Site	Q02	Project	Nowergup
Type:	Quadrat	Size:	10 × 10 m
Date:	25/11/2013	Described by:	GO & DM
Co-ordinates:	MGA 50	382651 mE	6497993 mN
Location:	Southern site		
Soil colour & type:	Brown sand		
Vegetation type:			
Vegetation condition:	Excellent (2)		
Fire age & intensity:			
Disturbances:			
Bare ground (%):	2-10	Logs (%):	0
Twigs (%):	30-70	Leaves (%):	10-30
Rocks (%):	<2 limestone outcropping		

Species list

Family	Species	Status	Cover (%)	Height (m)
Myrtaceae	*Melaleuca systena*		30-70	1.1
Primulaceae	*Lysimachia arvensis*	*	02-10	0.2
Apiaceae	*Daucus glochidiatus*		2-10	0.2
Primulaceae	*Lysimachia arvensis*	*	10-30	0.15
Proteaceae	*Hakea trifurcata*		<2	0.5
Haemodoraceae	*Conostylis teretifolia* subsp. *planescens*		<2	0.2
Iridaceae	*Watsonia meriana*	*	<2	1
Asparagaceae	*Acanthocarpus preissii*		2-10	0.4
Asparagaceae	*Lomandra hermaphrodita*		2-10	0.4
Asteraceae	*Asteraceae* sp.		<2	0.5
Asteraceae	*Sonchus oleraceus*	*	<2	0.2
Asteraceae	*Ursinia anthemoides*	*	2-10	0.15
Caryophyllaceae	*Silene nocturna*	*	<2	0.3
Cyperaceae	*Mesomelaena pseudostygia*		10-30	0.5

Family	Species	Status	Cover (%)	Height (m)
Dilleniaceae	*Hibbertia hypericoides*		30-70	0.6
Fabaceae	*?Pultenaea* sp.		<2	0.8
Fabaceae	*?Pultenaea* sp.		<2	0.3
Myrtaceae	*Calothamnus quadrifidus*		10-3	1.8
Myrtaceae	*Melaleuca systena*		30-70	0.2
Poaceae	*Avena sp.*	*	<2	1
Poaceae	*Briza minor*	*	<2	0.15
Poaceae	*Ehrharta calycina*	*	<2	0.4
Poaceae	*Lolium rigidum*	*	<2	0.3
Poaceae	*Poaceae sp.*		<2	0.2
Proteaceae	*Banksia nivea* subsp. *nivea*		2-10	0.3
Proteaceae	*Grevillea preissii*		<2	0.7
Xanthorrhoeaceae	*Xanthorrhoea preissii*		10-30	2.2

Site	Q03	Project	Nowergup
Type:	Quadrat	Size:	10 × 10 m
Date:	25/11/2013	Described by:	GO & DM
Co-ordinates:	MGA 50	382715 mE	6497724 mN
Location:	Southern site		
Soil colour & type:	Light brown sand		
Vegetation type:			
Vegetation condition:	Excellent (2)		
Fire age & intensity:	Old (5-20 years)		
Disturbances:	Weeds		
Bare ground (%):	10-30	Logs (%):	0
Twigs (%):	2-10	Leaves (%):	10-30
Rocks (%):	Limestone outcropping near top of ridge		

Species list

Family	Species	Status	Cover (%)	Height (m)
Myrtaceae	*Melaleuca systena*		10-30	1.2
Dilleniaceae	*Hibbertia hypericoides*		30-70	1.1
Primulaceae	*Lysimachia arvensis*	*	10-30	0.2
Iridaceae	*Watsonia meriana*	*	<2	1
Lauraceae	*Cassytha flava*		<2	CREEPER
Fabaceae	*Trifolium arvense*	*	<2	0.06
Asparagaceae	*Lomandra hermaphrodita*		2-10	0.3
Asteraceae	*Ursinia anthemoides*	*	<2	0.2
Caryophyllaceae	*Silene gallica*	*	<2	0.15
Cyperaceae	*Mesomelaena pseudostygia*		10-30	0.4
Fabaceae	*?Pultenaea sp.*		<2	0.3
Fabaceae	*Acacia pulchella*		<2	1.1
Fabaceae	*Bossiaea eriocarpa*		<2	0.8
Haemodoraceae	*Conostylis teretifolia subsp. planescens*		<2	0.15
Myrtaceae	*Calothamnus quadrifidus*		2-10	1.8
Myrtaceae	*Melaleuca systena*		10-30	0.2

Family	Species	Status	Cover (%)	Height (m)
Orobanchaceae	*Orobanche minor*	*	OPP	OPP
Poaceae	*Poaceae sp.*		10-30	0.15
Proteaceae	*Banksia dallanneyi*		<2	0.15
Proteaceae	*Banksia grandis*		OPP	OPP
Proteaceae	*Banksia sessilis*		<2	1.1
Xanthorrhoeaceae	*Xanthorrhoea preissii*		2-10	2.1
Xanthorrhoeaceae	*Xanthorrhoea preissii*		2-10	2

