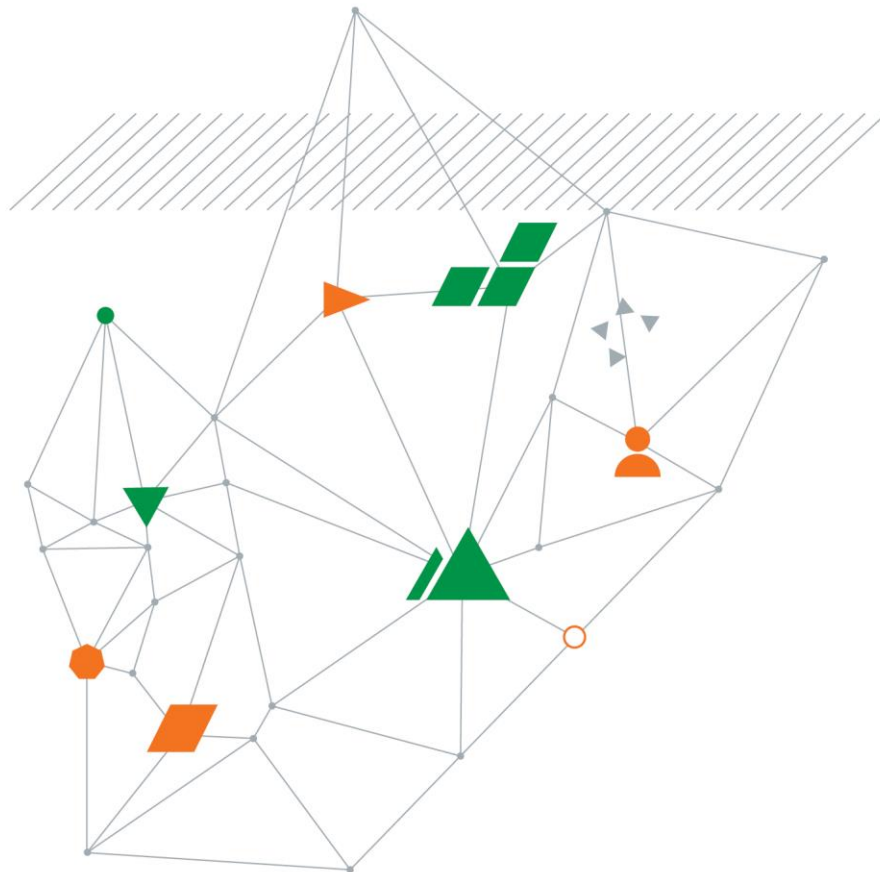


Warrego Energy PTY Ltd

EP 469 – West Erregulla 3D Seismic Survey 2014

Rehabilitation Management Plan

December 2014



Real
potential
is uncovered
only when
you scratch
beneath
the surface

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EP 469 – West Erregulla 3D Seismic Survey 2014

Prepared for
Warrego Energy Pty Ltd

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December 2014

ENAUPERT02034_12_RMP_v4

Quality Information

Revision History

Revision	Description	Date	Reviewer
v1	Draft to Warrego Energy	26/11/2014	Denise True
v2	Revised draft to Warrego Energy	05/12/2014	Denise True
v3	Draft to Department of Mines and Petroleum (DMP)	08/12/2014	Denise True
v4	Final to DMP	24/12/2014	Denise True

Distribution

Report Status	No. of copies	Format	Distributed to	Date
v1	1	Word (electronic)	Warrego Energy	26/11/2014
v2	1	Word (electronic)	Warrego Energy	05/12/2014
v3	1	PDF (electronic)	Warrego Energy	08/12/2014
	1	PDF (electronic)	DMP	
v4	1	PDF (electronic)	Warrego Energy	24/12/2014
	1	PDF (electronic)	DMP	

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1 Introduction

This chapter provides an introduction to the project and the purpose of this document.

1.1 Background

Warrego Energy Pty Ltd (Warrego Energy) is undertaking a three-dimensional (3D) seismic survey (the project) within exploration permit EP 469, approximately 50 km southeast of Dongara and 300 km north of Perth (Figure 1).

The West Erregulla Field – the target of the project – was discovered in 1990 following the drilling of the West Erregulla-1 well by Barrack Energy Limited. The project aims to further delineate subsurface hydrocarbon deposits and add to existing knowledge about hydrocarbon reserves in this area of the North Perth Basin to support future drilling and production activities.

The project involves traversing the project area in a grid pattern, sending, receiving and processing seismic signals in order to map the underlying geology using Vibroseis trucks. Preparation of the source lines for Vibroseis trucks involved clearing of native vegetation. Clearing of native vegetation for receiver lines was not required other than for three east-west access tracks oriented along selected receiver lines. A total of 56 ha of native vegetation were cleared for the project (Figure 2).

Vegetation was cleared using a raised roller mulching technique and mulched vegetation has been spread behind the machine, leaving rootstock intact to increase rehabilitation success. Clearing equipment was equipped with a GPS pre-programmed with the line locations so that locations of Threatened species were avoided. Lines were also altered to avoid topographical obstructions (e.g., laterite breakaways and steep slopes) and other environmentally sensitive features (e.g., drainage lines and watercourses).

This project has been approved by the Department of Mines and Petroleum (DMP) under the *Petroleum and Geothermal Energy Resources Act 1967* (PGER Act).

