleared landscape and minimise the incremental impacts to these conservation areas.

**Methodology** GIS database:
- ANCA wetlands - Environment Australia 26/3/99
- CALM Managed Lands and Waters - CALM 1/06/04
- Environmentally Sensitive Areas (ESA) - DEC 30/05/05
- Esperance 20cm Orthomosaic - Landgate 07
- Hydrographic catchments, subcatchments - DoW 01/06/07
- Ramsar wetlands - DEC 03
- Register of National Estate - EA 28/01/03
- South Coast Significant Wetlands - WRC 10/06/2003
- Topographic contours statewide - DOLA and ARMY 12/09/02

**(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.**

**Comments**

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

The proposed clearing site lies within the Bandy Creek Catchment and Bandy Creek Harbour subcatchment. The region is of low relief with shallow gradients, and characterised by a system of wetlands and areas of inundation. Annual rainfall is 500mm, and groundwater salinity ranges from 500 - 1000mg/L. DAFWA (2007)

have reported that the risk of salinity is low.

The application is to clear 0.8ha for sand extraction. To the west is a large area of previously cleared land that also appears to have been used for extractive industry.

There is a watercourse north of the proposed clearing as observed during a site visit (DEC 2007). This watercourse is associated with wetlands within and adjoining the property. The proposed clearing is unlikely to impact this watercourse as the buffers are adequate.

Threats to Pink Lake include broad scale vegetation clearing, changing hydrology (water becoming hyposaline and leaching of water from Lake Warden system) and pollution (nutrient enrichment and eutrophication) (DEC 2002). The proposed clearing is within the same low lying part of the sub catchment (Bandy Harbour) as that for Pink Lake. Clearing of 0.8ha will incrementally add to the run off into Pink Lake and contribute to the threatening process of hyposalinity within the lake.

The proposed clearing will incrementally add to the deterioration of the water quality of Pink Lake by contributing to the threatening process of hyposalinity within the lake system and is therefore may be at variance to this Principle.

A condition to revegetate the site after the sand extraction and revegetation conditions for nearby wetlands will be imposed which will address the loss of vegetation in this cleared landscape and minimise the incremental impacts.

**Methodology** DAFWA (2007)
DEC (2007)
DoW (2005)
GIS database:
- Esperance 20cm Orthomosaic - Landgate 07
- Groundwater Salinity Statewide ? DoW 13/07/06
- Hydrographic catchments, catchments - DoW 01/06/07
- Hydrographic catchments, subcatchments - DoW 01/06/07
- Hydrography, linear - DOW 13/7/06
- Mean Annual Rainfall Isohytes (1975 - 2003) - DEC 02/08/05
- Salinity Risk LM 25m - DOLA 00
- Topographic Contours, Statewide - DOLA 12/09/02

### (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**
DAFWA (2007) has advised that the risk of flooding causing land degradation is low and therefore the proposed clearing is unlikely to cause or exacerbate the incidence of flooding within the local area.

**Methodology** DAFWA (2007)

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

**Comments**

The Shire of Esperance has advised that an Extractive Industry Licence has been granted for this location (DOC32391), and that conditions included on the licence stipulate that no clearing should occur within 40m of a watercourse or within 20m of a boundary. Additionally, the Shire has advised that the applicant should be encouraged to undertake clearing and rehabilitation activities in accordance with the Excavation - Rehabilitation Management Plan provided by the proponent.

**Methodology**

## 4. Assessor's comments

**Comment**
The application has been assessed against the clearing principles, planning instruments and other matters in accordance with s51O of the Environmental Protection Act 1986, and the proposed clearing is at variance to Principles (a), (e) and (g), may be at variance to Principles (b), (d), (f), (h) and (i) and is not at variance to Principles (c) and (j).

## 5. References

DAFWA Land degradation assessment report. Office of the Commissioner of Soil and Land Conservation, Department of Agriculture and Food Western Australia. DoE TRIM ref DOC33136.
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Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
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Northcote, K. H. with Beckmann G G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68): 'Atlas of Australian Soils, Sheets 1 to 10, with explanatory data'. CSIRO and Melbourne University Press: Melbourne.
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## 6. Glossary

| Term | Meaning |
|---|---|
| BCS | Biodiversity Coordination Section of DEC |
| CALM | Department of Conservation and Land Management (now BCS) |
| DAFWA | Department of Agriculture and Food |
| DEC | Department of Environment and Conservation |
| DEP | Department of Environmental Protection (now DEC) |
| DoE | Department of Environment |
| DoIR | Department of Industry and Resources |
| DRF | Declared Rare Flora |
| EPP | Environmental Protection Policy |
| GIS | Geographical Information System |
| ha | Hectare (10,000 square metres) |
| TEC | Threatened Ecological Community |
| WRC | Water and Rivers Commission (now DEC) |