Site	Q04	Project	Nowergup
Type:	Quadrat	Size:	10 × 10 m
Date:	25/11/2013	Described by:	GO & DM
Co-ordinates:	MGA 50	382643 mE	6497852 mN
Location:	Southern site		
Soil colour & type:	Light brown sand		
Vegetation type:			
Vegetation condition:	Excellent (2)		
Fire age & intensity:	Old (5-20 years)		
Disturbances:	Weeds, rabbits, fox den in quadrat		
Bare ground (%):	10-30	Logs (%):	0
Twigs (%):	10-30	Leaves (%):	2-10
Rocks (%):	30-70 limestone outcropping		

Species list

Family	Species	Status	Cover (%)	Height (m)
Myrtaceae	*Melaleuca systena*		<2	0.6
Dilleniaceae	*Hibbertia hypericoides*		30-70	0.8
Primulaceae	*Lysimachia arvensis*	*	10-30	0.2
Restionaceae	*Desmocladus flexuosus*		2-10	0.3
Apiaceae	*Daucus glochidiatus*		<2	0.15
Asparagaceae	*Acanthocarpus preissii*		<2	0.8
Asparagaceae	*Lomandra hermaphrodita*		2-10	0.4
Asteraceae	*Asteraceae* sp.		<2	0.1
Colchicaceae	*Burchardia congesta*		<2	0.3
Cyperaceae	*Lepidosperma pubisquameum*		<2	0.4
Cyperaceae	*Mesomelaena pseudostygia*		<2	0.6
Dilleniaceae	*Hibbertia hypericoides*		30-70	0.4
Ericaceae	*Leucopogon parviflorus*		<2	0.8
Fabaceae	*Hardenbergia comptoniana*		2-10	CREEPER
Haemodoraceae	*Conostylis aculeata*		2-10	0.25

Family	Species	Status	Cover (%)	Height (m)
Lauraceae	*Cassytha flava*		<2	CREEPER
Myrtaceae	*Calothamnus quadrifidus*		30-70	1
Myrtaceae	*Melaleuca huegelii*		30-70	2.1
Poaceae	*Briza maxima*	*	<2	0.3
Poaceae	*Briza minor*	*	<2	0.08
Proteaceae	*Banksia dallanneyi*		<2	0.2
Proteaceae	*Banksia sessilis*		2-10	1.5
Proteaceae	*Grevillea preissii*		2-10	0.4
Restionaceae	*Desmocladus asper*		<2	0.2
Restionaceae	*Desmocladus asper*		30-70	0.2
Xanthorrhoeaceae	*Xanthorrhoea preissii*		10-30	1.8

Opportunistics

Family	Species	Status
Asparagaceae	*Acanthocarpus preissii*	
Asteraceae	*Conyza bonariensis*	*
Asteraceae	*Hypochaeris sp.*	*
Asteraceae	*Podotheca gnaphalioides*	
Asteraceae	*Waitzia suaveolens subsp. suaveolens*	
Casuarinaceae	*Allocasuarina humilis*	
Cyperaceae	*Mesomelaena preissii*	
Dilleniaceae	*Hibbertia hypericoides*	
Fabaceae	*Gompholobium tomentosum*	
Fabaceae	*Kennedia prostrata*	
Gentianaceae	*Centaurium erythraea*	*
Goodeniaceae	*Lechenaultia linarioides*	
Myrtaceae	*Calothamnus ?sanguineus*	
Myrtaceae	*Melaleuca huegelii*	
Myrtaceae	*Melaleuca systena*	
Phyllanthaceae	*Phyllanthus scaber*	
Poaceae	*Aira caryophyllea*	*
Poaceae	*Poa drummondiana*	
Poaceae	*Rostraria cristata*	*
Proteaceae	*Hakea trifurcata*	
Proteaceae	*Petrophile axillaris*	
Stylidiaceae	*Stylidium brunonianum*	

Flora species recorded within the Northern and Southern Study Areas

Family	Taxon	Status
Aizoaceae	*Sarcozona ?bicarinata*	
Amaranthceae	*Ptilotus manglesii*	
Apiaceae	*Daucus glochidiatus*	
Apiaceae	*Trachyandra divaricata*	*
Asparagaceae	*Acanthocarpus preissii*	
Asparagaceae	*Asparagus asparagoides*	* DP, WoNS
Asparagaceae	*Lomandra ?maritima*	
Asparagaceae	*Lomandra ?suaveolens*	
Asparagaceae	*Lomandra caespitosa*	
Asparagaceae	*Lomandra hermaphrodita*	
Asparagaceae	sp.	*
Asparagaceae	*Thysanotus arenarius*	
Asparagaceae	*Thysanotus sparteus*	
Asteraceae	sp.	
Asteraceae	*Carduus pycnocephalus*	*
Asteraceae	*Centaurea melitensis*	*
Asteraceae	*Conyza bonariensis*	*
Asteraceae	*Hypochaeris* sp.	*
Asteraceae	*Olearia axillaris*	
Asteraceae	*Podotheca gnaphalioides*	
Asteraceae	*Sonchus oleraceus*	*
Asteraceae	*Urospermum picroides*	*
Asteraceae	*Ursinia anthemoides*	*
Asteraceae	*Waitzia suaveolens* subsp. *suaveolens*	
Brassicaceae	*Brassica tournefortii*	*
Brassicaceae	*Heliophila pusilla*	*
Campanulaceae	*Lobelia rhytidosperma*	
Campanulaceae	*Lobelia tenuior*	
Caryophyllaceae	*Petrorhagia dubia*	*
Caryophyllaceae	*Silene gallica*	*
Caryophyllaceae	*Silene nocturna*	*
Casuarinaceae	*Allocasuarina humilis*	
Colchicaceae	*Burchardia congesta*	
Cyperaceae	sp.	
Cyperaceae	*Lepidosperma pubisquameum*	
Cyperaceae	*Lepidosperma* sp.	
Cyperaceae	*Lepidosperma squamatum*	
Cyperaceae	*Mesomelaena preissii*	
Cyperaceae	*Mesomelaena pseudostygia*	
Cyperaceae	*Schoenus* sp.	
Cyperaceae	*Tetraria octandra*	

