



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 7205/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Regan Scott Grant and Melita Grant

1.3. Property details

Property: Mining Lease 70/1340
Local Government Area: Shire of Lake Grace

1.4. Application

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

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 22 September 2016

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description Beard vegetation associations have been mapped for the whole of Western Australia. One Beard vegetation association is located within the application area (GIS Database):

Beard vegetation association 516: Shrublands; mallee scrub, black marlock.

Rick Botanical Consultants (Rick, 2016) conducted a flora and vegetation survey over the application in 2009 and 2016. Rick (2016) described and identified the following six vegetation types:

Eucalyptus kondininensis (Kondinin blackbutt) Woodland

The Kondinin blackbutt woodland occurs on higher ground. The understorey consists of a mid-dense layer of shrubs to 0.5m including *Atriplex paludosa* (frequent), *Enchylaena tomentosa*, *Threlkeldia diffusa*, *Templetonia sulcata*, *Maireana brevifolia*, *Tecticornia syncarpa*, *Frankenia ?tetrapetala*, *Disphyma crassifolium*, *Rhagodia crassifolia*, *Rhagodia preissii*, *Sclerolaena diacantha* and *Wilsonia rotundifolia*. Scattered shrubs to 2.5m of *Pitopsis angustifolium*, *Lycium australe* and *Hakea preissii* were also recorded. *Tecticornia syncarpa* (samphire) was prominent in degraded areas to the south east. Scattered herbs included *Calandrinia eremaea*, *Crassula exserta*, *Crassula colorata*, *Crassula colorata* var. *acuminata*, *Blennospora phlegmatocarpa* and the grass *Austrostipa exilis*;

Melaleuca thyoides Open Scrub

Small areas of *Melaleuca thyoides* Open Scrub surrounded by *Eucalyptus kondininensis* woodland. This association occurs on clay soils and has a very sparse understorey of shrubs to 1.5m including *Lycium australe*, *Rhagodia preissii* and *Pitopsis angustifolium* and sparse shrubs to 0.5m including *Tecticornia syncarpa*, *Atriplex paludosa*, *Rhagodia crassifolia*, *Maireana erioclada* and *Disphyma crassifolium*. The perennial herb *Brachyscome ciliaris* was also recorded;

Melaleuca halmaturorum Open Scrub

Melaleuca halmaturorum Open Scrub occurs on ridges of gypsum close to the lake edge with patchily distributed *Melaleuca* shrubs. The understorey consists of a sparse to mid dense layer of shrubs to 0.5m including *Tecticornia pergranulata* subsp. *pergranulata*, *Tecticornia pterygosperma* subsp. *pterygosperma*, *Tecticornia syncarpa*, *Maireana oppositifolia*, *Atriplex paludosa* subsp. *baudinii*, *Enchylaena tomentosa*, *Zygophyllum aurantiacum*, *Tecticornia indica* subsp. *bidens*, *Frankenia cinerea*, *Lawrenzia glomerata*, *Lawrenzia squamata* and *Threlkeldia diffusa*. Scattered shrubs to 1.0m including *Exocarpos aphyllus*, *Lycium australe* and *Pitopsis angustifolium* also occur. Scattered herbs include *Brachyscome ciliaris*, *Isotoma scapigera*, *Senecio quadridentatus*, *Vittadinia gracilis*, *Helichrysum luteoalbum* and *Carpobrotus modestus*. Scattered grasses recorded include *Austrostipa pycnostachya*, *Austrostipa drummondii*, *Rytidosperma setaceum*, *Austrostipa ?juncifolia* and *Austrostipa elegantissima*;

Hakea preissi Scrub

Hakea preissii Scrub occurring on higher ground on sandy loam and clay soils. Shrubs to 4m form a sparse layer with an understorey of mid dense shrubs to 0.5m including *Atriplex paludosa*, *Maireana erioclada*, *Enchylaena tomentosa*, *Tecticornia pergranulata* subsp. *pergranulata*, *Threlkeldia diffusa*, *Rhagodia crassifolia*, *Lawrenzia squamata*, *Frankenia ?tetrapetala* (no flowers) and *Tecticornia syncarpa*. Herbaceous species recorded include *Vittadinia gracilis* and *Brachyscome ciliaris* and the grass species *Austrostipa trichophylla* was also present.

