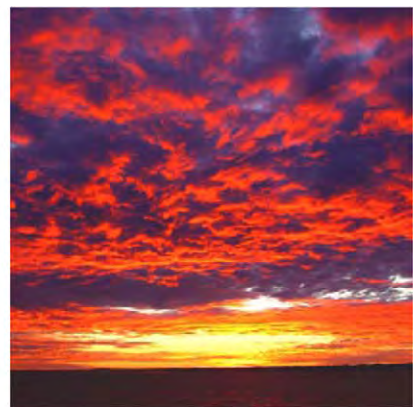


## GRACEFUL SUN MOTH SURVEY REPORT 2010

Lot 10 Marmion Avenue, Jindalee







## **GRACEFUL SUN MOTH SURVEY REPORT 2010**

**Lot 10 Marmion Avenue, Jindalee**

---

Prepared by:

**RPS**

38 Station Street, SUBIACO WA 6008  
PO Box 465, SUBIACO WA 6904

T: 618 9211 1111

F: 618 9211 1122

E: [environment@rpsgroup.com.au](mailto:environment@rpsgroup.com.au)

W: [rpsgroup.com.au](http://rpsgroup.com.au)

Prepared for:

**ESTATES DEVELOPMENT COMPANY**

49 Hampden Road  
NEDLANDS WA 6009

Report No: **L09851**

Version/Date: **Rev 0, August 2011**

**Document Status**

<b>Version</b>	<b>Purpose of Document</b>	<b>Orig</b>	<b>Review</b>	<b>Review Date</b>	<b>Format Review</b>	<b>RPS Release Approval</b>	<b>Issue Date</b>
Draft A	Draft for Client Review	JilAbe	BenHol	05.05.10	SN 05.05.10		
Draft B	Draft for Client Review		BenHol	27.05.10	SN 28.05.10		
Rev 0	Final for Issue		BenHol	29.07.11	DC 01.08.11	B. Hollyock	03.08.11

**Disclaimer**

*This document is and shall remain the property of RPS. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised copying or use of this document in any form whatsoever is prohibited.*

**TABLE OF CONTENTS****Page**

<b>1.0</b>	<b>INTRODUCTION AND SCOPE .....</b>	<b>1</b>
<b>1.1</b>	<b>Introduction .....</b>	<b>1</b>
<b>1.2</b>	<b>Scope.....</b>	<b>1</b>
<b>1.3</b>	<b>Previous Environmental Assessments.....</b>	<b>1</b>
1.3.1	Environmental Report .....	1
1.3.2	Vegetation and Flora Report.....	2
1.3.3	Fauna Assessment.....	2
<b>2.0</b>	<b>EXISTING ENVIRONMENT .....</b>	<b>3</b>
<b>2.1</b>	<b>Site Description .....</b>	<b>3</b>
<b>2.2</b>	<b>Zoning.....</b>	<b>3</b>
<b>2.3</b>	<b>Vegetation and Flora.....</b>	<b>3</b>
<b>3.0</b>	<b>GRACEFUL SUN MOTH .....</b>	<b>5</b>
<b>3.1</b>	<b>Description .....</b>	<b>5</b>
<b>4.0</b>	<b>GRACEFUL SUN MOTH SURVEY .....</b>	<b>7</b>
<b>4.1</b>	<b>Graceful Sun Moth Methodology .....</b>	<b>7</b>
<b>4.2</b>	<b>Graceful Sun Moth Survey Results.....</b>	<b>8</b>
4.2.1	Survey Day 1 – 9 March 2010.....	8
4.2.2	Survey Day 2 – 16 March 2010 .....	8
4.2.3	Survey Day 3 – 23 March 2010 .....	8
4.2.4	Survey Day 4 – 30 March 2010 .....	9
<b>4.3</b>	<b>Photographs .....</b>	<b>9</b>
<b>4.4</b>	<b>Summary .....</b>	<b>11</b>
<b>5.0</b>	<b>CONCLUSIONS.....</b>	<b>13</b>
<b>6.0</b>	<b>REFERENCE LIST .....</b>	<b>15</b>