Family	Taxon	Status
Dilleniaceae	*Hibbertia hypericoides*	
Dilleniaceae	*Hibbertia racemosa*	
Ericaceae	*Leucopogon parviflorus*	
Ericaceae	*Leucopogon polymorphus*	
Ericaceae	*Leucopogon* sp. Yanchep	P3
Euphorbiaceae	*Euphorbia terracina*	*
Fabaceae	?*Pultenaea* sp.	
Fabaceae	*Acacia ?lasiocarpa*	
Fabaceae	*Acacia alata* var. *tetrantha*	
Fabaceae	*Acacia lasiocarpa* var. *lasiocarpa*	
Fabaceae	*Acacia pulchella*	
Fabaceae	*Acacia truncata*	
Fabaceae	*Bossiaea eriocarpa*	
Fabaceae	*Gompholobium tomentosum*	
Fabaceae	*Hardenbergia comptoniana*	
Fabaceae	*Hovea trisperma*	
Fabaceae	*Jacksonia calcicola*	
Fabaceae	*Kennedia prostrata*	
Fabaceae	*Sphaerolobium medium*	
Fabaceae	*Templetonia retusa*	
Fabaceae	*Trifolium arvense*	*
Gentianaceae	*Centaurium erythraea*	*
Geraniaceae	*Pelargonium capitatum*	*
Goodeniaceae	*Lechenaultia linarioides*	
Goodeniaceae	*Scaevola thesioides*	
Haemodoraceae	*?Phlebocarya ciliata*	
Haemodoraceae	*Conostylis aculeata*	
Haemodoraceae	*Conostylis candicans* subsp. *calcicola*	
Haemodoraceae	*Conostylis teretifolia* subsp. *planescens*	
Haemodoraceae	*Haemodorum laxum*	
Hemerocallidaceae	*Tricoryne tenella*	
Iridaceae	*Watsonia meriana*	*
Lamiaceae	*Hemiandra glabra*	
Lauraceae	*Cassytha flava*	
Lauraceae	*Cassytha racemosa*	
Malvaceae	*Thomasia triphylla*	
Myrtaceae	*Calothamnus ?sanguineus*	
Myrtaceae	*Calothamnus quadrifidus*	
Myrtaceae	*Calothamnus sanguineus*	
Myrtaceae	*Eucalyptus ?decipiens*	
Myrtaceae	*Eucalyptus decipiens*	
Myrtaceae	*Eucalyptus foecunda*	
Myrtaceae	*Eucalyptus petrensis*	
Myrtaceae	*Kunzea glabrescens*	

Family	Taxon	Status
Myrtaceae	*Melaleuca huegelii*	
Myrtaceae	*Melaleuca* sp. Wanneroo (G.J. Keighery 16705)	P1
Myrtaceae	*Melaleuca systena*	
Orobanchaceae	*Orobanche minor*	*
Phyllanthaceae	*Phyllanthus scaber*	*
Poaceae	*Aira caryophyllea*	*
Poaceae	*Aristida* sp.	
Poaceae	*Austrostipa ?flavescens*	
Poaceae	*Avena* sp.	*
Poaceae	*Brachypodium distachyon*	*
Poaceae	*Briza maxima*	*
Poaceae	*Briza minor*	*
Poaceae	*Catapodium rigidum*	*
Poaceae	*Cynodon dactylon*	*
Poaceae	*Ehrharta calycina*	*
Poaceae	*Lolium rigidum*	*
Poaceae	*Poa drummondiana*	
Poaceae	sp.	
Poaceae	*Rostraria cristata*	*
Poaceae	*Rytidosperma occidentale*	
Polygalaceae	?*Comesperma* sp.	
Polygalaceae	*Comesperma confertum*	
Primulaceae	*Lysimachia arvensis*	*
Proteaceae	*Banksia attenuata*	
Proteaceae	*Banksia dallanneyi*	
Proteaceae	*Banksia grandis*	
Proteaceae	*Banksia nivea* subsp. *nivea*	
Proteaceae	*Banksia sessilis*	
Proteaceae	*Grevillea preissii*	
Proteaceae	*Hakea costata*	
Proteaceae	*Hakea erinacea*	
Proteaceae	*Hakea prostrata*	
Proteaceae	*Hakea trifurcata*	
Proteaceae	*Petrophile axillaris*	
Proteaceae	*Petrophile macrostachya*	
Restionaceae	*Desmocladus asper*	
Restionaceae	*Desmocladus fasciculatus*	
Restionaceae	*Desmocladus flexuosus*	
Rhamnaceae	*Trymalium ledifolium* var. *ledifolium*	
Rubiaceae	*Opercularia vaginata*	
Solanaceae	*Solanum nigrum*	*
Stylidiaceae	*Stylidium brunonianum*	
Stylidiaceae	*Stylidium maritimum*	P3

