Targeted Survey for Main's Assassin Spider (Zehyrarchaea mainae) for the Albany Wind Farm, Albany, Western Australia.

Report by Invertebrate Solutions Pty Ltd for Eco Logical Australia Pty Ltd on behalf of Synergy Pty Ltd

February 2020

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Prepared for: Eco Logical Australia Pty Ltd on behalf of Synergy

Frontispiece: Albany Wind Farm Turbine.

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Executive Summary

Synergy plans to undertake clearing surrounding wind turbines at the Albany Wind Farm, west of Albany in the south west of Western Australia, to enable ongoing maintenance of turbines. The Albany Wind Farm is situated in coastal peppermint (*Agonis sp*.) and heathland that is known to provide habitat for Main's Assassin Spider (*Zephyrarchaea mainae)* that is classified as Vulnerable under the Biodiversity Conservation Act 2016.

Invertebrate Solutions Pty Ltd (invertebrate Solutions) has been requested by Eco Logical Australia Pty Ltd (Eco Logical) on behalf of Synergy to undertake a targeted field survey for the Albany wind farm project area. The results of the targeted survey will be used to support a native vegetation clearing permit application to allow ongoing maintenance of the facility.

The targeted field survey was undertaken in December 2019 at 15 existing wind turbine sites recorded no *Z. mainae* individuals within any of proposed clearing areas. Many of the survey sites were situated on geographic rises in the landscape and exposed to strong winds making them unsuitable habitat for *Z. mainae*. The previous records of *Z. mainae* from the Albany Wind Farm area (Figure 1) are situated in protected gullies providing better microhabitat for the formation of an elevated leaf-litter layer which collects amongst the crowns of the understorey plants.

No direct impacts to *Z. mainae* are anticipated form the proposed clearing around the existing wind turbines.

The following recommendation is made with regard to the Project:

- No further surveys for Main's Assassin Spider (*Z. mainae)* are required for the Albany wind farm project area.

1. Introduction

Synergy plans to expand the cleared area surrounding wind turbines at the Albany Wind Farm, west of Albany in the south west of Western Australia. The Albany Wind Farm is situated in coastal peppermint (*Agonis sp*.) and heathland that is known to provide habitat for Main's Assassin Spider (*Zephyrarchaea mainae)* that is classified as Vulnerable under the Biodiversity Conservation Act 2016.

Invertebrate Solutions Pty Ltd (invertebrate Solutions) has been requested by Eco Logical Australia Pty Ltd (Eco Logical) on behalf of Synergy to undertake a targeted field survey for the Albany wind farm project area. The results of the targeted survey will be used to support a native vegetation clearing permit application to allow ongoing maintenance of the facility.

1.1 Purpose of this report

Invertebrate Solutions has been requested by Eco Logical on behalf of Synergy to undertake the following scope of works within the Albany wind farm project area, Albany, Western Australia:

- Undertake a targeted field survey for Main's Assassin Spider (*Z. mainae*) at 15 sites at the Albany Wind Farm
- Determine the presence or absence of *Z. mainae* within each of the 15 sites surveyed.
- Provide recommendations and any suggested requirements for further work to comply with relevant legislation.
- Provide a written report (including maps) containing the above items.

1.2 Project area

The Albany Wind Farm is located at Sandpatch to the west of the Albany townsite, on the south coast of Western Australia and is shown in Figure 1. The survey area consists of 15 separate proposed clearing envelopes around existing wind turbines.

1.3 *Zephyrarchaea mainae* Distribution, Ecology and Habitat

Main's Assassin Spider (*Z. mainae*) is known from the greater Albany region and occurs along the south coast of Western Australia from the Walpole-Nornalup National Park (near Walpole) east to Bremer Bay and north to the Porongurup National Park, with a range centred on the Torndirrup Peninsula south of Albany (Rix and Harvey 2012). The species has previously been collected by beating sedges (*Lepidosperma* sp.), curly grass (*Empodisma gracillimum*) and low shrubs in dense coastal or near-coastal groves of Peppermint (*Agonis* sp.) (Rix and Harvey 2012). There are also isolated records from wet Karri forests (*Eucalyptus diversicolor*) (Rix and Harvey 2012). The specific microhabitat required by *Z. mainae* is the elevated leaf-litter layer which collects amongst the crowns of the understorey plants as this forms protected, shaded habitats in in an otherwise exposed landscape (Framenau et al. 2008).

All *Zephyarchaea* species are known to be specialist predators on other spiders using their highly modified cephalothorax and chelicerae to 'spear' their prey (Plate 1) (Platnick 1991, Framenau 2008, Rix and Harvey 2012).

