



5066 Western Highway, Beaufort :
Targeted Golden Sun Moth survey

DRAFT REPORT

Prepared for Satterley Property Group

12 March 2020

Biosis offices

NEW SOUTH WALES

Albury

Phone: (02) 6069 9200
Email: albury@biosis.com.au

Newcastle

Phone: (02) 4911 4040
Email: newcastle@biosis.com.au

Sydney

Phone: (02) 9101 8700
Email: sydney@biosis.com.au

Western Sydney

Phone: (02) 9101 8700
Email: westernsydneyoffice@biosis.com.au

Wollongong

Phone: (02) 4201 1090
Email: wollongong@biosis.com.au

VICTORIA

Ballarat

Phone: (03) 5304 4250
Email: ballarat@biosis.com.au

Melbourne (Head Office)

Phone: (03) 8686 4800
Email: melbourne@biosis.com.au

Wangaratta

Phone: (03) 5718 6900
Email: wangaratta@biosis.com.au

Document information

Report to: Satterley Property Group

Prepared by: Debbie Cargill

Biosis project no.: 31333

File name: 31333.Satterley.Beaufort.GSM.DFT01.20200312

Citation: Biosis 2020. 5066 Western Highway, Beaufort: Targeted Golden Sun Moth survey. Report for Satterley Property Group. Authors: Cargill, D. Biosis Pty Ltd, Melbourne. Project no. 31333

Document control

Version	Internal reviewer	Date issued
Draft version 01	SGM	12/03/2020
Final version 01	SGM	26/03/2020

Acknowledgements

Biosis acknowledges the contribution of the following people and organisations in undertaking this study:

- Satterley Property Group: Andrew Jones
- Department of Environment, Land, Water and Planning for access to the Victorian Biodiversity Atlas and Native Vegetation Information Tools

Biosis staff involved in this project were:

- Jack Fursdon, Erin Baldwin, Kristin Campbell, Rose Baulch & Frances Walpole (assistance in the field)
- Julian Turner, Jason Prasad (mapping)

© Biosis Pty Ltd

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

Disclaimer:

Biosis Pty Ltd has completed this assessment in accordance with the relevant federal, state and local legislation and current industry best practice. The company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report content or for any purpose other than that for which it was intended.

Contents

1. Introduction	1
1.1 Project background	1
1.2 Objectives	1
2. Methods	3
2.1 Golden Sun Moth survey	3
2.2 Weather Conditions	3
2.3 Permits	3
2.4 Qualifications	4
3. Results and Discussion	6

Tables

Table 1 Golden Sun Moth survey details	7
--	---

Figures

Figure 1 Location of the study area, Victoria, and Golden Sun Moth survey effort	2
Figure 2 Golden Sun Moth survey records	5

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by Satterley Property Group (herein after referred to as 'Satterley') to undertake a targeted survey for the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed Golden Sun Moth *Synemon plana* (GSM). A property at Beaufort has been identified as one of the potential offset sites for impacts to GSM associated with the Lindum Vale residential development at 1960 and 2040 Mickleham Road, Mickleham (Referral 2015/7516).

The study area is located at one of the offset sites for the development at 5066 Western Highway, Beaufort (Lot 4A PS727373), which is approximately 51 kilometres west of Ballarat and 166 kilometres west of Melbourne central business district (Figure 1). It encompasses 142.1 hectares of private land (Figure 1), located within the Pyrenees Shire, is zoned as farming zone (FZ) and has a bushfire management overlay (BMO). The western portion of the study site has a restructure overlay (RO).

A previous GSM survey, undertaken between 5th November and 1st December 2018 by Ecocentric Environmental Consulting (Ecocentric Environmental Consulting 2019) found >1100 individual GSM present on site over four surveys although these were not conducted in a systematic manner.

This report presents the results of a targeted survey for GSM during the 2019-2020 survey season. The survey was conducted to confirm the suitability of the property as a potential offset site for EPBC Act offset requirements associated with GSM. The findings of this assessment will be used to inform the development of the 5066 Western Highway, Beaufort: GSM Offset Management Plan (Biosis 2020a) for Satterley.