Family	Taxon	Status
Stylidiaceae	*Stylidium rigidulum*	
Violaceae	*Hybanthus calycinus*	
Xanthorrhoeaceae	*Xanthorrhoea preissii*	

Likelihood of occurrence	Definition
Known	Species definitely recorded within the survey area from previous records or field survey results.
Likely	Species previously recorded within 5 km and suitable habitat occurs at the survey area.
Possible	Species previously recorded within 5 km with marginally suitable habitat occurring at the survey area. OR Species not previously recorded within 5 km, but suitable habitat occurs at the survey area.
Unlikely	Species previously recorded within 5 km but suitable habitat does not occur at the survey area.
Highly unlikely	Species not previously recorded within 5 km, suitable habitat does not occur at the survey area and/ or survey area is outside the species' natural distribution.

Flora Likelihood of Occurrence Assessment

		Status		Source						
Scientific name	Common name	State	Federal	NatureMap search	WAHER B/TPFL	EPBC search	Description and habitat requirements (Western Australian Herbarium, 1998-)	Likelihood of occurrence	Efficacy of field survey	References
Andersonia gracilis	Slender Andersonia	T	E			X	Slender erect or open straggly shrub, 0.1-0.5(-1) m high. Fl. white-pink-purple, Sep to Nov. White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps. *Andersonia gracilis* is currently known from the Badgingarra, Dandaragan and Kenwick areas where it is found on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils supporting low open heath vegetation with species such as *Calothamnus hirsutus, Verticordia densiflora* and *Kunzea recurva* over sedges.	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas.	NA	Department of Environment and Conservation (2006). Slender Andersonia (*Andersonia gracilis*) Interim Recovery Plan 2006-2011. Interim Recovery Plan No. 228. Department of Environment (DotE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669 Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Anigozanthos viridis subsp. *terraspectans*	Dwarf Green Kangaroo Paw	T	V			X	Rhizomatous, perennial, herb, 0.05-0.2 m high. Fl. green/yellow-green, Aug to Sep. Grey sand, clay loam. Winter-wet depressions.	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas. This species is restricted to the Cataby region (DotE, 2014).	NA	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/. Department of Environment. 2013. *Approved Conservation Advice for Anigozanthos viridis subsp. terraspectans (Dwarf Green Kangaroo Paw)*. Available online at: http://www.environment.gov.au/biodiversity/threatened/species/pubs/3435-conservation-advice.pdf Department of Environment (DotE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669
Acacia benthamii		P2		X	X		Shrub, ca 1 m high. Fl. yellow, Aug to Sep. Sand. Typically on limestone breakaways.	Likely: species previously recorded within 5 km and suitable habitat occurs at the Study Areas.	High	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.

		Status		Source						
Scientific name	Common name	State	Federal	NatureMap search	WAHER B/TPFL	EPBC search	Description and habitat requirements (Western Australian Herbarium, 1998-)	Likelihood of occurrence	Efficacy of field survey	References
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)		P1			X		Limestone.	Likely: species previously recorded within 5 km and suitable habitat occurs at the Study Areas.	Moderate	
Caladenia huegelii	King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid	T	E			X	Tuberous, perennial, herb, 0.25-0.6 m high. Fl. green & cream & red, Sep to Oct. Grey or brown sand, clay loam.	Unlikely: species not previously recorded within 5 km, but marginally suitable habitat occurs at the Study Areas.	Moderate	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Calectasia cyanea	Blue Tinsel Lily	T	CE	X			Rhizomatous, clump forming, woody perennial, herb, 0.1-0.6 m high, to 0.3 m wide. Fl. blue/purple, Jun to Oct. White, grey or yellow sand, gravel.	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas. This species is known only from a single population approximately 10 km south of Albany (DotE, 2014).	NA	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/. Department of Environment (DoE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669
Centrolepis caespitosa		P4	E			X	Tufted annual, herb (forming a rounded cushion up to 25 mm across). Fl. Oct to Dec. White sand, clay. Salt flats, wet areas. *Centrolepis caespitosa* occurs in winter-wet clay pans dominated by low shrubs and sedges	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas.	NA	Department of Conservation and Land Management (2004). Matted centrolepis (*Centrolepis caespitosa*) 2004-2008 Interim Recovery Plan No 159 (Gilfillan, S. & S. Barrett, 2004). Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.