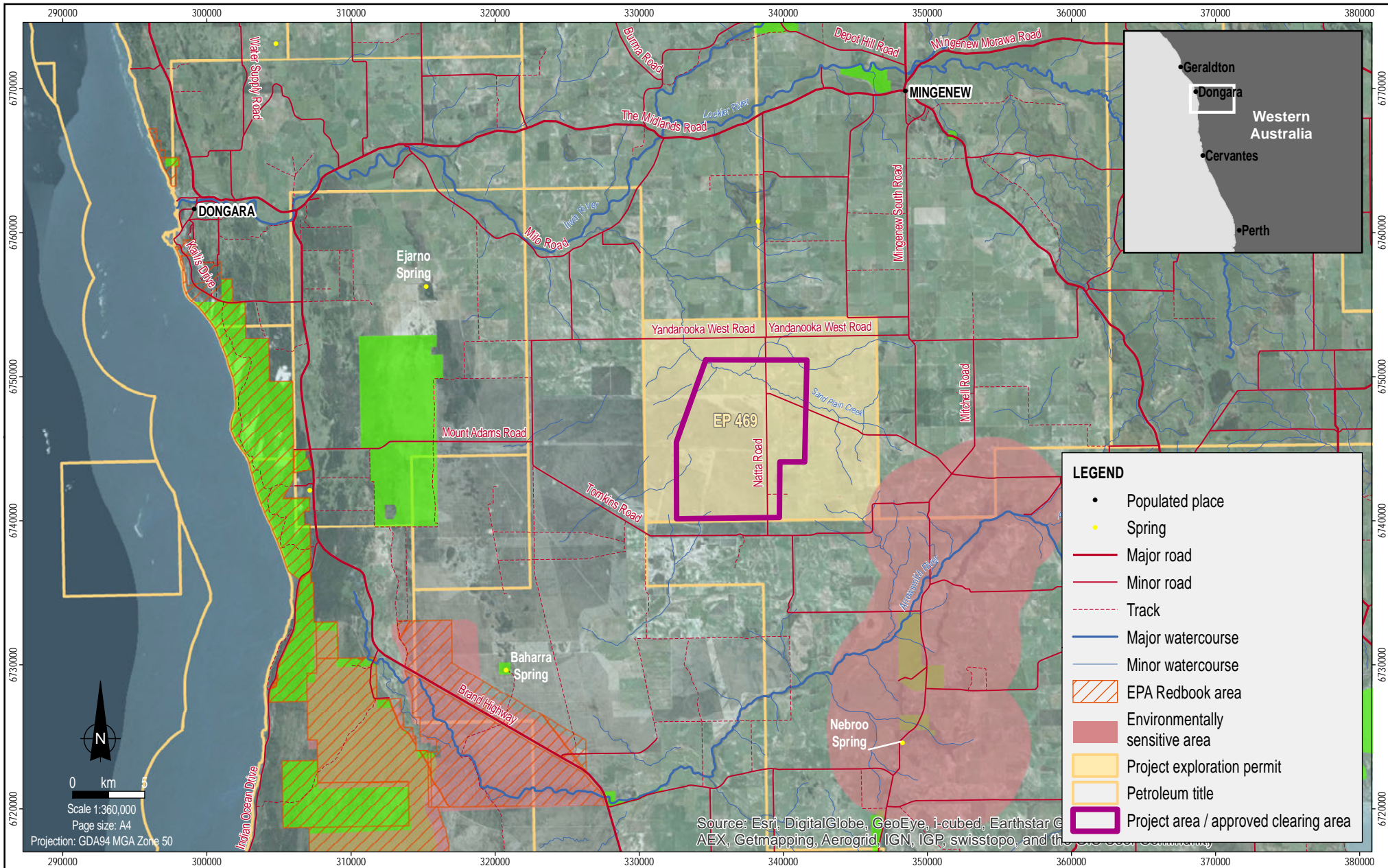
1.2 Purpose

Oil and gas exploration is a temporary land use that should be integrated with, or succeeded by, other land uses.

The purpose of this Rehabilitation Management Plan (RMP) is to outline the general rehabilitation and revegetation management actions that will be undertaken for the project to ensure the project area is returned to a condition suitable for future land use following completion of the project.

This rehabilitation program has been designed using a risk-based approach as endorsed by the DMP and the Western Australian Environment Protection Authority (EPA) (DMP, 2011). Details of the environmental risk assessment are presented in the project's approved Environment Plan (Coffey, 2014a).

This RMP should be read in conjunction with the project's approved Environment Plan (Coffey, 2014a) and Dieback and Weed Management Plan (Coffey, 2014b).



Source and notes:
 Seismic survey area from Warrego Energy; Petroleum title from DMP
 Crown reserves from Landgate
 Nature reserves and environmentally sensitive areas from DER
 EPA Redbook data from DEC (downloaded from SLIP, September 23, 2010)
 Roads, railways, powerlines and watercourses from GEODATA250K (optimum scale 1:250,000)
 Imagery from ArcGIS online