1.2 Objectives

The objectives of the GSM survey are to:

- Determine the presence/absence of GSM in the study area
- Record the location and number of any GSM recorded
- Provide a summary of all GSM observations within the study area
- Present the results of the survey program, weather conditions on survey days, survey method and habitat characteristics of the study area
- To inform the development of the 5066 Western Highway, Beaufort GSM Offset Management Plan (Biosis 2020) for Satterley.

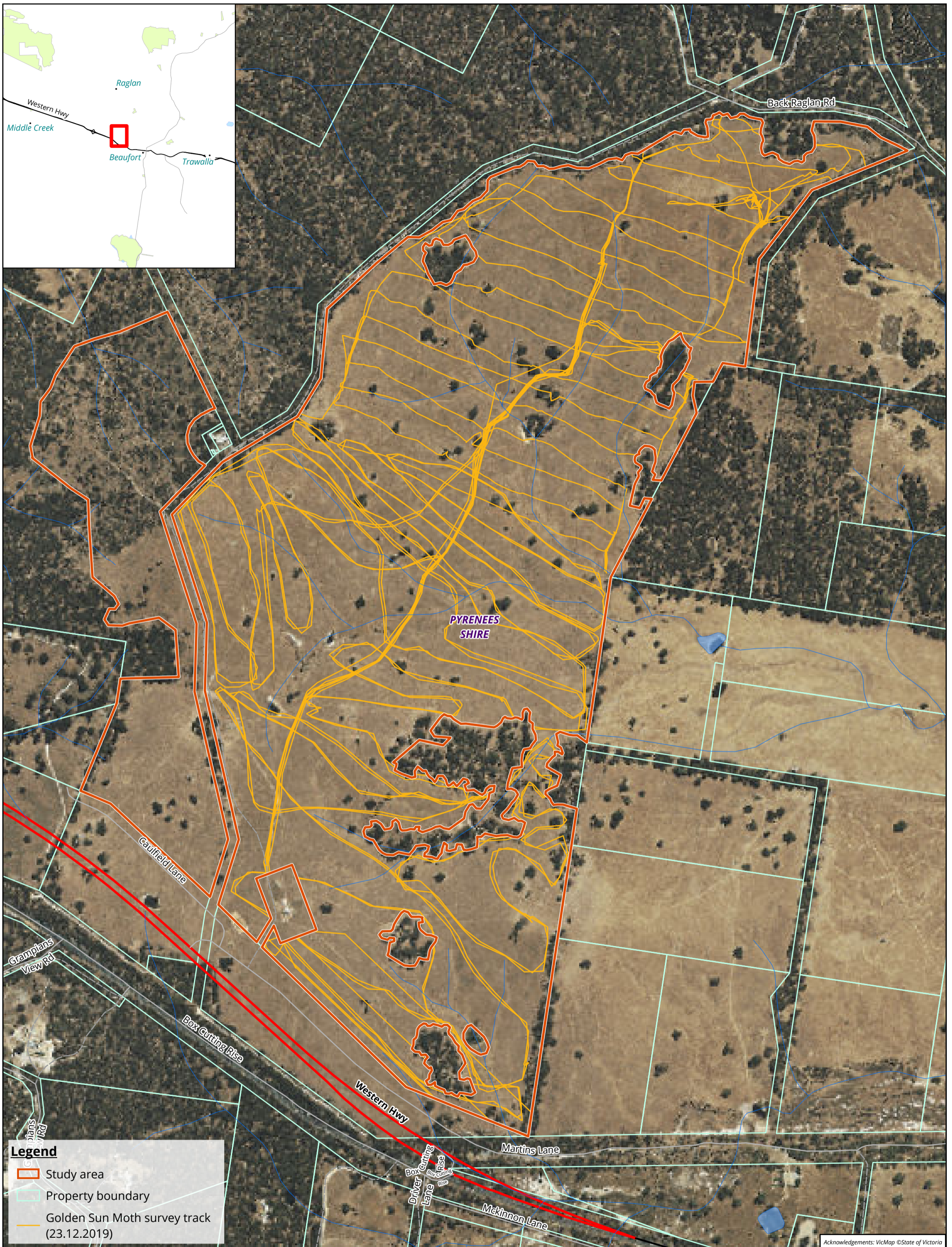


Figure 1 Golden Sun Moth survey effort, 2019/2020 survey season, Beaufort



0 50 100 150 200 250
 Metres
 Scale 1:6,500 @A3
 Coordinate system: GDA 1994 VICGRID94

Layout: 31333_F1_GSM_Tracks_Beaufort
 Matter: 31333, Date: 11/03/2020 2:27 PM
 Checked by: MJ, Drawn by: JSP, Last edited by: jprasad
 Location: Q:\Vic Data\WATS\GSM\GSM_Biosis_DataMgt\GSM_Biosis_DataMgt.aprx

2. Methods

2.1 Golden Sun Moth survey

A targeted survey was undertaken during the 2019 flight season for GSM. As the timing of the flight season varies annually and geographically, commencement of the flight season needed to be determined before a survey could be undertaken.