		Status		Source						
Scientific name	Common name	State	Federal	NatureMap search	WAHER B/TPFL	EPBC search	Description and habitat requirements (Western Australian Herbarium, 1998-)	Likelihood of occurrence	Efficacy of field survey	References
Darwinia foetida	Muchea bell	T	CE			X	Erect, or spreading, shrub to 0.7 m high, often using other shrubs for support. Young branches are slender, green-brown with prominent, decurrent leaf bases, becoming grey and woody. Fl. Green, Oct to Nov. Grey or white sand, swampy, seasonally wet sites. The Muchea Bell is known from three populations in swampy, seasonally wet habitat in the Muchea area, approximately 70km north of Perth.	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas. This species is restricted to the Muchea region.	NA	Commonwealth Conservation Advice on *Darwinia* sp. *Muchea* (B.J.Keighery 2458) (Muchea Bell) (Threatened Species Scientific Committee (TSSC), 2009ab) [Conservation Advice]. Department of Environment (DotE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669 Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Diuris micrantha	Dwarf Bee-orchid	T	V			X	Tuberous, perennial, herb, 0.3-0.6 m high. Fl. yellow & brown, Sep to Oct. Brown loamy clay. Winter-wet swamps, in shallow water. Dwarf Bee-orchid is known from seven populations, from east of Kwinana and south towards the Frankland area, Western Australia. It is found in small populations, on dark, grey to blackish, sandy clay-loam substrates in winter wet depressions or swamps. The bases of the flowering plants are often covered with shallow water	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas.	NA	Commonwealth Conservation Advice on *Diuris micrantha* (Threatened Species Scientific Committee, 2008mo) [Conservation Advice]. Department of Environment (DotE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669 Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.

		Status		Source						
Scientific name	Common name	State	Federal	NatureMap search	WAHER B/TPFL	EPBC search	Description and habitat requirements (Western Australian Herbarium, 1998-)	Likelihood of occurrence	Efficacy of field survey	References
Diuris purdiei	Purdie's Donkey Orchid	T	E			X	Tuberous, perennial, herb, 0.15-0.35 m high. Fl. yellow, Sep to Oct. Grey-black sand, moist. Winter-wet swamps. It grows on sand to sandy clay soils, in areas subject to winter inundation, and amongst native sedges and dense heath and emergent trees	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas.	NA	Commonwealth Conservation Advice on Diuris purdiei (Purdie's Donkey-orchid) (Threatened Species Scientific Committee, 2008j) [Conservation Advice]. Department of Environment (DotE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669 Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Drakaea elastica	Glossy-leaved Hammer-orchid, Praying Virgin	T	E			X	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. red & green & yellow, Oct to Nov. White or grey sand. Low-lying situations adjoining winter-wet swamps. Preferred habitat is low-lying areas of deep sand supporting banksia woodland or spearwood thicket	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas.	NA	Department of Environment and Conservation (2009). National recovery plan for the Glossy-leafed Hammer Orchid (*Drakaea elastica*) (Department of Environment and Conservation, 2009l) Department of Environment (DotE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669 Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.

		Status		Source						
Scientific name	Common name	State	Federal	NatureMap search	WAHERB/TPFL	EPBC search	Description and habitat requirements (Western Australian Herbarium, 1998-)	Likelihood of occurrence	Efficacy of field survey	References
Drakaea micrantha	Dwarf Hammer-orchid	T	V			X	Tuberous, perennial, herb, 0.15-0.3 m high. Fl. red & yellow, Sep to Oct. White-grey sand. The species is usually found in cleared fire breaks or open sandy patches that have been disturbed, and where competition from other plants has been removed. It occurs in infertile grey sands, in Banksia, Jarrah and Common Sheoak woodl and thickets of Spearwood (*Kunzea ericifolia*)	Possible: species not previously recorded within 5 km but some suitable habitat does occur at the Study Areas.	Moderate	Commonwealth Conservation Advice on *Drakaea micrantha* Hopper & A.P.Brown nom. inval. (Dwarf Hammer-orchid) (Threatened Species Scientific Committee, 2008k) [Conservation Advice]. Department of Environment (DotE) 2014, Species and Profile Database, retrieved January 2014 from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=7669 Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Eucalyptus argutifolia	Yanchep Mallee, Wabling Hill Mallee	T	V	X	X	X	Mallee, 1.5-4 m high, bark smooth. Fl. white, Mar to Apr. Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.	Unlikely: species previously recorded within 5 km and suitable habitat occurs at the Study Areas.	High	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Hibbertia spicata subsp. *leptotheca*		P3		X			Erect or spreading shrub, 0.2-0.5 m high. Fl. yellow, Jul to Oct. Sand. Near-coastal limestone ridges, outcrops & cliffs.	Likely: species previously recorded within 5 km and suitable habitat occurs at the Study Areas.	Moderate	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Jacksonia sericea		P4		X	X		Low spreading shrub, to 0.6 m high. Fl. orange, usually Dec or Jan to Feb. Calcareous & sandy soils.	Likely: species previously recorded within 5 km and suitable habitat occurs at the Study Areas.	Moderate	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Lepidosperma rostratum	Beaked Lepidosperma	T	E			X	Rhizomatous, tufted perennial, grass-like or herb (sedge), 0.5 m high. Fl. brown. Peaty sand, clay. Beaked Lepidosperma is associated with Marsh Banksia (*Banksia telmatiaea*) and Hairy Clawflower (*Calothamnus hirsutus*), and grows in sandy soil among low heath in a winter-wet swamp	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas.	NA	Commonwealth Conservation Advice on *Lepidosperma rostratum* (Threatened Species Scientific Committee, 2008rh) [Conservation Advice]. Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Leucopogon sp. Yanchep (M. Hislop 1986)		P3		X			Low hill, grey sand over limestone. Limestone heath.	Known: species recorded within Study Areas during the 2013 survey.	High	