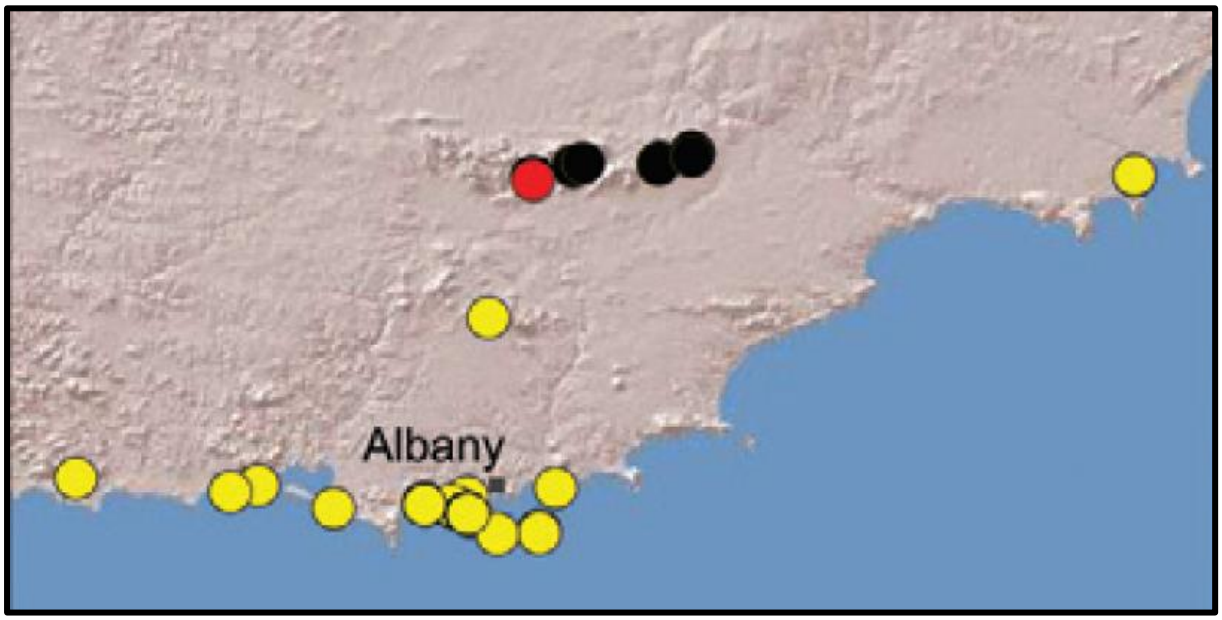


Plate 1 Distribution of *Zephyrarchaea* mainae (yellow circles) along the south coast of Western Australia from Walpole to Bremer Bay (After Rix and Harvey 2012).