coffey

Date:
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2034_12_F001_GIS

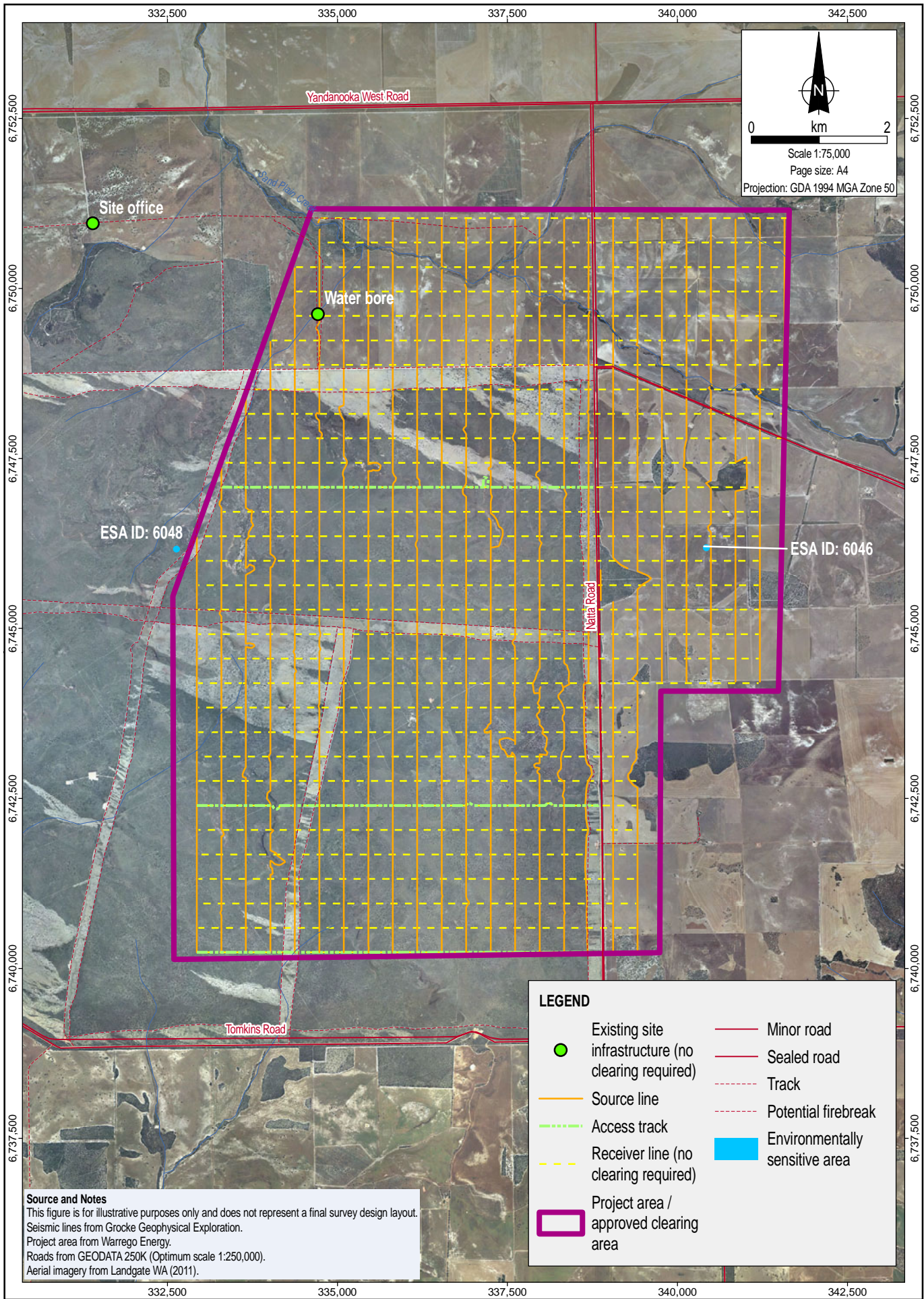
Warrego Energy

West Erregulla 3D Seismic Survey

warrego energy

Project area

Figure No:
1



Source and Notes
 This figure is for illustrative purposes only and does not represent a final survey design layout.
 Seismic lines from Grocke Geophysical Exploration.
 Project area from Warrego Energy.
 Roads from GEODATA 250K (Optimum scale 1:250,000).
 Aerial imagery from Landgate WA (2011).

LEGEND

	Existing site infrastructure (no clearing required)		Minor road
	Source line		Sealed road
	Access track		Track
	Receiver line (no clearing required)		Potential firebreak
	Project area / approved clearing area		Environmentally sensitive area

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2 Existing environment

This chapter provides a brief description of the project area's existing environment.

2.1 Site history and existing land use and disturbance

Approximately two thirds of the project area (6,450 ha) is comprised generally of pristine native vegetation associated with the Vacant Crown Land (VCL), the other third (3,099 ha) has previously been cleared for agricultural purposes (grazing and cropping).

Several small areas of disturbance from previous oil and gas exploration activities in the area are evident, although much of these areas now resemble surrounding areas of vegetation (Woodman, 2013).

A section of a gazetted thoroughfare (Natta Road) occurs within the project area.

2.2 Flora and vegetation

Woodman (2013) described and mapped 17 vegetation types (VTs) across the project area. While none of these VTs represent Western Australian or Commonwealth listed Threatened Ecological Communities, the vast majority (excluding VTs 13b and 14) are considered to be of high local significance due to geographical and local distribution restrictions and the presence of threatened and priority flora. The description of the 17 VTs and the mapping is provided in Appendix A.

The condition of nearly all mapped vegetation in the survey area is classified '1' (pristine). Remnant vegetation within private property (i.e., on agricultural land) varied in condition from pristine to poor depending on the number of weeds present and the decline in native species diversity relating to clearing and grazing impacts. Areas ranked good to poor were generally associated with Sand Plain Creek (Woodman, 2013).

A total of 30 confirmed and two probable conservation significant flora taxa (including one hybrid) are known from the project area (Woodman, 2013). A summary of the conservation significant flora known to occur within the project area and their locations are provided in Appendix B.