## TABLES

(contained within report text)

Page

Table 1:	Survey Summary.....	8
Table 2:	Recordings of Graceful Sun Moth.....	11

## FIGURES

(compiled at rear of report)

Figure 1:	Site Location
Figure 2:	Extent of <i>Lomandra maritima</i>
Figure 3:	Jindee GSM Transect Locations – 9 March 2010
Figure 4:	Jindee GSM Locations – 9 March 2010
Figure 5:	Jindee GSM Transect Locations – 16 March 2010
Figure 6:	Jindee GSM Locations – 16 March 2010
Figure 7:	Jindee GSM Transect Locations – 23 March 2010
Figure 8:	Jindee GSM Transect Locations – 30 March 2010
Figure 9:	All GSM Locations

## PLATES

(contained within report text)

Page

Plate 1:	Graceful Sun Moth Number 1 (9 March 2010) .....	9
Plate 2:	Graceful Sun Moth Number 2 (9 March 2010) .....	10
Plate 3:	Graceful Sun Moth Number 3 (9 March 2010) .....	10

## APPENDICES

APPENDIX 1:	DEC Graceful Sun Moth Information Kit
-------------	---------------------------------------

## **I.0 INTRODUCTION AND SCOPE**

### **I.1 Introduction**

The Graceful Sun Moth (*Synemon gratiosa*) was listed as rare or likely to become extinct under the *Wildlife Conservation Act 1950* on 14 July 1998 and more recently was listed as “Endangered” under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 8 January 2009.

This report details the findings of the March 2010 survey season of Graceful Sun Moth for Estates Development Company’s Jindee site.

### **I.2 Scope**

RPS Environment and Planning Pty Ltd (RPS) was commissioned to undertake a Graceful Sun Moth survey for Lot 10, Marmion Avenue, Jindalee between February and April 2010.

The scope of the investigation was to:

- Survey the site for the presence of the Graceful Sun Moth using pre-planned transects based on vegetation mapping and topography.
- Record wind speed, ambient air temperature, GPS location, cloud cover percentage, and the time along transect’s routes.
- Record the location for all Graceful Sun Moth sightings/captures.
- Prepare a survey results report suitable for submission to the Department of Environment and Conservation (DEC) and the Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (DSEWPC) as required.

### **I.3 Previous Environmental Assessments**

#### **I.3.1 Environmental Report**

An Environmental Report (Metropolitan Region Scheme (MRS) Amendment, Report 3: Bush Forever Site 397: Statement of Environmental Effects) was completed by RPS in 2007 (RPS 2007) to support the proposed MRS amendment. This report describes the existing environment, the environmental opportunities and constraints for urban development over the site and recommended management measures to address impacts from a land swap over the site.

### **1.3.2 Vegetation and Flora Report**

A Level 2 Flora and Vegetation survey of the study area was undertaken in accordance with Environmental Protection Authority (EPA) Guidance No. 51 (EPA 2004) survey requirements comprising of background research, reconnaissance survey, and detailed survey (RPS 2006).

### **1.3.3 Fauna Assessment**

Bamford Consulting Ecologists undertook a fauna assessment for the site in 2005. The survey aimed to investigate the likelihood of significant species present on site, and identify any significant potential fauna habitat within the site (Bamford Consulting Ecologists 2006).



## 2.0 EXISTING ENVIRONMENT

### 2.1 Site Description

The site consists of Lot 10 Marmion Avenue, Jindalee (the site), and is located north of Quinns Rock, west of Marmion Avenue, south of Lot 9, Brighton and is bordered by the Indian Ocean to the west. The site is 112 hectares in area (Figure 1).

### 2.2 Zoning

Lot 10 has been zoned Urban under the Metropolitan Region Scheme since the 1980s. To enable the development of the coastal village of Jindalee a land swap of coastal reserve land for inland Regional Open Space was proposed. A MRS amendment for the land swap was referred to the EPA for assessment in March 2008. The EPA assessed the proposed MRS amendment for Jindalee in May 2008. Under Section 48a of the *Environmental Protection Act 1986* (EP Act) the site was given “Scheme Amendment Not Assessed – Advice Given” level of assessment. It was endorsed by the Western Australian Planning Commission and the MRS now, in addition to Lot 10, zones a portion of the former coastal reserve adjacent to the site as “Urban” with land around Trigg Hill zoned as “Regional Open Space” (WAPC 2010).