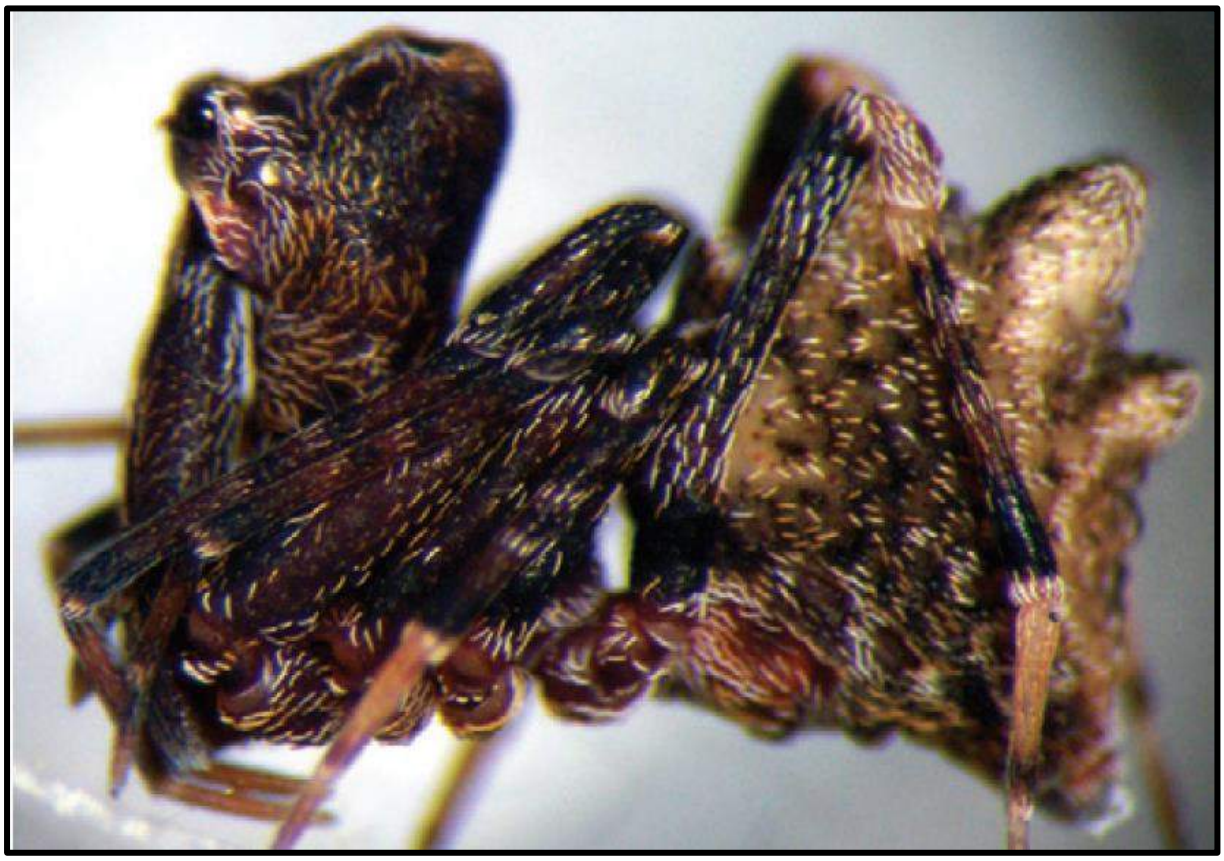
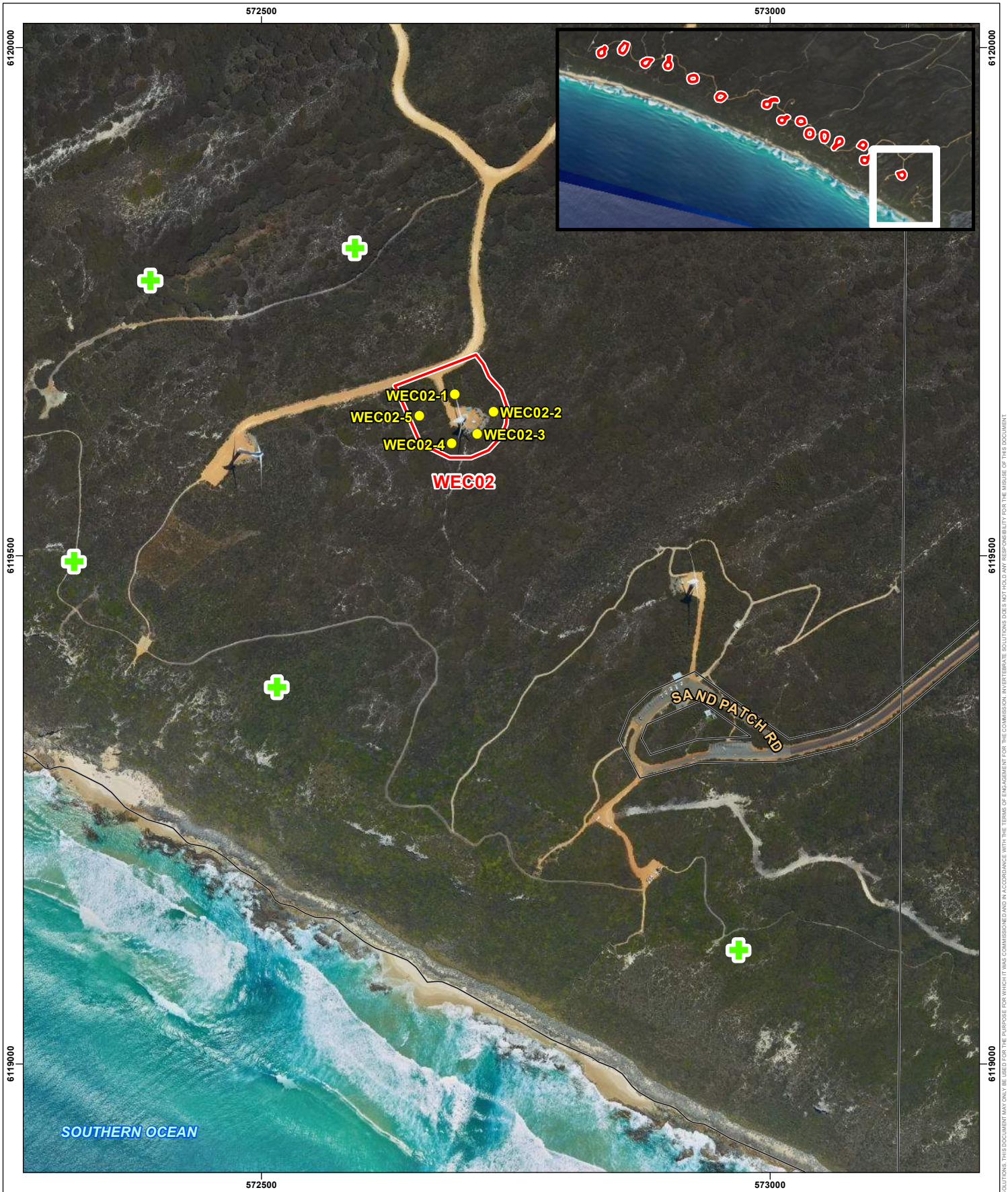


Plate 2 Adult female *Zephyrarchaea mainae,* noting the modified cephalothorax (After Rix and Harvey 2012)



Legend

- Survey Area
- Field Survey Location
- Historical Records of Main's Assassin Spider *(Zephyrarchaea mainae)*

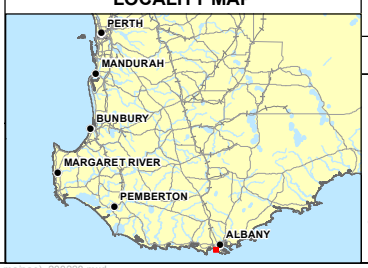
0 37.5 75 150 m

Scale: 1:5,000 @ A4

N

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY MAP



- LOCALITY MAP SOURCED FROM LANDGATE 2006
- NATGEO WORLD MAP FROM OPEN SOURCE

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PROJECT ID	DATE
Albany Wind Farm	28/02/2020

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
ENVIRONMAPS	TM	TM	0

Client: Synergy

Figure 1a

Location of Targeted Field Survey for Main's Assassin Spider *(Zephyrarchaea mainae)*

ENVIRONMAPS t: 0406 590 006
Environmental Mapping Solutions www.environmaps.com.au

C:\GIS\Jobs\Invertebrate Solutions\Albany Wind Farm - Synergy\Figures\AWF_F01A Location of targeted field survey for Main's Assassin Spider (Zephyrarchaea mainae)_200228.mxd

Legend

- Survey Area
- Field Survey Location
- Historical Records of Main's Assassin Spider *(Zephyrarchaea mainae)*