		Status		Source						
Scientific name	Common name	State	Federal	NatureMap search	WAHER B/TPFL	EPBC search	Description and habitat requirements (Western Australian Herbarium, 1998-)	Likelihood of occurrence	Efficacy of field survey	References
Melaleuca sp. Wanneroo		P1		X	X		Rugged limestone ridge. Mossy black sand. Melaleuca cardiophylla, M. sp., M. systena tall closed shrubland.	Known: species recorded within Study Areas during the 2013 survey.	High	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/.
Pimelea calcicola		P3		X	X		Erect to spreading shrub, 0.2-1 m high. Fl. Pink, Sep to Nov. Sand. Coastal limestone ridges.	Likely: species previously recorded within 5 km and suitable habitat occurs at the Study Areas.	Moderate	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/
Stylidium longitubum	Jumping Jacks	P3		X	X		Erect annual (ephemeral), herb, 0.05-0.12 m high. Fl. pink, Oct to Dec. Sandy clay, clay. Seasonal wetlands.	Unlikely: species previously recorded within 5 km but suitable habitat does not occur at the Study Areas.	Moderate	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/
Stylidium maritimum		P3		X	X		Caespitose perennial, herb, 0.3-0.7 m high, Leaves tufted, linear to narrowly oblanceolate, 10-40 cm long, 1-5.5 mm wide, apex acute to mucronate, margin involute, glabrous. Membraneous scale leaves present at base of mature leaves. Scape glandular throughout. Inflorescence paniculate. Fl. white/purple, Sep to Nov. Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.	Known: species recorded within Study Areas during the 2013 survey.	Moderate	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/
Tripterococcus paniculatus		P4		X	X		Perennial, herb, to 1 m high. Fl. yellow-green, Oct to Nov. Grey, black or peaty sand. Winter-wet flats.	Highly Unlikely: species not previously recorded within 5 km and suitable habitat does not occur at the Study Areas.	NA	Western Australian (WA) Herbarium 1998–, FloraBase—the Western Australian Flora, retrieved November, 2013, from http://florabase.dpaw.wa.gov.au/

Appendix E –Fauna likelihood of occurrence assessment

Fauna likelihood of occurrence assessment of conservation significant fauna identified in the desktop assessment as potentially occurring within the Study Areas

Fauna Likelihood of Occurrence Assessment

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
Birds							
Calyptorhynchus baudinii Baudin's Black Cockatoo	Vu	T		X		This species occurs in high-rainfall areas, usually at sites that are heavily forested and dominated by Marri and Eucalyptus species, especially Karri and Jarrah. The species is known to forage in heath lands with proteaceious shrubs.	**Present**. Recorded during the field survey. This species was recorded in the Study Area even though the EPBC Act Referral Guidelines (DoE 2012b) map the Study Area as outside the recognised foraging and breeding range for this species
Calyptorhynchus latirostris Carnaby's Black Cockatoo	En	T	X	X		This species mainly occurs in uncleared or remnant native eucalypt woodlands and in shrublands or kwongan heathland dominated by Hakea, Dryandra, Banksia and Grevillea species. The species also occurs in forests containing Marri, Jarrah or Karri (DoE 2012	**Likely**. This species was recorded in the area during previous studies (Western Wildlife, 2008). There is suitable foraging habitat in the Study Area for the Black Cockatoos.
Leipoa ocellata Malleefowl	Vu, Mi	T		X		The Malleefowl generally occurs in semi-arid areas of Western Australia, from Carnarvon to south east of the Eyre Bird Observatory (south-east Western Australia). It occupies shrublands and low woodlands that are dominated by mallee vegetation, as well as native pine Callitris woodlands, Acacia shrublands, Broombush Melaleuca uncinata vegetation or coastal heathlands. The nest is a large mound of sand or soil and organic matter (Jones and Goth 2008; Morcombe, 2004).	Unlikely. The Study Area is outside the currently known distribution for this species.

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
Rostratula benghalensis australis Australian Painted Snipe	En, Mi,Ma	T		X		The Australian Painted Snipe generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. Australian Painted Snipe breeding habitat requirements may be quite specific: shallow wetlands with areas of bare wet mud and both upper and canopy cover nearby. The species rarely occurs in south-western Australia, where it was once more common (Marchant & Higgins 1993; Garnett and Crowley 2000).	Unlikely. There is no suitable habitat for the species within the Study Area or in proximity to the Study Area.
Sternula nereis nereis Australian Fairy Tern	Vu	T		X		Within Australia, the Fairy Tern occurs along the coasts of Victoria, Tasmania, South Australia and Western Australia; occurring as far north as the Dampier Archipelago near Karratha. The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline. The bird roosts on beaches at night (Garnett and Crowley 2000; Nevill, 2008)	Unlikely. There is no suitable habitat for the species within the Study Area or in proximity to the Study Area.