1.1.1 Determining flight season commencement

The best indicator of the key survey period for GSM is the presence of flying males at known local sites. Pre-season checks were undertaken by Biosis and other ecological consultants at various known sites (reference sites) around Melbourne from late October to collaboratively determine the commencement of the GSM flight season for 2019. GSM began being reliably recorded flying at a known reference site (Broadmeadow Valley park) from 20 November 2019.

1.1.2 Targeted survey

A survey was undertaken in accordance with the *Significant Impact Guidelines for the Critically Endangered Golden Sun Moth* (DEWHA 2009).

Areas identified as potential GSM habitat in the subject area were surveyed. The survey was undertaken on 23 December 2019. The survey was undertaken during conditions that were suitable for male flight (generally >20°C, bright, clear days, full sun, absence of rain and wind other than a light breeze) between 10:00 hrs and 15:00 hrs (see Table 1 for weather data for days on which survey was undertaken).

The site was surveyed systematically by a qualified and experienced observer walking the site in a series of transects spaced approximately 50 metres apart. Tracks were recorded using a Garmin GPS or ArcGIS Runtime SDK Tracker App on mobile or tablet devices (Figure 1).

A site condition assessment was undertaken on 17 December 2019 by Stephen Mueck (accredited DELWP vegetation quality assessor HH173 – current until 19/4/2020), to quantify the extent and condition of GSM habitat on the site (Biosis 2020b).

2.2 Weather Conditions

Weather conditions, including temperature, humidity and wind speed were measured on site using a Kestrel Weather Meter (Model 4000). Weather data collected on site is provided in Table 1.

2.3 Permits

Biosis undertakes flora and fauna assessments under the following permits and approvals:

- Research Permit/Management Authorisation and Permit to Take Protected Flora & Protected Fish issued by DELWP under the *Wildlife Act 1975*, *Flora and Fauna Guarantee Act 1988* and *National Parks Act 1975* (Permit number 10008711).
- Approvals 30.17 and 19.18 from the Wildlife and Small Institutions Animal Ethics Committee.