0 37.5 75 150 m

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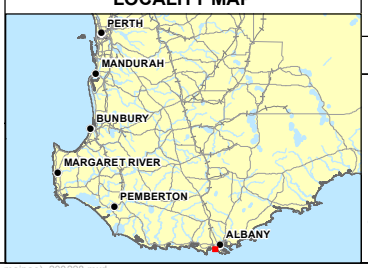
- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY MAP



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Client: Synergy

Figure 1b

Location of Targeted Field Survey for Main's Assassin Spider *(Zephyrarchaea mainae)*

ENVIRONMAPS t: 0406 590 006 Environmental Mapping Solutions www.environmaps.com.au

C:\GIS\Jobs\Invertebrate Solutions\Albany Wind Farm - Synergy\Figures\AWF_F01B Location of targeted field survey for Main's Assassin Spider (Zephyrarchaea mainae)_200228.mxd

Legend

- Survey Area
- Field Survey Location
- Historical Records of Main's Assassin Spider *(Zephyrarchaea mainae)*

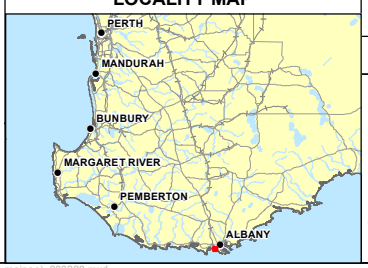
0 37.5 75 150 m

Scale: 1:5,000 @ A4

N

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY MAP



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ENVIRONMAPS	TM	TM	0

Client: Synergy

Figure 1c

Location of Targeted Field Survey for Main's Assassin Spider *(Zephyrarchaea mainae)*

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C:\GIS\Jobs\Invertebrate Solutions\Albany Wind Farm - Synergy\Figures\AWF_F01C Location of targeted field survey for Main's Assassin Spider (Zephyrarchaea mainae)_200228.mxd

Legend

- Survey Area
- Field Survey Location
- Historical Records of Main's Assassin Spider *(Zephyrarchaea mainae)*

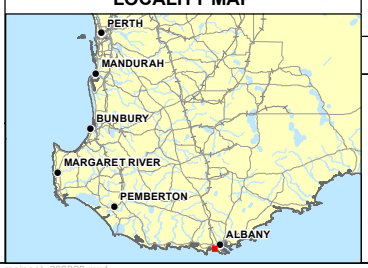
0 37.5 75 150 m

Scale: 1:5,000 @ A4

N

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY MAP



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Client: Synergy

Figure 1d

Location of Targeted Field Survey for Main's Assassin Spider *(Zephyrarchaea mainae)*

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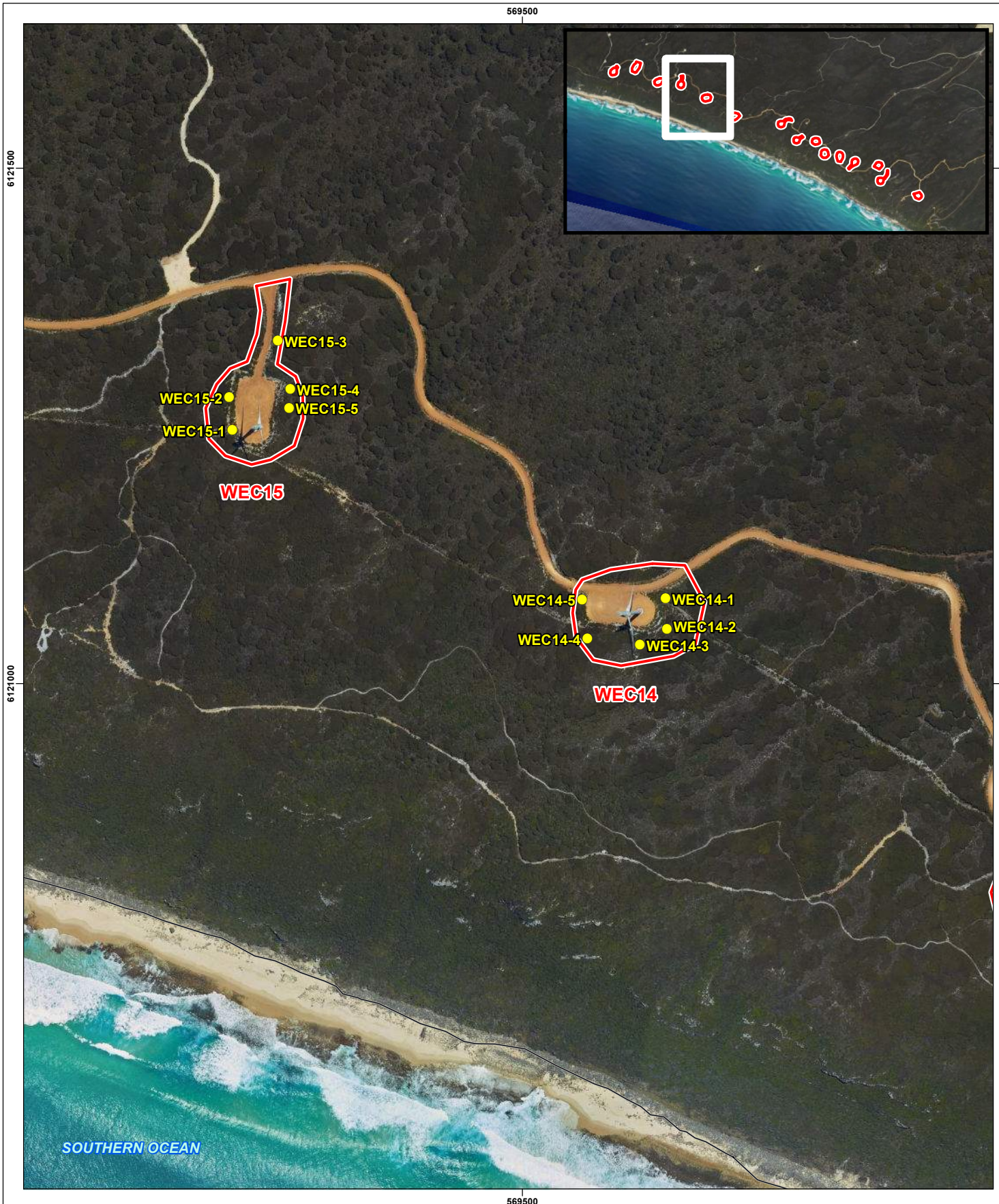
C:\GIS\Jobs\Invertebrate Solutions\Albany Wind Farm - Synergy\Figures\AWF_F01D Location of targeted field survey for Main's Assassin Spider (Zephyrarchaea mainae)_200228.mxd