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
Apus pacificus Fork-tailed Swift	Mi, Ma	S3		X		In south-west WA there are sparsely scattered records along the south coast, ranging from the Eyre Bird Observatory and west to Denmark. They are widespread in coastal and sub-coastal areas between Augusta and Carnarvon, including some on nearshore and offshore islands. There are no breeding records in Australia. This species is almost exclusively aerial, flying less than 1 m to at least 300 m above ground. This species is considered rare in the south-west region (DSEWPaC 2013).	Possible. The closest known record of this species are less than 2 km east of Wanneroo Road recorded in 2009 (DPaW and WAM 2013). There is potential this species may occur as an occasional vagrant however considering it is an almost exclusively aerial species with scattered records in the area the rate of occurance is likely to be low.
Pandion haliaetus Osprey	Ma	S3		X		Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers, particularly in northern Australia. They require extensive areas of open fresh, brackish or saline water for foraging (Marchant & Higgins 1993). They frequent a variety of wetland habitats including inshore waters, reefs, bays, coastal cliffs, beaches, estuaries, mangrove swamps, broad rivers, reservoirs and large lakes and waterholes. They exhibit a preference for coastal cliffs and elevated islands in some parts of their range, but may also occur on low sandy, muddy or rocky	Possible. Given the proximity of the Study Area to coastal habitats (which are the prefered habitat of the species) it is possible that the Osprey will ocasionally occur in the Study Area.

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
						shores and over coral cays.	
Ardea modesta Eastern Great Egret	Mi, Ma	S3			X	The eastern Great Egret is widespread in Australia. They have been reported in a wide range of wetland habitats, include swamps and marshes; margins of rivers and lakes; damp or flooded grasslands, pasture or agricultural lands; reservoirs; sewerage treatment ponds; drainage channels; salt pans; salt marshes; mangrove, and a range of coastal/marine habitats (DSEWPaC 2013)	Unlikely. There is no suitable habitat for the species within the Study Area or in proximity to the Study Area.
Ardea alba Great Egret, White Egret	Mi, Ma	S3		X		The Great Egret is a common and widespread species. They have been reported in a wide range of habitats including tropical and temperate grasslands, reservoirs; sewerage treatment ponds; drainage channels; wooded lands and terrestrial wetlands. It often forages away from water on low lying grasslands, improved pastures and croplands and roosts in trees, or amongst ground vegetation in or near lakes and swamps (Morcombe, 2004).	Unlikely. There is no suitable habitat for the species within the Study Area or in proximity to the Study Area.
Ardea ibis Cattle Egret	Mi, Ma	S3		X		The Cattle Egret is a common and widespread species. Typical habitat includes tropical and temperate	Unlikely. There is no suitable habitat for the species within the Study Area or in proximity to the Study Area.

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
						grasslands, wooded lands and terrestrial wetlands. It often forages away from water on low lying grasslands, improved pastures and croplands and roosts in trees, or amongst ground vegetation in or near lakes and swamps (Morcombe, 2004).	
Haliaeetus leucogaster White-bellied Sea-Eagle	Mi, Ma	S3		X		The White-bellied Sea-Eagle occurs in coastal habitats (especially those close to the sea-shore as well as any habitat characterized by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). It also occurs in the vicinity of estuaries, mangroves, swamps, lagoons and floodplains, often far inland along major rivers (Morcombe, 2004).	Possible. Given the proximity of the Study Area to coastal habitats (which are the prefered habitat of the species) it is possible that the Eagle will ocasionally occur in the Study Area.
Merops ornatus Rainbow Bee-eater	Mi, Ma	S3		X	X	Open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. It also inhabits sand dune systems in coastal areas and at inland sites that are in close proximity to water (Morcombe, 2004).	Likely.The Rainbow Bee-eater has previously been recorded in the area and is known to utlise a wide variety of habitat types including those represented in the Study Area. Whilst the rate of is occurance is likely to be low the Rainbow Bee-eater is likley to ocasionally occur in the Study Area.
Mammals							
Bettongia penicillata ogilbyi Woylie	En	T			X	Preferred habitat for the Woylie includes dense undergrowth, logs and rock-cavities and occasionally in burrows (Burbidge 2004). Scattered Woylie populations may be found	Unlikely. This Woylie has not been recorded on the Swan Coastal Plain for over 40 years and is now restricted to isolated population in Wheatbelt Conservation Estate.