2.3 Current dieback status

Based on the Phytophthora dieback occurrence assessment undertaken by Glevan Consulting (2012), the majority of the project area (the VCL) is classified as 'uninfested (Protectable)'. The dieback status of the private property (farmland) could not be determined due to a lack of native vegetation that can be used as indicator species and is therefore classified as 'Unmappable'.

Refer to the Dieback and Weed Management Plan (Coffey, 2014b) for further information.

2.4 Weeds

A total of 22 weed species are known to occur within the project area. None of the weeds identified within the project area are declared pests for the Shires of Three Springs and Mingenew, in which the project area is located. Nor are they listed as Weeds of National Significance.

Paterson's Curse (*Echium plantagineum*) was recorded from the project area and is classified as a declared pest under the *Biosecurity and Agricultural Management Act 2007*, but not within the Shires of Three Springs and Mingenew.

Weeds recorded within the VCL were often associated with *Eucalyptus accedens* vegetation (Woodman, 2013).

2.5 Feral animals

Eight introduced fauna species were recorded at the project area (Coffey, 2013) including cows, goats, rabbits, pigs, foxes, dingos and sheep. Another three introduced fauna species have previously been recorded in the region and so potentially occur in the project area including the cat, house mouse and rat (Coffey, 2013).

3 Rehabilitation activities

This chapter provides a summary of the project's key rehabilitation activities. Where practicable, Warrego will progressively rehabilitate disturbed land throughout each phase of operations within EP 469.

3.1 Demobilisation and removal of project infrastructure and waste

While some permanent line markers are required to be retained in accordance with the Schedule of Onshore Petroleum Exploration and Production Requirements 1991, all other pegs, markers and equipment will be removed from the project area following completion of the project.

Any temporary fencing set up by the seismic crew will be removed, and any pre-existing fencing that was modified will be reinstated, in accordance with landowner requirements.

All project waste is being collected and disposed of offsite, by arrangement with the local shire or otherwise by a licenced waste contractor.

Any site contamination resulting from the project will be remediated in accordance with the *Contaminated Sites Act 2003*.

3.2 Controlling third party access

To prevent unauthorised third party access, Warrego Energy had previously committed to closing all access tracks created by the project (i.e., through the placement of brushing at entrances to areas of remnant native vegetation). This requirement; however, is no longer necessary following the decision to discontinue clearing along each of the access tracks in advance of reaching the public road, preventing access.

3.3 Ground preparation and vegetation management

Cleared areas will be left to regenerate naturally as it is anticipated that active seeding and/or planting will not be required, given vegetation has been cleared using a raised roller mulching technique, resulting in the:

- Retention of topsoil and rootstock.
- Erosion protection from the mulching and spreading of cleared vegetation.

Where ground has become overly compacted, soils will be ripped to encourage natural revegetation. This is most likely to be required along the three east to west access tracks, where vehicle movements have been concentrated. Complete rehabilitation of access tracks will not be initiated until Warrego's exploration activities (including rehabilitation work and monitoring) have been finalised in the region.

3.4 Remedial planting or seeding

As discussed in Section 3.3 it is anticipated that active seeding and/or planting will not be required. The success of natural revegetation will be assessed by way of a post-project monitoring program.

Where monitoring indicates that supplementary planting is required a program of active seeding will be investigated with the DMP and DPAW. A seeding program, if required, would likely be scheduled

to take advantage of the onset of seasonal rainfall, use seedstock of local provenance, and include foraging species for Carnaby's Black Cockatoo, as practicable, and agreed with the DMP and DPAW.

3.5 Weed control

Weed and dieback management controls have been implemented in accordance with the project's Dieback and Weed Management Plan (Coffey, 2014b) (the DWMP). The DWMP details the steps to be taken to avoid the introduction and spread of dieback and weeds in the project area, including steps to be taken if dieback or weeds are identified during rehabilitation monitoring as resulting from the project's activities.

3.6 Stakeholder liaison

Warrego Energy initiated a stakeholder consultation program in 2008 when it acquired exploration rights in exploration permit EP 469. Since then, Warrego Energy has consulted with landholders, traditional owners, local government, state and federal government agencies and other stakeholders with regards to its broader West Erregulla Exploration Program. This has included consultation with landowners regarding proposed rehabilitation activities.

Warrego Energy engaged consultants KD.1 Pty Ltd (KD.1) to manage its landholder consultation program. Warrego Energy has been consulting with landowners and land managers whose land may be traversed by the project, to make land access arrangements and to identify other relevant issues. Land access agreements to ensure access on acceptable terms with regards to access, timing, land husbandry, operational considerations, compensation and rehabilitation have been finalised with all four landholders in the project area. Warrego Energy will continue to honour the conditions of these agreements.

A form of release will be obtained from each landowner to demonstrate the landowner's satisfaction with the execution of the project.

4 Rehabilitation completion criteria

To ensure successful rehabilitation of disturbed areas, Warrego Energy has developed a number of completion criteria, as detailed in Table 1.

Warrego Energy will continue to undertake rehabilitation activities and associated monitoring (discussed in Chapter 5) for a minimum of two years or up until these completion criteria are met.

- No permanent markers (other than any required under the Schedule of Onshore Petroleum Exploration and Production Requirements 1991), spoil or litter.
- No registered sites under the *Contaminated Sites Act 2003*.
- Vegetation cover of cleared areas should be at least 60% of that in surrounding undisturbed vegetation.
- Percentage occurrence of dominant species in the cleared areas within each VT should be at least 60% of that in the surrounding undisturbed vegetation.
- Number of species in the cleared areas should be at least 60% of that in the surrounding undisturbed vegetation.
- No new populations of, or spread of, environmentally significant weeds or new weed species caused by project activities within two years following completion of project activities.
- No occurrences of dieback within the VCL caused by project activities detected within two years following completion of project activities.
- No new apparent access to the VCL that could be used by third parties and develop into permanent access.
- Receipt of release forms from all affected land holders.