Legend

- Survey Area
- Field Survey Location
- Historical Records of Main's Assassin Spider *(Zephyrarchaea mainae)*

0 37.5 75 150 m

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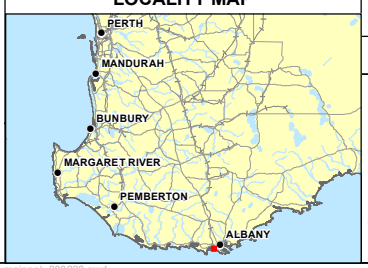

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HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

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ENVIRONMAPS	TM	TM	0

Client: Synergy

Figure 1e

Location of Targeted Field Survey for Main's Assassin Spider *(Zephyrarchaea mainae)*

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C:\GIS\Jobs\Invertebrate Solutions\Albany Wind Farm - Synergy\Figures\AWF_F01E Location of targeted field survey for Main's Assassin Spider (Zephyrarchaea mainae)_200228.mxd

Legend

- Survey Area
- Field Survey Location
- Historical Records of Main's Assassin Spider *(Zephyrarchaea mainae)*

0 37.5 75 150 m

Scale: 1:5,000 @ A4

N

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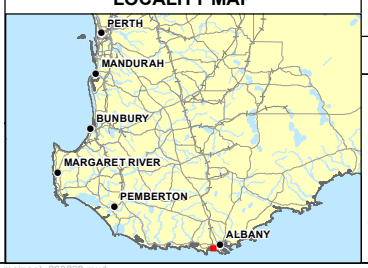

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HORIZONTAL DATUM AND PROJECTION: GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
ENVIRONMAPS	TM	TM	0

Client: Synergy

Figure 1f

Location of Targeted Field Survey for Main's Assassin Spider *(Zephyrarchaea mainae)*

ENVIRONMAPS t: 0406 590 006
Environmental Mapping Solutions www.environmaps.com.au

C:\GIS\Jobs\Invertebrate Solutions\Albany Wind Farm - Synergy\Figures\AWF_F01F Location of targeted field survey for Main's Assassin Spider (Zephyrarchaea mainae)_200228.mxd

1.4 Survey Staff Qualifications

Field sampling for *Z. mainae* was undertaken by an experienced ecologist:

- Dr Timothy Moulds *BSc (Hons) Geol., PhD. Invert. Ecol.* (Invertebrate Solutions)

Targeted sampling for *Z. mainae* was undertaken by Dr Tim Moulds under the collection licences issued by the Department of Parks and Wildlife:

- TFA 2019-0121; Licensee Dr Timothy Moulds (Invertebrate Solutions); Valid until 30/11/2020.

1.5 Report Limitations and Exclusions

This study was limited to the written scope provided to the client by Invertebrate Solutions (15th August 2019) and in Section 1.1. This study was limited to the extent of information made available to Invertebrate Solutions at the time of undertaking the work. Information not made available to this study, or which subsequently becomes available may alter the conclusions made herein. Assessment of potential impacts to SRE fauna was based on proposed development plans provided by the client.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. Invertebrate Solutions has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by Invertebrate Solutions described in this report (this section and throughout this report). Invertebrate Solutions disclaims liability arising from any of the assumptions being incorrect.

Invertebrate Solutions has prepared this report on the basis of information provided by Synergy, Eco Logical Australia Pty Ltd and others (including Government authorities), which Invertebrate Solutions has not independently verified or checked beyond the agreed scope of work. Invertebrate Solutions does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

Site conditions may change after the date of this report. Invertebrate Solutions does not accept responsibility arising from, or in connection with, any change to the site conditions. Invertebrate Solutions is also not responsible for updating this report if the site conditions change.

Field surveys for invertebrates require multiple seasonal surveys to fully record all species that may be present in an area, and in varying weather conditions. The current survey was undertaken in a single season and additional surveys at different times of the year may record additional species.

2. Methods

Invertebrate Solutions undertook the following tasks for the targeted survey of the Synergy Wind Farm Project area :

- Each site was sampled using bush beating onto a tray of thick *Agonis flexuosa* growth that is core habitat for *Z. mainae.*
- At each site five plots (~10 x 10 m) were be selected of the best available habitat whilst providing spatial distribution throughout the site.
- Each plot was beaten for 15 minutes to determine the presence of *Z. mainae*

The survey program was undertaken with regard to the Technical Guidance – Sampling of short range endemic invertebrate fauna (EPA 2016).