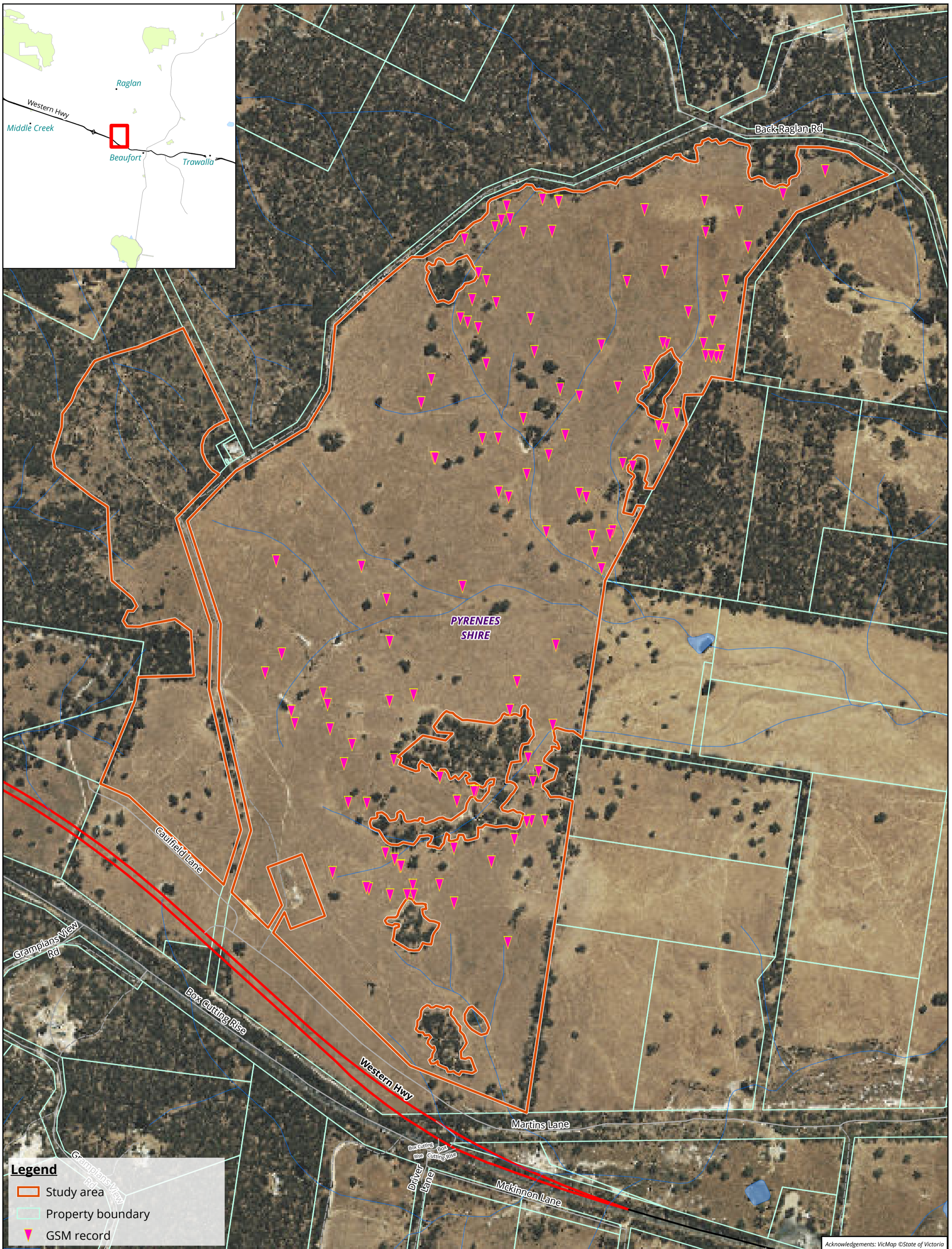
All GSM records will be submitted to DELWP for incorporation into the Victorian Biodiversity Atlas, in accordance with permit conditions.

2.4 Qualifications

The difficulty in determining presence/absence of GSM within a given area is well documented, and it is known that emergence patterns in this species can vary markedly within and between seasons (Gibson & New 2007).

However, to account for the difficulties associated with the GSM survey to the greatest extent possible, the survey was undertaken on a day within the confirmed flight season and on days when GSM were observed flying at reference sites around Melbourne. For further information regarding the limitations associated with GSM surveys see Gibson and New (2007).

The current GSM assessment was conducted late in the 2019/20 flight season, which is an optimal time for survey. The survey was conducted at the appropriate time and during suitable conditions when GSM were flying at the survey site. One targeted survey to detect the presence of the GSM was undertaken as the need to survey this site was identified late in the survey season. The significant impact guidelines for the GSM (DEWHA 2009) require an effort of four surveys within a flying season, although this is to prove absence. However, previous surveys of the site at 5066 Western Highway, Beaufort, were undertaken on four separate days over the 2018 flying season. These surveys recorded >400, >312, 257 and 191 individual GSM on the survey days, indicating the site supports the species and its habitat to a sufficient extent to be used as an offset site for the Lindum Vale residential development at 1960 and 2040 Mickleham Road, Mickleham (Referral 2015/7516)



Legend

- Study area
- Property boundary
- ▼ GSM record

Acknowledgements: VicMap ©State of Victoria

Figure 2 Golden Sun Moth (GSM) survey records, 2019/2020 survey season, Beaufort



0 50 100 150 200 250

 Metres
 Scale 1:6,843 @A3
 Coordinate system: GDA 1994 VICGRID94
 Layout: 31333_F2_GSM_Records_Beaufort
 Matter: 31333, Date: 11/03/2020 2:28 PM
 Checked by: MJ, Drawn by: JSP, Last edited by: jprasad
 Location: Q:\Vic Data\WATS\GSM\GSM_Biosis_DataMgt\GSM_Biosis_DataMgt.aprx

3. Results and Discussion

DELWP mapping of ecological vegetation classes (EVCs) indicates the pre-1750 vegetation of the site was dominated by Heathy Dry Forest (EVC 20) with central areas identified as a complex of Grassy Woodland (EVC 175) and Heathy Dry Forest. The site does not support any current wetlands as defined by DELWP mapping. The property drains from west to east and is dissected by three headwater sub-catchments and includes about six small farm dams.