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5 Monitoring

Monitoring will commence within one month after completion of project operations with a particular focus on third party access issues and the presence of introduced weeds. Rehabilitation monitoring will then continue annually between August and September for a minimum of two years and until monitoring has shown all completion criteria (detailed in Chapter 4) have been met.

Monitoring will be undertaken to ensure progress against the completion criteria discussed in Chapter 4 can be accurately assessed.

As project disturbance involved clearing along source lines (3.5 m wide), the establishment of 10 m by 10 m quadrats will not be possible. Instead similarly sized transects (100 m²) will be established within each VT impacted by the project, to allow for comparison to baseline quadrat data collected by Woodman (2013). Transect sites will also be selected with consideration as to their suitability as a weed/dieback monitoring site.

Transects will be orientated north-south/east-west along project disturbance and will be marked at each end with a steel fence dropper for the length of the rehabilitation program. A punched aluminium tag with the transect number will be attached to each fence dropper.

All vascular taxa that are visibly identifiable will be recorded and collected as necessary and the following additional information will also be recorded at each transect:

- Unique site number.
- Date of survey.
- GPS coordinates (GDA94).
- Vegetation condition (Keighery, 1994).
- Presence of disturbance (if any), including signs of third party access and or signs of dieback.
- Percentage foliage cover.
- Presence of weeds and percentage cover.
- Site photograph (preferably from the steel fence dropper), including record of location and direction to allow replication in subsequent years.

Warrego Energy previously committed to monitoring Threatened flora species *Thelymitra stellata* and *Paracaleana dixonii* (in line with the requirements of the Permit to Take) to assess the persistence of these species and their habitat in proximity to disturbed areas following completion of the project (i.e., those locations identified within 15 m of the conceptual disturbance footprint). However, as line preparation (i.e. clearing) successfully avoided passing within 15m of all known Threatened flora, monitoring the persistence of these individuals is no longer required.

Measurement against the weed and dieback completion criteria will be undertaken in accordance with the dieback and weed monitoring program detailed in the DWMP (Coffey, 2014b).

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6 Schedule

The project is being undertaken in a phased approach that started in October 2014. Indicative durations and timings for each aspect of the project, including monitoring are included in Table 1.

Table 1 Indicative project schedule

Activity	Approximate duration	Indicative timing
Seismic survey site preparation*	30 days	October 2014
Seismic survey mobilisation of machinery and equipment	20 days	November 2014
Seismic survey demobilisation and rehabilitation	25 days	December / January 2014
Post rehabilitation monitoring	Two years or until rehabilitation completion criteria have been met	Monitoring to commence within one month after completion of seismic acquisition operations and occur annually between August and September.

* Including vegetation clearing.

Monitoring was previously proposed to be undertaken between October to December, to ensure monitoring during the optimum period for Threatened flora present within the project area. As monitoring of Threatened flora is no longer required, monitoring will now be undertaken during August and September, for the following reasons:

- Period during which weed species are identifiable, while allowing adequate time after the monitoring to implement any necessary control measures (e.g. weed spraying) before the weeds release additional seeds.
- To coincide with vascular taxa flowering periods, anticipated in August and September (dependent on winter rainfall). The optimal time to conduct surveys in the Northern Sandplains is spring; however, the site is located towards the northern, drier end of the Northern Sandplains and as such, spring tends to arrive earlier than in the Swan Coastal Plain and further south.

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7 Reporting and review

A rehabilitation completion report will be provided to the DMP on an annual basis for two years or until the completion criteria are achieved. The report will list the areas disturbed by the exploration activities, areas rehabilitated and performance against rehabilitation criteria.

This RMP will be revised to take into consideration the progress of early stage rehabilitation works and any changes to, or additional approvals obtained in relation to Warrego Energy's exploration program within EP 469.

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8 References

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Coffey. 2014b. West Erregulla Exploration Program Dieback and Weed Management Plan. Report prepared for Warrego Energy, Subiaco, Western Australia.

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9 Glossary

9.1 Acronyms and abbreviations

3D	three dimensional
DMP	Department of Mines and Petroleum
EP	Environment Plan
EPA	Environment Protection Authority
PGER Act	Petroleum and Geothermal Energy Resources Act 1967
RMP	Rehabilitation Management Plan
VCL	Vacant Crown Land
VT	vegetation type
Warrego Energy	Warrego Energy Pty Ltd
DWMP	Dieback and Weed Management Plan