2.1 Targeted *Zephyrarchaea mainae* Survey Methodology

The targeted field survey was undertaken using bush beating onto a tray to determine the presence of a *Z. mainae.* The preferred habitat of *Z. mainae* is dense stands of peppermint tree (*Agonis flexuosa*) and areas of these within each wind turbine site was targeted for sampling. A total of five plots of approximately 10 m x 10 m were beaten for 15 minutes at each wind turbine site. The plots were selected to survey the best available habitat for *Z. mainae* and also provide spatial distribution at each wind turbine site. In total 75 minutes targeted searching at each of the 15 proposed clearing sites was undertaken.

Adults of *Z. mainae* are quite confidently identified in the field, however, to ensure accurate species identification a single adult male (or female if no males were recorded) from each site they were recorded was collected for voucher purposes. In the Invertebrate Solutions laboratory using a dissecting microscope, these specimens were curated and preserved in 100% ethanol and formally identified. Each specimen was kept in a separate labelled vial and assigned a specimen tracking code. Specimen and site collection data was recorded in an Excel spreadsheet. At the conclusion of the study, all specimens will be lodged at the Western Australian Museum in accordance with the permit conditions.

2.2 Survey Effort and Timing

Invertebrate Solutions completed a single season targeted SRE survey at the Albany Wind Farm Project area in December 2019. This comprised 15 sites that were surveyed in conjunction with a level 1 vertebrate fauna survey (Table 1, Appendix 1, 2). All coordinates in UTM are using datum GDA and located in Zone 50H.

Table 1 Locations of targeted field survey for Main's Assassin Spider (*Z. mainae*)

Sample Site	UTM (GDA)	Habitat	Active search effort	Sample Date
WEC02	572690 6119659	*Agonis flexuosa* and coastal heath	75 minutes	20 Dec 2019
WEC04	572243 6119935	*Agonis flexuosa* and coastal heath	75 minutes	20 Dec 2019
WEC05	572112 6120063	*Agonis flexuosa* and coastal heath	75 minutes	20 Dec 2019
WEC06	571771 6120105	*Agonis flexuosa* and coastal heath	75 minutes	20 Dec 2019
WEC07	571559 6120162	*Agonis flexuosa* and coastal heath	75 minutes	20 Dec 2019
WEC08	571340 6120245	*Agonis flexuosa* and coastal heath	75 minutes	20 Dec 2019
WEC09	571205 6120467	*Agonis flexuosa* and coastal heath	75 minutes	20 Dec 2019
WEC10	570925 6120431	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019
WEC12	570688 6120710	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019
WEC13	570006 6120829	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019
WEC14	569639 6121083	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019
WEC15	569219 6121246	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019
WEC16	568942 6121282	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019
WEC17	568605 6121526	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019
WEC18	568301 6121482	*Agonis flexuosa* and coastal heath	75 minutes	21 Dec 2019

The following specific comments are made with regard to project specific limitations for the Project:

- **Sampling effort** – The single phase survey included a total of 1,125 minutes of active searching split amongst 75 different sites at 15 different proposed clearing locations. This survey effort provides a high degree of certainty that individuals of *Z. maine* would be detected if present during the survey.
- **Timing** – The survey was undertaken in December when the species has been readily recorded in previous surveys in the area.
- **Methods** – the method of bush beating dense stands of *Agonis flexuosa* is a recognised technique for detecting *Z. mainae* and has previously been approved as an accepted method by staff of the Western Australian Museum.
- **Habitats sampled** – All significant potential habitats for *Z. mainae* within the Survey Area were sampled.
- **Access to areas** – No access issues were encountered in the survey with all areas able to be fully accessed.

3. Results

3.1 3.2 Habitat in Project Area

The vegetation units and condition mapping identified in the biological assessment (Eco Logical 2019) were used to assess the Project area for potential *Z. mainae* habitat. The Project area comprises a mosaic of Peppermint low forest (*Agonis flexuosa)*, coastal heath/limestone heath and fringing *Eucalyptus angulosa* low forest along clearing boundaries. The vegetation was observed to be in pristine to very good condition.

The majority of sites surveyed were found to have large areas of *Agonis* sp. present but mostly lacking the specific microhabitat required by *Z. mainae* of an elevated leaf-litter layer which collects amongst the crowns of the understorey plants. Sites that did provide the specific microhabitat were observed at WEC09, WEC12 and WEC14 (Figure 1, Appendix 1).

3.3 Targeted Survey Results

No individuals of *Z. mainae* were recorded from any of the 15 sites surveyed within the Albany Wind Farm Project area.

4. Discussion and Conclusions

No individuals of *Z. mainae* were recorded from any of the 15 sites surveyed within the Albany Wind Farm Project area.

Many of the survey sites were situated on geographic rises in the landscape and exposed to strong winds making them unsuitable habitat for *Z. mainae*. The previous records of *Z. mainae* from the Albany Wind Farm area (Figure 1) are situated in protected gullies providing better microhabitat for the formation of an elevated leaf-litter layer which collects amongst the crowns of the understorey plants.

No direct impacts to *Z. mainae* are anticipated form the proposed clearing around the existing wind turbines.