Atriplex (salt bush) Scrub/Heath

Atriplex Scrub/Heath associated with clay soils. *Atriplex paludosa* is prominent with shrubs to 0.5m or 1.0m forming a sparse to mid dense layer. Other shrub species recorded include *Enchylaena tomentosa*, *Lawrencia squamata*, *Disphyma crassifolium*, *Frankenia ?tetrapetala*, *Rhagodia crassifolia*, *Sclerolaena diacantha*, *Tecticornia syncarpa*, *Wilsonia rotundifolia* and *Disphyma crassifolium*. The perennial herb *Vittadinia gracilis* also occurs in this vegetation association; and

Tecticornia (samphire) Scrub/Heath

Tecticornia Scrub/Heath occurring on gypsum soils over clay. This association is confined to low lying areas subject to inundation. Shrubs to 0.5m form a sparse to mid dense stratum. Samphire's recorded including *Tecticornia pergranulata* subsp. *pergranulata*, *Tecticornia syncarpa*, *Tecticornia halocnemoides* and *Tecticornia moniliformis*. Other species recorded include *Maireana oppositifolia*, *Frankenia cinerea*, *Frankenia* sp southern gypsum, *Sclerolaena diacantha*, *Atriplex paludosa* and *Disphyma crassifolium*. Scattered shrubs to 1.0m of *Atriplex paludosa* were also recorded. Herbaceous species include *Isotoma scapigera*, *Lawrencia glomerata*, *Helichrysum luteoalbum* and *Atriplex spongiosa* with the grass *Rytidosperma setaceum* also present.

Clearing Description	RS & M Grant propose to clear up to 101.88 hectares of native vegetation within a total boundary of approximately 178 hectares, for the purpose of gypsum mining. The project is located approximately 5 kilometres south east of Newdegate in the Shire of Lake Grace.
Vegetation Condition	Completely Degraded : No longer intact; completely/almost completely without native species (Keighery, 1994). To: Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery, 1994).
Comment	The condition of the vegetation under application was determined via a flora and vegetation survey conducted over the application area by Rick (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 Proposal is at variance to this Principle

The application area occurs within the Western Mallee subregion of the Mallee Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). The Mallee bioregion is the south-eastern part of the Yilgarn Craton. The Western Mallee's main surface-types comprise clays and silts underlain by Kankar, exposed granite, sandplains and laterite pavements and salt lake systems on a granite basement. Mallee communities occur on a variety of surfaces; Eucalyptus woodlands occur mainly on fine textured soils, with scrub-heath on sands and laterite (CALM, 2002).

The vegetation under application ranges in condition from 'Excellent' to 'Completely Degraded.' Near the lake edge vegetation was mostly found to be in an 'Excellent' to 'Very Good' condition. As the distance from the lake increases, the condition of the vegetation tends to deteriorate, especially in areas adjacent to pasture cleared land or areas grazed by stock. Southern areas along the Lake edge have been subjected to historic mining activities and considered to be a 'Degraded' to 'Completely Degraded' condition (Rick, 2016; GIS Database).

A Level 1 flora survey was conducted over the application area in 2009 and 2016 by Rick Botanical Consultants (Rick, 2016). A total of 68 flora species were recorded within the application area, fifteen of which were introduced (weed) species. There are at least 21 species of Threatened and/or Priority flora species that are known from the local salt lake systems, nine of which are known to occur on gypsum (Rick, 2016). No Threatened flora species were recorded within the application area and the only Priority flora species identified was *Frankenia* sp. southern gypsum (P3). Recent survey work has shown *Frankenia* sp. southern gypsum to be relatively common within the local area (Rick, 2016). This species is known to regenerate post gypsum mining and the proposed clearing is not expected to impact on the overall conservation status (DPaW, 2016a). The Department of Parks and Wildlife (DPaW) advised that as the 2009 flora survey was undertaken during a period of low rainfall, it is possible that some Priority flora species would not have been located (if present) (DPaW, 2016a). The 2016 flora survey was also likely too early to detect some annual herb species (DPaW, 2016a). The proponent has committed to implementing management measures (as recommended by DPaW) to reduce potential impacts to conservation significant flora

No Priority Ecological Communities (PECs) are known within the application area (GIS Database), however two woodland areas identified within the application area meet the criteria for the Threatened Ecological Community (TEC) "Eucalypt Woodlands of the Western Australian Wheatbelt" (Rick, 2016). DPaW (2016a) confirmed that these two areas, one of which is approximately 20 hectares in size and the other is approximately 18 hectares, meet the criteria for the Eucalypt Woodlands TEC and are critical to the survival of the WA Wheatbelt Woodland TEC. DPaW (2016a) also advised that another three small occurrences of this community (all less than 2 hectares) could potentially be considered significant, due their relatively intact condition and proximity to areas of larger Eucalypt Woodlands. Potential impacts to TEC's and vegetation of conservation significance as a result of the proposed clearing may be minimised by the implementation of a TEC management condition.