9.2 Symbols and units of measure

ha	hectare
km	kilometre
m	metre

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Appendix A

Vegetation types in the project area

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No.	Description	Landform types	Soil types	Condition*	Area mapped (ha)
Supergroup 1					
1a	Mid open forest of <i>Eucalyptus accedens</i> over mid open shrubland dominated by <i>Gastrolobium spinosum</i> , <i>Olearia rudis</i> and <i>Anthocercis genistoides</i> over low open forbland and rushland dominated by <i>Calandrinia calyptrata</i> , <i>Calandrinia corrigioloides</i> , <i>Millotia myosotidifolia</i> , <i>Trachymene pilosa</i> and <i>Conostylis aculeata</i> subsp. <i>breviflora</i> on grey sand on mid slopes.	Mid slopes.	Grey, white sand.	1 or 2	25
1b	Mid open forest of <i>Eucalyptus accedens</i> over low open shrubland dominated by <i>Gastrolobium plicatum</i> and <i>Dodonaea divaricata</i> over low open forbland of mixed species including <i>Goodenia berardiana</i> , <i>Rhodanthe manglesii</i> , <i>Podolepis lessonii</i> and <i>Acanthocarpus canaliculatus</i> on grey-brown sandy or clay loams on mid-upper slopes	Upper and mid slopes.	Grey or brown clay and sandy loams.	1 or 2	42
2	Mid open forest of <i>Eucalyptus accedens</i> or low open forest <i>E. loxophleba</i> subsp. <i>loxophleba</i> over mid open shrubland dominated by <i>Rhagodia preissii</i> subsp. <i>preissii</i> and <i>Melaleuca acutifolia</i> on grey-brown sandy loams on flats and slopes.	Flats to mid slopes.	Brown to grey or white sandy loam.	1	6
3	Occasional mid woodland of <i>Eucalyptus accedens</i> over mid shrubland dominated by <i>Melaleuca concreta</i> , <i>M. marginata</i> and <i>M. acutifolia</i> over low isolated mixed shrubs and sedges including <i>Acacia ericksoniae</i> and <i>Lepidosperma</i> sp. A2 Inland Flat (G.J. Keighery 7000) on pink-brown or white clay loams on flats.	Drainage lines or flats, upper slope.	Brown or pink-brown clay or clay loam, sand.	1	22
4	Tall closed to open shrubland dominated by <i>Allocasuarina campestris</i> or occasionally <i>Acacia neurophylla</i> subsp. <i>neurophylla</i> over mid open shrubland and sedgeland of mixed species including <i>Grevillea bitemata</i> , <i>Melaleuca radula</i> , <i>Melaleuca concreta</i> , <i>Thryptomene</i> sp. <i>Mingenew</i> (Diels & Pritzel 332) (P3), <i>Ecdeiocolea monostachya</i> and <i>Thryptomene racemulosa</i> on grey-brown sand, sandy loam or clay loam, occasionally with granitic pebbles, on slopes and flats adjacent to seasonal creeks.	Flat, lower slopes, mid slopes, upper slopes.	Brown-grey to grey sand to sandy loam to clay loam.	3 or 4	48
4D				5	9

No.	Description	Landform types	Soil types	Condition*	Area mapped (ha)
5	Tall closed shrubland to shrubland dominated by <i>Allocasuarina campestris</i> with occasional <i>Acacia aciphylla</i> , <i>Acacia neurophylla</i> subsp. <i>neurophylla</i> and <i>Melaleuca viminea</i> subsp. <i>viminea</i> over sparse low shrubland and sedgeland of mixed species including <i>Ecdeiocolea monostachya</i> and <i>Thryptomene racemulosa</i> over open forbland and grassland of mixed introduced species including <i>*Ehrharta longiflora</i> and <i>Ursinia anthemoides</i> on grey or brown sandy or clay loams within and on the banks of seasonal creeks.	Flat, drainage line.	Brown-grey sand to sandy loam to clay loam.	3 or 4	40
6	Open woodland of <i>Eucalyptus loxophleba</i> subsp. <i>loxophleba</i> over mid closed shrubland dominated by <i>Melaleuca marginata</i> over sparse forbland of mixed species including <i>Rhodanthe polycephala</i> on grey-brown clay on slopes above seasonal creeks.	Mid slope.	Brown-grey light clay.	1	3
Supergroup 2					
7a	Mid mallee woodland to isolated mallees of <i>Eucalyptus conveniens</i> or mid open shrubland of <i>Allocasuarina campestris</i> over low shrubland and sedgeland of mixed species frequently dominated by <i>Ecdeiocolea monostachya</i> and <i>Melaleuca aspalathoides</i> , or occasionally <i>M. tinkeri</i> , <i>Hakea auriculata</i> or <i>Hakea lissocarpha</i> , on gravelly grey or brown clay loams or sands, usually with laterite on or near the surface, on slopes and crests.	Upper slopes, mid slopes, crests.	Grey or brown sand or clay loam, often with lateritic pebbles, occasionally with lateritic outcropping.	1	799
7b	Mid mallee woodland to isolated mallees of <i>Eucalyptus conveniens</i> or mid open shrubland of <i>Allocasuarina campestris</i> over low shrubland and sedgeland of mixed species dominated by <i>Banksia carlinoides</i> , <i>Ecdeiocolea monostachya</i> , <i>Hakea incrassata</i> , <i>Hibbertia hypericoides</i> and <i>Melaleuca aspalathoides</i> on gravelly grey or brown clay loams or sands, usually with laterite on or near the surface, on slopes and crests.	Upper slopes, mid slopes, lower slopes, crests, ridges.	Grey, brown or grey-brown sand, sandy loam or clay loam, often with lateritic pebbles.	1	664
8	Mid mallee woodland to isolated mallees of <i>Eucalyptus conveniens</i> over mid shrubland to open shrubland dominated by <i>Allocasuarina campestris</i> over low shrubland and sedgeland of mixed species dominated by <i>Ecdeiocolea monostachya</i> , <i>Hakea auriculata</i> , <i>Melaleuca radula</i> , <i>M. aspalathoides</i> and <i>Banksia fraseri</i> var. <i>fraseri</i> on gravelly grey or brown clay loams usually over massive laterite on breakaway tops, ridges and lateritic rises.	Upper slopes, mid slopes, crests, ridges, breakaways.	Grey, brown or grey brown clay or sandy loams, usually with lateritic pebbles and exposed lateritic outcropping.	1	444
8d				4	4