The City of Wanneroo’s Town Planning Scheme (TPS) zones the site as “Urban Development”. However, in order for development to commence the TPS must be amended to change the zoning to “Residential”. This amendment is being progressed.

### 2.3 Vegetation and Flora

The vegetation and flora survey undertaken for the site was undertaken by RPS in 2006. The vegetation mapping undertaken as part of this survey indicates that the site has two vegetation units that contain *Lomandra* species, they are:

- **AsISg:** *Acacia saligna*, *Spyridium globulosum*, *Olearia axillaris* Shrubland/Open Shrubland over *Pelargonium capitatum*, *Melaleuca systema* Open Low Heath over *Lomandra maritima* Sedgeland.

This unit occurs on slopes in the current regional open space and the proposed regional open space located in the eastern portion of the site. Examination of aerial photography shows it is common on slopes throughout Lot 10.

- **XpAs:** *Xanthorrhoea preissii*, *Spyridium globulosum*, *Acacia saligna* Tall Open Scrub/Open Heath over *Leucopogon propinquus*, *Melaleuca systema* Open Shrubland over *Lomandra maritima*, *Lepidosperma squamatum* Open Sedgeland.

This unit occurs in the proposed Regional Open Space located within the eastern portion of the site. Plot Jin4.

- The presence of *Lomandra maritima* in these two vegetation units totals approximately 65% of the site. See Figure 2.

### 3.0 GRACEFUL SUN MOTH

#### 3.1 Description

The Graceful Sun Moth (*Synemon gratiosa*) is endemic to Western Australia and was thought to be found on the Swan Coastal Plain, between Wanneroo and Mandurah. It is a small diurnal (daytime) flying moth. It grows to roughly 25–80 mm in wingspan and has clubbed antennae. Adults are active (fly) during the day in the breeding season (mid February to mid April). The Graceful Sun Moth is camouflaged when settled, showing only black-brown forewings wings. The bright orange/yellow hind wings are exposed when flying (DEWHA 2009, DEWHA 2008 and Common 1990). Males are smaller than the females having an average wingspan of 20 mm while the females have an average wingspan of 32 mm.

The Graceful Sun Moth has a one to two year life cycle (McNamara 2009). Eggs are laid at the base of two *Lomandra* species; *Lomandra maritima* and *Lomandra hermaphrodita*. The Graceful Sun Moth is believed to not disperse across unsuitable habitat, rarely dispersing more than a few hundred metres during their lifetime (Williams 2003). The larvae (caterpillars) hatch and live entirely within the roots of the plants. Adults are active for a short period of time, usually two to ten days (DEC 2009a and b).

Graceful Sun Moth males establish small territories in relatively open areas. They are known to occur along tracks. They are thought to not travel far from their small established territories. Females are thought to practise male avoidance behaviour after mating.

This page is intentionally blank.

## 4.0 GRACEFUL SUN MOTH SURVEY

### 4.1 Graceful Sun Moth Methodology

In November 2009, The DEC released a set of guidelines for surveying and capturing the Graceful Sun Moth to determine the presence of the Graceful Sun Moth on sites within its known habitat range.

The DEC recommended survey methodology (Appendix I) is based on the standard butterfly walk transect method. This survey methodology is recommended and endorsed by the DEC (Pollard and Yates 1993). The recommended DEC methodology can be summarised as follows:

- Surveys must be conducted between late February and early April.
- Graceful Sun Moth favour tracks and firebreaks as well as peaks of ridges of sand dunes, surveys should focus on these areas where possible.
- Surveys must be undertaken in warm sunny weather, it is recommended surveys are conducted between the hours of 10.00 am and 3.00 pm.
- Surveys should be undertaken in winds less than 18 km/hr.
- Due to the difficulty to detect Graceful Sun Moth, surveys must be conducted at least four times (four different days) to determine if Graceful Sun Moth is present.