The flora survey identified 15 introduced (weed) species within the application area (Rick, 2016). As weed species have been identified within the application area, there is potential for further weed invasion and/or spread. Weeds (and weed invasion) have the potential to alter the biodiversity of an area, competing with

native vegetation for available resources and making areas more fire prone. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

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

Methodology CALM (2002)
DPaW (2016a)
Rick (2016)

GIS Database:
- IBRA WA (Regions - Sub Regions)
- Imagery
- Pre-European vegetation
- Threatened and Priority Ecological Communities Buffers
- Threatened and Priority Ecological Communities Boundaries

(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

According to available databases the Malleefowl (*Leipoa ocellata* - VU), Red-necked Stint (*Calidris ruficollis* – Marine/Migratory) and the Red-tailed Phascogale (Pascogle calura - Conservation dependent) are known to occur within the local area (10 kilometre radius) (DPaW, 2016b). The Red-tailed Phascogale prefers *Allocasuarina* woodlands with hollow-containing eucalypts and areas of long unburnt vegetation, while Malleefowl require a sandy substrate and an abundance of leaf litter within shrublands and low woodlands, especially those dominated by mallee and/or acacias (DotE, 2016a; 2016b). While some of the larger Eucalypts present on site may contain hollows, according to flora survey information and available aerial imagery, the application area does not contain areas of preferred habitat for the Red-tailed Phascogale or Malleefowl (Rick, 2016: GIS Database).

The Red-necked Stint may frequent the application area; however this species prefers coast areas for breeding and foraging (DotE, 2016c).

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

Methodology DotE (2016a)
DotE (2016b)
DotE (2016c)

GIS Database:
- Imagery

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

Comments Proposal may be at variance to this Principle

A Level 1 flora survey was conducted over the application area in 2009 and 2016 by Rick Botanical Consultants and no Threatened flora species were recorded (Rick, 2016). The Department of Parks and Wildlife (DPaW) advised that as the 2009 flora survey was undertaken during a period of low rainfall, it is possible that some Threatened flora species would not have been located (if present) (DPaW, 2016a). The 2016 flora survey was also likely too early to detect some annual herb species (DPaW, 2016a). The proponent has committed to implementing the following management measures (as recommended by DPaW) to reduce potential impacts to conservation significant flora:

- Clearing should be limited to the proposed extraction footprint and minimal road access to minimise disturbance to the adjacent areas of similar habitat and other habitat;
- Gypsum extraction should be undertaken in sections to enable progressive rehabilitation of the site as mining proceeds. Overburden should be stockpiled for respreading on the final pit area, and its storage time minimised to assist with maintaining seed viability; and
- At the completion of extraction in specific sections of the pit, the area should be rehabilitated and the overburden respread.

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

Methodology DPaW (2016a)
Rick (2016)

GIS Database
- Threatened and Priority Flora

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

Comments Proposal is at variance to this Principle

According to available databases, there are no known Threatened Ecological Communities (TECs) within the application area (GIS Database); however two woodland areas identified within the application area meet the criteria for the Threatened Ecological Community “Eucalypt Woodlands of the Western Australian Wheatbelt” (Rick, 2016). DPaW (2016a) confirmed that these two areas, one of which is approximately 20 hectares in size and the other is approximately 18 hectares, meet the criteria for the Eucalypt Woodlands TEC and are critical to the survival of the WA Wheatbelt Woodland TEC. DPaW (2016a) also advised that another three small occurrences of this community (all less than 2 hectares) could potentially be considered significant, due their relatively intact condition and proximity to areas of larger Eucalypt Woodlands. TEC’s are considered a protected matter under the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

Potential impacts to TEC’s and vegetation of conservation significance as a result of the proposed clearing may be minimised by the implementation of a TEC management condition, excluding clearing within the TEC.

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

Methodology DPaW (2016a)
Rick (2016)

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

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments Proposal is not at variance to this Principle

The application area occurs within the Mallee Interim Biogeographic Regionalisation of Australia bioregion, in which approximately 56.5% of the pre-European vegetation remains (see table below) (Government of Western Australia, 2014; GIS Database). Two Beard vegetation association have been mapped within the application area (GIS Database). As the below table indicates, both are well represented within the state and bioregion, retaining levels above the recommended 30% threshold of pre-European settlement levels of native vegetation (Commonwealth of Australia, 2001).

There are several areas of intact native vegetation scattered throughout the local area. Areas of intact vegetation occur as patchy remnants, with larger areas of vegetation remaining to the south and east. The vegetation under application offers limited value as a stepping stone to other nearby vegetated areas. The vegetation under application is not considered to be a significant remnant in a highly cleared area.