The following recommendation is made with regard to construction of the Project:

- No additional surveys are required to meet the EPA Technical guidance, sampling of short range endemic invertebrate fauna (EPA 2016).

5. References

EPA (2016). Technical guidance. Sampling of short range endemic invertebrate fauna. Environmental Protection Authority: Perth. 35 pp.

Framenau, V.W., Moir, M.L. & Harvey, M.S. (2008) Terrestrial Invertebrates of the south coast NRM region of Western Australia: short-range endemics in Gondwanan relictual habitats. Unpublished Report to the Southcoast Natural Resource Management Inc.

Platnick, N.I. (1991). On Western Australian *Austrarchaea* (Araneae, Archaeidae). Bulletin of the British Arachnology Society 8: 259-261.

Rix, M.G. and Harvey, M.S. (2012). Australian Assassins, Part II: A review of the new assassin spider genus Zephyrarchaea (Araneae, Archaeidae) from southern Australia. ZooKeys 191: 1–62. doi: 10.3897/zookeys.191.3070

Appendix 1

Targeted search quadrat locations

Site	UTM (GDA)	Lat/Long Decimal	Lat/Long
WEC02-1	50 H 572690 6119659	S35.06319 E117.79719	S35 03 47.5 E117 47 49.9
WEC02-2	50 H 572728 6119642	S35.06334 E117.79761	S35 03 48.0 E117 47 51.4
WEC02-3	50 H 572712 6119620	S35.06354 E117.79744	S35 03 48.7 E117 47 50.8
WEC02-4	50 H 572687 6119611	S35.06362 E117.79717	S35 03 49.0 E117 47 49.8
WEC02-5	50 H 572655 6119638	S35.06338 E117.79681	S35 03 48.2 E117 47 48.5
WEC04-1	50 H 572243 6119935	S35.06073 E117.79227	S35 03 38.6 E117 47 32.2
WEC04-2	50 H 572169 6119858	S35.06143 E117.79146	S35 03 41.1 E117 47 29.3
WEC04-3	50 H 572146 6119839	S35.06161 E117.79121	S35 03 41.8 E117 47 28.4
WEC04-4	50 H 572118 6119838	S35.06162 E117.79090	S35 03 41.8 E117 47 27.3
WEC04-5	50 H 572131 6119889	S35.06115 E117.79104	S35 03 40.2 E117 47 27.8
WEC05-1	50 H 572112 6120063	S35.05959 E117.79082	S35 03 34.5 E117 47 26.9
WEC05-2	50 H 572139 6120066	S35.05956 E117.79111	S35 03 34.4 E117 47 28.0
WEC05-3	50 H 572158 6120108	S35.05917 E117.79132	S35 03 33.0 E117 47 28.8
WEC05-4	50 H 572124 6120120	S35.05907 E117.79094	S35 03 32.7 E117 47 27.4
WEC05-5	50 H 572101 6120099	S35.05926 E117.79069	S35 03 33.3 E117 47 26.5
WEC06-1	50 H 571771 6120105	S35.05923 E117.78708	S35 03 33.2 E117 47 13.5
WEC06-2	50 H 571738 6120160	S35.05874 E117.78671	S35 03 31.5 E117 47 12.2
WEC06-3	50 H 571767 6120175	S35.05860 E117.78702	S35 03 31.0 E117 47 13.3
WEC06-4	50 H 571788 6120167	S35.05867 E117.78726	S35 03 31.2 E117 47 14.1
WEC06-5	50 H 571794 6120146	S35.05887 E117.78733	S35 03 31.9 E117 47 14.4
WEC07-1	50 H 571559 6120162	S35.05873 E117.78474	S35 03 31.4 E117 47 05.1
WEC07-2	50 H 571565 6120192	S35.05846 E117.78482	S35 03 30.5 E117 47 05.3
WEC07-3	50 H 571575 6120232	S35.05810 E117.78492	S35 03 29.2 E117 47 05.7
WEC07-4	50 H 571569 6120267	S35.05779 E117.78484	S35 03 28.0 E117 47 05.4
WEC07-5	50 H 571526 6120238	S35.05805 E117.78437	S35 03 29.0 E117 47 03.7
WEC08-1	50 H 571340 6120245	S35.05800 E117.78234	S35 03 28.8 E117 46 56.4
WEC08-2	50 H 571360 6120257	S35.05789 E117.78256	S35 03 28.4 E117 46 57.2
WEC08-3	50 H 571349 6120289	S35.05761 E117.78243	S35 03 27.4 E117 46 56.8
WEC08-4	50 H 571300 6120293	S35.05757 E117.78189	S35 03 27.2 E117 46 54.8
WEC08-5	50 H 571285 6120244	S35.05801 E117.78174	S35 03 28.9 E117 46 54.3
WEC09-1	50 H 571205 6120467	S35.05601 E117.78084	S35 03 21.6 E117 46 51.0
WEC09-2	50 H 571217 6120423	S35.05641 E117.78098	S35 03 23.1 E117 46 51.5
WEC09-3	50 H 571232 6120418	S35.05645 E117.78114	S35 03 23.2 E117 46 52.1
WEC09-4	50 H 571181 6120418	S35.05646 E117.78058	S35 03 23.2 E117 46 50.1
WEC09-5	50 H 571156 6120450	S35.05616 E117.78030	S35 03 22.2 E117 46 49.1
WEC10-1	50 H 570925 6120431	S35.05635 E117.77777	S35 03 22.9 E117 46 40.0
WEC10-2	50 H 570949 6120441	S35.05626 E117.77803	S35 03 22.5 E117 46 40.9
WEC10-3	50 H 570891 6120472	S35.05599 E117.77739	S35 03 21.6 E117 46 38.6
WEC10-4	50 H 570979 6120499	S35.05573 E117.77835	S35 03 20.6 E117 46 42.1
WEC10-5	50 H 570985 6120479	S35.05592 E117.77843	S35 03 21.3 E117 46 42.3
WEC12-1	50 H 570688 6120710	S35.05386 E117.77514	S35 03 13.9 E117 46 30.5
WEC12-2	50 H 570702 6120666	S35.05425 E117.77531	S35 03 15.3 E117 46 31.1
WEC12-3	50 H 570723 6120686	S35.05406 E117.77554	S35 03 14.6 E117 46 31.9
WEC12-4	50 H 570721 6120717	S35.05379 E117.77551	S35 03 13.6 E117 46 31.8
WEC12-5	50 H 570752 6120718	S35.05378 E117.77585	S35 03 13.6 E117 46 33.1