No.	Description	Landform types	Soil types	Condition*	Area mapped (ha)
9	Mid to low open shrubland of <i>Allocasuarina campestris</i> , <i>Melaleuca concreta</i> and <i>Melaleuca marginata</i> over low shrubland dominated by <i>Melaleuca tinkerii</i> and occasionally <i>Gastrobium plicatum</i> over low shrubland and forbland dominated by <i>Stylidium torticarpum</i> (P3), <i>Leucopogon</i> sp. <i>Yandanooka</i> (M. Hislop 2507) and <i>Micromyrtus rogeri</i> (P1) on gravelly pink-brown or white-grey clay or clay loam over decaying laterite on breakaway tops and slopes.	Breakaway tops and slopes, flats below breakaways.	Brown, pink, grey, white or grey-white clay or clay loam, often with lateritic gravel, often with exposed decaying laterite outcropping.	1	50
Supergroup 3					
10	Mid sparse to open shrubland of mixed species including <i>Calothamnus quadrifidus</i> subsp. <i>angustifolius</i> , <i>Grevillea biformis</i> subsp. <i>biformis</i> and <i>Banksia attenuata</i> over low shrubland and sedgeland of mixed species dominated by <i>Ecdeiocolea monostachya</i> , <i>Melaleuca leuropoma</i> , <i>Daviesia divaricata</i> subsp. <i>divaricata</i> ms, <i>Mesomelaena pseudostygia</i> and <i>Banksia shuttleworthiana</i> on yellow-brown or occasionally grey sand on slopes and valley floors.	Upper slopes, mid slopes, lower slopes, flats, crests.	Yellow, yellow-brown, brown or grey sand or sandy loam.	1	1,033
10D				5	5
11	Mid sparse to open shrubland of <i>Allocasuarina campestris</i> and <i>Grevillea biformis</i> subsp. <i>biformis</i> over low shrubland and sedgeland dominated by <i>Hakea circumalata</i> , <i>Lepidobolus preissianus</i> subsp. <i>preissianus</i> , <i>Mesomelaena pseudostygia</i> and <i>M. stygia</i> subsp. <i>deflexa</i> (P3) on yellow or yellow-brown sand or sandy loam on mid to upper slopes.	Upper slopes, mid slopes.	Yellow or yellow-brown sand or sandy loam.	1	538
12	Occasional mid sparse to open shrubland of <i>Allocasuarina campestris</i> and <i>Grevillea biformis</i> subsp. <i>biformis</i> over low shrubland and sedgeland dominated by <i>Beaufortia elegans</i> , <i>Hibbertia hypericoides</i> and <i>Ecdeiocolea monostachya</i> on grey or brown sand or sandy loam on mid to upper slopes.	Mid slopes, upper slopes.	Grey-white to brown sand to sandy loam.	1	243

No.	Description	Landform types	Soil types	Condition*	Area mapped (ha)
Supergroup 4					
13a	Low open woodland of <i>Eucalyptus todtiana</i> over mid to low shrubland of mixed species dominated by <i>Allocasuarina humilis</i> , <i>Banksia scabrella</i> (P4), <i>Calothamnus sanguineus</i> , <i>Eremaea beaufortioides</i> var. <i>microphylla</i> , <i>Melaleuca</i> aff. <i>leuropoma</i> and <i>Hibbertia hypericoides</i> over low shrubland and sedgeland of mixed species including <i>Banksia dallanneyi</i> subsp. <i>media</i> , <i>Conostylis canteriata</i> , <i>Mesomelaena pseudostygia</i> and <i>Caustis dioica</i> on grey or brown sand on lower and mid slopes,	Mid slopes, lower slopes, plain.	Grey-white or brown sand or sandy loam.	1	1,740
13aD	Low open woodland of <i>Eucalyptus todtiana</i> over mid to low shrubland of mixed species dominated by <i>Allocasuarina humilis</i> , <i>Calothamnus sanguineus</i> , <i>Hakea trifurcata</i> , <i>Hibbertia hypericoides</i> and <i>Melaleuca leuropoma</i> over low shrubland and rushland of mixed species including <i>Banksia dallanneyi</i> subsp. <i>media</i> , <i>Conostylis aculeata</i> subsp. <i>breviflora</i> and <i>Conostylis canteriata</i> on grey, brown or yellow sand on flats, in depressions and on slopes.	Mid slopes, lower slopes, flats, drainage depressions.	Grey, brown or yellow sand or sandy loam.	5	5
13b				1	548
14	Low open shrubland dominated by <i>Calothamnus quadrifidus</i> subsp. <i>angustifolius</i> , <i>Banksia carlinoides</i> , <i>Hakea lissocarpha</i> and <i>Verticordia densiflora</i> over low open shrubland, sedgeland and forbland dominated by <i>Dampiera teres</i> (broad-leaf variant), <i>Jacksonia angulata</i> , <i>Harperia lateriflora</i> , <i>Opercularia vaginata</i> and <i>Melaleuca trichophylla</i> on grey-brown sands, sandy loams and clay loams in minor drainage lines and on flats.	Mid slopes, lower slopes, flats, drainage lines, wetlands, depressions.	Grey, grey-white, brown or grey-brown sand, sandy loam or clay loam.	1	167
Other (not classified in a Supergroup)					
PC 1D	Low woodland of <i>Acacia acuminata</i> over introduced pasture grasses and isolated native forbs including <i>Ptilotus manglesii</i> and <i>Arthropodium dyeri</i> on grey-brown clay loams on flats adjacent to seasonal creeks.	Flats adjacent to seasonal creeks.	Grey-brown clay loams.	4	10
Subtotal of mapped VTs					6,450
C	Cleared land (areas of disturbance with no vegetation)				3,099
Total					9,549

Source: Woodman (2013).