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DPaW Managed Lands
IBRA Bioregion – Mallee	7,395,894	4,181,381	~ 56.5	Least concern	~ 18.02
Beard veg assoc. - State					
125	3,485,787	3,146,498	~ 90.3	Least concern	~ 8.99
511	700,693	520,625	~ 74.3	Least concern	~ 15.37
Beard veg assoc. - Bioregion					
125	160,327	107,845	~ 67.3	Least concern	~ 26.82
511	139,877	67,480	~ 48.2	Least concern	~ 10.50

* Government of Western Australia (2014)

** Department of Natural Resources and Environment (2002)

Based on the above, the proposed clearing is not at variance to this principle.

Methodology Commonwealth of Australia (2001)
Department of Natural Resources and Environment (2002)
Government of Western Australia (2014)

GIS Database:

- DPaW Tenure
- IBRA Australia
- 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 Proposal is at variance to this Principle

The application area is situated on the edge of, and partly within, Lake Buchan (a non-perennial Lake). The application area is also within an area that is subject to inundation, therefore a large proportion of the vegetation under application is considered to be growing in association with a wetland.

There are many similar lakes and areas subject to inundation in the local area. (GIS Database). Three major salt lake systems are located in the region; Lake Grace, Lake Magenta and the Lake King salt lake system (Rick, 2016). Lake Buchan is part of the Lake Magenta salt lake chain, which includes six other lakes.

With the exception of the two woodland areas identified within the application area as meeting the criteria for the Threatened Ecological Community "Eucalypt Woodlands of the Western Australian Wheatbelt," the vegetation types recorded within the application are likely to be common and extensive throughout the region, given that salt lake chains are a dominant feature of the landscape (GIS Database).

While there are areas of 'Very Good' to 'Excellent' condition vegetation along the edge of Lake Buchan, the majority of the vegetation mapped along the lake fringes is considered to be in a 'Degraded' to 'Completely Degraded' condition (Rick, 2016). The proposed clearing is unlikely to result in significant local or regional scale impacts to the vegetation types identified within the application area that are growing in association with a wetland. Mining and clearing activities will not be able to totally avoid wetland or riparian vegetation, however clearing within these areas should still be limited where possible.

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

Methodology Rick (2016)

- GIS Database:
- Hydrography, linear
 - Hydrography, linear (hierarchy)

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

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

The application area is situated on the edge of, and partly within a non-perennial lake. The application area is also within an area that is subject to inundation. Two soil types are mapped over the application area (Northcote et al. 1960-68; GIS Database):

SV1 - Saline valleys and salt lakes-salt-lake channels, mostly devoid of true soils. Common soils are gypseous and saline loams on riverine wash and usually underlain by clayey or sandy strata; and

SI29 - Plains flanking saline valleys; some local occurrences of small clay pans and lakes with dunes and lunettes: chief soils are hard alkaline yellow soils with low rises of sandy alkaline yellow mottled soils

Rick (2016) conducted a flora and vegetation survey over the application area and identified gypsum and brown clay/loam sandy soils, to be the main soils present. Sandy soils are known to be prone to wind erosion when dry, while areas of hard clay are non-dispersive but may hold water.

Given the location and soil profile of the application area, water erosion issues are unlikely to be of concern. Potential wind erosion impacts as a result of the proposed clearing may be minimised by the implementation of a staged clearing condition.

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

**Methodology Northcote et al. (1960-68)
Rick (2016)**

- GIS Database
- Soils, Statewide

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

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

The application area is not located within an area designated for conservation (GIS Database). The nearest conservation area is located approximately 10 kilometres south. There are several areas of intact native

vegetation scattered throughout the local area. Areas of intact vegetation occur as patchy remnants adjacent to pasture cleared agricultural land, with larger areas of native vegetation persisting to the south and east of the application area. The vegetation under application offers limited value as a stepping stone to adjacent or nearby conservation areas.

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

Methodology GIS Database:
- DPaW Tenure
- Imagery

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

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

The application area is situated on the edge of, and partly within, Lake Buchan (a non-perennial Lake). The application area is also within an area that is subject to inundation. No Public Drinking Water Source Areas (PDWSA) or RIWI Act Groundwater Areas are mapped over the application area (GIS Database).

Aerial imagery suggests that surface water flows into Lake Buchan via two prominent ephemeral creek systems, neither of which are located within the application area (GIS Database). However, given the proximity of the application area to Lake Buchan and inundation areas, it is possible that some minor increases in sedimentation may occur within the wetland environment (when water is present) following clearing activities. Potential impacts to surface water quality as a result of the proposed clearing may be minimised by the implementation of a watercourse management condition.