Site	UTM (GDA)	Lat/Long Decimal	Lat/Long
WEC13-1	50 H 570006 6120829	S35.05283 E117.76766	S35 03 10.2 E117 46 03.6
WEC13-2	50 H 569985 6120815	S35.05296 E117.76743	S35 03 10.6 E117 46 02.8
WEC13-3	50 H 569991 6120758	S35.05347 E117.76751	S35 03 12.5 E117 46 03.0
WEC13-4	50 H 570015 6120776	S35.05331 E117.76777	S35 03 11.9 E117 46 04.0
WEC13-5	50 H 570055 6120808	S35.05302 E117.76820	S35 03 10.9 E117 46 05.5
WEC14-1	50 H 569639 6121083	S35.05056 E117.76362	S35 03 02.0 E117 45 49.0
WEC14-2	50 H 569640 6121053	S35.05083 E117.76363	S35 03 03.0 E117 45 49.1
WEC14-3	50 H 569614 6121038	S35.05097 E117.76335	S35 03 03.5 E117 45 48.0
WEC14-4	50 H 569563 6121044	S35.05092 E117.76278	S35 03 03.3 E117 45 46.0
WEC14-5	50 H 569558 6121082	S35.05058 E117.76273	S35 03 02.1 E117 45 45.8
WEC15-1	50 H 569219 6121246	S35.04912 E117.75899	S35 02 56.8 E117 45 32.4
WEC15-2	50 H 569216 6121278	S35.04883 E117.75896	S35 02 55.8 E117 45 32.3
WEC15-3	50 H 569263 6121333	S35.04834 E117.75948	S35 02 54.0 E117 45 34.1
WEC15-4	50 H 569275 6121286	S35.04876 E117.75960	S35 02 55.5 E117 45 34.6
WEC15-5	50 H 569274 6121268	S35.04892 E117.75960	S35 02 56.1 E117 45 34.5
WEC16-1	50 H 568942 6121282	S35.04882 E117.75595	S35 02 55.7 E117 45 21.4
WEC16-2	50 H 568923 6121255	S35.04906 E117.75575	S35 02 56.6 E117 45 20.7
WEC16-3	50 H 568871 6121291	S35.04874 E117.75518	S35 02 55.5 E117 45 18.6
WEC16-4	50 H 568895 6121328	S35.04840 E117.75544	S35 02 54.3 E117 45 19.6
WEC16-5	50 H 568940 6121331	S35.04837 E117.75594	S35 02 54.1 E117 45 21.4
WEC17-1	50 H 568605 6121526	S35.04664 E117.75225	S35 02 47.9 E117 45 08.1
WEC17-2	50 H 568628 6121553	S35.04640 E117.75250	S35 02 47.0 E117 45 09.0
WEC17-3	50 H 568599 6121471	S35.04714 E117.75217	S35 02 49.7 E117 45 07.8
WEC17-4	50 H 568565 6121453	S35.04730 E117.75181	S35 02 50.3 E117 45 06.5
WEC17-5	50 H 568549 6121496	S35.04691 E117.75163	S35 02 48.9 E117 45 05.9
WEC18-1	50 H 568301 6121482	S35.04705 E117.74891	S35 02 49.4 E117 44 56.1
WEC18-2	50 H 568292 6121442	S35.04742 E117.74881	S35 02 50.7 E117 44 55.7
WEC18-3	50 H 568271 6121422	S35.04760 E117.74859	S35 02 51.4 E117 44 54.9
WEC18-4	50 H 568230 6121422	S35.04761 E117.74814	S35 02 51.4 E117 44 53.3
WEC18-5	50 H 568229 6121470	S35.04717 E117.74813	S35 02 49.8 E117 44 53.3

Appendix 2

Targeted Search Site Habitats

WEC02 50 H 572690 6119659	
WEC04 50 H 572243 6119935	

WEC05 50 H 572112 6120063	
WEC06 50 H 571771 6120105	

WEC07 50 H 571559 6120162	
WEC08 50 H 571340 6120245	

WEC09 50 H 571205 6120467	
WEC10 50 H 570925 6120431	

WEC12 50 H 570688 6120710	
WEC13 50 H 570006 6120829	

WEC14 50 H 569639 6121083	
WEC15 50 H 569219 6121246	

WEC16 50 H 568942 6121282	
WEC17 50 H 568605 6121526	

WEC18 50 H 568301 6121482