Transect routes were determined using aerial imagery, vegetation maps, location of tracks and firebreaks, major vegetation types and landforms. This information was used to ensure that potential habitat areas were included in the chosen transects and surveyed. The DEC endorsed the mapped transect routes prior to commencing the surveys.

Transect routes were walked at a steady pace. All flying moths were recorded within a 5 metre radius. All transects were divided up into 100 metre sections. The following environmental parameters were recorded every 100 metres along a transect as well as when a Graceful Sun Moth was identified;

- Date of survey.
- Name and number of observers.
- Air temperature.
- Wind speed.
- GPS coordinates.
- Estimate of cloudiness (percentage).
- Time of transect (start and finish).
- Number of GSM recorded in the sector.

## 4.2 Graceful Sun Moth Survey Results

The DEC survey methodology was carried out and four separate surveys, a week apart were undertaken on 9, 16, 22 and 30 March 2010. Below is a table summarising survey dates and survey parameters.

**Table 1: Survey Summary**

Survey	Survey Date	Wind Speed (km/hr)	Temp (°C)	Cloud (%)	Time	GSM
1	9 March 2010	6.1–28.3	27–31.5	5–40	9.21–13.24	20
2	16 March 2010	1.8–27	22–28.5	5–40	9.35–13.33	15
3	23 March 2010	3.6–19	25–34	50–80	11.02–14.19	0
4	30 March 2010	0.3–16.2	27.5–30.5	30–40	12.58–15.05	0

### 4.2.1 Survey Day 1 – 9 March 2010

The Graceful Sun Moth Survey commenced on 9 March 2010. Transects were predetermined on the basis of vegetation and the presence of *Lomandra maritima*, presence of cleared tracks, topography, and the distance of transects required for the site based on the recommended length by the DEC. *Lomandra hermaphrodita* was not recorded at this site.

Figure 3 shows the transect lines that were undertaken on 9 March 2010. A total of 20 Graceful Sun Moths were recorded (Figure 4).

### 4.2.2 Survey Day 2 – 16 March 2010

The second survey day was conducted on 16 March 2010. The survey team attempted to follow the previous transects as much as possible with some slight variations due to site conditions and timing.

Figure 5 shows the transects that were undertaken on 16 March 2010. A total of 15 Graceful Sun Moths were recorded. The location of the Graceful Sun Moth locations is shown in Figure 6.

### 4.2.3 Survey Day 3 – 23 March 2010

The third survey was conducted on 23 March 2010. The survey team attempted to follow the previous transects as much as possible from Day 1 and Day 2.

Figure 7 shows the transects that were undertaken on 23 March 2010. No Graceful Sun Moths were found.

#### 4.2.4 Survey Day 4 – 30 March 2010

The final survey day was conducted on 30 March 2010. The survey team followed previously mapped transect routes.

Figure 8 shows the transects that were undertaken on 30 March 2010. No Graceful Sun Moths were found.

### 4.3 Photographs

In most cases, Graceful Sun Moth, captured or flying display erratic behaviour and therefore make still photography difficult. Some images were obtained for some specimens. Images were taken on the first survey day (9 March 2010) (see Plates 1–3).



**Plate 1: Graceful Sun Moth Number 1 (9 March 2010)**





**Plate 2: Graceful Sun Moth Number 2 (9 March 2010)**



**Plate 3: Graceful Sun Moth Number 3 (9 March 2010)**



## 4.4 Summary

A total of 35 Graceful Sun Moths were recorded over the four survey days. Table 2 shows the location and the parameters for each Graceful Sun Moth. Figure 9 shows the location of all Graceful Sun Moths recordings and transects for the survey period overlaid by the proposed Structure plan design.