The groundwater salinity of the application area is considered hypersaline (>35,000 milligrams/Litre Total Dissolved solids) (GIS Database). A further deterioration in the quality of groundwater is unlikely to result from proposed clearing activities.

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

Methodology GIS Database:
- Groundwater Salinity, Satewide
- Hydrography, linear
- Public Drinking Water Source Areas (PDWSAs)
- RIWI Act, Groundwater Areas

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

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

The application area is situated on the edge of, and partly within a non-perennial lake. The application area is also within an area that is subject to inundation (GIS Database). Based on climate data, this area is most likely to contain water during the winter months (BoM, 2016).

The application area has been subject to past disturbance and large areas have already been cleared for mining activities. Given the location and existing flood regime of the area, the proposed clearing is unlikely to result in an increase in the incidence or intensity of flooding.

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

Methodology BoM (2016)

GIS Database:
- Hydrography, linear

Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.

Comments

There are two native title claims over the application area (WC2003/006 and WC2000/007) (DAA, 2016). However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

According to available datasets, there are no Sites of Aboriginal Significance located in the area applied to clear (DAA, 2016). 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 Department of Environment Regulation, the Department of Parks and Wildlife and the Department of Water, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

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

The clearing permit application was advertised on 22 August 2016 by the Department of Mines and Petroleum inviting submissions from the public. No submissions were received in relation to this application.

Methodology DAA (2016)

4. References

- BoM (2016) Climate Statistics for Australian Locations. A Search for Climate Statistics, Australian Government Bureau of Meteorology. <<http://www.bom.gov.au>> (Accessed September 2016).
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions. Department of Conservation and Land Management.
- Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005, Canberra.
- DAA (2016) Aboriginal Heritage Inquiry System, Department of Aboriginal Affairs, Perth, Western Australia < <http://maps.dia.wa.gov.au>> (Accessed September 2016).
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- DotE (2015a) *Pascogle calura* in Species Profile and Threats Database, Department of the Environment, Canberra, viewed September 2016 <<http://www.environment.gov.au>>
- DotE (2015b) *Leipoa ocellata* in Species Profile and Threats Database, Department of the Environment, Canberra, viewed September 2016 <<http://www.environment.gov.au>>
- DotE (2015c) *Calidris ruficollis* in Species Profile and Threats Database, Department of the Environment, Canberra, viewed September 2016 < <http://www.environment.gov.au> >
- DPaW (2016a) Flora and TEC advice received in relation to Clearing Permit Application CPS 7205/1. Species and Communities Branch, Department of Parks and Wildlife, Western Australia, September 2016.
- DPaW (2016b) NatureMap, Department of Parks and Wildlife <<http://naturemap.dec.wa.gov.au>> (Accessed September 2016).
- Government of Western Australia (2015) 2015 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of June 2015. WA Department of Environment and Conservation, 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.
- Rick (2016) Lake Buchan Gypsum Mining Lease M70/1340 Vegetation and Flora Survey. Report prepared for R Grant by Anne (Coates) Rick Botanical Consultant, July 2016.
- 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.

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia
DAFWA	Department of Agriculture and Food, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DPaW and DER)
DER	Department of Environment Regulation, Western Australia
DMP	Department of Mines and Petroleum, Western Australia
DRF	Declared Rare Flora

DotE	Department of the Environment, Australian Government
DoW	Department of Water, Western Australia
DPaW	Department of Parks and Wildlife, Western Australia
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DotE)
EPA	Environmental Protection Authority, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

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

T	<p>Threatened species: Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora).</p> <p>Threatened fauna is that subset of ‘Specially Protected Fauna’ declared to be ‘likely to become extinct’ pursuant to section 14(4) of the Wildlife Conservation Act.</p> <p>Threatened flora is flora that has been declared to be ‘likely to become extinct or is rare, or otherwise in need of special protection’, pursuant to section 23F(2) of the Wildlife Conservation Act.</p> <p>The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.</p>
CR	<p>Critically endangered species Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
EN	<p>Endangered species Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
VU	<p>Vulnerable species Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.</p>
EX	<p>Presumed extinct species Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.</p>
IA	<p>Migratory birds protected under an international agreement Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>
CD	<p>Conservation dependent fauna Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i>, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.</p>

- OS Other specially protected fauna**
Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- P Priority species**
Species which are poorly known; or
Species that are adequately known, are rare but not threatened, and require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
- P1 Priority One - Poorly-known species:**
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
- P2 Priority Two - Poorly-known species:**
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
- P3 Priority Three - Poorly-known species:**
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
- P4 Priority Four - Rare, Near Threatened and other species in need of monitoring:**
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.