A 'D' postfix on a VT number indicates a degraded version of a VT.

* Vegetation condition is defined as in Keighery (1994 cited in Woodman Environmental, 2013):

1 – Pristine: pristine or nearly so; no obvious signs of disturbance.

2 – Excellent: vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.

3 – Very good: Vegetation structure altered, obvious signs of disturbance.

4 – Good: Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it.

5 – Poor: Basic vegetation structure severely impacted by disturbance.

C – Cleared land.

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Appendix B

Summary of conservation significant flora

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Taxon	Number of locations	Number of individuals	Found in VTs
Threatened			
<i>Eucalyptus crispata</i>	3 (4)	18	8, 10
<i>Eucalyptus leprophloia</i> *	2*	Unknown	8, C
<i>Paracaleana dixonii</i>	174	263	7a, 7b, 8, 10, 11, 12, 13a
<i>Thelymitra stellata</i>	139 (144)	273	7a, 7b, 8, 11, 13a
Priority 1			
<i>Lasiopetalum ogilvieanum</i>	26	113	7a, 7b, 8, 13a
<i>Malleostemon decipiens</i>	2	300	4, 5
<i>Micromyrtus rogeri</i>	504	17,174	1a, 1b, 3, 7a, 7b, 8, 9, 10, 11, 12, 13b, C
? <i>Stylidium carnosum</i> subsp. Narrow leaves (J.A. Wege 490)	1	1	10
<i>Synaphea oulopha</i>	146 (150)	846	1b, 7a, 7b, 8, 9, 10, 11, 13a, 13b
Priority 2			
<i>Eucalyptus abdita</i>	6 (7)	12	1b, 8 (potentially also in 11)
<i>Persoonia filiformis</i>	88	190	7a, 7b, 10, 13a
<i>Schoenus badius</i>	7	7^	7a, 10, 13b, 14
<i>Stylidium pseudocaespitosum</i>	1	1	13a
Priority 3			
<i>Acacia isoneura</i> subsp. <i>isoneura</i>	1	1	5
<i>Allocasuarina grevilleoides</i>	37	1,997	7a, 7b, 8, 13a
<i>Banksia fraseri</i> ?var. <i>crebra</i> *	1*	Unknown	7b
<i>Beyeria gardneri</i>	1	2	12
<i>Eucalyptus macrocarpa</i> x <i>pyriformis</i>	3	19	7b, 8, 11
<i>Guichenotia impudica</i> *	1*	Unknown	11
<i>Haemodorum loratum</i>	57	90	3, 7a, 7b, 8, 9, 10, 12, 13a, 13b
<i>Hemiandra</i> sp. <i>Eneabba</i> (H. Demarz 3687)	22	30	7a, 10, 13a, 13b
<i>Mesomelaena stygia</i> subsp. <i>deflexa</i>	514	21,527	3, 7a, 7b, 8, 9, 10, 11, 12, 13a, 13b
<i>Persoonia rudis</i>	17	18	7a, 7b, 8, 10, 11, 12, 13a
<i>Schoenus griffinianus</i> *	1*	1	13a
<i>Stylidium drummondianum</i>	433	9,294	1a, 1b, 7a, 7b, 8, 8D, 9, 10, 11, 13a, 13b, C
<i>Stylidium torticarpum</i>	59	1,111	1a, 1b, 3, 4, 7b, 8, 9, C
<i>Synaphea aephynsa</i>	157	1,780	7a, 7b, 8, 9, 10, 12, 13a
<i>Thryptomene</i> sp. <i>Mingenew</i> (Diels & Pritzel 332)	8	221	4, 4D, 5, 7a
<i>Verticordia luteola</i> var. <i>luteola</i>	2	21	13a

Taxon	Number of locations	Number of individuals	Found in VTs
Priority 4			
<i>Banksia scabrella</i>	463	7,668	7a, 7b, 8, 10, 11, 12, 13a, 13b, 14, C
<i>Calytrix chrysantha</i>	1	30	7a
<i>Eucalyptus macrocarpa</i> subsp. <i>elachantha</i>	121	1,310	3, 7a, 7b, 8, 10, 11, 12, 13a

Source: Woodman Environmental (2013).

Conservation status under the Wildlife Conservation Act 1950 (descriptions adapted from DEC (2012)):

Schedule 1 (S1) – Taxa that have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.

Priority 1 (P1) – Taxa that are known from few specimens or sight records from one or a few localities on lands not managed for conservation, e.g., agricultural or pastoral lands, urban areas, active mineral leases, Shire or Main Roads reserves.

Priority 2 (P2) – Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g., national parks, conservation parks, nature reserves, State forest, vacant Crown land (VCL), water reserves, etc.

Priority 3 (P3) – Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat.

Priority 4 (P4) – Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not current Threatened or in need of special protection, but could be if present circumstances change.

Bracketed totals include collections that could not be positively identified.

* Indicates record from desktop search that could not be verified as correct by Woodman Environmental in 2012 and is believed to be erroneous.

^ Numbers of individuals were not recorded for this species, however is an annual species that is likely to be more abundant than indicated.