A habitat condition assessment was undertaken on 17 December 2019 (Biosis 2020b). An overview summary of the findings are presented here, focusing on species indicative of GSM habitat. The site supports a scattered cover of small patches of eucalypts and individual trees and an open shrub cover of scattered wattles *Acacia* species. The ground cover is typically grassy and mostly dominated by native grasses, some of which are known or suspected GSM food plants, such as Wallaby-grasses *Rytidosperma* spp., and Spear-grasses *Austrostipa* species.

The site supports an average cover of weeds estimated at between 20% and 30%, although the more elevated areas in the west support a cover of weeds approaching 50%. The weediest areas in the west have a relatively high cover (i.e. up to 50%) of Sheep Sorrel *Acetosella vulgaris*. This likely reflects the grazing history of the site with sheep tending to camp in these elevated sites. The site lacks Chilean Needle Grass *Nassella neessiana* and none of the weeds present are known food plants for the GSM.

GSM were observed during the targeted survey, on the single day the survey was undertaken. A total of 162 individual GSM were recorded on 23 December 2019 (Table 1). This provides a density of 1.14 animals observed per hectare for one survey. Through an agreed protocol with the Department of Agriculture, Water and the Environment (DAWE) this translates to 4.56 animals per hectare over four surveys.

Previous surveys undertaken over four separate days in 2018 recorded >1100 individual GSM present on site (Ecocentric Environmental Consulting 2019). This translates to 8.16 animals per hectare over four surveys.

The survey results and past surveys indicate the presence of a widespread and significant population of the species at the site. The survey was undertaken at an appropriate time and during suitable conditions and on days when GSM had begun flying at other sites around Melbourne and Geelong, and were flying at the survey site. The habitat condition assessment, the current survey results, and the 2018 survey results (Ecotone Environmental Consulting 2019) confirm the suitability of this property as an offset site for EPBC Act offset requirements associated with impacts to GSM at Lindum Vale.

The results of this assessment will be used to inform the GSM Offset Management Plan at 5066 Western Highway, Beaufort as one of the potential offset sites for EPBC Act offset requirements to manage GSM impacts associated with the Lindum Vale development.

Table 1 Golden Sun Moth survey details

Date	Time Start	Time Finish	Observer initials	Golden Sun Moth observed on site?	Number of moths recorded	Temp (on site °C)	Cloud cover (%)	Wind direction	Average wind speed (km/hr)	Ground conditions	Humidity (%)	Reference Site
23/12/2019	12:34	14:30	SMB, JF, MLH, DB, WR	Yes	162	26.9 - 28	100 - 5	SSW	4.3 - 7.4	Dry	28.3 - 21	Known from site

References

Biosis 2020. *Beaufort: Golden Sun Moth Offset Management Plan*. Authors: Mueck, S. Biosis Pty Ltd. Project no. 31333.

DEWHA 2009. *Significant impact guidelines for the critically endangered golden sun moth (Synemon plana)*. Nationally threatened species and ecological communities EPBC Act policy statement 3.12, Australian Government Department of the Environment, Water, Heritage, and the Arts. Canberra, ACT.

Ecocentric Environmental Consulting 2019. *Proposed offset site for Golden Sun Moth (Synemon plana): 5066 Western Highway, Beaufort, Australia (Lot 4A PS727373)*. Report prepared for Bush Blocks Pty Ltd. Ecological Environmental Consulting, North Melbourne, Australia.

Gibson L & New TR 2007. Problems in studying populations of the golden sun-moth, *Synemon plana* (Lepidoptera: Castniidae), in south-eastern Australia, *Journal of Insect Conservation*, **11(3)**: 309–313.

Biosis 2020. *Offset site report: condition of the Golden Sun Moth offset site, 5066 Western Highway, Beaufort, 3373*. Letter report to Satterley Property Group. 13 February 2020. Authors: Mueck, S. Biosis Pty Ltd. Project no. 31333.