**Table 2: Recordings of Graceful Sun Moth**

Survey Date	Location		Number of GSM observed	Wind Speed (Km/hr)	Temp. (°C)	Cloud Cover (%)
	Northing	Easting				
9 March 2010	375356	6498576	1	17.1	32.5	15
9 March 2010	375574	6498623	1	7.6	34	15
9 March 2010	375632	6498669	1	8.4	34	10
9 March 2010	375660	6498839	4	16	30.5	35
9 March 2010	375582	6498846	2	14.6	30.5	30
9 March 2010	375361	6498739	1	11	32	30
9 March 2010	375305	6498821	1	15	33	20
9 March 2010	375264	6498860	2	10.6	33	20
9 March 2010	375130	6498712	1	19.7	35	20
9 March 2010	375075	6498348	2	23.5	33	15
9 March 2010	375279	6498213	2	11.4	36	15
9 March 2010	375502	6498314	1	6.6	36.5	10
9 March 2010	375587	6498312	1	10.9	35	10
16 March 2010	375616	6498317	1	3.2	26	25
16 March 2010	375121	6498721	1	6.1	26	25
16 March 2010	374938	6498842	1	24.8	23	40
16 March 2010	375527	6498826	2	20.5	23.5	30
16 March 2010	375580	6498845	1	17.2	24	30
16 March 2010	375666	6498846	1	20.1	23.5	30
16 March 2010	375420	6498023	2	10.4	25	5
16 March 2010	375713	6498273	1	3.6	28	5
16 March 2010	375055	6497971	2	13.6	25	5
16 March 2010	374720	6498564	2	18.7	24	5
16 March 2010	374674	6498635	1	20.8	23.5	5

This page is intentionally blank.

## 5.0 CONCLUSIONS

A Graceful Sun Moth survey was undertaken for Lot 10, Marmion Avenue, Jindalee. A total of 35 Graceful Sun Moths were recorded over the four survey days. The recordings indicate that the Graceful Sun Moth populations are scattered throughout the site and are found along the dune ridges traversing the site.

This page is intentionally blank.

## 6.0 REFERENCE LIST

- Bamford Consulting Ecologists. 2006. Jindee Fauna Assessment. Bamford Consulting Ecologists, Perth.
- Common, I.F.B. 1990. Moths of Australia. Melbourne University Press, Melbourne.
- Department of Environment and Conservation. 2009a. Graceful Sun Moth Fact Sheet. Department of Environment and Conservation, Perth.
- Department of Environment and Conservation. 2009b. Graceful Sun Moth Information Kit and Survey Methods. Department of Environment and Conservation, Perth.
- Department of Environment, Water, Heritage and the Arts. 2008. Approved Conservation Advice for *Synemon gratioiosa* (Graceful Sun Moth). Department of Environment, Water, Heritage and the Arts, Canberra.
- Department of Environment, Water, Heritage and the Arts. 2009. Advice to the Minister for the Environment, heritage and the Arts from the Threatened Species Scientific Committee (the Committee) on Amendments to the list of Threatened Species under the *Environment Protection and Conservation Biodiversity Act 1999*. Department of Environment, Water, Heritage and the Arts, Canberra.
- Environmental Protection Authority. (2004). *Terrestrial flora and vegetation surveys for Environmental Impact Assessment in Western Australia*. Guidance for the Assessment of Environmental Factors No. 51. Perth, Western Australia.
- McNamara, K. 2009. Brighton Development – Graceful Sun Moth. Letter regarding moth surveys on the Swan Coastal Plain.
- Pollard, E. and Yates, T.J. 1993. Monitoring butterflies for ecology and conservation. Chapman & Hall, London, UK.
- RPS Bowman Bishaw Gorham. 2006. Lot 10 Jindee Vegetation and Flora Survey. RPS Environment, Perth.
- RPS. 2007. MRS Amendment, Report 3: Bush Forever Site 397: Statement of Environmental Effects. Prepared by RPS.
- WAPC. 2010. Metropolitan Region Scheme Maps and Publications. <http://www.planning.wa.gov.au/The+planning+system/Mapping/MRS+maps/default.aspx>
- Williams, M. 2003. Effect of fire on butterflies. *Western Wildlife*. 7(4):1 and 4.

This page is intentionally blank.