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
						throughout the Jarrah forest in the south-west corner of Western Australia. Extant naturally occurring populations of the species are restricted to three small wheatbelt reserves in WA – Dryandra Woodland, Tutanning Nature Reserve and Perup Forest. All are characterised by the presence of thickets of the plant Gastrolobium (Van Dyck and Strahan 2008). The species historically occurred in a wide variety of habits, however is now restricted to forests and areas where predation has been controlled (or excluded).	
Dasyurus geoffroii Chuditch	Vu	T		X	X	The Chuditch inhabits eucalypt forest (especially Jarrah, Eucalyptus marginata), dry woodland and mallee shrublands. In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest. Most diurnal resting sites in sclerophyll forest consist of hollow logs or earth burrows (Van Dyke & Strahan, 2008). The species can travel large distances, has a large home range and is sparsely populated through a large portion of its range.	Possible. A Chuditch was sited in Neerabup on Waneroo Road (DPaW pers. comm. 2013).

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
Isoodon obesulus fusciventer Southern Brown Bandicoot / Quenda			P5		X	The Quenda prefers dense scrubby, often swampy, vegetation with dense cover up to one metre high. However, it also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation. The species often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover (Van Dyck and Strahan, 2008).	Likely. The Study Area provides some suitable habitat for this species which is known to occur in scattered populations across the Swan Coastal Palin and prefers habitat associated with a dense understorey. This species is known to occur in the Neerabup National Park and the nearby Nowergup Lake and Joondalup Lake (DPaW and WAM)
Macropus irma Western Brush Wallaby			P4		X	The Western Brush Wallaby is a grazer found primarily in open forest or woodland,particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest. This species was once very common in the south-west of Western Australia but has undergone a reduction in range and a significant decline in abundance in its current habitat. (Van Dyke & Strahan, 2008).	Likely. The Study Area provides some suitable habitat for this species. This species has been recorded previously within the Study Area in the Neerabup National Park (DPaW and WAM 2013).
Petrogale lateralis lateralis Black-flanked Rock-wallaby		T			X	The Black-flanked Rock-wallaby has undergone a large range restriction, formerly being known from suitable habitat across central and southern Western Australia. The current known populations remain restricted to suitable habitat in the Little Sandy Desert, Cape Range, the Wheatbelt	Highly unlikely. There is no suitable habitat present for this species within the Study Area or on the Swan Coastal Pain

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
						region, Barrow Island and Salisbury Island. In the south-west, colonies are largely confined to scattered granite outcrops in remnants of mallee scrub surrounded by cleared agricultural land. The habitat of Black-flanked Rock-wallaby varies between colonies but always involves grassland feeding habitat for feeding in close proximity to cliff, rock-pile, talus or escarpment refuge habitat. Rock cliffs or other steep substrates with adequate shelter and refuge are essential for breeding. Populations have been re-established via translocation to a number of sites along the Avon Valley, wheatbelt and southern coastline (Van Dyck and Strahan, 2008)	
Reptiles							
Morelia spilota imbricata Carpet Python		S4			X	The Carpet Python occurs in a large range of habitats including woodlands, forests and dense coastal scrub, on granite and limestone outcrops and along watercourses. The distribution of the species is from Geraldton and Yalgoo in the North east to Pinjin, Kalgoorlie, Fraser Range and most of the remaining south west. It is often arboreal and preys on birds, other reptiles and small to medium size mammals. The carpet python generally occurs in large, undisturbed bush; and	Present. This species was identified in the Study Area from a snake skin slough during the field survey.

Species name	Status			Source		Habitat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
						areas, preferring coastal limestone and woodlands on the Swan Coastal Plain (Bush et al. 1995; 2010).	
Invertebrates							
Austrosaga spinifer Cricket			P3		X	This species of cricket is an endemic to Australia. There is no habitat description available for this species.	Likely. There are two records of this species within the Study Area, along Wanneroo Road, recorded in 1981 and 1982
Hylaeus globuliferus Bee			P3		X	This native bee is thought to favour flowers of Adenanthos cygnorum for feeding, but has also been recorded on Banksia attenuata.	Likely. The closest known records of this species are less than 3 km east of the Study Area, recorded in 1995 and 1996 (DPaW and WAM 2013). Suitable habitat is present within the Study Area
Synemon gratiosa Graceful Sun Moth			P4		X	The Graceful Sun-moth (GSM) is closely associated with Banksia woodland. The species is also dependent upon *Lomandra maritima* and *L. hermaphrodita* being present for breeding.	Likely. There is excellent habitat for this species in the Study Areas and there are a number of records of this species in the surrounding region. Lomandra species were recorded during the 2013 survey.
Westralunio carteri Carter's Freshwater Mussel			P4		X	This species of mussel is south-west WA's only freshwater mussel. It is known from the Avon, Blackwood and Canning Rivers and is found in ponds, lakes, rivers, streams, and has been collected from a dam in WA. It is tolerant to human disturbance and	Highly unlikely. There is no suitable habitat for this species within the Study Area

Species name	Status			Source		Habitiat requirements and species ecology	Likelihood of occurrence
	EPBC Act	WC Act	DPaW	EPBC Act PMST	NatureMap search		
						organic pesticides, but sensitive to salinity levels.	

GHD

GHD House, 239 Adelaide Tce. Perth, WA 6004
P.O. Box 3106, Perth WA 6832
T: 61 8 6222 8222 F: 61 8 6222 8555 E: permail@ghd.com.au

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		Name	Signature	Name	Signature	Date
0	M Longman G. Owen	C. Grabham M. Dilly		T Moulds		10/02/2014

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